

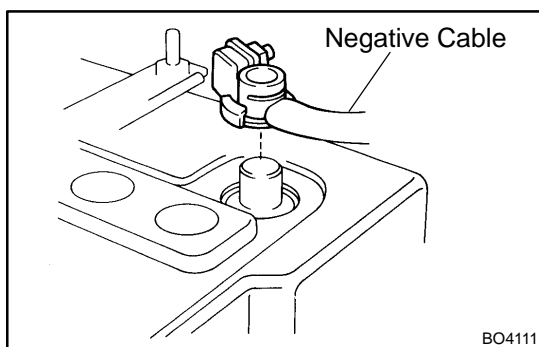
## FOR ALL OF VEHICLES PRECAUTION

IN0JF-01

### 1. FOR VEHICLES EQUIPPED WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

- (a) The LAND CRUISER is equipped with an SRS (Supplemental Restraint System), such as the driver airbag, front passenger airbag assembly and seat belt pretensioner. Failure to carry out service operations in the correct sequence could cause the supplemental restraint system to unexpectedly deploy during servicing, possibly leading to a serious accident.

Further, if a mistake is made in servicing the supplemental restraint system, it is possible the SRS may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in this manual.



### (b) GENERAL NOTICE

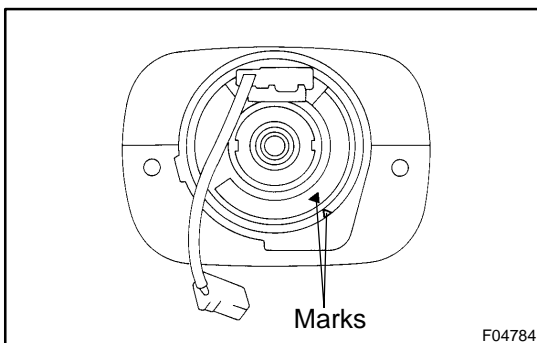
- (1) Malfunction symptoms of the supplemental restraint system are difficult to confirm, so the diagnostic trouble codes become the most important source of information when troubleshooting. When troubleshooting the supplemental restraint system, always inspect the diagnostic trouble codes before disconnecting the battery (See page [DI-692](#)).

- (2) Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

(The supplemental restraint system is equipped with a back-up power source so that if work is started within 90 seconds of disconnecting the negative (-) terminal cable from the battery, the SRS may deploy.)

When the negative (-) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by the each memory system. Then when work is finished, reset the clock and audio systems as before. To avoid erasing the memory of each memory system, never use a back-up power supply from another battery.

- (3) Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly and seat belt pretensioner should be inspected (See page [RS-18](#), [RS-32](#), [RS-47](#), [RS-60](#) and [BO-143](#)).
- (4) Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- (5) Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- (6) Never disassemble and repair the airbag sensor assembly, steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly or seat belt pretensioner in order to reuse them.
- (7) If the airbag sensor assembly, steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly or seat belt pretensioner have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- (8) Do not directly expose the airbag sensor assembly, steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly or seat belt pretensioner to hot air or flames.
- (9) Use a volt/ohmmeter with high impedance (10 k $\Omega$ /V minimum) for troubleshooting of the electrical circuit.
- (10) Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
- (11) After work on the supplemental restraint system is completed, check the SRS warning light (See page [DI-692](#)).



- (c) SPIRAL CABLE (in Combination Switch)  
 The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, otherwise cable disconnection and other troubles may result. Refer to [SR-37](#) of this manual concerning correct steering wheel installation.



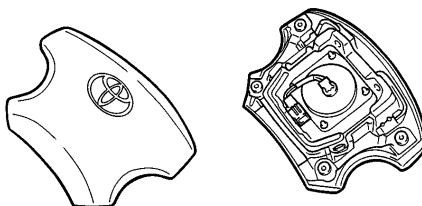
## (d) STEERING WHEEL PAD (with Airbag)

- (1) When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.  
Storing the pad with its metallic surface facing upward may lead to a serious accident if the airbag inflates for some reason. In addition do not store a steering wheel pad on top of another one.
- (2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)
- (3) Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.
- (4) Store the steering wheel pad where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the steering column near the combination switch connector before starting work.
- (6) When disposing of a vehicle or the steering wheel pad alone, the airbag should be deployed using an SST before disposal (See page [RS-20](#)). Carry out the operation in a safe place away from electrical noise.

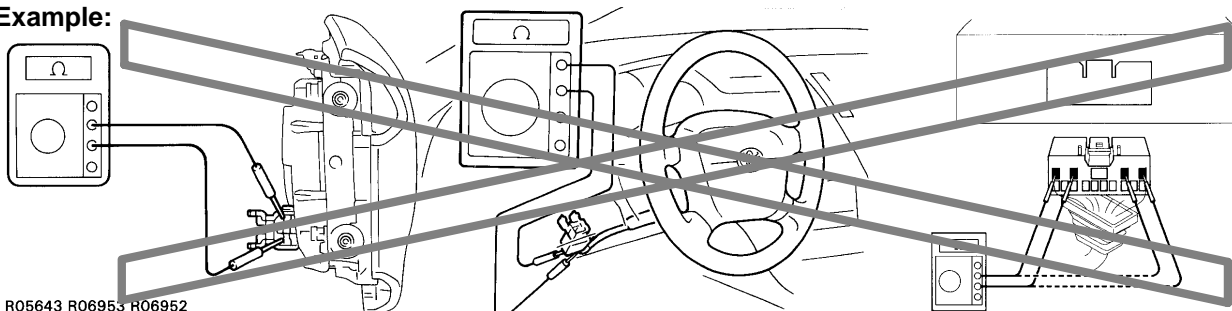
**Example:**

Correct ○

✗ Wrong



B09710

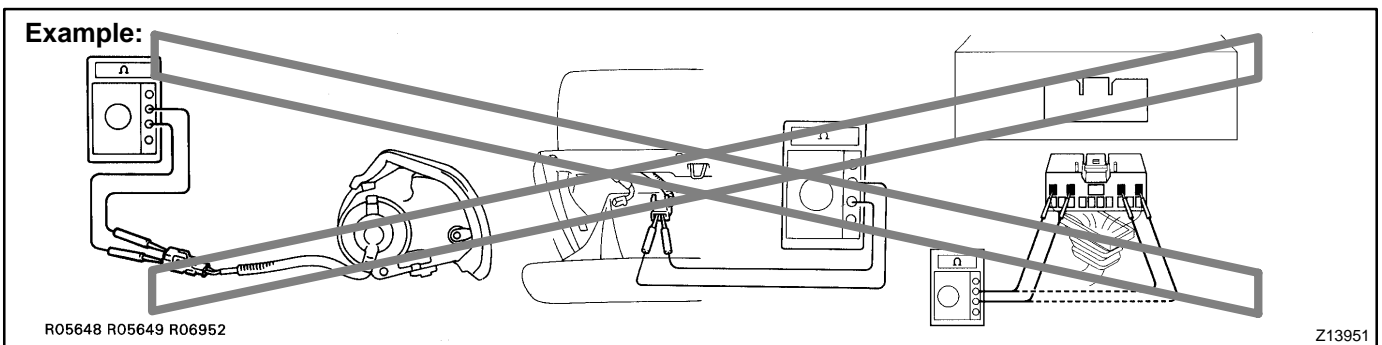
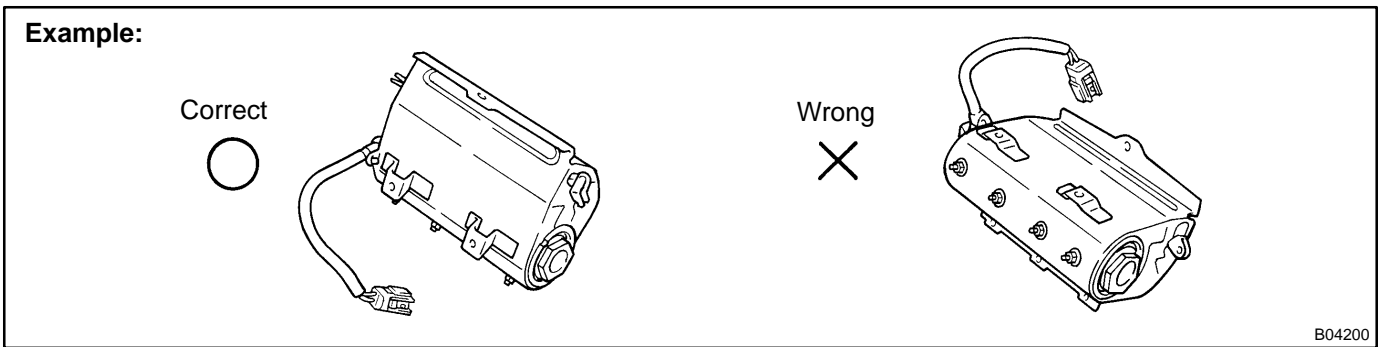
**Example:**

R05643 R06953 R06952

Z13950

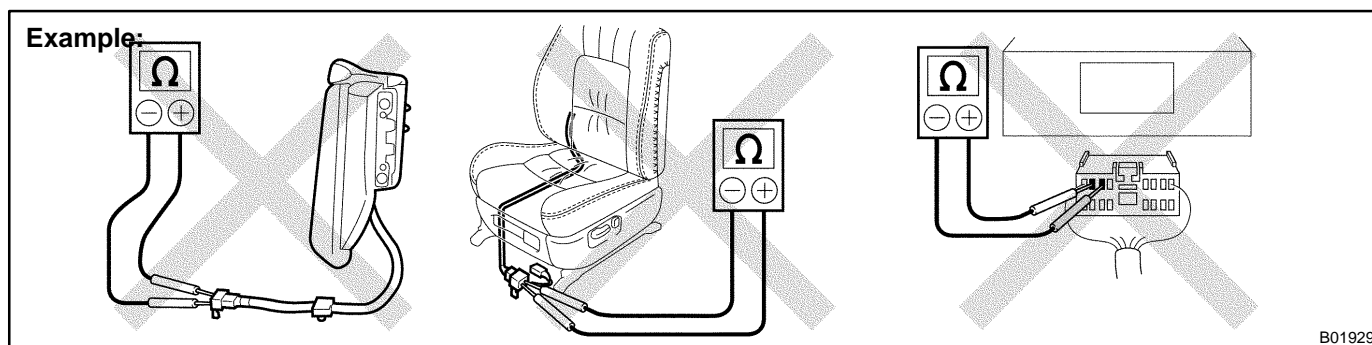
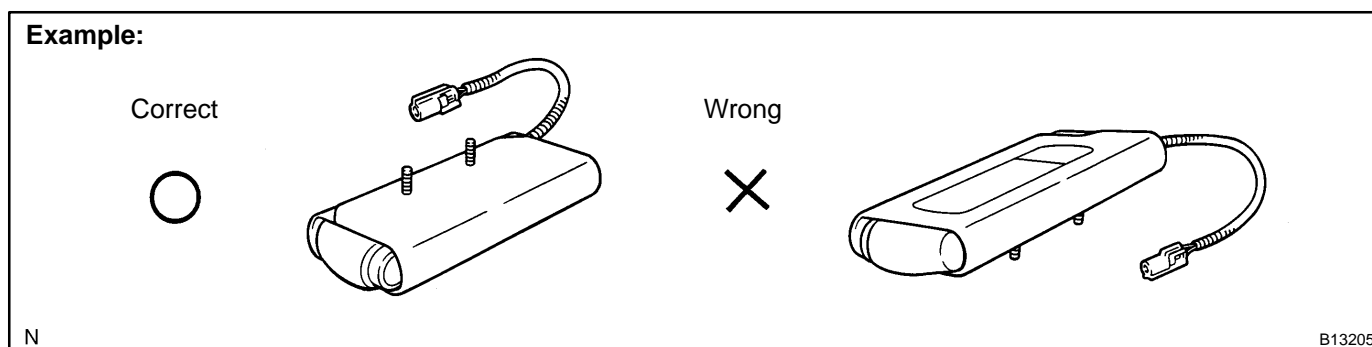
(e) FRONT PASSENGER AIRBAG ASSEMBLY

- (1) Always store a removed or new front passenger airbag assembly with the airbag deployment direction facing up.  
Storing the airbag assembly with the airbag deployment direction facing down could cause a serious accident if the airbag inflates.
- (2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)
- (3) Grease should not be applied to the front passenger airbag assembly and the airbag door should not be cleaned with detergents of any kind.
- (4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) installed on the assembly before starting work.
- (6) When disposing of a vehicle or the airbag assembly alone, the airbag should be deployed using an SST before disposal (See page RS-34 ).  
Perform the operation in a safe place away from electrical noise.



## (f) SIDE AIRBAG ASSEMBLY

- (1) Always store a removed or new side airbag assembly with the airbag deployment direction facing up. Storing the airbag assembly with the airbag deployment direction facing downward may lead to a serious accident if the airbag deploys for some.
- (2) Never measure the resistance of the airbag squib reason (This may cause the airbag to deploy, which is very dangerous.).
- (3) Grease should not be applied to the side airbag assembly and the surface should not be cleaned with detergents of any kind.
- (4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the seat before starting work.
- (6) When disposing of a vehicle or the side airbag assembly alone, the airbag should be deployed using an SST before disposal (See page [RS-48](#)). Perform the operation in a safe place away from electrical noise.



(g) CURTAIN SHIELD AIRBAG ASSEMBLY

- (1) Always store a removed or new curtain shield airbag assembly in a clear plastic bag, and keep it in a safe place.

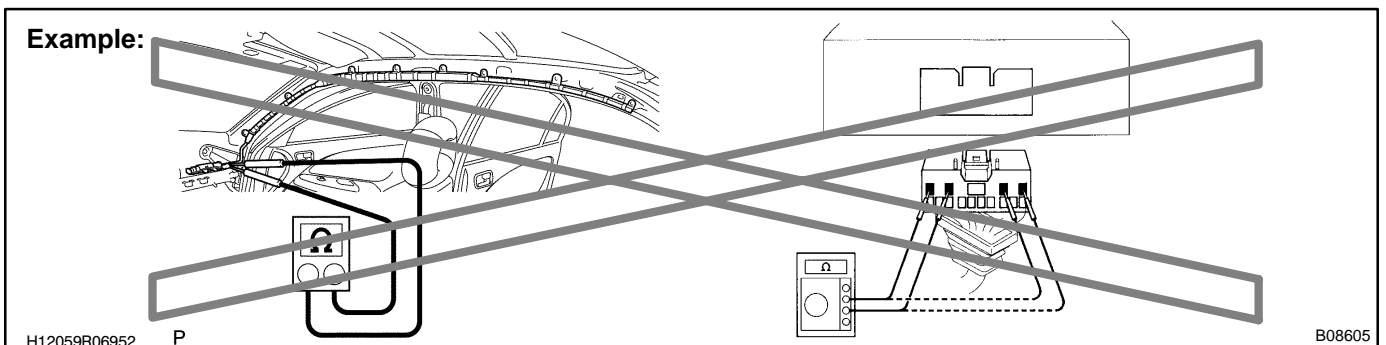
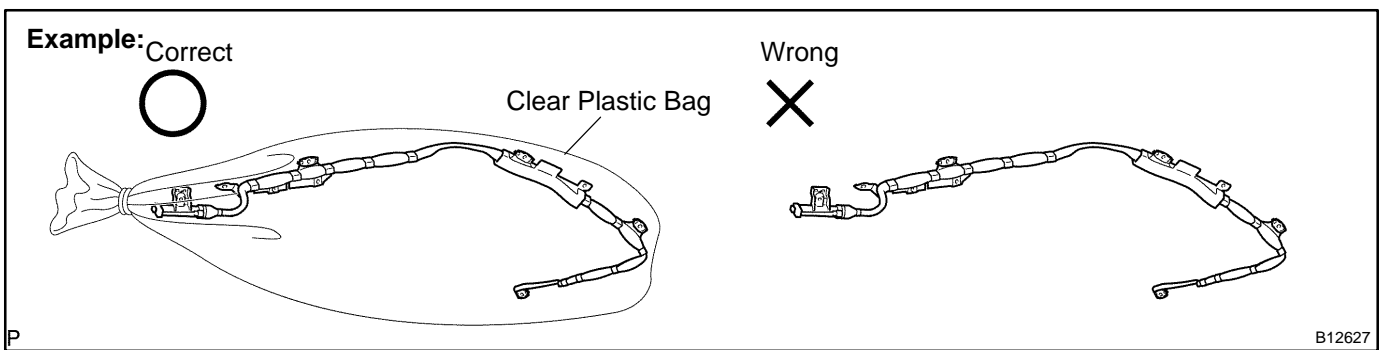
**NOTICE:**

**Protection bag is not reuse.**

**CAUTION:**

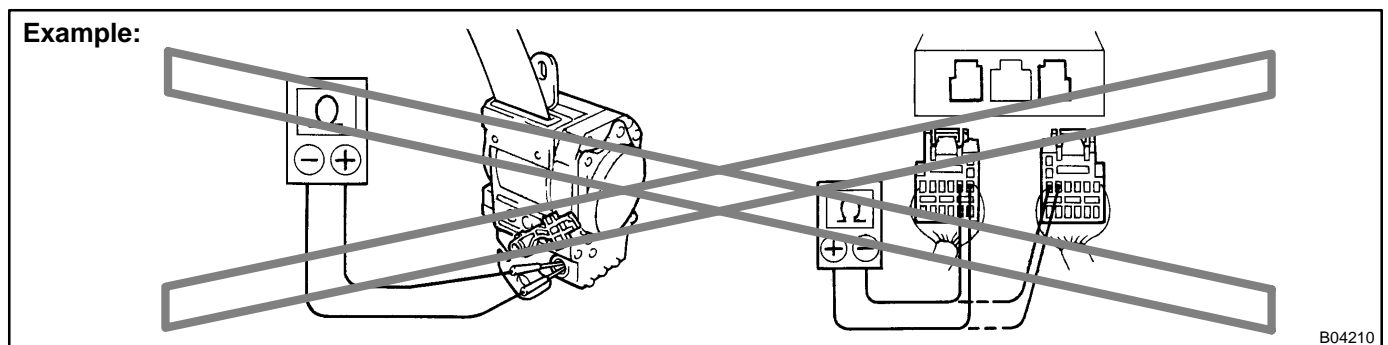
**Never disassemble the curtain shield airbag assembly.**

- (2) Never measure the resistance of the airbag squib (This may cause the airbag to deploy, which is very dangerous.).
- (3) Grease should not be attached to the curtain shield airbag assembly and the surface should not be cleared with detergents of any kind.
- (4) Store the airbag assembly where the ambient temperature remains below 93 °C (200 °F), without high humidity and away from electrical noise.
- (5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) into the instrument panel before starting work.
- (6) When disposing of a vehicle or the curtain shield airbag assembly alone, the airbag should be deployed using an SST before disposal (See page RS-61 ). Perform the operation in a safe place away from electrical noise.



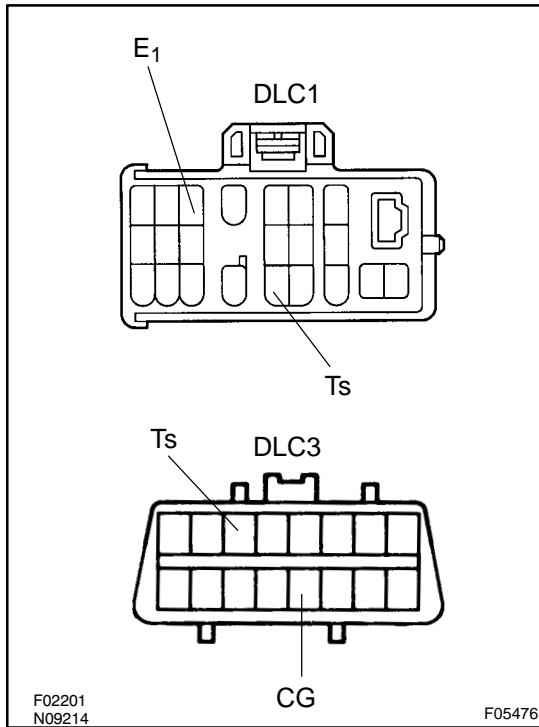
## (h) SEAT BELT PRETENSIONER

- (1) Never measure the resistance of the seat belt pretensioner. (This may cause the seat belt pretensioner activation which is very dangerous.)
- (2) Never disassemble the seat belt pretensioner.
- (3) Never install the seat belt pretensioner in another vehicle.
- (4) Store the seat belt pretensioner where the ambient temperature remains below 80°C (176°F) and away from electrical noise without high humidity.
- (5) When using electric welding, first disconnect the connector (yellow color and 2 pins) before starting work.
- (6) When disposing of a vehicle or the seat belt pretensioner alone, the seat belt pretensioner should be activated before disposal (See page [BO-144](#) ). Perform the operation in a safe place away from electrical noise.
- (7) The seat belt pretensioner is hot after activation, so let it cool down sufficiently before the disposal. However never apply water to the seat belt pretensioner.



- (i) AIRBAG SENSOR ASSEMBLY
  - (1) Never reuse the airbag sensor assembly involved in a collision when the SRS has deployed.
  - (2) The connectors to the airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not mounted to the floor, it could cause undesired ignition of the supplemental restraint system.
  - (3) Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery, even if only loosening the set bolts of the airbag sensor assembly.
- (j) WIRE HARNESS AND CONNECTOR

The SRS wire harness is integrated with the instrument panel wire harness assembly. The wires for the SRS wire harness are encased in a yellow corrugated tube and all the connectors in the system are a standard yellow color. If the SRS wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it as shown on page [RS-96](#) .



**2. FOR VEHICLE EQUIPPED WITH VEHICLE SKID CONTROL (VSC) SYSTEM**

- (a) Precaution when using drum tester:  
When using a drum tester, make sure that the ignition switch is OFF, start the engine with the diagnosis connector short-circuited between Ts and E<sub>1</sub> (CG) and take a measurement.

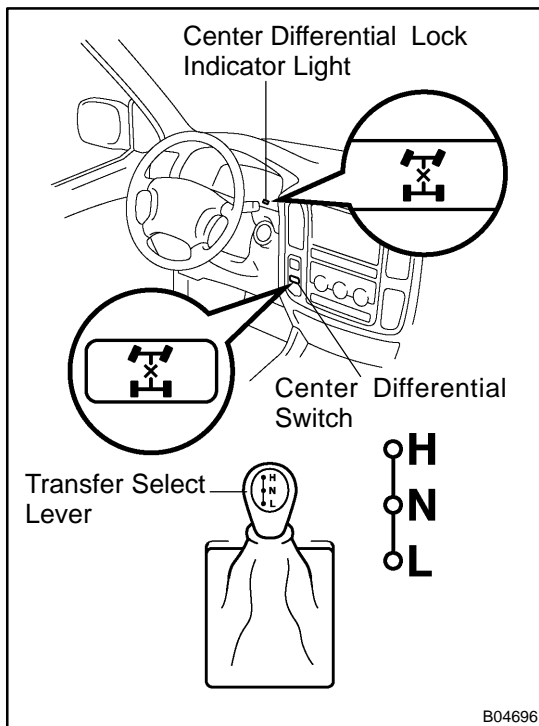
**NOTICE:**

- \* Check that VSC warning light is blinking.
- \* Ensure that the vehicle does not move using wires.
- \* After the measurement, disconnect the short circuit and check that the VSC warning light is turned off when restarting the engine.

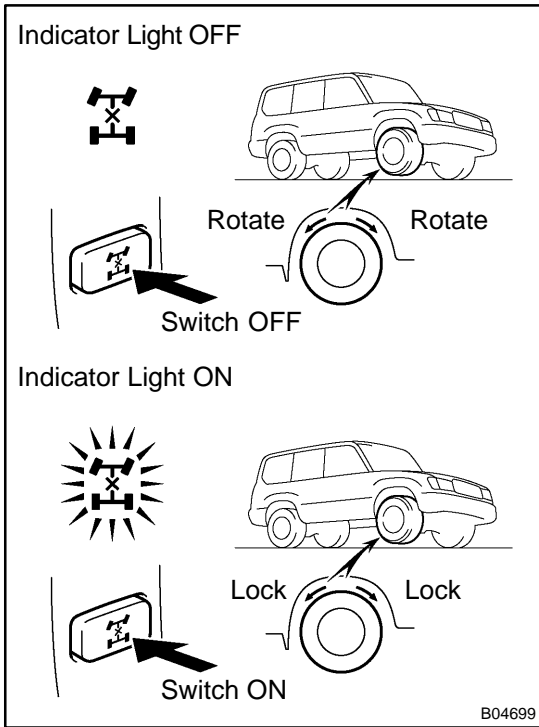
- (b) Precaution during VSC operation:
  - (1) Since VSC may be affected by the removal/installation of the VSC-related parts, do not remove/install those parts unless absolutely necessary.
  - (2) When operating on VSC, follow the instructions in BR section in this manual to surely make preparations or check after operations.

**3. WHEN SERVICING FULL-TIME 4WD VEHICLES**

The Full-time 4WD LAND CRUISER is equipped with the mechanical lock type center differential system. During tests using a brake tester or chassis dynamometer, such as braking force tests or speedometer tests, if only the front or rear wheels are to be rotated, it is necessary to set the position of the center differential to FREE or LOCK depending on the type of the test being performed.







**Center differential FREE condition:**

	Condition	Wheel
Center differential switch	OFF	A lifted wheel cannot be rotated even if only one wheel is lifted up, as long as transmission is in N position.
Indicator light	OFF	
Transfer select lever (H/L)	w/ VSC: Either will do w/o VSC: H position only	

**Center differential LOCK conditions (w/ VSC):**

	Condition	Wheel
Center differential switch	ON	A lifted wheel cannot be rotated even if only one wheel is lifted up, as long as transmission is in N position.
Indicator light	ON	
Transfer select lever (H/L)	Either will do	

**Center differential LOCK conditions (w/o VSC):**

	Condition	Wheel
Center differential switch	ON	A lifted wheel cannot be rotated even if only one wheel is lifted up, as long as transmission is in N position.
Indicator light	ON	
Transfer select lever (H/L)	H position	

	Condition	Wheel
Center differential switch	ON or OFF	A lifted wheel cannot be rotated even if only one wheel is lifted up, as long as transmission is in N position.
Indicator light	ON	
Transfer select lever (H/L)	L position	

**HINT:**

w/o Vehicle skid control (VSC) system:

When the transfer select lever is put in "L" position, the center differential is put in LOCK condition regardless of the position of the center differential lock switch.

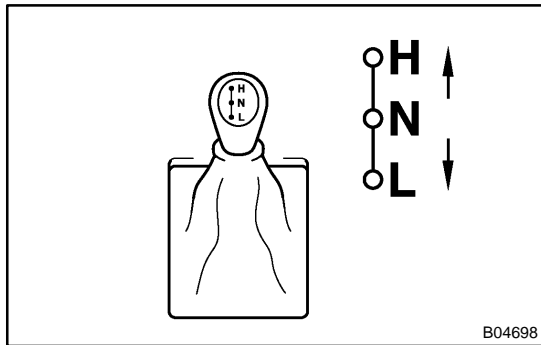
**CAUTION:**

**Center differential "LOCK" ↔ "FREE" selecting procedure:**

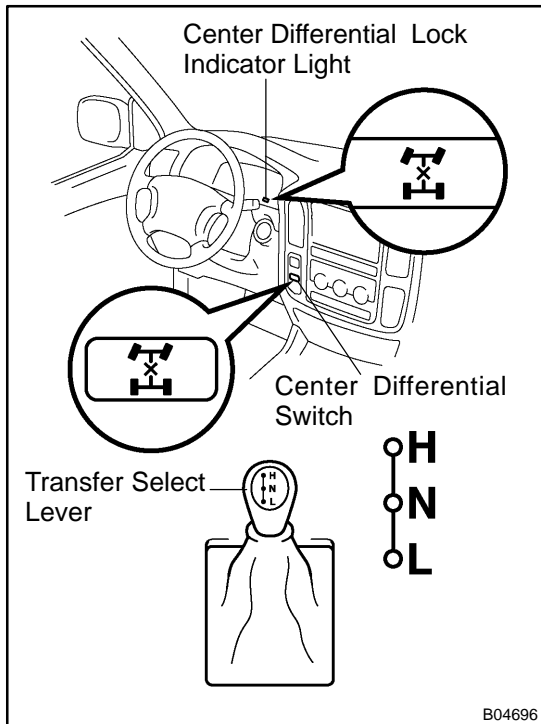
- \* Operate the switch only when all of 4 wheels are stopped or driven in a straight line.
- \* Never operate the switch when any wheel is slipping.
- \* Never operate the switch when any wheel is spinning freely.
- \* Never operate the switch when swerving or cornering.

**HINT:**

- \* Center differential "LOCK" ↔ "FREE" selecting procedure:  
Move the vehicle forward or backward slightly if the indicator light does not operate correctly when the center differential lock switch is turned ON or OFF.



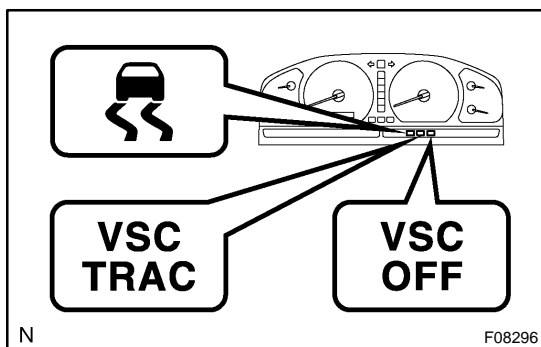
- \* Transfer gear "H" ↔ "L" gear shifting procedure:  
When shifting, always put the shift lever of the transmission in N position. In other positions, the gears of the transfer clash, and switching cannot be performed.



**4. WHEN TESTING BRAKES, SPEEDOMETER, ETC.**

- (a) When carrying out any kind of servicing or testing on a Full-time 4WD in which the front or rear wheels are to be rotated (braking test, speedometer test), be sure to observe the precautions given below. Incorrect preparations or test procedures may cause danger as well as unsuccessful test results. Before starting any such servicing or test, be sure to check the following items:

- \* Center differential mode position (FREE or LOCK)

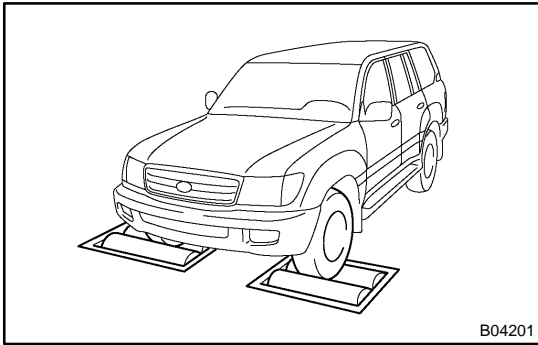


- \* Vehicle skid control (VSC) system (with or without):  
If the vehicle is equipped with the system, the slip indicator light, the VSC/TRAC indicator light and the VSC OFF indicator light come on with the ignition key turned to "ON". They will go off after about a few seconds.
- \* Whether wheels should be touching ground or jacked up
- \* Transmission gear position (N position)
- \* Transfer gear position (H or L position)
- \* Maximum testing vehicle speed
- \* Maximum testing time

**HINT:**

w/o Vehicle skid control (VSC) system:

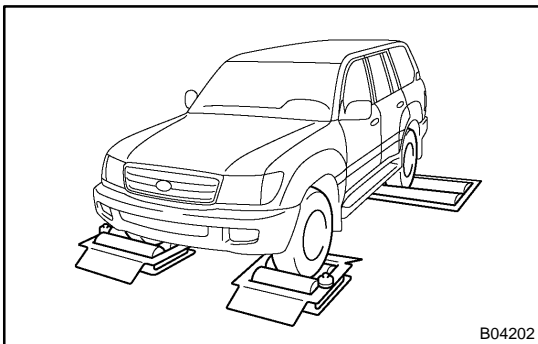
When the transfer select lever is put in "L" position, the center differential is put in LOCK condition regardless of the position of the center differential lock switch.



- (b) Using Braking Tester:
- Measure by low-speed type (Vehicle Speed: Below 0.5 km/h or 0.3 mph) brake tester and observe the following instructions before performing the test.
- (1) Position the wheels to be tested (front or rear) on the tester.
  - (2) Put the center differential in FREE position.
  - (3) If the vehicle is equipped with Vehicle Skid Control (VSC) system, prohibit the system from the activation (See step 2.).
  - (4) Shift the transmission shift lever to "N" position.

**HINT:**

Do not forget to change the Vehicle Skid Control (VSC) & Traction Control (TRAC) system to operational condition after the test. Check that the VSC warning indicator light goes off when restarting the engine.



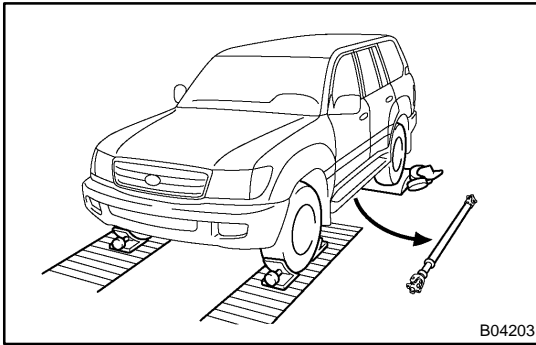
- (c) Using Speedometer Tester:
- Observe the following instructions and then measure with the rear wheels.
- (1) Position the rear wheels on the tester roller.
  - (2) Position the front wheels on the free roller or jack them up.
  - (3) Put the center differential in FREE position.
  - (4) If the vehicle is equipped with Vehicle Skid Control (VSC) & Traction Control (TRAC) system, prohibit the system from the activation (See step 2.).
  - (5) Ensure that the vehicle does not move using wires.

**CAUTION:**

**The maximum speed should be less than 60 km/h (37 mph) and maximum driving time should be 1 minute.**

**HINT:**

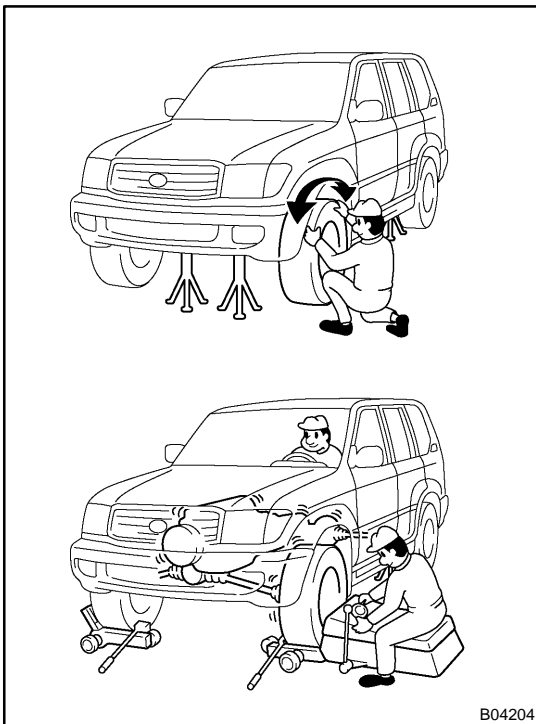
- \* Sudden shifting, braking, acceleration or deceleration is not allowed.
- \* Do not forget to change the Vehicle Skid Control (VSC) & Traction Control (TRAC) system to operational condition after the test. Check that the VSC warning indicator light goes off when restarting the engine.



- (d) Using Chassis Dynamometer:  
Observe the following instructions and then measure with the rear wheels.
- (1) Remove the front propeller shaft.
  - (2) Put the center differential in LOCK position.
  - (3) If the vehicle is equipped with Vehicle Skid Control (VSC) & Traction Control (TRAC) system, prohibit the system from the activation (See step 2.).
  - (4) Ensure that the vehicle is securely fixed.

**HINT:**

- \* Sudden shifting, braking, acceleration or deceleration is not allowed.
- \* Do not forget to change the Vehicle Skid Control (VSC) & Traction Control (TRAC) system to operational condition after the test. Check that the VSC warning indicator light goes off when restarting the engine.



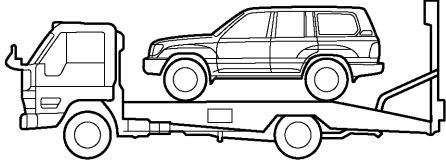
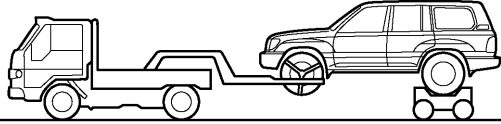
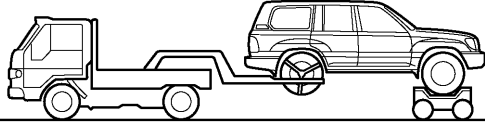
- (e) On-V ehicle Wheel Balancing:  
When doing on-vehicle wheel balancing on a full-time 4WD vehicle, to prevent each wheel from being rotated at different speed in different directions (which could damage the center differential), always be sure to observe the following precautions.
- (1) All of 4 wheels should be jacked up, being apart from the ground completely.
  - (2) Put the center differential in LOCK position.
  - (3) If the vehicle is equipped with Vehicle Skid Control (VSC) & Traction Control (TRAC) system, prohibit the system from the activation (See step 2.).
  - (4) The parking brake lever should be fully released.
  - (5) None of the brakes should be applied.
  - (6) The wheels should be driven on the wheel balancer with the engine running.
  - (7) Carry out the wheel balancing with the transmission position in D position.

**HINT:**

- \* When doing this balancing, pay attention to the other wheels rotating at the same time.
- \* Sudden acceleration, deceleration or braking is not allowed.
- \* Do not forget to change the Vehicle Skid Control (VSC) & Traction Control (TRAC) system to operational condition after the test. Check that the VSC warning indicator light goes off when restarting the engine.

**5. WHEN TOWING FULL-TIME 4WD VEHICLES**

- \* Use one of the methods shown below to tow the vehicle.
- \* If the vehicle has trouble in the chassis and drive train, use method 1 (flat bed truck).

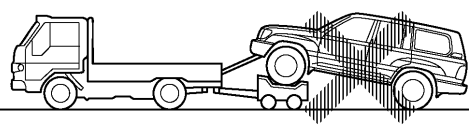
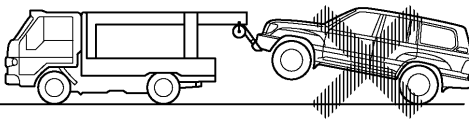
Towing Method \ Conditions	Parking Brake	Transmission Shift Lever Position
<p><b>1. Flat Bed Truck</b></p> 	Applied	Any Position
<p><b>2. Wheel Lift Type Truck</b> From Front</p>  <p>From Rear</p> 	Applied	Any Position

B04205

**NOTICE:**

**Do not use any towing method other than those shown above.**

- \* For example, the towing methods shown below are dangerous or damage the vehicle, so do not use them.

<p>NO</p> 	<ul style="list-style-type: none"> <li>▶ Never tow the vehicle using a method where the lifted-up wheel cannot rotate.</li> <li>▶ If this towing method is used, either from the front or rear:                             <ul style="list-style-type: none"> <li>(a) There is a danger of the drive train heating up and causing breakdown, or of the wheels flying off the dolly.</li> <li>(b) In addition, if the vehicle is equipped with the Vehicle Skid Control (VSC) &amp; Traction Control (TRAC) system, the system will apply the rotating wheels brake unless the engine isn't shut off.</li> </ul> </li> </ul>
<p>NO</p> 	<p>Do not use the sling type towing method, either from the front or rear, as this method causes damage to the body.</p>

B04206

## 6. FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

### CAUTION:

**If large amount of unburned gasoline flows into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.**

- (a) Use only unleaded gasoline.
- (b) Avoid prolonged idling.  
Avoid running the engine at idle speed for more than 20 minutes.
- (c) Avoid spark jump test.
  - (1) Perform spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
  - (2) While testing, never race the engine.
- (d) Avoid prolonged engine compression measurement.  
Engine compression tests must be done as rapidly as possible.
- (e) Do not run engine when fuel tank is nearly empty.  
This may cause the engine to misfire and create an extra load on the converter.
- (f) Avoid coasting with ignition turned off and prolonged braking.
- (g) Do not dispose of used catalyst along with parts contaminated with gasoline or oil.

## 7. IF VEHICLE IS EQUIPPED WITH MOBILE COMMUNICATION SYSTEM

For vehicles with mobile communication systems such as two-way radios and cellular telephones, observe the following precautions.

- (1) Install the antenna as far as possible away from the ECU and sensors of the vehicle's electronic system.
- (2) Install the antenna feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle's electronic systems. For details about ECU and sensors locations, refer to the section on the applicable component.
- (3) Do not wind the antenna feeder together with the other wiring as much as possible, also avoid running the antenna feeder parallel with other wire harnesses.
- (4) Check that the antenna and feeder are correctly adjusted.
- (5) Do not install powerful mobile communications system.

## 8. FOR USING OBD II SCAN TOOL OR TOYOTA HAND-HELD TESTER

### CAUTION:

**Observe the following items for safety reasons:**

- \* **Before using the OBD II scan tool or TOYOTA hand-held tester, the OBD II scan tool's instruction book or TOYOTA hand-held tester's operator manual should be read thoroughly.**
- \* **Be sure to route all cables securely when driving with the OBD II scan tool or TOYOTA hand-held tester connected to the vehicle. (i.e. Keep cables away from feet, pedals, steering wheel and shift lever.)**
- \* **Two persons are required when test driving with the OBD II scan tool or TOYOTA hand-held tester, one person to drive the vehicle and the other person to operate the OBD II scan tool or TOYOTA hand-held tester.**

# HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

## GENERAL INFORMATION

IN04S-46

A large number of ECU controlled systems are used in the LAND CRUISER. In general, the ECU controlled system is considered to be a very intricate system requiring a high level of technical knowledge and expert skill to troubleshoot. However, the fact is that if you proceed to inspect the circuits one by one, troubleshooting of these systems is not complex. If you have adequate understanding of the system and a basic knowledge of electricity, accurate diagnosis and necessary repair can be performed to locate and fix the problem. This manual is designed through emphasis of the above standpoint to help service technicians perform accurate and effective troubleshooting, and is compiled for the following major ECU controlled systems: The troubleshooting procedure and how to make use of it are described on the following pages.

System	Page
1. Engine	<a href="#">DI-1</a>
2. Automatic Transmission	<a href="#">DI-358</a>
3. ABS & Vehicle Stability Control (VSC) & Brake Assist (BA) System	<a href="#">DI-502</a>
4. Power Tilt and Power Telescopic Steering Column	<a href="#">DI-656</a>
5. Supplemental Restraint System	<a href="#">DI-690</a>
6. Wireless Door Lock Control System	<a href="#">DI-936</a>
7. Theft Deterrent System	<a href="#">DI-953</a>
8. Cruise Control System	<a href="#">DI-979</a>
9. Engine Immobiliser System	<a href="#">DI-1002</a>
10. Body Control System	<a href="#">DI-1038</a>
11. Driver Door Control System	<a href="#">DI-1089</a>
12. Multiplex Communication System	<a href="#">DI-1 127</a>
13. Navigation System	<a href="#">DI-1 151</a>
14. Rear View Monitor System	<a href="#">DI-1268</a>
15. Air Conditioning System	<a href="#">DI-1300</a>

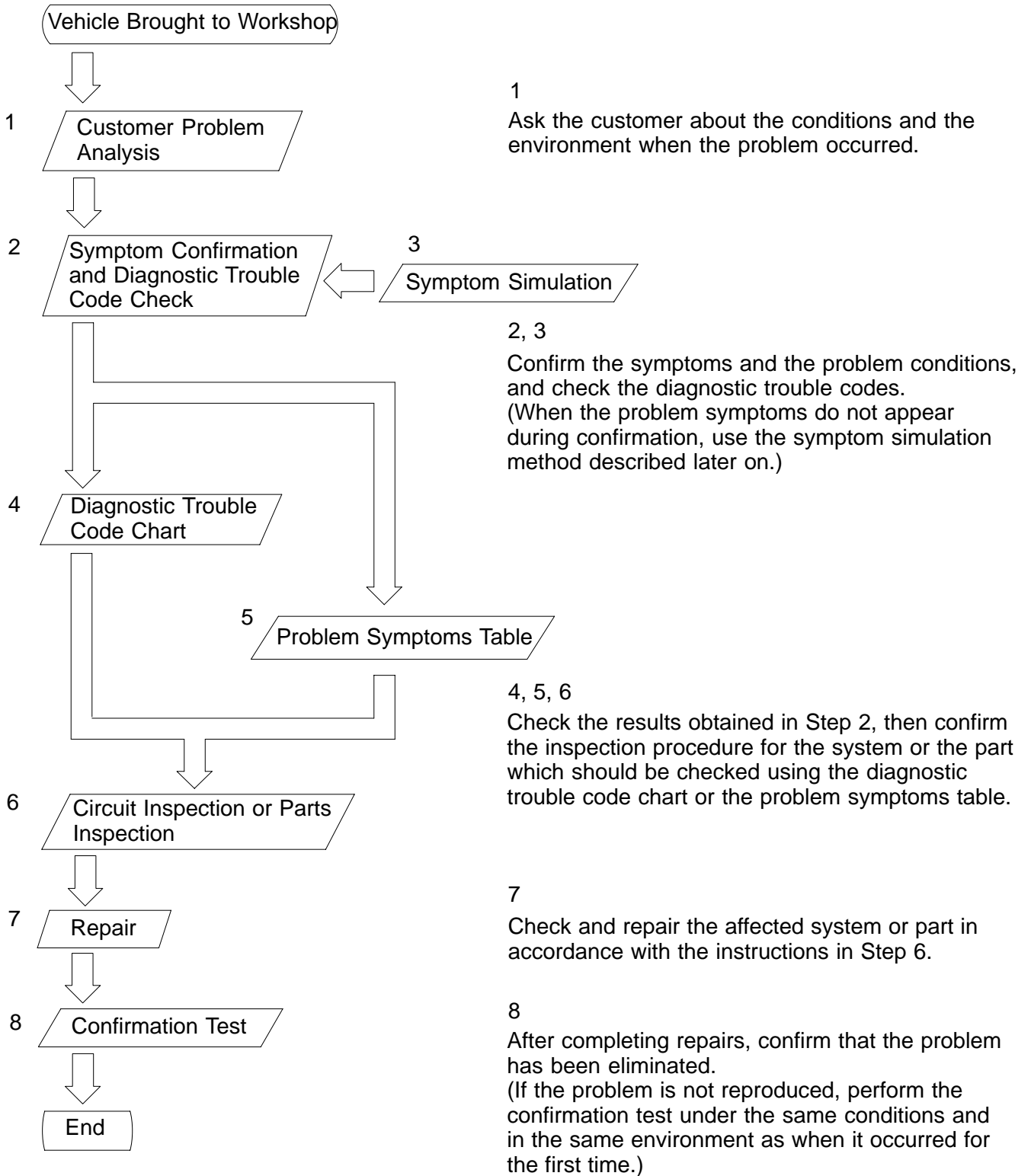
### FOR USING OBD II SCAN TOOL OR TOYOTA HAND-HELD TESTER

- ▶ Before using the scan tool or tester, the scan tool's instruction book or tester's operator manual should be read thoroughly.
- ▶ If the scan tool or tester cannot communicate with ECU controlled systems when you have connected the cable of the scan tool or tester to DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.
  - (1) If communication is normal when the tool is connected to another vehicle, inspect the diagnosis data link line (Bus $\ell$  line) or ECU power circuit of the vehicle.
  - (2) If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so perform the Self Test procedures outline in the Tester Operator's Manual.



# HOW TO PROCEED WITH TROUBLESHOOTING

Carry out troubleshooting in accordance with the procedure on the following page. Here, only the basic procedure is shown. Details are provided in Diagnostics section, showing the most effective methods for each circuit. Confirm the troubleshooting procedures first for the relevant circuit before beginning troubleshooting of that circuit.



**1. CUSTOMER PROBLEM ANALYSIS**

In troubleshooting, the problem symptoms must be confirmed accurately and all preconceptions must be cleared away in order to give an accurate judgment. To ascertain just what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time it occurred.

Important Point in the Problem Analysis:

The following 5 items are important points in the problem analysis. Past problems which are thought to be unrelated and the repair history, etc. may also help in some cases, so as much information as possible should be gathered and its relationship with the problem symptoms should be correctly ascertained for reference in troubleshooting. A customer problem analysis table is provided in Diagnostics section for each system for your use.

**Important Points in the Customer Problem Analysis**

- ▶ What ----- Vehicle model, system name
- ▶ When ----- Date, time, occurrence frequency
- ▶ Where ----- Road conditions
- ▶ Under what conditions? ----- Running conditions, driving conditions, weather conditions
- ▶ How did it happen? ----- Problem symptoms

(Sample) Engine control system check sheet.

<b>CUSTOMER PROBLEM ANALYSIS CHECK</b>			
<b>ENGINE CONTROL SYSTEM Check Sheet</b>		Inspector's Name _____	
Customer's Name	_____	Model and Model Year	_____
Driver's Name	_____	Frame No.	_____
Data Vehicle Brought in	_____	Engine Model	_____
License No.	_____	Odometer Reading	_____ km miles
<b>Problem Symptoms</b>	<input type="checkbox"/> Engine does not Start	<input type="checkbox"/> Engine does not crank	<input type="checkbox"/> No initial combustion <input type="checkbox"/> No complete combustion
	<input type="checkbox"/> Difficult to Start	<input type="checkbox"/> Engine cranks slowly <input type="checkbox"/> Other _____	
	<input type="checkbox"/> Poor Idling	<input type="checkbox"/> Incorrect first idle <input type="checkbox"/> Idling rpm is abnormal <input type="checkbox"/> High ( _____ rpm) <input type="checkbox"/> Low ( _____ rpm) <input type="checkbox"/> Rough idling <input type="checkbox"/> Other _____	
	<input type="checkbox"/> Poor Drive ability	<input type="checkbox"/> Hesitation <input type="checkbox"/> Back fire <input type="checkbox"/> Muffler explosion (after-fire) <input type="checkbox"/> Surging <input type="checkbox"/> Knocking <input type="checkbox"/> Other _____	
	<input type="checkbox"/> Engine Stall	<input type="checkbox"/> Soon after starting <input type="checkbox"/> After accelerator pedal depressed <input type="checkbox"/> After accelerator pedal released <input type="checkbox"/> During A/C operation <input type="checkbox"/> Shifting from N to D <input type="checkbox"/> Other _____	
	<input type="checkbox"/> Others	_____	
<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes ( _____ times per _____ day/month)			

**2. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE CHECK**

The diagnostic system in the LAND CRUISER fulfills various functions. The first function is the Diagnostic Trouble Code Check in which a malfunction in the signal circuits to the ECU is stored in code in the ECU memory at the time of occurrence, to be output by the technician during troubleshooting. Another function is the Input Signal Check which checks if the signals from various switches are sent to the ECU correctly. By using these check functions, the problem areas can be narrowed down quickly and troubleshooting can be performed effectively. Diagnostic functions are incorporated in the following systems in the LAND CRUISER.

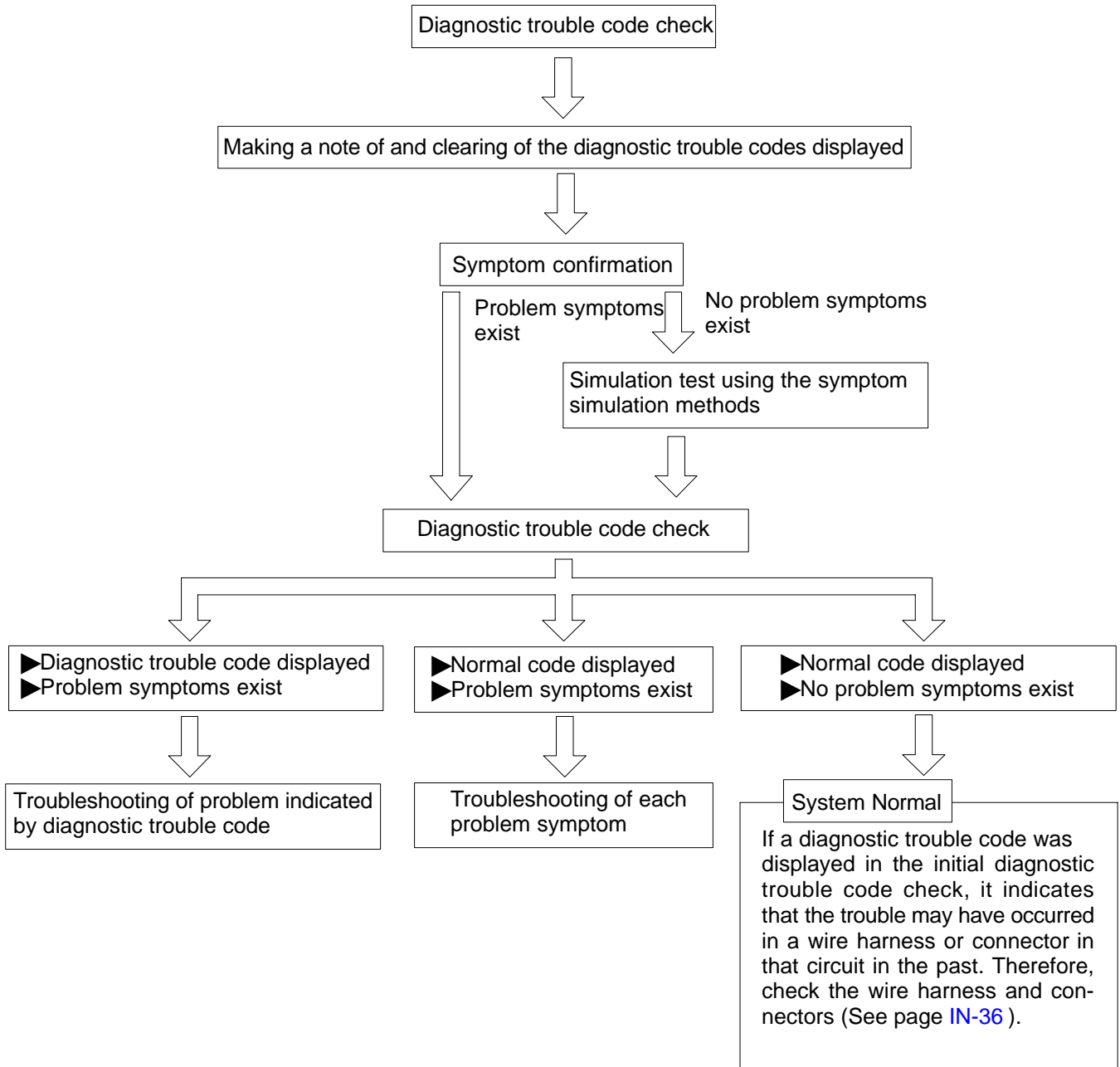
System	Diagnostic Trouble Code Check	Input Signal Check (Sensor Check)	Other Diagnosis Function
Engine	*(with Test Mode)	*	*
Automatic Transmission	*(with Test Mode)	*	*
ABS & Vehicle Stability Control (VSC) & Brake Assist (BA) System	*	*	*
Power Tilt and Power Telescopic Steering Column	*	*	
Supplemental Restraint System	*		
Theft Deterrent System	*		*
Cruise Control System	*		Cancel Signal Check
Engine Immobiliser System	*		*
Driver Door Control System	*		*
Navigation System	*		
Air Conditioning System	*	*	*

In diagnostic trouble code check, it is very important to determine whether the problem indicated by the diagnostic trouble code is still occurring or occurred in the past but returned to normal at present. In addition, it must be checked in the problem symptom check whether the malfunction indicated by the diagnostic trouble code is directly related to the problem symptom or not. For this reason, the diagnostic trouble codes should be checked before and after the symptom confirmation to determine the current conditions, as shown in the table below. If this is not done, it may, depending on the case, result in unnecessary troubleshooting for normally operating systems, thus making it more difficult to locate the problem, or in repairs not pertinent to the problem. Therefore, always follow the procedure in correct order and perform the diagnostic trouble code check.

**DIAGNOSTIC TROUBLE CODE CHECK PROCEDURE**

Diagnostic Trouble Code Check (Make a note of and then clear)	Confirmation of Symptoms	Diagnostic Trouble Code Check	Problem Condition
Diagnostic Trouble Code Display	Problem symptoms exist	Same diagnostic trouble code is displayed	Problem is still occurring in the diagnostic circuit
		Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit (The diagnostic trouble code displayed first is either for a past problem or it is a secondary problem)
Normal Code Display	No problem symptoms exist		The problem occurred in the diagnostic circuit in the past
	Problem symptoms exist	Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit
	No problem symptoms exist	Normal code is displayed	The problem occurred in a place other than in the diagnostic circuit in the past

Taking into account the above points, a flow chart showing how to proceed with troubleshooting using the diagnostic trouble code check is shown below. This flow chart shows how to utilize the diagnostic trouble code check effectively, then by carefully checking the results, indicates how to proceed either to diagnostic trouble code troubleshooting or to troubleshooting of problem symptoms table.

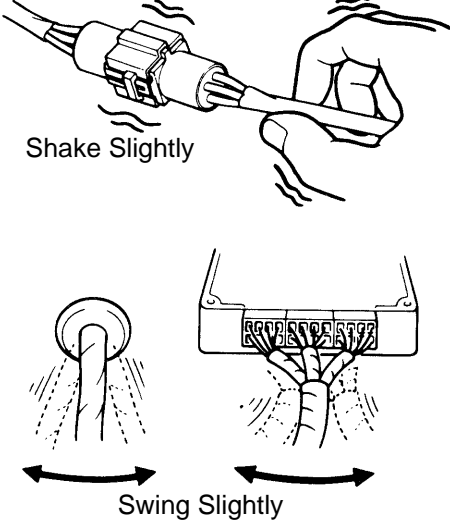
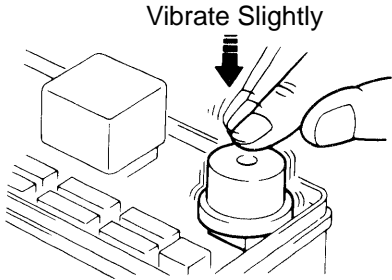


**3. SYMPTOM SIMULATION**

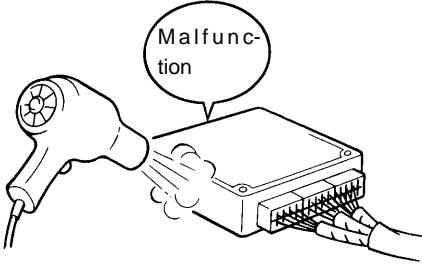

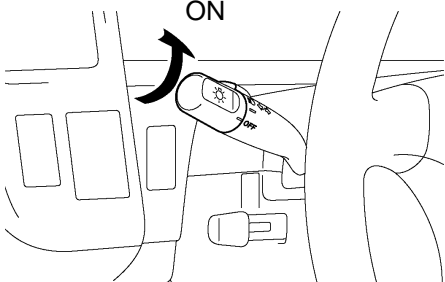
The most difficult case in troubleshooting is when there are no problem symptoms occurring. In such cases, a thorough customer problem analysis must be carried out, then simulate the same or similar conditions and environment in which the problem occurred in the customer's vehicle. No matter how much experience a technician has, or how skilled he may be, if he proceeds to troubleshoot without confirming the problem symptoms he will tend to overlook something important in the repair operation and make a wrong guess somewhere, which will only lead to a standstill. For example, for a problem which only occurs when the engine is cold, or for a problem which occurs due to vibration caused by the road during driving, etc., the problem can never be determined so long as the symptoms are confirmed with the engine hot condition or the vehicle at a standstill. Since vibration, heat or water penetration (moisture) is likely cause for problem which is difficult to reproduce, the symptom simulation tests introduced here are effective measures in that the external causes are applied to the vehicle in a stopped condition.

Important Points in the Symptom Simulation Test:

In the symptom simulation test, the problem symptoms should of course be confirmed, but the problem area or parts must also be found out. To do this, narrow down the possible problem circuits according to the symptoms before starting this test and connect a tester beforehand. After that, carry out the symptom simulation test, judging whether the circuit being tested is defective or normal and also confirming the problem symptoms at the same time. Refer to the problem symptoms table for each system to narrow down the possible causes of the symptom.

<p>1</p>	<p><b>VIBRATION METHOD: When vibration seems to be the major cause.</b></p>
<p><b>CONNECTORS</b> Slightly shake the connector vertically and horizontally.</p> <p><b>WIRE HARNESS</b> Slightly shake the wire harness vertically and horizontally. The connector joint, fulcrum of the vibration, and body through portion are the major areas to be checked thoroughly.</p>	 <p>The diagrams illustrate two vibration methods. The top diagram shows a hand shaking a connector, labeled 'Shake Slightly'. The bottom diagram shows a hand swinging a wire harness, labeled 'Swing Slightly', with arrows indicating the direction of movement.</p> <p>F12331 F12332</p>
<p><b>PARTS AND SENSOR</b> Apply slight vibration with a finger to the part of the sensor considered to be the problem cause and check that the malfunction occurs.</p> <p><b>HINT:</b> Applying strong vibration to relays may result in open relays.</p>	 <p>The diagram shows a hand vibrating a sensor component on a circuit board, labeled 'Vibrate Slightly'.</p> <p>F12330</p>

V07268

<p>2</p>	<p><b>HEAT METHOD: When the problem seems to occur when the suspect area is heated.</b></p>
<p>Heat the component that is the likely cause of the malfunction with a hair dryer or similar object. Check to see if the malfunction occurs.</p> <p><b>NOTICE:</b></p> <p>(1) Do not heat to more than 60 °C (140 °F). (Temperature is limited not to damage the components.)</p> <p>(2) Do not apply heat directly to parts in the ECU.</p>	 <p>F12334</p>
<p>3</p>	<p><b>WATER SPRINKLING METHOD: When the malfunction seems to occur on a rainy day or in a high-humidity condition.</b></p>
<p>Sprinkle water onto the vehicle and check to see if the malfunction occurs.</p> <p><b>NOTICE:</b></p> <p>(1) Never sprinkle water directly into the engine compartment, but indirectly change the temperature and humidity by applying water spray onto the radiator front surface.</p> <p>(2) Never apply water directly onto the electronic components.</p> <p><b>HINT:</b></p> <p>If a vehicle is subject to water leakage, the leaked water may contaminate the ECU. When testing a vehicle with a water leakage problem, special caution must be taken.</p>	 <p>F16649</p>
<p>4</p>	<p><b>OTHER: When a malfunction seems to occur when electrical load is excessive.</b></p>
<p>Turn on all electrical loads including the heater blower, head lights, rear window defogger, etc. and check to see if the malfunction occurs.</p>	 <p>B02389</p>

B02390

**4. DIAGNOSTIC TROUBLE CODE CHART**

The inspection procedure is shown in the table below. This table permits efficient and accurate troubleshooting using the diagnostic trouble codes displayed in the diagnostic trouble code check. Proceed with troubleshooting in accordance with the inspection procedure given in the diagnostic chart corresponding to the diagnostic trouble codes displayed. The engine diagnostic trouble code chart is shown below as an example.

▶DTC No.  
Indicates the diagnostic trouble code.

▶Page or Instructions  
Indicates the page where the inspection procedure for each circuit is to be found, or gives instructions for checking and repairs.

▶Trouble Area  
Indicates the suspect area of the problem.

▶Detection Item  
Indicates the system of the problem or contents of the problem.

**DTC CHART (SAE Controlled)**

HINT:  
Parameters listed in the chart may not be exactly the same as your reading due to the type of instrument or other factors.

If a malfunction code is displayed during the DTC check mode, check the circuit for that code listed in the table below. For details of each code, turn to the page referred to under the "See page" for the respective "DTC No." in the DTC chart.

DTC No. (See page)	Detection Item	Trouble Area	MIL*	Memory
P0100 (DI-24)	Mass Air Flow Circuit Malfunction	▶Open or short in mass air flow meter circuit ▶Mass air flow meter ▶ECM	○	○
P0101 (DI-28)	Mass Air Flow Circuit Range/ Performance Problem	▶Mass air flow meter	○	○
P0110 (DI-29)	Intake Air Temp. Circuit Malfunction	▶Open or short in intake air temp. sensor circuit ▶Intake air temp. sensor ▶ECM	○	○
P0115 (DI-33)	Engine Coolant Temp. Circuit Malfunction	▶Open or short in engine coolant temp. sensor circuit ▶Engine coolant temp. sensor ▶ECM	○	○
P0116 (DI-37)	Engine Coolant Temp. Circuit Range/ Performance Problem	▶Engine coolant temp. sensor ▶Cooling system	○	○
	Throttle Position Sensor/Switch Malfunction	▶Open or short in throttle position sensor circuit ▶Throttle position sensor ▶ECM		
	Throttle Position Sensor/ Switch Range/ Performance Problem	▶Throttle position sensor		



**5. PROBLEM SYMPTOMS TABLE**

The suspected circuits or parts for each problem symptom are shown in the table below. Use this table to troubleshoot the problem when a "Normal" code is displayed in the diagnostic trouble code check but the problem is still occurring. Numbers in the table indicate the inspection order in which the circuits or parts should be checked.

**HINT:**

When the problem is not detected by the diagnostic system even though the problem symptom is present, it is considered that the problem is occurring outside the detection range of the diagnostic system, or that the problem is occurring in a system other than the diagnostic system.

▶Page  
Indicates the page where the flow chart for each circuit is located.

▶Circuit Inspection, Inspection Order  
Indicates the circuit which needs to be checked for each problem symptom. Check in the order indicated by the numbers.

▶Problem Symptom

▶Circuit or Part Name  
Indicates the circuit or part which needs to be checked.

<b>PROBLEM SYMPTOMS TABLE</b>		
Symptom	Suspect Area	See page
Engine does not crank (Does not start)	1. Starter and starter relay	ST-2 ST-17
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. Engine control module (ECM)	DI-147 DI-151 IN-29
No complete combustion (Does not start)	1. Fuel pump control circuit	DI-151
Engine cranks normally (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	DI-144 DI-151 EM-3
Cold engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-144 DI-151
Hot engine	1. Starter signal circuit 2. Fuel pump control circuit	DI-144 DI-151
Engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	AC-88
Engine idle speed (Poor idling)	1. A/C signal circuit 2. Fuel pump control circuit	
Engine idle speed (Poor idling)	1. Compression 2. Fuel pump control circuit	

**6. CIRCUIT INSPECTION**

How to read and use each page is shown below.

►Diagnostic Trouble Code No. and Detection Item

►Circuit Description  
The major role and operation, etc. of the circuit and its component parts are explained.

<b>DTC</b>	<b>P0325</b>	<b>Knock Sensor 1 Circuit Malfunction</b>
------------	--------------	---

**CIRCUIT DESCRIPTION**

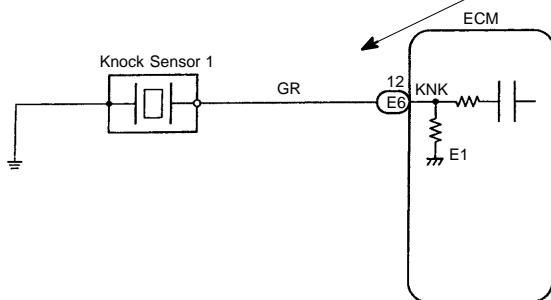
Knock sensor is fitted to the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting Condition	Trouble Area
P0325	No knock sensor 1 signal to ECM with engine speed 1,200 rpm or more.	►Open or short in knock sensor1 circuit ►Knock sensor 1 (looseness) ►ECM

If the ECM detects the above diagnosis conditions, it operates the fail safe function in which the corrective retard angle value is set to the maximum value.

►Indicates the diagnostic trouble code, diagnostic trouble code set parameter and suspect area of the problem.

**WIRING DIAGRAM**







►Wiring Diagram

This shows a wiring diagram of the circuit. Use this diagram together with ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit.

Wire colors are indicated by an alphabetical code.  
 B = Black, L = Blue, R = Red, BR = Brown,  
 LG = Light Green, V = Violet, G = Green,  
 O = Orange, W = White, GR = Gray, P = Pink,  
 Y = Yellow, SB = Sky Blue

The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

►Indicates the position of the ignition switch during the check.

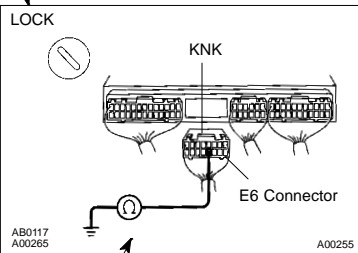
- |  |  |
|--|--|
| LOCK<br> Ignition Switch LOCK (OFF) | ON<br> Ignition Switch ON   |
| START<br> Ignition Switch START     | ACC<br> Ignition Switch ACC |

►Inspection Procedure

Use the inspection procedure to determine if the circuit is normal or abnormal, and, if it is abnormal, use it to determine whether the problem is located in the sensors, actuators, wire harness or ECU.

**INSPECTION PROCEDURE**

**1 Check continuity between terminal KNK of ECM connector and body ground.**



**PREPARATION:**

- (a) Remove the glove compartment (See page SF-68).
- (b) Disconnect the E6 connector of ECM.

**CHECK:**

Measure resistance between terminal KNK of ECM connector and body ground.

**OK:**

Resistance: 1 MΩ or higher

OK

Go to step 3.

NG

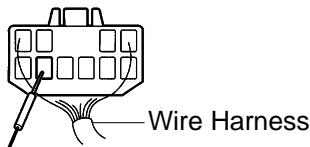
**2 Check knock sensor (See page SF-61).**

OK

Replace knock sensor.

►Indicates the place to check the voltage or resistance.

►Indicates the connector position to be checked, from the front or back side.

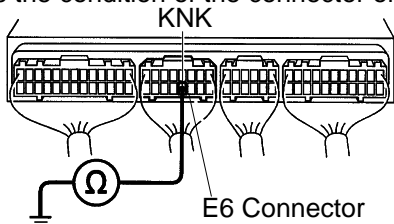


Check from the connector back side.  
(with harness)

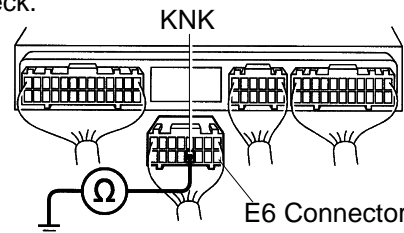


Check from the connector front side. (without harness)  
In this case, care must be taken not to bend the terminals.

►Indicates the condition of the connector of ECU during the check.

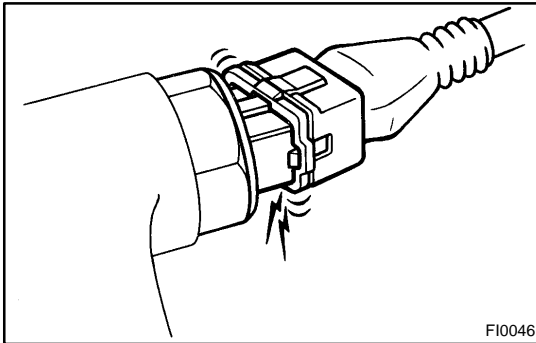


Connector being checked is connected.

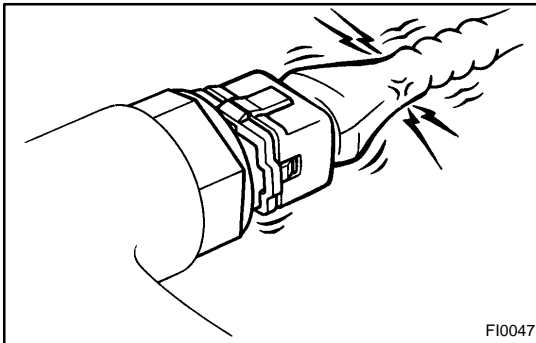


Connector being checked is disconnected.

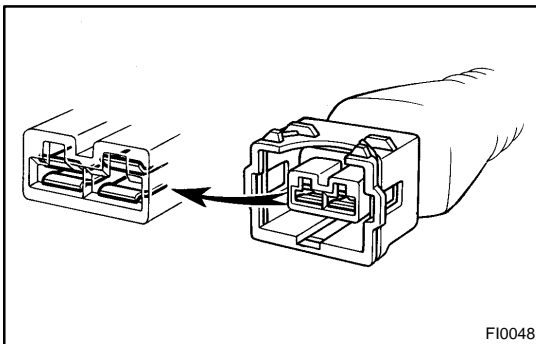
V08425



F10046



F10047



F10048

## HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE

### 1. CONNECTOR CONNECTION AND TERMINAL INSPECTION

- ▶ For troubleshooting, diagnostic trouble code charts or problem symptom table are provided for each circuit with detailed inspection procedures on the following pages.
- ▶ When all the component parts, wire harnesses and connectors of each circuit except the ECU are found to be normal in troubleshooting, then it is determined that the problem is in the ECU. Accordingly, if diagnosis is performed without the problem symptoms occurring, refer to Step 8 to replace the ECU. So always confirm that the problem symptoms are occurring, or proceed with inspection while using the symptom simulation method.
- ▶ The instructions "Check wire harness and connector" and "Check and replace ECU" which appear in the inspection procedure, are common and applicable to all diagnostic trouble codes. Follow the procedure outlined below whenever these instructions appear.

#### OPEN CIRCUIT:

This could be due to a disconnected wire harness, faulty contact in the connector, and a connector terminal pulled out, etc.

#### HINT:

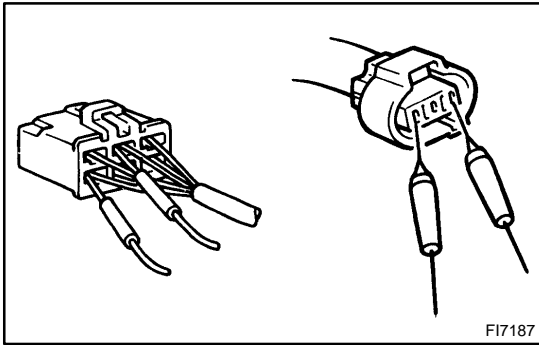
- ▶ It is rarely the case that a wire is broken in the middle of it. Most cases occur at the connector. In particular, carefully check the connectors of sensors and actuators
- ▶ Faulty contact could be due to rusting of the connector terminals, to foreign materials entering terminals or a deformation of connector terminals. Simply disconnecting and reconnecting the connectors once changes the condition of the connection and may result in a return to normal operation. Therefore, in troubleshooting, if no abnormality is found in the wire harness and connector check, but the problem disappears after the check, then the cause is considered to be in the wire harness or connectors.

#### SHORT CIRCUIT:

This could be due to a contact between wire harness and the body ground or to a short circuit occurred inside the switch, etc.

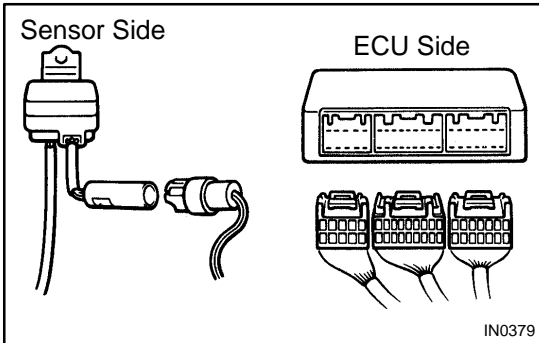
#### HINT:

When there is a short circuit between the wire harness and body ground, check thoroughly whether the wire harness is caught in the body or is clamped properly.



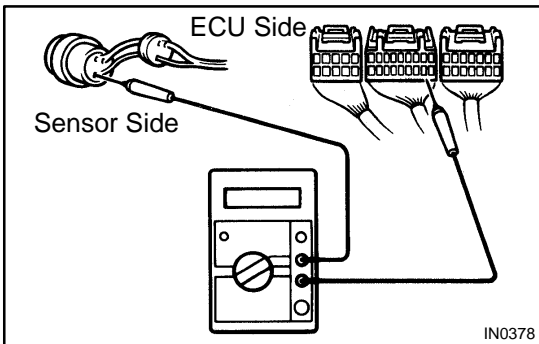
**2. CONNECTOR HANDLING**

When inserting tester probes into a connector, insert them from the rear of the connector. When necessary, use mini test leads. For water resistant connectors which cannot be accessed from behind, take good care not to deform the connector terminals.



**3. CONTINUITY CHECK (OPEN CIRCUIT CHECK)**

(a) Disconnect the connectors at both ECU and sensor sides.

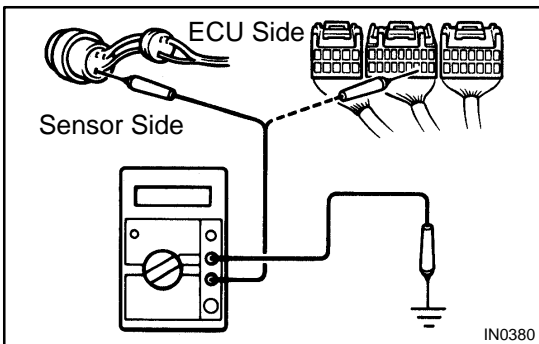


(b) Measure the resistance between the applicable terminals of the connectors.

**Resistance: 1 Ω or less**

HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.



**4. RESISTANCE CHECK (SHORT CIRCUIT CHECK)**

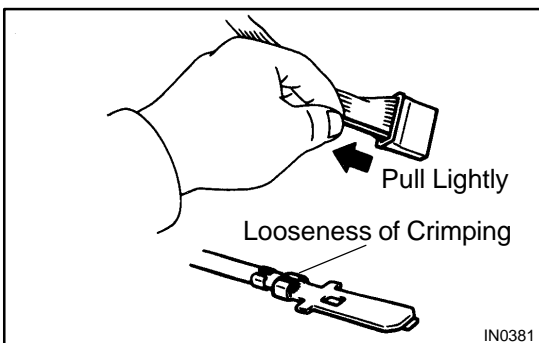
(a) Disconnect the connectors on both ends.

(b) Measure the resistance between the applicable terminals of the connectors and body ground. Be sure to carry out this check on the connectors on both ends.

**Resistance: 1 MΩ or higher**

HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.



**5. VISUAL CHECK AND CONTACT PRESSURE CHECK**

(a) Disconnect the connectors at both ends.

(b) Check for rust or foreign material, etc. in the terminals of the connectors.

(c) Check crimped portions for looseness or damage and check that the terminals are secured in lock portion.

HINT:

The terminals should not come out when pulled lightly from the back.

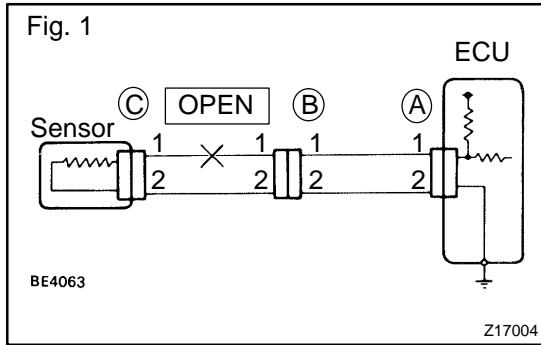
- (d) Prepare a test male terminal and insert it in the female terminal, then pull it out.

**NOTICE:**

**When testing a gold-plated female terminal, always use a gold-plated male terminal.**

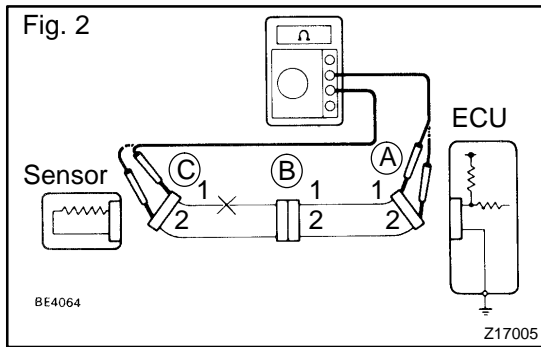
**HINT:**

When the test terminal is pulled out more easily than others, there may be poor contact in that section.

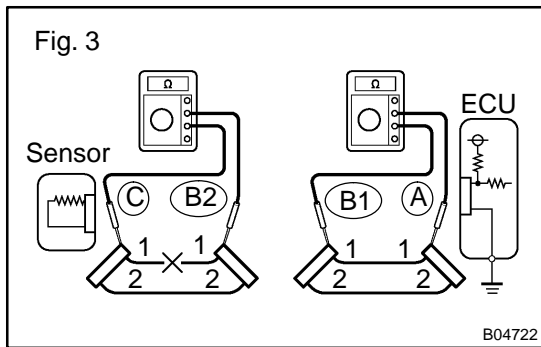


**6. CHECK OPEN CIRCUIT**

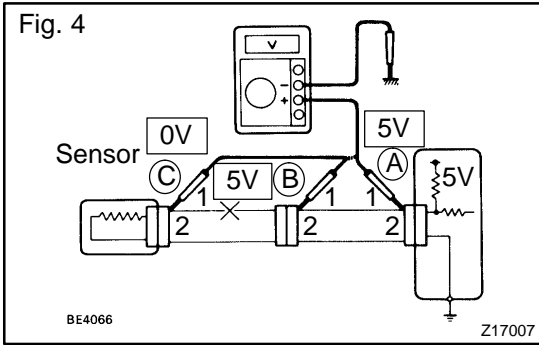
For the open circuit in the wire harness in Fig. 1, perform "(a) Continuity Check" or "(b) Voltage Check" to locate the section.



- (a) Check the continuity.
  - (1) Disconnect connectors "A" and "C" and measure the resistance between them.  
In the case of Fig. 2,  
Between terminal 1 of connector "A" and terminal 1 of connector "C" → No continuity (open)  
Between terminal 2 of connector "A" and terminal 2 of connector "C" → Continuity  
Therefore, it is found out that there is an open circuit between terminal 1 of connector "A" and terminal 1 of connector "C".



- (2) Disconnect connector "B" and measure the resistance between the connectors.  
In the case of Fig. 3,  
Between terminal 1 of connector "A" and terminal 1 of connector "B1" → Continuity  
Between terminal 1 of connector "B2" and terminal 1 of connector "C" → No continuity (open)  
Therefore, it is found out that there is an open circuit between terminal 1 of connector "B2" and terminal 1 of connector "C".

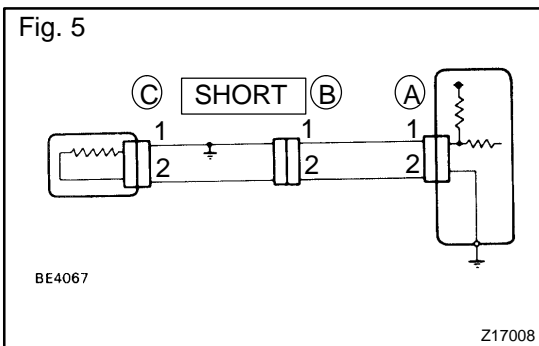


- (b) Check the voltage.  
In a circuit in which voltage is applied (to the ECU connector terminal), an open circuit can be checked for by conducting a voltage check.

As shown in Fig. 4, with each connector still connected, measure the voltage between body ground and terminal 1 of connector "A" at the ECU 5V output terminal, terminal 1 of connector "B", and terminal 1 of connector "C", in that order.

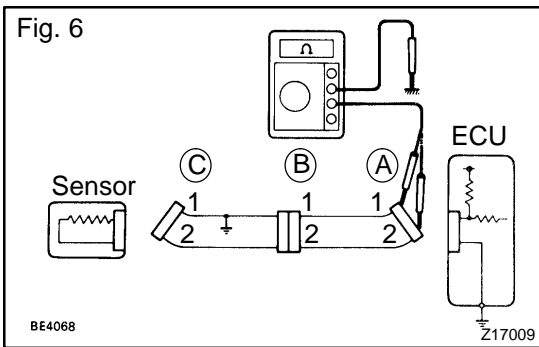
If the results are:

- 5V: Between Terminal 1 of connector "A" and Body Ground
  - 5V: Between Terminal 1 of connector "B" and Body Ground
  - 0V: Between Terminal 1 of connector "C" and Body Ground
- Then it is found out that there is an open circuit in the wire harness between terminal 1 of "B" and terminal 1 of "C".



## 7. CHECK SHORT CIRCUIT

If the wire harness is ground shorted as in Fig. 5, locate the section by conducting a "continuity check with ground".



Check the continuity with ground.

- (1) Disconnect connectors "A" and "C" and measure the resistance between terminal 1 and 2 of connector "A" and body ground.

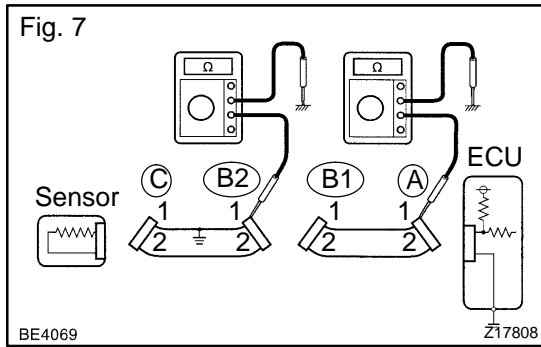
In the case of Fig. 6

Between terminal 1 of connector "A" and body ground → Continuity (short)

Between terminal 2 of connector "A" and body ground → No continuity

Therefore, it is found out that there is a short circuit between terminal 1 of connector "A" and terminal 1 of connector "C".

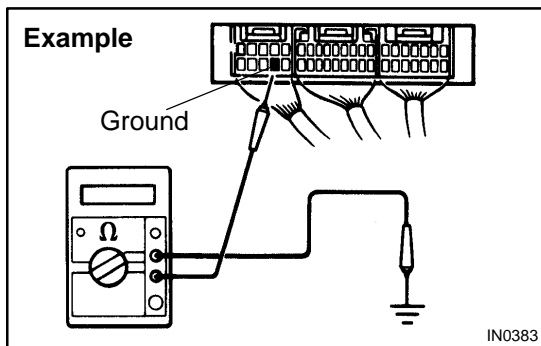




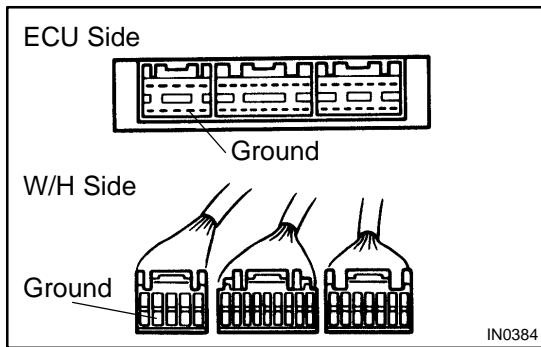
- (2) Disconnect connector "B" and measure the resistance between terminal 1 of connector "A" and body ground, and terminal 1 of connector "B2" and body ground.  
 Between terminal 1 of connector "A" and body ground → No continuity  
 Between terminal 1 of connector "B2" and body ground → Continuity (short)  
 Therefore, it is found out that there is a short circuit between terminal 1 of connector "B2" and terminal 1 of connector "C".

**8. CHECK AND REPLACE ECU**

First check the ECU ground circuit. If it is faulty, repair it. If it is normal, the ECU could be faulty, so replace the ECU with a normal functioning one and check that the symptoms appear.



- (1) Measure the resistance between the ECU ground terminal and the body ground.  
**Resistance: 1 Ω or less**



- (2) Disconnect the ECU connector, check the ground terminals on the ECU side and the wire harness side for bend and check the contact pressure.

# HOW TO USE THIS MANUAL

IN00U-13

## GENERAL INFORMATION

### 1. INDEX

An INDEX is provided on the first page of each section to guide you to the item to be repaired. To assist you in finding your way through the manual, the Section Title and major heading are given at the top of every page.

### 2. GENERAL DESCRIPTION

At the beginning of each section, a General Description is given that pertains to all repair operations contained in that section.

Read these precautions before starting any repair task.

### 3. TROUBLESHOOTING

TROUBLESHOOTING tables are included for each system to help you diagnose the problem and find the cause. The fundamentals of how to proceed with troubleshooting are described on page [IN-26](#).

Be sure to read this before performing troubleshooting.

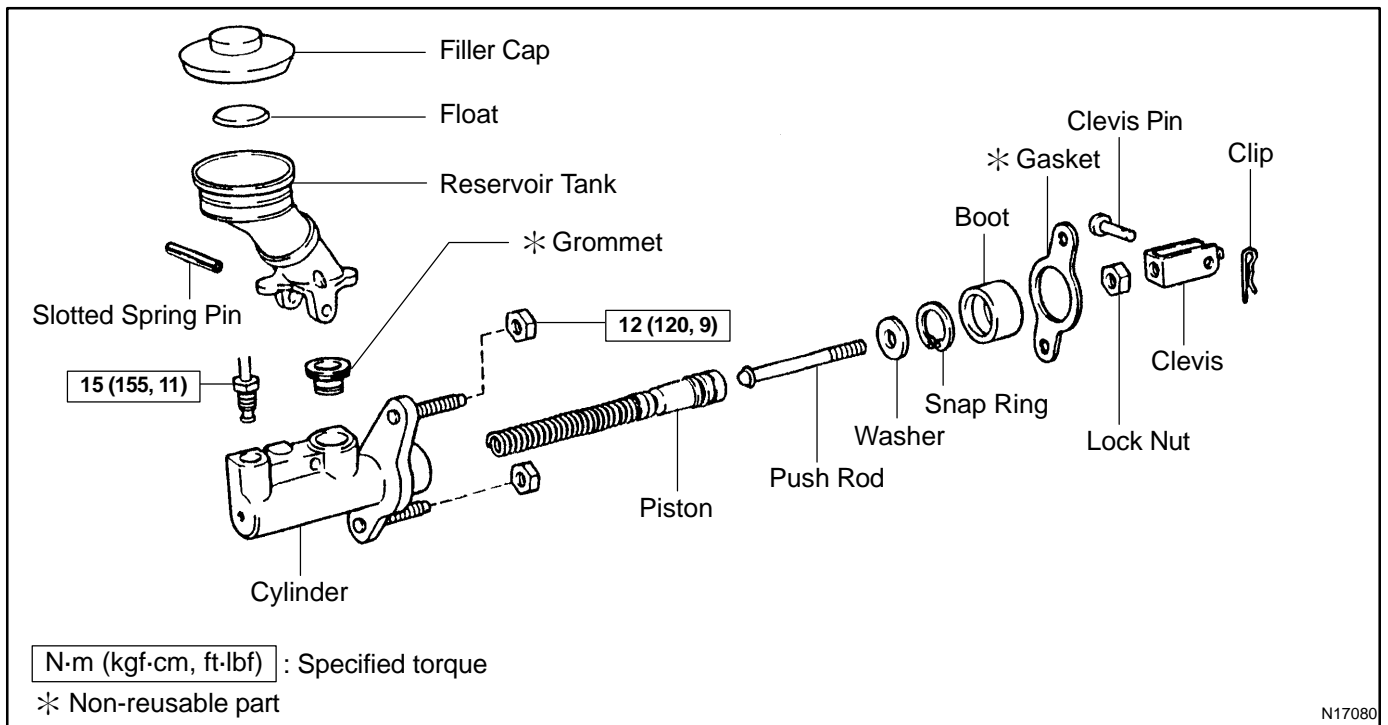
### 4. PREPARATION

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

### 5. REPAIR PROCEDURES

Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together.

Example:



The procedures are presented in a step-by-step format:

- ▶ The illustration shows what to do and where to do it.
- ▶ The task heading tells what to do.
- ▶ The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:

*Illustration:  
what to do and where*

*Task heading : what to do*

**21. CHECK PISTON STROKE OF OVERDRIVE BRAKE**

(a) Place SST and a dial indicator onto the overdrive brake piston as shown in the illustration.

**SST 09350-30020 (09350-06120)**

*Set part No.*

*Component part No.*

*Detailed text : how to do task*

(b) Measure the stroke applying and releasing the compressed air (392 — 785 kPa, 4 — 8 kgf/cm<sup>2</sup> or 57 — 114 psi) as shown in the illustration.

**Piston stroke: 1.40 — 1.70 mm (0.0551 — 0.0669 in.)**

*Specification*

This format provides the experienced technician with a FAST TRACK to the information needed. The upper case task heading can be read at a glance when necessary, and the text below it provides detailed information. Important specifications and warnings always stand out in bold type.

## 6. REFERENCES

References have been kept to a minimum. However, when they are required you are given the page to refer to.

## 7. SPECIFICATIONS

Specifications are presented in bold type throughout the text where needed. You never have to leave the procedure to look up your specifications. They are also found in Service Specifications section for quick reference.

## 8. CAUTIONS, NOTICES, HINTS:

- ▶ CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- ▶ NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- ▶ HINTS are separated from the text but do not appear in bold. They provide additional information to help you perform the repair efficiently.

## 9. SI UNIT

The UNITS given in this manual are primarily expressed according to the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English System.

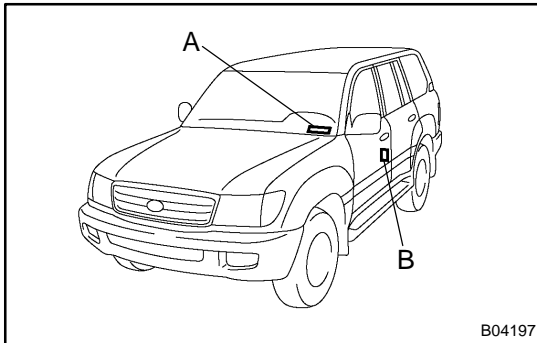
Example:

**Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)**

# IDENTIFICATION INFORMATION

## VEHICLE IDENTIFICATION AND ENGINE SERIAL NUMBER

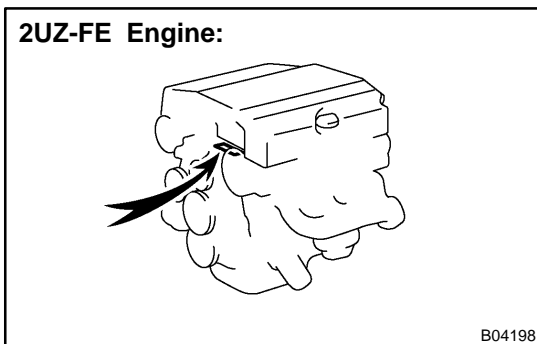
IN04P-02



### 1. VEHICLE IDENTIFICATION NUMBER

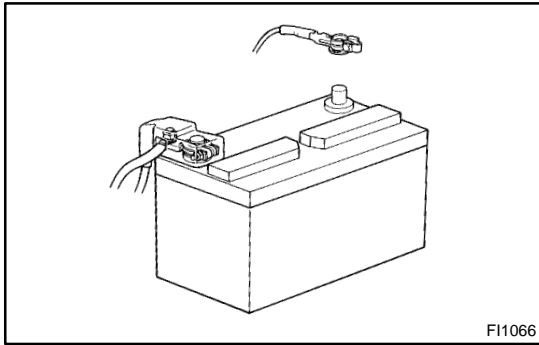
The vehicle identification number is stamped on the vehicle identification number plate and the certification label, as shown in the illustration.

- A: Vehicle Identification Number Plate
- B: Certification Label



### 2. ENGINE SERIAL NUMBER

The engine serial number is stamped on the engine block, as shown in the illustration.



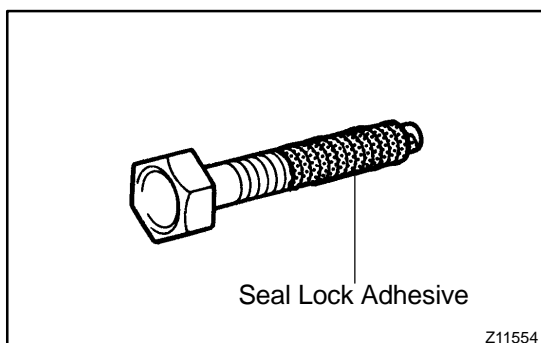
## REPAIR INSTRUCTIONS

### GENERAL INFORMATION

IN07M-02

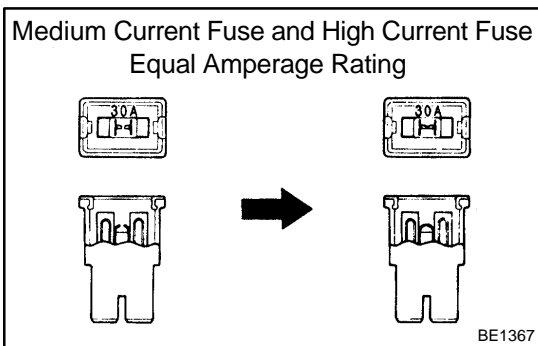
#### BASIC REPAIR HINT

- (a) Use fender, seat and floor covers to keep the vehicle clean and prevent damage.
- (b) During disassembly, keep parts in the appropriate order to facilitate reassembly.
- (c) Installation and removal of battery terminal:
  - (1) Before performing electrical work, disconnect the negative (-) terminal cable from the battery.
  - (2) If it is necessary to disconnect the battery for inspection or repair, first disconnect the negative (-) terminal cable.
  - (3) When disconnecting the terminal cable to prevent damage to battery terminal, loosen the cable nut and raise the cable straight up without twisting or prying it.
  - (4) Clean the battery terminals and cable ends with a clean shop rag. Do not scrape them with a file or other abrasive objects.
  - (5) Install the cable ends to the battery terminals after loosening the nut, and tighten the nut after installation. Do not use a hammer to tap the cable ends onto the terminals.
  - (6) Be sure the cover for the positive (+) terminal is properly in place.
- (d) Check hose and wiring connectors to make sure that they are connected securely and correctly.
- (e) Non-reusable parts
  - (1) Always replace cotter pins, gaskets, O-rings and oil seals, etc. with new ones.
  - (2) Non-reusable parts are indicated in the component illustrations by the "◀" symbol.



- (f) Precoated parts  
Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.
  - (1) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
  - (2) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

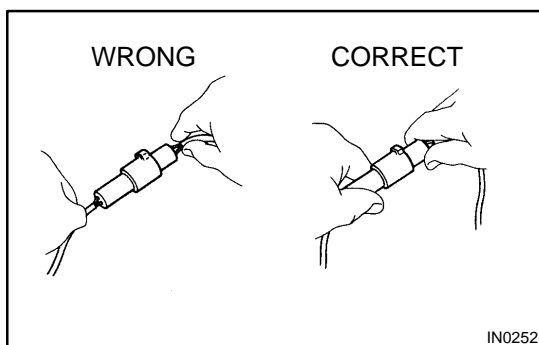
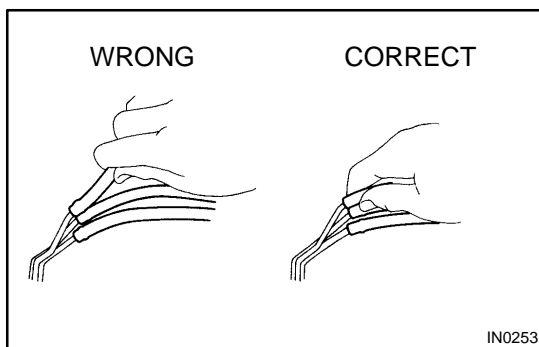
- (3) Precoated parts are indicated in the component illustrations by the "►" symbol.
- (g) When necessary, use a sealer on gaskets to prevent leaks.
- (h) Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.
- (i) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found in Preparation section in this manual.



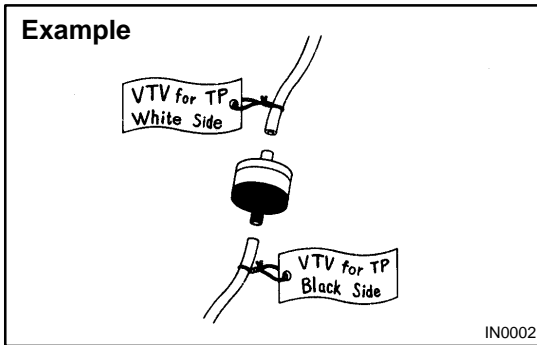
- (j) When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.

Illustration	Symbol	Part Name	Abbreviation
<p>BE5594</p>	<p>IN0365</p>	FUSE	FUSE
<p>BE5595</p>	<p>IN0366</p>	MEDIUM CURRENT FUSE	M-FUSE
<p>BE5596</p>	<p>IN0367</p>	HIGH CURRENT FUSE	H-FUSE
<p>BE5597</p>	<p>IN0367</p>	FUSIBLE LINK	FL
<p>BE5598</p>	<p>IN0368</p>	CIRCUIT BREAKER	CB

- (k) Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page [IN-8](#) ).
- \* Cancel the parking brake on the level place and shift the transmission in N position.
  - \* When jacking up the front wheels of the vehicle at first place stoppers behind the rear wheels.
  - \* When jacking up the rear wheels of the vehicle at first place stoppers before the front wheels.
  - \* When either the front or rear wheels only should be jacked up, set rigid racks and place stoppers in front and behind the other wheels on the ground.
  - \* After the vehicle is jacked up, be sure to support it on rigid racks. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.
- (l) Observe the following precautions to avoid damage to the following parts:
- (1) Do not open the cover or case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)



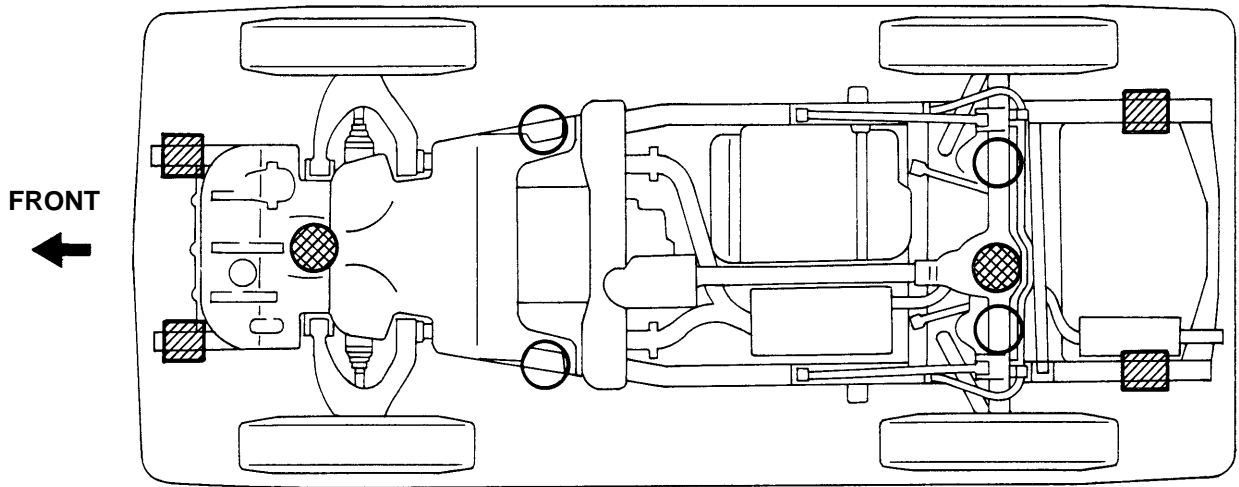
- (2) To disconnect vacuum hoses, pull off the end, not the middle of the hose.
- (3) To pull apart electrical connectors, pull on the connector itself, not the wires.
- (4) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.
- (5) When steam cleaning an engine, protect the electronic components, air filter and emission-related components from water.
- (6) Never use an impact wrench to remove or install temperature switches or temperature sensors.
- (7) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
- (8) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step-down adapter for adjustment. Once the hose has been stretched, it may leak air.




- (m) Installation and removal of vacuum hose:
- (1) When disconnecting vacuum hoses, use tags to identify how they should be reconnected to.
  - (2) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.
- (n) Bleeding of hydraulic brake booster system  
When repairing the hydraulic brake booster or ABS, bleeding the air out of the hydraulic brake booster (See page [BR-4](#) ).
- (o) Unless otherwise stated, all resistance is measured at an ambient temperature of 20°C (68°F). Because the resistance may be outside specifications if measured at high temperatures immediately after the vehicle has been running, measurement should be made when the engine has cooled down.



# VEHICLE LIFT AND SUPPORT LOCATIONS





**JACK POSITION** ————— 

Front ..... Engine under cover

Rear ..... Rear differential carrier

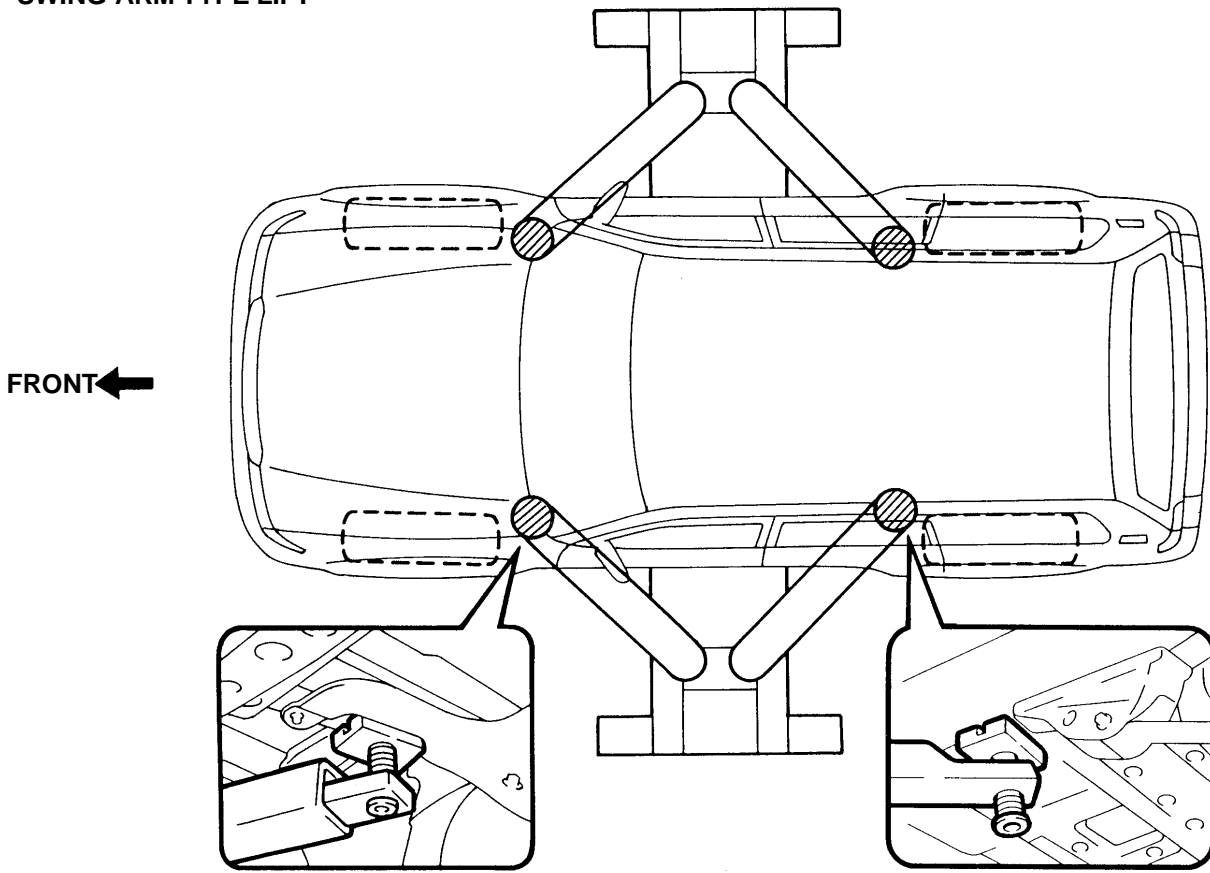
**CAUTION :** When jacking-up the front and rear, make sure the car is not carrying any extra weight.

**SCREW TYPE JACK POSITION** ————— 

**SUPPORT POSITION**  
Safety stand ..... 

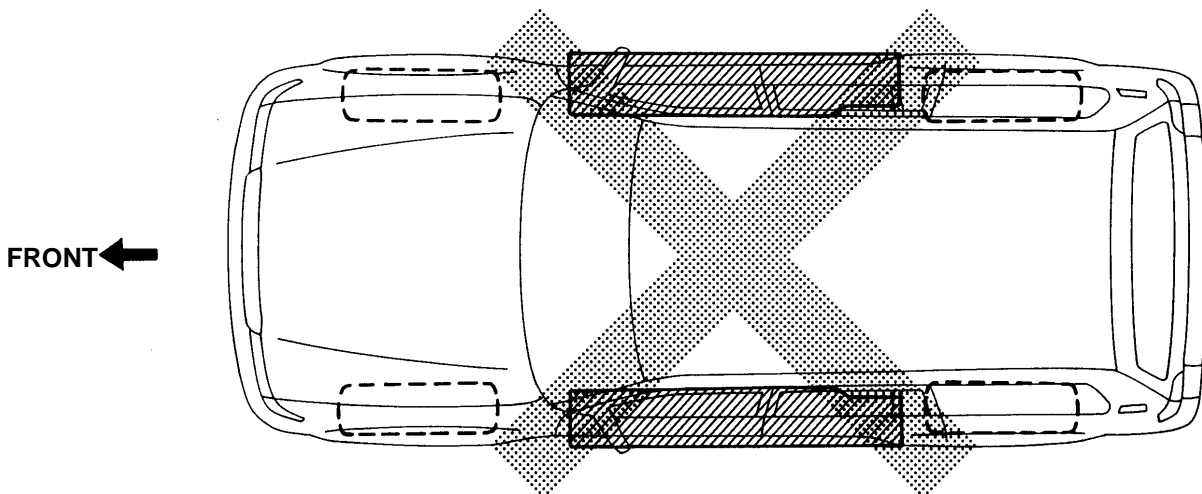
B04208

**SWING ARM TYPE LIFT**



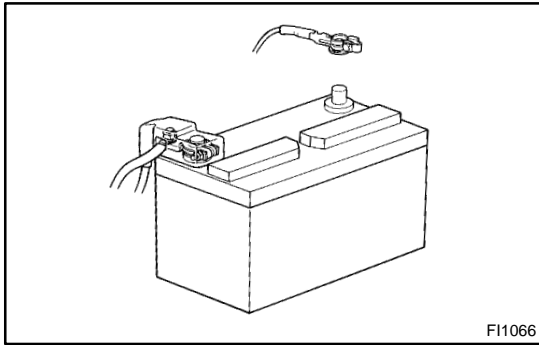
**NOTICE:** When lifting the vehicle, place the supports correctly at the positions shown above.

**PLATE TYPE LIFT (DO NOT USE.)**



**NOTICE:** Never use the plate type lift-using it to lift up the vehicle will cause the body shape to warp.

B04209



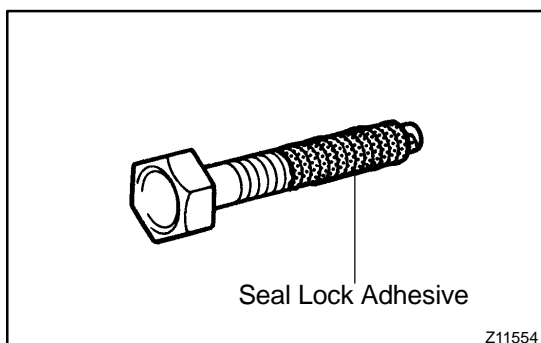
## REPAIR INSTRUCTIONS

### GENERAL INFORMATION

IN07M-02

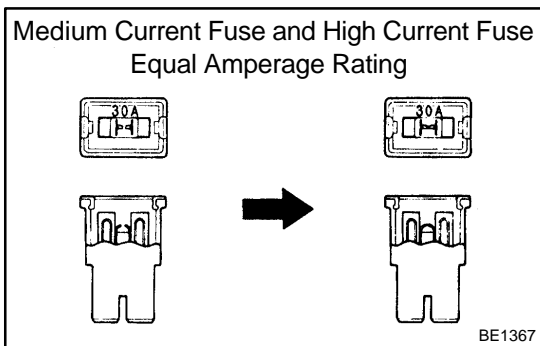
#### BASIC REPAIR HINT

- (a) Use fender, seat and floor covers to keep the vehicle clean and prevent damage.
- (b) During disassembly, keep parts in the appropriate order to facilitate reassembly.
- (c) Installation and removal of battery terminal:
  - (1) Before performing electrical work, disconnect the negative (-) terminal cable from the battery.
  - (2) If it is necessary to disconnect the battery for inspection or repair, first disconnect the negative (-) terminal cable.
  - (3) When disconnecting the terminal cable to prevent damage to battery terminal, loosen the cable nut and raise the cable straight up without twisting or prying it.
  - (4) Clean the battery terminals and cable ends with a clean shop rag. Do not scrape them with a file or other abrasive objects.
  - (5) Install the cable ends to the battery terminals after loosening the nut, and tighten the nut after installation. Do not use a hammer to tap the cable ends onto the terminals.
  - (6) Be sure the cover for the positive (+) terminal is properly in place.
- (d) Check hose and wiring connectors to make sure that they are connected securely and correctly.
- (e) Non-reusable parts
  - (1) Always replace cotter pins, gaskets, O-rings and oil seals, etc. with new ones.
  - (2) Non-reusable parts are indicated in the component illustrations by the "◀" symbol.



- (f) Precoated parts  
Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.
  - (1) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
  - (2) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

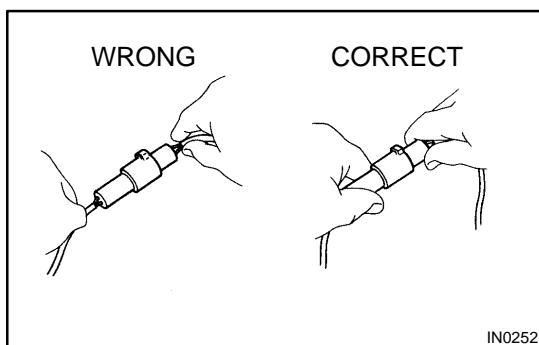
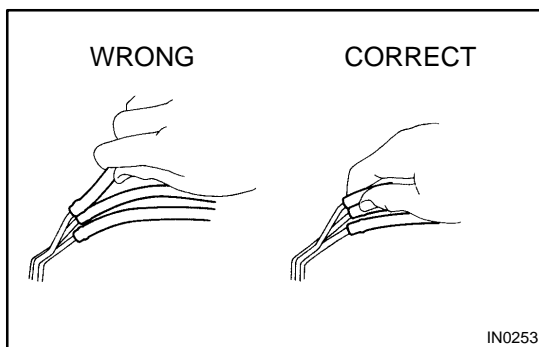
- (3) Precoated parts are indicated in the component illustrations by the "▶" symbol.
- (g) When necessary, use a sealer on gaskets to prevent leaks.
- (h) Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.
- (i) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found in Preparation section in this manual.



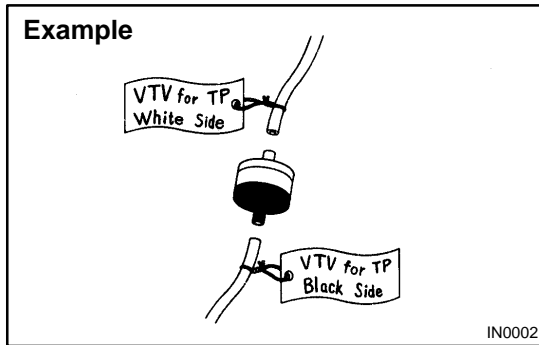
- (j) When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.

Illustration	Symbol	Part Name	Abbreviation
<p>BE5594</p>	<p>IN0365</p>	FUSE	FUSE
<p>BE5595</p>	<p>IN0366</p>	MEDIUM CURRENT FUSE	M-FUSE
<p>BE5596</p>	<p>IN0367</p>	HIGH CURRENT FUSE	H-FUSE
<p>BE5597</p>	<p>IN0367</p>	FUSIBLE LINK	FL
<p>BE5598</p>	<p>IN0368</p>	CIRCUIT BREAKER	CB

- (k) Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page [IN-8](#) ).
- \* Cancel the parking brake on the level place and shift the transmission in N position.
  - \* When jacking up the front wheels of the vehicle at first place stoppers behind the rear wheels.
  - \* When jacking up the rear wheels of the vehicle at first place stoppers before the front wheels.
  - \* When either the front or rear wheels only should be jacked up, set rigid racks and place stoppers in front and behind the other wheels on the ground.
  - \* After the vehicle is jacked up, be sure to support it on rigid racks. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.
- (l) Observe the following precautions to avoid damage to the following parts:
- (1) Do not open the cover or case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)

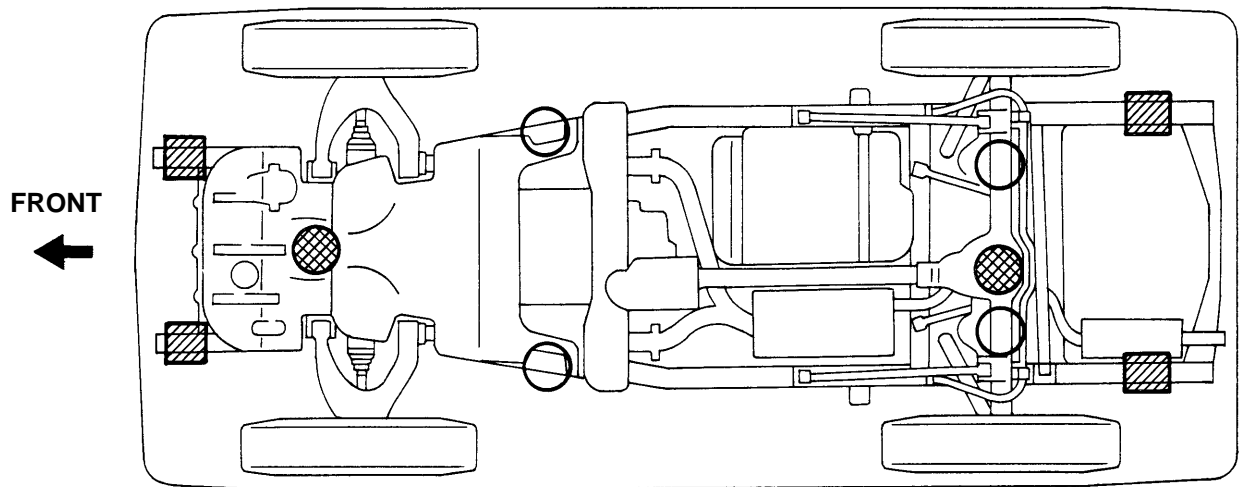



- (2) To disconnect vacuum hoses, pull off the end, not the middle of the hose.
- (3) To pull apart electrical connectors, pull on the connector itself, not the wires.
- (4) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.
- (5) When steam cleaning an engine, protect the electronic components, air filter and emission-related components from water.
- (6) Never use an impact wrench to remove or install temperature switches or temperature sensors.
- (7) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
- (8) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step-down adapter for adjustment. Once the hose has been stretched, it may leak air.



- (m) Installation and removal of vacuum hose:
- (1) When disconnecting vacuum hoses, use tags to identify how they should be reconnected to.
  - (2) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.
- (n) Bleeding of hydraulic brake booster system  
When repairing the hydraulic brake booster or ABS, bleeding the air out of the hydraulic brake booster (See page [BR-4](#) ).
- (o) Unless otherwise stated, all resistance is measured at an ambient temperature of 20°C (68°F). Because the resistance may be outside specifications if measured at high temperatures immediately after the vehicle has been running, measurement should be made when the engine has cooled down.

# VEHICLE LIFT AND SUPPORT LOCATIONS





**JACK POSITION** ————— 

Front ..... Engine under cover

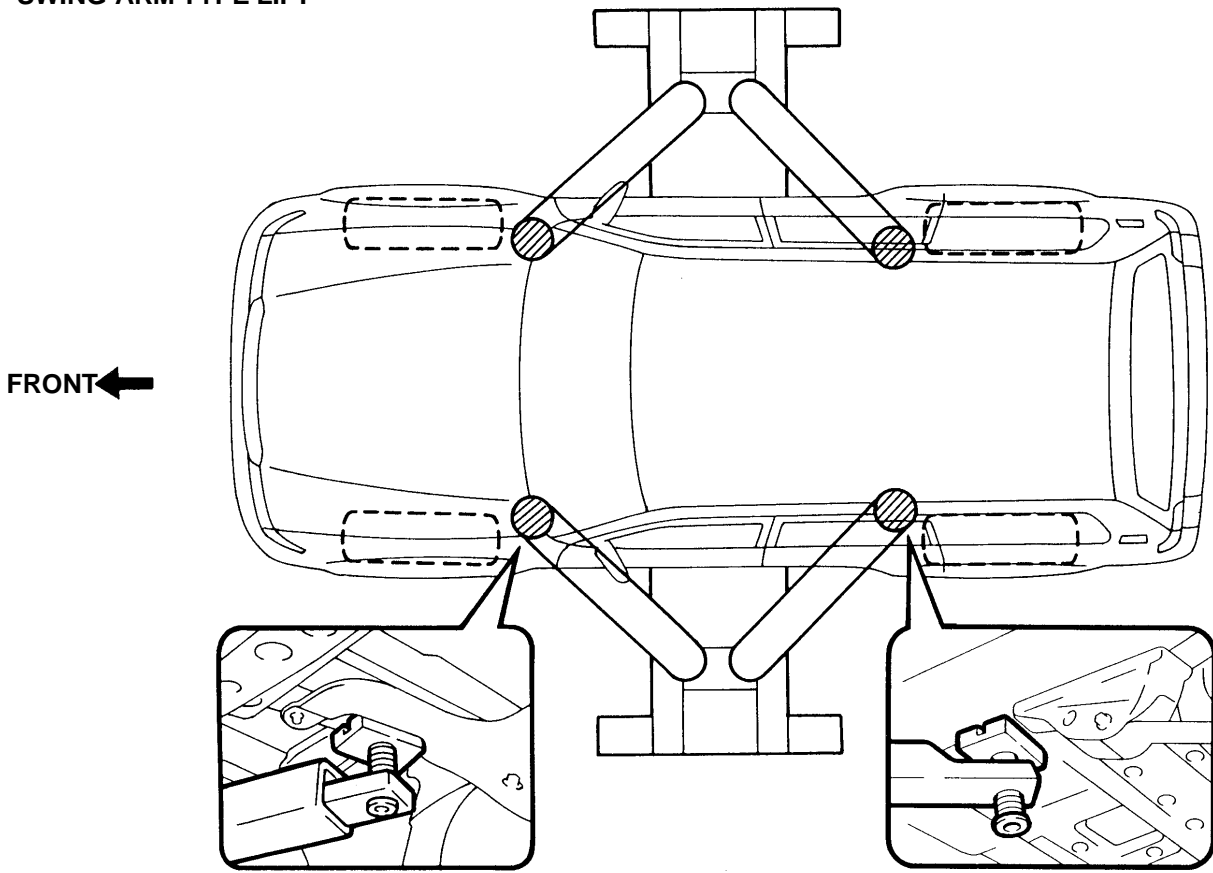
Rear ..... Rear differential carrier

**CAUTION :** When jacking-up the front and rear, make sure the car is not carrying any extra weight.

**SCREW TYPE JACK POSITION** ————— 

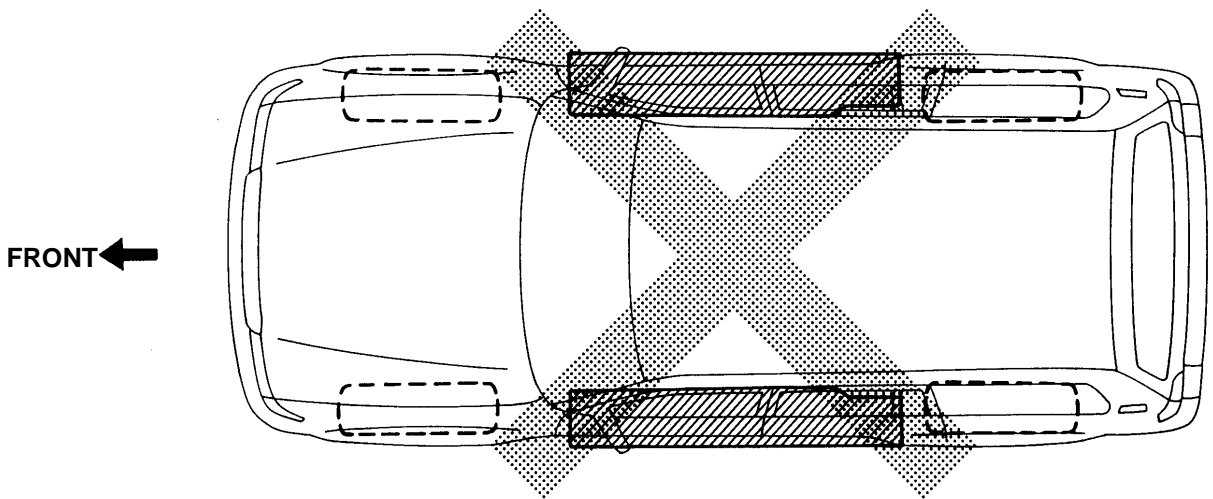
**SUPPORT POSITION**  
Safety stand ..... 

**SWING ARM TYPE LIFT**



**NOTICE:** When lifting the vehicle, place the supports correctly at the positions shown above.

**PLATE TYPE LIFT (DO NOT USE.)**



**NOTICE:** Never use the plate type lift-using it to lift up the vehicle will cause the body shape to warp.

B04209



# BODY

MA02V-02

## INSPECTION

### 1. TIRE ROTATION

Check the owner's manual supplement in which the maintenance schedule is shown.

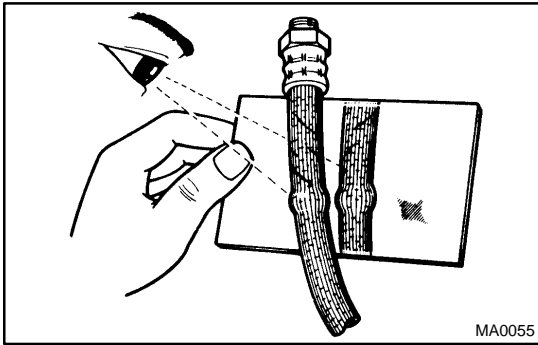
### 2. FINAL INSPECTION

(a) Check the operation of the body parts:

- ▶ Hood:
  - ▶ Auxiliary catch operates properly
  - ▶ Hood locks securely when closed
- ▶ Front and rear doors:
  - ▶ Door locks operate properly
  - ▶ Doors close properly
- ▶ Back door:
  - ▶ Door lock operates properly
- ▶ Seats:
  - ▶ Seat adjusts easily and locks securely in any position
  - ▶ Front seat back locks securely in any position
  - ▶ Folding-down rear seat backs lock securely.

(b) Be sure to deliver a clean car. Especially check:

- ▶ Steering wheel
- ▶ Shift lever knob
- ▶ All switch knobs
- ▶ Door handles
- ▶ Seats



## BRAKE INSPECTION

MA02T-02

### 1. INSPECT BRAKE LINE PIPES AND HOSES

#### HINT:

Check in a well lighted area. Check the entire circumference and length of the brake hoses using a mirror as required. Turn the front wheels fully right or left before checking the front brake.

- (a) Check the all brake lines and hoses for damage.
- (b) Check the all brake lines and hoses for wear.
- (c) Check the all brake lines and hoses for deformation.
- (d) Check the all brake lines and hoses for cracks.
- (e) Check the all brake lines and hoses for corrosion.
- (f) Check the all brake lines and hoses for leaks.
- (g) Check the all brake lines and hoses for bends.
- (h) Check the all brake lines and hoses for twists.
- (i) Check all clamps for tightness and connections for leakage.
- (j) Check that the hoses and lines are clear of sharp edges, moving parts and the exhaust system.
- (k) Check that the lines installed in grommets pass through the center of the grommets.

### 2. INSPECT FRONT AND REAR BRAKE PADS AND DISCS

(FRONT PADS: See page [BR-16](#) )

(REAR PADS: See page [BR-25](#) )

(FRONT DISCS: See page [BR-21](#) )

(REAR DISCS: See page [BR-30](#) )

### 3. INSPECT PARKING BRAKE LININGS AND DRUMS

(See page [BR-36](#) )

# CHASSIS INSPECTION

MA02U-07

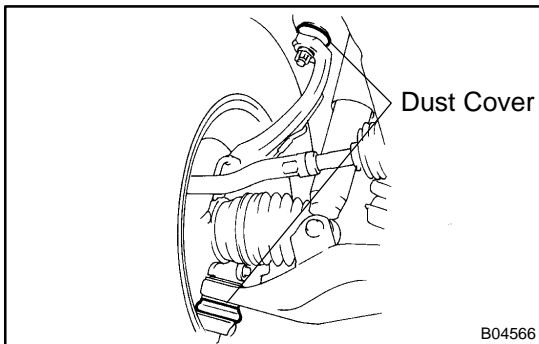
## 1. INSPECT STEERING LINKAGE

- (a) Check the steering linkage for looseness or damage.
- (b) Check the tie rod ends do not have excessive play.
- (c) Check the dust seals and boots are not damaged.
- (d) Check the boot clamps are not loose.
- (e) Check the inspect the dust cover for damage.

## 2. INSPECT SRS AIRBAG (See pages RS-18 , RS-32 )

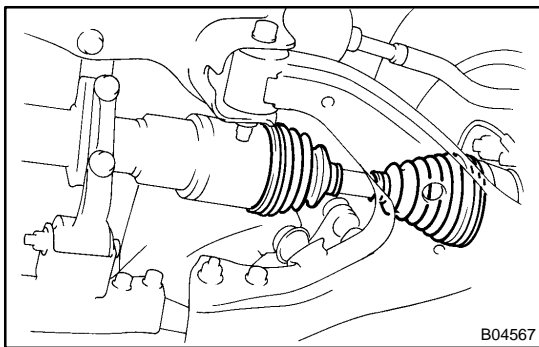
## 3. INSPECT STEERING GEAR HOUSING OIL

Check the steering gear housing for oil leakage.  
If leakage is found, check for cause and repair.



## 4. INSPECT BALL JOINTS AND DUST COVERS

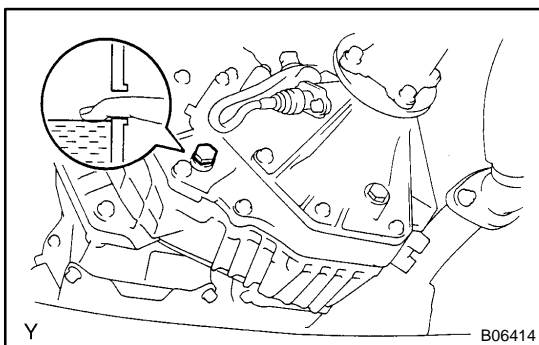
- (a) Jack up the front of the vehicle and support it with stands.
- (b) Make sure the front wheels are in a straight-ahead position, and depress the brake pedal.
- (c) Jack up the lower suspension arm until there is about half a load on the front suspension.
- (d) Inspect the dust cover for damage.



## 5. INSPECT DRIVE SHAFT BOOTS

Inspect the drive shaft boots for clamp looseness, grease leakage or damage.

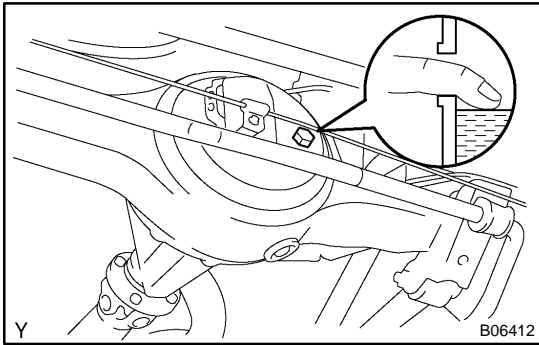
## 6. INSPECT AUTOMATIC TRANSMISSION OIL LEVEL (See page AT-3-1 )



## 7. INSPECT TRANSFER AND DIFFERENTIAL OIL LEVEL

- (a) Transfer:  
Remove the filler plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) of the bottom edge of the hole. If the level is low, add oil until it begins to run out of the filler hole.

**Transfer oil: See page TR-6**

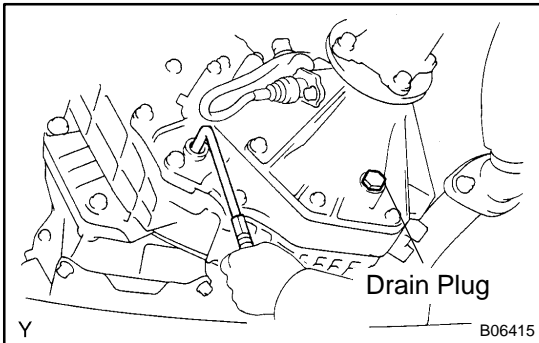


- (b) Differential:  
Remove the filler plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) of the bottom edge of the hole. If the level is low, add oil until it begins to run out of the filler hole.

**Front differential oil: See page SA-35**

**Rear differential oil: See page SA-95**

**8. REPLACE AUTOMATIC TRANSMISSION FLUID (See page AT-3-1 )**

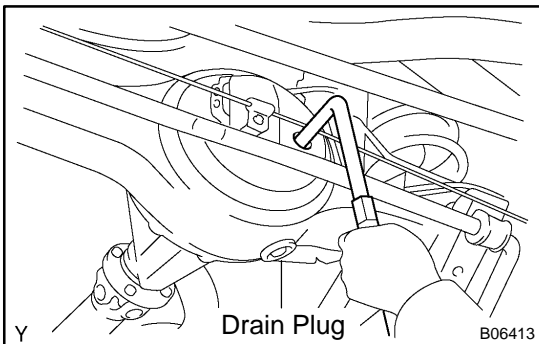


**9. REPLACE TRANSFER AND DIFFERENTIAL OIL**

- (a) Remove the drain plug and drain the oil.
- (b) Reinstall the drain plug securely.
- (c) Add new oil until it begins to run out of the filler hole.

**Transfer oil: See page TR-6**

**Front differential oil: See page SA-35**



**Rear differential oil: See page SA-95**

**10. REPACK FRONT WHEEL BEARINGS AND DRIVE SHAFT BUSHING GREASE**

- (a) Change the front wheel bearing grease (See page SA-16 ).

**NOTICE:**

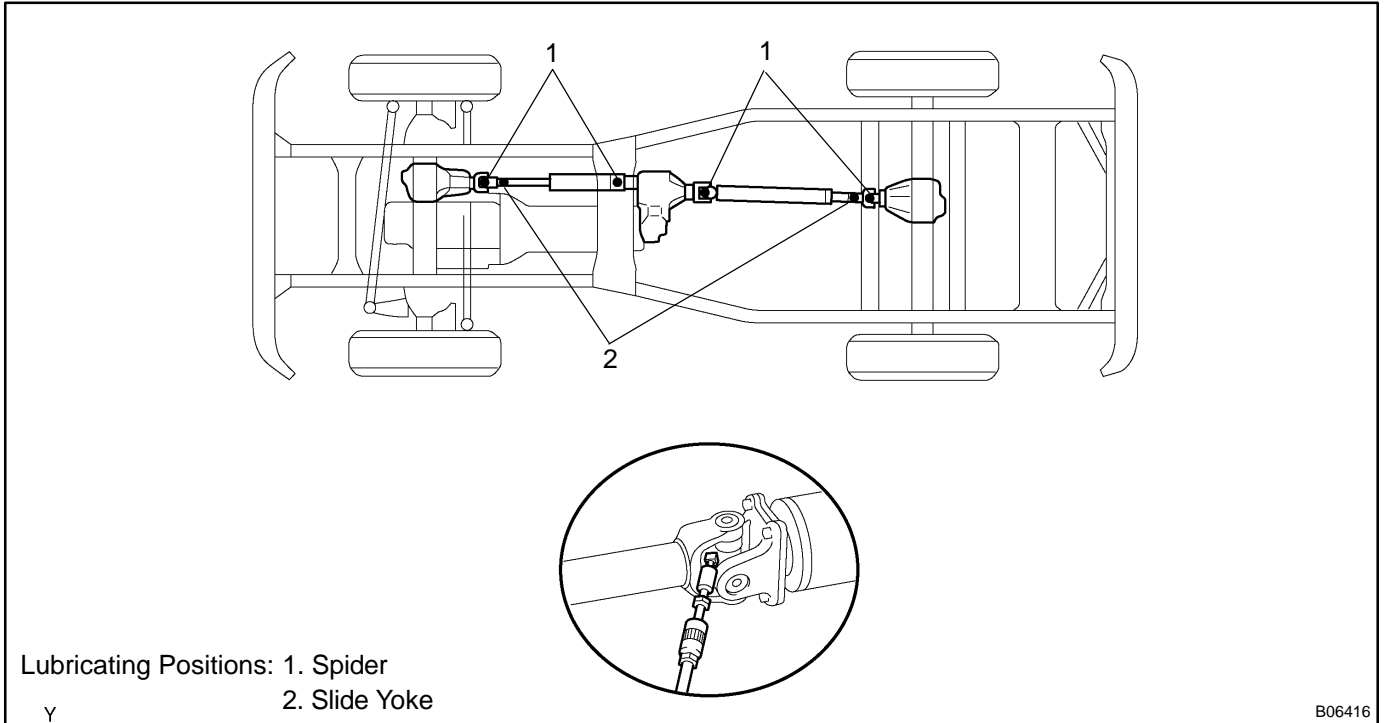
**Maintenance free for rear wheel bearing.**

- (b) Repack the drive shaft bushing grease (See page SA-33 ).

**11. LUBRICATE PROPELLER SHAFT AND TIGHTEN BOLTS**

- (a) Lubricate chassis components, referring to the lubrication chart. Before pumping in grease, wipe off any mud and dust on the grease fitting.

**Grease grade:  
Lithium base chassis grease (NLGI No.2)**



(b) Tightening bolts for propeller shaft (See page [PR-7](#)).

# ENGINE

## INSPECTION

MA02S-01

### HINT:

Inspect these items when the engine is cold.

1. **REPLACE TIMING BELT (See page [EM-15](#) )**
2. **INSPECT VALVE CLEARANCE (See page [EM-4](#) )**
3. **INSPECT DRIVE BELT (See page [CH-2](#) )**
4. **REPLACE ENGINE OIL AND OIL FILTER (See page [LU-2](#) )**
5. **REPLACE ENGINE COOLANT (See page [CO-2](#) )**
6. **INSPECT EXHAUST PIPES AND MOUNTINGS**

Visually inspect the pipes, hangers and connections for severe corrosion, leaks or damage.

7. **REPLACE AIR CLEANER FILTER**

Replace the air cleaner filter with a new one.

8. **INSPECT FUEL LINES, CONNECTIONS AND FUEL VAPOR CONTROL VALVE (See page [EC-5](#) )**

Visually inspect the fuel lines for cracks, leakage loose connections, deformation or tank band looseness.

9. **INSPECT GASKET IN FUEL TANK CAP (See page [EC-5](#) )**
10. **REPLACE SPARK PLUGS (See page [IG-1](#) )**
11. **California, Massachusetts and New York:**  
**INSPECT CHARCOAL CANISTER (See page [EC-5](#) )**

# INSIDE VEHICLE

MA02Q-01

## GENERAL MAINTENANCE

These are the maintenance and inspection items which are considered to be owner's responsibility. They can be done by the owner or be can have them done at a service shop. These items include those which should be checked on a daily basis, those which, in most cases, do not require (special) tools and those which are considered to be reasonable for the owner to do. Items and procedures for general maintenance are as follows.

### 1. GENERAL NOTES

- ▶ Maintenance items may vary from country and country. Check the owner's manual supplement in which the maintenance schedule is shown.
- ▶ Every service items in the periodic maintenance schedule must be performed.
- ▶ Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- ▶ Maintenance service after the last period should be performed at the same time interval as before unless otherwise noted.
- ▶ Failure to do even one item an cause the engine to run poorly and increase exhaust emissions.

### 2. LIGHTS

- (a) Check that the headlights, stop lights, taillights, turn signal lights, and other lights are all working.
- (b) Check the headlights aim.

### 3. WARNING LIGHTS AND BUZZERS

Check that all warning lights and buzzers function properly.

### 4. HORN

Check that it is working.

### 5. WINDSHIELD GLASS

Check for scratches, pits or abrasions.

### 6. WINDSHIELD WIPER AND WASHER

- (a) Check operation of the wipers and washer.
- (b) Check that the wipers do not streak.

### 7. WINDSHIELD DEFROSTER

Check that air comes out from the defroster outlet when operating the heater or air conditioner at defroster mode.

### 8. REAR VIEW MIRROR

Check that it is mounted securely.

### 9. SUN VISORS

Check that they move freely and mounted securely.

### 10. STEERING WHEEL

Check that it has the specified freeplay. Be alert for changes in steering condition, such as hard steering, excessive freeplay or strange noises.

### 11. SEATS

- (a) Check that all front seat controls such as seat adjusters, seatback recliner, etc. operate smoothly.
- (b) Check that all latches lock securely in any position.
- (c) Check that the head restraints move up and down smoothly and that the locks hold securely in any latch position.
- (d) For folding-down rear seat backs, check that the latches lock securely.

### 12. SEAT BELTS

- (a) Check that the seat belt system such as buckles, retractors and anchors operate properly and smoothly.
- (b) Check that the belt webbing is not cut, frayed, worn or damaged.

**13. ACCELERATOR PEDAL**

Check the pedal for smooth operation and uneven pedal effort or catching.

**14. BRAKE PEDAL (See page BR-9 )**

- (a) Check that pedal for smoothly operation.
- (b) Check that the pedal has the proper reserve distance and freeplay.

**15. BRAKE BOOSTER (See page BR-40 )**

Check the brake booster function.

**16. BRAKES**

At a safe place, check that the brakes do not pull to one side when applied.

**17. PARKING BRAKE (See page BR-14 )**

- (a) Check that the lever has the proper travel.
- (b) On a safe incline, check that the vehicle is held securely with only the parking brake applied.

**18. AUTOMATIC TRANSMISSION "PARK" MECHANISM**

- (a) Check the lock release button of the selector level for proper and smooth operation.
- (b) On a safe incline, check that the vehicle is held securely with the selector lever in the "P" position and all brakes released.



# OUTSIDE VEHICLE

## GENERAL MAINTENANCE

MA02P-02

These are some maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or they can have them done at a service shop. These items include those which should be checked on a daily basis, those which, in most cases, do not require (special) tools and those which are considered to be reasonable for the owner to do. Items and procedures for general maintenance are as follows.

### 1. GENERAL NOTES

- ▶ Maintenance items may vary from country and country. Check the owner's manual supplement in which the maintenance schedule is shown.
- ▶ Every service items in the periodic maintenance schedule must be performed.
- ▶ Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- ▶ Maintenance service after the last period should be performed at the same time interval as before unless otherwise noted.
- ▶ Failure to do even one item can cause the engine to run poorly and increase exhaust emissions.

### 2. TIRES

- (a) Check the pressure with a gauge. If necessary, adjust.
- (b) Check for cuts, damage or excessive wear.

### 3. WHEEL NUTS

When checking the tires, check the nuts for looseness or for missing nuts. If necessary, tighten them.

### 4. TIRE ROTATION

Check the owner's manual supplement in which the maintenance schedule is shown.

### 5. WINDSHIELD WIPER BLADES

Check for wear or cracks whenever they do not wipe clean. If necessary, replace.

### 6. FLUID LEAKS

- (a) Check underneath for leaking fuel, oil, water or other fluid.
- (b) If you smell gasoline fumes or notice any leak, have the cause found and corrected.

### 7. DOORS AND ENGINE HOOD

- (a) Check that all doors and the tailgate operate smoothly, and that all latches lock securely.
- (b) Check that the engine hood secondary latch secures the hood from opening when the primary latch is released.

# UNDER HOOD

MA02R-05

## GENERAL MAINTENANCE

### 1. GENERAL NOTICE

- ▶ Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- ▶ Every service item in the periodic maintenance schedule must be performed.
- ▶ Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- ▶ Maintenance services after the last period should be performed at the same interval as before unless otherwise noted.
- ▶ Failure to do even one item can cause the engine to run poorly and increase exhaust emissions.

### 2. WINDSHIELD WASHER FLUID

Check that there is sufficient fluid in the tank.

### 3. ENGINE COOLANT LEVEL

Check that the coolant level is between the LEVEL lines on the see-through reservoir at normal temperature (20°C (68°F)).

### 4. RADIATOR AND HOSES

- (a) Check that the front of the radiator is clean and not blocked with leaves, dirt or bugs.  
(See page [CO-14](#) )
- (b) Check the hoses for cracks, kinks, rot or loose connections.

### 5. BATTERY ELECTROLYTE LEVEL

- ▶ Check the indicator.
- ▶ When the indicator color is blue, the condition is satisfactory. A red color indicates that distilled water must be added, and white indicates that charging is necessary.

### 6. BRAKE FLUID LEVELS

Check that the brake fluid level is near the upper level line on the see-through reservoir.

(See page [BR-4](#) )

### 7. ENGINE DRIVE BELTS

Check drive belt for fraying, cracks, wear or oiliness.

### 8. ENGINE OIL LEVEL

Check the level on the dipstick with the engine turned off.

### 9. POWER STEERING FLUID LEVEL

- ▶ Check the level on the dipstick.
- ▶ The level should be in the "HOT" or "COLD" range depending on the fluid temperature.

### 10. AUTOMATIC TRANSMISSION FLUID LEVEL

Visually check the overflow plug and oil pan for fluid leaks or traces of fluid.

**11. EXHAUST SYSTEM**

Visually inspect for cracks, holes or loose supports.

If any change in the sound of the exhaust or smell of the exhaust fumes is noticed, have the cause located and corrected.

<b>DTC</b>	<b>Always ON</b>	<b>Malfunction in ECU VSC TRAC Warning Light Circuit</b>
------------	------------------	--

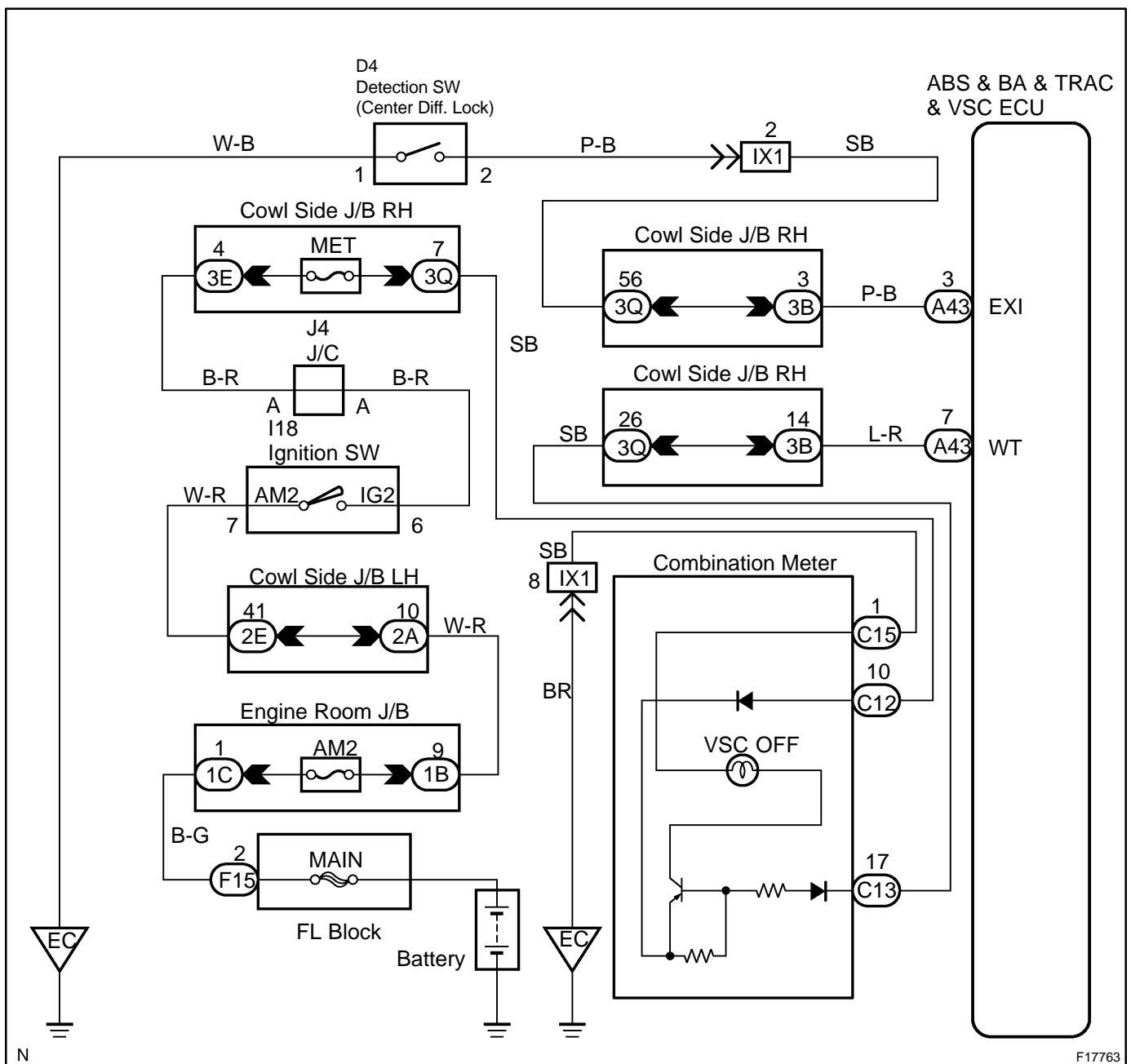
**CIRCUIT DESCRIPTION**

Always ON	There is a malfunction in the ECU internal circuit.	<ul style="list-style-type: none"> <li>▶ Power source circuit</li> <li>▶ Skid control ECU</li> <li>▶ VSC TRAC warning light circuit</li> </ul>
-----------	---	--

**HINT:**

If the fail safe function is activated in the VSC system, "VSC OFF" indicator light lights up.

**WIRING DIAGRAM**



## INSPECTION PROCEDURE

<b>1</b>	<b>Check that the ECU connectors are securely connected to the ECU.</b>
----------	---

<b>NO</b>	<b>Connect the connector to the ECU.</b>
-----------	--

<b>YES</b>
------------

<b>2</b>	<b>Is DTC output for VSC?</b>
----------	-------------------------------

Check the DTC on page [DI-505](#) .

<b>YES</b>	<b>Repair circuit indicated by the output code.</b>
------------	---

<b>NO</b>
-----------

<b>3</b>	<b>Does VSC TRAC warning light go off?</b>
----------	--

<b>YES</b>	<b>Check for open or short circuit in harness and connector between ECU-IG fuse and ECU (See page <a href="#">IN-36</a> ).</b>
------------	--

<b>NO</b>
-----------

<b>4</b>	<b>Check battery positive voltage.</b>
----------	--

**PREPARATION:**

Start the engine.

**CHECK:**

Check the battery positive voltage.

**OK:**

**Voltage: 10 to 16 V**

<b>NG</b>	<b>Check and repair the charging system.</b>
-----------	--

<b>OK</b>
-----------

<b>5</b>	<b>Check operation of the VSC TRAC warning light.</b>
----------	---

**In case of using the hand-held tester:**

**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the hand-held tester.

**CHECK:**

Check that "ON" and "OFF" of the VSC TRAC warning light can be shown on the combination meter on the hand-held tester.

**In case of not using the hand-held tester:**

**PREPARATION:**

- (a) Turn the ignition switch OFF.
- (b) Disconnect the connector from the skid control ECU.
- (c) Turn the ignition switch ON.

**CHECK:**

Check that the VSC TRAC warning light goes off.

**NG**

Check and replace combination meter (See page [BE-2](#)).

**OK**

<b>6</b>	<b>Check for short circuit in harness and connector between combination meter and skid control ECU, combination meter and DLC1 (See page <a href="#">IN-36</a>).</b>
----------	--

**NG**

Repair or replace harness or connector.

**OK**

Check and replace skid control ECU.



**INSPECTION PROCEDURE****HINT:**

Troubleshoot in accordance with the table below for each trouble symptom.

ABS warning light does not light up	*1
ABS warning light remains on	*2

\*1: Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

\*2: After inspection with step 4, start the inspection from step 5 in case of using the hand-held tester and start from step 6 in case of not using hand-held tester.

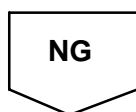
<b>1</b>	<b>Check operation of the ABS warning light.</b>
----------	--

**PREPARATION:**

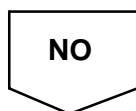
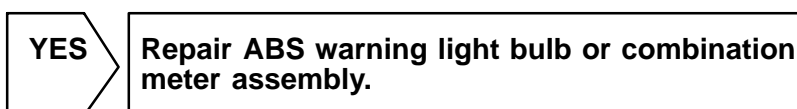
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the hand-held tester.

**CHECK:**

Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter on the hand-held tester.

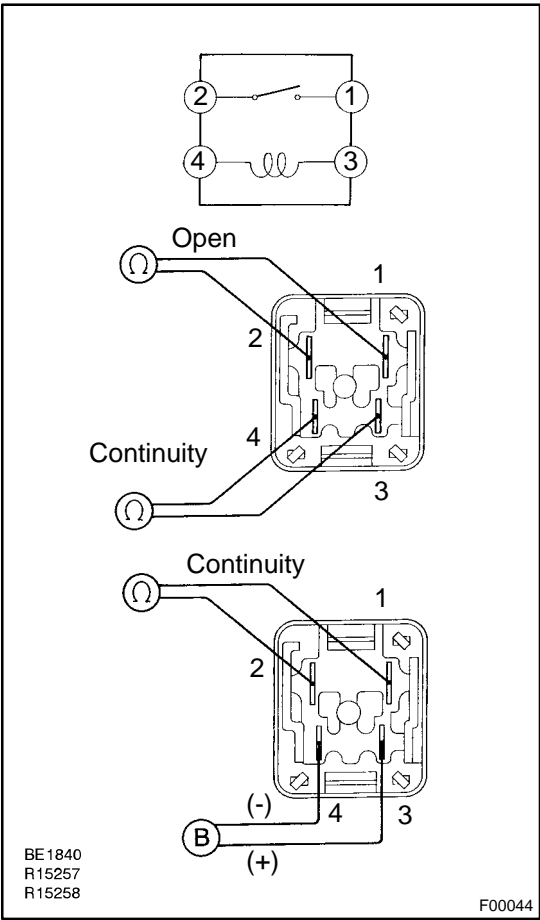


<b>2</b>	<b>Does the warning lights other than ABS warning light come on?</b>
----------	--





**3 Check IG1 No. 1 relay.**



**PREPARATION:**

Remove the IG1 No. 1 relay from the engine room J/B.

**CHECK:**

Check continuity between the IG1 No. 1 relay terminals listed in the table below.

**OK:**

Terminals 3 and 4	Continuity
Terminals 1 and 2	Open

**CHECK:**

- (a) Apply battery positive voltage between terminals 3 and 4.
- (b) Check continuity between terminals.

**OK:**

Terminals 1 and 2	Continuity
-------------------	------------

**NG** Replace IG1 No. 1 relay.

**OK**

Check for open circuit in harness and connector between IG1 No. 1 relay and combination meter (See page [IN-36](#)).

**4** Check that the ECU connectors are securely connected to the ECU.

**NO**

Connect the connector to the ECU.

**YES**

**5** Check operation of the ABS warning light (See step 1).

**OK**

Check and replace skid control ECU.

**NG**

**6** Is DTC output?

Check the DTC on page [DI-505](#) .

**YES**

Repair circuit indicated by the output code.

**NO**

**7** Check for short circuit in harness and connector between ABS warning light and skid control ECU (See page [IN-36](#) ).

**NG**

Repair or replace harness or connector.

**OK**

Check and repair skid control ECU.

<b>DTC</b>	<b>Always ON</b>	<b>Malfunction in ECU</b>
------------	------------------	---------------------------

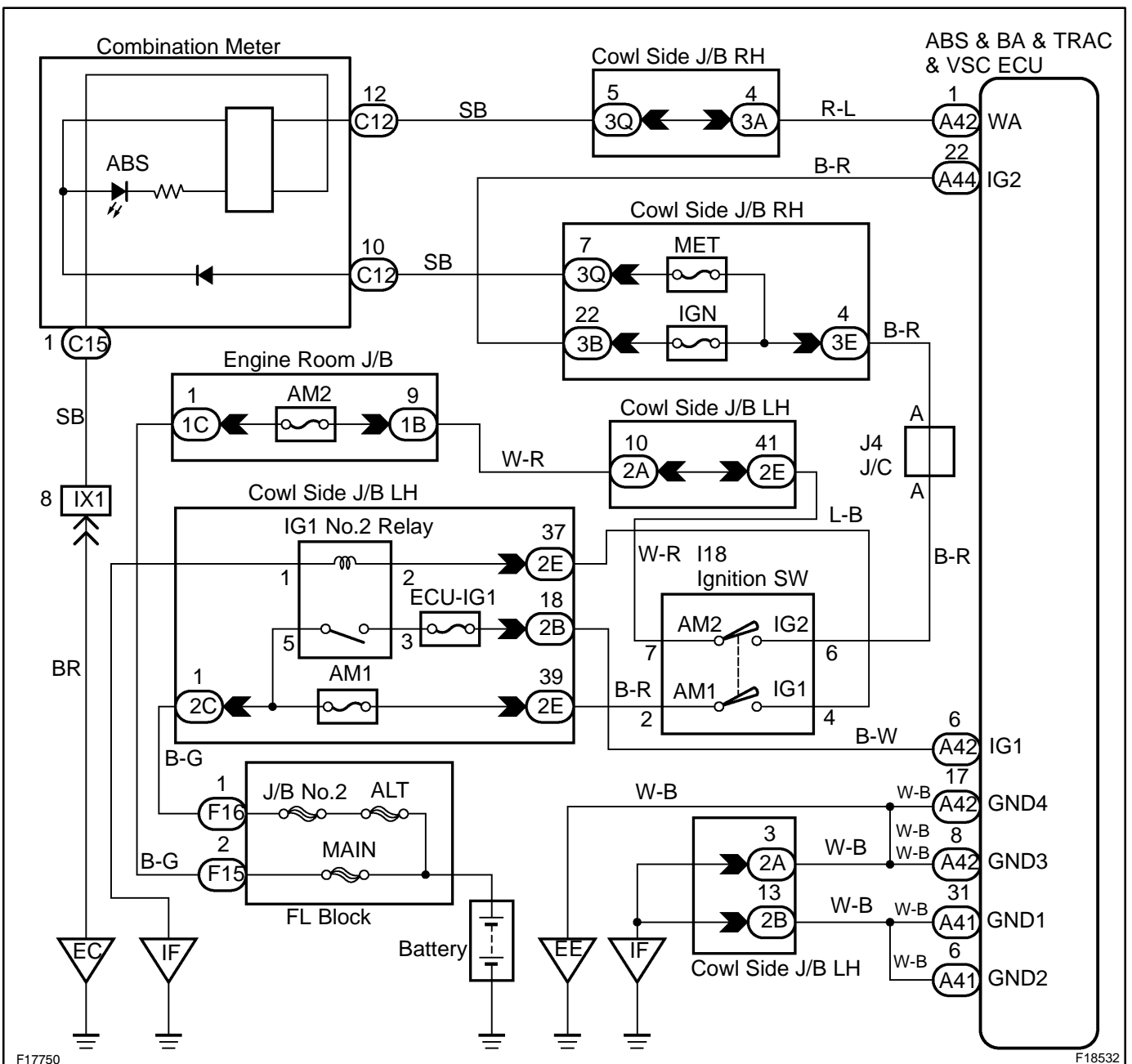
**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Either of the following 1. or 2. is detected: 1. The ECU connectors are disconnected from the ECU. 2. There is a malfunction in the ECU internal circuit.	<ul style="list-style-type: none"> <li>▶ Battery</li> <li>▶ C regulator</li> <li>▶ Power source circuit</li> <li>▶ Skid control ECU</li> </ul>

**HINT:**

The hand-held tester may not be used when the ECU is abnormal.

**WIRING DIAGRAM**



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check that the ECU connectors are securely connected to the ECU.</b>
----------	---

<b>NO</b>	<b>Connect the connector to the ECU.</b>
-----------	--

<b>YES</b>
------------

<b>2</b>	<b>Is DTC output?</b>
----------	-----------------------

Check the DTC on page [DI-505](#) .

<b>YES</b>	<b>Repair circuit indicated by the output code .</b>
------------	--

<b>NO</b>
-----------

<b>3</b>	<b>Does ABS warning light go off?</b>
----------	---------------------------------------

<b>YES</b>	<b>Check for open or short circuit in harness and connector between ECU-IG fuse and ECU (See page <a href="#">IN-36</a> ).</b>
------------	--

<b>NO</b>
-----------

<b>4</b>	<b>Check battery positive voltage.</b>
----------	--

**PREPARATION:**

Start the engine.

**CHECK:**

Check the battery positive voltage.

**OK:**

**Voltage: 10 to 14 V**

<b>NG</b>	<b>Check and repair the charging system.</b>
-----------	--

<b>OK</b>
-----------

<b>5</b>	<b>Check operation of the ABS warning light.</b>
----------	--

**In case of using the hand-held tester:**

**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the hand-held tester.

**CHECK:**

Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter by the hand-held tester.

**In case of not using the hand-held tester:**

**PREPARATION:**

- (a) Turn the ignition switch OFF.
- (b) Disconnect the connector from the skid control ECU.
- (c) Using a service wire, connect terminal WA of the skid control ECU harness side connector and body ground.
- (d) Turn the ignition switch ON.

**CHECK:**

Check that the ABS warning goes off.

<b>OK</b>	<b>Check and replace combination meter (See page <a href="#">BE-2</a>).</b>
-----------	---

**NG**

<b>6</b>	<b>Check for short circuit in harness and connector between combination meter and skid control ECU, combination meter and DLC1 (See page <a href="#">IN-36</a>).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

**OK**

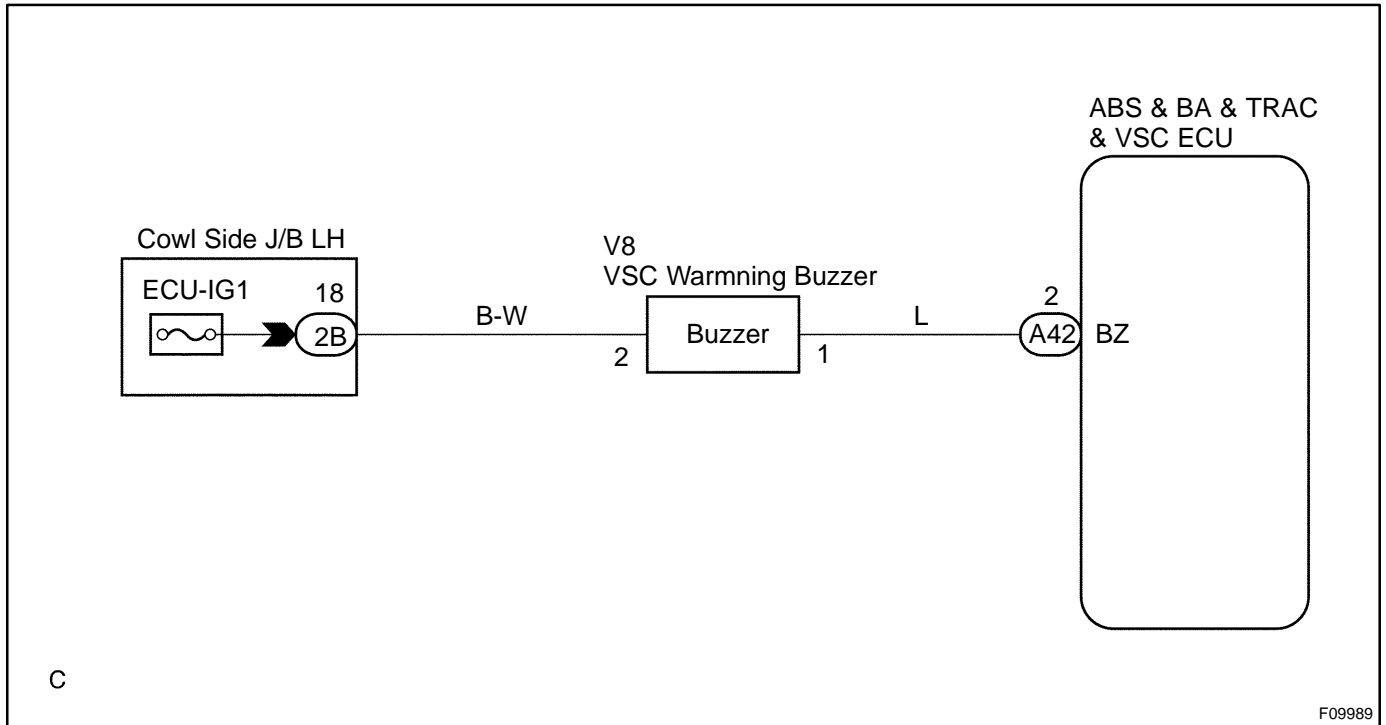
<b>Check and replace skid control ECU.</b>
--

## Brake Warning and VSC Buzzer Circuit

### CIRCUIT DESCRIPTION

The brake warning and VSC buzzer sounds while the accumulator pressure is abnormally low or an abnormality causing low fluid pressure occurs VSC is activated.

### WIRING DIAGRAM



### INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

<b>1</b>	<b>Check operation of the brake warning and VSC buzzer.</b>
----------	---

#### PREPARATION:

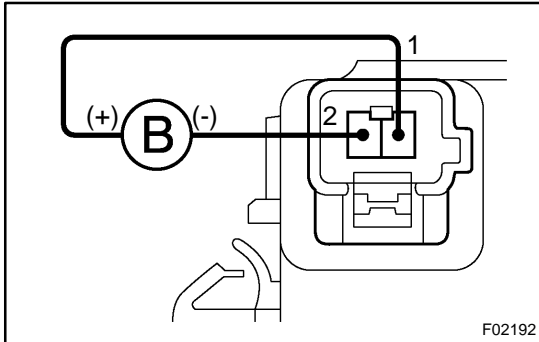
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the hand-held tester.

#### CHECK:

Check that brake warning and VSC buzzer sounds "ON" and "OFF" with the hand-held tester.

<b>OK</b>	<b>Check and replace skid control ECU.</b>
-----------	--

<b>NG</b>
-----------

**2 Check brake warning and VSC buzzer.****PREPARATION:**

Disconnect the brake warning and VSC buzzer connector.

**CHECK:**

Apply battery positive voltage to terminals 1 and 2 of the brake warning and VSC buzzer connector. Check that the brake warning light comes on and the VSC buzzer sounds.

**NG**

Replace brake warning and VSC buzzer.

**OK****3 Check for open and short circuit in harness and connector between skid control ECU and brake warning and VSC buzzer (See page [IN-36](#)).****NG**

Repair or replace harness or connector.

**OK**

Check and replace skid control ECU.





**INSPECTION PROCEDURE**

<b>1</b>	<b>Check parking brake switch circuit (See page <a href="#">BE-63</a> ).</b>
----------	--

<b>NG</b>	<b>Repair or replace parking brake switch circuit.</b>
-----------	--

<b>OK</b>
-----------

<b>2</b>	<b>Check brake fluid level warning switch circuit (See page <a href="#">BE-63</a> ).</b>
----------	--

<b>NG</b>	<b>Repair or replace brake fluid level warning switch circuit.</b>
-----------	--

<b>OK</b>
-----------

<b>3</b>	<b>Is DTC output for ABS?</b>
----------	-------------------------------

<b>YES</b>	<b>Repair circuit indicated by the output code.</b>
------------	---

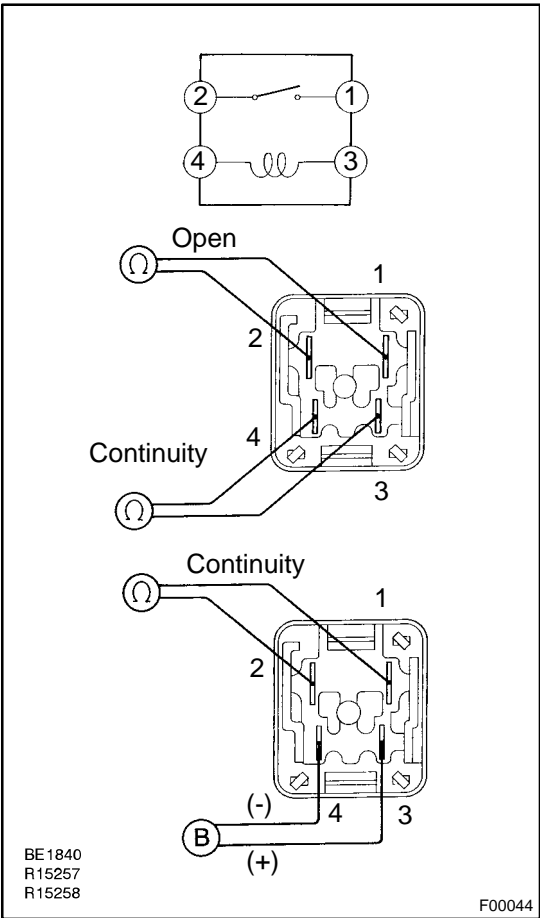
<b>NO</b>
-----------

<b>4</b>	<b>Do the warning lights other than BRAKE warning light come on?</b>
----------	--

<b>YES</b>	<b>Go to step 6.</b>
------------	----------------------

<b>NO</b>
-----------

**5 Check IG1 No. 1 relay.**



**PREPARATION:**

Remove the IG1 No. 1 relay from the engine room J/B.

**CHECK:**

Check continuity between the IG1 No. 1 relay terminals listed in the table below.

**OK:**

Terminals 3 and 4	Continuity
Terminals 1 and 2	Open

**CHECK:**

- (a) Apply battery positive voltage between terminals 3 and 4.
- (b) Check continuity between terminals.

**OK:**

Terminals 1 and 2	Continuity
-------------------	------------

**NG** Replace IG1 No. 1 relay.

**OK**

Check for open circuit in harness and connector between IG1 No. 1 relay and combination meter (See page IN-36).

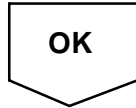
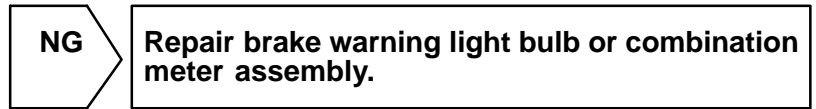
**6 Check that the ECU connectors are securely connected to the ECU.**

**NO** Connect the connector to the ECU.

**YES**

<b>7</b>	<b>Check BRAKE warning light.</b>
----------	-----------------------------------

Check if that the open circuit in the combination meter circuit (See page [BE-58](#) ).



<b>8</b>	<b>Check for short circuit in harness and connector between brake warning light and skid control ECU (See page <a href="#">IN-36</a> ).</b>
----------	---



<b>Check and repair skid control ECU.</b>
---

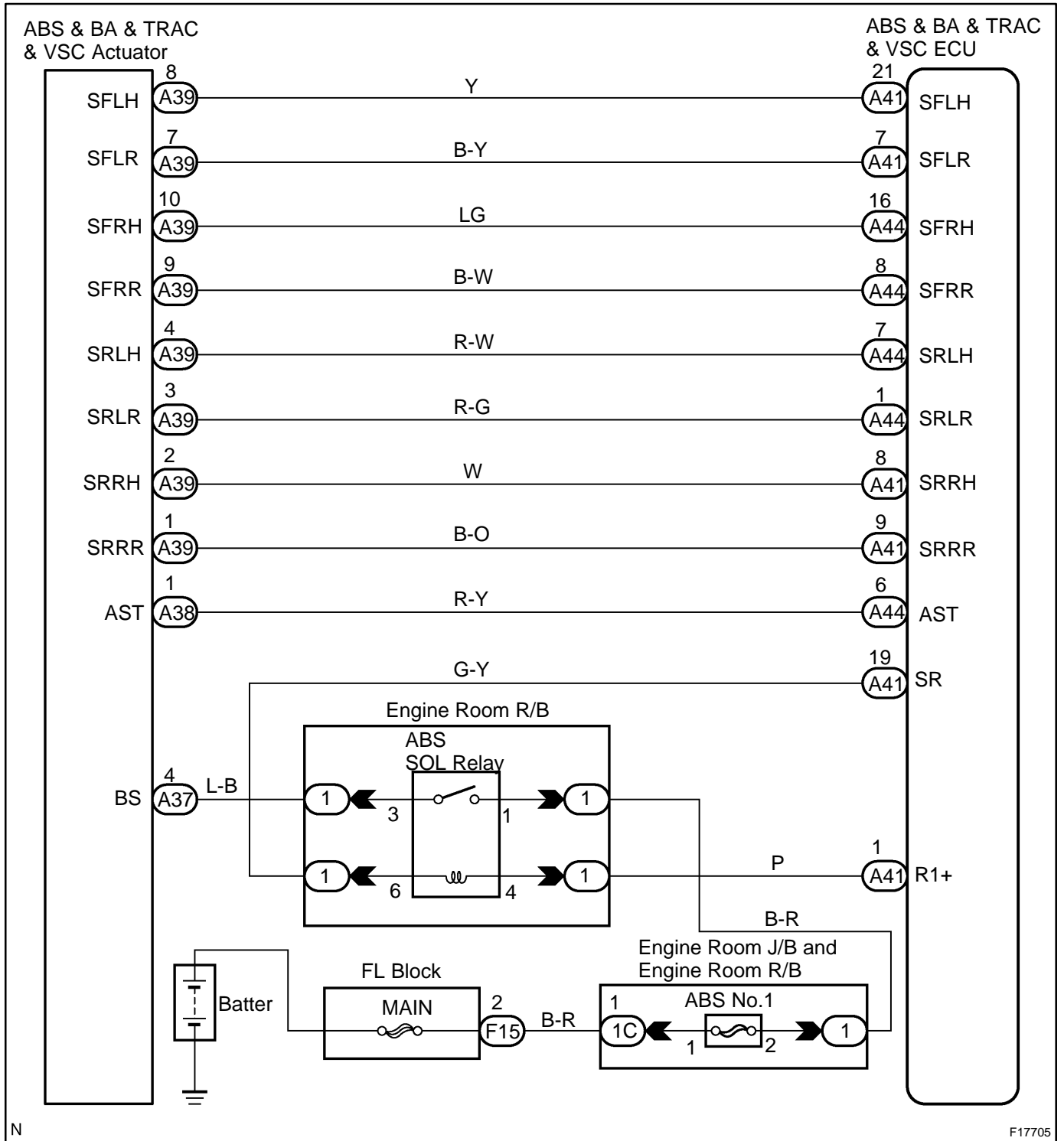
<b>DTC</b>	<b>C0226 / 21 - C0256 / 24</b>	<b>ABS Solenoid Circuit</b>
------------	--------------------------------	-----------------------------

## CIRCUIT DESCRIPTION

This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

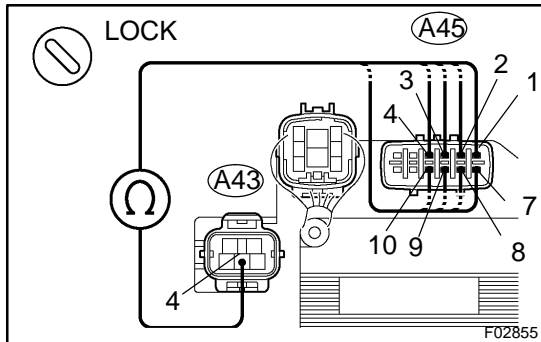
DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	Open or short in SFRH or SFRR circuit continues for 0.015 sec. or more.	▶Hydraulic brake booster ▶SFRH or SFRR circuit
C0236 / 22	Open or short in SFLH or SFLR circuit continues for 0.015 sec. or more.	▶Hydraulic brake booster ▶SFLH or SFLR circuit
C0246 / 23	Open or short in SRRH or SRRR circuit continues for 0.015 sec. or more.	▶Hydraulic brake booster ▶SRRH or SRRR circuit
C0256 / 24	Open or short in SRLH or SRLR circuit continues for 0.015 sec. or more.	▶Hydraulic brake booster ▶SRLH or SRLR circuit

WIRING DIAGRAM



N

F17705

**INSPECTION PROCEDURE****1 Check hydraulic brake booster solenoid.****PREPARATION:**

Disconnect the 2 connectors from the hydraulic brake booster.

**CHECK:**

Check continuity between terminals A43 - 4 and A45 - 1, 2, 3, 4, 7, 8, 9 and 10 of the hydraulic brake booster connector.

**OK:****Continuity****HINT:**

Resistance of each solenoid at 20 °C (68 °F):

SFRH, SFLH, SRRH, SRLH: 6.95 to 7.45 Ω

SFRR, SFLR, SRRR, SRLR: 2.00 to 2.40 Ω

**NG**

Replace hydraulic brake booster.

**OK****2 Check for open and short circuit in harness and connector between skid control ECU and actuator (See page IN-36 ).****NG**

Repair or replace harness or connector.

**OK**

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

<b>DTC</b>	<b>C0278 / 11, C0279 / 12</b>	<b>ABS Solenoid Relay Circuit</b>
------------	-------------------------------	-----------------------------------

**CIRCUIT DESCRIPTION**

This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
C0278 / 11	Conditions 1. and 2. continue for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.0 V and the solenoid relay is ON, however, the contact point of the solenoid relay is OFF. 2. With solenoid relay ON, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the solenoid relay does not become ON.	<ul style="list-style-type: none"> <li>▶ABS solenoid relay</li> <li>▶ABS solenoid relay circuit</li> </ul>
C0279 / 12	Immediately after ECU terminal IG1 becomes ON, and solenoid relay is OFF, however, when the condition that the solenoid relay due to the contact point is ON continues for 0.2 sec. or more.	

**WIRING DIAGRAM**

Refer to DTC C0226/21 on page [DI-528](#) .

**INSPECTION PROCEDURE**

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

<b>1</b>	<b>Check ABS solenoid relay operation.</b>
----------	--

**PREPARATION:**

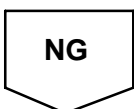
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the hand-held tester.

**CHECK:**

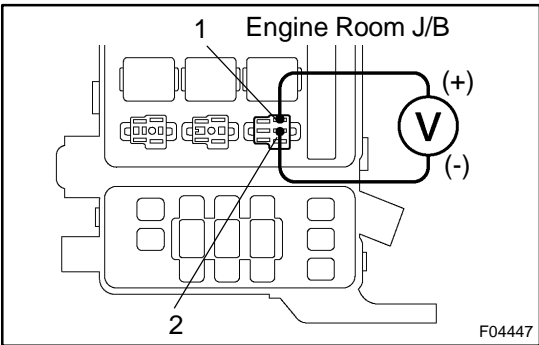
Check the operation sound of the ABS solenoid relay when operating it with the hand-held tester.

**OK:**

The operation sound of the ABS solenoid relay should be heard.



**2 Check voltage between terminals 1 and 2 of engine room J/B (for ABS solenoid relay).**



**PREPARATION:**

Remove the ABS solenoid relay from the engine room J/B.

**CHECK:**

Measure the voltage between terminals 1 and 2 of the engine room J/B (for ABS solenoid relay).

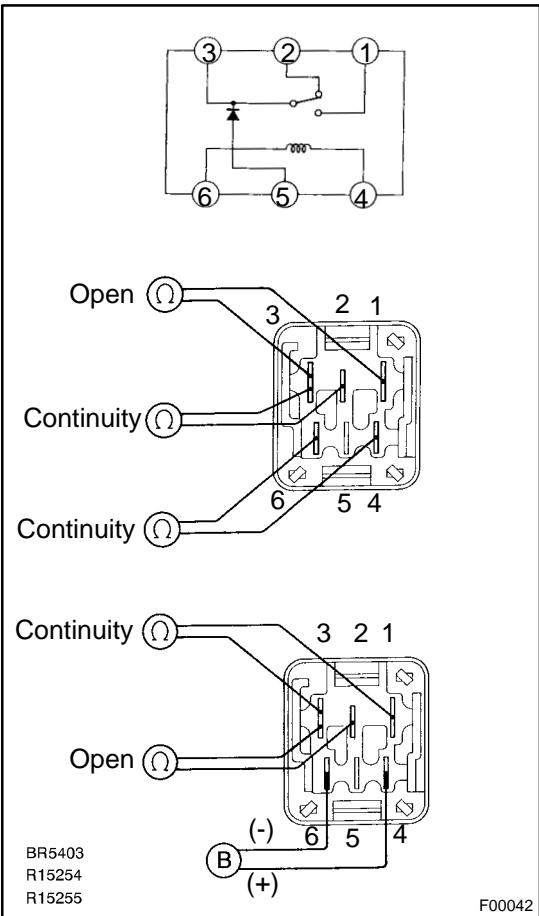
**OK:**

**Voltage: 10 to 14 V**

**NG** Check and repair harness or connector.

**OK**

**3 Check ABS solenoid relay.**



**CHECK:**

Check continuity between each terminal of the ABS solenoid relay.

**OK:**

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

**CHECK:**

- (a) Apply battery positive voltage between terminals 4 and 6.
- (b) Check continuity between each terminal of the ABS solenoid relay.

**OK:**

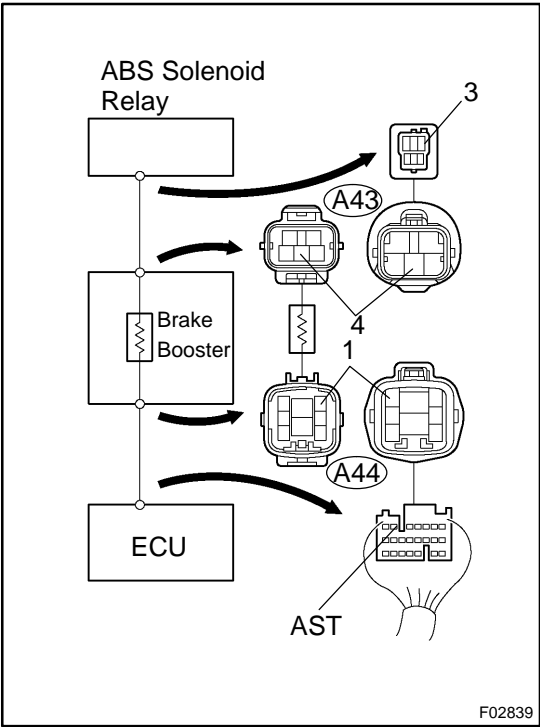
Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

**NG** Replace ABS solenoid relay.

**OK**



**4 Check continuity between terminals 3 of ABS solenoid relay and terminal AST of skid control ECU.**



**CHECK:**  
Check continuity between terminal 3 of the ABS solenoid relay and terminal AST of the skid control ECU.

**OK:**  
**Continuity**

**HINT:**  
There is resistance of  $33 \pm 3 \Omega$  between terminals 4 of connector A43 and terminal 1 of connector A44.

**NG** Repair or replace harness, connector or hydraulic brake booster.

**OK**

**5 Check for open and short circuit in harness and connector between ABS solenoid relay and skid control ECU (See page IN-36).**

**NG** Repair or replace harness or connector.

**OK**

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

<b>6</b>	<b>Check for open circuit in harness and connector between AST of hydraulic brake booster and AST of skid control ECU (See page <a href="#">IN-36</a>).</b>
----------	---

**NG**

**Repair or replace harness or connector.**

**OK**

**Replace hydraulic brake booster or skid control ECU.**

<b>DTC</b>	<b>C1201 / 51</b>	<b>Engine Control System Malfunction</b>
------------	-------------------	--

### CIRCUIT DESCRIPTION

If trouble occurs in the engine control system, the ECU prohibits TRAC and VSC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51	Conditions 1. and 2. continue for 5 sec.: 1. Engine speed: 500 rpm or more. 2. A trouble signal in the engine control system is input.	Engine control system

### INSPECTION PROCEDURE

1	<b>Check the DTC for the engine (See page <a href="#">DI-3</a>).</b>
---	--

\*1

**Repair engine control system according to the output code.**

\*2

**Check for ECM connected to malfunction indicator light.**

\*1: Output NG code

\*2: Malfunction indicator light remains ON

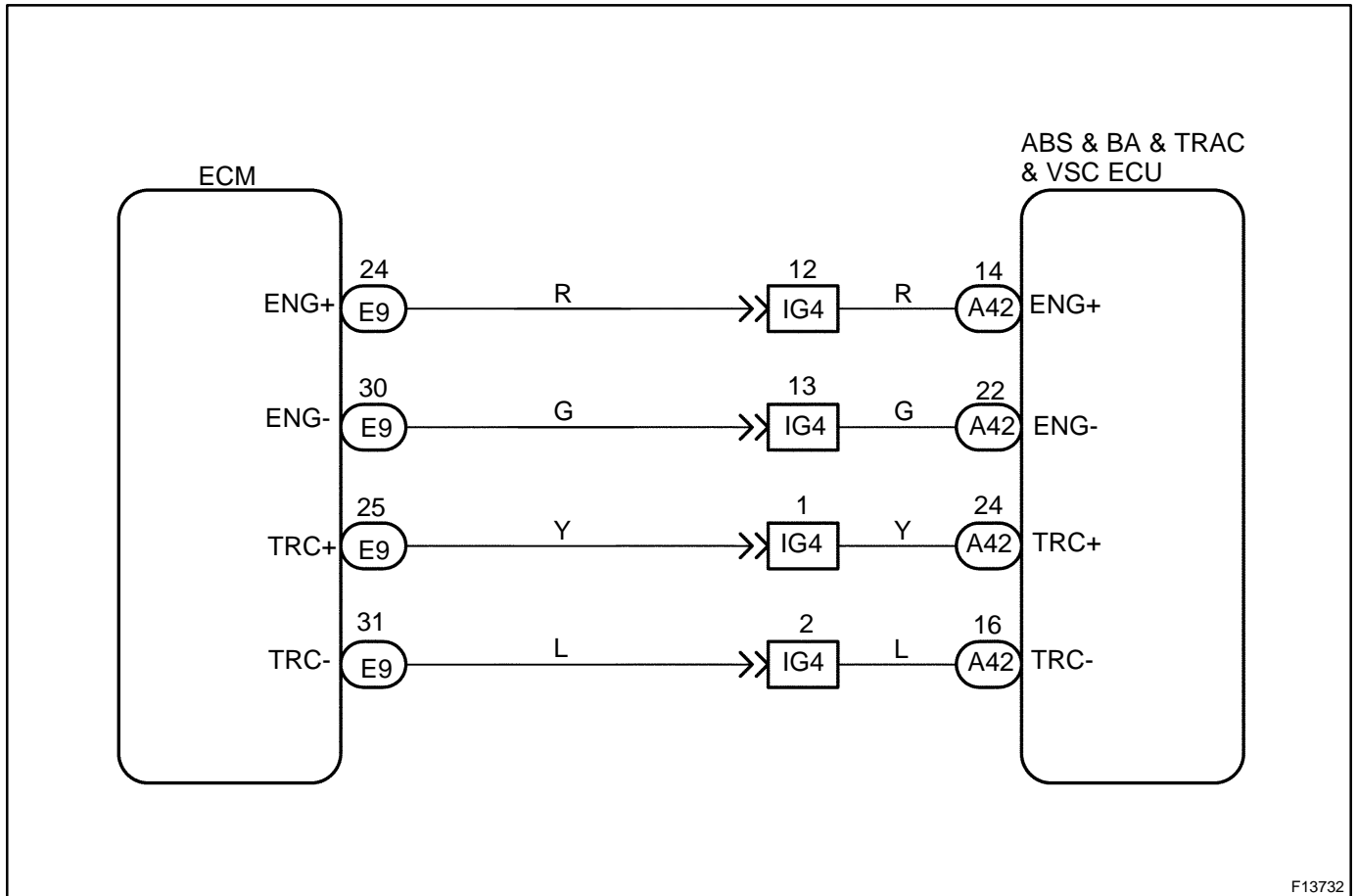
<b>DTC</b>	<b>C1203 / 53</b>	<b>ECM Communication Circuit Malfunction</b>
------------	-------------------	--

**CIRCUIT DESCRIPTION**

The circuit is used to send TRAC & VSC control information from the skid control ECU to the ECM (TRC+, TRC-), and engine control information from the ECM to the skid control ECU (ENG+, ENG-).

DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	Either of the following 1. or 2. continues for 5 sec.: 1. ECU IG1 terminal voltage is 9.5 V to 17.0 V and data transmission to the ECM is impossible. 2. ECU IG1 terminal voltage is 9.5 V to 17.0 V, engine speed is 500 rpm or more or vehicle speed is 60 km/h (36 mph) or more and data receiving from the ECM is impossible.	►TRC+ or TRC- circuit ►ENG+ or ENG- circuit ►ECM

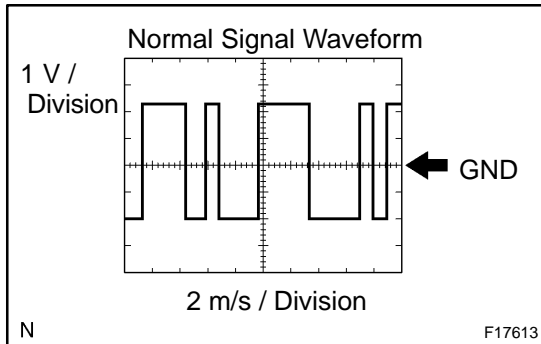
**WIRING DIAGRAM**



F13732

## INSPECTION PROCEDURE

<b>1</b>	<b>Check skid control ECU communication.</b>
----------	--



**(REFERENCE) INSPECTION USING OSCILLOSCOPE**

**PREPARATION:**

- (a) Remove the skid control ECU.
- (b) Connect the oscilloscope to each of terminal ENG+ or TRC+ and GND of the skid control ECU.

**CHECK:**

Start the engine, and check the signal waveform.

<b>NG</b>	<b>Check and replace skid control ECU.</b>
-----------	--

<b>OK</b>
-----------

<b>2</b>	<b>Check for open and short circuit in harness and connector between each of terminals ENG+, ENG-, TRC+, TRC- of skid control ECU and ECM (See page <a href="#">IN-36</a>).</b>
----------	---

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

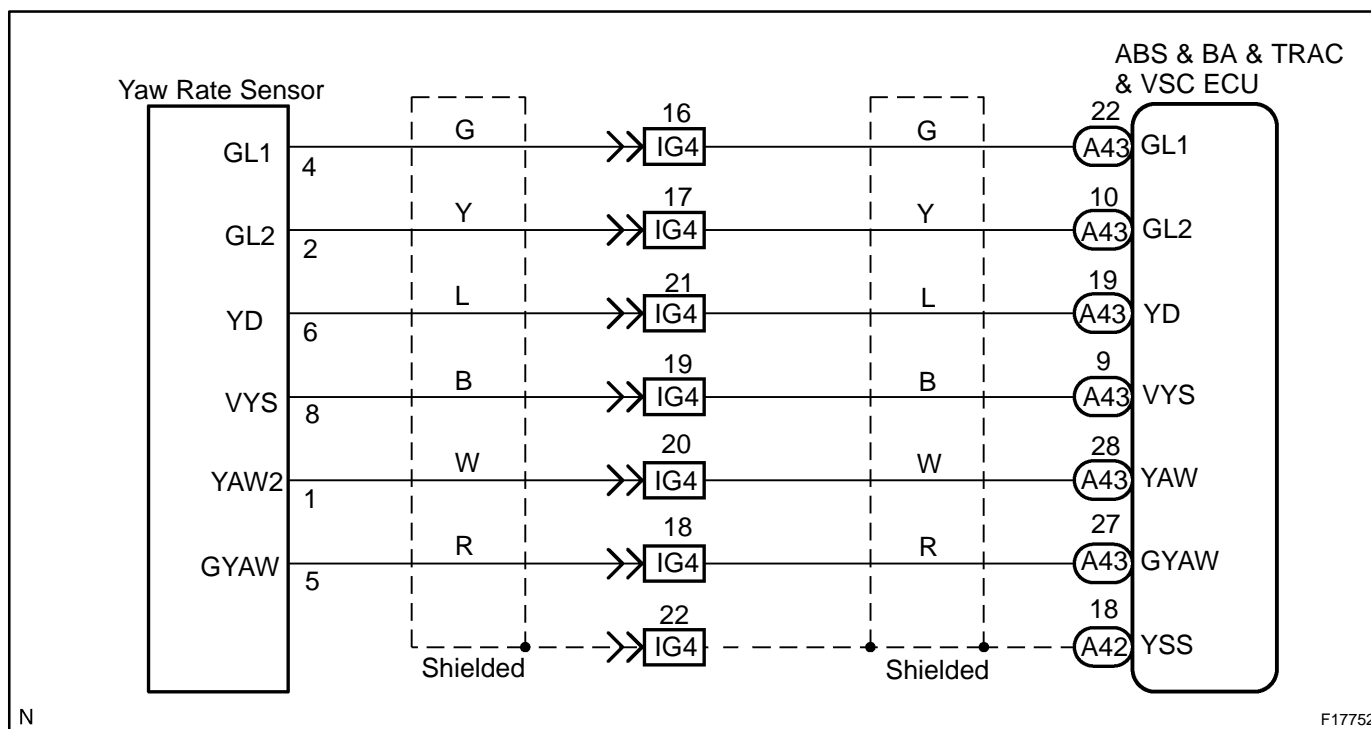
<b>Check and replace ECM.</b>
-------------------------------

<b>DTC</b>	<b>C1210 / 36</b>	<b>Zero Point Calibration of Yaw Rate Sensor Undone</b>
------------	-------------------	---

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1210 / 36	When either of the following 1. or 2. is detected: 1. After battery terminal was connected, when the shift lever was moved to other than P position within 15 sec. soon after ECU terminal IG1 becomes ON for the first time. 2. When the yaw rate sensor zero point recorded in ECU is deleted.	▶Yaw rate sensor ▶Yaw rate sensor circuit ▶PNP switch circuit (P position)

**WIRING DIAGRAM**



N

F17752

## INSPECTION PROCEDURE

<b>1</b>	<b>Check whether zero point calibration of yaw rate sensor has been done or not.</b>
----------	--

**PREPARATION:**

Shift the shift lever in the P position and turn the ignition switch ON. Repeat connecting and releasing Ts and E<sub>1</sub> terminals of the DLC1 4 times or more for 8 sec. After that do not move the vehicle for 15 sec. or more.

**CHECK:**

Check that the "VSC TRAC" warning light and "VSC OFF" indicator light light up for 15 sec.

<b>OK</b>	<b>No problem.</b>
-----------	--------------------

<b>NG</b>
-----------

<b>2</b>	<b>Check for open and short circuit in harness and connector between PNP switch (P position) and skid control ECU and ECM (See page <a href="#">IN-36</a>).</b>
----------	---

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

<b>3</b>	<b>Check for open and short circuit in harness and connector between yaw rate sensor and skid control ECU (See page <a href="#">IN-36</a>).</b>
----------	---

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

<b>4</b>	<b>Check yaw rate sensor (See page <a href="#">DI-553</a>).</b>
----------	---

<b>NG</b>	<b>Replace yaw rate sensor.</b>
-----------	---------------------------------

<b>OK</b>
-----------

<b>Check and replace skid control ECU.</b>
--

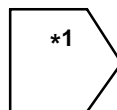
<b>DTC</b>	<b>C1223 / 43</b>	<b>ABS Control System Malfunction</b>
------------	-------------------	---------------------------------------

## CIRCUIT DESCRIPTION

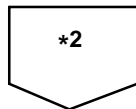
DTC No.	DTC Detecting Condition	Trouble Area
C1223 / 43	ABS control system is abnormal.	ABS control system

## INSPECTION PROCEDURE

<b>1</b>	<b>Check the DTC for the ABS (See page <a href="#">DI-505</a> ).</b>
----------	--



**Repair ABS control system according to the code output.**



**Check for ECU connected to malfunction indicator light.**

\*1: Output NG code

\*2: Malfunction indicator light remains ON



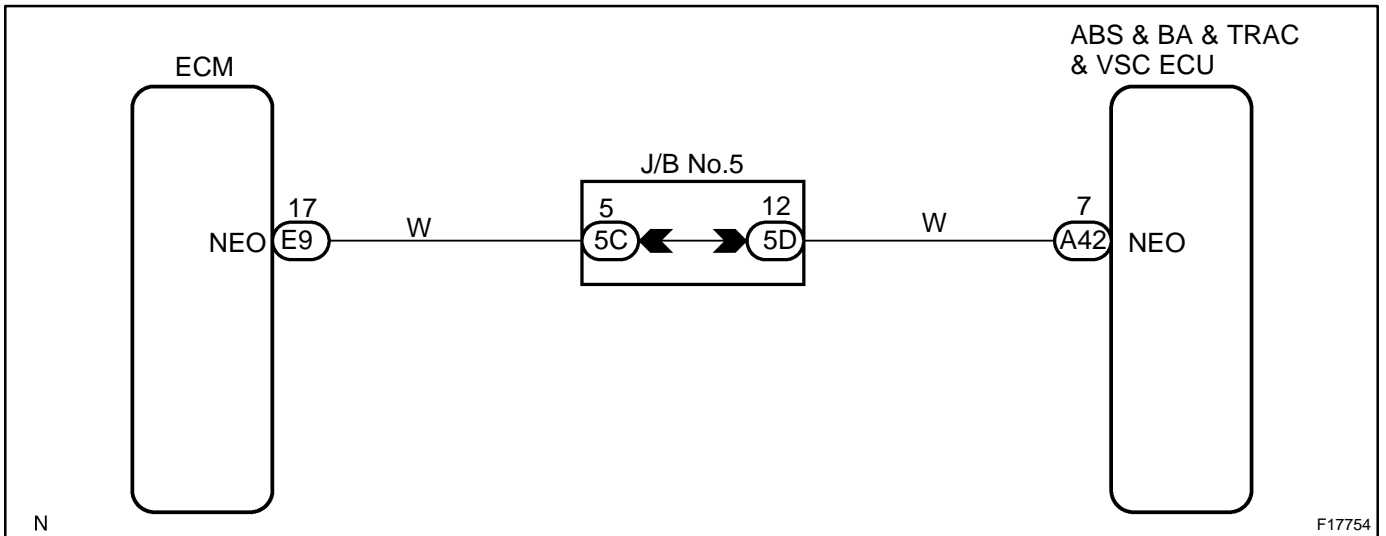
<b>DTC</b>	<b>C1224 / 44</b>	<b>NE Signal Circuit</b>
------------	-------------------	--------------------------

**CIRCUIT DESCRIPTION**

The skid control ECU receives engine revolution speed signals (NE signals) from the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
C1224 / 44	When either of the following 1. or 2. is detected: 1. At vehicle speed of 19 mph (30 km/h) or more, and when data received from the ECM is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more. 2. While TRAC is operating, the conditions that open or short circuit in engine revolution signal circuit is detected, main throttle opening degree is 0 and IDL switch is OFF continue for 0.24 sec. or more.	►NEO circuit ►ECM ►Skid control ECU

**WIRING DIAGRAM**

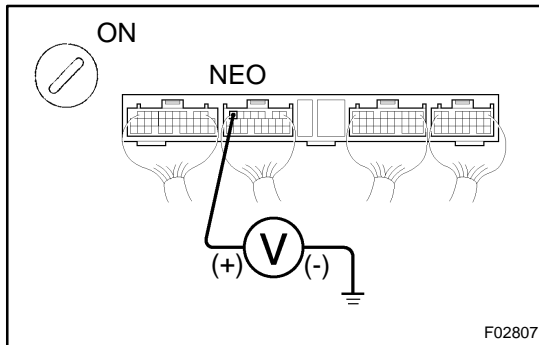


**INSPECTION PROCEDURE**

<b>1</b>	<b>Check for open and short circuit in harness and connector between terminal NEO of skid control ECU and terminal NEO of ECM (See page IN-36).</b>
----------	---

NG
Repair or replace harness and connector.

OK

**2 Check voltage between terminal NEO of skid control ECU and body ground.****PREPARATION:**

Remove the skid control ECU with connectors still connected.

**CHECK:**

- Turn the ignition switch ON.
- Measure voltage between terminal NEO of the skid control ECU and body ground for the engine conditions below.

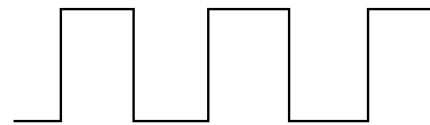
**OK:**

Engine condition	Voltage
OFF (IG ON)	10 to 14 V or below 1 V
ON (Idling)	10 to 14 V ↔ below 1 V (Pulse)

(Reference)

10 to 14 V

Below 1 V



F03007

**NG****Check and replace skid control ECU or ECM.****OK**

If the same codes are still output after the DTC is deleted, check the contact condition of each connection.

<b>DTC</b>	<b>C1225 / 25 to C1228 / 28</b>	<b>TRAC &amp; VSC Solenoid Circuit</b>
------------	---------------------------------	--

### CIRCUIT DESCRIPTION

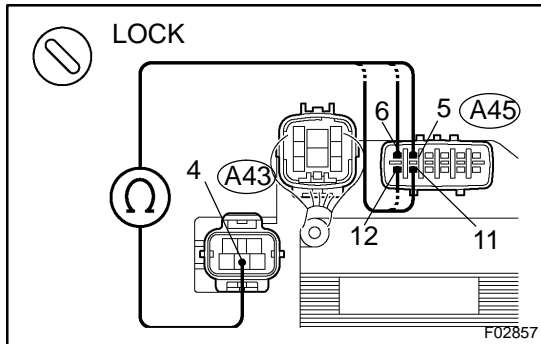
The TRAC & VSC solenoid operates in accordance with signals from the ECU and raises the fluid pressure in and releases it from the brake cylinders.

DTC No.	DTC Detecting Condition	Trouble Area
C1225 / 25	Open or short in SA1 circuit continues for 0.015 sec. or more.	▶Hydraulic brake booster ▶SA1 circuit
C1226 / 26	Open or short in SA2 circuit continues for 0.015 sec. or more.	▶Hydraulic brake booster ▶SA2 circuit
C1227 / 27	Open or short in SA3 circuit continues for 0.015 sec. or more.	▶Hydraulic brake booster ▶SA3 circuit
C1228 / 28	Open or short in STR circuit continues for 0.015 sec. or more.	▶Hydraulic brake booster ▶STR circuit



## INSPECTION PROCEDURE

<b>1</b>	<b>Check TRAC &amp; VSC solenoid.</b>
----------	---------------------------------------



**PREPARATION:**

Disconnect the 2 connectors from the hydraulic brake booster.

**CHECK:**

Check continuity between terminals A43 - 4 and A45 - 5, 6, 11 and 12 of the hydraulic brake booster.

**OK:**

**Continuity**

**HINT:**

Resistance of each solenoid at 20 °C (68 °F):

SA1, SA2, STR: 4.05 to 4.55 Ω

SA3: 6.95 to 7.45 Ω

<b>NG</b>	<b>Replace hydraulic brake booster.</b>
-----------	---

**OK**

<b>2</b>	<b>Check for open and short circuit in harness and connector between skid control ECU and hydraulic brake booster (See page <a href="#">IN-36</a> ).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

**OK**

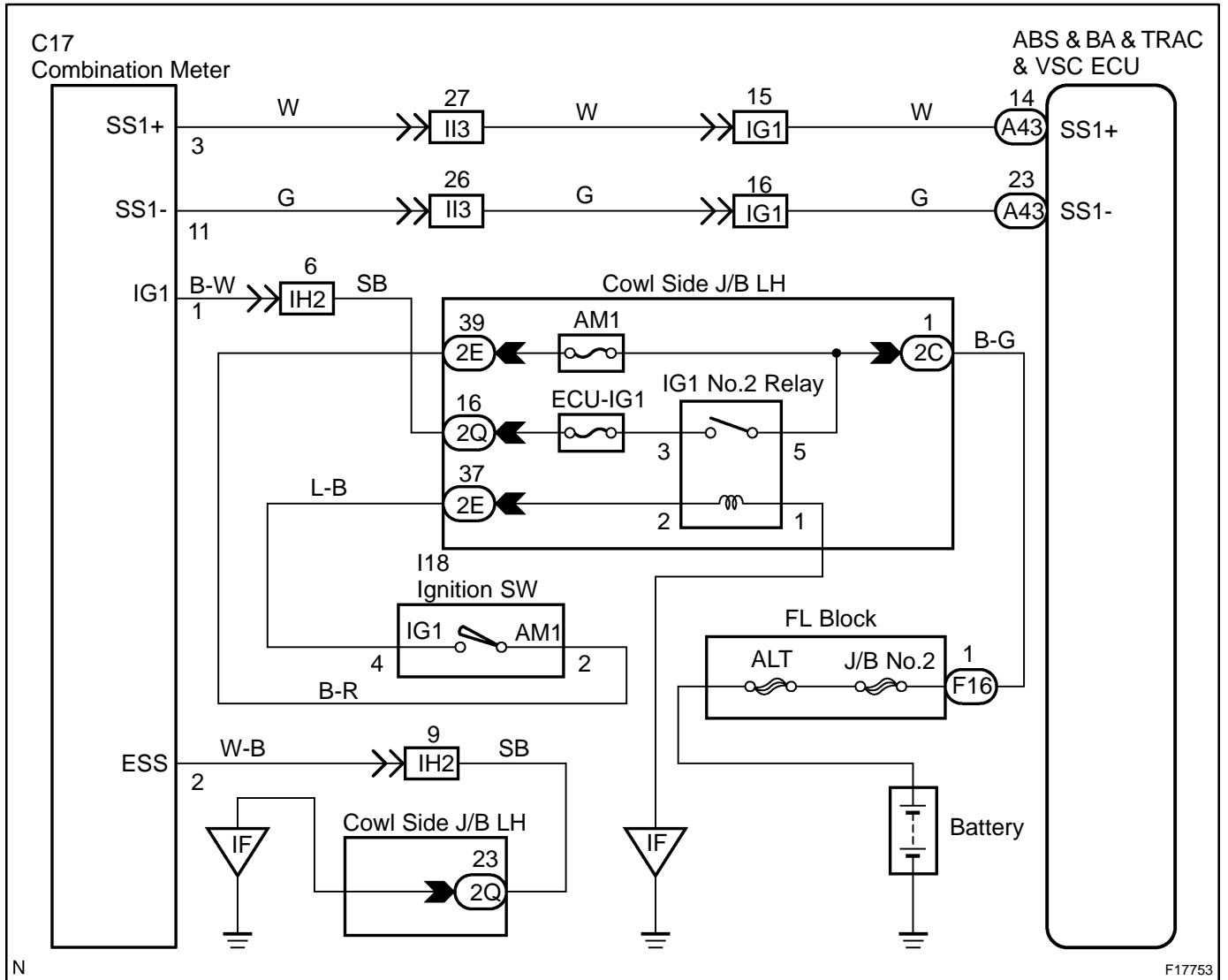
**If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.**

<b>DTC</b>	<b>C1231 / 31, C1335 / 35</b>	<b>Steering Angle Sensor Circuit</b>
------------	-------------------------------	--------------------------------------

## CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1231 / 31	Detection of any of the conditions 1. through 3.: 1. When the condition that ECU terminal IG1 voltage is 9.5 V or more, and does not receive data from steering angle sensor continues for 1 sec. or more. 2. When the steering angle sensor value changes by 360° or more with SSC signal from steering angle sensor remaining ON or OFF. 3. When the condition that difference between the steering angle value at edge occurring in SSC signal and the value at edge occurring in SSC signal after turning the steering wheel one-turn is out of the range from 355.5° - 364.5° occurs 10 times or more.	▶Steering angle sensor ▶Steering angle sensor circuit
C1335 / 35	When the ECU IG1 terminal voltage is 9.5 V or more, data transmission from the steering angle sensor is impossible for 1 sec. or more.	▶Steering angle sensor ▶Steering angle sensor circuit

WIRING DIAGRAM



N

F17753

**INSPECTION PROCEDURE****HINT:**

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

<b>1</b>	<b>Check output value of the steering angle sensor.</b>
----------	---

**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the DATALIST mode on the hand-held tester.

**CHECK:**

Check that the steering wheel turning angle value of the steering angle position sensor displayed on the hand-held tester is changing when turning the steering wheel.

**HINT:**

After certifying "Zero" point calibration of the steering angle sensor (Speed: 21 mph (35 km/h), driving straight ahead for 10 sec. or more), the value will change.

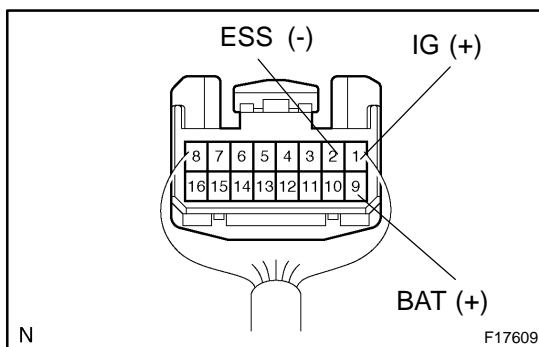
**OK:**

**Steering wheel turning angle value must be changing.**

<b>OK</b>	<b>Go to step 5.</b>
-----------	----------------------

**NG**

<b>2</b>	<b>Check input voltage of the steering angle sensor.</b>
----------	--

**PREPARATION:**

Remove the column lower cover.

**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminals 1 and 2, 2 and 9 of the combination switch wire harness side connector.

**OK:**

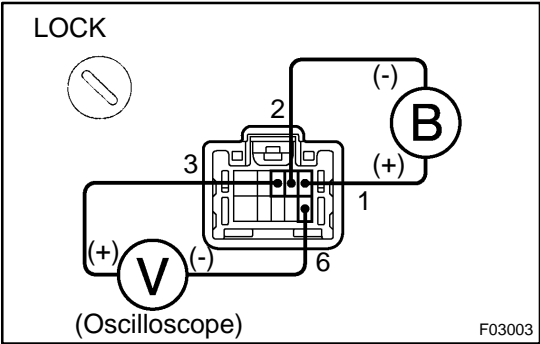
**Voltage: 10 to 14 V**

<b>NG</b>	<b>Check and replace harness and connector.</b>
-----------	---

**OK**



**3 Check steering angle sensor.**



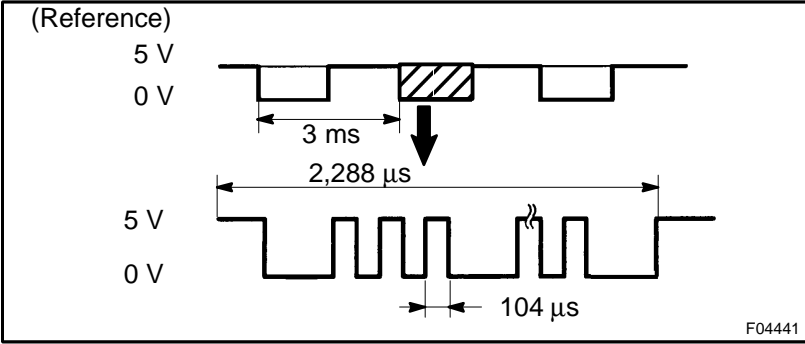
**PREPARATION:**

- (a) Remove the steering wheel lower No. 2 and No. 3 covers, steering wheel pad, steering wheel column upper and lower covers (See page SR-29 ).
- (b) Disconnect the combination switch connector (for steering angle sensor).
- (c) Connect the oscilloscope to terminals 3 and 6 of the combination switch connector (for steering angle sensor).
- (d) Apply battery positive voltage between terminals 1 and 2.

**CHECK:**

Turn the steering wheel slowly and check the signal waveform.

**OK:**



**HINT:**

The above signal waveform does not repeat ON and OFF regularly and this combination changes case by case according to the data.

**NG** → Replace steering angle sensor.

**OK**

**4 Check that slits of the steering sensor disc are clogged up.**

**NG** → Repair or replace steering sensor disc.

**OK**

**5** Check for open and short circuit in harness and connector between steering position sensor and ABS & BA & TRAC & VSC ECU (See page [IN-36](#)).

**NG**

Repair or replace harness or connector.

**OK**

Check and replace ABS & BA & TRAC & VSC ECU.

<b>DTC</b>	<b>C1232 / 32</b>	<b>Deceleration Sensor Circuit</b>
------------	-------------------	------------------------------------

## CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1232 / 32	Detection of either of the conditions 1. or 2.: 1. At a vehicle speed of 6 mph (10 km/h) or more, when the condition that ECU terminal GL1 signal change range is less than 20 mV, and ECU terminal GL2 signal change range swings by 468 mV or more occurs for 30 sec. or more. 2. At a vehicle speed of 6 mph (10 km/h) or more, when the condition that ECU terminal GL2 signal change range is less than 20 mV, and ECU terminal GL1 signal change range swings by 468 mV or more occurs for 30 sec. or more.	▶Deceleration sensor ▶Deceleration sensor circuit

## INSPECTION PROCEDURE

### HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

<b>1</b>	<b>Check output value of the yaw rate (deceleration) sensor.</b>
----------	--

### PREPARATION:

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the DATALIST mode on the hand-held tester.

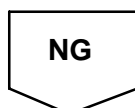
### CHECK:

Check that the deceleration value of the deceleration sensor displayed on the hand-held tester is changing when tilting the vehicle.

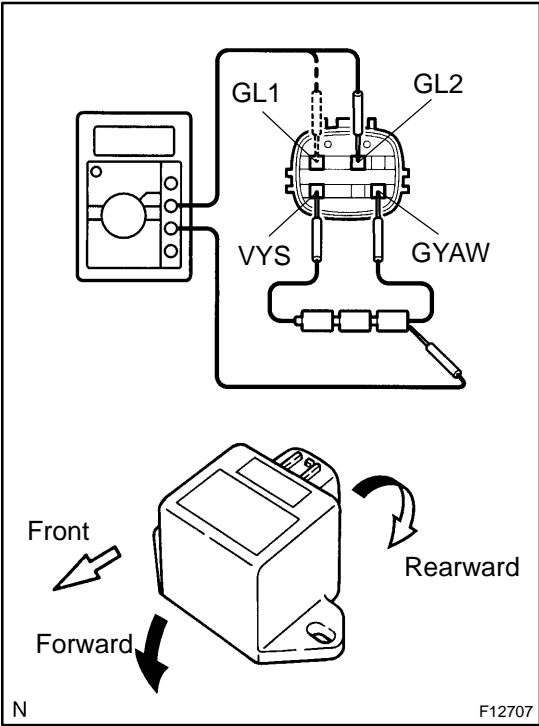
### OK:

**Deceleration value must be changing.**

<b>OK</b>	<b>Check and replace ABS &amp; BA &amp; TRAC &amp; VSC ECU.</b>
-----------	---



**2 Check yaw rate (deceleration) sensor.**



**PREPARATION:**

- (a) Connect 3 dry batteries of 1.5 V in series.
- (b) Connect VYS terminal to the batteries' positive (+) terminal, and GYAW terminal to the batteries' negative (-) terminal. Apply about 4.5 V between VYS and GYAW terminals.

**NOTICE:**

Do not apply voltage of 6 V or more to terminals VYS and GYAW.

**CHECK:**

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

**OK:**

Symbols	Condition	Standard Value
GL1	Horizontal	About 2.3 V
GL1	Lean rearward	1.0 V to about 2.3 V
GL1	Lean forward	About 2.3 V to 3.5 V
GL2	Horizontal	About 2.3 V
GL2	Lean rearward	About 2.3 V to 3.5 V
GL2	Lean forward	1.0 V to about 2.3 V

**HINT:**

- ▶ If the sensor is tilted too much, it may show the wrong value.
- ▶ If dropped, the sensor should be replaced with a new one.
- ▶ The sensor removed from the vehicle should not be placed upside down.

**NG** Replace yaw rate sensor.

**OK**

**3 Check for open or short circuit in harness and connector between yaw rate (deceleration) sensor and ABS & BA & TRAC & BA & VSC ECU (See page IN-36).**

**NG** Repair or replace harness and connector.

**OK**

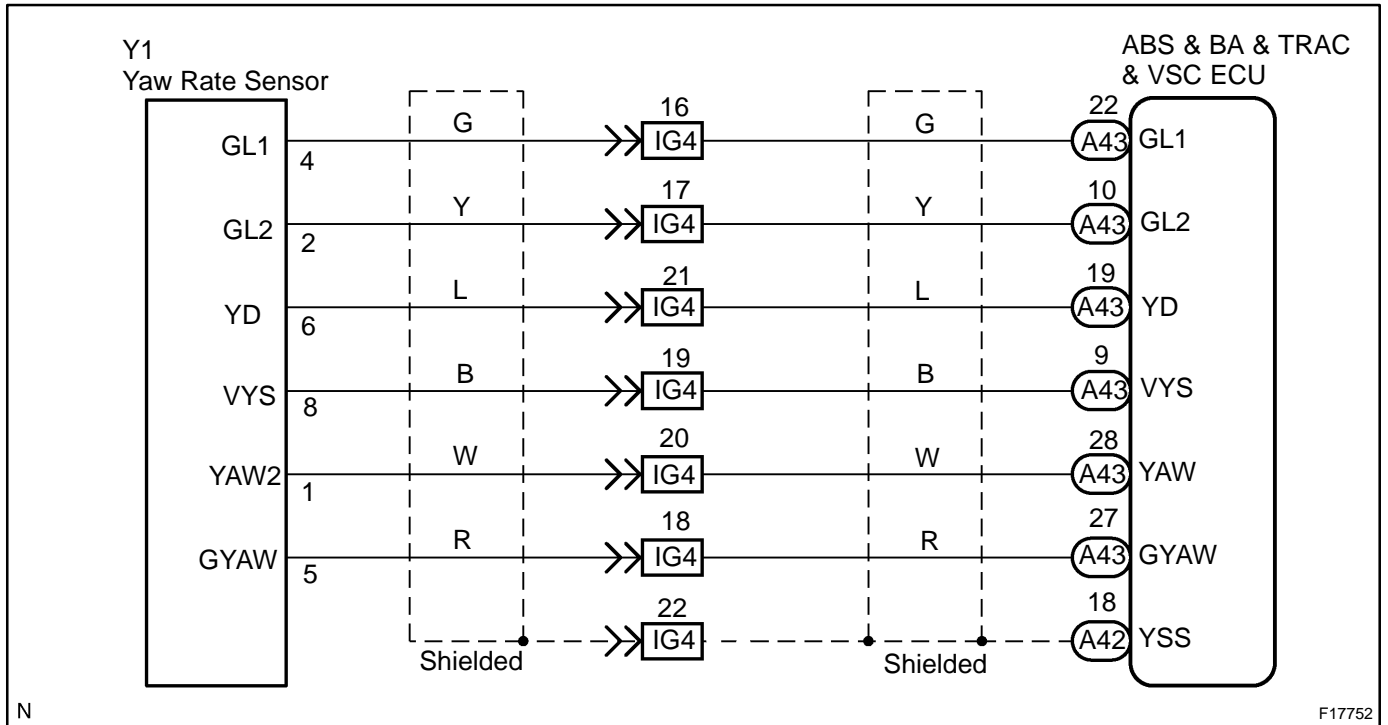
Check and replace ABS & BA & TRAC & VSC ECU.

<b>DTC</b>	<b>C1233 / 33, C1234 / 34</b>	<b>Yaw Rate Sensor Circuit</b>
------------	-------------------------------	--------------------------------

### CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1233 / 33	<p>When any of the following 1. through 4. is detected:</p> <ol style="list-style-type: none"> <li>1. ECU terminal IG1 voltage is 9.5 V to 17.0 V, and the condition that yaw rate sensor voltage is out of the range from 0.25 V to 4.75 V continues for 1 sec. or more.</li> <li>2. The conditions that yaw rate sensor open detect circuit signal is ON and the voltage of ECU terminal IG1 is 9.5 V to 17 V continue for 1 sec. or more.</li> <li>3. The conditions that yaw rate sensor power source voltage is out of the range from 4.4 V to 5.6 V and the voltage of ECU terminal IG1 is 9.5 V to 17 V continue for 1 sec. or more.</li> <li>4. When the condition that yaw rate sensor signal is momentarily open occurs 10 times or more and the voltage of ECU terminal IG1 is 9.5 V to 17 V.</li> </ol>	<ul style="list-style-type: none"> <li>▶Yaw rate sensor</li> <li>▶Yaw rate sensor circuit</li> </ul>
C1234 / 34	<p>Condition 1. or 2. is detected:</p> <ol style="list-style-type: none"> <li>1. When the conditions that yaw rate sensor VYS terminal voltage is 4.75 V to 5.25 V and YD malfunction signal of yaw rate sensor is ON continue for 5 sec. or more.</li> <li>2. Shift lever is in P position and output voltage of yaw rate sensor is out of the range from 2.4 V to 2.6 V or after the difference from zero point calibration voltage of yaw rate sensor becomes 0.08 V or more and when the condition that the vehicle speed exceeds more than 9 mph (15 km/h) while output condition of yaw rate sensor is repeated more than 3 times.</li> </ol>	

**WIRING DIAGRAM**

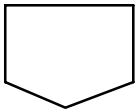


N

F17752

**INSPECTION PROCEDURE**

<b>1</b>	<b>Perform zero point calibration of the yaw rate sensor (See page <a href="#">DI-505</a> ).</b>
----------	--



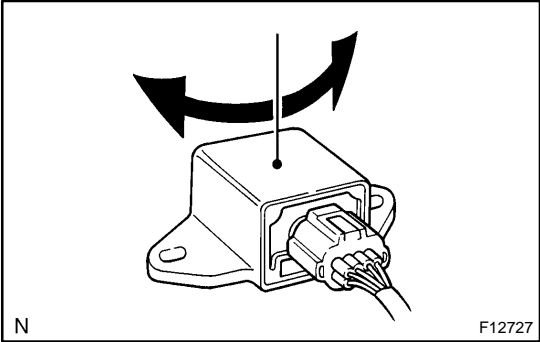
<b>2</b>	<b>Is DTC still output?</b>
----------	-----------------------------

Check the DTC on page [DI-505](#) .

<b>NO</b>	<b>END.</b>
-----------	-------------



**3 Check output value of the yaw rate sensor.**



**In case of using the hand-held tester:**

**PREPARATION:**

- (a) Remove the 2 bolts and yaw rate sensor with connectors still connected.
- (b) Connect the hand-held tester to the DLC3.
- (c) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (d) Select the DATALIST mode on the hand-held tester.

**CHECK:**

Check that the yaw rate value of the yaw rate sensor displayed on the hand-held tester changes. Place the yaw rate sensor vertically to the ground and turn the sensor pivoted on its center.

**OK:**

**Yaw rate value must be changing.**

**In case of not using the hand-held tester:**

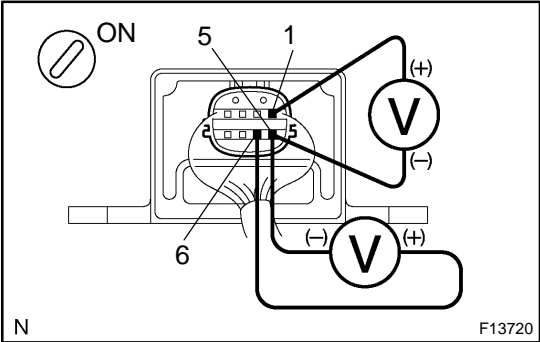
**PREPARATION:**

- (a) Remove the yaw rate sensor with the connector still connected to it.
- (b) Turn the ignition switch to ON.

**CHECK:**

Measure voltage between terminals YAW2 (1) - GYAW (5), and terminals YD (6) - GYAW (5) of the yaw rate sensor.

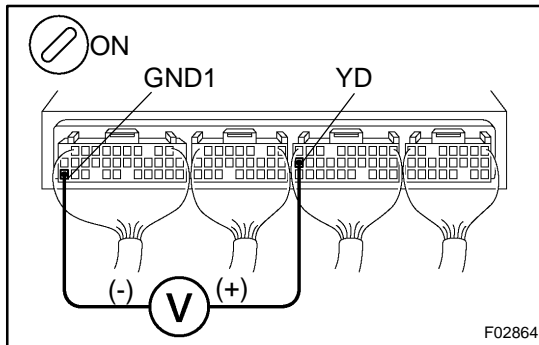
**OK:**



Terminals 1 and 5 (YAW2 - GYAW)	About 2.42 V to 2.58 V
Terminals 6 and 5 (YD - GYAW)	About 4.5 V to 5.3 V

**NG** Replace yaw rate sensor.

**OK**

**4 Check voltage between terminals YD and GND of ABS & BA & TRAC & VSC ECU.****PREPARATION:**

Remove the ABS & BA & TRAC & VSC ECU with connectors still connected.

**CHECK:**

- Turn the ignition switch ON.
- Measure voltage between terminals YD and GND of the ABS & BA & TRAC & VSC ECU.

**OK:**

**Voltage: 4.5 to 5.3 V**

**OK**

**Check and replace ABS & BA & TRAC & VSC ECU.**

**NG**

**5 Check for open and short circuit in harness and connector between yaw rate sensor and ABS & BA & TRAC & VSC ECU (See page [IN-36](#)).**

**NG**

**Repair or replace harness or connector.**

**OK**

**Check and replace ABS & BA & TRAC & VSC ECU.**



<b>DTC</b>	<b>C1237 / 37</b>	<b>Tires of Different Size</b>
------------	-------------------	--------------------------------

### CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1237 / 37	Driving at more than 19 mph (30 km/h) for more than 20 seconds with 1 or 2 tires of different size 3 times continuously.	<ul style="list-style-type: none"> <li>▶ Tire size</li> <li>▶ Skid control ECU</li> </ul>

### INSPECTION PROCEDURE

<b>1</b>	<b>Check tire size.</b>
----------	-------------------------

**CHECK:**

Check the size and condition of all 4 wheels.

<b>NG</b>	<b>Replace tires so that all 4 tires are of the same size.</b>
-----------	--

<b>OK</b>
-----------

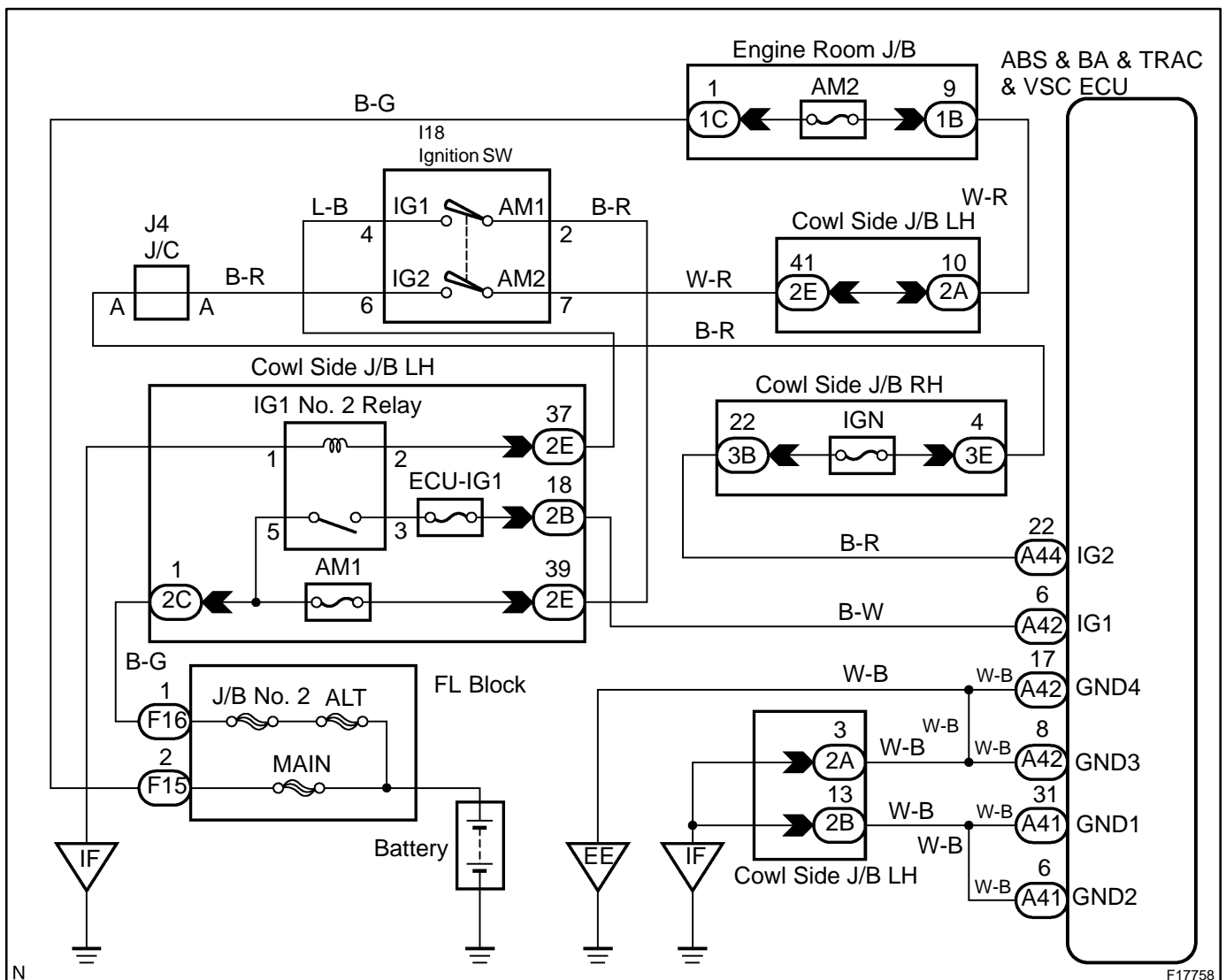
<b>Check and replace skid control ECU.</b>
--

<b>DTC</b>	<b>C1241 / 41</b>	<b>IG Power Source Circuit</b>
------------	-------------------	--------------------------------

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of any of the conditions 1. through 4.: 1. Vehicle speed is 1.9 mph (3 km/h) or more and voltage of ECU terminal IG remains below 9.5 V for more than 10 sec. 2. While the condition that the solenoid relay is ON continues, ECU terminal IG1 voltage becomes 9.5 V or less, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 sec. or more. 3. The condition that ECU terminal IG1 voltage is more than 17.0 V continues for 1.2 sec. or more. 4. While the solenoid relay outputs ON signal, ECU terminal IG1 voltage becomes more than 17.0 V, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 sec. or more.	<ul style="list-style-type: none"> <li>▶ Battery</li> <li>▶ C regulator</li> <li>▶ Power source circuit</li> </ul>

**WIRING DIAGRAM**



N

F17758

## INSPECTION PROCEDURE

<b>1</b>	<b>Check battery positive voltage.</b>
----------	--

**OK:**

Voltage: 10 to 14 V

<b>NG</b>	<b>Check and repair the charging system.</b>
-----------	--

<b>OK</b>
-----------

<b>2</b>	<b>Check voltage of the ECU IG power source.</b>
----------	--

**In case of using the hand-held tester:**

**PREPARATION:**

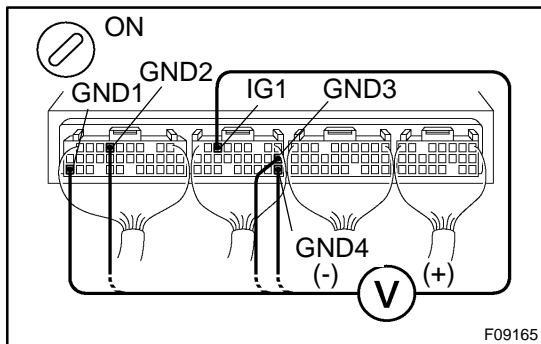
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the DATALIST mode on the hand-held tester.

**CHECK:**

Check the voltage condition output from the ECU displayed on the hand-held tester.

**OK:**

"Normal" is displayed.



**In case of not using the hand-held tester:**

**PREPARATION:**

Remove the skid control ECU with connectors still connected.

**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminals IG1 and GND of the skid control ECU connector.

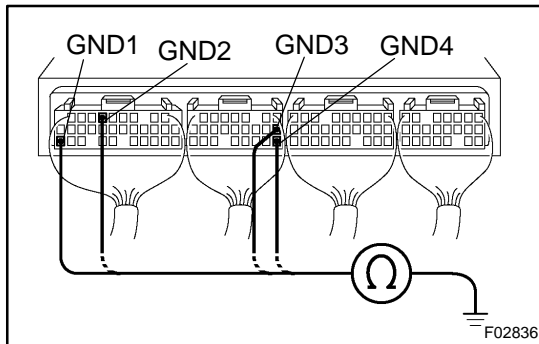
**OK:**

Voltage: 10 to 14 V

<b>OK</b>	<b>Turn ignition switch OFF, check and replace skid control ECU.</b>
-----------	--

<b>NG</b>
-----------

### 3 Check continuity between terminal GND of skid control ECU connector and body ground.

**CHECK:**

Measure resistance between terminal GND of the skid control ECU connector and body ground.

**OK:**

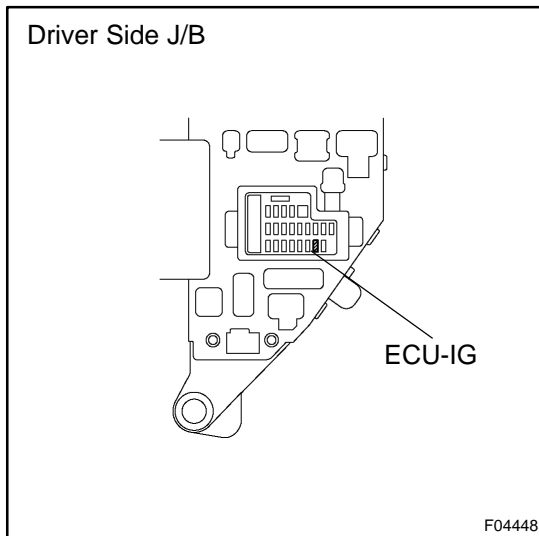
Resistance: 1 Ω or less

**NG**

Repair or replace harness or connector.

**OK**

### 4 Check ECU-IG fuse.

**PREPARATION:**

Remove the ECU-IG fuse from the driver side J/B.

**CHECK:**

Check continuity of the ECU-IG fuse.

**OK:**

Continuity

**NG**

Check for short circuit in all the harness and components connected to ECU-IG fuse (See attached wiring diagram).

**OK**

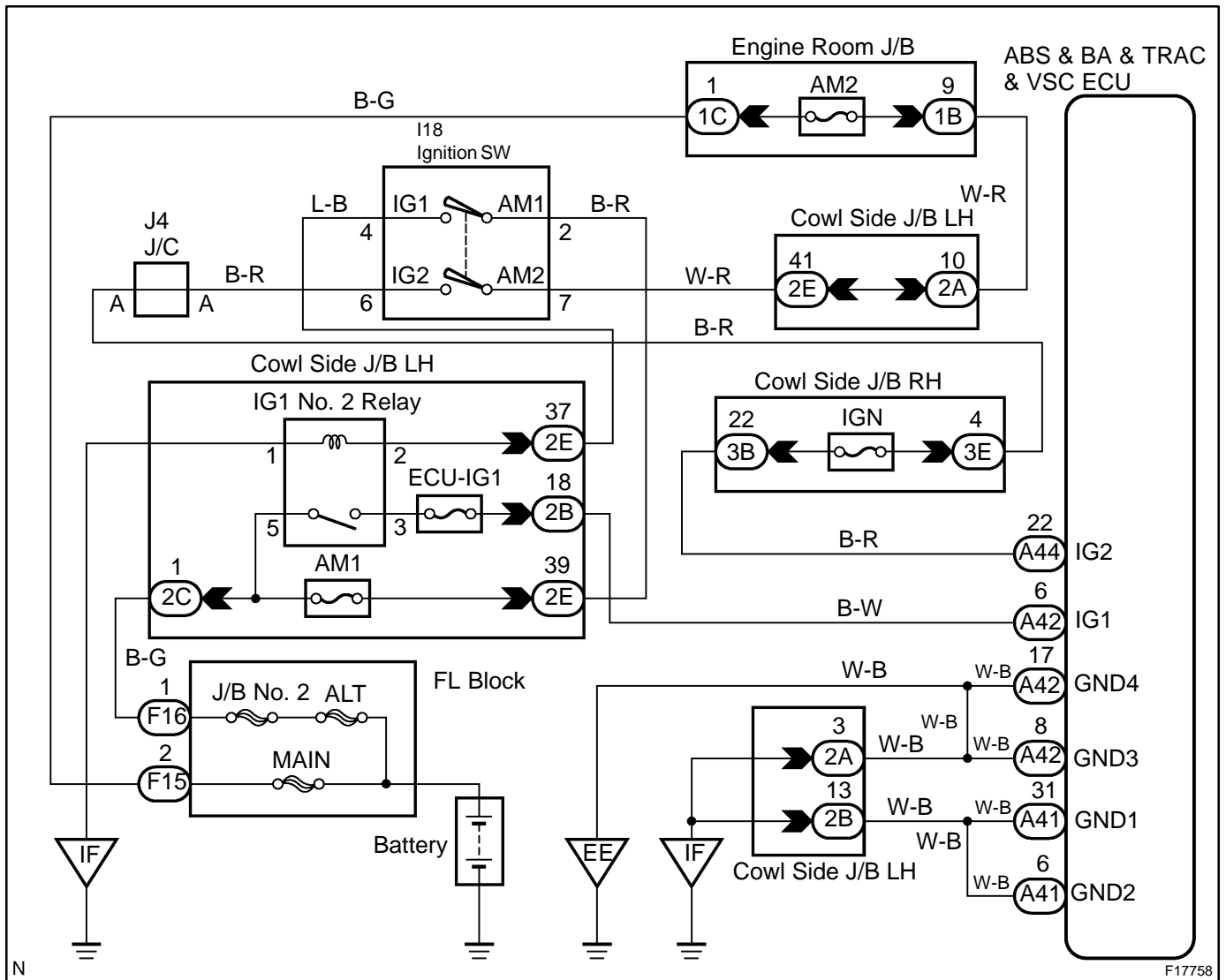
Check for open circuit in harness and connector between skid control ECU and battery (See page [IN-36](#) ).

<b>DTC</b>	<b>C1242 / 42</b>	<b>IG2 Power Source Circuit</b>
------------	-------------------	---------------------------------

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1242 / 42	With the vehicle running, open circuit in IG2 is detected for more than 7 sec.	<ul style="list-style-type: none"> <li>▶ Battery</li> <li>▶ C regulator</li> <li>▶ Power source circuit</li> </ul>

**WIRING DIAGRAM**



**INSPECTION PROCEDURE**

<b>1</b>	<b>Check battery positive voltage.</b>
----------	--

**OK:**

Voltage: 10 to 14 V

**NG****Check and repair the charging system.****OK**

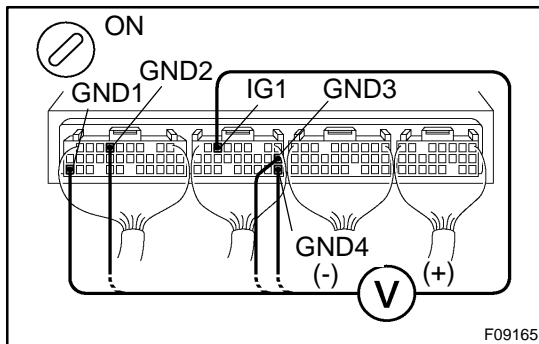
<b>2</b>	<b>Check voltage of the ECU IG power source.</b>
----------	--

**In case of using the hand-held tester:****PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the DATALIST mode on the hand-held tester.

**CHECK:**

Check the voltage condition output from the ECU displayed on the hand-held tester.

**OK:****"Normal" is displayed.****In case of not using the hand-held tester:****PREPARATION:**

Remove the skid control ECU with connectors still connected.

**CHECK:**

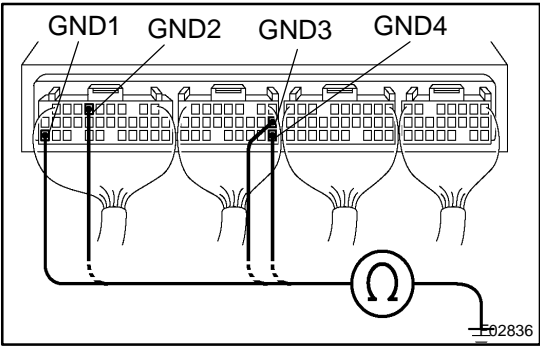
- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminals IG2 and GND of the skid control ECU connector.

**OK:**

Voltage: 10 to 14 V

**OK****Turn ignition switch OFF, check and replace skid control ECU.****NG**

**3 Check continuity between terminal GND of skid control ECU connector and body ground.**



**CHECK:**  
Measure resistance between terminal GND of the skid control ECU connector and body ground.

**OK:**  
**Resistance: 1 Ω or less**

**NG** → **Repair or replace harness or connector.**

**OK**

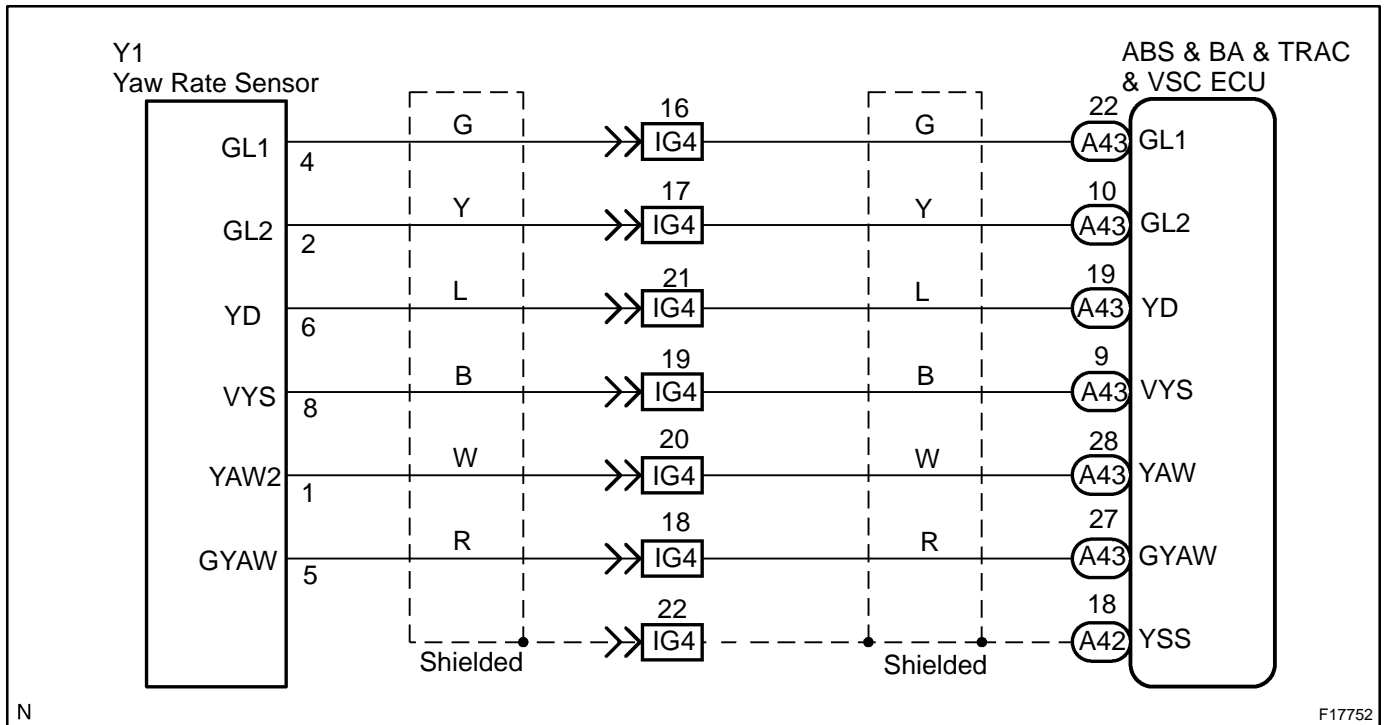
**Check for open circuit in harness and connector between skid control ECU and battery (See page [IN-36](#)).**

<b>DTC</b>	<b>C1243 / 43, C1245 / 45</b>	<b>Malfunction in Deceleration Sensor</b>
------------	-------------------------------	---

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1243 / 43	While vehicle speed becomes 0 mph (0 km/h) from 30 km/h (18 mph), and the condition that GL1 and GL2 signals of ECU terminals did not change 40 mV or less continued in a sequence 16 times.	
C1245 / 45	At the vehicle speed of 18 mph (30 km/h) or more, and the condition that the difference between acceleration and deceleration values of computation from deceleration sensor and vehicle speed becomes more than 0.35 G continues for 60 sec. or more.	<ul style="list-style-type: none"> <li>▶Deceleration sensor</li> <li>▶Wire harness for deceleration sensor system</li> </ul>

**WIRING DIAGRAM**



N

F17752



## INSPECTION PROCEDURE

### HINT:

Start the inspection from step1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

<b>1</b>	<b>Check output value of the yaw rate (deceleration) sensor.</b>
----------	--

### PREPARATION:

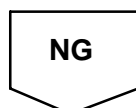
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the DATALIST mode on the hand-held tester.

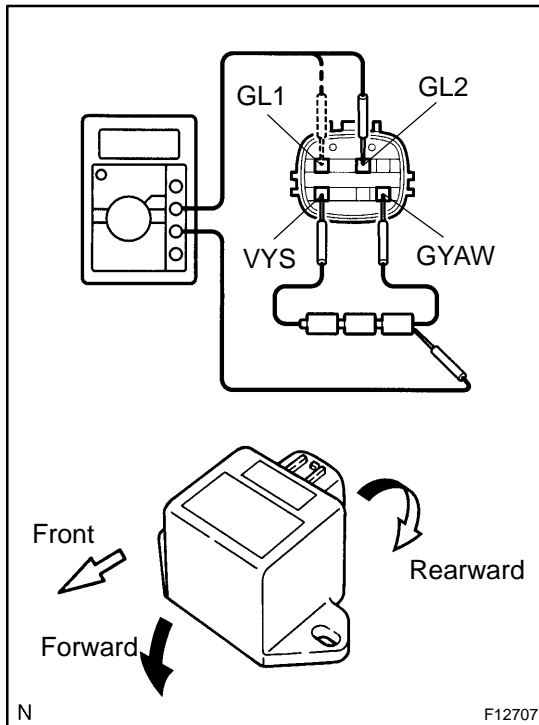
### CHECK:

Check that the deceleration value of the deceleration sensor displayed on the hand-held tester is changing when tilting the vehicle.

### OK:

**Deceleration value must be changing.**



**2 Check yaw rate (deceleration) sensor.****PREPARATION:**

- Connect 3 dry batteries of 1.5 V in series.
- Connect VYS terminal to the batteries' positive (+) terminal, and GYAW terminal to the batteries' negative (-) terminal. Apply about 4.5 V between VYS and GYAW terminals.

**NOTICE:**

**Do not apply voltage of 6 V or more to terminals VYS and GYAW.**

**CHECK:**

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

**OK:**

Symbols	Condition	Standard Value
GL1	Horizontal	About 2.3 V
GL1	Lean rearward	1.0 V to about 2.3 V
GL1	Lean forward	About 2.3 V to 3.5 V
GL2	Horizontal	About 2.3 V
GL2	Lean rearward	About 2.3 V to 3.5 V
GL2	Lean forward	1.0 V to about 2.3 V

**HINT:**

- ▶ If the sensor is tilted too much, it may show the wrong value.
- ▶ If dropped, the sensor should be replaced with a new one.
- ▶ The sensor removed from the vehicle should not be placed upside down.

**NG****Replace yaw rate sensor.****OK****3 Check for open or short circuit in harness and connector between yaw rate (deceleration) sensor and skid control ECU (See page IN-36).****NG****Repair or replace harness or connector.****OK****Check and replace skid control ECU.**

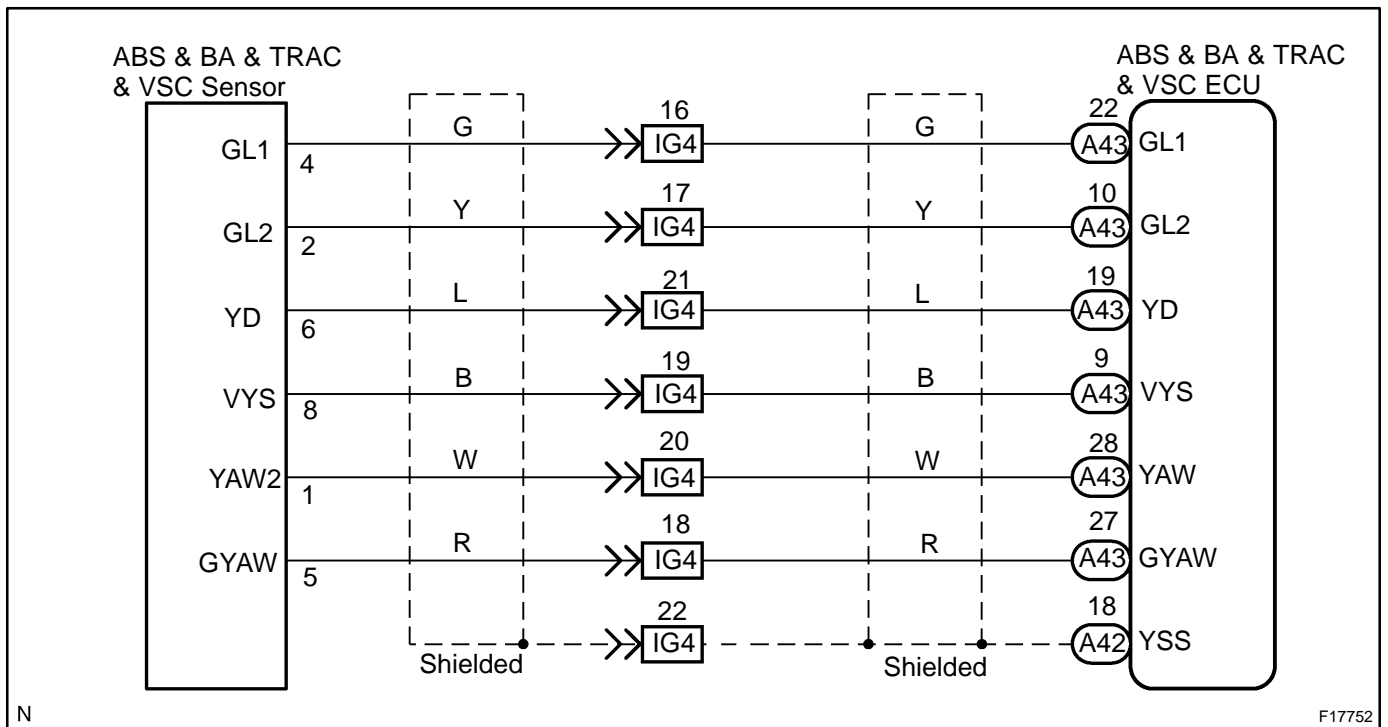
<b>DTC</b>	<b>C1244 / 44</b>	<b>Deceleration Sensor Circuit</b>
------------	-------------------	------------------------------------

### CIRCUIT DESCRIPTION

This sensor detects vehicle deceleration. The sensor signal is used in ABS & BA & TRAC & VSC control. If the sensor functions abnormally, the ABS warning light comes on.

DTC No.	DTC Detecting Condition	Trouble Area
C1244 / 44	<p>Either of the following 1., 2., 3. or 4. is detected:</p> <ol style="list-style-type: none"> <li>The condition that ECU terminals GL1 and GL2 values are -1.5 G or less or 1.5 G or more continues for 1.2 sec. or more.</li> <li>The condition that the deceleration sensor terminal VGS voltage is 4.4 V or less or 5.6 V or more continues for 1.2 sec. or more.</li> <li>At a vehicle speed of 0 mph (0 km/h), after the difference of output value between deceleration sensor terminals GL1 and GL2 becomes 0.6 G or more, and the condition that does not become 0.4 G or less continues for 60 sec. or more.</li> <li>Deceleration sensor signal momentary open occurs for 7 times or more.</li> </ol>	<ul style="list-style-type: none"> <li>▶Deceleration sensor</li> <li>▶Deceleration sensor circuit</li> </ul>

### WIRING DIAGRAM



N

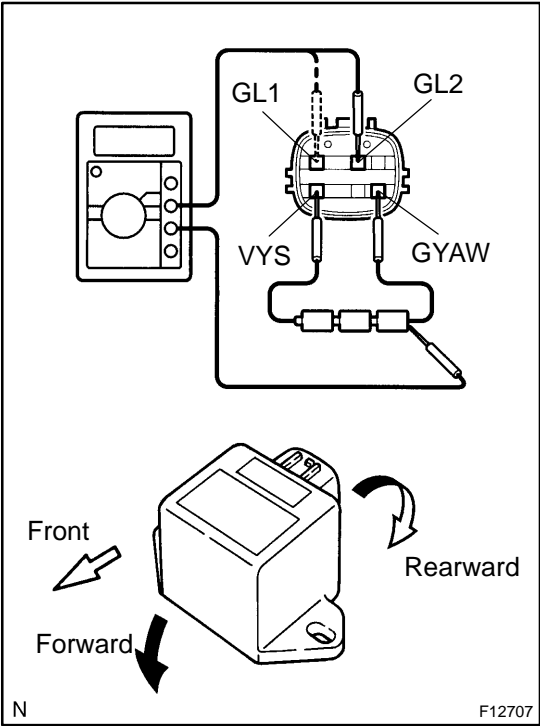
F17752

**INSPECTION PROCEDURE**

1	<b>Check for open and short circuit in harness and connector between yaw rate (deceleration) sensor and skid control ECU (See page <a href="#">IN-36</a>).</b>
---	--



**2 Check yaw rate (deceleration) sensor.**



**PREPARATION:**

- (a) Connect 3 dry batteries of 1.5 V in series.
- (b) Connect VYS terminal to the batteries' positive (+) terminal, and GYAW terminal to the batteries' negative (-) terminal. Apply about 4.5 V between VYS and GYAW terminals.

**NOTICE:**

**Do not apply voltage of 6 V or more to terminals VYS and GYAW.**

**CHECK:**

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

**OK:**

Symbols	Condition	Standard Value
GL1	Horizontal	About 2.3 V
GL1	Lean rearward	1.0 V to about 2.3 V
GL1	Lean forward	About 2.3 V to 3.5 V
GL2	Horizontal	About 2.3 V
GL2	Lean rearward	About 2.3 V to 3.5 V
GL2	Lean forward	1.0 V to about 2.3 V

**HINT:**

- ▶ If the sensor is tilted too much, it may show the wrong value.
- ▶ If dropped, the sensor should be replaced with a new one.
- ▶ The sensor removed from the vehicle should not be placed upside down.

**NG** Replace yaw rate sensor.

**OK**

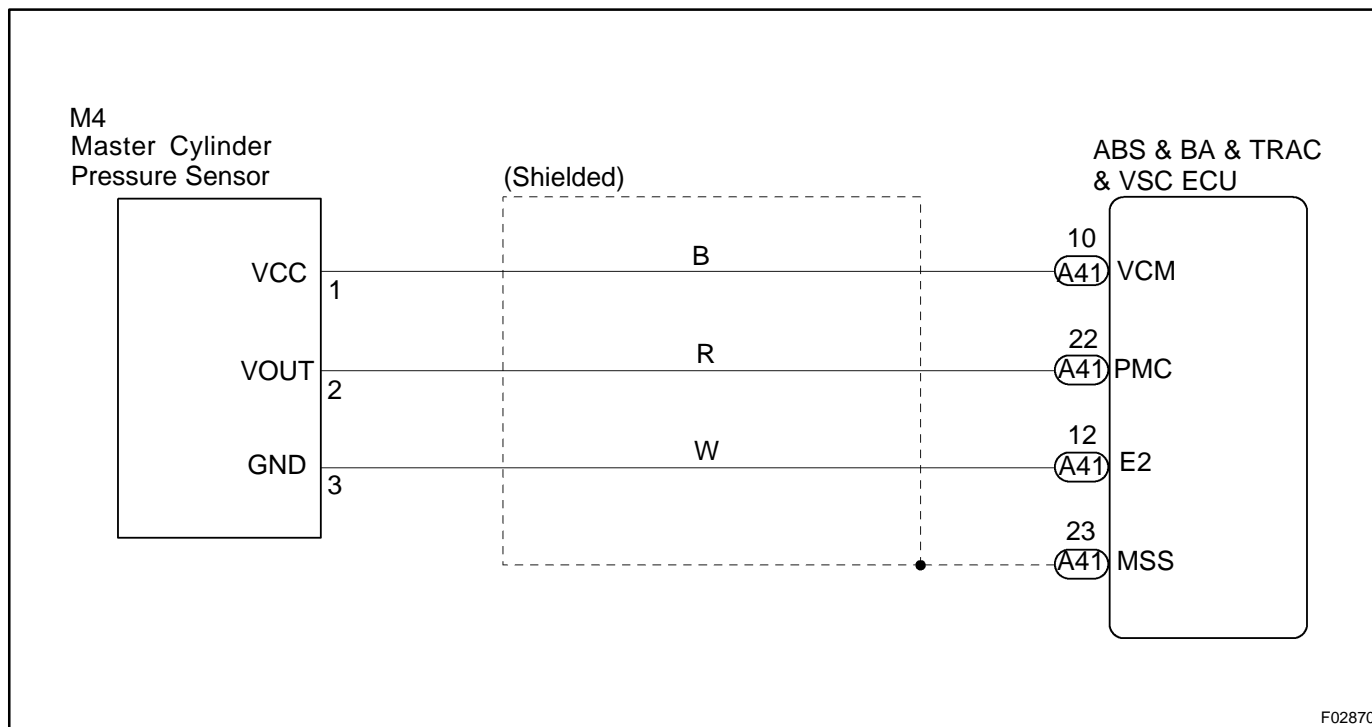
Check and replace skid control ECU.

<b>DTC</b>	<b>C1246 / 46</b>	<b>Master Cylinder Pressure Sensor Circuit</b>
------------	-------------------	--

### CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246 / 46	Either of the following 1., 2., 3., 4. or 5. is detected: 1. At a vehicle speed of 4 mph (7 km/h) or more, PMC terminal voltage does not change by more than 0.005 V once it exceeds 0.86 V continues for at least 30 secs. 2. Interference occurs to ECU terminal PMC 7 times or more for 5 sec. 3. ECU terminal STP is OFF, and the condition that terminal PMC voltage becomes more than 0.86 V or less than 0.3 V continues for 5 sec. or more. 4. The condition that ECU terminal IG1 voltage is 9.5 V to 17.0 V, and terminal VCM voltage other than the range from 4.4 V to 5.6 V continues for 1.2 sec. or more. 5. The condition that ECU terminal VCM voltage is 4.4 V to 5.6 V, and terminal PMC voltage other than the range from 0.14 V to 4.85 V continues for 1.2 sec. or more.	▶Master cylinder pressure sensor ▶Master cylinder pressure sensor circuit

### WIRING DIAGRAM



F02870

## INSPECTION PROCEDURE

**HINT:**

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

<b>1</b>	<b>Check output value of the master cylinder pressure sensor.</b>
----------	---

**PREPARATION:**

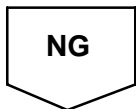
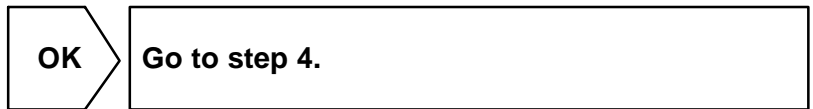
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the DATA LIST mode on the hand-held tester.

**CHECK:**

Check that the brake fluid pressure value of the master cylinder pressure sensor displayed on the hand-held tester is changing when depressing the brake pedal.

**OK:**

**Brake fluid pressure value must be changing.**



<b>2</b>	<b>Check master cylinder pressure sensor.</b>
----------	---

**PREPARATION:**

- (a) Install the LSPV gauge to the front caliper bleeder plug portion, and bleed the LSPV gauge.  
SST 09709-29018
- (b) Remove the air cleaner inlet and battery clamp cover.

**CHECK:**

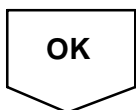
Start the engine and depress the brake pedal, then check the relation between the fluid pressure and voltage of PMC and E2 terminals of the skid control ECU with connectors still connected.

**OK:**

Front brake caliper fluid pressure	Voltage
0 kPa (0 Kgf/cm <sup>2</sup> , 0 psi)	0.37 to 0.63 V
5,883 kPa (60 kgf/cm <sup>2</sup> , 853 psi)	1.57 to 1.83 V
11,768 kPa (120 kgf/cm <sup>2</sup> , 1,706 psi)	2.77 to 3.03 V

**HINT:**

Voltage between terminals VCM and E2: 4.7 to 5.3 V



**3** Check for open and short circuit in harness and connector between master cylinder pressure sensor and skid control ECU (See page [IN-36](#)).

**NG**

Repair or replace harness or connector.

**OK**

Replace master cylinder pressure sensor.

**4** Check whether or not the ECU terminal STP input voltage is changed when the stop light switch is turned on and off.

**NO**

Check the stop light switch circuit (See page [DI-573](#)).

**YES**

Check and replace skid control ECU.

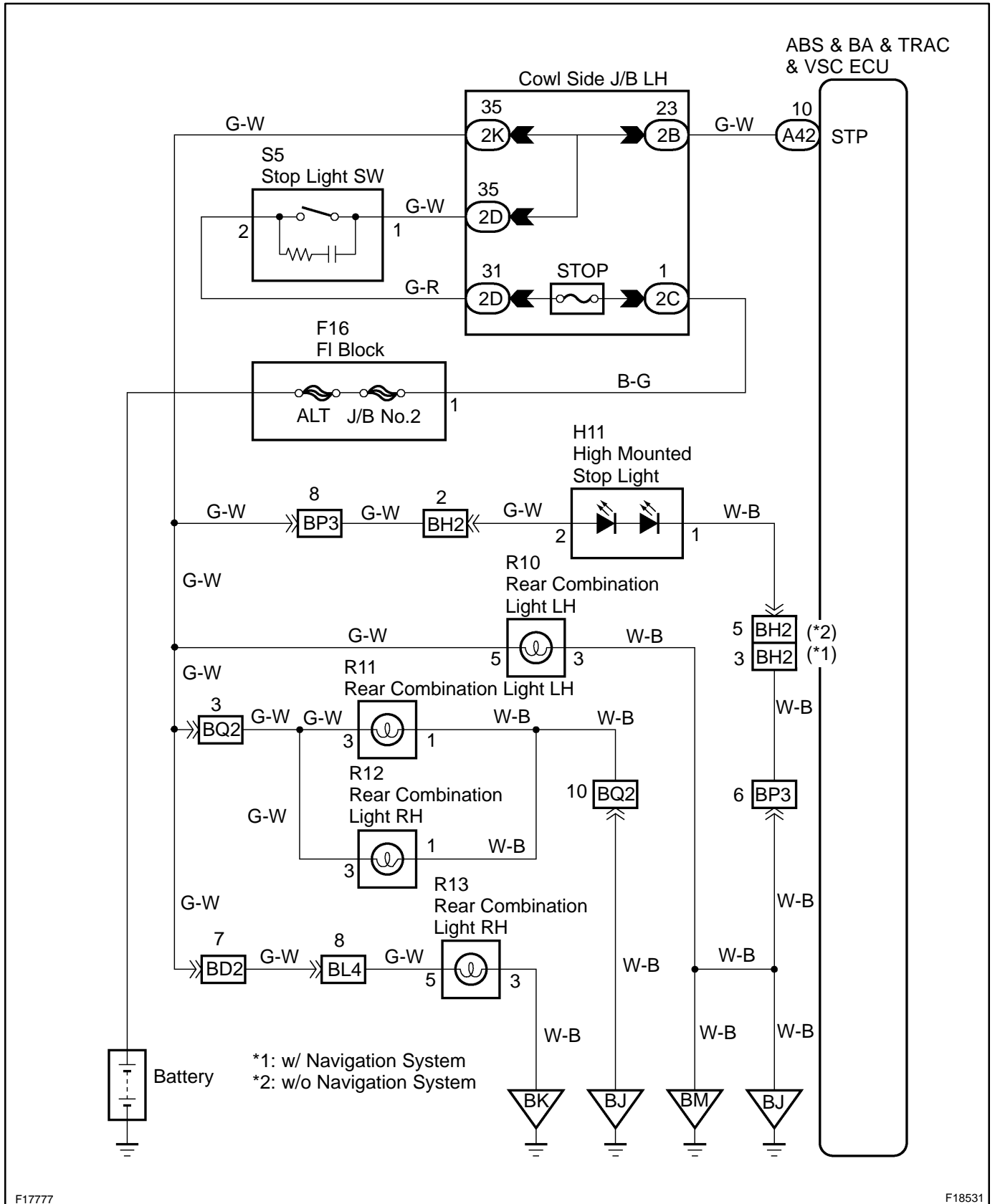


<b>DTC</b>	<b>C1249 / 49</b>	<b>Stop Light Switch Circuit</b>
------------	-------------------	----------------------------------

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	ECU terminal IG1 voltage is 9.5 to 17.2 V, ABS is in non-operation, and an open in stop light switch circuit continues for 0.3 sec. or more.	<ul style="list-style-type: none"> <li>▶ Stop light bulb</li> <li>▶ Stop light switch circuit</li> </ul>

WIRING DIAGRAM



## INSPECTION PROCEDURE

<b>1</b>	<b>Check operation of the stop light switch.</b>
----------	--

**CHECK:**

Check that the stop light lights up when the brake pedal is depressed and goes OFF when the brake pedal is released.

**OK** → **Go to step 3.**

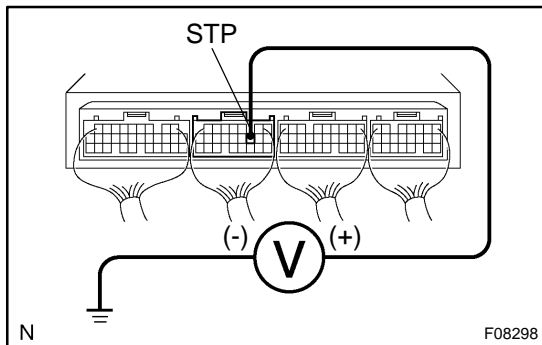
**NG**

<b>2</b>	<b>Check stop light circuit (See page <a href="#">BE-50</a> ).</b>
----------	--

**NG** → **Check stop light bulb and repair or replace stop light circuit.**

**OK**

<b>3</b>	<b>Check voltage between terminal STP of skid control ECU and body ground.</b>
----------	--



**PREPARATION:**

Remove the skid control ECU with connectors still connected.

**CHECK:**

Measure voltage between terminal STP of the skid control ECU and body ground when the brake pedal is depressed.

**OK:**

**Voltage: 10 to 14 V**

**OK** → **Proceed to next circuit inspection shown in problem symptoms table (See page [IN-36](#) ).**

**NG**

<b>4</b>	<b>Check for open circuit in harness and connector between skid control ECU and stop light switch (See page <a href="#">IN-36</a> ).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

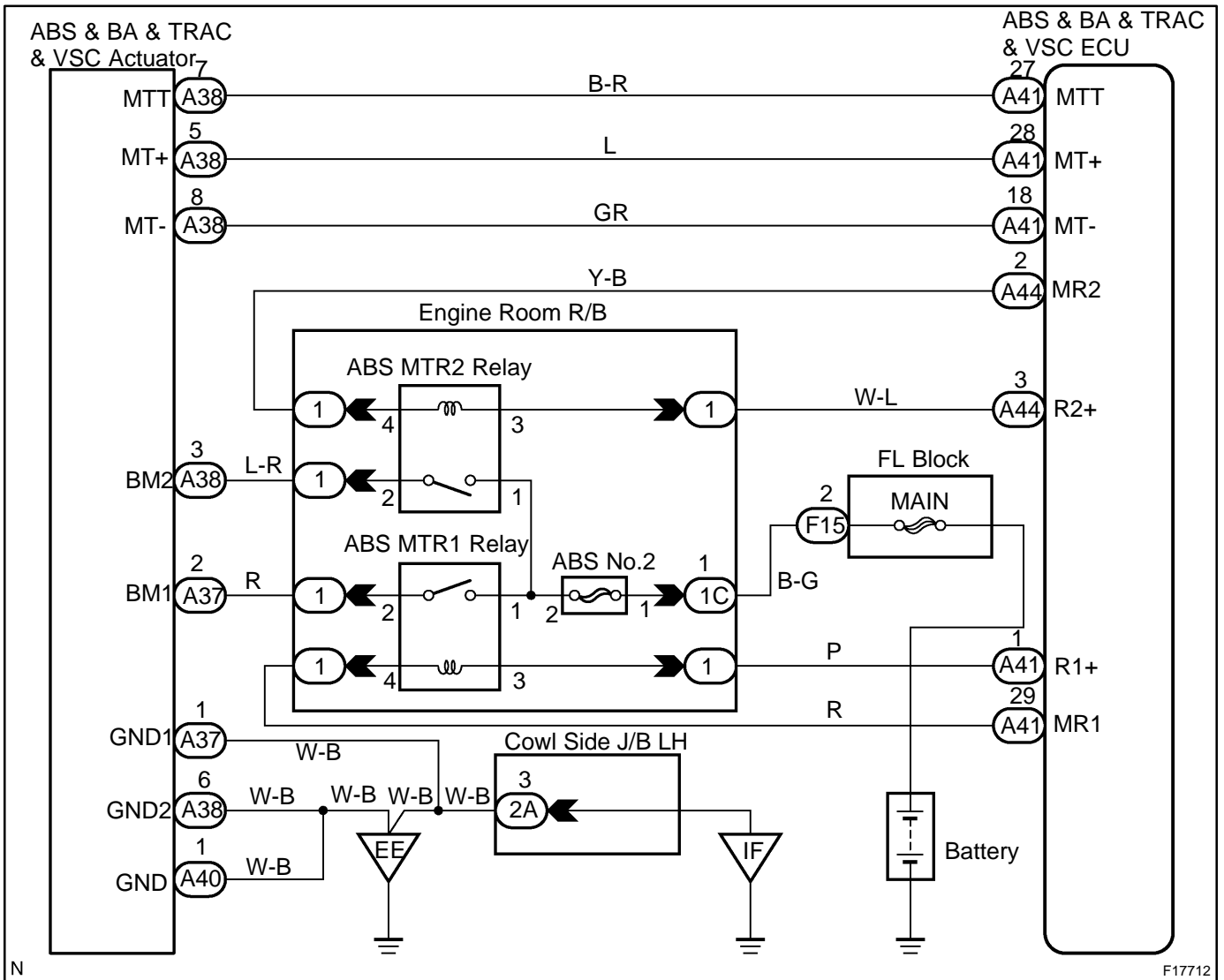
<b>Check and replace skid control ECU.</b>
--

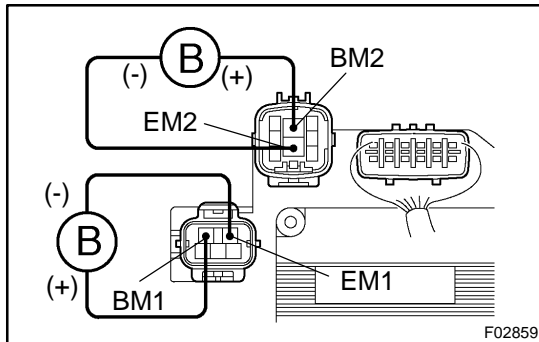
<b>DTC</b>	<b>C1251 / 51</b>	<b>Hydraulic Brake Booster Pump Motor Malfunction</b>
------------	-------------------	---

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	Either of the following 1. or 2. is detected: 1. After turning the ignition switch ON, the current of more than 30 A flows to the motor for more than 1 sec. 2. After turning the ignition switch ON, less than 7 A change in current is detected more than 3 times in a row when the motor is ON.	Hydraulic brake booster pump motor

**WIRING DIAGRAM**



**INSPECTION PROCEDURE****1 Check operation of hydraulic brake booster pump motor.****PREPARATION:**

Disconnect the 2 connectors from the hydraulic brake booster.

**CHECK:**

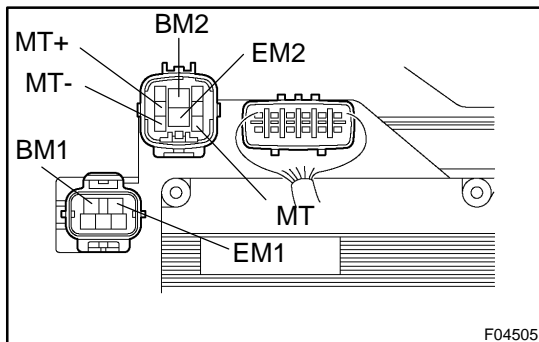
Connect the battery positive  $\ell$  lead to terminal BM1 or BM2 and the battery negative  $\vee$  lead to terminal EM1 or EM2 of the hydraulic brake booster (pump motor) connector.

**OK:**

The operation sound of the pump motor should be heard.

**NG**

Go to step 4.

**OK****2 Check hydraulic brake booster resistance.****PREPARATION:**

Disconnect the 2 connectors from the hydraulic brake booster.

**CHECK:**

Check resistance between terminals MT+ and MT-, BM1 and MT-, BM2 and MT-, EM1 and MT+, EM2 and MT+ of the hydraulic brake booster connector.

**OK:****30 to 36  $\Omega$** **NG**

Replace the hydraulic brake booster assembly.

**OK**

**3** Check for open circuit in harness and connector between hydraulic brake booster (MT+, MT-) and skid control ECU (See page [IN-36](#)).

**NG** Repair or replace harness or connector.

**OK**

Check and replace skid control ECU.

**4** Check for open or short circuit in harness and connector between hydraulic brake booster and skid control ECU (See page [IN-36](#)).

**NG** Replace wire harness.

**OK**

**5** Check hydraulic brake booster pump motor (See page [BR-64](#)).

**NG** Replace hydraulic brake booster pump motor.

**OK**

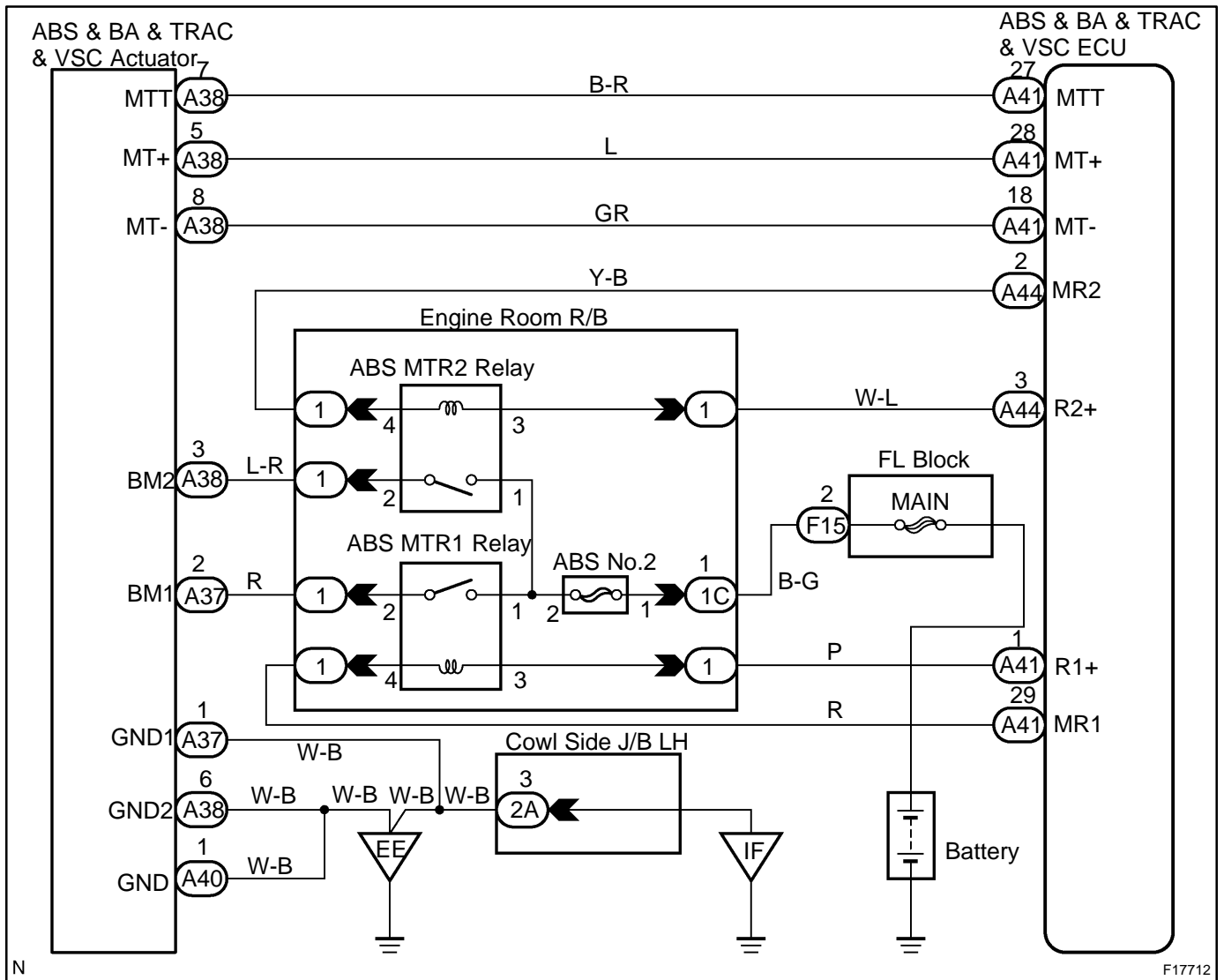
Replace hydraulic brake booster.

<b>DTC</b>	<b>C1252 / 52</b>	<b>Hydraulic Brake Booster Pump Motor ON Time Abnormally Long</b>
------------	-------------------	---

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1252 / 52	After the ignition switch is turned ON, the power is supplied to the pump motor for more than 5 minutes.	<ul style="list-style-type: none"> <li>▶Hydraulic brake booster pump motor</li> <li>▶Hydraulic brake booster pump motor circuit</li> <li>▶Pressure switch (PH or PL)</li> </ul>

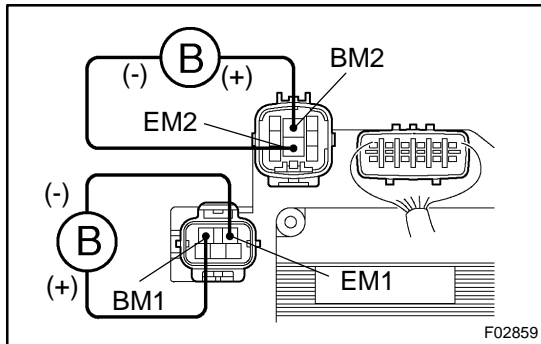
**WIRING DIAGRAM**





## INSPECTION PROCEDURE

<b>1</b>	<b>Check operation of hydraulic brake booster pump motor.</b>
----------	---



**PREPARATION:**

Disconnect the 2 connectors from the hydraulic brake booster.

**CHECK:**

Connect the battery positive  $\ell$  lead to terminal BM1 or BM2 and the battery negative  $\vee$  lead to terminal EM1 or EM2 of the hydraulic brake booster (pump motor) connector.

**OK:**

The operation sound of the pump motor should be heard.

<b>NG</b>	<b>Go to step 9.</b>
-----------	----------------------

**OK**

<b>2</b>	<b>Check for short circuit (to B+) in harness and connector between BM1 or BM2 of hydraulic brake booster and ABS motor 1 relay or ABS motor 2 relay (See page IN-36).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

**OK**

<b>3</b>	<b>Check for short circuit (to B+) in harness and connector between MT of hydraulic brake booster and skid control ECU (See page IN-36).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

**OK**

<b>4</b>	<b>Check pressure switch (PH).</b>
----------	------------------------------------

**In case of using the hand-held tester:**

**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the DATA LIST mode on the hand-held tester.

**CHECK:**

Depress the brake pedal more than 40 times with the ignition switch OFF, then turn the ignition switch ON and check the pressure switch (PH) condition.

**HINT:**

When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

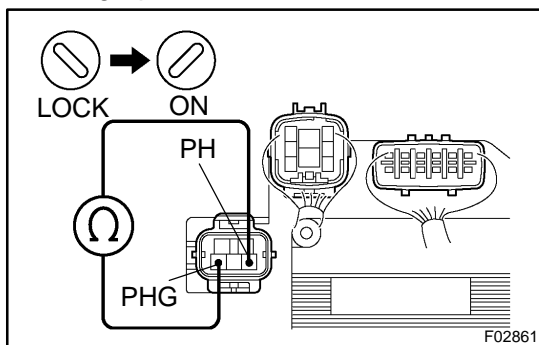
**OK:**

**"OFF" turns to "ON".**

**HINT:**

OFF: Low pressure

ON: High pressure



**In case of not using the hand-held tester:**

**PREPARATION:**

- (a) Disconnect the connector (5P) from the hydraulic brake booster.
- (b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

**HINT:**

When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

**CHECK:**

Measure resistance between terminals PH and PHG of the hydraulic brake booster connector.

**OK:**

**Resistance: 1.0 kΩ**

**PREPARATION:**

- (a) Connect the connector (5P) to the hydraulic brake booster.
- (b) Disconnect the connector (5P) after the ignition switch is turned ON and the pump motor is stopped.

**CHECK:**

Measure resistance between terminals PH and PHG of the hydraulic brake booster connector.

**OK:**

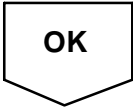
**Resistance: 0 Ω**

**HINT:**

After inspection, connect the connector and clear the DTC (See page [DI-505](#) ).

**NG**

**Replace hydraulic brake booster assembly.**



<b>5</b>	<b>Check pressure switch (PL).</b>
----------	------------------------------------

**In case of using hand-held tester:**

**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the DATA LIST mode on the hand-held tester.

**CHECK:**

Depress the brake pedal more than 40 times with the ignition switch OFF, then turn the ignition switch ON and check the pressure switch (PL) condition.

**HINT:**

When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

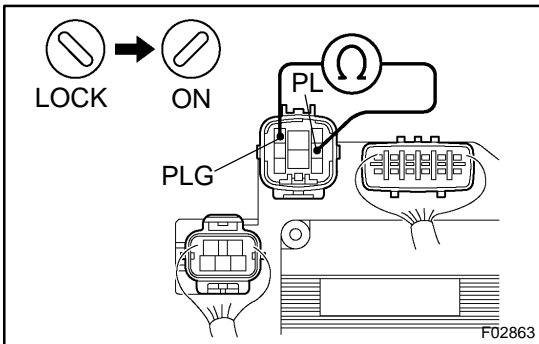
**OK:**

**"OFF" turns to "ON".**

**HINT:**

OFF: Low pressure

ON: High pressure



**In case of not using hand-held tester:**

**PREPARATION:**

- (a) Disconnect the connector (8P) from the hydraulic brake booster.
- (b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

**HINT:**

When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

**CHECK:**

Measure resistance between terminals PL and PLG of the hydraulic brake booster connector.

**OK:**

**Resistance: 5.7 kΩ**

**PREPARATION:**

- (a) Connect the connector (8P) to the hydraulic brake booster.
- (b) Disconnect the connector (8P) after the ignition switch is turned ON and the pump motor is stopped.

**CHECK:**

Measure resistance between terminals PL and PLG of the hydraulic brake booster connector.

**OK:**

**Resistance: 1.0 kΩ**

**HINT:**

After inspection, connect the connector and clear the DTC (See page [DI-505](#) ).

**NG** Replace hydraulic brake booster assembly.

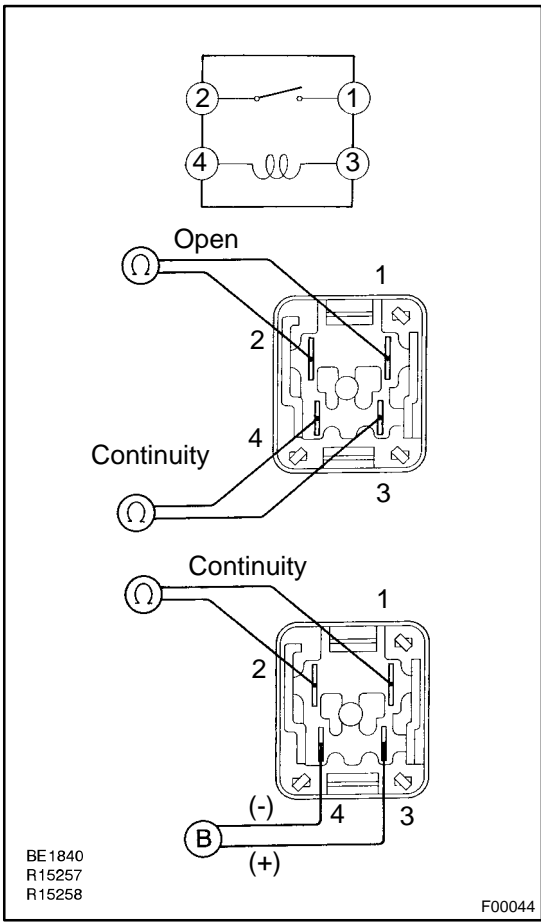
**OK**

**6** Check for short circuit (to B+) in harness and connector between pressure switch and skid control ECU (See page [IN-36](#) ).

**NG** Repair or replace harness or connector.

**OK**

**7** Check ABS motor 1 relay and ABS motor 2 relay.



**PREPARATION:**

Remove the ABS motor 1 relay and ABS motor 2 relay from the engine room J/B.

**CHECK:**

Check continuity between the motor relay terminals listed in the table below.

**OK:**

Terminals 3 and 4	Continuity (Reference value * <sup>1</sup> )
Terminals 1 and 2	Open

\*1: ABS motor 1 relay: 54 Ω  
ABS motor 2 relay: 62 Ω

**CHECK:**

- (a) Apply battery positive voltage between terminals 3 and 4.
- (b) Check continuity between terminals.

**OK:**

Terminals 1 and 2	Continuity
-------------------	------------

**NG** Replace ABS motor 1 relay or ABS motor 2 relay.

**OK**

**8** Check for short circuit in harness and connector between ABS motor 1 relay or ABS motor 2 relay and skid control ECU (See page [IN-36](#)).

**NG** Repair or replace harness or connector.

**OK**

Check and replace skid control ECU.

**9** Check for open or short circuit in harness and connector between hydraulic brake booster and skid control ECU (See page [IN-36](#)).

**NG** Replace wire harness.

**OK**

**10** Check hydraulic brake booster pump motor (See page [BR-64](#)).

**NG** Replace hydraulic brake booster pump motor.

**OK**

Replace hydraulic brake booster.

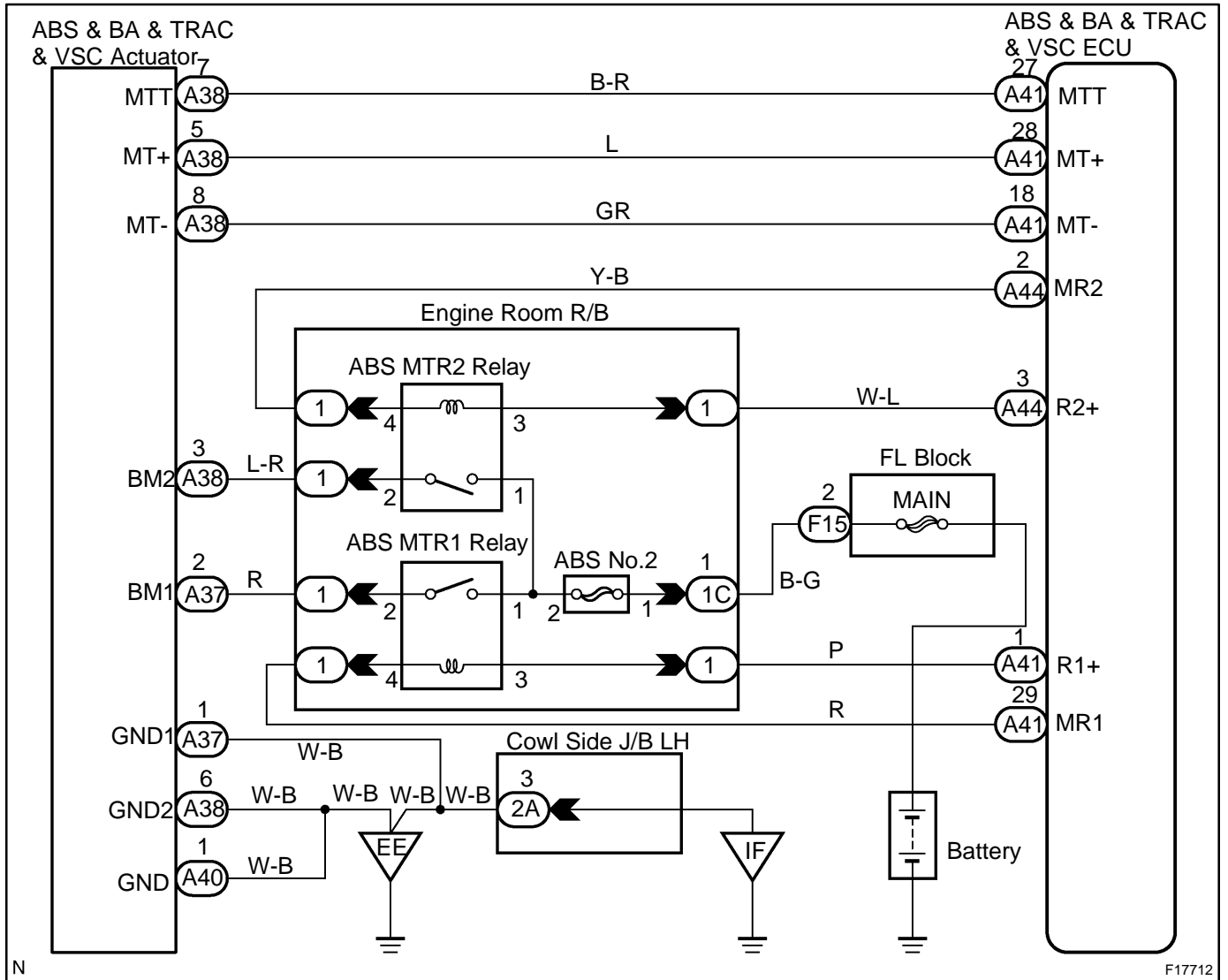
<b>DTC</b>	<b>C1253 / 53</b>	<b>Motor Relay Circuit</b>
------------	-------------------	----------------------------

## CIRCUIT DESCRIPTION

The ABS motor 1 relay and ABS motor 2 relay supply power to the hydraulic brake booster pump motor. While the ABS & BA & TRAC & VSC are activated, the ECU switches the motor relay ON and operates the hydraulic brake booster pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C1253 / 53	When any of the following 1. through 4. is detected: 1. After turning the ignition switch ON, open in the relay coil is detected for more than 1 sec. 2. When the pressure switch does not control motor driving, the condition that the motor relay is always ON continues for more than 1 sec. due to short circuit. 3. When the pressure switch (PH) detects the low pressure or while the pump motor operates to increase the pressure, the condition that the motor relay does not turn ON continues for more than 0.2 sec. 4. When pressure switch does not control motor driving, the condition that the motor relay is always ON due to the welded contact continues for more than 2 sec.	►ABS motor 1 or ABS motor 2 relay ►ABS motor 1 or ABS motor 2 relay circuit ►Hydraulic brake booster pump motor circuit

WIRING DIAGRAM



**INSPECTION PROCEDURE****HINT:**

Start the inspection from step 1, in case of using the hand-held tester and start from step 3, in case of not using hand-held tester.

<b>1</b>	<b>Check ABS motor 1 and ABS motor 2 relay operation.</b>
----------	---

**PREPARATION:**

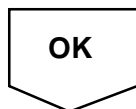
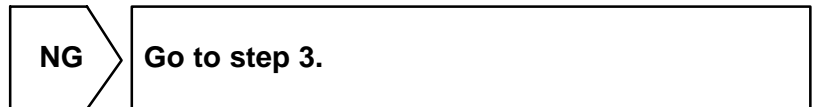
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the hand-held tester.

**CHECK:**

Check the operation sound of the ABS motor relays individually when operating it with the hand-held tester.

**OK:**

The operation sound of the ABS motor 1 relay and ABS motor 2 relay should be heard.



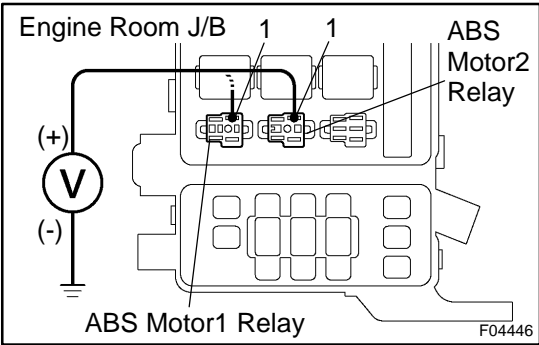
<b>2</b>	<b>Check for short circuit (to B+) in harness and connector between MT of hydraulic brake booster and skid control ECU (See page <a href="#">IN-36</a>).</b>
----------	--



<b>Check and replace skid control ECU.</b>
--



**3 Check voltage between terminal 1 of engine room J/B (for ABS motor 1 relay and ABS motor 2 relay) and body ground.**



**PREPARATION:**  
Remove the ABS motor 1 relay and ABS motor 2 relay from the engine room J/B.

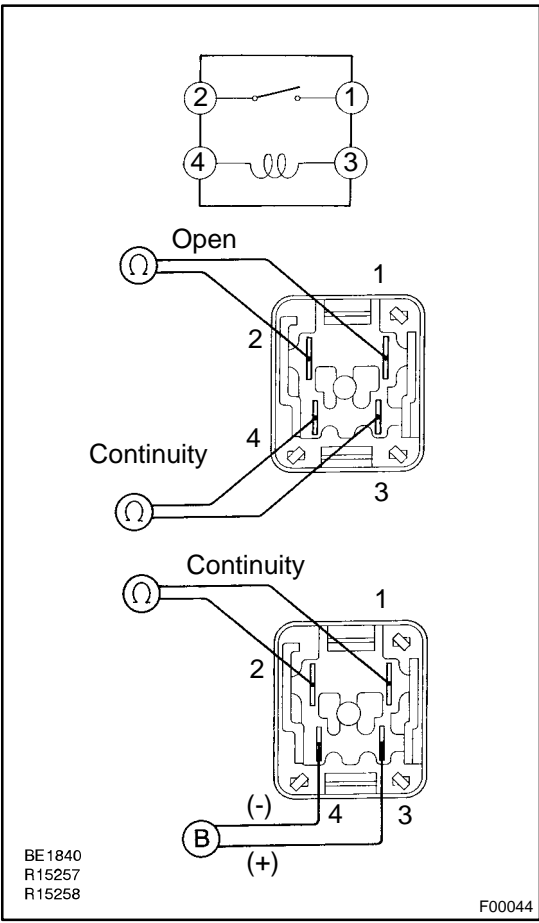
**CHECK:**  
Measure voltage between terminal 1 of the engine room J/B (for ABS motor 1 relay and ABS motor 2 relay) and body ground.

**OK:**  
**Voltage: 10 to 14 V**

**NG** Check and repair harness or connector.

**OK**

**4 Check ABS motor 1 relay and ABS motor 2 relay.**



**PREPARATION:**  
Remove the ABS motor 1 relay and ABS motor 2 relay from the engine room J/B.

**CHECK:**  
Check continuity between the motor relay terminals listed in the table below.

**OK:**

Terminals 3 and 4	Continuity (Reference value *1)
Terminals 1 and 2	Open

\*1: ABS motor 1 relay: 54 Ω  
ABS motor 2 relay: 62 Ω

**CHECK:**  
(a) Apply battery positive voltage between terminals 3 and 4.  
(b) Check continuity between terminals.

**OK:**

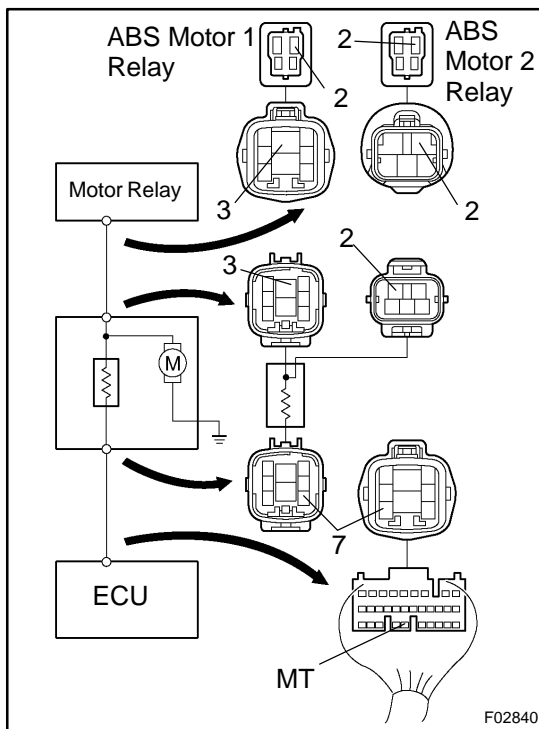
Terminals 1 and 2	Continuity
-------------------	------------

NG

Replace ABS motor 1 relay or ABS motor 2 relay.

OK

**5 Check continuity between terminal MT of the ABS & BA & TRAC & VSC ECU and terminals BM1 and BM2, respectively.**

**PREPARATION:**

Disconnect the 2 connectors from the hydraulic brake booster.

**CHECK:**

- Check continuity between terminal BM1 of the ABS motor 2 relay and terminal MT of the ABS & BA & TRAC & VSC ECU.
- Check continuity between terminal BM2 of the ABS motor 1 relay and terminal MT of the ABS & BA & TRAC & VSC ECU.

**OK:****Continuity****HINT:**

There is resistance of  $33 \pm 3 \Omega$  between terminal BM1 or BM2 and MT of the hydraulic brake booster.

NG

Repair or replace harness, connector or hydraulic brake booster.

OK

<b>6</b>	<b>Check for open and short circuit in harness and connector between ABS motor1 and ABS motor2 relay and ABS &amp; BA &amp; TRAC &amp; VSC ECU (See page <a href="#">IN-36</a>).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

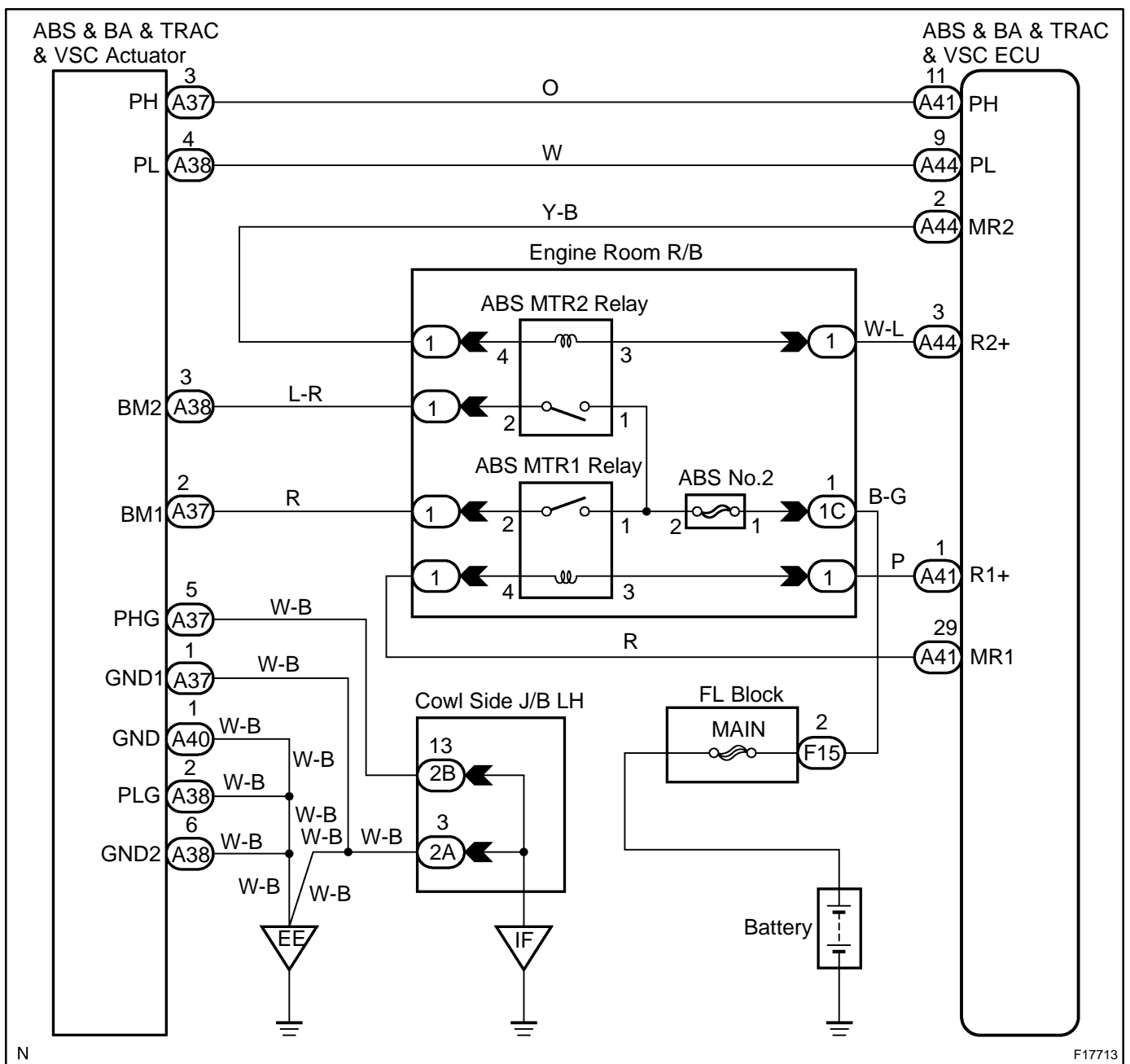
<b>Check and replace ABS &amp; BA &amp; TRAC &amp; VSC ECU.</b>
---

<b>DTC</b>	<b>C1254 / 54</b>	<b>Pressure Switch Circuit</b>
------------	-------------------	--------------------------------

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1254 / 54	Either of the following 1. or 2. is detected: 1. After turning the ignition switch ON, short or open circuit in pressure switch (PL) continued for more than 1 sec. 2. After turning the ignition switch ON, open in pressure switch (PH) continued for more than 1 sec.	▶Pressure switch (PH or PL) ▶Pressure switch circuit

**WIRING DIAGRAM**

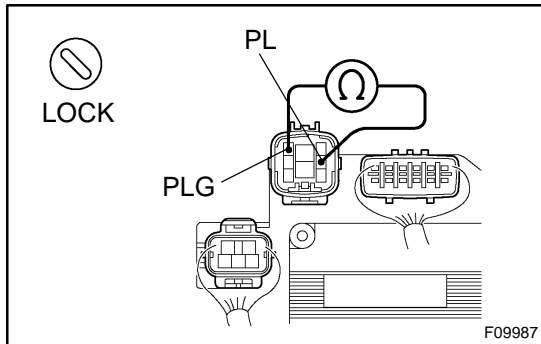


N

F17713

## INSPECTION PROCEDURE

<b>1</b>	<b>Check pressure switch (PL) resistance.</b>
----------	---



**PREPARATION:**

- (a) Disconnect the connector (8P) from the hydraulic brake booster.
- (b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

**HINT:**

When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

**CHECK:**

Measure resistance between terminals PL and PLG of the hydraulic brake booster connector.

**OK:**

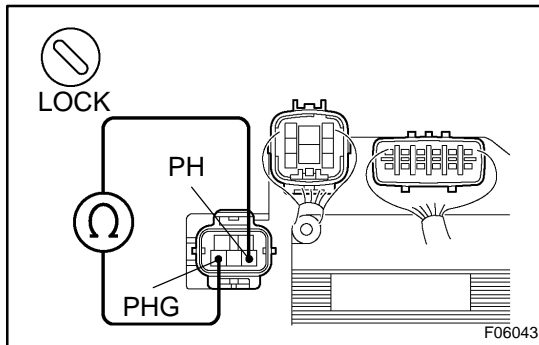
**Resistance: 5.1 to 6.3 kΩ**

**HINT:**

After inspection, connect the connector and clear the DTC (See page [DI-505](#) ).

<b>NG</b>	<b>Replace hydraulic brake booster assembly.</b>
-----------	--



**2 Check pressure switch (PH) resistance.****PREPARATION:**

- Disconnect the connector (5P) from the hydraulic brake booster.
- With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

**HINT:**

When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

**CHECK:**

Measure resistance between terminals PH and PHG of the hydraulic brake booster connector.

**OK:**

**Resistance: 0.9 to 1.1 kΩ**

**HINT:**

After inspection, connect the connector and clear the DTC (See page [DI-505](#) ).

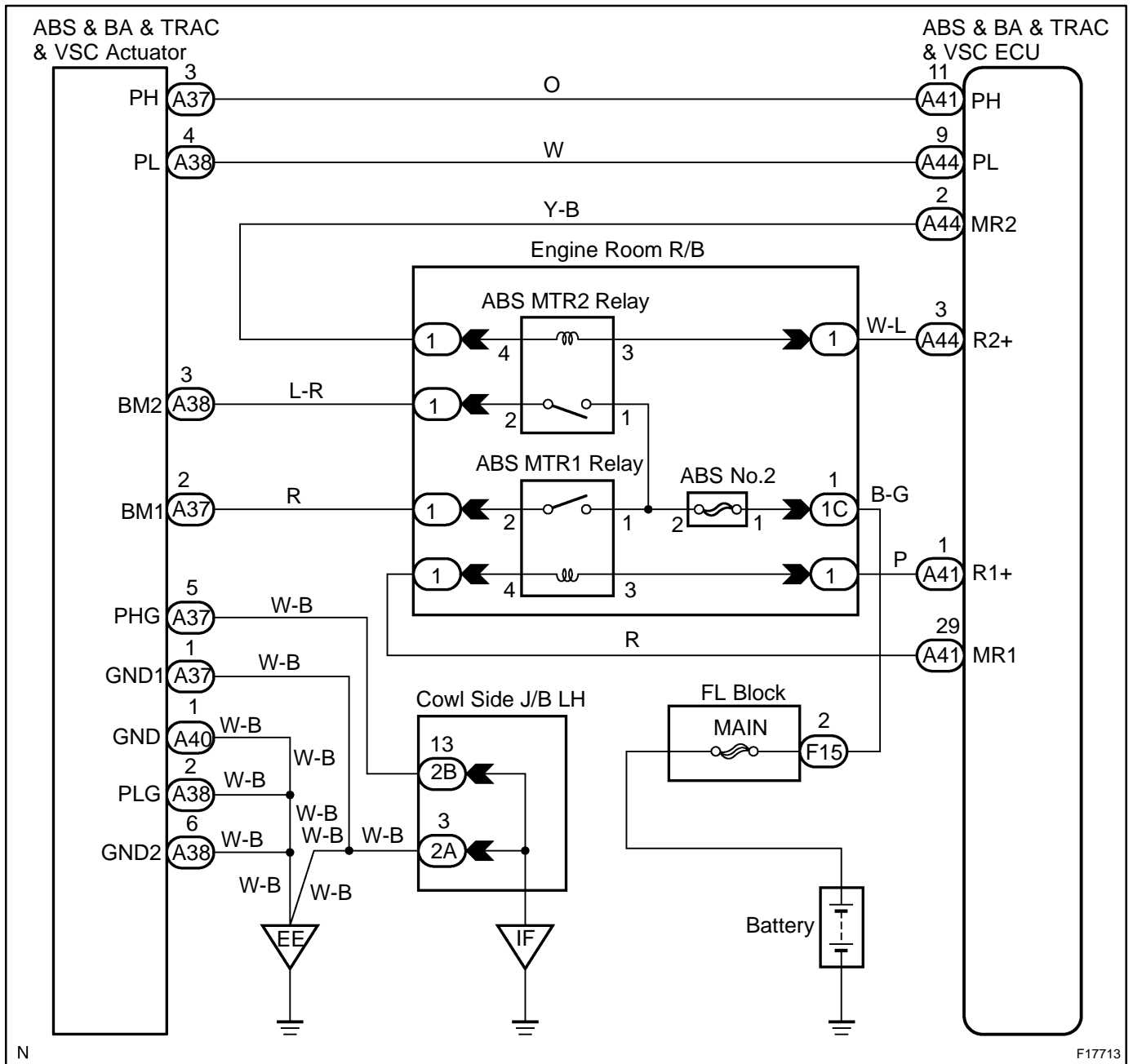
**NG****Replace hydraulic brake booster assembly.****OK****3 Check for open and short circuit in harness and connector between pressure switch and skid control ECU (See page [IN-36](#) ).****NG****Repair or replace harness or connector.****OK****Check and replace skid control ECU.**

<b>DTC</b>	<b>C1256 / 56</b>	<b>Accumulator Low Pressure Malfunction</b>
------------	-------------------	---

## CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1256 / 56	<p>Any of the following 1. through 7. is detected:</p> <ol style="list-style-type: none"> <li>1. With the vehicle running, when the pressure switch (PL) detects high pressure, although ABS, TRAC or VSC does not control, the pressure switch (PL) detects low pressure for more than 1.4 sec.</li> <li>2. With the vehicle running, when the pressure switch (PL) detects high pressure, although ABS, TRAC or VSC controls, the pressure switch (PL) detects low pressure for more than 0.2 sec.</li> <li>3. After the ignition switch is turned ON, the pressure switch (PL) detects low pressure for more than 64 sec.</li> <li>4. With the vehicle running, after ignition switch has been ON, the pressure switch (PL) detects low pressure for more than 0.2 sec. although ABS, TRAC, or VSC does not control and when the pressure switch is ON and stuck under high pressure.</li> <li>5. With the vehicle running, after ignition switch is ON, the pressure switch (PL) detects low pressure for more than 0.2 sec. when ABS, TRAC or VSC controls, the pressure switch is ON and stuck under high pressure.</li> <li>6. With the vehicle running, after ignition switch is ON, the pressure switch (PL) is stuck to under low pressure although ABS, TRAC or VSC does not control for more than 1.4 sec.</li> <li>7. With the vehicle running, after ignition switch is ON, the pressure switch (PL) is stuck under low pressure when ABS, TRAC or VSC controls for more than 0.2 sec.</li> </ol>	<ul style="list-style-type: none"> <li>▶Accumulator</li> <li>▶Pressure switch (PH or PL)</li> <li>▶Hydraulic brake booster pump motor</li> </ul>

# WIRING DIAGRAM



N

F17713



## INSPECTION PROCEDURE

<b>1</b>	<b>Check accumulator operation.</b>
----------	-------------------------------------

**PREPARATION:**

(a) Turn the ignition switch OFF, and depress the brake pedal 40 times or more.

HINT:

When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

(b) Install the LSPV gauge (SST) to the rear brake caliper and bleed air.

SST 09709-29018

**CHECK:**

Depress the brake pedal with a force of more than 294 N (30 kgf, 66 lbf) and turn the ignition switch ON, then check the rear brake caliper pressure when an increase of pressure changes from acutely to mildly.

**OK:**

**5,099 to 8,924 kPa (52 to 91 kgf/cm<sup>2</sup>, 740 to 1,294 psi) at 20°C (68°F)**

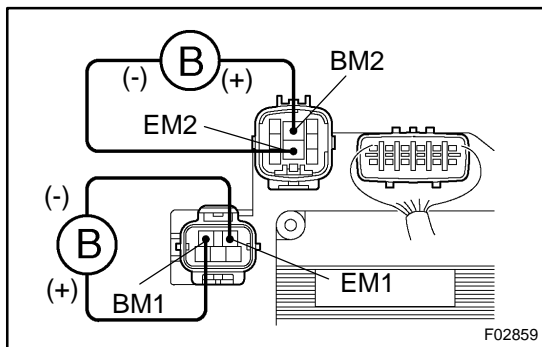
HINT:

If the value is not within the standard, cool the engine room and check it again.

<b>NG</b>	<b>Replace accumulator.</b>
-----------	-----------------------------

<b>OK</b>
-----------

<b>2</b>	<b>Check operation of hydraulic brake booster pump motor.</b>
----------	---



**PREPARATION:**

Disconnect the 2 connectors from the hydraulic brake booster.

**CHECK:**

Connect the battery positive  $\ell$  lead to BM1 or BM2 terminal and the battery negative  $\vee$  lead to EM1 or EM2 terminal of the hydraulic brake booster (pump motor) connector.

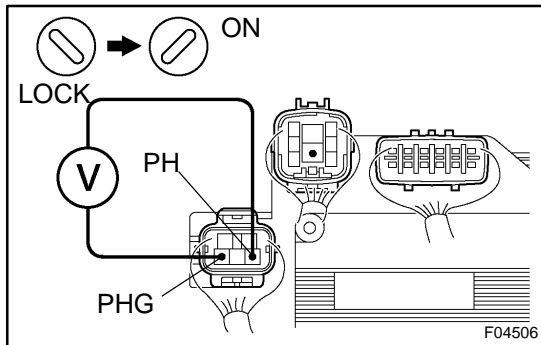
**OK:**

**The operation sound of the pump motor should be heard.**

<b>NG</b>	<b>Go to step 7.</b>
-----------	----------------------

<b>OK</b>
-----------

### 3 Check pressure switch (PH) operation.

**PREPARATION:**

(a) Turn the ignition switch OFF, and depress the brake pedal 40 times or more.

**HINT:**

When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

(b) Install the LSPV gauge (SST) to the rear brake caliper and bleed air.

SST 09709-29018

**CHECK:**

While checking the voltage between terminals PH and PHG of the hydraulic brake booster, depress the brake pedal with a force of more than 294 N (30 kgf, 66 lbf) and turn the ignition switch ON, then check the rear wheel cylinder pressure when voltage changes from 6 V to 0 V.

**OK:**

**12,553 to 20,104 kpa (128 to 205 kgf-cm<sup>2</sup>, 1,820 to 2,916 psi)**

**PREPARATION:**

Turn the ignition switch OFF and disconnect the connector (5P) from the hydraulic brake booster.

**CHECK:**

While checking the resistance between terminals PH and PHG, depress the brake pedal changing the force in a range of 197 N (20 kgf, 44 lbf) to 294 N (30 kgf, 66 lbf) and check the rear wheel cylinder pressure when resistance changes from 0 kΩ to 1 kΩ between PH and PHG.

**OK:**

**11,964 to 18,240 kpa (122 to 186 kgf-cm<sup>2</sup>, 1,735 to 2,645 psi)**

**HINT:**

After inspection, connect the connector, fill brake reservoir with brake fluid and clear the DTC (See page [DI-505](#)).

OK

Go to step 5.

NG

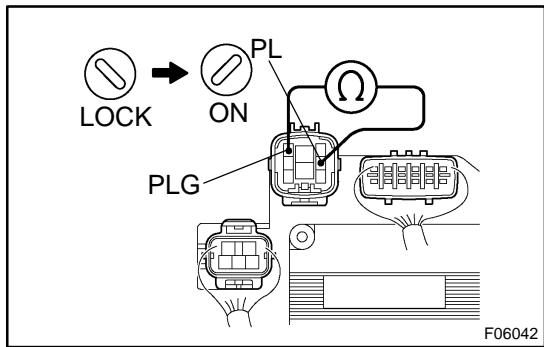
**4 Check for open circuit in harness and connector between pressure switch (PH) and skid control ECU (See page IN-36).**

**NG** Repair or replace harness or connector.

**OK**

Replace hydraulic brake booster assembly.

**5 Check pressure switch (PL) operation.**



**PREPARATION:**

- (a) Turn the motor switch OFF, and depress the brake pedal 40 times or more.

**HINT:**

When pressure in the power supply system is released, reaction force becomes light and stroke becomes longer.

- (b) Install the LSPV gauge (SST) to the rear brake caliper and bleed air.

SST 09709 -29018

- (c) Disconnect the connector (8P) from the hydraulic brake booster.

**CHECK:**

While checking the resistance between terminals PL and PLG of the hydraulic brake booster, depress the brake pedal with a force of more than 294 N (30 kgf, 66 lbf) and turn the ignition switch ON, then check the rear wheel cylinder pressure when the resistance changes from 5.7 kΩ to 1.0 kΩ.

**OK:**

**9,022 to 15,102 kpa (92 to 154 kgf-cm<sup>2</sup>, 1,308 to 2,190 psi)**

**PREPARATION:**

Turn the ignition switch OFF and disconnect the connector (8P) from the hydraulic brake booster.

**CHECK:**

While checking the resistance between terminals PL and PLG of the hydraulic brake booster, depress the brake pedal changing the force in a range of 197 N (20 kgf, 44 lbf) to 294 N (30 kgf, 66 lbf) and check the rear wheel cylinder pressure when resistance changes from 1.0 kΩ to 5.7 kΩ.

**OK:**

**8,532 to 13,337 kpa (87 to 136 kgf-cm<sup>2</sup>, 1,237 to 1,934 psi)**

## HINT:

After inspection, connect the connector, fill brake reservoir with brake fluid and clear the DTC (See page [DI-505](#) ).

NG

Replace hydraulic brake booster assembly.

OK

6

Check pressure switch (PH) and pressure switch (PL)

**CHECK:**

Compare the pressure value of the rear wheel cylinder measured in check pressure switch (PL) operation with the one measured in check pressure switch (PH) operation.

**OK:**

- ▶ Pressure when the voltage between PH and PHG becomes 6 to 0 V > pressure when the resistance between PL and PLG becomes 5.7 kΩ to 1.0 kΩ.
- ▶ Pressure when the resistance between PH and PHG becomes 0 kΩ to 1 kΩ > pressure when the resistance between PL and PLG becomes 1.0 kΩ to 5.7 kΩ.

NG

Replace hydraulic brake booster assembly.

OK

Check and replace skid control ECU.

7

Check for open or short circuit in harness and connector between hydraulic brake booster pump motor and hydraulic brake booster (See page [IN-36](#) ).

NG

Replace wire harness.

OK

<b>8</b>	<b>Check hydraulic brake booster pump motor (See page <a href="#">BR-64</a> ).</b>
----------	--

<b>NG</b>	<b>Replace hydraulic brake booster pump motor.</b>
-----------	--

<b>OK</b>
-----------

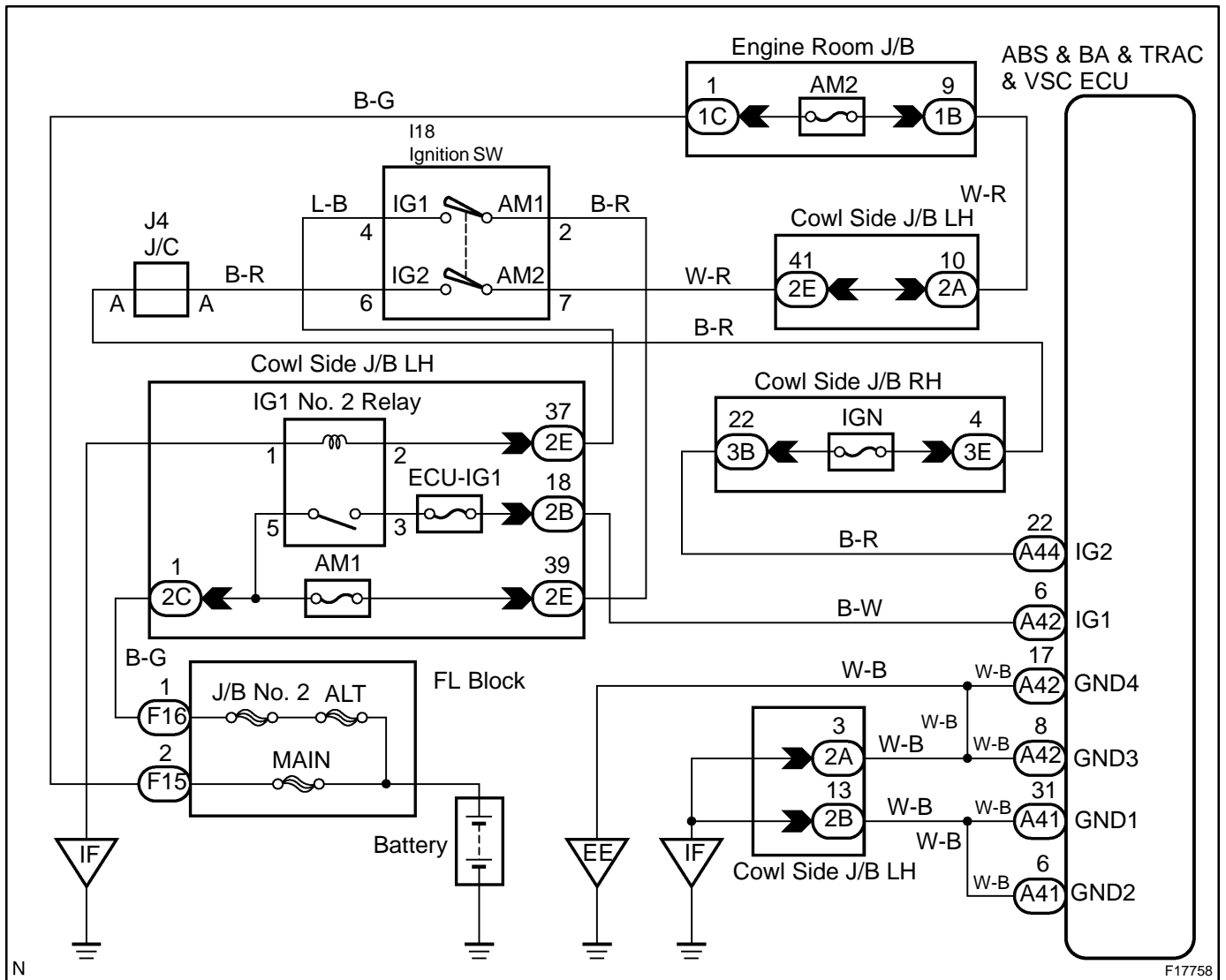
<b>Replace hydraulic brake booster.</b>
---

<b>DTC</b>	<b>C1257 / 57</b>	<b>Power Supply Drive Circuit</b>
------------	-------------------	-----------------------------------

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1257 / 57	When a malfunction inside ECU is detected.	<ul style="list-style-type: none"> <li>▶Battery</li> <li>▶Power source circuit</li> <li>▶Skid control ECU</li> </ul>

**WIRING DIAGRAM**



## INSPECTION PROCEDURE

<b>1</b>	<b>Check battery positive voltage.</b>
----------	--

**OK:**

Voltage: 10 to 14 V

**NG** → **Check and repair the charging system.**

**OK**

<b>2</b>	<b>Check voltage of the ECU IG power source.</b>
----------	--

**In case of using the hand-held tester:**

**PREPARATION:**

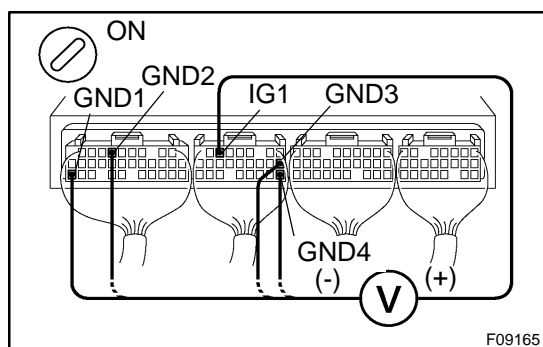
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the DATA LIST mode on the hand-held tester.

**CHECK:**

Check the voltage condition output from the ECU displayed on the hand-held tester.

**OK:**

"Normal" is displayed.



**In case of not using the hand-held tester:**

**PREPARATION:**

Remove the skid control ECU with connectors still connected.

**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminals IG1 and GND of the skid control ECU connector.

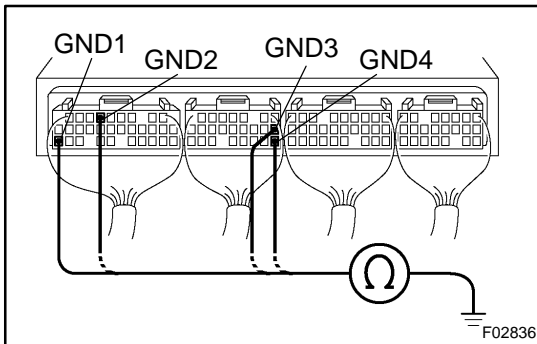
**OK:**

Voltage: 10 to 14 V

**OK** → **Turn ignition switch OFF, check and replace skid control ECU.**

**NG**

### 3 Check continuity between terminal GND of skid control ECU connector and body ground.

**CHECK:**

Measure resistance between terminal GND of the skid control ECU connector and body ground.

**OK:**

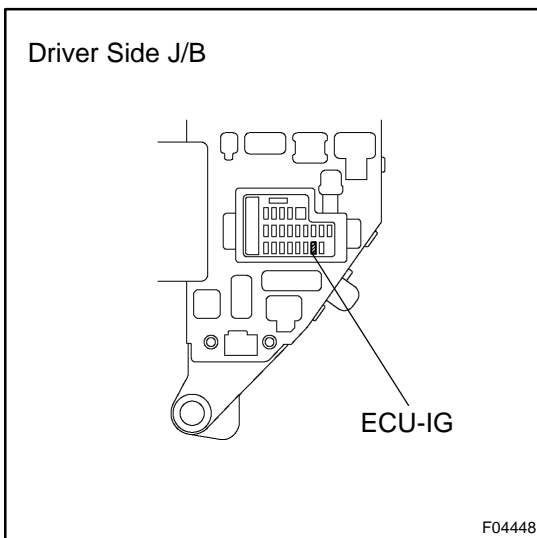
Resistance: 1 Ω or less

**NG**

Repair or replace harness or connector.

**OK**

### 4 Check ECU-IG fuse.

**PREPARATION:**

Remove the ECU-IG fuse from the driver side J/B.

**CHECK:**

Check continuity of the ECU-IG fuse.

**OK:**

Continuity

**NG**

Check for short circuit in all the harness and components connected to ECU-IG fuse (See attached wiring diagram).

**OK**

Check for open circuit in harness and connector between skid control ECU and battery (See page [IN-36](#)).

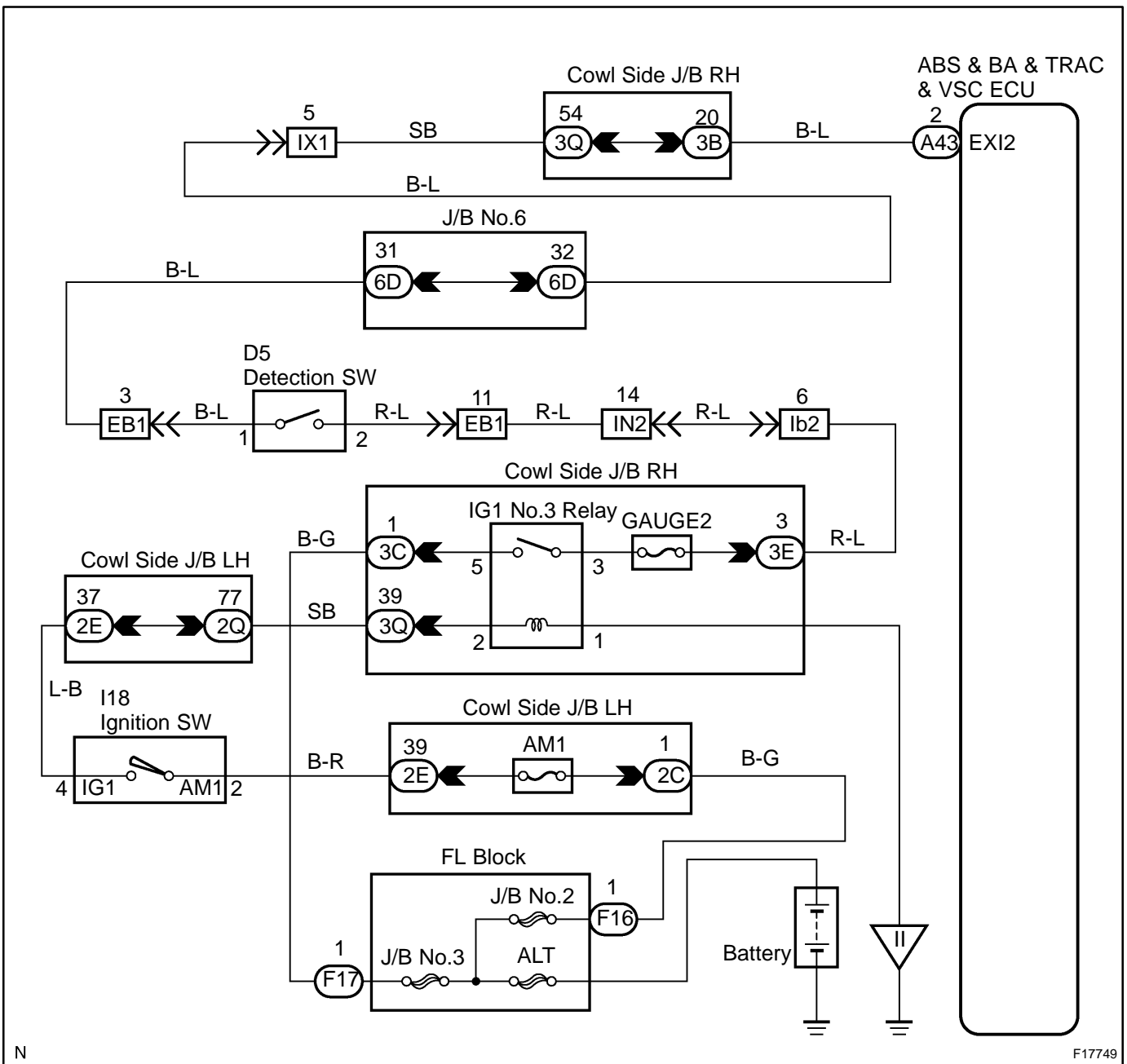


<b>DTC</b>	<b>C1268 / 68</b>	<b>Transfer L4 Position Switch Circuit</b>
------------	-------------------	--

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1268 / 68	Open or short circuit in transfer L4 position switch.	<ul style="list-style-type: none"> <li>▶Transfer L4 position switch</li> <li>▶Transfer L4 position switch circuit</li> </ul>

**WIRING DIAGRAM**

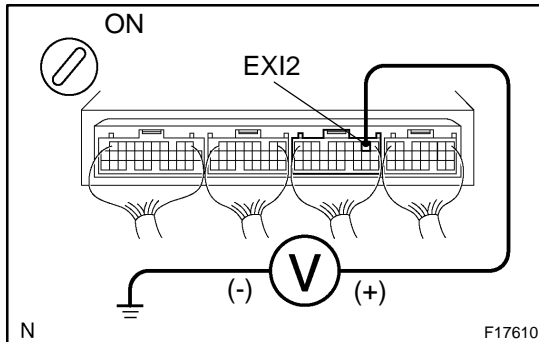


N

F17749

**INSPECTION PROCEDURE**

**1 Check voltage between terminal EXI2 of skid control ECU and body ground.**

**PREPARATION:**

Remove the skid control ECU with connectors still connected.

**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminal EXI2 of the skid control ECU and body ground when the transfer is in the L4 position.

**OK:**

**Voltage: 10 to 14 V**

**OK**

Proceed to next circuit inspection shown in problem symptoms chart (See page [DI-526](#) ).

**NG**

**2 Check transfer L4 position switch ( See page [TR-49](#) ).**

**NG**

Replace transfer L4 position switch.

**OK**

**3 Check for open or short circuit in harness and connector between transfer L4 position switch and skid control ECU ( See page [IN-36](#) ).**

**NG**

Repair or replace harness or connector.

**OK**

<b>4</b>	<b>Check for open or short circuit in harness and connector between skid control ECU and ECM (See page <a href="#">IN-36</a>).</b>
----------	--

**NG**

**Repair or replace harness or connector.**

**OK**

**Check and replace skid control ECU.**

<b>DTC</b>	<b>C1290 / 66</b>	<b>Zero Point Calibration of Steering Sensor Undone</b>
------------	-------------------	---

## CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1290 / 66	The steering sensor zero point calibration position vastly differs from the recorded value. (The angle becomes larger)	<ul style="list-style-type: none"> <li>▶Yaw rate sensor zero point calibration undone</li> <li>▶Steering angle sensor zero point calibration undone</li> </ul>

## INSPECTION PROCEDURE

<b>1</b>	<b>Perform zero point calibration. (See page <a href="#">DI-505</a> )</b>
----------	---

### HINT:

This code is output when a problem occurs in a zero point calibration of the steering angle sensor and yaw rate sensor.

Therefore, clear the stored zero point calibration data and correct the zero points.

- (a) Clear the zero point calibration data.
- (b) Perform a zero point calibration of the steering sensor and yaw rate sensor.

**NEXT**

<b>2</b>	<b>Is DTC output?</b>
----------	-----------------------

- (a) Clear the DTCs.
- (b) Turn the ignition switch to the ON position.
- (c) Are the same DTCs detected?

**NO**

**Proceed to next circuit inspection shown in problem symptoms table.**

**YES**

**No problem.**

### HINT:

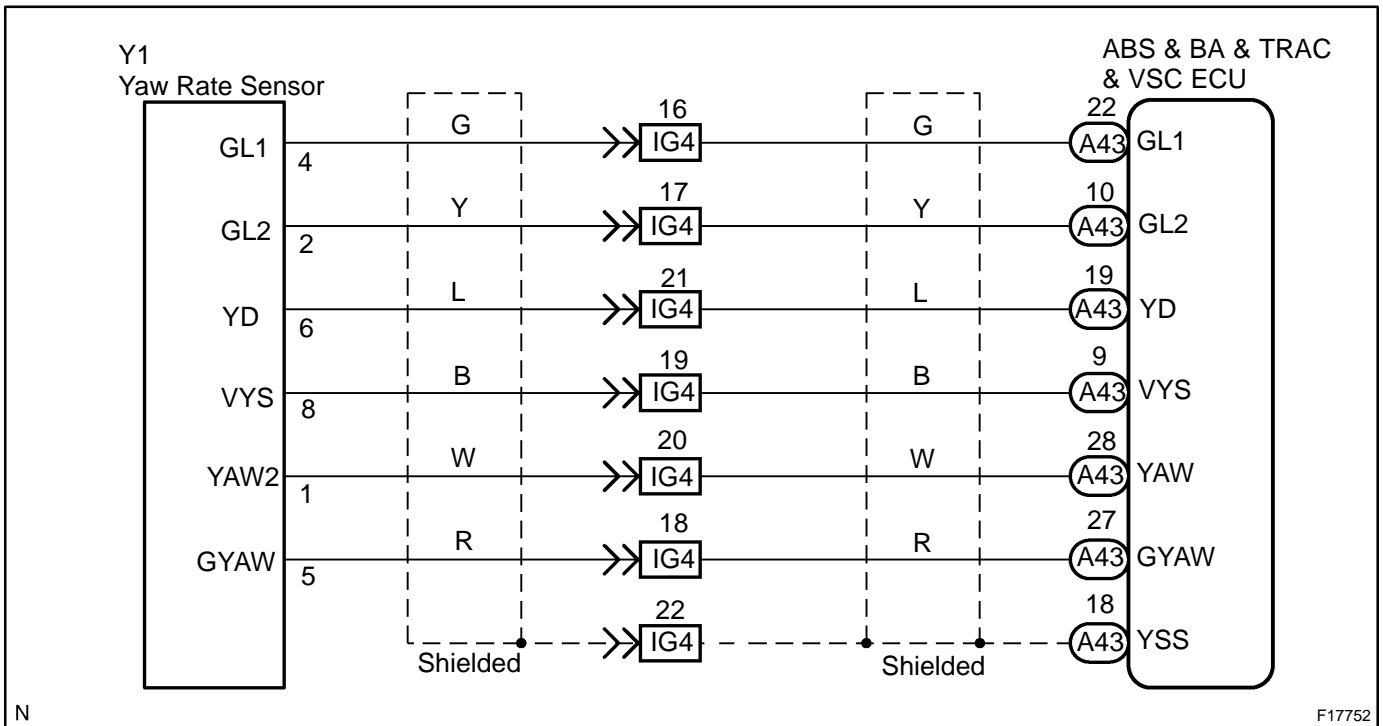
When the registered data is not equal to the input data, the DTC will be output.

<b>DTC</b>	<b>C1336 / 39</b>	<b>Zero Point Calibration of Deceleration Sensor Undone</b>
------------	-------------------	---

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1236 / 39	When either of the following 1. or 2. is detected: 1. In TEST mode, the shift lever is shifted to other than P position within 2 sec. after ECU terminal IG1 is turned ON for the first time. 2. When the deceleration sensor zero point recorded in ECU is deleted.	▶Deceleration sensor ▶Deceleration sensor circuit ▶PNP switch circuit (R position)

**WIRING DIAGRAM**

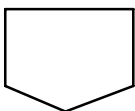


**INSPECTION PROCEDURE**

<b>1</b>	<b>Check whether zero point calibration of yaw rate (deceleration) sensor has been done or not.</b>
----------	---

**PREPARATION:**

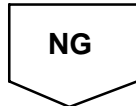
Shift the shift lever in the P position and turn the ignition switch ON. Repeat connecting and releasing Ts and E<sub>1</sub> terminals of the DLC1 4 times or more for 8 sec. After this, turn the ignition switch OFF and after connecting terminals Ts and E<sub>1</sub>, turn it ON again.



<b>2</b>	<b>Carry out yaw rate (deceleration) sensor zero point calibration and confirm it by VSC TRAC warning light.</b>
----------	--

**OK:**

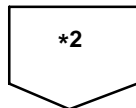
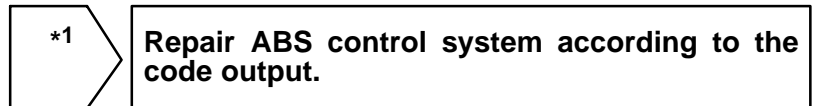
VSC TRAC warning light blinks



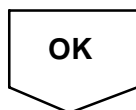
<b>3</b>	<b>Check DTC for the VSC (See page <a href="#">DI-505</a> ).</b>
----------	--

\*1 :Other than DTC C1336 / 39 is output.

\*2 :DTC C1336 / 39 only is output.



<b>4</b>	<b>Check for open and short circuit in harness and connector between PNP switch (P position) and skid control ECU and ECM (See page <a href="#">IN-36</a> ).</b>
----------	--



<b>5</b>	<b>Check for open and short circuit in harness and connector between yaw rate (deceleration) sensor and skid control ECU (See page <a href="#">IN-36</a> ).</b>
----------	---



<b>6</b>	<b>Check yaw rate (deceleration) sensor (See page <a href="#">DI-505</a> ).</b>
----------	---

<b>NG</b>	<b>Replace yaw rate sensor.</b>
-----------	---------------------------------

<b>OK</b>
-----------

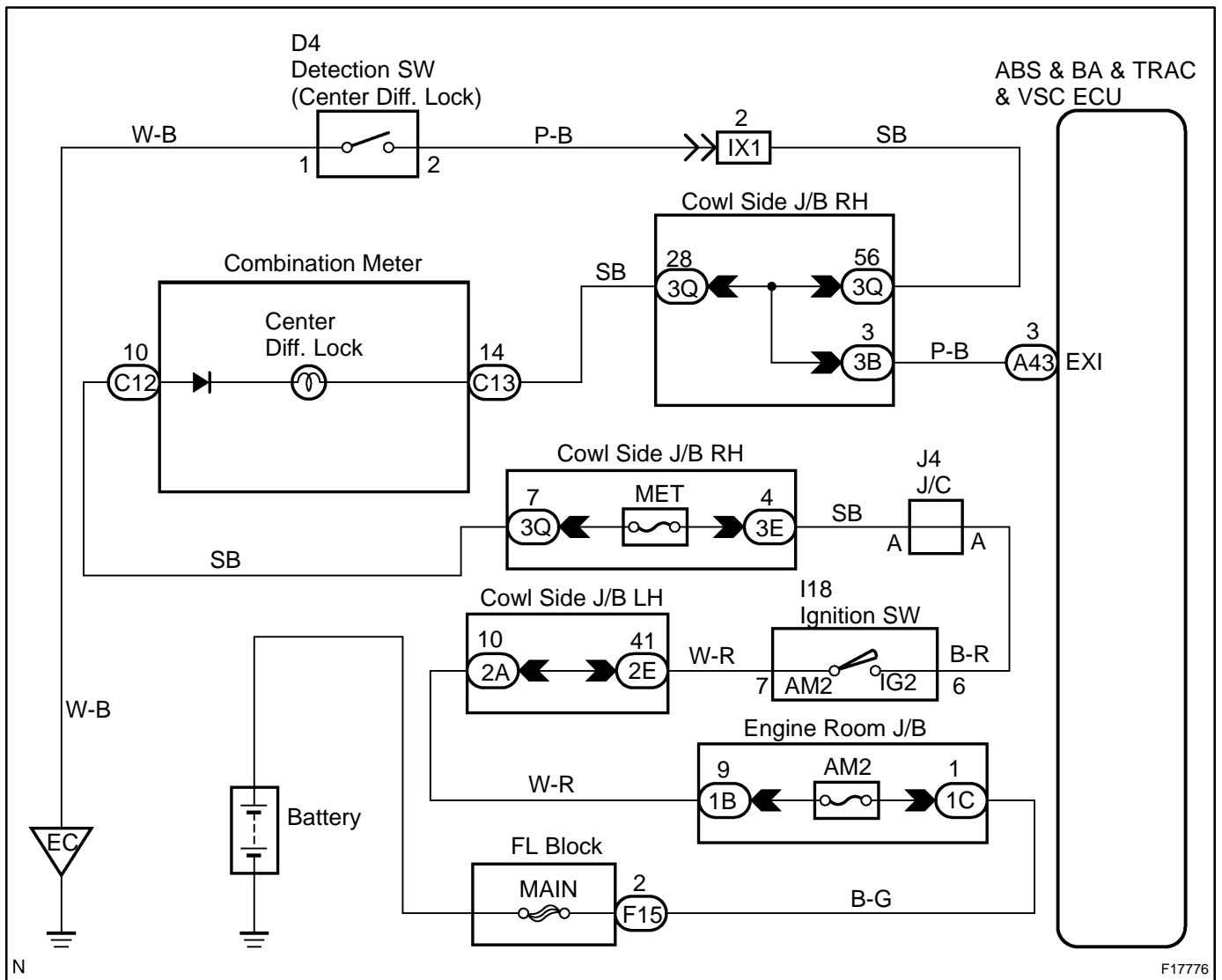
<b>Check and replace skid control ECU.</b>
--

<b>DTC</b>	<b>C1340 / 47</b>	<b>Center Differential Lock Circuit</b>
------------	-------------------	---

**CIRCUIT DESCRIPTION**

DTC No.	DTC Detecting Condition	Trouble Area
C1240 / 47	Open or short in center differential lock circuit.	<ul style="list-style-type: none"> <li>▶Center differential lock system</li> <li>▶Center differential lock circuit</li> </ul>

**WIRING DIAGRAM**





## INSPECTION PROCEDURE

<b>1</b>	<b>Check that the center differential is free and center diff. lock switch is OFF.</b>
----------	--

<b>NG</b>	<b>Repair the center differential lock system.</b>
-----------	--

<b>OK</b>
-----------

<b>2</b>	<b>Is DTC output?</b>
----------	-----------------------

Check the DTC on page [DI-505](#) .

<b>NO</b>	<b>END</b>
-----------	------------

<b>YES</b>
------------

<b>3</b>	<b>Check that bulb for center diff. lock indicator light is not burnt out.</b>
----------	--

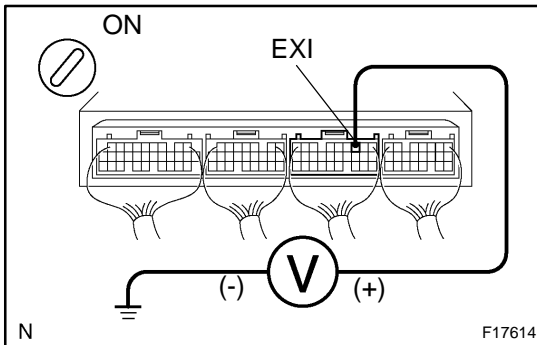
<b>NG</b>	<b>Replace indicator light.</b>
-----------	---------------------------------

<b>OK</b>
-----------

<b>4</b>	<b>Check for open circuit in harness and connector between battery and center diff. lock indicator light, center diff. lock indicator light and skid control ECU (See page <a href="#">IN-36</a> ).</b>
----------	---

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

**5 Check voltage between terminal EXI of skid control ECU and body ground.****PREPARATION:**

Remove the skid control ECU with connectors still connected.

**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminal EXI of the skid control ECU and body ground when the transfer is in the L4 position.

**OK:**

**Voltage: 10 to 14 V**

**NG**

**Repair or replace harness or connector.**

**OK**

**6 Check transfer indicator switch (See page TR-49 ).**

**NG**

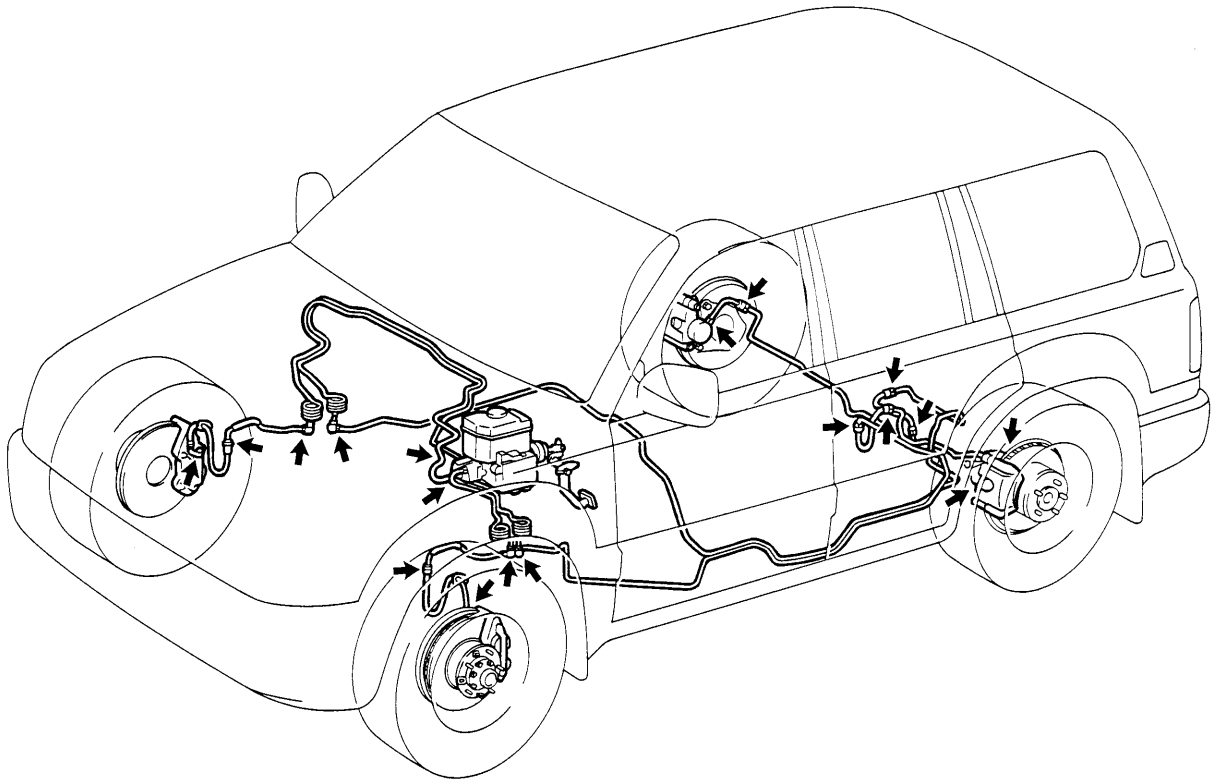
**Replace transfer indicator switch.**

**OK**

**Check and replace skid control ECU.**

## Check for Fluid Leakage

Check for fluid leakage from the actuator or hydraulic lines.



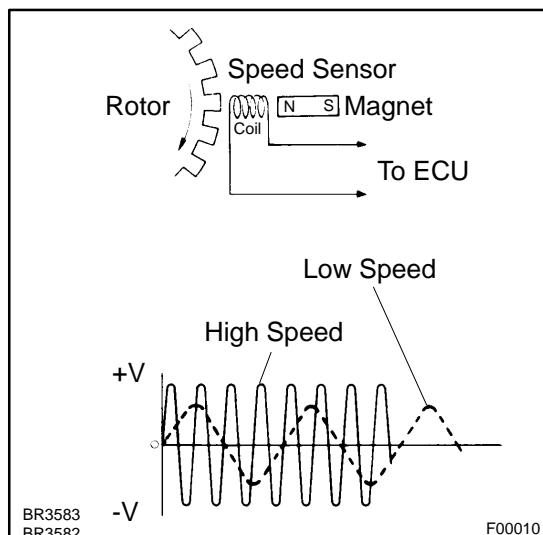
N

F09992

# CIRCUIT INSPECTION

<b>DTC</b>	<b>C0200 / 31 - C1239 / 39</b>	<b>Speed Sensor Circuit</b>
------------	--------------------------------	-----------------------------

## CIRCUIT DESCRIPTION



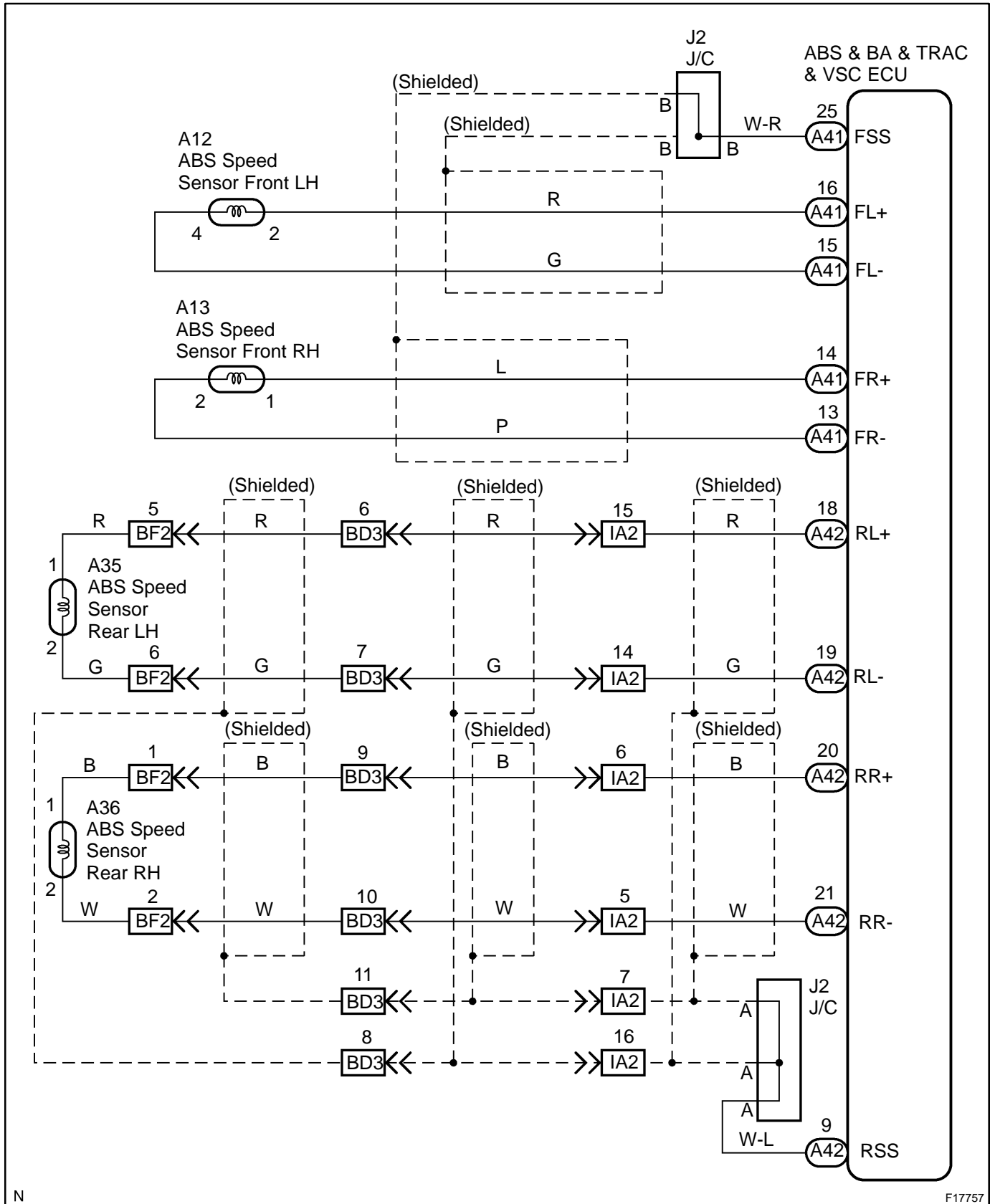
The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used for control of the ABS & BA & TRAC & VSC control system. The front and rear rotors each have 48 serrations. When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of the conditions 1. through 4.: 1. At a vehicle speed of 6 mph (10 km/h) or more, pulses are not input for 15 sec. 2. Momentary interruption of the speed sensor signal occurs at least 7 times in the time between switching the ignition switch ON and switching it OFF. 3. Continuous noise occurs into the speed sensor signals with a vehicle speed at 12 mph (20 km/h) or more. 4. The condition that the speed sensor signal circuit is open continues for 0.12 sec. or more. ▶ABS does not function ▶Brake pedal is not depressed ▶Parking brake is not set ▶Rear differential does not lock Under the above conditions, when the difference in velocity between the highest rotating and the second highest rotating wheels is within 1 mph (2 km/h), the slowest wheel rotates at 0 mph (0 km/h), and the second slowest wheel rotates at 7 mph (12 km/h) for 1 second or more.	▶Right front, left front, right rear and left rear speed sensor ▶Each speed sensor circuit ▶Sensor rotor
C1235 / 35 C1236 / 36 C1238 / 38 C1239 / 39	Continuous noise occurs into the speed sensor signals with a vehicle speed at 12 mph (20 km/h) or more continues for 5 sec or more.	▶Right front, left front, right rear, left rear speed sensor ▶Speed sensor rotor

**HINT:**

- ▶ DTC No. C0200 / 31 and C1235 / 35 are for the right front speed sensor.
- ▶ DTC No. C0205 / 32 and C1236 / 36 are for the left front speed sensor.
- ▶ DTC No. C0210 / 33 and C1238 / 38 are for the right rear speed sensor.
- ▶ DTC No. C0215 / 34 and C1239 / 39 are for the left rear speed sensor.

# WIRING DIAGRAM



## INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

<b>1</b>	<b>Check output value of speed sensor.</b>
----------	--

### PREPARATION:

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the DATALIST mode on the hand-held tester.

### CHECK:

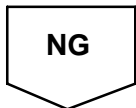
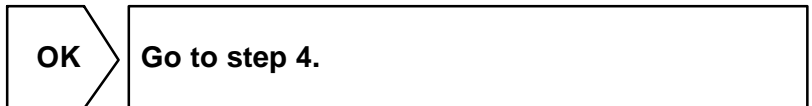
Check that there is no difference between the speed value output from the speed sensor displayed on the hand-held tester and the speed value displayed on the speedometer when driving the vehicle.

### OK:

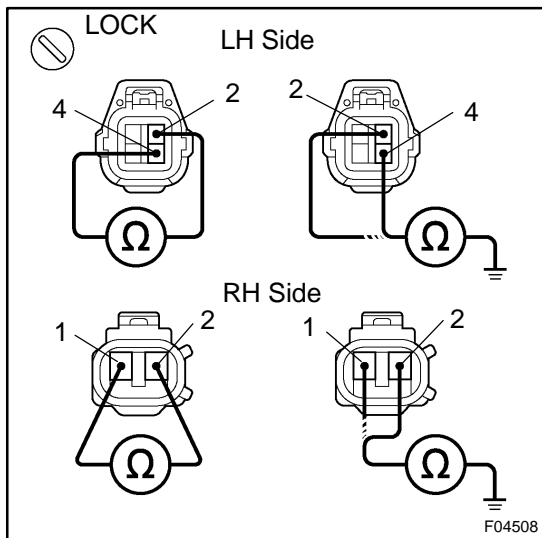
**There is almost no difference from the displayed speed value.**

HINT:

There is tolerance of  $\pm 10\%$  in the speedometer indication.



<b>2</b>	<b>Check speed sensor.</b>
----------	----------------------------



**Front:**

### PREPARATION:

- (a) Make sure that there is no looseness at the connector's locking part and connecting part of the connector.
- (b) Disconnect the speed sensor connector.

### CHECK:

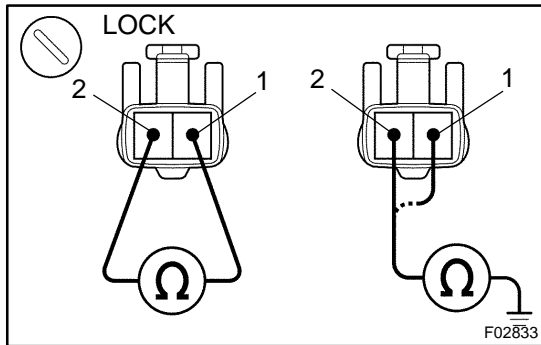
- ▶ LH side:  
Measure resistance between terminals 2 and 4 of the speed sensor connector.
- ▶ RH side:  
Measure resistance between terminals 1 and 2 of the speed sensor connector.

### OK:

**Resistance: 0.92 to 1.22 kΩ**

### CHECK:

- ▶ LH side:  
Measure resistance between terminals 2 and 4 of the speed sensor connector and body ground.
- ▶ RH side:  
Measure resistance between terminals 1 and 2 of the speed sensor connector and body ground.

**OK:****Resistance: 1 MΩ or higher****Rear:****PREPARATION:**

- (a) Make sure that there is no looseness at the connector's locking part and connecting part of the connector.
- (b) Disconnect the speed sensor connector.

**CHECK:**

Measure resistance between terminals 1 and 2 of the speed sensor connector.

**OK:****Resistance: 1.0 to 1.4 kΩ****CHECK:**

Measure resistance between terminal 1 or 2 of the speed sensor connector and body ground.

**OK:****Resistance: 1 MΩ or higher****NG****Replace speed sensor.****NOTICE:**

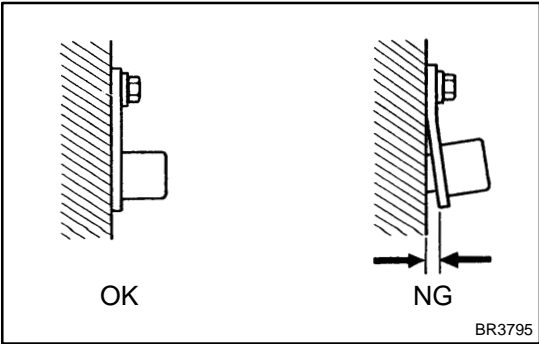
Check the speed sensor signal last (See page [DI-505](#) ).

**OK****3**

**Check for open and short circuit in harness and connector between each speed sensor and ECU (See page [IN-36](#) ).**

**NG****Repair or replace harness or connector.****OK**

**4 Check sensor installation.**



**CHECK:**  
Check the speed sensor installation.

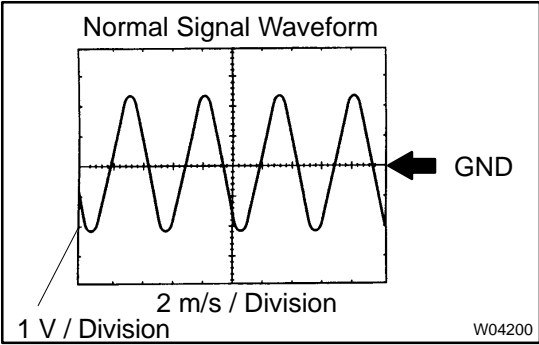
**OK:**  
The installation bolt is tightened properly and there is no clearance between the sensor and front steering knuckle or rear axle carrier.  
Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)

**NG** → Replace speed sensor.

**NOTICE:**  
Check the speed sensor signal last (See page [DI-505](#) ).

**OK**

**5 Check speed sensor and sensor rotor serrations.**



**(REFERENCE) INSPECTION USING OSCILLOSCOPE**

- PREPARATION:**
- (a) Remove the skid control ECU with connectors still connected.
  - (b) Connect the oscilloscope to each of terminals FR+ - FR-, FL+ - FL-, RR+ - RR- or RL+ - RL- of the skid control ECU.

**CHECK:**  
Drive the vehicle at about 12 mph (20 km/h), and check the signal waveform.

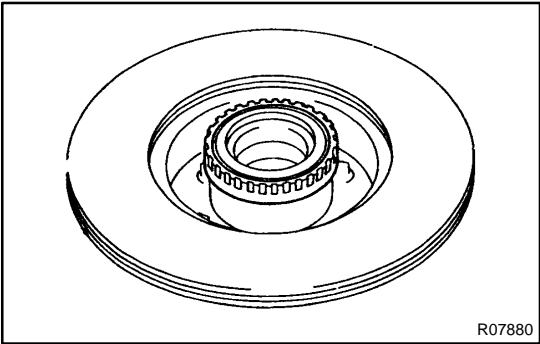
- HINT:**
- ▶ As vehicle speed (rpm of the wheels) increase, a cycle of the waveform narrows and the fluctuation in the output voltage becomes greater.
  - ▶ When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter deposited on it.

**OK** → Check and replace skid control ECU.

**NG**



**6 Check sensor rotor and sensor tip.**



**Front:**

**PREPARATION:**

Remove the front axle hub (See page SA-12 ).

**CHECK:**

Check the sensor rotor serrations.

**OK:**

**No scratches, missing teeth or foreign matter.**

**PREPARATION:**

Remove the front speed sensor (See page BR-69 ).

**CHECK:**

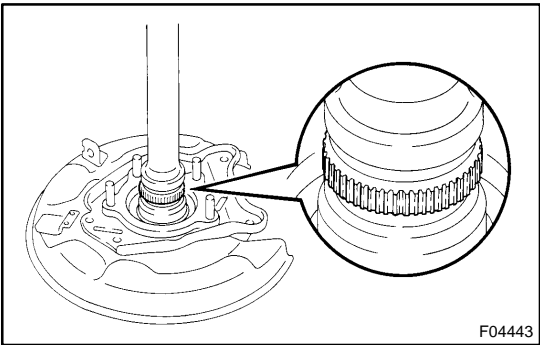
Check the sensor tip.

**OK:**

**No scratches or foreign matter on the sensor tip.**

**HINT:**

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.



**Rear:**

**PREPARATION:**

Remove the rear axle shaft (See page SA-84 ).

**CHECK:**

Check the sensor rotor serrations.

**OK:**

**No scratches, missing teeth or foreign matter.**

**PREPARATION:**

Remove the rear speed sensor (See page BR-72 ).

**CHECK:**

Check the sensor tip.

**OK:**

**No scratches or foreign matter on the sensor tip.**

**HINT:**

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.

<b>NG</b>	<b>Replace speed sensor or rotor.</b>
-----------	---------------------------------------

**NOTICE:**

**Check the speed sensor signal last (See page DI-505 ).**

<b>OK</b>
-----------

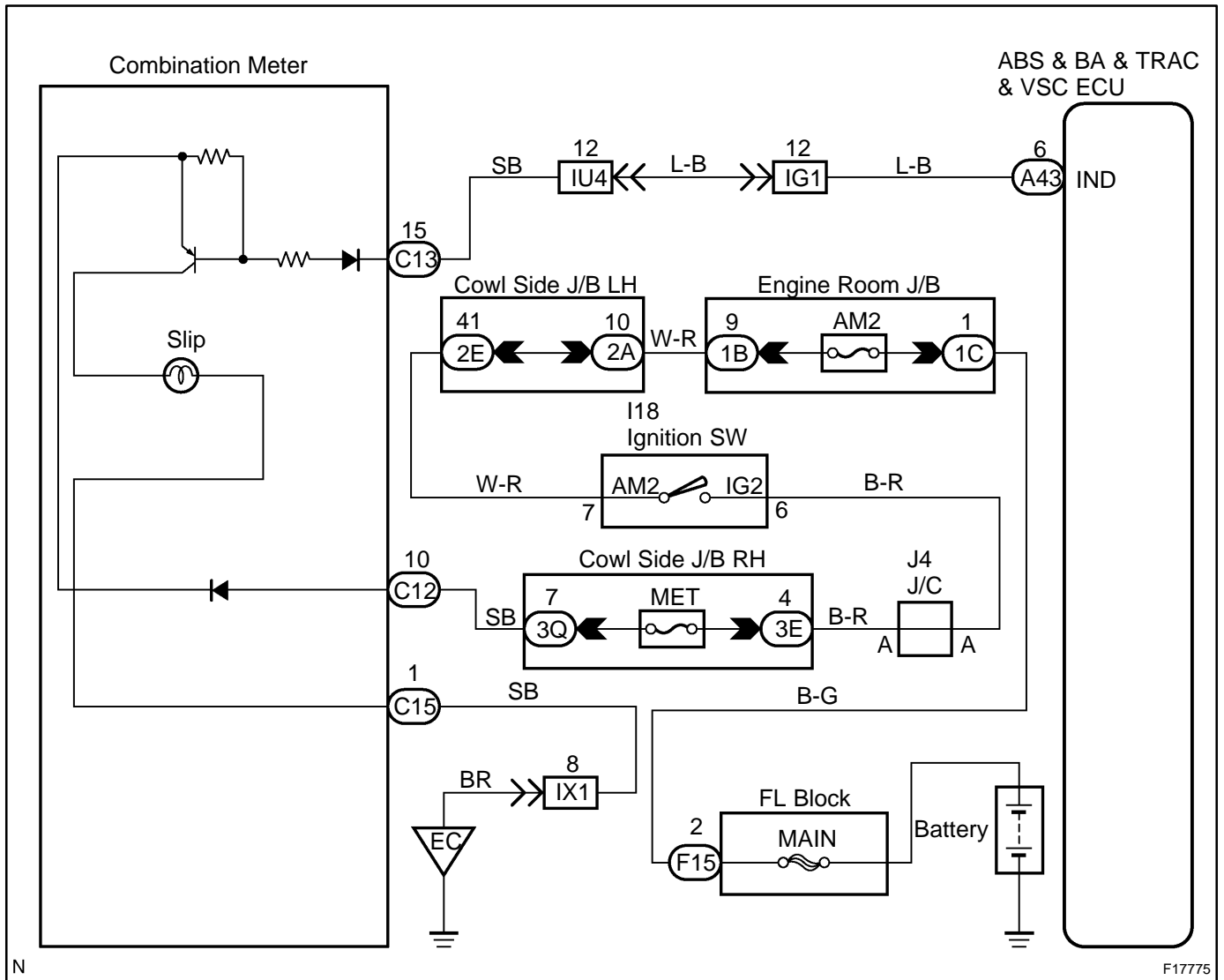
<b>Check and replace skid control ECU.</b>
--

# SLIP Indicator Light Circuit

## CIRCUIT DESCRIPTION

The SLIP indicator blinks during VSC operation.

## WIRING DIAGRAM



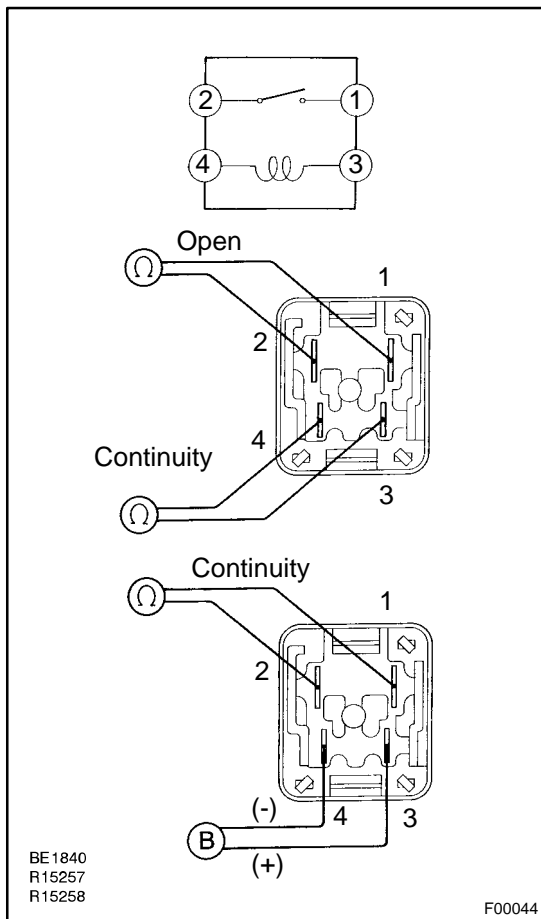
**INSPECTION PROCEDURE**

**1 Do the warning lights other than SLIP indicator light come on?**

**YES** Go to step 3.

**NO**

**2 Check IG1 No. 1 relay.**



**PREPARATION:**

Remove the IG1 No. 1 relay from the engine room J/B.

**CHECK:**

Check continuity between the IG1 No. 1 relay terminals listed in the table below.

**OK:**

Terminals 3 and 4	Continuity
Terminals 1 and 2	Open

**CHECK:**

- (a) Apply battery positive voltage between terminals 3 and 4.
- (b) Check continuity between terminals.

**OK:**

Terminals 1 and 2	Continuity
-------------------	------------

**NG** Replace IG1 No. 1 relay.

**OK**

Check for open circuit in harness and connector between IG1 No. 1 relay and combination meter (See page IN-36).

<b>3</b>	<b>Check SLIP indicator light.</b>
----------	------------------------------------

Check if that the open circuit in the combination meter circuit (See page [BE-58](#) ).

<b>NG</b>	<b>Repair SLIP indicator light bulb or combination meter assembly.</b>
-----------	--

<b>OK</b>
-----------

<b>4</b>	<b>Check for short circuit in harness and connector between SLIP indicator light and skid control ECU (See page <a href="#">IN-36</a> ).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

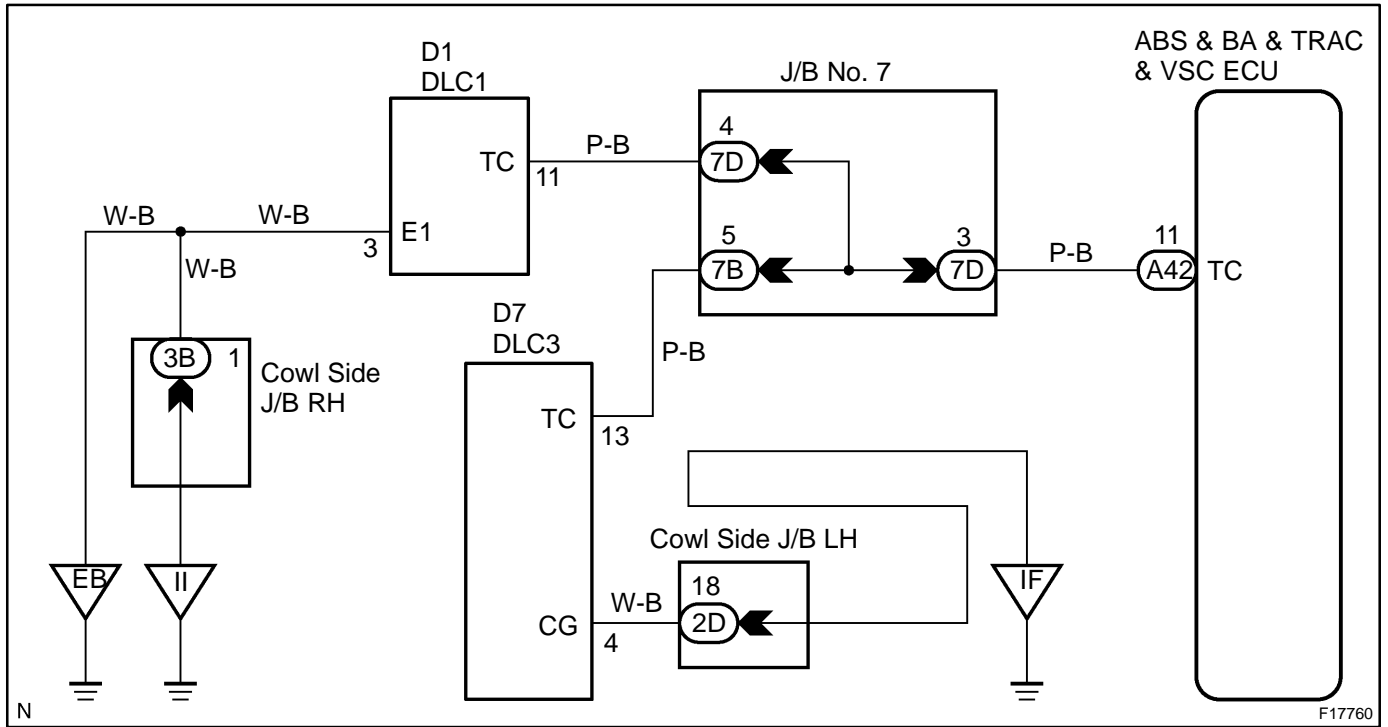
<b>Check and repair skid control ECU.</b>
---

## Tc Terminal Circuit

### CIRCUIT DESCRIPTION

Connecting terminals Tc and E<sub>1</sub> of the DLC1 or Tc and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light and VSC TRAC warning light.

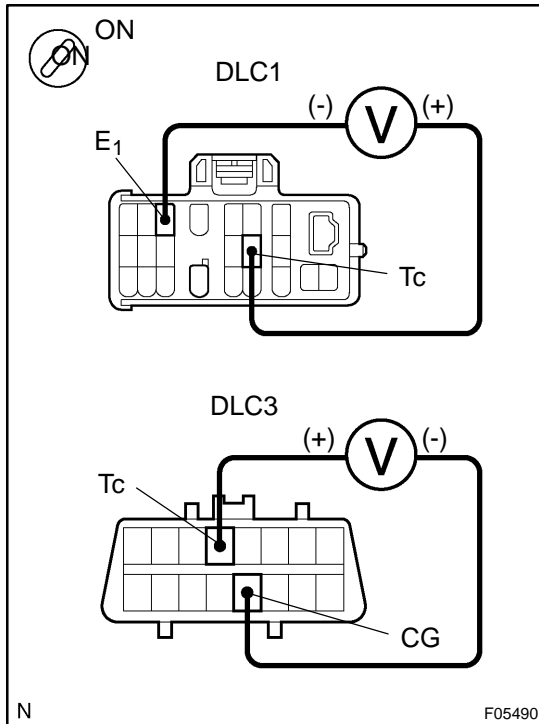
### WIRING DIAGRAM



F17760

## INSPECTION PROCEDURE

- |          |   |
|----------|---|
| <b>1</b> | <b>Check voltage between terminals Tc and E<sub>1</sub> of DLC1 or Tc and CG of DLC3.</b> |
|----------|---|

**CHECK:**

- Turn the ignition switch ON.
- Measure voltage between terminals Tc and E<sub>1</sub> of the DLC1 or Tc and CG of the DLC3.

**OK:****Voltage: 10 to 14 V****OK**

If ABS warning light does not blink even after Tc and E<sub>1</sub> are connected, the ECU may be defective.

**NG**

- |          |   |
|----------|---|
| <b>2</b> | <b>IG switch OFF, and check for open and short circuit in harness and connector between skid control ECU and DLC1 or DLC3, DLC1 or DLC3 and body ground (See page IN-36).</b> |
|----------|---|

**NG**

Repair or replace harness or connector.

**OK**

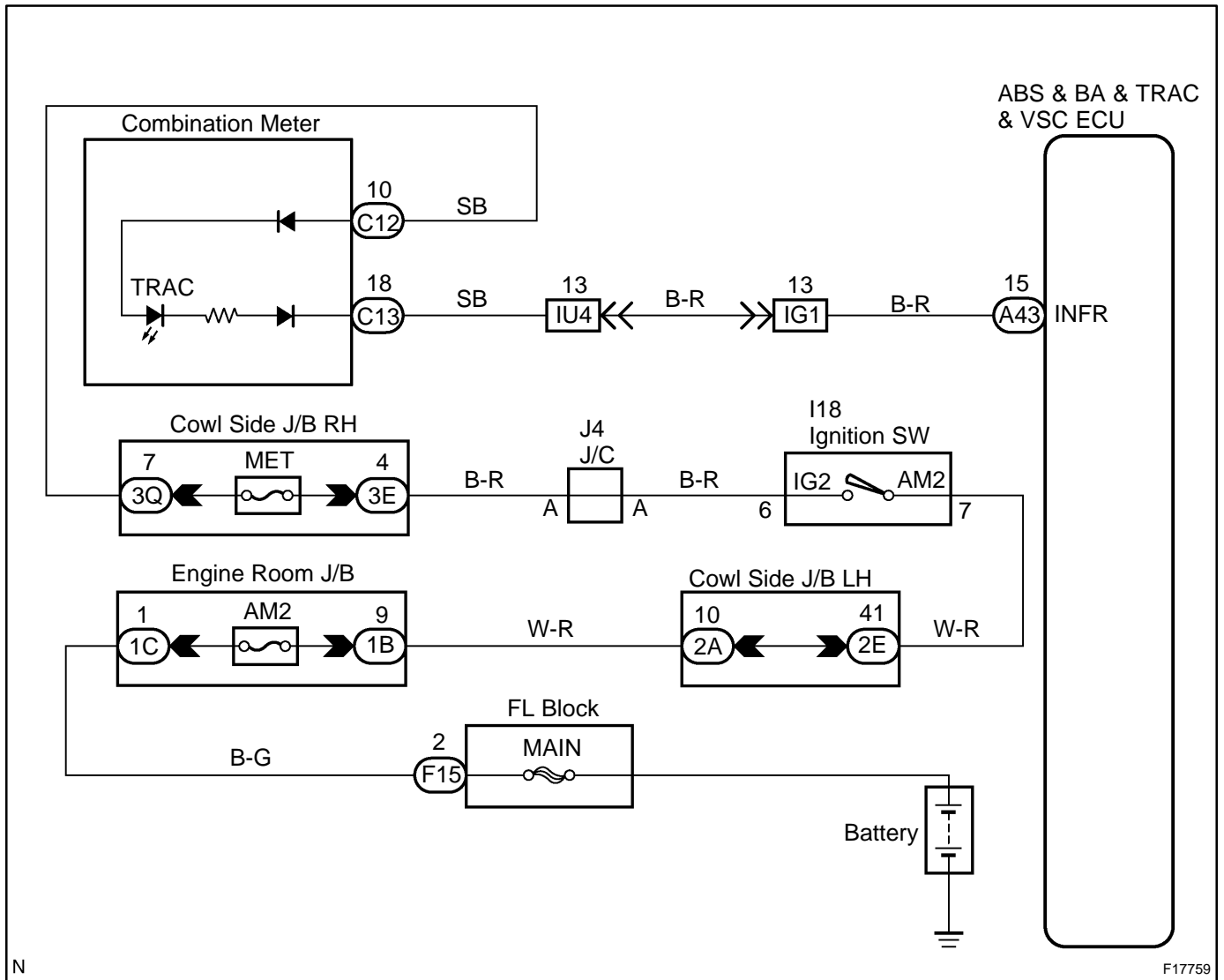
Check and replace skid control ECU.

# TRAC Indicator Light Circuit

## CIRCUIT DESCRIPTION

The TRAC indicator light blinks during TRAC operation.

## WIRING DIAGRAM



N

F17759

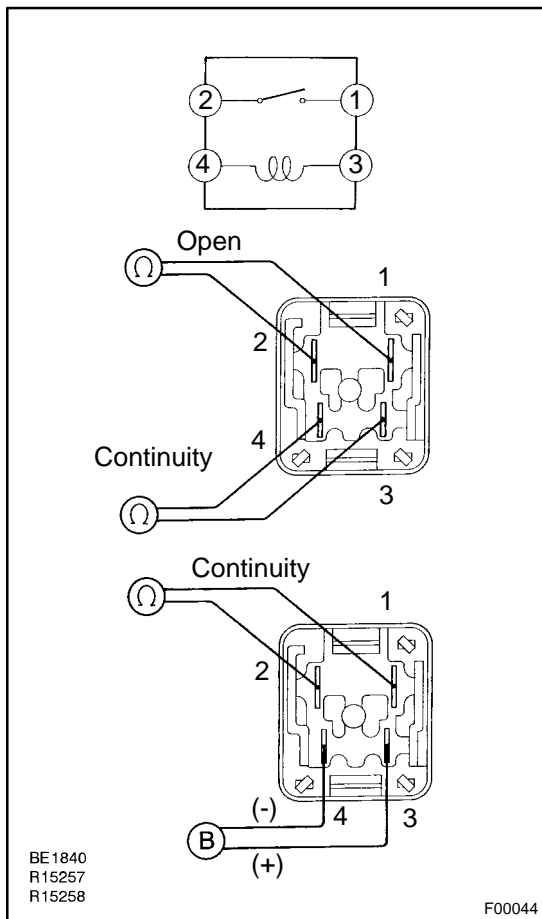
## INSPECTION PROCEDURE

**1 Do the warning lights other than TRAC indicator light come on?**

**YES** → Go to step 3.

**NO**

**2 Check IG1 No. 1 relay.**



**PREPARATION:**

Remove the IG1 No. 1 relay from the engine room J/B.

**CHECK:**

Check continuity between the IG1 No. 1 relay terminals listed in the table below.

**OK:**

Terminals 3 and 4	Continuity
Terminals 1 and 2	Open

**CHECK:**

- (a) Apply battery positive voltage between terminals 3 and 4.
- (b) Check continuity between terminals.

**OK:**

Terminals 1 and 2	Continuity
-------------------	------------

**NG** → Replace IG1 No. 1 relay.

**OK**

**Check for open circuit in harness and connector between IG1 No. 1 relay and combination meter (See page IN-36).**



**3 Check TRAC indicator light.**

Check that the open circuit in the combination meter circuit (See page [BE-58](#) ).

**NG****Repair TRAC indicator light bulb or combination meter assembly.****OK****4 Check for short circuit in harness and connector between TRAC indicator light and skid control ECU (See page [IN-36](#) ).****NG****Repair or replace harness or connector.****OK****Check and repair skid control ECU.**

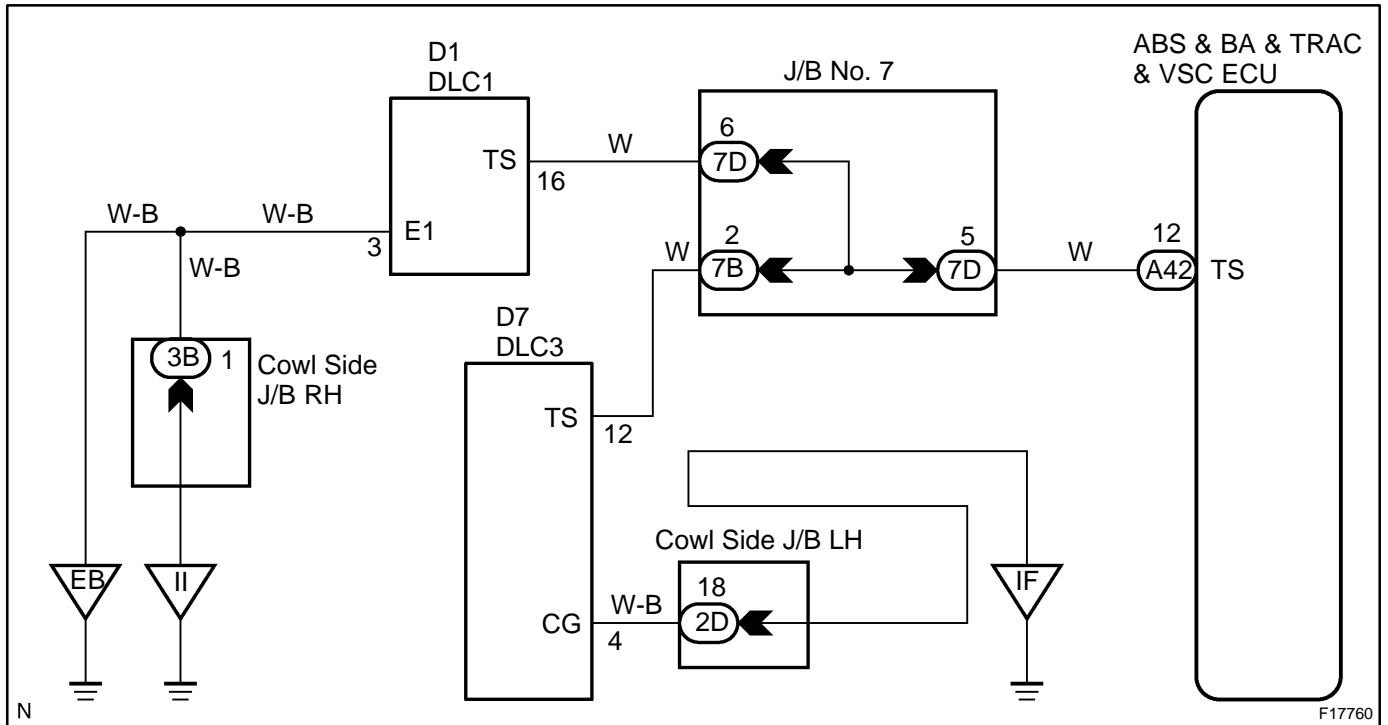
## Ts Terminal Circuit

### CIRCUIT DESCRIPTION

The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected by the DTC check.

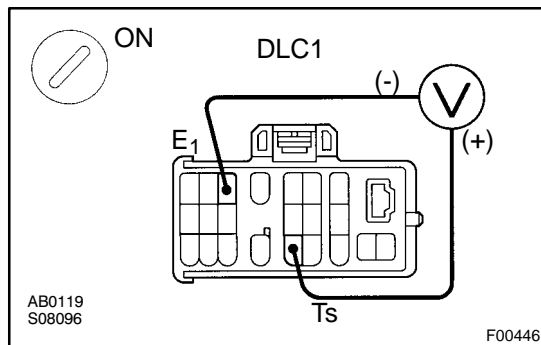
Connecting terminals Ts and E<sub>1</sub> of the DLC1 starts the check.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

- |          |  |
|----------|--|
| <b>1</b> | <b>Check voltage between terminals Ts and E<sub>1</sub> of DLC1.</b> |
|----------|--|

**CHECK:**

- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminals Ts and E<sub>1</sub> of the DLC1.

**OK:**

**Voltage: 10 to 14 V**

**OK**

If ABS warning light does not blink even after Ts and E<sub>1</sub> are connected, the ECU may be defective.

**NG**

- |          |   |
|----------|---|
| <b>2</b> | <b>IG switch OFF, and check for open and short circuit in harness and connector between skid control ECU and DLC1, DLC1 and body ground (See page <a href="#">IN-36</a>).</b> |
|----------|---|

**NG**

Repair or replace harness or connector.

**OK**

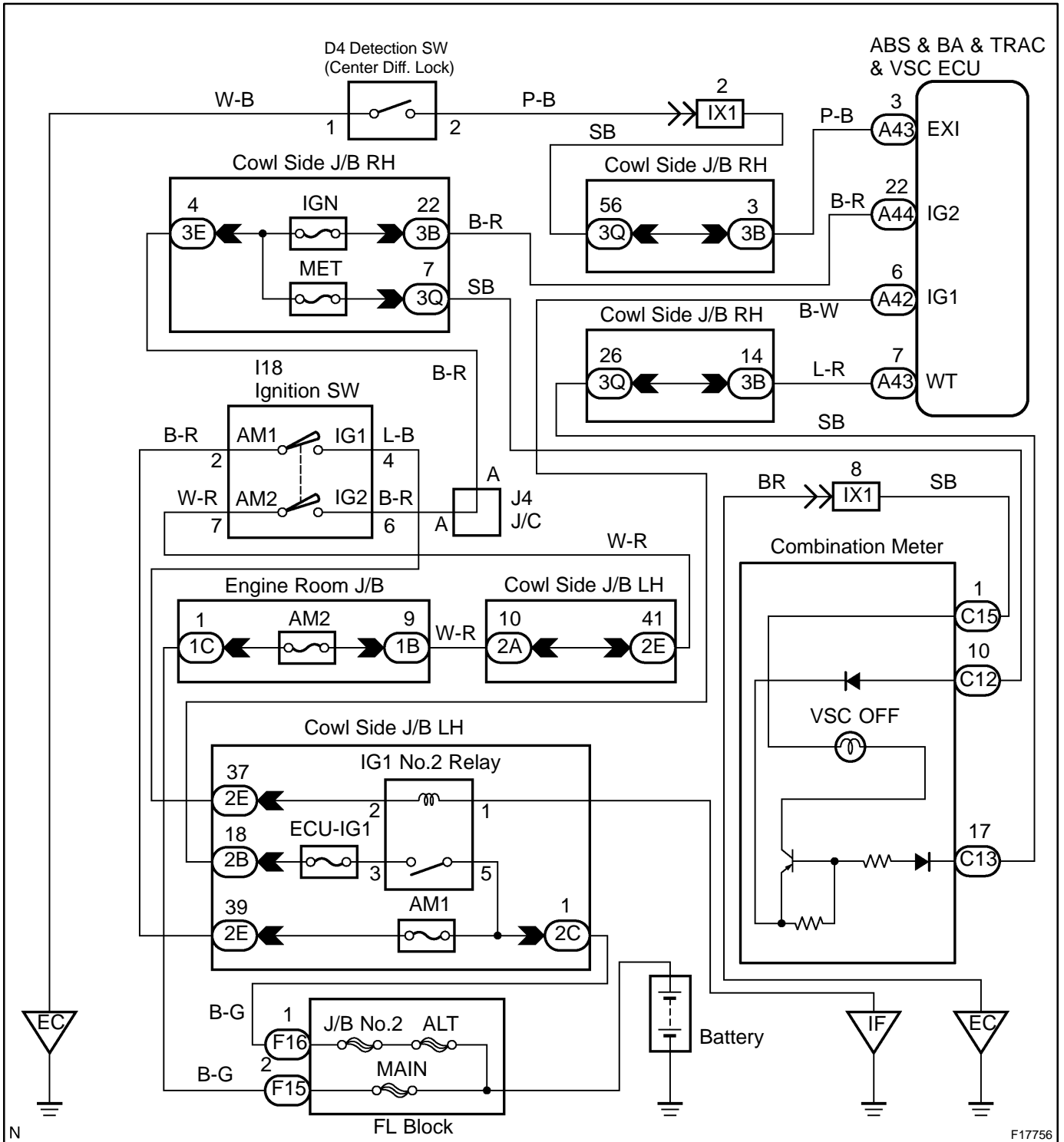
Check and replace skid control ECU.

# VSC OFF Indicator Light, Center Diff Lock Switch Circuit

## CIRCUIT DESCRIPTION

This is the VSC control main switch. When the center differential is locked, VSC control goes off and the VSC OFF indicator light lights up.

## WIRING DIAGRAM



**INSPECTION PROCEDURE****HINT:**

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

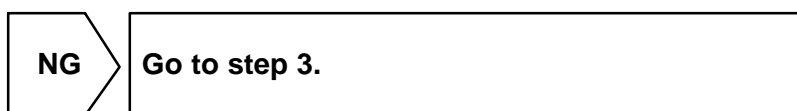
<b>1</b>	<b>Check operation of the VSC OFF indicator light.</b>
----------	--

**PREPARATION:**

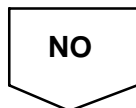
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the hand-held tester.

**CHECK:**

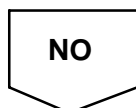
Check that "ON" and "OFF" of the VSC OFF indicator light can be shown on the combination meter with the hand-held tester.



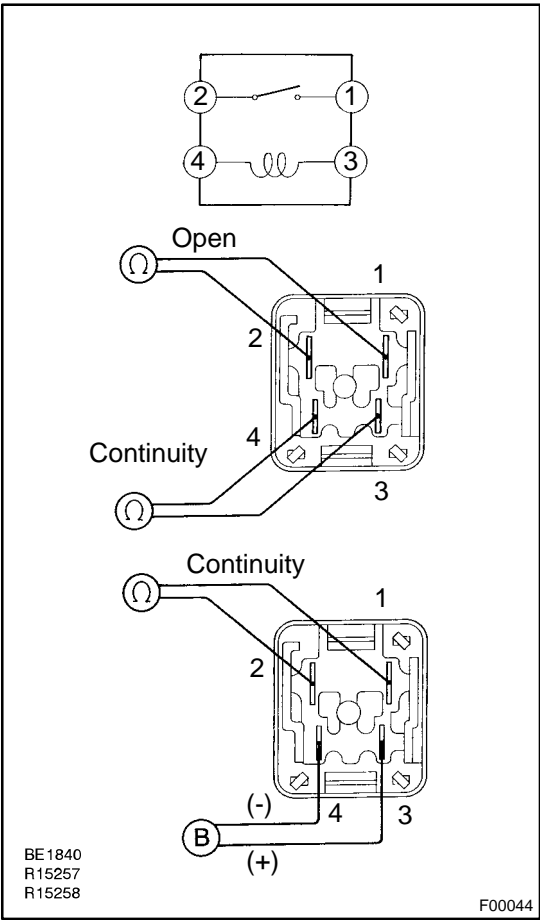
<b>2</b>	<b>Is DTC output for VSC?</b>
----------	-------------------------------



<b>3</b>	<b>Does the warning lights other than VSC OFF indicator light come on?</b>
----------	--



**4 Check IG1 No. 1 relay.**



**PREPARATION:**

Remove the IG1 No. 1 relay from the engine room J/B.

**CHECK:**

Check continuity between the IG1 No. 1 relay terminals listed in the table below.

**OK:**

Terminals 3 and 4	Continuity
Terminals 1 and 2	Open

**CHECK:**

- (a) Apply battery positive voltage between terminals 3 and 4.
- (b) Check continuity between terminals.

**OK:**

Terminals 1 and 2	Continuity
-------------------	------------

**NG** Replace IG1 No. 1 relay.

**OK**

Check for open circuit in harness and connector between IG1 No. 1 relay and combination meter (See page [IN-36](#)).

**5 Check VSC OFF indicator light.**

Check that the open circuit in the combination meter circuit (See page [BE-58](#)).

**NG** Repair VSC OFF indicator light bulb or combination meter assembly.

**OK**

**6** Check for short circuit in harness and connector between VSC OFF indicator light and skid control ECU (See page [IN-36](#)).

**NG**

Repair or replace harness or connector.

**OK**

**7** Check if center diff. lock switch remains ON, or check wire harness between center diff. lock switch and body ground for short circuit.

**NG**

Repair center diff. lock switch or repair or replace wire harness.

**OK**

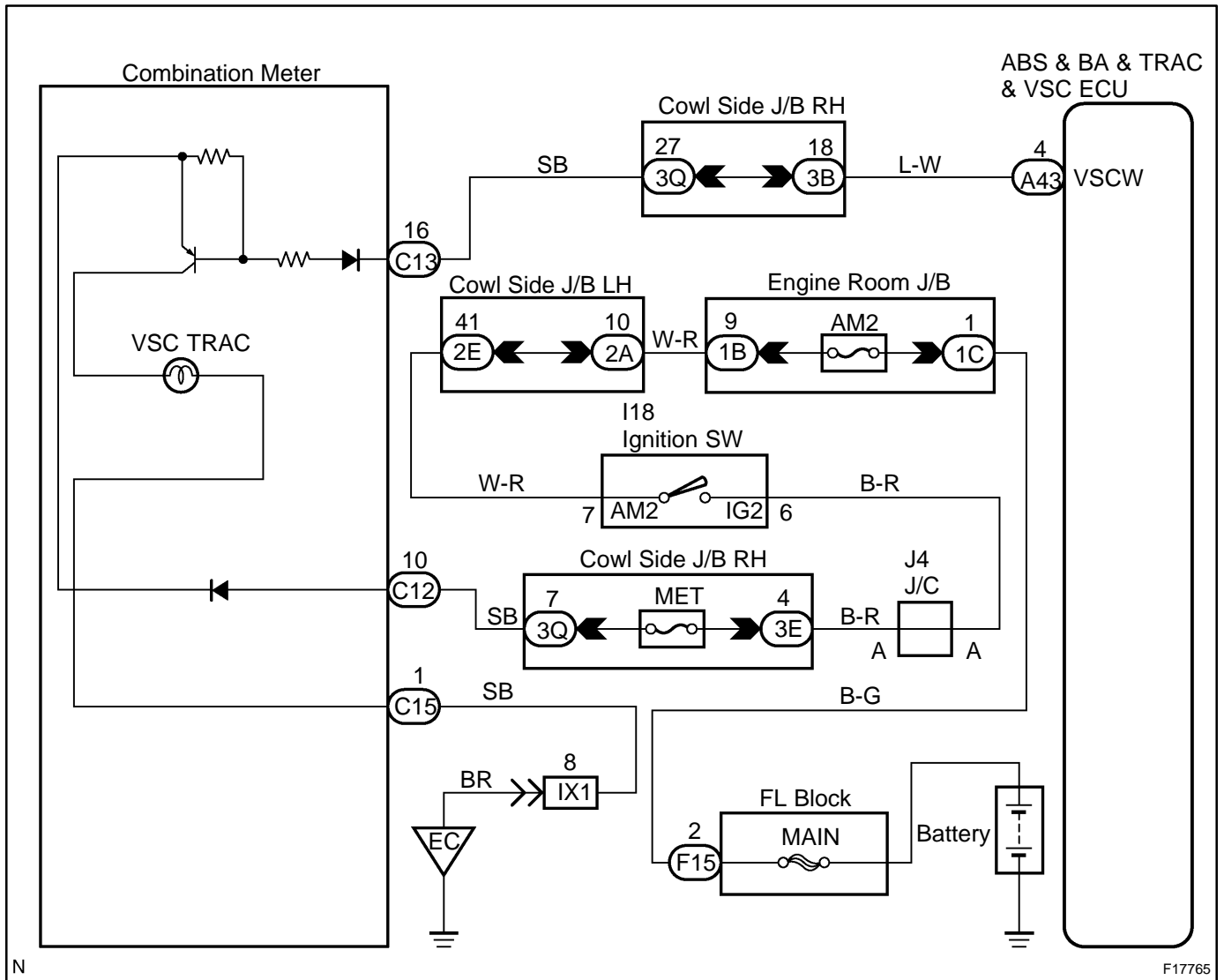
Check and repair skid control ECU.

# VSC TRAC Warning Light Circuit

## CIRCUIT DESCRIPTION

If the ECU stores DTC, the VSC TRAC warning light illuminates the combination meter.

## WIRING DIAGRAM



N

F17765



**INSPECTION PROCEDURE****HINT:**

Troubleshoot in accordance with the table below for each trouble symptom.

VSC TRAC warning light does not light up	*1
VSC TRAC warning light remains on	*2

\*1: Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

\*2: After inspection with step 4, start the inspection from step 5 in case of using the hand-held tester and start from step 6 in case of not using hand-held tester.

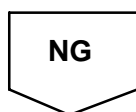
<b>1</b>	<b>Check operation of the VSC TRAC warning light.</b>
----------	---

**PREPARATION:**

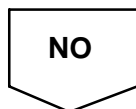
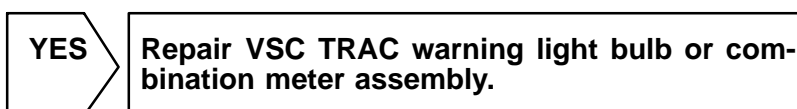
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the hand-held tester.

**CHECK:**

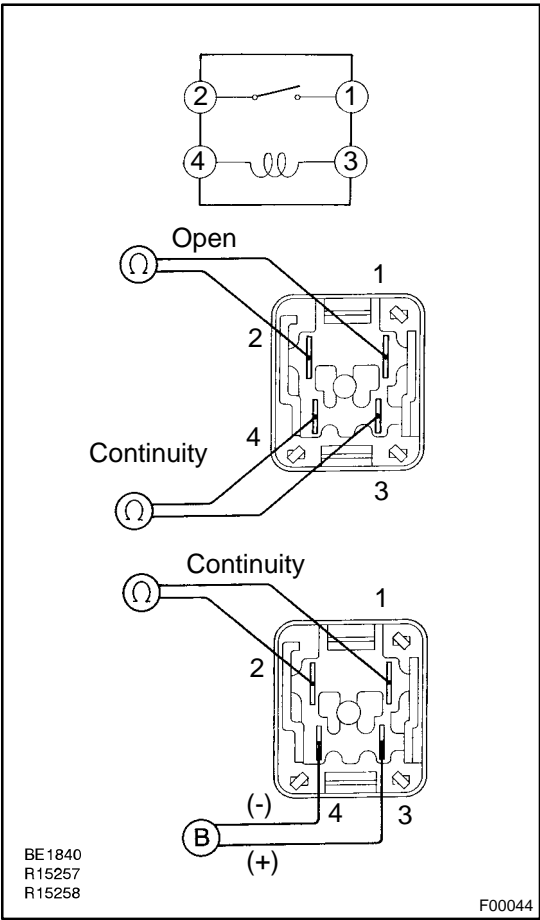
Check that "ON" and "OFF" of the VSC TRAC warning light can be shown on the combination meter on the hand-held tester.



<b>2</b>	<b>Does the warning lights other than VSC TRAC warning light come on?</b>
----------	---



**3 Check IG1 No. 1 relay.**



**PREPARATION:**

Remove the IG1 No. 1 relay from the engine room J/B.

**CHECK:**

Check continuity between the IG1 No. 1 relay terminals listed in the table below.

**OK:**

Terminals 3 and 4	Continuity
Terminals 1 and 2	Open

**CHECK:**

- (a) Apply battery positive voltage between terminals 3 and 4.
- (b) Check continuity between terminals.

**OK:**

Terminals 1 and 2	Continuity
-------------------	------------

**NG** Replace IG1 No. 1 relay.

**OK**

Check for open circuit in harness and connector between IG1 No. 1 relay and combination meter (See page [IN-36](#)).

**4** Check that the ECU connectors are securely connected to the ECU.

**NO**

Connect the connector to the ECU.

**YES**

**5** Check operation of the VSC TRAC warning light (See step 1).

**OK**

Check and replace skid control ECU.

**NG**

**6** Is DTC output?

Check the DTC on page [DI-505](#) .

**YES**

Repair circuit indicated by the output code.

**NO**

**7** Check for short circuit in harness and connector between VSC TRAC warning light and skid control ECU (See page [IN-36](#) ).

**NG**

Repair or replace harness or connector.

**OK**

Check and repair skid control ECU.

# CUSTOMER PROBLEM ANALYSIS CHECK

**ABS & EBD & BA Check Sheet**

Inspector's Name \_\_\_\_\_

Customer's Name	Registration No.	
	Registration Date	/ /
	Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading <span style="float:right">km miles</span>

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Continuously <input type="checkbox"/> Intermittently (    times a day)

Symptoms	<input type="checkbox"/> ABS does not operate.	
	<input type="checkbox"/> ABS does not operate efficiently.	
	<input type="checkbox"/> BA does not operate.	
	<input type="checkbox"/> EBD does not operate.	
	ABS Warning Light Abnormal	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not light up
	Brake Warning Light Abnormal (PKB released)	<input type="checkbox"/> Remains ON <input type="checkbox"/> Does not light up

DTC Check	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code    )
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code    )

Freeze Frame Data	STOP LIGHT SW	<input type="checkbox"/> ON <input type="checkbox"/> OFF
	SYSTEM	<input type="checkbox"/> NO SYS <input type="checkbox"/> ABS <input type="checkbox"/> BA <input type="checkbox"/> FAIL SF
	#IG ON	
	VEHICLE SPD	km/h MPH

TRAC & VSC Check Sheet

Inspector's Name \_\_\_\_\_

Customer's Name	_____	Registration No.	_____
	_____	Registration Date	/ /
	_____	Frame No.	_____
Date Vehicle Brought In	/ /	Odometer Reading	_____ km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent ( _____ times a day)

Symptoms	<input type="checkbox"/> TRAC does not operate. (Wheels spin when starting rapidly.)
	<input type="checkbox"/> VSC does not operate. (Wheels sideslip at the time of sharp turning.)
	TRAC OFF Indicator Light Abnormal <input type="checkbox"/> Remains ON <input type="checkbox"/> Does not light up
	VSC TRC Warning Indicator Abnormal <input type="checkbox"/> Displays <input type="checkbox"/> Does not display
	SLIP Indicator Light Abnormal <input type="checkbox"/> Remains ON <input type="checkbox"/> Does not light up
	Skid Control Buzzer Abnormal <input type="checkbox"/> Sounds <input type="checkbox"/> Does not sound

Check Item	ABS Warning Light	<input type="checkbox"/> Normal <input type="checkbox"/> Malfunction Code (Code _____)
	Malfunction Indicator Light	<input type="checkbox"/> Normal <input type="checkbox"/> Malfunction Code (Code _____)

DTC Check	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code _____)
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code _____)

Freeze Frame Data	VSC/TRC OFF SW	<input type="checkbox"/> ON <input type="checkbox"/> OFF
	SYSTEM	<input type="checkbox"/> VSC/TRC
	SHIFT POSITION	<input type="checkbox"/> P,N <input type="checkbox"/> 2 <input type="checkbox"/> R <input type="checkbox"/> 3 <input type="checkbox"/> D <input type="checkbox"/> 4 <input type="checkbox"/> L <input type="checkbox"/> FAIL
	STEERING ANG	_____ deg
	YAW RAT	_____ deg/s
	MAS CYL PRESS	_____ V
	THROTTLE	_____ deg
	MAS PRESS GRADE	_____ MPa/s
	G (RIGHT&LEFT)	_____ G
	G (BACK&FORTH)	_____ G

# DIAGNOSTIC TROUBLE CODE CHART

**NOTICE:****When removing the part, turn the ignition switch OFF.****HINT:**

- ▶ Using SST 09843-18020 or 09843-18040, connect terminals Tc and E<sub>1</sub> of the DLC1 or Tc and CG of the DLC3.
- ▶ If any abnormality is not found when inspecting parts, inspect the ECU.
- ▶ If a malfunction code is displayed during the DTC check, check the circuit listed that code. For details of each code, turn to the page referred to under the "See page" for respective "DTC No." in the DTC chart.

**DTC chart of ABS:**

DTC No. (See Page)	Detection Item	Trouble Area
C0278 / 11 (DI-531)	Open or short in ABS solenoid relay circuit	▶ABS solenoid relay
C0279 / 12 (DI-531)	B+ short in ABS solenoid relay circuit	▶ABS solenoid relay circuit
C0226 / 21 (DI-528)	Open or short in hydraulic brake booster solenoid circuit (SFR circuit)	▶Hydraulic brake booster ▶SFRR or SFRH circuit
C0236 / 22 (DI-528)	Open or short in hydraulic brake booster solenoid circuit (SFL circuit)	▶Hydraulic brake booster ▶SFLR or SFLH circuit
C0246 / 23 (DI-528)	Open or short in hydraulic brake booster solenoid circuit (SRR circuit)	▶Hydraulic brake booster ▶SRRR or SRRH circuit
C0256 / 24 (DI-528)	Open or short in hydraulic brake booster solenoid circuit (SRL circuit)	▶Hydraulic brake booster ▶SRLR or SRLH circuit
C1225 / 25 (DI-543)	Open or short in hydraulic brake booster solenoid circuit (SA1 circuit)	▶Hydraulic brake booster ▶SA1 circuit
C1226 / 26 (DI-543)	Open or short in hydraulic brake booster solenoid circuit (SA2 circuit)	▶Hydraulic brake booster ▶SA2 circuit
C1227 / 27 (DI-543)	Open or short in hydraulic brake booster solenoid circuit (SA3 circuit)	▶Hydraulic brake booster ▶SA3 circuit
C1228 / 28 (DI-543)	Open or short in hydraulic brake booster solenoid circuit (STR circuit)	▶Hydraulic brake booster ▶STR circuit
C0200 / 31*1 (DI-615)	Right front wheel speed sensor signal malfunction	▶Right front, left front, right rear and left rear speed sensor ▶Each speed sensor circuit ▶Sensor rotor
C0205 / 32*1 (DI-615)	Left front wheel speed sensor signal malfunction	
C0210 / 33*1 (DI-615)	Right rear wheel speed sensor signal malfunction	
C0215 / 34*1 (DI-615)	Left rear wheel speed sensor signal malfunction	
C1235 / 35 (DI-615)	Foreign matter is attached on the tip of the right front sensor	▶Right front, left front, right rear, left rear speed sensor
C1236 / 36 (DI-615)	Foreign matter is attached on the tip of the left front sensor	▶Sensor rotor
C1237 / 37 (DI-557)	Size of some tires is different from the other tires	Tire size

C1238 / 38 (DI-615)	Foreign matter is attached on the tip of the right rear sensor	▶ Right front, left front, right rear, left rear speed sensor ▶ Sensor rotor
C1239 / 39 (DI-615)	Foreign matter is attached on the tip of the left rear sensor	
C1241 / 41 (DI-558)	Low battery positive voltage or abnormally high battery positive voltage	▶ Battery ▶ C regulator ▶ Power source circuit
C1242 / 42*2 (DI-561)	Open in IG2 circuit	▶ Battery ▶ C regulator ▶ Power source circuit
C1243 / 43 (DI-564)	Malfunction in deceleration sensor (constant output)	▶ Deceleration sensor ▶ Wire harness for deceleration sensor system
C1244 / 44 (DI-567)	Open or short in deceleration sensor circuit	▶ Deceleration sensor ▶ Deceleration sensor circuit
C1245 / 45 (DI-564)	Malfunction in deceleration sensor	▶ Deceleration sensor ▶ Wire harness for deceleration sensor system
C1246 / 46 (DI-570)	Malfunction in master cylinder pressure sensor	▶ Master cylinder pressure sensor ▶ Master cylinder pressure sensor circuit
C1249 / 49 (DI-573)	Open in stop light switch circuit	▶ Stop light bulb ▶ Stop light switch circuit
C1251 / 51*2 (DI-577)	Pump motor is locked Open circuit in pump motor ground	Hydraulic brake booster pump motor
C1252 / 52*2 (DI-580)	Hydraulic brake booster pump motor malfunction	▶ Hydraulic brake booster pump motor ▶ Hydraulic brake booster pump motor circuit ▶ Pressure switch (PH or PL)
C1253 / 53*2 (DI-586)	Hydraulic brake booster pump motor relay malfunction	▶ ABS motor1 or ABS motor 2 relay ▶ ABS motor1 or ABS motor 2 relay circuit ▶ Hydraulic brake booster pump motor circuit
C1254 / 54*2 (DI-592)	Pressure switch malfunction	▶ Pressure switch (PH or PL) ▶ Pressure switch circuit
C1256 / 56*2 (DI-595)	Accumulator low pressure malfunction	▶ Accumulator ▶ Pressure switch (PH or PL) ▶ Hydraulic brake booster pump motor
C1257 / 57*2 (DI-602)	Power supply drive circuit malfunction	▶ Battery ▶ Power source circuit ▶ Skid control ECU
C1203 / 59 (DI-536)	ECM communication circuit malfunction	▶ TRC+ or TRC- circuit ▶ ENG+ or ENG- circuit ▶ ECM
C1268 / 68 (DI-605)	Transfer L4 position signal transmission failure	▶ Transfer L4 position switch ▶ Transfer L4 position switch circuit
Always ON (DI-621)	Malfunction in skid control ECU	▶ Battery ▶ C regulator ▶ Power source circuit ▶ Skid control ECU

\*1: As the DTC cannot be erased by replacing parts alone do either of the following operations.

- (1) Clear the DTC (See page DI-505).
- (2) At a speed of 20 km/h (12 mph), drive the vehicle for 30 sec. or more.

\*2: Using the following table, troubled parts can be specified.

Table of Trouble Part and DTC:

DTC		C1242/42		C1251/51		C1252/52		C1253/53		C1254/54		C1256/56		C1257/57	
		Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer
BRAKE warning light and buzzer															
Pressure switch	PH					*	*			*		*	*		
	PL					*	*			*		*	*		
Pump motor circuit	Pump motor			*	*	*	*					*	*		
	MTT wire harness					*	*	*							
	MT+ wire harness			*											
	MT- wire harness			*											
Accumulator malfunction												*	*		
Motor relay circuit	MR1 open circuit							*							
	MR2 open circuit							*							
	MR1 welded contact					*	*	*							
	MR2 welded contact					*	*	*							
Hydraulic brake booster	Pressure leaks					*	*					*	*		
Power source*	IG2 open circuit	*													
ECU	Power supply circuit													*	

\*: When IG1 circuit is open, the ABS warning light and BRAKE warning light come on.



**DTC chart of VSC:**

DTC No. (See Page)	Detection Item	Trouble Area
C1231 / 31 (DI-546)	Malfunction in steering angle sensor	▶Steering angle sensor ▶Steering angle sensor circuit
C1232 / 32 (DI-551)	Malfunction in deceleration sensor	▶Deceleration sensor ▶Deceleration sensor circuit
C1233 / 33 (DI-553)	Open or short in yaw rate sensor circuit	▶Yaw rate sensor ▶Yaw rate sensor circuit
C1234 / 34 (DI-553)	Malfunction in yaw rate sensor	▶Yaw rate sensor ▶Yaw rate sensor circuit
C1335 / 35 (DI-546)	Open circuit in steering angle sensor	▶Steering angle sensor ▶Steering angle sensor circuit
C1210 / 36 (DI-538)	Zero point calibration of yaw rate sensor undone	▶Yaw rate sensor ▶Yaw rate sensor circuit ▶PNP switch circuit (P position)
C1336 / 39 (DI-609)	Zero point calibration of deceleration sensor undone	▶Deceleration sensor ▶Deceleration sensor circuit ▶PNP switch (P position) circuit
C1223 / 43 (DI-540)	Malfunction in ABS control system	ABS control system
C1224 / 44 (DI-541)	Open or short in NE signal circuit	▶NEO circuit ▶ECM ▶Skid control ECU
C1290 / 66 (DI-608)	Zero point calibration of steering sensor undone	▶Steering angle sensor zero point calibration ▶Yaw rate sensor zero point calibration
C1340 / 47 (DI-612)	Open circuit in center differential lock signal	▶Center differential lock system ▶Center differential lock circuit
C1201 / 51 (DI-535)	ECM system malfunction	Engine control system
C1203 / 53 (DI-536)	ECM communication circuit malfunction	▶TRC+ or TRC- circuit ▶ENG+ or ENG- circuit ▶ECM
Always ON (DI-627)	Malfunction in skid control ECU Open in VSC TRAC warning light circuit	▶Power source circuit ▶VSC TRAC warning light circuit

**HINT:**

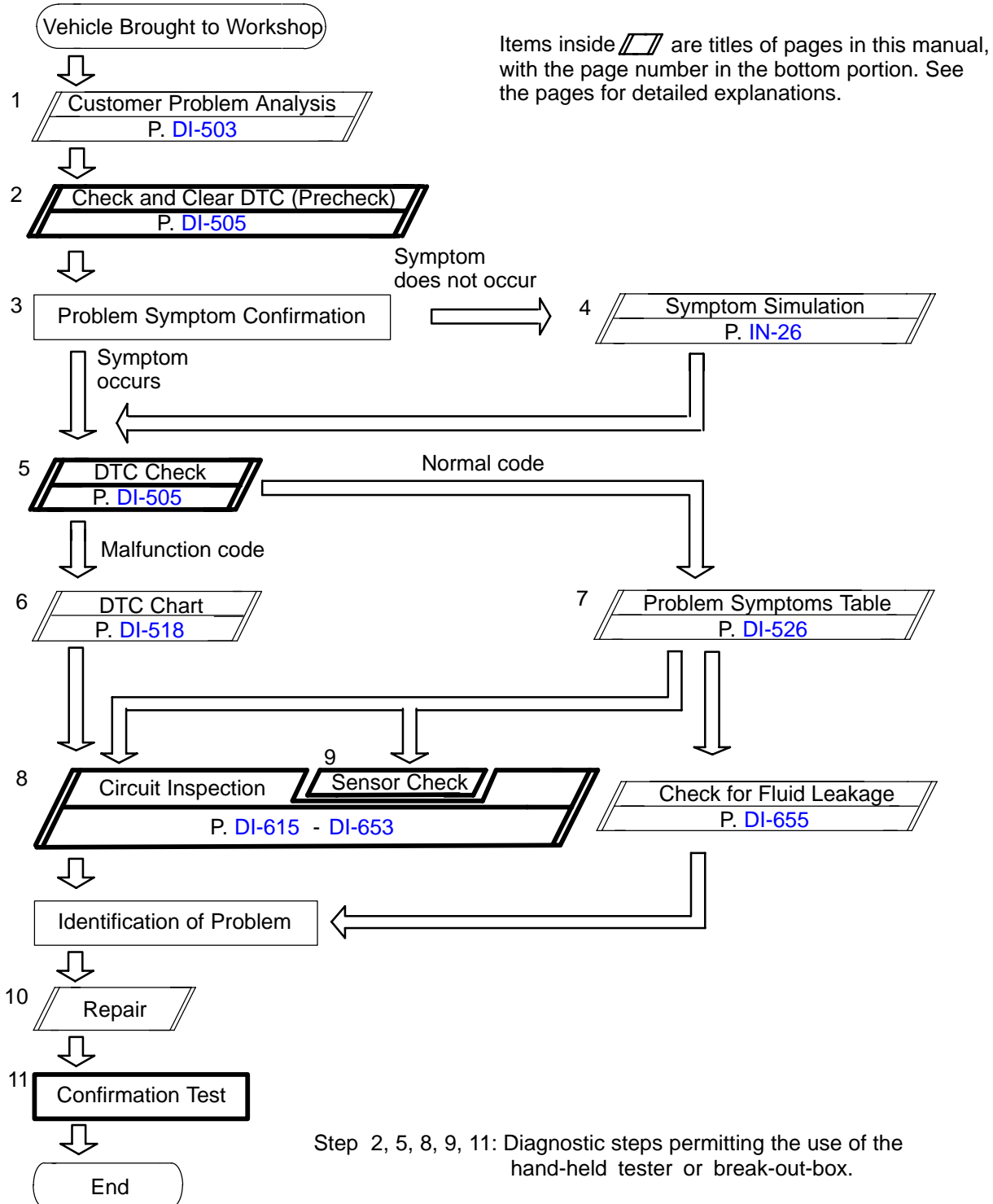
There is a case that TOYOTA hand-held tester cannot be used when the VSC TRAC warning light is always on.

# ABS & VEHICLE STABILITY CONTROL (VSC) & BRAKE ASSIST (BA) SYSTEM

DIC8N-01

## HOW TO PROCEED WITH TROUBLESHOOTING

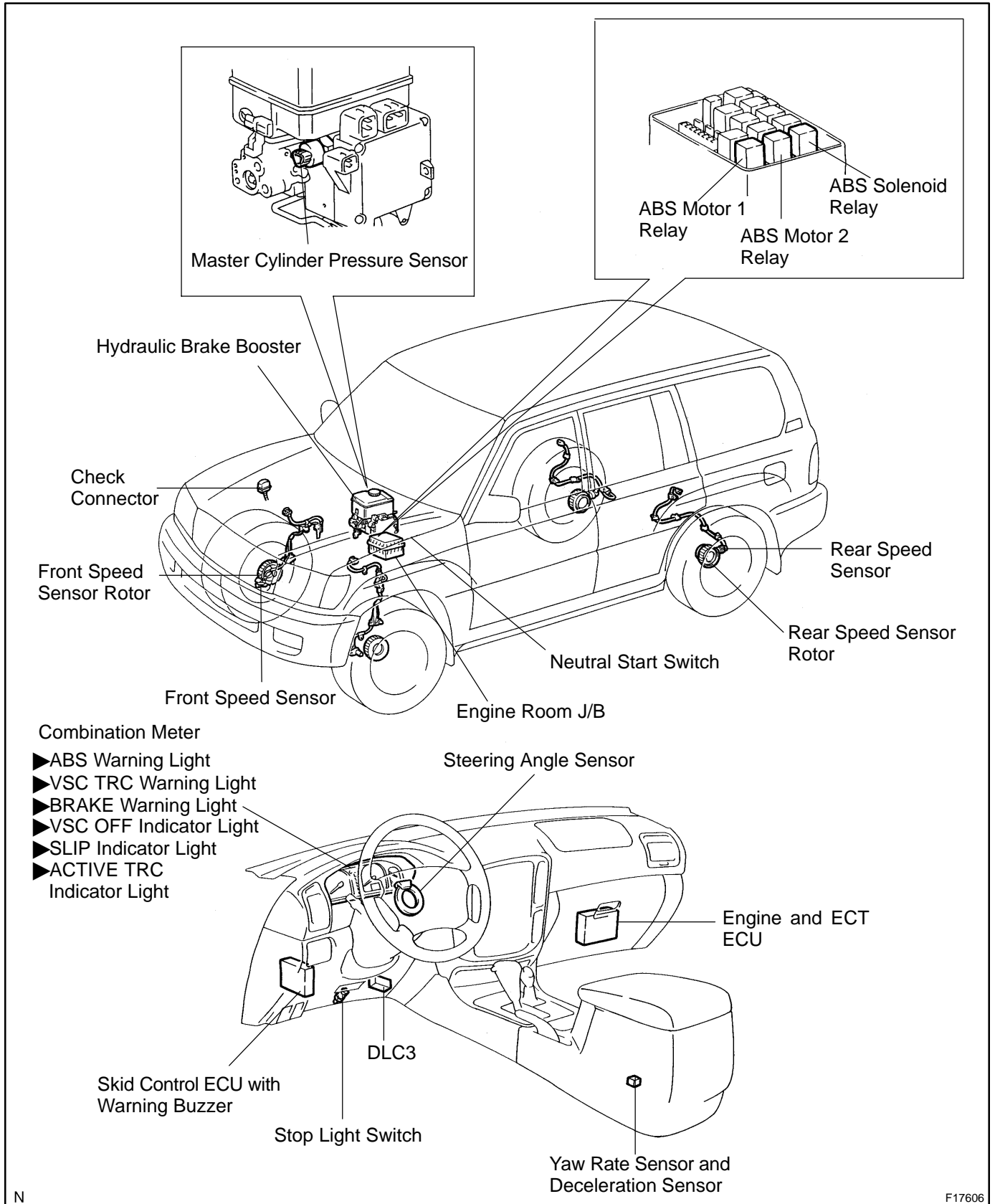
Troubleshoot in accordance with the procedure on the following pages.



**Fail safe function:**

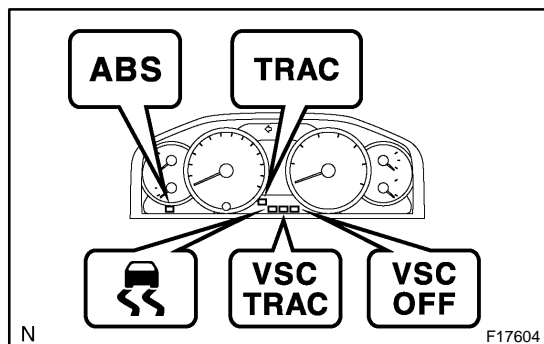
When a failure occurs in the ABS & BA & TRAC & VSC systems, the ABS and VSC warning lights are lit and ABS & BA & TRAC & VSC operation is prohibited. In addition to this, when the failure which disables EBD operation occurs, the BRAKE warning light is lit as well and EBD operation is prohibited.

# PARTS LOCATION



N

F17606



## PRE-CHECK

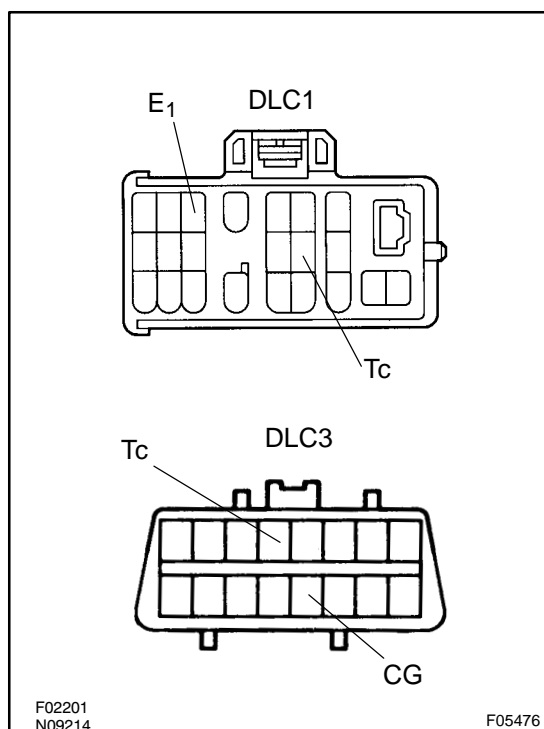
### 1. DIAGNOSIS SYSTEM

- (a) Check the warning lights and buzzer.
  - (1) Release the parking brake lever.
  - (2) When the ignition switch is turned ON, check that the ABS, VSC TRAC and BRAKE warning lights, VSC OFF, SLIP and TRAC indicator lights come on for 3 sec.
  - (3) When depressing the brake pedal repeatedly, it may turn on the ABS, VSC TRAC and BRAKE warning lights, VSC OFF indicator light and buzzer.

**HINT:**

- ▶ If the ECU stores DTC, the ABS, VSC TRAC and BRAKE warning lights and VSC OFF indicator light come ON.
- ▶ If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit, VSC TRAC warning light circuit, brake warning light circuit, VSC OFF indicator light circuit, SLIP indicator light circuit and ACTIVE TRAC indicator light circuit.

Trouble Area	See Page
ABS warning light circuit	<a href="#">DI-627</a>
VSC TRAC warning light circuit	<a href="#">DI-631</a>
BRAKE warning light circuit	<a href="#">DI-635</a>
VSC OFF indicator light circuit	<a href="#">DI-645</a>
SLIP indicator light circuit	<a href="#">DI-639</a>
TRAC indicator light circuit	<a href="#">DI-642</a>

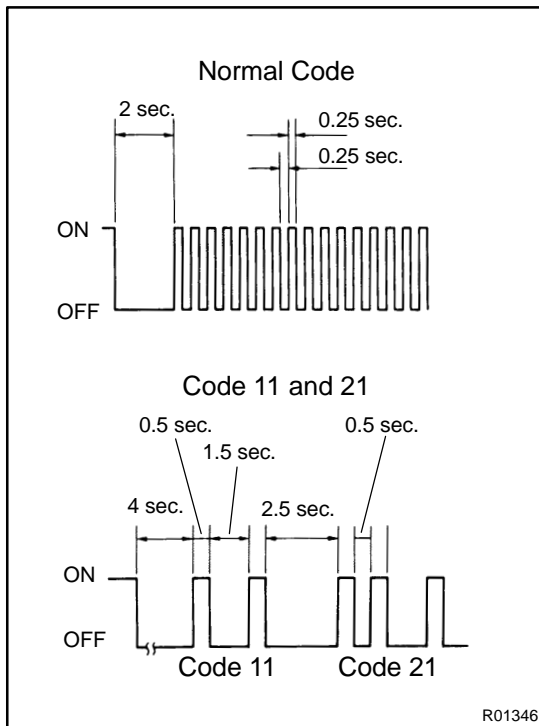


- (b) In case of not using hand-held tester:  
Check the DTC.
  - (1) Using SST, connect terminals Tc and E<sub>1</sub> of the DLC1 or Tc and CG of the DLC3.  
SST 09843-18020 or 09843-18040
  - (2) Turn the ignition switch ON.
  - (3) Read the DTC from the ABS or VSC TRAC warning light on the combination meter.

**HINT:**

- ▶ If no code appears, inspect the Tc circuit, ABS or VSC TRAC warning light circuit.

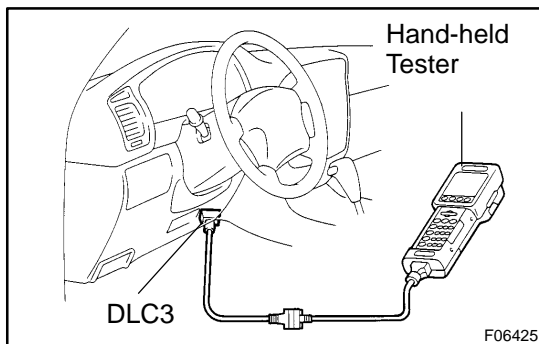
Trouble Area	See page
Tc circuit	<a href="#">DI-651</a>
ABS warning light circuit	<a href="#">DI-627</a>
VSC TRAC warning light circuit	<a href="#">DI-631</a>



► As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.

- (4) Codes are explained in the code table on page [DI-518](#).
- (5) After completing the check, disconnect terminals Tc and E<sub>1</sub> of the DLC1 or Tc and CG of the DLC3 and turn off the display.

If 2 or more malfunctions are indicated at the same time the lowest numbered DTC will be displayed 1st.

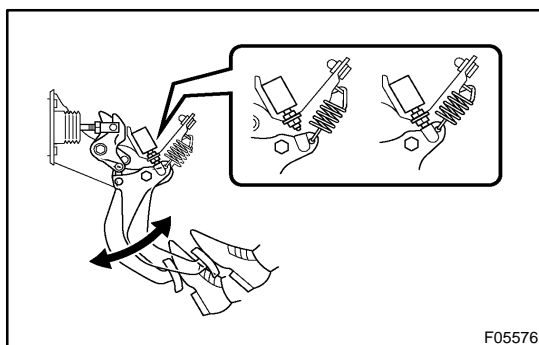


(c) In case of using hand-held tester:  
Check the DTC.

- (1) Hook up the hand-held tester to the DLC3.
- (2) Turn the ignition switch ON.
- (3) Read the DTC by following the prompts on the tester screen.

HINT:

Please refer to the hand-held tester operator's manual for further details.



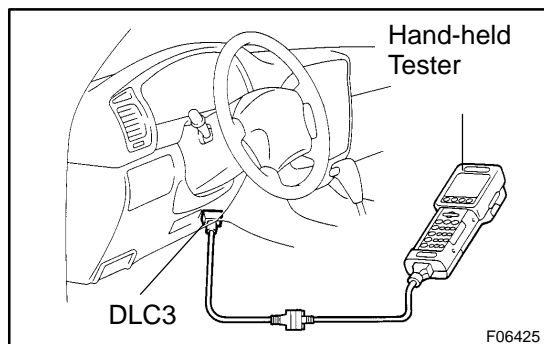
(d) In case of not using hand-held tester:  
Clear the DTC.

- (1) Using SST, connect terminals Tc and E<sub>1</sub> of the DLC1 or Tc and CG of the DLC3.

SST 09843-18020 or 09843-18040

- (2) Turn the ignition switch ON.
- (3) Clear the DTC stored in the ECU by depressing the brake pedal 8 or more times within 5 sec.
- (4) Check that the warning light shows the normal code.
- (5) Remove the SST from the terminals of the DLC1 or DLC3.

SST 09843-18020 or 09843-18040



- (e) In case of using hand-held tester:  
Clear the DTC.
- (1) Hook up the hand-held tester to the DLC3.
  - (2) Turn the ignition switch ON.
  - (3) Operate the hand-held tester to erase the codes.  
(See the hand-held tester operator's manual.)

## 2. DATA LIST

### HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as a first step of troubleshooting is one of the methods to shorten labor time.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on the tester, read the "DATA LIST".

Item	Measurement Item/Range (Display)	Normal Condition*	Diagnostic Note
HB MOT RELAY	HB Motor relay status/ ON or OFF	-	-
ABS MOT RELAY	Motor relay status/ ON or OFF	-	-
SOL RELAY	Solenoid relay status/ ON or OFF	-	-
PRESS HIGH	HIGH Hydraulic brake boost pressure/ ON or OFF	-	-
PRESS LOW	LOW Hydraulic brake boost pressure/ ON or OFF	-	-
VSC/TRC OFF SW	VSC OFF switch/ ON or OFF	-	-
IDLE SW	Main idle switch/ ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
STOP LIGHT SW	Stop light switch/ ON or OFF	ON: Brake pedal released OFF: Brake pedal depressed	-
PKB SW	PKB sw/ ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
ABS OPERT FR	Front Right wheel operation/ BEFORE or OPERATE	BEFORE: No ABS operation (FR) OPERATE: During ABS operation (FR)	-
ABS OPERT FL	Front Left wheel operation/ BEFORE or OPERATE	BEFORE: No ABS operation (FL) OPERATE: During ABS operation (FL)	-
ABS OPERT RR	Rear Right wheel operation/ BEFORE or OPERATE	BEFORE: No ABS operation (RR) OPERATE: During ABS operation (RR)	-
ABS OPRET RL	Rear Left wheel operation/ BEFORE or OPERATE	BEFORE: No ABS operation (RL) OPERATE: During ABS operation (RL)	-
WHEEL SPD FR	Front Right wheel speed / Min.: 0km/h, Max.: 326.4 km/h	Actual wheel speed	Speed indicated on speedometer

WHEEL SPD FL	Front Left wheel speed/ Min.: 0km/h, Max.: 326.4 km/h	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD RR	Rear Right wheel speed/ Min.: 0km/h, Max.: 326.4 km/h	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD RL	Rear Left wheel speed/ Min.: 0km/h, Max.: 326.4 km/h	Actual wheel speed	Speed indicated on speedometer
DECELERAT SENS	G sensor (GL1 filter)/ Min.: -1.869 G, Max.: 1.869	Approximately 0 ± 0.13 G at still condition	Reading changes when vehicle is bounced
DECELERAT SENS2	G sensor (GL2 filter)/ Min.: -1.869 G, Max.: 1.869	Approximately 0 ± 0.13 G at still condition	Reading changes when vehicle is bounced
IG VOLTAGE	ECU IG power voltage/ UNDER or NORMAL or OVER	-	-
SFRR	SFRR/ ON or OFF	-	-
SFRH	SFRH/ ON or OFF	-	-
SFLR	SFLR/ ON or OFF	-	-
SFLH	SFLH/ ON or OFF	-	-
SRRR (SRR)	SRRR (SRR)/ ON or OFF	-	-
SRRH (SRH)	SRRH (SRH)/ ON or OFF	-	-
SRLR	SRLR/ ON or OFF	-	-
SRLH	SRLH/ ON or OFF	-	-
SRCF (SA1)	SRCF (SA1)/ ON or OFF	-	-
SRCR (SA2)	SRCR (SA2)/ ON or OFF	-	-
SRMF (SMCF, SA3)	SRMF (SMCF, SA3)/ ON or OFF	-	-
SRMR (SMCR, STR)	SRMR (SMCR, STR)/ ON or OFF	-	-
THROTTLE	Throttle position sensor/ Min.: 0 deg, Max.: 125 deg	-	-
ENGINE SPD	Engine Speed/ Min.: 0 rpm, Max.: 6000 rpm	Actual engine speed	-
YAW RATE	Yaw rate sensor/ Min.: -128 deg/s, Max.: 128 deg/s	-	-
YAW ZERO VALUE	Memorized zero value/ Min.: -128 deg/s, Max.: 128 deg/s	-	-
STEERING ANG	Steering sensor/ Min.: -1682 deg, Max.: 1877 deg	-1682 to 1877 deg	Turning the steering wheel changes the value Left : Becomes grater Right : Becomes smaller
MAS CYL PRS 1	Master cylinder pressure 1/ Min.: 0 V, Max.: 5 V	When brake pedal is released: 0.3 - 0.9 V	Reading increases when brake pedal is depressed
AIR BLD SUPPORT	Air bleed support/ NOT SUP or SUPPORT	w/ BA: Supported w/ VSC: Not supported	-
TEST MODE	Test mode operation/ NORMAL or TEST	NORMAL: Normal mode TEST: During test mode	-
#CODES	Number of Trouble Code/ Min.: 0, Max.: 255	Min.: 0, Max.: 45	-

### 3. ACTIVE TEST

**HINT:**

Performing the ACTIVE TEST using the hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as a first step of troubleshooting is one of the methods to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on the tester, perform the "ACTIVE TEST".

**HINT:**

IG must be turned ON to proceed the ACTIVE TEST using a hand-held tester.

\*1: For VSC equipped vehicles only

Item	Test Details	Diagnostic Note
SFRR	Turns ABS solenoid (SFRR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH	Turns ABS solenoid (SFRH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLR	Turns ABS solenoid (SFLR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLH	Turns ABS solenoid (SFLH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRR	Turns ABS solenoid (SRRR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRH	Turns ABS solenoid (SRRH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLR	Turns ABS solenoid (SRLR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLH	Turns ABS solenoid (SRLH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRCF (SA1)	Turns ABS solenoid (SRCF (SA1)) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRCR (SA2)	Turns ABS solenoid (SRCR (SA2)) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRMF (SMCF, SA3)	Turns ABS solenoid (SMCF, SA3) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRMR (SMCR, STR)	Turns ABS solenoid (SRMR (SMCR, STR)) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRR & SFRH	Turns ABS solenoid SFRR & SFRH ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLR & SFLH	Turns ABS solenoid SFLR & SFLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SRH & SRR	Turns ABS solenoid SRRR & SRRH ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLR & SRLH	Turns ABS solenoid SRLR & SRLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH & SFLH	Turns ABS solenoid SFRH & SFLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SRCF & SRCR	Turns ABS solenoid SRCF & SRCR ON / OFF	Operation of solenoid (clicking sound) can be heard



SRMF & SRMR	Turns ABS solenoid SRMF & SRMR ON / OFF	Operation of solenoid (clicking sound) can be heard
SOL RELAY	Turns ABS solenoid relay ON/OFF	Operation of solenoid (clicking sound) can be heard
ABS MOT RELAY	Turns ABS motor relay ON/OFF	Operation of motor (clicking sound) can be heard
TRAC MOT RELAY	Turns TRC motor relay ON/OFF	Operation of motor (clicking sound) can be heard
ABS WARN LIGHT	Turns ABS warning light ON / OFF	Observe combination meter
VSC WARN LIGHT	Turns VSC warning light ON / OFF	Observe combination meter
VSC/ TRC OFF IND	Turns VSC / TRC OFF indicator ON / OFF	Observe combination meter
SLIP INDI LIGHT	Turns SLIP indicator light ON / OFF	Observe combination meter
BRAKE WRN LIGHT	Turns BRAKE warning light ON / OFF	Observe combination meter
VSC/BR WARN BUZ	Turns VSC / BRAKE warning buzzer ON / OFF	Buzzer can be heard

#### 4. FREEZE FRAME DATA

- (a) The vehicle (sensor) status memorized during ABS and/or VSC operation or at the time of error code detection can be displayed by the hand-held tester.
- (b) Only one record of freeze frame data is stored and the freeze frame data generated during ABS and/or VSC operation are constantly updated. Also, the number of the ignition switch's "ON" after the freeze frame data is stored can be memorized up to 31 and it can be displayed.

#### HINT:

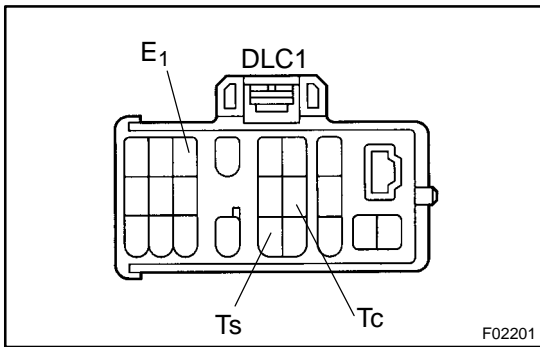
If the ignition switch "ON" operation exceeds 31 times, "31" appears on the display.

- (c) If the diagnosis code abnormality occurs, the freeze frame data at the occurrence of the abnormality is stored but the ABS actuation data is deleted.

Hand-held tester display	Measurement Item	Reference Value*
VEHICLE SPD	Wheel speed sensor reading	Speed indicated on speedometer
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
# IG ON	Number of operations of ignition switch ON after memorizing freeze frame data	0 - 31
MAS CYL PRESS	Master cylinder pressure sensor reading	Brake pedal release : 0.3 to 0.9 V Brake pedal depress: 0.8 to 4.5 V
MASS PRESS GRADE	Master cylinder pressure sensor change	-30 to 200 MPa/s
SYSTEM	System status	ABS activated: ABS VSC/TRC activated: VSC/TRC BA activated: BA Fail safe mode activated: FAIL SF No system activated: NO SYS
YAW RATE	Yaw rate angle sensor reading	-100 to 100
STEERING ANG	Steering sensor reading	Left turn: Increase Right turn: Drop
THROTTLE	Throttle position sensor reading	Release accelerator pedal: Approx. 0 deg. Depress accelerator pedal: Approx. 90 deg.
G (RIGHT & LEFT)	Right and left G	-1.869 to 1.869
G (BACK & FORTH)	Back and forth G	-1.869 to 1.869
VSC (TRC) OFF SW	VSC OFF switch signal	TRAC OFF SW ON: ON OFF: OFF

Hand-held tester display	Measurement Item	Reference Value*
SHIFT POSITION	Shift lever position	FAIL P,N R D 4 3 2 L
THROTTLE	Throttle sensor reading	0 to 125 deg.

\*: If no conditions are specifically stated for "Idling", it means the shift lever is in the N or P position, the A/C switch is OFF and all accessory switches are OFF.



**5. SPEED SENSOR SIGNAL CHECK (TEST MODE)**

HINT:

- ▶ When replacing the yaw rate sensor or ECU, make sure to perform a yaw rate sensor zero point calibration.
- ▶ If the ignition switch is turned from the ON to the ACC or LOCK position during test mode, DTC will be erased.

(a) In case of not using hand-held tester:

Check the speed sensor signal.

- (1) Turn the ignition switch OFF.
- (2) Using SST, connect terminals Ts and E<sub>1</sub> of the DLC1.

SST 09843-18020

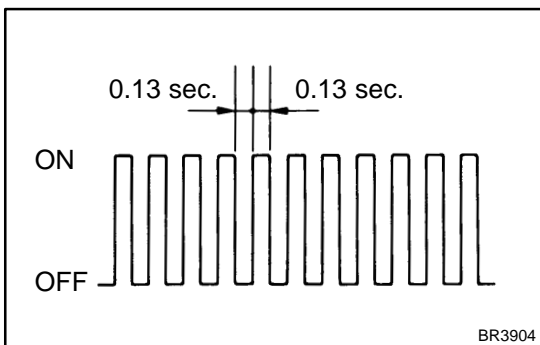
- (3) Start the engine.

- (4) Check that the ABS warning light blinks.

HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit and Ts circuit (See page [DI-627](#) and [DI-653](#) ).

- (5) Keep the vehicle in the stationary condition on the flat place for 6 sec. or more.
- (6) Shift the transfer lever in the L4 position and turn the center diff. lock switch ON.
- (7) Shift the transfer lever back.



- (8) Leaving the vehicle in the stationary condition and the brake pedal in a free condition for 1 sec. or more, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 sec. or more.
- (9) Leaving the vehicle in the stationary condition, depress the brake pedal with a force of 980 N (100 kgf, 221 lbf) or more quickly.

HINT:

At this time, the ABS warning light comes on for 3 sec.

- (10) Drive the vehicle straight forward.  
When driving the vehicle with a speed faster than 28 mph (45 km/h) for several seconds, check that the ABS warning light goes off.

HINT:

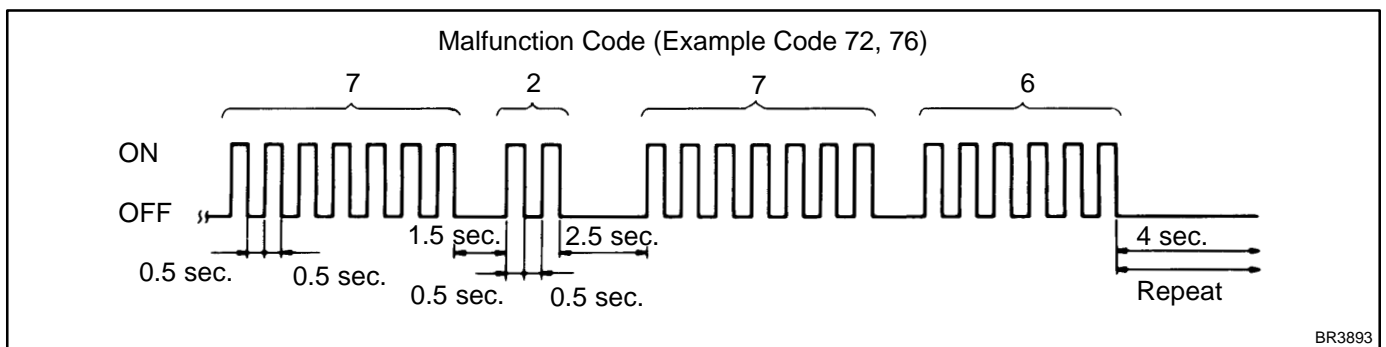
There is a case that the sensor check is not completed if the vehicle has its wheels spun or its steering wheel turned during this check.

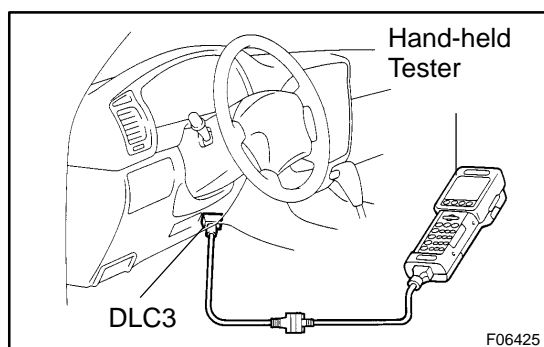
- (11) Stop the vehicle.
- (12) Using SST, connect terminals Tc and E<sub>1</sub> of the DLC1 or Tc and CG of the DLC3.  
SST 09843-18020 or 09843-18040
- (13) Read the number of blinks of the ABS warning light.

HINT:

- ▶ See the list of DTC on the next page.
- ▶ If every sensor is normal, a normal code is output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).
- ▶ If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.
- (14) After doing the check, disconnect the SST from terminals of the DLC1 or terminals of the DLC1 and DLC3, and turn the ignition switch OFF.

SST 09843-18020 or 09843-18040





- (b) In case of using hand-held tester:  
Check the sensor signal.
- (1) Hook up the hand-held tester to the DLC3.
  - (2) Do step (3) to (10) on the previous page.
  - (3) Read the DTC by following the prompts on the tester screen.

**HINT:**  
Please refer to the hand-held tester operator's manual for further details.

**DTC of speed sensor signal check function:**

Code No.	Diagnosis	Trouble Area
C1271 / 71	Low output voltage in right front speed sensor	▶Right front speed sensor ▶Sensor installation ▶Sensor rotor
C1272 / 72	Low output voltage in left front speed sensor	▶Left front speed sensor ▶Sensor installation ▶Sensor rotor
C1273 / 73	Low output voltage in right rear speed sensor	▶Right rear speed sensor ▶Sensor installation ▶Sensor rotor
C1274 / 74	Low output voltage in left rear speed sensor	▶Left rear speed sensor ▶Sensor installation ▶Sensor rotor
C1275 / 75	Abnormal change in output voltage of right front speed sensor	Right front speed sensor rotor
C1276 / 76	Abnormal change in output voltage of left front speed sensor	Left front speed sensor rotor
C1277 / 77	Abnormal change in output voltage of right rear speed sensor	Right rear speed sensor rotor
C1278 / 78	Abnormal change in output voltage of left rear speed sensor	Left rear speed sensor rotor
C1279 / 79	Deceleration sensor is faulty	▶Deceleration sensor ▶Sensor installation
C1281 / 81	Master cylinder pressure sensor output signal is faulty	Master cylinder pressure sensor
C1282 / 82	Transfer indicator (center diff. lock) switch malfunction	Transfer indicator (center diff. lock) switch
C1283 / 83	Transfer L4 position switch malfunction	Transfer L4 position switch

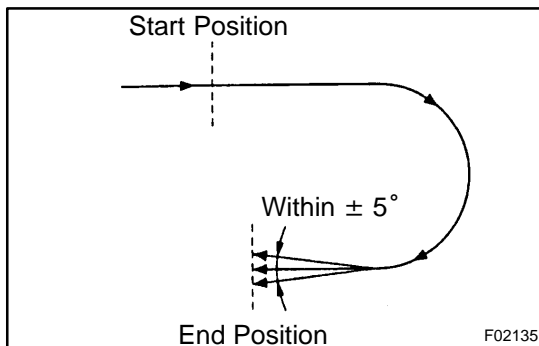
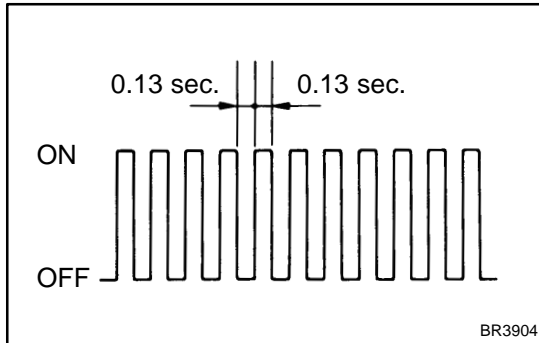
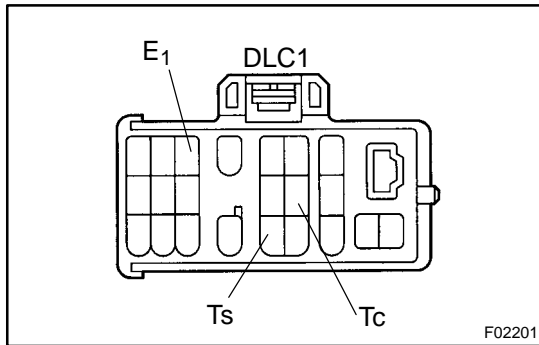
**6. In case of not using hand-held tester:  
VSC SENSOR CHECK (TEST MODE)**

**NOTICE:**

**When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform a zero point calibration of the yaw rate and deceleration sensors (See step 8.).**

**HINT:**

If the ignition switch is turned from the ON to the ACC or LOCK during test mode, DTC will be erased.



- (a) Procedures for test mode:
- (1) Turn the ignition switch OFF.
  - (2) Check that the shift lever is in the P position, and turn the steering wheel to the neutral position.
  - (3) Using SST, connect terminals Ts and E<sub>1</sub> of the DLC1.
- SST 09843-18020
- (4) Start the engine.

- (5) Check that the VSC TRAC warning light blinks.

**HINT:**

If the VSC TRAC warning light does not blink, inspect the VSC TRAC warning light circuit and Ts terminal circuit (See page [DI-631](#) and [DI-653](#)).

Turn the steering wheel either to the left or right 450° or more from the vehicle stationary condition, and turn back the steering wheel to the straight ahead position.

- (b) Keep the vehicle stationary on a level place for 1 sec. or more.

- (c) Check the yaw rate sensor.

Shift the shift lever to the D position and drive the vehicle at a vehicle speed of approx. 5 km/h (3 mph), turn the steering wheel either to the left or right 90° or more, and maintain this angle until the vehicle has turned 180°.

Stop the vehicle and shift the shift lever to the P position. Check that the VSC buzzer sounds for 3 sec.

If the VSC buzzer sounds, the sensor check is in normal completion.

If the VSC buzzer does not sound, do the sensor check again.

If the VSC buzzer still does not sound, check the VSC buzzer circuit, then do the sensor check again.

Trouble Area	See page
VSC buzzer circuit	<a href="#">DI-649</a>

**HINT:**

- ▶ Make a 180° turn. At the end of the turn, the direction of the vehicle should be within 180° ± 5° of its start position.
- ▶ Do not spin the wheels.

- (d) Read the DTC.

- (1) Using SST, connect terminals Tc and E<sub>1</sub> of the DLC1 or Tc and CG of the DLC3.

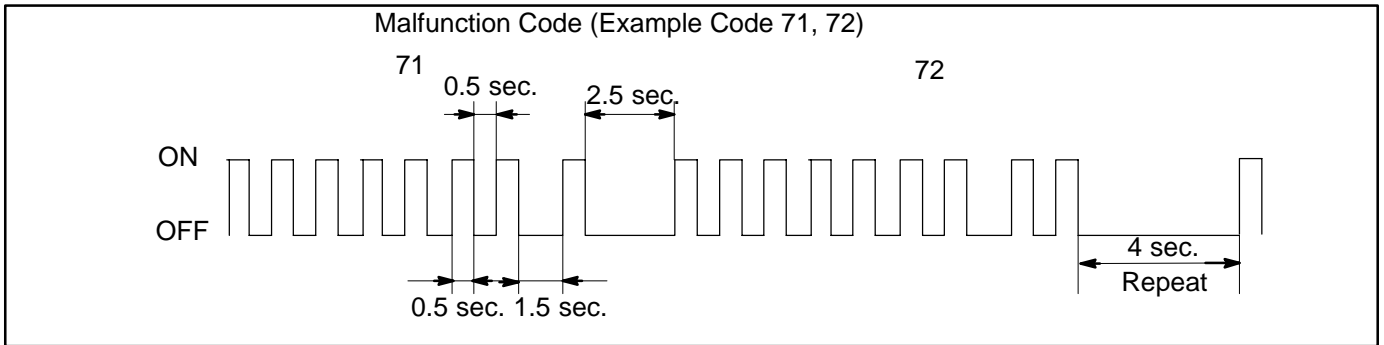
SST 09843-18020 or 09843-18040

- (2) Read the number of times the VSC TRAC warning light blinks.

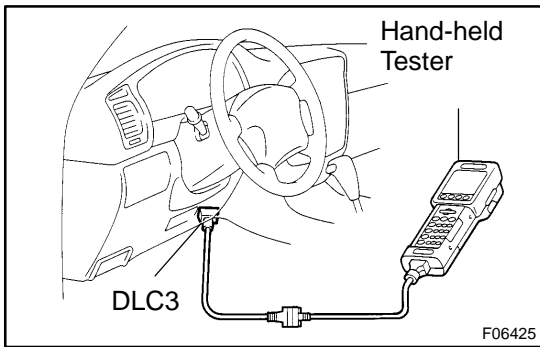
**HINT:**

- ▶ See the list of DTC shown on the next page.
- ▶ If every sensor is normal, a normal code is output. (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated.)

- ▶ If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.



- (3) After doing the check, disconnect the SST from terminals of the DLC1 or terminals of the DLC1 and DLC3 and turn the ignition switch OFF.  
SST 09843-18020 or 09843-18040



**7. In case of using hand-held tester:  
CHECK VSC SENSOR SIGNAL**

**NOTICE:**

When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform a zero point calibration of the yaw rate and deceleration sensors (See step 7.). Make sure that this operation should be done before starting the following.

- (a) Hook up the hand-held tester to the DLC3.
- (b) Do steps (a)-(2) and from (a)-(4) to (c) on the previous page.
- (c) Read the DTC by following the prompts on the tester screen.

**HINT:**

Please refer to the hand-held tester operator's manual for further details.

**DTC of the VSC sensor check function:**

Code No.	Diagnosis	Trouble Area
C0371 / 71	Yaw rate sensor output signal malfunction	<ul style="list-style-type: none"> <li>▶ Yaw rate sensor</li> <li>▶ Yaw rate sensor circuit</li> </ul>

**8. IF NECESSARY, PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSORS****HINT:**

- ▶ When having replaced the yaw rate sensor, deceleration sensor or/and the ECU, make sure to perform a yaw rate and deceleration sensors zero point calibration.
- ▶ This operation is also required when the deceleration sensor or yaw rate sensor has been replaced since the calibrated zero point of both sensors will be erased.

**NOTICE:**

- ▶ **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not start the engine.)**
- ▶ **Be sure to do this on a level surface (within an inclination of 1 %).**

- (a) Clear the zero point of the yaw rate and deceleration sensors.

- (1) Shift the shift lever to P range.
- (2) Turn the ignition switch ON in a stationary condition.
- (3) With the ignition switch ON, using SST, repeat a cycle of short and open between terminals Ts and E<sub>1</sub> of the DLC1 4 times or more within 8 sec. Check that the VSC warning light is lit indicating the recorded zero point is erased.

SST 09843-18020

- (4) Turn the ignition switch OFF.

- (b) Obtain the zero point of the yaw rate sensor.

- (1) Disconnect terminals Ts and E<sub>1</sub> of the DLC1.
- (2) Turn the ignition switch ON.

**HINT:**

The vehicle should be in a stationary condition with the shift lever in the P position.

- (3) Check that the lighted VSC warning light goes off about 15 sec. after the ignition switch is turned ON.

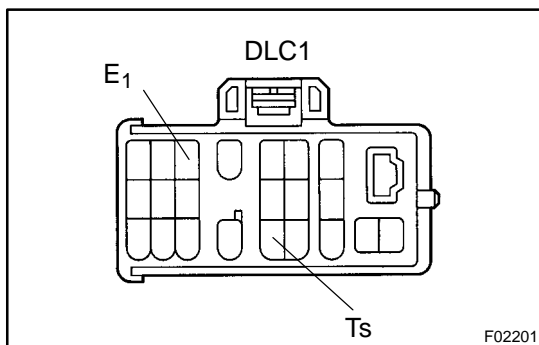
**HINT:**

Even if the ignition is not turned OFF in step (a)-(4) and remains ON, a yaw rate sensor zero point calibration can be completed. In this case, the VSC warning light is lit about 15 sec. and starts blinking. (Normal code)

- (4) After ensuring that the VSC warning light remains OFF for 2 sec., turn the ignition switch OFF.

**HINT:**

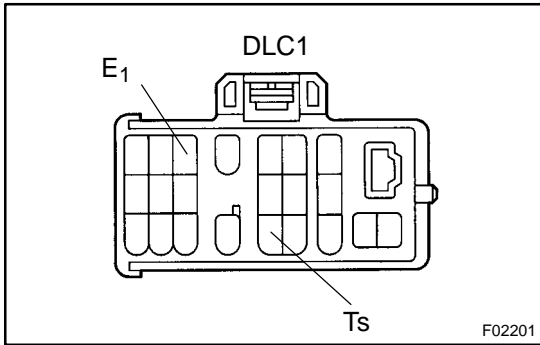
If the ignition switch is not turned OFF in step (a)-(4), ensure the blinking of the VSC warning light for 2 sec. and turn the ignition switch OFF.



(c) Perform a deceleration sensor zero point calibration.

**NOTICE:**

After step (b) (a yaw rate sensor zero point calibration), the VSC warning light goes off. At this time, if the vehicle is driven without performing step (c) (a deceleration sensor zero point calibration), deceleration sensor zero point calibration malfunction will be detected and the VSC warning light will light up. Therefore, perform step (c) right after step (b).



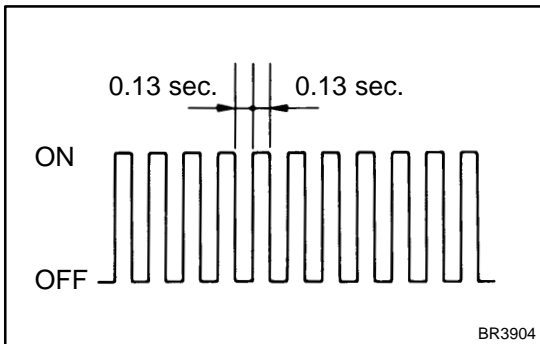
(1) Using SST, connect terminals Ts and E<sub>1</sub> of the DLC1.

SST 09843-18020

(2) Turn the ignition switch ON.

**HINT:**

Keep the vehicle in a stationary condition with the shift lever in the P position.



(3) After turning the ignition switch ON, check that the VSC warning light is lit for about 4 sec. and then starts quick blinking at 0.13 sec. intervals.

(4) After ensuring the blinking of the VSC warning light for 2 sec., turn the ignition switch OFF.

(5) Remove the SST and disconnect terminals Ts and E<sub>1</sub> of the DLC1.

SST 09843-18020



## PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

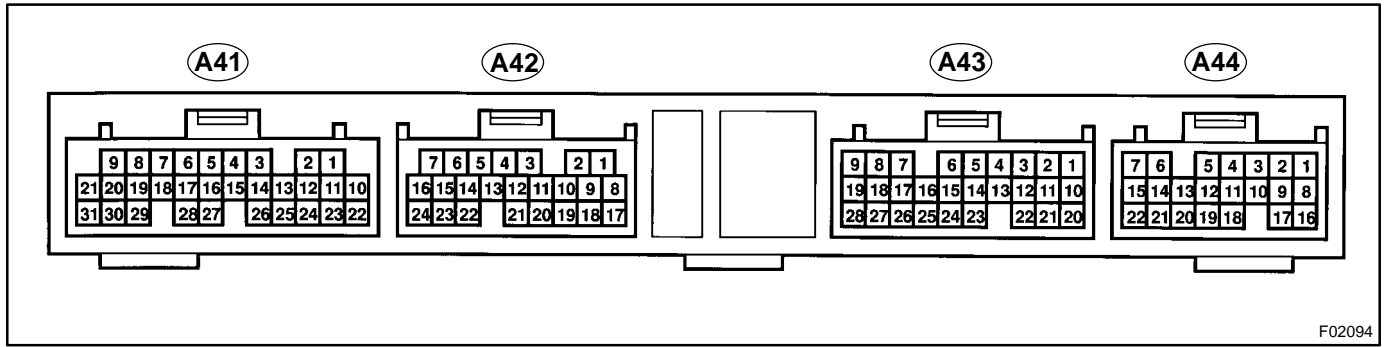
### NOTICE:

**When replacing the skid control ECU, sensor, etc., turn the ignition switch OFF.**

Symptom	Suspected Area	See page
ABS does not operate BA does not operate	Only when 1. to 4. are all normal and the problem is still occurring, replace the skid control ECU. 1. Reconfirm the DTC and check that the normal code is output. 2. IG power source circuit 3. Speed sensor circuit 4. Check the hydraulic brake booster with a checker or hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page <a href="#">DI-655</a> ).	<a href="#">DI-505</a> <a href="#">DI-558</a> <a href="#">DI-615</a> <a href="#">BR-40</a>
ABS does not operate efficiently BA does not operate	Only when 1. to 4. are all normal and the problem is still occurring, replace the skid control ECU. 1. Reconfirm the DTC and check that the normal code is output. 2. Speed sensor circuit 3. Stop light switch circuit 4. Check the hydraulic brake booster with a checker or hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page <a href="#">DI-655</a> ).	<a href="#">DI-505</a> <a href="#">DI-615</a> <a href="#">DI-573</a> <a href="#">BR-40</a>
ABS warning light abnormal	1. ABS warning light circuit 2. Skid control ECU	<a href="#">DI-627</a> <a href="#">IN-36</a>
DTC check cannot be done	Only when 1. to 4. are all normal and the problem is still occurring, replace the skid control ECU. 1. ABS warning light circuit 2. VSC OFF indicator light, center diff. lock indicator switch circuit 3. Center diff. lock indicator switch circuit 4. Tc terminal circuit	<a href="#">DI-627</a> <a href="#">DI-645</a> <a href="#">DI-612</a> <a href="#">DI-651</a>
Speed sensor signal check cannot be done	1. Ts terminal circuit 2. Skid control ECU	<a href="#">DI-653</a> <a href="#">IN-36</a>
TRAC does not operate	Only when 1. to 4. are all normal and the problem is still occurring, replace the skid control ECU. 1. Check the DTC, reconfirming that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit	<a href="#">DI-505</a> <a href="#">DI-558</a> <a href="#">DI-655</a> <a href="#">DI-615</a>
VSC does not operate	Only when 1. to 7. are all normal and the problem is still occurring, replace the skid control ECU. 1. Check the DTC, reconfirming that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit 5. Deceleration sensor circuit 6. Yaw rate sensor circuit 7. Steering angle sensor circuit	<a href="#">DI-505</a> <a href="#">DI-558</a> <a href="#">DI-655</a> <a href="#">DI-615</a> <a href="#">DI-570</a> <a href="#">DI-553</a> <a href="#">DI-605</a>

VSC TRAC warning light abnormal	1. VSC TRAC warning light circuit 2. Skid control ECU	DI-631 IN-36
BRAKE warning light abnormal	1. BRAKE warning light circuit 2. Skid control ECU	DI-635 IN-36
SLIP indicator light abnormal	1. SLIP indicator light circuit 2. Skid control ECU	DI-639 IN-36
VSC OFF indicator abnormal	1. VSC OFF indicator light, center diff. lock switch circuit 2. Skid control ECU	DI-645 IN-36
TRAC indicator light abnormal	1. TRAC indicator light circuit 2. Skid control ECU	DI-642 IN-36

# TERMINALS OF ECU



F02094

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SA1 (A41 - 2) - GND (A41 - 6, 31, A42 - 8, 17)	G - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
SA2 (A41 - 3) - GND (A41 - 6, 31, A42 - 8, 17)	B - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
SA3 (A41 - 4) - GND (A41 - 6, 31, A42 - 8, 17)	G-W - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
STR (A41 - 5) - GND (A41 - 6, 31, A42 - 8, 17)	G-Y - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
SFLR (A41 - 7) - GND (A41 - 6, 31, A42 - 8, 17)	B-Y - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
SRRH (A41 - 8) - GND (A41 - 6, 31, A42 - 8, 17)	W - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
SRRR (A41 - 9) - GND (A41 - 6, 31, A42 - 8, 17)	B-O - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
VCM (A41 - 10) - GND (A41 - 6, 31, A42 - 8, 17)	B - W-B	IG switch ON	4.5 to 5.5 V
PH (A41 - 11) - GND (A41 - 6, 31, A42 - 8, 17)	O - W-B	IG switch ON, pressure switch (PH) ON	Below 0.9 V
		IG switch ON, pressure switch (PH) OFF	5 to 8 V
FR+ (A41 - 14) - FR- (A41 - 13)	L - P	IG switch ON, slowly turn right front wheel	AC generation
FL+ (A41 - 16) - FL- (A41 - 15)	R - G	IG switch ON, slowly turn left front wheel	AC generation
SR (A41 - 19) - R1+ (A41 - 1)	G-Y - P	IG switch ON, ABS warning light OFF	10 to 14 V
SFLH (A41 - 21) - GND (A41 - 6, 31, A42 - 8, 17)	Y - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
PMC (A41 - 22) - E2 (A41 - 12)	R - W	IG switch ON, stop light switch OFF	0.3 to 0.7 V
E2 (A41 - 12) - GND (A41 - 6, 31, A42 - 8, 17)	W - W-B	IG switch OFF	Continuity
MTT (A41 - 27) - GND (A41 - 6, 31, A42 - 8, 17)	B-R - W-B	IG switch ON (Motor relay is OFF)	Below 1.5 V
MT+ (A41 - 28) - MT- (A41 - 18)	L - GR	IG switch ON (Motor relay is ON)	Below 1.5 V
MR1 (A41 - 29) - R1+ (A41 - 1)	R - P	IG switch ON, hydraulic brake booster pump motor running	10 to 14 V
WA (A42 - 1) - GND (A41 - 6, 31, A42 - 8, 17)	R-L - W-B	IG switch ON, ABS warning light OFF	Below 2.0 V

BZ (A42 - 2) - GND (A41 - 6, 31, A42 - 8, 17)	L - W-B	IG switch ON, VSC buzzer sound can be heard	Below 1.5 V
D/G (A42 - 3) - GND (A41 - 6, 31, A42 - 8, 17)	V-W - W-B	IG switch ON	10 to 14 V
P (A42 - 5) - GND (A41 - 6, 31, A42 - 8, 17)	G-W - W-B	IG switch ON, shift lever is in P position	10 to 14 V
IG1 (A42 - 6) - GND (A41 - 6, 31, A42 - 8, 17)	B-W - W-B	IG switch ON	10 to 14 V
NEO (A42 - 7) - GND (A41 - 6, 31, A42 - 8, 17)	W - W-B	Engine idling	Pulse generation
STP (A42 - 10) - GND (A41 - 6, 31, A42 - 8, 17)	G-W - W-B	Stop light switch pushed in	10 to 14 V
		Stop light switch released	2 to 5 V
Tc (A42 - 11) - GND (A41 - 6, 31, A42 - 8, 17)	P-B - W-B	IG switch ON and terminals Tc-E <sub>1</sub> of DLC1 connected	Below 1.0 V
		IG switch ON and terminals Tc-E <sub>1</sub> of DLC1 not connected	10 to 14 V
Ts (A42 - 12) - GND (A41 - 6, 31, A42 - 8, 17)	W - W-B	IG switch ON and terminals Ts-E <sub>1</sub> of DLC1 connected	Below 1.0 V
		IG switch ON and terminals Ts-E <sub>1</sub> of DLC1 not connected	10 to 14 V
PKB (A42 - 13) - GND (A41 - 6, 31, A42 - 8, 17)	R-W - W-B	IG switch ON, parking brake switch ON	Below 1.5 V
		IG switch ON, parking brake switch OFF	10 to 14 V
ENG+ (A42 - 14) - ENG - (A42 - 22)	R - G	IG switch ON	Pulse generation
RL+ (A42 - 18) - RL- (A42 - 19)	R - G	IG switch ON, slowly turn left rear wheel	AC generation
RR+ (A42 - 20) - RR- (A42 - 21)	B - W	IG switch ON, slowly turn right rear wheel	AC generation
TRC+ (A42 - 24) - TRC- (A42 - 16)	Y - L	IG switch ON	Pulse generation
EXI2 (A43 - 2) - GND (A41 - 6, 31, A42 - 8, 17)	B-L - W-B	IG switch ON, transfer in L4 position	8 to 14 V
		IG switch ON, transfer in any position except L4	Below 1.5 V
EXI (A43 - 3) - GND (A41 - 6, 31, A42 - 8, 17)	P-B - W-B	IG switch ON, center diff. lock switch ON	Below 2.0 V
		IG switch ON, center diff. lock switch OFF	10 to 14 V
VSCW (A43 - 4) - GND (A41 - 6, 31, A42 - 8, 17)	L-W - W-B	IG switch ON, VSC TRAC warning light ON	Below 2.0 V
		IG switch ON, VSC TRAC warning light OFF	10 to 14 V
BRL (A43 - 5) - GND (A41 - 6, 31, A42 - 8, 17)	Y-G - W-B	IG switch ON, BRAKE warning light ON	10 to 14 V
		IG switch ON, BRAKE warning light OFF	Below 2.0 V
IND (A43 - 6) - GND (A41 - 6, 31, A42 - 8, 17)	L-B - W-B	IG switch ON, SLIP indicator light ON	Below 2.0 V
		IG switch ON, SLIP indicator light OFF	10 to 14 V
WT (A43 - 7) - GND (A41 - 6, 31, A42 - 8, 17)	L-R - W-B	IG switch ON, VSC OFF indicator light ON	Below 2.0 V
		IG switch ON, VSC OFF indicator light OFF	10 to 14 V
VYS (A43 - 9) - GYAW (A43 - 27)	B - W-R	IG switch ON	4.5 to 5.5 V
GL2 (A43 - 10) - GYAW (A43 - 27)	Y - P	IG switch ON, vehicle is placed on the horizontal surface	2.0 to 3.0 V
SS1+ (A43 - 14) - SS1- (A43 - 23)	W - G	Engine idling, slowly turn steering wheel	Pulse generation (See page <a href="#">DI-546</a> )
INFR (A43 - 15) - GND (A41 - 6, 31, A42 - 8, 17)	B-R - W-B	IG switch ON, ACTIVE TRAC indicator light ON	Below 1.5 V
		IG switch ON, ACTIVE TRAC indicator light OFF	10 to 14 V
YD (A43 - 19) - GND (A41 - 6, 31, A42 - 8, 17)	L - W-B	Approx. 1 sec. after IG switch ON	4.5 to 5.3 V

GL1 (A43 - 22) - GYAW (A43 - 27)	G-R	IG switch ON, vehicle is placed on the horizontal surface	2.0 to 3.0 V
GYAW (A43 - 27) - GND (A41 - 6, 31, A42 - 8, 17)	R - W-B	IG switch OFF	Continuity
YAW (A43 - 28) - GYAW (A43 - 27)	W - R	IG switch ON, vehicle is in stationary condition	2 to 3 V
SRLR (A44 - 1) - GND (A41 - 6, 31, A42 - 8, 17)	R-G - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
MR2 (A44 - 2) - R2+ (A44 - 3)	Y-B - W-L	IG switch ON, hydraulic brake booster pump motor running	10 to 14 V
AST (A44 - 6) - GND (A41 - 6, 31, A42 - 8, 17)	R-Y - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
SRLH (A44 - 7) - GND (A41 - 6, 31, A42 - 8, 17)	R-W - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
SFRR (A44 - 8) - GND (A41 - 6, 31, A42 - 8, 17)	B-W - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
PL (A44 - 9) - GND (A41 - 6, 31, A42 - 8, 17)	W - W-B	IG switch ON, pressure switch ON	3 to 5 V
		IG switch ON, pressure switch OFF	7 to 11 V
TRIG (A44 - 20) - GND (A41 - 6, 31, A42 - 8, 17)	L - R	IG switch ON, ABS warning light OFF	10 to 14 V
+BO (A44 - 21) - GND (A41 - 6, 31, A42 - 8, 17)	LG - L	IG switch ON	10 to 14 V
SFRH (A44 - 16) - GND (A41 - 6, 31, A42 - 8, 17)	LG - W-B	IG switch ON, ABS warning light OFF	10 to 14 V
IG2 (A44 - 22) - GND (A41 - 6, 31, A42 - 8, 17)	B-W - W-B	IG switch ON	10 to 14 V

## Pattern Select Switch Circuit (2nd Start Switch)

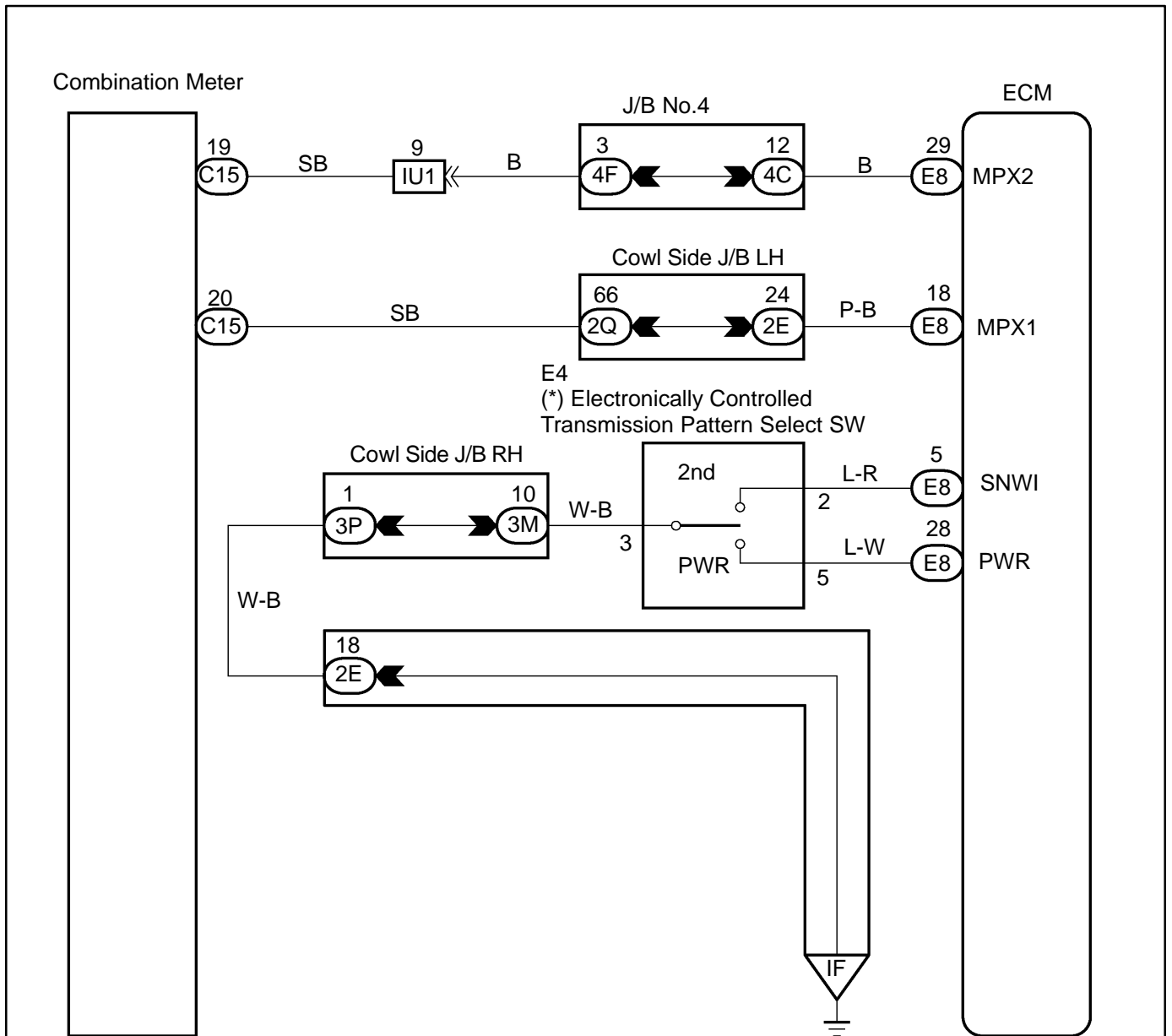
### CIRCUIT DESCRIPTION

When 2nd start mode is selected with the pattern select switch, the ECM controls the solenoid valves and the transmission starts from 2nd gear.

In D position, the transmission automatically shifts up through 3rd to 5th as usual.

In 2nd position, the transmission is held in 2nd gear.

WIRING DIAGRAM



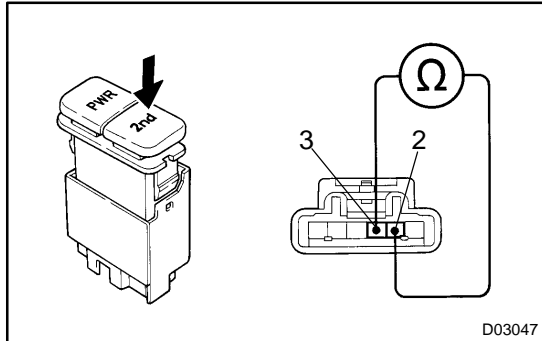
(\*) Pattern Select Switch (2nd Start Switch)  
 When the 2nd start switch is pushed, the switch contact is made and the 2nd mode is selected.  
 To cancel the 2nd start, push the 2nd start switch once again. The 2nd start is automatically cancelled out when the ignition switch is turned OFF.

C

D12771

# INSPECTION PROCEDURE

**1 Check pattern select switch (2nd start switch).**



**PREPARATION:**

Disconnect the pattern select switch connector.

**CHECK:**

Check continuity between terminals 2 and 3 of pattern select switch connector when pattern select switch is set to 2nd start switch ON and OFF.

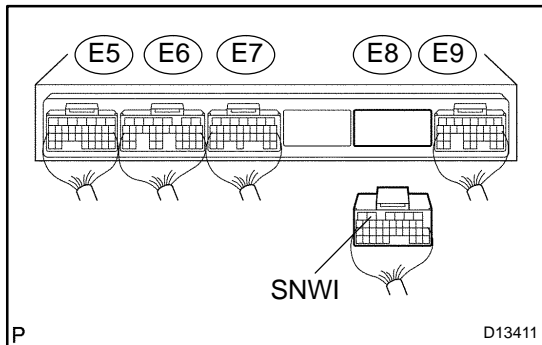
**OK:**

2nd start switch	Specified condition
Press continuously "2nd" switch	Continuity
Release "2nd" switch	No continuity

**NG** Replace the pattern select switch.

**OK**

**2 Check harness and connector between terminal SNWI of ECM and body ground.**



**PREPARATION:**

- (a) Connect the pattern select switch connector.
- (b) Disconnect the connector of ECM.

**CHECK:**

Check continuity between terminal SNWI of ECM and body ground when the pattern select switch is set to 2nd start switch ON and OFF.

**OK:**

2nd start switch	Specified condition
Press continuously "2nd" switch	Continuity
Release "2nd" switch	No Continuity

**OK** Proceed to next circuit inspection shown on matrix chart (See page [DI-396](#) ).

**NG**

Repair or replace harness or connector (See page [IN-36](#) ).



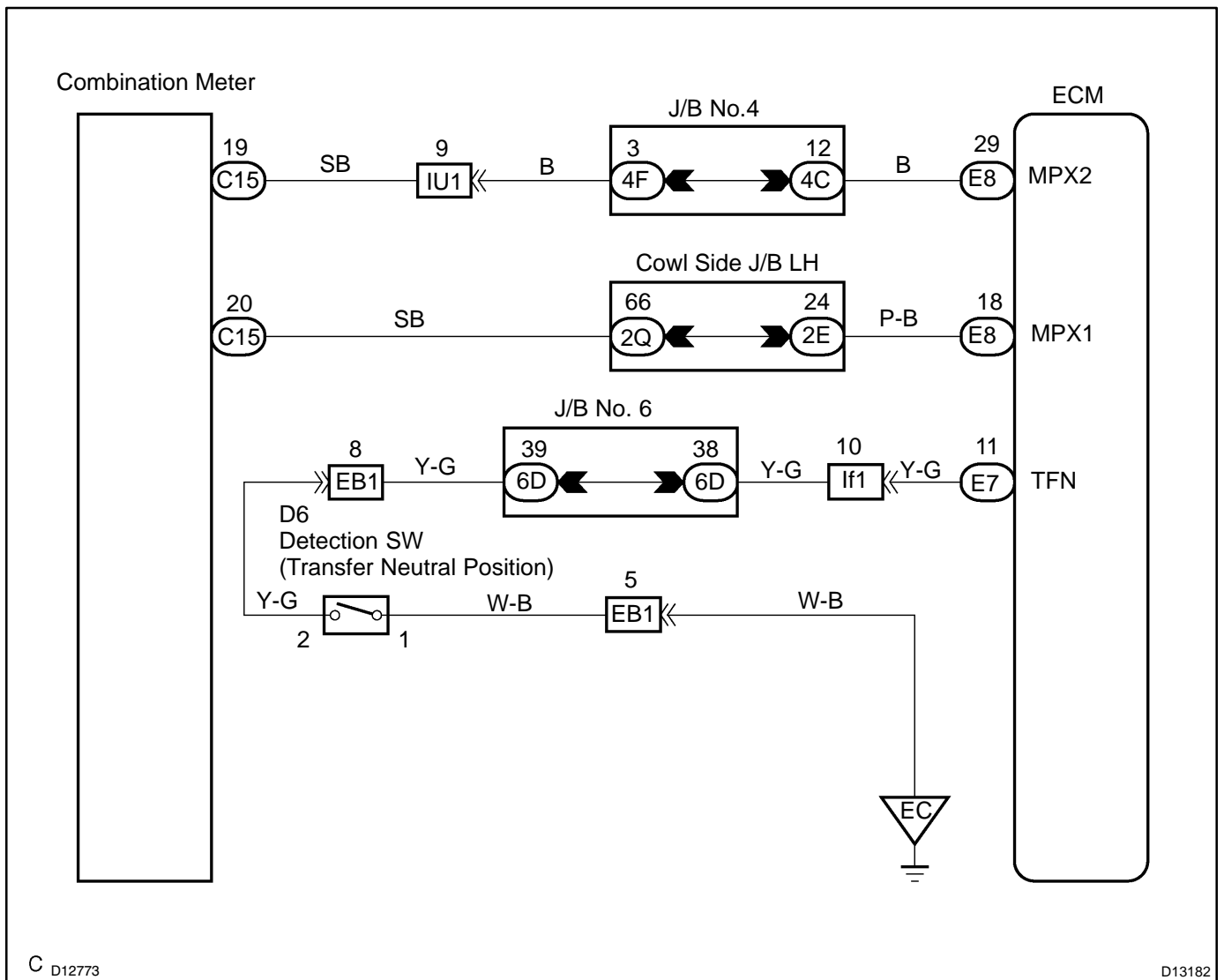
# A/T. P. (Automatic Transmission Parking) Indicator Circuit

## CIRCUIT DESCRIPTION

The propeller shaft and wheels are free even when the transmission shift lever is set to P as long as the transfer shift lever is in Neutral position. The A/T.P. indicator light lights up to warn the driver that the propeller shaft and wheels are not locked.

If the A/T.P. indicator light goes on, the transfer shift lever should be shifted to the positions other than N position.

## WIRING DIAGRAM



C D12773

D13182

**INSPECTION PROCEDURE**

**1** Check park/neutral position switch (See page [DI-402](#) ).

**NG**

Replace the park/neutral position switch.

**OK**

**2** Check transfer neutral position switch (See page [DI-457](#) ).

**NG**

Replace the transfer neutral position switch.

**OK**

**3** Check harness and connector between ECM and transfer neutral position switch, transfer neutral position switch and body ground (See page [IN-36](#) ).

**NG**

Repair or replace the harness or connector.

**OK**

Proceed to next circuit inspection shown on matrix chart (See page [DI-396](#) ).

## CIRCUIT INSPECTION

<b>DTC</b>	<b>P0705</b>	<b>Transmission Range Sensor Circuit Malfunction (PRNDL Input)</b>
------------	--------------	--

<b>DTC</b>	<b>P0850</b>	<b>Park/Neutral Switch Input Circuit</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P0705	(2-trip detection logic) ▶ All switches are OFF simultaneously for P, R, N, D, 3 and 2 positions. ▶ 2 or more switches are ON simultaneously for P, R, N, (D 4), 3 and (2 L) positions.	▶ Short in park/neutral position switch circuit ▶ Park/neutral position switch ▶ ECM
P0850	Park/neutral position switch remains ON (P, N position) during driving under conditions (a) and (b) for 30 sec. (2-trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 - 2,500 rpm	

## MONITOR DESCRIPTION

The park/neutral position switch detects the shift lever position and sends a signal to the ECM.

For security, the park/neutral position switch detects the shift lever position so that engine can be started only when the vehicle is in P or N shift position.

When the park/neutral position switch sends more than one signal at a time from switch positions P, R, N or D, the ECM interprets this as a fault in the switch. The ECM will turn on the MIL and store the DTC.

## MONITOR STRATEGY

### P0705:

Related DTCs	P0705	Park/neutral position switch/Verify switch input
Required sensors/Components	Park/neutral position switch	
Frequency of operation	Continuous	
Duration	Condition (A), (B) and (D)	2 sec.
	Condition (C)	60 sec.
MIL operation	2 driving cycle	
Sequence of operation	None	

**P0850:**

Related DTCs	P0850	Park/neutral position switch/Verify switch cycling
Required sensors/Components	Main	Park/neutral position switch
	Sub	Crankshaft position sensor (NE), MAF meter
Frequency of operation	Continuous	
Duration	30 sec.	
MIL operation	2 driving cycles	
Sequence of operation	None	

**TYPICAL ENABLING CONDITIONS****P0705:**

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Ignition switch	ON	
Battery voltage	10.5 V or more	

**P0850:**

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Vehicle speed	70 km/h (43 mph) or more	-
Engine speed	1,500 rpm or more	2,500 rpm or less
Intake air amount per revolution	0.9 g/rev. or more	-

## TYPICAL MALFUNCTION THRESHOLDS

### P0705:

Detection criteria	Threshold
<b>One of the following conditions is met: Condition (A), (B), (C) or (D)</b>	
<b>Condition (A)</b>	
Number of the following signal input at the same time	2 or more
P switch	ON
N switch	
R switch	
D switch	
3 switch	
2 switch	
<b>Condition (B)</b>	
Number of the following signal input at the same time	2 or more
NSW switch	ON
R switch	
D switch	
3 switch	
2 switch	
<b>Condition (C)</b>	
<b>All of following conditions are met</b>	
P switch	OFF
N switch	
NSW switch	
R switch	
D switch	
3 switch	
2 switch	
<b>Condition (D)</b>	
<b>Both (i) and (ii) are met</b>	
<b>(i) One of followings is met</b>	
NSW switch	ON
P switch	
N switch	
R switch	
<b>(ii) One of followings is met</b>	
4 switch	ON
L switch	

### P0850:

Detection criteria	Threshold
NSW signal	ON

### COMPONENT OPERATING RANGE

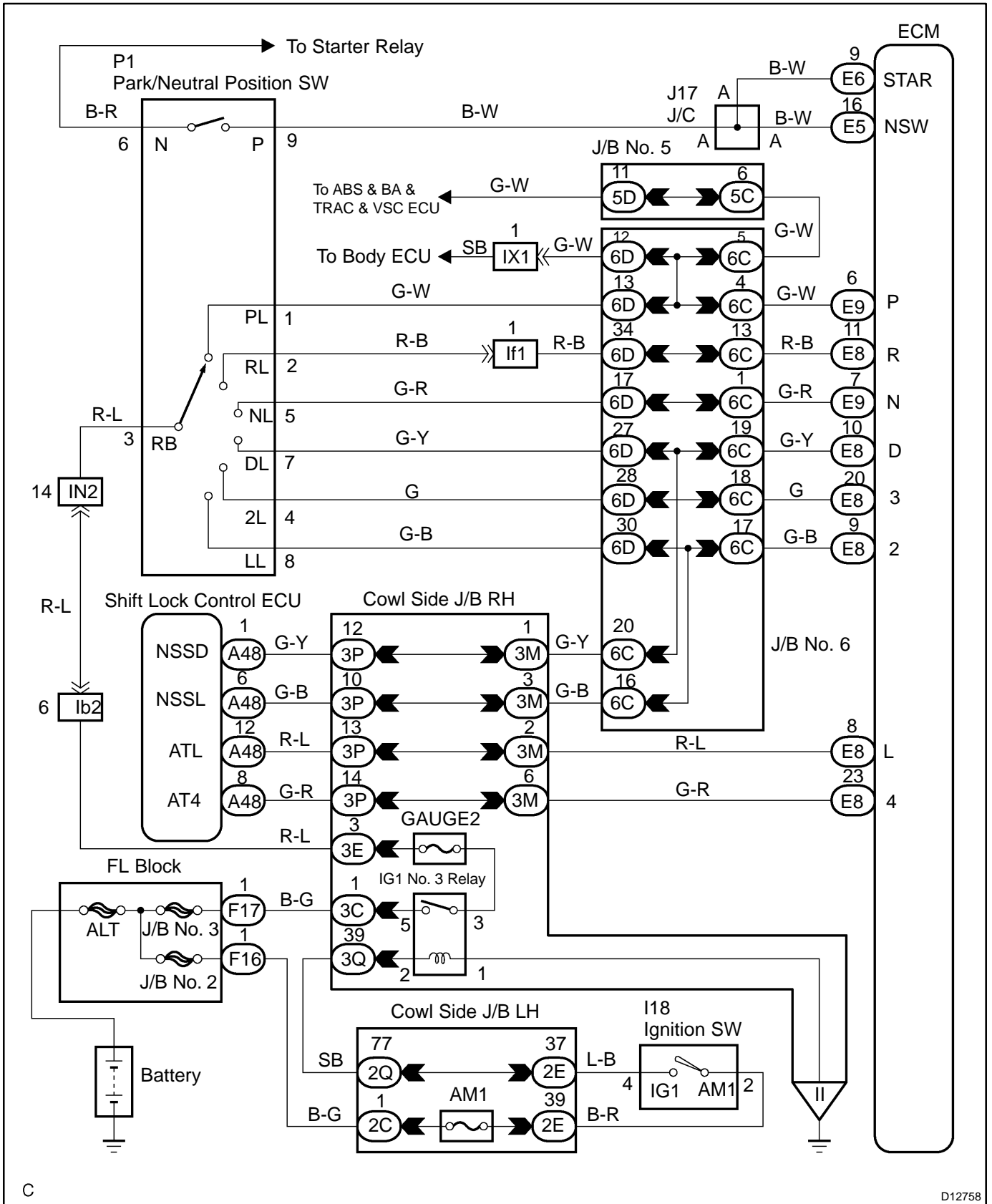
**P0705:**

Parameter	Standard value
Park/neutral position switch	The park/neutral position switch sends only one signal to the ECM.

**P0850:**

Parameter	Standard value
Park/neutral position switch	The park/neutral position switch is OFF when avobe condition.

# WIRING DIAGRAM



C

D12758

## INSPECTION PROCEDURE

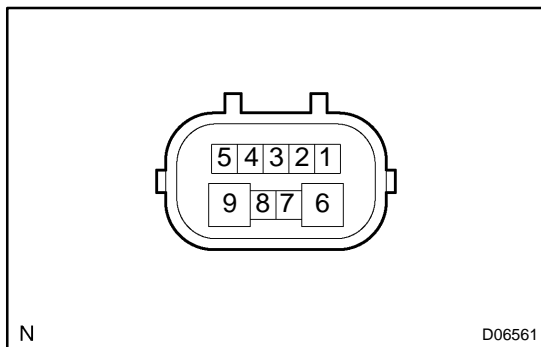
**HINT:**

According to the DATA LIST displayed by the OBD II scan tool or Hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as a first step of troubleshooting is one method to shorten labor time.

- (a) Warm up the engine.
- (b) Turn the ignition switch OFF.
- (c) Connect the OBD II scan tool or Hand-held tester to the DLC3.
- (d) Turn the ignition switch ON.
- (e) Push the "ON" button of OBD II scan tool or Hand-held tester.
- (f) Select the item "/DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL (or ATM)".
- (g) According to the display on tester, read the "DATA LIST".

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
PNP SW [NSW]	PNP SW Status/ ON or OFF	Shift lever position is; P or N: ON Except P or N: OFF	The shift lever position and these values are different, there are failures of the PNP switch or shift cable adjustment.
REVERSE	PNP SW Status/ ON or OFF	Shift lever position is; R: ON Except R: OFF	
DRIVE	PNP SW Status/ ON or OFF	Shift lever position is; D and 4: ON Except D and 4: OFF	

**1 Check park/neutral position switch.**



**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Disconnect the park/neutral position switch connector.

**CHECK:**

Check continuity between each terminal shown below when the shift lever is moved to each position.

**OK:**

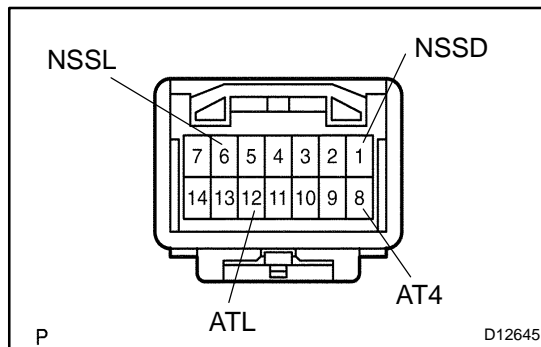
Shift position	Terminal No. to continuity	Terminal No. to continuity
P	1 - 3	6 - 9
R	2 - 3	-
N	3 - 5	6 - 9
D, 4	3 - 7	-
3	3 - 4	-
2, L	3 - 8	-

**NG** Replace park/neutral position switch (See page AT-7).





## 2 Check transmission control switch.



### PREPARATION:

- Connect the park/neutral position switch connector.
- Disconnect the shift lock control computer connector (transmission control switch).

### CHECK:

Check continuity between each terminal of shift lock control computer (transmission control switch).

### OK:

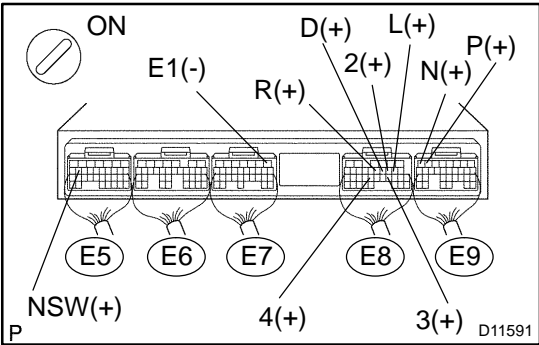
Shift position	Tester connection	Specified valve
D	1 - 8 (NSSD - AT4)	No continuity
4		Continuity
2	6 - 12 (NSSL - ATL)	No continuity
L		Continuity

**NG**

**Replace the transmission control switch (See page AT-20).**

**OK**

**3 Measure voltage between each terminals of NSW, P, R, N, D, 4, 3, 2, L and E1 of ECM.**



**PREPARATION:**

- (a) Connect the shift lock control computer connector (transmission control switch).
- (b) Turn the ignition switch ON.

**CHECK:**

Measure voltage between each terminals NSW, P, R, N, D, 4, 3, 2, L and E1 of ECM when the shift lever is shifted to the following positions.

**OK:**

Tester connection	Condition	Specified condition
NSW - Body ground	Shift lever position: P and N	Below 1 V
	Shift lever position: Except P and N	Battery voltage
P - Body ground	Shift lever position: P	Battery voltage
R - Body ground	Shift lever position: R	Battery voltage*
N - Body ground	Shift lever position: N	Battery voltage
D - Body ground	Shift lever position: D and 4	Battery voltage
4 - Body ground	Shift lever position: 4	Battery voltage
3 - Body ground	Shift lever position: 3	Battery voltage
2 - Body ground	Shift lever position: 2 and L	Battery voltage
L - Body ground	Shift lever position: L	Battery voltage

**HINT:**

\*: The voltage will drop slightly due to lighting up of the back up light.

**OK** Check and replace the ECM (See page [IN-36](#) ).

**NG**

Repair or replace the harness or connector (See page [IN-36](#) ).

<b>DTC</b>	<b>P0710</b>	<b>Transmission Fluid Temperature Sensor "A" Circuit</b>
------------	--------------	--

<b>DTC</b>	<b>P0712</b>	<b>Transmission Fluid Temperature Sensor "A" Circuit Low Input</b>
------------	--------------	--

<b>DTC</b>	<b>P0713</b>	<b>Transmission Fluid Temperature Sensor "A" Circuit High Input</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

The ATF temperature sensor converts fluid temperature into a resistance value which is input into the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
P0710	(a) and (b) is detected momentary within 0.5 sec. when neither P0712 or P0713 is not detected (1-trip detection logic) (a) ATF temperature sensor resistance is less than 79 $\Omega$ . (b) ATF temperature sensor resistance is more than 156 k $\Omega$ . HINT: Within 0.5 sec. the malfunction switches from (a) to (b) or from (b) to (a)	<ul style="list-style-type: none"> <li>▶ Open or short in ATF temperature sensor No. 1 circuit</li> <li>▶ ATF temperature sensor No. 1</li> <li>▶ ECM</li> </ul>
P0712	ATF temperature sensor resistance is less than 79 $\Omega$ . for 0.5 sec. or more (1-trip detection logic)	
P0713	ATF temperature sensor resistance is more than 156 k $\Omega$ . 15 minutes or more after the engine start DTC is detected for 0.5 sec. or more (1-trip detection logic)	

## MONITOR DESCRIPTION

The automatic transmission fluid (ATF) temperature sensor converts ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature, and the ECM detects an opens or shorts in the ATF temperature circuit. If the resistance value of the ATF temperature is less than 79  $\Omega$ \*1 or more than 156 k $\Omega$ \*2, the ECM interprets this as a fault in the ATF sensor or wiring. The ECM will turn on the MIL and store the DTC.

\*1: 150 $\times$ C (302 $\times$ F) or more is indicated regardless of the actual ATF temperature.

\*2: -40 $\times$ C (-40 $\times$ F) is indicated regardless of the actual ATF temperature.

HINT:

The ATF temperature can be checked on the OBD II scan tool or hand-held tester display.

## MONITOR STRATEGY

Related DTCs	P0710	ATF temperature sensor/Range check (Fluttering)
	P0712	ATF temperature sensor/Range check (Low resistance)
	P0713	ATF temperature sensor/Range check (High resistance)
Required sensors/Components	ATF temperature sensor	
Frequency of operation	Continuous	
Duration	0.5 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
<b>Range check (Fluttering, Low resistance)</b>		
The typical enabling condition is not available.	-	
<b>Range check (High resistance)</b>		
Time after engine start	15 min. or more	-

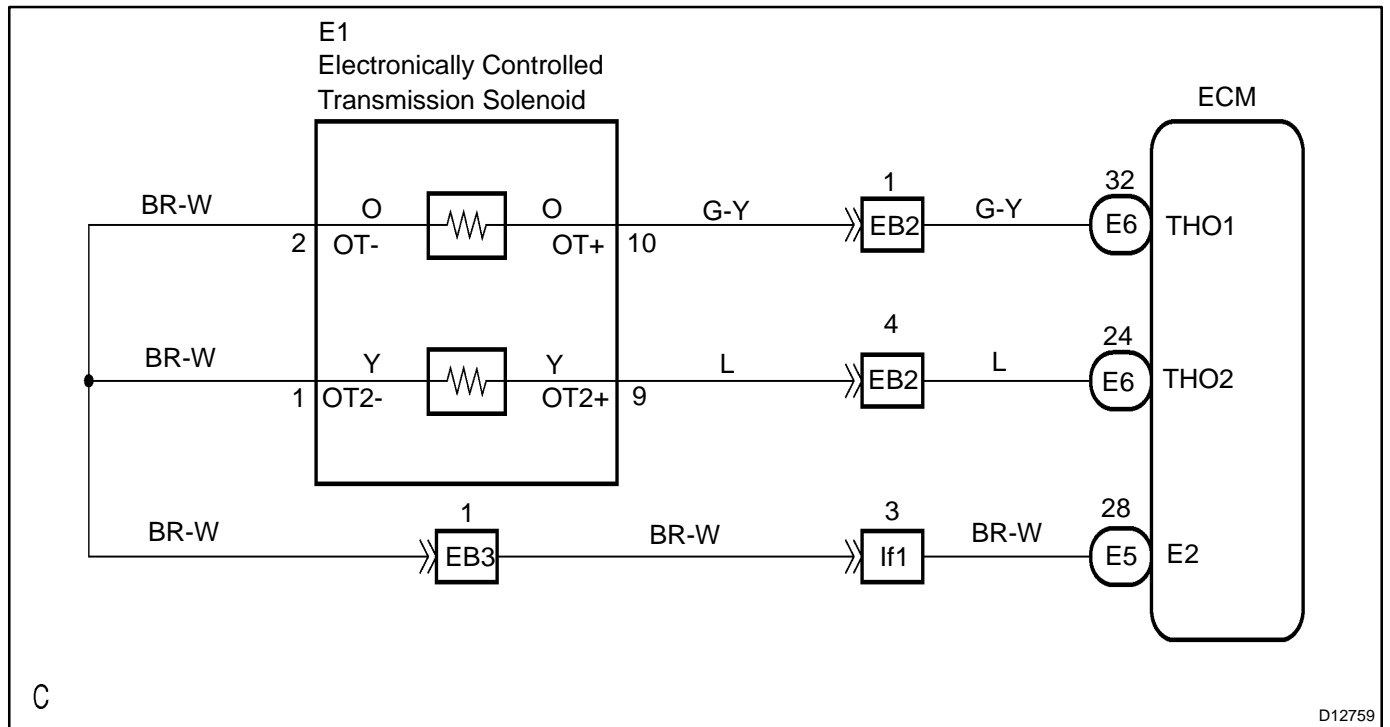
## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
<b>Range check (Fluttering)</b>	
ATF temperature sensor resistance	Less than 79 $\Omega$ or More than 156 k $\Omega$
<b>Range check (Low resistance)</b>	
ATF temperature sensor resistance	Less than 79 $\Omega$
<b>Range check (High resistance)</b>	
ATF temperature sensor resistance	More than 156 k $\Omega$

## COMPONENT OPERATING RANGE

Parameter	Standard value
ATF temperature sensor resistance	Atmospheric temperature to approx. 130°C (266°F)

**WIRING DIAGRAM**



## INSPECTION PROCEDURE

**HINT:**

According to the DATA LIST displayed by the OBD II scan tool or Hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as a first step of troubleshooting is one method to shorten labor time.

- (a) Warm up the engine.
- (b) Turn the ignition switch OFF.
- (c) Connect the OBD II scan tool or Hand-held tester to the DLC3.
- (d) Turn the ignition switch ON.
- (e) Push the "ON" button of OBD II scan tool or Hand-held tester.
- (f) Select the item "/DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL (or ATM)".
- (g) According to the display on tester, read the "DATA LIST".

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
AT FLUID TEMP	ATF Temp. Sensor No.1 Value/ min.: -40°C (-40°F) max.: 215°C (419°F)	80°C (176°F) (After Stall Test)	If the value is "-40°C (-40°F)" or "215°C (419°F)", ATF temp. sensor No. 1 circuit is opened or shorted.

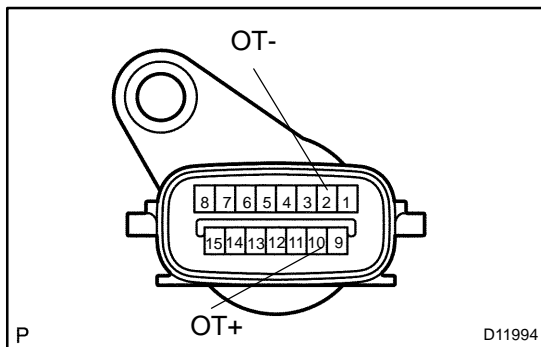
**HINT:**

When DTC P0712 is output and OBD II scan tool or hand-held tester output is 150°C (302°F), there is a short circuit.

Measure the resistance between THO1 (THO) and body ground.

Temperature Displayed	Malfunction
-40 °C (-40°F)	Open circuit
150°C (302°F) or more	Short circuit

<b>1</b>	<b>Check transmission wire.</b>
----------	---------------------------------



**PREPARATION:**

Disconnect the transmission wire connector from the transmission.

**CHECK:**

Measure the resistance between terminals OT+ and OT-.

**OK:**

79 Ω to 156 kΩ

**CHECK:**

Measure resistance between terminals OT+ and OT- of the transmission wire connector and body ground.

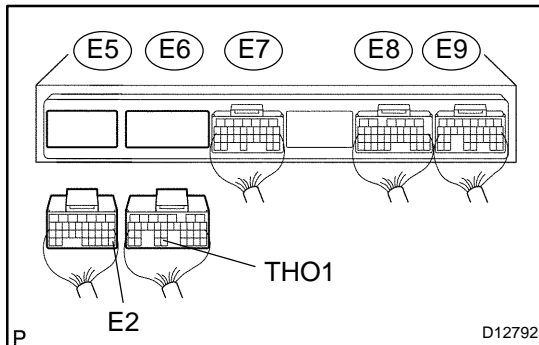
**OK:**

Resistance: 1 MΩ or higher

<b>NG</b>	<b>Replace the transmission wire (ATF temperature sensor).</b>
-----------	--



**2 Measure resistance between terminal THO1 and E2 of ECM connector.**



**PREPARATION:**

- (a) Connect the transmission wire connector.
- (b) Disconnect the connector of the ECM.

**CHECK:**

Measure the resistance between terminals THO1 and E2.

**OK:**

**79  $\Omega$  to 156 k $\Omega$**

**CHECK:**

Measure resistance between terminals THO1 and E2 of the ECM connector and body ground.

**OK:**

**Resistance: 1 M $\Omega$  or higher**

**NG**

**Repair or replace the harness or connector (See page [IN-36](#)).**

**OK**

**Check and replace the ECM (See page [IN-36](#)).**

<b>DTC</b>	<b>P0711</b>	<b>Transmission Fluid Temperature Sensor "A" Performance</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

The ATF temperature sensor converts fluid temperature into a resistance value which is input into the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
P0711	(A) Both (a) and (b) are detected: (2-trip detection logic) (a) Intake air and engine coolant temps. are more than -10°C (14°F) at engine start (b) After normal driving for over 20 min. and 9 km (6 mile) or more, ATF temp. is less than 20°C (68°F) (B) After 17 min. of engine start, the ATF temp. is 110°C (230°F) or more (2-trip detection logic).	<ul style="list-style-type: none"> <li>▶ Open or short in ATF temperature sensor No. 1 circuit</li> <li>▶ ATF temperature sensor No. 1</li> <li>▶ ECM</li> </ul>

## MONITOR DESCRIPTION

The ATF temperature sensor converts the ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature and detects an opens or shorts in the ATF temperature circuit or a fault of the ATF temperature sensor.

After running the vehicle for a certain period, the ATF temperature should increase. If the ATF temperature is below 10°C (50°F) after running the vehicle for a certain period, the ECM interprets this as a fault, and turns on the MIL.

When the ATF temperature is 110°C (230°F) or more after 17 minutes of engine cold start, the ECM also determines this as a fault, turns on the MIL, and stores the DTC.

## MONITOR STRATEGY

Related DTCs	P0711	ATF temperature sensor/Rationality check
Required sensors/Components	ATF temperature sensor	
Frequency of operation	Continuous	
Duration	3 sec.	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
ATF Temperature sensor "A" circuit	There is no malfunction in the circuit shown on the left.	
ECT (Engine coolant temperature) sensor circuit		
IAT (Intake air temperature) sensor circuit		
Time after engine start	18 min. and 20 sec. or more	-
ECT	-15 °C (5 °F) or more	-
Driving distance after engine start	9 km (6 mile) or more	-
IAT (12 sec. after engine start)	-20 °C (-4 °F) or more	-
ECT (12 sec. after engine start)	-20 °C (-4 °F) or more	-



## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
ATF Temperature	Less than 10°C (50°F) (ATF temperature = -10°C (14°F) at engine start) (Conditions vary with ATF temperature at engine start)

## COMPONENT OPERATING RANGE

Parameter	Standard value
ATF temperature sensor	Atmospheric temperature to approx. 130°C (266°F)

## WIRING DIAGRAM

See page [DI-410](#) .

## INSPECTION PROCEDURE

<b>1</b>	<b>Check other DTCs output (in addition to DTC P0711).</b>
----------	--

### PREPARATION:

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the OBD II scan tool or hand-held tester to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Push the "ON" button of the OBD II scan tool or the hand-held tester.
- (f) Select the item "DIAGNOSIS/ENHANCED OBD II/DTC INFO/CURRENT CODES".

### CHECK:

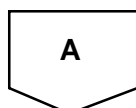
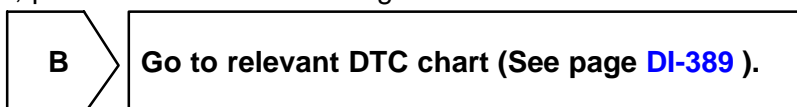
Read the DTCs using the OBD II scan tool or the hand-held tester.

### RESULT:

Display (DTC output)	Proceed to
Only "P0711" is output	A
"P0711" and other DTCs	B

### HINT:

If any other codes besides "P0711" is output, perform the troubleshooting for those DTCs first.



<b>2</b>	<b>Check transmission fluid level (See page <a href="#">DI-361</a> ).</b>
----------	---

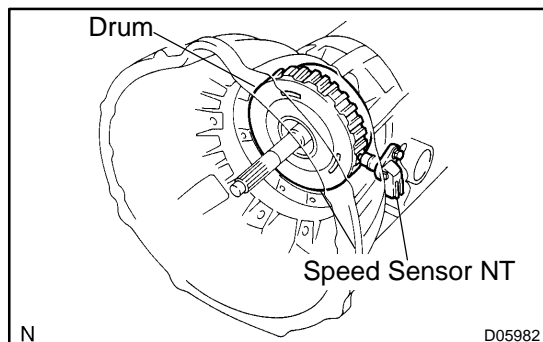
<b>NG</b>	<b>Add fluid.</b>
-----------	-------------------

<b>OK</b>
-----------

<b>Replace the transmission wire (ATF temperature sensor).</b>
--

<b>DTC</b>	<b>P0717</b>	<b>Input Speed Sensor Circuit No Signal</b>
------------	--------------	---

## CIRCUIT DESCRIPTION



The speed sensor NT detects the rotation speed of the input shaft from the rotation of the drum. Its construction is the same as that of the speed sensor SP2.

By comparing the speed sensor NT signal and speed sensor SP2 signal, the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure in response to various conditions, thus providing smooth gear shift.

DTC No.	DTC Detection Condition	Trouble Area
P0717	All conditions below are detected for 5 secs. or more (1-trip detection logic) (a) Gear change not being performed (b) Gear position: 1st, 2nd, 3rd, 4th or 5th (c) T/M input shaft rpm: 300 rpm or less (d) T/M output shaft rpm: 1,000 rpm or more (e) Park/neutral position switch: OFF (f) Shift solenoid valves, park/neutral position switch and vehicle speed sensor are in normal operation	<ul style="list-style-type: none"> <li>▶ Open or short in speed sensor NT circuit</li> <li>▶ Speed sensor NT</li> <li>▶ ECM</li> <li>▶ Automatic transmission assembly</li> </ul>

## MONITOR DESCRIPTION

The input speed sensor detects the transmission input shaft speed. The ECM determines the gear shift timing based on a comparison of the input speed sensor (input shaft speed) with the output speed sensor (output shaft speed).

When the output shaft speed is higher than the expected value and the input shaft speed is 300 rpm or less while running with the shift in the D position, the ECM will conclude that there is malfunction of the input turbine speed sensor (NT). The ECM will illuminate the MIL and a DTC is set.

## MONITOR STRATEGY

Related DTCs	P0717	Speed sensor (NT)/Verify pulse input
Required sensors/Components	Main	Speed sensor (NT)
	Sub	Speed sensor (NO)
Frequency of operation	Continuous	
Duration	5 sec.	
MIL operation	Immediate	
Sequence of operation	None	

### TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Shift change	Shift change is completed and before starting next shift change operation	
Transmission Shift position	4th or 5th	
Output shaft rpm	1,000 rpm or more	-
NSW switch	OFF	
R switch	OFF	
L switch	OFF	
Engine	Running	

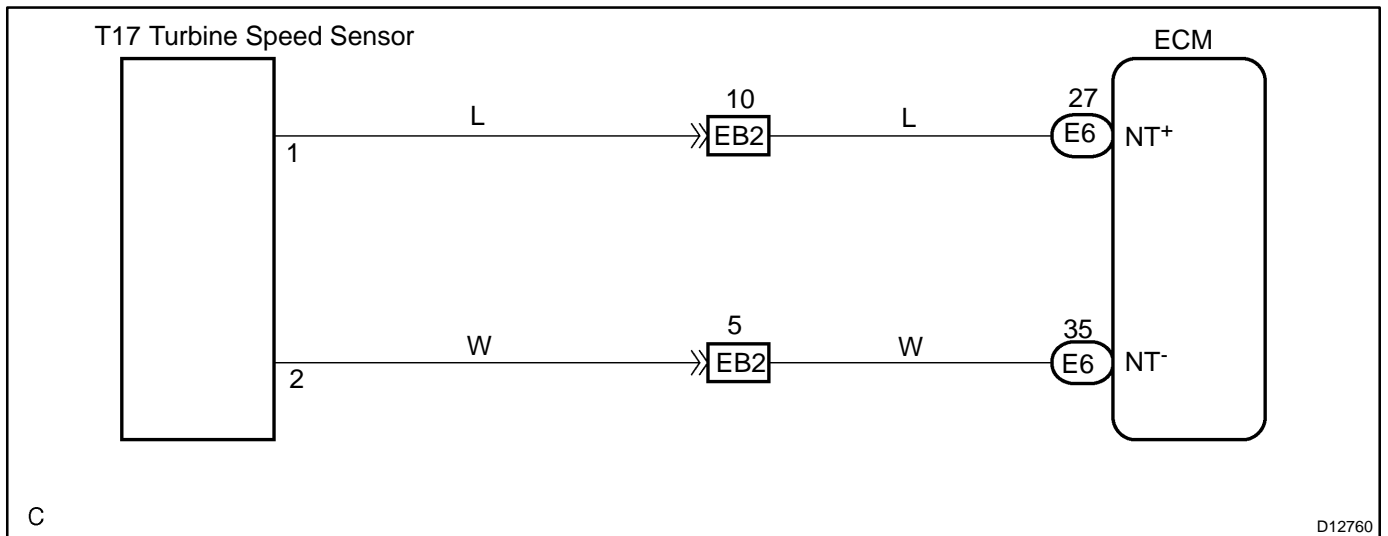
### TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
Sensor signal rpm	Less than 300 rpm

### COMPONENT OPERATING RANGE

Parameter	Standard value
Speed sensor (NT)	Input speed is equal to engine speed when lock-up ON.

### WIRING DIAGRAM

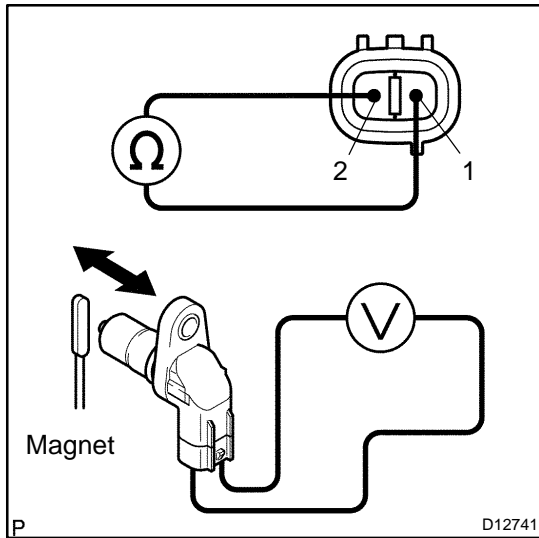


C

D12760

## INSPECTION PROCEDURE

## 1 Check speed sensor NT.

**PREPARATION:**

Remove the speed sensor NT.

**CHECK:**

- Measure the resistance between the sensor terminals.  
**Standard: 560 to 680  $\Omega$  at 20°C (68°F)**
- Measure the voltage between the sensor terminals when a magnet is put close to the front end of the sensor then moved away quickly.  
**Standard: Sensor generates voltage intermittently**

**HINT:**

The generated voltage is extremely low.

**OK:**

Standard

NG

Replace speed sensor NT.

OK

2 Check harness and connector between ECM and speed sensor NT (See page [IN-36](#)).

NG

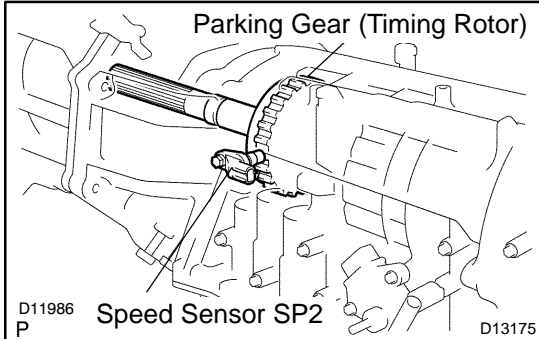
Repair or replace harness and connector.

OK

Check and replace the ECM (See page [IN-36](#)).

<b>DTC</b>	<b>P0722</b>	<b>Output Speed Sensor Circuit No Signal</b>
------------	--------------	--

**CIRCUIT DESCRIPTION**



The speed sensor SP2 detects the rotation speed of the transmission output shaft and sends signals to the ECM. The ECM determines the vehicle speed based on these signals. An AC voltage is generated in the speed sensor SP2 coil as the parking gear mounted on the rear planetary gear assembly rotates, and this voltage is sent to the ECM. The parking gear on the rear planetary gear is used as the timing rotor for this sensor. The gear shift point and lock-up timing are controlled by the ECM based on the signals from this vehicle speed sensor and the throttle position sensor signal. If the speed sensor SP2 malfunctions, the ECM uses input signals from the speed sensor NT as a back-up signal.

DTC No.	DTC Detection Condition	Trouble Area
P0722	<p>All conditions below are detected 500 times or more continuously (1-trip detection logic)</p> <p>(a) No signal from speed sensor SP2 is input to ECM while 4 pulses of No. 1 vehicle speed sensor signal are sent</p> <p>(b) Vehicle speed is 9 km/h (6 mph) or more for at least 4 sec.</p> <p>(c) Park/neutral position switch is OFF.</p> <p>(d) Transfer position is except neutral (4WD).</p>	<ul style="list-style-type: none"> <li>▶ Open or short in speed sensor SP2 circuit</li> <li>▶ Speed sensor SP2</li> <li>▶ ECM</li> </ul>

**MONITOR DESCRIPTION**

The output speed sensor monitors the output shaft speed. The ECM controls the gearshift point and the lock up timing based on the signals from the output speed sensor and throttle position sensor. If the ECM detects no signal from the output shaft speed sensor even while the vehicle is moving, it will conclude that is a malfunction of the output speed sensor. The ECM will illuminate the MIL and store the DTC.

**MONITOR STRATEGY**

Related DTCs	P0722	Speed sensor SP2/Verify pulse input
Required sensors/Components	Speed sensor SP2	
Frequency of operation	Continuous	
Duration	500 output shaft revolution	
MIL operation	Immediate	
Sequence of operation	None	

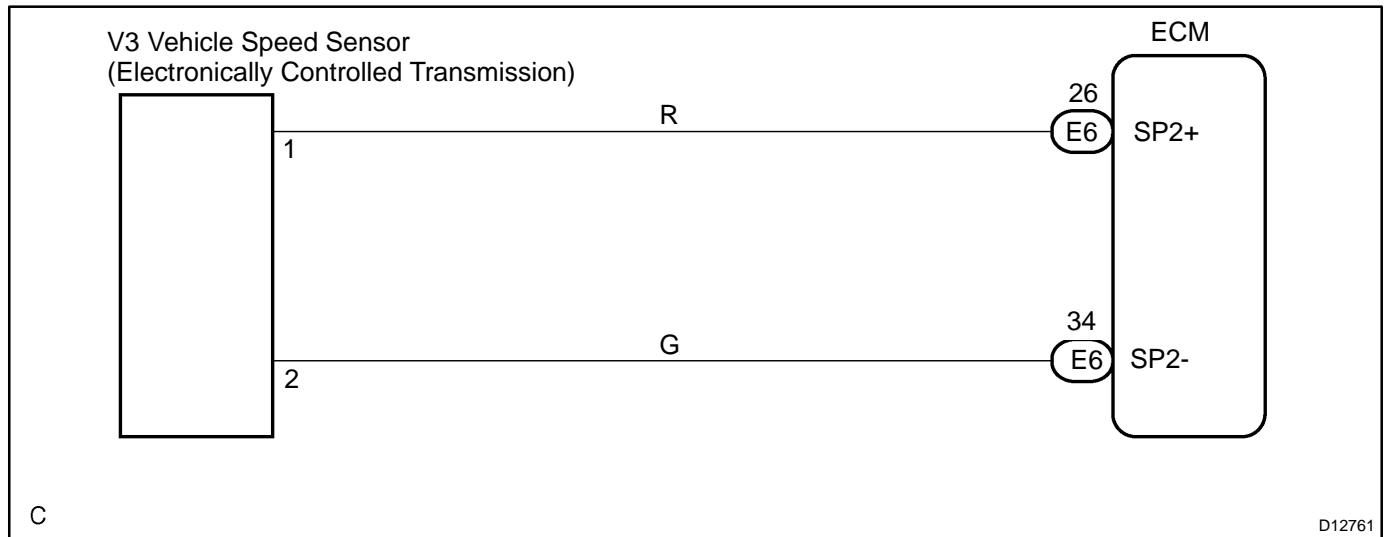
### TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Vehicle speed range (4 sec. or more)	9 km/h (6 mph) or more	-
NSW switch	OFF	
Transfer neutral switch	OFF	

### TYPICAL MALFUNCTION THRESHOLDS

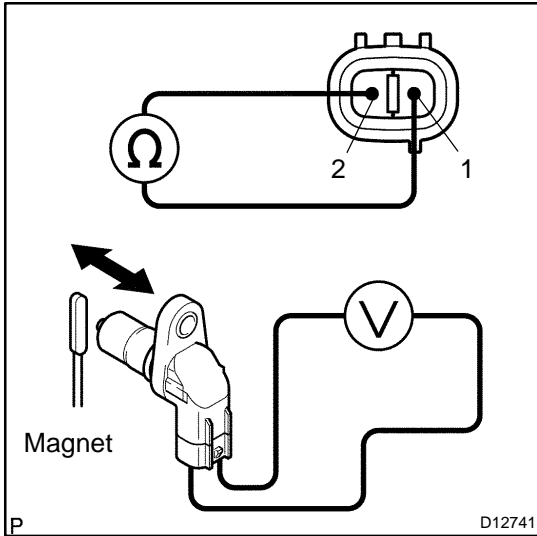
Detection criteria	Threshold
No pulse input during 4 vehicle speed sensor pulse input	500 times or more

### WIRING DIAGRAM



## INSPECTION PROCEDURE

## 1 Check speed sensor SP2.

**PREPARATION:**

Remove the speed sensor SP2.

**CHECK:**

- (a) Measure the resistance between the sensor terminals.  
**Standard: 560 to 680  $\Omega$  at 20°C (68°F)**
- (b) Measure the voltage between the sensor terminals when a magnet is put close to the front end of the sensor then moved away quickly.  
**Standard: Sensor generates voltage intermittently.**

**HINT:**

The generated voltage is extremely low.

**OK:**

Standard

NG

Replace speed sensor SP2.

OK

2 Check harness and connector between ECM and speed sensor SP2 (See page [IN-36](#)).

NG

Repair or replace harness and connector.

OK

Check and replace the ECM (See page [IN-36](#)).



<b>DTC</b>	<b>P0724</b>	<b>Brake Switch "B" Circuit High</b>
------------	--------------	--------------------------------------

## CIRCUIT DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling, while driving in lock-up condition, when brakes are suddenly applied.

When the brake pedal is operated, this switch sends a signal to ECM. Then the ECM cancels operation of the lock-up clutch while braking is in progress.

DTC No.	DTC Detection Condition	Trouble Area
P0724	Stop light switch always turn on even vehicle is driver Go and Stop 10 times. (2-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Short in stop light switch signal circuit</li> <li>▶ Stop light switch</li> <li>▶ ECM</li> </ul>

## MONITOR DESCRIPTION

When the stop light switch remains ON during "stop and go" driving, the ECM interprets this as a fault in the stop light switch and the MIL comes on and the ECM stores the DTC. The vehicle must stop and go (3 km/h (2 mph) to 30 km/h (19 mph)) ten times for two driving cycles in order to detect malfunction.

## MONITOR STRATEGY

Related DTCs	P0724	Stop light switch/Range check/Rationality
Required sensors/Components	Main	Stop light switch
	Sub	Vehicle speed sensor
Frequency of operation	Continuous	
Duration	GO and STOP 10 times	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
<b>The stop light switch remains on during GO and STOP 10 times.</b>		
GO and STOP are defined as follows;		
GO: Vehicle speed	30 km/h (19 mph) or more	-
STOP: Vehicle speed	-	Less than 3 km/h (2 mph)

## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
Brake switch status	ON stuck

## WIRING DIAGRAM

See page [DI-278](#) .

### INSPECTION PROCEDURE

1	Check stop light switch (See page <a href="#">BE-50</a> ).
---	--

NG	Replace stop light switch.
----	----------------------------

OK
----

2	Check harness and connector between ECM and stop light switch (See page <a href="#">IN-36</a> ).
---	--

NG	Repair or replace harness or connector.
----	---

OK
----

Check and replace ECM (See page <a href="#">IN-36</a> ).
--

<b>DTC</b>	<b>P0748</b>	<b>Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1)</b>
------------	--------------	--

### **CIRCUIT DESCRIPTION**

Shifting from 1st to 5th is performed in combination with ON and OFF of the shift solenoid valves S1, S2, SR, SL1 and SL2, controlled by ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

Fail Safe Function:

If either of the shift solenoid valve circuits develops an open or short, the ECM turns the other shift solenoid ON and OFF to shift to the gear positions shown in the table below.

Manual shifting as shown in the following table must be done (In the case of a short circuit, the ECM stops sending current to the short circuited solenoid).

◀: ON X: OFF

Position	NORMAL						S1 OFF						S2 OFF						SR OFF					
	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2
"R"	R	○	×	×	×	○	R	×	×	×	×	○	R	○	×	×	×	○	R	○	×	×	×	○
"D"	1 st	○	×	×	×	○	4 th ↓ 3 rd	×	×	○	×	○	1 st	○	×	×	×	○	1 st	○	×	×	×	○
	2 nd	○	○	×	×	○	3 rd	×	○	×	×	○	1 st ↓ 4 th	○	×	×	×	○	2 nd	○	○	×	×	○
	3 rd	×	○	×	×	○	3 rd	×	○	×	×	○	4 th	×	×	×	×	○	3 rd	×	○	×	×	○
	4 th	×	×	×	×	○	4 th	×	×	×	×	○	4 th	×	×	×	×	○	4 th	×	×	×	×	○
	5 th	×	×	○	○	×	5 th	×	×	○	○	×	5 th	×	×	○	○	×	4 th	×	×	×	○	×
"3"	1 st	○	×	×	×	○	3 rd ↓ 3 rd E/B	×	×	○	×	○	1 st	○	×	×	×	○	1 st	○	×	×	×	○
	2 nd	○	○	×	×	○	3 rd ↓ 3 rd E/B	×	○	×	×	○	1 st ↓ 3 rd E/B	○	×	×	×	○	2 nd	○	○	×	×	○
	3 rd E/B	×	○	×	×	×	3 rd E/B	×	○	×	×	×	3 rd E/B	×	×	×	×	×	3 rd E/B ↓ 3 rd	×	○	×	×	×
	4 th	×	×	○	×	○	4 th	×	×	○	×	○	4 th	×	×	○	×	○	3 rd	×	×	×	×	○
	5 th	×	×	○	○	×	5 th	×	×	○	○	×	5 th	×	×	○	○	×	3 rd E/B ↓ 3 rd	×	×	×	○	×
"2"	1 st	○	×	×	×	○	1 st	×	×	×	×	○	1 st	○	×	×	×	○	1 st	○	×	×	×	○
	2 nd E/B	○	○	○	×	×	3 rd E/B	×	○	○	×	×	2 nd E/B ↓ 4 th	○	×	○	×	×	2 nd	○	○	×	×	×
	3 rd E/B	×	○	○	×	×	3 rd E/B	×	○	○	×	×	Fail 4th	×	×	○	×	×	2 nd	×	○	×	×	×
	4 th	×	×	○	×	○	4 th	×	×	○	×	○	4 th	×	×	○	×	○	1 st ↓ 2 nd	×	×	×	×	○
	5 th	×	×	○	○	×	5 th	×	×	○	○	×	5 th	×	×	○	○	×	1 st E/B ↓ 2 nd	×	○	×	○	×
"L"	1 st E/B	○	×	×	×	×	1 st E/B	×	×	×	×	×	1 st E/B	○	×	×	×	×	1 st E/B	○	×	×	×	×
	2 nd E/B	○	○	○	×	×	3 rd E/B	×	○	○	×	×	2 nd E/B ↓ 4 th	○	×	○	×	×	2 nd	○	○	×	×	×
	3 rd E/B	×	○	○	×	×	3 rd E/B	×	○	○	×	×	Fail 4 th	×	×	○	×	×	2 nd	×	○	×	×	×
	4 th	×	×	○	×	○	4 th	×	×	○	×	○	4 th	×	×	○	×	○	1 st ↓ 2 nd	×	×	×	×	○
	5 th	×	×	○	○	×	5 th	×	×	○	○	×	5 th	×	×	○	○	×	1 st E/B ↓ 2 nd	×	×	×	○	×

◀: ON X: OFF

Position	S1 S2 OFF						S2 SR OFF						S1 SR OFF						S1 S2 SR OFF					
	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2	Gear	S1	S2	SR	SL1	SL2
"R"	R	X	X	X	X	O	R	O	X	X	X	O	R	X	X	X	X	O	R	X	X	X	X	O
"D"	4 th	X	X	X	X	O	1 st	O	X	X	X	O	4 th ↓ 3 rd	X	X	X	X	O	4 th	X	X	X	X	O
	4 th	X	X	X	X	O	1 st ↓ 4 th	O	X	X	X	O	3 rd	X	O	X	X	O	4 th	X	X	X	X	O
	4 th	X	X	X	X	O	4 th	X	X	X	X	O	3 rd	X	O	X	X	O	4 th	X	X	X	X	O
	4 th	X	X	X	X	O	4 th	X	X	X	X	O	4 th	X	X	X	X	O	4 th	X	X	X	X	O
	5 th	X	X	O	O	X	4 th	X	X	X	O	X	4 th	X	X	X	O	X	4 th	X	X	X	O	X
"3"	3 rd ↓ 3 rd E/B	X	X	X	X	O	1 st	O	X	X	X	O	3 rd	X	X	X	X	O	3 rd	X	X	X	X	O
	3 rd ↓ 3 rd E/B	X	X	X	X	O	1 st ↓ 3 rd	O	X	X	X	O	3 rd	X	O	X	X	O	3 rd	X	X	X	X	O
	3 rd E/B	X	X	X	X	X	3 rd E/B ↓ 3 rd	X	X	X	X	O	3 rd E/B ↓ 3 rd	X	O	X	X	O	3 rd E/B ↓ 3 rd	X	X	X	X	O
	4 th	X	X	O	X	O	3 rd	X	X	X	X	O	3 rd	X	X	X	X	O	3 rd	X	X	X	X	O
	5 th	X	X	O	O	X	1 st E/B ↓ 3 rd	X	X	X	O	X	3 rd E/B ↓ 3 rd	X	X	X	O	X	3 rd E/B ↓ 3 rd	X	X	X	O	X
"2"	1 st	X	X	X	X	O	1 st	O	X	X	X	O	1 st	X	X	X	X	O	1 st	X	X	X	X	O
	Fail 4 th	X	X	O	X	X	1 st E/B ↓ 1 st	O	X	X	X	O	2 nd	X	O	X	X	X	1 st E/B ↓ 1 st	X	X	X	X	O
	Fail 4 th	X	X	O	X	X	1 st E/B ↓ 1 st	X	X	X	X	O	2 nd	X	O	X	X	X	1 st E/B ↓ 1 st	X	X	X	X	O
	4 th	X	X	O	X	O	1 st	X	X	X	X	O	1 st ↓ 2nd	X	X	X	X	O	1 st	X	X	X	X	O
	5 th	X	X	O	O	X	1 st E/B ↓ 1 st	X	X	X	O	X	1 st E/B ↓ 2nd	X	X	X	O	X	1 st E/B ↓ 1 st	X	X	X	O	X
"L"	1 st E/B	X	X	X	X	X	1 st E/B	O	X	X	X	X	1 st E/B	X	X	X	X	X	1 st E/B	X	X	X	X	X
	Fail 4 th	X	X	O	X	X	1 st E/B ↓ 1 st	O	X	X	X	O	2 nd	X	O	X	X	X	1 st E/B ↓ 1 st	X	X	X	X	O
	Fail 4 th	X	X	O	X	X	1 st E/B ↓ 1 st	X	X	X	X	O	2 nd	X	O	X	X	X	1 st E/B ↓ 1 st	X	X	X	X	O
	4 th	X	X	O	X	O	1 st	X	X	X	X	O	1 st ↓ 2nd	X	X	X	X	O	1 st	X	X	X	X	O
	5 th	X	X	O	O	X	1 st E/B ↓ 1 st	X	X	X	O	X	1 st E/B ↓ 2nd	X	X	X	O	X	1 st E/B ↓ 1 st	X	X	X	O	X

## DIAGNOSTICS - AUTOMATIC TRANSMISSION

DTC No.	DTC Detection Condition	Trouble Area
P0748	ECM checks for an open or short circuit in shift solenoid valves SL1 (1-trip detection logic) (a) When solenoid, duty ratio equal to 100% (b) When solenoid is not energized, duty ratio is less than 3%	<ul style="list-style-type: none"> <li>⌘Open or short in shift solenoid valve SL1 circuit</li> <li>⌘Shift solenoid valve SL1</li> <li>⌘ECM</li> </ul>

## MONITOR DESCRIPTION

The ECM commands gearshift by turning the shift solenoid valves "ON/OFF". When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stores the DTC. And the ECM performs the fail-safe function and turns the other shift solenoid valves in good condition "ON/OFF" (In case of an open or short circuit, the ECM stops sending current to the circuit.).

## MONITOR STRATEGY

Related DTCs	P0748	Shift solenoid valve SL1/Range check
Required sensors/Components	Shift solenoid valve SL1	
Frequency of operation	Continuous	
Duration	1 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Battery voltage	10 V or more	-

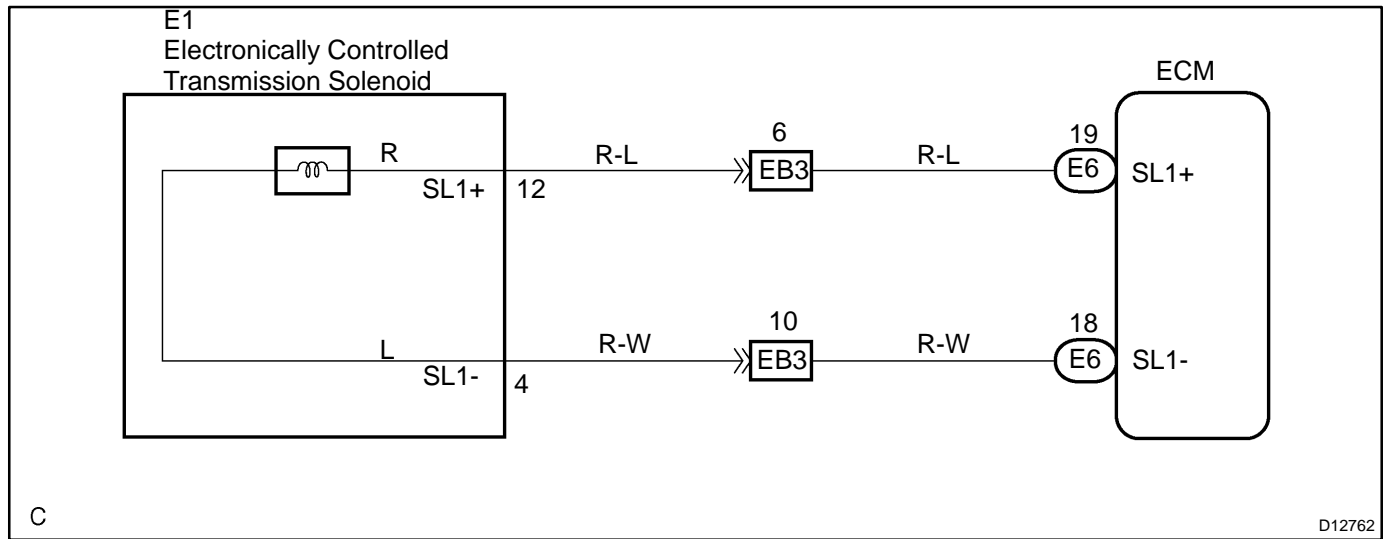
## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
Output signal duty	100%

## COMPONENT OPERATING RANGE

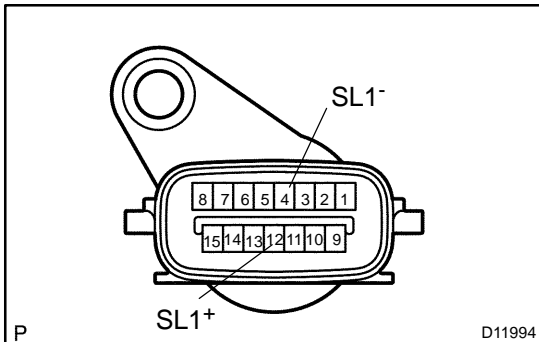
Parameter	Standard value
Output signal duty	Less than 100%

### WIRING DIAGRAM



## INSPECTION PROCEDURE

## 1 Check transmission wire.

**PREPARATION:**

Disconnect the transmission wire connector.

**CHECK:**

Measure resistance between SL1+ and SL1- of transmission wire.

**OK:**

Resistance: 5.0 to 5.6  $\Omega$  at 20°C (68°F)

**CHECK:**

Measure resistance between terminals SL1+ and SL1- of the transmission wire connector and body ground.

**OK:**

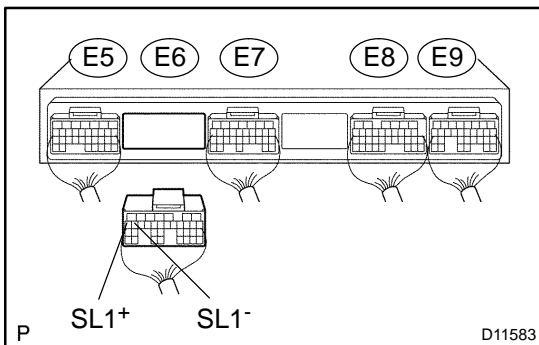
Resistance: 1 M $\Omega$  or higher

NG

Go to step 3.

OK

## 2 Measure resistance between terminal SL1+ and SL1- of ECM connector.

**PREPARATION:**

- Connect the transmission wire connector.
- Disconnect the connector of the ECM.

**CHECK:**

Measure resistance between terminals SL1+ and SL1- of ECM connector.

**OK:**

Resistance: 5.0 to 5.6  $\Omega$  at 20°C (68°F)

**CHECK:**

Measure resistance between terminals SL1+ and SL1- of the ECM connector and body ground.

**OK:**

Resistance: 1 M $\Omega$  or higher

NG

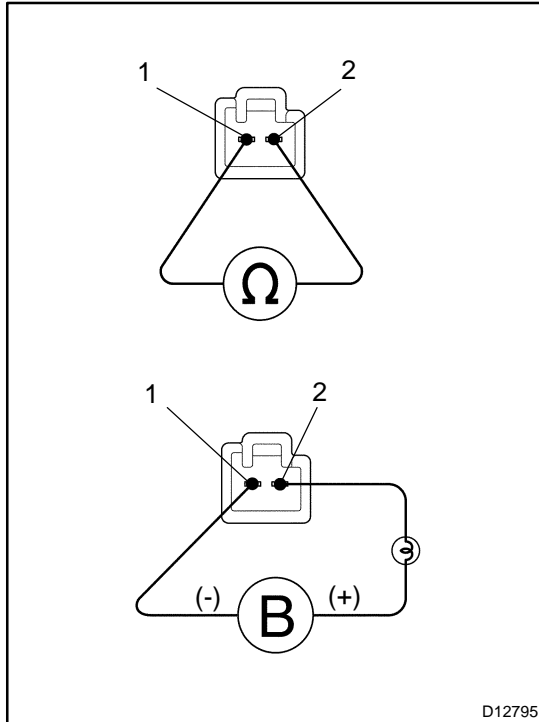
Repair or replace the harness or connector (See page [IN-36](#)).

OK

Check and replace the ECM (See page [IN-36](#)).



### 3 Check shift solenoid valve SL1.



#### **PREPARATION:**

- Jack up the vehicle.
- Remove the oil pan.
- Remove the shift solenoid valve SL1.

#### **CHECK:**

- Measure the resistance between terminals 1 and 2 of solenoid connector.

**Standard: 5.0 to 5.6  $\Omega$  at 20°C (68°F)**

- Connect the positive (+) lead with an 21 W bulb to terminal 2 of solenoid connector and negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

**Standard: Solenoid sounds operation noise.**

#### **OK:**

Standard

**NG**

**Replace the shift solenoid valve SL1  
(See page AT-8).**

**OK**

**Repair or replace the transmission wire  
(See page AT-6).**

<b>DTC</b>	<b>P0751</b>	<b>Shift Solenoid "A" Performance (Shift Solenoid Valve S1)</b>
------------	--------------	---

## SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor and direct clutch speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear). Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0751	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Shift solenoid valve S1 is stuck open or closed</li> <li>▶ Valve body is blocked up or stuck</li> <li>▶ Automatic transmission (clutch, brake or gear etc.)</li> </ul>

## MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". According to the input shaft revolution and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd, 4th or 5th gear position). When the gear position commanded by the ECM and the actual gear position are not same, the ECM illuminates the MIL.

## MONITOR STRATEGY

Related DTCs	P0751	Shift solenoid valve S1/OFF malfunction
		Shift solenoid valve S1/ON malfunction
Required sensors/Components	Main	Shift solenoid valve S1
	Sub	Vehicle speed sensor, Throttle position sensor, Speed sensor (NT), Speed sensor (NO)
Frequency of operation	Continuous	
Duration	OFF malfunction (A) and (B)	0.4 sec.
	OFF malfunction (C)	Immediate
	ON malfunction (A), (B) and (C)	0.4 sec.
	ON malfunction (D)	3 sec.
	ON malfunction (E)	0.5 sec.
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
<b>The following conditions are common to all conditions below: Off malfunction (A), (B), (C) and ON malfunction (A), (B), (C), (D), (E)</b>		
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	

Turbine speed sensor (NT) circuit	There is no malfunction in the circuits shown on the left.	
Output speed sensor (NO) circuit		
Shift solenoid "A" (S1) circuit		
Shift solenoid "B" (S2) circuit		
Shift solenoid "E" (SR) circuit		
Pressure control solenoid "A" (SL1) circuit		
Pressure control solenoid "B" (SL2) circuit		
ECT (Engine coolant temperature) sensor circuit		
KCS sensor circuit		
ETCS (Electric throttle control system)	Not system down	
Transmission shift position	"D"	
ECT	40°C (104°F) or more	-
Spark advance from Max. retard timing by KCS control	0° CA or more	-
Engine	Running	
Transfer range	"HIGH"*1	
<b>Transfer range "HIGH" *1 (This condition is applied only 4WD)</b>		
*1 Following conditions met		
Vehicle speed sensor "A" circuit	There is no malfunction in the circuits shown on the left.	
Output shaft speed sensor circuit		
Transfer output speed	143 rpm or more	-
NO/NOtf (Transfer input speed/Transfer output speed)	0.9 or more	Less than 1.1
<b>OFF malfunction (A)</b>		
ECM selected gear	1st	
Vehicle speed	2 km/h (1 mph) or more	Less than 40 km/h (25 mph)
Throttle valve opening angle	8% or more and 6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>OFF malfunction (B)</b>		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
Continuous time for ECM selecting 4th gear	2 sec. or more	-
Actual gear when ECM selected 4th gear	4th	
<b>OFF malfunction (C)</b>		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
<b>ON malfunction (A)</b>		
ECM selected gear	1st	
Vehicle speed	2 km/h (1 mph) or more	Less than 40 km/h (25 mph)
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>ON malfunction (B)</b>		
ECM selected gear	4th	
Vehicle speed	2 km/h (1 mph) or more	-

## DIAGNOSTICS - AUTOMATIC TRANSMISSION

Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>ON malfunction (C)</b>		
ECM selected gear	3rd	
Vehicle speed	2 km/h (1 mph) or more	-
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>ON malfunction (D)</b>		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
Vehicle speed (During transition from 4th to 5th gear)	-	Less than 100 km/h (62 mph)
<b>ON malfunction (E)</b>		
ECM selected gear	5th	
Engine speed - Turbine speed (NE - NT) (After transition from 4th to 5th gear)	-	150 rpm
Vehicle speed (After transition from 4th to 5th gear)	-	Less than 100 km/h (62 mph)

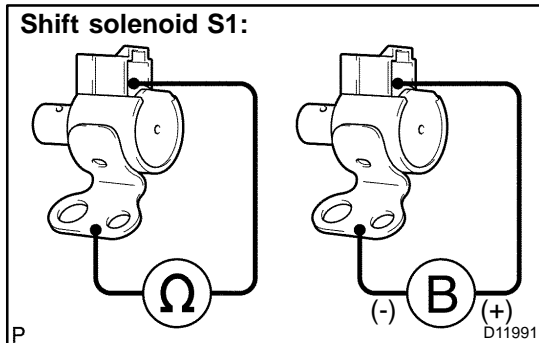
## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
<b>[OFF malfunction]</b>	
<b>All of the following conditions are met: Condition (A), (B) and (C)</b>	
It is necessary 2 detections/one drive cycle 1st detection; temporary flag ON 2nd detection; pending fault code ON	
<b>OFF malfunction (A)</b>	
Turbine speed/Output speed (NT/NO)	0.93 or more and 1.07 or less
<b>OFF malfunction (B)</b>	
Turbine speed/Output speed (NT/NO)	0.65 or more and 0.79 or less
<b>OFF malfunction (C)</b>	
Output record from ECM for 4th → 5th upshifting	Recorded
<b>[ON malfunction]</b>	
<b>Either of the following conditions is met:</b>	
▶ON malfunction (A) and (B)	
▶ON malfunction (B) or (C), and ON malfunction (D) or (E)	
<b>ON malfunction (A) and (B)</b>	
Turbine speed/Output speed (NT/NO)	3.30 or more and 7.50 or less
<b>ON malfunction (C)</b>	
Turbine speed/Output speed (NT/NO)	1.91 or more and 2.35 or less
<b>ON malfunction (D)</b>	

Turbine speed - Output speed x 4th gear ratio (NT - NO x 4th gear ratio)	1,000 rpm or more
<b>ON malfunction (E)</b>	
Turbine speed - Output speed x 5th gear ratio (NT - NO x 5th gear ratio)	1,000 rpm or more

## INSPECTION PROCEDURE

<b>1</b>	<b>Check shift solenoid valve S1 operation.</b>
----------	---



### PREPARATION:

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Remove the shift solenoid valve S1.

### CHECK:

Measure the resistance between the solenoid connector terminal and the body ground.

### OK:

**Resistance: 11 to 15  $\Omega$  at 20°C (68°F)**

### CHECK:

Connect the battery positive lead to the solenoid connector terminal and the battery negative lead to the solenoid body ground.

### OK:

**Solenoid sounds operation noise.**

**NG**

**Replace shift solenoid valve S1 (See page AT-8).**

**OK**

<b>2</b>	<b>Check valve body (See page DI-396).</b>
----------	--

**NG**

**Repair or replace valve body.**

**OK**

**Repair or replace transmission (See page AT-30).**

<b>DTC</b>	<b>P0756</b>	<b>Shift Solenoid "B" Performance (Shift Solenoid Valve S2)</b>
------------	--------------	---

## SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor and direct clutch speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear). Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0756	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Shift solenoid valve S2 is stuck open or closed</li> <li>▶ Valve body is blocked up or stuck</li> <li>▶ Automatic transmission (clutch, brake or gear etc.)</li> </ul>

## MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". According to the input shaft revolution and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd, 4th or 5th gear position). When the gear position commanded by the ECM and the actual gear position are not same, the ECM illuminates the MIL.

## MONITOR STRATEGY

Related DTCs	P0756	Shift solenoid valve S2/OFF malfunction
		Shift solenoid valve S2/ON malfunction
Required sensors/Components	Main	Shift solenoid valve S2
	Sub	Vehicle speed sensor, Throttle position sensor, Speed sensor (NT), Speed sensor (NO)
Frequency of operation	Continuous	
Duration	OFF malfunction (A), (B), (C)	0.4 sec.
	OFF malfunction (D)	Immediate
	ON malfunction (A) and (B)	0.4 sec.
	ON malfunction (C)	3 sec.
	ON malfunction (D)	0.5 sec.
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
<b>The following conditions are common to all conditions below: OFF malfunction (A), (B), (C), (D) and ON malfunction (A), (B), (C), (D)</b>		
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	

Turbine speed sensor (NT) circuit	There is no malfunction in the circuits shown on the left.	
Output speed sensor (NO) circuit		
Shift solenoid "A" (S1) circuit		
Shift solenoid "B" (S2) circuit		
Shift solenoid "E" (SR) circuit		
Pressure control solenoid "A" (SL1) circuit		
Pressure control solenoid "B" (SL2) circuit		
ECT (Engine coolant temperature) sensor circuit		
KCS sensor circuit		
ETCS (Electric throttle control system)	Not system down	
Transmission shift position	"D"	
ECT	40°C (104°F) or more	-
Spark advance from Max. retard timing by KCS control	0° CA or more	-
Engine	Running	
Transfer range	"HIGH"*1	
<b>Transfer range "HIGH" *1 (This condition is applied only 4WD)</b>		
*1 Following conditions met		
Vehicle speed sensor "A" circuit	There is no malfunction in the circuits shown on the left.	
Output shaft speed sensor circuit		
Transfer output speed	143 rpm or more	-
NO/NOtf (Transfer input speed/Transfer output speed)	0.9 or more	Less than 1.1
<b>OFF malfunction (A)</b>		
ECM selected gear	1st	
Vehicle speed	2 km/h (1 mph) or more	Less than 40 km/h (25 mph)
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>OFF malfunction (B)</b>		
ECM selected gear	2nd	
Vehicle speed	2 km/h (1 mph) or more	-
Output speed	2nd → 1st down shift point or more	-
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>OFF malfunction (C)</b>		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
Continuous time for ECM selecting 4th gear	2 sec. or more	-
Actual gear when ECM selected 4th gear	4th	
<b>OFF malfunction (D)</b>		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
<b>ON malfunction (A)</b>		
ECM selected gear	1st	
Vehicle speed	2 km/h (1 mph) or more	Less than 40 km/h (25 mph)

## DIAGNOSTICS - AUTOMATIC TRANSMISSION

Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>ON malfunction (B)</b>		
ECM selected gear	4th	
Vehicle speed	2 km/h (1 mph) or more	-
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>ON malfunction (C)</b>		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
Vehicle speed (During transition from 4th to 5th gear)	-	Less than 100 km/h (62 mph)
<b>ON malfunction (D)</b>		
ECM selected gear	5th	
Engine speed - Turbine speed (NE - NT) (After transition from 4th to 5th gear)	-	Less than 150 rpm
Vehicle speed (After transition from 4th to 5th gear)	-	Less than 100 km/h (62 mph)

## TYPICAL MALFUNCTION THRESHOLDS

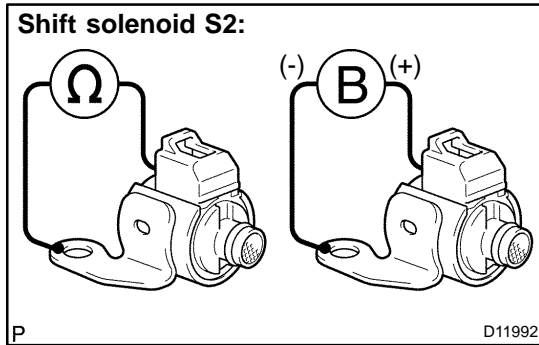
Detection criteria	Threshold
<b>[OFF malfunction]</b>	
<b>All of the following conditions are met: Condition (A), (B), (C) and (D)</b>	
It is necessary 2 detections/one drive cycle 1st detection; temporary flag ON 2nd detection; pending fault code ON	
<b>OFF malfunction (A) and (B)</b>	
Turbine speed/Output speed (NT/NO)	3.30 or more and 7.50 or less
<b>OFF malfunction (C)</b>	
Turbine speed/Output speed (NT/NO)	0.65 or more and 0.79 or less
<b>OFF malfunction (D)</b>	
Output record from ECM for 4th → 5th upshifting	Recorded
<b>[ON malfunction]</b>	
<b>Both of the following conditions are met: ON malfunction (A) or (B), and ON malfunction (C) or (D)</b>	
<b>ON malfunction (A)</b>	
Turbine speed/Output speed (NT/NO)	1.91 or more and 2.35 or less
<b>ON malfunction (B)</b>	
Turbine speed/Output speed (NT/NO)	1.28 or more and 1.53 or less
<b>ON malfunction (C)</b>	
Turbine speed - Output speed x 4th gear ratio (NT - NO x 4th gear ratio)	1,000 rpm or more



<b>ON malfunction (E)</b>	
Turbine speed - Output speed x 5th gear ratio (NT - NO x 5th gear ratio)	1,000 rpm or more

## INSPECTION PROCEDURE

<b>1</b>	<b>Check shift solenoid valve S2 operation.</b>
----------	---



### **PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Remove the shift solenoid valve S2.

### **CHECK:**

Measure the resistance between the solenoid connector terminal and the body ground.

### **OK:**

**Resistance: 11 to 15 Ω at 20°C (68°F)**

### **CHECK:**

Connect the battery positive lead to the solenoid connector terminal and the battery negative lead to the solenoid body ground.

### **OK:**

**Solenoid sounds operation noise.**

**NG**

**Replace shift solenoid valve S2 (See page [AT-8](#)).**

**OK**

<b>2</b>	<b>Check valve body (See page <a href="#">DI-396</a>).</b>
----------	--

**NG**

**Repair or replace valve body.**

**OK**

**Repair or replace transmission (See page [AT-30](#)).**

<b>DTC</b>	<b>P0771</b>	<b>Shift Solenoid "E" Performance (Shift Solenoid Valve SR)</b>
------------	--------------	---

## SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor and direct clutch speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear). Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0771	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Shift solenoid valve SR is stuck open or closed</li> <li>▶ Shift solenoid valve SL1 is stuck open or closed</li> <li>▶ Valve body is blocked up or stuck</li> <li>▶ Automatic transmission (clutch, brake or gear etc.)</li> </ul>

## MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". According to the input shaft revolution and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd, 4th or 5th gear position). When the gear position commanded by the ECM and the actual gear position are not same, the ECM illuminates the MIL and stores the DTC.

## MONITOR STRATEGY

Related DTCs	P0771	Shift solenoid valve SR/Rationality check
Required sensors/Components	Main	Shift solenoid valve SR
	Sub	Speed sensor (NT), Speed sensor (NO), Crankshaft position sensor (NE)
Frequency of operation	Continuous	
Duration	OFF malfunction (A)	0.4 sec.
	OFF malfunction (B) and (C)	Immediate
	ON malfunction	0.15 sec.
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
<b>The following items are common to all condition below: OFF malfunction (A), (B), (C) and ON malfunction</b>		
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	

Turbine speed sensor (NT) circuit	There is no malfunction in the circuits shown on the left.	
Output speed sensor (NO) circuit		
Shift solenoid "A" (S1) circuit		
Shift solenoid "B" (S2) circuit		
Shift solenoid "E" (SR) circuit		
Pressure control solenoid "A" (SL1) circuit		
Pressure control solenoid "B" (SL2) circuit		
ECT (Engine coolant temperature) sensor circuit		
KCS sensor circuit		
ETCS (Electric throttle control system)		
Transmission shift position	"D"	
ECT	40°C (104°F) or more	-
Spark advance from Max. retard timing by KCS control	0° CA or more	-
Engine	Running	
Transfer range	"HIGH"*1	
<b>Transfer range "HIGH" *1 (This condition is applied only 4WD)</b>		
*1 Following conditions met		
Vehicle speed sensor "A" circuit	There is no malfunction in the circuits shown on the left.	
Output shaft speed sensor circuit		
Transfer output speed	143 rpm or more	-
NO/NOtf (Transfer input speed/Transfer output speed)	0.9 or more	Less than 1.1
<b>OFF malfunction (A)</b>		
ECM selected gear	5th	
Vehicle speed	2 km/h (1 mph)	-
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>OFF malfunction (B)</b>		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
Continuous time for ECM selecting 4th gear	2 sec. or more	-
<b>OFF malfunction (C)</b>		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
<b>ON malfunction</b>		
Current ECM selected gear	2th	
Last ECM selected gear	1st	
Throttle valve opening angle (During transition from 1st to 2nd gear)	4.5% or more at 2,000 rpm (conditions vary with turbine speed)	-

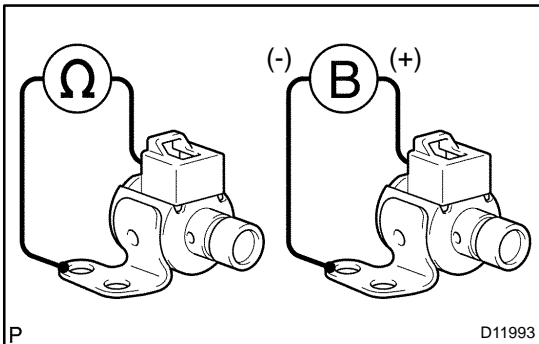
## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
<b>[OFF malfunction]</b>	
<b>All of the following conditions are met: OFF malfunction (A), (B) and (C)</b>	

It is necessary 2 detections/one drive cycle 1st detection; temporary flag ON 2nd detection; temporary pending fault code ON	
<b>OFF malfunction (A)</b>	
Turbine speed/Output speed (NT/NO)	0.93 or more and 1.07 or less
<b>OFF malfunction (B)</b>	
Turbine speed/Output speed (NT/NO)	Not change as follow 0.93 or more and 1.07 or less ↓ 0.65 or more and 0.79 or less
<b>OFF malfunction (C)</b>	
Output record from ECM for 4th → 5th upshifting	Recorded
<b>[ON malfunction]</b>	
It is necessary 2 detections/one drive cycle 1st detection; temporary flag ON 2nd detection; temporary pending fault code ON	
Turbine speed - Output speed x 1st gear ratio (NT - NO x 1st gear ratio)	150 rpm or more

**INSPECTION PROCEDURE**

<b>1</b>	<b>Check shift solenoid valve SR operation.</b>
----------	---



**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Remove the shift solenoid valve SR.

**CHECK:**

Measure the resistance between the solenoid connector terminal and the body ground.

**OK:**

**Resistance: 11 to 15 Ω at 20°C (68°F)**

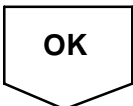
**CHECK:**

Connect the battery positive lead to the solenoid connector terminal and the battery negative lead to the solenoid body ground.

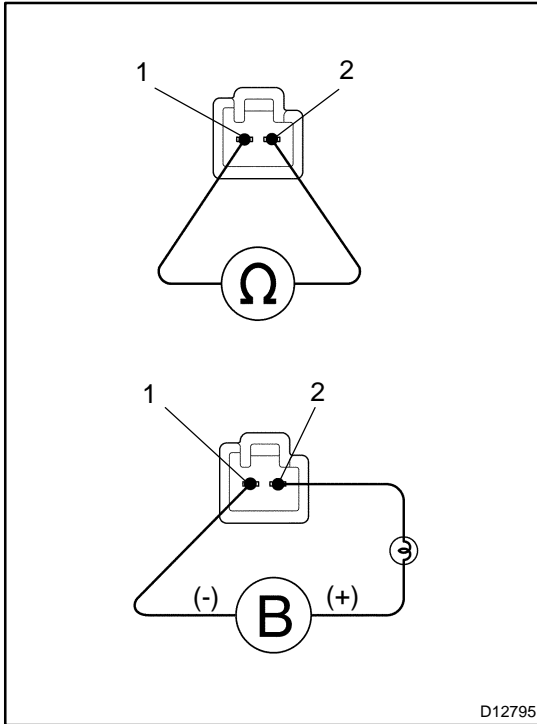
**OK:**

**Solenoid sounds operation noise.**

<b>NG</b>	<b>Replace shift solenoid valve SR (See page AT-8).</b>
-----------	---



## 2 Check shift solenoid valve SL1 operation.



### **PREPARATION:**

Remove the shift solenoid valve SL1.

### **CHECK:**

- (a) Measure the resistance between terminals 1 and 2 of solenoid connector.

**Standard: 5.0 to 5.6  $\Omega$  at 20°C (68°F)**

- (b) Connect the positive (+) lead with an 21 W bulb to terminal 2 of solenoid connector and negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

**Standard: Solenoid sounds operation noise.**

### **OK:**

Standard

**NG**

Replace shift solenoid valve SL1 (See page [AT-8](#)).

**OK**

## 3 Check valve body (See page [DI-396](#)).

**NG**

Repair or replace valve body (See page [AT-8](#)).

**OK**

Repair or replace transmission (See page [AT-30](#)).

<b>DTC</b>	<b>P0776</b>	<b>Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)</b>
------------	--------------	---

## SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor and direct clutch speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear). Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0776	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> <li>⌘ Shift solenoid valve SL2 is stuck open or closed</li> <li>⌘ Valve body is blocked up or stuck</li> <li>⌘ Automatic transmission (clutch, brake or gear etc.)</li> </ul>

## MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". According to the input shaft revolution and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd, 4th or 5th gear position). When the gear position commanded by the ECM and the actual gear position are not same, the ECM illuminates the MIL and stores the DTC.

## MONITOR STRATEGY

Related DTCs	P0776	Shift solenoid valve SL2/ON malfunction
Required sensors/Components	Main	Shift solenoid valve SL2
	Sub	Speed sensor (NT), Speed sensor (NO), Crankshaft position sensor (NE)
Frequency of operation	Continuous	
Duration	ON malfunction (A), (B) and (C)	0.4 sec.
	ON malfunction (D)	3 sec.
	ON malfunction (E)	0.5 sec.
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
<b>The following items are common to all condition below: ON malfunction (A), (B), (C), (D) and (E)</b>		
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Turbine speed sensor (NT) circuit	There is no malfunction in the circuits shown on the left.	
Output speed sensor (N) circuit		
Shift solenoid "A" (S1) circuit		
Shift solenoid "B" (S2) circuit		
Shift solenoid "E" (SR) circuit		
Pressure control solenoid "A" (SL1) circuit		
Pressure control solenoid "B" (SL2) circuit		
ECT (Engine coolant temperature) sensor circuit		
KCS sensor circuit		
ETCS (Electric throttle control system)		
Transmission shift position	"D"	
ECT	40°C (104°F) or more	-
Spark advance from Max. retard timing by KCS control	0° CA or more	-
Engine	Running	
Transfer range	"HIGH"*1	
<b>Transfer range "HIGH" *1 (This condition is applied only 4WD)</b>		
*1 Following conditions met		
Vehicle speed sensor "A" circuit	There is no malfunction in the circuits shown on the left.	
Output shaft speed sensor circuit		
Transfer output speed	143 rpm or more	-
NO/NOt (Transfer input speed/Transfer output speed)	0.9 or more	Less than 1.1
<b>ON malfunction (A)</b>		
ECM selected gear	1st	
Vehicle speed	2 km/h (1 mph) or more	Less than 40 km/h (25 mph)
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>ON malfunction (B)</b>		
ECM selected gear	3rd	
Vehicle speed	2 km/h (1 mph)	-
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>ON malfunction (C)</b>		
ECM selected gear	4th	
Vehicle speed	2 km/h (1 mph) or more	-
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>ON malfunction (D)</b>		
Current ECM selected gear	5th	

## DIAGNOSTICS - AUTOMATIC TRANSMISSION

Last ECM selected gear	4th	
Vehicle speed (During transition from 4th to 5th gear)	-	Less than 100 km/h (62 mph)
<b>ON malfunction (E)</b>		
ECM selected gear	5th	
Engine speed - Turbine speed (NE - NT) (After transition from 4th to 5th gear)	-	Less than 150 rpm
Vehicle speed (After transition from 4th to 5th gear)	-	Less than 100 km/h (62 mph)

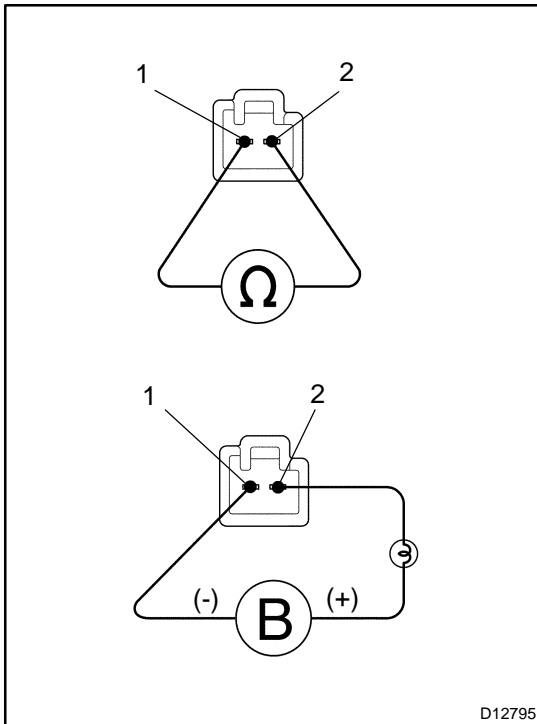
## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
<b>Both of the following conditions are met:</b> * <b>ON malfunction (A) and (B), or ON malfunction (C)</b> * <b>ON malfunction (D) or (E)</b>	
<b>ON malfunction (A)</b>	
Turbine speed/Output speed (NT/NO)	3.30 or more and 7.50 or less
<b>ON malfunction (B)</b>	
Turbine speed/Output speed (NT/NO)	1.28 or more and 1.53 or less
<b>ON malfunction (C)</b>	
Turbine speed/Output speed (NT/NO)	0.93 or more and 1.07 or less
<b>ON malfunction (D)</b>	
Turbine speed - Output speed x 4th gear ratio (NT - NO x 4th gear ratio)	1,000 rpm or more
<b>ON malfunction (E)</b>	
Turbine speed - Output speed x 5th gear ratio (NT - NO x 5th gear ratio)	1,000 rpm or more



## INSPECTION PROCEDURE

## 1 Check shift solenoid valve SL2 operation.

**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Remove the shift solenoid valve SL2.

**CHECK:**

- (a) Measure the resistance between terminals 1 and 2 of solenoid connector.

**Standard: 5.0 to 5.6 Ω at 20°C (68°F)**

- (b) Connect the positive (+) lead with an 21 W bulb to terminal 2 of solenoid connector and negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

**Standard: Solenoid sounds operation noise.**

**OK:**

Standard

NG

Replace shift solenoid valve SL2 (See page [AT-8](#)).

OK

2 Check valve body (See page [DI-396](#)).

NG

Repair or replace valve body (See page [AT-8](#)).

OK

Repair or replace transmission  
(See page [AT-30](#)).

<b>DTC</b>	<b>P0778</b>	<b>Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2)</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

See page [DI-426](#) .

DTC No.	DTC Detection Condition	Trouble Area
P0778	ECM checks for an open or short circuit in shift solenoid valves SL2 (1-trip detection logic) (a) When solenoid is energized, duty ratio exceed 75% (b) When solenoid is not energized, duty ratio is less than 3%	<ul style="list-style-type: none"> <li>▶ Open or short in shift solenoid valve SL2 circuit</li> <li>▶ Shift solenoid valve SL2</li> <li>▶ ECM</li> </ul>

## MONITOR DESCRIPTION

The ECM commands gearshift by turning the shift solenoid valves "ON/OFF". When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stores the DTC. And the ECM performs the fail-safe function and turns the other shift solenoid valves in good condition "ON/OFF" (In case of an open or short circuit, the ECM stops sending current to the circuit.) (see page [DI-426](#) ).

## MONITOR STRATEGY

Related DTCs	P0778	Shift solenoid valve SL2/Range check
Required sensors/Components	Shift solenoid valve SL2	
Frequency of operation	Continuous	
Duration	1 sec.	
MIL operation	1 driving cycle	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Battery voltage	10 V or more	-

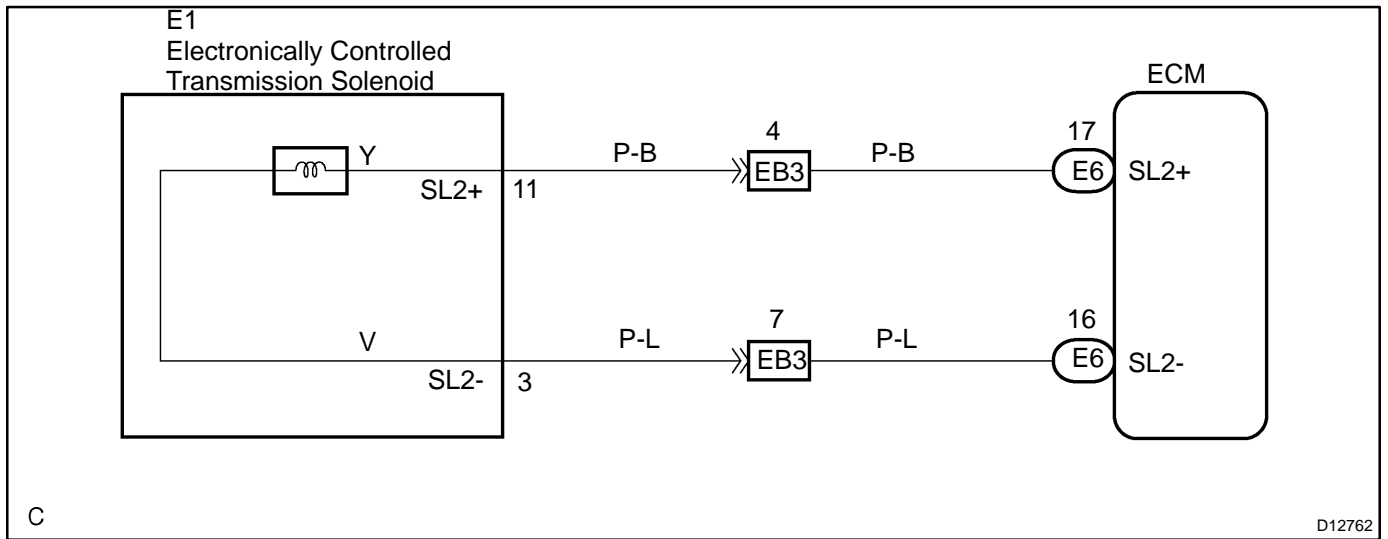
## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
Output signal duty	100%

## COMPONENT OPERATING RANGE

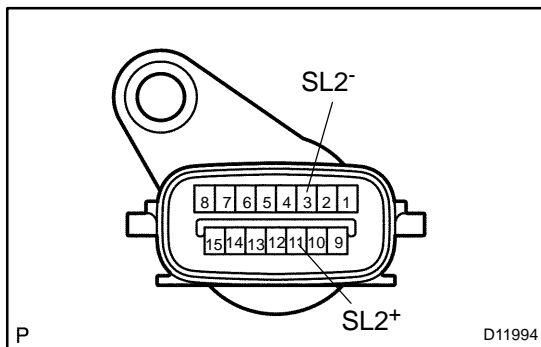
Parameter	Standard value
Output signal duty	Less than 100%

### WIRING DIAGRAM



### INSPECTION PROCEDURE

1	<b>Check transmission wire.</b>
---	---------------------------------



**PREPARATION:**

Disconnect the transmission wire connector.

**CHECK:**

Measure resistance between SL2+ and SL2- of transmission wire.

**OK:**

**Resistance: 5.0 to 5.6 Ω at 20°C (68°F)**

**CHECK:**

Measure resistance between terminals SL2+ and SL2- of the transmission wire connector and body ground.

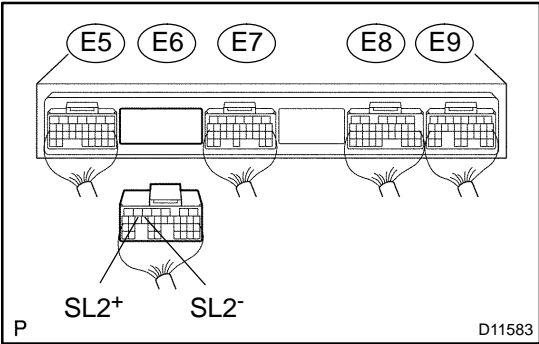
**OK:**

**Resistance: 1 MΩ or higher**

<b>NG</b>	<b>Go to step 3.</b>
-----------	----------------------

<b>OK</b>
-----------

**2 Measure resistance between terminal SL2<sup>+</sup> and SL2<sup>-</sup> of ECM connector.**



**PREPARATION:**

- (a) Connect the transmission wire connector.
- (b) Disconnect the connector of the ECM.

**CHECK:**

Measure resistance between terminals SL2<sup>+</sup> and SL2<sup>-</sup> of ECM connector.

**OK:**

**Resistance: 5.0 to 5.6 Ω at 20°C (68°F)**

**CHECK:**

Measure resistance between terminals SL2<sup>+</sup> and SL2<sup>-</sup> of the ECM connector and body ground.

**OK:**

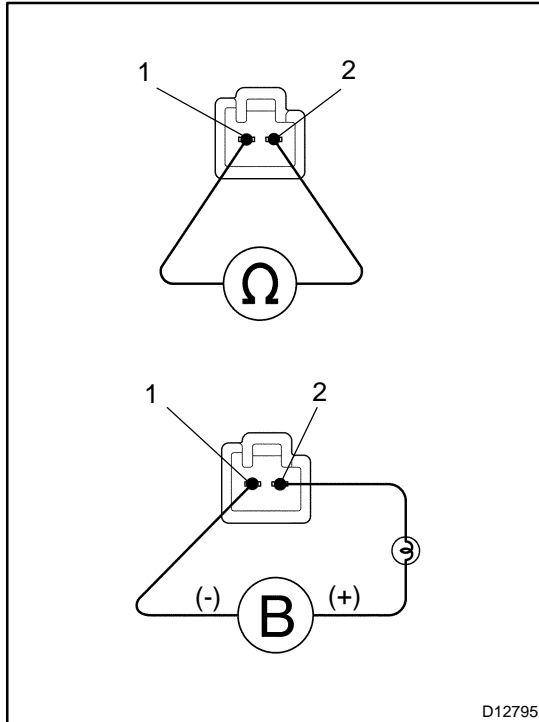
**Resistance: 1 MΩ or higher**

**NG** → **Repair or replace the harness or connector (See page IN-36).**

**OK**

**Check and replace the ECM (See page IN-36).**

### 3 Check shift solenoid valve SL2.

**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Remove the shift solenoid valve SL2.

**CHECK:**

- (a) Measure the resistance between terminals 1 and 2 of solenoid connector.

**Standard: 5.0 to 5.6  $\Omega$  at 20°C (68°F)**

- (b) Connect the positive (+) lead with an 21 W bulb to terminal 2 of solenoid connector and negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

**Standard: Solenoid sounds operation noise.**

**OK:**

Standard

**NG**

**Replace the shift solenoid valve SL2  
(See page AT-8).**

**OK**

**Repair or replace the transmission wire  
(See page AT-6).**

<b>DTC</b>	<b>P0781</b>	<b>1-2 Shift</b>
------------	--------------	------------------

## SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor and direct clutch speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear). Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transmission (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0781	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Valve body is blocked up or stuck (1-2 shift)</li> <li>▶ Automatic transmission assembly</li> <li>▶ ECM</li> </ul>

## MONITOR DESCRIPTION

The ECM calculates the "actual" transmission gear by comparing the signals from the input speed sensor and the output speed sensor. The ECM can detect many mechanical problems in the shift solenoids, valve body, and the transmission clutches, brakes, and gears. If the ECM detects that the actual gear position and the commanded gear position are different, it will illuminate the MIL and store the DTC.

## MONITOR STRATEGY

Related DTCs	P0781	Valve body/Rationality check
Required sensors/Components	Main	Valve body
	Sub	Automatic transmission assembly, Speed sensor (NT), Speed sensor (NO), Vehicle speed sensor, Throttle speed sensor
Frequency of operation	Continuous	
Duration	Condition (A) and (B)	0.4 sec.
	Condition (C)	3 sec.
	Condition (D)	0.5 sec.
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
<b>The Following items are common to all conditions below: Condition (A), (B), (C) and (D)</b>		
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Turbine speed sensor (NT) circuit	There is no malfunction in the circuits shown on the left.	
Output speed sensor (NO) circuit		
Shift solenoid "A" (S1) circuit		
Shift solenoid "B" (S2) circuit		
Shift solenoid "E" (SR) circuit		
Pressure control solenoid "A" (SL1) circuit		
Pressure control solenoid "B" (SL2) circuit		
ECT (Engine coolant temperature) sensor circuit		
KCS sensor circuit		
ETCS (Electric throttle control system)		
Transmission shift position	"D"	
ECT	40°C (104°F) or more	-
Spark advance from Max. retard timing by KCS control	0° CA or more	-
Engine	Running	
Transfer range	"HIGH"*1	
<b>Transfer range "HIGH" *1 (This condition is applied only 4WD)</b>		
*1 Following conditions met		
Vehicle speed sensor "A" circuit	There is no malfunction in the circuits shown on the left.	
Output shaft speed sensor circuit		
Transfer output speed	143 rpm or more	-
NO/NOtf (Transfer input speed/Transfer output speed)	0.9 or more	Less than 1.1
<b>Condition (A)</b>		
ECM selected gear	2nd	
Vehicle speed	2 km/h (1 mph) or more	-
Output speed	2nd → 1st down shift point or more	-
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>Condition (B)</b>		
ECM selected gear	4th	
Vehicle speed	2 km/h (1 mph) or more	-
Throttle valve opening angle	6.5% or more at 2,000 rpm (conditions vary with engine speed)	-
<b>Condition (C)</b>		
Current ECM selected gear	5th	
Last ECM selected gear	4th	
Vehicle speed (During transition from 4th to 5th gear)	-	Less than 100 km/h (62 mph)
<b>Condition (D)</b>		

ECM selected gear	5th	
Engine speed - Turbine speed (NE - NT) (After transition from 4th to 5th gear)	-	Less than 150 rpm
Vehicle speed (After transition from 4th to 5th gear)	-	Less than 100 km/h (62 mph)

**TYPICAL MALFUNCTION THRESHOLDS**

Detection criteria	Threshold
<b>Both of the following conditions are met: Condition (A), and Condition (B), (C) or (D)</b>	
<b>Condition (A)</b>	
Turbine speed/Output speed (NT/NO)	3.30 or more and 7.50 or less
<b>Condition (B)</b>	
Turbine speed/Output speed (NT/NO)	1.28 or more and 1.53 or less
<b>Condition (C)</b>	
Turbine speed - Output speed x 4th gear ratio (NT - NO x 4th gear ratio)	1,000 rpm or more
<b>Condition (D)</b>	
Turbine speed - Output speed x 5th gear ratio (NT - NO x 5th gear ratio)	1,000 rpm or more

**INSPECTION PROCEDURE**

<b>1</b>	<b>Check other DTCs output (in addition to DTC P0781).</b>
----------	--

**PREPARATION:**

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the OBD II scan tool or hand-held tester to the DLC3.
- (d) Turn the ignition switch to the ON position.
- (e) Push the "ON" button of the OBD II scan tool or the hand-held tester.
- (f) Select the item "DIAGNOSIS/ENHANCED OBD II/DTC INFO/CURRENT CODES".

**CHECK:**

Read the DTCs using the OBD II scan tool or the hand-held tester.

**RESULT:**

Display (DTC output)	Proceed to
Only "P0781" is output	A
"P0781" and other DTCs	B

**HINT:**

If any other codes besides "P0781" is output, perform the troubleshooting for those DTCs first.

**B**

**Go to relevant DTC chart (See page [DI-389](#))**

**A**



<b>2</b>	<b>Clear the DTC and running test (See page <a href="#">DI-361</a> ).</b>
----------	---

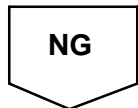
**CHECK:**

Clear the DTC again, and check DTC again after conducting the running test.

**OK:**

**Normal code**

<b>OK</b>	<b>END</b>
-----------	------------



**Repair or replace valve body (See page [AT-8](#) ).**

<b>DTC</b>	<b>P0818</b>	<b>Driveline Disconnect Switch Input Circuit</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

The ECM detects the signal from the transfer neutral position switch.

This DTC indicates that the transfer neutral position switch remains ON.

DTC No.	DTC Detecting Condition	Trouble Area
P0818	Transfer neutral position switch remains ON while vehicle running under conditions for 30 sec. (2-trip detection logic) ▶ Vehicle speed is 25 km/h or more ▶ Transfer shift position is H	▶ Short in transfer neutral position switch circuit ▶ Transfer neutral position switch ▶ ECM

## MONITOR DESCRIPTION

The ECM detects whether or not the transfer gear is in the neutral position by monitoring the signal from the transfer neutral position switch.

If the ECM detects that the transfer-case is in neutral under the following conditions, the ECM will conclude that there is a malfunction of the transfer-case neutral position switch:

- ▶ Transfer-case neutral position switch indicates that the transfer-case is in neutral.
- ▶ Transfer-case shifter is in the "H" position.
- ▶ The vehicle is traveling at 25 km/h (16 mph) or more.
- ▶ The neutral switch has been ON for more than thirty seconds.

If all of the above conditions are detected, the ECM will conclude that there is a malfunction of the transfer-case neutral position switch, illuminate the MIL and store the DTC.

## MONITOR STRATEGY

Related DTCs	P0818	Transfer neutral position switch/Verify switch cycling
Required sensors/Components	Main	Transfer neutral position switch
	Sub	Vehicle speed sensor
Frequency of operation	Continuous	
Duration	30 sec.	
MIL operation	2 driving cycles	
Sequence of operation	None	

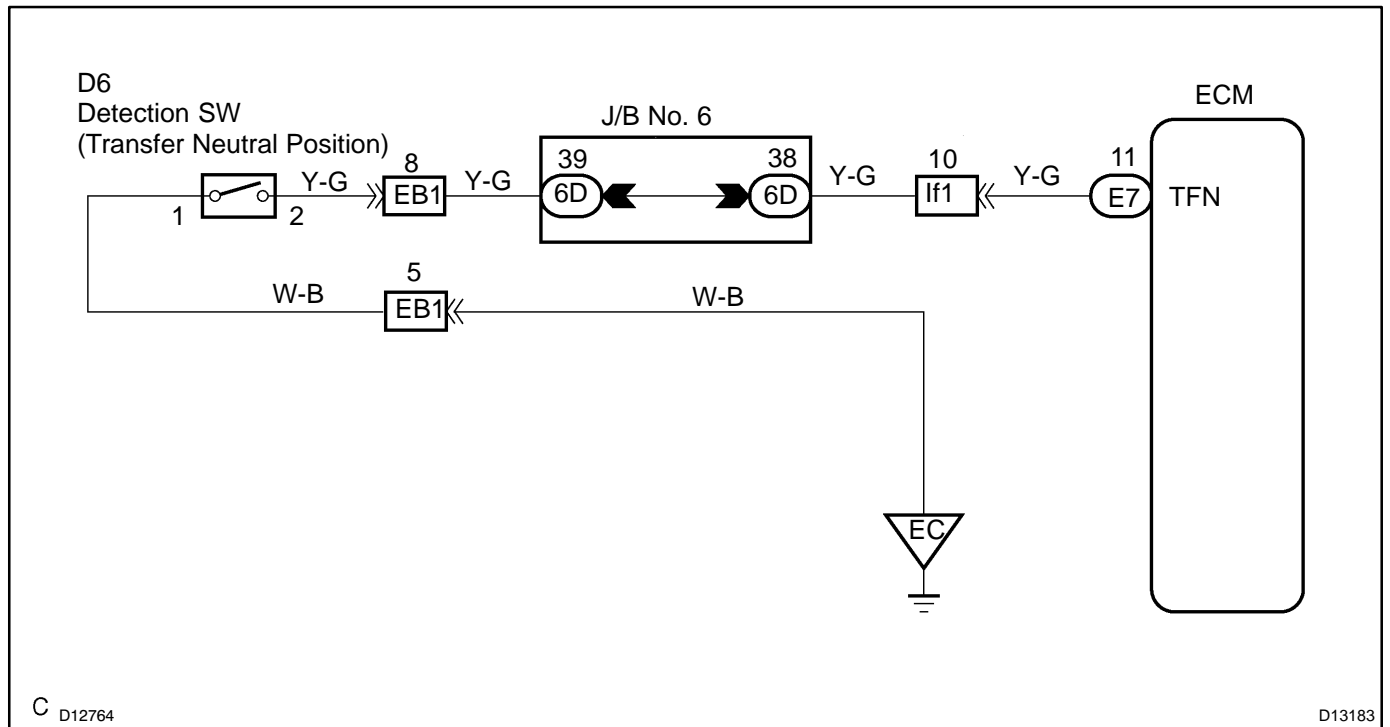
## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Vehicle speed	25 km/h (16 mph) or more	-
Transfer position	High	
Ignition switch ON and time after OFF to ON	0.5 sec. or more	-

## TYPICAL MALFUNCTION THRESHOLDS

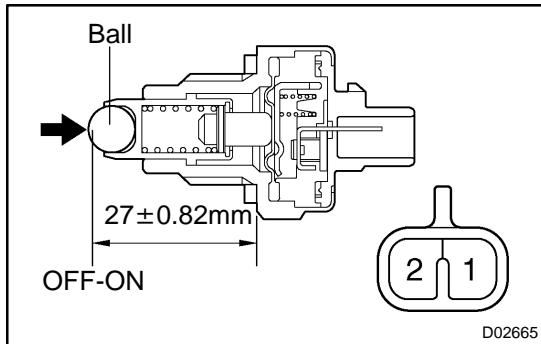
Detection criteria	Threshold
Transfer neutral switch signal	ON

### WIRING DIAGRAM



## INSPECTION PROCEDURE

**1** Check transfer neutral position switch.



**PREPARATION:**

Remove the transfer neutral position switch.

**CHECK:**

Check the continuity between the switch terminals when pushing the ball at the tip of the switch.

**OK:**

Switch	Specified condition
Push	Continuity
Free	No continuity

**NG** Replace transfer neutral position switch.

**OK**

**2** Check harness and connector between ECM and transfer neutral position switch, transfer neutral position switch and body ground (See page [IN-36](#) ).

**NG** Repair or replace the harness or connector.

**OK**

Check and replace the ECM (See page [IN-36](#) ).

<b>DTC</b>	<b>P0973</b>	<b>Shift Solenoid "A" Control Circuit Low (Shift Solenoid Valve S1)</b>
------------	--------------	---

<b>DTC</b>	<b>P0974</b>	<b>Shift Solenoid "A" Control Circuit High (Shift Solenoid Valve S1)</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

See page [DI-426](#) .

DTC No.	DTC Detection Condition	Trouble Area
P0973	ECM detects short in solenoid valve S1 circuit 4 times when solenoid valve S1 is operated (1-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Short in shift solenoid valve S1 circuit</li> <li>▶ Shift solenoid valve S1</li> <li>▶ ECM</li> </ul>
P0974	ECM detects open in solenoid valve S1 circuit 4 times when solenoid valve S1 is not operated (1-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Open in shift solenoid valve S1 circuit</li> <li>▶ Shift solenoid valve S1</li> <li>▶ ECM</li> </ul>

## MONITOR DESCRIPTION

The ECM commands gearshift by turning the shift solenoid valves "ON/OFF". When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stored the DTC. And the ECM performs the fail-safe function and turns the other shift solenoid valves in good condition "ON/OFF" (In case of an open or short circuit, the ECM stops sending current to the circuit.).

## MONITOR STRATEGY

Related DTCs	P0973	Shift solenoid valve S1/Range check (Low resistance)
	P0974	Shift solenoid valve S1/Range check (High resistance)
Required sensors/Components	Shift solenoid valve S1	
Frequency of operation	Continuous	
Duration	0.1 sec. x 2 (times) or more	
MIL operation	1 driving cycle	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
<b>Range check (Low resistance)</b>		
Solenoid	ON	
<b>Range check (High resistance)</b>		
Solenoid	OFF	

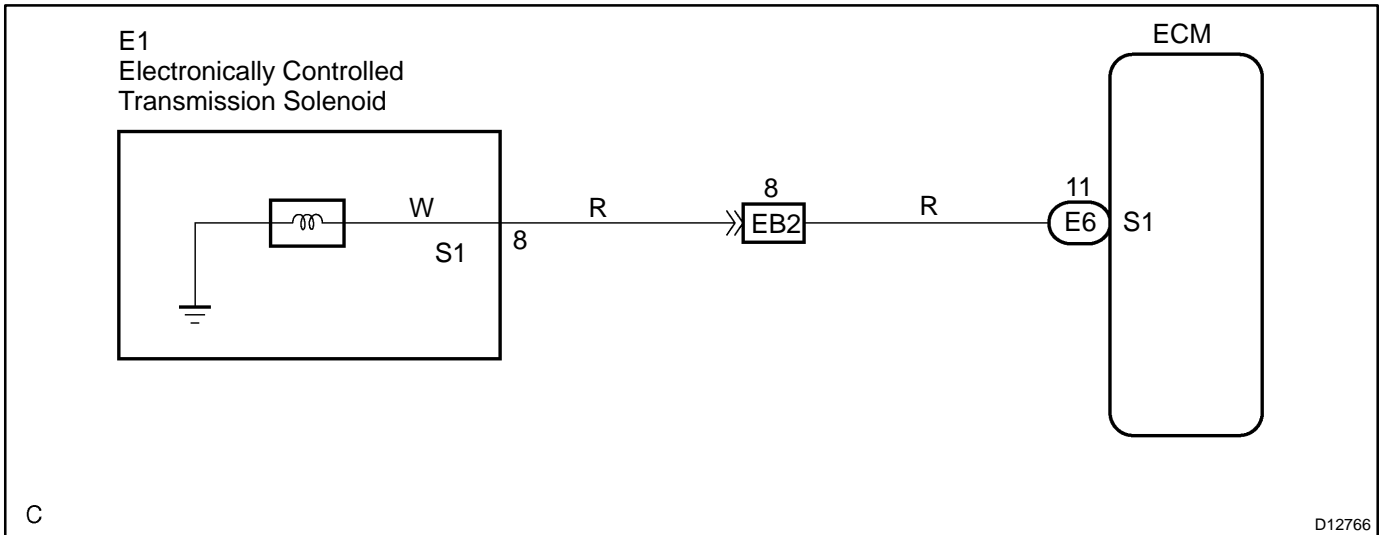
### TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
<b>Range check (Low resistance)</b>	
Intelligent power MOS diagnosis fail signals detected while the solenoid is operated	Fail at solenoid resistance: 8 Ω or less
<b>Range check (High resistance)</b>	
Intelligent power MOS diagnosis fail signals detected while the solenoid is not operated	Fail at solenoid resistance: 100 kΩ or more

### COMPONENT OPERATING RANGE

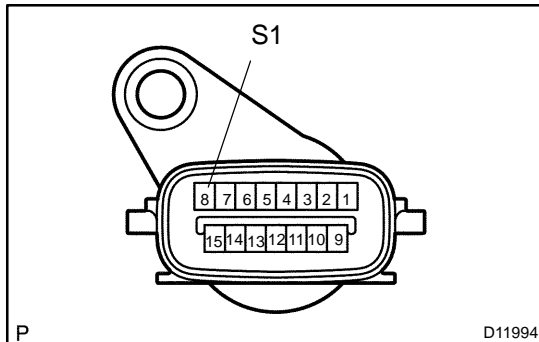
Parameter	Standard value
Shift solenoid valve S1	Resistance: 11 to 15 Ω at 20°C (68°F)

### WIRING DIAGRAM



## INSPECTION PROCEDURE

## 1 Check transmission wire.

**PREPARATION:**

Disconnect the transmission wire connector.

**CHECK:**

Measure resistance between S1 of transmission wire connector and body ground.

**OK:**

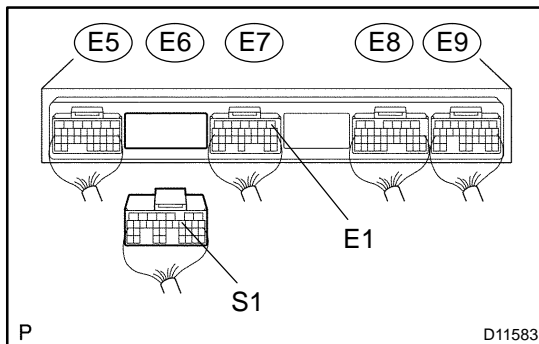
Resistance: 11 to 15  $\Omega$  at 20°C (68°F)

**NG**

Go to step 3.

**OK**

## 2 Measure resistance between terminal S1 and E1 of ECM connector.

**PREPARATION:**

(a) Connect the transmission wire connector.

(b) Disconnect the connector of the ECM.

**CHECK:**

Measure resistance between terminals S1 and E1 of ECM connector.

**OK:**

Resistance: 11 to 15  $\Omega$  at 20°C (68°F)

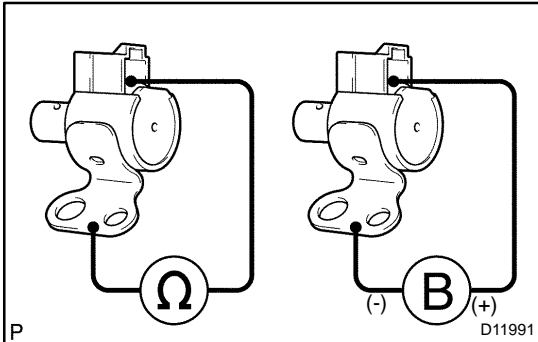
**NG**

Repair or replace the harness or connector (See page [IN-36](#)).

**OK**

Check and replace the ECM (See page [IN-36](#)).

### 3 Check shift solenoid valve S1.



#### **PREPARATION:**

- Jack up the vehicle.
- Remove the oil pan.
- Remove the shift solenoid valve S1.

#### **CHECK:**

Measure the resistance between the solenoid connector terminal and the body ground.

#### **OK:**

**Resistance: 11 to 15  $\Omega$  at 20°C (68°F)**

#### **CHECK:**

Connect the battery positive lead to the solenoid connector terminal and the battery negative lead to the solenoid body ground.

#### **OK:**

**Solenoid sounds operation noise.**

**NG**

**Replace the shift solenoid valve S1  
(See page [AT-8](#)).**

**OK**

**Repair or replace the transmission wire  
(See page [AT-6](#)).**



<b>DTC</b>	<b>P0976</b>	<b>Shift Solenoid "B" Control Circuit Low (Shift Solenoid Valve S2)</b>
------------	--------------	---

<b>DTC</b>	<b>P0977</b>	<b>Shift Solenoid "B" Control Circuit High (Shift Solenoid Valve S2)</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

See page [DI-426](#) .

DTC No.	DTC Detection Condition	Trouble Area
P0976	ECM detects short in solenoid valve S2 circuit 4 times when solenoid valve S2 is operated (1-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Short in shift solenoid valve S2 circuit</li> <li>▶ Shift solenoid valve S2</li> <li>▶ ECM</li> </ul>
P0977	ECM detects open in solenoid valve S2 circuit 4 times when solenoid valve S2 is not operated (1-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Open in shift solenoid valve S2 circuit</li> <li>▶ Shift solenoid valve S2</li> <li>▶ ECM</li> </ul>

## MONITOR DESCRIPTION

The ECM commands gearshift by turning the shift solenoid valves "ON/OFF". When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stored the DTC. And the ECM performs the fail-safe function and turns the other shift solenoid valves in good condition "ON/OFF" (In case of an open or short circuit, the ECM stops sending current to the circuit.).

## MONITOR STRATEGY

Related DTCs	P0976	Shift solenoid valve S2/Range check (Low resistance)
	P0977	Shift solenoid valve S2/Range check (High resistance)
Required sensors/Components	Shift solenoid valve S2	
Frequency of operation	Continuous	
Duration	0.1 sec. x 2 (times) or more	
MIL operation	1 driving cycle	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
<b>Range check (Low resistance)</b>		
Solenoid	ON	
<b>Range check (High resistance)</b>		
Solenoid	OFF	

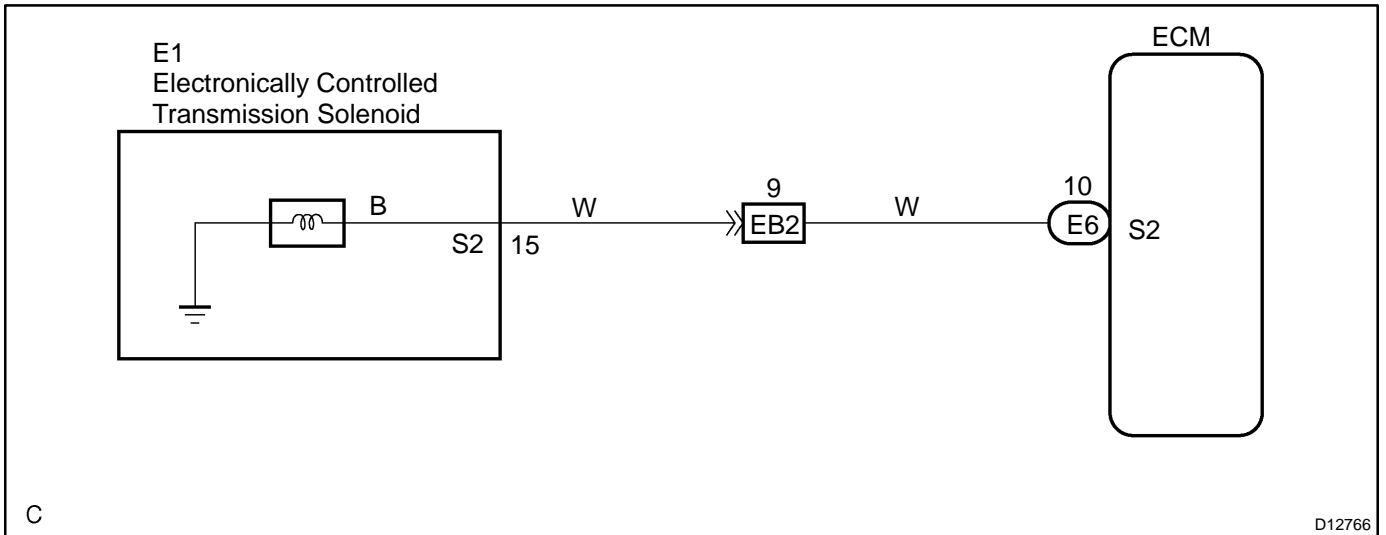
### TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
<b>Range check (Low resistance)</b>	
Intelligent power MOS diagnosis fail signal detected while the solenoid is operated	Fail at solenoid resistance: 8 Ω or less
<b>Range check (High resistance)</b>	
Intelligent power MOS diagnosis fail signal detected while the solenoid is not operated	Fail at solenoid resistance: 100 kΩ or more

### COMPONENT OPERATING RANGE

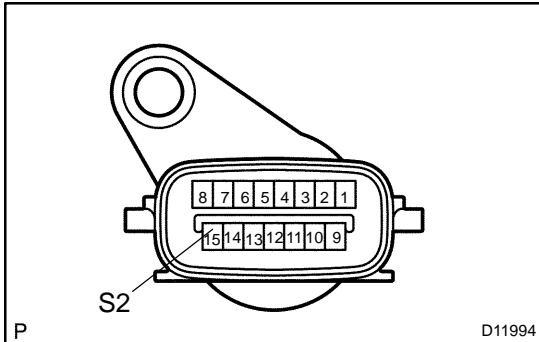
Parameter	Standard value
Shift solenoid valve S2	Resistance: 11 to 15 Ω at 20°C (68°F)

### WIRING DIAGRAM



## INSPECTION PROCEDURE

## 1 Check transmission wire.

**PREPARATION:**

Disconnect the transmission wire connector.

**CHECK:**

Measure resistance between S2 of transmission wire connector and body ground.

**OK:**

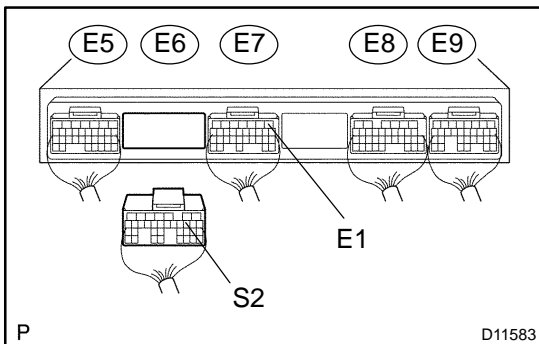
Resistance: 11 to 15  $\Omega$  at 20°C (68°F)

**NG**

Go to step 3.

**OK**

## 2 Measure resistance between terminal S2 and E1 of ECM connector.

**PREPARATION:**

- (a) Connect the transmission wire connector.
- (b) Disconnect the connector of the ECM.

**CHECK:**

Measure resistance between terminals S2 and E1 of ECM connector.

**OK:**

Resistance: 11 to 15  $\Omega$  at 20°C (68°F)

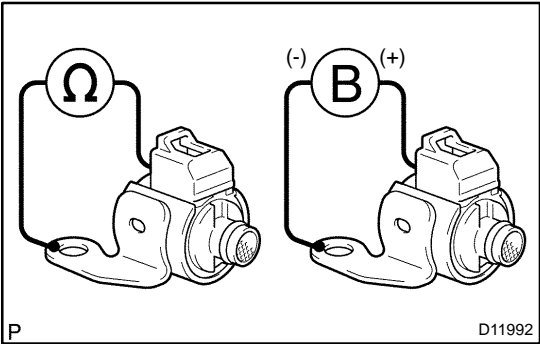
**NG**

Repair or replace the harness or connector (See page [IN-36](#)).

**OK**

Check and replace the ECM (See page [IN-36](#)).

**3 Check shift solenoid valve S2.**



**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Remove the shift solenoid valve S2.

**CHECK:**

Measure the resistance between the solenoid connector terminal and the body ground.

**OK:**

**Resistance: 11 to 15 Ω at 20°C (68°F)**

**CHECK:**

Connect the battery positive lead to the solenoid connector terminal and the battery negative lead to the solenoid body ground.

**OK:**

**Solenoid sounds operation noise.**

**NG** → **Replace the shift solenoid valve S2 (See page AT-8).**

**OK**

**Repair or replace the transmission wire (See page AT-6).**

<b>DTC</b>	<b>P0985</b>	<b>Shift Solenoid "E" Control Circuit Low (Shift Solenoid Valve SR)</b>
------------	--------------	---

<b>DTC</b>	<b>P0986</b>	<b>Shift Solenoid "E" Control Circuit High (Shift Solenoid Valve SR)</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

see page [DI-426](#) .

DTC No.	DTC Detection Condition	Trouble Area
P0985	ECM detects short in solenoid valve SR circuit 4 times when solenoid valve SR is operated (1-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Short in shift solenoid valve SR circuit</li> <li>▶ Shift solenoid valve SR</li> <li>▶ ECM</li> </ul>
P0986	ECM detects open in solenoid valve SR circuit 4 times when solenoid valve SR is not operated (1-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Open in shift solenoid valve SR circuit</li> <li>▶ Shift solenoid valve SR</li> <li>▶ ECM</li> </ul>

## MONITOR DESCRIPTION

The ECM commands gearshift by turning the shift solenoid valves "ON/OFF". When there is an open or short circuit in any shift solenoid valve circuit, the ECM detects the problem and illuminates the MIL and stores the DTC. And the ECM performs the fail-safe function and turns the other shift solenoid valves in good condition "ON/OFF" (In case of an open or short circuit, the ECM stops sending current to the circuit.) (see page [DI-426](#) ).

## MONITOR STRATEGY

Related DTCs	P0985	Shift solenoid valve SR/Range check (Low resistance)
	P0986	Shift solenoid valve SR/Range check (High resistance)
Required sensors/Components	Shift solenoid valve SR	
Frequency of operation	Continuous	
Duration	0.1 sec. x 2 (times) or more	
MIL operation	1 driving cycle	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
<b>Range check (Low resistance)</b>		
Solenoid	ON	
<b>Range check (High resistance)</b>		
Solenoid	OFF	

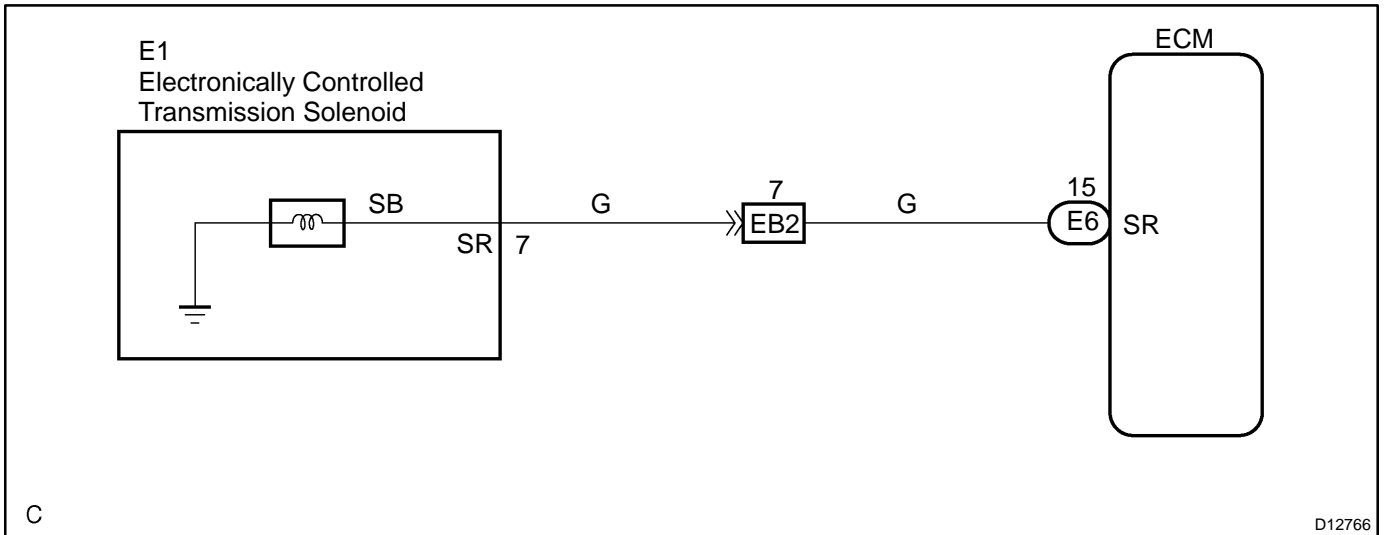
### TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
<b>Range check (Low resistance)</b>	
Intelligent power MOS diagnosis fail signals detected while the solenoid is operated	Fail at solenoid resistance: 8 Ω or less
<b>Range check (High resistance)</b>	
Intelligent power MOS diagnosis fail signals detected while the solenoid is not operated	Fail at solenoid resistance: 100 kΩ or more

### COMPONENT OPERATING RANGE

Parameter	Standard value
Shift solenoid valve SR	Resistance: 11 to 15 at 20°C (68°F)

### WIRING DIAGRAM

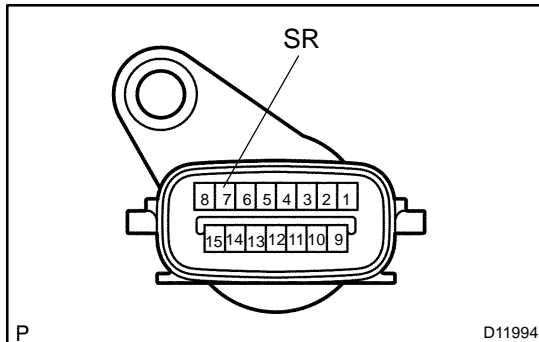


C

D12766

## INSPECTION PROCEDURE

## 1 Check transmission wire.

**PREPARATION:**

Disconnect the transmission wire connector.

**CHECK:**

Measure resistance between SR of transmission wire connector and body ground.

**OK:**

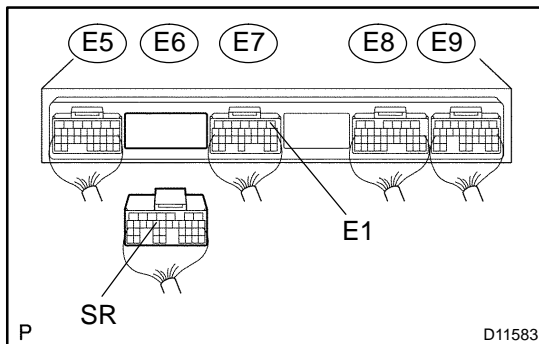
Resistance: 11 to 15  $\Omega$  at 20°C (68°F)

NG

Go to step 3.

OK

## 2 Measure resistance between terminal SR and E1 of ECM connector.

**PREPARATION:**

- Connect the transmission wire connector.
- Disconnect the connector of the ECM.

**CHECK:**

Measure resistance between terminals SR and E1 of ECM connector.

**OK:**

Resistance: 11 to 15  $\Omega$  at 20°C (68°F)

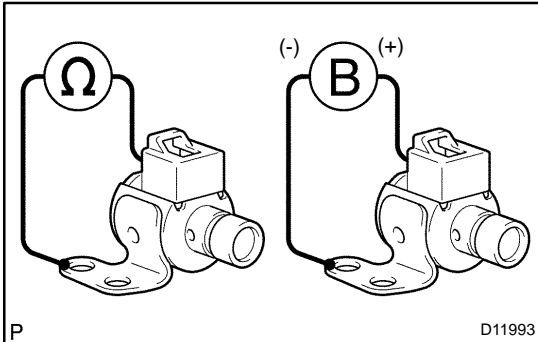
NG

Repair or replace the harness or connector (See page [IN-36](#)).

OK

Check and replace the ECM (See page [IN-36](#)).

### 3 Check shift solenoid valve SR.



#### **PREPARATION:**

- Jack up the vehicle.
- Remove the oil pan.
- Remove the shift solenoid valve SR.

#### **CHECK:**

Measure the resistance between the solenoid connector terminal and the body ground.

#### **OK:**

**Resistance: 11 to 15  $\Omega$  at 20°C (68°F)**

#### **CHECK:**

Connect the battery positive lead to the solenoid connector terminal and the battery negative lead to the solenoid body ground.

#### **OK:**

**Solenoid sounds operation noise.**

**NG**

**Replace the shift solenoid valve SR  
(See page [AT-8](#)).**

**OK**

**Repair or replace the transmission wire  
(See page [AT-6](#)).**



<b>DTC</b>	<b>P1782</b>	<b>T/F L4 Range Position Switch Performance</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

The ECM detects the signal from the transfer L4 position switch.  
This DTC indicates that the transfer L4 position switch remains ON.

DTC No.	DTC Detecting Condition	Trouble Area
P1782	Transfer L4 position switch remains ON while vehicle running under conditions for 18 seconds or more (1-trip detection logic) (a) Output shaft speed 3000 rpm or less (b) Transfer shift position is H	<ul style="list-style-type: none"> <li>▶ Short in transfer L4 position switch circuit</li> <li>▶ Transfer L4 position switch</li> <li>▶ ECM</li> </ul>

## MONITOR DESCRIPTION

The ECM monitors the transfer-case L4 position switch to determine when the transfer-case L4 gear is engaged. If the transfer-case L4 gears remain engaged under the following conditions, the ECM will conclude that there is a malfunction of the L4 position switch:

- ▶ L4 switch indicated that the L4 transfer-case gears are engaged.
- ▶ Transfer-case shifter is in the "H" position.
- ▶ Transfer-case output shaft rpm is between 750 and 3,000 rpm.
- ▶ The specified time period has elapsed.

If all of the above conditions are detected, the ECM will conclude that there is a malfunction of the L4 switch, illuminate the MIL and store the DTC.

## MONITOR STRATEGY

Related DTCs	P1782	Transfer L4 position switch/ON malfunction
Required sensors/Components	Transfer L4 position switch	
Frequency of operation	Continuous	
Duration	ON malfunction (A)	1.8 sec.
	ON malfunction (B)	0.5 sec.
MIL operation	2 driving cycles	
Sequence of operation	None	

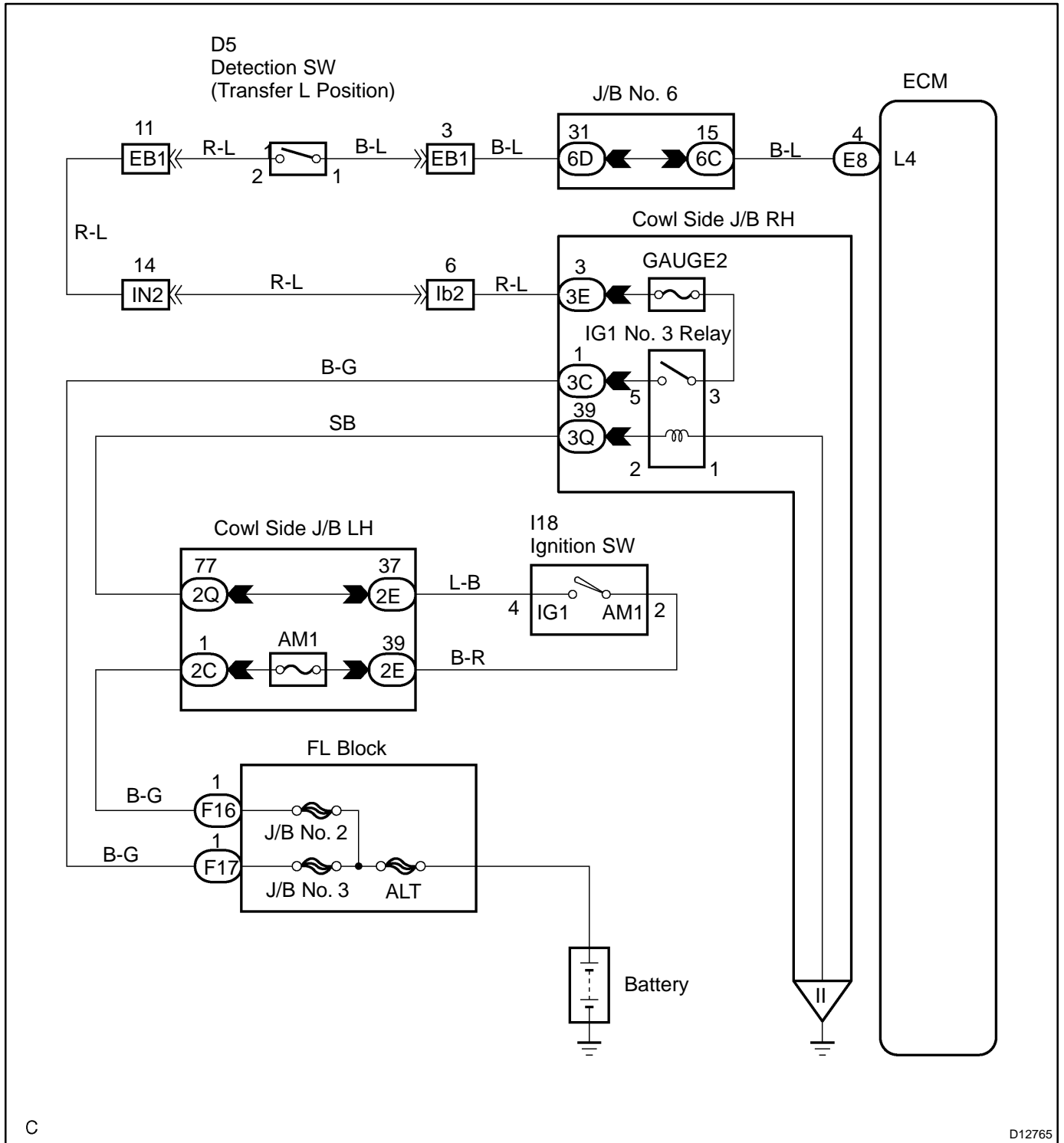
## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
<b>The following items are common to all conditions below: ON malfunction (A) and (B)</b>		
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Output speed sensor circuit	There is no malfunction in the circuits shown on the left.	
Vehicle speed sensor "A" circuit		
Transfer neutral position switch	OFF	
<b>ON malfunction (A)</b>		
Output speed (Transfer output speed)	1,000 rpm or more	Less than 3,000 rpm
<b>ON malfunction (B)</b>		
Output speed (Transfer output speed)	143 rpm or more	-

## TYPICAL MALFUNCTION THRESHOLDS

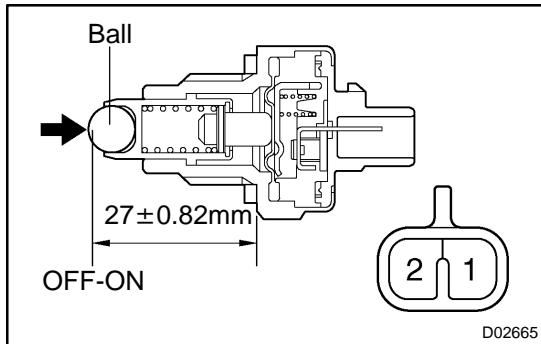
Detection criteria	Threshold
<b>Both of the following conditions is met: ON malfunction (A) and (B)</b>	
<b>ON malfunction (A)</b>	
L4 switch	ON
<b>ON malfunction (B)</b>	
Actual Transfer gear ratio Transfer input speed/Transfer output speed (NO/NO <sub>f</sub> )	0.9 or more and Less than 1.1

# WIRING DIAGRAM



## INSPECTION PROCEDURE

**1** Check transfer L4 position switch.



**PREPARATION:**

Remove the transfer L4 position switch.

**CHECK:**

Check the continuity between the switch terminals when pushing the ball at the tip of the switch.

**OK:**

Switch	Specified condition
Push	Continuity
Free	No continuity

**NG** Replace transfer L4 position switch.

**OK**

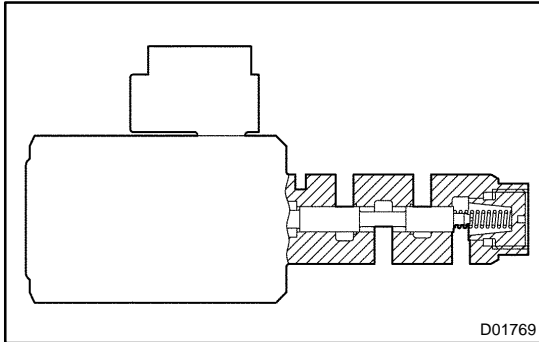
**2** Check harness and connector between battery and transfer L4 position switch, transfer L4 position switch and ECM (See page [IN-36](#) ).

**NG** Repair or replace the harness or connector.

**OK**

Check and replace the ECM (See page [IN-36](#) ).

<b>DTC</b>	<b>P2714</b>	<b>Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)</b>
------------	--------------	---



## SYSTEM DESCRIPTION

The ECM calculates the shifting condition by using the signals from the vehicle speed sensor, throttle position sensor, etc.. And compares this result with the signal that ECM sends to SLT to detect mechanical trouble of the shift solenoid valve SLT, valve body, torque converter clutch and automatic transmission assembly (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P2714	ECM detects a malfunction on SLT (ON side) according to the revolution difference of the turbine and the output shaft, and also by the oil pressure.	<ul style="list-style-type: none"> <li>▶ Shift solenoid valve SLT is stuck open or closed</li> <li>▶ Valve body blocked up or stuck</li> <li>▶ Automatic transmission assembly</li> </ul>

## MONITOR DESCRIPTION

The ECM sends (ED: delete "the") signals (Duty Ratio) to the shift solenoid valve SLT based on the information such as the signal from throttle position sensor and the vehicle speed sensor.

Based on the signal's duty-ratio, the shift solenoid valve SLT adjusts the hydraulic pressure to the primary regulator valve to an appropriate level. This function enables a smooth vehicle operation by adjusting the line hydraulic pressure to match the engine output and running condition.

The ECM calculates the "actual" transmission gear by comparing the signals from the input speed sensor and the output speed sensor. The ECM can detect many mechanical problems in the shift solenoids, valve body, and the transmission clutches, brakes, and gears. If the ECM detects that the actual gear position and the commanded gear position are different, it will illuminate the MIL and store the DTC.

## MONITOR STRATEGY

Related DTCs	P2714	Shift solenoid valve SLT/ON malfunction
Required sensors/Components	Main	Shift solenoid valve SLT
	Sub	Valve body, ATF temperature sensor, Speed sensor (NT), Speed sensor (NO)
Frequency of operation	Continuous	
Duration	Immediate	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

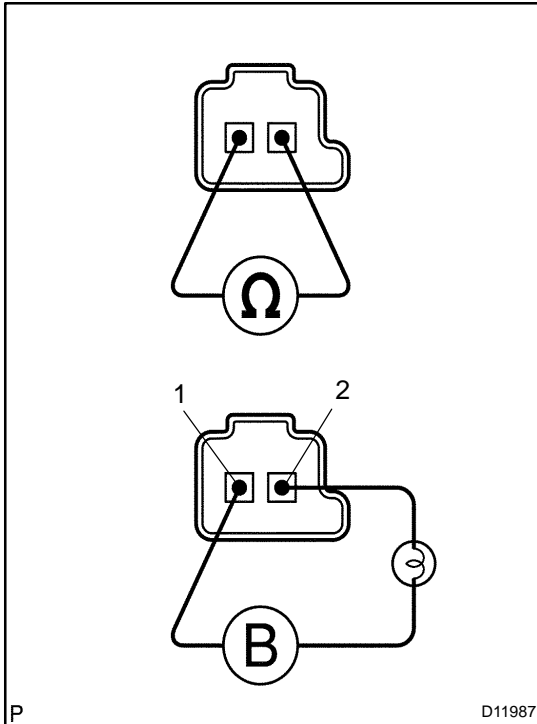
Item	Specification	
	Minimum	Maximum
<b>[The following items are common to all conditions below: OFF malfunction (A) and (B)]</b>		
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Turbine speed sensor (NT) circuit	There is no malfunction in the circuits shown on the left.	
Output speed sensor (NO) circuit		
Transmission Fluid Temperature Sensor "A" circuit		
Shift solenoid "A" (S1) circuit		
Shift solenoid "B" (S2) circuit		
Shift solenoid "E" (SR) circuit		
Pressure control solenoid "A" (SL1) circuit		
Pressure control solenoid "B" (SL2) circuit		
Pressure control solenoid "D" (SLT) circuit		
ECT (Engine coolant temperature) sensor circuit		
KCS sensor circuit		
ETCS (Electric throttle control system)		
Transmission shift position	"D"	
ECT	40°C (104°F) or more	-
Spark advance from Max. retard timing by KCS control	0° CA or more	-
Engine	Running	
Transfer range	"HIGH"*1	
ATF temperature	10°C or more	-
<b>Transfer range "HIGH" *1 (This condition is applied only 4WD)</b>		
*1 Following conditions met		
Vehicle speed sensor "A" circuit	There is no malfunction in the circuits shown on the left.	
Output shaft speed sensor circuit		
Transfer output speed	143 rpm or more	-
NO/NOt (Transfer input speed/Transfer output speed)	0.9 or more	Less than 1.1

## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
Summation of C1 clutch heat generations = $\sum$ (Turbine speed - Output speed x Temporary ratio)	Specified value

## INSPECTION PROCEDURE

## 1 Check shift solenoid valve SLT operation.

**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Remove the shift solenoid valve SLT.

**CHECK:**

- (a) Measure the resistance between terminals 1 and 2 of solenoid connector.

**Standard: 5.0 to 5.6  $\Omega$  at 20°C (68°F)**

- (b) Connect the positive (+) lead with an 21 W bulb to terminal 2 of solenoid connector and negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

**Standard: Solenoid sounds operation noise.**

**OK:**

Standard

**NG**

Replace the shift solenoid valve SLT  
(See page [AT-8](#)).

**OK**

2 Check valve body (See page [DI-396](#)).

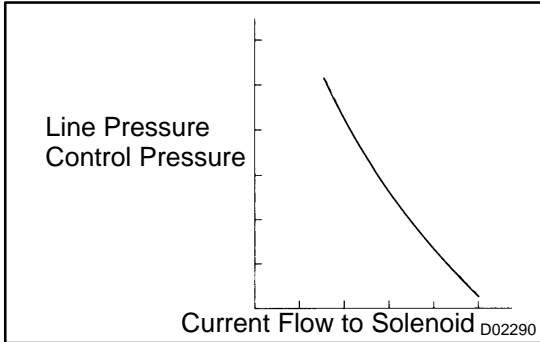
**NG**

Replace the valve body (See page [AT-8](#)).

**OK**

Repair or replace transmission (See page [AT-30](#)).

<b>DTC</b>	<b>P2716</b>	<b>Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)</b>
------------	--------------	--



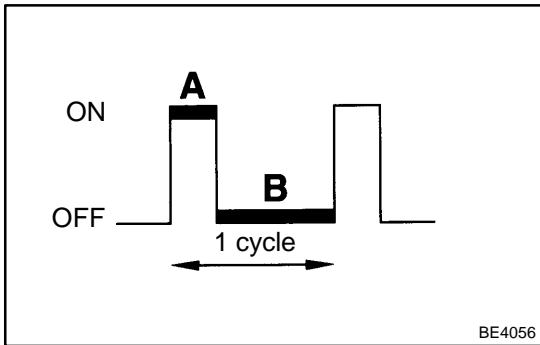
**CIRCUIT DESCRIPTION**

The throttle pressure that is applied to the primary regulator valve (which modulates line pressure) causes the solenoid valve SLT, under electronic control, to precisely and minutely modulate and generate line pressure according to the accelerator pedal effort, or the detected engine power output. This controls the line pressure and provides smooth shifting characteristics.

Upon receiving the throttle valve opening angle signal, ECM controls the line pressure by sending a predetermined (\*) duty ratio to the solenoid valve, modulating the line pressure, and generating throttle pressure.

(\*) Duty Ratio

The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then



$$\text{Duty Ratio} = \frac{A}{A + B} \times 100 (\%)$$

DTC No.	DTC Detection Condition	Trouble Area
P2716	ECM detects solenoid SLT circuit open or short malfunction for 1 sec. or more (1-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Open or short in shift solenoid valve SLT circuit</li> <li>▶ Shift solenoid valve SLT</li> <li>▶ ECM</li> </ul>

**MONITOR DESCRIPTION**

When an open or short in the linear solenoid valve (SLT) circuit is detected, the ECM interprets this as a fault. The ECM will turn ON the MIL and store the DTC.

**MONITOR STRATEGY**

Related DTCs	P2716	Shift solenoid valve SLT/Range check
Required sensors/Components	Shift solenoid valve SLT	
Frequency of operation	Continuous	
Duration	1 sec.	
MIL operation	Immediate	
Sequence of operation	None	



### TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Solenoid current cut status	Not cut	
Battery voltage	11 V or more	-
CPU command duty ratio to SLT	19% or more	-

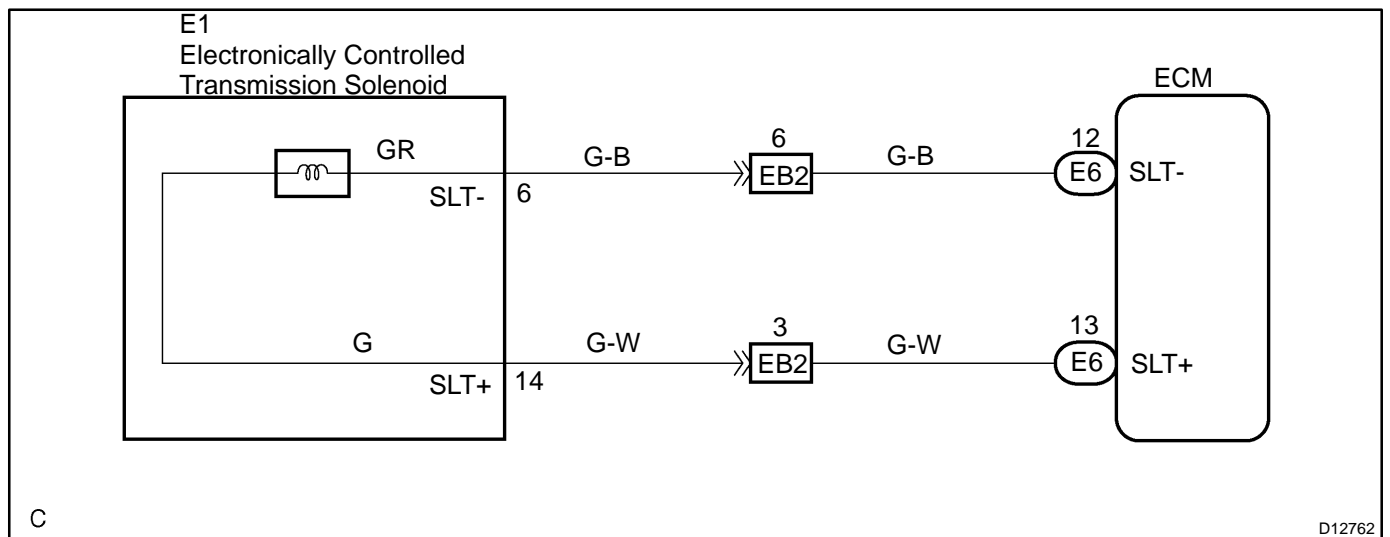
### TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
Solenoid status from IC	Fail (Open or short)

### COMPONENT OPERATING RANGE

Parameter	Standard value
Output signal duty	Less than 100%

### WIRING DIAGRAM

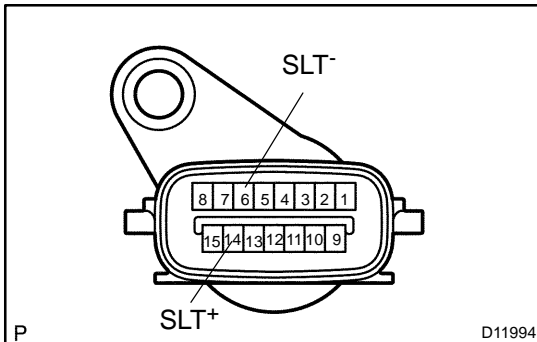


C

D12762

## INSPECTION PROCEDURE

## 1 Check transmission wire.

**PREPARATION:**

Disconnect the transmission wire connector.

**CHECK:**

Measure resistance between SLT+ and SLT- of transmission wire.

**OK:**

Resistance: 5.0 to 5.6  $\Omega$  at 20°C (68°F)

**CHECK:**

Measure resistance between terminals SLT+ and SLT- of the transmission wire connector and body ground.

**OK:**

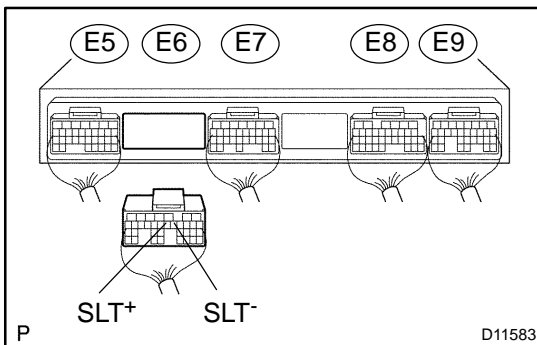
Resistance: 1 M $\Omega$  or higher

NG

Go to step 3.

OK

## 2 Measure resistance between terminal SLT+ and SLT- of ECM connector.

**PREPARATION:**

- Connect the transmission wire connector.
- Disconnect the connector of the ECM.

**CHECK:**

Measure resistance between terminals SLT+ and SLT- of ECM connector.

**OK:**

Resistance: 5.0 to 5.6  $\Omega$  at 20°C (68°F)

**CHECK:**

Measure resistance between terminals SLT+ and SLT- of the ECM connector and body ground.

**OK:**

Resistance: 1 M $\Omega$  or higher

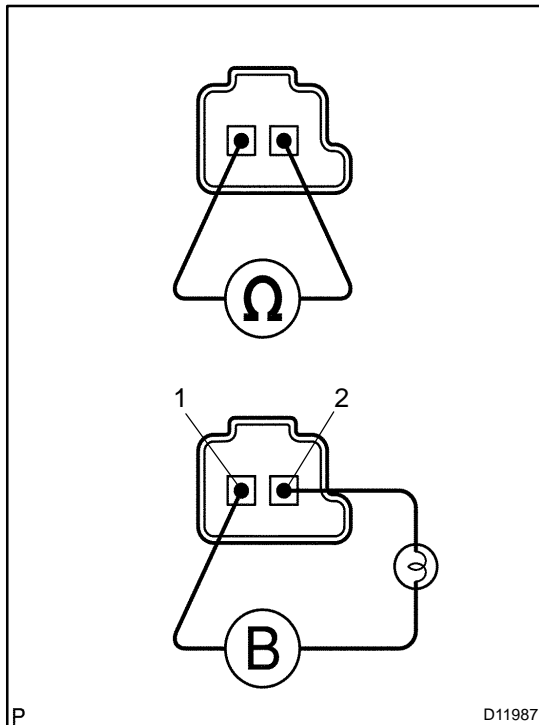
NG

Repair or replace the harness or connector (See page [IN-36](#) ).

OK

Check and replace the ECM (See page [IN-36](#) ).

### 3 Check shift solenoid valve SLT.



#### **PREPARATION:**

- Jack up the vehicle.
- Remove the oil pan.
- Remove the shift solenoid valve SLT.

#### **CHECK:**

- Measure the resistance between terminals 1 and 2 of solenoid connector.

**Standard: 5.0 to 5.6 Ω at 20°C (68°F)**

- Connect the positive (+) lead with an 21 W bulb to terminal 2 of solenoid connector and negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

**Standard: Solenoid sounds operation noise.**

#### **OK:**

Standard

**NG**

**Replace the shift solenoid valve SLT  
(See page AT-8).**

**OK**

**Repair or replace the transmission wire  
(See page AT-6).**

<b>DTC</b>	<b>P2740</b>	<b>Transmission Fluid Temperature Sensor "B" Circuit</b>
------------	--------------	--

<b>DTC</b>	<b>P2742</b>	<b>Transmission Fluid Temperature Sensor "B" Circuit Low Input</b>
------------	--------------	--

<b>DTC</b>	<b>P2743</b>	<b>Transmission Fluid Temperature Sensor "B" Circuit High Input</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

The ATF temperature sensor converts fluid temperature into a resistance value which is input in to the ECM. ATF temperature sensor No.2 is on the transmission and just before the oil cooler inlet pipeline.

If ECM detects the abnormally high temperature of ATF by this sensor, it draws driver's attention by illuminating the warning lamp.

HINT:

- ▶ The temperature of ATF easily raises when towing, climbing hills and in traffic, etc.
- ▶ If the ATF temperature sensor No.2 shorts, the signal that indicates the ATF temperature is 150>C (302>F) or higher is input in ECM.

Vehicle conditions when sensor is in normal and when the vehicle is in short are indicated in the table below.

ATF temperature No.2 Sensor State	Detection Condition	Symptom	Recovery Condition
Sensor is normal	▶AT fluid temp. more than 150>C (302>F).	▶AT Oil Temp. warning light remains on	▶AT fluid temp. less than 135>C (275>F). *1
	▶AT fluid temp. more than 130>C (266>F).	▶Shift point too high.	▶AT fluid temp. less than 110>C (230>F).
Sensor is in short	▶Any conditions.	▶AT Oil Temp. warning light remains on ▶Shift point too high.	▶Symptoms still occur

HINT:

\*1: When AT fluid temperature is in normal range, it decreases to less than 135>C within 5 minutes with the shift lever in P or N position in a idling state.

DTC No.	DTC Detecting Condition	Trouble Area
P2740	(a) and (b) is detected momentary within 0.5 sec. when neither P2742 or P2743 is not detected (1-trip detection logic) (a) ATF temperature sensor resistance is less than 79 Ω. (b) ATF temperature sensor resistance is more than 156 kΩ. HINT: Within 0.5 sec. the malfunction switches from (a) to (b) or from (b) to (a)	▶Open or short in ATF temperature sensor No. 2 circuit ▶ATF temperature sensor No. 2 ▶ECM
P2742	ATF temperature sensor resistance is less than 79 Ω. for 0.5 sec. or more (1-trip detection logic)	
P2743	DTC is detected for 0.5 sec. or more (1-trip detection logic) ATF temperature sensor resistance is more than 156 kΩ. after started engine for 15 minutes or more	

## MONITOR DESCRIPTION

The automatic transmission fluid (ATF) temperature sensor converts ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature, and the ECM detects an opens or shorts in the ATF temperature circuit. If the resistance value of the ATF temperature is less than 79  $\Omega$  or more than 156 k $\Omega$ , the ECM interprets this as a fault in the ATF sensor or wiring. The ECM will turn on the MIL and store the DTC.

## MONITOR STRATEGY

Related DTCs	P2740	ATF temperature sensor/Range check (Fluttering)
	P2742	ATF temperature sensor/Range check (Low resistance)
	P2743	ATF temperature sensor/Range check (High resistance)
Required sensors/Components	ATF temperature sensor	
Frequency of operation	Continuous	
Duration	0.5 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
<b>Range check (Fluttering, Low resistance)</b>		
The typical enabling condition is not available.	-	
<b>Range check (High resistance)</b>		
Time after engine start	15 min. or more	-

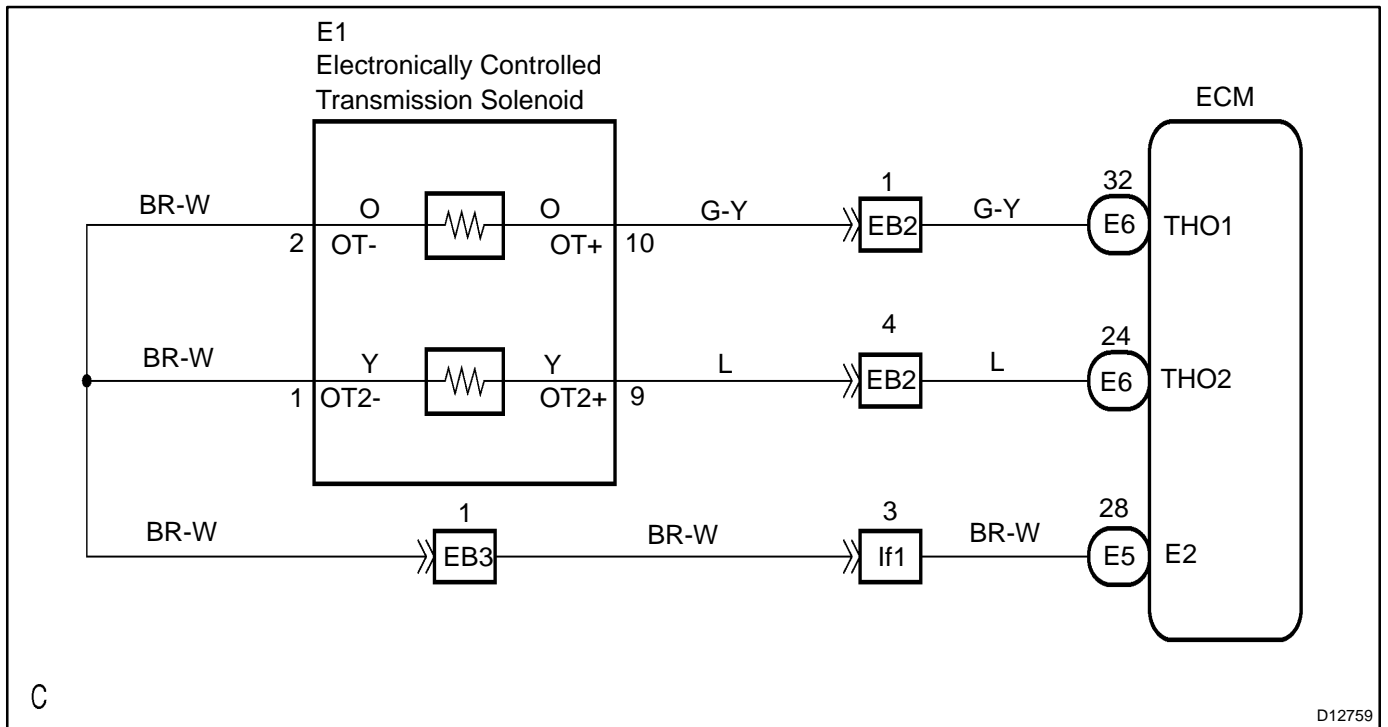
## TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
<b>Range check (Fluttering)</b>	
ATF temperature sensor resistance	Less than 25 $\Omega$ or More than 156 k $\Omega$
<b>Range check (Low resistance)</b>	
ATF temperature sensor resistance	Less than 25 $\Omega$
<b>Range check (High resistance)</b>	
ATF temperature sensor resistance	More than 156 k $\Omega$

## COMPONENT OPERATING RANGE

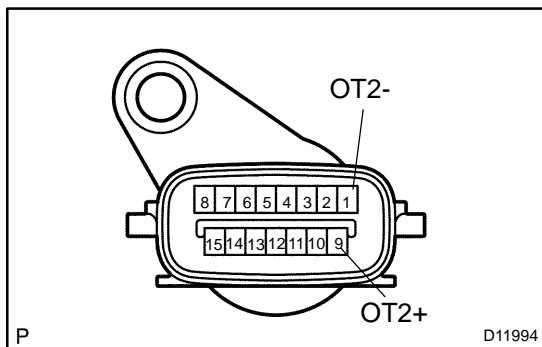
Parameter	Standard value
ATF temperature sensor	Atmospheric temperature to approx. 130°C (266°F)

### WIRING DIAGRAM



### INSPECTION PROCEDURE

1	<b>Check transmission wire.</b>
---	---------------------------------



**PREPARATION:**

Disconnect the transmission wire connector from the transmission.

**CHECK:**

Measure the resistance between terminals OT2+ and OT2-.

**OK:**

**79 Ω to 156 kΩ**

**CHECK:**

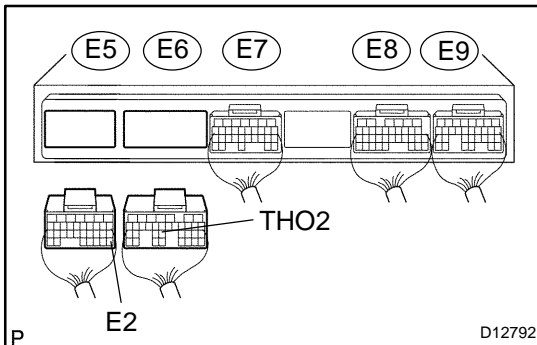
Measure resistance between terminals OT2+ and OT2- of the transmission wire connector and body ground.

**OK:**

**Resistance: 1 MΩ or higher**

<b>NG</b>	<b>Replace the transmission wire (ATF temperature sensor).</b>
-----------	--

<b>OK</b>
-----------

**2 Measure resistance between terminal THO2 and E2 of ECM connector.**
**PREPARATION:**

- (a) Connect the transmission wire connector.
- (b) Disconnect the connector of the ECM.

**CHECK:**

Measure the resistance between terminals THO2 and E2.

**OK:**

**79  $\Omega$  to 156 k $\Omega$**

**CHECK:**

Measure resistance between terminals THO2 and E2 of the ECM connector and body ground.

**OK:**

**Resistance: 1 M $\Omega$  or higher**

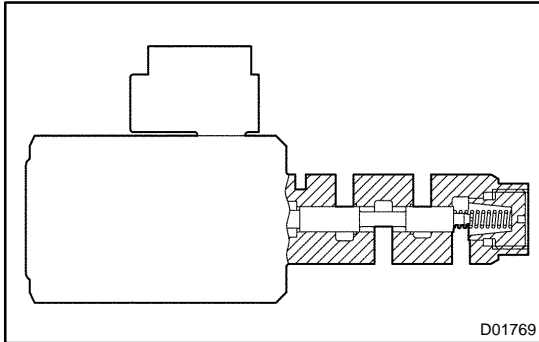
**NG**

**Repair or replace the harness or connector (See page [IN-36](#)).**

**OK**

**Check and replace the ECM (See page [IN-36](#)).**

<b>DTC</b>	<b>P2757</b>	<b>Torque Converter Clutch Pressure Control Solenoid Performance(Shift Solenoid Valve SLU)</b>
------------	--------------	--



## SYSTEM DESCRIPTION

The ECM uses the signals from the Throttle Position Sensor and Air-flow Meter to monitor the engagement condition of the lock-up clutch.

Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect mechanical trouble of the shift solenoid valve SLU, valve body, torque converter clutch and automatic transmission assembly (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P2757	Lock-up does not occur when driving in the lock-up range (normal driving at 80 km/h [50 mph]), or lock-up remains ON in the lock-up OFF range. (2-trip detection logic)	<ul style="list-style-type: none"> <li>▶ Shift solenoid valve SLU is stuck open or closed</li> <li>▶ Valve body blocked up or stuck</li> <li>▶ Lock-up clutch</li> <li>▶ Automatic transmission assembly</li> </ul>

## MONITOR DESCRIPTION

The ECM controls the oil pressure to the lock-up clutch based on engine-load information from the throttle position sensor, crankshaft position sensor, input speed sensor, and the oil pressure sensor for shift-solenoid SLU. The ECM commands the shift-solenoid SLU using a duty-cycle control signal. In turn, the shift solenoid operates the lock-up control valve and causes lock-up or flexible lock-up of the torque converter clutch.

To monitor the condition of the lock up clutch, the ECM monitors the signals from the input speed sensor, crank position sensor, the throttle position sensor, and air flow meter. The ECM uses this information to determine when the vehicle's torque converter clutch should be locked-up. The ECM can detect many mechanical problems in the shift solenoids, valve body, and the transmission clutches, brakes, and gears. If the ECM detects that the torque converter clutch locked below the minimum lock-up speed, it will illuminate the MIL and store the DTC.

## MONITOR STRATEGY

Related DTCs	P2757	Shift solenoid valve SLU/OFF malfunction
		Shift solenoid valve SLU/ON malfunction
Required sensors/Components	Main	Shift solenoid valve SLU
	Sub	Valve body, Vehicle speed sensor, Throttle position sensor, Speed sensor (NT), Speed sensor (NO)
Frequency of operation	Continuous	
Duration	OFF malfunction	2 sec.
	ON malfunction	1.8 sec.
MIL operation	2 driving cycles	
Sequence of operation	None	



## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
<b>The following items are common to all conditions below: OFF malfunction and ON malfunction</b>		
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Turbine speed sensor (NT) circuit	There is no malfunction in the circuits shown on the left.	
Output speed sensor (NO) circuit		
Shift solenoid "A" (S1) circuit		
Shift solenoid "B" (S2) circuit		
Shift solenoid "E" (SR) circuit		
Torque converter clutch pressure control solenoid circuit		
KCS sensor circuit		
ETCS (Electric throttle control system)	Not system down	
Transmission shift position	"D"	
ECT (Engine coolant temperature)	40°C (104°F) or more	-
Spark advance from Max. retard timing by KCS control	0° CA or more	-
Engine	Running	
ECM selected gear	4th or 5th	
Vehicle speed	25 km/h or more	-
Shift solenoid "A" (S1) circuit	There is no malfunction in the circuits shown on the left.	
Shift solenoid "B" (S2) circuit		
Pressure control solenoid "B" (SL2) circuit		
1-2 Shift valve		
Transfer neutral position switch	OFF	
Transfer range	"HIGH"*1	
<b>Transfer range "HIGH" *1 (This condition is applied only 4WD)</b>		
*1 Following conditions met		
Vehicle speed sensor "A" circuit	There is no malfunction in the sensor circuits shown on the left.	
Output shaft speed sensor circuit		
Transfer output speed	143 rpm or more	-
NO/NOtf (Transfer input speed/Transfer output speed)	0.9 or more	Less than 1.1
<b>OFF malfunction</b>		
ECM lock-up command	ON (SLU pressure: 513kpa or more)	
Vehicle speed	-	Less than 100 km/h (62 mph)
<b>ON malfunction</b>		
ECM lock-up command	OFF (SLU pressure: less than 4kpa)	
Throttle valve opening angle	9% or more	-
Vehicle speed	-	Less than 60 km/h (38 mph)

### TYPICAL MALFUNCTION THRESHOLDS

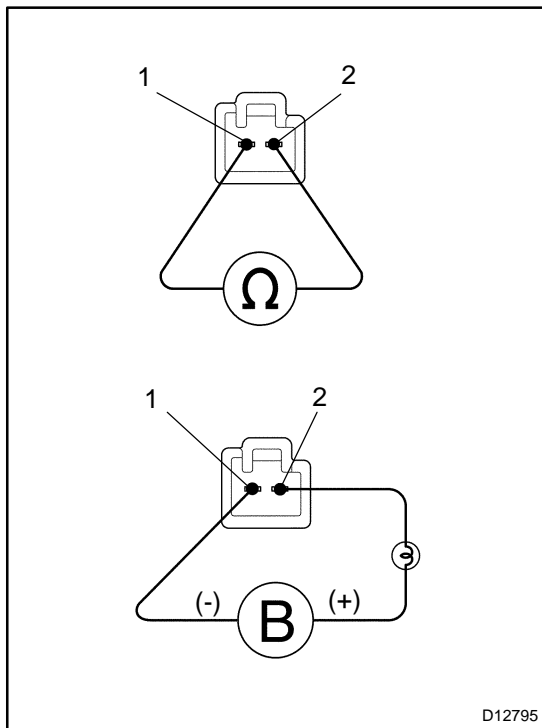
Detection criteria	Threshold
<b>OFF malfunction</b>	
Engine speed - Turbine speed	70 rpm or more
<b>ON malfunction</b>	
It is necessary 2 detections/one driving cycle 1st detection; temporary flag ON 2nd detection; pending fault code ON	
Vehicle speed must be under 10 km/h (6 mph) once before 2nd detection	
Engine speed - Turbine speed	Less then 35 rpm

### COMPONENT OPERATING RANGE

Parameter	Standard value
Speed sensor (NT)	Input speed is equal to engine speed when lock-up ON.

### INSPECTION PROCEDURE

<b>1</b>	<b>Check shift solenoid valve SLU operation.</b>
----------	--



**PREPARATION:**

- (a) Jack up the vehicle.
- (b) Remove the oil pan.
- (c) Remove the shift solenoid valve SLU.

**CHECK:**

- (a) Measure the resistance between terminals 1 and 2 of solenoid connector.

**Standard: 5.0 to 5.6 Ω at 20°C (68°F)**

- (b) Connect the positive (+) lead with an 21 W bulb to terminal 2 of solenoid connector and negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

**Standard: Solenoid sounds operation noise.**

**OK:**

Standard

<b>NG</b>	<b>Replace the shift solenoid valve SLU (See page AT-8).</b>
-----------	--

<b>OK</b>
-----------

<b>2</b>	<b>Check valve body (See page <a href="#">DI-396</a> ).</b>
----------	---

<b>NG</b>	<b>Replace the valve body (See page <a href="#">AT-8</a> ).</b>
-----------	---

<b>OK</b>
-----------

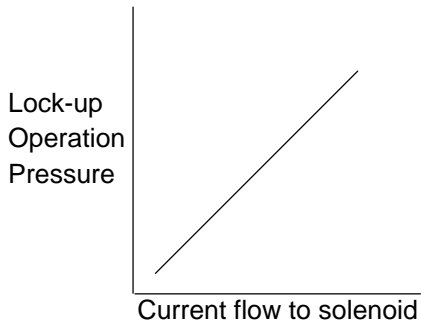
<b>3</b>	<b>Check torque converter clutch (See page <a href="#">AT-34</a> ).</b>
----------	---

<b>OK</b>	<b>Repair or replace transmission (See page <a href="#">AT-30</a> ).</b>
-----------	--

<b>NG</b>
-----------

<b>Replace the torque converter clutch (See page <a href="#">AT-30</a> ).</b>
---

<b>DTC</b>	<b>P2759</b>	<b>Torque Converter Clutch Pressure Control Solenoid Control Circuit Electrical(Shift Solenoid Valve SLU)</b>
------------	--------------	---

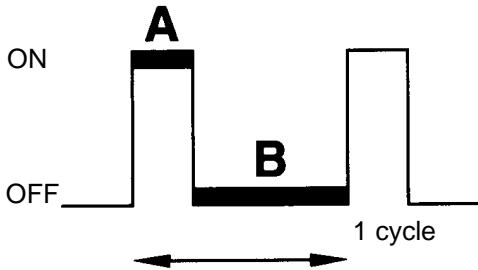


**CIRCUIT DESCRIPTION**

The amount of current flow to the solenoid is controlled by the (\*) duty ratio of the ECM output signal. The higher the duty ratio becomes, the higher the lock-up hydraulic pressure becomes during the lock-up operation.

(\*) Duty Ratio

The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then



(\*)

$$\text{Duty Ratio} = \frac{A}{A + B} \times 100 (\%)$$

BE4056

D00160

DTC No.	DTC detection condition	Trouble Area
P2759	The following condition is detected. (1-trip detection logic) SLU output signal's duty ON of 3.3 msec. or more with duty ratio of least 95% lasts for 1 second.	<ul style="list-style-type: none"> <li>▶ Open or short in shift solenoid valve SLU circuit</li> <li>▶ Shift solenoid valve SLU</li> <li>▶ ECM</li> </ul>

**MONITOR DESCRIPTION**

The ECM controls the oil pressure to the lock-up clutch based on engine-load information from the throttle position sensor, crankshaft position sensor, input speed sensor, and the oil pressure sensor for shift-solenoid SLU. The ECM commands the shift-solenoid SLU using a duty-cycle control signal. In turn, the shift solenoid operates the lock-up control valve and cause lock-up or flexible lock-up of the torque converter clutch. The ECM illuminates the MIL and store the DTC when ECM detects an open or a short circuit malfunction in the shift solenoid valve SLU.

**MONITOR STRATEGY**

Related DTCs	P2759	Shift solenoid valve SLU/Range check
Required sensors/Components	Shift solenoid valve SLU	
Frequency of operation	Continuous	
Duration	1 sec.	
MIL operation	Immediate	
Sequence of operation	None	

### TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present.	See page <a href="#">DI-361</a>	
Battery voltage	10 V or more	-

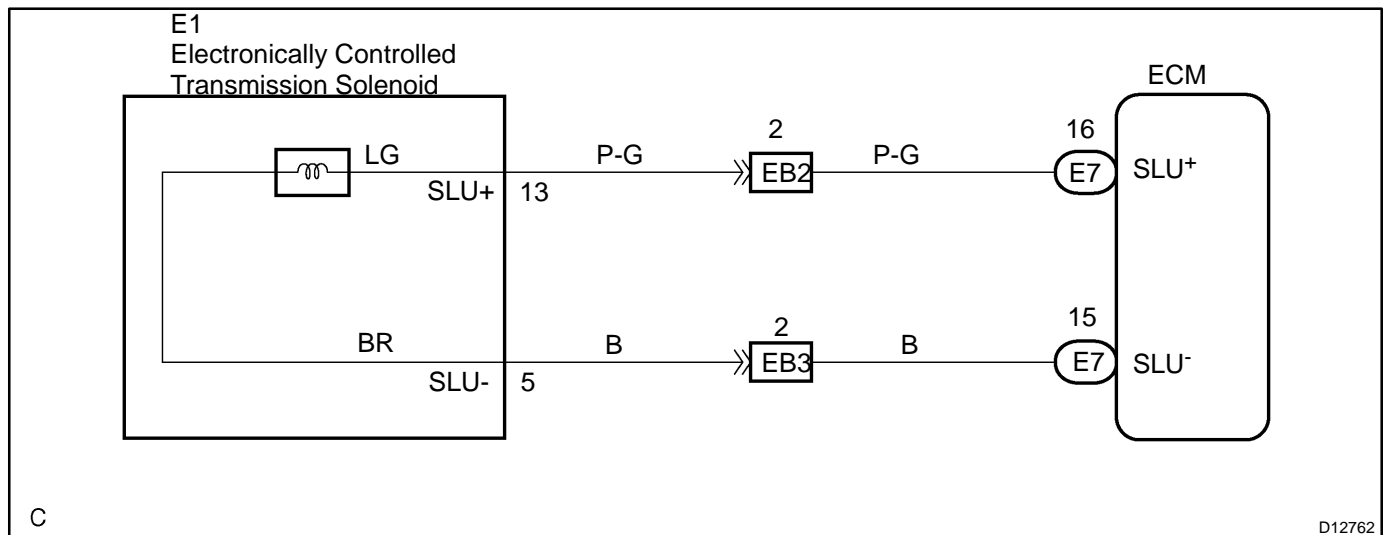
### TYPICAL MALFUNCTION THRESHOLDS

Detection criteria	Threshold
Output signal duty	100%

### COMPONENT OPERATING RANGE

Parameter	Standard value
Output signal duty	Less than 100%

### WIRING DIAGRAM

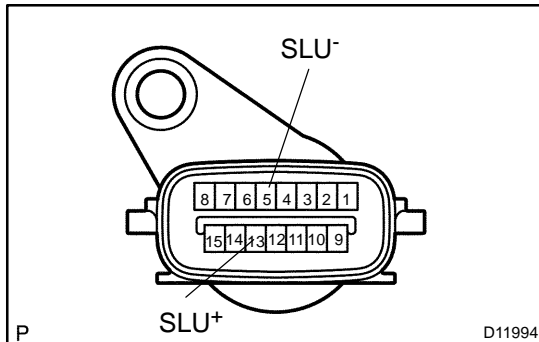


C

D12762

## INSPECTION PROCEDURE

## 1 Check transmission wire.

**PREPARATION:**

Disconnect the transmission wire connector.

**CHECK:**

Measure resistance between SLU+ and SLU- of transmission wire.

**OK:**

Resistance: 5.0 to 5.6  $\Omega$  at 20°C (68°F)

**CHECK:**

Measure resistance between terminals SLU+ and SLU- of the transmission wire connector and body ground.

**OK:**

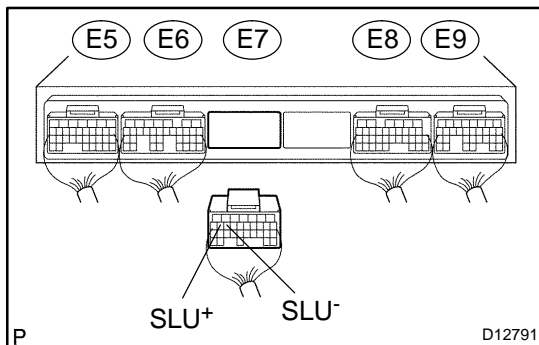
Resistance: 1 M $\Omega$  or higher

NG

Go to step 3.

OK

## 2 Measure resistance between terminal SLU+ and SLU- of ECM connector.

**PREPARATION:**

- Connect the transmission wire connector.
- Disconnect the connector of the ECM.

**CHECK:**

Measure resistance between terminals SLU+ and SLU- of ECM connector.

**OK:**

Resistance: 5.0 to 5.6  $\Omega$  at 20°C (68°F)

**CHECK:**

Measure resistance between terminals SLU+ and SLU- of the ECM connector and body ground.

**OK:**

Resistance: 1 M $\Omega$  or higher

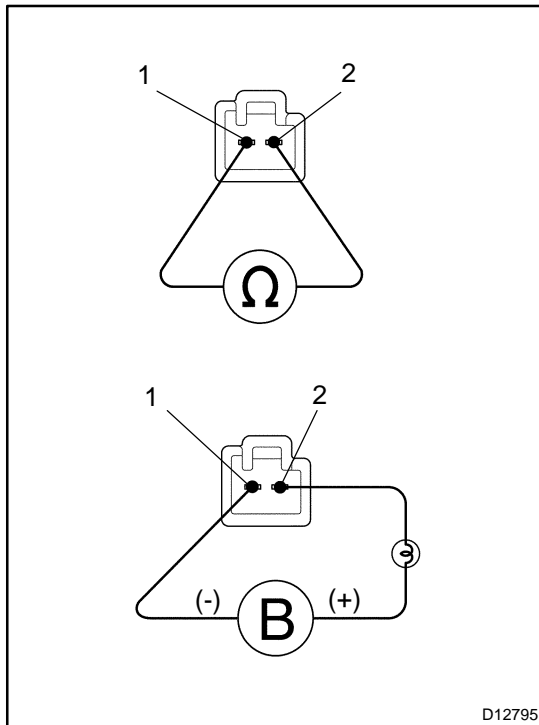
NG

Repair or replace the harness or connector (See page [IN-36](#)).

OK

Check and replace the ECM (See page [IN-36](#)).

### 3 Check shift solenoid valve SLU.



#### **PREPARATION:**

- Jack up the vehicle.
- Remove the oil pan.
- Remove the shift solenoid valve SLU.

#### **CHECK:**

- Measure the resistance between terminals 1 and 2 of solenoid connector.

**Standard: 5.0 to 5.6 Ω at 20°C (68°F)**

- Connect the positive (+) lead with an 21 W bulb to terminal 2 of solenoid connector and negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

**Standard: Solenoid sounds operation noise.**

#### **OK:**

Standard

**NG**

**Replace the shift solenoid valve SLU  
(See page AT-8).**

**OK**

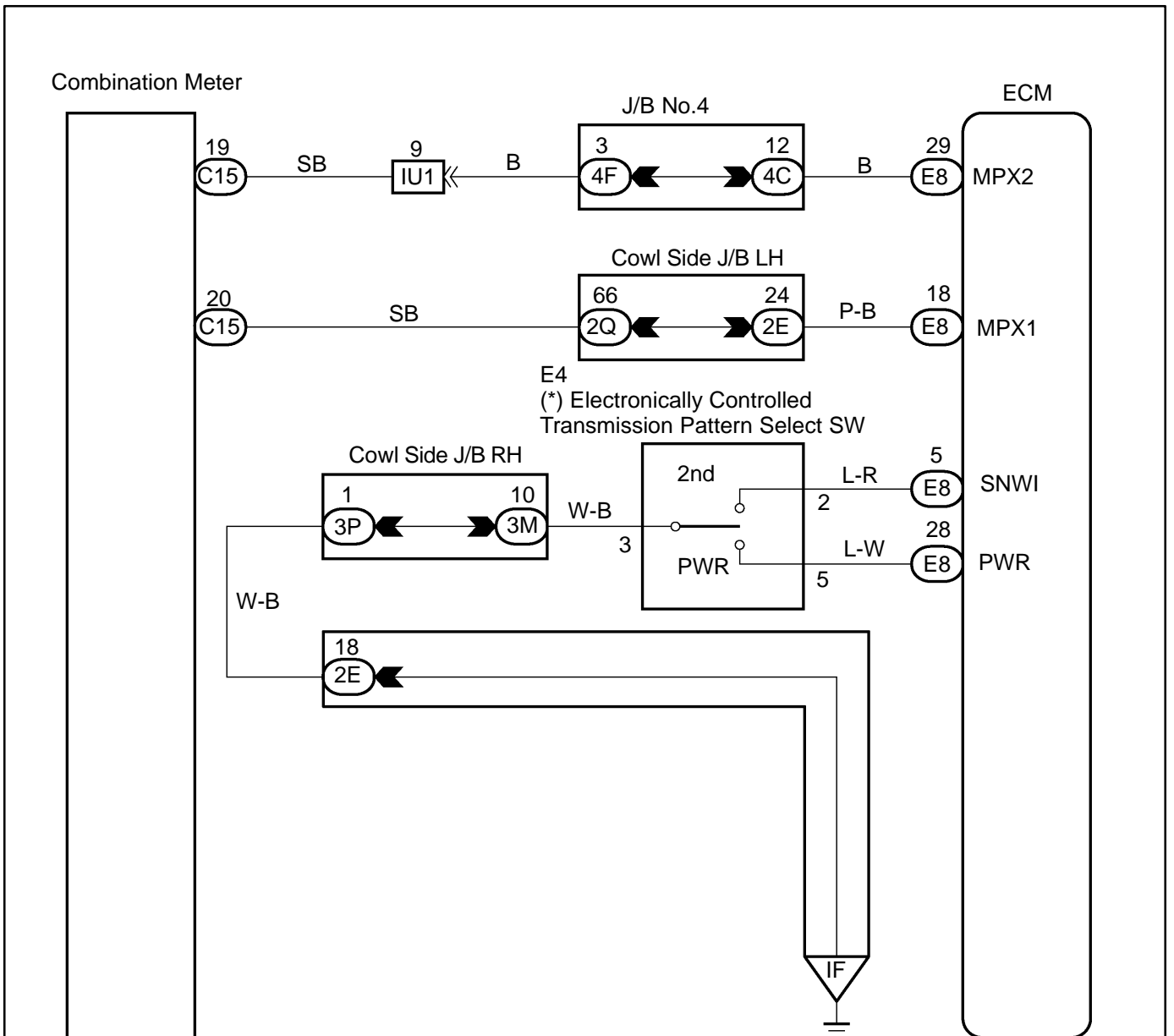
**Repair or replace the transmission wire  
(See page AT-6).**

# Pattern Select Switch Circuit (PWR Mode Switch)

## CIRCUIT DESCRIPTION

The ECM memory contains the shift programs for the NORMAL and POWER patterns, 2 position, L position and the lock-up patterns. Following the programs corresponding to the signals from the pattern select switch, the park/neutral position and other various sensors, the ECM switches the solenoid valves ON and OFF, and controls the transmission gear change and the lock-up clutch operation.

## WIRING DIAGRAM



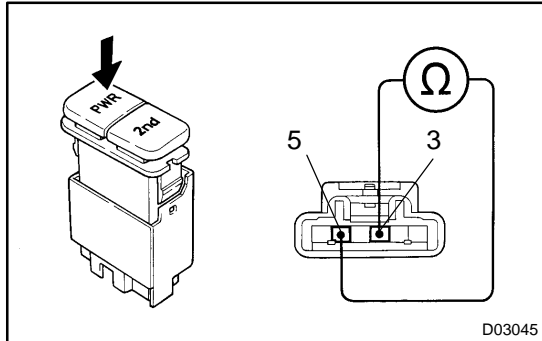
(\*) Pattern Select Switch (PWR Mode Switch)

When the PWR mode switch is pushed in, the switch contact is made and the PWR mode is selected. To cancel the PWR mode, push the PWR mode switch once again.



# INSPECTION PROCEDURE

**1 Check pattern select switch (PWR mode switch).**



**PREPARATION:**

Disconnect the pattern select switch connector.

**CHECK:**

Check continuity between terminals 3 and 5 of pattern select switch connector when the select switch is set to PWR and NORM positions.

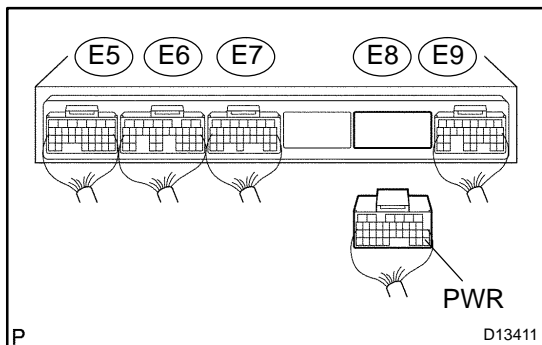
**OK:**

Pattern select switch	Specified condition
PWR	Continuity
NORM	No continuity

**NG** Replace the pattern select switch.

**OK**

**2 Check harness and connector between terminal PWR of ECM and body ground.**



**PREPARATION:**

- (a) Connect the pattern select switch connector.
- (b) Disconnect the connector of ECM.

**CHECK:**

Check continuity between terminal PWR of ECM and body ground when the pattern select switch is set to the PWR (POWER) position and NORM (NORMAL) position.

**OK:**

Pattern select switch	Specified condition
PWR	Continuity
NORM	No Continuity

**HINT:**

The ECM uses the normal pattern signal if the PWR signal is not input.

**OK** Proceed to next circuit inspection shown on matrix chart (See page [DI-396](#) ).

**NG**

Repair or replace harness or connector (See page [IN-36](#) ).

# CUSTOMER PROBLEM ANALYSIS CHECK

Automatic Transmission  
System Check Sheet

Inspector's  
Name \_\_\_\_\_ :

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate No.	
Date Vehicle Brought In	/ /	Odometer Reading	km mile

Date Problem Occurred	/ /
How Often Does Problem Occur?	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent ( times a day)

Symptoms	<input type="checkbox"/> Vehicle does not move ( <input type="checkbox"/> Any position <input type="checkbox"/> particular position)
	<input type="checkbox"/> No up-shift ( <input type="checkbox"/> 1st → 2nd <input type="checkbox"/> 2nd → 3rd <input type="checkbox"/> 3rd → 4th <input type="checkbox"/> 4th → 5th)
	<input type="checkbox"/> No down-shift ( <input type="checkbox"/> 5th → 4th <input type="checkbox"/> 4th → 3rd <input type="checkbox"/> 3rd → 2nd <input type="checkbox"/> 2nd → 1st)
	<input type="checkbox"/> Lock-up malfunction
	<input type="checkbox"/> Shift point too high or too low
	<input type="checkbox"/> Harsh engagement ( <input type="checkbox"/> N → D <input type="checkbox"/> Lock-up <input type="checkbox"/> Any drive position)
	<input type="checkbox"/> Slip or shudder
	<input type="checkbox"/> No kick-down
	<input type="checkbox"/> Others ( )

Check Item	Malfunction Indicator Lamp	<input type="checkbox"/> Normal <input type="checkbox"/> Remains ON
------------	----------------------------	---

DTC Check	1st Time	<input type="checkbox"/> Normal code <input type="checkbox"/> Malfunction code (DTC )
	2nd Time	<input type="checkbox"/> Normal code <input type="checkbox"/> Malfunction code (DTC )

## DIAGNOSTIC TROUBLE CODE CHART

If a DTC is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the page given.

\*1: ...MIL light up

DTC No. (See Page)	Detection Item	Trouble Area	MIL *1	Memory
P0500 (DI-274)	Vehicle Speed Sensor "A"	<ul style="list-style-type: none"> <li>✧Open or short in No. 1 vehicle speed sensor circuit</li> <li>✧No. 1 vehicle speed sensor</li> <li>✧Combination meter</li> <li>✧ECM</li> </ul>	▶	◀
P0705 (DI-402)	Transmission Range Sensor Circuit Malfunction (PRNDL Input)	<ul style="list-style-type: none"> <li>✧Short in park/neutral position switch circuit</li> <li>✧Park/neutral position switch</li> <li>✧ECM</li> </ul>	▶	◀
P0710 (DI-410)	Transmission Fluid Temperature Sensor "A" Circuit	<ul style="list-style-type: none"> <li>✧Open or short in ATF temperature sensor No.1 circuit</li> <li>✧ATF temperature sensor No.1</li> <li>✧ECM</li> </ul>	▶	◀
P0711 (DI-415)	Transmission Fluid Temperature Sensor "A" Performance	<ul style="list-style-type: none"> <li>✧ATF temperature sensor No.1</li> <li>✧ECM</li> </ul>	▶	◀
P0712 (DI-410)	Transmission Fluid Temperature Sensor "A" Circuit Low Input	<ul style="list-style-type: none"> <li>✧Short in ATF temperature sensor No.1 circuit</li> <li>✧ATF temperature sensor No.1</li> <li>✧ECM</li> </ul>	▶	◀
P0713 (DI-410)	Transmission Fluid Temperature Sensor "A" Circuit High Input	<ul style="list-style-type: none"> <li>✧Open in ATF temperature sensor No.1 circuit</li> <li>✧ATF temperature sensor No.1</li> <li>✧ECM</li> </ul>	▶	◀
P0717 (DI-418)	Input Speed Sensor Circuit No Signal	<ul style="list-style-type: none"> <li>✧Open or short in speed sensor NT circuit</li> <li>✧Speed sensor NT</li> <li>✧ECM</li> </ul>	▶	◀
P0722 (DI-421)	Output Speed Sensor	<ul style="list-style-type: none"> <li>✧Open or short in speed sensor SP2 circuit</li> <li>✧Speed sensor SP2</li> <li>✧ECM</li> </ul>	▶	◀
P0724 (DI-424)	Brake Switch "B" Circuit High	<ul style="list-style-type: none"> <li>✧Short in stop light switch circuit</li> <li>✧Stop light switch</li> <li>✧ECM</li> </ul>	▶	◀
P0748 (DI-426)	Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1)	<ul style="list-style-type: none"> <li>✧Open or short in shift solenoid valve SL1 circuit</li> <li>✧Shift solenoid valve SL1</li> <li>✧ECM</li> </ul>	▶	◀
P0751 (DI-433)	Shift Solenoid "A" Performance (Shift Solenoid Valve S1)	<ul style="list-style-type: none"> <li>✧Shift solenoid valve S1 is stuck open or closed</li> <li>✧Valve body is blocked up or stuck</li> <li>✧Shift solenoid valve S1</li> <li>✧Automatic transmission assembly</li> <li>✧ECM</li> </ul>	▶	◀
P0756 (DI-437)	Shift Solenoid "B" Performance (Shift Solenoid Valve S2)	<ul style="list-style-type: none"> <li>✧Shift solenoid valve S2 is stuck open or closed</li> <li>✧Valve body is blocked up or stuck</li> <li>✧Shift solenoid valve S2</li> <li>✧Automatic transmission assembly</li> <li>✧ECM</li> </ul>	▶	◀
P0771 (DI-441)	Shift Solenoid "E" Performance (Shift Solenoid Valve SR)	<ul style="list-style-type: none"> <li>✧Shift solenoid valve SR is stuck open or closed</li> <li>✧Shift solenoid valve SL1 is stuck open or closed</li> <li>✧Valve body is blocked up or stuck</li> <li>✧Shift solenoid valve SR</li> <li>✧Shift solenoid valve SL1</li> <li>✧Automatic transmission assembly</li> <li>✧ECM</li> </ul>	▶	◀

P0776 (DI-445)	Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)	<ul style="list-style-type: none"> <li>✘Shift solenoid valve SL2 is stuck open or closed</li> <li>✘Valve body is blocked up or stuck</li> <li>✘Shift solenoid valve SL2</li> <li>✘Automatic transmission assembly</li> <li>✘ECM</li> </ul>	▶	◀
P0778 (DI-449)	Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2)	<ul style="list-style-type: none"> <li>✘Open or short in shift solenoid valve SL2 circuit</li> <li>✘Shift solenoid valve SL2</li> <li>✘ECM</li> </ul>	▶	◀
P0781 (DI-453)	1-2 Shift	<ul style="list-style-type: none"> <li>✘Valve body is blocked up or stuck (1-2 shift valve)</li> <li>✘Automatic transmission assembly</li> <li>✘ECM</li> </ul>	▶	◀
P0818 (DI-457)	Driveline Disconnect Switch In- put Circuit	<ul style="list-style-type: none"> <li>✘Short in transfer neutral position switch circuit</li> <li>✘Transfer neutral position switch</li> <li>✘ECM</li> </ul>	▶	◀
P0850 (DI-402)	Park/Neutral Switch Input Circuit	<ul style="list-style-type: none"> <li>✘Short in park/neutral position switch circuit</li> <li>✘Park/neutral position switch</li> <li>✘ECM</li> </ul>	▶	◀
P0973 (DI-460)	Shift Solenoid "A" Control Circuit Low (Shift Solenoid Valve S1)	<ul style="list-style-type: none"> <li>✘Open or short in shift solenoid valve S1 circuit</li> <li>✘Shift solenoid valve S1</li> <li>✘ECM</li> </ul>	▶	◀
P0974 (DI-460)	Shift Solenoid "A" Control Circuit High (Shift Solenoid Valve S1)		▶	◀
P0976 (DI-464)	Shift Solenoid "B" Control Circuit Low (Shift Solenoid Valve S2)	<ul style="list-style-type: none"> <li>✘Open or short in shift solenoid valve S2 circuit</li> <li>✘Shift solenoid valve S2</li> <li>✘ECM</li> </ul>	▶	◀
P0977 (DI-464)	Shift Solenoid "B" Control Circuit High (Shift Solenoid Valve S2)		▶	◀
P0985 (DI-468)	Shift Solenoid "E" Control Circuit Low (Shift Solenoid Valve SR)	<ul style="list-style-type: none"> <li>✘Open or short in shift solenoid valve SR circuit</li> <li>✘Shift solenoid valve SR</li> <li>✘ECM</li> </ul>	▶	◀
P0986 (DI-468)	Shift Solenoid "E" Control Circuit High (Shift Solenoid Valve SR)		▶	◀
P1782 (DI-472)	T/F L4 Range Position Switch Performance	<ul style="list-style-type: none"> <li>✘Short in transfer L4 position switch circuit</li> <li>✘Transfer L4 position switch</li> <li>✘ECM</li> </ul>	▶	◀
P2714 (DI-476)	Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)	<ul style="list-style-type: none"> <li>✘Shift solenoid valve SLT is stuck open or closed</li> <li>✘Valve body is blocked up or stuck</li> <li>✘Shift solenoid valve SLT</li> <li>✘Automatic transmission assembly</li> <li>✘ECM</li> </ul>	▶	◀
P2716 (DI-479)	Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)	<ul style="list-style-type: none"> <li>✘Open or short in shift solenoid valve SLT circuit</li> <li>✘Shift solenoid valve SLT</li> <li>✘ECM</li> </ul>	▶	◀
P2740 (DI-483)	Transmission Fluid Temperature Sensor "B" Circuit	<ul style="list-style-type: none"> <li>✘Open or short in ATF temperature sensor No. 2 circuit</li> <li>✘ATF temperature sensor No. 2</li> <li>✘ECM</li> </ul>	▶	◀
P2742 (DI-483)	Transmission Fluid Temperature Sensor "B" Circuit Low	<ul style="list-style-type: none"> <li>✘Short in ATF temperature sensor No. 2 circuit</li> <li>✘ATF temperature sensor No. 2</li> <li>✘ECM</li> </ul>	▶	◀
P2743 (DI-483)	Transmission Fluid Temperature Sensor "B" Circuit High	<ul style="list-style-type: none"> <li>✘Open in ATF temperature sensor No. 2 circuit</li> <li>✘ATF temperature sensor No. 2</li> <li>✘ECM</li> </ul>	▶	◀


DIAGNOSTICS - AUTOMATIC TRANSMISSION

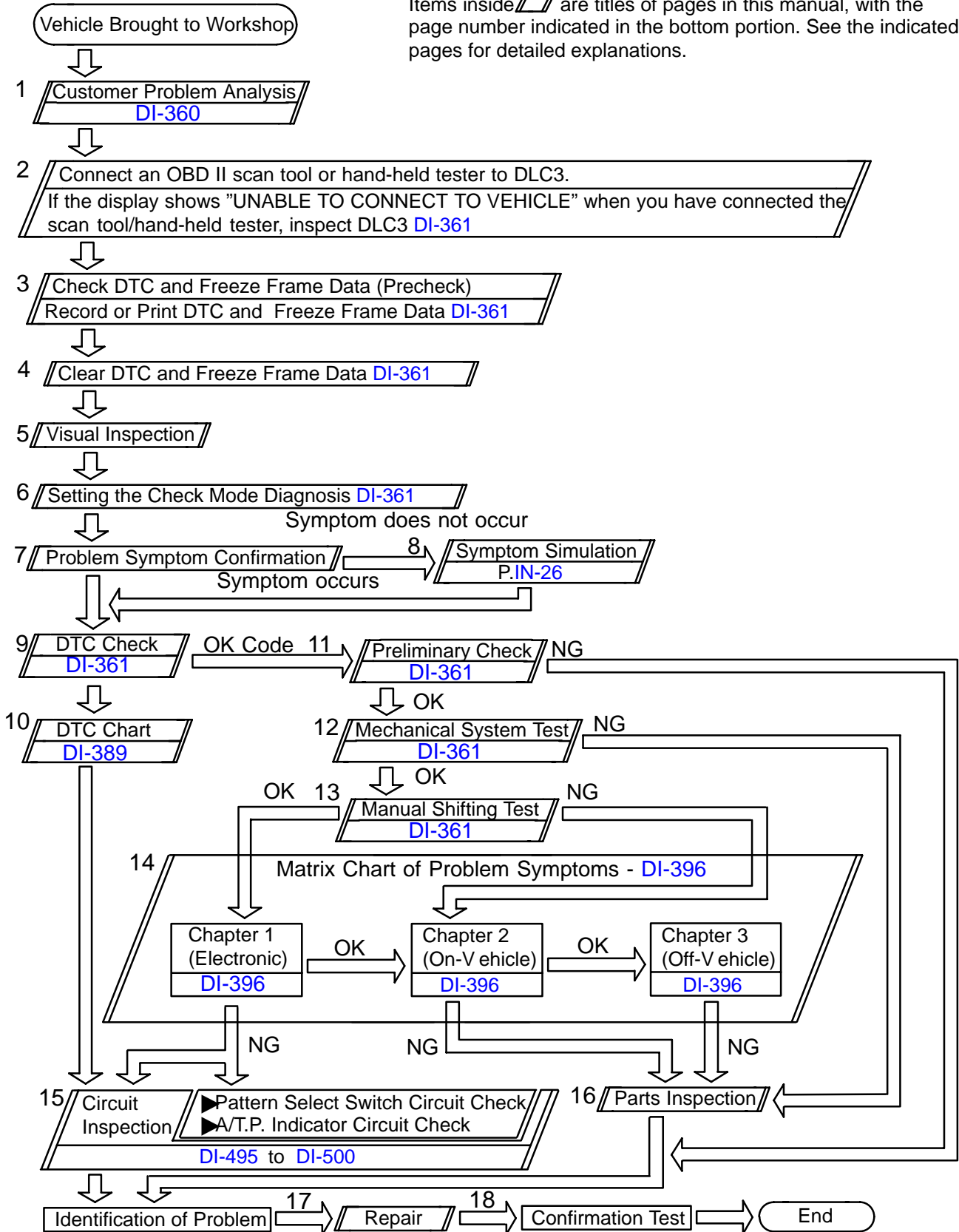
<p>P2757 (DI-487)</p>	<p>Torque Converter Clutch Pressure Control Solenoid Performance (Shift Solenoid Valve SLU)</p>	<ul style="list-style-type: none"> <li>✧Shift solenoid valve SLU is stuck open or closed</li> <li>✧Valve body is blocked up or stuck</li> <li>✧Shift solenoid valve SLU</li> <li>✧Automatic transmission assembly</li> <li>✧ECM</li> </ul>	▶	◀
<p>P2759 (DI-491)</p>	<p>Torque Converter Clutch Pressure Control Solenoid Control Circuit Electrical (Shift Solenoid Valve SLU)</p>	<ul style="list-style-type: none"> <li>✧Open or short in shift solenoid valve SLU circuit</li> <li>✧Shift solenoid valve SLU</li> <li>✧ECM</li> </ul>	▶	◀

# AUTOMATIC TRANSMISSION

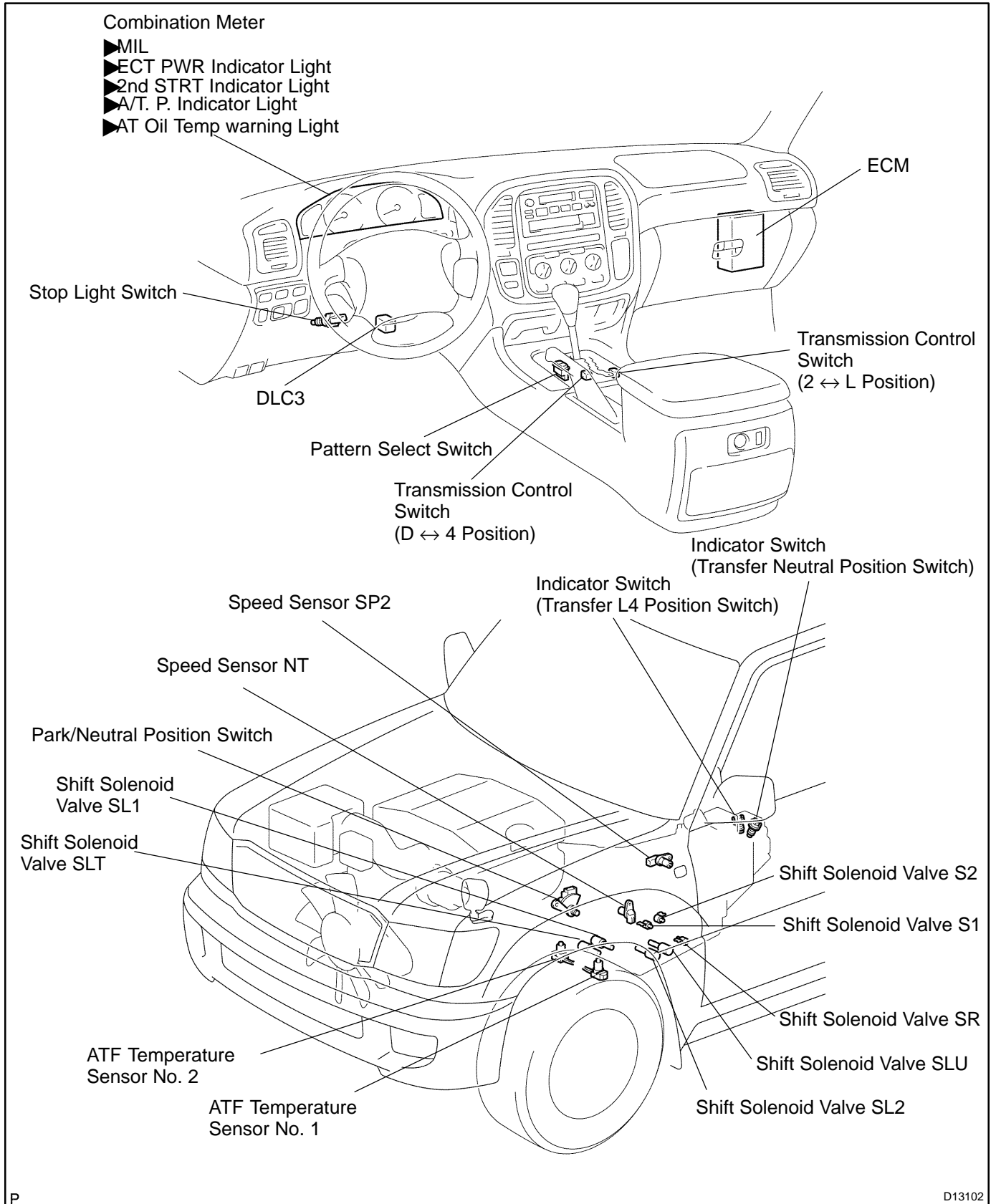
## HOW TO PROCEED WITH TROUBLESHOOTING

DISBN-04

Items inside  are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.



# PARTS LOCATION



## PRECAUTION

### NOTICE:

Perform the **RESET MEMORY (AT initialization)** when replacing the automatic transmission assy, engine assy or the ECM (See page [DI-361](#) ).

### HINT:

Initialization can not be completed by only disconnecting the battery terminal.



## PRE-CHECK

### 1. DIAGNOSIS SYSTEM

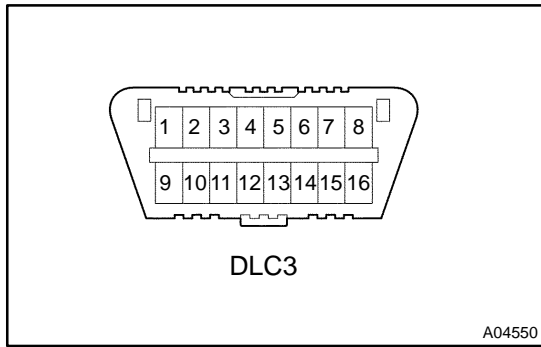
#### (a) Description

- (1) When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you need to connect an OBD II scan tool complying with SAE J1987 or a hand-held tester to the vehicle, and read off various data output from the vehicle's ECM.
- (2) OBD II regulations require that the vehicle's on-board computer illuminate the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in the drive system components which affect the vehicle emissions. In addition to the MIL illuminating when a malfunction is detected, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory (See page [DI-381](#) ).



If the malfunction does not occur in 3 consecutive trips, the MIL goes off but the DTCs remain in the ECM memory.

- (3) To check the DTCs, connect the OBD II scan tool or hand-held tester to the DLC3 of the vehicle. The OBD II scan tool or hand-held tester also enables you to erase the DTCs and check freeze frame data and various forms of engine data (For instruction book).
- (4) The DTCs include SAE controlled codes and Manufacturer controlled codes. SAE controlled codes must be set as prescribed by the SAE, while Manufacturer controlled codes can be set freely by a manufacturer within the prescribed limits (See the DTC chart on page [DI-381](#) ).
- (5) The diagnosis system operates in the normal mode during the normal vehicle use, and also has a check mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2 trip detection logic(\*) to prevent erroneous detection. By switching the ECM to the check mode when troubleshooting, the technician can cause the MIL to light up for a malfunction that is only detected once or momentarily. (hand-held tester).
- (6) \*2 trip detection logic:  
When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory. If the same malfunction is detected again during the second test drive, this second detection causes the MIL to illuminate.



- (b) Inspect the DLC3.  
The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Tester connection	Condition	Specified condition
7 (Bus ℓ Line) - 5 (Signal ground)	During communication	Pulse generation
4 (Chassis Ground) - Body	Always	1 Ω or less
5 (Signal Ground) - Body	Always	1 Ω or less
16 (B+) - Body	Always	9 to 14 V

**HINT:**

If your display shows **UNABLE TO CONNECT TO VEHICLE** when you have connected the cable of the OBD II scan tool or hand-held tester to the DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

- ▶ If the communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- ▶ If the communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

- (c) Inspect the battery voltage.  
**Battery Voltage: 11 to 14 V**

If voltage is below 11 V, recharge the battery before proceeding.

- (d) Check the MIL.
  - (1) The MIL comes on when the ignition switch is turned ON and the engine is not running.

**HINT:**

If the MIL does not light up, troubleshoot the combination meter (See page [BE-63](#) ).

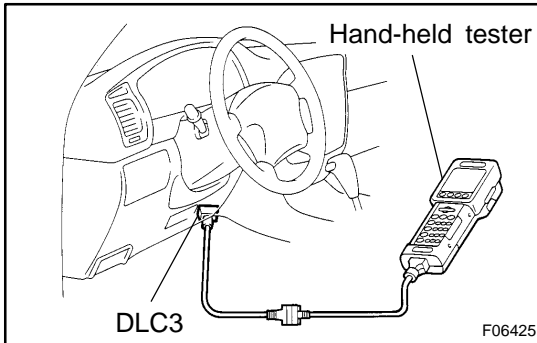
- (2) When the engine is started, the MIL should go off. If the lamp remains on, it means that the diagnosis system has detected a malfunction or abnormality in the system.

## 2. Normal Mode: DTC CHECK

### NOTICE:

#### Hand-held tester only:

When the diagnostic system is switched from the normal mode to the check mode, all the DTCs and freeze frame data recorded in the normal mode will be erased. So before switching modes, always check the DTCs and freeze frame data, and note them down.



- (a) Checking DTCs using the OBD II scan tool or hand-held tester.
- (1) Connect the OBD II scan tool or hand-held tester to DLC3.
  - (2) Turn the ignition switch ON.
  - (3) Use the OBD II scan tool or hand-held tester to check the DTCs and freeze frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book).
  - (4) See page [DI-381](#) to confirm the details of the DTCs.

### NOTICE:

When simulating symptoms with an OBD II scan tool (excluding hand-held tester) to check the DTCs, use the normal mode. For codes on the DTCs chart subject to "2 trip detection logic", turn the ignition switch OFF after the symptom is simulated once. Then repeat the simulation process again. When the problem has been simulated twice, the MIL is indicated on the instrument panel and DTCs are recorded in the ECM.

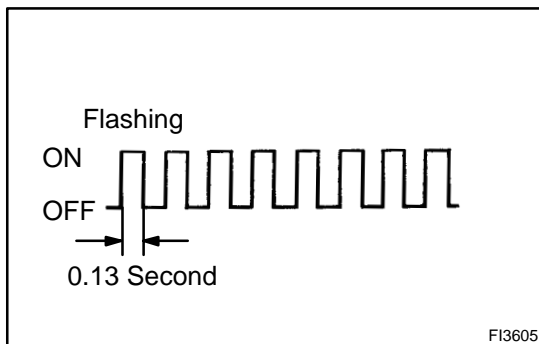
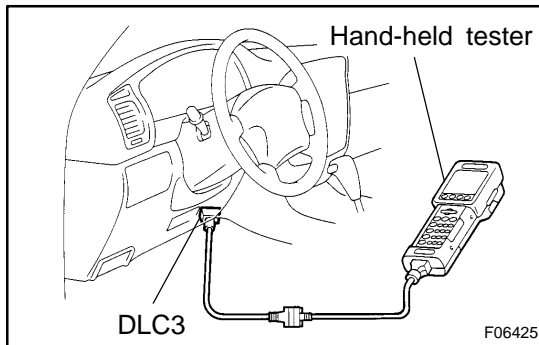
- (b) When using the OBD II scan tool or hand-held tester:  
Clearing the DTCs.
- (1) Connect the OBD II scan tool or hand-held tester to DLC3.
  - (2) Turn the ignition switch ON.
  - (3) When operating an OBD II scan tool (complying with SAE J1978) or hand-held tester to erase the codes, the DTCs and freeze frame data will be erased. (See the OBD II scan tool's instruction book for operating instructions.)
- (c) When not using the OBD II scan tool or hand-held tester:  
Clearing the DTCs.
- (1) Disconnecting the battery terminal or remove the EFI and ETCS fuse from engine room J/B for 60 seconds or more.

### 3. Check Mode: DTC CHECK

#### HINT:

Hand-held tester only:

Compared to the normal mode, the check mode has more sensing ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check mode.



- (a) Procedure for Check Mode using the hand-held tester.
- (1) Check the initial conditions.
    - ▶ Battery positive voltage 11 V or more
    - ▶ Throttle valve fully closed
    - ▶ Transmission in P or N position
    - ▶ A/C switched OFF
  - (2) Turn the ignition switch OFF.
  - (3) Connect the hand-held tester to the DLC3.
  - (4) Turn the ignition switch ON.
  - (5) Switch the hand-held tester from the normal mode to the check mode (Check that the MIL flashes).

#### NOTICE:

**If the hand-held tester switches the ECM from the normal mode to the check mode or vice-versa, or if the ignition switch is turned from ON to ACC or OFF during the check mode, the DTC and freeze frame data will be erased.**

- (6) Start the engine (MIL goes off after the engine starts).
- (7) Simulate the conditions of the malfunction described by the customer.

#### NOTICE:

**Leave the ignition switch ON until you have checked the DTCs, etc.**

- (8) After simulating the malfunction conditions, use the hand-held tester diagnosis selector to check the DTCs and freeze frame data, etc.

#### HINT:

Be sure not to turn the ignition switch OFF, as turning it OFF switches the diagnosis system from the check mode to the normal mode, which erases all the DTCs, etc.

- (9) After checking the DTC, inspect the applicable circuit.
- (b) When using the OBD II scan tool or hand-held tester:  
Clearing the DTCs.
- (1) Connect the OBD II scan tool or hand-held tester to DLC3.
  - (2) Turn the ignition switch ON.

- (3) When operating an OBD II scan tool (complying with SAE J1978) or hand-held tester to erase the codes, the DTCs and freeze frame data will be erased. (See the OBD II scan tool's instruction book for operating instructions.)
- (c) When not using the OBD II scan tool or hand-held tester:
  - (1) Disconnecting the battery terminal or remove the EFI and ETCS fuse from engine room J/B for 60 seconds or more.

**4. DATA LIST**

**HINT:**

According to the DATA LIST displayed by the OBD II scan tool or Hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as a first step of troubleshooting is one method to shorten labor time.

- (a) Warm up the engine.
- (b) Turn the ignition switch OFF.
- (c) Connect the OBD II scan tool or Hand-held tester to the DLC3.
- (d) Turn the ignition switch ON.
- (e) Push the "ON" button of OBD II scan tool or Hand-held tester.
- (f) Select the item "/DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL (or ATM)".
- (g) According to the display on tester, read the "DATA LIST".

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
STOP LIGHT SW	Stop light SW Status/ ON or OFF	▶ Brake Pedal is depressed: ON ▶ Brake Pedal is released: OFF	←
SHIFT	Actual Gear Position/ 1st, 2nd, 3rd, 4th or 5th	Shift Lever Position is; ▶ L: 1st ▶ 2: 1st or 2nd ▶ 3: 1st, 2nd or 3rd ▶ 4: 1st, 2nd, 3rd or 4th ▶ D: 1st, 2nd, 3rd, 4th or 5th	←
PNP SW [NSW]	PNP SW Status/ ON or OFF	Shift lever position is; P or N: ON Except P or N: OFF	The shift lever position and these values are different, there are failures of the PNP switch or shift cable adjustment.
REVERSE	PNP SW Status/ ON or OFF	Shift lever position is; R: ON Except R: OFF	
DRIVE	PNP SW Status/ ON or OFF	Shift lever position is; D and 4: ON Except D and 4: OFF	
4th/DRIVE	PNP SW Status/ ON or OFF	Shift lever position is; 4: ON Except 4: OFF	
3RD	PNP SW Status/ ON or OFF	Shift lever position is; 3: ON Except 3: OFF	
2ND	PNP SW Status/ ON or OFF	Shift lever position is; 2 and L: ON Except 2 and L: OFF	
LOW	PNP SW Status/ ON or OFF	Shift lever position is; L: ON Except L: OFF	
LOCK UP SOL	Lock Up Solenoid Status/ ON or OFF	▶ Lock Up: ON ▶ Except Lock Up: OFF	←

PATTERN SW (M)	Pattern SW (PWR) Status/ ON or OFF	Pattern SW (PWR) is; Pushed in: ON Pushed once again: OFF	←
SNOW SW	Pattern SW (2nd) Status/ ON or OFF	▶IG SW ON: OFF ↓ ▶Pattern SW (2nd) Push: ON ↓ ▶Pattern SW (2nd) Push: OFF	←
SOLENOID (SLT)	Shift Solenoid SLT Status/ ON or OFF	IG SW ON: ON	←
SOLENOID (SLU)	Shift Solenoid SLU Status/ ON or OFF	▶Lock Up: ON ▶Except Lock Up: OFF	←
SPD (SP2)	Counter Gear Speed display/ min.: 0 km/h (0 mph) max.: 255 km/h (158 mph)	Vehicle stopped: 0 km/h (0 mph)	←
AT FLUID TEMP	ATF Temp. Sensor No. 1 Value/ min.: -40:°C (-40:°F) max.: 215:°C (419:°F)	80:°C (176:°F) (After Stall Test)	If the value is "-40:°C (-40:°F)" or "215:°C (419:°F)", ATF temp. sensor No. 1 circuit is opened or shorted.

## 5. ACTIVE TEST

### HINT:

Performing the ACTIVE TEST using the Hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as a first step of troubleshooting is one method to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- Warm up the engine.
- Turn the ignition switch OFF.
- Connect the Hand-held tester to the DLC3.
- Turn the ignition switch ON.
- Push the "ON" button of Hand-held tester.
- Select the item "/DIAGNOSIS/ENHANCED OBD II/ACTIVE TEST".
- According to the display on tester, perform the "ACTIVE TEST".

Item	Test Details	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] Less than 50 km/h (31 mph) [Others] ▶Press → button: Shift up ▶Press ← button: Shift down	Possible to check the operation of the shift solenoid values. HINT: Shifting to the 5th gear is possible only when the vehicle stops or idle is ON.
LOCK UP	[Test Details] Control the shift solenoid SLU to set the ATM to the lock-up condition. [Vehicle Condition] Vehicle Speed: 58 km/h (36 mph) or more	Possible to check the SLU operation.
LINE PRESS UP	[Test Details] Operate the shift solenoid SLT and raise the line pressure. [Vehicle Condition] ▶Vehicle Stopped. ▶DL: ON [Others] ON: Line pressure up. OFF: No action (normal operation)	-

## 6. DEFINITION OF TERMS

Term	Definition
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and its details).
Related DTCs	Diagnostic code
Typical enabling condition	Preconditions that allow the ECM to detect malfunctions. With all preconditions satisfied, the ECM sets the DTC when the monitored value(s) exceeds the malfunction threshold(s).
Sequence of operation	The priority order that is applied to monitoring, if multiple sensors and components are used to detect the malfunction. While another sensor is being monitored, the next sensor or component will not be monitored until the previous monitoring has concluded.
Required sensor/components	The sensors and components that are used by the ECM to detect malfunctions.
Frequency of operation	The number of times that the ECM checks for malfunctions per driving cycle. "Once per driving cycle" means that the ECM detects malfunction only one time during a single driving cycle. "Continuous" means that the ECM detects malfunction every time when enabling condition is met.
Duration	The minimum time that the ECM must sense a continuous deviation in the monitored value(s) before setting a DTC. This timing begins after the "typical enabling conditions" are met.
Malfunction thresholds	Beyond this value, the ECM will conclude that there is a malfunction and set a DTC.
MIL operation	MIL illumination timing after a defect is detected. "Immediately" means that the ECM illuminates MIL the instant the ECM determines that there is a malfunction. "2 driving cycle" means that the ECM illuminates MIL if the same malfunction is detected again in the 2nd driving cycle.

## 7. TOYOTA/LEXUS PART AND SYSTEM NAME LIST

This reference list indicates the part names used in this manual along with their definitions.

TOYOTA/LEXUS name	Definition
Toyota HCAC system, Hydrocarbon adsorptive Catalyst (HCAC) system, HC adsorptive three-way catalyst	HC adsorptive three-way catalytic converter
Variable Valve Timing sensor, VVT sensor	Camshaft position sensor
Variable valve timing system, VVT system	Camshaft timing control system
Camshaft timing oil control valve, Oil control valve OCV, VVT, VSV	Camshaft timing oil control valve
Variable timing and lift, VVTL	Camshaft timing and lift control
Crankshaft position sensor "A"	Crankshaft position sensor
Engine speed sensor	Crankshaft position sensor
THA	Intake air temperature
Knock control module	Engine knock control module
Knock sensor	Engine knock sensor
Mass or volume air flow circuit	Mass air flow sensor circuit
Vacuum sensor	Manifold air pressure sensor
Internal control module, Control module, Engine control ECU, PCM	Power train control module
FC idle	Deceleration fuel cut
Idle air control valve	Idle speed control
VSV for CCV, Canister close valve VSV for canister control	Evaporative emissions canister vent valve
VSV for EVAP, Vacuum switching valve assembly No. 1, EVAP VAV, Purge VSV	Evaporative emissions canister purge valve
VSV for pressure switching valve, Bypass VSV	Evaporative emission pressure switching valve
Vapor pressure sensor, EVAP pressure sensor, Evaporative emission control system pressure sensor	Fuel tank pressure sensor
Charcoal canister	Evaporative emissions canister
ORVR system	On-board refueling vapor recovery system
Intake manifold runner control	Intake manifold tuning system
Intake manifold runner valve, IMRV, IACV (runner valve)	Intake manifold tuning valve
Intake control VSV	Intake manifold tuning solenoid valve

AFS	Air fuel ratio sensor
O2 sensor	Heater oxygen sensor
Oxygen sensor pumping current circuit	Oxygen sensor output signal
Oxygen sensor reference ground circuit	Oxygen sensor signal ground
Accel position sensor	Accelerator pedal position sensor
Throttle actuator control motor, Actuator control motor, Electronic throttle motor, Throttle control motor	Electronic throttle actuator
Electronic throttle control system, Throttle actuator control system	Electronic throttle control system
Throttle/pedal position sensor, Throttle/pedal position switch, Throttle position sensor/switch	Throttle position sensor
Turbo press sensor	Turbocharger pressure sensor
Turbo VSV	Turbocharger pressure control solenoid valve
P/S pressure switch	Power-steering pressure switch
VSV for ACM	Active control engine mount
Speed sensor, Vehicle speed sensor "A", Speed sensor for skid control ECU	Vehicle speed sensor
ATF temperature sensor, Trans. fluid temp. sensor, ATF temperature sensor "A"	Transmission fluid temperature sensor
Electronic controlled automatic transmission, ECT	Electronically controlled automatic
Intermediate shaft speed sensor "A"	Counter gear speed sensor
Output speed sensor	Output shaft speed sensor
Input speed sensor, Input turbine speed sensor "A", Speed sensor (NT), Turbine speed sensor	Input turbine speed sensor
PNP switch, NSW	Park/neutral position switch
Pressure control solenoid	Transmission pressure control solenoid
Shift solenoid	Transmission shift solenoid valve
Transmission control switch, Shift lock control unit	Shift lock control module
Engine immobilizer system, Immobilizer system	Vehicle anti-theft system



**8. The monitor will run whenever the following DTCs are not present (Monitor disablement List)**

HINT:

This table indicates ECM monitoring status for the items in the upper columns if the DTCs in each line on the left are being set.

As for the "X" mark, when the DTC on the left is stored, detection of the DTC in the upper column is not performed.

DTC		Monitor disablement (X : disabled)																																			
		P0010,P0020	P0031-0052	P0031-0052	P0037-0058	P0043-P0064	P0100-P0103	P0101	P0110-P0113	P0115-P0118	P0116	P0120-P2135	P0125	P0128	P0130-P0153	P0134-P0154	P0136,P0156	P0142,P0162	P0171-P0175	P0300,P0308	P0325-P0333	P0335	P0340,P0341	P0340-P0346	P0351-P0358	P0401	P0402	P0405	P0409	P0420,P0430	P0442-P0446	P0450,P0453					
Component/System		VVT VVS1,2	FrO2S heater sensor 1	A/F sensor heater sensor 1	FrO2S heater sensor 2	FrO2S heater sensor 3	MAF sensor	MAF sensor	IAT sensor	ECT sensor	ECT sensor	TP sensor	Insufficient ECT for CL	Thermostat	O2S Sensor 1	FrO2S,A/F sensor (No Activity)	O2S Sensor 2	O2S Sensor 3	Fuel system	Misfire	Knock sensor	CKP sensor	CMP sensor	VVT sensor 1,2	Ignitor	EGR system (closed)	EGR system (open)	EGR Lift sensor	EGR Lift sensor	Catalyst	EVAP system	EVAP press sensor					
Monitor detected malfunction	P0010,P0020	VVT VVS1,2																																			
	P0031-0052	FrO2S heater sensor 1																																			
	P0031-0052	A/F sensor heater sensor 1																																			
	P0037-0058	FrO2S heater sensor 2																																			
	P0043-0064	FrO2S heater sensor 3																																			
	P0100-P0103	MAF sensor																																			
	P0110-P0113	IAT sensor																																			
	P0115-P0118	ECT sensor																																			
	P0120-P2135	TP sensor																																			
	P0125	ECT sensor																																			
	P0128	Thermostat																																			
	P0130-P0153	O2S Sensor 1																																			
	P0134,P0154	Closed Loop																																			
	P0136,P0156	O2S Sensor 2																																			
	P0142,P0162	O2S Sensor 3																																			
	P0171-P0172	Fuel system																																			
	P0300-P0308	Misfire																																			
	P0325-P0333	Knock sensor																																			
	P0335	CKP sensor																																			
	P0340,P0341	CMP sensor																																			
	P0340-P0346	VVT sensor 1,2																																			
	P0351-P0358	Ignitor																																			
	P0401	EGR system (closed)																																			
	P0402	EGR system (open)																																			
	P0405,P0409	Lift sensor																																			
	P0420,P0430	Catalyst																																			
	P0442-P0446	EVAP system																																			
	P0450,P0451	EVAP press sensor																																			

P

D13631







## 9. PROBLEM SYMPTOM CONFIRMATION

Taking into consideration the results of the customer problem analysis, try to reproduce the symptoms. If the problem is that the transmission does not shift up, shift down, or the shift point is too high or too low, conduct the following road test referring to the automatic shift schedule and simulate the problem symptoms.

## 10. ROAD TEST

### NOTICE:

**Perform the test at normal operating ATF temperature 50 to 80°C (122 to 176°F).**

(a) D position test (NORM and PWR pattern):

Shift into the D position and fully depress the accelerator pedal and check the following points.

(1) Check up-shift operation.

Check that 1 → 2, 2 → 3, 3 → 4 and 4 → 5th up-shifts take place, and that the shift points conform to the automatic shift schedule (See page [SS-23](#)).

### HINT:

- ▶ 5th Gear Up-shift Prohibition Control (1. Coolant temp. is 55°C (131°F) or less. 2. Vehicle speed is 51 km/h (32 mph) or less.)
- ▶ 4th Gear Up-shift Prohibition Control (1. Coolant temp. is 40°C (104°F) or less. 2. Vehicle speed is 45 km/h (28 mph) or less.)
- ▶ 5th Gear Lock-up Prohibition Control (1. Brake pedal is depressed. 2. Coolant temp. is 60°C (140°F) or less.)
- ▶ When the 2nd start switch is on, there is no 1→2 up-shift and 2→1 down-shift.

(2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2, 2 → 3, 3 → 4 and 4 → 5th up-shifts.

(3) Check for abnormal noises and vibration.

Drive in the D position lock-up or 5th gear and check for abnormal noises and vibration.

### HINT:

The check for the cause of abnormal noises and vibration must be done very thoroughly as it could also be due to loss of balance in the differential, torque converter clutch, etc.

(4) Check kick-down operation.

While running in the D position, 2nd, 3rd, 4th and 5th gears, check that the possible kick-down vehicle speed limits for 2 → 1, 3 → 2, 4 → 3 and 5th → 4 kick-downs conform to those indicated on the automatic shift schedule (See page [SS-23](#)).

(5) Check abnormal shock and slip at kick-down.

(6) Check the lock-up mechanism.

- ▶ Drive in D position 5th gear, at a steady speed (lock-up ON) of about 70 km/h (43 mph).
- ▶ Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

If there is a big jump in engine speed, there is no lock-up.

(b) 4 position test:

Shift into the 4 position and fully depress the accelerator pedal and check the following points.

(1) Check up-shift operation.

Check that the 1 → 2, 2 → 3 and 3 → 4 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page [SS-23](#)).

### HINT:

▶ There is no 5th up-shift in the 4 position.

▶ 4th Gear Lock-up Prohibition Control (1. Brake pedal is depressed. 2. Coolant temp. is 60°C (140°F) or less.)

- (2) Check engine braking.  
While driving in the 4 position and 4th gear, release the accelerator pedal and check the engine braking effect.
- (3) Check for abnormal noises during acceleration and deceleration, and for shock at up-shift and down-shift.
- (4) Check the lock-up mechanism.
  - ▶ Drive in 4 position 4th gear, at a steady speed (lock-up ON) of about 64 km/h (40 mph).
  - ▶ Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

If there is a big jump in engine speed, there is no lock-up.

(c) 3 position test:

Shift into the 3 position and fully depress the accelerator pedal and check the following points.

- (1) Check up-shift operation.  
Check that the 1 → 2 and 2 → 3 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page [SS-23](#) ).
- (2) Check engine braking.  
While running in the 3 position and 3rd gear, release the accelerator pedal and check the engine braking effect.
- (3) Check for abnormal noises during acceleration and deceleration, and for shock at up-shift and down-shift.

(d) 2 position test:

Shift into the 2 position and fully depress the accelerator pedal and check the following points.

- (1) Check up-shift operation.  
Check that the 1 → 2 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page [SS-23](#) ).

HINT:

When the 2nd start switch is ON, there is no 1 → 2 up-shift and 2 → 1 down-shift.

- (2) Check engine braking.  
While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.
- (3) Check for abnormal noises during acceleration and deceleration, and for shock at up-shift and down-shift.

(e) L position test:

Shift into the L position and fully depress the accelerator pedal and check the following points.

- (1) Check no up-shift.  
While running in the L position, check that there is no up-shift to 2nd gear.
- (2) Check engine braking.  
While running in the L position, release the accelerator pedal and check the engine braking effect.
- (3) Check for abnormal noises during acceleration and deceleration.

(f) R position test:

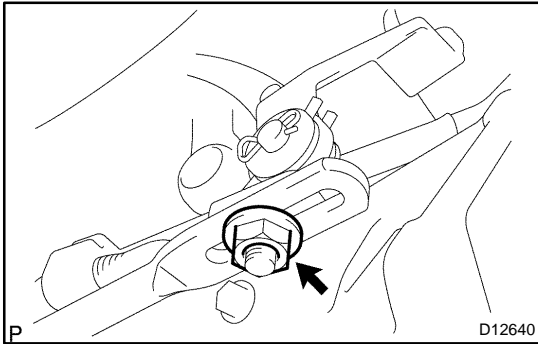
Shift into the R position, lightly depress the accelerator pedal, and check that the vehicle moves backward without any abnormal noise or vibration.

**CAUTION:**

**Before conducting this test ensure that the test area is free from people and obstruction.**

## (g) P position test:

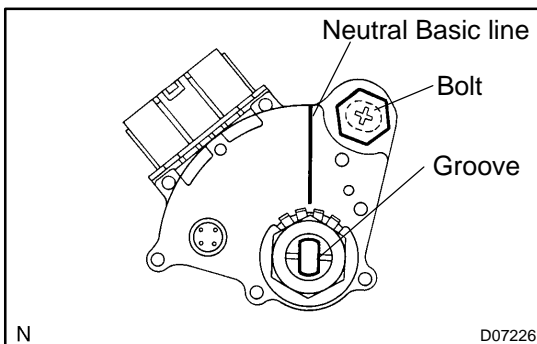
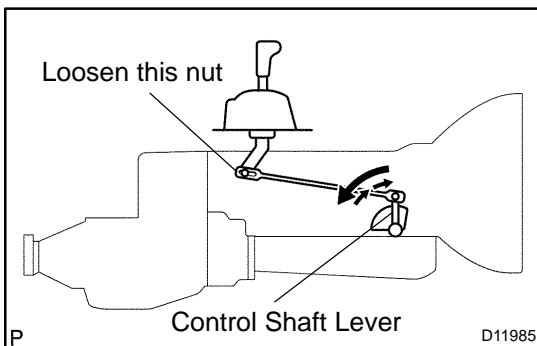
Stop the vehicle on a grade (more than 5°) and after shifting into the P position, release the parking brake. Then, check that the parking lock pawl holds the vehicle in place.

**11. ADJUST SHIFT LEVER POSITION**

When shifting the shift lever from the N position to other positions, check that the lever can be shifted smoothly and accurately to each position and that the position indicator is not aligned with the correct position.

If the indicator is not aligned with the correct position, carry out the following adjustment procedures.

- (a) Loosen the nut on the shift lever.
  - (b) Push the control shaft fully rearward.
  - (c) Return the control shaft lever 2 notches to N position.
  - (d) Set the shift lever to N position.
  - (e) While holding the shift lever lightly toward the R position side, tighten the shift lever nut.
- Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)**
- (f) Start the engine and make sure that the vehicle moves forward when shifting the lever from the N to D position and reverses when shifting it to the R position.

**12. ADJUST PARK/NEUTRAL POSITION SWITCH**

- ▶ Check that the engine can be started with the shift lever only in the N or P position, but not in other positions.

If it is not as stated above, carry out the following adjustment procedures.

- ▶ Loosen the park/neutral position switch bolt and set the shift lever to the N position.
- ▶ Align the groove with neutral basic line.
- ▶ Hold in position and tighten the bolt.

**Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)**

- ▶ For continuity inspection of the park/neutral position switch, see page [DI-394](#).

**13. CHECK IDLE SPEED**

**Idle speed (In N position and air conditioner OFF):**  
**700 ± 50 rpm**

**14. MECHANICAL SYSTEM TESTS****(a) Measure the stall speed.**

The object of this test is to check the overall performance of the transmission and engine by measuring the stall speeds in the D and R positions.

**NOTICE:**

- ▶ **Do the test at normal operating fluid temperature 70 to 80 °C (158 to 176 °F).**
  - ▶ **Do not continuously run this test longer than 5 seconds.**
  - ▶ **To ensure safety, conduct this test in a wide, clear level area which provides good traction.**
  - ▶ **The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**
- (1) Chock all 4 wheels.
  - (2) Connect an OBD II scan tool or hand-held tester to DLC3.
  - (3) Fully apply the parking brake.
  - (4) Keep your left foot pressing firmly on the brake pedal.
  - (5) Start the engine.
  - (6) Shift into the D position. Press all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

**Stall speed: 2,150 ± 150 rpm**

- (7) Do the same test in R position.

**Stall speed: 2,150 ± 150 rpm**

**Evaluation:**

Problem	Possible cause
(a) Engine stall speed low in D and R positions	<ul style="list-style-type: none"> <li>▶ Engine output may be insufficient</li> <li>▶ Stator one-way clutch is not operating properly</li> </ul> <p>HINT: If the value is less than the specified value by 600 rpm or more, the torque converter could be faulty.</p>
(b) Engine stall speed high in D position	<ul style="list-style-type: none"> <li>▶ Line pressure too low</li> <li>▶ Clutch No. 1 (C<sub>1</sub>) slipping</li> <li>▶ One-way clutch No.3 (F<sub>3</sub>) not operating properly</li> </ul>
(c) Engine stall speed high in R position	<ul style="list-style-type: none"> <li>▶ Line pressure too low</li> <li>▶ Brake No. 4 (B<sub>4</sub>) slipping</li> <li>▶ Clutch No. 3 (C<sub>3</sub>) slipping</li> <li>▶ One-way clutch No.1 (F<sub>1</sub>) not operating properly</li> </ul>
(d) Engine stall speed high in D and R positions	<ul style="list-style-type: none"> <li>▶ Line pressure too low</li> <li>▶ Improper fluid level</li> </ul>



- (b) Measure the time lag.  
 When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the clutch and brake.

**NOTICE:**

- ▶ **Do the test at normal operating fluid temperature 70 to 80 °C (158 to 176 °F).**
- ▶ **Be sure to allow 1 minute interval between tests.**
- ▶ **Take 3 measurements and take the average value.**

- (1) Fully apply the parking brake.
- (2) Start the engine and check idle speed.

**Idle speed (In N position and air conditioner OFF): 700 ± 50 rpm.**

- (3) Shift the shift lever from N to D position. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.

**Time lag:**

**N → D Less than 1.2 seconds**

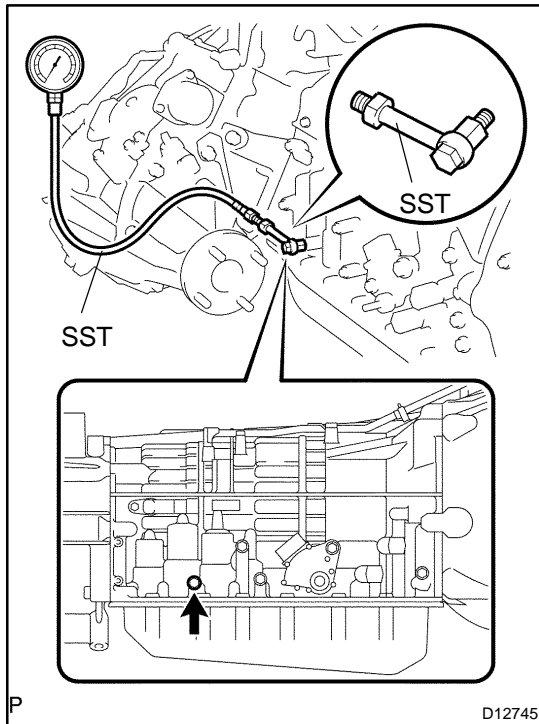
- (4) In the same manner, measure the time lag for N → R.

**Time lag:**

**N → R Less than 1.5 seconds**

**Evaluation (If N → D time or N → R time lag is longer than the specified):**

Problem	Possible cause
N → D time lag is longer	<ul style="list-style-type: none"> <li>▶Line pressure too low</li> <li>▶Clutch No. 1 (C<sub>1</sub>) worn</li> <li>▶One-way clutch No.3 (F<sub>3</sub>) not operating properly</li> </ul>
N → R time lag is longer	<ul style="list-style-type: none"> <li>▶Line pressure too low</li> <li>▶Clutch No. 3 (C<sub>3</sub>) worn</li> <li>▶Brake No. 4 (B<sub>4</sub>) worn</li> <li>▶One-way clutch No.1 (F<sub>1</sub>) not operating properly</li> </ul>



**15. HYDRAULIC TEST**

Measure the line pressure.

**NOTICE:**

- ▶ Do the test at normal operation fluid temperature 70 to 80°C (158 to 176°F).
- ▶ The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.
- ▶ Be careful to prevent SST's hose from interfering with the exhaust pipe.
- ▶ This check must be conducted after checking and adjusting engine.
- ▶ Perform under condition that A/C is OFF.
- ▶ When conducting stall test, do not continue more than 10 seconds.

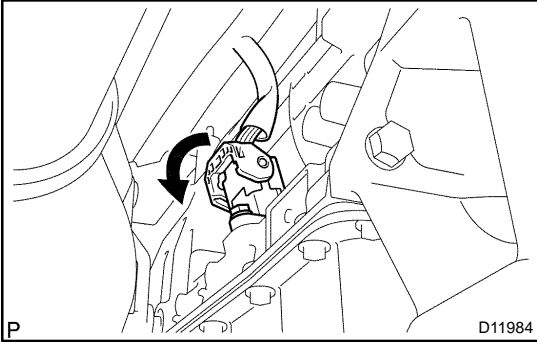
- (1) Warm up the ATF.
  - (2) Remove the test plug on the transmission case center right side and connect SST.
- SST 09992-00095 (09992-00231, 09992-00271)
- (3) Fully apply the parking brake and chock the 4 wheels.
  - (4) Start the engine and check idling speed.
  - (5) Keep your left foot pressing firmly on the brake pedal and shift into D position.
  - (6) Measure the line pressure when the engine is idling.
  - (7) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
  - (8) In the same manner, do the test in R position.

**Specified line pressure:**

Condition	D position kPa (kgf/cm <sup>2</sup> , psi)	R position kPa (kgf/cm <sup>2</sup> , psi)
Idling	362 to 420 (3.7 to 4.2, 53 to 59)	500 to 580 (5.1 to 5.9, 73 to 84)
Stall	1,360 to 1,460 (13.8 to 14.9, 196 to 212)	1,295 to 1,415 (13.2 to 14.4, 188 to 205)

**Evaluation**

Problem	Possible cause
If the measured value at all positions are higher	<ul style="list-style-type: none"> <li>▶Shift solenoid valve SLT defective</li> <li>▶Regulator valve defective</li> </ul>
If the measured value at all positions are lower	<ul style="list-style-type: none"> <li>▶Shift solenoid valve SLT defective</li> <li>▶Regulator valve defective</li> <li>▶Oil pump defective</li> </ul>
If pressure is low in the D position only	<ul style="list-style-type: none"> <li>▶D position circuit fluid leakage</li> <li>▶Clutch No. 1 (C<sub>1</sub>) defective</li> </ul>
If pressure is low in the R position only	<ul style="list-style-type: none"> <li>▶R position circuit fluid leakage</li> <li>▶Clutch No. 3 (C<sub>3</sub>) defective</li> <li>▶Brake No. 4 (B<sub>4</sub>) defective</li> </ul>



## 16. MANUAL SHIFTING TEST

### HINT:

By this test, it can be determined whether the trouble is within the electrical circuit or is a mechanical problem in the transmission.

- (a) Disconnect the transmission wire.
- (b) Inspect the manual driving operation.

Check that the shift and gear positions correspond with the table below.

While driving, shift through the L, 2, 3, 4 and D positions. Check that the gear change corresponds to the shift position.

Shift Position	Gear Position
D	4th
4	4th
3	3rd
2	1st
L	1st
R	Reverse
P	Pawl Lock

### HINT:

If the gear positions of the L, 2, 3, 4 and D are difficult to distinguish, do the following road test.

If any abnormality is found in the above test, the problem is in the transmission itself.

- (c) Connect the transmission wire.
- (d) Cancel out DTC.

**17. RESET MEMORY**

**CAUTION:**

Perform the RESET MEMORY (AT initialization) when replacing the automatic transmission assy, engine assy or the ECM.

**NOTICE:**

Hand-held tester only

**HINT:**

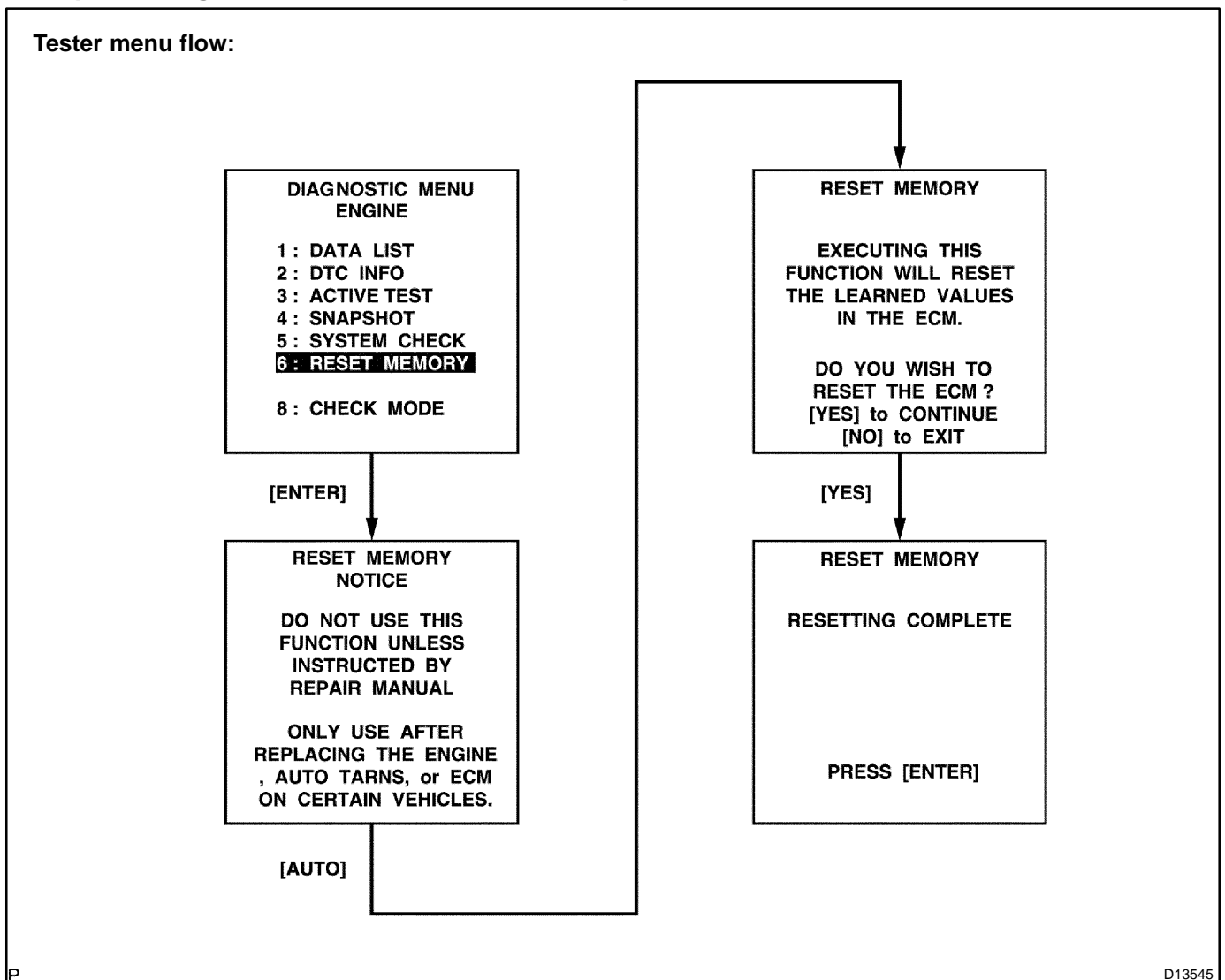
The ECM memorizes the condition that the ECT controls the automatic transmission assy and engine assy according to those characteristics. Therefore, when the automatic transmission assy, engine assy, or ECM has been replaced, it is necessary to reset the memory so that the ECM can memorize the new information.

Reset procedure is as follows.

- (a) Turn the ignition switch off.
- (b) Connect the hand-held tester to the DLC3.
- (c) Turn the ignition switch to the ON position and push the hand-held tester main switch on.
- (d) Select the item "DIAGNOSIS/ENHANCED OBD II".
- (e) Perform the reset memory procedure from the ENGINE menu.

**CAUTION:**

After performing the RESET MEMORY, be sure to perform the ROAD TEST described earlier.



**MEMO**

**MEMO**

**MEMO**

**MEMO**



**MEMO**

**MEMO**

**MEMO**

**MEMO**

## PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the diagnostic trouble code check although the trouble still occurs, check the electrical circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 3 chapters.

**Chapter 1: Electronic Circuit Matrix Chart**

**Chapter 2: On-vehicle Repair Matrix Chart**

**Chapter 3: Off-vehicle Repair Matrix Chart**

- \* If the instruction "Proceed to next circuit inspection shown on matrix chart" is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- \* If the trouble still occurs even though there are no abnormalities in any of the other circuits, then check and replace the ECM.

**Chapter 1: Electronic Circuit Matrix Chart**

HINT:

\*1: When a malfunction is on the circuit \*1 mark is attached, DTC is output.

Symptom	Suspect Area	See page
No up-shift (A particular gear, from 1st to 4th gear, is not up-shifted)	1. Shift solenoid valve (S1) circuit *1 2. Shift solenoid valve (S2) circuit *1 3. ECM	DI-460 DI-464 IN-36
No up-shift (4th → 5th)	1. Transmission control switch circuit (D - 4) *1 2. Engine coolant temp. sensor circuit *1 3. Speed sensor NT circuit *1 4. Shift solenoid valve (SL1) circuit *1 5. Shift solenoid valve (SL2) circuit *1 6. Shift solenoid valve (SR) circuit *1 7. ECM	DI-402 DI-36 DI-418 DI-426 DI-449 DI-468 IN-36
No up-shift (3rd → 4th)	1. Engine coolant temp. sensor circuit *1 2. Shift solenoid valve (S2) circuit *1 3. ECM	DI-36 DI-464 IN-36
No up-shift (1st → 2nd)	1. Transmission control switch circuit (2 - L) *1 2. Shift solenoid valve (S2) circuit *1 3. ECM	DI-402 DI-464 IN-36
No down-shift (5th → 4th)	1. Transmission control switch circuit (D - 4) *1 2. Shift solenoid valve (SL1) circuit *1 3. Shift solenoid valve (SL2) circuit *1 4. Shift solenoid valve (SR) circuit *1 5. ECM	DI-402 DI-426 DI-449 DI-468 IN-36
No down-shift (2nd → 1st)	1. Transmission control switch circuit (2 - L) *1 2. Shift solenoid valve (S2) circuit *1 3. ECM	DI-402 DI-464 IN-36
No down-shift (A particular gear, from 1st to 4th gear, is not down-shifted)	1. Shift solenoid valve (S1) circuit *1 2. Shift solenoid valve (S2) circuit *1 3. ECM	DI-460 DI-464 IN-36
No lock-up	1. ATF temperature sensor circuit *1 2. Transfer L4 position switch circuit *1 3. Stop light switch circuit *1 4. Speed sensor NT circuit *1 5. Shift solenoid valve (SLU) circuit *1 6. ECM	DI-410 DI-472 DI-424 DI-418 DI-491 IN-36
No lock-up off	ECM	IN-36

## DIAGNOSTICS - AUTOMATIC TRANSMISSION

Shift point too high or too low	<ol style="list-style-type: none"> <li>1. Shift solenoid valve (SLT) circuit *1</li> <li>2. Speed sensor NT circuit *1</li> <li>3. Speed sensor SP2 circuit *1</li> <li>4. Throttle position sensor circuit *1</li> <li>5. ATF temperature sensor circuit *1</li> <li>6. Pattern select switch circuit (PWR mode switch)</li> <li>7. Transfer L4 position switch circuit *1</li> <li>8. ECM</li> </ol>	<p>DI-479</p> <p>DI-418</p> <p>DI-421</p> <p>DI-36</p> <p>DI-410</p> <p>DI-495</p> <p>DI-472</p> <p>IN-36</p>
Up-shift to 5th from 4th while shift lever is 4 position	<ol style="list-style-type: none"> <li>1. Transmission control switch circuit (D - 4) *1</li> <li>2. ECM</li> </ol>	<p>DI-402</p> <p>IN-36</p>
Up-shift to 5th from 4th while engine is cold	<ol style="list-style-type: none"> <li>1. Engine coolant temp. sensor circuit *1</li> <li>2. ECM</li> </ol>	<p>DI-36</p> <p>IN-36</p>
Up-shift to 4th from 3rd while shift lever is 3 position	<ol style="list-style-type: none"> <li>1. Park/neutral position switch circuit *1</li> <li>2. ECM</li> </ol>	<p>DI-402</p> <p>IN-36</p>
Up-shift to 3rd from 2nd while shift lever is 2 position	<ol style="list-style-type: none"> <li>1. Park/neutral position switch circuit *1</li> <li>2. ECM</li> </ol>	<p>DI-402</p> <p>IN-36</p>
Up-shift to 2nd from 1st while shift lever is L position	<ol style="list-style-type: none"> <li>1. Transmission control switch circuit (2 - L) *1</li> <li>2. ECM</li> </ol>	<p>DI-402</p> <p>IN-36</p>
Harsh engagement (N → D)	<ol style="list-style-type: none"> <li>1. Speed sensor NT circuit *1</li> <li>2. Shift solenoid valve (SL1) circuit *1</li> <li>3. Shift solenoid valve (SLT) circuit *1</li> <li>4. ECM</li> </ol>	<p>DI-418</p> <p>DI-426</p> <p>DI-479</p> <p>IN-36</p>
Harsh engagement (Lock-up)	<ol style="list-style-type: none"> <li>1. Speed sensor NT circuit *1</li> <li>2. Speed sensor SP2 circuit *1</li> <li>3. Shift solenoid valve (SLU) circuit *1</li> <li>4. ECM</li> </ol>	<p>DI-418</p> <p>DI-421</p> <p>DI-491</p> <p>IN-36</p>
Harsh engagement (Any driving position)	ECM	IN-36
Poor acceleration	<ol style="list-style-type: none"> <li>1. ATF temperature sensor No.2 circuit *1</li> <li>2. ECM</li> </ol>	<p>DI-483</p> <p>IN-36</p>
No engine braking	ECM	IN-36
No kick-down	ECM	IN-36
Engine stalls when starting off or stopping	ECM	IN-36
No pattern select (PWR)	<ol style="list-style-type: none"> <li>1. Pattern select switch circuit (PWR mode switch)</li> <li>2. ECM</li> </ol>	<p>DI-495</p> <p>IN-36</p>
No 2nd start	<ol style="list-style-type: none"> <li>1. Pattern select switch circuit (2nd start switch)</li> <li>2. Transmission control switch circuit (2 - L) *1</li> <li>3. ECM</li> </ol>	<p>DI-497</p> <p>DI-402</p> <p>IN-36</p>
AT Oil Temp. warning light remains on	<ol style="list-style-type: none"> <li>1. ATF temperature sensor No.2 circuit *1</li> <li>2. ECM</li> </ol>	<p>DI-483</p> <p>IN-36</p>
Lock-up at 3rd gear		
Shift point too high		
A/T.P. indicator light does not light up	<ol style="list-style-type: none"> <li>1. A/T.P. indicator light circuit</li> <li>2. Combination meter circuit</li> <li>3. ECM</li> </ol>	<p>DI-500</p> <p>BE-58</p> <p>IN-36</p>

## Chapter 2: On-Vehicle Repair

## ▶: A750E, A750F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM999U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse positions	1. Transmission control rod 2. Manual valve 3. Parking lock pawl 4. Off-vehicle repair matrix chart	DI-361 ▶ ▶ -
Vehicle does not move in R position	1. Valve body assy 2. Off-vehicle repair matrix chart	AT-8 -
No up-shift (1st → 2nd)	1. Valve body assy 2. Off-vehicle repair matrix chart	AT-8 -
No up-shift (2nd → 3rd)	1. Valve body assy 2. Off-vehicle repair matrix chart	AT-8 -
No up-shift (3rd → 4th)	1. Valve body assy 2. Off-vehicle repair matrix chart	AT-8 -
No up-shift (4th → 5th)	1. Valve body assy 2. Off-vehicle repair matrix chart	AT-8 -
No down-shift (5th → 4th)	1. Valve body assy 2. Off-vehicle repair matrix chart	AT-8 -
No down-shift (4th → 3rd)	1. Valve body assy 2. Off-vehicle repair matrix chart	AT-8 -
No down-shift (3rd → 2nd)	1. Valve body assy 2. Off-vehicle repair matrix chart	AT-8 -
No down-shift (2nd → 1st)	1. Valve body assy 2. Off-vehicle repair matrix chart	AT-8 -
No lock-up or No lock-up off	1. Shift solenoid valve (SLU) 2. Valve body assy 3. Off-vehicle repair matrix chart	DI-487 AT-8 -
Harsh engagement (N → D)	1. Shift solenoid valve (SL1) 2. Valve body assy 3. C <sub>1</sub> accumulator 4. Off-vehicle repair matrix chart	DI-441 AT-8 ▶ -
Harsh engagement (Lock-up)	1. Shift solenoid valve (SLU) 2. Valve body assy 3. Off-vehicle repair matrix chart	DI-487 AT-8 -
Harsh engagement (N → R)	1. Shift solenoid valve (SLT) 2. Shift solenoid valve (SLU) 3. Valve body assy 4. C <sub>3</sub> accumulator 5. Off-vehicle repair matrix chart	DI-476 DI-487 AT-8 ▶ -
Harsh engagement (1st → 2nd → 3rd → 4th → 5th)	1. Shift solenoid valve (SLT) 2. Shift solenoid valve (SL1) 3. Valve body assy	DI-476 DI-441 AT-8
Harsh engagement (1st → 2nd)	1. Valve body assy 2. B <sub>3</sub> accumulator 3. Off-vehicle repair matrix chart	AT-8 ▶ -
Harsh engagement (2nd → 3rd)	1. Valve body assy 2. C <sub>3</sub> accumulator 3. Off-vehicle repair matrix chart	AT-8 ▶ -
Harsh engagement (3rd → 4th)	1. Valve body assy 2. C <sub>2</sub> accumulator 3. Off-vehicle repair matrix chart	AT-8 ▶ -

## DIAGNOSTICS - AUTOMATIC TRANSMISSION

Harsh engagement (4th → 5th)	<ol style="list-style-type: none"> <li>1. Shift solenoid valve (SL1)</li> <li>2. Shift solenoid valve (SL2)</li> <li>3. Valve body assy</li> <li>4. Off-vehicle repair matrix chart</li> </ol>	<p>DI-441 DI-445 AT-8 -</p>
Harsh engagement (5th → 4th)	<ol style="list-style-type: none"> <li>1. Shift solenoid valve (SL1)</li> <li>2. Shift solenoid valve (SL2)</li> <li>3. Valve body assy</li> <li>4. Off-vehicle repair matrix chart</li> </ol>	<p>DI-441 DI-445 AT-8 -</p>
Slip or shudder (Forward and reverse)	<ol style="list-style-type: none"> <li>1. Transmission control rod</li> <li>2. Valve body assy</li> <li>3. Oil strainer</li> <li>4. Off-vehicle repair matrix chart</li> </ol>	<p>DI-361 AT-8 AT-8 -</p>
No engine braking (1st: L position)	<ol style="list-style-type: none"> <li>1. Valve body assy</li> <li>2. Off-vehicle repair matrix chart</li> </ol>	<p>AT-8 -</p>
No engine braking (2nd: 2 position)	<ol style="list-style-type: none"> <li>1. Valve body assy</li> <li>2. Off-vehicle repair matrix chart</li> </ol>	<p>AT-8 -</p>
No kick-down	Valve body assy	AT-8
Shift point too high or too low	<ol style="list-style-type: none"> <li>1. Shift solenoid valve (SLT)</li> <li>2. Shift solenoid valve (SL1)</li> <li>3. Valve body assy</li> </ol>	<p>DI-476 DI-441 AT-8</p>
Poor acceleration	<ol style="list-style-type: none"> <li>1. Shift solenoid valve (SLT)</li> <li>2. Valve body assy</li> </ol>	<p>DI-476 AT-8</p>
Engine stalls when starting off or stopping	<ol style="list-style-type: none"> <li>1. Shift solenoid valve (SLU)</li> <li>2. Valve body assy</li> </ol>	<p>DI-487 AT-8</p>



## Chapter 3: Off-Vehicle Repair

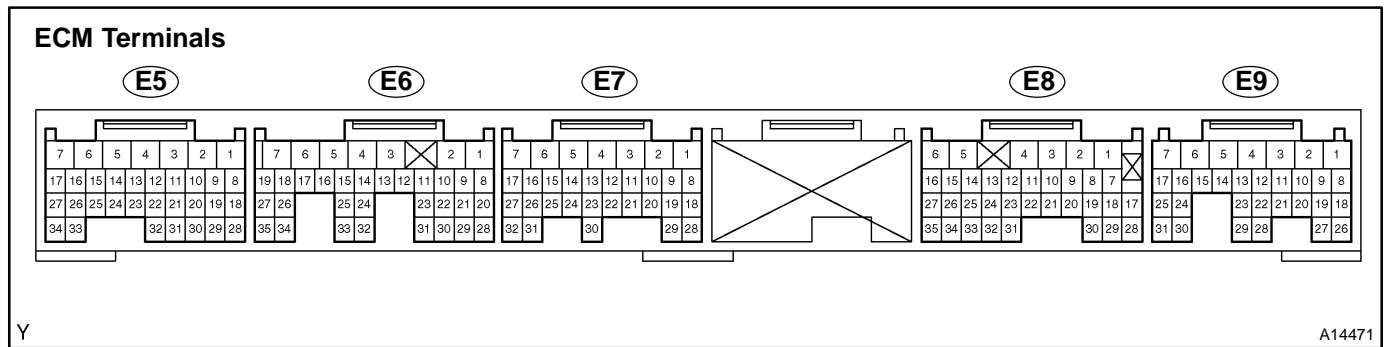
## ▶: A750E, A750F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM999U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse positions	1. Rear planetary gear unit 2. Torque converter clutch	▶ AT-34
Vehicle does not move in R position	1. Brake No. 4 (B <sub>4</sub> ) 2. Clutch No. 3 (C <sub>3</sub> ) 3. One-way clutch No.4 (F <sub>1</sub> )	▶ ▶ ▶
No up-shift (1st → 2nd)	1. Brake No. 3 (B <sub>3</sub> ) 2. One-way clutch No.1 (F <sub>1</sub> ) 3. One-way clutch No. 2 (F <sub>2</sub> )	▶ ▶ ▶
No up-shift (2nd → 3rd)	Clutch No. 3 (C <sub>3</sub> )	▶
No up-shift (3rd → 4th)	Clutch No. 2 (C <sub>2</sub> )	▶
No up-shift (4th → 5th)	1. Brake No. 1 (B <sub>1</sub> ) 2. Clutch No. 1 (C <sub>1</sub> )	▶ ▶
No lock-up or No lock-up off	Torque converter clutch	▶ AT-34
Harsh engagement (N → D)	1. Clutch No. 1 (C <sub>1</sub> ) 2. One-way clutch No.3 (F <sub>3</sub> )	▶ ▶
Harsh engagement (N → R)	1. Clutch No. 3 (C <sub>3</sub> ) 2. Brake No. 4 (B <sub>4</sub> ) 3. One-way clutch No.1 (F <sub>1</sub> )	▶ ▶ ▶
Harsh engagement (1 → 2)	1. Brake No. 3 (B <sub>3</sub> ) 2. One-way clutch No.1 (F <sub>1</sub> ) 3. One-way clutch No. 2 (F <sub>2</sub> )	▶ ▶ ▶
Harsh engagement (2 → 3)	Clutch No. 3 (C <sub>3</sub> )	▶
Harsh engagement (3 → 4)	Clutch No. 2 (C <sub>2</sub> )	▶
Harsh engagement (4 → 5th)	1. Brake No. 1 (B <sub>1</sub> ) 2. Clutch No. 1 (C <sub>1</sub> )	▶ ▶
Harsh engagement (Lock-up)	Torque converter clutch	▶ AT-34
Slip or shudder (Forward and reverse: After warm-up)	1. One-way clutch No.1 (F <sub>1</sub> ) 2. Clutch No. 3 (C <sub>3</sub> ) 3. Torque converter clutch	▶ ▶ ▶
Slip or shudder (Particular position: Just after engine starts)	Torque converter clutch	▶ AT-34
Slip or shudder (R position)	1. Brake No. 4 (B <sub>4</sub> ) 2. One-way clutch No.1 (F <sub>1</sub> ) 3. Clutch No. 3 (C <sub>3</sub> )	▶ ▶ ▶
Slip or shudder (1st)	1. Clutch No. 1 (C <sub>1</sub> ) 2. One-way clutch No.3 (F <sub>3</sub> )	▶ ▶
Slip or shudder (2nd)	1. Clutch No. 1 (C <sub>1</sub> ) 2. Brake No. 3 (B <sub>3</sub> ) 3. One-way clutch No.1 (F <sub>1</sub> ) 4. One-way clutch No.2 (F <sub>2</sub> )	▶ ▶ ▶ ▶
Slip or shudder (3rd)	1. Clutch No. 1 (C <sub>1</sub> ) 2. Clutch No. 3 (C <sub>3</sub> ) 3. One-way clutch No.1 (F <sub>1</sub> )	▶ ▶ ▶
Slip or shudder (4th)	1. Clutch No. 1 (C <sub>1</sub> ) 2. Clutch No. 2 (C <sub>2</sub> )	▶ ▶
Slip or shudder (5th)	1. Clutch No. 2 (C <sub>2</sub> ) 2. Clutch No. 3 (C <sub>3</sub> ) 3. Brake No. 1 (B <sub>1</sub> )	▶ ▶ ▶
No engine braking (1st – 4th: D position)	Clutch No. 1 (C <sub>1</sub> )	▶

**DIAGNOSTICS - AUTOMATIC TRANSMISSION**

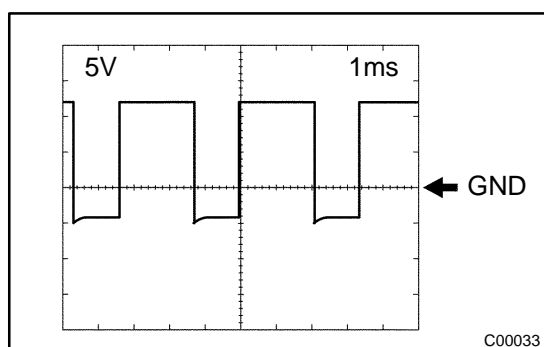
No engine braking (1st: L position)	Brake No. 4 (B <sub>4</sub> )	▶
No engine braking (2nd: 2 position)	Brake No. 2 (B <sub>2</sub> )	▶
No engine braking (3rd: 3 position)	Brake No. 1 (B <sub>1</sub> )	▶
Poor acceleration (All positions)	Torque converter clutch	AT-34
Poor acceleration (5th)	1. Clutch No. 1 (C <sub>1</sub> ) 2. Clutch No. 3 (C <sub>3</sub> ) 3. Brake No. 1 (B <sub>1</sub> ) 4. Front planetary gear unit	▶ ▶ ▶ ▶
Engine stalls when starting off or stopping	Torque converter clutch	AT-34

# TERMINALS OF ECM



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
P (E9-6) - E1 (E7-1)	G-W - BR	IG switch ON and shift lever P position	10 to 14
		IG switch ON and shift lever other than P position	Below 1
N (E9-7) - E1 (E7-1)	G-R - BR	IG switch ON and shift lever N position	10 to 14
		IG switch ON and shift lever other than N position	Below 1
L4 (E8-4) - E1 (E7-1)	B-L - BR	IG switch ON and Transfer shift lever L position	9 to 14
		IG switch ON and Transfer shift lever other than L position	Below 1.5
SNWI (E8-5) - E1 (E7-1)	L-R - BR	IG switch ON	9 to 14
		IG switch ON and Press continuously 2nd start switch	Below 1
L (E8-8) - E1 (E7-1)	R-L - BR	IG switch ON and shift lever L position	9 to 14
		IG switch ON and shift lever other than L position	Below 1.5
2 (E8-9) - E1 (E7-1)	G-B - BR	IG switch ON and shift lever 2 and L position	9 to 14
		IG switch ON and shift lever other than 2 and L position	Below 1.5
D (E8-10) - E1 (E7-1)	G-Y - BR	IG switch ON and shift lever D and 4 position	9 to 14
		IG switch ON and shift lever other than D and 4 position	Below 1.5
R (E8-11) - E1 (E7-1)	R-B - BR	IG switch ON and shift lever R position	9 to 14
		IG switch ON and shift lever other than R position	Below 1.5
STP (E8-19) - E1 (E7-1)	G-W - BR	Brake pedal is depressed	7.5 to 14
		Brake pedal is released	Below 1.5
3 (E8-20) - E1 (E7-1)	G - BR	IG switch ON and shift lever 3 position	9 to 14
		IG switch ON and shift lever other than 3 position	Below 1.5
4 (E8-23) - E1 (E7-1)	G-R - BR	IG switch ON and shift lever 4 position	9 to 14
		IG switch ON and shift lever other than 4 position	Below 1.5
PWR (E8-28) - E1 (E7-1)	L-W - BR	IG switch ON and Pattern select switch "PWR" OFF	9 to 14
		IG switch ON and Pattern select switch "PWR" ON	Below 1
TFN (E7-11) - E1 (E7-1)	Y-G - BR	IG switch ON and Transfer shift lever N position	Below 1.5
		IG switch ON and Transfer shift lever other than N position	9 to 14
SLU+ (E7-16) - SLU- (E7-15)	P-G - B	Engine idle speed	Pulse generation 2 reference
S2 (E6-10) - E1 (E7-1)	W - BR	IG switch ON	Below 1.5
		2nd or 3rd gear	9 to 14
		1st, 4th or 5th gear	Below 1.5
S1 (E6-11) - E1 (E7-1)	R - BR	IG switch ON	9 to 14
		1st or 2nd gear	9 to 14
		3rd, 4th or 5th gear	Below 1.5

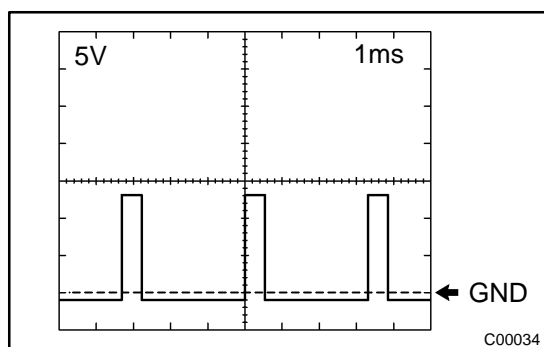
SLT+ (E6-13) - SLT- (E6-12)	G-W - G-B	Engine idle speed	Pulse generation 1 reference
SR (E6-15) - E1 (E7-1)	G - BR	IG switch ON	Below 1.5
		5th gear	9 to 14
		1st gear	Below 1
SL2+ (E6-17) - SL2- (E6-16)	P-B - P-L	Engine idle speed	Pulse generation 3 reference
SL1+ (E6-19) - SL1- (E6-18)	R-L - R-W	Engine idle speed	Pulse generation 4 reference
THO2 (E6-24) - E2 (E5-28)	L - BR-W	ATF temperature: 115°C (239°F) or more	Below 1.5
SP2+ (E6-26) - SP2- (E6-34)	R - G	Vehicle speed 20 km/h (12 mph)	Pulse generation 6 reference
NT+ (E6-27) - NT- (E6-35)	L - W	Engine idle speed	Pulse generation 5 reference
THO1 (E6-32) - E2 (E5-28)	G-Y - BR-W	ATF temperature: 115°C (239°F) or more	Below 1.5
NSW (E5-16) - E1 (E7-1)	B-W - BR	IG switch ON and shift lever P and N position	Below 1.5
		IG switch ON and shift lever other than P and N position	9 to 14



## Pulse generation 1

**Reference:**

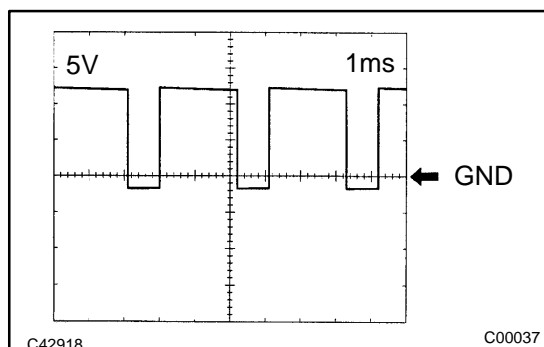
Item	Condition
Terminal	SLT+ - SLT-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



## Pulse generation 2

**Reference:**

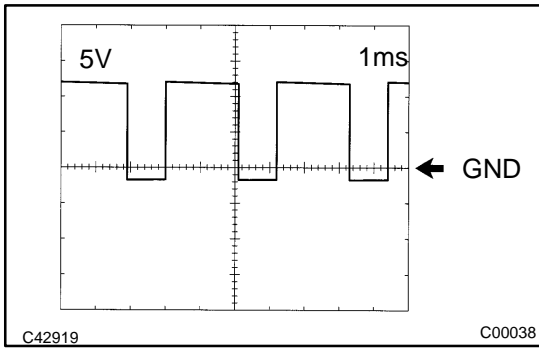
Item	Condition
Terminal	SLU+ - SLU-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



## Pulse generation 3

**Reference:**

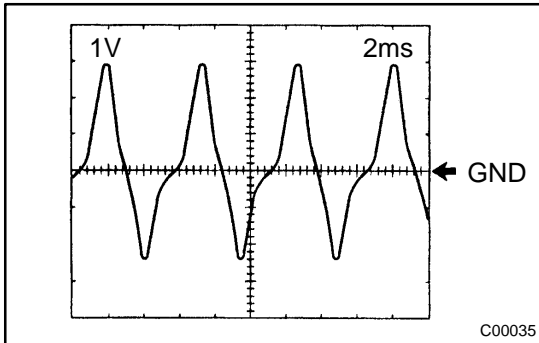
Item	Condition
Terminal	SL2+ - SL2-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



Pulse generation 4

Reference:

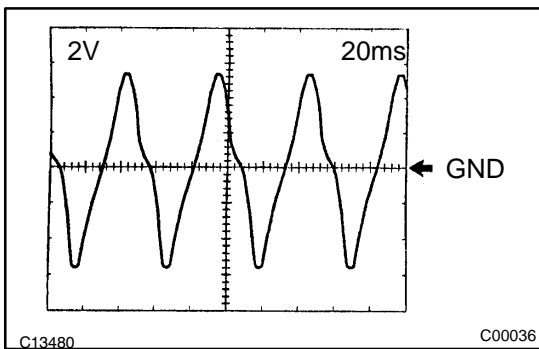
Item	Condition
Terminal	SL1+ - SL1-
Tool setting	5V/DIV, 1ms/DIV
Vehicle condition	Engine idle speed



Pulse generation 5

Reference:

Item	Condition
Terminal	NT+ - NT-
Tool setting	1V/DIV, 2ms/DIV
Vehicle condition	Engine idle speed



Pulse generation 6

Reference:

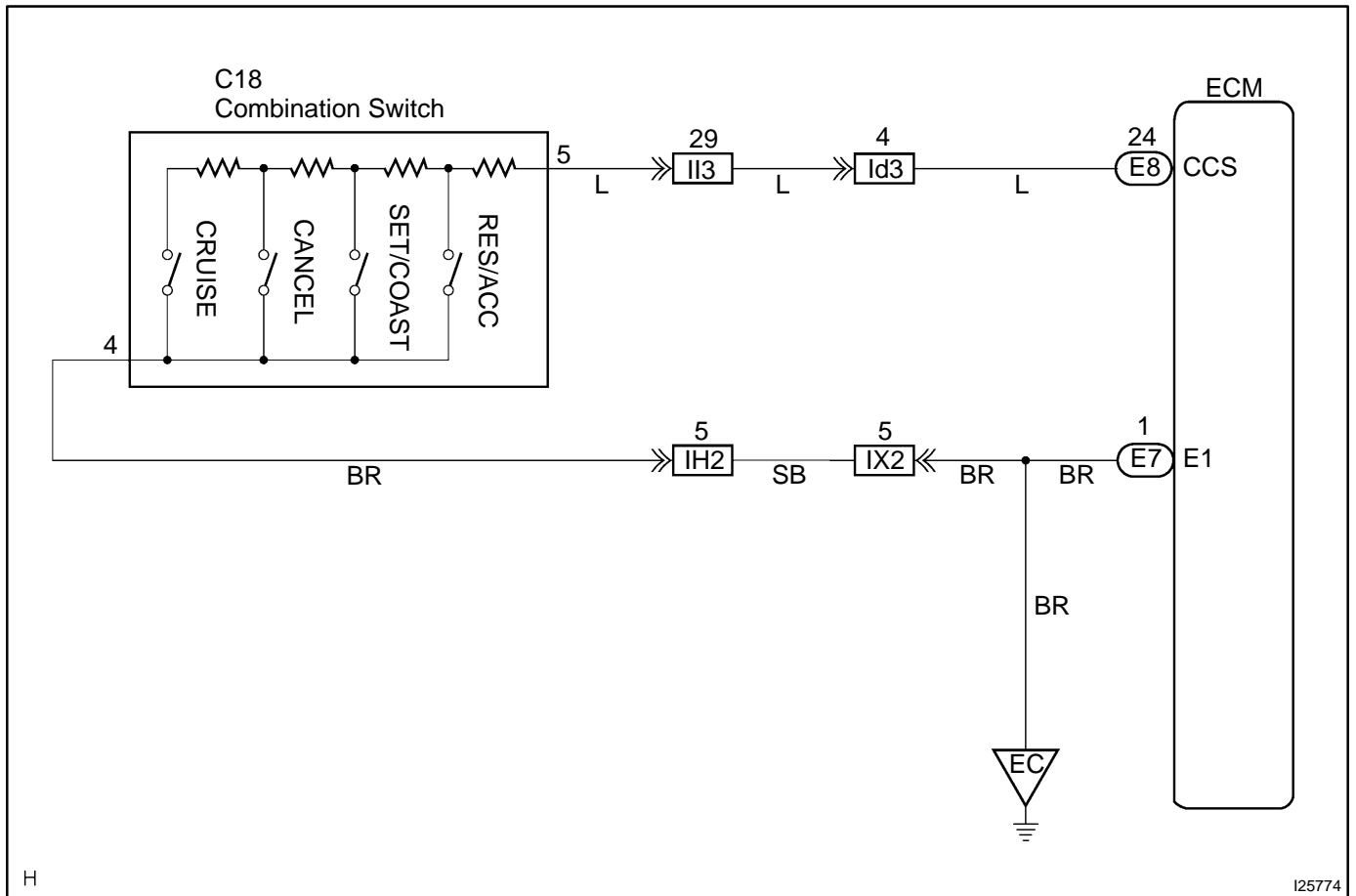
Item	Condition
Terminal	SP2+ - SP2-
Tool setting	2V/DIV, 20ms/DIV
Vehicle condition	Vehicle speed 20 km/h (12 mph)

# Main Switch Circuit (Cruise Control Switch)

## CIRCUIT DESCRIPTION

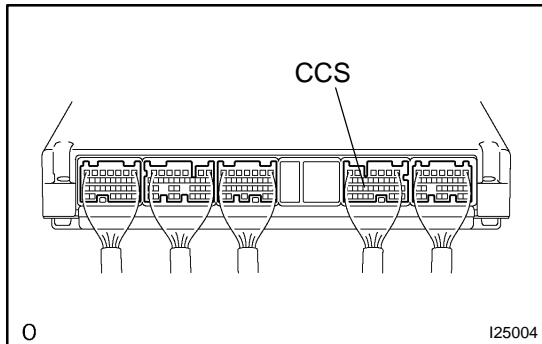
This circuit carries the -/SET, +/RESUME and Cancel signals (each voltage) to the ECM.

## WIRING DIAGRAM



## INSPECTION PROCEDURE

**1 Check voltage between terminal CCS of ECM connector and body ground.**



**PREPARATION:**

- (a) Remove the ECM with connector still connected.
- (b) Turn ignition switch ON.

**CHECK:**

Measure voltage between terminal CCS of ECM connector and body ground, when each of the -/SET, +RES and CANCEL is turned ON.

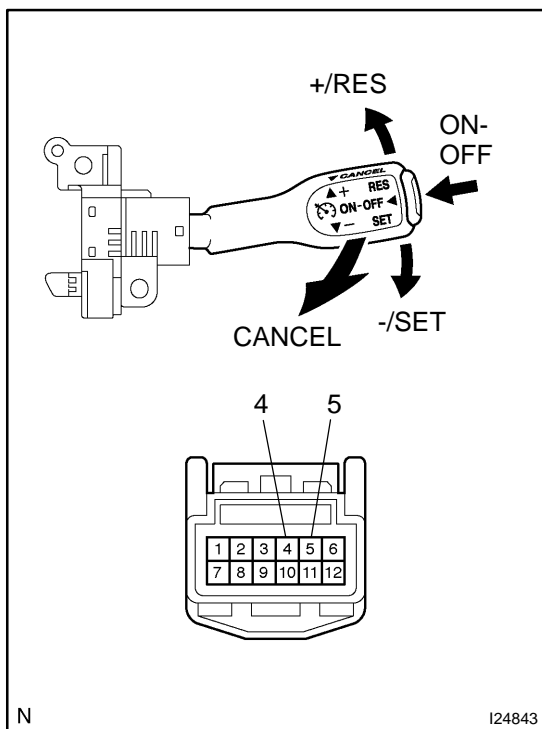
**OK:**

Switch Position	Voltage
Neutral	9 - 14 V
+RES	2.1 - 4 V
-/SET	4 - 7.1 V
CANCEL	6 - 10.1 V

**OK** Proceed to next circuit inspection shown on problem symptom table (See page [DI-991](#) ).

**NG**

**2 Check main switch continuity.**



**PREPARATION:**

- (a) Remove steering wheel center pad (See page [SR-9](#) ).
- (b) Disconnect the control switch connector.

**CHECK:**

- (a) Measure resistance between terminals 4 and 5 of cruise control switch connector when control switch is operated.

Switch position	Resistance (Ω)
Neutral	∞ (No continuity)
+RES	210 - 270
-/SET	560 - 700
CANCEL	1380 - 1700

- (b) Check continuity between terminals 4 and 5 of control switch connector when main switch is held on and off.

**OK:**

Switch position	Tester connection	Specified condition
OFF	4 - 5	No continuity
ON	4 - 5	Continuity

NG

Replace control switch.

OK

3

Check harness and connector between ECM and cruise control switch, cruise control switch and body ground (See page [IN-26](#) ).

NG

Repair or replace harness or connector.

OK

4

Check cruise control indicator light (See combination meter.)

NG

Replace combination meter.

OK

Check and replace ECM (See page [IN-36](#) ).



## CIRCUIT INSPECTION

<b>DTC</b>	<b>P0500/21</b>	<b>Vehicle Speed Sensor "A"</b>
------------	-----------------	---------------------------------

<b>DTC</b>	<b>P0503/23</b>	<b>Vehicle Speed Sensor "A" Intermittent/Erratic/High</b>
------------	-----------------	---

## CIRCUIT DESCRIPTION

See page [.DI-274](#)

DTC No.	DTC Detection Condition	Trouble Area
P0500/21 P0503/23	No vehicle speed sensor signal to ECM under following conditions (a) and (b): (2 trip detection logic) (a) Park/neutral position switch is OFF (b) Vehicle is being driven	<ul style="list-style-type: none"> <li>▶ Combination meter</li> <li>▶ Open or short in vehicle speed sensor circuit</li> <li>▶ Vehicle speed sensor</li> <li>▶ ECM</li> </ul>

## WIRING DIAGRAM

See page [.DI-274](#)

## INSPECTION PROCEDURE

See page [.DI-274](#)

<b>DTC</b>	<b>P0571/52</b>	<b>Brake Switch "A" Circuit</b>
------------	-----------------	---------------------------------

## CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the ECM. When the ECM receives this signal, it cancels the cruise control.

A fail-safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit.

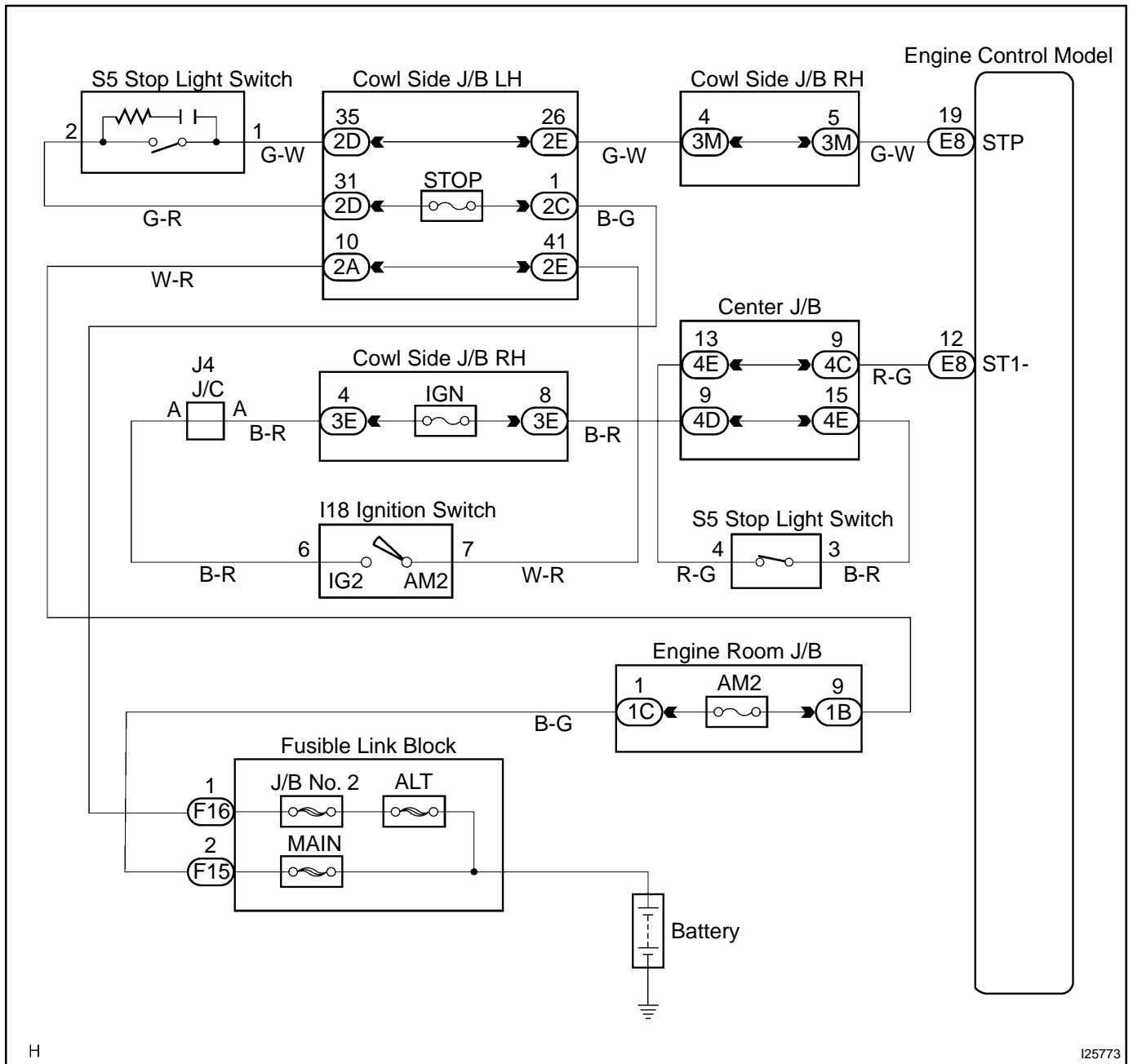
The cancel condition is that battery positive voltage is supplied to terminal STP.

When the brake is on, battery positive voltage is normally applied through the STOP fuse and stop light switch to terminal STP of the ECM, and the ECM turns the cruise control OFF.

If the harness connected to terminal STP has an open circuit, terminal STP will have battery positive voltage and the cruise control will be turned OFF.

DTC No.	Detection Item	Trouble Area
P0571/52	Stop light switch circuit.	<ul style="list-style-type: none"> <li>▶ Stop light switch</li> <li>▶ Harness or connector between ECM and stop light switch circuit</li> <li>▶ ECM</li> </ul>

# WIRING DIAGRAM



### INSPECTION PROCEDURE

**HINT:**

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check stop light switch using hand-held tester.</b>
----------	--

**PREPARATION:**

Connect the hand-held tester to the DLC3.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main SW ON.

**CHECK:**

Select the item "STOP LIGHT SW" in the DATA LIST and read its value displayed.

**OK:**

- Brake pedal depressed: ON**
- Brake pedal released: OFF**

<b>OK</b>	<b>Proceed to next circuit inspection shown in problem symptom table (See page <a href="#">DI-991</a> ).</b>
-----------	--

<b>NG</b>
-----------

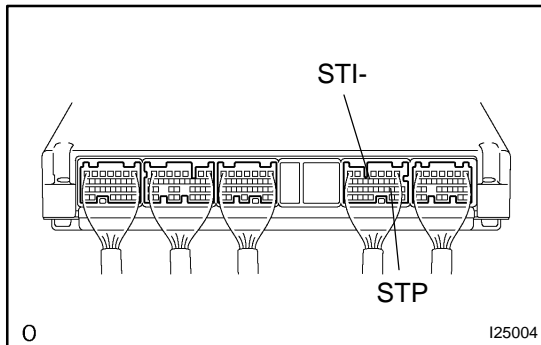
<b>2</b>	<b>Check operation of stop light.</b>
----------	---------------------------------------

**CHECK:**

Check that stop light comes on when brake pedal is depressed, and turns off when brake pedal is released.

<b>NG</b>	<b>Check stop light system (See page <a href="#">BE-49</a> ).</b>
-----------	---

<b>OK</b>
-----------

**3 Check voltage between terminal STP/STI- of ECM connector and body ground.**

**PREPARATION:**

- Remove the ECM with connectors still connected.
- Turn ignition switch ON.

**CHECK:**

Measure voltage between terminal STP/STI- of ECM connector and body ground when the brake pedal is depressed and released.

**OK:**

Depressed	10 - 14 V
Released	Below 1 V

**OK**

Proceed to next circuit inspection shown in problem symptom table (See page [DI-991](#) ).

**NG**
**4 Check wire harness and connector between terminal STP of ECM and stop light switch, and terminal STI- of ECM and stop light switch (See page [IN-36](#) ).**
**NG**

Repair or replace harness or connector.

**OK**

Check and replace ECM (See page [IN-36](#) ).

<b>DTC</b>	<b>P0607/54</b>	<b>Control Module Performance</b>
------------	-----------------	-----------------------------------

## CIRCUIT INSPECTION

This DTC expresses the internal abnormalities of ECM.

DTC No.	Detection Item	Trouble Area
P0607/54	<ul style="list-style-type: none"> <li>▶ Cruise control input signal abnormal.</li> <li>▶ Stop light switch input signal abnormal.</li> </ul>	▶ ECM

## INSPECTION PROCEDURE

**Check and replace ECM (See page [IN-36](#) ).**

## CRUISE MAIN Indicator Light Circuit

### CIRCUIT DESCRIPTION

When the cruise control main switch is turned ON, CRUISE MAIN indicator light lights up.

### INSPECTION PROCEDURE

1	<b>Perform Active Test of hand-held tester.</b>
---	---

#### **PREPARATION:**

Connect the hand-held tester to the DLC3.

#### **CHECK:**

Check the cruise indicator of the combination meter using Active Test.

#### **OK:**

Description	Tester display	Check condition
CRUISE Indicator light	CRUISE INDIC	ON/OFF

**OK**

**Proceed to next circuit inspection shown on problem symptom table (See page [DI-991](#) ).**

**NG**

**Check and replace combination meter.  
(See page [IN-36](#) ).**

# CUSTOMER PROBLEM ANALYSIS CHECK

**CRUISE CONTROL SYSTEM Check Sheet**

Inspector's name: \_\_\_\_\_

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	Odometer Reading	km Mile

Condition of Problem Occurrence	Date of Problem Occurrence	/ /
	Frequency Problem Occurs?	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (    Times a day)
	Vehicle Speed when Problem Occurred	km Mile

Symptoms	<input type="checkbox"/> Auto cancel occurs	▶ Driving condition * City driving    * Freeway    * Up hill    * Down hill ▶ After cancel occurred, did the driver activate cruise control again? * Yes    * No
	* Cancel does not occur	* With brake ON * Except D position shift * When control SW turns to CANCEL position
	* Cruise control malfunction	* Slip to acceleration side * Slip to deceleration side * Hunting occurs * O/D cut off does not occur * O/D does not return
	* Switch malfunction	* SET    * ACCEL    * COAST    * RESUME    * CANCEL
	* Cruise main indicator light	* Remains ON    * Does not light up    * Blinks

DTC Check	1st Time	* Normal Code    * Malfunction Code (Code    )
	2nd Time	* Normal Code    * Malfunction Code (Code    )



## DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the appropriate page.

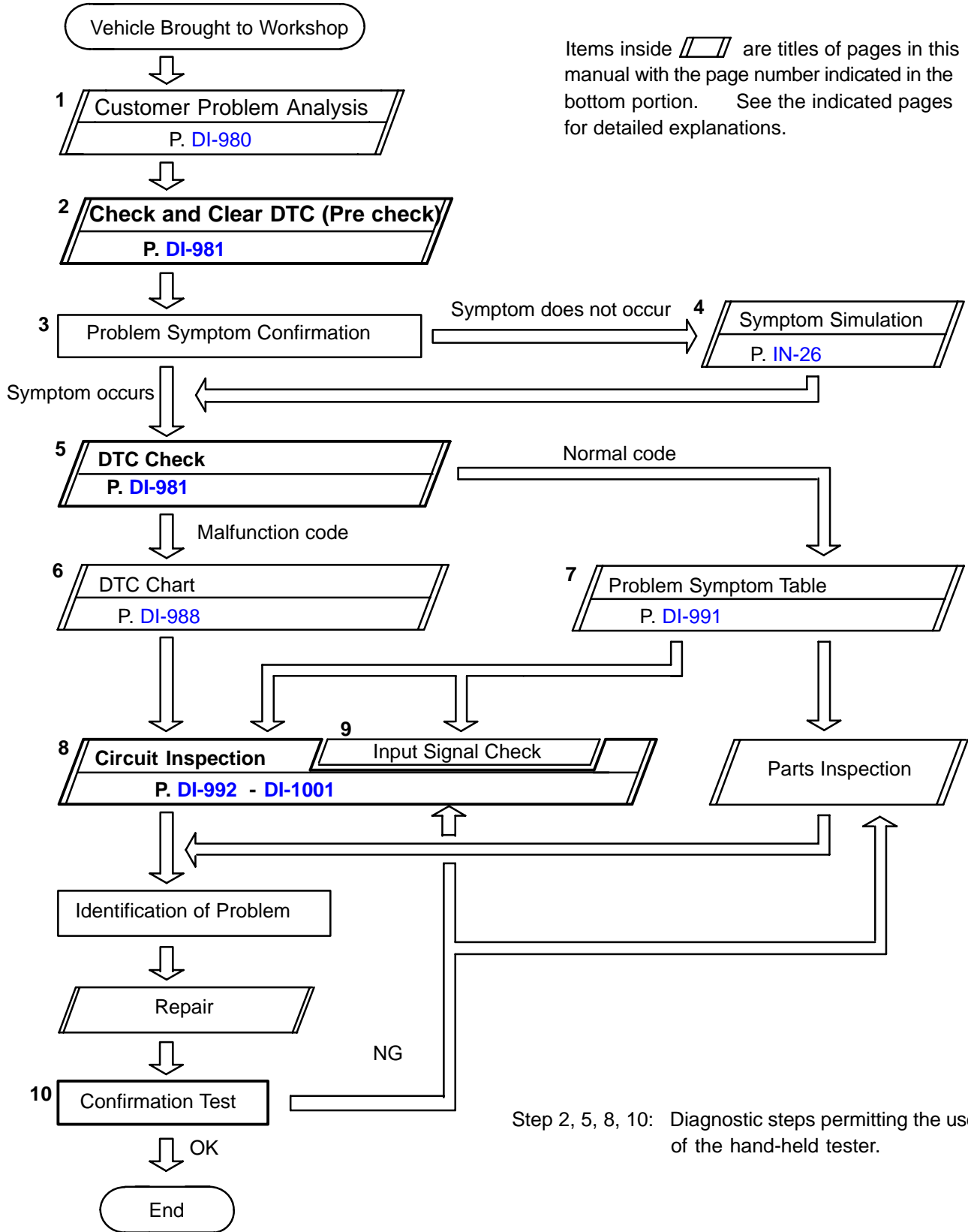
DTC No. (See Page)	Circuit Inspection	Trouble Area
P0500/21 (DI-992)	Vehicle Speed Sensor "A"	<ul style="list-style-type: none"> <li>▶ Combination meter</li> <li>▶ Open or short in vehicle speed sensor circuit</li> </ul>
P0503/23 (DI-992)	Vehicle Speed Sensor "A" Intermittent/Erratic/High	<ul style="list-style-type: none"> <li>▶ Vehicle speed sensor</li> <li>▶ ECM</li> </ul>
P0571/52 (DI-993)	Brake Switch "A" Circuit	<ul style="list-style-type: none"> <li>▶ Short in stop light switch circuit</li> <li>▶ Stop light switch</li> <li>▶ ECM</li> </ul>
P0607/54 (DI-997)	Control Module Performance	<ul style="list-style-type: none"> <li>▶ ECM</li> </ul>

# CRUISE CONTROL SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

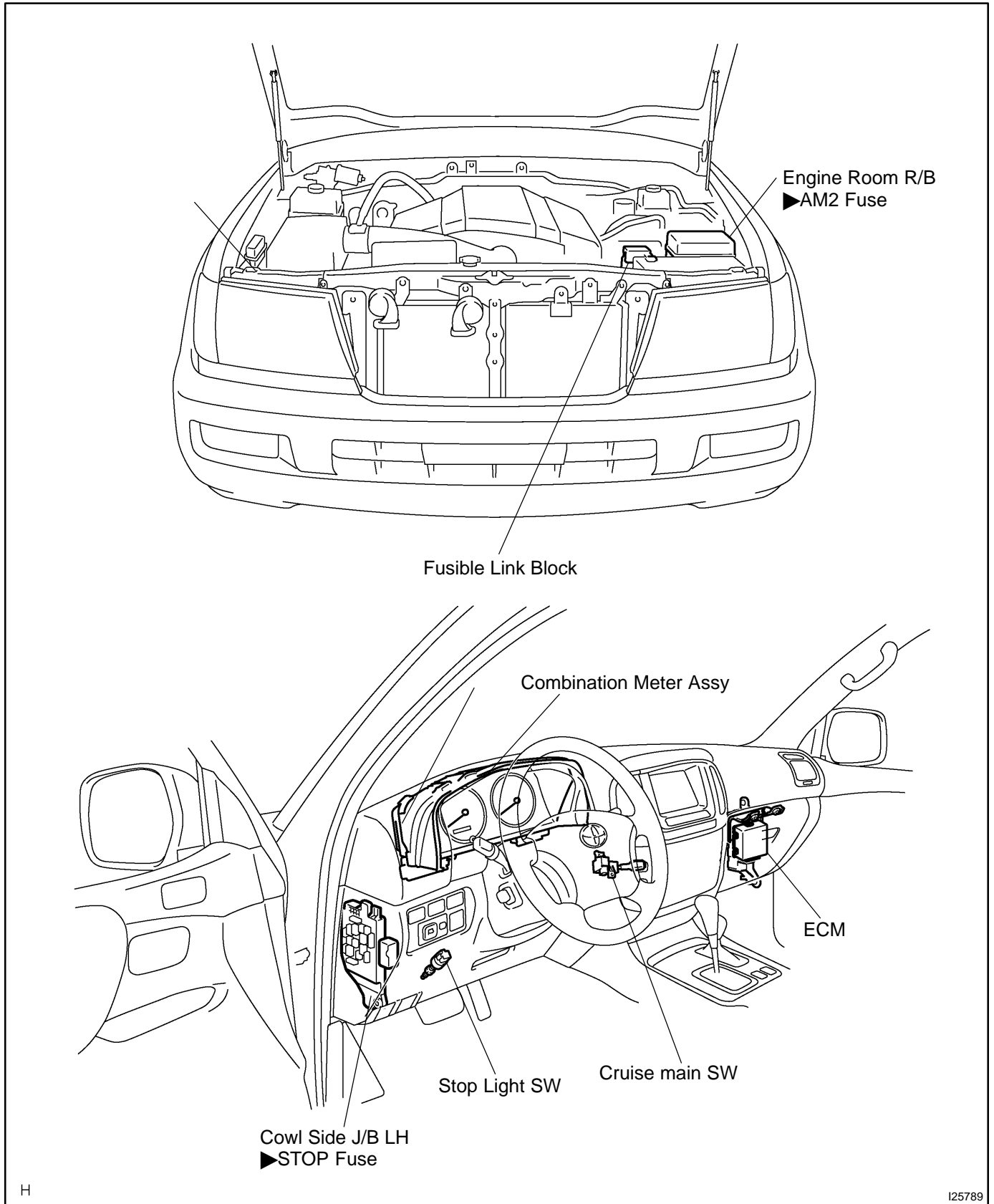
DI26R-35

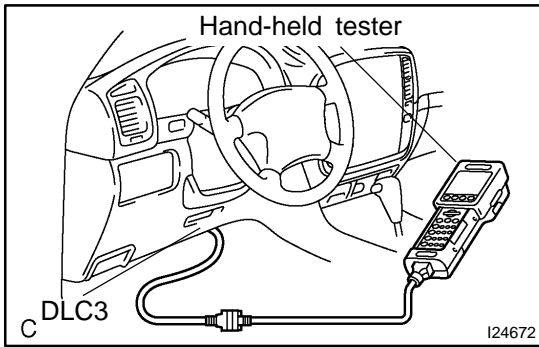
Troubleshoot in accordance with the procedure on the following page.



Step 2, 5, 8, 10: Diagnostic steps permitting the use of the hand-held tester.

# PARTS LOCATION





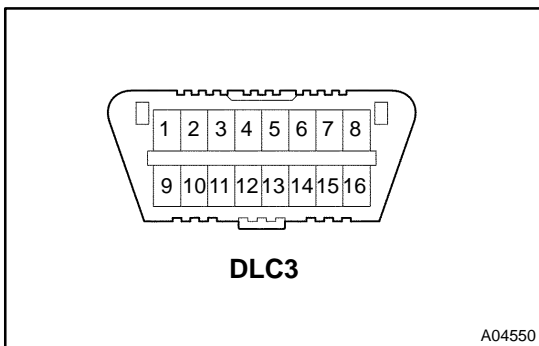
## PRE-CHECK

### 1. DIAGNOSIS SYSTEM

#### (a) Description

ECM controls the function of cruise control on this vehicle. Data of the cruise control or DTC can be read from DLC3 of the vehicle. When a trouble occurs on cruise control, Check CRUISE MAIN indicator does not light up but DTC inspection is performed.

Therefore when there seems to be a trouble on cruise control, use hand-held tester or SST to check and troubleshoot it.



#### (b) Check the DLC3.

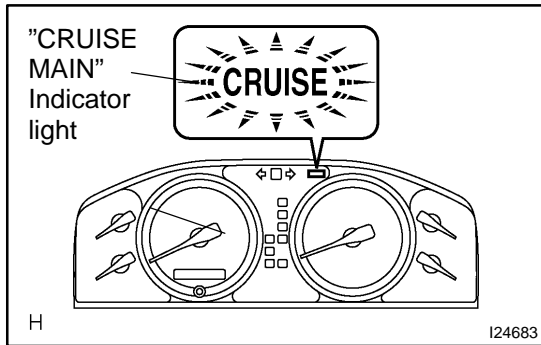
The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Terminal No.	Connection/Specified Condition	Condition
4	Chassis Ground ↔ Body Ground/1 or less	Always
13	TC ↔ Body Ground/9 - 14 V	Always

#### HINT:

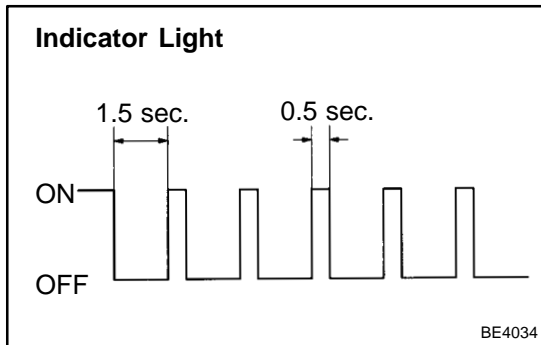
If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of the hand-held tester to DLC3, turned the ignition switch ON and operated the hand-held tester, there is a problem on the vehicle side or tool side.

- ▶ If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- ▶ If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

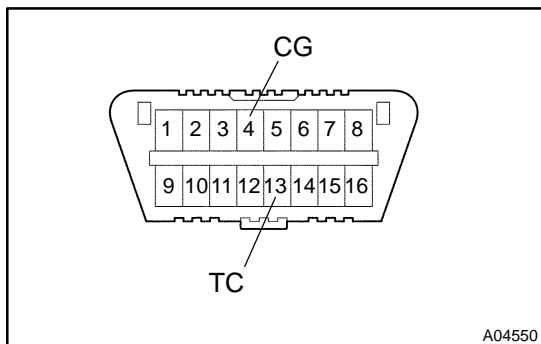


- (c) Check the indicator.
- (1) Turn the ignition switch to ON.
  - (2) Check that the CRUISE MAIN indicator light comes on when the cruise control main switch is turned ON, and that the indicator light goes off when the main switch is turned OFF.

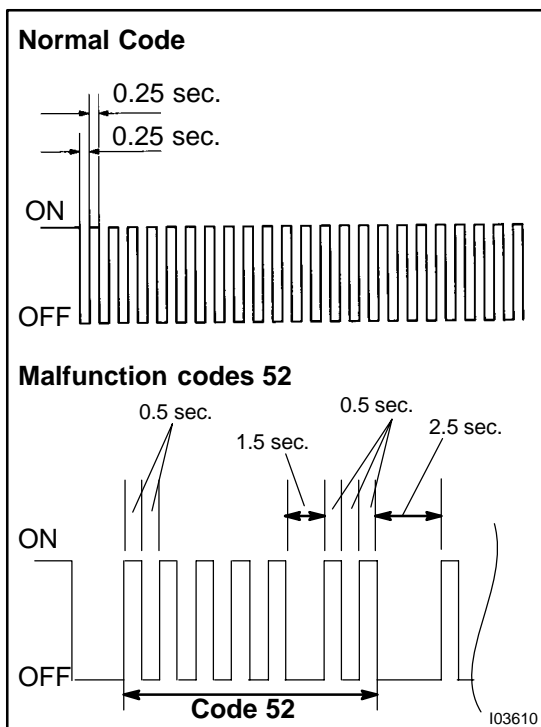
**HINT:**  
If the indicator check result is not normal, proceed to troubleshooting (See page BE-2 ) for the combination meter section.



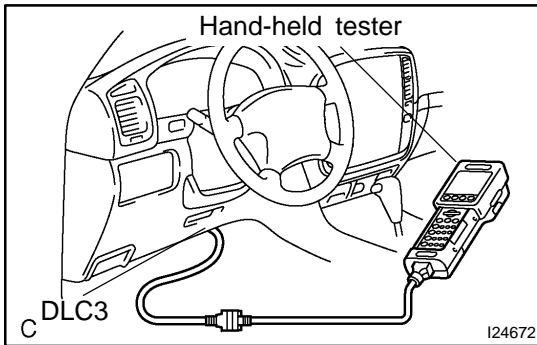
- (d) Check the DTC.
- HINT:**  
If a malfunction occurs in the speed sensor or stop light switch, etc. during cruise control driving, the ECM actuates AUTO CANCEL of the cruise control and turns ON and OFF the CRUISE MAIN indicator light to inform the driver of a malfunction. At the same time, the malfunction is stored in memory as a diagnostic trouble code.



- (e) Output DTC using diagnosis check wire.
- (1) Turn the ignition switch ON.
  - (2) Using SST, connect terminals Tc and CG of DLC3.  
SST 09843-18040
  - (3) Read the DTC on the CRUISE MAIN indicator light.



- HINT:**
- ▶ If the DTC is not output, inspect the diagnosis circuit.
  - ▶ As an example, the blinking patterns for codes; normal 52 are shown in the illustration.



## 2. USING HAND-HELD TESTER

- (a) Hook up the hand-held tester to the DLC3.
- (b) Monitor the ECU data by following the prompts on the tester screen.

### HINT:

Hand-held tester has a "Snapshot" function which records the monitored data.

Please refer to the hand-held tester operator's manual for further details.

## 3. DTC CLEARANCE

- (a) The following actions will erase the DTCs and freeze frame data.
  - (1) Operating the hand-held tester to erase the codes (See the hand-held tester instruction book for operating instructions.).
  - (2) Disconnecting the battery terminals or EFI fuse.
- (b) After completing repairs, the DTC retained in memory can be cleared by removing the EFI fuse for 10 seconds or more with the ignition switch off.
- (c) Check that the normal code is displayed after connecting the fuse.

## 4. DATA LIST

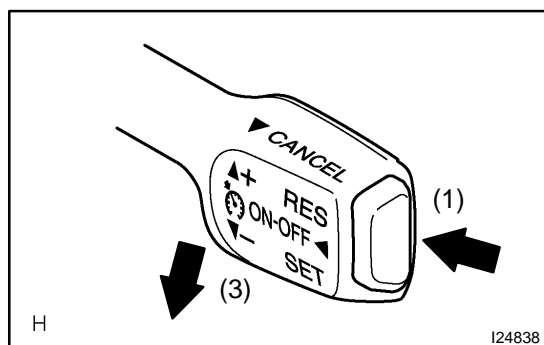
### HINT:

According to the DATA LIST displayed by the hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as a first step of troubleshooting is one of the method to shorten the labor time.

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on tester, read the "DATA LIST".

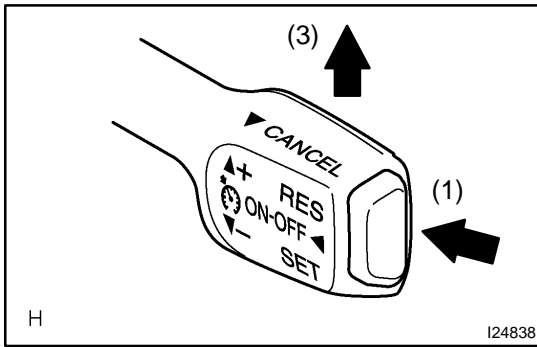
Item	Measurement Item/Display (Range)	Normal Condition	Diagnostic Note
VEHICLE SPD	Vehicle speed/ min.: 0 km/h (0 mph)max.: 255 km/h (158 mph)	Actual vehicle speed	-
MEMORY SPD	Vehicle speed/ min.: 0 km/h (0 mph)max.: 255 km/h (158 mph)	Actual vehicle speed	-
THROTTLE	Throttle operating angle/ min.: 0 km/h (0 mph)max.: 125 km/h ( mph)	Actual vehicle speed	-
CRUISE CONTROL	Cruise control	ON: Cruise control is SET OFF: Cruise control is UNSET	-
MAIN SW (MAIN)	Main switch (Main CPU)	ON: Main switch (Main CPU) is SET OFF: Main switch (Main CPU) is UNSET	-

MAIN SW (SUB)	Main switch (Sub CPU)	ON: Main switch (Sub CPU) is SET OFF: Main switch (Sub CPU) is UNSET	-
CCS READY M	Switch ready (Main CPU)	ON: Switch ready (Main CPU) is SET OFF: Switch ready (Main CPU) is UNSET	-
CCS READY S	Switch ready (Sub CPU)	ON: Switch ready (Sub CPU) is SET OFF: Switch ready (Sub CPU) is UNSET	-
CCS INDICATOR M	Switch indicator (Main CPU)	ON: Switch indicator (Main CPU) is ON OFF: Switch indicator (Main CPU) is OFF	-
CCS INDICATOR S	Switch indicator (Sub CPU)	ON: Switch indicator (Sub CPU) is ON OFF: Switch indicator (Sub CPU) is OFF	-
CANCEL SW	CANCEL switch	ON: CANCEL switch is SET OFF: CANCEL switch is UNSET	-
SET/COAST SW	SET/COAST switch	ON: SET/COAST switch is SET OFF: SET/COAST switch is UNSET	-
RES/ACC SW	RES/ACC switch	ON: RES/ACC switch is SET OFF: RES/ACC switch is UNSET	-
STP LIGHT SW2-M	Stop light SW signal (Main CPU)	ON: Brake pedal depressed OFF: Brake pedal released	-
STP LIGHT SW2-S	Stop light SW signal (Sub CPU)	ON: Brake pedal depressed OFF: Brake pedal released	-
STP LIGHT SW1-M	Stop light SW signal (Sub CPU)	ON: Brake pedal depressed OFF: Brake pedal released	-
SHIFT D POS	Shift D position	ON: Shift is D position OFF: Shift is except D position	-

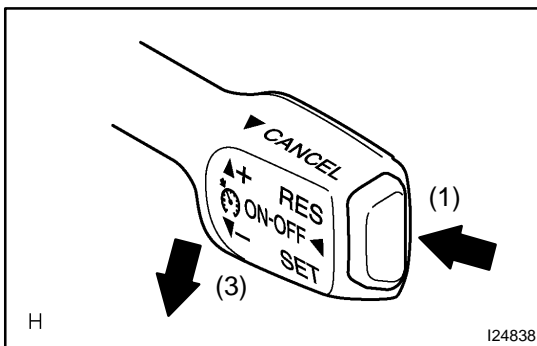


## 5. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)

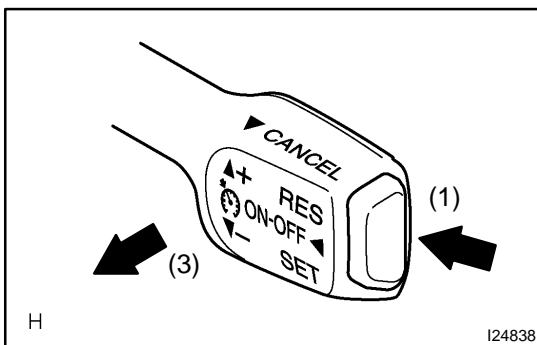
- (a) Inspect the SET switch.
- (1) Push the main switch ON.
  - (2) Drive at a desired speed [40 km/h (25 mph) or higher].
  - (3) Press the control switch to the -/SET.
  - (4) After releasing the switch, check that the vehicle cruises at the desired speed.



- (b) Inspect the ACCEL switch.
- (1) Push the main switch button to ON.
  - (2) Drive at a desired speed [40 km/h (25 mph) or higher].
  - (3) Check that the vehicle speed increases while the control switch is pulled up to +/RES, and that the vehicle cruises at the set speed when the switch is released.
  - (4) Momentarily press the control switch upward to the +/RES and then immediately release it. Check that the vehicle speed increases by about 1.5 km/h (Tap-up function).



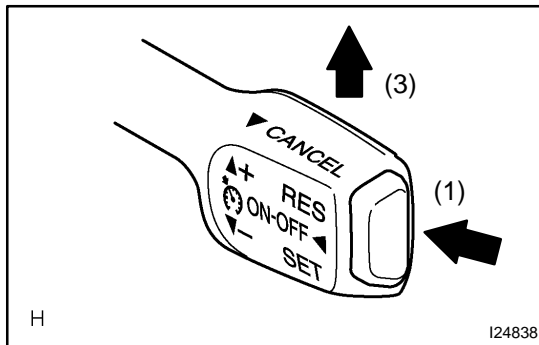
- (c) Inspect the COAST switch.
- (1) Push the main switch button to ON.
  - (2) Drive at a desired speed [40 km/h (25 mph) or higher].
  - (3) Check that the vehicle speed decreases while the control switch is push down to -/SET, and the vehicle cruises at the set speed when the switch is released.
  - (4) Momentarily press the control switch downward to -/SET, and then immediately release it. Check that the vehicle speed decreases by about 1.5 km/h (Tap-down function).



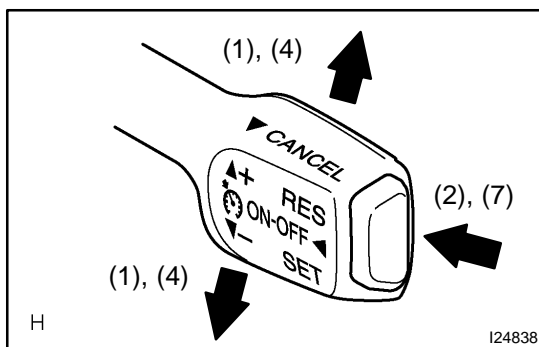
- (d) Inspect the CANCEL switch.
- (1) Push the main button to ON.
  - (2) Drive at a desired speed [40 km/h (25 mph) or higher].
  - (3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
    - ▶ Depress the brake pedal
    - ▶ Shift to except D position
    - ▶ Push the main switch button to OFF



- ▶ Pull the cruise control switch to CANCEL



- (e) Inspect the RESUME switch.
- (1) Push the main switch button to ON.
  - (2) Drive at a desired speed [40 km/h (25 mph) or higher].
  - (3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
    - ▶ Depress the brake pedal
    - ▶ Shift to except D position
    - ▶ Press the main switch button to OFF
  - (4) After the control switch is pulled up to +/RES at the driving speed of more than 40 km/h (25 mph), check that the vehicle restores the speed before the cancellation.



## 6. INPUT SIGNAL CHECK

### HINT:

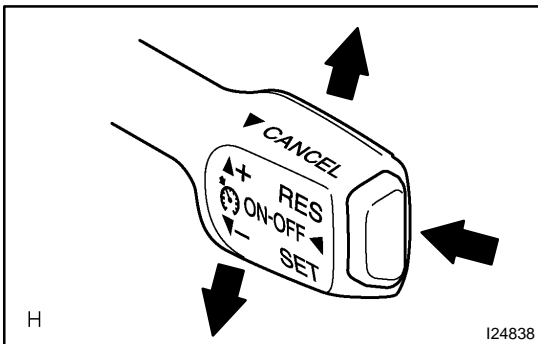
- ▶ For check No.1 - No. 3  
Turn the ignition switch to ON.
- ▶ For check No. 4  
Jack up the vehicle.  
Start the engine.  
Shift to D position

- (a) Check the input signal
- (1) Keep the main switch to -/SET or +/RES position and hold it down or hold it up.
  - (2) Press the switch button to ON.
  - (3) Check that the CRUISE main indicator light blinks twice or 3 times repeatedly after 3 seconds.
  - (4) Turn the -/SET or +/RES switch to OFF.
  - (5) Operate each switch as listed in the table below.
  - (6) Read the blinking pattern of the CRUISE main indicator light.
  - (7) After performing the check, turn the main switch button to OFF.

**HINT:**

When 2 or more signals are input to the ECM, the lowest numbered code will be displayed first.

No.	Operation Method	CRUISE Main Indicator Light Blinking Pattern	Diagnosis
1	Turn -/SET switch ON		-/SET switch circuit is normal
2	Turn +/RES switch ON		+/RES switch circuit is normal
3	Turn CANCEL switch ON		CANCEL switch circuit is normal
	Depress brake pedal (Turn stop lamp switch assy ON)		Stop light switch circuit is normal
	Shift to except D position (Turn PNP switch OFF)		PNP switch circuit is normal



**7. INPUT SIGNAL CHECK**

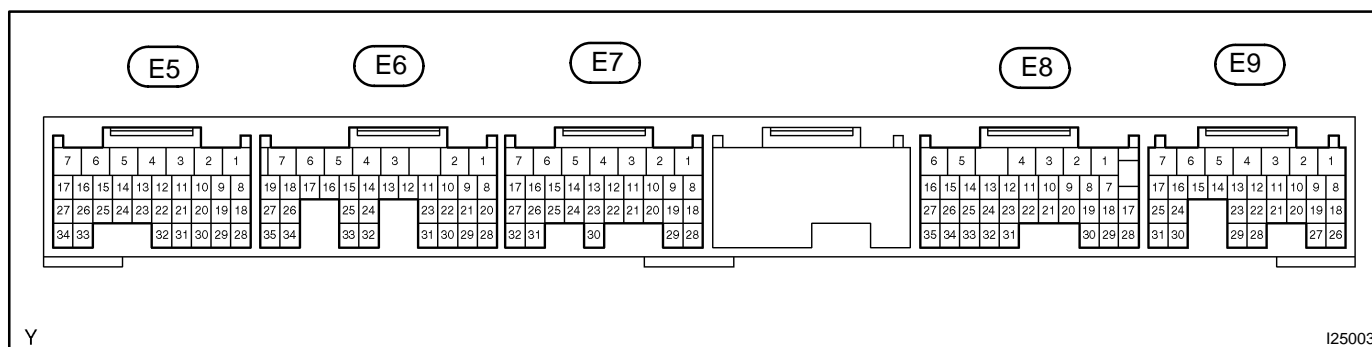
**(Using hand-held tester)**

- (a) Connect the hand-held tester to DLC3.
- (b) Check the control switch (MAIN, CANCEL, SET/COAST, RES/ACC).

## PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
SET not occurring or CANCEL occurring. (DTC is Normal)	1. Input Signal Circuit 2. Vehicle Speed Sensor Circuit 3. Stop Light Switch Circuit 4. Park/Neutral Position Switch Circuit 5. ECM	DI-997 DI-992 DI-993 IN-36
SET not occurring or CANCEL occurring. (DTC is not output)	1. ECM	IN-36
Actual vehicle speed deviates above or below the set speed.	1. Input Signal Circuit 2. ECM	DI-997 IN-36
Gear shifting occurs frequently between 3rd and O/D when driving on uphill road. (Hurting)	1. ECM	IN-36
Cruise control not cancelled, even when brake pedal is depressed.	1. Stop Light Switch Circuit 2. ECM	DI-993 IN-36
Cruise control not cancelled, even when transmission is shifted to "N" position.	1. Park/Neutral Position Switch Circuit 2. ECM	IN-36
Control switch does not operate. (+/SET, +/-RES, CANCEL not possible)	1. Cruise Control Switch Circuit 2. ECM	DI-998 IN-36
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.	1. Input Signal Circuit 2. ECM	DI-997 IN-36
Poor response is ACCEL and RESUME modes.	1. ECM	IN-36
O/D does not resume, even though the road is not uphill.	1. ECM	IN-36
DTC memory is erased.	1. ECM	IN-36
DTC is not output, or is output when should not be.	1. Diagnosis Circuit 2. ECM	- IN-36
Cruise MAIN indicator light remains ON or falls to light up.	1. Input Signal Circuit 2. ECM	DI-997 IN-36
Cruise MAIN indicator light does not light up.	1. Cruise MAIN indicator Light Circuit	DI-1001

# TERMINALS OF ECM



Symbols (Terminals No.)	Wiring Color	Condition	Specified condition
STP ↔ E1 (E8-19 ↔ E7-1)	G-W ↔ BR	Depress brake pedal	10 - 16 V
		Release brake pedal	Below 1 V
CCS ↔ E1 (E8-24 ↔ E7-1)	L ↔ BR	Ignition switch ON	10 - 16 V
		Ignition switch ON CANCEL switch hold ON	3.6 - 7.2 V
		Ignition switch ON -/SET switch hold ON	2.1 - 4.9 V
		Ignition switch ON +/RES switch hold ON	0.7 - 2.6 V
		Ignition switch ON Main switch OFF	Below 1 V
		Ignition switch ON Main switch ON	10 - 14 V
ST1- ↔ E1 (E8-12 ↔ E7-1)	R-G ↔ BR	Depress brake pedal	Below 1 V
		Release brake pedal	10 - 14 V

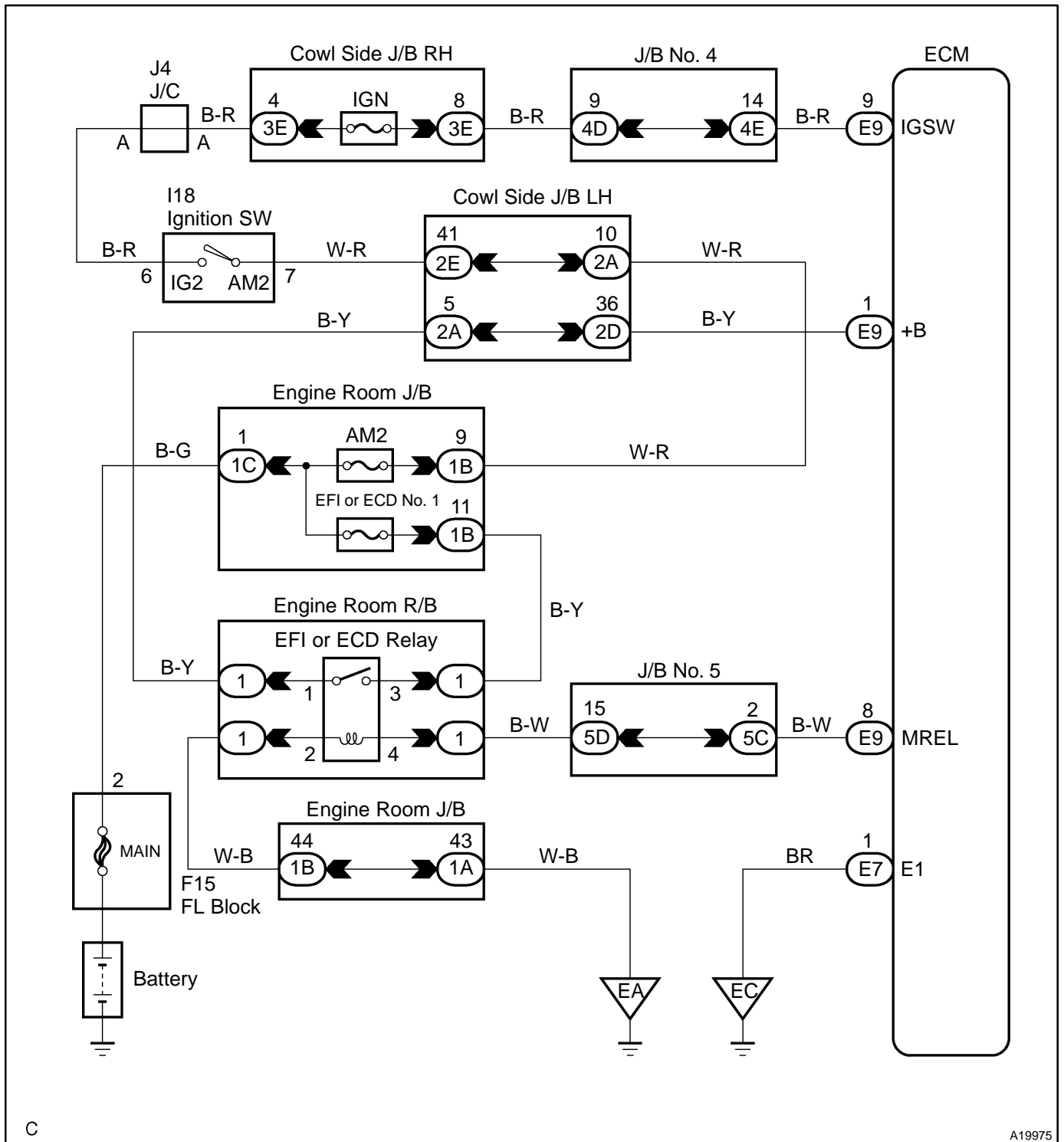
## ECM Power Source Circuit

### CIRCUIT DESCRIPTION

When the ignition switch is turned ON, battery positive voltage is applied to terminal IGSW of the ECM and the EFI or ECD relay control circuit in the ECM sends a signal to terminal MREL of the ECM switching on the EFI or ECD relay.

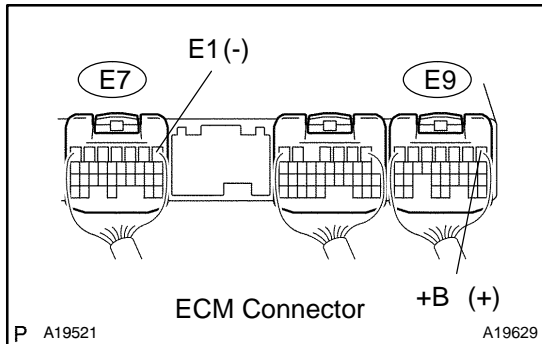
This signal causes current to flow to the coil, closing the contacts of the EFI or ECD relay and supplying power to terminal +B of the ECM.

WIRING DIAGRAM



### INSPECTION PROCEDURE

**1** Check voltage between terminals +B and E1 of ECM connectors.



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals +B and E1 of the ECM connectors.

**OK:**

**Voltage: 9 to 14 V**

**OK** → Proceed to next circuit inspection shown on problem symptoms table (See page [BE-2](#)).

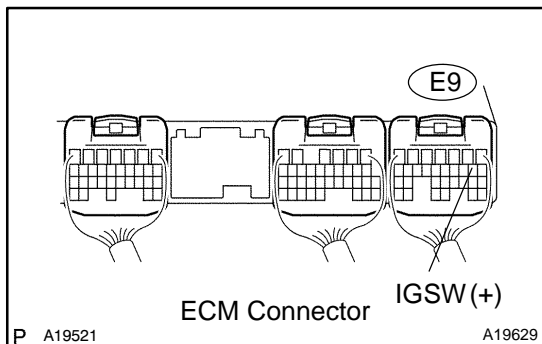
**NG**

**2** Check for open in harness and connector between terminal E1 of ECM and body ground (See page [IN-36](#)).

**NG** → Repair or replace harness or connector.

**OK**

**3** Check voltage between terminal IGSW of ECM connector and body ground.



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

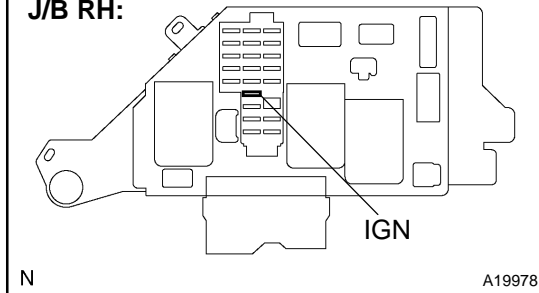
Measure the voltage between terminal IGSW of the ECM connector and body ground.

**OK:**

**Voltage: 9 to 14 V**

**OK** → Go to step 6.

**NG**

**4 Check IGN fuse.**Cowl Side  
J/B RH:**PREPARATION:**

Remove the IGN fuse from the cowl side J/B RH.

**CHECK:**

Check the continuity of the IGN fuse.

**OK:**

Continuity

NG

Check for short in all harness and components connected to IGN fuse.

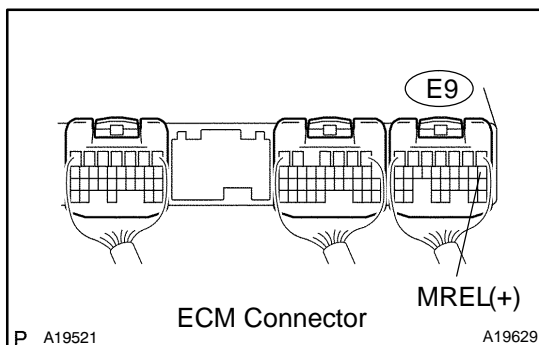
OK

**5 Check ignition switch (See page [BE-29](#) ).**

NG

Replace ignition switch.

OK

Check and repair harness and connector between battery and ignition switch, and ignition switch and ECM (See page [IN-36](#) ).**6 Check voltage between terminal MREL of ECM connector and body ground.****PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminal MREL of the ECM connector and body ground.

**OK:**

Voltage: 9 to 14 V

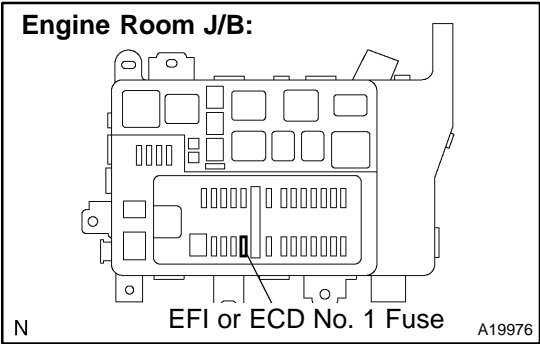
NG

Replace ECM (See page [SF-60](#) ).

OK



**7** Check EFI or ECD No. 1 fuse of engine room J/B.



**PREPARATION:**  
Remove the EFI or ECD No. 1 fuse from the engine room J/B.

**CHECK:**  
Check continuity of EFI or ECD No. 1 fuse.

**OK:**  
Continuity

**NG** Check for short in all harness and components connected to EFI or ECD No. 1 fuse.

**OK**

**8** Check EFI or ECD relay (See page [SF-38](#) ).

**NG** Replace EFI or ECD relay.

**OK**

**9** Check for open and short in harness and connector between terminal MREL of ECM and body ground (See page [IN-36](#) ).

**NG** Repair or replace harness or connector.

**OK**

Check and repair harness or connector between EFI or ECD No. 1 fuse and battery (See page [IN-36](#) ).

## Fuel Pump Control Circuit

### CIRCUIT DESCRIPTION

Refer to DTC P0230 on page [DI-162](#) .

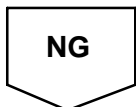
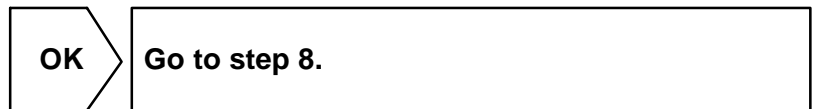
### WIRING DIAGRAM

Refer to DTC P0230 on page [DI-162](#) .

### INSPECTION PROCEDURE

#### Hand-held tester:

1	Check fuel pump operation (See page <a href="#">SF-7</a> ).
---	---



2	Connect hand-held tester, and check operation of fuel pump relay.
---	---

#### PREPARATION:

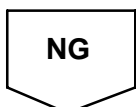
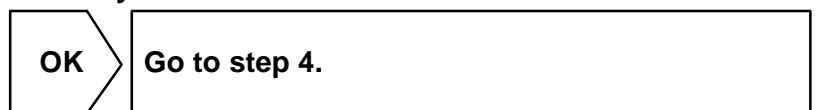
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / FUEL PUMP / SPD.

#### CHECK:

Check the operation of the fuel pump relay when it is switched ON and OFF by the hand-held tester.

#### OK:

Operating noise can be heard from the relay.



3	Check operation of fuel pump relay (See page <a href="#">SF-40</a> ).
---	---



<b>4</b>	<b>Check fuel pump (See page <a href="#">SF-7</a>).</b>
----------	---

<b>NG</b>	<b>Repair or replace fuel pump.</b>
-----------	-------------------------------------

<b>OK</b>
-----------

<b>5</b>	<b>Check circuit opening relay (See page <a href="#">SF-39</a> ).</b>
----------	---

<b>NG</b>	<b>Replace circuit opening relay.</b>
-----------	---------------------------------------

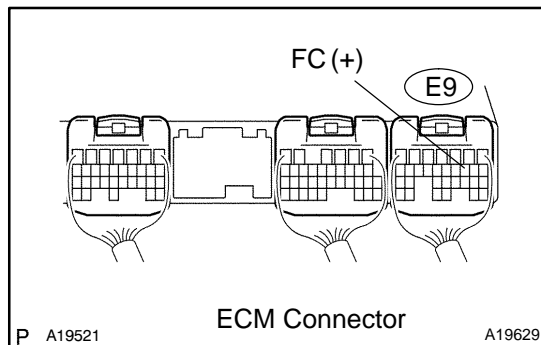
<b>OK</b>
-----------

<b>6</b>	<b>Check for open in harness and connector between EFI or ECD relay and fuel pump, and fuel pump and body ground (See page <a href="#">IN-36</a> ).</b>
----------	---

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

**7 Check voltage between terminal FC and E1 of ECM connector.**



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminal FC of the ECM connector and body ground.

**OK:**

**Voltage: 9 to 14 V**

**NG**

**Check for open in harness and connector between battery and FC terminal of ECM (See page [IN-36](#)).**

**OK**

**Proceed to problem symptoms table (See page [DI-48](#)).**

**8 Check fuel pump resistor (See page [SF-42](#)).**

**NG**

**Replace fuel pump resistor.**

**OK**

**Check for open in harness and connector between circuit opening relay and fuel pump resistor, and fuel pump resistor and fuel pump (See page [IN-36](#)).**

**OBD II scan tool (excluding hand-held tester):**

<b>1</b>	<b>Check operation of fuel pump (See page <a href="#">SF-7</a> ).</b>
----------	---

<b>OK</b>	<b>Go to step 7.</b>
-----------	----------------------

<b>NG</b>
-----------

<b>2</b>	<b>Check operation of fuel pump relay (See page <a href="#">SF-40</a> ).</b>
----------	--

<b>NG</b>	<b>Replace fuel pump relay.</b>
-----------	---------------------------------

<b>OK</b>
-----------

<b>3</b>	<b>Check fuel pump (See page <a href="#">SF-7</a> ).</b>
----------	--

<b>NG</b>	<b>Repair or replace fuel pump.</b>
-----------	-------------------------------------

<b>OK</b>
-----------

<b>4</b>	<b>Check circuit opening relay (See page <a href="#">SF-39</a> ).</b>
----------	---

<b>NG</b>	<b>Replace circuit opening relay.</b>
-----------	---------------------------------------

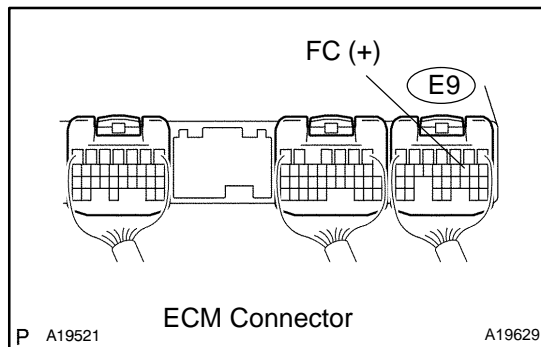
<b>OK</b>
-----------

<b>5</b>	<b>Check for open in harness and connector between EFI or ECD relay and fuel pump, and fuel pump and body ground (See page <a href="#">IN-36</a> ).</b>
----------	---

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

**6 Check voltage between terminal FC of ECM connector and body ground.**



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminal FC of the ECM connector and body ground.

**OK:**

**Voltage: 9 to 14 V**

**NG**

**Check for open in harness and connector between battery and FC terminal of ECM (See page [IN-36](#)).**

**OK**

**Proceed to problem symptoms table (See page [DI-48](#)).**

**7 Check fuel pump resistor (See page [SF-42](#)).**

**NG**

**Replace fuel pump resistor.**

**OK**

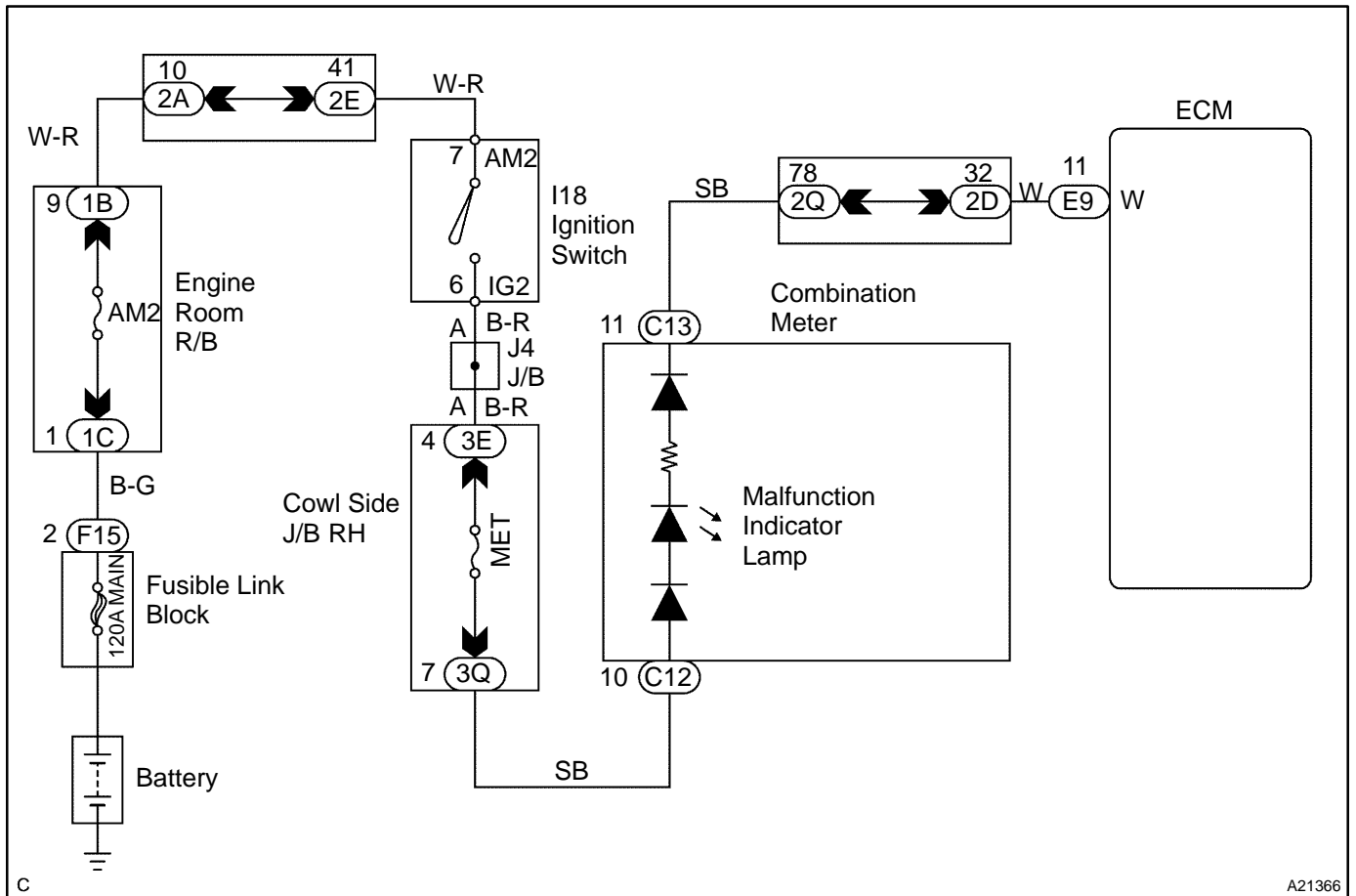
**Check for open in harness and connector between circuit opening relay and fuel pump resistor, fuel pump resistor and fuel pump (See page [IN-36](#)).**

# MIL Circuit

## CIRCUIT DESCRIPTION

If the ECM detects a trouble, the MIL lights up. At this time, the ECM records a DTC in the memory.

## WIRING DIAGRAM



C

A21366

## INSPECTION PROCEDURE

### HINT:

Troubleshoot each trouble symptom in accordance with the chart below .

MIL remains on	Start inspection from step 1
MIL does not light up	Start inspection from step 3

<b>1</b>	<b>Clear DTC.</b>
----------	-------------------

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or the OBD II scan tool main switch ON.
- (c) Read the DTC (See page [DI-3](#) ).
- (d) Clear the DTC (See page [DI-3](#) ).
- (e) Check that MIL does not light up.

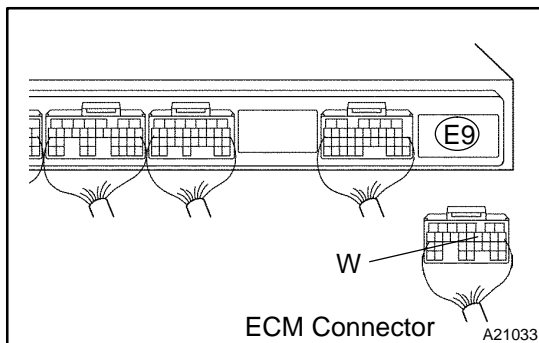
**Standard: MIL does not light up**

OK

Repair circuit indicated by output code  
(See page [DI-36](#) ).

NG

<b>2</b>	<b>Check harness and connector (Check for short in wire harness).</b>
----------	---



- (a) Disconnect the E9 ECM connector.
- (b) Turn the ignition switch ON.
- (c) Check that MIL does not light up.

**Standard: MIL does not light up**

OK

Replace ECM (See page [SF-60](#) ).

NG

Check and repair harness and connector between combination meter and ECM (See page [IN-36](#) ).



<b>3</b>	<b>Check that MIL lights up.</b>
----------	----------------------------------

Check that MIL lights up when turning the ignition switch ON.

**Standard: MIL lights up**

<b>OK</b>	<b>System OK.</b>
-----------	-------------------

<b>NG</b>
-----------

<b>4</b>	<b>Inspect combination meter assy (MIL circuit).</b>
----------	--

See the combination meter troubleshooting on page [BE-63](#) .

<b>NG</b>	<b>Repair or replace bulb or combination meter assembly.</b>
-----------	--

<b>OK</b>
-----------

<b>Check and repair harness and connector between combination meter and ECM (See page <a href="#">IN-36</a> ).</b>
--

**CIRCUIT INSPECTION**

<b>DTC</b>	<b>P0031</b>	<b>Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 1)</b>
<b>DTC</b>	<b>P0032</b>	<b>Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 1)</b>
<b>DTC</b>	<b>P0037</b>	<b>Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 2)</b>
<b>DTC</b>	<b>P0038</b>	<b>Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 2)</b>
<b>DTC</b>	<b>P0051</b>	<b>Oxygen Sensor Heater Control Circuit Low (Bank 2 Sensor 1)</b>
<b>DTC</b>	<b>P0052</b>	<b>Oxygen Sensor Heater Control Circuit High (Bank 2 Sensor 1)</b>
<b>DTC</b>	<b>P0057</b>	<b>Oxygen Sensor Heater Control Circuit Low (Bank 2 Sensor 2)</b>
<b>DTC</b>	<b>P0058</b>	<b>Oxygen Sensor Heater Control Circuit High (Bank 2 Sensor 2)</b>

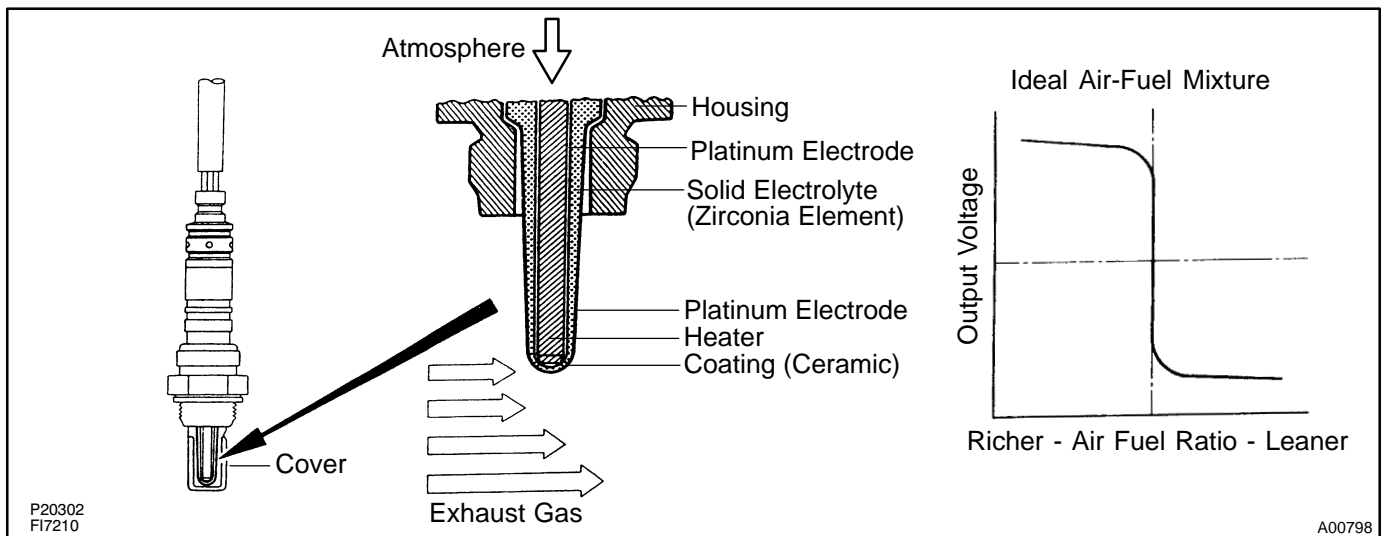
### CIRCUIT DESCRIPTION

To obtain a high purification rate for the CO, HC and NOx components of the exhaust gas, a three-way catalytic converter is used, but for the most efficient use of the three-way catalytic converter, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric air-fuel ratio.

The heated oxygen sensor has the characteristic which its output voltage changes suddenly in the vicinity of the stoichiometric air-fuel ratio. This characteristic is used to detect the oxygen concentration in the exhaust gas and provide the ECM with feedback to control the air-fuel ratio.

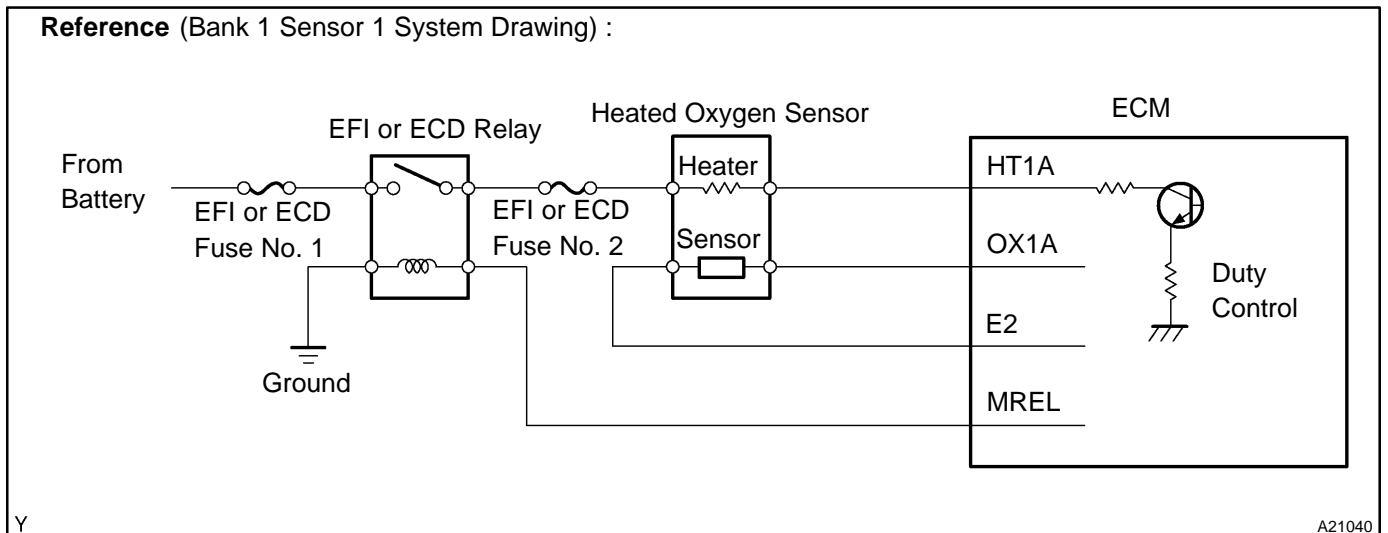
When the air-fuel ratio becomes LEAN, the oxygen concentration in the exhaust increases and the heated oxygen sensor informs the ECM of the LEAN condition (low voltage, i.e. less than 0.45 V).

When the air-fuel ratio is RICHER than the stoichiometric air-fuel ratio, the oxygen concentration in the exhaust gas is reduced and the heated oxygen sensor informs the ECM of the RICH condition (high voltage, i.e. more than 0.45 V). The ECM judges by the voltage output from the heated oxygen sensor whether the air-fuel ratio is RICH or LEAN and controls the injection time accordingly. However, if malfunction of the heated oxygen sensor causes output of abnormal voltage, this disables the ECM for performing an accurate air-fuel ratio control. The heated oxygen sensors include a heater which heats the zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temperature of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.



**HINT:**

The ECM provides a pulse width modulated control circuit to adjust current through the heater. The heated oxygen sensor heater circuit uses a relay on the B+ side of the circuit.



## DIAGNOSTICS - ENGINE

DTC No.	DTC Detecting Condition	Trouble Area
P0031 P0037 P0051 P0057	Heater current is 0.25 A or less when the heater operates with more than 10.5 V positive battery voltage	<ul style="list-style-type: none"> <li>▶ Open in heater circuit of heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> <li>▶ ECM</li> </ul>
P0032 P0038 P0052 P0058	When heater operates, heater current exceeds 2.0 A	<ul style="list-style-type: none"> <li>▶ Short in heater circuit of heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> <li>▶ ECM</li> </ul>

## HINT:

- ▶ Bank 1 refers to bank that includes cylinder No. 1.
- ▶ Bank 2 refers to bank that does not include cylinder No. 1.
- ▶ Sensor 1 refers to the sensor closer to the engine assembly.
- ▶ Sensor 2 refers to the sensor farther away from the engine assembly.

**MONITOR DESCRIPTION**

The sensing portion of the heated oxygen sensor has a zirconia element which is used to detect oxygen concentration in the exhaust. If the zirconia element is at the proper temperature and difference of the oxygen concentration between the inside and outside surface of sensor is large, the zirconia element will generate voltage signals. In order to increase the oxygen concentration detecting capacity in the zirconia element, the ECM supplements the heat from the exhaust with heat from a heating element inside the sensor. When current in the sensor is out of the standard operating range, the ECM interprets this as a fault in the heated oxygen sensor and sets a DTC.

## Example:

The ECM will set a high current DTC if the current in the sensor is more than 2.0 A when the heater is OFF. Similarly, the ECM will set a low current DTC if the current is less than 0.25 A when the heater is ON.

## MONITOR STRATEGY

Related DTCs	P0031	Heated oxygen sensor heater current bank 1 sensor 1 (Low current)
	P0032	Heated oxygen sensor heater current bank 1 sensor 1 (High current)
	P0037	Heated oxygen sensor heater current bank 1 sensor 2 (Low current)
	P0038	Heated oxygen sensor heater current bank 1 sensor 2 (High current)
	P0051	Heated oxygen sensor heater current bank 2 sensor 1 (Low current)
	P0052	Heated oxygen sensor heater current bank 2 sensor 1 (High current)
	P0057	Heated oxygen sensor heater current bank 2 sensor 2 (Low current)
	P0058	Heated oxygen sensor heater current bank 2 sensor 2 (High current)
Required sensors/components	Main sensors/components	Heated oxygen sensor
	Related sensors/components	Vehicle speed sensor
Frequency of operation	Continuous	
Duration	0.3 sec.	
MIL operation	P0031, P0037, P0051, P0057: 1 driving cycle	
	P0032, P0038, P0052, P0058: Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>P0031, P0037, P0051, P0057 (Low current):</b>		
Either of the following conditions is met:	A or B	
A. Following conditions are met:	1, 2, 3, 4 and 5	
1. Time after engine start	250 sec.	500 sec.
2. Battery voltage	10.5 V	-
3. Vehicle speed	-	90 km/h (56 mph)
4. Misfire	Not detected	
5. Pass/Fail detection in this driving cycle	Not detected	
B. Following conditions are met:	1, 2, 3, 4 and 5	
1. Time after engine start	500 sec.	-
2. Battery voltage	10.5 V	-
3. Vehicle speed	40 km/h (25 mph)	-
4. Misfire	Not detected	
5. Pass/Fail detection in this driving cycle	Not detected	
<b>P0032, P0038, P0052, P0058 (High current):</b>		
Intrusive heating is OFF		

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>P0031, P0037, P0051, P0057 (Low current):</b>	
Heated oxygen sensor heater current	Less than 0.25 A (at 0.3 sec. after heater "ON")
<b>P0032, P0038, P0052, P0058 (High current):</b>	
Heated oxygen sensor heater current	More than 2.0 A (while intrusive heating is OFF)

## COMPONENT OPERATING RANGE

Parameter	Standard Value
Heated oxygen sensor heater current under the following conditions: (a) Engine has been warmed up (b) Engine is idling (c) Battery voltage is 11 to 14 V	0.4 to 1.0 A

## MONITOR RESULT

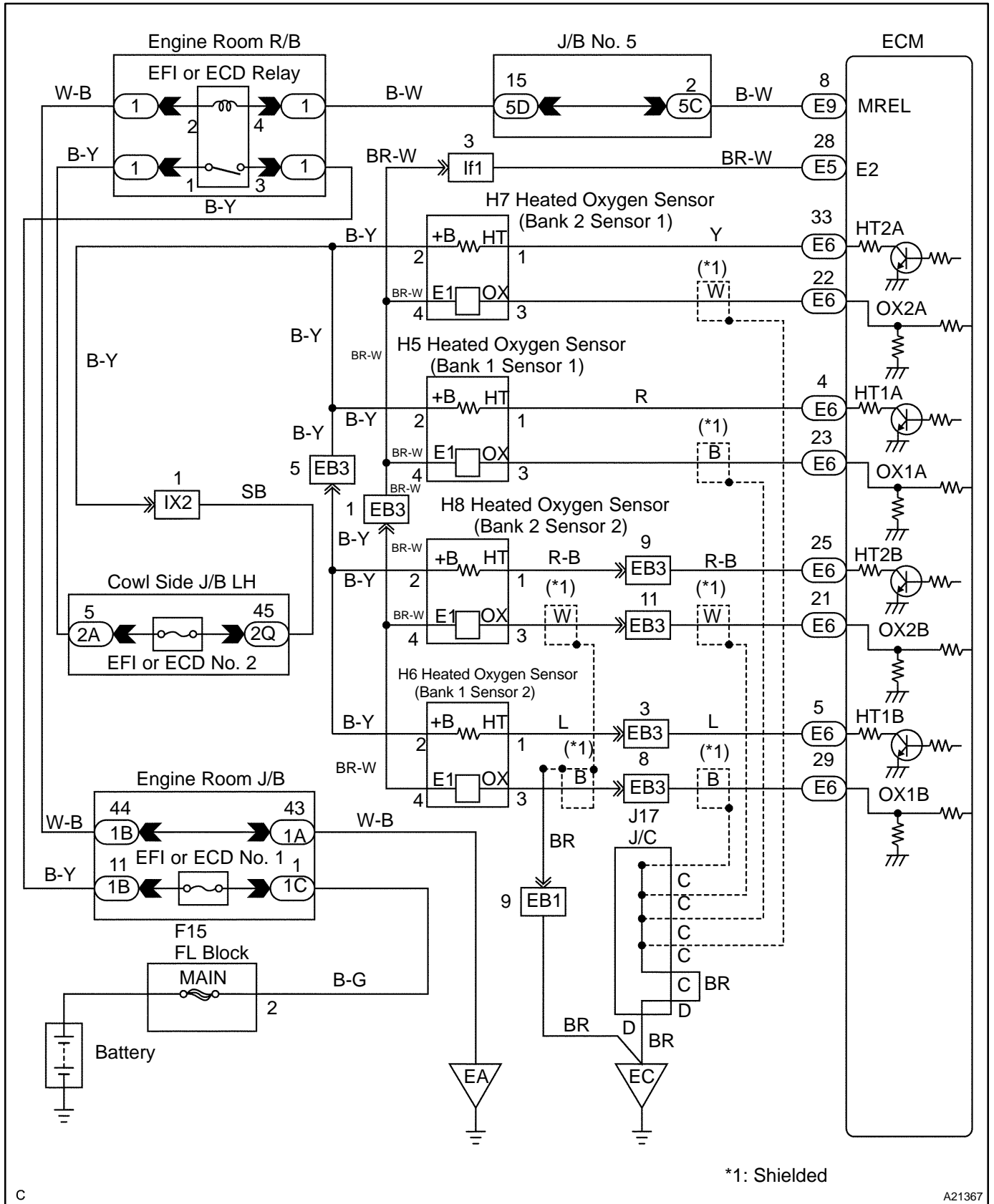
The detailed information is described in "CHECKING MONITOR STATUS" (see page [DI-3](#)).

- ▶ TID (Test Identification) is assigned to each emission-related component.
- ▶ TLT (Test Limit Type):  
If TLT is 0, the component is malfunctioning when the test value is higher than the test limit.  
If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.
- ▶ CID (Component Identification) is assigned to each test value.
- ▶ Unit Conversion is used to calculate the test value indicated on generic OBD scan tools.

### TID \$04: HO2S Heater

TLT	CID	Unit Conversion	Description of Test Value	Description of Test Limit
1	\$01	Multiply by 0.000076 (A)	Maximum HO2S heater current (bank 1 sensor 1)	Malfunction criterion
1	\$02	Multiply by 0.000076 (A)	Maximum HO2S heater current (bank 1 sensor 2)	Malfunction criterion
1	\$10	Multiply by 0.000076 (A)	Maximum HO2S heater current (bank 2 sensor 1)	Malfunction criterion
1	\$20	Multiply by 0.000076 (A)	Maximum HO2S heater current (bank 2 sensor 2)	Malfunction criterion

# WIRING DIAGRAM



C

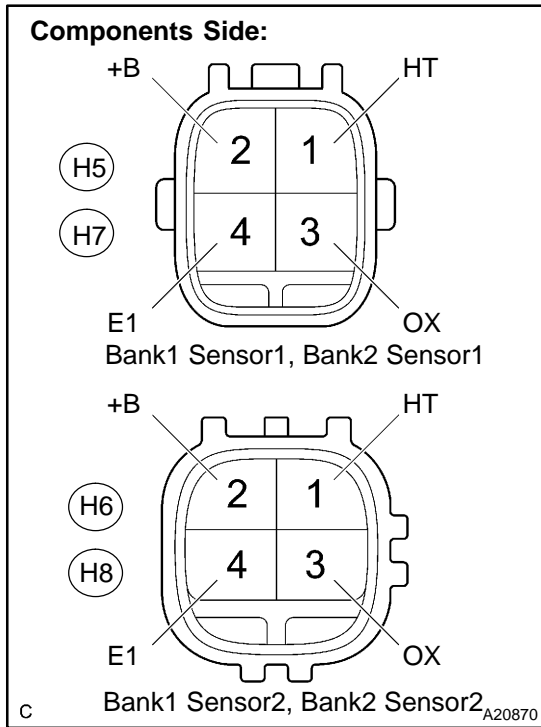
A21367

# INSPECTION PROCEDURE

**HINT:**

Read freeze frame data using hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful to determine whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

**1 Check resistance of heated oxygen sensor heater.**



**PREPARATION:**

Disconnect the H5, H6, H7 or H8 heated oxygen sensor connector.

**CHECK:**

Measure resistance between terminals of the heated oxygen sensor.

**OK:**

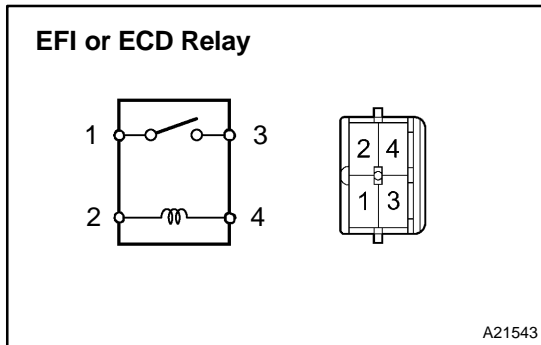
Tester Connection	Specified Condition
HT (H5-1) - +B (H5-2)	11 to 16 Ω (20°C)
HT (H6-1) - +B (H6-2)	11 to 16 Ω (20°C)
HT (H7-1) - +B (H7-2)	11 to 16 Ω (20°C)
HT (H8-1) - +B (H8-2)	11 to 16 Ω (20°C)

**NG** Replace heated oxygen sensor.

**OK**



**2 Check EFI or ECD relay.**



**PREPARATION:**

Remove the EFI or ECD relay from the engine room R/B.

**CHECK:**

Inspect the EFI or ECD relay.

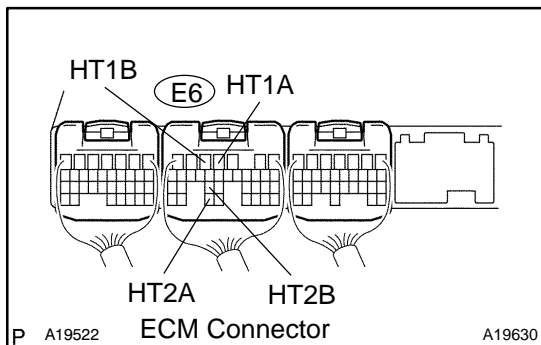
**OK:**

Terminal No.	Condition	Specified Condition
2 - 4	Constant	Continuity
1 - 3	Usually	No Continuity
	Apply B+ between terminals 2 and 4	Continuity

**NG** Replace EFI or ECD relay.

**OK**

**3 Check voltage between terminals HT1A, HT2A, HT1B, HT2B of ECM connectors and body ground.**



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals of the ECM connectors and body ground.

**HINT:**

- ▶ Connect terminal HT1A to the bank 1 sensor 1.
- ▶ Connect terminal HT1B to the bank 1 sensor 2.
- ▶ Connect terminal HT2A to the bank 2 sensor 1.
- ▶ Connect terminal HT2B to the bank 2 sensor 2.

**OK:**

Tester Connection	Specified Condition
HT1A (E6-4) - Body ground	9 to 14 V
HT1B (E6-5) - Body ground	9 to 14 V
HT2A (E6-33) - Body ground	9 to 14 V
HT2B (E6-25) - Body ground	9 to 14 V

**OK** Replace ECM (See page SF-60 ).

**NG**

Check and repair harness or connector between EFI or ECD relay and heated oxygen sensor, and heated oxygen sensor and ECM (See page IN-36 ).

<b>DTC</b>	<b>P0100</b>	<b>Mass or Volume Air Flow Circuit</b>
------------	--------------	--

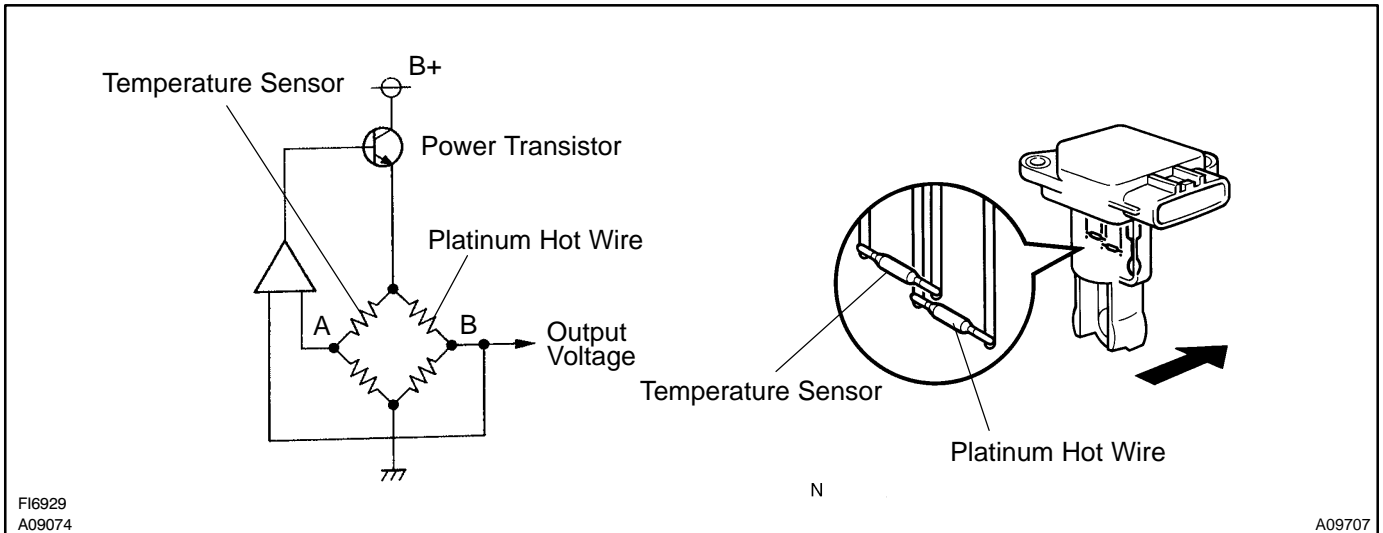
<b>DTC</b>	<b>P0102</b>	<b>Mass or Volume Air Flow Circuit Low Input</b>
------------	--------------	--

<b>DTC</b>	<b>P0103</b>	<b>Mass or Volume Air Flow Circuit High Input</b>
------------	--------------	---

**CIRCUIT DESCRIPTION**

The Mass Air Flow (MAF) meter measures the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and provide a proper air fuel ratio. Inside the MAF meter, there is a heated platinum wire exposed to the flow of intake air.

By applying a specific current to the wire, the ECM heats this wire to a given temperature. The flow of incoming air cools the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to these components in the MAF meter. The voltage level is proportional to the airflow through the sensor. The ECM interprets this voltage as the intake air amount. The circuit is constructed so that the platinum hot wire and temperature sensor provide a bridge circuit, with the power transistor controlled so that the potential of A and B remains equal to maintain the set temperature.



DTC No.	DTC Detection Condition	Trouble Area
P0100	Open or short in mass air flow meter circuit for more than 3 sec.	<ul style="list-style-type: none"> <li>▶ Open or short in mass air flow meter circuit</li> <li>▶ Mass air flow meter</li> <li>▶ ECM</li> </ul>
P0102	Open or short in mass air flow meter circuit for more than 3 sec.	
P0103	Open in mass air flow meter circuit for more than 3 sec. (EVG circuit) Short in mass air flow meter circuit for more than 3 sec. (+B circuit)	

**HINT:**

After confirming DTC P0100, P0102 or P0103, use the hand-held tester or the OBD II scan tool to confirm the MAF ratio from the ALL menu (to reach the ALL menu: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL).

Mass Air Flow Value (gm/sec.)	Malfunction
Approx. 0.0	▶Mass air flow meter power source circuit open ▶VG circuit open or short
271.0 or more	▶EVG circuit open

**MONITOR DESCRIPTION**

If there is a defect in the MAF (Mass Air Flow) meter or an open or short circuit, the voltage level will deviate outside the normal operating range. The ECM interprets this deviation as a defect in the MAF meter and sets a DTC.

Example:

When the MAF meter voltage output is less than 0.2 V, or more than 4.9 V, and if either the condition continues for more than 3 sec.

**MONITOR STRATEGY**

Related DTCs	P0100	Mass air flow meter circuit range check (Fluttering)
	P0102	Mass air flow meter circuit range check (Low voltage)
	P0103	Mass air flow meter circuit range check (High voltage)
Required sensors/components	Mass air flow meter	
Frequency of operation	Continuous	
Duration	3 sec.	
MIL operation	Immediate (When engine speed is at less than 4,000 rpm) 2 driving cycles (When engine speed is at 4,000 rpm or more)	
Sequence of operation	None	

**TYPICAL ENABLING CONDITIONS**

The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page DI-3)
The typical enabling condition is not available	-

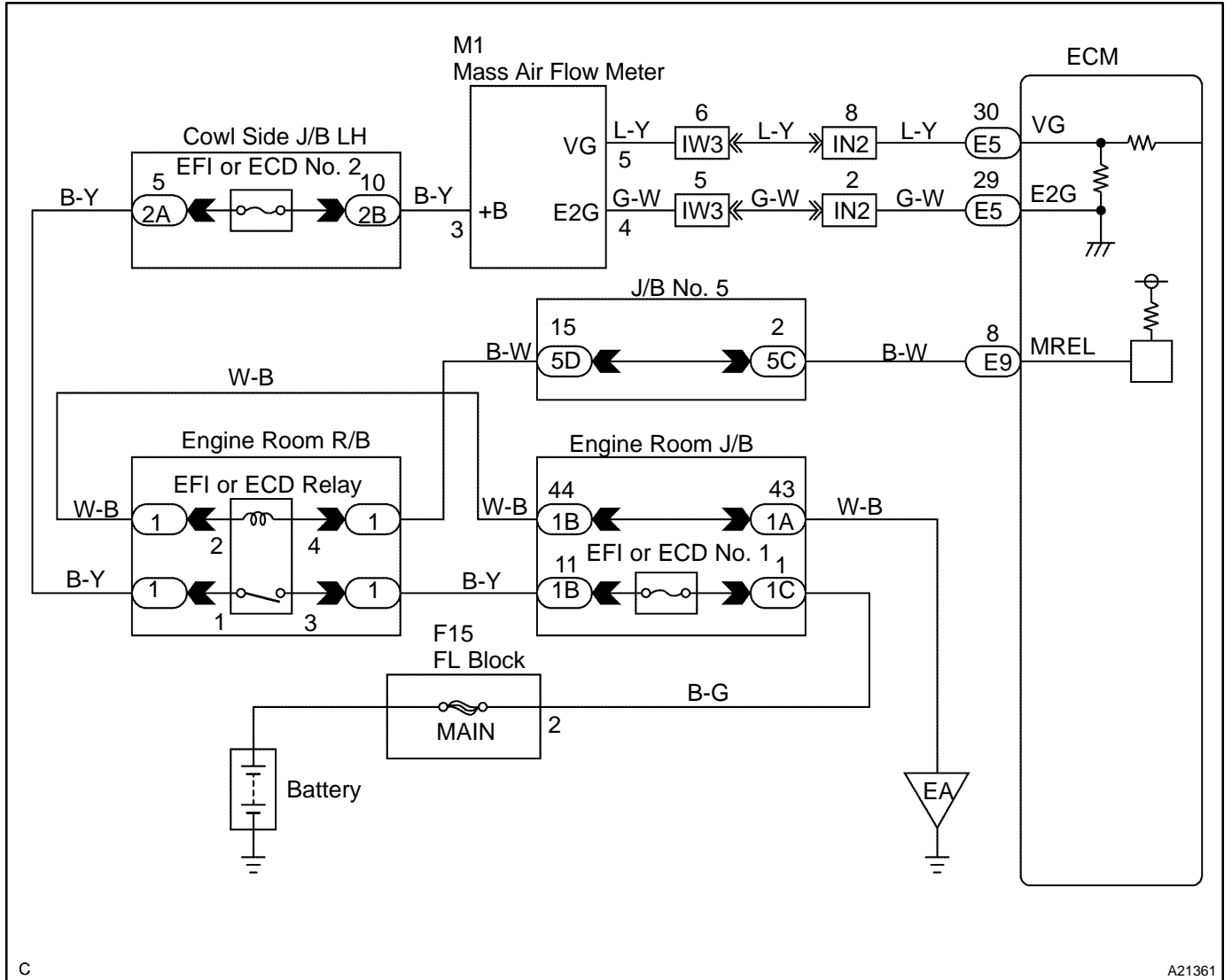
**TYPICAL MALFUNCTION THRESHOLDS**

Detection Criteria	Threshold
<b>P0100:</b>	
Mass air flow meter voltage	Less than 0.2 V or more than 4.9 V
<b>P0102:</b>	
Mass air flow meter voltage	Less than 0.2 V
<b>P0103:</b>	
Mass air flow meter voltage	More than 4.9 V

### COMPONENT OPERATING RANGE

Parameter	Standard Value
Mass air flow meter voltage	0.4 to 2.2 V

### WIRING DIAGRAM



C

A21361

## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

<b>1</b>	<b>Connect OBD II scan tool or hand-held tester, and read value of mass air flow rate.</b>
----------	--

### PREPARATION:

- (a) Connect the OBD II scan tool or hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the OBD II scan tool or the hand-held tester main switch ON.
- (c) Start the engine.
- (d) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / MAF.

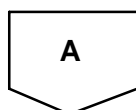
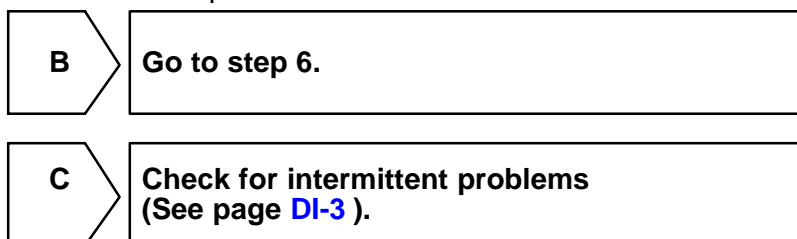
### CHECK:

Read the mass air flow rate on the OBD II scan tool or the hand-held tester.

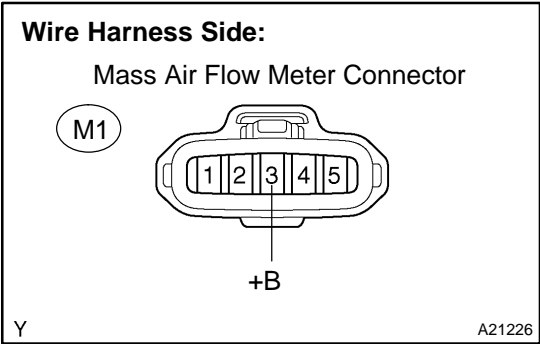
### RESULT:

Air Flow Rate (gm/s)	Proceed to
0.0	A
271.0 or more	B
Between 1 and 270.0 (*1)	C

\*1: The value must be changed when the throttle valve is opened or closed.



**2 Check voltage of mass air flow meter power source.**



**PREPARATION:**

- (a) Disconnect the M1 mass air flow meter connector.
- (b) Turn the ignition switch ON.

**CHECK:**

Measure voltage between terminal of the mass air flow meter connector and body ground.

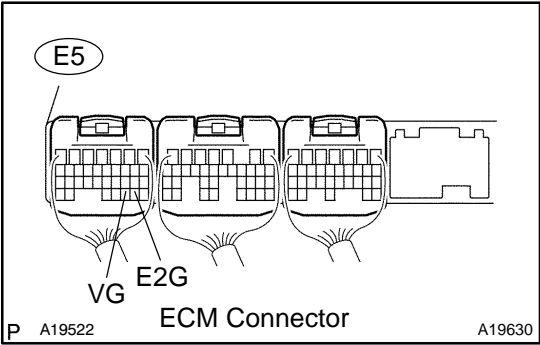
**OK:**

Tester Connection	Specified Condition
+B (M1-3) - Body ground	9 to 14 V

**NG** Go to step 5.

**OK**

**3 Check voltage between terminal VG of ECM connector and body ground.**



**PREPARATION:**

Start the engine.

**CHECK:**

Measure the voltage between the specified terminal of the E5 ECM connector.

**HINT:**

The shift position should be P or N and the A/C switch should be turned OFF.

**OK:**

Tester Connection	Condition	Specified Condition
VG (E5-30) - E2G (E5-29)	Engine is idling	0.5 to 3.0 V

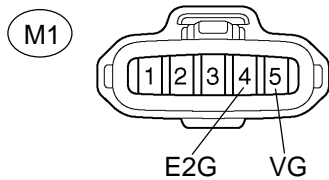
**OK** Replace ECM (See page SF-60 ).

**NG**

#### 4 Check for open and short in harness and connector between mass air flow meter and ECM.

##### Wire Harness Side:

Mass Air Flow Meter Connector



Y

A21226

##### PREPARATION:

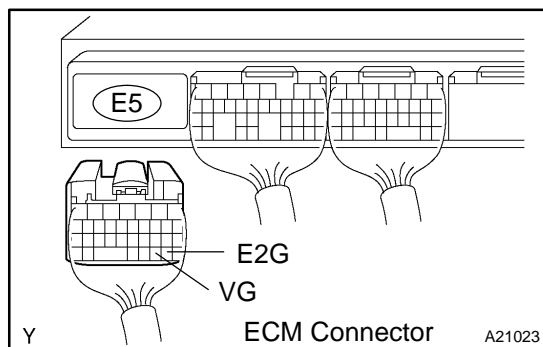
- Disconnect the M1 mass air flow meter connector.
- Disconnect the E5 ECM connector.

##### CHECK:

Check the resistance between the wire harness side connectors.

##### OK:

Tester Connection	Specified Condition
VG (M1-5) - VG (E5-30)	Below 1 $\Omega$
E2G (M1-4) - E2G (E5-29)	Below 1 $\Omega$
VG (M1-5) or VG (E5-30) - Body ground	10 k $\Omega$ or higher



Y

A21023

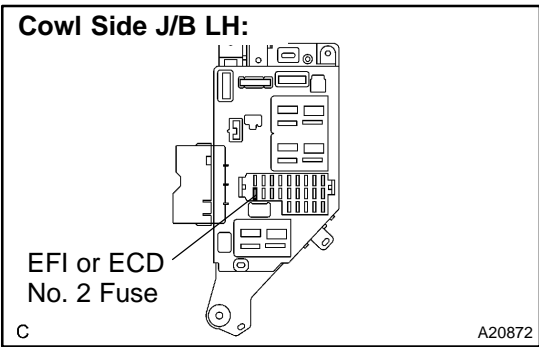
**NG**

**Repair or replace harness or connector.**

**OK**

**Replace mass air flow meter.**

**5 Check for open and short in harness and connector between mass air flow meter and EFI or ECD relay.**



**Check EFI or ECD No. 2 fuse:**

**PREPARATION:**

Remove the EFI or ECD No. 2 fuse from the cowl side J/B LH.

**CHECK:**

Check for continuity in the EFI or ECD No. 2 fuse.

**OK:**

**Continuity**

**Check harness and connector:**

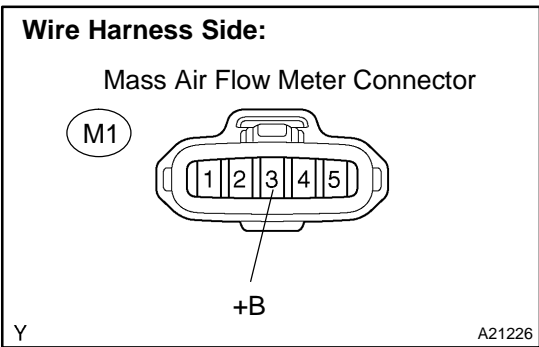
**PREPARATION:**

- (a) Install the EFI or ECD No. 2 fuse.
- (b) Disconnect the M1 mass air flow meter connector.
- (c) Remove the EFI or ECD relay from the engine room R/B.

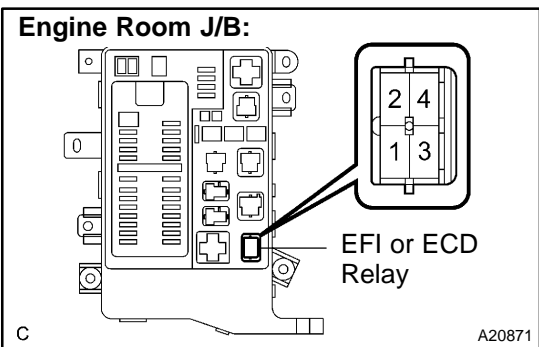
**CHECK:**

Check the resistance between the wire harness side connectors.

**OK:**



Tester Connection	Specified Condition
+B (M1-3) - Engine Room J/B (EFI or ECD relay terminal 1)	Below 1 Ω
+B (M1-3) or Engine room J/B (EFI or ECD relay terminal 1) - Body ground	10 kΩ or higher



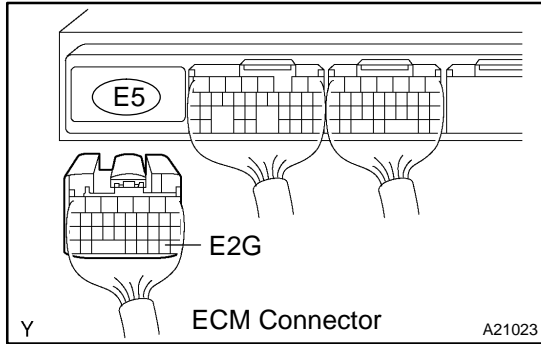
**NG** Repair or replace harness or connector.

**OK**

**Check ECM power source circuit (See page DI-345).**



**6 Check continuity between terminal E2G of ECM connector and body ground.**



**CHECK:**

Check the resistance between terminal of the E5 ECM connector and body ground.

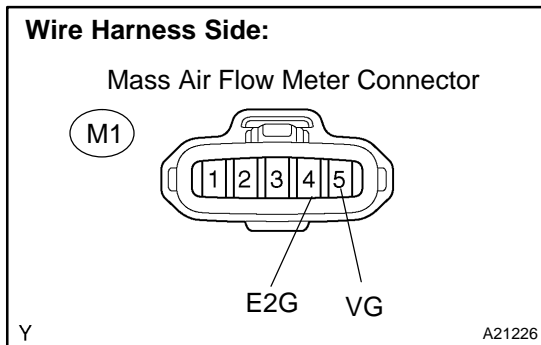
**OK:**

Tester Connection	Specified Condition
E2G (E5-29) - Body ground	Below 1 Ω

**NG** → **Replace ECM (See page SF-60).**

**OK**

**7 Check for open in harness and connector between mass air flow meter and ECM.**



**PREPARATION:**

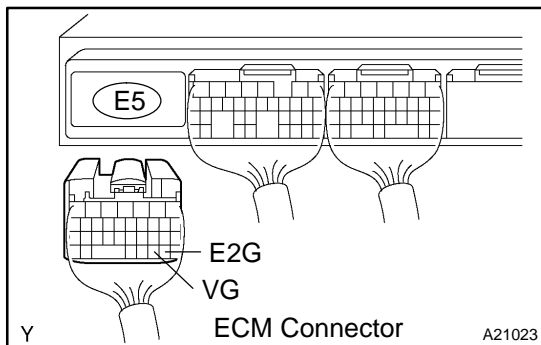
- (a) Disconnect the M1 mass air flow meter connector.
- (b) Disconnect the E5 ECM connector.

**CHECK:**

Check the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
VG (M1-5) - VG (E5-30)	Below 1 Ω
E2G (M1-4) - E2G (E5-29)	Below 1 Ω
VG (M1-5) or VG (E5-30) - Body ground	10 kΩ or higher
E2G (M1-4) or E2G (E5-29) - Body ground	10 kΩ or higher



**NG** → **Repair or replace harness or connector.**

**OK**

**Replace mass air flow meter.**

<b>DTC</b>	<b>P0101</b>	<b>Mass or Volume Air Flow Circuit Range/ Performance Problem</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

Refer to DTC P0100, P0102 and P0103 on page [DI-57](#) .

DTC No.	DTC Detecting Condition	Trouble Area
P0101	After engine is warmed up, conditions (a), (b), (c) and (d) continue for more than 10 seconds: (2 trip detection logic) (a) Throttle valve fully closed (b) Voltage output of the mass air flow meter is more than 2.2 V. (c) Engine coolant temperature is more than 70 °C (158 °F). (d) Engine speed is less than 900 rpm.	▶ Mass air flow meter
	Conditions (a), (b) and (c) continue for more than 6 seconds with engine speed: (2 trip detection logic) (a) Engine speed is more than 0 rpm. (b) VTA is more than 0.1 V. (c) Voltage output of the mass air flow meter is less than 0.25 V.	

## MONITOR DESCRIPTION

The MAF (Mass Air Flow) meter helps the ECM calculate the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and provide a proper air fuel ratio. Inside the MAF meter, there is a heated platinum wire exposed to the flow of intake air. By applying a specific current to the wire, the ECM heats this wire to a given temperature. The flow of incoming air cools the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to these components in the MAF meter. The voltage level is proportional to the air flow through the MAF meter. The ECM interprets this voltage as the intake air amount. If there is a defect in the MAF meter or an open or short circuit, the voltage level will deviate outside the normal operating range. The ECM interprets this deviation as a defect in the MAF meter and sets a DTC.

Example:

If the voltage is more than 2.2 V at idle or less than 0.25 V at idle OFF, the ECM interprets this as a defect in the MAF meter and sets a DTC.

## MONITOR STRATEGY

Related DTCs	P0101	Mass air flow meter rationality
Required sensors/components	Main sensors/components	Mass air flow meter
	Related sensors/components	Engine speed sensor, Engine coolant temperature sensor, Throttle position sensor
Frequency of operation	Continuous	
Duration	10 sec. (High voltage) 6 sec. (Low voltage)	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>High voltage:</b>		
Engine speed	-	900 rpm
Idle	ON	
Engine coolant temperature	70>C (158>F)	-
<b>Low voltage:</b>		
Engine speed	0 rpm	-
Throttle position	0.1 V	-

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Mass air flow meter voltage (High voltage)	More than 2.2 V
Mass air flow meter voltage (Low voltage)	Less than 0.25 V

### INSPECTION PROCEDURE

**HINT:**

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

<b>1</b>	<b>Are there any other codes (besides DTC P0101) being output?</b>
----------	--

**PREPARATION:**

- (a) Connect the hand-held tester or the OBD II scan tool to DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

**CHECK:**

Read the DTC using the hand-held tester or the OBD II scan tool.

**RESULT:**

Display (DTC output)	Proceed to
"P0101" and other DTCs	A
Only P0101	B

**HINT:**

If any other codes besides P0101 are output, perform the troubleshooting for those codes first.

**B**

**Replace mass air flow meter.**

**A**

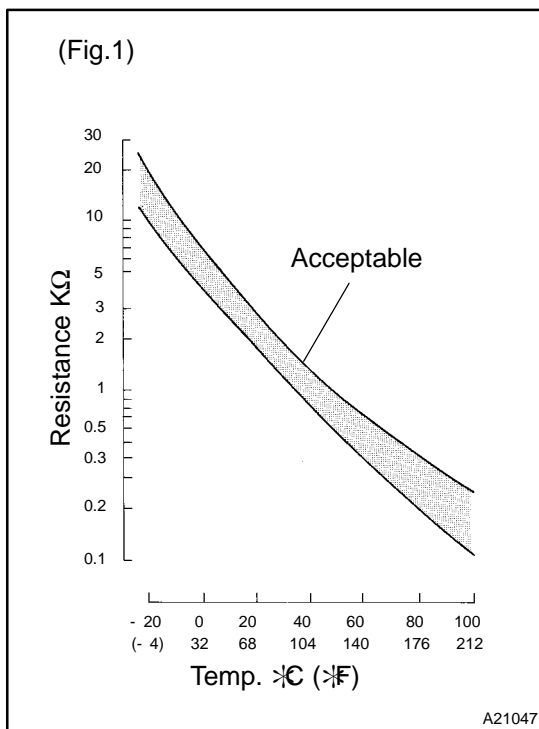
**Go to relevant DTC chart (See page [DI-36](#) ).**

<b>DTC</b>	<b>P0110</b>	<b>Intake Air Temperature Circuit</b>
------------	--------------	---------------------------------------

<b>DTC</b>	<b>P0112</b>	<b>Intake Air Temperature Circuit Low Input</b>
------------	--------------	---

<b>DTC</b>	<b>P0113</b>	<b>Intake Air Temperature Circuit High Input</b>
------------	--------------	--

**CIRCUIT DESCRIPTION**



The intake air temperature (IAT) sensor, mounted on the mass air flow (MAF) meter, monitors the intake air temperature. The IAT sensor has a thermistor that varies its resistance depending on the temperature of the intake air. When the air temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in resistance are reflected as voltage changes to the ECM terminal.

(See Fig. 1).

The intake air temperature sensor is connected to the ECM (See below ). The 5 V power source voltage in the ECM is applied to the intake air temperature sensor from terminal THA (THAR) via resistor R.

That is, the resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temperature, the voltage at terminal THA (THAR) also changes. Based on this signal, the ECM increases the fuel injection volume to improve the driveability during cold engine operation.

DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0110	Step 1	Open or short in intake air temperature sensor circuit for 0.5 sec.	<ul style="list-style-type: none"> <li>▶ Open or short in intake air temperature sensor circuit</li> <li>▶ Intake air temperature sensor (built in mass air flow meter)</li> <li>▶ ECM</li> </ul>
P0112	Step 4	Short in intake air temperature sensor circuit for 0.5 sec.	
P0113	Step 2	Open in intake air temperature sensor circuit for 0.5 sec.	

**HINT:**

After confirming DTC "P0110, P0112 or P0113", use the hand-held tester or the OBD II scan tool to confirm the intake air temperature in the "DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL".

Temperature Displayed	Malfunction
-40 °C (-40 °F)	Open circuit
140 °C (284 °F) or more	Short circuit

## MONITOR DESCRIPTION

The ECM monitors the sensor voltage and uses this value to calculate the intake air temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a fault in the IAT (Intake Air Temperature) sensor and sets a DTC.

Example:

When the sensor voltage output equal to  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ), or more than  $140^{\circ}\text{C}$  ( $284^{\circ}\text{F}$ ).

## MONITOR STRATEGY

Related DTCs	P0110	Intake air temperature sensor range check (Fluttering)
	P0112	Intake air temperature sensor range check (Low resistance)
	P0113	Intake air temperature sensor range check (High resistance)
Required sensors/components	Intake air temperature sensor	
Frequency of operation	Continuous	
Duration	0.5 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )
The typical enabling condition is not available	-

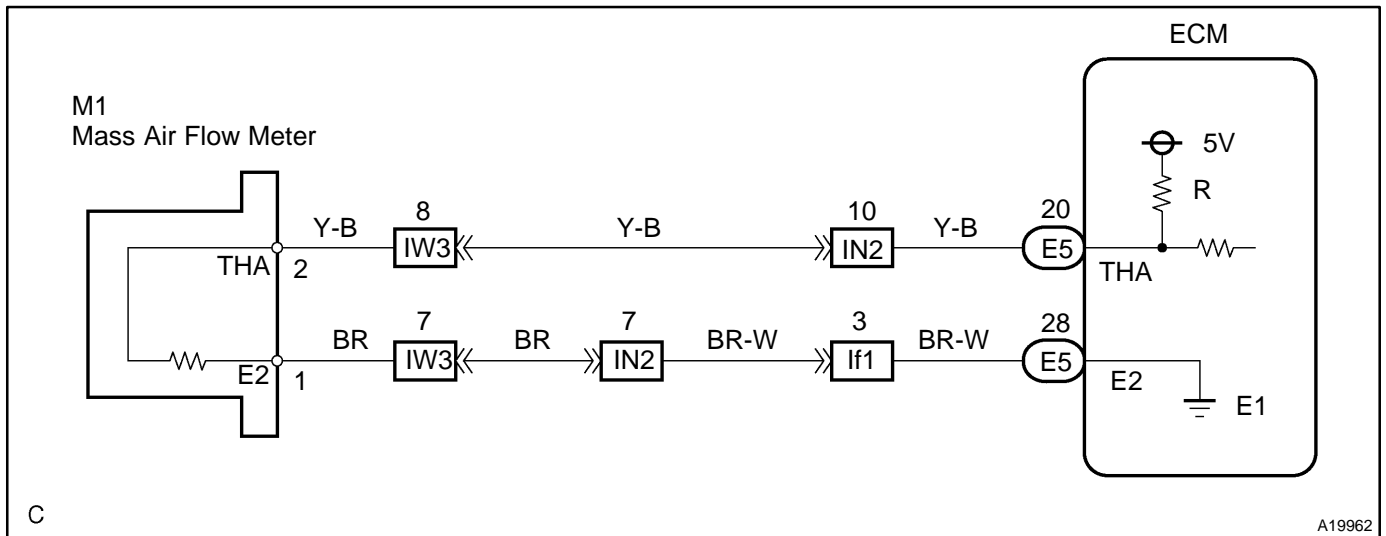
## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>P0110:</b>	
Intake air temperature sensor resistance (Intake air temperature)	Less than $98.5\ \Omega$ , or more than $156\ \text{k}\Omega$ (More than $140^{\circ}\text{C}$ ( $284^{\circ}\text{F}$ ), or less than $-40^{\circ}\text{C}$ ( $-40^{\circ}\text{F}$ ))
<b>P0112:</b>	
Intake air temperature sensor resistance (Intake air temperature)	Less than $98.5\ \Omega$ (More than $140^{\circ}\text{C}$ ( $284^{\circ}\text{F}$ ))
<b>P0113:</b>	
Intake air temperature sensor resistance (Intake air temperature)	More than $156\ \text{k}\Omega$ (Less than $-40^{\circ}\text{C}$ ( $-40^{\circ}\text{F}$ ))

## COMPONENT OPERATING RANGE

Parameter	Standard Value
Intake air temperature sensor resistance	$98.5\ \Omega$ ( $140^{\circ}\text{C}$ ( $284^{\circ}\text{F}$ )) to $156\ \text{k}\Omega$ ( $-40^{\circ}\text{C}$ ( $-40^{\circ}\text{F}$ ))

## WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

- ▶ If DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

<b>1</b>	<b>Connect OBD II scan tool or hand-held tester, and read value of intake air temperature.</b>
----------	--

**PREPARATION:**

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the OBD II scan tool or the hand-held tester main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.

**CHECK:**

Read the temperature value on the OBD II scan tool or the hand-held tester.

**OK:**

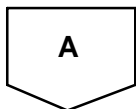
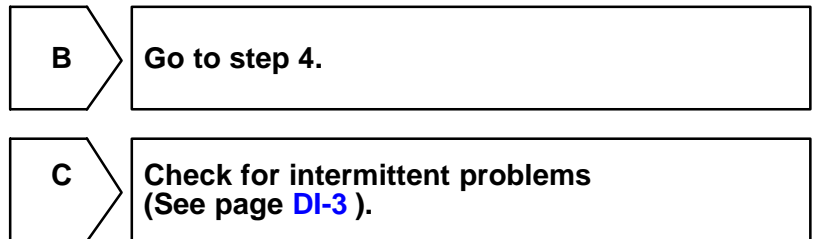
**Same as actual intake air temperature.**

**RESULT:**

Temperature Displayed	Proceed to
-40 °C (-40 °F)	A
140 °C (284 °F) or more	B
OK (Same as present temperature)	C

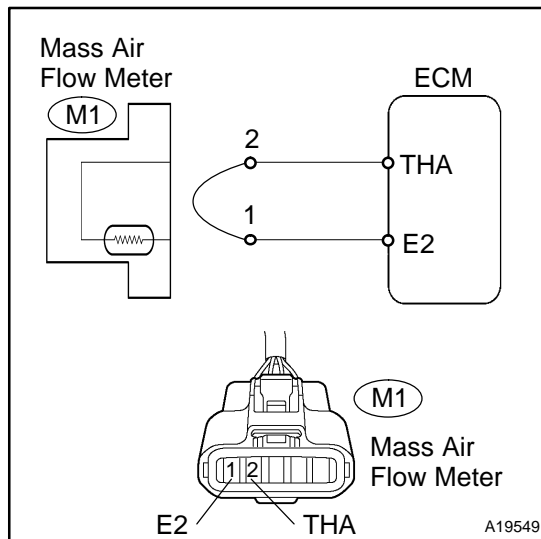
**HINT:**

- ▶ If there is an open circuit, the OBD II scan tool or the hand-held tester indicates -40 °C (-40 °F).
- ▶ If there is a short circuit, the OBD II scan tool or the hand-held tester indicates 140 °C (284 °F) or more.





## 2 Check for open in harness or ECM.



### PREPARATION:

- Disconnect the M1 mass air flow meter connector.
- Connect terminals 1 and 2 of the mass air flow meter wire harness side connector.
- Turn the ignition switch ON.
- When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.

### CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

### OK:

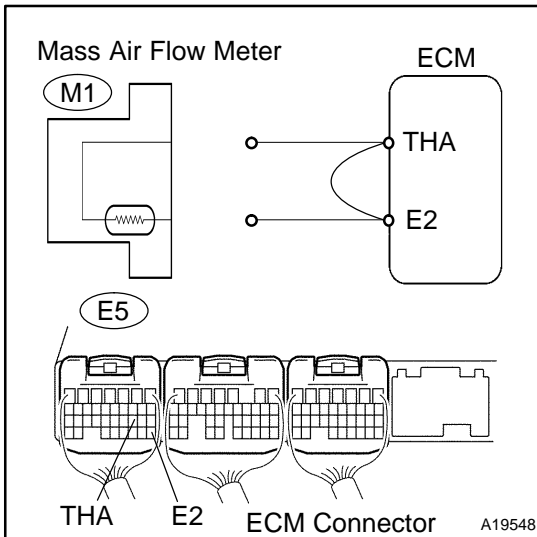
**Temperature value: 140°C (284°F) or more**

**OK**

**Confirm good connection at sensor. If OK, replace mass air flow meter.**

**NG**

### 3 Check for open in harness or ECM.



#### PREPARATION:

(a) Connect terminals THA and E2 of the E5 ECM connector.  
HINT:

Before checking, do a visual and contact pressure checks for the ECM connector.

(b) Turn the ignition switch ON.

(c) When using hand-held tester, enter the following menus:  
DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.

#### CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

#### OK:

Temperature value: 140°C (284°F) or more

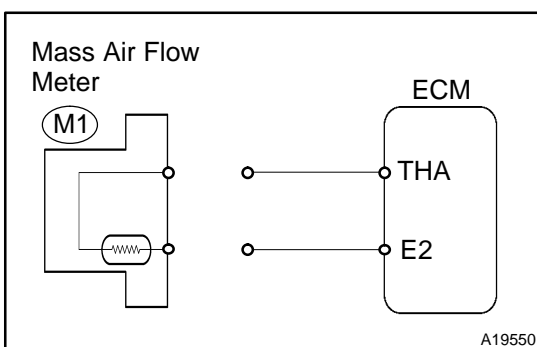
OK

Repair or replace harness or connector.

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page SF-60).

### 4 Check for short in harness and ECM.



#### PREPARATION:

(a) Disconnect the M1 mass air flow meter connector.

(b) Turn the ignition switch ON.

(c) When using hand-held tester, enter the following menus:  
DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.

#### CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

#### OK:

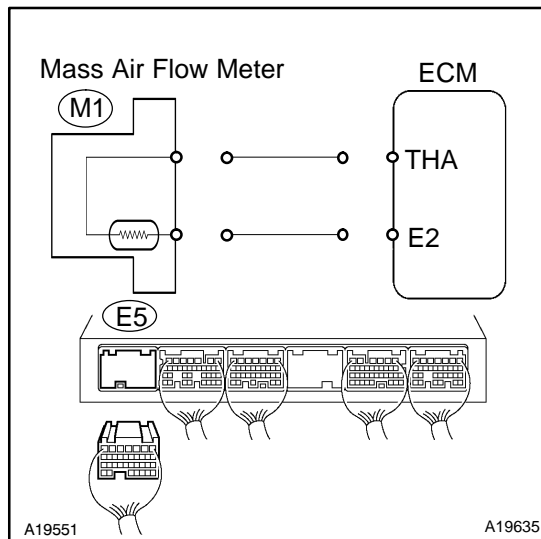
Temperature value: -40°C (-40°F)

OK

Replace mass air flow meter.

NG

## 5 Check for short in harness or ECM.



### PREPARATION:

- Disconnect the E5 ECM connector.
- Turn the ignition switch ON.
- When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.

### CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

### OK:

Temperature value: **-40°C (-40°F)**

OK

Repair or replace harness or connector.

NG

Replace ECM (See page [SF-60](#) ).

<b>DTC</b>	<b>P0115</b>	<b>Engine Coolant Temperature Circuit</b>
------------	--------------	---

<b>DTC</b>	<b>P0117</b>	<b>Engine Coolant Temperature Circuit Low Input</b>
------------	--------------	---

<b>DTC</b>	<b>P0118</b>	<b>Engine Coolant Temperature Circuit High Input</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

A thermistor is built in the Engine Coolant Temperature (ECT) sensor and changes the resistance value according to the engine coolant temperature.

The structure of the sensor and connection to the ECM is the same the Intake Air Temperature (IAT) sensor.

HINT:

If the ECM detects the DTC "P0115, P0117 or P0118", it operates the fail-safe function in which the ECT is assumed to be 80 °C (176 °F).

DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0115	Step 1	Open or short in engine coolant temperature sensor circuit for 0.5 sec.	<ul style="list-style-type: none"> <li>▶ Open or short in engine coolant temperature sensor circuit</li> <li>▶ Engine coolant temperature sensor</li> <li>▶ ECM</li> </ul>
P0117	Step 4	Short in engine coolant temperature sensor circuit for 0.5 sec.	
P0118	Step 2	Open in engine coolant temperature sensor circuit for 0.5 sec.	

HINT:

After confirming DTC "P0115, P0117 or P0118," use the OBD II scan tool or the hand-held tester to confirm the engine coolant temperature from the DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL.

Temperature Displayed	Malfunction
-40 °C (-40 °F)	Open circuit
140 °C (284 °F) or more	Short circuit

## MONITOR DESCRIPTION

The ECT (Engine Coolant Temperature) sensor is used to monitor the engine coolant temperature. The ECT sensor has a thermistor that varies its resistance depending on the temperature of the engine coolant. When the coolant temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in resistance are reflected in the voltage output from the sensor.

The ECM monitors the sensor voltage and uses this value to calculate the engine coolant temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a fault in the ECT sensor and sets a DTC.

Example:

When the ECM calculates that the ECT is less than -40 °C (-40 °F), or more than 140 °C (284 °F), and if either the condition continues for 0.5 sec. or more, the ECM will set a DTC.

## MONITOR STRATEGY

Related DTCs	P0115	Engine coolant temperature sensor range check (Fluttering)
	P0117	Engine coolant temperature sensor range check (Low resistance)
	P0118	Engine coolant temperature sensor range check (High resistance)
Required sensors/components	Engine coolant temperature sensor	
Frequency of operation	Continuous	
Duration	0.5 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )
The typical enabling condition is not available	-

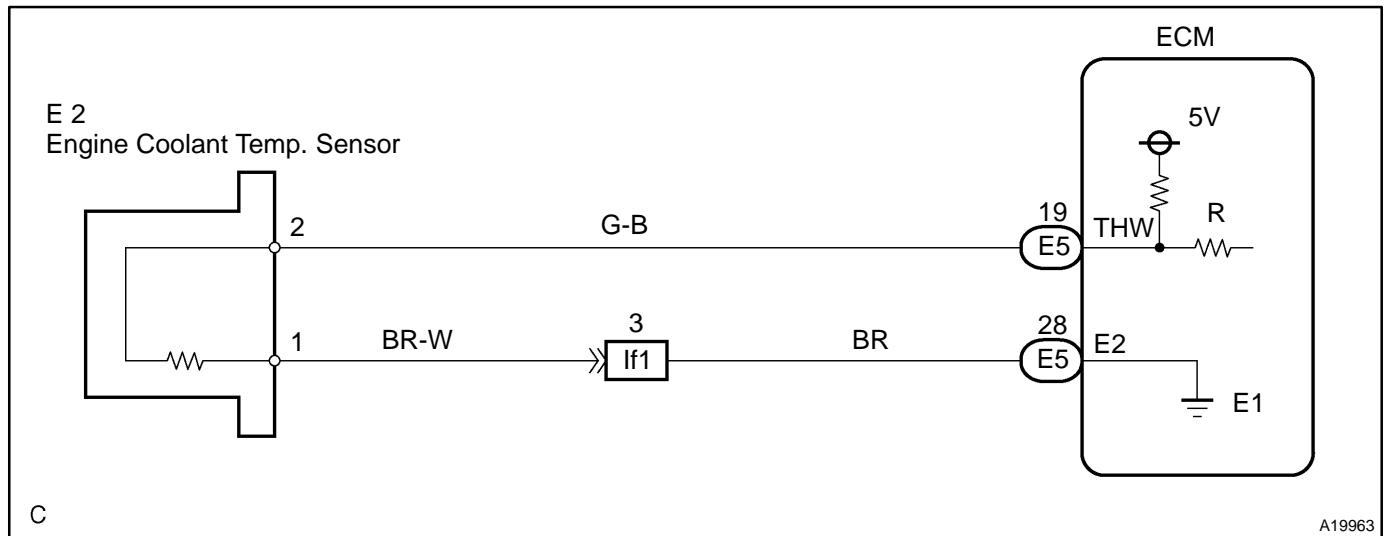
## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>P0115:</b>	
Engine coolant temperature sensor resistance (Coolant temperature)	Less than 79 $\Omega$ or more than 156 k $\Omega$ (More than 140: $^{\circ}$ C (284: $^{\circ}$ F) or less than -40: $^{\circ}$ C (-40: $^{\circ}$ F))
<b>P0117:</b>	
Engine coolant temperature sensor resistance (Coolant temperature)	Less than 79 $\Omega$ (More than 140: $^{\circ}$ C (284: $^{\circ}$ F))
<b>P0118:</b>	
Engine coolant temperature sensor resistance (Coolant temperature)	More than 156 k $\Omega$ (Less than -40: $^{\circ}$ C (-40: $^{\circ}$ F))

## COMPONENT OPERATING RANGE

Parameter	Standard Value
Engine coolant temperature sensor resistance	79 $\Omega$ (140: $^{\circ}$ C (284: $^{\circ}$ F)) to 156 k $\Omega$ (-40: $^{\circ}$ C (-40: $^{\circ}$ F))

## WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

- ▶ If DTCs related to different system that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

<b>1</b>	<b>Connect OBD II scan tool or hand-held tester, and read value of engine coolant temperature.</b>
----------	--

**PREPARATION:**

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the OBD II scan tool or hand-held tester main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

**CHECK:**

Read the temperature value on the OBD II scan tool or the hand-held tester.

**OK:**

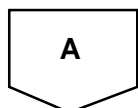
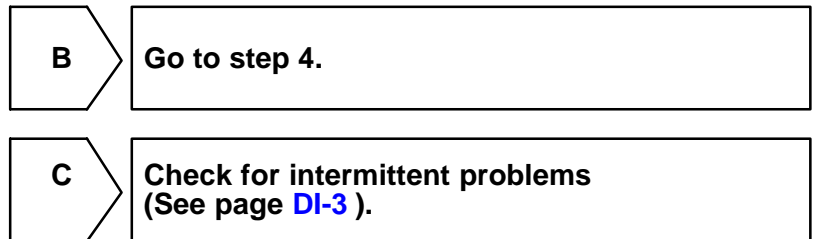
**Same value as actual engine coolant temperature.**

**RESULT:**

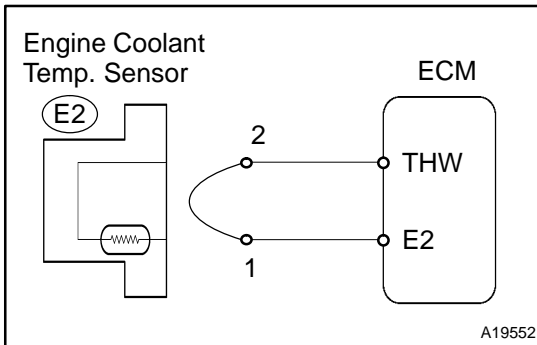
Temperature Displayed	Proceed to
-40 °C (-40°F)	A
140 °C (284 °F) or more	B
OK (Same as present temperature)	C

**HINT:**

- ▶ If there is an open circuit, OBD II scan tool or hand-held tester indicates -40°C (-40°F).
- ▶ If there is a short circuit, OBD II scan tool or hand-held tester indicates 140°C (284°F) or more.



## 2 Check for open in harness or ECM.



### PREPARATION:

- Disconnect the E2 engine coolant temperature (ECT) sensor connector.
- Connect terminals 1 and 2 of the engine coolant temperature sensor wire harness side connector.
- Turn the ignition switch ON.
- When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

### CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

### OK:

**Temperature value: 140°C (284°F) or more**

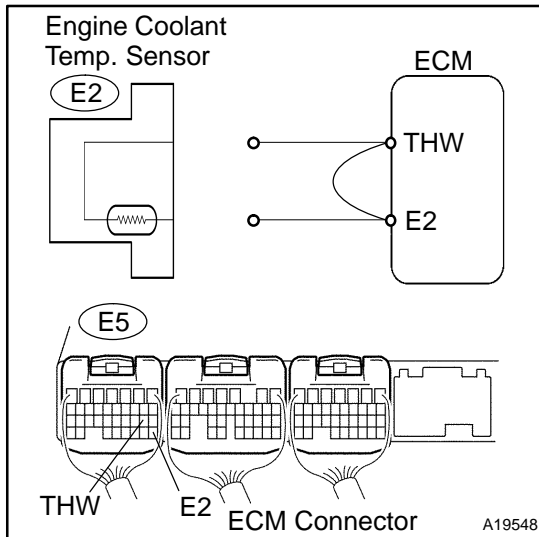
**OK**

**Confirm good connection at sensor. If OK, replace engine coolant temperature sensor.**

**NG**



### 3 Check for open in harness or ECM.



#### PREPARATION:

- Disconnect the E2 engine coolant temperature sensor connector.
- Connect terminals THW and E2 of the E5 ECM connector.

#### HINT:

Before checking, do a visual and contact pressure checks for the ECM connector.

- Turn the ignition switch ON.
- When using hand-held tester, enter the following menus:  
DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

#### CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

#### OK:

Temperature value: 140°C (284°F) or more

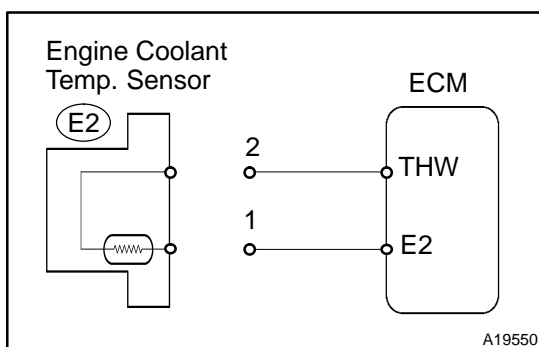
OK

Repair or replace harness or connector.

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page [SF-60](#)).

### 4 Check for short in harness and ECM.



#### PREPARATION:

- Disconnect the E2 engine coolant temperature sensor connector.
- Turn the ignition switch ON.
- When using hand-held tester, enter the following menus:  
DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

#### CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

#### OK:

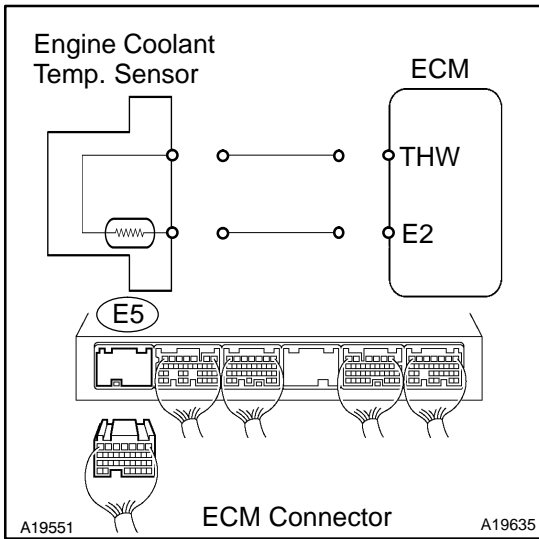
Temperature value: -40°C (-40°F)

OK

Replace engine coolant temperature sensor.

NG

## 5 Check for short in harness or ECM.



### PREPARATION:

- Disconnect the E5 ECM connector.
- Turn the ignition switch ON.
- When using hand-held tester, enter the following menus:  
DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

### CHECK:

Read the temperature value on the OBD II scan tool or the hand-held tester.

### OK:

Temperature value: **-40°C (-40°F)**

**OK**

**Repair or replace harness or connector.**

**NG**

**Replace ECM (See page [SF-60](#)).**

<b>DTC</b>	<b>P0116</b>	<b>Engine Coolant Temperature Circuit Range/ Performance Problem</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

Refer to DTC P0115 on page [DI-75](#).

DTC No.	DTC Detecting Condition	Trouble Area
P0116	<p>If the engine coolant temperature was 35°C (95°F) or more but less than 60°C (140°F) when the engine is started, and if conditions (a) and (b) are met:</p> <p>(a) Vehicle has accelerated and decelerated.</p> <p>(b) Engine coolant temperature remains within 3°C (5.4°F) of the initial engine coolant temperature (2 trip detection logic)</p> <p>▶ If the engine coolant temperature is more than 60°C (140°F) when the engine is started and the vehicle has accelerated and decelerated</p> <p>▶ If the engine coolant temperature sensor records a temperature variation below 1°C (1.8°F) successively 6 times (6 trip detection logic)</p>	▶ Engine coolant temperature sensor

## MONITOR DESCRIPTION

The ECT (Engine Coolant Temperature) sensor is used to monitor the engine coolant temperature. The ECT sensor has a thermistor that varies its resistance depending on the temperature of the engine coolant. When the coolant temperature is low, the resistance in the thermistor increases. When the temperature is high, the resistance drops. The variations in resistance are reflected in the voltage output from the sensor. The ECM monitors the sensor voltage and uses this value to calculate the engine coolant temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a fault in the ECT sensor and sets a DTC.

Examples:

- (1) Upon starting the engine, the ECT is between 35°C (95°F) and 60°C (140°F). If after driving for 250 sec., the ECT still remains within 3°C (5.4°F) of the starting temperature, a DTC will be set (2 trip detection logic).
- (2) Upon starting the engine, the ECT is over 60°C (140°F). If after driving for 250 sec., the ECT still remains within 1°C (1.8°F) of the starting temperature, a DTC will be set (6 trip detection logic).

## MONITOR STRATEGY

Related DTCs	P0116	Engine coolant temperature sensor range check (Stuck)
Required sensors/components	Main sensors/components	Engine coolant temperature sensor
	Related sensors/components	Intake air temperature sensor, Crankshaft position sensor, Mass air flow meter
Frequency of operation	Continuous	
Duration	250 sec.	
MIL operation	2 driving cycles (When temperature is fixed between 35°C (95°F) and 60°C (140°F)) 6 driving cycles (When temperature is fixed at 60°C (140°F) or more)	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>Case 1 (When temperature is fixed between 35°C (95°F) and 60°C (140°F)):</b>		
Cumulative idle off period	250 sec.	-
Speed increase 30 km/h (19 mph) or more	10 times	-
Engine coolant temperature	35°C (95°F)	60°C (140°F)
Intake air temperature	-6.7 °C (20°F)	-
<b>Case 2 (When temperature is fixed at 60°C (140°F) or more):</b>		
Engine coolant temperature at engine start	60°C (140°F)	-
Intake air temperature	-6.7 °C (20°F)	-
Stop and go	Once or more (Stop for 20 sec. or more and accelerate to more than 70 km/h (43 mph) with in 40 sec.)	
Steady driving and stop *	Once or more	

\*: Vehicle is driven by 65 km/h (40 mph) or more for 30 sec. or more and the vehicle speed reaches 70 km/h (44 mph). The vehicle is decelerated from 65 km/h (40 mph) to 3 km/h (2 mph) or less within 35 sec. and stopped for 10 sec.

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>Case1 (When temperature is fixed between 35°C (95°F) and 60°C (140°F)):</b>	
Change of engine coolant temperature value	Less than 3°C (5.4°F)
<b>Case2 (When temperature is fixed at 60°C (140°F) or more):</b>	
Change of engine coolant temperature value	1°C (1.8°F) or less

## COMPONENT OPERATING RANGE

Standard Value
Engine coolant temperature changes with the actual engine coolant temperature.

## INSPECTION PROCEDURE

### HINT:

- ▶ If DTC P0115, P0116, P0117, P0118 and P0125 are output simultaneously, ECT sensor circuit may be open or shorted. Perform the troubleshooting of DTC P0115, P0117 or P0118 first.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

**Replace engine coolant temperature sensor.**

<b>DTC</b>	<b>P0120</b>	<b>Throttle/Pedal Position Sensor/Switch "A" Circuit</b>
<b>DTC</b>	<b>P0122</b>	<b>Throttle/Pedal Position Sensor/Switch "A" Circuit Low Input</b>
<b>DTC</b>	<b>P0123</b>	<b>Throttle/Pedal Position Sensor/Switch "A" Circuit High Input</b>
<b>DTC</b>	<b>P0220</b>	<b>Throttle/Pedal Position Sensor/Switch "B" Circuit</b>
<b>DTC</b>	<b>P0222</b>	<b>Throttle/Pedal Position Sensor/Switch "B" Circuit Low Input</b>
<b>DTC</b>	<b>P0223</b>	<b>Throttle/Pedal Position Sensor/Switch "B" Circuit High Input</b>
<b>DTC</b>	<b>P2135</b>	<b>Throttle/Pedal Position Sensor/Switch "A"/"B" Voltage Correction</b>

**HINT:**

This is the purpose for the "throttle position sensor".

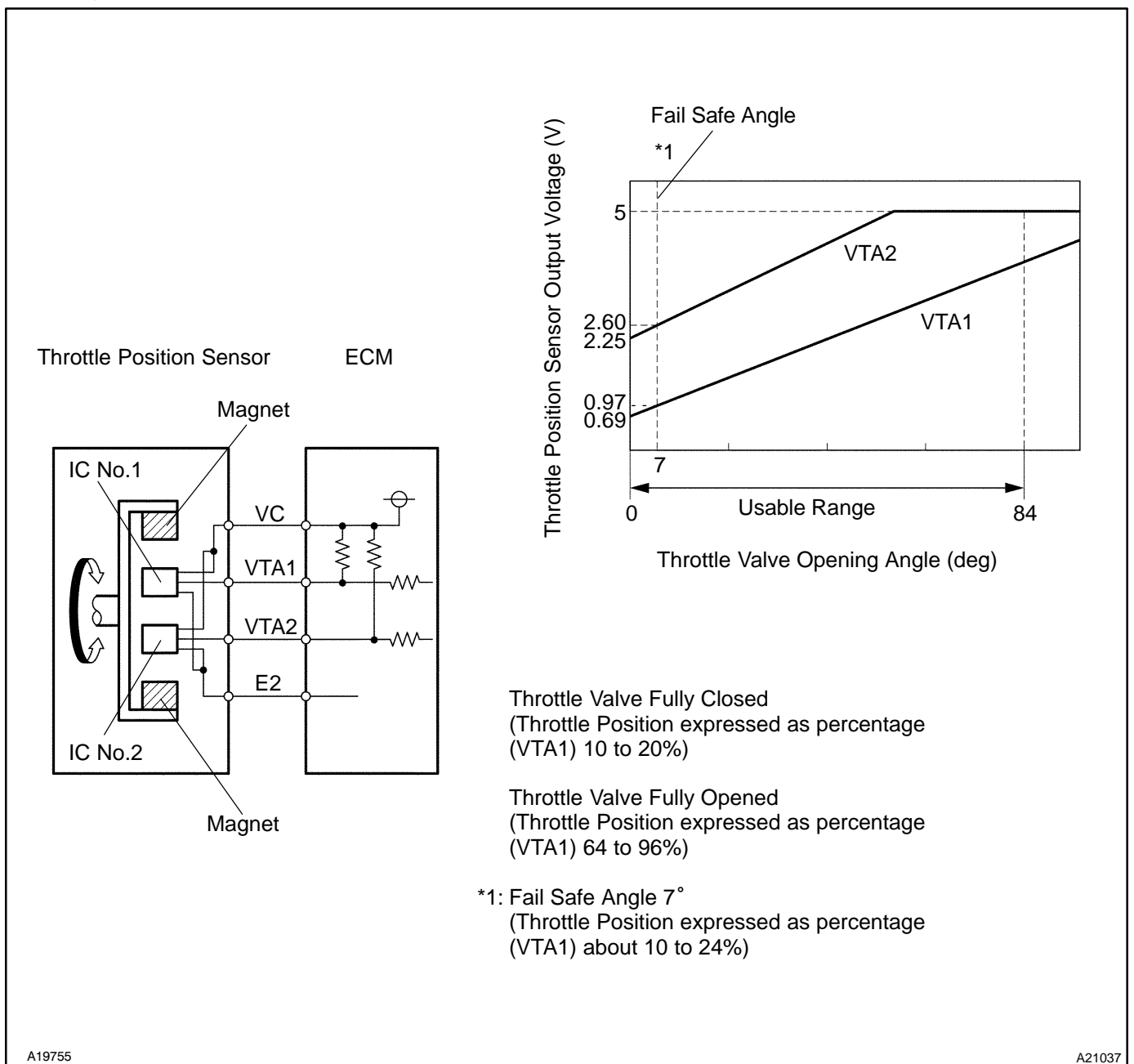
### CIRCUIT DESCRIPTION

**HINT:**

- ▶ This Electrical Throttle Control System (ETCS) does not use a throttle cable.
- ▶ This throttle position sensor is a non-contact type.

The throttle position sensor is mounted on the throttle body and it detects the opening angle of the throttle valve. This sensor is electronically controlled and uses Hall-effect elements, so that accurate control and reliability can be obtained. The throttle position sensor has 2 sensor elements / signal outputs: VTA1 and VTA2. VTA1 used to detect the throttle opening angle and VTA2 is used to detect malfunctions in VTA1. Voltage applied to VTA1 and VTA2 change between 0V and 5V in proportion to the opening angle of the throttle valve. There are several checks that the ECM performs to confirm proper operation of the throttle position sensor and VTA1.

The ECM judges the current opening angle of the throttle valve from these signals input from terminals VTA1 and VTA2, and the ECM controls the throttle motor to make the throttle valve angle properly in response to driver inputs.



DTC No.	DTC Detection Condition	Trouble Area
	Condition (a) of DTC P0120, P0122, P0123, P0220, P0222 or P0223 continues for 2 sec. (Open or short in the throttle control motor and sensor circuit)	
P0120	Detection conditions for DTCs P0122 and P0123 are not satisfied but condition (a) is satisfied (a) VTA1 is "0.2 V or less" or VTA1 is "4.8 V or more"	▶ Throttle control motor and sensor ▶ ECM
P0122	(a) VTA1 is 0.2 V or less	▶ Throttle control motor and sensor ▶ Short in VTA1 circuit ▶ Open in VC circuit ▶ ECM
P0123	(a) VTA1 is 4.8 V or more	▶ Throttle control motor and sensor ▶ Open in VTA1 circuit ▶ Open in E2 circuit ▶ VC and VTA1 circuit are short-circuited ▶ ECM
P0220	Detection conditions for DTCs P0222 and P0223 are not satisfied but condition (a) is satisfied (a) VTA2 is "0.5 V or less" or VTA2 is "4.8 V or more" and VTA1 is "0.2 V or more" and VTA1 is "1.8 V or less"	▶ Throttle control motor and sensor ▶ ECM
P0222	(a) VTA2 is 0.5 V or less	▶ Throttle control motor and sensor ▶ Short in VTA2 circuit ▶ Open in VC circuit ▶ ECM
P0223	(a) VTA2 is "4.8 V or more" and VTA1 is "0.2 V or more" and VTA1 is "1.8 V or less"	▶ Throttle control motor and sensor ▶ Open in VTA2 circuit ▶ Open in E2 circuit ▶ VC and VTA2 circuit are short-circuited ▶ ECM
P2135	Condition (a) continues for 0.5 sec. or more, or condition (b) continues for 0.4 sec. or more: (a) Difference between VTA1 and VTA2 is 0.02 V or less (b) VTA1 is "0.2 V or less" and VTA2 is "0.5 V or less"	▶ VTA1 and VTA2 circuit are short-circuited ▶ Throttle control motor and sensor ▶ ECM

**HINT:**

- ▶ After confirming DTCs, use the hand-held tester or the OBD II scan tool to confirm the throttle valve opening percentage and closed throttle position switch condition.
- ▶ THROTTLE POS means VTA1 signal as well as the THROTTLE POS #2 for the VTA2 signal.

**Reference (Normal condition):**

Tester display	Accelerator pedal fully released	Accelerator pedal fully depressed
THROTTLE POS	10 to 24 %	66 to 98%
THROTTLE POS #2	2.1 to 3.1 V	4.5 to 5.5 V

## MONITOR DESCRIPTION

The ECM uses throttle position sensor to monitor the throttle valve opening angle.

- (a) There is a specific voltage difference expected between VTA1 and VTA2 for each throttle opening angle.
  - ▶ If the difference between VTA1 and VTA2 is incorrect the ECM interprets this as a fault and will set a DTC.
- (b) VTA1 and VTA2 each have a specific voltage operating range.
  - ▶ If VTA1 or VTA2 is out of the normal operating range the ECM interprets this as a fault and will set a DTC.
- (c) VTA1 and VTA2 should never be close to the same voltage levels.
  - ▶ If VTA1 is within 0.02 V of VTA2 the ECM interprets this as a short circuit in the throttle position sensor system and will set a DTC.

## FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

## MONITOR STRATEGY

Related DTCs	P0120	Throttle position sensor (sensor 1) range check (Fluttering)
	P0122	Throttle position sensor (sensor 1) range check (Low voltage)
	P0123	Throttle position sensor (sensor 1) range check (High voltage)
	P0220	Throttle position sensor (sensor 2) range check (Fluttering)
	P0222	Throttle position sensor (sensor 2) range check (Low voltage)
	P0223	Throttle position sensor (sensor 2) range check (High voltage)
	P2135	Throttle position sensor range check (Correlation)
Required sensors/components	Throttle position sensor	
Frequency of operation	Continuous	
Duration	2 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page DI-3).
Throttle control motor power	ON



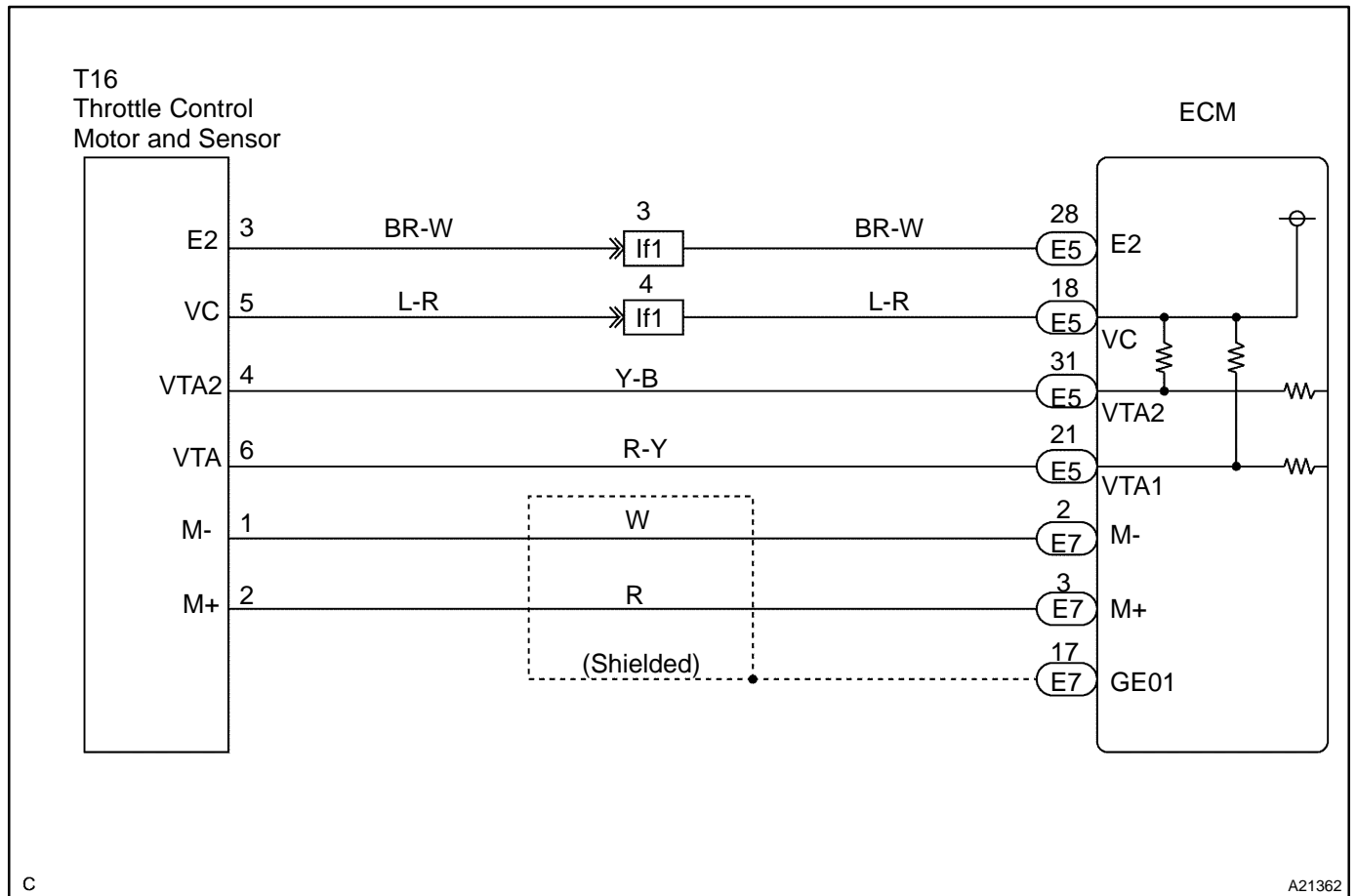
## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>P0120:</b>	
VTA1 voltage	0.2 V or less or 4.8 V or more (2 sec. or more)
<b>P0122:</b>	
VTA1 voltage	0.2 V or less (2 sec. or more)
<b>P0123:</b>	
VTA1 voltage	4.8 V or more (2 sec. or more)
<b>P0220:</b>	
VTA2 voltage	0.5 V or less or 4.8 V or more (2 sec. or more)
<b>P0222:</b>	
VTA2 voltage	0.5 V or less (2 sec. or more)
<b>P0223:</b>	
Both of the following conditions are met for 2 sec. or more:	A and B
A. VTA1 voltage	0.2 V or more and 1.8 V or less
B. VTA2 voltage	4.8 V or more
<b>P2135:</b>	
Different between VTA1 and VTA2 voltage	0.02 V or less
Both of the following conditions are met:	A and B
A. VTA1 voltage	0.2 V or less
B. VTA2 voltage	0.5 V or less

## COMPONENT OPERATING RANGE

Parameter	Standard Value
Throttle position sensor VTA1 voltage	0.6 to 3.96 V
Throttle position sensor VTA2 voltage	2.25 to 5.0 V

### WIRING DIAGRAM



### INSPECTION PROCEDURE

**HINT:**

- ▶ If DTCs related to different system that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

**Hand-held tester:**

<b>1</b>	<b>Connect hand-held tester, and read the voltage for throttle position sensor data.</b>
----------	--

**PREPARATION:**

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / THROTTLE POS and THROTTLE POS #2.

**CHECK:**

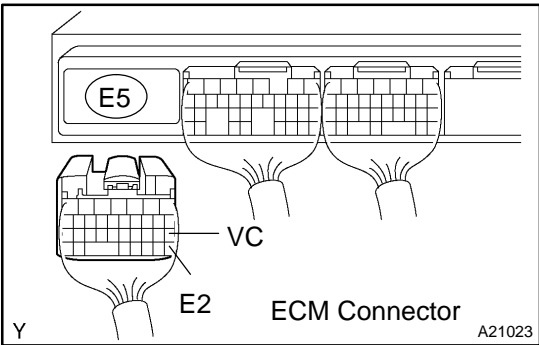
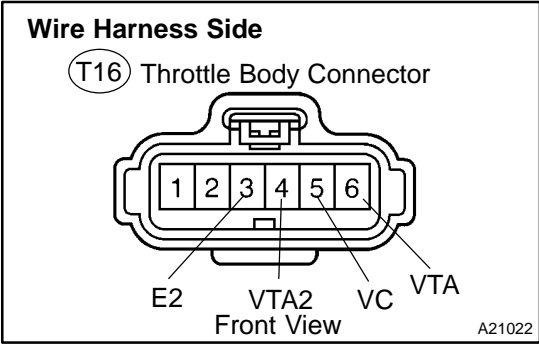
Read voltage value displayed on the hand-held tester.

**OK:****RESULT:**

Throttle position expressed as percentage and voltage				Trouble area	Proceed to
Accelerator pedal released		Accelerator pedal depressed			
THROTTLE POS (VTA1)	THROTTLE POS #2 (VTA2)	THROTTLE POS (VTA1)	THROTTLE POS #2 (VTA2)		
0 %	0 to 0.2 V	0 %	0 to 0.2 V	VC circuit open	A
100 %	4.5 to 5.5 V	100 %	4.5 to 5.5 V	E2 circuit open	
0 % or 100 %	2.1 to 3.1 V (Fail safe)	0 % or 100 %	2.1 to 3.1 V (Fail safe)	VTA1 circuit open or ground short	
about 16 % (Fail safe)	0 to 0.2 or 4.5 to 5.5 V	about 16 % (Fail safe)	0 to 0.2 or 4.5 to 5.5 V	VTA2 circuit open or ground short	
10 to 24 %	2.15 to 3.05 V	64 to 96 % (Does not fail safe)	4.5 to 5.5 V (Does not fail safe)	Throttle position sensor circuit is normal	

**B****Go to step 5.****A**

**2 Check for open and short in harness and connector between ECM and throttle position sensor.**



**PREPARATION:**

- (a) Disconnect the T16 throttle control motor and sensor connector.
- (b) Disconnect the E5 ECM connector.

**CHECK:**

Check the resistance between the wire harness side connectors.

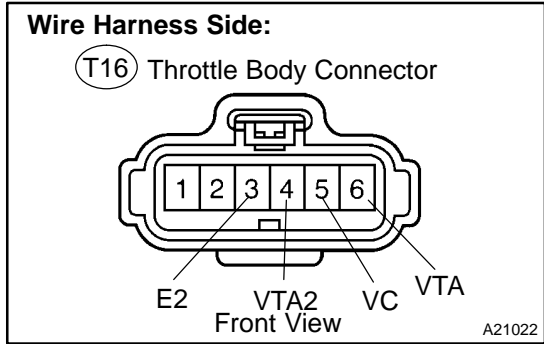
**OK:**

Tester Connection	Specified Condition
VC (T16-5) - VC (E5-18)	Below 1 Ω
VTA (T16-6) - VTA1 (E5-21)	
VTA2 (T16-4) - VTA2 (E5-31)	
E2 (T16-3) - E2 (E5-28)	10 kΩ or higher
VC (T16-5) or VC (E5-18) - Body ground	
VTA (T16-6) or VTA1 (E5-21) - Body ground	
VTA2 (T16-4) or VTA2 (E5-31) - Body ground	

**NG** Repair or replace harness or connector.

**OK**

**3 Check voltage between terminals VC and E2 of ECM connector.**



**PREPARATION:**

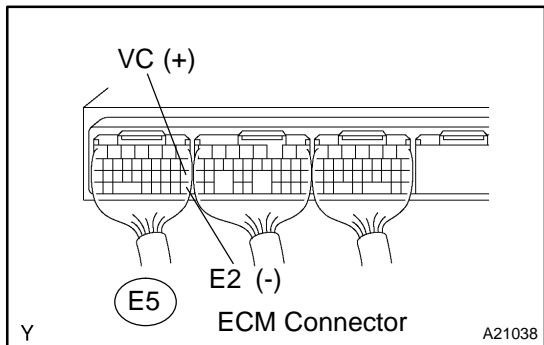
- (a) Disconnect the T16 throttle control motor and sensor connector.
- (b) Turn the ignition switch ON.

**CHECK:**

Measure the voltage between the specified terminals of the E5 ECM connector.

**OK:**

Tester Connection	Specified Condition
VC (E5-18) - E2 (E5-28)	4.5 to 5.5 V



**NG** Replace ECM (See page [SF-60](#) ).

**OK**

**4 Replace throttle body (See page [SF-36](#) ).**

**Go**

<b>5</b>	<b>Check if DTC output recur.</b>
----------	-----------------------------------

**PREPARATION:**

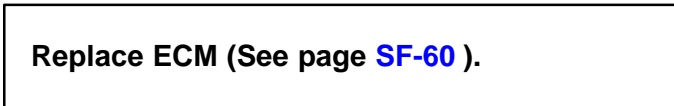
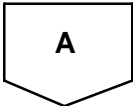
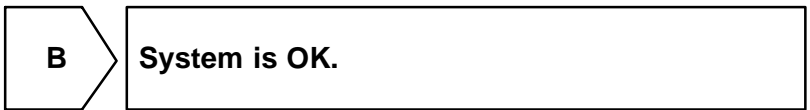
- (a) Clear the DTC (See page [DI-3](#)).
- (b) Start the engine.
- (c) Run the engine at idle for 15 seconds or more.

**CHECK:**

Read the DTC (See page [DI-3](#)).

**RESULT:**

Display (DTC Output)	Proceed to
"P0120, P0122, P0123, P0220, P0222, P0223 and/or P2135" are output again	A
No DTC output	B

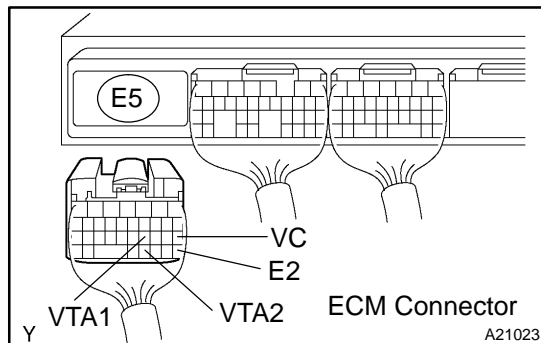
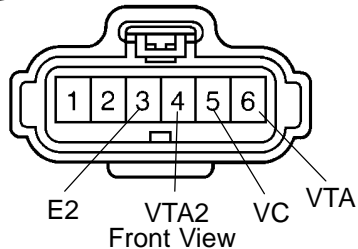


**OBD II scan tool (excluding hand-held tester):**

- |          |  |
|----------|--|
| <b>1</b> | <b>Check for open and short in harness and connector between ECM and throttle position sensor.</b> |
|----------|--|

**Wire Harness Side**

(T16) Throttle Body Connector

**PREPARATION:**

- (a) Disconnect the T16 throttle control motor and sensor connector.
- (b) Disconnect the E5 ECM connector.

**CHECK:**

Check the resistance between the wire harness side connectors.

**OK:**

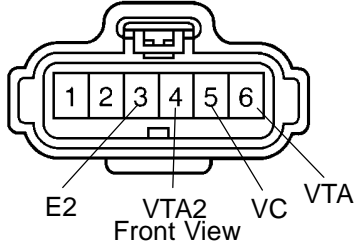
Tester Connection	Specified Condition
VC (T16-5) - VC (E5-18)	Below 1 $\Omega$
VTA (T16-6) - VTA1 (E5-21)	
VTA2 (T16-4) - VTA2 (E5-31)	
E2 (T16-3) - E2 (E5-28)	10 k $\Omega$ or higher
VC (T16-5) or VC (E5-18) - Body ground	
VTA (T16-6) or VTA1 (E5-21) - Body ground	
VTA2 (T16-4) or VTA2 (E5-31) - Body ground	

**NG****Repair or replace harness or connector.****OK**

**2 Check voltage between terminals VC and E2 of ECM connector.**

**Wire Harness Side:**

(T16) Throttle Body Connector



**PREPARATION:**

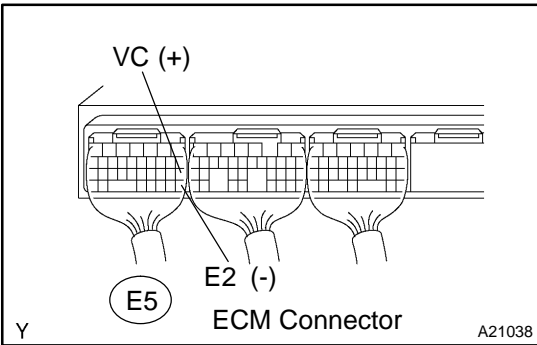
- (a) Disconnect the T16 throttle control motor and sensor connector.
- (b) Turn the ignition switch ON.

**CHECK:**

Measure the voltage between the specified terminals of the E5 ECM connector.

**OK:**

Tester Connection	Specified Condition
VC (E5-18) - E2 (E5-28)	4.5 to 5.5 V



**NG** Replace ECM (See page [SF-60](#) ).

**OK**

**3 Replace throttle body (See page [SF-36](#) ).**

**Go**



<b>4</b>	<b>Check if DTC output recur.</b>
----------	-----------------------------------

**PREPARATION:**

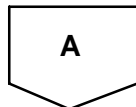
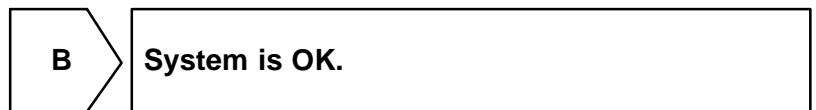
- (a) Clear the DTC (See page [DI-3](#)).
- (b) Start the engine.
- (c) Run the engine at idle for 15 seconds or more.

**CHECK:**

Read the DTC (See page [DI-3](#)).

**RESULT:**

Display (DTC Output)	Proceed to
"P0120, P0122, P0123, P0220, P0222, P0223 and/or P2135" are output again	A
No DTC output	B



**Replace ECM (See page [SF-60](#) ).**

<b>DTC</b>	<b>P0121</b>	<b>Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance Problem</b>
------------	--------------	--

**HINT:**

This is the purpose of the "throttle position sensor".

**CIRCUIT DESCRIPTION**

Refer to DTC P0120 on page [DI-84](#).

DTC No.	DTC Detecting Condition	Trouble Area
P0121	Condition (a) continues for 2.0 sec.: (a) Difference between VTA1 and VTA2 deviates from the threshold	Throttle control motor and sensor

**MONITOR DESCRIPTION**

The ECM uses throttle position sensor to monitor the throttle valve opening angle.

This sensor including two signals, VTA1 and VTA2. VTA1 is used to detect the throttle opening angle and VTA2 is used to detect malfunctions in VTA1. There are several checks that the ECM performs confirm proper operation of the throttle position sensor and VTA1.

There is a specific voltage difference expected between VTA1 and VTA2 for each throttle opening angle. If the voltage output difference of the VTA1 and VTA2 deviates from the normal operating range, the ECM interprets this as a malfunction of the throttle position sensor. The ECM will turn on the MIL and a DTC is set.

**FAIL SAFE**

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

**MONITOR STRATEGY**

Related DTCs	P0121	Throttle position sensor rationality
Required sensors/components	Throttle position sensor	
Frequency of operation	Continuous	
Duration	2 sec.	
MIL operation	Immediate	
Sequence of operation	None	

**TYPICAL ENABLING CONDITIONS**

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> ).	
VTA2 voltage	-	4.6 V

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Different between VTA1 and VTA2 $ VTA1 - (VTA2 \times 0.8 \text{ to } 1.2) ^*$ * Corrected by learning value	Less than 0.1 V and more than 0.4 V

## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

**Replace throttle control motor and sensor (See page [SF-36](#)).**

<b>DTC</b>	<b>P0125</b>	<b>Insufficient Coolant Temperature for Closed Loop Fuel Control</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

Refer to DTC P0115 on page [DI-75](#) .

DTC No.	DTC Detection Condition	Trouble Area
P0125	If THW or THA is less than -6.6°C (20°F) at engine start and 20 min. or more after starting engine, engine coolant temp. sensor value is 20°C (68°F) or less (2 trip detection logic)	<ul style="list-style-type: none"> <li>▶Cooling system</li> <li>▶Engine coolant temperature sensor</li> <li>▶Thermostat</li> </ul>
	If THW and THA is between -6.6°C (20°F) and 10°C (50°F) at engine start, 5 min. or more after starting engine and engine coolant temp. sensor value is 20°C (68°F) or less (2 trip detection logic)	
	If THW and THA greater than 10°C (50°F) at engine start and 2 min. or more after starting engine, engine coolant temp. sensor value is 20°C (68°F) or less (2 trip detection logic)	

## MONITOR DESCRIPTION

The ECT (Engine Coolant Temperature) sensor is used to monitor the temperature of the engine coolant. The resistance of the sensor varies with the actual coolant temperature. The ECM applies a voltage to the sensor and the varying resistance of the sensor causes the signal voltage to vary. The ECM monitors the ECT signal voltage after engine start-up. If, after sufficient time has passed, the sensor still reports that the engine is not warmed up enough for closed-loop fuel control after sufficient time has passed, the ECM interprets this as a fault in the sensor or cooling system and sets a DTC.

Example:

The engine coolant temperature was 0°C (32°F) at engine start. After 5 min. running time, the ECT sensor still indicates that the engine is not warmed up enough to begin air fuel ratio feedback control of the air-fuel ratio. The ECM interprets this as a fault in the sensor or cooling system and will set a DTC.

## MONITOR STRATEGY

Related DTCs	P0125	Insufficient coolant temperature for closed loop fuel control
Required sensors/components	Main sensors/components	Engine coolant temperature sensor, Cooling system, Thermostat
	Related sensors/components	Mass air flow meter
Frequency of operation	Continuous	
Duration	2 min. (at engine start, engine coolant or intake air temperature of 10°C (50°F) or more) 5 min. (at engine start, engine coolant or intake air temperature of -6.6°C (20°F) to 10°C (50°F)) 20 min. (at engine start, engine coolant or intake air temperature of less than -6.6°C (20°F))	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of Disable a Monitor" table (on page <a href="#">DI-3</a> )	
Fuel cut	OFF	
Engine	Running	

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Time until "engine coolant temperature" detection temperature reaches feedback start temperature	
When the temperature at the time of engine starting is 10°C (50°F) or more	Engine coolant temperature is less than "closed-loop enable temperature" when 2 min. or more after engine start
When the temperature at the time of engine starting is "-6.6°C (20°F)" to "10°C (50°F)"	Engine coolant temperature is less than "closed-loop enable temperature" when 5 min. or more after engine start
When the temperature at the time of engine starting is -6.6°C (20°F) or less	Engine coolant temperature is less than "closed-loop enable temperature" when 20 min. or more after engine start

## INSPECTION PROCEDURE

### HINT:

- ▶ If DTC P0115, P0116, P0117, P0118 and P0125 are output simultaneously, engine coolant temperature sensor circuit may be open or short. Perform the troubleshooting of DTC P0115, P0117 or P0118 first.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

<b>1</b>	<b>Are there any other codes (besides DTC P0125) being output?</b>
----------	--

### PREPARATION:

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

### CHECK:

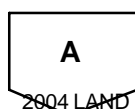
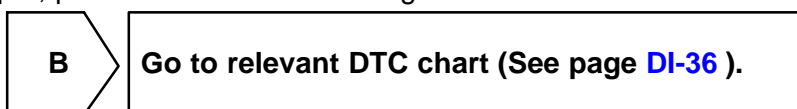
Read the DTCs using the hand-held tester or the OBD II scan tool.

### RESULT:

Display (DTC output)	Proceed to
P0125	A
"P0125" and other DTCs	B

### HINT:

If any other codes besides "P0125" are output, perform the troubleshooting for those DTCs first.



<b>2</b>	<b>Inspect thermostat (See page CO-12 ).</b>
----------	--

<b>NG</b>	<b>Replace thermostat (See page CO-11).</b>
-----------	---

<b>OK</b>
-----------

<b>3</b>	<b>Check cooling system.</b>
----------	------------------------------

**CHECK:**

Check that there is detect cooling system which causes overcool, such as abnormal radiator fan operation, modified cooling system and so on.

<b>NG</b>	<b>Repair or replace cooling system.</b>
-----------	--

<b>OK</b>
-----------

<b>Replace engine coolant temperature sensor.</b>
---

<b>DTC</b>	<b>P0128</b>	<b>Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)</b>
------------	--------------	---

**HINT:**

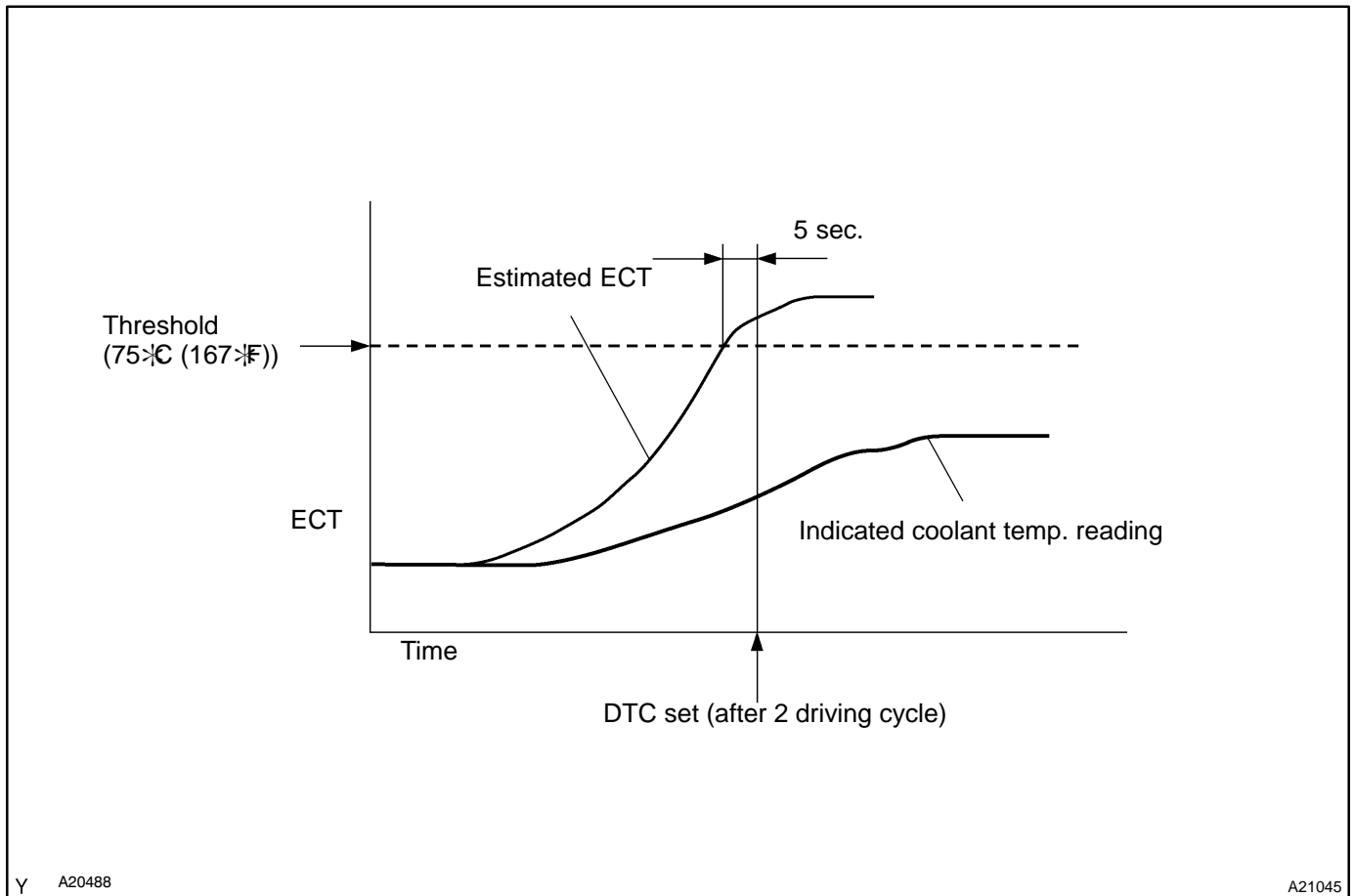
This is the purpose of "thermostat" malfunction detection.

**CIRCUIT DESCRIPTION**

If the engine coolant temperature does not reach 75°C (167°F) despite sufficient warm-up time has elapsed.

DTC No.	DTC Detection condition	Trouble Area
P0128	Condition (a), (b) and (c) are met: (a) Cold start (b) After sufficient warm-up time has elapsed (c) Engine coolant temperature greater than 75°C (167°F)	<ul style="list-style-type: none"> <li>▶Thermostat</li> <li>▶Cooling system</li> <li>▶Engine coolant temperature sensor</li> <li>▶ECM</li> </ul>

**MONITOR DESCRIPTION**



The ECM estimates the coolant temperature based on starting temperature, engine loads, and engine speeds. The ECM then compares the estimated temperature with the actual ECT (Engine Coolant Temperature). When the estimated coolant temperature reaches 75°C (167°F), the ECM checks the actual ECT. If the actual ECT is less than 75°C (167°F), the ECM will interpret this as a fault in the thermostat or engine cooling system and set a DTC.

## MONITOR STRATEGY

Related DTCs	P0128	Thermostat
Required sensors/components	Main sensors/components	Engine coolant temperature sensor, Engine cooling system, Thermostat
	Related sensors/components	Intake air temperature sensor, Vehicle speed sensor
Frequency of operation	Once per drive cycle	
Duration	15 min.	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page DI-3)	
Battery voltage	11.0 V	-
Intake air temperature (at engine start)	-10 °C (14 °F)	35 °C (95 °F)
Engine coolant temperature (at engine start)	-10 °C (14 °F)	35 °C (95 °F)
Difference between intake air temperature and engine coolant temperature (at engine start)	-15 °C (-27 °F)	7 °C (12.6 °F)

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Duration period of both A and B	5 sec. or more
A Estimated engine coolant temperature	75 °C (167 °F) or more
B Engine coolant temperature sensor output value	Less than 75 °C (167 °F)

## MONITOR RESULT

The detailed information is described in "CHECKING MONITOR STATUS" (see page DI-3).

- ▶ TID (Test Identification) is assigned to each emission-related component.
- ▶ TLT (Test Limit Type):  
If TLT is 0, the component is malfunctioning when the test value is higher than the test limit.  
If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.
- ▶ CID (Component Identification) is assigned to each test value.
- ▶ Unit Conversion is used to calculate the test value indicated on generic OBD scan tools.

### TID \$08: Thermostat

TLT	CID	Unit Conversion	Description of Test Value	Description of Test Limit
1	\$01	Multiply by 0.625 and subtract 40 (°C)	ECT sensor output when estimated ECT reaches malfunction criterion	Malfunction criterion



## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

<b>1</b>	<b>Are there any other codes (besides DTC P0128) being output?</b>
----------	--

### PREPARATION:

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

### CHECK:

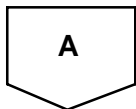
Read the DTC using the hand-held tester or the OBD II scan tool.

### RESULT:

Display (DTC Output)	Proceed to
P0128	A
P0128 and other DTCs	B

### HINT:

If any other codes besides P0128 are output, perform the troubleshooting for those DTCs first.



<b>2</b>	<b>Check cooling system.</b>
----------	------------------------------

### CHECK:

Check that there is a defect in the cooling system which causes over-cool, such as abnormal radiator fan operation, modified cooling system and so on.



<b>3</b>	<b>Check thermostat (See page <a href="#">CO-12</a> ).</b>
----------	--

<b>NG</b>	<b>Replace thermostat.</b>
-----------	----------------------------

<b>OK</b>
-----------

<b>Replace ECM (See page <a href="#">SF-60</a> ).</b>
---

<b>DTC</b>	<b>P0130</b>	<b>Oxygen Sensor Circuit (Bank 1 Sensor 1)</b>
<b>DTC</b>	<b>P0150</b>	<b>Oxygen Sensor Circuit (Bank 2 Sensor 1)</b>
<b>DTC</b>	<b>P2195</b>	<b>Oxygen Sensor Signal Stack Lean (Bank 1 Sensor 1)</b>
<b>DTC</b>	<b>P2196</b>	<b>Oxygen Sensor Signal Stack Rich (Bank 1 Sensor 1)</b>
<b>DTC</b>	<b>P2197</b>	<b>Oxygen Sensor Signal Stack Lean (Bank 2 Sensor 1)</b>
<b>DTC</b>	<b>P2198</b>	<b>Oxygen Sensor Signal Stack Rich (Bank 2 Sensor 1)</b>

## CIRCUIT DESCRIPTION

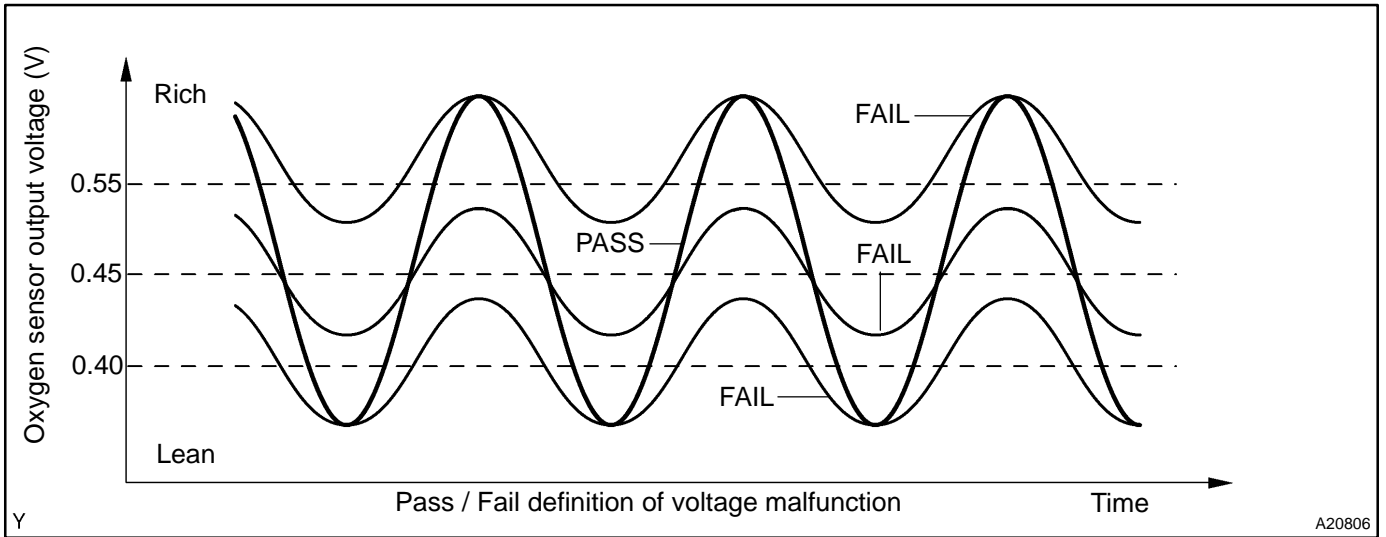
Refer to DTC P0031 on page [DI-49](#) .

DTC No.	Detection Item	Trouble Area
P0130 P0150	Output voltage of heated oxygen sensor remains at 0.4 V or more, or 0.55 V or less, during idling after engine is warmed up (2 trip detection logic)	<ul style="list-style-type: none"> <li>▶ Open or short in heated oxygen sensor circuit</li> <li>▶ Heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> </ul>
P2195 P2197	Output voltage of heated oxygen sensor remains at 0.55 V or less, during idling after engine is warmed up (2 trip detection logic)	<ul style="list-style-type: none"> <li>▶ EFI or ECD relay</li> <li>▶ Air induction system</li> <li>▶ Fuel pressure</li> </ul>
P2196 P2198	Output voltage of heated oxygen sensor remains at 0.4 V or more, during idling after engine is warmed up (2 trip detection logic)	<ul style="list-style-type: none"> <li>▶ Injector</li> <li>▶ ECM</li> </ul>

### HINT:

- ▶ Bank 1 refers to bank that includes cylinder No. 1.
- ▶ Bank 2 refers to bank that does not includes cylinder No. 2.
- ▶ Sensor 1 refers to the sensor closer to the engine assembly.
- ▶ The heated oxygen sensor's output voltage and the short-term fuel trim value can be read using the OBD II scan tool or hand-held tester.

**MONITOR DESCRIPTION**



The ECM uses the heated oxygen sensor information to regulate the air-fuel ratio close to a stoichiometric ratio. This maximizes the catalytic converter’s ability to purify the exhaust gas. The sensor detects oxygen levels in the exhaust gas and sends this signal to the ECM.

The inner surface of the sensor element is exposed to outside air. The outer surface of the sensor element is exposed to exhaust gas. The sensor element is made of platinum coated zirconia and includes an integrated heating element. The heated oxygen sensor has the characteristic whereby its output voltage changes suddenly in the vicinity of the stoichiometric air-fuel ratio. The heated oxygen sensor generates output voltage between 0 V and 1.0 V in response to the oxygen concentration in exhaust gas. When the output voltage of the heated oxygen sensor is 0.55 V or more, the ECM judges that the air-fuel ratio is RICH. When it is 0.4 V or less, the ECM judges that the air-fuel ratio is LEAN.

Under normal condition, the output voltage from the heated oxygen sensor alternates RICH and LEAN sides periodically. If the heated oxygen sensor outputs RICH signal (or LEAN signal) constantly, or if the heated oxygen sensor cannot output enough voltage to reach the minimum specification, the ECM interprets this as a malfunction in the heated oxygen sensor and sets a DTC.

**MONITOR STRATEGY**

Related DTCs	P0130	Front heated oxygen sensor voltage is constant at lean side or rich side (Bank 1)
	P0150	Front heated oxygen sensor voltage is constant at lean side or rich side (Bank 2)
	P2195	Front heated oxygen sensor voltage is constant at lean side (Bank 1)
	P2196	Front heated oxygen sensor voltage is constant at rich side (Bank 1)
	P2197	Front heated oxygen sensor voltage is constant at lean side (Bank 2)
	P2198	Front heated oxygen sensor voltage is constant at rich side (Bank 2)
Required sensors/components	Main sensors/components	Front heated oxygen sensor
	Related sensors/components	Crank position sensor, Vehicle speed sensor
Frequency of operation	Once per drive cycle	
Duration	20 to 36 sec. x (3 times)	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
There is history that the following conditions A and B were met:	20 sec. (Continuously)	-
A. Vehicle speed	40 km/h (25 mph)	-
B. Engine speed	900 rpm	-
Time after engine start	120 sec.	-
Idle	ON	
Fuel system status	Closed loop	

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>P0130, P0150:</b>	
Either of the following conditions A or B is met:	3 times or more
A. Front oxygen sensor voltage is 0.55 V or less	For 18 sec. or more
B. Front oxygen sensor voltage is 0.4 V or more	For 18 sec. or more
<b>P2195, P2197:</b>	
Front heated oxygen sensor voltage	Constant 0.55 V or less
<b>P2196, P2198:</b>	
Front heated oxygen sensor voltage	Constant 0.4 V or more

## COMPONENT OPERATING RANGE

Parameter	Standard value
In the normal condition, the heated oxygen sensor voltage	0 to 1 V

## O2S TEST RESULT

Refer to page [DI-3](#) for detailed information.

### Front HO2S voltage monitor

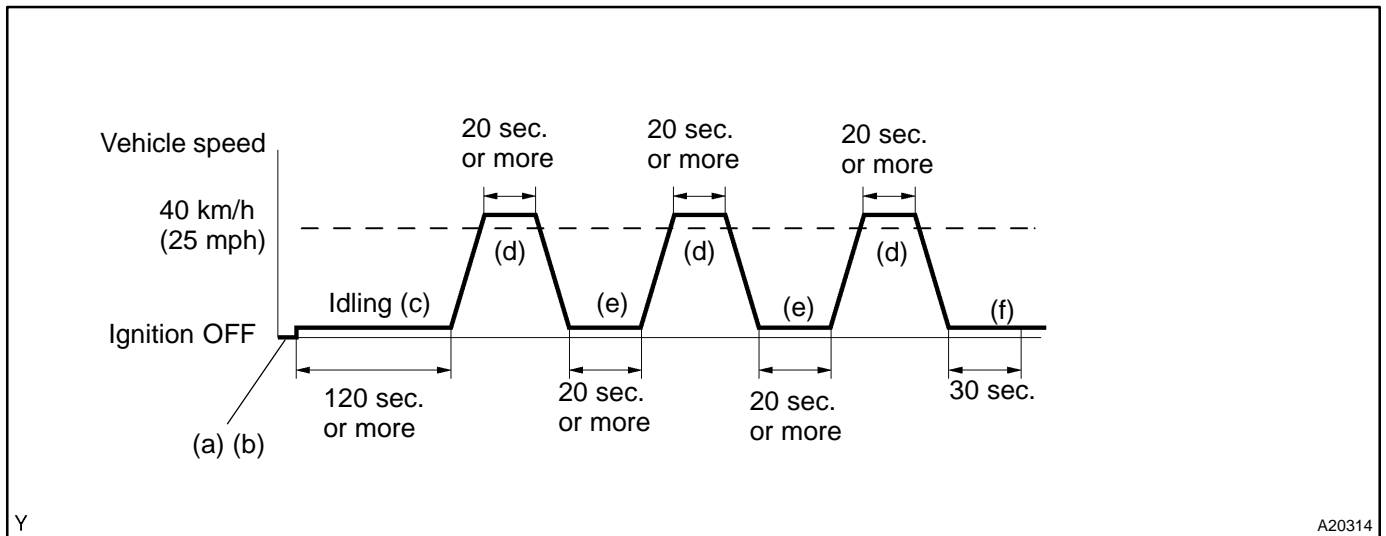
If the HO2S voltage is out of the standard value, the ECM interprets this as a malfunction.

TEST ID	Description of TEST DATA	Conversion Factor	Unit
\$07	Minimum front HO2S voltage	N/A	V
\$08	Maximum front HO2S voltage	N/A	V

## WIRING DIAGRAM

Refer to DTC P0031 on page [DI-49](#).

## CONFIRMATION DRIVING PATTERN



- (a) Connect the hand-held tester to the DLC3.
- (b) Switch the hand-held tester from the "normal mode" to the "check mode" (See page [DI-3](#)).
- (c) Start the engine and let the engine idle for 120 seconds or more.
- (d) Drive the vehicle at 25 mph (40 km/h) or more for 20 seconds or more.
- (e) Let the engine idle for 20 seconds or more. Perform steps (d) and (e) at 3 times.
- (f) Let the engine idle for 30 seconds.

### HINT:

If a malfunction exists, the MIL will light up during step (f).

### NOTICE:

**If the conditions in this test are not strictly followed, detection of the malfunction will not be possible. If you do not have a hand-held tester, turn the ignition switch OFF after performing steps (c) to (f), then perform steps (c) to (f) again.**

## INSPECTION PROCEDURE

### HINT:

Hand-held tester only:

The narrowing down the trouble area is possible by performing ACTIVE TEST of the following "A/F CONTROL" (Heated oxygen sensor or another can be distinguished).

- (a) Perform ACTIVE TEST by hand-held tester (A/F CONTROL).

### HINT:

"A/F CONTROL" is an ACTIVE TEST which changes the injection volume to -12.5 % or +25 %.

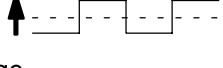
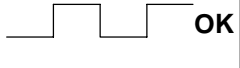
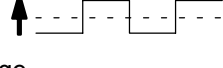
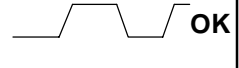
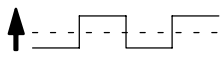
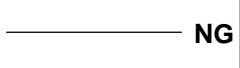
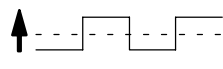
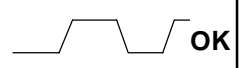
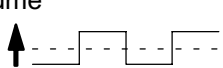

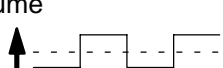





- (1) Connect the hand-held tester to the DLC3 on the vehicle.
- (2) Turn the ignition switch ON.
- (3) Warm up the engine with the engine speed at 2,500 rpm for approximately 90 seconds.
- (4) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL".
- (5) Perform "A/F CONTROL" with the engine in an idle condition (press the right or left button).

### RESULT:

**Heated oxygen sensor reacts in accordance with increase and decrease of injection volume**  
**+25% → rich output: More than 0.5 V**  
**-12.5% → lean output: Less than 0.4 V**

**NOTICE:**

However, there is a few seconds delay in the sensor 1 (front sensor) output. And there is about 20 seconds delay in the sensor 2 (rear sensor).

	Output voltage of heated oxygen sensor (sensor 1: front sensor)	Output voltage of heated oxygen sensor (sensor 2: rear sensor)	Mainly suspect trouble area
Case 1	Injection volume +25 %  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V	Injection volume +25 %  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V	—
Case 2	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Injection volume +25 %  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V	Sensor 1: front sensor (sensor 1, heater, sensor 1 circuit)
Case 3	Injection volume +25 %  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Sensor 2: rear sensor (sensor 2, heater, sensor 2 circuit)
Case 4	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Extremely rich or lean of the actual air-fuel ratio (Injector, fuel pressure, gas leakage in exhaust system, etc.)

The following A/F CONTROL procedure enables the technician to check and graph the voltage output of the heated oxygen sensors (sensor 1 and 2).

For displaying the graph indication, enter "ACTIVE TEST / A/F CONTROL / USER DATA" then select "O2S B1S1 and O2S B1S2" by pressing "YES" button and push "ENTER" button before pressing "F4" button.

**NOTICE:**

If the vehicle is short of fuel, the air-fuel ratio becomes LEAN and heated oxygen sensor DTCs will be recorded, and the MIL then comes on.

**HINT:**

- ▶ If different DTCs related to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may be open.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- ▶ A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air fuel mixture. Check for conditions that would cause the engine to run rich.
- ▶ A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air fuel mixture. Check for conditions that would cause the engine to run lean.

<b>1</b>	<b>Are there any other codes (besides DTC P0130, P0150, P2195, P2197, P2196 or P2198) being output?</b>
----------	---

**PREPARATION:**

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

**CHECK:**

Read the DTC using the hand-held tester or the OBD II scan tool.

**RESULT:**

Display (DTC Output)	Proceed to
"P0130, P0150, P2195, P2196, P2197 and/or P2198"	A
"P0130, P0150 P2195, P2196, P2197 or P2198" and other DTCs	B

**HINT:**

If any other codes besides "P0130, P0150, P2195, P2196, P2197 and/or P2198" are output, perform the troubleshooting for those DTCs first.

**B**

**Go to relevant DTC chart (See page [DI-36](#) ).**

**A**



<b>2</b>	<b>Check output voltage of heated oxygen sensor during idling.</b>
----------	--

**PREPARATION:**

- (a) Warm up the heated oxygen sensor with the engine speed at 2,500 rpm for approximately 90 seconds.
- (b) Connect the hand-held tester or OBD II scan tool to the DLC3.
- (c) When using hand-held tester, enter the following menu: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / O2S B1 S1 or B2 S1.

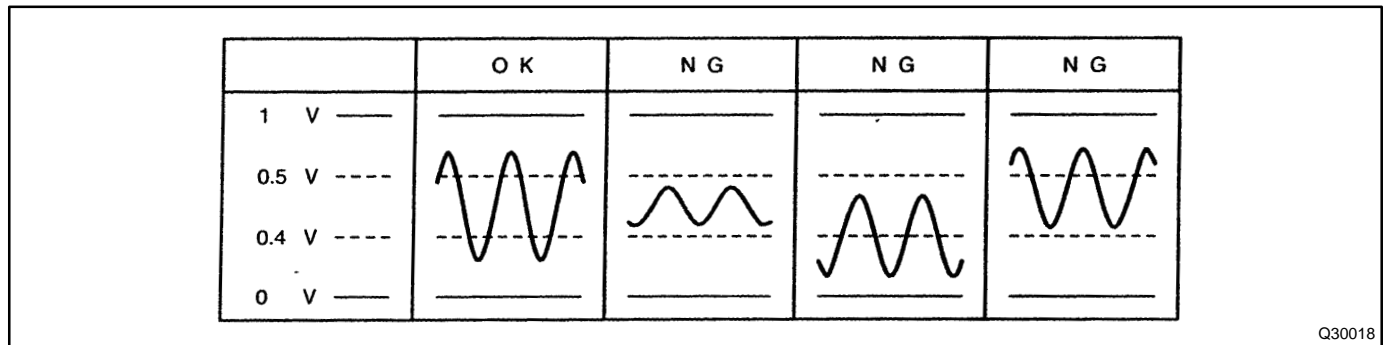
**CHECK:**

Check the output voltage of the heated oxygen sensor during idling the OBD II scan tool or hand-held tester.

**OK:**

**Heated oxygen sensor output voltage:**

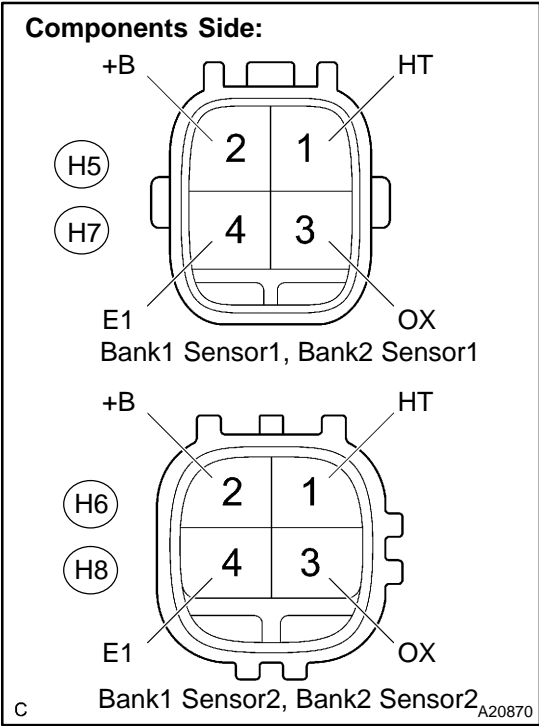
**Alternates repeatedly between less than 0.4 V and more than 0.5 V (See the following table).**



<b>OK</b>	<b>Go to step 9.</b>
-----------	----------------------

**NG**

**3 Check resistance of heated oxygen sensor heater.**



**PREPARATION:**

Disconnect the H5, H6, H7 or H8 heated oxygen sensor connector.

**CHECK:**

Measure resistance between terminals of the heated oxygen sensor.

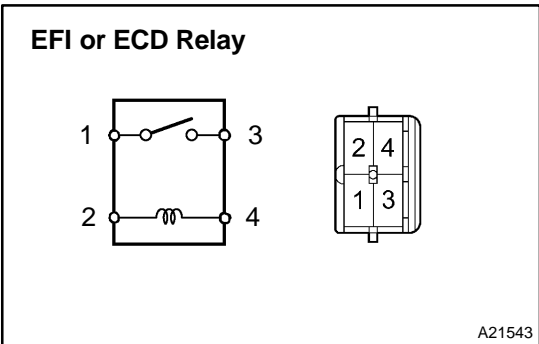
**OK:**

Tester Connection	Specified Condition
HT (H5-1) - +B (H5-2)	11 to 16 Ω (20°C)
HT (H6-1) - +B (H6-2)	11 to 16 Ω (20°C)
HT (H7-1) - +B (H7-2)	11 to 16 Ω (20°C)
HT (H8-1) - +B (H8-2)	11 to 16 Ω (20°C)

**OK**

**NG** Replace heated oxygen sensor.

**4 Check EFI or ECD relay.**



**PREPARATION:**

Remove the EFI or ECD relay from the engine room R/B.

**CHECK:**

Inspect the EFI or ECD relay.

**OK:**

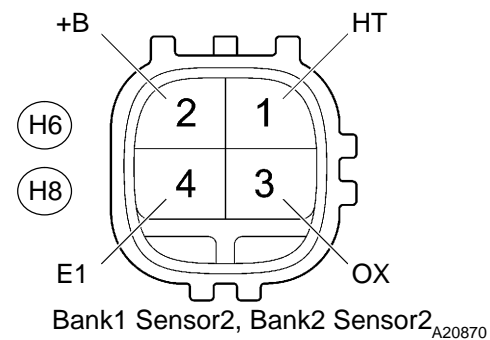
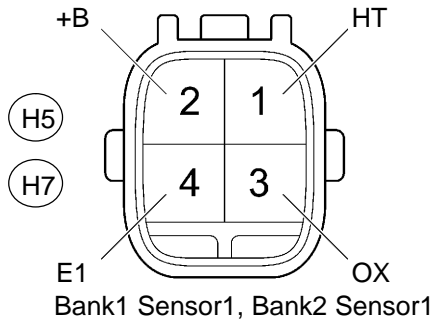
Terminal No.	Condition	Specified Condition
2 - 4	Constant	Continuity
1 - 3	Usually	No Continuity
	Apply B+ between terminals 2 and 4	Continuity

**OK**

**NG** Replace EFI or ECD relay.

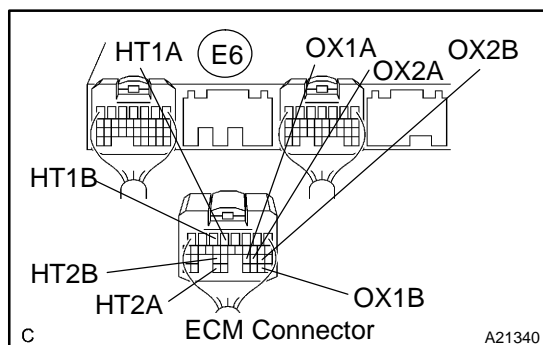
**5 Check for open and short in harness and connector between ECM and heated oxygen sensor.**

**Components Side:**



c

A20870



c

A21340

**PREPARATION:**

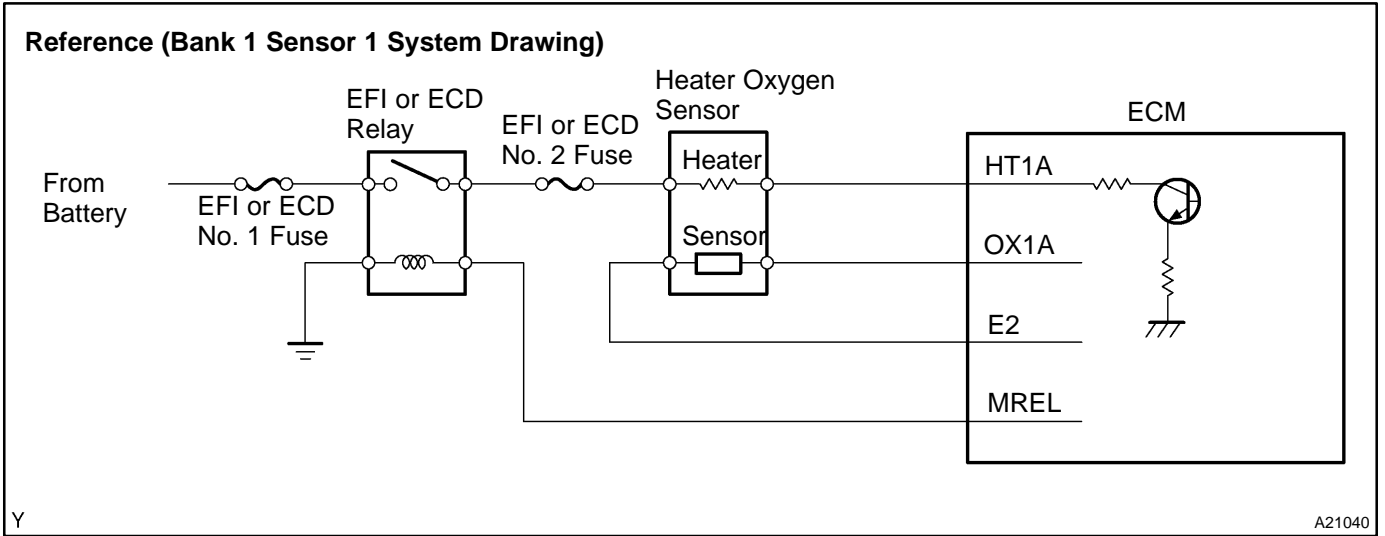
- Disconnect the H5, H6, H7 or H8 heated oxygen sensor connector.
- Disconnect the E6 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
OX (H5-3) - OX1A (E6-23)	Below 1 $\Omega$
HT (H5-1) - HT1A (E6-4)	Below 1 $\Omega$
OX (H6-3) - OX1B (E6-29)	Below 1 $\Omega$
HT (H6-1) - HT1B (E6-5)	Below 1 $\Omega$
OX (H7-3) - OX2A (E6-22)	Below 1 $\Omega$
HT (H7-1) - HT2A (E6-33)	Below 1 $\Omega$
OX (H8-3) - OX2B (E6-21)	Below 1 $\Omega$
HT (H8-1) - HT2B (E6-25)	Below 1 $\Omega$
OX (H5-3) or OX1A (E6-23) - Body ground	10 k $\Omega$ or higher
HT (H5-1) or HT1A (E6-4) - Body ground	10 k $\Omega$ or higher
OX (H6-3) or OX1B (E6-29) - Body ground	10 k $\Omega$ or higher
HT (H6-1) or HT1B (E6-5) - Body ground	10 k $\Omega$ or higher
OX (H7-3) or OX2A (E6-22) - Body ground	10 k $\Omega$ or higher
HT (H7-1) or HT2A (E6-33) - Body ground	10 k $\Omega$ or higher
OX (H8-3) or OX2B (E6-21) - Body ground	10 k $\Omega$ or higher
HT (H8-1) or HT2B (E6-25) - Body ground	10 k $\Omega$ or higher



**NG** → Repair or replace harness or connector.

**OK**

**6** Check air induction system (See page [SF-1](#) ).

**CHECK:**

Check the air induction system for vacuum leaks.

**NG** → Repair or replace air induction system.

**OK**

**7** Check fuel pressure (See page [SF-7](#) ).

**CHECK:**

Check the fuel pressure (high or low pressure).

**NG** → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page [SF-1](#) ).

**OK**

<b>8</b>	<b>Check injector injection (See page <a href="#">SF-24</a> ).</b>
----------	--

<b>NG</b>	<b>Replace injector.</b>
-----------	--------------------------

<b>OK</b>
-----------

<b>Replace heated oxygen sensor.</b>
--------------------------------------

<b>9</b>	<b>Perform confirmation driving pattern.</b>
----------	--

HINT:

Clear all DTCs prior to performing the confirmation driving pattern.

<b>Go</b>
-----------

<b>10</b>	<b>Is there DTC P0130, P0150, P2195, P2196, P2197 or P2198 being output again?</b>
-----------	--

<b>NO</b>	<b>Check for intermittent problems (See page <a href="#">DI-3</a> ).</b>
-----------	--

<b>YES</b>
------------

<b>Replace ECM (See page <a href="#">SF-60</a> ).</b>
---

<b>DTC</b>	<b>P0133</b>	<b>Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1)</b>
------------	--------------	--

<b>DTC</b>	<b>P0153</b>	<b>Oxygen Sensor Circuit Slow Response (Bank 2 Sensor 1)</b>
------------	--------------	--

**CIRCUIT DESCRIPTION**

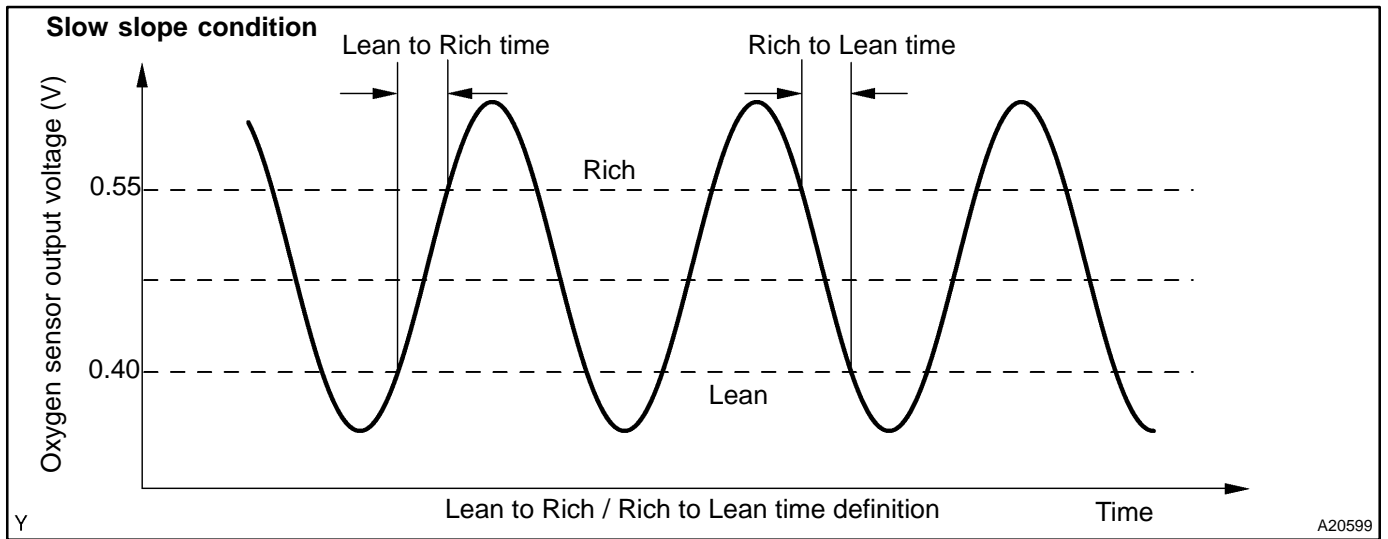
Refer to DTC P0031 on page [DI-49](#) .

DTC No.	DTC Detecting Condition	Trouble Area
P0133 P0153	After engine has been warmed up, if response time that heated oxygen sensor's output voltage reaches from RICH to LEAN, or from LEAN to RICH, is 0.6 seconds or more during idling. (2 trip detection logic)	<ul style="list-style-type: none"> <li>▶ Open or short in heated oxygen sensor circuit</li> <li>▶ Heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> </ul>
	If response time of heated oxygen sensor's output voltage in one RICH-LEAN cycle is 5.6 seconds or more during idling. (2 trip detection logic)	<ul style="list-style-type: none"> <li>▶ Air induction system</li> <li>▶ Fuel pressure</li> <li>▶ Injector</li> <li>▶ ECM</li> </ul>

**HINT:**

- ▶ Bank 1 refers to bank that includes cylinder No. 1.
- ▶ Bank 2 refers to bank that does not includes cylinder No. 1.
- ▶ Sensor 1 refers to the sensor closer to the engine assembly.

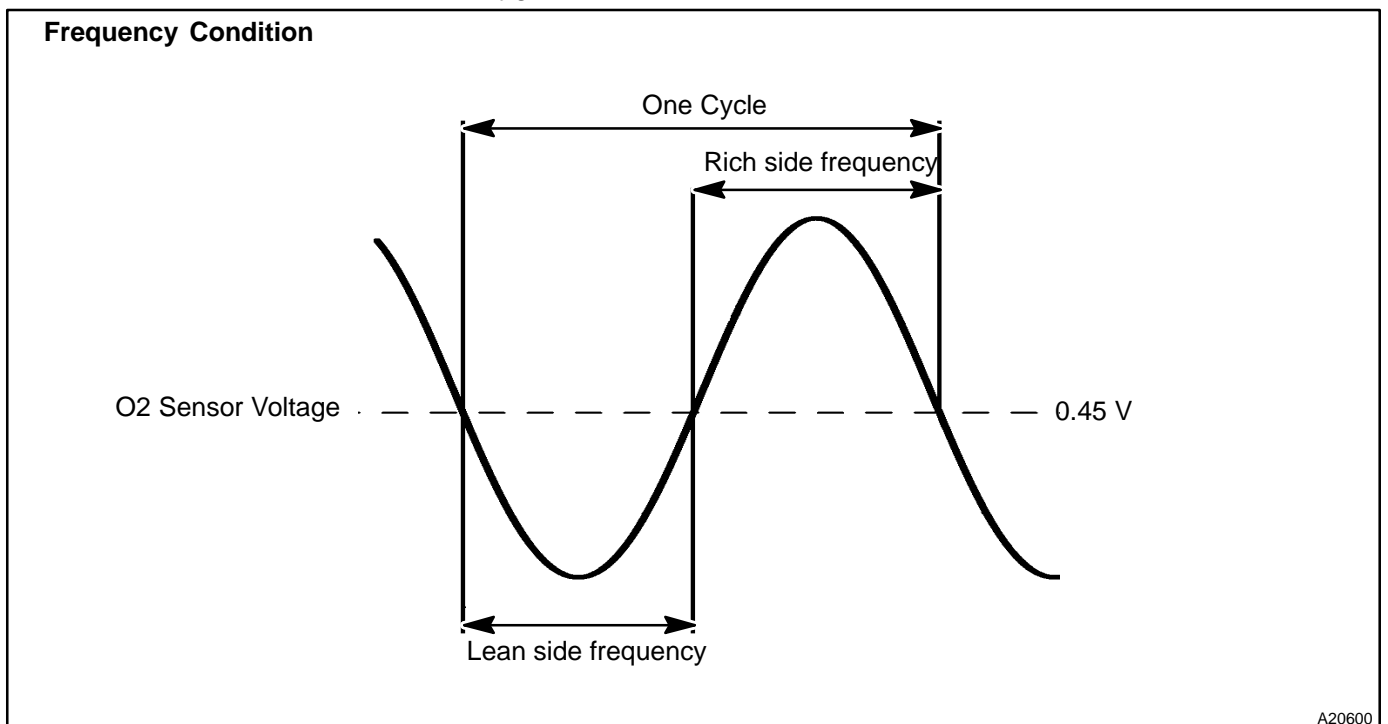
**MONITOR DESCRIPTION**



The ECM uses the heated oxygen sensor information to regulate the air-fuel ratio close to a stoichiometric ratio. This maximizes the catalytic converter's ability to purify the exhaust gases. The sensor detects oxygen levels in the exhaust gas and sends this signal to the ECM.

The inner surface of the sensor element is exposed to outside air. The outer surface of the sensor element is exposed to exhaust gas. The sensor element is made of platinum coated zirconia and includes an integrated heating element. The heated oxygen sensor has the characteristic whereby its output voltage changes suddenly in the vicinity of the stoichiometric air-fuel ratio. The heated oxygen sensor generates waveforms of a voltage between 0 V and 1 V in response to the oxygen concentration in exhaust gas. When the output voltage of the heated oxygen sensor is 0.55 V or more, the ECM judges that the air-fuel ratio is RICH. When it is 0.40 V or less, the ECM judges that the air-fuel ratio is LEAN.

The ECM monitors the response feature of the heated oxygen sensor. If the response time of the heated oxygen sensor output status change from RICH to LEAN or vice versa becomes longer, the ECM interprets this as a malfunction in the heated oxygen sensor and sets a DTC.



## MONITOR STRATEGY

Related DTCs	P0133	Front heated oxygen sensor response monitor (Bank 1)
	P0153	Front heated oxygen sensor response monitor (Bank 2)
Required sensors/components	Main sensors/components	Front heated oxygen sensor
	Related sensors/components	Crank position sensor, Vehicle speed sensor, Mass air flow meter
Frequency of operation	Once per drive cycle	
Duration	Within 60 sec.	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>Frequency idle condition:</b>		
There is history that the following conditions were met for 20 sec.	A and B	
A. Vehicle speed	40 km/h (25 mph)	-
B. Engine speed	900 rpm	-
Idle	ON	
Vehicle speed	-	5 km/h (3 mph)
Fuel system status	Closed loop	
Time after engine start	120 sec.	-
Engine coolant temperature	40°C (104°F)	-
<b>Frequency cruise condition:</b>		
There is history that the following conditions were met for 20 sec.	A and B	
A. Vehicle speed	40 km/h (25 mph)	-
B. Engine speed	900 rpm	-
Intake air amount	3 g/sec.	13 g/sec.
Time after engine start	120 sec.	-
Idle	OFF	
Fuel system status	Closed loop	
Engine speed	1,000 rpm	3,500 rpm
Engine coolant temperature	70°C (158°F)	-
<b>Slow slope condition:</b>		
Both of the following condition were met for 20 sec.	A and B	
A. Vehicle speed	40 km/h (25 mph)	-
B. Engine speed	900 rpm	-
Time after engine start	120 sec.	-
Idle	ON	
Vehicle speed	-	5 km/h (3 mph)



Fuel system status	Closed loop	
Engine coolant temperature	40°C (104°F)	-

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>Frequency idle condition</b>	
Time required by the sensor's output voltage to change in one RICH-LEAN cycle	5.6 sec. or more
<b>Frequency cruise condition</b>	
Time required by the sensor's output voltage to change in one RICH-LEAN cycle	a specific time or more
<b>Slow slope condition</b>	
Both of the following conditions were met	A and B
A. Number of judgment made	3 times
B. Following conditions were met	(a) or (b)
(a) Average lean to rich response time	0.9 sec. or more
(b) Average rich to lean response time	0.9 sec. or more

## COMPONENT OPERATING RANGE

Parameter	Standard value
Voltage output from heated oxygen sensor	Quickly fluctuates between 0.4 and 0.55 V

## O2S TEST RESULT

Refer to page [DI-3](#) for detailed information.

### Front HO2S slow slope monitor

If the HO2S sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

TEST ID	Description of TEST DATA	Conversion Factor	Unit
\$03	(Test constant) Low sensor voltage for response time calculation	N/A	V
\$04	(Test constant) High sensor voltage for response time calculation	N/A	V

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

TEST ID	Description of TEST DATA	Conversion Factor	Unit
\$31	Time to change from Lean ( $\ell$ 0.4 V) to Rich ( $\vee$ 0.55 V)	N/A	sec.
\$32	Time to change from Rich ( $\vee$ 0.55 V) to Lean ( $\ell$ 0.4 V)	N/A	sec.

### Front HO2S frequency monitor (idling)

If the \$38 is out of the standard value, the ECM interprets this as a malfunction.

TEST ID	Description of TEST DATA	Conversion Factor	Unit
\$38	Response time of heated oxygen sensor's output voltage in one RICH-LEAN cycle	N/A	sec.

**Front HO2S frequency monitor (cruse)**

If the \$90 is out of the standard value, the ECM interprets this as a malfunction.

TEST ID	Description of TEST DATA	Conversion Factor	Unit
\$90	Remained value of that average of switching frequency is subtracted from average of switching frequency threshold	Multiply by 0.04096 plus 5.2	sec.

**WIRING DIAGRAM**

Refer to DTC P0031 on page [DI-49](#) .

**INSPECTION PROCEDURE**

HINT:

Hand-held tester only:

The narrowing down the trouble area is possible by performing ACTIVE TEST of the following "A/F CONTROL" (Heated oxygen sensor or another can be distinguished).

(a) Perform ACTIVE TEST by hand-held tester (A/F CONTROL).

HINT:

"A/F CONTROL" is the ACTIVE TEST which changes the injection volume to -12.5 % or +25 %.

- (1) Connect the hand-held tester to the DLC3 on the vehicle.
- (2) Turn the ignition switch ON.
- (3) Warm up the engine with the engine speed at 2,500 rpm for approximately 90 seconds.
- (4) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL".
- (5) Perform "A/F CONTROL" with the engine in an idle condition (press the right or left button).

**RESULT:**

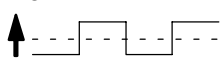

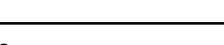
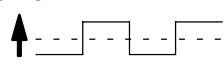
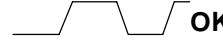
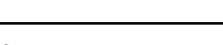
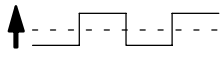
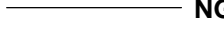
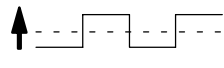
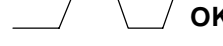
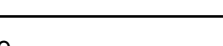
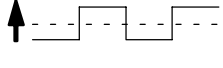
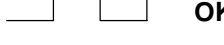
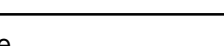
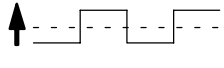

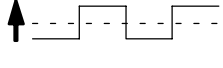

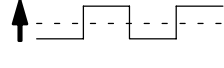

**Heated oxygen sensor reacts in accordance with increase and decrease of injection volume**

**+25 % → rich output: More than 0.5 V**

**-12.5 % → lean output: Less than 0.4 V**

**NOTICE:**

**However, there is a few second delay in the sensor 1 (front sensor) output. And there is about 20 seconds delay in the sensor 2 (rear sensor).**

	Output voltage of heated oxygen sensor (sensor 1: front sensor)	Output voltage of heated oxygen sensor (sensor 2: rear sensor)	Mainly suspect trouble area
Case 1	Injection volume +25 %  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V 	Injection volume +25 %  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V 	—
Case 2	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Injection volume +25 %  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V 	Sensor 1: front sensor (sensor 1, heater, sensor 1 circuit)
Case 3	Injection volume +25 %  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V 	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Sensor 2: rear sensor (sensor 2, heater, sensor 2 circuit)
Case 4	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Injection volume +25 %  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Extremely rich or lean of the actual air-fuel ratio (Injector, fuel pressure, gas leakage in exhaust system, etc.)

The following A/F CONTROL procedure enables the technician to check and graph the voltage output of the heated oxygen sensors (sensor 1 and 2).

For displaying the graph indication, enter "ACTIVE TEST / A/F CONTROL / USER DATA" then select "O2S B1S1 and O2S B1S2" by pressing "YES" button and push "ENTER" button before pressing "F4" button.

**NOTICE:**

**If the vehicle is short of fuel, the air-fuel ratio becomes LEAN and DTCs P0133 and/or P0153 will be recorded, and the MIL then comes on.**

- ▶ If different DTCs related to different systems while terminal E2 as ground terminal are output simultaneously, terminal E2 may be open.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- ▶ A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air fuel mixture. Check for conditions that would cause the engine to run rich.
- ▶ A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air fuel mixture. Check for conditions that would cause the engine to run lean.

<b>1</b>	<b>Are there any other codes (besides DTC P0133 or P0153) being output?</b>
----------	---

**PREPARATION:**

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

**CHECK:**

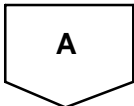
Read the DTC using the hand-held tester or the OBD II scan tool.

**RESULT:**

Display (DTC Output)	Proceed to
"P0133 and/or P0153"	A
"P0133 or P0153" and other DTCs	B

**HINT:**

If any other codes besides "P0133 and/or P0153" are output, perform the troubleshooting for those DTCs first.



<b>2</b>	<b>Check output voltage of heated oxygen sensor during idling.</b>
----------	--

**PREPARATION:**

- (a) Warm up the heated oxygen sensor with the engine speed at 2,500 rpm for approximately 90 seconds.
- (b) Connect the hand-held tester or OBD II scan tool to the DLC3.
- (c) When using hand-held tester, enter the following menu: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / O2S B1 S1 or B2 S1.

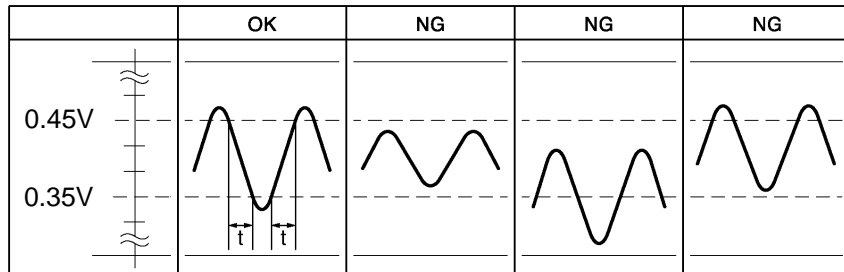
**CHECK:**

Check the output voltage of the heated oxygen sensor while idling the OBD II scan tool or hand-held tester.

**OK:**

**Heated oxygen sensor output voltage:**

**Alternates between less than 0.35 V and more than 0.45 V, and period of "t" must exist less than 0.6 seconds (See the following table).**



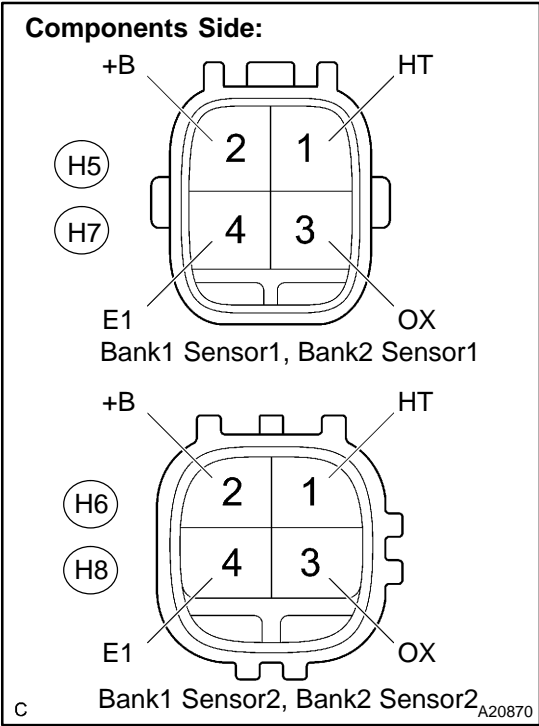
N

A20315

<b>OK</b>	<b>Go to step 9.</b>
-----------	----------------------

<b>NG</b>
-----------

**3 Check resistance of heated oxygen sensor heater.**



**PREPARATION:**

Disconnect the H5, H6, H7 or H8 heated oxygen sensor connector.

**CHECK:**

Measure resistance between terminals of the heated oxygen sensor.

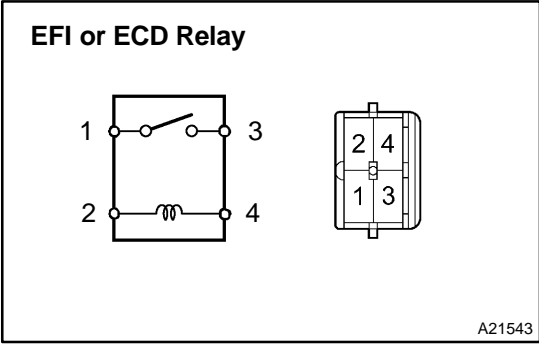
**OK:**

Tester Connection	Specified Condition
HT (H5-1) - +B (H5-2)	11 to 16 Ω (20°C)
HT (H6-1) - +B (H6-2)	11 to 16 Ω (20°C)
HT (H7-1) - +B (H7-2)	11 to 16 Ω (20°C)
HT (H8-1) - +B (H8-2)	11 to 16 Ω (20°C)

**NG** Replace heated oxygen sensor.

**OK**

**4 Check EFI or ECD relay.**



**PREPARATION:**

Remove the EFI or ECD relay from the engine room R/B.

**CHECK:**

Inspect the EFI or ECD relay.

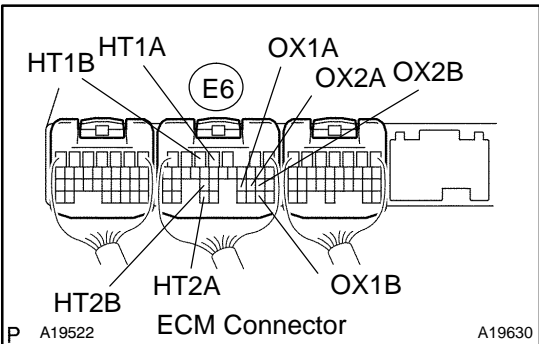
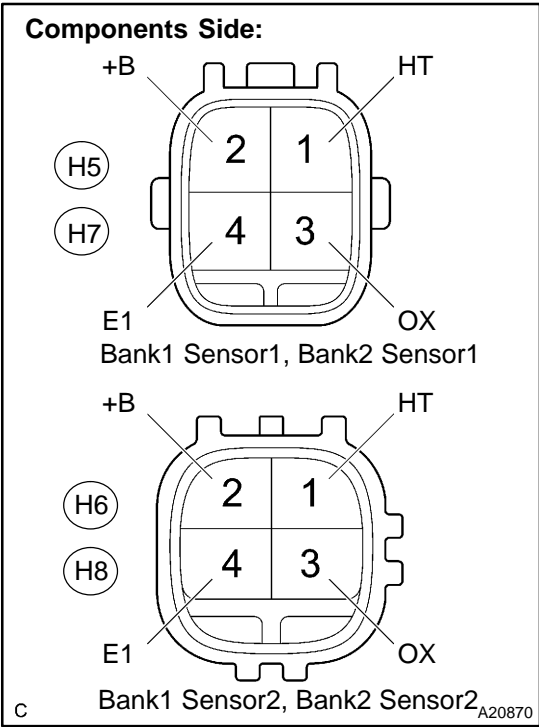
**OK:**

Terminal No.	Condition	Specified Condition
2 - 4	Constant	Continuity
1 - 3	Usually	No Continuity
	Apply B+ between terminals 2 and 4	Continuity

**NG** Replace EFI or ECD relay.

**OK**

**5 Check for open and short in harness and connector between ECM and heated oxygen sensor.**



**PREPARATION:**

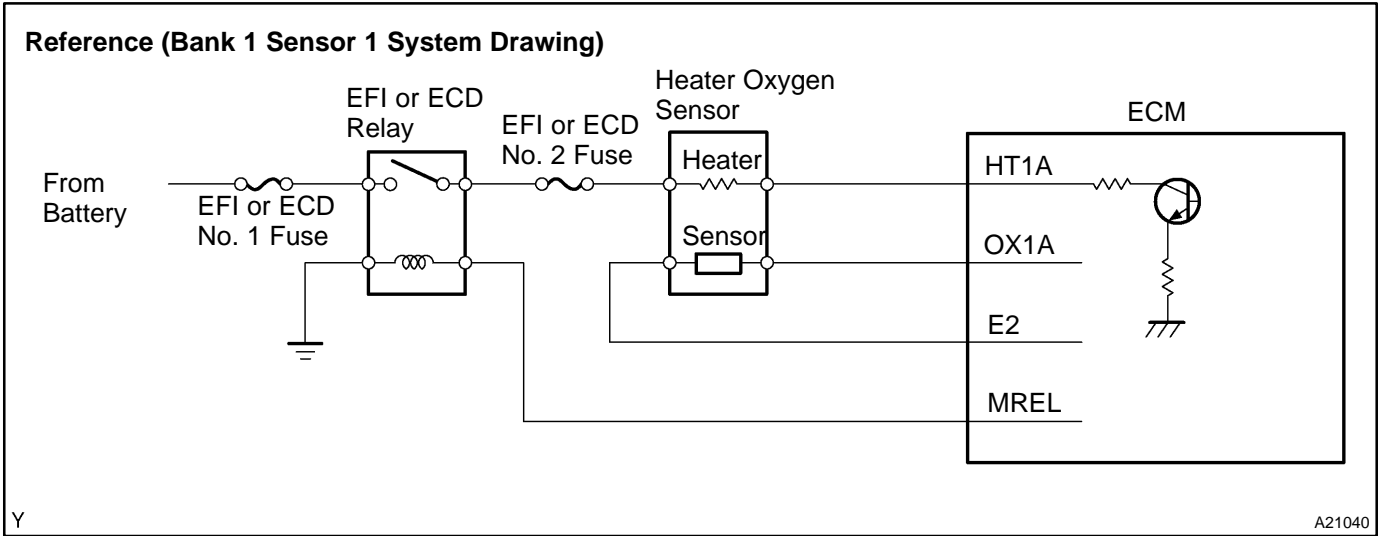
- (a) Disconnect the H5, H6, H7 or H8 heated oxygen sensor connector.
- (b) Disconnect the E6 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
OX (H5-3) - OX1A (E6-23)	Below 1 Ω
HT (H5-1) - HT1A (E6-4)	Below 1 Ω
OX (H6-3) - OX1B (E6-29)	Below 1 Ω
HT (H6-1) - HT1B (E6-5)	Below 1 Ω
OX (H7-3) - OX2A (E6-22)	Below 1 Ω
HT (H7-1) - HT2A (E6-33)	Below 1 Ω
OX (H8-3) - OX2B (E6-21)	Below 1 Ω
HT (H8-1) - HT2B (E6-25)	Below 1 Ω
OX (H5-3) or OX1A (E6-23) - Body ground	10 kΩ or higher
HT (H5-1) or HT1A (E6-4) - Body ground	10 kΩ or higher
OX (H6-3) or OX1B (E6-29) - Body ground	10 kΩ or higher
HT (H6-1) or HT1B (E6-5) - Body ground	10 kΩ or higher
OX (H7-3) or OX2A (E6-22) - Body ground	10 kΩ or higher
HT (H7-1) or HT2A (E6-33) - Body ground	10 kΩ or higher
OX (H8-3) or OX2B (E6-21) - Body ground	10 kΩ or higher
HT (H8-1) or HT2B (E6-25) - Body ground	10 kΩ or higher



**NG** → Repair or replace harness or connector.

**OK**

**6** Check air induction system (See page [SF-1](#)).

**CHECK:**

Check the air induction system for vacuum leaks.

**NG** → Repair or replace air induction system.

**OK**

**7** Check fuel pressure (See page [SF-7](#)).

**CHECK:**

Check the fuel pressure (high or low pressure).

**NG** → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page [SF-1](#)).

**OK**



<b>8</b>	<b>Check injector injection (See page <a href="#">SF-24</a> ).</b>
----------	--

<b>NG</b>	<b>Replace injector.</b>
-----------	--------------------------

<b>OK</b>
-----------

<b>Replace heated oxygen sensor.</b>
--------------------------------------

<b>9</b>	<b>Perform confirmation driving pattern (See page <a href="#">DI-106</a> ).</b>
----------	---

HINT:

Clear all DTCs prior to performing the confirmation driving pattern.

<b>Go</b>
-----------

<b>10</b>	<b>Is there DTC P0133 or P0153 being output again?</b>
-----------	--

<b>NO</b>	<b>Check for intermittent problems (See page <a href="#">DI-3</a> ).</b>
-----------	--

<b>YES</b>
------------

<b>Replace heated oxygen sensor.</b>
--------------------------------------

<b>DTC</b>	<b>P0134</b>	<b>Oxygen Sensor Circuit No Activity Detected (Bank 1 Sensor 1)</b>
------------	--------------	---

<b>DTC</b>	<b>P0154</b>	<b>Oxygen Sensor Circuit No Activity Detected (Bank 2 Sensor 1)</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

Refer to DTC P0031 on page [DI-49](#) .

DTC No.	DTC Detecting Condition	Trouble Area
P0134 P0154	<p>After the engine is warmed up, heated oxygen sensor (bank 1, sensor 1) output does not indicate RICH (more than 0.45 V) even once when the following conditions continue for 65 sec. or more:</p> <p>(a) Engine speed: 1,400 rpm or more            (b) Vehicle speed: 25 to 81 mph (40 to 130 km/h) or more            (c) Throttle valve does not fully closed            (d) 180 sec. or more after starting engine            (e) Engine coolant temperature more than 40°C (104°F)</p>	<ul style="list-style-type: none"> <li>▶ Open or short in heated oxygen sensor circuit</li> <li>▶ Heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> <li>▶ Air induction system</li> <li>▶ Fuel pressure</li> <li>▶ PCV hose connection</li> <li>▶ PCV valve and hose</li> <li>▶ Injector</li> <li>▶ Gas leakage on exhaust system</li> <li>▶ PCV piping</li> <li>▶ ECM</li> </ul>

### HINT:

- ▶ Bank 1 refers to bank that includes cylinder No. 1.
- ▶ Bank 2 refers to bank that does not includes cylinder No. 1.
- ▶ Sensor 1 refers to the sensor closer to the engine assembly.
- ▶ After confirming DTC P0134 and P0154, check the output voltage of the heated oxygen sensor in the "DIAGNOSIS / ENHANCE OBD II / DATA LIST / ALL" using the OBD II scan tool or the hand-held tester. If output voltage of the heated oxygen sensor is always less than 0.1 V, heated oxygen sensor circuit may be open or short.

## MONITOR DESCRIPTION

The ECM uses the heated oxygen sensor to optimize the air-fuel mixture in closed-loop fuel control. This control helps decrease exhaust emissions by providing the catalyst with a nearly stoichiometric mixture. The sensor detects the oxygen level in the exhaust gas and the ECM uses this data to control the air-fuel ratio. The sensor output voltage ranges from 0 V to 1 V. If the signal voltage is less than 0.4 V, the air-fuel ratio is LEAN. If the signal voltage is more than 0.55 V, the air-fuel ratio is RICH. If the conditions for the closed-loop fuel control are met and after a specified time-period, the sensor's output signal never indicates RICH, the ECM will conclude that the closed-loop fuel control is malfunctioning. The ECM will illuminate the MIL and a DTC is set.

## MONITOR STRATEGY

Related DTCs	P0134	Excessive time to enter closed loop (Bank 1)
	P0154	Excessive time to enter closed loop (Bank 2)
Required sensors/components	Main sensors/components	Front heated oxygen sensor
	Related sensors/components	Crank position sensor, Engine coolant temperature sensor, Vehicle speed sensor
Frequency of operation	Once per drive cycle	
Duration	65 sec.	
MIL operation	1 driving cycle	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
Both of the following conditions were met	A and B	
A. Time after following conditions met for 50 sec.	(a), (b), (c), (d), (e) and (f)	
(a) Engine coolant temperature	40>C (104°F)	-
(b) Engine speed	1,400 rpm	-
(c) Vehicle speed	40 km/h (25 mph)	-
(d) Idle	OFF	
(e) Time after engine start	180 sec.	-
(f) Fuel enrichment correction factor	1	63.998
B. Neither fail nor pass is determined yet in the present drive cycle		

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Front heated oxygen sensor voltage	Less than 0.45 V

## COMPONENT OPERATING RANGE

Parameter	Standard value
In the normal condition, the front heated oxygen sensor voltage	0 to 1 V

## WIRING DIAGRAM

Refer to DTC P0031 on page [DI-49](#) .

## INSPECTION PROCEDURE

HINT:

Hand-held tester only:

The narrowing down the trouble area is possible by performing ACTIVE TEST of the following "A/F CONTROL" (Heated oxygen sensor or another can be distinguished).

(a) Perform ACTIVE TEST by hand-held tester (A/F CONTROL).

HINT:

"A/F CONTROL" is the ACTIVE TEST which changes the injection volume to -12.5 % or +25 %.

- (1) Connect the hand-held tester to the DLC3 on the vehicle.
- (2) Turn the ignition switch ON.
- (3) Warm up the engine with the engine speed at 2,500 rpm for approximately 90 seconds.
- (4) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL".
- (5) Perform "A/F CONTROL" with the engine in an idle condition (press the right or left button).

### RESULT:

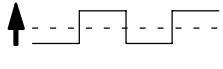
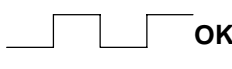
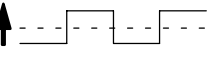
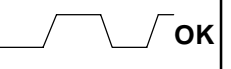
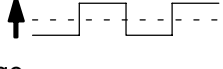
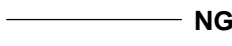
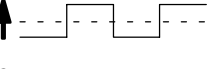

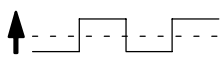

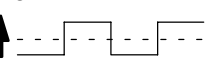

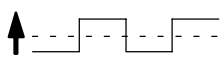

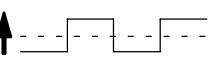

**Heated oxygen sensor reacts in accordance with increase and decrease of injection volume**

**+25 % → rich output: More than 0.5 V**

**-12.5 % → lean output: Less than 0.4 V**

### NOTICE:

**However, there is a few seconds delay in the sensor 1 (front sensor) output. And there is about 20 seconds delay in the sensor 2 (rear sensor).**

	Output voltage of heated oxygen sensor (sensor 1: front sensor)	Output voltage of heated oxygen sensor (sensor 2: rear sensor)	Mainly suspect trouble area
Case 1	Injection volume +25 % ↑  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V	Injection volume +25 % ↑  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V	—
Case 2	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Injection volume +25 % ↑  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V	Sensor 1: front sensor (sensor 1, heater, sensor 1 circuit)
Case 3	Injection volume +25 % ↑  -12.5 % Output voltage More than 0.5 V  <b>OK</b> Less than 0.4 V	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Sensor 2: rear sensor (sensor 2, heater, sensor 2 circuit)
Case 4	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Extremely rich or lean of the actual air-fuel ratio (Injector, fuel pressure, gas leakage in exhaust system, etc.)

The following A/F CONTROL procedure enables the technician to check and graph the voltage output of the heated oxygen sensors (sensor 1 and 2).

For displaying the graph indication, enter "ACTIVE TEST / A/F CONTROL / USER DATA" then select "O2S B1S1 and O2S B1S2" by pressing "YES" button and push "ENTER" button before pressing "F4" button.

HINT:

- ▶ If different DTCs related to different systems terminal E2 as the ground terminal are output simultaneously, terminal E2 may be open.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- ▶ A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air fuel mixture. Check for conditions that would cause the engine to run rich.
- ▶ A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air fuel mixture. Check for conditions that would cause the engine to run lean.

<b>1</b>	<b>Are there any other codes (besides DTCs P0134 and P0154) being output?</b>
----------	---

**PREPARATION:**

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

**CHECK:**

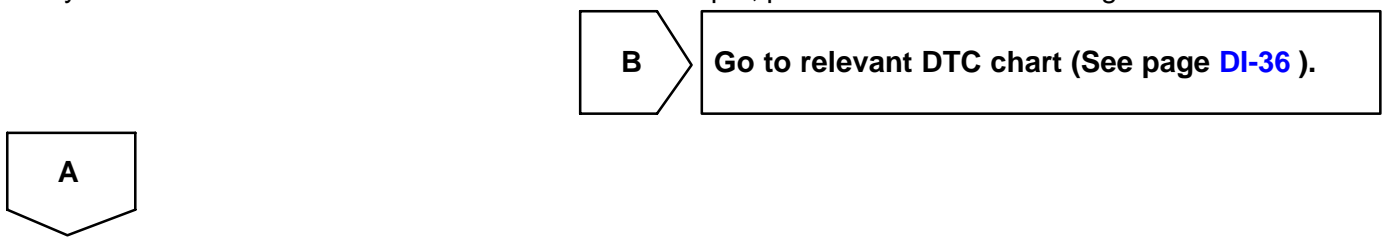
Read the DTC using the hand-held tester or the OBD II scan tool.

**RESULT:**

Display (DTC Output)	Proceed to
"P0134 and/or P0154"	A
"P0134 or P0154" and other DTCs	B

HINT:

If any other codes besides P0134 and/or P0154 are output, perform the troubleshooting for those codes first.



<b>2</b>	<b>Connect OBD II scan tool or hand-held tester, and read value for voltage output of heated oxygen sensor (bank 1, 2 sensor 1).</b>
----------	--

**PREPARATION:**

- (a) Connect the OBD II scan tool or the hand-held tester to the DLC3.
- (b) Warm up the engine to the normal operating temperature.
- (c) When using hand-held tester, enter the following menu: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / O2S B1 S1 or B2 S1.

**CHECK:**

Read the voltage output of the heated oxygen sensors when the engine speed is suddenly increased.

**HINT:**

Quickly accelerate the engine to 4,000 rpm 3 times by using the accelerator pedal.

**OK:**

Heated oxygen sensor output a RICH signal (0.45 V or more) at least once.

<b>OK</b>	<b>Go to step 12.</b>
-----------	-----------------------

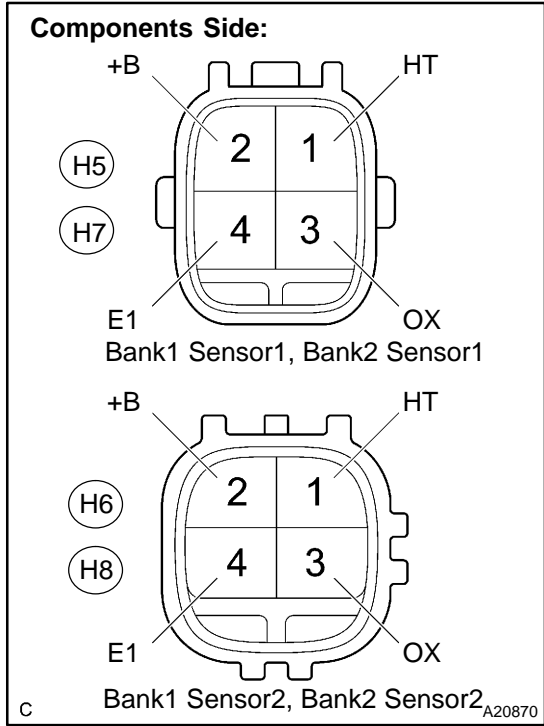
<b>NG</b>
-----------

<b>3</b>	<b>Check connection of PCV piping.</b>
----------	--

<b>NG</b>	<b>Repair or replace PCV piping.</b>
-----------	--------------------------------------

<b>OK</b>
-----------

**4 Check resistance of heated oxygen sensor heater.**



**PREPARATION:**

Disconnect the H5, H6, H7 or H8 heated oxygen sensor connector.

**CHECK:**

Measure resistance between terminals of the heated oxygen sensor.

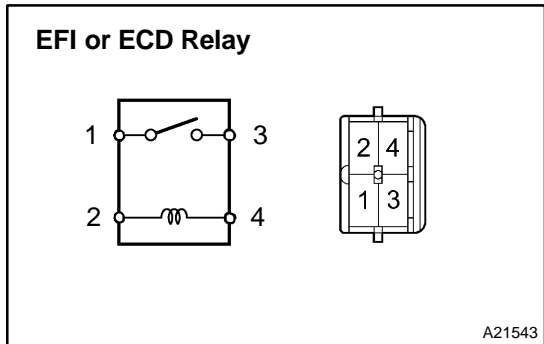
**OK:**

Tester Connection	Specified Condition
HT (H5-1) - +B (H5-2)	11 to 16 Ω (20°C)
HT (H6-1) - +B (H6-2)	11 to 16 Ω (20°C)
HT (H7-1) - +B (H7-2)	11 to 16 Ω (20°C)
HT (H8-1) - +B (H8-2)	11 to 16 Ω (20°C)

**OK**

**NG** Replace heated oxygen sensor.

**5 Check EFI or ECD relay.**



**PREPARATION:**

Remove the EFI or ECD relay from the engine room R/B.

**CHECK:**

Inspect the EFI or ECD relay.

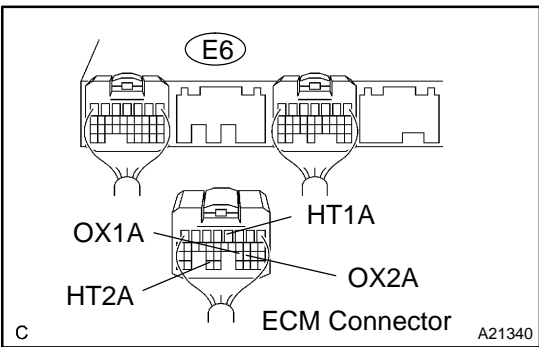
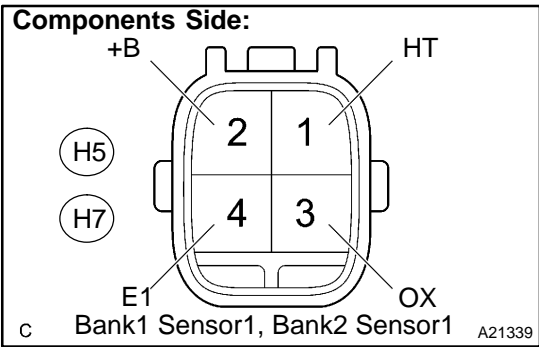
**OK:**

Terminal No.	Condition	Specified Condition
2 - 4	Constant	Continuity
1 - 3	Usually	No Continuity
	Apply B+ between terminals 2 and 4	Continuity

**OK**

**NG** Replace EFI or ECD relay.

**6 Check for open and short in harness and connector between ECM and heated oxygen sensor (bank 1, 2 sensor 1).**



**PREPARATION:**

- (a) Disconnect the H5 or H7 heated oxygen sensor connector.
- (b) Disconnect the E6 ECM connector.

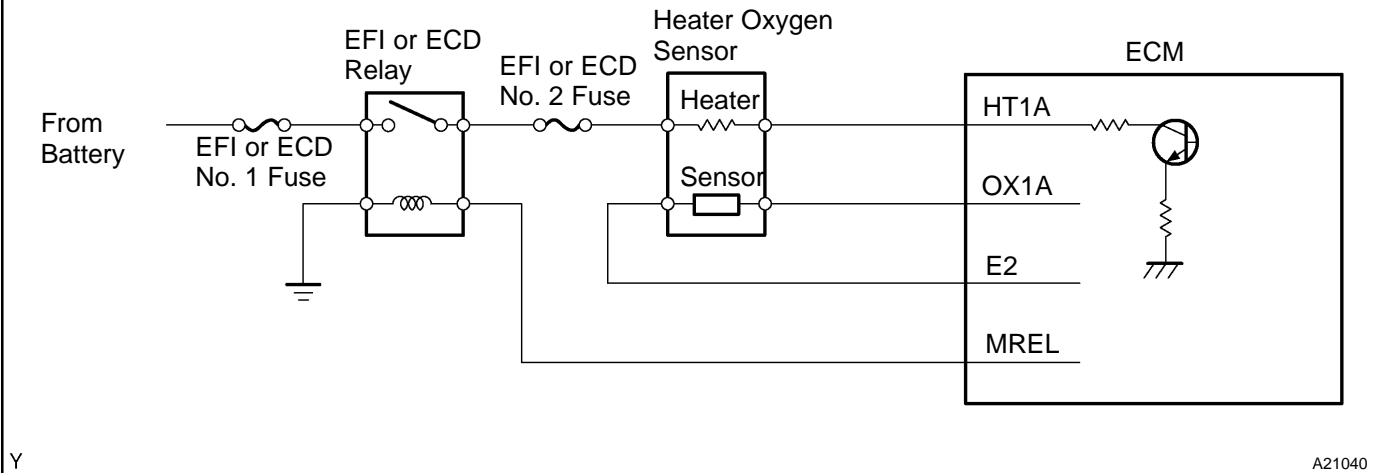
**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
OX (H5-3) - OX1A (E6-23)	Below 1 Ω
HT (H5-1) - HT1A (E6-4)	Below 1 Ω
OX (H7-3) - OX2A (E6-22)	Below 1 Ω
HT (H7-1) - HT2A (E6-33)	Below 1 Ω
OX (H5-3) or OX1A (E6-23) - Body ground	10 kΩ or higher
HT (H5-1) or HT1A (E6-4) - Body ground	10 kΩ or higher
OX (H7-3) or OX2A (E6-22) - Body ground	10 kΩ or higher
HT (H7-1) or HT2A (E6-33) - Body ground	10 kΩ or higher

**Reference (Bank 1 Sensor 1 System Drawing)**



**NG** Repair or replace harness or connector.

**OK**



**7** Check whether misfire is occurred or not by monitoring DTC and data list.

**NG**

Perform troubleshooting for misfire  
(See page [DI-167](#) ).

**OK**

**8** Check air induction system (See page [SF-1](#) ).

**CHECK:**

Check the air induction system for vacuum leaks.

**NG**

Repair or replace air induction system.

**OK**

**9** Check fuel pressure (See page [SF-7](#) ).

**CHECK:**

Check the fuel pressure (high or low pressure).

**NG**

Check and repair fuel pump, pressure regulator,  
fuel pipe line and filter (See page [SF-1](#) ).

**OK**

**10** Check injector injection (See page [SF-24](#) )

**NG**

Replace injector.

**OK**

**11** Check exhaust system for gas leakage.

**NG** Repair or replace exhaust gas leakage point.

**OK**

Replace heated oxygen sensor (bank 1, 2 sensor 1).

**12** Perform confirmation driving pattern (See page [DI-106](#) ).

HINT:  
Clear all DTCs prior to performing the confirmation driving pattern.

**Go**

**13** Are there DTCs P0134 and P0154 being output again?

**YES** Replace ECM (See page [SF-60](#) ).

**NO**

**14** Confirm if vehicle has run out of fuel in past.

**NO** Check for intermittent problems (See page [DI-3](#) ).

**YES**

DTCs P0134 and P0154 are caused by running out of fuel.

<b>DTC</b>	<b>P0136</b>	<b>Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)</b>
------------	--------------	--

<b>DTC</b>	<b>P0156</b>	<b>Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 2)</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

Refer to DTC P0031 on page [DI-49](#) .

DTC No.	DTC Detecting Condition	Trouble Area
P0136 P0156	The following condition (a) or (b) continues 300 sec. or more. (a) During driving with the engine warmed up, heated oxygen sensor output does not change. (b) Heated oxygen sensor output is very low most of the time.	<ul style="list-style-type: none"> <li>⌘Open or short in heated oxygen sensor circuit</li> <li>⌘Heated oxygen sensor</li> <li>⌘Heated oxygen sensor heater</li> <li>⌘EFI or ECD relay</li> </ul>

### HINT:

- \* Bank 1 refers to bank that includes cylinder No. 1.
- \* Bank 2 refers to bank that does not includes cylinder No. 1.
- \* Sensor 2 refers to the sensor farther away from the engine assembly.

## MONITOR DESCRIPTION

The ECM monitors the rear heated oxygen sensor in the following 3 items:

- (1) If the rear heated oxygen sensor voltage changes between Rich and Lean while the vehicle is running (repeating acceleration and deceleration). If not, the ECM interprets this as a malfunction, illuminates the MIL, and then sets DTC.
- (2) If the rear heated oxygen sensor voltage does not remain at less than 0.05 V for a long time while the vehicle is running. If not, the ECM interprets this as a malfunction, illuminates the MIL, and then sets DTC.
- (3) If the sensor's voltage drops to below 0.2 V (extremely Lean status) immediately when the vehicle decelerates and the fuel cut is working. if not, the ECM interprets this to mean the sensor's response feature has deteriorated, illuminates the MIL, and then sets DTC.

## MONITOR STRATEGY

Related DTCs	P0136	Heated rear oxygen sensor output voltage (Crack) (Bank 1)
		Heated rear oxygen sensor output voltage (Bank 1)
		Heated rear oxygen sensor slow response (Bank 1)
	P0156	Heated rear oxygen sensor output voltage (Crack) (Bank 2)
		Heated rear oxygen sensor output voltage (Bank 2)
		Heated rear oxygen sensor slow response (Bank 2)
Required sensors/components	Main sensors/components	Heated rear oxygen sensor
	Related sensors/components	Mass air flow meter, Vehicle speed sensor
Frequency of operation	Once per drive cycle	
Duration	300 sec.	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page DI-3)	
<b>Case 1 (Output voltage (crack)):</b>		
Vehicle speed	3 km/h (2 mph)	-
Idle	OFF	
Fuel cut	OFF	
Time after fuel cut ON to OFF	40 sec.	-
Intake air amount per revolution	0.7 g/rev	-
<b>Case 2 (Output voltage):</b>		
All of the following conditions are met:	A, B, C and D	
A. Pass/fail detection in this driving cycle	Not detected	
B. Engine	Running	
C. Time after engine start	0 sec.	-
D. Either of the following conditions is met:	(a) or (b)	
(a) Cumulative time while heated oxygen sensor heater is ON	22 sec.	-
(b) At once more heated oxygen sensor voltage	0.2 V	-
<b>Case 3 (Slow response):</b>		
Rear oxygen sensor voltage before the fuel cut	0.2 V or more	-
Catalyst condition	Warmed up	
Engine coolant temperature	75°C (167°F)	-

Fuel cut	Operating	
Time after engine start	200 sec.	-

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>Case 1 (Output voltage (crack)):</b>	
Following conditions are met:	A, B and C
A. Cumulative rear heated oxygen sensor monitor time	300 sec. or more
B. Time while rear heated oxygen sensor voltage is less than 0.05 V	180 sec. or more
C. Maximum rear heated oxygen sensor rich time (0.45 V or more)	Less than 20 sec.
<b>Case 2 (Output voltage):</b>	
Number of heated oxygen sensor voltage "switching"	0 time or less
"Switching" is counted when the sensor signal crosses the minimum or maximum voltage	
Minimum voltage	Less than 0.4 V
Maximum voltage	0.5 V or more
<b>Case 3 (Slow response):</b>	
Time until the rear oxygen sensor voltage drops to 0.2 V after fuel cut starts operating	6 sec. or more

## COMPONENT OPERATING RANGE

Parameter	Standard Value
Heated oxygen sensor voltage	0 to 1 V

## O2S TEST RESULT

Refer to page [DI-3](#) for detailed information.

### Rear HO2S voltage monitor

If the HO2S sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

TEST ID	Description of TEST DATA	Conversion Factor	Unit
\$07	Minimum rear HO2S voltage	N/A	V
\$08	Maximum rear HO2S voltage	N/A	V

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

TEST ID	Description of TEST DATA	Conversion Factor	Unit
\$31	Time to change from Lean (<0.4 V) to Rich (ℓ 0.5 V)	N/A	sec.
\$32	Time to change from Rich (ℓ 0.5 V) to Lean (<0.4 V)	N/A	sec.

### Rear HO2S slow response monitor

If the elapsed time is out of the standard value, the ECM interprets this as a malfunction.

TEST ID	Description of TEST DATA	Conversion Factor	Unit
\$37	Until rear HO2S voltage drops to 0.2 V after fuel-cut starting	N/A	sec.

### Rear HO2S element monitor

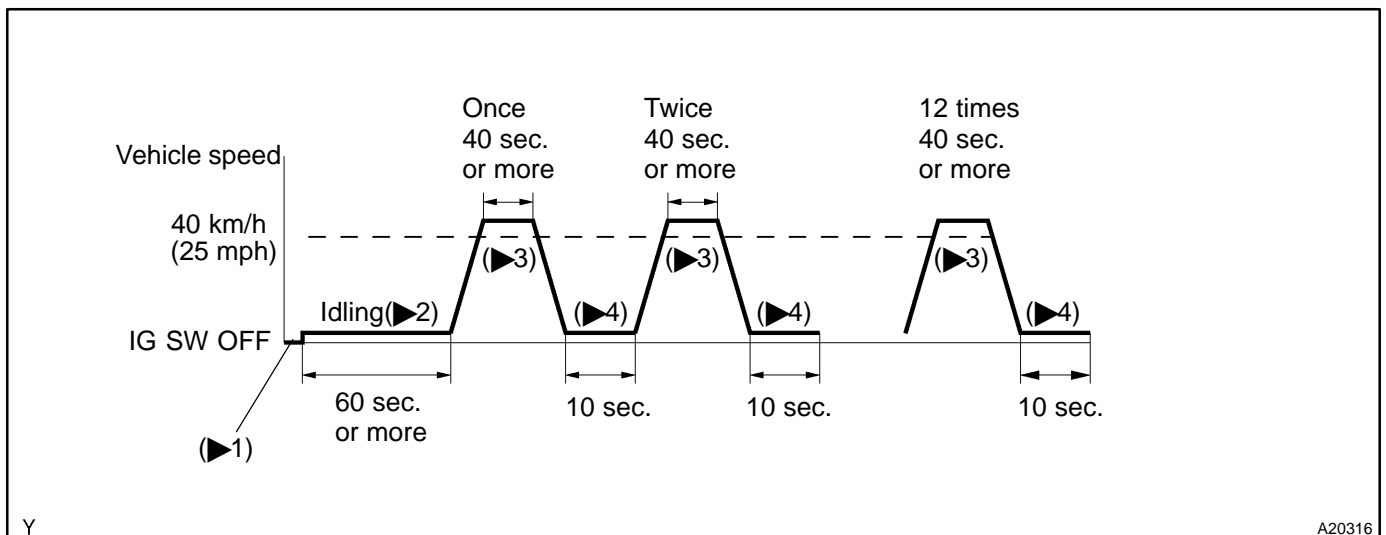
If all the values (\$81, \$84, \$85 and \$87) are out of the standard values, the ECM interprets this as a malfunction.

TEST ID	Description of TEST DATA	Conversion Factor	Unit
\$81	Percentage of monitoring time when the HO2S voltage is less than 0.05 V	Multiply 0.3906	%
\$84	Percentage of monitoring time when the HO2S voltage is more than 0.7 V	Multiply 0.3906	%
\$85	Time when the HO2S voltage is 0.45 V or more	Multiply 0.2621	sec.
\$87	Percentage of monitoring time when the HO2S voltage is 0.45 V or more	Multiply 0.3906	%

## WIRING DIAGRAM

Refer to DTC P0031 on page [DI-49](#).

## CONFIRMATION DRIVING PATTERN



1. Connect the hand-held tester to the DLC3. (▶1)
2. Switch the hand-held tester from the normal mode to the check mode (See page [DI-3](#)). (▶1)
3. Start the engine and let the engine idle for 60 seconds or more. (▶2)
4. Drive the vehicle at 40 km/h (25 mph) or more for 40 seconds or more. (▶3)
5. Let the engine idle for 10 seconds or more. (▶4)
6. Perform steps 4. and 5. for 12 times.

HINT:

If a malfunction exists, the MIL will light up on the multi-information display during step 6.

**NOTICE:**

If the conditions in this test are not strictly followed, a malfunction detection will not occur. If you do not have a hand-held tester, turn the ignition switch OFF after performing steps from 3 to 6, then perform steps from 3 to 6 again.

## INSPECTION PROCEDURE

HINT:

Hand-held tester only:

The narrowing down the trouble area is possible by performing ACTIVE TEST of the following "A/F CONTROL" (Heated oxygen sensor or another can be distinguished).

(a) Perform ACTIVE TEST by hand-held tester (A/F CONTROL).

HINT:

"A/F CONTROL" is the ACTIVE TEST which changes the injection volume to -12.5 % or +25 %.

- (1) Connect the hand-held tester to the DLC3 on the vehicle.
- (2) Turn the ignition switch ON.
- (3) Warm up the engine with the engine speed at 2,500 rpm for approximately 90 seconds.
- (4) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL".
- (5) Perform "A/F CONTROL" with the engine in an idle condition (press the right or left button).

### RESULT:

**Heated oxygen sensor reacts in accordance with increase and decrease of injection volume**

**+25 % → rich output: More than 0.5 V**

**-12.5 % → lean output: Less than 0.4 V**

### NOTICE:

**However, there is a few seconds delay in the sensor 1 (front sensor) output. And there is about 20 seconds delay in the sensor 2 (rear sensor).**

	Output voltage of heated oxygen sensor (sensor 1: front sensor)	Output voltage of heated oxygen sensor (sensor 2: rear sensor)	Mainly suspect trouble area
Case 1	Injection volume +25 % ↑ -12.5 % Output voltage More than 0.5 V Less than 0.4 V <b>OK</b>	Injection volume +25 % ↑ -12.5 % Output voltage More than 0.5 V Less than 0.4 V <b>OK</b>	—
Case 2	Injection volume +25 % ↑ -12.5 % Output voltage Almost no reaction <b>NG</b>	Injection volume +25 % ↑ -12.5 % Output voltage More than 0.5 V Less than 0.4 V <b>OK</b>	Sensor 1: front sensor (sensor 1, heater, sensor 1 circuit)
Case 3	Injection volume +25 % ↑ -12.5 % Output voltage More than 0.5 V Less than 0.4 V <b>OK</b>	Injection volume +25 % ↑ -12.5 % Output voltage Almost no reaction <b>NG</b>	Sensor 2: rear sensor (sensor 2, heater, sensor 2 circuit)
Case 4	Injection volume +25 % ↑ -12.5 % Output voltage Almost no reaction <b>NG</b>	Injection volume +25 % ↑ -12.5 % Output voltage Almost no reaction <b>NG</b>	Extremely rich or lean of the actual air-fuel ratio (Injector, fuel pressure, gas leakage in exhaust system, etc.)

The following A/F CONTROL procedure enables the technician to check and graph the voltage output of the heated oxygen sensors.

For displaying the graph indication, first enter "ACTIVE TEST / A/F CONTROL / USER DATA," then select "O2S B1S1 and O2S B1S2" by pressing "YES" button, and push "ENTER" button before pressing "F4" button.

**HINT:**

- \* If different DTCs that are related to different system are output simultaneously while terminal E2 is used as a ground terminal, terminal E2 may be open.
- \* Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

<b>1</b>	<b>Are there any other codes (besides DTC P0136 or P0156) being output?</b>
----------	---

**PREPARATION:**

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

**CHECK:**

Read the DTC using the hand-held tester or the OBD II scan tool.

**RESULT:**

Display (DTC Output)	Proceed to
P0136	A
"P0136" and other DTCs	B

**HINT:**

If any other codes besides P0136 are output, perform the troubleshooting for those DTCs first.

**B** → **Go to relevant DTC chart (See page [DI-36](#)).**

**A**



## 2 Check output voltage of heated oxygen sensor.

### PREPARATION:

- Connect the OBD II scan tool or the hand-held tester to the DLC3.
- After warming up the engine, run the engine at 2,500 rpm for 3 minutes.
- When using hand-held tester, enter the following menu: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / O2S B2 S1 or B2 S2.

### CHECK:

Read the voltage output of the heated oxygen sensor when the engine speed is suddenly increased.

### HINT:

Quickly accelerate the engine to 4,000 rpm 3 minutes by using the accelerator pedal.

### OK:

Heated oxygen sensor output voltage: Alternates from 0.4 V or less to 0.5 V or more.

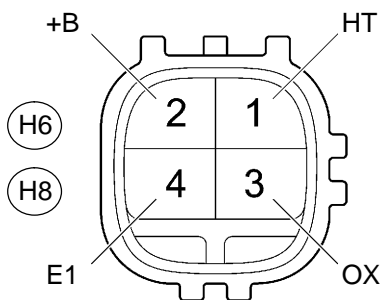
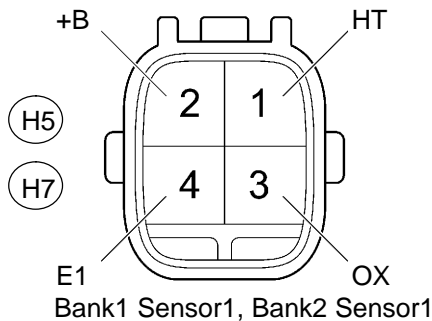
OK

Go to step 6.

NG

## 3 Check resistance of heated oxygen sensor heater.

### Components Side:



### PREPARATION:

Disconnect the H5, H6, H7 or H8 heated oxygen sensor connector.

### CHECK:

Measure resistance between terminals of the heated oxygen sensor.

### OK:

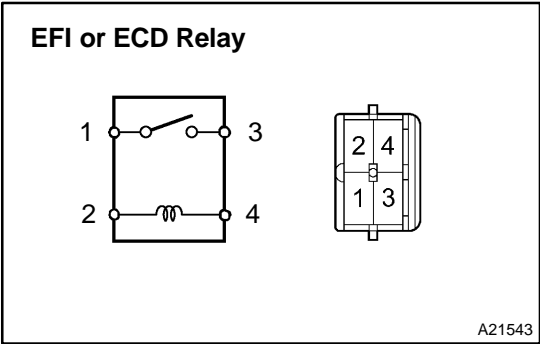
Tester Connection	Specified Condition
HT (H5-1) - +B (H5-2)	11 to 16 $\Omega$ (20°C)
HT (H6-1) - +B (H6-2)	11 to 16 $\Omega$ (20°C)
HT (H7-1) - +B (H7-2)	11 to 16 $\Omega$ (20°C)
HT (H8-1) - +B (H8-2)	11 to 16 $\Omega$ (20°C)

NG

Replace heated oxygen sensor.

OK

**4 Check EFI or ECD relay.**



**PREPARATION:**

Remove the EFI or ECD relay from the engine room R/B.

**CHECK:**

Inspect the EFI or ECD relay.

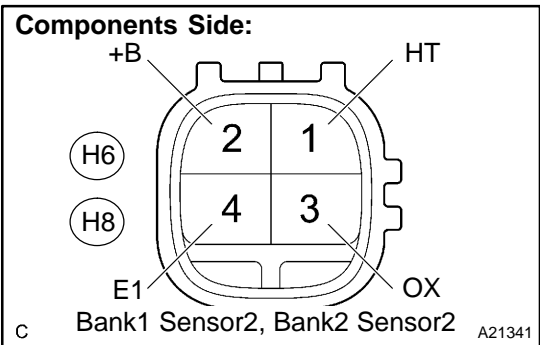
**OK:**

Terminal No.	Condition	Specified Condition
2 - 4	Constant	Continuity
1 - 3	Usually	No Continuity
	Apply B+ between terminals 2 and 4	Continuity

**NG** Replace EFI or ECD relay.

**OK**

**5 Check for open and short in harness and connector between ECM and heated oxygen sensor.**



**PREPARATION:**

(a) Disconnect the H6 or H8 heated oxygen sensor connector.

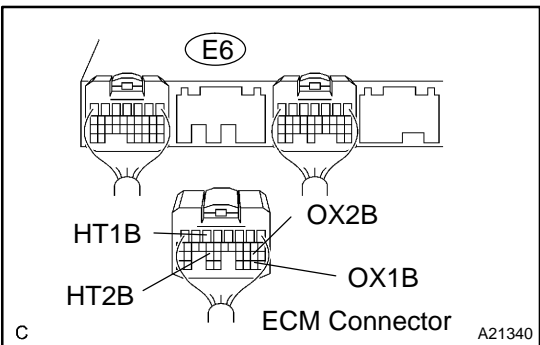
(b) Disconnect the E6 ECM connector.

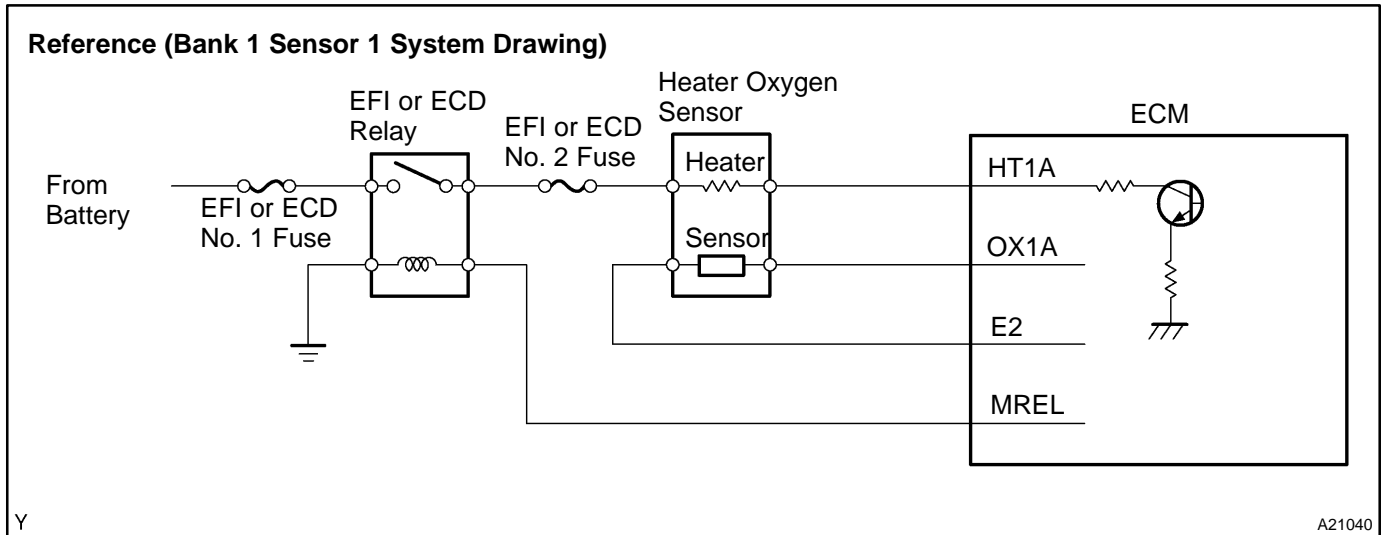
**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
OX (H6-3) - OX1B (E6-29)	Below 1 Ω
HT (H6-1) - HT1B (E6-5)	Below 1 Ω
OX (H8-3) - OX2B (E6-21)	Below 1 Ω
HT (H8-1) - HT2B (E6-25)	Below 1 Ω
OX (H6-3) or OX1B (E6-29) - Body ground	10 kΩ or higher
HT (H6-1) or HT1B (E6-5) - Body ground	10 kΩ or higher
OX (H8-3) or OX2B (E6-21) - Body ground	10 kΩ or higher
HT (H8-1) or HT2B (E6-25) - Body ground	10 kΩ or higher





**NG** → Repair or replace harness or connector.

**OK**

Replace heated oxygen sensor.

**6** Perform confirmation driving pattern.

HINT:  
Clear all DTCs prior to performing the confirmation driving pattern.

**Go**

**7** Is the DTC P0136 or P0156 being output again?

**NO** → Check for intermittent problems.

**YES**

Replace heated oxygen sensor.

<b>DTC</b>	<b>P0171</b>	<b>System too Lean (Bank 1)</b>
------------	--------------	---------------------------------

<b>DTC</b>	<b>P0172</b>	<b>System too Rich (Bank 1)</b>
------------	--------------	---------------------------------

<b>DTC</b>	<b>P0174</b>	<b>System too Lean (Bank 2)</b>
------------	--------------	---------------------------------

<b>DTC</b>	<b>P0175</b>	<b>System too Rich (Bank 2)</b>
------------	--------------	---------------------------------

## CIRCUIT DESCRIPTION

The fuel trim is related to the feedback compensation value, not to the basic injection time. The fuel trim includes the short-term fuel trim and the long-term fuel trim.

The short-term fuel trim is the short-term fuel compensation used to maintain the air-fuel ratio at stoichiometric air-fuel ratio. The signal from the heated oxygen sensor indicates whether the air-fuel ratio is RICH or LEAN compared to the stoichiometric air-fuel ratio. This variance triggers a reduction in the fuel volume if the air-fuel ratio is RICH, and an increase in the fuel volume if it is LEAN.

The long-term fuel trim is the overall fuel compensation carried out in long-term to compensate for a continual deviation of the short-term fuel trim from the central value, due to individual engine differences, wear over-time and changes in the operating environment.

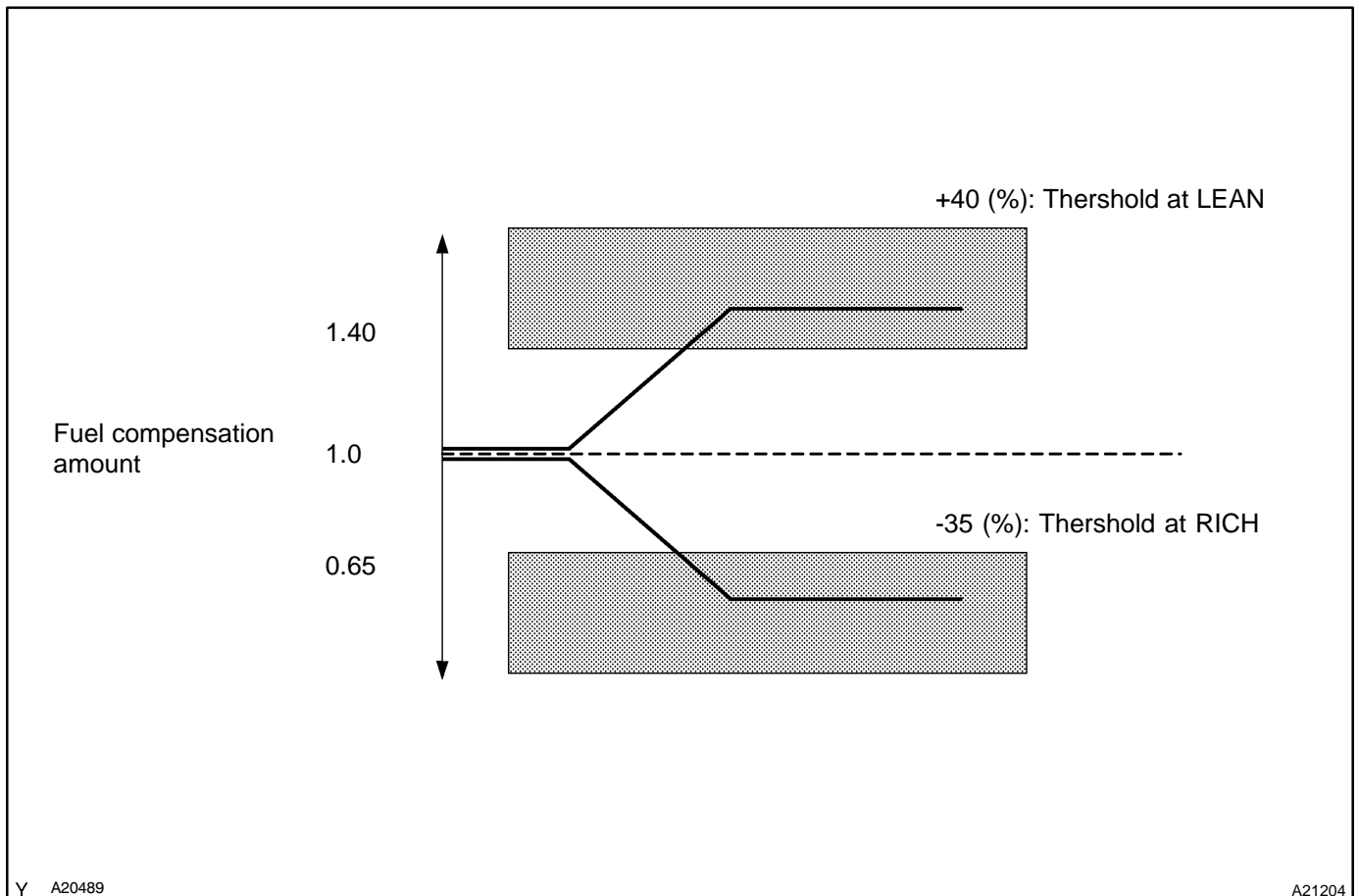
If both the short-term fuel trim and the long-term fuel trim are LEAN or RICH beyond a certain value, it is detected as a malfunction and the MIL is illuminated and a DTC is set.

DTC No.	DTC Detecting Condition	Trouble Area
P0171 P0174	When air-fuel ratio feedback is stable after warming up engine, fuel trim is considerably in error on LEAN side (2 trip detection logic)	<ul style="list-style-type: none"> <li>✧Air induction system</li> <li>✧Injector blockage</li> <li>✧Mass air flow meter</li> <li>✧Engine coolant temperature sensor</li> <li>✧Fuel pressure</li> <li>✧Gas leakage in exhaust system</li> <li>✧Open or short in heated oxygen sensor (bank 1, 2 sensor 1) circuit</li> <li>✧Heated oxygen sensor (bank 1, 2 sensor 1)</li> <li>✧Heated oxygen sensor heater (bank 1, 2 sensor 1)</li> <li>✧EFI or ECD relay</li> <li>✧PCV piping</li> <li>✧ECM</li> </ul>
P0172 P0175	When air-fuel ratio feedback is stable after warming up engine, fuel trim is considerably in error on RICH side (2 trip detection logic)	<ul style="list-style-type: none"> <li>✧Injector leak, blockage</li> <li>✧Mass air flow meter</li> <li>✧Engine coolant temperature sensor</li> <li>✧Ignition system</li> <li>✧Fuel pressure</li> <li>✧Gas leakage in exhaust system</li> <li>✧Open or short in heated oxygen sensor (bank 1, 2 sensor 1) circuit</li> <li>✧Heated oxygen sensor (bank 1, 2 sensor 1)</li> <li>✧ECM</li> </ul>

## HINT:

- \* When DTC P0171 or P0174 is recorded, the actual air-fuel ratio is on the LEAN side. When DTC P0172 or P0175 is recorded, the actual air-fuel ratio is on the RICH side.
- \* If the vehicle runs out of fuel, the air-fuel ratio is LEAN and DTC P0171 or P0174 may be recorded. The MIL then comes on.
- \* If the total of the short-term fuel trim value and long-term fuel trim value is within  $\pm 35\%$  (engine coolant temperature is more than  $75^{\circ}\text{C}$  ( $167^{\circ}\text{F}$ )), the system is functioning normally.

## MONITOR DESCRIPTION



Under closed-loop fuel control, fuel injection amounts that deviate from the ECM's estimated fuel amount will cause a change in the long-term fuel trim compensation value. This long-term fuel trim is adjusted when there are persistent deviations in the short-term fuel trim values. And the deviation from a simulated fuel injection amount by the ECM affects a smoothed fuel trim learning value. The smoothed fuel trim learning value is the combination of smoothed short term fuel trim (fuel feedback compensation value) and smoothed long term fuel trim (learning value of the air-fuel ratio). When the smoothed fuel trim learning value exceeds the DTC threshold, the ECM interprets this as a fault in the fuel system and sets a DTC.

## Example:

If the smoothed fuel trim learning value is more than +40% or less than -35% the ECM interprets this as a malfunction in the fuel system.

## MONITOR STRATEGY

Related DTCs	P0171	Fuel system lean (Bank 1)
	P0172	Fuel system rich (Bank 1)
	P0174	Fuel system lean (Bank 2)
	P0175	Fuel system rich (Bank 2)
Required sensors/components	Main sensors/components	Front oxygen sensor
	Related sensors/components	Engine coolant temperature sensor, Mass air flow meter, Crankshaft position sensor
Frequency of operation	Continuous	
Duration	10 sec.	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
Battery voltage	11 V	-
Fuel system: Closed loop	13 sec.	-
One of the following conditions is met:	A or B	
A. Engine speed	-	1,000 rpm
B. Intake air amount per revolution	0.26 g/sec.	-
Warm up condition to enable air fuel ratio learning control	Conditions are met	

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Following condition is continue for 3 sec.	A or B
A. Smoothed fuel trim learning value (Lean)	40% or more
B. Smoothed fuel trim learning value (Rich)	-35% or less

## WIRING DIAGRAM

Refer to DTC P0031 on page [DI-49](#) .

## INSPECTION PROCEDURE

HINT:

Hand-held tester only:

The narrowing down the trouble area is possible by performing ACTIVE TEST of the following "A/F CONTROL" (Heated oxygen sensor or another can be distinguished).

(a) Perform ACTIVE TEST by hand-held tester (A/F CONTROL).

HINT:

"A/F CONTROL" is the ACTIVE TEST which changes the injection volume to -12.5 % or +25 %.

- (1) Connect the hand-held tester to the DLC3 on the vehicle.
- (2) Turn the ignition switch ON.
- (3) Warm up the engine with the engine speed at 2,500 rpm for approximately 90 seconds.
- (4) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL".
- (5) Perform "A/F CONTROL" with the engine in an idle condition (press the right or left button).

### RESULT:

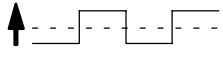
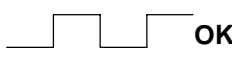
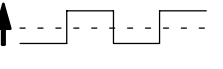
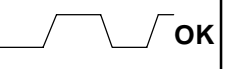
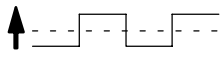

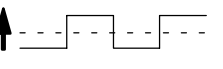
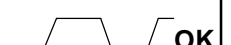
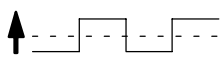

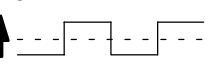

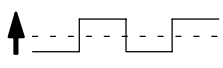

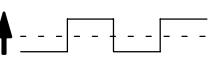

**Heated oxygen sensor reacts in accordance with increase and decrease of injection volume**

**+25 % → rich output: More than 0.5 V**

**-12.5 % → lean output: Less than 0.4 V**

### NOTICE:

**However, there is a few seconds delay in the sensor 1 (front sensor) output. And there is about 20 seconds delay in the sensor 2 (rear sensor).**

	Output voltage of heated oxygen sensor (sensor 1: front sensor)	Output voltage of heated oxygen sensor (sensor 2: rear sensor)	Mainly suspect trouble area
Case 1	Injection volume +25 % ↑  -12.5 % Output voltage More than 0.5 V  Less than 0.4 V <b>OK</b>	Injection volume +25 % ↑  -12.5 % Output voltage More than 0.5 V  Less than 0.4 V <b>OK</b>	—
Case 2	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Injection volume +25 % ↑  -12.5 % Output voltage More than 0.5 V  Less than 0.4 V <b>OK</b>	Sensor 1: front sensor (sensor 1, heater, sensor 1 circuit)
Case 3	Injection volume +25 % ↑  -12.5 % Output voltage More than 0.5 V  Less than 0.4 V <b>OK</b>	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Sensor 2: rear sensor (sensor 2, heater, sensor 2 circuit)
Case 4	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Injection volume +25 % ↑  -12.5 % Output voltage Almost no reaction  <b>NG</b>	Extremely rich or lean of the actual air-fuel ratio (Injector, fuel pressure, gas leakage in exhaust system, etc.)

The following A/F CONTROL procedure enables the technician to check and graph the voltage output of the heated oxygen sensors (sensor 1 and 2).

For displaying the graph indication, enter "ACTIVE TEST / A/F CONTROL / USER DATA" then select "O2S B1S1 and O2S B1S2" by pressing "YES" button and push "ENTER" button before pressing "F4" button.

HINT:

- \* If different DTCs related to different systems that have terminal E2 as the ground terminal, terminal E2 may be open.
- \* Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- \* A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air fuel mixture. Check for conditions that would cause the engine to run rich.
- \* A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air fuel mixture. Check for conditions that would cause the engine to run lean.

<b>1</b>	<b>Check air induction system (See page SF-1 ).</b>
----------	---

**CHECK:**

Check the air induction system for vacuum leaks.

<b>NG</b>	<b>Repair or replace air induction system.</b>
-----------	--

<b>OK</b>
-----------

<b>2</b>	<b>Check connection of PCV piping.</b>
----------	--

<b>NG</b>	<b>Repair or replace PCV piping.</b>
-----------	--------------------------------------

<b>OK</b>
-----------

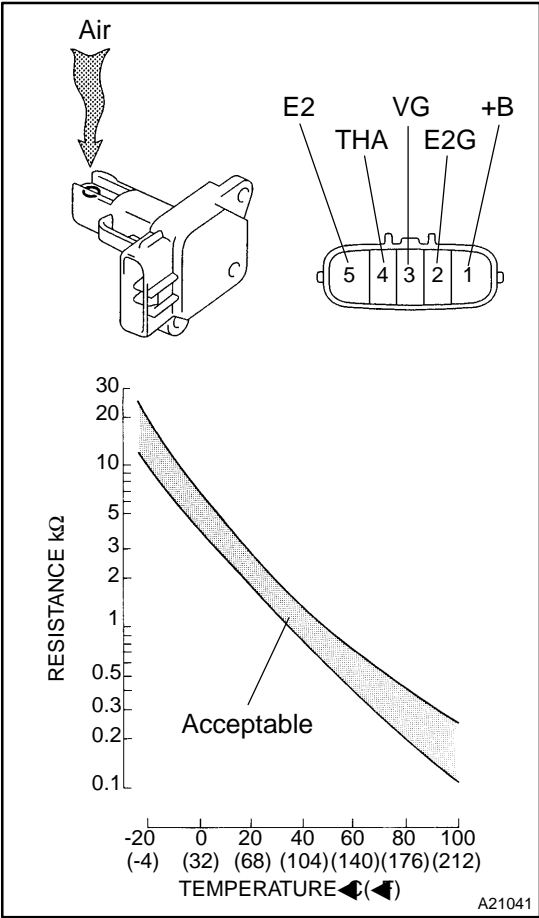
<b>3</b>	<b>Check injector injection (See page SF-24 ).</b>
----------	--

<b>NG</b>	<b>Replace injector.</b>
-----------	--------------------------

<b>OK</b>
-----------



**4 Check mass air flow meter.**



**PREPARATION:**

Remove the mass air flow meter.

**CHECK:**

- (a) Inspect output voltage.
  - (1) Apply battery voltage across terminals +B and E2G.
  - (2) Connect the positive (+) tester probe to terminal VG, and negative (-) tester probe to terminal E2G.
  - (3) Blow air into the mass air flow sensor, and check that the voltage fluctuates.
- (b) Inspect resistance.
  - (1) Measure the resistance between terminals of the intake air temperature sensor.

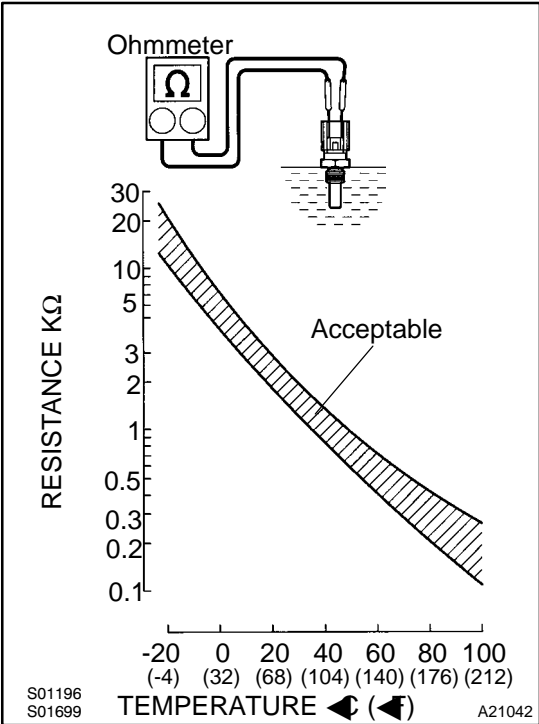
**Resistance:**

Tester Connection	Temperature	Specified Condition
THA (4) - E2 (5)	-20 (°C) (-4 (°F))	13.6 to 18.4 kΩ
	20 (°C) (68 (°F))	2.21 to 2.69 kΩ
	60 (°C) (140 (°F))	0.49 to 0.67 kΩ

**NG** Replace mass air flow meter.

**OK**

**5 Check engine coolant temperature sensor.**



**PREPARATION:**

Remove the engine coolant temperature sensor.

**CHECK:**

- (a) Measure the resistance between the terminals of the engine coolant temperature sensor.

**Resistance:**

Tester Connection	Specified Condition
1 - 2	2.32 to 2.59 kΩ (20°C (68°F))
	0.310 to 0.326 kΩ (80°C (176°F))

**NOTICE:**

**In case of checking the engine coolant temperature sensor in the water, be careful not to allow water to go into the terminals. After checking, dry the sensor.**

**HINT:**

Alternate procedure: Connect an ohmmeter to the installed engine coolant temperature sensor and read the resistance. Use an infrared thermometer to measure the engine temperature in the immediate vicinity of the sensor. Compare these values to the resistance/temperature graph. Change the engine temperature (warm up or allow to cool down) and repeat the test.

- (b) Reinstall the engine coolant temperature sensor.

**NG** → **Repair or replace engine coolant temperature sensor.**

**OK**

**6 Check for spark and ignition (See page IG-1).**

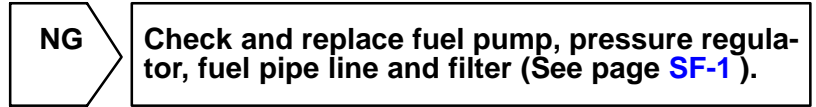
**NG** → **Repair or replace ignition system.**

**OK**

<b>7</b>	<b>Check fuel pressure (See page <a href="#">SF-7</a>).</b>
----------	---

**CHECK:**

Check the fuel pressure (high or low pressure).



<b>8</b>	<b>Check exhaust system for gas leakage.</b>
----------	--



**9 Check output voltage of heated oxygen sensor (bank 1, 2 sensor 1) during idling.**

**PREPARATION:**

- (a) Warm up the heated oxygen sensor with the engine speed at 2,500 rpm for approximately 90 seconds.
- (b) Connect the hand-held tester or OBD II scan tool to the DLC3.
- (c) When using hand-held tester, enter the following menu: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / O2S B1 S1 or B2 S1.

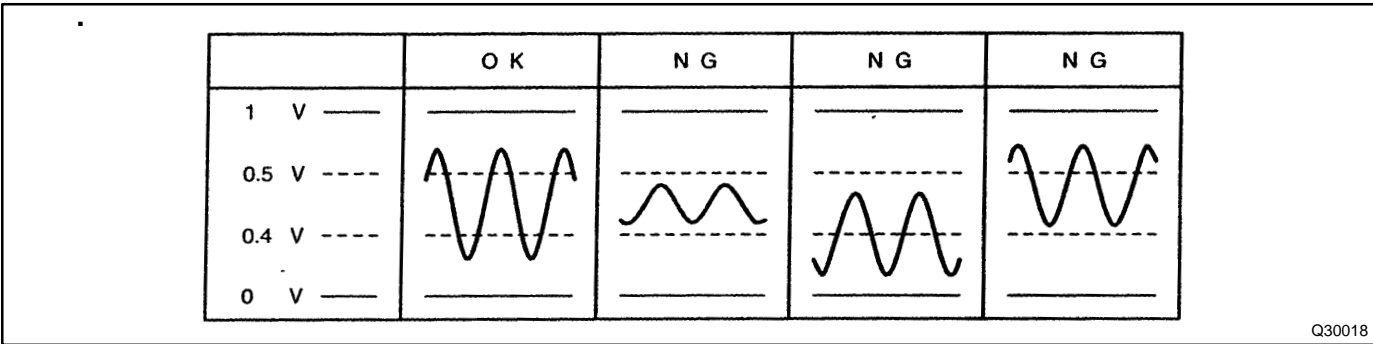
**CHECK:**

Check the output voltage of the heated oxygen sensor during idling using the OBD II scan tool or hand-held tester.

**OK:**

**Heated oxygen sensor output voltage:**

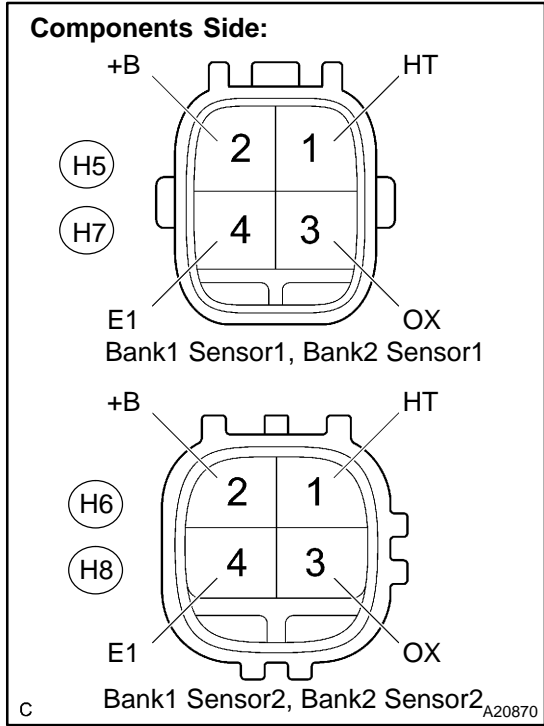
**Alternates between less than 0.4 V and more than 0.55 V (See the following table).**



**OK** → **Go to step 17.**

**NG**

**10 Check resistance of heated oxygen sensor heater.**



**PREPARATION:**

Disconnect the H5, H6, H7 or H8 heated oxygen sensor connector.

**CHECK:**

Measure resistance between terminals of the heated oxygen sensor.

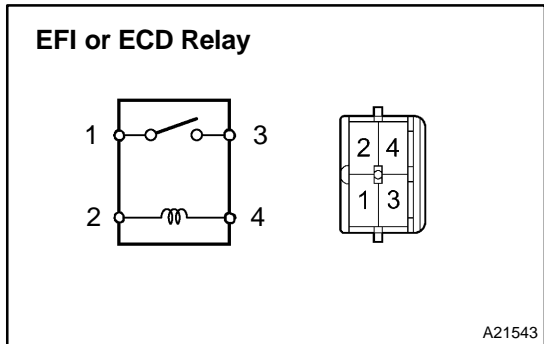
**OK:**

Tester Connection	Specified Condition
HT (H5-1) - +B (H5-2)	11 to 16 Ω (20°C)
HT (H6-1) - +B (H6-2)	11 to 16 Ω (20°C)
HT (H7-1) - +B (H7-2)	11 to 16 Ω (20°C)
HT (H8-1) - +B (H8-2)	11 to 16 Ω (20°C)

**OK**

**NG** Replace heated oxygen sensor.

**11 Check EFI or ECD relay.**



**PREPARATION:**

Remove the EFI or ECD relay from the engine room R/B.

**CHECK:**

Inspect the EFI or ECD relay.

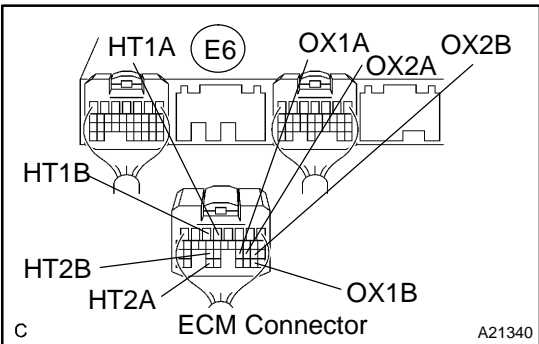
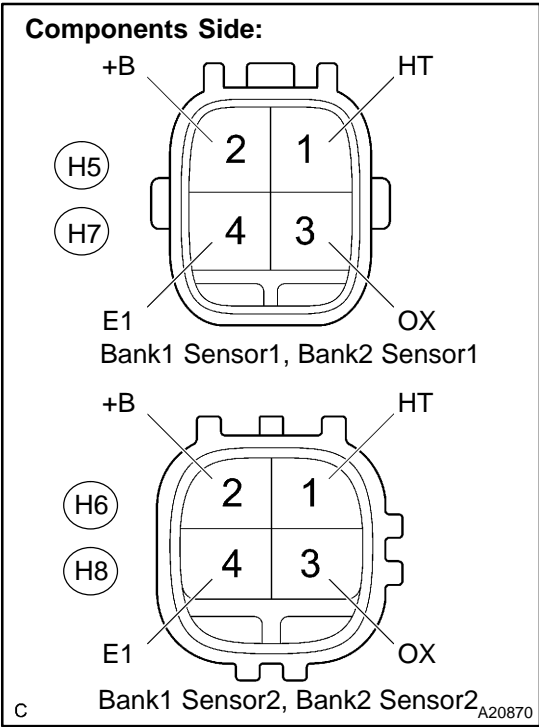
**OK:**

Terminal No.	Condition	Specified Condition
2 - 4	Constant	Continuity
1 - 3	Usually	No Continuity
	Apply B+ between terminals 2 and 4	Continuity

**OK**

**NG** Replace EFI or ECD relay.

**12 Check for open and short in harness and connector between ECM and heated oxygen sensor.**



**PREPARATION:**

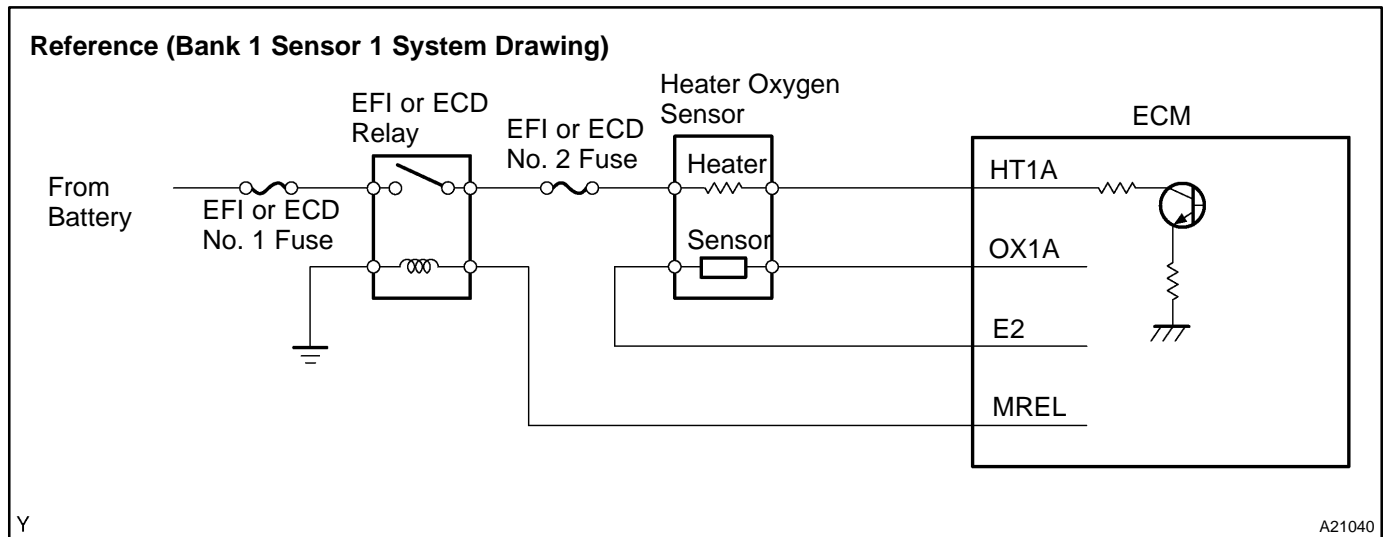
- (a) Disconnect the H5, H6, H7 or H8 heated oxygen sensor connector.
- (b) Disconnect the E6 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
OX (H5-3) - OX1A (E6-23)	Below 1 Ω
HT (H5-1) - HT1A (E6-4)	Below 1 Ω
OX (H6-3) - OX1B (E6-29)	Below 1 Ω
HT (H6-1) - HT1B (E6-5)	Below 1 Ω
OX (H7-3) - OX2A (E6-22)	Below 1 Ω
HT (H7-1) - HT2A (E6-33)	Below 1 Ω
OX (H8-3) - OX2B (E6-21)	Below 1 Ω
HT (H8-1) - HT2B (E6-25)	Below 1 Ω
OX (H5-3) or OX1A (E6-23) - Body ground	10 kΩ or higher
HT (H5-1) or HT1A (E6-4) - Body ground	10 kΩ or higher
OX (H6-3) or OX1B (E6-29) - Body ground	10 kΩ or higher
HT (H6-1) or HT1B (E6-5) - Body ground	10 kΩ or higher
OX (H7-3) or OX2A (E6-22) - Body ground	10 kΩ or higher
HT (H7-1) or HT2A (E6-33) - Body ground	10 kΩ or higher
OX (H8-3) or OX2B (E6-21) - Body ground	10 kΩ or higher
HT (H8-1) or HT2B (E6-25) - Body ground	10 kΩ or higher



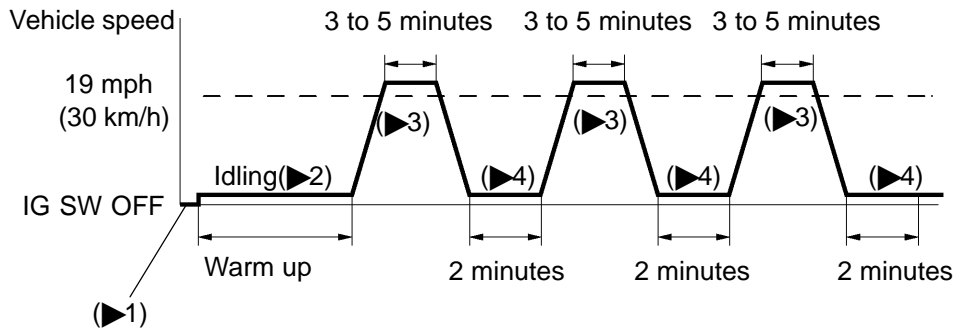
**NG** Replace or replace harness or connector.

**OK**

**13** Replace heated oxygen sensor.

**Go**

<b>14</b>	<b>Perform confirmation driving pattern.</b>
-----------	--



Y A09299

A21418

- (a) Disconnect the battery terminal and wait for a minute (clear learning value of the air fuel ratio). (▶1)
- (b) Connect the hand-held tester to the DLC3. (▶1)
- (c) Switch the hand-held tester from the normal mode to the check mode (See page [DI-3](#)). (▶1)
- (d) Start the engine and let it idle until engine coolant temperature is 75 °C (167 °F) or more. (▶2)
- (e) Drive the vehicle at 19 mph (30 km/h) or more for 3 minutes or more. (▶3)
- (f) Let the engine idle for approx. 2 minutes. (▶4)
- (g) Perform steps (e) and (g) at least 3 times.

HINT:

If a malfunction exists, the MIL will be illuminated during step (f).

**NOTICE:**

**If the conditions in this test are not strictly followed, detecting a malfunction may be difficult. If you do not have a hand-held tester, turn the ignition switch OFF after performing steps (e) to (f), and then do step (f) again.**

<b>GO</b>
-----------

<b>15</b>	<b>Is there DTC P0171, P0172, P0174 or P0175 being output again?</b>
-----------	--

<b>YES</b>
------------

Replace ECM (See page <a href="#">SF-60</a> ) and perform confirmation driving pattern (Refer to step 14).
--

<b>NO</b>
-----------



**16** Confirm if vehicle has run out of fuel in past.

**NO**

Check for intermittent problems  
(See page [DI-3](#) ).

**YES**

DTC P0171, P0172, P0174 or P0175 is caused by running out of fuel.

**17** Perform confirmation driving pattern.

HINT:

Clear all DTCs prior to performing the confirmation driving pattern (Refer to step 14).

**Go**

**18** Is there DTC P0171, P0172 P0174 and/or P0175 being output again?

**NO**

Go to step 22.

**YES**

**19** Replace heated oxygen sensor.

**Go**

**20** Perform confirmation driving pattern.

HINT:

Clear all DTCs prior to performing the confirmation driving pattern (Refer to step 14).

**Go**

21	Is the DTC P0171, P0172, P0174 and/or P0175 being output again?
----	---

**YES** → Replace ECM (See page [SF-60](#) ) and perform confirmation driving pattern (Refer to step 14).

**No**

22	Confirm if vehicle has run out of fuel in past.
----	---

**NO** → Check for intermittent problems. (See page [DI-3](#) ).

**YES**

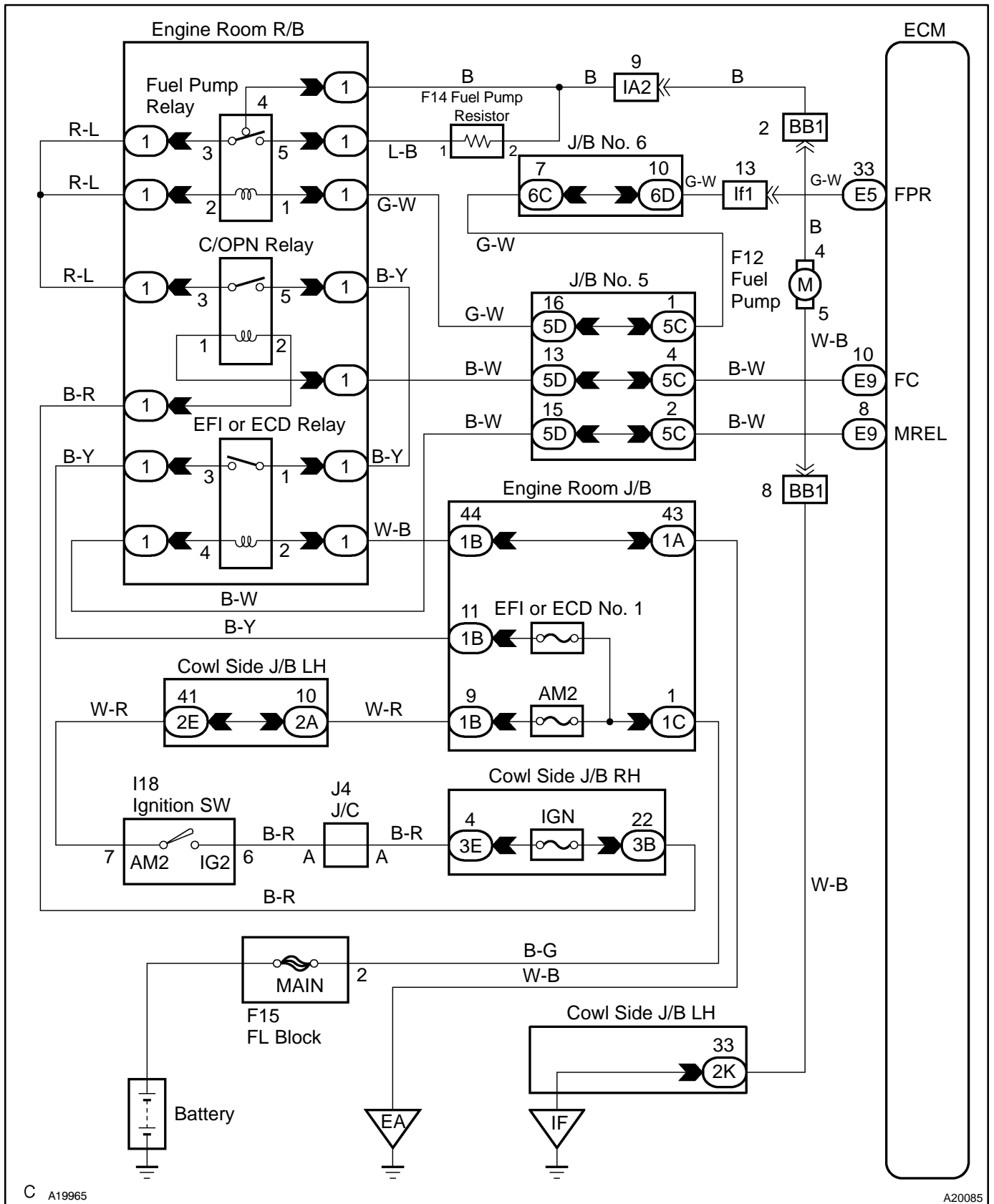
DTC is caused by running out of fuel (DTCs P0171, P0172 P0174 and/or P0175).



DIAGNOSTICS - ENGINE

DTC No.	DTC Detecting Condition	Trouble Area
P0230	Open or short in fuel pump relay circuit	▶ Open or short in fuel pump relay circuit ▶ Fuel pump relay ▶ Circuit opening relay ▶ Fuel pump ▶ ECM

WIRING DIAGRAM



HINT:

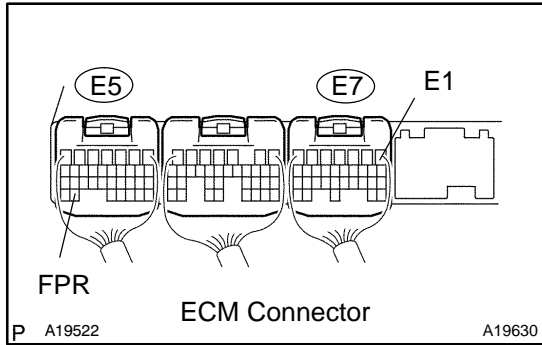
This diagnostic chart is based on premise that engine is started. If the engine is not started, proceed to problem symptoms table on [DI-48](#).

# INSPECTION PROCEDURE

**HINT:**

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

**1 Check voltage between terminal FPR and E1 of ECM.**



**CHECK:**

Measure the voltage between terminals of E5 and E7 ECM connectors.

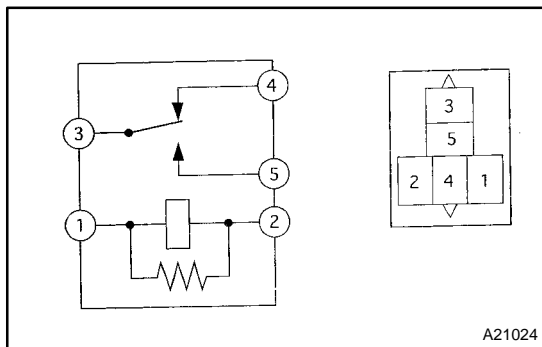
**OK:**

Tester Connection	Condition	Specified Condition
FPR (E5-33) - E1 (E7-1)	STA signal ON	9 to 14 V
FPR (E5-33) - E1 (E7-1)	STA signal OFF	0 to 3 V

**OK** Replace ECM (See page SF-60).

**NG**

**2 Check fuel pump relay.**



**PREPARATION:**

Remove the fuel pump relay from the engine room R/B.

**CHECK:**

Inspect the fuel pump relay.

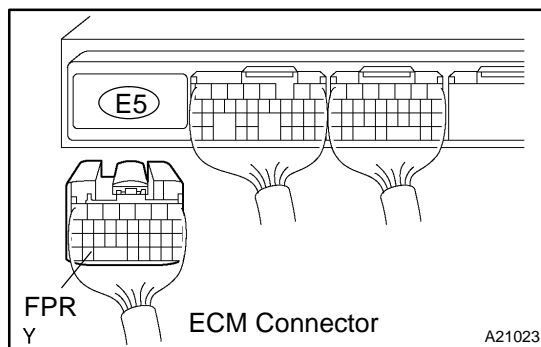
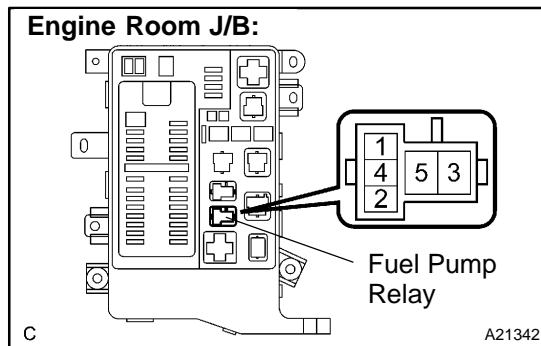
**OK:**

Tester Connection	Specified Condition
1 - 2	Continuity
3 - 4	Continuity
3 - 5	No continuity
3 - 5	Continuity (Apply battery voltage terminal 1 and 2)

**NG** Replace fuel pump relay.

**OK**

### 3 Check for open and short in harness and connector between fuel pump relay and ECM.



#### **PREPARATION:**

- Remove the fuel pump relay from the engine room J/B.
- Disconnect the E5 ECM connector.

#### **CHECK:**

Measure the resistance between wire harness side connectors.

#### **OK:**

Tester Connection	Specified Condition
Engine Room J/B (Fuel pump relay terminal 1) - FPR (E5-33)	Below 1 $\Omega$
Engine Room J/B (Fuel pump relay terminal 1) or FPR (E5-33) - Body ground	10 k $\Omega$ or higher

**NG**

**Repair or replace harness or connector.**

**OK**

**Replace ECM (See page SF-60 ).**

<b>DTC</b>	<b>P0300</b>	<b>Random/Multiple Cylinder Misfire Detected</b>
<b>DTC</b>	<b>P0301</b>	<b>Cylinder 1 Misfire Detected</b>
<b>DTC</b>	<b>P0302</b>	<b>Cylinder 2 Misfire Detected</b>
<b>DTC</b>	<b>P0303</b>	<b>Cylinder 3 Misfire Detected</b>
<b>DTC</b>	<b>P0304</b>	<b>Cylinder 4 Misfire Detected</b>
<b>DTC</b>	<b>P0305</b>	<b>Cylinder 5 Misfire Detected</b>
<b>DTC</b>	<b>P0306</b>	<b>Cylinder 6 Misfire Detected</b>
<b>DTC</b>	<b>P0307</b>	<b>Cylinder 7 Misfire Detected</b>
<b>DTC</b>	<b>P0308</b>	<b>Cylinder 8 Misfire Detected</b>

## CIRCUIT DESCRIPTION

When a misfire occurs in the engine, hydrocarbons (HC) enter the exhaust in high concentrations. If this HC concentration is high enough, there could be an increase in exhaust emissions levels. High concentrations of HC can also cause to temperature of the catalyst to increase, possibly damaging the catalyst. To prevent this increase in emissions and limit the possibility of thermal damage, the ECM monitors the misfire rate. When the temperature of the catalyst reaches a point of thermal degradation, the ECM will blink the MIL. For monitoring misfire, the ECM uses both the camshaft position sensor and the crankshaft position sensor. The camshaft position sensor is used to identify misfiring cylinders and the crankshaft position sensor is used to measure variations in the crankshaft rotation speed. The misfire counter increments when crankshaft rotation speed variations exceed threshold values.

If the misfiring rate exceeds the threshold value and could cause emissions deterioration, the ECM illuminates the MIL.



DTC No.	DTC Detecting Condition	Trouble Area
P0300	Misfiring of random cylinders is detected	<ul style="list-style-type: none"> <li>▶ Open or short in engine wire</li> <li>▶ Connector connection</li> <li>▶ Vacuum hose connection</li> </ul>
P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	Misfiring of each cylinder is detected	<ul style="list-style-type: none"> <li>▶ Ignition system</li> <li>▶ Injector</li> <li>▶ Fuel pressure</li> <li>▶ Mass air flow meter</li> <li>▶ Engine coolant temperature sensor</li> <li>▶ Compression pressure</li> <li>▶ Valve clearance</li> <li>▶ Valve timing</li> <li>▶ PCV piping</li> <li>▶ ECM</li> </ul>

**HINT:**

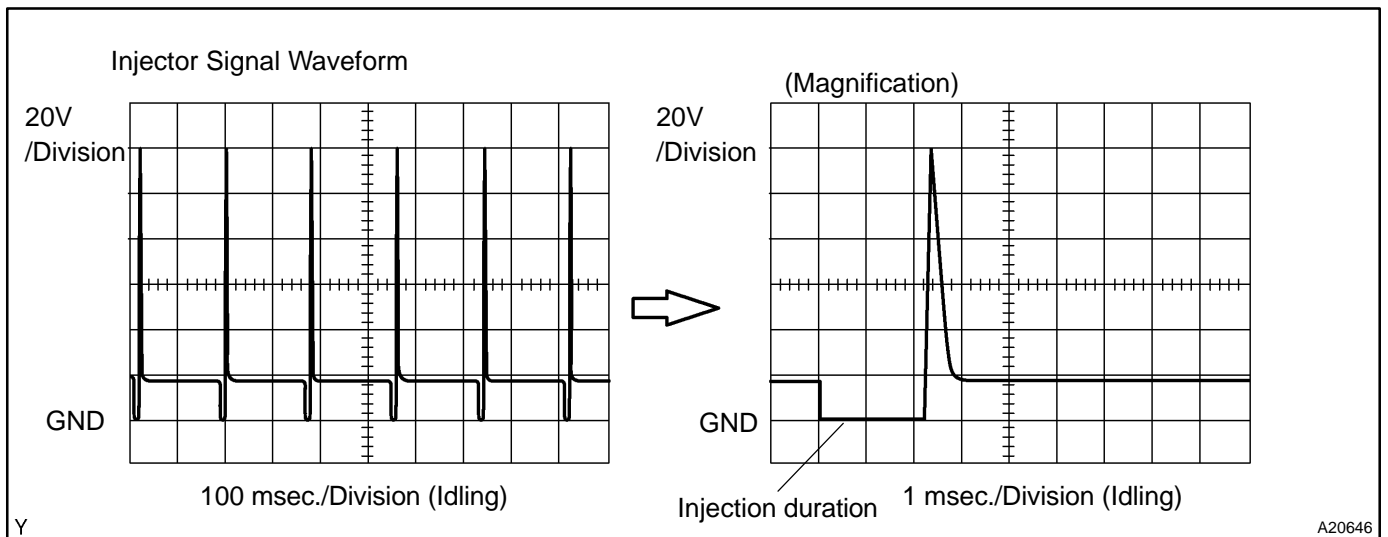
When several codes for a misfiring cylinder are recorded repeatedly but no random misfire code is recorded, it indicates that the misfires have been detected and recorded at different times.

Reference: Inspection using the oscilloscope.

With the engine idling, check the waveform between terminals #1 to #8 and E01 of the ECM connectors.

**HINT:**

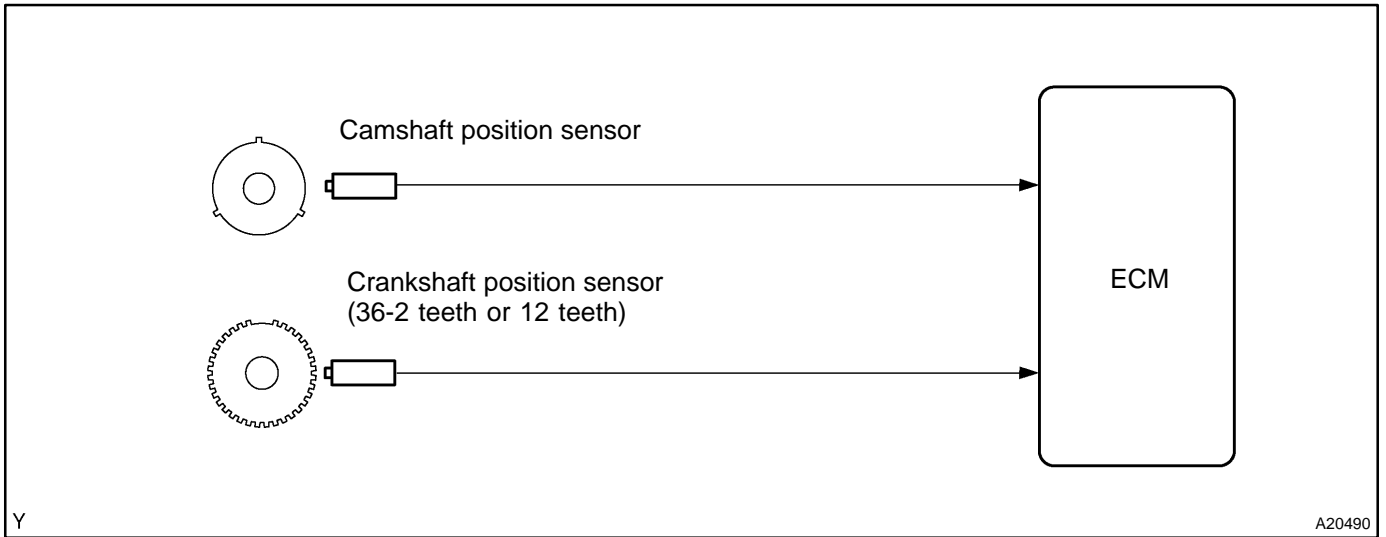
The correct waveform is as shown.



Y

A20646

**MONITOR DESCRIPTION**



The ECM illuminates the MIL (2 trip detection logic) if:

The ECM will illuminate the MIL when the percent misfire exceeds the specified limit per 1,000 engine revolutions. One occurrence of excessive misfire during engine start will set the MIL. Four occurrences are required to set the MIL 1,000 revolutions after engine start.

The ECM blinks the MIL (MIL blinks immediately) if:

- ▶ Within 200 engine revolutions at a high rpm, the threshold for "percent of misfire causing catalyst damage" is reached 1 time.
- ▶ Within 200 engine revolutions at a normal rpm, the threshold for "percent of misfire causing catalyst damage" is reached 3 time.

**MONITOR STRATEGY**

Related DTCs	P0300	Random/Multiple cylinder misfire detected
	P0301	Cylinder 1 misfire detected
	P0302	Cylinder 2 misfire detected
	P0303	Cylinder 3 misfire detected
	P0304	Cylinder 4 misfire detected
	P0305	Cylinder 5 misfire detected
	P0306	Cylinder 6 misfire detected
	P0307	Cylinder 7 misfire detected
	P0308	Cylinder 8 misfire detected
Required sensors/components	Main sensors/components	Camshaft position sensor, Crankshaft position sensor
	Related sensors/components	Engine coolant temperature sensor, Intake air temperature sensor, Throttle position sensor
Frequency of operation	Continuous	
Duration	Every 1,000 revolutions (soon after engine is started: 1 time, other 4 times) (emission related misfire) Every 200 revolutions (1 or 3 times) (catalyst deteriorating misfire)	
MIL operation	2 driving cycles MIL ON Immediate MIL blinking (Catalyst deteriorating misfire)	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

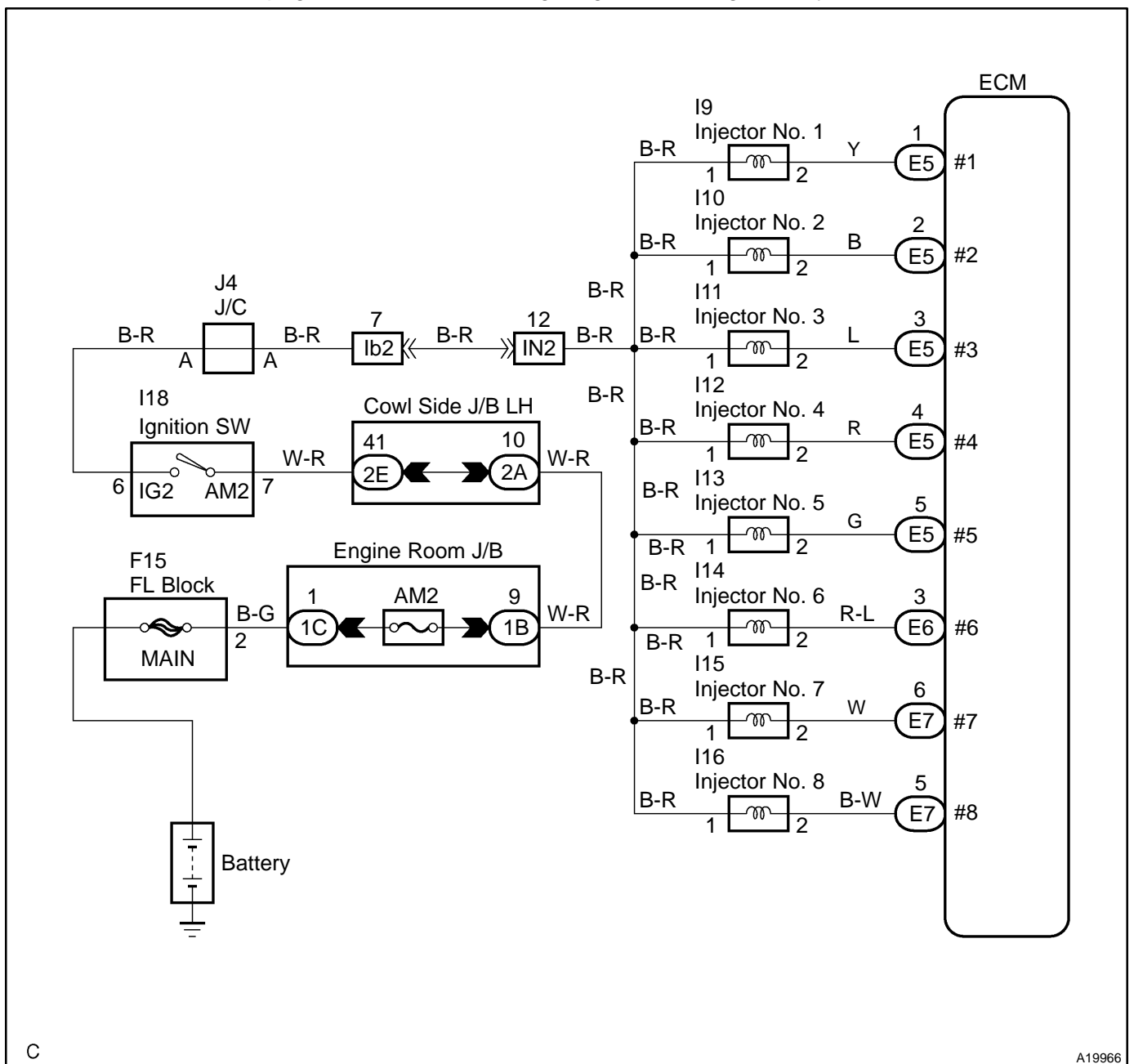
Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
Battery voltage	8 V	-
VVT	Normal operation (i. e. not under scan-tool control)	
Engine speed fluctuation	Engine speed should not have changed rapidly	
Engine speed (Two full revolutions (2 rev.) after engine has started)	400 rpm	5,300 rpm
All of the following conditions are met:	A, B and C	
A. Engine coolant temperature	-10 :C (14:F)	-
B. Either of the following conditions is met:	(a) or (b)	
(a) Intake air temperature	-10 :C (14:F)	-
(b) Engine coolant temperature	75:C (167:F)	-
C. Either of the following conditions is met:	(a) or (b)	
(a) Engine coolant temperature at engine started	-7 :C (19:F)	-
(b) Engine coolant temperature	20:C (68:F)	-
Intake air amount per revolution (varies with engine speed)	0.4 g/rev.	-
Throttle position learning	Completed	
Throttle position	Rapid throttle opening or closing operation has not occurred	
	-	Changing value of throttle position Less than 0.5:per 0.008 sec.
Rough road counter	-	14 times/1,000 revolutions (Not running on rough road)
<b>For paired cylinder misfire (6 or 8 cylinders):</b>		
When ECT is between -10:C (14:F) and 75:C (167:F), the following conditions are met:	A and B	
A. Engine speed	-	3,000 rpm
B. Intake air amount per revolution at 1,800 rpm (varies with engine speed)	0.7 g/sec.	-
When ECT is over 75:C (167:F), the following conditions are met:	A or (B and C)	
A. NE signal plate tooth width learning was not completed		
B. Engine speed	-	3,000 rpm
C. Intake air amount per revolution at 1,800 rpm (varies with engine speed)	0.7 g/sec.	-

### TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Emission related misfire rate: 1. During the first 1,000 revolutions after engine start (MIL is set when misfire is detected 1 time) 2. After the first 1,000 revolutions have occurred (MIL is set when misfire is detected 4 times)	3 %/1,000 revolutions
Catalyst damage misfire count: 1. Low engine rpm area (ex. less than 3,000 rpm): 200 revolutions (MIL is set when misfire is detected 3 times) 2. High engine rpm area: Every 200 revolutions	96 count/200 revolutions (Threshold varies with engine speed and intake air amount per revolution)

### WIRING DIAGRAM

Refer to DTC P0351 on page DI-202 for the wiring diagram of the ignition system.



C

A19966

## CONFIRMATION DRIVING PATTERN

- (a) Connect the hand-held tester to the DLC3.
- (b) Record DTC and the freeze frame data.
- (c) Use the hand-held tester to set to the check mode (See page [DI-3](#)).
- (d) Read the value on the misfire counter for each cylinder when idling. If the value is displayed on the misfire counter, skip the following procedure of confirmation driving.
- (e) Drive the vehicle several times with the engine speed, load and its surrounding range shown with ENGINE SPD, CALC LOAD in the freeze frame data or MISFIRE RPM, MISFIRE LOAD in the DATA LIST. If you have no hand-held tester, turn the ignition switch OFF after the symptom is simulated once. Then repeat the simulation process again.

### HINT:

In order to memorize the DTC of misfire, it is necessary to drive around MISFIRE RPM, MISFIRE LOAD in the DATA LIST for the following period of time. Take care not to turn the ignition switch OFF. Turning the ignition switch OFF switches the diagnosis system from check mode to normal mode. So all DTCs, etc., are erased.

Engine Speed	Time
Idling	3 minutes 30 seconds or more
1,000 rpm	3 minutes or more
2,000 rpm	1 minute 30 seconds or more
3,000 rpm	1 minute or more

- (f) Check if there is misfire and DTC and the freeze frame data. Record the DTC's, freeze frame data and misfire counter data.
- (g) Turn the ignition switch OFF and wait at least 5 seconds.

## INSPECTION PROCEDURE

### HINT:

- ▶ If DTCs besides misfire DTCs are memorized simultaneously, troubleshoot the non-misfire DTCs first.
- ▶ If the misfire does not occur when the vehicle is brought to the workshop, the misfire can be confirmed by reproducing the condition of the freeze frame data. Also, after finishing the repair, confirm that there is no misfire (See confirmation driving pattern).
- ▶ On 6 and 8 cylinder engines, misfiring cylinder identification is disabled at high engine speed and only a general misfire fault code P0300 is stored instead of a cylinder specific misfire fault code (P0301 to P0308).

If the misfire starts in a high engine speed area or the misfire occurs only in a high engine speed area, only code P0300 may be stored.

When only a general misfire fault code like P0300 is stored:

- ▶ Erase the general misfire fault code from the hand-held tester or OBD II scan tool.
- ▶ Start the engine and drive the confirmation pattern.
- ▶ Read the value of the misfire ratio for each cylinder. Or read the DTC.
- ▶ Perform repairs on the cylinder that has a high misfire ratio. Or repair the cylinder indicated by the DTC.
- ▶ After finishing repairs, drive the confirmation pattern again and confirm that no misfire occurs.
- ▶ When either of SHORT FT #1, LONG FT #1, SHORT FT #2 or LONG FT #2 in the freeze frame data is over the range of  $\pm 20\%$ , there is a possibility that the air-fuel ratio is becoming RICH ( $-20\%$  or less) or LEAN ( $+20\%$  or more).
- ▶ When COOLANT TEMP in the freeze frame data is less than  $80^{\circ}\text{C}$  ( $176^{\circ}\text{F}$ ), there is a possibility of misfire only during engine warm-up.
- ▶ If the misfire cannot be reproduced, the following reasons may apply: 1) the vehicle has low fuel, 2) improper fuel is being used, and 3) the ignition plug is contaminated.

► Be sure to check the value on the misfire counter after the repair.

**1** Are there any other codes (besides DTC P0300, P0301, P0302, P0303, P0304 P0305, P0306, P0307 or P0308) being output?

**PREPARATION:**

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

**CHECK:**

Read the DTC using hand-held tester or the OBD II scan tool.

**RESULT:**

Display (DTC Output)	Proceed to
"P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307 and/or P0308"	A
"P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307 or P0308" and other DTCs	B

**HINT:**

If any other codes besides "P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307 or P0308" are output, perform the troubleshooting for those DTC.

**B** → Go to relevant DTC chart (See page [DI-36](#) ).

**A**

**2** Check wire harness, connector and vacuum hose in engine room.

**CHECK:**

- (a) Check the connection conditions of the wire harness and connector.
- (b) Check for the disconnection, piping and brake of the vacuum hose.

**NG** → Repair or replace, then confirm that there is no misfire (See confirmation driving pattern).

**OK**

**3** Check connection of PCV piping.

**NG** → Repair or replace PCV piping.

**OK**

<b>4</b>	<b>Connect hand-held tester, and read the number of misfire.</b>
----------	--

**PREPARATION:**

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or the OBD II scan tool main switch ON.
- (c) Start the engine.
- (d) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / CYL#1 to CYL#8.

**CHECK:**

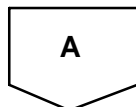
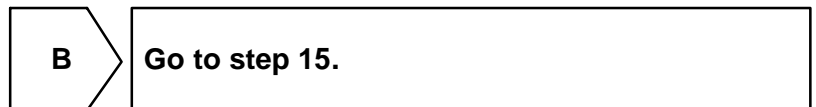
Read the number of misfire on the hand-held tester or the OBD II scan tool.

**HINT:**

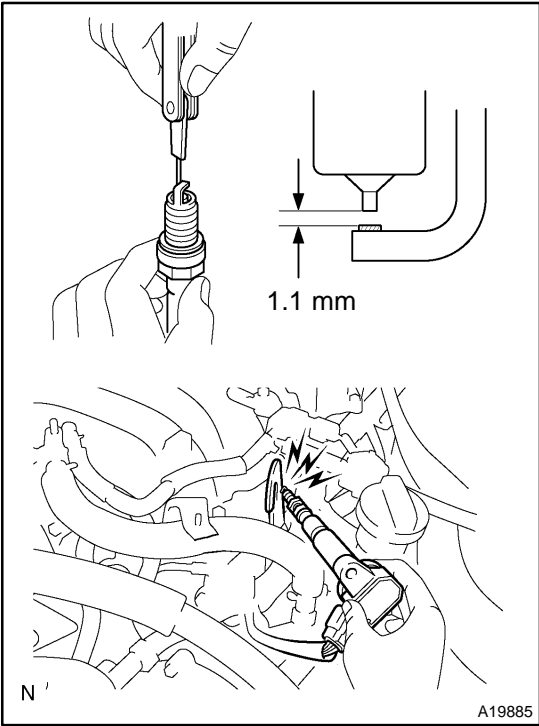
When a misfire is not reproduced, be sure to branch below based on the stored DTC.

**RESULT:**

High Misfire Rate Cylinder	Proceed to
1 or 2 cylinders	A
More than 3 cylinders	B



**5 Check spark plug and spark of misfiring cylinder.**



**PREPARATION:**

- (a) Remove the ignition coil assembly.
- (b) Remove the spark plug.

**CHECK:**

- (a) Check the electrode for carbon deposits.
- (b) Check the spark plug type (See page IG-1 ).
- (c) Check electrode gap.

**OK:**

**No large carbon deposit present.**

**Not wet with gasoline or oil.**

**Electrode gap: 1.0 to 1.3 mm (0.039 to 0.051 in.)**

**NOTICE:**

**If adjusting the gap of a new spark plug, bend only "the base / ground" electrode. Do not touch the tip. Never attempt to adjust the gap on a used plug.**

**PREPARATION:**

- (a) Install the spark plug to the ignition coil assembly.
- (b) Disconnect the injector connector.
- (c) Ground spark plug.

**CHECK:**

Check if spark occurs while engine is being cranked.

**CAUTION:**

**Always disconnect each injector connector.**

**NOTICE:**

**Do not crank the engine for more than 2 seconds.**

**OK:**

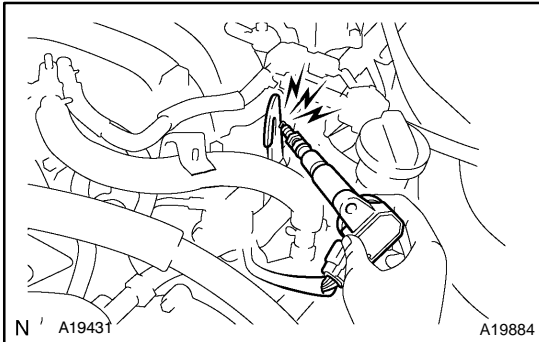
**Spark occurs across electrode gap.**

<b>OK</b>	<b>Go to step 8.</b>
-----------	----------------------

**NG**



<b>6</b>	<b>Change normal spark plug and check spark of misfiring cylinder.</b>
----------	--

**PREPARATION:**

- (a) Change to the normal spark plug.
  - (1) Remove the spark plug that may be faulty from the ignition coil assembly.
  - (2) Install the spark plug to the ignition coil assembly.
- (b) Disconnect the injector connector.
- (c) Ground the spark plug.

**CHECK:**

Check if spark occurs while the engine is being cranked.

**CAUTION:**

**Always disconnect each injector connector.**

**NOTICE:**

**Do not crank the engine for more than 2 seconds.**

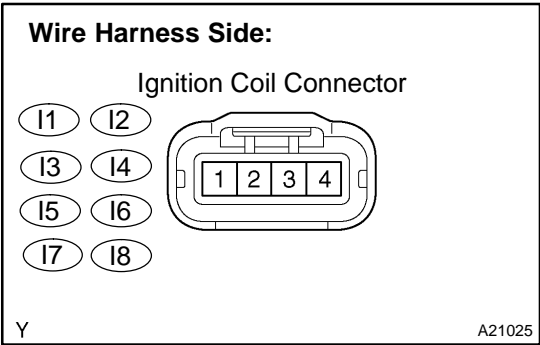
**OK:**

**Spark jumps across electrode gap.**

<b>OK</b>	<b>Replace spark plug.</b>
-----------	----------------------------

<b>NG</b>
-----------

**7 Check for open and short in harness and connector between ignition coil and ECM.**



**Check the harness and connector between the ignition coil and the ECM (IGF terminal) connectors:**

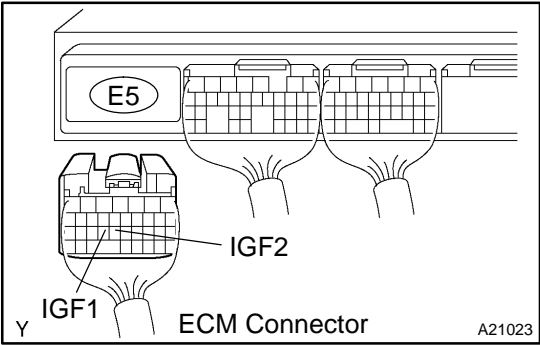
**PREPARATION:**

- (a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- (b) Disconnect the E5 ECM connector.

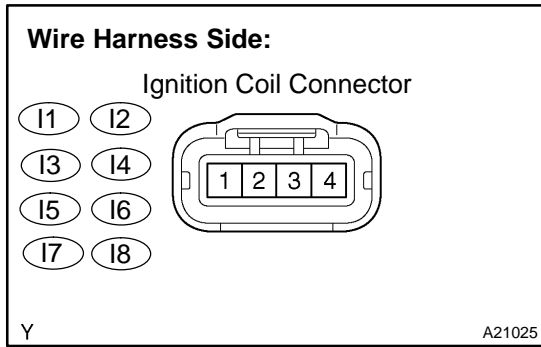
**CHECK:**

Check the resistance between the wire harness side connectors.

**OK:**



Tester Connection	Specified Condition
Ignition coil (I1-2) - IGF1 (E5-24)	Below 1 Ω
Ignition coil (I2-2) - IGF2 (E5-23)	Below 1 Ω
Ignition coil (I3-2) - IGF1 (E5-24)	Below 1 Ω
Ignition coil (I4-2) - IGF2 (E5-23)	Below 1 Ω
Ignition coil (I5-2) - IGF1 (E5-24)	Below 1 Ω
Ignition coil (I6-2) - IGF2 (E5-23)	Below 1 Ω
Ignition coil (I7-2) - IGF1 (E5-24)	Below 1 Ω
Ignition coil (I8-2) - IGF2 (E5-23)	Below 1 Ω
Ignition coil (I1-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
Ignition coil (I2-2) or IGF2 (E5-23) - Body ground	10 kΩ or higher
Ignition coil (I3-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
Ignition coil (I4-2) or IGF2 (E5-23) - Body ground	10 kΩ or higher
Ignition coil (I5-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
Ignition coil (I6-2) or IGF2 (E5-23) - Body ground	10 kΩ or higher
Ignition coil (I7-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
Ignition coil (I8-2) or IGF2 (E5-23) - Body ground	10 kΩ or higher



**Check the harness and connector between the ignition coil and the ECM (IGT terminal) connectors:**

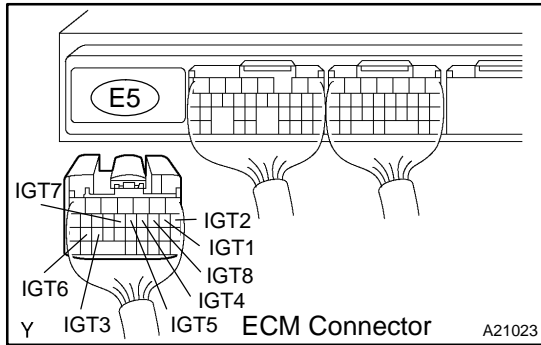
**PREPARATION:**

- (a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- (b) Disconnect the E5 ECM connector.

**CHECK:**

Check the resistance between the wire harness side connectors.

**OK:**



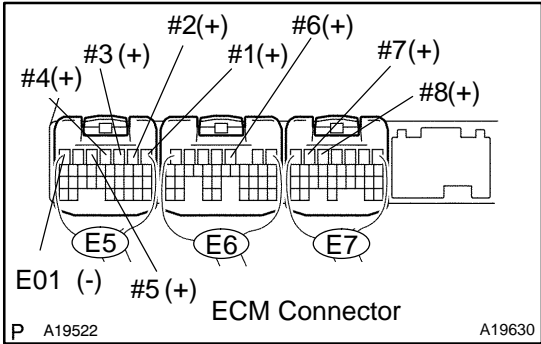
Tester Connection	Specified Condition
Ignition coil (I1-3) - IGT1 (E5-9)	Below 1 Ω
Ignition coil (I2-3) - IGT2 (E5-8)	Below 1 Ω
Ignition coil (I3-3) - IGT3 (E5-25)	Below 1 Ω
Ignition coil (I4-3) - IGT4 (E5-11)	Below 1 Ω
Ignition coil (I5-3) - IGT5 (E5-12)	Below 1 Ω
Ignition coil (I6-3) - IGT6 (E5-26)	Below 1 Ω
Ignition coil (I7-3) - IGT7 (E5-13)	Below 1 Ω
Ignition coil (I8-3) - IGT8 (E5-10)	Below 1 Ω
Ignition coil (I1-3) or IGT1 (E5-9) - Body ground	10 kΩ or higher
Ignition coil (I2-3) or IGT2 (E5-8) - Body ground	10 kΩ or higher
Ignition coil (I3-3) or IGT3 (E5-25) - Body ground	10 kΩ or higher
Ignition coil (I4-3) or IGT4 (E5-11) - Body ground	10 kΩ or higher
Ignition coil (I5-3) or IGT5 (E5-12) - Body ground	10 kΩ or higher
Ignition coil (I6-3) or IGT6 (E5-26) - Body ground	10 kΩ or higher
Ignition coil (I7-3) or IGT7 (E5-13) - Body ground	10 kΩ or higher
Ignition coil (I8-3) or IGT8 (E5-10) - Body ground	10 kΩ or higher

**OK** Replace ignition coil with igniter, then confirm that there is no misfire.

**NG**

Repair or replace harness or connector.

**8 Check ECM terminal of misfiring cylinder.**



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between the terminals of the E5, E6 and E7 ECM connectors.

**OK:**

Tester Connection	Specified Condition
#1 (E5-1) - E01 (E5-7)	9 to 14 V
#2 (E5-2) - E01 (E5-7)	9 to 14 V
#3 (E5-3) - E01 (E5-7)	9 to 14 V
#4 (E5-4) - E01 (E5-7)	9 to 14 V
#5 (E5-5) - E01 (E5-7)	9 to 14 V
#6 (E6-3) - E01 (E5-7)	9 to 14 V
#7 (E7-6) - E01 (E5-7)	9 to 14 V
#8 (E7-5) - E01 (E5-7)	9 to 14 V

**OK** Go to step 11.

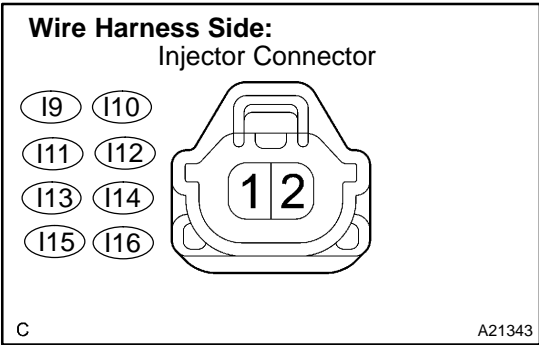
**NG**

**9 Check injector resistance of misfiring cylinder (See page SF-19).**

**NG** Replace injector.

**OK**

**10 Check for open and short in harness and connector between ignition SW and injector, injector and ECM of misfiring cylinder.**



**Check the harness and the connector between the injector connector and the ECM connector:**

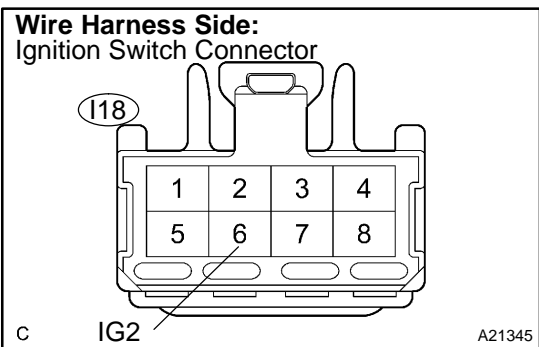
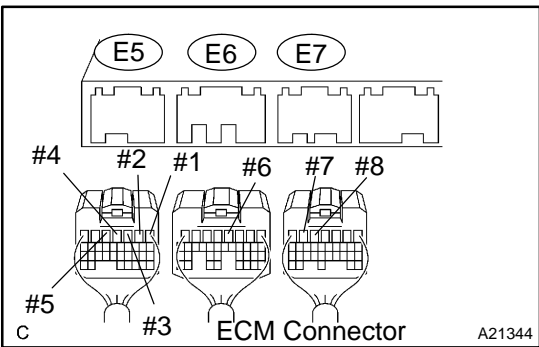
**PREPARATION:**

- (a) Disconnect the I9, I10, I11, I12, I13, I14, I15 or I16 injector connector.
- (b) Disconnect the E5, E6 or E7 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**



Tester Connection	Specified Condition
Injector (I9-2) - #1 (E5-1)	Below 1 Ω
Injector (I10-2) - #2 (E5-2)	Below 1 Ω
Injector (I11-2) - #3 (E5-3)	Below 1 Ω
Injector (I12-2) - #4 (E5-4)	Below 1 Ω
Injector (I13-2) - #5 (E5-5)	Below 1 Ω
Injector (I14-2) - #6 (E6-3)	Below 1 Ω
Injector (I15-2) - #7 (E7-6)	Below 1 Ω
Injector (I16-2) - #8 (E7-5)	Below 1 Ω
Injector (I9-2) or #1 (E5-1) - Body ground	10 kΩ or higher
Injector (I10-2) or #2 (E5-2) - Body ground	10 kΩ or higher
Injector (I11-2) or #3 (E5-3) - Body ground	10 kΩ or higher
Injector (I12-2) or #4 (E5-4) - Body ground	10 kΩ or higher
Injector (I13-2) or #5 (E5-5) - Body ground	10 kΩ or higher
Injector (I14-2) or #6 (E6-3) - Body ground	10 kΩ or higher
Injector (I15-2) or #7 (E7-6) - Body ground	10 kΩ or higher
Injector (I16-2) or #8 (E7-5) - Body ground	10 kΩ or higher

**Check the harness and connector between the injector connector and the ignition switch:**

**PREPARATION:**

- (a) Disconnect the I9, I10, I11, I12, I13, I14, I15 or I16 injector connector.
- (b) Disconnect the I18 ignition switch connector.

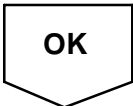
**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
Injector (I9-1) - IG2 (I18-6)	Below 1 Ω
Injector (I10-1) - IG2 (I18-6)	Below 1 Ω
Injector (I11-1) - IG2 (I18-6)	Below 1 Ω
Injector (I12-1) - IG2 (I18-6)	Below 1 Ω
Injector (I13-1) - IG2 (I18-6)	Below 1 Ω
Injector (I14-1) - IG2 (I18-6)	Below 1 Ω
Injector (I15-1) - IG2 (I18-6)	Below 1 Ω
Injector (I16-1) - IG2 (I18-6)	Below 1 Ω
Injector (I9-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I10-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I11-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I12-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I13-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I14-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I15-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Injector (I16-1) or IG2 (I18-6) - Body ground	10 kΩ or higher

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--



**11** Check injector injection of misfiring cylinder (See page [SF-24](#) ).

**NG**

Replace injector.

**OK**

**12** Check compression pressure of misfiring cylinder (See page [EM-3](#) ).

**NG**

Repair or replace.

**OK**

**13** Check valve clearance of misfiring cylinder (See page [EM-4](#) ).

**NG**

Adjust valve clearance.

**OK**

**14** Check result of step 4 switch step by number of misfire cylinder.

High misfire rate cylinder	Proceed to
1 or 2 cylinders	A
More than 3 cylinders	B

**B**

Check for intermittent problems  
(See page [DI-3](#) ).

**A**

<b>15</b>	<b>Check valve timing (Check for looseness or a jumped tooth of timing belt) (See page <a href="#">EM-22</a> ).</b>
-----------	---

<b>NG</b>	<b>Adjust valve timing (Repair or replace timing belt).</b>
-----------	---

<b>OK</b>
-----------

<b>16</b>	<b>Check fuel pressure (See page <a href="#">SF-7</a> ).</b>
-----------	--

<b>NG</b>	<b>Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page <a href="#">SF-1</a> ).</b>
-----------	--

<b>OK</b>
-----------



<b>17</b>	<b>Check intake air temperature and mass air flow rate.</b>
-----------	---

**PREPARATION:**

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON.

**CHECK:**

Check the intake air temperature.

- (1) Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/INTAKE AIR".
- (2) Read its value displayed on the hand-held tester or the OBD II scan tool.

**OK:**

**Equivalent to ambient temperature**

**CHECK:**

Check the air flow rate.

- (1) Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL/MAF".
- (2) Read its value displayed on the hand-held tester or the OBD II scan tool.

**OK:**

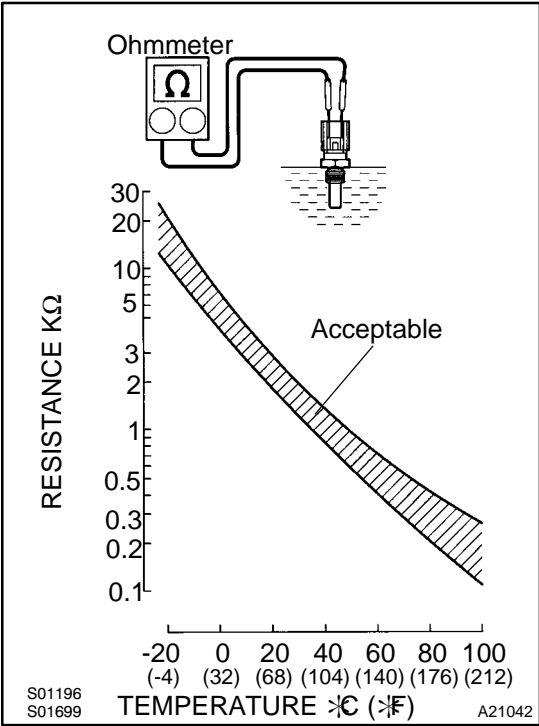
Condition	Air Flow Rate (gm/s)
Ignition switch ON (do not start engine)	0
Idling	4 to 6
Running without load (2,500 rpm)	13 to 20
Idling to quickly accelerating	Air flow rate fluctuates

**NG**

**Replace mass air flow meter.**

**OK**

**18 Check engine coolant temperature sensor.**



**PREPARATION:**

Remove the engine coolant temperature sensor.

**CHECK:**

Measure the resistance between the terminals of the engine coolant temperature sensor.

**Resistance:**

Tester Connection	Specified Condition
1 - 2	2.32 to 2.59 kΩ (20°C (68°F))
	0.310 to 0.326 kΩ (80°C (176°F))

**NOTICE:**

**In case of checking the engine coolant temperature sensor in the water, be careful not to allow water to go into the terminals. After checking, dry the sensor.**

**HINT:**

Alternate procedure: Connect an ohmmeter to the installed engine coolant temperature sensor and read the resistance. Use an infrared thermometer to measure the engine temperature in the immediate vicinity of the sensor. Compare these values to the resistance/temperature graph. Change the engine temperature (warm up or allow to cool down) and repeat the test.

**NG** → **Replace engine coolant temperature sensor.**

**OK**

**19 Switch step by number of misfire cylinder (Refer result of step 4).**

High misfire rate cylinder	Proceed to
1 or 2 cylinders	A
More than 3 cylinders	B

**B** → **Go to step 5.**

**A**

**Check for intermittent problems (See page DI-3).**

<b>DTC</b>	<b>P0325</b>	<b>Knock Sensor 1 Circuit (Bank 1 or Single Sensor)</b>
------------	--------------	---

<b>DTC</b>	<b>P0330</b>	<b>Knock Sensor 2 Circuit (Bank 2)</b>
------------	--------------	--

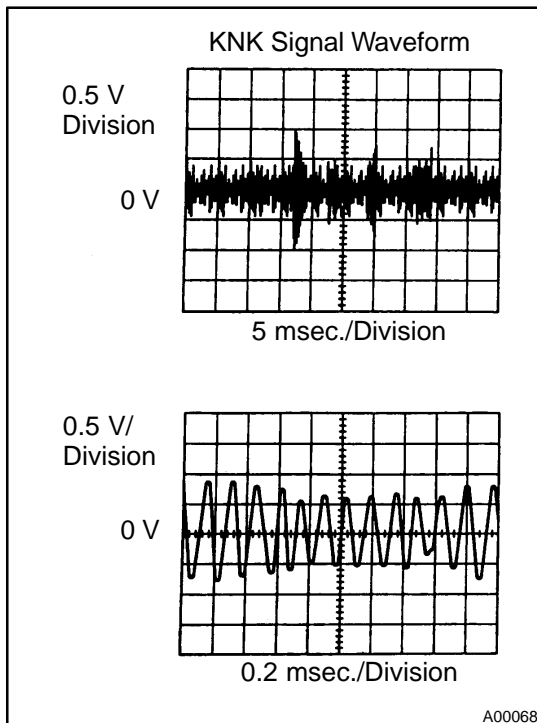
## CIRCUIT DESCRIPTION

Each knock sensor is fitted to the right bank and left bank of the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed. The piezoelectric element sends a signal to the ECM, when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting Condition	Trouble Area
P0325	No signal of knock sensor 1 signal to ECM with engine speed between 2,000 rpm and 5,400 rpm	<ul style="list-style-type: none"> <li>▶ Open or short in knock sensor 1 circuit</li> <li>▶ Knock sensor 1 (looseness)</li> <li>▶ ECM</li> </ul>
P0330	No signal of knock sensor 2 signal to ECM with engine speed between 2,000 rpm and 5,400 rpm	<ul style="list-style-type: none"> <li>▶ Open or short in knock sensor 2 circuit</li> <li>▶ Knock sensor 2 (looseness)</li> <li>▶ ECM</li> </ul>

### HINT:

- ▶ Bank 1 refers to the bank that includes cylinder No. 1.
- ▶ Bank 2 refers the the bank that does not include cylinder No. 1.



### Reference: INSPECTION USING OSCILLOSCOPE

- ▶ With the engine racing (4,000 rpm), check the waveform between terminals KNK1 and KNK2 of the ECM connector and body ground.

### HINT:

The correct waveform is as shown.

- ▶ Spread the time on the horizontal axis, and confirm that period of the wave is 0.13 msec. (Normal mode vibration frequency of knock sensor: 8.1 kHz)

### HINT:

If normal mode vibration frequency is not 8.1 kHz, the sensor has malfunction.

## MONITOR DESCRIPTION

The knock sensor located on the cylinder block, detects spark knock.

When spark knock occurs, the sensor pick-up vibrates in a specific frequency range. When the ECM detects the voltage in this frequency range, it retards the ignition timing to suppress the spark knock.

The ECM also senses background engine noise with the knock sensor and uses this noise to check for faults in the sensor. If the knock sensor signal level is too low for more than 10 sec., and if the knock sensor output voltage is out of normal range, the ECM interprets this as a fault in the knock sensor and sets a DTC.

## MONITOR STRATEGY

Related DTCs	P0325	Knock sensor (Bank 1) range check or rationality
	P0330	Knock sensor (Bank 2) range check or rationality
Required sensors/components	Main sensors/components	Knock sensor
	Related sensors/components	Crankshaft position sensor, Camshaft position sensor, Engine coolant temperature sensor, Mass air flow meter
Frequency of operation	Continuous	
Duration	10 sec.	
MIL operation	Immediate	
Sequence of operation	None	

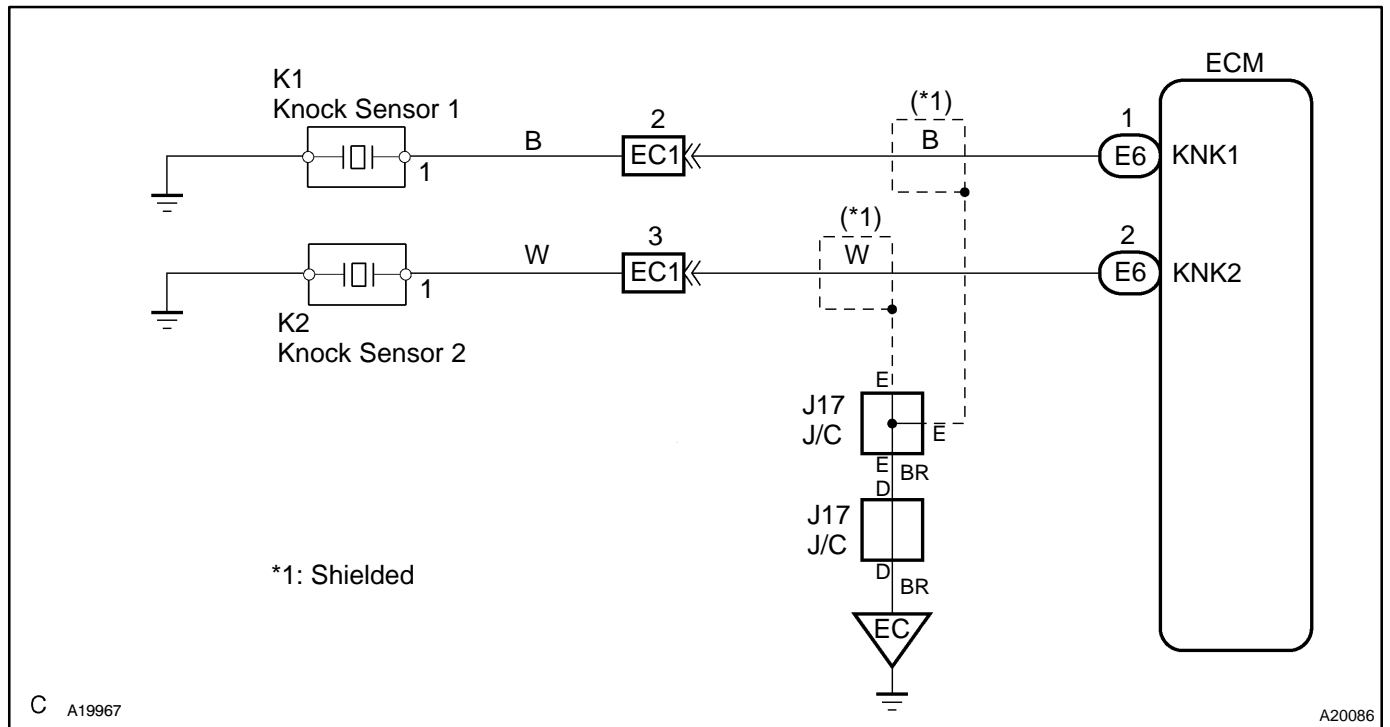
## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
Battery voltage	10 V	-
Idle	OFF	
Time after engine start	5 sec.	-
Engine coolant temperature	60>C (140>F)	-
Intake air amount per revolution	0.45 g/rev	-
Engine speed	2,000 rpm	5,400 rpm

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Sensor failure is indicated when the knock sensor output level is below the specific threshold for:	10 sec.

### WIRING DIAGRAM

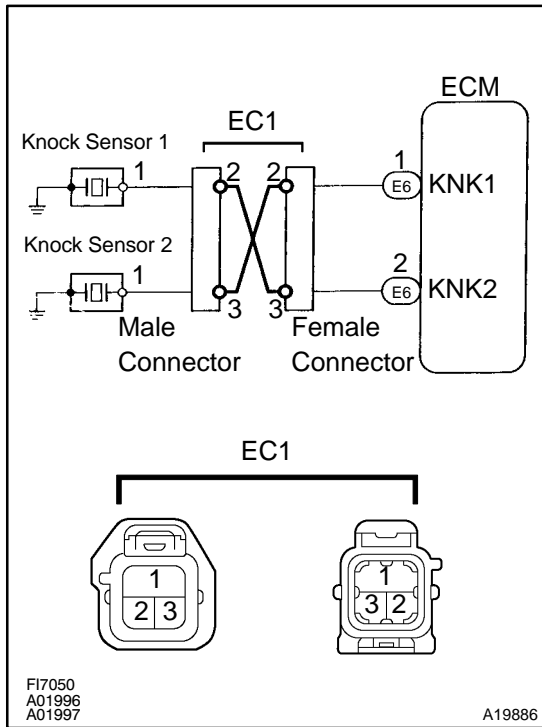


# INSPECTION PROCEDURE

**HINT:**

- ▶ DTC P0325 is for the bank 1 knock sensor circuit.
- ▶ DTC P0330 is for the bank 2 knock sensor circuit.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

**1 Connect OBD II scan tool or hand-held tester, and check knock sensor circuit.**



**PREPARATION:**

- (a) Connect the OBD II scan tool or hand-held tester to the DLC3.
- (b) Disconnect the EC1 connector.
- (c) Connect the terminals of the disconnected EC1 male connector and EC1 female as follows.

Male connector ↔ Female connector
Terminal 2 ↔ Terminal 3
Terminal 3 ↔ Terminal 2

- (d) Turn ignition switch ON and push the OBD II scan tool or hand-held tester main switch ON.
- (e) After the engine is warmed up, perform quick racing to 4,000 rpm 3 times.

**CHECK:**

Check the DTC.

**RESULT:**

Type I	DTC same as when vehicle brought in P0325 → P0325 or P0330 → P0330
Type II	DTC different to when vehicle brought in P0325 → P0330 or P0330 → P0325

**Type II** → **Go to step 3.**

**Type I**

<b>2</b>	<b>Check for open and short in harness and connector between EC1 connector and ECM (See page <a href="#">IN-36</a>).</b>
----------	--

**NG****Repair or replace harness or connector.****OK****Replace ECM (See page [SF-60](#)).**

<b>3</b>	<b>Check for open and short in harness and connector between EC1 connector and knock sensor (See page <a href="#">IN-36</a>).</b>
----------	---

HINT:

- ▶ If DTC P0325 has changed to P0330, check the knock sensor circuit on the bank 1 side.
- ▶ If DTC P0330 has changed to P0325, check the knock sensor circuit on the bank 2 side.

**NG****Repair or replace harness or connector.****OK****Replace knock sensor.**

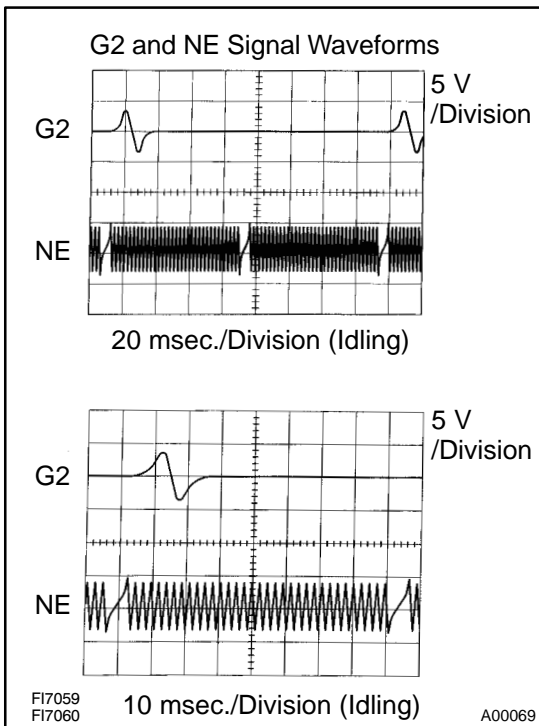
<b>DTC</b>	<b>P0335</b>	<b>Crankshaft Position Sensor "A" Circuit</b>
------------	--------------	---

<b>DTC</b>	<b>P0339</b>	<b>Crankshaft Position Sensor "A" Circuit Intermittent</b>
------------	--------------	--

**CIRCUIT DESCRIPTION**

The crankshaft position sensor system consists of a crankshaft position sensor plate and a pick-up coil. The sensor plate has 34 teeth and is installed on the crankshaft. The pick-up coil is made of an iron core and magnet. The sensor plate rotates and as each tooth passes through the pick-up coil, a pulse signal is created. The pick-up coil generates 34 signals for each engine revolution. Based on these signals, the ECM calculates the crankshaft position and engine RPM. Using these calculations, the fuel injection time and ignition timing are controlled.

DTC No.	DTC Detecting Condition	Trouble Area
P0335	No crankshaft position sensor signal to ECM during cranking (2 trip detection logic)	<ul style="list-style-type: none"> <li>▶Open or short in crankshaft position sensor circuit</li> <li>▶Crankshaft position sensor</li> <li>▶Signal plate</li> <li>▶ECM</li> </ul>
	No crankshaft position sensor signal to ECM with engine speed 600 rpm or more (2 trip detection logic)	
P0339	In condition (a), (b) and (c), when no crankshaft position sensor (NE) signal is input for 0.05 sec. or more. : (1 trip detection logic) (c) Engine revolution 1000 rpm or more (d) STA signal is OFF (e) 3 sec. or more has lapsed after STA signal is switched from ON to OFF.	



**Reference: Inspection using the oscilloscope.**

The correct waveform is as shown.

Tester Connection	Specified Condition
G2+ (E7-27) - G2- (E7-32)	Correct waveform is as shown
NE+ (E7-25) - NE- (E7-24)	



## MONITOR DESCRIPTION

If there is no signal from the crankshaft sensor even though the engine is revolving, the ECM interprets this as a malfunction of the sensor.

## MONITOR STRATEGY

Related DTCs	P0335	Crankshaft position sensor range check or rationality
Required sensors/components	Main sensors/components	Crankshaft position sensor
	Related sensors/components	Engine speed sensor
Frequency of operation	Continuous	
Duration	Case 1: 4.7 sec. Case 2: 0.016 sec. Case 3: 2 rev x 5 times	
MIL operation	Case 1: 2 driving cycles Case 2, 3: 1 driving cycle	
Sequence of operation	None	

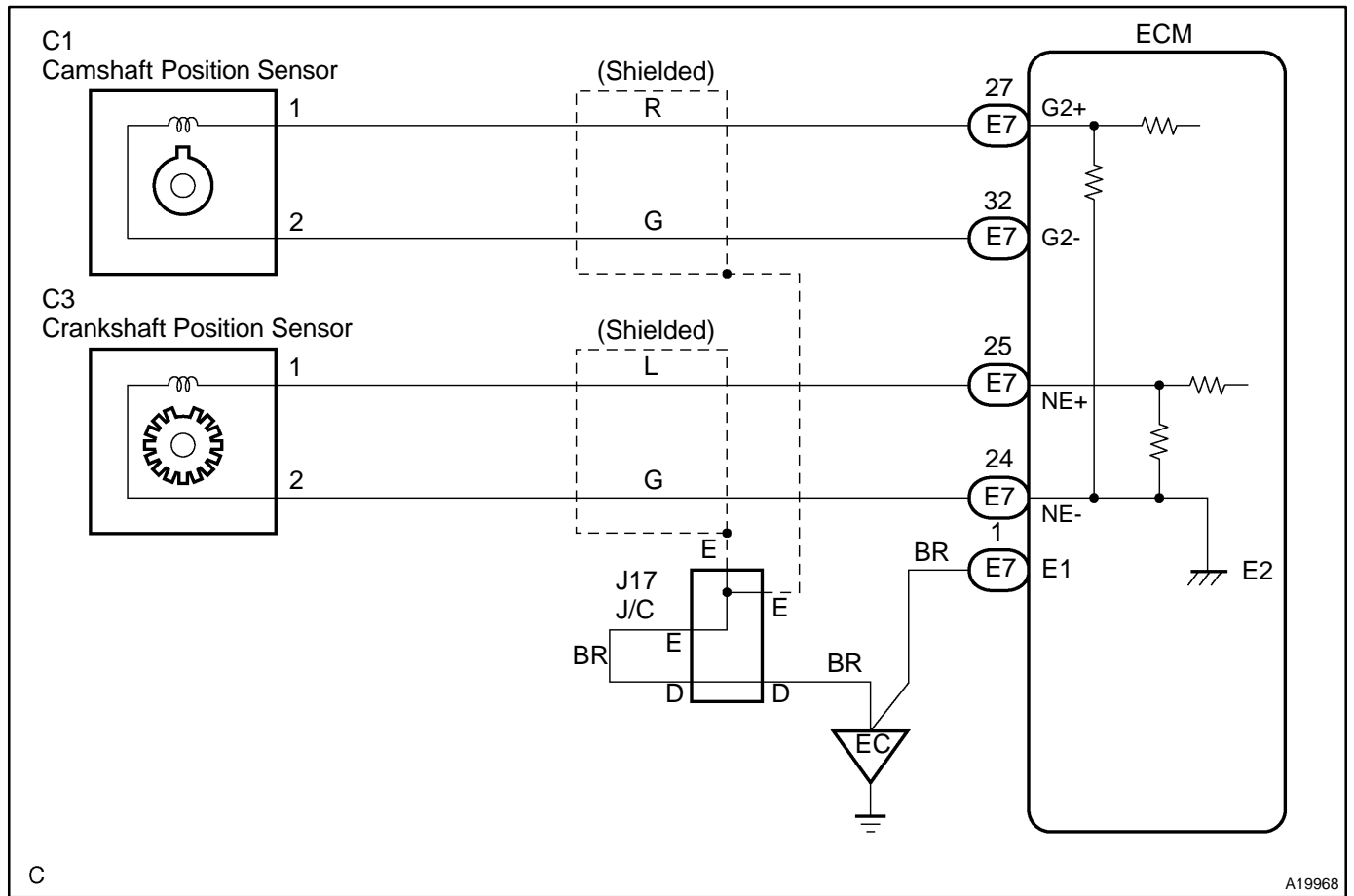
## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>Case 1:</b>		
Starter	ON	
Minimum battery voltage while starter ON	-	11 V
<b>Case 2:</b>		
Engine speed	600 rpm	-
Starter	OFF	
Time after starter ON to OFF	3 sec.	-
<b>Case 3:</b>		
Time after starter ON to OFF	0.3 sec.	-
Number of camshaft position sensor signal pulse	1	
Battery voltage	7 V	-
Minimum battery voltage while starter ON	-	11 V

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>Case 1:</b>	
Engine speed signal	No signal for 4.7 sec.
<b>Case 2:</b>	
Engine speed signal	No signal for 0.016 sec.
<b>Case 3:</b>	
Number of crankshaft position sensor signal pulse	17 or more and 29 or less

# WIRING DIAGRAM



C

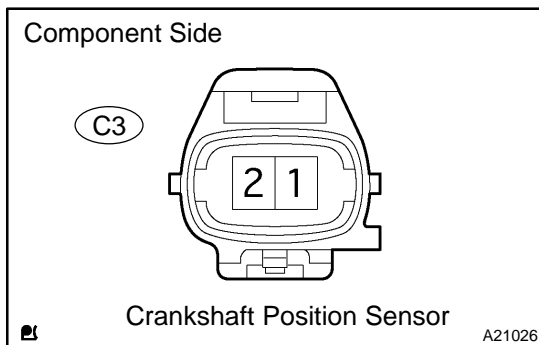
A19968

## INSPECTION PROCEDURE

### HINT:

- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.
- ▶ READ VALUE OF HAND-HELD TESTER OR OBD II SCAN TOOL
  - (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
  - (b) Start the engine and push the hand-held tester or the OBD II scan tool main switch ON.
  - (c) Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / ENGINE SPD".
- ▶ The engine speed can be confirmed in DATA LIST using the hand-held tester or OBD II scan tool. If there is no NE signals from the crankshaft position sensor despite the engine revolving, the engine speed will be indicated as zero. If voltage output of the crankshaft position sensor is insufficient, the engine speed will be indicated as lower RPM (than the actual RPM).

### 1 Check resistance of crankshaft position sensor.



#### PREPARATION:

Disconnect the C3 crankshaft position sensor connector.

#### CHECK:

Measure the resistance between terminals 1 and 2.

#### OK:

Tester Connection	Specified Condition
1 - 2	985 to 1,600 $\Omega$ at cold
	1,265 to 1,890 $\Omega$ at hot

#### NOTICE:

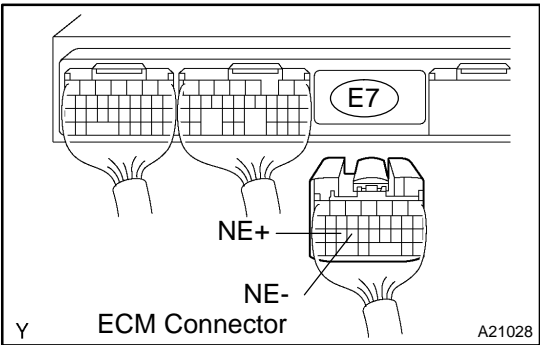
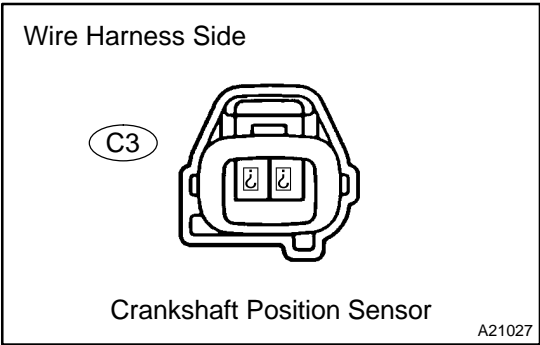
"Cold" and "Hot" shown above mean the temperature of the coils themselves. "Cold" is from  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) to  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ ) and "Hot" is from  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ ) to  $100^{\circ}\text{C}$  ( $212^{\circ}\text{F}$ ).

NG

Replace crankshaft position sensor.

OK

**2 Check for open and short in harness and connector between ECM and crankshaft position sensor.**



**PREPARATION:**

- (a) Disconnect the C3 crankshaft position sensor connector.
- (b) Disconnect the E7 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
Crankshaft position sensor (C3-1) - NE+ (E7-25)	Below 1 Ω
Crankshaft position sensor (C3-2) - NE- (E7-24)	Below 1 Ω
Crankshaft position sensor (C3-1) or NE+ (E7-25) - Body ground	10 kΩ or higher
Crankshaft position sensor (C3-2) or NE- (E7-24) - Body ground	10 kΩ or higher

**NG** Repair or replace harness or connector.

**OK**

**3 Check sensor installation (crankshaft position sensor).**

**CHECK:**

Check the crankshaft position sensor installation.

**NG** Tighten sensor.

**OK**

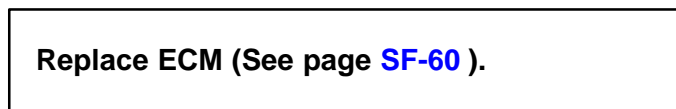
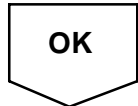
<b>4</b>	<b>Inspect teeth of sensor plate.</b>
----------	---------------------------------------

**PREPARATION:**

Remove the crankshaft angle sensor plate (See page [EM-15](#) ).

**CHECK:**

Check the teeth of sensor plate.



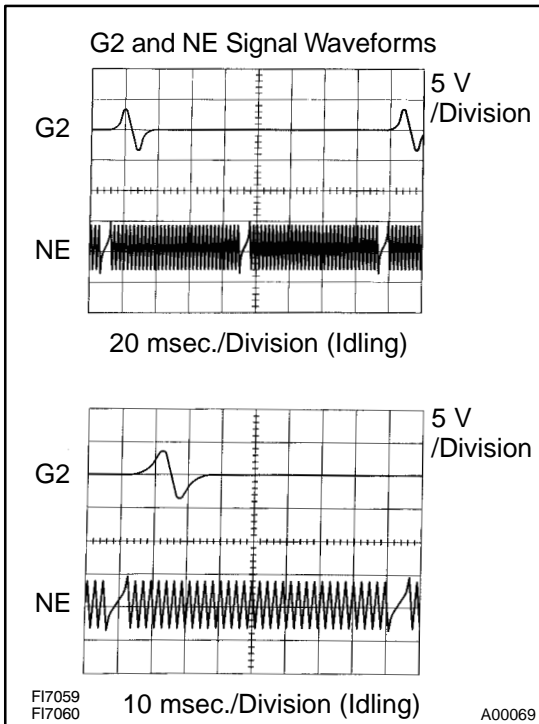
<b>DTC</b>	<b>P0340</b>	<b>Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)</b>
------------	--------------	---

<b>DTC</b>	<b>P0341</b>	<b>Camshaft Position Sensor "A" Circuit Range/Performance (Single Sensor)</b>
------------	--------------	---

**CIRCUIT DESCRIPTION**

The camshaft position sensor (G signal) consists of a magnet iron core and pickup coil. The G signal plate has 1 tooth on its outer circumference and is installed on the LH camshaft timing pulley. When the camshafts rotate, protrusion on the signal plate and air gap on the pickup coil change, causing fluctuations in the magnetic field and generating a voltage in the pickup coil. The NE signal plate has 34 teeth and is mounted on the crankshaft. The NE signal sensor generates 34 signals at every engine revolution. The ECM detects the crankshaft angle and the engine revolution based on the NE signals, and the cylinder and the angle of the G2 based on the combination of the G and NE signals.

DTC No.	DTC Detection Condition	Trouble Area
P0340	No camshaft position sensor signal to ECM during cranking (2 trip detection logic)	<ul style="list-style-type: none"> <li>▶ Open or short in camshaft position sensor circuit</li> <li>▶ Camshaft position sensor</li> <li>▶ LH camshaft timing pulley</li> <li>▶ Jumping teeth of timing belt</li> <li>▶ ECM</li> </ul>
	No camshaft position sensor signal to ECM with engine speed 600 rpm or more (1 trip detection logic)	
P0341	While crankshaft rotates twice, camshaft position sensor signal will be input to ECM 12 times or more (1 trip detection logic) ▶ Hint: Under normal condition, the camshaft position signal is input into the ECM 3 times per 2 engine revolutions	



**Reference: Inspection using the oscilloscope.**

The correct waveform is as shown.

Tester Connection	Specified Condition
G2+ (E7-27) - G2- (E7-32)	Correct waveform is as shown
NE+ (E7-25) - NE- (E7-24)	

## MONITOR DESCRIPTION

If there is no signal from the camshaft position sensor even though the engine is turning, or if the rotation of the camshaft and the crankshaft is not synchronized, the ECM interprets this as a malfunction of the sensor.

## MONITOR STRATEGY

Related DTCs	P0340	Camshaft position sensor (Bank 1) range check or rationality
	P0341	Camshaft position sensor (Bank 1) range check or rationality
Required sensors/components	Main sensors/components	Camshaft position sensor
	Related sensors/components	Crankshaft position sensor, Engine speed sensor
Frequency of operation	Continuous	
Duration	5 sec.	
MIL operation	P0340 case 1 (no signal): 2 driving cycles P0340 case 2 (mis-aligned), P0341: Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>P0340 Case 1 (No signal):</b>		
Starter	ON	
Minimum battery voltage while starter ON	-	11 V
<b>P0340 Case 2 (Mis-aligned):</b>		
Engine speed	600 rpm	-
Starter	OFF	
<b>P0341:</b>		
Starter	After OFF to ON timing	
Engine revolution	720°CA	

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>P0340 Case 1 (No signal):</b>	
Camshaft position sensor signal	No signal
<b>P0340 Case 2 (Mis-aligned):</b>	
Crankshaft/camshaft alignment is mis-aligned (judged by comparing the crankshaft position to the camshaft position)	
Camshaft position sensor signal: No input in appropriate timing.	
<b>P0341:</b>	
Crankshaft/Camshaft alignment	Mis-aligned
Camshaft position sensor count	12 or more / 720°CA (= Engine 2 revolutions)

### COMPONENT OPERATING RANGE

Parameter	Standard Value
Camshaft position sensor signal input during every 720°CA	3

### WIRING DIAGRAM

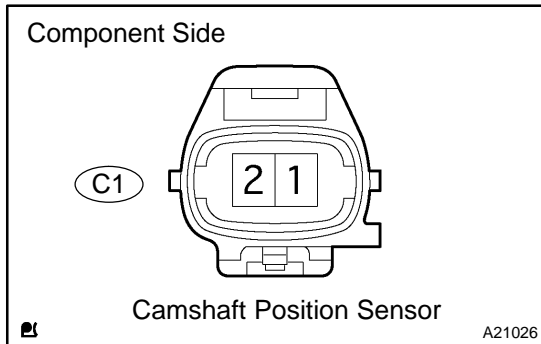
Refer to DTC P0335 on page [DI-191](#) .

### INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

<b>1</b>	<b>Check resistance of camshaft position sensor.</b>
----------	--



**PREPARATION:**

Disconnect the C1 camshaft position sensor connector.

**CHECK:**

Measure the resistance between terminals 1 and 2.

**OK:**

Tester Connection	Specified Condition
1 - 2	1,630 to 2,740 Ω at cold
	2,065 to 3,225 Ω at hot

**NOTICE:**

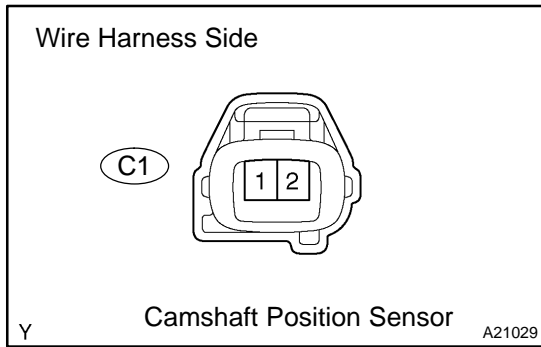
” Cold” and ”Hot” shown above mean the temperature of the coils themselves. ”Cold” is from -10°C (14°F) to 50°C (122°F) and ”Hot” is from 50°C (122°F) to 100°C (212°F).

<b>NG</b>	<b>Replace camshaft position sensor.</b>
-----------	--

<b>OK</b>
-----------



**2 Check for open and short in harness and connector between ECM and camshaft position sensor.**



**PREPARATION:**

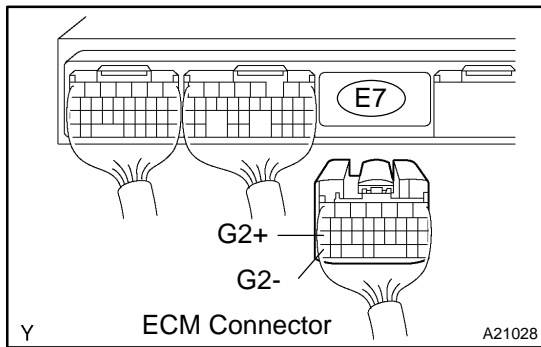
- (a) Disconnect the C1 camshaft position sensor connector.
- (b) Disconnect the E7 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
Camshaft position sensor (C1-1) - G2+ (E7-27)	Below 1 Ω
Camshaft position sensor (C1-2) - G2- (E7-32)	Below 1 Ω
Camshaft position sensor (C1-1) or G2+ (E7-27) - Body ground	10 kΩ or higher
Camshaft position sensor (C1-2) or G2- (E7-32) - Body ground	10 kΩ or higher



**NG** Repair or replace harness or connector.

**OK**

**3 Check sensor installation (Camshaft position sensor).**

**CHECK:**

Check the camshaft position sensor installation.

**NG** Tighten sensor.

**OK**

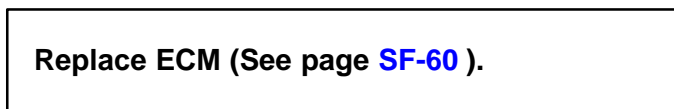
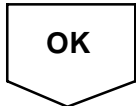
<b>4</b>	<b>Inspect teeth of LH camshaft timing belt pulley.</b>
----------	---

**PREPARATION:**

Remove the LH camshaft timing belt pulley (See page [EM-35](#) ).

**CHECK:**

Check the LH camshaft timing belt pulley.



<b>DTC</b>	<b>P0351</b>	<b>Igniter Coil "A" Primary/Secondary Circuit</b>
<b>DTC</b>	<b>P0352</b>	<b>Igniter Coil "B" Primary/Secondary Circuit</b>
<b>DTC</b>	<b>P0353</b>	<b>Igniter Coil "C" Primary/Secondary Circuit</b>
<b>DTC</b>	<b>P0354</b>	<b>Igniter Coil "D" Primary/Secondary Circuit</b>
<b>DTC</b>	<b>P0355</b>	<b>Igniter Coil "E" Primary/Secondary Circuit</b>
<b>DTC</b>	<b>P0356</b>	<b>Igniter Coil "F" Primary/Secondary Circuit</b>
<b>DTC</b>	<b>P0357</b>	<b>Igniter Coil "G" Primary/Secondary Circuit</b>
<b>DTC</b>	<b>P0358</b>	<b>Igniter Coil "H" Primary/Secondary Circuit</b>

**HINT:**

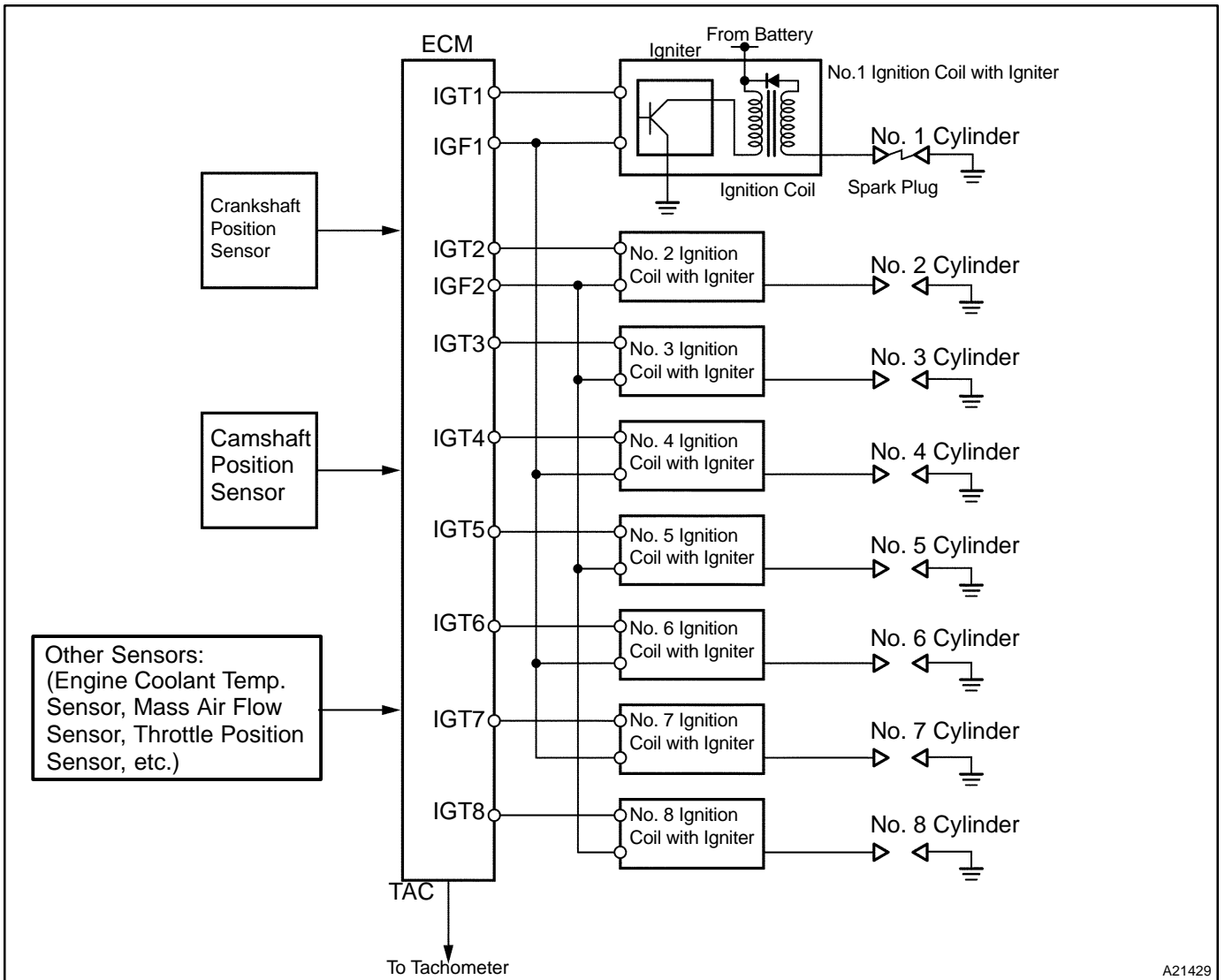
- ▶ These DTCs indicate a malfunction related to primary circuit.
- ▶ If DTC P0351 is displayed, check No. 1 ignition coil with igniter circuit.
- ▶ If DTC P0352 is displayed, check No. 2 ignition coil with igniter circuit.
- ▶ If DTC P0353 is displayed, check No. 3 ignition coil with igniter circuit.
- ▶ If DTC P0354 is displayed, check No. 4 ignition coil with igniter circuit.
- ▶ If DTC P0355 is displayed, check No. 5 ignition coil with igniter circuit.
- ▶ If DTC P0356 is displayed, check No. 6 ignition coil with igniter circuit.
- ▶ If DTC P0357 is displayed, check No. 7 ignition coil with igniter circuit.
- ▶ If DTC P0358 is displayed, check No. 8 ignition coil with igniter circuit.

### CIRCUIT DESCRIPTION

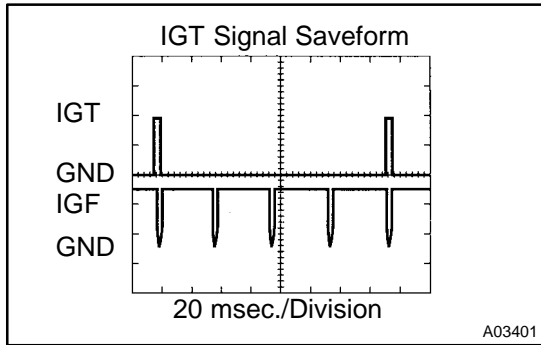
These DTCs indicate a malfunction related to primary circuit.

The DIS is a 1-cylinder ignition system which ignites one cylinder with one ignition coil. In the 1-cylinder ignition system, the one spark plug is connected to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plug. The spark of the spark plug passes from the center electrode to the ground electrode.

The ECM determines the ignition timing and outputs the ignition signals (IGTs) for each cylinder. Using the IGT, the ECM turns on and off the power transistor inside the igniter and this switches on and off the current to the primary coil. When current to the primary coil is cut off, high-voltage is generated in the secondary coil and this voltage is applied to the spark plugs to create sparks inside the cylinders. As the ECM cuts the current to the primary coil, the igniter sends back the ignition confirmation signal (IGF) for each cylinder ignition to the ECM.



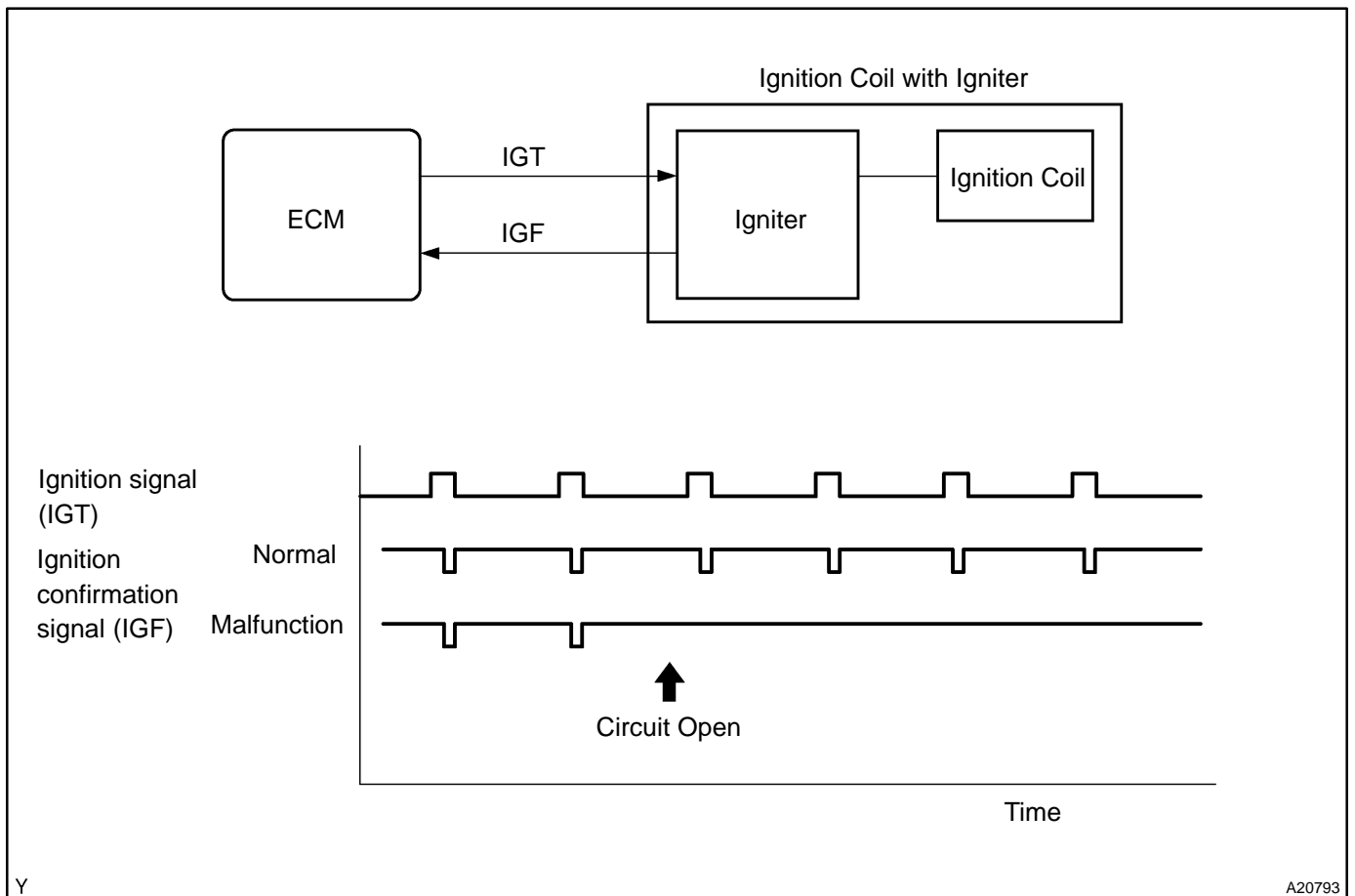
DTC No.	DTC Detecting Condition	Trouble Area
P0351 P0352 P0353 P0354 P0355 P0356 P0357 P0358	No IGF signal to ECM while engine is running	<ul style="list-style-type: none"> <li>▶ Open or short in IGF1 or IGF2 and IGT1 to IGT8 circuit from ignition coil with igniter to ECM</li> <li>▶ No. 1 to No. 8 ignition coil with igniter</li> <li>▶ Ignition system</li> <li>▶ ECM</li> </ul>



**Reference: Inspection using the oscilloscope.**

During cranking or idling, check the waveform between terminals IG1 to IG8 and E1, and IGF1, IGF2 and E1 of the E5 and E7 ECM connectors.

**MONITOR DESCRIPTION**



If the ECM does not receive the IGF after sending the IGT it interprets this as a fault in the igniter and sets a DTC.

## MONITOR STRATEGY

Related DTCs	P0351	No. 1 ignition coil with igniter circuit malfunction
	P0352	No. 2 ignition coil with igniter circuit malfunction
	P0353	No. 3 ignition coil with igniter circuit malfunction
	P0354	No. 4 ignition coil with igniter circuit malfunction
	P0355	No. 5 ignition coil with igniter circuit malfunction
	P0356	No. 6 ignition coil with igniter circuit malfunction
	P0357	No. 7 ignition coil with igniter circuit malfunction
	P0358	No. 8 ignition coil with igniter circuit malfunction
Required sensors/components	Igniter	
Frequency of operation	Continuous	
Duration	0.256 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
Engine speed	-	1,500 rpm
Either of the following conditions is met:	A or B	
A. Following conditions are met:	(a) and (b)	
(a) Engine speed	-	500 rpm
(b) Battery voltage	6 V	-
B. Following conditions are met:	(a) and (b)	
(a) Engine speed	500 rpm	-
(b) Battery voltage	10 V	-

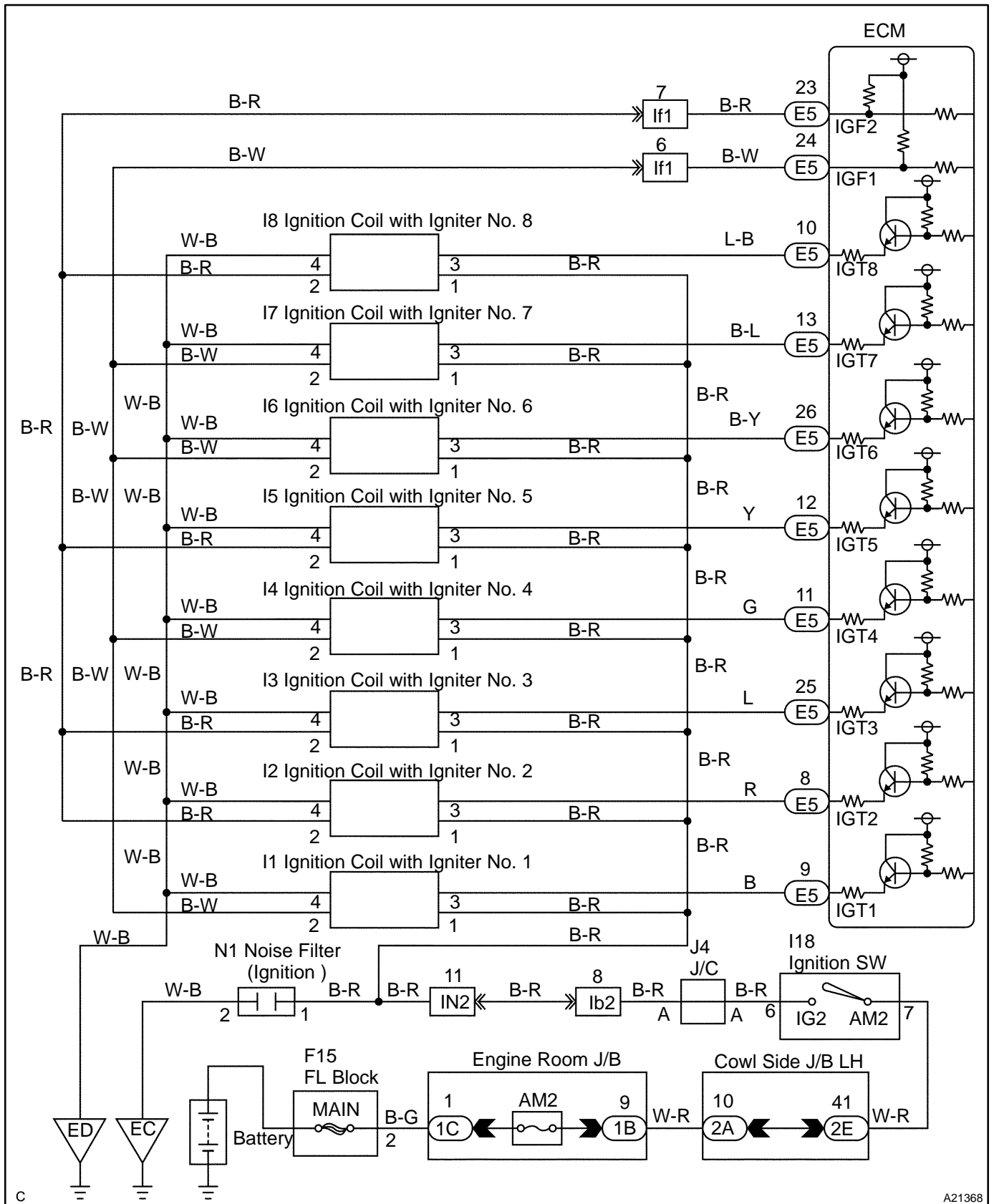
## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
"Ignition signal fail count"	More than 2
"Ignition signal fail count" is as follows:	When IGF should have returned despite sending IGT.

## COMPONENT OPERATING RANGE

Standard Value
Confirmed signal number = ignition signal number

# WIRING DIAGRAM



C

A21368

## INSPECTION PROCEDURE

HINT:

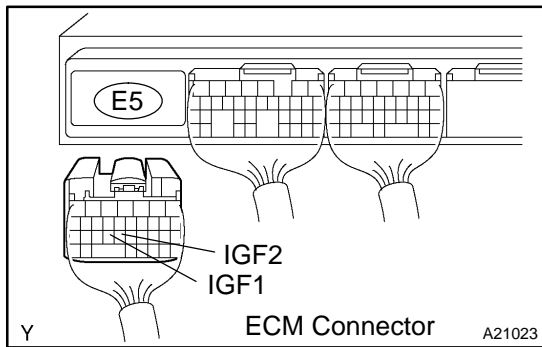
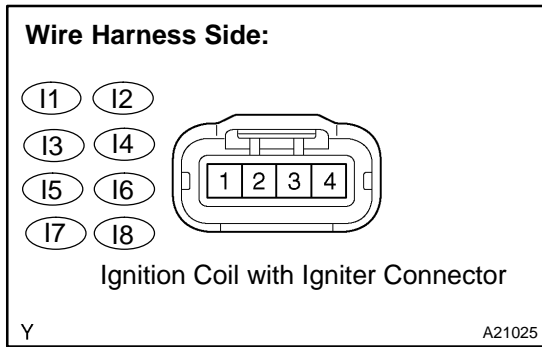
- ▶ If DTCs P0351, P0354, P0356 and P0357 are output simultaneously, IGF1 circuit may be open or short.
- ▶ If DTCs P0352, P0353, P0355 and P0358 are output simultaneously, IGF2 circuit may be open or short.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

<b>1</b>	<b>Check spark plug and spark (See page <a href="#">IG-1</a> ).</b>
----------	---





**2 Check for open and short in harness and connector in IGF signal circuits between ECM and ignition coil with igniter.**



**PREPARATION:**

- (a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil with igniter connector.
- (b) Disconnect the E5 ECM connector.

**CHECK:**

Check the resistance between the wire harness side connectors.

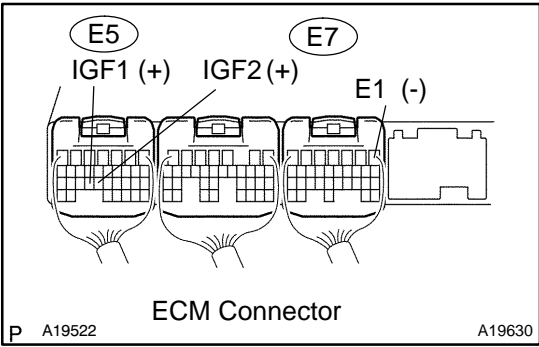
**OK:**

Tester Connection	Specified Condition
Ignition coil (I1-2) - IGF1 (E5-24)	Below 1 Ω
Ignition coil (I2-2) - IGF2 (E5-23)	Below 1 Ω
Ignition coil (I3-2) - IGF1 (E5-24)	Below 1 Ω
Ignition coil (I4-2) - IGF2 (E5-23)	Below 1 Ω
Ignition coil (I5-2) - IGF1 (E5-24)	Below 1 Ω
Ignition coil (I6-2) - IGF2 (E5-23)	Below 1 Ω
Ignition coil (I7-2) - IGF1 (E5-24)	Below 1 Ω
Ignition coil (I8-2) - IGF2 (E5-23)	Below 1 Ω
Ignition coil (I1-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
Ignition coil (I2-2) or IGF2 (E5-23) - Body ground	10 kΩ or higher
Ignition coil (I3-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
Ignition coil (I4-2) or IGF2 (E5-23) - Body ground	10 kΩ or higher
Ignition coil (I5-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
Ignition coil (I6-2) or IGF2 (E5-23) - Body ground	10 kΩ or higher
Ignition coil (I7-2) or IGF1 (E5-24) - Body ground	10 kΩ or higher
Ignition coil (I8-2) or IGF2 (E5-23) - Body ground	10 kΩ or higher

**NG** Repair or replace harness or connector.

**OK**

**3 Disconnect ignition coil with igniter connector, and check voltage between terminals IGF1, IGF2 and E1 of ECM connector.**



**PREPARATION:**

- (a) Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil with igniter connector.
- (b) Turn the ignition switch ON.

**CHECK:**

Measure the voltage between the E5 and E7 ECM connectors.

**OK:**

Tester Connection	Specified Condition
IGF1 (E5-24) - E1 (E7-1)	4.5 to 5.5 V
IGF2 (E5-23) - E1 (E7-1)	4.5 to 5.5 V

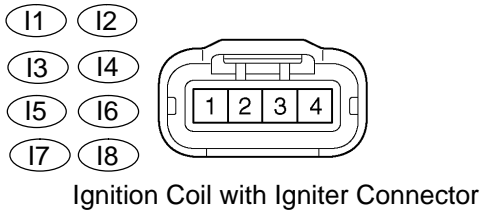
**NG** Replace ECM (See page SF-60 ).

**OK**

Replace ignition coil with igniter.

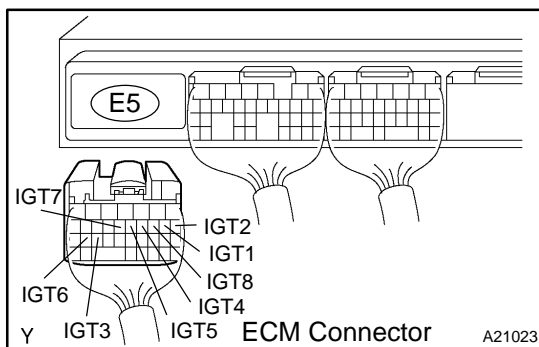
**4 Check for open and short in harness and connector in IGT signal circuit between ECM and ignition coil with igniter.**

**Wire Harness Side:**



Y

A21025



Y

A21023

**PREPARATION:**

- Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil connector.
- Disconnect the E5 ECM connector.

**CHECK:**

Check the resistance between the wire harness side connectors.

**OK:**

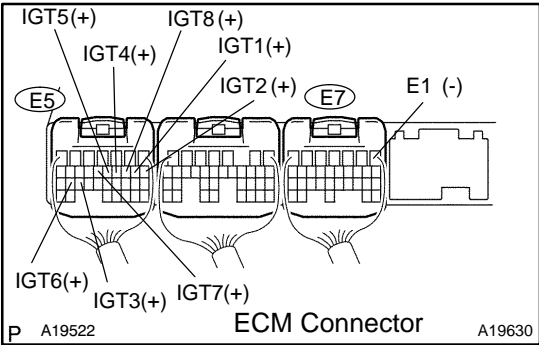
Tester Connection	Specified Condition
Ignition coil (I1-2) - IGT1 (E5-9)	Below 1 $\Omega$
Ignition coil (I2-2) - IGT2 (E5-8)	Below 1 $\Omega$
Ignition coil (I3-2) - IGT3 (E5-25)	Below 1 $\Omega$
Ignition coil (I4-2) - IGT4 (E5-11)	Below 1 $\Omega$
Ignition coil (I5-2) - IGT5 (E5-12)	Below 1 $\Omega$
Ignition coil (I6-2) - IGT6 (E5-26)	Below 1 $\Omega$
Ignition coil (I7-2) - IGT7 (E5-13)	Below 1 $\Omega$
Ignition coil (I8-2) - IGT8 (E5-10)	Below 1 $\Omega$
Ignition coil (I1-2) or IGT1 (E5-9) - Body ground	10 k $\Omega$ or higher
Ignition coil (I2-2) or IGT2 (E5-8) - Body ground	10 k $\Omega$ or higher
Ignition coil (I3-2) or IGT3 (E5-25) - Body ground	10 k $\Omega$ or higher
Ignition coil (I4-2) or IGT4 (E5-11) - Body ground	10 k $\Omega$ or higher
Ignition coil (I5-2) or IGT5 (E5-12) - Body ground	10 k $\Omega$ or higher
Ignition coil (I6-2) or IGT6 (E5-26) - Body ground	10 k $\Omega$ or higher
Ignition coil (I7-2) or IGT7 (E5-13) - Body ground	10 k $\Omega$ or higher
Ignition coil (I8-2) or IGT8 (E5-10) - Body ground	10 k $\Omega$ or higher

**NG**

**Repair or replace harness or connector.**

**OK**

**5 Check voltage between terminals IGT1 - IGT8 and E1 of ECM connector and body ground.**



**CHECK:**

Measure the voltage between terminals the E5 and E7 ECM connectors when the engine is cranked.

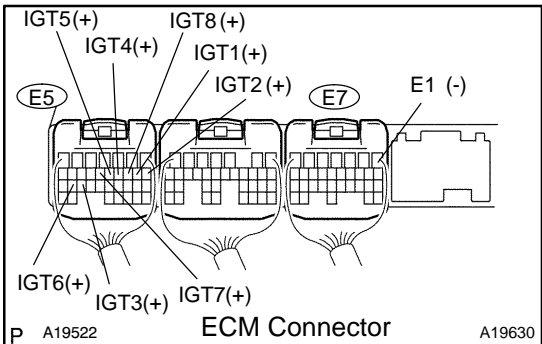
**OK:**

Tester Connection	Specified Condition
IGT1 (E5-9) - E1 (E7-1)	More than 0.1 V or less than 4.5 V
IGT2 (E5-8) - E1 (E7-1)	
IGT3 (E5-25) - E1 (E7-1)	
IGT4 (E5-11) - E1 (E7-1)	
IGT5 (E5-12) - E1 (E7-1)	
IGT6 (E5-26) - E1 (E7-1)	
IGT7 (E5-13) - E1 (E7-1)	
IGT8 (E5-10) - E1 (E7-1)	

**NG** Replace ECM (See page [SF-60](#) ).

**OK**

**6 Disconnect ignition coil with igniter connector, and check voltage between terminals IGT1 - IGT8 of ECM connector and body ground.**



**PREPARATION:**

Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil with igniter connector.

**CHECK:**

Measure the voltage between terminals the E5 and E7 ECM connectors when the engine is cranked.

**OK:**

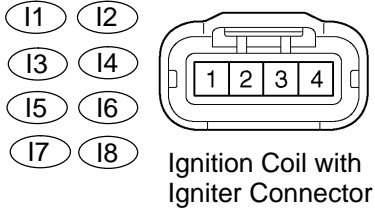
Tester Connection	Specified Condition
IGT1 (E5-9) - E1 (E7-1)	4.5 V or more
IGT2 (E5-8) - E1 (E7-1)	
IGT3 (E5-25) - E1 (E7-1)	
IGT4 (E5-11) - E1 (E7-1)	
IGT5 (E5-12) - E1 (E7-1)	
IGT6 (E5-26) - E1 (E7-1)	
IGT7 (E5-13) - E1 (E7-1)	
IGT8 (E5-10) - E1 (E7-1)	

**NG** Replace ECM (See page [SF-60](#) ).

**OK**

**7 Check ignition coil with igniter power source circuit.**

**Wire Harness Side:**



Y

A21025

**PREPARATION:**

Disconnect the I1, I2, I3, I4, I5, I6, I7 or I8 ignition coil with igniter connector.

**CHECK:**

Measure the voltage between the terminal of the wire harness side connector and body ground.

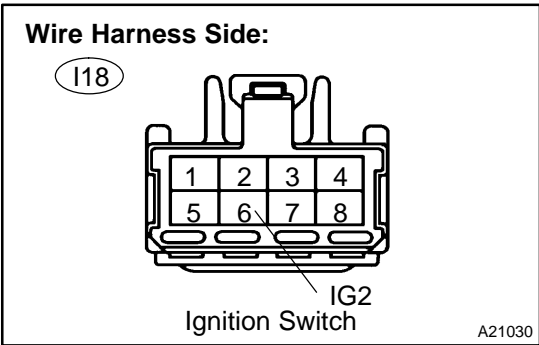
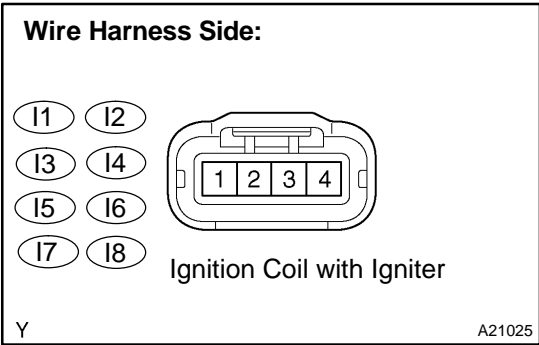
**OK:**

Tester Connection	Specified Condition
I1-1 - Body ground	9 to 14 V
I2-1 - Body ground	
I3-1 - Body ground	
I4-1 - Body ground	
I5-1 - Body ground	
I6-1 - Body ground	
I7-1 - Body ground	
I8-1 - Body ground	

**OK** Repair ignition coil with igniter.

**NG**

**8 Check for open and short in harness and connector between ignition switch and ignition coil with igniter.**



**PREPARATION:**

- (a) Disconnect the I1, 2, I3, I4, I5, I6, I7 or I8 ignition coil with igniter connector.
- (b) Disconnect the I18 ignition switch connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
Ignition coil (I1-1) - IG2 (I18-6)	Below 1 Ω
Ignition coil (I2-1) - IG2 (I18-6)	Below 1 Ω
Ignition coil (I3-1) - IG2 (I18-6)	Below 1 Ω
Ignition coil (I4-1) - IG2 (I18-6)	Below 1 Ω
Ignition coil (I5-1) - IG2 (I18-6)	Below 1 Ω
Ignition coil (I6-1) - IG2 (I18-6)	Below 1 Ω
Ignition coil (I7-1) - IG2 (I18-6)	Below 1 Ω
Ignition coil (I8-1) - IG2 (I18-6)	Below 1 Ω
Ignition coil (I1-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Ignition coil (I2-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Ignition coil (I3-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Ignition coil (I4-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Ignition coil (I5-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Ignition coil (I6-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Ignition coil (I7-1) or IG2 (I18-6) - Body ground	10 kΩ or higher
Ignition coil (I8-1) or IG2 (I18-6) - Body ground	10 kΩ or higher

**NG** **Repair or replace harness or connector.**

**OK**

**Replace ignition coil with igniter.**

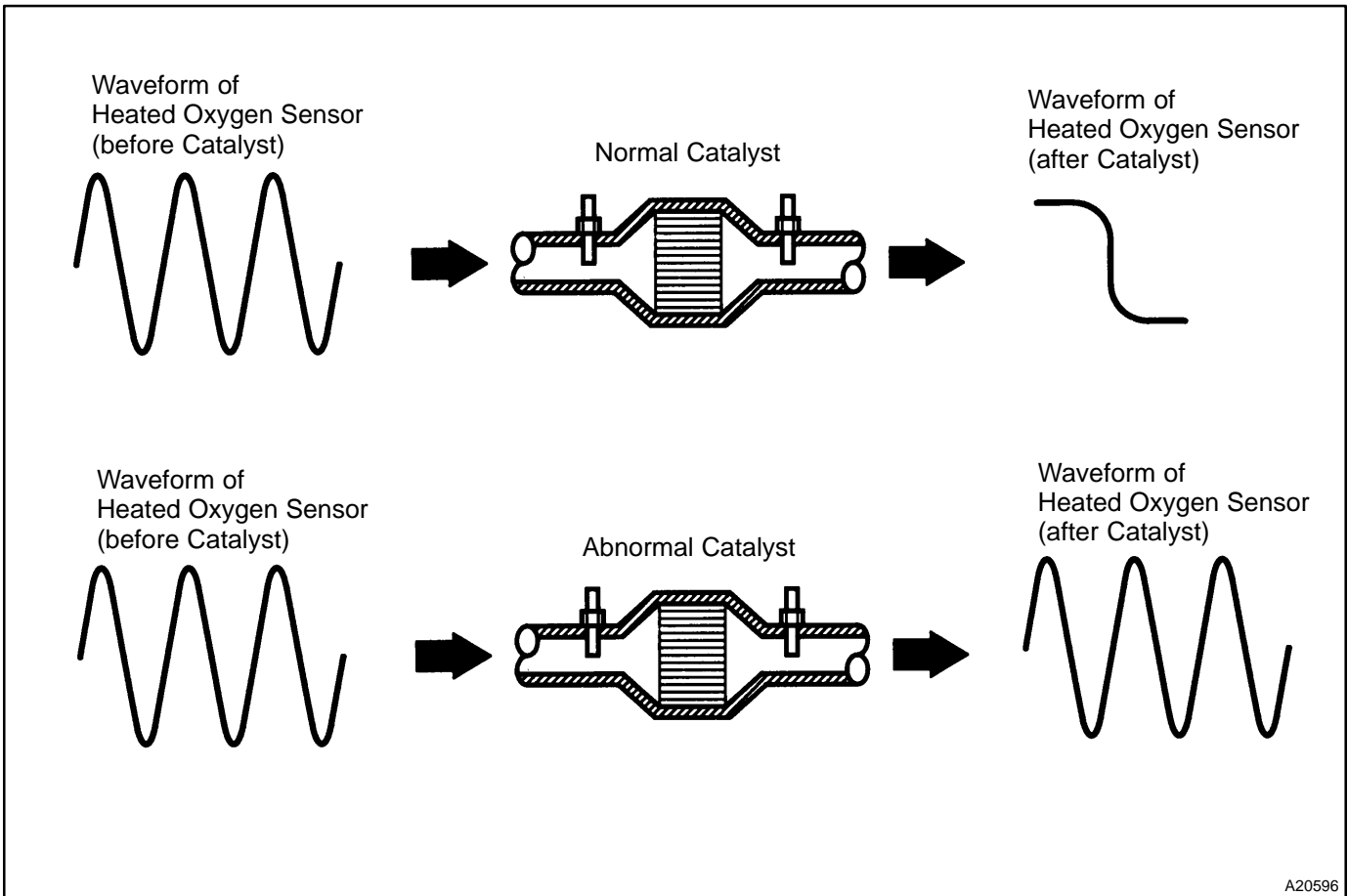
<b>DTC</b>	<b>P0420</b>	<b>Catalyst System Efficiency Below Threshold (Bank 1)</b>
------------	--------------	--

<b>DTC</b>	<b>P0430</b>	<b>Catalyst System Efficiency Below Threshold (Bank 2)</b>
------------	--------------	--

**MONITOR DESCRIPTION**

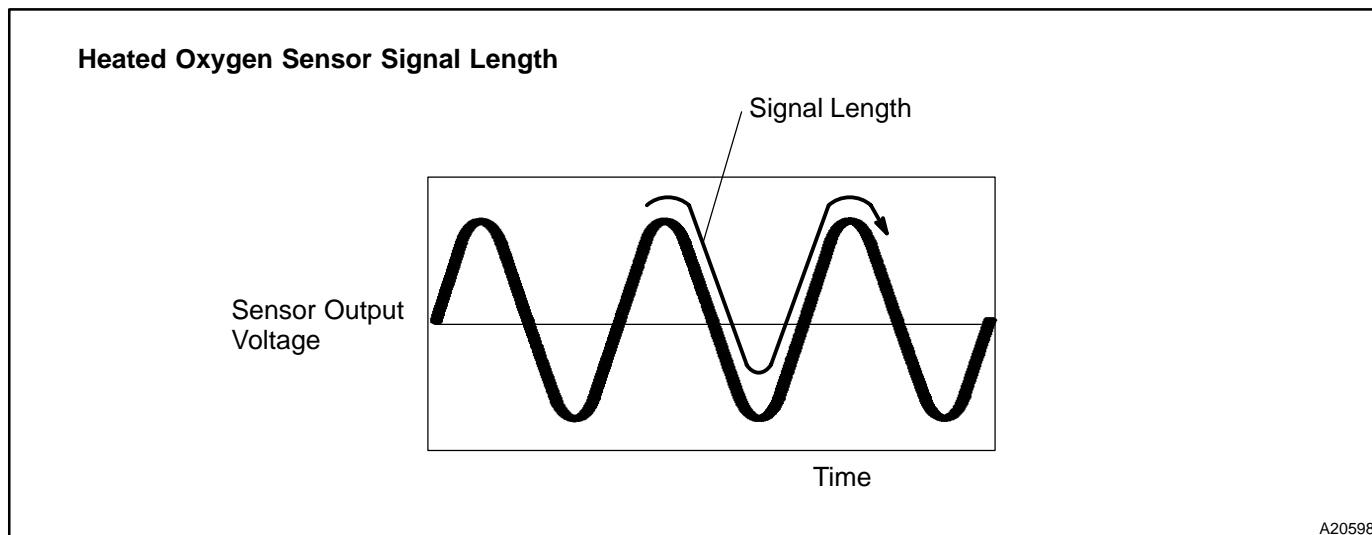
The vehicle is equipped with two heated oxygen sensors. One is mounted upstream from the TWC (Three-Way Catalytic) converter (Front Oxygen Sensor, "sensor 1"), the second is mounted downstream (Rear Oxygen Sensor "sensor 2"). The catalyst efficiency monitor compares the sensor 1 and sensor 2 signals in order to calculate TWC ability to store the oxygen.

During normal operation, the TWC stores and releases oxygen as needed. This results in low oxygen variations in the post TWC exhaust stream as shown below.



A20596





DTC No.	DTC Detecting Condition	Trouble Area
P0420 P0430	After engine and catalyst are warmed up, and while vehicle is driven within set vehicle and engine speed range, waveform of heated oxygen sensors have same amplitude (2 trip detection logic)	<ul style="list-style-type: none"> <li>▶ Gas leakage on exhaust system</li> <li>▶ Heated oxygen sensor (bank 1, 2 sensor 1, 2)</li> <li>▶ Three-way catalytic converter</li> </ul>

**HINT:**

- ▶ Bank 1 refers to the bank that includes cylinder No.1.
- ▶ Bank 2 refers to the bank that does not include cylinder No.1.
- ▶ Sensor 1 refers to the sensor closest to the engine assembly.
- ▶ Sensor 2 refers to the sensor farthest away from the engine assembly.

**MONITOR STRATEGY**

Related DTCs	P0420	Bank 1 catalyst is deteriorated
	P0430	Bank 2 catalyst is deteriorated
Required sensors/components	Main sensors/components	Front and rear heated oxygen sensor
	Related sensors/components	Mass air flow meter, Engine coolant temperature sensor, Engine speed sensor, Intake air temperature sensor
Frequency of operation	Once per driving cycle	
Duration	90 sec.	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
Battery voltage	11 V	-
Intake air temperature	-10 °C (14 °F)	-
Idle	OFF	
Intake air amount	8 g/sec.	50 g/sec.
Engine speed	-	4,000 rpm
Engine coolant temperature	75 °C (167 °F)	
Estimated catalyst temperature conditions are met:	A and B	
A. Estimated temperature of up stream catalyst	450 °C (842 °F)	820 °C (1,508 °F)
B. Estimated temperature of down stream catalyst	450 °C (842 °F)	820 °C (1,508 °F)
Fuel system status	Closed loop	

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Catalyst deterioration level (Heated oxygen sensor locus length ratio)	0.6 or more
Number of times detection	8 times

## MONITOR RESULT

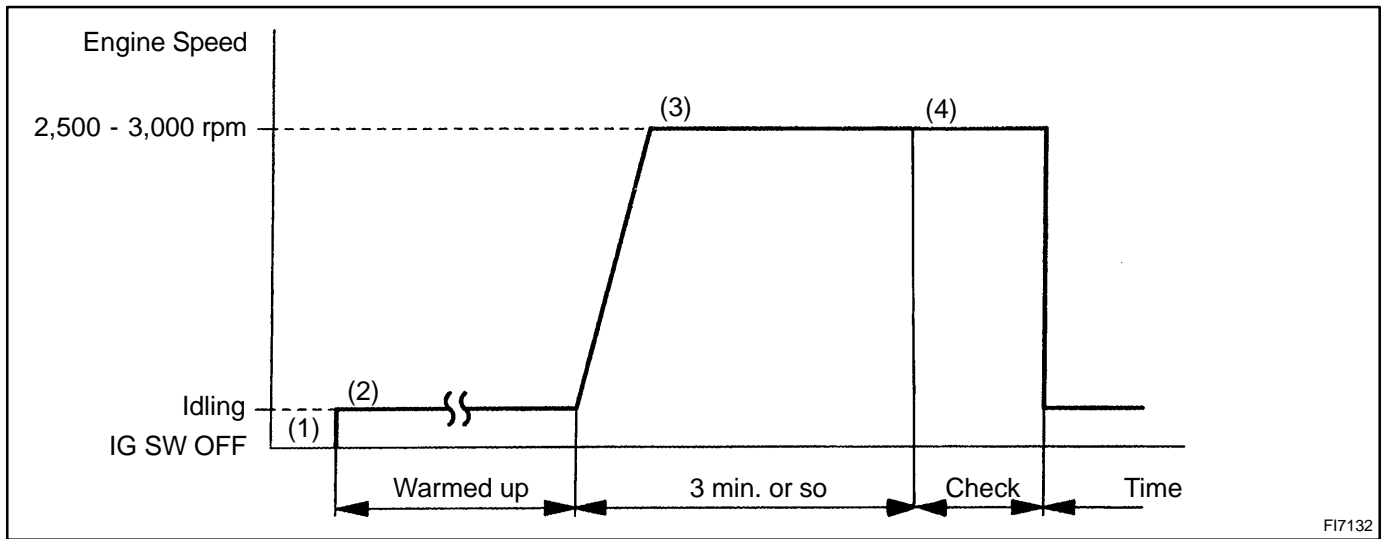
The detailed information is described in "CHECKING MONITOR STATUS" (see page [DI-3](#)).

- ▶ TID (Test Identification) is assigned to each emission-related component.
- ▶ TLT (Test Limit Type):  
If TLT is 0, the component is malfunctioning when the test value is higher than the test limit.  
If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.
- ▶ CID (Component Identification) is assigned to each test value.
- ▶ Unit Conversion is used to calculate the test value indicated on generic OBD scan tools.

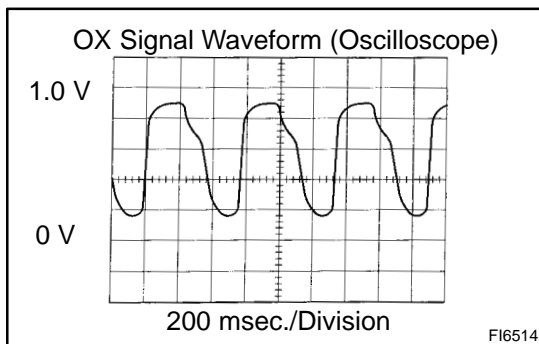
### TID \$01: Catalyst- Using Front HO2S and Rear HO2S

TLT	CID	Unit Conversion	Description of Test Value	Description of Test Limit
0	\$01	Multiply by 0.0078 (no dimension)	Catalyst deterioration level bank 1: Determined by waveform of front HO2S and rear HO2S	Malfunction criterion
0	\$02	Multiply by 0.0078 (no dimension)	Catalyst deterioration level bank 2: Determined by waveform of front HO2S and rear HO2S	Malfunction criterion

## CONFIRMATION ENGINE RACING PATTERN



- Connect the hand-held tester to the DLC3, or connect the probe of the oscilloscope between terminals OXL1, OXL2, OXR1, OXR2 and E1 of the ECM connector.
- Start the engine and warm it up with all accessories switched OFF until engine coolant temperature is stable.
- Race the engine at 2,500 - 3,000 rpm for about 3 minutes.
- After confirming that the waveform of the heated oxygen sensor (bank 1, 2 sensor 1 (OX1A, OX2A)), oscillate around 0.5 V during feedback to the ECM, check the waveform of the heated oxygen sensor (bank 1, 2 sensor 2 (OX1B, OX2B)).



### HINT:

If there is a malfunction in the system, the waveform of the heated oxygen sensor (bank 1, 2 sensor 2 (OX1B, OX2B)) is almost the same as that of the heated oxygen sensor (bank 1, 2 sensor 1 (OX1A, OX2A)) on the left.

There are some cases where, even though a malfunction exists, the MIL may either light up or not light up.

## INSPECTION PROCEDURE

**HINT:**

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

<b>1</b>	<b>Are there any other codes (besides DTC P0420 or P0430) being output?</b>
----------	---

**PREPARATION:**

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

**CHECK:**

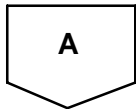
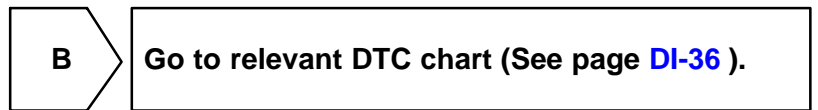
Read the DTC using the hand-held tester or the OBD II scan tool.

**RESULT:**

Display (DTC Output)	Proceed to
"P0420 and/or P0430"	A
"P0420 or P0430" and other DTCs	B

**HINT:**

If any other codes besides "P0420 and/or P0430" are output, perform the troubleshooting for those DTCs first.



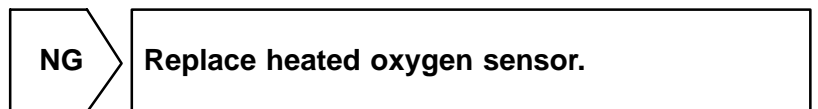
<b>2</b>	<b>Check gas leakage on exhaust system.</b>
----------	---



<b>3</b>	<b>Check heated oxygen sensor (bank 1, 2 sensor 1) (See page SF-57).</b>
----------	--

**HINT:**

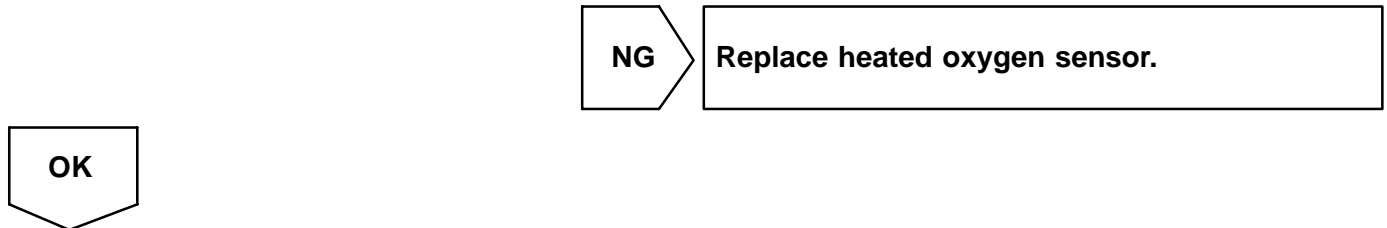
Refer to the hint following the end of this flowchart.



<b>4</b>	<b>Check heated oxygen sensor (bank 1, 2 sensor 2) (See page SF-57).</b>
----------	--

HINT:

Refer to the hint following the end of this flowchart.



**Replace the front and rear three-way catalytic converter in the bank a malfunction is detected.**

HINT:

Hand-held tester only:

The narrowing down the trouble area is possible by performing ACTIVE TEST of the following "A/F CONTROL" (Heated oxygen sensor or another can be distinguished).

(a) Perform ACTIVE TEST by hand-held tester (A/F CONTROL).

HINT:

"A/F CONTROL" is the ACTIVE TEST which changes the injection volume to -12.5 % or +25 %.

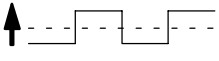

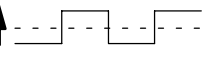
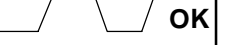
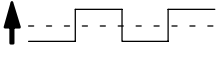
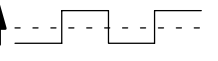
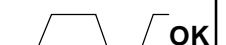
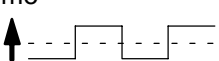

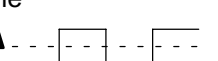
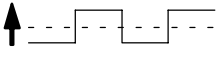
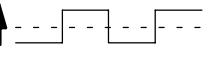
- (1) Connect the hand-held tester to the DLC3 on the vehicle.
- (2) Turn the ignition switch ON.
- (3) Warm up the engine with the engine speed at 2,500 rpm for approximately 90 seconds.
- (4) Select the item "DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL".
- (5) Perform "A/F CONTROL" with the engine in an idle condition (press the right or left button).

**RESULT:**

**Heated oxygen sensor reacts in accordance with increase and decrease of injection volume**  
**+25 % → rich output: More than 0.5 V**  
**-12.5 % → lean output: Less than 0.4 V**

**NOTICE:**

However, there is a few second delay in the sensor 1 (front sensor) output. And there is about 20 seconds delay in the sensor 2 (rear sensor).

	Output voltage of heated oxygen sensor (sensor 1: front sensor)	Output voltage of heated oxygen sensor (sensor 2: rear sensor)	Mainly suspect trouble area
Case 1	Injection volume +25 %    ↑ -12.5 %    ↓  Output voltage More than 0.5 V    ↑ Less than 0.4 V    ↓  <b>OK</b>	Injection volume +25 %    ↑ -12.5 %    ↓  Output voltage More than 0.5 V    ↑ Less than 0.4 V    ↓  <b>OK</b>	—
Case 2	Injection volume +25 %    ↑ -12.5 %    ↓  Output voltage Almost no reaction ————— <b>NG</b>	Injection volume +25 %    ↑ -12.5 %    ↓  Output voltage More than 0.5 V    ↑ Less than 0.4 V    ↓  <b>OK</b>	Sensor 1: front sensor (sensor 1, heater, sensor 1 circuit)
Case 3	Injection volume +25 %    ↑ -12.5 %    ↓  Output voltage More than 0.5 V    ↑ Less than 0.4 V    ↓  <b>OK</b>	Injection volume +25 %    ↑ -12.5 %    ↓  Output voltage Almost no reaction ————— <b>NG</b>	Sensor 2: rear sensor (sensor 2, heater, sensor 2 circuit)
Case 4	Injection volume +25 %    ↑ -12.5 %    ↓  Output voltage Almost no reaction ————— <b>NG</b>	Injection volume +25 %    ↑ -12.5 %    ↓  Output voltage Almost no reaction ————— <b>NG</b>	Extremely rich or lean of the actual air-fuel ratio (Injector, fuel pressure, gas leakage in exhaust system, etc.)

The following A/F CONTROL procedure enables the technician to check and graph the voltage output of the heated oxygen sensors (sensor 1 and 2).

For displaying the graph indication, enter "ACTIVE TEST / A/F CONTROL / USER DATA" then select "O2S B1S1 and O2S B1S2" by pressing "YES" button and push "ENTER" button before pressing "F4" button.

**NOTICE:**

If the vehicle is short of fuel, the air-fuel ratio becomes LEAN and DTCs P0133 and/or P0153 will be recorded, and the MIL then comes on.

- ▶ If different DTCs related to different systems while terminal E2 as ground terminal are output simultaneously, terminal E2 may be open.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- ▶ A high heated oxygen sensor (sensor 1) voltage (0.5 V or more) could be caused by a rich air fuel mixture. Check for conditions that would cause the engine to run rich.
- ▶ A low heated oxygen sensor (sensor 1) voltage (0.4 V or less) could be caused by a lean air fuel mixture. Check for conditions that would cause the engine to run lean.

<b>DTC</b>	<b>P0441</b>	<b>Evaporative Emission Control System Incorrect Purge Flow</b>
------------	--------------	---

<b>DTC</b>	<b>P0446</b>	<b>Evaporative Emission Control System Vent Control Circuit</b>
------------	--------------	---

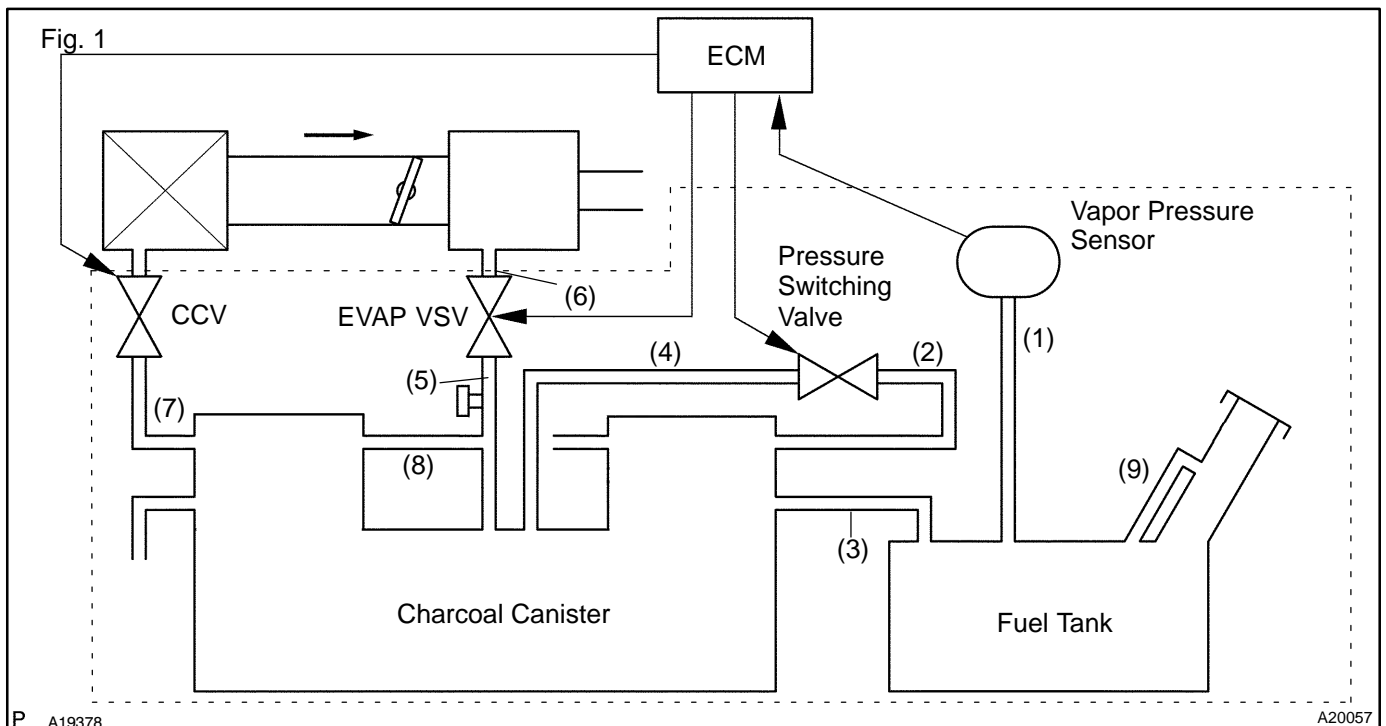
<b>DTC</b>	<b>P2418</b>	<b>Evaporative Emission System Valve Control Circuit/Open</b>
------------	--------------	---

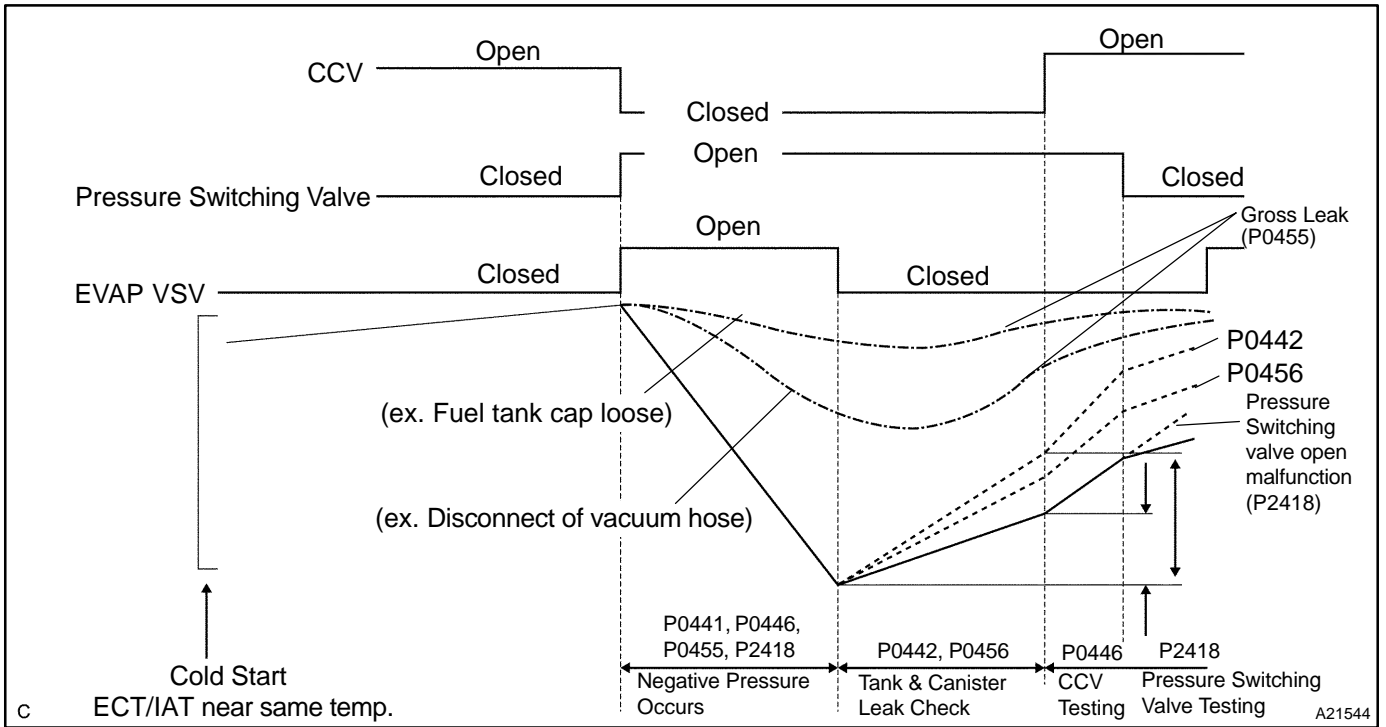
**CIRCUIT DESCRIPTION**

The vapor pressure sensor, canister closed valve (CCV), and pressure switching valve are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.

DTCs P0441, P0446 and P2418 are recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or when there is a malfunction in either the EVAP VSV, the pressure switching valve, or in the vapor pressure sensor itself.





DTC No.	DTC Detecting Condition	Trouble Area
P0441	Pressure in charcoal canister and fuel tank does not drop during purge control (2 trip detection logic)	▶ Vacuum hose cracks, holed, blocked, damaged or disconnected ((1), (2), (3), (4), (5), (6), (7), (8) and (9) in Fig. 1)
	During purge cut-off, pressure is very low compared with atmospheric pressure (2 trip detection logic)	▶ Fuel tank cap incorrectly installed ▶ Fuel tank cap cracked or damaged
P0446	No fuel tank pressure rise when commanding the CCV open after an EVAP leak test	▶ Open or short in vapor pressure sensor circuit ▶ Vapor pressure sensor
	A high negative pressure (vacuum) does not occurs in the system when commanding the EVAP VSV open and CCV closed with the pressure switching valve open	▶ Open or short in VSV circuit for EVAP ▶ EVAP VSV
		▶ Open or short in VSV circuit for CCV ▶ CCV
P2418	No fuel tank pressure change when commanding the pressure switching valve closed for the check after the EVAP leak test	▶ Open or short in VSV circuit for pressure switching valve ▶ Pressure switching valve
	A high negative pressure (vacuum) does not occurs in the system when commanding the EVAP VSV open and CCV closed with the pressure switching valve open	▶ Fuel tank cracked, holed or damaged ▶ Charcoal canister cracked, holed or damaged
		▶ ECM

**HINT:**

**Typical DTC output of each trouble part**

Trouble part		Typical DTC output (*1)
Small Leak		P0442 and/or P0456
Medium Leak (ex.: Vacuum hose loose)		P0455
Large Leak (ex.: Fuel tank cap loose)		P0441, P0446, P0455 and P2418
EVAP VSV	Open Malfunction	P0441
	Close Malfunction	P0441, P0446, P0455 and P2418
CCV	Open Malfunction	P0441, P0446, P0455 and P2418
	Close Malfunction	P0446
Pressure Switching Valve	Open Malfunction	P2418
	Close Malfunction	P0441, P0446, P0455 and P2418

\*1: ECM may output some other DTC combination.



## MONITOR DESCRIPTION

### **P0441**

The ECM checks for a stuck closed malfunction in the EVAP VSV by commanding it to open with the CCV closed. If a high negative pressure does not develop in the fuel tank, the ECM determines that the EVAP VSV remains closed. The ECM turns on the MIL and a DTC is set.

The ECM checks for EVAP VSV "stuck open" fault by commanding both valves (EVAP VSV and CCV) to close at a time when the fuel tank is at atmospheric pressure. If the fuel tank develops a high negative pressure at this early stage of the test, the ECM determines that the EVAP VSV is stuck OPEN.

The ECM will turn on the MIL and a DTC is set.

### **P0446**

The ECM checks the CCV "stuck closed" by commanding the CCV to open after the EVAP leak test. If the fuel tank pressure does not rise (lose vacuum), the ECM determines that the CCV is stuck closed. The ECM will turn on the MIL and a DTC is set.

If the EVAP VSV "stuck closed" is detected, the ECM determines that the CCV is "stuck open". The ECM turns on the MIL and a DTC is set.

### **P2418**

The ECM checks the pressure switching valve (bypass VSV) "stuck open" by commanding the pressure switching valve to close after the EVAP leak test. If the fuel tank pressure does not change, the ECM determines that the pressure switching valve is malfunctioning. The ECM will turn on the MIL and a DTC is set.

If the EVAP VSV "stuck closed" is detected, the ECM determines that the CCV is "stuck closed". The ECM turns on the MIL and a DTC is set.

## MONITOR STRATEGY

Related DTCs	P0441	EVAP VSV malfunction
	P0446	CCV malfunction
	P2418	Bypass VSV malfunction
Required sensors/components	EVAP VSV, CCV, Bypass VSV and Vapor pressure sensor	
Frequency of operation	Once per drive cycle	
Duration	P0441 : 90 sec. P0446 : 10 sec. P2418 : 10 sec.	
MIL operation	2 drive cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Same as P0442 (see page [DI-245](#) ).

## TYPICAL MALFUNCTION THRESHOLDS

### P0441

Detection Criteria	Threshold
Either the following condition is met:	A or B
A. Following conditions are met:	(a) and (b)
(a) Fuel tank pressure at the vacuum introduction start	-1.6 kPa (-12 mmHg, -0.47 in.Hg) or more
(b) Difference between the fuel tank pressure at the vacuum introduction start and completion	Less than 0.9 kPa (7 mmHg, 0.27 in.Hg)
B. Following conditions are met:	(a) and (b)
(a) Difference between "minimum" fuel tank pressure before the leak check and the fuel tank pressure at 14 sec. after the leak check	0.5 kPa or more (3.5 mmHg, 0.15 in.Hg)
(b) Fuel tank pressure at 14 sec. after the leak check	Less than -3.7 kPa (-28 mmHg, -1.1 in.Hg)

### P0446

Case 1: CCV stuck closed	
Fuel tank pressure when the CCV is opened after an EVAP leak check	Not changing
Case 2: CCV stuck open	
Fuel tank pressure after the EVAP VSV is opened and manifold vacuum is introduced to the fuel tank	Not changing

### P2418

Case 1: Bypass VSV stuck open	
Fuel tank pressure when the pressure switching valve is closed after an EVAP leak check	Not changing
Case 2: Bypass VSV stuck closed	
Fuel tank pressure after the EVAP VSV is opened and manifold vacuum is introduced to the fuel tank	Not changing

## MONITOR RESULT

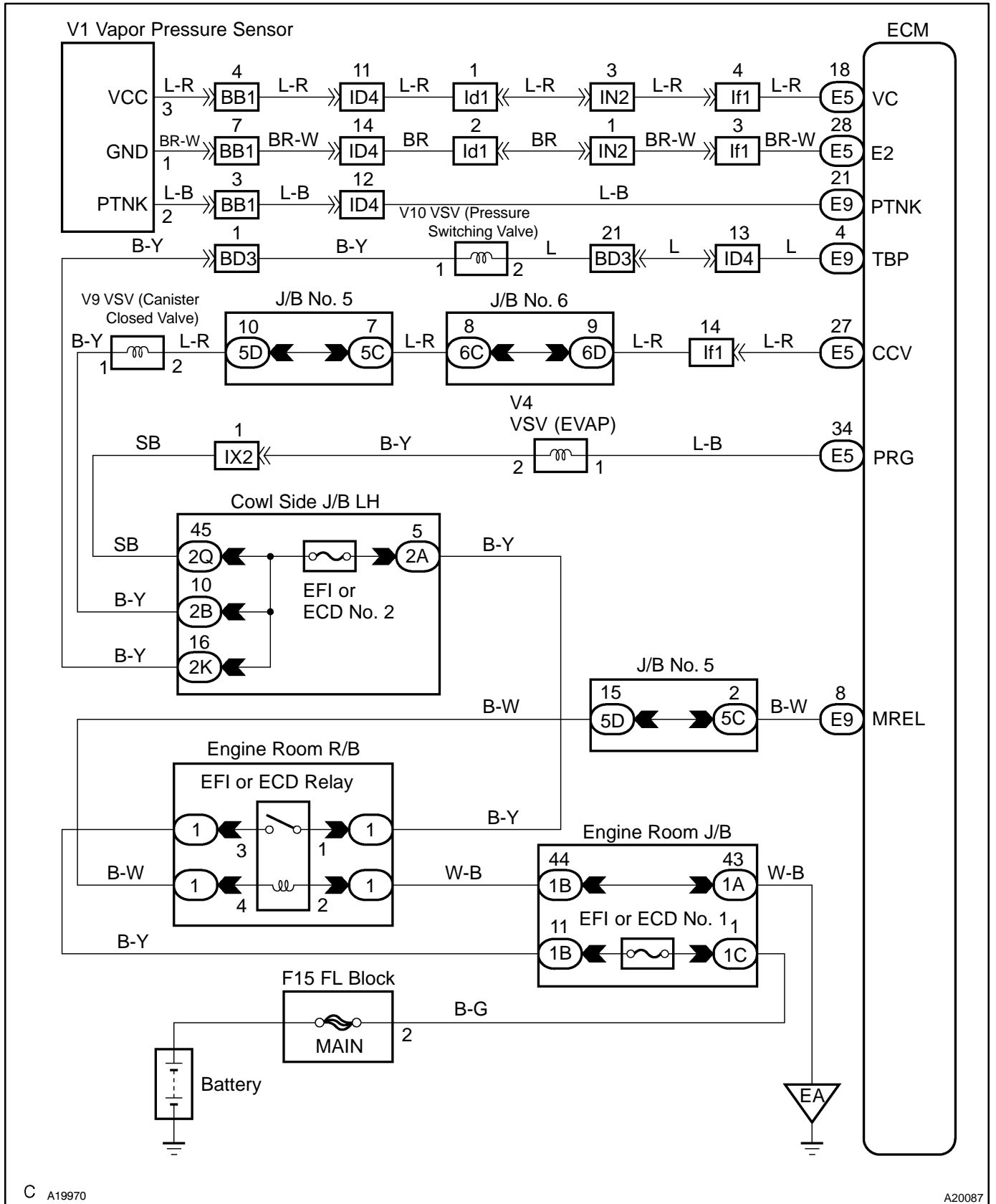
The detailed information is described in "CHECKING MONITOR STATUS" (see page [DI-3](#)).

- ▶ TID (Test Identification) is assigned to each emission-related component.
- ▶ TLT (Test Limit Type):  
If TLT is 0, the component is malfunctioning when the test value is higher than the test limit.  
If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.
- ▶ CID (Component Identification) is assigned to each test value.
- ▶ Unit Conversion is used to calculate the test value indicated on generic OBD scan tools.

### TID \$02: EVAP - Vacuum Monitor

TLT	CID	Unit Conversion	Description of Test Value	Description of Test Limit
1	\$01	Multiply by 0.0916 (mmHg)	Test value of EVAP VSV: Determined by fuel tank pressure change during vacuum introduction	Malfunction criterion
1	\$02	Multiply by 0.0458 and subtract 2.93 (mmHg)	Test value of bypass VSV (pressure switching valve): Determined by fuel tank pressure change at switching over bypass VSV	Malfunction criterion
0	\$03	Multiply by 0.0458 (mmHg)	Test value of 0.04 inch leak: Determined by fuel tank pressure change	Malfunction criterion
0	\$04	Multiply by 0.0458 (mmHg)	Test value of 0.02 inch leak: Determined by fuel tank pressure change	Malfunction criterion
1	\$05	Multiply by 0.0458 and subtract 2.93 (mmHg)	Test value of CCV: Determined by fuel tank pressure change at switching over CCV	Malfunction criterion

# WIRING DIAGRAM



C A19970

A20087

### INSPECTION PROCEDURE

HINT:

- ▶ If DTC P0441 (Purge Flow), P0446 (CCV) or P2418 (Pressure switching valve) or P0451 (Evaporative Pressure Sensor) is output with DTC P0442, P0455 or P0456, first troubleshoot DTC P0441, P0446 or P0451. If no malfunction is detected, troubleshoot DTC P0442, P0455 or P0456 next.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.
- ▶ When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

#### Hand-held tester:

<b>1</b>	<b>Check that fuel tank cap meets OEM specifications.</b>
----------	---

<b>NG</b>	<b>Replace with a cap that meets OEM specifications.</b>
-----------	--

<b>OK</b>
-----------

<b>2</b>	<b>Check that fuel tank cap is correctly installed.</b>
----------	---

<b>NG</b>	<b>Correctly install fuel tank cap.</b>
-----------	---

<b>OK</b>
-----------

<b>3</b>	<b>Check fuel tank cap (See page <a href="#">EC-5</a>).</b>
----------	---

<b>NG</b>	<b>Replace fuel tank cap.</b>
-----------	-------------------------------

<b>OK</b>
-----------

<b>4</b>	<b>Check filler neck for damage.</b>
----------	--------------------------------------

**PREPARATION:**

Remove the fuel tank cap.

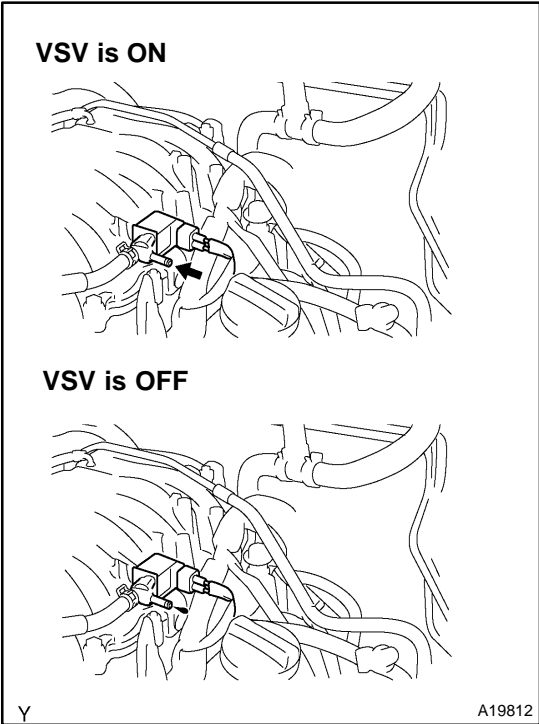
**CHECK:**

Visually inspect the filler neck for damage.

<b>NG</b>	<b>Replace filler pipe.</b>
-----------	-----------------------------

<b>OK</b>
-----------

<b>5</b>	<b>Check purge flow.</b>
----------	--------------------------



**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Select the "ENHANCED OBD II / ACTIVE TEST" mode on the hand-held tester.
- (c) Disconnect the vacuum hose for the EVAP VSV from the charcoal canister.
- (d) Start the engine.
- (e) Select the item "EVAP (ALON) / ALL" in the ACTIVE TEST and operate EVAP VSV.

**CHECK:**

When the EVAP VSV is operated by the hand-held tester, check whether the disconnected hose applies suction to your finger.

**OK:**

- VSV is ON:**  
Disconnected hose applies suction to your finger.
- VSV is OFF:**  
Disconnected hose applies no suction to your finger.

<b>OK</b>	<b>Go to step 9.</b>
-----------	----------------------

<b>NG</b>
-----------

<b>6</b>	<b>Check vacuum hose between intake manifold and EVAP VSV, and EVAP VSV and charcoal canister.</b>
----------	--

**CHECK:**

- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole, damage and blockage.

**NG****Repair or replace vacuum hose.****OK**

<b>7</b>	<b>Check operation of EVAP VSV (See page <a href="#">SF-44</a> ).</b>
----------	---

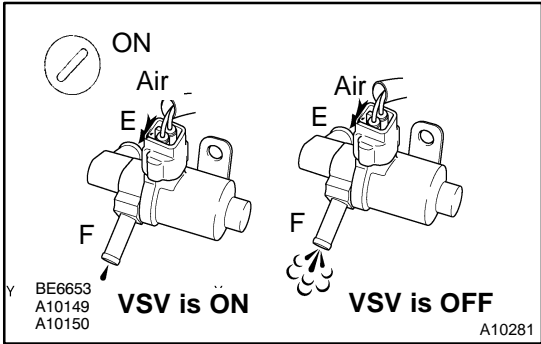
**NG****Replace EVAP VSV.****OK**

<b>8</b>	<b>Check for open and short in harness and connector between EFI or ECD relay and EVAP VSV, and EVAP VSV and ECM (See page <a href="#">IN-36</a> ).</b>
----------	---

**NG****Repair or replace harness or connector.****OK**

<b>Replace ECM (See page <a href="#">SF-60</a> ).</b>
---

<b>9</b>	<b>Check CCV.</b>
----------	-------------------



**PREPARATION:**

- (a) Disconnect the vacuum hose for the CCV VSV from the charcoal canister.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the "ENHANCED OBD II / ACTIVE TEST" mode on the hand-held tester.
- (d) Select the item "CAN CTRL VSV / ALL" in the ACTIVE TEST and operate CCV.

**CHECK:**

Check the VSV operation when it is operated by the hand-held tester.

**OK:**

**VSV is ON:**

**Air does not flow from port E to port F.**

**VSV is OFF:**

**Air from port E flows out through port F.**

<b>OK</b>	Go to step 13.
-----------	----------------

<b>NG</b>
-----------

<b>10</b>	<b>Check vacuum hose between CCV and charcoal canister.</b>
-----------	---

**CHECK:**

- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole damage, and blockage.

<b>NG</b>	Repair or replace vacuum hose.
-----------	--------------------------------

<b>OK</b>
-----------

<b>11</b>	<b>Check operation of CCV (See page SF-48 ).</b>
-----------	--

<b>NG</b>	Replace CCV.
-----------	--------------

<b>OK</b>
-----------



- 12 Check for open and short in harness and connector between EFI or ECD relay and CCV, and CCV and ECM (See page [IN-36](#) ).

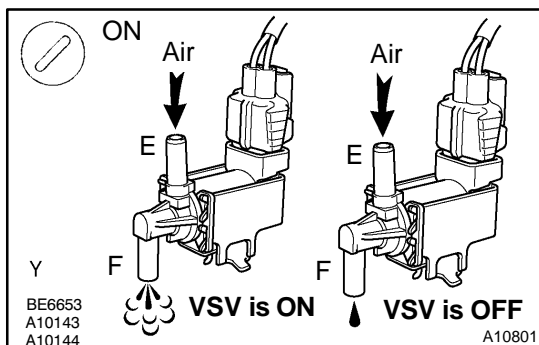
NG

Repair or replace harness or connector.

OK

Replace ECM (See page [SF-60](#) ).

- 13 Check pressure switching valve.

**PREPARATION:**

- Turn the ignition switch ON and push the hand-held tester main switch ON.
- Select the "ENHANCED OBD II / ACTIVE TEST" mode on the hand-held tester.
- Select the item "TANK BYPASS VSV / ALL" in the ACTIVE TEST and operate pressure switching valve.

**CHECK:**

Check the VSV operation when it is operated by the hand-held tester.

**OK:****VSV is ON:**

Air from port E flows out through port F.

**VSV is OFF:**

Air does not flow from port E to port F.

OK

Go to step 16.

NG

- 14 Check operation of pressure switching valve (See page [SF-46](#) ).

NG

Replace pressure switching valve.

OK

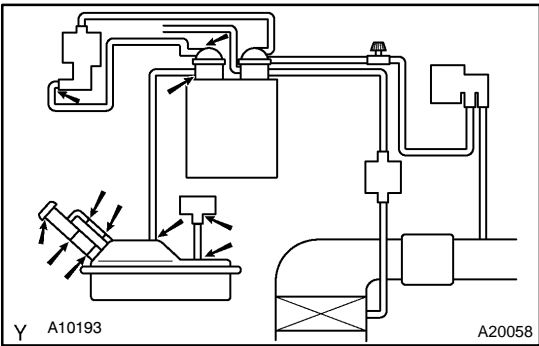
<b>15</b>	<b>Check for open and short in harness and connector between EFI or ECD relay and pressure switching valve, and pressure switching valve and ECM (See page IN-36).</b>
-----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

**OK**

**Replace ECM (See page SF-60).**

<b>16</b>	<b>Check whether hose close to fuel tank has been modified, and check whether there are signs of any accident near fuel tank.</b>
-----------	---



**CHECK:**  
Check for cracks, deformation and loose connection of the following parts:

- ▶ Fuel tank
- ▶ Fuel tank filler pipe
- ▶ Hoses and tubes around fuel tank

<b>NG</b>	<b>Repair or replace evaporative emission leak part.</b>
-----------	--

**OK**

<b>17</b>	<b>Check vacuum hoses between vapor pressure sensor and fuel tank, and charcoal canister and pressure switching valve.</b>
-----------	--

**CHECK:**

- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole and damage.

<b>NG</b>	<b>Repair or replace vacuum hose.</b>
-----------	---------------------------------------

**OK**

<b>18</b>	<b>Check hose and tube between fuel tank and charcoal canister.</b>
-----------	---

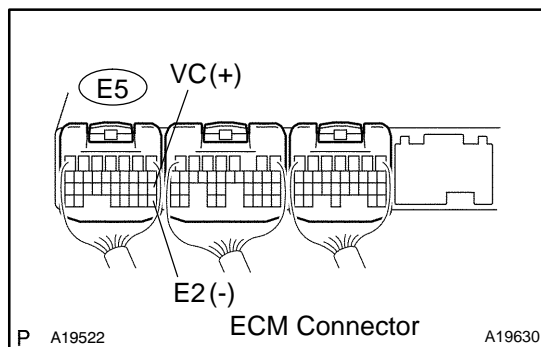
**CHECK:**

- (a) Check for proper connection of the fuel tank and fuel evap pipe (See page [EC-2](#) ), fuel evap pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.
- (b) Check the hose and tube for cracks, hole and damage.

<b>NG</b>	<b>Repair or replace hose and tube.</b>
-----------	---

<b>OK</b>
-----------

<b>19</b>	<b>Check voltage between terminals VC and E2 of ECM connector.</b>
-----------	--

**CHECK:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals the E5 ECM connector.

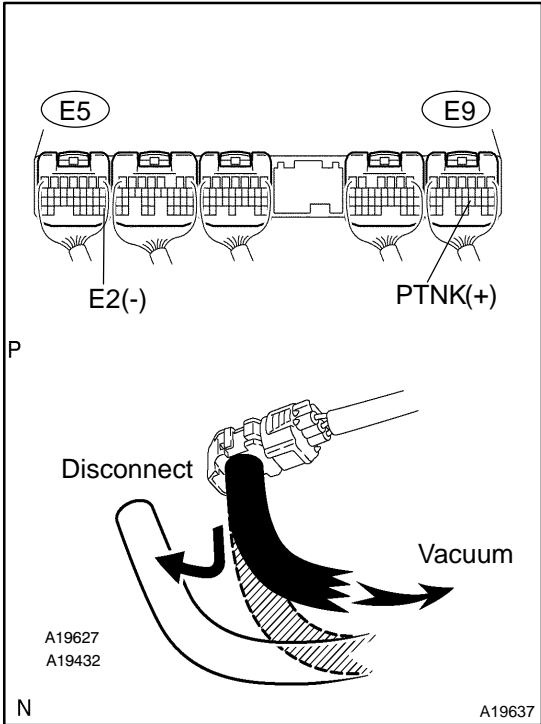
**OK:**

Tester Connection	Specified Condition
VC (E5-18) - E2 (E5-28)	4.5 to 5.5 V

<b>NG</b>	<b>Replace ECM (See page <a href="#">SF-60</a> ).</b>
-----------	---

<b>OK</b>
-----------

**20** Check voltage between terminals PTNK and E2 of ECM connectors.



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals PTNK and E2 of the ECM connectors at following condition (1) and (2).

- (1) Disconnect the vacuum hose from the vapor pressure sensor.
- (2) Using the MITYVAC (Hand-Held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.

**NOTICE:**

The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).

**OK:**

Condition (1) Voltage: 2.9 to 3.7 V

Condition (2) Voltage: 0.5 V or less

**OK** → Go to step 22.

**NG**

**21** Check for open and short in harness and connector between vapor pressure sensor and ECM (See page [IN-36](#) ).

**NG** → Repair or replace harness or connector.

**OK**

Replace ECM (See page [SF-60](#) ).

**22** Check fuel tank inlet valve.

**NG** → Replace fuel tank inlet valve.

**OK**

<b>23</b>	<b>Check fuel tank.</b>
-----------	-------------------------

<b>NG</b>	<b>Replace fuel tank.</b>
-----------	---------------------------

<b>OK</b>
-----------

<b>24</b>	<b>Check charcoal canister for cracks, hole and damage.</b>
-----------	---

<b>NG</b>	<b>Replace charcoal canister.</b>
-----------	-----------------------------------

<b>OK</b>
-----------

<b>Replace ECM (See page <a href="#">SF-60</a> ).</b>
---

**OBD II scan tool (excluding hand-held tester):**

<b>1</b>	<b>Check that fuel tank cap meets OEM specifications.</b>
----------	---

<b>NG</b>	<b>Replace with a cap that meets OEM specifications.</b>
-----------	--

<b>OK</b>
-----------

<b>2</b>	<b>Check that fuel tank cap is correctly installed.</b>
----------	---

<b>NG</b>	<b>Correctly install fuel tank cap.</b>
-----------	---

<b>OK</b>
-----------

<b>3</b>	<b>Check fuel tank cap (See page <a href="#">EC-5</a>).</b>
----------	---

<b>NG</b>	<b>Replace fuel tank cap.</b>
-----------	-------------------------------

<b>OK</b>
-----------

<b>4</b>	<b>Check filler neck for damage.</b>
----------	--------------------------------------

**PREPARATION:**

Remove the fuel tank cap.

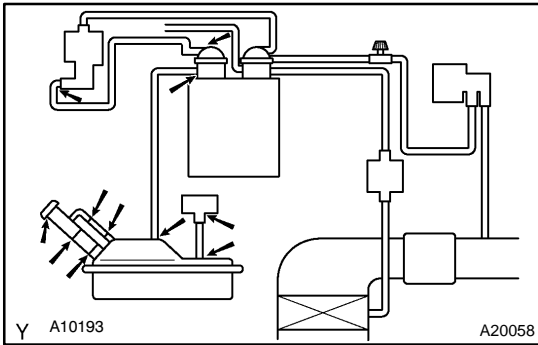
**CHECK:**

Visually inspect the filler neck for damage.

<b>NG</b>	<b>Replace filler pipe.</b>
-----------	-----------------------------

<b>OK</b>
-----------

- 5 Check whether hose close to fuel tank has been modified, and check whether there are signs of any accident near fuel tank or charcoal canister.**

**CHECK:**

Check for cracks, deformation and loose connection of the following parts:

- ▶ Fuel tank
- ▶ Charcoal canister
- ▶ Fuel tank filler pipe
- ▶ Hoses and tubes around fuel tank and charcoal canister

**NG**

**Repair or replace evaporative emissions leak part.**

**OK**

- 6 Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and pressure switching valve.**

**CHECK:**

- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole and damage.

**NG**

**Repair or replace vacuum hose.**

**OK**

- 7 Check hose and tube between fuel tank and charcoal canister.**

**CHECK:**

- (a) Check for proper connection of the fuel tank and fuel evap pipe (See page [EC-2](#)), fuel evap pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.
- (b) Check the hose and tube for cracks, hole and damage.

**NG**

**Repair or replace hose and tube.**

**OK**

<b>8</b>	<b>Check vacuum hoses ((8) and (9) in Fig. 1 in circuit description).</b>
----------	---

**CHECK:**

- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole damage, and blockage.

<b>NG</b>	<b>Repair or replace vacuum hose.</b>
-----------	---------------------------------------

<b>OK</b>
-----------

<b>9</b>	<b>Check VSV connector for EVAP, VSV connector for CCV, VSV connector for pressure switching valve and vapor pressure sensor connector for looseness and disconnection.</b>
----------	---

<b>NG</b>	<b>Repair or connect VSV or sensor connector.</b>
-----------	---

<b>OK</b>
-----------

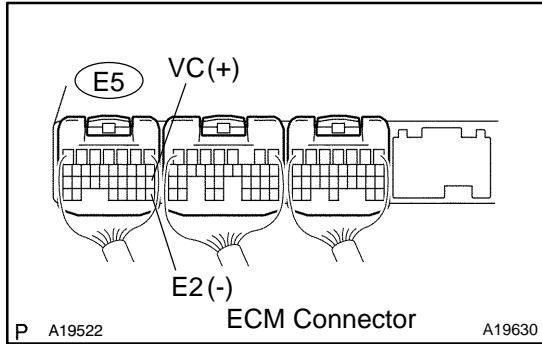
<b>10</b>	<b>Check charcoal canister for cracks, hole and damage.</b>
-----------	---

<b>NG</b>	<b>Replace charcoal canister.</b>
-----------	-----------------------------------

<b>OK</b>
-----------



**11 Check voltage between terminals VC and E2 of ECM connector.**



**CHECK:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals the E5 ECM connector.

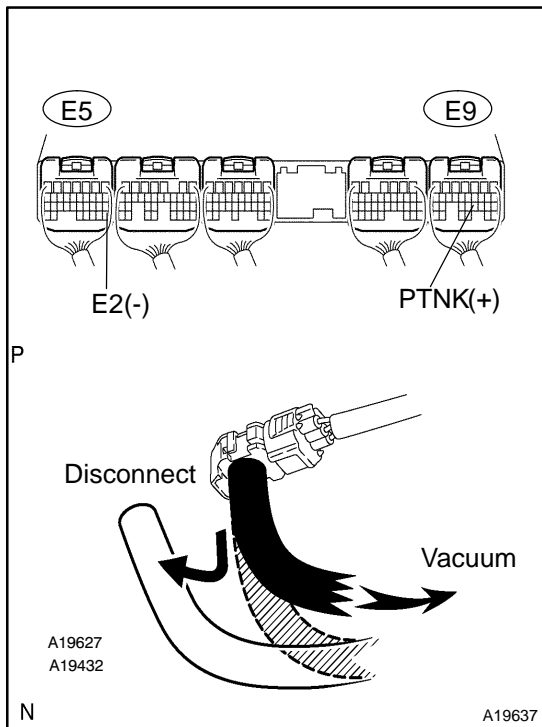
**OK:**

Tester Connection	Specified Condition
VC (E5-18) - E2 (E5-28)	4.5 to 5.5 V

**NG** → **Replace ECM (See page SF-60 ).**

**OK**

**12 Check voltage between terminals PTNK and E2 of ECM connectors.**



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals PTNK and E2 of the ECM connectors at following condition (1) and (2).

- (1) Disconnect the vacuum hose from the vapor pressure sensor.
- (2) Using the MITYVAC (Hand-Held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.

**NOTICE:**

The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).

**OK:**

Condition (1) Voltage: 2.9 to 3.7 V

Condition (2) Voltage: 0.5 V or less

**OK** → **Go to step 14.**

**NG**

**13** Check for open and short in harness and connector between vapor pressure sensor and ECM (See page [IN-36](#) ).

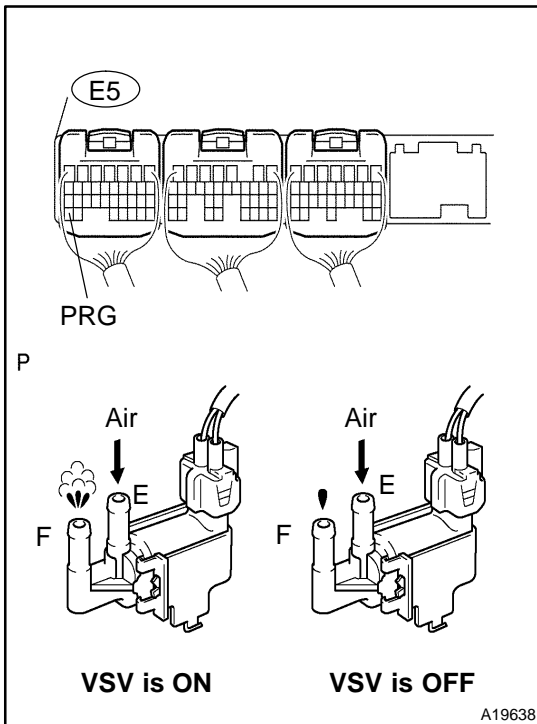
**NG**

Repair or replace harness or connector.

**OK**

Replace ECM (See page [SF-60](#) ).

**14** Check EVAP VSV.



**PREPARATION:**

- Remove the glove compartment door (See page [SF-60](#) ).
- Turn the ignition switch ON.

**CHECK:**

Check the VSV function.

- Connect between terminal PRG of the ECM connector and body ground (ON).
- Disconnect between terminal PRG of the ECM connector and body ground (OFF).

**OK:**

- VSV is ON:**  
Air from port E flows out through port F.
- VSV is OFF:**  
Air does not flow from port E to port F.

**OK**

Go to step 17.

**NG**

**15** Check operation of EVAP VSV (See page [SF-44](#) ).

**NG**

Replace EVAP VSV.

**OK**

**16** Check for open and short in harness and connector between EFI or ECD relay and EVAP VSV, and EVAP VSV and ECM (See page [IN-36](#) ).

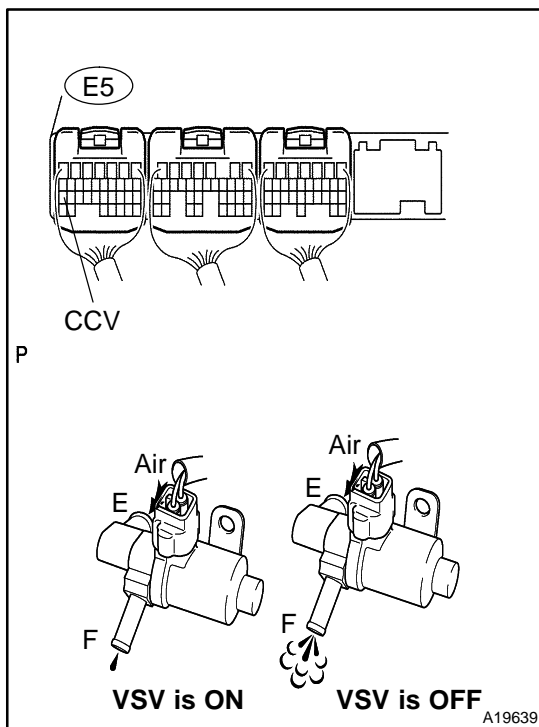
**NG**

Repair or replace harness or connector.

**OK**

Replace ECM (See page [SF-60](#) ).

**17** Check CCV.



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Check the VSV function.

- (1) Connect the terminal CCV of the ECM connector and body ground (ON).
- (2) Disconnect the terminal CCV of the ECM connector and body ground (OFF).

**OK:**

- (1) **VSV is ON:**  
Air does not flow from port E to port F.
- (2) **VSV is OFF:**  
Air from port E flows out through port F.

**OK**

Go to step 20.

**NG**

**18** Check operation of CCV (See page [SF-48](#) ).

**NG**

Replace CCV.

**OK**

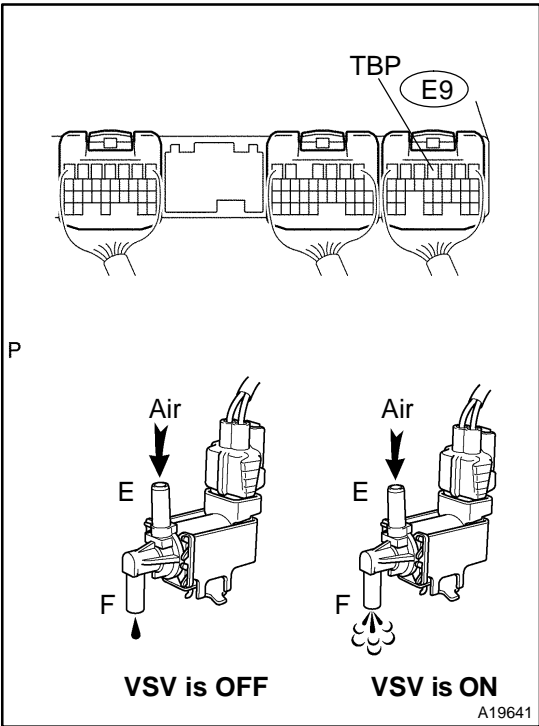
19 Check for open and short in harness and connector between EFI or ECD relay and CCV, and CCV and ECM (See page IN-36 ).

NG Repair or replace harness or connector.

OK

Replace ECM (See page SF-60 ).

20 Check pressure switching valve.



**PREPARATION:**  
Turn the ignition switch ON.

- CHECK:**  
Check the VSV function.
- (1) Connect the terminal TBP of the ECM connector and body ground (ON).
  - (2) Disconnect the terminal TBP of the ECM connector and body ground (OFF).

- OK:**
- (1) VSV is ON:  
Air does not flow from port E to port F.
  - (2) VSV is OFF:  
Air from port E flows out through port F.

OK Go to step 23.

NG

21 Check operation of pressure switching valve (See page SF-46 ).

NG Replace pressure switching valve.

OK

22	Check for open and short in harness and connector between EFI or ECD relay and pressure switching valve, and pressure switching valve and ECM (See page <a href="#">IN-36</a> ).
----	--

NG

Repair or replace harness or connector.

OK

Replace ECM (See page [SF-60](#)).

23	Check fuel tank inlet valve.
----	------------------------------

NG

Replace fuel tank inlet valve.

OK

24	Check fuel tank.
----	------------------

NG

Replace fuel tank.

OK

It is likely that vehicle user did not properly close fuel tank cap.

<b>DTC</b>	<b>P0442</b>	<b>Evaporative Emission Control System Leak Detected (Small Leak)</b>
------------	--------------	---

<b>DTC</b>	<b>P0455</b>	<b>Evaporative Emission Control System Leak Detected (Gross Leak)</b>
------------	--------------	---

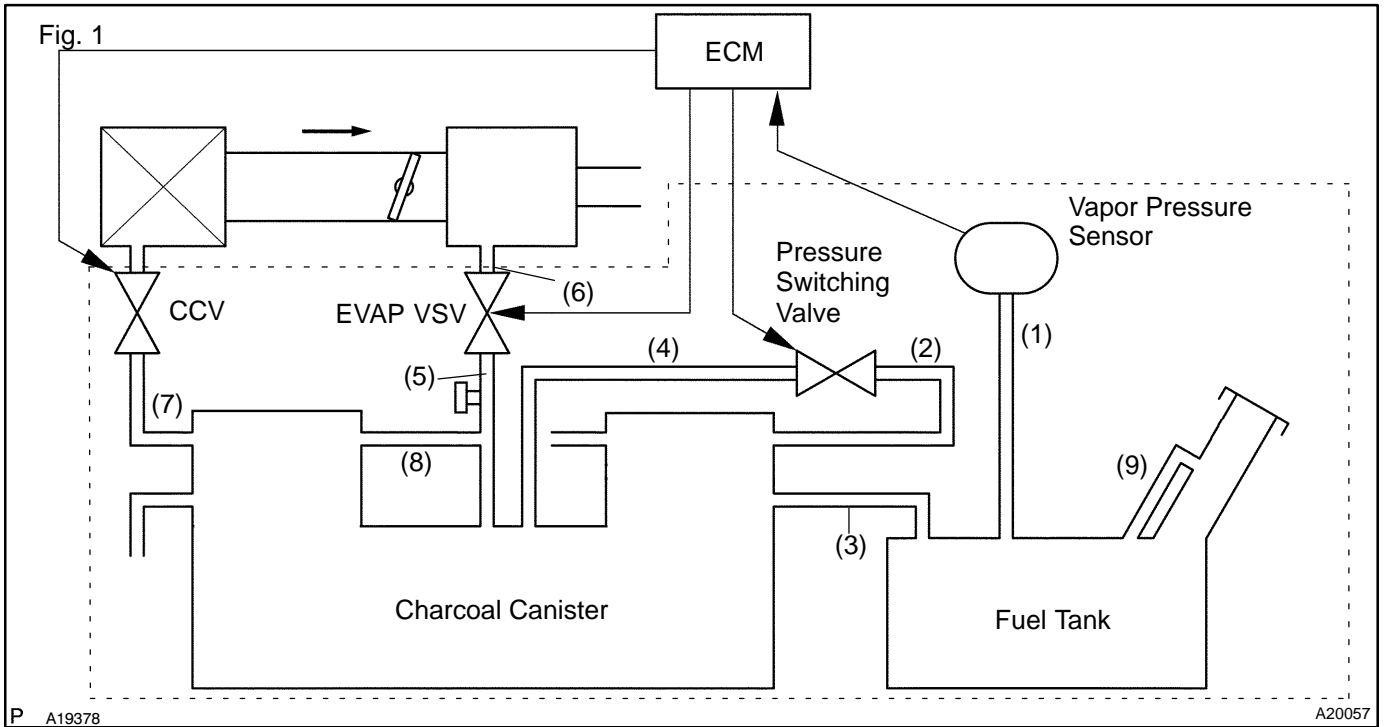
<b>DTC</b>	<b>P0456</b>	<b>Evaporative Emission Control System Leak Detected (Very Small Leak)</b>
------------	--------------	--

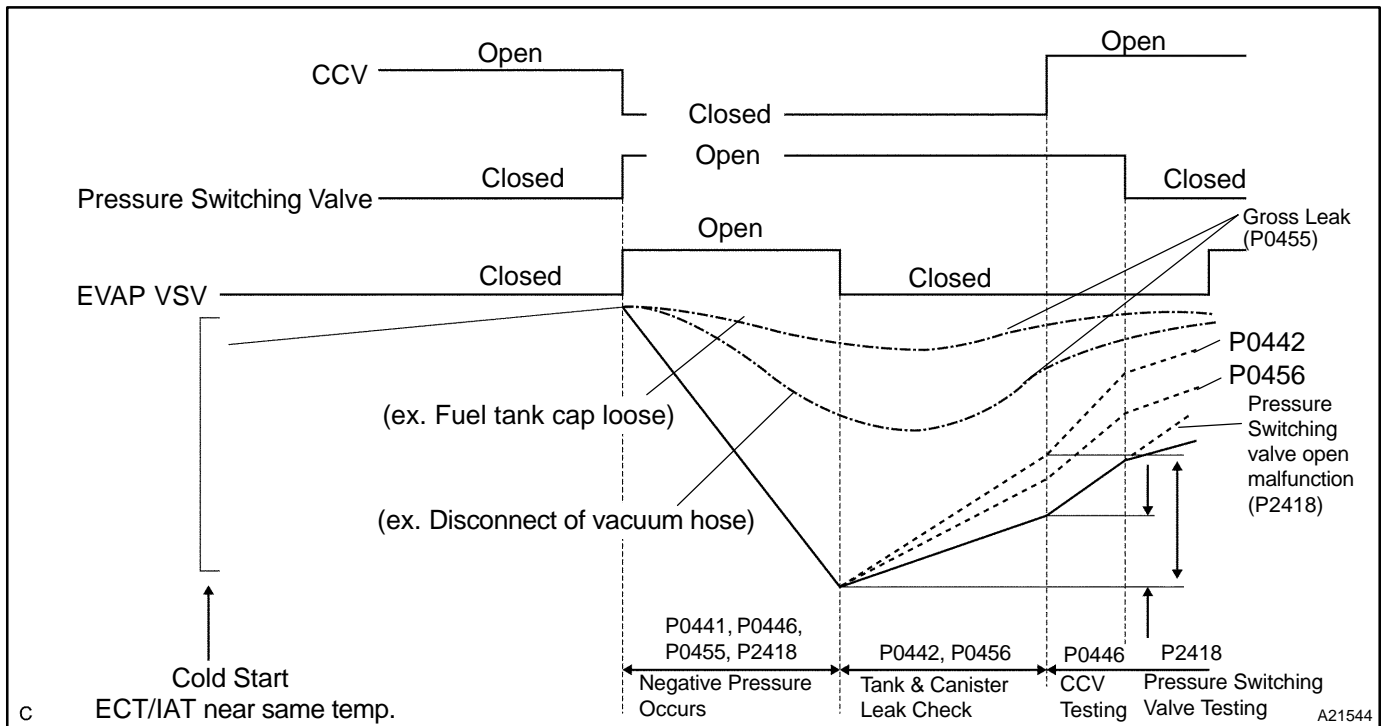
**CIRCUIT DESCRIPTION**

The vapor pressure sensor, canister closed valve (CCV) and pressure switching valve are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.

DTC P0442, P0455 or P0456 is recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or when the vapor pressure sensor malfunctions.





## MONITOR DESCRIPTION

A leak in the evaporative emission system prompts the ECM to set DTC P0442, P0455 or P0456. The ECM checks for leaks in the system by introducing a high negative pressure (vacuum) from the intake manifold by commanding the EVAP VSV open while the CCV (vent) is closed and the pressure switching valve is open. After sufficient time has elapsed the fuel tank should have developed a high negative pressure (vacuum) and the EVAP VSV closed. The ECM then monitors the pressure-rise (loss of vacuum) in the fuel tank. If the pressure rises too rapidly, the ECM concludes that there is a leak in the system. The ECM will turn on the MIL and set a DTC.

The ECM has separate DTCs for small and large leaks:

- (1) DTC P0442 is set when the internal fuel tank pressure has a large increase and the EVAP system has a small leak.
- (2) DTC P0455 is set when the EVAP system has various large leaks. Even though the ECM sends a signal to the EVAP VSV (when CCV is closed) to create a vacuum, the internal fuel tank pressure does not decrease beyond a specified level.
- (3) DTC P0456 is set when the internal fuel tank pressure increase slightly and the EVAP system has a small leak.

**HINT:**

Refer to DTCs P0441, P0446 and P2418

DTC No.	DTC Detecting Condition	Trouble Area
P0442	After the negative pressure introduction has been completed, if the pressure in the EVAP system sharply increases.	After the negative pressure introduction has been completed, if the pressure in the EVAP system sharply increases. ▶Hose or tube cracked, holed, damaged or loose seal ((3) in Fig. 1)
P0455	If the vacuum is not strong enough, the ECM assumes the EVAP system has a large hole.	▶Fuel tank cap incorrectly installed ▶Fuel tank cap cracked or damaged ▶Vacuum hose cracked, holed, blocked, damaged or disconnected ((1), (2), (4), (5), (6), (7), (8) and (9) in Fig. 1)
P0456	If the pressure in the EVAP system slightly increase while the ECM performs a leak check.	▶Fuel tank cracked, holed or damaged ▶Charcoal canister cracked, holed or damaged ▶Open or short in vapor pressure sensor circuit ▶Vapor pressure sensor ▶ECM

**HINT:**

Typical DTC output of each trouble part

Trouble part		Typical DTC output (*1)
Small Leak		P0442 and/or P0456
Medium Leak (ex: Vacuum hose loose)		P0455
Large Leak (ex: Fuel tank cap loose)		P0441, P0446, P0455 and P2418
EVAP VSV	Open Malfunction	P0441
	Close Malfunction	P0441, P0446, P0455 and P2418
CCV	Open Malfunction	P0441, P0446, P0455 and P2418
	Close Malfunction	P0446
Pressure Switching Valve	Open Malfunction	P2418
	Close Malfunction	P0441, P0446, P0455 and P2418

\*1: ECM may output some other DTC combination.

**MONITOR STRATEGY**

Related DTCs	P0442	Small leak (0.040 inch or more large hole) is detected
	P0455	Gross leak detected
	P0456	Very small leak (0.020 inch hole) is detected
Required sensors/components	Main sensors/components	Vapor pressure sensor
	Related sensors/components	Mass air flow sensor, Engine coolant temperature sensor EVAP VSV (purge VSV), CCV
Frequency of operation	Once per drive cycle	
Duration	60 sec.	
MIL operation	2 drive cycles	
Sequence of operation	None	



## TYPICAL ENABLING CONDITIONS

Item	Criteria	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>Common pre-conditions for 0.020, 0.040 inch and gross:</b>		
Altitude	-	2,400 m (7,872 ft.)
Throttle position learning	Completed	
Vapor pressure sensor	No malfunction	
Difference between intake air temperature and engine coolant temperature at engine start	-7 °C (-13°F)	11.1°C (20°F)
Vehicle speed condition	A or B	
A. Time after vehicle stopped (Less than 10 km/h (6 mph))	90 sec.	-
B. Time after vehicle started (7 km/h (4 mph) or more)	20 sec.	-
<b>0.020 inch malfunction detection:</b>		
Engine coolant temperature at engine start	10°C (50°F)	32°C (89.6°F)
Intake air temperature at engine start	10°C (50°F)	32°C (89.6°F)
Intake air temperature	10°C (50°F)	-
Fuel level condition in fuel tank during leak check	Fuel slosh is small (must not drive on road in bad conditions)	
Time after engine start	-	50 min.
Fuel tank pressure condition before leak check (Fuel tank condition before closed negative pressure introduction)	Tank inside pressure change is small before negative pressure introduction. (Reference: If fuel in tank is high temperature, vapor volume increase and tank inside pressure changes also increase)	
Vehicle speed and intake air amount condition before and after negative pressure introduction	Steady speed and not change greatly of intake air amount	
Fuel level	-	90%
0.020 inch leak detection	Not completed	
0.040 inch leak detection	Not detected	
CCV malfunction, bypass VSV malfunction	Not detected	
Vehicle speed	-	130 km/h (81 mph)
EVAP VSV (Evap purge VSV) malfunction	Not detected	
<b>0.040 inch and gross malfunction:</b>		
Engine coolant temperature at engine start	10°C (50°F)	35°C (95°F)
Intake air temperature at engine start	10°C (50°F)	35°C (95°F)
Intake air temperature	10°C (50°F)	-
Fuel level condition in fuel tank during leak check	Fuel slosh is small (must not drive on road in bad conditions)	
Time after engine start	-	50 min.
Fuel tank pressure condition before leak check (Fuel tank condition before closed negative pressure introduction)	Tank inside pressure change is small before negative pressure introduction. (Reference: If fuel in tank is high temperature, vapor volume increase and tank inside pressure changes also increase)	

## DIAGNOSTICS - ENGINE

Vehicle speed and intake air amount condition before and after negative pressure introduction	Steady speed and not change greatly of intake air amount	
Fuel level	-	90%
0.040 inch leak detection	Not completed	
Fuel tank pressure at vacuum introduction completed	-2.4 kPa (-18 mmHg, -0.71 in.Hg)	-
P0446 VSV check	Not executed	

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>0.020 inch malfunction detection:</b>	
Fuel tank pressure changing value for 5 sec. from -2.0 kPa (-15 mmHg, -0.59 in.Hg) point	Increase 0.067 kPa (0.5 mmHg, 0.02 in.Hg) or more
Fuel tank pressure changing value for 5 sec. from -2.7 kPa (-20 mmHg, -0.79 in.Hg) point	Increase 0.067 kPa (0.5 mmHg, 0.02 in.Hg) or more
<b>0.040 inch malfunction detection:</b>	
Fuel tank pressure changing value for 5 sec. from -2.0 kPa (-15 mmHg, -0.59 in.Hg) point	Increase 0.16 kPa (1.2 mmHg, 0.05 in.Hg) or more
Fuel tank pressure changing value for 5 sec. from -2.7 kPa (-20 mmHg, -0.79 in.Hg) point	Increase 0.16 kPa (1.2 mmHg, 0.05 in.Hg) or more
<b>Gross leak detection:</b>	
Fuel tank pressure min. value at vacuum introduction	-2.4 kPa (-18 mmHg, -0.71 in.Hg) or more

## MONITOR RESULT

The detailed information is described in "CHECKING MONITOR STATUS" (see page [DI-3](#)).

- ▶ TID (Test Identification) is assigned to each emission-related component.
- ▶ TLT (Test Limit Type):  
If TLT is 0, the component is malfunctioning when the test value is higher than the test limit.  
If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.
- ▶ CID (Component Identification) is assigned to each test value.
- ▶ Unit Conversion is used to calculate the test value indicated on generic OBD scan tools.

## TID \$02: EVAP - Vacuum Monitor

TLT	CID	Unit Conversion	Description of Test Value	Description of Test Limit
1	\$01	Multiply by 0.0916 (mmHg)	Test value of EVAP VSV: Determined by fuel tank pressure change during vacuum introduction	Malfunction criterion
1	\$02	Multiply by 0.0458 and subtract 2.93 (mmHg)	Test value of bypass VSV (pressure switching valve): Determined by fuel tank pressure change at switching over bypass VSV	Malfunction criterion
0	\$03	Multiply by 0.0458 (mmHg)	Test value of 0.04 inch leak: Determined by fuel tank pressure change	Malfunction criterion
0	\$04	Multiply by 0.0458 (mmHg)	Test value of 0.02 inch leak: Determined by fuel tank pressure change	Malfunction criterion
1	\$05	Multiply by 0.0458 and subtract 2.93 (mmHg)	Test value of CCV: Determined by fuel tank pressure change at switching over CCV	Malfunction criterion

## WIRING DIAGRAM

Refer to DTC P0441, P0446 and P2418 on page [DI-222](#) .

### Hand-held tester:

1	Check that fuel tank cap meets OEM specifications.
---	--

NG	Replace with a cap that meets OEM specifications.
----	---

OK
----

2	Check that fuel tank cap is correctly installed.
---	--

NG	Correctly install fuel tank cap.
----	----------------------------------

OK
----

3	Check fuel tank cap (See page <a href="#">EC-5</a> ).
---	---

NG	Replace fuel tank cap.
----	------------------------

OK
----

4	Check filler neck for damage.
---	-------------------------------

#### PREPARATION:

Remove the fuel tank cap.

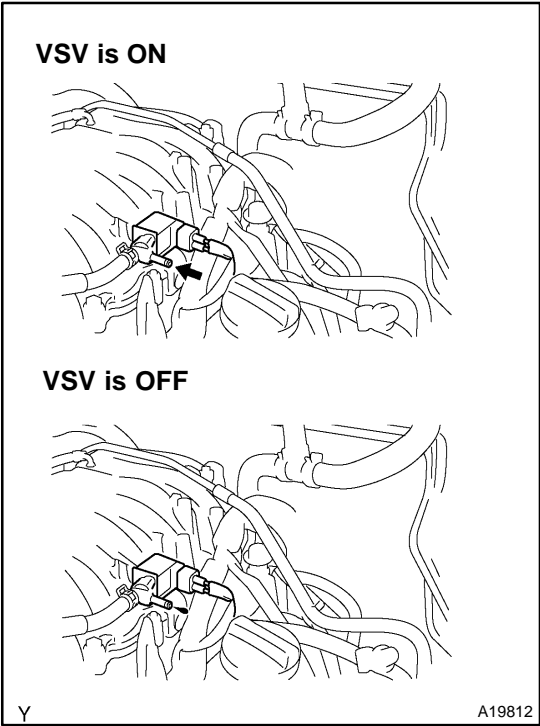
#### CHECK:

Visually inspect the filler neck for damage.

NG	Replace filler pipe.
----	----------------------

OK
----

<b>5</b>	<b>Check purge flow.</b>
----------	--------------------------



**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Select the "ENHANCED OBD II / ACTIVE TEST" mode on the hand-held tester.
- (c) Disconnect the vacuum hose for the EVAP VSV from the charcoal canister.
- (d) Start the engine.
- (e) Select the item "EVAP (ALON) / ALL" in the ACTIVE TEST and operate EVAP VSV.

**CHECK:**

When the EVAP VSV is operated by the hand-held tester, check whether the disconnected hose applies suction to your finger.

**OK:**

- VSV is ON:**  
Disconnected hose applies suction to your finger.
- VSV is OFF:**  
Disconnected hose applies no suction to your finger.

<b>OK</b>	<b>Go to step 9.</b>
-----------	----------------------

<b>NG</b>
-----------

<b>6</b>	<b>Check vacuum hose between intake manifold and EVAP VSV, and EVAP VSV and charcoal canister.</b>
----------	--

**CHECK:**

- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole, damage and blockage.

<b>NG</b>	<b>Repair or replace vacuum hose.</b>
-----------	---------------------------------------

<b>OK</b>
-----------

<b>7</b>	<b>Check operation of EVAP VSV (See page <a href="#">SF-44</a> ).</b>
----------	---

<b>NG</b>	<b>Replace EVAP VSV.</b>
-----------	--------------------------

<b>OK</b>
-----------

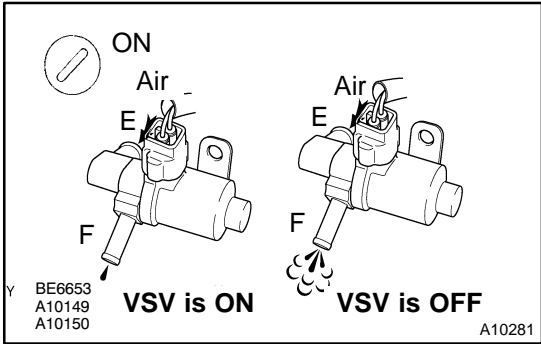
<b>8</b>	<b>Check for open and short in harness and connector between EFI or ECD relay and EVAP VSV, and EVAP VSV and ECM (See page <a href="#">IN-36</a> ).</b>
----------	---

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

<b>Replace ECM (See page <a href="#">SF-60</a> ).</b>
---

**9 Check CCV.**



**PREPARATION:**

- (a) Disconnect the vacuum hose for the CCV from the charcoal canister.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Select the "ENHANCED OBD II / ACTIVE TEST" mode on the hand-held tester.
- (d) Select the item "CAN CTRL VSV / ALL" in the ACTIVE TEST and operate CAN CTRL VSV (Press the right or left button).

**CHECK:**

Check the VSV operation when it is operated by the hand-held tester.

**OK:**

**VSV is ON:**

**Air does not flow from port E to port F.**

**VSV is OFF:**

**Air from port E flows out through port F.**

**OK** → Go to step 13.

**NG**

**10 Check vacuum hose between CCV and charcoal canister.**

**CHECK:**

- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole damage, and blockage.

**NG** → Repair or replace vacuum hose.

**OK**

11 Check operation of CCV (See page [SF-48](#) ).

NG

Replace CCV.

OK

12 Check for open and short in harness and connector between EFI or ECD relay and CCV, and CCV and ECM (See page [IN-36](#) ).

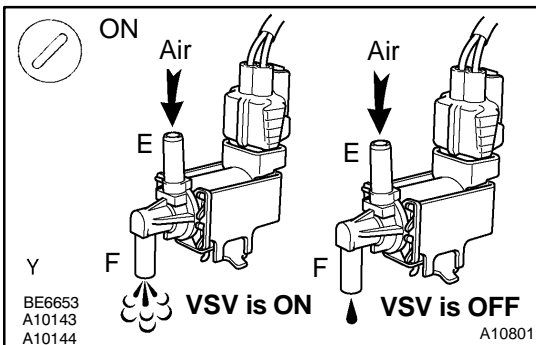
NG

Repair or replace harness or connector.

OK

Replace ECM (See page [SF-60](#) ).

13 Check pressure switching valve.



**PREPARATION:**

- Turn the ignition switch ON and push the hand-held tester main switch ON.
- Select the "ENHANCED OBD II / ACTIVE TEST" mode on the hand-held tester.
- Select the item "TANK BYPASS VSV / ALL" in the ACTIVE TEST and operate TANK BYPASS VSV (press the right or left button).

**CHECK:**

Check the VSV operation when it is operated by the hand-held tester.

**OK:**

**VSV is ON:**

Air from port E flows out through port F.

**VSV is OFF:**

Air does not flow from port E to port F.

OK

Go to step 16.

NG

14 Check operation of pressure switching valve (See page SF-46 ).

NG Replace pressure switching valve.

OK

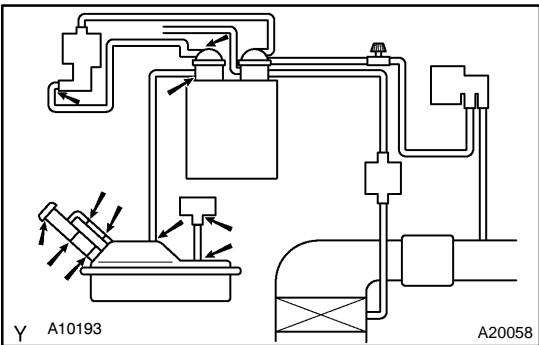
15 Check for open and short in harness and connector between EFI or ECD relay and pressure switching valve, and pressure switching valve and ECM (See page IN-36 ).

NG Repair or replace harness or connector.

OK

Replace ECM (See page SF-60 ).

16 Check whether hose close to fuel tank has been modified, and check whether there are signs of any accident near fuel tank or charcoal canister.



**CHECK:**  
Check for cracks, deformation and loose connection of the following parts:

- ▶ Fuel tank
- ▶ Charcoal canister
- ▶ Fuel tank filler pipe
- ▶ Hoses and tubes around fuel tank and charcoal canister

NG Repair or replace evaporative emissions leak part.

OK



**17 Check vacuum hoses between vapor pressure sensor and fuel tank, and charcoal canister and pressure switching valve.**

**CHECK:**

- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole and damage.

**NG** Repair or replace vacuum hose and tube.

**OK**

**18 Check hose and tube between fuel tank and charcoal canister.**

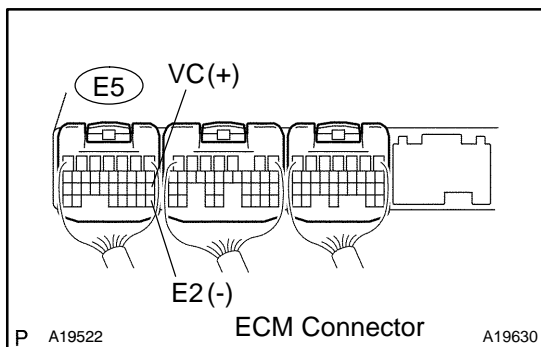
**CHECK:**

- (a) Check for proper connection of the fuel tank and fuel evap pipe (See page EC-2 ), fuel evap pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.
- (b) Check the hose and tube for cracks, hole and damage.

**NG** Repair or replace hose and tube.

**OK**

**19 Check voltage between terminals VC and E2 of ECM connector.**



**CHECK:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals of the E5 ECM connector.

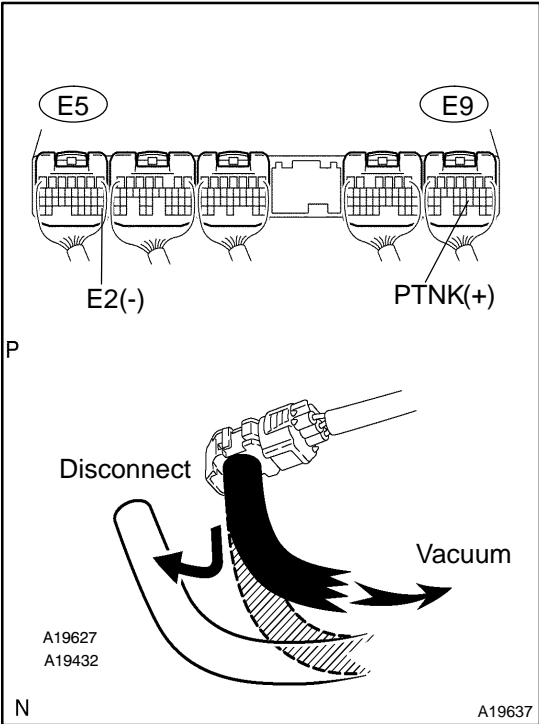
**OK:**

Tester Connection	Specified Condition
VC (E5-18) - E2 (E5-28)	4.5 to 5.5 V

**NG** Replace ECM (See page SF-60 ).

**OK**

**20 Check voltage between terminals PTNK and E2 of ECM connectors.**



**PREPARATION:**

- (a) Remove the glove compartment door (See page [SF-60](#)).
- (b) Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals PTNK and E2 of the ECM connectors at following condition (1) and (2).

- (1) Disconnect the vacuum hose from the vapor pressure sensor.
- (2) Using the MITYVAC (Hand-Held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.

**NOTICE:**

The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).

**OK:**

- Condition (1) Voltage: 2.9 to 3.7 V
- Condition (2) Voltage: 0.5 V or less

**OK** → Go to step 22.

**NG**

**21 Check for open and short in harness and connector between vapor pressure sensor and ECM (See page [IN-36](#)).**

**NG** → Repair or replace harness or connector.

**OK**

Replace ECM (See page [SF-60](#)).

**22 Check fuel tank inlet valve.**

**NG** → Replace fuel tank inlet valve.

**OK**

23	Check fuel tank.
----	------------------

NG	Replace fuel tank.
----	--------------------

OK
----

24	Check charcoal canister for cracks, hole and damage.
----	--

NG	Replace charcoal canister.
----	----------------------------

OK
----

Replace ECM (See page <a href="#">SF-60</a> ).
--

**OBD II scan tool (excluding hand-held tester):**

1	Check that fuel tank cap meets OEM specifications.
---	--

NG	Replace with a cap that meets OEM specifications.
----	---

OK

2	Check that fuel tank cap is correctly installed.
---	--

NG	Correctly install fuel tank cap.
----	----------------------------------

OK

3	Check fuel tank cap (See page <a href="#">EC-5</a> ).
---	---

NG	Replace fuel tank cap.
----	------------------------

OK

4	Check filler neck for damage.
---	-------------------------------

**PREPARATION:**

Remove the fuel tank cap.

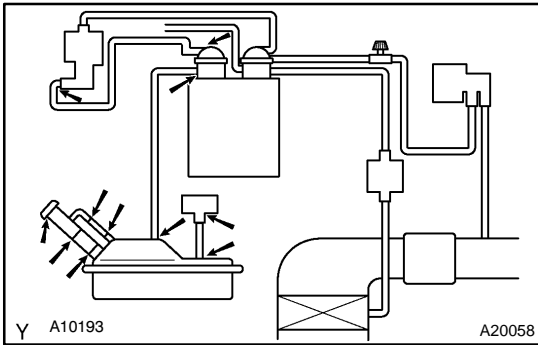
**CHECK:**

Visually inspect the filler neck for damage.

NG	Replace filler pipe.
----	----------------------

OK

- 5 Check whether hose close to fuel tank has been modified, and check whether there are signs of any accident near fuel tank or charcoal canister.**

**CHECK:**

Check for cracks, deformation and loose connection of the following parts:

- ▶ Fuel tank
- ▶ Charcoal canister
- ▶ Fuel tank filler pipe
- ▶ Hoses and tubes around fuel tank and charcoal canister

**NG**

**Repair or replace evaporative emission leak part.**

**OK**

- 6 Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and pressure switching valve, and pressure switching valve and charcoal canister.**

**CHECK:**

- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole and damage.

**NG**

**Repair or replace vacuum hose.**

**OK**

- 7 Check hose and tube between fuel tank and charcoal canister.**

**CHECK:**

- (a) Check for proper connection of the fuel tank and fuel evap pipe (See page [EC-2](#)), fuel evap pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.
- (b) Check the hose and tube for cracks, hole and damage.

**NG**

**Repair or replace hose and tube.**

**OK**

<b>8</b>	<b>Check vacuum hoses ((5), (6), (7), (8) and (9) in Fig. 1 in circuit description).</b>
----------	--

**CHECK:**

- (a) Check that the vacuum hose is connected correctly.
- (b) Check the vacuum hose for looseness and disconnection.
- (c) Check the vacuum hose for cracks, hole damage, and blockage.

<b>NG</b>	<b>Repair or replace vacuum hose.</b>
-----------	---------------------------------------

<b>OK</b>
-----------

<b>9</b>	<b>Check VSV connector for EVAP, VSV connector for CCV, VSV connector for pressure switching valve and vapor pressure sensor connector for looseness and disconnection.</b>
----------	---

<b>NG</b>	<b>Repair or connect VSV or sensor connector.</b>
-----------	---

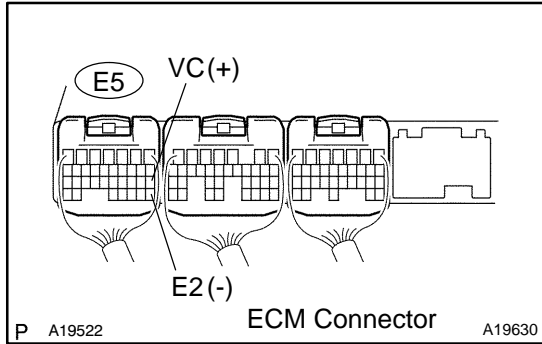
<b>OK</b>
-----------

<b>10</b>	<b>Check charcoal canister for cracks, hole and damage.</b>
-----------	---

<b>NG</b>	<b>Replace charcoal canister.</b>
-----------	-----------------------------------

<b>OK</b>
-----------

**11 Check voltage between terminals VC and E2 of ECM connector.**



**CHECK:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals of the E5 ECM connector.

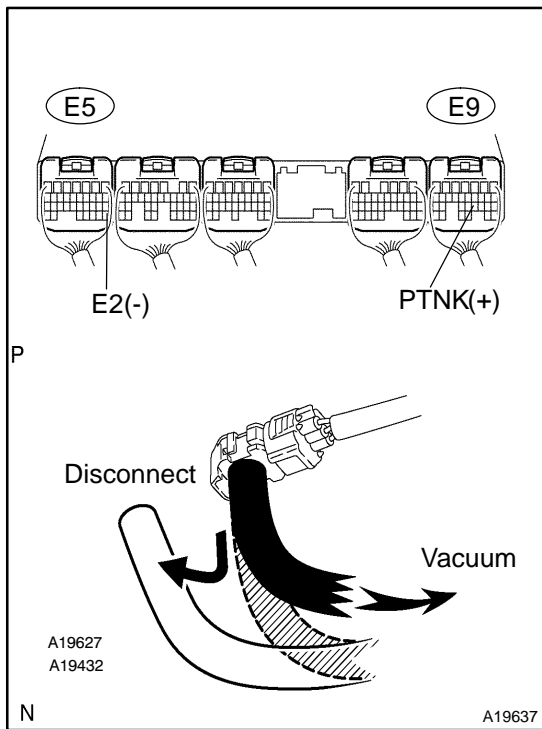
**OK:**

Tester Connection	Specified Condition
VC (E5-18) - E2 (E5-28)	4.5 to 5.5 V

**NG** Replace ECM (See page [SF-60](#) ).

**OK**

**12 Check voltage between terminals PTNK and E2 of ECM connectors.**



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals PTNK and E2 of the ECM connectors at following condition (1) and (2).

- (1) Disconnect the vacuum hose from the vapor pressure sensor.
- (2) Using the MITYVAC (Hand-Held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.

**NOTICE:**

The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).

**OK:**

- Condition (1) Voltage: 2.9 to 3.7 V
- Condition (2) Voltage: 0.5 V or less

**OK** Go to step 14.

**NG**

- 13** Check for open and short in harness and connector between vapor pressure sensor and ECM (See page [IN-36](#) ).

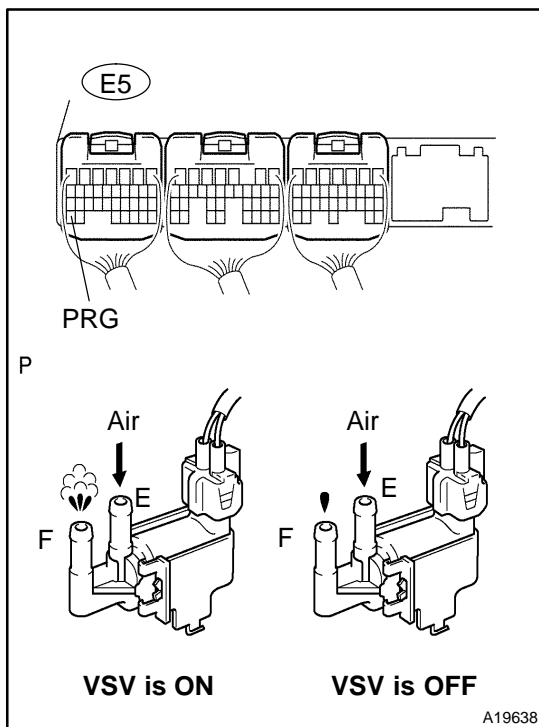
**NG**

Repair or replace harness or connector.

**OK**

Replace ECM (See page [SF-60](#) ).

- 14** Check EVAP VSV.



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Check the VSV function.

- (1) Connect between terminal EVP1 of the ECM connector and body ground (ON).
- (2) Disconnect between terminal EVP1 of the ECM connector and body ground (OFF).

**OK:**

- (1) **VSV is ON:**  
Air from port E flows out through port F.
- (2) **VSV is OFF:**  
Air does not flow from port E to port F.

**OK**

Go to step 17.

**NG**



15 Check operation of EVAP VSV (See page [SF-44](#) ).

NG

Replace EVAP VSV.

OK

16 Check for open and short in harness and connector between EFI or ECD relay and EVAP VSV, and EVAP VSV and ECM (See page [IN-36](#) ).

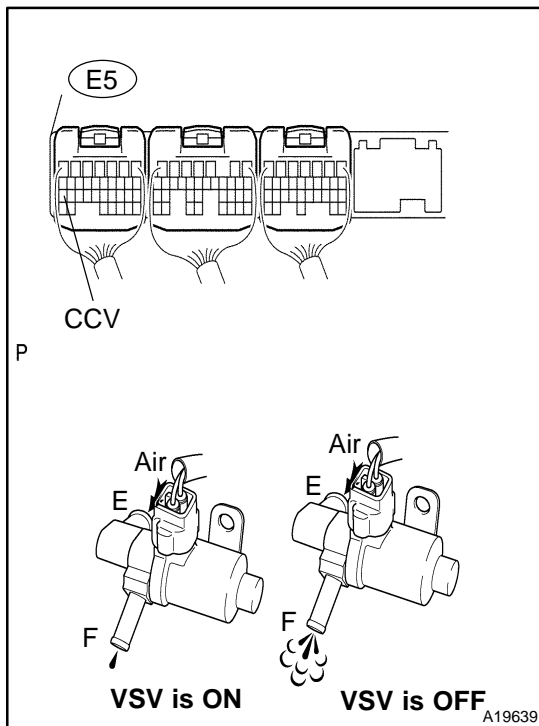
NG

Repair or replace harness or connector.

OK

Replace ECM (See page [SF-60](#) ).

17 Check CCV.



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Check the VSV function.

- (1) Connect between terminal CCV of the ECM connector and body ground (ON).
- (2) Disconnect between terminal CCV of the ECM connector and body ground (OFF).

**OK:**

- (1) **VSV is ON:**  
Air does not flow from port E to port F.
- (2) **VSV is OFF:**  
Air from port E flows out through port F.

OK

Go to step 20.

NG

<b>18</b>	<b>Check operation of CCV (See page <a href="#">SF-48</a> ).</b>
-----------	--

<b>NG</b>	<b>Replace CCV.</b>
-----------	---------------------

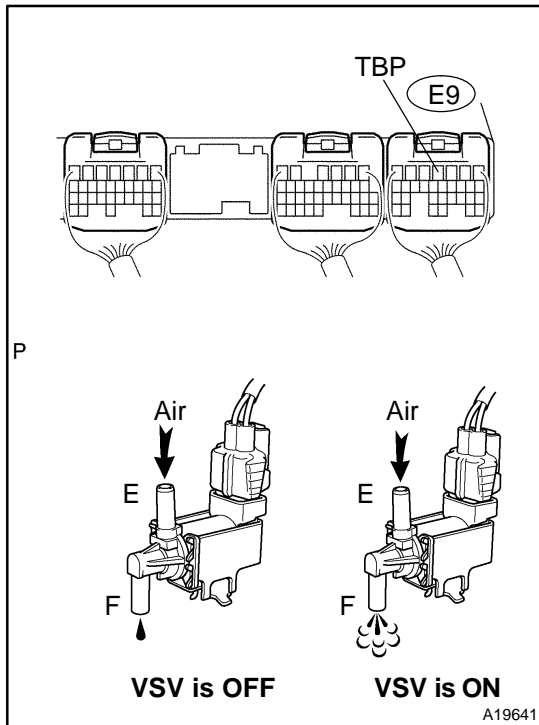
<b>OK</b>
-----------

<b>19</b>	<b>Check for open and short in harness and connector between EFI or ECD relay and CCV, and CCV and ECM (See page <a href="#">IN-36</a> ).</b>
-----------	---

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

<b>Replace ECM (See page <a href="#">SF-60</a> ).</b>
---

**20 Check pressure switching valve.**

**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Check the VSV function.

- (1) Connect between terminal TBP of the ECM connector and body ground (ON).
- (2) Disconnect between terminal TBP of the ECM connector and body ground (OFF).

**OK:**

- (1) VSV is ON:  
Air from port E flows out through port F.
- (2) VSV is OFF:  
Air does not flow from port E to port F.

**OK**
**Go to step 23.**
**NG**
**21 Check operation of pressure switching valve (See page [SF-46](#)).**
**NG**
**Replace pressure switching valve.**
**OK**

22	Check for open and short in harness and connector between EFI or ECD relay and pressure switching valve, and pressure switching valve and ECM (See page <a href="#">IN-36</a> ).
----	--

NG	Repair or replace harness or connector.
----	---

OK
----

Replace ECM (See page <a href="#">SF-60</a> ).
--

23	Check fuel tank inlet valve.
----	------------------------------

NG	Replace fuel tank inlet valve.
----	--------------------------------

OK
----

24	Check fuel tank.
----	------------------

NG	Replace fuel tank.
----	--------------------

OK
----

It is likely that vehicle user did not properly close fuel tank cap.
--

<b>DTC</b>	<b>P0451</b>	<b>Evaporative Emission Control System Pressure Sensor/Switch Range/Performance</b>
------------	--------------	---

<b>DTC</b>	<b>P0452</b>	<b>Evaporative Emission Control System Pressure Sensor/Switch Low Input</b>
------------	--------------	---

<b>DTC</b>	<b>P0453</b>	<b>Evaporative Emission Control System Pressure Sensor/Switch High Input</b>
------------	--------------	--

## MONITOR DESCRIPTION

DTC "P0451, P0452 or P0453" is recorded by the ECM when the vapor pressure sensor malfunctions.

### P0451

The ECM sensor pressure in the fuel tank using the vapor pressure sensor. The ECM supplies the sensor with a regulated 5 V reference voltage and the sensor returns a signal voltage between 0.5 V and 4.5 V according to the pressure level in the fuel tank.

When the pressure in the fuel tank is low, the output voltage of the vapor pressure sensor is low. When it is high, the output voltage is high.

For this DTC P0451, the ECM checks for a "noisy" sensor or a "stuck" sensor.

The ECM checks for a "noisy" sensor by monitoring the fuel tank pressures when the vehicle is stationary and there should be little variation in the tank pressure. If the indicated pressure varies beyond specified limits, the ECM will illuminate the MIL (2-trip detection logic) and a DTC is set.

The ECM checks for a "stuck" sensor by monitoring the fuel tank pressure for an extended time period. If the indicated pressure does not change over this period, the ECM will conclude that the fuel tank pressure sensor is malfunctioning, The ECM will illuminate the MIL and a DTC is set.

### P0452 and P0453

The ECM sensor pressure in the fuel tank using the vapor pressure sensor. The ECM supplies the sensor with a regulated 5 V reference voltage and the sensor returns a signal voltage between 0.5 V and 4.5 V according to the pressure level in the fuel tank.

If the output voltage of the vapor pressure sensor is out of normal range, the ECM will determine that there is a malfunction in the sensor or sensor circuit.

When pressure indicated by the vapor pressure sensor deviates below -3.999 kPa (-30 mmHg, -1.18 in.Hg) or above 1.999 kPa (15 mmHg, 0.59 in.Hg), the ECM interprets this as a malfunction in the vapor pressure sensor. The ECM will turn on the MIL and a DTC will be set.

DIAGNOSTICS - ENGINE

DTC No.	DTC Detecting Condition	Trouble Area
P0451	Vapor pressure sensor output extremely changes under conditions of (a) and (b): (2 trip detection logic) (a) Vehicle speed: 0 km/h (0mph), Engine speed: Idling and pressure switching valve is OFF (b) Vapor pressure sensor value $\nabla$ opening pressure valve of charcoal canister	<ul style="list-style-type: none"> <li>▶ Open or short in vapor pressure sensor circuit</li> <li>▶ Vapor pressure sensor</li> <li>▶ ECM</li> </ul>
P0452	10 seconds or less after engine starting condition vapor pressure sensor fixed value continues for fixed value or less: (2 trip detection logic)	
P0453	10 seconds or less after engine starting condition vapor pressure sensor fixed value continues for fixed value or more: (2 trip detection logic)	

**MONITOR STRATEGY**

**P0451**

Related DTCs	P0451	Evaporative emission control system pressure sensor range/performance
Required sensors/components	Main sensors/components	Vapor pressure sensor
	Related sensors/components	Mass air flow meter, Engine coolant temperature sensor
Frequency of operation	Once per driving cycle	
Duration	Signal fluctuation (noise) monitoring: 10 sec. No signal change (stuck) monitoring: 20 min.	
MIL operation	2 driving cycles	
Sequence of operation	None	

**P0452 and P0453**

Related DTCs	P0452	Evaporative emission control system pressure sensor/switch low input
	P0453	Evaporative emission control system pressure sensor/switch high input
Required sensors/components	Main sensors/components	Vapor pressure sensor
	Related sensors/components	Mass air flow meter, Engine coolant temperature sensor
Frequency of operation	Once per driving cycle	
Duration	17 sec.	
MIL operation	2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

### P0451

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>Signal fluctuation (noise) monitoring:</b>		
Altitude	-	2,400 m (7,872 ft)
Difference between intake air temperature and engine coolant temperature at engine start	-7 °C (-12.6°F)	11.1°C (20°F)
Engine coolant temperature at engine start	4.4°C (40°F)	35°C (95°F)
Intake coolant temperature at engine start	4.4°C (40°F)	35°C (95°F)
Vehicle stop and idling	5 sec.	15 sec.
<b>Stuck monitoring:</b>		
Altitude	-	2,400 m (7,872 ft)
Vapor pressure sensor	No malfunction	
Difference between intake air temperature and engine coolant temperature at engine start	-7 °C (-12.6°F)	11.1°C (20°F)
Engine coolant temperature at engine start	4.4°C (40°F)	35°C (95°F)
Intake air coolant temperature at engine start	4.4°C (40°F)	35°C (95°F)
Time after engine start	5 sec.	-

### P0452 and P0453

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
Difference between intake air temperature and engine coolant temperature at engine start	-	12°C (21.6°F)
Engine coolant temperature at engine start	10°C (50°F)	35°C (95°F)
Intake air temperature at engine start	10°C (50°F)	35°C (95°F)
Engine	Running	

## TYPICAL MALFUNCTION THRESHOLDS

### P0451

Detection Criteria	Threshold
<b>Signal fluctuation (noise) monitoring:</b>	
The number of times the output changed $\ell$ 0.667 kPa ( $\pm$ 5 mmHg, $\pm$ 0.02 in.Hg) or more during 5 to 15 sec. after idling and vehicle stop	5 times or more
<b>No signal change (stuck) monitoring:</b>	
Fuel tank pressure "no change" time (less than 0.018 kPa (0.135 mmHg, 0.005 in.Hg) change since engine start)	10 min. or more

### P0452 and P0453

Detection Criteria	Threshold
<b>P0452:</b>	
Fuel tank pressure	Less than -3.999 kPa (-30 mmHg, -1.18 in.Hg) / when engine running
<b>P0453:</b>	
Fuel tank pressure	1.999 kPa (15 mmHg, 0.59 in.Hg) or more / when engine running

## WIRING DIAGRAM

Refer to DTC P0441, P0446 and P2418 on page [DI-222](#) .

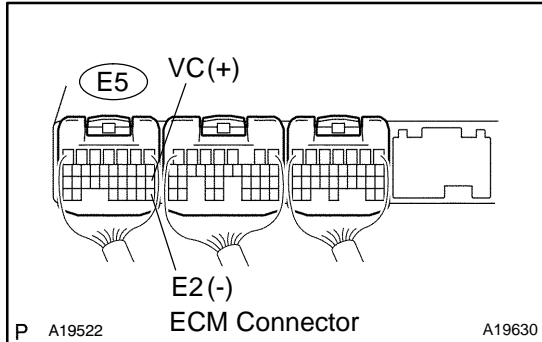
## INSPECTION PROCEDURE

### HINT:

- ▶ If different DTCs related to different system that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may be open.
- ▶ If DTC P0441 (Purge Flow), P0446 (CCV), P0451, P0452 or P0453 (Evaporative Pressure Sensor) is output with DTC P0442 or P0456, troubleshoot DTC P0441, P0446, P0451, P0452 or P0453 first. If no malfunction is detected, troubleshoot DTC P0442 or P0456 next.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- ▶ When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.



**1 Check voltage between terminals VC and E2 of ECM connector.**



**CHECK:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals of the E5 ECM connector.

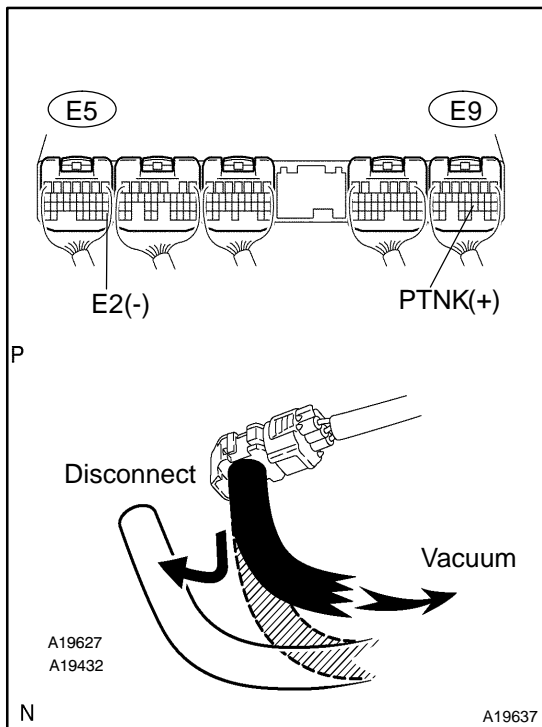
**OK:**

Tester Connection	Specified Condition
VC (E5-18) - E2 (E5-28)	4.5 to 5.5 V

**NG** Replace ECM (See page [SF-60](#) ).

**OK**

**2 Check voltage between terminals PTNK and E2 of ECM connectors.**



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminals PTNK and E2 of the ECM connectors.

- (1) Disconnect the vacuum hose from the vapor pressure sensor.
- (2) Using the MITYVAC (Hand-Held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.
- (3) Check the vapor pressure sensor output waveform using a hand-held tester.

**NOTICE:**

The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).

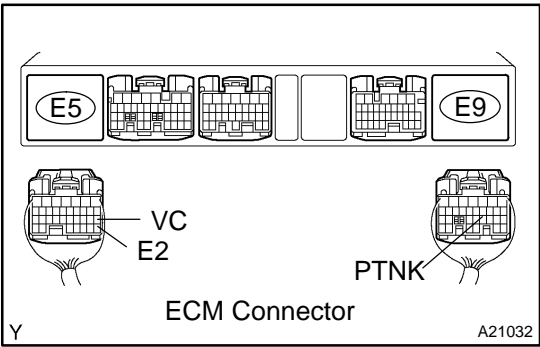
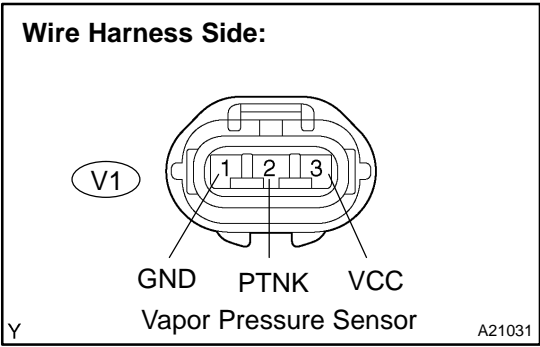
**OK:**

- (1) Voltage: 2.9 to 3.7 V
- (2) Voltage: 0.5 V or less
- (3) A consecutive waveform presents.

**OK** Check for intermittent problems (See page [DI-3](#) ).

**NG**

**3 Check for open and short in harness and connector between vapor pressure sensor and ECM.**



**PREPARATION:**

- (a) Disconnect the V1 vapor pressure sensor connector.
- (b) Disconnect the E5 and E9 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
PTNK (V1-2) - PTNK (E9-21)	Below 1 Ω
GND (V1-1) - E2 (E5-28)	Below 1 Ω
VCC (V1-3) - VC (E5-18)	Below 1 Ω
PTNK (V1-2) or PTNK (E9-21) - Body ground	10 kΩ or higher
VCC (V1-3) or VC (E5-18) - Body ground	10 kΩ or higher

**NG** Repair or replace harness or connector.

**OK**

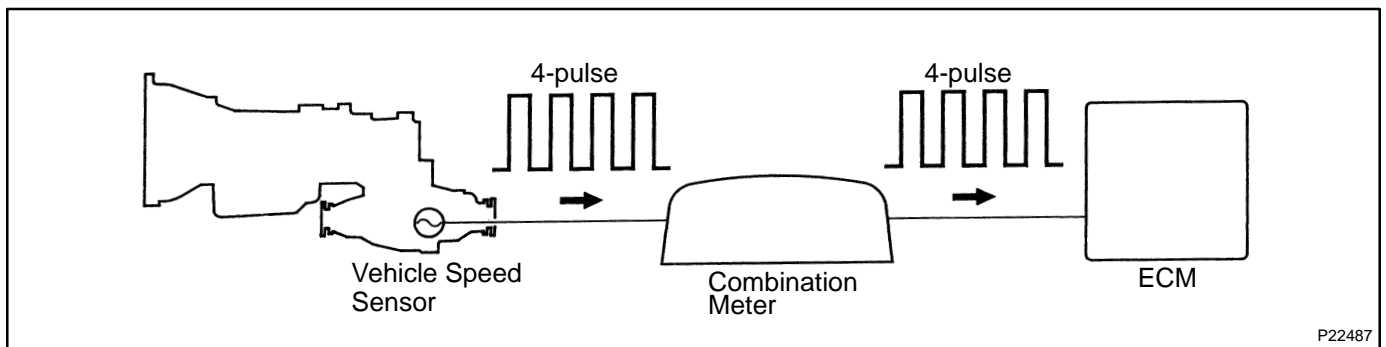
Replace vapor pressure sensor.

<b>DTC</b>	<b>P0500</b>	<b>Vehicle Speed Sensor "A"</b>
------------	--------------	---------------------------------

<b>DTC</b>	<b>P0503</b>	<b>Vehicle Speed Sensor "A" Intermittent/Erratic/High</b>
------------	--------------	---

**CIRCUIT DESCRIPTION**

The No.1 vehicle speed sensor outputs a 4-pulse signal for every revolution of the rotor shaft, which is rotated by the transmission output shaft via the driven gear. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the ECM. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	Proceed to	DTC Detection Condition	Trouble Area
P0500	Step 1	No vehicle speed sensor signal to ECM under following conditions (a) and (b): (1 trip detection logic) (a) Park/neutral position switch is OFF (b) Vehicle is being driven	<ul style="list-style-type: none"> <li>▶ Combination meter</li> <li>▶ Open or short in vehicle speed sensor circuit</li> <li>▶ Vehicle speed sensor</li> <li>▶ ECM</li> </ul>
P0503	DI-3	Intermittent problem in the vehicle speed sensor circuit	

**MONITOR DESCRIPTION**

The ECM assumes that the vehicle is driven when the park/neutral position switch is OFF and it has been over 4 sec. since the actual vehicle speed was 9 km/h (6 mph) or more.

If there is no signal from the vehicle speed sensor with these conditions satisfied, the ECM concludes that there is a fault in the vehicle speed sensor. The ECM will turn on the MIL and a DTC is set.

### MONITOR STRATEGY

Related DTCs	P0500	Vehicle speed sensor "A" pulse input error
Required sensors/components	Main sensors	Vehicle speed sensor
	Related sensors	Park/Neutral position switch, Engine coolant temperature sensor, Combination meter
Frequency of operation	Continuous	
Duration	500 output X 4 times	
MIL operation	Immediate	
Sequence of operation	None	

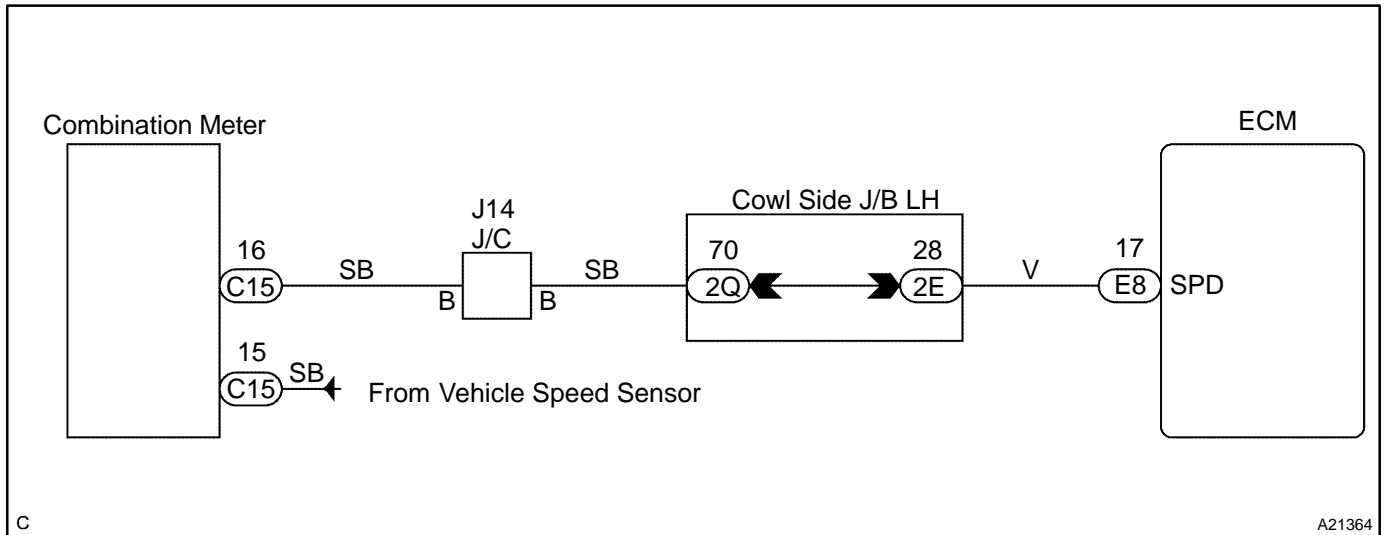
### TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page DI-3)	
Vehicle speed is 9 km/h (6 mph) or more	4 sec.	-
Park/neutral position switch	OFF	
Transfer neutral switch	Not "N" position	

### TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Sensor signal	No pulse input

### WIRING DIAGRAM



## INSPECTION PROCEDURE

**HINT:**

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

<b>1</b>	<b>Check operation of speedometer.</b>
----------	--

**CHECK:**

Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.

**HINT:**

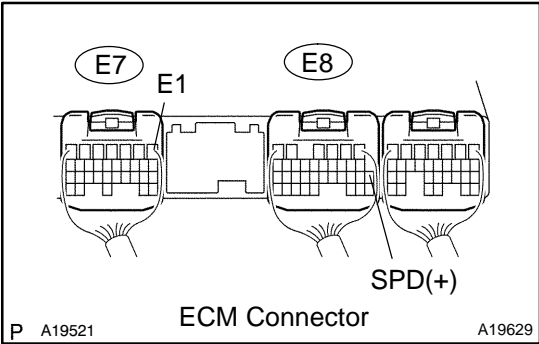
The vehicle speed is operating normally if the speedometer display is normal.

**NG**

**Check speedometer circuit. See combination meter troubleshooting (See page [BE-2](#)).**

**OK**

**2 Check voltage between terminal SPD and E1 of ECM connector.**



**PREPARATION:**

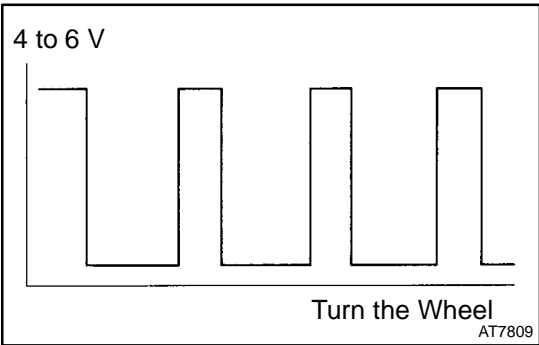
- (a) Shift the shift lever to neutral.
- (b) Jack up the rear wheel on one side.
- (c) Turn the ignition switch ON.

**CHECK:**

Measure the voltage between the specified terminal of the E7 and E8 ECM connector when the wheel is turned slowly.

**OK:**

Tester Connection	Specified Condition
SPD (E8-17) - E1 (E7-1)	Generated intermittently



**HINT:**

The output voltage should fluctuate up and down similarly to the diagram on the left when the wheel is turned slowly.

**NG** Check and repair harness and connector between combination meter and ECM.

**OK**

Replace ECM (See page SF-60 ).

<b>DTC</b>	<b>P0504</b>	<b>Brake Switch "A"/"B" Correlation</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

In addition to turning on the stop lamps, the stop lamp switch signals are used for a variety of engine, transmission, and suspension functions as well as being an input for diagnostic checks. It is important that the switch operates properly, therefore this switch is designed with two complementary signal outputs: STP and ST1-. The ECM analyzes these signal outputs to detect malfunctions in the stop lamp switch.

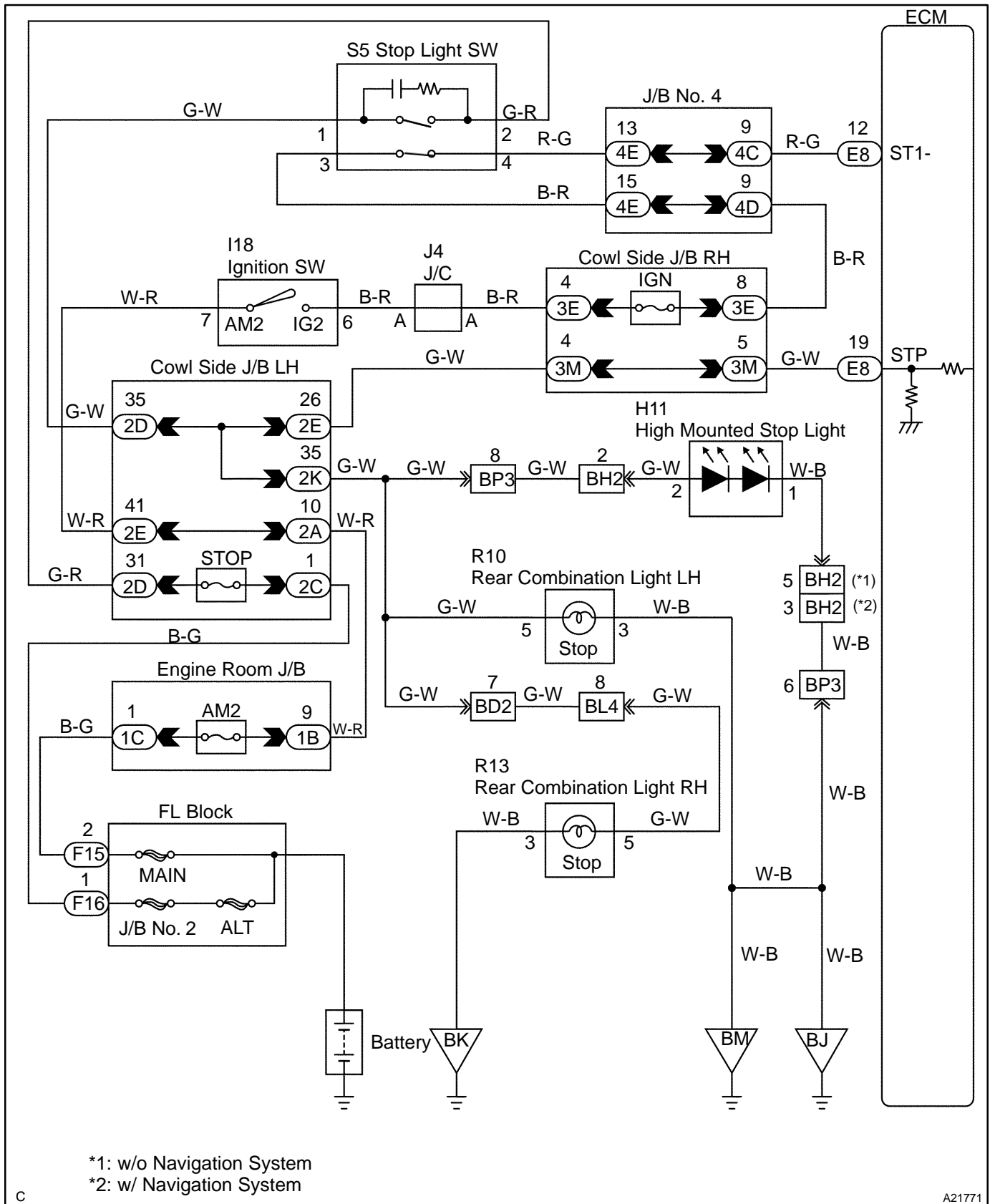
### HINT:

Normal condition is as shown in the table.

Signal	Brake pedal released	In transition	Brake pedal depressed
STP	OFF	ON	ON
ST1-	ON	ON	OFF

DTC No.	DTC Detection Condition	Trouble Area
P0504	Conditions (a), (b) and (c) continue for 0.5 sec. or more: (a) Ignition switch ON (b) Brake pedal released (c) STP signal is OFF when the ST1- signal is OFF	<ul style="list-style-type: none"> <li>▶ Short in stop lamp switch signal circuit</li> <li>▶ Stop lamp fuse</li> <li>▶ Stop lamp switch</li> <li>▶ ECM</li> </ul>

# WIRING DIAGRAM





## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

### Hand-held tester:

<b>1</b>	<b>Check operation of stop light.</b>
----------	---------------------------------------

### CHECK:

Check if the stop lights come on and go off normally when the brake pedal is operated and released.

**NG**

**Check and repair stop light circuit.**

**OK**

<b>2</b>	<b>Check STOP fuse.</b>
----------	-------------------------

### PREPARATION:

Remove the STOP fuse from the cowl side J/B LH.

### CHECK:

Check the continuity of the STOP fuse.

### OK:

**Continuity**

**NG**

**Check for short in all harness and components connected to STOP fuse.**

**OK**

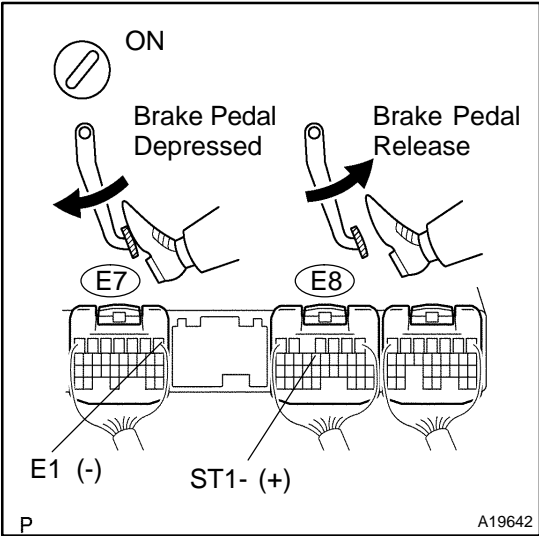
<b>3</b>	<b>Check stop light switch (See page <a href="#">BE-50</a>).</b>
----------	--

**NG**

**Replace stop light switch.**

**OK**

**4 Check STP signal and ST1- voltage.**



**PREPARATION:**

- (a) Turn the ignition switch ON.
- (b) Select the item "DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STOP LIGHT SW".

**CHECK:**

Read the signal displayed on the hand-held tester.

**OK:**

Brake Pedal	Specified Condition
Depressed	STP Signal ON
Released	STP Signal OFF

**CHECK:**

Measure the voltage between the specified terminals of the E7 and E8 ECM connectors.

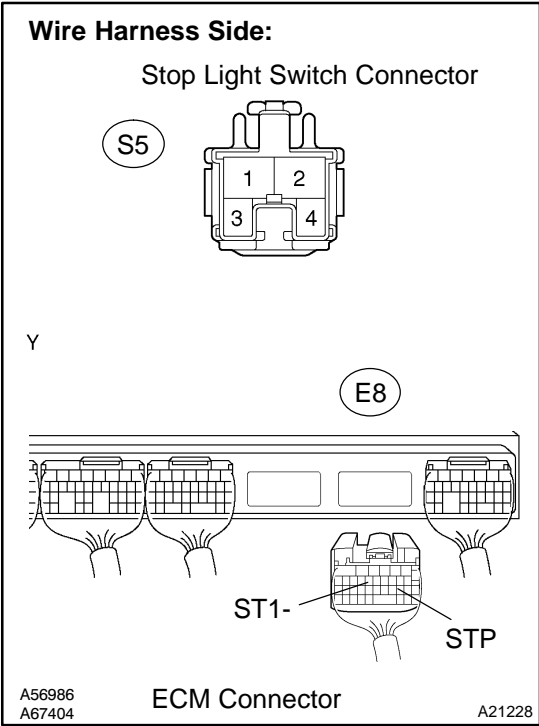
**OK:**

Tester Connection	Brake Pedal	Specified Condition
ST1- (E8-12) - E1 (E7-1)	Depressed	Below 1.5 V
	Released	7.5 to 14 V

**OK** → **Check for intermittent problems (See page DI-3).**

**NG**

**5 Check harness and connector between ECM and stop light switch.**



**PREPARATION:**

- (a) Disconnect the S5 stop light switch connector.
- (b) Disconnect the E8 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
Stop light switch (S5-1) - STP (E8-19)	Below 1 Ω
Stop light switch (S5-4) - ST1- (E8-12)	Below 1 Ω
Stop light switch (S5-1) or STP (E8-19) - Body ground	10 kΩ or higher
Stop light switch (S5-4) or ST1- (E8-12) - Body ground	10 kΩ or higher

**NG** Repair or replace harness or connector.

**OK**

Replace ECM (See page SF-60 ).

**OBD II scan tool (excluding hand-held tester):**

<b>1</b>	<b>Check operation of stop light.</b>
----------	---------------------------------------

**CHECK:**

Check if the stop lights come on and go off normally when the brake pedal is operated and released.

<b>NG</b>	<b>Check and repair stop light circuit.</b>
-----------	---

<b>OK</b>
-----------

<b>2</b>	<b>Check STOP fuse.</b>
----------	-------------------------

**PREPARATION:**

Remove the STOP fuse from the cowl side J/B LH.

**CHECK:**

Check the continuity of the STOP fuse.

**OK:**

**Continuity**

<b>NG</b>	<b>Check for short in all harness and components connected to STOP fuse.</b>
-----------	--

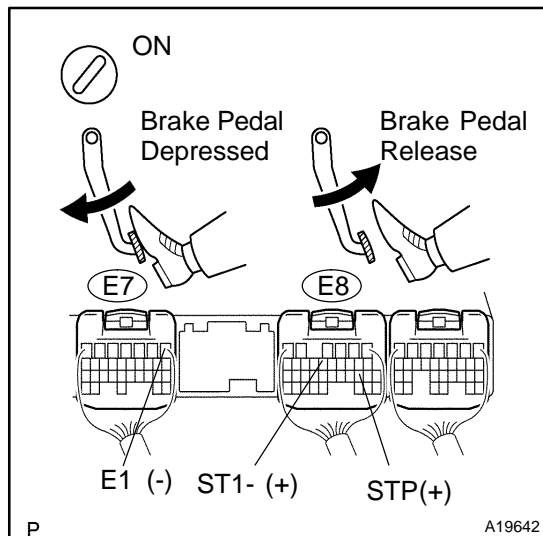
<b>OK</b>
-----------

<b>3</b>	<b>Check stop light switch (See page <a href="#">BE-50</a> ).</b>
----------	---

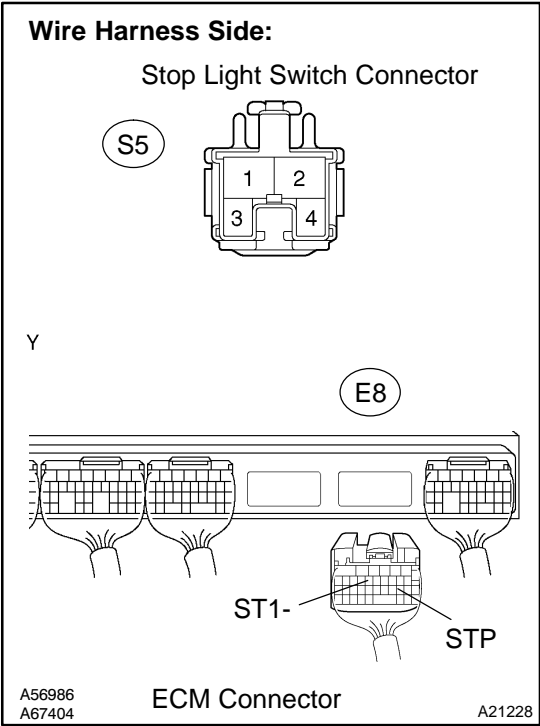
<b>NG</b>	<b>Replace stop light switch.</b>
-----------	-----------------------------------

<b>OK</b>
-----------

#### 4 Check STP signal.



**5 Check harness and connector between ECM and stop light switch.**



**PREPARATION:**

- (a) Disconnect the S5 stop light switch connector.
- (b) Disconnect the E8 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
Stop light switch (S5-1) - STP (E8-19)	Below 1 Ω
Stop light switch (S5-4) - ST1- (E8-12)	Below 1 Ω
Stop light switch (S5-1) or STP (E8-19) - Body ground	10 kΩ or higher
Stop light switch (S5-4) or ST1- (E8-12) - Body ground	10 kΩ or higher

**NG** Repair or replace harness or connector.

**OK**

Replace ECM (See page SF-60 ).

<b>DTC</b>	<b>P0505</b>	<b>Idle Air Control System</b>
------------	--------------	--------------------------------

**MONITOR DESCRIPTION**

The idle speed is controlled by the ETCS (Electronic Throttle Control System).

The ETCS is composed of the throttle motor which operates the throttle valve, and the throttle position sensor, which detects the opening angle of the throttle valve.

The ECM controls the throttle motor to provide the proper throttle valve opening angle to obtain the target idle speed.

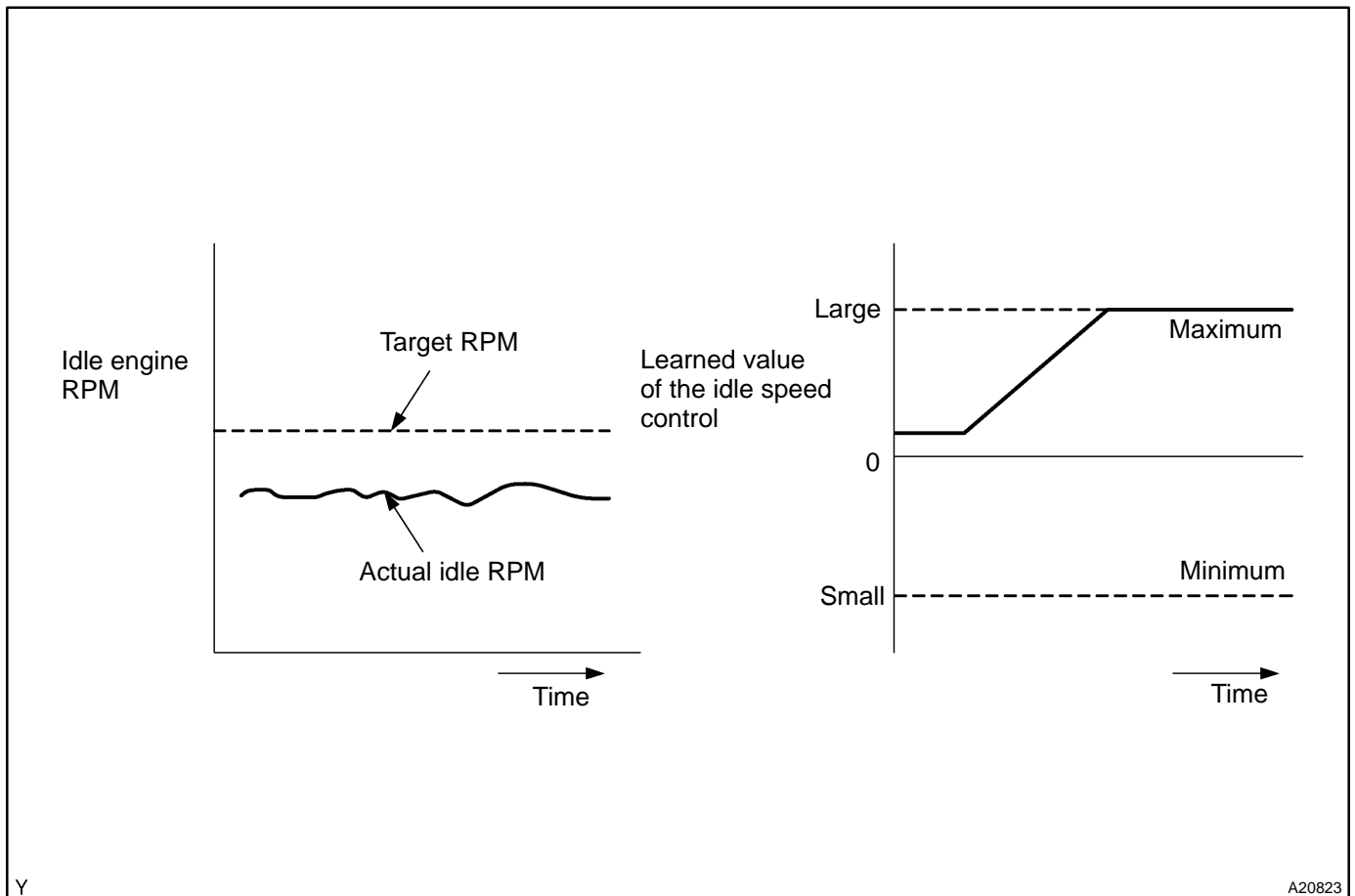
The ECM regulates the idle speed by opening and closing the throttle valve using the ETCS. The ECM concludes that the idle speed control ECM function is malfunctioning if: 1) the actual idle RPM varies more than the specified amount, or 2) a learned value of the idle speed control remains at the maximum or minimum five times or more during a drive cycle. The ECM will turn on the MIL and set a DTC.

Example:

If the actual idle RPM varies from the target idle RPM by more than 100 (\*1) rpm five times during a drive cycle, the ECM will turn on the MIL and a DTC is set.

HINT:

\*1: RPM threshold varies with engine load.



Y

A20823

DTC No.	DTC Detecting Condition	Trouble Area
P0505	Idle speed continues to vary greatly from target speed (1 trip detection logic)	<ul style="list-style-type: none"> <li>▶ Electric throttle control system</li> <li>▶ Air induction system</li> <li>▶ PCV hose connection</li> </ul>

## MONITOR STRATEGY

Related DTCs	P0505	Idle air control malfunction
Required sensors/components	Main sensors/components	Crankshaft position sensor
	Related sensors/components	Vehicle speed sensor, Engine coolant temperature sensor
Frequency of operation	Functional check: Once per trip Range check: Continuous	
Duration	Functional check: 10 min. Range check: 10 sec.	
MIL operation	Functional check: 2 driving cycles Range check: Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>Functional check:</b>		
Precondition is met when both of the following are met	A and B	
A. Intake air flow rate learnings is enabled	3 sec.	-
B. Engine	Running	
<b>Range check:</b>		
Output signal duty	10%	90%
Battery voltage	10 V	-

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>Functional check:</b>	
<b>Case 1:</b>	
All of the following conditions are met:	A, B and C
A. Engine RPM - target engine RPM (History that vehicle had run for 10 km/h (6.2 mph) or more)	Less than -100 rpm or more than 200 rpm (A/C ON or park/neutral position switch ON) or Less than -100 rpm or more than 150 rpm (A/C OFF and park/neutral position switch OFF)
B. Number of fall judgment	5 times or more
C. Intake air control flow rate learning value	Value when fail is judged first + 3.31 L/sec. or more or Value when fail is judged first - 3.31 L/sec. or less
<b>Case 2:</b>	
Both or the following condition are met:	A and B
A. Engine RPM - target engine RPM (History that vehicle had run for 10 km/h (6.2 mph) or more)	Less than -100 rpm or more than 200 rpm (A/C ON or park/neutral position switch ON) or Less than -100 rpm or more than 150 rpm (A/C OFF and park/neutral position switch OFF)
B. Intake air control flow rate learning value is for 5 sec.	2.48 L/sec. or less or 11 L/sec. or more



Range check:
Missing output duty change

## INSPECTION PROCEDURE

### HINT:

- ▶ When the throttle position is slightly opened (the accelerator pedal is slightly depressed) because a floor carpet is overlapped on the accelerator pedal, or if not fully releasing the accelerator pedal, etc., DTC P0505 will possibly be detected.
- ▶ Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

<b>1</b>	<b>Are there any other codes (besides P0505) being output?</b>
----------	--

### PREPARATION:

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

### CHECK:

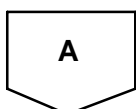
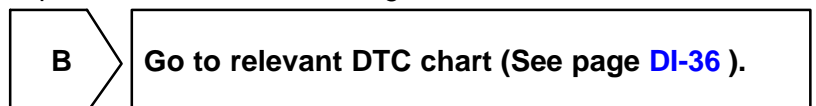
Read the DTC using the hand-held tester or the OBD II scan tool.

### RESULT:

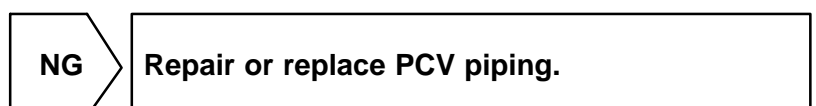
Display (DTC Output)	Proceed to
P0505	A
"P0505" and other DTCs	B

### HINT:

If any other codes besides P0505 are output, perform the troubleshooting for those DTCs first.



<b>2</b>	<b>Check connection of PCV piping.</b>
----------	--



<b>3</b>	<b>Check air induction system (See page <a href="#">SF-1</a> ).</b>
----------	---

**CHECK:**

Check for vacuum leaks in air induction system.

<b>NG</b>	<b>Repair or replace air induction system.</b>
-----------	--

<b>OK</b>
-----------

<b>Check electric throttle control system (See page <a href="#">SF-33</a> ).</b>
--

<b>DTC</b>	<b>P0560</b>	<b>System Voltage</b>
------------	--------------	-----------------------

## MONITOR DESCRIPTION

The battery supplies electricity to the ECM even when the ignition switch is OFF. This electricity allows the ECM store data such as DTC history, freeze frame data, fuel trim values, and other data.

If the battery voltage falls below a minimum level, the ECM will conclude that there is a fault in the power supply circuit. The next time the engine starts, the ECM will turn on the MIL and a DTC will be set.

DTC No.	DTC Detecting Condition	Trouble Area
P0560	Open in back up power source circuit	<ul style="list-style-type: none"> <li>▶ Open in back-up power source circuit</li> <li>▶ EFI or ECD No.1 fuse</li> <li>▶ ECM</li> </ul>

### HINT:

If DTC P0560 present, the ECM will not store another DTC.

## MONITOR STRATEGY

Related DTCs	P0560	System voltage malfunction
Required sensors/components	ECM	
Frequency of operation	Continuous	
Duration	3 sec.	
MIL operation	Immediate (*1)	
Sequence of operation	None	

\*1: The DTC is set immediate. The MIL will be illuminated after the next engine start.

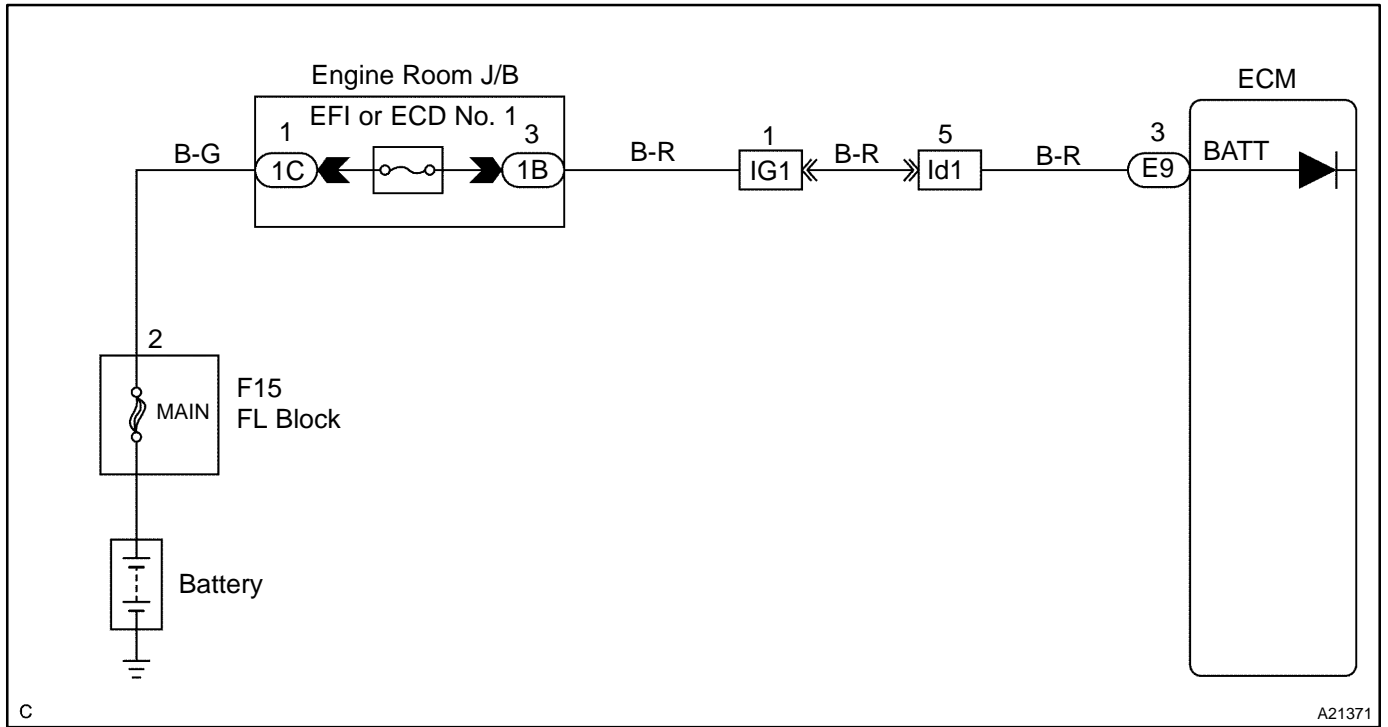
## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page DI-3)	
Stand-by RAM	Initialized	

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Battery voltage	Less than 3.5 V

**WIRING DIAGRAM**



C

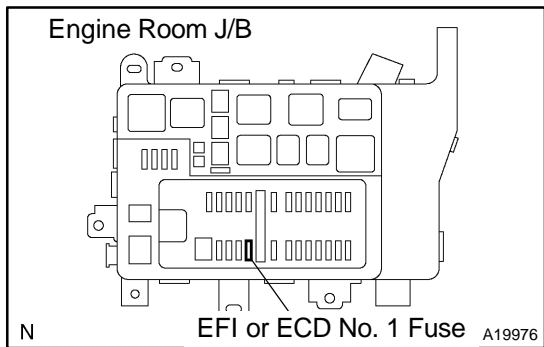
A21371

**INSPECTION PROCEDURE**

**HINT:**

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

<b>1</b>	<b>Check EFI or ECD No. 1 fuse of engine room J/B.</b>
----------	--



**PREPARATION:**

Remove the EFI or ECD No. 1 fuse from the engine room J/B.

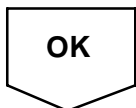
**CHECK:**

Check the continuity of the EFI or ECD No. 1 fuse.

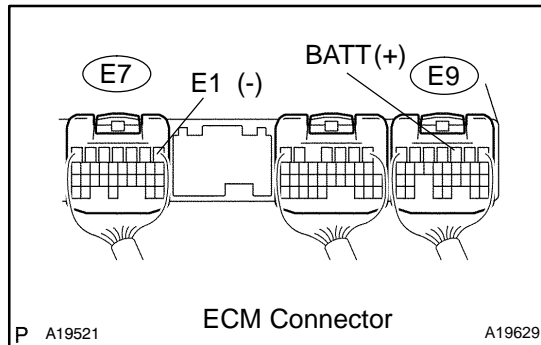
**OK:**

**Continuity**

**NG** → **Check for short in all harness and components connected to EFI or ECD No. 1 fuse.**



**2 Check voltage between terminal BATT and E1 of ECM connector.**

**CHECK:**

Measure the voltage between terminals of the E7 and E9 ECM connector.

**OK:**

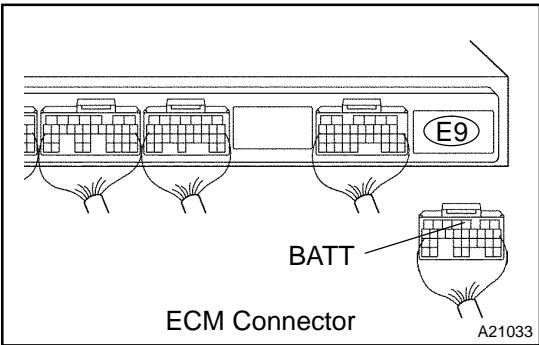
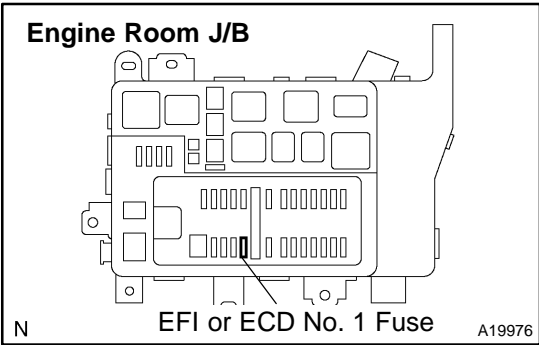
Tester Connection	Specified Condition
BATT (E9-3) - E1 (E7-1)	9 to 14 V

**OK**

**Check for intermittent problems (See page [DI-3](#)).**

**NG**

**3 Check for open and short in harness and connector between ECM and EFI or ECD No. 1 fuse, EFI or ECD No. 1 fuse and battery.**



**Check the harness and the connector between the EFI or ECD No. 1 fuse and the ECM:**

**PREPARATION:**

- (a) Remove the EFI or ECD No. 1 fuse from the engine room J/B.
- (b) Disconnect the E9 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connector.

**OK:**

Tester Connection	Specified Condition
Engine Room J/B (EFI or ECD No. 1 fuse terminal 2) - BATT (E9-3)	Below 1 Ω
Engine Room J/B (EFI or ECD No. 1 fuse terminal 2) or BATT (E9-3) - Body ground	10 kΩ or higher

**Check the harness and connector between the EFI or ECD No. 1 fuse and the battery:**

**PREPARATION:**

- (a) Remove the EFI or ECD No. 1 fuse from the engine room J/B.
- (b) Disconnect the battery positive terminal.

**CHECK:**

Measure the resistance between the wire harness side connector.

**OK:**

Tester Connection	Specified Condition
Engine Room J/B (EFI or ECD No. 1 fuse terminal 1) - Battery positive terminal	Below 1 Ω
Engine Room J/B (EFI or ECD No. 1 fuse terminal 1) or Battery positive terminal - Body ground	10 kΩ or higher

**NG** → **Repair or replace harness or connector.**

**OK**

**Check and replace engine room J/B.**

<b>DTC</b>	<b>P0604</b>	<b>Internal Control Module Random Access Memory (RAM) Error</b>
------------	--------------	---

<b>DTC</b>	<b>P0606</b>	<b>ECM/PCM Processor</b>
------------	--------------	--------------------------

<b>DTC</b>	<b>P0607</b>	<b>Control Module Performance</b>
------------	--------------	-----------------------------------

<b>DTC</b>	<b>P0657</b>	<b>Actuator Supply Voltage Circuit / Open</b>
------------	--------------	---

## MONITOR DESCRIPTION

The ECM continuously monitors its internal memory status, internal circuits, and output signals to the throttle actuator. This self-check insures that the ECM is functioning properly. If any malfunction is detected, the ECM will set the appropriate DTC and illuminate the MIL.

The ECM memory status is diagnosed by internal "mirroring" of the main CPU and the sub CPU to detect RAM (Random Access Memory) errors. The two CPUs also perform continuous mutual monitoring.

The ECM sets a DTC if: 1) outputs from the 2 CPUs are different and deviate from the standards, 2) the signals to the throttle actuator deviate from the standards, 3) a malfunction is found in the throttle actuator supply voltage, and 4) any other ECM malfunction is found.

DTC No.	DTC Detecting Condition	Trouble Area
P0604 P0606 P0607 P0657	ECM malfunction	▶ECM

## MONITOR STRATEGY

Related DTCs	P0604	Random access memory (RAM) error range check
	P0606	ECM range check/description
	P0657	Actuator supply voltage circuit range check
Required sensors/components	ECM	
Frequency of operation	Continuous	
Duration	1 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page DI-3)
The typical enabling condition is not available	-

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>P0604:</b>	
RAM mirror check failure	
<b>P0606:</b>	
ECM error	
<b>P0657:</b>	
ECM error	

## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

**Replace ECM (See page [SF-60](#) ).**



<b>DTC</b>	<b>P0617</b>	<b>Starter Relay Circuit High</b>
------------	--------------	-----------------------------------

## MONITOR DESCRIPTION

While the engine is being cranked, the battery positive voltage is applied to terminal STA of the ECM. If the vehicle is being driven and the ECM detects the starter control signal (STA), the ECM concludes that the starter control circuit is malfunctioning. The ECM will turn on the MIL and a DTC is set.

DTC No.	DTC Detection Condition	Trouble Area
P0617	When all conditions (a), (b) and (c) are satisfied for 20 seconds with battery (+B) voltage 10.5 V or more (a) Vehicle speed $\geq$ 20 km/h (12.4 mph) (b) Engine revolution $\geq$ 1,000 rpm (c) STA signal ON	<ul style="list-style-type: none"> <li>▶ Park/neutral position switch</li> <li>▶ Starter relay circuit</li> <li>▶ Ignition switch</li> <li>▶ ECM</li> </ul>

## MONITOR STRATEGY

Related DTCs	P0617	Starter signal error
Required sensors/components	Main sensors/components	Starter signal
	Related sensors/components	Vehicle speed sensor, Engine speed sensor
Frequency of operation	Continuous	
Duration	20 sec.	
MIL operation	Immediate	
Sequence of operation	None	

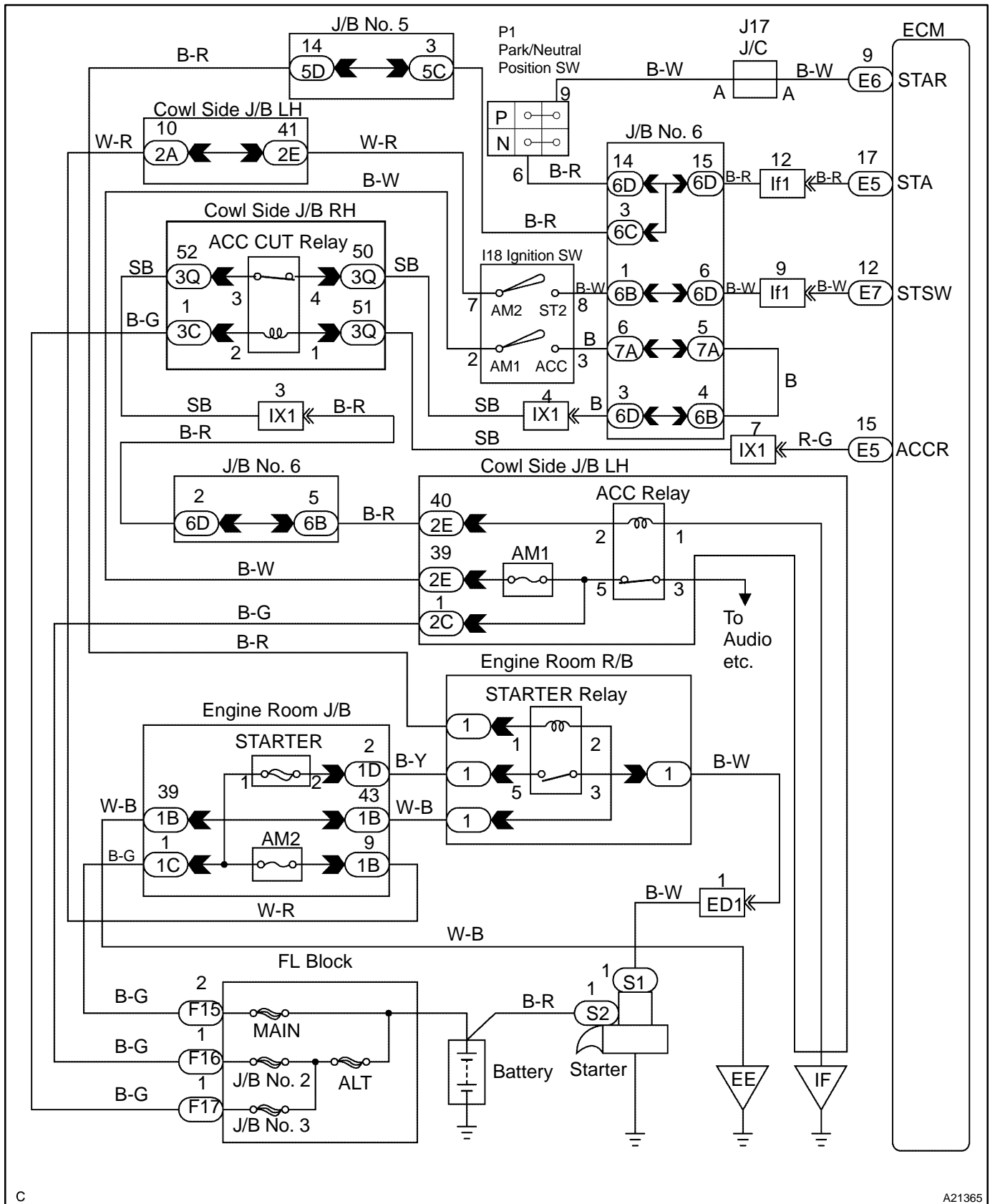
## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
Battery voltage	10.5 V	-
Vehicle speed	20 km/h (12.4 mph)	-
Engine speed	1,000 rpm	-

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Starter signal	ON (at "more than 20 km/h (12.4 mph) and more than 1,000 rpm")

# WIRING DIAGRAM



C

A21365

## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

### Hand-held tester:

<b>1</b>	<b>Connect hand-held tester, and check STA signal.</b>
----------	--

### PREPARATION:

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STARTER SIG.

### CHECK:

Read the STA signal on the hand-held tester while the starter operates.

### OK:

Ignition Switch Position	ON	START
STA Signal	OFF	ON

**OK**

**Go to step 5.**

**NG**

<b>2</b>	<b>Check park/neutral position switch (See page <a href="#">DI-402</a> ).</b>
----------	---

**NG**

**Replace park/neutral position switch.  
Go to next step 5 after the replacement.**

**OK**

<b>3</b>	<b>Check ignition switch (See page <a href="#">BE-29</a> ).</b>
----------	---

**NG**

**Replace ignition switch.  
Go the next step 5 after the replacement.**

**OK**

<b>4</b>	<b>Connect hand-held tester, and check STA signal.</b>
----------	--

**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STARTER SIG.

**CHECK:**

Read the STA signal on the hand-held tester while the starter operates.

**OK:**

Ignition Switch Position	ON	START
STA Signal	OFF	ON

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

<b>5</b>	<b>Check DTC reoccur.</b>
----------	---------------------------

**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and hand-held tester main switch ON.
- (c) Clear DTC (See page [DI-3](#) ).
- (d) Drive the vehicle more than 40 km/h (25 mph) for 20 seconds or more.

**CHECK:**

Check DTC reoccur.

**RESULT:**

Display (DTC output)	Proceed to
P0617	A
No DTC output	B

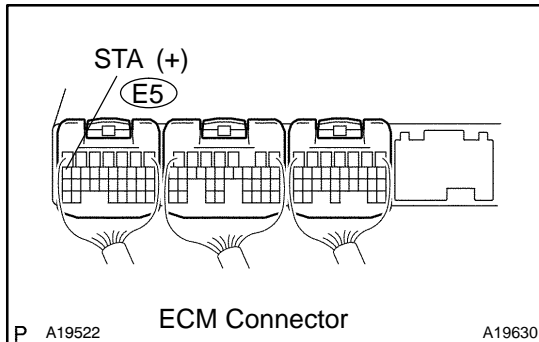
<b>A</b>	<b>Replace ECM (See page <a href="#">SF-60</a> ).</b>
----------	---

<b>B</b>
----------

<b>Check for intermittent problems (See page <a href="#">DI-3</a> ).</b>
--

**OBD II scan tool (excluding hand-held tester):**

**1 Check voltage between terminal STA of ECM connector and body ground.**

**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminal STA of the ECM connector and the body ground, while cranking the engine (ignition switch START position) and while not engine cranking the engine (ignition switch position ON).

**OK:****Voltage:**

**6 V or more (ignition switch START position)**

**0 V (ignition switch ON position)**

**OK**

**Go to step 5.**

**NG**

**2 Check park/neutral position switch (See page [DI-402](#) ).**

**NG**

**Replace park/neutral position switch.  
Go to next step 5 after the replacement.**

**OK**

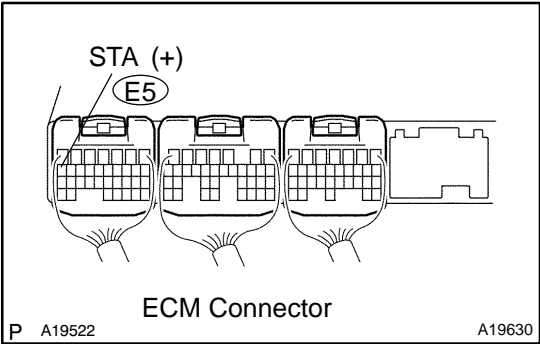
**3 Check ignition switch (See page [BE-29](#) ).**

**NG**

**Replace ignition switch.  
Go to next step 5 after the replacement.**

**OK**

**4 Check voltage between terminal STA of ECM connector and body ground.**



**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminal STA of the ECM connector and the body ground, while cranking the engine (ignition switch START position) and while not engine cranking the engine (ignition switch position ON).

**OK:**

**Voltage:**

**6 V or more (ignition switch START position)**

**0 V (ignition switch ON position)**

**NG** → Repair or replace harness or connector.

**OK**

**5 Check DTC reoccur.**

**PREPARATION:**

- (a) Connect the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and hand-held tester main switch ON.
- (c) Clear DTC (See page [DI-3](#)).
- (d) Drive the vehicle more than 40 km/h (25 mph) for 20 seconds or more.

**CHECK:**

Check DTC reoccur.

**RESULT:**

Display (DTC output)	Proceed to
P0617	A
No DTC output	B

**A** → Replace ECM (See page [SF-60](#)).

**B**

Check for intermittent problems (See page [DI-3](#)).

<b>DTC</b>	<b>P2102</b>	<b>Throttle Actuator Control Motor Circuit Low</b>
------------	--------------	--

<b>DTC</b>	<b>P2103</b>	<b>Throttle Actuator Control Motor Circuit High</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

The throttle motor is operated by the ECM and it opens and closes the throttle valve.

The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body. The throttle position sensor provides feedback to the ECM. This feedback allows the ECM to control the throttle motor and monitor the throttle opening angle as the ECM responds to driver inputs.

HINT:

This Electrical Throttle Control System (ETCS) does not use a throttle cable.

DTC No.	DTC Detection Condition	Trouble Area
P2102	Conditions (a) and (b) continue for 2.0 seconds: (a) Throttle control motor output duty 80 % or more (b) Throttle control motor current 0.5 A or less	<ul style="list-style-type: none"> <li>▶ Open in throttle control motor and sensor circuit</li> <li>▶ Throttle control motor and sensor</li> <li>▶ ECM</li> </ul>
P2103	Either of following conditions is met. (a) Throttle control motor current 10 A or more (0.1 sec) (b) Throttle control motor current 7 A or more (0.6 sec.)	<ul style="list-style-type: none"> <li>▶ Short in throttle control motor and sensor circuit</li> <li>▶ Throttle control motor and sensor</li> <li>▶ Throttle valve</li> <li>▶ Throttle body</li> <li>▶ ECM</li> </ul>

## MONITOR DESCRIPTION

The ECM monitors the current through the electronic throttle motor and detects malfunctions or open circuit in the throttle motor based on the voltage of the current. When the current deviates from the standard, the ECM concludes that there is a fault in the throttle motor.

Or, if the throttle valve is not functioning properly (for example, stuck ON) the ECM concludes that there is a fault and turns on the MIL and a DTC is set.

Example:

When the current is more than 10 A. Or the current is less than 0.5 A when the motor driving duty ratio is exceeding 80%. The ECM concludes that the current is out of range, turns on the MIL and a DTC is set.

## FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

## MONITOR STRATEGY

Related DTCs	P2102	Throttle actuator control motor current (Low current)
	P2103	Throttle actuator control motor current (High current)
Required sensors/components	Throttle actuator motor	
Frequency of operation	Continuous	
Duration	2 sec.	
MIL operation	P2102: Immediate P2103: 1 driving cycle	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>P2102:</b>		
Throttle motor	ON	
Duty-cycle ratio to open throttle actuator	80%	-
Throttle actuator power supply	8 V	-
Current motor current - Motor current at 0.016 sec. before	-	0.2 A
<b>P2103:</b>		
Throttle motor	ON	
Either of the following conditions is met:	A or B	
A. Throttle actuator power supply	8 V	-
B. Throttle actuator power	ON	

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>P2102:</b>	
Throttle motor current	Less than 0.5 A (when motor drive duty 80% or more)
<b>P2103:</b>	
Throttle motor current	More than 10 A (0.1 sec.) More than 7 A (0.6 sec.)

## WIRING DIAGRAM

Refer to DTC P0120 on page [DI-84](#) .



## INSPECTION PROCEDURE

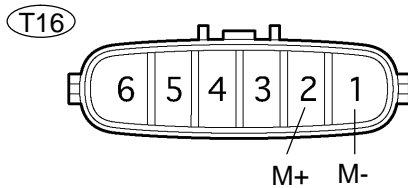
### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

### 1 Check throttle control motor.

#### Component Side:

Throttle Control Motor and Sensor



A21034

#### PREPARATION:

Disconnect the throttle control motor and sensor connector.

#### CHECK:

Measure the resistance between terminals of the throttle control motor.

#### OK:

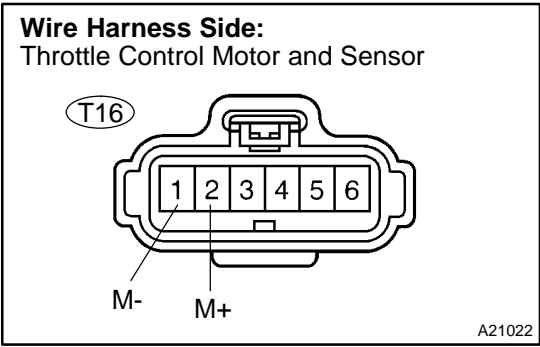
Tester Connection	Specified Condition
M+ (T16-2) - M- (T16-1)	0.3 to 100 $\Omega$ (20°C (68°F))

NG

Replace throttle body (See page [SF-36](#)).

OK

**2 Check for open and short in harness and connector between throttle control motor and ECM.**



**PREPARATION:**

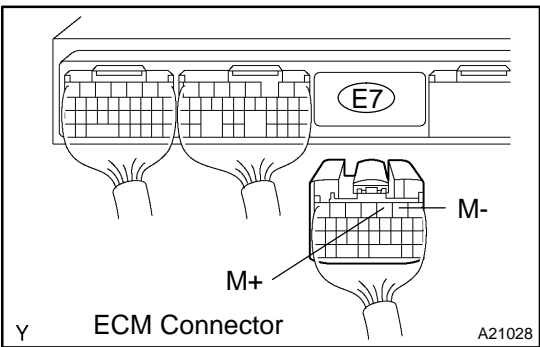
- (a) Disconnect the T16 throttle control motor and sensor connector.
- (b) Disconnect the E7 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
M+ (T16-2) - M+ (E7-3)	Below 1 Ω
M- (T16-1) - M- (E7-2)	Below 1 Ω
M+ (T16-2) or M+ (E7-3) - Body ground	10 kΩ or higher
M- (T16-1) or M- (E7-2) - Body ground	10 kΩ or higher



**NG** → **Repair or replace harness or connector.**

**OK**

**3 Visually check throttle valve.**

**CHECK:**

Check between the throttle valve and the housing for foreign objects. Also, check if the valve can open and close smoothly.

**NG** → **Remove foreign object and clean throttle body.**

**OK**

**Replace ECM (See page SF-60 ).**

<b>DTC</b>	<b>P2111</b>	<b>Throttle Actuator Control System -Stuck Open</b>
------------	--------------	---

<b>DTC</b>	<b>P2112</b>	<b>Throttle Actuator Control System -Stuck Closed</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

The throttle motor is operated by the ECM and it opens and closes the throttle valve using gears. The opening angle of the throttle valve is detected by the throttle position sensor, which is mounted on the throttle body. The throttle position sensor provides feedback to the ECM to control the throttle motor and set the throttle valve angle in response to driver input.

### HINT:

This Electrical Throttle Control System (ETCS) does not use a throttle cable.

DTC No.	DTC Detection Condition	Trouble Area
P2111	Throttle motor locked during ECM order to close.	<ul style="list-style-type: none"> <li>▶Throttle control motor and sensor circuit</li> <li>▶Throttle control motor and sensor</li> </ul>
P2112	Throttle motor locked during ECM order to open.	<ul style="list-style-type: none"> <li>▶Throttle body</li> <li>▶Throttle valve</li> </ul>

## MONITOR DESCRIPTION

The ECM concludes that there is a malfunction of the ETCS (Electronic Throttle Control System) when the throttle valve remains at a fixed angle despite high drive current from the ECM. The ECM will turn on the MIL and a DTC is set.

## FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

## MONITOR STRATEGY

Related DTCs	P2111	Throttle motor actuator lock (Open)
	P2112	Throttle motor actuator lock (Closed)
Required sensors/components	Main sensors/components	Throttle actuator motor
	Related sensors/components	Throttle position sensor
Frequency of operation	Continuous	
Duration	0.5 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
<b>P2111:</b>		
Throttle motor current	2 A	-
Throttle motor duty to close side	80%	-
<b>P2112:</b>		
Throttle motor current	2 A	-
Throttle motor duty to open side	80%	-

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Current throttle position sensor voltage at this time - throttle position sensor voltage 0.016 sec. earlier	Less than 0.1 V when throttle motor open (or close) duty 80% or more

## WIRING DIAGRAM

Refer to DTC P0120 on page [DI-84](#) .

## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

<b>1</b>	<b>Visually check throttle valve.</b>
----------	---------------------------------------

**PREPARATION:**

Remove the intake air connector.

**CHECK:**

Check whether or not a foreign matter is caught between the throttle valve and housing. Also, if the valve can open and close smoothly.

**NG**

**Remove foreign matter and clean throttle body.**

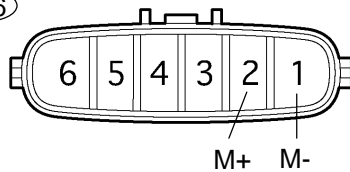
**OK**

<b>2</b>	<b>Check throttle control motor.</b>
----------	--------------------------------------

**Component Side:**

Throttle Control Motor and Sensor

(T16)



A21034

**PREPARATION:**

Disconnect the throttle control motor and sensor connector.

**CHECK:**

Measure the resistance between terminals of the throttle control motor.

**OK:**

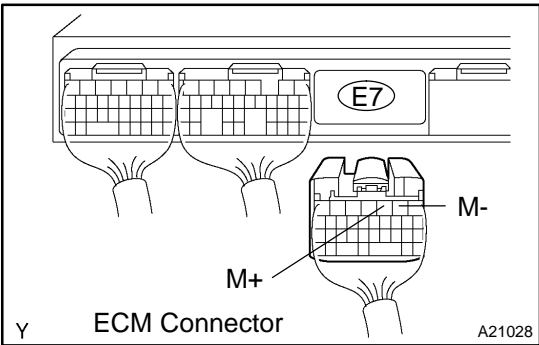
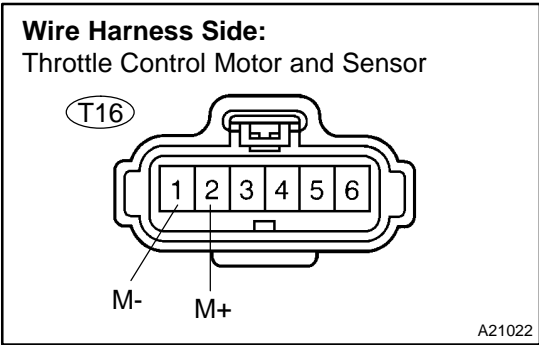
Tester Connection	Specified Condition
M+ (T16-2) - M- (T16-1)	0.3 to 100 $\Omega$ (20°C (68°F))

**NG**

**Replace throttle body (See page SF-36).**

**OK**

**3 Check for open and short in harness and connector between ECM and throttle control motor.**



**PREPARATION:**

- (a) Disconnect the T16 throttle control motor and sensor connector.
- (b) Disconnect the E7 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
M+ (T16-2) - M+ (E7-3)	Below 1 Ω
M- (T16-1) - M- (E7-2)	Below 1 Ω
M+ (T16-2) or M+ (E7-3) - Body ground	10 kΩ or higher
M- (T16-1) or M- (E7-2) - Body ground	10 kΩ or higher

**NG** Repair or replace harness or connector.

**OK**

Check for intermittent problems (See page DI-3).

<b>DTC</b>	<b>P2118</b>	<b>Throttle Actuator Control Motor Current Range/Performance</b>
------------	--------------	--

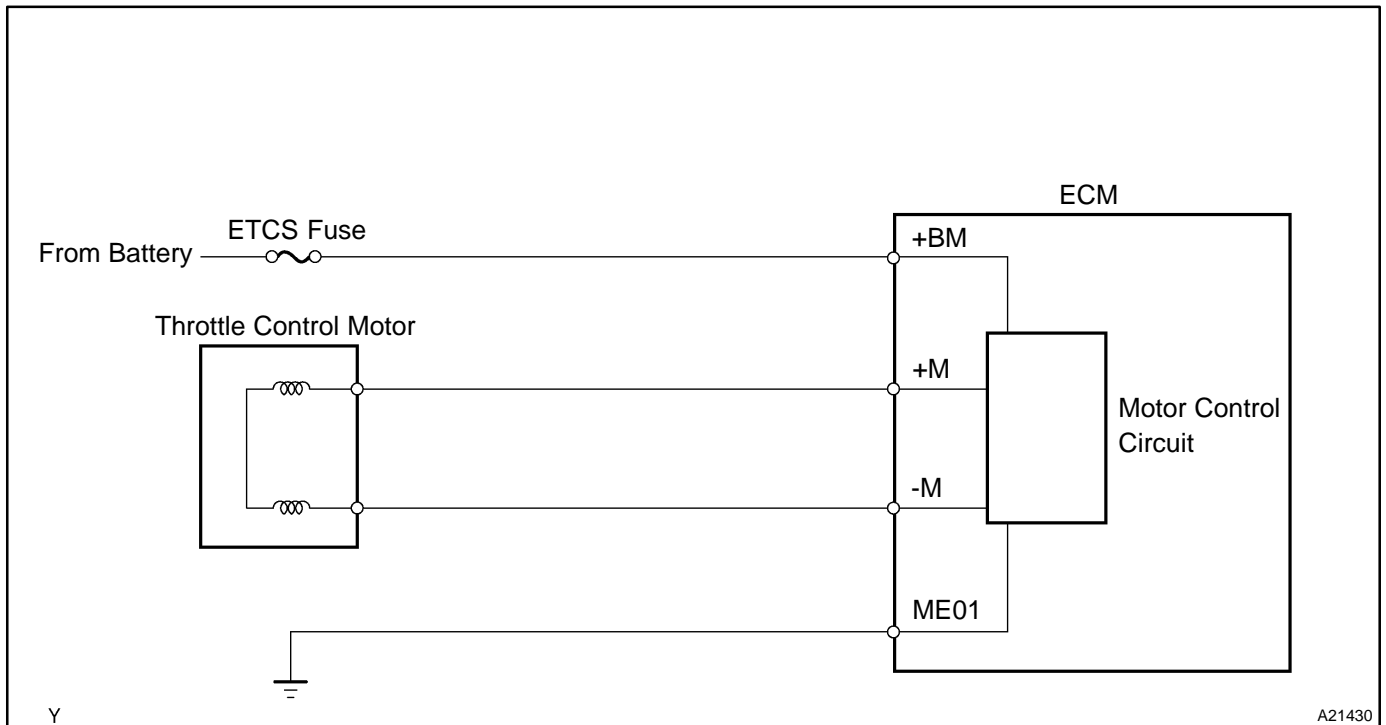
**CIRCUIT DESCRIPTION**

The Electronic Throttle Control System (ETCS) has a dedicated power supply circuit. The voltage (+BM) is monitored and when the voltage is low (less than 4V), the ECM concludes that the ETCS has a fault and current to the throttle control motor is cut.

When the voltage becomes unstable, the ETCS itself becomes unstable. For this reason, when the voltage is low, the current to the motor is cut. If repairs are made and the system has returned to normal, turn the ignition switch to OFF. The ECM then allows current to flow to the motor and the motor can be restarted.

HINT:

This Electrical Throttle Control System (ETCS) does not use a throttle cable.



DTC No.	DTC Detection Condition	Trouble Area
P2118	Open in ETCS power source circuit	<ul style="list-style-type: none"> <li>▶ Open in ETCS power source circuit</li> <li>▶ ETCS fuse</li> <li>▶ ECM</li> </ul>

**MONITOR DESCRIPTION**

The ECM monitors the battery supply voltage applied to the electronic throttle motor. When the power supply voltage drops below the threshold, the ECM concludes that the power supply has an open circuit. A DTC is set and the MIL is turned on.

## FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

## MONITOR STRATEGY

Related DTCs	P2118	Throttle actuator motor power supply line range check (Low voltage)
Required sensors/components	Throttle actuator motor	
Frequency of operation	Continuous	
Duration	0.8 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page DI-3)	
Actuator power	ON	
Battery voltage	8 V	-

## TYPICAL MALFUNCTION THRESHOLDS

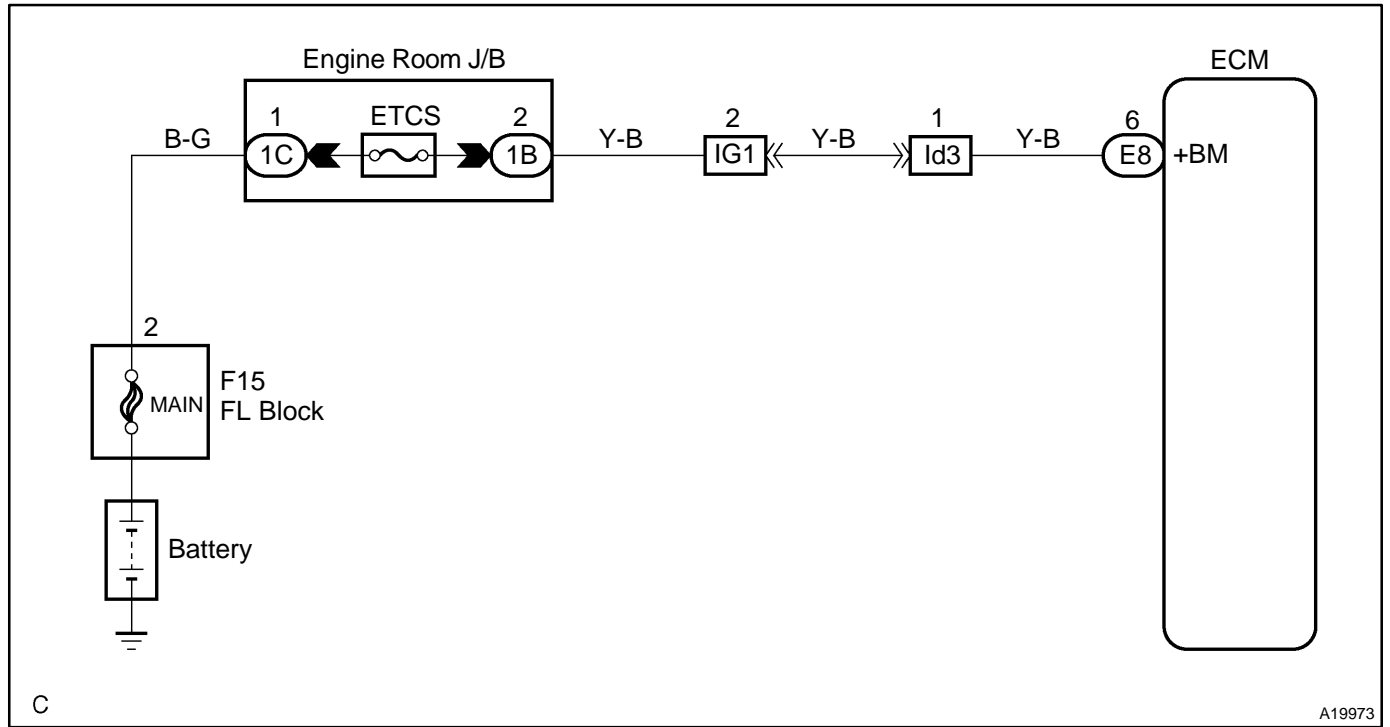
Detection Criteria	Threshold
Throttle actuator motor power supply voltage	Less than 4 V

## COMPONENT OPERATING RANGE

Parameter	Standard Value
Throttle actuator motor power supply voltage	9 to 14 V



### WIRING DIAGRAM



C

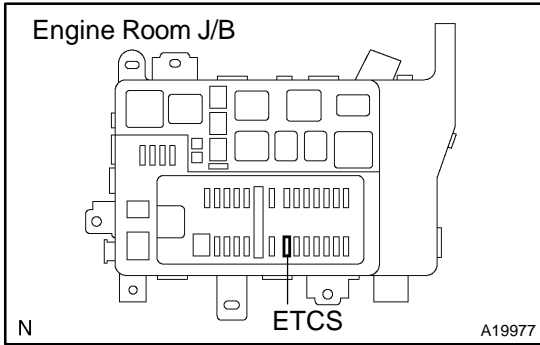
A19973

# INSPECTION PROCEDURE

## HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

**1 Check ETCS fuse.**



### PREPARATION:

Remove the ETCS fuse from the engine room J/B.

### CHECK:

Check the continuity of the ETCS fuse.

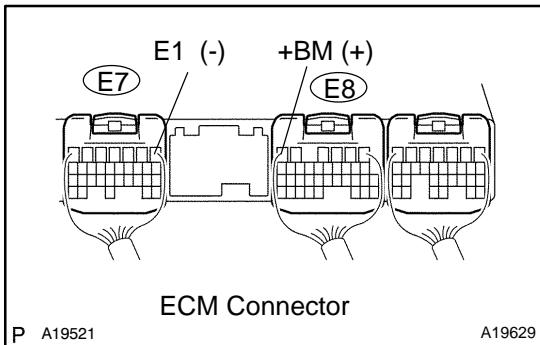
### OK:

Continuity

**NG** Check for short in all harness and components connected to ETCS fuse.

**OK**

**2 Check voltage between terminal +BM and E1 of ECM connector.**



### CHECK:

Measure the voltage between the specified terminals of the E7 and E8 ECM connector.

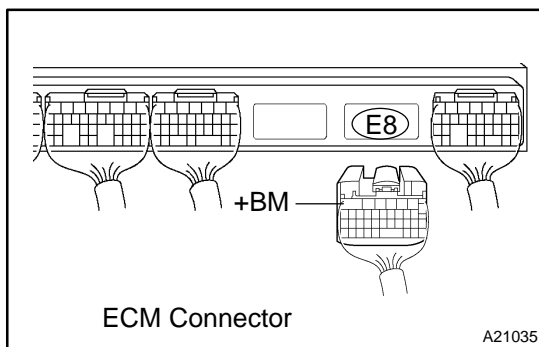
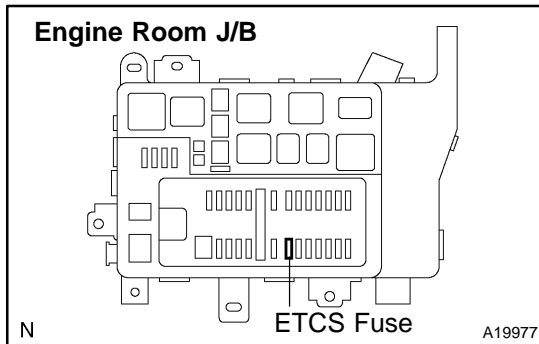
### OK:

Tester Connection	Specified Condition
+BM (E8-6) - E7 (E7-1)	9 to 14 V

**OK** Check for intermittent problems (See page [DI-3](#)).

**NG**

**3 Check for open or short in harness or connector between battery and ETCS fuse, ETCS fuse and ECM.**



**Check the harness and the connector between the ETCS fuse and the ECM:**

**PREPARATION:**

- Remove the ETCS fuse from the engine room J/B.
- Disconnect the E8 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connector.

**OK:**

Tester Connection	Specified Condition
Engine Room J/B (ETCS fuse terminal 2) - +BM (E8-6)	Below 1 $\Omega$
Engine Room J/B (ETCS fuse terminal 2) or +BM (E8-6) - Body ground	10 k $\Omega$ or higher

**Check the harness and connector between the ETCS fuse and the battery:**

**PREPARATION:**

- Remove the ETCS fuse from the engine room J/B.
- Disconnect the battery positive terminal.

**CHECK:**

Measure the resistance between the wire harness side connector.

**OK:**

Tester Connection	Specified Condition
Engine Room J/B (ETCS fuse terminal 1) - Battery positive terminal	Below 1 $\Omega$
Engine Room J/B (ETCS fuse terminal 1) or Battery positive terminal - Body ground	10 k $\Omega$ or higher

**NG**

**Repair or replace harness or connector.**

**OK**

**Check engine room J/B.**

<b>DTC</b>	<b>P2119</b>	<b>Throttle Actuator Control Throttle Body Range/Performance</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

The Electric Throttle Control System (ETCS) is composed of a throttle motor that operates the throttle valve, a throttle position sensor that detects the opening angle of the throttle valve, an accelerator pedal position sensor that detects the accelerator pedal position, and the ECM that controls the ETCS system.

The ECM operates the throttle motor to position the throttle valve for proper response to driver inputs. The throttle position sensor, mounted on the throttle body, detects the opening angle of the throttle valve and provides this signal to the ECM so that the ECM can regulate the throttle motor.

DTC No.	DTC Detection Condition	Trouble Area
P2119	Throttle opening angle continues to vary greatly from target throttle opening angle	<ul style="list-style-type: none"> <li>▶ Electric throttle control system</li> <li>▶ Throttle body</li> </ul>

## MONITOR DESCRIPTION

The ECM determines the "actual" throttle angle based on the throttle position sensor signal. The "actual" throttle position is compared to the "target" throttle position commanded by the ECM. If the difference of these two values exceeds a specified limit, the ECM interprets this as a fault in the ETCS (Electronic Throttle Control System). The ECM turns on the MIL and a DTC is set.

## FAIL SAFE

If the ETCS (Electronic Throttle Control System) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimum speed.

If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

## MONITOR STRATEGY

Related DTCs	P2119	Electronic throttle control system failure
Required sensors/components	Main sensors	Throttle actuator motor
	Related sensors	Throttle position sensor
Frequency of operation	Continuous	
Duration	1 sec.	
MIL operation	Immediate	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page DI-3)
The typical enabling condition is not available	-

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Difference between "target throttle position" and "actual throttle position"	0.3 V or more

## COMPONENT OPERATING RANGE

Standard Value
Commanded throttle position and current throttle position are nearly same

## WIRING DIAGRAM

Refer to DTC P2102 and P2103 on page [DI-302](#) .

## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

<b>1</b>	<b>Are there any other codes (besides DTC P2119) being output?</b>
----------	--

### PREPARATION:

- (a) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester or OBD II scan tool main switch ON.
- (c) When using hand-held tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

### CHECK:

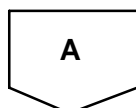
Read the DTC using the hand-held tester or the OBD II scan tool.

### RESULT:

Display (DTC Output)	Proceed to
P2119	A
"P2119" and other DTC	B

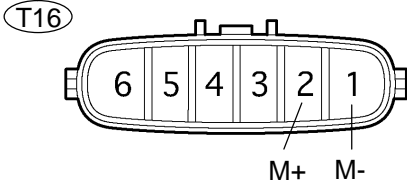
### HINT:

If any other codes besides P2119 are output, perform the troubleshooting for those DTCs first.



**2 Check throttle control motor.**

**Component Side:**  
Throttle Control Motor and Sensor



A21034

**PREPARATION:**

Disconnect the throttle control motor and sensor connector.

**CHECK:**

Measure the resistance between terminals of the throttle control motor.

**OK:**

Tester Connection	Specified Condition
M+ (T16-2) - M- (T16-1)	0.3 to 100 Ω (20°C (68°F))

**NG**

**Replace throttle body (See page SF-36).**

**OK**

**3 Replace ECM and clear DTC (Check if DTC outputs reoccur).**

**PREPARATION:**

- (a) Replace ECM.
- (b) Clear the DTC (See page DI-3).
- (c) Start and warm up the engine.
- (d) Run the engine at idle for 15 seconds or more.

**CHECK:**

Read the DTC using the hand-held tester or the OBD II scan tool.

**OK:**

**No DTC output.**

**OK**

**System is normal.**

**NG**

**Replace throttle body.**

<b>DTC</b>	<b>P2120</b>	<b>Throttle/Pedal Position Sensor/Switch "D" Circuit</b>
<b>DTC</b>	<b>P2122</b>	<b>Throttle/Pedal Position Sensor/Switch "D" Circuit Low Input</b>
<b>DTC</b>	<b>P2123</b>	<b>Throttle/Pedal Position Sensor/Switch "D" Circuit High Input</b>
<b>DTC</b>	<b>P2125</b>	<b>Throttle/Pedal Position Sensor/Switch "E" Circuit</b>
<b>DTC</b>	<b>P2127</b>	<b>Throttle/Pedal Position Sensor/Switch "E" Circuit Low Input</b>
<b>DTC</b>	<b>P2128</b>	<b>Throttle/Pedal Position Sensor/Switch "E" Circuit High Input</b>
<b>DTC</b>	<b>P2138</b>	<b>Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation</b>

**HINT:**

This is the repair procedure for the "accelerator pedal position sensor".

### CIRCUIT DESCRIPTION

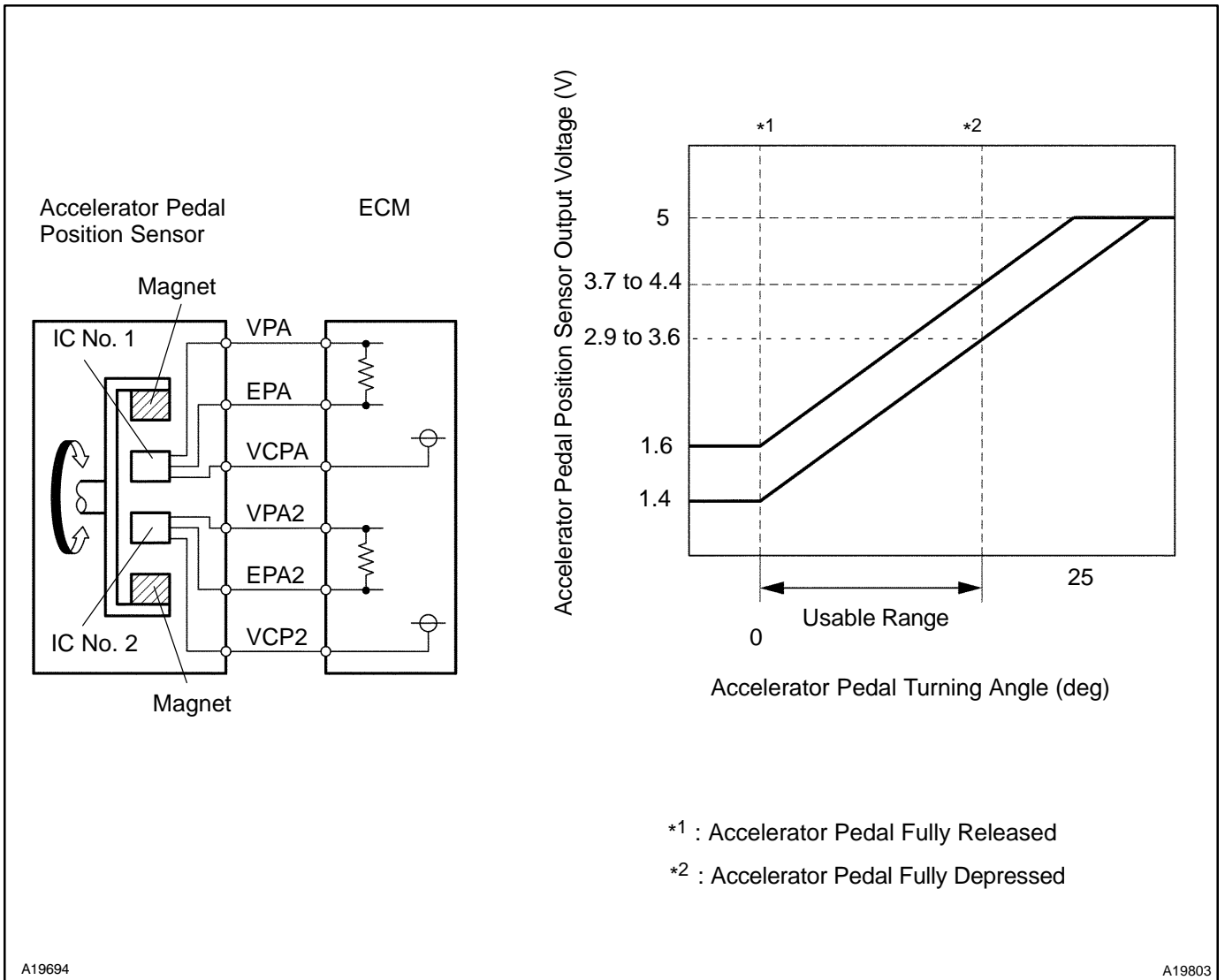
**HINT:**

- ▶ This electrical throttle system does not use a throttle cable.
- ▶ This accelerator pedal position sensor is a non-contact type.

The accelerator pedal position sensor is mounted in the accelerator pedal to detect the angle of the accelerator pedal. This sensor is electronically controlled and uses Hall-effect elements.

In the accelerator pedal position sensor, the voltage applied to terminals VPA and VPA2 of the ECM changes between 0 V and 5 V in proportion to the angle of the accelerator pedal. The VPA is a signal to indicate the actual accelerator pedal angle and is used for the engine control. VPA2 is used to detect malfunctions of the sensor itself.

The ECM judges the current angle of the accelerator pedal from these signals input from terminals VPA and VPA2, and the ECM controls the throttle motor based on these signals.





DTC No.	DTC Detection Condition (Open or short in accelerator pedal position sensor circuit)	Main trouble Area
P2120	Condition (a) continues for 0.5 seconds or more: (a) VPA $\ell$ 0.2 V and VPA2 $\vee$ 0.97 deg, or VPA $\vee$ 4.8 V	▶ Accelerator pedal position sensor ▶ ECM
P2122	Condition (a) and (b) continues for 0.5 seconds or more: (a) VPA $\ell$ 0.2 V (b) VPA2 $\vee$ 0.97 deg	▶ Accelerator pedal position sensor ▶ VCPA circuit open ▶ VPA circuit open or ground short ▶ ECM
P2123	Condition (a) continues for 2.0 seconds or more: (a) VPA $\vee$ 4.8 V	▶ Accelerator pedal position sensor ▶ EPA circuit open ▶ ECM
P2125	Condition (a) continues for 0.5 seconds or more: (a) VPA2 $\ell$ 0.5 V and VPA $\vee$ 0.97 deg, or VPA2 $\vee$ 4.8 V and 0.2 V $\ell$ VPA $\ell$ 3.45 V	▶ Accelerator pedal position sensor ▶ ECM
P2127	Condition (a) and (b) continues for 0.5 seconds or more: (a) VPA2 $\ell$ 0.5 V (b) VPA $\vee$ 0.97 deg	▶ Accelerator pedal position sensor ▶ VCP2 circuit open ▶ VPA2 circuit open or ground short ▶ ECM
P2128	Condition (a) and (b) continues for 2.0 seconds or more: (a) VPA2 $\vee$ 4.8 V (a) 0.2 V $\ell$ VPA $\ell$ 3.45 V	▶ Accelerator pedal position sensor ▶ EPA circuit open ▶ ECM
P2138	Condition (a) or (b) continues for 2.0 seconds or more: (a) $ VPA - VPA2  \ell$ 0.02 V (b) VPA $\ell$ 0.2 V and VPA2 $\ell$ 0.5 V	▶ VPA and VPA2 circuit are short circuited ▶ Accelerator pedal position sensor ▶ ECM

**HINT:**

After confirming DTC P2120, P2122, P2123, P2125, P2127, P2128 and P2138 use the OBD II scan tool or the hand-held tester to confirm the accelerator pedal opening percentage.

Trouble area	Accelerator pedal position expressed as voltage			
	Accelerator pedal completely released		Accelerator pedal fully depressed	
	ACCEL POS #1	ACCEL POS #2	ACCEL POS #1	ACCEL POS #2
VC circuit open	0 to 0.2 V	0 to 0.2 V	0 to 0.2 V	0 to 0.2 V
VPA circuit open or ground short	0 to 0.2 V	1.2 to 2.0 V	0 to 0.2 V	3.4 to 5.3 V
VPA2 circuit open or ground short	0.5 to 1.1 V	0 to 0.2 V	2.6 to 4.5 V	0 to 0.2 V
E2 circuit open	4.5 to 5.5 V	4.5 to 5.5 V	4.5 to 5.5 V	4.5 to 5.5 V

**MONITOR DESCRIPTION**

When VPA or VPA2, deviates from the standard, or the difference between the voltage outputs of the two sensors is less than threshold, the ECM concludes that there is a defect in the accelerator pedal position sensor. The ECM turns on the MIL and a DTC is set.

Example:

When the voltage output of the VPA below 0.2 V or exceeds 4.8 V.

**FAIL SAFE**

The accelerator pedal position sensor has two (main and sub) sensor circuits. If a malfunction occurs in either of the sensor circuits, the ECM detects the abnormal signal voltage difference between the two sensor circuits and switches to limp mode. In limp mode, the remaining circuit is used to calculate the accelerator pedal opening to allow the vehicle to continue driving.

If both circuits malfunction, the ECM regards the opening angle of the accelerator pedal to be fully closed. In this case, the throttle valve will remain closed as if the engine is idling.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

**MONITOR STRATEGY**

Related DTCs	P2120	Accelerator position sensor 1 (VPA) range check (Fluttering)
	P2122	Accelerator position sensor 1 (VPA) range check (Low voltage)
	P2123	Accelerator position sensor 1 (VPA) range check (High voltage)
	P2125	Accelerator position sensor 2 (VPA2) range check (Fluttering)
	P2127	Accelerator position sensor 2 (VPA2) range check (Low voltage)
	P2128	Accelerator position sensor 2 (VPA2) range check (High voltage)
	P2138	Accelerator position sensor correlation range check
Required sensors/components	Accelerator position sensor	
Frequency of operation	Continuous	
Duration	2 sec.	
MIL operation	Immediate	
Sequence of operation	None	

**TYPICAL ENABLING CONDITIONS**

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
Ignition switch	ON	
Throttle control motor power	ON	

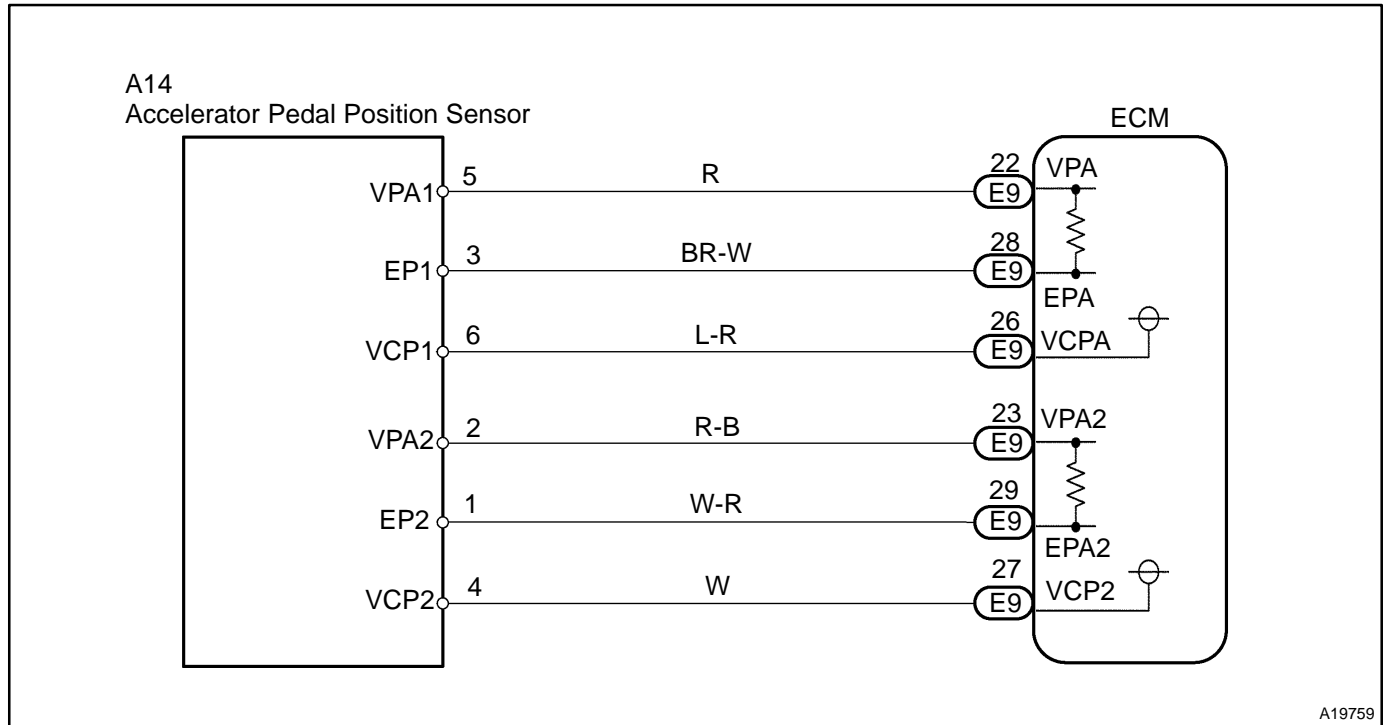
## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>P2120:</b>	
VPA voltage	0.2 V or less or 4.8 V or more fluttering
<b>P2122:</b>	
VPA voltage	0.2 V or less (When VPA2 angle 1 deg or more)
<b>P2123:</b>	
VPA voltage	4.8 V or more
<b>P2125:</b>	
VPA2 voltage	0.5 V or less or 4.8 V or more fluttering
<b>P2127:</b>	
VPA2 voltage	0.5 V or less (When VPA angle 1 deg or more)
<b>P2128:</b>	
Following conditions are met:	A and B
A. VPA voltage	0.2 V or more and 3.45 V or less
B. VPA2 voltage	4.8 V or more
<b>P2138:</b>	
Following condition is met for	A or B
A. Difference between VPA and VPA2 voltages	0.02 V or less
B. Both following conditions are met:	(a) and (b)
(a) VPA voltage	0.2 V or less
(b) VPA2 voltage	0.5 V or less

## COMPONENT OPERATING RANGE

Parameter	Standard Value
VPA voltage	More than 0.2 V and less than 4.8 V
VPA2 voltage	More than 0.5 V and Less than 4.8 V
Difference between VPA and VPA2 voltages	More than 0.02 V

# WIRING DIAGRAM



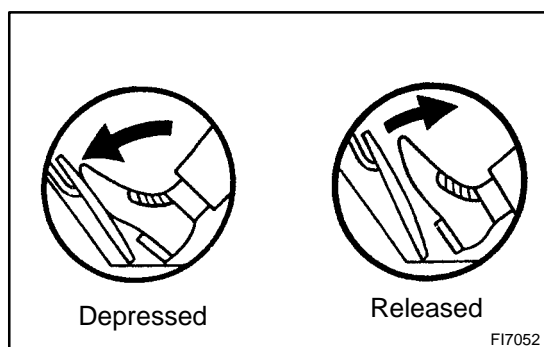
## INSPECTION PROCEDURE

### HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

### Hand-held tester:

<b>1</b>	<b>Connect hand-held tester, and read the voltage for accelerator pedal position sensor data.</b>
----------	---



### PREPARATION:

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / ACCEL POS #1 and ACCEL POS #2.

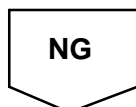
### CHECK:

Read the voltage for the accelerator pedal position sensor data.

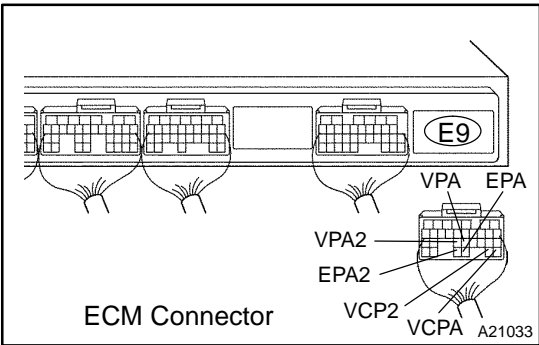
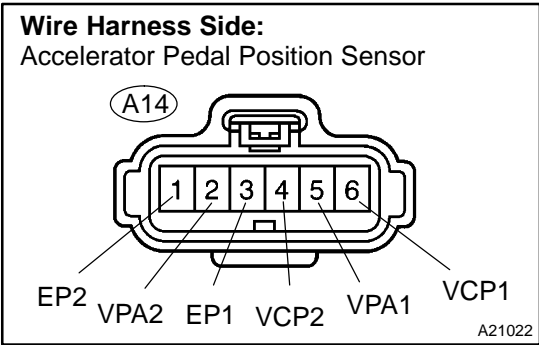
### OK:

Accelerator pedal	ACCEL POS #1	ACCEL POS #2
Released	0.5 to 1.1 V	1.2 to 2.0 V
Depressed	2.6 to 4.5 V	3.4 to 5.3 V

<b>OK</b>	<b>Go to step 5.</b>
-----------	----------------------



**2 Check for open and short in harness and connector in VCPA, VCP2, VPA, VPA2 EPA and EPA2 circuit between ECM and accelerator pedal position sensor.**



**PREPARATION:**

- (a) Disconnect the A14 accelerator pedal position sensor connector.
- (b) Disconnect the E9 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

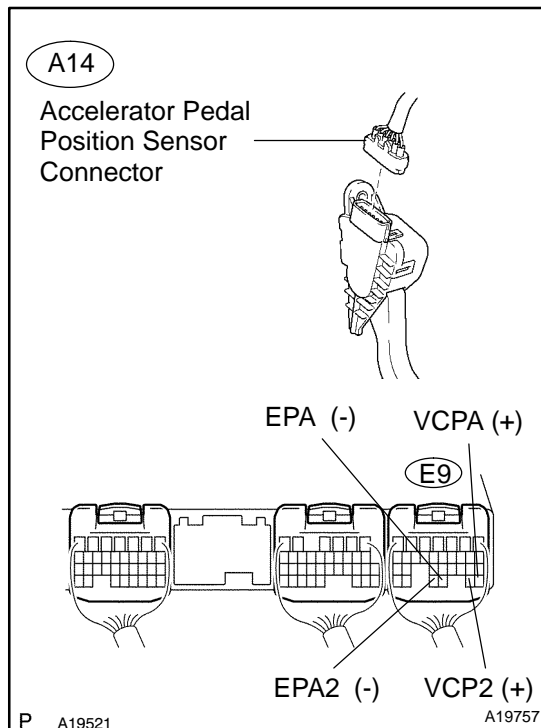
**OK:**

Tester Connection	Specified Condition
VPA1 (A14-5) - VPA (E9-22)	Below 1 Ω
EP1 (A14-3) - EPA (E9-28)	Below 1 Ω
VCP1 (A14-6) - VCPA (E9-26)	Below 1 Ω
VPA2 (A14-2) - VPA2 (E9-23)	Below 1 Ω
EP2 (A14-1) - EPA2 (E9-29)	Below 1 Ω
VCP2 (A14-4) - VCP2 (E9-27)	Below 1 Ω
VPA1 (A14-5) or VPA (E9-22) - Body ground	10 kΩ or higher
EP1 (A14-3) or EPA (E9-28) - Body ground	10 kΩ or higher
VCP1 (A14-6) or VCPA (E9-26) - Body ground	10 kΩ or higher
VPA2 (A14-2) or VPA2 (E9-23) - Body ground	10 kΩ or higher
EP2 (A14-1) or EPA2 (E9-29) - Body ground	10 kΩ or higher
VCP2 (A14-4) or VCP2 (E9-27) - Body ground	10 kΩ or higher

**NG** **Repair or replace harness or connector.**

**OK**

**3 Check voltage between terminals VCPA and EPA, and VCP2 and EPA2 of ECM terminals.**



**PREPARATION:**

- Turn the ignition switch ON.
- Disconnect the A14 accelerator pedal position sensor connector.

**CHECK:**

Measure the voltage between the specified terminals of the E9 ECM connector.

**OK:**

Tester Connection	Specified Condition
VCPA (E9-26) - EPA (E9-28)	4.5 to 5.5 V
VCP2 (E9-27) - EPA2 (E9-29)	4.5 to 5.5 V

**NG**

**Replace ECM (See page SF-60).**

**OK**

**4 Replace accelerator pedal assembly (See page SF-58).**

**Go**

<b>5</b>	<b>Check if DTC output recur?</b>
----------	-----------------------------------

**PREPARATION:**

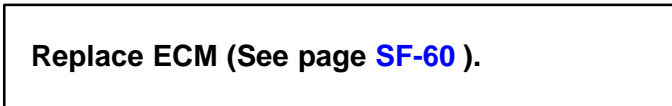
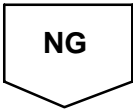
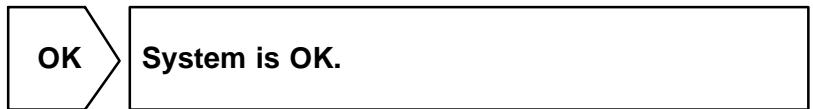
- (a) Connect the hand-held tester to the DLC3.
- (b) Disconnect the battery terminals or remove the EFI or ECD No. 1 fuse and ETCS fuse (Clear DTCs).
- (c) Start the engine.
- (d) Drive the engine at idle for 15 seconds or more.

**CHECK:**

Read the DTC output.

**OK:**

No DTC output.



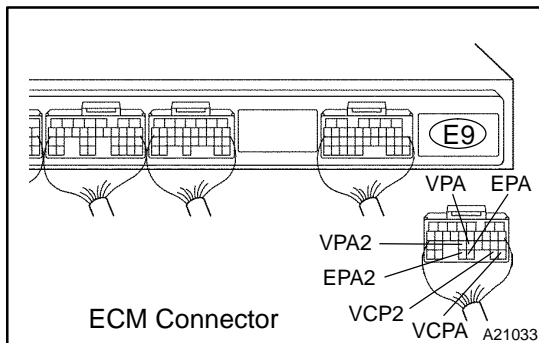
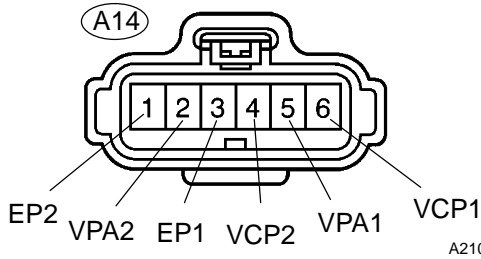


**OBD II scan tool (excluding hand-held tester):**

- |          |   |
|----------|---|
| <b>1</b> | <b>Check for open and short in harness and connector in VCPA, VCP2, VPA, VPA2 EPA and EPA2 circuit between ECM and accelerator pedal position sensor.</b> |
|----------|---|

**Wire Harness Side:**

Accelerator Pedal Position Sensor

**PREPARATION:**

- Disconnect the A14 accelerator pedal position sensor connector.
- Disconnect the E9 ECM connector.

**CHECK:**

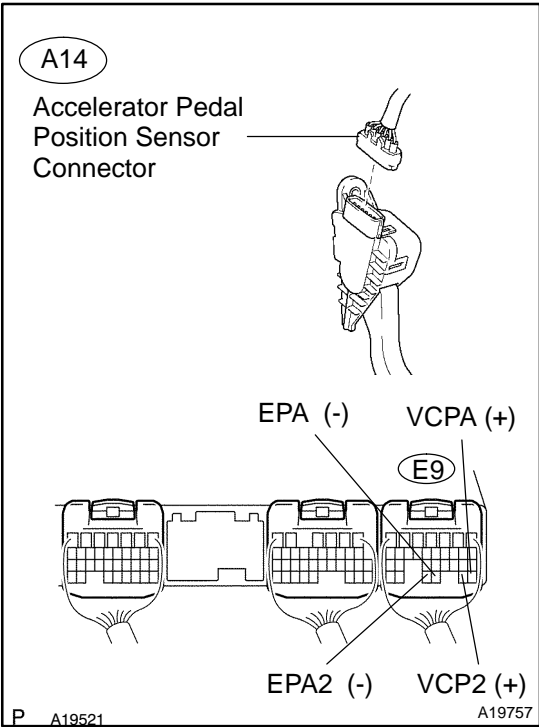
Measure the resistance between the wire harness side connectors.

**OK:**

Tester Connection	Specified Condition
VPA1 (A14-5) - VPA (E9-22)	Below 1 $\Omega$
EP1 (A14-3) - EPA (E9-28)	Below 1 $\Omega$
VCP1 (A14-6) - VCPA (E9-26)	Below 1 $\Omega$
VPA2 (A14-2) - VPA2 (E9-23)	Below 1 $\Omega$
EP2 (A14-1) - EPA2 (E9-29)	Below 1 $\Omega$
VCP2 (A14-4) - VCP2 (E9-27)	Below 1 $\Omega$
VPA1 (A14-5) or VPA (E9-22) - Body ground	10 k $\Omega$ or higher
EP1 (A14-3) or EPA (E9-28) - Body ground	10 k $\Omega$ or higher
VCP1 (A14-6) or VCPA (E9-26) - Body ground	10 k $\Omega$ or higher
VPA2 (A14-2) or VPA2 (E9-23) - Body ground	10 k $\Omega$ or higher
EP2 (A14-1) or EPA2 (E9-29) - Body ground	10 k $\Omega$ or higher
VCP2 (A14-4) or VCP2 (E9-27) - Body ground	10 k $\Omega$ or higher

**NG****Repair or replace harness or connector.****OK**

**2 Check voltage between terminals VCPA and EPA, and VCP2 and EPA2 of ECM terminals.**



**PREPARATION:**

- (a) Turn the ignition switch ON.
- (b) Disconnect the A14 accelerator pedal position sensor connector.

**CHECK:**

Measure the voltage between the specified terminals of the E9 ECM connector.

**OK:**

Tester Connection	Specified Condition
VCPA (E9-26) - EPA (E9-28)	4.5 to 5.5 V
VCP2 (E9-27) - EPA2 (E9-29)	4.5 to 5.5 V

**NG** Replace ECM (See page SF-60 ).

**OK**

**3 Replace accelerator pedal assembly (See page SF-58 ).**

**Go**

<b>4</b>	<b>Check if DTC output recur?</b>
----------	-----------------------------------

**PREPARATION:**

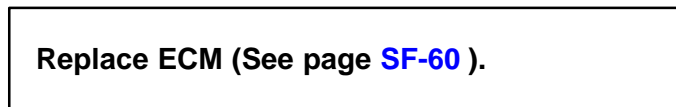
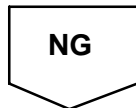
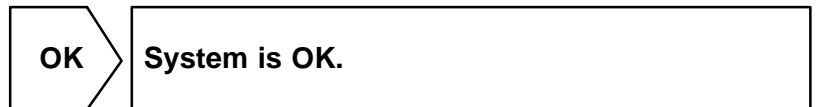
- (a) Connect the OBD II scan tool to the DLC3.
- (b) Disconnect the battery terminals or remove the EFI or ECD No. 1 fuse and ETCS fuse (Clear DTCs).
- (c) Start the engine.
- (d) Drive the engine at idle for 15 seconds or more.

**CHECK:**

Read the DTC output.

**OK:**

No DTC output.



<b>DTC</b>	<b>P2121</b>	<b>Throttle/Pedal Position Sensor/Switch "D" Circuit Range/Performance</b>
------------	--------------	--

**HINT:**

This is repair procedure for the "accelerator pedal position sensor".

**CIRCUIT DESCRIPTION**

Refer to DTC P2120 on page [DI-318](#) .

DTC No.	DTC Detecting Condition	Trouble Area
P2121	Conditions (a) and (b) continue for 0.5 seconds: (a) Difference between VPA and VPA2 exceeds the threshold (b) IDL is OFF	<ul style="list-style-type: none"> <li>▶ Accelerator pedal position sensor circuit</li> <li>▶ Accelerator pedal position sensor</li> <li>▶ ECM</li> </ul>

**MONITOR DESCRIPTION**

The accelerator pedal position sensor is mounted on the accelerator pedal bracket. The accelerator pedal position sensor has 2 sensor elements/signal outputs: VPA1 and VPA2. VPA1 is used to detect the actual accelerator pedal angle (used for engine control) and VPA2 is used to detect malfunctions in VPA1. When the difference between the voltage outputs of VPA1 and VPA2 deviate from the standard, the ECM concludes the accelerator pedal position sensor has a malfunction. The ECM turns on the MIL and a DTC is set.

**FAIL SAFE**

The accelerator pedal position sensor has two (main and sub) sensor circuits. If a malfunction occurs in either of the sensor circuits, the ECM detects the abnormal signal voltage difference between the two sensor circuits and switches to limp mode. In limp mode, the remaining circuit is used to calculate the accelerator pedal opening to allow the vehicle to continue driving.

If both circuits malfunction, the ECM regards the opening angle of the accelerator pedal to be fully closed. In this case, the throttle valve will remain closed as if the engine is idling.

If a "pass" condition is detected and then the ignition switch is turned OFF, the fail-safe operation will stop and the system will return to normal condition.

**MONITOR STRATEGY**

Related DTCs	P2121	Accelerator position sensor (rationality)
Required sensors/components	Accelerator position sensor	
Frequency of operation	Continuous	
Duration	0.5 sec.	
MIL operation	Immediate	
Sequence of operation	None	

### TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of disable a monitor" (on page <a href="#">DI-3</a> )	
Either of the following conditions is met	A or B	
A. Ignition switch	ON	
B. Throttle control motor power	ON	
System is not under limp home mode due to accelerator pedal position sensor malfunction		

### TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
$ VPA - (VPA2 - 0.8) ^*$ *Corrected by learning value	More than 0.4 V

### WIRING DIAGRAM

Refer to DTC P2120 on page [DI-318](#) .

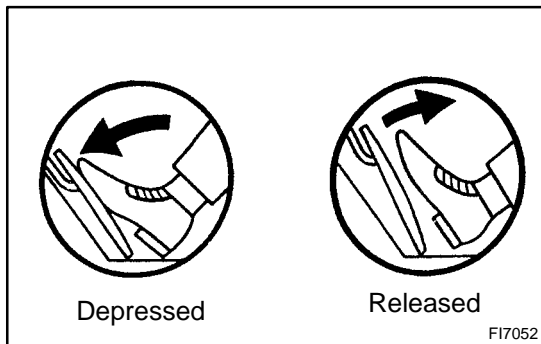
### INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, as well as other data from the time when a malfunction occurred.

#### Hand-held tester:

<b>1</b>	<b>Connect hand-held tester, and read the voltage for accelerator pedal position sensor data.</b>
----------	---



#### PREPARATION:

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / ACCEL POS #1 and ACCEL POS #2.

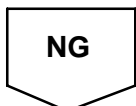
#### CHECK:

Read the voltage for the accelerator pedal position sensor data.

#### OK:

Accelerator pedal	ACCEL POS #1	ACCEL POS #2
Released	0.5 to 1.1 V	1.2 to 2.0 V
Depressed	2.6 to 4.5 V	3.4 to 5.3 V

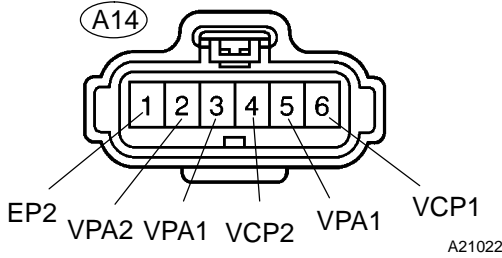
<b>OK</b>	<b>Replace ECM (See page <a href="#">SF-60</a> ).</b>
-----------	---



**2 Check for open and short in harness and connector between accelerator pedal position sensor and ECM.**

**Wire Harness Side:**

Accelerator Pedal Position Sensor



**PREPARATION:**

- (a) Disconnect the A14 accelerator pedal position sensor connector.
- (b) Disconnect the E9 ECM connector.

**CHECK:**

Measure the resistance between the wire harness side connectors.

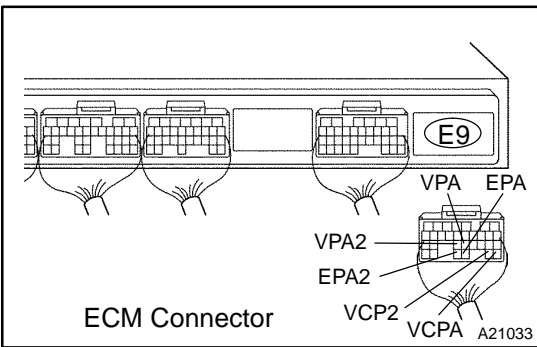
**OK:**

**Standard (Check for open):**

Tester Connection	Specified Condition
VPA1 (A14-5) - VPA (E9-22)	Below 1 Ω
EP1 (A14-3) - EPA (E9-28)	Below 1 Ω
VCP1 (A14-6) - VCPA (E9-26)	Below 1 Ω
VPA2 (A14-2) - VPA2 (E9-23)	Below 1 Ω
EP2 (A14-1) - EPA2 (E9-29)	Below 1 Ω
VCP2 (A14-4) - VCP2 (E9-27)	Below 1 Ω

**Standard (Check for short):**

Tester Connection	Specified Condition
VPA1 (A14-5) or VPA (E9-22) - Body ground	10 kΩ or higher
EP1 (A14-3) or EPA (E9-28) - Body ground	10 kΩ or higher
VCP1 (A14-6) or VCPA (E9-26) - Body ground	10 kΩ or higher
VPA2 (A14-2) or VPA2 (E9-23) - Body ground	10 kΩ or higher
EP2 (A14-1) or EPA2 (E9-29) - Body ground	10 kΩ or higher
VCP2 (A14-4) or VCP2 (E9-27) - Body ground	10 kΩ or higher



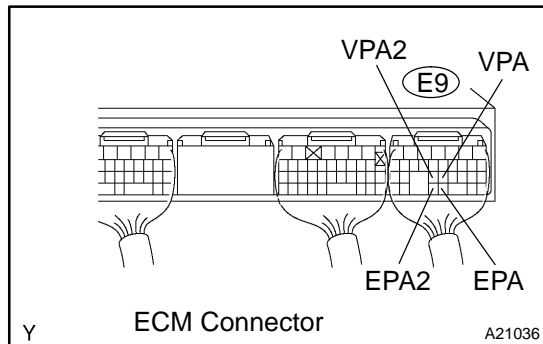
**NG** Repair or replace harness or connector.

**OK**

Replace accelerator pedal pedal assembly.

**OBD II scan tool (excluding hand-held tester):**

- |          |   |
|----------|---|
| <b>1</b> | <b>Check voltage between terminals VPA and EPA, VPA2 and EPA2 of ECM connector.</b> |
|----------|---|

**PREPARATION:**

Turn the ignition switch ON.

**CHECK:**

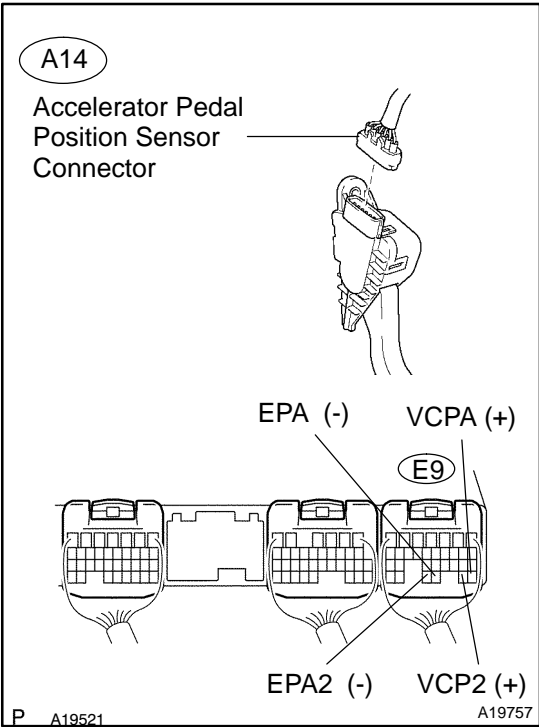
Measure the voltage between the specified terminals of the E9 ECM connector.

**OK:**

Accelerator Pedal Position	Tester Connection	Tester Connection
	VPA (E9-22) - EPA (E9-28)	VPA2 (E9-23) - EPA2 (E9-29)
Released	0.5 to 1.1 V	1.2 to 2.0 V
Depressed	2.6 to 4.5 V	3.4 to 5.3 V

**OK****Replace ECM (See page SF-60 ).****NG**

**2 Check for open and short in harness and connector between accelerator pedal position sensor and ECM.**



**PREPARATION:**

- (a) Turn the ignition switch ON.
- (b) Disconnect the A14 accelerator pedal position sensor connector.

**CHECK:**

Measure the voltage between the specified terminals of the E9 ECM connector.

**OK:**

Tester Connection	Specified Condition
VCPA (E9-26) - EPA (E9-28)	4.5 to 5.5 V
VCP2 (E9-27) - EPA2 (E9-29)	4.5 to 5.5 V

**NG** Replace ECM (See page SF-60 ).

**OK**

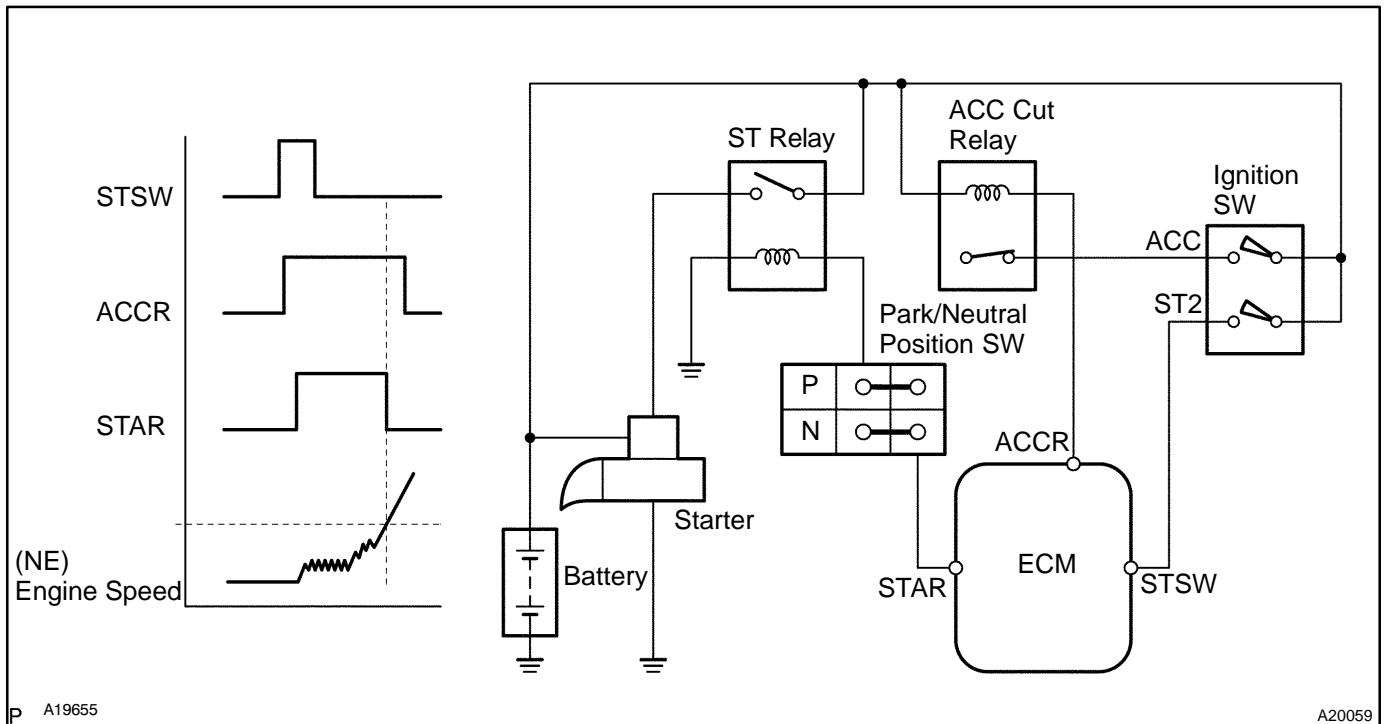
Replace accelerator pedal assembly.



## Cranking Hold Function Circuit

### CIRCUIT DESCRIPTION

The starter is controlled by the ECM, when the ECM detects a start signal (STSW) from the ignition switch, this system monitors the engine speed (NE) and continues to operate the starter until it has determined that the engine has started (engine speed reaches approximately 500 rpm). If the engine is already running and the ignition switch is turned to START, the ECM will not operate the starter.



### WIRING DIAGRAM

Refer to DTC P0617 on page [DI-296](#).

### INSPECTION PROCEDURE

#### Hand-held tester:

1	Check operation of engine cranking.
---	-------------------------------------

#### CHECK:

When turning the ignition switch to the START position, check whether the starter motor starts.

#### OK:

Starter motor starts.

OK

Check for intermittent problems (See page [DI-3](#)).

NG

**2 Connect hand-held tester, and check STA signal.**

**PREPARATION:**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STARTER SIG.

**CHECK:**

Read the STA signal on the hand-held tester while the starter operates.

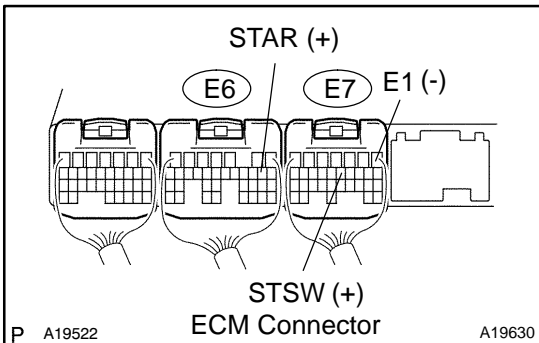
**OK:**

Ignition Switch Position	ON	START
STA Signal	OFF	ON

**NG** Go to step 5.

**OK**

**3 Check voltage between terminal STAR, STSW and E1 of ECM connector.**



**CHECK:**

Measure the voltage between the terminals of the E6 and E7 ECM connectors, while cranking the engine (ignition switch START position).

**OK:**

Tester Connection	Specified Condition
STAR (E6-9) - E1 (E7-1)	9 to 14 V
STSW (E7-12) - E1 (E7-1)	9 to 14 V

**RESULT:**

Terminal STAR	Terminal STSW	Proceed to
9 to 14 V	9 to 14 V	A
0 V	9 to 14 V	B
0 V	0 V	C

**B** Replace ECM (See page SF-60).

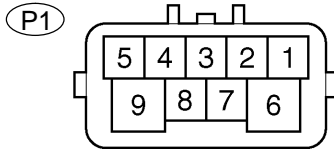
**C** Go to step 9.

**A**

#### 4 Check park/neutral position switch.

##### Component Side:

Park/neutral Position Switch



##### PREPARATION:

Remove the P1 park/neutral position switch connector.

##### CHECK:

Check continuity between each terminal shown below when the shift lever is moved to each range.

Shift range	Terminal No. to continuity	
P	1 - 3	6 - 9
R	2 - 3	-
N	3 - 5	6 - 9
D	3 - 7	-
2	3 - 4	-
L	3 - 8	-

##### OK:

There is continuity.

NG

Replace the park/neutral position switch.

OK

Check and repair harness and connector between park/neutral position switch and ECM (See page [IN-36](#)).

#### 5 Check starter relay (See page [ST-18](#)).

NG

Replace starter relay.

OK

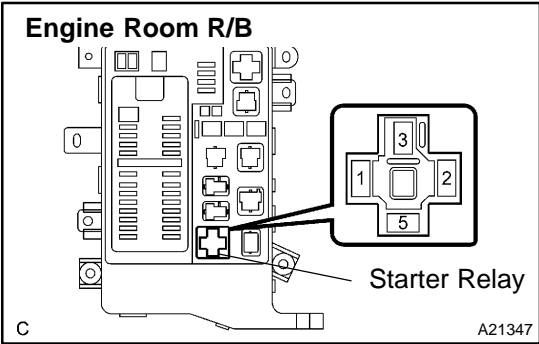
#### 6 Check for open and short in harness and connector between park/neutral position switch and starter relay, starter relay and body ground (See page [IN-36](#)).

NG

Repair or replace harness or connector.

OK

**7 Check engine room R/B (Starter relay voltage).**



**PREPARATION:**

Remove the starter relay from the engine room R/B.

**CHECK:**

Measure the voltage between the terminal of the engine room R/B and body ground.

**OK:**

Tester Connection	Specified Condition
Starter relay (5) - Body ground	9 to 14 V

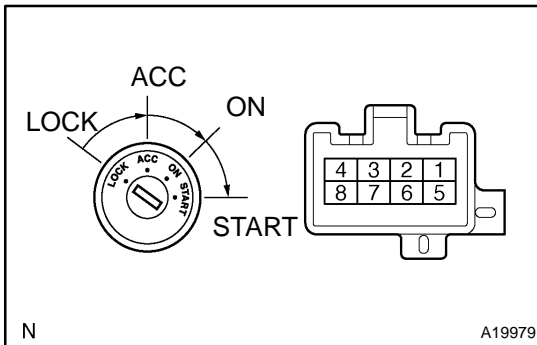
**NG** Check and repair harness and connector between starter relay and battery.

**OK**

**8 Check starter (See page ST-16 ).**

**NG** Repair or replace starter.

**OK**

**9 Check ignition switch.****PREPARATION:**

- Remove the lower finish panel.
- Disconnect the ignition switch connector.

**CHECK:**

Check continuity between terminals shown below.

**OK:**

Switch Position	Terminal No. to continuity	
LOCK	-	-
ACC	2-3	-
ON	2-3-4	6-7
START	1-2-4	6-7-8

**NG****Replace ignition switch.****OK**

**Check for open in harness and connector between ECM and ignition switch, ignition switch and battery (See page [IN-36](#) ).**

**OBD II scan tool (excluding hand-held tester):**

<b>1</b>	<b>Check operation of engine cranking.</b>
----------	--

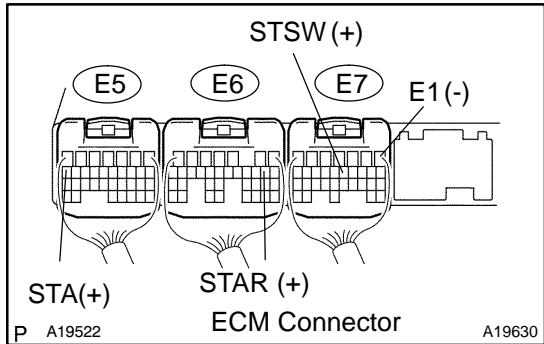
**CHECK:**

When turning the ignition switch to the ST position, check whether the starter motor starts.

**OK** → **Check for intermittent problems (See page [DI-3](#)).**

**NG**

<b>2</b>	<b>Check voltage between terminal STSW, STAR, STA and E1 of ECM connector.</b>
----------	--



**CHECK:**

Measure the voltage between the terminals of E5, E6 and E7 ECM connectors, while cranking the engine (ignition switch START position).

**OK:**

Tester Connection	Specified Condition
STA (E5-17) - E1 (E7-1)	9 to 14 V
STAR (E6-9) - E1 (E7-1)	9 to 14 V
STSW (E7-12) - E1 (E7-1)	9 to 14 V

**RESULT:**

Terminal STA	Terminal STAR	Terminal STSW	Proceed to
9 to 14 V	9 to 14 V	9 to 14 V	A
0 V	9 to 14 V	9 to 14 V	B
0 V	0 V	9 to 14 V	C
0 V	0 V	0 V	D

**B** → **Go to step 7.**

**C** → **Replace ECM (See page [SF-60](#)).**

**D** → **Go to step 8.**

**A**

3 Check starter relay (See page [ST-18](#)).

NG

Replace starter relay.

OK

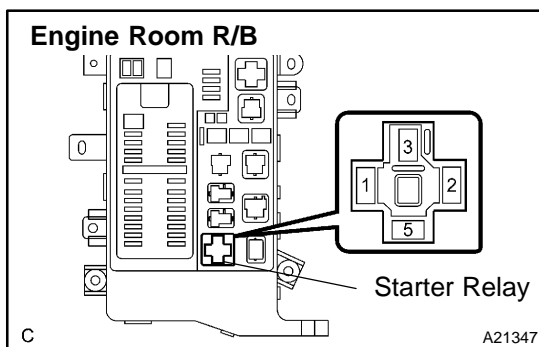
4 Check for open and short in harness and connector between park/neutral position switch and starter relay, starter relay and body ground (See page [IN-36](#)).

NG

Repair or replace harness or connector.

OK

5 Check engine room R/B (Starter relay voltage).



**PREPARATION:**

Remove the starter relay from the engine room R/B.

**CHECK:**

Measure the voltage between the terminal of the engine room R/B and body ground.

**OK:**

Tester Connection	Specified Condition
Starter relay (5) - Body ground	9 to 14 V

NG

Check and repair harness and connector between starter relay and battery (See page [IN-36](#)).

OK

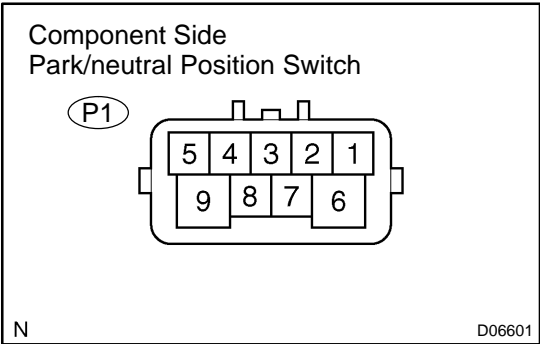
**6** Check starter (See page [ST-16](#) ).

**NG** Repair or replace starter.

**OK**

Check and repair harness and connector between starter relay and starter, starter and battery (See page [IN-36](#) ).

**7** Check park/neutral position switch.



**PREPARATION:**

Remove the P1 park/neutral position switch connector.

**CHECK:**

Check continuity between each terminal shown below when the shift lever is moved to each range.

Shift range	Terminal No. to continuity	
P	1 - 3	6 - 9
R	2 - 3	-
N	3 - 5	6 - 9
D	3 - 7	-
2	3 - 4	-
L	3 - 8	-

**OK:**

There is continuity.

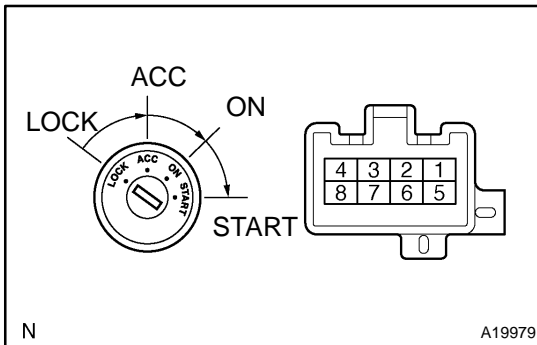
**NG** Replace the park/neutral position switch.

**OK**

Check and repair harness and connector between park/neutral position switch and ECM (See page [IN-36](#) ).



## 8 Check ignition switch.



### PREPARATION:

- Remove the lower finish panel.
- Disconnect the ignition switch connector.

### CHECK:

Check continuity between terminals shown below.

### OK:

Switch Position	Terminal No. to continuity	
LOCK	-	-
ACC	2-3	-
ON	2-3-4	6-7
START	1-2-4	6-7-8

**NG**

**Replace ignition switch.**

**OK**

**Check and replace harness and connector between ECM and ignition switch, ignition switch and battery (See page [IN-36](#) ).**

# CUSTOMER PROBLEM ANALYSIS CHECK

**ENGINE CONTROL SYSTEM Check Sheet**

Inspector's Name \_\_\_\_\_

Customer's Name		VIN	
Driver's Name		Production Date	
Data Vehicle Brought in		Licence Plate No.	
Engine model		Odometer Reading	km miles

Problem Symptoms	<input type="checkbox"/> Engine does not Start	<input type="checkbox"/> Engine does not crank	<input type="checkbox"/> No initial combustion	<input type="checkbox"/> No complete combustion
	<input type="checkbox"/> Difficult to Start	<input type="checkbox"/> Engine cranks slowly <input type="checkbox"/> Other _____		
	<input type="checkbox"/> Poor Idling	<input type="checkbox"/> Incorrect first idle <input type="checkbox"/> Idling rpm is abnormal <input type="checkbox"/> High (          rpm) <input type="checkbox"/> Low (          rpm) <input type="checkbox"/> Rough idling <input type="checkbox"/> Other _____		
	<input type="checkbox"/> Poor Driveability	<input type="checkbox"/> Hesitation <input type="checkbox"/> Back fire <input type="checkbox"/> Muffler explosion (after-fire) <input type="checkbox"/> Surging <input type="checkbox"/> Knocking <input type="checkbox"/> Other _____		
	<input type="checkbox"/> Engine Stall	<input type="checkbox"/> Soon after starting <input type="checkbox"/> After accelerator pedal depressed <input type="checkbox"/> After accelerator pedal released <input type="checkbox"/> During A/C operation <input type="checkbox"/> Shifting from N to D <input type="checkbox"/> Other _____		
	<input type="checkbox"/> Others	_____		

Dates Problem Occurred		_____		
Problem Frequency		<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (          times per          day/month) <input type="checkbox"/> Once only <input type="checkbox"/> Other _____		
Condition When Problem Occurs	Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Other _____		
	Outdoor Temperature	<input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (approx. ____ °C/ ____ °F)		
	Place	<input type="checkbox"/> Highway <input type="checkbox"/> Suburbs <input type="checkbox"/> Inner city <input type="checkbox"/> Uphill <input type="checkbox"/> Downhill <input type="checkbox"/> Rough road <input type="checkbox"/> Other _____		
	Engine Temp.	<input type="checkbox"/> Cold <input type="checkbox"/> Warming up <input type="checkbox"/> After warming up <input type="checkbox"/> Any temp. <input type="checkbox"/> Other _____		
	Engine Operation	<input type="checkbox"/> Starting <input type="checkbox"/> Just after starting (          min.) <input type="checkbox"/> Idling <input type="checkbox"/> Racing <input type="checkbox"/> Driving <input type="checkbox"/> Constant speed <input type="checkbox"/> Acceleration <input type="checkbox"/> Deceleration <input type="checkbox"/> A/C switch ON/OFF <input type="checkbox"/> Other _____		

Condition of malfunction indicator light (MIL)		<input type="checkbox"/> Remains on <input type="checkbox"/> Sometimes light up <input type="checkbox"/> Does not light up		
DTC Inspection	Normal Mode (Pre-check)	<input type="checkbox"/> Normal	<input type="checkbox"/> Malfunction code(s) (code          ) <input type="checkbox"/> Freezed frame data (          )	
	Check Mode	<input type="checkbox"/> Normal	<input type="checkbox"/> Malfunction code(s) (code          ) <input type="checkbox"/> Freezed frame data (          )	

## DIAGNOSTIC TROUBLE CODE CHART

### HINT:

Parameters listed in the chart may not be exactly the same as your reading due to the type of instrument or other factors.

If a malfunction code is displayed during the DTC check in check mode, check the circuit for the codes listed in the table below. For details of each code, refer to the "See page" under the respective "DTC No." in the DTC chart.

DTC No. (See page)	Detection Item	Trouble Area	MIL*1	Memory
P0031 (DI-49)	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 1)	<ul style="list-style-type: none"> <li>▶Open in heater circuit of heated oxygen sensor</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶ECM</li> </ul>	*	*
P0032 (DI-49)	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 1)	<ul style="list-style-type: none"> <li>▶Short in heater circuit of heated oxygen sensor</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶ECM</li> </ul>	*	*
P0037 (DI-49)	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 2)	<ul style="list-style-type: none"> <li>▶Open in heater circuit of heated oxygen sensor</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶ECM</li> </ul>	*	*
P0038 (DI-49)	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 2)	<ul style="list-style-type: none"> <li>▶Short in heater circuit of heated oxygen sensor</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶ECM</li> </ul>	*	*
P0051 (DI-49)	Oxygen Sensor Heater Control Circuit Low (Bank 2 Sensor 1)	<ul style="list-style-type: none"> <li>▶Open in heater circuit of heated oxygen sensor</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶ECM</li> </ul>	*	*
P0052 (DI-49)	Oxygen Sensor Heater Control Circuit High (Bank 2 Sensor 1)	<ul style="list-style-type: none"> <li>▶Short in heater circuit of heated oxygen sensor</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶ECM</li> </ul>	*	*
P0057 (DI-49)	Oxygen Sensor Heater Control Circuit Low (Bank 2 Sensor 2)	<ul style="list-style-type: none"> <li>▶Open in heater circuit of heated oxygen sensor</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶ECM</li> </ul>	*	*
P0058 (DI-49)	Oxygen Sensor Heater Control Circuit High (Bank 2 Sensor 2)	<ul style="list-style-type: none"> <li>▶Short in heater circuit of heated oxygen sensor</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶ECM</li> </ul>	*	*
P0100 (DI-57)	Mass or Volume Air Flow Circuit	<ul style="list-style-type: none"> <li>▶Open or short in mass air flow meter circuit</li> <li>▶Mass air flow meter</li> <li>▶ECM</li> </ul>	*	*
P0101 (DI-65)	Mass or Volume Air Flow Circuit Range/Performance Problem	<ul style="list-style-type: none"> <li>▶Mass air flow meter</li> </ul>	*	*
P0102 (DI-57)	Mass or Volume Air Flow Circuit Low Input	<ul style="list-style-type: none"> <li>▶Open or short in mass air flow meter circuit</li> <li>▶Mass air flow meter</li> <li>▶ECM</li> </ul>	*	*
P0103 (DI-57)	Mass or Volume Air Flow Circuit High Input	<ul style="list-style-type: none"> <li>▶Open or short in mass air flow meter circuit (+B circuit)</li> <li>▶Mass air flow meter</li> <li>▶ECM</li> </ul>	*	*

## DIAGNOSTICS - ENGINE

P0110 (DI-68)	Intake Air Temperature Circuit	<ul style="list-style-type: none"> <li>▶Open or short in intake air temperature sensor circuit</li> <li>▶Intake air temperature sensor (built in mass air flow meter)</li> <li>▶ECM</li> </ul>	*	*
P0112 (DI-68)	Intake Air Temperature Circuit Low Input	<ul style="list-style-type: none"> <li>▶Open or short in intake air temperature sensor circuit</li> <li>▶Intake air temperature sensor (built in mass air flow meter)</li> <li>▶ECM</li> </ul>	*	*
P0113 (DI-68)	Intake Air Temperature Circuit High Input	<ul style="list-style-type: none"> <li>▶Open or short in intake air temperature sensor circuit</li> <li>▶Intake air temperature sensor (built in mass air flow meter)</li> <li>▶ECM</li> </ul>	*	*
P0115 (DI-75)	Engine Coolant Temperature Circuit	<ul style="list-style-type: none"> <li>▶Open or short in engine coolant temperature sensor circuit</li> <li>▶Engine coolant temperature sensor</li> <li>▶ECM</li> </ul>	*	*
P0116 (DI-82)	Engine Coolant Temperature Circuit Range/Performance Problem	<ul style="list-style-type: none"> <li>▶Engine coolant temperature sensor</li> </ul>	*	*
P0117 (DI-75)	Engine Coolant Temperature Circuit Low Input	<ul style="list-style-type: none"> <li>▶Open or short in engine coolant temperature sensor circuit</li> <li>▶Engine coolant temperature sensor</li> <li>▶ECM</li> </ul>	*	*
P0118 (DI-75)	Engine Coolant Temperature Circuit High Input	<ul style="list-style-type: none"> <li>▶Open or short in engine coolant temperature sensor circuit</li> <li>▶Engine coolant temperature sensor</li> <li>▶ECM</li> </ul>	*	*
P0120 (DI-84)	Throttle Pedal Position Sensor/Switch "A" Circuit	<ul style="list-style-type: none"> <li>▶Throttle control motor and sensor</li> <li>▶ECM</li> </ul>	*	*
P0121 (DI-97)	Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance Problem	<ul style="list-style-type: none"> <li>▶Throttle control motor and sensor</li> </ul>	*	*
P0122 (DI-84)	Throttle/Pedal Position Sensor/Switch "A" Circuit Low Input	<ul style="list-style-type: none"> <li>▶Throttle control motor and sensor</li> <li>▶Short in VTA1 circuit</li> <li>▶Open in VC circuit</li> <li>▶ECM</li> </ul>	*	*
P0123 (DI-84)	Throttle/Pedal Position Sensor/Switch "A" Circuit High Input	<ul style="list-style-type: none"> <li>▶Throttle control motor and sensor</li> <li>▶Open in VTA1 circuit</li> <li>▶Open in E2 circuit</li> <li>▶VC and VTA1 circuit are short-circuited</li> <li>▶ECM</li> </ul>	*	*
P0125 (DI-99)	Insufficient Coolant Temperature for Closed Loop Fuel Control	<ul style="list-style-type: none"> <li>▶Cooling system</li> <li>▶Engine coolant temperature sensor</li> <li>▶Thermostat</li> </ul>	*	*
P0128 (DI-102)	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)	<ul style="list-style-type: none"> <li>▶Thermostat</li> <li>▶Cooling system</li> <li>▶Engine coolant temperature sensor</li> <li>▶ECM</li> </ul>	Ⓜ	Ⓜ
P0130 (DI-106)	Oxygen Sensor Circuit (Bank 1 Sensor 1)	<ul style="list-style-type: none"> <li>▶Open or short in heated oxygen sensor circuit</li> <li>▶Heated oxygen sensor</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶Air induction system</li> <li>▶Fuel pressure</li> <li>▶Injector</li> <li>▶ECM</li> </ul>	*	*

P0133 (DI-117)	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1)	<ul style="list-style-type: none"> <li>▶ Open or short in heated oxygen sensor circuit</li> <li>▶ Heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> <li>▶ Air induction system</li> <li>▶ Fuel pressure</li> <li>▶ Injector</li> <li>▶ ECM</li> </ul>	*	*
P0134 (DI-129)	Oxygen Sensor Circuit No Activity Detected (Bank 1 Sensor 1)	<ul style="list-style-type: none"> <li>▶ Open or short in heated oxygen sensor circuit</li> <li>▶ Heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> <li>▶ Air induction system</li> <li>▶ Fuel pressure</li> <li>▶ PCV hose connection</li> <li>▶ PCV valve and hose</li> <li>▶ Injector</li> <li>▶ Gas leakage on exhaust system</li> <li>▶ PCV piping</li> <li>▶ ECM</li> </ul>	*	*
P0136 (DI-138)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	<ul style="list-style-type: none"> <li>▶ Open or short in heated oxygen sensor circuit</li> <li>▶ Heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> </ul>	*	*
P0150 (DI-106)	Oxygen Sensor Circuit (Bank 2 Sensor 1)	<ul style="list-style-type: none"> <li>▶ Open or short in heated oxygen sensor circuit</li> <li>▶ Heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> <li>▶ Air induction system</li> <li>▶ Fuel pressure</li> <li>▶ Injector</li> <li>▶ ECM</li> </ul>	*	*
P0153 (DI-117)	Oxygen Sensor Circuit Slow Response (Bank 2 Sensor 1)	<ul style="list-style-type: none"> <li>▶ Open or short in heated oxygen sensor circuit</li> <li>▶ Heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> <li>▶ Air induction system</li> <li>▶ Fuel pressure</li> <li>▶ Injector</li> <li>▶ ECM</li> </ul>	*	*
P0154 (DI-129)	Oxygen Sensor Circuit No Activity Detected (Bank 2 Sensor 1)	<ul style="list-style-type: none"> <li>▶ Open or short in heated oxygen sensor circuit</li> <li>▶ Heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> <li>▶ Air induction system</li> <li>▶ Fuel pressure</li> <li>▶ PCV hose connection</li> <li>▶ PCV valve and hose</li> <li>▶ Injector</li> <li>▶ Gas leakage on exhaust system</li> <li>▶ PCV piping</li> <li>▶ ECM</li> </ul>	*	*
P0156 (DI-138)	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 2)	<ul style="list-style-type: none"> <li>▶ Open or short in heated oxygen sensor circuit</li> <li>▶ Heated oxygen sensor</li> <li>▶ Heated oxygen sensor heater</li> <li>▶ EFI or ECD relay</li> </ul>	*	*

## DIAGNOSTICS - ENGINE

P0171 (DI-147)	System too Lean (Bank 1)	<ul style="list-style-type: none"> <li>▶Air induction system</li> <li>▶Injector blockage</li> <li>▶Mass air flow meter</li> <li>▶Engine coolant temperature sensor</li> <li>▶Fuel pressure</li> <li>▶Gas leakage on exhaust system</li> <li>▶Open or short in heated oxygen sensor (bank 1 sensor 1) circuit</li> <li>▶Heated oxygen sensor (bank 1 sensor 1)</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶PCV piping</li> <li>▶ECM</li> </ul>	*	*
P0172 (DI-147)	System too Rich (Bank 1)	<ul style="list-style-type: none"> <li>▶Injector leak, blockage</li> <li>▶Mass air flow meter</li> <li>▶Engine coolant temperature sensor</li> <li>▶Ignition system</li> <li>▶Fuel pressure</li> <li>▶Gas leakage in exhaust system</li> <li>▶Open or short in heated oxygen sensor (bank 1 sensor 1) circuit</li> <li>▶Heated oxygen sensor (bank 1 sensor 1)</li> <li>▶ECM</li> </ul>	*	*
P0174 (DI-147)	System too Lean (Bank 2)	<ul style="list-style-type: none"> <li>▶Air induction system</li> <li>▶Injector blockage</li> <li>▶Mass air flow meter</li> <li>▶Engine coolant temperature sensor</li> <li>▶Fuel pressure</li> <li>▶Gas leakage on exhaust system</li> <li>▶Open or short in heated oxygen sensor (bank 2 sensor 1) circuit</li> <li>▶Heated oxygen sensor (bank 2 sensor 1)</li> <li>▶Heated oxygen sensor heater</li> <li>▶EFI or ECD relay</li> <li>▶PCV piping</li> <li>▶ECM</li> </ul>	*	*
P0175 (DI-147)	System too Rich (Bank 2)	<ul style="list-style-type: none"> <li>▶Injector leak, blockage</li> <li>▶Mass air flow meter</li> <li>▶Engine coolant temperature sensor</li> <li>▶Ignition system</li> <li>▶Fuel pressure</li> <li>▶Gas leakage in exhaust system</li> <li>▶Open or short in heated oxygen sensor (bank 2 sensor 1) circuit</li> <li>▶Heated oxygen sensor (bank 2 sensor 1)</li> <li>▶ECM</li> </ul>	*	*
P0220 (DI-84)	Throttle/Pedal Position Sensor/ Switch "B" Circuit	<ul style="list-style-type: none"> <li>▶Throttle control motor and sensor</li> <li>▶ECM</li> </ul>	*	*
P0222 (DI-84)	Throttle/Pedal Position Sensor/ Switch "B" Circuit Low Input	<ul style="list-style-type: none"> <li>▶Throttle control motor and sensor</li> <li>▶Short in VTA2 circuit</li> <li>▶Open in VC circuit</li> <li>▶ECM</li> </ul>	*	*
P0223 (DI-84)	Throttle/Pedal Position Sensor/ Switch "B" Circuit High Input	<ul style="list-style-type: none"> <li>▶Throttle control motor and sensor</li> <li>▶Open in VTA2 circuit</li> <li>▶Open in E2 circuit</li> <li>▶VC and VTA2 circuit are short-circuited</li> <li>▶ECM</li> </ul>	*	*

P0230 (DI-162)	Fuel Pump Primary Circuit	<ul style="list-style-type: none"> <li>▶Open or short in fuel pump relay circuit</li> <li>▶Fuel pump relay</li> <li>▶Circuit opening relay</li> <li>▶Fuel pump</li> <li>▶ECM</li> </ul>	-	*
P0300 (DI-167)	Random/Multiple Cylinder Misfire Detected	<ul style="list-style-type: none"> <li>▶Open or short in engine wire</li> <li>▶Connector connection</li> <li>▶Vacuum hose connection</li> <li>▶Ignition system</li> <li>▶Injector</li> <li>▶Fuel pressure</li> <li>▶Mass air flow meter</li> <li>▶Engine coolant temperature sensor</li> <li>▶Compression pressure</li> <li>▶Valve clearance</li> <li>▶Valve timing</li> <li>▶PCV piping</li> <li>▶ECM</li> </ul>	*2	*
P0301 (DI-167)	Cylinder 1 Misfire Detected		*2	*
P0302 (DI-167)	Cylinder 2 Misfire Detected		*2	*
P0303 (DI-167)	Cylinder 3 Misfire Detected		*2	*
P0304 (DI-167)	Cylinder 4 Misfire Detected		*2	*
P0305 (DI-167)	Cylinder 5 Misfire Detected		*2	*
P0306 (DI-167)	Cylinder 6 Misfire Detected		*2	*
P0307 (DI-167)	Cylinder 7 Misfire Detected		*2	*
P0308 (DI-167)	Cylinder 8 Misfire Detected		*2	*
P0325 (DI-186)	Knock Sensor 1 Circuit (Bank 1 or Single Sensor)	<ul style="list-style-type: none"> <li>▶Open or short in knock sensor 1 circuit</li> <li>▶Knock sensor 1 (looseness)</li> <li>▶ECM</li> </ul>	*	*
P0330 (DI-186)	Knock Sensor 2 Circuit (Bank 2)	<ul style="list-style-type: none"> <li>▶Open or short in knock sensor 2 circuit</li> <li>▶Knock sensor 2 (looseness)</li> <li>▶ECM</li> </ul>	*	*
P0335 (DI-191)	Crankshaft Position Sensor "A" Circuit	<ul style="list-style-type: none"> <li>▶Open or short in crankshaft position sensor circuit</li> <li>▶Crankshaft position sensor</li> <li>▶Signal plate</li> <li>▶ECM</li> </ul>	*	*
P0339 (DI-191)	Crankshaft Position Sensor "A" Circuit Intermittent	<ul style="list-style-type: none"> <li>▶Open or short in crankshaft position sensor circuit</li> <li>▶Crankshaft position sensor</li> <li>▶Signal plate</li> <li>▶ECM</li> </ul>	-	*
P0340 (DI-197)	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)	<ul style="list-style-type: none"> <li>▶Open or short in camshaft position sensor circuit</li> <li>▶Camshaft position sensor</li> </ul>	*	*
P0341 (DI-197)	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 1 or Single Sensor)	<ul style="list-style-type: none"> <li>▶LH camshaft timing pulley</li> <li>▶Jumping teeth of timing belt</li> <li>▶ECM</li> </ul>	*	*
P0351 (DI-202)	Ignition Coil "A" Primary/Secondary Circuit	<ul style="list-style-type: none"> <li>▶Open or short in IGF 1 and IGT 1 circuit from No. 1 ignition coil with igniter to ECM</li> <li>▶No. 1 ignition coil with igniter</li> <li>▶Ignition system</li> <li>▶ECM</li> </ul>	*	*
P0352 (DI-202)	Ignition Coil "B" Primary/Secondary Circuit	<ul style="list-style-type: none"> <li>▶Open or short in IGF 2 and IGT 2 circuit from No. 2 ignition coil with igniter to ECM</li> <li>▶No. 2 ignition coil with igniter</li> <li>▶Ignition system</li> <li>▶ECM</li> </ul>	*	*

## DIAGNOSTICS - ENGINE

P0353 (DI-202)	Ignition Coil "C" Primary/Secondary Circuit	<ul style="list-style-type: none"> <li>▶Open or short in IGF 2 and IGT 3 circuit from No. 3 ignition coil with igniter to ECM</li> <li>▶No. 3 ignition coil with igniter</li> <li>▶Ignition system</li> <li>▶ECM</li> </ul>	*	*
P0354 (DI-202)	Ignition Coil "D" Primary/Secondary Circuit	<ul style="list-style-type: none"> <li>▶Open or short in IGF 1 and IGT 4 circuit from No. 4 ignition coil with igniter to ECM</li> <li>▶No. 4 ignition coil with igniter</li> <li>▶Ignition system</li> <li>▶ECM</li> </ul>	*	*
P0355 (DI-202)	Ignition Coil "E" Primary/Secondary Circuit	<ul style="list-style-type: none"> <li>▶Open or short in IGF 2 and IGT 5 circuit from No. 5 ignition coil with igniter to ECM</li> <li>▶No. 5 ignition coil with igniter</li> <li>▶Ignition system</li> <li>▶ECM</li> </ul>	*	*
P0356 (DI-202)	Ignition Coil "F" Primary/Secondary Circuit	<ul style="list-style-type: none"> <li>▶Open or short in IGF 1 and IGT 6 circuit from No. 6 ignition coil with igniter to ECM</li> <li>▶No. 6 ignition coil with igniter</li> <li>▶Ignition system</li> <li>▶ECM</li> </ul>	*	*
P0357 (DI-202)	Ignition Coil "G" Primary/Secondary Circuit	<ul style="list-style-type: none"> <li>▶Open or short in IGF 1 and IGT 7 circuit from No. 7 ignition coil with igniter to ECM</li> <li>▶No. 7 ignition coil with igniter</li> <li>▶Ignition system</li> <li>▶ECM</li> </ul>	*	*
P0358 (DI-202)	Ignition Coil "H" Primary/Secondary Circuit	<ul style="list-style-type: none"> <li>▶Open or short in IGF 2 and IGT 8 circuit from No. 8 ignition coil with igniter to ECM</li> <li>▶No. 8 ignition coil with igniter</li> <li>▶Ignition system</li> <li>▶ECM</li> </ul>	*	*
P0420 (DI-215)	Catalyst System Efficiency Below Threshold (Bank 1)	<ul style="list-style-type: none"> <li>▶Gas leakage on exhaust system</li> <li>▶Heated oxygen sensor (bank 1 sensor 1, 2)</li> <li>▶Three-way catalytic converter</li> </ul>	*	*
P0430 (DI-215)	Catalyst System Efficiency Below Threshold (Bank 2)	<ul style="list-style-type: none"> <li>▶Gas leakage on exhaust system</li> <li>▶Heated oxygen sensor (bank 2 sensor 1, 2)</li> <li>▶Three-way catalytic converter</li> </ul>	*	*
P0441 (DI-222)	Evaporative Emission Control System Incorrect Purge Flow	<ul style="list-style-type: none"> <li>▶Vacuum hose cracks, holed, blocked, damaged or disconnected ((1), (2), (3), (4), (5), (6), (7), (8) and (9) in Fig. 1)</li> <li>▶Fuel tank cap incorrectly installed</li> <li>▶Fuel tank cap cracked or damaged</li> <li>▶Open or short in vapor pressure sensor circuit</li> <li>▶Vapor pressure sensor</li> <li>▶Open or short in VSV circuit for EVAP</li> <li>▶EVAP VSV</li> <li>▶Open or short in VSV circuit for CCV</li> <li>▶CCV</li> <li>▶Open or short in VSV circuit for pressure switching valve</li> <li>▶Pressure switching valve</li> <li>▶Fuel tank cracked, holed or damaged</li> <li>▶Charcoal canister cracked, holed or damaged</li> <li>▶ECM</li> </ul>	*	*



P0442 (DI-245)	Evaporative Emission Control System Leak Detected (Small Leak)	<p>After the negative pressure introduction has been completed, if the pressure in the EVAP system sharply increases.</p> <ul style="list-style-type: none"> <li>▶Hose or tube cracked, holed, damaged or loose seal ((3) in Fig. 1)</li> <li>▶Fuel tank cap incorrectly installed</li> <li>▶Fuel tank cap cracked or damaged</li> <li>▶Vacuum hose cracked, holed, blocked, damaged or disconnected ((1), (2), (4), (5), (6), (7), (8) and (9) in Fig. 1)</li> <li>▶Fuel tank cracked, holed or damaged</li> <li>▶Charcoal canister cracked, holed or damaged</li> <li>▶Open or short in vapor pressure sensor circuit</li> <li>▶Vapor pressure sensor</li> <li>▶ECM</li> </ul>	*	*
P0446 (DI-222)	Evaporative Emission Control System Vent Control Circuit	▶Same as DTC No. P0441	*	*
P0451 (DI-268)	Evaporative Emission Control System Pressure Sensor/Switch Range/Performance	<ul style="list-style-type: none"> <li>▶Open or short in vapor pressure sensor circuit</li> <li>▶Vapor pressure sensor</li> <li>▶ECM</li> </ul>	*	*
P0452 (DI-268)	Evaporative Emission Control System Pressure Sensor/Switch Low Input	<ul style="list-style-type: none"> <li>▶Open in vapor pressure sensor circuit</li> <li>▶Vapor pressure sensor</li> <li>▶ECM</li> </ul>	*	*
P0453 (DI-268)	Evaporative Emission Control System Pressure Sensor/Switch High Input	<ul style="list-style-type: none"> <li>▶Short in vapor pressure sensor circuit</li> <li>▶Vapor pressure sensor</li> <li>▶ECM</li> </ul>	*	*
P0455 (DI-245)	Evaporative Emission Control System Leak Detected (Gross Leak)	▶Same as DTC No. P0442	*	*
P0456 (DI-245)	Evaporative Emission Control System Leak Detected (Very Small Leak)	▶Same as DTC No. P0442	*	*
P0500 (DI-274)	Vehicle Speed Sensor "A"	<ul style="list-style-type: none"> <li>▶Combination meter</li> <li>▶Open or short in vehicle speed sensor circuit</li> </ul>	*	*
P0503 (DI-274)	Vehicle Speed Sensor "A" Inter-mittent/Erratic/High	<ul style="list-style-type: none"> <li>▶Vehicle speed sensor</li> <li>▶ECM</li> </ul>	-	*
P0504 (DI-278)	Brake Switch "A"/"B" Correlation	<ul style="list-style-type: none"> <li>▶Short in stop lamp switch signal circuit</li> <li>▶STOP fuse</li> <li>▶Stop lamp switch</li> <li>▶ECM</li> </ul>	-	*
P0505 (DI-286)	Idle Air Control System	<ul style="list-style-type: none"> <li>▶Air induction system</li> <li>▶Electric throttle control system</li> <li>▶PCV hose connection</li> </ul>	*	*
P0560 (DI-290)	System Voltage	<ul style="list-style-type: none"> <li>▶Back-up power source circuit</li> <li>▶EFI or ECD No. 1 fuse</li> <li>▶ECM</li> </ul>	*	*
P0571 (DI-993)	Brake Switch "A" Circuit	<ul style="list-style-type: none"> <li>▶Stop light switch signal circuit</li> <li>▶Stop light switch</li> <li>▶ECM</li> </ul>	-	*
P0604 (DI-294)	Internal Control Module Random Access Memory (RAM) Error	▶ECM	*	*
P0606 (DI-294)	ECM/PCM Processor	▶ECM	*	*
P0607 (DI-294)	Control Module Performance	▶ECM	*	*

## DIAGNOSTICS - ENGINE

P0617 (DI-296)	Starter Relay Circuit High	▶Park/neutral position switch ▶Starter relay circuit ▶Ignition switch ▶ECM	*	*
P0657 (DI-294)	Actuator Supply Voltage Circuit / Open	▶ECM	*	*
P0724 (DI-424)	Brake Switch "B" Circuit High	▶Short in stop light switch signal circuit ▶Stop light switch ▶ECM	*	*
P2102 (DI-302)	Throttle Actuator Control Motor Circuit Low	▶Open in throttle control motor and sensor circuit ▶Throttle control motor and sensor ▶ECM	*	*
P2103 (DI-302)	Throttle Actuator Control Motor Circuit High	▶Short in throttle control motor and sensor circuit ▶Throttle control motor and sensor ▶Throttle valve ▶Throttle body ▶ECM	*	*
P2111 (DI-306)	Throttle Actuator Control System - Stuck Open	▶Throttle control motor and sensor circuit ▶Throttle control motor and sensor ▶Throttle valve ▶Throttle body	*	*
P2112 (DI-306)	Throttle Actuator Control System - Stuck Closed	▶Throttle control motor and sensor circuit ▶Throttle control motor and sensor ▶Throttle valve ▶Throttle body	*	*
P2118 (DI-310)	Throttle Actuator Control Motor Current Range/Performance	▶Open in throttle control motor and sensor power source circuit ▶ETCS fuse ▶ECM	*	*
P2119 (DI-315)	Throttle Actuator Control Throttle Body Range/Performance	▶Electric throttle control system ▶Throttle body	*	*
P2120 (DI-318)	Throttle/Pedal Position Sensor/ Switch "D" Circuit	▶Accelerator pedal position sensor ▶ECM	*	*
P2121 (DI-331)	Throttle/Pedal Position Sensor/ Switch "D" Circuit Range/Performance	▶Accelerator pedal position sensor	*	*
P2122 (DI-318)	Throttle/Pedal Position Sensor/ Switch "D" Circuit Low Input	▶Accelerator pedal position sensor ▶WCPA circuit open ▶WPA circuit open or ground short ▶ECM	*	*
P2123 (DI-318)	Throttle/Pedal Position Sensor/ Switch "D" Circuit High Input	▶Accelerator pedal position sensor ▶EPA circuit open ▶ECM	*	*
P2125 (DI-318)	Throttle/Pedal Position Sensor/ Switch "E" Circuit	▶Accelerator pedal position sensor ▶ECM	*	*
P2127 (DI-318)	Throttle/Pedal Position Sensor/ Switch "E" Circuit Low Input	▶Accelerator pedal position sensor ▶WCP2 circuit open ▶WPA2 circuit open or ground short ▶ECM	*	*
P2128 (DI-318)	Throttle/Pedal Position Sensor/ Switch "E" Circuit High Input	▶Accelerator pedal position sensor ▶EPA circuit open ▶ECM	*	*
P2135 (DI-84)	Throttle Pedal Position Sensor/ Switch "A" / "B" Voltage Correlation	▶WTA1 and WTA2 circuit are short-circuited ▶Throttle control motor and sensor ▶ECM	*	*

P2138 (DI-318)	Throttle Pedal Position Sensor/ Switch "D" / "E" Voltage Correlation	▶VPA and VPA2 circuit are short circuited ▶Accelerator pedal position sensor ▶ECM	*	*
P2195 (DI-106)	Oxygen Sensor Signal Stuck Lean (Bank 1 Sensor 1)	▶Open or short in heated oxygen sensor circuit ▶Heated oxygen sensor	*	*
P2196 (DI-106)	Oxygen Sensor Signal Stuck Rich (Bank 1 Sensor 1)	▶Heated oxygen sensor heater ▶EFI or ECD relay	*	*
P2197 (DI-106)	Oxygen Sensor Signal Stuck Lean (Bank 2 Sensor 1)	▶Air induction system ▶Fuel pressure	*	*
P2198 (DI-106)	Oxygen Sensor Signal Stuck Rich (Bank 2 Sensor 1)	▶injector ▶ECM	*	*
P2418 (DI-222)	Evaporative Emission System Valve Control Circuit/Open	▶Same as DTC No. P0441	*	*

\*1: - .... MIL does not light up. \* .... MIL lights up.

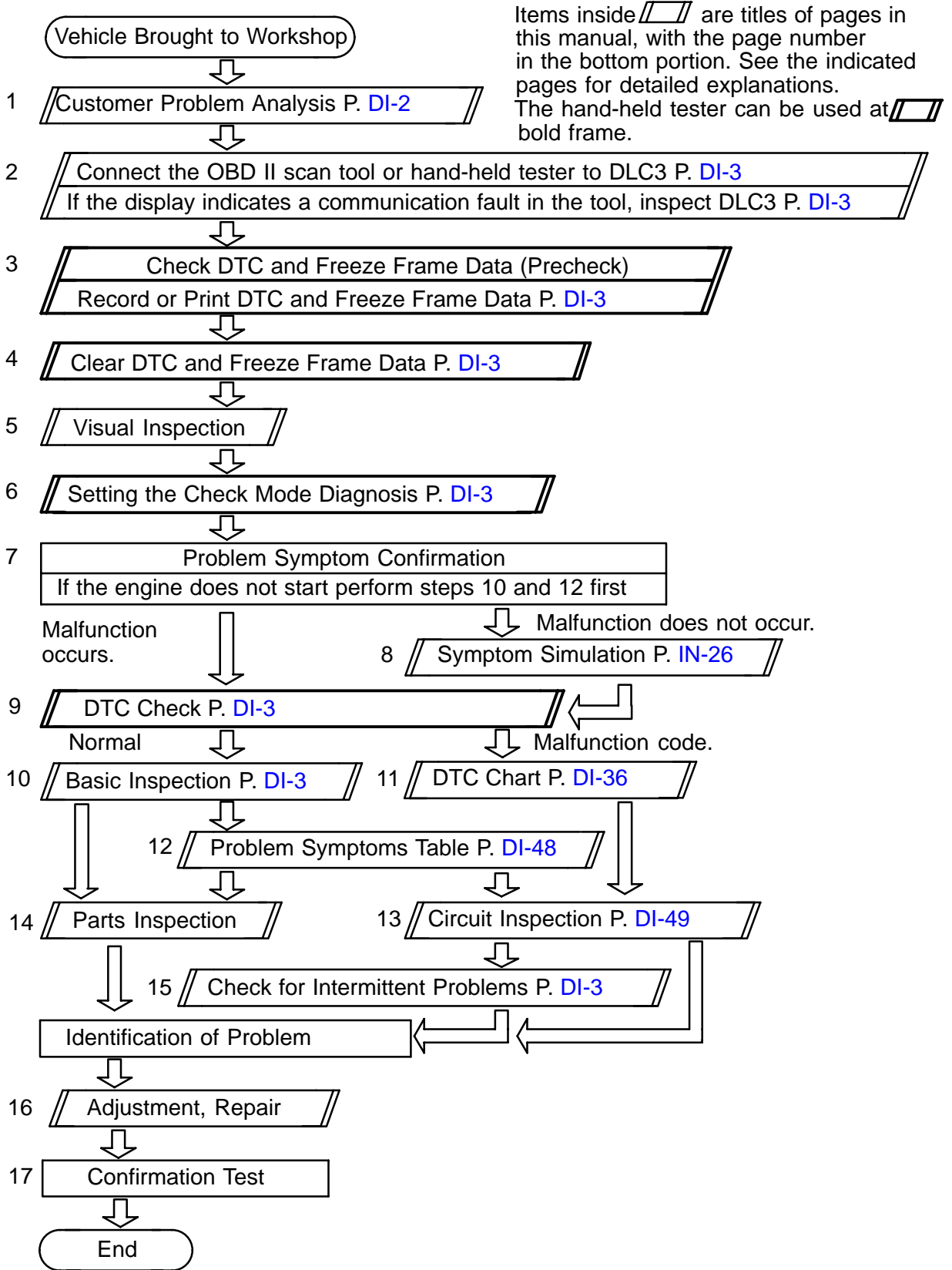
\*2: MIL lights up or blinks.

# ENGINE

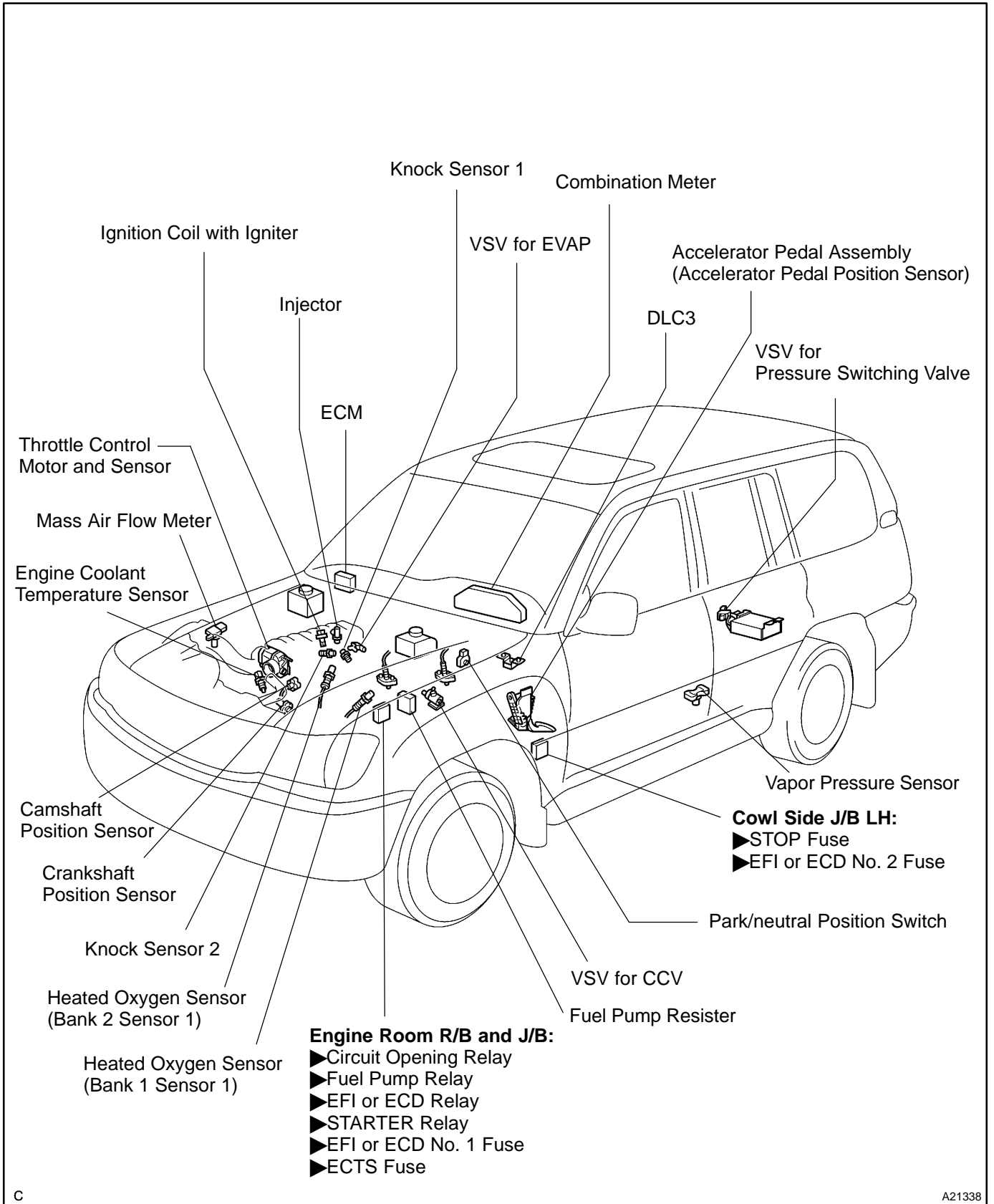
## HOW TO PROCEED WITH TROUBLESHOOTING

DI078-23

Troubleshoot in accordance with the procedure on the following page.

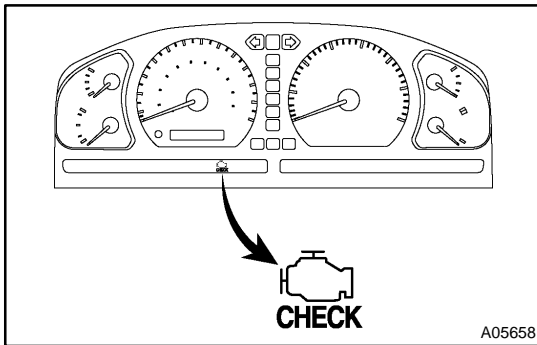


# PARTS LOCATION



C

A21338



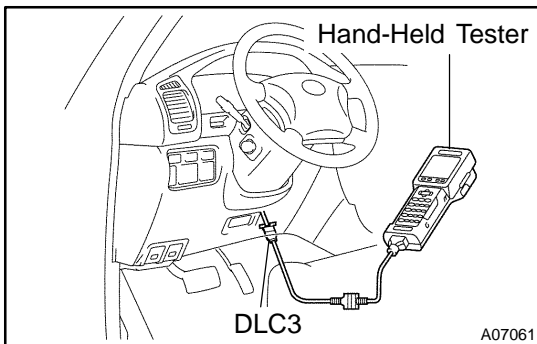
## PRE-CHECK

### 1. DIAGNOSIS SYSTEM

#### (a) Description

- ▶ When troubleshooting On-Board Diagnostic (OBD II) vehicles, the vehicle must be connected to the OBD II scan tool (in compliance with SAE J1978) or the hand-held tester. Various data output from the vehicle's ECM can then be read.
- ▶ OBD II regulations require that the vehicle's on-board computer illuminates the Malfunction Indicator Light (MIL) on the instrument panel when the computer detects a malfunction in: 1) the emission control system/components, or 2) the powertrain control components (which affect vehicle emissions), or 3) the computer. In addition, the applicable Diagnostic Trouble Codes (DTCs) prescribed by SAE J2012 are recorded in the ECM memory (See page [DI-36](#)).

If the malfunction does not reoccur in 3 consecutive trips, the MIL goes off automatically but the DTCs remain recorded in the ECM memory.



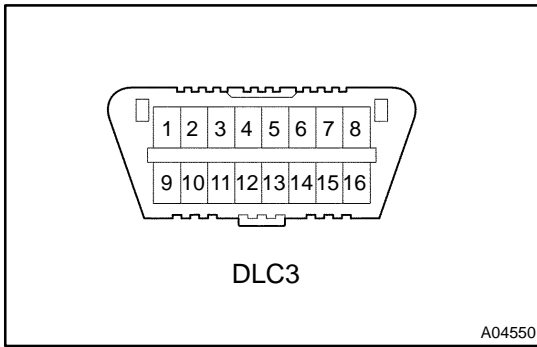
- ▶ To check the DTC, connect the hand-held tester or OBD II scan tool to the Data Link Connector 3 (DLC3) of the vehicle. The hand-held tester or OBD II scan tool also enables you to erase the DTC and check the freeze frame data and various forms of engine data (See the instruction manual for the OBD II scan tool or the hand-held tester). The DTC includes SAE controlled codes and manufacturer controlled codes. SAE controlled codes must be set according to the SAE, while manufacturer controlled codes can be set by a manufacturer with certain restrictions (See the DTC chart on page [DI-36](#)).

- ▶ The diagnosis system operates in "normal mode" during normal vehicle use. In "normal mode", 2 trip detection logic\* is used to ensure accurate detection of malfunctions. A "check mode" is also available to technicians as an option. In "check mode", 1 trip detection logic is used for simulating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent malfunctions (hand-held tester only) (See step 3).
- ▶ \*2 trip detection logic:  
When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory. This is known as 1st trip detection. If the ignition switch is turned OFF and then ON again, and the same malfunction is detected again, the MIL will illuminate. This is known as 2nd trip detection.
- ▶ Freeze frame data:  
The freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when a malfunction is detected. When troubleshooting, freeze frame data can help determining if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

Priorities for troubleshooting:

When multiple DTCs occur, find out the order in which the DTCs should be inspected by checking the component's DTC chart. If no instructions are written in the DTC chart, check DTCs in the following order of priority:

- (1) DTCs other than fuel trim malfunction DTCs (P0171, P0172, P0174 and P0175) and misfire DTCs (P0300 to P0308).
- (2) Fuel trim malfunction DTCs (P0171, P0172, P0174 and P0175).
- (3) Misfire DTCs (P0300 to P0308).



- (b) Check the DLC3.  
The vehicle's ECM uses the ISO 9141-2 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Symbol (Terminal No.)	Name (Reference terminal)	Result (Condition)
SIL (7)	Bus "+" line (5 - Signal ground)	Pulse generation (During transmission)
CG (4)	Chassis ground (Body ground)	1 $\Omega$ or less (Always)
SG (5)	Signal ground (Body ground)	1 $\Omega$ or less (Always)
BAT (16)	Battery positive (Body ground)	9 to 14 V (Always)

**HINT:**

Connect the cable of the hand-held tester to the DLC3, turn the ignition switch ON and attempt to use the hand-held tester. If the screen displays UNABLE TO CONNECT TO VEHICLE, a problem exists in the vehicle side or the tester side.

- ▶ If the communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- ▶ If the communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

- (c) Inspect the battery voltage.

**Battery Voltage: 11 to 14 V**

If voltage is below 11 V, recharge the battery before proceeding.

- (d) Check the MIL.

- (1) The MIL comes on when the ignition switch is turned ON and the engine is not running.

**HINT:**

If the MIL is not illuminated, troubleshoot the MIL circuit (See page [DI-355](#)).

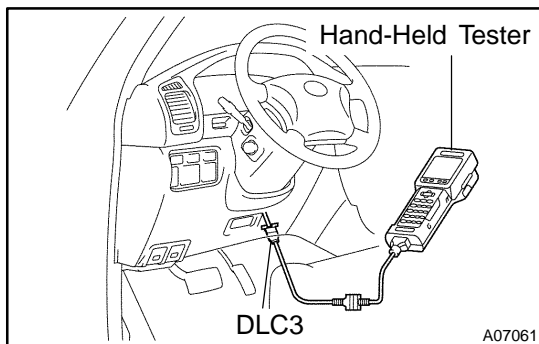
- (2) When the engine is started, the MIL should not illuminate. If the lamp remains on, the diagnosis system has detected a malfunction or abnormality in the system.



## 2. DTC CHECK (Normal Mode)

### NOTICE:

- ▶ If no DTC appears in normal mode:  
On the OBD II scan tool or the hand-held tester check the pending fault code using the Continuous Test Results function (Mode 7 for SAE J1979).
- ▶ When the diagnosis system is changed from normal mode to check mode or vice-versa, all DTCs and freeze frame data recorded in normal mode will be erased. Before changing modes, always check and make a note of DTCs and freeze frame data.



- (a) Checking DTCs using the OBD II scan tool or hand-held tester.
- (1) Connect the OBD II scan tool or the hand-held tester to DLC3.
  - (2) Turn the ignition switch ON.
  - (3) Use the OBD II scan tool or the hand-held tester to check the DTCs and freeze frame data and then write them down.  
For the hand-held tester, enter the following menu: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES. For the OBD II scan tool, see its instruction manual.
  - (4) See page [DI-36](#) to confirm the details of the DTCs.

### NOTICE:

When simulating a symptom with the OBD II scan tool (excluding hand-held tester) to check the DTCs, use the normal mode. For DTCs chart subject to "2 trip detection logic", perform either of the following actions.

- ▶ Check the pending fault code:  
For the hand-held tester, enter the following menu: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- ▶ Turn the ignition switch OFF after the symptom is simulated once. Then repeat the simulation process again. When the problem has been simulated twice, the MIL comes on and the DTCs are recorded in the ECM.

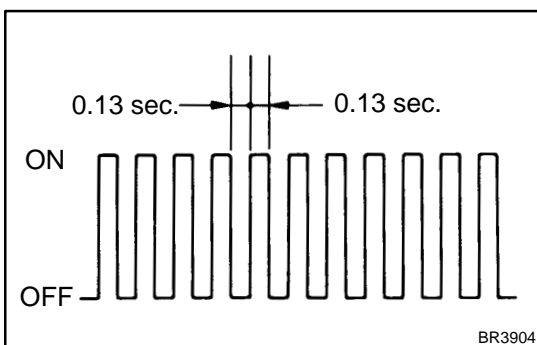
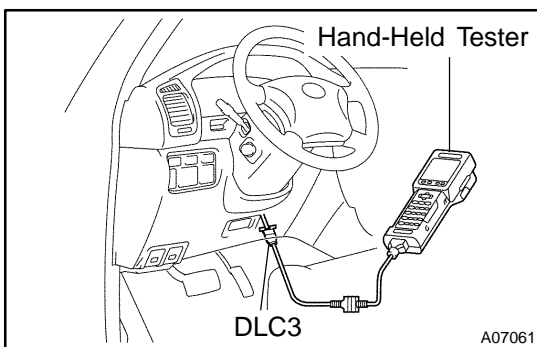
- ▶ **Check the pending fault code using the Continuous Test Results function (Mode 7 for SAE J1979) on the OBD II scan tool.**
- (b) Clearing the DTCs using the OBD II scan tool or the hand-held tester.
  - (1) Connect the OBD II scan tool or the hand-held tester to the DLC3.
  - (2) Turn the ignition switch ON.
  - (3) Erase DTCs and freeze frame data with the OBD II scan tool (complying with SAE J1978) or the hand-held tester. For the hand-held tester: 1) enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CLEAR CODES; and 2) press YES. For the OBD II scan tool, see its instruction manual.
- (c) Clearing the DTCs not using the OBD II scan tool or the hand-held tester.  
Remove the EFI or ECD No. 1 and ETCS fuses from the engine room J/B for more than 60 seconds, or disconnect the battery terminal for more than 60 seconds.  
After disconnecting the battery terminal, perform the "INITIALIZE" procedure.

### 3. DTC CHECK (Check Mode)

#### HINT:

Hand-held tester only:

Check mode has a higher sensitivity to detect malfunctions and can detect malfunctions that normal mode cannot detect. Check mode can also detect all the malfunctions that normal mode can detect.



- (a) Follow these steps when preparing to use the hand-held tester check mode.
  - (1) Make sure that the items below are true:
    - ▶ Battery positive voltage 11 V or more
    - ▶ Throttle valve fully closed
    - ▶ Transmission in the P or N position
    - ▶ A/C switched OFF
  - (2) Turn the ignition switch OFF.
  - (3) Connect the hand-held tester to the DLC3.
  - (4) Turn the ignition switch ON.
  - (5) Change the ECM to check mode with the hand-held tester. Enter the following menus: DIAGNOSIS / ENHANCED OBD II / CHECK MODE. Make sure the MIL flashes as shown in the illustration.

#### NOTICE:

**All DTCs and freeze frame data recorded will be erased if: 1) the hand-held tester is used to change the ECM from normal mode to check mode or vice-versa; or 2) during check mode, the ignition switch is turned from ON to ACC or OFF.**

- (6) Start the engine. The MIL should turn off after the engine starts.
  - (7) Simulate the conditions of the malfunction described by the customer.
  - (8) After simulating the malfunction conditions, use the hand-held tester diagnosis selector to check the DTC, freeze frame data and other data.
  - (9) After checking the DTC, inspect the applicable circuit.
- (b) Clearing DTCs using the OBD II scan tool or the hand-held tester.
- (1) Connect the OBD II scan tool or the hand-held tester to the DLC3.
  - (2) Turn the ignition switch ON.
  - (3) Erase DTCs and freeze frame data with the OBD II scan tool (complying with SAE J1978) or the hand-held tester. For the hand-held tester: 1) enter the following menus: DIAGNOSIS ENHANCED OBD II / DTC INFO / CLEAR CODES; and 2) press YES. For the OBD II scan tool, see its instruction manual.
- (c) Clearing the DTCs without using the OBD II scan tool or the hand-held tester.
- Remove the EFI or ECD No. 1 and ETCS fuses from the engine room J/B for more than 60 seconds, or disconnect the battery terminal for more than 60 seconds.
- After disconnecting the battery terminal, perform the "INITIALIZE" procedure.

#### 4. FAIL-SAFE CHART

If any of the following code is recorded, the ECM enters fail-safe mode.

DTC No.	Fail-Safe Operation	Fail-Safe Deactivation Conditions
P0031 P0032 P0037 P0038 P0051 P0052 P0057 P0058	The heater circuit in which an abnormality is detected is turned off	Ignition switch OFF
P0100 P0102 P0103	Ignition timing is calculated from engine speed and throttle angle	"Pass" condition detected
P0110 P0112 P0113	Intake air temperature is fixed at 20°C (68°F)	"Pass" condition detected
P0115 P0117 P0118	Engine coolant temperature is fixed at 80°C (176°F)	"Pass" condition detected

## DIAGNOSTICS - ENGINE

P0120 P0121 P0122 P0123 P0220 P0222 P0223 P0607 P0657 P2102 P2103 P2111 P2112 P2118 P2119 P2135	If the Electronic Throttle Control System (ETCS) has a malfunction, the ECM cuts off current to the throttle control motor. The throttle control valve returns to a predetermined opening angle (approximately 16°) by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection (intermittent fuel-cut) and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue at a minimal speed. If the accelerator pedal is depressed firmly and slowly, the vehicle can be driven slowly. If the accelerator pedal is depressed quickly, the vehicle may speed up and slow down erratically.	"Pass" condition is detected and then the ignition switch is turned OFF.
P0325 P0330	Max. timing retardation	Ignition switch OFF
P0351 P0352 P0353 P0354 P0355 P0356 P0357 P0358	Fuel cut	"Pass" condition detected
P2120 P2121 P2122 P2123 P2125 P2127 P2128 P2138	The accelerator pedal position sensor has two (main and sub) sensor circuits. If a malfunction occurs in either of the sensor circuits, the ECM detects the abnormal signal voltage difference between the two sensor circuits and switches to limp mode. In limp mode, the remaining circuit is used to calculate the accelerator pedal opening to allow the vehicle to continue driving. If both circuits malfunction, the ECM regards the opening angle of the accelerator pedal to be fully closed. In this case, the throttle valve will remain closed as if the engine is idling.	"Pass" condition is detected and the ignition switch is turned OFF.

## 5. CHECK FOR INTERMITTENT PROBLEMS

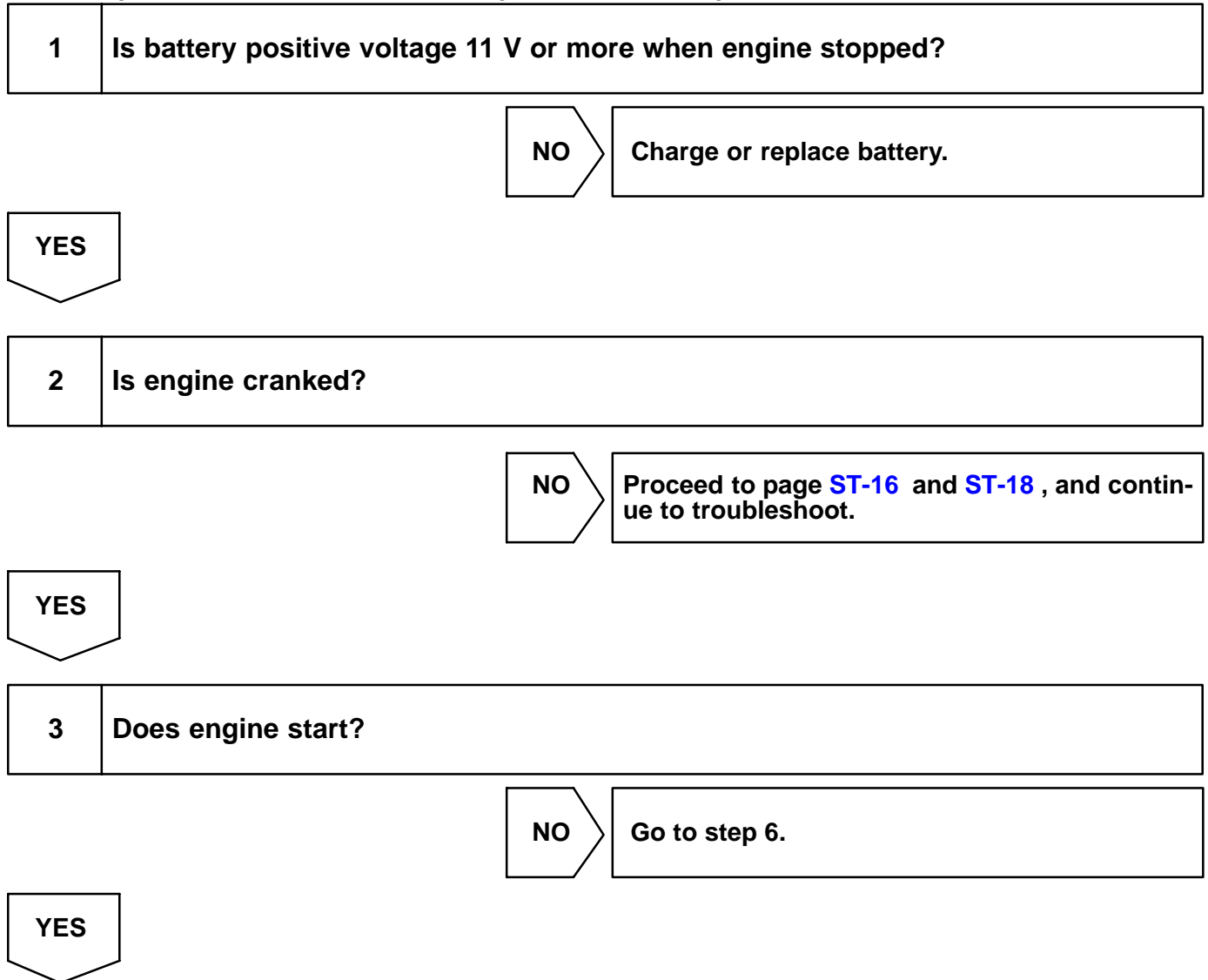
Hand-held tester only:

Inspect the vehicle's ECM using check mode. Intermittent problems are easier to detect when the ECM is in check mode with hand-held tester. In check mode, the ECM uses 1 trip detection logic, which has a higher sensitivity to malfunctions than normal mode (default), which uses 2 trip detection logic.

- (a) Clear the DTCs. (See step 2)
- (b) Set the check mode. (See step 3)
- (c) Perform a simulation test (See page [IN-26](#) ).
- (d) Check the connector and terminal (See page [IN-36](#) ).
- (e) Wiggle the harness and connector (See page [IN-36](#) ).

## 6. BASIC INSPECTION

When the malfunction is not confirmed in the DTC check, troubleshooting should be carried out in all the possible circuits considered as causes of the problem. In many cases, by carrying out the basic engine check shown in the following flowchart, the location causing the problem can be found quickly and efficiently. Therefore, using this check is essential in the engine troubleshooting.



<b>4</b>	<b>Check air filter.</b>
----------	--------------------------

**PREPARATION:**

Remove the air filter.

**CHECK:**

Visual check that the air filter is not excessively dirty or oily.

<b>NG</b>	<b>Repair or replace air filter.</b>
-----------	--------------------------------------

<b>OK</b>
-----------

<b>5</b>	<b>Check idle speed.</b>
----------	--------------------------

**PREPARATION:**

- (a) Warm up the engine to the normal operating temperature.
- (b) Switch off all the accessories.
- (c) Switch off the A/C.
- (d) Shift the transmission into the N position.
- (e) Connect the OBD II scan tool or hand-held tester to the DLC3 of the vehicle.

**CHECK:**

Use CURRENT DATA to check the idle speed.

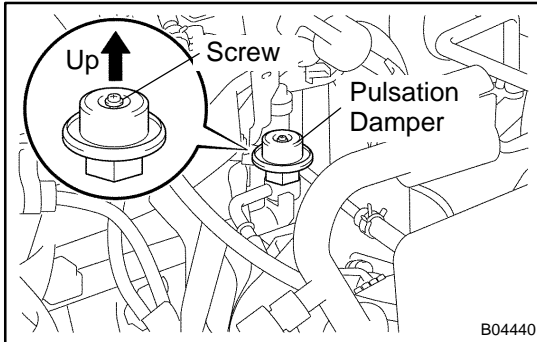
**OK:**

**Idle speed:**  
**650 to 750 rpm**

<b>NG</b>	<b>Proceed to problem symptoms table on page <a href="#">DI-48</a> .</b>
-----------	--

<b>OK</b>
-----------

<b>6</b>	<b>Check fuel pressure.</b>
----------	-----------------------------

**PREPARATION:**

- (a) Be sure that enough fuel is in the tank.
- (b) Connect the hand-held tester to the DLC3.
- (c) Turn the ignition switch ON and push the hand-held tester main switch ON.
- (d) Use the ACTIVE TEST mode to operate the fuel pump.
- (e) Please refer to the hand-held tester operator's manual for further details.
- (f) If you have no hand-held tester, connect the positive (+) and negative (-) leads from the battery to the fuel pump connector (See page [SF-7](#)).

**CHECK:**

Check that the pulsation damper screw rises up when the fuel pump operation (See page [SF-7](#)).

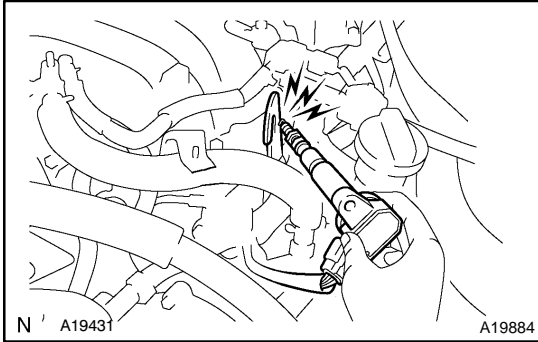
**HINT:**

At this time, you will hear a fuel flowing noise.

<b>NG</b>	<b>Proceed to page <a href="#">SF-7</a> and continue to troubleshoot.</b>

<b>OK</b>
-----------

7

**Check for spark.****PREPARATION:**

- (a) Disconnect the ignition coil.
- (b) Remove the spark plug.
- (c) Install the spark plug to the ignition coil.
- (d) Disconnect the injector connector.
- (e) Ground the spark plug.

**CHECK:**

Check if spark occurs while the engine is being cranked.

**NOTICE:**

**To prevent excess fuel from being injected from the injectors during this test, don't crank the engine for more than 5 to 10 seconds at a time.**

**NG**

**Proceed to page [IG-1](#) and continue to troubleshoot.**

**OK**

**Proceed to problem symptoms table on page [DI-48](#) .**



## 7. DATA LIST

### HINT:

Using the hand-held tester DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to shorten labor time.

### NOTICE:

**In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.**

- (a) Warm up the engine.
- (b) Turn the ignition switch OFF.
- (c) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (d) Turn the ignition switch ON.
- (e) Push the "ON" button of the hand-held tester.
- (f) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST.
- (g) According to the display on tester, read the "DATA LIST".

Item	Measurement Item/Range (Display)	Normal Condition*	Diagnostic Note
INJECTOR	Injection period of the No. 1 cylinder/ Min.: 0 ms, Max.: 32.64 ms	Idling: 2.1 to 3.9 ms	-
IGN ADVANCE	Ignition timing advance for No.1 cylinder/ Min.: -64 deg., Max.: 63.5 deg.	Idling: BTDC 5 to 25°	-
CALC LOAD	Calculated load by ECM/ Min.: 0%, Max.: 100%	▶Idling: 12.5 to 19.7% ▶Racing without load (2,500 rpm): 10.7 to 17.9%	-
MAF	Air flow rate from MAF sensor/ Min.: 0 gm/s, Max.: 655 gm/s	▶Idling: 4.1 to 6.4 gm/sec. ▶Racing without load (2,500 rpm): 12.5 to 20.8 gm/sec.	If value is approximately 0.0 gm/s: ▶Mass air flow meter power source circuit open ▶V/G circuit open or short If value is 160.0 gm/s or more: ▶E2G circuit open
ENGINE SPD	Engine Speed/ Min.: 0 rpm, Max.: 16,383 rpm	Idling: 650 to 750 rpm	-
COOLANT TEMP	Coolant temperature/ Min.: -40°C, Max.: 140°C	After warming up: 80 to 95°C (176 to 203°F)	▶If value is -40>C (-40>F): sensor circuit is open.
INTAKE AIR	Intake air temperature/ Min.: -40 °C, Max.: 140 °C	Equivalent to ambient temp. (After cold soak)	▶If value is 140>C (284>F) or more: sensor circuit is shorted.
THROTTLE POS	Absolute throttle position sensor/ Min.: 0%, Max.: 100%	▶Throttle fully closed: 10 to 24% ▶Throttle fully open: 66 to 98%	Read value with the ignition switch ON (Do not start engine).
THROTTLE INITIAL	Throttle fully closed rearing value	0.5 to 0.9 V	-
CTP SW	Closed throttle position switch/ ON or OFF	▶Throttle fully closed: ON ▶Throttle open: OFF	-
VEHICLE SPD	Vehicle speed/ Min.: 0 km/h, Max.: 255 km/h	Vehicle stopped: 0 km/h (0 mph)	Speed indicated on speedometer
O2S B1 S1	Oxygen sensor output voltage of the bank 1 sensor 1/ Min.: 0 V, Max.: 1.275 V	Idling: 0.1 to 0.9 V	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables the technician to check the voltage output of each sensor.
O2S B2 S1	Oxygen sensor output voltage of the bank 2 sensor 1/ Min.: 0 V, Max.: 1.275 V		Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables the technician to check the voltage output of each sensor.

## DIAGNOSTICS - ENGINE

O2S B1 S2	Oxygen sensor output voltage of the bank 1 sensor 2/ Min.: 0 V, Max.: 1.275 V	Driving 50 km/h (31 mph): 0.1 to 0.9 V	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables the technician to check the voltage output of each sensor.
O2S B2 S2	Oxygen sensor output voltage of the bank 2 sensor 2/ Min.: 0 V, Max.: 1.275 V		Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables the technician to check the voltage output of each sensor.
SHORT FT #1	Short term fuel trim of bank 1/ Min.: -100%, Max.: 100%	0 ± 20%	This item is short-term fuel compensation used to maintain air-fuel ratio at stoichiometric air-fuel ratio
LONG FT #1	Long term fuel trim of bank 1/ Min.: -100%, Max.: 100%	0 ± 20%	This item is overall, long-term fuel compensation that helps to maintain air-fuel ratio at stoichiometric air-fuel ratio (steadies long term deviations of short-term fuel trim from central value)
TOTAL FT #1	Total fuel trim of bank 1/ Min.: 0.5, Max.: 1.496	Idling: 0.5 to 1.4	-
SHORT FT #2	Short term fuel trim of bank 2/ Min.: -100%, Max.: 100%	0 ± 20%	Same as SHORT FT #1
LONG FT #2	Long term fuel trim of bank 2/ Min.: -100%, Max.: 100%	0 ± 20%	Same as LONG FT #1
TOTAL FT #2	Total fuel trim of bank 2/ Min.: 0.5, Max.: 1.496	Idling: 0.5 to 1.4	-
O2FT B1 S1	Short term fuel trim associated with the bank 1, sensor 1/ Min.: -100%, Max.: 100%	0 ± 20%	Same as SHORT FT #1
O2FT B1 S2	Short term fuel trim associated with the bank 1, sensor 2/ Min.: -100%, Max.: 100%	0 ± 20%	Same as SHORT FT #2
O2FT B2 S1	Short term fuel trim associated with the bank 2, sensor 1/ Min.: -100%, Max.: 100%	0 ± 20%	Same as SHORT FT #1
O2FT B2 S2	Short term fuel trim associated with the bank 2, sensor 2/ Min.: -100%, Max.: 100%	0 ± 20%	Same as SHORT FT #2
O2 LR B1 S1	Response time of the O2 sensor lean to rich (bank 1, sensor 1)/ Min.: 0 ms, Max.: 16,711 ms	Idling after warming up: 0 to 1,000 ms	-
O2 LR B2 S1	Response time of the O2 sensor lean to rich (bank 2, sensor 1)/ Min.: 0 ms, Max.: 16,711 ms	Idling after warming up: 0 to 1,000 ms	-
O2 RL B1 S1	Response time of the O2 sensor rich to lean (bank 1, sensor 1)/ Min.: 0 ms, Max.: 16,711 ms	Idling after warming up: 0 to 1,000 ms	-
O2 RL B2 S1	Response time of the O2 sensor rich to lean (bank 2, sensor 1)/ Min.: 0 ms, Max.: 16,711 ms		-

FUEL SYS #1	Fuel system status (Bank1)/ OL or CL or OLDRIVE or OL- FAULT or CLFAULT	Idling after warming up: CL	<ul style="list-style-type: none"> <li>▶OL: Open Loop-has not yet satisfied conditions to go closed loop.</li> <li>▶CL: Closed Loop-using oxygen sensor(s) as feed back for fuel control.</li> <li>▶OL DRIVE: Open loop due to driving conditions (Power enrichment, deceleration enlargement).</li> <li>▶OL FAULT: Open loop due to detected system fault.</li> <li>▶CL FAULT: Closed loop, but fault with at least one oxygen sensor may be using single oxygen sensor for fuel control.</li> </ul>
FUEL SYS #2	Fuel system status (Bank2)/ OL or CL or OLDRIVE or OL- FAULT or CLFAULT		
FC IDL	Idle fuel cut/ ON or OFF	Fuel cut operation: ON	FC IDL = "ON" when throttle valve fully closed and engine speed is over 1,500 rpm.
MIL	MIL status/ ON or OFF	MIL ON: ON	-
STARTER SIG	Starter signal/ ON or OFF	Cranking: ON	-
A/C SIG	A/C signal/ ON or OFF	A/C ON: ON	-
PNP SW [NSW]	Park/neutral position switch signal/ ON or OFF	P or N range: ON	-
ELECT LOAD SIG	Electrical load signal/ ON or OFF	Defogger switch ON: ON	-
STOP LIGHT SW	Stop light switch/ ON or OFF	<ul style="list-style-type: none"> <li>▶Brake pedal depressed: ON</li> <li>▶Brake pedal released: OFF</li> </ul>	-
FUEL PMP SP CTL	Fuel pump speed control status/ ON or OFF	Idling: ON	-
FUEL PUMP/SPD	Fuel pump/speed status/ ON/H or OFF/M, L	Idling: ON	-
A/C MAG CLUTCH	A/C magnet clutch status/ ON or OFF	A/C magnet clutch ON: ON	-
EVAP VSV	VSV status for EVAP control/ ON or OFF	VSV operating: ON	VSV for EVAP is controlled by the ECM (ground side duty control)
IGNITION	Ignition counter/ Min.: 0, Max.: 400	0 to 400	-
VAPOR PRESS	Vapor pressure/ Min.: -4.125 kPa, Max.: 2.125 kPa	Fuel tank cap removed: 0 kPa	Pressure inside of fuel tank as read by the vapor pressure sensor.
CYL #1 - CYL #8	Misfire ratio of the cylinder/ Min.: 0%, Max.: 50%	0%	This item is displayed in only idling

\*1: If no conditions are specifically stated for "Idling", it means the shift lever is in the N or P position, the A/C switch is OFF and all accessory switches are OFF.

## 8. ACTIVE TEST

### HINT:

Performing the ACTIVE TEST using the hand-held tester or the OBD II scan tool allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as a first step of troubleshooting is one method to shorten diagnostic time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Warm up the engine.
- (b) Turn the ignition switch OFF.
- (c) Connect the hand-held tester or the OBD II scan tool to the DLC3.
- (d) Turn the ignition switch ON.
- (e) Push the "ON" button of the hand-held tester or the OBD II scan tool.
- (f) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST.
- (g) According to the display on tester, perform the "ACTIVE TEST".

Item	Test Details	Diagnostic Note
INJ VOL	[Test Details] Control the injection volume. Min.: -12.5%, Max.: 24.8% [Vehicle Condition] Engine speed: 3,000 rpm or less.	▶All injectors are tested at once. ▶Injection volume is gradually changed between -12.5 and 25%
A/F CONTROL	[Test Details] Control injection volume -12.5 or 25 % (change injection volume -12.5 % or 25 %) [Vehicle Condition] Engine speed: 3,000 rpm or less	Following A/F CONTROL procedure enables technician to check and graph voltage outputs of both the A/F sensor and heated oxygen sensor For displaying graph, enter "ACTIVE TEST / A/F CONTROL / USER DATA", select "AFS B1S1 and O2S B1S2" by pressing "YES" and push "ENTER". Then press "F4"
FUEL PUMP / SPD	[Test Details] Control the fuel pump speed. ON or OFF	-
VVT CTRL B1	[Test Details] Active VVT system (Bank 1) ON or OFF	▶ON: Rough idle or engine stall ▶OFF: Normal engine speed
VVT CTRL B2	[Test Details] Active VVT system (Bank 2) ON or OFF	▶ON: Rough idle or engine stall ▶OFF: Normal engine speed
CAN CTRL VSV	[Test Details] Activate the VSV for canister control. ON or OFF	-
TANK BYPASS VSV	[Test Details] Activate the VSV for tank bypass. ON or OFF	-
A/C MAG CLUTCH	[Test Details] Control the A/C magnet clutch. ON or OFF	-
EVAP VSV (ALONE)	[Test Details] Activate the VSV for EVAP control. ON or OFF	-

TC/TE1	[Test Details] Connect the TC and TE1. ON or OFF	Switch to the same state as the connection between terminal TC and TE1.
FC IDL PROHBT	[Test Details] Control the idle fuel cut prohibit. ON or OFF	-

## 9. DEFINITION OF TERMS

Term	Definition
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and its details).
Related DTCs	Diagnostic code
Typical enabling condition	Preconditions that allow the ECM to detect malfunctions. With all preconditions satisfied, the ECM sets the DTC when the monitored value(s) exceeds the malfunction threshold(s).
Sequence of operation	The priority order that is applied to monitoring, if multiple sensors and components are used to detect the malfunction. When a sensor is being monitored, the next sensor or component will not be monitored until the sensor monitoring is finished.
Required sensor/components	The sensors and components that are used by the ECM to detect malfunctions.
Frequency of operation	The number of times that the ECM checks for malfunctions per driving cycle. "Once per driving cycle" means that the ECM detects the malfunction only one time during a single driving cycle. "Continuous" means that the ECM detects malfunction every time an enabling condition is met.
Duration	The minimum time that the ECM must sense a continuous deviation in the monitored value(s) before setting a DTC. This timing begins after the "typical enabling conditions" are met.
Malfunction thresholds	Beyond this value, the ECM will conclude that there is a malfunction and set a DTC.
MIL operation	MIL illumination timing after a defect is detected. "Immediately" means that the ECM illuminates MIL the instant the ECM determines that there is a malfunction. "2 driving cycle" means that the ECM illuminates MIL if the same malfunction is detected again in the 2nd driving cycle.

## 10. TOYOTA/LEXUS PART AND SYSTEM NAME LIST

This reference list indicates the part names used in this manual along with their definitions.

TOYOTA/LEXUS name	Definition
Toyota HCAC system, Hydro-carbon Adsorptive Catalyst (HCAC) system, HC adsorptive three-way catalyst	HC adsorptive three-way catalytic converter
Variable Valve Timing sensor, VVT sensor	Camshaft position sensor
Variable valve timing system, VVT system	Camshaft timing control system
Camshaft timing oil control valve, Oil control valve, OCV, VVT, VSV	Camshaft timing oil control valve
Variable timing and lift, VVTL	Camshaft timing and lift control
Crankshaft position sensor "A"	Crankshaft position sensor
Engine speed sensor	Crankshaft position sensor
THA	Intake air temperature
Knock control module	Engine knock control module
Knock sensor	Engine knock sensor
Mass or volume air flow circuit	Mass air flow sensor circuit
Vacuum sensor	Manifold air pressure sensor
Internal control module, Control module, Engine control ECU, PCM	Power train control module
FC idle	Deceleration fuel cut

## DIAGNOSTICS - ENGINE

Idle air control valve	Idle speed control
VSV for CCV, Canister close valve VSV for canister control	Evaporative emissions canister vent valve
VSV for EVAP, Vacuum switching valve assembly No. 1, EVAP VSV, Purge VSV	Evaporative emissions canister purge valve
VSV for pressure switching valve, Bypass VSV	Evaporative emission pressure switching valve
Vapor pressure sensor, EVAP pressure sensor, Evaporative emission control system pressure sensor	Fuel tank pressure sensor
Charcoal canister	Evaporative emissions canister
ORVR system	On-board refueling vapor recovery system
Intake manifold runner control	Intake manifold tuning system
Intake manifold runner valve, IMRV, IACV (runner valve)	Intake manifold tuning valve
Intake control VSV	Intake manifold tuning solenoid valve
AFS	Air fuel ratio sensor
O2 sensor	Heater oxygen sensor
Oxygen sensor pumping current circuit	Oxygen sensor output signal
Oxygen sensor reference ground circuit	Oxygen sensor signal ground
Accel position sensor	Accelerator pedal position sensor
Throttle actuator control motor, Actuator control motor, Electronic throttle motor, Throttle control motor	Electronic throttle actuator
Electronic throttle control system, Throttle actuator control system	Electronic throttle control system
Throttle/pedal position sensor, Throttle/pedal position switch, Throttle position sensor/switch	Throttle position sensor
Turbo press sensor	Turbocharger pressure sensor
Turbo VSV	Turbocharger pressure control solenoid valve
P/S pressure switch	Power-steering pressure switch
VSV for ACM	Active control engine mount
Speed sensor, Vehicle speed sensor "A", Speed sensor for skid control ECU	Vehicle speed sensor
ATF temperature sensor, Trans. fluid temp. sensor, ATF temperature sensor "A"	Transmission fluid temperature sensor
Electronic controlled automatic transmission, ECT	Electronically controlled automatic
Intermediate shaft speed sensor "A"	Counter gear speed sensor
Output speed sensor	Output shaft speed sensor
Input speed sensor, Input turbine speed sensor "A", Speed sensor (NT), Turbine speed sensor	Input turbine speed sensor
PNP switch, NSW	Park/neutral position switch
Pressure control solenoid	Transmission pressure control solenoid
Shift solenoid	Transmission shift solenoid valve
Transmission control switch, Shift lock control unit	Shift lock control module
Engine immobiliser system, Immobiliser system	Vehicle anti-theft system

**11. The monitor will run whenever the following DTCs are not present (Monitor disablement List)**

HINT:

This table indicates ECM monitoring status for the items in the upper columns if the DTCs in each line on the left are being set.

As for the "X" mark, when the DTC on the left is stored, detection of the DTC in the upper column is not performed.

			Monitor disablement (X - disabled)																											
Fault code	Fault code	Component/ system	P0010,P0020	P0011	P0012	P0016,P0018	P0021	P0022	P0030,50	P0031,32,51,52	P0035,P0155	P0036,56	P0043,44,63,64	P0100	P0101	P0105	P0106	P0110	P0115	P0116	P0120,P0121	P0125	P0128	P0130-P0153	P0134,P0154	P0136,P0156	P0142,P0162	P0171,P0172	P0300-P0308	
			P0010,P0020	P0011	P0012	P0016,P0018	P0021	P0022	P0031,32,51,52	P0031,32,51,52	P0037,38,57,58	P0043,44,63,64	P0100-P0103	P0101	P0105-P0108	P0106	P0110-P0113	P0115-P0118	P0116	P0120-P0223,P2135	P0125	P0128	P0130-P0153	P0134,P0154	P0136,P0156	P0142,P0162	P0171,P0172	P0300-P0308		
P0010,P0020	P0010,P0020	VVT VSV1,2																												
P0011	P0011	VVT System1 - Advance																												
P0012	P0012	VVT System1 - Retard																												
P0016,P0018	P0016,P0018	VVT System - Misalignment																												
P0021	P0021	VVT System2 - Advance																												
P0022	P0022	VVT System2 - Retard																												
P0030,50	P0031,32,51,52	O2 Sensor Heater - Sensor1																												
P0135,P0155	P0031,32,51,52	A/F Sensor Heater - Sensor1																												
P0036,56	P0037,38,57,58	O2 Sensor Heater - Sensor2																												
P0043,44,63,64	P0043,44,63,64	O2 Sensor Heater - Sensor3																												
P0100,P0101	P0100-P0103	MAF sensor																												
P0105,P0106	P0105-P0108	MAP sensor																												
P0110	P0110-P0113	IAT sensor																												
P0115,P0116	P0115-P0118	ECT sensor																												
P0120,P0121	P0120-P0223,P2135	TP sensor																												
P0125	P0125	Insufficient ECT for Closed Loop																												
P0128	P0128	Thermostat																												
P0130-P0153	P0130-P0153	O2 Sensor - Sensor1																												
P0134,P0154	P0134,P0154	O2 Sensor, A/F Sensor(No Activity) - Sensor1																												
P0136,P0156	P0136,P0156	O2 Sensor - Sensor2																												
P0142,P0162	P0142,P0162	O2 Sensor - Sensor3																												
P0171,P0172	P0171,P0172	Fuel system																												
P0300-P0308	P0300-P0308	Misfire																												
P0325,P0330	P0325-P0333	Knock sensor																												
P0335	P0335	CKP sensor																												
P0340, P0341	P0340, P0341	CMP sensor																												
P0340-P0346	P0340-P0346	VVT sensor1,2																												
P0351-P0358	P0351-P0358	Ignitor																												
P0385	P0385	CKP sensor 2																												
P0401	P0401	EGR system (closed)																												
P0402	P0402	EGR system (open)																												
P0405,P0409	P0405-P0409	Lift sensor																												
P0420,P0430	P0420,P0430	Catalyst																												
P0442-P0456	P0442-P0456	EVAP system																												
P0450,P0451	P0450-P0453	EVAP press sensor																												

DIAGNOSTICS - ENGINE

Monitor disablement (X - disabled)

Monitor detected malfunction	Fault code		Component/system		Monitor disablement (X - disabled)																												
	Code 1	Code 2	Code 1	Code 2	P0010,P0020	P0011	P0012	P0016,P0018	P0021	P0022	P0030,50	P0031,32,51,52	P0031,32,51,52	P0037,38,57,58	P0043,44,63,64	P0100	P0101	P0105	P0106	P0110	P0115	P0116	P0120,P0121	P0125	P0128	P0130-P0153	P0134,P0154	P0136,P0156	P0142,P0162	P0171,P0172	P0300-P0308		
					VVT_VSV1,2	VVT_System1 - Advance	VVT_System1 - Retard	VVT_System - Misalignment	VVT_System2 - Advance	VVT_System2 - Retard	O2 Sensor Heater - Sensor1	A/F Sensor Heater - Sensor1	O2 Sensor Heater - Sensor2	O2 Sensor Heater - Sensor3	MAF sensor	MAF sensor	MAP sensor	MAP sensor	IAT sensor	ECT sensor	ECT sensor	TP sensor	Insufficient ECT for Closed Loop	P0125	P0128	O2 Sensor - Sensor1	O2 Sensor, A/F Sensor(No Activity) - Sensor1	O2 Sensor - Sensor2	O2 Sensor - Sensor3	Fuel system	Misfire		
P0500	P0500	VSS																							X	X	X	X	X	X	X		
P0511	P0511	IAC valve																							X	X	X	X	X	X	X		
P0510	P0510	Idle switch														X		X						X	X	X	X	X	X	X	X		
P0560	P0560	System Voltage																						X	X	X	X	X	X	X	X		
P0617	P0617	Starter signal																															
P0705	P0705	Shift lever position switch																															
P0710	P0710-P0713	Trans fluid temp sensor																															
P0720-P0793	P0720-P0793	Output speed sensor																															
P0715-P0717	P0715-P0717	Input speed sensor																															
P0724	P0724	Stop lamp switch																															
P0741-P0796	P0741-P0796	Trans solenoid (function)																															
P0748-P0798	P0748-P0799	Trans solenoid (range)																															
P0850	P0850	PNP switch																													X		
P1010,P1020	P1010,P1020	VVTL																						X						X			
P1011,12,(21,22)	P1011,12,(21,22)	VVTL system1,(2)																						X					X				
P1126	P1126	Electronic magnet clutch																															
P1129	P1129	Electronic throttle system																															
P1430	P1430	HC adsorber ACT press sensor																															
P2004,6	P2004,6	Intake Manifold Runner Control																															
P2009,10	P2009,10	Intake Manifold Runner Control Circuit																															
P2014,16,17	P2014,16,17	Intake Manifold Runner Position Sensor																															
P2102,P2103	P2102,P2103	Throttle motor																															
P2120-P2138	P2120-P2138	Accel position sensor																															
P2196,P2198	P2196,P2198	A/F sensor (rationality)																							X			X	X				
P2226	P2226	BARO sensor																								X		X	X				
P2237,P2240	P2237,P2240	A/F sensor (open)																							X			X	X				
P2423,24	P2423,24	HC Adsorption Catalyst																															
P2430,2,3	P2430,2,3	AIR Pressure Sensor(Low/High)																															
P2431	P2431	AIR Pressure Sensor(Rationality)																															
P2440	P2440	AIR control valve stuck open																								X	X	X	X	X	X	X	
P2441	P2441	AIR control valve stuck close																								X	X	X	X	X	X	X	
P2444	P2444	AIP stuck On																								X	X	X	X	X	X	X	
P2445	P2445	AIP stuck Off																								X	X	X	X	X	X	X	
P2714-P2759	P2714-P2759	Trans solenoid(SLU-SLD)																															
P2A00,P2A03	P2A00,P2A03	A/F sensor (slow response)																							X			X	X				

C

A21571



Monitor detected malfunction	Fault code		Monitor disablement (X - disabled)																										
	Fault code	Component/ system	P0325-P0330	P0335	P0340-P0341	P0340-P0346	P0351-P0358	P0385	P0401	P0402	P0405	P0409	P0420-P0430	P0440-P0446	P0450-P0451	P0500	P0500	P0500	P0511	P0510	P0560	P0617	P0705	P0710	P0720-P0793	P0715-P0717	P0724	P0741-P0796	
			P0325-P0333	P0335	P0340-P0341	P0340-P0346	P0351-P0358	P0385	P0401	P0402	P0405-P0406	P0409	P0420-P0430	P0440-P0446	P0450-P0453	P0500	P0500	P0500	P0511	P0510	P0560	P0617	P0705	P0710-P0713	P0720-P0793	P0715-P0717	P0724	P0741-P0796	
			Knock sensor	CKP sensor	CMP sensor	VVT sensor1,2	Ignitor	CKP sensor 2	EGR system (closed)	EGR system (open)	EGR Lift sensor	EGR Lift sensor	Catalyst	EVAP system	EVAP press sensor	VSS(ECT2sensor)	VSS(ECT1sensor, non-ECT)	VSS(M/T)	IAC valve	Idle switch	System Voltage	Starter signal	Shift lever position switch	Trans fluid temp sensor	Output speed sensor	Input speed sensor	Stop lamp switch	Trans solenoid (function)*1	
P0010,P0020	P0010,P0020	VVT VSV1,2																											X
P0011	P0011	VVT System1 - Advance						X	X			X	X				X												
P0012	P0012	VVT System1 - Retard						X	X			X	X				X												
P0016,P0018	P0016,P0018	VVT System - Misalignment																											
P0021	P0021	VVT System2 - Advance						X	X			X	X				X												
P0022	P0022	VVT System2 - Retard						X	X			X	X				X												
P0030,50	P0031,32,51,52	O2 Sensor Heater - Sensor1						X	X			X					X												X
P0135,P0155	P0031,32,51,52	A/F Sensor Heater - Sensor1						X	X			X					X												
P0036,56	P0037,38,57,58	O2 Sensor Heater - Sensor2										X																	
P0043,44,63,64	P0043,44,63,64	O2 Sensor Heater - Sensor3										X																	
P0100,P0101	P0100-P0103	MAF sensor						X	X			X	X				X	X											X
P0105,P0106	P0105-P0108	MAP sensor						X	X			X	X				X	X											X
P0110	P0110-P0113	IAT sensor						X	X			X																	X
P0115,P0116	P0115-P0118	ECT sensor						X	X		X	X	X				X	X											X
P0120,P0121	P0120-P0223,P2135	TP sensor						X	X		X	X	X		X		X	X											X
P0125	P0125	Insufficient ECT for Closed Loop						X	X		X	X	X				X	X											X
P0128	P0128	Thermostat																											
P0130-P0153	P0130-P0153	O2 Sensor - Sensor1						X	X			X	X				X												X
P0134,P0154	P0134,P0154	O2 Sensor, A/F Sensor(No Activity) - Sensor1						X	X			X					X												X
P0136,P0156	P0136,P0156	O2 Sensor - Sensor2										X																	
P0142,P0162	P0142,P0162	O2 Sensor - Sensor3																											
P0171,P0172	P0171,P0172	Fuel system						X	X			X	X				X												X
P0300-P0308	P0300-P0308	Misfire										X	X				X												X
P0325,P0330	P0325-P0333	Knock sensor	X					X	X																				X
P0335	P0335	CKP sensor		X				X	X			X	X				X												X
P0340, P0341	P0340, P0341	CMP sensor			X			X	X			X	X				X												X
P0340-P0346	P0340-P0346	VVT sensor1,2				X																							
P0351-P0358	P0351-P0358	Ignitor					X	X				X	X				X												X
P0385	P0385	CKP sensor 2					X	X				X	X				X												
P0401	P0401	EGR system (closed)							X			X																	X
P0402	P0402	EGR system (open)								X		X						X											X
P0405,P0409	P0405-P0409	Lift sensor																											
P0420,P0430	P0420,P0430	Catalyst																											
P0442-P0456	P0442-P0456	EVAP system																	X										
P0450,P0451	P0450-P0453	EVAP press sensor										X	X																



Monitor detected malfunction	Fault code		Component/system		Monitor disablement (X - disabled)	
	Code 1	Code 2	Code 1	Code 2	Code 1	Code 2
P0010,P0020	P0010,P0020	VVT VSV1,2				
P0011	P0011	VVT System1 - Advance				
P0012	P0012	VVT System1 - Retard				
P0016,P0018	P0016,P0018	VVT System - Misalignment				
P0021	P0021	VVT System2 - Advance				
P0022	P0022	VVT System2 - Retard				
P0030,50	P0031,32,51,52	O2 Sensor Heater - Sensor1				
P0135,P0155	P0031,32,51,52	A/F Sensor Heater - Sensor1				
P0036,56	P0037,38,57,58	O2 Sensor Heater - Sensor2				
P0043,44,63,64	P0043,44,63,64	O2 Sensor Heater - Sensor3				
P0100,P0101	P0100-P0103	MAF sensor				
P0105,P0106	P0105-P0108	MAP sensor				
P0110	P0110-P0113	IAT sensor				
P0115,P0116	P0115-P0118	ECT sensor				
P0120,P0121	P0120-P0223,P2135	TP sensor				
P0125	P0125	Insufficient ECT for Closed Loop				
P0128	P0128	Thermostat				
P0130-P0153	P0130-P0153	O2 Sensor - Sensor1				
P0134,P0154	P0134,P0154	O2 Sensor, A/F Sensor(No Activity) - Sensor1				
P0136,P0156	P0136,P0156	O2 Sensor - Sensor2				
P0142,P0162	P0142,P0162	O2 Sensor - Sensor3				
P0171,P0172	P0171,P0172	Fuel system				
P0300-P0308	P0300-P0308	Misfire				
P0325,P0330	P0325-P0333	Knock sensor				
P0335	P0335	CKP sensor				
P0340, P0341	P0340, P0341	CMP sensor				
P0340-P0346	P0340-P0346	VVT sensor1,2				
P0351-P0358	P0351-P0358	Ignitor				
P0385	P0385	CKP sensor 2				
P0401	P0401	EGR system (closed)				
P0402	P0402	EGR system (open)				
P0405,P0409	P0405-P0409	Lift sensor				
P0420,P0430	P0420,P0430	Catalyst				
P0442-P0456	P0442-P0456	EVAP system				
P0450,P0451	P0450-P0453	EVAP press sensor				

C

A21575

DIAGNOSTICS - ENGINE

Monitor disablement (X - disabled)

Monitor detected malfunction	Fault code		Component/system		Fault code		Component/system		Fault code	
	Monitor detected malfunction	Component/system	Monitor detected malfunction	Component/system	Monitor detected malfunction	Component/system	Monitor detected malfunction	Component/system	Monitor detected malfunction	Component/system
P0500	P0500	VSS	X	Trans solenoid (function)*2	P0741-P0796	Trans solenoid (function)*2			P0741-P0796	Trans solenoid (function)*2
P0511	P0511	IAC valve		Trans solenoid (range)	P0748-P0798	Trans solenoid (range)			P0748-P0798	Trans solenoid (range)
P0510	P0510	Idle switch		PNP switch	P0850	PNP switch			P0850	PNP switch
P0560	P0560	System Voltage		VVTL	P1010,P1020	VVTL			P1010,P1020	VVTL
P0617	P0617	Starter signal		VVTL system1,(,2)	P1011,12,(,21,22)	VVTL system1,(,2)			P1011,12,(,21,22)	VVTL system1,(,2)
P0705	P0705	Shift lever position switch		Electronic magnet clutch	P1126	Electronic magnet clutch			P1126	Electronic magnet clutch
P0710	P0710-P0713	Trans fluid temp sensor		Electronic throttle system	P1129	Electronic throttle system			P1129	Electronic throttle system
P0720-P0793	P0720-P0793	Output speed sensor		HC adsorber ACT press sensor	P1430	HC adsorber ACT press sensor			P1430	HC adsorber ACT press sensor
P0715-P0717	P0715-P0717	Input speed sensor		Intake Manifold Runner Control	P2004,6	Intake Manifold Runner Control			P2004,6	Intake Manifold Runner Control
P0724	P0724	Stop lamp switch		Intake Manifold Runner Control Circuit	P2009,10	Intake Manifold Runner Control Circuit			P2009,10	Intake Manifold Runner Control Circuit
P0741-P0796	P0741-P0796	Trans solenoid (function)		Intake Manifold Runner Position Sensor	P2014,16,17	Intake Manifold Runner Position Sensor			P2014,16,17	Intake Manifold Runner Position Sensor
P0748-P0798	P0748-P0798	Trans solenoid (range)	X	Throttle motor	P2102,P2103	Throttle motor			P2102,P2103	Throttle motor
P0850	P0850	PNP switch		Accel position sensor	P2120-P2138	Accel position sensor			P2120-P2138	Accel position sensor
P1010,P1020	P1010,P1020	VVTL		A/F Sensor(Rationality) - Sensor1	P2196,P2198	A/F Sensor(Rationality) - Sensor1			P2196,P2198	A/F Sensor(Rationality) - Sensor1
P1011,12,(,21,22)	P1011,12,(,21,22)	VVTL system1,(,2)		BARO sensor	P2226	BARO sensor			P2226	BARO sensor
P1126	P1126	Electronic magnet clutch		A/F Sensor(Open) - Sensor1	P2237,P2240	A/F Sensor(Open) - Sensor1			P2237,P2240	A/F Sensor(Open) - Sensor1
P1129	P1129	Electronic throttle system		HC Adsorption Catalyst	P2423,24	HC Adsorption Catalyst			P2423,24	HC Adsorption Catalyst
P1430	P1430	HC adsorber ACT press sensor		AIR Pressure Sensor(Low/High)	P2430,2,3	AIR Pressure Sensor(Low/High)			P2430,2,3	AIR Pressure Sensor(Low/High)
P2004,6	P2004,6	Intake Manifold Runner Control		AIR Pressure Sensor(Rationality)	P2431	AIR Pressure Sensor(Rationality)			P2431	AIR Pressure Sensor(Rationality)
P2009,10	P2009,10	Intake Manifold Runner Control Circuit		AIR control valve stuck open	P2440	AIR control valve stuck open			P2440	AIR control valve stuck open
P2014,16,17	P2014,16,17	Intake Manifold Runner Position Sensor		AIR control valve stuck close	P2441	AIR control valve stuck close			P2441	AIR control valve stuck close
P2102,P2103	P2102,P2103	Throttle motor		AIP stuck On	P2444	AIP stuck On			P2444	AIP stuck On
P2120-P2138	P2120-P2138	Accel position sensor		AIP stuck Off	P2445	AIP stuck Off			P2445	AIP stuck Off
P2196,P2198	P2196,P2198	A/F sensor (rationality)		Trans solenoid(SLU-SLD)	P2714-P2759	Trans solenoid(SLU-SLD)			P2714-P2759	Trans solenoid(SLU-SLD)
P2226	P2226	BARO sensor		A/F Sensor (Slow response) - Sensor1	P2A00,P2A03	A/F Sensor (Slow response) - Sensor1			P2A00,P2A03	A/F Sensor (Slow response) - Sensor1
P2237,P2240	P2237,P2240	A/F sensor (open)								
P2423,24	P2423,24	HC Adsorption Catalyst								
P2430,2,3	P2430,2,3	AIR Pressure Sensor(Low/High)								
P2431	P2431	AIR Pressure Sensor(Rationality)								
P2440	P2440	AIR control valve stuck open								
P2441	P2441	AIR control valve stuck close								
P2444	P2444	AIP stuck On								
P2445	P2445	AIP stuck Off								
P2714-P2759	P2714-P2759	Trans solenoid(SLU-SLD)								
P2A00,P2A03	P2A00,P2A03	A/F sensor (slow response)								

C

A21576

## 12. O2S TEST RESULT

### INTRODUCTION

The O2S TEST RESULT refers to the results of the engine control module (ECM) when it monitors the oxygen sensor (O2S), and it can be read using the hand-held tester or the generic OBD II scantool. Based on this, you can find the O2S's conditions.

The ECM monitors the O2S in the various items. You can read the monitor result (TEST DATA) of each monitor item using the O2S TEST RESULT. However, the output value of the TEST DATA is the latest "snapshot" value that is taken after monitoring and therefore is not dynamic.

In this repair manual, the description of the O2S TEST RESULT (for O2S related DTCs) are written in a table.

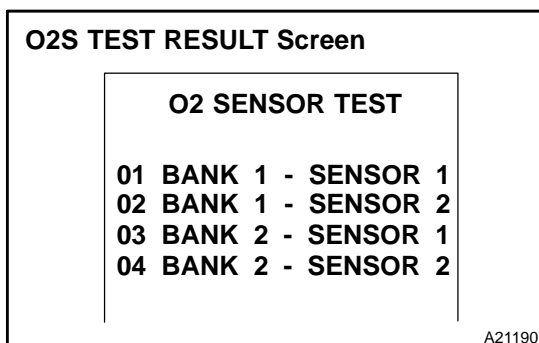
This table consists of 5 items:

- (1) TEST ID (a code applied to each TEST DATA)
- (2) Description of TEST DATA
- (3) Conversion Factor (When Conversion Factor has a value written in the table, multiply the TEST DATA value appearing on the scan tool by the Conversion Factor value. The result will be the required value.)
- (4) Unit
- (5) Standard Value

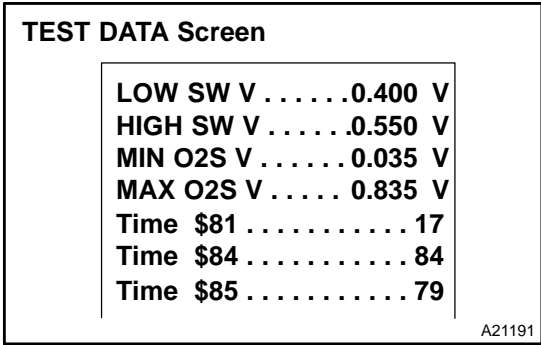
If the TEST DATA value appearing on the scan tool is out of the standard value, the O2S is malfunctioning. If it is within the standard value, the O2S is functioning normally. However, if the value is on the borderline of the standard value, the O2S may malfunction very soon.


### HOW TO READ O2S TEST RESULT USING HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.



- (b) On the tester screen, select the following menus: DIAGNOSIS/CARB OBDII/O2S TEST RESULT. A list of the O2S equipped on the vehicle will be displayed.



- (c) Select the desired O2S and press ENTER. The following screen will appear.
- (d) Press HELP and  simultaneously. More information will appear.
- (e) Example:
  - (1) The hand-held tester displays "17" as a value of the "TIME \$81" (see the illustration on the left).
  - (2) Find the Conversion Factor value of "TIME \$81" in the O2S TEST RESULT chart below. 0.3906 is specified for \$81 in this chart.
  - (3) Multiply "17" in step (1) by 0.3906 (Conversion Factor) in the step (2).  
**17 x 0.3906 = 6.6 %**
  - (4) If the answer is within the standard value, the "TIME \$81" can be confirmed to be normal.

**O2S TEST RESULT Chart**

TEST ID	Description of TEST DATA	Conversion Factor	Unit	Standard Value
\$81	Percentage of monitoring time when the HO2S voltage is less than 0.05V	Multiply 0.3906	%	Within 60 %

### 13. CHECKING MONITOR STATUS

#### NOTICE:

The Monitor Status is not applicable to the heated oxygen sensor (HO2S). The HO2S status can be checked with O2S TEST RESULT.

#### (a) INTRODUCTION

The purpose of the monitor result (mode 6) is to allow access to the results for on-board diagnostic monitoring tests of specific components/systems that are not continuously monitored. Examples are catalyst, EVAP and thermostat.

The monitor result allows the OBD scan tool to display the monitor status, test value and test limit. The monitor status indicates whether the component is functioning normally or not (PASS or FAIL). The test value is the value that was used to determine the monitor status. When the test value is inside the test limit, the ECM determines the component is functioning normally (PASS). If the test value is outside the test limit, the ECM determines the component is malfunctioning (FAIL).

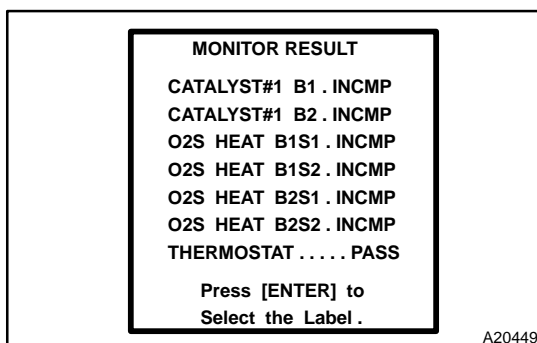
A problem in these components/systems can be found by comparing the test value and test limit. The monitor result information is included under "MONITOR RESULT" in the DTC sections.

#### (b) PROCEDURE

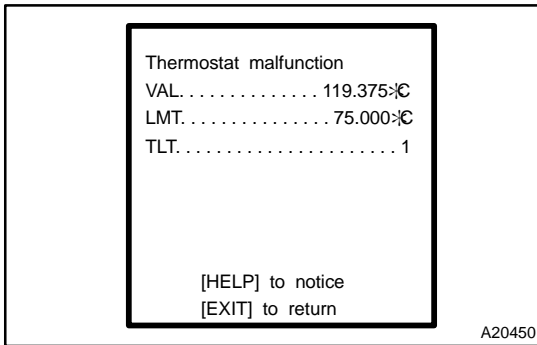
#### NOTICE:

The monitor result and test value are cleared when the ignition switch is turned OFF.

- (1) Connect the hand-held tester to the DLC3.
- (2) Turn the ignition switch ON.
- (3) Clear the DTCs.
- (4) Run the vehicle in accordance with the applicable drive pattern described in READINESS MONITOR DRIVE PATTERN (see page [DI-30](#) ).



- (5) Select from the tester menus: DIAGNOSIS, ENHANCED OBD II, MONITOR INFO and MONITOR RESULT. The monitor result appears after the component name.  
INCMP: The component has not been monitored yet.  
PASS: The component is functioning normally.  
FAIL: The component is malfunctioning.
- (6) Confirm that the component is set to either PASS or FAIL.



- (7) Select the component (Label) and press ENTER. The accuracy test value appears when the monitor result is either PASS or FAIL.  
 VAL The test value  
 LMT: The test limit  
 TLT: The test limit type. Either 0 or 1 is displayed.
- (8) If TLT is 0, the component is malfunctioning when the test value is higher than the test limit. If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.
- (9) Compare the test value with the test limit. The test value is usually significantly higher or lower than the test limit. If the test value is on the borderline of the test limit, there is a potential malfunction in the component.

**HINT:**

The monitor result might on rare occasions be PASS even if the MIL is illuminated. This indicates the system malfunctioned on a previous driving cycle. This might be caused by an intermittent problem.



## PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	16.Starter 17.Starter relay 18.Park/neutral position switch	ST-16 ST-18 DI-402
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. Engine control module (ECM)	DI-345 DI-350 IN-36
No complete combustion (Does not start)	1. Fuel pump control circuit	DI-350
Engine cranks normally but difficult to start	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	DI-336 DI-350 EM-3
Difficult to start with cold engine	1. Starter signal circuit 2. Fuel pump control circuit	DI-336 DI-350
Difficult to start with hot engine	1. Starter signal circuit 2. Fuel pump control circuit	DI-336 DI-350
High engine idle speed (Poor idling)	1. A/C switch circuit 2. ECM power source circuit	- DI-345
Low engine idle speed (Poor idling)	1. A/C switch circuit 2. Fuel pump control circuit	- DI-350
Rough idling (Poor idling)	1. Compression 2. Fuel pump control circuit	EM-3 DI-350
Hunting (Poor idling)	1. ECM power source circuit 2. Fuel pump control circuit	DI-345 DI-350
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit 2. A/T faulty	DI-350 DI-396
Surging (Poor driveability)	1. Fuel pump control circuit	DI-350
Engine stalls soon after starting	1. Fuel pump control circuit	DI-350
Engine stalls during A/C operation	1. A/C switch circuit 2. Engine control module (ECM)	- IN-36
Unable to refuel/Difficult to refuel	1. ORVR system	-

## READINESS MONITOR DRIVE PATTERN

### 1. PURPOSE OF THE READINESS TESTS

- ▶ The On-Board Diagnostic (OBD II) system is designed to monitor the performance of emission-related components and report any detected abnormalities in the form of Diagnostic Trouble Codes (DTCs). Since the various components need to be monitored during different driving conditions, the OBD II system is designed to run separate monitoring programs called Readiness Monitors. Many state Inspection and Maintenance (I/M) programs require that vehicles complete their Readiness Monitors prior to beginning an emissions test.
- ▶ The current status of the Readiness Monitors can be seen by using the hand-held tester with version 9.0 software (or newer), or a generic OBD II Scan tool.
- ▶ To view the Readiness Monitor status using the hand-held tester, select "Monitor Status" from the Enhanced OBD II Menu.
- ▶ A status of "complete" indicates that the necessary conditions have been met to run the performance tests for the related Readiness Monitor.
- ▶ The Readiness Monitor will be reset to "incomplete" if:
  - ▶ ECM has lost power (battery or fuse).
  - ▶ DTCs have been cleared.
  - ▶ The conditions for running the Readiness Monitor have not been met.
- ▶ In the event that any Readiness Monitor shows "incomplete," follow the appropriate Readiness Monitor Drive Pattern to active the monitor and change the readiness status to "complete."

#### **CAUTION:**

**Strictly observe of posted speed limits, traffic laws, and road conditions when performing these drive patterns.**

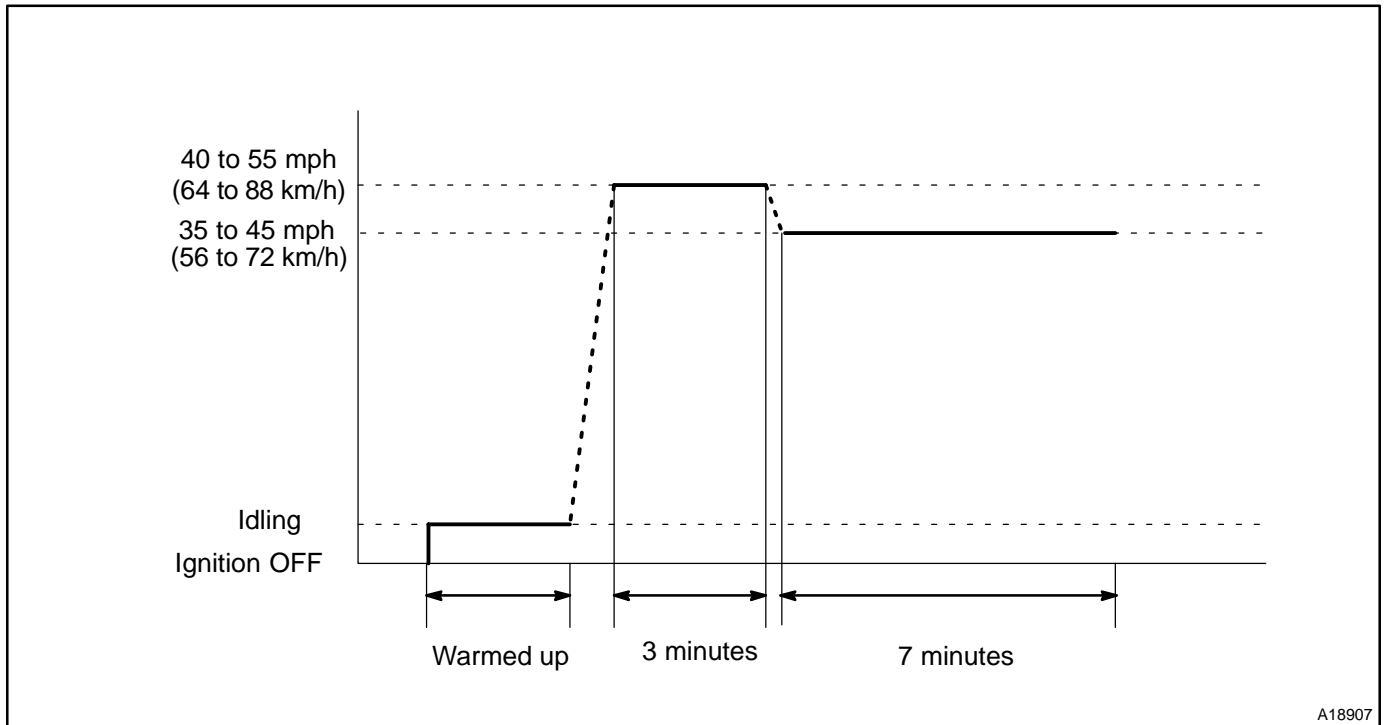
#### **NOTICE:**

**These drive patterns represent the fastest method to satisfy all necessary conditions which allow the specific readiness monitor to complete.**

**In the event that the drive pattern must be interrupted (possibly due to traffic conditions or other factors) the drive pattern can be resumed, and in most cases, the readiness monitor will still set to "complete".**

**To ensure rapid completion of readiness monitors, avoid sudden changes in vehicle load and speed (driving up and down hills and/or sudden acceleration).**

## 2. CATALYST MONITOR (O2S TYPE)



### (a) Preconditions

The monitor will not run unless:

- ▶ MIL is OFF.
- ▶ Engine Coolant Temperature (ECT) is 75°C (167°F) or greater.
- ▶ Intake Air Temperature (IAT) is -10°C (14°F) or greater

### NOTICE:

**The readiness test can be completed in cold ambient conditions (less than -10°C / 14°F), if the drive pattern is repeated a second time after cycling the ignition off.**

### (b) Drive Pattern

- (1) Connect the OBD II scan tool to the DLC3 to check monitor status and preconditions.
- (2) Drive the vehicle at 40 to 55 mph (64 to 88 km/h) for approximately for 3 minutes.

### NOTICE:

**Drive with smooth throttle operation and avoid sudden acceleration.**

**If IAT is less than 10°C (50°F) when engine was started, drive the vehicle at 40 to 55 mph (64 to 88 km/h) for additional 4 minutes.**

- (3) Drive the vehicle at 35 to 45 mph (56 to 72 km/h) for approximately 7 minutes.

### NOTICE:

**Drive with smooth throttle operation and avoid sudden deceleration as much as possible with the throttle fully closed.**

- (4) If readiness status does not switch to complete, make sure that the preconditions are met and the ignition switch is turned OFF and then repeat steps (2) and (3).
- (5) Release pressure in the fuel tank by removing and then reinstalling the fuel tank cap.
- (6) Start the engine and immediately begin driving as directed.

### 3. EVAP MONITOR (VACUUM PRESSURE MONITOR)

#### NOTICE:

**A cold soak must be performed prior to conducting the drive pattern to complete the Internal Pressure Readiness Monitor.**

#### (a) Cold Soak Preconditions

The monitor will not run unless:

- ▶ MIL is OFF
- ▶ Fuel level is approximately 1/2 to 3/4
- ▶ Altitude is 7,800 feet (2,400 m) or less

#### (b) Cold Soak Procedure

Let the vehicle cold soak for 8 hours or until the difference between IAT and ECT becomes less than 7°C (13°F)

#### HINT:

Examples:

##### ▶ Scenario 1

ECT = 24°C (75°F)

IAT = 16°C (60°F)

Difference between ECT and IAT is 8°C (15°F)

→ The monitor will not run because difference between ECT and IAT is greater than 7°C (13°F)

##### ▶ Scenario 2

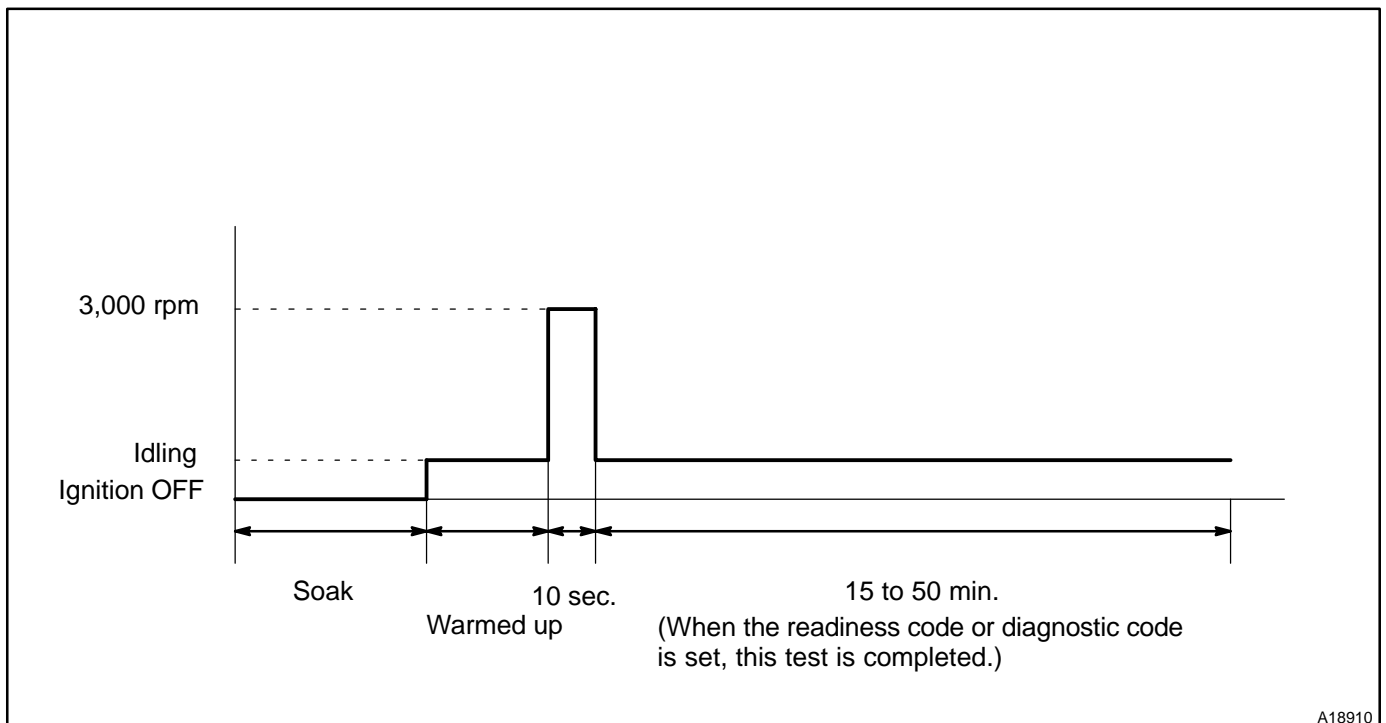
ECT = 21°C (70°F)

IAT = 20°C (68°F)

Difference between ECT and IAT is 1°C (2°F)

→ The monitor will run because difference between ECT and IAT is less than 7°C (13°F)

### 4. EVAP MONITOR (VACUUM PRESSURE MONITOR) (CONTINUED)



## (a) Preconditions

The monitor will not run unless:

- ▶ MIL is OFF
- ▶ Fuel level is approximately 1/2 to 3/4
- ▶ Altitude is 7,800 feet (2,400 m) or less\*
- ▶ Engine Coolant Temperature (ECT) is between 4.4°C and 35°C (40°F and 95°F)
- ▶ Intake Air Temperature (IAT) is between 4.4°C and 35°C (40°F and 95°F)
- ▶ Cold Soak Procedure has been completed
- ▶ Before starting the engine, the difference between ECT and IAT must be less than 7°C (13°F)

HINT:

Examples:

## ▶ Scenario 1

ECT = 24°C (75°F)

IAT = 16°C (60°F)

Difference between ECT and IAT is 8°C (15°F)

→ The monitor will not run because difference between ECT and IAT is greater than 7°C (13°F)

## ▶ Scenario 2

ECT = 21°C (70°F)

IAT = 20°C (68°F)

Difference between ECT and IAT is 1°C (2°F)

→ The monitor will run because difference between ECT and IAT is less than 7°C (13°F)

**The readiness test can be completed in cold ambient conditions (less than 40°F / 4.4°C) and/or at high altitudes (more than 7,800 feet / 2,400 m) if the drive pattern is repeated a second time after cycling the ignition off.**

## (b) Drive Pattern

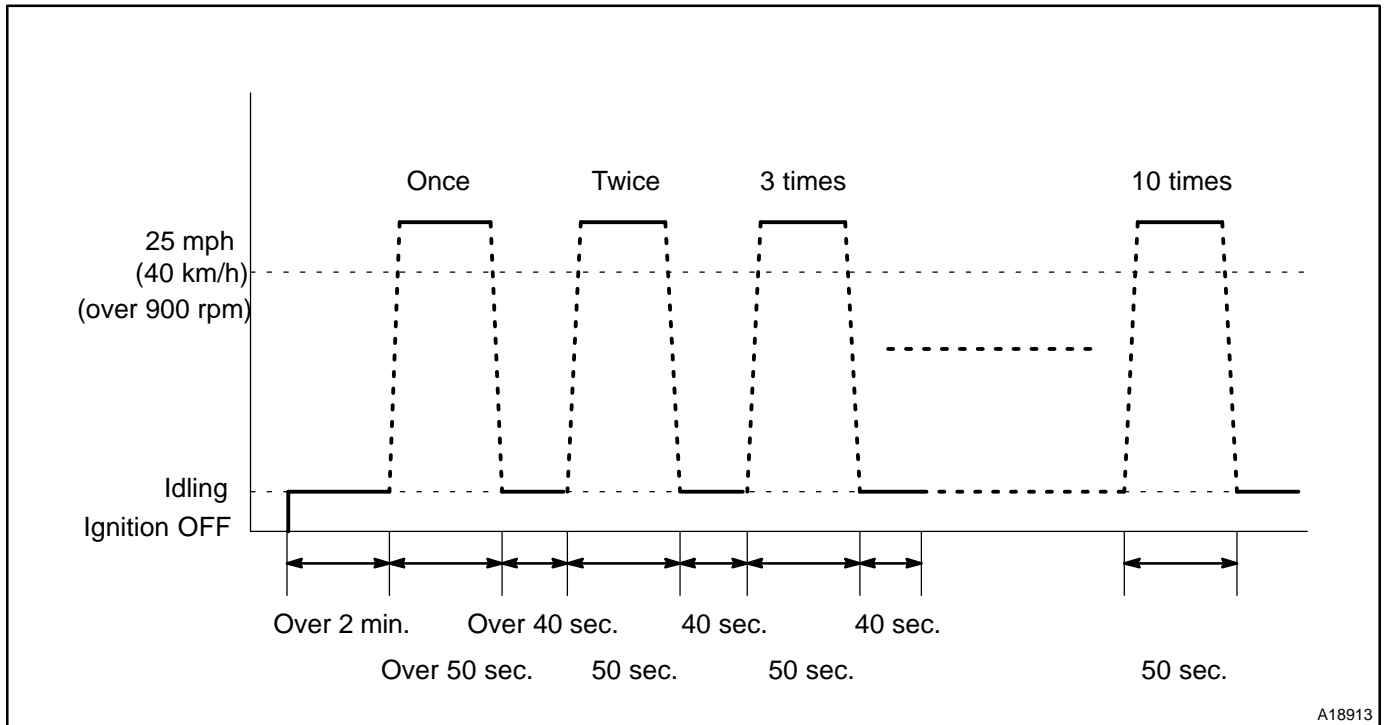
- (1) Connect the OBD II scan tool to DLC3 to check monitor status and preconditions (refer to "a").
- (2) Release pressure in fuel tank by removing the fuel tank cap and then reinstalling it.
- (3) Start the engine and allow it to idle until ECT becomes 75°C (167°F) or higher.
- (4) Run the engine at 3,000 rpm for about 10 seconds.
- (5) Allow the engine to idle with the A/C ON (to create slight load) for 15 to 50 minutes.

**NOTICE:**

**If the vehicle is not equipped with A/C put a slight load on the engine by doing the following :**

- ▶ **Securely set the parking brake.**
- ▶ **Block the drive wheels with wheel chocks.**
- ▶ **Allow the vehicle to idle in drive for 15 to 50 minutes.**

## 5. OXYGEN SENSOR MONITOR (FRONT AND REAR O2S SYSTEM)



A18913

### (a) Preconditions

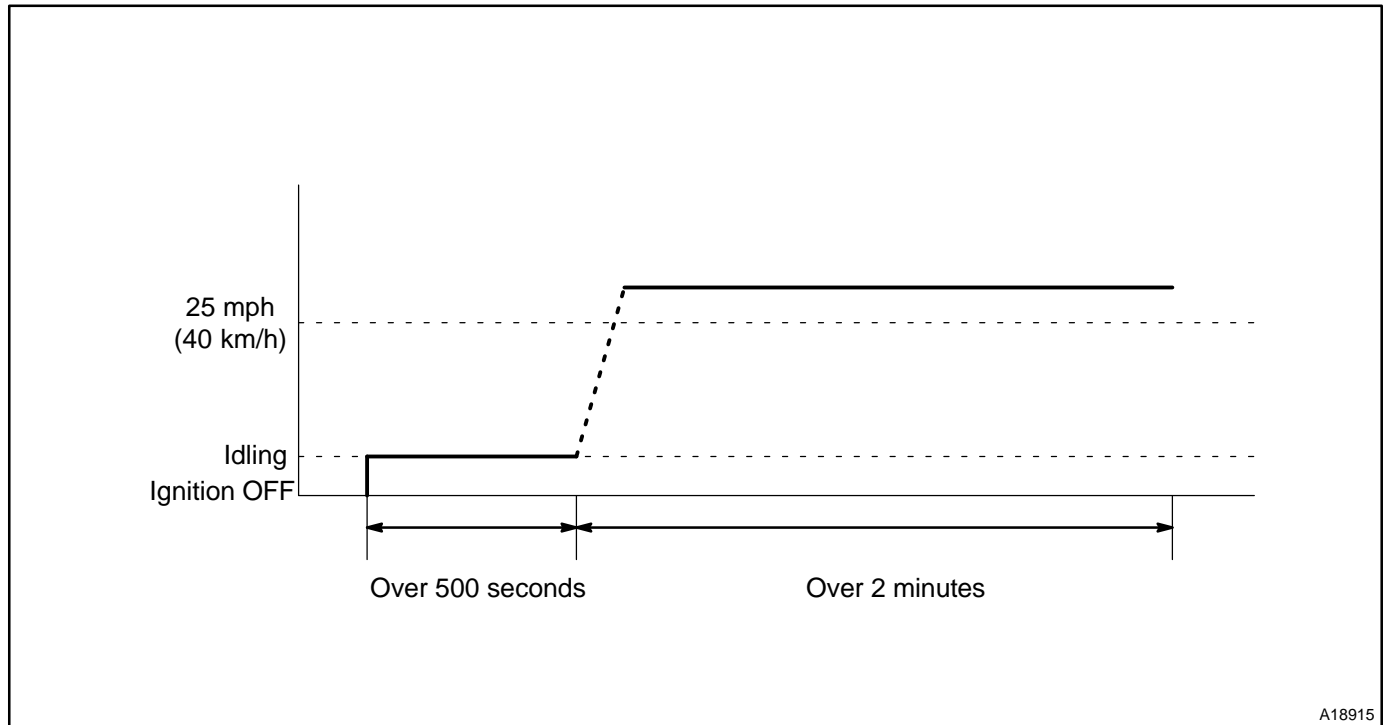
The monitor will not run unless:

- ▶ MIL is OFF

### (b) Drive Pattern

- (1) Connect the OBD II scan tool to DLC3 to check monitor status and preconditions (refer to step "a").
- (2) Start the engine and allow it to idle for 2 minutes or more.
- (3) Drive the vehicle at 25 mph (40 km/h) or more for at least 50 seconds.
- (4) Stop the vehicle and allow the engine to idle for 40 seconds or more.
- (5) Perform steps (3) and (4) ten times.
- (6) Check the status of the readiness monitor on the scan tool display. If readiness status did not switch to complete, ensure preconditions are met, turn the ignition off and then repeat steps (1) and (5).

## 6. OXYGEN SENSOR HEATER MONITOR



A18915

### (a) Preconditions

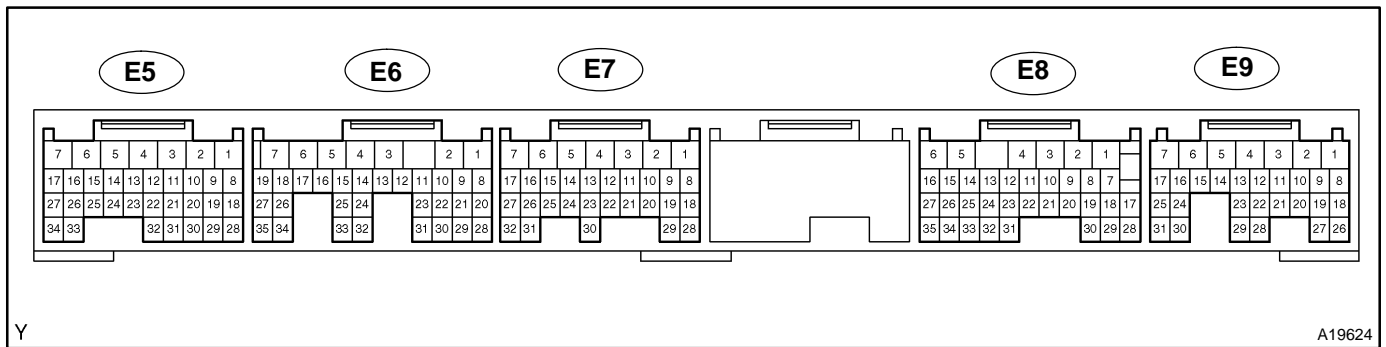
The monitor will not run unless:

- ▶ MIL is OFF

### (b) Drive Pattern

- (1) Connect the OBD II scan tool to the DLC3 to check monitor status and preconditions (refer to step "a").
- (2) Start the engine and allow it to idle for 500 seconds or more.
- (3) Drive the vehicle at 25 mph (40 km/h) or more at least 2 minutes.
- (4) Check the status of the readiness monitor on the scan tool display. If readiness status did not switch to complete, ensure the preconditions are met, turn the ignition off and then repeat steps (2) and (3).

## TERMINALS OF ECM



Each ECM terminals standard normal voltage is shown in the table below. In the table, first follow the information under "Condition".

Look under "Symbols (Terminals No.)" for the terminals to be inspected.

The standard normal voltage between the terminals is shown under "STD Voltage".

Use the illustration above as a reference for the ECM terminals.

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage
BATT (E9-3) - E1 (E7-1)	B-R - BR	Always	9 to 14 V
+BM (E8-6) - E1 (E7-1)	Y-B - BR		
IGSW (E9-9) - E1 (E7-1)	B-R - BR	IG switch ON	9 to 14 V
+B (E9-1) - E1 (E7-1)	B-Y - BR		
MREL (E9-8) - E1 (E7-1)	B-W - BR	IG switch ON	9 to 14 V
VC (E5-18) - E2 (E5-28)	L-R - BR-W	IG switch ON	4.5 to 5.5 V
VG (E5-30) - E2G (E5-29)	L-Y - G-W	Idling, P or N position, A/C switch OFF	0.5 to 3.0 V
THA (E5-20) - E2 (E5-28)	Y-B - BR-W	Idling, Intake air temp. 20°C (68°F)	0.5 to 3.4 V
THW (E5-19) - E2 (E5-28)	G-B - BR-W	Idling, Engine coolant temp. 80°C (176°F)	0.2 to 1.0 V
VTA1 (E5-21) - E2 (E5-28)	R-Y - BR-W	IG switch ON, Accelerator pedal released	0.5 to 1.2 V
		IG switch ON, Accelerator pedal depressed	3.2 to 4.8 V
VTA2 (E5-31) - E2 (E5-28)	Y-B - BR-W	IG switch ON, Accelerator pedal released	2.0 to 3.1 V
		IG switch ON, Accelerator pedal depressed	4.7 to 5.1 V
VPA (E9-22) - E2 (E5-28)	R - BR-W	IG switch ON, Accelerator pedal released	0.3 to 0.9 V
		IG switch ON, Accelerator pedal depressed	3.2 to 4.8 V
VPA2 (E9-23) - E2 (E5-28)	R-B - BR-W	IG switch ON, Accelerator pedal released	1.8 to 2.7 V
		IG switch ON, Accelerator pedal depressed	4.7 to 5.1 V
VCPA (E9-26) - EPA (E9-28)	L-R - BR-W	IG switch ON	4.5 to 5.5 V
VCP2 (E9-27) - EPA2 (E9-29)	W - W-R	IG switch ON	4.5 to 5.5 V
OX1A (E6-23) - E1 (E7-1)	B - BR	Maintain engine speed at 2,500 rpm for 2 minutes after warming up	Pulse generation (See page <a href="#">DI-215</a> )
OX1B (E6-29) - E1 (E7-1)	B - BR		
OX2A (E6-22) - E1 (E7-1)	W - BR	Maintain engine speed at 2,500 rpm for 2 minutes after warming up	Pulse generation (See page <a href="#">DI-215</a> )
OX2B (E6-21) - E1 (E7-1)	W - BR		
HT1A (E6-4) - E1 (E7-1)	R - BR	Idling	Below 3.0 V
HT1B (E6-5) - E1 (E7-1)	L - BR		
HT2A (E6-33) - E1 (E7-1)	Y - BR	IG switch ON	9 to 14 V
HT2B (E6-25) - E1 (E7-1)	R - B - BR		



## DIAGNOSTICS - ENGINE

#1 (E5-1) - E01 (E5-7)	Y - W-B	IG switch ON	9 to 14 V
#2 (E5-2) - E01 (E5-7)	B - W-B		
#3 (E5-3) - E01 (E5-7)	L - W-B		
#4 (E5-4) - E01 (E5-7)	R - W-B		
#5 (E5-5) - E01 (E5-7)	G - W-B		
#6 (E6-3) - E01 (E5-7)	R-L - W-B		
#7 (E7-6) - E01 (E5-7)	W - W-B		
#8 (E7-5) - E01 (E5-7)	B-W - W-B		
KNK1 (E6-1) - E1 (E7-1)	B - BR	Maintain engine speed at 4,000 rpm after warming up	Pulse generation (See page <a href="#">DI-186</a> )
KNK2 (E6-2) - E1 (E7-1)	W - BR		
G2+ (E7-27) - G2- (E7-32)	R - G	Idling	Pulse generation (See page <a href="#">DI-191</a> )
NE+ (E7-25) - NE- (E7-24)	L - G		
PRG (E5-34) - E1 (E7-1)	L-B - BR	IG switch ON	9 to 14 V
CCV (E5-27) - E1 (E7-1)	L-R - BR	IG switch ON	9 to 14 V
TBP (E9-4) - E1 (E7-1)	L - BR	IG switch ON, disconnect vacuum hose from VSV for pressure switching valve	9 to 14 V
PTNK (E9-21) - E2 (E5-28)	L-B - BR-W	Ignition switch ON	2.9 to 3.7 V
		Apply vacuum 4.0 kPa (30 mmHg, 1.18 in.Hg)	Below 0.5 V
SPD (E8-17) - E1 (E7-1)	V - BR	IG switch ON, Rotate driving wheel slowly	Pulse generation (See page <a href="#">DI-274</a> )
M+ (E7-3) - E1 (E7-1)	R - BR	Idling	Pulse generation (See page <a href="#">DI-302</a> )
M- (E7-2) - E1 (E7-1)	W - BR		
FPR (E5-33) - E1 (E7-1)	G-W - BR	IG switch ON	0 to 3.0 V
FC (E9-10) - E1 (E7-1)	B-W - BR	IG switch ON	9 to 14 V
IGT1 (E5-9) - E1 (E7-1)	B - BR	Idling	Pulse generation (See page <a href="#">DI-202</a> )
IGT2 (E5-8) - E1 (E7-1)	R - BR		
IGT3 (E5-25) - E1 (E7-1)	L - BR		
IGT4 (E5-11) - E1 (E7-1)	G - BR		
IGT5 (E5-12) - E1 (E7-1)	Y - BR		
IGT6 (E5-26) - E1 (E7-1)	B-Y - BR		
IGT7 (E5-13) - E1 (E7-1)	B-L - BR		
IGT8 (E5-10) - E1 (E7-1)	L-B - BR		
IGF1 (E5-24) - E1 (E7-1)	B-W - BR	IG switch ON	4.5 to 5.5 V
IGF2 (E5-23) - E1 (E7-1)	B-R - BR	Idling	Pulse generation (See page <a href="#">DI-202</a> )
STP (E8-19) - E1 (E7-1)	G-W - BR	Brake pedal is depressed	7.5 to 14 V
		Brake pedal is released	Below 1.5 V
ST1- (E8-12) - E1 (E7-1)	R-G - BR	Brake pedal is depressed	Below 1.5 V
		Brake pedal is released	7.5 to 14 V
STA (E5-17) - E1 (E7-1)	B-R - BR	Shift lever range P or N, Ignition switch START	6.0 V or more
STSW (E7-12) - E1 (E7-1)	B-W - BR	Shift lever range P or N, ignition switch START	6.0 V or more
ACCR (E5-15) - E1 (E7-1)	R-G - BR	Shift lever range P or N, ignition switch START	9 to 14 V
STAR (E6-9) - E1 (E7-1)	B-W - BR	Shift lever range P or N, ignition switch START	9 to 14 V
NSW (E5-16) - E1 (E7-1)	B-W - BR	IG switch ON, Other shift position in P, N	9 to 14 V
		IG switch ON, Shift position in P, N	0 to 3.0 V
W (E9-11) - E1 (E7-1)	W - BR	Idling	9 to 14 V
		IG switch ON	Below 3.0 V
SIL (E9-18) - E1 (E7-1)	V-W - BR	During transmission	Pulse generation
TACH (E9-5) - E1 (E7-1)	B - BR	Idling	Pulse generation

# CIRCUIT INSPECTION

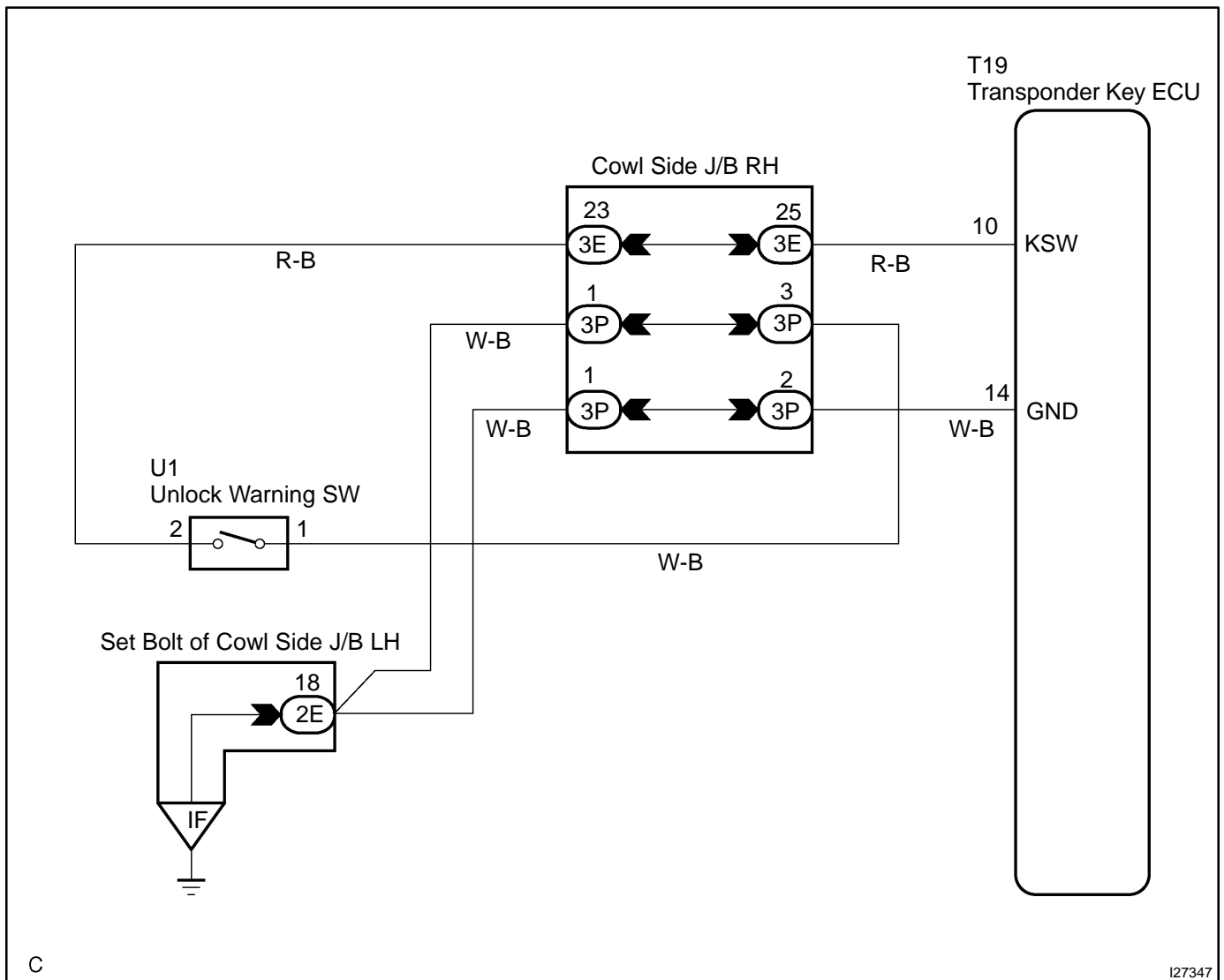
<b>DTC</b>	<b>B2780</b>	<b>Key Unlock Warning Switch Malfunction</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

This DTC is detected when the Transponder key ECU does not detect the key unlock warning switch ON even with the ignition switch ON. (In normal condition, the key unlock warning switch should be ON when the ignition switch is ON.)

DTC No.	DTC Detecting Condition	Trouble Area
B2780	The key unlock warning switch On is not detected when the ignition switch is ON.	<ul style="list-style-type: none"> <li>▶ Key unlock warning switch</li> <li>▶ Wire harness</li> </ul>

## WIRING DIAGRAM



C

I27347

## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

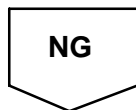
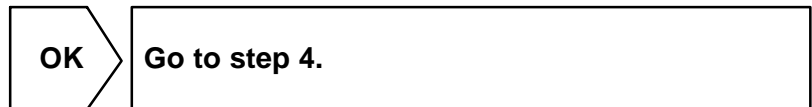
<b>1</b>	<b>Check key unlock warning switch using hand-held tester.</b>
----------	--

### PREPARATION:

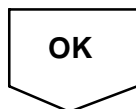
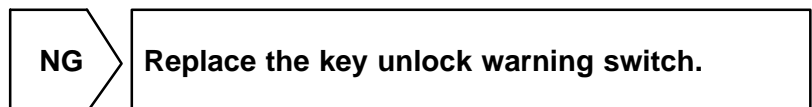
Connect the hand-held tester to the DLC3.

### CHECK:

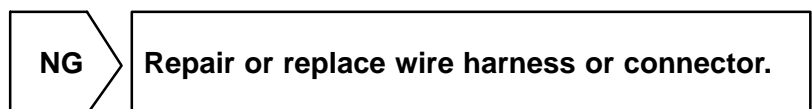
Check the key unlock warning switch using DATA LIST.



<b>2</b>	<b>Check key unlock warning switch (See page <a href="#">BE-29</a> ).</b>
----------	---



<b>3</b>	<b>Check wire harness and connector between key unlock warning switch and transponder key ECU (See page <a href="#">IN-36</a> ).</b>
----------	--



<b>Replace transponder key ECU.</b>
-------------------------------------

<b>4</b>	<b>Check whether or not DTC is detected when DTC is cleared, key is inserted into ignition key cylinder and IG SW is turned ON. (See page <a href="#">DI-1004</a> ).</b>
----------	--

**RESULT:**

OK	B2780 is not output.
NG	B2780 is output.

<b>NG</b>	<b>Replace Transponder Key ECU).</b>
-----------	--------------------------------------



**No problem at this time.  
It is suspected that DTC was detected for  
some reason in the past.**

<b>DTC</b>	<b>B2784</b>	<b>TRANSPONDER KEY COIL MALFUNCTION</b>
------------	--------------	---

## CIRCUIT DESCRIPTION

This DTC is output when short or open of the key coil built in the transponder key amplifier is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B2784	Transponder key coil malfunction	Transponder key amplifier with coil

## INSPECTION PROCEDURE

Replace key.

# CUSTOMER PROBLEM ANALYSIS CHECK

## ENGINE IMMOBILISER Check Sheet

 Inspector's  
Name : \_\_\_\_\_

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (    times a day)

Symptoms	<input type="checkbox"/> Immobiliser is not set. <input type="checkbox"/> (Engine starts with key codes other than the registered key code.)
	<input type="checkbox"/> Engine does not start.

Check Item	Malfunction Indicator Lamp	<input type="checkbox"/> Normal <input type="checkbox"/> Remains ON <input type="checkbox"/> Does not Light Up
------------	----------------------------	--

DTC Check	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code    )
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code    )

## DIAGNOSTIC TROUBLE CODE CHART

DTC No. (SEE PAGE)	Circuit Inspection	Trouble Area
B2780 (DI-1014)	Key unlock warning switch malfunction	▶Key unlock warning switch ▶Wire harness
B2784 (DI-1017)	Transponder key coil malfunction	Transponder key amplifier with coil
B2793 (DI-1018)	Transponder chip malfunction	Key
B2794 (DI-1019)	Unmatched encryption code	▶Key ▶Transponder key amplifier
B2795 (DI-1020)	Unmatched key code	▶Key ▶Unregistered key inserted before
B2796 (DI-1021)	No communication in immobiliser system	▶Key ▶Transponder key amplifier with coil ▶Wire harness ▶Transponder key ECU
B2797 (DI-1023)	Communication malfunction No.1	▶Key ▶Wire harness ▶Transponder key amplifier with coil ▶Transponder key ECU
B2798 (DI-1026)	Communication malfunction No.2	▶Key ▶Transponder key amplifier with coil ▶Wire harness ▶Transponder key ECU
B2799/99 (DI-1026)	Engine immobiliser system malfunction	▶Wire harness ▶Transponder key ECU ▶ECM

### HINT:

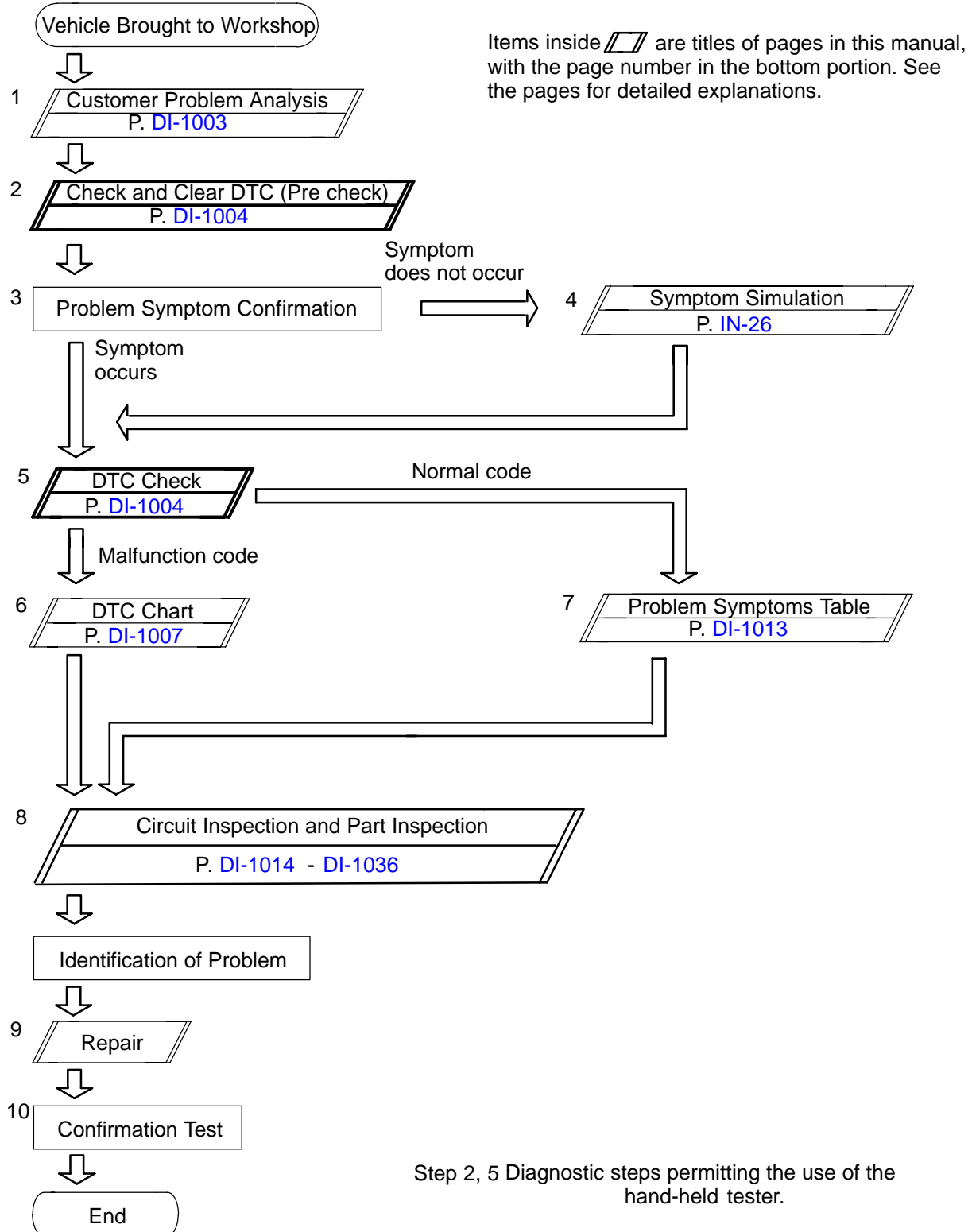
To reduce the unnecessary exchange of Transponder key ECU, check that a trouble occurs with the original Transponder key ECU at the time of exchanging Transponder key ECU and the trouble will disappear with a new Transponder key ECU.

# ENGINE IMMOBILISER SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

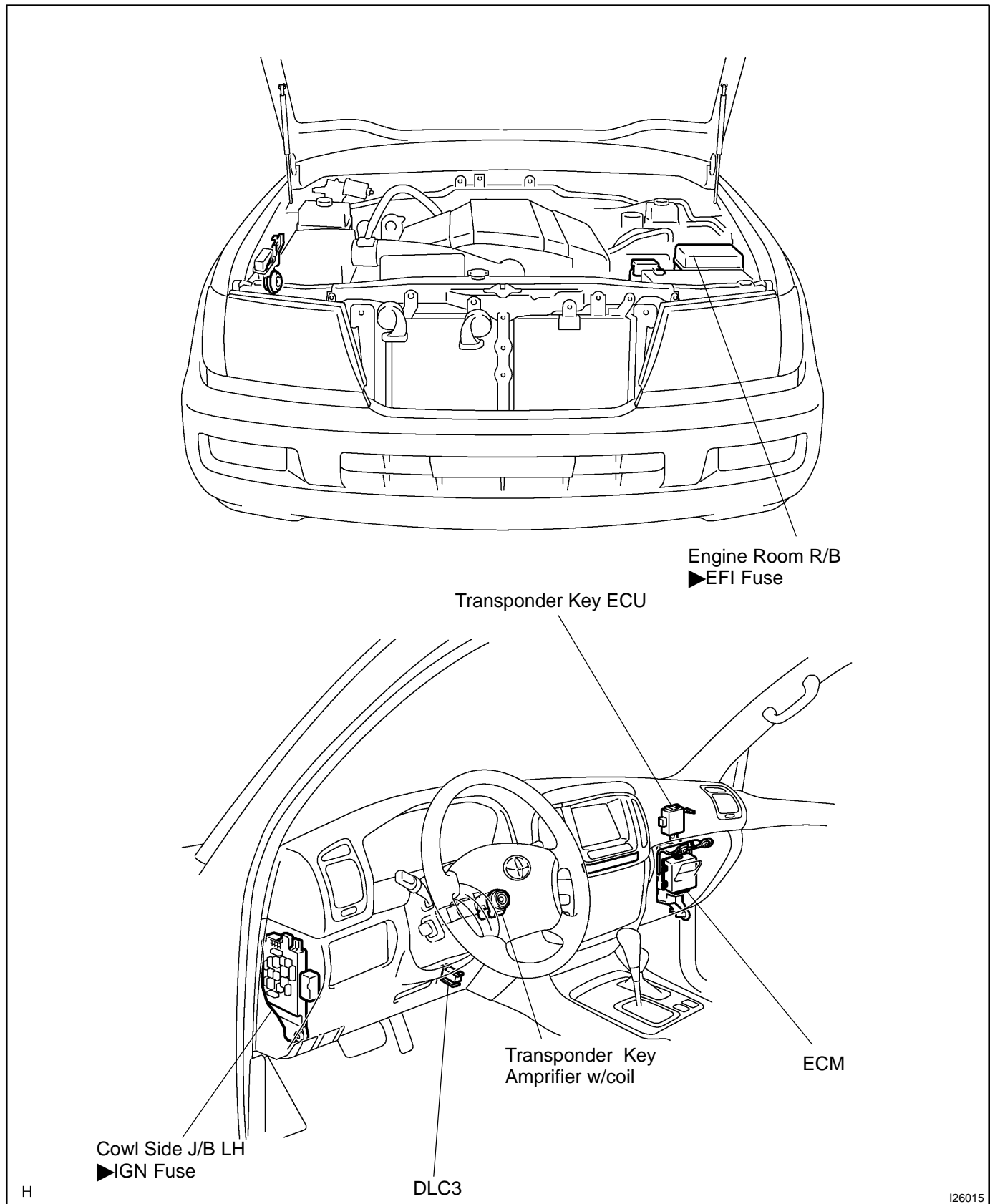
DI1AJ-40

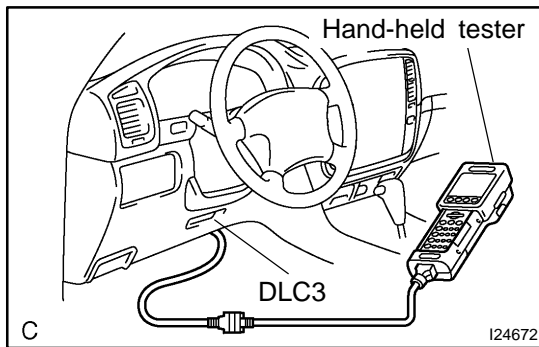
Troubleshoot in accordance with the procedure on the following pages.





# PARTS LOCATION



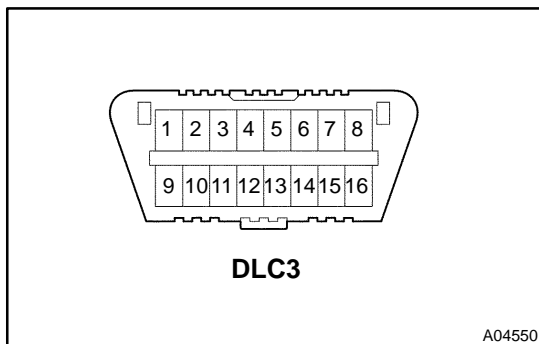


## PRE-CHECK

### 1. DIAGNOSIS SYSTEM

#### (a) Description

ECM controls the function of immobiliser on this vehicle. Data of the immobiliser or DTC can be read from DLC3 of the vehicle. When a trouble occurs on immobiliser, MIL does not light up but DTC inspection is performed. Therefore when there seems to be a trouble on immobiliser, use hand-held tester or SST to check and trouble-shoot it.



#### (b) Inspect the DLC3.

The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAEJ1962 and matches the ISO 9141-2 format.

Tester connection	condition	Specified condition
7 (Bus ℓ Line) - 5 (Signal ground)	During communication	Pulse generation
4 (Chassis Ground) - Body	Always	1 Ω or less
5 (Signal Ground) - Body	Always	1 Ω or less
16 (B+) - Body	Always	9 - 14 V

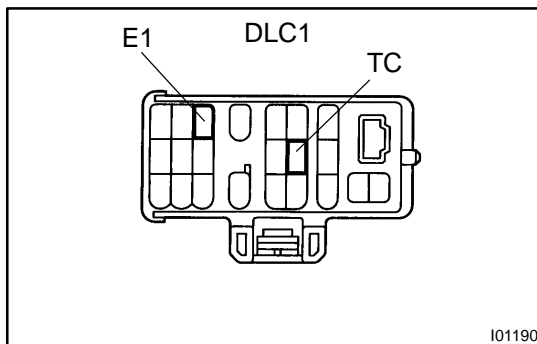
#### HINT:

If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of hand-held tester to DLC3, turned the ignition switch ON and operated the hand-held tester, there is a problem on the vehicle side or tool side.

- ▶ If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- ▶ If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

**2. INSPECT DIAGNOSIS**

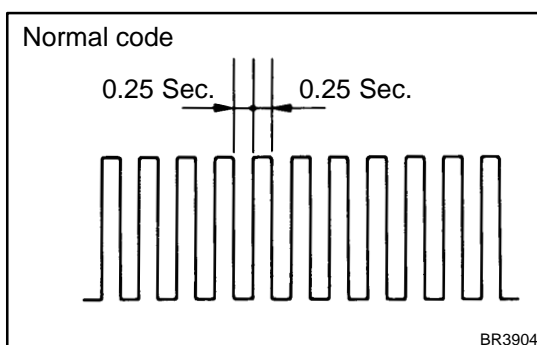
- (a) Check the DTC (Using hand-held tester).
- (1) Prepare hand-held tester.
  - (2) Connect hand-held tester to DLC3 under the instrument panel lower pad.
  - (3) Turn the ignition switch ON and turn hand-held tester switch ON.
  - (4) Use hand-held tester to check the DTCs. and "Snap-shot function" which records the monitor data (For operating instructions, see the hand-held tester instruction book.).
  - (5) See page [DI-1007](#) to confirm the details of the DTCs.



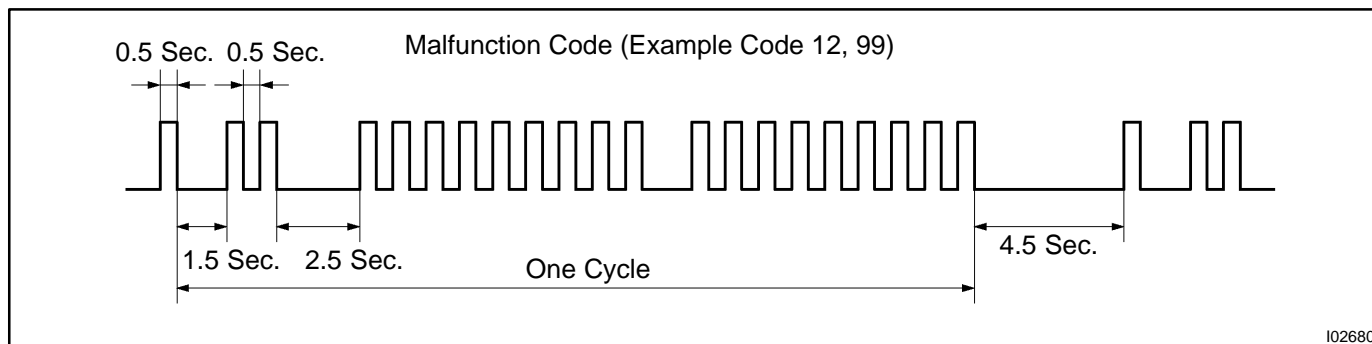
- (b) Check the DTC (Using diagnosis check wire).
- (1) Turn ignition switch ON.
  - (2) Using SST, connect between terminals 11 (TC) and 3 (E1) of DLC1.
- SST 09843-18020
- (3) Read the diagnostic trouble code from malfunction indicator lamp.

**HINT:**

- ▶ If a diagnostic trouble code is not output, check the TC terminal circuit.
- ▶ ECM controls the immobiliser function on this vehicle, DTC is out put with engine data.



- ▶ As an example, the blinking patterns for codes; normal, 12 and 99 are shown in the charts.



- (4) When DTC "99" is output, there is a trouble of immobiliser. Start troubleshooting referring to PROBLEM SYMPTOMS TABLE.
- (5) After completing the check, disconnect terminals 11 (TC) and 3 (E1) and turn off the display.

**HINT:**

In the event of 2 or more malfunction codes, indication will begin from the smaller numbered code and continue in order to the larger.

- (c) Clear the DTC.  
The following operations will erase the DTCs and freeze frame data.
  - (1) Operating the hand-held tester to erase the codes (See the hand-held tester instruction book for operating instructions.).
  - (2) Disconnecting the battery terminals or EFI fuse.

**3. CHECK HAND-HELD TESTER****(a) ECU DATA MONITOR**

- (1) Make a judgement of good or bad and find out a malfunctioning part by the data monitor.

**Standard:****TRANSPONDER KEY ECU**

Item	Condition	Specified Condition
IMMOBILISER	Ignition switch ON → When key is not inserted in the ignition switch cylinder	UNSET/SET
MASTER KEY	Ignition switch ON with master key → Pull out key from ignition switch cylinder	CORRESP/WRONG
SUB KEY	Ignition switch ON with sub-key → Pull out key from ignition switch cylinder	CORRESP/WRONG
REGIST MAS CODE	-	0 - 3
REGIST SUB CODE	-	0 - 1
KEY SW	Ignition switch ON → Without key	ON/OFF
IG SW	Ignition switch ON → OFF	ON/OFF

**(b) ACTIVE TEST**

- (1) Make a judgement of good or bad and find out a malfunctioning part by the active test.

**Standard:****TRANSPONDER KEY ECU**

Item	Operation
SECURITY INDIC	ON / OFF

## PROBLEM SYMPTOMS TABLE

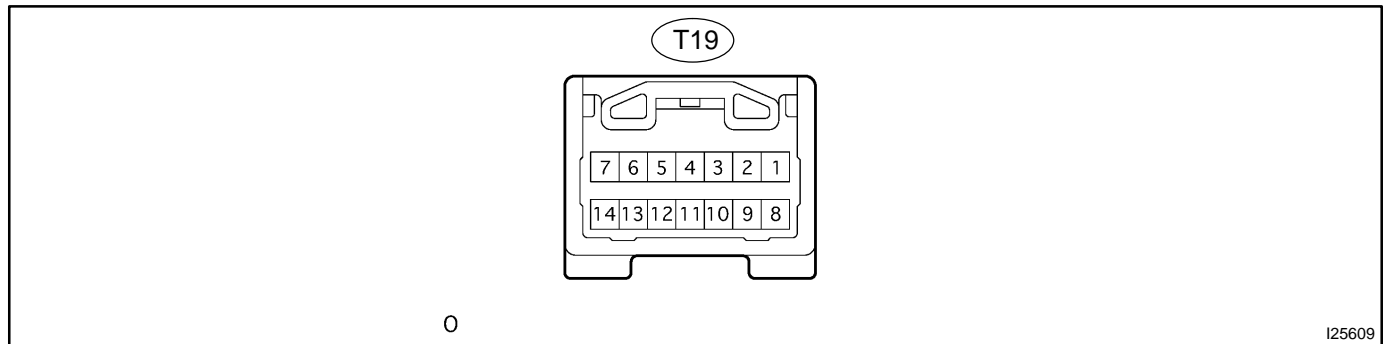
Symptom	Suspect Area	See page
Immobiliser is not set. (Engine starts with key codes other than the registered key code.)	1. Transponder key ECU	<a href="#">IN-36</a>
Engine does not start.	1. Key 2. Wire harness 3. Transponder key coil 4. Amplifier 5. Transponder key ECU 6. ECM	*1 <a href="#">IN-36</a> <a href="#">BE-196</a> <a href="#">IN-36</a>
Security indicator is always ON.	1. Multi-display (security indicator) 2. Wire harness 3. Transponder key ECU	*2 <a href="#">IN-36</a> <a href="#">IN-36</a>
Security indicator is always ON. (Although code has been registered in the automatic registration mode, indicator is not OFF.)	1. Wire harness 2. Transponder key amplifier with coil 3. Transponder key ECU	<a href="#">IN-36</a> <a href="#">BE-196</a> <a href="#">IN-36</a>
Security indicator is OFF. (When DTC of immobiliser is output)	1. Wire harness 2. Transponder key amplifier with coil 3. Transponder key ECU	<a href="#">IN-36</a> <a href="#">BE-196</a> <a href="#">IN-36</a>
Security indicator is OFF. (When DTC of immobiliser is not output)	1. Multi-display (security indicator) 2. Diagnosis circuit 3. Wire harness 4. Transponder key ECU	<a href="#">IN-36</a> <a href="#">IN-36</a>
Security indicator is abnormally blinking.	1. Wire harness 2. Transponder key ECU	<a href="#">IN-36</a> <a href="#">IN-36</a>
No code is output.	1. Power source circuit 2. Transponder key ECU	<a href="#">DI-1031</a> <a href="#">IN-36</a>

\*1 : Check that the key which did not start the engine has been registered and that it is possible to start with other already registered key.

\*2 : Finish the automatic registration mode because the mode might still remain.

# TERMINALS OF ECM

## 1. TRANSPONDER KEY ECU



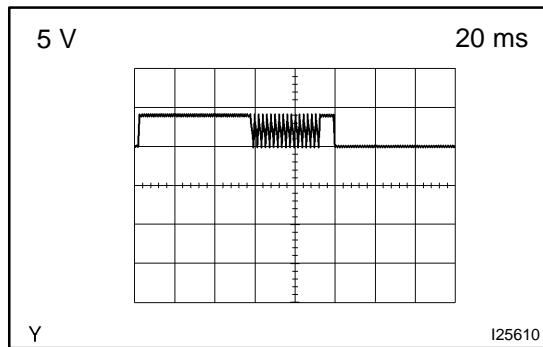
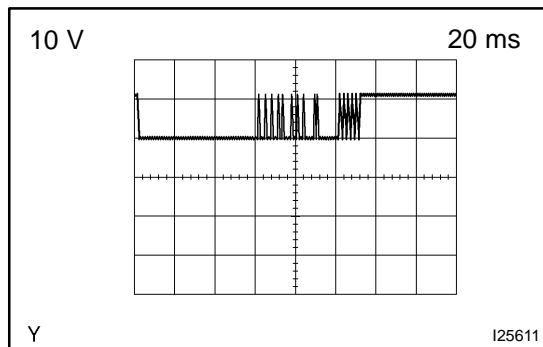
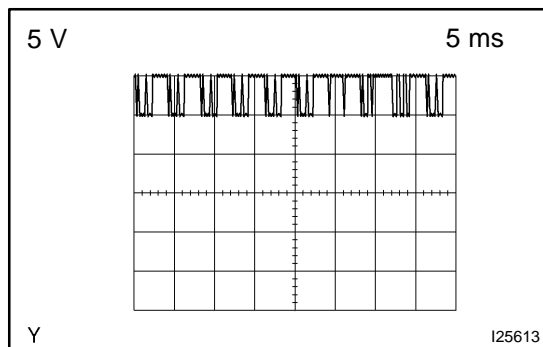
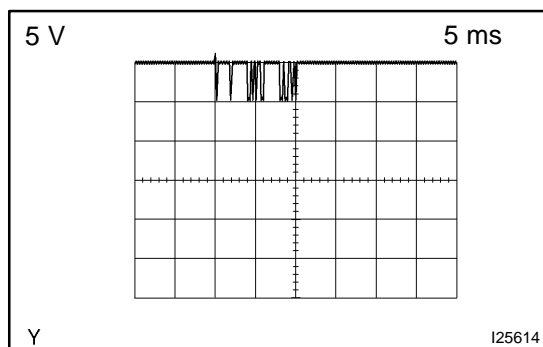
I25609

(a) Disconnect the transponder key ECU connector.

### Standard:

Symbols (Terminal No.)	Wiring Color	Condition	Specified condition
T19-14 (Body ground) (GND (Body ground))	W-B ↔ Body ground	Constant	Continuity
T19-1 (VB) (+B (GND))	L-W ↔ W-B	Constant	10 - 14 V
T19-2 (IG) (IG (GND))	B-R ↔ W-B	Ignition switch OFF → ON	0 V → 10 - 14 V
T19-10 (KSW) (KSW (GND))	R-B ↔ W-B	No key in the ignition key cylinder → With key	No Continuity → Continuity
T19-4 (CTY) (CTY (GND))	R-Y ↔ W-B	Driver's door close → open	No Continuity → Continuity
T19-10 (KSW) (KSW (GND))	R-B ↔ W-B	No key in the ignition key cylinder → With key	10 - 14 V → 0 V
T19-8 (VC5) (VC5 (GND))	Y ↔ W-B	Ignition switch OFF → ON	0 V → 5 V
T19-12 (TXCT) (TXCT (GND))	V-G ↔ W-B	Ignition switch OFF → ON	Waveform 1
T19-11 (CODE) (CODE (GND))	L-B ↔ W-B	Ignition switch OFF → ON	Waveform 2
T19-6 (EFIO) (EFIO (GND))	W ↔ W-B	Ignition switch OFF → ON	Waveform 3
T19-7 (EFII) (EFII (GND))	Y ↔ W-B	Ignition switch OFF → ON	Waveform 4
T19-3 (IND) (IND (GND))	G-R ↔ W-B	Immobiliser system unset → set	0 V → 10 - 14 V ↔ 0 V
T19-4 (CTY) (CTY (GND))	R-Y ↔ W-B	Driver's door close → open	10 - 14 V → 0 V

(b) Inspection using oscilloscope.

**Referece:****Referece:****Referece:****Referece:**

(c) Waveform 1

Item	Condition
Terminal	TXCT - GND
Tool setting	5 V/DIV, 20 ms/DIV
Vehicle condition	Ignition switch ON

(d) Waveform 2

Item	Condition
Terminal	CODE - GND
Tool setting	10 V/DIV, 20 ms/DIV
Vehicle condition	Ignition switch ON

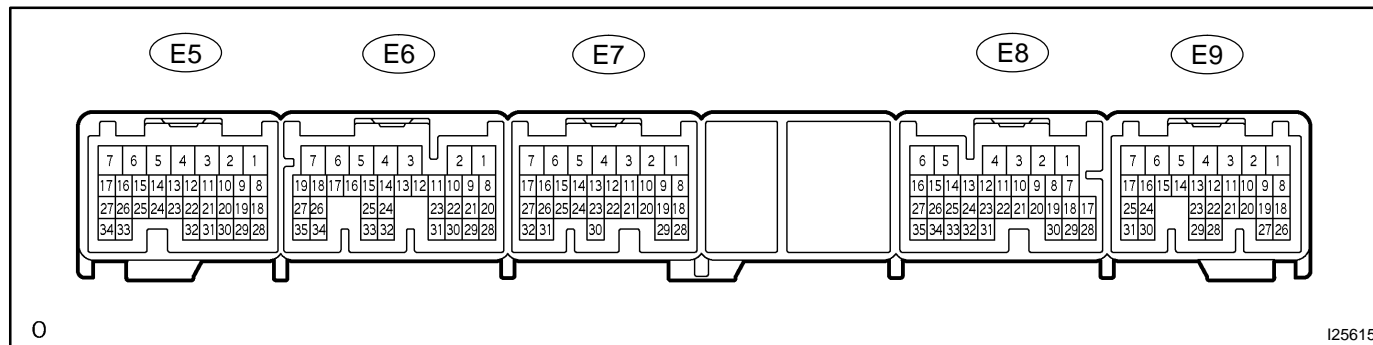
(e) Waveform 3

Item	Condition
Terminal	EFIO - GND
Tool setting	5 V/DIV, 5 ms/DIV
Vehicle condition	Ignition switch ON

(f) Waveform 4

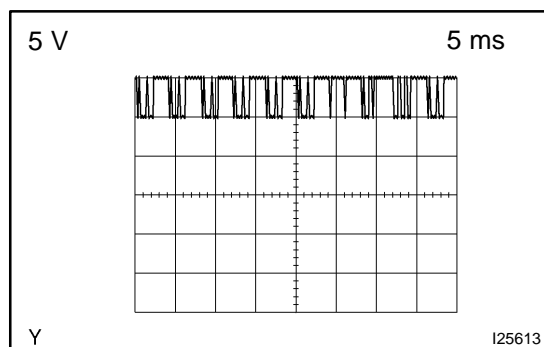
Item	Condition
Terminal	EFII - GND
Tool setting	5 V/DIV, 5 ms/DIV
Vehicle condition	Constant

## 2. ECM



Symbols (Terminal No.)	Wiring Color	Condition	Specified condition
E9-3 ↔ E7-1 (BATT ↔ E1)	B-R ↔ BR	Constant	9 - 14 V
E9-1 ↔ E7-1 (+B ↔ E1)	B-Y ↔ BR	Ignition switch OFF → ON	9 - 14 V
E9-2 ↔ E7-1 (+B2 ↔ E1)	B-Y ↔ BR	Ignition switch OFF → ON	9 - 14 V
E9-9 ↔ E7-1 (IGSW ↔ E1)	B-R ↔ BR	Ignition switch OFF → ON	9 - 14 V
E8-27 ↔ E7-1 (IMI ↔ E1)	W ↔ BR	No key in the ignition key cylinder → With key	Waveform 1
E8-26 ↔ E7-1 (IMO ↔ E1)	Y ↔ BR	No key in the ignition key cylinder → With key	Waveform 2
E7-1 ↔ Body ground (E1 ↔ Body ground)	BR ↔ Body ground	Constant	Continuity

(a) Inspection using oscilloscope.

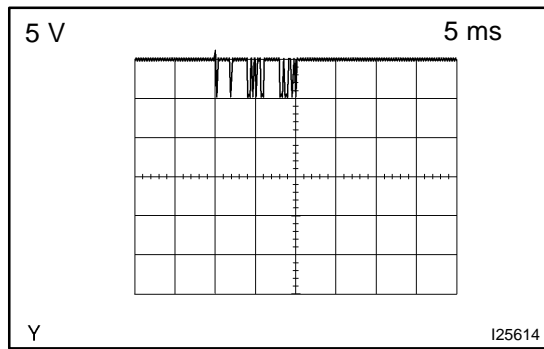
**Referece:**

(b) Waveform 1

Item	Condition
Terminal	IMI - GND
Tool setting	5 V/DIV, 5 ms/DIV
Vehicle condition	Ignition switch ON



## Referece:



## (c) Waveform 2

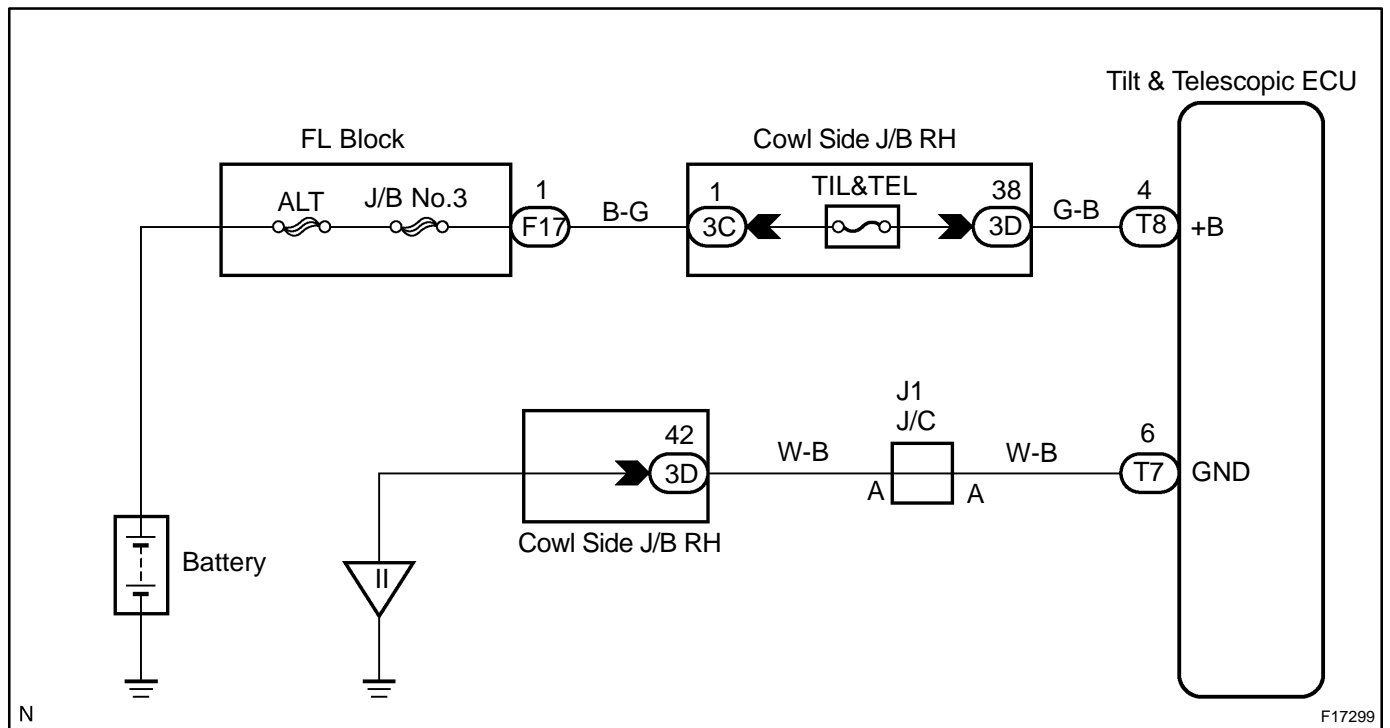
Item	Condition
Terminal	IMO - GND
Tool setting	5 V/DIV, 5 ms/DIV
Vehicle condition	Constant

# Actuator Power Source Circuit

## CIRCUIT DESCRIPTION

This is the power source for the motors.

## WIRING DIAGRAM

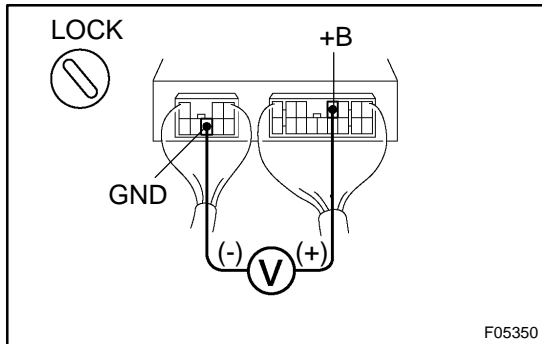


N

F17299

## INSPECTION PROCEDURE

**1 Check voltage between terminals +B and GND of ECU connector.**



**PREPARATION:**

Remove ECU with connectors still connected.

**CHECK:**

Measure voltage between terminals +B and GND of ECU connector.

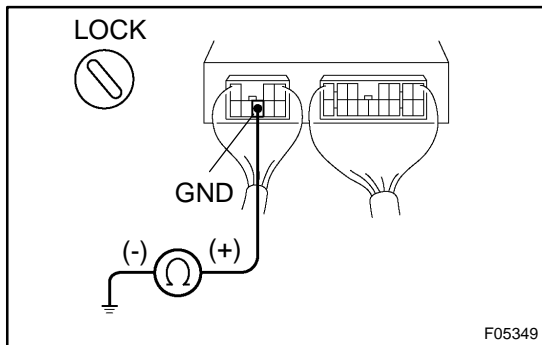
**OK:**

**Voltage: 8 - 16 V**

**OK** Proceed to next circuit inspection shown on the problem symptoms table (See page [DI-663](#) ).

**NG**

**2 Check continuity between terminal GND of ECU connector and body ground.**



**CHECK:**

Measure resistance between terminal GND of ECU connector and body ground.

**OK:**

**Resistance: 1 kΩ or less**

**NG** Repair or replace harness or connector.

**OK**

<b>3</b>	<b>Check POWER fuse.</b>
----------	--------------------------

**PREPARATION:**

Remove POWER fuse from passenger side J/B.

**CHECK:**

Check continuity of POWER fuse.

**OK:**

Continuity

**NG**

**Check for short circuit in harness and all components connected to POWER fuse.**

**OK**

**Check for open circuit in harness and connector between ECU and battery  
(See page [IN-36](#) ).**

# CIRCUIT INSPECTION

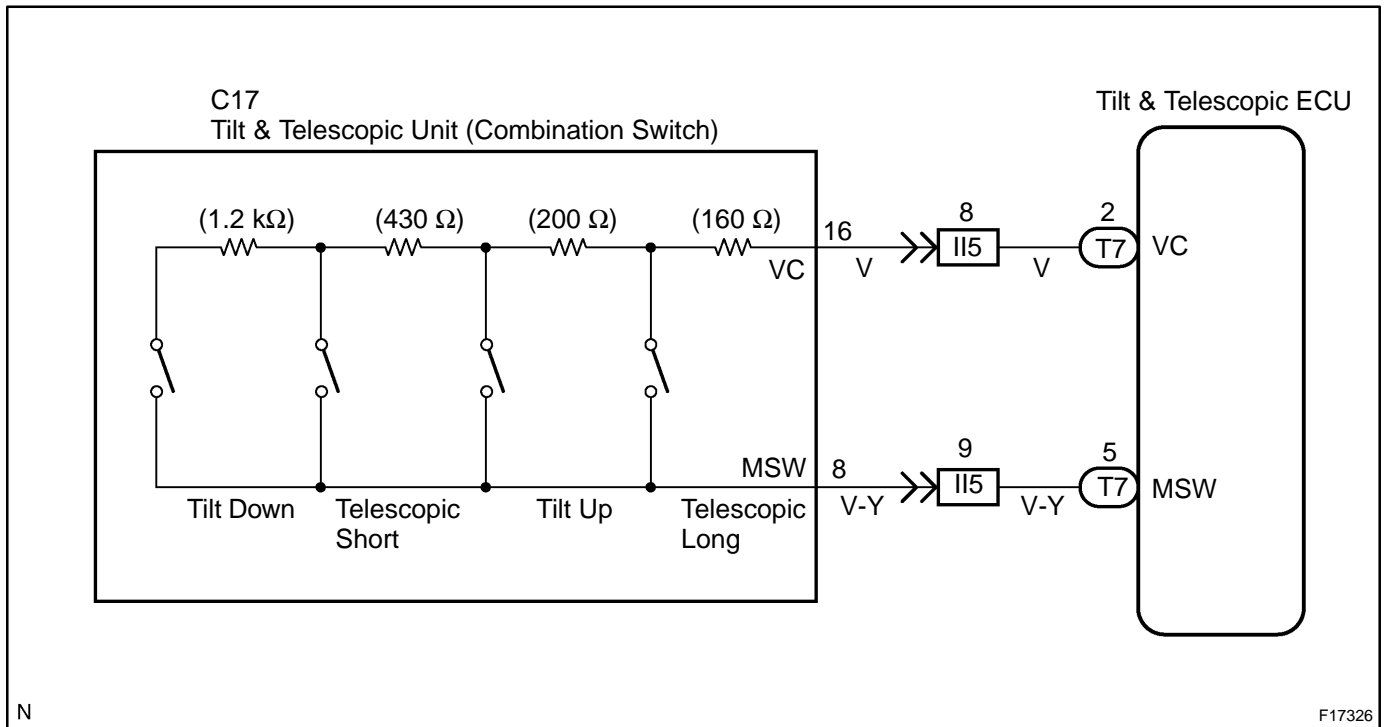
<b>DTC</b>	<b>B2603</b>	<b>Tilt and Telescopic Manual switch circuit Malfunction</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

The different voltage value is input to tilt and telescopic ECU by operating the manual switch. Then tilt and telescopic ECU judges which motor and which direction tilt motor or telescopic motor should be moved based on the voltage value.

DTC No.	DTC Detecting Condition	Trouble Area
B2603	The abnormal voltage value which is not within the specification is input to tilt and telescopic ECU when being operated with the manual switch.	<ul style="list-style-type: none"> <li>▶Tilt and telescopic manual switch circuit</li> <li>▶Tilt and telescopic ECU</li> </ul>

## WIRING DIAGRAM



N

F17326

### INSPECTION PROCEDURE

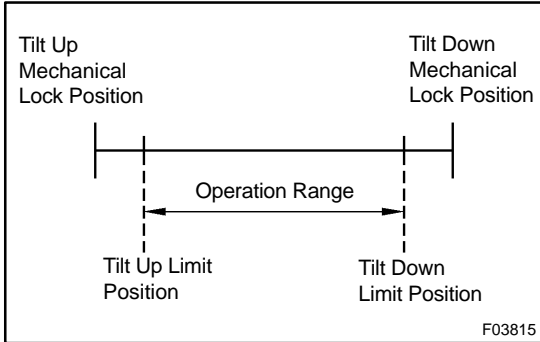
1	Check tilt and telescopic manual switch circuit (See page <a href="#">DI-687</a> ).
---	---

NG	Repair or replace malfunction part.
----	-------------------------------------

OK
----

Check and replace the tilt and telescopic ECU (See page <a href="#">IN-36</a> ).
--

<b>DTC</b>	<b>B2610</b>	<b>Tilt Position Sensor or Tilt Motor Circuit Malfunction</b>
------------	--------------	---



**CIRCUIT DESCRIPTION**

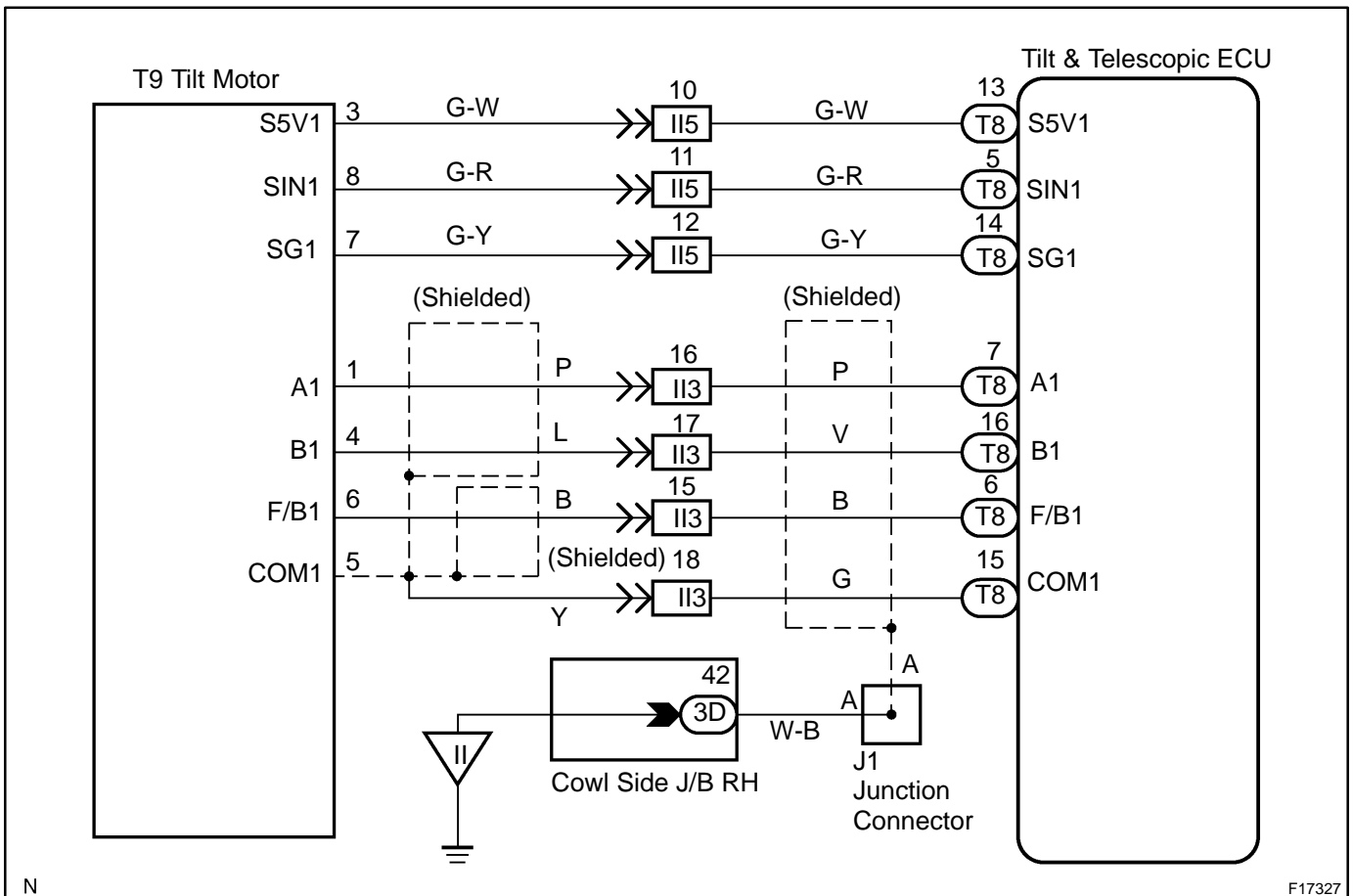
Tilt motor is operated by the power voltage supplied from tilt and telescopic ECU and makes the steering column tilt upward and downward. Tilt position sensor (Hole IC) in the tilt motor detects the tilt of the steering column and outputs the signal to the CPU in response to that tilt.

**HINT:**

Limit positions can be confirmed on the screen of the TOYOTA hand-held tester.

DTC No.	DTC Detecting Condition	Trouble Area
B2610	During tilt function operation, tilt operation stops within the operation range.	<ul style="list-style-type: none"> <li>▶ Sensor power source circuit</li> <li>▶ Actuator power source circuit</li> <li>▶ Tilt motor circuit</li> <li>▶ Tilt and telescopic ECU</li> </ul>

**WIRING DIAGRAM**



**INSPECTION PROCEDURE**

**1** Check sensor power source circuit (See page [DI-679](#) ).

**NG**

Repair or replace malfunction part.

**OK**

**2** Check actuator power source circuit (See page [DI-676](#) ).

**NG**

Repair or replace malfunction part.

**OK**

**3** Check tilt motor circuit (See page [DI-681](#) ).

**NG**

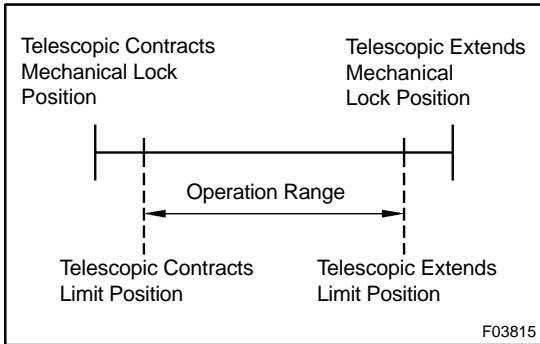
Repair or replace malfunction part.

**OK**

Check and replace the tilt and telescopic ECU (See page [IN-36](#) ).



<b>DTC</b>	<b>B2611</b>	<b>Telescopic Position Sensor or Telescopic Motor Circuit Malfunction</b>
------------	--------------	---



**CIRCUIT DESCRIPTION**

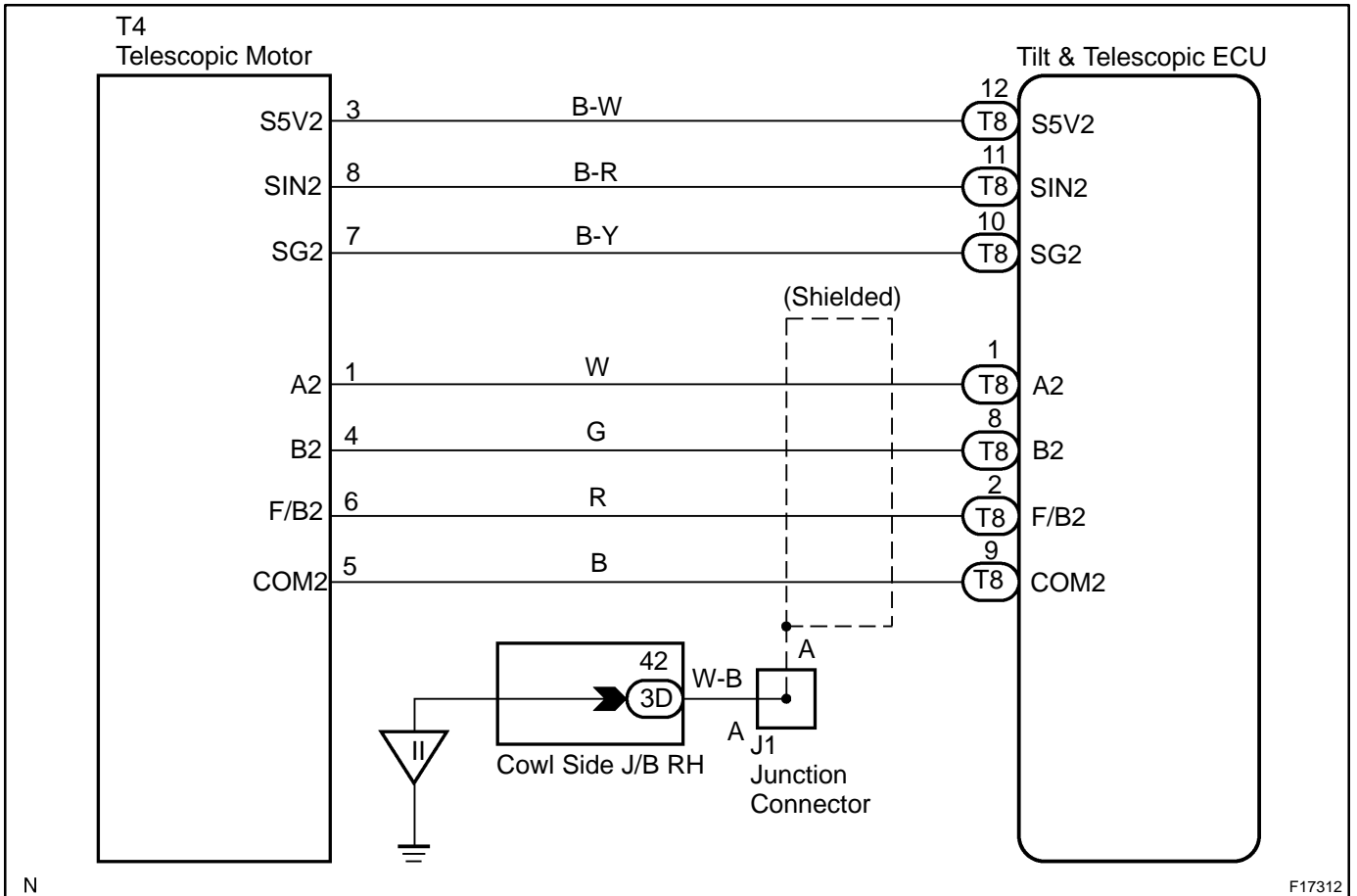
Telescopic motor is operated by the power voltage supplied from tilt and telescopic ECU and makes the steering column slide forward and rearward. Telescopic position sensor (Hole IC) in the telescopic motor detects the sliding position of the forward and rearward direction of the steering column and outputs the signal to the CPU in response to that sliding amount.

**HINT:**

Limit positions can be confirmed on the screen of the TOYOTA hand-held tester.

DTC No.	DTC Detecting Condition	Trouble Area
B2611	During telescopic function operation, telescopic operation stops within the operation range.	<ul style="list-style-type: none"> <li>▶ Sensor power source circuit</li> <li>▶ Actuator power source circuit</li> <li>▶ Telescopic motor circuit</li> <li>▶ Tilt and telescopic ECU</li> </ul>

**WIRING DIAGRAM**



**INSPECTION PROCEDURE**

**1** Check sensor power source circuit (See page [DI-679](#)).

**NG**

Repair or replace malfunction part.

**OK**

**2** Check actuator power source circuit (See page [DI-676](#)).

**NG**

Repair or replace malfunction part.

**OK**

**3** Check telescopic motor circuit (See page [DI-684](#)).

**NG**

Repair or replace malfunction part.

**OK**

Check and replace the tilt and telescopic ECU (See page [IN-36](#)).

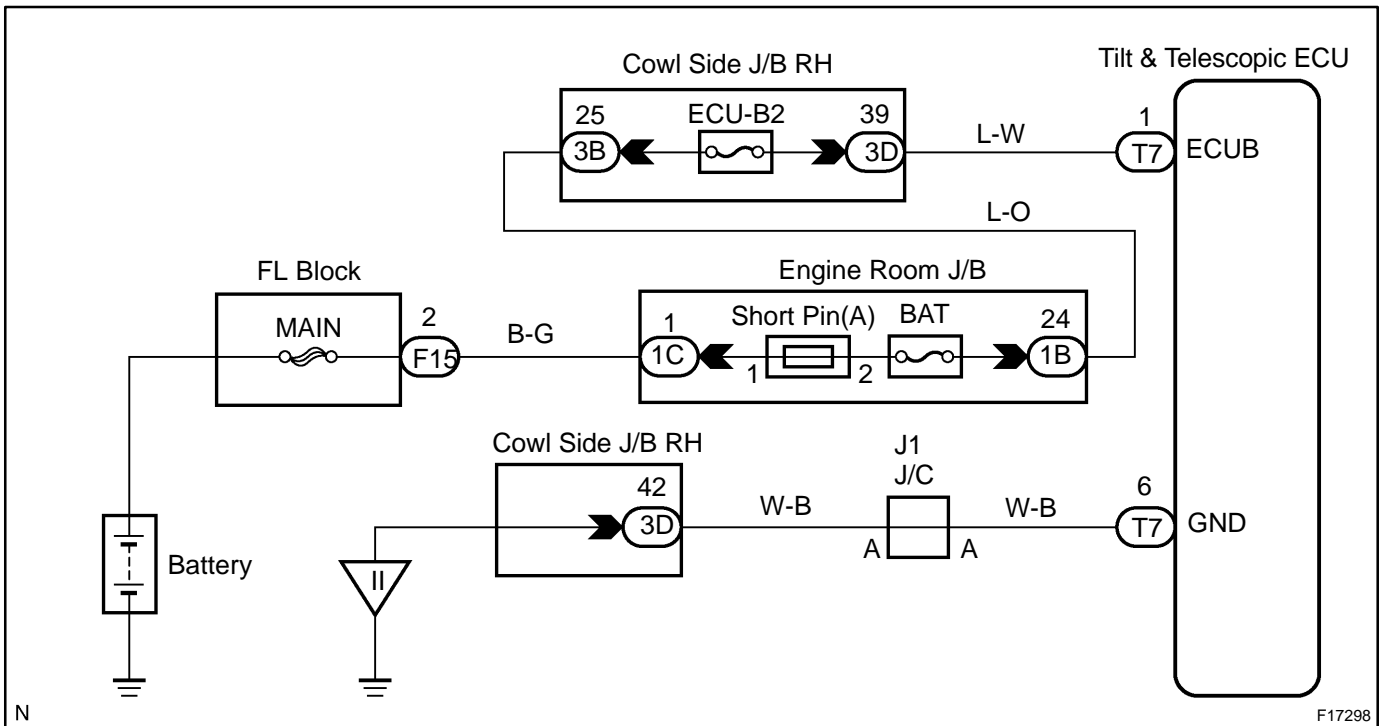
<b>DTC</b>	<b>B2620</b>	<b>ECU Power Source Circuit Malfunction</b>
------------	--------------	---

**CIRCUIT DESCRIPTION**

ECU power source circuit supply the battery positive voltage to tilt and telescopic ECU.

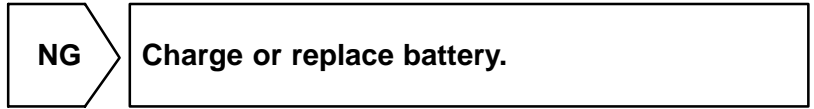
DTC No.	DTC Detecting Condition	Trouble Area
B2620	The condition that the voltage of the ECU Power Source circuit drop to be 8V or less continues for 10 seconds or more	<ul style="list-style-type: none"> <li>▶Battery</li> <li>▶ECU power source circuit</li> <li>▶Tilt and telescopic ECU</li> </ul>

**WIRING DIAGRAM**

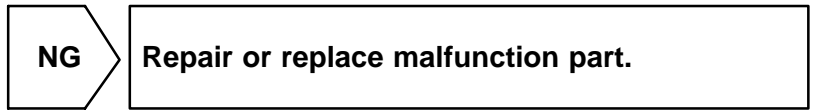


**INSPECTION PROCEDURE**

<b>1</b>	<b>Check that the battery positive voltage is 11V or more when engine is stopped.</b>
----------	---



<b>2</b>	<b>Check ECU power source circuit (See page <a href="#">DI-673</a> ).</b>
----------	---



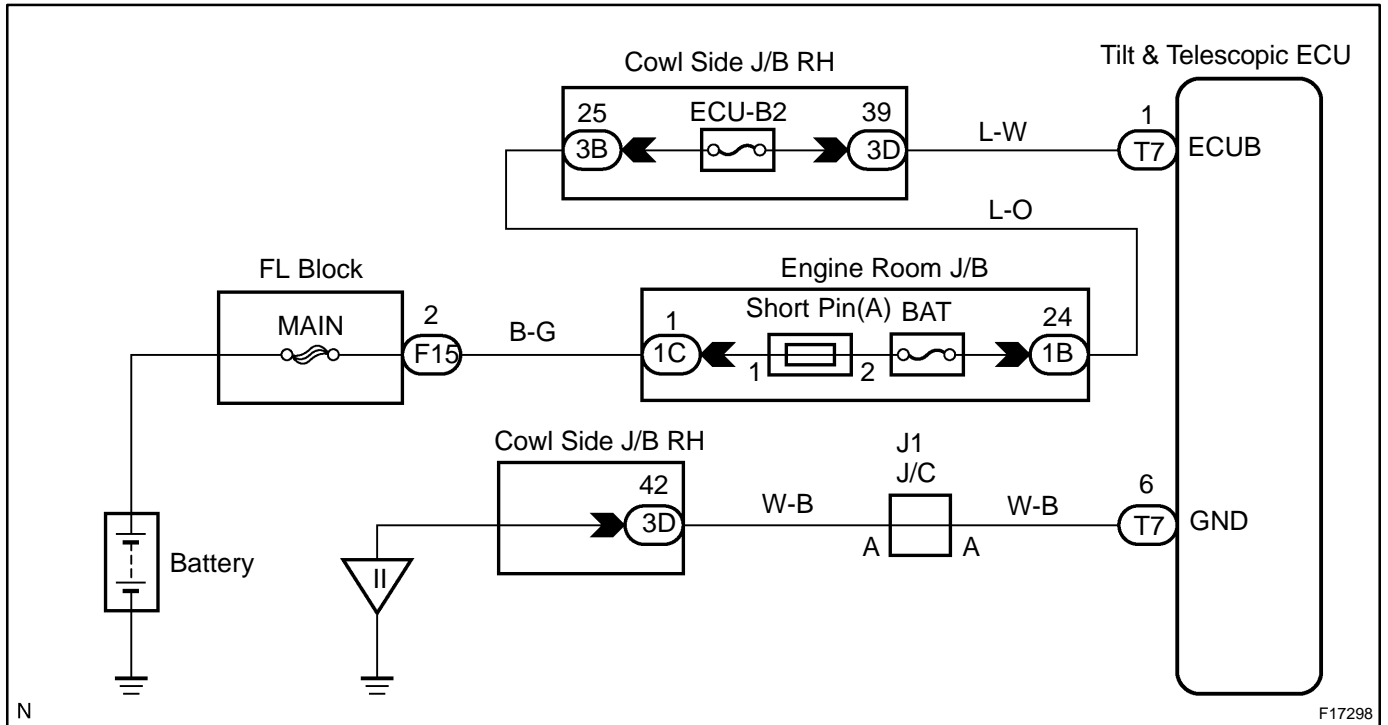
**Check and replace the tilt and telescopic ECU (See page [IN-36](#) ).**

## ECU Power Source Circuit

### CIRCUIT DESCRIPTION

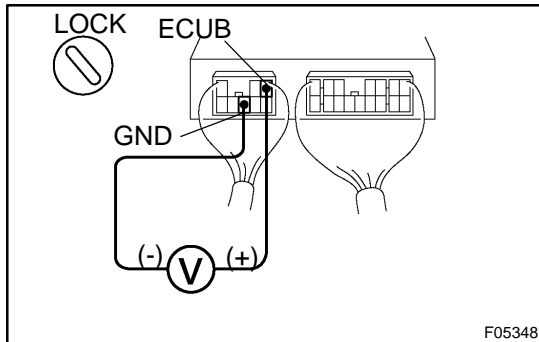
The ECU power source supplies power to the CPU and sensors, etc. power is supplied to the ECU even when the ignition switch is lock position.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

**1 Check voltage between terminals ECUB and GND of ECU connector.**

**PREPARATION:**

Remove ECU with connectors still connected.

**CHECK:**

Measure voltage between terminals ECUB and GND of ECU connector.

**OK:**

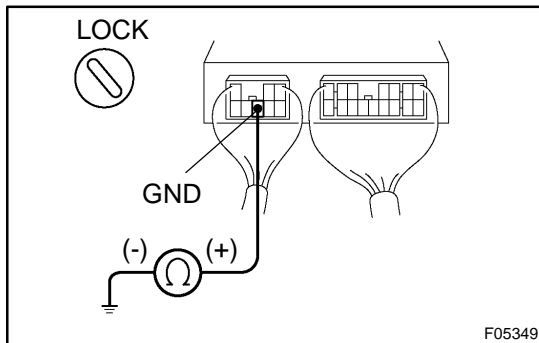
**Voltage: 8 - 16 V**

**OK**

Proceed to next circuit inspection shown on the problem symptoms table (See page [DI-663](#) ).

**NG**

**2 Check continuity between terminal GND of ECU connector and body ground.**

**CHECK:**

Measure resistance between terminal GND of ECU connector and body ground.

**OK:**

**Resistance: 1 k $\Omega$  or less**

**NG**

Repair or replace harness or connector.

**OK**

<b>3</b>	<b>Check ECU-B fuse.</b>
----------	--------------------------

**PREPARATION:**

Remove ECU-B fuse from engine room R/B.

**CHECK:**

Check continuity of ECU-B fuse.

**OK:**

Continuity



**Check for short in harness and all components connected to ECU-B fuse.**



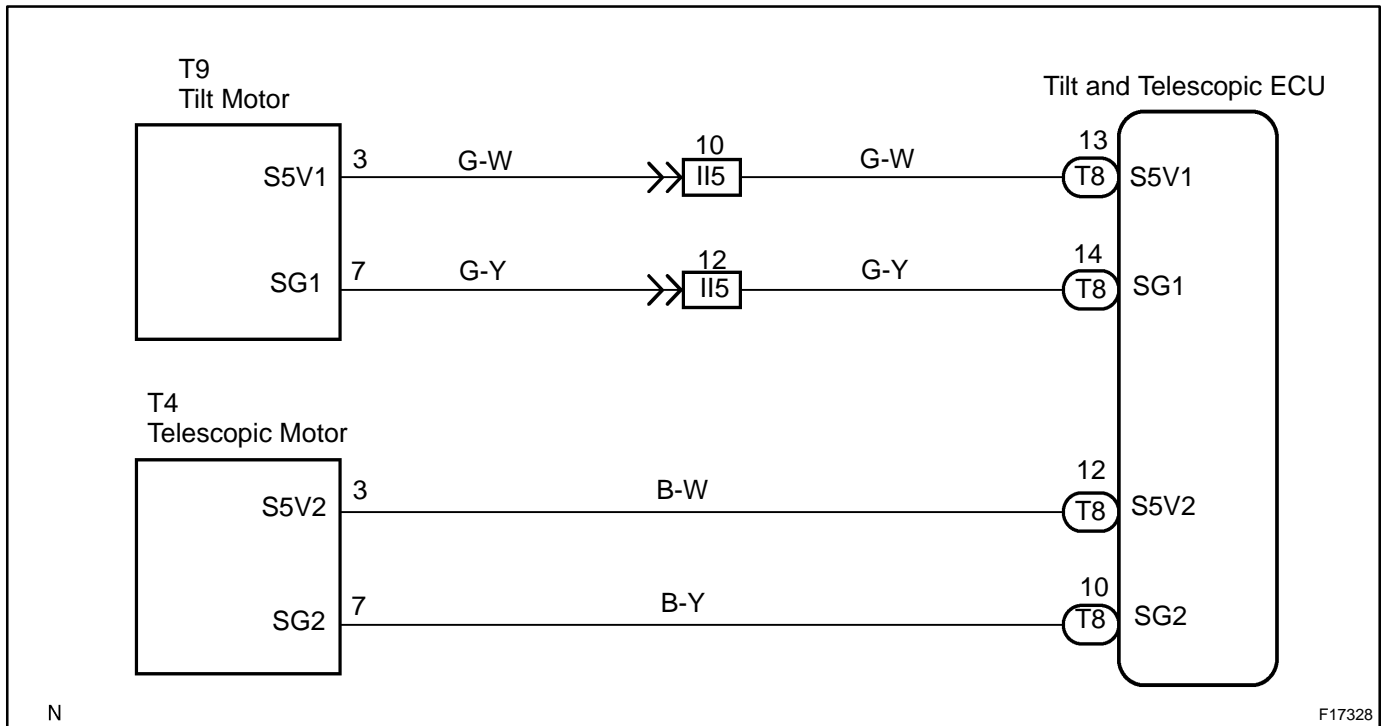
**Check for open circuit in harness and connector between ECU and battery (See page [IN-36](#)).**

# Sensor Power Source Circuit

## CIRCUIT DESCRIPTION

Power to the position sensor is output from ECU.

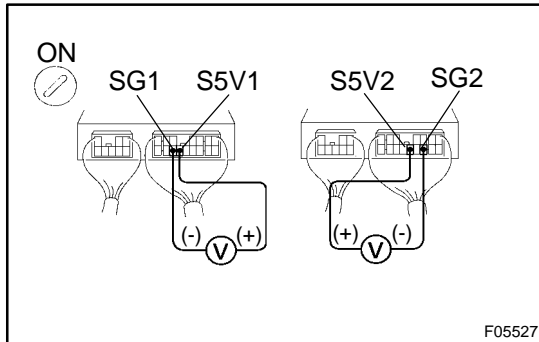
## WIRING DIAGRAM





## INSPECTION PROCEDURE

- |          |   |
|----------|---|
| <b>1</b> | <b>Check voltage between terminals S5V1 and SG1, S5V2 and SG2 of ECU connector.</b> |
|----------|---|

**PREPARATION:**

Remove ECU with connectors still connected.

**CHECK:**

Measure voltage between terminals S5V1 and SG1, S5V2 and SG2 of ECU connector.

**OK:**

**Voltage: 4.5 - 5.5 V**

**NG**

**Go to step 3.**

**OK**

- |          |   |
|----------|---|
| <b>2</b> | <b>Check for open circuit in harness and connector between terminals S5V1 and SG1, S5V2 and SG2 of ECU connector.</b> |
|----------|---|

**NG**

**Repair or replace harness or connector.**

**OK**

Proceed to next circuit inspection shown on the problem symptoms table (See page [DI-663](#)).

- |          |  |
|----------|--|
| <b>3</b> | <b>Check for short circuit in harness between terminals S5V1 and SG1, S5V2 and SG2 of ECU connector.</b> |
|----------|--|

**NG**

**Repair or replace harness or connector.**

**OK**

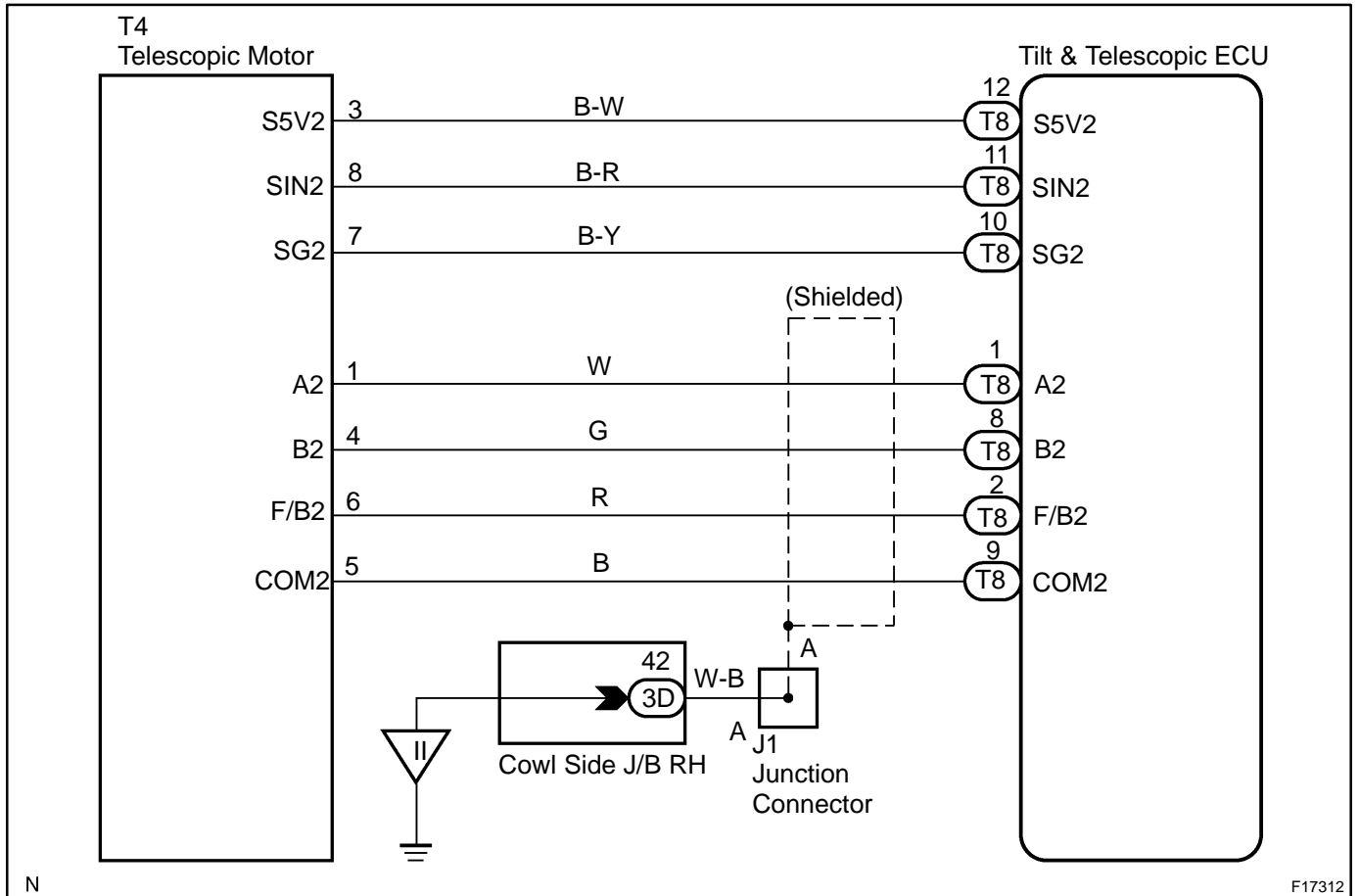
Check and replace tilt and telescopic ECU (See page [IN-36](#)).

# Telescopic Motor Circuit

## CIRCUIT DESCRIPTION

The ECU provides both +B and ground for the telescopic motor. Reversing polarity of the applied voltage reverses the motor.

## WIRING DIAGRAM



N

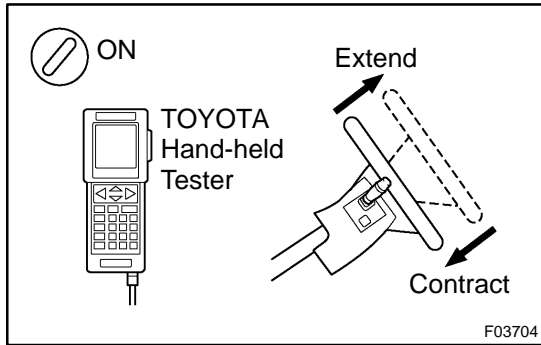
F17312

## INSPECTION PROCEDURE

In case of using TOYOTA hand-held tester, start inspection from step 1.

In case of not using TOYOTA hand-held tester, start inspection from step 2.

<b>1</b>	<b>Check telescopic motor operation using TOYOTA hand-held tester.</b>
----------	--



### **PREPARATION:**

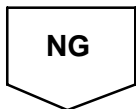
- (a) Connect the TOYOTA hand-held tester to the DLC3.
- (b) Turn ignition switch ON and push the TOYOTA hand-held tester main switch ON.
- (c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

### **CHECK:**

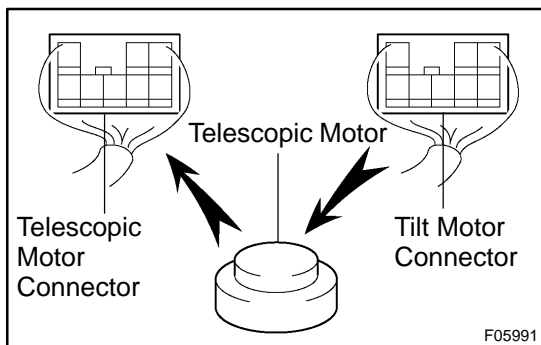
Check that the steering column length become short (long) and confirm that telescopic position value change when the ACTIVE TEST carried out.

### **OK:**

**Steering column length must be short (long).  
Telescopic position value must be changed.**



<b>2</b>	<b>Check telescopic motor.</b>
----------	--------------------------------



### **PREPARATION:**

- (a) Disconnect telescopic motor connector and tilt motor connector.
- (b) Remove telescopic motor (See page SR-30).

### **CHECK:**

Connect tilt motor connector to telescopic motor. Then confirm that telescopic motor moved when operating the manual switch.



3	Check for open or short circuit in harness and connector between tilt and telescopic ECU and telescopic motor (See page <a href="#">IN-36</a> ).
---	--



Repair or replace harness or connector.



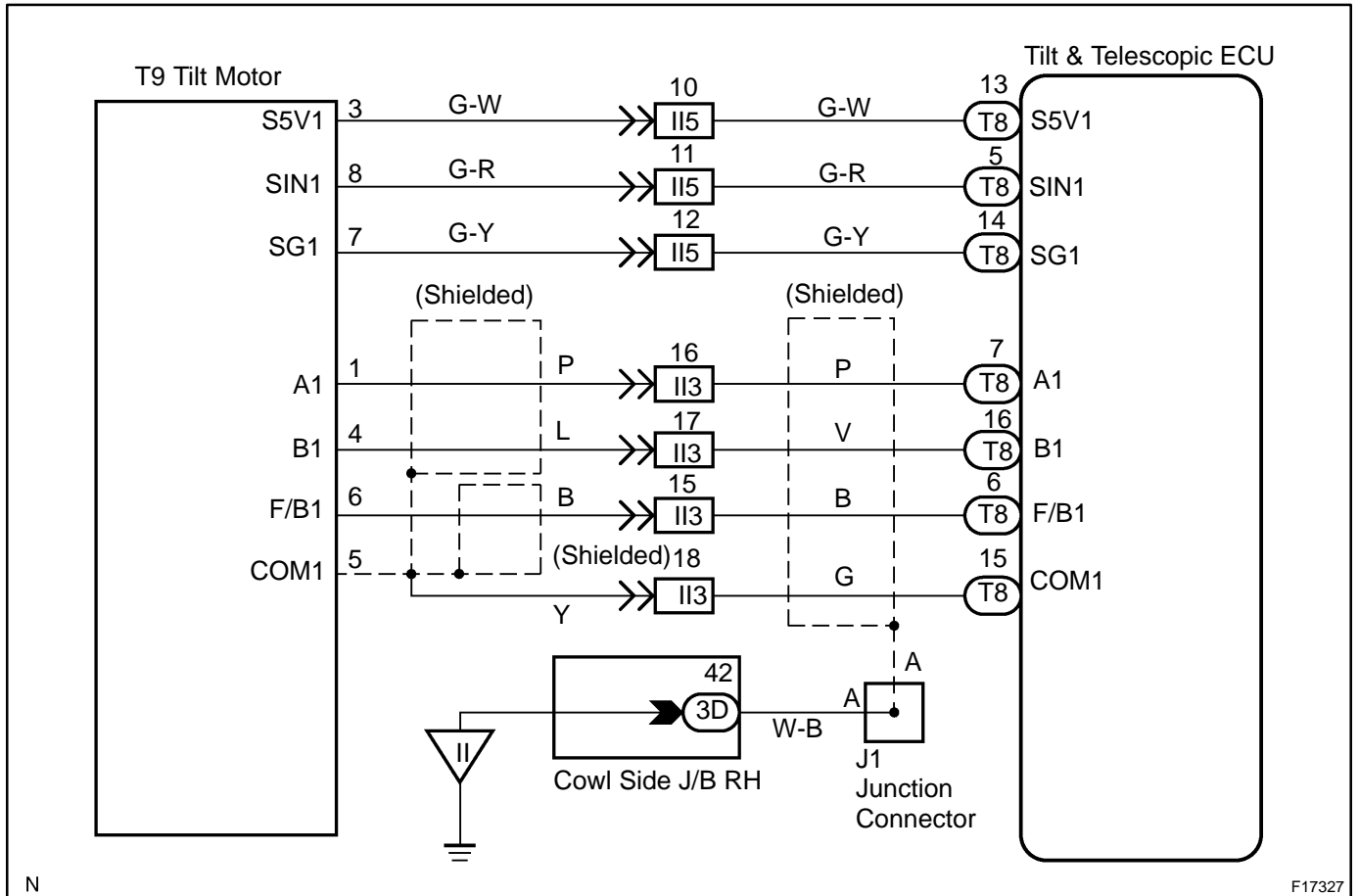
Proceed to next circuit inspection shown on the problem symptoms table (See page [DI-663](#)).

# Tilt Motor Circuit

## CIRCUIT DESCRIPTION

The ECU provided both +B and ground for the tilt motor.  
Reversing polarity of the applied voltage reverses the motor.

## WIRING DIAGRAM



N

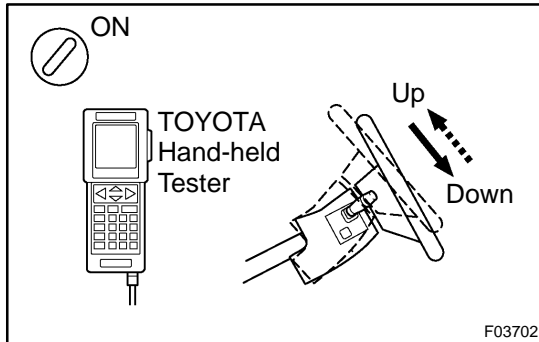
F17327

## INSPECTION PROCEDURE

In case of using TOYOTA hand-held tester, start inspection from step 1.

In case of not using TOYOTA hand-held tester, start inspection from step 2.

### 1 Check tilt motor operation using TOYOTA hand-held tester.



#### PREPARATION:

- Connect the TOYOTA hand-held tester to the DLC3.
- Turn ignition switch ON and push the TOYOTA hand-held tester main switch ON.
- Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

#### CHECK:

Check that the steering wheel tilt up (down) and confirm that tilt position value change when the ACTIVE TEST carried out.

#### OK:

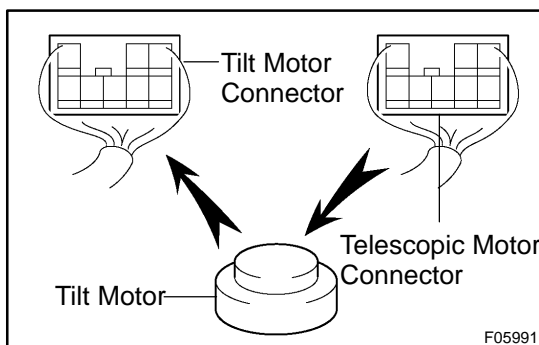
**Steering wheel must be moved upward (downward).  
Tilt position value must be changed.**

OK

**Proceed to next circuit inspection shown on the problem symptoms table (See page DI-663).**

NG

### 2 Check tilt motor.



#### PREPARATION:

- Disconnect tilt motor connector and telescopic motor connector.
- Remove tilt motor (See page SR-30).

#### CHECK:

Connect telescopic motor connector to tilt motor. Then confirm that tilt motor moved when operating the manual switch.

NG

**Replace tilt motor.**

OK

<b>3</b>	<b>Check for open or short circuit in harness and connector between tilt and telescopic ECU and tilt motor (See page <a href="#">IN-36</a>).</b>
----------	--

<b>NG</b>	<b>Repair or replace harness or connector.</b>
-----------	--

<b>OK</b>
-----------

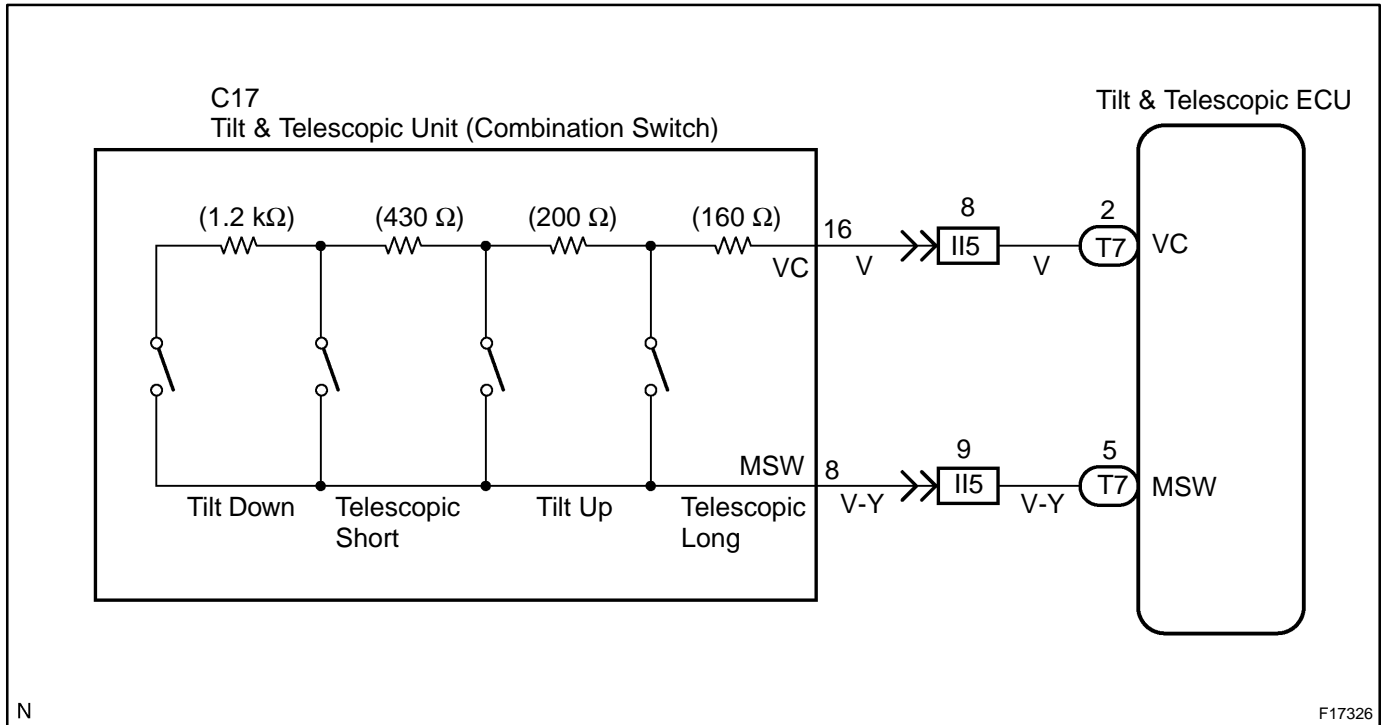
<b>Proceed to next circuit inspection shown on the problem symptoms table (See page <a href="#">DI-663</a>).</b>
--

## Tilt and Telescopic Manual Switch Circuit

### CIRCUIT DESCRIPTION

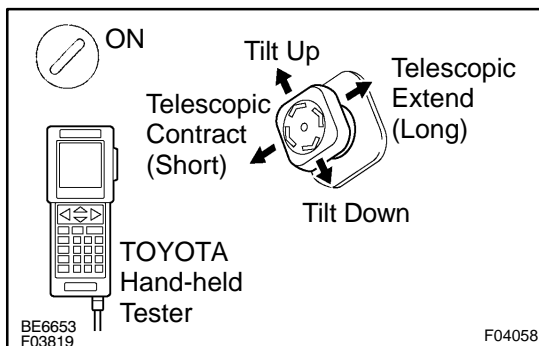
The different voltage signals which are occurred by operating the manual switch are sent to the tilt and telescopic ECU.

### WIRING DIAGRAM



### INSPECTION PROCEDURE

- 1 Check tilt and telescopic manual switch voltage.



#### When using TOYOTA hand-held tester

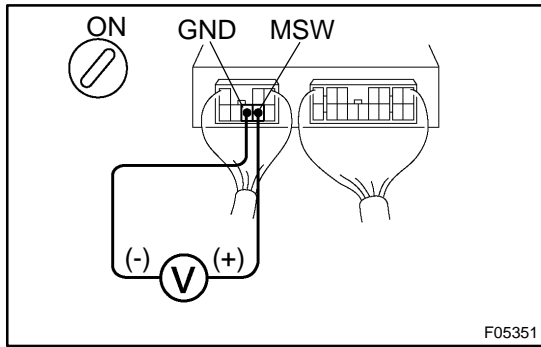
##### PREPARATION:

- (a) Connect the TOYOTA hand-held tester to the DLC3.
- (b) Turn ignition switch ON and push the TOYOTA hand-held tester main switch ON.
- (c) Select DATALIST mode on the TOYOTA hand-held tester.

##### CHECK:

Read the voltages on the tester screen when operating the manual switch.





**When not using TOYOTA hand-held tester**

**PREPARATION:**

Remove tilt and telescopic ECU with connector still connected.

**CHECK:**

Measure voltage between terminals MSW and GND of ECU connector when operating the manual switch.

**OK:**

Manual switch position	Standard voltage
Neutral position	0.00 – 0.20 V
Tilt up	1.30 – 1.70 V
Tilt down	0.30 – 0.50 V
Telescopic short	0.65 – 0.95 V
Telescopic long	2.05 – 2.75 V

**RESULT:**

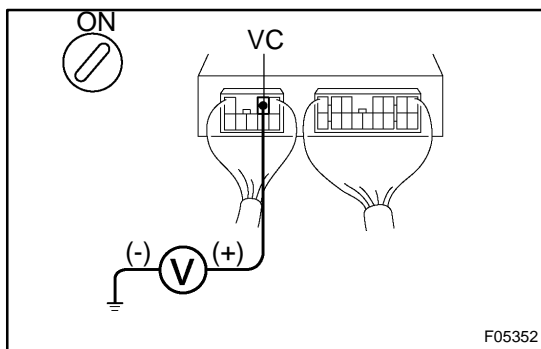
A	Switch voltages in all directions are within the standard.
B	Switch voltage in a certain direction is out of the standard.
C	Switch voltages in all directions are out of the standard.

**A** Proceed to next circuit inspection shown on the problem symptoms table (See page DI-663 ).

**B** Replace the manual switch.

**C**

**2** Check voltage between terminal VC of ECU connector and body ground.



**PREPARATION:**

Remove ECU with connectors still connected.

**CHECK:**

Measure voltage between terminal VC of ECU and body ground.

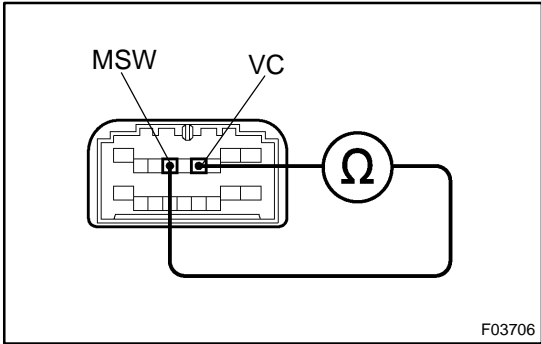
**OK:**

**Voltage: 4.5 - 5.5 V**

**NG** Go to step 4.

**OK**

**3 Check tilt and telescopic manual switch.**



**PREPARATION:**

Disconnect combination switch connector.

**CHECK:**

Measure resistance between terminals VC and MSW of combination switch connector when operating the manual switch.

**OK:**

Switch position	Resistance
Tilt up	360 Ω
Tilt down	1,990 Ω
Telescopic short	790 Ω
Telescopic long	160 Ω

**NG** Replace the manual switch.

OK

**4 Check for open or short circuit in harness and connector between tilt and telescopic ECU and manual switch (See page IN-36).**

**NG** Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on the problem symptoms table (See page DI-663).

# CUSTOMER PROBLEM ANALYSIS CHECK

**POWER TILT AND POWER TELESCOPIC STEERING SYSTEM CHECK SHEET**

Inspector's Name \_\_\_\_\_

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (    times a day)

Symptoms	Manual Function does not Operate	<input type="checkbox"/> Both Tilt and Telescopic <input type="checkbox"/> Tilt only <input type="checkbox"/> Telescopic only
	Auto Away/Return Function does not Operate	<input type="checkbox"/> Both Auto Away and Auto Return <input type="checkbox"/> Auto Away only <input type="checkbox"/> Auto Return only
	<input type="checkbox"/> Memory Function does not Operate	

DTC Check	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code    )
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code (Code    )

**DIAGNOSTIC TROUBLE CODE CHART**

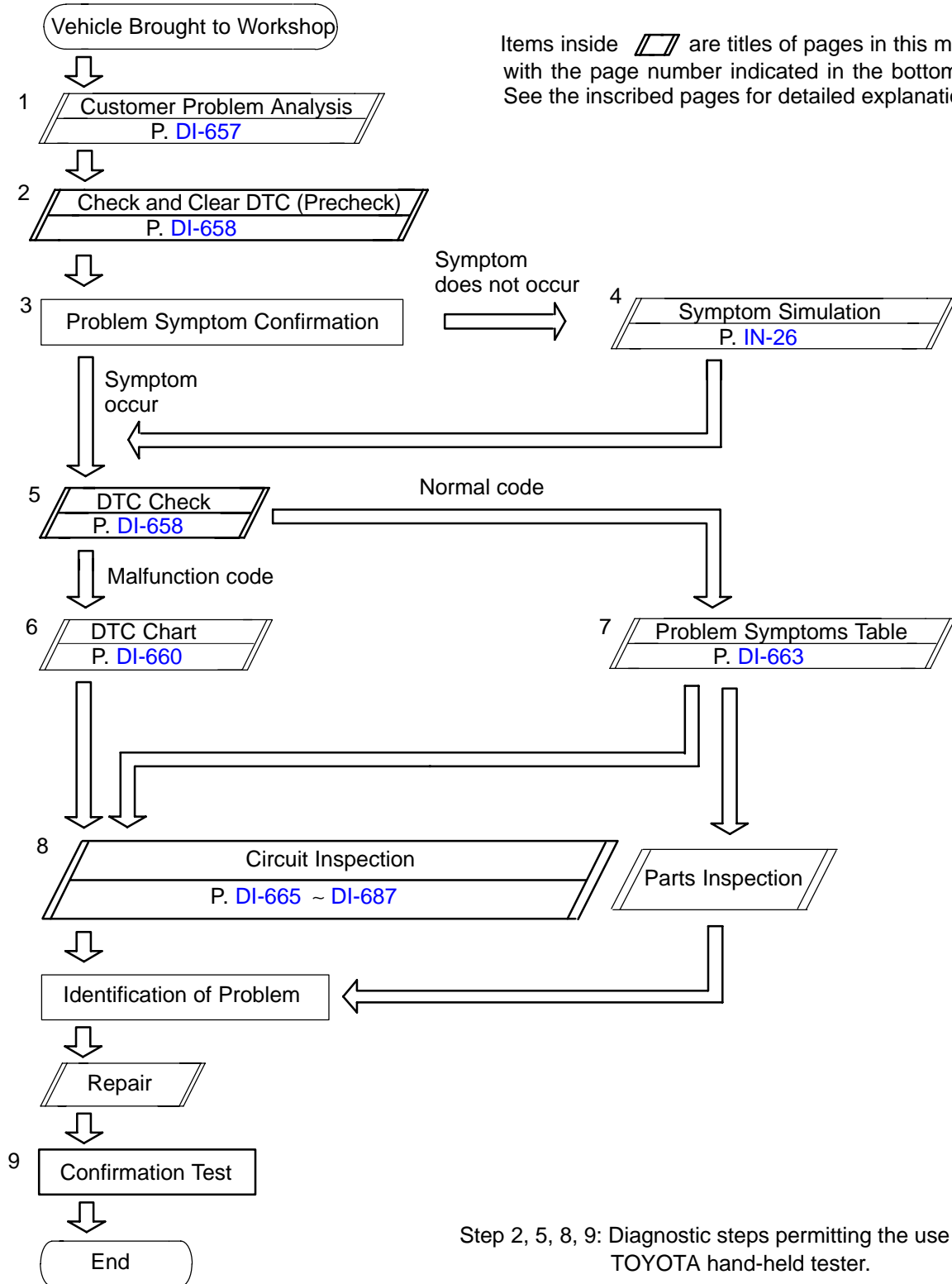
If a DTC is displayed during the DTC check, check the circuit for that code listed in the table below. For details of each code, turn the page referred to under the "See page" for the respective "DTC No." in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area
B2603 (DI-665)	Tilt and telescopic manual switch malfunction	<ul style="list-style-type: none"> <li>▶Tilt and telescopic manual switch circuit</li> <li>▶Tilt and telescopic ECU</li> </ul>
B2610 (DI-667)	Tilt position sensor or tilt motor malfunction	<ul style="list-style-type: none"> <li>▶Sensor power source circuit</li> <li>▶Actuator power source circuit</li> <li>▶Tilt motor circuit</li> <li>▶Tilt and telescopic ECU</li> </ul>
B2611 (DI-669)	Telescopic position sensor or telescopic motor malfunction	<ul style="list-style-type: none"> <li>▶Sensor power source circuit</li> <li>▶Actuator power source circuit</li> <li>▶Telescopic motor circuit</li> <li>▶Tilt and telescopic ECU</li> </ul>
B2620 (DI-671)	ECU power source circuit malfunction	<ul style="list-style-type: none"> <li>▶Battery</li> <li>▶ECU power source circuit</li> <li>▶Tilt and telescopic ECU</li> </ul>

# POWER TILT AND POWER TELESCOPIC STEERING COLUMN

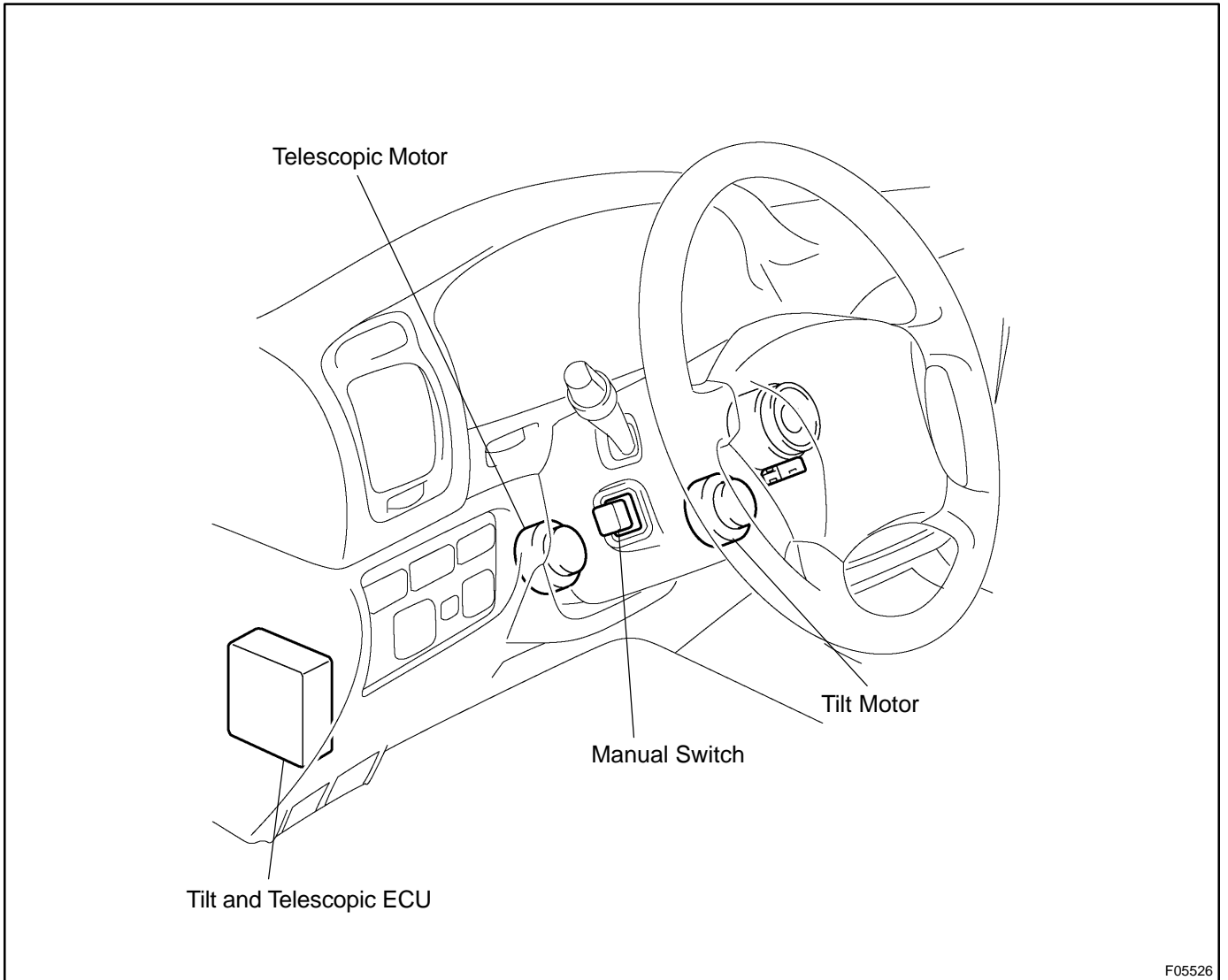
## HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.

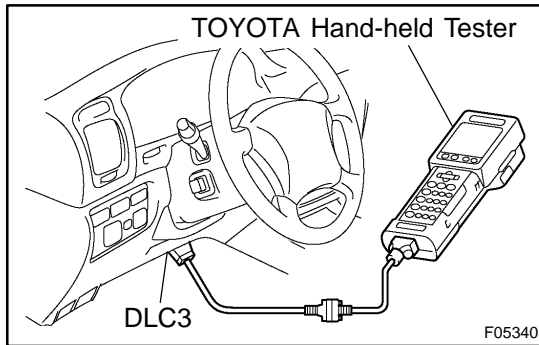


Step 2, 5, 8, 9: Diagnostic steps permitting the use of the TOYOTA hand-held tester.

# PARTS LOCATION



F05526



## PRE-CHECK

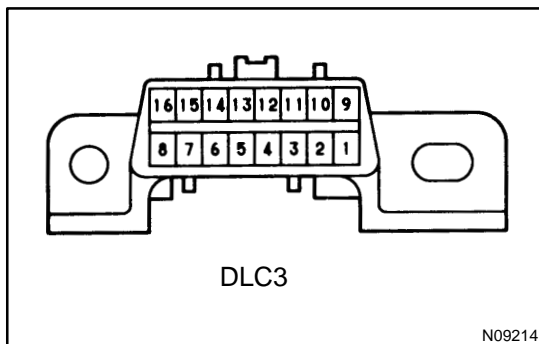
### 1. DESCRIPTION

#### (a) DIAGNOSIS SYSTEM

When troubleshooting Multiplex OBD (M-OBD) vehicles, the only difference from the usual troubleshooting procedure is that you connect the TOYOTA hand-held tester to vehicle, and read off various data output from the vehicle's Power Tilt and Telescopic Steering ECU.

The Power Tilt and Telescopic Steering ECU records the applicable DTCs when the computer detects a malfunction in the computer itself or its circuit.

To check the DTCs, connect a TOYOTA hand-held tester to DLC3 on the vehicle. The TOYOTA hand-held tester enables you to erase the DTCs and activate the several actuators and check freeze frame data and various forms on steering data.



#### (b) DATA LINK CONNECTOR 3 (DLC3)

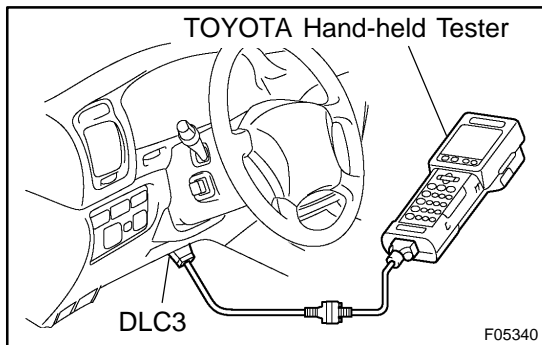
The Power Tilt and Telescopic Steering ECU uses ISO 14230 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 14230 format.

Terminal No.	Connection	Voltage or Resistance	Condition
7	Bus + Line	Pulse generation	During transmission
4	Chassis Ground	↔ Body Ground 1 Ω or less	Always
5	Signal Ground	↔ Body Ground 1 Ω or less	Always
16	Battery Positive	↔ Body Ground 9 - 14 V	Always

#### HINT:

If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of TOYOTA hand-held tester to DLC3, turned the ignition switch ON and operated the TOYOTA hand-held tester, there is a problem on the vehicle side or tester side.

- ▶ If communication is normal when the tester is connected to another vehicle, inspect DLC3 on the original vehicle.
- ▶ If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself, so consult the Service Department listed in the tester's Operator's Manual.



## 2. DIAGNOSIS INSPECTION

- (a) Check the DTC.
  - (1) Prepare the TOYOTA hand-held tester.
  - (2) Connect the TOYOTA hand-held tester to DLC3 at the lower of the instrument panel.
  - (3) Turn the ignition switch ON and turn the TOYOTA hand-held tester switch ON.
  - (4) Use the TOYOTA hand-held tester to check the DTCs and freeze frame data, note or print them (See the Operator's Manual for operating instructions.).
  - (5) See page [DI-660](#) to confirm the details of the DTC.
- (b) Clear the DTC.
 

The following actions will erase the DTC and freeze frame data.

  - ▶ When using the TOYOTA hand-held tester:
 

Operating the TOYOTA hand-held tester to erase the DTCs (See the Operator's Manual for operating instructions.).
  - ▶ When not using the TOYOTA hand-held tester:
 

Disconnecting the battery terminals.



## PROBLEM SYMPTOMS TABLE

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

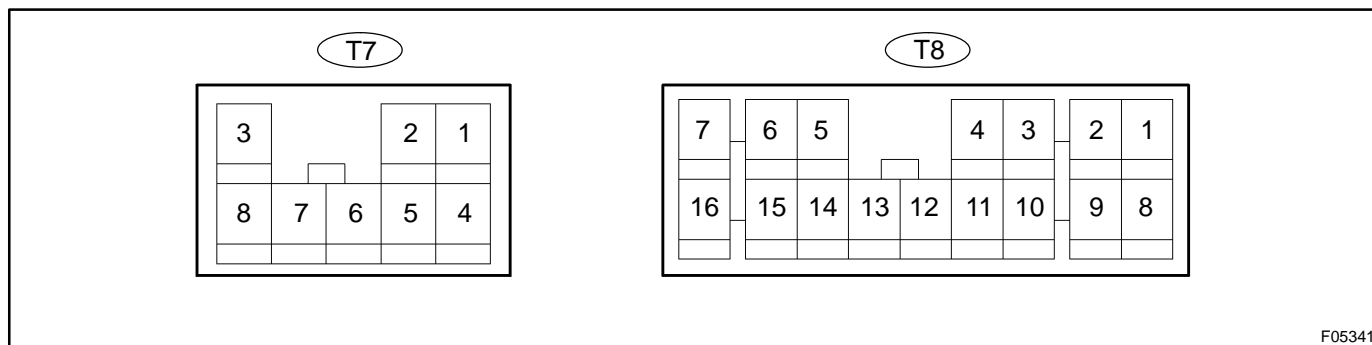
The table below will be useful for you in troubleshooting these electrical systems. The most likely causes of the malfunction are shown in the order of their probability. Inspect each part in the order shown, and replace the part when it is found to be faulty.

- \* If the instruction "Proceed to next circuit inspection shown on the chart" is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- \* If the problem still occurs even though there are no abnormalities in any of the other circuits, then check and replace ECU.

Symptom	Suspect Area	See page
Both tilt and telescopic: Manual, auto away/return and memory functions *Do not operate *Stop part way *Do not stop	1. Multiplex communication system 2. ECU power source circuit 3. Key unlock warning switch 4. Body ECU 5. Actuator power source circuit 6. Sensor power source circuit 7. Tilt motor circuit 8. Telescopic motor circuit 9. Tilt and telescopic ECU	- DI-673 BE-29 DI-1038 DI-676 DI-679 DI-681 DI-684 IN-36
Tilt only: Manual, auto away/return and memory functions *Do not operate *Stop part way *Do not stop	1. Multiplex communication system 2. Sensor power source circuit 3. Tilt motor circuit 4. Tilt and telescopic ECU	- DI-679 DI-681 IN-36
Telescopic only: Manual, auto away/return and memory functions *Do not operate *Stop part way *Do not stop	1. Multiplex communication system 2. Sensor power source circuit 3. Telescopic motor circuit 4. Tilt and telescopic ECU	- DI-679 DI-684 IN-36
Both tilt and telescopic: Only tilt and telescopic manual switch function does not operate	1. Multiplex communication system 2. Tilt and telescopic manual switch circuit 3. Tilt motor circuit 4. Telescopic motor circuit 5. Tilt and telescopic ECU	- DI-687 DI-681 DI-684 IN-36
Tilt only: Only tilt and telescopic manual switch function does not operate	1. Multiplex communication system 2. Tilt and telescopic manual switch circuit 3. Tilt motor circuit 4. Tilt and telescopic ECU	- DI-687 DI-681 IN-36
Telescopic only: Only tilt and telescopic manual switch function does not operate	1. Multiplex communication system 2. Tilt and telescopic manual switch circuit 3. Telescopic motor circuit 4. Tilt and telescopic ECU	- DI-687 DI-684 IN-36

Symptom	Suspect Area	See page
Both away and return: Only auto away/return function does not operate	<ol style="list-style-type: none"> <li>1. Check status of auto away function using TOYOTA hand-held tester</li> <li>2. Multiplex communication system</li> <li>3. Ignition switch</li> <li>4. Key unlock warning switch</li> <li>5. Tilt motor circuit</li> <li>6. Telescopic motor circuit</li> <li>7. Tilt and telescopic ECU</li> </ol>	<p style="text-align: center;">-</p> <p style="text-align: center;">-</p> <p style="text-align: center;"><a href="#">BE-29</a></p> <p style="text-align: center;"><a href="#">BE-29</a></p> <p style="text-align: center;"><a href="#">DI-681</a></p> <p style="text-align: center;"><a href="#">DI-684</a></p> <p style="text-align: center;"><a href="#">IN-36</a></p>
Only away: Only Auto away/return function does not operate	<ol style="list-style-type: none"> <li>1. Multiplex communication system</li> <li>2. Key unlock warning switch</li> <li>3. Ignition switch</li> <li>4. Tilt motor circuit</li> <li>5. Telescopic motor circuit</li> <li>6. Tilt and telescopic ECU</li> </ol>	<p style="text-align: center;">-</p> <p style="text-align: center;"><a href="#">BE-29</a></p> <p style="text-align: center;"><a href="#">BE-29</a></p> <p style="text-align: center;"><a href="#">DI-681</a></p> <p style="text-align: center;"><a href="#">DI-684</a></p> <p style="text-align: center;"><a href="#">IN-36</a></p>
Only return: Only auto away/return function does not operate	<ol style="list-style-type: none"> <li>1. Multiplex communication system</li> <li>2. Key unlock warning switch</li> <li>3. Ignition switch</li> <li>4. Tilt motor circuit</li> <li>5. Telescopic motor circuit</li> <li>6. Tilt and telescopic ECU</li> </ol>	<p style="text-align: center;">-</p> <p style="text-align: center;"><a href="#">BE-29</a></p> <p style="text-align: center;"><a href="#">BE-29</a></p> <p style="text-align: center;"><a href="#">DI-681</a></p> <p style="text-align: center;"><a href="#">DI-684</a></p> <p style="text-align: center;"><a href="#">IN-36</a></p>

## TERMINALS OF ECU



F05341

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
IG (T7-4) - GND (T7-6)	B-W - W-B	IG switch ON	10 - 14 (DC)
		IG switch LOCK	Below 1 (DC)
VC (T7-2) - GND (T7-6)	V - W-B	Always	4.5 - 5.5 (DC)
GND (T7-6) - Body Ground	W-B - Body Ground	Always	Below 1 (DC)
ECUB (T7-1) - Body Ground	L-W - Body Ground	Always	10 - 14 (DC)
ECUB (T7-1) - GND (T7-6)	L-W - W-B	Always	10 - 14 (DC)
MSW (T7-5) - GND (T7-6)	V-Y - W-B	Tilt up by manual switch	1.30 - 1.70 (DC)
		Tilt down by manual switch	0.30 - 0.50 (DC)
		Telescopic extended by manual switch	2.05 - 2.75 (DC)
		Telescopic contracted by manual switch	0.65 - 0.95 (DC)
		Manual switch is not operating	Below 0.20 (DC)
+B (T8-4) - GND (T7-6)	G-B - W-B	Always	10 - 14 (DC)
S5V1 (T8-13) - SG1 (T8-14)	G-W - G-Y	IG switch ON	4.5 - 5.5 (DC)
S5V2 (T8-12) - SG2 (T8-10)	B-W - B-Y	IG switch ON	4.5 - 5.5 (DC)
A1 (T8-7) - COM1 (T8-15)	P - G	IG switch ON, tilt up or down by manual switch	190 - 230 (AC)
B1 (T8-16) - COM1 (T8-15)	V - G	IG switch ON, tilt up or down by manual switch	190 - 230 (AC)
A2 (T8-1) - COM2 (T8-9)	W - B	IG switch ON, telescopic extend or contracted by manual switch	190 - 230 (AC)
B2 (T8-8) - COM2 (T8-9)	G - B	IG switch ON, telescopic extend or contracted by manual switch	190 - 230 (AC)

# CIRCUIT INSPECTION

<b>DTC</b>	<b>B0100/13</b>	<b>Short in D Squib Circuit</b>
------------	-----------------	---------------------------------

## CIRCUIT DESCRIPTION

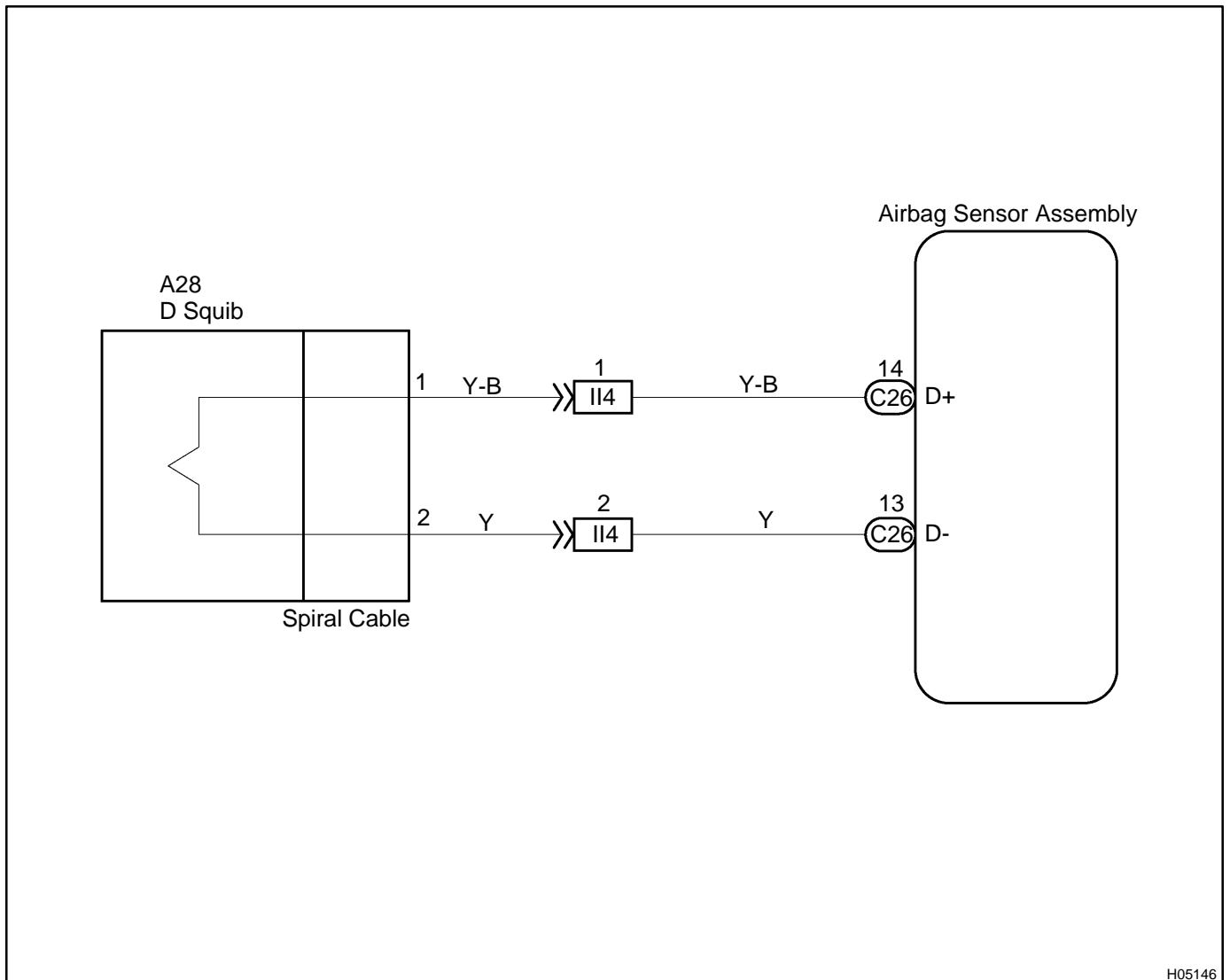
The D squib circuit consists of the airbag sensor assembly, the spiral cable and the steering wheel pad. It causes the airbag to deploy when the airbag deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B0100/13 is recorded when a short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0100/13	<ul style="list-style-type: none"> <li>▶ Short in D squib circuit</li> <li>▶ D squib malfunction</li> <li>▶ Spiral cable malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Steering wheel pad (D squib)</li> <li>▶ Spiral cable</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> <li>▶ Column wire</li> </ul>

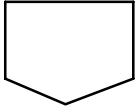
## WIRING DIAGRAM



H05146

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page <a href="#">DI-923</a> ).</b>
----------	---



<b>2</b>	<b>Check connector.</b>
----------	-------------------------

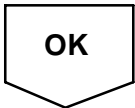
**CHECK:**

Make sure that the orange spiral cable connector is not damaged.

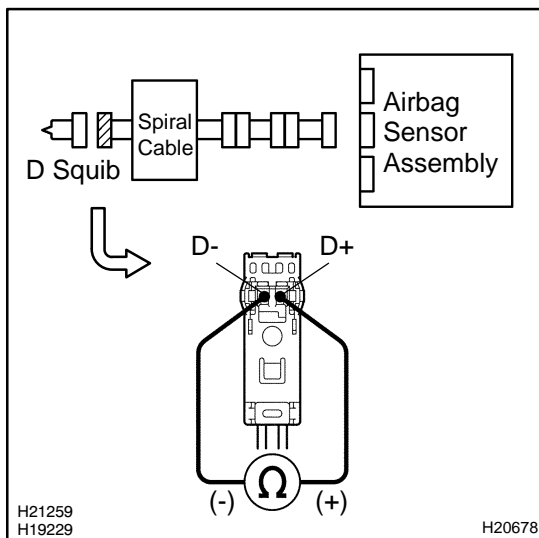
**OK:**

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

<b>NG</b>	<b>Replace spiral cable.</b>
-----------	------------------------------



<b>3</b>	<b>Check D squib circuit.</b>
----------	-------------------------------

**PREPARATION:**

Release the airbag activation prevention mechanism built in the connector on the airbag sensor assembly side between the steering wheel pad (D squib) and the airbag sensor assembly (See page [DI-692](#) ).

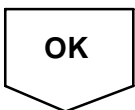
**CHECK:**

Measure the resistance between D+ and D- of the orange connector on the steering wheel pad (D squib) side between the airbag sensor assembly and the steering wheel pad (D squib).

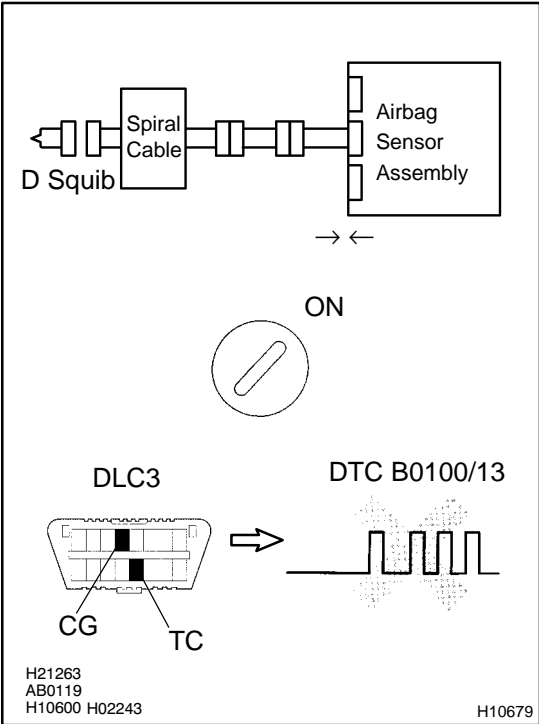
**OK:**

**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Go to step 6.</b>
-----------	----------------------



**4 Check airbag sensor assembly.**



**PREPARATION:**

- (a) Connect the connector to the airbag sensor assembly.
- (b) Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page DI-692 ).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page DI-692 ).

**OK:**

**DTC B0100/13 is not output.**

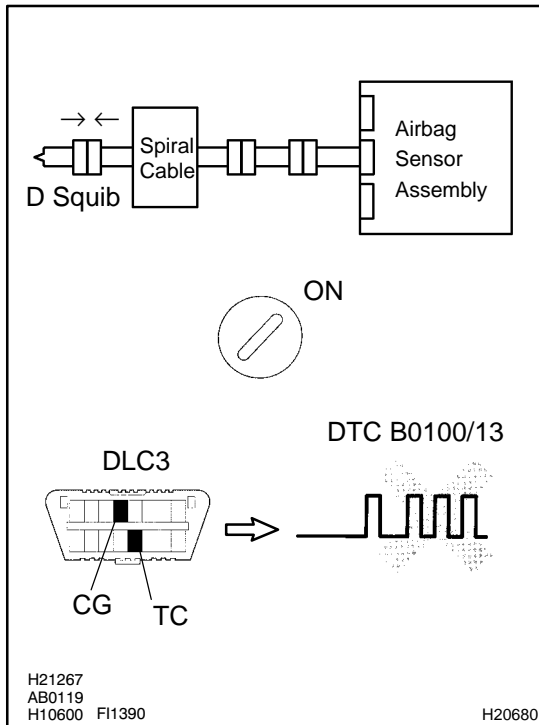
**HINT:**

Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

**NG** → **Replace airbag sensor assembly.**

**OK**

## 5 Check D squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad (D squib) to the spiral cable.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0100/13 is not output.**

### HINT:

Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

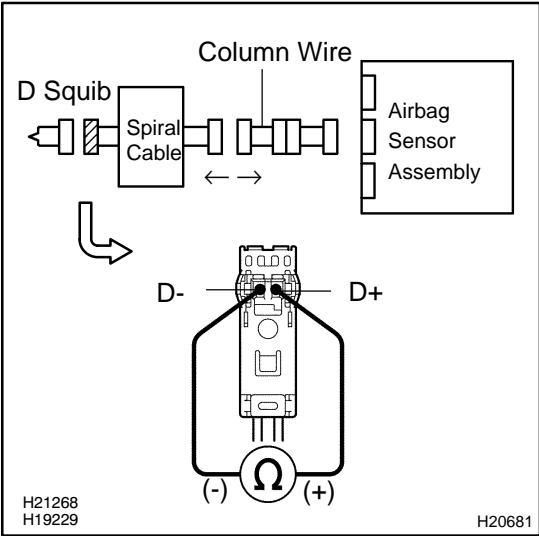
**NG**

**Replace steering wheel pad (D squib).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

**6 Check spiral cable.**



**PREPARATION:**

- (a) Disconnect the spiral cable connector from the column wire.
- (b) Release the airbag activation prevention mechanism built in the connector of the spiral cable on the airbag sensor assembly side (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between D+ and D- of the orange spiral cable connector on the steering wheel pad (D squib) side.

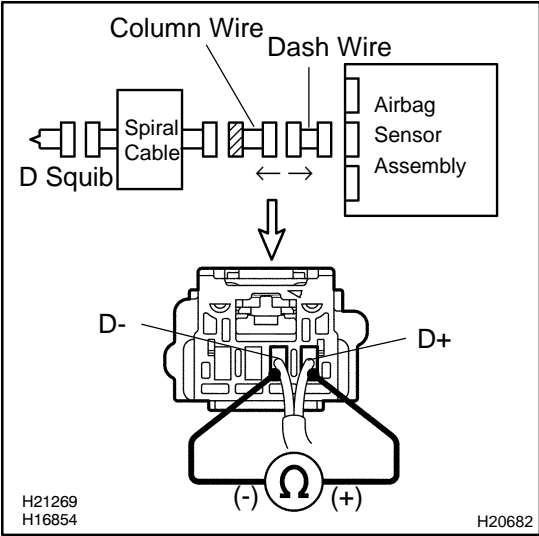
**OK:**

**Resistance: 1 MΩ or Higher**

**NG** → Replace spiral cable.

**OK**

**7 Check column wire.**



**PREPARATION:**

- (a) Disconnect the column wire connector from the dash wire.
- (b) Release the airbag activation prevention mechanism built in the connector of the column wire on the airbag sensor assembly side (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between D+ and D- of the column wire connector on the spiral cable side.

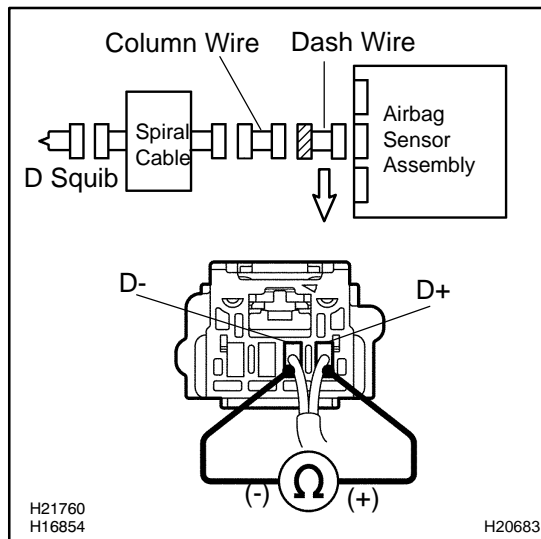
**OK:**

**Resistance: 1 MΩ or Higher**

**NG** → Repair or replace column wire.

**OK**



**8 Check dash wire.****PREPARATION:**

Release the airbag activation prevention mechanism built in the connector of the dash wire on the airbag sensor assembly side (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between D+ and D- of the dash wire connector on the column wire side.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG****Repair or replace dash wire.****OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0101/14</b>	<b>Open in D Squib Circuit</b>
------------	-----------------	--------------------------------

**CIRCUIT DESCRIPTION**

The D squib circuit consists of the airbag sensor assembly, the spiral cable and the steering wheel pad. It causes the airbag to deploy when the airbag deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B0101/14 is recorded when an open is detected in the D squib circuit.

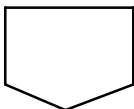
DTC No.	DTC Detecting Condition	Trouble Area
B0101/14	<ul style="list-style-type: none"> <li>▶ Open in D squib circuit</li> <li>▶ D squib malfunction</li> <li>▶ Spiral cable malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Steering wheel pad (D squib)</li> <li>▶ Spiral cable</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> <li>▶ Column wire</li> </ul>

**WIRING DIAGRAM**

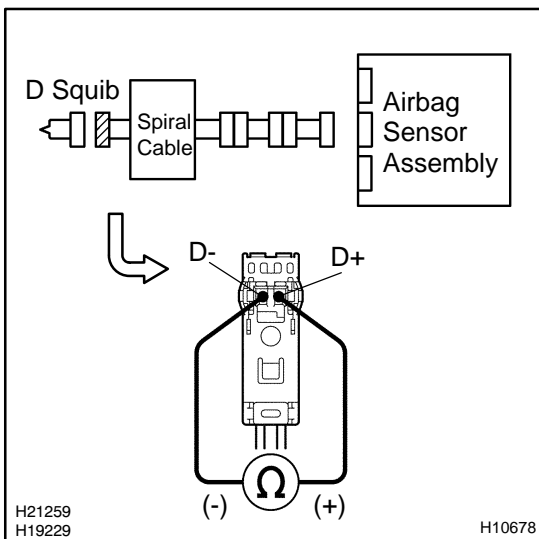
See page DI-71 1.

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



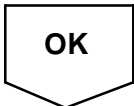
<b>2</b>	<b>Check D squib circuit.</b>
----------	-------------------------------



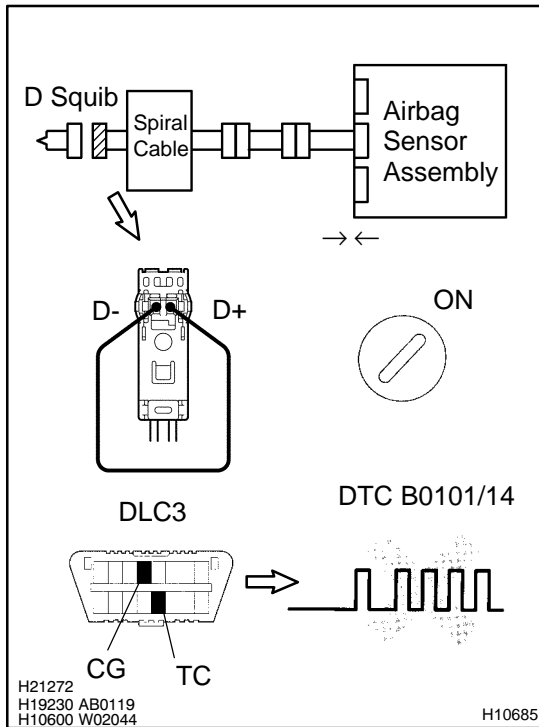
**CHECK:**  
Measure the resistance between D+ and D- of the orange connector on the steering wheel pad (D squib) side between the airbag sensor assembly and the steering wheel pad (D squib).

**OK:**  
**Resistance: Below 1 Ω**

<b>NG</b>	<b>Go to step 5.</b>
-----------	----------------------



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect D+ and D- of the orange connector on the steering wheel pad (D squib) side between the airbag sensor assembly and the steering wheel pad (D squib).
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0101/14 is not output.**

#### HINT:

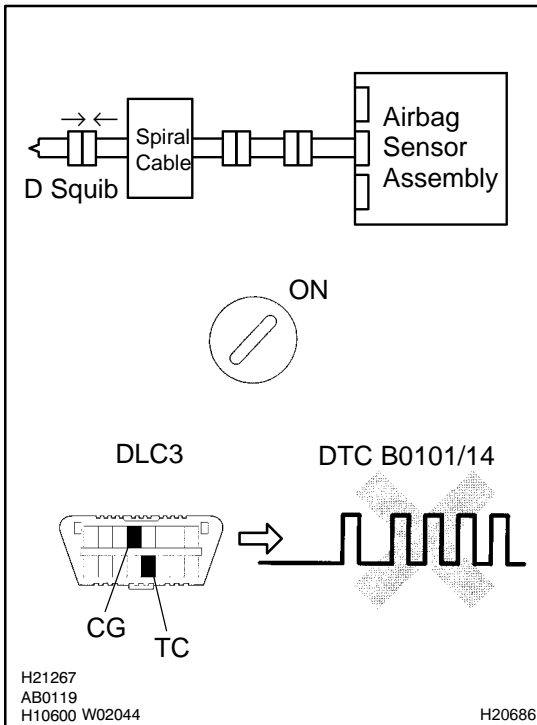
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check D squib.



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad (D squib) to the spiral cable.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0101/14 is not output.**

#### HINT:

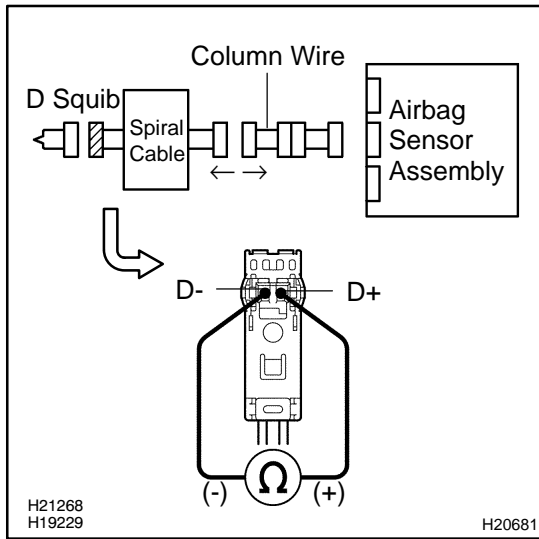
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

**NG**

**Replace steering wheel pad (D squib).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

**5 Check spiral cable.****PREPARATION:**

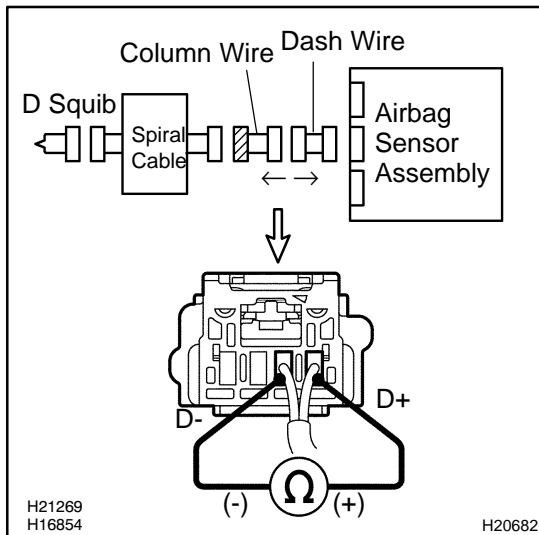
Disconnect the spiral cable connector from the column wire.

**CHECK:**

Measure the resistance between D+ and D- of the orange spiral cable connector on the steering wheel pad (D squib) side.

**OK:**

**Resistance: Below 1 Ω**

**NG****Replace spiral cable.****OK****6 Check column wire.****PREPARATION:**

Disconnect the column wire connector from the dash wire.

**CHECK:**

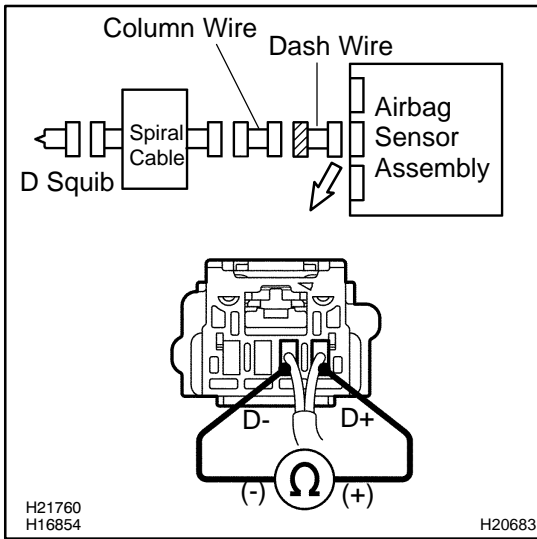
Measure the resistance between D+ and D- of the column wire connector on the spiral cable side.

**OK:**

**Resistance: Below 1 Ω**

**NG****Repair or replace column wire.****OK**

## 7 Check dash wire.



### **CHECK:**

Measure the resistance between D+ and D- of the dash wire connector on the column wire side.

### **OK:**

**Resistance: Below 1 Ω**

**NG**

**Repair or replace dash wire.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0102/11</b>	<b>Short in D Squib Circuit (to Ground)</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The D squib circuit consists of the airbag sensor assembly, the spiral cable and the steering wheel pad. It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B0102/11 is recorded when a ground short is detected in the D squib circuit.

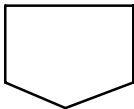
DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	<ul style="list-style-type: none"> <li>▶ Short in D squib circuit (to ground)</li> <li>▶ D squib malfunction</li> <li>▶ Spiral cable malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Steering wheel pad (D squib)</li> <li>▶ Spiral cable</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> <li>▶ Column wire</li> </ul>

**WIRING DIAGRAM**

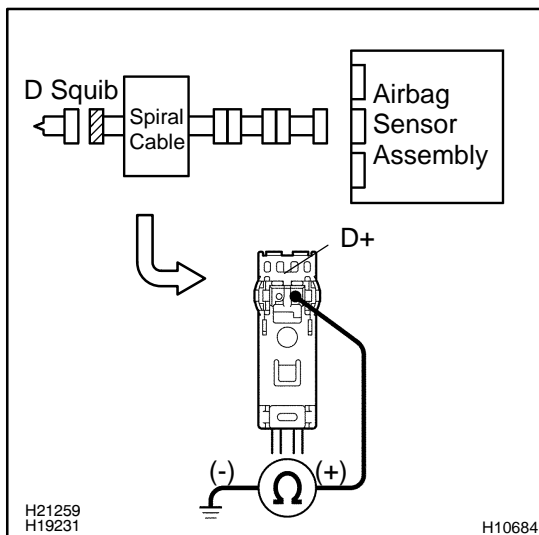
See page DI-71 1.

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check D squib circuit.</b>
----------	-------------------------------



**CHECK:**

Measure the resistance between the body ground and D+ of the orange connector on the steering wheel pad (D squib) side between the airbag sensor assembly and the steering wheel pad (D squib) side.

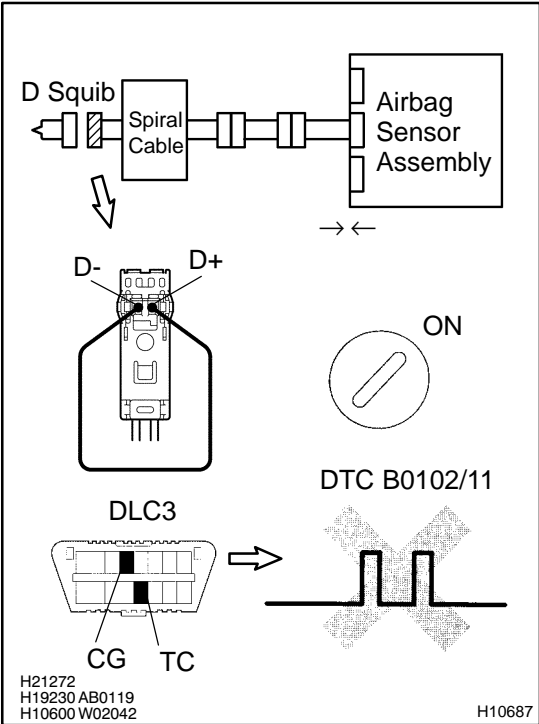
**OK:**

**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Go to step 5.</b>
-----------	----------------------



**3 Check airbag sensor assembly.**



**PREPARATION:**

- (a) Connect the connector to the airbag sensor assembly.
- (b) Using a service wire, connect D+ and D- of the orange connector on the steering wheel pad (D squib) side between the airbag sensor assembly and the steering wheel pad (D squib).
- (c) Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page DI-692).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check DTC (See page DI-692).

**OK:**

**DTC B0102/11 is not output.**

**HINT:**

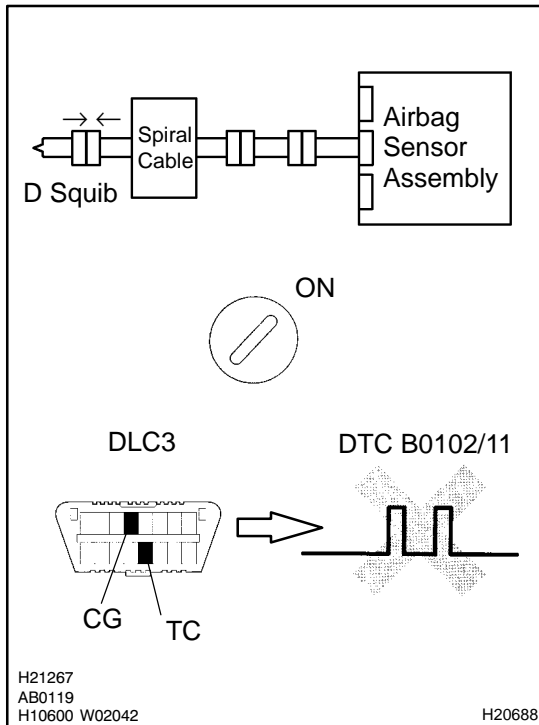
Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

**NG** Replace airbag sensor assembly.

**OK**



#### 4 Check D squib.



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad (D squib) to the spiral cable.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0102/11 is not output.**

#### HINT:

Codes other than code B0102/11 may be output at this time, but they are not relevant to this check.

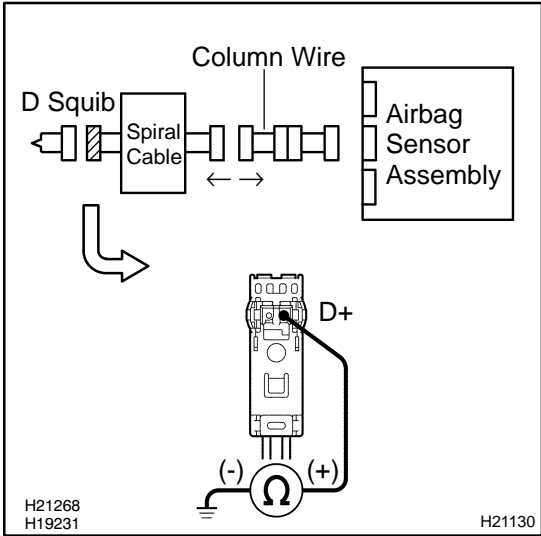
**NG**

**Replace steering wheel pad (D squib).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

**5 Check spiral cable.**



**PREPARATION:**

Disconnect the spiral cable connector from the column wire.

**CHECK:**

Measure the resistance between the body ground and D+ of the orange spiral cable connector on the steering wheel pad (D squib) side.

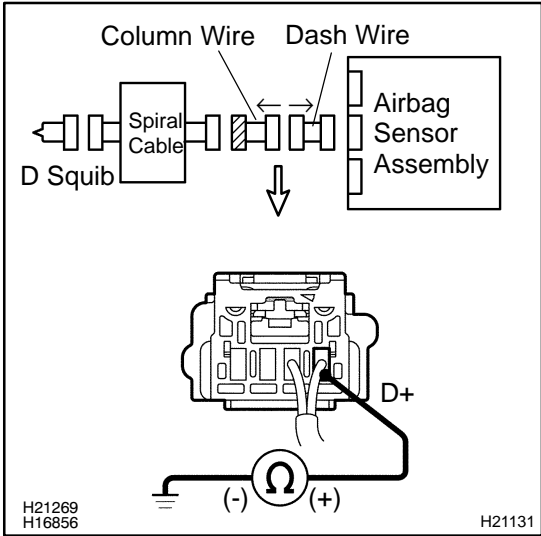
**OK:**

**Resistance: 1 M $\Omega$  or Higher**

**NG** → **Replace spiral cable.**

**OK**

**6 Check column wire.**



**PREPARATION:**

Disconnect the column wire connector from the dash wire.

**CHECK:**

Measure the resistance between the body ground and D+ of the column wire connector on the spiral cable side.

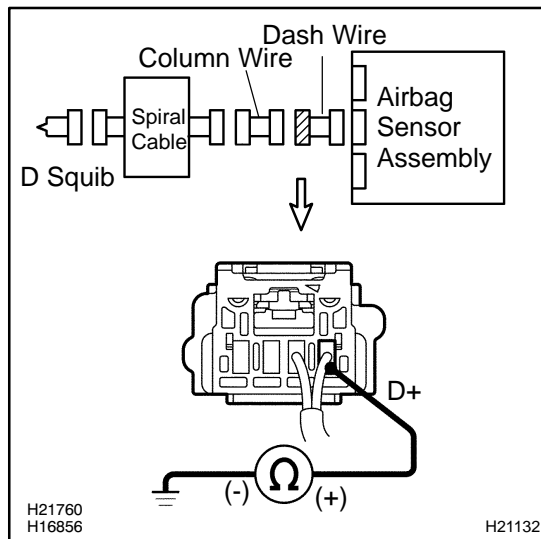
**OK:**

**Resistance: 1 M $\Omega$  or Higher**

**NG** → **Repair or replace column wire.**

**OK**

## 7 Check dash wire.



### **CHECK:**

Measure the resistance between the body ground and D+ of the dash wire connector on the column wire side.

### **OK:**

**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace dash wire.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0103/12</b>	<b>Short in D Squib Circuit (to B+)</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The D squib circuit consists of the airbag sensor assembly, the spiral cable and the steering wheel pad. It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each components, see page OPERATION on page RS-3 .

DTC B0103/12 is recorded when a B+ short is detected in the D squib circuit.

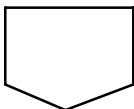
DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	<ul style="list-style-type: none"> <li>▶ Short circuit in D squib circuit (to B+)</li> <li>▶ D squib malfunction</li> <li>▶ Spiral cable malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Steering wheel pad (D squib)</li> <li>▶ Spiral cable</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> <li>▶ Column wire</li> </ul>

**WIRING DIAGRAM**

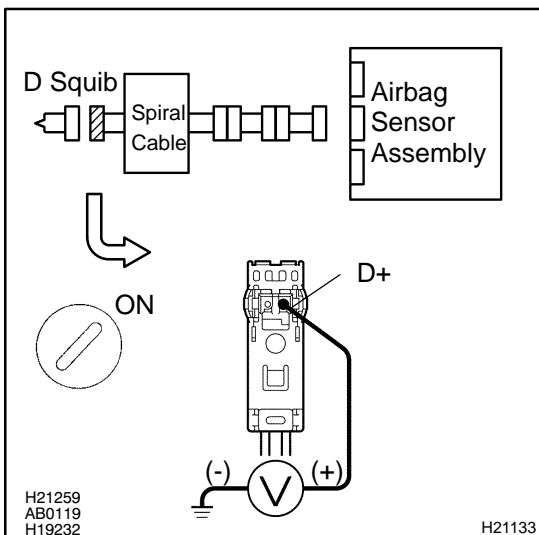
See page DI-71 1.

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check D squib circuit.</b>
----------	-------------------------------



**PREPARATION:**

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and D+ of the orange connector on the steering wheel pad (D squib) side between the airbag sensor assembly and the steering wheel pad (D squib).

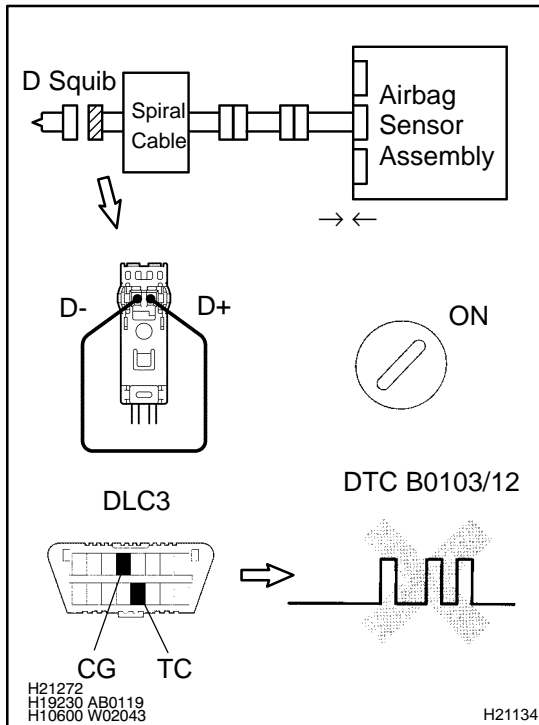
**OK:**

**Voltage: Below 1 V**

<b>NG</b>	<b>Go to step 5.</b>
-----------	----------------------



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect D+ and D- of the orange connector on the steering wheel pad (D squib) side between the airbag sensor assembly and the steering wheel pad (D squib).
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#) ).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#) ).

#### OK:

**DTC B0103/12 is not output.**

#### HINT:

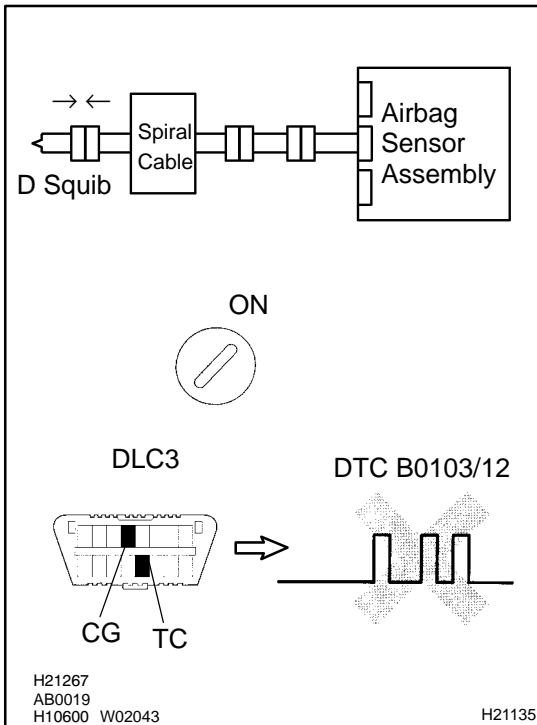
Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check D squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad (D squib) to the spiral cable.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0103/12 is not output.**

### HINT:

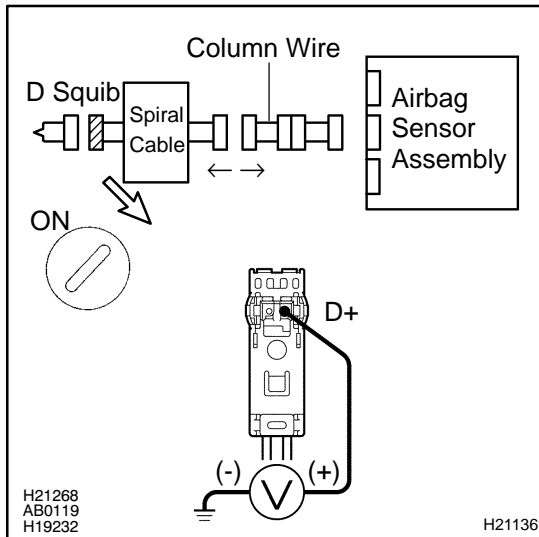
Codes other than code B0103/12 may be output at this time, but they are not relevant to this check.

**NG**

**Replace steering wheel pad (D squib).**

**OK**

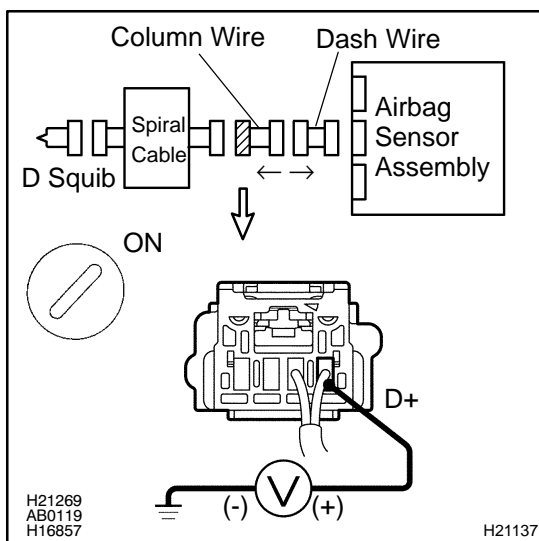
**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

**5 Check spiral cable.****PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect the spiral cable connector from the column wire.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and D+ of the orange spiral cable connector on the steering wheel pad (D squib) side.

**OK:****Voltage: Below 1 V****NG****Replace spiral cable.****OK****6 Check column wire.****PREPARATION:**

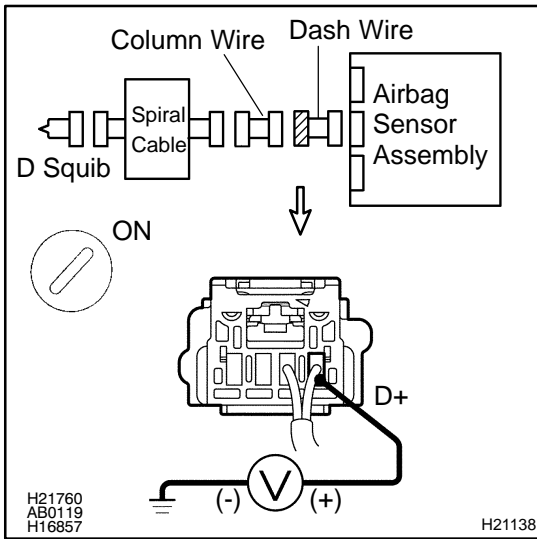
- Turn the ignition switch to LOCK.
- Disconnect the column wire connector from the dash wire.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and D+ of the column wire connector on the spiral cable side.

**OK:****Voltage: Below 1 V****NG****Repair or replace column wire.****OK**

## 7 Check dash wire.



### **CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and D+ of the dash wire connector on the column wire side.

### **OK:**

**Voltage: Below 1 V**

**NG**

**Repair or replace dash wire.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**



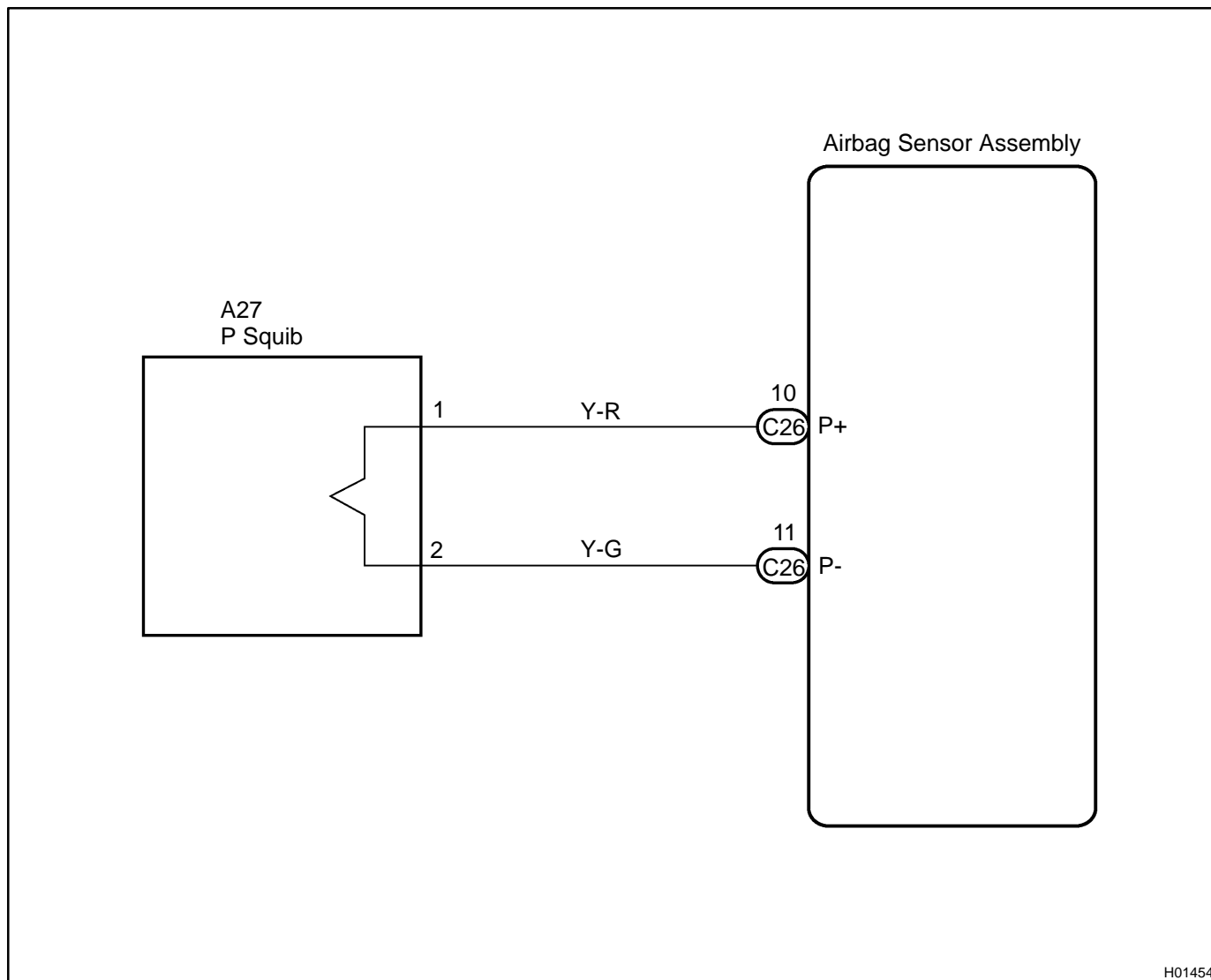
<b>DTC</b>	<b>B0105/53</b>	<b>Short in P Squib Circuit</b>
------------	-----------------	---------------------------------

### CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and the front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3. DTC B0105/53 is recorded when a short is detected in the P squib circuit.

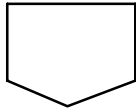
DTC No.	DTC Detecting Condition	Trouble Area
B0105/53	<ul style="list-style-type: none"> <li>▶ Short in P squib circuit</li> <li>▶ P squib malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Front passenger airbag assembly (P squib)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> </ul>

### WIRING DIAGRAM

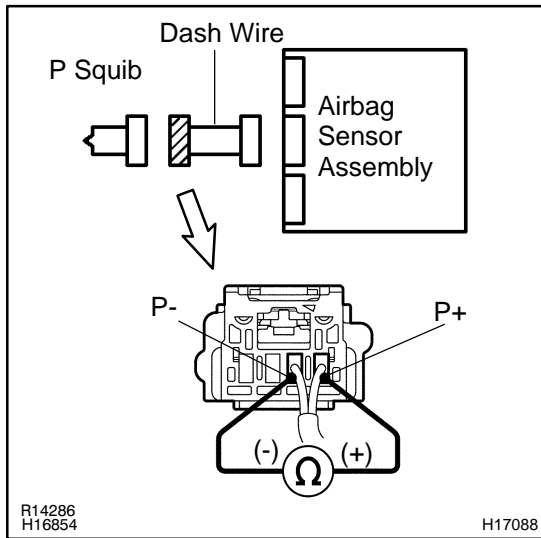


### INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page <a href="#">DI-923</a> ).</b>
----------	---



<b>2</b>	<b>Check dash wire (P squib circuit).</b>
----------	---



**PREPARATION:**

Release the airbag activation prevention mechanism built in the connector of the dash wire on the airbag sensor assembly side (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between P+ and P- of the dash wire connector on the front passenger airbag assembly (P squib) side.

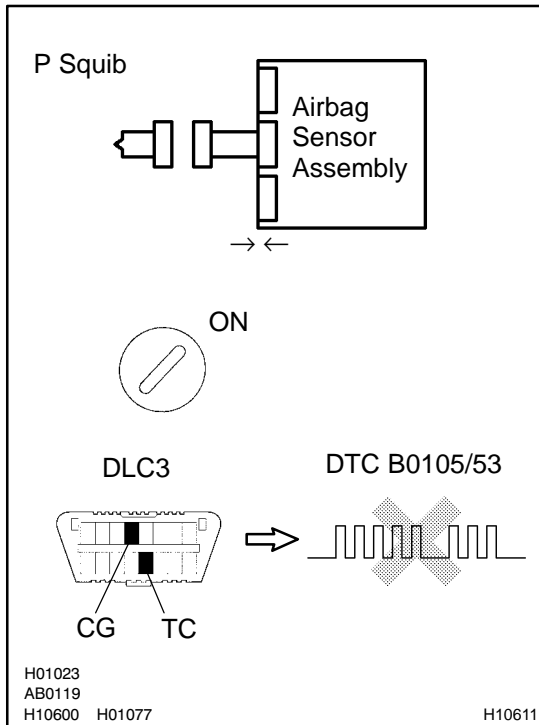
**OK:**

**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Repair or replace dash wire.</b>
-----------	-------------------------------------



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0105/53 is not output.**

#### HINT:

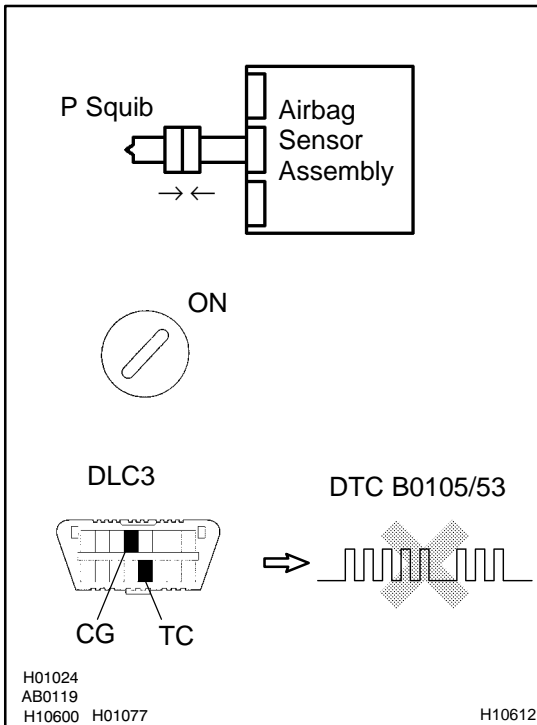
Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly (P squib) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0105/53 is not output.**

### HINT:

Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front passenger airbag assembly (P squib).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0106/54</b>	<b>Open in P Squib Circuit</b>
------------	-----------------	--------------------------------

**CIRCUIT DESCRIPTION**

The P squib circuit consists of the airbag sensor assembly and the front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3 . DTC B0106/54 is recorded when an open is detected in the P squib circuit.

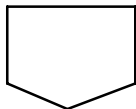
DTC No.	DTC Detecting Condition	Trouble Area
B0106/54	<ul style="list-style-type: none"> <li>▶ Open in P squib circuit</li> <li>▶ P squib malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Front passenger airbag assembly (P squib)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> </ul>

**WIRING DIAGRAM**

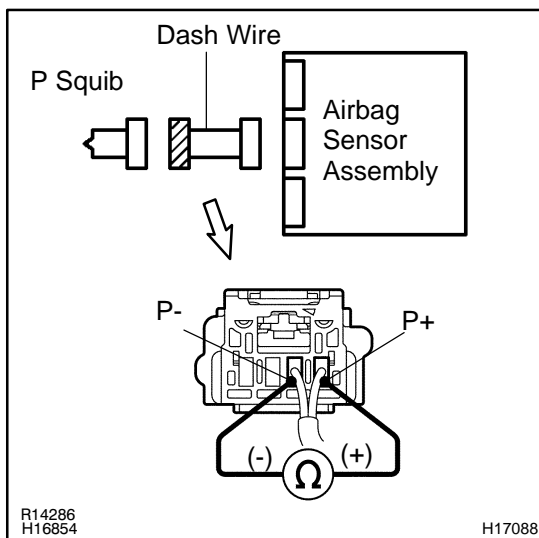
See page DI-732 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check dash wire (P squib circuit).</b>
----------	---



**CHECK:**  
Measure the resistance between P+ and P- of the dash wire connector on the front passenger airbag assembly (P squib) side.

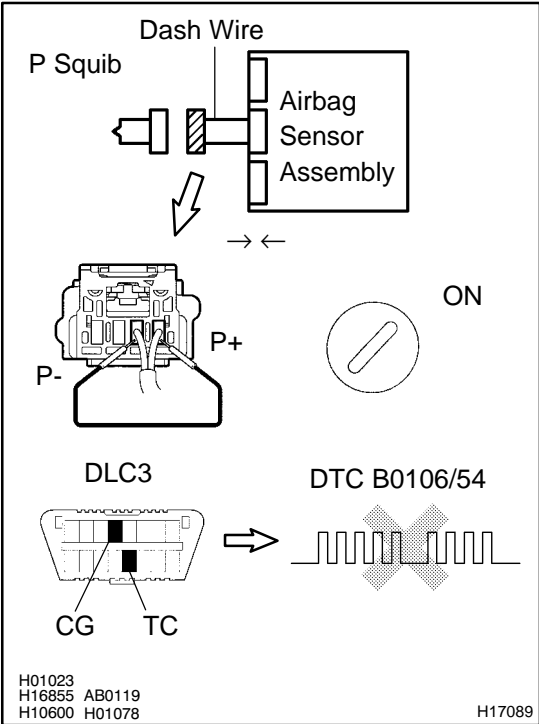
**OK:**  
**Resistance: Below 1 Ω**

<b>NG</b>	<b>Repair or replace dash wire.</b>
-----------	-------------------------------------



**OK**

**3 Check airbag sensor assembly.**



**PREPARATION:**

- (a) Connect the connector to the airbag sensor assembly.
- (b) Using a service wire, connect P+ and P- of the dash wire connector on the front passenger airbag assembly (P squib) side.
- (c) Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page DI-692).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page DI-692).

**OK:**

**DTC B0106/54 is not output.**

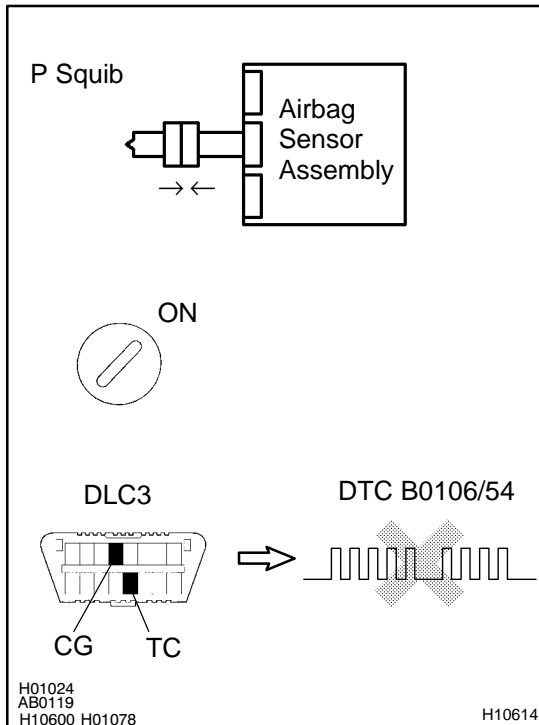
**HINT:**

Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

**NG** Replace airbag sensor assembly.

**OK**

## 4 Check P squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly (P squib) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0106/54 is not output.**

### HINT:

Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front passenger airbag assembly (P squib).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0107/51</b>	<b>Short in P Squib Circuit (to Ground)</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The P squib circuit consists of the airbag sensor assembly and the front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3 . DTC B0107/51 is recorded when ground short is detected in the P squib circuit.

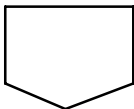
DTC No.	DTC Detecting Condition	Trouble Area
B0107/51	<ul style="list-style-type: none"> <li>▶ Short in P squib circuit (to ground)</li> <li>▶ P squib malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Front passenger airbag assembly (P squib)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> </ul>

**WIRING DIAGRAM**

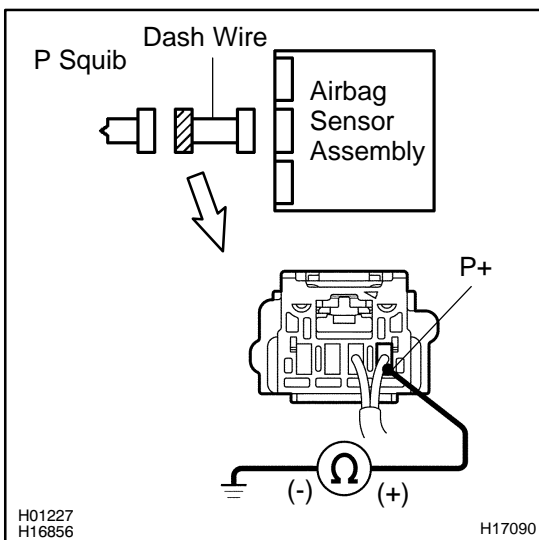
See page DI-732 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



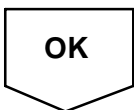
<b>2</b>	<b>Check dash wire (P squib circuit).</b>
----------	---



**CHECK:**  
Measure the resistance between the body ground and P+ of the dash wire connector on the front passenger airbag assembly (P squib) side.

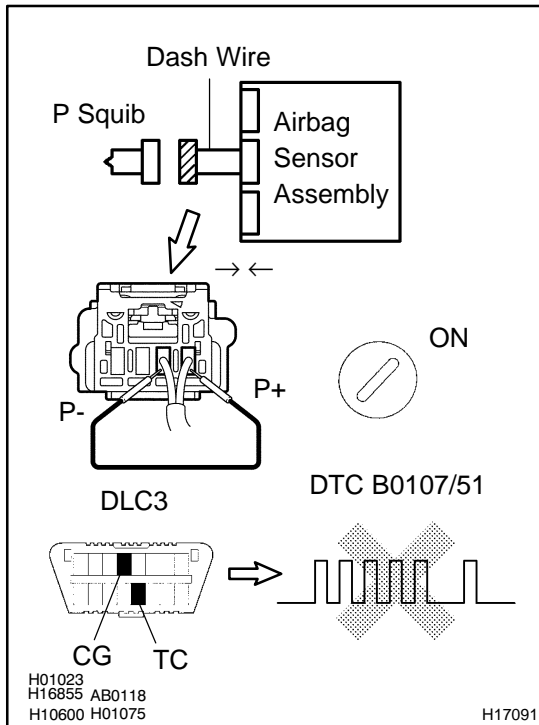
**OK:**  
**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Repair or replace dash wire.</b>
-----------	-------------------------------------





### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect P+ and P- of the dash wire connector on the front passenger airbag assembly (P squib) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0107/51 is not output.**

#### HINT:

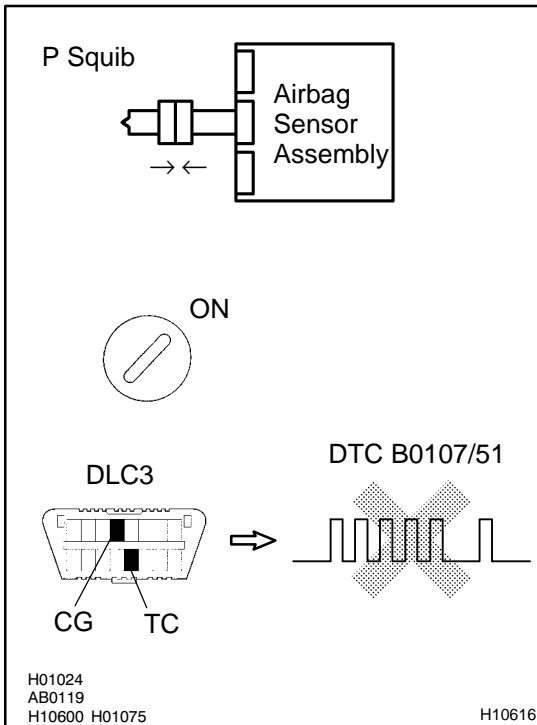
Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly (P squib) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0107/51 is not output.**

### HINT:

Codes other than code B0107/51 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front passenger airbag assembly (P squib).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0108/52</b>	<b>Short in P Squib Circuit (to B+)</b>
------------	-----------------	---

## CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and the front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B0108/52 is recorded when a B+ short is detected in the P squib circuit.

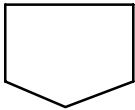
DTC No.	DTC Detecting Condition	Trouble Area
B0108/52	<ul style="list-style-type: none"> <li>▶ Short in P squib circuit (to B+)</li> <li>▶ P squib malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Front passenger airbag assembly (P squib)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> </ul>

## WIRING DIAGRAM

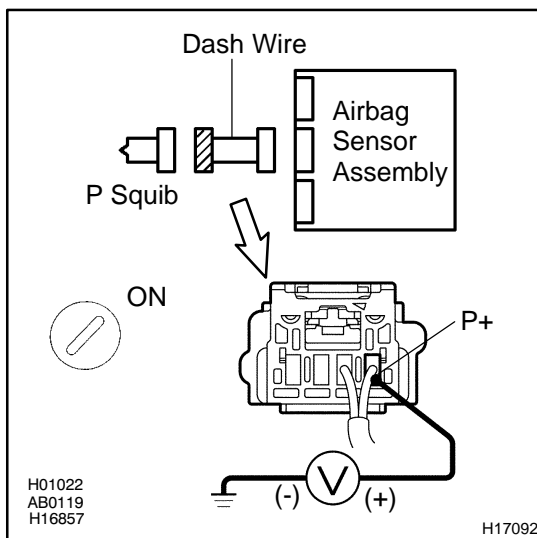
See page DI-732 .

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check dash wire (P squib circuit).</b>
----------	---



### PREPARATION:

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and P+ of the dash wire connector on the front passenger airbag assembly (P squib) side.

### OK:

**Voltage: Below 1 V**

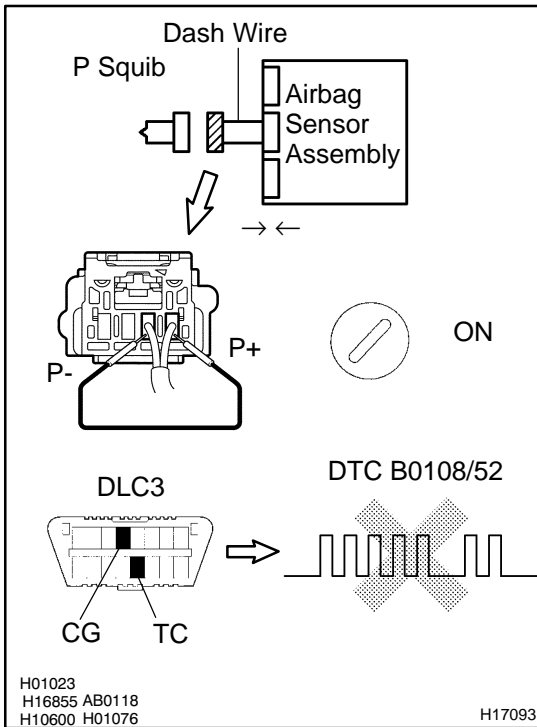
**NG**

**Repair or replace dash wire.**



**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect P+ and P- of the dash wire connector on the front passenger airbag assembly (P squib) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0108/52 is not output.**

#### HINT:

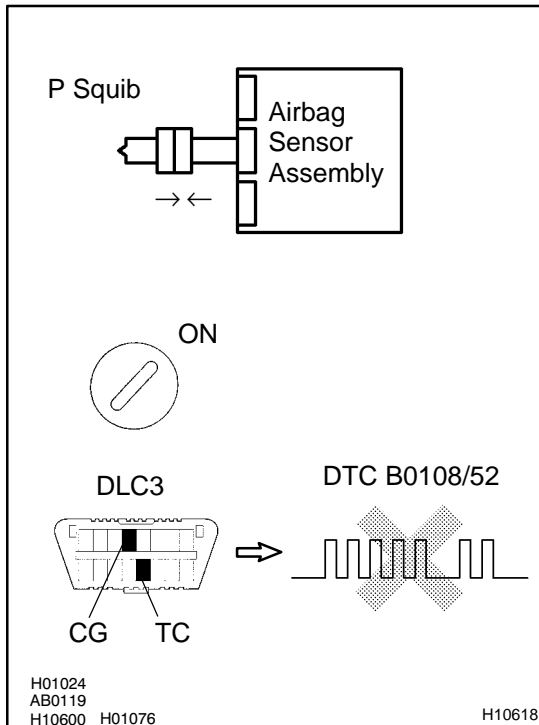
Codes other than code B0108/52 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P squib.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly (P squib) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0108/52 is not output.**

### HINT:

Codes other than code B0108/52 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front passenger airbag assembly (P squib).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0110/43</b>	<b>Short in Side Squib RH Circuit</b>
------------	-----------------	---------------------------------------

**CIRCUIT DESCRIPTION**

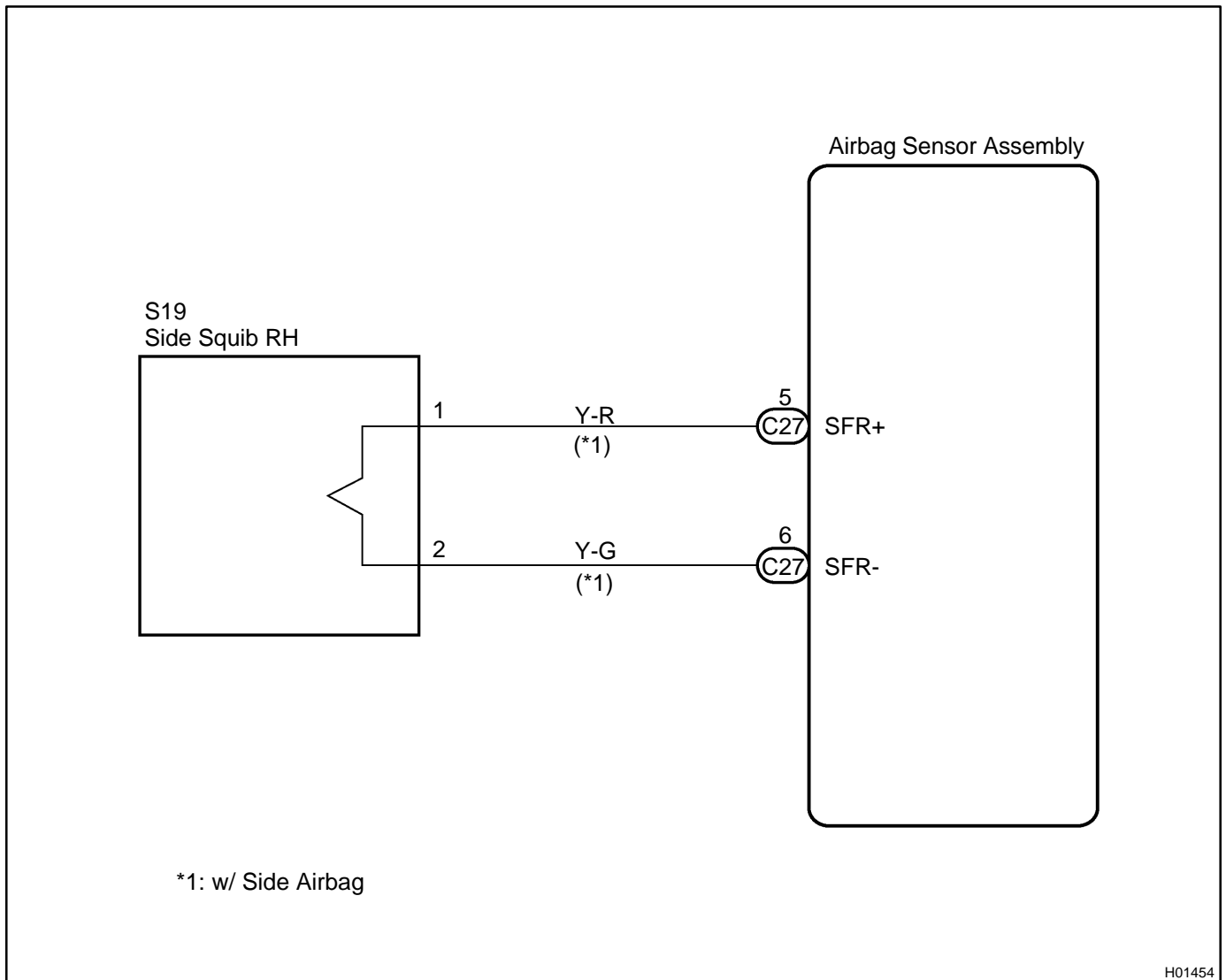
The side squib RH circuit consists of the airbag sensor assembly and the side airbag assembly RH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3. DTC B0110/43 is recorded when a short is detected in the side squib RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0110/43	<ul style="list-style-type: none"> <li>▶ Short in side squib RH circuit</li> <li>▶ Side squib RH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Side airbag assembly RH (Side squib RH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 2 wire</li> </ul>

**HINT:**

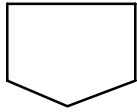
DTC B0110/43 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

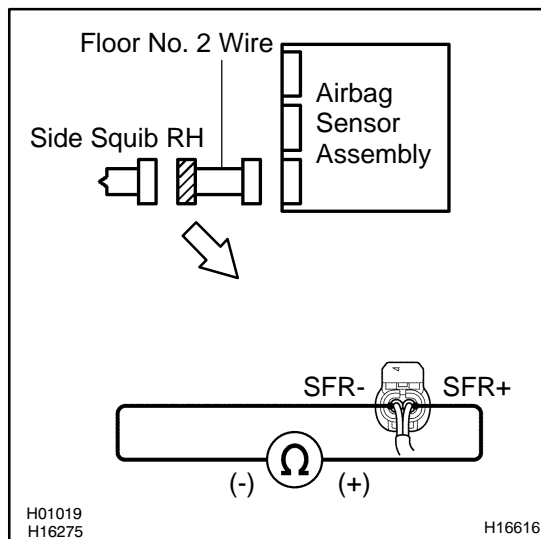


## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-923](#) ).



2 Check floor No. 2 wire (side squib RH circuit).

**PREPARATION:**

Release the airbag activation prevention mechanism built in the connector of the floor No. 2 wire on the airbag sensor assembly side (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between SFR+ and SFR- of the floor No. 2 wire connector on the side airbag assembly RH (side squib RH) side.

**OK:**

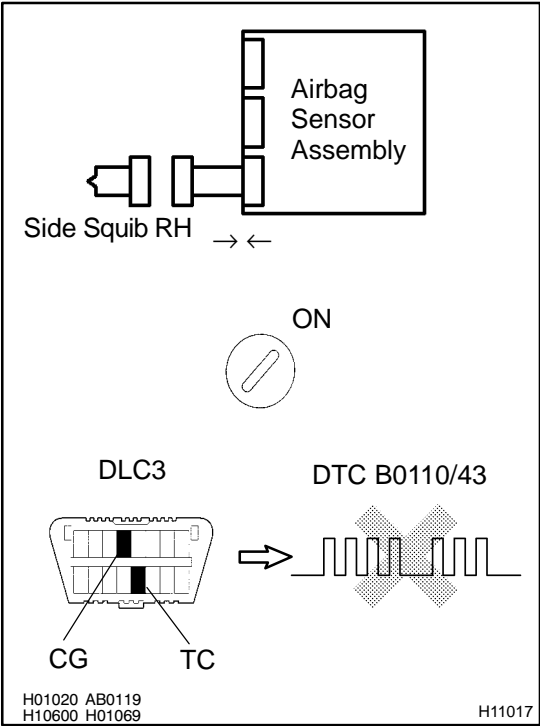
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace floor No. 2 wire.**

**OK**

**3 Check airbag sensor assembly.**



**PREPARATION:**

- (a) Connect the connector to the airbag sensor assembly.
- (b) Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page DI-692).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page DI-692).

**OK:**

**DTC B0110/43 is not output.**

**HINT:**

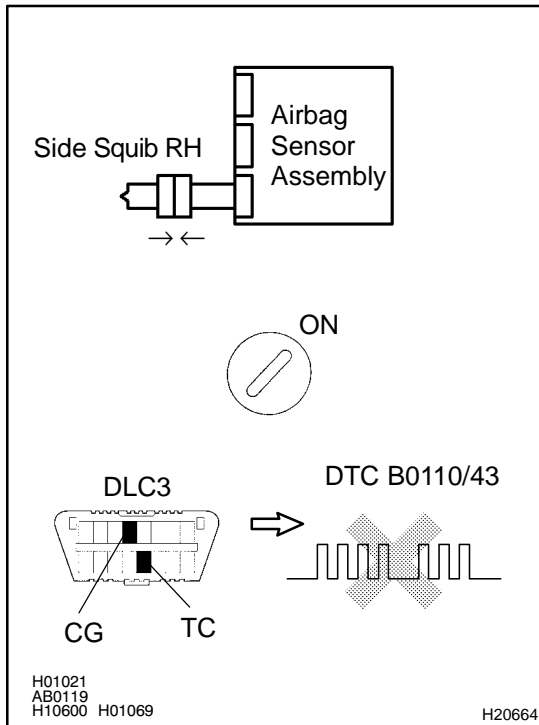
Codes other than code B0110/43 may be output at this time, but they are not relevant to this check.

**NG** Replace airbag sensor assembly.

**OK**



## 4 Check side squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly RH (side squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0110/43 is not output.**

### HINT:

Codes other than code B0110/43 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly RH (side squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0111/44</b>	<b>Open in Side Squib RH Circuit</b>
------------	-----------------	--------------------------------------

**CIRCUIT DESCRIPTION**

The side squib RH circuit consists of the airbag sensor assembly and the side airbag assembly RH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3 . DTC B0111/44 is recorded when an open is detected in the side squib RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0111/44	<ul style="list-style-type: none"> <li>▶Open in side squib RH circuit</li> <li>▶Side squib RH malfunction</li> <li>▶Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶Side airbag assembly RH (Side squib RH)</li> <li>▶Airbag sensor assembly</li> <li>▶Floor No. 2 wire</li> </ul>

**HINT:**

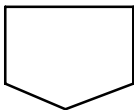
DTC B0111/44 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

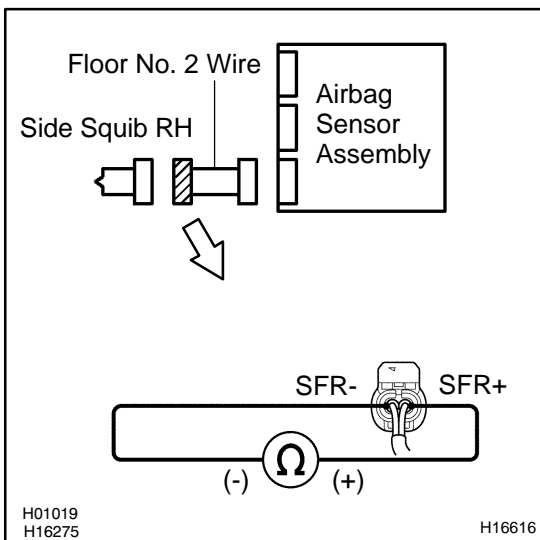
See page DI-745 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 2 wire (side squib RH circuit).</b>
----------	--



**CHECK:**

Measure the resistance between SFR+ and SFR- of the floor No. 2 wire connector on the side airbag assembly RH (side squib RH) side.

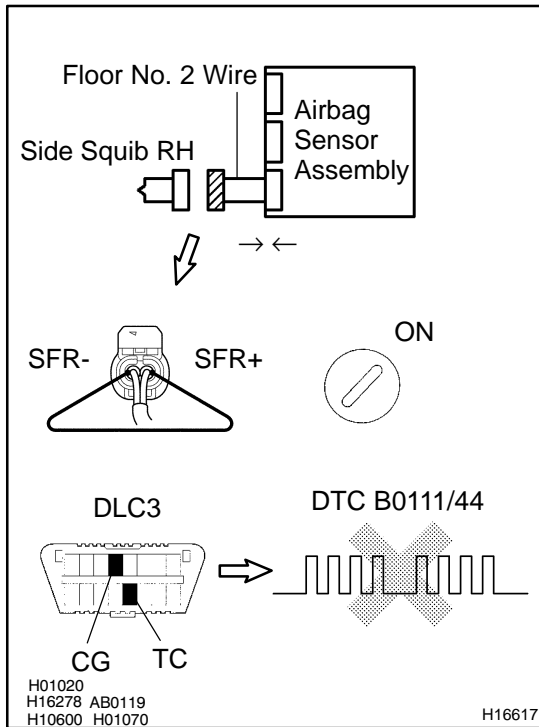
**OK:**

**Resistance: Below 1 Ω**

<b>NG</b>	<b>Repair or replace floor No. 2 wire.</b>
-----------	--



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFR+ and SFR- of the floor No. 2 wire connector on the side airbag assembly RH (side squib RH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0111/44 is not output.**

#### HINT:

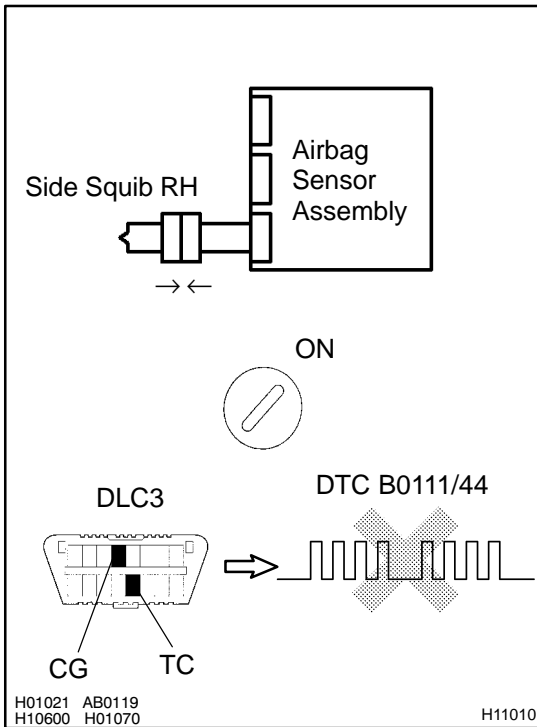
Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check side squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly RH (side squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0111/44 is not output.**

### HINT:

Codes other than code B0111/44 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly RH (side squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0112/41</b>	<b>Short in Side Squib RH Circuit (to Ground)</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The side squib RH circuit consists of the airbag sensor assembly and the side airbag assembly RH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3 . DTC B0112/41 is recorded when ground short is detected in the side squib RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0112/41	<ul style="list-style-type: none"> <li>▶ Short in side squib RH circuit (to ground)</li> <li>▶ Side squib RH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Side airbag assembly RH (Side squib RH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 2 wire</li> </ul>

**HINT:**

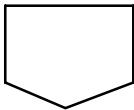
DTC B0112/41 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

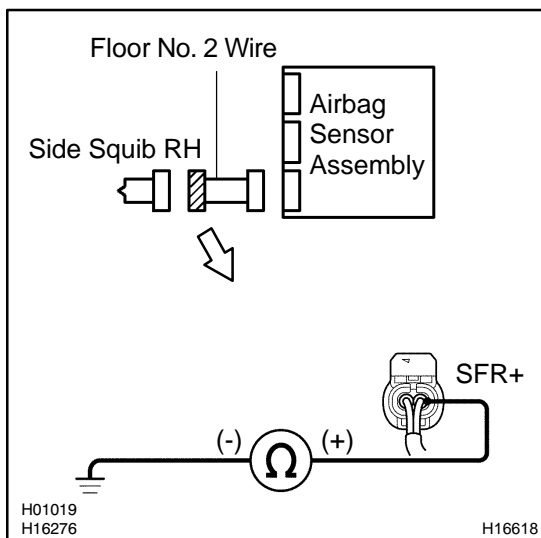
See page DI-745 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 2 wire (side squib RH circuit).</b>
----------	--



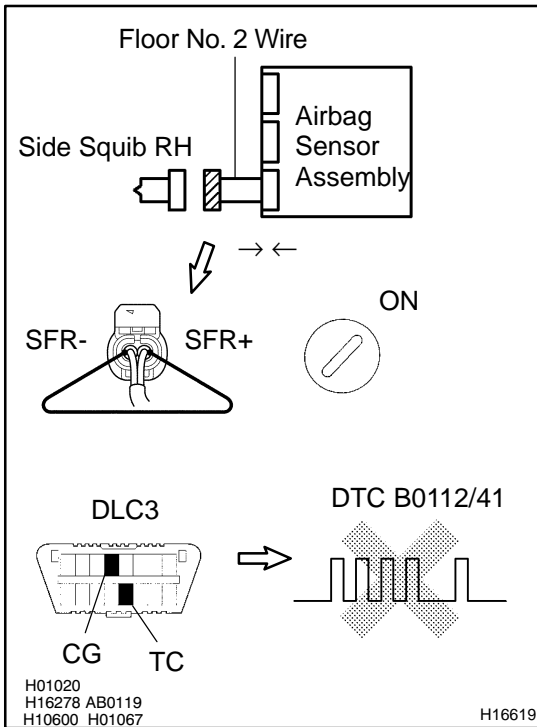
**CHECK:**  
Measure the resistance between the body ground and SFR+ of the floor No. 2 wire connector on the side airbag assembly RH (side squib RH) side.

**OK:**  
**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Repair or replace floor No. 2 wire.</b>
-----------	--



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFR+ and SFR- of the floor No. 2 wire connector on the side airbag assembly RH (side squib RH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0112/41 is not output.**

#### HINT:

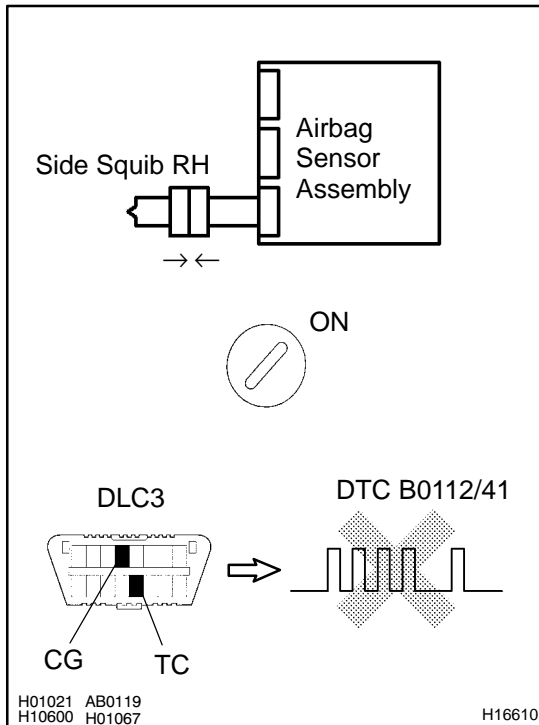
Codes other than code B0112/41 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check side squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly RH (side squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0112/41 is not output.**

### HINT:

Codes other than code B0112/41 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly RH (side squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0113/42</b>	<b>Short in Side Squib RH Circuit (to B+)</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The side squib RH circuit consists of the airbag sensor assembly and the side airbag assembly RH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3 . DTC B0113/42 is recorded when a B+ short is detected in the side squib RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0113/42	<ul style="list-style-type: none"> <li>▶ Short in side squib RH circuit (to B+)</li> <li>▶ Side squib RH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Side airbag assembly RH (Side squib RH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 2 wire</li> </ul>

**HINT:**

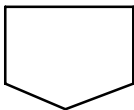
DTC B0113/42 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

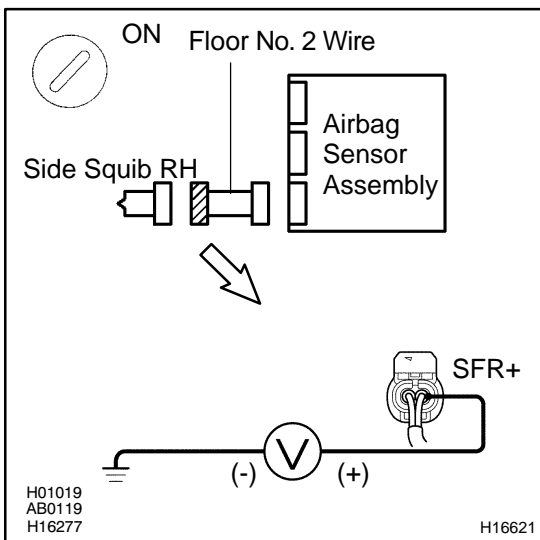
See page DI-745 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 2 wire (side squib RH circuit).</b>
----------	--



**PREPARATION:**

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and SFR+ of the floor No. 2 wire connector on the side airbag assembly RH (side squib RH) side.

**OK:**

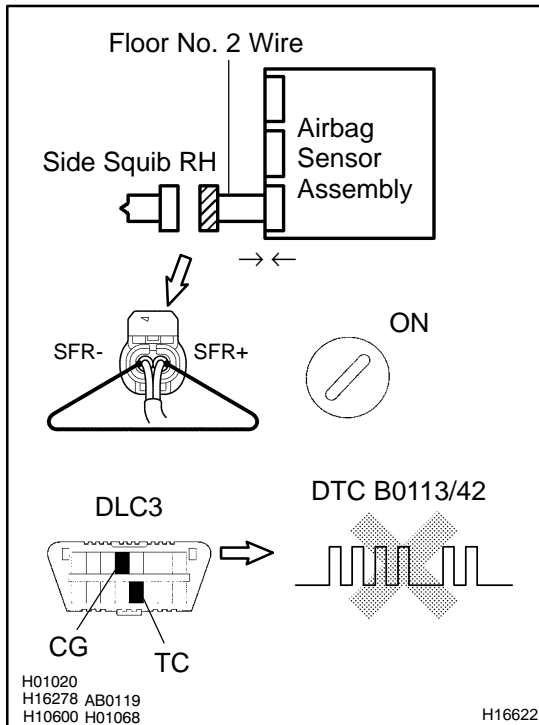
**Voltage: Below 1 V**

<b>NG</b>	<b>Repair or replace floor No. 2 wire.</b>
-----------	--





### 3 Check airbag sensor assembly.



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFR+ and SFR- of the floor No. 2 wire connector on the side airbag assembly RH (side squib RH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0113/42 is not output.**

#### HINT:

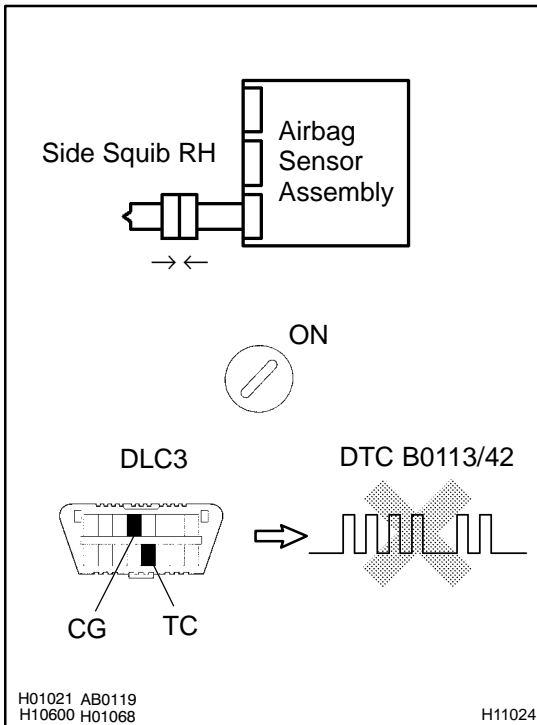
Codes other than code B0113/42 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check side squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly RH (side squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0113/42 is not output.**

### HINT:

Codes other than code B0113/42 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly RH (side squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0115/47</b>	<b>Short in Side Squib LH Circuit</b>
------------	-----------------	---------------------------------------

**CIRCUIT DESCRIPTION**

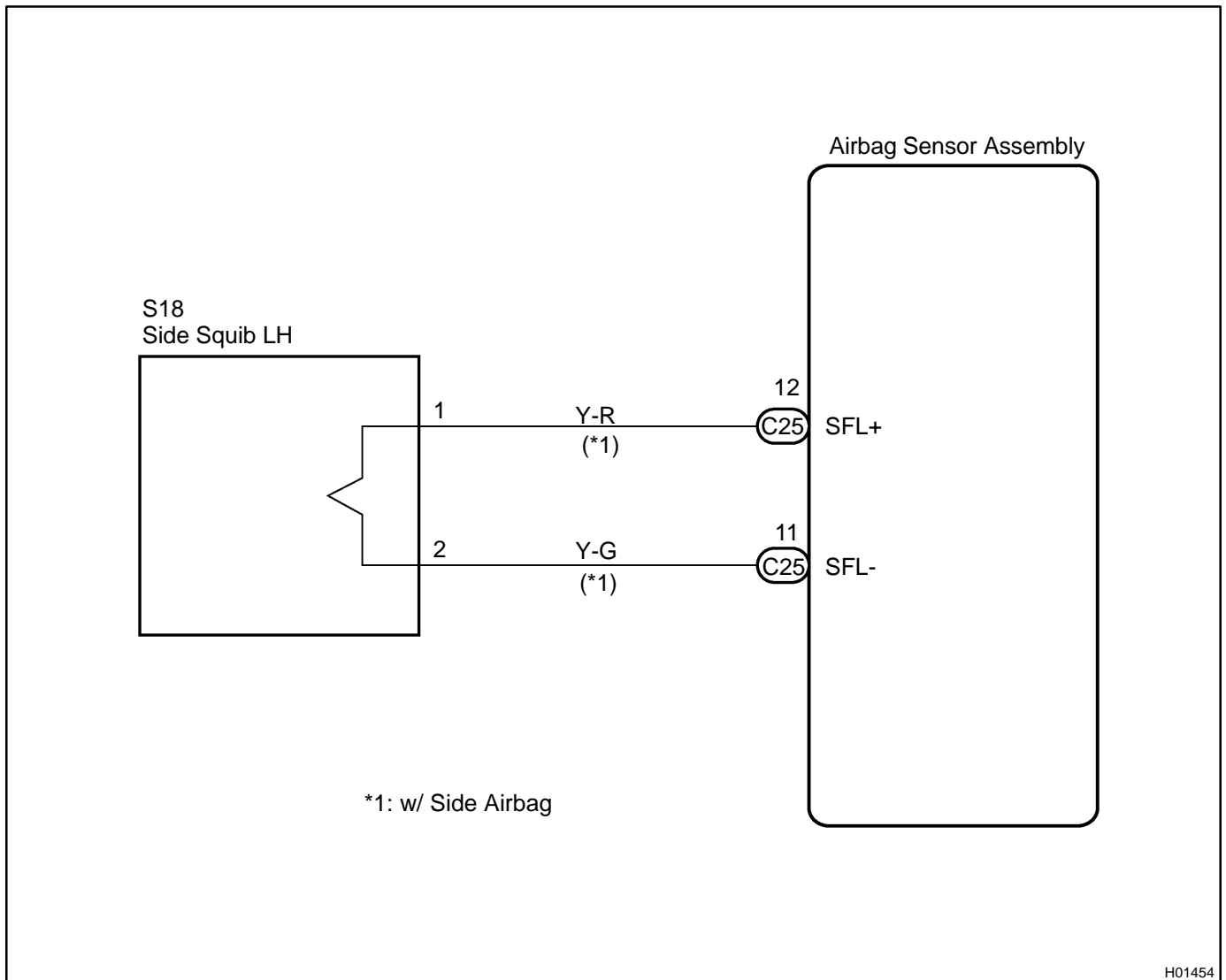
The side squib LH circuit consists of the airbag sensor assembly and the side airbag assembly LH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3. DTC B0115/47 is recorded when a short is detected in the side squib LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0115/47	<ul style="list-style-type: none"> <li>▶ Short in side squib LH circuit</li> <li>▶ Side squib LH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Side airbag assembly LH (Side squib LH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 1 wire</li> </ul>

**HINT:**

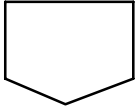
DTC B0115/47 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

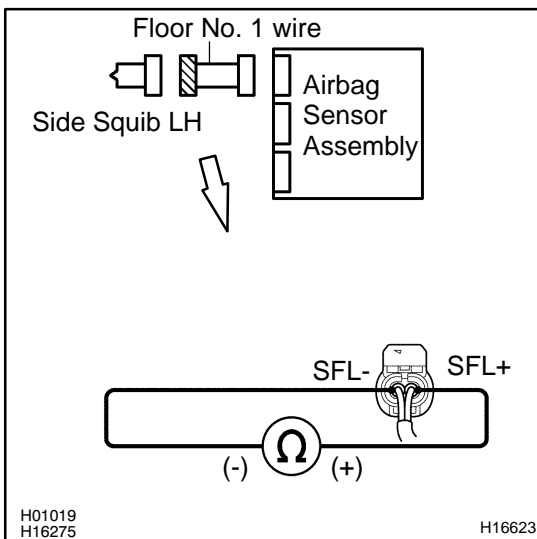


## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-923](#) ).



2 Check floor No. 1 wire (side squib LH circuit).

**PREPARATION:**

Release the airbag activation prevention mechanism built in the connector of the floor No. 1 wire on the airbag sensor assembly side (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between SFL+ and SFL- of the floor No. 1 wire connector on the side airbag assembly LH (side squib LH) side.

**OK:**

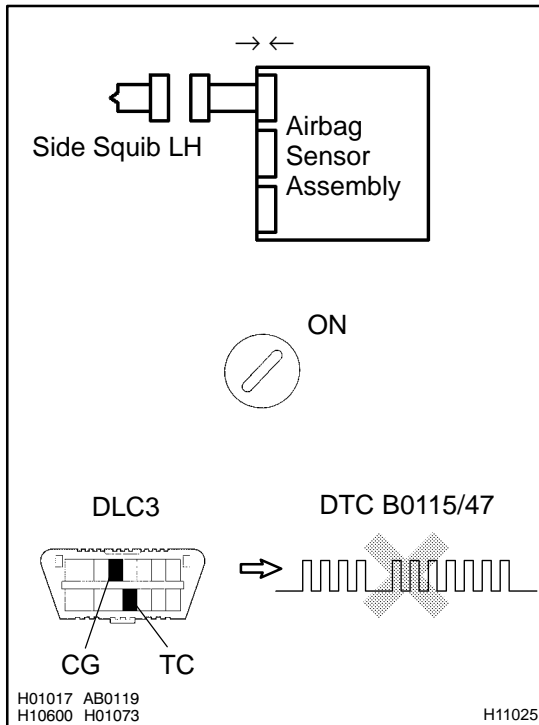
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace floor No. 1 wire.**

**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0115/47 is not output.**

#### HINT:

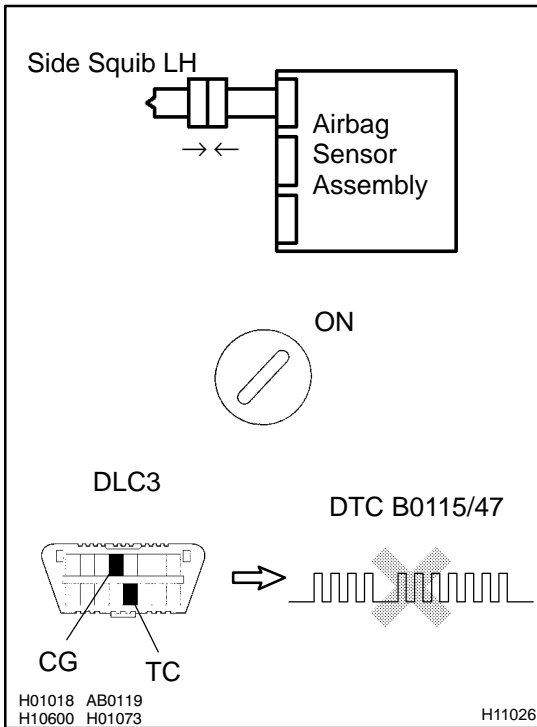
Codes other than code B0115/47 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check side squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly LH (side squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0115/47 is not output.**

### HINT:

Codes other than code B0115/47 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly LH (side squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0116/48</b>	<b>Open in Side Squib LH Circuit</b>
------------	-----------------	--------------------------------------

**CIRCUIT DESCRIPTION**

The side squib LH circuit consists of the airbag sensor assembly and the side airbag assembly LH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3 . DTC B0116/48 is recorded when an open is detected in the side squib LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0116/48	<ul style="list-style-type: none"> <li>▶Open in side squib LH circuit</li> <li>▶Side squib LH malfunction</li> <li>▶Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶Side airbag assembly LH (Side squib LH)</li> <li>▶Airbag sensor assembly</li> <li>▶Floor No. 1 wire</li> </ul>

**HINT:**

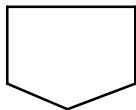
DTC B0116/48 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

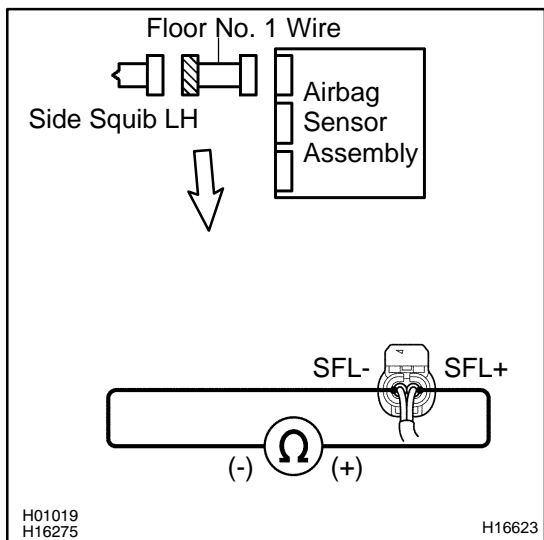
See page DI-758 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 1 wire (side squib LH circuit).</b>
----------	--



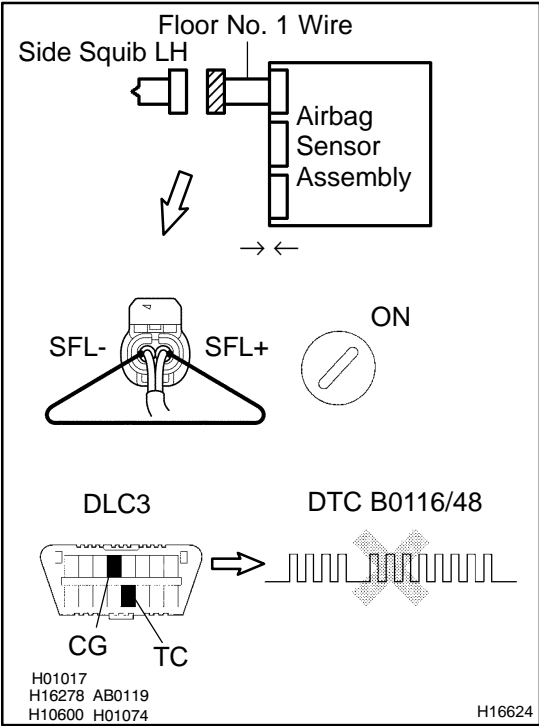
**CHECK:**  
Measure the resistance between SFL+ and SFL- of the floor No. 1 wire connector on the side airbag assembly LH (side squib LH) side.

**OK:**  
**Resistance: Below 1 Ω**

<b>NG</b>	<b>Repair or replace floor No. 1 wire.</b>
-----------	--



**3 Check airbag sensor assembly.**



**PREPARATION:**

- (a) Connect the connector to the airbag sensor assembly.
- (b) Using a service wire, connect SFL+ and SFL- of the floor No. 1 wire connector on the side airbag assembly LH (side squib LH) side.
- (c) Connect the negative (-) terminal cable to the battery, and wait at least 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page DI-692 ).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page DI-692 ).

**OK:**

**DTC B0116/48 is not output.**

**HINT:**

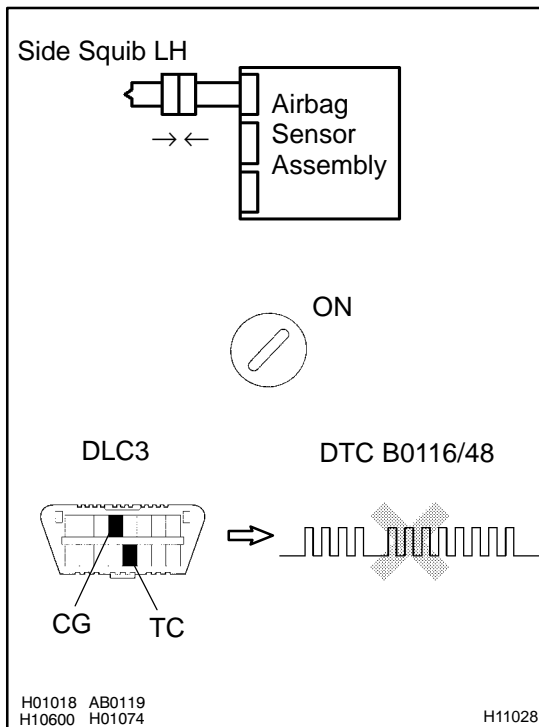
Codes other than code B0116/48 may be output at this time, but they are not relevant to this check.

**NG** Replace airbag sensor assembly.

**OK**



## 4 Check side squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly LH (side squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0116/48 is not output.**

### HINT:

Codes other than code B0116/48 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly LH (side squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0117/45</b>	<b>Short in Side Squib LH Circuit (to Ground)</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The side squib LH circuit consists of the airbag sensor assembly and the side airbag assembly LH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3 . DTC B0117/45 is recorded when ground short is detected in the side squib LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0117/45	<ul style="list-style-type: none"> <li>▶Short in side squib LH circuit (to ground)</li> <li>▶Side squib LH malfunction</li> <li>▶Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶Side airbag assembly LH (Side squib LH)</li> <li>▶Airbag sensor assembly</li> <li>▶Floor No. 1 wire</li> </ul>

**HINT:**

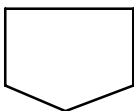
DTC B0117/45 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

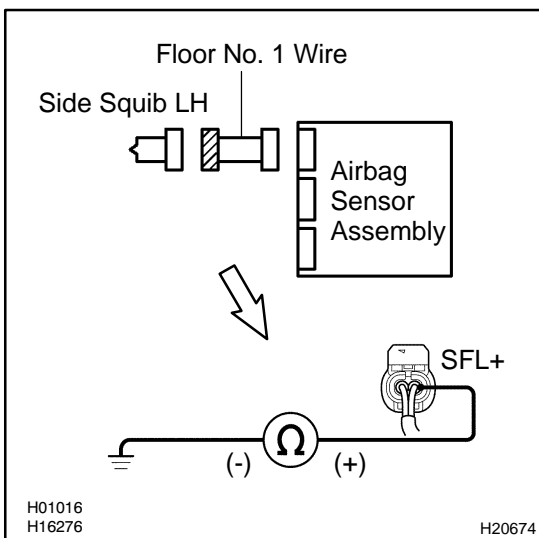
See page DI-758 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 1 wire (side squib LH circuit).</b>
----------	--



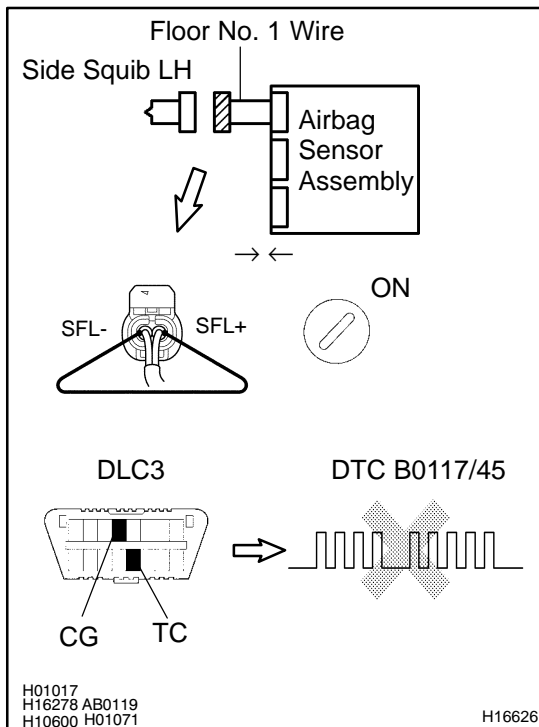
**CHECK:**  
Measure the resistance between the body ground and SFL+ of the floor No. 1 wire connector on the side airbag assembly LH (side squib LH) side.

**OK:**  
**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Repair or replace floor No. 1 wire.</b>
-----------	--



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFL+ and SFL- of the floor No. 1 wire connector on the side airbag assembly LH (side squib LH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0117/45 is not output.**

#### HINT:

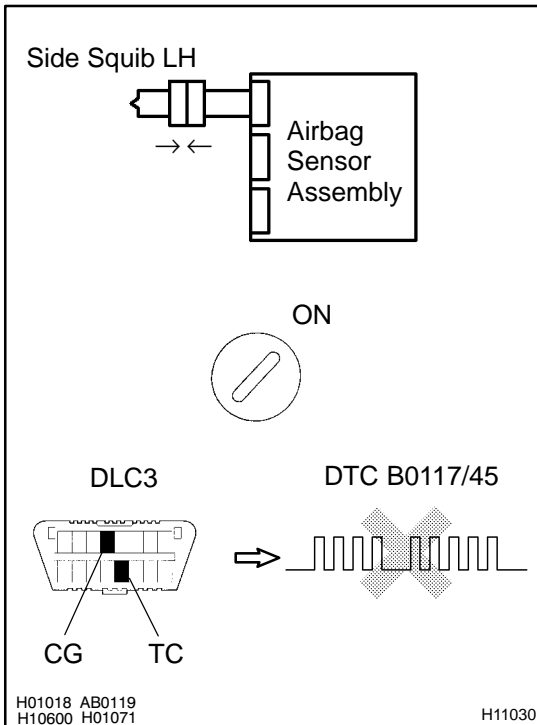
Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check side squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly LH (side squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0117/45 is not output.**

### HINT:

Codes other than code B0117/45 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly LH (side squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0118/46</b>	<b>Short in Side Squib LH Circuit (to B+)</b>
------------	-----------------	---

## CIRCUIT DESCRIPTION

The side squib LH circuit consists of the airbag sensor assembly and the side airbag assembly LH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3. DTC B0118/46 is recorded when a B+ short is detected in the side squib LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0118/46	<ul style="list-style-type: none"> <li>▶ Short in side squib LH circuit (to B+)</li> <li>▶ Side squib LH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Side airbag assembly LH (Side squib LH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 1 wire</li> </ul>

### HINT:

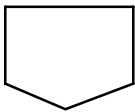
DTC B0118/46 is indicated only for the vehicle equipped with the side airbag.

## WIRING DIAGRAM

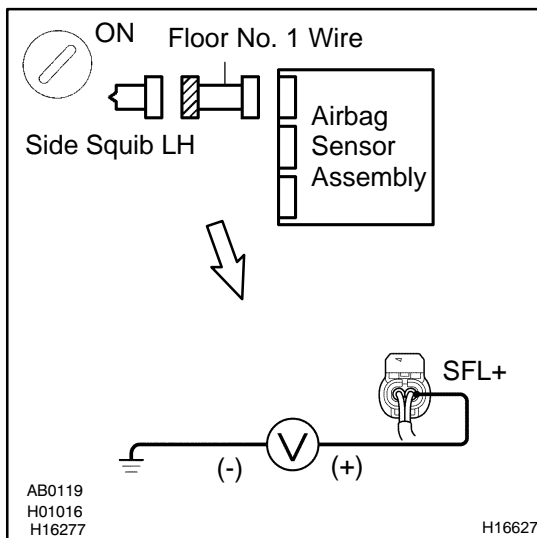
See page DI-692.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-692).</b>
----------	--



<b>2</b>	<b>Check floor No. 1 wire (side squib LH circuit).</b>
----------	--



### CHECK:

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and SFL+ of the floor No. 1 wire connector on the side airbag assembly LH (side squib LH) side.

### OK:

**Voltage: Below 1 V**



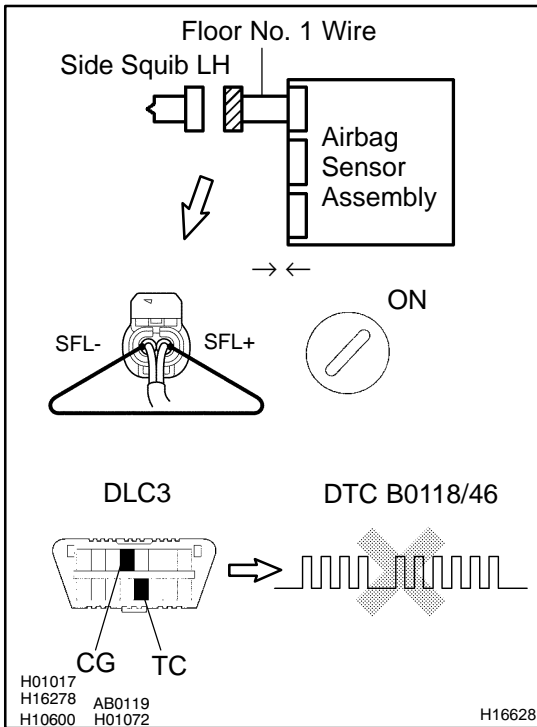
**NG**

**Repair or replace floor No. 1 wire.**



**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect SFL+ and SFL- of the floor No. 1 wire connector on the side airbag assembly LH (side squib LH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0118/46 is not output.**

#### HINT:

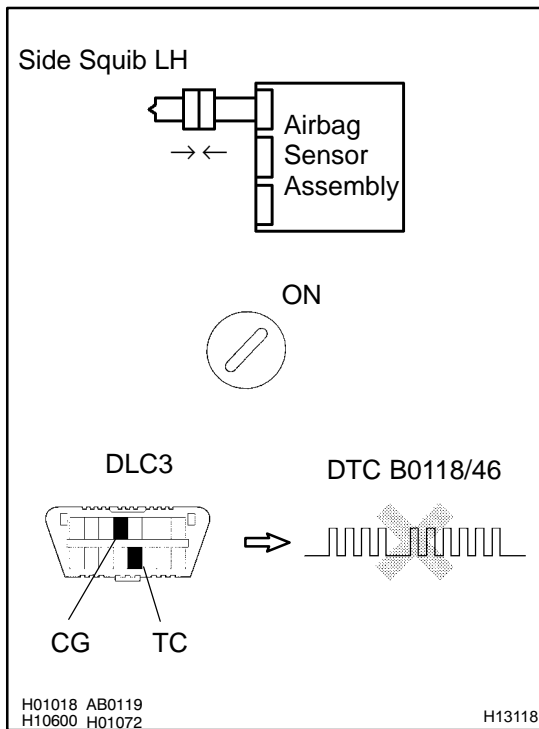
Codes other than code B0118/46 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check side squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the side airbag assembly LH (side squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0118/46 is not output.**

### HINT:

Codes other than code B0118/46 may be output at this time, but they are not relevant to this check.

**NG**

**Replace side airbag assembly LH (side squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0126/B0127/27</b>	<b>Seat Belt Buckle Switch LH Malfunction</b>
------------	-----------------------	---

**CIRCUIT DESCRIPTION**

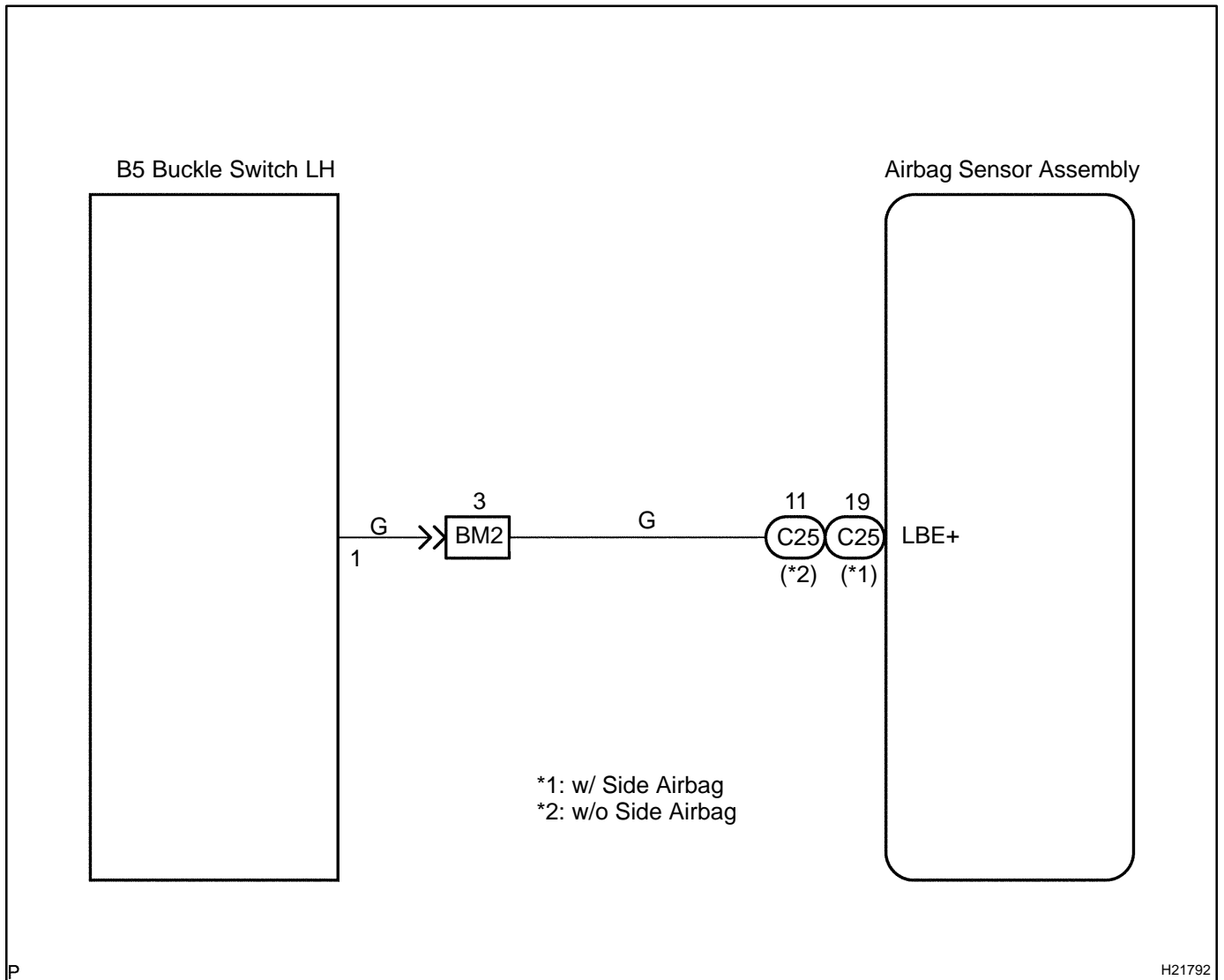
The seat belt buckle switch LH malfunction circuit consists of the airbag sensor assembly and the front seat inner belt LH (seat belt buckle switch LH).

For details of the function of each component, see OPERATION on page RS-3 .

DTC B0126/B0127/27 is recorded when a malfunction is detected in the seat belt buckle switch LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0126/B0127/27	▶Seat belt buckle switch LH circuit malfunction	<ul style="list-style-type: none"> <li>▶Front seat inner belt LH (Seat belt buckle switch LH)</li> <li>▶Airbag sensor assembly</li> <li>▶Floor No. 1 wire</li> <li>▶Front seat wire LH</li> </ul>

**WIRING DIAGRAM**

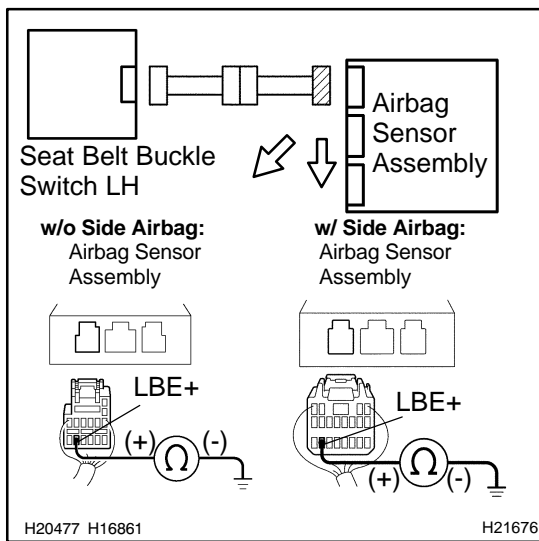




## INSPECTION PROCEDURE

**1 Prepare for inspection (See step 1 on page DI-692 ).**

**2 Check wire harness (to ground).**

**CHECK:**

Measure the resistance between the body ground and LBE+ of the connector on the airbag sensor assembly side between the front seat inner belt LH (seat belt buckle switch LH) and the airbag sensor assembly.

**OK:**

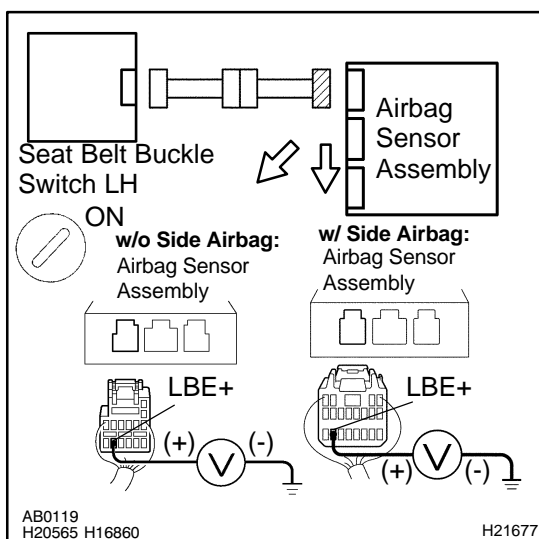
**Resistance: 1 MΩ or Higher**

**NG**

**Go to step 7.**

**OK**

**3 Check wire harness (to B+).**

**PREPARATION:**

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and LBE+ of the connector on the airbag sensor assembly side between the front seat inner belt LH (seat belt buckle switch LH) and the airbag sensor assembly.

**OK:**

**Voltage: Below 1 V**

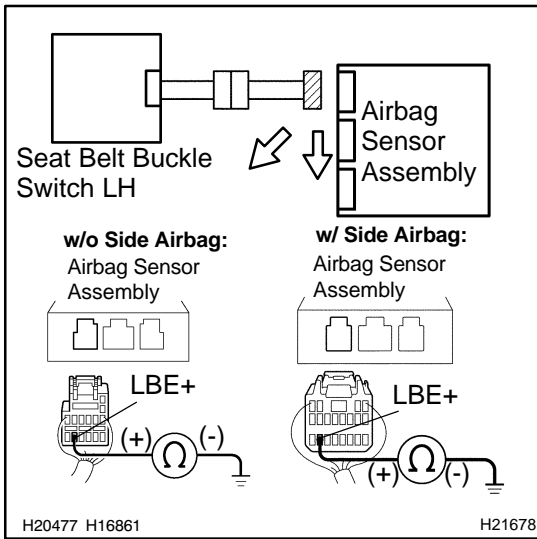
**NG**

**Go to step 8.**

**OK**

2004 LAND CRUISER (RM1071U)

#### 4 Check front seat inner belt LH.



#### PREPARATION:

- Connect the connector of the front seat inner belt LH (seat belt buckle switch LH).
- Unlock the seat belt for the driver's seat.

#### CHECK:

Measure the resistance between the body ground and LBE+ of the connector on the airbag sensor assembly side between the front seat inner belt LH (seat belt buckle switch LH) and the airbag sensor assembly.

#### OK:

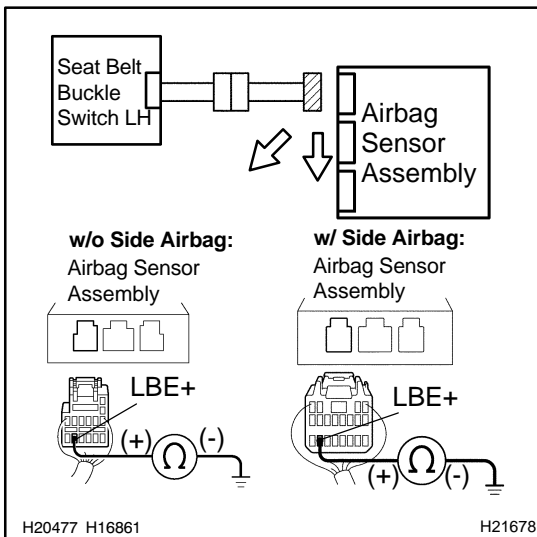
Resistance: 1 k $\Omega$  - 1.6 k $\Omega$

NG

Replace front seat inner belt LH.

OK

#### 5 Check front seat inner belt LH.



#### PREPARATION:

Lock the seat belt for the driver's seat.

#### CHECK:

Measure the resistance between the body ground and LBE+ of the connector on the airbag sensor assembly side between the front seat inner belt LH (seat belt buckle switch LH) and the airbag sensor assembly.

#### OK:

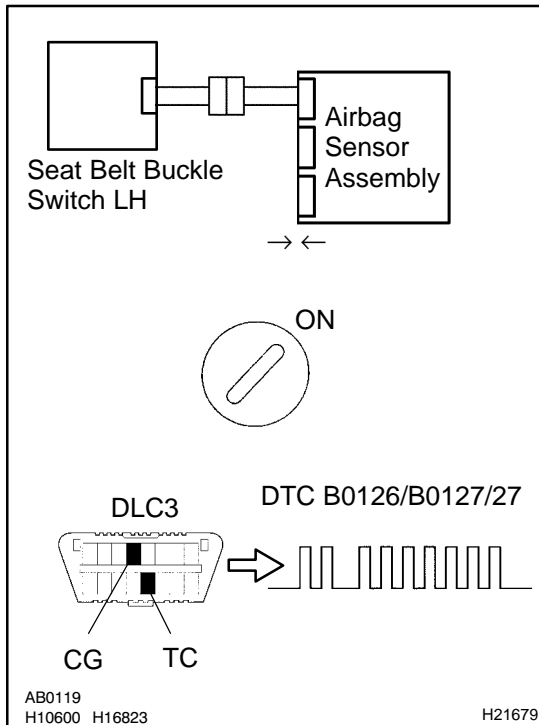
Resistance: 100  $\Omega$  - 500  $\Omega$

NG

Replace front seat inner belt LH.

OK

## 6 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0126/B0127/27 is not output.**

### HINT:

Codes other than code B0126/B0127/27 may be output at this time, but they are not relevant to this check.

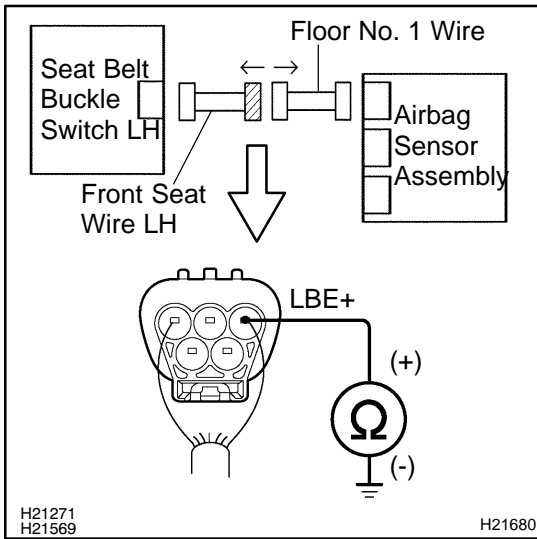
**NG**

**Replace airbag sensor assembly.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

## 7 Check front seat wire LH (to ground).



### PREPARATION:

Disconnect the front seat wire LH connector from the floor No. 1 wire.

### CHECK:

Measure the resistance between the body ground and LBE+ of the front seat wire LH connector on the floor No. 1 wire side.

### OK:

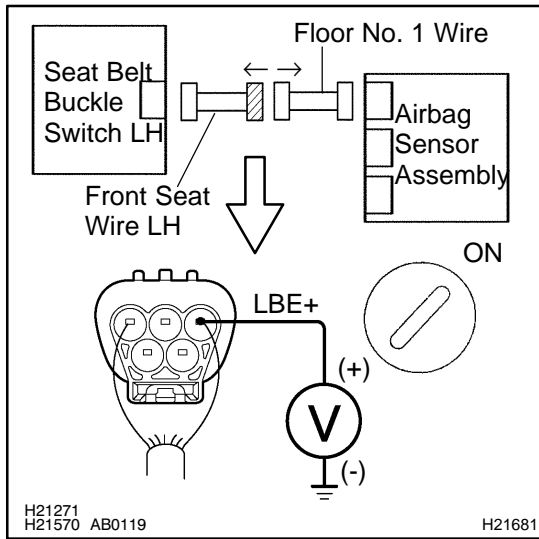
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace front seat wire LH.**

**OK**

**Repair or replace floor No. 1 wire.**

**8 Check front seat wire LH (to B+).****PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the front seat wire LH connector from the floor No. 1 wire.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and LBE+ of the front seat wire LH connector on the floor No. 1 wire side.

**OK:****Voltage: Below 1 V****NG****Repair or replace front seat wire LH.****OK****Repair or replace floor No. 1 wire.**

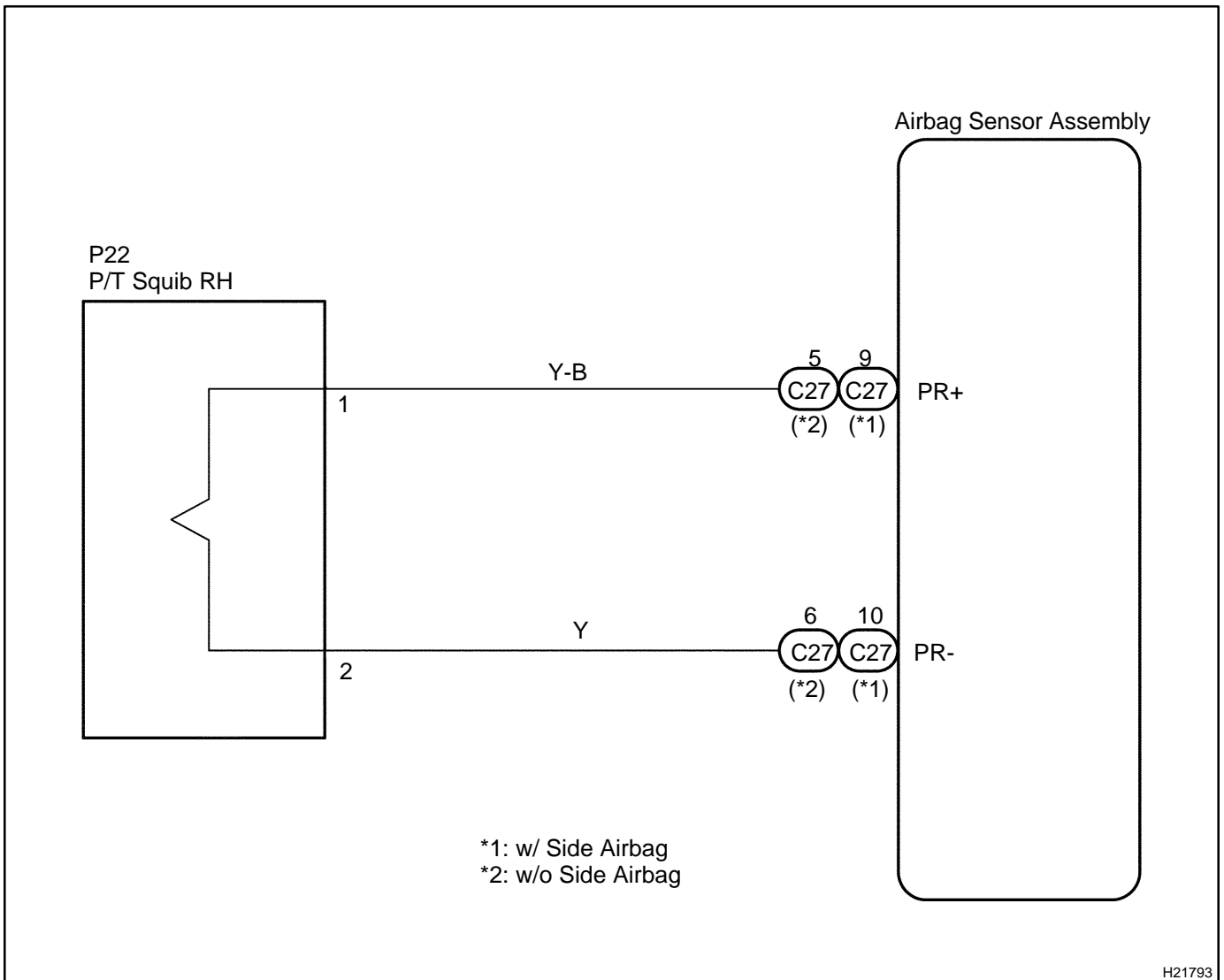
<b>DTC</b>	<b>B0130/63</b>	<b>Short in P/T Squib RH Circuit</b>
------------	-----------------	--------------------------------------

### CIRCUIT DESCRIPTION

The P/T squib RH circuit consists of the airbag sensor assembly and the seat belt pretensioner RH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3. DTC B0130/63 is recorded when a short is detected in the P/T squib RH circuit.

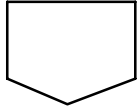
DTC No.	DTC Detecting Condition	Trouble Area
B0130/63	<ul style="list-style-type: none"> <li>▶ Short in P/T squib RH circuit</li> <li>▶ P/T squib RH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Seat belt pretensioner RH (P/T squib RH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 2 wire</li> </ul>

### WIRING DIAGRAM

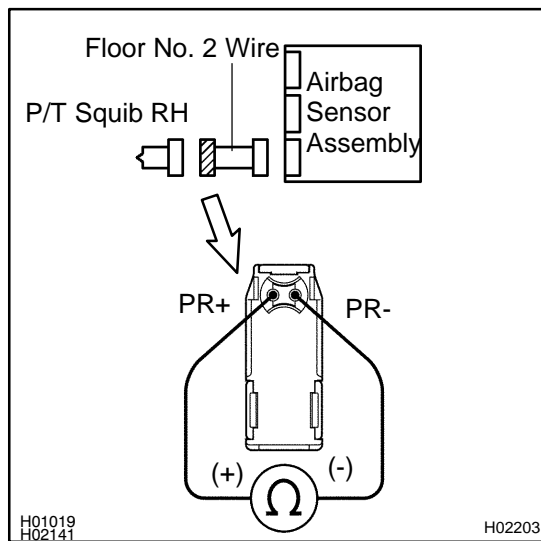


## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-923](#) ).



2 Check floor No. 2 wire (P/T squib RH circuit).

**PREPARATION:**

Release the airbag activation prevention mechanism built in the connector of the floor No. 2 wire on the airbag sensor assembly side (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between PR+ and PR- of the floor No. 2 wire connector on the seat belt pretensioner RH (P/T squib RH) side.

**OK:**

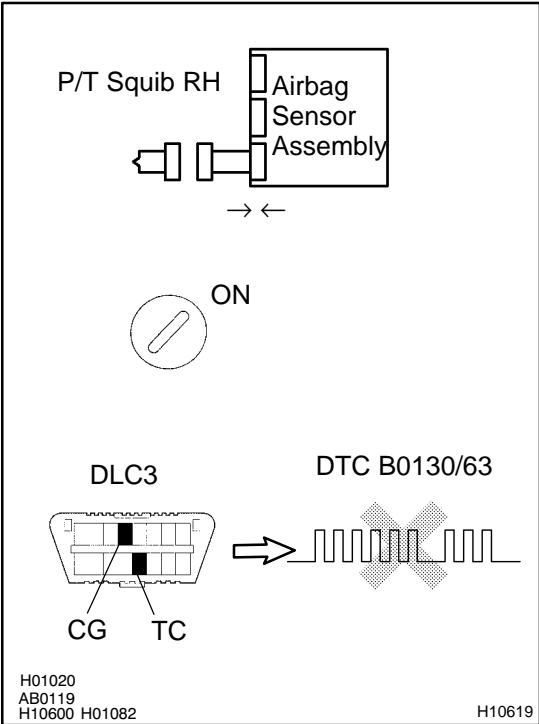
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace floor No. 2 wire.**

**OK**

**3 Check airbag sensor assembly.**



H01020  
AB0119  
H10600 H01082

H10619

**PREPARATION:**

- (a) Connect the connector to the airbag sensor assembly.
- (b) Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page [DI-692](#) ).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page [DI-692](#) ).

**OK:**

**DTC B0130/63 is not output.**

**HINT:**

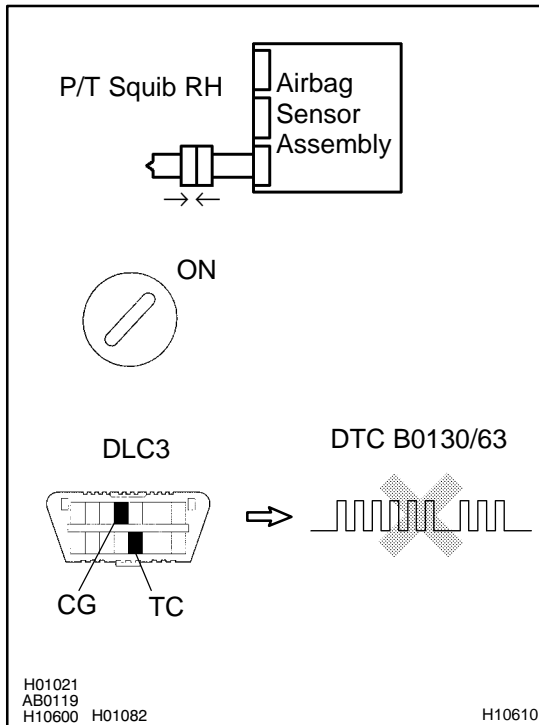
Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

**NG** → **Replace airbag sensor assembly.**

**OK**



## 4 Check P/T squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner RH (P/T squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0130/63 is not output.**

### HINT:

Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

**NG**

**Replace seat belt pretensioner RH (P/T squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0131/64</b>	<b>Open in P/T Squib RH Circuit</b>
------------	-----------------	-------------------------------------

**CIRCUIT DESCRIPTION**

The P/T squib RH circuit consists of the airbag sensor assembly and the seat belt pretensioner RH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3 . DTC B0131/64 is recorded when an open is detected in the P/T squib RH circuit.

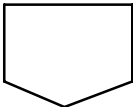
DTC No.	DTC Detecting Condition	Trouble Area
B0131/64	<ul style="list-style-type: none"> <li>▶Open in P/T squib RH circuit</li> <li>▶P/T squib RH malfunction</li> <li>▶Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶Seat belt pretensioner RH (P/T squib RH)</li> <li>▶Airbag sensor assembly</li> <li>▶Floor No. 2 wire</li> </ul>

**WIRING DIAGRAM**

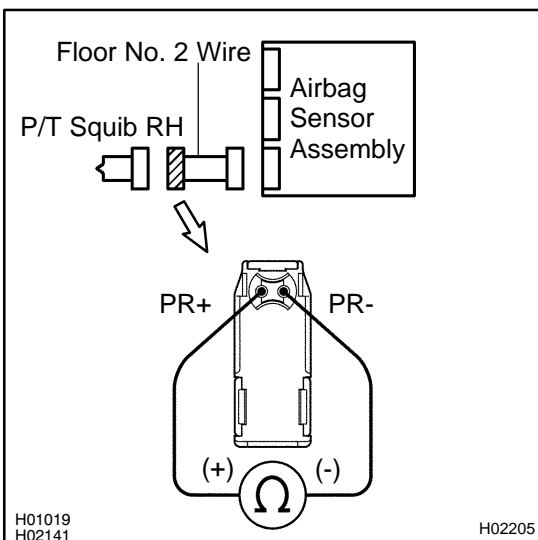
See page DI-777 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 2 wire (P/T squib RH circuit).</b>
----------	---



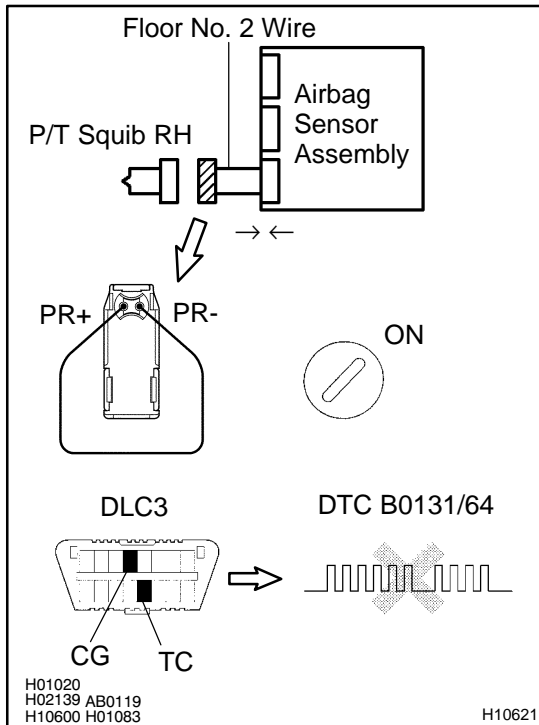
**CHECK:**  
Measure the resistance between PR+ and PR- of the floor No. 2 wire connector on the seat belt pretensioner RH (P/T squib RH) side.

**OK:**  
**Resistance: Below 1 Ω**

<b>NG</b>	<b>Repair or replace floor No. 2 wire.</b>
-----------	--



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect PR+ and PR- of the floor No. 2 wire connector on the seat belt pretensioner RH (P/T squib RH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0131/64 is not output.**

#### HINT:

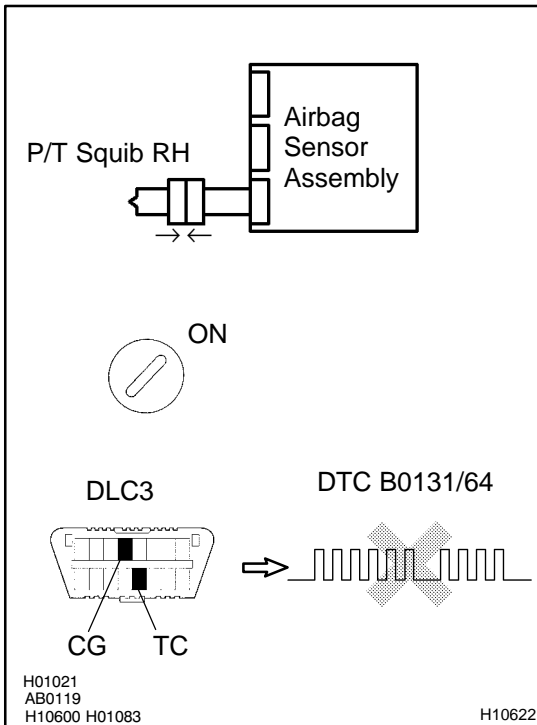
Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P/T squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner RH (P/T squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0131/64 is not output.**

### HINT:

Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

**NG**

**Replace seat belt pretensioner RH (P/T squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0132/61</b>	<b>Short in P/T Squib RH Circuit (to Ground)</b>
------------	-----------------	--

## CIRCUIT DESCRIPTION

The P/T squib RH circuit consists of the airbag sensor assembly and the seat belt pretensioner RH. It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3.

DTC B0132/61 is recorded when a ground short is detected in the P/T squib RH circuit.

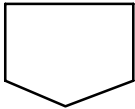
DTC No.	DTC Detecting Condition	Trouble Area
B0132/61	<ul style="list-style-type: none"> <li>▶ Short in P/T squib RH circuit (to ground)</li> <li>▶ P/T squib RH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Seat belt pretensioner RH (P/T squib RH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 2 wire</li> </ul>

## WIRING DIAGRAM

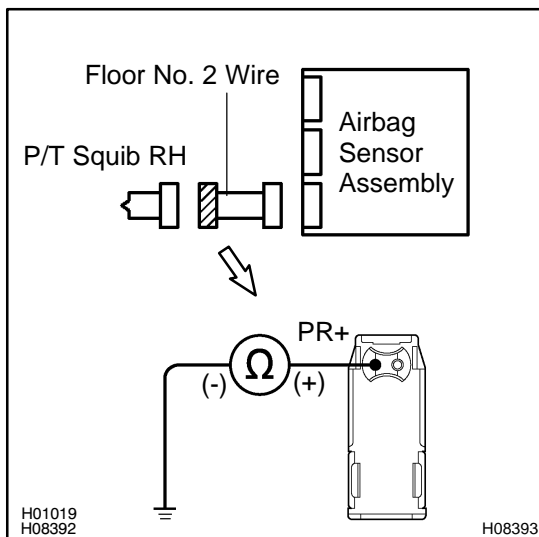
See page DI-692.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-692).</b>
----------	--



<b>2</b>	<b>Check floor No. 2 wire (P/T squib RH circuit).</b>
----------	---



### CHECK:

Measure the resistance between the body ground and PR+ of the floor No. 2 wire connector on the seat belt pretensioner RH (P/T squib RH) side.

### OK:

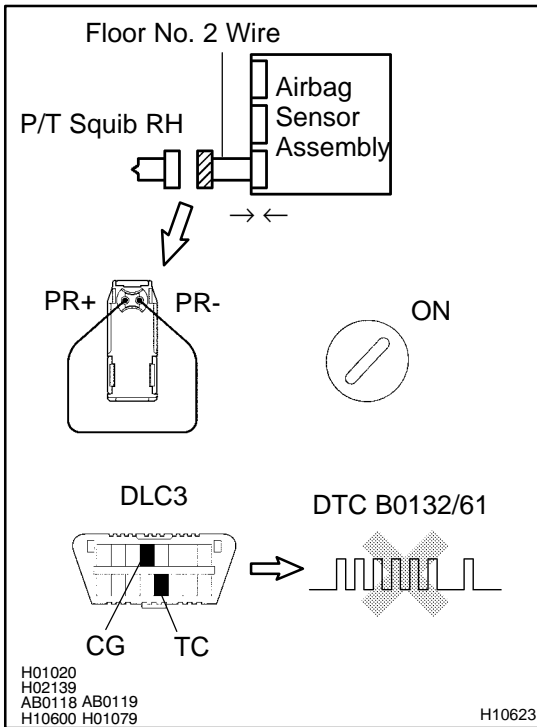
**Resistance: 1 MΩ or Higher**



<b>NG</b>	<b>Repair or replace floor No. 2 wire.</b>
-----------	--



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect PR+ and PR- of the floor No. 2 wire connector on the seat belt pretensioner RH (P/T squib RH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0132/61 is not output.**

#### HINT:

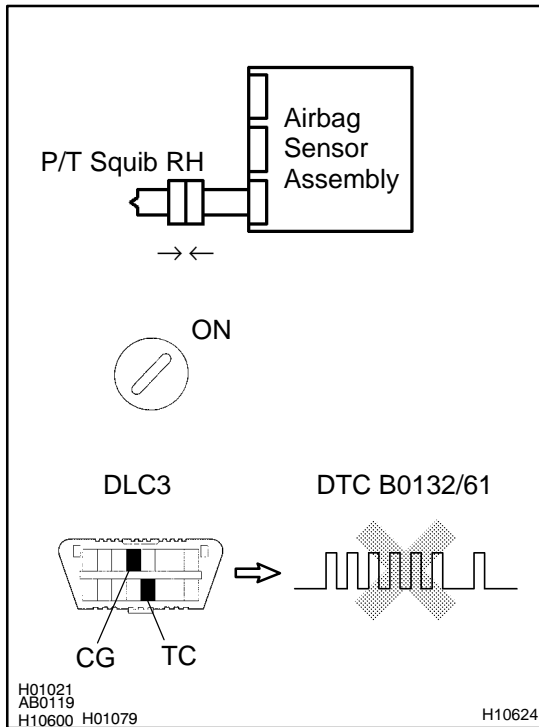
Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P/T squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner RH (P/T squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0132/61 is not output.**

### HINT:

Codes other than code B0132/61 may be output at this time, but they are not relevant to this check.

**NG**

**Replace seat belt pretensioner RH (P/T squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0133/62</b>	<b>Short in P/T Squib RH Circuit (to B+)</b>
------------	-----------------	--

## CIRCUIT DESCRIPTION

The P/T squib RH circuit consists of the airbag sensor assembly and the seat belt pretensioner RH. It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B0133/62 is recorded when a B+ short is detected in the P/T squib RH circuit.

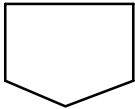
DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	<ul style="list-style-type: none"> <li>▶ Short in P/T squib RH circuit (to B+)</li> <li>▶ P/T squib RH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Seat belt pretensioner RH (P/T squib RH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 2 wire</li> <li>▶ Dash wire (Bench seat)</li> </ul>

## WIRING DIAGRAM

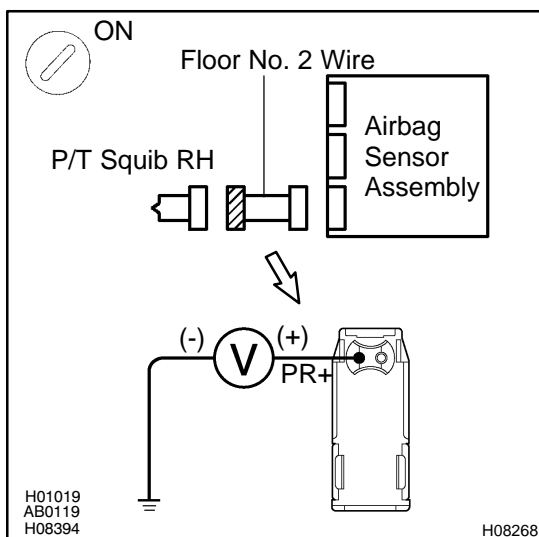
See page DI-777 .

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 2 wire (P/T squib RH circuit).</b>
----------	---



### PREPARATION:

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and PR+ of the floor No. 2 wire connector on the seat belt pretensioner RH (P/T squib RH) side.

### OK:

**Voltage: Below 1 V**

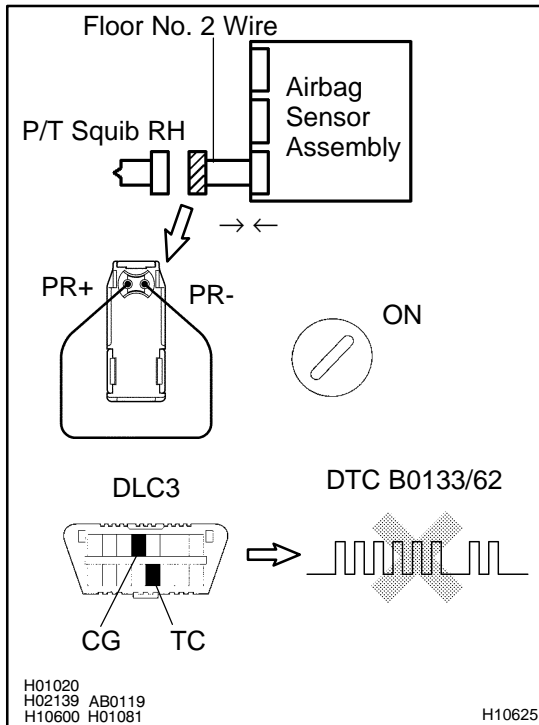


**Repair or replace floor No. 2 wire.**





### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect PR+ and PR- of the floor No. 2 wire connector on the seat belt pretensioner RH (P/T squib RH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0133/62 is not output.**

#### HINT:

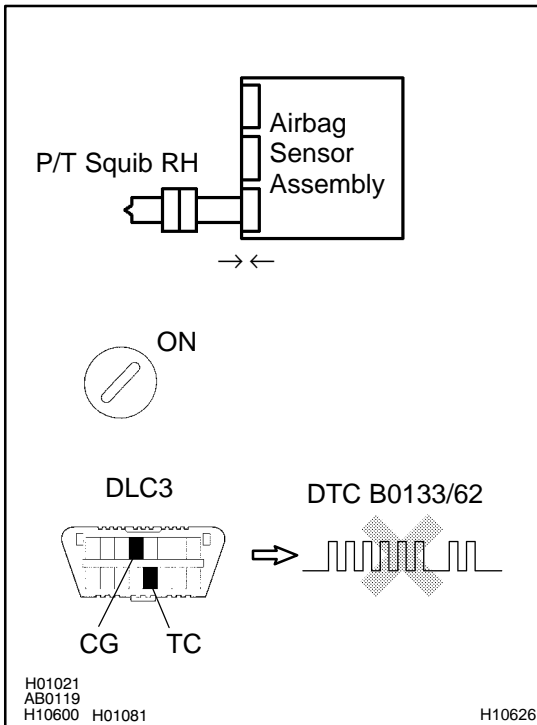
Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P/T squib RH.



### PREPARATION:

- Turn ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner RH (P/T squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0133/62 is not output.**

### HINT:

Codes other than code B0133/62 may be output at this time, but they are not relevant to this check.

**NG**

**Replace seat belt pretensioner RH (P/T squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

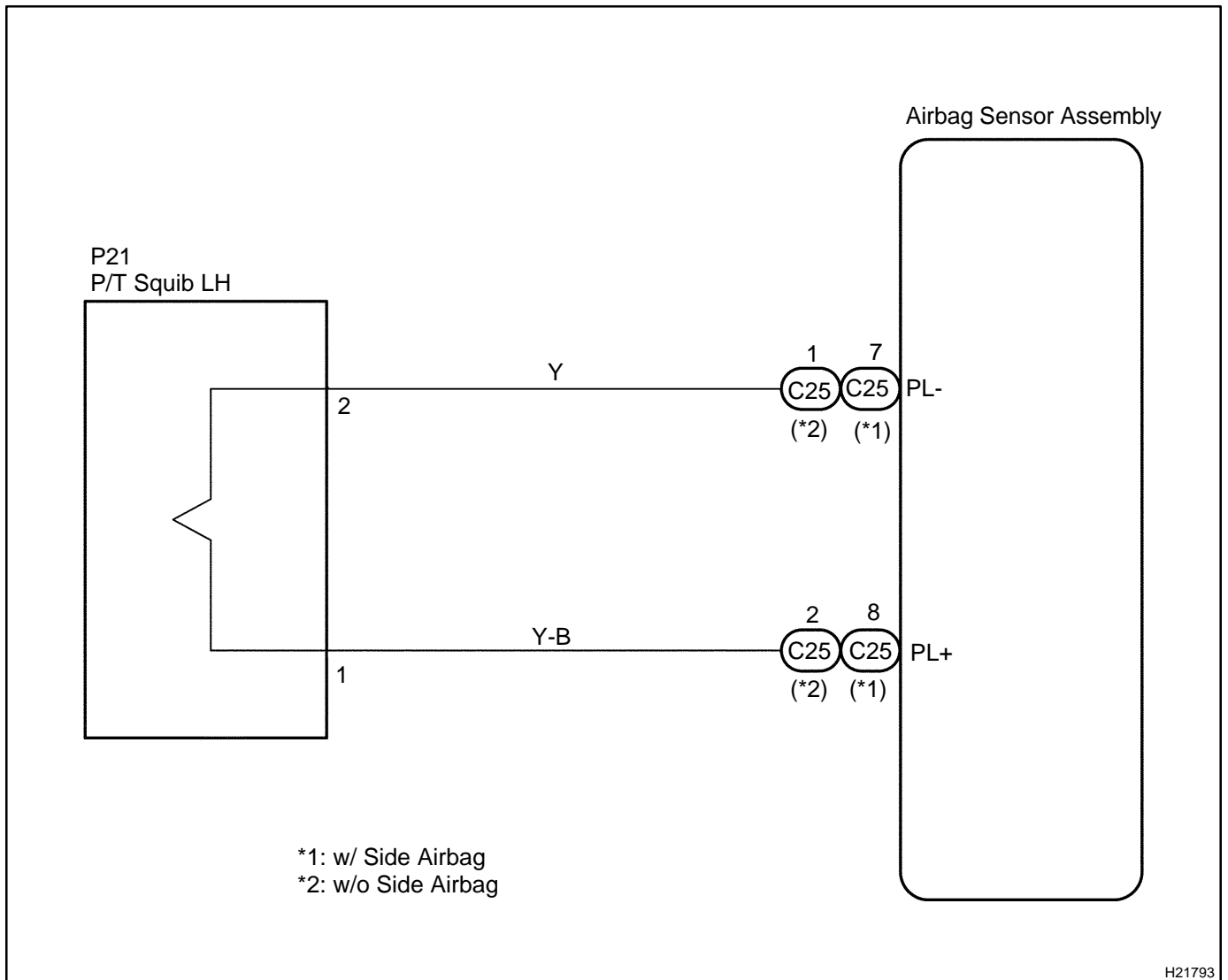
<b>DTC</b>	<b>B0135/73</b>	<b>Short in P/T Squib LH Circuit</b>
------------	-----------------	--------------------------------------

### CIRCUIT DESCRIPTION

The P/T squib LH circuit consists of the airbag sensor assembly and the seat belt pretensioner LH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3. DTC B0135/73 is recorded when a short is detected in the P/T squib LH circuit.

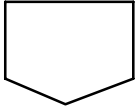
DTC No.	DTC Detecting Condition	Trouble Area
B0135/73	<ul style="list-style-type: none"> <li>▶ Short in P/T squib LH circuit</li> <li>▶ P/T squib LH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Seat belt pretensioner LH (P/T squib LH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 1 wire</li> </ul>

### WIRING DIAGRAM

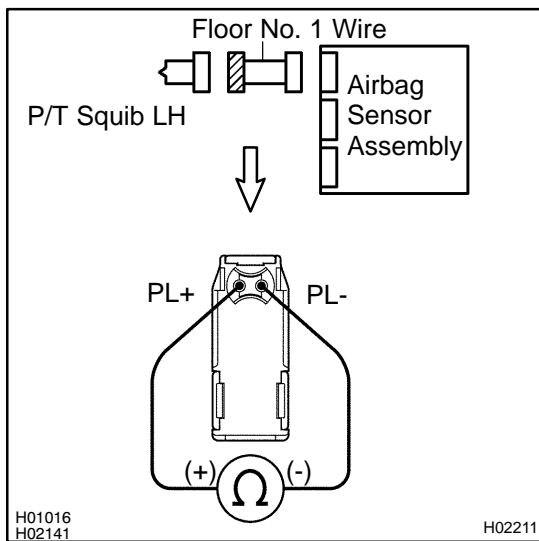


## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-923](#) ).



2 Check floor No. 1 wire (P/T squib LH circuit).

**PREPARATION:**

Release the airbag activation prevention mechanism built in the connector of the floor No. 1 wire on the airbag sensor assembly side (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between PL+ and PL- of the floor No. 1 wire connector on the seat belt pretensioner LH (P/T squib LH) side.

**OK:**

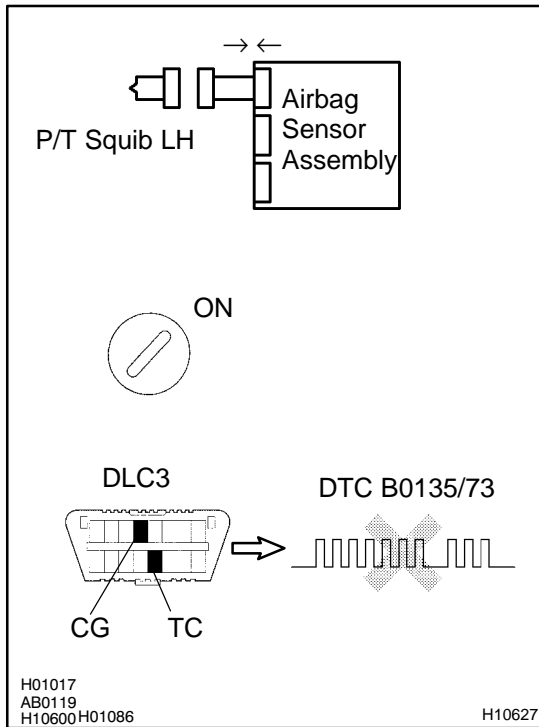
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace floor No. 1 wire.**

**OK**

### 3 Check airbag sensor assembly.



#### **PREPARATION:**

- Connect the connector to the airbag sensor assembly.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### **CHECK:**

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### **OK:**

**DTC B0135/73 is not output.**

#### **HINT:**

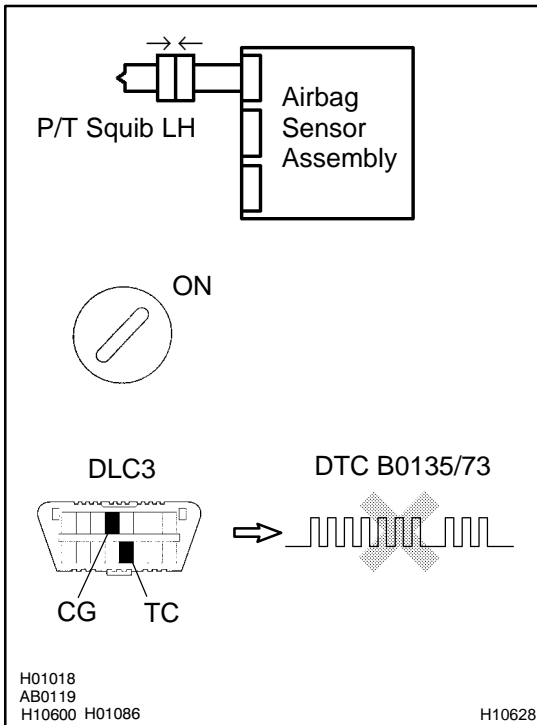
Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P/T squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner LH (P/T squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0135/73 is not output.**

### HINT:

Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

**NG**

**Replace seat belt pretensioner LH (P/T squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0136/74</b>	<b>Open in P/T Squib LH Circuit</b>
------------	-----------------	-------------------------------------

## CIRCUIT DESCRIPTION

The P/T squib LH circuit consists of the airbag sensor assembly and the seat belt pretensioner LH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3. DTC B0136/74 is recorded when an open is detected in the P/T squib LH circuit.

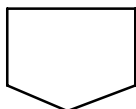
DTC No.	DTC Detecting Condition	Trouble Area
B0136/74	<ul style="list-style-type: none"> <li>▶ Open in P/T squib LH circuit</li> <li>▶ P/T squib LH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Seat belt pretensioner LH (P/T squib LH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 1 wire</li> </ul>

## WIRING DIAGRAM

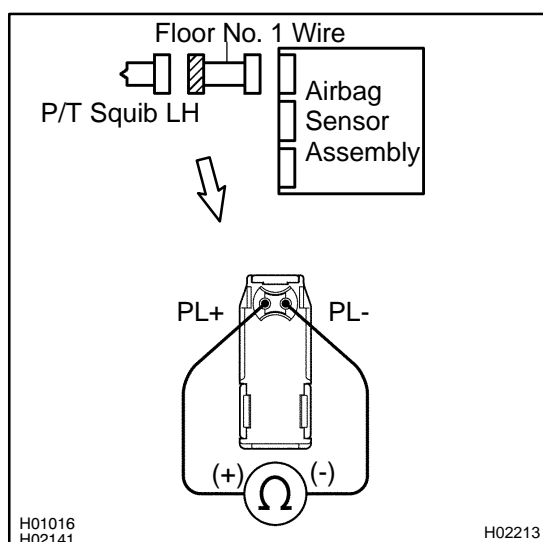
See page DI-790.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923).</b>
----------	--



<b>2</b>	<b>Check floor No. 1 wire (P/T squib LH circuit).</b>
----------	---



### **CHECK:**

Measure the resistance between PL+ and PL- of the floor No. 1 wire connector on the seat belt pretensioner LH (P/T squib LH) side.

### **OK:**

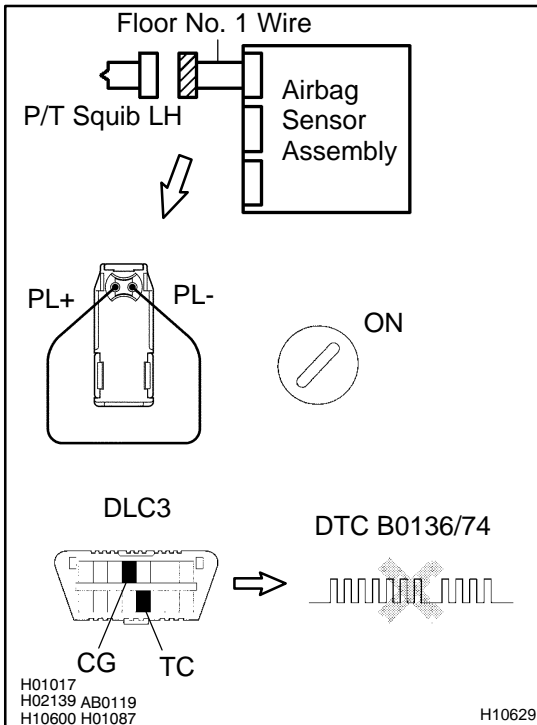
**Resistance: Below 1 Ω**

<b>NG</b>	<b>Repair or replace floor No. 1 wire.</b>
-----------	--



**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect PL+ and PL- of the floor No. 1 wire connector on the seat belt pretensioner LH (P/T squib LH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0136/74 is not output.**

#### HINT:

Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

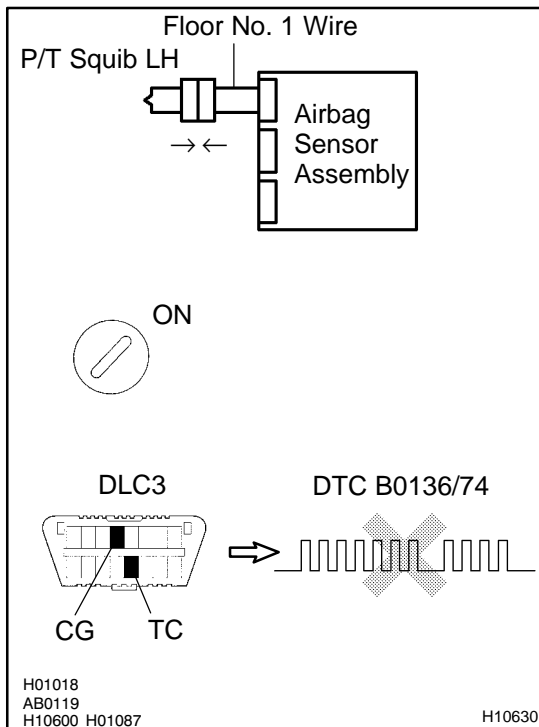
**NG**

**Replace airbag sensor assembly.**

**OK**



## 4 Check P/T squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner LH (P/T squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0136/74 is not output.**

### HINT:

Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

**NG**

**Replace seat belt pretensioner LH (P/T squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B0137/71</b>	<b>Short in P/T Squib LH Circuit (to Ground)</b>
------------	-----------------	--

**CIRCUIT DESCRIPTION**

The P/T squib LH circuit consists of the airbag sensor assembly and the seat belt pretensioner LH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3. DTC B0137/71 is recorded when a ground short is detected in the P/T squib LH circuit.

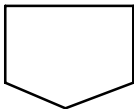
DTC No.	DTC Detecting Condition	Trouble Area
B0137/71	<ul style="list-style-type: none"> <li>▶ Short in P/T squib LH circuit (to ground)</li> <li>▶ P/T squib LH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Seat belt pretensioner LH (P/T squib LH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 1 wire</li> </ul>

**WIRING DIAGRAM**

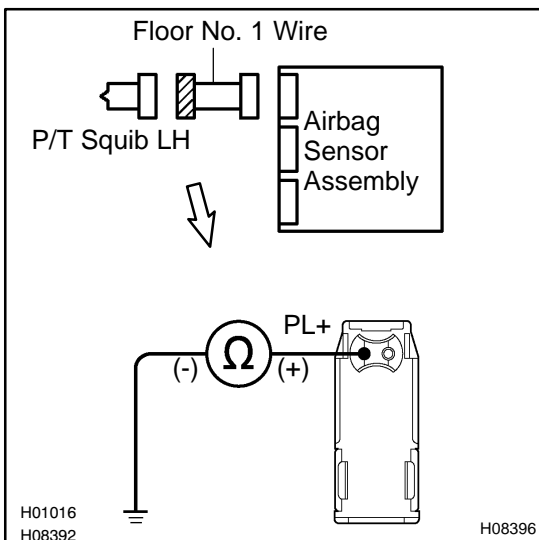
See page DI-790.

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923).</b>
----------	--



<b>2</b>	<b>Check floor No. 1 wire (P/T squib LH circuit).</b>
----------	---



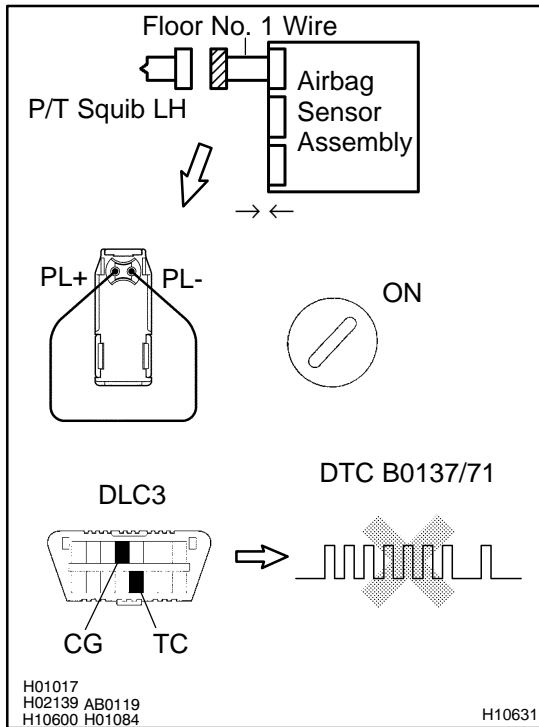
**CHECK:**  
Measure the resistance between the body ground and PL+ of the floor No. 1 wire connector on the seat belt pretensioner LH (P/T squib LH) side.

**OK:**  
**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Repair or replace floor No. 1 wire.</b>
-----------	--



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect PL+ and PL- of the floor No. 1 wire connector on the seat belt pretensioner LH (P/T squib LH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0137/71 is not output.**

#### HINT:

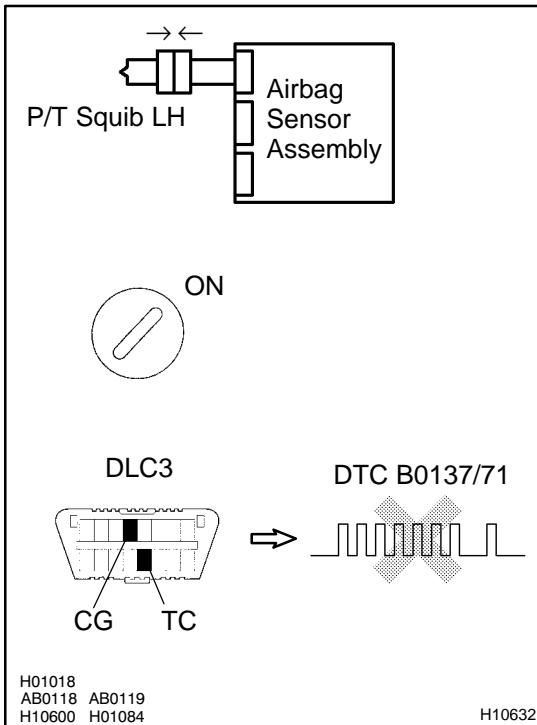
Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P/T squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner LH (P/T squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0137/71 is not output.**

### HINT:

Codes other than code B0137/71 may be output at this time, but they are not relevant to this check.

**NG**

**Replace seat belt pretensioner LH (P/T squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B0138/72</b>	<b>Short in P/T Squib LH Circuit (to B+)</b>
------------	-----------------	--

## CIRCUIT DESCRIPTION

The P/T squib LH circuit consists of the airbag sensor assembly and seat belt pretensioner LH. It causes the SRS to deploy when the SRS deployment conditions are satisfied. For details of the function of each component, see OPERATION on page RS-3. DTC B0138/72 is recorded when a B+ short is detected in the P/T squib LH circuit.

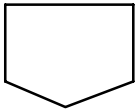
DTC No.	DTC Detecting Condition	Trouble Area
B0138/72	<ul style="list-style-type: none"> <li>▶ Short in P/T squib LH circuit (to B+)</li> <li>▶ P/T squib LH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Seat belt pretensioner LH (P/T squib LH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 1 wire</li> </ul>

## WIRING DIAGRAM

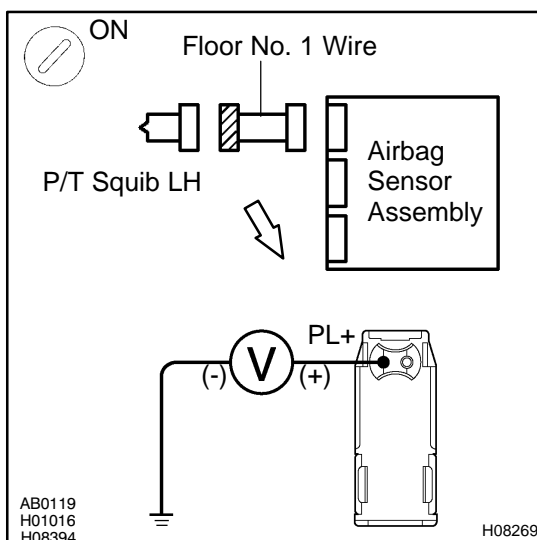
See page DI-790.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923).</b>
----------	--



<b>2</b>	<b>Check floor No. 1 wire (P/T squib LH circuit).</b>
----------	---



### PREPARATION:

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and PL+ of the floor No. 1 wire connector on the seat belt pretensioner LH (P/T squib LH) side.

### OK:

**Voltage: Below 1 V**

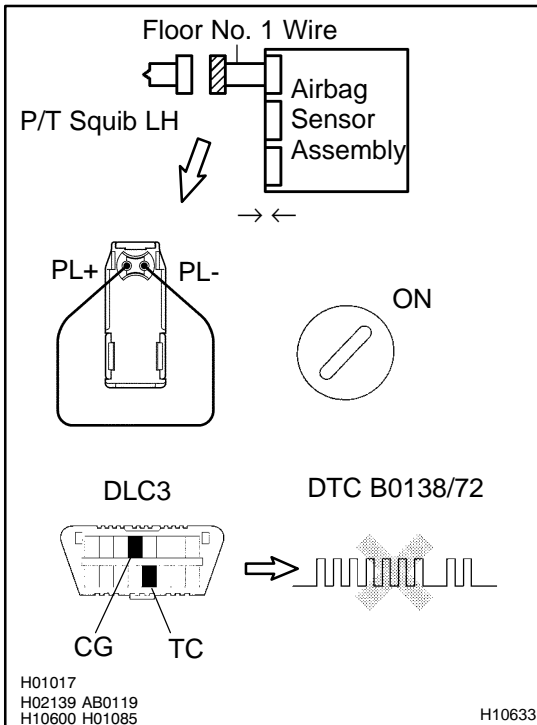


<b>NG</b>	<b>Repair or replace floor No. 1 wire.</b>
-----------	--



**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect PL+ and PL- of the floor No. 1 wire connector on the seat belt pretensioner LH (P/T squib LH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B0138/72 is not output.**

#### HINT:

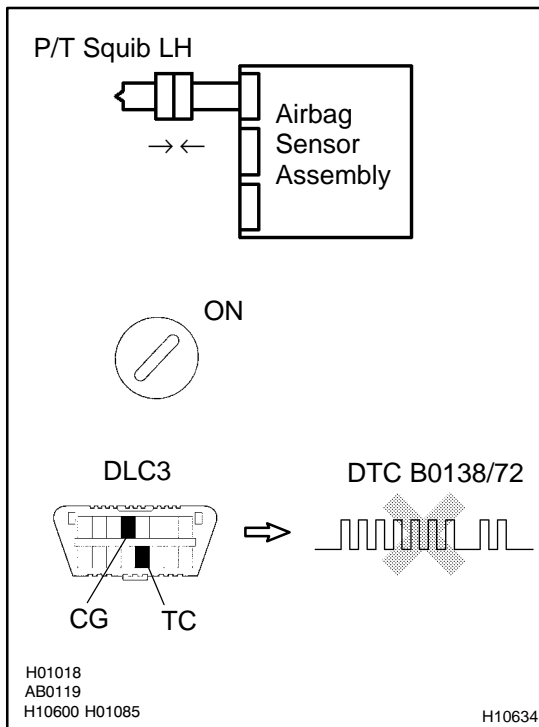
Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P/T squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the seat belt pretensioner LH (P/T squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B0138/72 is not output.**

### HINT:

Codes other than code B0138/72 may be output at this time, but they are not relevant to this check.

**NG**

**Replace seat belt pretensioner LH (P/T squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B1100/31</b>	<b>Airbag Sensor Assembly Malfunction</b>
------------	-----------------	---

## CIRCUIT DESCRIPTION

The airbag sensor assembly consists of the airbag sensor, safing sensor, drive circuit, diagnosis circuit and ignition control, etc.

It receives signals from the airbag sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

DTC B1100/31 is recorded when occurrence of a malfunction in the airbag sensor assembly is detected.

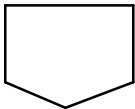
DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	▶Airbag sensor assembly malfunction	▶Airbag sensor assembly

## INSPECTION PROCEDURE

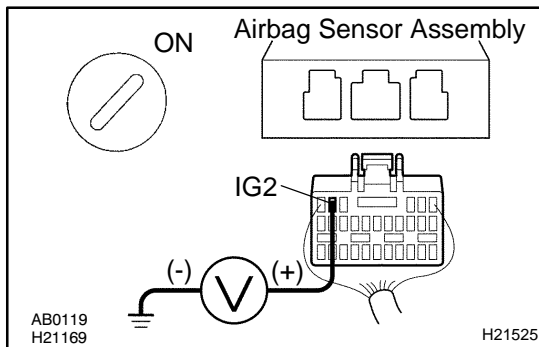
HINT:

When a malfunction code other than code B1100/31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code B1100/31.

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check airbag sensor assembly.</b>
----------	--------------------------------------



### PREPARATION:

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and IG2 of the dash wire connector on the airbag sensor assembly side.

### OK:

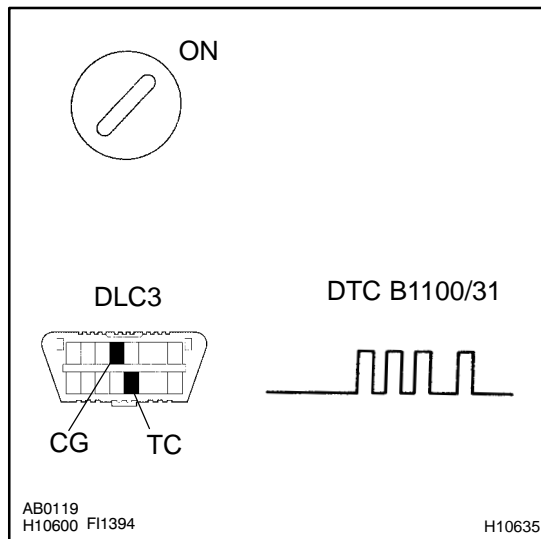
**Voltage: 10 - 14 V**

<b>NG</b>	<b>Check that an abnormality occurs on the battery and charging system.</b>
-----------	---





<b>3</b>	<b>Is DTC B1100/31 output again?</b>
----------	--------------------------------------

**PREPARATION:**

Clear the DTC (See page [DI-692](#) ).

**CHECK:**

- (a) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (b) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (c) Repeat operation in step (a) and (b) at least 5 times.
- (d) Check the DTC (See page [DI-692](#) ).

**OK:**

**DTC B1100/31 is output.**

**HINT:**

Codes other than code B1100/31 may be output at this time, but they are not relevant to this check.

**NO**

**Using simulation method, reproduce malfunction symptoms (See page [IN-26](#) ).**

**YES**

**Replace airbag sensor assembly.**

<b>DTC</b>	<b>B1135/24</b>	<b>Half Connection in Airbag Sensor Assembly Connector</b>
------------	-----------------	--

**CIRCUIT DESCRIPTION**

The airbag sensor assembly detects partial connection of connector.

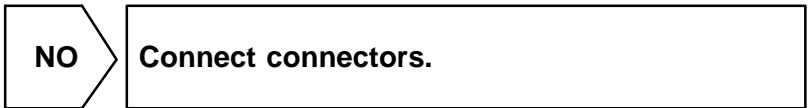
For details of the function of each component, see OPERATION on page [RS-3](#) .

DTC B1135/24 is recorded when the airbag sensor assembly detects an open in the electrical connection check mechanism of the airbag sensor connector or in the airbag sensor circuit.

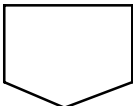
DTC No.	DTC Detecting Condition	Trouble Area
B1135/24	<ul style="list-style-type: none"> <li>▶Malfunction of electrical connection check mechanism of airbag sensor assembly connector</li> <li>▶Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶Electrical connection check mechanism</li> <li>▶Airbag sensor assembly</li> </ul>

**INSPECTION PROCEDURE**

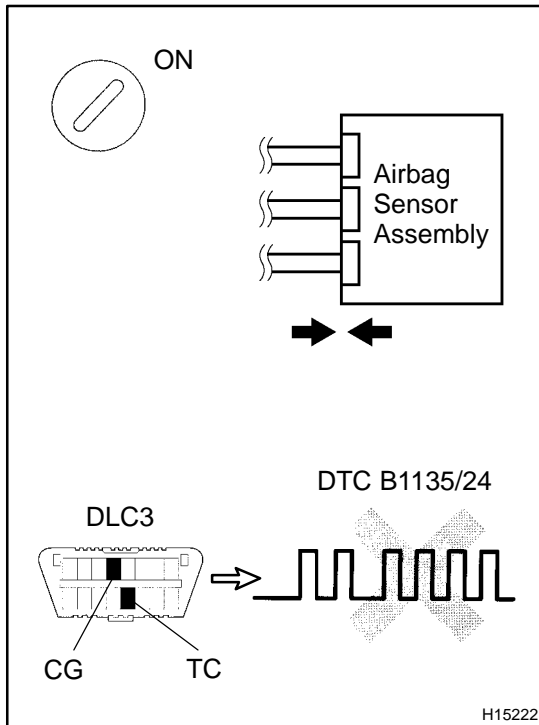
<b>1</b>	<b>Are connectors of airbag sensor assembly properly connected?</b>
----------	---



<b>2</b>	<b>Prepare for inspection (See step 1 on page <a href="#">DI-923</a> ).</b>
----------	---



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connectors to the airbag sensor assembly.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1135/24 is not output.**

#### HINT:

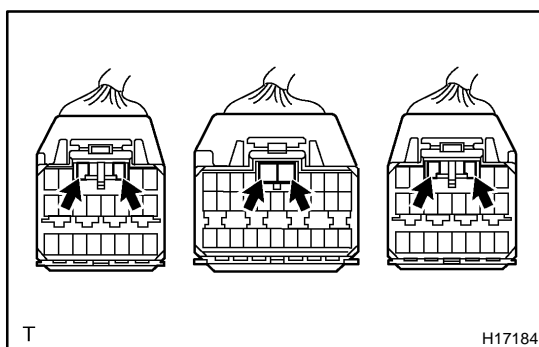
Codes other than code B1135/24 may be output at this time, but they are not relevant to this check.

OK

Complete.

NG

### 4 Perform a visual check of the disconnection detection pin.



#### OK:

**No deformation is identified.**

#### HINT:

Compare it with the other 2 connector pins.

NG

Repair or replace wire harness.

OK

Replace airbag sensor assembly.

<b>DTC</b>	<b>B1140/32</b>	<b>Side and Curtain Shield Airbag Sensor Assembly RH Malfunction</b>
------------	-----------------	--

### CIRCUIT DESCRIPTION

The side and curtain shield airbag sensor assembly RH consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

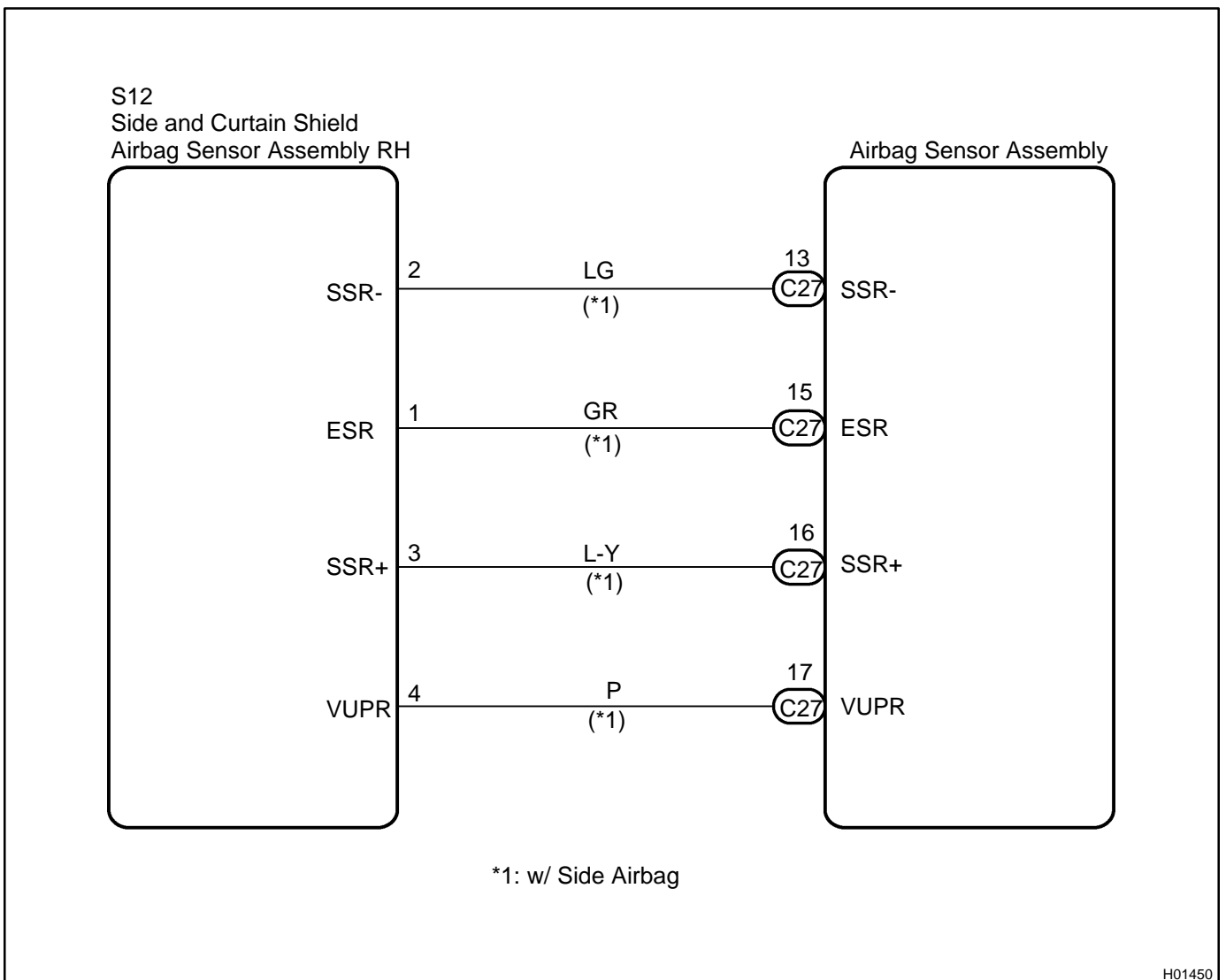
DTC B1140/32 is recorded when occurrence of a malfunction in the side and curtain shield airbag sensor assembly RH is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1140/32	▶Side and curtain shield airbag sensor assembly RH malfunction	▶Side and curtain shield airbag sensor assembly RH ▶Floor No. 2 wire ▶Airbag sensor assembly

**HINT:**

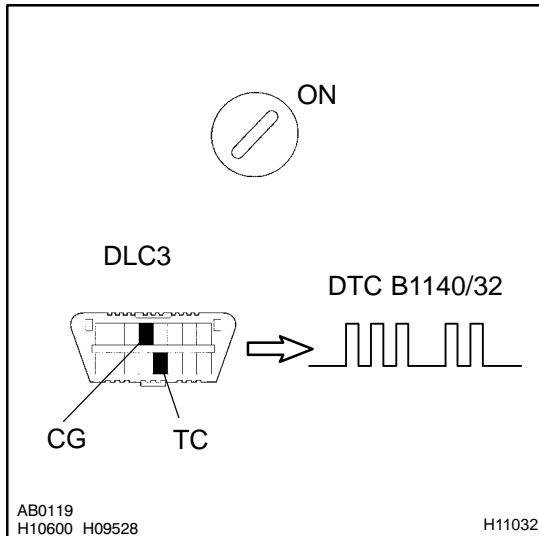
DTC B1140/32 is indicated only for the vehicle equipped with the side airbag.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

1	Is DTC B1140/32 output?
---	-------------------------

**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page [DI-692](#)).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page [DI-692](#)).

**OK:****DTC B1140/32 is output.****HINT:**

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

**NO**

The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

**YES**

2	Is connector of side and curtain shield airbag sensor assembly RH properly connected?
---	---

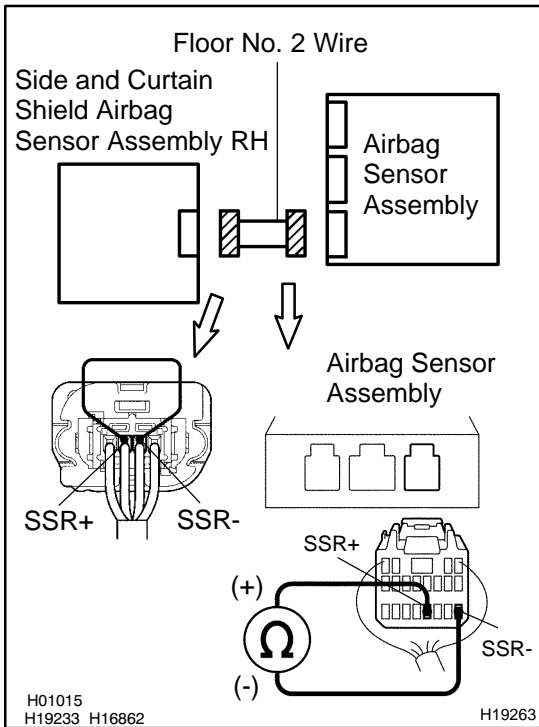
**NO**

Connect connector.

**YES**

3	Prepare for inspection (See step 1 on <a href="#">DI-923</a> ).
---	---

#### 4 Check floor No. 2 wire.



#### **PREPARATION:**

Using a service wire, connect SSR+ and SSR- of the floor No. 2 wire connector on the side and curtain shield airbag sensor assembly RH side.

#### **CHECK:**

Measure the resistance between SSR+ and SSR- of the floor No. 2 wire connector on the airbag sensor assembly side.

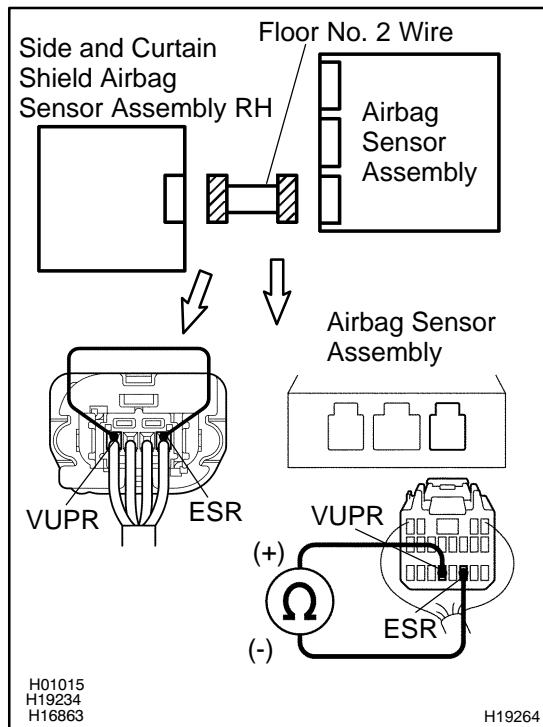
#### **OK:**

**Resistance: Below 1 Ω**

**NG**

**Repair or replace floor No. 2 wire.**

**OK**

**5 Check floor No. 2 wire.**
**PREPARATION:**

Using a service wire, connect VUPR and ESR of the floor No. 2 wire connector on the side and curtain shield airbag sensor assembly RH side.

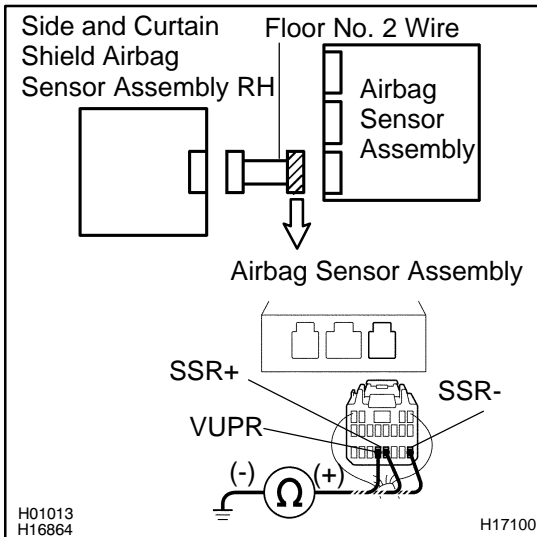
**CHECK:**

Measure the resistance between VUPR and ESR of the floor No. 2 wire connector on the airbag sensor assembly side.

**OK:**

**Resistance: Below 1  $\Omega$**

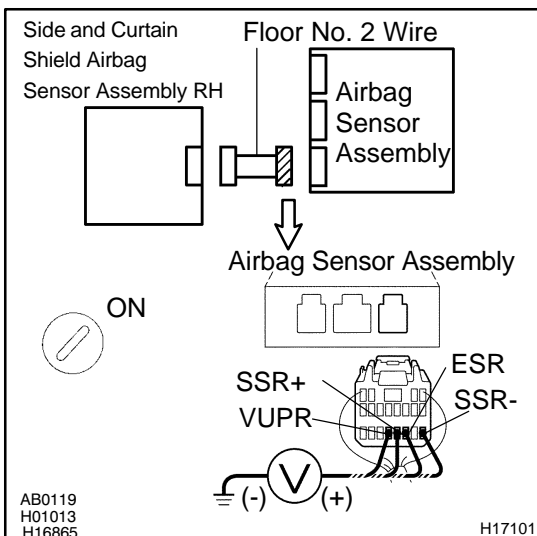
**NG**
**Repair or replace floor No. 2 wire.**
**OK**

**6 Check floor No. 2 wire (to ground).****CHECK:**

Measure the resistance between the body ground and each of VUPR, SSR+ and SSR- of the floor No. 2 wire connector on the airbag sensor assembly side.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG****Repair or replace floor No. 2 wire.****OK****7 Check floor No. 2 wire (to B+).****PREPARATION:**

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and each of VUPR, SSR+, SSR- and ESR of the floor No. 2 wire connector on the airbag sensor assembly side.

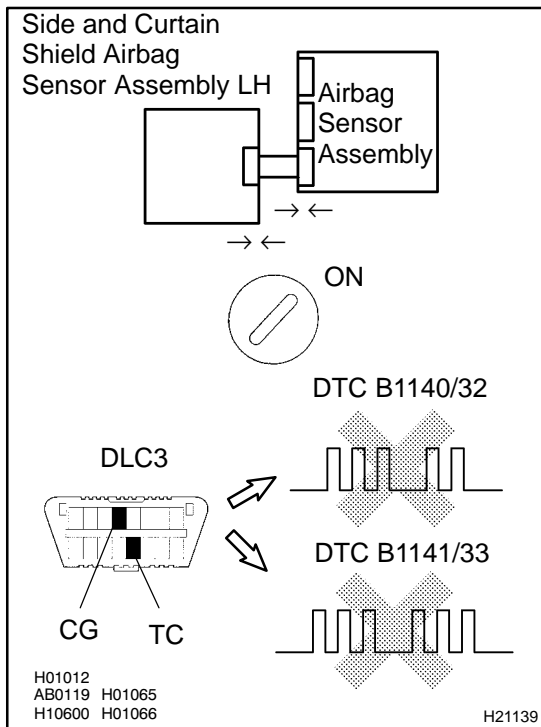
**OK:**

**Voltage: Below 1 V**

**NG****Repair or replace floor No. 2 wire.****OK**



## 8 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Change the side and curtain shield airbag sensor assembly LH position with RH position.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**Neither DTC B1140/32 nor B1141/33 are not output.**

### HINT:

Codes other than code B1140/32 or B1141/33 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly (DTC B1140/32 is output).

NG

Replace side and curtain shield airbag sensor assembly RH (DTC B1141/33 is output).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

<b>DTC</b>	<b>B1141/33</b>	<b>Side and Curtain Shield Airbag Sensor Assembly LH Malfunction</b>
------------	-----------------	--

**CIRCUIT DESCRIPTION**

The side and curtain shield airbag sensor assembly LH consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

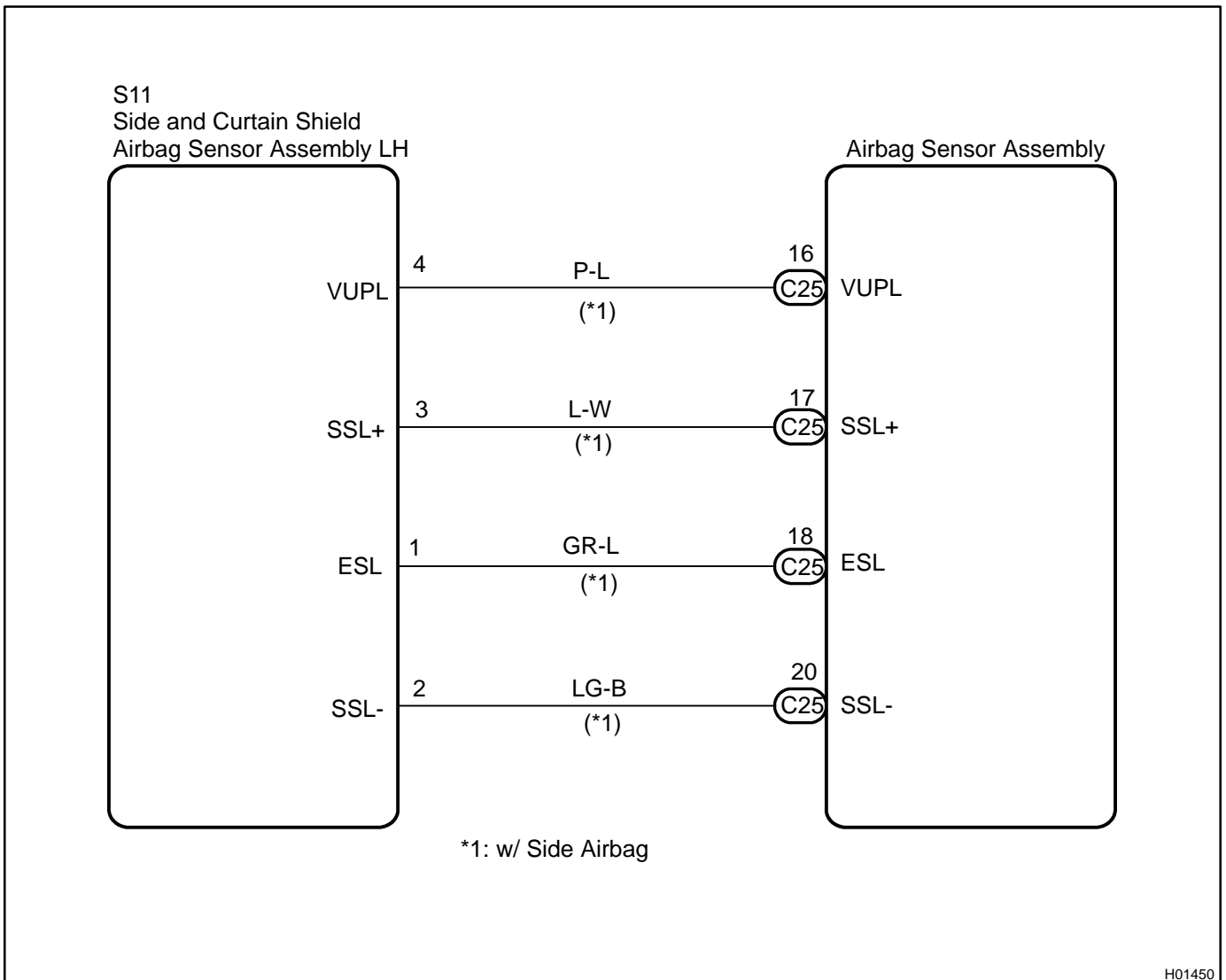
DTC B1141/33 is recorded when occurrence of a malfunction in the side and curtain shield airbag sensor assembly LH is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1141/33	▶Side and curtain shield airbag sensor assembly LH malfunction	▶Side and curtain shield airbag sensor assembly LH ▶Floor No. 1 wire ▶Airbag sensor assembly

**HINT:**

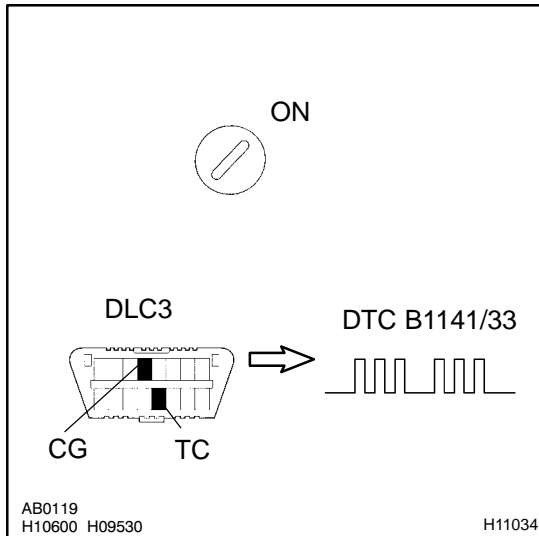
DTC B1141/33 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**



## INSPECTION PROCEDURE

<b>1</b>	<b>Is DTC B1141/33 output?</b>
----------	--------------------------------

**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page [DI-692](#)).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page [DI-692](#)).

**OK:**

**DTC B1141/33 is output.**

**HINT:**

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

**YES**

The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

**NO**

<b>2</b>	<b>Is connector of side and curtain shield airbag sensor assembly LH properly connected?</b>
----------	--

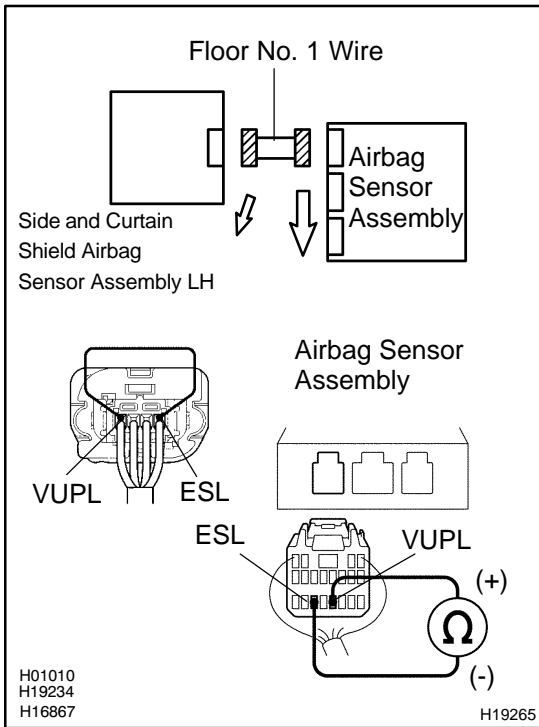
**NO**

Connect connector.

**YES**

<b>3</b>	<b>Prepare for inspection (See step 1 on page <a href="#">DI-923</a>).</b>
----------	--

#### 4 Check floor No. 1 wire.



#### **PREPARATION:**

Using a service wire, connect VUPL and ESL of the floor No. 1 wire connector on the side and curtain shield airbag sensor assembly LH side.

#### **CHECK:**

Measure the resistance between VUPL and ESL of the floor No. 1 wire connector on the airbag sensor assembly side.

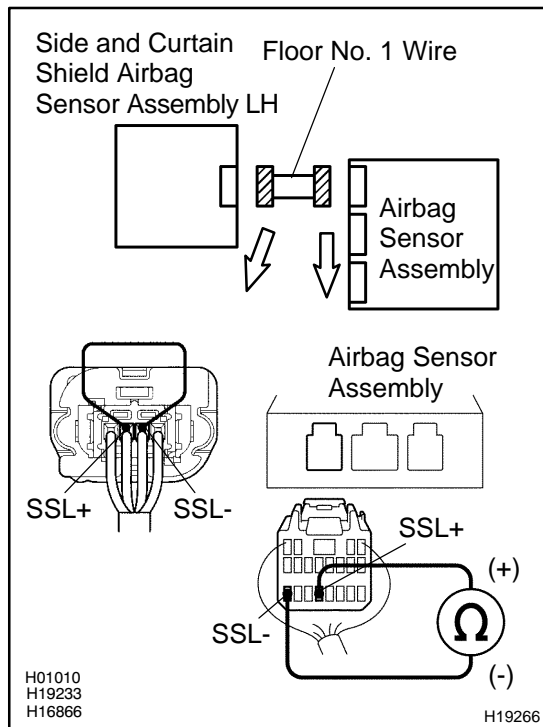
#### **OK:**

**Resistance: Below 1 Ω**

**NG**

**Repair or replace floor No. 1 wire.**

**OK**

**5 Check floor No. 1 wire.**

**PREPARATION:**

Using a service wire, connect SSL+ and SSL- of the floor No. 1 wire connector on the side and curtain shield airbag sensor assembly LH side.

**CHECK:**

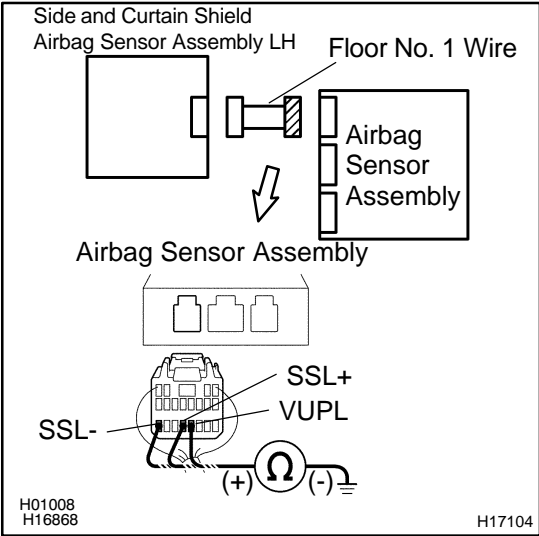
Measure the resistance between SSL+ and SSL- of the floor No. 1 wire connector on the airbag sensor assembly side.

**OK:**

**Resistance: Below 1  $\Omega$**

**NG**
**Repair or replace floor No. 1 wire.**
**OK**

**6 Check floor No. 1 wire (to ground).**



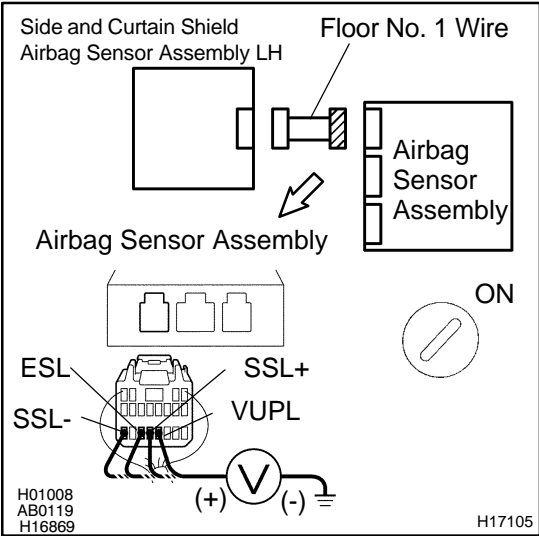
**CHECK:**  
Measure the resistance between the body ground and each of VUPL, SSL+ and SSL- of the floor No. 1 wire connector on the airbag sensor assembly side.

**OK:**  
**Resistance: 10 kΩ or Higher**

**NG** → **Repair or replace floor No. 1 wire.**

**OK**

**7 Check floor No. 1 wire (to B+).**



**PREPARATION:**  
Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

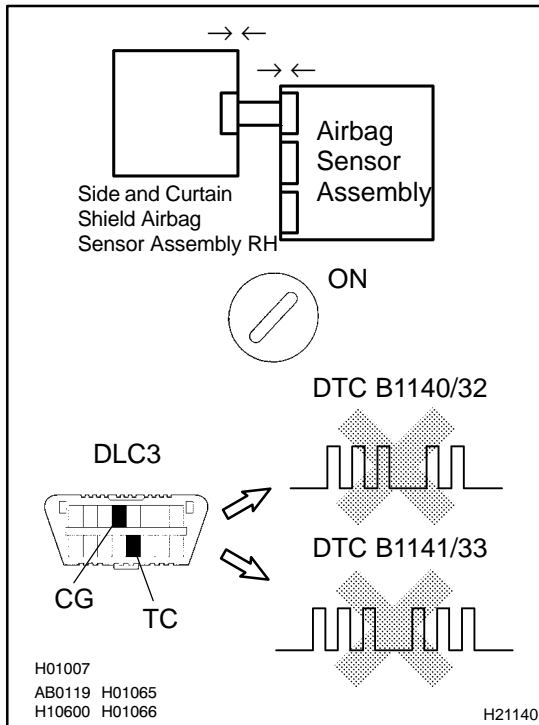
**CHECK:**  
(a) Turn the ignition switch to ON.  
(b) Measure the voltage between the body ground and each of VUPL, SSL+, SSL- and ESL of the floor No. 1 wire connector on the airbag sensor assembly side.

**OK:**  
**Voltage: Below 1 V**

**NG** → **Repair or replace floor No. 1 wire.**

**OK**

## 8 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Change the side and curtain shield airbag sensor assembly RH position with LH position.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**Neither DTC B1141/33 nor B1140/32 are not output.**

### HINT:

Codes other than code B1141/33 or B1140/32 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly (DTC B1141/33 is output).**

**NG**

**Replace side and curtain shield airbag sensor assembly LH (DTC B1140/32 is output).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B1148/36</b>	<b>Front Airbag Sensor RH Malfunction</b>
------------	-----------------	---

### CIRCUIT DESCRIPTION

The front airbag sensor RH circuit consists of the diagnosis circuit and frontal deceleration sensor, etc. It receives signals from the frontal deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

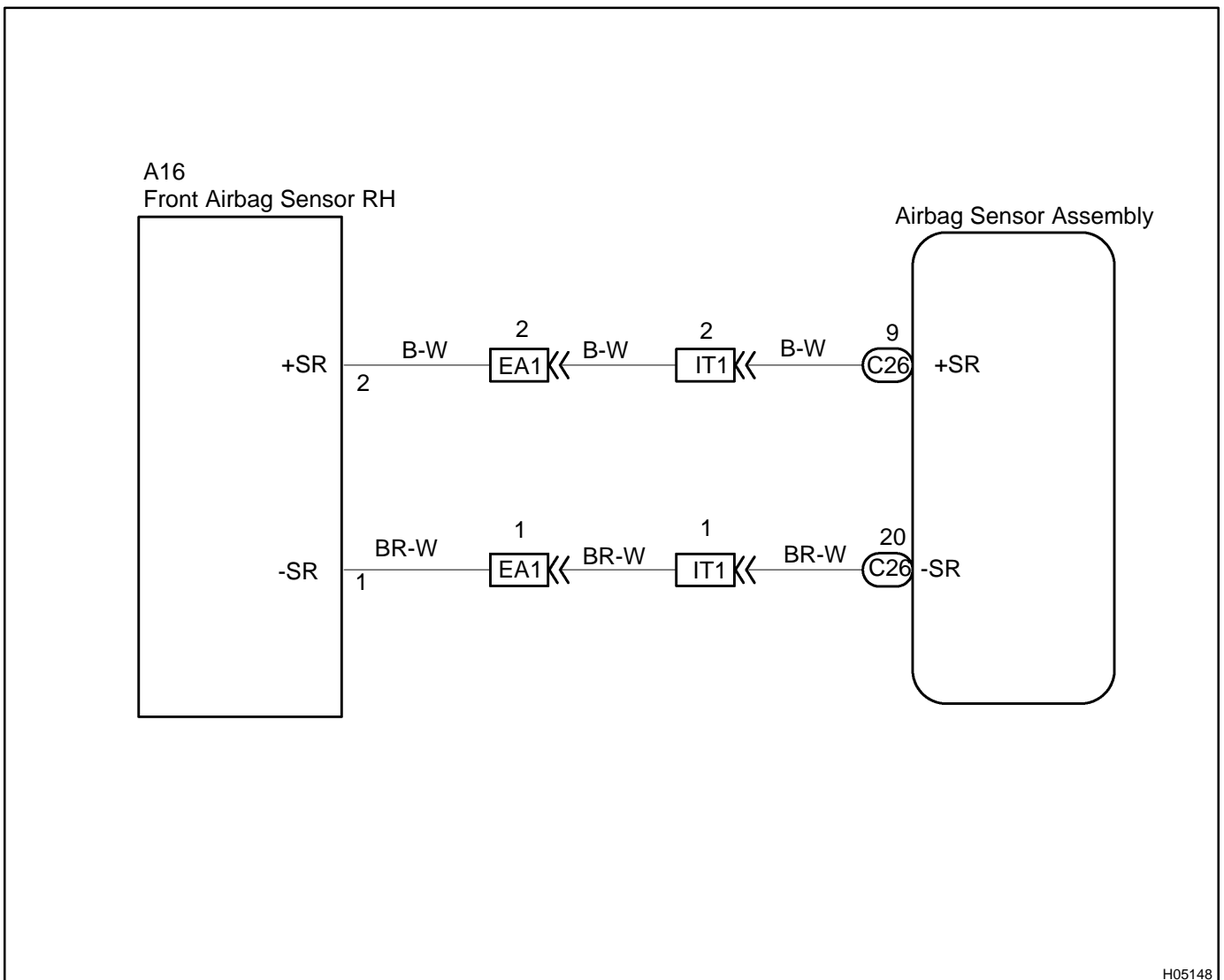
DTC B1148/36 is recorded when occurrence of a malfunction in the front airbag sensor RH is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1148/36	▶Front airbag sensor RH malfunction	<ul style="list-style-type: none"> <li>▶Front airbag sensor RH</li> <li>▶Airbag sensor assembly</li> <li>▶Dash wire</li> <li>▶Engine room No. 2 wire</li> <li>▶Engine room main wire</li> </ul>

**HINT:**

DTC B1148/36 is indicated only for the vehicle equipped with the side airbag and without the side airbag (dual stage airbag).

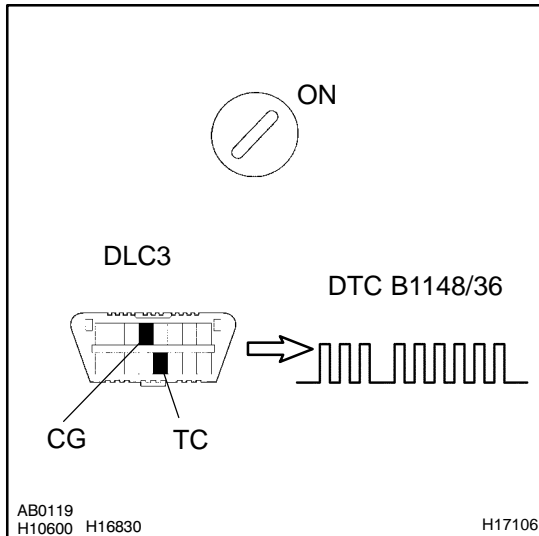
### WIRING DIAGRAM





## INSPECTION PROCEDURE

<b>1</b>	<b>Is DTC B1148/36 output?</b>
----------	--------------------------------

**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page [DI-692](#) ).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page [DI-692](#) ).

**OK:**

**DTC B1148/36 is output.**

**HINT:**

Codes other than code B1148/36 may be output at this time, but they are not relevant to this check.

**NO**

**The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

**YES**

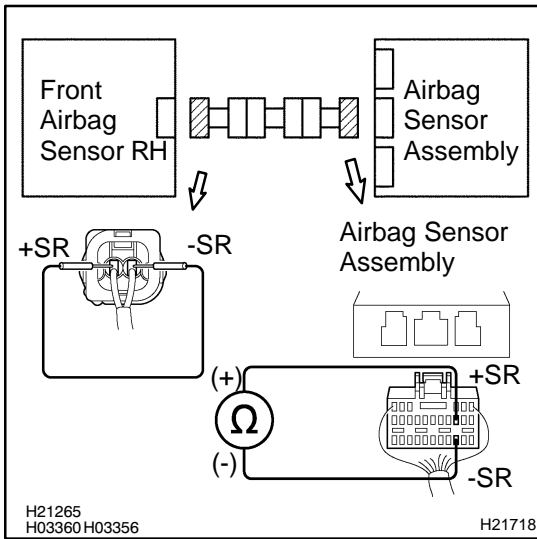
<b>2</b>	<b>Is connector of front airbag sensor RH properly connected?</b>
----------	---

**No**

**Connect connector.**

**YES**

<b>3</b>	<b>Prepare for inspection (See step 1 on <a href="#">DI-923</a> ).</b>
----------	--

**4 Check wire harness.****PREPARATION:**

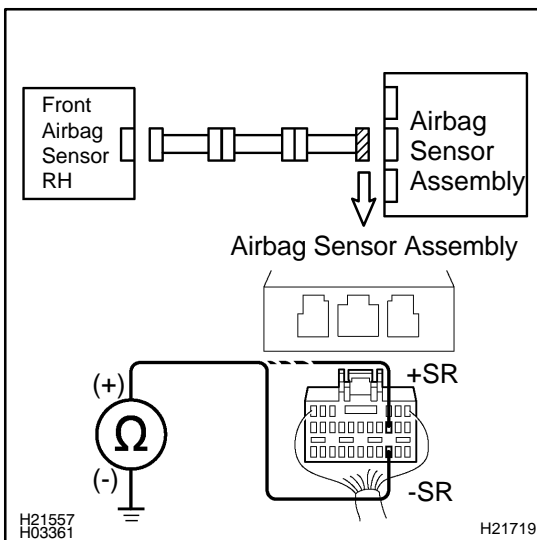
Using a service wire, connect +SR and -SR on the front airbag sensor RH side between the front airbag sensor RH and the airbag sensor assembly.

**CHECK:**

Measure the resistance between +SR and -SR on the airbag sensor assembly side between the front airbag sensor RH and the airbag sensor assembly.

**OK:**

**Resistance: Below 1 Ω**

**NG****Go to step 8.****OK****5 Check wire harness (to ground).****CHECK:**

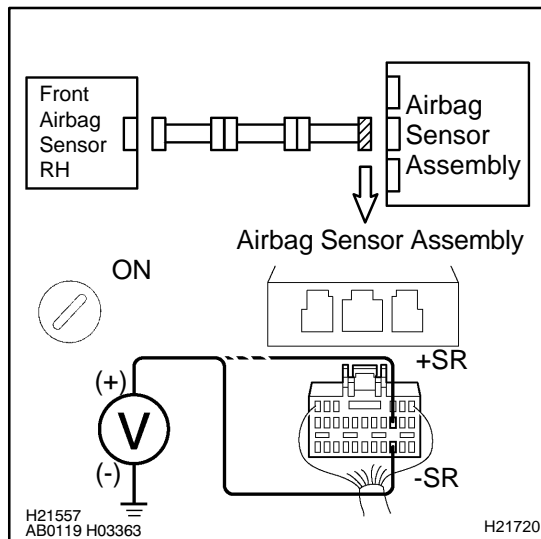
Measure the resistance between the body ground and each of +SR and -SR on the airbag sensor assembly side between the front airbag sensor RH and the airbag sensor assembly.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG****Go to step 10.****OK**

## 6 Check wire harness (to B+).



### PREPARATION:

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and each of +SR and -SR on the airbag sensor assembly side between the front airbag sensor RH and the airbag sensor assembly.

### OK:

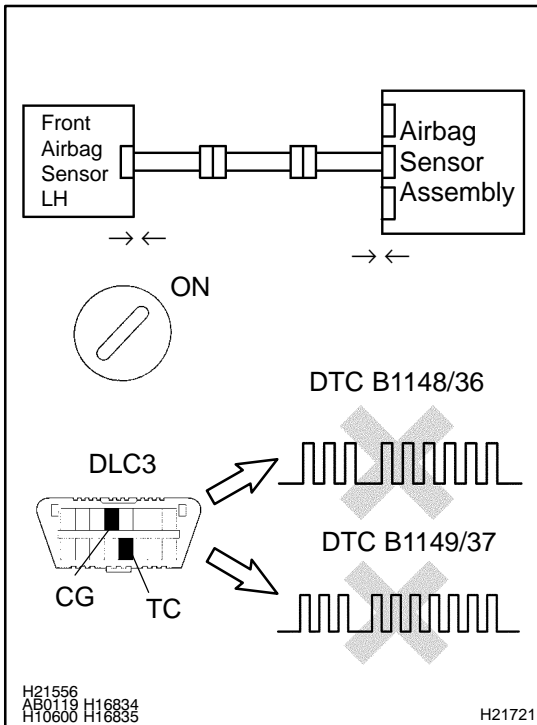
**Voltage: Below 1 V**

**NG**

**Go to step 12.**

**OK**

## 7 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Change the front airbag sensor LH position with RH position.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**Neither DTC B1148/36 nor B1149/37 are not output.**

### HINT:

Codes other than code B1148/36 or B1149/37 may be output at this time, but they are not relevant to this check.

**NG**

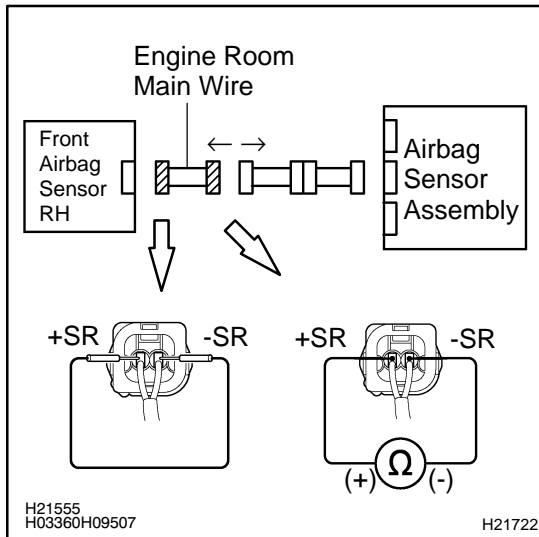
**Replace airbag sensor assembly  
(DTC B1148/36 is output).**

**NG**

**Replace front airbag sensor RH  
(DTC B1149/37 is output).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

**8 Check engine room main wire.****PREPARATION:**

- Disconnect the engine room main wire connector on the airbag sensor assembly side.
- Using a service wire, connect +SR and -SR of the engine room main wire connector on the front airbag sensor RH side.

**CHECK:**

Measure the resistance between +SR and -SR of the engine room main wire connector on the airbag sensor assembly side.

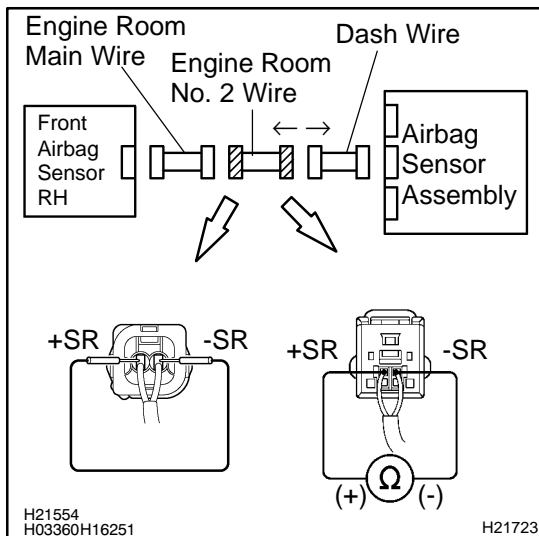
**OK:**

Resistance: Below 1  $\Omega$

**NG**

Repair or replace engine room main wire.

**OK**

**9 Check engine room No. 2 wire.****PREPARATION:**

- Disconnect the engine room No. 2 wire connector from the dash wire.
- Using a service wire, connect +SR and -SR of the engine room No. 2 wire connector on the engine room main wire side.

**CHECK:**

Measure the resistance between +SR and -SR of the engine room No. 2 wire connector on the dash wire side.

**OK:**

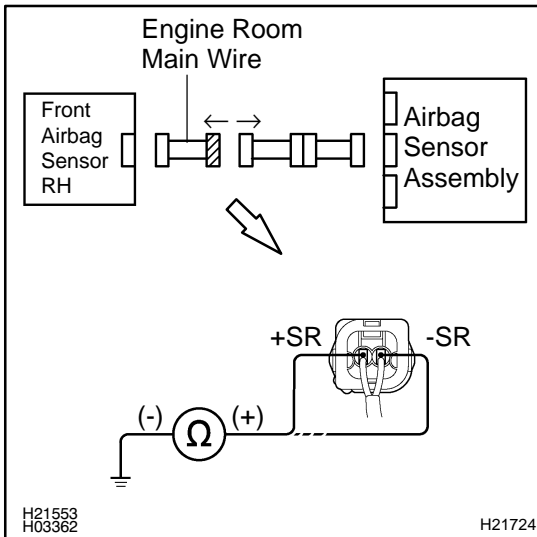
Resistance: Below 1  $\Omega$

**NG**

Repair or replace engine room No. 2 wire.

**OK**

Repair or replace dash wire.

**10 Check engine room main wire (to ground).****PREPARATION:**

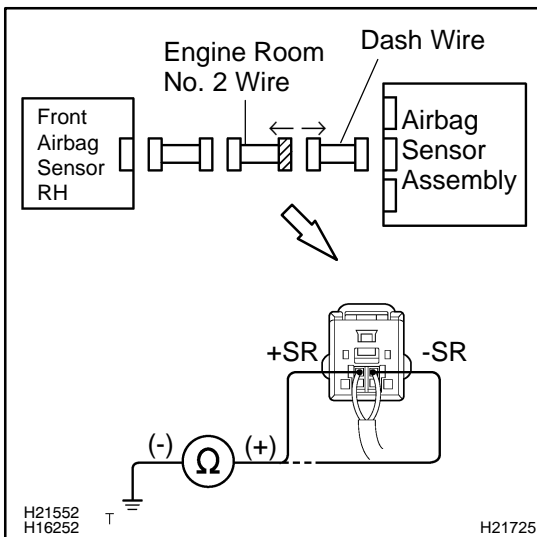
Disconnect the engine room main wire connector on the airbag sensor assembly side.

**CHECK:**

Measure the resistance between the body ground and each of +SR and -SR of the engine room main wire connector on the airbag sensor assembly side.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG****Repair or replace engine room main wire.****OK****11 Check engine room No. 2 wire (to ground).****PREPARATION:**

Disconnect the engine room No. 2 wire connector from the dash wire.

**CHECK:**

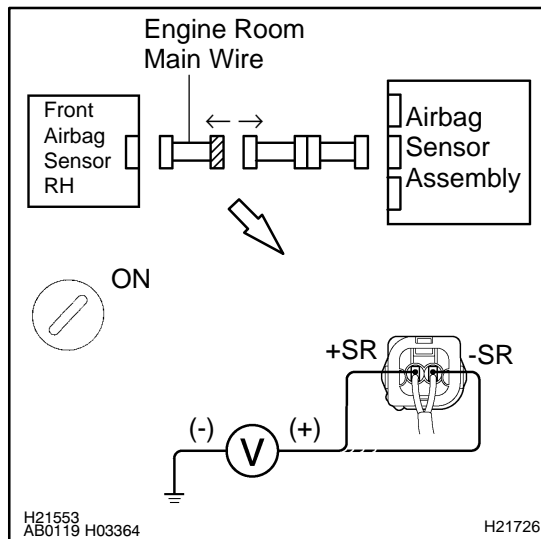
Measure the resistance between the body ground and each of +SR and -SR of the engine room No. 2 wire connector on the dash wire side.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG****Repair or replace engine room No. 2 wire.****OK****Repair or replace dash wire.**

## 12 Check engine room main wire (to B+).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the engine room main wire connector on the airbag sensor assembly side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and each of +SR and -SR of the engine room main wire connector on the airbag sensor assembly side.

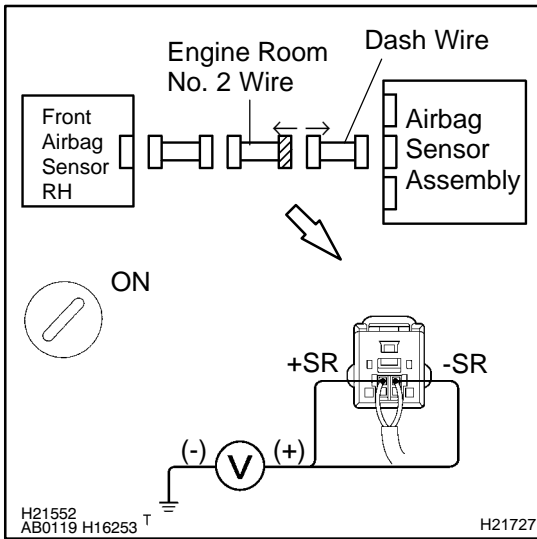
### OK:

**Voltage: Below 1 V**

**NG**

**Repair or replace engine room main wire.**

**OK**

**13 Check engine room No. 2 wire (to B+).**

**PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the engine room No. 2 wire connector from the dash wire.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and each of +SR and -SR of the engine room No. 2 wire connector on the dash wire side.

**OK:**
**Voltage: Below 1 V**
**NG**
**Repair or replace engine room No. 2 wire.**
**OK**
**Repair or replace dash wire.**



<b>DTC</b>	<b>B1149/37</b>	<b>Front Airbag Sensor LH Malfunction</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The front airbag sensor LH circuit consists of the diagnosis circuit and frontal deceleration sensor, etc. It receives signals from the frontal deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

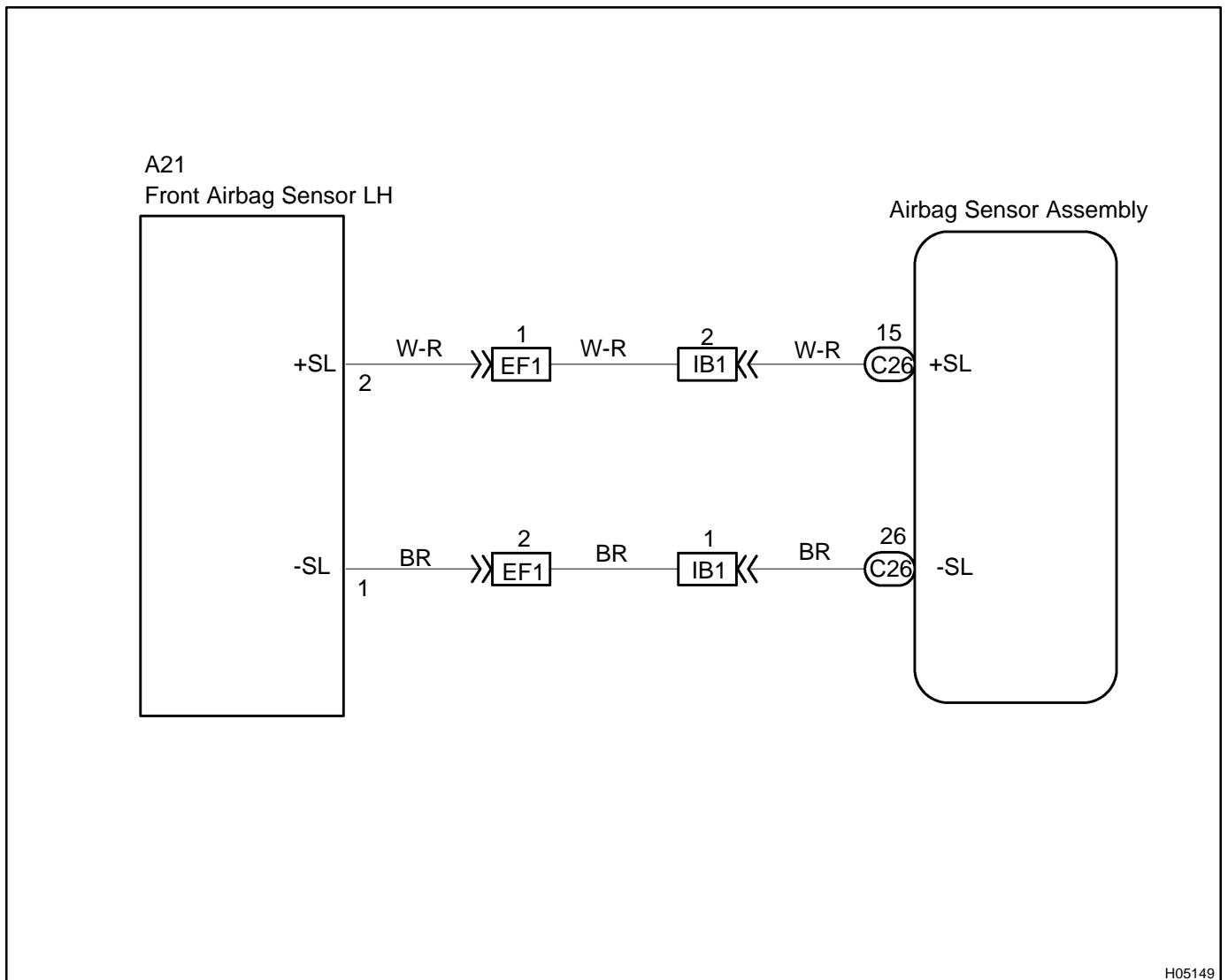
DTC B1149/37 is recorded when malfunction is detected in the front airbag sensor LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1149/37	▶Front airbag sensor LH malfunction	<ul style="list-style-type: none"> <li>▶Front airbag sensor LH</li> <li>▶Airbag sensor assembly</li> <li>▶Dash wire</li> <li>▶Engine room No. 2 wire</li> <li>▶Engine room main wire</li> </ul>

**HINT:**

DTC B1149/37 is indicated only for the vehicle equipped with the side airbag and without the side airbag (dual stage airbag).

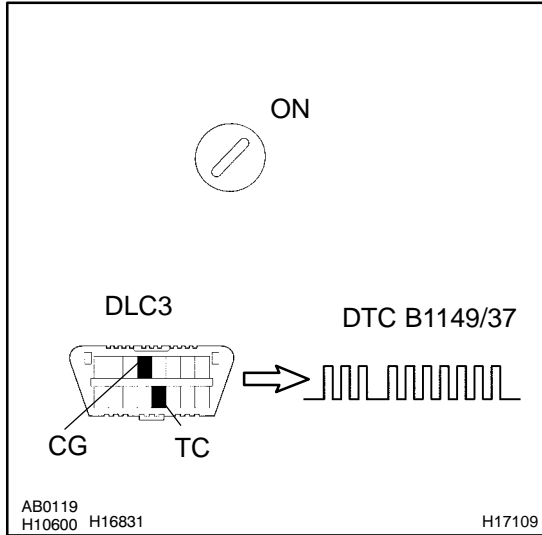
**WIRING DIAGRAM**



H05149

# INSPECTION PROCEDURE

<b>1</b>	<b>Is DTC B1149/37 output?</b>
----------	--------------------------------



**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page [DI-692](#) ).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page [DI-692](#) ).

**OK:**

**DTC B1149/37 is output.**

**HINT:**

Codes other than code B1149/37 may be output at this time, but they are not relevant to this check.

<b>NO</b>	<b>The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.</b>
-----------	--

<b>YES</b>
------------

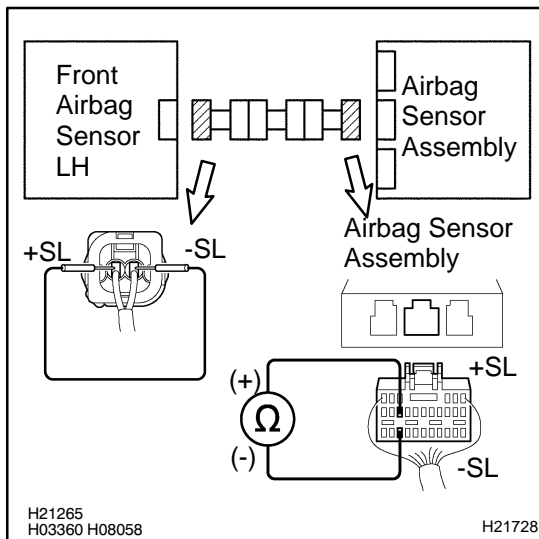
<b>2</b>	<b>Is connector of front airbag sensor LH properly connected?</b>
----------	---

<b>NO</b>	<b>Connect connector.</b>
-----------	---------------------------

<b>YES</b>
------------

<b>3</b>	<b>Prepare for inspection (See step 1 on page <a href="#">DI-923</a> ).</b>
----------	---

<b>YES</b>
------------

**4 Check wire harness.****PREPARATION:**

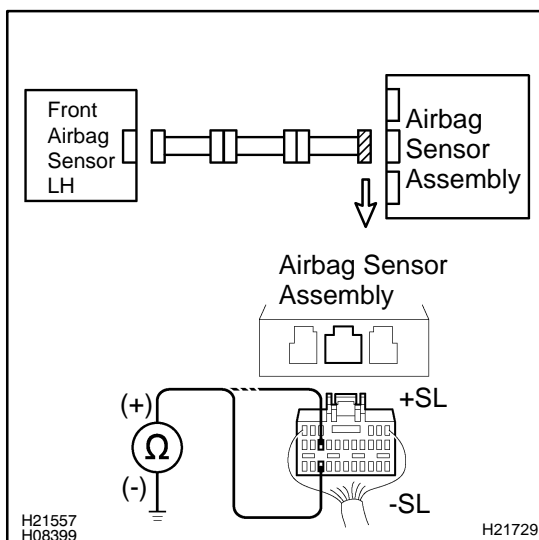
Using a service wire, connect +SL and -SL on the front airbag sensor LH side between the airbag sensor assembly and the front airbag sensor LH.

**CHECK:**

Measure the resistance between +SL and -SL on the airbag sensor assembly side between the front airbag sensor LH and the airbag sensor assembly.

**OK:**

**Resistance: Below 1  $\Omega$**

**NG****Go to step 8.****OK****5 Check wire harness (to ground).****CHECK:**

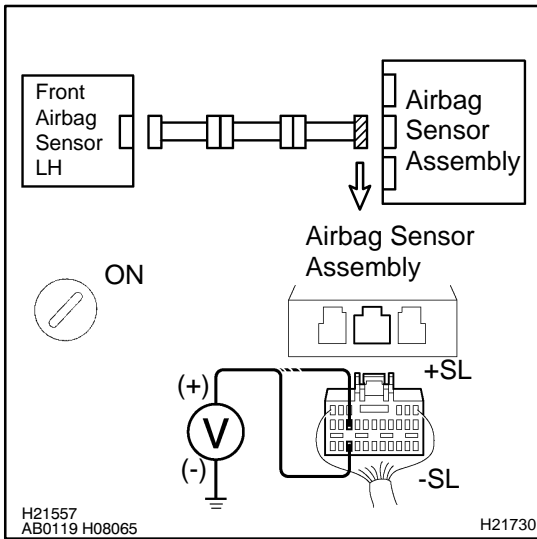
Measure the resistance between the body ground and each of +SL and -SL on the airbag sensor assembly side between the front airbag sensor LH and the airbag sensor assembly.

**OK:**

**Resistance: 1 M $\Omega$  or Higher**

**NG****Go to step 10.****OK**

## 6 Check wire harness (to B+).



### PREPARATION:

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and each of +SL and -SL on the airbag sensor assembly side between the front airbag sensor LH and the airbag sensor assembly.

### OK:

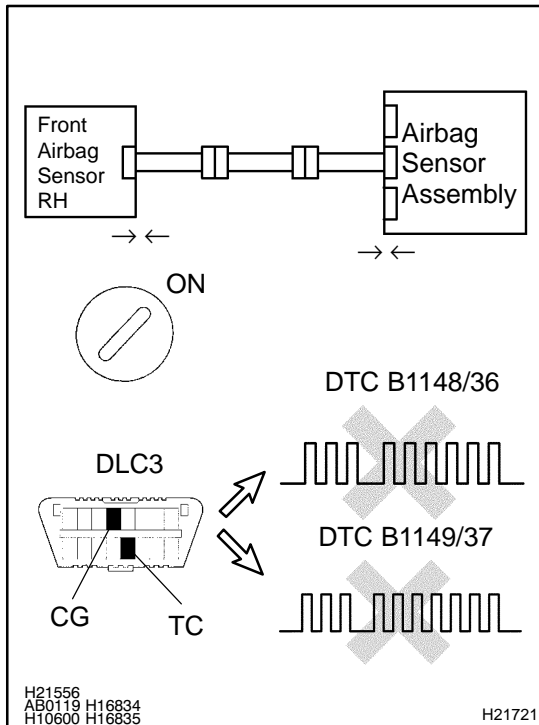
**Voltage: Below 1 V**

**NG**

**Go to step 12.**

**OK**

## 7 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Change the front airbag sensor RH position with LH position.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**Neither DTC B1148/36 nor B1149/37 not output.**

### HINT:

Codes other than code B1149/37 or B1148/36 may be output at this time, but they are not relevant to this check.

**NG**

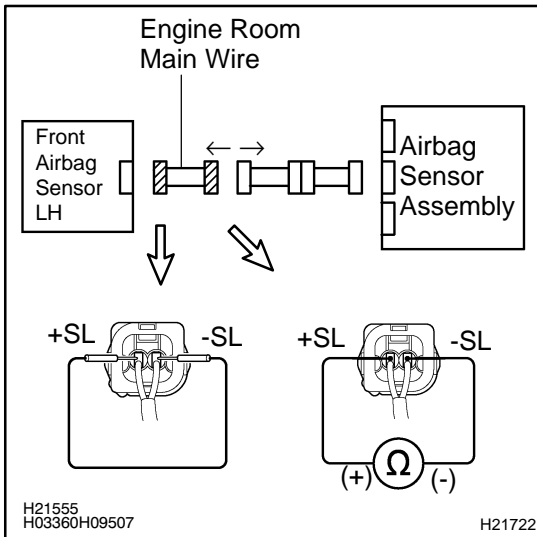
**Replace airbag sensor assembly  
(DTC B1149/37 is output).**

**NG**

**Replace front airbag sensor LH  
(DTC B1148/36 is output).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

**8 Check engine room main wire.****PREPARATION:**

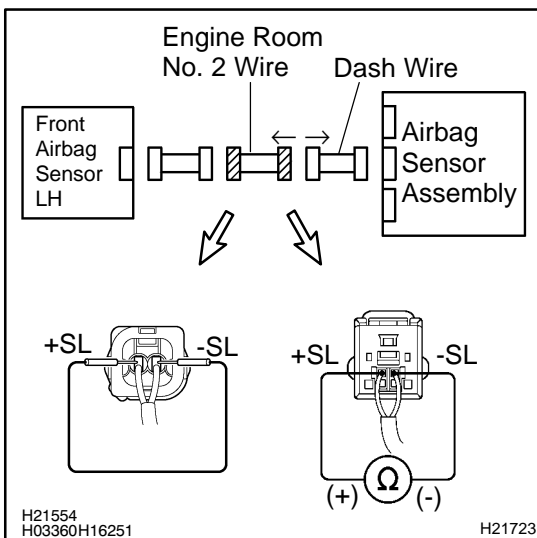
- Disconnect the engine room main wire connector on the airbag sensor assembly side.
- Using a service wire, connect +SL and -SL of the engine room main wire on the front airbag sensor LH side.

**CHECK:**

Measure the resistance between +SL and -SL of the engine room main wire connector on the airbag sensor assembly side.

**OK:**

**Resistance: Below 1 Ω**

**NG****Repair or replace engine room main wire.****OK****9 Check engine room No. 2 wire.****PREPARATION:**

- Disconnect the engine room No. 2 wire connector from the dash wire.
- Using a service wire, connect +SL and -SL of the engine room No. 2 wire on the engine room main wire side.

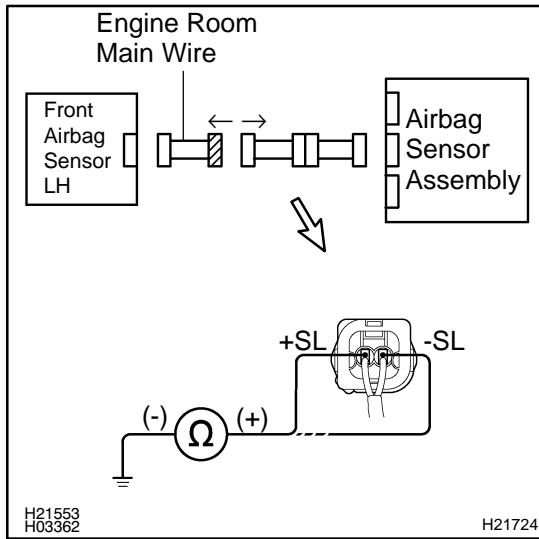
**CHECK:**

Measure the resistance between +SL and -SL of the engine room No. 2 wire connector on the dash wire side.

**OK:**

**Resistance: Below 1 Ω**

**NG****Repair or replace engine room No. 2 wire.****OK****Repair or replace dash wire.**

**10 Check engine room main wire (to ground).****PREPARATION:**

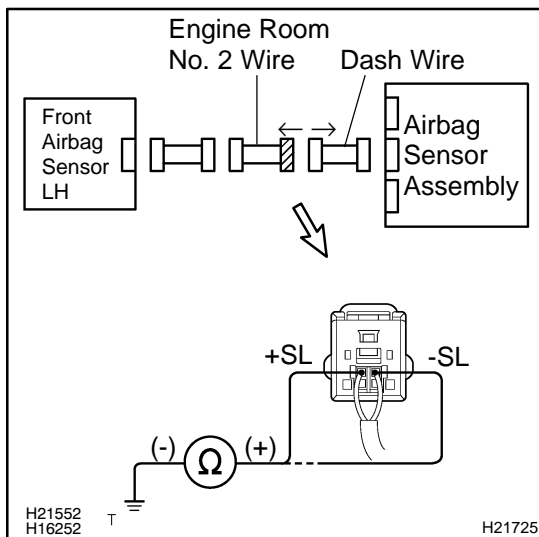
Disconnect the engine room main wire connector on the airbag sensor assembly side.

**CHECK:**

Measure the resistance between the body ground and each of +SL and -SL of the engine room main wire connector on the airbag sensor assembly side.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG****Repair or replace engine room main wire.****OK****11 Check engine room No. 2 wire (to ground).****PREPARATION:**

Disconnect the engine room No. 2 wire connector from the dash wire.

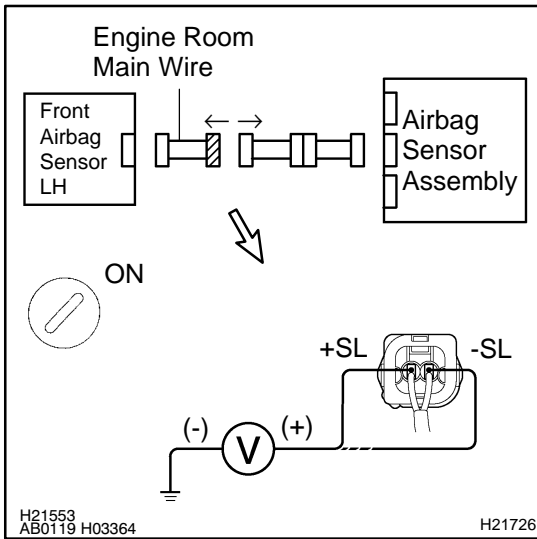
**CHECK:**

Measure the resistance between the body ground and each of +SL and -SL of the engine room No. 2 wire connector on the dash wire side.

**OK:**

**Resistance: 1 MΩ or Higher**

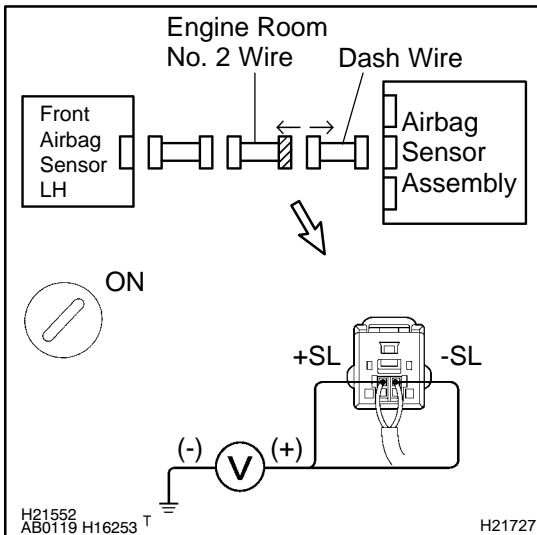
**NG****Repair or replace engine room No. 2 wire.****OK****Repair or replace dash wire.**

**12 Check engine room main wire (to B+).****PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the engine room main wire connector on the airbag sensor assembly side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and each of +SL and -SL of the engine room main wire connector on the airbag sensor assembly side.

**OK:****Voltage: Below 1 V****NG****Repair or replace engine room main wire.****OK****13 Check engine room No. 2 wire (to B+).****PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the engine room No. 2 wire connector from the dash wire.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and each of +SL and -SL of the engine room No. 2 wire connector on the dash wire side.

**OK:****Voltage: Below 1 V****NG****Repair or replace engine room No. 2 wire.****OK****Repair or replace dash wire.**

2004 LAND CRUISER (RM1071U)



<b>DTC</b>	<b>B1153/25</b>	<b>Seat Position Sensor Assembly Malfunction</b>
------------	-----------------	--

### CIRCUIT DESCRIPTION

The seat position sensor circuit consists of the airbag sensor assembly and the seat position sensor assembly.

For details of the function of each components, see OPERATION on page RS-3.

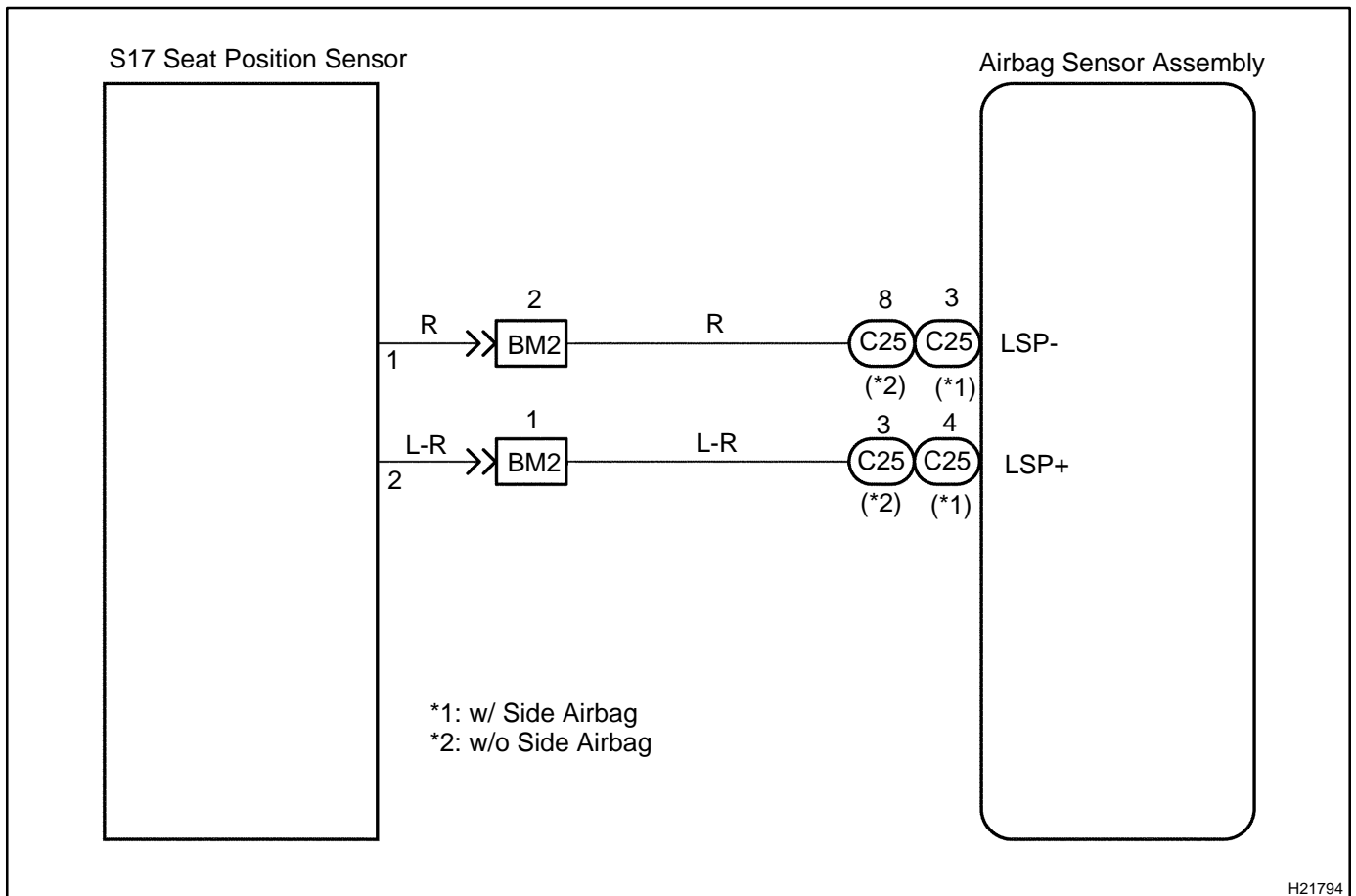
B1153/25 is recorded when a malfunction is detected in the seat position sensor circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1153/25	▶ Seat position sensor assembly malfunction	▶ Seat position sensor assembly ▶ Airbag sensor assembly ▶ Floor No. 1 wire ▶ Front seat wire LH

**HINT:**

DTC B1153/25 is indicated only for the vehicle equipped with the side airbag and without the side airbag (dual stage airbag).

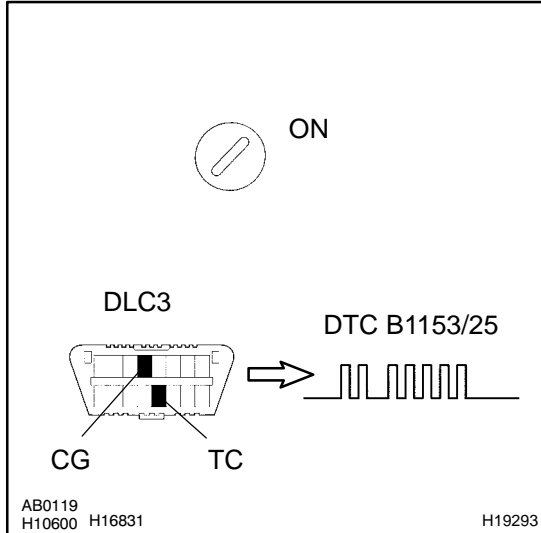
### WIRING DIAGRAM



H21794

### INSPECTION PROCEDURE

<b>1</b>	<b>Is DTC B1153/25 output ?</b>
----------	---------------------------------



**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page [DI-692](#) ).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page [DI-692](#) ).

**OK:**

**DTC B1153/25 is output.**

**HINT:**

Codes other than code B1153/25 may be output at this time, but they are not relevant to this check.

<b>NO</b>	<b>The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.</b>
-----------	--

**YES**

<b>2</b>	<b>Is connector of the seat position sensor assembly properly connected ?</b>
----------	---

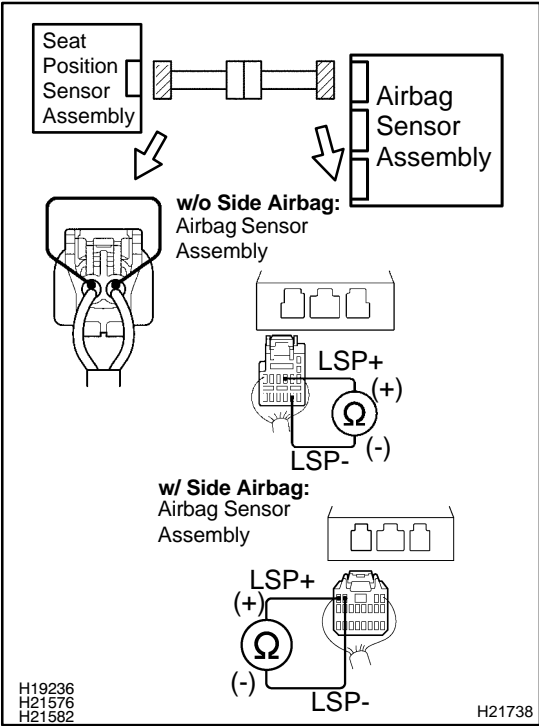
<b>NO</b>	<b>Connect connector.</b>
-----------	---------------------------

**YES**

<b>3</b>	<b>Prepare for inspection (See step 1 on <a href="#">DI-923</a> ).</b>
----------	--

**YES**

**4 Check wire harness.**



**PREPARATION:**

Using a service wire, connect LSP+ and LSP- of the connector on the seat position sensor assembly side between the airbag sensor assembly and the seat position sensor assembly.

**CHECK:**

Measure the resistance between LSP+ and LSP- of the connector on the airbag sensor assembly side between the seat position sensor assembly and the airbag sensor assembly.

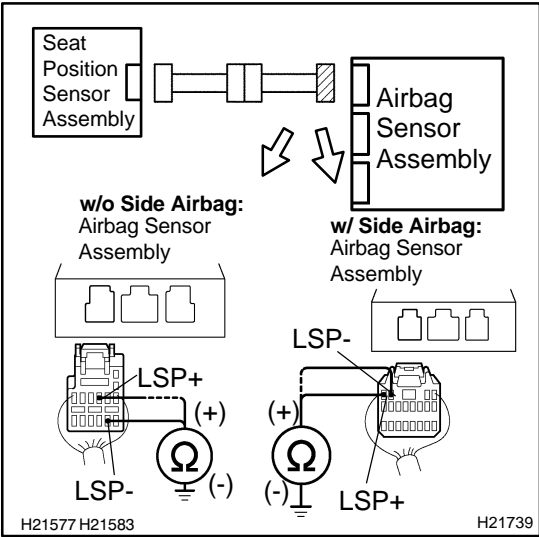
**OK:**

**Resistance: Below 1 Ω**

**NG** → **Go to step 9.**

**OK**

**5 Check wire harness (to ground).**



**PREPARATION:**

Release the service wire from the connector on the seat position sensor assembly side.

**CHECK:**

Measure the resistance between the body ground and each of LSP+ and LSP- of the connector on the airbag sensor assembly side between the seat position sensor assembly and the airbag sensor assembly.

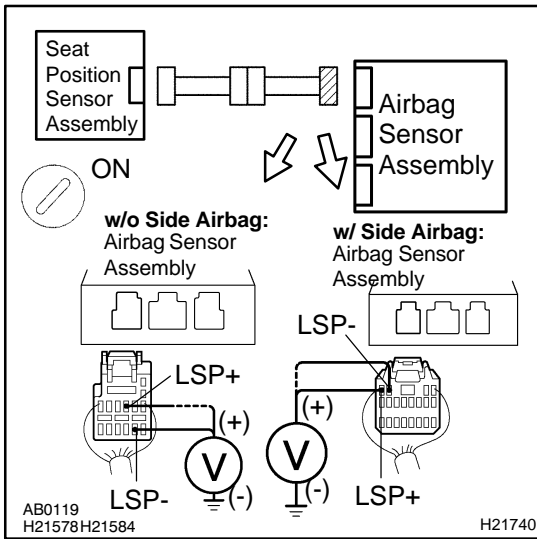
**OK:**

**Resistance: 10 kΩ or Higher**

**NG** → **Go to step 10.**

**OK**

## 6 Check wire harness (to B+).



### PREPARATION:

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and each of LSP+ and LSP- of the connector on the airbag sensor assembly side between the seat position sensor assembly and the airbag sensor assembly.

### OK:

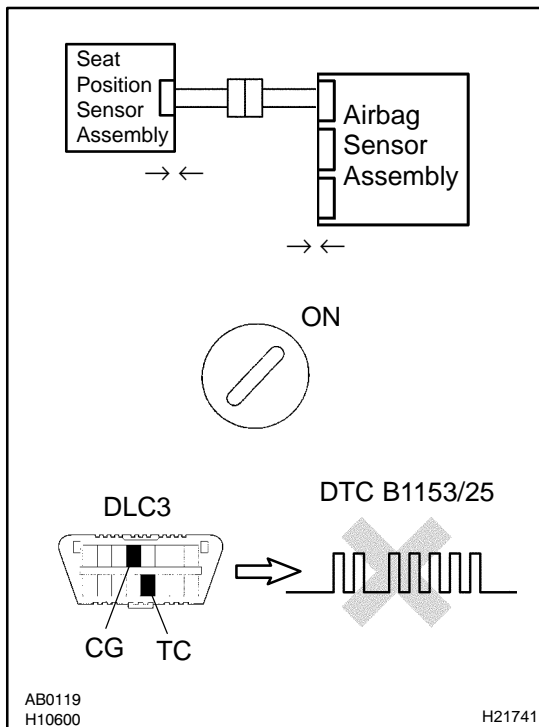
**Voltage: Below 1 V**

**NG**

**Go to step 11.**

**OK**

## 7 Check seat position sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connectors of the seat position sensor assembly and the airbag sensor assembly.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1153/25 is not output.**

### HINT:

Codes other than code B1153/25 may be output at this time, but they are not relevant to this check.

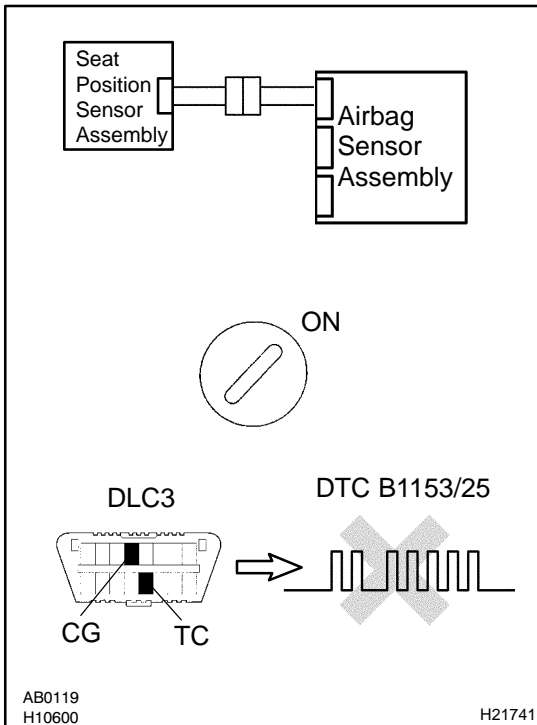
**NG**

**Replace seat position sensor assembly, then go to next step.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

## 8 Is DTC B1153/25 output again ?



### PREPARATION:

- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1153/25 is not output.**

### HINT:

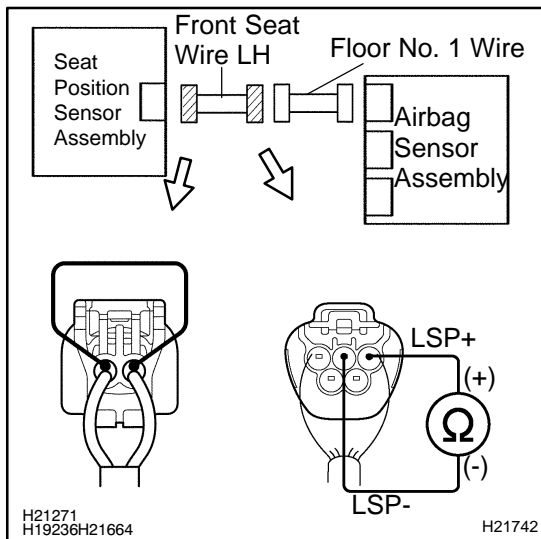
Codes other than code B1153/25 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

**9 Check front seat wire LH.****PREPARATION:**

- Disconnect the front seat wire LH connector from the floor No. 1 wire.
- Using a service wire, connect LSP+ and LSP- of the front seat wire LH connector on the seat position sensor assembly side.

**CHECK:**

Measure the resistance between LSP+ and LSP- of the front seat wire LH connector on the floor No. 1 wire side.

**OK:**

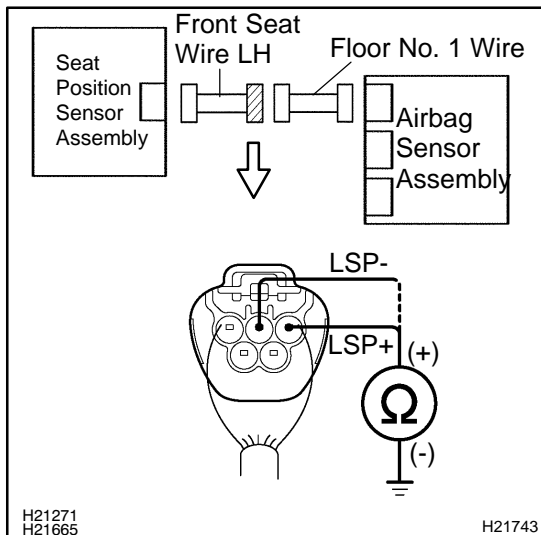
Resistance: Below 1  $\Omega$

NG

Repair or replace front seat wire LH.

OK

Repair or replace floor No. 1 wire.

**10 Check front seat wire LH (to ground).****PREPARATION:**

- Disconnect the front seat wire LH connector from the floor No. 1 wire.
- Release the service wire from the front seat wire LH connector on the seat position sensor assembly side.

**CHECK:**

Measure the resistance between the body ground and each of LSP+ and LSP- of the front seat wire LH connector on the floor No. 1 wire side.

**OK:**

Resistance: 10 k $\Omega$  or Higher

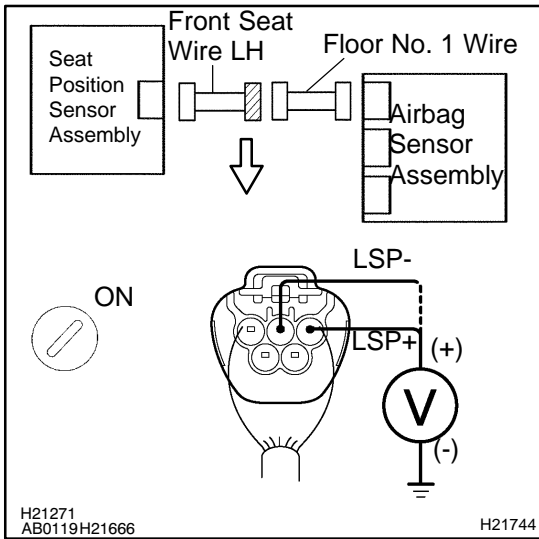
NG

Repair and replace floor No. 1 wire.

OK

Repair and replace floor No. 1 wire.

## 11 Check front seat wire LH (to B+).



### PREPARATION:

Disconnect the front seat wire LH connector from the floor No. 1 wire.

### CHECK:

Measure the voltage between the body ground and each of LSP+ and LSP- of the front seat wire LH connector on the floor No. 1 wire side.

### OK:

**Voltage: Below 1 V**

**NG**

**Repair or replace front seat wire LH.**

**OK**

**Repair or replace floor No. 1 wire.**



<b>DTC</b>	<b>B1154/38</b>	<b>Curtain Shield Airbag Sensor Assembly RH Malfunction</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The curtain shield airbag sensor assembly RH consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

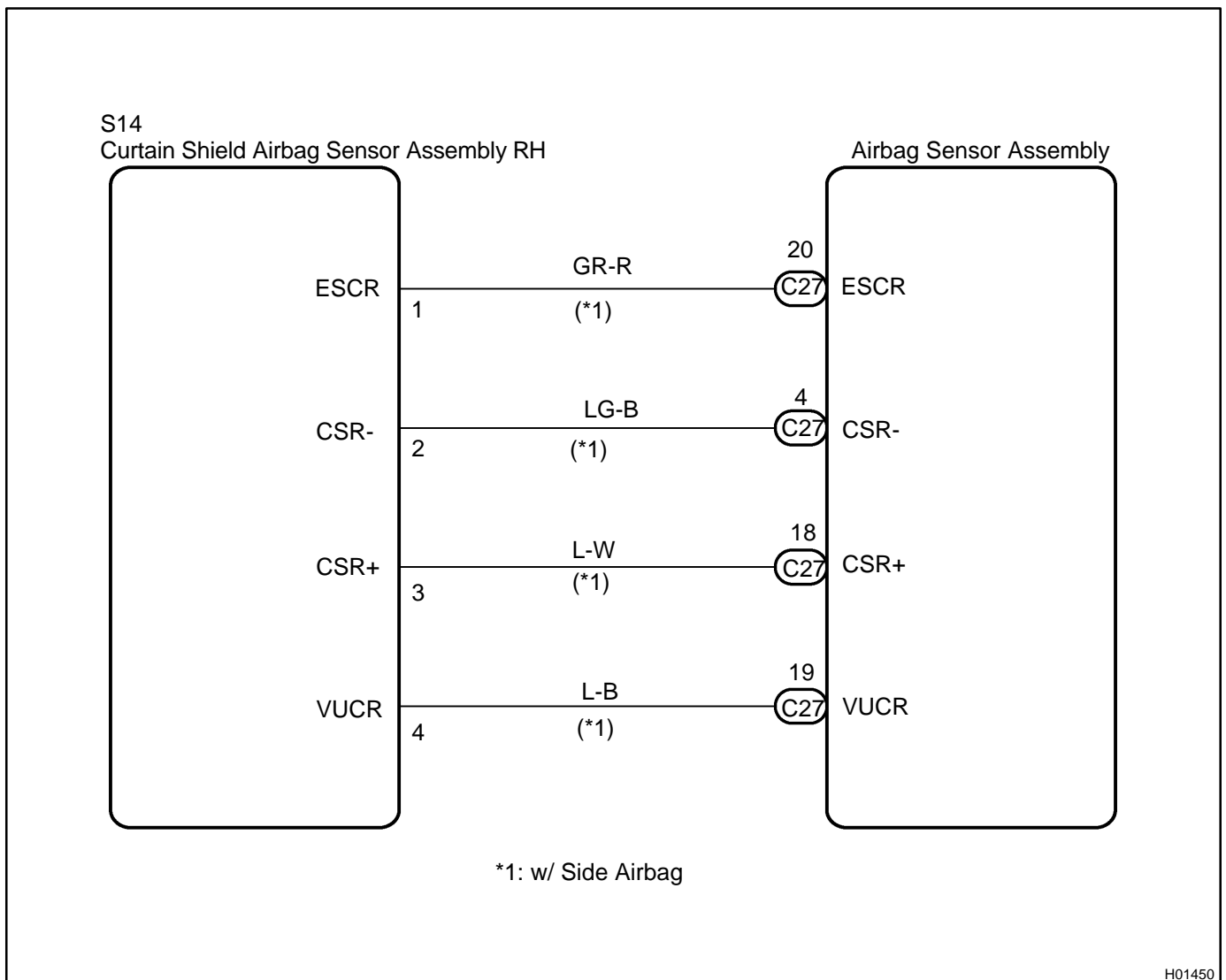
DTC B1154/38 is recorded when occurrence of a malfunction in the curtain shield airbag sensor assembly RH is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1154/38	▶Curtain shield airbag sensor assembly RH malfunction	▶Curtain shield airbag sensor assembly RH ▶Floor No. 2 wire ▶Airbag sensor assembly

**HINT:**

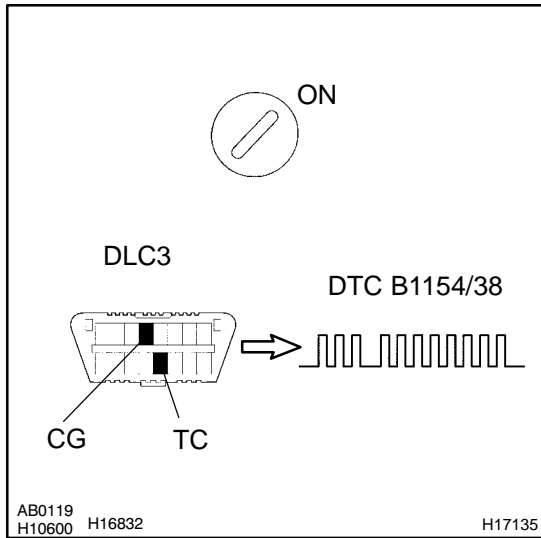
DTC B1154/38 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**



### INSPECTION PROCEDURE

<b>1</b>	<b>Is DTC B1154/38 output?</b>
----------	--------------------------------



**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page [DI-692](#) ).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page [DI-692](#) ).

**OK:**

**DTC B1154/38 is output.**

**HINT:**

Codes other than code B1154/38 may be output at this time, but they are not relevant to this check.

<b>NO</b>	<b>The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.</b>
-----------	--

<b>YES</b>
------------

<b>2</b>	<b>Is connector of curtain shield airbag sensor assembly RH properly connected?</b>
----------	---

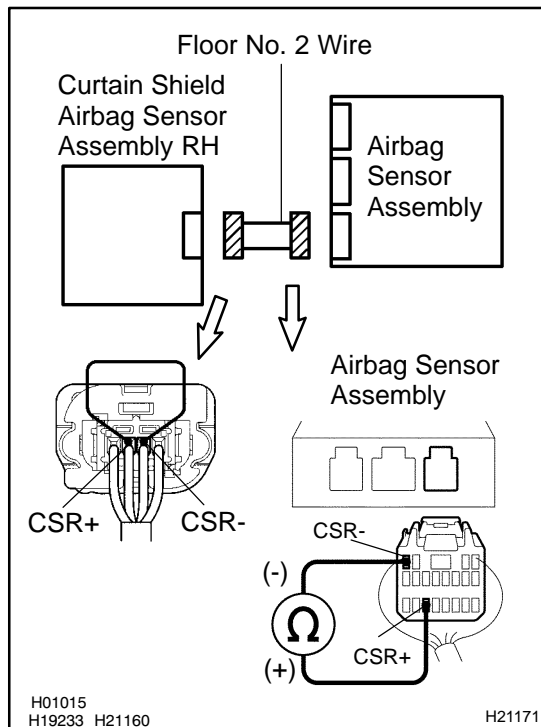
<b>NO</b>	<b>Connect connector.</b>
-----------	---------------------------

<b>YES</b>
------------

<b>3</b>	<b>Prepare for inspection (See step 1 on <a href="#">DI-923</a> ).</b>
----------	--

<b>YES</b>
------------

#### 4 Check floor No. 2 wire.



#### **PREPARATION:**

Using a service wire, connect CSR+ and CSR- of the floor No. 2 wire connector on the curtain shield airbag sensor assembly RH side.

#### **CHECK:**

Measure the resistance between CSR+ and CSR- of the floor No. 2 wire connector on the airbag sensor assembly side.

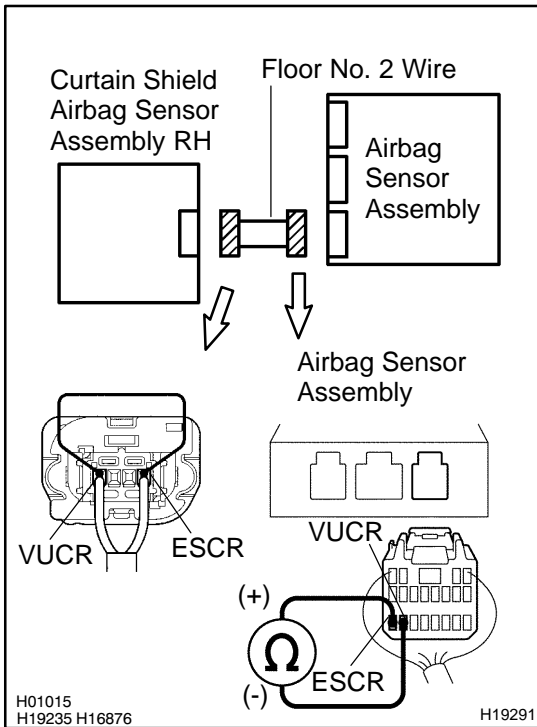
#### **OK:**

**Resistance: Below 1  $\Omega$**

**NG**

**Repair or replace floor No. 2 wire.**

**OK**

**5 Check floor No. 2 wire.**

**PREPARATION:**

Using a service wire, connect VUCR and ESCR of the floor No. 2 wire connector on the curtain shield airbag sensor assembly RH side.

**CHECK:**

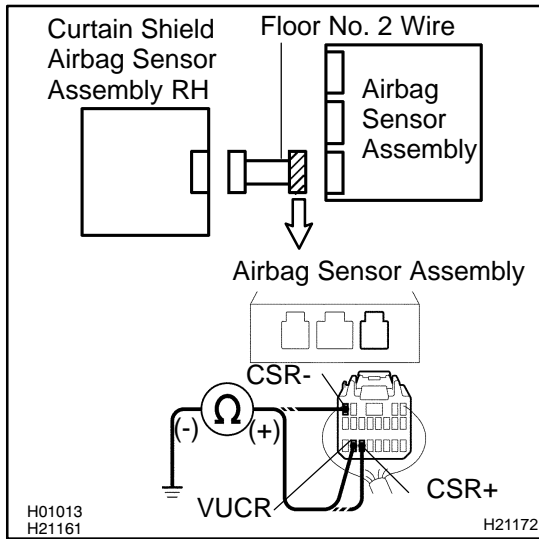
Measure the resistance between VUCR and ESCR of the floor No. 2 wire connector on the airbag sensor assembly side.

**OK:**

**Resistance: Below 1  $\Omega$**

**NG**
**Repair or replace floor No. 2 wire.**
**OK**

## 6 Check floor No. 2 wire (to ground).

**CHECK:**

Measure the resistance between the body ground and each of VUCR, CSR+ and CSR- of the floor No. 2 wire connector on the airbag sensor assembly side.

**OK:**

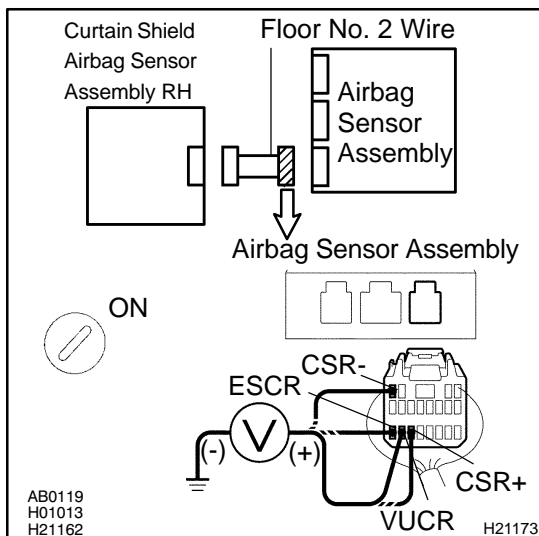
**Resistance: 10 k $\Omega$  or Higher**

**NG**

**Repair or replace floor No. 2 wire.**

**OK**

## 7 Check floor No. 2 wire (to B+).

**PREPARATION:**

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and each of VUCR, CSR+, CSR- and ESCR of the floor No. 2 wire connector on the airbag sensor assembly side.

**OK:**

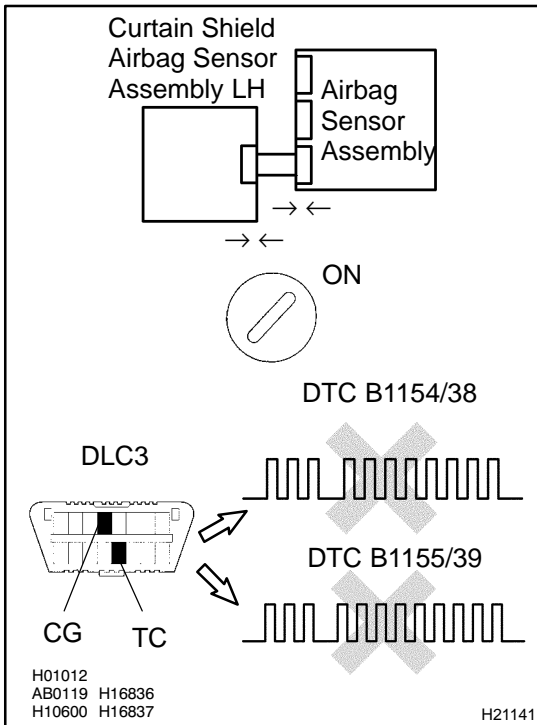
**Voltage: Below 1 V**

**NG**

**Repair or replace floor No. 2 wire.**

**OK**

## 8 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Change the curtain shield airbag sensor assembly LH position with RH position.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**Neither DTC B1154/38 nor B1155/39 are not output.**

### HINT:

Codes other than code B1154/38 or B1155/39 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly (DTC B1154/38 is output).

NG

Replace curtain shield airbag sensor assembly RH (DTC B1155/39 is output).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

<b>DTC</b>	<b>B1155/39</b>	<b>Curtain Shield Airbag Sensor Assembly LH Malfunction</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The curtain shield airbag sensor assembly LH consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

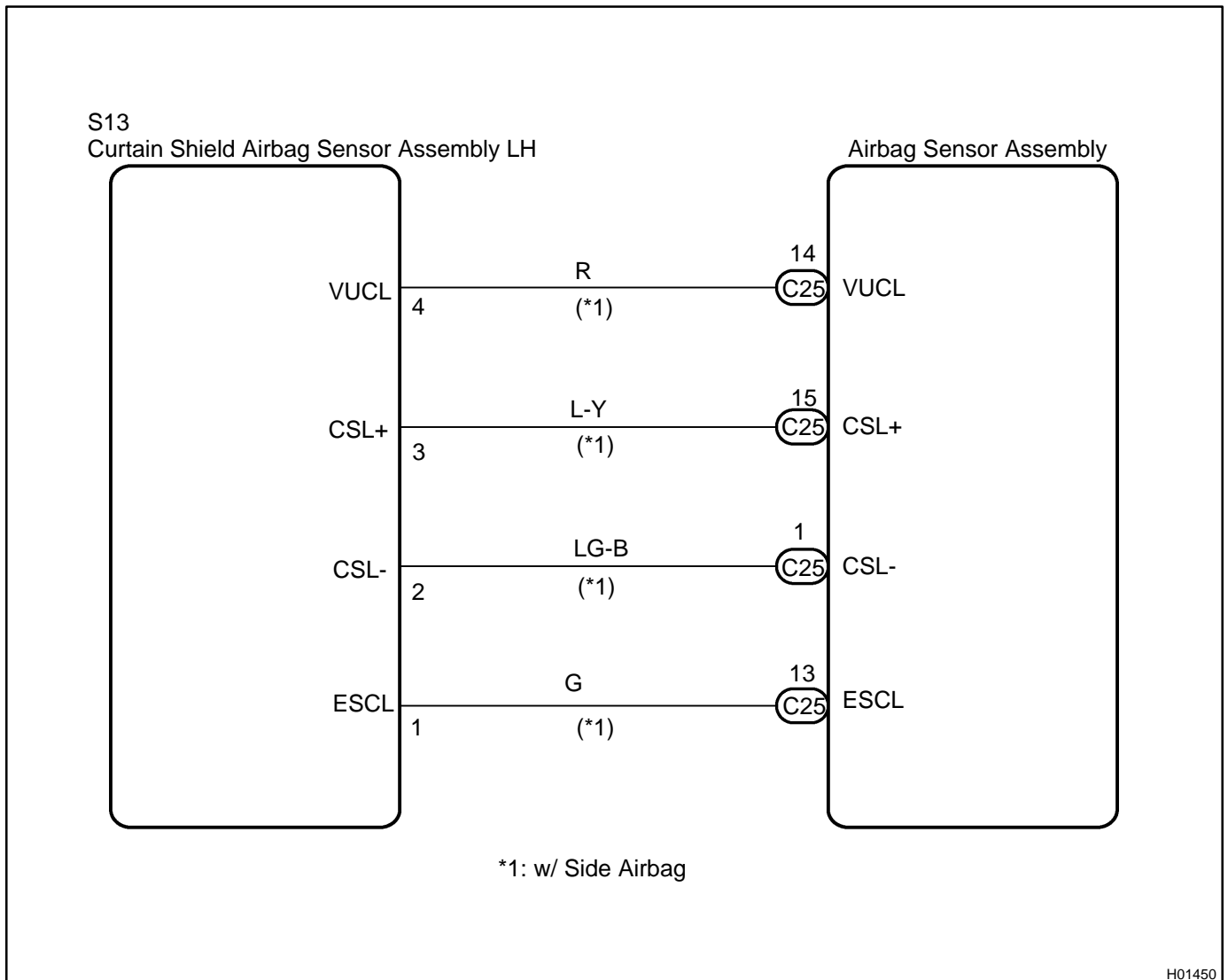
DTC B1155/39 is recorded when occurrence of a malfunction in the curtain shield airbag sensor assembly LH is detected.

DTC No.	DTC Detecting Condition	Trouble Area
B1155/39	▶Curtain shield airbag sensor assembly LH malfunction	▶Curtain shield airbag sensor assembly LH ▶Floor No. 1 wire ▶Airbag sensor assembly

**HINT:**

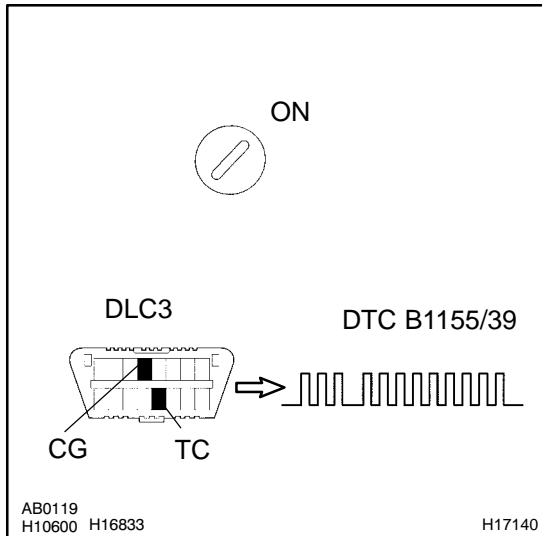
DTC B1155/39 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**



# INSPECTION PROCEDURE

<b>1</b>	<b>Is DTC B1155/39 output?</b>
----------	--------------------------------



**CHECK:**

- (a) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (b) Clear the DTC stored in memory (See page [DI-692](#) ).
- (c) Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- (d) Turn the ignition switch to ON, and wait at least for 10 seconds.
- (e) Check the DTC (See page [DI-692](#) ).

**OK:**

**DTC B1155/39 is output.**

**HINT:**

Codes other than code B1155/39 may be output at this time, but they are not relevant to this check.

<b>YES</b>	<b>The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.</b>
------------	--

<b>NO</b>
-----------

<b>2</b>	<b>Is connector of curtain shield airbag sensor assembly LH properly connected?</b>
----------	---

<b>NO</b>	<b>Connect connector.</b>
-----------	---------------------------

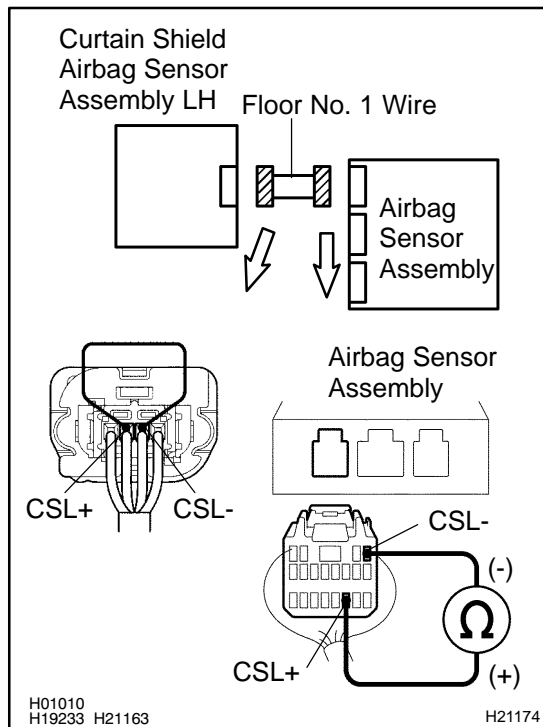
<b>YES</b>
------------

<b>3</b>	<b>Prepare for inspection (See step 1 on page <a href="#">DI-923</a> ).</b>
----------	---

--



#### 4 Check floor No. 1 wire.



#### **PREPARATION:**

Using a service wire, connect CSL+ and CSL- of the floor No. 1 wire connector on the curtain shield airbag sensor assembly LH side.

#### **CHECK:**

Measure the resistance between CSL+ and CSL- of the floor No. 1 wire connector on the airbag sensor assembly side.

#### **OK:**

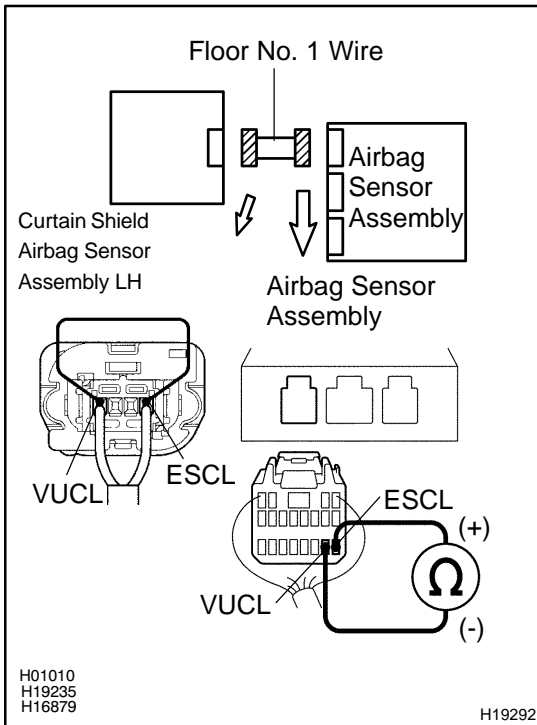
**Resistance: Below 1  $\Omega$**

**NG**

**Repair or replace floor No. 1 wire.**

**OK**

## 5 Check floor No. 1 wire.



### **PREPARATION:**

Using a service wire, connect VUCL and ESCL of the floor No. 1 wire connector on the curtain shield airbag sensor assembly LH side.

### **CHECK:**

Measure the resistance between VUCL and ESCL of the floor No. 1 wire connector on the airbag sensor assembly side.

### **OK:**

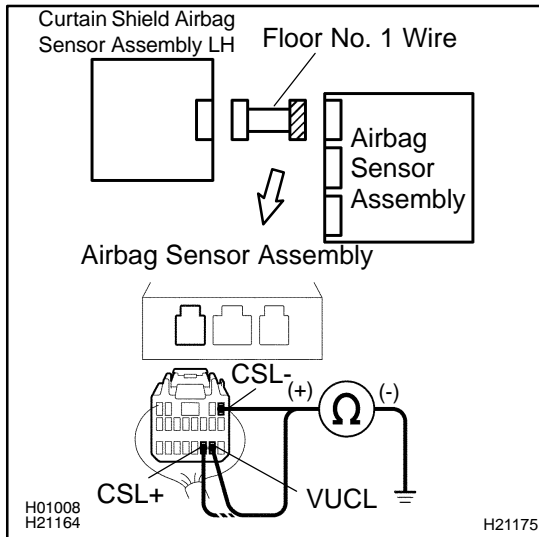
**Resistance: Below 1 Ω**

**NG**

**Repair or replace floor No. 1 wire.**

**OK**

## 6 Check floor No. 1 wire (to ground).



### **CHECK:**

Measure the resistance between the body ground and each of VUCL, CSL+ and CSL- of the floor No. 1 wire connector on the airbag sensor assembly side.

### **OK:**

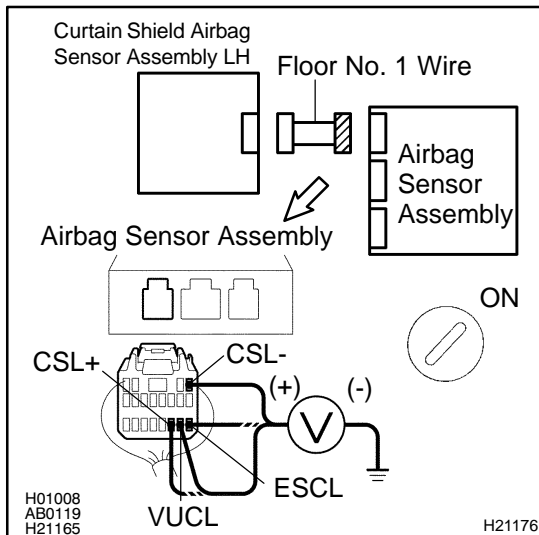
**Resistance: 10 kΩ or Higher**

**NG**

**Repair or replace floor No. 1 wire.**

**OK**

## 7 Check floor No. 1 wire (to B+).



### **PREPARATION:**

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### **CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and each of VUCL, CSL+, CSL- and ESCL of the floor No. 1 wire connector on the airbag sensor assembly side.

### **OK:**

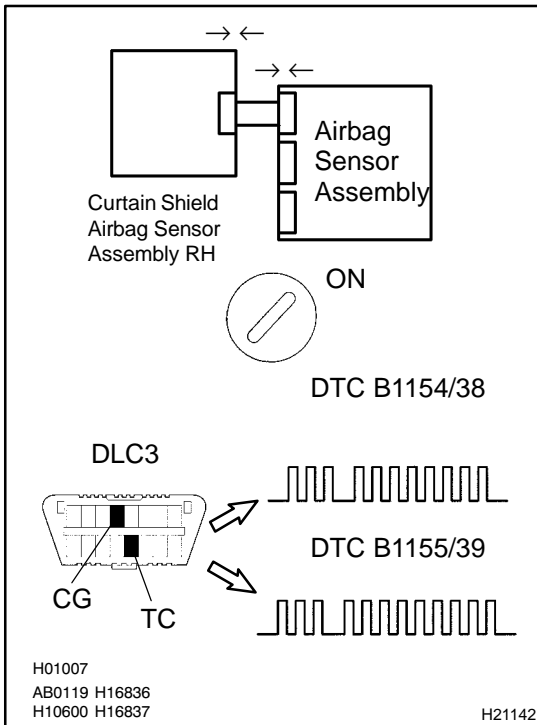
**Voltage: Below 1 V**

**NG**

**Repair or replace floor No. 1 wire.**

**OK**

## 8 Check airbag sensor assembly.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Change the curtain shield airbag sensor assembly RH position with LH position.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

Neither DTC B1155/39 nor B1154/38 are not output.

### HINT:

Codes other than code B1155/39 B1154/38 may be output at this time, but they are not relevant to this check.

NG

Replace airbag sensor assembly  
(DTC B1155/39 is output).

NG

Replace curtain shield airbag sensor assembly  
LH (DTC B1154/38 is output).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

<b>DTC</b>	<b>B1160/83</b>	<b>Short in Curtain Shield Squib RH Circuit</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The curtain shield squib RH circuit consists of the airbag sensor assembly and the curtain shield airbag assembly RH.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3.

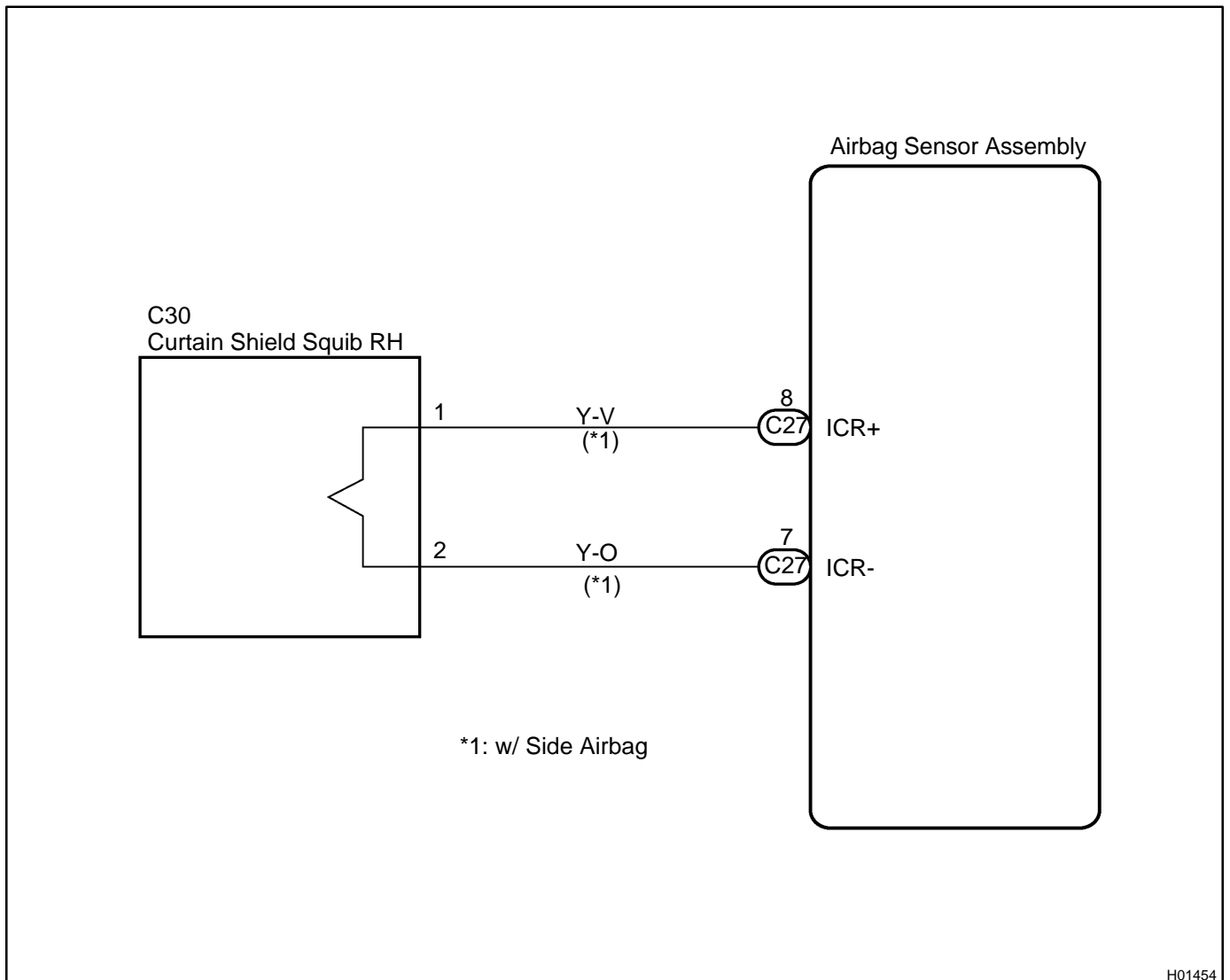
DTC B1110/83 is recorded when a short is detected in the curtain shield squib RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1110/83	<ul style="list-style-type: none"> <li>▶ Short in curtain shield squib RH circuit</li> <li>▶ Curtain shield squib RH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Curtain shield airbag assembly RH (Curtain shield squib RH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 2 wire</li> </ul>

HINT:

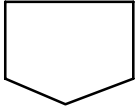
DTC B1160/83 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

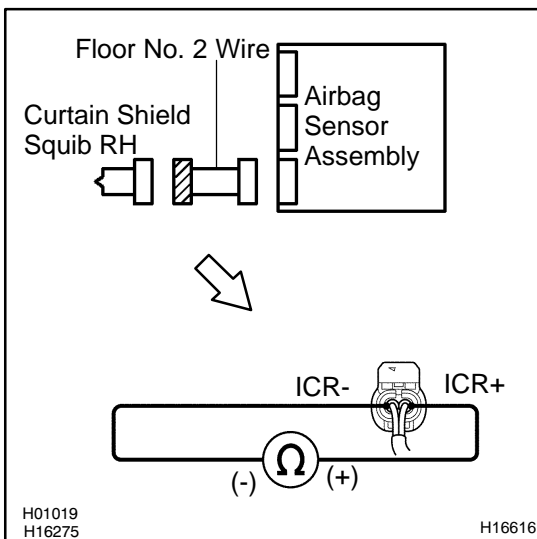


## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-923](#) ).



2 Check floor No. 2 wire (curtain shield squib RH circuit).



### **PREPARATION:**

Release the airbag activation prevention mechanism built in the connector of the floor No. 2 wire on the airbag sensor assembly side (See page [DI-692](#) ).

### **CHECK:**

Measure the resistance between ICR+ and ICR- of the floor No. 2 wire connector on the curtain shield airbag assembly RH (curtain shield squib RH) side.

### **OK:**

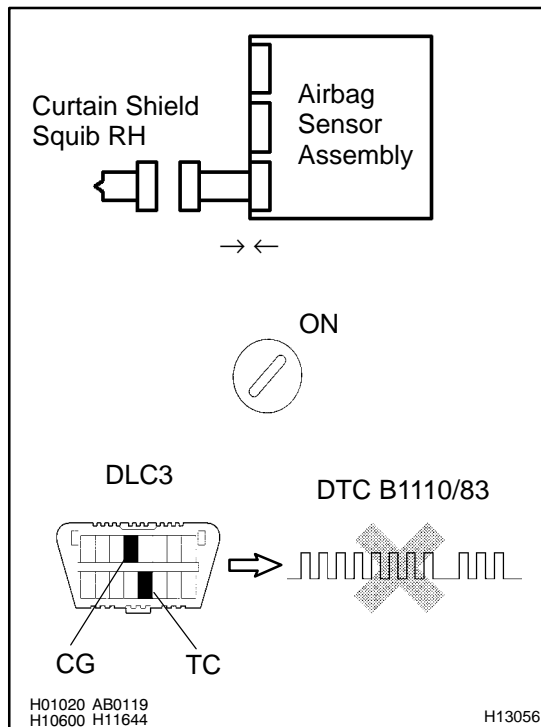
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace floor No. 2 wire.**

**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1110/83 is not output.**

#### HINT:

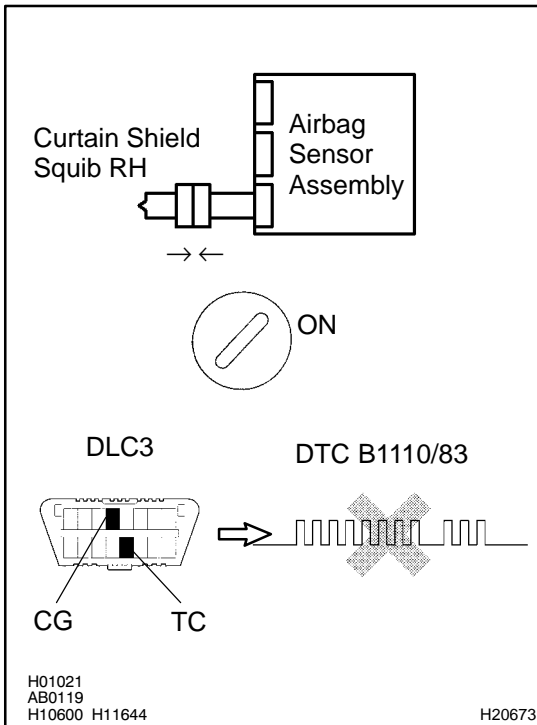
Codes other than code B1110/83 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check curtain shield squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the curtain shield airbag assembly RH (curtain shield squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1110/83 is not output.**

### HINT:

Codes other than code B1110/83 may be output at this time, but they are not relevant to this check.

**NG**

**Replace curtain shield airbag assembly RH (curtain shield squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**



<b>DTC</b>	<b>B1161/84</b>	<b>Open in Curtain Shield Squib RH Circuit</b>
------------	-----------------	--

**CIRCUIT DESCRIPTION**

The curtain shield squib RH circuit consists of the airbag sensor assembly and the curtain shield airbag assembly RH.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B1161/84 is recorded when an open is detected in the curtain shield squib RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1161/84	<ul style="list-style-type: none"> <li>▶Open in curtain shield squib RH circuit</li> <li>▶Curtain shield squib RH malfunction</li> <li>▶Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶Curtain shield airbag assembly RH (Curtain shield squib RH)</li> <li>▶Airbag sensor assembly</li> <li>▶Floor No. 2 wire</li> </ul>

**HINT:**

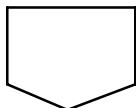
DTC B1161/84 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

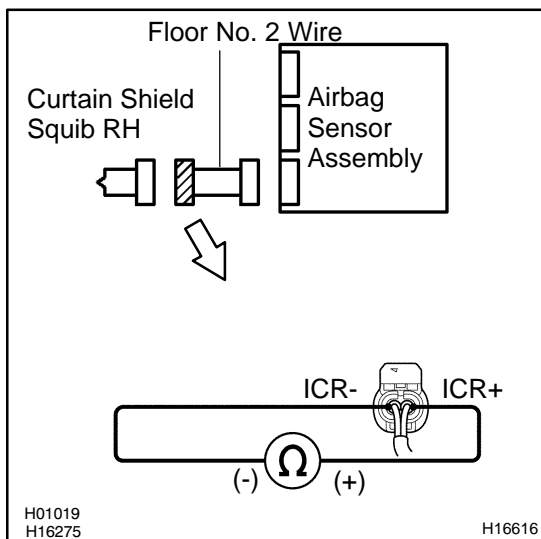
See page DI-856 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 2 wire (curtain shield squib RH circuit).</b>
----------	--



**CHECK:**

Measure the resistance between ICR+ and ICR- of the floor No. 2 wire connector on the curtain shield airbag assembly RH (curtain shield squib RH) side.

**OK:**

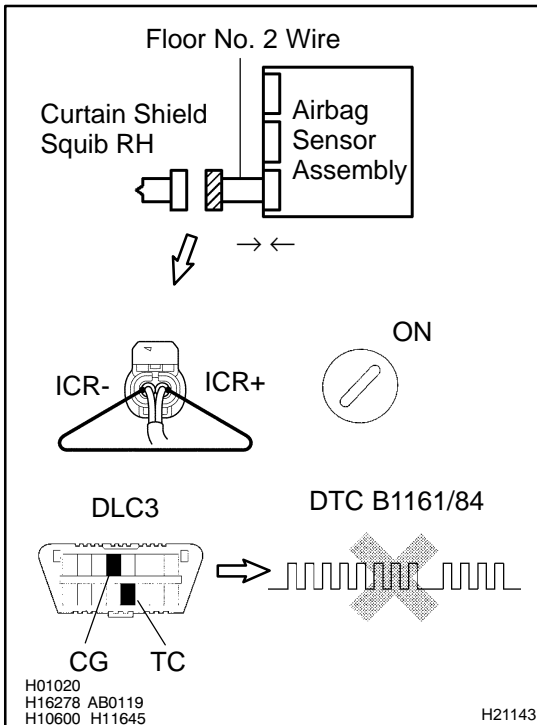
**Resistance: Below 1 Ω**

<b>NG</b>	<b>Repair or replace floor No. 2 wire.</b>
-----------	--



**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect ICR+ and ICR- of the floor No. 2 wire connector on the curtain shield airbag assembly RH (curtain shield squib RH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1161/84 is not output.**

#### HINT:

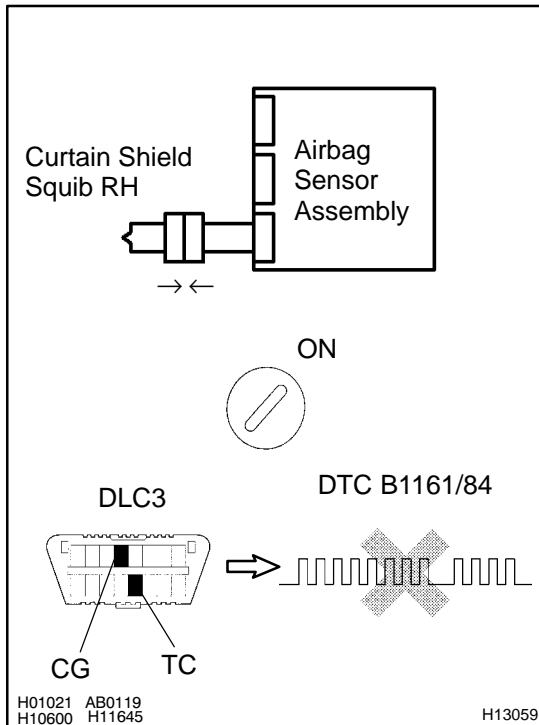
Codes other than code B1161/84 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check curtain shield squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the curtain shield airbag assembly RH (curtain shield squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1161/84 is not output.**

### HINT:

Codes other than code B1161/84 may be output at this time, but they are not relevant to this check.

**NG**

**Replace curtain shield airbag assembly RH (curtain shield squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B1162/81</b>	<b>Short in Curtain Shield Squib RH Circuit (to Ground)</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The curtain shield squib RH circuit consists of the airbag sensor assembly and the curtain shield airbag assembly RH.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B1162/81 is recorded when ground short is detected in the curtain shield squib RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1162/81	<ul style="list-style-type: none"> <li>▶Short in curtain shield squib RH circuit (to ground)</li> <li>▶Curtain shield squib RH malfunction</li> <li>▶Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶Curtain shield airbag assembly RH (Curtain shield squib RH)</li> <li>▶Airbag sensor assembly</li> <li>▶Floor No. 2 wire</li> </ul>

HINT:

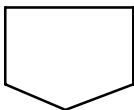
DTC B1162/81 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

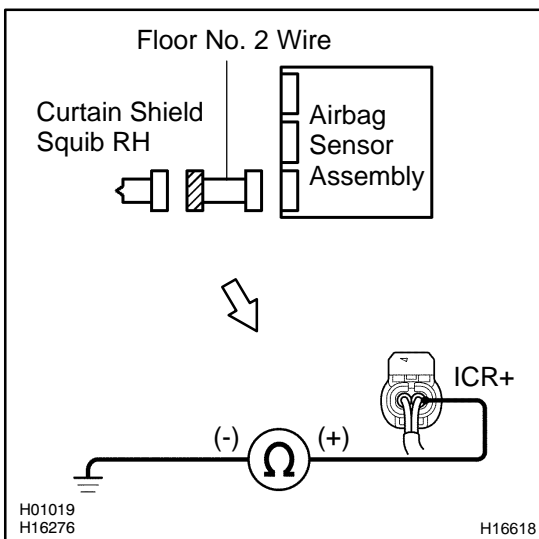
See page DI-856 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 2 wire(curtain shield squib RH circuit).</b>
----------	---



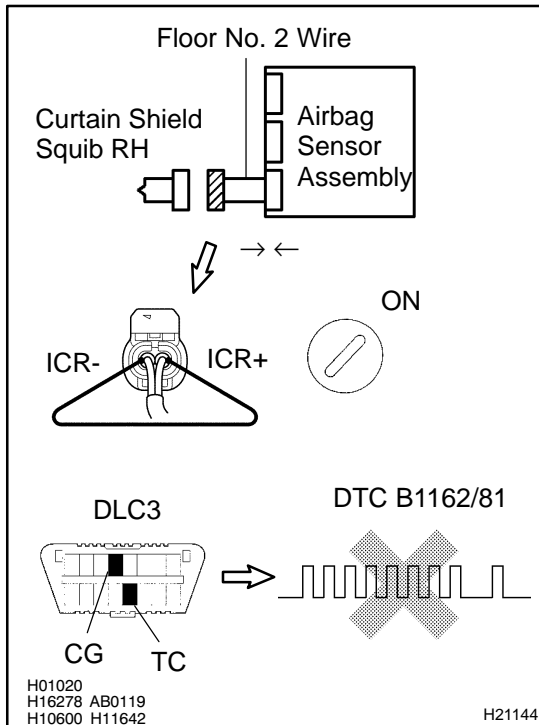
**CHECK:**  
Measure the resistance between the body ground and ICR+ of the floor No. 2 wire connector on the curtain shield airbag assembly RH (curtain shield squib RH) side.

**OK:**  
**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Repair or replace floor No. 2 wire.</b>
-----------	--



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect ICR+ and ICR- of the floor No. 2 wire connector on the curtain shield airbag assembly RH (curtain shield squib RH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1162/81 is not output.**

#### HINT:

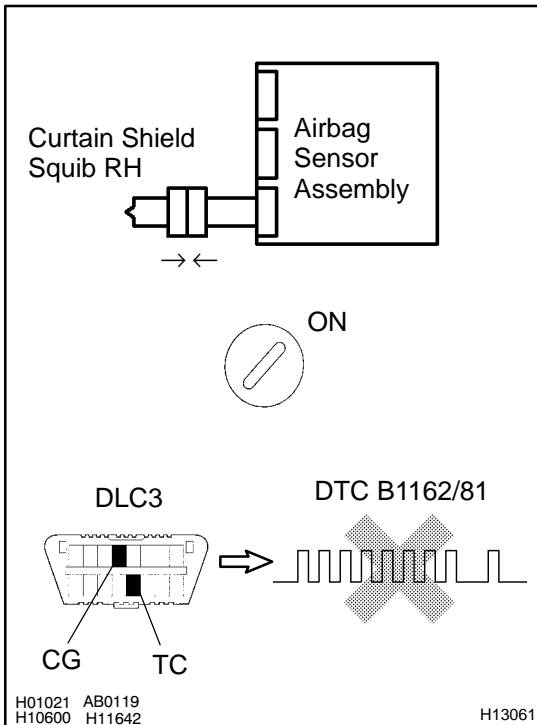
Codes other than code B1162/81 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check curtain shield squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the curtain shield airbag assembly RH (curtain shield squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1162/81 is not output.**

### HINT:

Codes other than code B1162/81 may be output at this time, but they are not relevant to this check.

**NG**

**Replace curtain shield airbag assembly RH (curtain shield squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B1163/82</b>	<b>Short in Curtain Shield Squib RH Circuit (to B+)</b>
------------	-----------------	---

## CIRCUIT DESCRIPTION

The curtain shield squib RH circuit consists of the airbag sensor assembly and the curtain shield airbag assembly RH.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3.

DTC B1163/82 is recorded when a B+ short is detected in the curtain shield squib RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1163/82	<ul style="list-style-type: none"> <li>▶ Short in curtain shield squib RH circuit (to B+)</li> <li>▶ Curtain shield squib RH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Curtain shield airbag assembly RH (Curtain shield squib RH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 2 wire</li> </ul>

HINT:

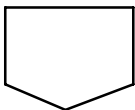
DTC B1163/82 is indicated only for the vehicle equipped with the side airbag.

## WIRING DIAGRAM

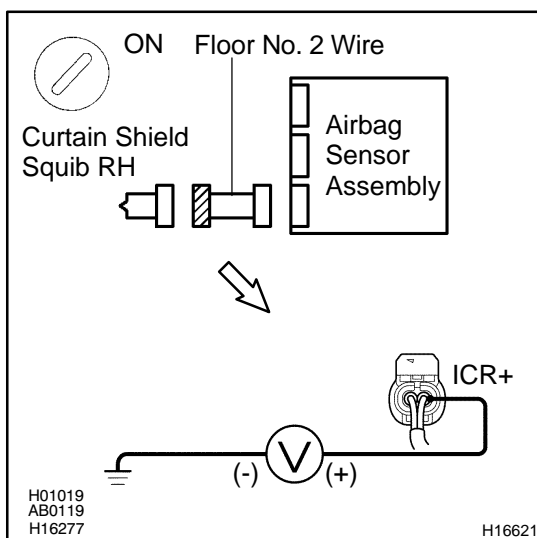
See page DI-856.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923).</b>
----------	--



<b>2</b>	<b>Check floor No. 2 wire (curtain shield squib RH circuit).</b>
----------	--



### PREPARATION:

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and ICR+ of the floor No. 2 wire connector on the curtain shield airbag assembly RH (curtain shield squib RH) side.

### OK:

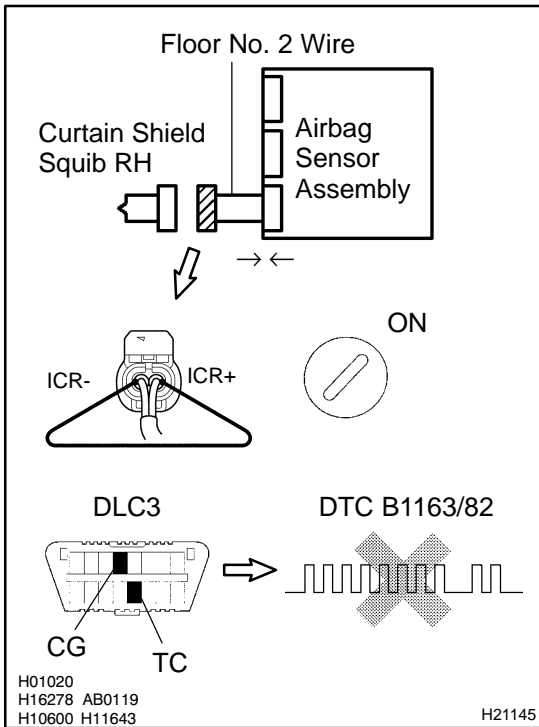
**Voltage: Below 1 V**



**Repair or replace floor No. 2 wire.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect ICR+ and ICR- of the floor No. 2 wire connector on the curtain shield airbag assembly RH (curtain shield squib RH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1163/82 is not output.**

#### HINT:

Codes other than code B1163/82 may be output at this time, but they are not relevant to this check.

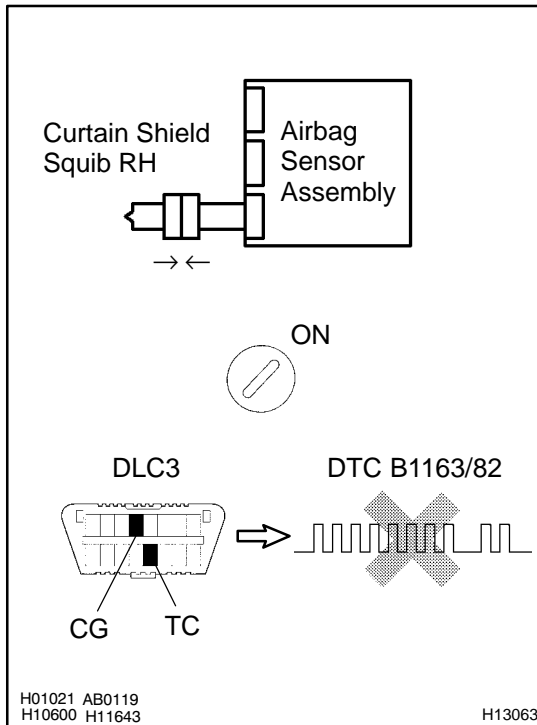
**NG**

**Replace airbag sensor assembly.**

**OK**



## 4 Check curtain shield squib RH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the curtain shield airbag assembly RH (curtain shield squib RH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1163/82 is not output.**

### HINT:

Codes other than code B1163/82 may be output at this time, but they are not relevant to this check.

**NG**

**Replace curtain shield airbag assembly RH (curtain shield squib RH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B1165/87</b>	<b>Short in Curtain Shield Squib LH Circuit</b>
------------	-----------------	---

### CIRCUIT DESCRIPTION

The curtain shield squib LH circuit consists of the airbag sensor assembly and the curtain shield airbag assembly LH.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3.

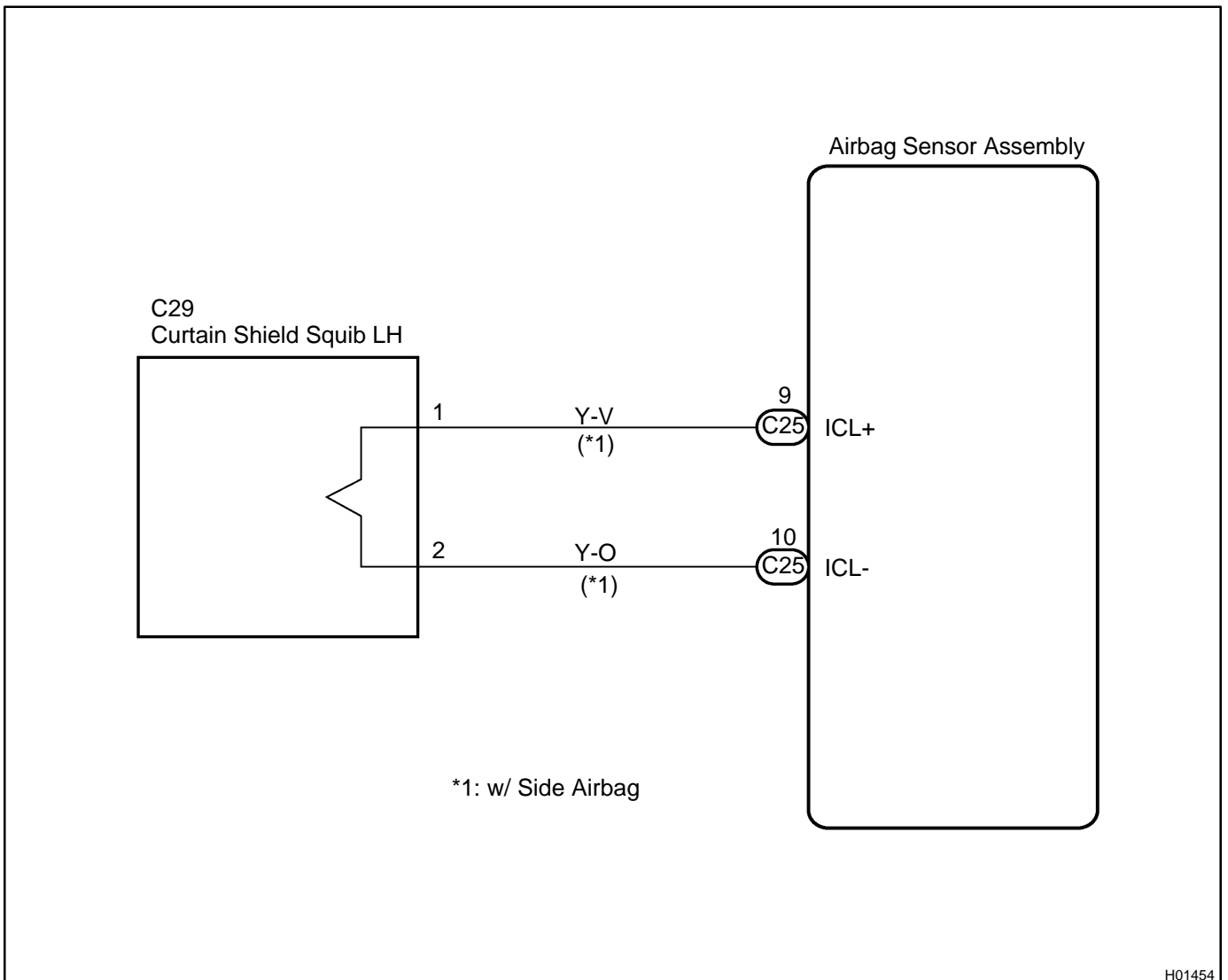
DTC B1165/87 is recorded when a short is detected in the curtain shield squib LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1165/87	<ul style="list-style-type: none"> <li>▶ Short in curtain shield squib LH circuit</li> <li>▶ Curtain shield squib LH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Curtain shield airbag assembly LH (Curtain shield squib LH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 1 wire</li> </ul>

HINT:

DTC B1165/87 is indicated only for the vehicle equipped with the side airbag.

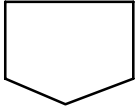
### WIRING DIAGRAM



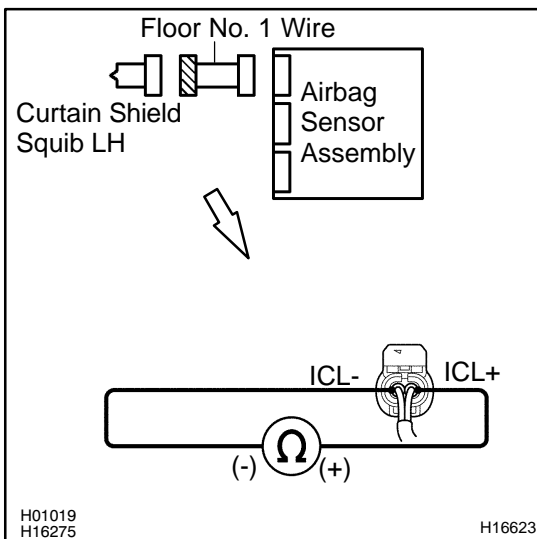
H01454

## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-923](#) ).



2 Check floor No. 1 wire (curtain shield squib LH circuit).

**PREPARATION:**

Release the airbag activation prevention mechanism built in the connector of the floor No. 1 wire on the airbag sensor assembly side (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between ICL+ and ICL- of the floor No. 1 wire connector on the curtain shield airbag assembly LH (curtain shield squib LH) side.

**OK:**

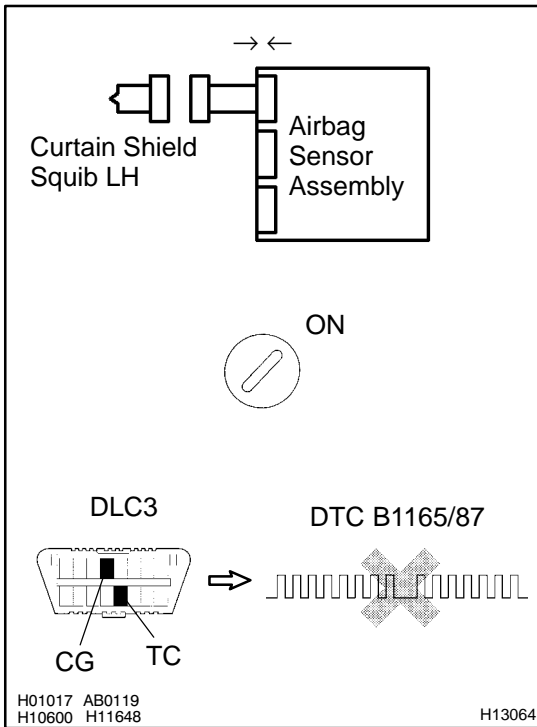
**Resistance: 1 M $\Omega$  or Higher**

**NG**

**Repair or replace floor No. 1 wire.**

**OK**

### 3 Check airbag sensor assembly.



#### **PREPARATION:**

- Connect the connector to the airbag sensor assembly.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### **CHECK:**

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch or ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### **OK:**

**DTC B1165/87 is not output.**

#### **HINT:**

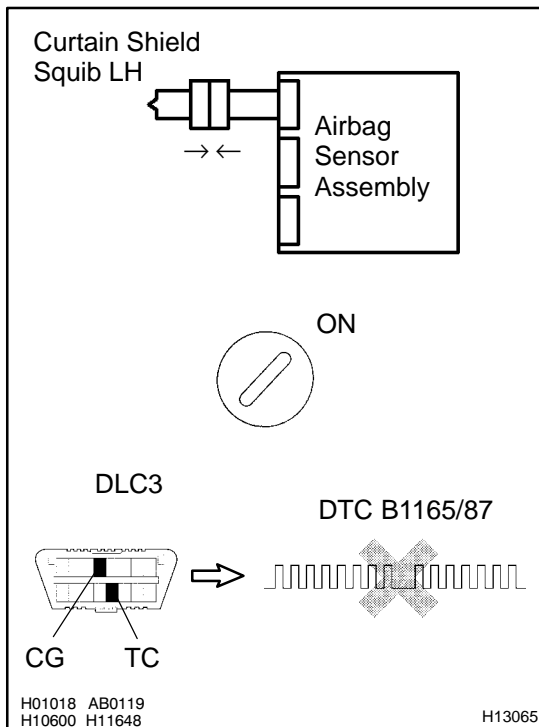
Codes other than code B1165/87 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check curtain shield squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the curtain shield airbag assembly LH (curtain shield squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1165/87 is not output.**

### HINT:

Codes other than code B1165/87 may be output at this time, but they are not relevant to this check.

**NG**

**Replace curtain shield airbag assembly LH (curtain shield squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B1166/88</b>	<b>Open in Curtain Shield Squib LH Circuit</b>
------------	-----------------	--

**CIRCUIT DESCRIPTION**

The curtain shield squib LH circuit consists of the airbag sensor assembly and the curtain shield airbag assembly LH.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B1166/88 is recorded when an open is detected in the curtain shield squib LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1166/88	<ul style="list-style-type: none"> <li>▶ Open in curtain shield squib LH circuit</li> <li>▶ Curtain shield squib LH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Curtain shield airbag assembly LH (Curtain shield squib LH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 1 wire</li> </ul>

HINT:

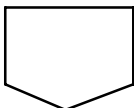
DTC B1166/88 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

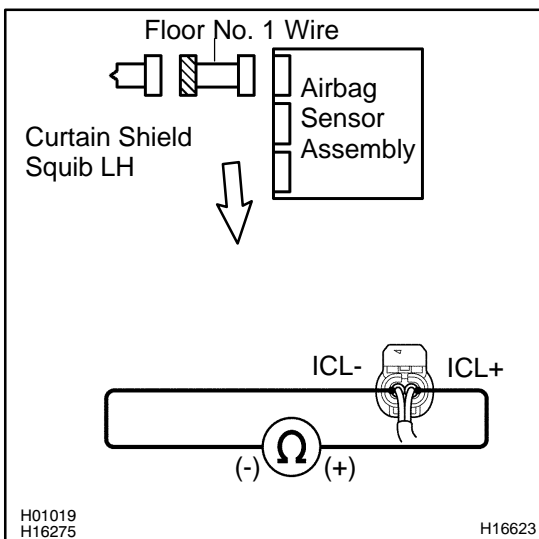
See page DI-869 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 1 wire (curtain shield squib LH circuit).</b>
----------	--



**CHECK:**

Measure the resistance between ICL+ and ICL- of the floor No. 1 wire connector on the curtain shield airbag assembly LH (curtain shield squib LH) side.

**OK:**

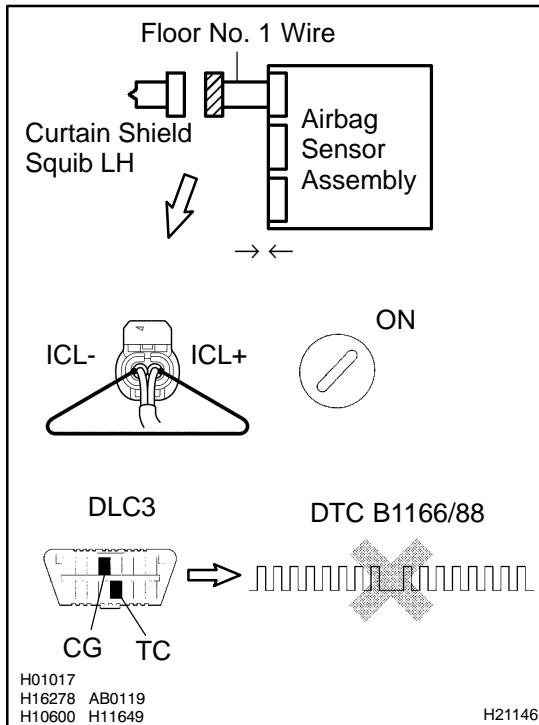
**Resistance: Below 1 Ω**

<b>NG</b>	<b>Repair or replace floor No. 1 wire.</b>
-----------	--



2004 LAND CRUISER (RM1071U)

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect ICL+ and ICL- of the floor No. 1 wire connector on the curtain shield airbag assembly LH (curtain shield squib LH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1166/88 is not output.**

#### HINT:

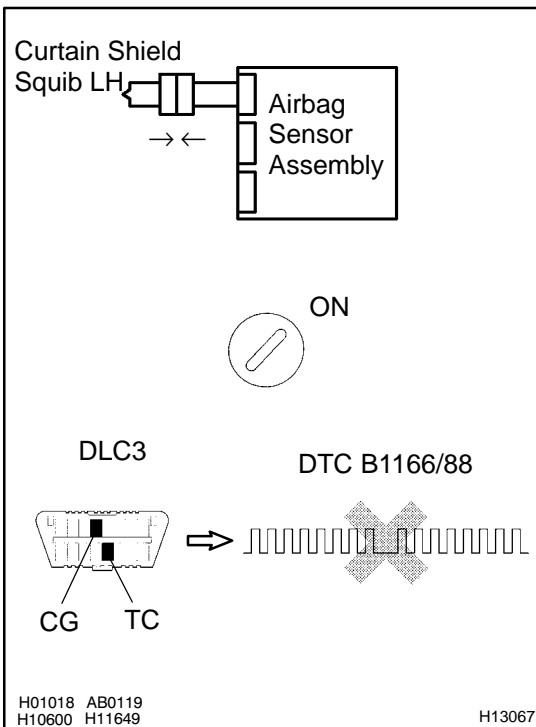
Codes other than code B1166/88 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check curtain shield squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the curtain shield airbag assembly LH (curtain shield squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1166/88 is not output.**

### HINT:

Codes other than code B1166/88 may be output at this time, but they are not relevant to this check.

**NG**

**Replace curtain shield airbag assembly LH (curtain shield squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**



<b>DTC</b>	<b>B1167/85</b>	<b>Short in Curtain Shield Squib LH Circuit (to Ground)</b>
------------	-----------------	---

**CIRCUIT DESCRIPTION**

The curtain shield squib LH circuit consists of the airbag sensor assembly and the curtain shield airbag assembly LH.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B1167/85 is recorded when ground short is detected in the curtain shield squib LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1167/85	<ul style="list-style-type: none"> <li>▶Short in curtain shield squib LH circuit (to ground)</li> <li>▶Curtain shield squib LH malfunction</li> <li>▶Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶Curtain shield airbag assembly LH (Curtain shield squib LH)</li> <li>▶Airbag sensor assembly</li> <li>▶Floor No. 1 wire</li> </ul>

**HINT:**

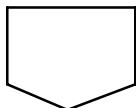
DTC B1167/85 is indicated only for the vehicle equipped with the side airbag.

**WIRING DIAGRAM**

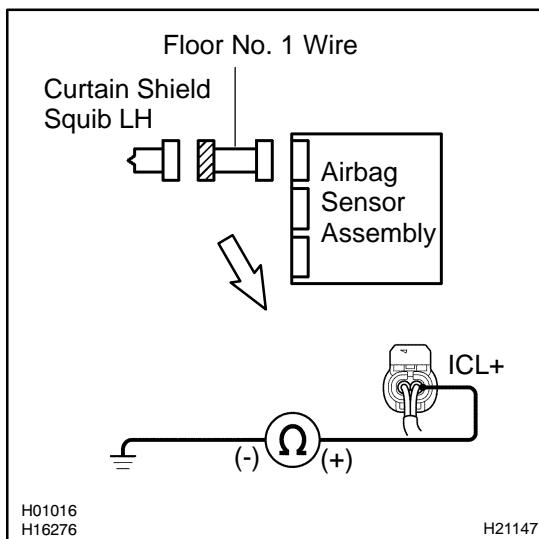
See page DI-856 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 1 wire (curtain shield squib LH circuit).</b>
----------	--



**CHECK:**

Measure the resistance between the body ground and ICL+ of the floor No. 1 wire connector on the curtain shield airbag assembly LH (curtain shield squib LH) side.

**OK:**

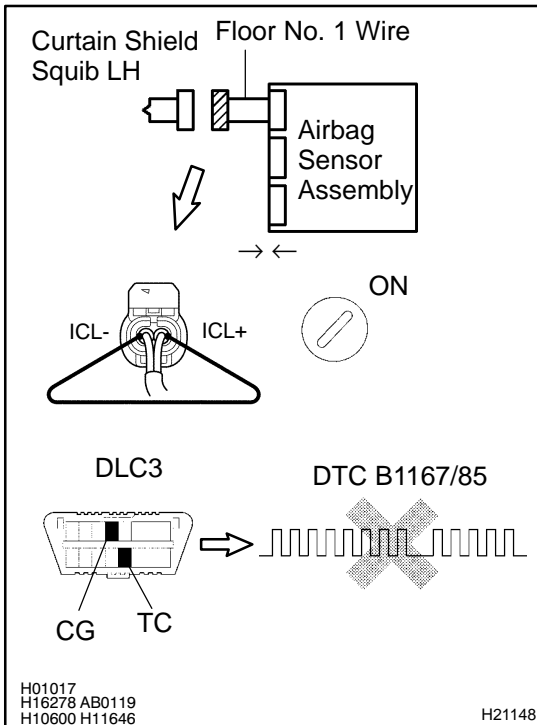
**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Repair or replace floor No. 1 wire.</b>
-----------	--



2004 LAND CRUISER (RM1071U)

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect ICL+ and ICL- of the floor No. 1 wire connector on the curtain shield airbag assembly LH (curtain shield squib LH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1167/85 is not output.**

#### HINT:

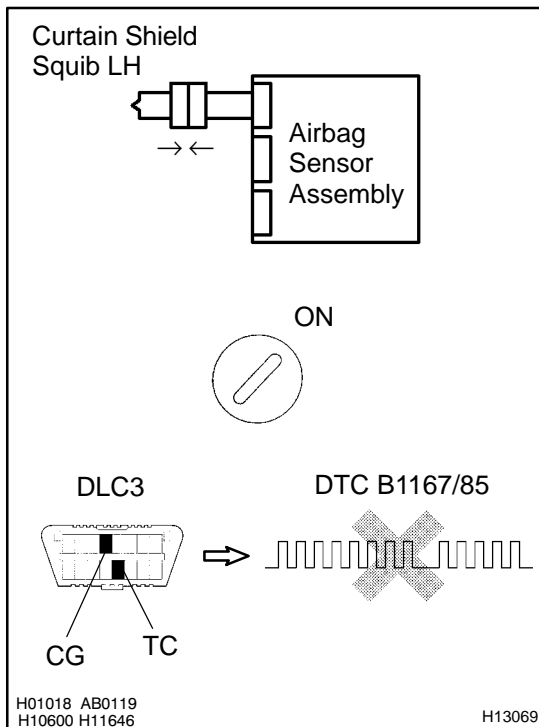
Codes other than code B1167/85 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check curtain shield squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the curtain shield airbag assembly LH (curtain shield squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1167/85 is not output.**

### HINT:

Codes other than code B1167/85 may be output at this time, but they are not relevant to this check.

**NG**

**Replace curtain shield airbag assembly LH (curtain shield squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B1168/86</b>	<b>Short in Curtain Shield Squib LH Circuit (to B+)</b>
------------	-----------------	---

## CIRCUIT DESCRIPTION

The curtain shield squib LH circuit consists of the airbag sensor assembly and the curtain shield airbag assembly LH.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B1168/86 is recorded when a B+ short is detected in the curtain shield squib LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1168/86	<ul style="list-style-type: none"> <li>▶ Short in curtain shield squib LH circuit (to B+)</li> <li>▶ Curtain shield squib LH malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Curtain shield airbag assembly LH (Curtain shield squib LH)</li> <li>▶ Airbag sensor assembly</li> <li>▶ Floor No. 1 wire</li> </ul>

HINT:

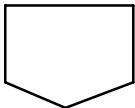
DTC B1168/86 is indicated only for the vehicle equipped with the side airbag.

## WIRING DIAGRAM

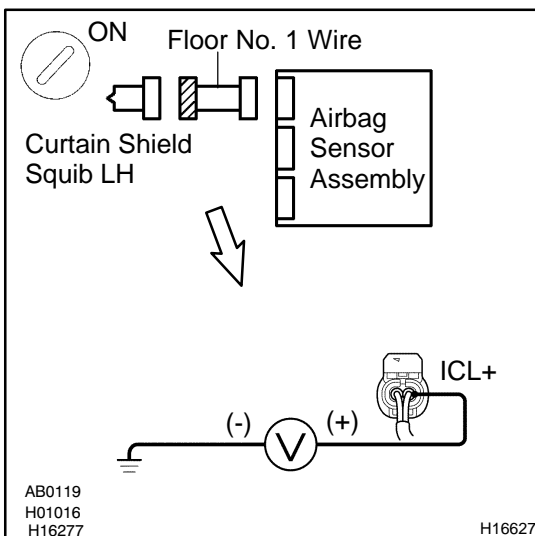
See page DI-869 .

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check floor No. 1 wire (curtain shield squib LH circuit).</b>
----------	--



### PREPARATION:

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and ICL+ of the floor No. 1 wire connector on the curtain shield airbag assembly LH (curtain shield squib LH) side.

### OK:

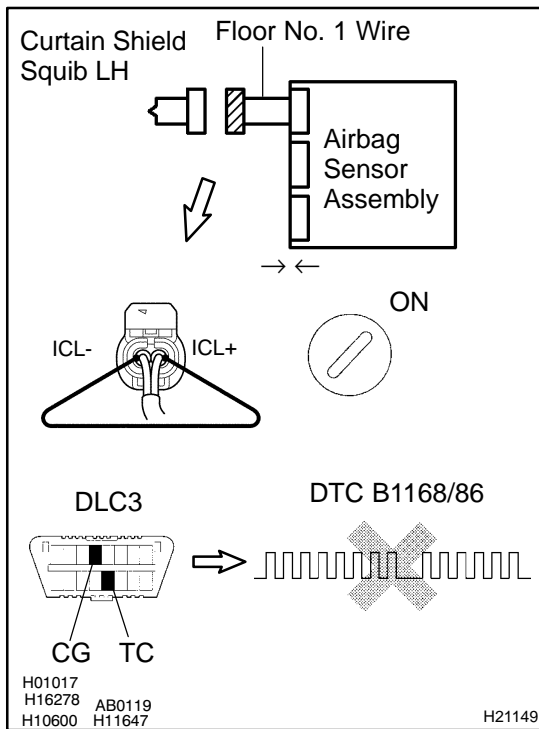
**Voltage: Below 1 V**



**Repair or replace floor No. 1 wire.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect ICL+ and ICL- of the floor No. 1 wire connector on the curtain shield airbag assembly LH (curtain shield squib LH) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1168/86 is not output.**

#### HINT:

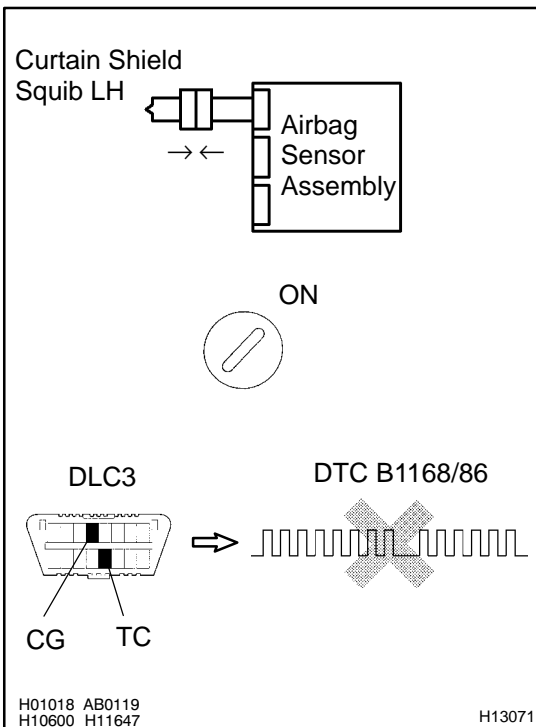
Codes other than code B1168/86 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check curtain shield squib LH.



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the curtain shield airbag assembly LH (curtain shield squib LH) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1168/86 is not output.**

### HINT:

Codes other than code B1168/86 may be output at this time, but they are not relevant to this check.

**NG**

**Replace curtain shield airbag assembly LH (curtain shield squib LH).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B1180/17</b>	<b>Short in D Squib (2nd step) Circuit</b>
------------	-----------------	--

### CIRCUIT DESCRIPTION

The D squib (2nd step) circuit consists of the airbag sensor assembly, the spiral cable and the steering wheel pad.

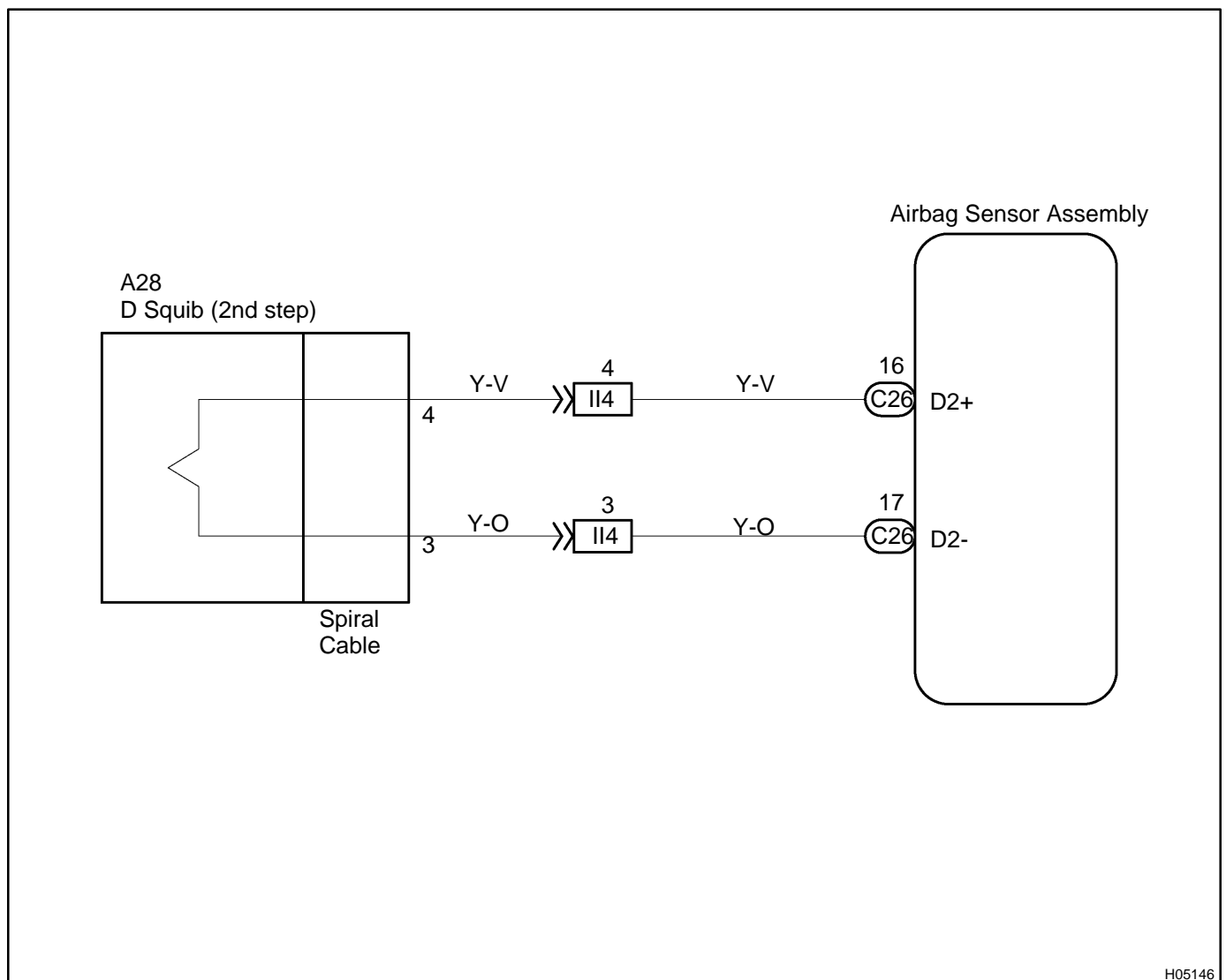
It causes the airbag to deploy when the airbag deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B1180/17 is recorded when a short is detected in the D squib (2nd step) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1180/17	<ul style="list-style-type: none"> <li>▶ Short in D squib (2nd step) circuit</li> <li>▶ D squib (2nd step) malfunction</li> <li>▶ Spiral cable malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Steering wheel pad (D squib (2nd step))</li> <li>▶ Spiral cable</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> <li>▶ Column wire</li> </ul>

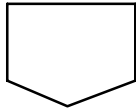
### WIRING DIAGRAM



H05146

**INSPECTION PROCEDURE**

**1** Prepare for inspection (See step 1 on page [DI-923](#) ).



**2** Check connector.

**CHECK:**

Make sure that the black spiral cable connector is not damaged.

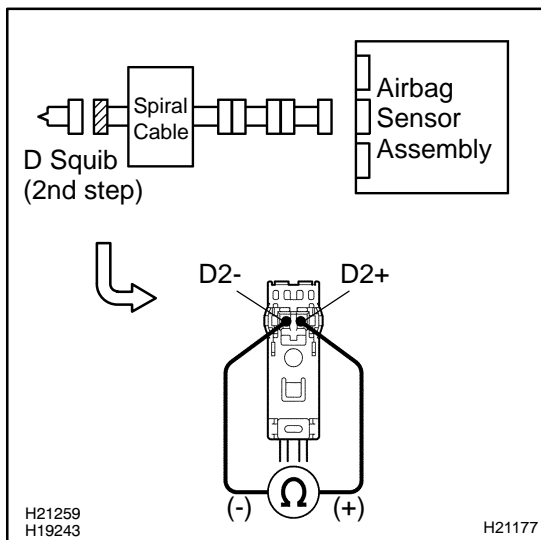
**OK:**

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

**NG** Replace spiral cable.



**3** Check D squib (2nd step) circuit.



**PREPARATION:**

Release the airbag activation prevention mechanism built in the connector on the airbag sensor assembly side between the air bag sensor assembly and the steering wheel pad (D squib (2nd step)) (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between D2+ and D2- of the black connector on the steering wheel pad (D squib (2nd step)) side between the airbag sensor assembly and the steering wheel pad (D squib (2nd step)).

**OK:**

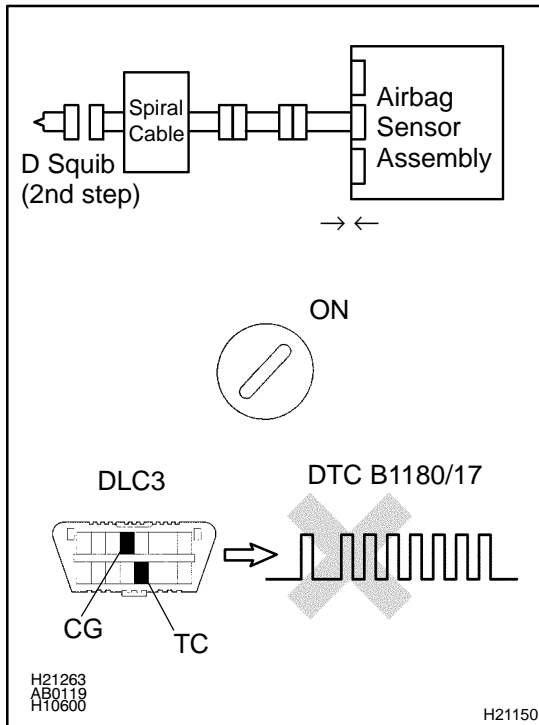
**Resistance: 1 MΩ or Higher**

**NG** Go to step 6.





## 4 Check airbag sensor assembly.



### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1180/17 is not output.**

### HINT:

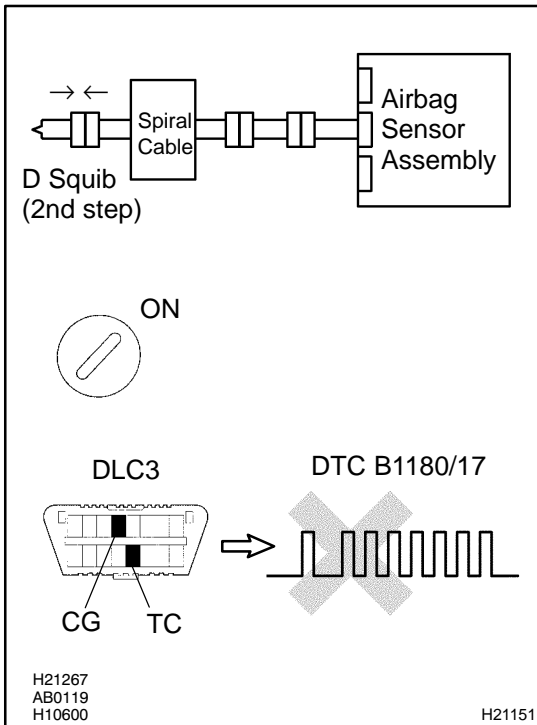
Codes other than code B1180/17 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 5 Check D squib (2nd step).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad (D squib (2nd step)) to the spiral cable.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1180/17 is not output.**

### HINT:

Codes other than code B1180/17 may be output at this time, but they are not relevant to this check.

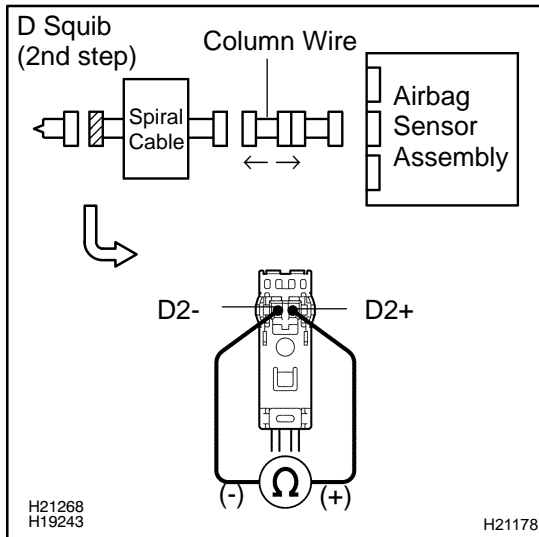
**NG**

**Replace steering wheel pad (D squib (2nd step)).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

## 6 Check spiral cable.



### PREPARATION:

- Disconnect the spiral cable connector from the column wire.
- Release the airbag activation prevention mechanism built in the spiral cable connector on the airbag sensor assembly side (See page [DI-692](#)).

### CHECK:

Measure the resistance between D2+ and D2- of the black spiral cable connector on the steering wheel pad (D squib (2nd step)) side.

### OK:

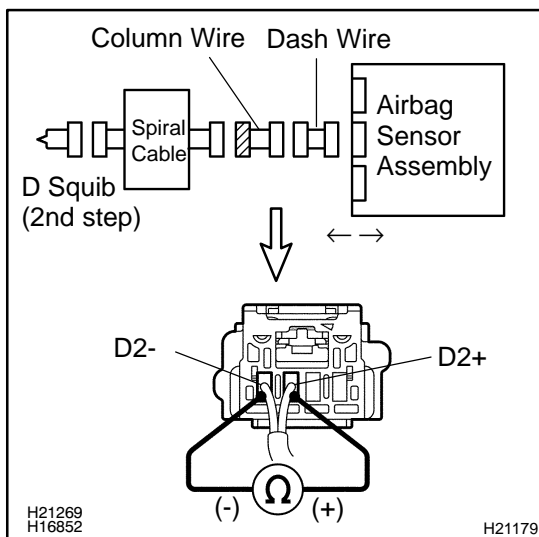
**Resistance: 1 MΩ or Higher**

**NG**

**Replace spiral cable.**

**OK**

## 7 Check column wire.



### PREPARATION:

Release the airbag activation prevention mechanism built in the column wire connector on the airbag sensor assembly side (See page [DI-692](#)).

### CHECK:

Measure the resistance between D2+ and D2- of the column wire connector on the spiral cable side.

### OK:

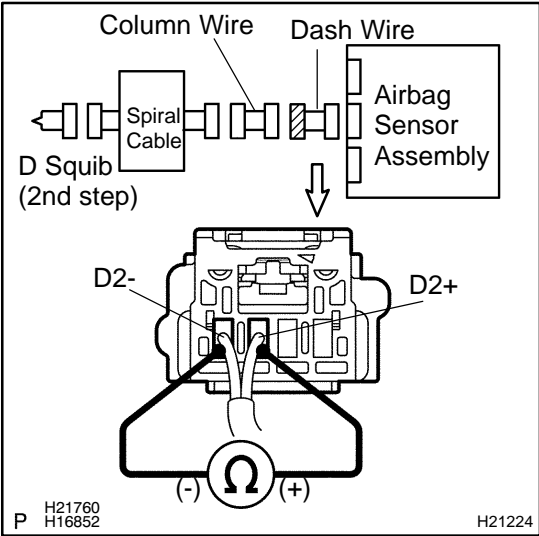
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace column wire.**

**OK**

**8 Check dash wire.**



**PREPARATION:**

Release the airbag activation prevention mechanism built in the connector of the dash wire on the airbag sensor assembly side (See page DI-692 ).

**CHECK:**

Measure the resistance between D2+ and D2- of the dash wire connector on the column wire side.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG** → **Repair or replace dash wire.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B1181/18</b>	<b>Open in D Squib (2nd step) Circuit</b>
------------	-----------------	---

## CIRCUIT DESCRIPTION

The D squib (2nd step) circuit consists of the airbag sensor assembly, the spiral cable and the steering wheel pad. It causes the airbag to deploy when the airbag deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B1181/18 is recorded when an open is detected in the D squib (2nd step) circuit.

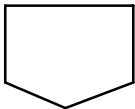
DTC No.	DTC Detecting Condition	Trouble Area
B1181/18	<ul style="list-style-type: none"> <li>▶ Open in D squib (2nd step) circuit</li> <li>▶ D squib (2nd step) malfunction</li> <li>▶ Spiral cable malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Steering wheel pad (D squib (2nd step))</li> <li>▶ Spiral cable</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> <li>▶ Column wire</li> </ul>

## WIRING DIAGRAM

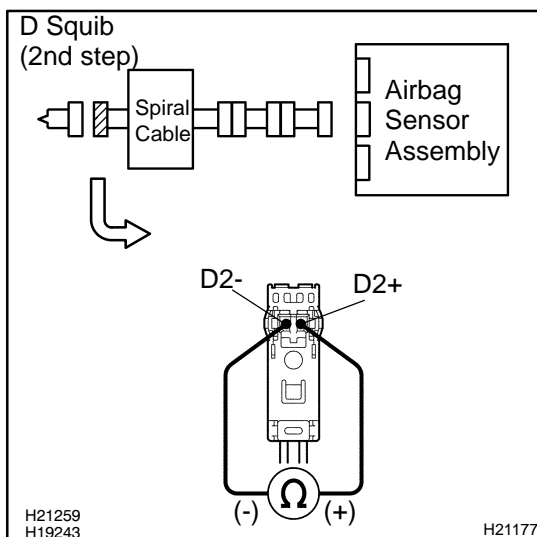
See page DI-882 .

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check D squib (2nd step) circuit.</b>
----------	--



### **CHECK:**

Measure the resistance between D2+ and D2- of the black connector on the steering wheel pad (D squib (2nd step)) side between the airbag sensor assembly and the steering wheel pad (D squib (2nd step)).

### **OK:**

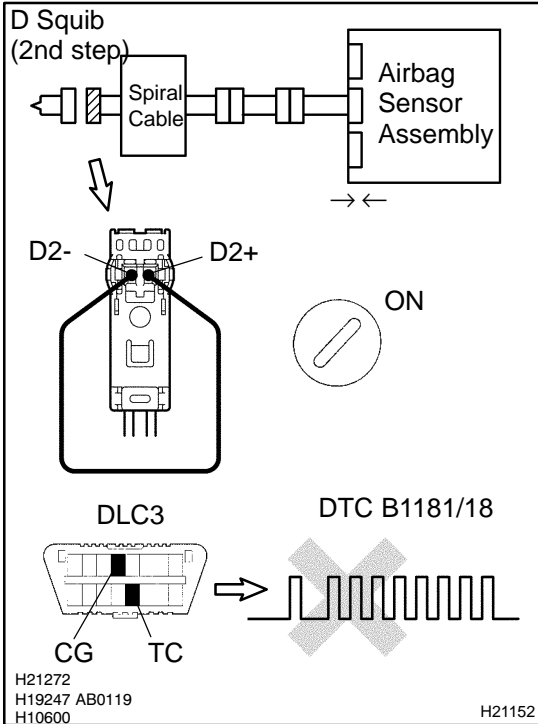
**Resistance: Below 1 Ω**

<b>NG</b>	<b>Go to step 6.</b>
-----------	----------------------



**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect D2+ and D2- of the black connector on the steering wheel pad (D squib (2nd step)) side between the airbag sensor assembly and the steering wheel pad (D squib (2nd step)).
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1181/18 is not output.**

#### HINT:

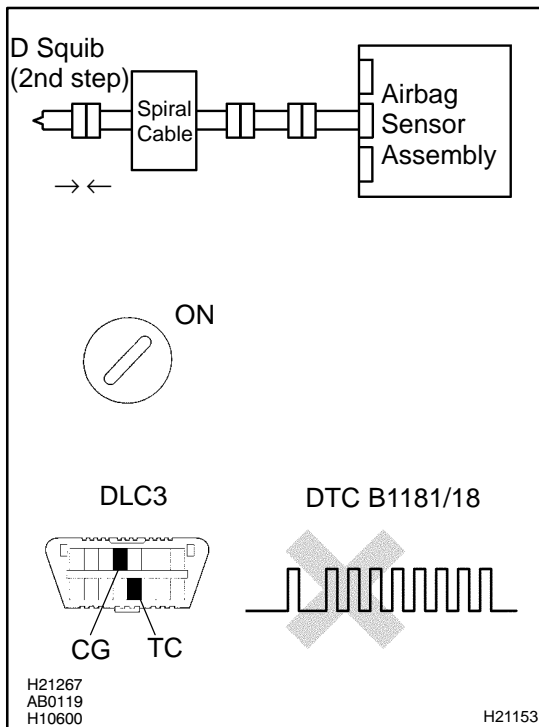
Codes other than code B1181/18 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check D squib (2nd step).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad (D squib (2nd step)) to the spiral cable.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1181/18 is not output.**

### HINT:

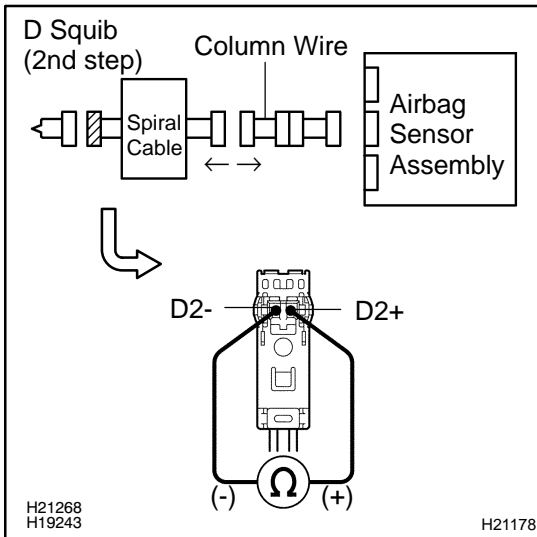
Codes other than code B1181/18 may be output at this time, but they are not relevant to this check.

**NG**

**Replace steering wheel pad (D squib (2nd step)).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

**5 Check spiral cable.****PREPARATION:**

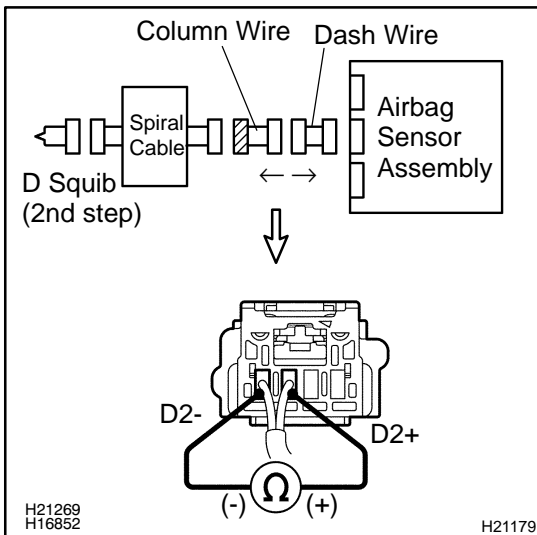
Disconnect the spiral cable connector from the column wire.

**CHECK:**

Measure the resistance between D2+ and D2- of the black spiral cable connector on the steering wheel pad (D squib (2nd step)) side.

**OK:**

**Resistance: Below 1 Ω**

**NG****Replace spiral cable.****OK****6 Check column wire.****PREPARATION:**

Disconnect the column wire connector from the dash wire.

**CHECK:**

Measure the resistance between D2+ and D2- of the column wire connector on the spiral cable side.

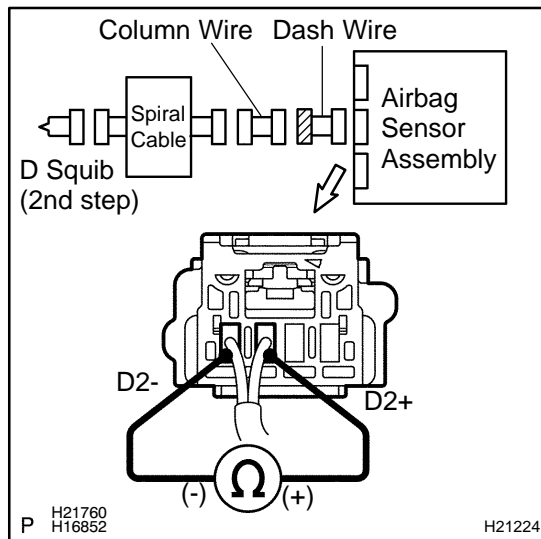
**OK:**

**Resistance: Below 1 Ω**

**NG****Repair or replace column wire.****OK**



## 7 Check dash wire.



### **CHECK:**

Measure the resistance between D2+ and D2- of the dash wire connector on the column wire side.

### **OK:**

**Resistance: Below 1 Ω**

**NG**

**Repair or replace dash wire.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B1182/19</b>	<b>Short in D Squib (2nd step) Circuit (to Ground)</b>
------------	-----------------	--

**CIRCUIT DESCRIPTION**

The D squib (2nd step) circuit consists of the airbag sensor assembly, the spiral cable and the steering wheel pad.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B0102/11 is recorded when a ground short is detected in the D squib (2nd step) circuit.

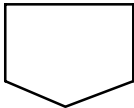
DTC No.	DTC Detecting Condition	Trouble Area
B1182/19	<ul style="list-style-type: none"> <li>▶ Short in D squib (2nd step) circuit (to ground)</li> <li>▶ D squib (2nd step) malfunction</li> <li>▶ Spiral cable malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Steering wheel pad (D squib (2nd step))</li> <li>▶ Spiral cable</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> <li>▶ Column wire</li> </ul>

**WIRING DIAGRAM**

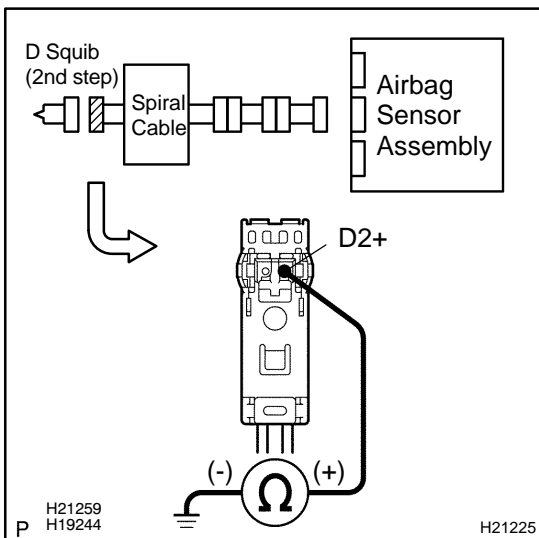
See page DI-882 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-692 ).</b>
----------	---



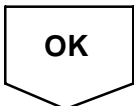
<b>2</b>	<b>Check D squib (2nd step) circuit.</b>
----------	--



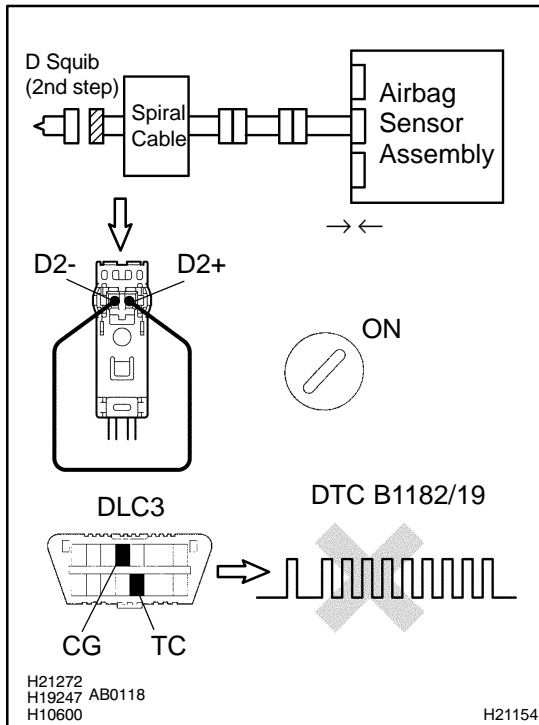
**CHECK:**  
Measure the resistance between the body ground and D2+ of the black connector on the steering wheel pad (D squib (2nd step)) side between the airbag sensor assembly and the steering wheel pad (D squib (2nd step)).

**OK:**  
**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Go to step 5.</b>
-----------	----------------------



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect D2+ and D2- of the black connector on the steering wheel pad (D squib (2nd step)) side between the airbag sensor assembly and the steering wheel pad (D squib (2nd step)).
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1182/19 is not output.**

#### HINT:

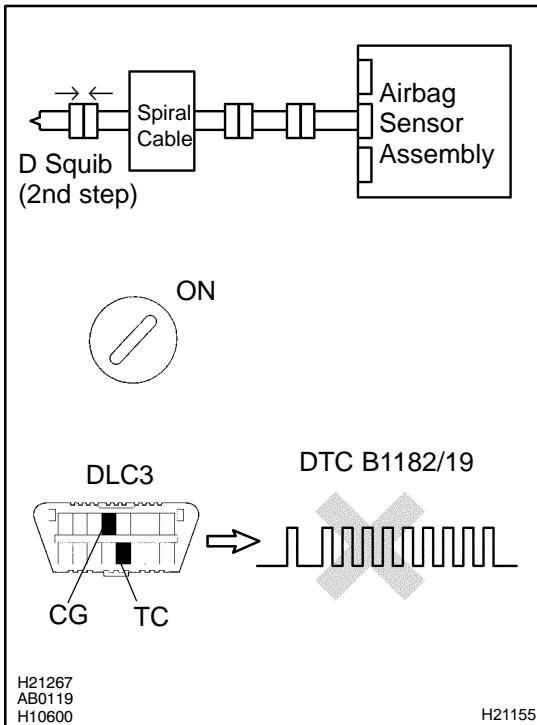
Codes other than code B1182/19 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check D squib (2nd step).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad (D squib (2nd step)) to the spiral cable.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1182/19 is not output.**

### HINT:

Codes other than code B1182/19 may be output at this time, but they are not relevant to this check.

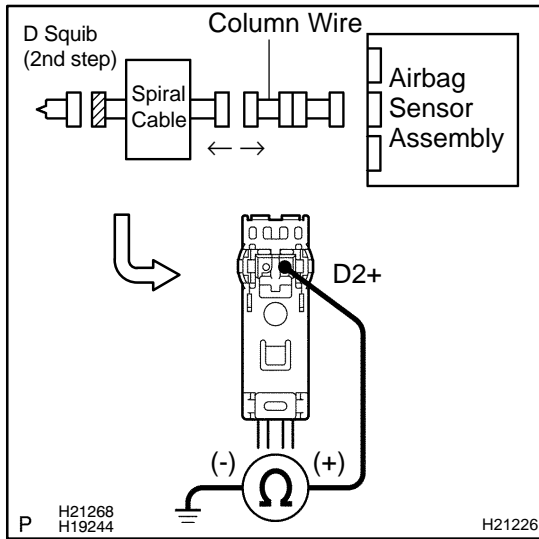
**NG**

**Replace steering wheel pad (D squib (2nd step)).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

## 5 Check spiral cable.



### PREPARATION:

Disconnect the spiral cable connector from the column wire.

### CHECK:

Measure the resistance between the body ground and D2+ of the black spiral cable connector on the steering wheel pad (D squib (2nd step)) side.

### OK:

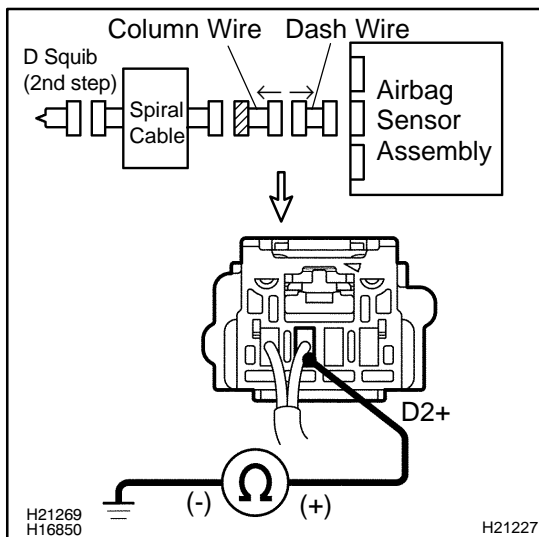
**Resistance: 1 MΩ or Higher**

NG

Replace spiral cable.

OK

## 6 Check column wire.



### PREPARATION:

Disconnect the column wire connector from the dash wire.

### CHECK:

Measure the resistance between the body ground and D2+ of the column wire connector on the spiral cable side.

### OK:

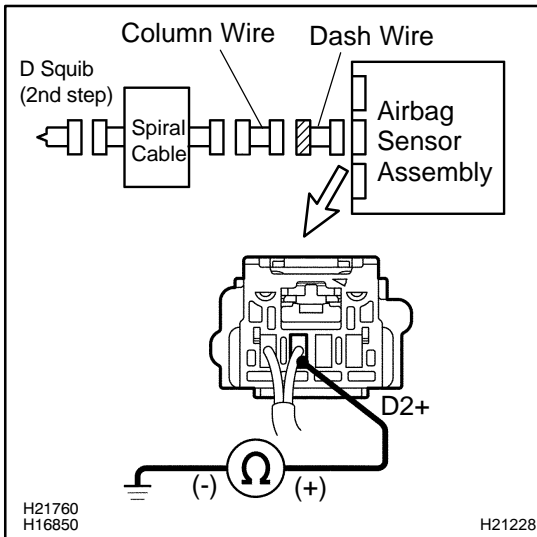
**Resistance: 1 MΩ or Higher**

NG

Repair or replace column wire.

OK

## 7 Check dash wire.



### **CHECK:**

Measure the resistance between the body ground and D2+ of the dash wire connector on the column wire side.

### **OK:**

**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace dash wire.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B1183/22</b>	<b>Short in D Squib (2nd step) Circuit (to B+)</b>
------------	-----------------	--

## CIRCUIT DESCRIPTION

The D squib (2nd step) circuit consists of the airbag sensor assembly, the spiral cable and the steering wheel pad.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3.

DTC B1183/22 is recorded when a B+ short is detected in the D squib (2nd step) circuit.

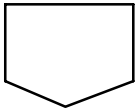
DTC No.	DTC Detecting Condition	Trouble Area
B1183/22	<ul style="list-style-type: none"> <li>▶ Short in D squib (2nd step) circuit (to B+)</li> <li>▶ D squib (2nd step) malfunction</li> <li>▶ Spiral cable malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Steering wheel pad (D squib (2nd step))</li> <li>▶ Spiral cable</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> <li>▶ Column wire</li> </ul>

## WIRING DIAGRAM

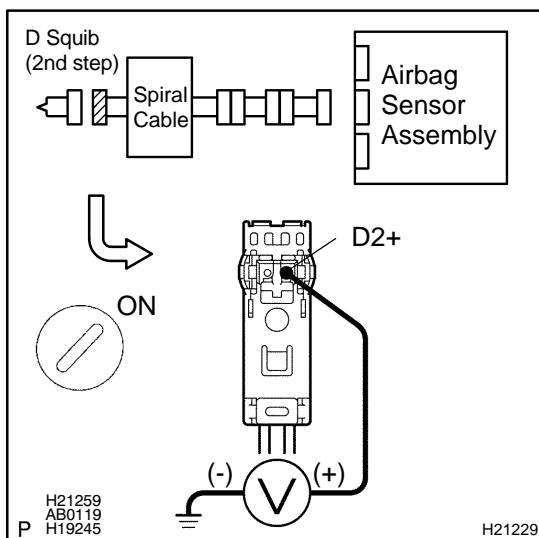
See page DI-882.

## INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923).</b>
----------	--



<b>2</b>	<b>Check D squib (2nd step) circuit.</b>
----------	--



### PREPARATION:

Connect the negative (-) terminal cable to the battery and wait at least for 2 seconds.

### CHECK:

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and D2+ of the black connector on the steering wheel pad (D squib (2nd step)) side between the airbag sensor assembly and the steering wheel pad (D squib (2nd step)).

### OK:

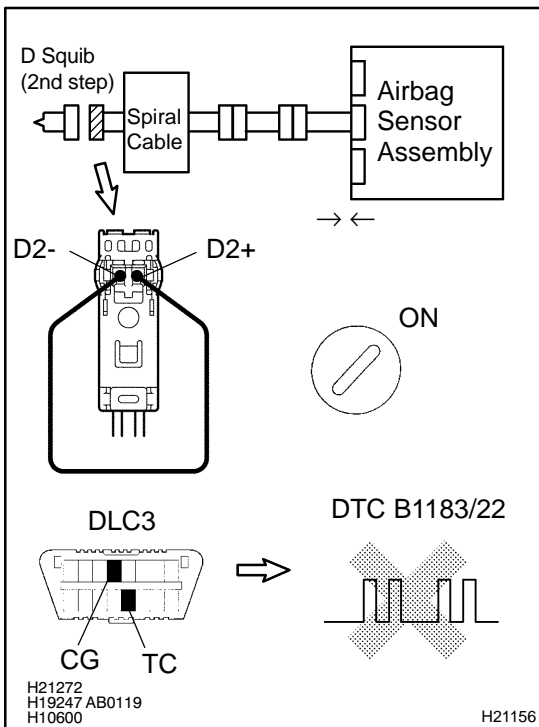
**Voltage: Below 1 V**



**Go to step 5.**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect D2+ and D2- of the black connector on the steering wheel pad (D squib (2nd step)) side between the airbag sensor assembly and the steering wheel pad (D squib (2nd step)).
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1183/22 is not output.**

#### HINT:

Codes other than code B1183/22 may be output at this time, but they are not relevant to this check.

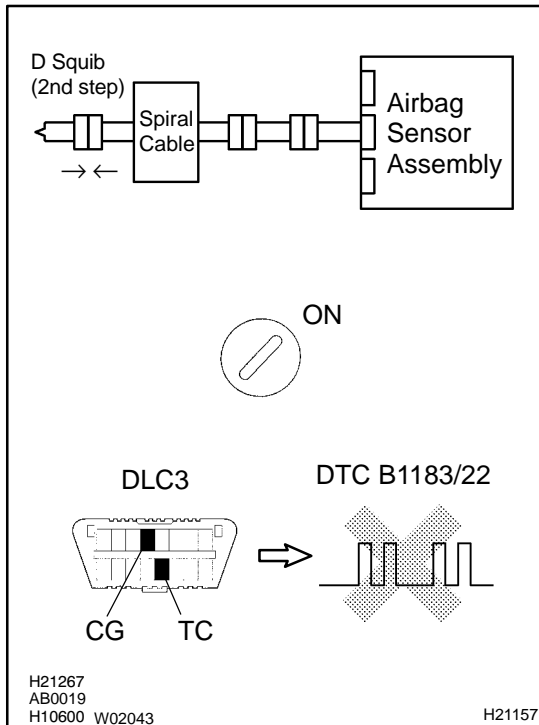
**NG**

**Replace airbag sensor assembly.**

**OK**



## 4 Check D squib (2nd step).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the steering wheel pad (D squib (2nd step)) to the spiral cable.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1183/22 is not output.**

### HINT:

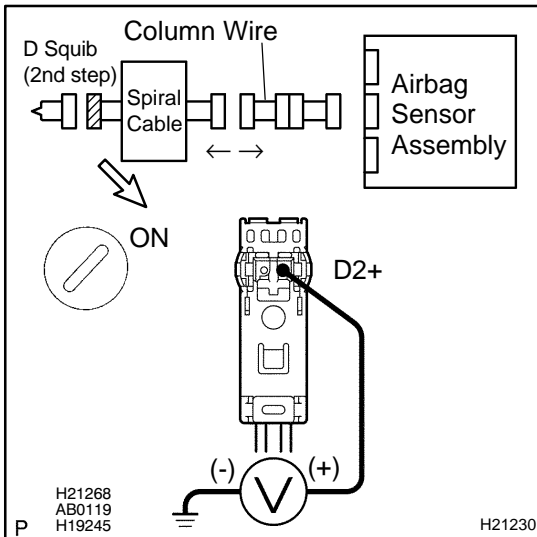
Codes other than code B1183/22 may be output at this time, but they are not relevant to this check.

**NG**

**Replace steering wheel pad (D squib (2nd step)).**

**OK**

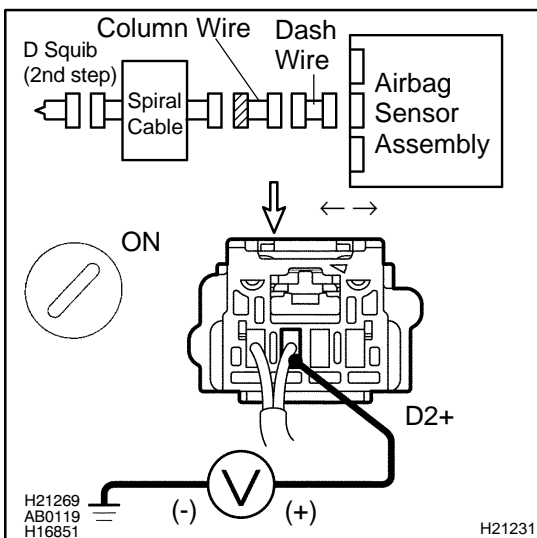
**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

**5 Check spiral cable.****PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the spiral cable connector from the column wire.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and D2+ of the black spiral cable connector on the steering wheel pad (D squib (2nd step)) side.

**OK:****Voltage: Below 1 V****NG****Replace spiral cable.****OK****6 Check column wire.****PREPARATION:**

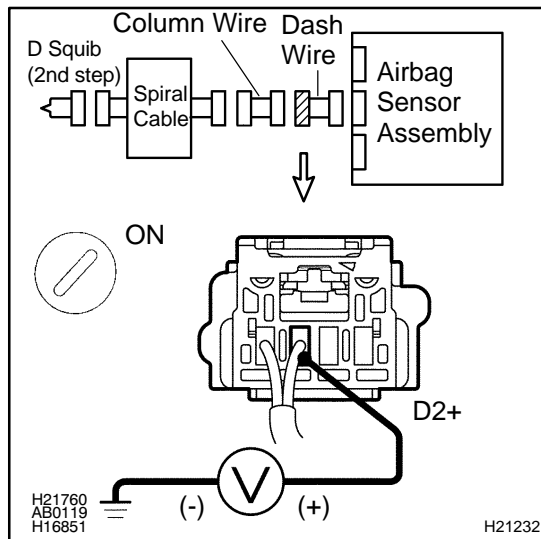
- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the column wire connector from the dash wire.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and D2+ of the column wire connector on the spiral cable side.

**OK:****Voltage: Below 1 V****NG****Repair or replace column wire.****OK**

## 7 Check dash wire.



### **CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and D2+ of the dash wire connector on the column wire side.

### **OK:**

**Voltage: Below 1 V**

**NG**

**Repair or replace dash wire.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B1185/57</b>	<b>Short in P Squib (2nd step) Circuit</b>
------------	-----------------	--

**CIRCUIT DESCRIPTION**

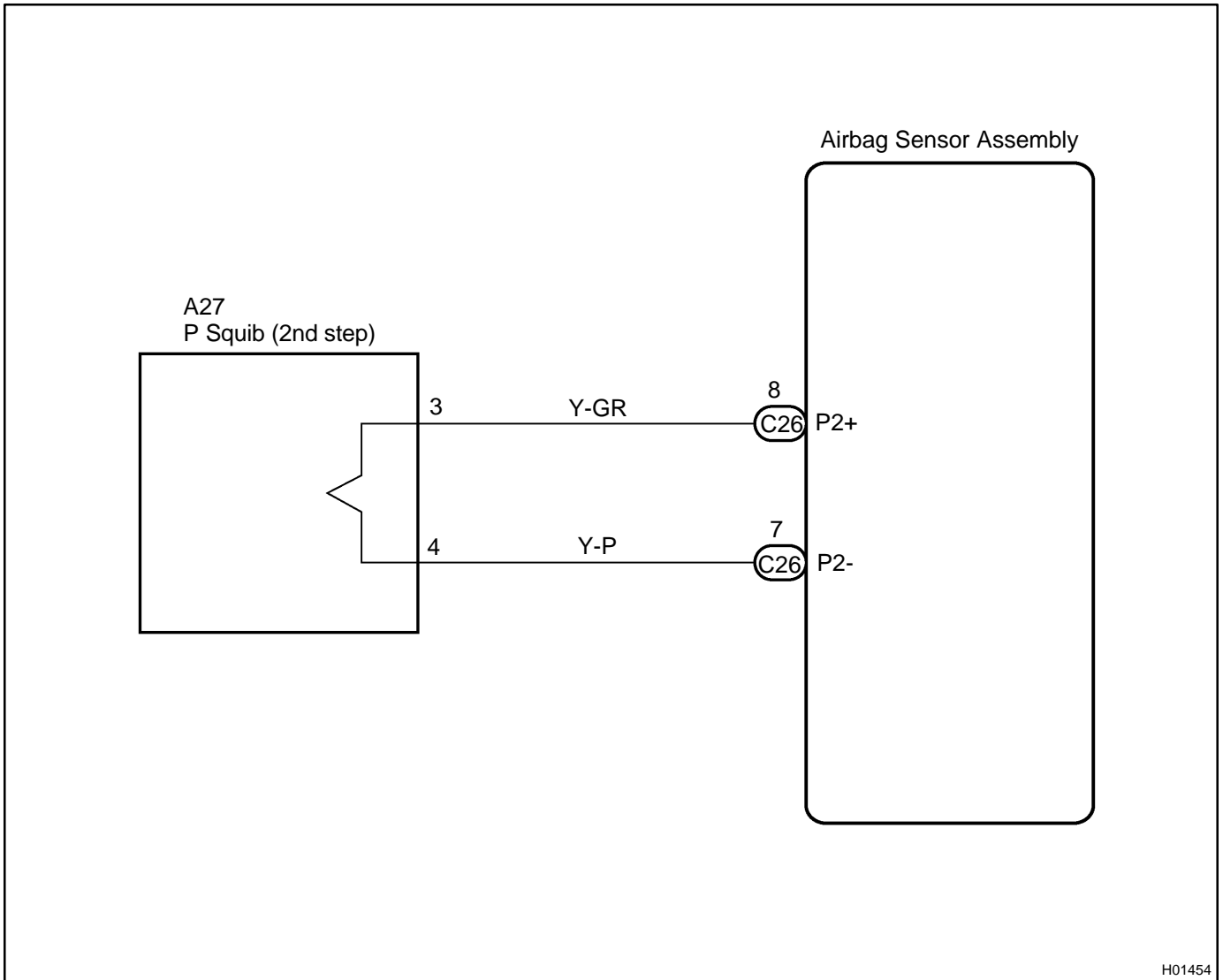
The P squib (2nd step) circuit consists of the airbag sensor assembly and the front passenger airbag assembly. It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3.

DTC B1185/57 is recorded when a short is detected in the P squib (2nd step) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1185/57	<ul style="list-style-type: none"> <li>▶ Short in P squib (2nd step) circuit</li> <li>▶ P squib (2nd step) malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Front passenger airbag assembly (P squib (2nd step))</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> </ul>

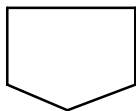
**WIRING DIAGRAM**



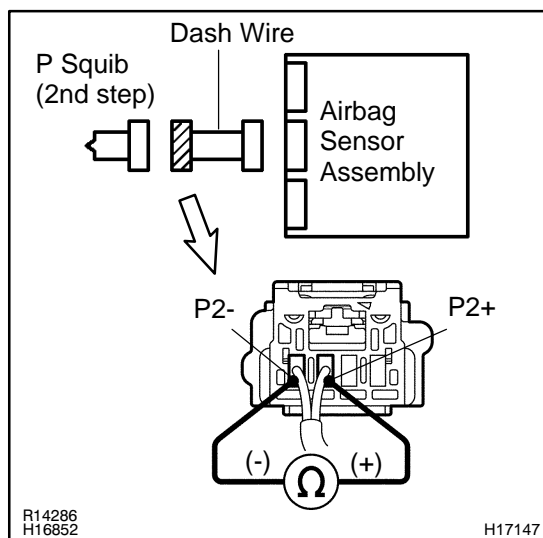
H01454

## INSPECTION PROCEDURE

1 Prepare for inspection (See step 1 on page [DI-923](#) ).



2 Check dash wire (P squib (2nd step) circuit).

**PREPARATION:**

Release the airbag activation prevention mechanism built in the connector of the dash wire on the airbag sensor assembly side (See page [DI-692](#) ).

**CHECK:**

Measure the resistance between P2+ and P2- of the dash wire connector on the front passenger airbag assembly (P squib (2nd step)) side.

**OK:**

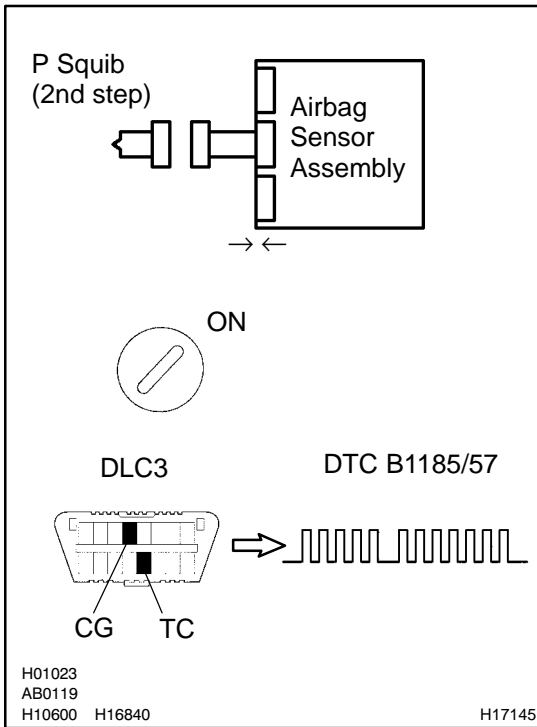
**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace dash wire.**

**OK**

### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1185/57 is not output.**

#### HINT:

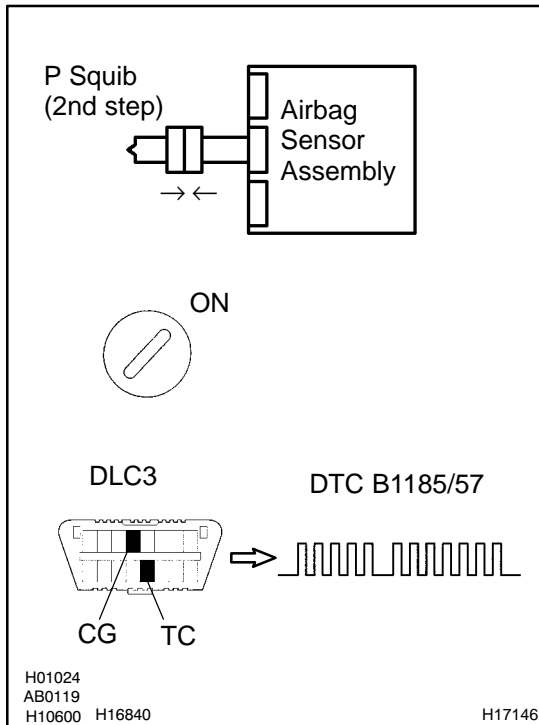
Codes other than code B1185/57 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check P squib (2nd step).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly (P squib (2nd step)) connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1185/57 is not output.**

#### HINT:

Codes other than code B1185/57 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front passenger airbag assembly (P squib (2nd step)).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B1186/58</b>	<b>Open in P Squib (2nd step) Circuit</b>
------------	-----------------	---

### CIRCUIT DESCRIPTION

The P squib (2nd step) circuit consists of the airbag sensor assembly and the front passenger airbag assembly.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B1186/58 is recorded when an open is detected in the P squib (2nd step) circuit.

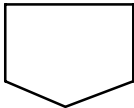
DTC No.	DTC Detecting Condition	Trouble Area
B1186/58	<ul style="list-style-type: none"> <li>▶ Open in P squib (2nd step) circuit</li> <li>▶ P squib (2nd step) malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Front passenger airbag assembly (P squib (2nd step))</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> </ul>

### WIRING DIAGRAM

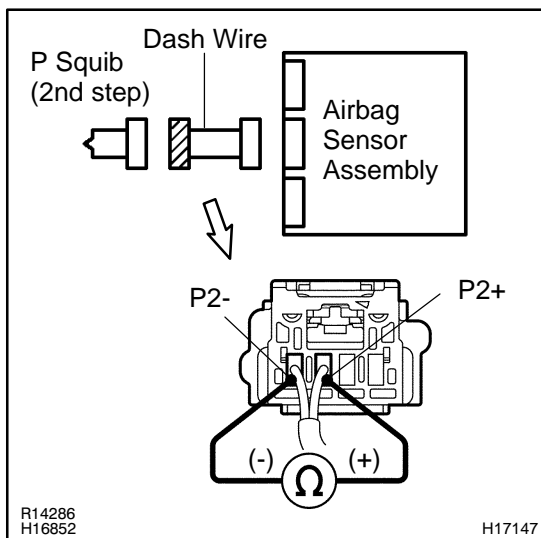
See page DI-903 .

### INSPECTION PROCEDURE

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check dash wire (P squib (2nd step) circuit).</b>
----------	--



**CHECK:**

Measure the resistance between P2+ and P2- of the dash wire connector on the front passenger airbag assembly (P squib (2nd step)) side.

**OK:**

**Resistance: Below 1 Ω**

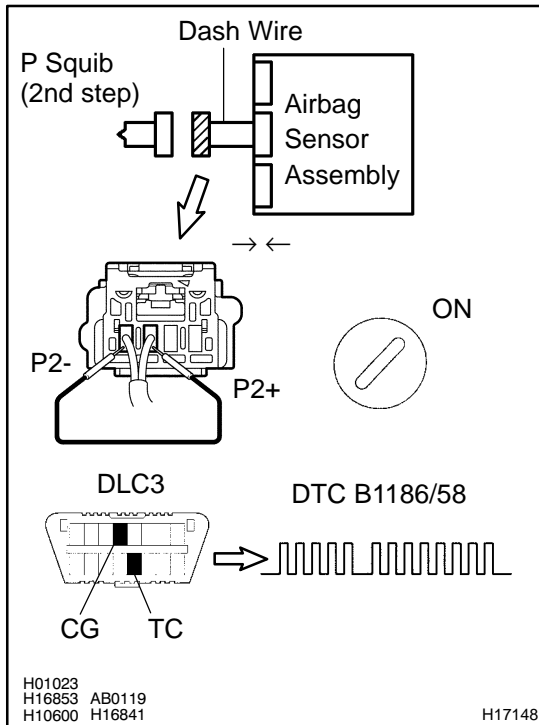


**Repair or replace dash wire.**





### 3 Check airbag sensor assembly.



#### **PREPARATION:**

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect P2+ and P2- of the dash wire connector on the front passenger airbag assembly (P squib (2nd step)) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### **CHECK:**

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### **OK:**

**DTC B1186/58 is not output.**

#### **HINT:**

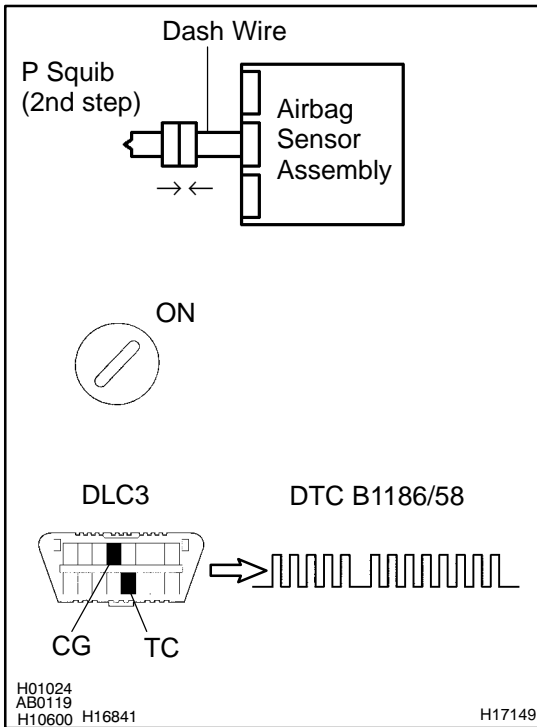
Codes other than code B1186/58 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check P squib (2nd step).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly (P squib (2nd step)) to the dash wire.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1186/58 is not output.**

#### HINT:

Codes other than code B1186/58 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front passenger airbag assembly (P squib (2nd step)).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>B1187/55</b>	<b>Short in P Squib (2nd step) Circuit (to Ground)</b>
------------	-----------------	--

**CIRCUIT DESCRIPTION**

The P squib (2nd step) circuit consists of the airbag sensor assembly and the front passenger airbag assembly.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B1187/55 is recorded when ground short is detected in the P squib (2nd step) circuit.

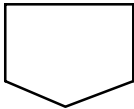
DTC No.	DTC Detecting Condition	Trouble Area
B1187/55	<ul style="list-style-type: none"> <li>▶ Short in P squib (2nd step) circuit (to ground)</li> <li>▶ P squib (2nd step) malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Front passenger airbag assembly (P squib (2nd step))</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> </ul>

**WIRING DIAGRAM**

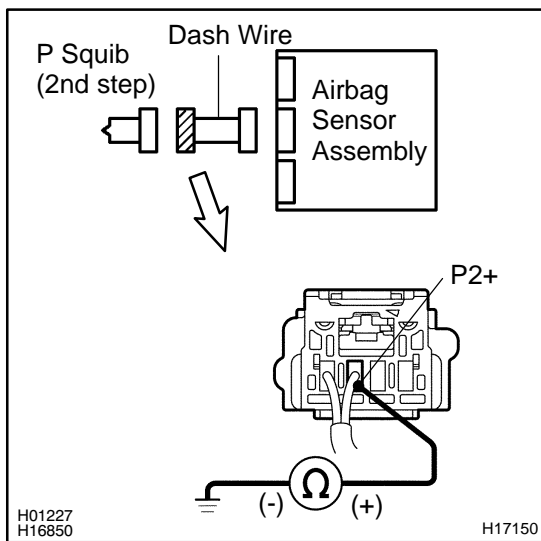
See page DI-903 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check dash wire(P squib (2nd step) circuit).</b>
----------	---



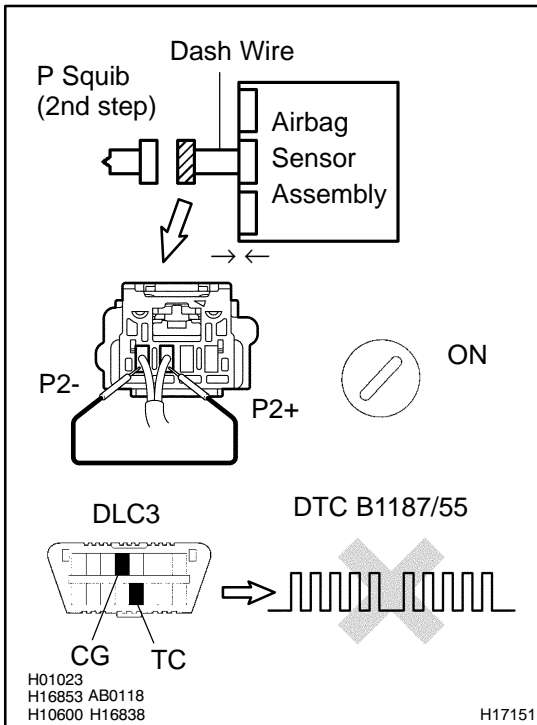
**CHECK:**  
Measure the resistance between the body ground and P2+ of the dash wire connector on the front passenger airbag assembly (P squib (2nd step)) side.

**OK:**  
**Resistance: 1 MΩ or Higher**

<b>NG</b>	<b>Repair or replace dash wire.</b>
-----------	-------------------------------------



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect P2+ and P2- of the dash wire connector on the front passenger airbag assembly (P squib (2nd step)) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1187/55 is not output.**

#### HINT:

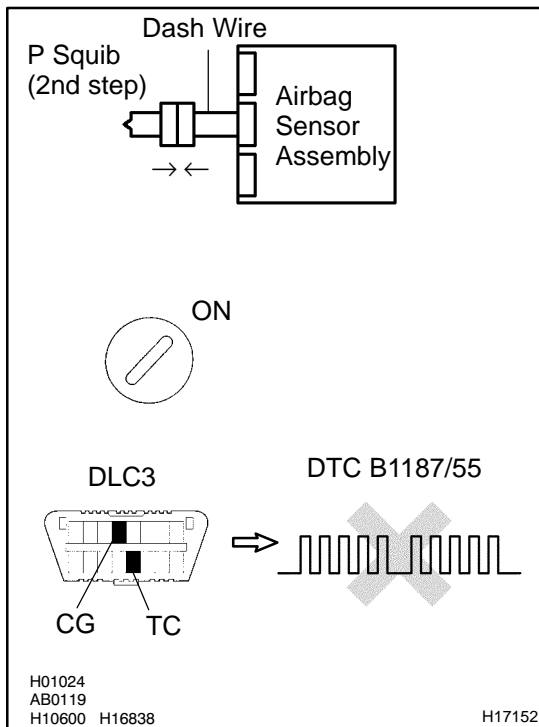
Codes other than code B1187/55 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

#### 4 Check P squib (2nd step).



#### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly (P squib (2nd step)) to the dash wire.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1187/55 is not output.**

#### HINT:

Codes other than code B1187/55 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front passenger airbag assembly (P squib (2nd step)).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**

<b>DTC</b>	<b>B1188/56</b>	<b>Short in P Squib (2nd step) Circuit (to B+)</b>
------------	-----------------	--

**CIRCUIT DESCRIPTION**

The P squib (2nd step) circuit consists of the airbag sensor assembly and the front passenger airbag assembly.

It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS-3 .

DTC B1188/56 is recorded when a B+ short is detected in the P squib (2nd step) circuit.

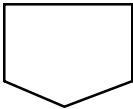
DTC No.	DTC Detecting Condition	Trouble Area
B1188/56	<ul style="list-style-type: none"> <li>▶ Short in P squib (2nd step) circuit (to B+)</li> <li>▶ P squib (2nd step) malfunction</li> <li>▶ Airbag sensor assembly malfunction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Front passenger airbag assembly (P squib (2nd step))</li> <li>▶ Airbag sensor assembly</li> <li>▶ Dash wire</li> </ul>

**WIRING DIAGRAM**

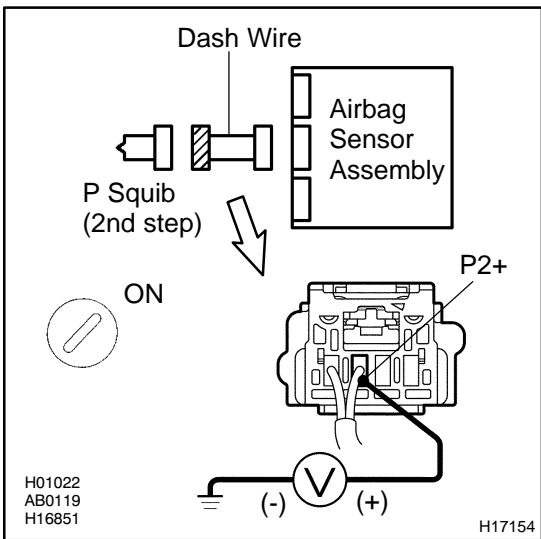
See page DI-903 .

**INSPECTION PROCEDURE**

<b>1</b>	<b>Prepare for inspection (See step 1 on page DI-923 ).</b>
----------	---



<b>2</b>	<b>Check dash wire (P squib (2nd step) circuit).</b>
----------	--



**PREPARATION:**

Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

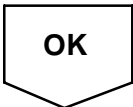
**CHECK:**

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and P2+ of the dash wire connector on the front passenger airbag assembly (P squib (2nd step)) side.

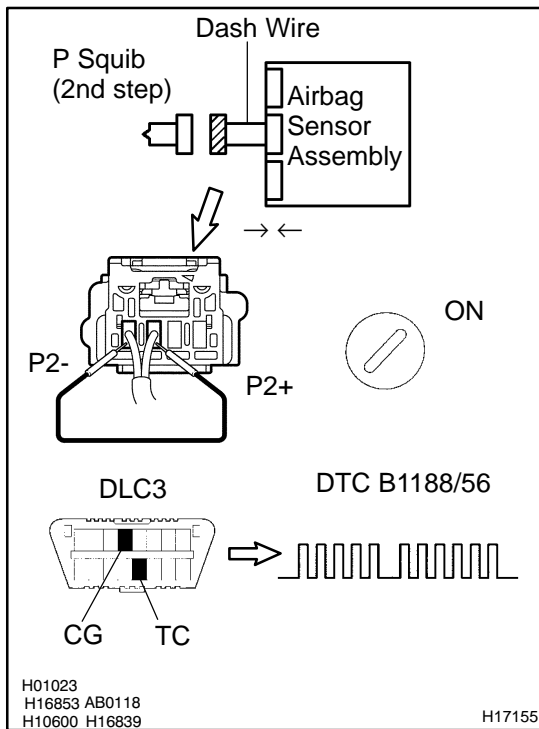
**OK:**

**Voltage: Below 1 V**

<b>NG</b>	<b>Repair or replace dash wire.</b>
-----------	-------------------------------------



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the connector to the airbag sensor assembly.
- Using a service wire, connect P2+ and P2- of the dash wire connector on the front passenger airbag assembly (P squib (2nd step)) side.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

#### OK:

**DTC B1188/56 is not output.**

#### HINT:

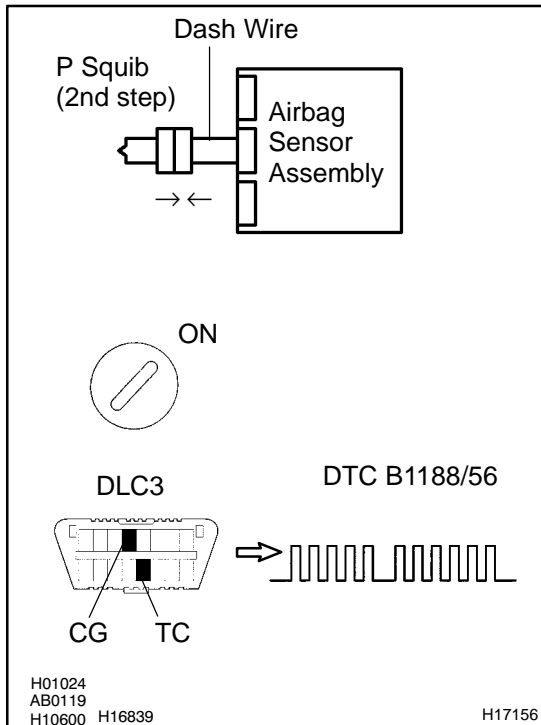
Codes other than code B1188/56 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

## 4 Check P squib (2nd step).



### PREPARATION:

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Connect the front passenger airbag assembly (P squib (2nd step)) to the dash wire.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1188/56 is not output.**

### HINT:

Codes other than code B1188/56 may be output at this time, but they are not relevant to this check.

**NG**

**Replace front passenger airbag assembly (P squib (2nd step)).**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.**



<b>DTC</b>	<b>B1628/29</b>	<b>RSCA off Switch Indicator Malfunction</b>
------------	-----------------	--

## CIRCUIT DESCRIPTION

The RSCA off switch is a mechanism that operates both right and left side of the curtain shield airbag assembly and the seat belt pretensioner when the airbag sensor assembly detects a roll-over.

The RSCA off switch indicator light is installed in the combination meter.

As operating the RSCA off switch, the indicator light comes on to inform the driver that the roll-over detection system is not working.

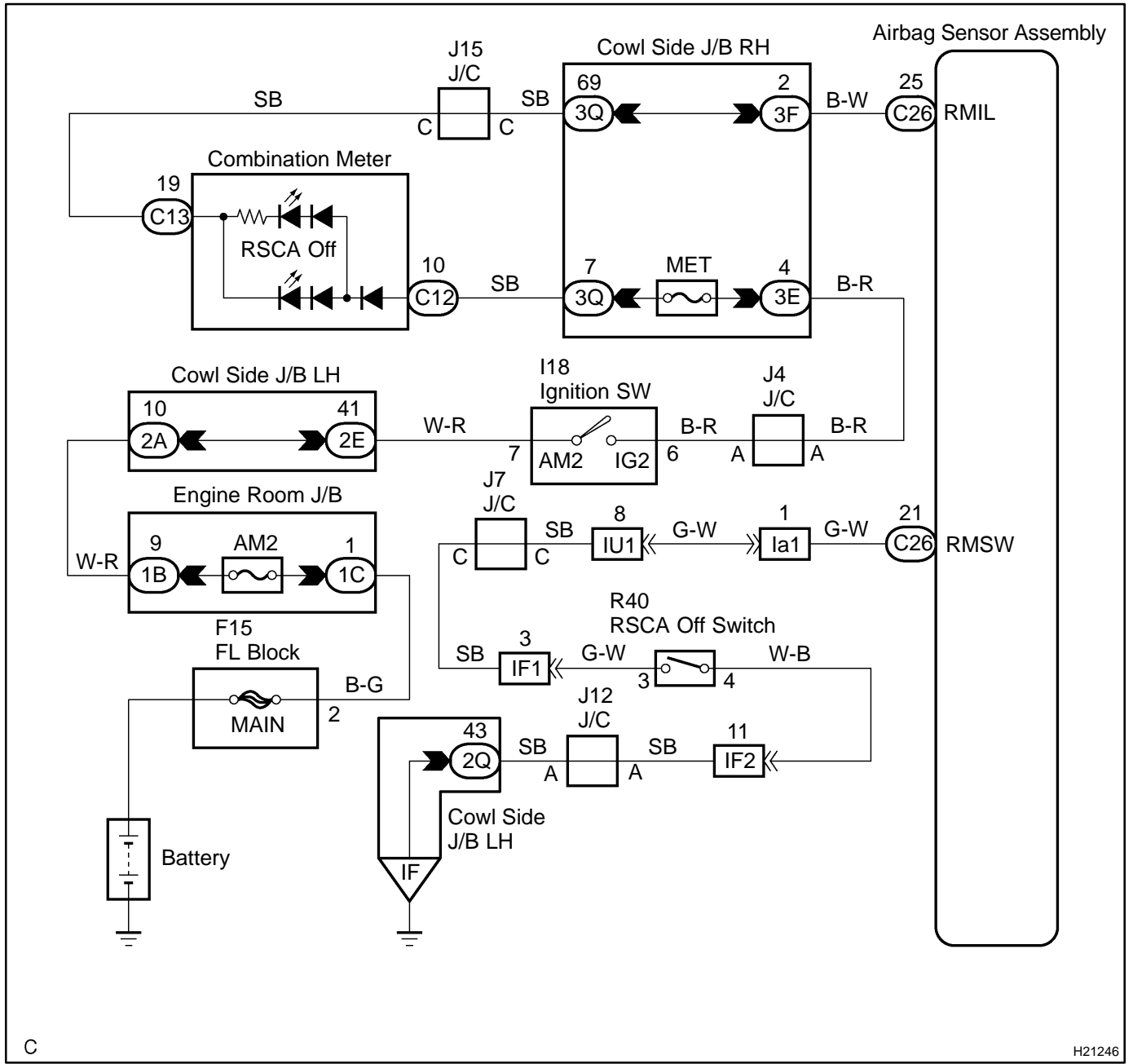
The initial setting of the roll-over detection system is on. It automatically operates every time the ignition switch is turned on.

DTC No.	DTC Detecting Condition	Trouble Area
B1628/29	▶RSCA off indicator circuit malfunction	<ul style="list-style-type: none"> <li>▶RSCA off switch</li> <li>▶Airbag sensor assembly</li> <li>▶Dash wire</li> <li>▶Instrument panel wire</li> </ul>

### HINT:

DTC B1628/29 is indicated only for the vehicle equipped with the side airbag.

# WIRING DIAGRAM



C

H21246

**INSPECTION PROCEDURE**

The RSCA off indicator light remains on when the RSCA off switch is not operating (Remains ON).

<b>1</b>	<b>Does indicator light turn off?</b>
----------	---------------------------------------

**PREPARATION:**

Disconnect the combination meter connector.

**CHECK:**

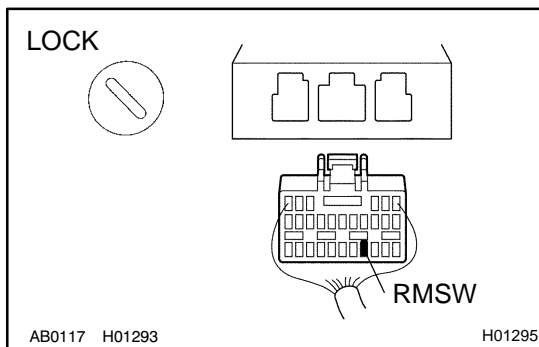
- (a) Turn the ignition switch to ON.
- (b) Check operation of RSCA off indicator light.

**OK:**

The indicator light does not light up.



<b>2</b>	<b>Check wire harness.</b>
----------	----------------------------

**PREPARATION:**

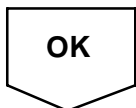
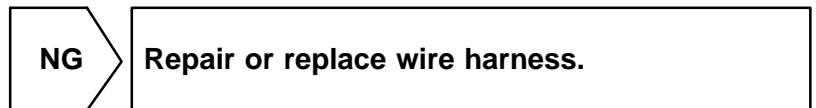
- (a) Turn the ignition switch to LOCK.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- (c) Disconnect the airbag sensor assembly connector.

**CHECK:**

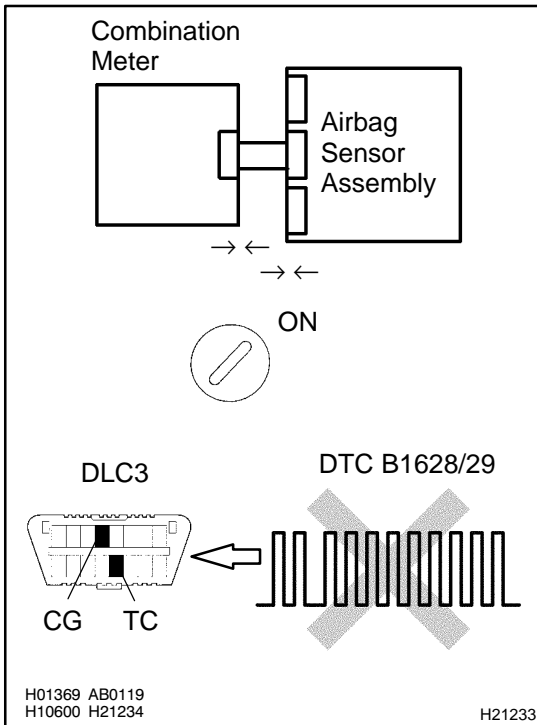
Measure the resistance between the body ground and RMSW on the airbag sensor assembly side between the combination meter and airbag sensor assembly.

**OK:**

**Resistance: 1 MΩ or Higher**



### 3 Check airbag sensor assembly.



#### PREPARATION:

- Connect the airbag sensor assembly connector.
- Connect the combination meter connector.
- Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#) ).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#) ).

#### OK:

**DTC B2628/29 is not output.**

#### HINT:

Codes other than code B1628/29 may be output at this time, but they are not relevant to this check.

**NG**

**Replace airbag sensor assembly.**

**OK**

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

**The RSCA off indicator light does not come on when the RSCA off switch is operating (Remains OFF).**

<b>1</b>	<b>Check voltage of combination meter.</b>
----------	--

**PREPARATION:**

Disconnect the combination meter connector.

**CHECK:**

Measure the voltage of the combination meter.

**OK:****Voltage: 10 - 14 V****NG****Check combination meter (See page [BE-58](#) ).****OK**

<b>2</b>	<b>Check wire harness.</b>
----------	----------------------------

**PREPARATION:**

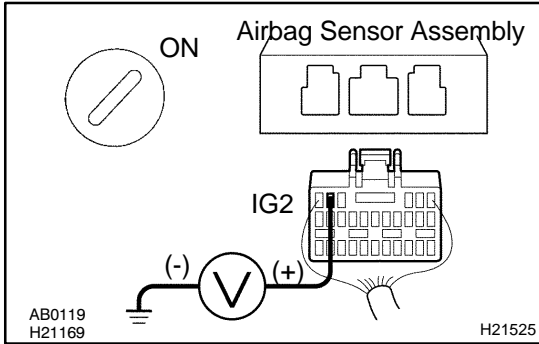
Disconnect the combination meter connector.

**CHECK:**

Measure the voltage between the body ground and RMSW on the combination meter side between the air-bag sensor assembly and the combination meter.

**OK:****Voltage: Below 1 V****NG****Repair or replace wire harness.****OK**

### 3 Check wire harness.



#### PREPARATION:

- (a) Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- (b) Connect the combination meter connector.
- (c) Turn the ignition switch to LOCK, and wait at least for 90 seconds.
- (d) Disconnect the airbag sensor assembly connector.
- (e) Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

#### CHECK:

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and IG2 on the airbag sensor assembly side.

#### OK:

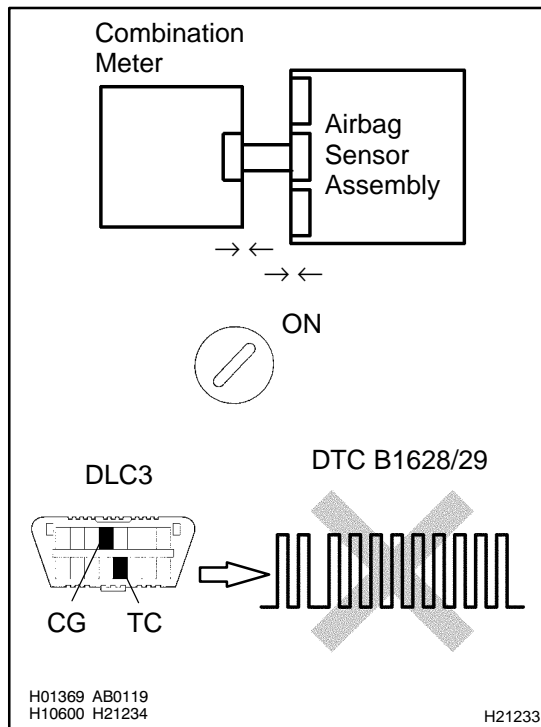
**Voltage: 10 - 14 V**

**NG**

**Repair or replace wire harness.**

**OK**

## 4 Check airbag sensor assembly.



### PREPARATION:

Connect the airbag sensor assembly connector.

### CHECK:

- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Clear the DTC stored in memory (See page [DI-692](#)).
- Turn the ignition switch to LOCK, and wait at least for 10 seconds.
- Turn the ignition switch to ON, and wait at least for 10 seconds.
- Check the DTC (See page [DI-692](#)).

### OK:

**DTC B1628/29 is not output.**

### HINT:

Codes other than code B1628/29 may be output at this time, but they are not relevant to this check.

NG

**Replace airbag sensor assembly.**

OK

**From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

<b>DTC</b>	<b>Normal</b>	<b>Source Voltage Drop</b>
------------	---------------	----------------------------

**CIRCUIT DESCRIPTION**

The SRS is equipped with a voltage-increase circuit (DC-DC converter) in the airbag sensor assembly in case the source voltage drops.

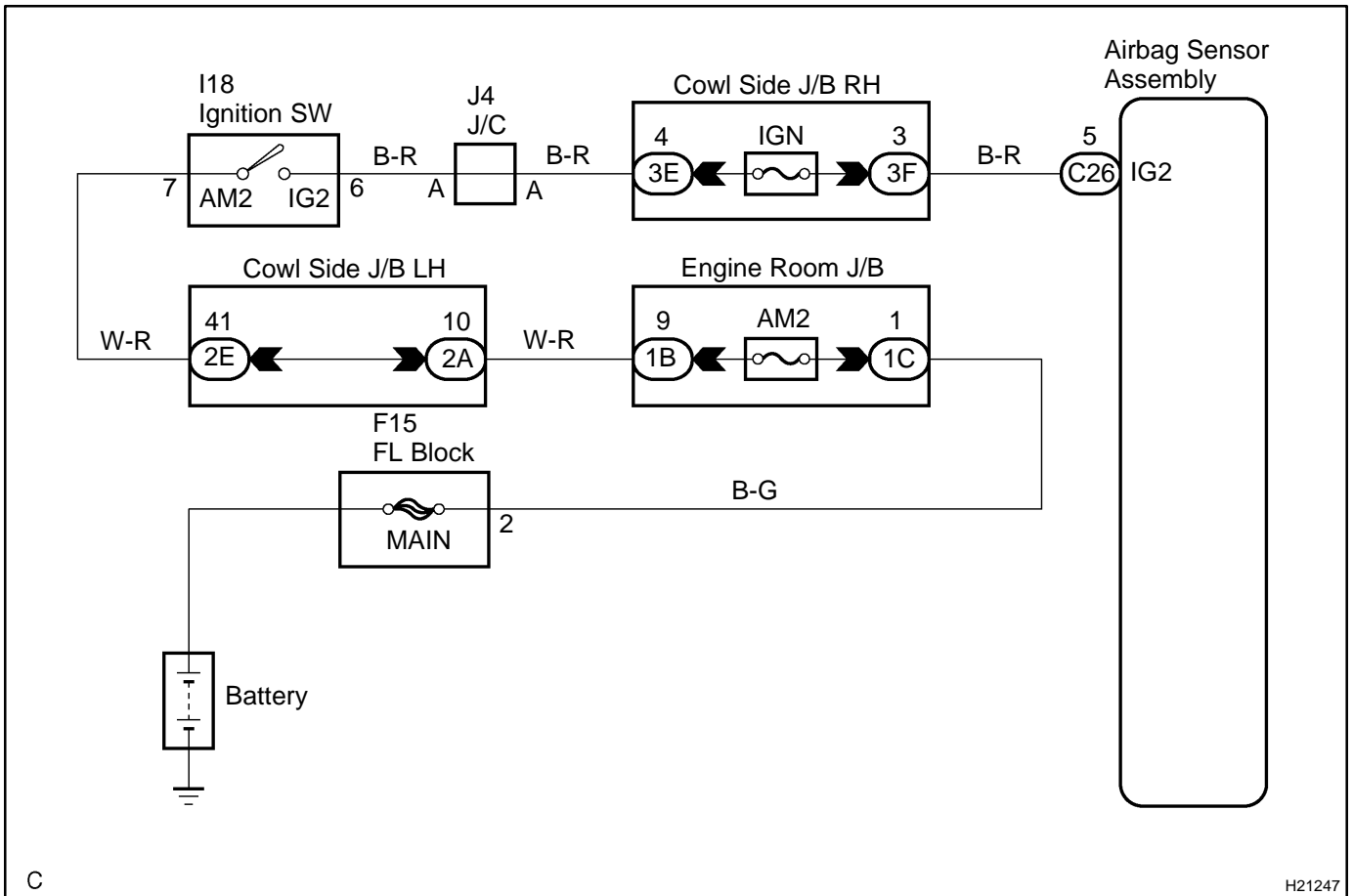
When the battery voltage drops, the voltage-increase circuit (DC-DC converter) functions to increase the voltage of the SRS to normal voltage.

The diagnosis system malfunction display for this circuit is differ from the other circuits in that when the SRS warning light remains on and the DTC shows a normal code, source voltage drop is indicated.

Malfunction in this circuit is not recorded in the airbag sensor assembly, and when the source voltage returns to normal, the SRS warning light automatically goes off.

DTC No.	Diagnosis
(Normal)	Source voltage drop

**WIRING DIAGRAM**



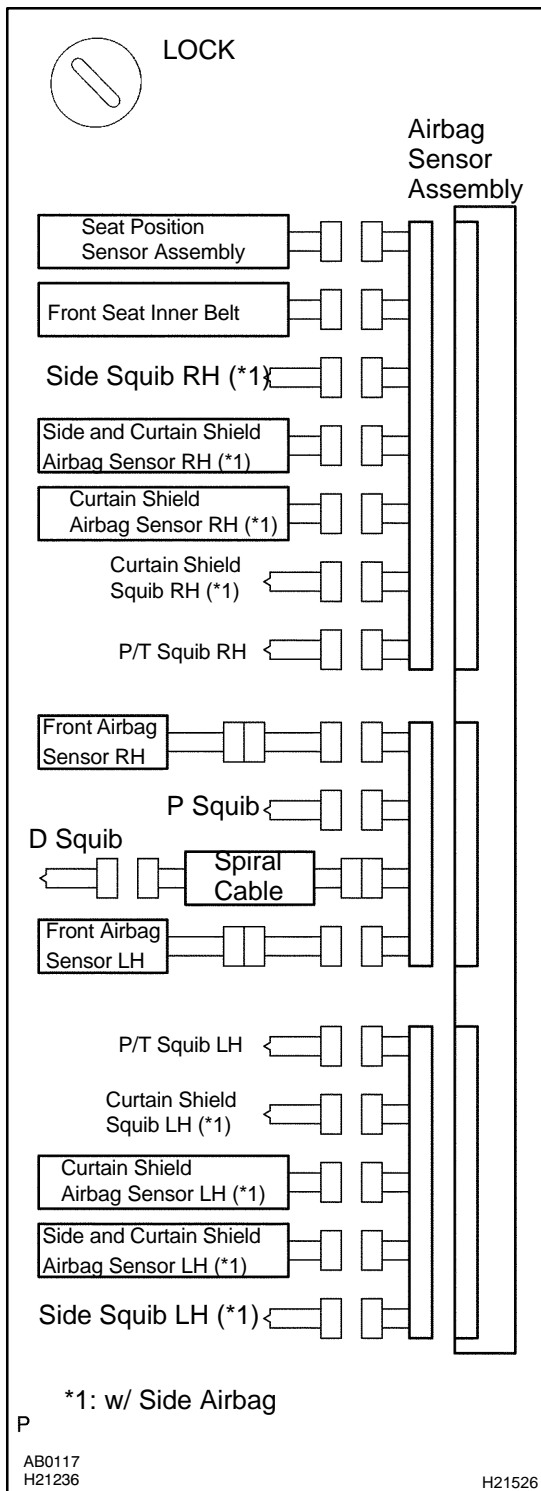
C

H21247



## INSPECTION PROCEDURE

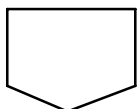
## 1 Prepare for inspection.

**PREPARATION:**

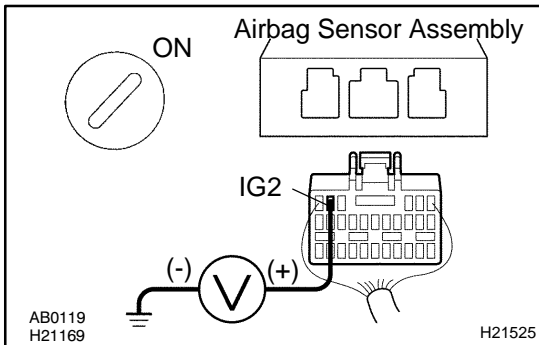
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Remove the steering wheel pad (See page [SR-29](#)).
- Disconnect the connector of the front passenger airbag assembly (See page [RS-31](#)).
- w/ Side airbag:  
Disconnect the connector of the side airbag assembly RH and LH (See page [RS-44](#)).
- w/ Side airbag:  
Disconnect the connector of the curtain shield airbag assembly RH and LH (See page [RS-59](#)).
- Disconnect the connector of the seat belt pretensioner RH and LH (See page [BO-141](#)).
- Disconnect the connectors of the airbag sensor assembly (See page [RS-70](#)).
- Disconnect the connector of the front airbag sensor RH and LH (See page [RS-75](#)).
- w/ Side airbag:  
Disconnect the connector of the side and curtain shield airbag sensor assembly RH and LH (See page [RS-80](#)).
- w/ Side airbag:  
Disconnect the connector of the curtain shield airbag sensor assembly RH and LH (See page [RS-86](#)).
- Disconnect the connector of the seat position sensor assembly (See page [RS-91](#)).
- Disconnect the front seat inner belt LH connector (See page [BO-106](#)).

**CAUTION:**

**Store the steering wheel pad, front passenger airbag assembly, side airbag assembly and curtain shield airbag assembly with the front surface facing upward.**



## 2 Check source voltage.



### **PREPARATION:**

Connect the negative (-) terminal cable to the battery.

### **CHECK:**

- Turn the ignition switch to ON.
- Measure the voltage between the body ground and IG2 on the airbag sensor assembly and operate electric system (defogger, wiper, headlight, heater blower, etc.).

### **OK:**

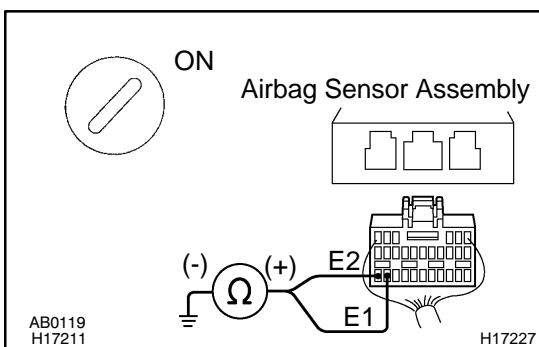
**Voltage: 10 - 14 V**

**NG**

**Check harness between battery and airbag sensor assembly, and check battery and charging system.**

**OK**

## 3 Check airbag sensor assembly connector.



### **CHECK:**

Measure the resistance between the body ground and each of E1 and E2 of the airbag sensor assembly connector.

### **OK:**

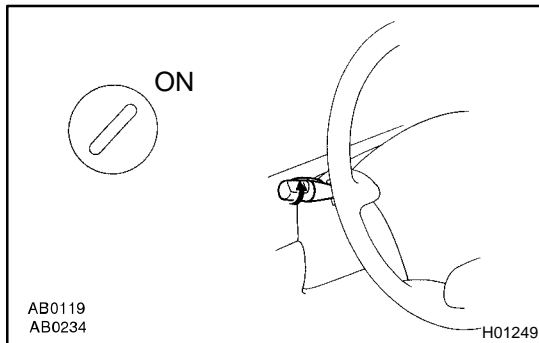
**Resistance: 0 Ω (Continuity)**

**NG**

**Repair or replace airbag sensor assembly connector.**

**OK**

<b>4</b>	<b>Does SRS warning light turn off?</b>
----------	---

**PREPARATION:**

- (a) Turn the ignition switch to LOCK.
- (b) Connect the steering wheel pad connector.
- (c) Connect the front passenger airbag assembly connector.
- (d) w/ Side airbag:  
Connect the side airbag assembly connectors.
- (e) Connect the seat belt pretensioner connectors.
- (f) Connect the airbag sensor assembly connectors.
- (g) Connect the front airbag sensor connectors.
- (h) w/ Side airbag:  
Connect the side and curtain shield airbag sensor assembly connectors.
- (i) w/ Side airbag:  
Connect the curtain shield airbag assembly connectors.
- (j) w/ Side airbag:  
Connect the curtain shield airbag sensor assembly connectors.
- (k) Connect the seat position sensor assembly connector.
- (l) Connect the front seat inner belt LH connector.

**CHECK:**

- (a) Turn the ignition switch to ON.
- (b) Operate electric system (defogger, wiper, headlight, heater blower, etc.) and check that SRS warning light goes off.

<b>NO</b>	<b>Check for DTCs. If a DTC is output, perform troubleshooting for the DTC. If a normal code is output, replace airbag sensor assembly.</b>
-----------	---

<b>YES</b>
------------

<p><b>From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.</b></p>
---

# SRS Warning Light Circuit Malfunction

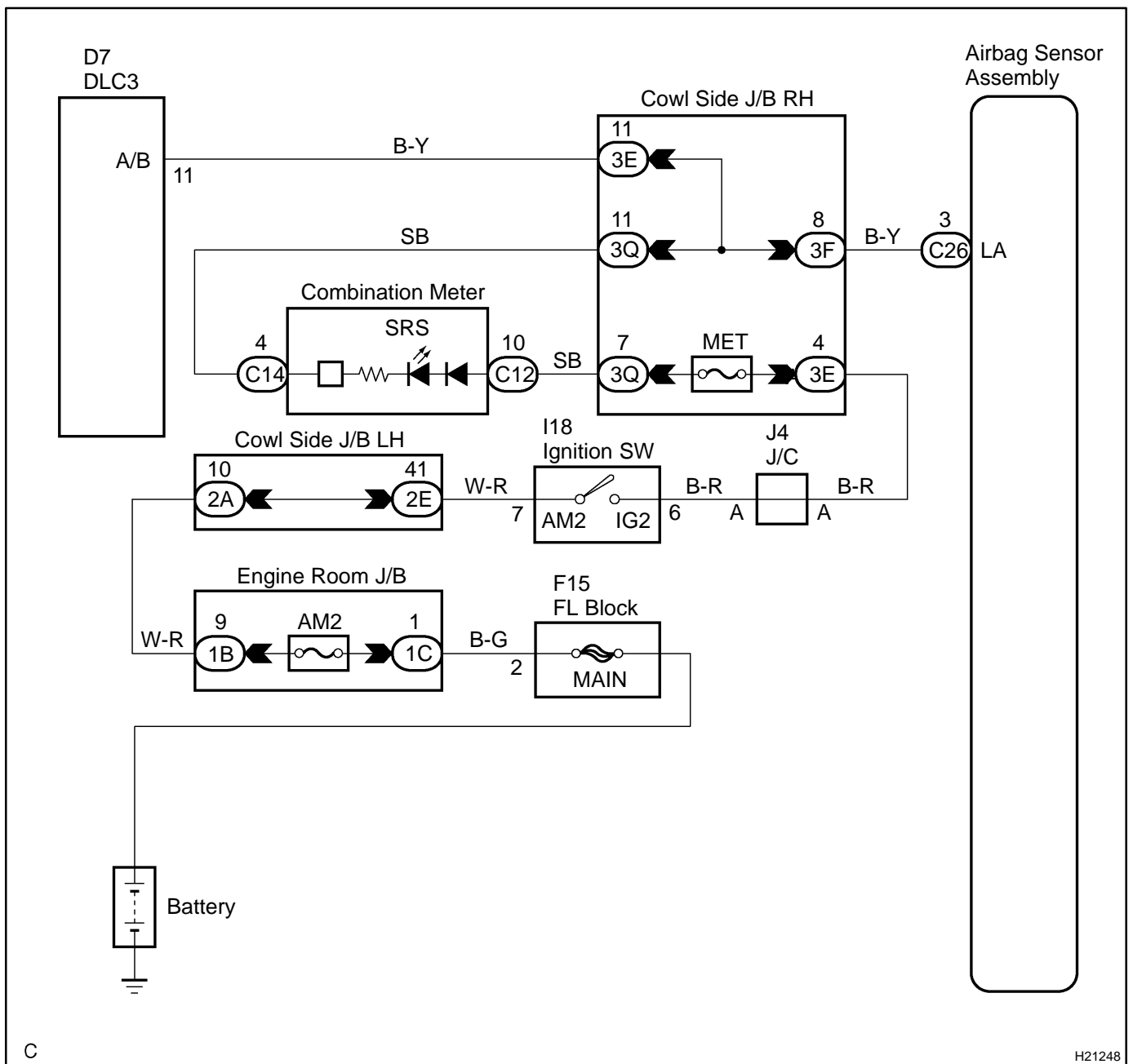
## CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter.

When the SRS is normal, the SRS warning light comes on for approx. 6 seconds after the ignition switch is turned from the LOCK position to ON position, and then turns off automatically.

If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality. When terminal TC and CG of the DLC3 are connected, the DTC is indicated by blinking the SRS warning light.

## WIRING DIAGRAM

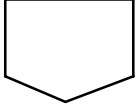


C

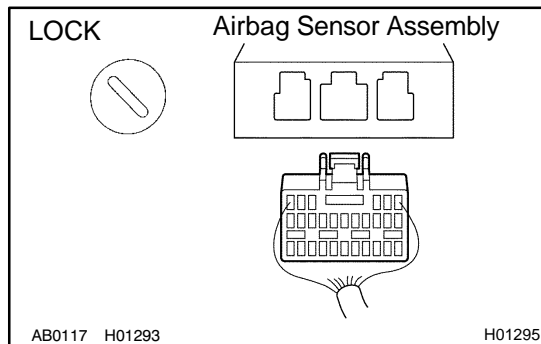
H21248

**INSPECTION PROCEDURE****Always lights up, when ignition switch is in LOCK position.**

<b>1</b>	<b>Prepare for inspection (See step 1 on page <a href="#">DI-923</a> ).</b>
----------	---



<b>2</b>	<b>Does SRS warning light turn off?</b>
----------	---

**PREPARATION:**

- (a) Turn the ignition switch to LOCK.
- (b) Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- (c) Disconnect the airbag sensor assembly connector.
- (d) Connect the negative (-) terminal cable to the battery.

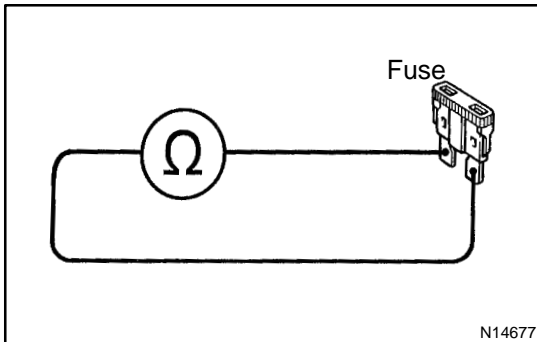
**CHECK:**

Check operation of SRS warning light.

<b>NO</b>	<b>Check combination meter (See page <a href="#">BE-2</a> ).</b>
-----------	--

<b>YES</b>
------------

<b>Replace airbag sensor assembly.</b>
--

**Does not light up, when ignition switch is turned to ON.****1 Check AM2 Fuse.****PREPARATION:**

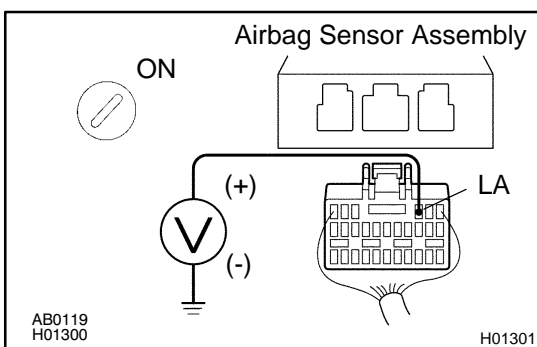
Remove the AM2 fuse.

**CHECK:**

Check continuity of the AM2 fuse.

**OK:****Continuity****HINT:**

- ▶ Fuse may be burnt out even if it appears to be OK during visual inspection.
- ▶ If fuse is OK, install it.

**NG****Go to step 5.****OK****2 Prepare for inspection (See step 1 on page [DI-923](#) ).****3 Check SRS warning light circuit.****PREPARATION:**

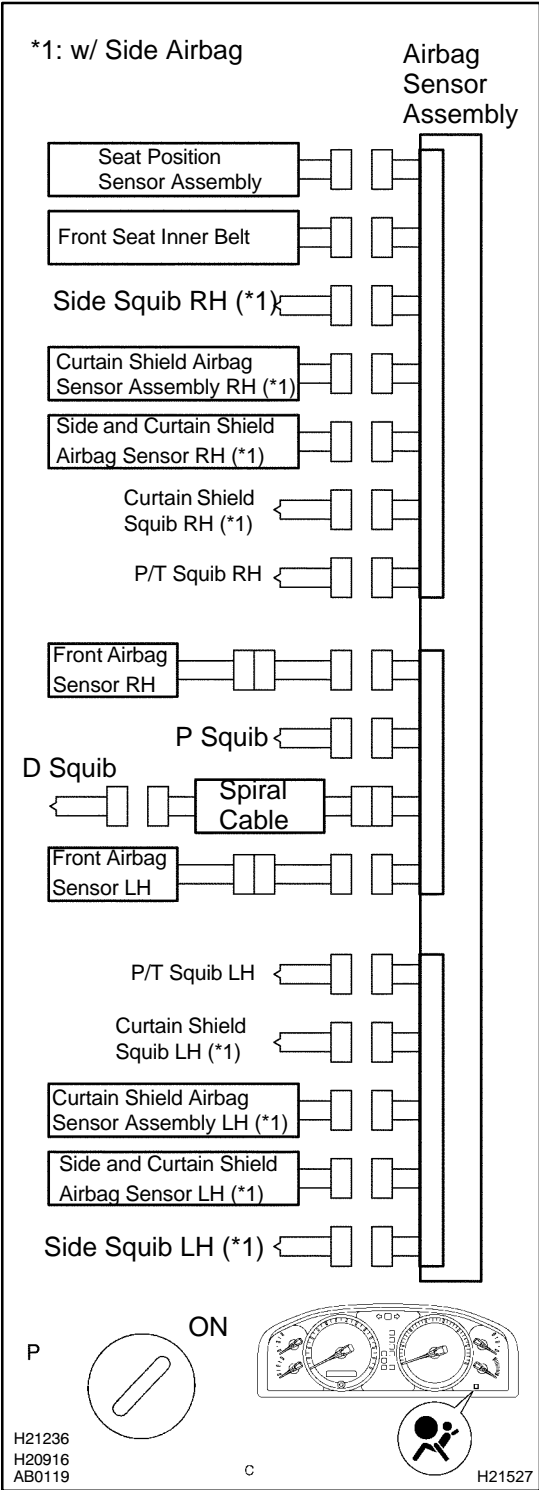
Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the body ground and LA of the airbag sensor assembly connector.

**OK:****Voltage: 10 - 14 V****NG****Check SRS warning light bulb or repair SRS warning light circuit.****OK**

**4 Does SRS warning light come on?**



**PREPARATION:**

- (a) Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- (b) Connect the airbag sensor assembly connector.
- (c) Connect the negative (-) terminal cable to the battery, and wait at least for 2 seconds.

**CHECK:**

- (a) Turn the ignition switch to ON.
- (b) Check operation of the SRS warning light.

**NO** Replace airbag sensor assembly.

**YES**

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use simulation method to check.

<b>5</b>	<b>Is new AM2 fuse burnt out again?</b>
----------	---

**NO**

Using simulation method, reproduce malfunction symptoms (See page [IN-26](#)).

**YES**

**Check harness between AM2 fuse and SRS warning light.**

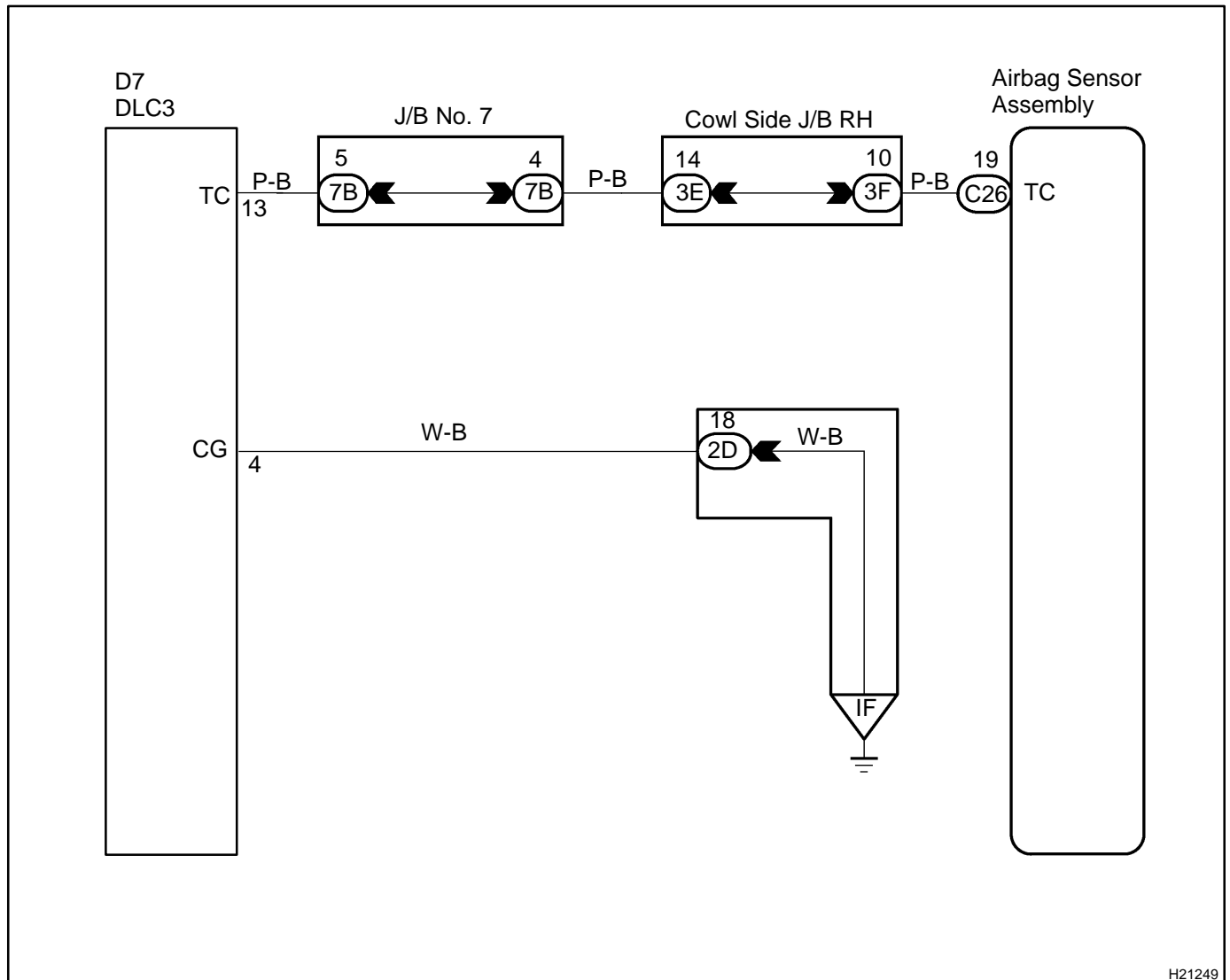


## TC Terminal Circuit

### CIRCUIT DESCRIPTION

DTC output mode is set by connecting terminal TC and CG of the DLC3 the airbag sensor assembly. The DTCs are displayed by blinking the SRS warning light.

### WIRING DIAGRAM

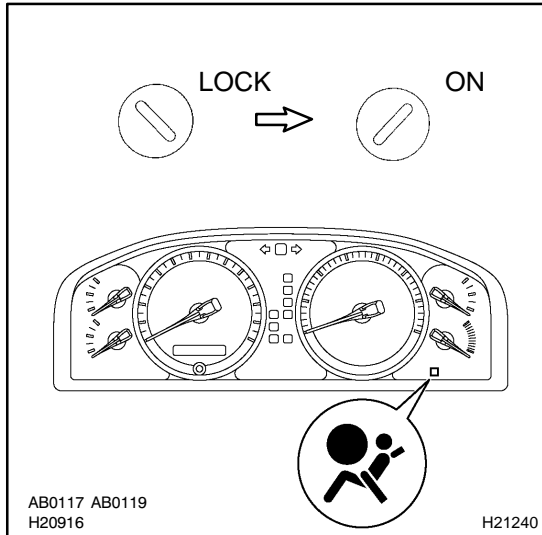


H21249

### INSPECTION PROCEDURE

If the DTC is not displayed, do the following troubleshooting.

<b>1</b>	<b>Does SRS warning light light up for approx. 6 seconds?</b>
----------	---

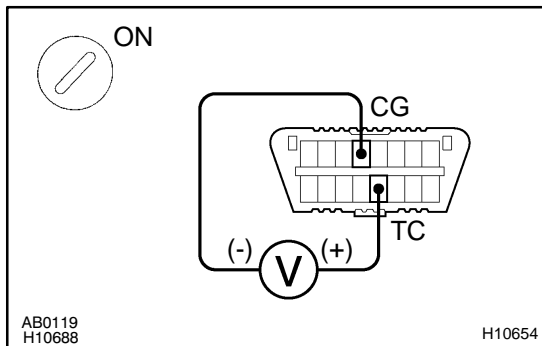


**CHECK:**  
Check operation of the SRS warning light after ignition switch is turned from LOCK position to ON position.

<b>NO</b>	<b>Check SRS warning light system.</b> (See page <a href="#">DI-927</a> )
-----------	--

<b>YES</b>
------------

<b>2</b>	<b>Check voltage between terminal TC and CG of DLC3.</b>
----------	--



**PREPARATION:**  
Turn the ignition switch to ON.

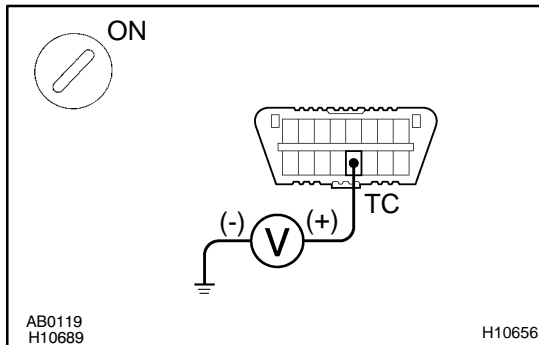
**CHECK:**  
Measure the voltage between terminal TC and CG of DLC3.

**OK:**  
**Voltage: 4 - 14 V**

<b>OK</b>	<b>Go to step 4.</b>
-----------	----------------------

<b>NG</b>
-----------

### 3 Check voltage between terminal TC of DLC3 and body ground.

**CHECK:**

Measure the voltage between the body ground and terminal TC of DLC3.

**OK:**

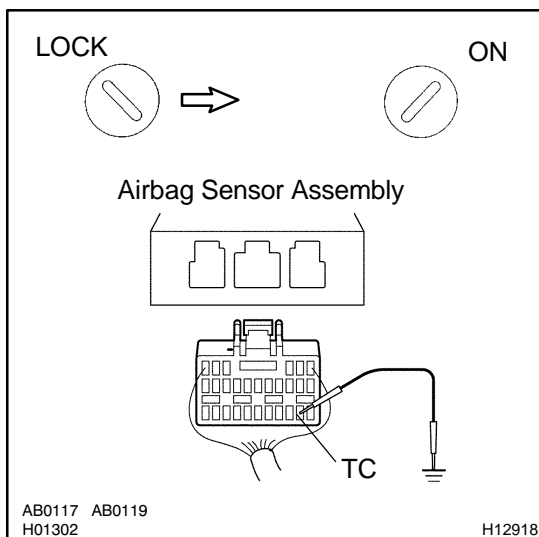
**Voltage: 4 - 14 V**

**OK**

**Check harness between terminal CG of DLC3 and body ground.**

**NG**

### 4 Check airbag sensor assembly.

**PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect the negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the airbag sensor assembly connector.
- Insert the service wire into terminal TC from back side as shown in the illustration.
- Connect the airbag sensor assembly connector with service wire.
- Connect the negative (-) terminal cable to the battery.
- Turn the ignition switch to ON and wait at least for 20 seconds.
- Connect the service wire of terminal TC to body ground.

**CHECK:**

Check operation of SRS warning light.

**OK:**

**SRS warning light comes on.**

**NOTICE:**

**Pay due attention to the terminal connecting position to avoid a malfunction.**

**OK**

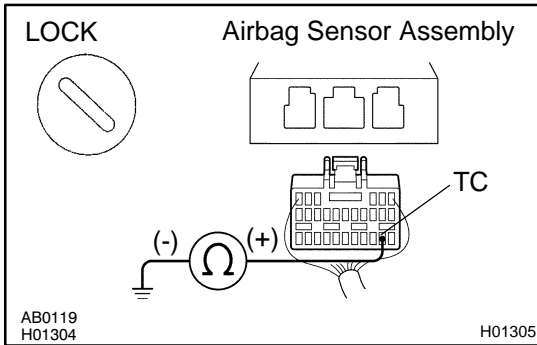
**Check harness between the airbag sensor assembly and DLC3.**

**NG**

**Replace airbag sensor assembly.**

If the DTC is displayed without a DTC check procedure, perform the following troubleshooting.

- |          |  |
|----------|--|
| <b>1</b> | <b>Check resistance between terminal TC of airbag sensor assembly and body ground.</b> |
|----------|--|



**PREPARATION:**

- Turn the ignition switch to LOCK.
- Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
- Disconnect the airbag sensor assembly connector.

**CHECK:**

Check resistance between terminal TC of the airbag sensor assembly connector and body ground.

**OK:**

**Resistance: 1 MΩ or Higher**

**NG**

**Repair or replace harness or connector.**

**OK**

**Replace airbag sensor assembly.**

# CUSTOMER PROBLEM ANALYSIS CHECK

**Supplemental Restraint System Check Sheet**

Inspector's Name \_\_\_\_\_

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km Miles

Date Problem Occurred	/ /
Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Other
Temperature	Approx.

Vehicle Operation	<input type="checkbox"/> Starting <input type="checkbox"/> Idling <input type="checkbox"/> Driving [ <input type="checkbox"/> Constant speed <input type="checkbox"/> Acceleration <input type="checkbox"/> Deceleration <input type="checkbox"/> Other ]
Road Conditions	
Details of Problem	

Vehicle Inspection, Repair History Prior to Occurrence of Malfunction (Including Supplemental Restraint System)	
---	--

**Diagnosis System Inspection**

SRS Warning Light Inspection	1st Time	<input type="checkbox"/> Remains ON <input type="checkbox"/> Sometimes Lights Up <input type="checkbox"/> Does Not Light Up
	2nd Time	<input type="checkbox"/> Remains ON <input type="checkbox"/> Sometimes Lights Up <input type="checkbox"/> Does Not Light Up
DTC Inspection	1st Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code [ Code. ]
	2nd Time	<input type="checkbox"/> Normal Code <input type="checkbox"/> Malfunction Code [ Code. ]

## DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit.).

DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0100/13 (DI-711)	▶Short in D squib circuit	▶Steering wheel pad (squib) ▶Spiral cable ▶Airbag sensor assembly ▶Dash wire ▶Column wire	ON
B0101/14 (DI-717)	▶Open in D squib circuit	▶Steering wheel pad (squib) ▶Spiral cable ▶Airbag sensor assembly ▶Dash wire ▶Column wire	ON
B0102/11 (DI-722)	▶Short in D squib circuit (to ground)	▶Steering wheel pad (squib) ▶Spiral cable ▶Airbag sensor assembly ▶Dash wire ▶Column wire	ON
B0103/12 (DI-727)	▶Short in D squib circuit (to B+)	▶Steering wheel pad (squib) ▶Spiral cable ▶Airbag sensor assembly ▶Dash wire ▶Column wire	ON
B0105/53 (DI-732)	▶Short in P squib circuit	▶Front passenger airbag assembly (squib) ▶Airbag sensor assembly ▶Dash wire	ON
B0106/54 (DI-736)	▶Open in P squib circuit	▶Front passenger airbag assembly (squib) ▶Airbag sensor assembly ▶Dash wire	ON
B0107/51 (DI-739)	▶Short in P squib circuit (to ground)	▶Front passenger airbag assembly (squib) ▶Airbag sensor assembly ▶Dash wire	ON
B0108/52 (DI-742)	▶Short in P squib circuit (to B+)	▶Front passenger airbag assembly (squib) ▶Airbag sensor assembly ▶Dash wire	ON
B0110/43 (*1) (DI-745)	▶Short in side squib RH circuit	▶Side airbag assembly RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B0111/44 (*1) (DI-749)	▶Open in side squib RH circuit	▶Side airbag assembly RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B0112/41 (*1) (DI-752)	▶Short in side squib RH circuit (to ground)	▶Side airbag assembly RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B0113/42 (*1) (DI-755)	▶Short in side squib RH circuit (to B+)	▶Side airbag assembly RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B0115/47 (*1) (DI-758)	▶Short in side squib LH circuit	▶Side airbag assembly LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink

B0116/48 (*1) (DI-762)	▶Open in side squib LH circuit	▶Side airbag assembly LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B0117/45 (*1) (DI-765)	▶Short in side squib LH circuit (to ground)	▶Side airbag assembly LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B0118/46 (*1) (DI-768)	▶Short in side squib LH circuit (to B+)	▶Side airbag assembly LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B0126/B0127/ 27 (DI-771)	▶Seat belt buckle switch LH malfunction	▶Front seat inner belt LH ▶Airbag sensor assembly ▶Floor No. 1 wire ▶Front seat wire LH	ON
B0130/63 (DI-777)	▶Short in P/T squib RH circuit	▶Seat belt pretensioner RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B0131/64 (DI-781)	▶Open in P/T squib RH circuit	▶Seat belt pretensioner RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B0132/61 (DI-784)	▶Short in P/T squib RH circuit (to ground)	▶Seat belt pretensioner RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B0133/62 (DI-787)	▶Short in P/T squib RH circuit (to B+)	▶Seat belt pretensioner RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B0135/73 (DI-790)	▶Short in P/T squib LH circuit	▶Seat belt pretensioner LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B0136/74 (DI-794)	▶Open in P/T squib LH circuit	▶Seat belt pretensioner LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B0137/71 (DI-797)	▶Short in P/T squib LH circuit (to ground)	▶Seat belt pretensioner LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B0138/72 (DI-800)	▶Short in P/T squib LH circuit (to B+)	▶Seat belt pretensioner LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B1100/31 (DI-803)	▶Airbag sensor assembly malfunction	▶Airbag sensor assembly	ON
B1135/24 (DI-805)	▶Half connection in airbag sensor assembly connector	▶Airbag sensor assembly ▶Dash wire ▶Floor No. 1 wire ▶Floor No. 2 wire	ON
B1140/32 (*1) (DI-807)	▶Side and curtain shield airbag sensor assembly RH malfunction	▶Side and curtain shield airbag sensor assembly RH ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B1141/33 (*1) (DI-813)	▶Side and curtain shield airbag sensor assembly LH malfunction	▶Side and curtain shield airbag sensor assembly LH ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B1148/36 (DI-819)	▶Front airbag sensor RH malfunction	▶Front airbag sensor RH ▶Airbag sensor assembly ▶Dash wire ▶Engine room No. 2 wire ▶Engine room main wire	ON

## DIAGNOSTICS - SUPPLEMENTAL RESTRAINT SYSTEM

B1149/37 (DI-828)	▶Front airbag sensor LH malfunction	▶Front airbag sensor LH ▶Airbag sensor assembly ▶Dash wire ▶Engine room No. 2 wire ▶Engine room main wire	ON
B1153/25 (DI-836)	▶Seat position sensor malfunction	▶Seat position sensor assembly ▶Airbag sensor assembly ▶Floor No. 1 wire ▶Front seat wire LH	ON
B1154/38 (*1) (DI-844)	▶Curtain shield airbag sensor assembly RH malfunction	▶Curtain shield airbag sensor assembly RH ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B1155/39 (*1) (DI-850)	▶Curtain shield airbag sensor assembly LH malfunction	▶Curtain shield airbag sensor assembly LH ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B1160/83 (*1) (DI-856)	▶Short in curtain shield squib RH circuit	▶Curtain shield airbag assembly RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B1161/84 (*1) (DI-860)	▶Open in curtain shield squib RH circuit	▶Curtain shield airbag assembly RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B1162/81 (*1) (DI-863)	▶Short in curtain shield squib RH circuit (to ground)	▶Curtain shield airbag assembly RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B1163/82 (*1) (DI-866)	▶Short in curtain shield squib RH circuit (to B+)	▶Curtain shield airbag assembly RH (squib) ▶Airbag sensor assembly ▶Floor No. 2 wire	Blink
B1165/87 (*1) (DI-869)	▶Short in curtain shield squib LH circuit	▶Curtain shield airbag assembly LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B1166/88 (*1) (DI-873)	▶Open in curtain shield squib LH circuit	▶Curtain shield airbag assembly LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B1167/85 (*1) (DI-876)	▶Short in curtain shield squib LH circuit (to ground)	▶Curtain shield airbag assembly LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B1168/86 (*1) (DI-879)	▶Short in curtain shield squib LH circuit (to B+)	▶Curtain shield airbag assembly LH (squib) ▶Airbag sensor assembly ▶Floor No. 1 wire	Blink
B1180/17 (DI-882)	▶Short in D squib (2nd step) circuit	▶Steering wheel pad (D squib, 2nd step) ▶Spiral cable ▶Airbag sensor assembly ▶Dash wire ▶Column wire	ON
B1181/18 (DI-888)	▶Open in D squib (2nd step) circuit	▶Steering wheel pad (D squib, 2nd step) ▶Spiral cable ▶Airbag sensor assembly ▶Dash wire ▶Column wire	ON
B1182/19 (DI-893)	▶Short in D squib (2nd step) circuit (to ground)	▶Steering wheel pad (D squib, 2nd step) ▶Spiral cable ▶Airbag sensor assembly ▶Dash wire ▶Column wire	ON



B1183/22 (DI-898)	▶ Short in D squib (2nd step) circuit (to B+)	▶ Steering wheel pad (D squib, 2nd step) ▶ Spiral cable ▶ Airbag sensor assembly ▶ Dash wire ▶ Column wire	ON
B1185/57 (DI-903)	▶ Short in P squib (2nd step) circuit	▶ Front passenger airbag assembly (squib) ▶ Airbag sensor assembly ▶ Dash wire	ON
B1186/58 (DI-907)	▶ Open in P squib (2nd step) circuit	▶ Front passenger airbag assembly (squib) ▶ Airbag sensor assembly ▶ Dash wire	ON
B1187/55 (DI-910)	▶ Short in P squib (2nd step) circuit (to ground)	▶ Front passenger airbag assembly (squib) ▶ Airbag sensor assembly ▶ Dash wire	ON
B1188/56 (DI-913)	▶ Short in P squib (2nd step) circuit (to B+)	▶ Front passenger airbag assembly (squib) ▶ Airbag sensor assembly ▶ Dash wire	ON
B1628/29 (*1) (DI-913)	▶ RSCA cutoff switch indicator	▶ RSCA cutoff switch ▶ Airbag sensor assembly ▶ Dash wire ▶ Instrument panel wire	Blink
Normal (DI-923)	▶ System normal	-	OFF
	▶ Voltage source drop	▶ Battery ▶ Airbag sensor assembly	ON

\*1: w/ Side Airbag

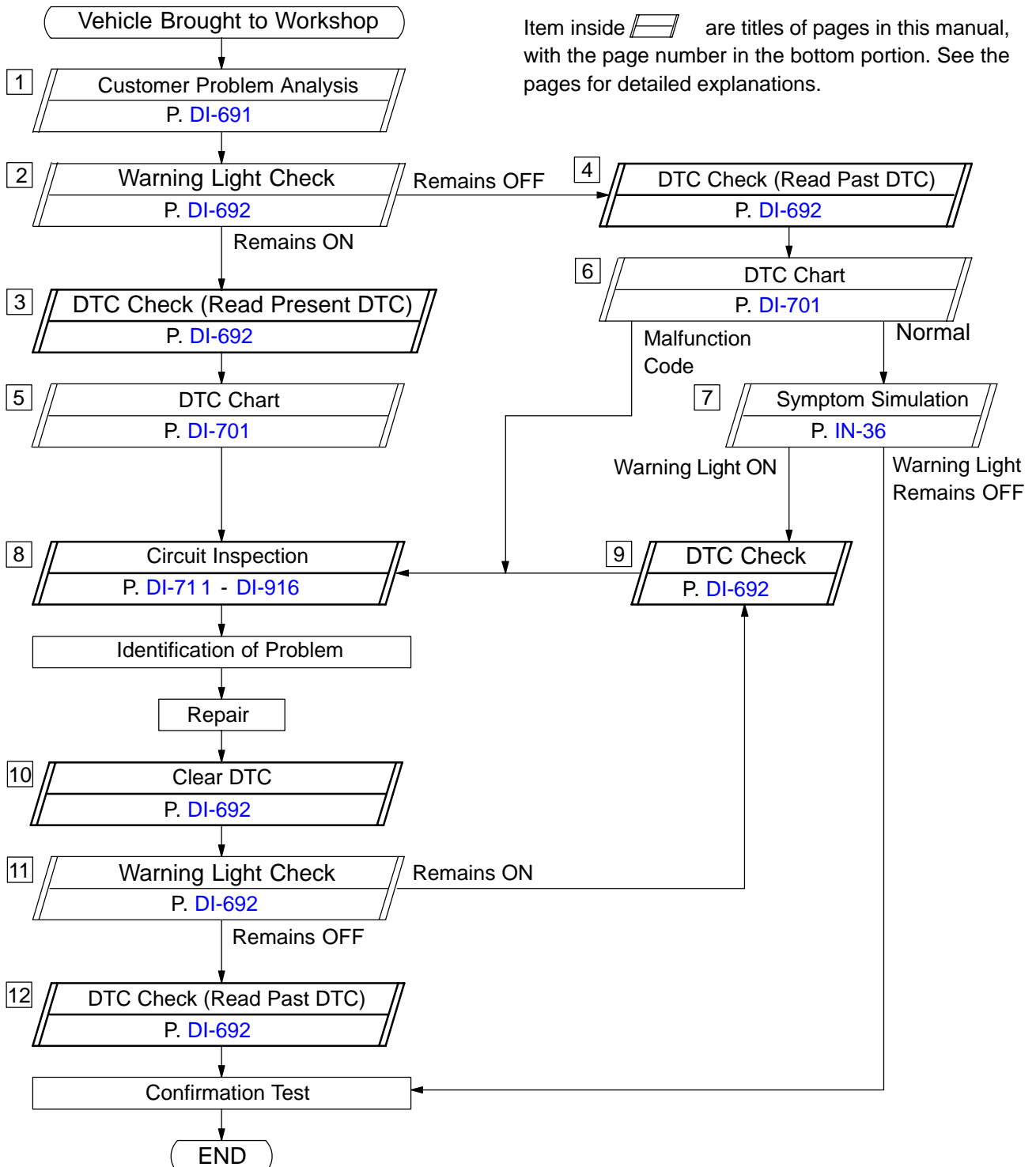
**HINT:**

- ▶ When the SRS warning light remains lit up and the DTC is the normal code, a voltage source drop is possible.  
This malfunction is not stored in memory by the airbag sensor assembly and if the power source voltage returns to normal, the SRS warning light will automatically go out.
- ▶ When 2 or more codes are indicated, smaller numbered code will be shown first.
- ▶ If a code not listed on the chart is displayed, the airbag sensor assembly is at fault.
- ▶ In the case of any malfunction concerning any open circuit, ground short, or B+ short due to any squib, another malfunction code may not be detected. In this case, correct the malfunction currently indicated and then perform malfunction diagnosis again. Another malfunction code may then be detected.

# SUPPLEMENTAL RESTRAINT SYSTEM

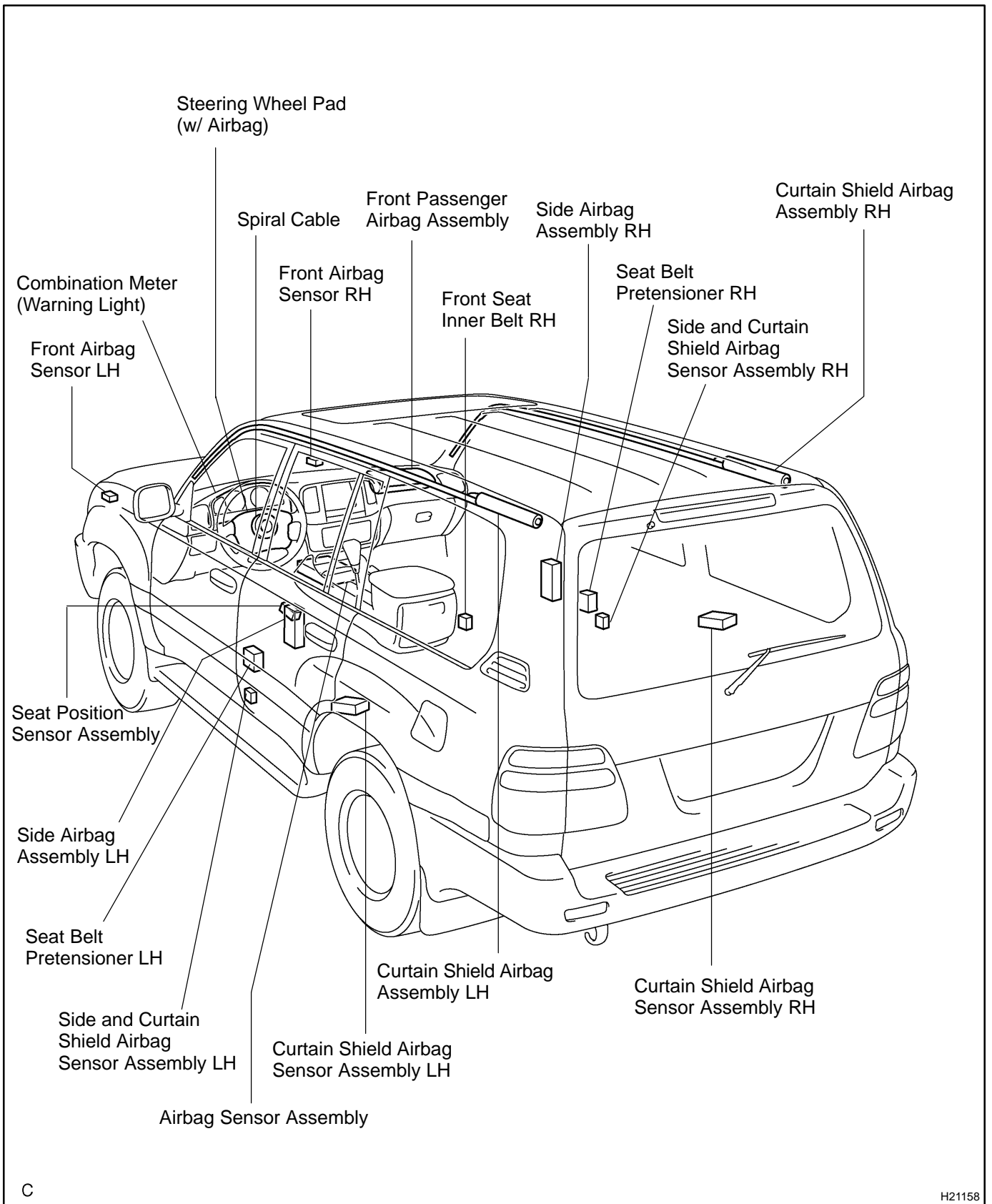
## HOW TO PROCEED WITH TROUBLESHOOTING

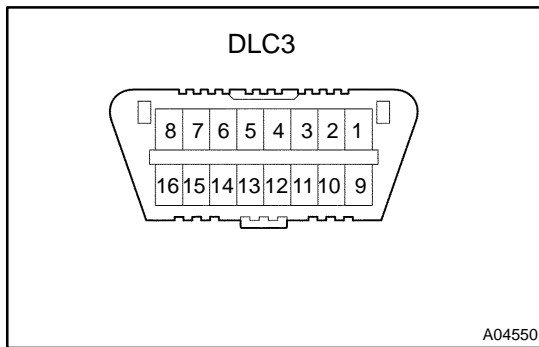
DI6OW-18



Step 3, 4, 8, 9, 10, 12: Diagnostic steps permitting the use of the TOYOTA hand-held tester.

# PARTS LOCATION





## PRE-CHECK

### 1. DIAGNOSIS SYSTEM

- (a) Check the DLC3.

#### HINT:

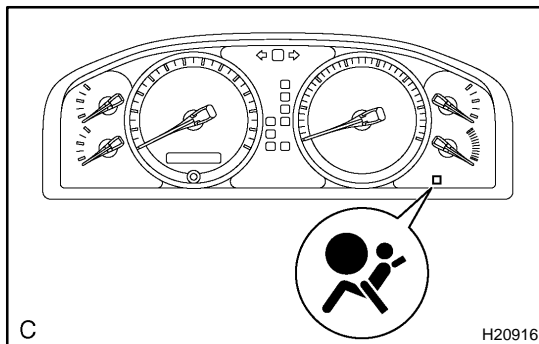
The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus $\ell$ Line/Pulse generation	During Transmission
4	Chassis Ground $\leftrightarrow$ Body Ground/1 $\Omega$ or less	Always
16	Battery Positive $\leftrightarrow$ Body Ground/9 – 14 V	Always

#### HINT:

If your display shows **UNABLE TO CONNECT TO VEHICLE** when you have connected the cable of the OBD II scan tool or TOYOTA hand-held tester to the DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

- ▶ If communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- ▶ If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

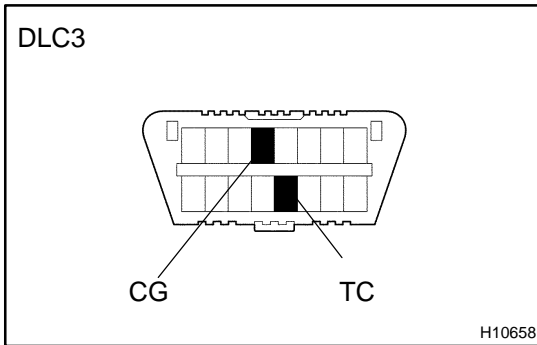


### 2. SRS WARNING LIGHT CHECK

- (a) Turn the ignition switch to ON, and check that the SRS warning light comes on.
- (b) Check that the SRS warning light goes out after approx. 6 seconds.

#### HINT:

- ▶ When the ignition switch is at ON and the SRS warning light remains on or flashes, the airbag sensor assembly has detected a malfunction code.
- ▶ If, after approx. 6 seconds have elapsed, the SRS warning light sometimes comes on even when the ignition switch is OFF. In this case, a short in the SRS warning light circuit is possible. Proceed to "SRS warning light circuit malfunction" on page [DI-927](#).



### 3. DTC CHECK (Using diagnosis check wire)

(a) Present troubles codes:

Output the DTC.

- (1) Turn the ignition switch to ON, and wait for approx. 60 seconds.
- (2) Using SST, connect terminal TC and CG of the DLC3.

SST 09843-18040

**NOTICE:**

**Pay attention to the terminal connecting position to avoid a malfunction.**

(b) Past troubles codes:

Output the DTC.

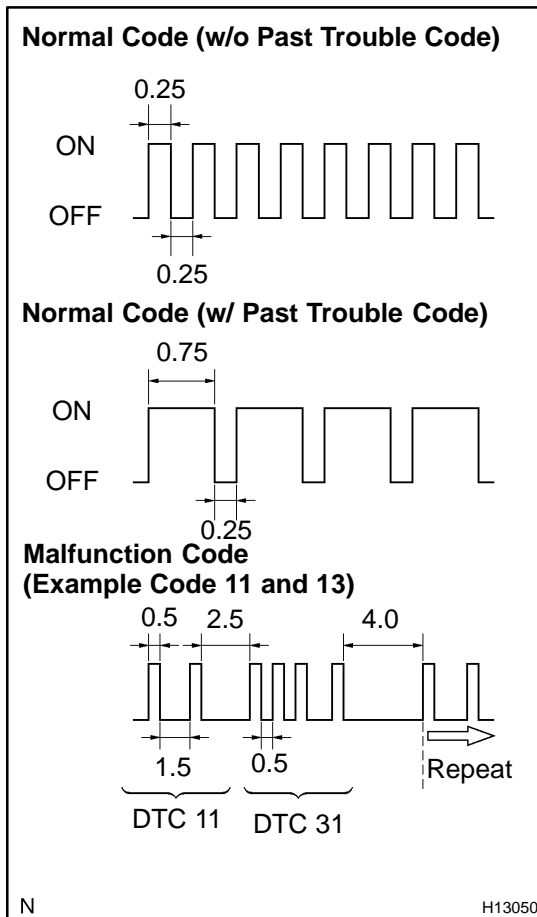
- (1) Using SST, connect terminal TC and CG of the DLC3.

SST 09843-18040

- (2) Turn the ignition switch to ON, and wait for approx. 60 seconds.

**NOTICE:**

**Pay attention to the terminal connecting position to avoid a malfunction.**

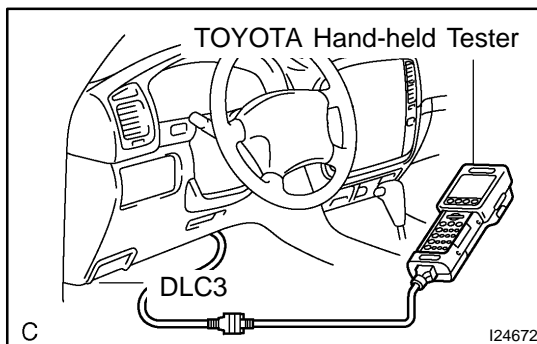


- (c) Read the DTC.
- Read the DTC by counting the blinking times. As an example, the blinking patterns of normal, 11 and 31 are shown in the illustration.
- ▶ Normal code indication (w/o past trouble code)  
The light blinks 2 times per seconds.
  - ▶ Normal code indication (w/ past trouble code)  
When the past troubles code is stored in the airbag sensor assembly, the light blinks only ones a second.
  - ▶ Malfunction code indication  
The first blinking indicates the first DTC. Second blinking occurs after 1.5-second of pausing.

If there are 2 or more codes, there will be a 2.5-second pause between each code. After all the codes are shown, there will be a 4.0-second pausing, and they will all be repeated.

**HINT:**

- ▶ If 2 or more malfunctions are found, the indication starts from the smaller numbered code.
- ▶ If the light does not blink or comes out at all, or if DTCs are indicated without a connection of the terminals, proceed to the TC terminal circuit inspection on page [DI-932](#).



**4. DTC CHECK (Using TOYOTA hand-held tester)**

- (a) Hook up the TOYOTA hand-held tester to the DLC3.
- (b) Read the DTCs by following the prompts on the tester screen.

**HINT:**

Please refer to the TOYOTA hand-held tester operator's manual for further details.

**5. DTC CLEARANCE (Not using service wire)**

When the ignition switch is turned OFF, the diagnostic trouble code is cleared.

**HINT:**

Depending on the DTC, the code might not be cleared by turning the ignition switch OFF.

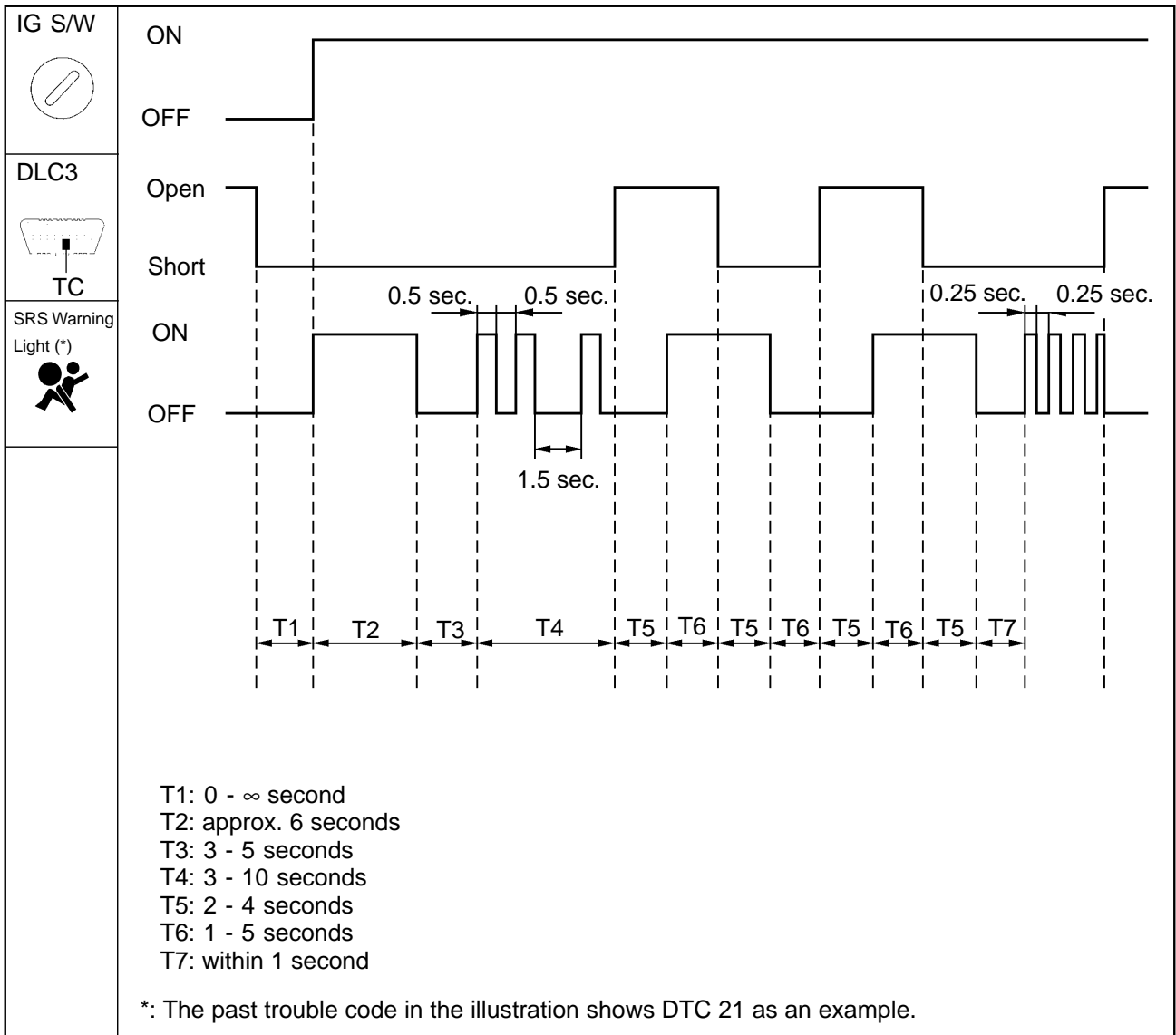
In this case, proceed to the next step.

**6. DTC CLEARANCE (Using service wire)**

- (a) Connect the service wire to terminal TC of the DLC3.
- (b) Ground terminal TC of the DLC3.
- (c) Turn the ignition switch to the ON position.
- (d) Within 3 to 10 sec. after DTC is started to be output, release ground from terminal TC of the DLC3.
- (e) The SRS warning light comes on 2 to 4 sec. later. Within 1 to 5 sec. after that, ground terminal TC of the DLC3.
- (f) The SRS warning light goes off 2 to 4 sec. after grounding terminal TC. Within 1 to 5 sec. after that, release ground from terminal TC again.

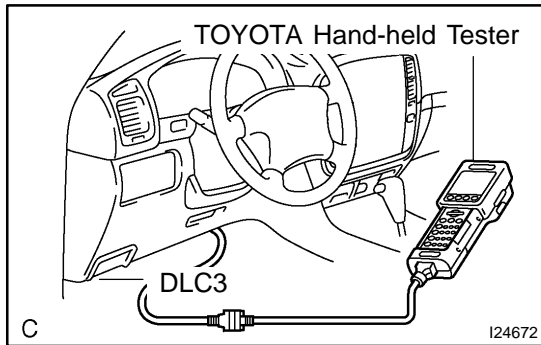
- (g) The SRS warning light comes on again 2 to 4 sec. later. Within 1 to 5 sec. after that, ground terminal TC of the DLC3 again.
- (h) The SRS warning light goes off 2 to 4 sec. later. Within 1 sec. after that, normal code is output indicating that DTC deletion is completed.

If DTCs are not cleared, repeat the above procedure until the codes are cleared.



N

H13049



### 7. DTC CLEARANCE (Using TOYOTA hand-held tester)

- (a) Hook up the TOYOTA hand-held tester to the DLC3.
- (b) Clear the DTCs by following the prompts on the tester screen.

#### HINT:

Please refer to the TOYOTA hand-held tester operation's manual for further details.

### 8. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

As explained in the troubleshooting later, insert a paper with the same thickness as the male terminal between the terminal and the short spring to release it (Refer to illustrations on next 4 pages).

#### CAUTION:

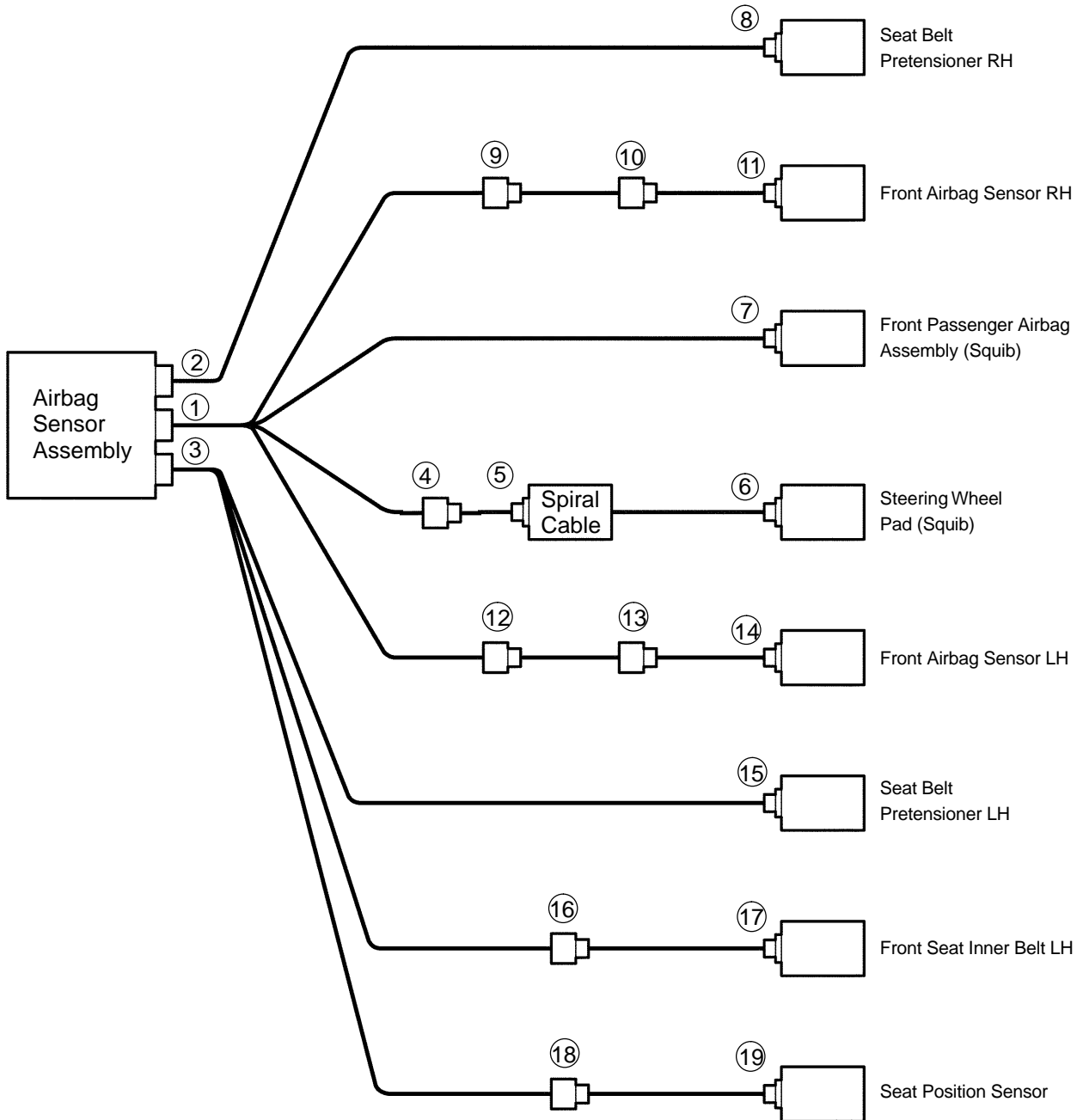
**Never release the airbag activation prevention mechanism on the squib connector.**

#### NOTICE:

- ▶ Do not release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.
- ▶ To prevent the terminal and the short spring to be damaged, always use a paper with the same thickness as the male terminals.

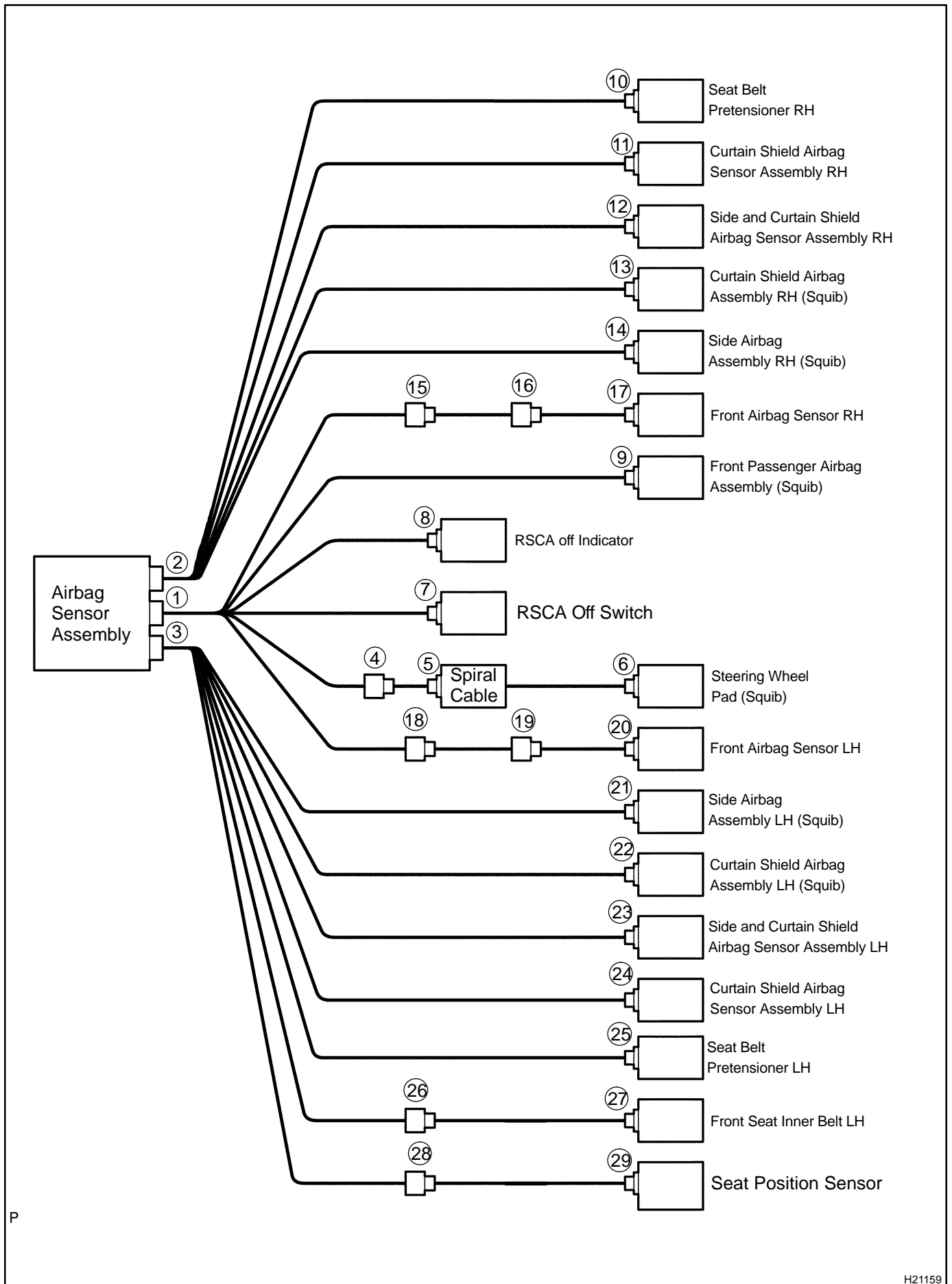


w/o Side Airbag:



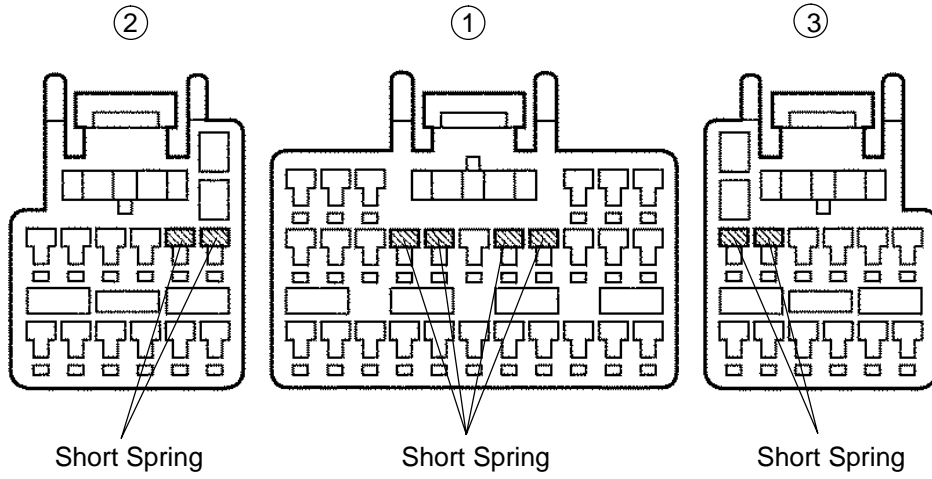
P

H21251



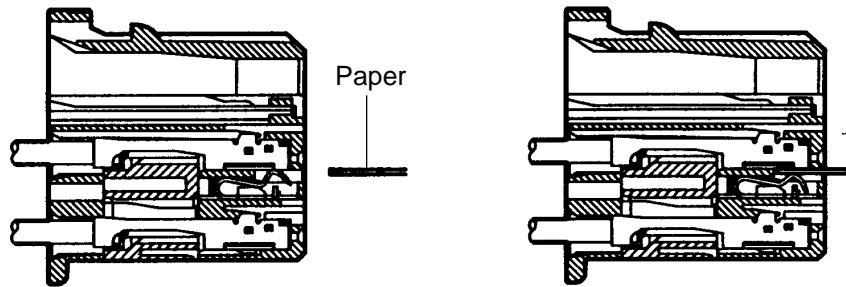
w/o Side Airbag:

Airbag Sensor Assembly Connector



Before Release

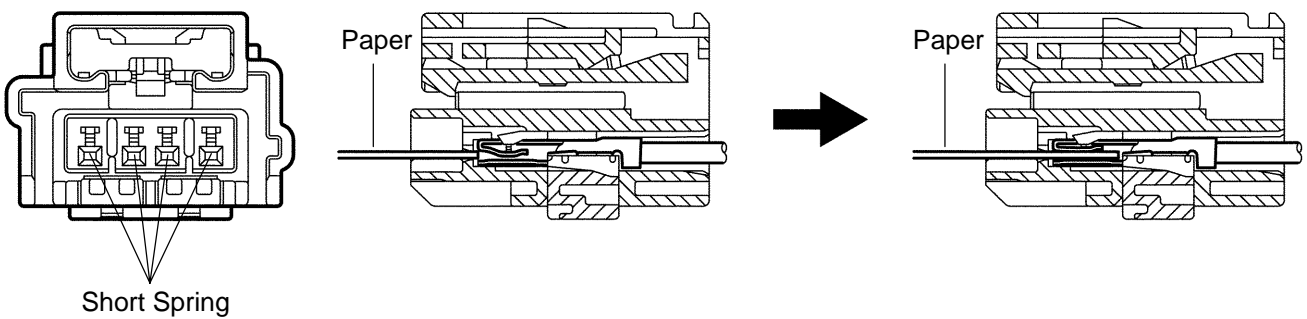
After Release



Connector ④ ⑤ ⑦

Before Release

After Release

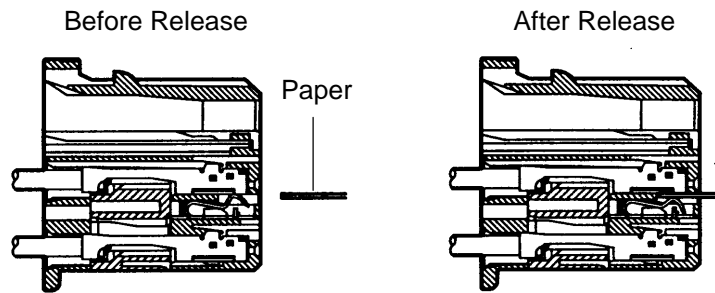
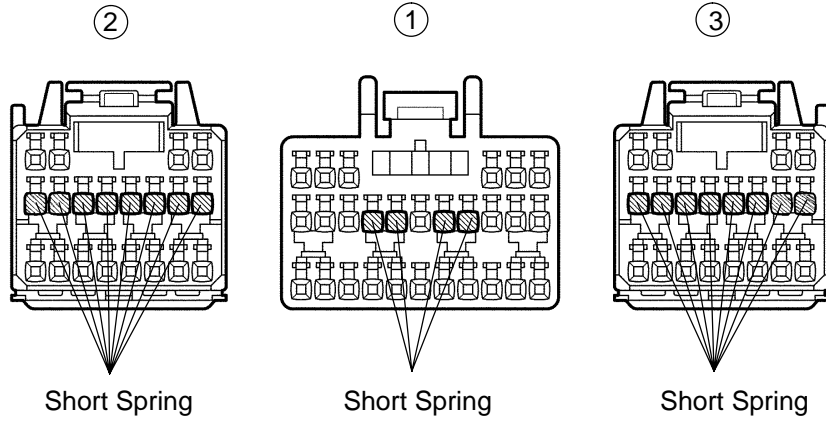


H02297  
H01233  
H16883

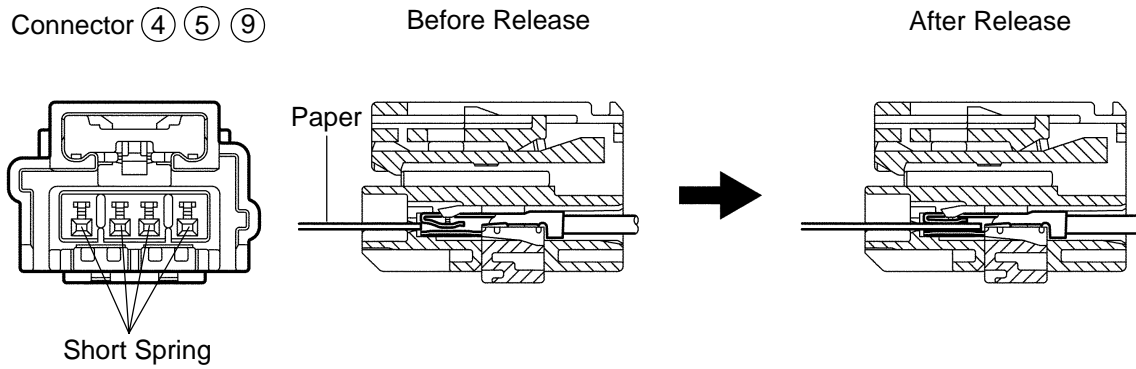
H21585

w/ Side Airbag:

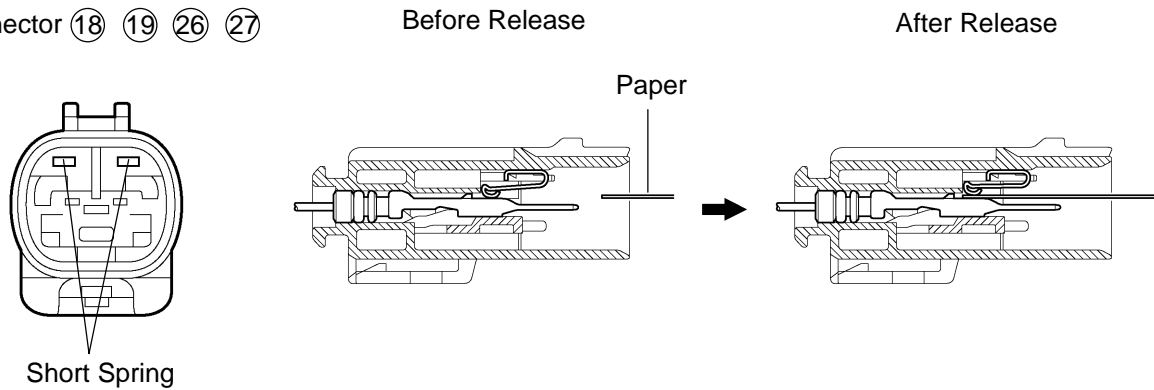
Airbag Sensor Assembly Connector



Connector ④ ⑤ ⑨



Connector ⑱ ⑲ ⑳ ㉓



H16882 H01233  
H16883  
H09672 H09658

H21759

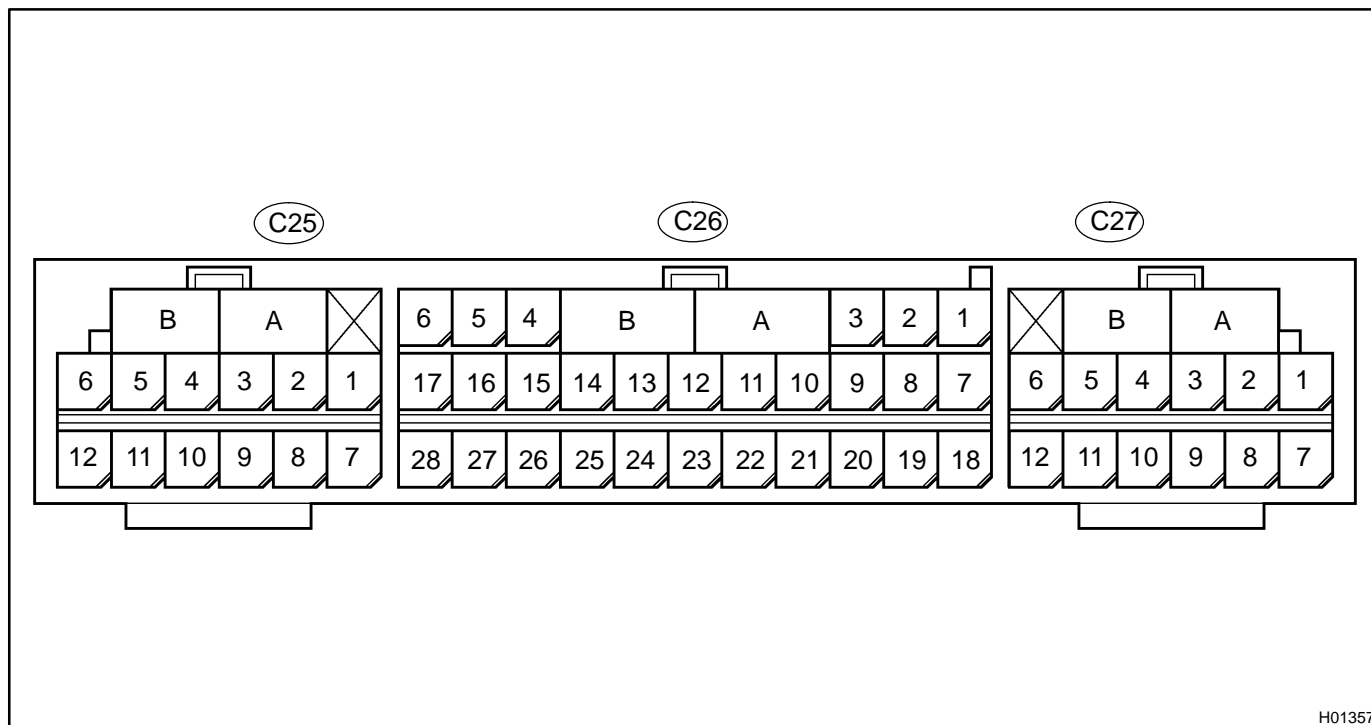
## PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspected Area	See page
▶With the ignition switch in ON position, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed.	▶SRS warning light circuit	DI-927
▶SRS warning light is always lit up even when ignition switch is in the LOCK position.		
▶With the ignition switch in ON position, the SRS warning light does not light up.		
▶DTC is not displayed.	▶TC terminal circuit	DI-932
▶SRS warning light is always lit up at the time of DTC check procedure.		
▶DTC is displayed without TC and CG terminal connection.		

## TERMINALS OF ECU

### 1. w/o Side Airbag:



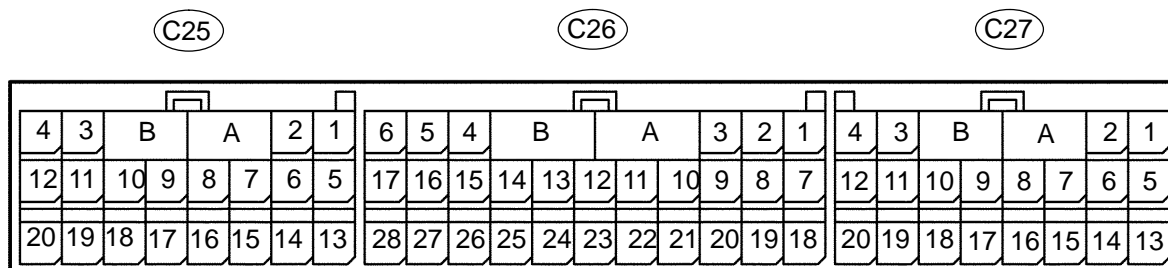
H01357

No.	Symbol	Terminal Name
A	-	Electrical Connector Check Mechanism
B	-	Electrical Connector Check Mechanism
C26 - 3	LA	SRS Warning Light
C26 - 5	IG2	Power Source
C26 - 7	P2-	Squib (Passenger, 2nd step)
C26 - 8	P2+	Squib (Passenger, 2nd step)
C26 - 9	+SR	Front Airbag Sensor RH
C26 - 10	P+	Squib (Passenger)
C26 - 11	P-	Squib (Passenger)
C26 - 12	SIL	Diagnosis
C26 - 13	D-	Squib (Driver)
C26 - 14	D+	Squib (Driver)
C26 - 15	+SL	Front Airbag Sensor LH
C26 - 16	D2+	Squib (Driver, 2nd step)
C26 - 17	D2-	Squib (Driver, 2nd step)
C26 - 19	TC	Diagnosis
C26 - 20	-SR	Front Airbag Sensor RH
C26 - 23	GSW2	Engine ECU
C26 - 26	-SL	Front Airbag Sensor LH
C26 - 27	E1	Ground
C26 - 28	E2	Ground
C25 - 1	PL-	Squib (Seat Belt Pretensioner, LH)
C25 - 2	PL+	Squib (Seat Belt Pretensioner, LH)
C25 - 3	LSP+	Seat Position Sensor Assembly

DIAGNOSTICS - SUPPLEMENTAL RESTRAINT SYSTEM

No.	Symbol	Terminal Name
C25 - 8	LSP-	Seat Position Sensor Assembly
C25 - 11	LBE+	Seat Belt Buckle Switch LH
C27 - 5	PR+	Squib (Seat Belt Pretensioner, RH)
C27 - 6	PR-	Squib (Seat Belt Pretensioner, RH)

## 2. w/ Side Airbag:



P

H16828

No.	Symbol	Terminal Name
A	-	Electrical Connector Check Mechanism
B	-	Electrical Connector Check Mechanism
C26 - 3	LA	SRS Warning Light
C26 - 5	IG2	Power Source
C26 - 7	P2-	Squib (Passenger, 2nd step)
C26 - 8	P2+	Squib (Passenger, 2nd step)
C26 - 9	+SR	Front Airbag Sensor RH
C26 - 10	P+	Squib (Passenger)
C26 - 11	P-	Squib (Passenger)
C26 - 12	SIL	Diagnosis
C26 - 13	D-	Squib (Driver)
C26 - 14	D+	Squib (Driver)
C26 - 15	+SL	Front Airbag Sensor LH
C26 - 16	D2+	Squib (Driver, 2nd step)
C26 - 17	D2-	Squib (Driver, 2nd step)
C26 - 19	TC	Diagnosis
C26 - 20	-SR	Front Airbag Sensor RH
C26 - 21	RMSW	RSCA Off Switch
C26 - 22	MPX2	Instrument Panel Integration ECU
C26 - 23	GSW2	Diagnosis
C26 - 25	RMIL	RSCA Off Switch Indicator
C26 - 26	-SL	Front Airbag Sensor LH
C26 - 27	E1	Ground
C26 - 28	E2	Ground
C25 - 1	CSL-	Curtain Shield Airbag Sensor Assembly LH



## DIAGNOSTICS - SUPPLEMENTAL RESTRAINT SYSTEM

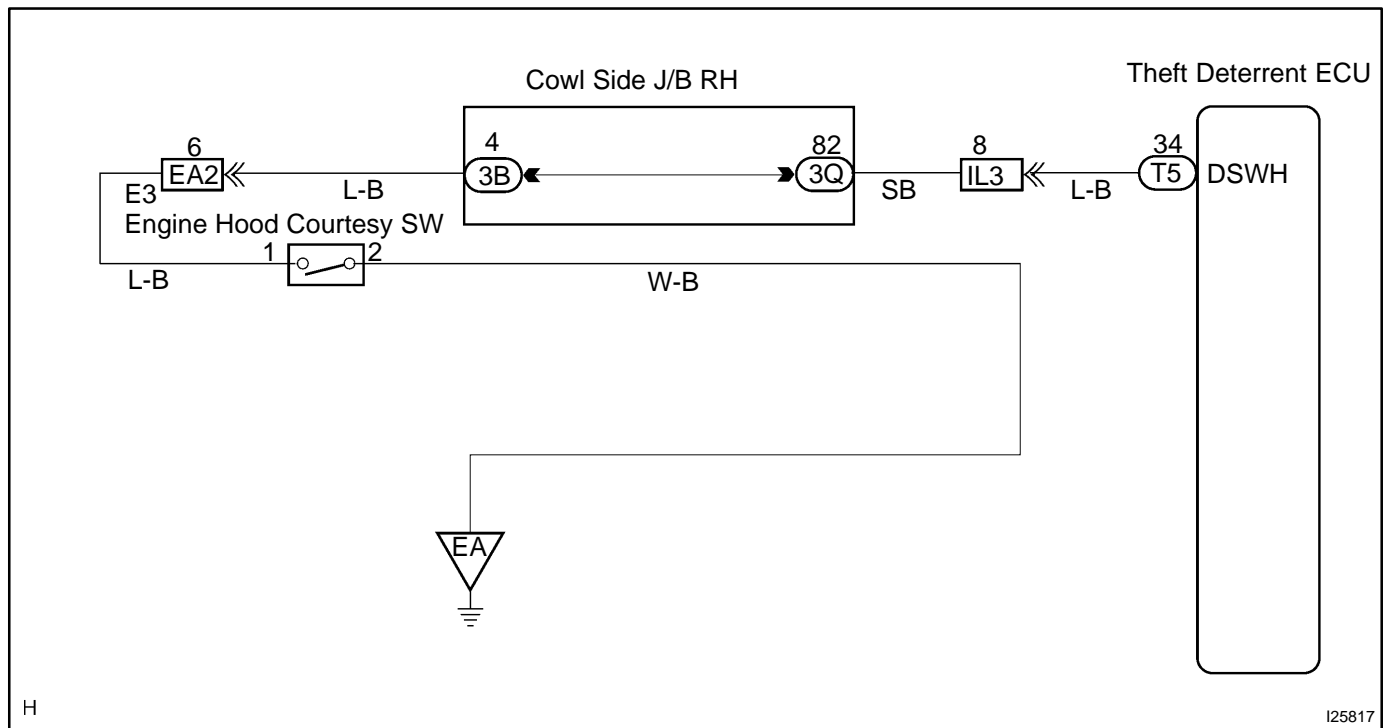
No.	Symbol	Terminal Name
C25 - 3	LSP-	Seat Position Sensor Assembly
C25 - 4	LSP+	Seat Position Sensor Assembly
C25 - 7	PL-	Squib (Seat Belt Pretensioner, LH)
C25 - 8	PL+	Squib (Seat Belt Pretensioner, LH)
C25 - 9	ICL+	Squib (Curtain Shield, LH)
C25 - 10	ICL-	Squib (Curtain Shield, LH)
C25 - 11	SFL-	Squib (Side, LH)
C25 - 12	SFL+	Squib (Side, LH)
C25 - 13	ESCL	Curtain Shield Airbag Sensor Assembly LH
C25 - 14	VUCL	Curtain Shield Airbag Sensor Assembly LH
C25 - 15	CSL+	Curtain Shield Airbag Sensor Assembly LH
C25 - 16	VUPL	Side and Curtain Shield Airbag Sensor Assembly LH
C25 - 17	SSL+	Side and Curtain Shield Airbag Sensor Assembly LH
C25 - 18	ESL	Side and Curtain Shield Airbag Sensor Assembly LH
C25 - 19	LBE+	Seat Belt Buckle Switch LH
C25 - 20	SSL-	Side and Curtain Shield Airbag Sensor Assembly LH
C27 - 4	CSR-	Curtain Shield Airbag Sensor Assembly RH
C27 - 5	SFR+	Squib (Side, RH)
C27 - 6	SFR-	Squib (Side, RH)
C27 - 7	ICR-	Squib (Curtain Shield, RH)
C27 - 8	ICR+	Squib (Curtain Shield, RH)
C27 - 9	PR+	Squib (Seat Belt Pretensioner, RH)
C27 - 10	PR-	Squib (Seat Belt Pretensioner, RH)
C27 - 13	SSR-	Side and Curtain Shield Airbag Sensor Assembly RH
C27 - 15	ESR	Side and Curtain Shield Airbag Sensor Assembly RH
C27 - 16	SSR+	Side and Curtain Shield Airbag Sensor Assembly RH
C27 - 17	VUPR	Side and Curtain Shield Airbag Sensor Assembly RH
C27 - 18	CSR+	Curtain Shield Airbag Sensor Assembly RH
C27 - 19	VUCR	Curtain Shield Airbag Sensor Assembly RH
C27 - 20	ESCR	Curtain Shield Airbag Sensor Assembly RH

## Engine hood courtesy switch circuit

### CIRCUIT DESCRIPTION

The door courtesy light goes on when the door is opened and goes off when closed.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

**HINT:**

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check engine hood courtesy switch using hand-held tester.</b>
----------	--

**PREPARATION:**

Connect the hand-held tester to DLC 3.

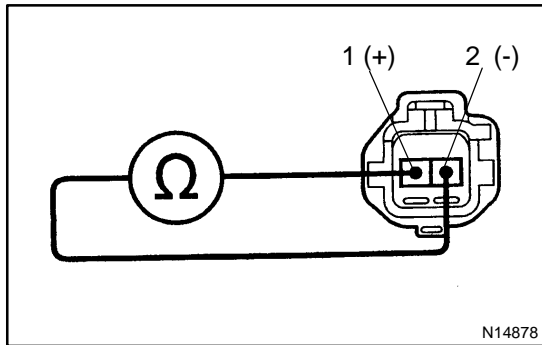
**CHECK:**

Check that the engine hood courtesy switch operate in DATA LIST (See page [DI-1040](#) ).

<b>OK</b>	<b>Proceed to next circuit inspection shown on problem symptoms table (See page <a href="#">DI-965</a> ).</b>
-----------	---

<b>NG</b>
-----------

<b>2</b>	<b>Check the engine hood courtesy switch.</b>
----------	---



**PREPARATION:**

- (a) Remove engine hood lock assembly.
- (b) Disconnect engine hood courtesy switch connector.

**CHECK:**

Check continuity between terminals 1 and 2 when engine hood lock is locked and unlocked.

Engine hood lock	Tester connection	Specified condition
LOCK	-	No continuity
UNLOCK	1 - 2	Continuity

<b>NG</b>	<b>Replace the engine hood courtesy switch.</b>
-----------	---

<b>OK</b>
-----------

<b>3</b>	<b>Check wireharness and connector between courtesy switch and theft deterrent ECU (See page <a href="#">IN-26</a> ).</b>
----------	---

<b>NG</b>	<b>Repair or replace wireharness or connector.</b>
-----------	--

<b>OK</b>
-----------

**Proceed to next circuit inspection shown on  
problem symptoms table  
(See page [DI-965](#)).**

# Security indicator circuit

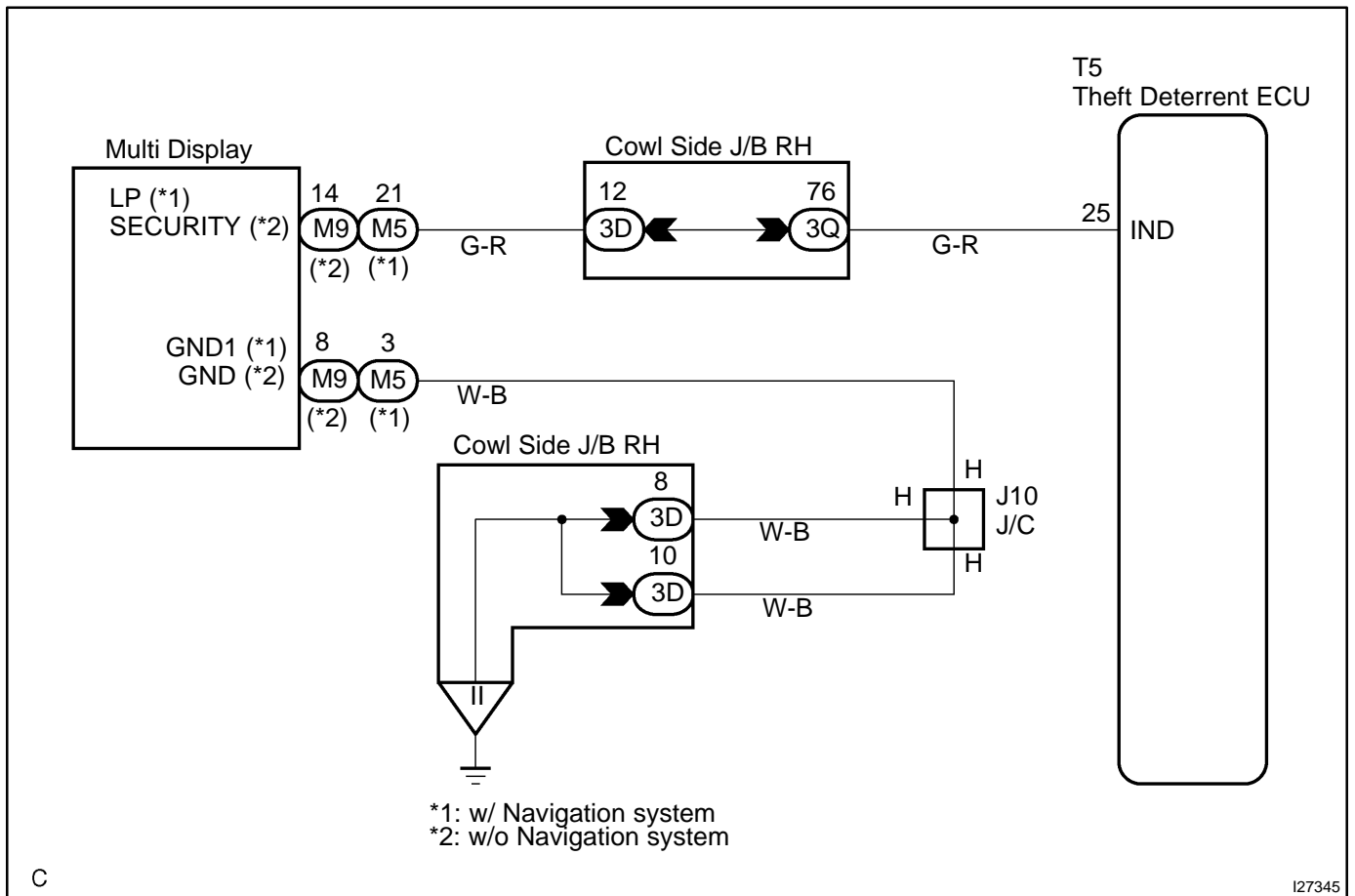
## CIRCUIT DESCRIPTION

When the theft deterrent system is preparing to be set, this circuit lights up the indicator.

When the system is set, the indicator blinks.

It also indicates the condition of the immobiliser system according to the request from the Transponder Key ECU.

## WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check security indicator using hand-held tester.</b>
----------	---

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

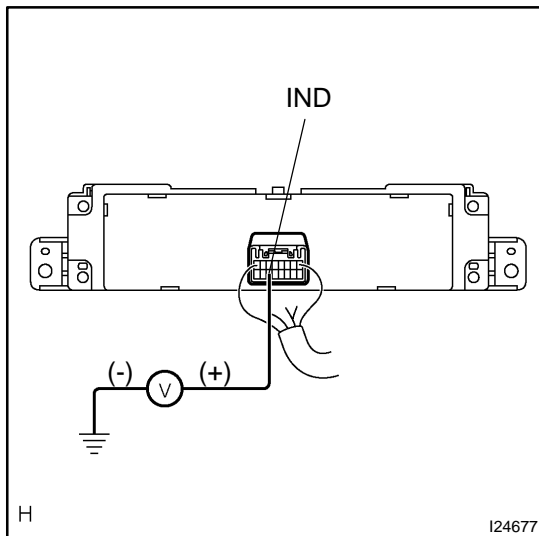
Check that the theft deterrent in the indicator lights in ACTIVE TEST (See page [DI-955](#) ).

OK

Proceed to next circuit inspection shown in problem symptoms table (See page [DI-965](#) ).

NG

<b>2</b>	<b>Check security indicator.</b>
----------	----------------------------------



### CHECK:

Connect the positive lead from the battery to terminal 7 (14) and negative lead to terminal 6 (8), and check that the warning light lights up.

( ): w/o Navigation system

### OK:

Indicator light lights up.

NG

Replace multi-display.

OK

3	Check wire harness and connector between theft deterrent ECU and indicator, indicator and body ground (See page <a href="#">IN-36</a> ).
---	--

NG

Repair or replace wire harness or connector.

OK

Proceed to next circuit inspection shown in problem symptoms table (See page [DI-965](#) ).

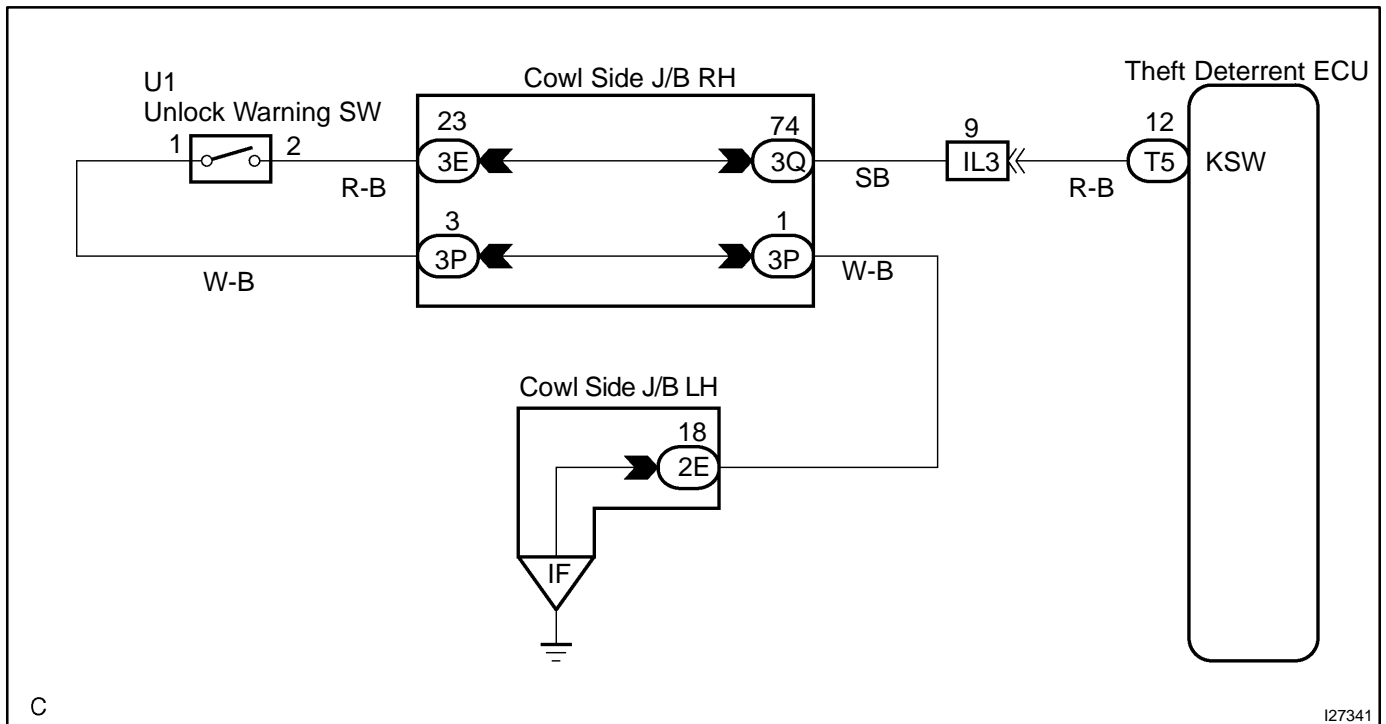
## Key unlock warning switch circuit

### CIRCUIT DESCRIPTION

The key unlock warning switch goes on when the ignition key is inserted the key cylinder and goes off when the ignition key is removed.

The ECU operates the key confinement prevention function while the key unlock warning switch is ON.

### WIRING DIAGRAM



### INSPECTION PROCEDURE

HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check unlock warning switch using hand-held tester.</b>
----------	--

#### PREPARATION:

Connect the hand-held tester to DLC 3.

#### CHECK:

Check that the unlock warning switch operate in DATA LIST (See page [DI-1040](#) ).

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-965](#) ).

NG



<b>2</b>	<b>Check key unlock warning switch (See page <a href="#">BE-29</a>).</b>
----------	--

<b>NG</b>	<b>Replace the key unlock warning switch.</b>
-----------	---

<b>OK</b>
-----------

<b>3</b>	<b>Check wireharness and connector between key unlock warning switch and theft deterrent ECU (See page <a href="#">IN-26</a>).</b>
----------	--

<b>OK</b>	<b>Repair or replace wireharness or connector.</b>
-----------	--

<b>OK</b>
-----------

<b>Proceed to next circuit inspection shown on problem symptoms table (See page <a href="#">DI-965</a>).</b>
--

## CIRCUIT INSPECTION

### Power source circuit

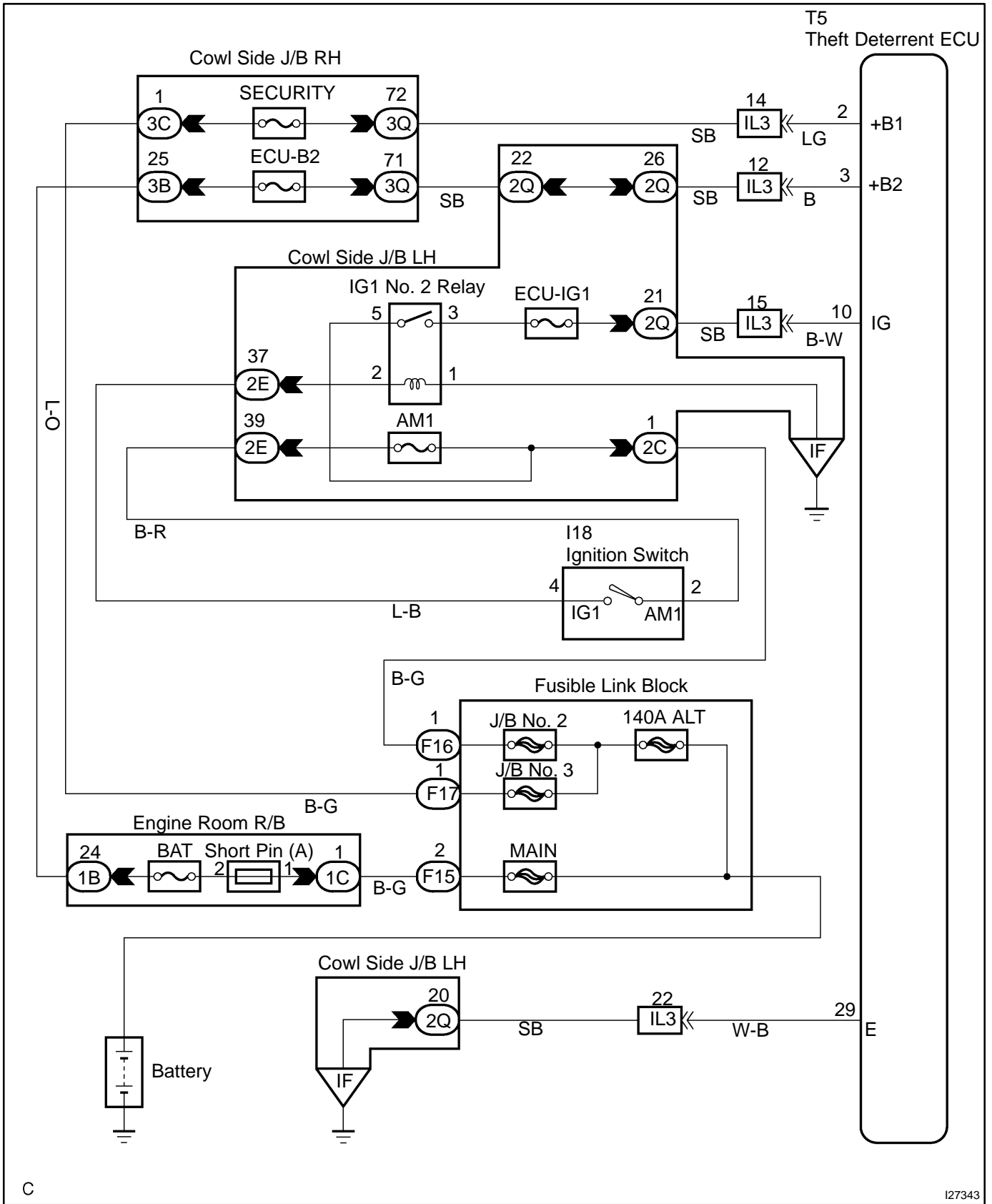
#### CIRCUIT DESCRIPTION

When the ignition switch is turned to the ACC position, battery positive voltage is applied to the terminal ACC of the ECU.

Also, if the ignition switch is turned to the ON position, battery positive voltage is applied to the terminals ACC and IG of the ECU.

When the battery positive voltage is applied to the terminal IG of the ECU while the theft deterrent system is activated, the warning stops.

Furthermore, power supplied from the terminals ACC and IG of the ECU is used as power for the door courtesy switch, position switch, etc.



C

I27343

## INSPECTION PROCEDURE

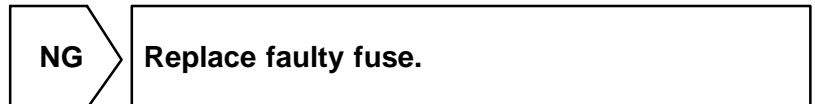
<b>1</b>	<b>Check ECU-B2 and SECURITY fuse.</b>
----------	--

### CHECK:

Check continuity of ECU-B2 and SECURITY fuse.

### OK:

Continuity



<b>2</b>	<b>Check voltage between terminals +B1, +B2 and E of theft deterrent ECU connector.</b>
----------	---

### PREPARATION:

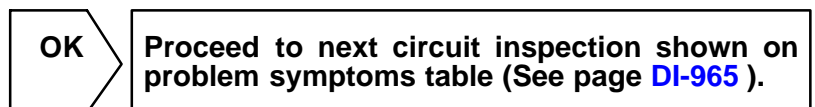
- (a) Turn the ignition switch OFF.
- (b) Disconnect the theft deterrent ECU connector.

### CHECK:

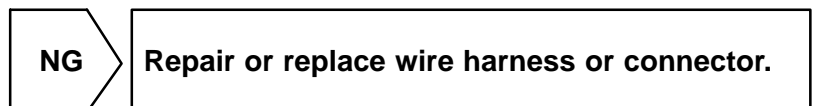
Measure the voltage between terminals +B1, +B2 and E.

### OK:

Voltage: 10 - 14V



<b>3</b>	<b>Check wire harness and connector between theft deterrent ECU and body ground (See page IN-36).</b>
----------	---



**Proceed to next circuit inspection shown on problem symptoms table (See page DI-965).**

## Theft deterrent horn circuit

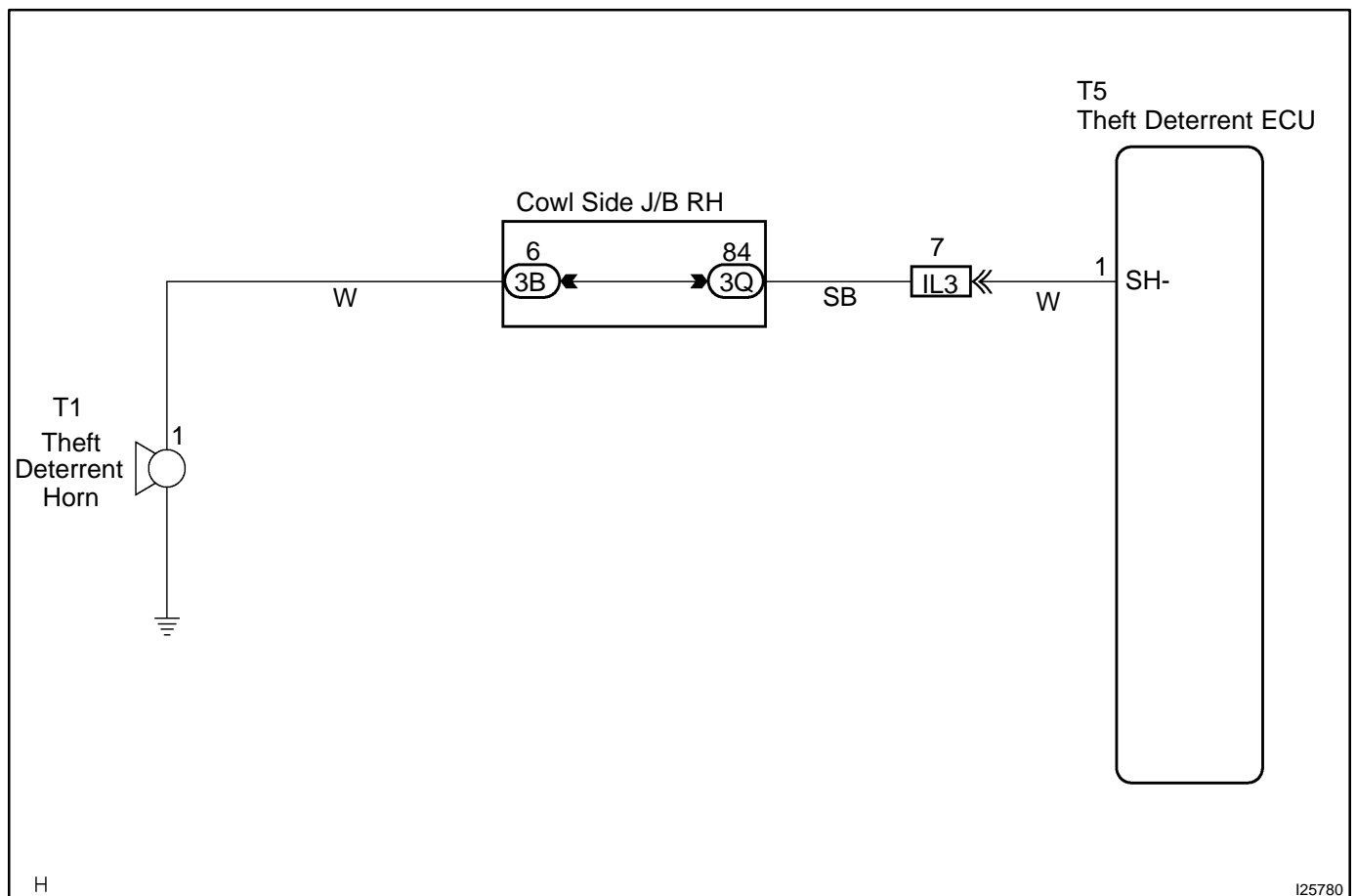
### CIRCUIT DESCRIPTION

When the theft deterrent system is activated, the relay in the ECU is turned ON and OFF at of approximately 0.2 sec. interval, causing the theft deterrent horn to sound (See the wiring diagram below).

In this condition, if any of the following operations is done, the relay in the ECU is turned OFF, thus stopping the theft deterrent horn from sounding:

- (1) Unlock the driver door with key.
- (2) Turn the ignition switch to ON position.
- (3) Unlock the doors with the wireless door lock control system.
- (4) Wait for approximately 60 seconds.
- (5) Press the panic switch of the wireless door lock control system.

### WIRING DIAGRAM



## INSPECTION PROCEDURE

### HINT:

In case of using the hand-held tester, start the inspection from step 1 and in case of not using the hand-held tester, start from step 2.

<b>1</b>	<b>Check theft deterrent horn using hand-held tester.</b>
----------	---

### PREPARATION:

Connect the hand-held tester to the DLC 3.

### CHECK:

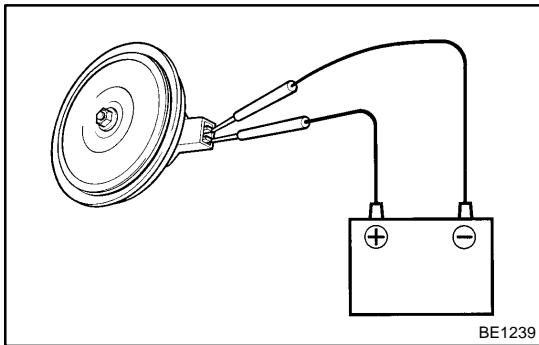
Check that the theft deterrent horn sounds in ACTIVE TEST (See page [DI-955](#) ).

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-965](#) ).

NG

<b>2</b>	<b>Check theft deterrent horn.</b>
----------	------------------------------------



### CHECK:

Connect positive (+) lead to terminal 1 and negative (-) lead to body ground of theft deterrent horn connector, and that the theft deterrent horn blows.

### OK:

Horn sounding.

NG

Replace theft deterrent horn.

OK

<b>3</b>	<b>Check wire harness and connector between theft deterrent ECU and theft deterrent horn (See page <a href="#">IN-26</a> ).</b>
----------	---

NG

Check and repair wire harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page [DI-965](#) ).

# CUSTOMER PROBLEM ANALYSIS CHECK

**THEFT DETERRENT SYSTEM Check Sheet**

Inspector's name: \_\_\_\_\_

Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km Mile

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constantly <input type="checkbox"/> Sometimes ( Times per day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	<b>Weather</b> <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	<b>Outdoor Temperature</b> <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx. °F ( °C))

<b>Problem Symptom</b>	<input type="checkbox"/> Theft deterrent system cannot be set.		
	<input type="checkbox"/> Indicator light does not flash when the theft deterrent system is set. (It stays ON or does not light at all.)		
	<input type="checkbox"/> Theft deterrent system does not operate.	<input type="checkbox"/> When unlocked using the door lock knob. <input type="checkbox"/> When the engine hood is opened.	<u>Malfunction</u> <input type="checkbox"/> Horns only <input type="checkbox"/> Theft deterrent horn only <input type="checkbox"/> Headlights only <input type="checkbox"/> Taillights only <input type="checkbox"/> Starter cut only <input type="checkbox"/> Door lock operation only
	<input type="checkbox"/> Once set system cannot be canceled.	<input type="checkbox"/> When door is unlocked using key or wireless door lock control system. <input type="checkbox"/> When the key is inserted in the ignition key cylinder and turned to ACC or ON position. (However, only when the system has never operated) <input type="checkbox"/> When the luggage compartment door is opened with the key.	
	<input type="checkbox"/> System cannot be canceled during warning operation.	<input type="checkbox"/> When door is unlocked using key or wireless door lock control system. <input type="checkbox"/> When the key is inserted in the ignition key cylinder and turned to ACC or ON position.	
	<input type="checkbox"/> Warning operation starts when the system is set and the door or luggage compartment door is opened with the key.		
	<input type="checkbox"/> Others.		

# THEFT DETERRENT SYSTEM

## HOW TO PROCEED WITH TROUBLESHOOTING

DI01P-16

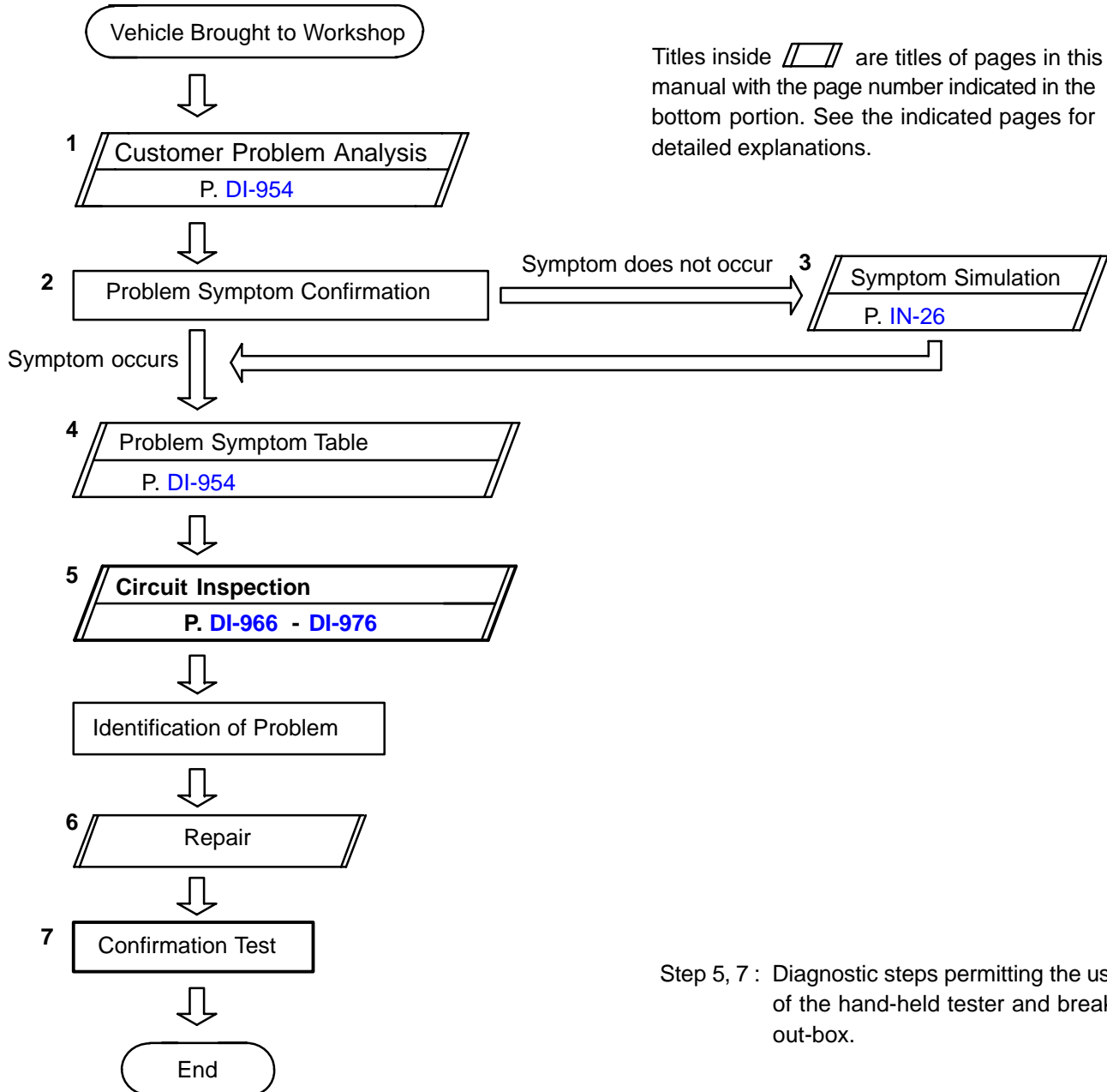
### HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

For troubleshooting use a volt/ohm meter.

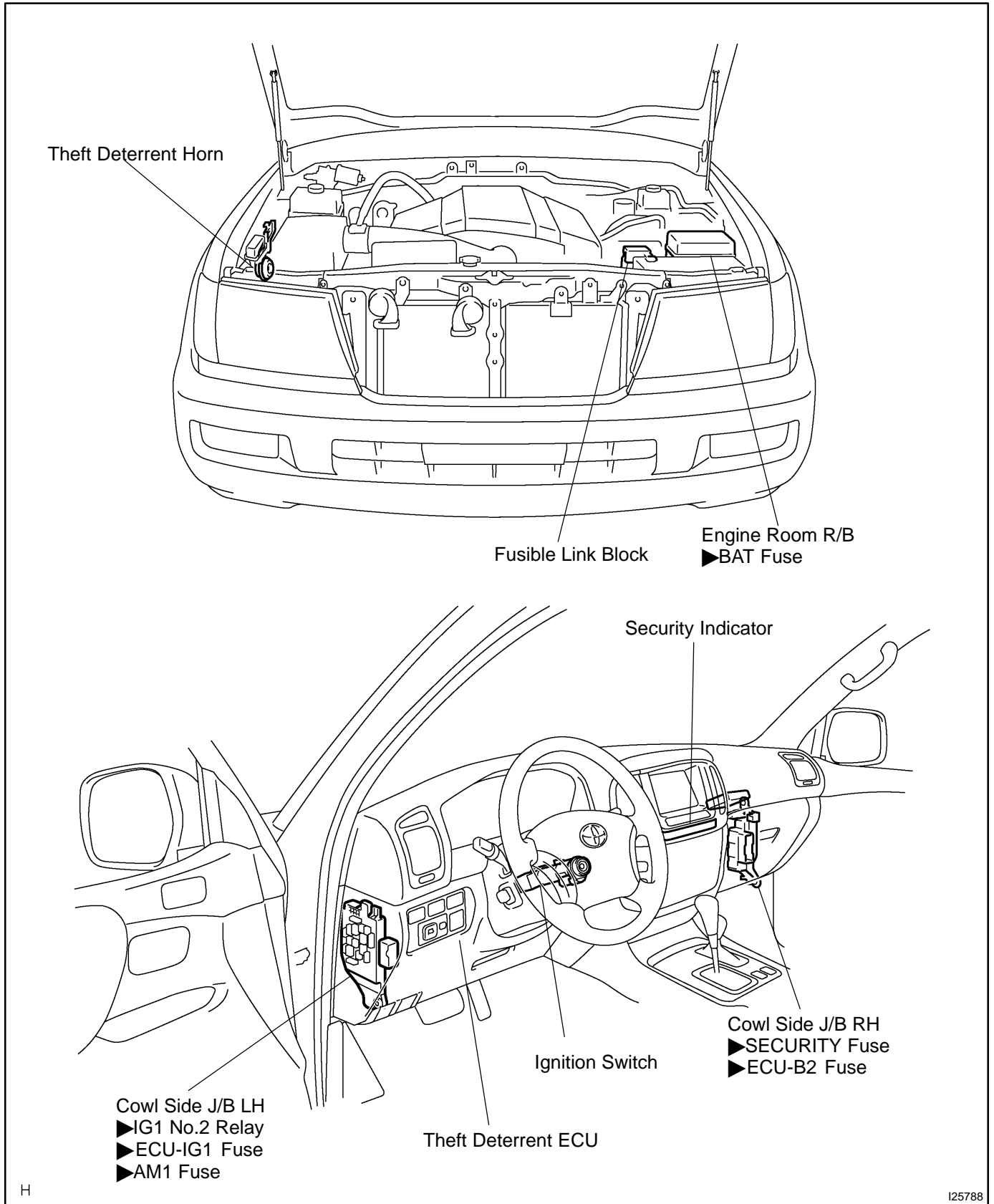
Be sure to use troubleshooting procedure appropriate to the diagnostic tool being used.

Perform troubleshooting in accordance with the procedure on the following page.





# PARTS LOCATION



## PRE-CHECK

### 1. OUTLINE OF THEFT DETERRENT SYSTEM

The security has an "Alarm Control" and the control consists of 2 modes.

- ◀ Active mode  
This mode begins "Alarm Control" as the user locks the vehicle by intention (See the reference step 2).
- ◀ Passive mode  
This mode begins "Alarm Control" even if the user forgets locking the vehicle (See the reference step 5). (This mode begins "Alarm Control" when the user closed all doors and the engine hood.)

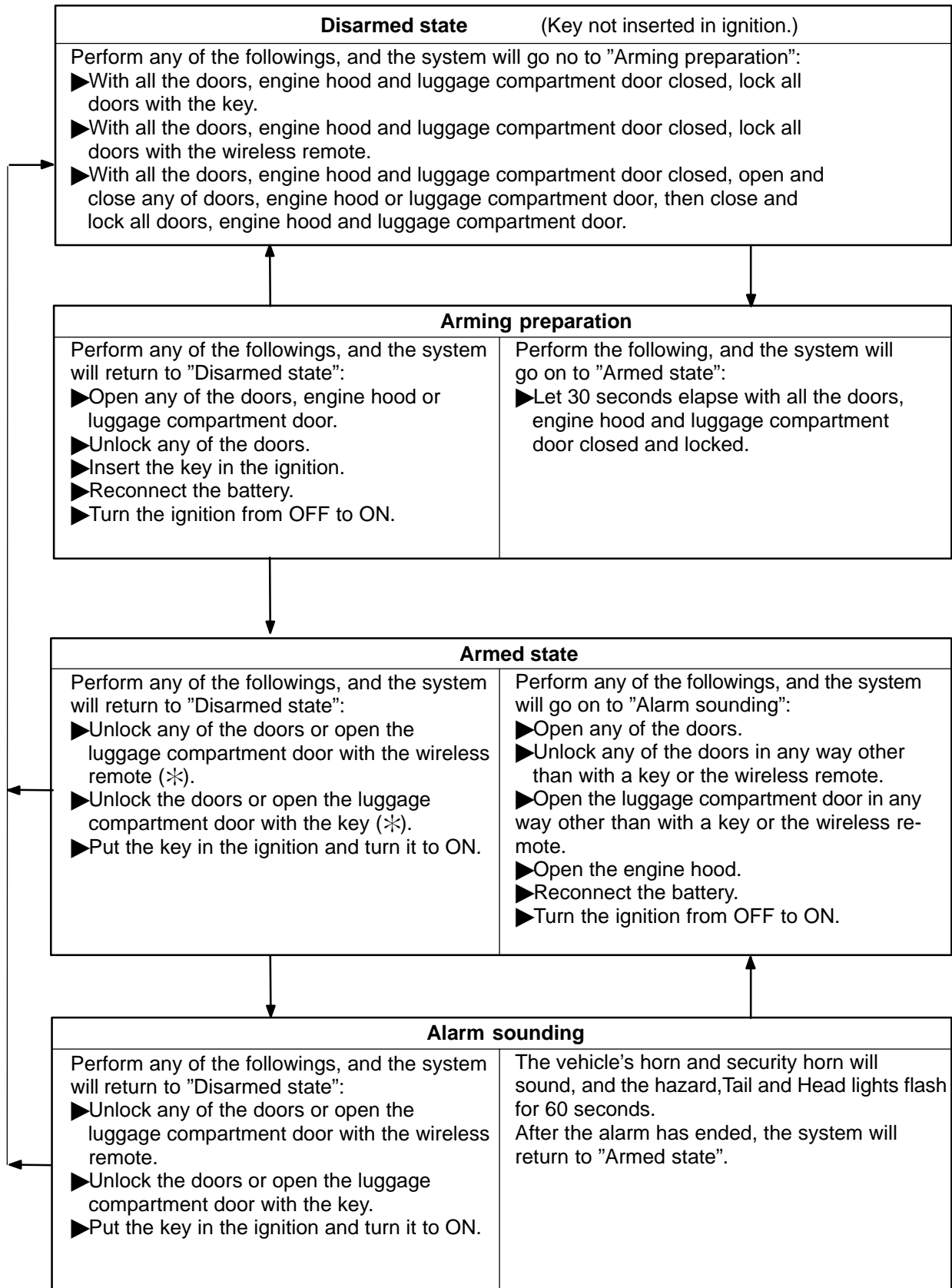
#### HINT:

- ◀ "Alarm Control" refers to the function that detects intrusion into the vehicle and sounds an alarm.
- ◀ Even when the "Alarm Control" operates in the passive mode, it works as in the active mode if a condition to begin the active mode is met.

### 2. ACTIVE ARMING MODE

There are 4 modes in active mode.

- (1) Disarmed state
  - ◀ The alarm system is not set (theft detection is impossible), and the alarm does not sound. The system does not detect any theft.
- (2) Arming preparation (for 30 seconds)
  - ◀ The waiting period when the alarm set requirements are met to when the system is actually set.
- (3) Armed state  
The state the alarm is set (operation is possible). The system can detect theft.
- (4) Alarm sounding:  
The system detects theft and informs using sounds and lights.
  - ◀ The state of waiting to switch to armed state again to have alarming interval after finishing alarming time.
  - ◀ Perform forced door lock when the door is unlocked.

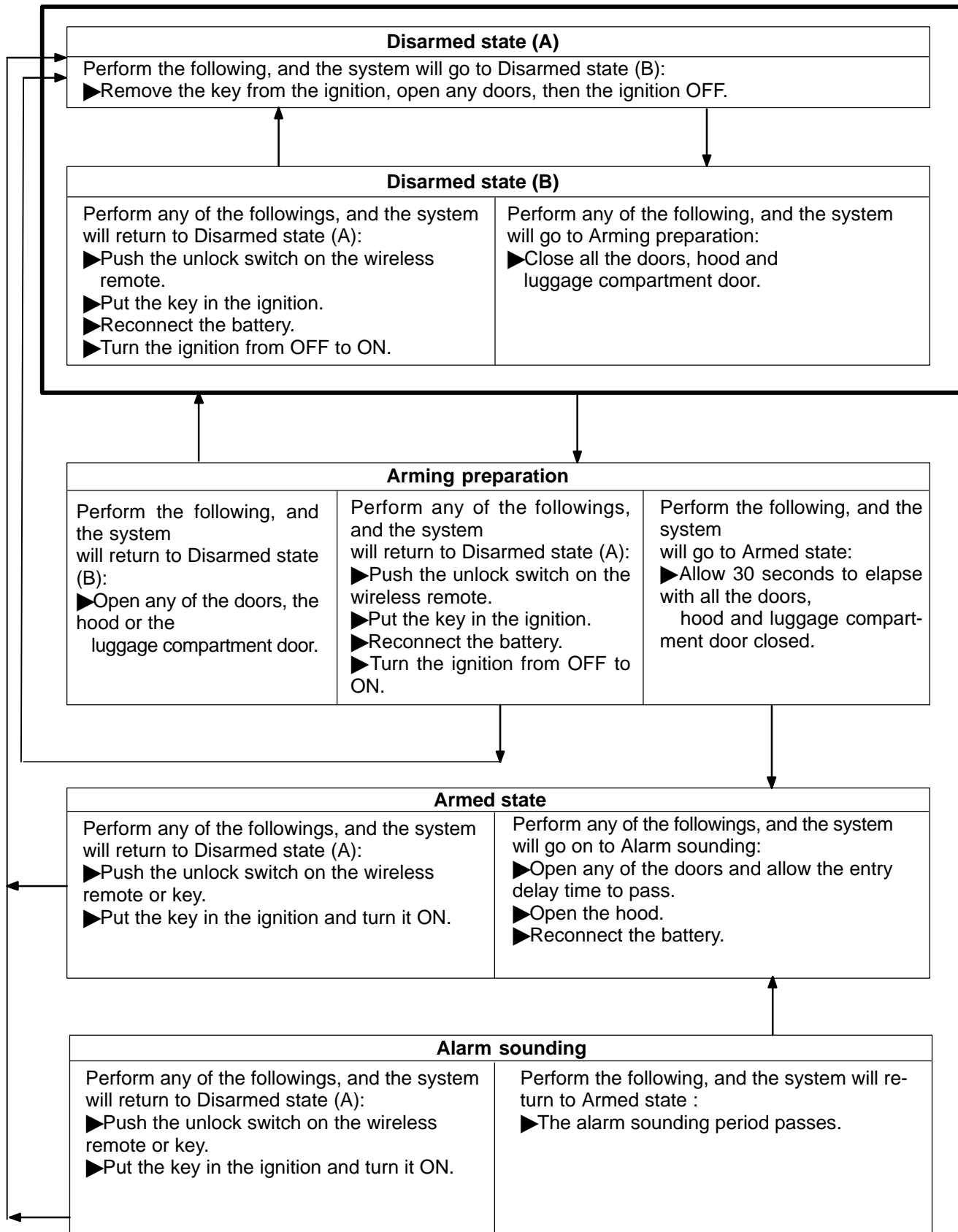


### 3. PASSIVE ARMING MODE

There are 4 modes in active mode.

- (1) Disarmed state (1)
  - ◀ The state is same as the disarmed state in active mode.
- (2) Disarmed state (2)
  - ◀ The alarm is not set. Pulling out the key and any of the doors is/are opened. (= the state if the opened door(s) and the engine hood are closed, the alarm is set.)
- (3) Arming preparation (for 30 seconds)

The state is same as the arming preparation in active mode.
- (4) Armed state  
The state is same as the armed state in the active mode (However, it does not performs the theft deterrent by unlock operation).
- (5) Alarm sounding:  
The system detects theft and informs using sounds and lights.
  - ◀ The state is same as the alarming sounding in the active mode (However, it does not performs forced door lock output).

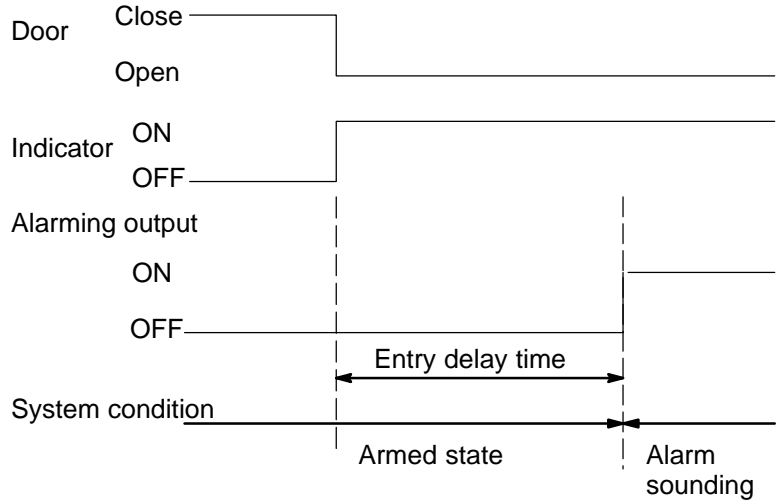


HINT:

In the armed state, if one of the doors is opened, entry delay occurs. (14 secs.)

During this time, the mode transfers to the disarmed state when the condition described on the previous page (※) is met.

When the condition is not met, the system judges as a theft occurred, and the mode transfers to alarm sounding.



#### 4. INDICATOR LIGHT OUTPUT

The indicator output the condition of the alarm control and the intrusion sensor control as shown below.

Condition	Indicator light
Disarmed state	OFF
Arming preparation	ON
Armed state (Entry delay time)	OFF (ON)
Alarm sounding	ON

#### HINT:

Even in disarmed state, the indicator light flashes. (Due to the signal output from immobiliser system). The indicator always flashes by receiving the signal from the immobiliser system at any time in the arming condition.

Flashing frequency:

0.2 seconds (ON)

1.8 seconds (OFF)

Response:

The hazard lights flash under the following conditions.

- (1) When the system is set.  
When arming preparation is set from disarmed state using the wireless door lock, the hazard lights flash once.
- (2) When the system is released.  
When disarmed state is set from either arming preparation, armed state or alarm sounding using the wireless door lock, the hazard lights flash twice.

#### 5. SWITCH TO ACTIVE MODE

In each passive mode, when "disarmed state of active mode → arming preparation switch condition" is met, the active mode switch to each condition. In this case, active mode continues till disarmed state.

Passive mode when transfer condition is met.	Active mode transfer condition
Disarmed state	Arming preparation condition
Arming preparation condition	Arming preparation condition
Armed state (During entry delay time)	Arming condition (After alarming time has elapsed, arming condition if all the doors, engine hood and luggage compartment door is closed, all the doors are locked.)
Alarm sounding	After alarming time has elapsed, arming condition if all the doors, engine hood and luggage compartment door is closed, all the doors are locked.

## 6. FORCED DOOR LOCK CONTROL

While detecting intrusion into the vehicle and sounding alarm, alarm control outputs the door lock at the moment the door is unlocked, and prevents intrusion into the vehicle.

### (1) Condition for Starting Forced Door Lock

Detecting any of the following conditions activates the forced door lock.

- ◀ Alarm system is in alarm status in active mode.
- ◀ Except for the case that the key unlock/luggage unlock switch is turned on.
- ◀ No key is in the ignition key cylinder.
- ◀ Some of the doors are unlocked.
- ◀ Since the start of the last forced lock, 0.38 sec. or more has been elapsed.

### (2) Conditions for Stopping Forced Door Lock

Detecting any of the following conditions stops the forced door lock.

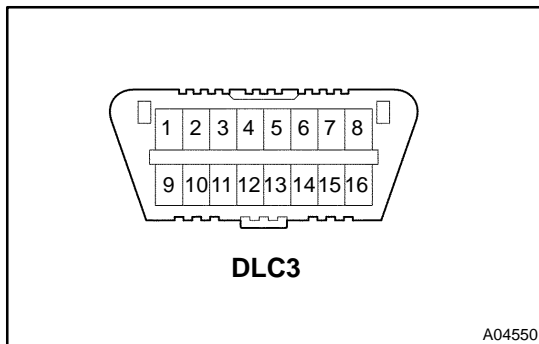
- ◀ All doors are locked.
- ◀ An alarm is stopped.
- ◀ A key is inserted into the key cylinder.

## 7. PANIC CONTROL

The function to sound the alarm when the user presses the panic switch of the wireless key.

## 8. ALARM MEMORY CONTROL

If an alarm is activated while a user leaves the vehicle, when the user comes back to the vehicle and reset the security system, the tail lights will come on for 2 sec. to show the alarm occurrence.



## 9. DTC CHECK (Using hand-held tester)

### (a) Inspect the DLC3.

The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAEJ1962 and matches the ISO 9141-2 format.

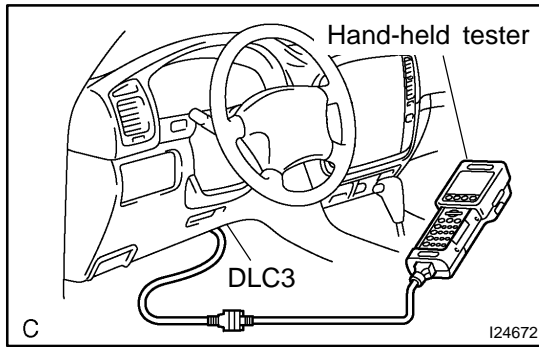
#### HINT:

If the display shows "UNABLE TO CONNECT TO VEHICLE" when the cable of hand-held tester is connected to DLC3, the ignition switch is turned ON and the scan tool is operated, there is a problem either on the vehicle side or the tool side.

- ◀ If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- ◀ If communication does not function when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

### (b) Make sure the details of the DLC3.





- (c) Prepare the hand-held tester.
- (d) Connect the hand-held to DLC3.
- (e) Turn the ignition switch ON and the hand-held tester main switch ON.
- (f) Use the hand-held tester to check the DTCs, note them down. (For opening instructions, see the hand-held tester's intrusion book).

## 10. DATA LIST

### HINT:

By the DATA LIST displayed on the Hand-held tester, you can read the value of the switch, sensor, actuator and so on without removing any parts. Reading the DATA LIST as a first step of troubleshooting is one of the method to shorten the labor time.

- (a) Turn the ignition switch OFF.
- (b) Connect the hand-held tester to DLC3.
- (c) Turn the ignition switch ON.
- (d) According to the display on the tester, read the "DATA LIST".

### THEFT DETERRENT ECU:

Item	Condition	Specified Condition
HOOD COURTESY SW	Engine hood Close → Open	OFF/ON
INTRS DETECT	Intrusion sensor detection OFF → ON	OFF/ON
GLS BRK DETECT	Glass broken sensor detection OFF → ON	OFF/ON
KEY UNLK WRN SW	Insert key	OFF/ON
IG SW	IG switch ON or other	OFF/ON
PASSIVE MODE	Passive mode → other mode	OFF/ON
WARN BY GLS SEN	Warning by glass broken sensor OFF → ON	OFF/ON
INTRUSION SEN	Intrusion sensor OFF → ON	OFF/ON
WARNING (HORN)	Warning by Horn OFF → ON	OFF/ON
ENTRY DELAY	Entry delay time	0 s/14 s/30 s

## 11. ACTIVE TEST

### HINT:

Performing ACTIVE TEST using the Hand-held tester allows the relay, and so on to operate without removing any parts. Performing ACTIVE TEST as a first step of troubleshooting is one of the method to shorten the labor time.

DATA LIST can be displayed during ACTIVE TEST.

- (a) Turn the ignition switch OFF.
- (b) Connect the Hand-held tester to DLC3.
- (c) Turn the ignition switch ON.
- (d) According to the display on tester, perform the "ACTIVE TEST".

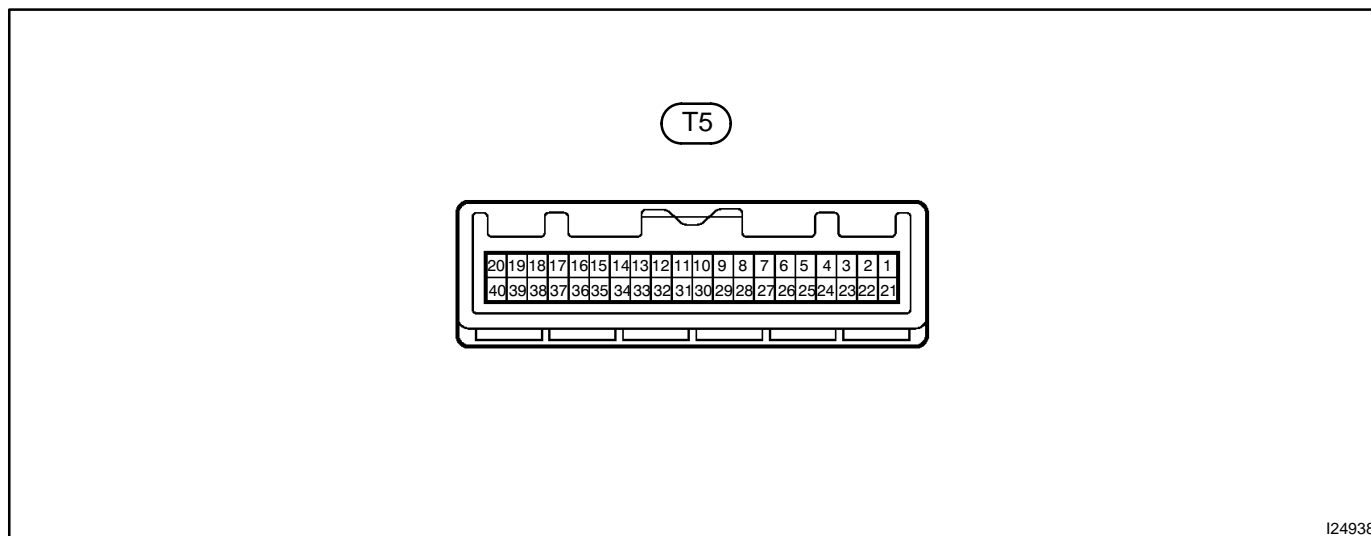
### THEFT DETERRENT ECU:

Item	Test details	Diagnostic note
SECURITY INDIC	Turns security indicator ON/OFF	Connect terminals TC and E1 of DLC1
SECURITY HORN2	Turns security horn2 ON/OFF	-

## PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Theft deterrent system is not set.	<ol style="list-style-type: none"> <li>1. Security indicator circuit</li> <li>2. Key unlock warning switch circuit</li> <li>3. Door courtesy switch circuit</li> <li>4. Door unlock detection switch circuit</li> <li>5. Engine hood courtesy switch circuit</li> <li>6. Power source circuit</li> <li>7. Theft deterrent ECU</li> </ol>	<a href="#">DI-969</a> <a href="#">DI-974</a> <a href="#">DI-1062</a> <a href="#">DI-1 110</a> <a href="#">DI-976</a> <a href="#">DI-966</a> -
Security indicator does not light up or blink.	<ol style="list-style-type: none"> <li>1. Security indicator circuit</li> <li>2. Theft deterrent ECU</li> </ol>	<a href="#">DI-969</a> -
Theft deterrent system cannot be unset even if ignition switch is ON.	<ol style="list-style-type: none"> <li>1. Key unlock warning switch circuit</li> <li>2. Power source circuit</li> <li>3. Theft deterrent ECU</li> </ol>	<a href="#">DI-974</a> <a href="#">DI-966</a> -
During warning condition, horn does not operate.	<ol style="list-style-type: none"> <li>1. Horn circuit</li> <li>2. Theft deterrent ECU</li> </ol>	<a href="#">DI-972</a> -

## TERMINALS OF ECU



I24938

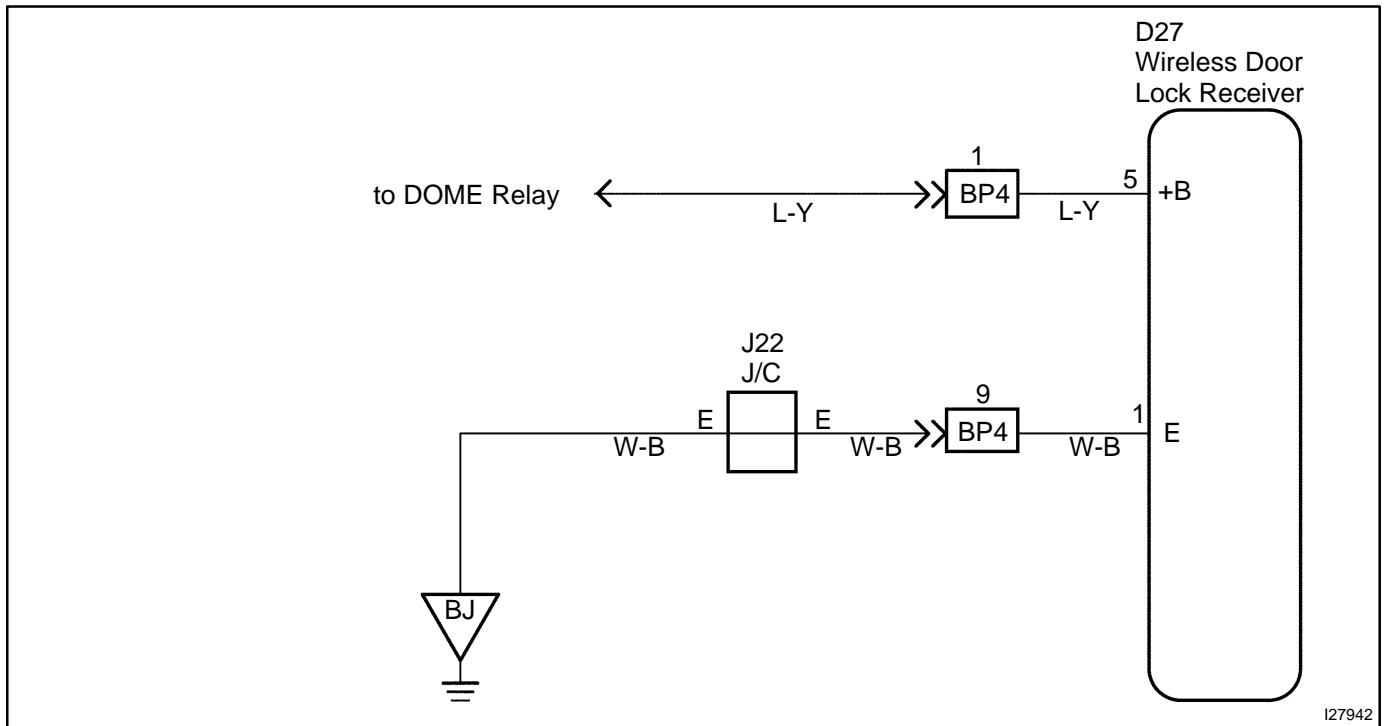
Symbols (Terminals No.)	Wiring Color	Condition	Specified condition
SH- ↔ Body Ground (T5-1 ↔ Body Ground)	W ↔ W-B	Always	10 - 14 V
+B1 ↔ Body ground (T5-2 ↔ Body ground)	LG ↔ Body Ground	Always	10 - 14 V
+B2 ↔ Body Ground (T5-3 ↔ Body Ground)	B ↔ Body Ground	Always	10 - 14 V
HORN ↔ E (T5-5 ↔ T5-29)	G-O ↔ W-B	Horn switch "OFF"	10 - 14 V
IG ↔ E (T5-10 ↔ T5-29)	B-W ↔ W-B	Ignition switch is turned to "ON" position	10 - 14 V
GBS ↔ E (T5-11 ↔ T5-29)	Y-G ↔ W-B	Glass sensor is "ON"	10 - 14 V
		Glass sensor is "OFF"	Below 1 Ω
KSW ↔ E (T5-12 ↔ T5-29)	R-B ↔ W-B	Key unlock warning switch "ON" (Key inserted)	Below 1 Ω
		Key unlock warning switch "OFF" (Key removed)	1 MΩ or higher
IND ↔ E (T5-25 ↔ T5-29)	G-R ↔ W-B	During set preparation	3 - 5 V
E ↔ Body ground (T5-29 ↔ Body Ground)	W-B ↔ Body Ground	Always	10 - 14 V
MPX1 (T5-31)	B	Multiplex communication circuit	-
DSWH ↔ E (T5-34 ↔ T5-29)	L-R ↔ W-B	Engine hood courtesy switch "ON" (Engine hood opened)	Below 1 Ω
		Engine hood courtesy switch "OFF" (Engine hood closed)	1 MΩ or higher

# ECU Power Source Circuit

## CIRCUIT DESCRIPTION

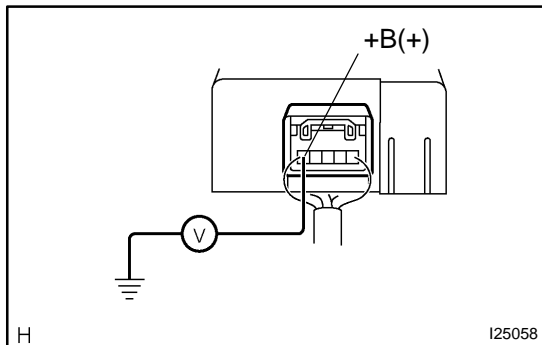
Battery positive voltage is always applied to the terminal +B of the wireless door lock ECU.

## WIRING DIAGRAM



## INSPECTION PROCEDURE

- |   |   |
|---|---|
| 1 | <b>Check voltage between terminal +B of ECU connector and ground.</b> |
|---|---|



### PREPARATION:

Remove the wireless door lock ECU.

### CHECK:

Measure voltage between terminal +B of ECU connector and ground.

### OK:

**Voltage: 10 - 14 V**

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-948](#) ).

NG

2	<b>Check wire harness and connector between wireless door lock ECU and body ECU (Main) (See page <a href="#">IN-36</a> ).</b>
---	---

NG

Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown in problem symptom table (See page [DI-948](#) ).

# CIRCUIT INSPECTION

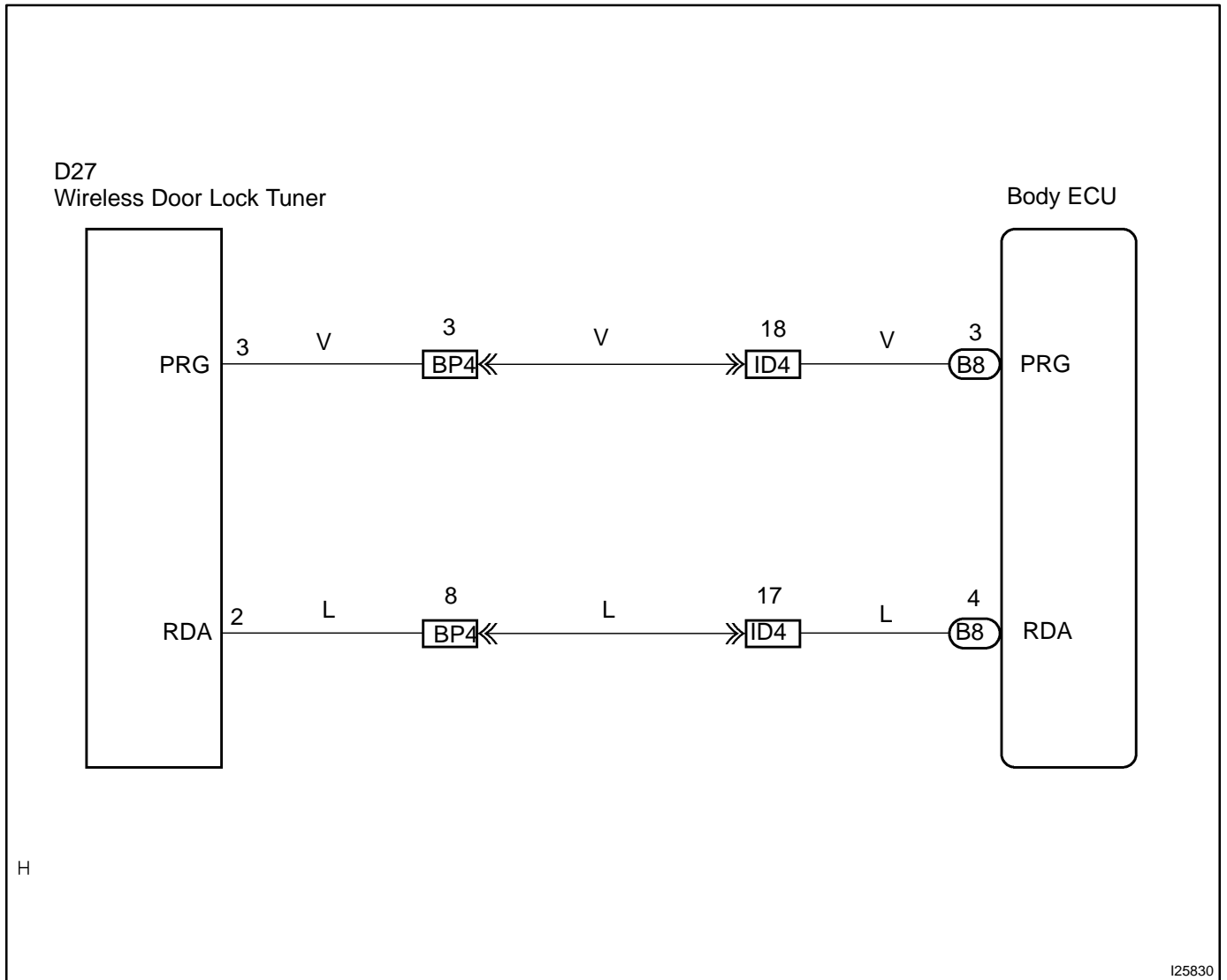
<b>DTC</b>	<b>B1242</b>	<b>Wireless door lock receiver circuit malfunction</b>
------------	--------------	--

## CIRCUIT DESCRIPTION

This DTC is output when GND short of RDA terminal is detected.

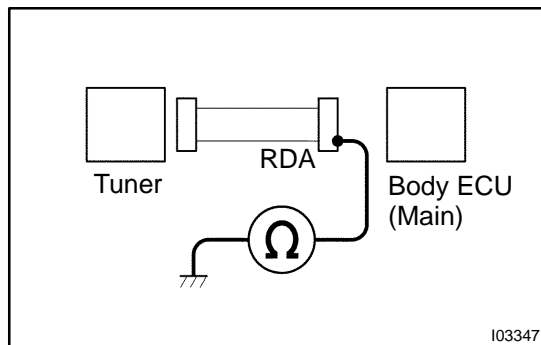
DTC No.	DTC Detecting Condition	Trouble Area
B1242/42	GND short of RDA terminal	<ul style="list-style-type: none"> <li>▶Wire harness</li> <li>▶Wireless door lock tuner</li> <li>▶Body ECU (Main)</li> </ul>

## WIRING DIAGRAM



## INSPECTION PROCEDURE

## 1 Check wire harness.

**PREPARATION:**

Disconnect the connector of tuner and body ECU.

**CHECK:**

Check the continuity between wireharness and body ground.

**OK:**

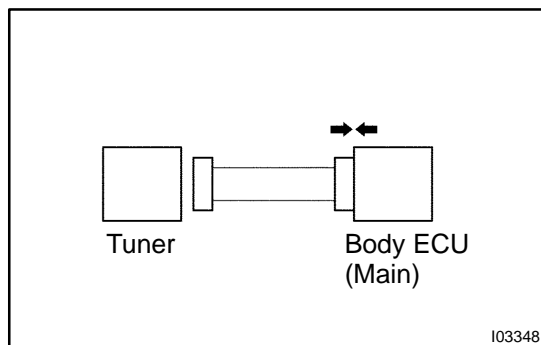
No continuity.

NG

Repair or replace the wire harness.

OK

## 2 Check body ECU.

**PREPARATION:**

Connect the connector of body ECU.

**CHECK:**

Check the DTC.

**OK:**

B1242 is not output.

NG

Replace the body ECU (Main).

OK

Replace the tuner.

# CUSTOMER PROBLEM ANALYSIS CHECK

## WIRELESS DOOR LOCK CONTROL System Check Sheet

Inspector's  
Name \_\_\_\_\_

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km Miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	<input type="checkbox"/> Constant <input type="checkbox"/> Sometimes (   times/per   day, month) <input type="checkbox"/> Once only
Weather Conditions When Problem Occurred	<b>Weather</b> <input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Various/Others
	<b>Outdoor Temperature</b> <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (Approx.   °F (   °C))
	<b>Place</b> <input type="checkbox"/> Everywhere <input type="checkbox"/> Specific Locality(   )
Date Transmitter Battery Last Replaced	/ /

<b>Problem Symptom</b>	<input type="checkbox"/> Whole wireless door lock control system does not operate.	
	<input type="checkbox"/> Only door unlock operation is not possible.	
	<input type="checkbox"/> Only door lock operation is not possible.	
	<input type="checkbox"/> Only key confinement prevention function is not possible.	
	<input type="checkbox"/> Wireless door lock function operates even when each door is opened.	
	<input type="checkbox"/> Wireless door lock functions incorrectly. ( Although one door is unlocked, when the transmitter switch is pressed, all doors become unlocked.)	<input type="checkbox"/> When RH door is unlocked <input type="checkbox"/> When LH door is unlocked
	<input type="checkbox"/> Others	



## DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during DTC check, check the circuit corresponding to the code in the table below (Proceed to the page given for the circuit).

DTC No. (See Page)	Circuit Inspection	Trouble Area
B1242 (DI-949)	Wireless door lock tuner circuit malfunction	▶Wire harness ▶Wireless door lock tuner (door control receiver) ▶Theft deterrent ECU

# WIRELESS DOOR LOCK CONTROL SYSTEM

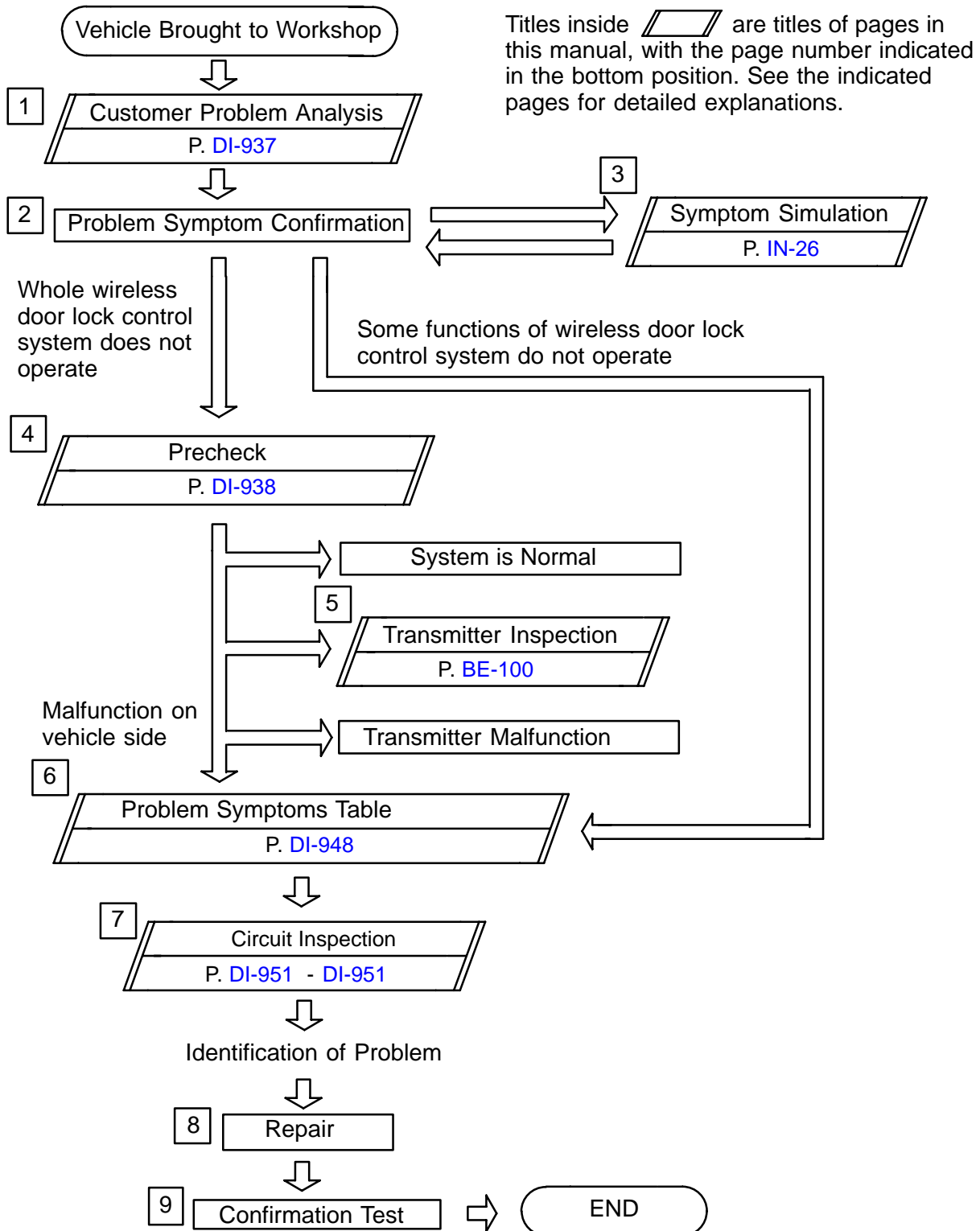
D10DQ-13

## HOW TO PROCEED WITH TROUBLESHOOTING

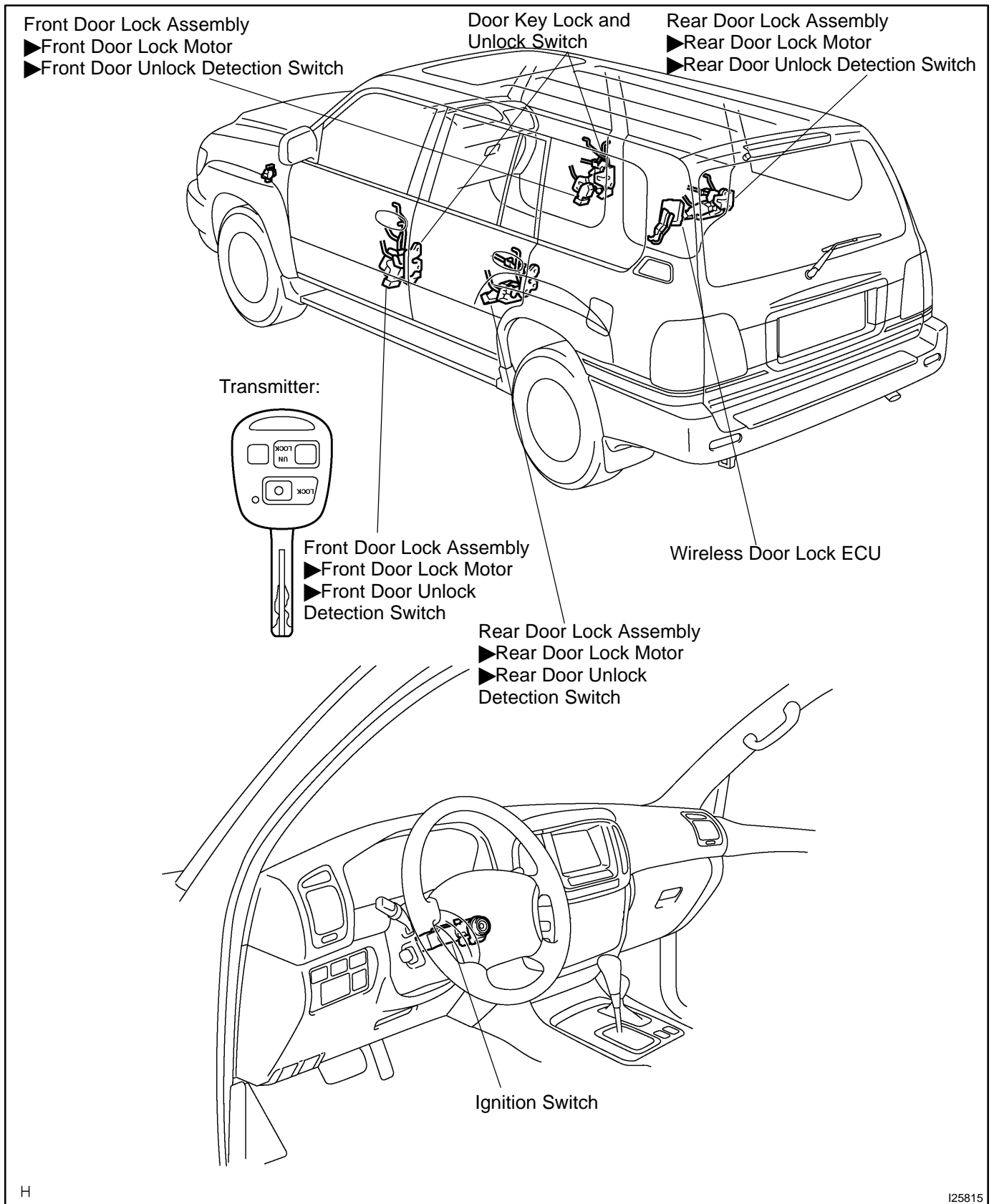
**HINT:**

Troubleshooting of the wireless door lock control system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the wireless door lock control system, first make certain that the door lock control system is operating normally.

Perform troubleshooting in accordance with procedure on the following page.



# PARTS LOCATION



## PRE-CHECK

### 1. CHARACTERS OF WIRELESS DOOR LOCK

- (a) The operation distance changes according to how customers hold the transmitter or where it is used.
- (b) Because of using the very weak radio wave, if there is a strong wave or noise on the frequency being used, the operation distance may become shorter.

### 2. WIRELESS DOOR LOCK BASIC FUNCTION

- (a) Stand on the driver's side. Stay 1 m away from the vehicle.
- (b) Turn the transmitter toward the vehicle and press any one of the transmission switched for 1 sec.

### 3. INSPECT WIRELESS DOOR LOCK DIAGNOSIS MODE

- (a) Start up diagnosis mode.

**HINT:**

Follow the method below.

- (1) Insert the ignition key into the ignition key cylinder.
- (2) Remove the ignition key from the ignition key cylinder.
- (3) Insert the key into the ignition switch.
- (4) Turn the ignition switch ON once within 5 sec.
- (5) Repeat turning the ignition switch OFF → ON 9 times within 30 sec.
- (6) Enter the diagnosis mode, and make sure that the taillight lights up.

	Within. 5secs.	Within. 30secs.			
Key Plate Inserted					
Key Plate Not Inserted					
ON	1	2	3	9	10
OFF					
	Once	9 times			

I20790

- (b) Finishing the Diagnosis Mode.

During the Diagnosis mode, turn the ignition switch OFF → ON to go back to the normal mode.

At this time make sure that the taillight lights up.

(1) LOCK switch	
ON	
OFF	
	0.13secs. 0.5secs.
(2) UNLOCK switch	
ON	
OFF	
	0.13secs. 0.25secs. 0.5secs.
(3) Luggage door switch	
ON	
OFF	
	0.5secs. 0.5secs.
(4) Disagreement of recognition code or rolling code.	
ON	
OFF	While receiving

I20456

(c) Diagnosis Mode Check.

HINT:

Check how the taillight lights up when pressing each transmitter switch.

- (1) LOCK switch
- (2) UNLOCK switch
- (3) Luggage door switch
- (4) Disagreement of recognition code or rolling code.

HINT:

If (4) is detected in the Diagnosis Check, conduct the recognition code registration.

- (5) No response from the taillight.

HINT:

Conduct the following checks.

- \* Wireless door lock transmitter.
- \* Wireless door lock receiver.

#### 4. INSPECT WIRELESS DOOR LOCK TRANSMITTER OPERATION

HINT:

Refer to "3. REPLACE TRANSMITTER (LITHIUM) BATTERY".

- (a) Using a screwdriver, remove the 2 screws and cover.
- (b) Remove the battery (lithium battery).



I04149

(c) Install a new or normal battery (lithium battery).

HINT:

When a new or normal battery can not be obtained, connect 2 new 1.5 V batteries in series, connect the battery (+) to the battery receptacle side terminal and battery (-) to the bottom terminal, then apply 3 V voltage to the transmitter.

- (d) In the location where is approx. 1 m away from driver's outside handle in the right direction, face the key plate of the transmitter to the vehicle, and check the transmitter operation when pressing transmission switch of the transmitter body.

Standard:

- \* Remote control of vehicle door lock can be operated.
- \* LED lights up more than once.

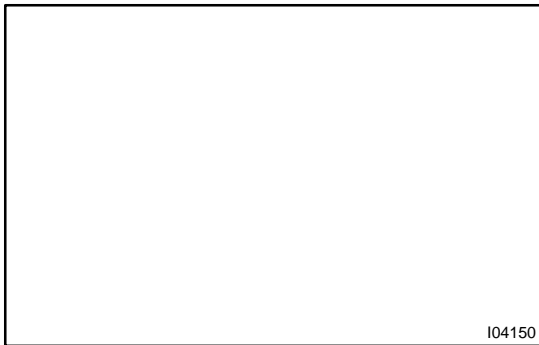
## HINT:

- \* The minimum operation distance differs according to operator, the way of holding the transmitter, and location.
  - \* As weak wave is used, operation distance might be shortened when noise is detected in strong wave or used frequency.
- (e) Install the battery (lithium battery).  
 (f) Install a cover so that O-ring is not distorted or slipped off.  
 (g) Using a screwdriver, tighten the 2 screws.

**5. CHECK BATTERY CAPACITY**

## HINT:

- \* Make sure to use the TOYOTA electrical tester.
- \* With the battery unloaded, judge can not be made whether the battery is available or not on the test.
- \* When the transmitter is faulty, the energy amount left in the battery might not be checked correctly.
- \* On the lithium battery used for the transmitter, the voltage more than 2.5 V with the battery unloaded is shown on the tester until the energy is completely consumed. Accordingly when inspecting the energy amount left in the battery, it is necessary to measure the voltage when the battery is loaded. (1.2 k $\Omega$ ).



- (a) Remove the 2 screws and cover using a (-) driver.  
 (b) Remove the battery (lithium battery) from the transmitter.  
 (c) Connect the lead to the (-) terminal of the transmitter and install the battery.



- (d) Connect the (+) tester to the (+) battery (lithium battery), and (-) tester to the lead respectively.  
 (e) Press one of the transmitting switches on the transmitter for approx. 1 second.  
 (f) Press the transmitting switch on the transmitter again to check the voltage.

**Standard: 2.1 V or more**

HINT:

- \* When the temperature of the battery is low, the judge can not be made correctly.  
When the outcome of the test is less than 2.1 V, conduct the test again after leaving the battery in the place at 18 °C for more than 30 minutes.
  - \* By auto power off function, the voltage becomes no load voltage (more than 2.5 V) condition 20 seconds after the switch was pressed.  
Make sure to read the voltage before of it.
  - \* High voltage might be shown 1 to 2 times after leaving the battery, judge should be made with the voltage shown at the 3rd time or later.
- (g) Disconnect the lead.  
 (h) Set the battery (lithium battery) in the transmitter.  
 (i) Install the cover, so that the O-ring is not distorted or slipped off.  
 (j) Using a screwdriver, tighten the 2 screws.

**6. REPLACE TRANSMITTER (LITHIUM) BATTERY**

**NOTICE:**

**Special caution should be taken for handling each component as they are precision electronic components.**

- (a) Using a screwdriver, remove the screw and cover.

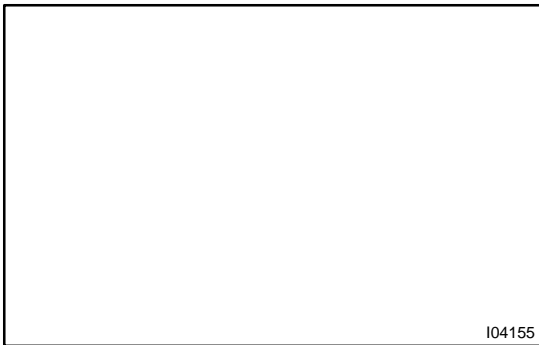
**NOTICE:**

**Do not pry out the cover forcibly.**

HINT:

Push the cover with a finger so that there becomes clearance, then pry out the cover from that clearance.

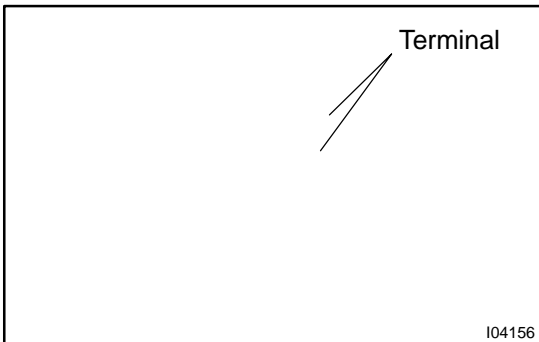
- (b) Remove the transmitter.



- (c) Using a screwdriver, remove the 2 screws and cover.
- (d) Remove the battery (lithium battery).

**NOTICE:**

- \* **Do not push the terminals with a finger.**
- \* **If prying up the battery (lithium battery) forcibly to remove, the terminals are deformed.**



- (e) Install a battery (lithium battery) as shown in the illustration.

**NOTICE:**

**Face the battery upward. Take care not to deform the terminals.**

- (f) Check that O-ring is not distorted or slipped off, and install the cover.
- (g) Using a screwdriver, tighten the 2 screws.

**NOTICE:**

**When the screws are tightened loosely, it might cause faulty contact of battery (lithium battery) and terminals.**

- (h) Assemble the transmitter to the key plate and the cover.
- (i) Using a screwdriver, tighten the screw.

**7. REPLACE DOOR CONTROL RECEIVER AND TRANSMITTER****NOTICE:**

**When replacing the theft deterrent ECU or transmitter, registration of recognition code is necessary because they are provided as a single components.**

- (a) Select the operation mode to perform from the following operation modes.
  - \* Add mode
  - \* Rewrite mode
  - \* Prohibition mode
  - \* Confirmation mode

**HINT:**

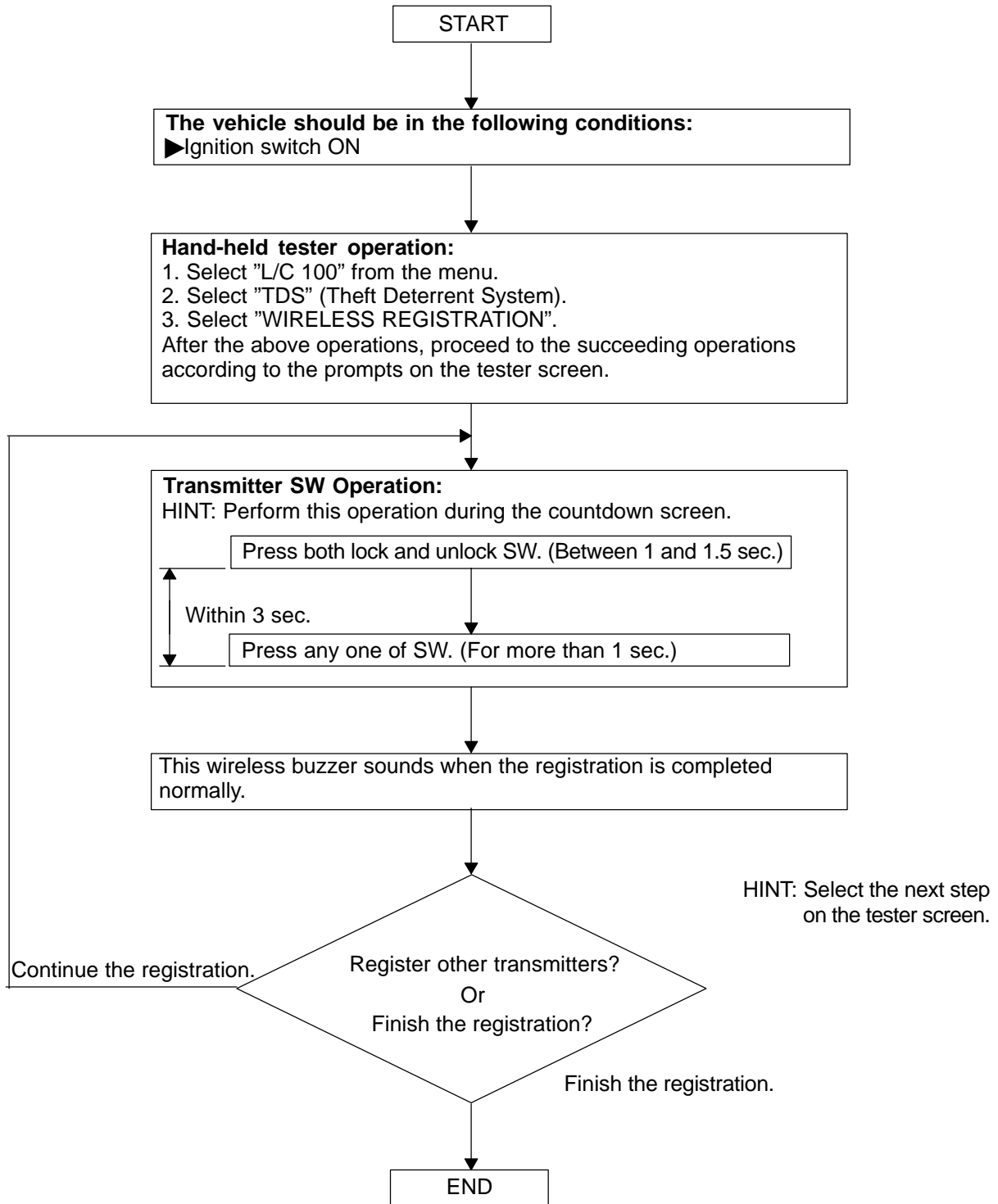
- \* The "Add mode" is for adding the newly recognized codes for registration while the already registered codes are retained. This mode is used when the transmitter is added. When the number of the registered codes exceeds 4 codes, the previously registered codes will be erased in order, starting from the first registered code.
  - \* The "Rewrite mode" is for erasing all the registered codes and registering newly recognized codes only. This mode is used when the transmitter or the door control receiver is replaced.
  - \* The "Prohibition mode" is for erasing all the registered codes to prohibit the wireless door lock operation. This mode is used when the transmitter is lost.
  - \* The "Confirmation mode" is for confirming the number of recognition codes that are registered. This mode is used to check the number of registered codes when new codes are added to the registration, etc.
- (b) Follow the chart on the following page to register the transmitter recognition code to the theft deterrent ECU.

**HINT:**

- \* When procedure is out of the specified, the registration operation is cancelled.
- \* Maximum 4 recognition codes can be registered.
- \* For the details of the registration procedure, see page [BE-93](#).



(c) By TOYOTA Hand-Held Tester



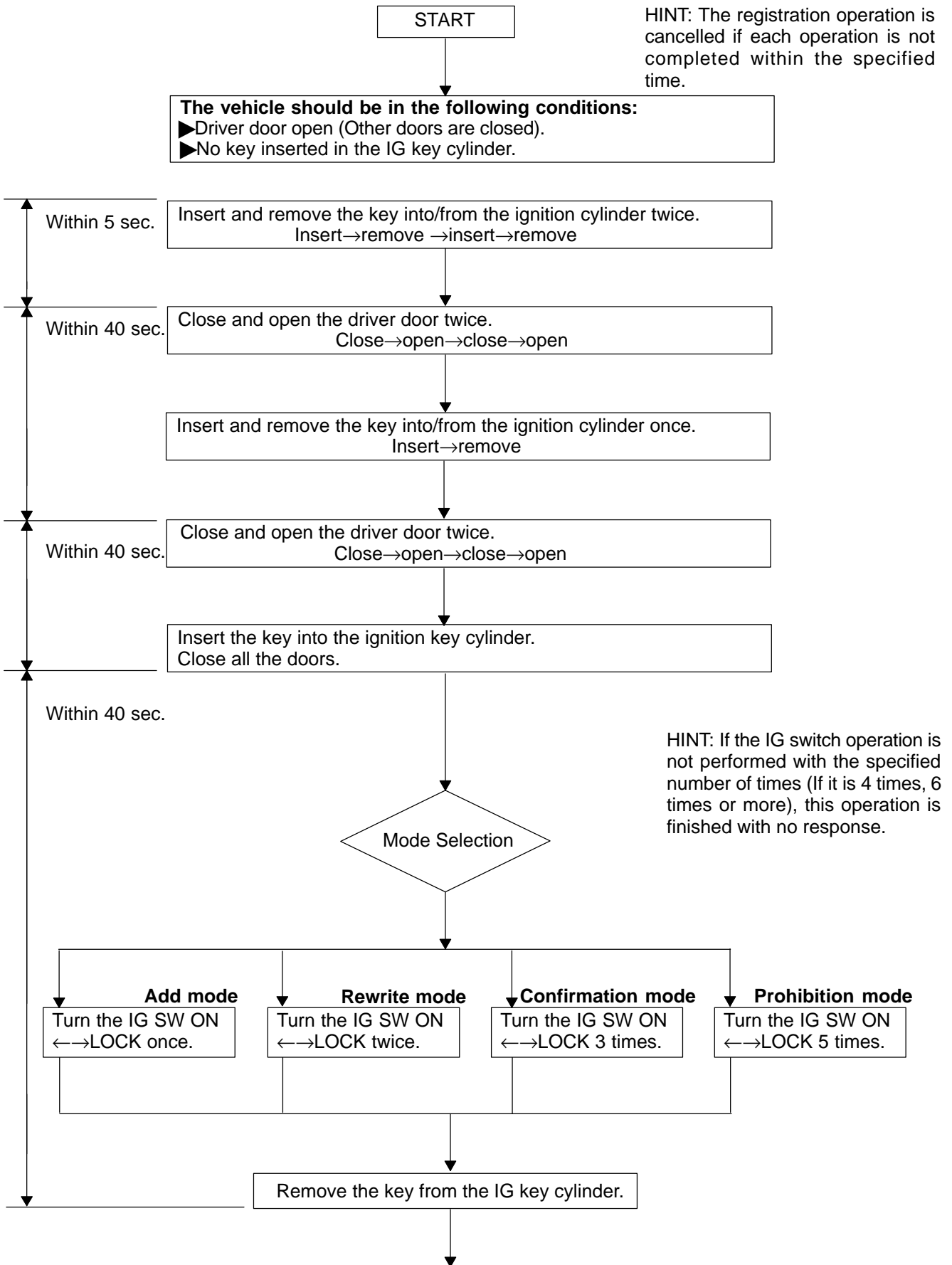
**HINT:**

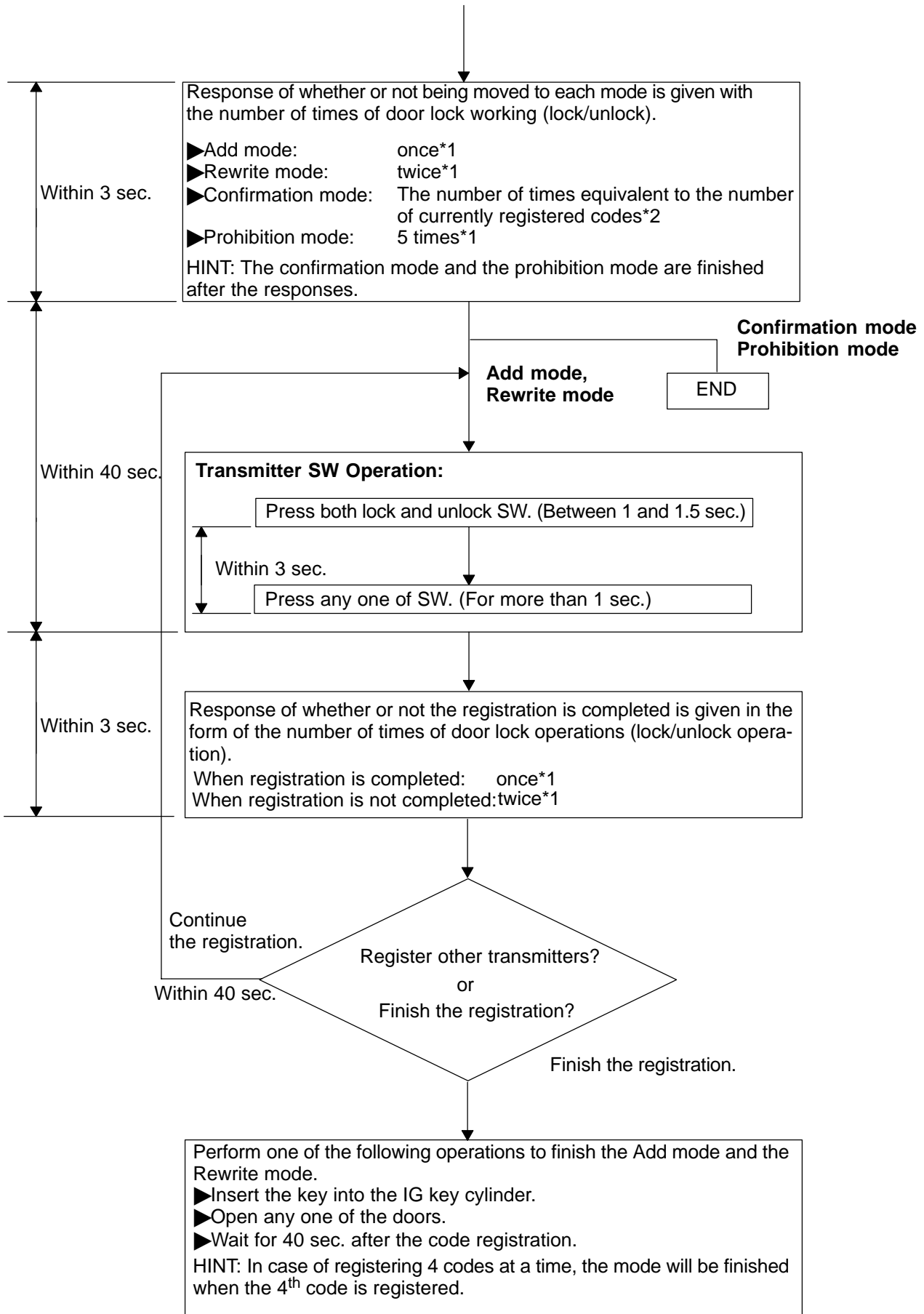
This page is to show briefly the registration procedure using the hand-held tester.

For detailed procedures, please refer to the prompts on the tester screen.

The number of currently registered codes can be checked out on the first screen of the WIRELESS REGISTRATION.

(d) By Switch Operation:





## PROBLEM SYMPTOMS TABLE

Perform troubleshooting of the circuit for the applicable problem symptom in the order given in the chart below. Proceed to the page located for each circuit.

### HINT:

- ▶ Troubleshooting of the wireless door lock control system is based on the premise that the door lock control system and theft deterrent system are operating normally. Accordingly, before troubleshooting the wireless door lock control system, first make certain that the door lock control system and theft deterrent system are operating normally.
- ▶ If the instruction "Proceed to next circuit inspection shown on matrix chart" is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- ▶ If the trouble still reappears even through there are no abnormalities in any of the other circuits, check and replace the Wireless Door Lock ECU as the last step.

Symptom	Suspect Area	See page
All function of wireless door lock control system do no operate.	<ol style="list-style-type: none"> <li>1. ECU Power Source Circuit.</li> <li>2. Door Courtesy Switch Circuit.</li> <li>3. Door Key Lock and Unlock Switch Circuit.</li> <li>4. Key Unlock Warning Switch Circuit.</li> <li>5. Wireless Door Lock ECU.</li> <li>6. Body ECU (Main).</li> </ol>	<a href="#">DI-951</a> <a href="#">DI-1062</a> <a href="#">DI-1 106</a> <a href="#">DI-1060</a> <a href="#">IN-36</a> <a href="#">IN-36</a>
Only door unlock operation is not possible (Lock operation is possible).	<ol style="list-style-type: none"> <li>1. Door Key Lock and Unlock Switch Circuit</li> <li>2. Door Unlock Detection Switch Circuit</li> <li>3. Wireless Door Lock ECU.</li> <li>4. Body ECU (Main).</li> </ol>	<a href="#">DI-1 106</a> <a href="#">DI-1060</a> <a href="#">IN-36</a> <a href="#">IN-36</a>
Only door lock operation is not possible (Unlock operation is possible).	<ol style="list-style-type: none"> <li>1. Door Key Lock and Unlock Switch Circuit</li> <li>2. Wireless Door Lock ECU</li> <li>3. Body ECU (Main).</li> </ol>	<a href="#">DI-1 106</a> <a href="#">IN-36</a> <a href="#">IN-36</a>
Only transmitter misoperation prevention function is not possible.	<ol style="list-style-type: none"> <li>1. Key Unlock Warning Switch Circuit</li> <li>2. Wireless Door Lock ECU</li> <li>3. Body ECU (Main).</li> </ol>	<a href="#">DI-1060</a> <a href="#">IN-36</a> <a href="#">IN-36</a>
Wireless door lock function operates even when each door is opened.	<ol style="list-style-type: none"> <li>1. Door Courtesy Switch Circuit</li> <li>2. Wireless Door Lock ECU</li> <li>3. Body ECU (Main).</li> </ol>	<a href="#">DI-1062</a> <a href="#">IN-36</a> <a href="#">IN-36</a>
Wireless door lock functions incorrectly. (Although one door is unlocked, when the transmitter switch is pressed, all doors unlock. )	<ol style="list-style-type: none"> <li>1. Door Unlock Detection Switch Circuit</li> <li>2. Wireless Door Lock ECU</li> <li>3. Body ECU (Main).</li> </ol>	<a href="#">DI-1060</a> <a href="#">IN-36</a> <a href="#">IN-36</a>
Wireless door lock operates, but the taillight does not respond.	<ol style="list-style-type: none"> <li>1. Taillight Relay Circuit</li> <li>2. Taillight Circuit</li> <li>3. Wireless Door Lock ECU</li> <li>4. Body ECU (Main).</li> </ol>	<a href="#">DI-1076</a> <a href="#">DI-1076</a> <a href="#">IN-36</a> <a href="#">IN-36</a>

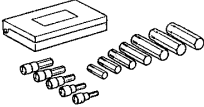
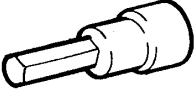

**EQUIPMENT**

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Sernsor
Torque wrench	
Dial indicator	Magnetic clutch
Plastic hammer	Magnetic clutch

**LUBRICANT**

Item	Capacity	Classification
Compressor oil	-	ND-OIL 8 or equivalent
When replacing condenser	40 cc (1.4 fl. oz.)	
When replacing evaporator	40 cc (1.4 fl. oz.)	


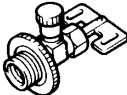




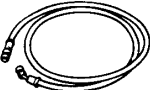
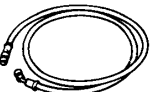

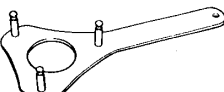


## RECOMMENDED TOOLS

	09040-0001 1 Hexagon Wrench Set .	Expansion valve
	(09043-20050) Socket Hexagon Wrench 5.	5.0 mm (0.20 in.)
	09082-00040 TOYOTA Electrical Tester.	




# AIR CONDITIONING

## SST (Special Service Tools)

PP1AE-03

	07110-58060	Air Conditioner Service Tool Set	
	(07117-58060)	Refrigerant Drain Service Valve	
	(07117-58070)	T-Joint	
	(07117-58080)	Quick Disconnect Adapter	High pressure side
	(07117-58090)	Quick Disconnect Adapter	Low pressure side
	(07117-88060)	Refrigerant Charging Hose	High pressure side (Color: Red)
	(07117-88070)	Refrigerant Charging Hose	Low pressure side (Color: Blue)
	(07117-88080)	Refrigerant Charging Hose	Utility (Color: Green)
	07112-66040	Magnetic Clutch Remover	
	07112-76060	Magnetic Clutch Stopper	
	07116-38360	Gas Leak Detector Assembly	
	09870-00015	A/C Quick Joint Puller No.1	Suction tube



	<p>09870-00025 A/C Quick Joint Puller No.2</p>	<p>Liquid tube</p>
	<p>95994-10010 Snap Ring Pliers (DENSO Part No.)</p>	
	<p>95994-10020 Snap Ring Pliers (DENSO Part No.)</p>	

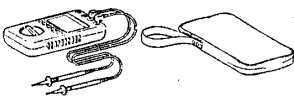
**EQUIPMENT**

OBD II scan tool	
Torque wrench	
Calipers	Torque converter clutch
Straight edge	Torque converter clutch
Dial indicator	Drive plate runout

**LUBRICANT**

Item	Capacity	Classification
Automatic transmission fluid Dry fill Drain and refill	10.6 liters (11.2 US qts, 9.3 Imp qts) 3.0 liters (3.2 US qts, 2.6 Imp qts)	ATF WS

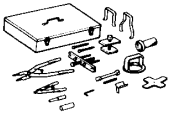
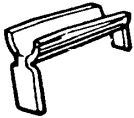
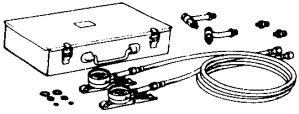
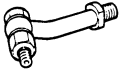

# RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	
---	---------------------------------------	--

# AUTOMATIC TRANSMISSION

## SST (Special Service Tools)

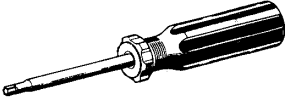
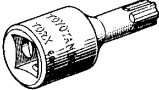

PP3XT-01

	<p>09350-30020 TOYOTA Automatic Transmission Tool Set</p>	
	<p>(09351-32020) Stator Stopper</p>	
	<p>09992-00095 Automatic Transmission Oil Pressure Gauge Set</p>	
	<p>(09992-00231) Adaptor C</p>	
	<p>(09992-00271) Gauge Assy</p>	

**EQUIPMENT**

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Heat light	Seat heater
Hexagon wrench (6 mm)	Power seat
Torque wrench	
Masking tape	Rear window defogger wire
Tin foil	Rear window defogger wire


**RECOMMENDED TOOLS**

	09041-00030 Torx Driver T30 .	For removing and installing steering wheel pad
	09042-00010 Torx Socket T30 .	For removing and installing steering wheel pad
	09082-00040 TOYOTA Electrical Tester.	

# BODY ELECTRICAL

## SST (Special Service Tools)

PP00-18

	09843-18020 Diagnosis Check Wire	
---	----------------------------------	--



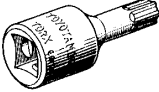

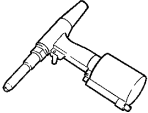



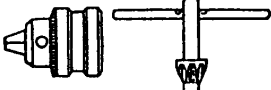



**EQUIPMENT**

Clip remover	
Torque wrench	
Hexagon wrench (6 mm)	
Torx driver	
Hog ring pliers	
Hand riveter	
Tape	To avoid surface damage
Adhesive tape	To avoid surface damage
Double-stick tape	
Adhesive	
Cleaner	
Shop rag	
Knife	
Sealer gun	
Brush	
Putty spatula	
Glass plate or similar object	
Wooden block or similar object	
Heat light	
Piano wire	
Plastic sheet	To avoid surface damage
Tacker	BANZAI 303XT
Tack pin	BANZAI UX-7
Rope (no projections, difficult to break)	Seat belt pretensioner
Tire with disk wheel Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Seat belt pretensioner
Vinyl bag	Seat belt pretensioner

**LUBRICANT**

Item	Capacity	Classification
MP grease	-	-

# RECOMMENDED TOOLS

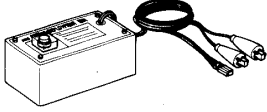
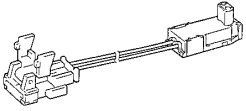

	<p>09042-00010 Torx Socket T30 .</p>	
	<p>09042-00020 Torx Socket T40 .</p>	
	<p>09050-20010 Air Riveter.</p>	
	<p>(09050-02010) Dust Cap.</p>	
	<p>09050-02050 Nose Piece No.4.</p>	
	<p>09050-00032 Air Drill</p>	
	<p>(09050-00210) Chuck Set</p>	
	<p>(09050-00220) Handle</p>	
	<p>09060-60350 Revet Cutter.</p>	
	<p>09070-20010 Moulding Remover .</p>	

**SSM (Special Service Materials)**

08833-00030	Three cement black or equivalent	
08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	
08850-00801	Windshield Glass Adhesive Set or equivalent	

**BODY****SST (Special Service Tools)**

PP0SG-01

	09082-00700 SRS Airbag Deployment Tool	
	09082-00740 Airbag Deployment Wire Sub-harness No.2	
	09812-00010 Door Hinge Set Bolt Wrench	

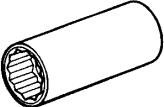

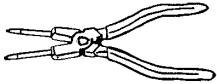
**EQUIPMENT**

Torque wrench	
Micrometer	Brake disc
Dial indicator	Brake disc
Brake drum gauge	Brake disc
Brake pedal effort gauge	

**LUBRICANT**

Item	Capacity	Classification
Brake fluid	-	SAE J1703 or FMVSS No. 116 DOT3




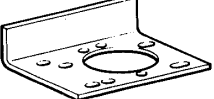

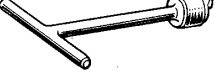


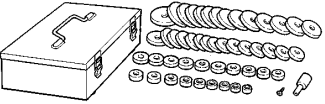


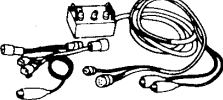
## RECOMMENDED TOOLS

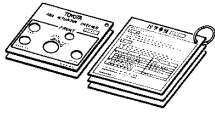
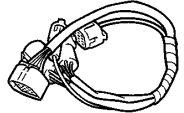
	<p>09017-12301 Deep Socket Wrench 30 mm .</p>	
	<p>09082-00040 TOYOTA Electrical Tester.</p>	
	<p>09905-00013 Snap Ring Pliers .</p>	



**BRAKE****SST (Special Service Tools)**

PP2AA-02


	09023-00100	Union Nut Wrench 10 mm	
	09318-12010	Transfer Bearing Adjusting Nut Wrench	
	09630-00014	Power Steering Gear Housing Overhaul Tool Set	
	(09631-00142)	Overhaul Stand	
	09709-29018	LSPV Gauge Set	
	09717-20010	Brake Shoe Return Spring Remover	
	09718-20010	Brake Shoe Return Spring Replacer	
	09843-18020	Diagnosis Check Wire	
	09950-60010	Replacer Set	
	(09951-00180)	Replacer 18	
	(09951-00190)	Replacer 19	
	09990-00150	ABS Actuator Checker and Sub-harness	

	09990-00240 ABS Actuator Checker Sheet "G"	
	09990-00480 ABS Actuator Checker Sub-harness "S"	

**EQUIPMENT**

Ammeter(A)	
Torque wrench	
Vernier calipers	Rotor (Slip ring)


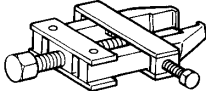

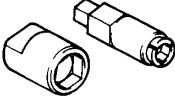

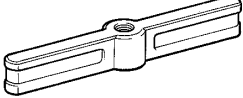
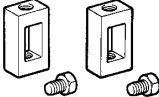
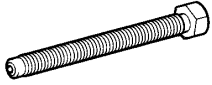
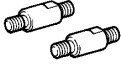
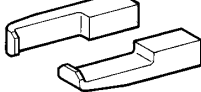


## RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	
---	---------------------------------------	--



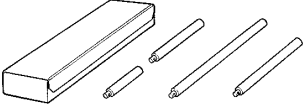

# CHARGING

## SST (Special Service Tools)

PP3Y4-01

	<p>09285-76010 Injection Pump Camshaft Bearing Cone Replacer</p>	
	<p>09820-00021 Alternator Rear Bearing Puller</p>	
	<p>09820-00031 Alternator Rear Bearing Replacer</p>	
	<p>09820-6301 1 Alternator Pulley Set Nut Wrench Set</p>	
	<p>09950-4001 1 Puller B Set</p>	
	<p>(09951-04020) Hanger 200</p>	
	<p>(09952-04010) Slide Arm</p>	
	<p>(09953-04020) Center Bolt 150</p>	
	<p>(09954-04010) Arm 25</p>	
	<p>(09955-04071) Claw No.7</p>	
	<p>(09958-0401 1) Holder</p>	
	<p>09950-60010 Replacer Set</p>	

PREPARATION - CHARGING

	<p>(09951-00250) Replacer 25</p>	
	<p>(09951-00470) Replacer 47</p>	
	<p>09950-70010 Handle Set</p>	
	<p>(09951-07100) Handle 100</p>	

## COOLANT

Item	Capacity	Classification
Engine coolant w/ Front heater	14.8 liters (15.6 US qts, 13.0 Imp. qts)	TOYOTA LONG LIFE Antifreeze Coolant or equivalent
w/ Front heater and rear heater	15.3 liters (16.2 US qts, 13.4 Imp qts)	

# COOLING EQUIPMENT

PP1AQ-01

Heater	Thermostat
Radiator cap tester	
Thermometer	Thermostat
Torque wrench	



# SSM (Special Service Materials)

	08826-00100 Seal Packing 1282B, THREE BOND 1282B or equivalent (FIPG)	Water pump Water inlet housing
--	---	-----------------------------------

# EMISSION CONTROL EQUIPMENT

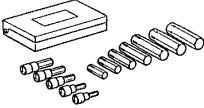

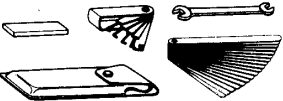


PP1AK-05

Torque wrench	
MITYVAC (Hand-held vacuum pump)	
Vacuum Gauge	
Hose Clipper	

**EQUIPMENT**

Caliper gauge	
CO/HC meter	
Compression gauge	
Connecting rod aligner	
Cylinder gauge	
Dial indicator	
Dye penetrant	
Engine tune-up tester	
Groove cleaning tool	
Heater	
Magnetic finger	
Micrometer	
Pin hole grinder	
OBD II scan tool	
Piston ring compressor	
Piston ring expander	
Plastigage	
Precision straight edge	
Press	
Soft brush	
Ridge reamer	
Solvent	
Spring tester	Valve spring
Steel square	Valve spring
Thermometer	
Torque wrench	
Valve seat cutter	
V-block	
Vernier calipers	
Wire brush	Valve

## RECOMMENDED TOOLS

	09040-0001 1 Hexagon Wrench Set .	
	09090-04020 Engine Sling Device	For suspension engine
	09200-00010 Engine Adjust Kit .	
	09258-00030 Hose Plug Set .	Plug for vacuum hose, fuel hose etc.
	09904-00010 Expander Set .	

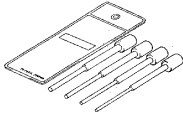
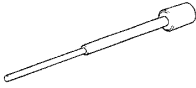
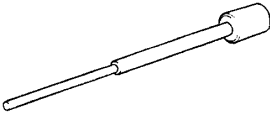
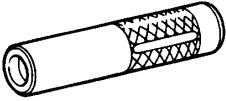
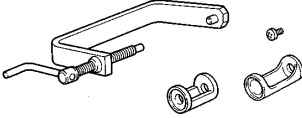
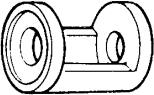


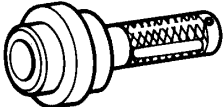
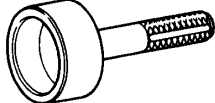
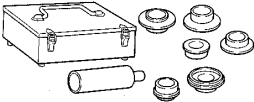
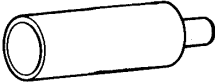
**SSM (Special Service Materials)**

08826-00080	Seal Packing Black or equivalent (FIPG)	Camshaft bearing cap Cylinder head semi-circular plug Cylinder head cover Rear oil seal retainer
08826-00080	Seal Packing Black or equivalent (FIPG)	Camshaft housing plug
08826-00100	Seal Packing 1282B, THREE BOND 1282B or equivalent (FIPG)	Coolant drain union
08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	Drive plate bolt Torque converter clutch bolt
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	No.1 idler pulley bolt



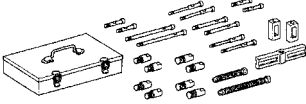
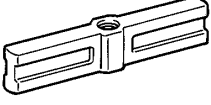
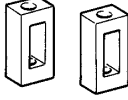

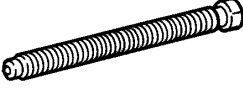
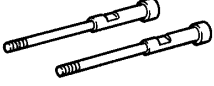
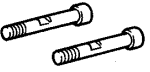
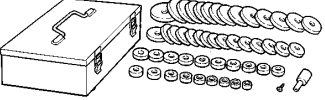


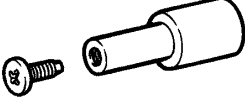
# ENGINE MECHANICAL

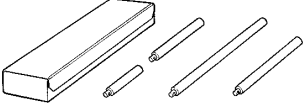

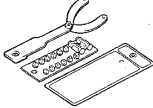

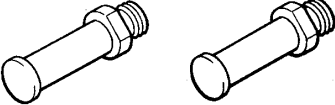

## SST (Special Service Tools)

PP3X6-01

	09201-10000	Valve Guide Bushing Remover & Replacer Set	
	(09201-01060)	Valve Guide Bushing Remover & Replacer 6	
	09201-01055	Valve Guide Bushing Remover & Replacer 5.5	
	09201-41020	Valve Stem Oil Seal Replacer	
	09202-70020	Valve Spring Compressor	
	(09202-00010)	Attachment	
	09213-7001 1	Crankshaft Pulley Holding Tool	
	09222-30010	Connecting Rod Bushing Remover & Replacer	
	09223-4601 1	Crankshaft Front Oil Seal Replacer	Crankshaft pulley Crankshaft timing pulley
	09223-56010	Crankshaft Rear Oil Seal Replacer	
	09316-6001 1	Transmission & Transfer Bearing Replacer	
	(09316-0001 1)	Replacer Pipe	Crankshaft front oil seal

PREPARATION - ENGINE MECHANICAL

	<p>09330-00021 Companion Flange Holding Tool</p>	<p>Crankshaft pulley</p>
	<p>09843-18020 Diagnosis Check Wire</p>	
	<p>09950-50013 Puller C Set</p>	
	<p>(09951-05010) Hanger 150</p>	<p>Crankshaft pulley Crankshaft timing pulley</p>
	<p>(09952-05010) Slide Arm</p>	<p>Crankshaft pulley Crankshaft timing pulley</p>
	<p>(09953-05010) Center Bolt 100</p>	<p>Crankshaft pulley Crankshaft timing pulley</p>
	<p>(09953-05020) Center Bolt 150</p>	<p>Crankshaft pulley Crankshaft timing pulley</p>
	<p>(09954-0501 1) Claw No.1</p>	<p>Crankshaft timing pulley</p>
	<p>(09954-05021) Claw No.2</p>	<p>Crankshaft pulley</p>
	<p>09950-60010 Replacer Set</p>	
	<p>(09951-00240) Replacer 24</p>	
	<p>(09951-00440) Replacer 44</p>	
	<p>(09952-06010) Adapter</p>	

	<p>09950-70010 Handle Set</p>	
	<p>(09951-07100) Handle 100</p>	<p>Spark plug tube Valve guide bushing</p>
	<p>09960-10010 Variable Pin Wrench Set</p>	
	<p>(09962-01000) Variable Pin Wrench Arm Assy</p>	<p>Camshaft sub-gear</p>
	<p>(09963-01000) Pin 10</p>	<p>Camshaft sub-gear</p>
	<p>(09963-00500) Pin 5</p>	<p>Camshaft sub-gear</p>



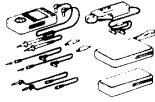
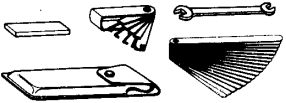
**EQUIPMENT**

Megger (Insulation resistance meter)	Spark plug
Spark plug cleaner	
Torque wrench	

# IGNITION

## RECOMMENDED TOOLS

PP1AL-01

	09082-00050 TOYOTA Electrical Tester Set.	
	09200-00010 Engine Adjust Kit .	

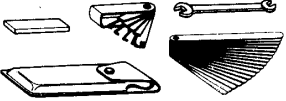
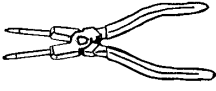
**EQUIPMENT**

Oil pressure gauge	
Precision straight edge	
Torque wrench	

**LUBRICANT**

Item	Capacity	Classification
Engine oil Dry fill Drain and refill w/ Oil filter change w/o Oil filter change	8.0 liters (8.5 US qts, 7.0 Imp. qts)  6.8 liters (7.2 US qts, 6.0 Imp. qts) 6.4 liters (6.8 US qts, 5.6 Imp qts)	API grade SL Energy-Conserving or ILSAC multigrade engine oil.

# RECOMMENDED TOOLS

	<p>09200-00010 Engine Adjust Kit .</p>	
	<p>09905-00013 Snap Ring Pliers .</p>	


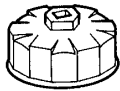
**SSM (Special Service Materials)**

08826-00080	Seal Packing Black or equivalent (FIPG)	Oil pump No.1 oil pan No.2 oil pan
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Oil pressure switch

# LUBRICATION

## SST (Special Service Tools)

PP1AT-02

	<p>09032-00100 Oil Pan Seal Cutter</p>	
	<p>09228-07501 Oil Filter Wrench</p>	

# MAINTENANCE EQUIPMENT

PP1AY-01

Mirror	Brake hose
--------	------------



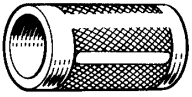
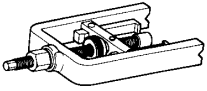
# EQUIPMENT

Torque wrench	
Dial indicator	

# PROPELLER SHAFT

## SST (Special Service Tools)

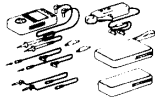
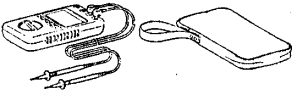

PP19L-02

	<p>09636-20010 Upper Ball Joint Dust Cover Replacer</p>	
	<p>09332-25010 Universal Joint Bearing Remover &amp; Replacer</p>	

**EQUIPMENT**

Torque wrench	
Bolt: Length: 35 mm (1.387 in.) Pitch: 1.0 mm (0.039 in.) Diam.: 6.0 mm (0.236 in.)	Airbag disposal
Tire Width: 185 mm (7.28 in.) Inner diam.: 360 mm (14.17 in.)	Airbag disposal
Tire with disc wheel Width: 185 mm (7.28 in.) Inner diam.: 360 mm (14.17 in.)	Airbag disposal
Plastic bag	Airbag disposal

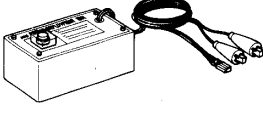
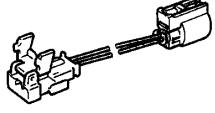
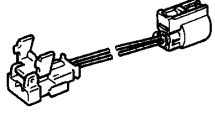
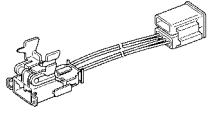

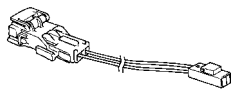


**RECOMMENDED TOOLS**

	09082-00050 TOYOTA Electrical Tester Set.	
	09082-00040 TOYOTA Electrical Tester.	
	(09083-00150) Test Lead Set	Seat belt pretensioner connector

# SUPPLEMENTAL RESTRAINT SYSTEM

## SST (Special Service Tools)

PP3X7-01

	09082-00700	SRS Airbag Deployment Tool	
	09082-00750	Airbag Deployment Wire Sub-harness No.3	
	09082-00760	Airbag Deployment Wire Sub-harness No.4	
	09082-00780	Airbag Deployment Wire Sub-Harness No.6	
	09082-00802	Airbag Deployment Wire Sub-Harness No.8	
	(09082-10801)	Wire A	
	(09082-30801)	Wire C	
	09843-18040	Diagnosis Check Wire No.2	

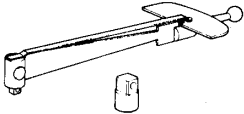
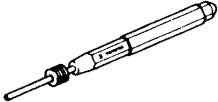
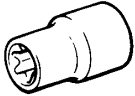
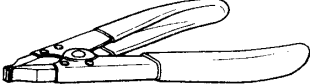
**EQUIPMENT**

Dial indicator with magnetic base	
Drill	
Micrometer	
Torque wrench	
Vernier calipers	

**LUBRICANT**

FRONT DRIVE SHAFT		
Item	Capacity	Classification
Outboard joint grease	368 - 378 g (13.0 - 13.3 oz.)	
Inboard joint grease	293 - 303 g (10.3 - 10.7 oz.)	
FRONT DIFFERENTIAL		
Item	Capacity	Classification
Hypoid gear oil	1.70 liters (1.80 US qts, 1.50 Imp.qts)	Hypoid gear oil API GL-5 Above -18 °C (0°F) SAE 90 Below -18 °C (0°F) SAE 80W-90 or 80W
REAR DIFFERENTIAL		
Item	Capacity	Classification
Hypoid gear oil	Normal	Hypoid gear oil API GL-5 Above -18 °C (0°F) SAE 90 Below -18 °C (0°F) SAE 80W-90 or 80W
	w/ Diff. lock	
Hypoid gear oil LSD	w/ LSD	Hypoid gear oil LSD API GL-5 Above -18 °C (0°F) SAE 90 Below -18 °C (0°F) SAE 80W-90 or 80W

## RECOMMENDED TOOLS

	09025-00010 Torque Wrench (30 kgf-cm)	
	09031-00030 Pin Punch .	
	09044-00020 Torx Socket E10 .	
	09905-00012 Snap Ring No.1 Expander .	






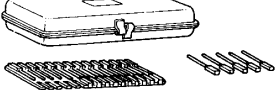

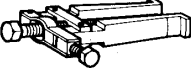
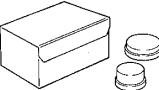

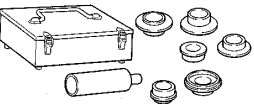
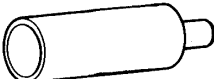


**SSM (Special Service Materials)**

08826-00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	
08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	
08833-00100	THREE BOND 1360K or equivalent	


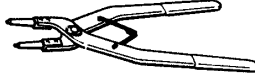

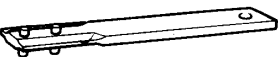
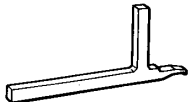
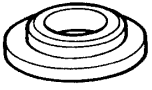

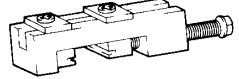




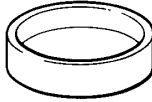
# SUSPENSION AND AXLE

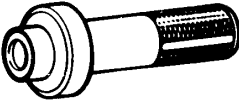
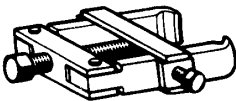
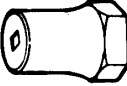
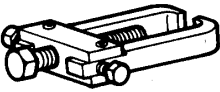

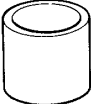
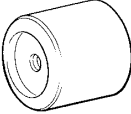
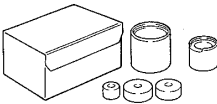

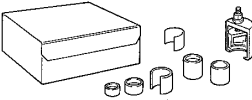



## SST (Special Service Tools)

PP1VL-03


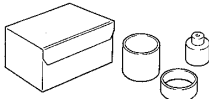

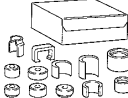


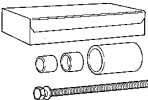
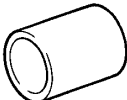


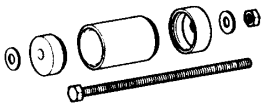
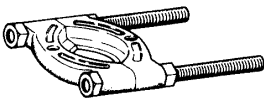
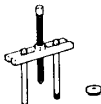
	09023-00100	Union Nut Wrench 10 mm	Rear axle Rear differential
	09214-7601 1	Crankshaft Pulley Replacer	Rear differential
	09223-00010	Cover & Seal Replacer	Front differential
	09240-00020	Wire Gauge Set	Front drive shaft
	09308-00010	Oil Seal Puller	Front differential Rear axle Rear differential
	09308-10010	Oil Seal Puller	Front differential Rear differential
	09315-00022	Clutch Release Bearing Remover & Replacer	Front differential
	09316-2001 1	Transfer Bearing Replacer	Front drive shaft Front suspension
	09316-6001 1	Transmission & Transfer Bearing Replacer	Front differential Rear differential
	(09316-0001 1)	Replacer Pipe	
	(09316-00021)	Replacer "A"	
	09330-00021	Companion Flange Holding Tool	Front differential Rear differential

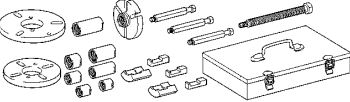
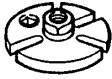


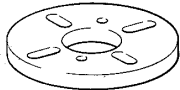
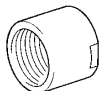
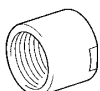

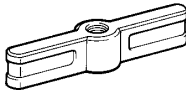
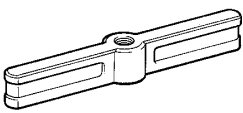
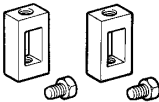
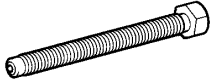
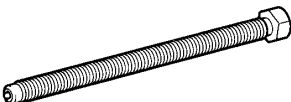
PREPARATION - SUSPENSION AND AXLE

	<p>09350-30020</p>	<p>TOYOTA Automatic Transmission Tool Set</p>	<p>Front differential</p>
	<p>(09350-07060)</p>	<p>No.1 Snap Ring Expander</p>	
	<p>09502-12010</p>	<p>Differential Bearing Replacer</p>	<p>Front differential</p>
	<p>09504-0001 1</p>	<p>Differential Side Bearing Adjusting Nut Wrench</p>	<p>Rear differential</p>
	<p>09504-22012</p>	<p>Differential Side Bearing Replacer</p>	<p>Front differential Rear differential (w/ Diff. lock)</p>
	<p>09506-30012</p>	<p>Differential Drive Pinion Rear Bearing Cone Replacer</p>	<p>Front differential</p>
	<p>09506-35010</p>	<p>Differential Drive Pinion Rear Bearing Replacer</p>	<p>Front differential Rear differential</p>
	<p>09521-24010</p>	<p>Drive Shaft Boot Clamping Tool</p>	<p>Front drive shaft</p>
	<p>09521-2501 1</p>	<p>Rear Axle Shaft Puller</p>	<p>Rear axle</p>
	<p>09521-25021</p>	<p>Rear Axle Shaft Puller Attachment</p>	<p>Rear axle</p>
	<p>09527-1701 1</p>	<p>Rear Axle Shaft Bearing Remover</p>	<p>Front suspension</p>
	<p>09550-00032</p>	<p>Replacer</p>	<p>Front differential</p>
	<p>09550-60010</p>	<p>Differential Side Bearing Replacer</p>	<p>Rear differential (w/ Diff. lock)</p>

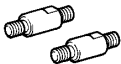
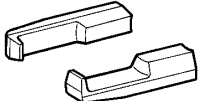

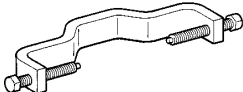
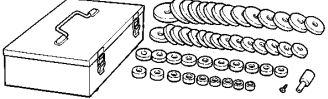





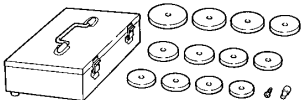
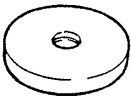
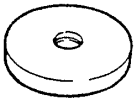
	09554-3001 1	Differential Oil Seal Replacer	Front differential
	09556-22010	Drive Pinion Front Bearing Remover	Front differential Rear differential
	09607-60020	Front Wheel Adjusting Nut Wrench	Front axle
	09628-6201 1	Ball Joint Puller	Front axle Front drive shaft Front suspension
	09631-12090	Seal Ring Tool	Rear axle
	09631-32020	Seal Ring Tool	Front suspension
	09649-17010	Steering Knuckle Tool	Rear differential (w/ LSD)
	09710-14013	Rear Suspension Bushing Tool Set	Rear suspension
	(09710-00061)	Replacer	
	09710-22021	Front Suspension Bushing Tool Set	Front suspension
	(09710-01071)	Lower Arm Bushing Remover	
	09710-28012	Front Suspension Bushing Tool Set	Front suspension Rear suspension
	(09710-07031)	Bushing Replacer	

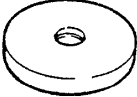




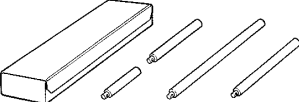


## PREPARATION - SUSPENSION AND AXLE

	(09710-07062) Bushing Replacer	
	09710-28021 Front Suspension Bushing Tool Set	Front suspension
	(09710-08031) Base	
	09710-30021 Suspension Bushing Tool Set	Front suspension
	(09710-03101) Bushing Replacer	
	09710-30050 Suspension Arm Bushing Replacer	Rear differential
	09726-3501 1 Front Lower Arm Bushing Remover & Replacer	Front suspension
	(09726-05021) Gate	
	09726-36010 Lower Control Arm Bushing Replacer	Front suspension
	09726-40010 Lower Control Shaft Bearing Replacer	Rear differential
	09830-36010 Front Mounting Cushion Remover & Replacer	Front suspension
	09950-00020 Bearing Remover	Front drive shaft Front differential Front suspension Rear differential
	09950-00030 Bearing Remover Attachment	Front suspension Rear differential

	<p>09950-30012 Puller A Set</p>	<p>Front differential Rear differential</p>
	<p>(09951-03010) Upper Plate</p>	
	<p>(09953-03010) Center Bolt</p>	
	<p>(09954-03010) Arm</p>	
	<p>(09955-03030) Lower Plate 130</p>	
	<p>(09956-03020) Adapter 18</p>	
	<p>(09956-03040) Adapter 22</p>	
	<p>09950-4001 1 Puller B Set</p>	<p>Front suspension Front differential Rear differential</p>
	<p>(09951-04010) Hanger 150</p>	
	<p>(09951-04020) Hanger 200</p>	
	<p>(09952-04010) Slide Arm</p>	
	<p>(09953-04020) Center Bolt 150</p>	
	<p>(09953-04030) Center Bolt 200</p>	

PREPARATION - SUSPENSION AND AXLE

	<p>(09954-04010) Arm 25</p>	
	<p>(09955-04061) Claw No.6</p>	
	<p>(09957-04010) Attachment</p>	
	<p>(09958-0401 1) Holder</p>	
	<p>09950-60010 Replacer Set</p>	<p>Front axle Rear differential</p>
	<p>(09951-00400) Replacer 40</p>	
	<p>(09951-00410) Replacer 41</p>	
	<p>(09951-00480) Replacer 48</p>	
	<p>(09951-00540) Replacer 54</p>	
	<p>(09951-00580) Replacer 58</p>	
	<p>09950-60020 Replacer Set No.2</p>	<p>Front axle Front differential Rear axle Rear differential</p>
	<p>(09951-00710) Replacer 71</p>	
	<p>(09951-00730) Replacer 73</p>	



	<p>(09951-00780) Replacer 78</p>	
	<p>(09951-00810) Replacer 81</p>	
	<p>(09951-00890) Replacer 89</p>	
	<p>(09951-00910) Replacer 91</p>	
	<p>(09951-01030) Replacer 103</p>	
	<p>09950-70010 Handle Set</p>	<p>Front axle Front and rear differential Front and rear suspension Rear axle</p>
	<p>(09951-07100) Handle 100</p>	
	<p>(09951-07150) Handle 150</p>	



**EQUIPMENT**

Graduated cylinder	Injector
OBD II scan tool	
Sound scope	Injector
Torque wrench	
Vacuum gauge	


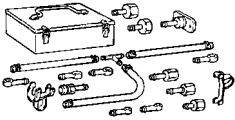
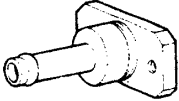
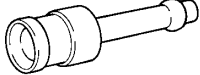

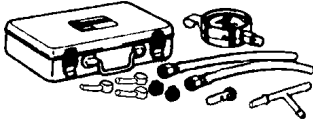


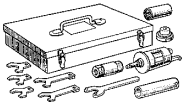
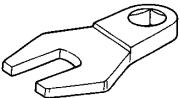


# RECOMMENDED TOOLS

	<p>09082-00040 TOYOTA Electrical Tester.</p>	
	<p>09258-00030 Hose Plug Set .</p>	<p>Plug for vacuum hose, fuel hose etc.</p>

## SFI

## SST (Special Service Tools)

PP0U3-05

	09023-12700	Union Nut Wrench 17mm	Fuel line flare nut
	09268-41047	Injection Measuring Tool Set	
	(09268-41091)	NO.7 Union	
	(09268-41 110)	Adaptor	
	(09268-41300)	Clamp	
	09268-45014	EFI Fuel Pressure Gauge	
	(09268-41 190)	Adaptor	
	(90405-06167)	I Union	
	09612-24014	Steering Gear Housing Overhaul Tool Set	
	(09617-2401 1)	Steering Rack Wrench	Fuel pressure pulsation damper
	09816-30010	Oil Pressure Switch Socket	Knock sensor
	09842-30070	Wiring "F" EFI Inspection	

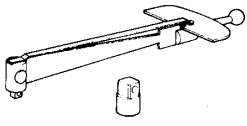
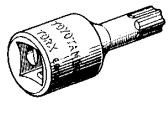
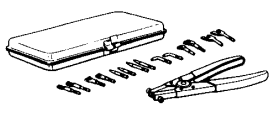
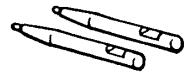
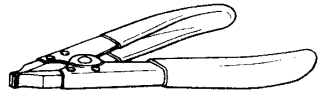
**EQUIPMENT**

Caliper gauge	PS vane pump
Vernier Calipers	PS vane pump
Dial indicator	PS gear
Feeler gauge	PS vane pump
Micrometer	PS vane pump
Torque wrench	

**LUBRICANT**

Item	Capacity	Classification
Power steering fluid Total	0.8 liters (0.9 US qts, 0.7 Imp.qts)	ATF DEXRON® II or III

# RECOMMENDED TOOLS



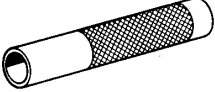
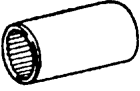

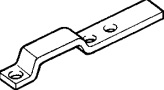

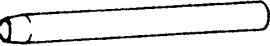
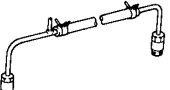
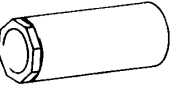

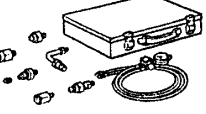
	<p>09025-00010 Torque Wrench (30 kgf-cm)</p>	<p>PS vane pump PS gear</p>
	<p>09042-00010 Torx Socket T30 .</p>	<p>Tilt steering column Power tilt and power telescopic steering column</p>
	<p>09904-00010 Expander Set .</p>	
	<p>(09904-00050) No. 4 Claw</p>	
	<p>09905-00012 Snap Ring No.1 Expander .</p>	

**SSM (Special Service Materials)**

08833-00080 Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	PS gear
---	---------

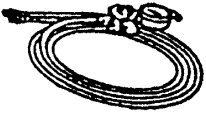

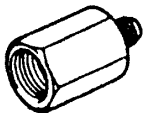
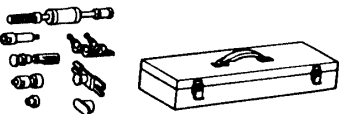

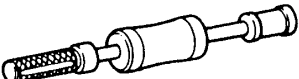
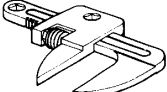
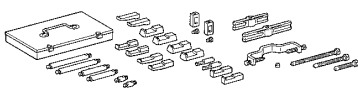
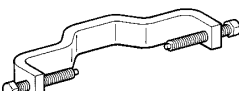
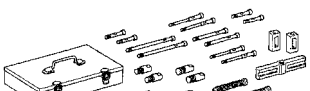
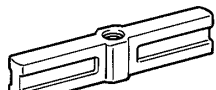
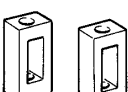

**STEERING****SST (Special Service Tools)**

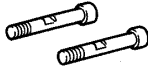
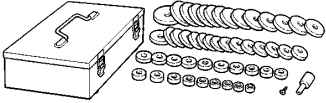






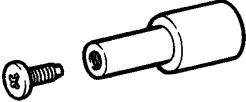
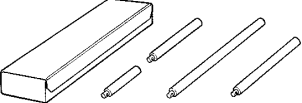

PP3X9-01

	09023-38200	Union Nut Wrench 12mm	POWER STEERING GEAR
	09023-38400	Union Nut Wrench 14mm	POWER STEERING GEAR
	09612-2201 1	Tilt Handle Bearing Replacer	TILT STEERING COLUMN
	09616-0001 1	Steering Worm Bearing Adjusting Socket	POWER STEERING GEAR
	09630-00014	Power Steering Gear Housing Overhaul Tool Set	POWER STEERING GEAR POWER STEERING VANE PUMP
	(09631-00132)	Vane Pump Bracket	POWER STEERING VANE PUMP
	(09631-00142)	Overhaul Stand	POWER STEERING GEAR
	09631-00350	Steering Rack Cover 35	POWER STEERING GEAR
	09631-12071	Steering Rack Oil Seal Test Tool	POWER STEERING GEAR
	09631-20060	Bearing Guide Nut Wrench	POWER STEERING GEAR
	09631-20081	Seal Ring Tool	POWER STEERING GEAR
	09640-10010	Power Steering Pressure Gauge Set	POWER STEERING FLUID



PREPARATION - STEERING

	(09641-01010) Gauge Assy	POWER STEERING FLUID
	(09641-01030) Attachment B	POWER STEERING FLUID
	(09641-01060) Attachment E	POWER STEERING FLUID
	09910-00015 Puller Set	POWER TILT AND POWER TELESCOPIC STEERING COLUMN
	(09911-0001 1) Puller Clamp	POWER TILT AND POWER TELESCOPIC STEERING COLUMN
	(09912-00010) Puller Slide Hammer	POWER TILT AND POWER TELESCOPIC STEERING COLUMN
	09922-10010 Variable Open Wrench	POWER STEERING GEAR
	09950-4001 1 Puller B Set	POWER TILT AND POWER TELESCOPIC STEERING COLUMN TILT STEERING COLUMN
	(09958-0401 1) Holder	POWER TILT AND POWER TELESCOPIC STEERING COLUMN TILT STEERING COLUMN
	09950-50013 Puller C Set	TILT STEERING COLUMN
	(09951-05010) Hanger 150	TILT STEERING COLUMN
	(09952-05010) Slide Arm	TILT STEERING COLUMN
	(09953-05020) Center Bolt 150	TILT STEERING COLUMN

	(09954-05021) Claw No.2	TILT STEERING COLUMN
	09950-60010 Replacer Set	POWER STEERING GEAR POWER STEERING VANE PUMP
	(09951-00180) Replacer 18	POWER STEERING GEAR
	(09951-00260) Replacer 26	POWER STEERING GEAR
	(09951-00280) Replacer 28	POWER STEERING GEAR POWER STEERING VANE PUMP
	(09951-00320) Replacer 32	POWER STEERING GEAR
	(09951-00330) Replacer 33	POWER STEERING GEAR
	(09951-00360) Replacer 36	POWER STEERING GEAR
	(09952-06010) Adapter	POWER STEERING GEAR
	09950-70010 Handle Set	POWER STEERING GEAR POWER STEERING VANE PUMP
	(09951-07100) Handle 100	POWER STEERING GEAR POWER STEERING VANE PUMP

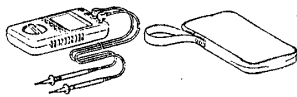
## PREPARATION - STEERING

A technical drawing of a cylindrical power steering gear component with a flange on one end.	(09951-07150) Handle 150	POWER STEERING GEAR
A technical drawing of a cylindrical power steering gear component, similar to the one above but with a different flange design.	(09951-07200) Handle 200	POWER STEERING GEAR

**EQUIPMENT**

Dial indicator	Commutator
Magnetic finger	Steel ball
Pull scale	Brush spring
Sandpaper	Commutator
Torque wrench	
V-block	Commutator
Vernier calipers	Commutator, Brush

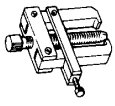
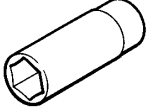

## RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	
---	---------------------------------------	--

# STARTING

## SST (Special Service Tools)

PP1AZ-06

	<p>09286-4601 1 Injection Pump Spline Shaft Puller</p>	<p>Armature front bearing</p>
	<p>09810-38140 Starter Magnet Switch Nut Wrench 14</p>	
	<p>09820-00031 Alternator Rear Bearing Replacer</p>	<p>Armature bearing</p>

**EQUIPMENT**

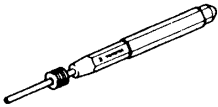
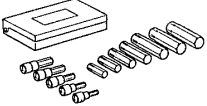
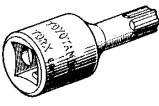
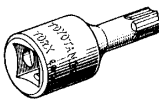
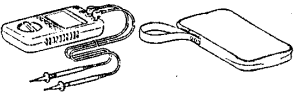
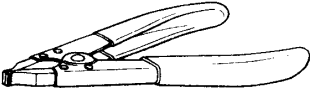
Dial indicator	Cylinder gauge
Straight edge	
Torque wrench	
Magnetic finger	
Feeler gauge	
Vernier calipers	
Micrometer	

# LUBRICANT

Item	Capacity	Classification
Transfer oil	1.3 liters (1.4 US qts, 1.1 Imp. qts)	API GL-4 or GL-5 SAE 75W-90



# RECOMMENDED TOOLS

	<p>09031-00030 Pin Punch .</p>	
	<p>09040-0001 1 Hexagon Wrench Set .</p>	
	<p>09042-00010 Torx Socket T30 .</p>	
	<p>09042-00020 Torx Socket T40 .</p>	
	<p>09082-00040 TOYOTA Electrical Tester.</p>	
	<p>09905-00012 Snap Ring No.1 Expander .</p>	

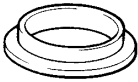
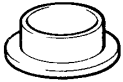
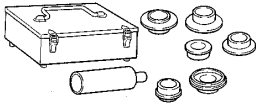
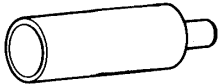


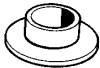



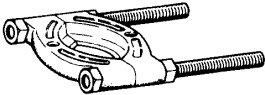
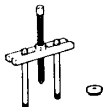
**SSM (Special Service Materials)**

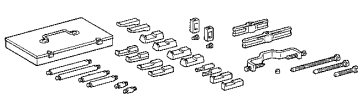
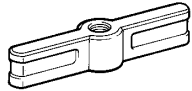
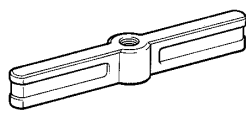
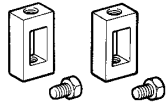
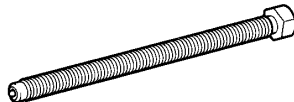
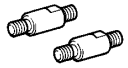
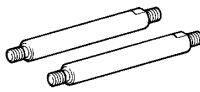
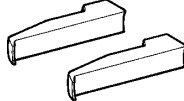
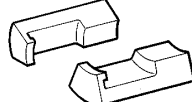
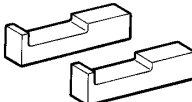
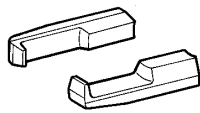

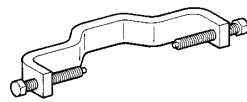
08826-00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	Front case x Rear case Rear case x Case cover Case x Extension housing Motor actuator x Front case
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Straight Screw plug Case cover set bolt Rear case set bolt

# TRANSFER

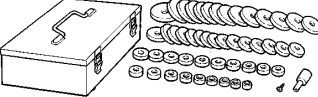




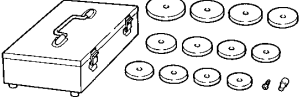
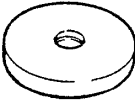
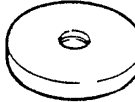
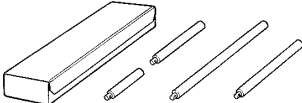

## SST (Special Service Tools)

PP1YS-02

	09316-12010	Transfer Bearing Replacer	Center differential
	09316-2001 1	Transfer Bearing Replacer	Front extension housing, Rear extension housing
	09316-6001 1	Transmission & Transfer Bearing Replacer	
	(09316-0001 1)	Replacer Pipe	Front extension housing, Rear extension housing, Idler gear, Transfer assembly, Center differential, Input shaft
	(09316-00021)	Replacer "A"	Rear extension housing
	(09316-00031)	Replacer "B"	Front extension housing, Rear extension housing, Idler gear, Transfer assembly, Input shaft
	(09316-00041)	Replacer "C"	Front extension housing, Rear extension housing
	(09316-00061)	Replacer "E"	Front extension housing
	(09316-00071)	Replacer "F"	Idler gear, Front extension housing
	09325-12010	Transmission Oil Plug	Rear extension housing
	09950-00020	Bearing Remover	Idler gear, Center differential
	09950-00030	Bearing Remover Attachment	Center differential

	09950-4001 1	Puller B Set	
	(09951-04010)	Hanger 150	Idler gear
	(09951-04020)	Hanger 200	Input shaft, Front extension housing, Transfer assembly
	(09952-04010)	Slide Arm	Input shaft, Idler gear, Front extension housing, Transfer assembly
	(09953-04030)	Center Bolt 200	Input shaft, Idler gear, Front extension housing, Transfer assembly
	(09954-04010)	Arm 25	Input shaft, Front extension housing, Transfer assembly, Idler gear
	(09954-04020)	Arm 100	Front extension housing
	(09955-0401 1)	Claw No.1	Input shaft
	(09955-04021)	Claw No.2	Front extension housing
	(09955-04051)	Claw No.5	Front extension housing
	(09955-04061)	Claw No.6	Idler gear, Transfer assembly
	(09957-04010)	Attachment	Input shaft, Idler gear, Front extension housing, Transfer assembly
	(09958-0401 1)	Holder	Input shaft, Idler gear, Front extension housing

## PREPARATION - TRANSFER

	09950-60010 Replacer Set	
	(09951-00270) Replacer 27	Transfer assembly
	(09951-00320) Replacer 32	Transfer assembly, Center differential
	(09951-00330) Replacer 33	Idler gear
	(09951-00400) Replacer 40	Input shaft
	09950-60020 Replacer Set No.2	
	(09951-00790) Replacer 79	Transfer assembly
	(09951-00890) Replacer 89	Transfer assembly
	09950-70010 Handle Set	Transfer assembly, Center differential
	(09951-07150) Handle 150	Transfer assembly

# AIR CONDITIONING

## SERVICE DATA

SS003-03

Refrigerant charge volume	Single A/C	650 ± 50 g (22.93 ± 1.76 oz.)
	Dual A/C	1,050 ± 50 g (37.03 ± 1.76 oz.)
Idle speed	Magnetic clutch not engaged	700 ± 50 rpm
	Magnetic clutch engaged	780 ± 50 rpm
Magnetic clutch clearance		0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

# TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Condenser x Discharge tube	5.4	55	48 in.·lbf
Condenser x Liquid tube	10	100	7
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Expansion valve x Evaporator	3.4	35	30
Liquid line (Block joint)	10	100	7
Liquid line (Piping line)	14	140	10
Discharge line (Piping joint)	22	225	16
Suction line (Block joint)	10	100	7
Suction line (Piping joint)	5/8"	32	24
	3/4"	42	31
Compressor x Cylinder block	49	500	36

# AUTOMATIC TRANSMISSION

## SERVICE DATA

SS000-02

A750F		
Line pressure (Wheel locked)	Engine idling D position R position AT stall (Throttle valve fully opened) D position R position	362 - 420 kPa (3.7 - 4.3 kgf·cm <sup>2</sup> , 53 - 61 psi) 500 - 580 kPa (5.1 - 5.9 kgf·cm <sup>2</sup> , 73 - 84 psi) 1,360 - 1,460kPa (13.9 - 14.9 kgf·cm <sup>2</sup> , 197 - 212 psi) 1,295 - 1,415 kPa (13.2 - 14.4 kgf·cm <sup>2</sup> , 188 - 205 psi)
Engine stall revolution	D and R positions	2,150 ℓ 150 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	700 ℓ 50 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter runout	Max.	0.30 mm (0.0118 in.)
Torque converter clutch installation distance		More than 17.1 mm (0.673 in.)
Shift schedule		
D position (Throttle valve fully opened)	1 → 2 2 → 3 3 → 4 4 → 5 5 → 4 4 → 3 3 → 2 2 → 1	45 - 57 km/h (28 - 35 mph) 79 - 90 km/h (49 - 56 mph) 113 - 128 km/h (70 - 80 mph) 165 - 180 km/h (103 - 112 mph) 158 - 173 km/h (98 - 108 mph) 105 - 117 km/h (65 - 73 mph) 70 - 78 km/h (43 - 48 mph) 35 - 41 km/h (22 - 25 mph)
(Throttle valve fully closed)	4 → 5 5 → 4	32 - 38 km/h (20 - 24 mph) 24 - 29 km/h (15 - 18 mph)
3 position (Throttle valve fully opened)	1 → 2 2 → 3 4 → 3 3 → 2 2 → 1	45 - 57 km/h (28 - 35 mph) 79 - 90 km/h (49 - 56 mph) 119 - 132 km/h (74 - 82 mph) 70 - 78 km/h (43 - 48 mph) 35 - 41 km/h (22 - 25 mph)
2 position (Throttle valve fully opened)	1 → 2 3 → 2 2 → 1	45 - 57 km/h (28 - 35 mph) 80 - 88 km/h (50 - 55 mph) 35 - 41 km/h (22 - 25 mph)
L position (Throttle valve fully opened)	2 → 1	41 - 47 km/h (25 - 29 mph)
Lock-up point	Throttle valve opening 5 %	
D position		
5th gear	Lock-up ON Lock-up OFF	67 - 74 km/h (42 - 46 mph) 60 - 67 km/h (37 - 42 mph)
4 position		
4th gear	Lock-up ON Lock-up OFF	61 - 68 km/h (38 - 42 mph) 54 - 61 km/h (34 - 38 mph)



## TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
No.1 vehicle speed sensor x Transfer case		16	160	12
No.2 vehicle speed sensor x Transmission case	NT	5.4	55	48 in.·lbf
	SP2	5.4	55	48 in.·lbf
ATF temperature sensor (for linear control ) x Valve body		11	112	8
ATF temperature sensor (for oil temp warning lamp ) x Valve body		10	100	7
ATF temperature sensor x Transmission case		5.4	55	48 in.·lbf
Park/neutral position switch	Bolt	13	130	9
	Nut	3.9	40	35 in.·lbf
Transmission control shaft lever x Transmission control rod		13	130	9
Shift solenoid lock plate x Valve body		6.4	65	57 in.·lbf
Shift solenoid S1 S2 x Valve body		10	102	7
Shift solenoid SR x Valve body		6.4	65	57 in.·lbf
Valve body x Transmission case		11	110	8
Oil stainer x Valve body		10	100	7
Oil pan x Transmission case		4.4	55	39 in.·lbf
Drain plug x Oil pan		20	205	15
Parking lock pawl bracket x Transmission case		7.4	75	65 in.·lbf
Shift lever assembly x Body		8.3	85	73 in.·lbf
Control lever x Shift lever plate		13	130	9
Transmission control rod x Shift lever assembly		13	130	9
Shift lever guide housing x Shift lever plate		4.9	50	43 in.·lbf
Power steering oil cooler sub-assy x Body		7.5	76	66 in.·lbf
Oil cooler bracket x Body		12	117	8
Oil cooler bracket x Oil cooler		4.9	50	43 in.·lbf
Oil cooler pipe x Body		4.9	50	43 in.·lbf
Oil filler pipe		12	122	9
Transfer shift lever x Transfer shift lever rod assembly		12	122	9
Transfer shift lever boot x Body		5.4	55	48 in.·lbf
Hole plug x Transmission housing		18	185	13
Drive plate x Torque converter clutch		48	490	35
Oil cooler pipe union nut		34	347	25
Crossmember	Bolt	50	510	37
	Nut	74	750	54
Engine mounting insulator rear x Transmission case		59	600	43
Transmission housing x Engine	Bolt A	71	724	52
	Bolt B	37	377	27
Drive plate x Crankshaft	1st	49	500	36
	2nd	Turn 90°	Turn 90°	Turn 90°

# BODY ELECTRICAL

## SERVICE DATA

SSOCN-30

AUTOMATIC LIGHT CONTROL SENSOR	
(Connector disconnected)	
3 - Ground (Ignition switch ON)	5.2 - 9.0V
TURN SIGNAL FLASHER	
1 - Ground (Ignition switch LOCK or ACC)	No voltage
1 - Ground (Ignition switch ON)	Battery positive voltage
4 - Ground (Constant)	Battery positive voltage
SPEEDOMETER (ON-VEHICLE)	
USA:	
Standard indication (mph)	Allowable range (mph)
20	18 - 24
40	38 - 44
60	56 - 66
80	78 - 88
100	98 - 110
120	118 - 132
CANADA:	
Standard indication (km/h)	Allowable range (km/h)
20	17 - 24
40	38 - 46
60	57.5 - 67
80	77 - 88
100	96 - 109
120	115 - 130
140	134 - 151.5
160	153 - 173
TACHOMETER (ON-VEHICLE)/ DC 13.5 V 25 °C at (77 °F)	
Standard indication	Allowable range
700	630 - 770
1,000	900 - 1,100
2,000	1,850 - 2,150
3,000	2,800 - 3,200
4,000	3,800 - 4,200
5,000	4,800 - 5,200
6,000	5,750 - 6,250
7,000	6,700 - 7,300
FUEL SENDER GAUGE	
Float position mm (in.)	Voltage (V)
F: Approx. 85.3 (3.36)	Approx. 0.30 ± 0.1
1/2: Approx. 1.7 (0.76)	Approx. 2.45 ± 0.1
E: Approx. 9.19 (3.62)	Approx. 4.60 ± 0.1
DEFOGGER SWITCH (w/ Navigation)	
B22 - Ground (Ignition switch LOCK or ACC)	No voltage

2004 LAND CRUISER (RM1071U)

## SERVICE SPECIFICATIONS - BODY ELECTRICAL

B22 - Ground (Ignition switch ON)	Battery positive voltage
A10 - Ground (Constant)	Battery positive voltage
DEFOGGER SWITCH (w/o Navigation)	
8 - Ground (Ignition switch LOCK or ACC)	No voltage
8 - Ground (Ignition switch ON)	Battery positive voltage
2 - Ground (Constant)	Battery positive voltage
SLIDING ROOF CONTROL ASSEMBLY	
5 - Ground (Constant)	Battery positive voltage
8 - Ground (Ignition switch LOCK or ACC)	No voltage
8 - Ground (Ignition switch ON)	Battery positive voltage
POWER MIRROR SWITCH	
4 - Ground (Ignition switch LOCK)	No voltage
4 - Ground (Ignition switch ACC or ON)	Battery positive voltage
POWER SEAT SWITCH (Driver's Seat)	
11 - Ground (Constant)	Battery positive voltage
POWER SEAT SWITCH (Passenger's Seat)	
11 - Ground (Constant)	Battery positive voltage
LUMBAR SUPPORT SWITCH (Driver's Seat)	
POWER MIRROR SWITCH (Wire harness side)	
4 - Ground (Ignition switch is LOCK)	No voltage
4 - Ground (Ignition switch is ACC or ON)	Battery positive voltage
POWER AMPLIFIER	
7 - Ground (Constant)	Battery positive voltage
16 - Ground (Constant)	Battery positive voltage
REAR SEAT AUDIO	
24 - Ground (Ignition switch LOCK)	No voltage
24 - Ground (Ignition switch ACC or ON)	Battery positive voltage
12 - Ground (Constant)	Battery positive voltage
DVD CHANGER	
1 - Ground (Ignition switch LOCK)	No voltage
1 - Ground (Ignition switch ACC or ON)	Battery positive voltage
10 - Ground (Constant)	Battery positive voltage
RADIO RECEIVER	
A1 - Ground (Ignition switch LOCK)	No voltage
A11 - Ground (Ignition switch ACC or ON)	Battery positive voltage
A11 - Ground (Constant)	Battery positive voltage
ANTENNA MOTOR CONTROL RELAY	
4 - Ground (Constant)	Battery positive voltage
7 - Ground (Ignition switch ACC or LOCK)	No voltage
7 - Ground (Ignition switch ON)	Battery positive voltage
17 - Ground (Ignition switch LOCK)	No voltage
17 - Ground (Ignition switch ACC or ON)	Battery positive voltage
OVERHEAD J/B	
8 - Ground (Constant)	Battery positive voltage

11 - Ground (Ignition switch OFF or ACC)	No voltage
11 - Ground (Ignition switch ON)	Battery positive voltage

# BODY

## TORQUE SPECIFICATION

SS00L-11

Part tightened	N·m	kgf·cm	ft·lbf
FRONT BUMPER	-	-	-
Front bumper cover x Body Bolt:	8.5	87	76 in·lbf
Front bumper cover x Body Screw:	3.0	31	27 in·lbf
Fog light x Front bumper cover	4.9	50	43 in·lbf
Front bumper reinforcement x Body	58	590	43
REAR BUMPER	-	-	-
Rear bumper cover x Body	20	204	15
Reflex reflector x Rear bumper cover	4.9	50	43 in·lbf
Rear bumper step reinforcement x Extension mounting bracket	12.5	127	11
Extension mounting bracket x Body	19	195	14
Rear bumper reinforcement x Body	20	204	15
HOOD	-	-	-
Hood x Hood side hinge	18	185	13
FRONT DOOR	-	-	-
Door glass x Window regulator	8.0	82	71 in·lbf
Window regulator x Door panel	8.0	82	71 in·lbf
Door lock x Door panel	5.0	51	44 in·lbf
Outside handle x Door panel	5.0	51	44 in·lbf
Door lock cylinder x Outside handle	5.0	51	44 in·lbf
Door hinge x Body	23	235	17
Door hinge x Door panel	26	265	19
Door check x Door panel	5.0	51	44 in·lbf
Door check x Body	27	275	20
Door lock striker x Body	11	115	8
REAR DOOR	-	-	-
Door glass x Window regulator	8.0	82	71 in·lbf
Window regulator x Door panel	8.0	82	71 in·lbf
Door lock x Door panel	5.0	51	44 in·lbf
Outside handle x Door panel	5.0	51	44 in·lbf
Door hinge x Body	23	235	17
Door hinge x Door panel	26	265	19
Door check x Door panel	5.0	51	44 in·lbf
Door check x Body	27	275	20
Door lock striker x Body	11	115	8
UPPER BACK DOOR	-	-	-
Back door hinge x Body	28	286	21
Back door hinge x Door panel	31	316	23
Door lock striker x Door panel	11.5	117	8
Back door control x Door panel	5.0	51	44 in·lbf
Back door lock x Door panel	7.0	71	62 in·lbf
LOWER BACK DOOR	-	-	-
Back door lock x Door panel	5.0	51	44 in·lbf

2004 LAND CRUISER (RM1071U)

Author :

Date :

189

Tail gate stay x Door panel		18.5	189	14
Tail gate stay x Body		18.5	189	14
Door hinge x Body		28	286	21
Door hinge x Door panel		31	316	23
Door lock striker x Body		11.5	117	8
Back door lock control x Door panel		5.0	51	44 in.-lbf
Upper back door striker x Door panel		11.5	117	8
BACK DOOR STAY		-	-	-
Back door stay x Body		17.5	178	13
Back door stay x Door panel		13	133	10
FRONT WIPER AND WASHER		-	-	-
Wiper arm x Wiper link		20	204	15
Wiper link x Body		5.4	55	48 in.-lbf
REAR WIPER AND WASHER		-	-	-
Wiper motor and link assembly x Door panel		5.4	55	48 in.-lbf
Wiper arm x Wiper link		5.4	55	48 in.-lbf
INSTRUMENT PANEL		-	-	-
Front passenger airbag assembly x Reinforcement		20	204	15
Steering wheel set nut		50	510	37
Front passenger airbag assembly x Instrument panel		6.0	61	53 in.-lbf
SIDE STEP		-	-	-
No. 1 side step bracket x Side step		5.0	51	44 in.-lbf
No. 1 side step bracket x Body		18	184	13
No. 2 side step bracket x Side step		5.0	51	44 in.-lbf
No. 2 side step bracket x Body	Bolt:	18	184	13
No. 2 side step bracket x Body	Nut:	12	120	9
No. 3 side step bracket x Side step		5.0	51	44 in.-lbf
No. 3 side step bracket x Body		18	184	13
FRONT SEAT		-	-	-
Front seat adjuster x Body		42	430	31
Seatback assembly x Seat adjuster		43	440	32
Armrest x Seatback assembly		37	380	27
Seat cushion assembly x Seat adjuster		21	210	15
Seat position control relay x Seat adjuster		5.5	56	49 in.-lbf
Seatback cover x Seatback frame	w/ Side airbag:	4.7	48	42in.-lbf
Seat position sensor x Seat adjuster	Driver's side:	8.0	82	71in.-lbf
REAR NO. 1 SEAT (LH)		-	-	-
Seat cushion hinge x Body		37	380	27
Seatback assembly x Seat adjuster		41	420	30
Seat adjuster x Seat cushion frame		41	420	30
REAR NO. 1 SEAT (RH)		-	-	-
Seat cushion hinge x Body		37	380	27
Seatback assembly x Seat adjuster		37	380	27
Seat adjuster x Seat cushion frame		37	380	27
REAR NO. 2 SEAT		-	-	-
Seatback assembly x Reclining adjuster		41	420	30

2004 LAND CRUISER (RM1071U)

## SERVICE SPECIFICATIONS - BODY

Reclining adjuster x Seat cushion frame		41	420	30
Seat leg adjuster x Seat cushion frame	A Bolt:	18	184	13
Seat leg adjuster x Seat cushion frame	B Bolt:	37	380	27
SEAT BELT		-	-	-
Outer belt shoulder anchor x Adjustable anchor		42	430	31
Adjustable anchor x Body		42	430	31
Outer belt shoulder anchor x Body		42	430	31
Seat belt reclining detecting part x Seat back assembly		3.9	40	35 in.·lbf
Seat belt floor anchor x Body		42	430	31
Retractor x Body	Upper Side:	5.0	51	44 in.·lbf
Retractor x Body	Lower Side:	42	430	31
Retractor x Seatback frame		42	430	31
Inner belt x seat cushion frame		42	430	31
Inner belt x Rear seat lock		42	430	31
Lap type center with inner belt x Seat cushion frame		42	430	31
Rear seat shoulder belt guide x Seatback frame		42	430	31
CRS tether anchor bracket x Body		27	275	20

# BRAKE

## SERVICE DATA

SS062-17

Brake pedal height (from asphalt sheet)		183.7 - 193.7 mm (7.232 - 7.626 in.)
Brake pedal freeplay		1.0 - 6.0 mm (0.039 - 0.236 in.)
Brake pedal reserve distance at 490 N (50 kgf, 110.1 lbf)		More than 116 mm (4.57 in.)
Brake pedal lever clearance		3.0 mm (0.118 in.)
Front brake pad thickness	STD	11.5 mm (0.453 in.)
Front brake pad thickness	Minimum	1.0 mm (0.039 in.)
Front brake disc thickness	STD	32.0 mm (1.260 in.)
Front brake disc thickness	Minimum	30.0 mm (1.181 in.)
Front brake disc runout	Maximum	0.07 mm (0.0028 in.)
Rear brake pad thickness	STD	12.0 mm (0.472 in.)
Rear brake pad thickness	Minimum	1.0 mm (0.039 in.)
Rear brake disc thickness	STD	18.0 mm (0.709 in.)
Rear brake disc thickness	Minimum	16.0 mm (0.611 in.)
Rear brake disc runout	Maximum	0.1 mm (0.004 in.)
Rear brake disc inside diameter	STD	230 mm (9.06 in.)
Rear brake disc inside diameter	Maximum	231 mm (9.09 in.)
Parking brake shoe lining thickness	STD	4.0 mm (0.157 in.)
Parking brake shoe lining thickness	Minimum	1.0 mm (0.039 in.)
Parking brake lever travel at 196 N (20 kgf, 44 lbf)		4 - 6 clicks
Parking brake clearance between rear shoe and lever		Less than 0.25 mm (0.0098 in.)
Parking brake shoe and lever clearance adjusting shim thickness		0.3 mm (0.012 in.) 0.4 mm (0.016 in.) 0.5 mm (0.020 in.) 0.6 mm (0.024 in.) 0.9 mm (0.035 in.)



## TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Brake line union nut	15	155	11
Hydraulic brake booster clevis lock nut	25	260	19
Hydraulic brake booster x Pedal bracket	15	155	11
Brake pedal bracket set bolt	20	200	14
ABS ECU or ABS & BA & TRAC & VSC ECU set nut	5.0	51	44 in·lbf
Bleeder plug	11	110	8
Front disc brake caliper x Flexible hose	30	310	22
Front disc brake mounting bolt x Steering knuckle	123	1,250	90
Rear disc brake caliper installation bolt	26	270	20
Rear disc brake caliper x Flexible hose	30	310	22
Rear disc brake torque plate x Rear backing plate	103	1,050	76
Reservoir set screw	1.7	17.5	15.2 in·lbf
Master cylinder pressure sensor (w/ ABS & BA & TRAC & VSC only)	81	830	60
Accumulator x Booster pump motor	54	550	36
Front speed sensor installation bolt	8.0	82	71 in·lbf
Front speed sensor harness clamp bolt	13	130	9
Rear speed sensor installation bolt	8.0	82	71 in·lbf
Rear speed sensor harness clamp bolt	13	130	9
Front brake disc x Front axle hub	74	750	54
Parking brake bellcrank assembly x Backing plate	13	130	9
Bellcrank stopper bolt lock nut	5.4	55	48 in·lbf

# CHARGING

## SERVICE DATA

SS00F-04

Battery	Specific gravity	at 20° C (68° F)	1.25 - 1.29
	Voltage	at 20° C (68° F)	12.5 - 12.9 V
Generator	Rated output		12V 130A
	Rotor coil resistance	at 20° C (68° F)	2.3 - 2.7 $\Omega$
	Slip ring diameter	STD	14.2 - 14.4 mm (0.559 - 0.567 in.)
		Minimum	14.0 mm (0.551 in.)
Brush exposed length		STD	10.5 mm (0.413 in.)
		Minimum	4.5 mm (0.177 in.)
Charging circuit	Without load	STD amperage	10 A or less
		STD voltage	13.2 - 14.8 V
	With load	STD amperage	30 A or less

**TORQUE SPECIFICATION**

Part tightened	N·m	kgf·cm	ft·lbf	
Bearing retainer x Drive end frame	2.6	27	23 in.·lbf	
Rectifier end frame x Drive end frame	5.8	59	51 in.·lbf	
Generator pulley x Rotor	110.3	1,125	81	
Brush holder x Rectifier end frame	1.8	18	16 in.·lbf	
End cover x Rectifier end frame	4.6	47	41 in.·lbf	
Rear end cover x Rectifier end frame	4.6	47	41 in.·lbf	
Generator x Cylinder block	Bolt	39	400	29
	Nut 10 mm	39	440	29
	Nut 8 mm	15.5	158	11

# COOLING

## SERVICE DATA

SS009-01

Thermostat	Valve opening temperature Valve lift at 95°C (203°F)	80 - 84°C (176 - 183°F) 10 mm (0.39 in.) or more
Radiator cap	Relief valve opening pressure STD Minimum	93 - 123 kPa (0.95 - 1.25 kgf/cm <sup>2</sup> , 13.5 - 17.8 psi) 78 kPa (0.8 kgf/cm <sup>2</sup> , 11.4 psi)

**TORQUE SPECIFICATION**

Part tightened	N·m	kgf·cm	ft·lbf
Drain plug x Union on cylinder block	12.7	130	9
Water pump x Cylinder block	21	215	15
Bolt	18	185	13
Stud bolt and nut			
Water inlet housing x Water pump	18	185	13
Water inlet x Water inlet housing	19	195	14
Radiator x Fan shroud	5.0	50	44 in.·lbf
Radiator x Radiator side support	12.7	130	9
Radiator side support x Bracket	20	200	15
Radiator mounting bolt	18	185	13
Radiator mounting nut	20	200	15

# EMISSION CONTROL

## TORQUE SPECIFICATION

SS005-05

Part tightened	N·m	kgf·cm	ft·lbf
Front exhaust pipe x Exhaust manifold	62	632	46
Front exhaust pipe x Center pipe	40	408	30
Heated oxygen sensor x Front exhaust pipe	20	200	14

# ENGINE MECHANICAL

## SERVICE DATA

SS00Q-10

Compression pressure	at 250 rpm STD Minimum Difference of pressure between each cylinder	1,324 kPa (13.5 kgf/cm <sup>2</sup> , 192 psi) or more 981 kPa (10.0 kgf/cm <sup>2</sup> , 142 psi) 98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi) or less
Valve clearance	at cold Intake Exhaust Valve clearance adjusting shim	0.15 - 0.25 mm (0.006 - 0.010 in.) 0.25 - 0.35 mm (0.010 - 0.014 in.) No.00 2.000 mm (0.0787 in.) No.02 2.020 mm (0.0795 in.) No.04 2.040 mm (0.0803 in.) No.06 2.060 mm (0.0811 in.) No.08 2.080 mm (0.0819 in.) No.10 2.100 mm (0.0827 in.) No.12 2.120 mm (0.0835 in.) No.14 2.140 mm (0.0843 in.) No.16 2.160 mm (0.0850 in.) No.18 2.180 mm (0.0858 in.) No.20 2.200 mm (0.0866 in.) No.22 2.220 mm (0.0874 in.) No.24 2.240 mm (0.0882 in.) No.26 2.260 mm (0.0890 in.) No.28 2.280 mm (0.0898 in.) No.30 2.300 mm (0.0906 in.) No.32 2.320 mm (0.0913 in.) No.34 2.340 mm (0.0921 in.) No.36 2.360 mm (0.0929 in.) No.38 2.380 mm (0.0937 in.) No.40 2.400 mm (0.0945 in.) No.42 2.420 mm (0.0953 in.) No.44 2.440 mm (0.0961 in.) No.46 2.460 mm (0.0969 in.) No.48 2.480 mm (0.0976 in.) No.50 2.500 mm (0.0984 in.) No.52 2.520 mm (0.0992 in.) No.54 2.540 mm (0.1000 in.) No.56 2.560 mm (0.1008 in.) No.58 2.580 mm (0.1016 in.) No.60 2.600 mm (0.1024 in.) No.62 2.620 mm (0.1031 in.) No.64 2.640 mm (0.1039 in.) No.66 2.660 mm (0.1047 in.) No.68 2.680 mm (0.1055 in.) No.70 2.700 mm (0.1063 in.) No.72 2.720 mm (0.1071 in.) No.74 2.740 mm (0.1079 in.) No.76 2.760 mm (0.1087 in.) No.78 2.780 mm (0.1094 in.) No.80 2.800 mm (0.1102 in.)
Ignition timing	w/ Terminals TC and E1 connected of DLC1	5 -15° BTDC @ idle
Idle speed	-	700 ± 50 rpm
Timing belt tensioner	Protrusion from housing end	10.5 - 11.5 mm (0.413 - 0.453 in.)

## SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Cylinder head	Warpage	Maximum	0.10 mm (0.039 in.)
	Valve seat		
	Refacing angle		30°, 45°, 60°
	Contacting angle		45°
	Contacting width		1.0 - 1.4 mm (0.039 - 0.055 in.)
	Valve guide bushing bore diameter	STD	10.285 - 10.306 mm (0.4049 - 0.4057 in.)
		O/S 0.05	10.335 - 10.356 mm (0.4069 - 0.4077 in.)
	Cylinder head bolt thread inside diameter	STD	9.810 - 9.960 mm (0.3862 - 0.3921 in.)
Protrusion height		Minimum	9.70 mm (0.3819 in.)
		Intake	9.2 - 9.8 mm (0.362 - 0.386 in.)
		Exhaust	8.2 - 8.8 mm (0.323 - 0.346 in.)
Valve guide bushing	Inside diameter		5.510 - 5.530 mm (0.2169 - 0.2177 in.)
	Outside diameter (for repair part)	STD	10.285 - 10.306 mm (0.4049 - 0.4057 in.)
		O/S 0.05	10.335 - 10.356 mm (0.4069 - 0.4077 in.)
Valve	Valve overall length	STD Intake	95.05 mm (3.7421 in.)
		Exhaust	95.10 mm (3.7441 in.)
		Minimum Intake	94.55 mm (3.7224 in.)
		Exhaust	94.60 mm (3.7244 in.)
	Valve face angle		44.5°
	Stem diameter	Intake	5.470 - 5.485 mm (0.2154 - 0.2159 in.)
		Exhaust	5.465 - 5.480 mm (0.2152 - 0.2157 in.)
	Stem oil clearance	STD Intake	0.025 - 0.060 mm (0.0010 - 0.0024 in.)
		Exhaust	0.030 - 0.065 mm (0.0012 - 0.0026 in.)
		Maximum Intake	0.08 mm (0.0031 in.)
		Exhaust	0.10 mm (0.0039 in.)
	Margin thickness	STD IN	1.25 mm (0.049 in.)
		EX	1.4 mm (0.055 in.)
Minimum		0.5 mm (0.020 in.)	
Valve spring	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length		54.1 mm (2.130 in.)
	Installed tension at 35.0 mm (1.378 in.)		204 - 226 N (20.8 - 23.0 kgf-cm, 45.9 - 50.7 lbf)
Valve lifter	Lifter diameter		30.966 - 30.976 mm (1.2191 - 2.2195 in.)
	Lifter bore diameter		31.000 - 31.016 mm (1.2205 - 1.2211 in.)
	Oil clearance	STD	0.024 - 0.050 mm (0.0009 - 0.0020 in.)
		Maximum	0.07 mm (0.0028 in.)
Camshaft	Thrust clearance	STD Intake	0.040 - 0.090 mm (0.0016 - 0.0035 in.)
		Exhaust	0.040 - 0.085 mm (0.0016 - 0.0033 in.)
		Maximum	0.12 mm (0.0047 in.)
	Journal oil clearance	STD	0.030 - 0.067 mm (0.0012 - 0.0026 in.)
		Maximum	0.10 mm (0.0039 in.)
	Journal diameter		26.954 - 26.970 mm (1.0612 - 1.0618 in.)
	Circle runout		0.08 mm (0.0031 in.)
	Cam lobe height	STD Intake	41.94 - 42.04 mm (1.6512 - 1.6551 in.)
		Exhaust	41.96 - 42.06 mm (1.6520 - 1.6559 in.)
		Minimum Intake	41.79 mm (1.6453 in.)
		Exhaust	41.81 mm (1/6461 in.)
Camshaft gear backlash	STD	0.020 - 0.200 mm (0.0008 - 0.0079 in.)	
	Maximum	0.30 mm (0.0188 in.)	
Camshaft gear spring end free distance		18.2 - 18.8 mm (0.712 - 0.740 in.)	
Manifold	Warpage	Maximum Intake	0.15 mm (0.0059 in.)
		Exhaust	0.50 mm (0.0197 in.)



Cylinder block	Cylinder head surface warpage	Maximum	0.07 mm (0.0028 in.)
	Cylinder bore diameter	STD STD Mark 1 Mark 2 Mark 3 Maximum STD O/S 050	94.002 - 94.010 mm (3.7009 - 3.7012 in.) 94.010 - 94.023 mm (3.7012 - 3.7017 in.) 94.023 - 94.031 mm (3.7017 - 3.7020 in.) 94.231 mm (3.7099 in.) 94.731 mm (3.7296 in.)
	Main bearing cap bolt tension portion diameter	STD Minimum	10.760 - 10.970 mm (0.4236 - 0.4319 in.) 10.40 mm (0.4094 in.)
Piston and piston ring	Piston diameter	STD Mark 1	93.902 - 93.912 mm (3.6969 - 3.6973 in.)
		Mark 2	93.912 - 93.920 mm (3.6973 - 3.6976 in.)
		Mark 3	93.920 - 93.930 mm (3.6976 - 3.6980 in.)
		O/S 0.50	94.402 - 94.430 mm (3.7166 - 3.7177 in.)
	Piston oil clearance	STD	0.090 - 0.111 mm (0.0035 - 0.0044 in.)
		Maximum	0.13 mm (0.0051 in.)
	Piston ring groove clearance	No.1	0.030 - 0.080 mm (0.0012 - 0.0031 in.)
		No.2	0.030 - 0.070 mm (0.0012 - 0.0028 in.)
	Piston ring end gap	STD No.1	0.300 - 0.500 mm (0.0118 - 0.0197 in.)
		No.2	0.400 - 0.650 mm (0.0157 - 0.0256 in.)
Oil		0.130 - 0.480 mm (0.0051 - 0.0189 in.)	
Maximum No.1		1.10 mm (0.0433 in.)	
	No.2	1.20 mm (0.0472 in.)	
	Oil	1.15 mm (0.0453 in.)	
Connecting rod	Thrust clearance	STD	0.160 - 0.290 mm (0.0063 - 0.0138 in.)
		Maximum	0.35 mm (0.0138 in.)
	Connecting rod thickness		22.880 - 22.920 mm (0.9008 - 0.9024 in.)
	Connecting rod oil clearance	STD	0.027 - 0.053 mm (0.0011 - 0.0021 in.)
		Maximum	0.065 mm (0.0026 in.)
	Connecting rod bearing center wall thickness (Reference)	Mark 2	1.484 - 1.487 mm (0.0584 - 0.0585 in.)
		Mark 3	1.487 - 1.490 mm (0.0585 - 0.0587 in.)
		Mark 4	1.490 - 1.493 mm (0.0587 - 0.0588 in.)
		Mark 5	1.493 - 1.496 mm (0.0588 - 0.0589 in.)
		Mark 6	1.496 - 1.499 mm (0.0589 - 0.0590 in.)
		Mark 7	1.499 - 1.502 mm (0.0590 - 0.0591 in.)
		Rod bend	Maximum per 100 mm (3.94 in.)
	Rod twist	Maximum per 100 mm (3.94 in.)	0.15 mm (0.0059 in.)
	Bushing inside diameter		22.005 - 22.014 mm (0.8663 - 0.8667 in.)
	Piston pin diameter		21.997 - 22.006 mm (0.8660 - 0.8664 in.)
Bushing oil clearance	STD	0.005 - 0.011 mm (0.0002 - 0.0004 in.)	
	Maximum	0.05 mm (0.0020 in.)	
Connecting rod bolt tension portion diameter	STD	7.200 - 7.300 mm (0.2835 - 0.2874 in.)	
	Minimum	7.00 mm (0.2756 in.)	
Crankshaft	Thrust clearance	STD	0.020 - 0.220 mm (0.0008 - 0.0087 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness		2.440 - 2.490 mm (0.0961 - 0.0980 in.)
	Main journal bore diameter on cylinder block (with main bearing)		66.986 - 67.000 mm (2.6372 - 2.6378 in.)
	Main journal oil clearance	STD	0.040 - 0.058 mm (0.0016 - 0.0023 in.)
Maximum		0.070 mm (0.0028 in.)	
Main journal diameter		66.988 - 67.000 mm (2.6373 - 2.6378 in.)	

SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Crankshaft (cont'd)	Main bearing center wall thickness (Reference)		
		No.1 and No.5 Mark 3	2.481 - 2.484 mm (0.0977 - 0.0978 in.)
		Mark 4	2.484 - 2.487 mm (0.0978 - 0.0979 in.)
		Mark 5	2.487 - 2.490 mm (0.0979 - 0.0980 in.)
		Mark 6	2.490 - 2.493 mm (0.0980 - 0.0981 in.)
		Mark 7	2.493 - 2.496 mm (0.0981 - 0.0983 in.)
		Others Mark 1	2.481 - 2.484 mm (0.0977 - 0.0978 in.)
		Mark 2	2.484 - 2.487 mm (0.0978 - 0.0979 in.)
		Mark 3	2.487 - 2.490 mm (0.0979 - 0.0980 in.)
		Mark 4	2.490 - 2.493 mm (0.0980 - 0.0981 in.)
		Mark 5	2.493 - 2.496 mm (0.0981 - 0.0983 in.)
		Crank pin diameter	51.982 - 52.000 mm (2.0465 - 2.0472 in.)
		Circle runout	Maximum 0.08 mm (0.0031 in.)
	Main journal taper and out-of-round	Maximum 0.02 mm (0.0008 in.)	
	Crank pin taper and out-of-round	Maximum 0.02 mm (0.0008 in.)	

## TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Fan shroud x Radiator assembly		5	51	44 in.·lbf
Radiator bracket x Radiator assembly	Bolt	18	185	13
	Nut	20	200	15
A/C Compressor x Cylinder block		49	500	36
Generator x Generator bracket		39	400	29
No.1 idler pulley, No.2 idler pulley x Cylinder Block		34.5	350	25
Camshaft timing pulley x Camshaft timing tube		108	1,100	80
Drive belt tensioner x Cylinder block		16	160	12
Timing belt tensioner x Oil pump		26	270	19
Crankshaft pulley x Crankshaft		245	2,500	181
Fan bracket x Cylinder block	12 mm head	16	160	12
	14 mm head	32	330	24
No.2 timing belt cover x Cylinder block		16	160	12
No.3 timing belt cover x Cylinder block, cylinder head		7.5	80	66 in.·lbf
Drive belt idler pulley x Fan bracket		39	400	29
Fluid coupling x Fan bracket		21	215	16
Exhaust manifold x Cylinder head		44	450	33
Cylinder head x Cylinder block	1st	32	325	24
	2nd	Turn 90°	Turn 90°	Turn 90°
	3rd	Turn 90°	Turn 90°	Turn 90°
Camshaft bearing cap x Cylinder head	Bolt C	7.5	80	66 in.·lbf
	Others	16	160	12
Cylinder head cover x Cylinder head		6.0	60	53 in.·lbf
Engine hanger x Cylinder head		37	380	27
Front water bypass joint, Rear water bypass joint x Cylinder head		18	185	13
Intake manifold x Cylinder head		18	185	13
V-bank cover bracket x Intake manifold		7.5	80	66 in.·lbf
Timing belt rear plate x Cylinder head		7.5	80	66 in.·lbf
Drive plate x Crankshaft	1st	49	500	36
	2nd	Turn 90°	Turn 90°	Turn 90°
Transmission x Cylinder block		72	730	53
Transmission x No.1 oil pan		37	380	27
Drive plate x Torque converter clutch		48	490	35
Flywheel housing under cover x Transmission		18	185	13
Frame crossmember x Body		50	510	37
Frame crossmember x Rear engine mounting insulator		74	750	55
Frame bracket x Engine mounting bracket		30	310	22
PS pump x Cylinder head		62	632	46
A/C compressor x Cylinder block, Fan bracket		49	500	36
Main bearing cap x Cylinder block	1st	27	275	20
	2nd	Turn 90°	Turn 90°	Turn 90°
Connecting rod cap x Connecting rod	1st	24.5	250	18
	2nd	Turn 90°	Turn 90°	Turn 90°
Rear oil seal retainer x Cylinder block		8.0	80	71 in.·lbf
Engine coolant drain union x Cylinder block		49	500	36

## SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Engine mounting bracket x Cylinder block	36	370	27
Water bypass pipe x Cylinder block	18	185	13
Front exhaust pipe x Exhaust manifold	63	640	46
No.2 front exhaust pipe x Front exhaust pipe	40	408	30
Center exhaust pipe x Front exhaust pipe	40	408	30
Heated oxygen sensor (Bank 1, 2 sensor 2) x Front exhaust pipe	20	200	14
Heat insulator x Exhaust manifold	7.5	77	66 in.·lbf
Shift lever assembly x Transmission	8.3	86	73 in.·lbf
Shift lever assembly x Transmission control rod	13	130	9

# IGNITION

## SERVICE DATA

SS006-03

Firing order	-	1 - 8 - 4 - 3 - 6 - 5 - 7 - 2
Spark plug	Recommended spark plug Correct electrode gap for new spark plug Maximum electrode gap for used spark plug	DENSO made SK20R11 NGK made IFR6A11 1.1 mm (0.043 in.) 1.3 mm (0.051 in.)
Camshaft position sensor	Resistance	Cold 835 - 1,400 $\Omega$ Hot 1,060 - 1,645 $\Omega$
Crankshaft position sensor	Resistance	Cold 1,630 - 2,740 $\Omega$ Hot 2,065 - 3,225 $\Omega$

**TORQUE SPECIFICATION**

Part tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head	17.5	180	13
Ignition coil (with igniter) x Cylinder head cover	7.5	80	66 in.·lbf
Camshaft position sensor x LH cylinder head	7.5	80	66 in.·lbf
Crankshaft position sensor x Oil pump	6.5	65	58 in.·lbf

# LUBRICATION

## SERVICE DATA

SS00B-01

Oil pressure		at idle speed at 3,000 rpm	29 kPa (0.3 kgf/cm <sup>2</sup> , 4.3 psi) or more 294 - 588 kPa (3.0 - 6.0 kgf/cm <sup>2</sup> , 43 - 85 psi)
Oil pump	Tip clearance	STD	0.110 - 0.240 mm (0.0043 - 0.0094 in.)
		Maximum	0.35 mm (0.0138 in.)
	Side clearance	STD	0.030 - 0.090 mm (0.0012 - 0.0035 in.)
		Maximum	0.15 mm (0.0059 in.)
	Body clearance	STD	0.100 - 0.175 mm (0.0039 - 0.0069 in.)
		Maximum	0.30 mm (0.0118 in.)

**TORQUE SPECIFICATION**

Part tightened	N·m	kgf·cm	ft·lbf
No.2 oil pan x Drain plug	39	400	29
Oil pump body cover x Oil pump body	10	105	8
Oil pump x Cylinder block	14 mm head	30.5	22
	12 mm and 6mm hexagon head	15.5	11
Oil strainer x Cylinder block, Oil pump	7.5	80	66 in.·lbf
No.1 oil pan x Oil pump, Oil seal retainer	7.5	80	66 in.·lbf
No.1 oil pan x Cylinder block	10 mm head	7.5	66 in.·lbf
	12 mm head	28	21
Oil pan baffle plate x No.1 oil pan	7.5	80	66 in.·lbf
No.2 oil pan x No.1 oil pan	7.5	80	66 in.·lbf
Oil filter bracket x Oil pump	18	185	13
Oil cooler x Oil filter bracket	Union bolt	68.6	51
Oil dipstick guide x Cylinder head	15	153	11



# PROPELLER SHAFT

## SERVICE DATA

SS0NK-02

Shaft runout	Max.	0.8 mm (0.031 in.)
Bearing axial play	Max.	0 mm (0 in.)
Snap ring thickness	Color Mark	
	- 1	2.28 - 2.30 mm (0.0898 - 0.0906 in.)
	- 2	2.30 - 2.32 mm (0.0906 - 0.0913 in.)
	- -	2.32 - 2.34 mm (0.0913 - 0.0921 in.)
	Brown -	2.34 - 2.36 mm (0.0921 - 0.0929 in.)
	Blue -	2.36 - 2.38 mm (0.0929 - 0.0937 in.)
	- 6	2.38 - 2.40 mm (0.0937 - 0.0945 in.)
	- 7	2.40 - 2.42 mm (0.0945 - 0.0953 in.)
	- 8	2.42 - 2.44 mm (0.0953 - 0.0961 in.)
	- 九	2.44 - 2.46 mm (0.0961 - 0.0969 in.)
- 10	2.46 - 2.48 mm (0.0969 - 0.0976 in.)	

M00054

## TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Front propeller shaft x Front differential	80	820	59
Front propeller shaft x Transfer	80	820	59
Rear propeller shaft x Transfer	106	1,080	78
Rear propeller shaft x Rear differential	106	1,080	78

# SUPPLEMENTAL RESTRAINT SYSTEM

## TORQUE SPECIFICATION

SS061-66

Part tightened	N·m	kgf·cm	ft·lbf
Steering wheel set nut	50	510	37
Steering wheel pad set screw (Torx screw)	8.8	90	78 in.·lbf
Front passenger airbag assembly x Instrument panel	6.0	61	53 in.·lbf
Front passenger airbag assembly x Instrument panel reinforcement	20	205	15
Front seat x Body	42	430	31
Seat cushion assembly x Seat adjuster assembly	21	210	15
Seatback cover with pad x Seatback frame	4.7	48	42 in.·lbf
Armrest x Seatback frame	37	380	27
Seatback frame x Seat adjuster assembly	43	440	32
Curtain shield airbag assembly x Body	9.8	100	86 in.·lbf
Airbag sensor assembly x Body	17.5	178	13
Front airbag sensor x Body	7.5	76	66 in.·lbf
Side and curtain shield airbag sensor assembly x Body	20	205	15
Front seat outer belt x Body	Upper bolt:	8.0	81
	Lower bolt:	42	428
Curtain shield airbag sensor assembly x Body	17.5	178	13
Rear seat belt anchor x Body	42	428	31
Seat position sensor assembly x Seat adjuster assembly	8.0	82	71 in.·lbf

# SUSPENSION AND AXLE

## SERVICE DATA

SS00J-10

Cold tire inflation pressure	Tire size P275/70R16	Front	200 kPa (2.0 kgf/cm <sup>2</sup> , 29 psi) *220 kPa (2.2 kgf/cm <sup>2</sup> , 32 psi)	
		Rear	220 kPa (2.2 kgf/cm <sup>2</sup> , 32 psi) *240 kPa (2.4 kgf/cm <sup>2</sup> , 35 psi)	
Front wheel alignment	Vehicle height			
	Front	A - B	71 mm (2.795 in.)	
	Rear	C - D	51 mm (2.008 in.)	
	Camber			0°05' ± 45' (0.08° ± 0.75°)
		Right-left error		30' (0.5°) or less
	Caster			2°30' ± 45' (2.5° ± 0.75°)
		Right-left error		30' (0.5°) or less
Steering axis inclination			12°10' ± 45' (12.17° ± 0.75°)	
	Right-left error		30' (0.5°) or less	
Toe-in (total)			0°06' ± 12' (0.1° ± 0.2°, 1 ± 2 mm, 0.04 ± 0.08 in.)	
	Rack end length difference		3.0 mm (0.118 in.) or less	
Wheel angle		Inside wheel	36°42' (33°42' - 36°42')	
			36.7° (33.7° - 36.7°)	
		Outside wheel: Reference	32°36' 32.6°	
Front axle	Front axle hub preload (at starting)		42 - 67 N (4.3 - 6.8 kgf, 9.5 - 15.0 lbf)	
	Snap ring thickness		1.8 mm (0.0709 in.) 2.0 mm (0.0787 in.) 2.2 mm (0.0866 in.) 2.4 mm (0.0945 in.) 2.6 mm (0.1024 in.) 2.8 mm (0.1102 in.)	
Front drive shaft	Front drive shaft length		573.9 ± 5.0 mm (22.594 ± 0.197 in.)	
Front suspension	Upper suspension arm ball joint turning torque		1.0 - 4.4 N·m (10 - 45 kgf·cm, 8.9 - 39 in.·lbf)	
	Lower suspension arm ball joint turning torque		0.29 - 2.94 N·m (3 - 30 kgf·cm, 2.6 - 26 in.·lbf)	
Rear axle shaft	Bearing backlash	Max.	0.6 mm (0.024 in.)	
	Axle shaft deviation	Max.	0.05 mm (0.0020 in.)	
	Axle shaft runout	Max.	2.0 mm (0.079 in.)	
	Axle shaft flange runout	Max.	0.05 mm (0.0020 in.)	

\*: Trailer towing

A: Ground clearance of spindle center

B: Ground clearance of lower suspension arm front bolt center

C: Ground clearance of rear axle shaft center

D: Ground clearance of lower control arm front bushing center

## SERVICE SPECIFICATIONS - SUSPENSION AND AXLE

Front differential	Companion flange vertical runout	Max.	0.09 mm (0.0035 in.)	
	Companion flange lateral runout	Max.	0.09 mm (0.0035 in.)	
	Drive pinion preload (at starting)	New bearing	1.0 - 1.6 N·m (10 - 16 kgf·cm, 8.9 - 14.2 in.·lbf)	
		Reused bearing	0.5 - 0.8 N·m (5 - 8 kgf·cm, 4.4 - 7.1 in.·lbf)	
	Total preload (at starting)		Drive pinion preload plus 0.4 - 0.6 N·m (4 - 6 kgf·cm, 3.5 - 5.3 in.·lbf)	
	Ring gear runout	Max.	0.07 mm (0.0028 in.)	
	Ring gear backlash		0.13 - 0.18 mm (0.0051 - 0.0071 in.)	
	Side gear backlash		0.05 - 0.20 mm (0.0020 - 0.0079 in.)	
	Differential case runout	Max.	0.07 mm (0.0028 in.)	
	Front differential oil seal drive in depth		1.5 mm (0.059 in.)	
Side gear thrust washer thickness		0.9 mm (0.035 in.) 1.0 mm (0.039 in.) 1.1 mm (0.043 in.) 1.2 mm (0.047 in.) 1.3 mm (0.051 in.)		

<p>Front differential</p>	<p>Side bearing adjusting washer thickness</p>	<p>2.58 mm (0.1016 in.)                  2.60 mm (0.1024 in.)                  2.62 mm (0.1031 in.)                  2.64 mm (0.1039 in.)                  2.66 mm (0.1047 in.)                  2.68 mm (0.1055 in.)                  2.70 mm (0.1063 in.)                  2.72 mm (0.1071 in.)                  2.74 mm (0.1079 in.)                  2.76 mm (0.1087 in.)                  2.78 mm (0.1094 in.)                  2.80 mm (0.1102 in.)                  2.82 mm (0.1110 in.)                  2.84 mm (0.1118 in.)                  2.86 mm (0.1126 in.)                  2.88 mm (0.1134 in.)                  2.90 mm (0.1142 in.)                  2.92 mm (0.1150 in.)                  2.94 mm (0.1157 in.)                  2.96 mm (0.1165 in.)                  2.98 mm (0.1173 in.)                  3.00 mm (0.1181 in.)                  3.02 mm (0.1189 in.)                  3.04 mm (0.1197 in.)                  3.06 mm (0.1205 in.)                  3.08 mm (0.1213 in.)                  3.10 mm (0.1220 in.)                  3.12 mm (0.1228 in.)                  3.14 mm (0.1236 in.)                  3.16 mm (0.1244 in.)                  3.18 mm (0.1252 in.)                  3.20 mm (0.1260 in.)                  3.22 mm (0.1268 in.)                  3.24 mm (0.1276 in.)                  3.26 mm (0.1283 in.)                  3.28 mm (0.1291 in.)                  3.30 mm (0.1299 in.)                  3.32 mm (0.1307 in.)                  3.34 mm (0.1315 in.)                  3.36 mm (0.1323 in.)                  3.38 mm (0.1331 in.)                  3.40 mm (0.1339 in.)                  3.42 mm (0.1346 in.)                  3.44 mm (0.1354 in.)                  3.46 mm (0.1362 in.)                  3.48 mm (0.1370 in.)</p>
---------------------------	--	---

## SERVICE SPECIFICATIONS - SUSPENSION AND AXLE

Front differential	Drive pinion bearing adjusting washer thickness	1.70 mm (0.067 in.) 1.73 mm (0.068 in.) 1.76 mm (0.069 in.) 1.79 mm (0.070 in.) 1.82 mm (0.072 in.) 1.85 mm (0.073 in.) 1.88 mm (0.074 in.) 1.91 mm (0.075 in.) 1.94 mm (0.076 in.) 1.97 mm (0.078 in.) 2.00 mm (0.079 in.) 2.03 mm (0.080 in.) 2.06 mm (0.081 in.) 2.09 mm (0.082 in.) 2.12 mm (0.083 in.) 2.15 mm (0.085 in.) 2.18 mm (0.086 in.) 2.21 mm (0.087 in.) 2.24 mm (0.088 in.) 2.27 mm (0.089 in.) 2.30 mm (0.091 in.) 2.33 mm (0.092 in.)
--------------------	---	--

Rear differential	Companion flange vertical runout	Max.	0.10 mm (0.0039 in.)
	Companion flange lateral runout	Max.	0.10 mm (0.0039 in.)
	Drive pinion preload (at starting)	New bearing Reused bearing	1.3 - 1.8 N-m (13 - 19 kgf-cm, 11.5 - 15.9 in.-lbf) 0.64 - 0.92 N-m (6.5 - 9.4 kgf-cm, 5.7 - 8.1 in.-lbf)
	Total preload (at starting)		Drive pinion preload plus 0.38 - 0.63 N-m (3.9 - 6.5 kgf-cm, 3.3 - 5.6 in.-lbf)
	Ring gear runout	Max.	0.05 mm (0.0020 in.)
	Ring gear backlash		0.13 - 0.18 mm (0.0051 - 0.0071 in.)
	Side gear backlash		0.02 - 0.15 mm (0.0008 - 0.0059 in.)
	Differential case runout	Max.	0.04 mm (0.0016 in.)
	Rear differential front oil seal drive in depth		0.5 mm (0.020 in.)
	Side gear thrust washer thickness		1.55 mm (0.061 in.) 1.60 mm (0.063 in.) 1.65 mm (0.065 in.) 1.70 mm (0.067 in.) 1.75 mm (0.069 in.) 1.80 mm (0.071 in.) 1.85 mm (0.073 in.) 1.90 mm (0.075 in.) 1.95 mm (0.077 in.) 2.00 mm (0.079 in.) 2.05 mm (0.081 in.) 2.10 mm (0.083 in.)
	Tooth contact pattern adjusting washer thickness		1.050 mm (0.04134 in.) 1.075 mm (0.04232 in.) 1.100 mm (0.04331 in.) 1.125 mm (0.04429 in.) 1.150 mm (0.04528 in.) 1.175 mm (0.04626 in.) 1.200 mm (0.04724 in.) 1.225 mm (0.04823 in.) 1.250 mm (0.04921 in.) 1.275 mm (0.05020 in.) 1.300 mm (0.05118 in.) 1.325 mm (0.05217 in.) 1.350 mm (0.05315 in.) 1.375 mm (0.05413 in.) 1.400 mm (0.05512 in.) 1.425 mm (0.05610 in.) 1.450 mm (0.05709 in.) 1.475 mm (0.05807 in.) 1.500 mm (0.05906 in.) 1.525 mm (0.06004 in.) 1.550 mm (0.06102 in.)



SERVICE SPECIFICATIONS - SUSPENSION AND AXLE

Rear differential (w/ Diff. Lock)	Companion flange vertical runout	Max.	0.10 mm (0.0039 in.)	
	Companion flange lateral runout	Max.	0.10 mm (0.0039 in.)	
	Drive pinion preload (at starting)	New bearing	1.3 - 1.8 N·m (13 - 19 kgf·cm, 11.5 - 15.9 in.·lbf)	
		Reused bearing	0.64 - 0.92 N·m (6.5 - 9.4 kgf·cm, 5.7 - 8.1 in.·lbf)	
	Total preload (at starting)		Drive pinion preload plus 0.3 - 0.5 N·m (3 - 5 kgf·cm, 2.7 - 4.4 in.·lbf)	
	Ring gear runout	Max.	0.05 mm (0.0020 in.)	
	Ring gear backlash		0.13 - 0.18 mm (0.0051 - 0.0071 in.)	
	Side gear backlash		0.02 - 0.15 mm (0.0008 - 0.0059 in.)	
	Differential case runout	Max.	0.04 mm (0.0016 in.)	
	Rear differential front oil seal drive in depth		0.5 mm (0.020 in.)	
	Side gear thrust washer thickness			1.55 mm (0.061 in.)
				1.60 mm (0.063 in.)
				1.65 mm (0.065 in.)
			1.70 mm (0.067 in.)	
			1.75 mm (0.069 in.)	
			1.80 mm (0.071 in.)	
			1.85 mm (0.073 in.)	
			1.90 mm (0.075 in.)	
			1.95 mm (0.077 in.)	
			2.00 mm (0.079 in.)	
		2.05 mm (0.081 in.)		
		2.10 mm (0.083 in.)		
Ring gear backlash adjusting washer thickness	Mark			
	1		2.67 mm (0.1051 in.)	
	2		2.70 mm (0.1063 in.)	
	3		2.73 mm (0.1075 in.)	
	4		2.76 mm (0.1087 in.)	
	5		2.79 mm (0.1098 in.)	
	6		2.82 mm (0.1110 in.)	
	7		2.85 mm (0.1122 in.)	
	8		2.88 mm (0.1134 in.)	
	9		2.91 mm (0.1146 in.)	
	10		2.94 mm (0.1157 in.)	
	11		2.97 mm (0.1169 in.)	
	12		3.00 mm (0.1181 in.)	
	13		3.03 mm (0.1193 in.)	
	14		3.06 mm (0.1205 in.)	
	15		3.09 mm (0.1217 in.)	
	16		3.12 mm (0.1228 in.)	
	17		3.15 mm (0.1240 in.)	
	18		3.18 mm (0.1252 in.)	
	19		3.21 mm (0.1264 in.)	
	20		3.24 mm (0.1276 in.)	
	21		3.27 mm (0.1287 in.)	
	22		3.30 mm (0.1299 in.)	
23		3.33 mm (0.1311 in.)		

Rear differential (w/ Diff. Lock)	Tooth contact pattern adjusting washer thickness	1.050 mm (0.04134 in.) 1.075 mm (0.04232 in.) 1.100 mm (0.04331 in.) 1.125 mm (0.04429 in.) 1.150 mm (0.04528 in.) 1.175 mm (0.04626 in.) 1.200 mm (0.04724 in.) 1.225 mm (0.04823 in.) 1.250 mm (0.04921 in.) 1.275 mm (0.05020 in.) 1.300 mm (0.05118 in.) 1.325 mm (0.05217 in.) 1.350 mm (0.05315 in.) 1.375 mm (0.05413 in.) 1.400 mm (0.05512 in.) 1.425 mm (0.05610 in.) 1.450 mm (0.05709 in.) 1.475 mm (0.05807 in.) 1.500 mm (0.05906 in.) 1.525 mm (0.06004 in.) 1.550 mm (0.06102 in.)
--------------------------------------	--	--

SERVICE SPECIFICATIONS - SUSPENSION AND AXLE

Rear differential (w/ LSD)	Companion flange vertical runout	Max.	0.10 mm (0.0039 in.)
	Companion flange lateral runout	Max.	0.10 mm (0.0039 in.)
	Drive pinion preload (at starting)	New bearing Reused bearing	1.3 - 1.8 N-m (13 - 19 kgf-cm, 11.5 - 15.9 in.-lbf) 0.64 - 0.92 N-m (6.5 - 9.4 kgf-cm, 5.7 - 8.1 in.-lbf)
	Total preload (at starting)		Drive pinion preload plus 0.38 - 0.63 N-m (3.9 - 6.5 kgf-cm, 3.3 - 5.6 in.-lbf)
	Ring gear runout	Max.	0.05 mm (0.0020 in.)
	Ring gear backlash		0.13 - 0.18 mm (0.0051 - 0.0071 in.)
	Side gear backlash		0.02 - 0.15 mm (0.0008 - 0.0059 in.)
	Differential case runout	Max.	0.04 mm (0.0016 in.)
	Side gear thrust washer thickness (Reference)		1.97 - 2.06 mm (0.0776 - 0.0811 in.)
	Clutch plate thickness (Reference)		1.97 - 2.03 mm (0.0776 - 0.0799 in.)
	Compression spring free length (Reference)		32.8 mm (1.291 in.)
	Rear differential front oil seal drive in depth		0.5 mm (0.020 in.)
	Adjusting shim thickness	Mark	
		A	0.20 mm (0.0079 in.)
		B	0.25 mm (0.0098 in.)
	C	0.30 mm (0.0118 in.)	
	D	0.35 mm (0.0138 in.)	
	Tooth contact pattern adjusting washer thickness		1.050 mm (0.04134 in.) 1.075 mm (0.04232 in.) 1.100 mm (0.04331 in.) 1.125 mm (0.04429 in.) 1.150 mm (0.04528 in.) 1.175 mm (0.04626 in.) 1.200 mm (0.04724 in.) 1.225 mm (0.04823 in.) 1.250 mm (0.04921 in.) 1.275 mm (0.05020 in.) 1.300 mm (0.05118 in.) 1.325 mm (0.05217 in.) 1.350 mm (0.05315 in.) 1.375 mm (0.05413 in.) 1.400 mm (0.05512 in.) 1.425 mm (0.05610 in.) 1.450 mm (0.05709 in.) 1.475 mm (0.05807 in.) 1.500 mm (0.05906 in.) 1.525 mm (0.06004 in.) 1.550 mm (0.06102 in.)

## TORQUE SPECIFICATION

FRONT			
Part tightened	N-m	kgf-cm	ft-lbf
Hub bolt	131	1,340	97
Knuckle stopper bolt lock nut	44	450	32
Steering knuckle x Brake caliper	123	1,250	91
Disc x Axle hub	74	750	55
Flange x Axle hub	33	335	24
Axle hub bearing lock nut	64	650	47
Flexible hose x Bracket	28	290	21
ABS speed sensor installation bolt	8.0	82	71 in.-lbf
ABS speed sensor wire harness x Steering knuckle arm	13	130	10
ABS speed sensor wire harness bracket x Steering knuckle	28	290	21
Steering knuckle arm x Steering knuckle	147	1,500	108
Tie rod end x Steering knuckle arm	122	1,250	90
Upper suspension arm x Steering knuckle	110	1,125	81
Lower suspension arm x Steering knuckle	159	1,625	117
Oil seal x Steering knuckle	18	185	13
Propeller shaft x Companion flange	80	820	59
Body x No. 3 frame crossmember	68	695	50
No. 3 frame crossmember x Differential support	186	1,900	137
Differential support x Differential tube	186	1,900	137
Differential support x Differential carrier	78	800	58
Differential support x Body	186	1,900	137
Differential carrier cover x Body	186	1,900	137
Breather hose bracket x Carrier cover	17	173	13
Filler plug	49	500	36
Drain plug	49	500	36
Differential tube x Differential carrier	105	1,070	77
Bearing cap x Differential carrier	85	870	63
Oil deflector x Carrier cover	7.3	74	65 in.-lbf
Carrier cover x Differential carrier	47	475	35
Differential case x Ring gear	97	985	72
Companion flange x Drive pinion	See page SA-47		
Lower suspension arm x Shock absorber	135	1,400	100
Piston rod x Body	68	700	50
Torque arm x Lower suspension arm	225	2,300	166
ABS speed sensor wire harness x Upper suspension arm	13	130	10
Upper suspension arm x Body	98	1,000	72
Stabilizer bar link x Lower suspension arm	52	530	38
Lower suspension arm x Body	230	2,350	170
Stabilizer bar x Stabilizer bar link	25	250	18
Stabilizer bar bracket x Body	18	185	13

## SERVICE SPECIFICATIONS - SUSPENSION AND AXLE

REAR			
Part tightened	N-m	kgf-cm	ft-lbf
Hub bolt	131	1,340	97
Axle housing x Brake caliper	103	1,050	76
Axle housing x Backing plate	123	1,250	91
Brake line	15	150	11
Shock Absorber x Axle housing	98	1,000	72
Stabilizer bar bracket x Body	18	185	13
Follow spring x Body	28	290	21
Piston rod x Body	69	704	51
Lateral control rod x Body	150	1,530	111
Upper control arm x Body	150	1,530	111
Upper control arm x Axle housing	150	1,530	111
Lower control arm x Body	150	1,530	111
Lower control arm x Axle housing	150	1,530	111
Heat insulator x Body	18	185	13
Lateral control rod x Axle housing	149	1,520	110
Stabilizer bar x Stabilizer bar bracket	26	270	19
Stabilizer bar link x Stabilizer bar bracket	15	150	11
Stabilizer bar bracket x Axle housing	18	185	13
Propeller shaft x Companion flange	106	1,080	78
Companion flange x Drive pinion w/ Diff. Lock w/ LSD		See page <a href="#">SA-107</a> See page <a href="#">SA-127</a> See page <a href="#">SA-150</a>	
Differential carrier x Axle housing	72	740	53
Filler plug	49	500	36
Drain plug	49	500	36
Differential case x Ring gear	137	1,400	101
Differential carrier			
Bearing cap x Differential carrier	83	850	61
Adjusting nut lock x Bearing cap	13	130	10
RH differential case x LH differential case	47	480	35
Differential carrier (w/ Diff. Lock)			
No. 1 actuator protector x Actuator	15	150	11
No. 2 actuator protector x Axle housing	36	367	27
Bearing cap x Differential carrier	113	1,150	83
Cover x Differential carrier	18	185	13
Actuator x Differential carrier	24	240	18
Actuator x Shift fork	20	200	15
Indicator switch	40	410	30
Differential cover x Differential case	58	590	43
Differential carrier (w/ LSD)			
Bearing cap x Differential carrier	83	850	61
Adjusting nut lock x Bearing cap	13	130	10
RH differential case x LH differential case	47	480	35

# SFI

## SERVICE DATA

SS0CB-20

Fuel pressure regulator	Fuel pressure	at no vacuum	265 - 304 kPa (2.7 - 3.1 kgf/cm <sup>2</sup> , 38 - 44 psi)
Fuel pump	Resistance	at 20°C (68°F)	0.2 - 3.0 Ω
Injector	Resistance	at 20°C (68°F)	13.4 - 14.2 Ω
	Injection volume		56 - 69 cm <sup>3</sup> (3.4 - 4.2 cu in.) per 15 seconds
	Difference between each cylinder		13 cm <sup>3</sup> (0.8 cu in.) or less
	Fuel leakage		1 drop or less per 12 minutes
MAF meter	Resistance (THA - E2)	at -20°C (-4°F)	12.5 - 16.9 kΩ
		at 20°C (68°F)	2.19 - 2.67 kΩ
		at 60°C (140°F)	0.50 - 0.68 kΩ
Throttle body	Throttle body fully closed angle		5.5°
Accelerator pedal position sensor	Standard throttle valve opening percentage Sensor lever full-open position		60 % or more
Throttle control motor	Motor resistance	at 20°C (68°F)	0.3 - 100 Ω
VSV for EVAP	Resistance	at 20°C (68°F)	30 - 34 Ω
VSV for vapor pressure sensor	Resistance	at 20°C (68°F)	30 - 36 Ω
ECT sensor	Resistance	at -20°C (-4°F)	10 - 20 kΩ
		0°C (32°F)	4 - 7 kΩ
		20°C (68°F)	2 - 3 kΩ
		40°C (104°F)	0.9 - 1.3 kΩ
		60°C (140°F)	0.4 - 0.7 kΩ
		80°C (176°F)	0.2 - 0.4 kΩ
Vapor pressure sensor	Power source voltage		4.5 - 5.5 V
Heated oxygen sensor	Heater coil resistance	at 20°C (68°F)	11 - 16 Ω
Fuel cut rpm		Fuel return rpm	1,000 rpm
Fuel pump resistor	Resistance	at 20°C (68°F)	0.70 - 0.76 Ω
VSV for CCV	Resistance	at 20°C (68°F)	24 - 30 Ω

## TORQUE SPECIFICATION

Part tightened	N-m	kgf-cm	ft-lbf
Fuel line			
Union bolt type	39	400	29
Flare nut type	34	345	25
	38	380	28
Fuel pressure pulsation damper x Delivery pipe	33	340	24
	39	400	29
Fuel pressure regulator x RH delivery pipe	7.5	80	66 in.-lbf
Fuel tank vent tube set plate x Fuel tank	3.5	35	31 in.-lbf
Front fuel pipe x Delivery pipe	39	400	29
Front fuel pipe x Lower intake manifold	7.5	80	66 in.-lbf
Fuel return pipe x LH delivery pipe	7.5	80	66 in.-lbf
Delivery pipe x Lower intake manifold	18	185	13
Fuel sender gauge x Fuel tank	1.5	15	13 in.-lbf
Fuel tank x Body	39	400	29
Drain plug x Fuel tank	6.5	65	58 in.-lbf
Fuel tank filler pipe x Fuel tank	3.5	35	31 in.-lbf
Cutoff valve cover x Fuel tank	1.5	15	13 in.-lbf
Accelerator pedal position sensor x Body	5.0	51	44 in.-lbf
Throttle body x Upper intake manifold, Lower intake manifold	18	185	13
Upper intake manifold, Accelerator cable bracket x Lower intake manifold	18	185	13
ECT sensor x Front water bypass joint	20.4	208	15
Knock sensor x Cylinder block	45	450	33
Heated oxygen sensor x Exhaust manifold	44	450	32
Heated oxygen sensor x Front exhaust pipe	20	200	14
No.1 rear seat x Body	41	420	30
MAF meter x Air cleaner	1.68	17	15 in.-lbf
Fuel pump resistor x Body	12	122	8.8

# STEERING

## SERVICE DATA

SS00H-05

POWER STEERING FLUID		
Oil level rise	Maximum	Below 5 mm (0.20 in.)
Oil pressure at idle speed with valve closed	Minimum	10,000 kPa (102 kgf/cm <sup>2</sup> , 1,451 psi)
STEERING WHEEL		
Steering wheel freeplay	Maximum	40 mm (1.58 in.)
Steering effort at idle speed	Maximum	4.9 N·m (50 kgf·cm, 43 in.-lbf)
PS VANE PUMP		
Pump shaft and front housing bushing oil clearance	STD	0.021 - 0.043 mm (0.00083 - 0.00169 in.)
	Maximum	0.070 mm (0.00276 in.)
Pump shaft and rear housing bushing oil clearance	STD	0.020 - 0.077 mm (0.00079 - 0.00303 in.)
	Maximum	0.080 mm (0.00315 in.)
Vane plate thickness	Minimum	1.405 mm (0.0531 in.)
Vane plate and pump rotor groove clearance	Maximum	0.03 mm (0.0012 in.)
Flow control valve spring length	Minimum	31.3 mm (1.2323 in.)
Pump rotating torque	Maximum	0.28 N·m (2.8 kgf·cm, 2.4 in.-lbf) or less
PS GEAR		
Steering rack runout	Maximum	0.03 mm (0.0118 in.)
Total preload	Center area	1.8 - 2.2 N·m (18.4 - 22.4 kgf·cm, 16.0 - 19.5 in.-lbf)
	End area	1.3 - 1.7 N·m (13.3 - 17.3 kgf·cm, 11.5 - 15.0 in.-lbf)



# TORQUE SPECIFICATION

Part tightened	N-m	kgf-cm	ft-lbf
<b>STEERING COLUMN</b>			
Steering wheel set nut	50	510	37
Steering wheel pad set screw (Torx screw)	8.8	90	78 in.-lbf
Steering column assembly set nut and bolt	25	260	19
Intermediate shaft assembly x Sliding yoke	34	350	25
Sliding yoke x No. 2 Intermediate shaft assembly	34	350	25
Control valve shaft x No. 2 Intermediate shaft assembly	34	350	25
Main shaft assembly x Intermediate shaft assembly	34	350	25
Hole cover x Body	13	130	9
<b>TILT STEERING COLUMN:</b>			
Tube attachment x Column tube	15	150	11
Tilt steering bolt	20	210	15
No. 2 lower cover set nut	25	260	19
<b>POWER TILT AND POWER TELESCOPIC STEERING COLUMN:</b>			
Steering column protector No. 1 set bolt	15	150	11
Power tilt motor set bolt	20	210	15
Power telescopic motor set bolt	8.8	90	78 in.-lbf
Column tube stopper	19	190	14
Tube attachment x Column tube	15	150	11
Telescopic steering slider support set bolt	11	110	8
Telescopic steering screw set nut	2.0	20	17 in.-lbf
No. 2 lower cover set nut	25	260	19
Column upper tube sub-assembly x Column upper tube assembly	20	210	15
Telesco lever lock bolt	10	100	7
<b>PS VANE PUMP</b>			
Union bolt x Pressure feed tube	56	575	42
PS vane pump assembly set bolt	17	175	13
Suction port union set bolt	12	120	9
Pressure port union	69	700	51
Rear housing set bolt	22	225	16
<b>PS GEAR</b>			
Cylinder end stopper	110 (145)	1,122 (1,480)	81 (107)
Bearing guide nut	24.5	250	19
Control valve housing set bolt	18	180	13
Rack guide spring cap	25	250	18
Rack guide spring cap lock nut	51 (70)	520 (700)	38 (51)
Rack x Rack end	99 (132)	1,014 (1,350)	74 (98)
Tie rod end lock nut	55	560	41
Turn pressure tube union nut	23 (24.5)	230 (250)	17 (18)
PS gear assembly set bolt and nut	120	1,250	89
Return tube x Control valve housing	50 (44)	510 (450)	37 (29)
Pressure feed tube x Control valve housing	42	430	31
Tube clamp set bolt	18	180	13

**SS-44****SERVICE SPECIFICATIONS - STEERING**

Tie rod end x Steering knuckle	72	730	53
Engine oil filter assembly set bolt and nut	18	180	13

( ): For use without SST

# STARTING

## SERVICE DATA

SS00D-01

Starter	Rated voltage and output power		12 V 2.0 kW
	No-load characteristics	Current	100 A or less at 11.5 V
		rpm	2,500 rpm or less
	Brush length	STD	15.0 mm (0.591 in.)
		Minimum	9.0 mm (0.354 in.)
	Spring installed load	STD	21.5 - 27.5 N (2.2 - 2.8 kgf, 4.8 - 6.2 lbf)
		Minimum	12.7 N (1.3 kgf, 2.9 lbf)
	Commutator		
	Diameter	STD	35.0 mm (1.378 in.)
		Minimum	34.0 mm (1.339 in.)
	Undercut depth	STD	0.7 mm (0.028 in.)
		Minimum	0.2 mm (0.008 in.)
	Circle runout	Maximum	0.05 mm (0.0020 in.)
	Field frame		
	Shunt coil resistance	at 20°C (68°F)	1.5 - 1.9 Ω
Magnetic switch			
Contact plate for wear	Maximum	0.9 mm (0.035 in.)	


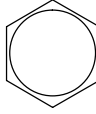
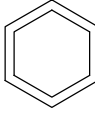
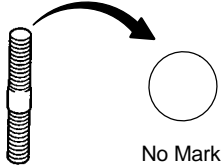
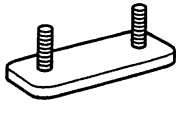

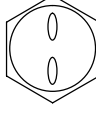
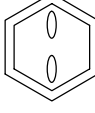
















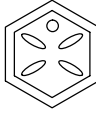


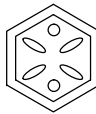
## TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Terminal 30 nut, Terminal C nut x Terminal bolt	17	170	13
End cover x Magnetic switch housing	3.6	37	32 in.·lbf
End cover x Brush holder	3.8	39	34 in.·lbf
Starter hosing x Magnetic switch	9.3	95	82 in.·lbf
End cover with field frame x Magnetic switch	9.3	95	82 in.·lbf
Lead wire of field coil x Terminal C	5.9	60	52 in.·lbf
Wire clamp, Starter wire x Starter	9.81	100	87 in.·lbf
Starter x Cylinder block	39	400	29

# STANDARD BOLT

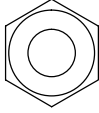
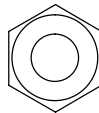
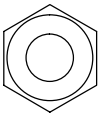
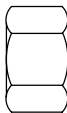

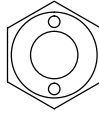
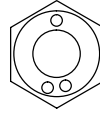
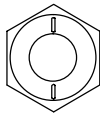
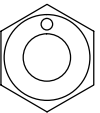
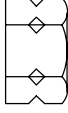
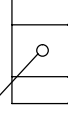
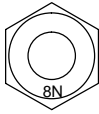
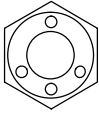
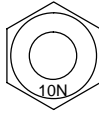
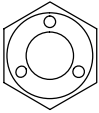
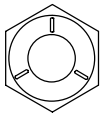
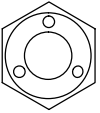


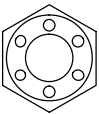
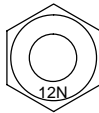
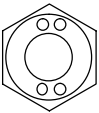
## HOW TO DETERMINE BOLT STRENGTH

SS02S-01

Bolt Type				Class
Hexagon Head Bolt		Stud Bolt	Weld Bolt	
Normal Recess Bolt	Deep Recess Bolt			
  No Mark	 No Mark	 No Mark		4T
 				5T
  w/ Washer	 w/ Washer			6T
 	 			7T
		 		8T
				9T
	 			10T
	 			11T

B06431

# HOW TO DETERMINE NUT STRENGTH

Present Standard Hexagon Nut	Nut Type		Class
	Old Standard Hexagon Nut		
	Cold Forging Nut	Cutting Processed Nut	
 No Mark			4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
  			6N
	 	  *	7N (5T)
 			8N
 	 	 No Mark	10N (7T)
 			11N
 			12N

\*: Nut with 1 or more marks on one side surface of the nut.

B06432

**HINT:**

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

2004 LAND CRUISER (RM1071U)

## SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N-m	kgf-cm	ft-lbf	N-m	kgf-cm	ft-lbf
4T	6	1	5	55	48 in.-lbf	6	60	52 in.-lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	-	-	-
5T	6	1	6.5	65	56 in.-lbf	7.5	75	65 in.-lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	-	-	-
6T	6	1	8	80	69 in.-lbf	9	90	78 in.-lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	-	-	-
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	-	-	-
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

# TRANSFER

## SERVICE DATA

SS00M-03

Idler gear rear bearing adjusting shim thickness	Mark 2	0.30 mm (0.0118 in.)
	Mark 3	0.45 mm (0.0177 in.)
	Mark 4	2.40 mm (0.0945 in.)
	Mark 5	2.60 mm (0.1024 in.)
	Mark 6	2.80 mm (0.1102 in.)
	Mark 7	3.00 mm (0.1181 in.)
	Mark 8	3.20 mm (0.1260 in.)
	Mark 9	3.40 mm (0.1339 in.)
	Mark 10	3.60 mm (0.1417 in.)
	Mark 11	3.80 mm (0.1496 in.)
	Mark 12	4.00 mm (0.1575 in.)
	Mark 13	0.55 mm (0.0216 in.)
	Output shaft rear bearing adjusting shim thickness	Mark B
Mark C		0.45 mm (0.0177 in.)
Mark D		1.00 mm (0.0394 in.)
Mark E		1.20 mm (0.0472 in.)
Mark F		1.40 mm (0.0551 in.)
Mark G		1.60 mm (0.0630 in.)
Mark H		1.80 mm (0.0709 in.)
Mark J		2.00 mm (0.0787 in.)
Mark K		2.20 mm (0.0866 in.)
Mark L		2.40 mm (0.0945 in.)
Mark M		2.60 mm (0.1024 in.)
Input gear snap ring thickness	Mark A	2.90 mm (0.1141 in.)
	Mark B	2.95 mm (0.1161 in.)
	Mark C	3.00 mm (0.1181 in.)
	Mark D	3.05 mm (0.1201 in.)
	Mark E	3.10 mm (0.1220 in.)
	Mark F	3.15 mm (0.1240 in.)
Input shaft rear ball bearing snap ring thickness	Mark A	2.00 mm (0.0787 in.)
	Mark B	2.10 mm (0.0827 in.)
	Mark C	2.20 mm (0.0866 in.)
	Mark D	2.30 mm (0.0906 in.)
	Mark E	2.40 mm (0.0945 in.)
Idler low gear thrust clearance	STD	0.125 - 0.275 mm (0.00492 - 0.01083 in.)
	Max.	0.275 mm (0.01083 in.)
Idler low gear radial clearance	STD	0.015 - 0.068 mm (0.00059 - 0.00268 in.)
	Max.	0.068 mm (0.00268 in.)
Idler gear diameter	STD	38.48 - 38.50 mm (1.5149 - 1.5157 in.)
	Max.	38.50 mm (1.5157 in.)
Idler low gear diameter	STD	45.52 - 45.54 mm (1.7922 - 1.7930 in.)
	Max.	45.54 mm (1.7930 in.)
High speed output gear thrust clearance	STD	0.10 - 0.25 mm (0.0039 - 0.0098 in.)
	Max.	0.25 mm (0.0098 in.)
High speed output gear radial clearance	STD	0.035 - 0.091 mm (0.00138 - 0.00358 in.)
	Max.	0.091 mm (0.00358 in.)
Center differential front case, rear case backlash	Max.	0.05 mm (0.0020 in.)



Shift fork No.2 and clutch sleeve clearance	STD Max.	0.1 - 0.4 mm (0.0039 - 0.0157 in.) 0.4 mm (0.0157 in.)
Center differential side gear thrust washer thickness		1.70 mm (0.0669 in.) 1.85 mm (0.0728 in.) 2.00 mm (0.0787 in.) 2.15 mm (0.0846 in.) 2.30 mm (0.0906 in.) 2.45 mm (0.0965 in.) 2.60 mm (0.1024 in.) 2.75 mm (0.1083 in.) 2.90 mm (0.1142 in.) 3.05 mm (0.1201 in.)
Front drive gear piece snap ring thickness	Mark A Mark B Mark C Mark D Mark E Mark F Mark G Mark H Mark J Mark K Mark L	2.00 mm (0.0787 in.) 2.10 mm (0.0827 in.) 2.20 mm (0.0866 in.) 2.30 mm (0.0906 in.) 2.40 mm (0.0945 in.) 2.50 mm (0.0984 in.) 2.60 mm (0.1024 in.) 2.70 mm (0.1063 in.) 2.80 mm (0.1102 in.) 1.80 mm (0.0709 in.) 1.90 mm (0.0748 in.)
Front extension housing ball bearing snap ring thickness	Mark A Mark B	1.70 mm (0.0669 in.) 1.80 mm (0.0709 in.)
Front output shaft hub snap ring thickness	Mark A Mark B Mark C Mark D Mark E	1.80 mm (0.0709 in.) 1.90 mm (0.0748 in.) 2.00 mm (0.0787 in.) 2.10 mm (0.0827 in.) 2.20 mm (0.0866 in.)
Oil pump driven rotor body clearance	STD Max.	0.08 - 0.17 mm (0.0031 - 0.0067 in.) 0.17 mm (0.0067 in.)
Oil pump driven rotor body tip clearance	STD Max.	0.05 - 0.15 mm (0.0020 - 0.0059 in.) 0.15 mm (0.0059 in.)
Oil pump side clearance	STD Max.	0.03 - 0.10 mm (0.0012 - 0.0039 in.) 0.10 mm (0.0039 in.)
Rear extension housing ball bearing snap ring thickness	Mark A Mark B	1.70 mm (0.0669 in.) 1.80 mm (0.0709 in.)
Rear output shaft ball bearing snap ring thickness	Mark 1 Mark 2 Mark 3 Mark 4	1.95 mm (0.0768 in.) 2.05 mm (0.0807 in.) 2.15 mm (0.0847 in.) 2.25 mm (0.0886 in.)
Motor actuator Terminal 1 - Terminal 5 Terminal 1 or 5 - body ground	STD resistance STD resistance	0.3 - 100 Ω More than 0.5 MΩ
Breather hose (from the hose end to the clip end)		5 mm (0.20 in.) or more

## TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Crossmember x Frame	50	510	37
Crossmember x Engine rear mounting	74	750	54
Transfer x Transmission	69	700	51
Filler and drain plug	37	380	27
Oil pump plate x Rear extension housing	4.9	50	43 in.·lbf
Oil pump cover x Rear extension housing	4.9	50	43 in.·lbf
Lever lock pin	12	120	9
Oil strainer x Rear case	4.9	50	43 in.·lbf
Oil receiver x Front case	12	120	9
Case cover x Rear case	37	380	27
Rear extension housing x Rear case	37	380	27
Front extension housing x Front case	37	380	27
Transfer indicator switch (Center diff. lock)	37	380	27
Transfer indicator switch (Low switch)	37	380	27
Transfer indicator switch (Neutral switch)	37	380	27
Screw plug x Front case	19	190	14
Screw plug x Rear extension housing	29	300	22
Motor actuator x Front case	18	185	13
Differential front case x Differential rear case	See page <a href="#">TR-31</a>		
Front case x Rear case	37	380	27
Crossmember x Transfer case protector	28	290	21
Speed sensor driven gear	11	115	8
Transfer shift lever rod assembly x Shift outer lever	14	140	10
Transfer control shift lever retainer x Transmission	19	190	14
Transfer x Front propeller shaft	80	820	59
Front propeller shaft x Front differential	80	820	59
Transfer x Rear propeller shaft	106	1,080	78
Rear propeller shaft x Rear differential	106	1,080	78
Rear extension housing x Retainer	39	400	29

# CO/HC INSPECTION

EMOKG-07

## HINT:

This check is used only to determine whether or not the idle CO/HC complies with regulations.

### 1. INITIAL CONDITIONS

- (a) The engine is at normal operating temperature.
- (b) Air cleaner is installed.
- (c) All pipes and hoses of the air induction system are connected.
- (d) All accessories are switched OFF.
- (e) All vacuum lines are properly connected.

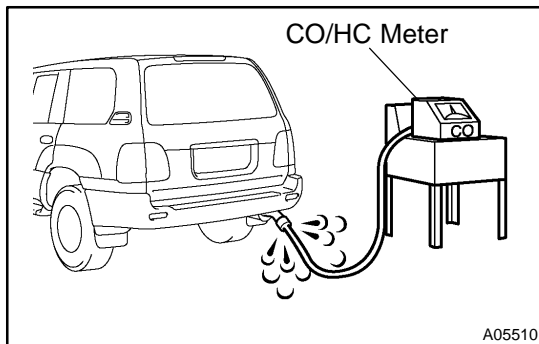
## HINT:

All vacuum hoses should be properly connected.

- (f) SFI system wiring connectors are fully plugged.
- (g) Ignition timing is set correctly.
- (h) Transmission is in neutral range.
- (i) Tachometer and CO/HC meter are calibrated by hand.

### 2. START ENGINE

### 3. RACE ENGINE AT 2,500 RPM FOR APPROX. 180 SECONDS



4. INSERT CO/HC METER TESTING PROBE AT LEAST 40 cm (1.3 ft) INTO TAILPIPE DURING IDLING
5. IMMEDIATELY CHECK CO/HC CONCENTRATION AT IDLE AND/OR 2,500 RPM

## HINT:

When performing the 2 mode (2,500 rpm and idle) test, follow the measurement order prescribed by the applicable local regulations.

## 6. TROUBLESHOOTING

### HINT:

If the CO/HC concentration does not comply with the regulations, perform troubleshooting in the order given below.

See the table below for possible causes, and then inspect and correct the applicable causes if necessary.

CO	HC	Problems	Causes
Normal	High	Rough idle	1. Faulty ignitions: <ul style="list-style-type: none"> <li>▶ Incorrect timing</li> <li>▶ Fouled, shorted or improperly gapped plugs</li> </ul> 2. Incorrect valve clearance 3. Leaky intake and exhaust valves 4. Leaky cylinders
Low	High	Rough idle (fluctuating HC reading)	1. Vacuum leaks: <ul style="list-style-type: none"> <li>▶ PCV hoses</li> <li>▶ Intake manifold</li> <li>▶ Throttle body</li> <li>▶ Brake booster line</li> </ul> 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Faulty SFI systems: <ul style="list-style-type: none"> <li>▶ Faulty pressure regulator</li> <li>▶ Defective ECT sensor</li> <li>▶ Faulty ECM</li> <li>▶ Faulty injectors</li> <li>▶ Faulty throttle position sensor</li> <li>▶ Faulty MAF meter</li> </ul>

# COMPRESSION INSPECTION

EMOKR-09

## HINT:

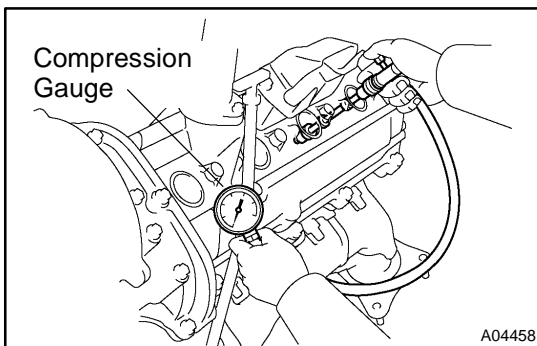
If there is a lack of power, excessive oil consumption or poor fuel economy, measure the compression pressure.

### 1. WARM UP AND STOP ENGINE

Allow the engine to warm up to the normal operating temperature.

### 2. REMOVE SPARK PLUGS

(See page [IG-1](#) )



### 3. CHECK CYLINDER COMPRESSION PRESSURE

- (a) Insert a compression gauge into the spark plug hole.
- (b) Fully open the throttle.
- (c) While cranking the engine, measure the compression pressure.

## HINT:

Always use a fully charged battery to obtain the engine speed at 250 rpm or more.

- (d) Repeat steps (a) to (c) for each cylinder.

## NOTICE:

**This measurement must be done as quickly as possible.**

#### Compression pressure:

**1,324 kPa (13.5 kgf/cm<sup>2</sup>, 192 psi) or more**

#### Minimum pressure:

**981 kPa (10.0 kgf/cm<sup>2</sup>, 142 psi)**

#### Difference between each cylinder:

**98 kPa (1.0 kgf/cm<sup>2</sup>, 14 psi) or less**

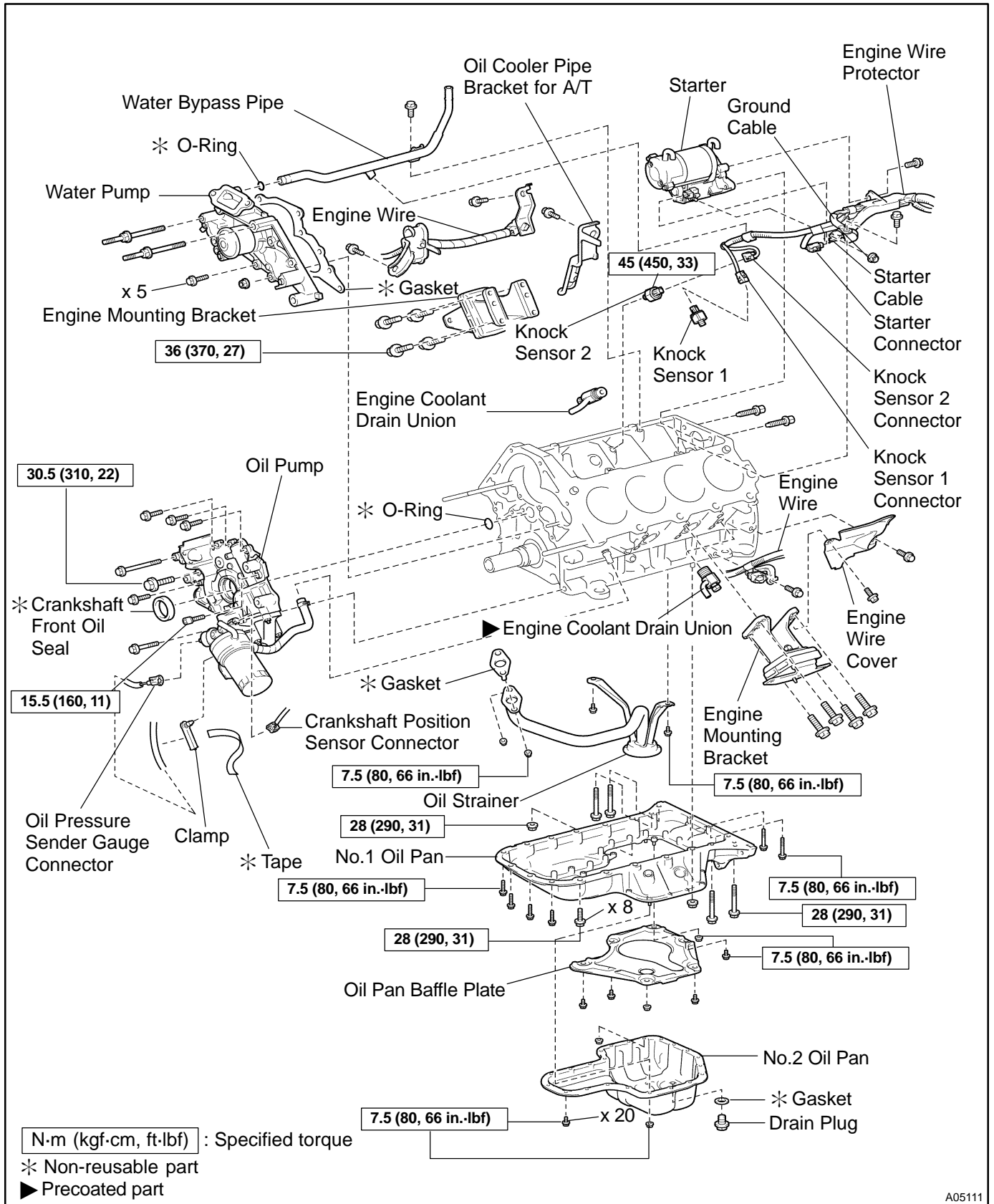
- (e) If the cylinder compression in one or more cylinders is lower than the specification, pour a small amount of engine oil into the cylinder through the spark plug hole and repeat steps (a) to (c) for the cylinders.
  - ▶ If adding oil helps the compression, chances are that the piston rings and/or cylinder bore are worn or damaged.
  - ▶ If the pressure stays low, a valve may be sticking or the seating is improper, or there may be leakage past the gasket.

### 4. REINSTALL SPARK PLUGS

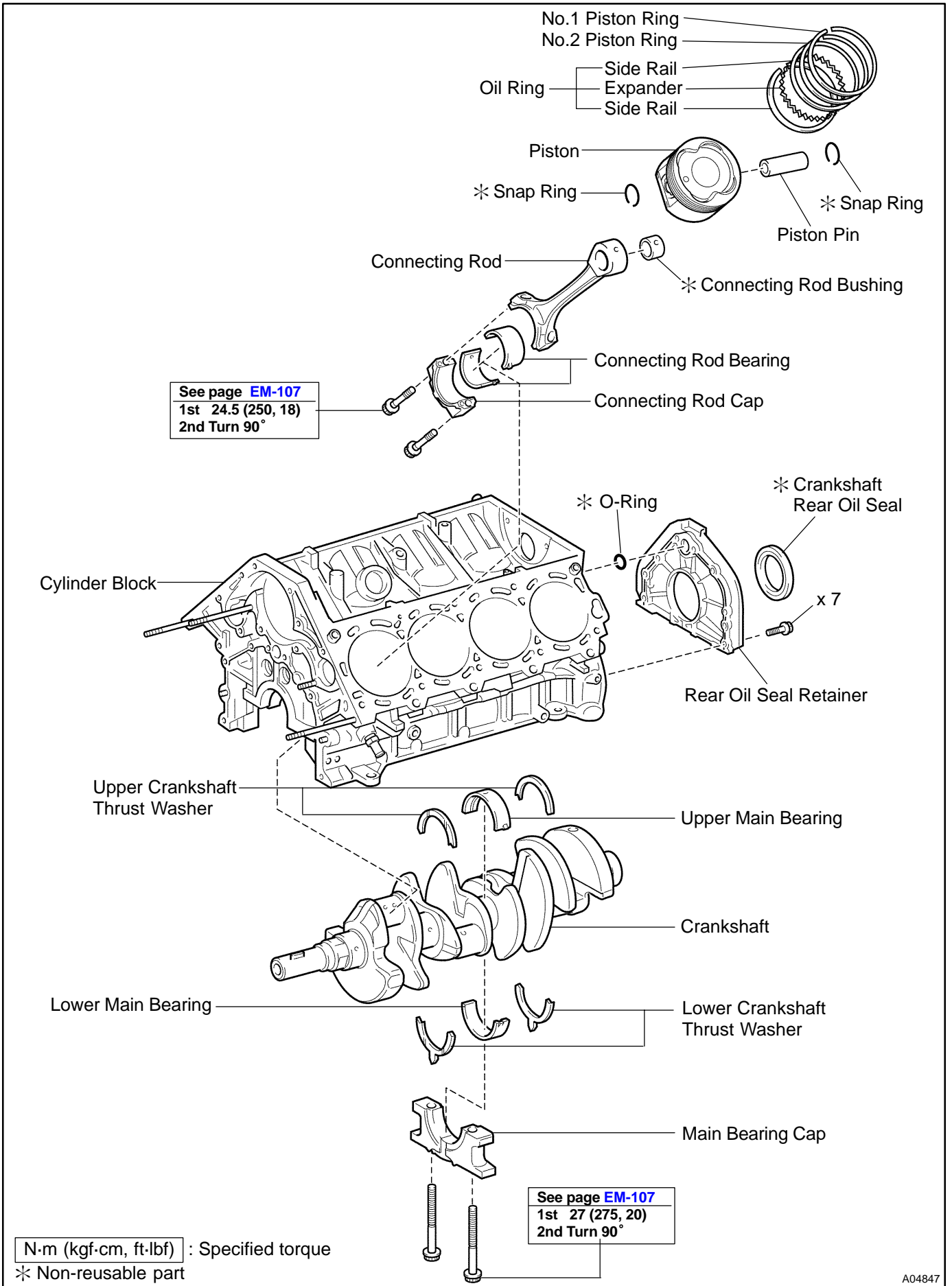
(See page [IG-1](#) )

# CYLINDER BLOCK COMPONENTS

EM0E9-15



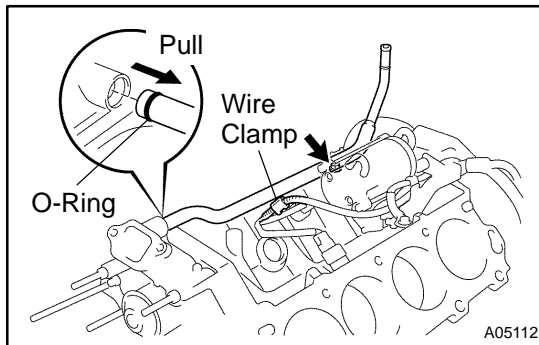
A05111



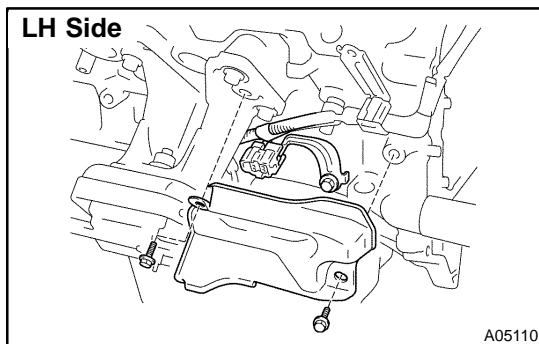
A04847

## DISASSEMBLY

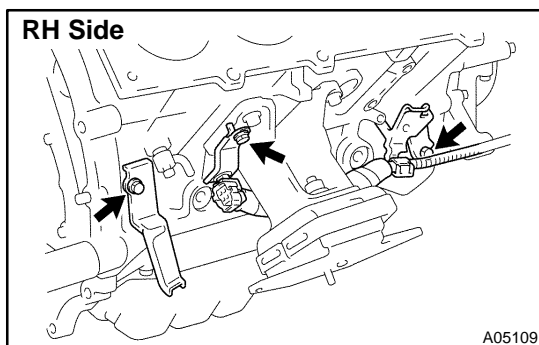
1. **INSTALL ENGINE TO ENGINE STAND**
2. **REMOVE TIMING BELT AND PULLEYS**  
(See page [EM-15](#) )
3. **REMOVE CYLINDER HEAD** (See page [EM-35](#) )



4. **REMOVE WATER BYPASS PIPE**
  - (a) Disconnect the wire clamp (for knock sensor 1, 2) from the bracket of the water bypass pipe.
  - (b) Remove the bolt.
  - (c) Pull out the water bypass pipe from the water pump.
  - (d) Remove the O-ring from the water bypass pipe.
5. **REMOVE STARTER** (See page [ST-5](#) )
6. **REMOVE KNOCK SENSORS** (See page [SF-55](#) )



7. **DISCONNECT ENGINE WIRE FROM LH SIDE OF CYLINDER BLOCK**
  - (a) Remove the 2 bolts and the engine wire cover from the LH side of the cylinder block.
  - (b) Remove the bolt, disconnect the bracket on the engine wire from the cylinder block.



8. **DISCONNECT ENGINE WIRE FROM RH SIDE OF CYLINDER BLOCK**  
Remove the 2 bolts, and disconnect the 2 brackets on the engine wire from the cylinder block.

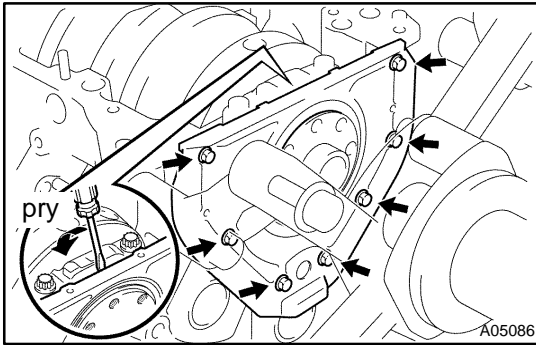
9. **REMOVE OIL COOLER PIPE BRACKET FOR A/T**  
Remove the bolt and bracket.

### 10. REMOVE ENGINE MOUNTING BRACKETS

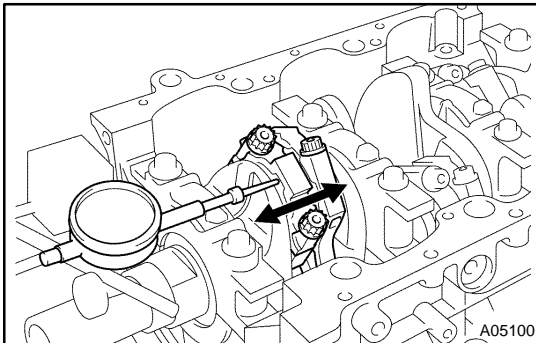
Remove the 4 bolts and the mounting bracket. Remove the 2 mounting brackets

11. **REMOVE WATER PUMP** (See page [CO-6](#) )
12. **REMOVE NO.2 OIL PAN** (See page [LU-8](#) )
13. **REMOVE OIL PAN BAFFLE PLATE**
14. **REMOVE NO.1 OIL PAN** (See page [LU-8](#) )
15. **REMOVE OIL STRAINER**
16. **REMOVE OIL PUMP** (See page [LU-8](#) )
17. **REMOVE ENGINE COOLANT DRAIN UNIONS**  
Remove the 2 drain unions.



**18. REMOVE REAR OIL SEAL RETAINER**

- (a) Remove the 7 bolts.
- (b) Using a screwdriver, pry off the oil seal retainer and the main bearing cap with a screwdriver.
- (c) Remove the O-ring.

**19. CHECK CONNECTING ROD THRUST CLEARANCE**

Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

**Standard thrust clearance:**

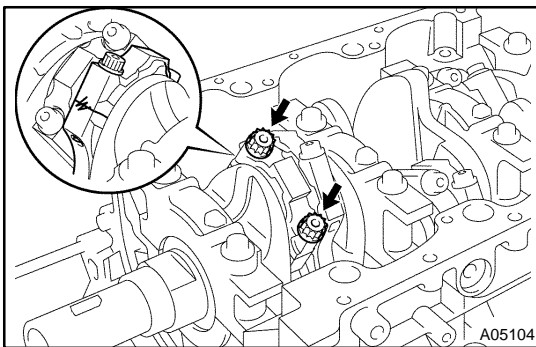
**0.160 - 0.290 mm (0.0063 - 0.0138 in.)**

**Maximum thrust clearance: 0.35 mm (0.0138 in.)**

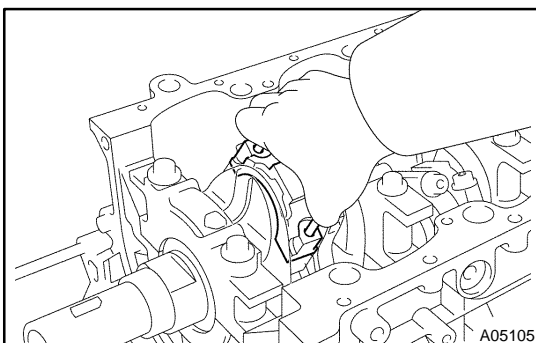
If the thrust clearance is greater than the maximum, replace the connecting rod assembly(s). If necessary, replace the crankshaft.

**Connecting rod thickness:**

**22.880 - 22.920 mm (0.9008 - 0.9024 in.)**

**20. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE**

- (a) Check the matchmarks on the connecting rod and cap to ensure correct reassembly.
- (b) Remove the 2 connecting rod cap bolts.



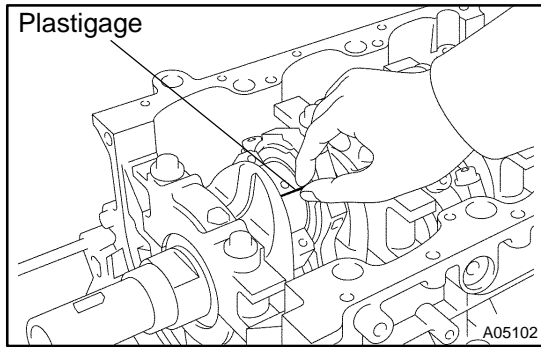
- (c) Using the 2 removed connecting rod cap bolts, remove the connecting rod cap and the lower bearing by wiggling the connecting rod cap right and left.

**HINT:**

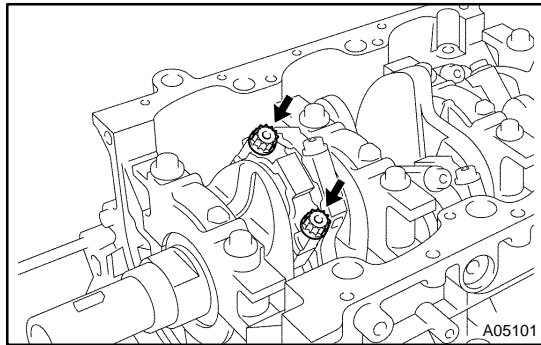
Keep the lower bearing inserted with the connecting rod cap.

- (d) Clean the crank pin and the bearing.
- (e) Check the crank pin and the bearing for pitting and scratches.

If the crank pin or the bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



(f) Lay a strip of plastigage across the crank pin.

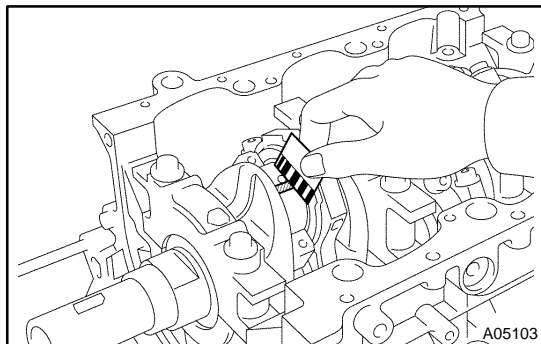


(g) Install the connecting rod cap with the 2 bolts.  
(See page EM-107 )

**NOTICE:**

**Do not turn the crankshaft.**

(h) Remove the 2 bolts, the connecting rod cap and the lower bearing. (See procedure (b) and (c) above)



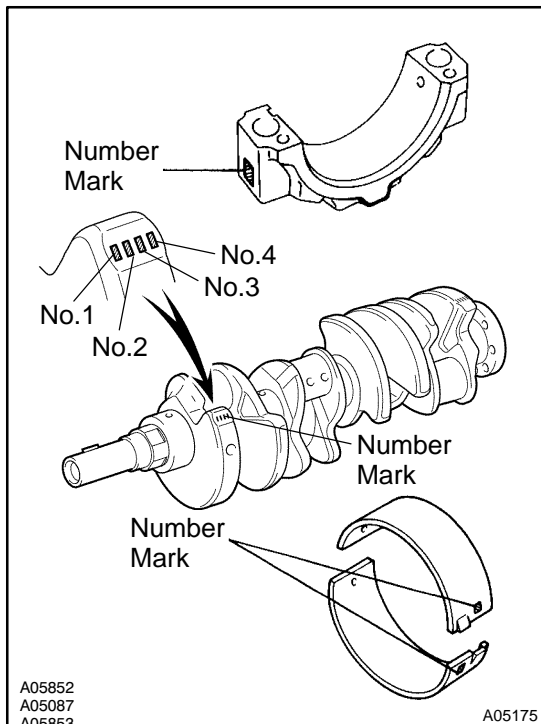
(i) Measure the plastigage at its widest point.

**Standard oil clearance:**

**0.027 - 0.053 mm (0.0011 - 0.0021 in.)**

**Maximum oil clearance: 0.065 mm (0.0026 in.)**

If the oil clearance is greater than the maximum, replace the bearings. If necessary, replace the crankshaft.



**HINT:**

If using a standard bearing, replace it with the one having the same number. If the number of the bearing cannot be determined, sum up the numbers imprinted on the connecting rod cap and the crankshaft, then select the one with the same number as the total. There are 6 sizes of standard bearings, marked "2", "3", "4", "5", "6" and "7".

	Number mark											
Connecting rod cap	1	1	2	1	2	3	2	3	4	3	4	4
Crankshaft	1	2	1	3	2	1	3	2	1	3	2	3
Use bearing	2		3		4			5		6		7

**EXAMPLE:**

Connecting rod cap "3" + Crankshaft "1"  
= Total number 4 (Use bearing "4")

A05852  
A05087  
A05853

A05175

**Reference****Connecting rod big end inside diameter:**

Mark "1"	55.000 - 55.006 mm (2.1654 - 2.1656 in.)
Mark "2"	55.006 - 55.012 mm (2.1656 - 2.1658 in.)
Mark "3"	55.012 - 55.018 mm (2.1658 - 2.1661 in.)
Mark "4"	55.018 - 55.024 mm (2.1661 - 2.1663 in.)

**Crankshaft crank pin diameter:**

Mark "1"	51.994 - 52.000 mm (2.0470 - 2.0472 in.)
Mark "2"	51.988 - 51.994 mm (2.0468 - 2.0470 in.)
Mark "3"	51.982 - 51.988 mm (2.0465 - 2.0468 in.)

**Standard sized bearing center wall thickness:**

Mark "2"	1.484 - 1.487 mm (0.0584 - 0.0585 in.)
Mark "3"	1.487 - 1.490 mm (0.0585 - 0.0587 in.)
Mark "4"	1.490 - 1.493 mm (0.0587 - 0.0588 in.)
Mark "5"	1.493 - 1.496 mm (0.0588 - 0.0589 in.)
Mark "6"	1.496 - 1.499 mm (0.0589 - 0.0590 in.)
Mark "7"	1.499 - 1.502 mm (0.0590 - 0.0591 in.)

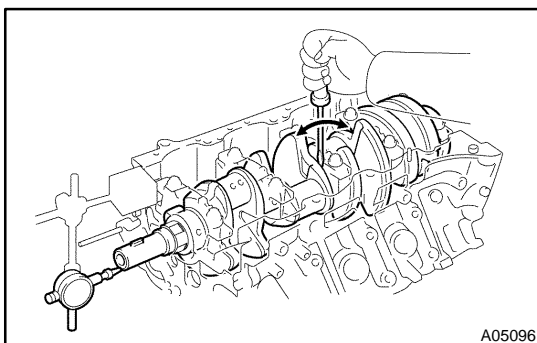
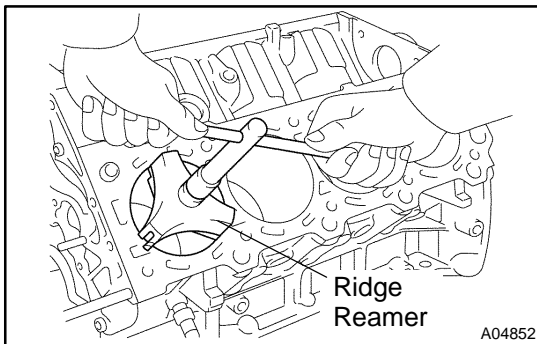
(j) Completely remove the plastigage.

**21. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES**

- (a) Using a ridge reamer, remove all the carbon from the top of the cylinder.
- (b) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.

**HINT:**

- ▶ Keep the bearings, the connecting rod and the cap together.
- ▶ Arrange the piston and connecting rod assemblies in correct order.

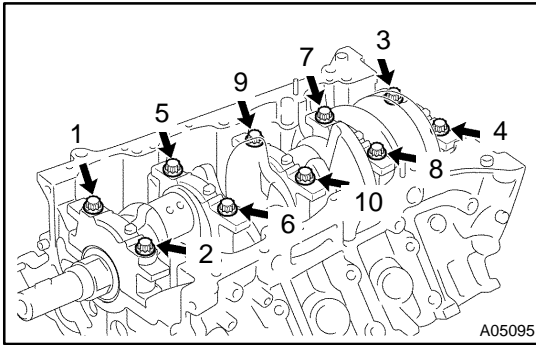
**22. CHECK CRANKSHAFT THRUST CLEARANCE**

Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

**Standard thrust clearance:****0.020 - 0.220 mm (0.0008 - 0.0087 in.)****Maximum thrust clearance: 0.30 mm (0.0118 in.)**

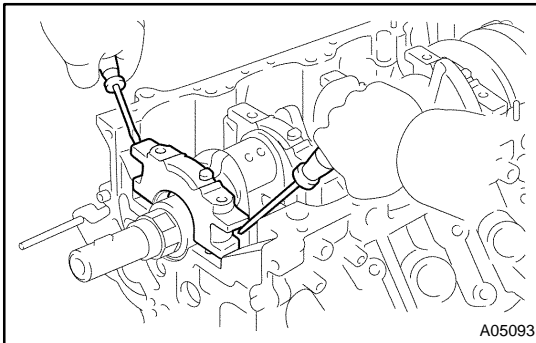
If the thrust clearance is greater than the maximum, replace the thrust washers as a set.

**Thrust washer thickness:****2.440 - 2.490 mm (0.0961 - 0.0980 in.)**



### 23. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

- (a) Evenly loosen and remove the 10 main bearing cap bolts a little at time for several times, in the sequence shown.



- (b) Using 2 screwdrivers, pry out the main bearing cap, and remove the 5 main bearing caps, the 5 lower bearings and the 2 lower thrust washers (No.3 main bearing cap only).

#### NOTICE:

**Be careful not to damage the cylinder block.**

#### HINT:

- ▶ Keep the lower bearing and the main bearing cap together.
- ▶ Arrange the main bearing caps and lower thrust washers in correct order.

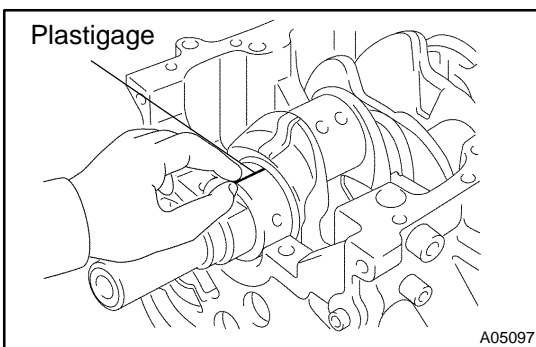
- (c) Lift out the crankshaft.

#### HINT:

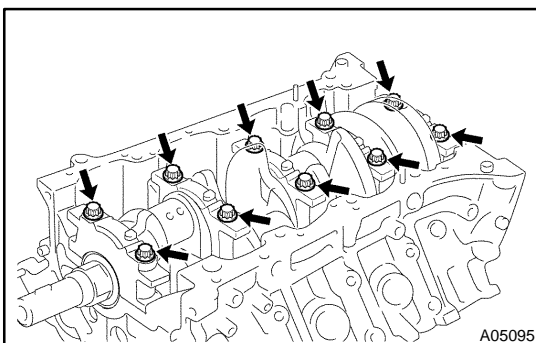
Keep the upper bearings and the upper thrust washers together with the cylinder block.

- (d) Clean each main journal and bearing.  
 (e) Check each main journal and bearing for pitting and scratches.

If the journal or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



- (f) Place the crankshaft on the cylinder block.  
 (g) Lay a strip of plastigage across each journal.

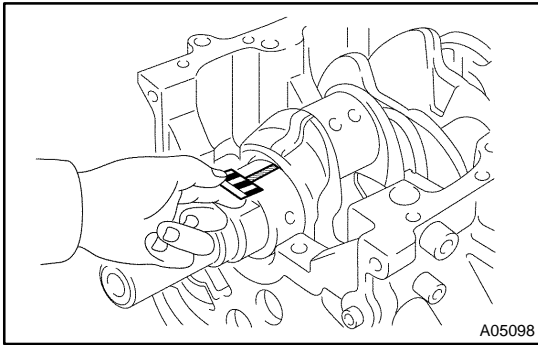


- (h) Install the main bearing caps.  
 (See page [EM-107](#) )

#### NOTICE:

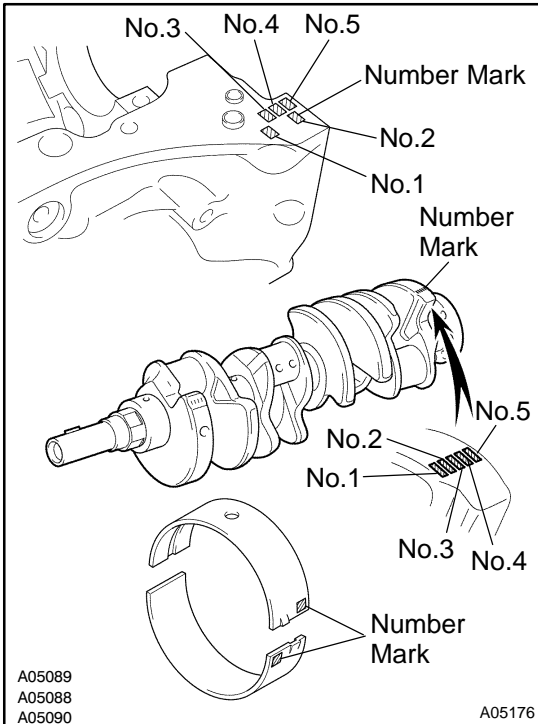
**Do not turn the crankshaft.**

- (i) Remove the main bearing caps.  
 (See procedure (a) and (b) above)



- (j) Measure the plastigage at its widest point.  
**Standard clearance:**  
**0.040 - 0.058 mm (0.0016 - 0.0023 in.)**  
**Maximum clearance: 0.070 mm (0.0028 in.)**

If the oil clearance is greater than the maximum, replace the bearings. If necessary, replace the crankshaft.



**HINT:**

If using a standard bearing, replace it with the one having the same number. If the number of the bearing cannot be determined, sum up the numbers imprinted on the cylinder block and the crankshaft, then refer to the table below for the appropriate bearing number. There are 5 sizes of the standard bearings. For No.1 and No.5 position bearings, use bearings marked "3", "4", "5", "6" and "7". For others position bearings, use bearings marked "1", "2", "3", "4" and "5".

**No.1, No.5:**

		Use bearing
Cylinder block (A) + Crankshaft (B)	0 - 5	3
	6 - 11	4
	12 - 17	5
	18 - 23	6
	24 - 28	7

**EXAMPLE:**

Cylinder block "08" + Crankshaft "06"  
 = Total number 14 (Use bearing "5")

**Others:**

		Use bearing
Cylinder block (A) + Crankshaft (B)	0 - 5	1
	6 - 11	2
	12 - 17	3
	18 - 23	4
	24 - 28	5

**EXAMPLE:**

Cylinder block "08" + Crankshaft "06"  
 = Total number 14 (Use bearing "3")

**Reference**

**Cylinder block main journal bore diameter (A):**

Mark "00"	72.000 mm (2.8346 in.)
Mark "01"	72.001 mm (2.8347 in.)
Mark "02"	72.002 mm (2.8347 in.)
Mark "03"	72.003 mm (2.8348 in.)
Mark "04"	72.004 mm (2.8348 in.)
Mark "05"	72.005 mm (2.8348 in.)
Mark "06"	72.006 mm (2.8349 in.)
Mark "07"	72.007 mm (2.8349 in.)

Mark "08"	72.008 mm (2.8350 in.)
Mark "09"	72.009 mm (2.8350 in.)
Mark "10"	72.010 mm (2.8350 in.)
Mark "11"	72.011 mm (2.8351 in.)
Mark "12"	72.012 mm (2.8351 in.)
Mark "13"	72.013 mm (2.8352 in.)
Mark "14"	72.014 mm (2.8352 in.)
Mark "15"	72.015 mm (2.8352 in.)
Mark "16"	72.016 mm (2.8353 in.)

**Crankshaft main journal diameter (B):**

Mark "00"	67.000 mm (2.6378 in.)
Mark "01"	66.999 mm (2.6378 in.)
Mark "02"	66.998 mm (2.6377 in.)
Mark "03"	66.997 mm (2.6377 in.)
Mark "04"	66.996 mm (2.6376 in.)
Mark "05"	66.995 mm (2.6376 in.)
Mark "06"	66.994 mm (2.6376 in.)
Mark "07"	66.993 mm (2.6375 in.)
Mark "08"	66.992 mm (2.6375 in.)
Mark "09"	66.991 mm (2.6374 in.)
Mark "10"	66.990 mm (2.6374 in.)
Mark "11"	66.989 mm (2.6374 in.)
Mark "12"	66.988 mm (2.6373 in.)

**Standard bearing center wall thickness:  
No.1 and No.5**

Mark "3"	2.481 - 2.484 mm (0.0977 - 0.0978 in.)
Mark "4"	2.484 - 2.487 mm (0.0978 - 0.0979 in.)
Mark "5"	2.487 - 2.490 mm (0.0979 - 0.0980 in.)
Mark "6"	2.490 - 2.493 mm (0.0980 - 0.0981 in.)
Mark "7"	2.493 - 2.496 mm (0.0981 - 0.0983 in.)

**Others:**

Mark "1"	2.481 - 2.484 mm (0.0977 - 0.0978 in.)
Mark "2"	2.484 - 2.487 mm (0.0978 - 0.0979 in.)
Mark "3"	2.487 - 2.490 mm (0.0979 - 0.0980 in.)
Mark "4"	2.490 - 2.493 mm (0.0980 - 0.0981 in.)
Mark "5"	2.493 - 2.496 mm (0.0981 - 0.0983 in.)

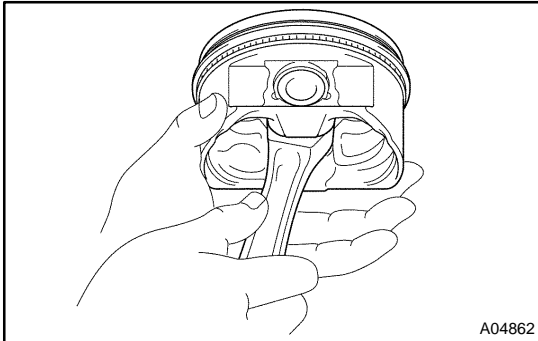
(k) Completely remove the plastigage.

**24. REMOVE CRANKSHAFT**

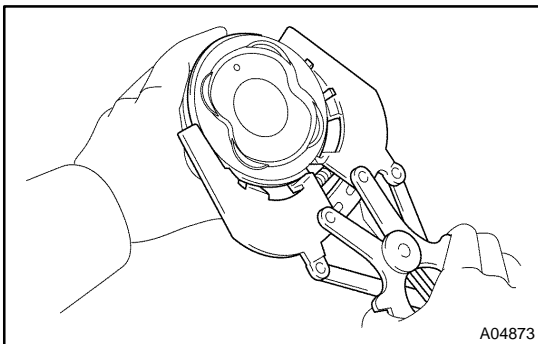
- (a) Lift up the crankshaft.
- (b) Remove the 5 upper main bearings and the 2 upper thrust washers from the cylinder block.

**HINT:**

Arrange the main bearing caps, bearings and thrust washers in correct order for installation.

**25. CHECK FIT BETWEEN PISTON AND PISTON PIN**

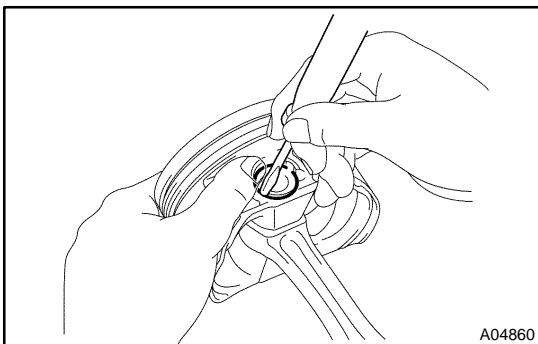
Try to move the piston back and forth on the piston pin. If any movement is felt, replace the piston and pin as a set.

**26. REMOVE PISTON RINGS**

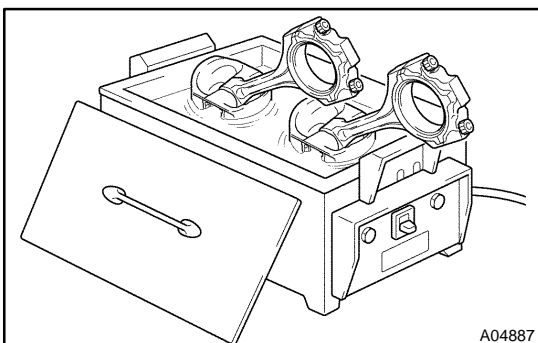
- (a) Using a piston ring expander, remove the 2 compression rings.
- (b) Remove the 2 side rails and the oil ring by hand.

**HINT:**

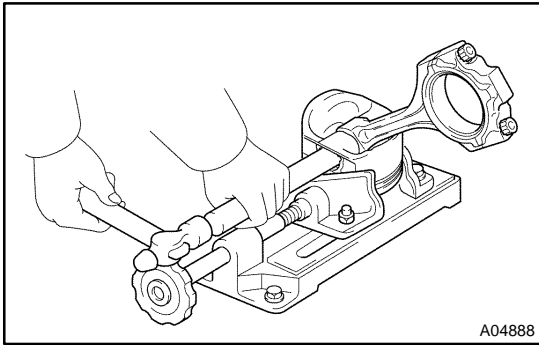
Arrange the piston rings in correct order for installation.

**27. DISCONNECT CONNECTING ROD FROM PISTON**

- (a) Using a small screwdriver, pry out the 2 snap rings.



- (b) Gradually heat the piston to approx. 60°C (140°F).

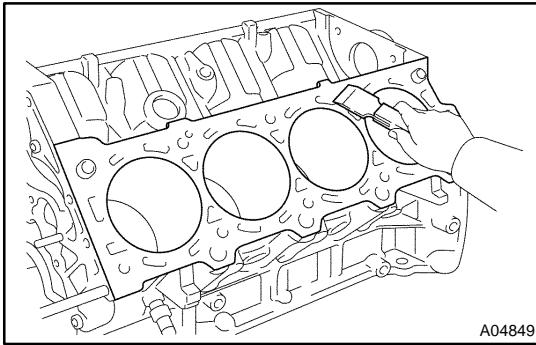


- (c) Using a plastic-faced hammer and a brass bar, lightly tap out the piston pin and the pin and remove the connecting rod.

HINT:

- ▶ The piston and the pin are the set.
- ▶ Arrange the pistons, the pins, the rings, the connecting rods and the bearings in correct order for installation.

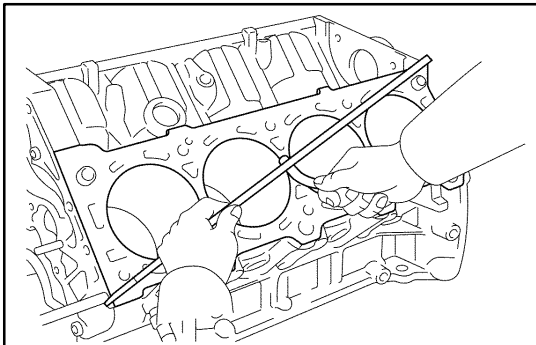




## INSPECTION

### 1. CLEAN CYLINDER BLOCK

- (a) Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.
- (b) Using a soft brush and solvent, thoroughly clean the cylinder block.



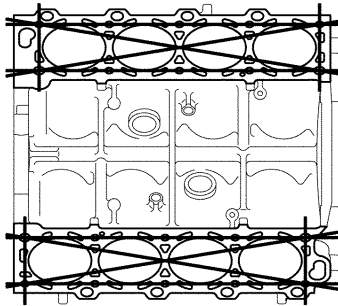
### 2. INSPECT CYLINDER BLOCK

- (a) Inspect for flatness.  
Using a precision straight edge and a feeler gauge, measure the surfaces contacting the cylinder head and main bearing cap for a warp.

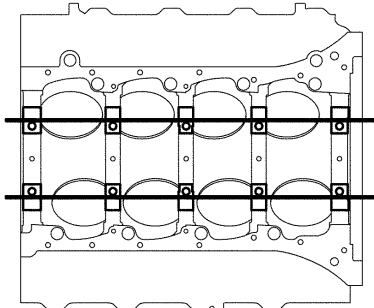
**Maximum warpage: 0.07 mm (0.0028 in.)**

If the warp is greater than the maximum, replace the cylinder block.

Cylinder Block Side

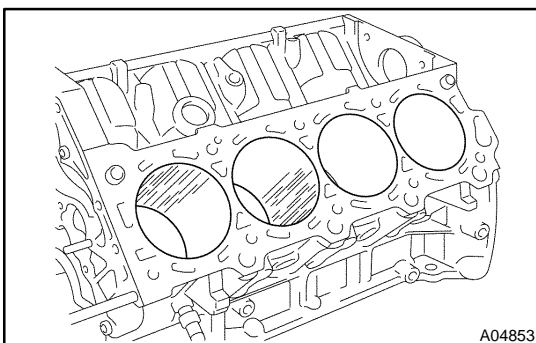


Main Bearing Cap Side

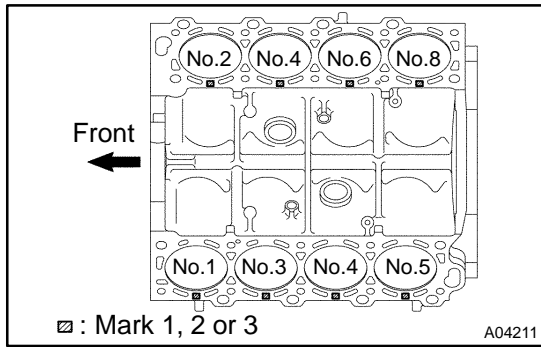


A04850  
A04210  
A04212

A05178



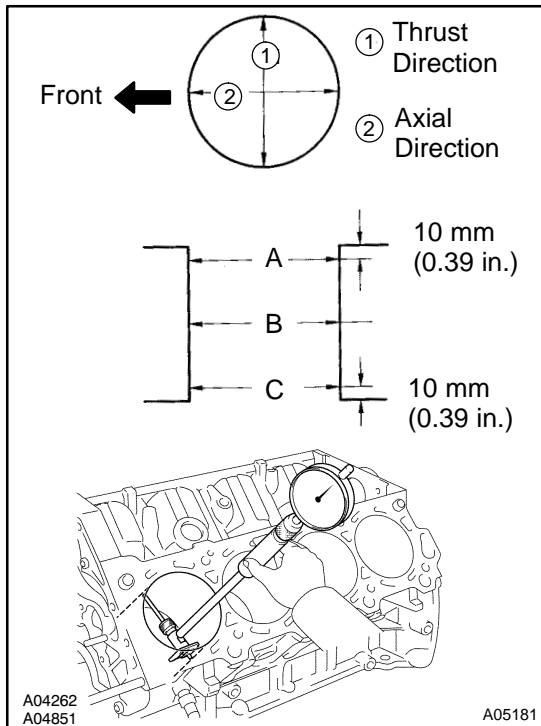
- (b) Visually check the cylinder for vertical scratches.  
If deep scratches are found, rebore all the 8 cylinders and replace all the 8 pistons (See page [EM-104](#) ). If necessary, replace the cylinder block.



(c) Inspect the cylinder bore diameter.

HINT:

There are 3 sizes of the standard cylinder bore diameter, marked "1", "2" and "3" accordingly. The mark is stamped on the top of the cylinder block.



Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

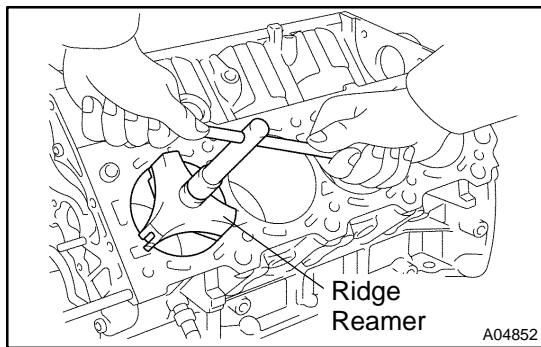
**Standard diameter:**

STD	Mark "1"	94.002 - 94.010 mm (3.7009 - 3.7012 in.)
	Mark "2"	94.010 - 94.023 mm (3.7012 - 3.7017 in.)
	Mark "3"	94.023 - 94.031 mm (3.7017 - 3.7020 in.)

**Maximum diameter: 94.23 mm (3.7098 in.)**

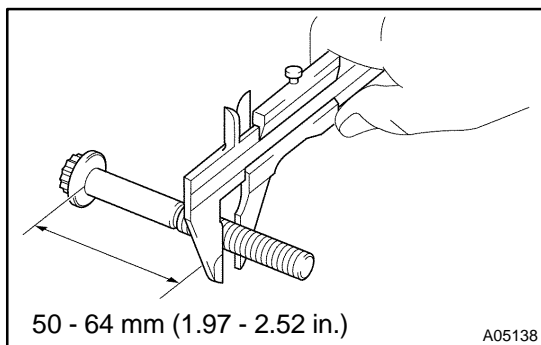
STD	94.231 mm (3.7099 in.)
O/S 0.50	94.731 mm (3.7296 in.)

If the diameter is greater than the maximum, rebore all the 8 cylinders and replace all the 8 pistons (See page EM-104 ). If necessary, replace the cylinder block.



(d) Remove the cylinder ridge.

If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.



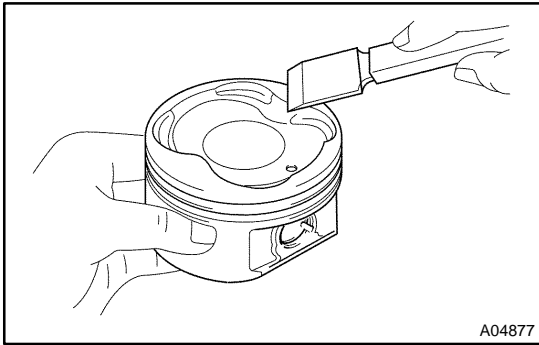
(e) Using vernier calipers, measure the thread outside diameter of the main bearing cap bolt.

**Standard diameter:**

**10.760 - 10.970 mm (0.4236 - 0.4319 in.)**

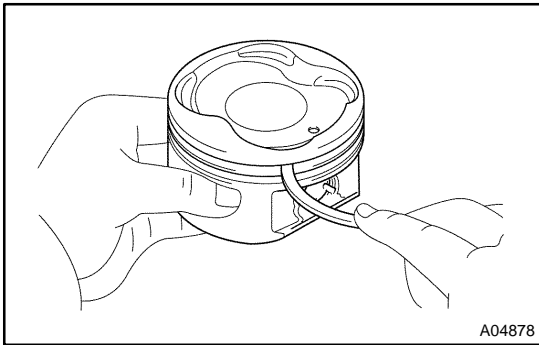
**Minimum diameter: 10.40 mm (0.4094 in.)**

If the diameter is less than the minimum, replace the cap bolt.

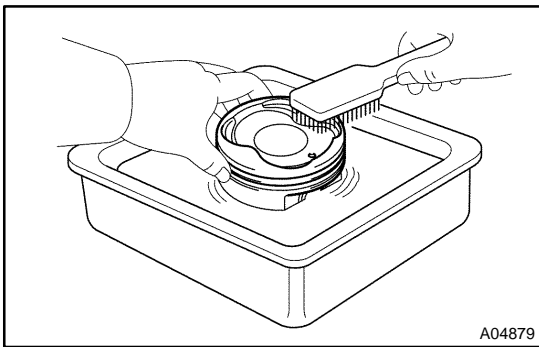


**3. CLEAN PISTON**

(a) Using a gasket scraper, remove the carbon from the piston top.



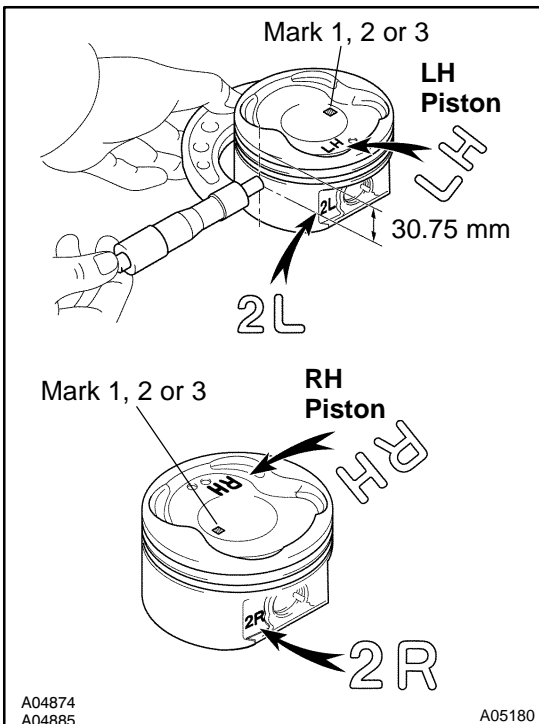
(b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



(c) Using solvent and a brush, thoroughly clean the piston.

**NOTICE:**

**Do not use a wire brush.**



**4. INSPECT PISTON AND CONNECTING ROD**

(a) Inspect the piston oil clearance.

**HINT:**

There are 3 sizes of the standard piston diameter, marked "1", "2" and "3" accordingly. The mark is stamped on the piston top.

- (1) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 30.75 mm (1.2106 in.) from the piston head.

**Piston diameter:**

STD	Mark "1"	93.902 - 93.912 mm (3.6969 - 3.6973 in.)
	Mark "2"	93.912 - 93.920 mm (3.6973 - 3.6976 in.)
	Mark "3"	93.920 - 93.930 mm (3.6976 - 3.6980 in.)
O/S 0.50		94.402 - 94.430 mm (3.7166 - 3.7177 in.)

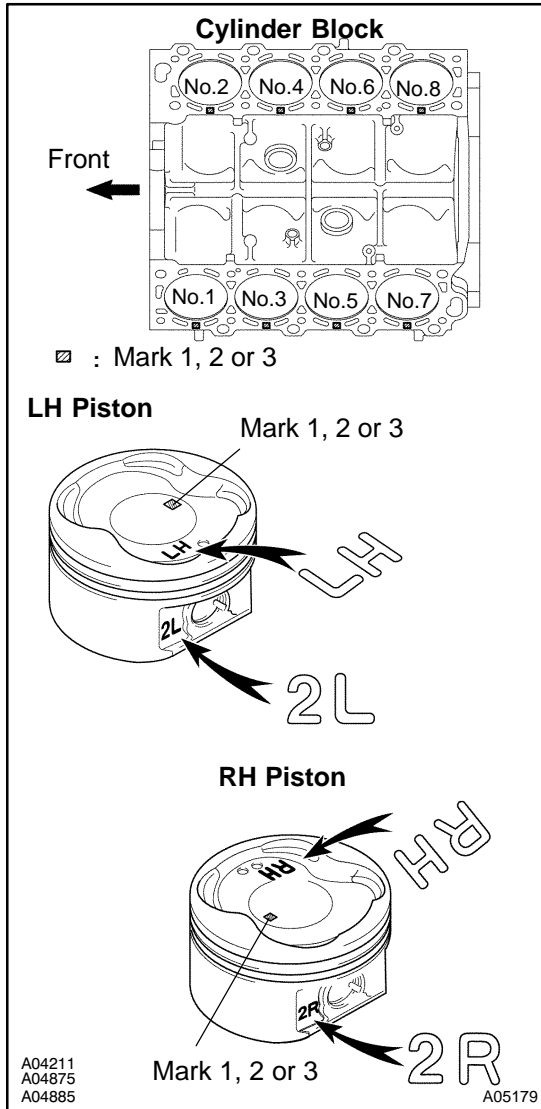
- (2) Measure the cylinder bore diameter in the thrust directions. (See step 2 above)
- (3) Subtract the piston diameter from the cylinder bore diameter.

**Standard oil clearance:**

**0.090 - 0.111 mm (0.0035 - 0.0044 in.)**

**Maximum oil clearance: 0.13 mm (0.0051 in.)**

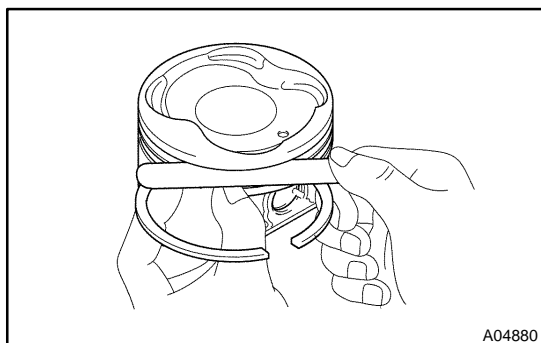
If the oil clearance is greater than the maximum, replace all the 8 pistons and rebore all the 8 cylinders. (See page [EM-104](#) ) If necessary, replace the cylinder block.



**HINT**

Use new cylinder block:

- ▶ Use a piston with the same number mark as the cylinder diameter marked on the cylinder block.
- ▶ The shape of the piston varies for the LH and the RH banks. The LH piston is marked as "LH" and "2L", and the RH piston as "RH" and "2R".

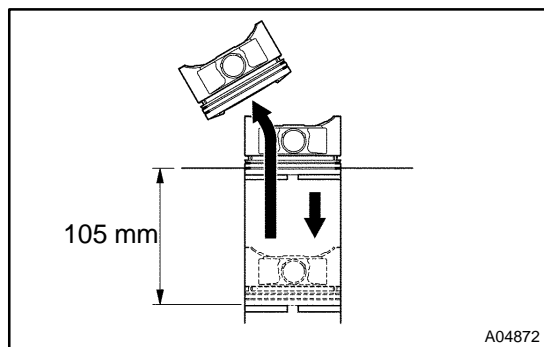


- (b) Inspect the piston ring groove clearance. Using a feeler gauge, measure the clearance between new piston ring and the wall of the ring groove.

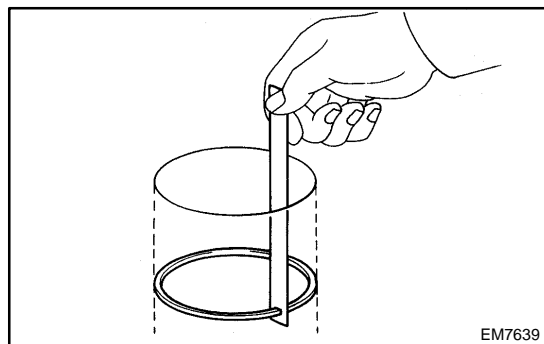
**Ring groove clearance:**

No.1	0.030 - 0.080 mm (0.0012 - 0.0031 in.)
No.2	0.030 - 0.070 mm (0.0012 - 0.0028 in.)

If the clearance is not as specified, replace the piston.



- (c) Inspect the piston ring end gap.
- (1) Insert the piston ring into the cylinder bore.
  - (2) Using a piston, push the piston ring to a little beyond the bottom of the ring travel, 105 mm (4.13 in.) from the top of the cylinder block.



- (3) Using a feeler gauge, measure the end gap.

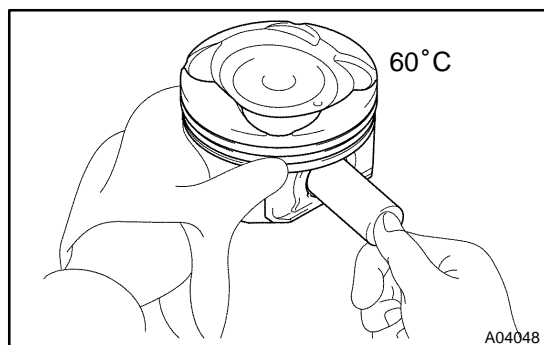
**Standard end gap:**

No.1	0.300 - 0.500 mm (0.0118 - 0.0197 in.)
No.2	0.400 - 0.650 mm (0.0157 - 0.0256 in.)
Oil (Side rail)	0.130 - 0.480 mm (0.0051 - 0.0189 in.)

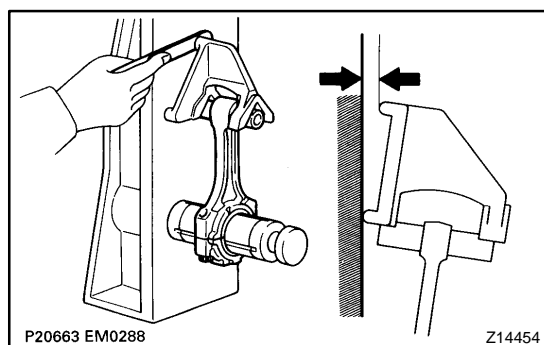
**Maximum end gap:**

No.1	1.10 mm (0.0433 in.)
No.2	1.20 mm (0.0472 in.)
Oil (Side rail)	1.15 mm (0.0453 in.)

If the end gap is greater than the maximum, replace the piston ring. If the end gap is greater than the maximum, even with a new piston ring, rebore all the 8 cylinders (See page [EM-104](#)) or replace the cylinder block.



- (d) Inspect the piston pin fit.  
At 60°C (140°F), you should be able to push the piston pin into the piston pin hole with your thumb.

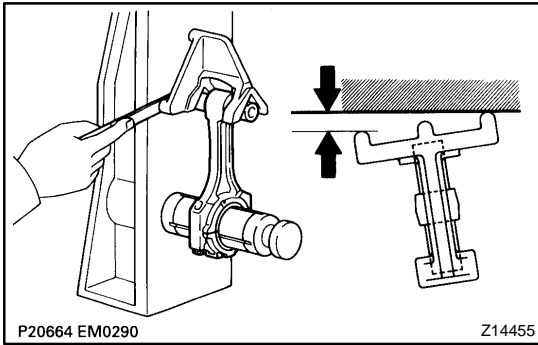


- (e) Using a rod aligner and the feeler gauge, check the connecting rod alignment.
- (1) Check for bend.

**Maximum bend:**

**0.05 mm (0.0020 in.) per 100 mm (3.94 in.)**

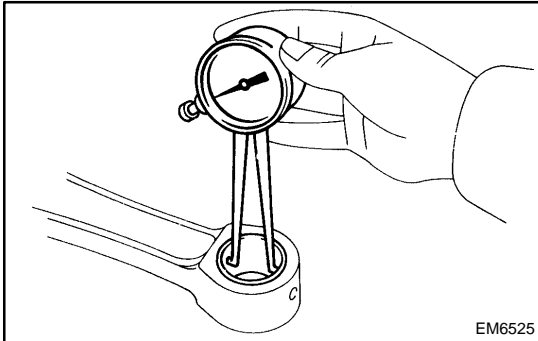
If bend is greater than maximum, replace the connecting rod assembly.



- (2) Check for twist

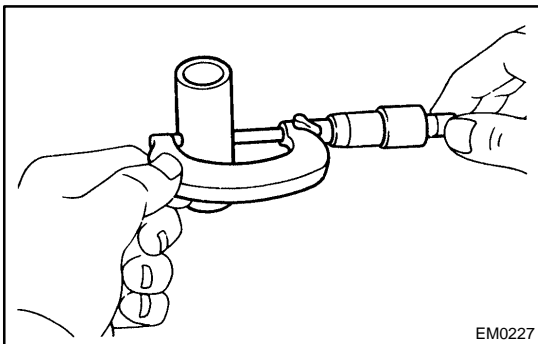
**Maximum twist:****0.15 mm (0.0059 in.) per 100 mm (3.94 in.)**

If twist is greater than the maximum, replace the connecting rod assembly.



- (f) Inspect the piston pin oil clearance.

- (1) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.

**Bushing inside diameter:****22.005 - 22.014 mm (0.8663 - 0.8667 in.)**

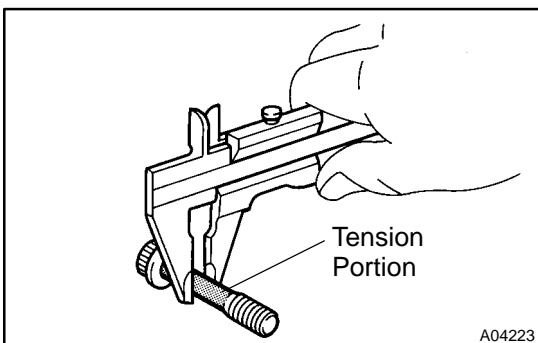
- (2) Using a micrometer, measure the piston pin diameter.

**Piston pin diameter:****21.997 - 22.009 mm (0.8660 - 0.8664 in.)**

- (3) Subtract the piston pin diameter from the bushing inside diameter.

**Standard oil clearance:****0.005 - 0.011 mm (0.0002 - 0.0004 in.)****Maximum oil clearance: 0.05 mm (0.0020 in.)**

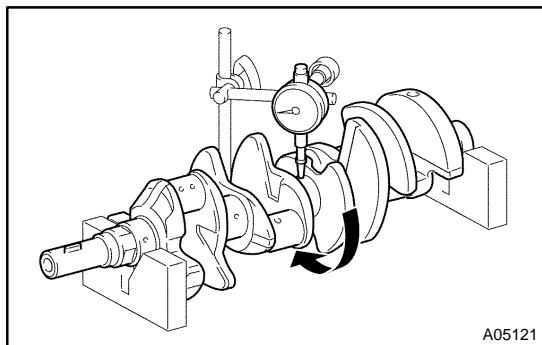
If the oil clearance is greater than the maximum, replace the bushing. If necessary, replace the piston and the piston pin as a set.



- (g) Using vernier calipers, measure the tension portion of the connecting rod bolt.

**Standard diameter:****7.200 - 7.300 mm (0.2835 - 0.2874 in.)****Minimum diameter: 7.00 mm (0.2756 in.)**

If the diameter is less than the minimum, replace the bolt.

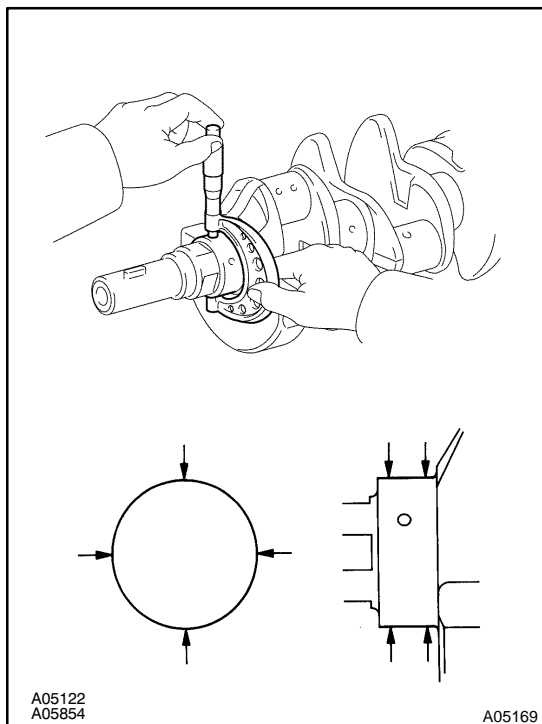


## 5. INSPECT CRANKSHAFT

- (a) Inspect for circle runout.
- (1) Place the crankshaft on V-blocks.
  - (2) Using a dial indicator, measure the circle runout at the center journal.

**Maximum circle runout: 0.08 mm (0.0031 in.)**

If the circle runout is greater than the maximum, replace the crankshaft.



- (b) Inspect the main journals and the crank pins.
- (1) Using a micrometer, measure the diameter of each main journal and crank pin.

**Main journal diameter:**

**66.988 - 67.000 mm (2.6373 - 2.6378 in.)**

**Crank pin diameter:**

**51.982 - 52.000 mm (2.0465 - 2.0472 in.)**

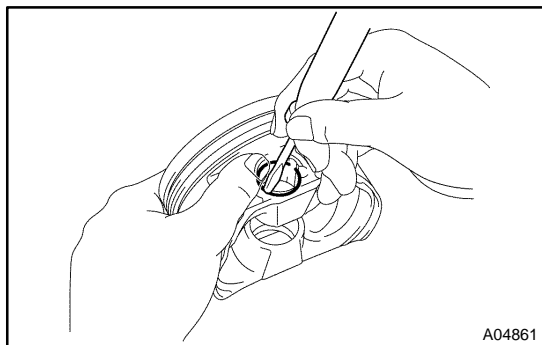
If the diameter is not as specified, check the oil clearance (See page [EM-88](#)). If necessary, replace the crankshaft.

- (2) Check each main journal and crank pin for taper and out-of-round as shown.

**Maximum taper and out-of-round:**

**0.02 mm (0.0008 in.)**

If the taper and out-of-round is greater than the maximum, replace the crankshaft.



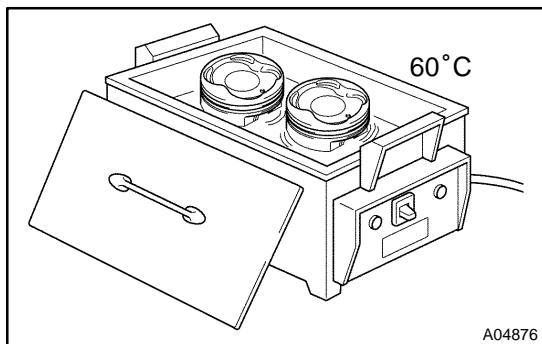
## REASSEMBLY

### HINT:

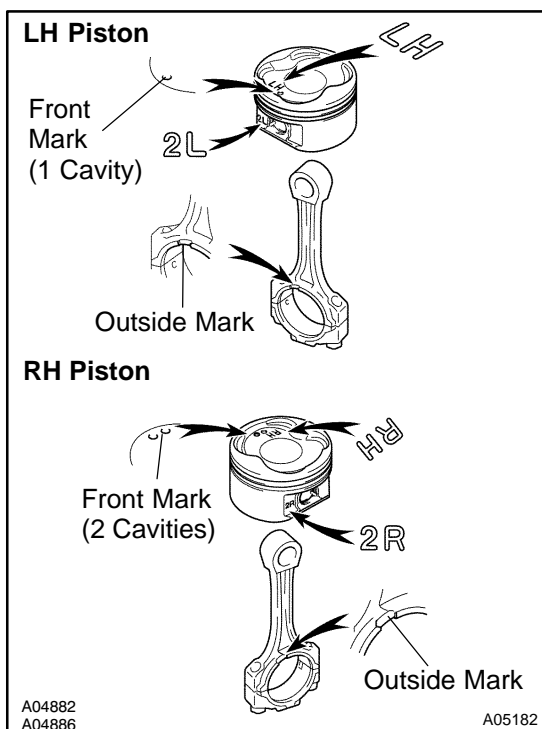
- ▶ Thoroughly clean all parts to be assembled.
- ▶ Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- ▶ Replace all gaskets, O-rings and oil seals with new parts.

### 1. ASSEMBLE PISTON AND CONNECTING ROD

- (a) Using a small screwdriver, install a new snap ring on one side of the piston pin hole.



- (b) Gradually heat the piston to about 60°C (140°F).



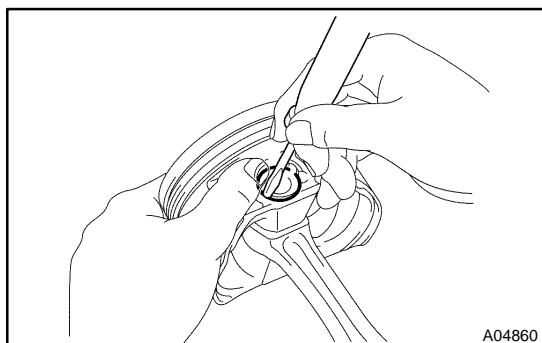
- (c) Coat the piston pin with engine oil.

- (d) Position the piston front mark to the outside mark on the connecting rod as shown in the diagram.

### NOTICE:

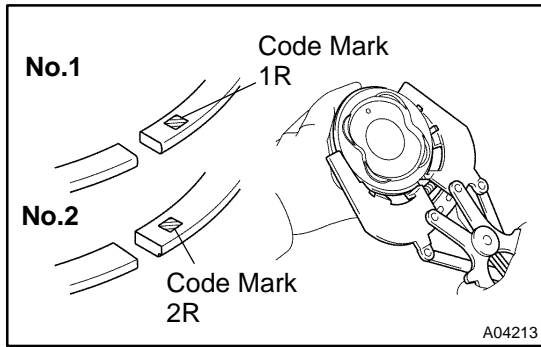
The installation directions of the piston and connecting rod are different for the LH and RH banks. The LH piston is marked with "LH" and "2L", the RH piston with "RH" and "2R".

- (e) Align the piston pin holes of the piston and connecting rod, and push in the piston pin with your thumb.



- (f) Using a small screwdriver, install a new snap ring on the other side of the piston pin hole.



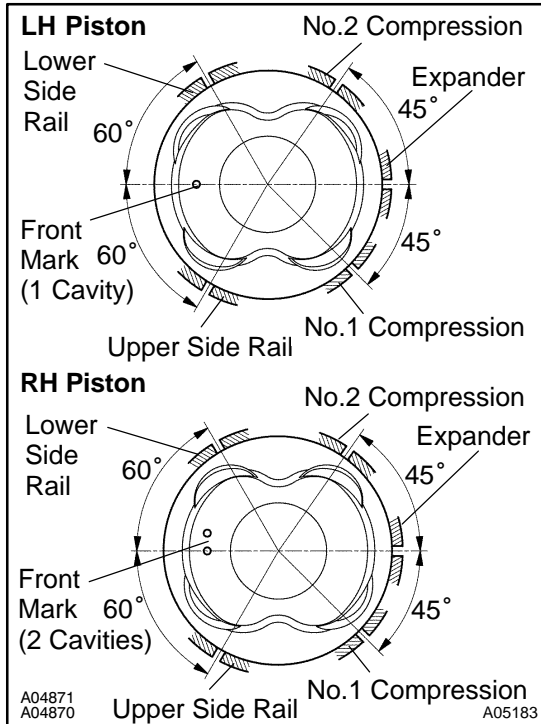


**2. INSTALL PISTON RINGS**

- (a) Install the oil ring expander and the 2 side rails by hand.
- (b) Using a piston ring expander, install the 2 compression rings with the code mark facing upward.

**Code mark:**

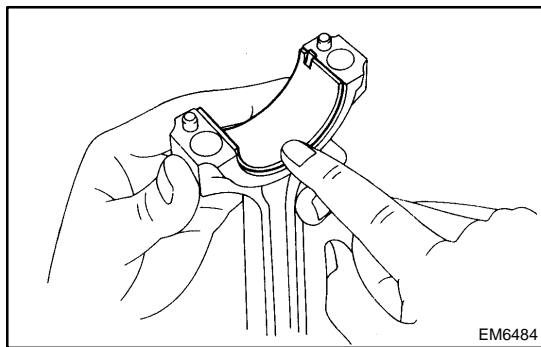
No.1	1R
No.2	2R



- (c) Position the piston rings so that the ring ends are as shown.

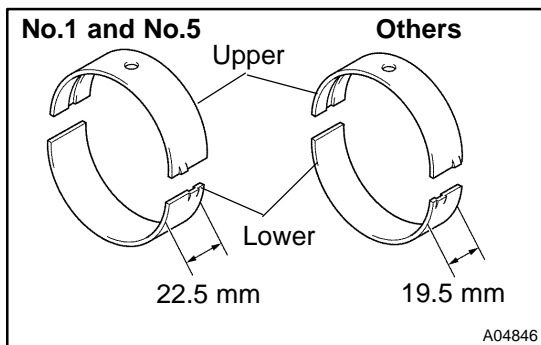
**NOTICE:**

**Do not align the ring ends.**



**3. INSTALL BEARINGS**

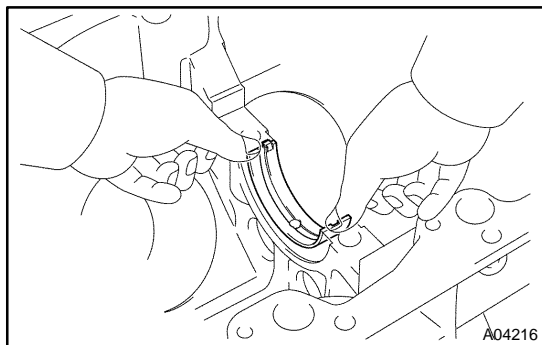
- (a) Align the bearing claw with the groove of the connecting rod or the connecting cap.
- (b) Install the bearings in the connecting rod and the connecting rod cap.



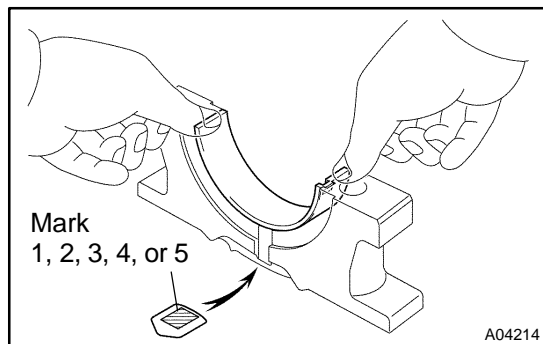
**4. INSTALL MAIN BEARINGS**

**HINT:**

- ▶ Main bearings come in widths of 19.5 mm (0.768 in.) and 22.5 mm (0.886 in.). Install the 22.5 mm (0.886 in.) bearings in the No.1 and No.5 cylinder block journal positions with the main bearing cap. Install the 19.5 mm (0.768 in.) bearings in the other positions.
- ▶ Upper bearings have an oil groove and an oil holes; lower bearings do not.



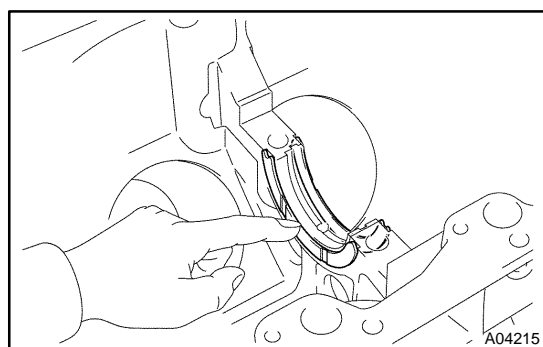
- (a) Align the bearing claw with the claw groove of the cylinder block, and push in the 5 upper bearings.



- (b) Align the bearing claw with the claw groove of the main bearing cap, and push in the 5 lower bearings.

HINT:

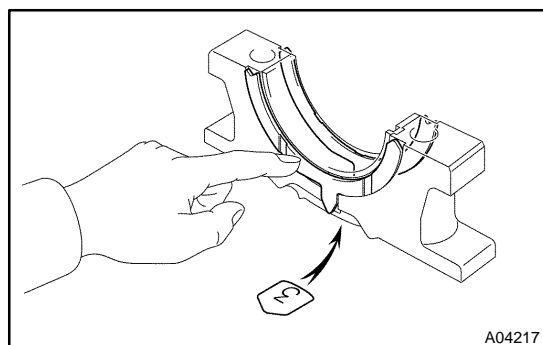
A number is marked on each main bearing cap to indicate the installation position.



#### 5. INSTALL UPPER THRUST WASHERS

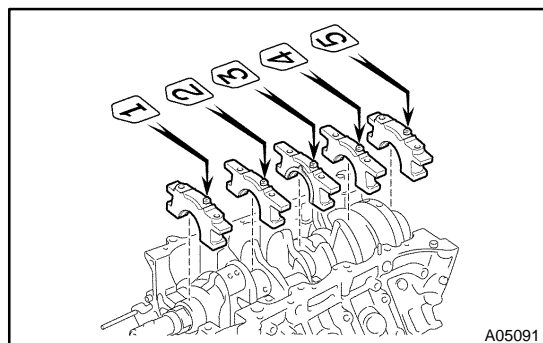
Install the 2 thrust washers under the No.3 journal position of the cylinder block with the oil grooves facing outward.

#### 6. PLACE CRANKSHAFT ON CYLINDER BLOCK



#### 7. PLACE MAIN BEARING CAPS AND LOWER THRUST WASHERS ON CYLINDER BLOCK

- (a) Install the 2 thrust washers on the No.3 bearing cap with the grooves facing outward.

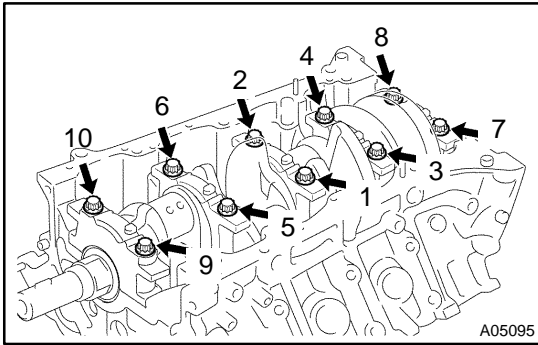


- (b) Install the 5 main bearing caps in their proper locations.

#### 8. INSTALL MAIN BEARING CAP BOLTS

HINT:

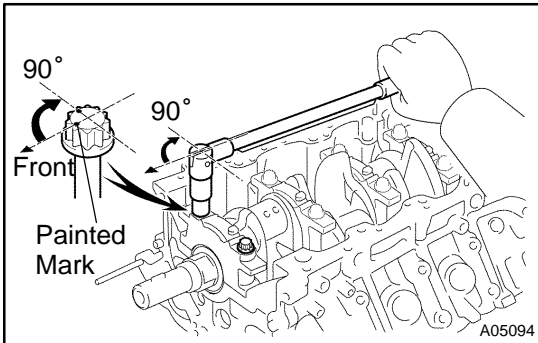
- ▶ The main bearing cap bolts are tightened in 2 steps (steps (b) and (d)).
- ▶ If any one of the main bearing cap bolts is broken or deformed, replace it.



- (a) Apply a light coat of engine oil on the threads and under the main bearing cap bolts.
- (b) Install and evenly tighten the 10 main bearing cap bolts a little at a time for several times as in the sequence shown.

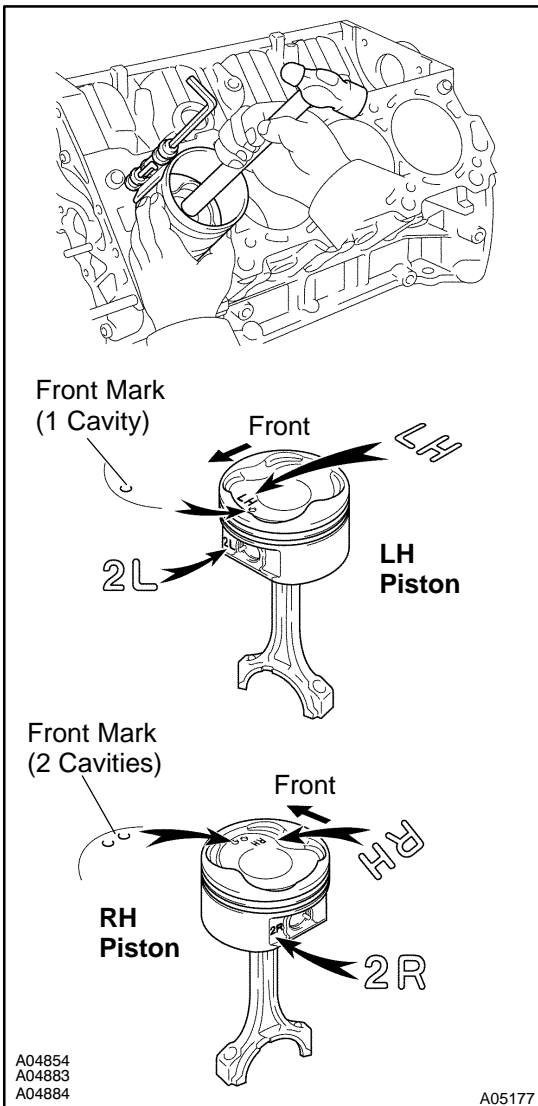
**Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)**

If any one of the main bearing cap bolts does not meet the torque specification, replace the main bearing cap bolt.



- (c) Mark the front of the main bearing cap bolt with paint.
- (d) Retighten the main bearing cap bolts by 90° in the numerical order shown.
- (e) Check that the painted mark is now at a 90° angle to the front.
- (f) Check that the crankshaft turns smoothly.

**9. CHECK CRANKSHAFT THRUST CLEARANCE**  
(See page [EM-88](#))

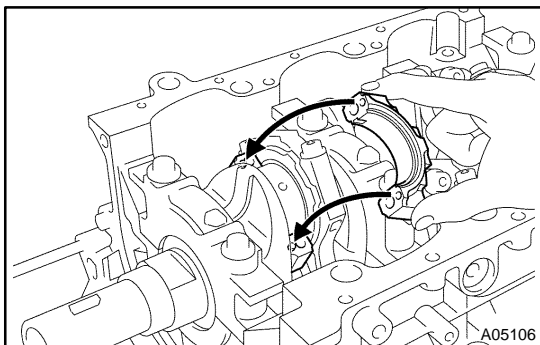


**10. INSTALL PISTON AND CONNECTING ROD ASSEMBLES**

Using a piston ring compressor, push the correctly numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.

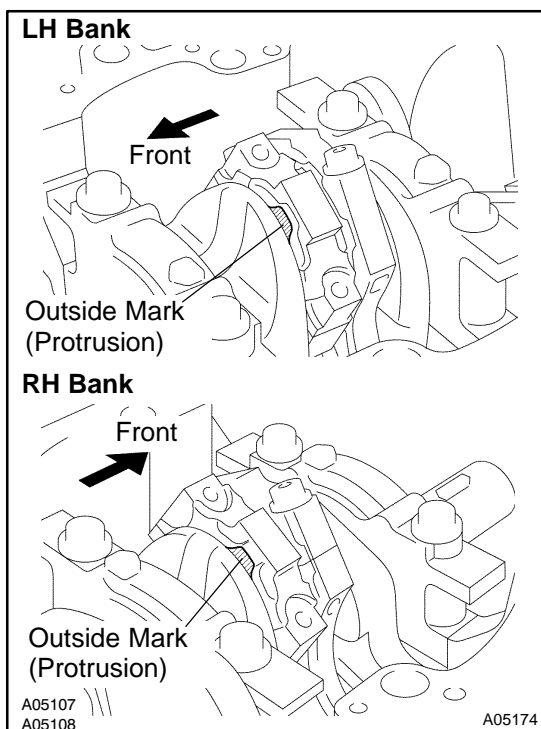
**NOTICE:**

The shape of the piston varies for the LH and RH banks. The LH piston is marked with "LH" and "2R", the RH piston with "RH" and "2R".



### 11. PLACE CONNECTING ROD CAP ON CONNECTING ROD

- (a) Match the numbered connecting rod cap with the connecting rod.
- (b) Align the pin groove of the connecting rod cap with the pins of the connecting rod, and install the connecting rod cap.

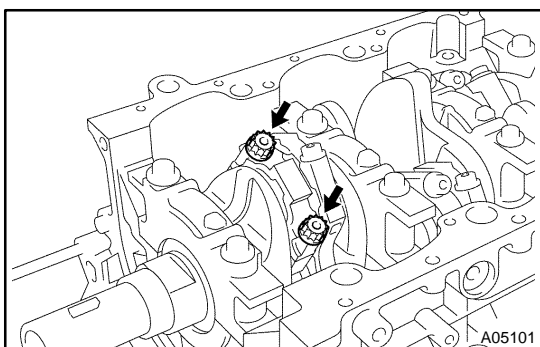


- (c) Check that the outside mark of the connecting rod cap is facing in correct direction.

### 12. INSTALL CONNECTING ROD CAP BOLTS

#### HINT:

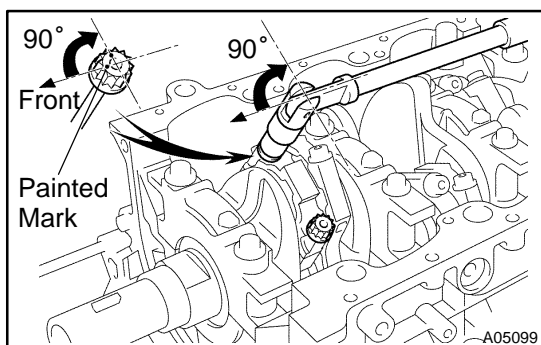
- ▶ The connecting rod cap bolts are tightened in 2 steps (steps (b) and (d)).
- ▶ If any one of the connecting rod cap bolts is broken or deformed, replace it.



- (a) Apply a light coat of engine oil on the threads and under the heads of the connecting rod cap bolts.
- (b) Install and alternately tighten the 2 connecting rod cap bolts a little at a time for several times.

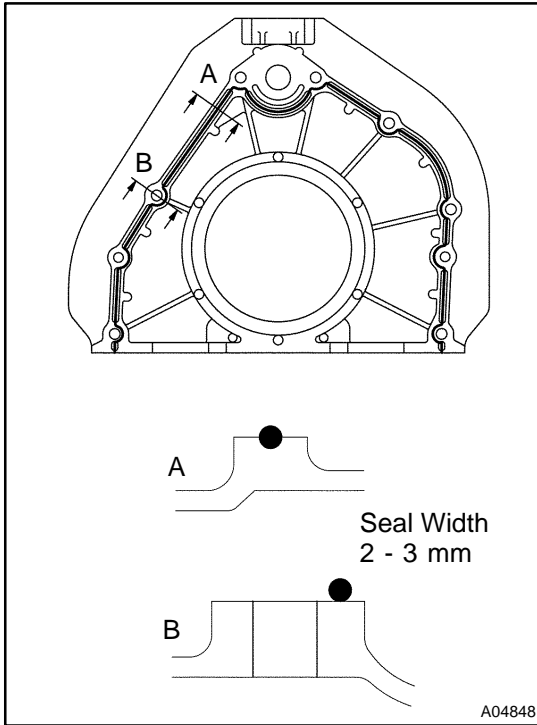
**Torque: 24.5 N·m (250 kgf·cm, 18 ft·lbf)**

If any one of the connecting rod cap bolts does not meet the torque specification, replace the connecting rod cap bolts.



- (c) Mark the front of the connecting cap bolt with paint.
- (d) Retighten the cap bolts 90° as shown.
- (e) Check that the painted mark is now at a 90° angle to the front.
- (f) Check that the crankshaft turns smoothly.

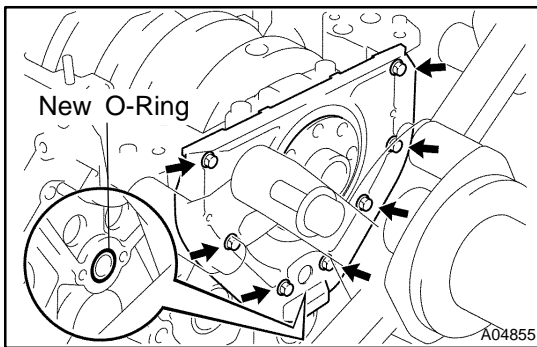
### 13. CHECK CONNECTING ROD THRUST CLEARANCE (See page [EM-88](#))

**14. INSTALL REAR OIL SEAL RETAINER**

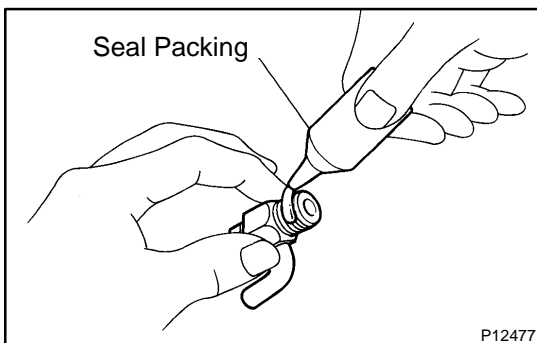
- (a) Remove any old packing (FIPG) material, and be careful not to drop any oil on the contact surfaces of the oil seal retainer and the cylinder block.
- ▶ Using a razor blade and a gasket scraper, remove old FIPG from the seal surface.
  - ▶ Clean all the components to remove the redundant FIPG completely.
  - ▶ Clean sealing surfaces with solvent so that any residue does not remain on the seal.
- (b) Apply seal packing to the oil seal retainer as shown in the illustration.

**Seal packing: Part No. 08826-00080 or equivalent**

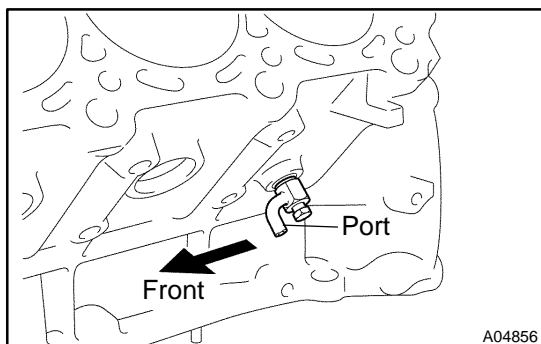
- ▶ Install a nozzle that is cut to a 2 - 3 mm (0.08 - 0.12 in.) opening.
- ▶ Parts must be assembled within 5 minutes after the seal packing application. Otherwise the material must be removed and the seal packing have to be reapplied.
- ▶ Immediately remove the nozzle from the tube and reinstall the cap.



- (c) Install a new O-ring to the cylinder block.
- (d) Install the oil seal retainer with the 7 bolts.  
**Torque: 8.0 N·m (80 kgf·cm, 71 in.-lbf)**

**15. INSTALL ENGINE COOLANT DRAIN UNIONS**

- (a) Apply seal packing to 2 or 3 threads from the end of the drain unions.
- Seal packing: Part No. 08826-00100 or equivalent**



- (b) Install the 2 drain unions.

**Torque: 49 N·m (500 kgf-cm, 36 ft-lbf)**

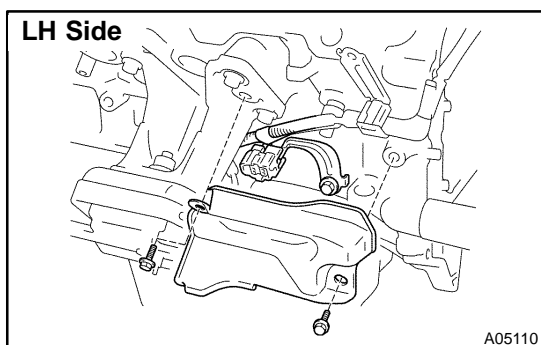
**HINT:**

After applying the specified torque, rotate the drain union clockwise until the drain port is facing forward.

16. **INSTALL OIL PUMP (See page LU-15 )**
17. **INSTALL OIL STRAINER (See page LU-15 )**
18. **INSTALL NO.1 OIL PAN (See page LU-15 )**
19. **INSTALL OIL PAN BAFFLE PLATE (See page LU-15 )**
20. **INSTALL NO.2 OIL PAN (See page LU-15 )**
21. **INSTALL WATER PUMP (See page CO-8 )**
22. **INSTALL ENGINE MOUNTING BRACKETS**

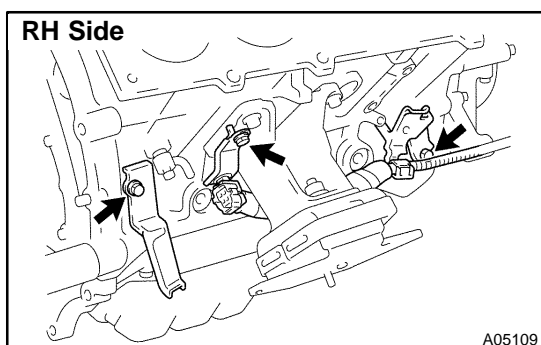
Install the mounting bracket with the 4 bolts. Install the 2 mounting brackets.

**Torque: 36 N·m (370 kgf-cm, 27 ft-lbf)**



23. **INSTALL ENGINE WIRE TO LH SIDE OF CYLINDER BLOCK**

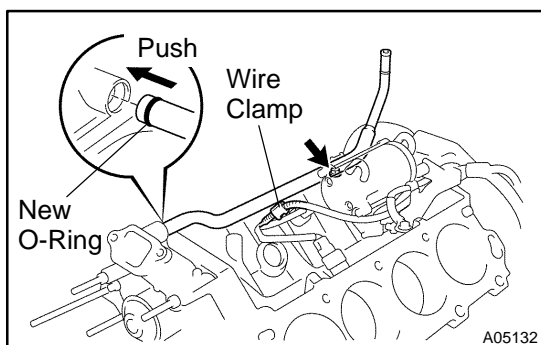
- (a) Install the bracket on the engine wire with the bolt.
- (b) Install the engine wire cover with the 2 bolts.



24. **INSTALL ENGINE WIRE TO RH SIDE OF CYLINDER BLOCK**

Install the 2 brackets on the engine wire with the 2 bolts.

25. **INSTALL OIL COOLER PIPE BRACKET FOR A/T**  
Install the bracket with the bolt.
26. **INSTALL KNOCK SENSORS (See page SF-55 )**
27. **INSTALL STARTER (See page ST-17 )**

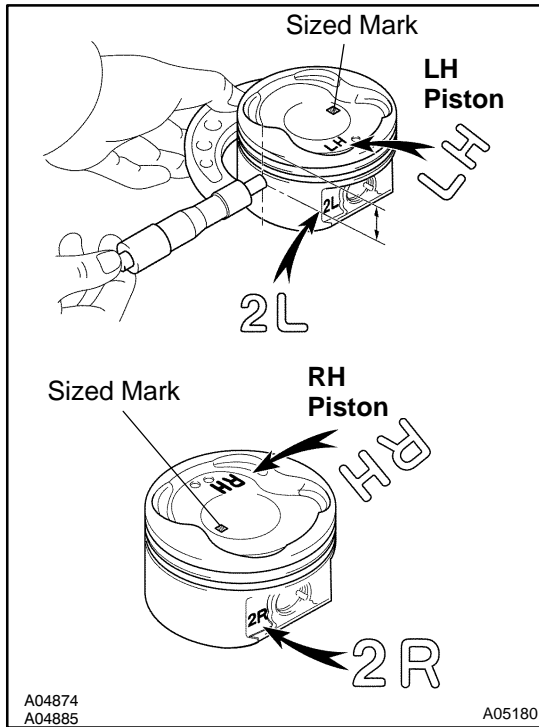


28. **INSTALL WATER BYPASS PIPE**

- (a) Install a new O-ring to the water bypass pipe.
- (b) Apply soapy water to the O-ring.
- (c) Push the water bypass pipe end into the pipe hole of the water pump.
- (d) Install the water bypass pipe with the bolt.  
**Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)**
- (e) Install the wire clamp to the bracket of the water bypass pipe.

29. **INSTALL CYLINDER HEADS (See page EM-59 )**

30. **INSTALL TIMING BELT AND PULLEYS**  
(See page [EM-22](#) )
31. **DISCONNECT ENGINE FROM ENGINE STAND**



## REPLACEMENT

### 1. REPLACE OVERSIZED (O/S) PISTONS FOR CYLINDER BORING

#### HINT:

- ▶ Bore all the 8 cylinders to the oversized piston outside diameter.
- ▶ Replace all the piston rings with the ones to match the oversized pistons.

- (a) Keep 8 new O/S pistons.

**O/S 0.50 piston diameter:**

**94.402 - 94.430 mm (3.7166 - 3.7177 in.)**

#### HINT:

The shape of the piston varies for the LH and RH banks. The LH piston is marked with "LH" and "2L", the RH piston with "RH" and "2R".

- (b) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 30.75 mm (1.2106 in.) from the piston head.
- (c) Calculate the amount for each cylinder to be rebored as follows:

**Size to be rebored = P + C - H**

**P = Piston diameter**

**C = Piston clearance:**

**0.090 - 0.111 mm (0.0035 - 0.0044 in.)**

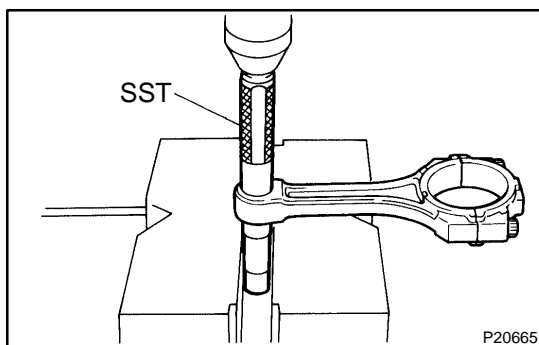
**H = Allowance for honing: 0.02 mm (0.0008 in.) or less**

- (d) Bore and hone the cylinders to calculated dimensions.

**Maximum honing: 0.02 mm (0.0008 in.)**

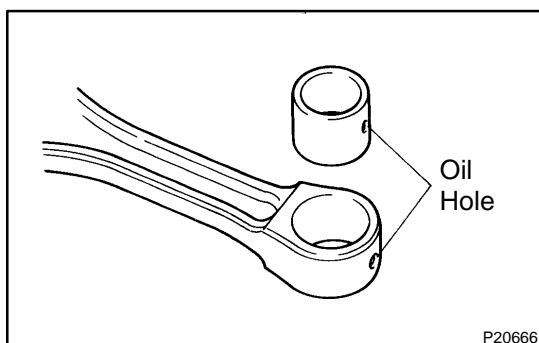
#### NOTICE:

**Excess honing will destroy the finished roundness.**



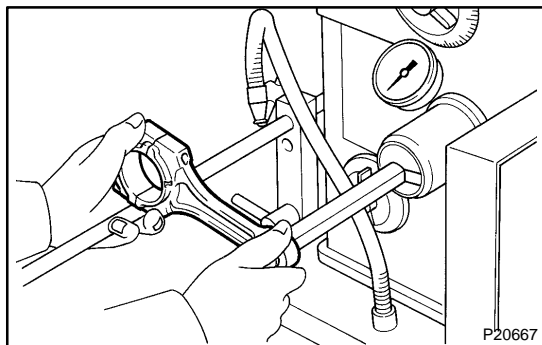
### 2. REPLACE CONNECTING ROD BUSHINGS

- (a) Using SST and a press, press out the bushing.  
SST 09222-30010

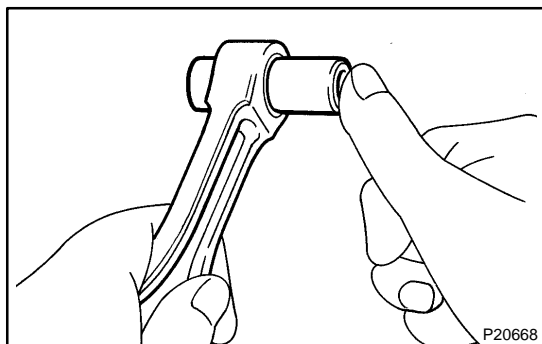


- (b) Align the oil holes of a new bushing and the connecting rod.
- (c) Using SST and a press, press in the bushing.  
SST 09222-30010

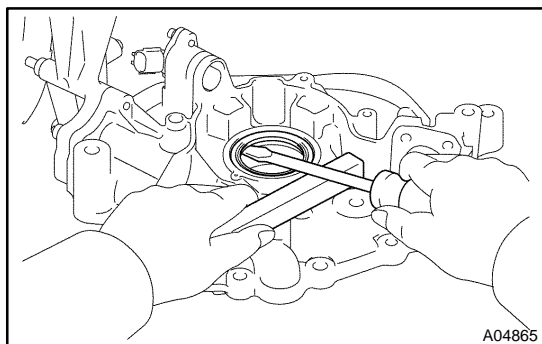




- (d) Using a pin hole grinder, hone the bushing to obtain the standard specified clearance (See page EM-97) between the bushing and piston pin.



- (e) Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.

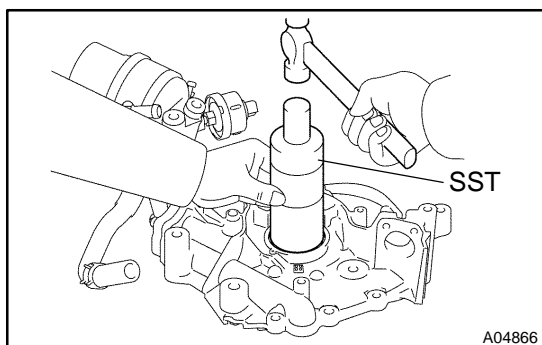


### 3. REPLACE CRANKSHAFT FRONT OIL SEAL

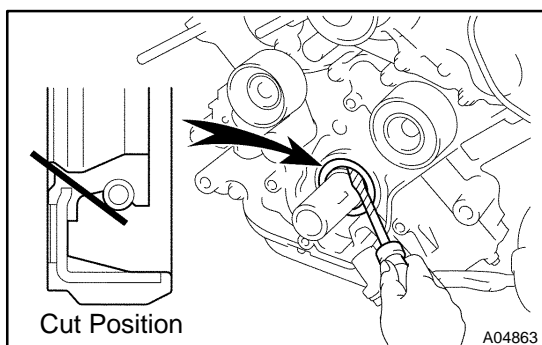
#### HINT:

There are 2 methods ((a) and (b)) to replace the oil seal.

- (a) If the oil pump is removed from the cylinder block:
- (1) Using a screwdriver, pry out the oil seal.



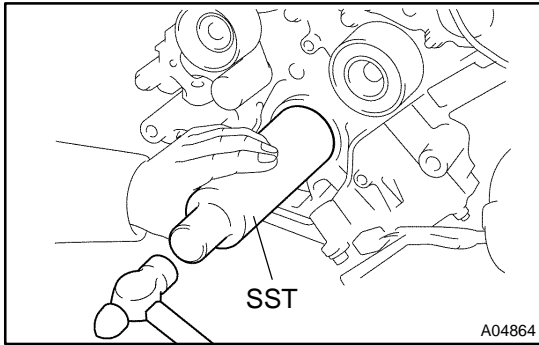
- (2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump body edge.  
SST 09316-6001 1 (09316-00011)
- (3) Apply MP grease to the oil seal lip.



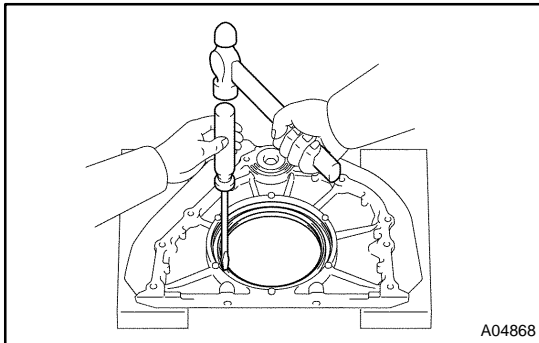
- (b) If the oil pump is installed to the cylinder block:
- (1) Using a knife, cut off the oil seal lip.
  - (2) Using a screwdriver, pry out the oil seal.

#### NOTICE:

**Be careful not to damage the crankshaft. Tape up the screwdriver tip.**



- (3) Apply MP grease to a new oil seal lip.
  - (4) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump body edge.
- SST 09316-6001 1 (09316-00011)

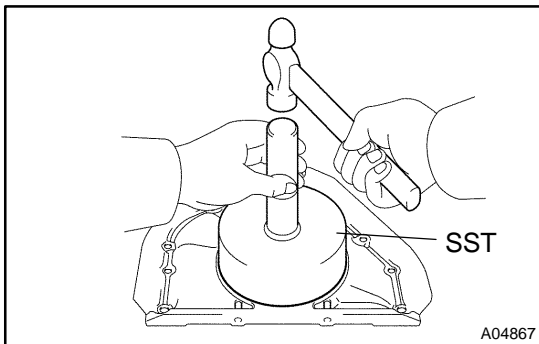


#### 4. REPLACE CRANKSHAFT REAR OIL SEAL

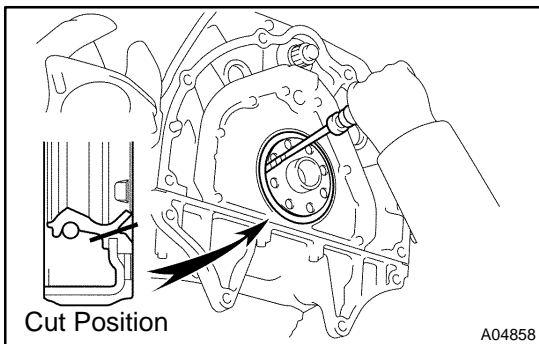
##### HINT:

There are 2 methods ((a) and (b)) to replace the oil seal.

- (a) If the rear oil seal retainer is removed from the cylinder block:
  - (1) Using a screwdriver and hammer, tap out the oil seal.



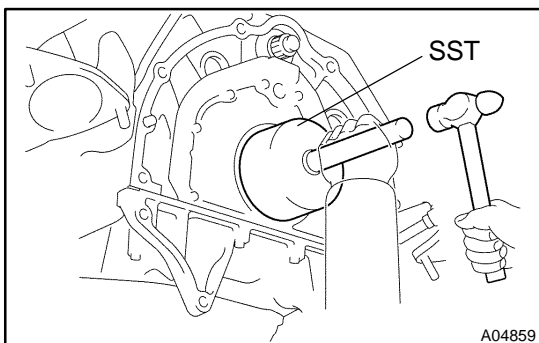
- (2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.
- SST 09223-56010
- (3) Apply MP grease to the oil seal lip.



- (b) If the rear oil seal retainer is installed to the cylinder block:
  - (1) Using a knife, cut off the oil seal lip.
  - (2) Using a screwdriver, pry out the oil seal.

##### NOTICE:

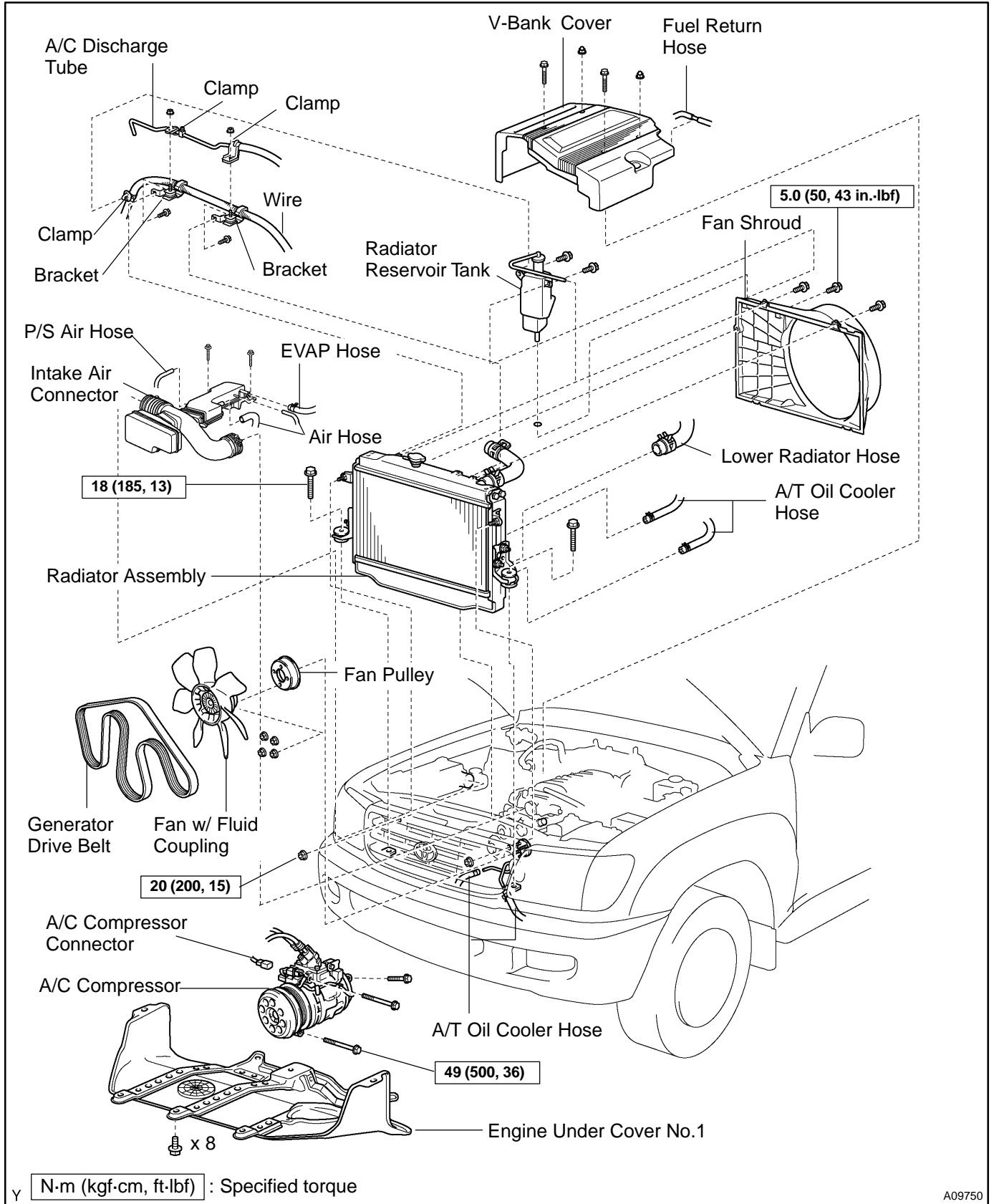
**Be careful not to damage the crankshaft. Tape up the screwdriver tip.**



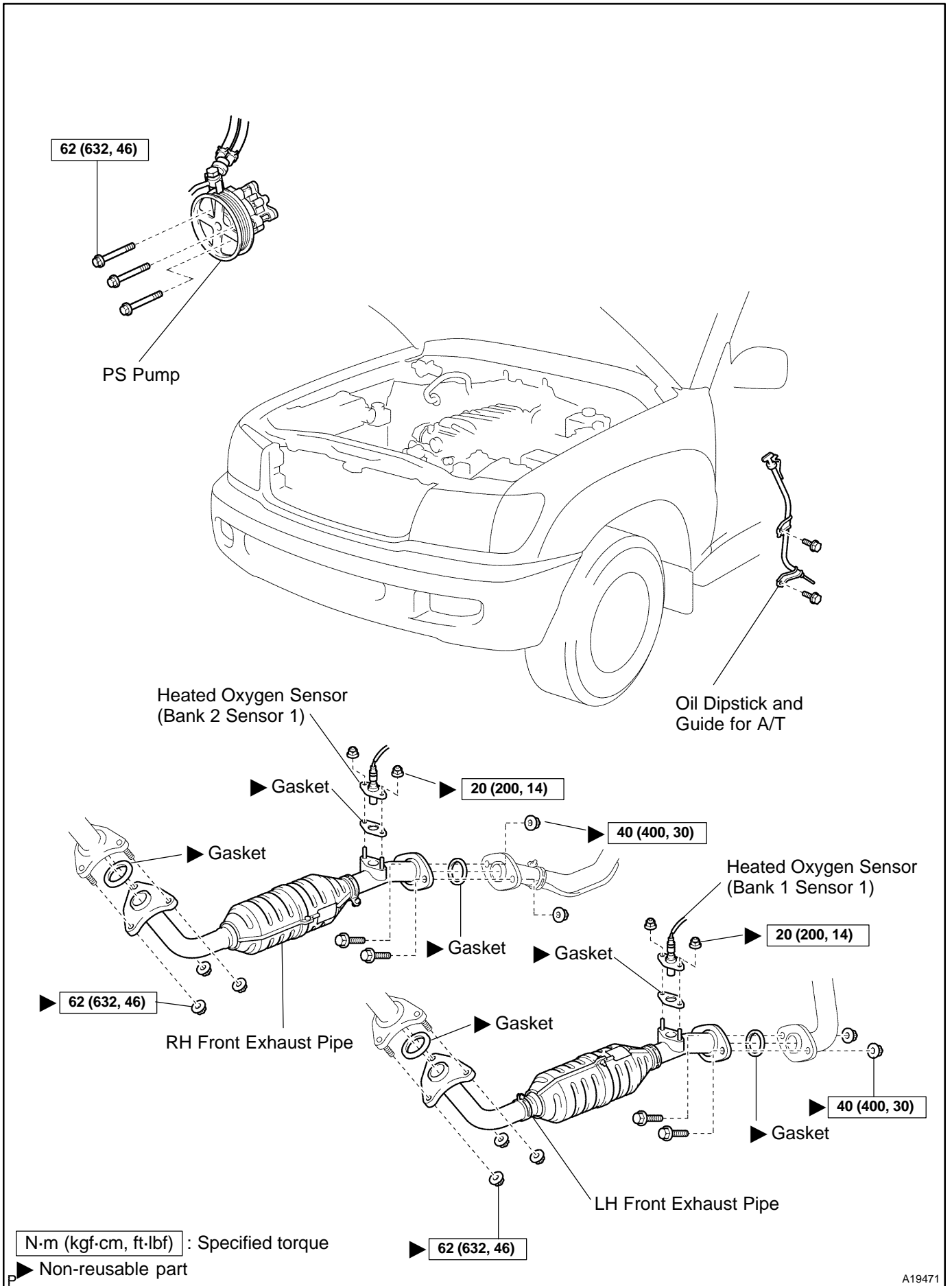
- (3) Apply MP grease to a new oil seal lip.
  - (4) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.
- SST 09223-56010

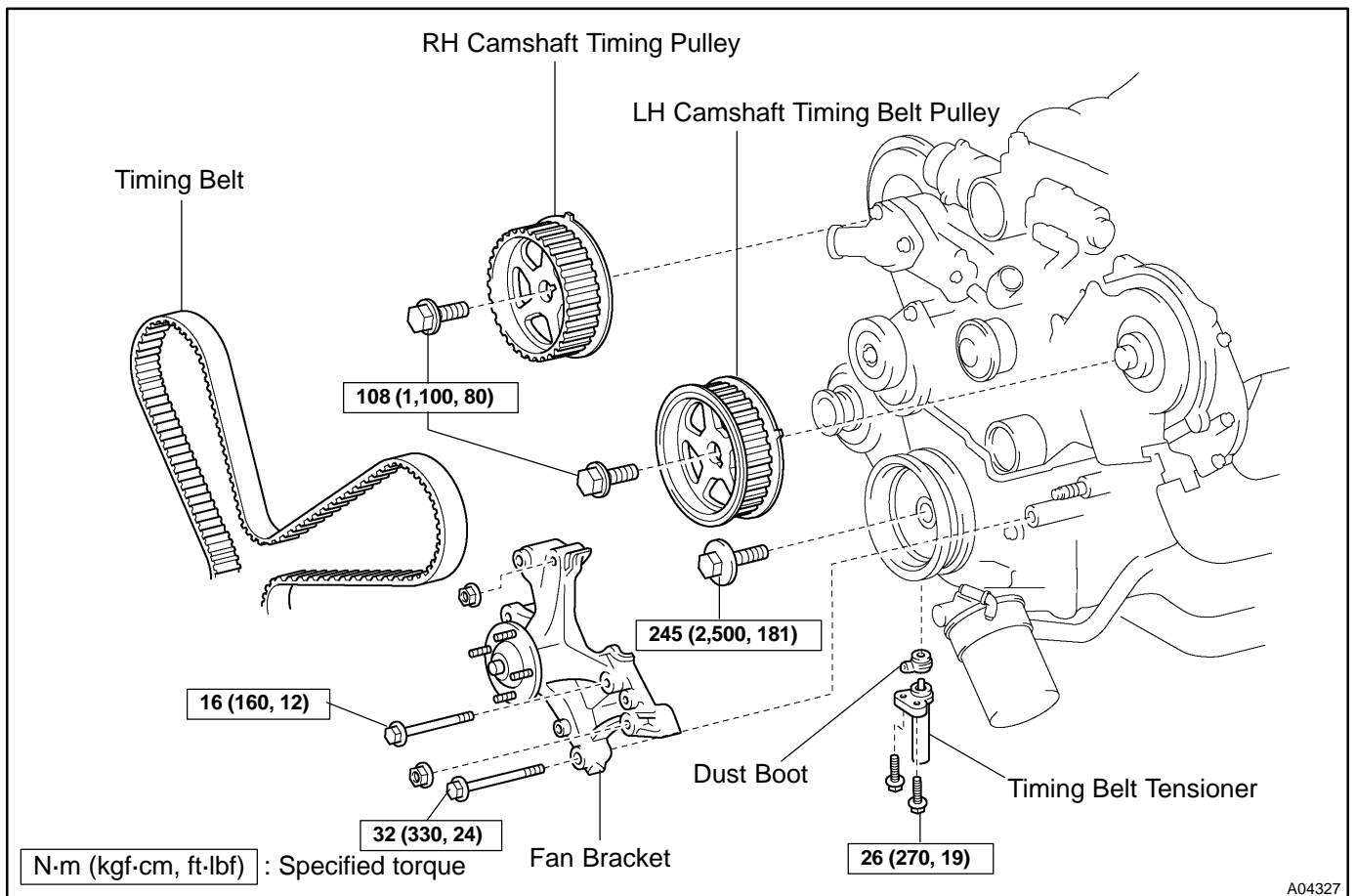
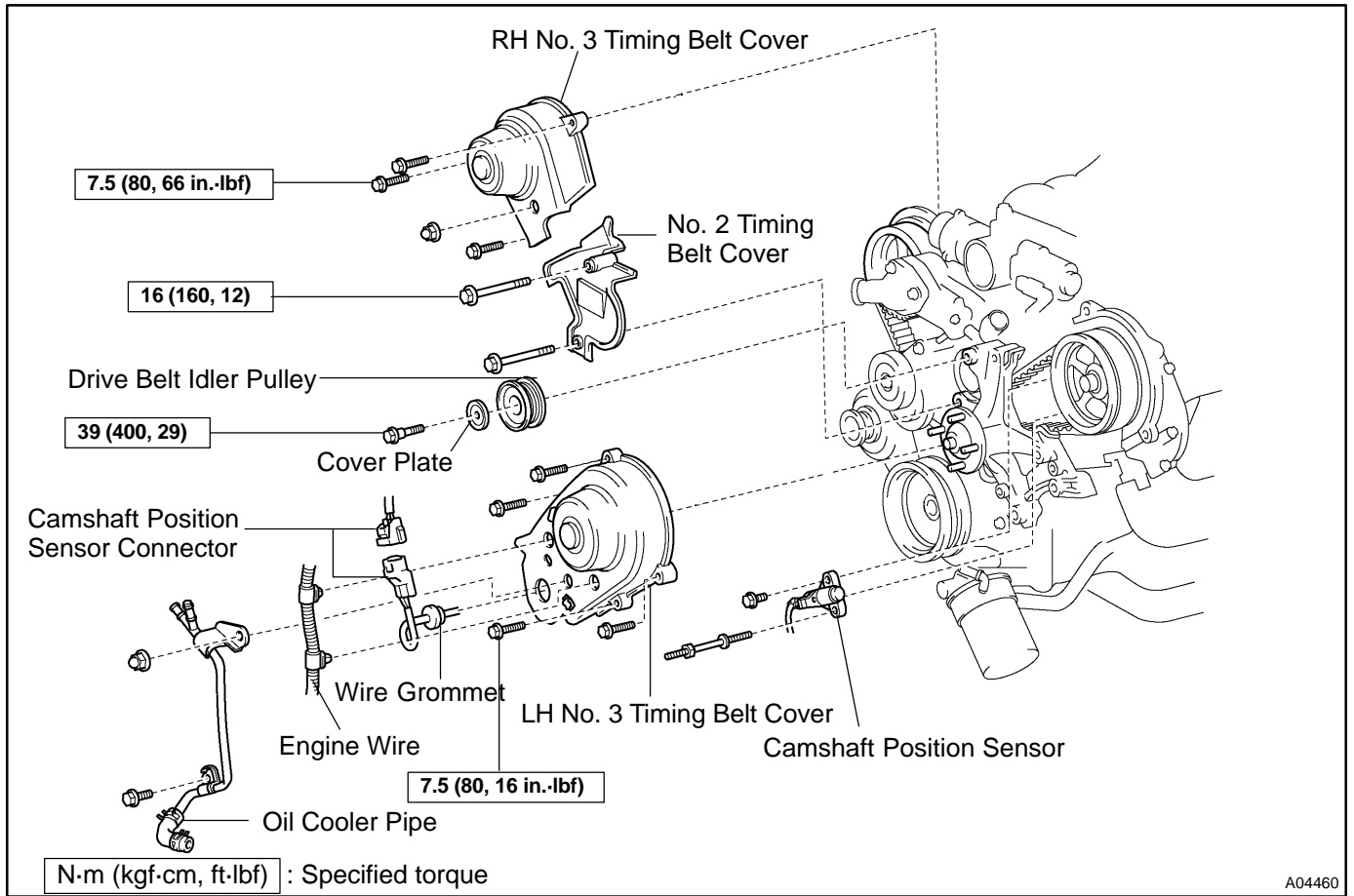
# CYLINDER HEAD COMPONENTS

EM1V7-01

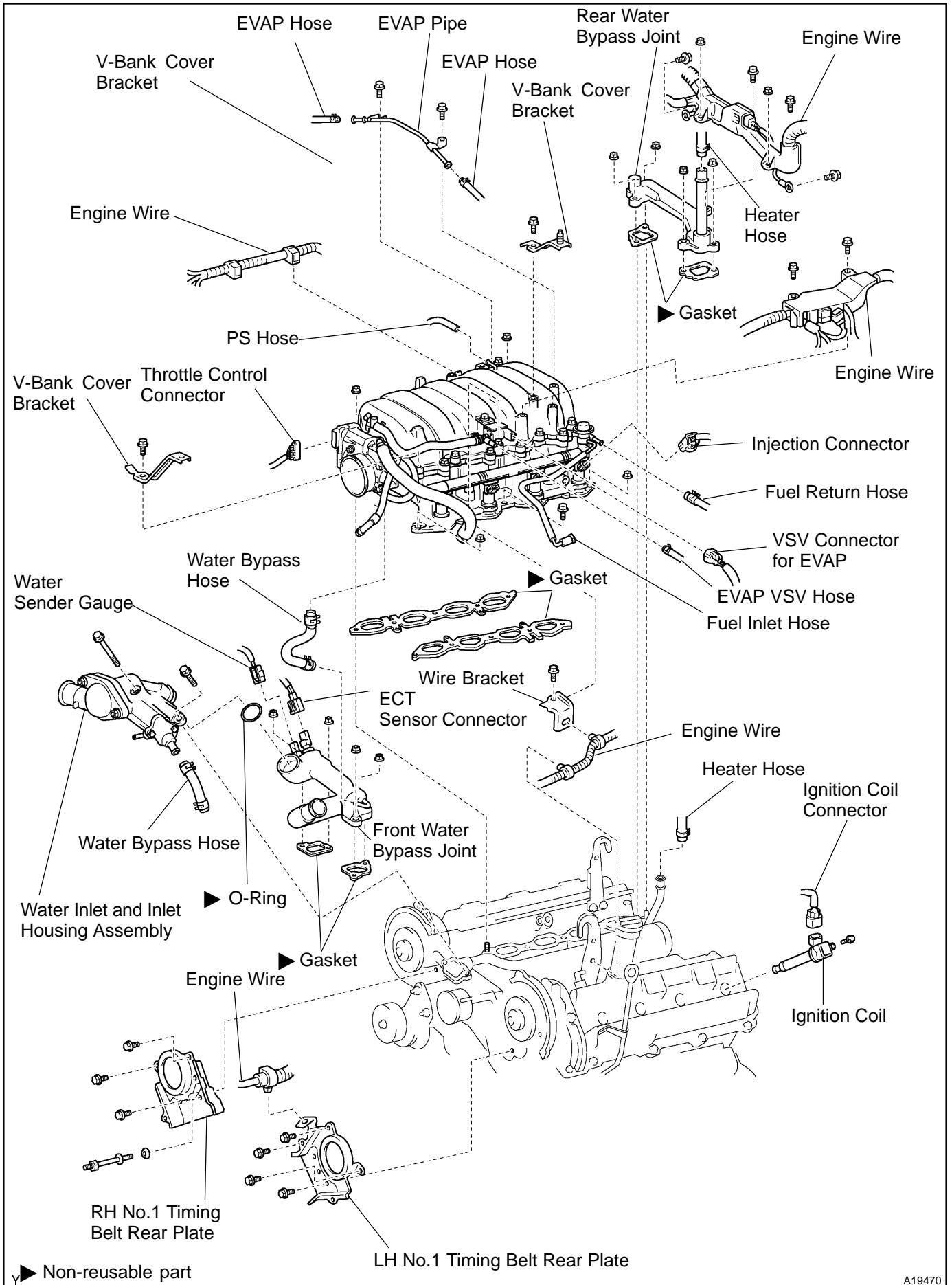


A09750

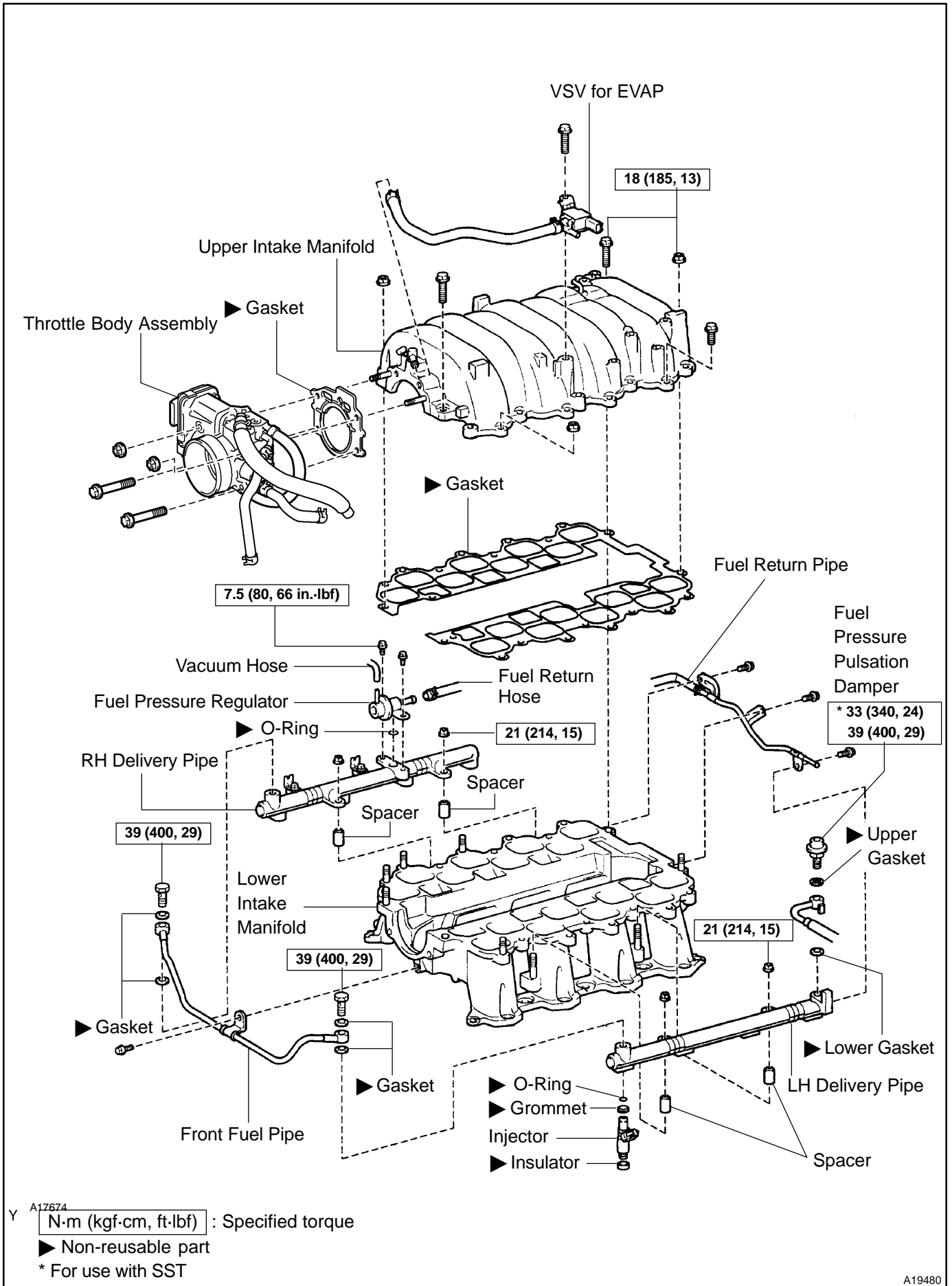




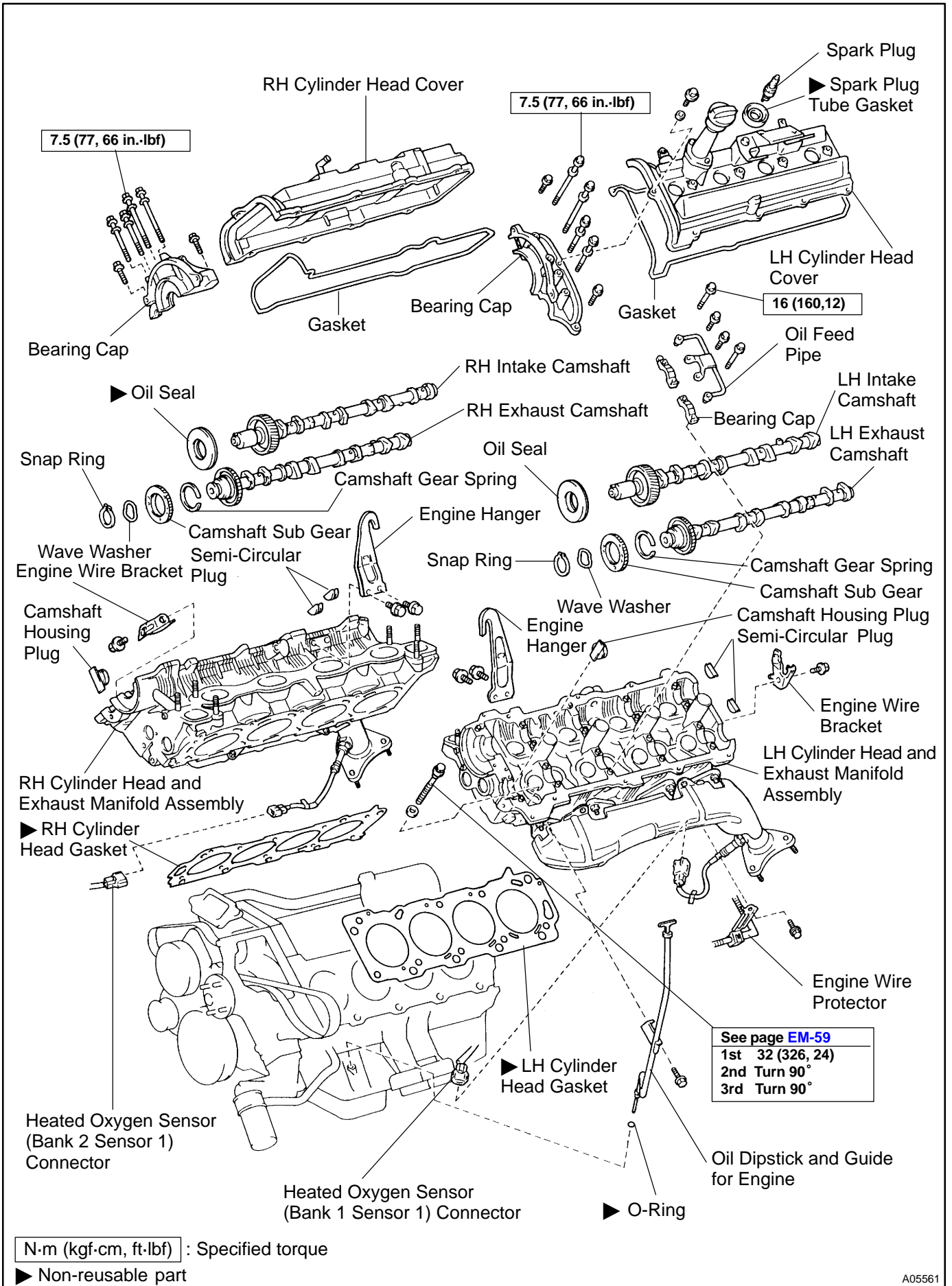
ENGINE MECHANICAL - CYLINDER HEAD



A19470

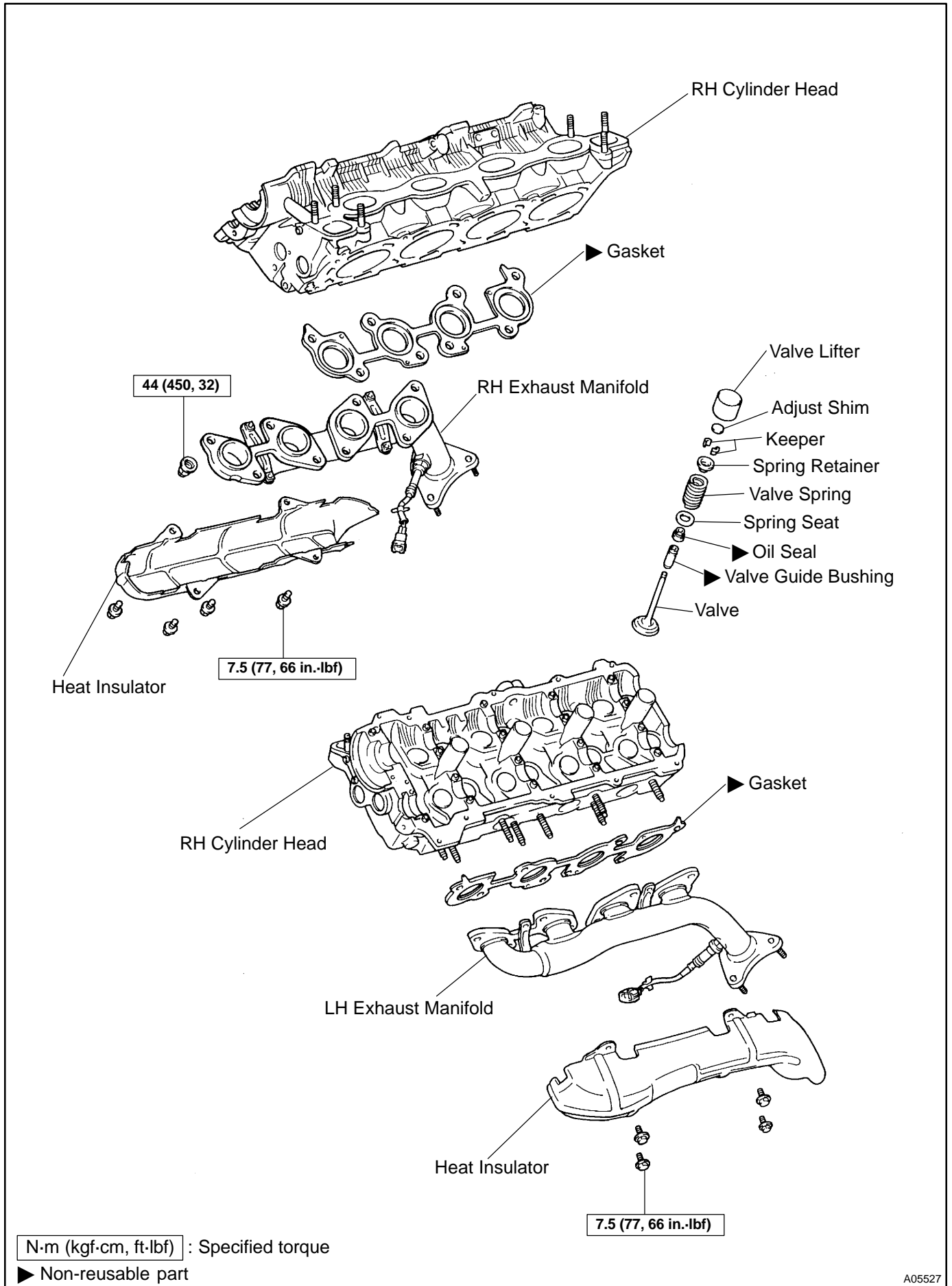


A19480

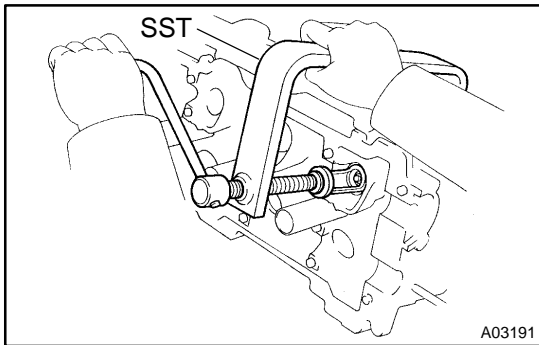


A05561





A05527



## DISASSEMBLY

### 1. REMOVE VALVE LIFTERS AND SHIMS

#### HINT:

Arrange the valve lifters and the shims in correct order.

### 2. REMOVE VALVES

- (a) Using SST, compress the valve spring and remove the 2 keepers.

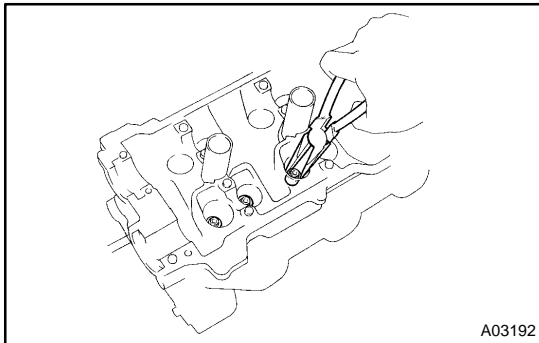
SST 09202-70020

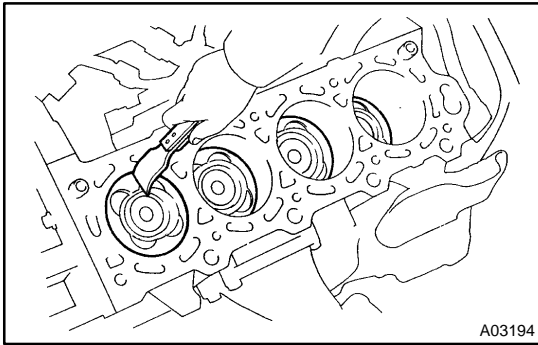
- (b) Remove the spring retainer.  
(c) Remove the valve spring.  
(d) Remove the valve.  
(e) Remove the spring seat.

#### HINT:

Arrange the valves, the valve springs, the spring seats and the spring retainers in correct order.

- (f) Using needle-nose pliers, remove the oil seal.



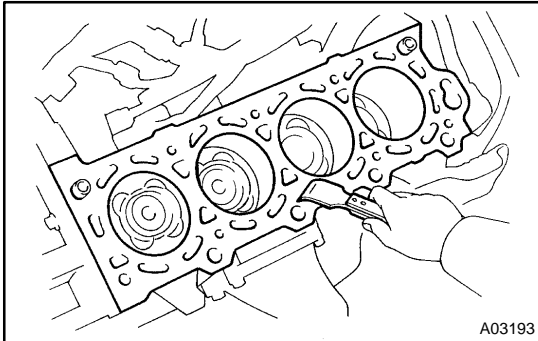


A03194

## INSPECTION

### 1. CLEAN TOP SURFACES OF PISTONS AND CYLINDER BLOCK

- (a) Turn the crankshaft, and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.

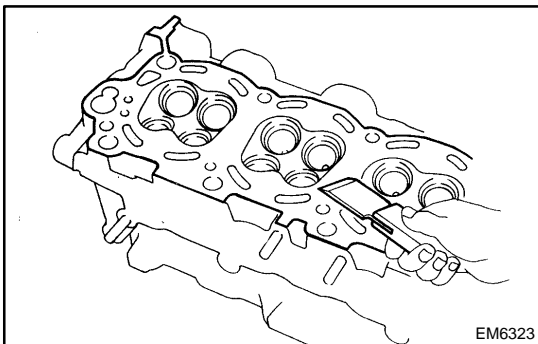


A03193

- (b) Using a gasket scraper, remove all the gasket material from the cylinder block surface.
- (c) Using compressed air, blow carbon and oil from the bolt holes.

#### CAUTION:

Protect your eyes when using high pressure compressed air.



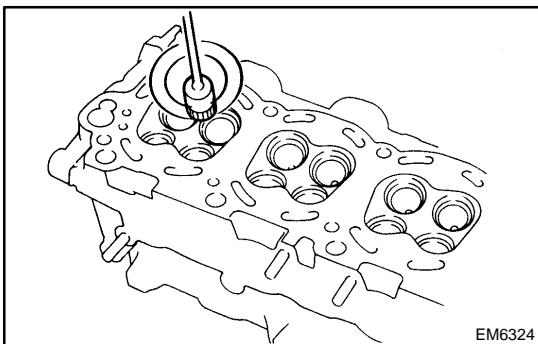
EM6323

### 2. REMOVE GASKET MATERIAL

Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

#### NOTICE:

Be careful not to scratch the cylinder block contact surface.



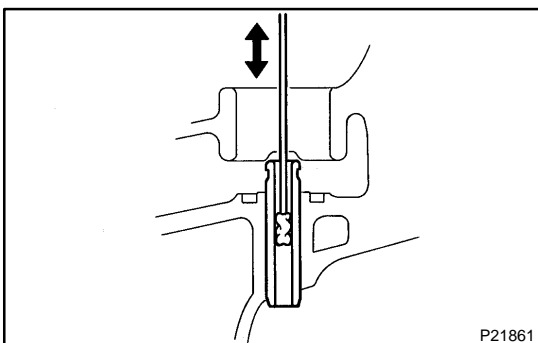
EM6324

### 3. CLEAN COMBUSTION CHAMBERS

Using a wire brush, remove all the carbon from the combustion chambers.

#### NOTICE:

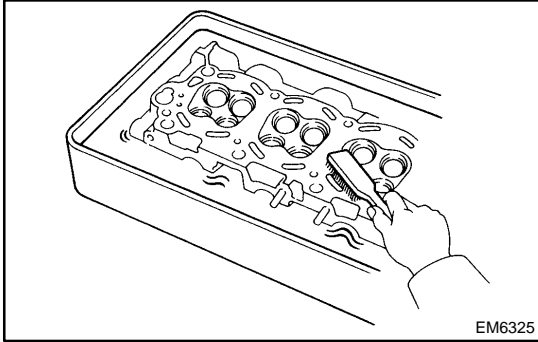
Be careful not to scratch the cylinder block contact surface.



P21861

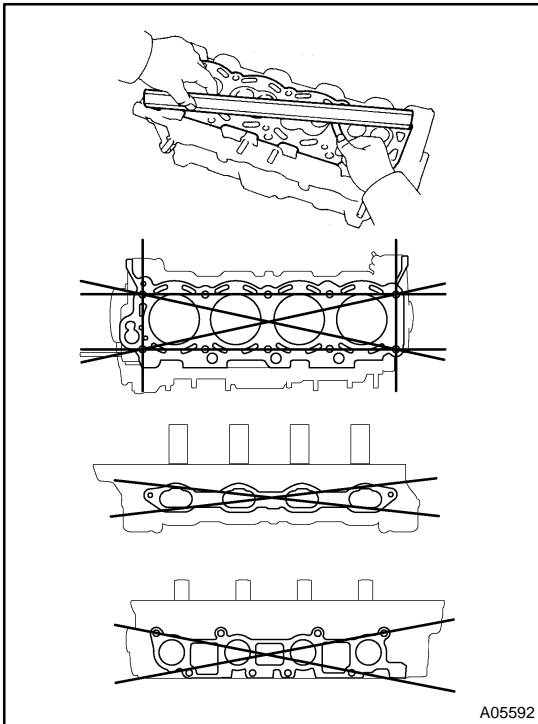
### 4. CLEAN VALVE GUIDE BUSHINGS

Using a valve guide bushing brush and solvent, clean all the guide bushings.



### 5. CLEAN CYLINDER HEAD

Using a soft brush and solvent, thoroughly clean the cylinder head.

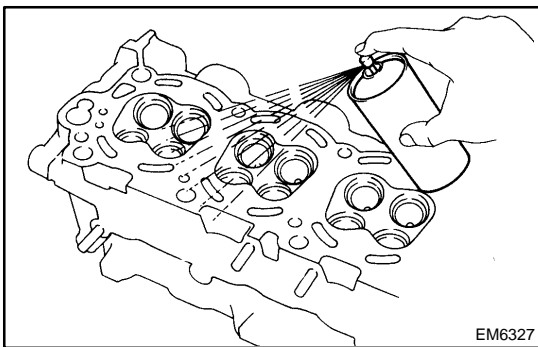


### 6. INSPECT FOR FLATNESS

Using a precision straight edge and a feeler gauge, measure the surfaces contacting the cylinder block and the manifolds for a warp.

**Maximum warpage:  
0.10 mm (0.0039 in.)**

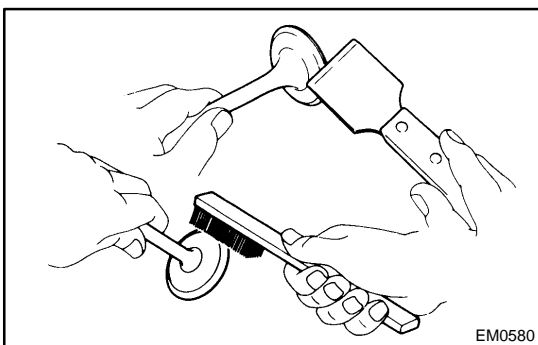
If the warp is greater than maximum, replace the cylinder head.



### 7. INSPECT FOR CRACKS

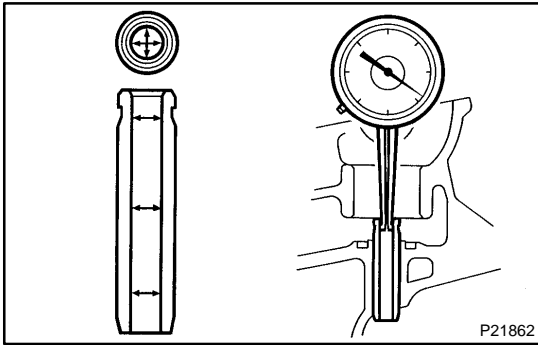
Using a dye penetrate, check the combustion chamber, the intake ports, the exhaust ports and the cylinder head surface for cracks.

If there is a crack, replace the cylinder head.



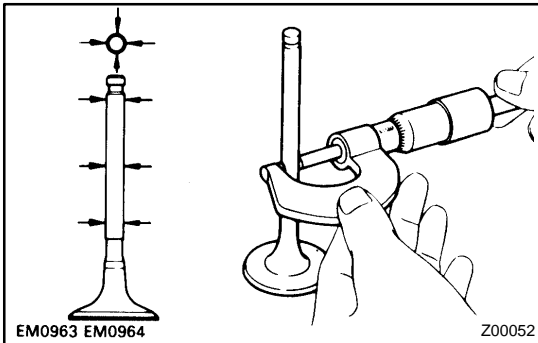
### 8. CLEAN VALVES

- (a) Using a gasket scraper, chip off any carbon from the valve head.
- (b) Using a wire brush, thoroughly clean the valve.



- 9. INSPECT VALVE STEMS AND GUIDE BUSHINGS**  
 (a) Using a caliper gauge, measure the inside diameter of the guide bushing.

**Bushing inside diameter:**  
**5.510 - 5.530 mm (0.2169 - 0.2177 in.)**



- (b) Using a micrometer, measure the diameter of the valve stem.

**Valve stem diameter:**  
**Intake**  
**5.470 - 5.485 mm (0.2154 - 0.2159 in.)**  
**Exhaust**  
**5.465 - 5.480 mm (0.2152 - 0.2157 in.)**

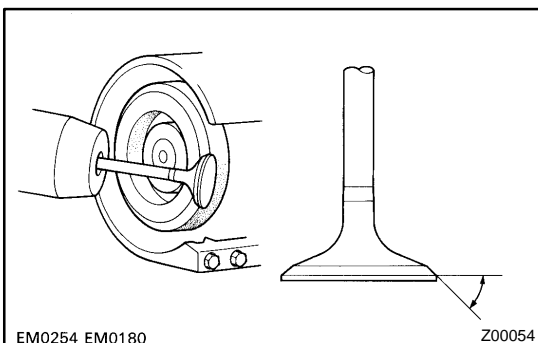
- (c) Subtract the valve stem diameter measurement from the guide bushing inside diameter measurement.

**Standard oil clearance:**  
**Intake**  
**0.025 - 0.060 mm (0.0010 - 0.0024 in.)**

**Exhaust**  
**0.030 - 0.065 mm (0.0012 - 0.0026 in.)**

**Maximum oil clearance:**  
**Intake**  
**0.08 mm (0.0031 in.)**  
**Exhaust**  
**0.10 mm (0.0039 in.)**

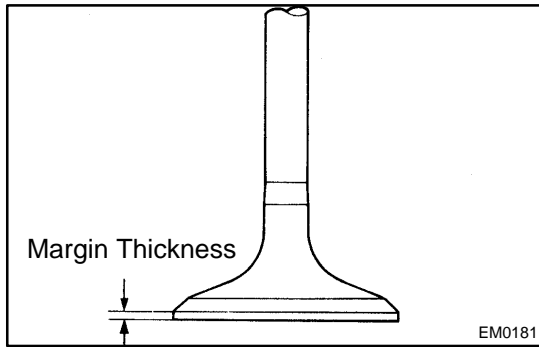
If the clearance is greater than the maximum, replace the valve and the guide bushing. (See Page [EM-55](#) )



**10. INSPECT AND GRIND VALVES**

- (a) Grind the valve enough to remove pits and carbon.  
 (b) Check that the valve is ground to the correct valve face angle.

**Valve face angle:**  
**44.5°**



- (c) Check the valve head margin thickness.

**Standard margin thickness:**

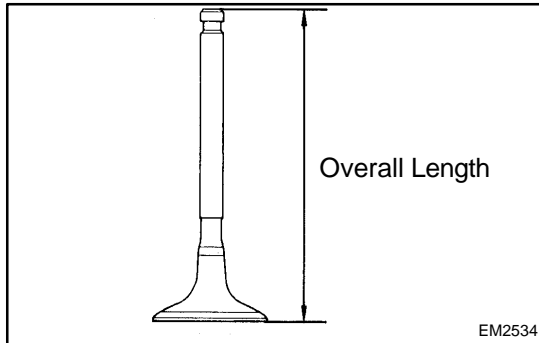
**IN 1.25 mm (0.049 in.)**

**EX 1.40 mm (0.055 in.)**

**Minimum margin thickness:**

**0.5 mm (0.020 in.)**

If the margin thickness is less than the minimum, replace the valve.



- (d) Check the valve overall length.

**Standard overall length:**

**Intake: 95.05 mm (3.7421 in.)**

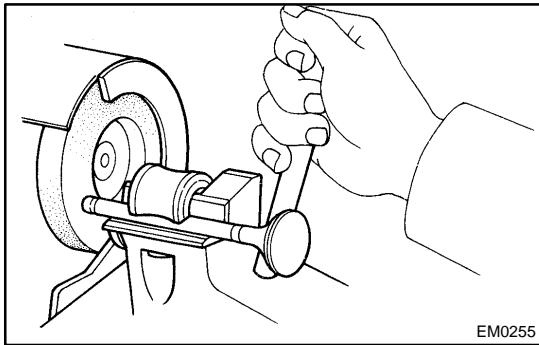
**Exhaust: 95.10 mm (3.7441 in.)**

**Minimum overall length:**

**Intake: 94.55 mm (3.7224 in.)**

**Exhaust: 94.60 mm (3.7244 in.)**

If the overall length is less than the minimum, replace the valve.

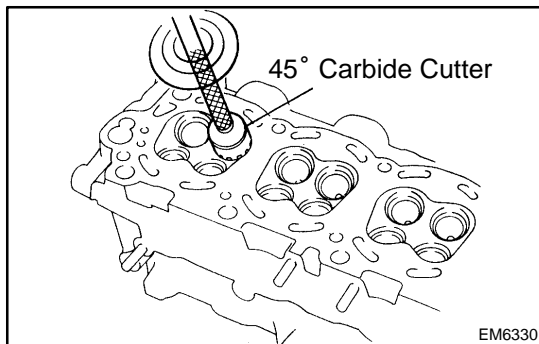


- (e) Check the surface of the valve stem tip for wear.

If the valve stem tip is worn, resurface the tip with a grinder or replace the valve.

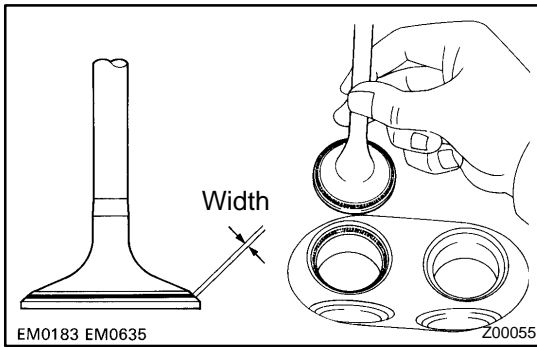
**NOTICE:**

**Do not grind off to below the minimum.**



## 11. INSPECT AND CLEAN VALVE SEATS

- (a) Using a 45° carbide cutter, resurface the valve seats. Remove just enough metal to clean the seats.



- (b) Check the valve seating position.  
Apply a light coat of prussian blue (or white lead) to the valve face. Lightly press the valve against the seat. Do not rotate valve.

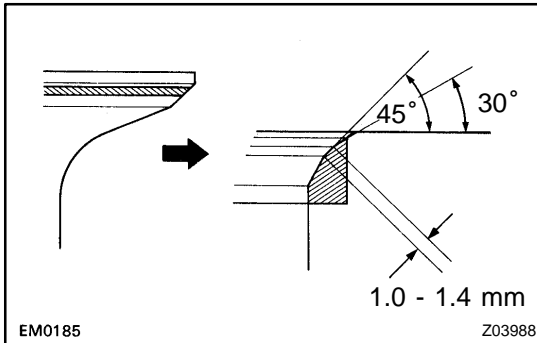
- (c) Check the valve face and seat for the following:
- ▶ If blue appears 360° around the face, the valve is concentric. If not, replace the valve.
  - ▶ If blue appears 360° around the valve seat, the guide and face are concentric. If not, resurface the seat.

- ▶ Check that the seat contact is in the middle of the valve face with the following width:

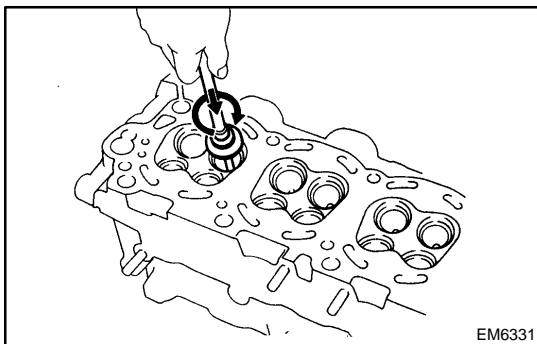
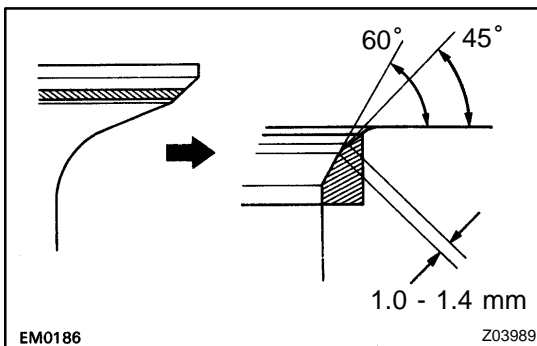
**1.0 - 1.4 mm (0.039 - 0.055 in.)**

If not, correct the valve seats as follows:

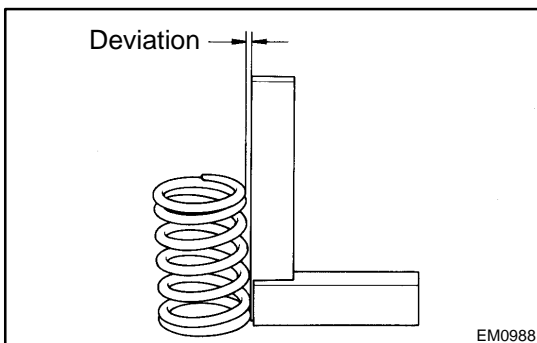
- ▶ If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.



- ▶ If the seating is too low on the valve face, use 60° and 45° cutters to correct the seat.



- (d) Hand-lap the valve and valve seat with an abrasive compound.  
(e) After hand-lapping, clean the valve and valve seat.



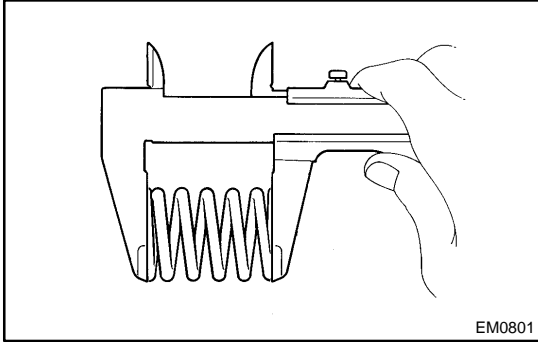
## 12. INSPECT VALVE SPRINGS

- (a) Using a steel square, measure the deviation of the valve spring.

**Maximum deviation:**

**2.0 mm (0.079 in.)**

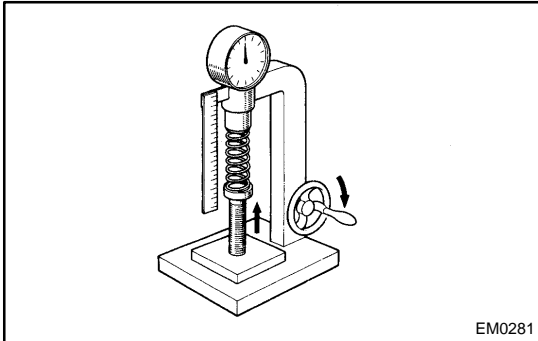
If the deviation is greater than the maximum, replace the valve spring.



- (b) Using vernier calipers, measure the free length of the valve spring.

**Free length:**  
**54.1 mm (2.130 in.)**

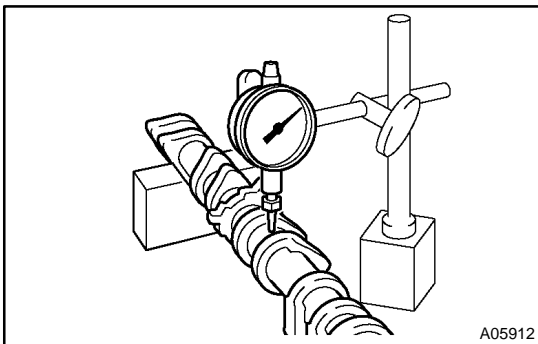
If the free length is not as specified, replace the valve spring.



- (c) Using a spring tester, measure the tension of the valve spring at the installed length.

**Installed tension:**  
**204 - 226 N (20.8 - 23.0 kgf, 45.9 - 50.7 lbf)**  
**at 35.0 mm (1.378 in.)**

If the installed tension is not as specified, replace the valve spring.

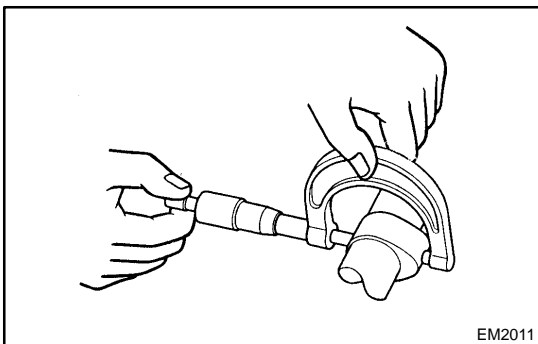


### 13. INSPECT CAMSHAFT FOR RUNOUT

- (a) Place the camshaft on V-blocks.  
 (b) Using a dial indicator, measure the circle runout at the center journal.

**Maximum circle runout:**  
**0.08 mm (0.0031 in.)**

If the circle runout is greater than the maximum, replace the camshaft.



### 14. INSPECT CAM LOBES

Using a micrometer, measure the cam lobe height.

**Standard cam lobe height:**

**Intake:**

**41.94 - 42.04 mm (1.6512 - 1.6551 in.)**

**Exhaust:**

**41.96 - 42.06 mm (1.6520 - 1.6559 in.)**

**Minimum cam lobe height:**

**Intake:**

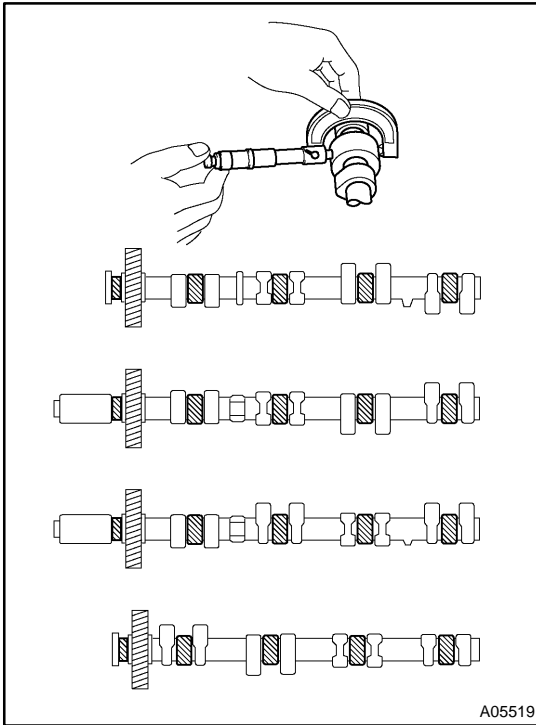
**41.79 mm (1.6453 in.)**

**Exhaust:**

**41.81 mm (1.6461 in.)**

If the cam lobe height is less than the minimum, replace the camshaft.



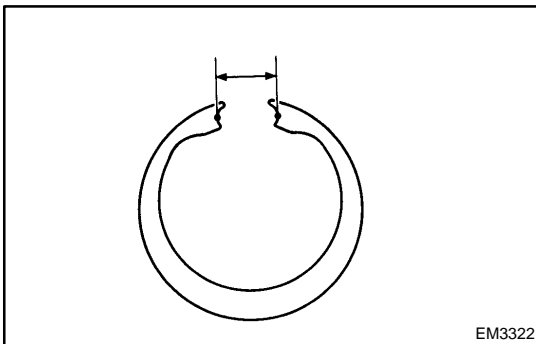
**15. INSPECT CAMSHAFT JOURNALS**

Using a micrometer, measure the journal diameter.

**Journal diameter:**

**26.954 - 26.970 mm (1.0612 - 1.0618 in.)**

If the journal diameter is not as specified, check the oil clearance.

**16. INSPECT CAMSHAFT GEAR SPRING**

Using vernier calipers, measure the free distance between the spring ends.

**Free distance:**

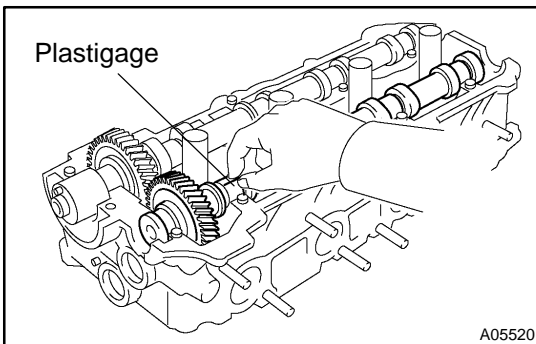
**18.2 - 18.8 mm (0.712 - 0.740 in.)**

If the free distance is not as specified, replace the gear spring.

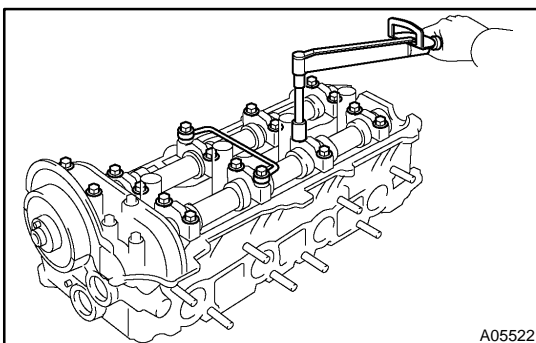
**17. INSPECT CAMSHAFT BEARINGS**

Check that bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.

**18. INSPECT CAMSHAFT JOURNAL OIL CLEARANCE**

- (a) Clean the bearing caps and the camshaft journals.
- (b) Place the camshafts on the cylinder head.
- (c) Lay a strip of plastigage across each of the camshaft journals.



- (d) Install the bearing caps.

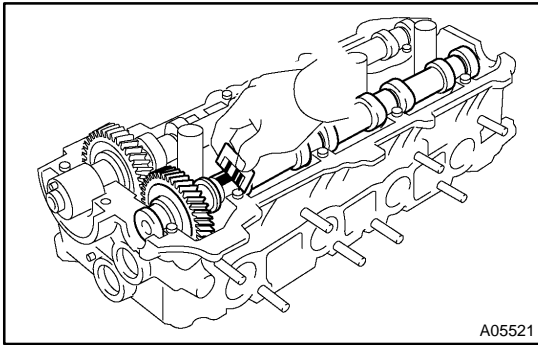
(See page [EM-59](#) )

**Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)**

**NOTICE:**

**Do not turn the camshaft.**

- (e) Remove the bearing caps.



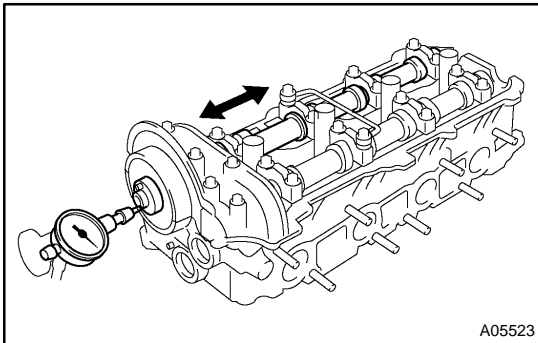
- (f) Measure the Plastigage at its widest point.

**Maximum oil clearance:**

**0.10 mm (0.0039 in.)**

If the oil clearance is greater than the maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

- (g) Completely remove the plastigage.  
 (h) Remove the camshafts.



#### 19. INSPECT CAMSHAFT THRUST CLEARANCE

- (a) Install the camshaft.

(See page [EM-59](#) )

- (b) Using a dial indicator, measure the thrust clearance as moving the camshaft back and forth.

**Standard thrust clearance:**

**Intake**

**0.040 - 0.090 mm (0.0016 - 0.0035 in.)**

**Exhaust**

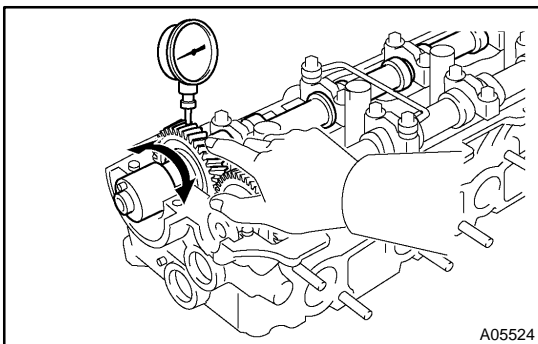
**0.040 - 0.085 mm (0.0016 - 0.0033 in.)**

**Maximum thrust clearance:**

**0.12 mm (0.0047 in.)**

If the thrust clearance is greater than the maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

- (c) Remove the camshafts.



#### 20. INSPECT CAMSHAFT GEAR BACKLASH

- (a) Install the camshafts without installing the exhaust cam sub-gear and the front bearing cap.

(See page [EM-59](#) )

- (b) Using a dial indicator, measure the backlash.

**Standard backlash:**

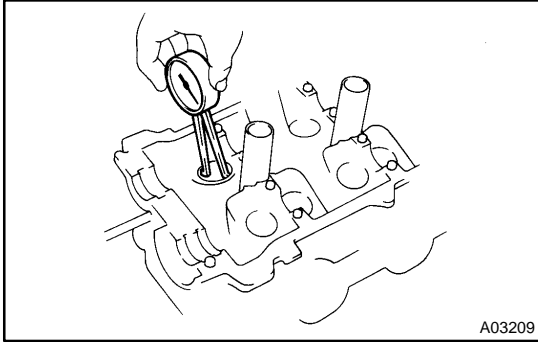
**0.020 - 0.200 mm (0.0008 - 0.0079 in.)**

**Maximum backlash:**

**0.30 mm (0.0188 in.)**

If the backlash is greater than the maximum, replace the camshafts.

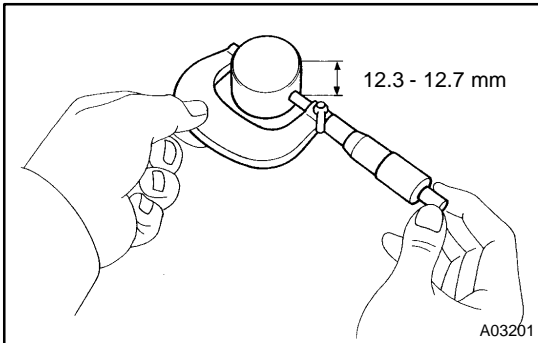
- (c) Remove the camshafts.

**21. INSPECT VALVE LIFTERS AND LIFTER BORES**

- (a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.

**Lifter bore diameter:**

**31.000 - 31.016 mm (1.2205 - 1.2211 in.)**



- (b) Using a micrometer, measure the lifter diameter at the valve lifter center line, 12.3 - 12.7 mm (0.484 - 0.500 in.) from the valve lifter head.

**Lifter diameter:**

**30.966 - 30.976 mm (1.2191 - 1.2195 in.)**

- (c) Subtract the lifter diameter from the lifter bore diameter.

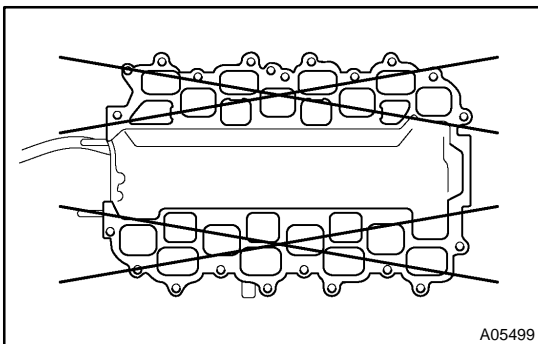
**Standard oil clearance:**

**0.024 - 0.050 mm (0.0009 - 0.0020 in.)**

**Maximum oil clearance:**

**0.07 mm (0.0028 in.)**

If the oil clearance is greater than the maximum, replace the lifter. If necessary, replace the cylinder head.

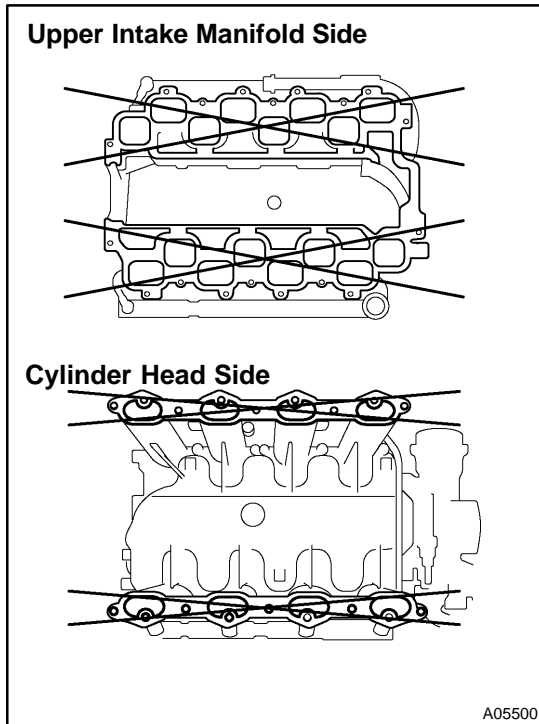
**22. INSPECT INTAKE MANIFOLD**

- (a) Upper intake manifold:

Using a precision straight edge and a feeler gauge, measure the surface contacting of the lower intake manifold for a warp.

**Maximum warpage: 0.15 mm (0.0059 in.)**

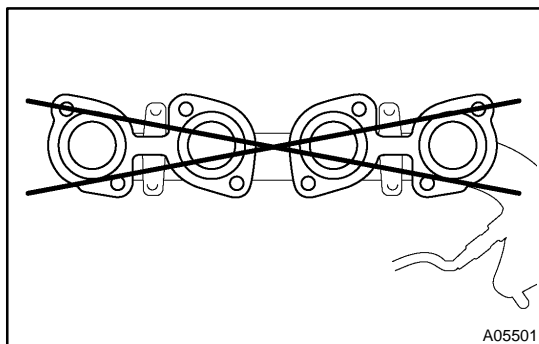
If the warp is greater than the maximum, replace the upper intake manifold.



- (b) Lower intake manifold:  
Using a precision straight edge and a feeler gauge, measure the surface contacting of the cylinder head and the upper intake manifold for a warpage.

**Maximum warpage:  
0.15 mm (0.0059 in.)**

If the warp is greater than the maximum, replace the lower intake manifold.

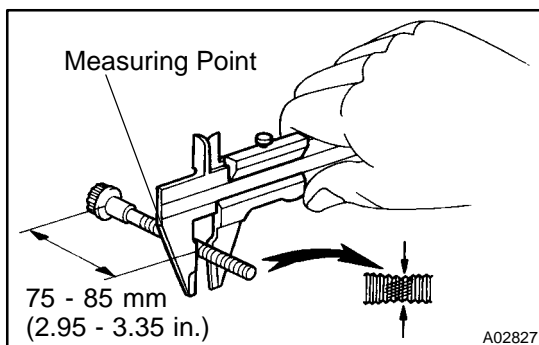


### 23. INSPECT EXHAUST MANIFOLD

Using a precision straight edge and a feeler gauge, measure the surface contacting of the cylinder head for a warp.

**Maximum warpage:  
0.50 mm (0.0197 in.)**

If the warp is greater than the maximum, replace the manifold.



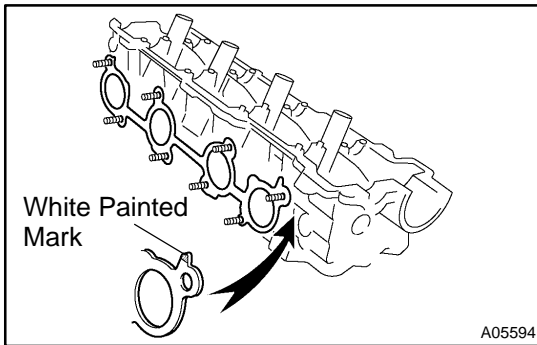
### 24. INSPECT CYLINDER HEAD BOLTS

Using vernier calipers, measure the thread outside diameter of the bolt.

**Standard outside diameter:  
9.810 - 9.960 mm (0.3862 - 0.3921 in.)**

**Minimum outside diameter:  
9.700 mm (0.3819 in.)**

If the diameter is less than the minimum, replace the bolt.



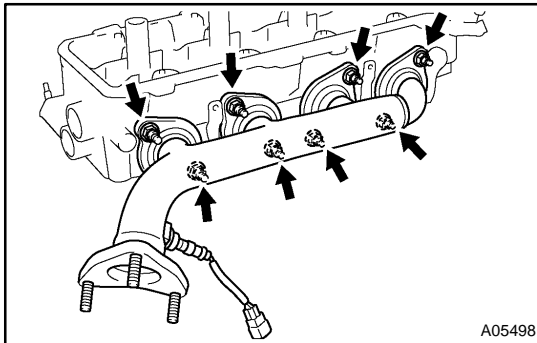
## INSTALLATION

### 1. INSTALL RH EXHAUST MANIFOLD TO CYLINDER HEAD

- (a) Place a new gasket on the cylinder head with the white painted marks facing the manifold side.

**NOTICE:**

**Be careful of the installation direction.**

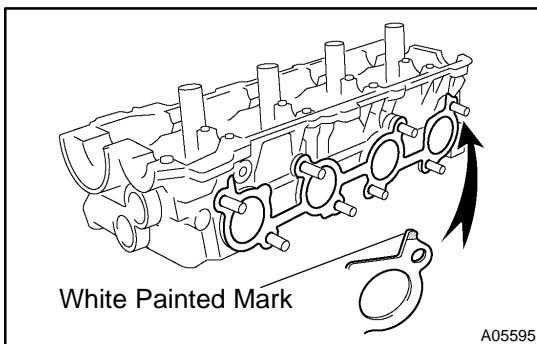


- (b) Install the exhaust manifold with 8 new nuts. Evenly tighten the nuts a little at a time for several times.

**Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)**

- (c) Install the heat insulator with the 4 bolts.

**Torque: 7.5 N·m (77 kgf·cm, 66 in.-lbf)**

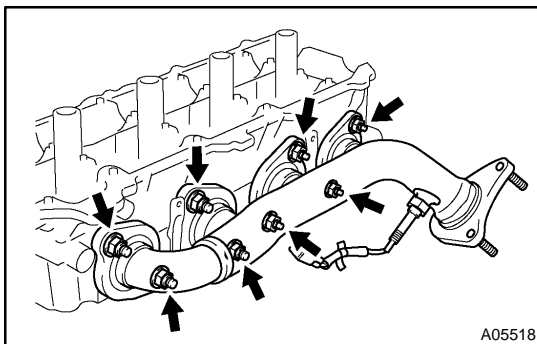


### 2. INSTALL LH EXHAUST MANIFOLD TO CYLINDER HEAD

- (a) Place a new gasket on the cylinder head with the white painted marks facing the manifold side.

**NOTICE:**

**Be careful of the installation direction.**

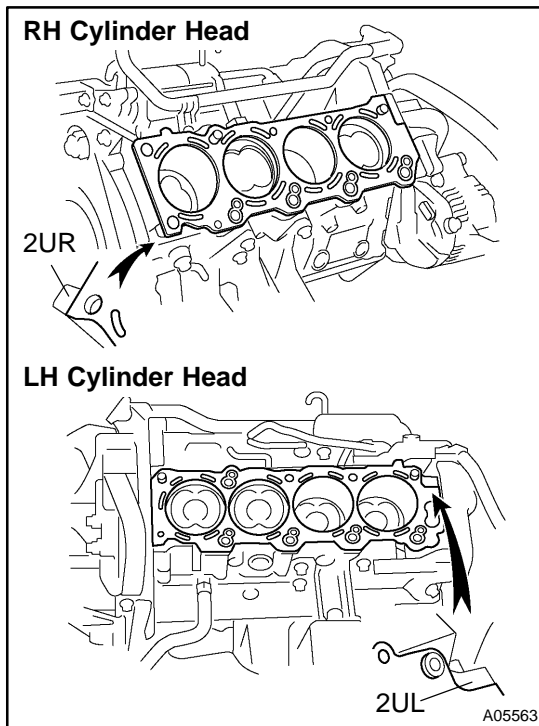


- (b) Install the exhaust manifold with 8 new nuts. Evenly tighten the nuts a little at a time for several times.

**Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)**

- (c) Install the heat insulator with the 4 bolts.

**Torque: 7.5 N·m (77 kgf·cm, 66 in.-lbf)**



### 3. PLACE CYLINDER HEAD ON CYLINDER BLOCK

- (a) Place 2 new cylinder head gaskets in position on the cylinder block.

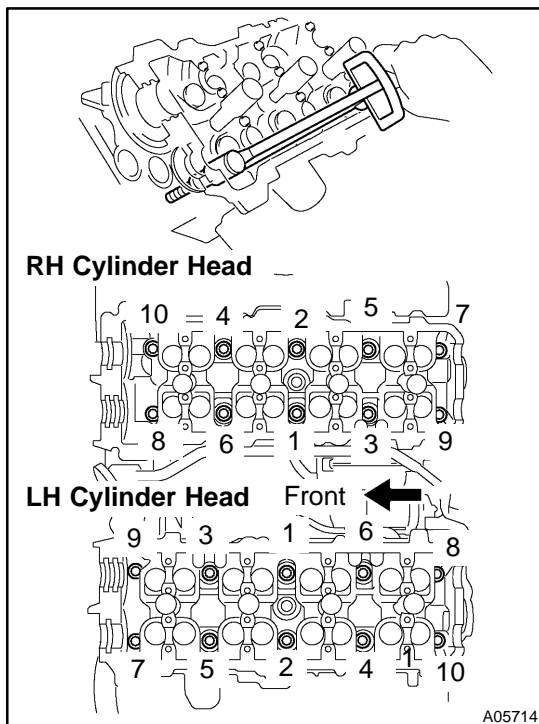
#### HINT:

On the rear side of the cylinder head gasket, there is a mark to distinguish the LH and RH banks, a "2UR" for the RH bank and a "2UL" for the LH bank.

#### NOTICE:

**Be careful of the installation direction.**

- (b) Place the 2 cylinder heads in position on the cylinder head gaskets.



### 4. INSTALL CYLINDER HEAD BOLTS

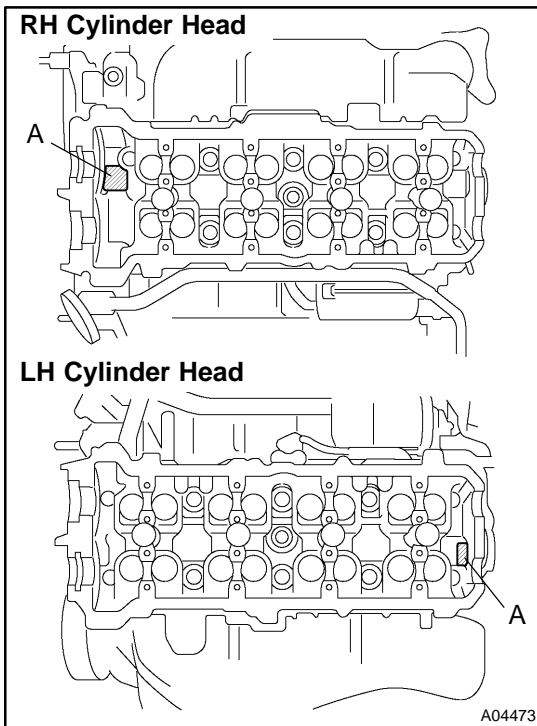
#### HINT:

- ▶ The cylinder head bolts are tightened in 2 progressive steps (steps (c) and (e)).
- ▶ If any cylinder head bolt is broken or deformed, replace it.

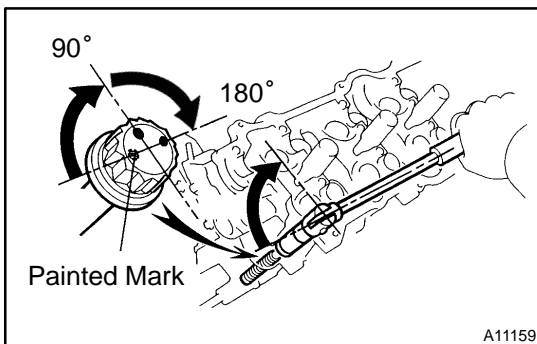
- (a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.
- (b) Install the plate washer to the cylinder head bolt.
- (c) Install and evenly tighten the 10 cylinder head bolts on one side of the cylinder head a little at a time for several times as in the order shown, then do the other side as shown.

**Torque: 32 N·m (325 kgf·cm, 24 ft·lbf)**

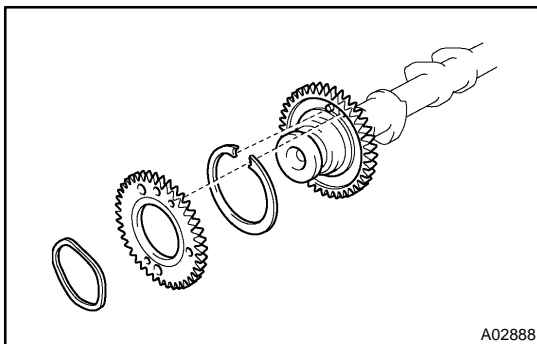
If any one of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.

**NOTICE:**

Do not drop the plate washer of the cylinder head bolt into A area in the illustration. It will fall down to the oil pan through the cylinder head and the cylinder block.



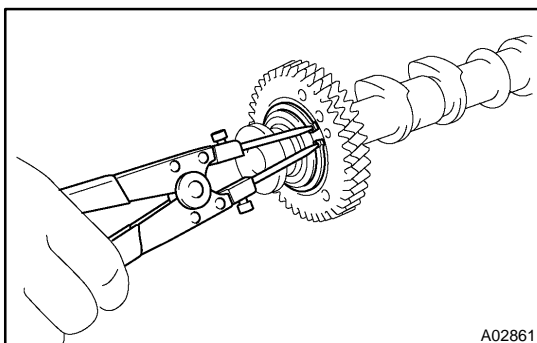
- (d) Mark the front of the cylinder head bolt head with paint.
- (e) Retighten the cylinder head bolts by 90° only for the first time.
- (f) Then retighten them by 90° further for the second time.
- (g) Check that the painted mark is now at a 180° angle to the front.

**5. INSTALL SPARK PLUGS****6. ASSEMBLE EXHAUST CAMSHAFT**

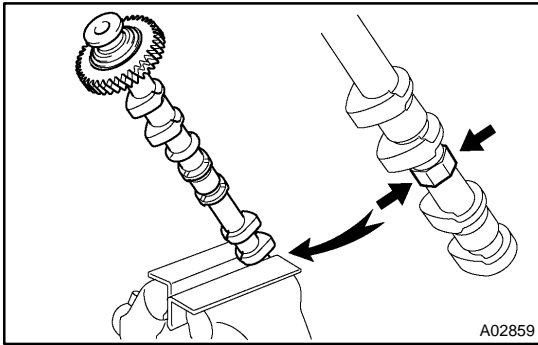
- (a) Install the camshaft gear spring, the camshaft sub-gear and the wave washer.

**HINT:**

Attach the pins on the gears to the gear spring ends.



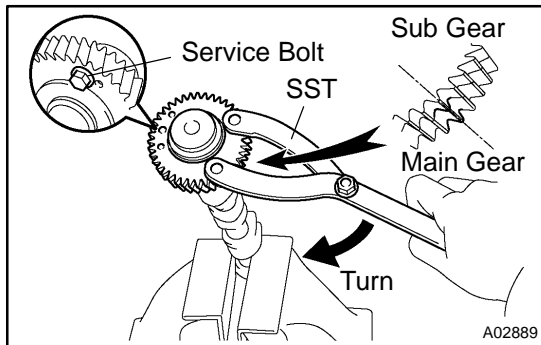
- (b) Using snap ring pliers, install the snap ring.



(c) Mount the hexagon shaped part of the camshaft in a vise.

**NOTICE:**

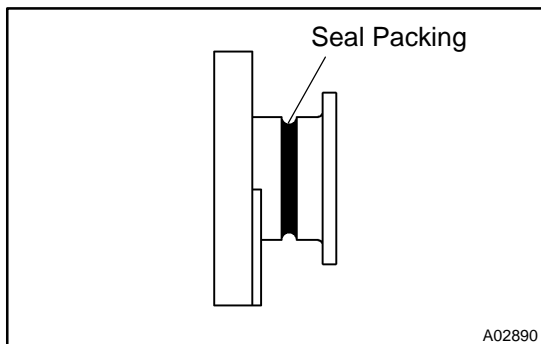
**Be careful not to damage the camshaft.**



(d) Using SST, align the holes of the camshaft main gear and sub-gear by turning camshaft sub-gear counterclockwise, and temporarily install a service bolt.

SST 09960-10010 (09962-01000, 09963-00500)

(e) Align the gear teeth of the main gear and sub-gear, and tighten the service bolt.



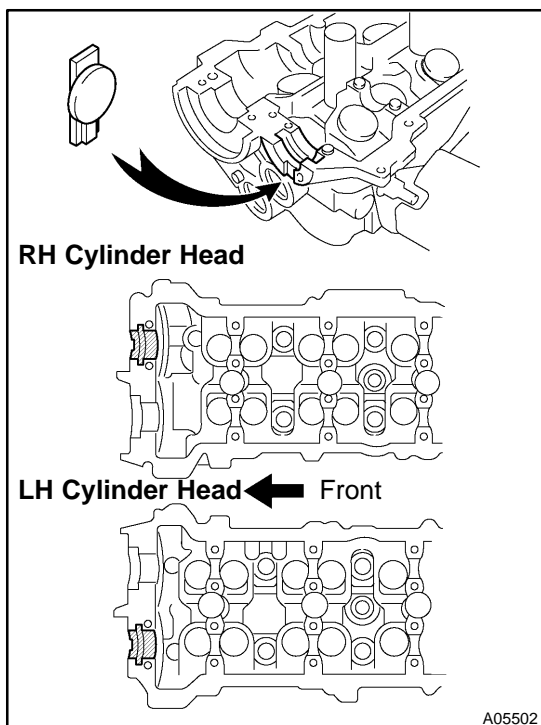
**7. INSTALL CAMSHAFT HOUSING PLUGS**

(a) Remove any old packing (FIPG) material.

(b) Apply seal packing to the camshaft housing plug grooves.

**Seal packing:**

**Part No. 08826-00080 or equivalent**



(c) Install the 2 camshaft housing plugs to the cylinder heads.



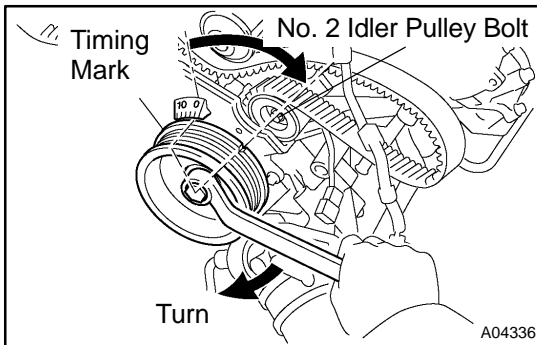
## 8. INSTALL CAMSHAFTS

### NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. Otherwise, excessive pressure is put on the cylinder head journal thrust, causing a burr on the journal and damage on the camshaft. To avoid this, follow the steps below.

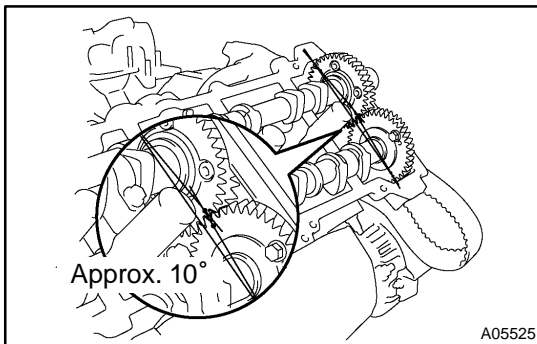
- (a) Set the crankshaft pulley position.

Turn the crankshaft pulley clockwise or counterclockwise, and put the timing mark of the crankshaft pulley in line with the centers of the crankshaft pulley bolt and the idler pulley bolt.



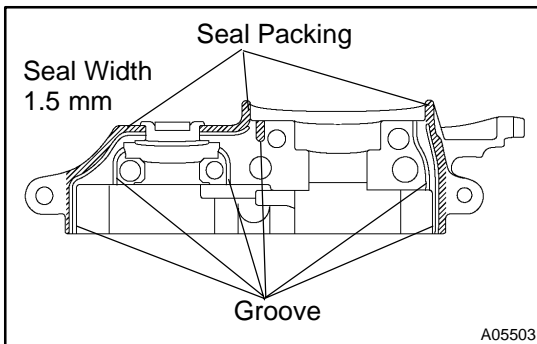
### NOTICE:

Having the crankshaft pulley at the wrong angle can cause the piston head and the valve head to come into contact with each other when removing the camshaft, causing damage on them. So always set the crankshaft pulley at the correct angle.



- (b) Install the RH camshafts.

- (1) Apply MP grease to the thrust portion of the intake and exhaust camshafts.
- (2) Place the intake and exhaust camshafts.
- (3) Set the timing mark (1 dot mark) of the camshaft main gear at approx. 10° angle.



- (4) Remove any old packing (FIPG) material from the front bearing cap.
- (5) Apply seal packing to the front bearing cap as shown in the illustration.

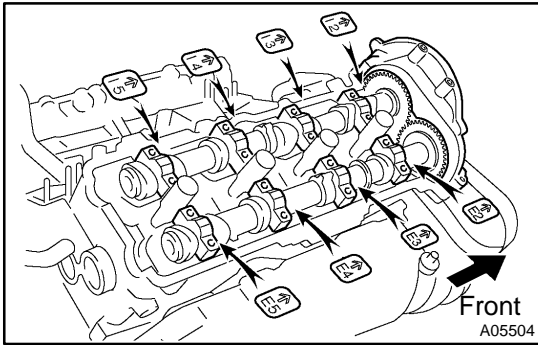
### Seal packing:

#### Part No. 08826-00080 or equivalent

- ▶ Install a nozzle that is cut to a 1.5 mm (0.06 in.) opening.
- ▶ Parts must be assembled within 5 minutes the seal packing application. Otherwise the material must be removed and the packing have to be reapplied.
- ▶ Immediately remove nozzle from the tube and reinstall cap.

### NOTICE:

Do not apply seal packing to the front bearing cap grooves.



- (6) Install the front bearing cap.

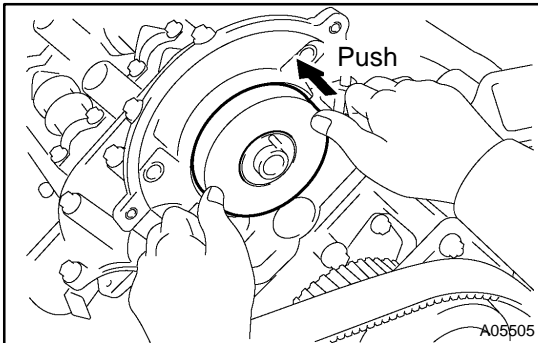
HINT:

Installing the front bearing cap will determine the thrust portion of the camshaft.

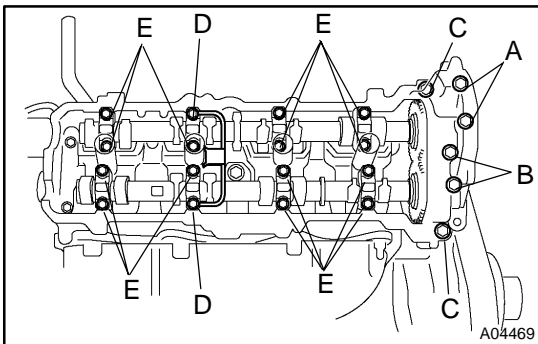
- (7) Install the other bearing cap in the sequence shown with the arrow mark facing forward.

HINT:

Align the arrow marks at the front and rear of the cylinder head with the mark on the bearing cap.



- (8) Push in the camshaft oil seal.



- (9) Apply a light coat of engine oil on the threads and under the heads (D and E) of the bearing cap bolts.

HINT:

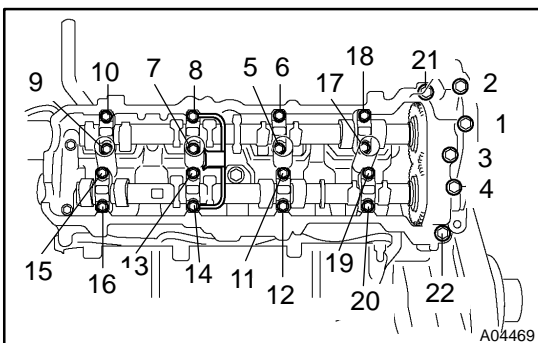
Do not apply engine oil under the heads of the bearing cap bolt (A), (B) and (C).

- (10) Install the oil feed pipe and the 22 bearing cap bolts as shown.

HINT:

Bolt length:

- 94 mm (3.70 in.) for A
- 72 mm (2.83 in.) for B
- 25 mm (0.98 in.) for C
- 52 mm (2.05 in.) for D
- 38 mm (1.50 in.) for E



- (11) Evenly tighten the 22 bearing cap bolts a little at a time for several times as in the sequence shown.

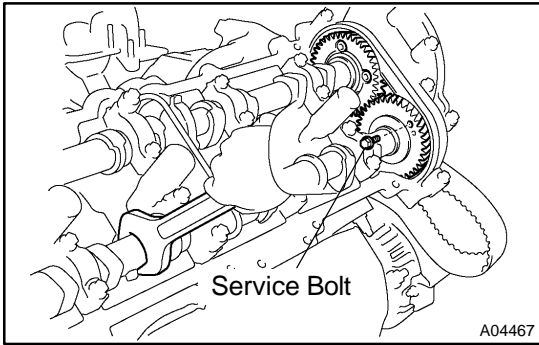
**Torque:**

**Bolt C:**

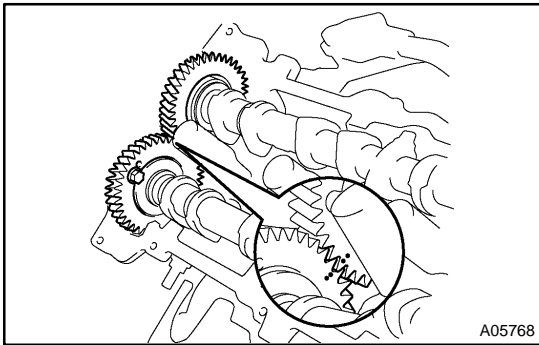
**7.5 N·m (80 kgf·cm, 69 in.-lbf)**

**Others**

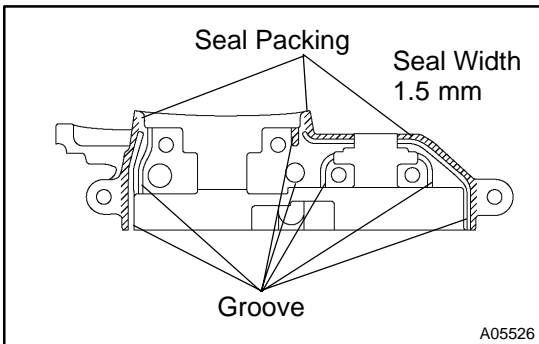
**16 N·m (160 kgf·cm, 12 ft·lbf)**



- (12) Move a service bolt of the sub-gear upward by turning the hexagon shaped port of the exhaust camshaft with a wrench.
- (13) Remove the service bolt.



- (c) Install the LH camshafts.
  - (1) Apply MP grease to the thrust portion of the intake and exhaust camshafts.
  - (2) Place the intake and exhaust camshafts.
  - (3) Engage the intake to the exhaust gear by putting the timing marks (2 dot marks) on each gear.



- (4) Remove any old packing (FIPG) material.
- (5) Apply seal packing to the front bearing cap.

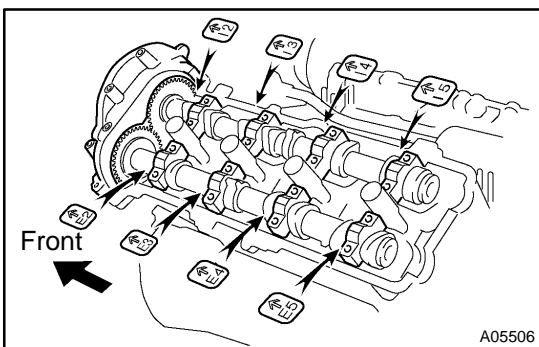
**Seal packing:**

**Part No. 08826-00080 or equivalent**

- ▶ Install a nozzle that is cut to a 1.5 mm (0.06 in.) opening.
- ▶ Parts must be assembled within 5 minutes the seal packing application. Otherwise the material must be removed and the packing have to be reapplied.
- ▶ Immediately remove nozzle from the tube and reinstall cap.

**NOTICE:**

**Do not apply seal packing to the front bearing cap grooves.**



- (6) Install the front bearing cap.

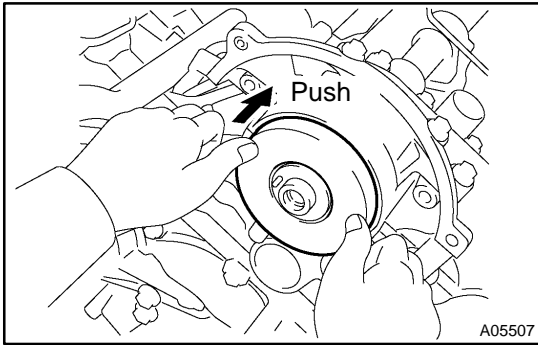
**HINT:**

Installing the front bearing cap will determine the thrust portion of the camshaft.

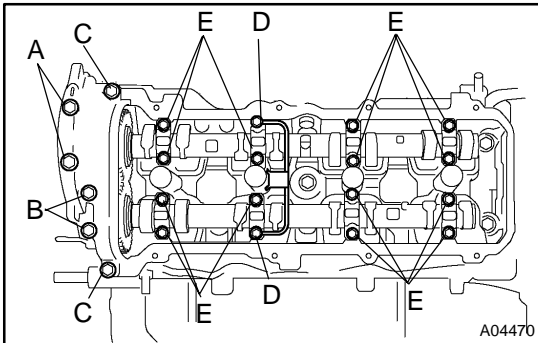
- (7) Install the other bearing cap in the sequence shown with the arrow mark facing forward.

**HINT:**

Align the arrow marks at the front and rear of the cylinder head with the mark on the bearing cap.



- (8) Push in the camshaft oil seal.



- (9) Apply a light coat of engine oil on the threads and under the heads (D and E) of the bearing cap bolts.

**HINT:**

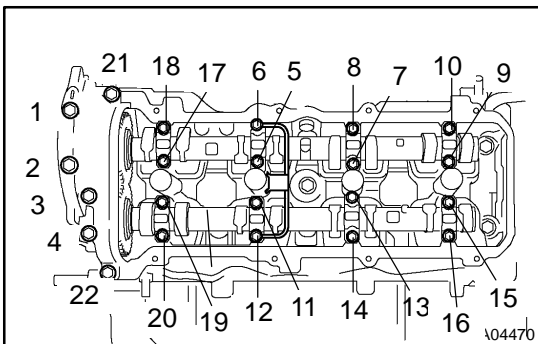
Do not apply engine oil under the heads of the bearing cap bolt (A), (B) and (C).

- (10) Install the oil feed pipe and the 22 bearing cap bolts as shown.

**HINT:**

Bolt length:

- 94 mm (3.70 in.) for A
- 72 mm (2.83 in.) for B
- 25 mm (0.98 in.) for C
- 52 mm (2.05 in.) for D
- 38 mm (1.50 in.) for E



- (11) Uniformly tighten the 22 bearing cap bolts in several passes, in the sequence shown.

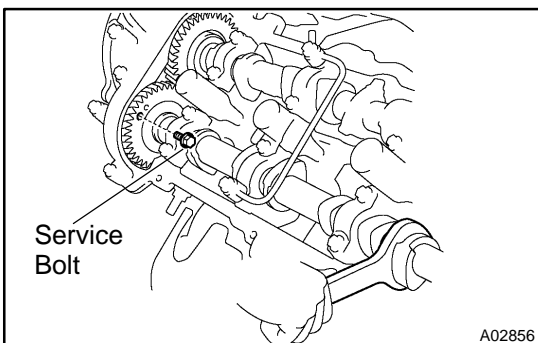
**Torque:**

**Bolt C:**

**7.5 N·m (80 kgf·cm, 69 in.-lbf)**

**Others**

**16 N·m (160 kgf·cm, 12 ft·lbf)**

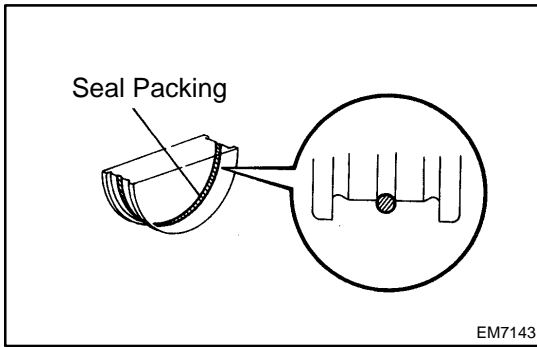


- (12) Move a service bolt of the sub-gear upward by turning the hexagon shaped port of the exhaust camshaft with a wrench.

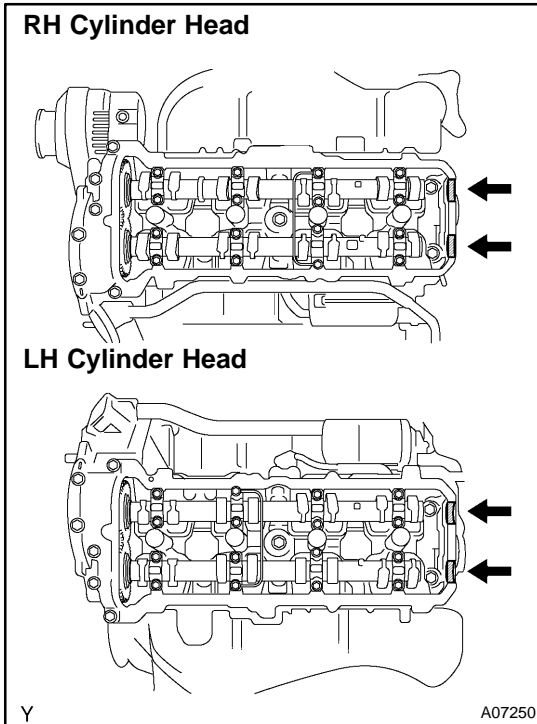
- (13) Remove the service bolt.

**9. CHECK AND ADJUST VALVE CLEARANCE (See page EM-4)**

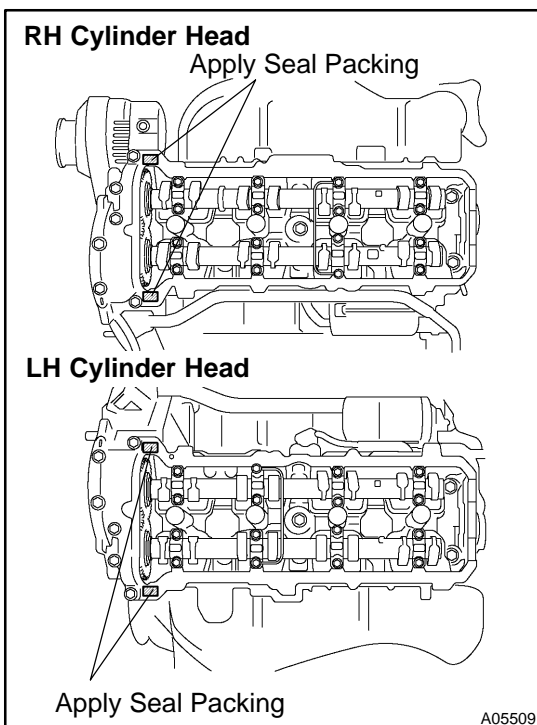
Turn the camshaft and the position the cam lobe upward, and check and adjust the valve clearance.

**10. INSTALL SEMI-CIRCULAR PLUGS**

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the semi-circular plug grooves.

**Seal packing:****Part No. 08826-00080 or equivalent**

- (c) Install the 4 semi-circular plugs to the cylinder heads.

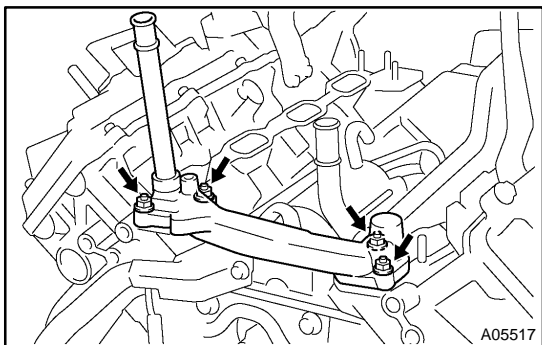
**11. INSTALL CYLINDER HEAD COVER**

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the cylinder heads as shown in the illustration.

**Seal packing:****Part No. 08826-00080 or equivalent**

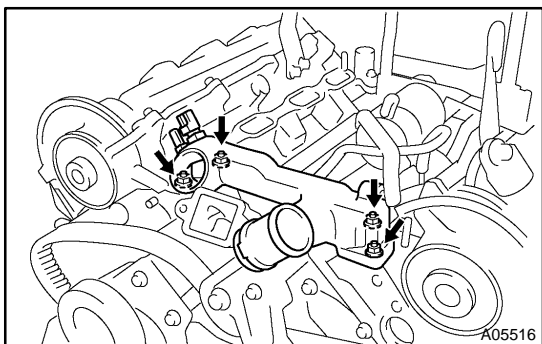
- (c) Install the gasket to the cylinder head cover.
- (d) Install the seal washer to the bolt.
- (e) Install the cylinder head cover with the 18 bolts. Evenly tighten the bolts a little at a time for several times. Install the 2 cylinder head covers.

**Torque: 6.0 N·m (60 kgf·cm, 53 in.-lbf)****12. INSTALL ENGINE HANGERS****Torque: 37 N·m (380 kgf·cm, 27 ft-lbf)****13. INSTALL OIL DIPSTICK AND GUIDE FOR ENGINE**

**14. INSTALL REAR WATER BYPASS JOINT**

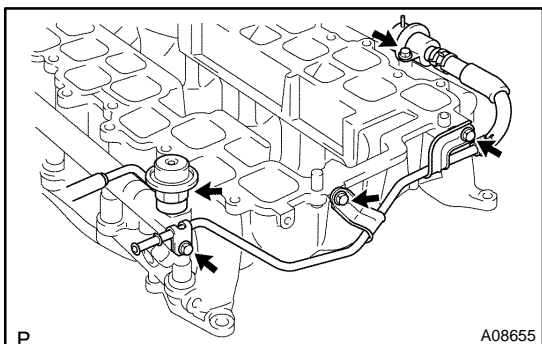
- (a) Install 2 new gaskets to the cylinder head.
- (b) Install the 4 nuts holding the water bypass joint to the cylinder heads. Alternately tighten the nuts.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

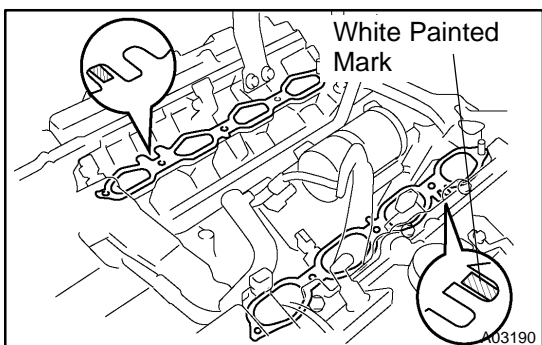
**15. INSTALL FRONT WATER BYPASS JOINT**

- Install 2 new gaskets and the water bypass joint with the 4 nuts. Alternately tighten the nuts.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

**16. INSTALL WATER INLET AND INLET HOUSING ASSEMBLY (See page CO-8)****17. ASSEMBLE UPPER AND LOWER INTAKE MANIFOLDS**

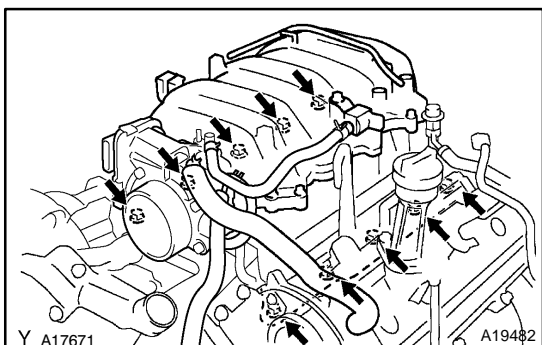
- (a) Install the 2 delivery pipes and the 8 injectors (See page SF-27).
- (b) Install new 2 gaskets, the fuel pressure regulator and the fuel pulsation damper.
- (c) Install the fuel return hose to the lower intake manifold with the 3 bolts.
- (d) Connect the fuel return hose to the fuel pressure regulator.

**18. INSTALL INTAKE MANIFOLD ASSEMBLY**

- (a) Place 2 new gaskets on the cylinder heads with white painted mark facing upward.

**NOTICE:**

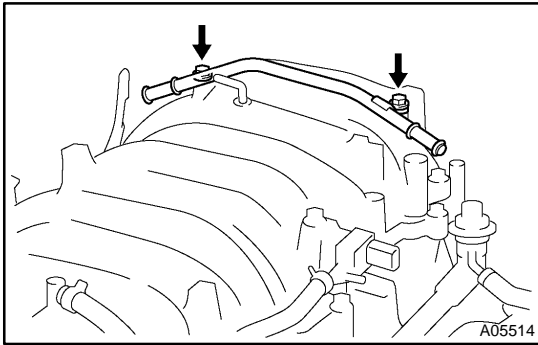
- ▶ **Align the port holes of the gasket and cylinder head.**
- ▶ **Be careful of the installation direction.**



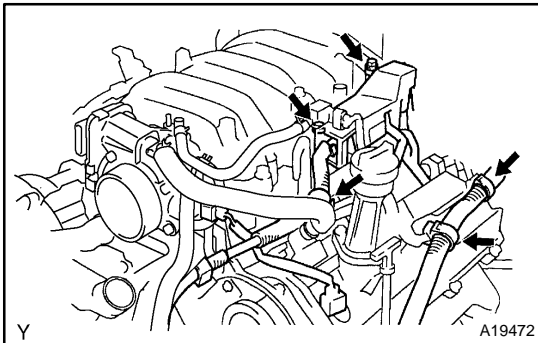
- (b) Place the intake manifold assembly on the cylinder heads.
- (c) Install and uniformly tighten the 6 bolts and the 4 nuts in several passes.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

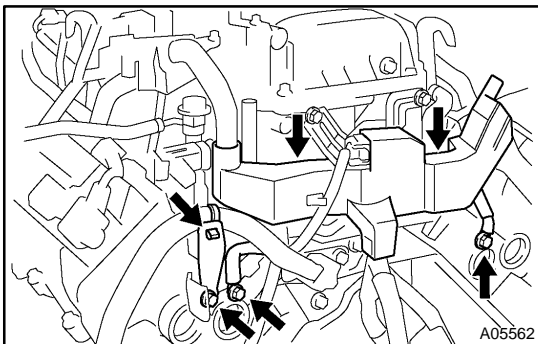
## ENGINE MECHANICAL - CYLINDER HEAD



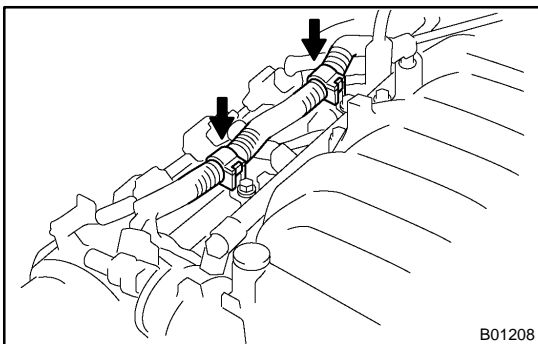
- (d) Install the EVAP pipe to the intake manifold with the 2 bolts.



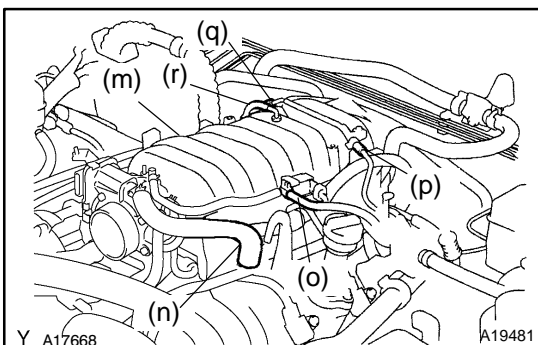
- (e) Connect the wire protector to the intake manifold with the 2 bolts.  
 (f) Install the engine wire to the engine hanger.  
 (g) Install the engine wire to the LH No.1 timing belt rear plate.  
 (h) Install the engine wire to the bracket.



- (i) Connect the wire protector to the rear water bypass joint and RH cylinder head with the 2 bolts.  
 (j) Install the 2 ground cables to the RH and LH cylinder head.  
 (k) Install the guide for A/T bracket to the LH cylinder head.

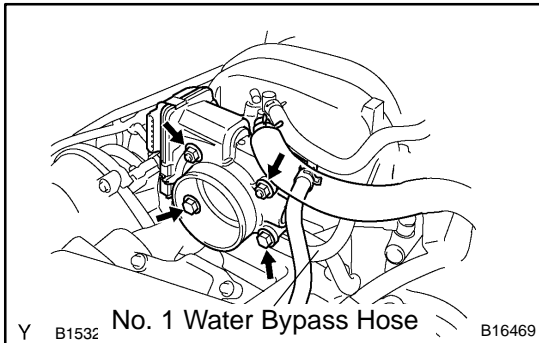


- (l) Connect the 2 wire clamps to the wire clamp bracket on the RH delivery pipe.



- (m) Connect the fuel pressure regulator vacuum hose to the fuel pressure regulator pipe.  
 (n) Connect the PCV hose to the PCV valve on the LH cylinder head.  
 (o) Connect the EVAP hose (from charcoal canister) to the VSV for EVAP.  
 (p) Connect the EVAP hose (from charcoal canister) to the EVAP pipe on the intake manifold.  
 (q) Connect the EVAP hose (from intake air connector) to the EVAP pipe on the intake manifold.

- (r) Connect the PS air hose to intake manifold.



- (s) Connect the No.1 water bypass hose (from water inlet housing) to throttle body.
- (t) Connect the throttle control connector.
- (u) Connect the VSV connector for EVAP.
- (v) Connect the 8 injector connectors.
- (w) Connect the ECT sensor.
- (x) Connect the water sender gauge.
- (y) Connect the 8 ignition coil connectors.
- (z) Connect the 2 oxygen sensor connectors.

**19. CONNECT FUEL INLET HOSE (See page SF-24 )**

**20. INSTALL TIMING BELT REAR PLATES**

- (a) Install the RH timing belt rear plates.  
Install the No.1 timing belt rear plate to the cylinder head with the 3 bolts and the stud bolt.  
**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**
- (b) Install the LH timing belt rear plates.
- (1) Connect the wire clamp to the No.1 timing belt rear plate.
  - (2) Install the No.1 timing belt rear plate to the cylinder head with the 3 bolts.

**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**

**21. INSTALL V-BANK COVER**

Install the 3 V-bank covers.

**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**

**22. INSTALL IGNITION COILS (See page IG-6 )**

**23. INSTALL OIL DIPSTICK AND GUIDE FOR A/T**

**24. INSTALL FRONT EXHAUST PIPE (See page EM-1 15)**

**25. INSTALL PS PUMP (See page EM-81 )**

**26. INSTALL CAMSHAFT POSITION SENSOR (See page IG-10 )**

**27. INSTALL CAMSHAFT TIMING PULLEYS**

(See page EM-22 )

**28. CONNECT TIMING BELT TO CAMSHAFT TIMING PULLEYS (See page EM-22 )**

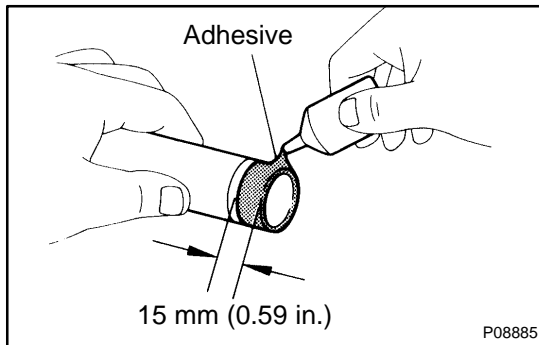
**29. CHECK ENGINE OIL LEVEL**



## REASSEMBLY

### HINT:

- ▶ Thoroughly clean all parts to be assembled.
- ▶ Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- ▶ Replace all gaskets and oil seals with new ones.



### 1. INSTALL SPARK PLUG TUBES

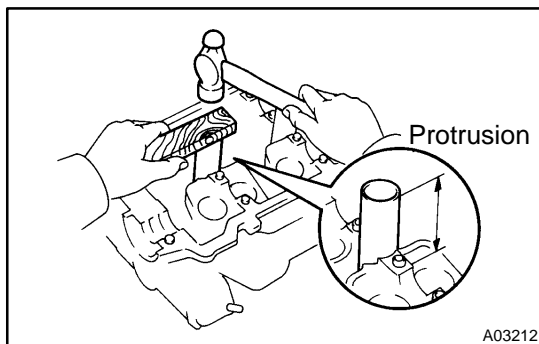
#### HINT:

When using a new cylinder head, the spark plug tubes must be installed.

- (a) Apply adhesive to the end of the spark plug tube.

#### Adhesive:

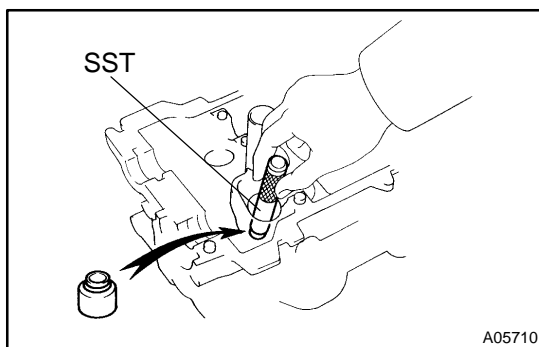
**Part No. 08833-00070, THREE BOND 1324 or equivalent**



- (b) Using a wooden block and hammer, tap in a new spark tube until the protrusion from the camshaft bearing cap installation surface of the cylinder head becomes 48.4 - 49.6 mm (1.906 - 1.953 in.).

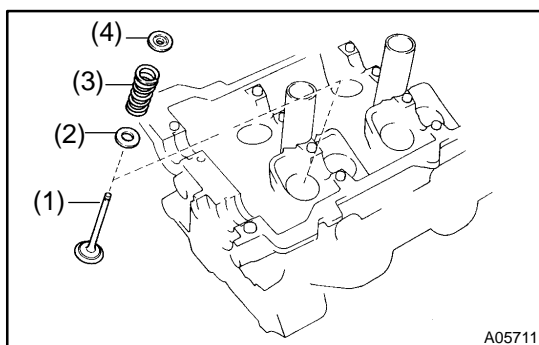
#### NOTICE:

**Avoid tapping a new spark plug tube in too far by measuring the amount of the protrusion as tapping.**

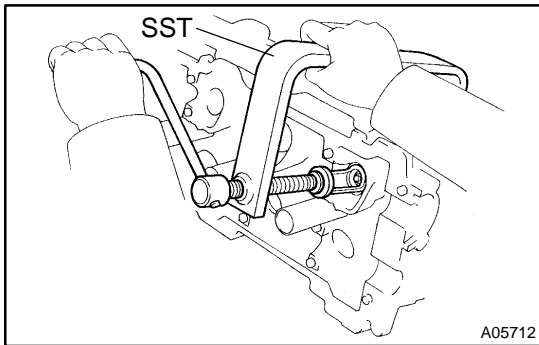


### 2. INSTALL VALVES

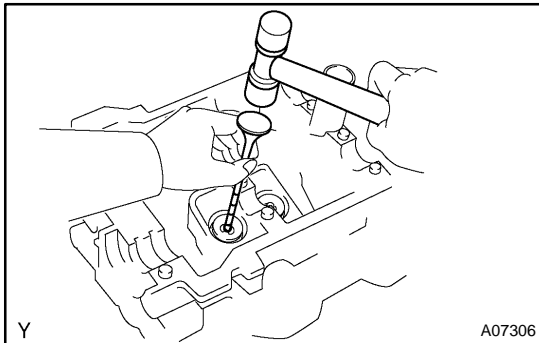
- (a) Using SST, push in a new oil seal.  
SST 09201-41020



- (b) Install the valve (1), the spring seat (2), the valve spring (3), and the spring retainer (4).



- (c) Using SST, compress the valve spring and place the 2 keepers around the valve stem.  
SST 09202-70020



- (d) Using a plastic-faced hammer and the valve stem tip taped up with vinyl tape, lightly tap the valve stem tip to assure proper fit.

**NOTICE:**

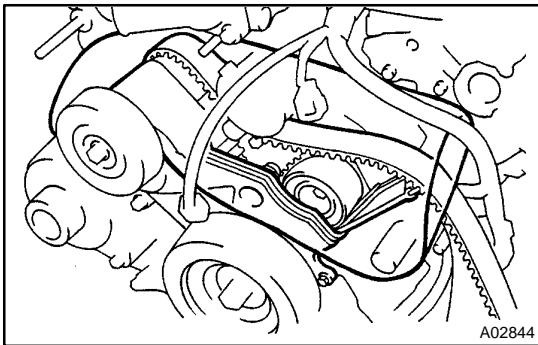
**Be careful not to damage the valve stem tip.**

**3. INSTALL SHIMS AND VALVE LIFTERS**

- (a) Install the shim and the valve lifter.  
(b) Check that the valve lifter rotates smoothly by hand.

## REMOVAL

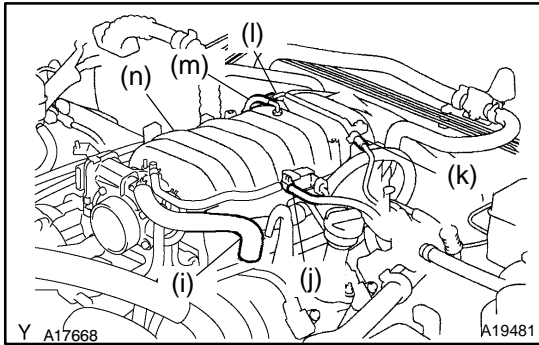
1. DRAIN ENGINE COOLANT
2. REMOVE V-BANK COVER  
Remove the V-bank covers.
3. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS (See page [EM-15](#))
4. REMOVE CAMSHAFT TIMING PULLEYS (See page [EM-15](#))
5. REMOVE CAMSHAFT POSITION SENSOR (See page [IG-9](#))
6. DISCONNECT PS PUMP FROM ENGINE (See page [EM-77](#))
7. REMOVE FRONT EXHAUST PIPE (See page [EM-115](#))
8. REMOVE OIL DIPSTICK AND GUIDE FOR A/T
9. REMOVE IGNITION COILS (See page [IG-6](#))
10. REMOVE TIMING BELT REAR PLATES
  - (1) Remove the 3 bolts, the stud bolt, and the RH No.1 timing belt rear plates.
  - (2) Disconnect the wire clamp from the LH timing belt rear plate.
  - (3) Remove the 3 bolts, the stud bolt, the LH No.1 and the timing belt rear plates.



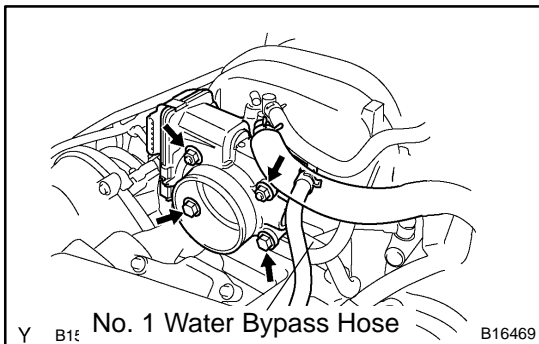
### NOTICE:

- ▶ Be careful not to drop anything inside the timing belt cover.
- ▶ Do not allow the belt to contact correct with oil, water or dust.

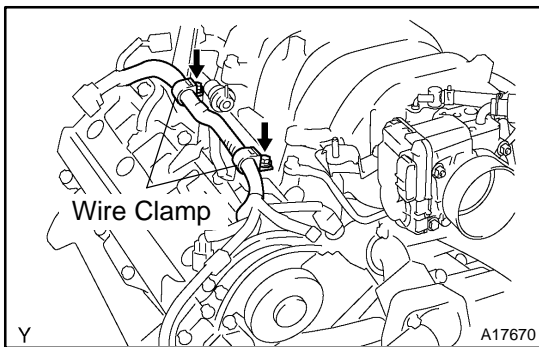
11. DISCONNECT FUEL INLET HOSE (See page [SF-24](#))
12. REMOVE INTAKE MANIFOLD ASSEMBLY
  - (a) Disconnect the throttle control connector.
  - (b) Disconnect the VSV connector for EVAP.
  - (c) Disconnect the 8 injector connectors.
  - (d) Disconnect the ECT sensor connector.
  - (e) Disconnect the water sender gauge connector.
  - (f) Disconnect the 8 ignition coil connectors.
  - (g) Disconnect the 2 oxygen sensor connectors.



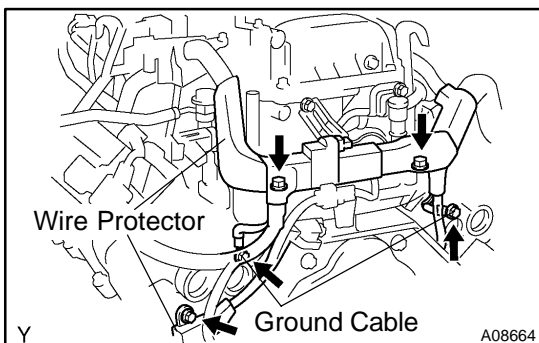
- (h) Disconnect the fuel pressure regulator vacuum hose from the fuel pressure regulator pipe.
- (i) Disconnect the PCV hose from the PCV valve on the LH cylinder head.
- (j) Disconnect the EVAP hose (from charcoal canister) from VSV for EVAP.
- (k) Disconnect the EVAP hose (from charcoal canister) from the EVAP pipe on the intake manifold.
- (l) Disconnect the EVAP hose (from intake air connector) from the EVAP pipe on the intake manifold.
- (m) Disconnect the PS air hose from the intake manifold.



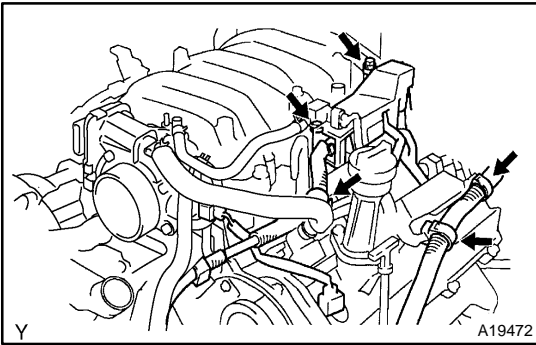
- (n) Disconnect the No.1 water bypass hose from the front water by-pass joint.



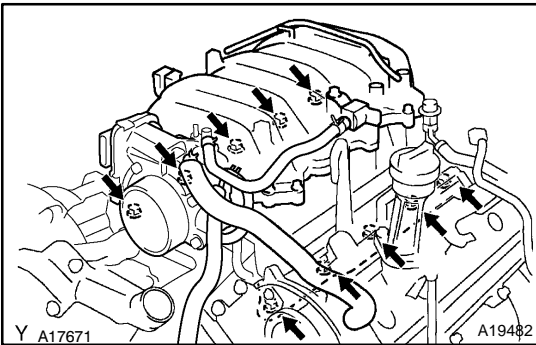
- (o) Disconnect the 2 wire clamps from the wire clamp bracket on the RH delivery pipe.



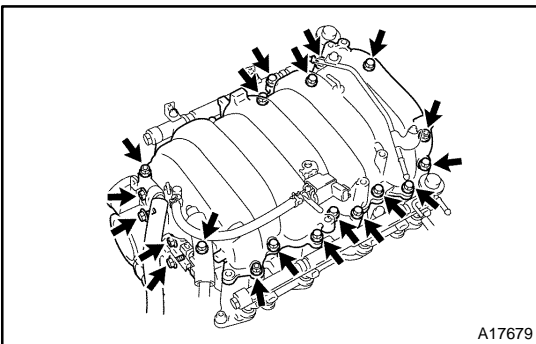
- (p) Remove the 2 bolts and disconnect the engine wire protector from the rear water bypass joint and the RH cylinder head.
- (q) Remove the guide for A/T bracket from the LH cylinder head.
- (r) Remove the 2 ground cables from the RH and LH cylinder head.



- (s) Remove the 2 bolts and disconnect the engine wire protector from the intake manifold.
- (t) Remove the engine wire from the engine hanger.
- (u) Remove the engine wire from the wire bracket.
- (v) Remove the RH rear and the LH front V-bank cover brackets.

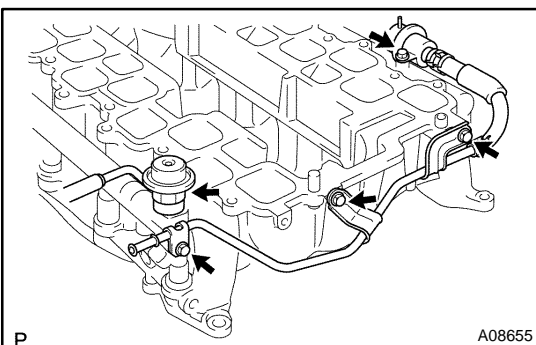
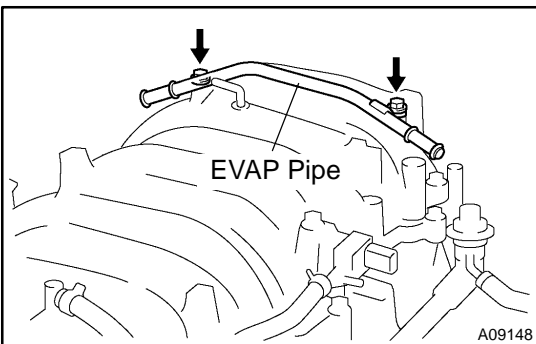


- (w) Remove the 6 bolts, the 4 nuts, the intake manifold assembly and the 2 gaskets.



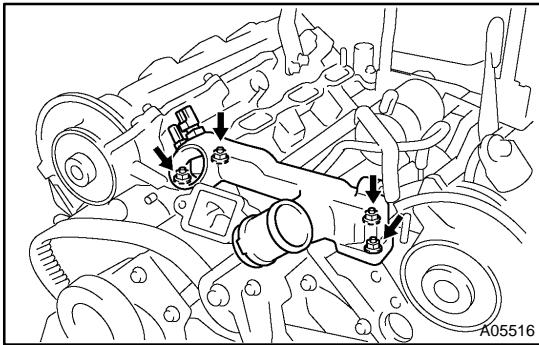
### 13. DISASSEMBLE UPPER AND LOWER INTAKE MANIFOLDS

- (a) Remove the throttle body (See page [SF-36](#) ).
- (b) Remove the 13 bolts, the 3 nuts, the upper intake manifold and the gasket.
- (c) Disconnect the EVAP hose from the upper intake manifold, and remove the accelerator cable clamp and VSV for EVAP.
- (d) Remove the bolt, the union, the 2 gaskets and the brake booster tube from the upper intake manifold.
- (e) Remove the 2 bolts and the EVAP pipe from the intake manifold.



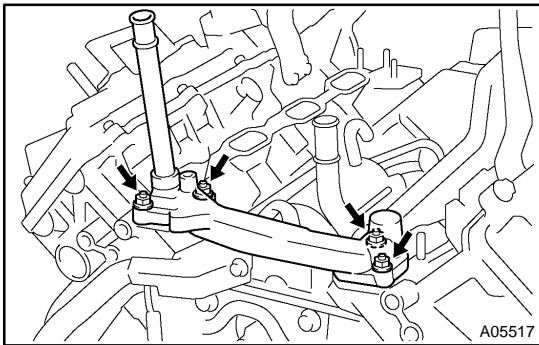
- (f) Disconnect the fuel return hose from the fuel pressure regulator.
- (g) Remove the 3 bolts holding the fuel return hose from the lower intake manifold.
- (h) Remove the fuel pressure regulator, the fuel pressure pulsation damper and the 2 gaskets.
- (i) Remove the bolt and the rear fuel pipe.
- (j) Remove the 2 delivery pipes and the 8 injectors (See page [SF-22](#) ).

**14. REMOVE WATER INLET AND INLET HOUSING ASSEMBLY (See page CO-6 )**



**15. REMOVE FRONT WATER BYPASS JOINT**

Remove the 4 nuts, the water bypass joint and the 2 gaskets.

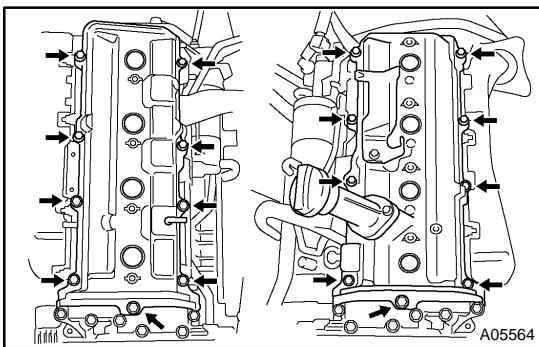


**16. REMOVE REAR WATER BYPASS JOINT**

Remove the 4 nuts, the water bypass joint and the 2 gaskets.

**17. REMOVE ENGINE HANGERS**

**18. REMOVE OIL DIPSTICK AND GUIDE FOR A/T**



**19. REMOVE CYLINDER HEAD COVERS**

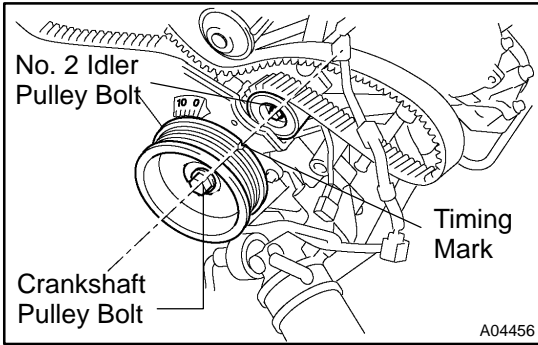
Remove the 18 bolts, the 18 seal washers, the cylinder head cover and gasket. Remove the 2 cylinder head covers.

**20. IF NECESSARY, REMOVE SEMI-CIRCULAR PLUGS AND CAMSHAFT HOUSING PLUGS**

**21. REMOVE CAMSHAFTS**

**NOTICE:**

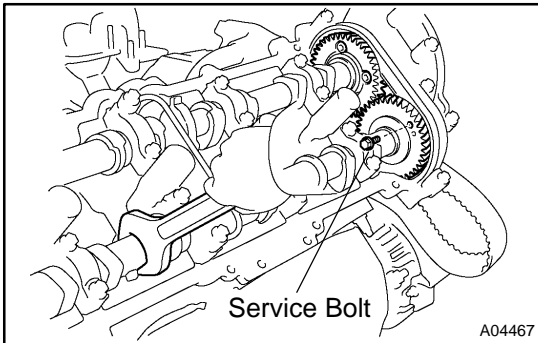
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. Otherwise, excessive pressure is put on the cylinder head journal thrust, causing a burr on the journal and damage on the camshaft. To avoid this, follow the steps below.



- (a) Check the crankshaft pulley position.  
Check that the timing mark of the crankshaft pulley is aligned with the centers of the crankshaft pulley bolt and the idler pulley bolt.

**NOTICE:**

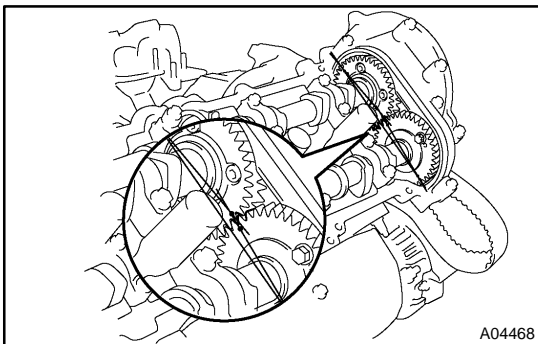
**Having the crankshaft pulley at the wrong angle can cause the piston head and the valve head to come into contact with each other when removing the camshaft, causing damage on them. So always set the crankshaft pulley at the correct angle.**



- (b) Remove the RH camshafts.
  - (1) Move a service bolt of the sub-gear upward by turning the hexagon shaped port of the exhaust camshaft with a wrench.
  - (2) Secure the sub-gear to the main gear with a service bolt.

**Recommended service bolt:**

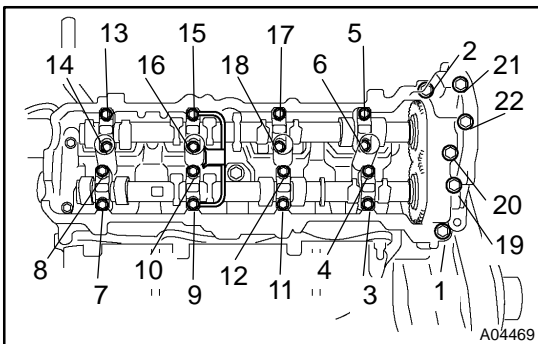
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 - 20 mm

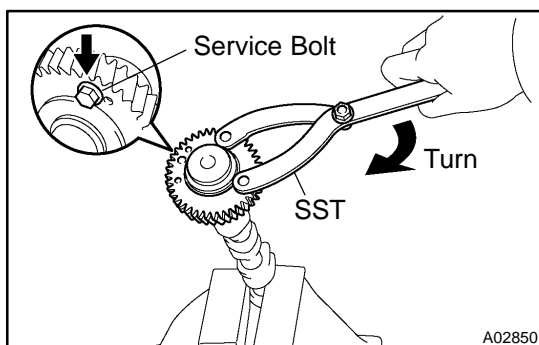
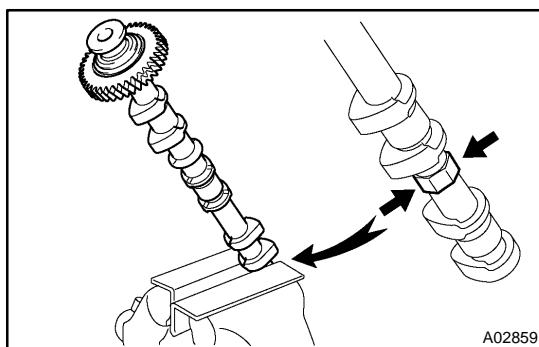
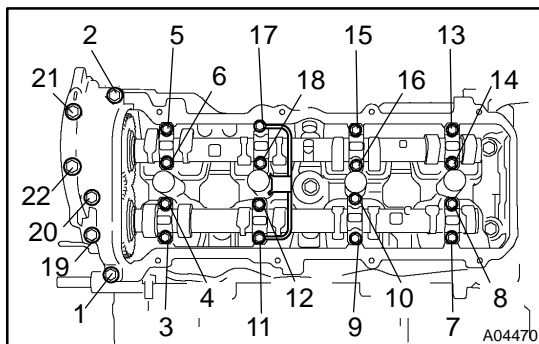
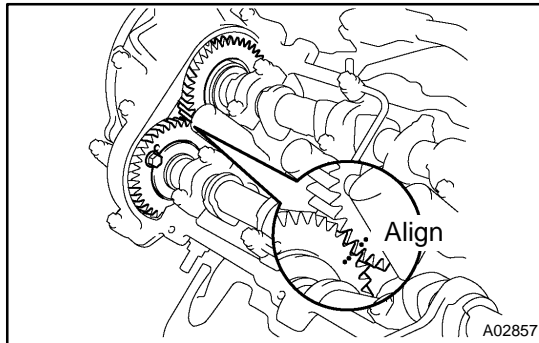
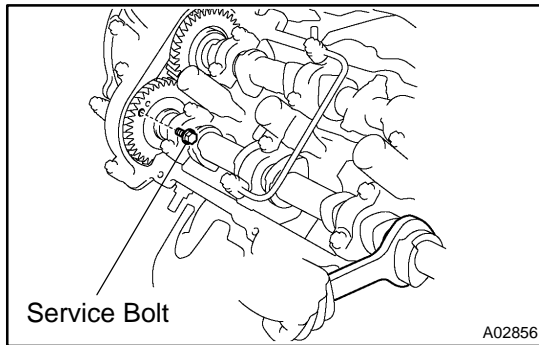


**HINT:**

When removing the camshafts, make sure that the torsional spring force of the sub-gear is eliminated by the above operation.

- (3) Set the timing mark (1 dot mark) of the camshaft main gear at approx. 10° angle by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.
- (4) Uniformly loosen and remove the 22 bearing cap bolts a little at a time for several times in the sequence shown.
- (5) Remove the oil feed pipe, 9 bearing caps, cam shaft timing oil control valve and camshafts.





- (c) Remove the LH camshafts.
- (1) Move a service bolt of the sub-gear upward by turning the hexagon shaped port of the exhaust camshaft with a wrench.
  - (2) Secure the sub-gear to the main gear with a service bolt.

**Recommended service bolt:**

Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 - 20 mm

**HINT:**

When removing the camshaft, make sure that the torsional spring force of the sub-gear is eliminated by the above operation.

- (3) Align the timing mark (2 dot marks) of the camshaft drive gear by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.
- (4) Evenly loosen and remove the 22 bearing cap bolts a little at a time for several times as in the sequence shown.
- (5) Remove the oil feed pipe, 9 bearing caps, and camshafts.

**HINT:**

Arrange the bearing caps in correct order for installation.

**22. DISASSEMBLE EXHAUST CAMSHAFTS**

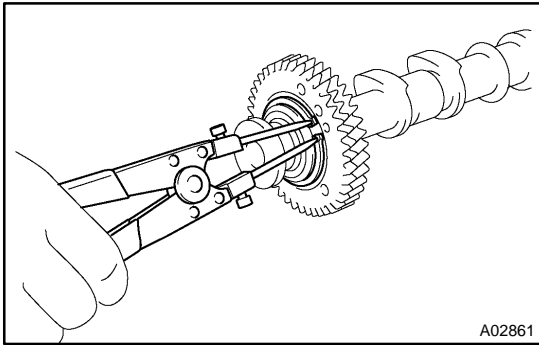
- (a) Mount the hexagon wrench head portion of the camshaft in a vise.

**NOTICE:**

**Be careful not to damage the camshaft.**

- (b) Using SST, turn the sub-gear clockwise, and remove the service bolt.  
SST 09960-10010 (09962-01000, 09963-00500)





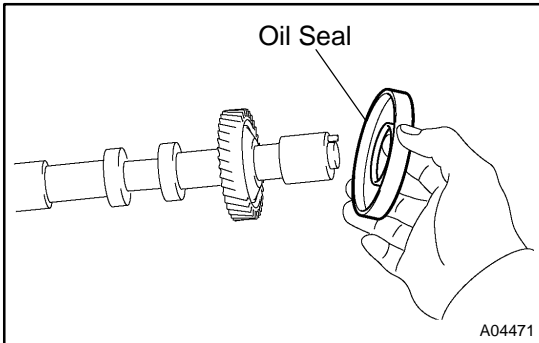
- (c) Using snap ring pliers, remove the snap ring.
- (d) Remove the wave washer.
- (e) Remove the camshaft sub-gear.
- (f) Remove the camshaft gear spring.

**HINT:**

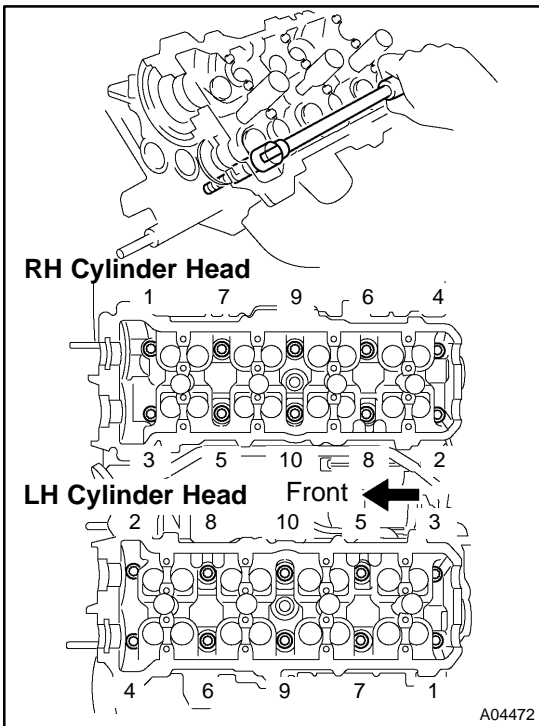
Arrange the camshaft sub-gears and gear spring (RH and LH sides).

**NOTICE:**

**Be careful not to damage the camshaft timing tube.**



- 23. REMOVE OIL SEAL FROM INTAKE CAMSHAFT
- 24. REMOVE SPARK PLUGS

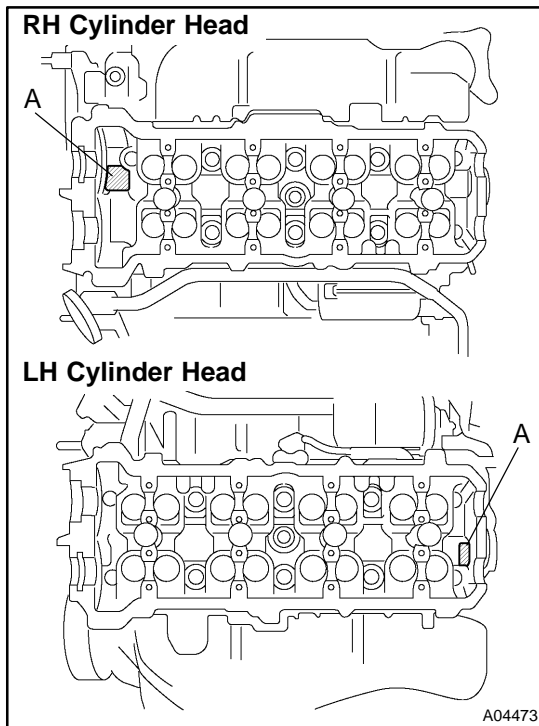


- 25. REMOVE CYLINDER HEAD AND EXHAUST MANIFOLD ASSEMBLIES

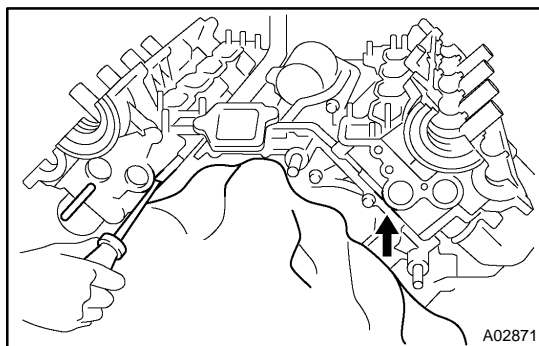
- (a) Uniformly loosen the 10 cylinder head bolts on one side of each cylinder head in a little at a time for several times as in the sequence shown, then do the other side as shown. Remove the 20 cylinder head bolts and the plate washers.

**NOTICE:**

- ▶ Removing the bolts in incorrect order could cause a warp or cracks in the cylinder head.



- ▶ Do not drop the plate washer of the cylinder head bolt into A area in the illustration. It will fall down to the oil pan through the cylinder head and the cylinder block.



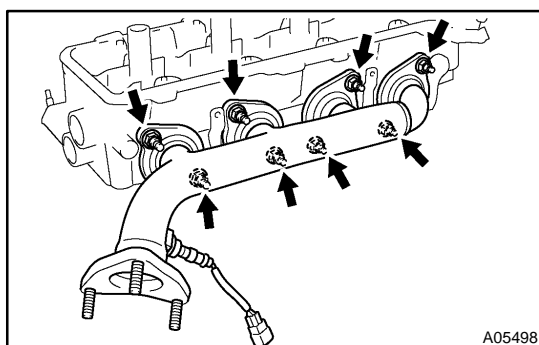
- (b) Lift the cylinder head from the dowels on the cylinder block, and place the 2 cylinder heads on wooden blocks.

**HINT:**

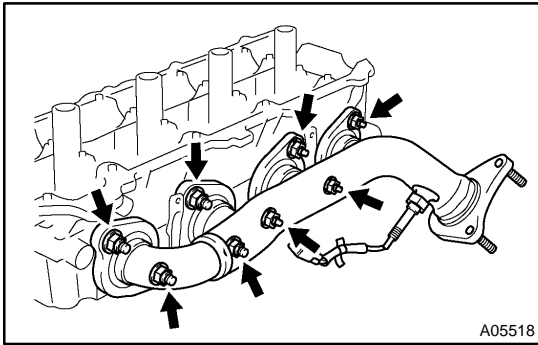
After lifting off the cylinder head, pry off the cylinder head and the cylinder block with a screwdriver.

**NOTICE:**

- ▶ Be careful not to damage the contact surfaces of the cylinder head and the cylinder block.
- ▶ The cylinder head should not be tilted so to secure the valve lifter. If the cylinder head is tilted, remove the valve lifter and check that the adjusting shim is set correctly.

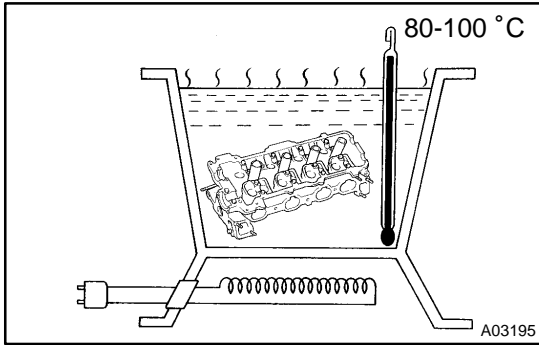
**26. REMOVE RH EXHAUST MANIFOLD FROM CYLINDER HEAD**

- (a) Remove the 4 bolts and the heat insulator.
- (b) Remove the 8 nuts, the exhaust manifold and the gasket.



**27. REMOVE LH EXHAUST MANIFOLD FROM CYLINDER HEAD**

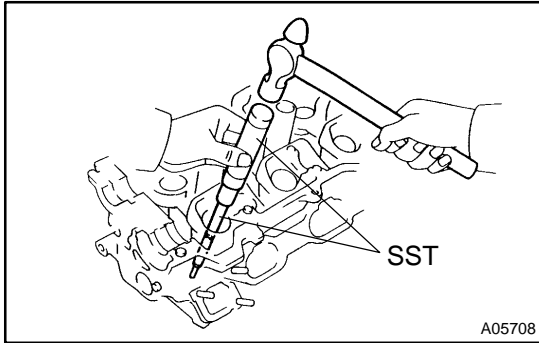
- (a) Remove the 4 bolts and the heat insulator.
- (b) Remove the 8 nuts, the exhaust manifold and the gasket.



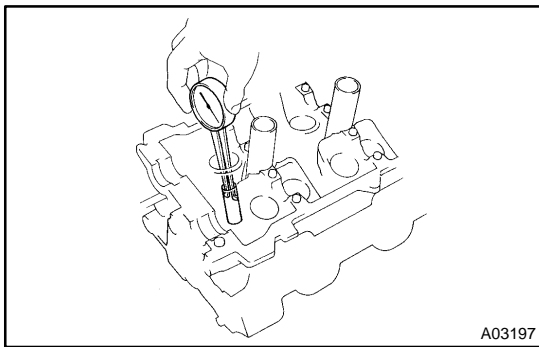
## REPLACEMENT

### 1. REPLACE VALVE GUIDE BUSHINGS

(a) Gradually heat the cylinder head to 80 - 100°C (176 - 212°F).



(b) Using SST and a hammer, tap out the guide bushing.  
 SST 09201-10000 (09201-01060),  
 09950-70010 (09951-07100)



(c) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.

Both intake and exhaust

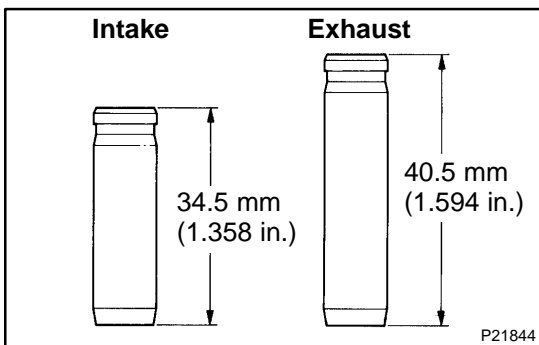
Bushing bore diameter mm (in.)	Bushing size
10.285 - 10.306 (0.4049 - 0.4057)	Use STD
10.335 - 10.356 (0.4069 - 0.4077)	Use O/S STD

(d) Select a new guide bushing (STD or O/S 0.05).

If the bushing bore diameter of the cylinder head is greater than 10.306 mm (0.4057 in.), machine the bushing bore to the following dimension:

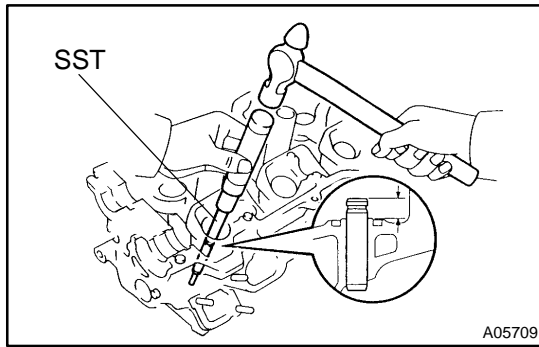
**10.335 - 10.356 mm (0.4069 - 0.4077 in.)**

If the bushing bore diameter of the cylinder head is greater than 10.356 mm (0.4077 in.), replace the cylinder head.



#### HINT:

The intake bushing and the exhaust bushing differ in their sizes.



- (e) Gradually heat the cylinder head to 80 - 100°C (176 - 212°F).
- (f) Using SST and a hammer, tap in a new guide bushing to the specified protrusion height.

**Protrusion height:****Intake**

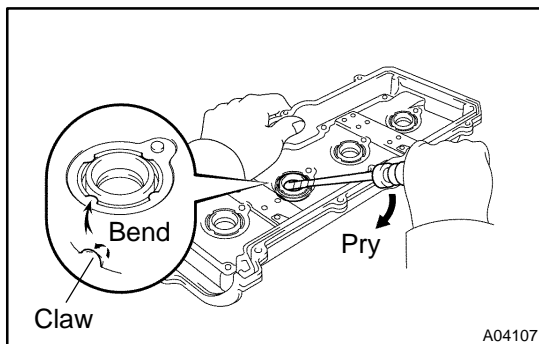
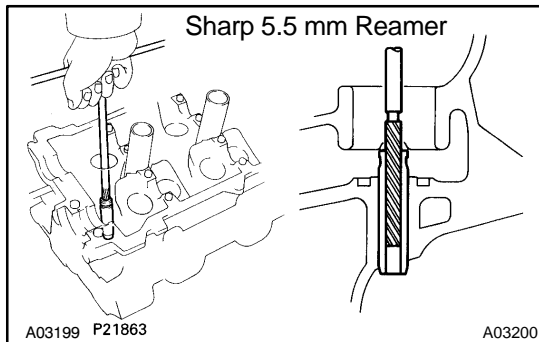
9.2 - 9.8 mm (0.362 - 0.386 in.)

**Exhaust**

8.2 - 8.8 mm (0.323 - 0.346 in.)

SST 09201-10000 (09201-01060),  
09950-70010 (09951-07100)

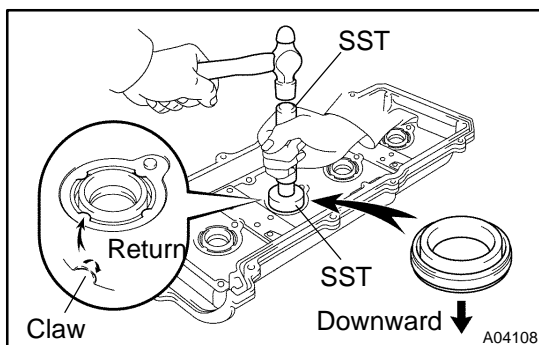
- (g) Using a sharp 5.5 mm reamer, ream the guide bushing to obtain the standard specified clearance (See page [EM-45](#)) between the guide bushing and the valve stem.

**2. REPLACE SPARK PLUG TUBE GASKETS**

- (a) Bend the 4 ventilation case claws installed on the cylinder head cover to an angle of 90° or more.
- (b) Using a screwdriver, pry out the gasket.

**NOTICE:**

**Be careful not to damage the cylinder head cover. Tape up the screwdriver tip.**



- (c) Using SST and a hammer, tap in a new gasket until its surface is flush with the upper edge of the cylinder head cover.

SST 09950-60010 (09551-00240, 09951-00440,  
09952-06010) 09950-70010 (09951-07100)

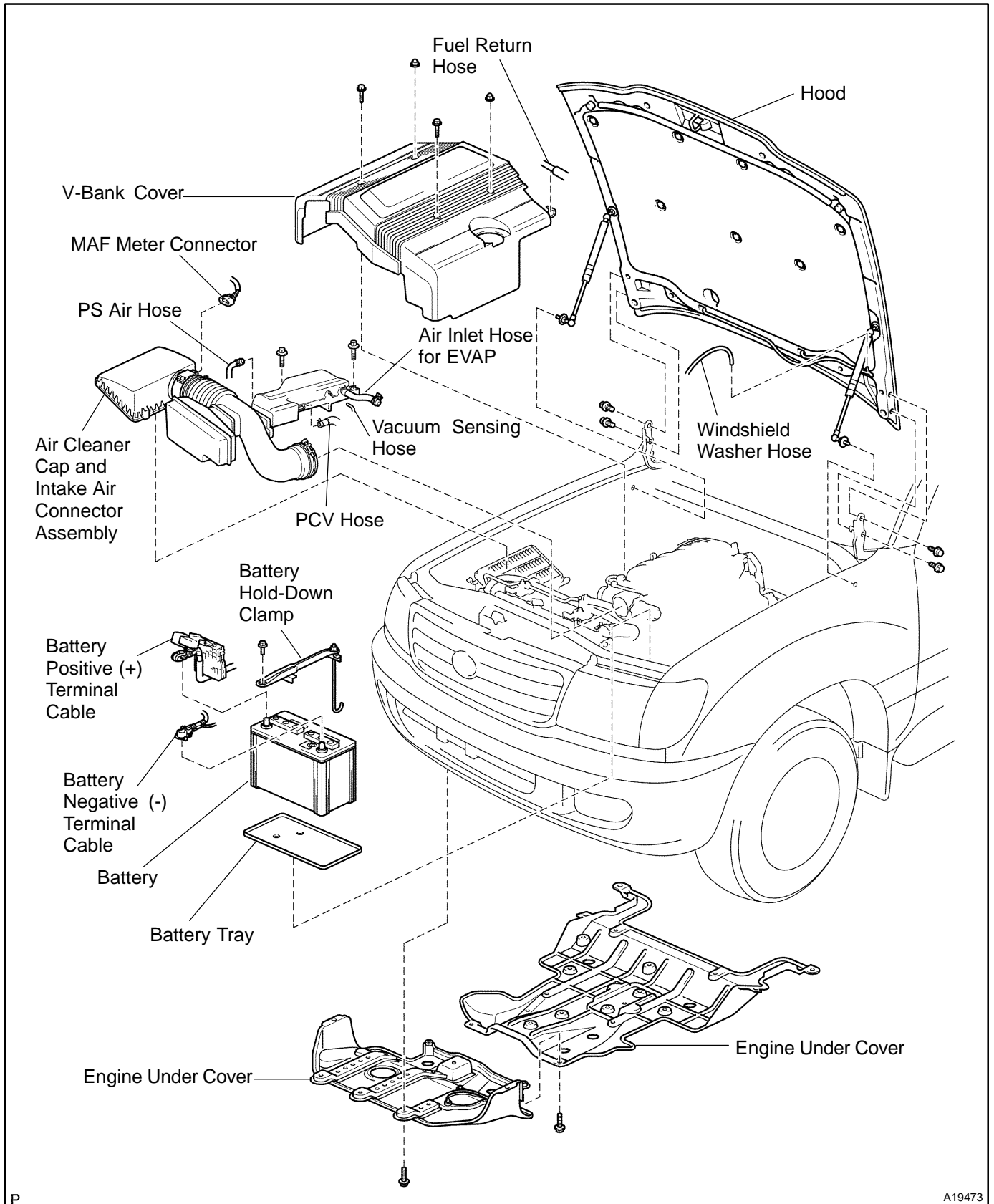
**NOTICE:**

**Be careful of the installation direction.**

- (d) Apply a light coat of MP grease to the gasket lip.
- (e) Put the 4 ventilation case claws back to its original position.

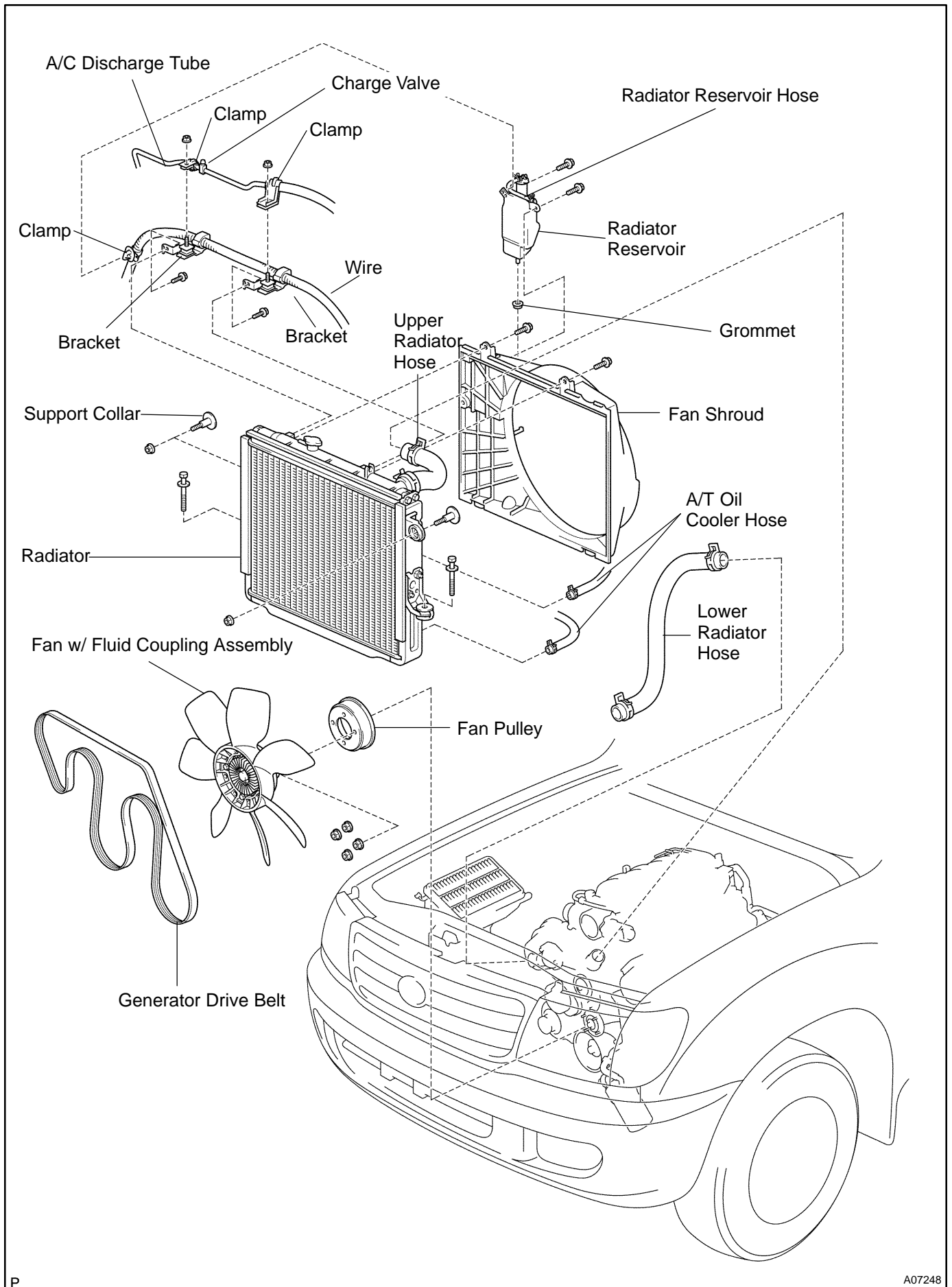
# ENGINE UNIT COMPONENTS

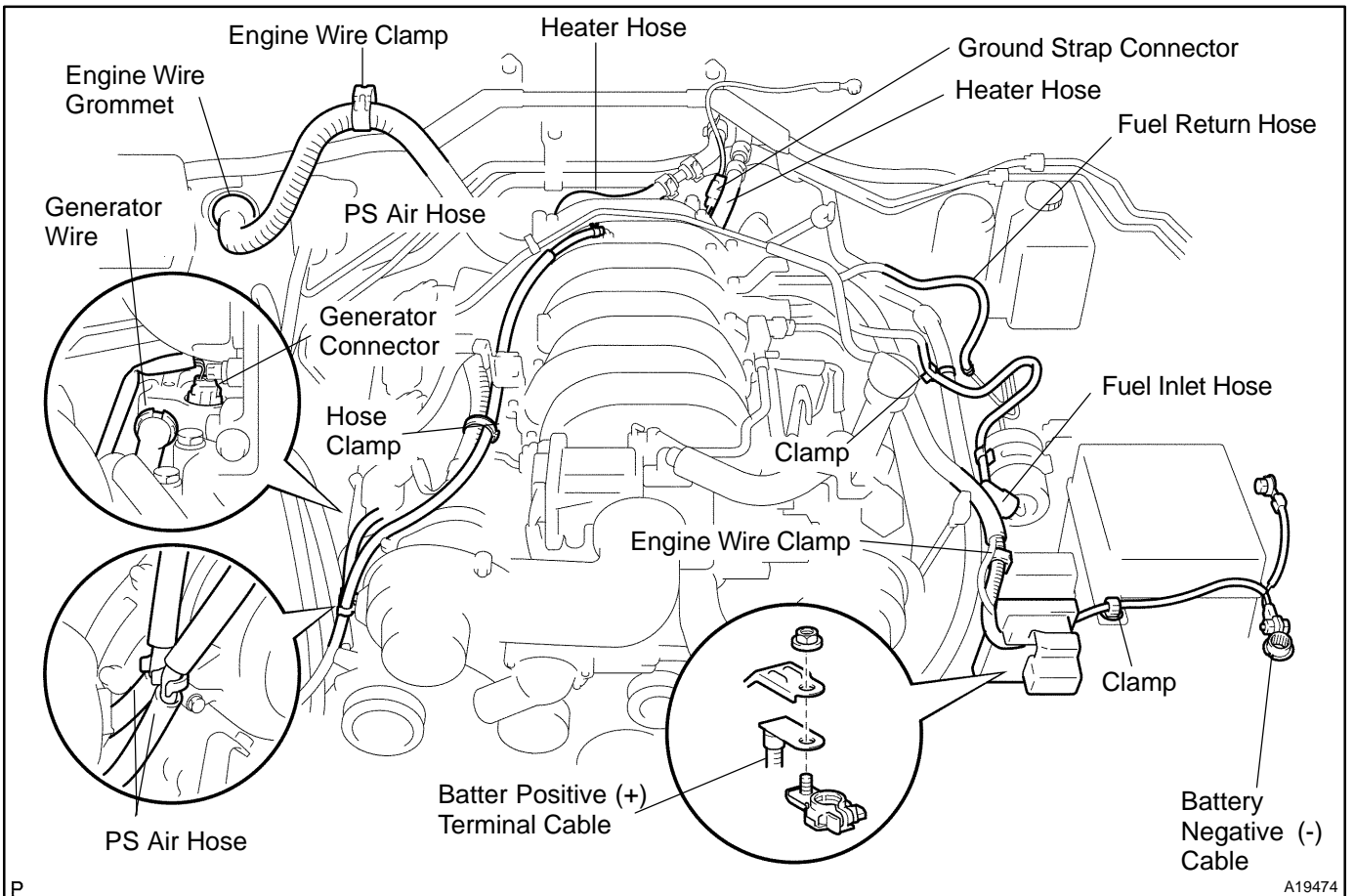
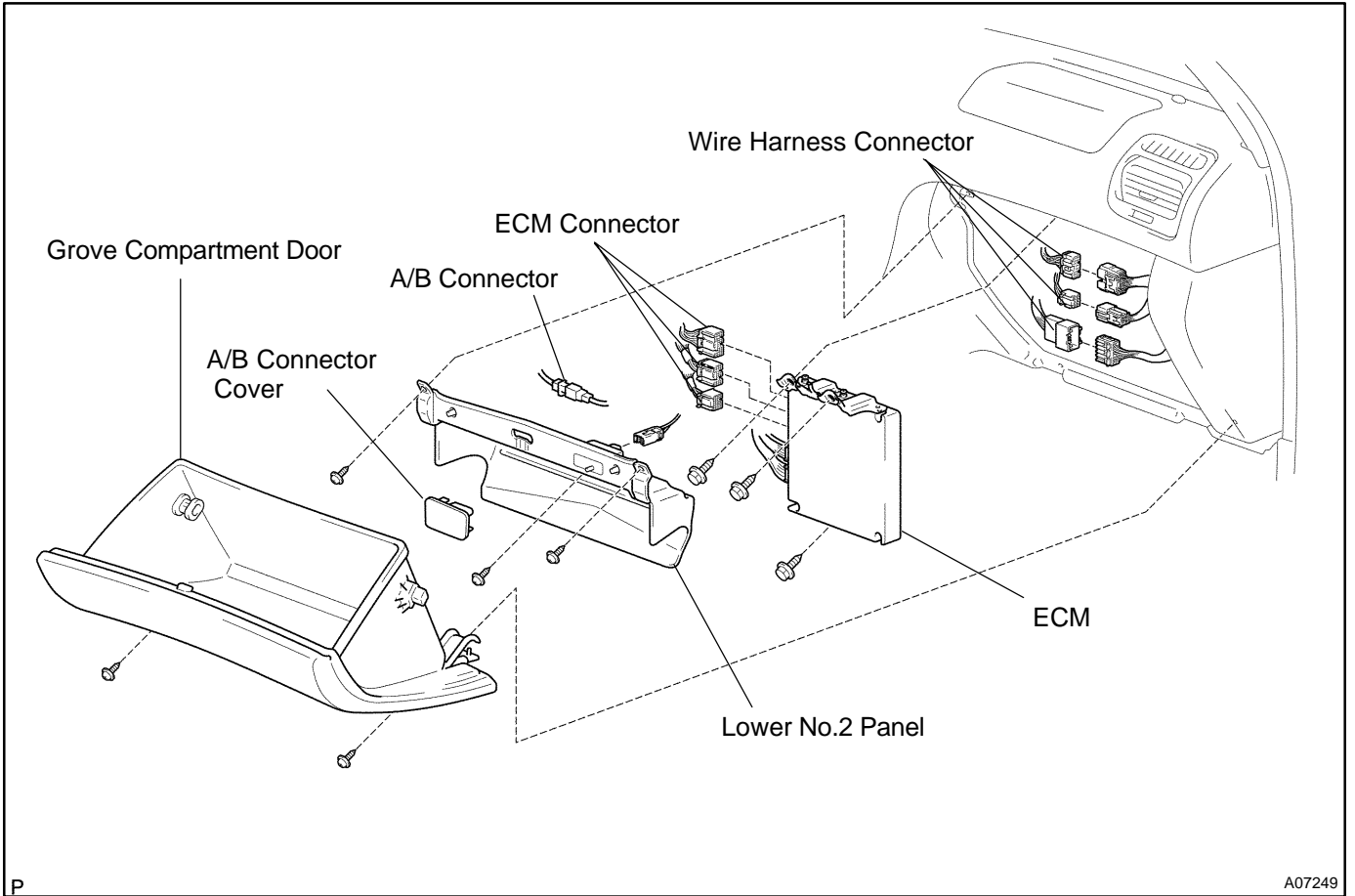
EM0LB-09



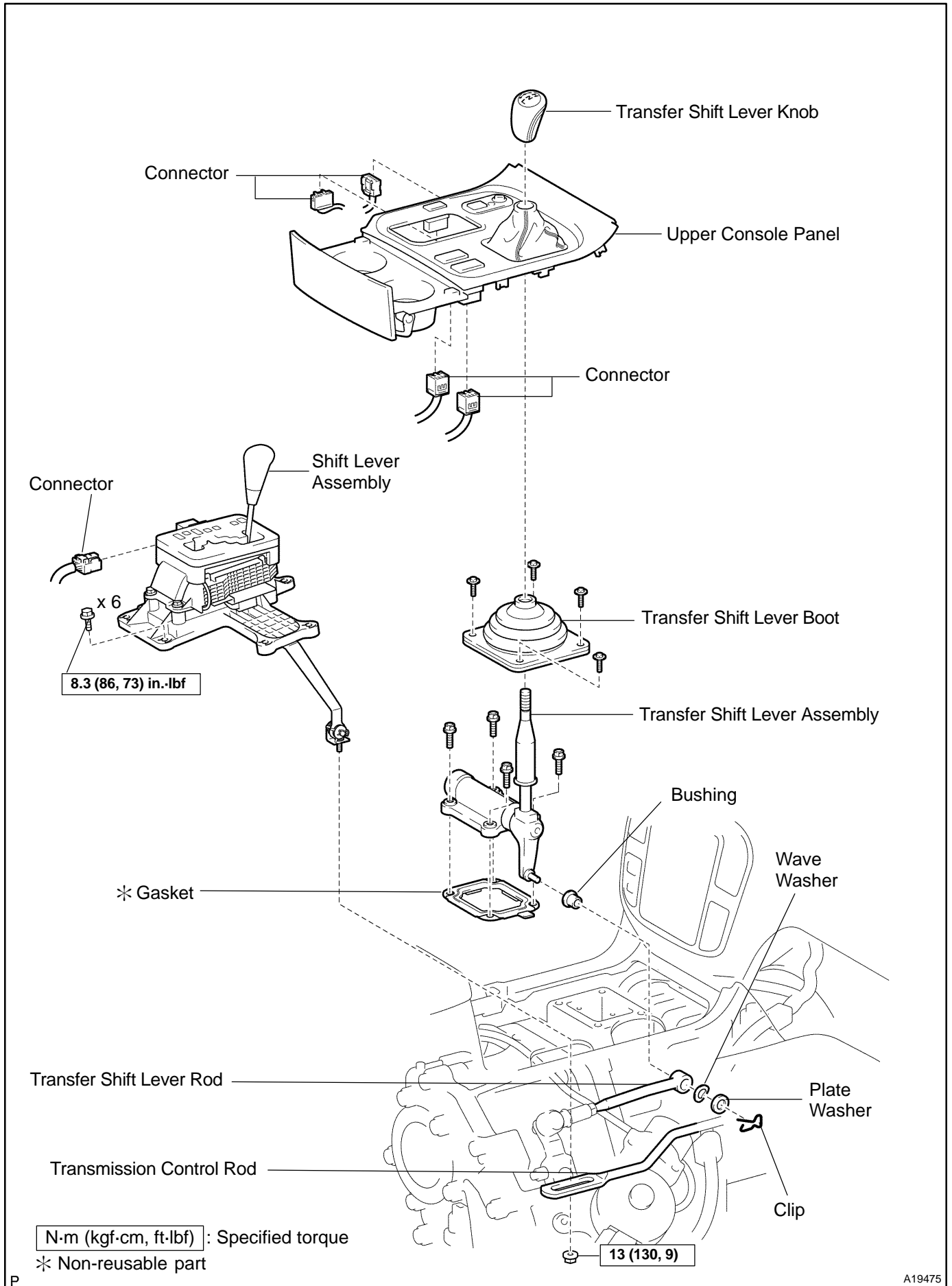
P

A19473





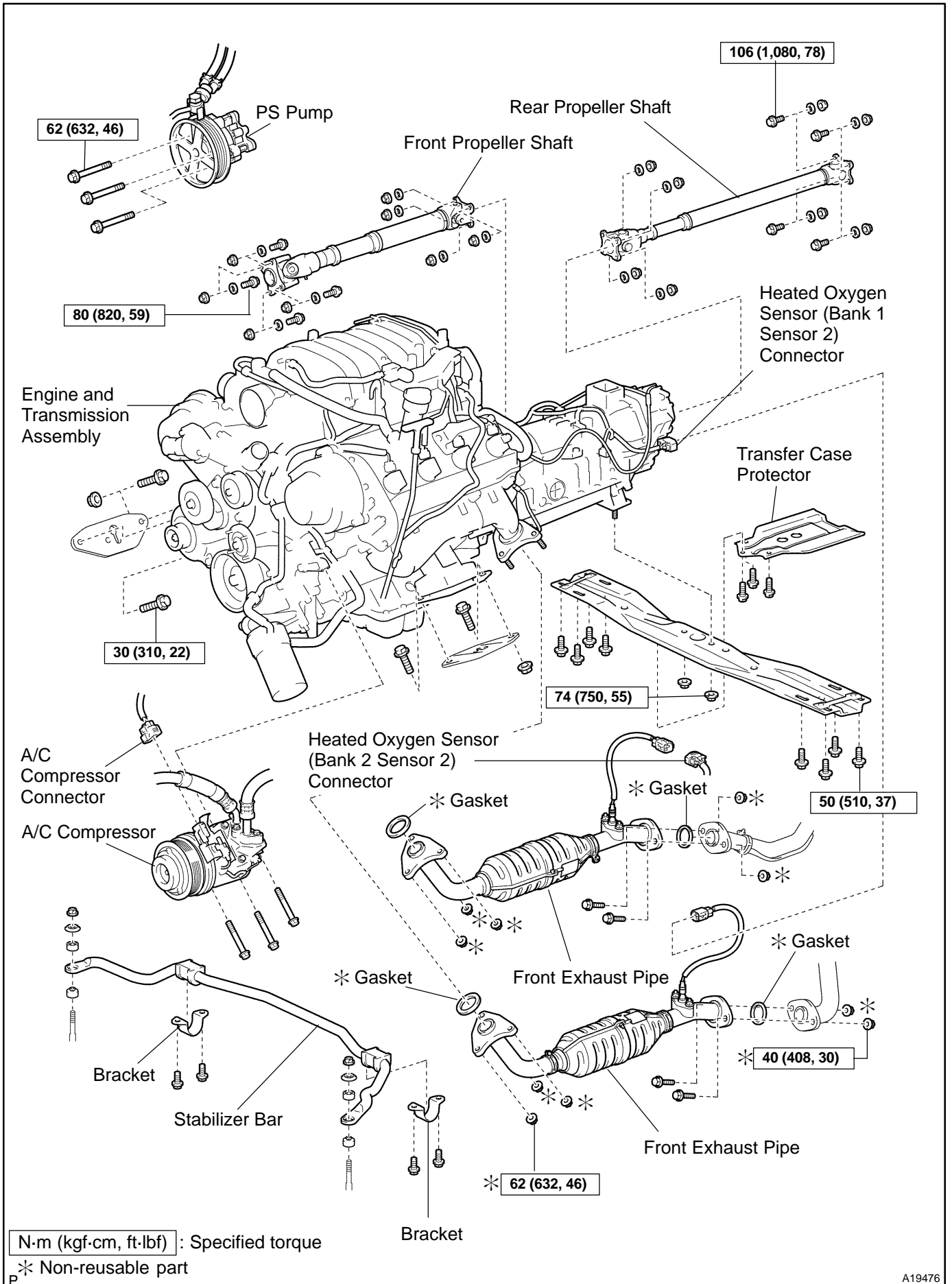




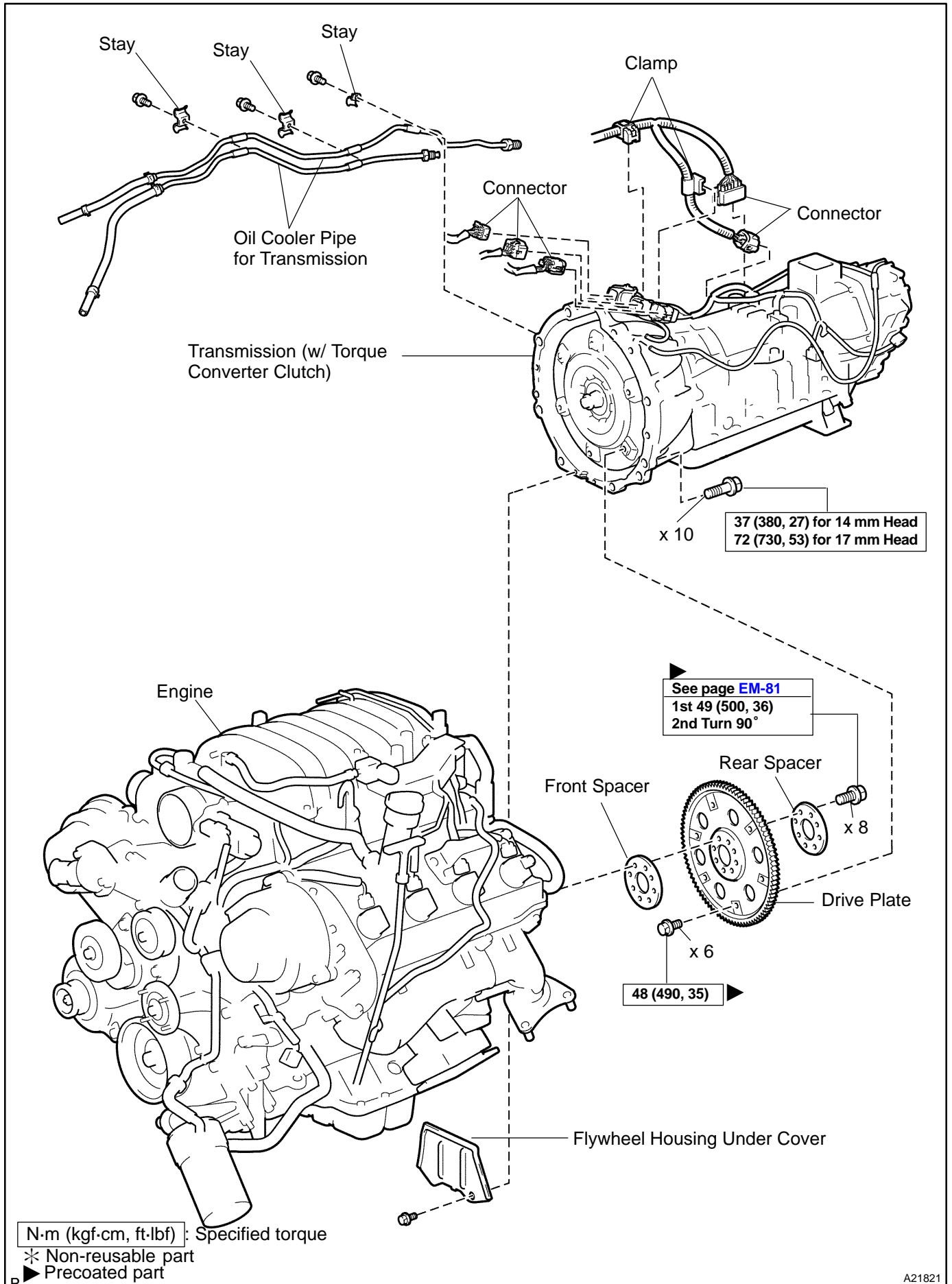
**N·m (kgf·cm, ft·lbf)** : Specified torque  
\* Non-reusable part

**13 (130, 9)**

A19475



A19476



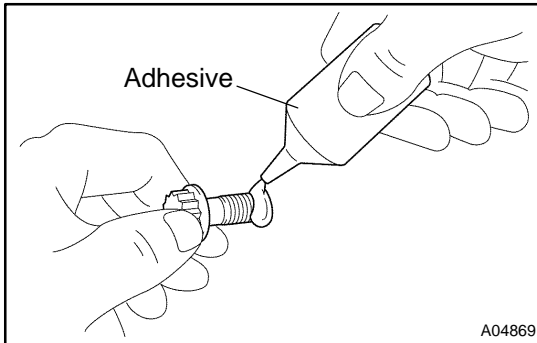
A21821

## INSTALLATION

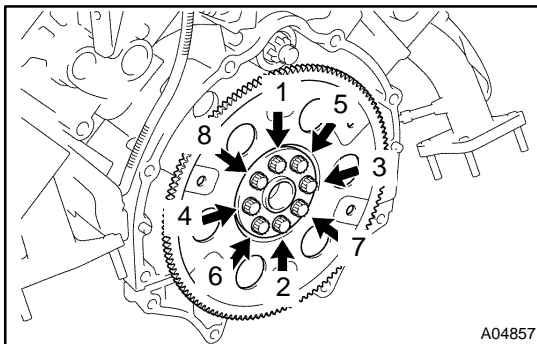
### 1. INSTALL DRIVE PLATE

#### HINT:

- ▶ The mounting bolts are tightened in 2 steps (steps (c) and (e)).
- ▶ If any one of the mounting bolts is broken or deformed, replace it.



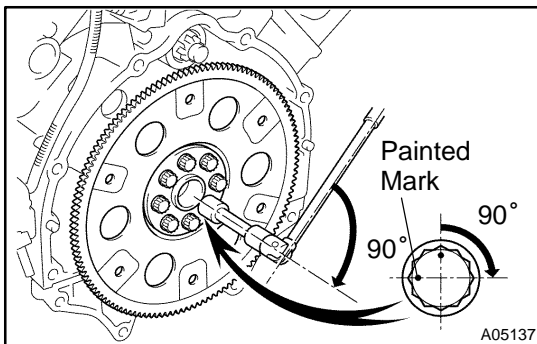
- (a) Apply adhesive to 2 or 3 threads of the mounting bolt end.  
**Adhesive:**  
**Part No. 08833-00070, THREE BOND 1324 or equivalent**



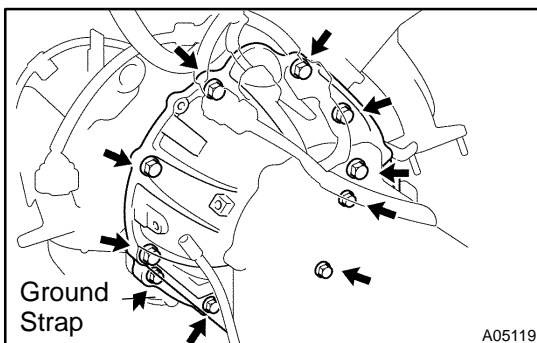
- (b) Install the front spacer, the drive plate and the rear spacer on the crankshaft.  
 (c) Hold the crankshaft pulley bolt with a wrench, and install and evenly tighten the 8 mounting bolts, a little at a time for several times as in the sequence shown.

**Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)**

If any one of the mounting bolts does not meet the torque specification, replace the mounting bolt.



- (d) Mark the mounting bolt with paint.  
 (e) Retighten the mounting bolts by 90° in the numerical order shown.  
 (f) Check that the painted mark is now at a 90° angle to (e).



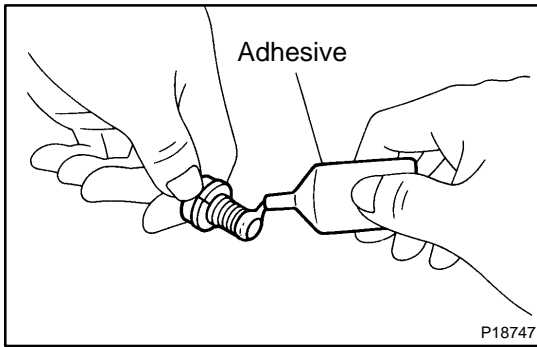
### 2. INSTALL TRANSMISSION TO ENGINE

- (a) Check the torque converter clutch installation.  
 (See page [AT-33](#))  
 (b) Attach the transmission to the engine.  
 (c) Install the ground strap and 10 bolts.

**Torque:**

**37 N·m (380 kgf·cm, 27 ft·lbf) for 14 mm head**

**72 N·m (730 kgf·cm, 53 ft·lbf) for 17 mm head**

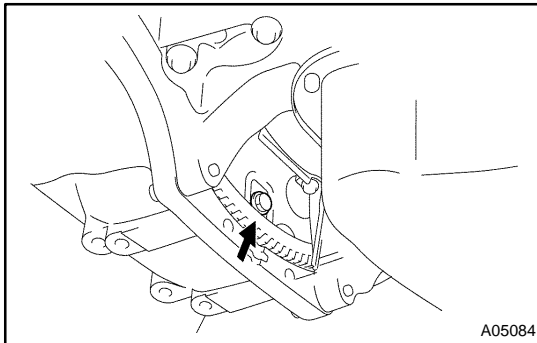


### 3. INSTALL TORQUE CONVERTER CLUTCH BOLTS

- (a) Apply adhesive to 2 or 3 threads from the bolt end.

**Adhesive:**

**Part No. 08833-00070, THREE BOND 1324 or equivalent**

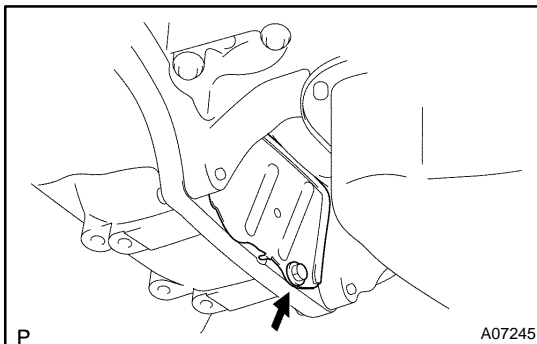


- (b) Hold the crankshaft pulley bolt with a wrench, and install the 6 bolts evenly.

**Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)**

**HINT:**

First install the black colored bolt, install the other bolts.



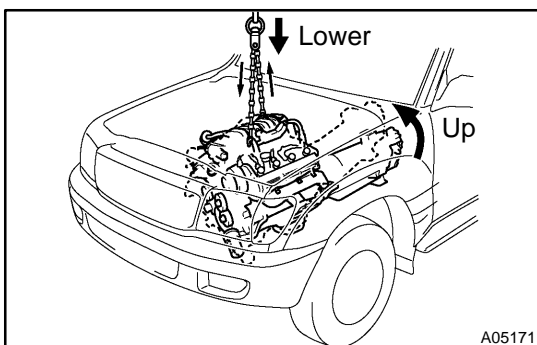
- (c) Install the flywheel housing under cover with the bolt.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

### 4. INSTALL OIL COOLER PIPE FOR TRANSMISSION

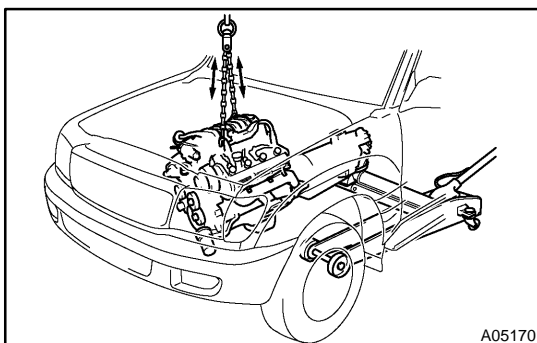
### 5. CONNECT ENGINE WIRE TO TRANSMISSION

- (a) Connect the 5 connectors.  
 (b) Connect the 2 wire clamps.

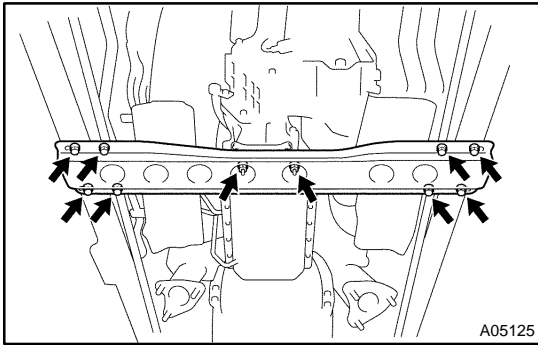


### 6. INSTALL ENGINE AND TRANSMISSION ASSEMBLY IN VEHICLE

- (a) Attach the engine chain hoist to the engine hangers.  
 (b) Slowly lower the engine and the transmission assembly into the engine compartment.  
 (c) Attach the engine mounting brackets to the frame brackets.



- (d) Keep the engine level with a jack.



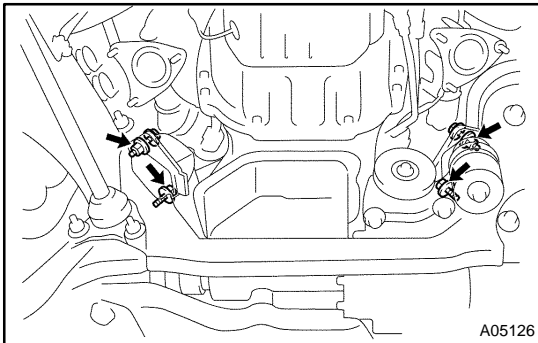
- (e) Install the frame crossmember with the 8 bolts and the 4 nuts.

**Torque:**

**50 N·m (510 kgf·cm, 37 ft·lbf) for bolts**

**74 N·m (750 kgf·cm, 55 ft·lbf) for nuts**

- (f) Install the transfer case protector with the 3 bolts.



- (g) Install the 2 nuts and the 4 bolts holding the engine mounting brackets to the frame brackets.

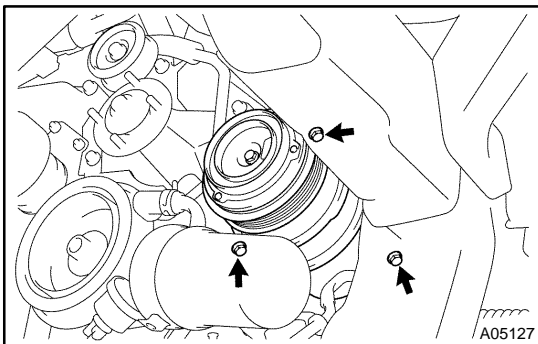
**Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)**

- (h) Remove the engine chain hoist.

**7. INSTALL PS PUMP**

Install the PS pump with the 3 bolts.

**Torque: 62 N·m (632 kgf·cm, 46 ft·lbf)**



**8. INSTALL A/C COMPRESSOR**

- (a) Install the A/C compressor with the 3 bolts.

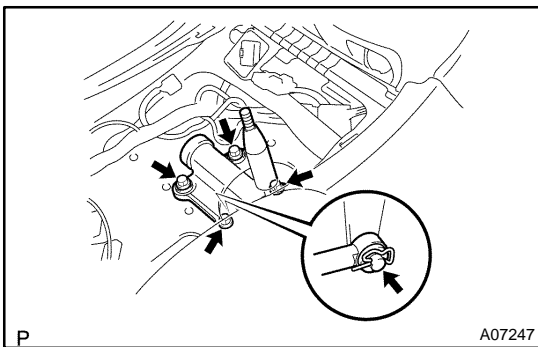
**Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)**

- (b) Connect the A/C compressor connector.

**9. INSTALL STABILIZER BAR (See page SA-82 )**

**10. INSTALL PROPELLER SHAFT (See page PR-7 )**

**11. INSTALL FRONT EXHAUST PIPES**



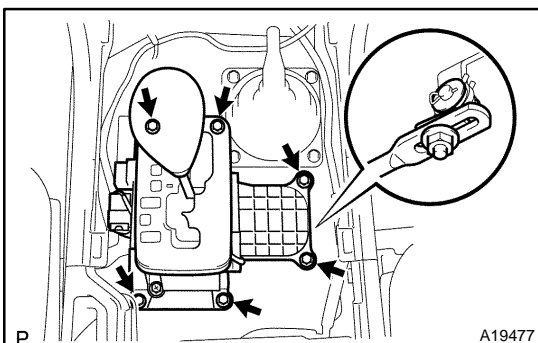
**12. INSTALL SHIFT LEVER ASSEMBLY AND TRANSFER SHIFT LEVER ASSEMBLY**

- (a) Install the transfer shift lever.

- (1) Install a new gasket and the shift lever with the 4 bolts.

- (2) Connect the transfer shift lever rod to the shift lever with the bushing, the wave washer, the plate washer and the clip.

- (b) Install the transfer shift lever boot with the 4 bolts.



- (c) Install the shift lever assembly.

- (1) Connect the transmission control rod to the shift lever assembly with the nut.

**Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)**

- (2) Install the shift lever assembly with the 6 bolts.

**Torque: 8.3 N·m (86 kgf·cm, 73 in.-lbf)**

- (3) Connect the connector.

- (d) Install the console upper cover.

- (e) Install the transfer shift lever knob.

**13. CONNECT HOSES, WIRES, CONNECTORS, CLAMPS, GROMMET AND CABLES**

- (a) Connect the 2 PS air hoses to the hose clamp on the No.3 RH timing belt cover.
- (b) Connect the generator wire.
- (c) Connect the generator connector.
- (d) Connect the hose clamp for the PS air hose.
- (e) Connect the PS air hose to upper intake manifold.
- (f) Connect the 2 heater hoses.
- (g) Connect the engine wire clamp to the bracket on the cowl panel.
- (h) Connect the engine wire grommet to the cowl panel.
- (i) Connect the ground strap connector.
- (j) Connect the fuel main hose and the clamps.
- (k) Connect the fuel return hose and the clamp.
- (l) Connect the air inlet hose to the charcoal canister.
- (m) Connect the EVAP hose to the charcoal canister.
- (n) Connect the engine wire to the clamp on the right fender apron.
- (o) Connect the clamp on battery negative (-) cable to the relay box.
- (p) Connect the battery negative (-) cable to the right fender apron.
- (q) Connect the battery positive (+) terminal cable.

**14. CONNECT ENGINE WIRE TO CABIN**

- (a) Connect the 3 wire harness connectors.
- (b) Install the ECM with the 3 screws.
- (c) Connect the 3 connectors to the ECM.
- (d) Install the glove compartment door.
- (e) Install the lower No.2 panel.

**15. INSTALL FAN PULLEY, FAN, FLUID COUPLING AND GENERATOR DRIVE BELT**

- (a) Temporarily install the fan pulley, the fan and the fluid coupling assembly with the 4 nuts.
- (b) Install the generator drive belt. (See page [CH-16](#))
- (c) Tighten the 4 nuts holding the fluid coupling to the fan bracket.

**16. INSTALL RADIATOR AND FAN SHROUD**

- (a) Place the fan shroud in the installation position.
- (b) Install the radiator with the 2 support collars, the 2 nuts and the 2 bolts.
- (c) Connect the 2 A/T oil cooler hoses to the radiator.
- (d) Install the lower radiator hose.
- (e) Attach the lower side of the fan shroud to the brackets of the radiator, and install the fan shroud with the 2 bolts.
- (f) Install the 2 brackets on the wire to the radiator with the 2 bolts.
- (g) Install the 2 clamps on the A/C discharge tube to the brackets on the wire with the 2 nuts.

- (h) Connect the upper radiator hose to the front water bypass joint.

**17. INSTALL RADIATOR RESERVOIR**

- (a) Install the grommet to the reservoir.
- (b) Attach the lower side of the reservoir to the fan shroud.
- (c) Install the reservoir with the 2 bolts.
- (d) Connect the reservoir hose to the radiator.
- (e) Install the clamp on the wire to the reservoir.

**18. INSTALL AIR CLEANER CAP AND INTAKE AIR CONNECTOR PIPE ASSEMBLY**

**19. INSTALL BATTERY**

**20. FILL WITH ENGINE COOLANT (See page [CO-2](#) )**

**21. FILL WITH ENGINE OIL (See page [LU-2](#) )**

**22. START ENGINE AND CHECK FOR LEAKS**

**23. INSTALL V-BANK COVER**

**24. INSTALL ENGINE UNDER COVERS**

**25. INSTALL HOOD**

**26. PERFORM ROAD TEST**

Check for abnormal noise, shock, slippage, and make sure the shift points is correct and operation is smooth.

**27. RECHECK ENGINE COOLANT AND OIL LEVELS**



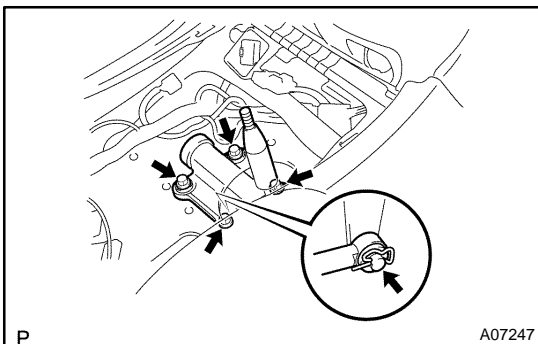
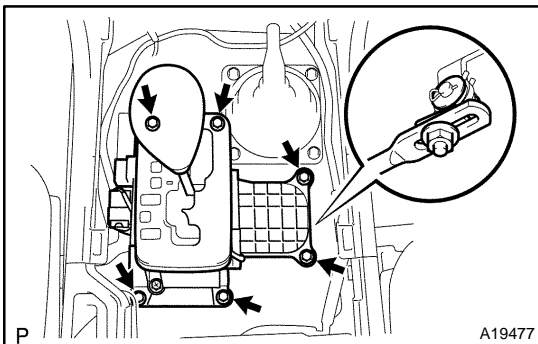
## REMOVAL

1. REMOVE HOOD
2. REMOVE ENGINE UNDER COVERS
3. DRAIN ENGINE COOLANT
4. DRAIN ENGINE OIL
5. REMOVE V-BANK COVER
6. REMOVE BATTERY
7. REMOVE AIR CLEANER CAP AND INTAKE AIR CONNECTOR PIPE ASSEMBLY
8. REMOVE RADIATOR RESERVOIR
  - (a) Disconnect the clamp on the wire from the reservoir.
  - (b) Disconnect the reservoir hose from the radiator.
  - (c) Remove the 2 bolts, the reservoir and the grommet.
9. REMOVE RADIATOR AND FAN SHROUD
  - (a) Disconnect the upper radiator hose from the front water bypass joint.
  - (b) Remove the 2 nuts, and disconnect the 2 clamps on the A/C discharge tube from the bracket.
  - (c) Remove the 2 bolts, and disconnect the 2 brackets on the wire from the radiator.
  - (d) Remove the 3 bolts, and disconnect the fan shroud from the radiator.
  - (e) Remove the lower radiator hose.
  - (f) Disconnect the 2 A/T oil cooler hoses from the radiator.
  - (g) Remove the 2 bolts, the 2 nuts, the 2 support collars and the radiator.
  - (h) Remove the fan shroud.
10. REMOVE GENERATOR DRIVE BELT, FAN, FLUID COUPLING AND FAN PULLEY
  - (a) Loosen the 4 nuts holding the fluid coupling to the fan bracket.
  - (b) Remove the generator drive belt. (See page [CH-7](#) )
  - (c) Remove the 4 nuts, the fan, the fluid coupling assembly and the fan pulley.
11. DISCONNECT ENGINE WIRE FROM CABIN
  - (a) Remove the glove compartment door.
  - (b) Remove the lower No.2 panel.
  - (c) Disconnect the 3 connectors from the ECM.
  - (d) Remove the 3 screws, and disconnect ECM from the body bracket.
  - (e) Disconnect the 3 wire harness connectors.
12. DISCONNECT HOSES, WIRES, CONNECTORS, CLAMPS, GROMMET AND CABLES
  - (a) Disconnect the 2 PS air hoses from the hose clamp on the No.3 RH timing belt cover.
  - (b) Disconnect the generator wire.
  - (c) Disconnect the generator connector.
  - (d) Disconnect the hose clamp for PS air hose.
  - (e) Disconnect the PS air hose from upper intake manifold.

- (f) Disconnect the 2 heater hoses.
- (g) Disconnect the engine wire clamp from the bracket on the cowl panel.
- (h) Disconnect the engine wire grommet from cowl panel.
- (i) Disconnect the ground strap connector.
- (j) Disconnect the fuel main hose and the clamps.
- (k) Disconnect the fuel return hose and the clamp.
- (l) Disconnect the air inlet hose from the charcoal canister.
- (m) Disconnect the EVAP hose from the charcoal canister.
- (n) Disconnect the engine wire from the clamp on the right fender apron.
- (o) Disconnect the clamp on battery negative (-) cable from the relay box.
- (p) Disconnect the battery negative (-) cable from the right fender apron.
- (q) Disconnect the battery positive (+) terminal cable.

### 13. REMOVE SHIFT LEVER ASSEMBLY AND TRANSFER SHIFT LEVER ASSEMBLY

- (a) Remove the transfer shift lever knob.
- (b) Remove the upper console panel.
- (c) Remove the shift lever assembly.
  - (1) Disconnect the connector.
  - (2) Remove the 6 bolts.
  - (3) Remove the nut and disconnect the transmission control rod from the shift lever assembly.
  - (4) Remove the shift lever assembly.
- (d) Remove the 4 bolts and the transfer shift lever boot.



- (e) Remove the transfer shift lever assembly.
  - (1) Remove the clip, the plate washer and the wave washer, and disconnect the transfer rod from the shift lever.
  - (2) Remove the bushing.
  - (3) Remove the 4 bolts, the shift lever and the gasket.

### 14. REMOVE FRONT EXHAUST PIPES

### 15. REMOVE PROPELLER SHAFT (See page PR-4 )

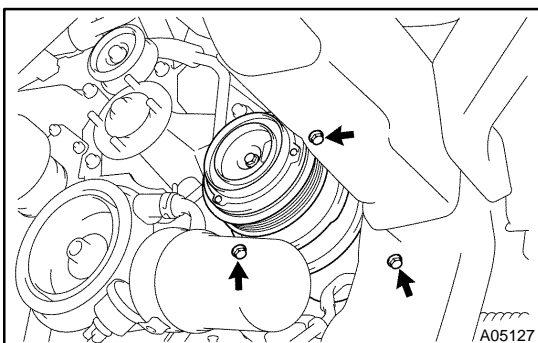
### 16. REMOVE STABILIZER BAR (See page SA-81 )

### 17. DISCONNECT A/C COMPRESSOR FROM ENGINE

- (a) Disconnect the A/C compressor connector.
- (b) Remove the 3 bolts, and disconnect the A/C compressor from the engine.

#### HINT:

Suspend the A/C compressor securely.

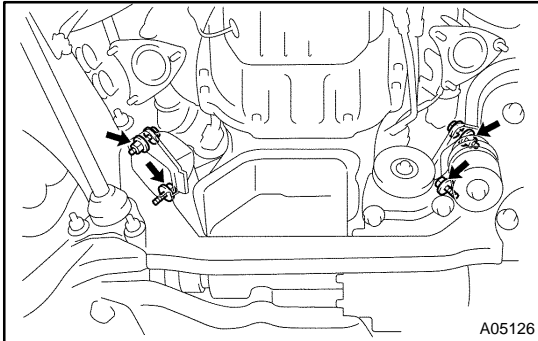


**18. DISCONNECT PS PUMP FROM ENGINE**

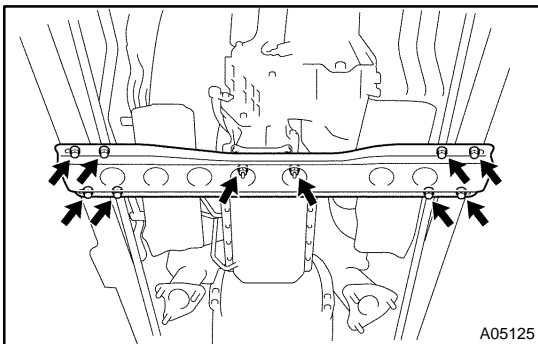
Remove the 3 bolts, and disconnect the PS pump from the engine.

HINT:

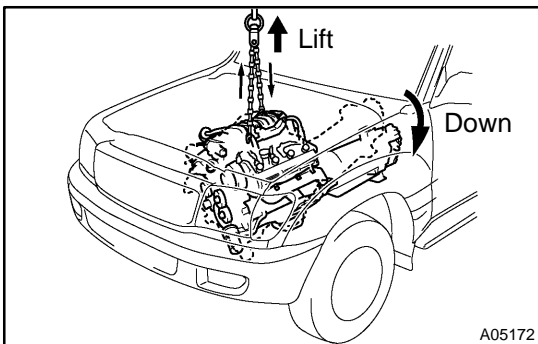
Suspend the PS pump securely.

**19. REMOVE ENGINE AND TRANSMISSION ASSEMBLY FROM VEHICLE**

- (a) Attach the engine chain hoist to the engine hangers.
- (b) Remove the 2 nuts and the 4 bolts holding the engine mounting brackets to the frame brackets.
- (c) Remove the 3 bolts and the transfer case protector.



- (d) Remove the 8 bolts, the 2 nuts and the frame crossmember.



- (e) Lift the engine and take out from the vehicle slowly and carefully.

HINT:

Make sure the engine is clear of all wiring, hoses and cables.

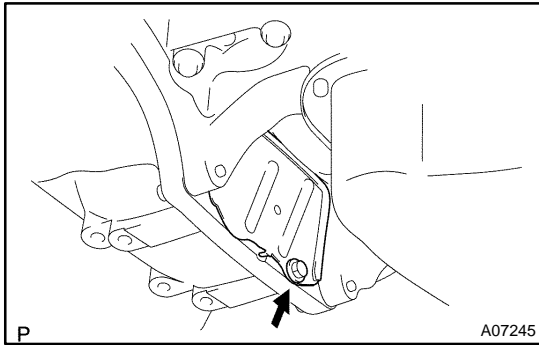
- (f) Place the engine and transmission assembly onto a stand.

**20. DISCONNECT ENGINE WIRE FROM TRANSMISSION**

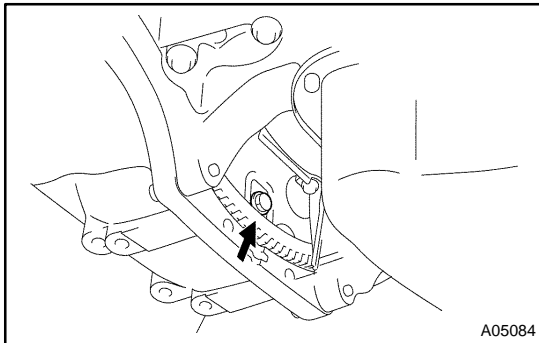
- (a) Disconnect the 5 connectors.
- (b) Disconnect the 2 wire clamps.

**21. REMOVE OIL COOLER PIPES FOR TRANSMISSION**

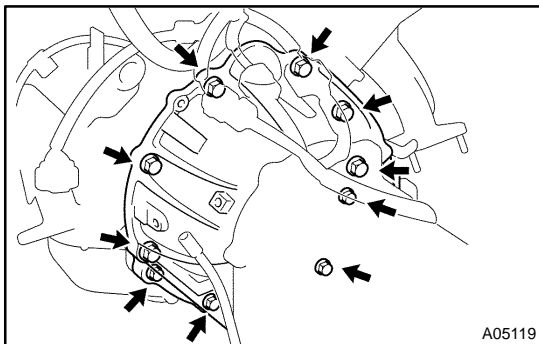
- (a) Remove the 3 bolts and the 3 stays.
- (b) Loosen the 2 union nuts, and remove the 2 oil cooler pipes.

**22. REMOVE TORQUE CONVERTER CLUTCH BOLTS**

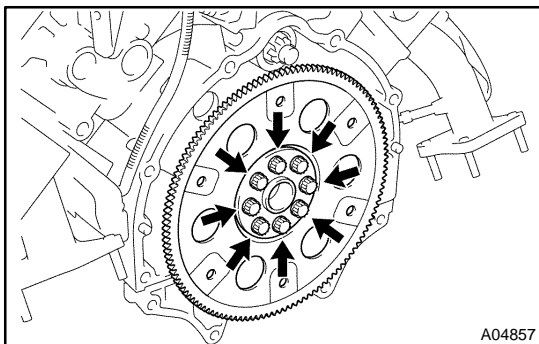
- (a) Remove the bolt and the flywheel housing under cover.



- (b) Turn the crankshaft pulley bolt to gain access to each bolt.  
 (c) Hold the crankshaft pulley bolt with a wrench, and remove the 6 bolts.

**23. REMOVE TRANSMISSION**

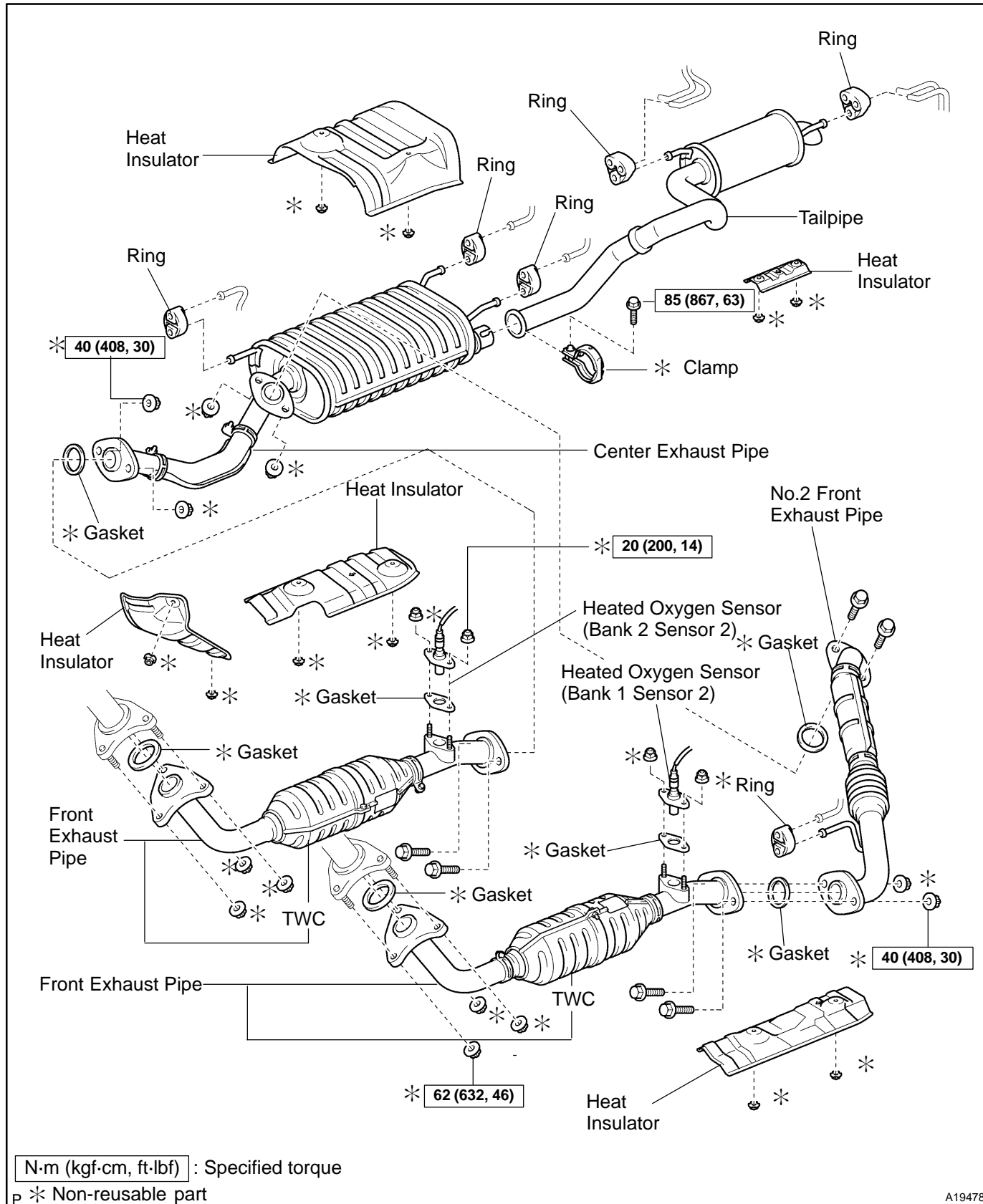
- (a) Remove the 10 bolts.  
 (b) Remove the transmission together with the torque converter clutch from the engine.

**24. REMOVE DRIVE PLATE**

- Hold the crankshaft pulley bolt with a wrench, and remove the 8 bolts, the front spacer, the drive plate and the rear spacer.

# EXHAUST SYSTEM COMPONENTS

EM0EE-18



# IDLE SPEED INSPECTION

EMOKU-10

## 1. INITIAL CONDITIONS

- (a) Engine is at normal operating temperature
- (b) Air cleaner is installed
- (c) All pipes and hoses of air induction systems are connected
- (d) All accessories are switched OFF
- (e) All vacuum lines are properly connected

### HINT:

All vacuum hoses should be properly connected.

- (f) SFI system wiring connectors are fully plugged
- (g) Ignition timing is set correctly
- (h) Transmission is in neutral position
- (i) Air conditioning switches are OFF

## 2. CONNECT TOYOTA HAND-HELD TESTER OR OBD II SCAN TOOL (See page [EM-9](#))

## 3. INSPECT IDLE SPEED

- (a) Race the engine speed at 2,500 rpm for approx. 90 seconds.
- (b) Check the idle speed.

**Idle speed: 700 ± 50 rpm**

If the idle speed is not as specified, check the air intake system.

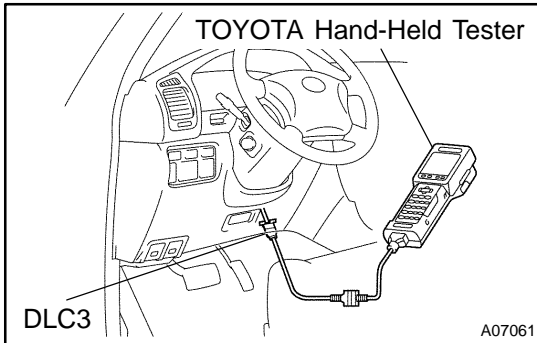
## 4. DISCONNECT TOYOTA HAND-HELD TESTER OR OBD II SCAN TOOL

## IGNITION TIMING INSPECTION

EMOKT-10

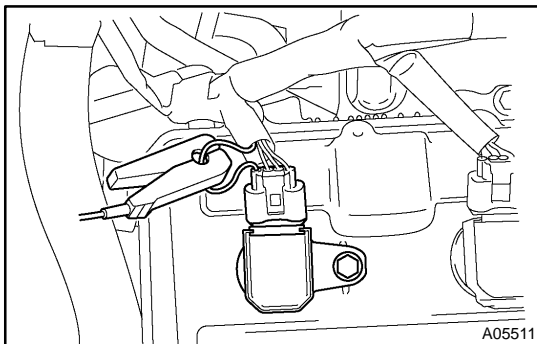
1. REMOVE BATTERY CLAMP COVER
2. REMOVE INTAKE AIR CONNECTOR
3. REMOVE V-BANK COVER
4. WARM UP ENGINE

Allow the engine to warm up to the normal operating temperature.



5. CONNECT TOYOTA HAND-HELD TESTER OR OBD II SCAN TOOL

- (a) Connect the TOYOTA hand-held tester or OBD II scan tool to the DLC3.
- (b) Please refer to the TOYOTA hand-held tester or OBD II scan tool operator's manual for further details.



6. CONNECT TIMING LIGHT TO ENGINE

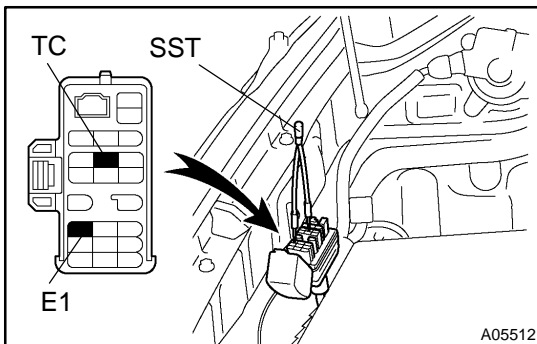
Connect the tester probe of a timing light to the wire of the ignition coil connector for No.1 cylinder.

7. CHECK IDLE SPEED

- (a) Race the engine speed at 2,500 rpm for approx. 90 seconds.
- (b) Check the idle speed.

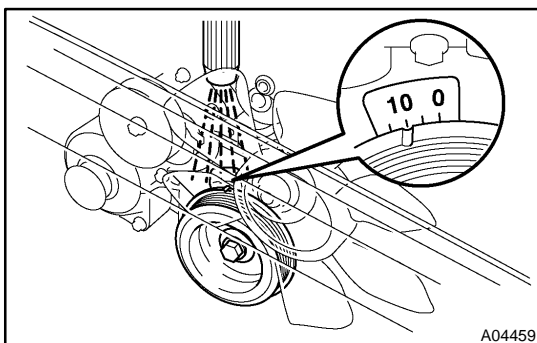
**Idle speed:**

**700 ± 50 rpm**



8. INSPECT IGNITION TIMING

- (a) Using SST, connect terminal TC and E1 of the DLC1.  
SST 09843-18020



- (b) Using a timing light, check the ignition timing.

**Ignition timing:**

**5 - 15° BTDC @ idle**

**(Transmission in neutral position)**

- (c) Remove SST from the DLC1.  
SST 09843-18020

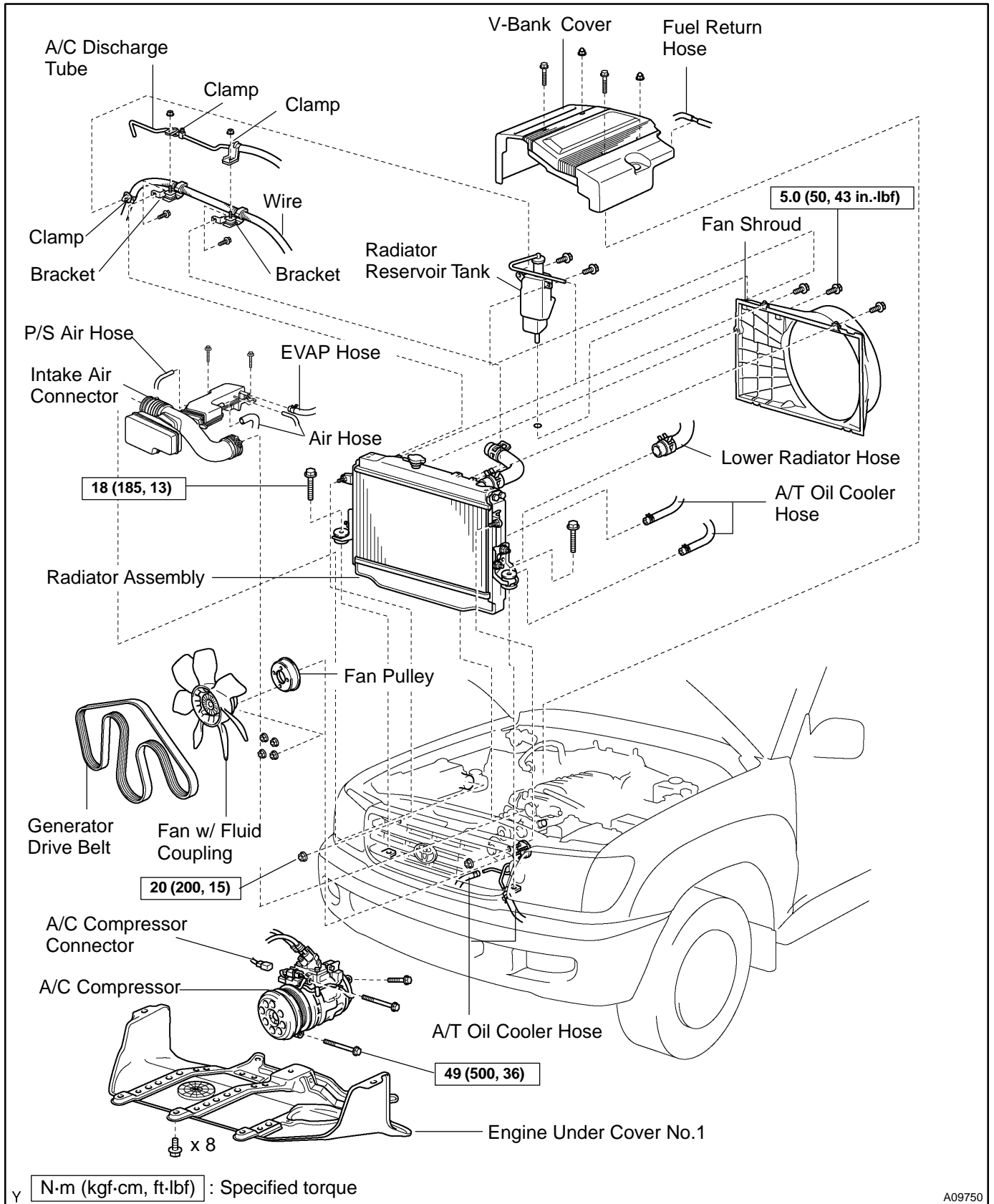
9. DISCONNECT TIMING LIGHT FROM ENGINE
10. DISCONNECT TOYOTA HAND-HELD TESTER OR OBD II SCAN TOOL

- 11. REINSTALL V-BANK COVER**
- 12. REINSTALL INTAKE AIR CONNECTOR**
- 13. REINSTALL BATTERY CLAMP COVER**

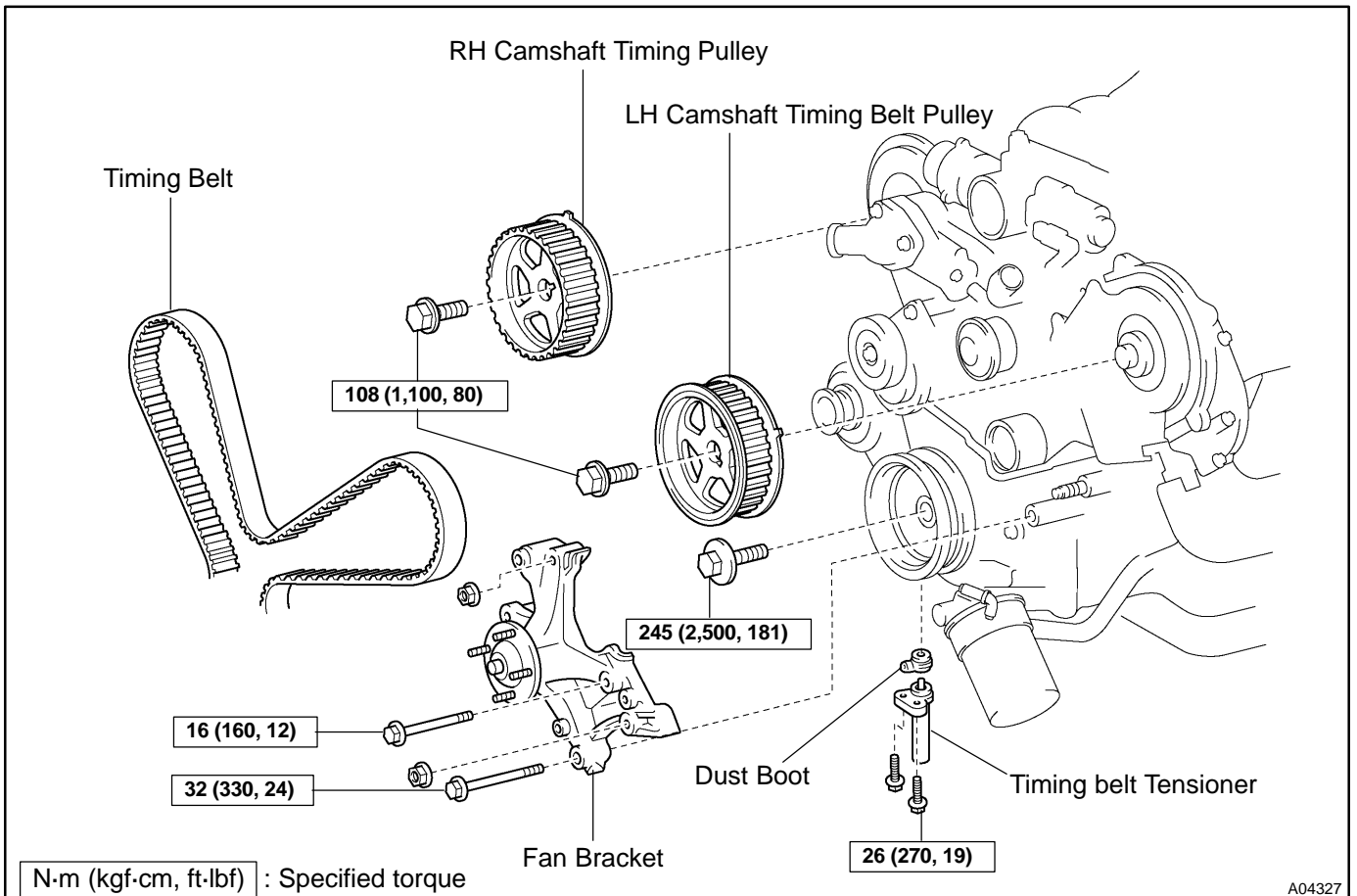
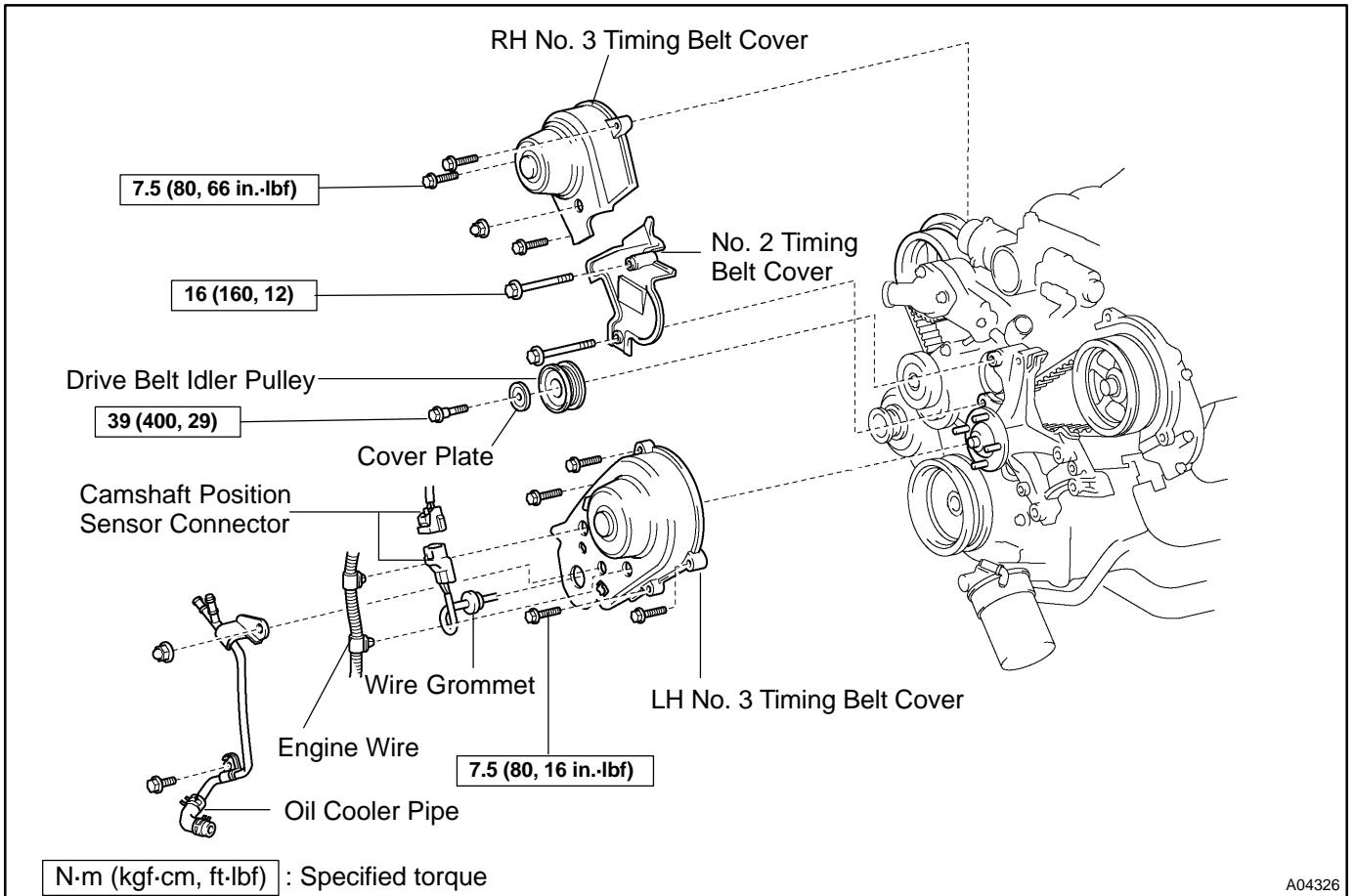


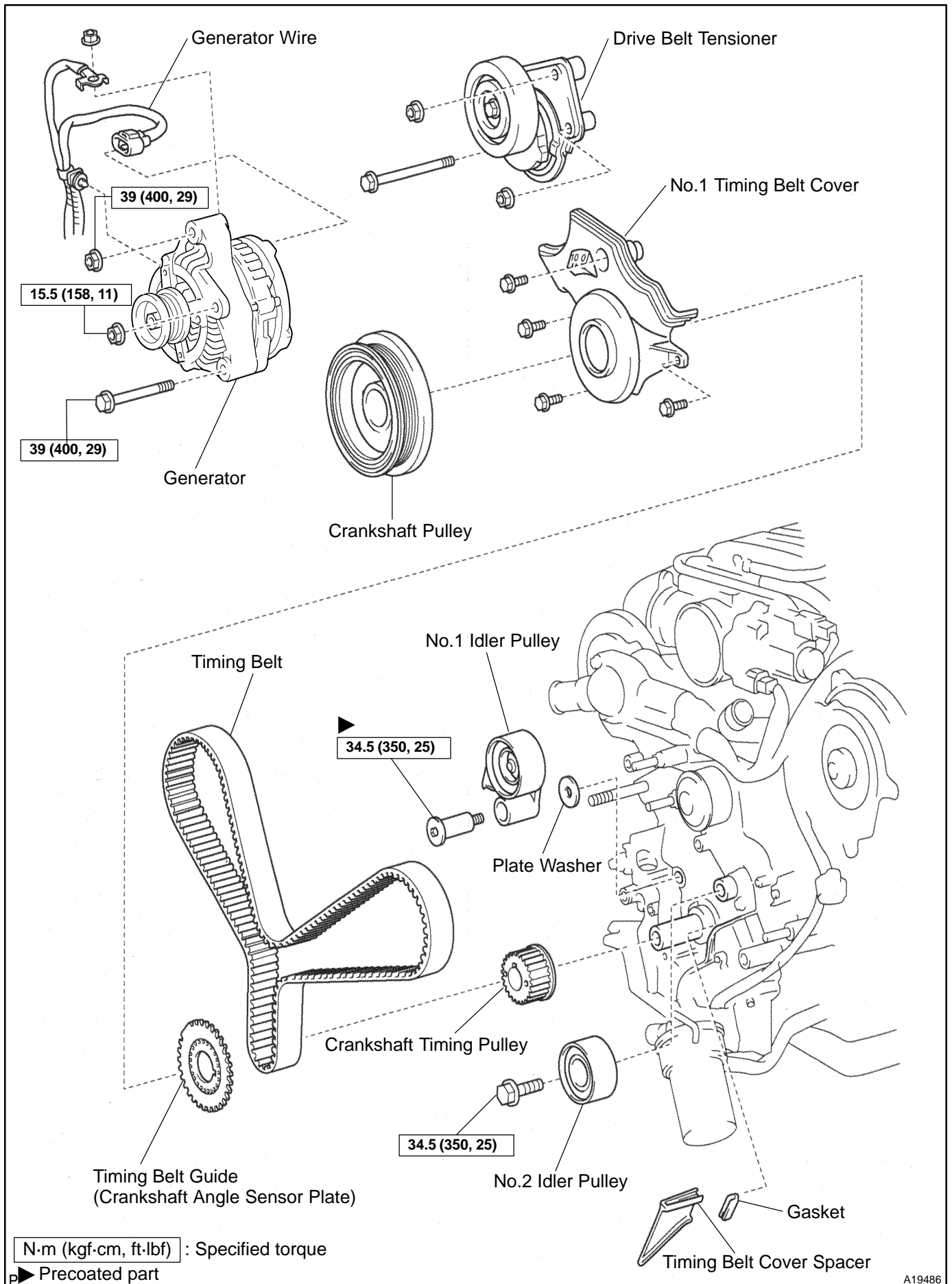
# TIMING BELT COMPONENTS

EMOKV-11

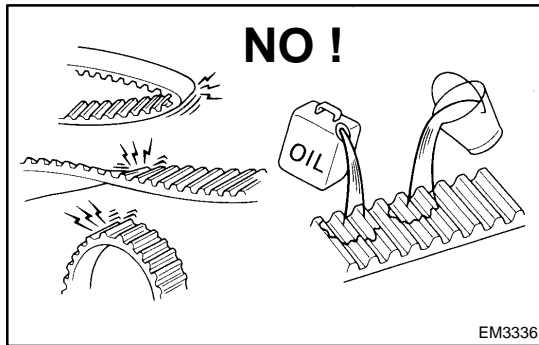


A09750





A19486



## INSPECTION

### 1. INSPECT TIMING BELT

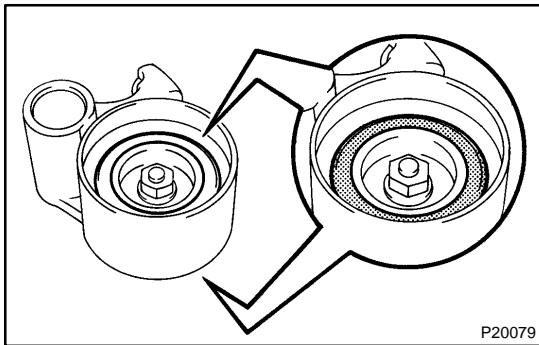
#### NOTICE:

- ▶ Do not bend, twist or turn the timing belt inside out.
- ▶ Do not allow the timing belt to contact with oil, water or steam.
- ▶ Do not utilize timing belt tension when installing or removing the mount bolt of the camshaft timing pulley.

If there any defects as shown in the illustrations, check these points:

- (a) Premature parting
  - ▶ Check for proper installation.
  - ▶ Check the timing cover gasket for damage and proper installation.
- (b) If the belt teeth are cracked or damaged, check if either camshaft is locked.
- (c) If there is noticeable wear or cracks on the belt face, check if there are nicks on the side of the idler pulley lock and the water pump.
- (d) Even if there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.
- (e) If there is noticeable wear on the belt teeth, check timing cover for damage and for foreign materials on the pulley teeth.

If necessary, replace the timing belt.

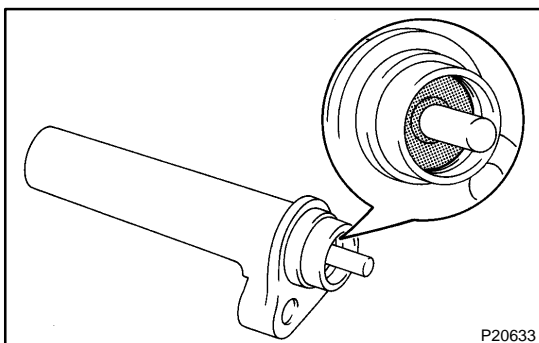


### 2. INSPECT IDLER PULLEYS

- (a) Visually check the seal portion of the idler pulley for oil leakage.

If leakage is found, replace the idler pulley.

- (b) Check that the idler pulley turns smoothly.
- If necessary, replace the idler pulley.



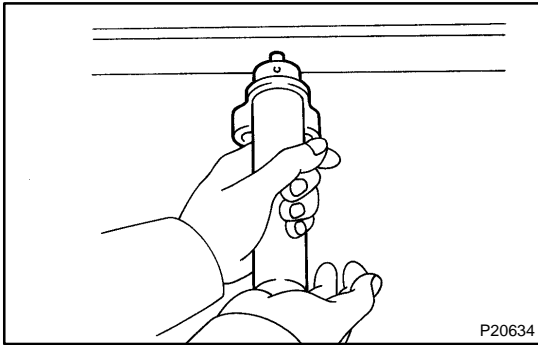
### 3. INSPECT TIMING BELT TENSIONER

- (a) Visually check the seal portion of the tensioner for oil leakage.

#### HINT:

If there is only the faintest trace of oil on the seal on the push rod side, the tensioner is all right.

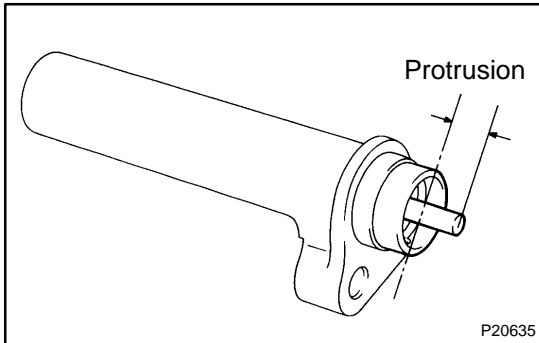
If leakage is found, replace the tensioner.



- (b) Hold the tensioner with both hands, and push the push rod strongly to check that it doesn't move. If the push rod moves, replace the tensioner.

**NOTICE:**

**Never hold the tensioner push rod facing downward.**



- (c) Measure the protrusion of the push rod from the housing end.

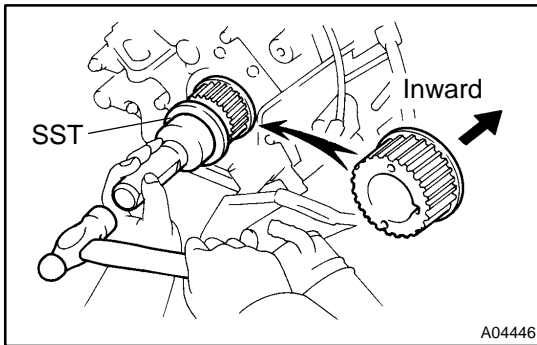
**Protrusion:**

**10.5 - 11.5 mm (0.413 - 0.453 in.)**

If the protrusion is not as specified, replace the tensioner.

**4. INSPECT WATER PUMP**

**(See page CO-7 )**

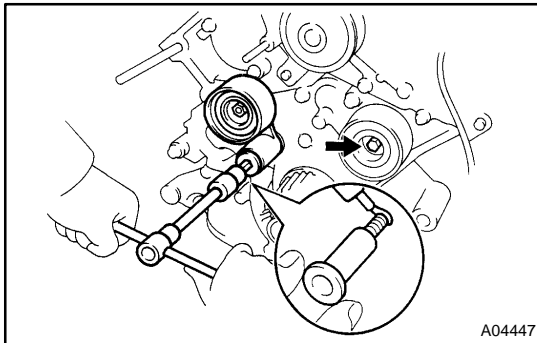


## INSTALLATION

### 1. INSTALL CRANKSHAFT TIMING PULLEY

- (a) Align the timing pulley set key with the key groove of the pulley.
- (b) Using SST and a hammer, tap in the timing pulley, facing the flange side inward.

SST 09223-4601 1



### 2. INSTALL NO.1 IDLER PULLEY AND NO.2 IDLER PULLEY

- (a) Apply adhesive 2 or 3 threads from the end of the pivot bolt.

#### Adhesive:

**Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent**

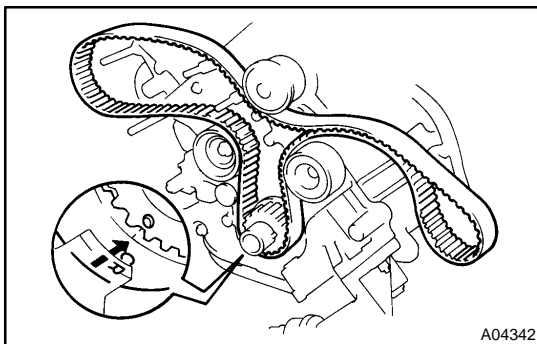
- (b) Using a 10 mm hexagon wrench, install the plate washer and the No.1 idler pulley with the pivot bolt.

**Torque: 34.5 N·m (350 kgf·cm, 25 ft·lbf)**

- (c) Install the No.2 idler pulley with the bolt.

**Torque: 34.5 N·m (350 kgf·cm, 25 ft·lbf)**

- (d) Check that the No.1 and No.2 idler pulley moves smoothly.



### 3. TEMPORARILY INSTALL TIMING BELT

#### NOTICE:

**The engine should be cold.**

- (a) Remove any oil or water on and clean the crankshaft pulley, the oil pump pulley, the water pump pulley, the No.1 idler pulley and the No.2 idler pulley.

#### NOTICE:

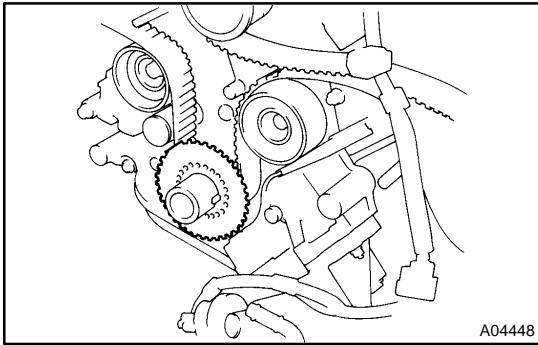
**Only wipe the pulleys; do not use any cleansing agent.**

- (b) Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.

- (c) Install the timing belt on the crankshaft timing pulley, the No.1 idler pulley and the No.2 idler pulley.

### 4. INSTALL TIMING BELT COVER SPACER

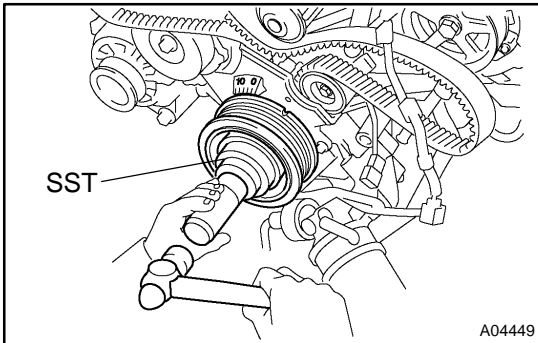
- (a) Install the gasket to the cover spacer.
- (b) Install the cover spacer.

**5. INSTALL TIMING BELT GUIDE**

Install the belt guide, facing the cup side outward.

**6. INSTALL NO.1 TIMING BELT COVER**

Install the timing belt cover with the 4 bolts.

**7. INSTALL CRANKSHAFT PULLEY**

(a) Align the pulley set key with the key groove of the crankshaft pulley.

(b) Using SST and a hammer, tap in the crankshaft pulley.  
SST 09223-4601 1

**8. INSTALL DRIVE BELT TENSIONER**

Install the belt tensioner with the bolt and the 2 nuts.

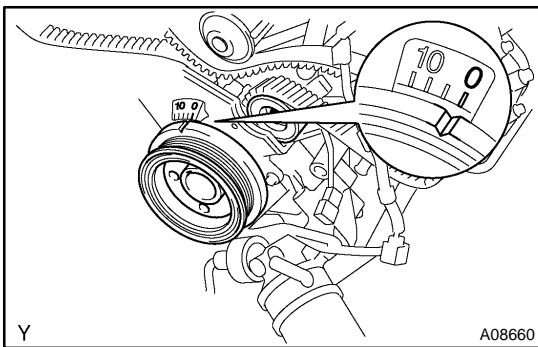
**Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)**

**HINT:**

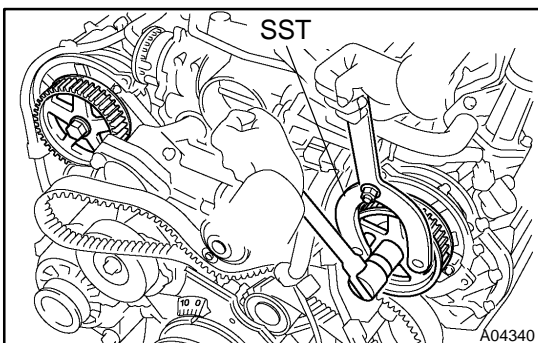
Use a bolt of 106 mm (4.18 in.) in length.

**9. INSTALL GENERATOR**

(See page [CH-16](#))

**10. CHECK CRANKSHAFT PULLEY POSITION**

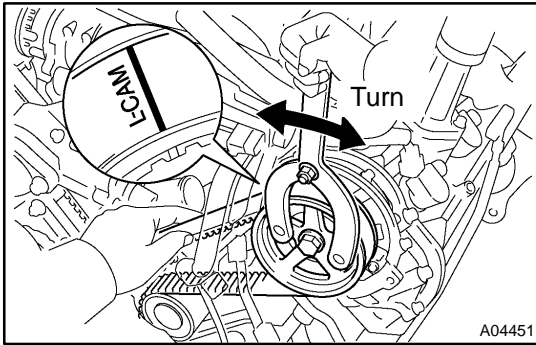
Check that the timing mark of the crankshaft pulley is aligned with the timing mark "0" of the No.1 timing belt cover.

**11. INSTALL RH, LH CAMSHAFT TIMING PULLEYS**

(a) Align the camshaft knock pin with the knock pin groove of the timing pulley, and slide on the timing pulley.

(b) Using SST, install the pulley bolt.  
SST 09960-10010 (09962-01000, 09963-01000)

**Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)**



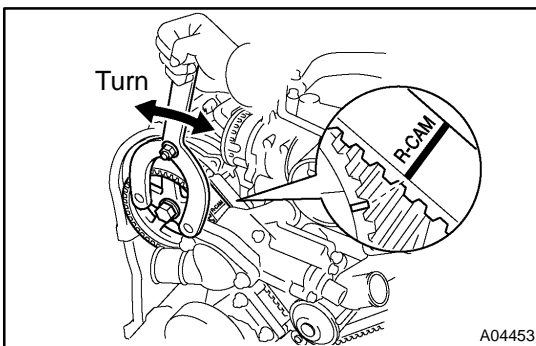
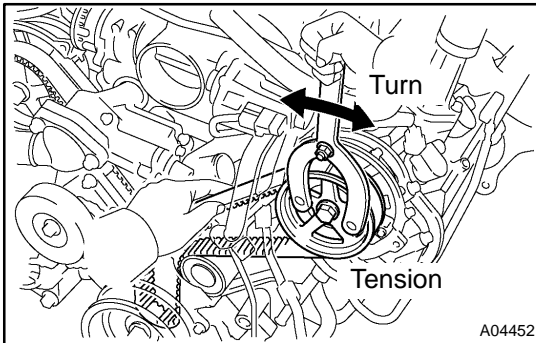
## 12. CONNECT TIMING BELT TO LH CAMSHAFT TIMING PULLEY

- (a) Remove any oil or water on the LH camshaft timing pulley, and clean it up.

### NOTICE:

**Only wipe the pulleys; do not use any cleansing agent.**

- (b) Turn the LH camshaft timing pulley. Align the installation mark on the timing belt with the timing mark of the camshaft timing pulley, and hang the timing belt on the LH camshaft timing pulley.
- (c) Turn the LH camshaft timing pulley counterclockwise until there is tension between the crankshaft timing pulley and the LH camshaft timing pulley.



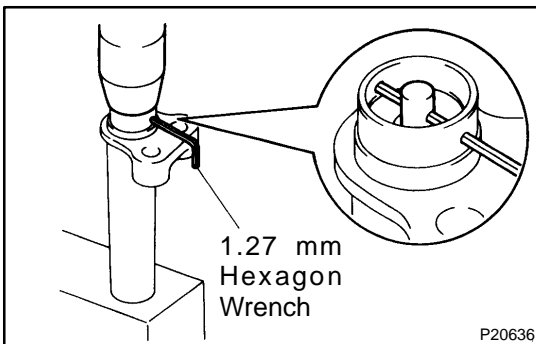
## 13. CONNECT TIMING BELT TO RH CAMSHAFT TIMING PULLEY

- (a) Remove any oil or water on the RH camshaft timing pulley and water pump pulley, and clean them up.

### NOTICE:

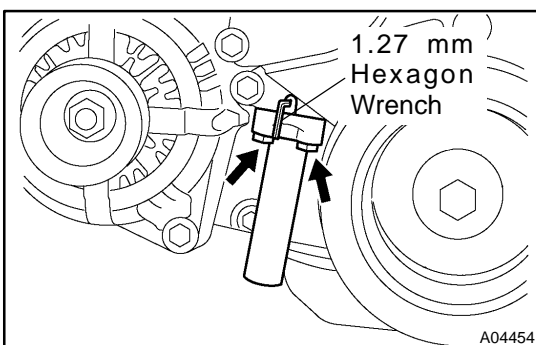
**Only wipe the pulleys; do not use any cleansing agent.**

- (b) Turn the RH camshaft timing pulley. Align the installation mark on the timing belt with the timing mark of the camshaft timing pulley, and hang the timing belt on the RH camshaft timing pulley.



## 14. SET TIMING BELT TENSIONER

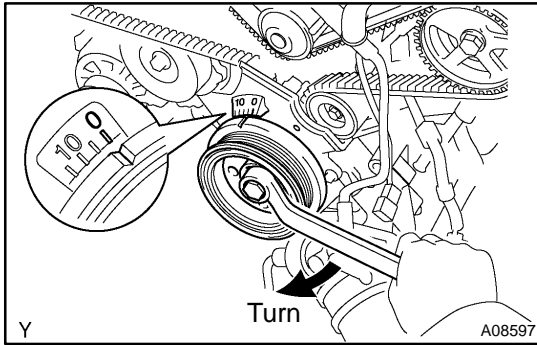
- (a) Using a press, slowly press in the push rod using 981 - 9,807 N (100 - 1,000 kgf, 220 - 2,205 lbf) of pressure.
- (b) Align the holes of the push rod and the housing, pass a 1.27 mm (0.050 in.) hexagon wrench through the holes to keep the setting position of the push rod.
- (c) Release the press.
- (d) Install the dust boot to the belt tensioner.



## 15. INSTALL TIMING BELT TENSIONER

- (a) Temporarily install the belt tensioner with the 2 bolts.
- (b) Alternately tighten the 2 bolts.  
**Torque: 26 N·m (270 kgf·cm, 19 ft·lbf)**
- (c) Using pliers, remove the 1.27 mm (0.050 in.) hexagon wrench from the belt tensioner.

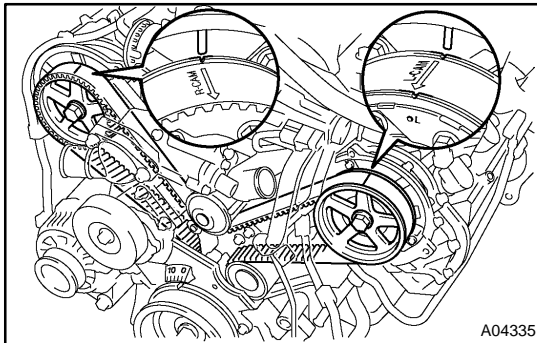


**16. CHECK VALVE TIMING**

- (a) Temporarily install the crankshaft pulley bolt.
- (b) Slowly turn the crankshaft pulley 2 revolutions from TDC to TDC.

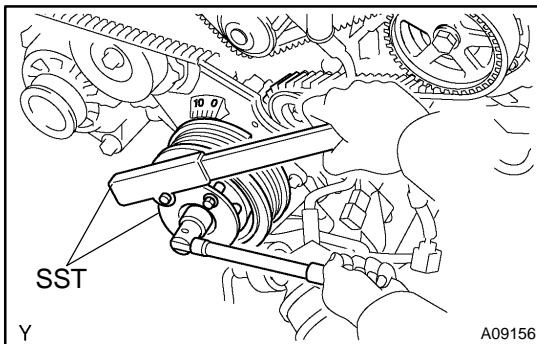
**NOTICE:**

**Always turn the crankshaft pulley clockwise.**



- (c) Check that each pulley aligns with the timing marks as shown in the illustration.

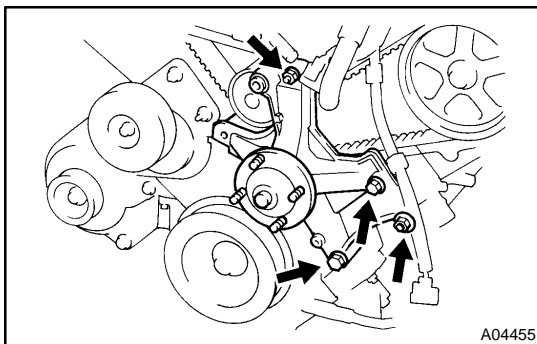
If the timing marks do not align, remove the timing belt and reinstall it.

**17. TIGHTEN CRANKSHAFT PULLEY BOLT**

Using SST, install the pulley bolt.

SST 09213-7001 1 (90105-70020),  
09330-00021

**Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)**

**18. INSTALL FAN BRACKET**

Install the fan bracket with the 2 bolts and the 2 nuts.

**Torque:**

**12 mm head**

**16 N·m (160 kgf·cm, 12 ft·lbf)**

**14 mm head**

**32 N·m (330 kgf·cm, 24 ft·lbf)**

**HINT:**

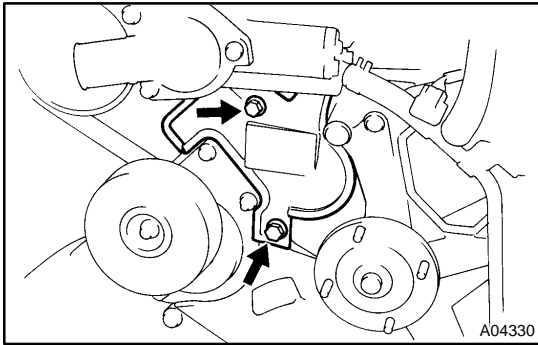
**Bolt Length:**

106 mm (4.17 in.) for 12 mm head (A)

114 mm (4.49 in.) for 14 mm head (B)

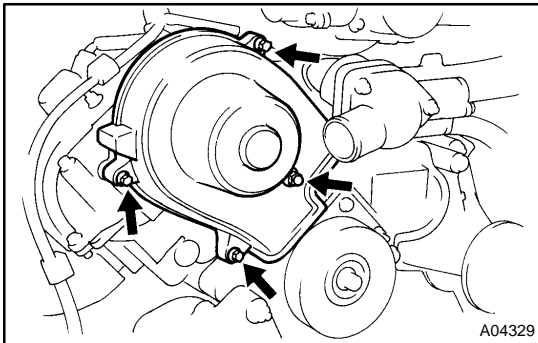
**19. INSTALL A/C COMPRESSOR**

(See page [EM-81](#) )

**20. INSTALL NO.2 TIMING BELT COVER**

Install the No.2 timing belt cover with the 2 bolts.

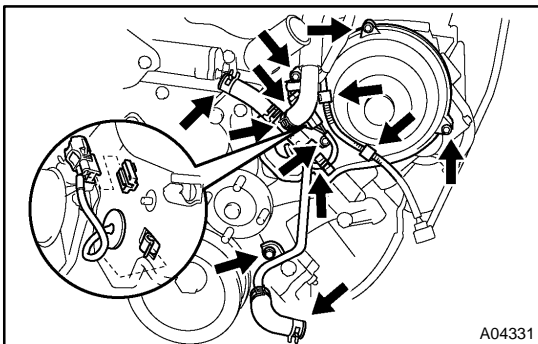
**Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)**

**21. INSTALL RH NO.3 TIMING BELT COVER**

(a) Fit the RH No.3 timing belt cover, matching it with the fan bracket.

(b) Install the RH No.3 timing belt cover with the 3 bolts and nut.

**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**

**22. INSTALL LH NO.3 TIMING BELT COVER**

(a) Install the oil cooler pipe and the bolt.

(b) Run the camshaft position sensor wire through the LH No.3 timing belt cover hole.

(c) Fit the LH No.3 timing belt cover, matching it with the fan bracket.

(d) Install the LH No.3 timing belt cover with the 4 bolts and the nut.

**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**

(e) Install the wire grommet to the LH No.3 timing belt cover.

(f) Install the sensor connector to the connector bracket.

(g) Connect the sensor connector.

(h) Install the sensor wire to the wire clamp on the LH No.3 timing belt cover.

(i) Install the engine wire to the 2 wire clamps on the LH No.3 timing belt cover.

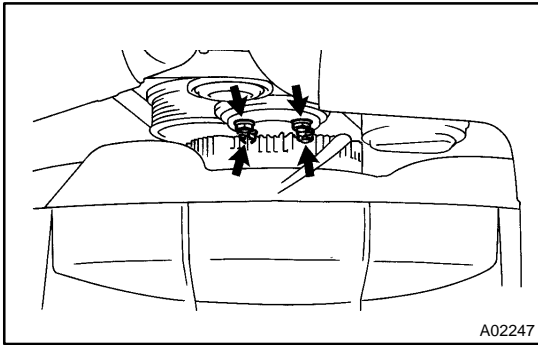
**23. INSTALL DRIVE BELT IDLER PULLEY**

Install the idler pulley and the cover plate with the bolt.

**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

**24. INSTALL RADIATOR ASSEMBLY**

(See page [CO-19](#) )



**25. INSTALL FAN PULLEY, FAN, FLUID COUPLING AND DRIVE BELT**

- (a) Temporarily install the fan pulley, the fan, fluid coupling assembly with the 4 nuts.
- (b) Install the generator drive belt.  
(See page [CH-16](#) )
- (c) Tighten the 4 nuts holding the fluid coupling to the fan bracket.

**Torque: 21 N·m (215 kgf-cm, 16 ft-lbf)**

**26. INSTALL AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY**

**27. INSTALL V-BANK COVER**

**28. FILL WITH ENGINE COOLANT**

**29. START ENGINE AND CHECK FOR LEAKS**

**30. RECHECK ENGINE COOLANT LEVEL**

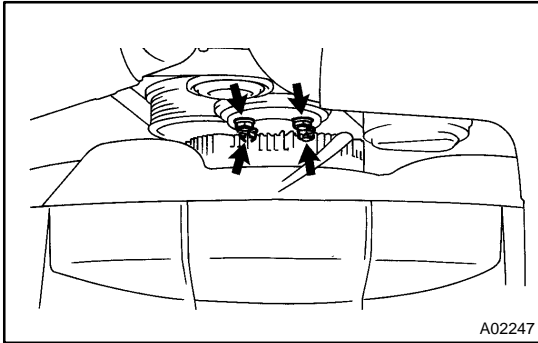
**31. INSTALL BATTERY CLAMP COVER**

**32. INSTALL ENGINE UNDER COVER**

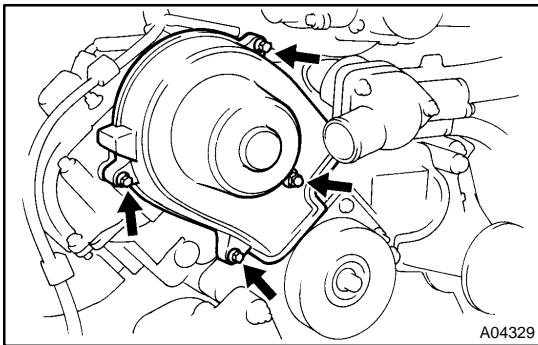
**33. INSTALL OIL PAN PROTECTOR**

## REMOVAL

1. REMOVE OIL PAN PROTECTOR
2. REMOVE ENGINE UNDER COVER
3. DRAIN ENGINE COOLANT
4. REMOVE BATTERY CLAMP COVER
5. REMOVE V-BANK COVER
  - (a) Remove the fuel return hose from the V-bank cover.
  - (b) Remove the 2 bolt, 2 cap nuts and V-bank cover.
6. REMOVE AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY
7. REMOVE DRIVE BELT, FAN, FLUID COUPLING AND FAN PULLEY
  - (a) Loosen the 4 nuts holding the fluid coupling to the fan bracket.
  - (b) Remove the generator drive belt.  
(See page [CH-7](#) )
  - (c) Remove the 4 nuts, the fan, the fluid coupling assembly and the fan pulley.
8. REMOVE RADIATOR ASSEMBLY  
(See page [CO-17](#) )
9. REMOVE DRIVE BELT IDLER PULLEY  
Remove the pulley bolt, the cover plate and the idler pulley.

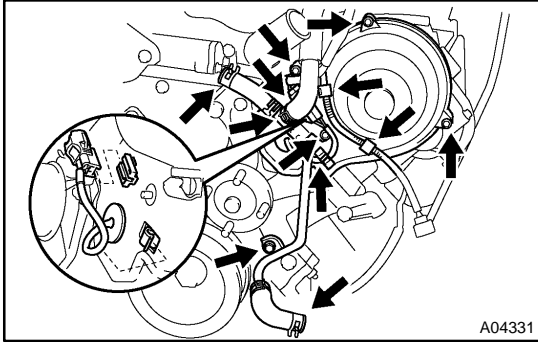


A02247

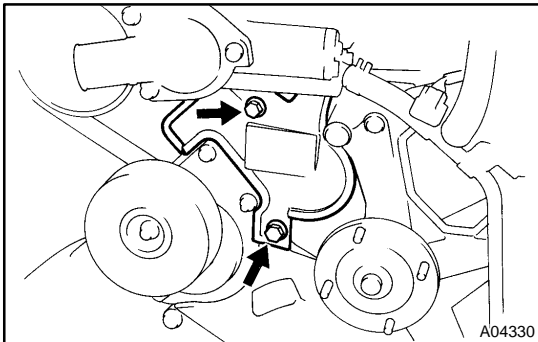


A04329

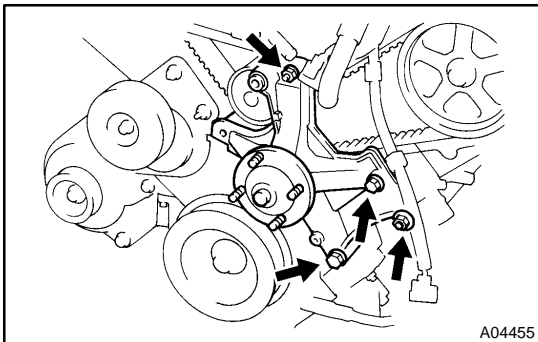
10. REMOVE RH NO.3 TIMING BELT COVER  
Remove the 3 bolts, the nut and the RH No.3 timing belt cover.

**11. REMOVE LH NO.3 TIMING BELT COVER**

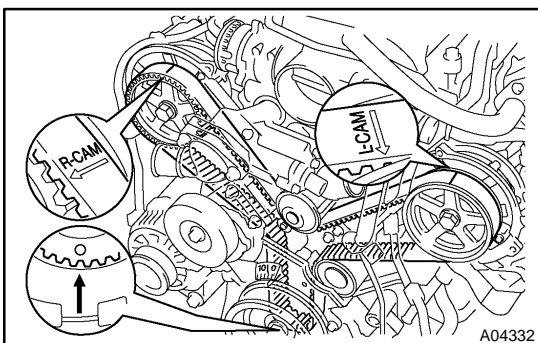
- (a) Disconnect the engine wire from the 2 wire clamps.
- (b) Remove the 4 bolts and the nut.
- (c) Disconnect the camshaft position sensor wire from the wire clamp on the LH No.3 timing belt cover.
- (d) Disconnect the sensor connector from the connector bracket.
- (e) Disconnect the camshaft position sensor connector.
- (f) Remove the wire grommet from the LH No.3 timing belt cover.
- (g) Remove the LH No.3 timing belt cover.
- (h) Remove the oil cooler pipe and the 2 bolts.

**12. REMOVE NO.2 TIMING BELT COVER**

Remove the 2 bolts and the No.2 timing belt cover.

**13. DISCONNECT A/C COMPRESSOR FROM ENGINE**  
(See page [EM-77](#))**14. REMOVE FAN BRACKET**

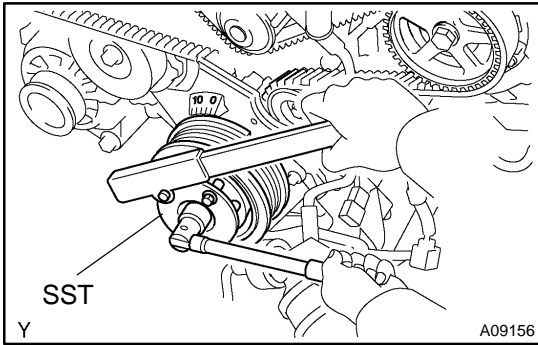
Remove the 2 bolts, the 2 nuts and the fan bracket.

**15. IF RE-USING TIMING BELT, CHECK INSTALLATION MARKS ON TIMING BELT**

Check that there are 3 installation marks on the timing belt as turning the crankshaft pulley as shown in the illustration.

HINT:

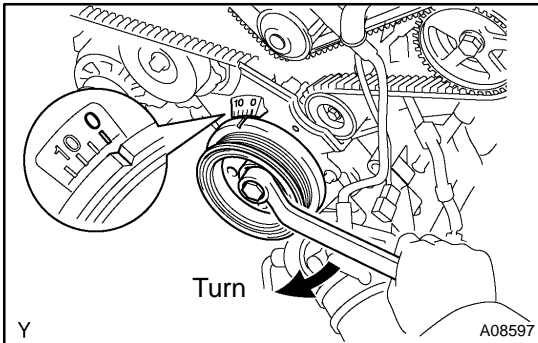
If the installation marks are disappeared, place a new installation mark on the timing belt before removing each part.



### 16. LOOSEN CRANKSHAFT PULLEY BOLT

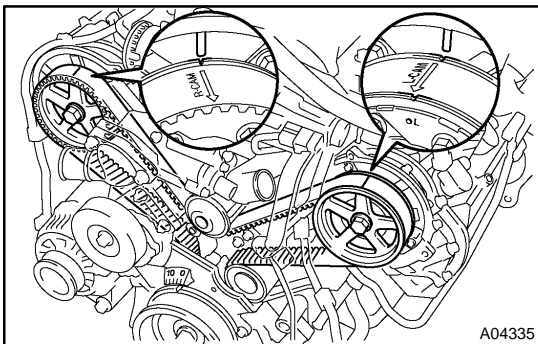
Using SST, loosen the pulley bolt.

SST 09213-7001 1 (90105-70020),  
09330-00021



### 17. SET NO.1 CYLINDER TO TDC/COMPRESSION

- (a) Turn the crankshaft pulley and align its groove with the timing mark "0" of the No.1 timing belt cover.



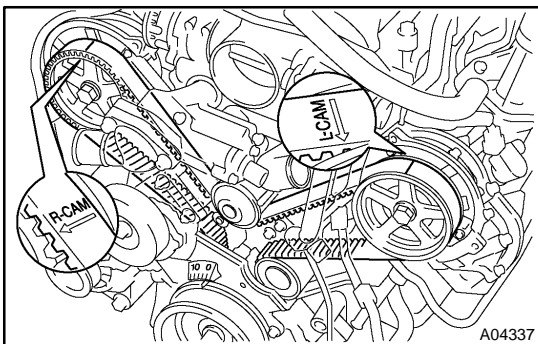
- (b) Check that the timing marks of the camshaft timing pulleys and that of the timing belt rear plates aligned.

If not, turn the crankshaft 1 revolution (360°).

- (c) Remove the crankshaft pulley bolt.

#### NOTICE:

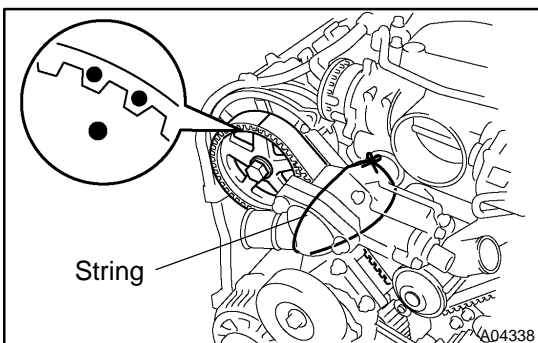
**Do not turn the crankshaft pulley.**



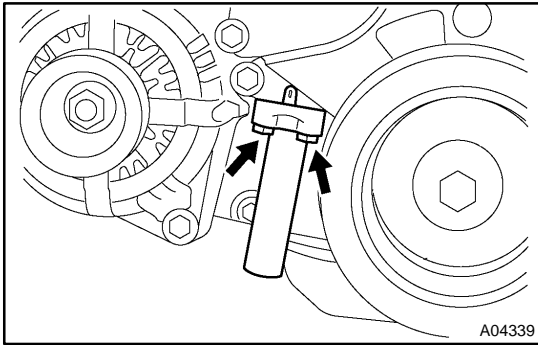
### 18. REMOVE TIMING BELT TENSIONER

#### HINT:

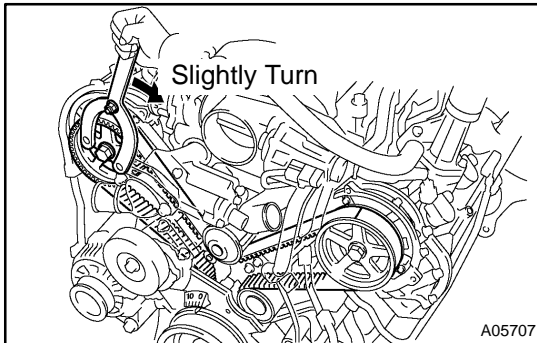
- ▶ When re-using timing belt:  
If the installation marks are disappeared, place 2 new installation marks on the timing belt to match the timing marks of the camshaft timing pulleys before the removal.



- ▶ When replacing timing belt tensioner only:  
To avoid meshing of the timing pulley and the timing belt, secure one of them with string, and then place match-marks on the timing belt and the RH camshaft timing pulley.

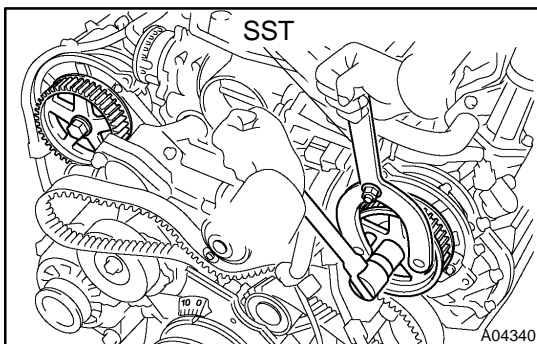


Alternately loosen the 2 bolts, and remove the belt tensioner and the dust boot.



### 19. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS

- (a) Using SST, loosen the tension spring between the LH and RH camshaft timing pulleys by slightly turning the LH camshaft timing pulley clockwise.  
SST 09960-10010 (09962-01000, 09963-01000)
- (b) Disconnect the timing belt from the camshaft timing pulleys.



### 20. REMOVE CAMSHAFT TIMING PULLEYS

Using SST, remove the bolt and the timing pulley. Remove the 2 timing pulleys.

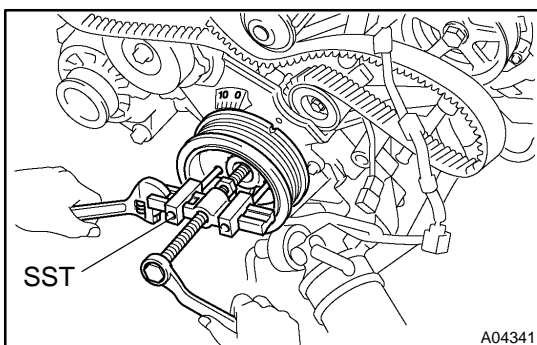
SST 09960-10010 (09962-01000, 09963-01000)

### 21. REMOVE GENERATOR

(See page [CH-7](#))

### 22. REMOVE DRIVE BELT TENSIONER

Remove the bolt, 2 nuts and the belt tensioner.



### 23. REMOVE CRANKSHAFT PULLEY

Using SST, remove the crankshaft pulley.

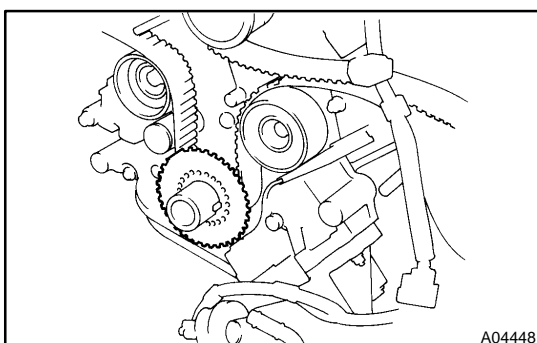
SST 09950-50013 (09951-05010, 09952-05010, 09953-05010, 09954-05011, 09953-05020, 09954-05021)

#### NOTICE:

**Do not turn the crankshaft pulley.**

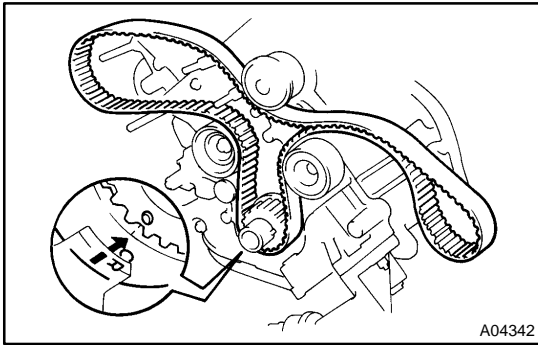
### 24. REMOVE NO.1 TIMING BELT COVER

Remove the 4 bolts and the timing belt cover.

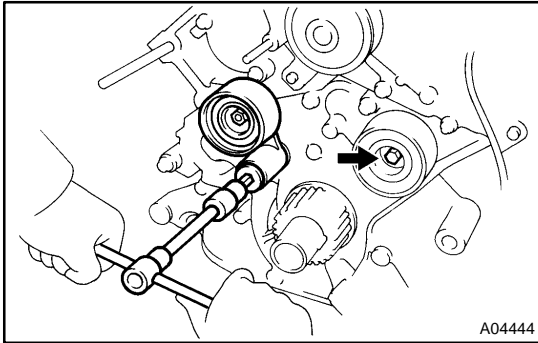


### 25. REMOVE TIMING BELT GUIDE

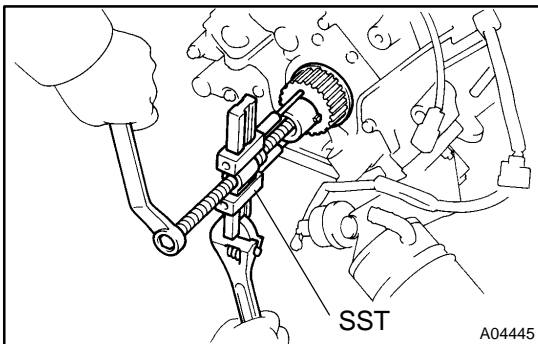
### 26. REMOVE TIMING BELT COVER SPACER

**27. REMOVE TIMING BELT****HINT:**

If re-using the belt and the installation mark is disappeared from it, place a new installation mark on the timing belt to the match the dot mark on the crankshaft timing pulley.

**28. REMOVE NO.1 IDLER PULLEY AND NO.2 IDLER PULLEY**

- (a) Using a 10 mm hexagon wrench, remove the bolt, the No.1 idler pulley and the plate washer.
- (b) Remove the bolt and the No.2 idler pulley.

**29. REMOVE CRANKSHAFT TIMING PULLEY**

Using SST, remove the timing pulley.

SST 09950-50013 (09951-05010, 09952-05010,  
09953-05010, 09953-05020, 09954-05011,  
09954-05021)

**NOTICE:**

**Do not turn the timing pulley.**



# VALVE CLEARANCE INSPECTION

EMOKS-08

## HINT:

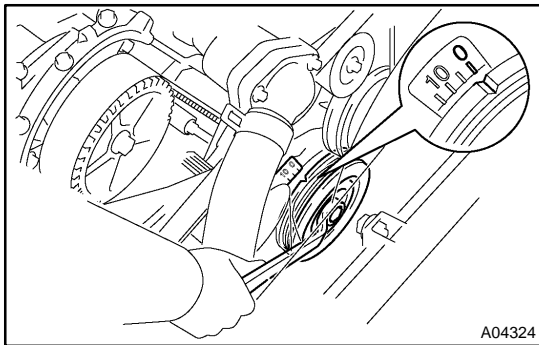
Inspect and adjust the valve clearance when the engine is cold.

1. DRAIN ENGINE COOLANT
2. REMOVE BATTERY CLAMP COVER
3. REMOVE V-BANK COVER
4. REMOVE AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY
5. REMOVE NO.3 TIMING BELT COVERS  
(See page [EM-15](#) )
6. REMOVE IGNITION COILS (See page [IG-6](#) )
7. REMOVE RH CYLINDER HEAD COVER

Remove the 9 bolts, the 9 seal washers and the cylinder head cover.

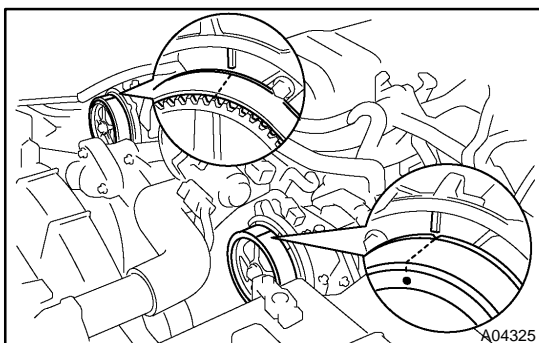
## 8. REMOVE LH CYLINDER HEAD COVER

- (a) Remove the oil dipstick for the transmission.
- (b) Disconnect the PCV hose.
- (c) Disconnect the engine wire clamp from the wire bracket on the cylinder head cover.
- (d) Remove the 9 bolts, the 9 seal washers and the cylinder head cover.

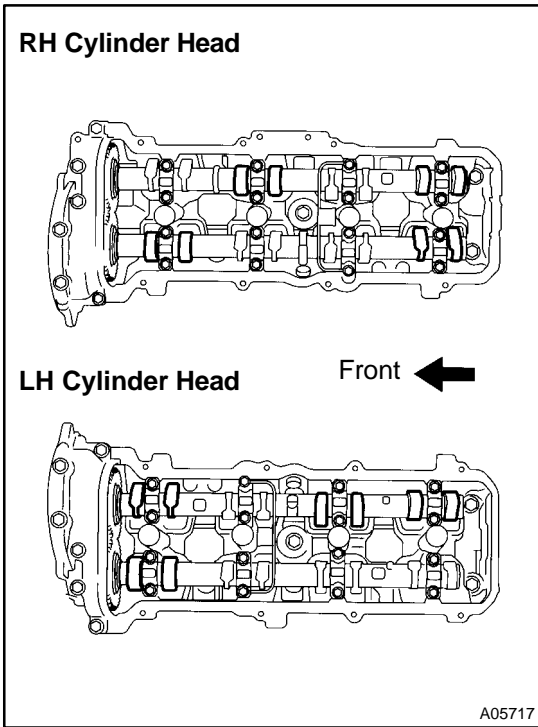


## 9. SET NO.1 CYLINDER TO TDC/COMPRESSION

- (a) Turn the crankshaft pulley, and align its groove with timing mark "0" of the No.1 timing belt cover.



- (b) Check that the timing marks of the camshaft timing pulleys and that of the timing belt rear plates are aligned. If not, turn the crankshaft 1 revolution (360°) and align the mark as above.



**10. INSPECT VALVE CLEARANCE**

- (a) Check only the valves indicated.
  - ▶ Using a feeler gauge, measure the clearance between the valve lifter and the camshaft.
  - ▶ Record the out-of-specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

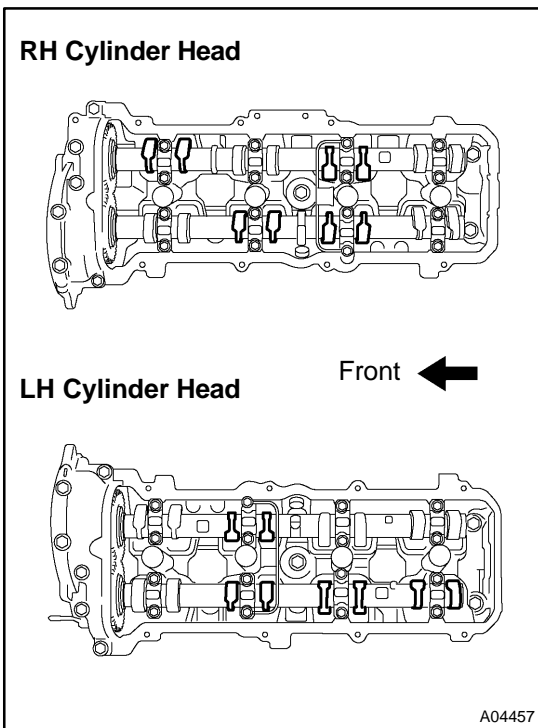
**Valve clearance (Cold):**

**Intake**

**0.15 - 0.25 mm (0.006 - 0.010 in.)**

**Exhaust**

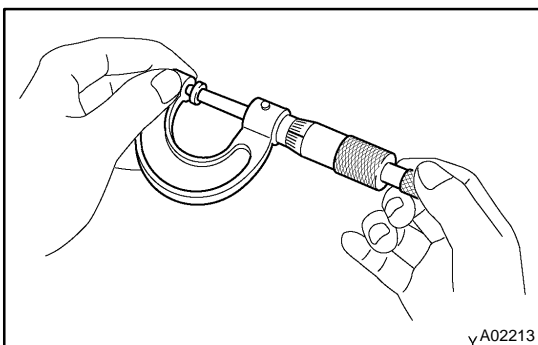
**0.25 - 0.35 mm (0.010 - 0.014 in.)**



- (b) Turn the crankshaft 1 revolution (360°) and align the mark as above (See procedure in step 9).
- (c) Check only the valves indicated as shown. Measure the valve clearance. (See procedure in step (a))

**11. ADJUST VALVE CLEARANCE**

- (a) Remove the timing belt (See page EM-15).
- (b) Remove the camshafts (See page EM-35).
- (c) Remove the valve lifter and adjusting shim.



- (d) Determine the replacement adjusting shim size according to the following Formula and Charts:
  - ▶ Using a micrometer, measure the thickness of the removed shim.
  - ▶ Calculate the thickness of a new shim so that the valve clearance comes within the specified value.

**T** ..... Thickness of removed shim

**A** ..... Measured valve clearance

**N** ..... Thickness of new shim

**Intake:**

$$N = T + (A - 0.20 \text{ mm (0.008 in.)})$$

**Exhaust:**

$$N = T + (A - 0.30 \text{ mm (0.012 in.)})$$

- ▶ Select a new shim with the closest thickness as close as possible to the calculated value.

**HINT:**

Shims are available in 41 increments of 0.020 mm (0.0008 in.), from 2.00 mm (0.0787 in.) to 2.80 mm (0.1102 in.).

- (e) Place a new adjusting shim on the valve.
- (f) Place the valve lifter.
- (g) Reinstall the camshafts (See page [EM-57](#)).
- (h) Reinstall the timing belt (See page [EM-22](#)).
- (i) Recheck the valve clearance.

**12. REINSTALL CYLINDER HEAD COVERS****13. REINSTALL IGNITION COILS****14. REINSTALL NO.3 TIMING BELT COVERS (See page [EM-22](#))****15. REINSTALL AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY****16. REFILL WITH ENGINE COOLANT****17. START ENGINE AND CHECK FOR LEAKS****18. RECHECK ENGINE COOLANT LEVEL****19. REINSTALL V-BANK COVER****20. REINSTALL BATTERY CLAMP COVER**



Adjusting Shim Selection Chart (Exhaust)

Main chart table with columns for Measured clearance (mm/in.) and Installed shim thickness (mm/in.), and a detailed table for Shim No. and Thickness (mm/in.) at the bottom right.

Exhaust valve clearance (Cold): 0.25 - 0.35 mm (0.010 - 0.014 in.)

EXAMPLE:

The 2.300 mm (0.0906 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.300 mm (0.0906 in.) shim with a No. 44 shim.

# EMISSION CONTROL SYSTEM

EC07H-02

## PURPOSE

The emission control systems are installed to reduce the amount of HC, CO and NO<sub>x</sub> exhausted from the engine ((3) and (4)), to prevent the atmospheric release of blow-by gas-containing HC (1) and evaporated fuel containing HC being released from the fuel tank (2).

The function of each system is shown in these table:

System	Abbreviation	Function
(1) Positive Crankcase Ventilation	PCV	Reduces HC
(2) Evaporative Emission Control	EVAP	Reduces evaporated HC
(3) Three-Way Catalytic Converter	TWC	Reduces HC, CO and NO <sub>x</sub>
(4) Sequential Multiport Fuel Injection*	SFI	Injects a precisely timed, optimum amount of fuel for reduced exhaust emissions

Remark: \* For inspection and repair of the SFI system, refer to the SF section in this manual.

# EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM INSPECTION

ECOMF-01

## 1. INSPECT LINES AND CONNECTIONS

Visually check for loose connections, sharp bends or damage.

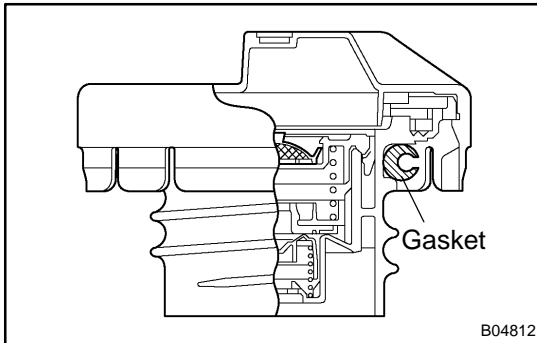
## 2. INSPECT FUEL TANK

Visually check for deformation, cracks or fuel leakage.

## 3. INSPECT FUEL TANK CAP

Visually check if the cap and/or gasket are deformed or damaged.

If necessary, repair or replace the cap.

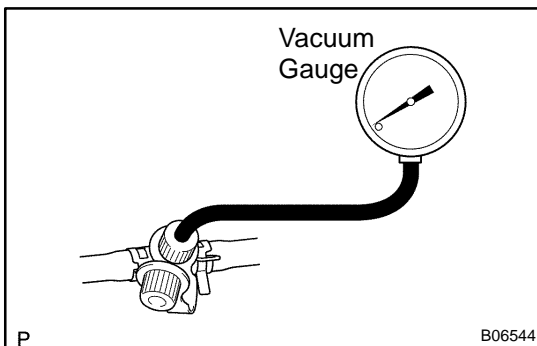


## 4. INSPECT EVAP SYSTEM LINE

(a) Warm up the engine and stop the engine.

Allow the engine to warm up to normal operating temperature.

(b) Install a vacuum gauge (EVAP control system test equipment vacuum gauge) to the EVAP service port on the purge line.



(c) TOYOTA Hand-Held tester:

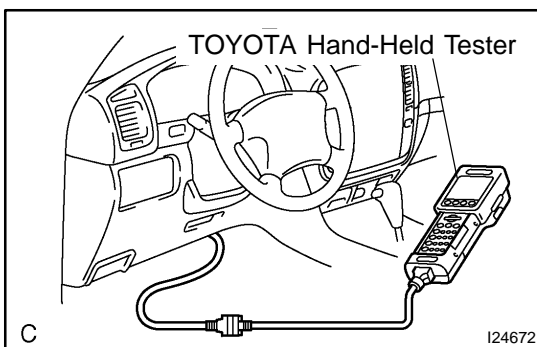
Forced driving of the VSV for the EVAP.

(1) Connect a TOYOTA hand-held tester to the DLC3.

(2) Start the engine.

(3) Push the TOYOTA hand-held tester main switch ON.

(4) Use the ACTIVE TEST mode on the TOYOTA hand-held tester to operate the VSV for the EVAP.



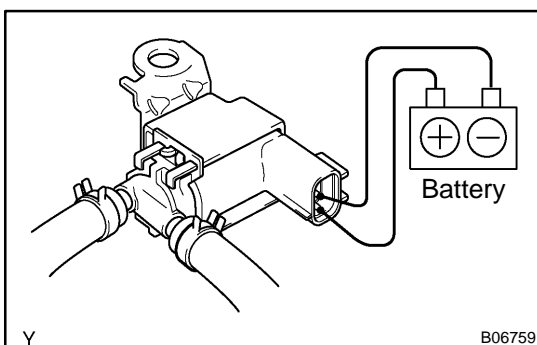
(d) If you have no TOYOTA Hand-Held Tester:

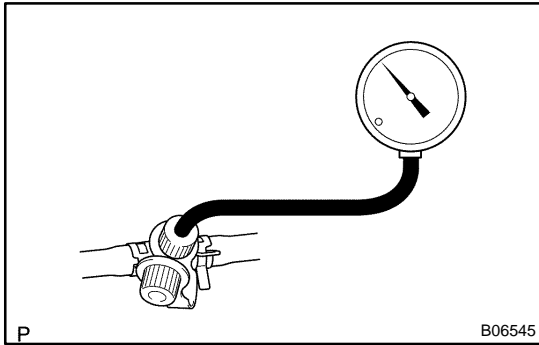
Forced driving of the VSV for the EVAP.

(1) Disconnect the VSV connector for the EVAP.

(2) Connect the positive (+) and negative (-) leads from the battery to the VSV terminals for the EVAP.

(3) Start the engine.





(e) Check the vacuum at idle.

**Vacuum:**

**Maintain at 0.368 - 19.713 in.Hg (5 - 268 in.Aq) for over 5 seconds**

**HINT:**

If the vacuum does not change, you can conclude that the hose connecting the VSV to the service port has come loose or is blocked, or the VSV is malfunctioning.

(f) TOYOTA Hand-Held Tester:

Conclude forced driving of the VSV for the EVAP.

- (1) Stop the engine.
- (2) Disconnect the TOYOTA hand-held tester from the DLC3.

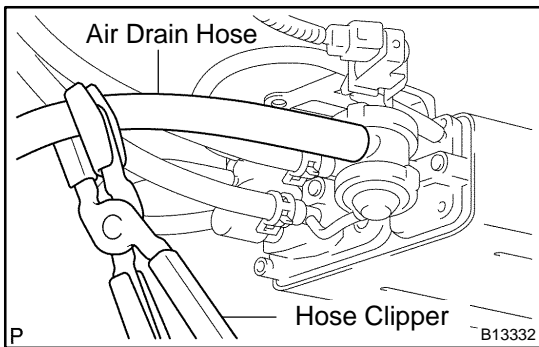
(g) If you have no TOYOTA Hand-Held Tester:

Conclude forced driving of the VSV for the EVAP.

- (1) Stop the engine.
- (2) Disconnect the positive (+) and negative (-) leads from the battery from the VSV terminals for the EVAP.
- (3) Connect the VSV connector for the EVAP.

(h) Disconnect the vacuum gauge from the EVAP service port on the purge line.

(i) Connect a pressure gauge to the EVAP service port on the purge line.



(j) Check the pressure.

- (1) Close off the air drain hose at the marked position of the canister with a hose clipper or similar instrument.

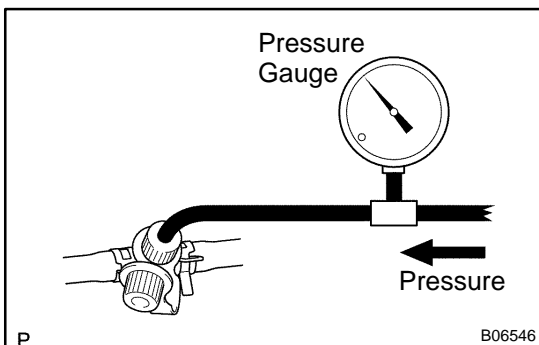
- (2) Add the pressure (13.5 - 15.5 in.Aq) from the EVAP service port.

**Pressure:**

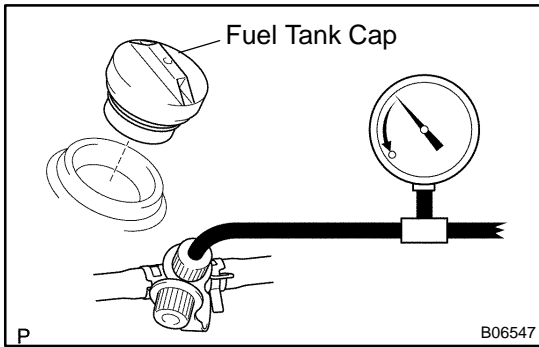
**2 minutes after the pressure is added, the gauge should be over 7.7 - 8.8 in.Aq.**

**HINT:**

If you can't add pressure, you can conclude that the hose connecting the VSV to the canister or fuel tank has slipped off or the VSV is open.





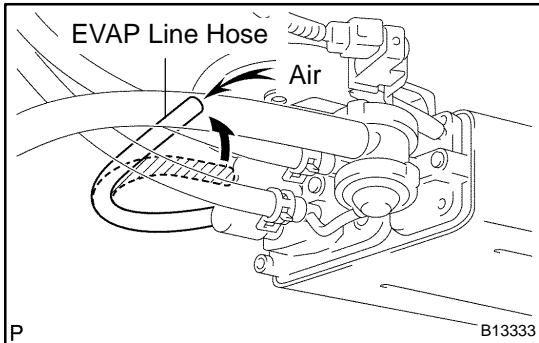


- (3) Check if the pressure decreases when the fuel tank cap is removed while adding pressure.

**HINT:**

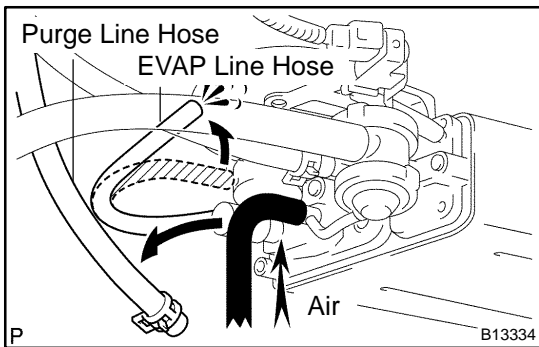
If the pressure does not decrease when the filler cap is removed, then you can conclude that the hose connecting the service port to the fuel tank is blocked, etc.

- (k) Disconnect the pressure gauge from the EVAP service port on the purge line.



**5. CHECK AIRTIGHTNESS IN FUEL TANK AND FILLER PIPE**

- (a) Disconnect the EVAP line hose from the charcoal canister side and then pressurize and make the internal pressure in the fuel tank 4 kPa (41 gf/cm<sup>2</sup>, 0.58 psi).
  - (b) Check that the internal pressure of the fuel tank can be hold for 1 minute.
  - (c) Check the connected portions of each hose and pipe.
  - (d) Check the installed parts on the fuel tank.
- If there is no abnormality, replace the fuel tank and filler pipe.
- (e) Reconnect the EVAP line hose to the charcoal canister.



**6. INSPECT FUEL CUTOFF VALVE AND FILL CHECK VALVE**

- (a) Disconnect the purge line hose and EVAP line hose from the charcoal canister.
- (b) Plug the cap to the air drain hose.
- (c) Pressurize 4 kPa (41 gf/cm<sup>2</sup>, 0.58 psi) to the purge port and check that there is ventilation through the EVAP line hose.

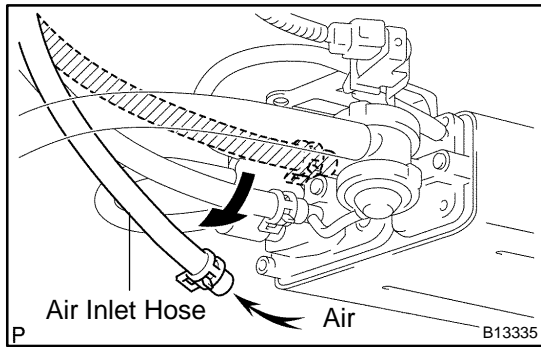
**HINT:**

In the condition that the fuel is full, as the float valve of the fill check valve is closed and has no ventilation, it is necessary to check the fuel amount (volume).

- (d) Check if there is any stuck in the vent line hose and EVAP line hose.

If there is no stuck in hoses, replace the fuel cutoff valve and fill check valve.

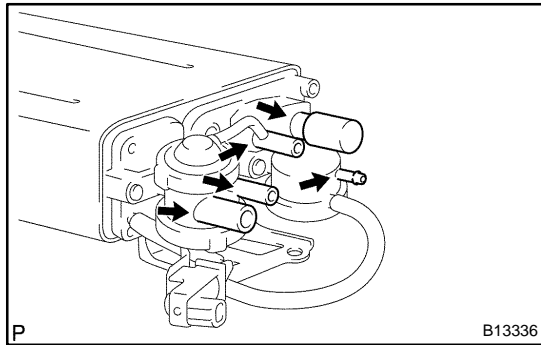
- (e) Reconnect the purge line hose and EVAP line hose to the charcoal canister.



**7. CHECK AIR INLET LINE**

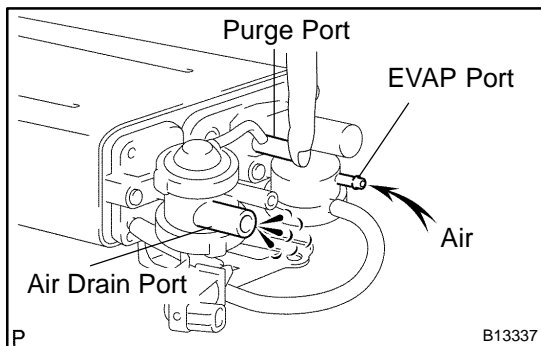
- (a) Disconnect the air inlet line hose from the charcoal canister.
- (b) Check that there is ventilation in the air inlet line.
- (c) Reconnect the air inlet line hose to the charcoal canister.

**8. REMOVE CHARCOAL CANISTER ASSEMBLY**

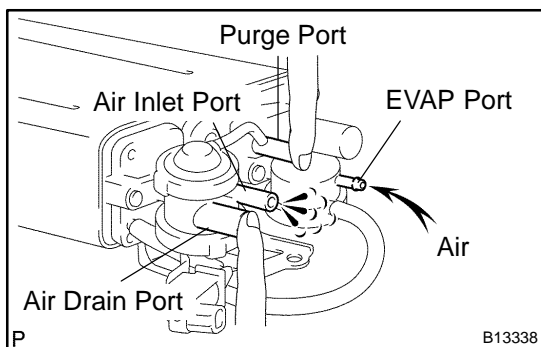


**9. INSPECT CHARCOAL CANISTER**

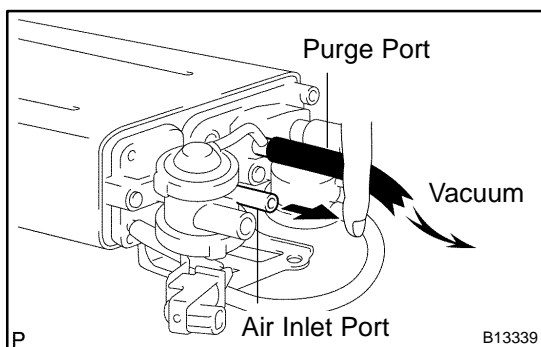
- (a) Visually check the charcoal canister for cracks or damage.



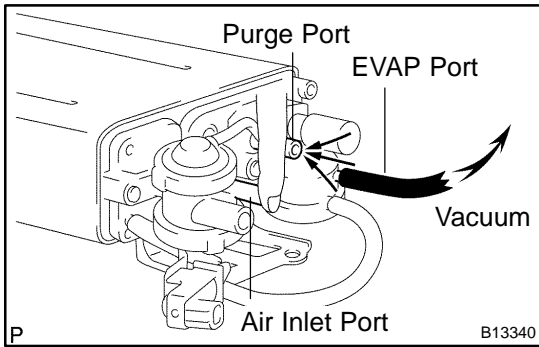
- (b) Inspect the charcoal canister operation.
  - (1) While holding the purge port closed, blow air (1.76 kPa, 18 gf/cm<sup>2</sup>, 0.26 psi) into the EVAP port and check that air flows from the air drain port.



- (2) While holding the purge port and the air drain port closed, blow air (1.76 kPa, 18 gf/cm<sup>2</sup>, 0.26 psi) into the EVAP port and check that air does not flow from the air inlet port.



- (3) Apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the purge port, check that the vacuum does not decrease when the air inlet port is closed, and check that the vacuum decreases when the air inlet port is released.



- (4) While holding the air inlet port closed, apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in Hg) to the EVAP port and check that air flows into the purge port.

If operation is not as specified, replace the charcoal canister.

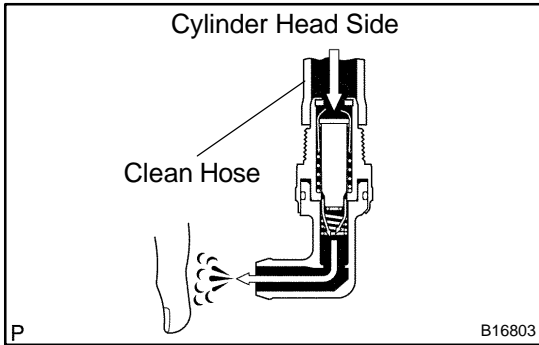
- (5) Remove the cap from the vent port.

10. **INSPECT VSV FOR EVAP (See page SF-44 )**
11. **INSPECT VSV FOR CANISTER CLOSED VALVE (CCV) (See page SF-48 )**
12. **INSPECT VSV FOR VAPOR PRESSURE SENSOR (See page SF-46 )**
13. **INSPECT VAPOR PRESSURE SENSOR (See page SF-52 )**
14. **REINSTALL CHARCOAL CANISTER ASSEMBLY**

# POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM INSPECTION

EC07K-04

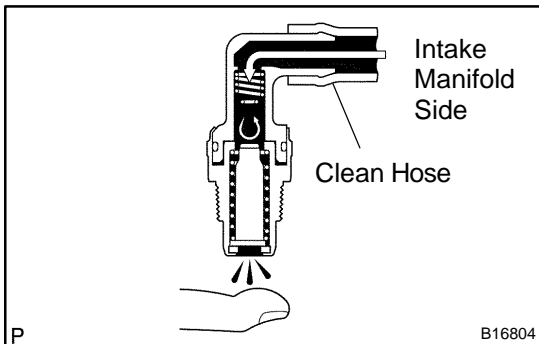
1. REMOVE V-BANK COVER
2. INSPECT PCV VALVE
  - (a) Remove the PCV valve.



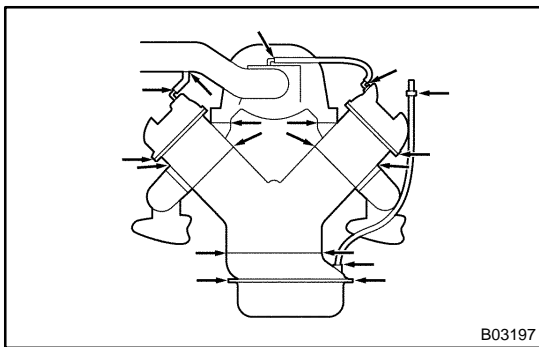
- (b) Install a clean hose to the PCV valve.
- (c) Inspect the PCV valve operation.
  - (1) Blow air into the cylinder head side, and check that air passes through easily.

**CAUTION:**

**Do not suck air through the valve. Petroleum substances inside the valve are harmful.**

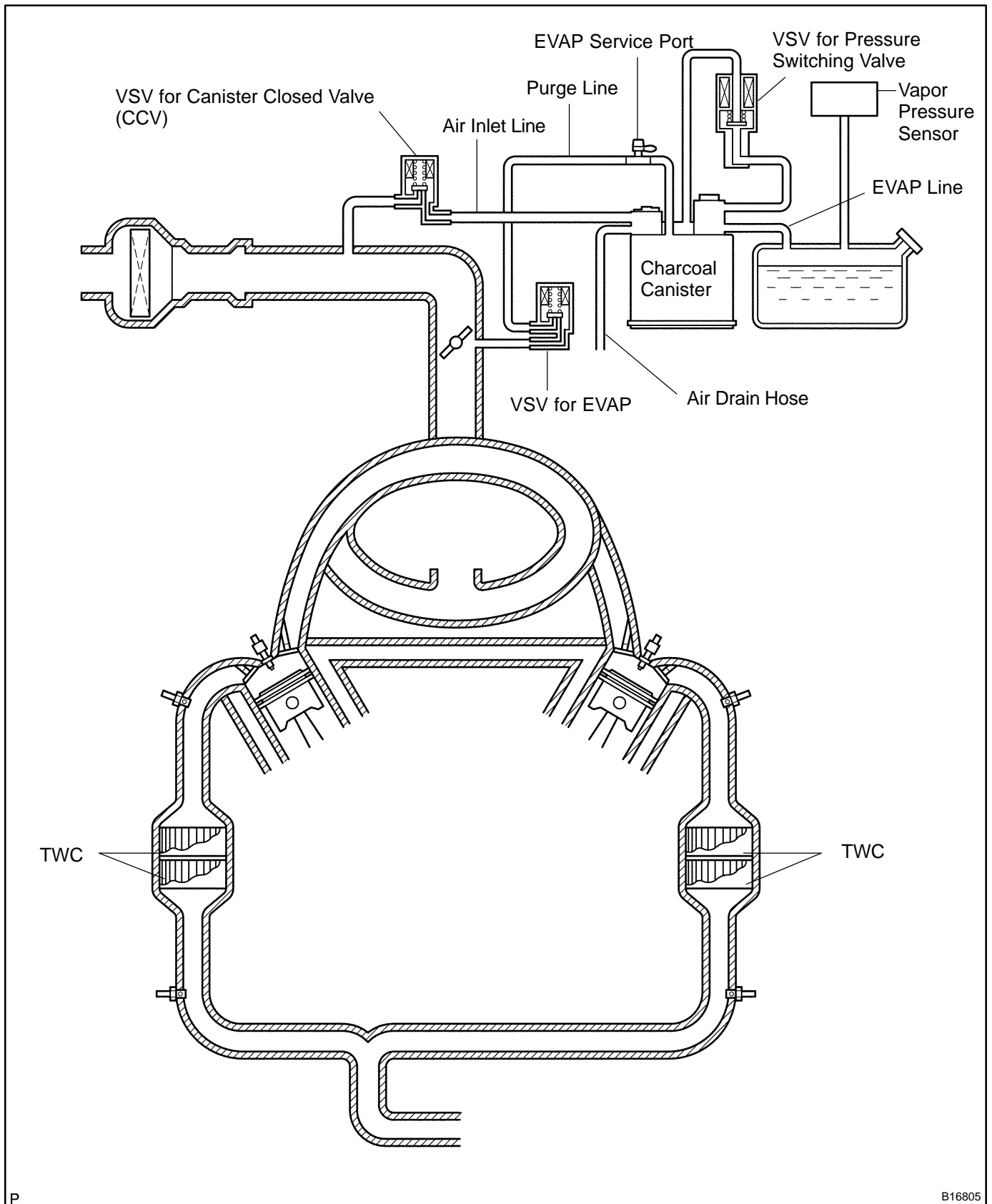


- (2) Blow air into the intake manifold side, and check that air passes through with difficulty.
- If operation is not as specified, replace the PCV valve.
- (d) Remove the clean hose from the PCV valve.
  - (e) Reinstall the PCV valve.



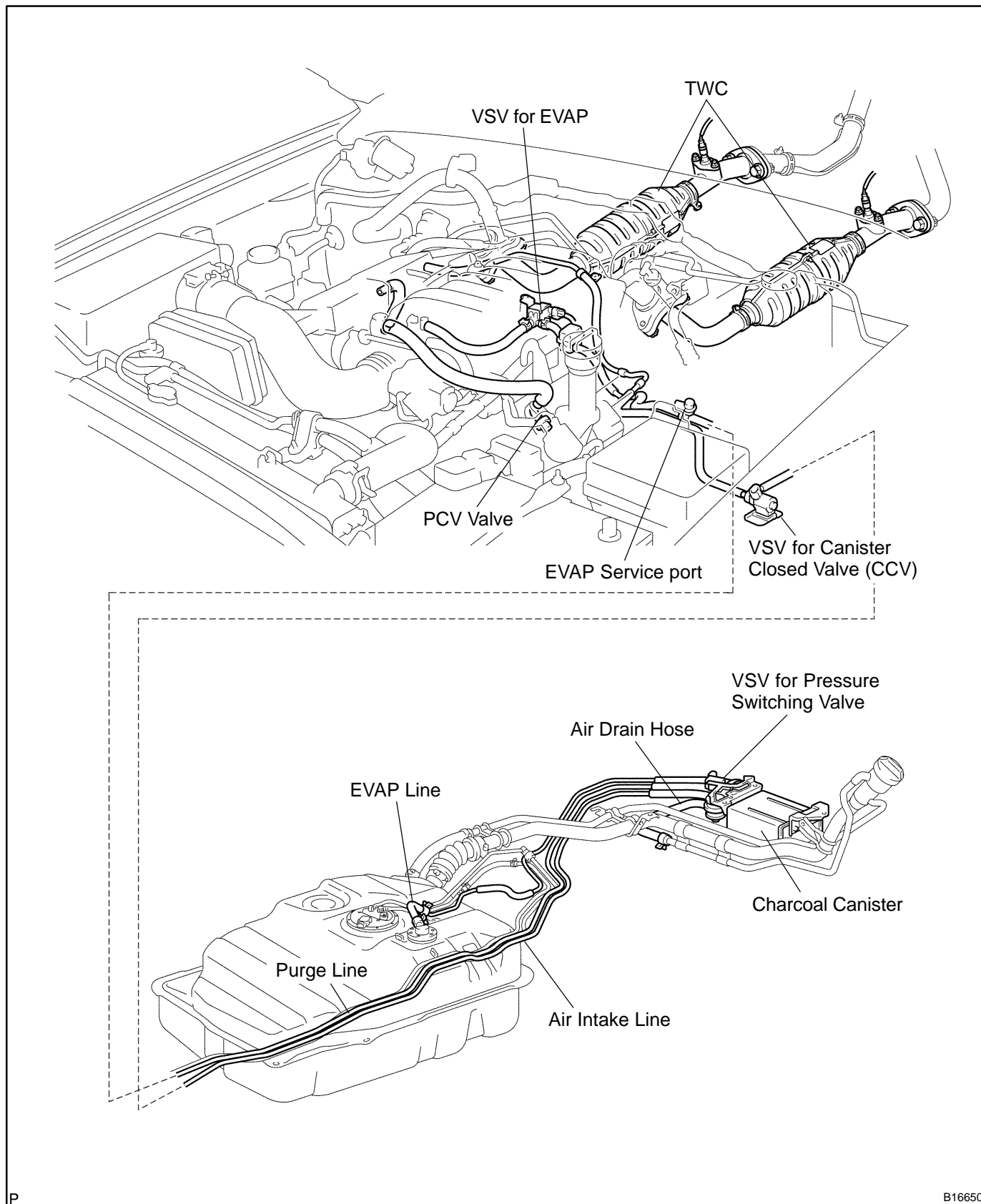
3. INSPECT HOSES, CONNECTIONS AND GASKETS  
Visually for cracks, leaks or damage.
4. REINSTALL V-BANK COVER

# DRAWING



# PARTS LAYOUT AND SCHEMATIC DRAWING LOCATION

EC071-09

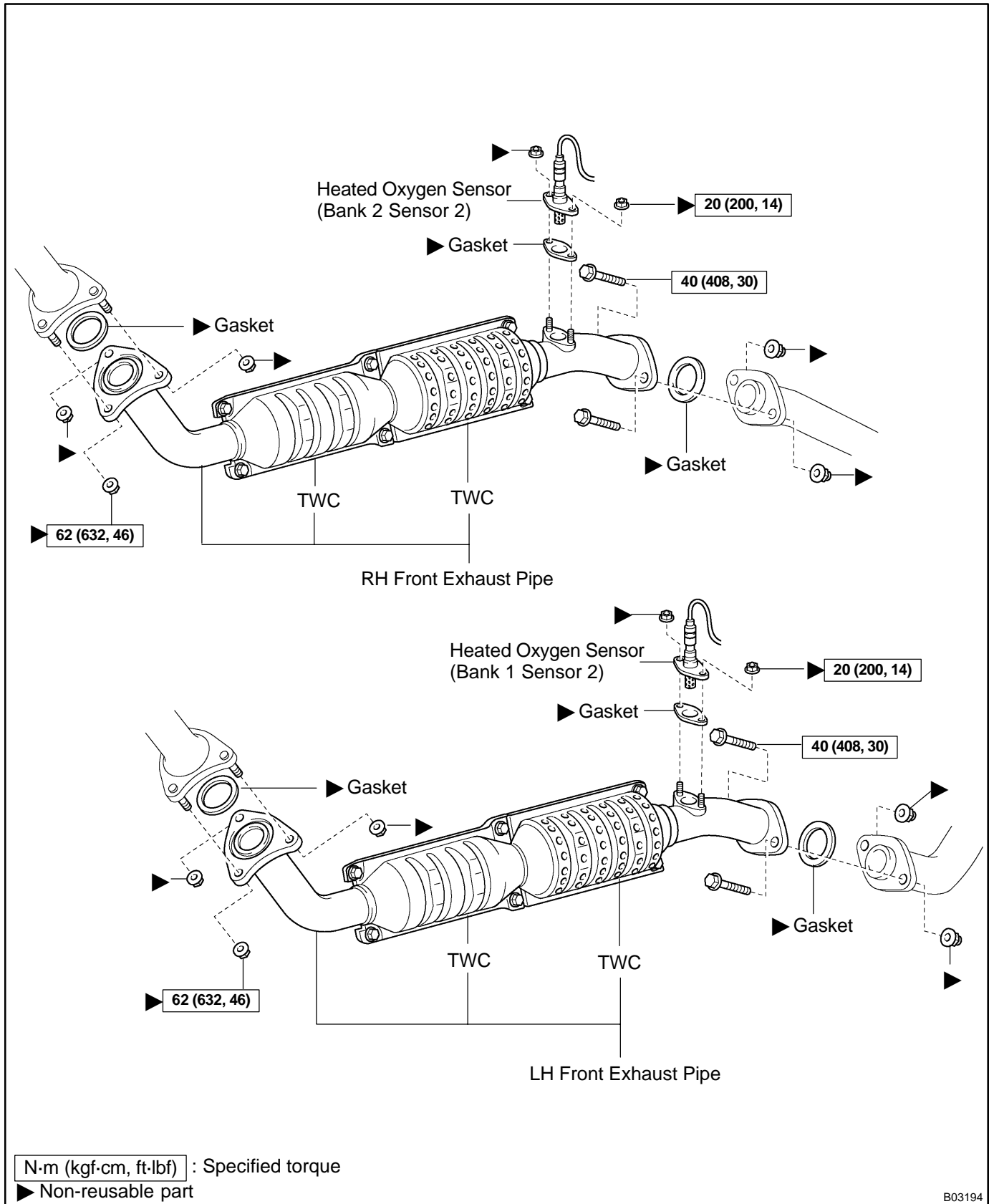


P

B16650

# THREE-WAY CATALYTIC CONVERTER (TWC) SYSTEM COMPONENTS

EC07M-02



## INSPECTION

### 1. CHECK EXHAUST PIPE ASSEMBLY

- (a) Check the connections for looseness or damage.
- (b) Check the clamps for weakness, cracks or damage.

### 2. INSPECT TWC

Check for dents or damage.

If any part of protector is damaged or dented to the extent that it contacts the TWC, repair or replace it.

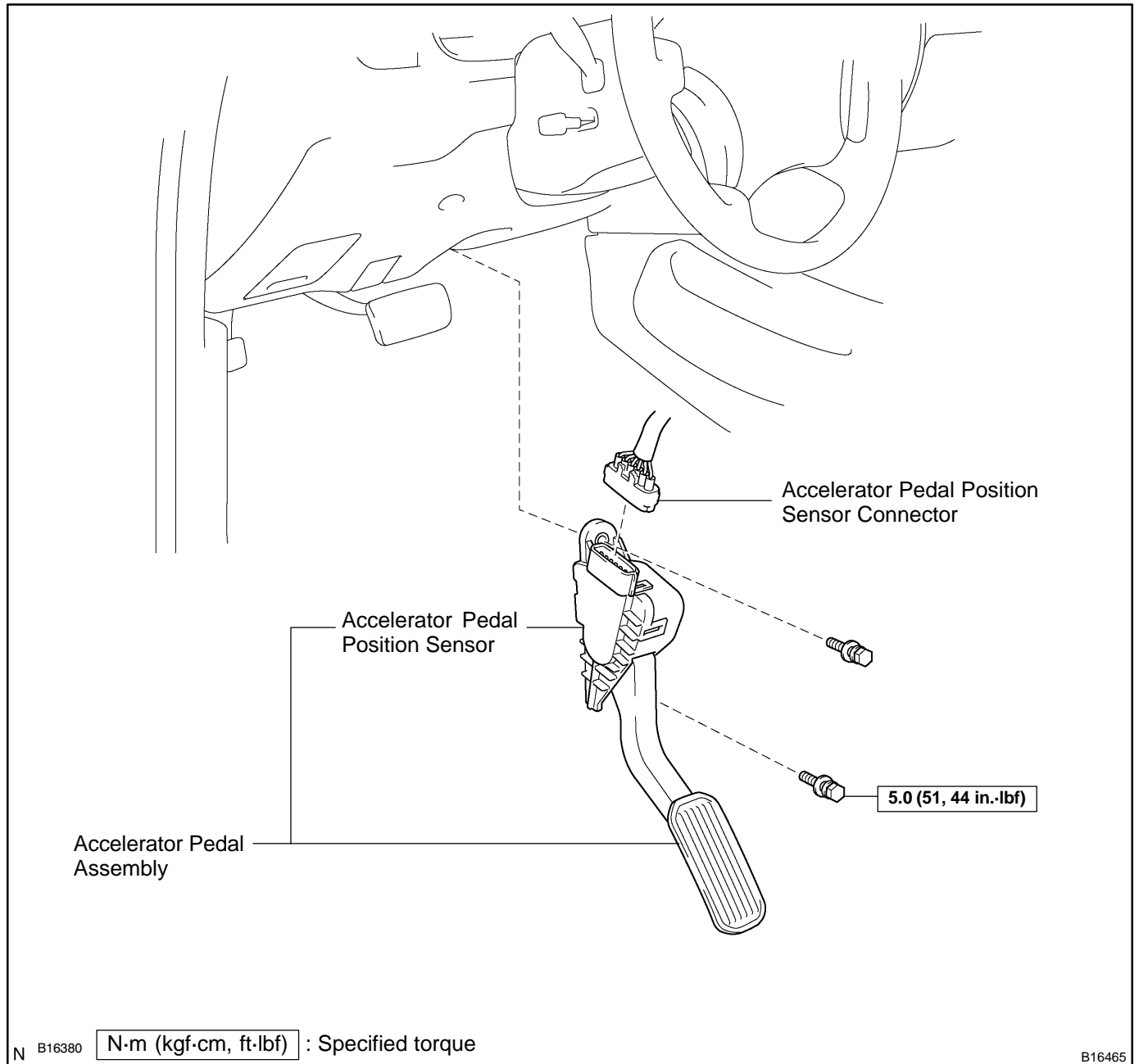
### 3. INSPECT HEAT INSULATOR

- (a) Check the heat insulator for damage.
- (b) Check for adequate clearance between the TWC and heat insulator.



# ACCELERATOR PEDAL POSITION SENSOR COMPONENTS

SF1UM-03



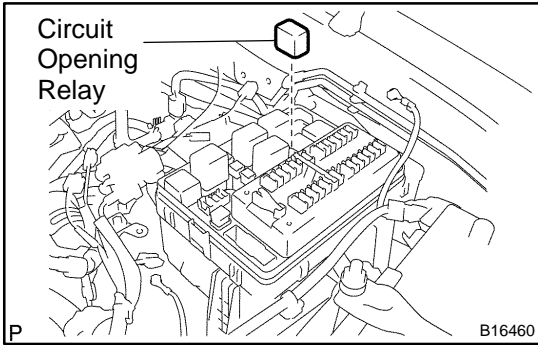
## INSPECTION

### INSPECT ACCELERATOR PEDAL POSITION SENSOR (See page [DI-318](#) )

If necessary, replace the accelerator pedal assembly.

#### NOTICE:

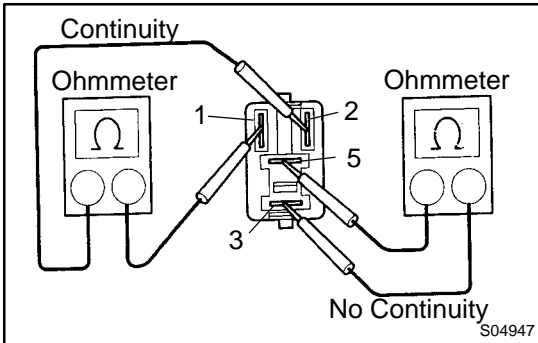
- ▶ Be careful not to give a shock to the accelerator pedal assembly.
- ▶ Be careful not to disassemble the accelerator pedal assembly.



# CIRCUIT OPENING RELAY INSPECTION

SF136-06

1. REMOVE RELAY BOX COVER
2. REMOVE CIRCUIT OPENING RELAY (Marking: C/OPN)

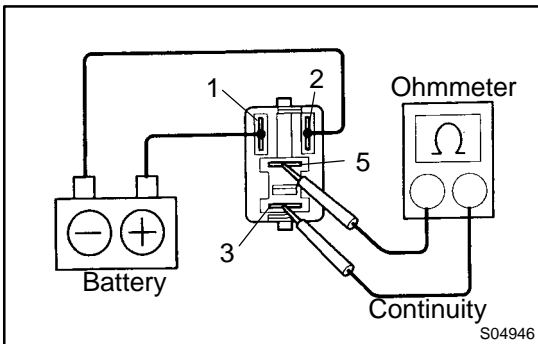


3. INSPECT CIRCUIT OPENING RELAY CONTINUITY
  - (a) Using an ohmmeter, check that there is a continuity between terminal 1 and 2.

If there is no continuity, replace the relay.

  - (b) Check that there is no continuity between terminal 3 and 5.

If there is a continuity, replace the relay.

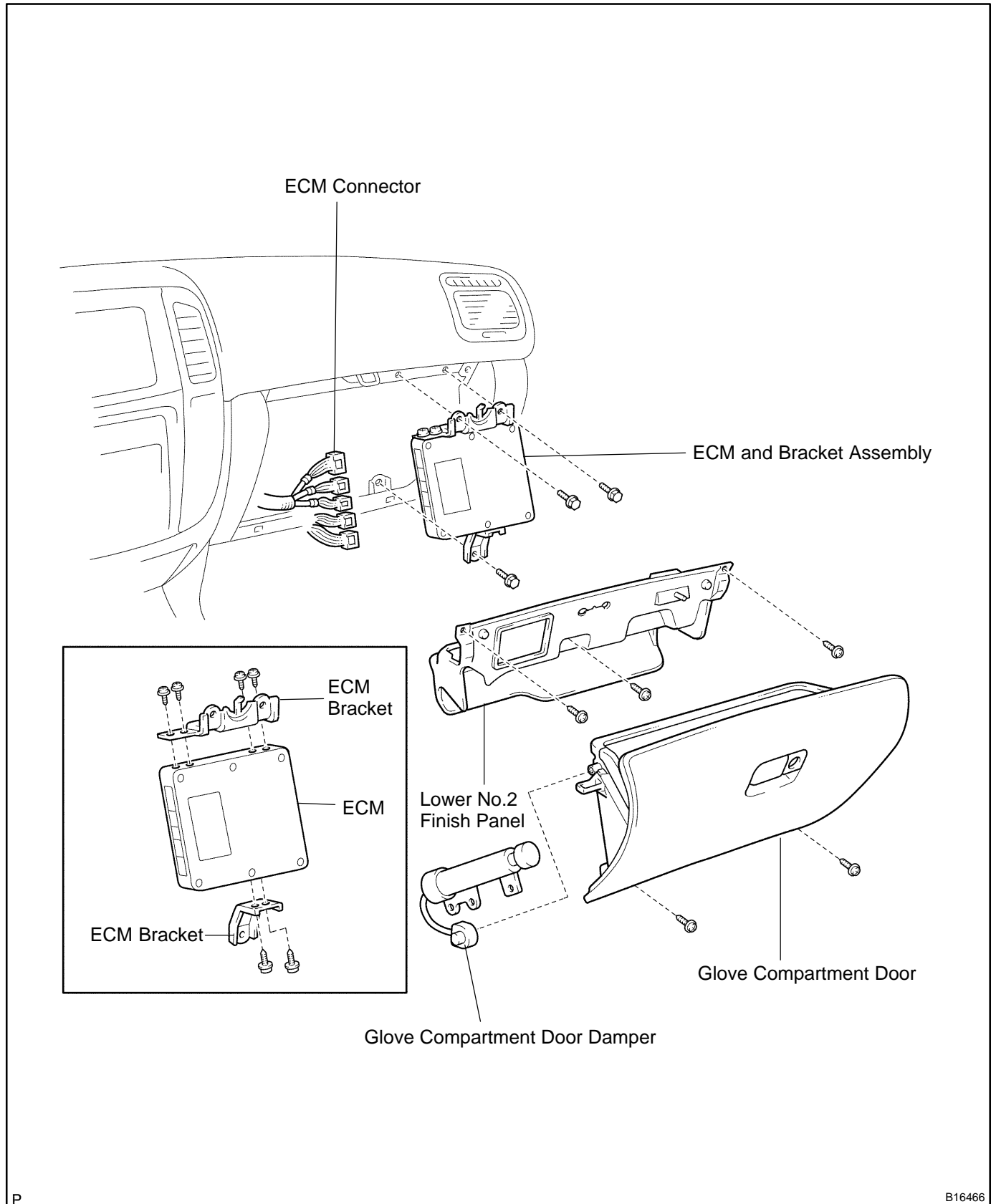


4. INSPECT CIRCUIT OPENING RELAY OPERATION
  - (a) Apply the battery positive voltage across terminal 1 and 2.
  - (b) Using an ohmmeter, check that there is a continuity between terminal 3 and 5.

If there is no continuity, replace the relay.
5. REINSTALL CIRCUIT OPENING RELAY
6. REINSTALL RELAY BOX COVER

# ENGINE CONTROL MODULE (ECM) COMPONENTS

SF000-12



P

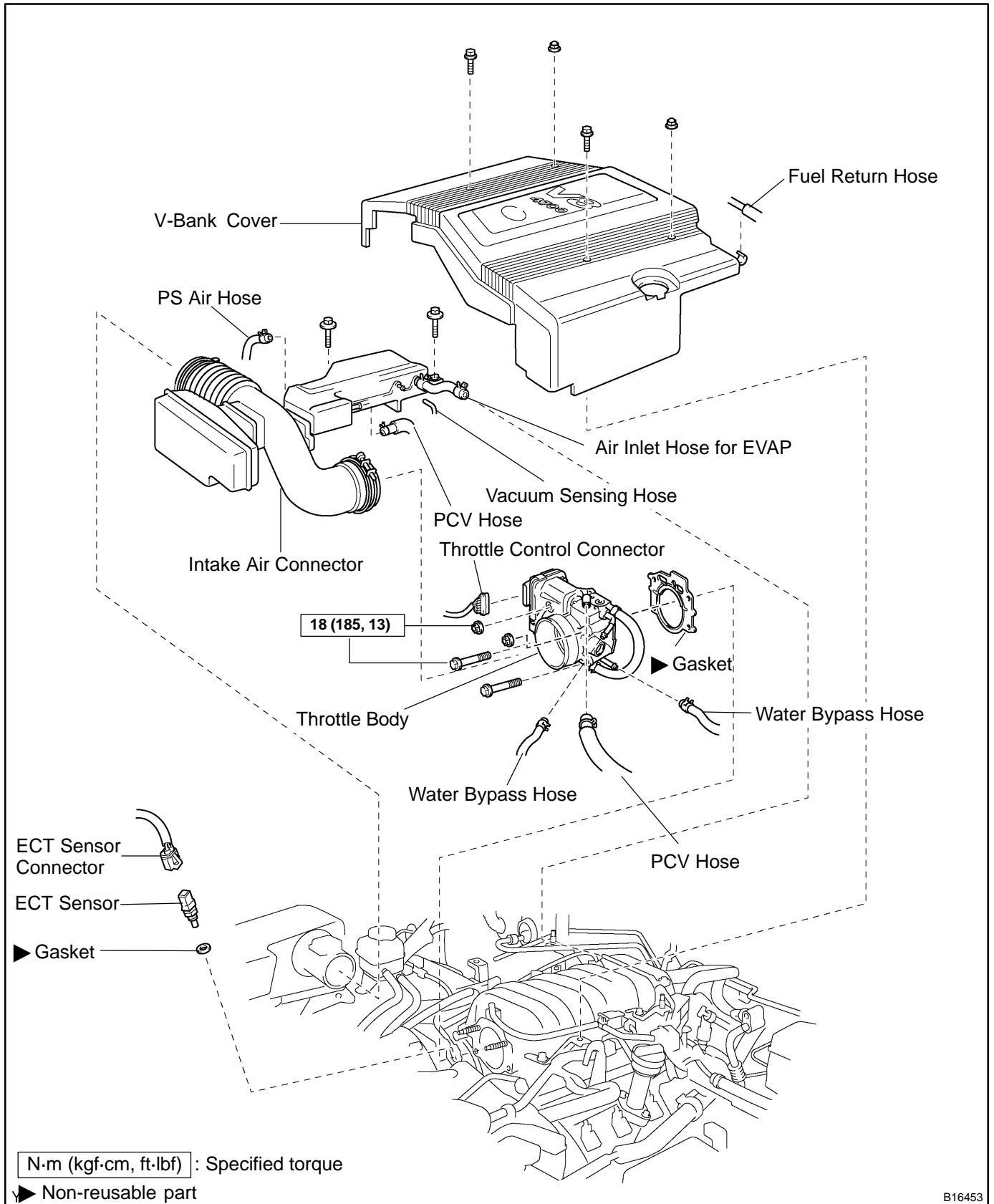
B16466

## INSPECTION

1. REMOVE ECM
2. INSPECT ECM (See page [DI-46](#) )
3. REINSTALL ECM

# ENGINE COOLANT TEMPERATURE (ECT) SENSOR COMPONENTS

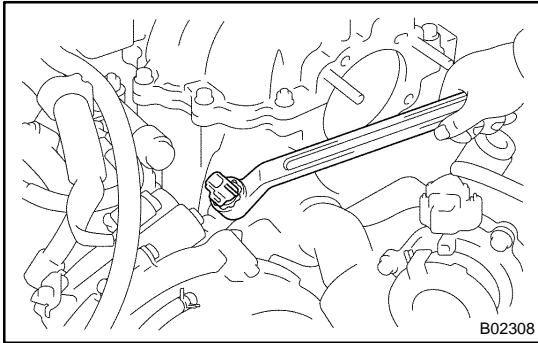
SFOPN-11



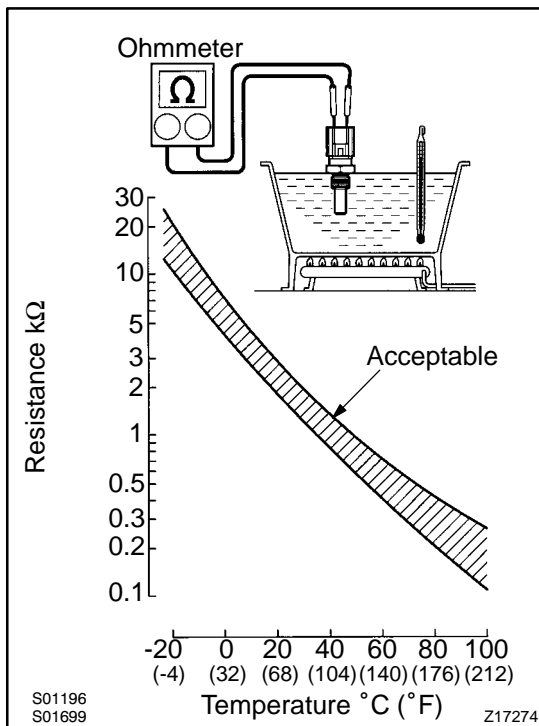
B16453

## INSPECTION

1. DRAIN ENGINE COOLANT
2. REMOVE V-BANK COVER
3. REMOVE INTAKE AIR CONNECTOR
4. DISCONNECT THROTTLE BODY FROM INTAKE MANIFOLDS (See page SF-36 )



5. REMOVE ECT SENSOR
  - (a) Disconnect the ECT sensor connector.
  - (b) Remove the ECT sensor and the gasket.



### 6. INSPECT ECT SENSOR

Using an ohmmeter, measure the resistance between the terminals.

**Resistance: Refer to the graph**

If the resistance is not as specified, replace the ECT sensor.

### 7. REINSTALL ECT SENSOR

- (a) Install a new gasket and the ECT sensor.  
**Torque: 20.4 N·m (208 kgf·cm, 15 ft·lbf)**
- (b) Connect the ECT sensor connector.

### 8. REINSTALL THROTTLE BODY TO INTAKE MANIFOLDS

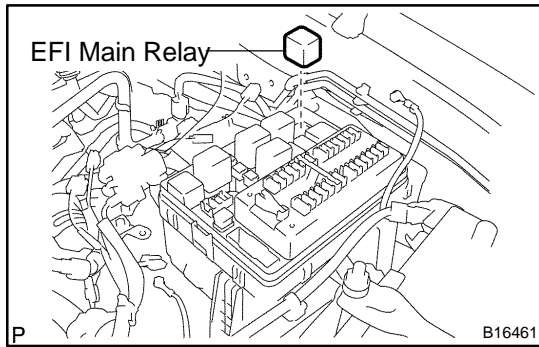
Install a new gasket and the throttle body with the 2 bolts and 2 nuts.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

### 9. REINSTALL INTAKE AIR CONNECTOR

### 10. REFILL WITH ENGINE COOLANT (See page CO-2 )

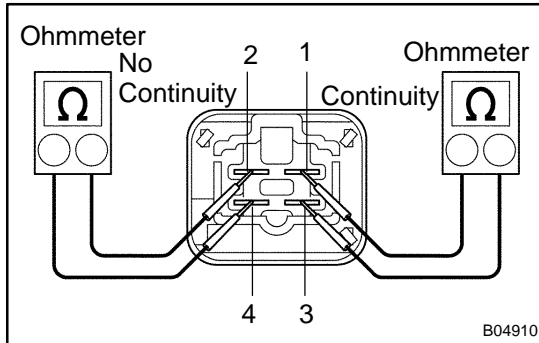
### 11. REINSTALL V-BANK COVER



## EFI MAIN RELAY INSPECTION

SF06G-18

1. REMOVE RELAY BOX COVER
2. REMOVE EFI MAIN RELAY (Marking: EFI)



### 3. INSPECT EFI MAIN RELAY

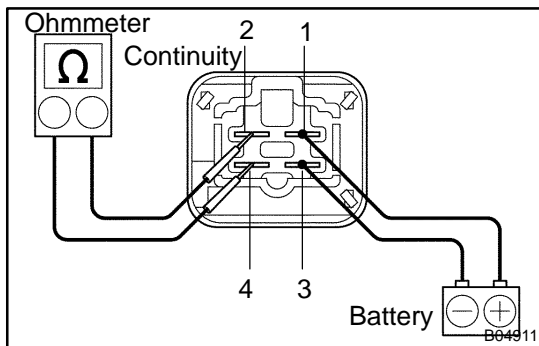
- (a) Inspect the relay continuity.

- (1) Using an ohmmeter, check that there is a continuity between terminal 1 and 3.

If there is no continuity, replace the relay.

- (2) Check that there is no continuity between terminals 2 and 4.

If there is a continuity, replace the relay.



- (b) Inspect the relay operation.

- (1) Apply battery positive voltage across terminals 1 and 3.

- (2) Using an ohmmeter, check that there is a continuity between terminal 2 and 4.

If there is no continuity, replace the relay.

4. REINSTALL EFI MAIN RELAY
5. REINSTALL RELAY BOX COVER

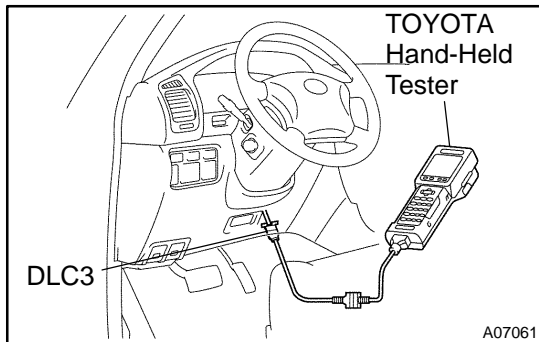


# FUEL CUT RPM INSPECTION

SF002-14

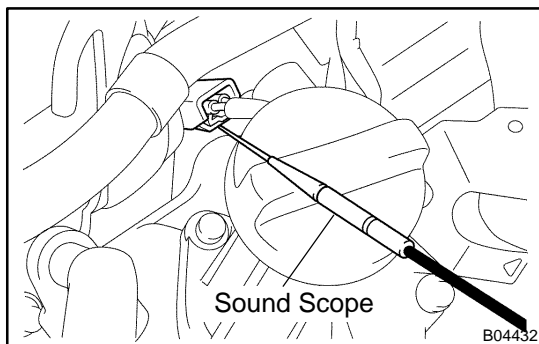
## 1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.



## 2. CONNECT TOYOTA HAND-HELD TESTER OR OBDII SCAN TOOL

- (a) Connect the TOYOTA hand-held tester or OBDII scan tool to the DLC3.
- (b) Please refer to the TOYOTA hand-held tester or OBDII scan tool operator's manual for further details.



## 3. INSPECT FUEL CUTOFF RPM OPERATION

- (a) Increase the engine speed to at least 2,500 rpm.
- (b) Check the injector for operating noise.
- (c) Check that when the throttle lever is released, injector operation noise stops momentarily and then resumes.

### HINT:

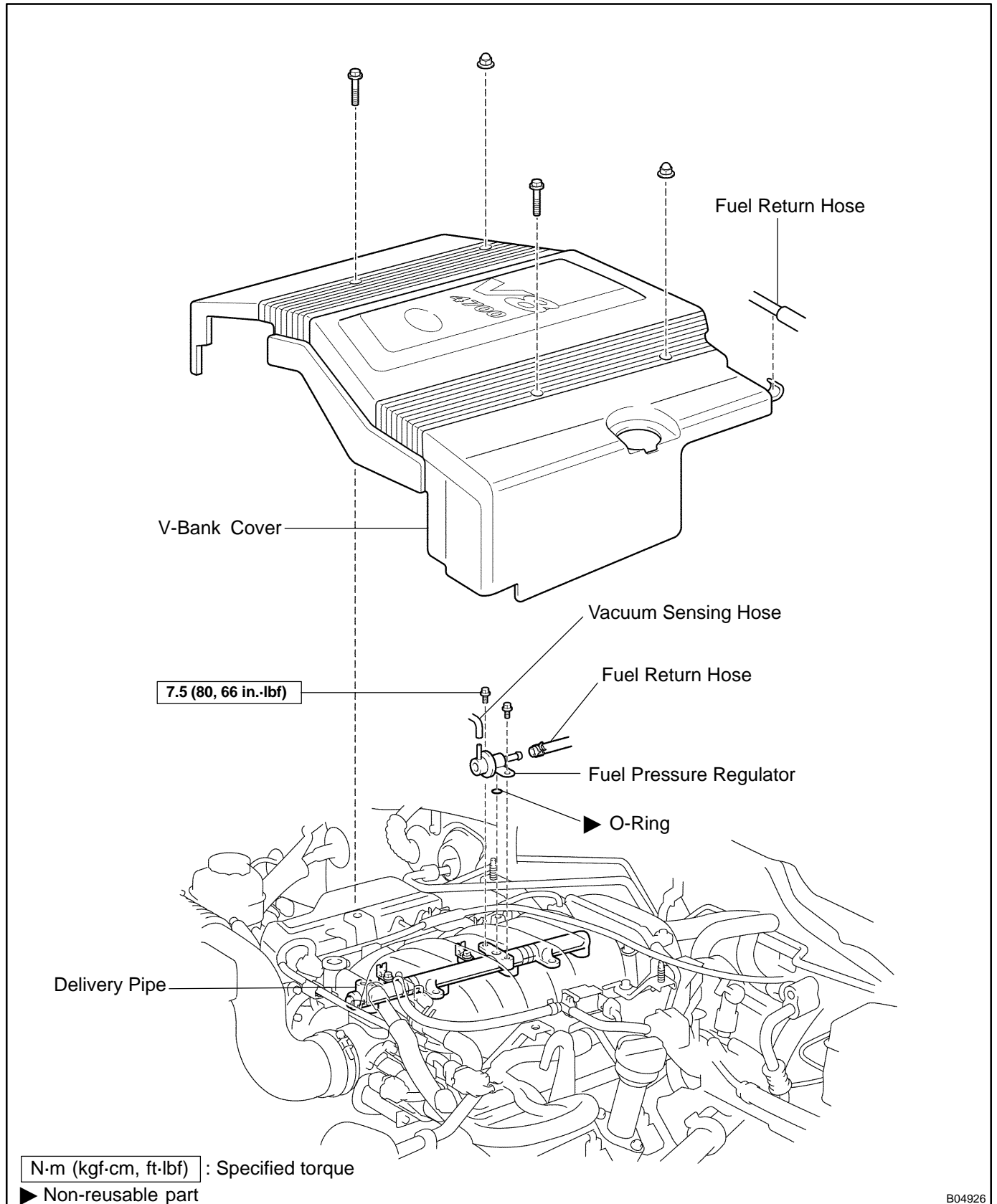
- ▶ The vehicle should be at rest during the inspection.
- ▶ Inspection with the A/C OFF.

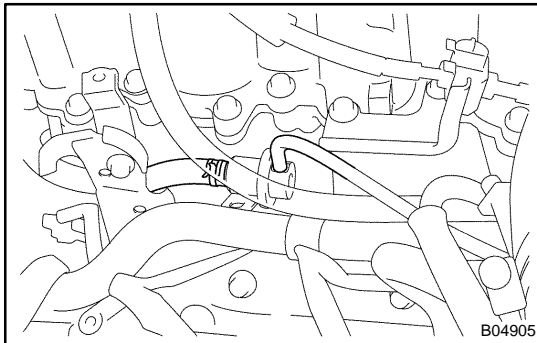
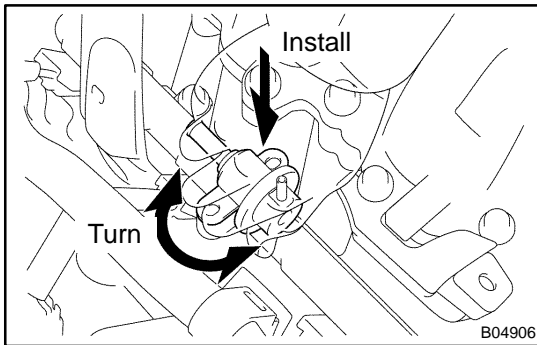
**Fuel return speed: 1,000 rpm**

## 4. DISCONNECT TOYOTA HAND-HELD TESTER OR OBDII SCAN TOOL

# FUEL PRESSURE REGULATOR COMPONENTS

SFOXZ-11





## INSTALLATION

### 1. INSTALL FUEL PRESSURE REGULATOR

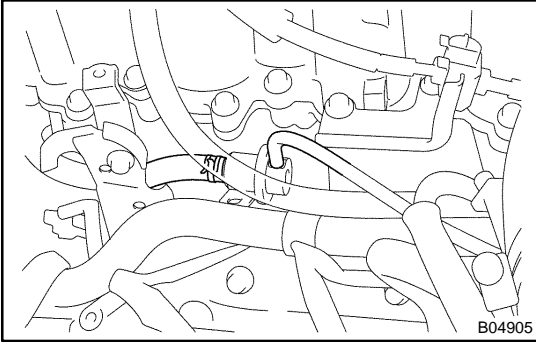
- Apply a light coat of gasoline to a new O-ring, and install it to the fuel pressure regulator.
- While turning the fuel pressure regulator left and right, install it to the delivery pipe.
- Install the fuel pressure regulator with the 2 bolts.

**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**

- Connect the vacuum sensing hose to the fuel pressure regulator.
- Connect the fuel return hose to the pressure regulator.

### 2. CHECK FOR FUEL LEAKS (See page SF-1 )

### 3. INSTALL V-BANK COVER



## REMOVAL

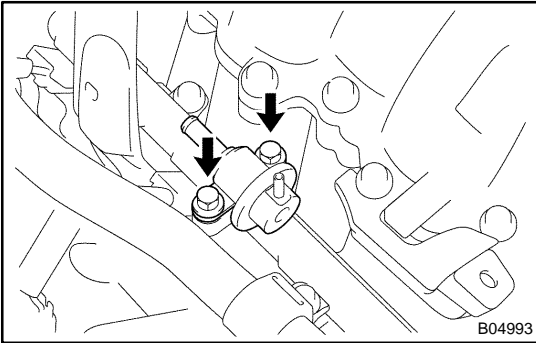
### 1. REMOVE V-BANK COVER

### 2. REMOVE FUEL PRESSURE REGULATOR

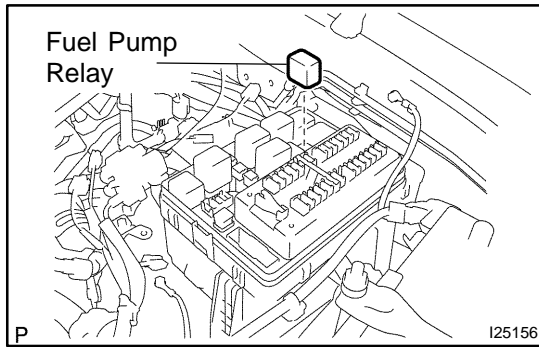
- (a) Disconnect the vacuum sensing hose from the fuel pressure regulator.
- (b) Disconnect the fuel return hose from the fuel pressure regulator.

### CAUTION:

**Put a shop rag under the fuel pressure regulator.**



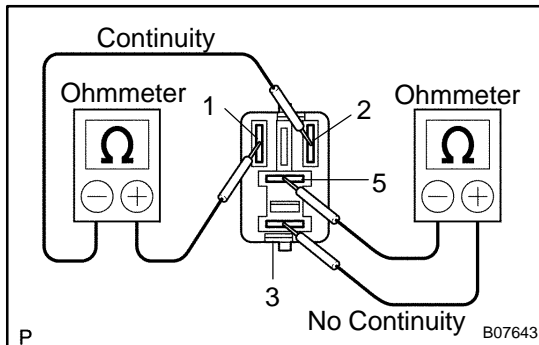
- (c) Remove the 2 bolts, and pull out the pressure regulator.
- (d) Remove the O-ring from the fuel pressure regulator.



## FUEL PUMP RELAY INSPECTION

SF137-06

1. REMOVE RELAY BOX COVER
2. REMOVE FUEL PUMP RELAY (Marking: F/PUMP)



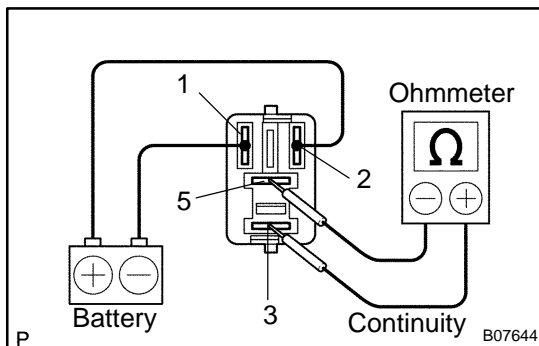
### 3. INSPECT FUEL PUMP RELAY CONTINUITY

- (a) Using an ohmmeter, check that there is a continuity between terminal 1 and 2.

If there is no continuity, replace the relay.

- (b) Check that there is no continuity between terminals 3 and 5.

If there is a continuity, replace the relay.



### 4. INSPECT FUEL PUMP RELAY OPERATION

- (a) Apply the battery positive voltage across terminal 1 and 2.

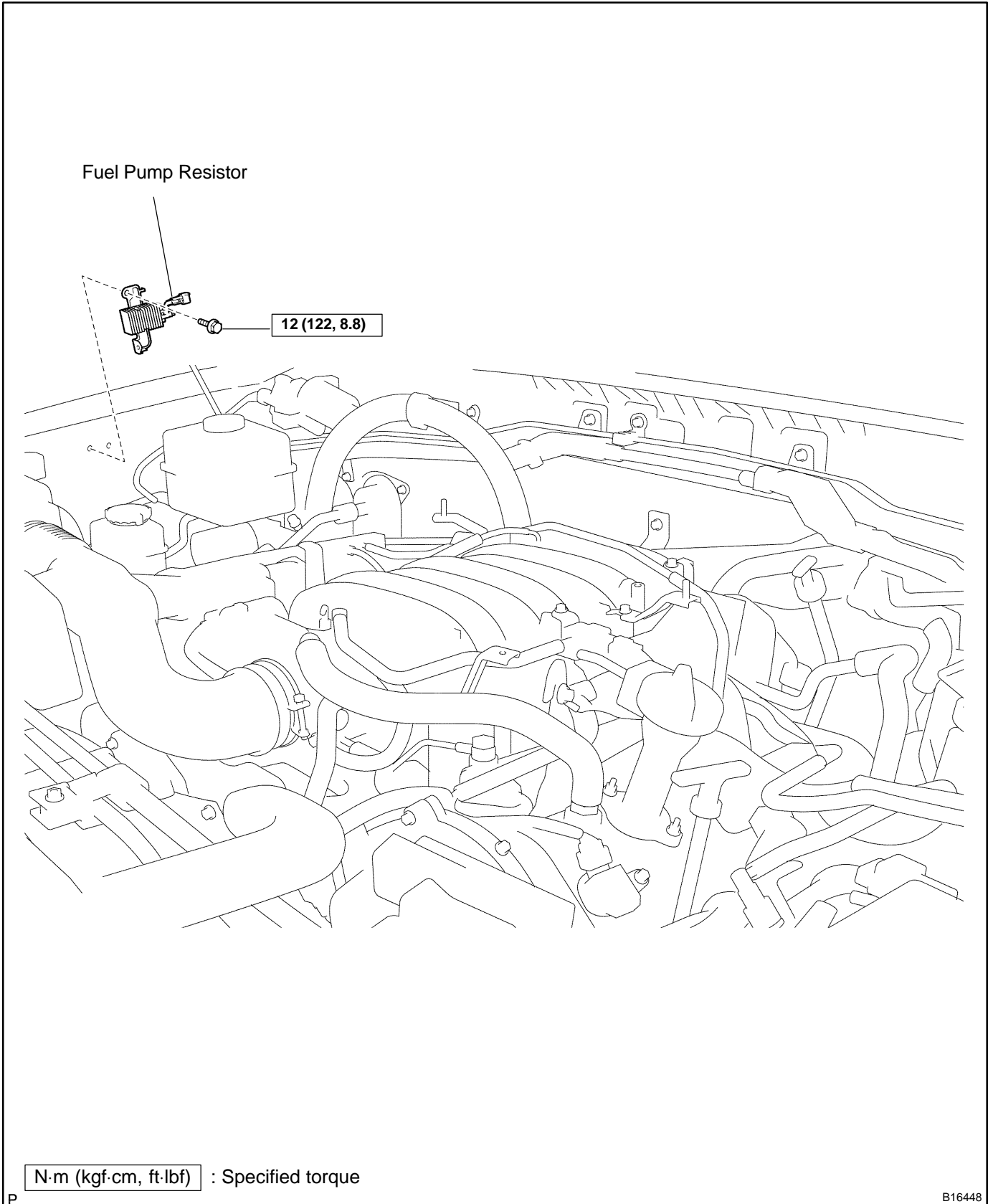
- (b) Using an ohmmeter, check that there is a continuity between terminal 3 and 5.

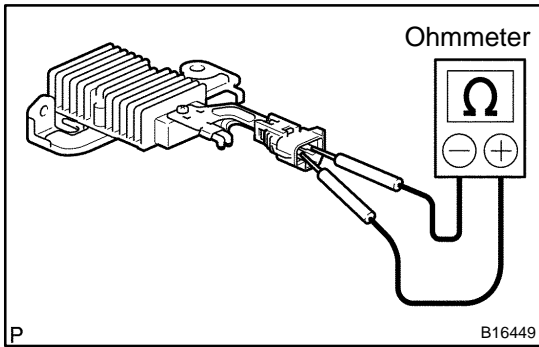
If there is no continuity, replace the relay.

5. REINSTALL FUEL PUMP RELAY
6. REINSTALL RELAY BOX COVER

# FUEL PUMP RESISTOR COMPONENTS

SF138-04





## INSPECTION

1. REMOVE FUEL PUMP RESISTOR
2. INSPECT FUEL PUMP RESISTOR

Using an ohmmeter, measure the resistance between the terminals.

**Resistance: 0.70 - 0.76  $\Omega$  at 20°C (68°F)**

If the resistance is not as specified, replace the resistor.

3. REINSTALL FUEL PUMP RESISTOR

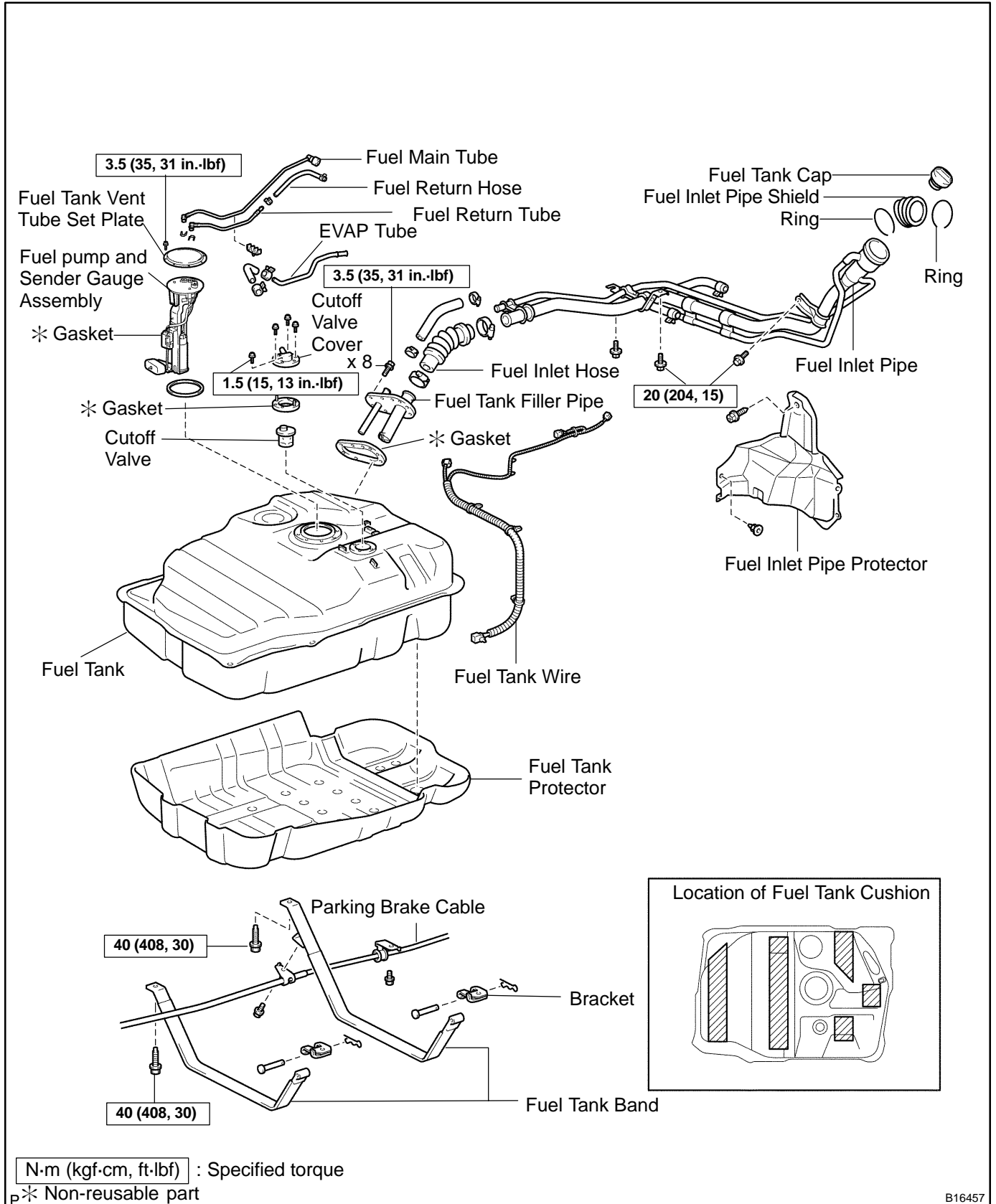
**Torque: 12 N·m (122 kgf·cm, 8.8 ft·lbf)**

# FUEL TANK AND LINE COMPONENTS

SF00Z-15

## CAUTION:

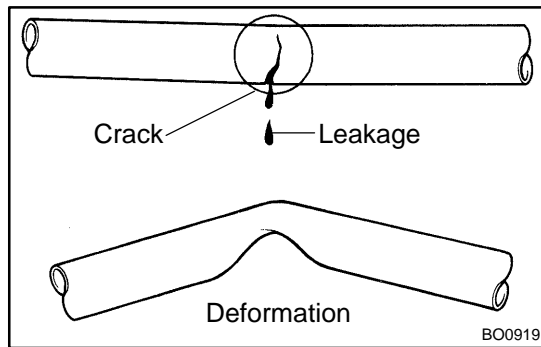
- ▶ Always use new gaskets when replacing the fuel tank or component parts.
- ▶ Apply the proper torque to all tightening parts.



B16457

2004 LAND CRUISER (RM1071U)



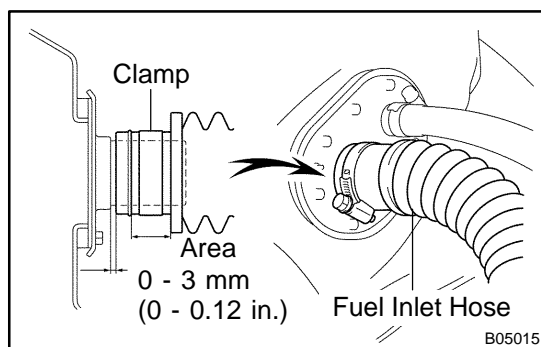
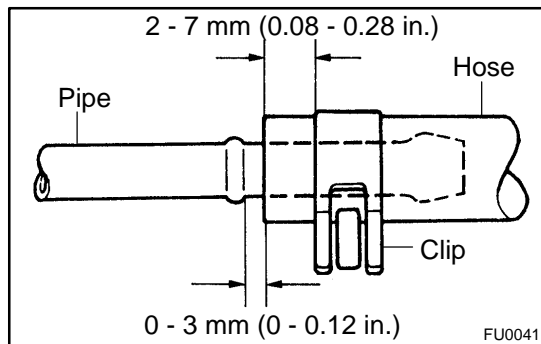


## INSPECTION

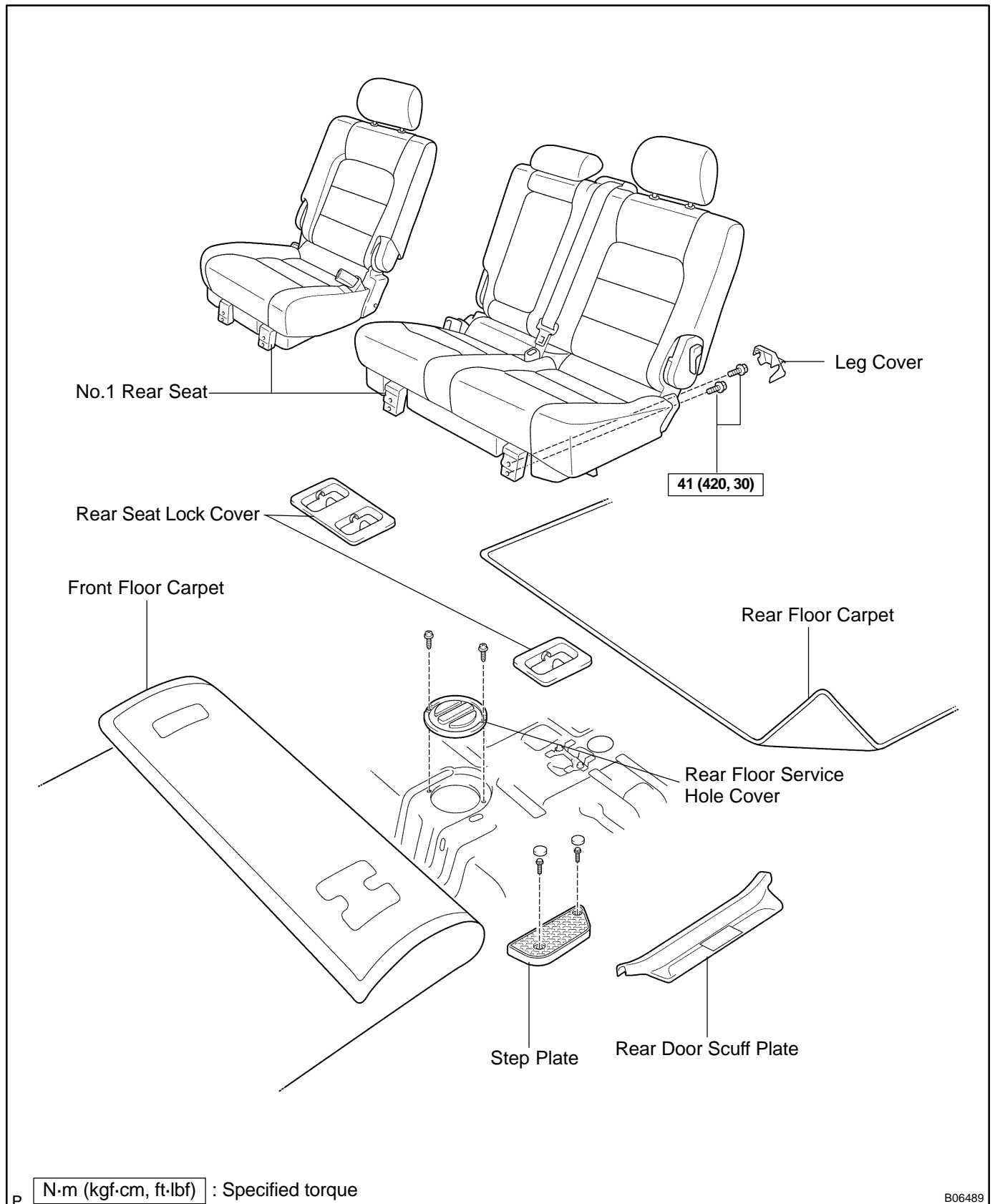
### INSPECT FUEL TANK AND LINE

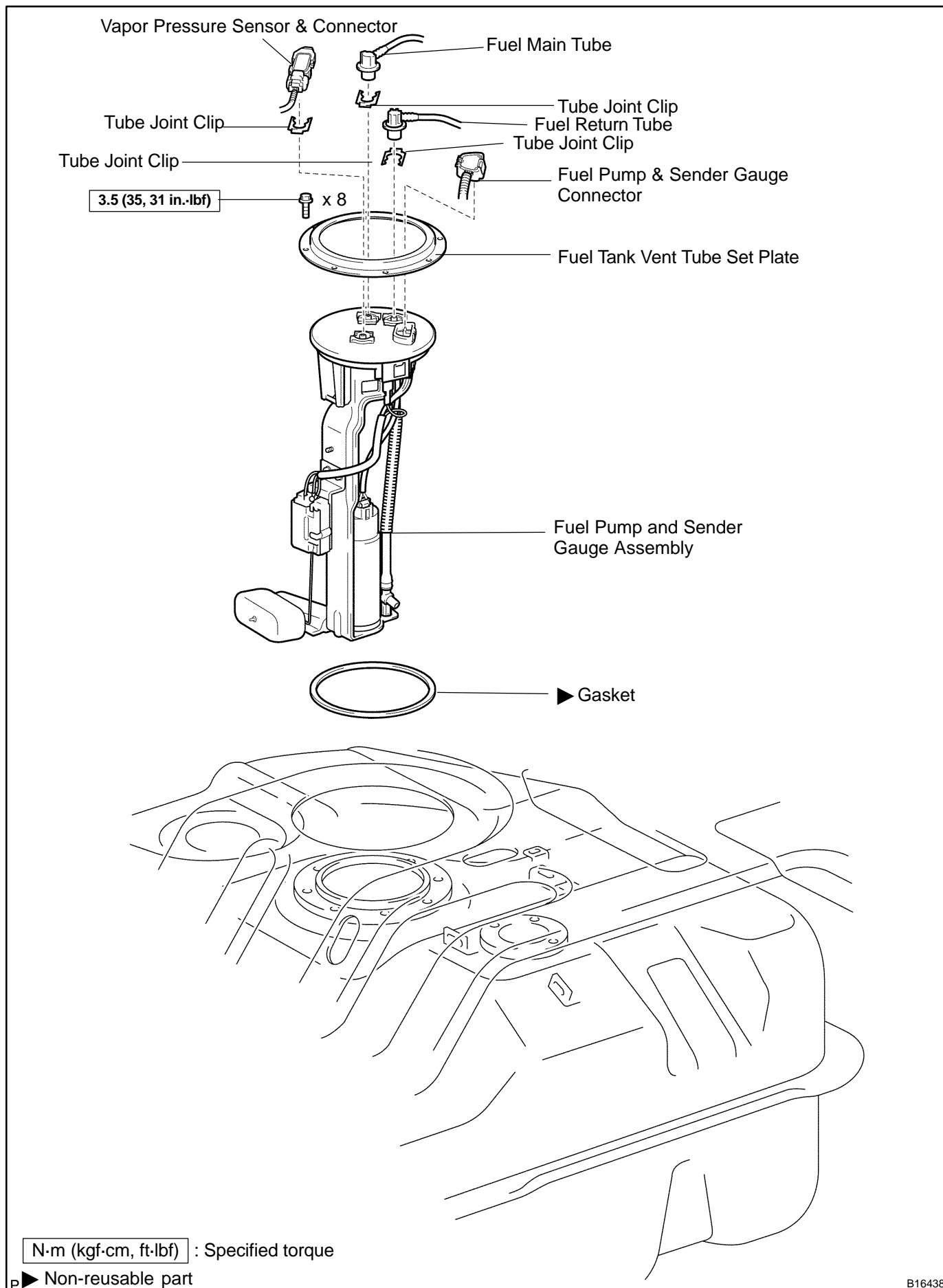
- Check the fuel lines from cracks or leakage, and all connections for deformation.
- Check the fuel tank vapor vent system hoses and all connections for looseness, sharp bends or damage.
- Check the fuel tank for deformation, cracks, fuel leakage or tank band looseness.
- Check the filler neck for damage or fuel leakage.
- Hose and pipe connections are as shown in the illustration.

If a problem is found, repair or replace the parts as necessary.

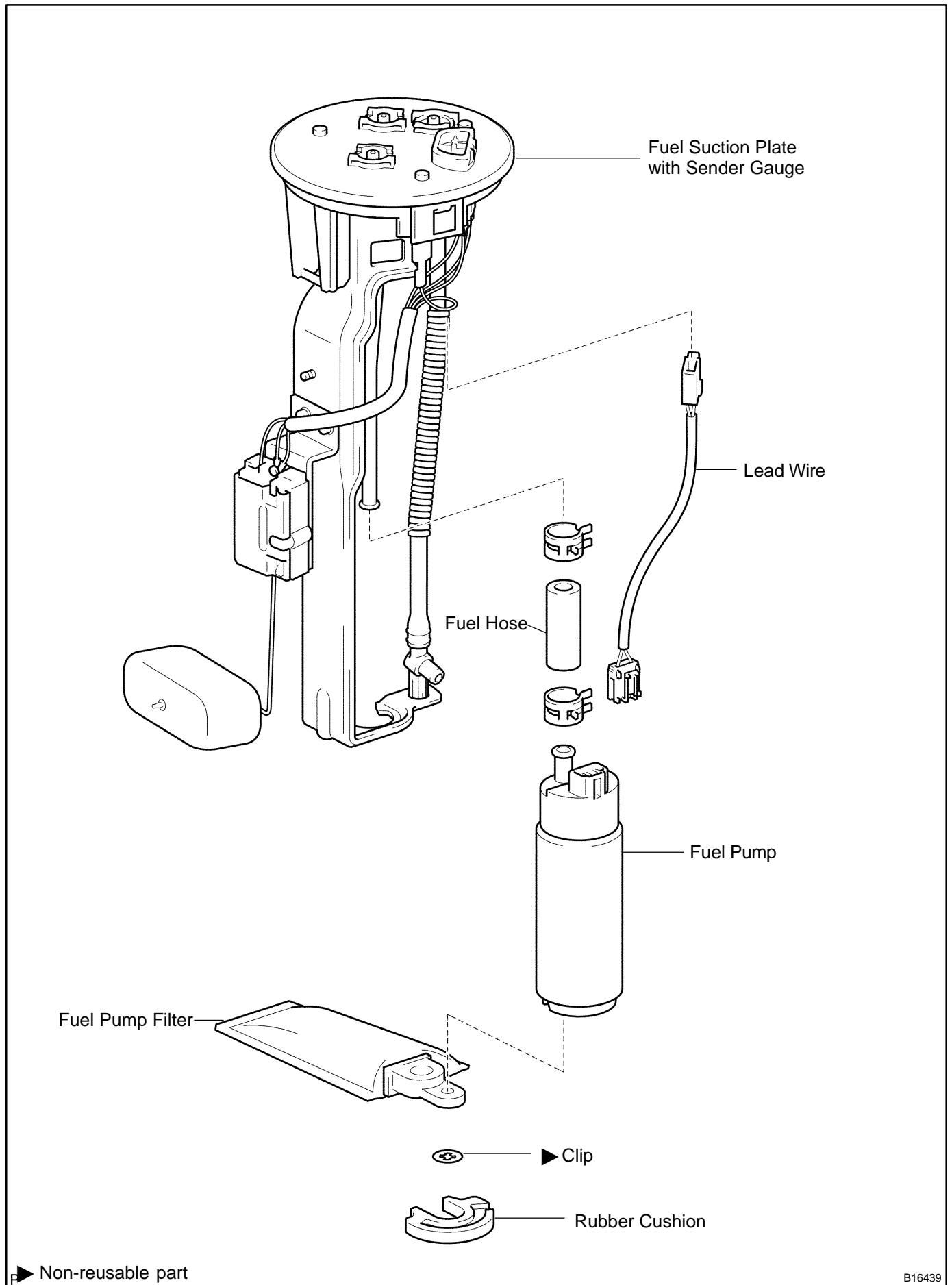


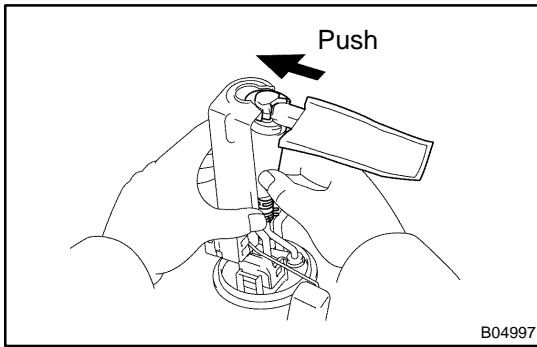
# COMPONENTS





B16438





## INSTALLATION

### 1. INSTALL FUEL PUMP FILTER TO FUEL PUMP

Install the pump filter with a new clip.

### 2. INSTALL FUEL PUMP TO FUEL PUMP BRACKET

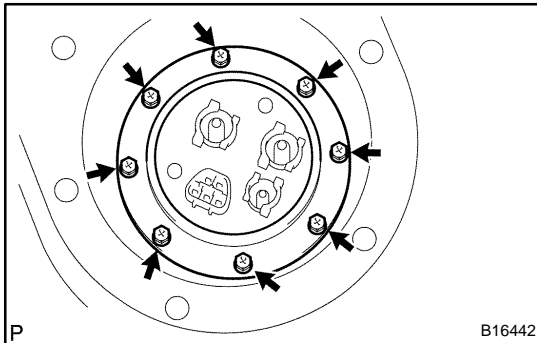
- Install the rubber cushion to the fuel pump.
- Connect the fuel hose to the outlet port of the fuel pump.
- Install the fuel pump by pushing the lower side of the fuel pump.

### 3. INSTALL LEAD WIRE TO FUEL PUMP

### 4. INSTALL FUEL PUMP AND SENDER GAUGE ASSEMBLY TO FUEL TANK

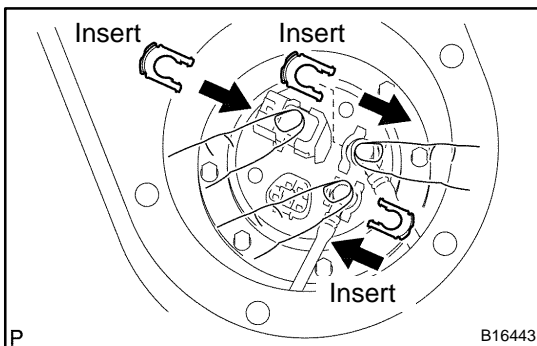
- Install a new gasket to the fuel suction plate.
- Insert the fuel pump and the sender gauge assembly into the fuel tank.
- Install the fuel tank vent tube set plate with the 8 bolts.

**Torque: 3.5 N·m (35 kgf·cm, 31 in.-lbf)**



### 5. CONNECT FUEL MAIN TUBE AND RETURN TUBE (FUEL TUBE CONNECTORS) TO FUEL SUCTION PLATE

- Before installing the tube connectors, check foreign matters on the connection between the nylon tube and the suction plate.
- Attach the fuel tube connectors to the ports of the fuel suction plate and insert the clips until you hear a click.



- After the connection, pull out the clips to check to see that they are installed securely.

### 6. CONNECT FUEL PUMP & SENDER GAUGE CONNECTOR

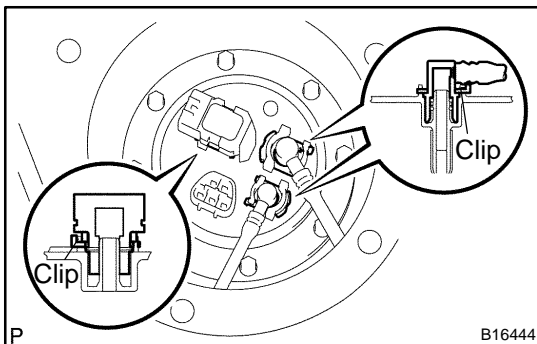
### 7. CHECK FOR FUEL LEAKS (See page SF-1)

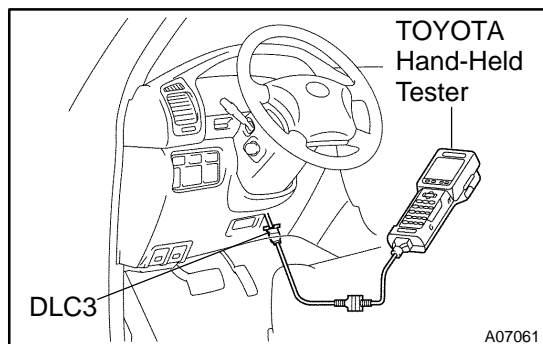
### 8. INSTALL REAR FLOOR SERVICE HOLE COVER

- Install the rear service hole cover with the 2 screws.
- Cover the rear and front floor carpets.

### 9. INSTALL REAR DOOR SCUFF PLATES, STEP PLATES AND REAR SEAT LOCK COVERS

### 10. INSTALL NO.1 REAR SEATS





## FUEL PUMP ON-VEHICLE INSPECTION

SF10V-02

### 1. CHECK FUEL PUMP OPERATION

- (a) Connect a TOYOTA hand-held tester or OBD II scan tool to the DLC3.
- (b) Turn the ignition switch ON, and press the TOYOTA hand-held tester or OBD II scan tool main switch ON.

#### NOTICE:

#### Do not start the engine.

- (c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester or OBD II scan tool.
- (d) Please refer to the TOYOTA hand-held tester or OBD II scan tool operator's manual for further details.
- (e) If you have no TOYOTA hand-held tester or OBD II scan tool, connect the positive (+) and negative (-) leads from the battery to the fuel pump connector. (See step 3)
- (f) Disconnect the fuel return hose from the clamp on the V-bank cover.
- (g) Remove the 2 bolts, nuts and V-bank cover.
- (h) Check that the pulsation damper screw pop up when the fuel pump operates.

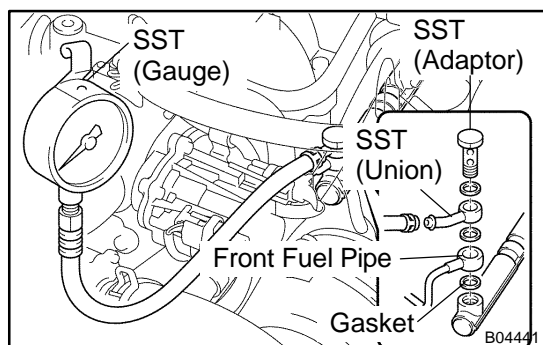
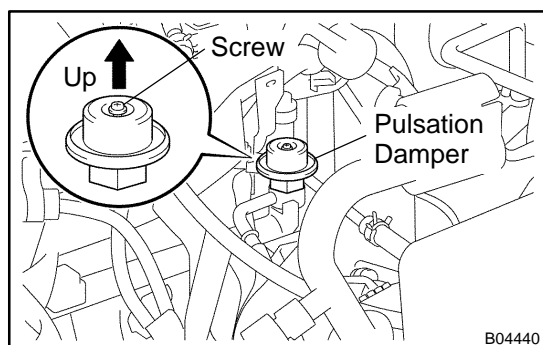
If operation is not as specified, check following parts:

- ▶ Fusible link
- ▶ Fuses
- ▶ EFI main relay
- ▶ Fuel pump
- ▶ ECM
- ▶ Wiring connections

- (i) Turn the ignition switch OFF.
- (j) Disconnect the TOYOTA hand-held tester or OBD II scan tool from the DLC3.

### 2. CHECK FUEL PRESSURE

- (a) Check the battery positive voltage is above 12 V.
- (b) Disconnect the negative (-) terminal cable from the battery.
- (c) Remove the front fuel pipe from the LH delivery pipe (See page SF-22 ).



- (d) Install the front fuel pipe and SST (pressure gauge) to the delivery pipe with the 3 lower gaskets and SST (adaptor). SST 09268-45014 (09268-41190, 90405-06167)

#### Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

- (e) Wipe off any splattered gasoline.
- (f) Reconnect the negative (-) terminal cable to the battery.
- (g) Connect a TOYOTA hand-held tester or OBD II scan tool to the DLC3 (See (a) to (e) in step 1 on the check fuel pump operation).
- (h) Measure the fuel pressure.

**Fuel pressure:****265 - 304 kPa (2.7 - 3.1 kgf/cm<sup>2</sup>, 38 - 44 psi)**

If pressure is higher than the specification, replace the fuel pressure regulator.

If pressure is lower than the specification, check these parts:

- ▶ Fuel hoses and connections
- ▶ Fuel pump
- ▶ Fuel filter
- ▶ Fuel pressure regulator

(i) Disconnect the TOYOTA hand-held tester from the DLC3.

(j) Start the engine.

(k) Measure the fuel pressure at idle.

**Fuel pressure:****265 - 304 kPa (2.7 - 3.1 kgf/cm<sup>2</sup>, 38 - 44 psi)**

(l) Stop the engine.

(m) Check that the fuel pressure remains in the specification below for 5 minutes after the engine stop.

**Fuel pressure:****147 kPa (1.5 kgf/cm<sup>2</sup>, 21 psi) or more**

If the pressure is not as specified, check the fuel pump, pressure regulator and/or the injectors.

(n) After checking the fuel pressure, disconnect the negative (-) terminal cable from the battery and carefully remove the SST to prevent gasoline from splashing.

SST 09268-45014

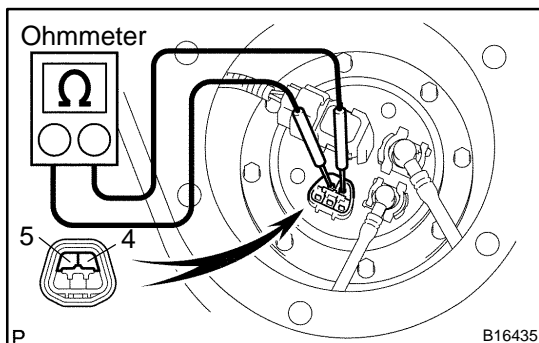
(o) Reinstall the front fuel pipe to the LH delivery pipe (See page [SF-27](#) ).

(p) Reconnect the negative (-) terminal cable to the battery.

(q) Check for fuel leaks (See page [SF-1](#) ).

(r) Reinstall the V-bank cover with the 2 bolts and nuts.

(s) Reconnect the fuel return hose to the clamp on the V-bank cover.

**3. INSPECT FUEL PUMP**

(a) Remove the No.1 rear seats.

(b) Remove the 2 rear door scuff plates, the step plates and the rear seat lock covers.

(c) Pull off the front and rear floor carpets.

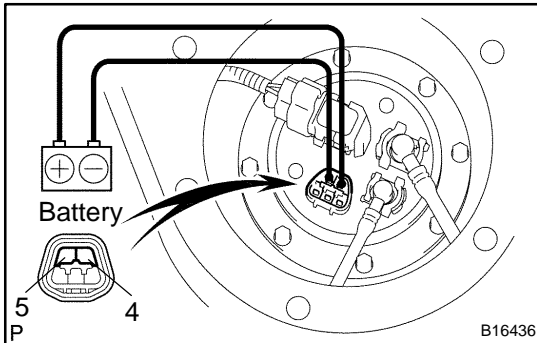
(d) Remove the 2 screws and the rear floor service hole cover.

(e) Disconnect the fuel pump & sender gauge connector.

(f) Using an ohmmeter, measure the resistance between terminal 4 and 5.

**Resistance: 0.2 - 3.0  $\Omega$  at 20°C (68°F)**

If the resistance is not as specified, replace the fuel pump and/or the lead wire.



- (g) Inspect the fuel pump operation. Connect the battery positive (+) lead to terminal 4 of the connector, and the battery negative (-) lead to terminal 5. Check that the fuel pump operates.

**NOTICE:**

- ▶ **These tests must be done quickly (within 10 seconds) to prevent the coil burning out.**
- ▶ **Keep the fuel pump as far away from the battery as possible.**
- ▶ **Always change the connection on the battery side.**

If operation is not as specified, replace the fuel pump and/or lead wire.

- (h) Reconnect the fuel pump & sender gauge connector.  
 (i) Reinstall the rear floor service hole cover with the 2 screws.  
 (j) Reinstall the front and rear floor carpets.  
 (k) Remove the 2 rear door scuff plates, the step plates and the rear seat lock covers.  
 (l) Reinstall the No.1 rear seats.



## REMOVAL

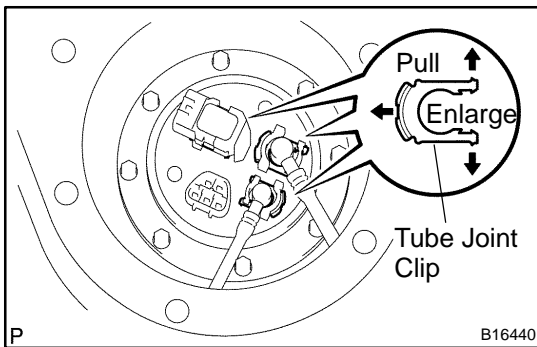
### CAUTION:

Do not smoke or work near an open flame when working the fuel pump.

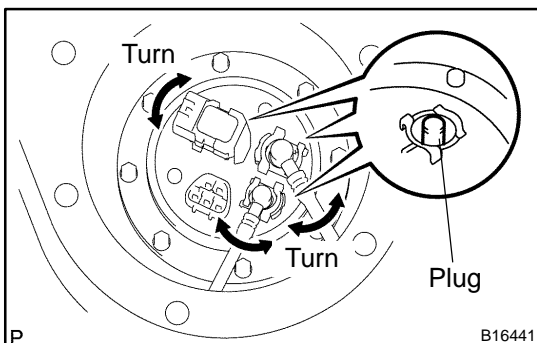
1. REMOVE NO.1 REAR SEATS
2. REMOVE REAR DOOR SCUFF PLATES, STEP PLATES AND REAR SEAT LOCK COVERS
3. REMOVE REAR FLOOR SERVICE HOLE COVER
  - (a) Take off the front and rear floor carpets.
  - (b) Remove the 2 screws and rear floor service hole cover.
4. DISCONNECT FUEL PUMP & SENDER GAUGE CONNECTOR
5. DISCONNECT FUEL MAIN TUBE AND RETURN TUBE (FUEL TUBE CONNECTORS) FROM FUEL SUCTION PLATE

### CAUTION:

- ▶ Perform disconnecting operation of the fuel tube connector (quick type) after reading the precautions. (See page SF-1 )
- ▶ Prevent the retained pressure in the fuel line from splashing inside the vehicle compartment.
- ▶ Be careful not to damage the contact surface or let the foreign matters on there when sealing the tube and the suction plates with the quick connectors through O-ring.
- ▶ Be sure to perform the disconnection by hand. Do not use tools.
- ▶ Do not bend or turn the nylon tube by force.



- (a) Before the operation, remove foreign matters or dirt sticking to the tube joint clips.
- (b) Enlarge the tip of the clips with fingers and pull them out for disconnection.

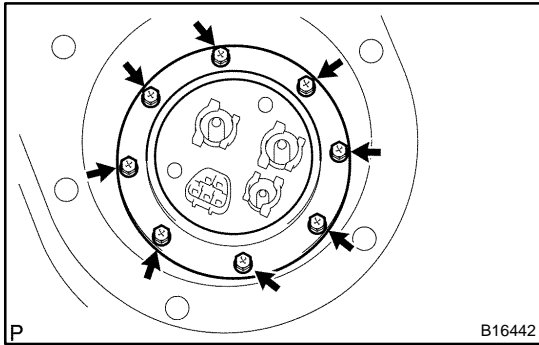


- (c) Pull out the fuel main tube and the return tube. If the nylon tube and the suction plate stick together, ease the connection by turning the nylon tube with fingers and pull it out for disconnection.

### NOTICE:

**Plug the port of the fuel suction plate with a clean rubber cap.**

- (d) After the disconnection, protect the connector with a plastic bag.



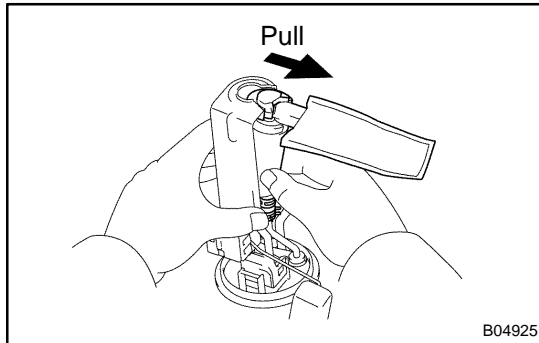
## 6. REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK

- (a) Remove the 8 bolts.
- (b) Pull out the fuel pump and the sender gauge assembly.

### NOTICE:

- ▶ Do not damage the fuel pump filter.
- ▶ Be careful that the arm of the sender gauge should not bent.

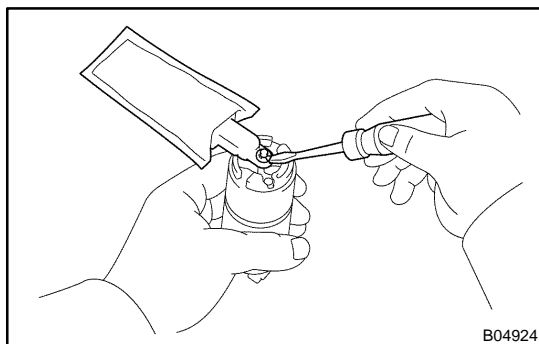
- (c) Remove the gasket from the fuel section plate.



## 7. REMOVE LEAD WIRE FROM FUEL PUMP

## 8. REMOVE FUEL PUMP FROM FUEL PUMP BRACKET

- (a) Pull out the lower side of the fuel pump from the pump bracket.
- (b) Disconnect the fuel hose from the fuel pump, and remove the fuel pump.
- (c) Remove the rubber cushion from the fuel pump.

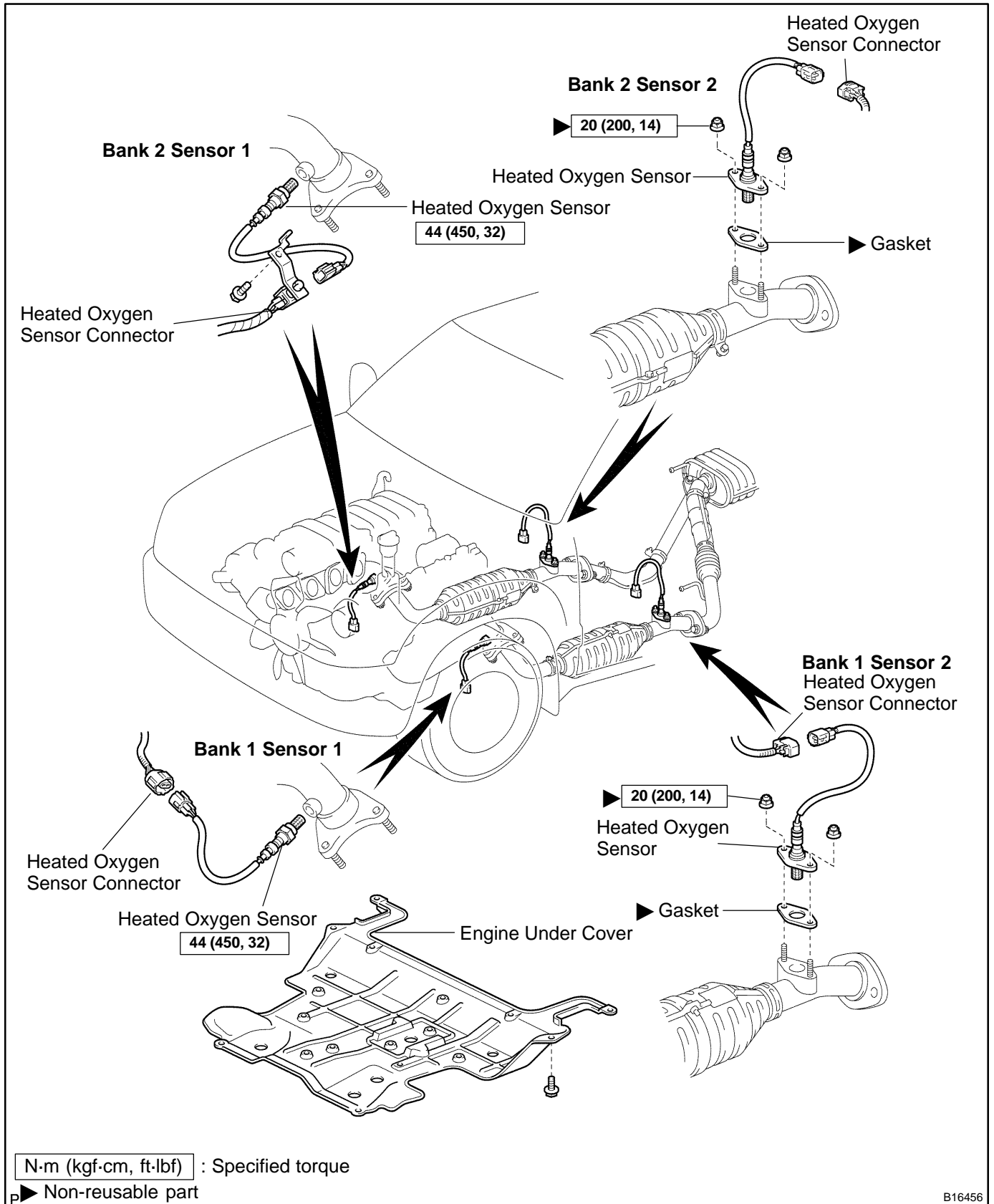


## 9. REMOVE FUEL PUMP FILTER FROM FUEL PUMP

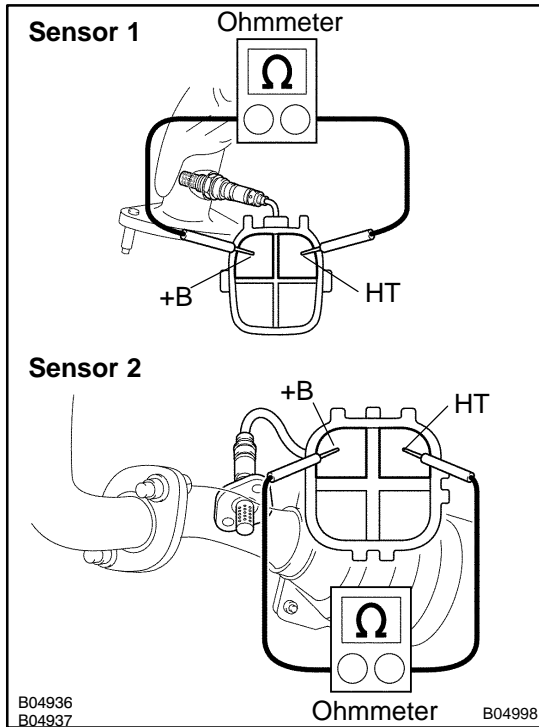
- (a) Using a small screwdriver, remove the clip.
- (b) Pull out the pump filter.

# HEATED OXYGEN SENSOR COMPONENTS

SFOY9-09



B16456



## INSPECTION

### 1. INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSORS

- (a) Disconnect the oxygen sensor connector.
- (b) Using an ohmmeter, measure the resistance between terminal +B and HT.

**Resistance: 11 - 16  $\Omega$  at 20°C (68°F)**

If the resistance is not as specified, replace the sensor.

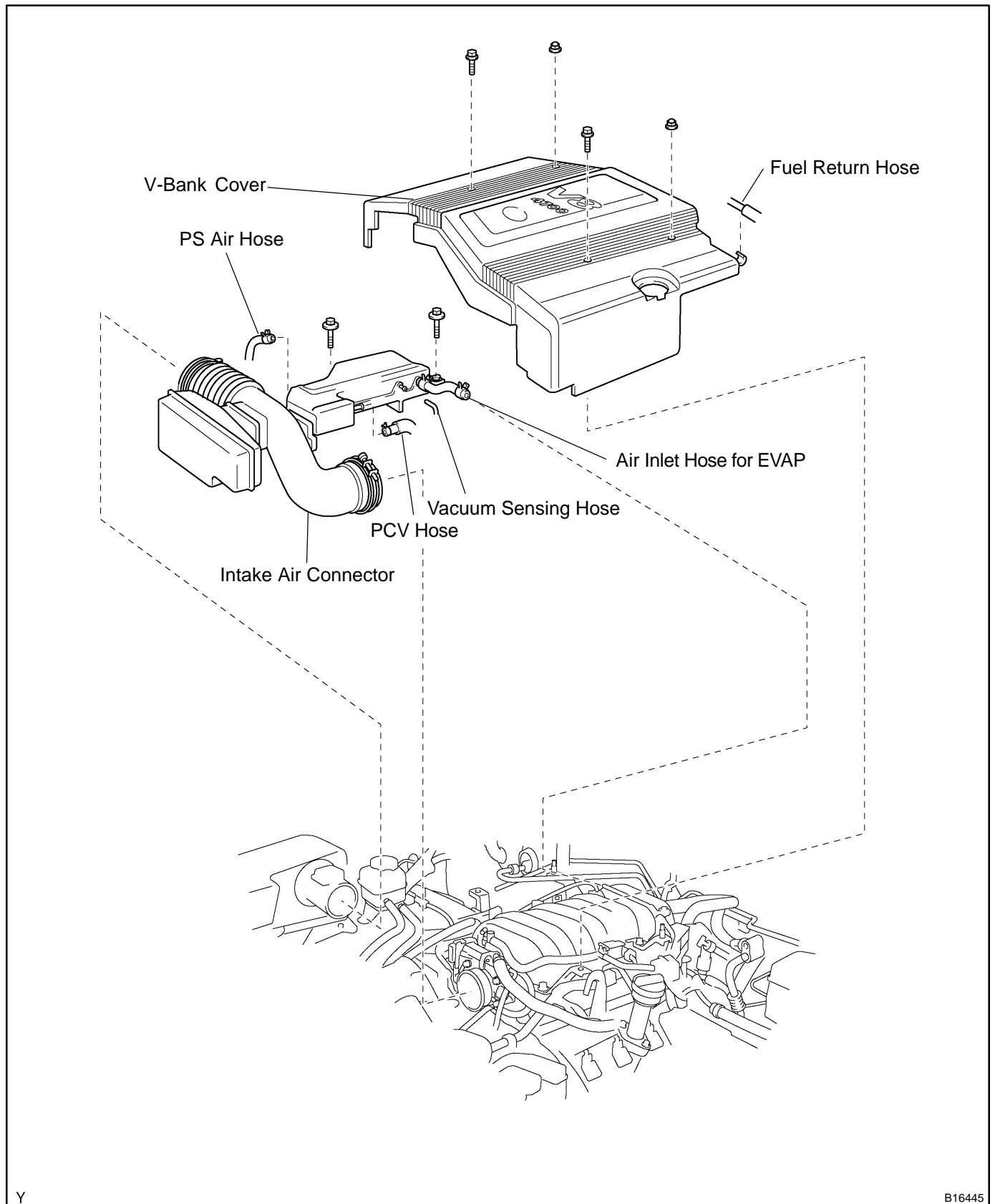
**Torque:**

**44 N·m (450 kgf·cm, 32 ft·lbf) for sensor 1**

**20 N·m (200 kgf·cm, 14 ft·lbf) for sensor 2**

- (c) Reconnect the oxygen sensor connector.
- ### 2. INSPECT OPERATION OF HEATED OXYGEN SENSORS (See pages [DI-106](#) and [DI-138](#))

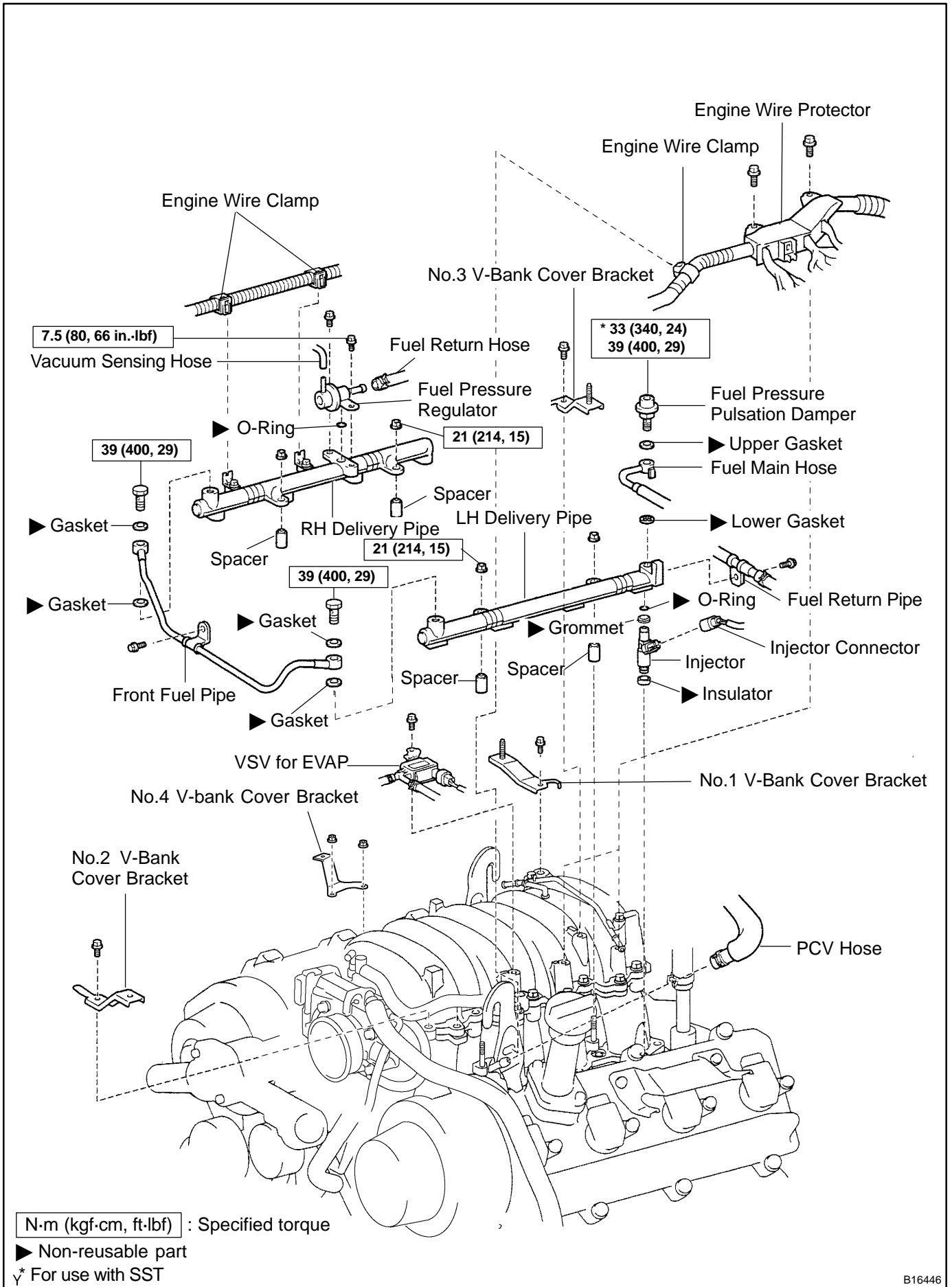
# COMPONENTS



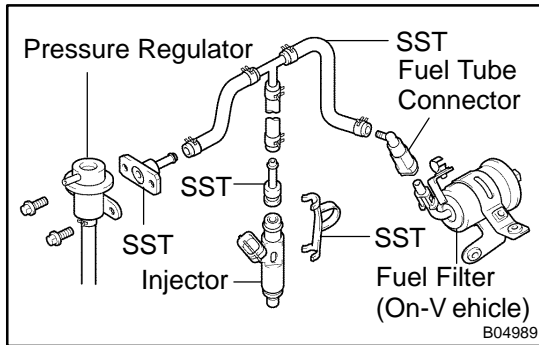
Y

B16445

SFI - INJECTOR



B16446

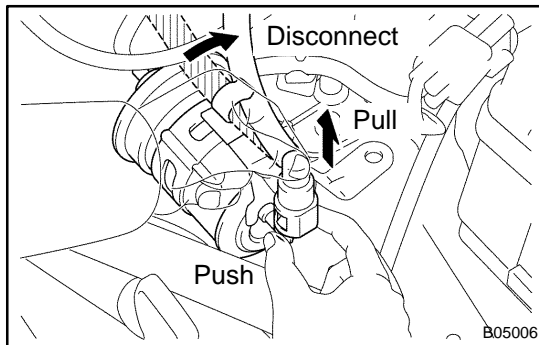


## INSPECTION

### 1. INSPECT INJECTOR INJECTION

#### CAUTION:

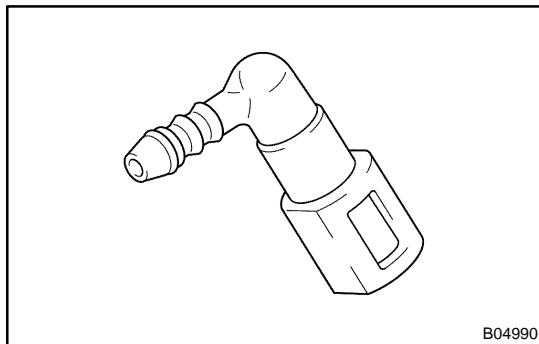
Keep injector clean of sparks during the test.



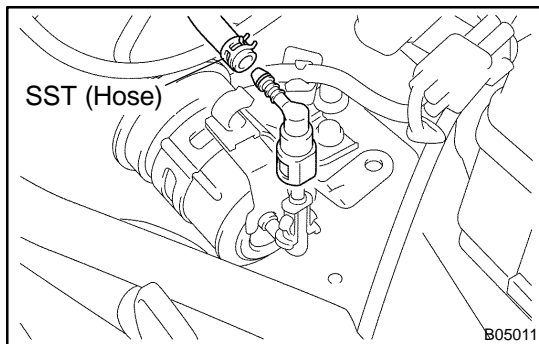
- (a) Disconnect the fuel inlet hose (fuel tube connector) from the fuel filter.

#### CAUTION:

- ▶ Perform disconnecting operations of the fuel tube connector (quick type) after reading the precautions (See page SF-1).
- ▶ Prevent the retained pressure in the fuel pipe line from splashing inside the engine compartment.



- (b) Use a new fuel main hose and take out the fuel tube connector from its hose.  
Part No. 23271-50150



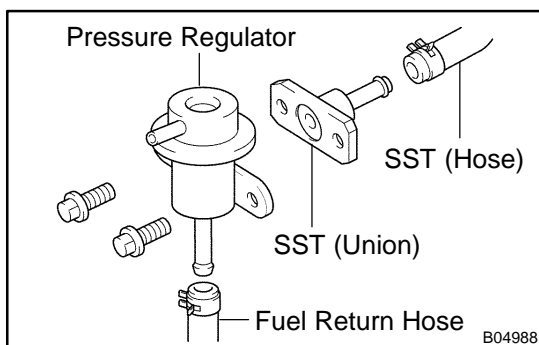
- (c) Connect SST (hose) and fuel tube connector to the fuel filter outlet.  
SST 09268-41047

#### CAUTION:

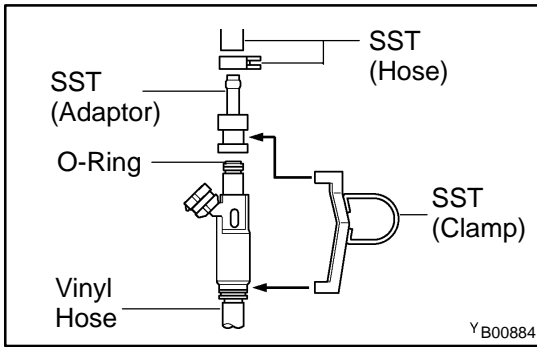
Perform connecting operations of the fuel tube connector (quick type) after reading the precautions (See page SF-1).

#### HINT:

Use the vehicle's fuel filter.



- (d) Remove the pressure regulator from the delivery pipe.  
(e) Install the O-ring to the fuel inlet of the pressure regulator.  
(f) Connect SST (hose) to the fuel inlet of the pressure regulator with SST (union) and the 2 bolts.  
SST 09268-41047 (09268-41091)  
**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**  
(g) Connect the fuel return hose to the fuel outlet of the pressure regulator.

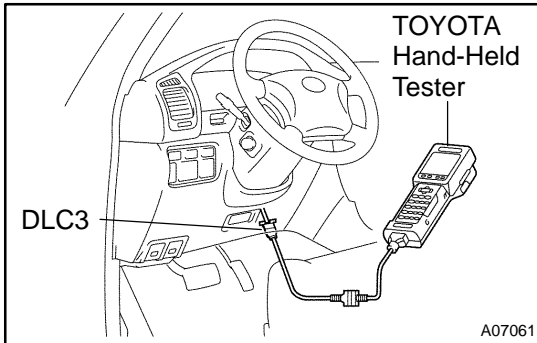


- (h) Install the O-ring to the injector.
- (i) Connect SST (adaptor and hose) to the injector, and hold the injector and union with SST (clamp).  
SST 09268-41047 (09268-41110, 09268-41300)

- (j) Put the injector into the graduated cylinder.

**CAUTION:**

**Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.**



- (k) Connect the TOYOTA hand-held tester or OBD II scan tool to the DLC3.

- (l) Connect the battery negative (-) cable to the battery.
- (m) Turn the ignition switch ON, and press the TOYOTA hand-held tester or OBD II scan tool main switch ON.

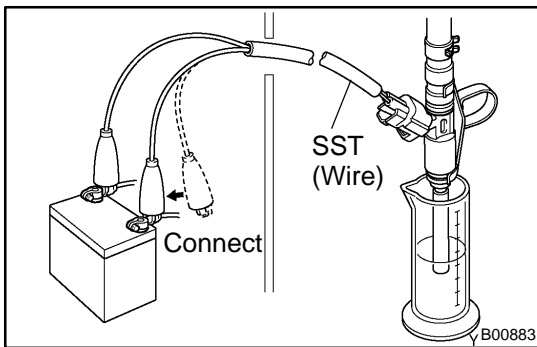
**NOTICE:**

**Do not start the engine.**

- (n) Select ACTIVE TEST mode on the TOYOTA hand-held tester or OBD II scan tool.

- (o) Please refer to the TOYOTA hand-held tester or OBD II scan tool operator's manual for further details.

- (p) If you have no TOYOTA hand-held tester or OBD II scan tool, connect the positive (+) and negative (-) leads from the battery to the fuel pump connector (See page SF-7).



- (q) Connect SST (wire) to the injector and the battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector 2 or 3 times.

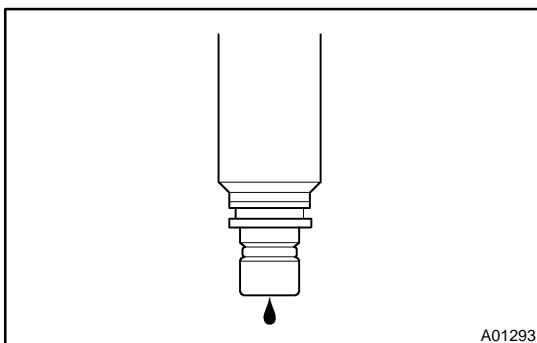
SST 09842-30070

**Volume: 56 - 69 cm<sup>3</sup> (3.4 - 4.2 cu in.) per 15 seconds**

**Difference between each injector:**

**13 cm<sup>3</sup> (0.8 cu in.) or less**

If the injection volume is not as specified, replace the injector.

**2. INSPECT LEAKAGE**

- (a) In the condition above, disconnect the tester probes of SST (wire) from the battery and check the fuel leakage from the injector.

SST 09842-30070

**Fuel drop: 1 drop or less per 12 minutes**



- (b) Turn the ignition switch OFF.
- (c) Disconnect the negative (-) terminal cable from the battery.
- (d) Remove SST and fuel tube connector.  
SST 09268-41047, 09842-30070
- (e) Disconnect the TOYOTA hand-held tester or OBD II scan tool from the DLC3.
- (f) Reconnect the fuel inlet pipe (fuel tube connector) to the fuel filter.

**CAUTION:**

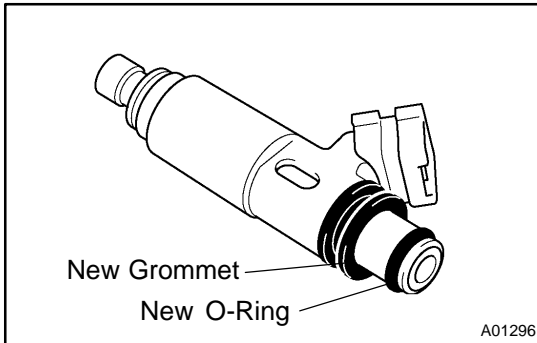
**Perform connecting operations of the fuel tube connector (quick type) after observing the precautions (See page [SF-1](#)).**

## INSTALLATION

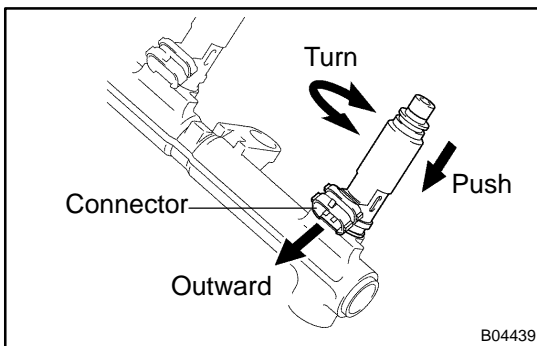
### 1. INSTALL INJECTORS AND DELIVERY PIPES

#### NOTICE:

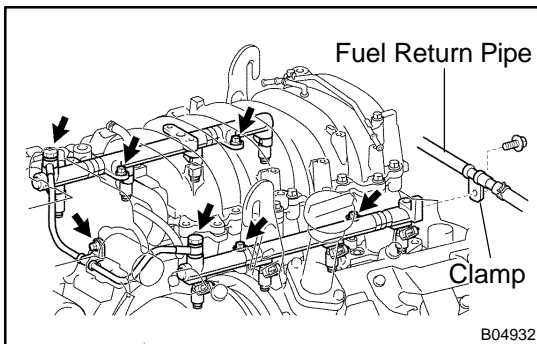
- ▶ Be careful not to drop the injectors when installing the delivery pipes.
- ▶ Since the O-ring may be stuck to the injector, do not put a side load on it at the removal.



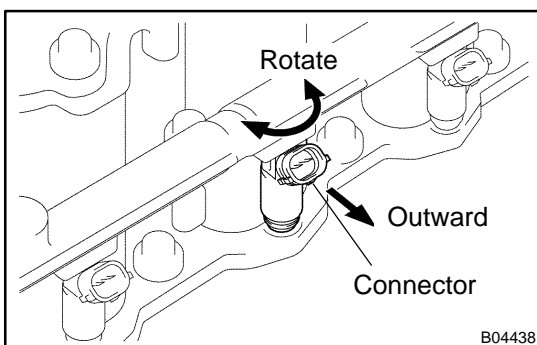
- (a) Install a new grommet to each injector.
- (b) Apply a light coat of gasoline to new O-rings and install them to each injector.



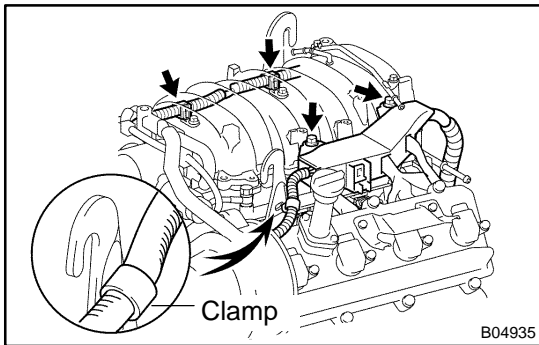
- (c) While turning the injector clockwise and counterclockwise, push it to the delivery pipes. Install the 8 injectors.
- (d) Position injector connector outward.
- (e) Place the 4 spacers and 8 new insulators on the intake manifold.
- (f) Place the 2 delivery pipes and the injectors assemblies on the lower intake manifold.
- (g) Temporarily install the 4 nuts.
- (h) Install the front fuel pipe with the bolt, the 4 new gaskets and the 2 union bolts.



- Torque:**  
**39 N·m (400 kgf·cm, 29 ft·lbf) for union bolts**  
**7.5 N·m (80 kgf·cm, 66 in.-lbf) for bolt**
- (i) Install the bolt holding the clamp on the fuel return pipe to the LH delivery pipe.  
**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**



- (j) Check that the injectors rotate smoothly.
- HINT:**  
 If injectors do not rotate smoothly, the probable cause is incorrect installation of O-rings. Replace the O-rings in that case.
- (k) Position the injector connector outward.
  - (l) Tighten the 4 nuts holding the delivery pipes to the lower intake manifold.  
**Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)**
  - (m) Connect the 8 injectors connectors.



## 2. INSTALL ENGINE WIRE TO LH DELIVERY PIPE

Install the 2 wire clamps on the engine wire to the brackets on the delivery pipe.

## 3. INSTALL ENGINE WIRE PROTECTOR

- (a) Connect the engine wire clamp to the No.1 engine hanger.
- (b) Install the engine wire protector with the 2 bolts.
- (c) Connect the PCV hose to the PCV valve.
- (d) Connect VSV EVAP to the upper intake manifold.
- (e) Install the No.1 V-bank cover bracket to the upper intake manifold.
- (f) Install the No.2 V-bank cover bracket to the upper intake manifold.
- (g) Install the No.3 V-bank cover bracket to the upper intake manifold.
- (h) Install the No.4 V-bank cover bracket to the upper intake manifold.

## 4. INSTALL FUEL PRESSURE PULSATION DAMPER (See page [SF-1](#))

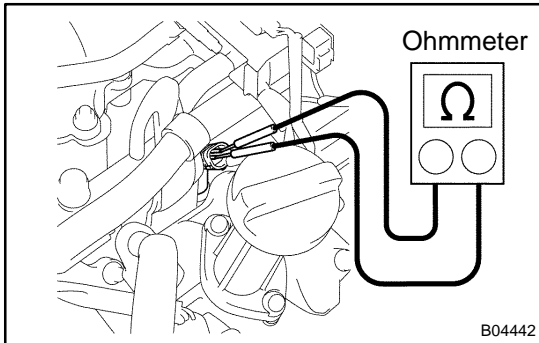
## 5. INSTALL INTAKE AIR CONNECTOR

## 6. INSTALL V-BANK COVER

# INJECTOR ON-VEHICLE INSPECTION

SF00R-10

1. REMOVE V-BANK COVER
2. REMOVE INTAKE AIR CONNECTOR



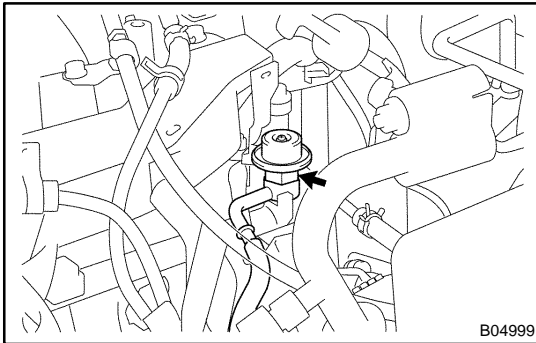
3. **INSPECT INJECTOR RESISTANCE**

- (a) Disconnect the 8 injector connectors.
- (b) Using an ohmmeter, measure the resistance between the terminals.

**Resistance: 13.4 - 14.2  $\Omega$  at 20°C (68°F)**

If the resistance is not as specified, replace the injector.

- (c) Reconnect the 8 injector connectors.
4. **REINSTALL INTAKE AIR CONNECTOR**
  5. **REINSTALL V-BANK COVER**



## REMOVAL

1. REMOVE V-BANK COVER
2. REMOVE INTAKE AIR CONNECTOR
3. REMOVE FUEL PRESSURE PULSATION DAMPER

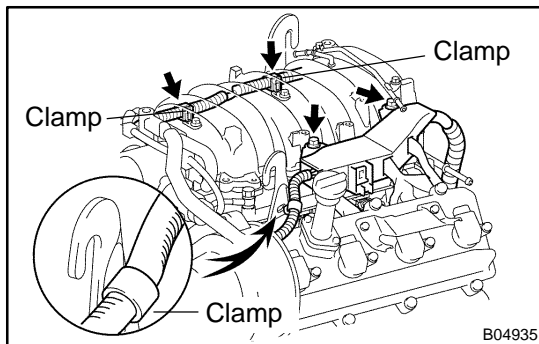
Remove the pulsation damper, the upper gasket, the fuel main hose and the lower gasket.

### CAUTION:

- ▶ Put a shop rag under the delivery pipe.
- ▶ Slowly loosen the pulsation damper.

4. DISCONNECT ENGINE WIRE PROTECTOR FROM UPPER INTAKE MANIFOLD

- (a) Disconnect the PCV hose from the PCV valve.
- (b) Disconnect the VSV for EVAP from the upper intake manifold.
- (c) Remove the No.1 V-bank cover bracket from the upper intake manifold.
- (d) Remove the No.2 V-bank cover bracket from the upper intake manifold.
- (e) Remove the No.3 V-bank cover bracket from the upper intake manifold.
- (f) Remove the No.4 V-bank cover bracket from the upper intake manifold.



- (g) Remove the 2 bolts, and disconnect the engine wire protector from the upper intake manifold.
- (h) Disconnect the engine wire clamp from the No.1 engine hanger.

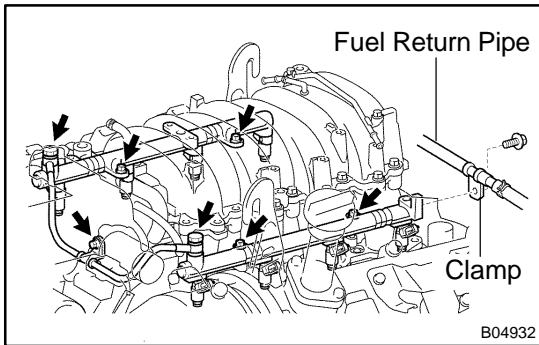
5. DISCONNECT ENGINE WIRE FROM RH DELIVERY PIPE

Disconnect the 2 wire clamps on the engine wire from the brackets on the delivery pipe.

6. REMOVE DELIVERY PIPES AND INJECTORS

### NOTICE:

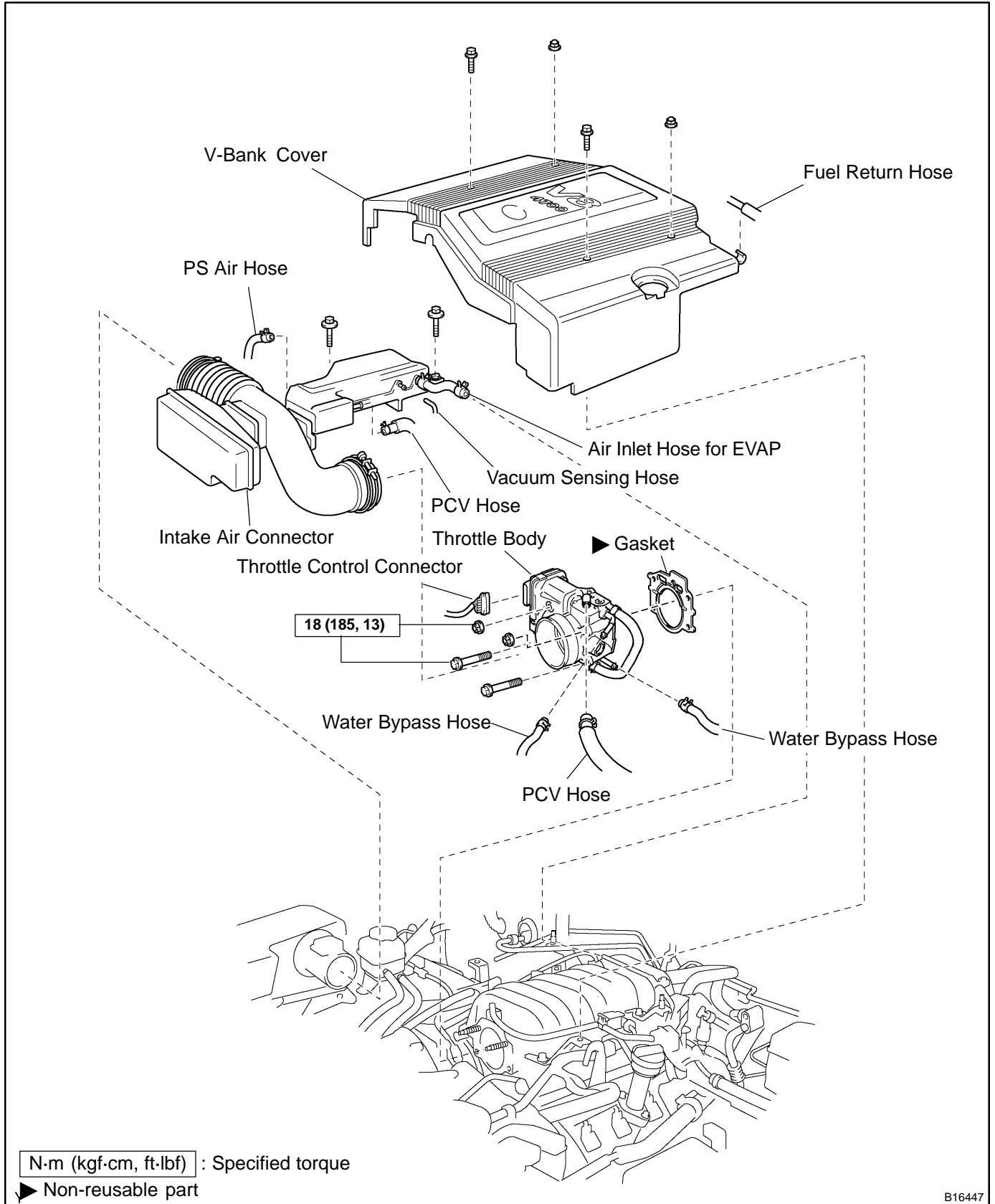
- ▶ Be careful not to drop the injectors when removing the delivery pipes.
- ▶ Since the O-ring may be stuck to the injector, do not put a side load on it at the removal.

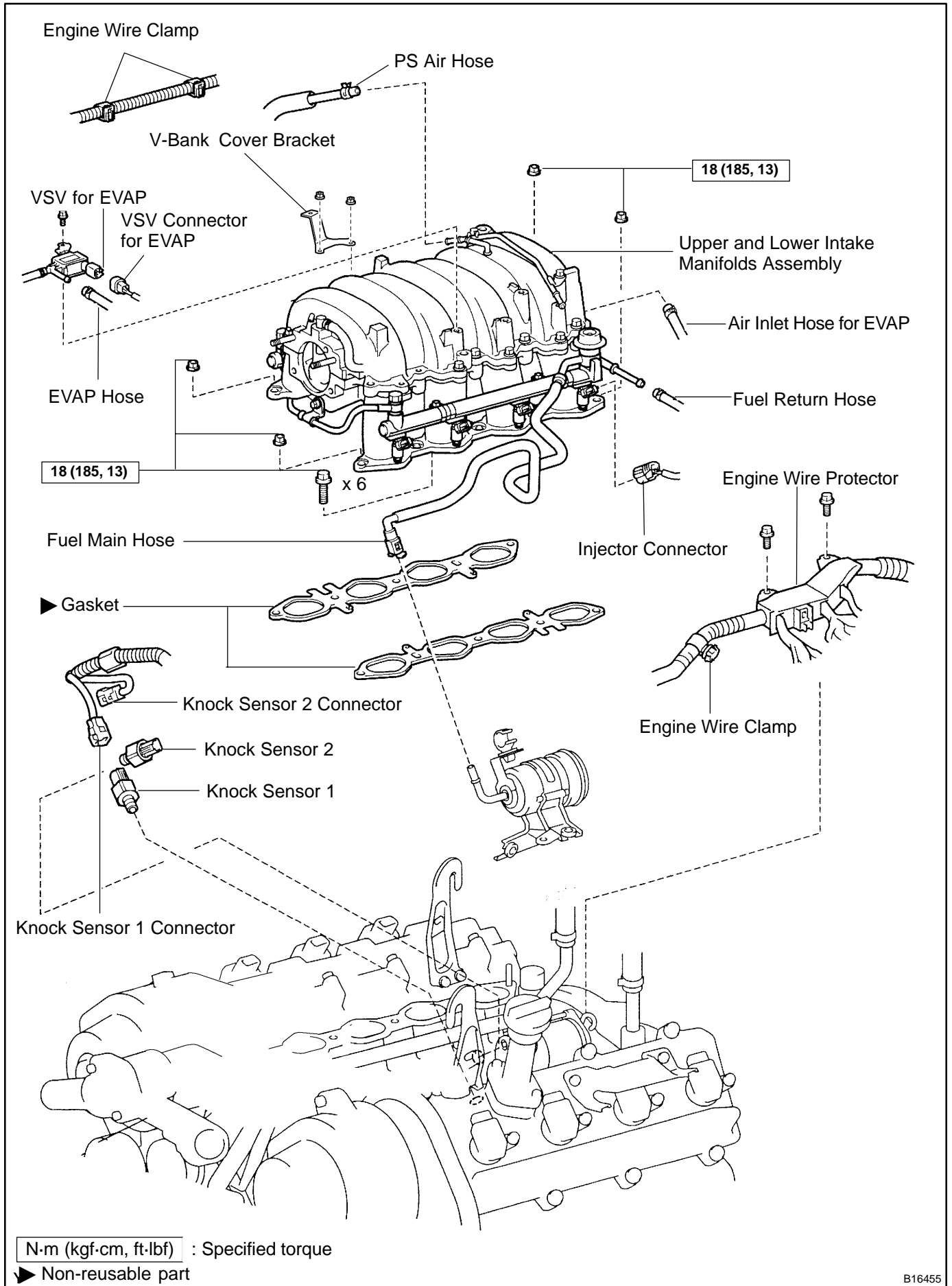


- (a) Remove the bolt holding the clamp on the fuel return pipe to the LH delivery pipe.
- (b) Remove the bolt, the 2 union bolts, the 4 gaskets and the front fuel pipe.
- (c) Disconnect the 8 injector connectors.
- (d) Remove the 4 nuts holding the delivery pipes to the lower intake manifold.
- (e) Remove the 2 delivery pipes, the 8 injectors, the 4 spacers and the 8 insulators.
- (f) Remove the O-ring and the grommet from each injector.

# KNOCK SENSOR COMPONENTS

SFOPR-14



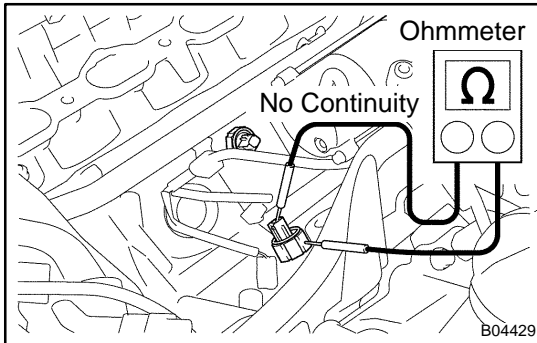


B16455

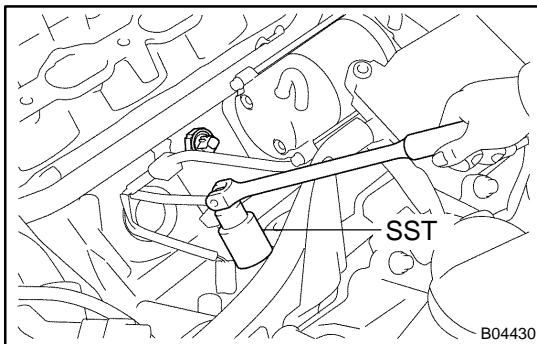


## INSPECTION

1. REMOVE V-BANK COVER
2. REMOVE INTAKE AIR CONNECTOR
3. DISCONNECT THROTTLE BODY FROM INTAKE MANIFOLDS (See page SF-50 )
4. REMOVE UPPER AND LOWER INTAKE MANIFOLDS ASSEMBLY (See page EM-35 )



5. **INSPECT KNOCK SENSOR 1, 2**
  - (a) Disconnect the knock sensor connectors.
  - (b) Using an ohmmeter, check that there is no continuity between the terminal and body.



If there is a continuity, replace the sensor with SST.

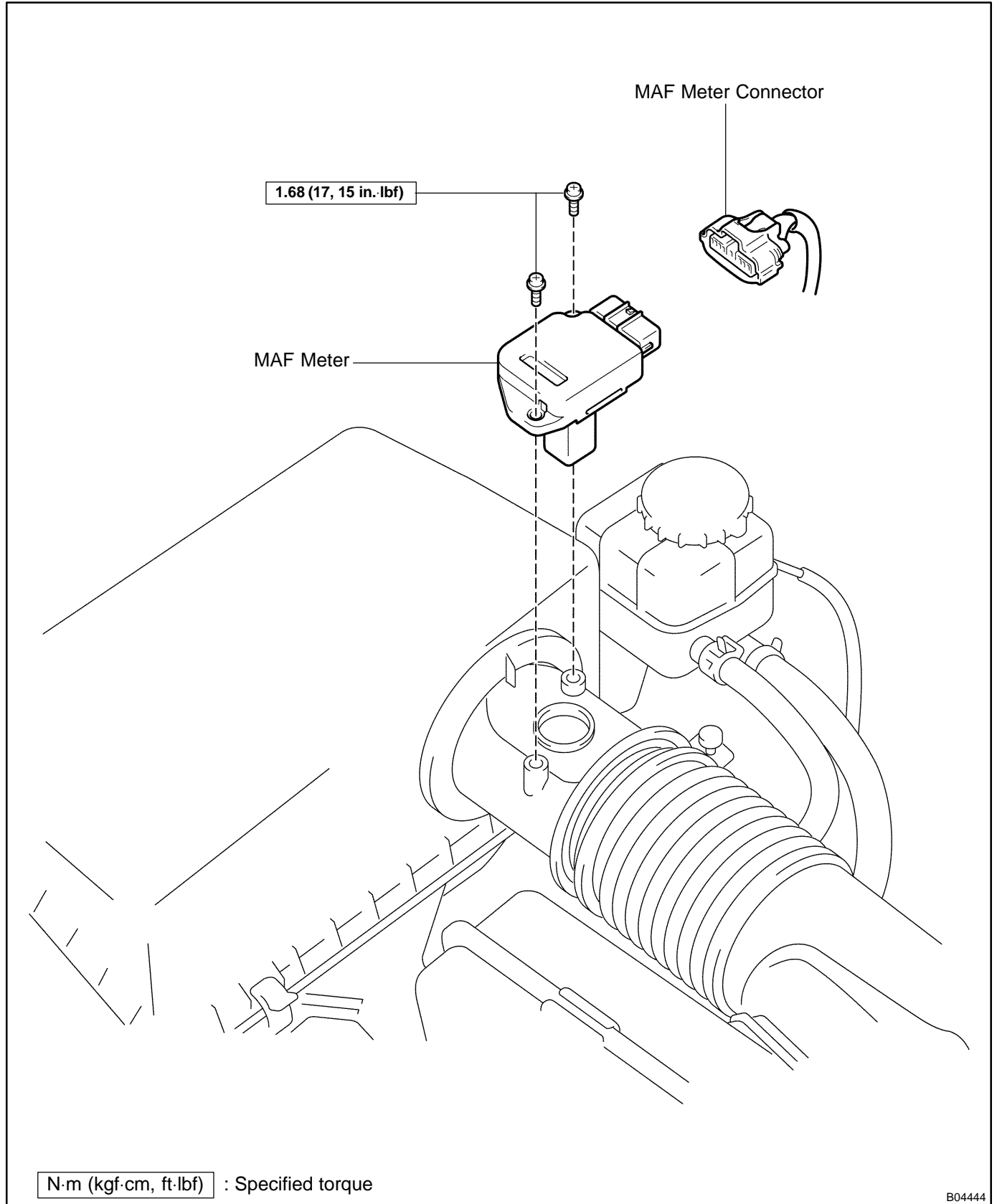
SST 09816-30010

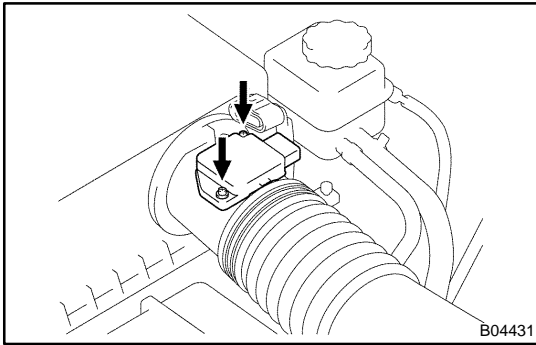
**Torque: 45 N·m (450 kgf·cm, 33 ft·lbf)**

- (c) Reconnect the knock sensor connectors.
6. **REINSTALL UPPER AND LOWER INTAKE MANIFOLDS ASSEMBLY (See page EM-59 )**
7. **REINSTALL THROTTLE BODY TO INTAKE MANIFOLDS (See page SF-50 )**
8. **REINSTALL INTAKE AIR CONNECTOR**
9. **REINSTALL V-BANK COVER**

# MASS AIR FLOW (MAF) METER COMPONENTS

SF0P1-10



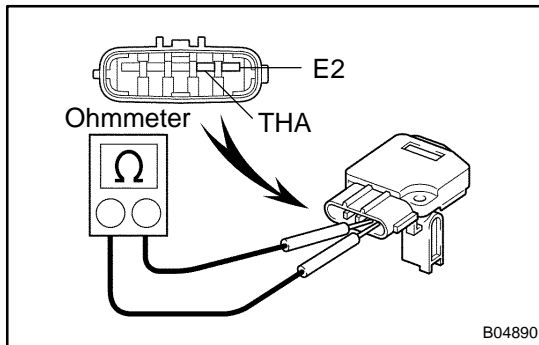


## INSPECTION

### 1. DISCONNECT MAF METER CONNECTOR

### 2. REMOVE MAF METER

Remove the 2 screws and MAF meter.

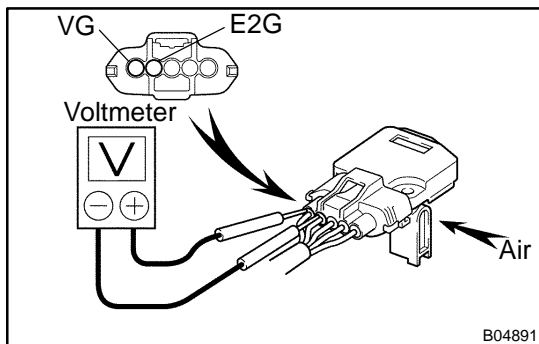


### 3. INSPECT MAF METER

- (a) Using an ohmmeter, measure the resistance between terminals THA and E2.

Terminals	Resistance	Temperature
THA - E2	12.5 - 16.9 k $\Omega$	-20 °C (-4 °F)
THA - E2	2.19 - 2.67 k $\Omega$	20 °C (68 °F)
THA - E2	0.50 - 0.68 k $\Omega$	60 °C (140 °F)

If the resistance is not as specified, replace the MAF meter.



- (b) Inspect for operation.

- (1) Connect the MAF meter connector.
- (2) Connect the negative (-) terminal cable to the battery.
- (3) Turn the ignition switch ON.
- (4) Using a voltmeter, connect the positive (+) tester probe to terminal VG and negative (-) tester probe to terminal E2G.
- (5) Blow air into the MAF meter, and check that the voltage fluctuates.

If operation is not as specified, replace the MAF meter.

- (6) Turn the ignition switch OFF.
- (7) Disconnect the negative (-) terminal cable from the battery.
- (8) Disconnect the MAF meter connector.

### 4. REINSTALL MAF METER

Install the MAF meter with the 2 screws.

**Torque: 1.68 N·m (17 kgf·cm, 15 in.-lbf)**

### 5. RECONNECT MAF METER CONNECTOR

# SFI SYSTEM PRECAUTION

SFOXU-11

## 1. BEFORE WORKING ON FUEL SYSTEM, DISCONNECT NEGATIVE (-) TERMINAL CABLE FROM BATTERY

### HINT:

Any diagnostic trouble code retained by the computer will be erased when the negative (-) terminal cable is removed from the battery.

Therefore, if necessary, read the diagnosis before removing the negative (-) terminal cable from the battery.

## 2. DO NOT SMOKE OR WORK NEAR AN OPEN FLAME WHEN WORKING ON THE FUEL SYSTEM

## 3. KEEP GASOLINE AWAY FROM RUBBER OR LEATHER PARTS

## 4. MAINTENANCE PRECAUTIONS

- (a) Take following precautions to prevent the engine misfire.
  - (1) Check proper connection to battery terminals, etc.
  - (2) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.
  - (3) When cleaning the engine compartment, be especially careful to protect the electrical system from water.
- (b) Take following precautions to handle the oxygen sensor.
  - (1) Do not drop the oxygen sensor or hit against an object.
  - (2) Do not allow the sensor to contact with water.

## 5. IF VEHICLE IS EQUIPPED WITH MOBILE RADIO SYSTEM (HAM, CB, ETC.)

If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

## 6. AIR INDUCTION SYSTEM

- (a) Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to be out of tune.
- (b) Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will cause air suction, which makes the engine out of tune.

## 7. ELECTRONIC CONTROL SYSTEM

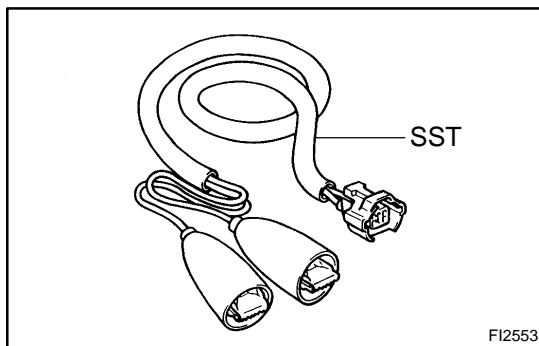
- (a) Disconnect the power by either turning the ignition switch OFF or disconnecting the negative (-) terminal cable from the battery before removing SFI wiring connectors, terminals, etc.

### HINT:

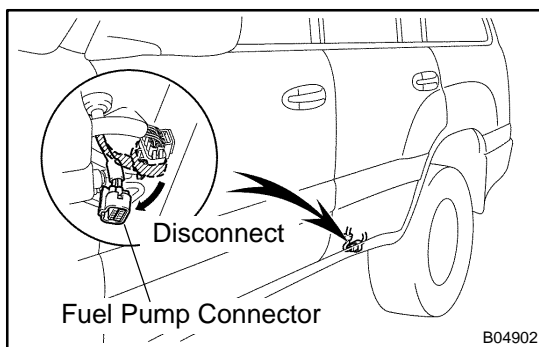
Always check the diagnostic trouble code before disconnecting the negative (-) terminal cable from the battery.

- (b) When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (-) cables.

- (c) Do not a severe impact during removal or installation. Handle all SFI parts carefully, especially the ECM.
- (d) Be careful during the troubleshooting as there are numerous transistor circuit, and even slight terminal contact can cause further troubles.
- (e) Do not open the ECM cover.
- (f) When inspecting in rainy weather, take care to prevent entry of water. Also, when washing the engine compartment, prevent water from getting on the SFI parts and the wiring connectors.
- (g) Parts should be replaced as the original assembly.
- (h) Care should be taken when pulling out and inserting the wiring connectors.
  - (1) Release the lock and pull out the connector.
  - (2) Fully insert the connector and check that it is locked.

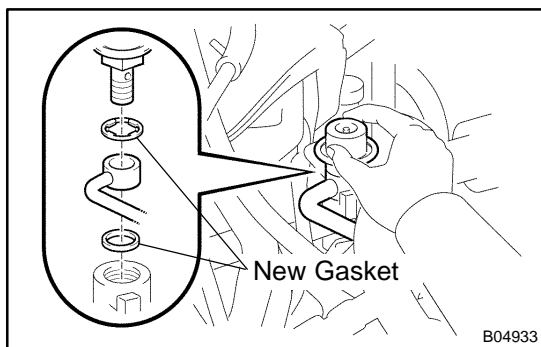


- (i) Use SST for the inspection, the injector and the wiring connector test.  
SST 09842-30070



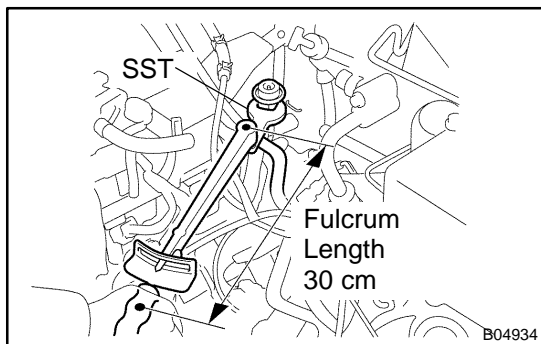
## 8. FUEL SYSTEM

- (a) When disconnecting the high fuel pressure line, a large amount of gasoline may be spilled:
  - (1) Disconnect the fuel pump connector.
  - (2) Start the engine. After the engine has stopped on its own, turn the ignition switch OFF.
  - (3) Put a container under the connection.
  - (4) Slowly loosen the connection.
  - (5) Disconnect the connection.
  - (6) Plug the connection with a rubber plug.
  - (7) Reconnect the fuel pump connector.



- (b) When connecting the union bolt (fuel pressure pulsation damper) on the high pressure pipe union, follow the procedure below:

- (1) Always use 2 new gaskets.
- (2) Tighten the union bolt by hand.



- (3) Using SST, tighten the union bolt to the specified torque.

SST 09612-24014 (09617-24011)

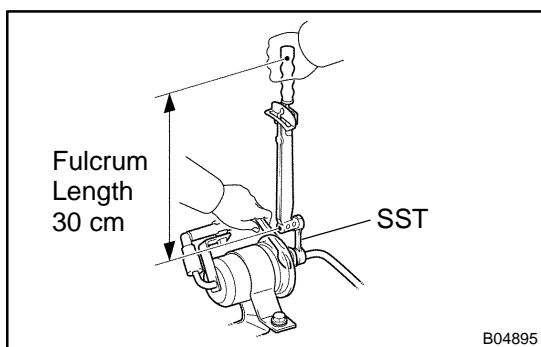
**Torque:**

**33 N·m (340 kgf·cm, 24 ft·lbf) for use with SST**

**39 N·m (400 kgf·cm, 29 ft·lbf)**

**HINT:**

Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).



- (c) When connecting the flare nut on the high pressure pipe union, follow the procedure below:

- (1) Apply a light coat of engine oil to the flare nut, and tighten the flare nut by hand.
- (2) Using SST, tighten the flare nut to the specified torque.

SST 09023-12700

**NOTICE:**

**Do not rotate the fuel filter outlet when tightening the flare nut.**

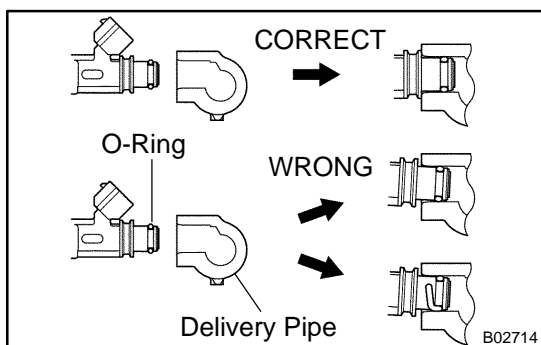
**Torque:**

**34 N·m (345 kgf·cm, 25 ft·lbf) for use with SST**

**38 N·m (380 kgf·cm, 28 ft·lbf)**

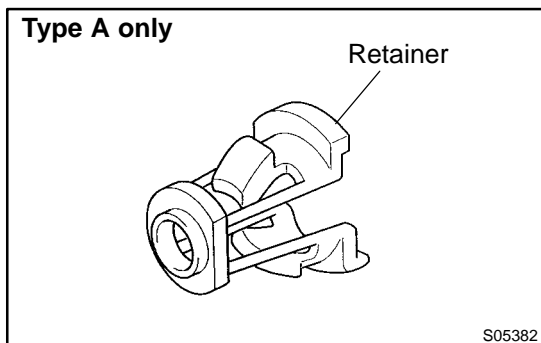
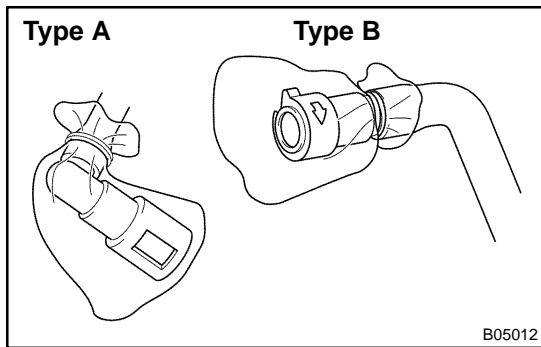
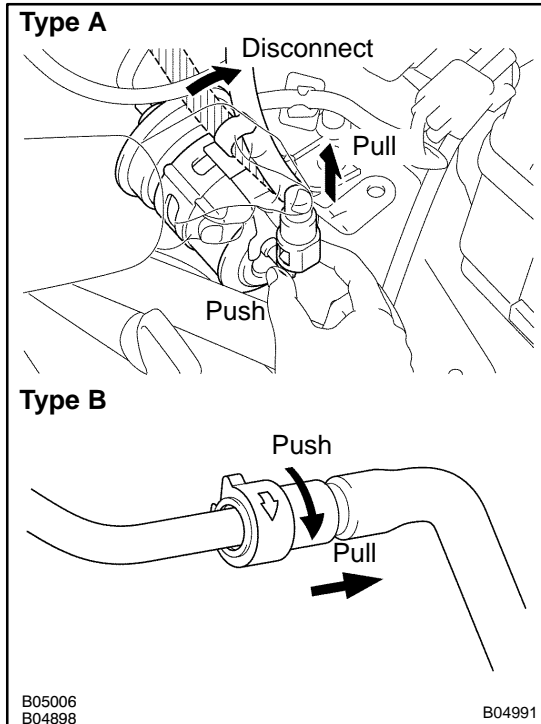
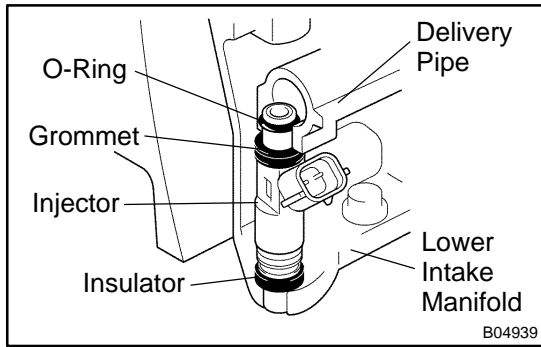
**HINT:**

Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).



- (d) Take following precautions to remove and install the injectors.

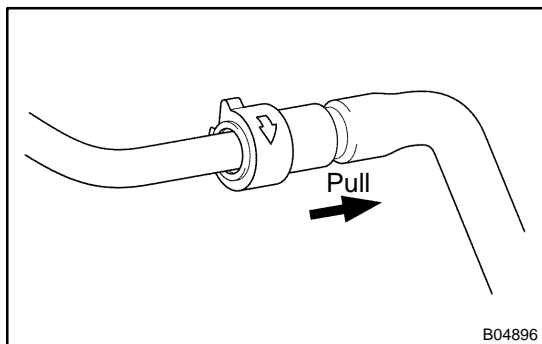
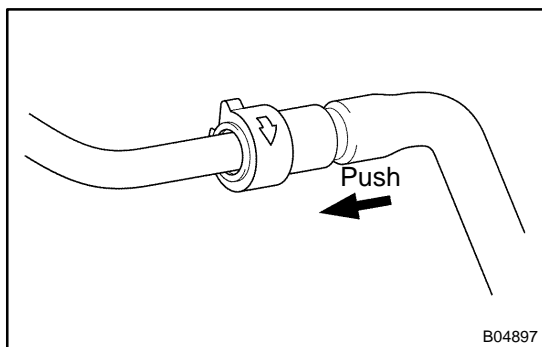
- (1) Never reuse the O-ring.
- (2) When placing a new O-ring on the injector, take care not to damage it.
- (3) Coat a new O-ring with spindle oil or gasoline before installing; never use engine, gear or brake oil.



- (e) Install the injector to the delivery pipe and lower intake manifold as shown in the illustration. Before installing the injector, spindle oil or gasoline must be applied on the place where the delivery pipe or the intake manifold touches the O-ring of the injector.
- (f) Take following precautions to disconnect the fuel tube connector (quick type):
  - (1) Check that there is no dirt on the pipe and around the connector before disconnecting them. If there is, clean the dirt away.
  - (2) Be sure to disconnect it with hands.
  - (3) Type A:  
When the connector and the pipe are stuck, push the clicks of the retainer and pull the connector to free to disconnect and pull it out. Do not use any tool at this time.  
Type B:  
When the connector and the pipe are stuck, turn and pull the connector to disconnect. Do not use any tool at this time.
  - (4) Inspect if there is any dirt or the likes on the seal surface of the disconnected pipe and clean it away.

- (5) Prevent the disconnected pipe and connector from damaging and getting foreign objects by covering them with a vinyl bag.

- (g) Take following precautions to connect the fuel tube connector (quick type):
  - (1) Do not reuse the retainer removed from the pipe.
  - (2) Do not use any tool. Use hands to connect the retainer to the pipe.
  - (3) Check if there is any damage or foreign objects on the connected part of the pipe.



(4) Match the axis of the connector with that of the pipe, and push in the connector until the connector makes a "click" sound. In the joint part is too tight to connect them, apply a little new engine oil on the tip of the pipe.

(5) After finishing the connection, check if the pipe and the connector are securely connected by pulling them.

(6) Check if there is any fuel leakage.

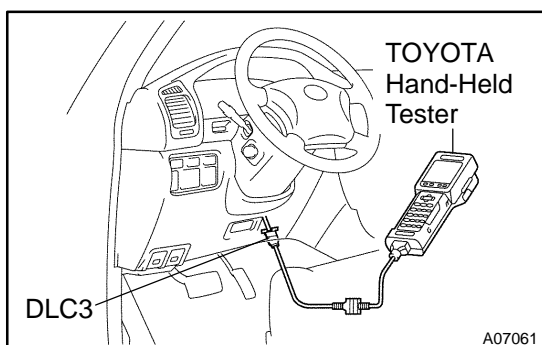
(h) Take following precautions to handle the nylon tube.

(1) Pay attention not to turn the joint part of the nylon tube and the quick connector by force when connecting them.

(2) Pay attention not to twist the nylon tube.

(3) Do not remove the EPDM protector on the outside of the nylon tube.

(4) Do not connect them by bending the nylon tube.



(i) Check that there are no fuel leaks on the fuel system after doing the maintenance.

(1) Connect the TOYOTA hand-held tester or OBD II scan tool to the DLC3.

(2) Turn the ignition switch ON and press the TOYOTA hand-held or OBD II scan tool tester main switch ON.

**NOTICE:**

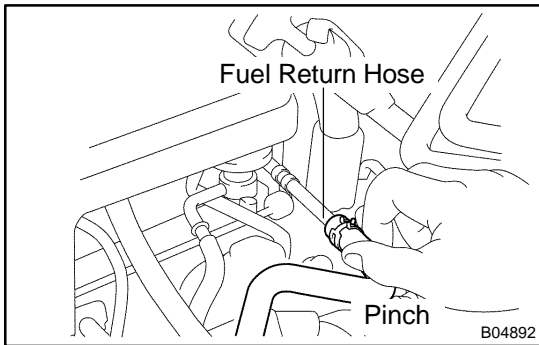
**Do not start the engine.**

(3) Select the ACTIVE TEST mode on the TOYOTA hand-held tester or OBD II scan tool .

(4) Please refer to the TOYOTA hand-held tester or OBD II scan tool operator's manual for further details.

(5) If you have no TOYOTA hand-held tester or OBD II scan tool, connect the positive (+) and negative (-) leads from the battery to the fuel pump connector (See page SF-7 ).





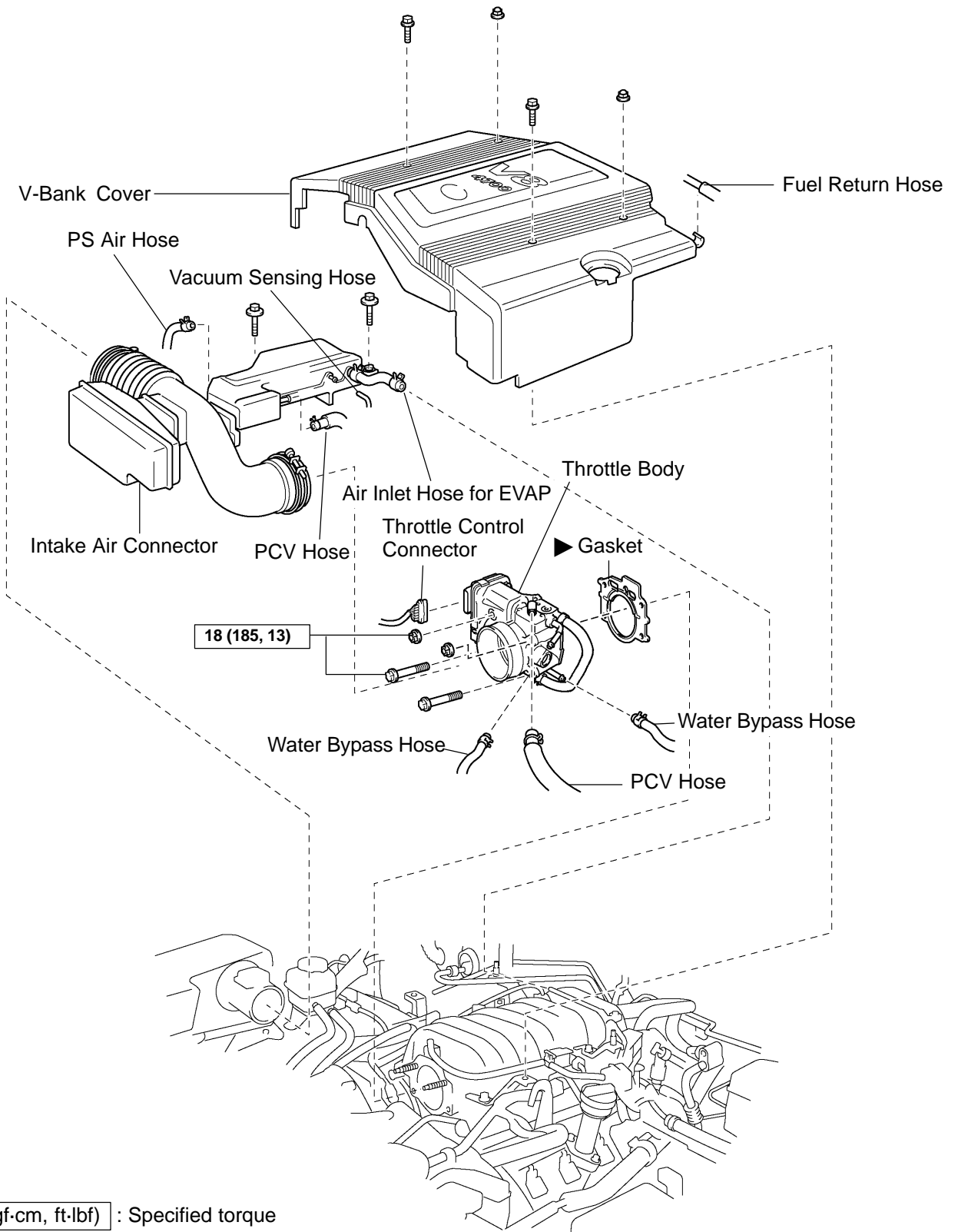
- (6) Pinch the fuel return hose.  
The pressure in the high pressure line will rise to approx. 392 kPa (4 kgf/cm<sup>2</sup>, 57 psi). In this state, check to see that there is no leak on any part of the fuel system.

**NOTICE:**

**Always pinch the hose. Do not bend as it may cause the hose to crack.**

- (7) Turn the ignition switch OFF.
- (8) Disconnect the TOYOTA hand-held tester from the DLC3.

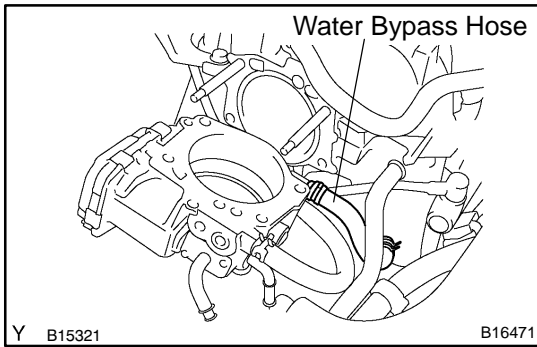
# COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

▶ Non-reusable part

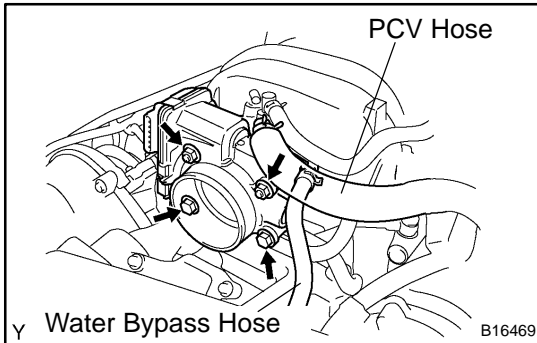
B16447



## INSTALLATION

### 1. INSTALL THROTTLE BODY

- (a) Connect the water bypass hose to the manifold thermostat on the throttle body.



- (b) Install a new gasket and the throttle body with the 2 bolts and the 2 nuts.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

- (c) Connect the water bypass hose and the PCV hose to the throttle body.
- (d) Connect the throttle control connector.

### 2. INSTALL INTAKE AIR CONNECTOR

### 3. FILL WITH ENGINE COOLANT (See page [CO-2](#))

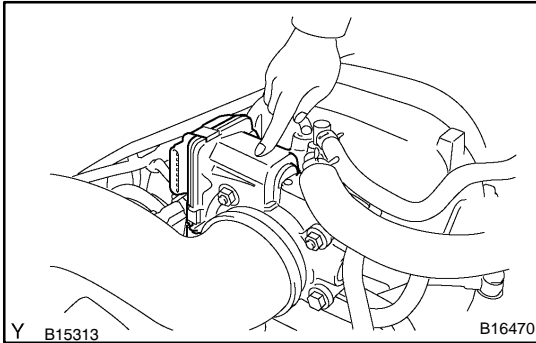
### 4. START ENGINE AND CHECK FOR ENGINE COOLANT LEAKS

### 5. INSTALL V-BANK COVER

# THROTTLE BODY ON-VEHICLE INSPECTION

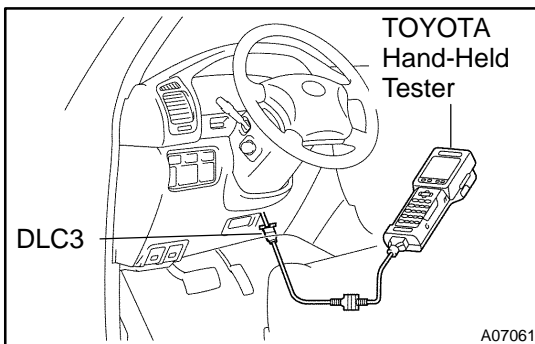
SF1UV-01

1. REMOVE V-BANK COVER
2. INSPECT SYSTEM OPERATION



- (a) Inspect the throttle control motor for operating sound.
  - (1) Turn the ignition switch ON.
  - (2) When turning the accelerator pedal position sensor lever, check the running sound of the motor. Also, check that there is no friction sound.

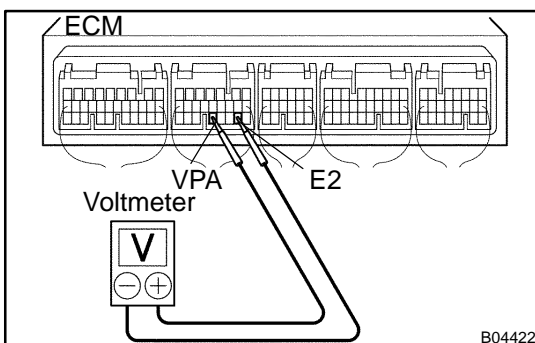
If operation is not as specified, check the throttle control motor (See step 3), wiring and ECM.



- (b) Inspect the accelerator pedal position sensor.
  - (1) Connect the TOYOTA hand-held tester or OBD II scan tool to the DLC3.
  - (2) Check that the MIL does not come on.
  - (3) When turning the accelerator pedal position sensor lever to the full-open position, check that the throttle valve opening percentage (THROTTLE POS) of CURRENT DATA shows the standard value.

**Standard throttle valve opening percentage:  
60 % or more**

If operation is not as specified, check that the accelerator pedal position sensor (See page [DI-318](#)), wiring and ECM.



If you have no TOYOTA hand-held tester or OBD II scan tool, measure the voltage between terminal VPA and E2 of the ECM connector.

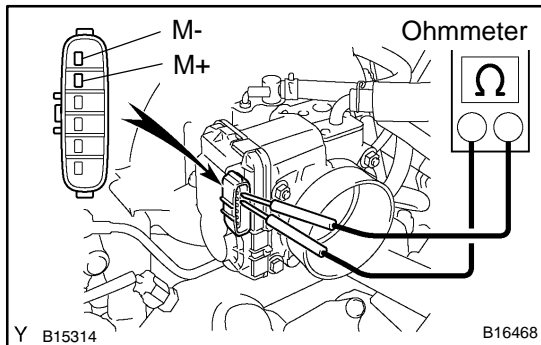
- (c) Inspect the air assist system.
  - (1) Start the engine and check that the MIL does not come on.
  - (2) Allow the engine to warm up to normal operating temperature.
  - (3) Turn the A/C compressor ON to OFF, and check the idle speed.

Idle speed (Transmission in neutral):  $700 \pm 50$  rpm

**NOTICE:**

Perform inspection under the condition with no electrical load.

- (d) After checking the above (b) to (d), perform the running test and check that there is no incongruity.



**3. INSPECT THROTTLE CONTROL MOTOR**

- (a) Disconnect the throttle connector.  
 (b) Using an ohmmeter, measure the motor resistance between terminal M+ and M-.

**Motor resistance:  $0.3 - 100 \Omega$  at  $20^\circ\text{C}$  ( $68^\circ\text{F}$ )**

If the resistance is not as specified, replace the throttle body.

- (c) Reconnect the throttle body connector.

**4. INSPECT THROTTLE POSITION SENSOR (See page [DI-84](#))**

If necessary, replace the throttle body.

**NOTICE:**

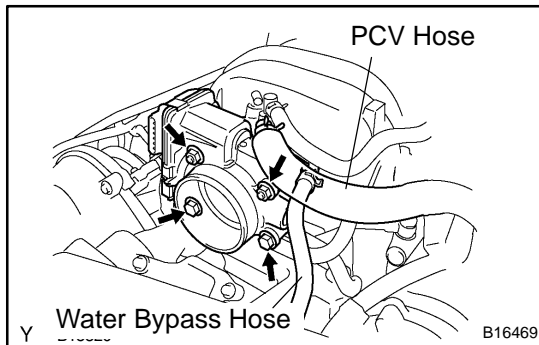
**Be careful not to give a shock to the throttle body.**

**Be careful not to disassemble the throttle body.**

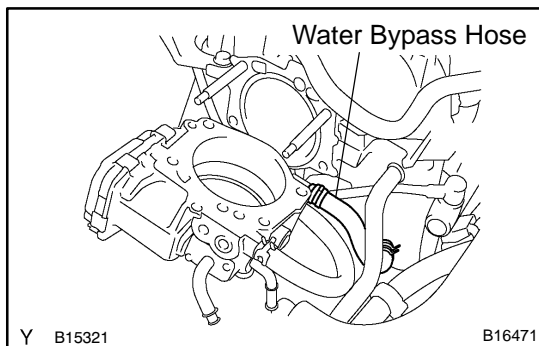
**5. REINSTALL V-BANK COVER**

## REMOVAL

1. REMOVE V-BANK COVER
2. DRAIN ENGINE COOLANT
3. REMOVE INTAKE AIR CONNECTOR
4. REMOVE THROTTLE BODY
  - (a) Disconnect the throttle control connector.



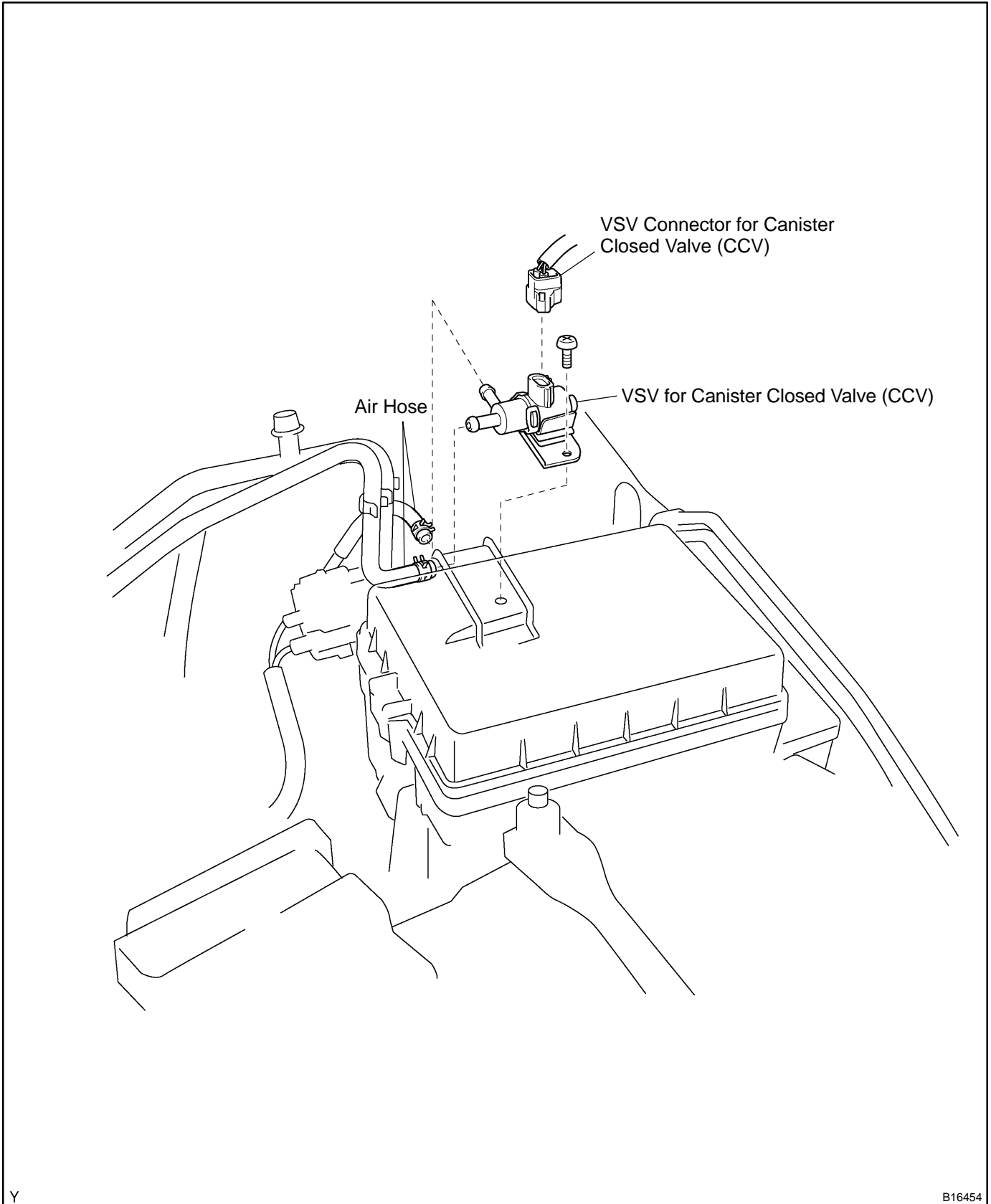
- (b) Disconnect the PCV hose and the water bypass hose from the throttle body.
- (c) Remove the 2 bolts and 2 nuts, and disconnect the throttle body from the intake manifold.



- (d) Disconnect the water bypass hose from the manifold thermostat on the throttle body, and remove the throttle body.
- (e) Remove the gasket.

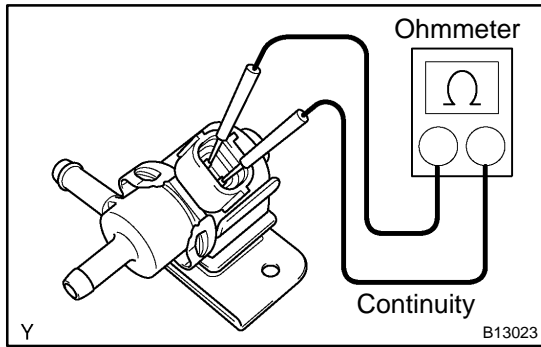
# VSV FOR CANISTER CLOSED VALVE (CCV) COMPONENTS

SF149-05



Y

B16454



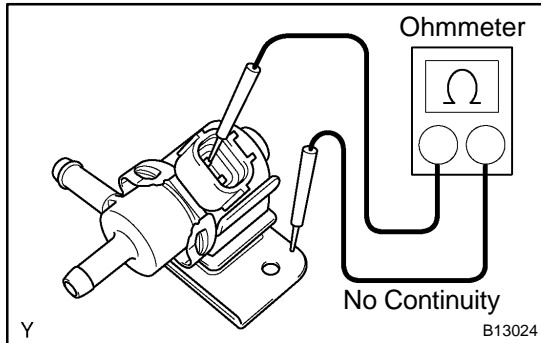
## INSPECTION

1. REMOVE VSV
2. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is a continuity between the terminals.

**Resistance: 24 - 30  $\Omega$  at 20°C (68°F)**

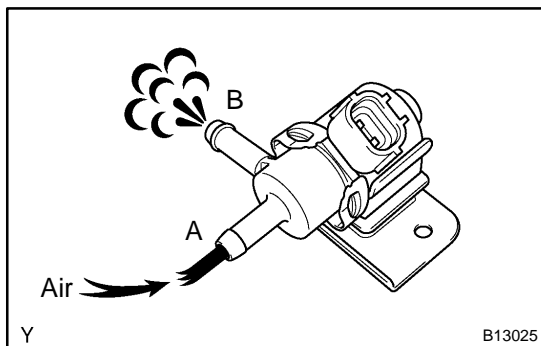
If there is no continuity, replace VSV.



3. INSPECT VSV FOR GROUND

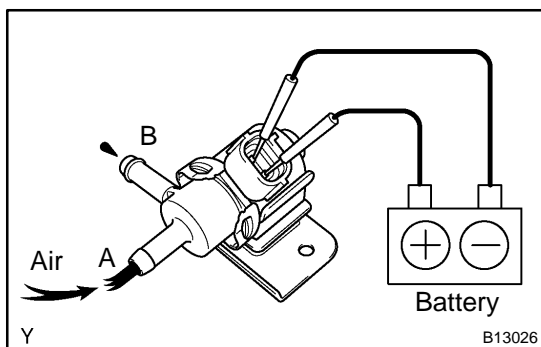
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is a continuity, replace VSV.



4. INSPECT VSV OPERATION

- (a) Check that air flows from the ports A to B.



- (b) Apply the battery positive voltage across the terminals.

- (c) Check that air does not flow from the ports A to B.

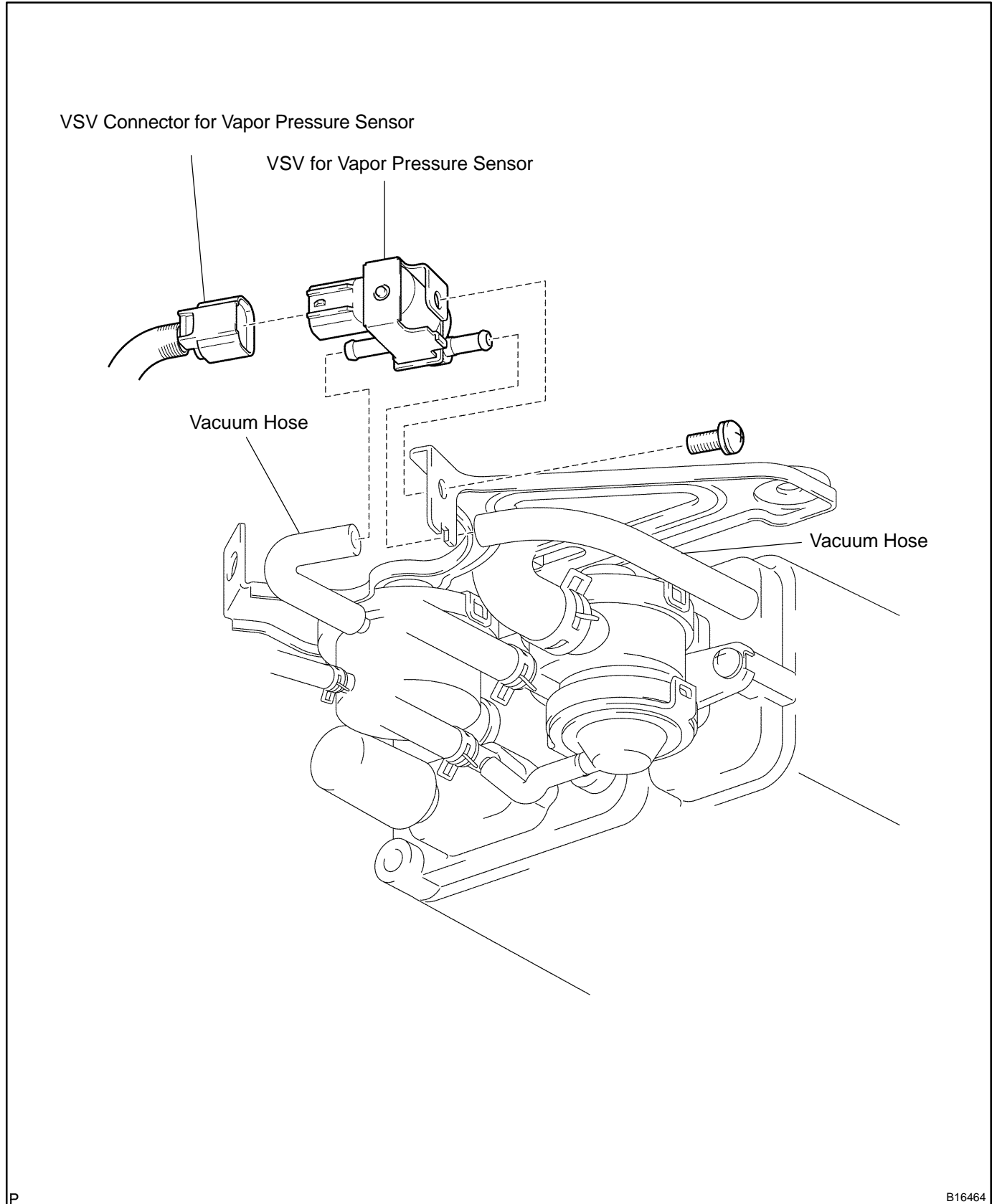
If operation is not as specified, replace VSV.

5. REINSTALL VSV



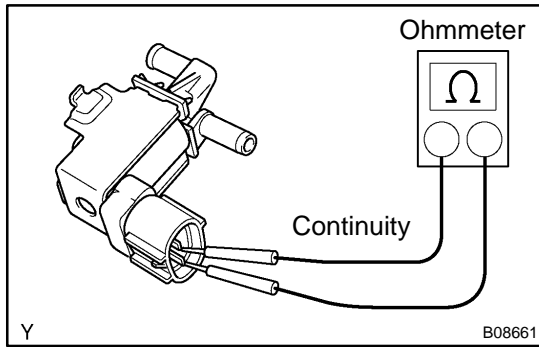
# VSV FOR VAPOR PRESSURE SENSOR COMPONENTS

SF0Y8-09



P

B16464



## INSPECTION

### 1. REMOVE VSV

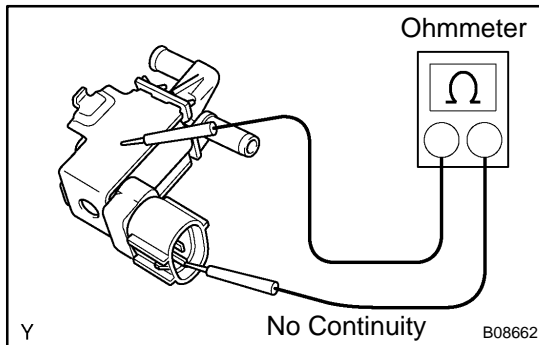
### 2. INSPECT VSV

- (a) Inspect VSV for open circuit.

Using an ohmmeter, check that there is continuity between the terminals.

**Resistance: 30 - 36 Ω at 20°C (68°F)**

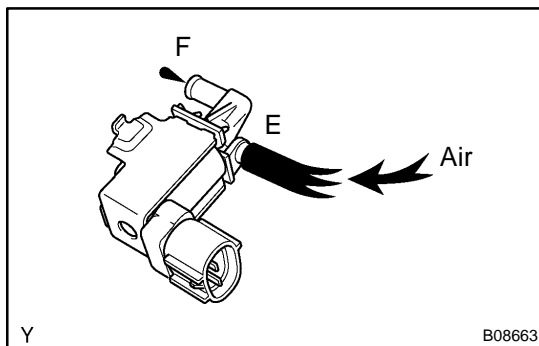
If there is no continuity, replace the VSV.



- (b) Inspect the VSV for ground.

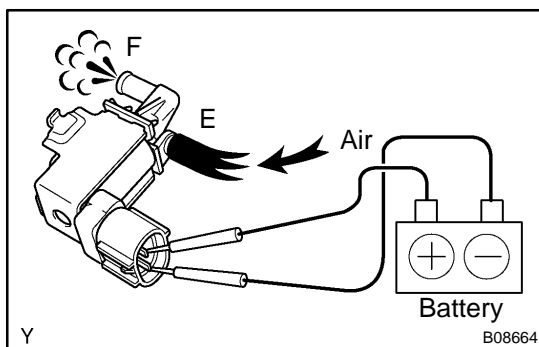
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is a continuity, replace the VSV.



- (c) Inspect the VSV operation.

- (1) Check that air flows from the ports E to F.



- (2) Apply the battery positive voltage across the terminals.

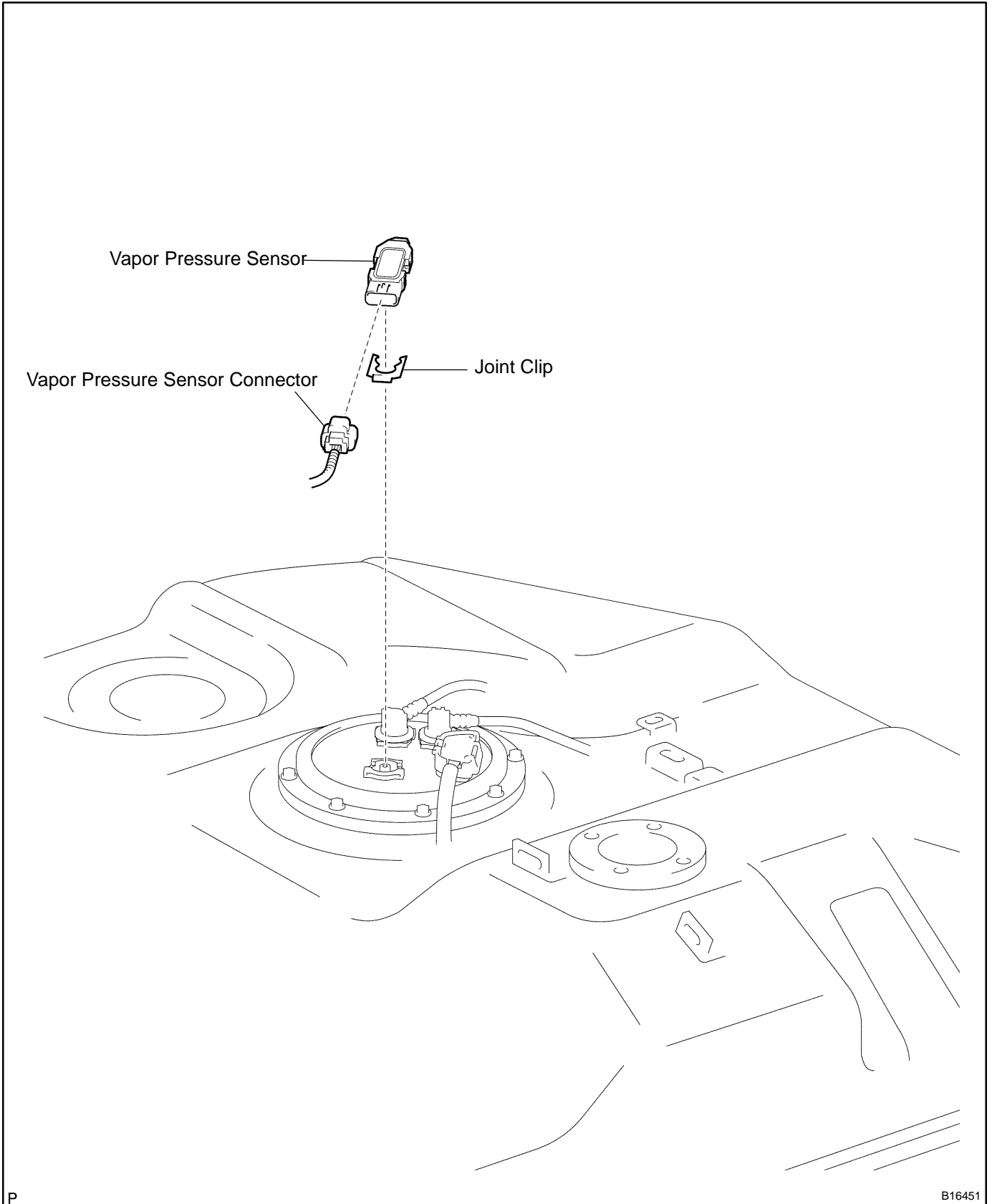
- (3) Check that air flows from the ports E to F.

If operation is not as specified, replace VSV.

### 3. REINSTALL VSV

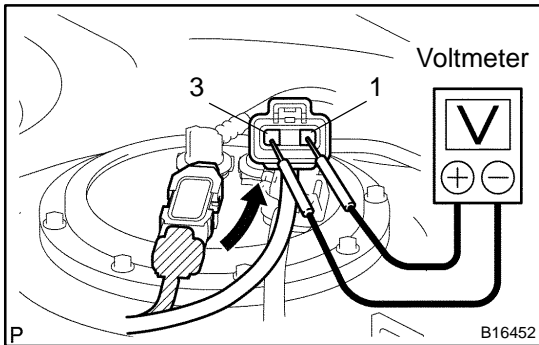
# VAPOR PRESSURE SENSOR COMPONENTS

SFOPP-10



P

B16451



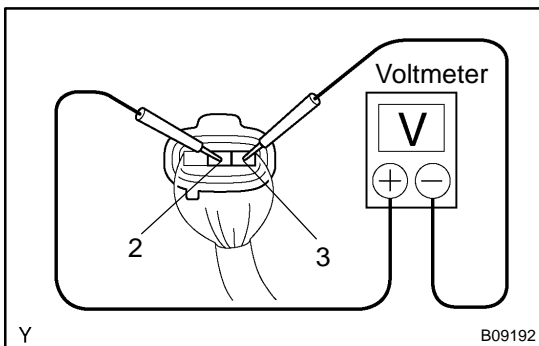
## INSPECTION

### 1. INSPECT POWER SOURCE VOLTAGE OF VAPOR PRESSURE SENSOR

- (a) Disconnect the vapor pressure sensor connector.
- (b) Turn the ignition switch ON.
- (c) Using a voltmeter, measure the voltage between connector terminal 1 and 3 of the wiring harness side.

**Voltage: 4.5 - 5.5 V**

- (d) Turn the ignition switch OFF.
- (e) Reconnect the vapor pressure sensor connector.



### 2. INSPECT POWER OUTPUT OF VAPOR PRESSURE SENSOR

- (a) Turn the ignition switch ON.
- (b) Remove the fuel tank cap.
- (c) Connect a voltmeter to terminal 2 and 3, and measure the output voltage.

**Voltage: 3.0 - 3.6 V**

- (d) Reinstall the fuel tank cap.
- (e) Turn the ignition switch OFF.

# COOLANT INSPECTION

COO10-06

**HINT:**

Check the coolant level when the engine is cold.

**1. CHECK ENGINE COOLANT LEVEL AT RADIATOR RESERVOIR**

The engine coolant level should be between the "LOW" and "FULL" lines at normal temperature (20°C(68°F)).

If low, check for leaks and add "Toyota Super Long Life Coolant" or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology up to the "FULL" line.

**2. CHECK ENGINE COOLANT QUALITY**

(a) Remove the radiator cap.

**CAUTION:**

**To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.**

(b) There should not be any excessive deposits of rust or scale around the radiator cap or radiator filler hole, and the coolant should be free from oil.

If excessively dirty, clean the coolant passages and replace the coolant.

(c) Reinstall the radiator cap.

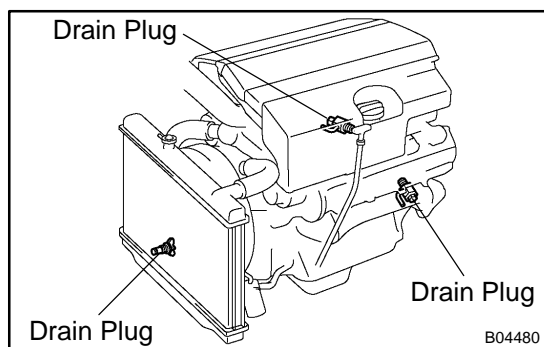
## REPLACEMENT

### 1. DRAIN ENGINE COOLANT

- (a) Remove the radiator cap.

#### CAUTION:

**To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.**



- (b) Remove the 3 drain plugs on the engine and radiator, and drain the coolant.

- (c) Close the 3 drain plugs.

**Torque: 12.7 N·m (130 kgf·cm, 9 ft·lbf) for engine**

### 2. REFILL WITH ENGINE COOLANT

- (a) Slowly fill the system with coolant.

#### Capacity:

**w/ Front heater: 14.8 liters (15.6 US qts, 13.0 Imp. qts)**

**w/ Front heater and rear heater:**

**15.3 liters (16.2 US qts, 13.4 Imp. qts)**

#### NOTICE:

**Do not use plain water alone.**

#### HINT:

- ▶ Use of improper coolants may damage the engine cooling system.
- ▶ Use "Toyota Super Long Life Coolant" or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology.
- ▶ New Toyota vehicles are filled with Toyota Super Long Life Coolant (color is pink, premixed ethylene glycol concentration is approximately 50 % and freezing temperature is  $-35^{\circ}\text{C}$  ( $-31^{\circ}\text{F}$ )). When replacing the coolant, Toyota Super long Life Coolant is recommended.
- ▶ Observe the coolant level inside the radiator by pressing the inlet and outlet radiator hoses several times by hand. If the coolant level goes down, add the coolant.

If the coolant level goes down, add the coolant.

- (b) Install the radiator cap.

- (c) Bleed the cooling system.

- (1) Start the engine, and open the heater water valve.
- (2) Maintain the engine speed at 2,000 - 2,500 rpm, and warm up the engine.

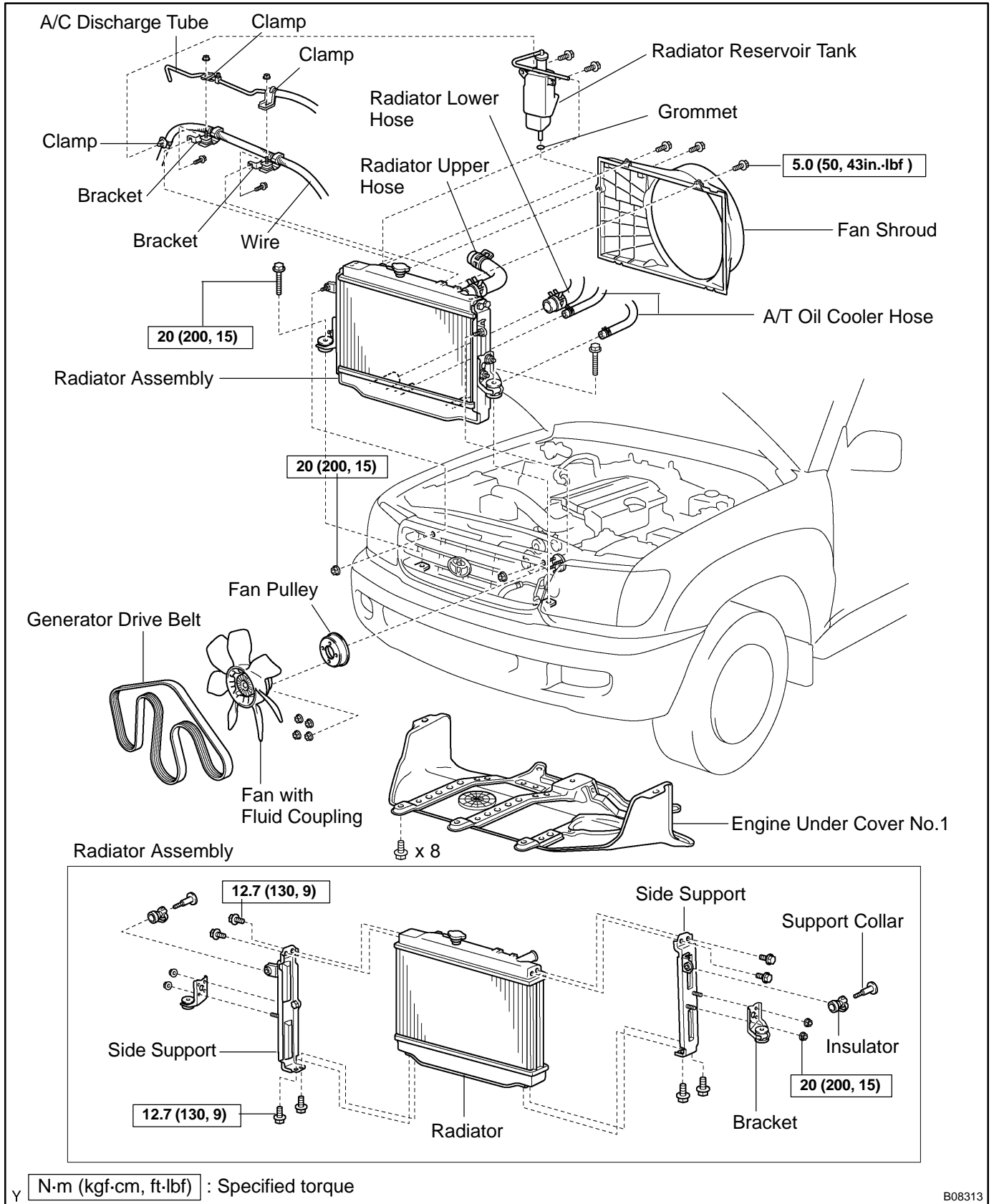
- (d) Stop the engine, and wait until the engine coolant cools down.

- (e) Refill coolant into the reservoir until it is "FULL".

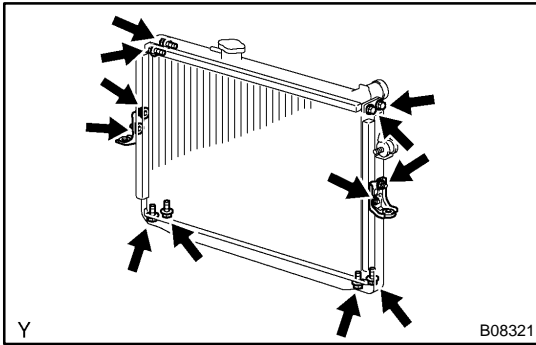
### 3. CHECK FOR ENGINE COOLANT LEAKS

### 4. CHECK ENGINE COOLANT SPECIFIC GRAVITY CORRECTLY

# COMPONENTS



B08313



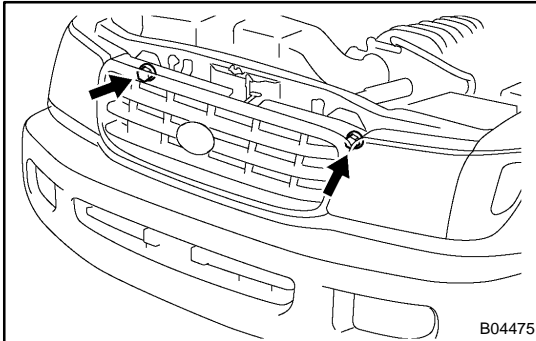
## INSTALLATION

### 1. INSTALL SIDE SUPPORTS TO RADIATOR

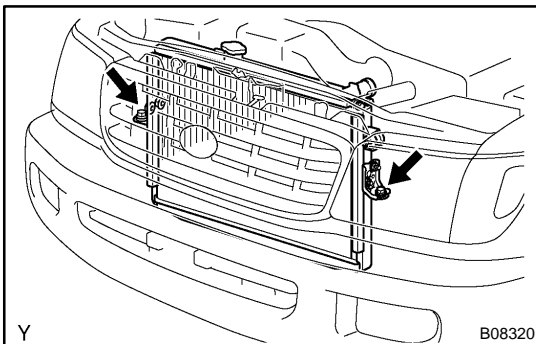
- (a) Install the 2 side support with 8 nuts.  
**Torque: 12.7 N·m (130 kgf·cm, 9 ft·lbf)**
- (b) Install the 2 brackets with the 4 nuts.  
**Torque: 20 N·m (200 kgf·cm, 13 ft·lbf)**

### 2. INSTALL RADIATOR ASSEMBLY

- (a) Place the radiator assembly to the body.



- (b) Install the 2 nuts.  
**Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)**



- (c) Install the radiator assembly with the 2 bolts to the body.  
**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

### 3. INSTALL FAN PULLEY, FAN SHROUD, FAN WITH FLUID COUPLING AND GENERATOR DRIVE BELT

- (a) Place the fan with fluid coupling, fan pulley and fan shroud in position.
- (b) Temporarily install the fan pulley mounting nuts.
- (c) Install the fan shroud with the 3 bolts.  
**Torque: 5.0 N·m (50 kgf·cm, 43 in·lbf)**
- (d) Connect the A/T oil cooler hoses to the clamp on the fan shroud.
- (e) Install the generator drive belt. (See page [CH-16](#))
- (f) Tighten the 4 fan pulley mounting nuts.
- (g) Install the 2 brackets on wire to the radiator wire with 2 bolts.
- (h) Install the 2 clamps on the A/C discharge tube to the brackets on the wire with the 2 nuts.

### 4. INSTALL RADIATOR RESERVOIR

- (a) Install the grommet to the reservoir.
- (b) Attach the lower side of the reservoir to the fan shroud.
- (c) install the reservoir with the 2 bolts.
- (d) Connect the reservoir hose to the radiator.
- (e) Install the clamp on the wire to the radiator.

### 5. CONNECT A/T OIL COOLER HOSES TO RADIATOR

### 6. CONNECT RADIATOR UPPER HOSE TO RADIATOR

### 7. CONNECT RADIATOR LOWER HOSE TO RADIATOR

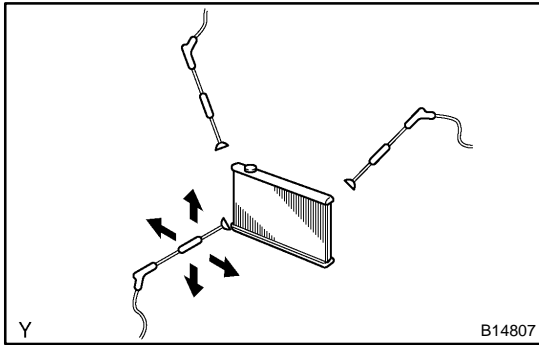
### 8. FILL WITH ENGINE COOLANT

### 9. START ENGINE AND CHECK FOR ENGINE COOLANT LEAKS

### 10. RECHECK ENGINE COOLANT LEVEL



**11. INSTALL ENGINE UNDER COVER NO.1**



## RADIATOR ON-VEHICLE CLEANING

CO1B0-01

### INSPECT FINS FOR BLOCKAGE

If fins are clogged, wash them with water or a steam cleaner and dry with compressed air.

#### NOTICE:

- ▶ If the distance between the steam cleaner and the core is too close, there is a possibility of damaging the fin, so keep the following injection distance.

Injection Pressure	Injection Distance
2,942 - 4,903 kpa (30 - 50 kg/cm <sup>2</sup> , 427 - 711 psi)	300 mm (11.811 in)
4,903 - 7,845 kpa (50 - 80 kg/cm <sup>2</sup> , 711 - 1,138 psi)	500 mm (19.685 in)

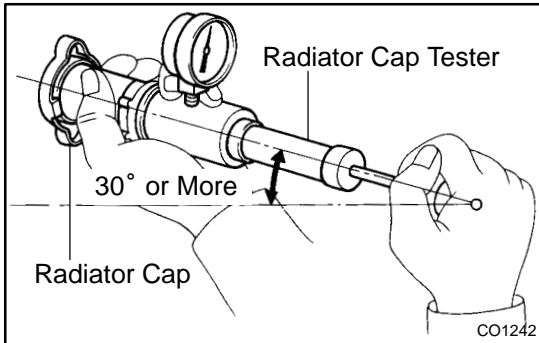
- ▶ If the fins are bent, straighten them with a screwdriver or pliers.
- ▶ Never apply water directly onto the electronic components.

## ON-VEHICLE INSPECTION

### 1. REMOVE RADIATOR CAP

#### CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.



### 2. INSPECT RADIATOR CAP

#### NOTICE:

- ▶ If the radiator cap has contaminations, always rinse it with water.
- ▶ Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.
- ▶ When performing steps (a) and (b) below, keep the tester at an angle of over 30° above the horizontal.

- (a) Using a radiator cap tester, slowly pump the tester and check that air is coming from the vacuum valve.

**Pump speed: 1 push/(3 seconds or more)**

#### NOTICE:

**Push the pump at a constant speed.**

If air is not coming from the vacuum valve, replace the radiator cap.

- (b) Pump the radiator cap tester, and measure the relief valve opening pressure.

**Pump speed: 1 push within 1 second**

#### NOTICE:

**This pump speed is for the first pump only (in order to close the vacuum valve). After this, the pump speed can be reduced.**

**Standard opening pressure:**

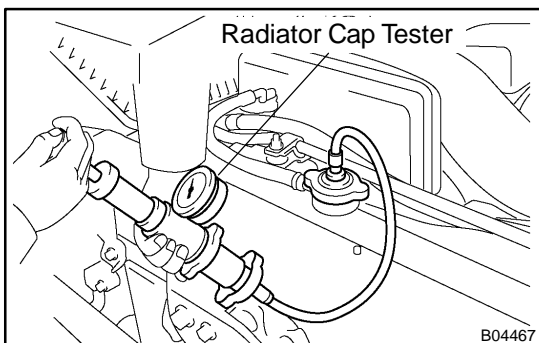
**93 - 123 kPa (0.95 - 1.25 kgf/cm<sup>2</sup>, 13.5 - 17.8 psi)**

**Minimum opening pressure:**

**78 kPa (0.8 kgf/cm<sup>2</sup>, 11.4 psi)**

#### HINT:

Use the tester's maximum reading as the opening pressure. If the opening pressure is less than minimum, replace the radiator cap.



### 3. INSPECT COOLING SYSTEM FOR LEAKS

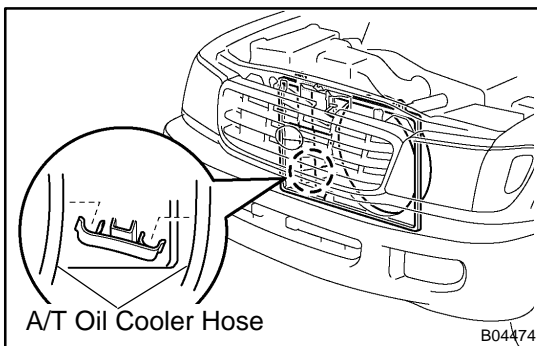
- (a) Fill the radiator with coolant and attach a radiator cap tester.
- (b) Warm up the engine.
- (c) Pump it to 118 kPa (1.2 kgf/cm<sup>2</sup>, 17.1 psi), and check that the pressure does not drop.

If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and head.

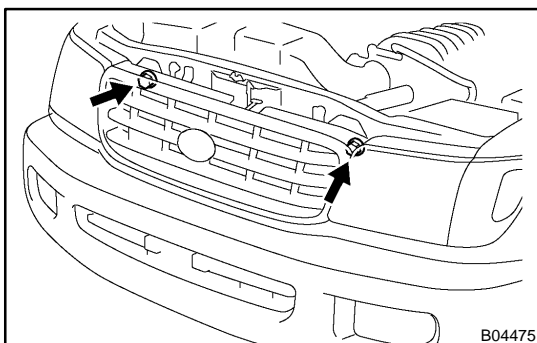
### 4. REINSTALL RADIATOR CAP

## REMOVAL

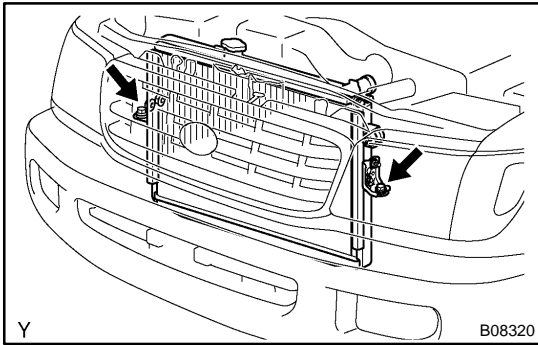
1. REMOVE ENGINE UNDER COVER NO.1
2. DRAIN ENGINE COOLANT
3. DISCONNECT RADIATOR UPPER HOSE FROM RADIATOR
4. DISCONNECT RADIATOR LOWER HOSE FROM RADIATOR
5. DISCONNECT A/T OIL COOLER HOSES FROM RADIATOR
6. REMOVE RADIATOR RESERVOIR
  - (a) Disconnect the clamp on the wire from the radiator.
  - (b) Disconnect the reservoir hose from the radiator.
  - (c) Remove the 2 bolts, reservoir and grommet.



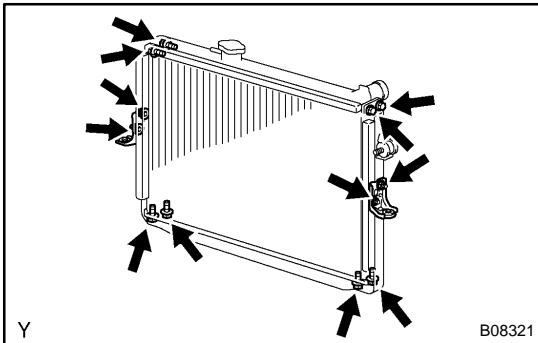
7. REMOVE RADIATOR ASSEMBLY
  - (a) Remove the 2 nuts, and disconnect the 2 clamps on the A/C discharge tube from the bracket.
  - (b) Remove the 2 bolts, and disconnect the 2 brackets on the wire from the radiator.
  - (c) Disconnect the A/T oil cooler hoses from the clamp on the fan shroud.
  - (d) Loosen the fan pulley mounting nuts holding the fluid coupling to the fan bracket.
  - (e) Remove generator drive belt. (See page [CH-7](#))
  - (f) Remove the 3 bolts holding the fan shroud to the radiator.
  - (g) Remove the 4 fan pulley mounting nuts.
  - (h) Pull out the fan with fluid coupling, fan pulley and fan shroud.



- (i) Remove the 2 nuts.



- (j) Remove the 2 bolts.
- (k) Lift out the radiator assembly.

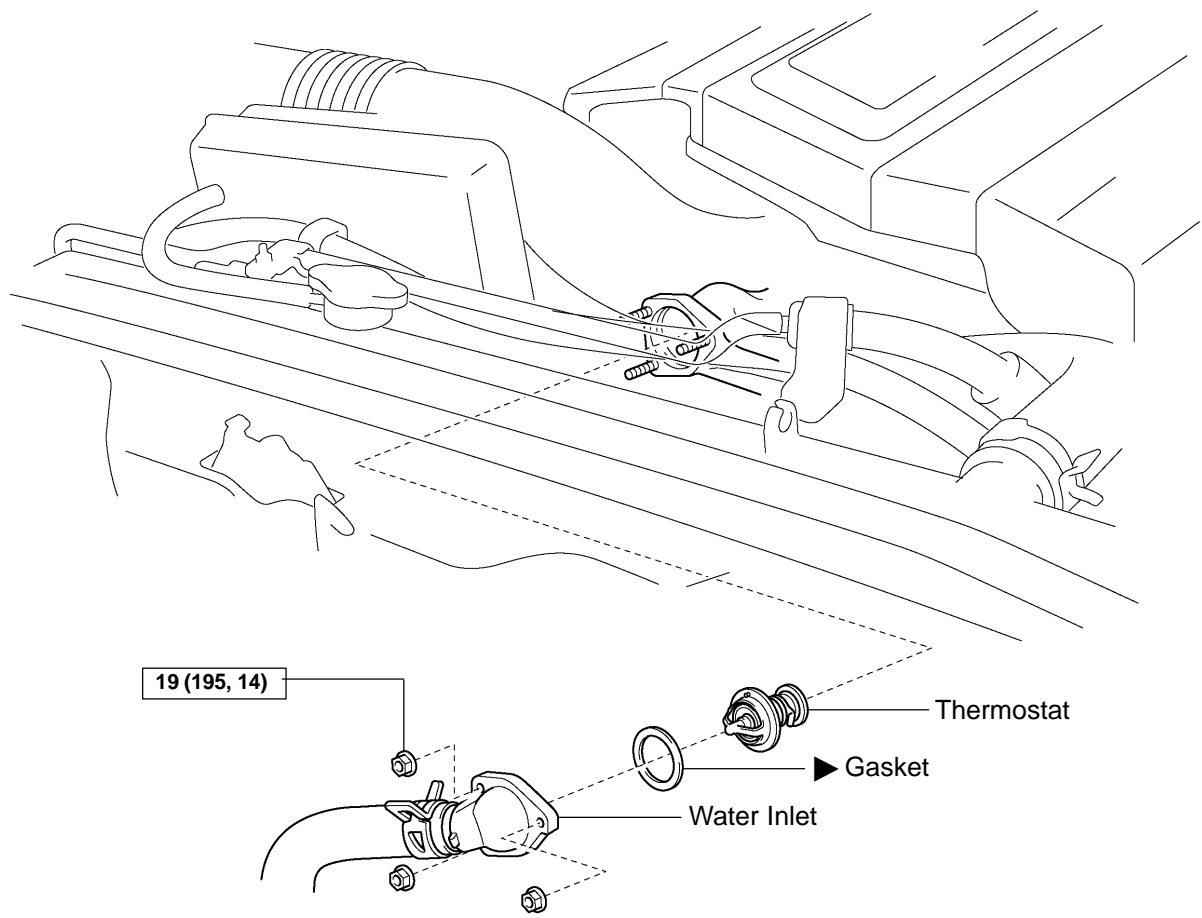


### 8. REMOVE RADIATOR SIDE SUPPORTS FROM RADIATOR

- (a) Remove the 4 nuts and 2 brackets.
- (b) Remove the 8 nuts and 2 side supports.

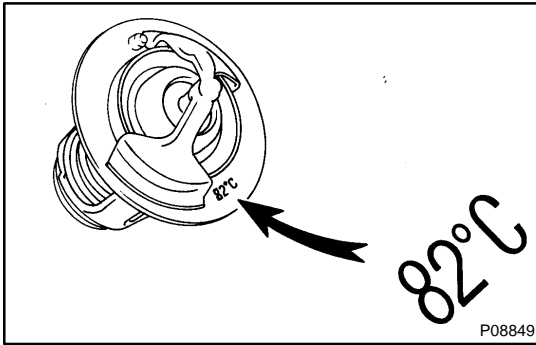
# THERMOSTAT COMPONENTS

CO01U-01



**19 (195, 14)** : Specified torque  
▶ Non-reusable part

B04464

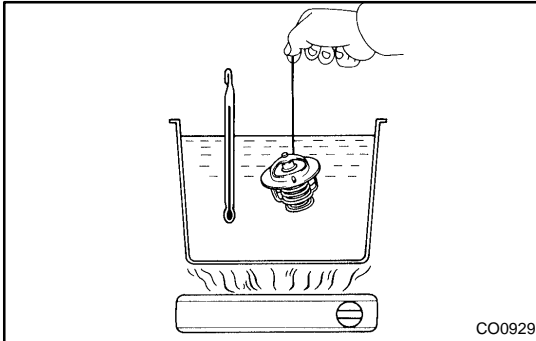


## INSPECTION

### INSPECT THERMOSTAT

#### HINT:

The thermostat is numbered with the valve opening temperature.

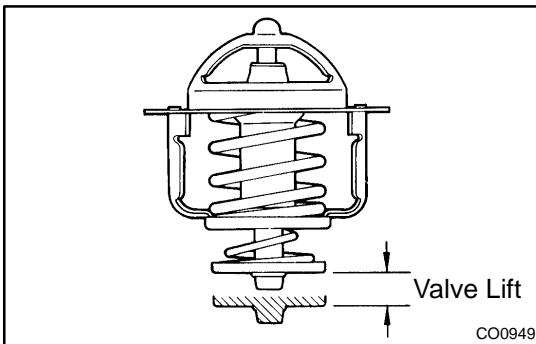


(a) Immerse the thermostat in water and gradually heat the water.

(b) Check the valve opening temperature.

**Valve opening temperature: 80 - 84 °C (176 - 183 °F)**

If the valve opening temperature is not as specified, replace the thermostat.



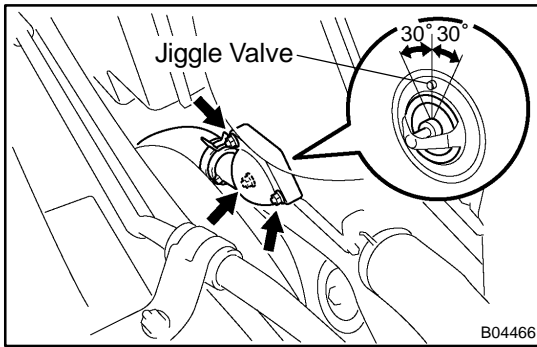
(c) Check the valve lift.

**Valve lift: 10 mm (0.39 in.) or more at 95 °C (203 °F)**

If the valve lift is not as specified, replace the thermostat.

(d) Check that the valve is fully closed when the thermostat is at low temperatures (below 40 °C (104 °F)).

If not closed, replace the thermostat.



## INSTALLATION

1. **PLACE THERMOSTAT IN WATER INLET HOUSING**
  - (a) Install a new gasket to the thermostat.
  - (b) Insert the thermostat into the water inlet housing with the jiggle valve facing straight upward.

### HINT:

The jiggle valve may be set within 30° of either side of the prescribed position.

2. **INSTALL WATER INLET**

Install the water inlet with the 3 nuts.

**Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)**

3. **FILL WITH ENGINE COOLANT**
4. **START ENGINE AND CHECK FOR COOLANT LEAKS**
5. **RECHECK ENGINE COOLANT LEVEL**

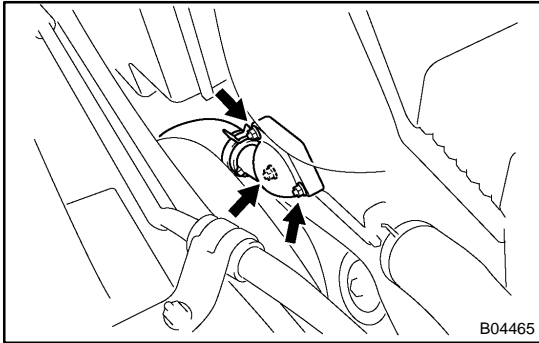


## REMOVAL

### HINT:

Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

#### 1. DRAIN ENGINE COOLANT



#### 2. DISCONNECT WATER INLET FROM WATER INLET HOUSING

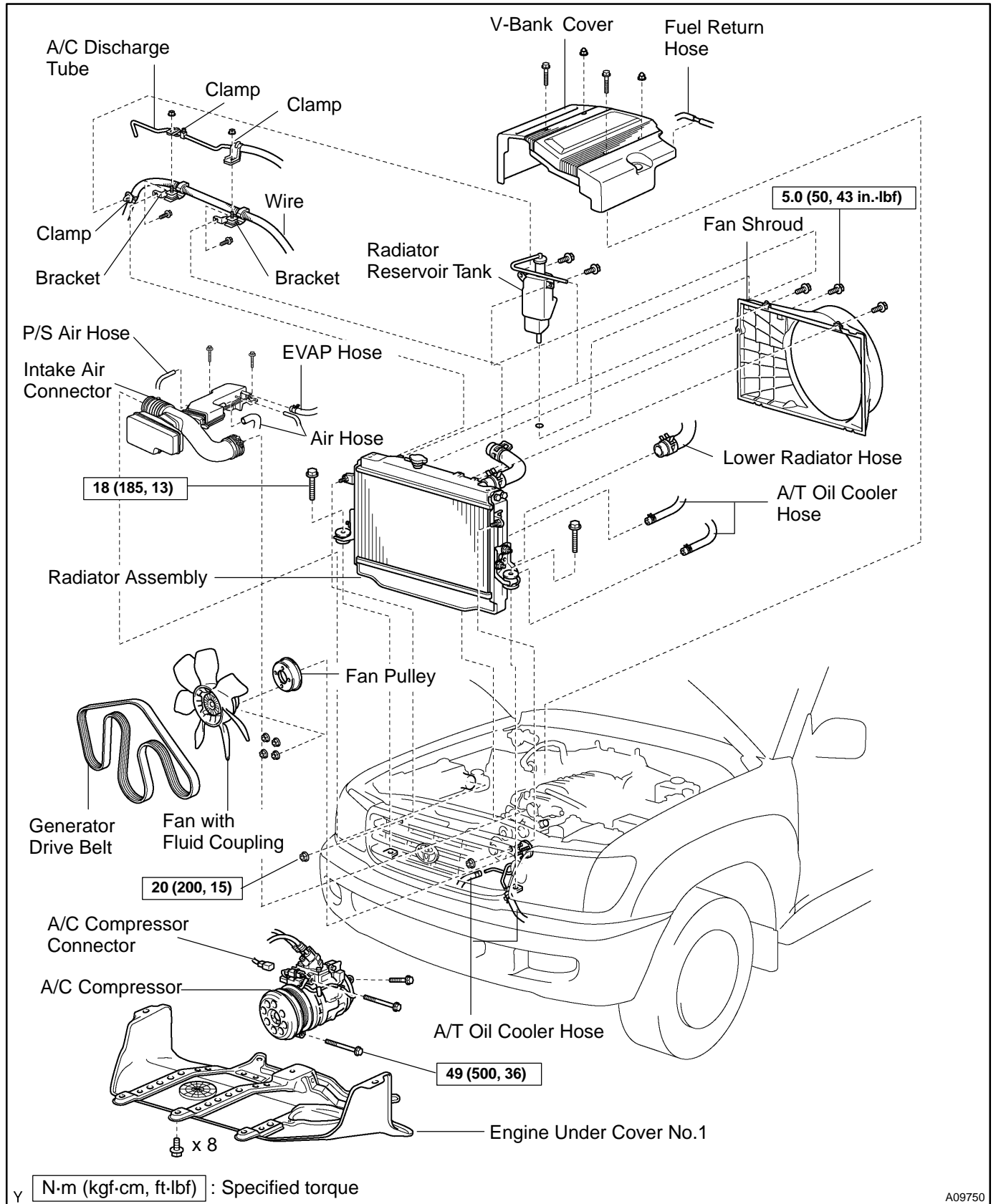
Remove the 3 nuts and disconnect the water inlet from the water inlet housing.

#### 3. REMOVE THERMOSTAT

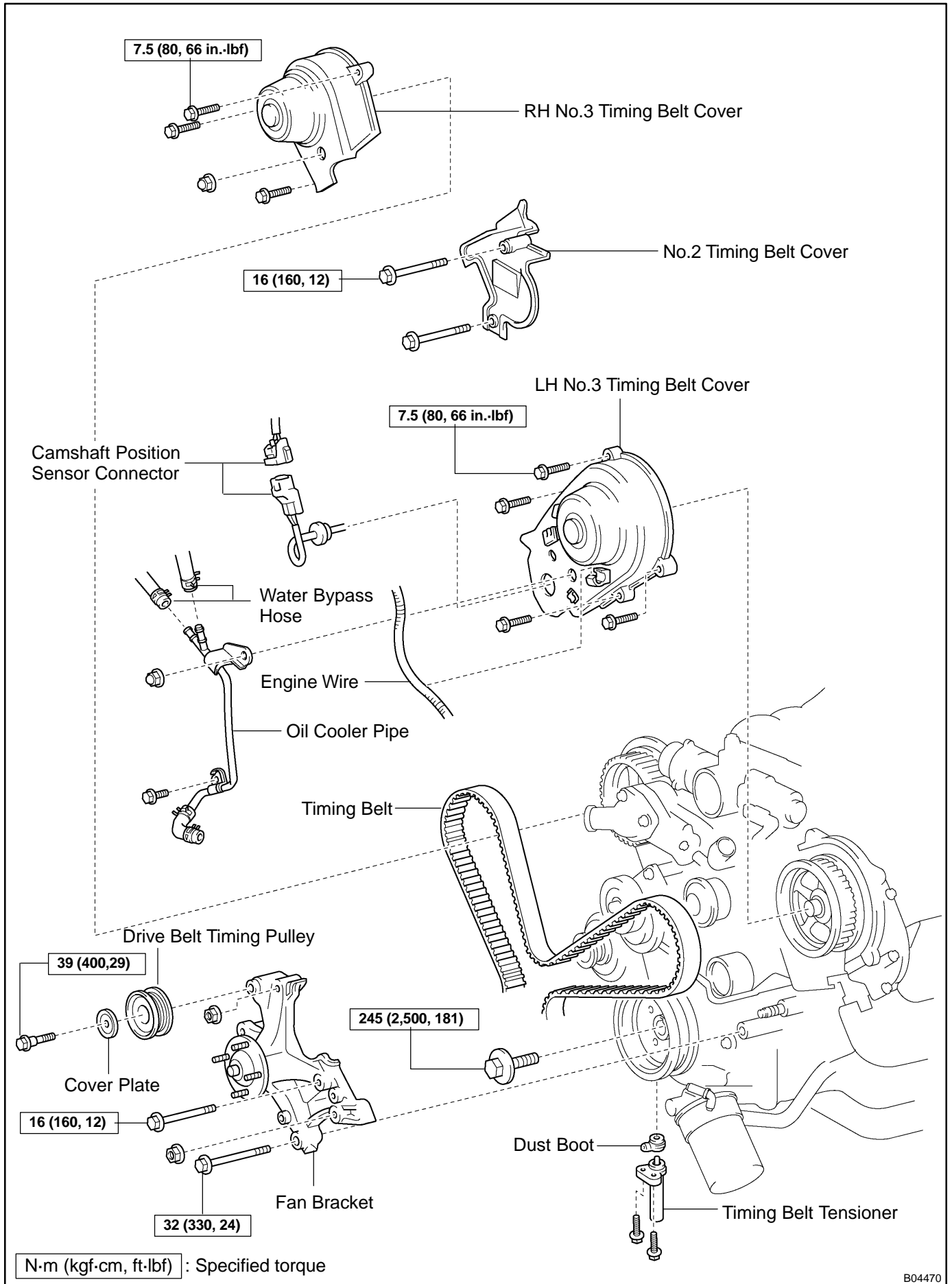
- (a) Remove the thermostat.
- (b) Remove the gasket from the thermostat.

# WATER PUMP COMPONENTS

CO01Q-06

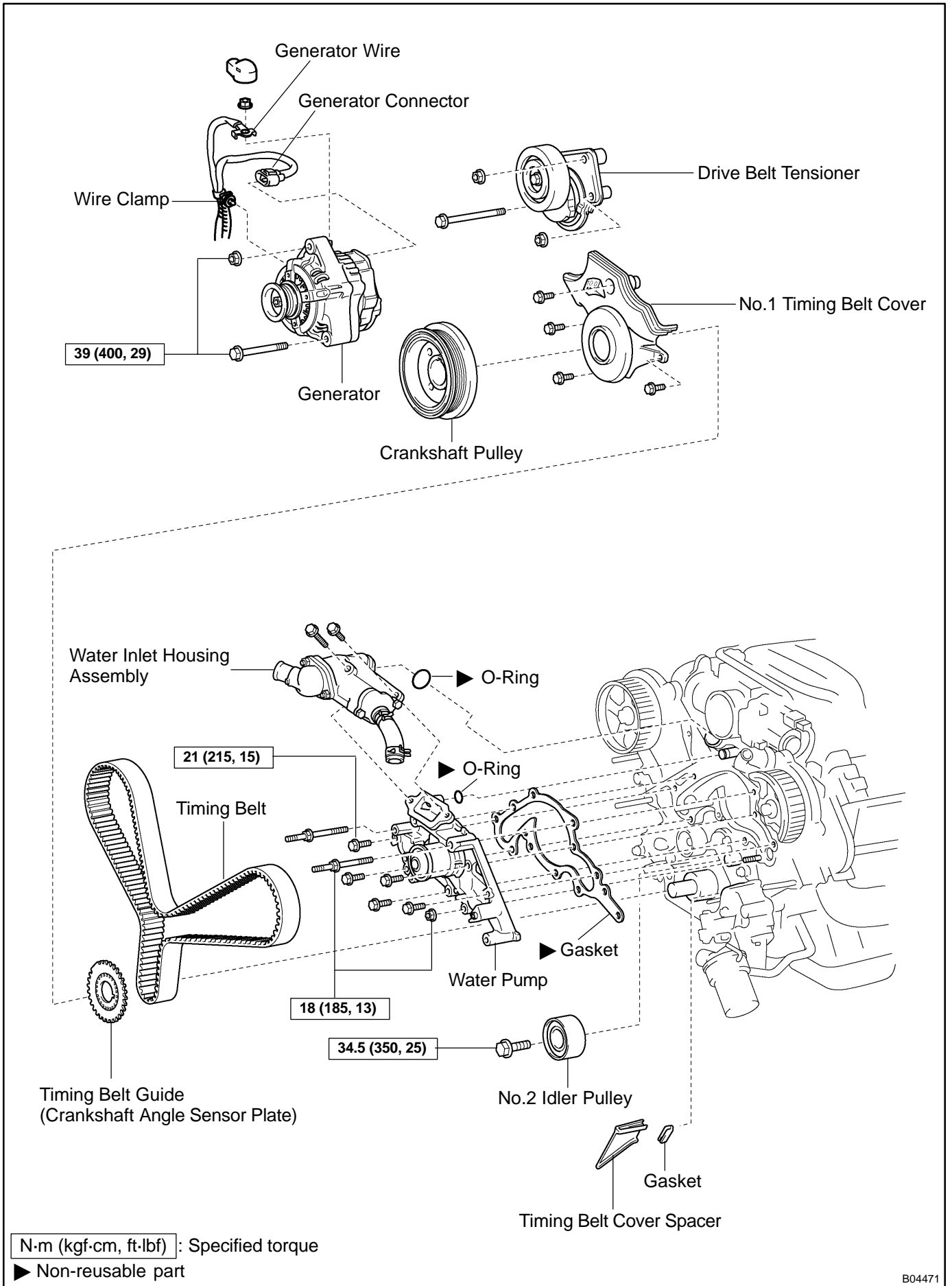


A09750

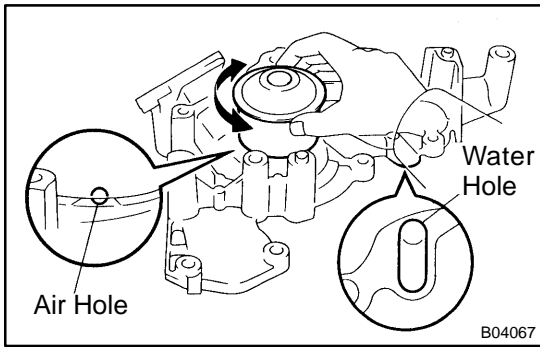


B04470

COOLING - WATER PUMP



B04471



## INSPECTION

### 1. INSPECT WATER PUMP

- (a) Visually check the air hole and water hole for coolant leakage.

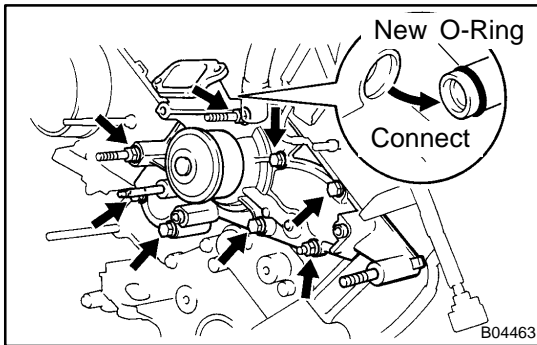
If leakage is found, replace the water pump and timing belt.

- (b) Turn the pulley, and check that the water pump bearing moves smoothly and quietly.

If necessary, replace the water pump.

### 2. INSPECT TIMING BELT COMPONENTS

(See page [EM-20](#) )



## INSTALLATION

### 1. INSTALL WATER PUMP

- Install a new O-ring to the water bypass pipe end.
- Apply soapy water to the O-ring.
- Connect the water pump to the water bypass pipe end.
- Install the water pump and new gasket with the 5 bolts, 2 stud bolts and nut. Uniformly tighten the bolts, stud bolts and nut in several passes.

#### Torque:

**Bolt: 21 N-m (215 kgf-cm, 15 ft-lbf)**

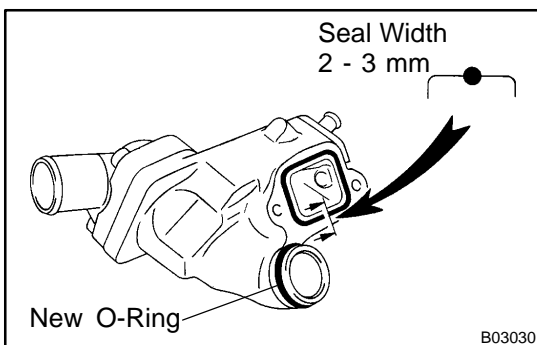
**Stud bolt and nut: 18 N-m (185 kgf-cm, 13 ft-lbf)**

#### HINT:

Use bolts 35 mm (1.38 in.) in length.

### 2. INSTALL WATER INLET AND INLET HOUSING ASSEMBLY

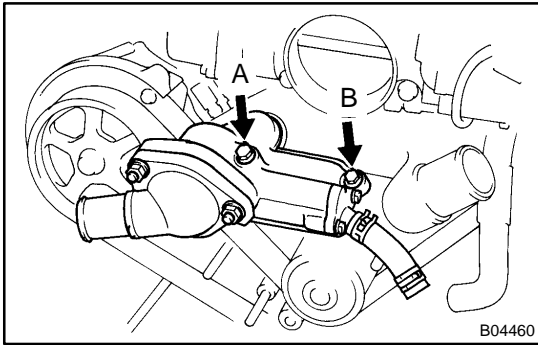
- Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the water inlet housing and water pump.
  - ▶ Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
  - ▶ Thoroughly clean all components to remove all the loose material.
  - ▶ Using a non-residue solvent, clean both sealing surfaces.



- Apply seal packing to the sealing groove of water inlet housing as shown in the illustration.

#### Seal packing: Part No. 08826-00100 or equivalent

- ▶ Install a nozzle that has been cut to a 2 - 3 mm (0.08 - 0.12 in.) opening.
  - ▶ Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
  - ▶ Immediately remove nozzle from the tube and reinstall cap.
- Install a new O-ring to the water inlet housing.
  - Apply soapy water on the O-ring.
  - Attach the water inlet housing end to the front water bypass joint hole.



- (f) Install the water inlet and housing assembly with the 2 bolts. Alternately tighten the bolts.

**Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)**

**HINT:**

Each bolt length is indicated in the illustration.

Bolt length:

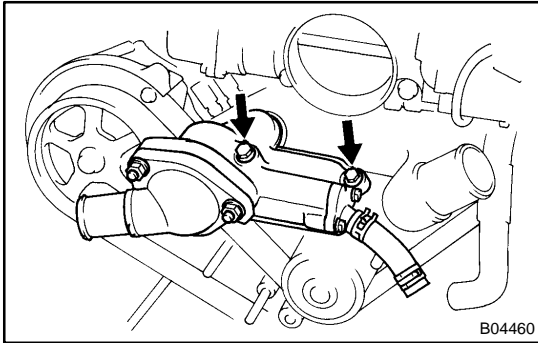
76 mm (3.00 in.) for A

22 mm (0.87 in.) for B

3. **INSTALL NO.2 IDLER PULLEY (See page EM-22 )**
4. **INSTALL TIMING BELT (See page EM-22 )**
5. **FILL WITH ENGINE COOLANT**
6. **START ENGINE AND CHECK FOR ENGINE COOLANT LEAKS**
7. **RECHECK ENGINE COOLANT LEVEL**

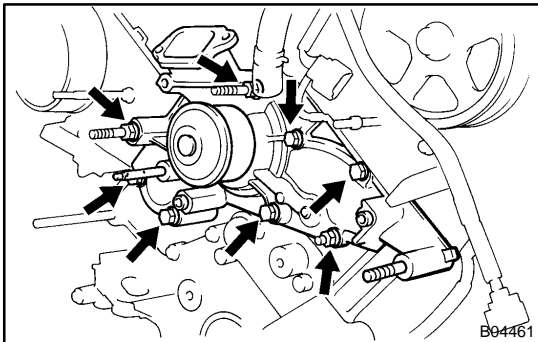
## REMOVAL

1. DRAIN ENGINE COOLANT
2. REMOVE TIMING BELT (See page [EM-15](#) )
3. REMOVE NO.2 IDLER PULLEY (See page [EM-15](#) )



### 4. REMOVE WATER INLET AND INLET HOUSING ASSEMBLY

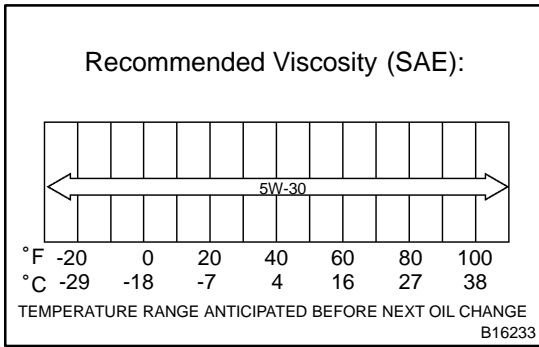
- (a) Disconnect the water bypass hose from the water inlet housing.
- (b) Remove the 2 bolts holding the water inlet housing to the water pump.
- (c) Disconnect the water inlet housing from the front water bypass joint, and remove the water inlet and inlet housing assembly.
- (d) Remove the O-ring from the water inlet housing.



### 5. REMOVE WATER PUMP

- (a) Remove the 5 bolts, 2 stud bolts, nut, water pump and gasket.
- (b) Remove the O-ring from the water bypass pipe.





# OIL AND FILTER INSPECTION

LU08N-04

## 1. CHECK ENGINE OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

If the quality is visibly poor, replace the oil.

### Oil grade:

**API grade SL Energy-Conserving or ILSAC multi-grade engine oil.**

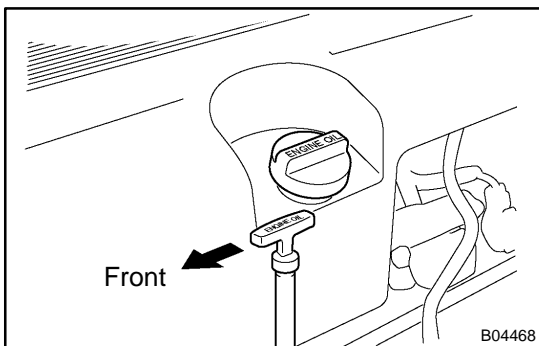
## 2. CHECK ENGINE OIL LEVEL

The oil level should be between the "L" and "F" marks on the dipstick.

If low, check for leakage and add oil up to the "F" mark.

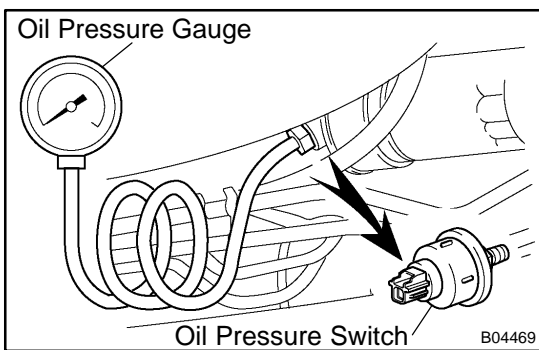
### NOTICE:

- ▶ Do not fill with engine oil above the "F" mark.



- ▶ Install the oil dipstick facing the direction shown in the illustration.

## 3. REMOVE ENGINE UNDER COVER NO.1



## 4. REMOVE OIL PRESSURE SWITCH

## 5. INSTALL OIL PRESSURE GAUGE

## 6. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

## 7. CHECK OIL PRESSURE

### Oil pressure:

**At idle: 29 kPa (0.3 kgf/cm<sup>2</sup>, 4.2 psi) or more**

**At 3,000 rpm:**

**294 - 588 kPa (3.0 - 6.0 kgf/cm<sup>2</sup>, 43 - 85 psi)**

## 8. REMOVE OIL PRESSURE GAUGE

## 9. REINSTALL OIL PRESSURE SWITCH

- (a) Apply adhesive to 2 or 3 threads of the oil pressure switch.

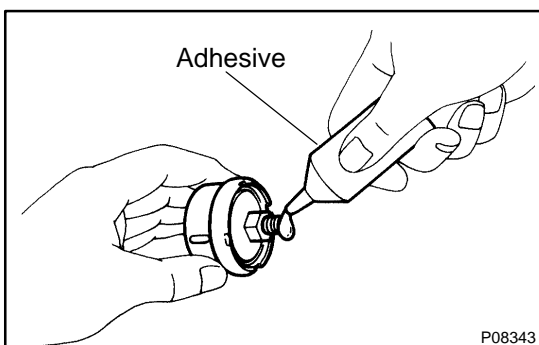
### Adhesive:

**Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent**

- (b) Reinstall the oil pressure switch.

## 10. START ENGINE, AND CHECK FOR ENGINE OIL LEAKS

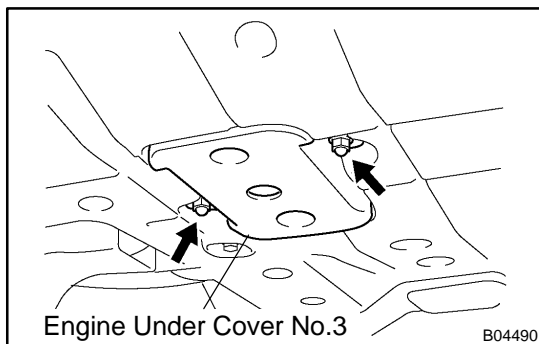
## 11. REINSTALL ENGINE UNDER COVER NO.1



## REPLACEMENT

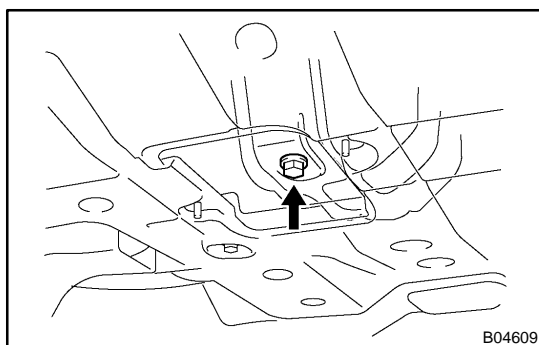
### CAUTION:

- ▶ Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.
- ▶ Care should be taken, therefore, when changing engine oil to minimize the frequency and length of time your skin is exposed to used engine oil. Protective clothing and gloves that cannot be penetrated by oil should be worn. The skin should be thoroughly washed with soap and water, or use water-less hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.
- ▶ In order to preserve the environment, used oil and used oil filters must be disposed of only at designated disposal sites.



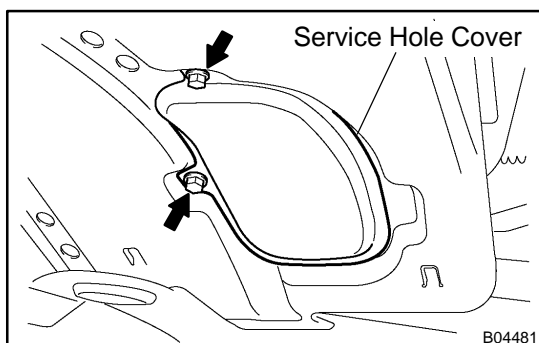
### 1. DRAIN ENGINE OIL

- (a) Remove the 2 nuts and engine under cover No.3.



- (b) Remove the oil filler cap.

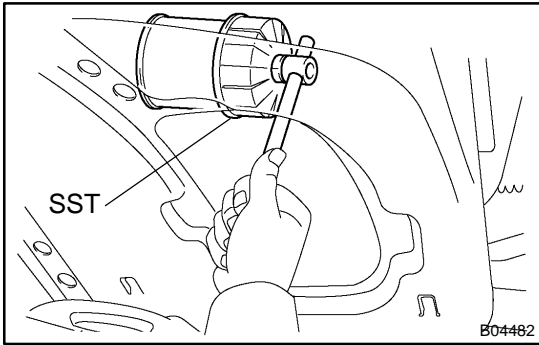
- (c) Remove the oil drain plug, and drain the oil into a container.



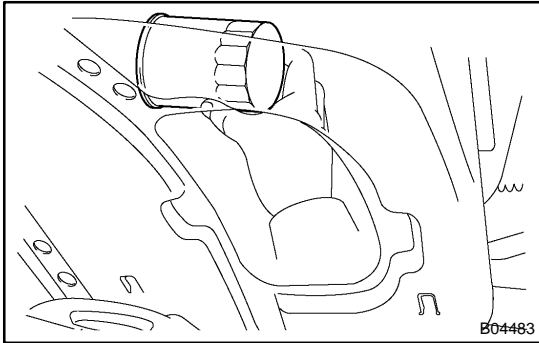
### 2. REPLACE OIL FILTER

- (a) Remove the 2 bolts and service hole cover.

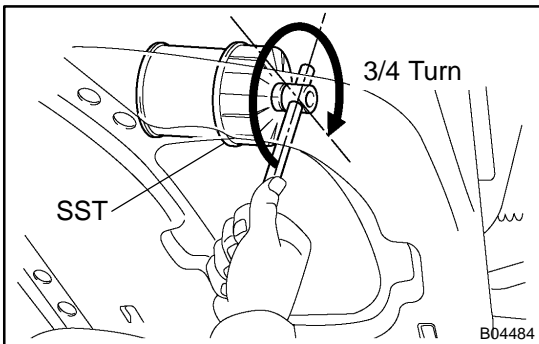
LUBRICATION - OIL AND FILTER



- (b) Using SST, remove the oil filter.  
SST 09228-07501
- (c) Clean the oil filter contact surface on the oil filter mounting.
- (d) Lubricate the filter rubber gasket with clean engine oil.



- (e) Tighten the oil filter by hand until the rubber gasket contacts the seat of the filter mounting.



- (f) Using SST, give it an additional 3/4 turn to seat the filter.  
SST 09228-07501

**3. REFILL WITH ENGINE OIL**

- (a) Clean and install the oil drain plug with a new gasket.  
**Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)**

- (b) Fill with new engine oil.

**Capacity:**

**Drain and refill:**

**w/ Oil filter change: 6.8 liters (7.2 US qts, 6.0 Imp. qts)**

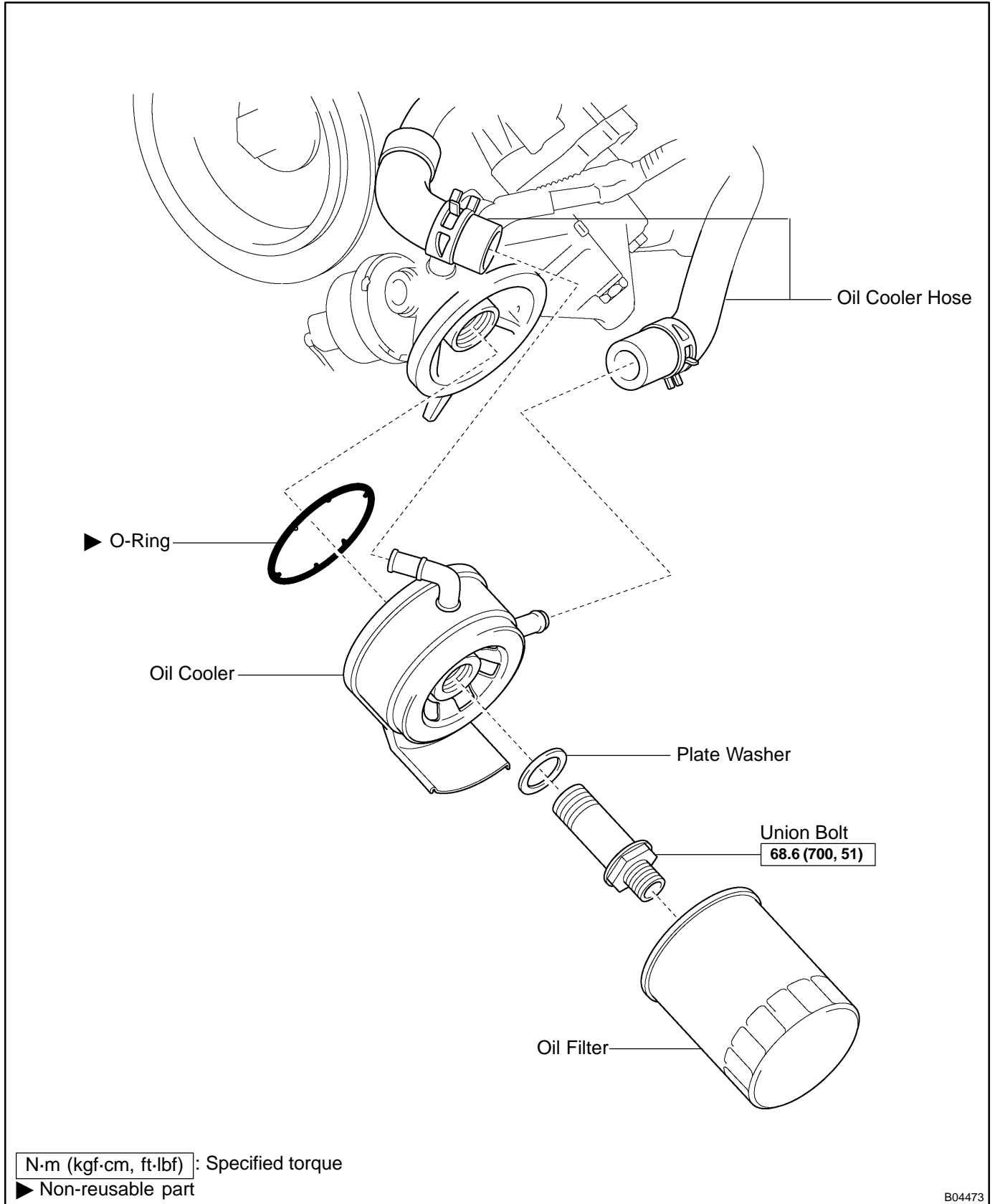
**w/o Oil filter change: 6.4 liters (6.8 US qts, 5.6 Imp. qts)**

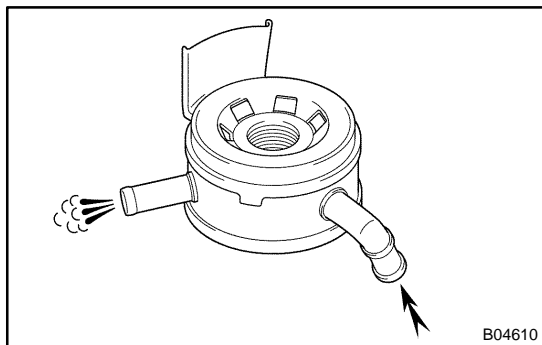
**Dry fill: 8.0 liters (8.5 US qts, 7.0 Imp. qts)**

- (c) Reinstall the oil filler cap.
- 4. START ENGINE AND CHECK FOR ENGINE OIL LEAKS**
- 5. RECHECK ENGINE OIL LEVEL**
- 6. REINSTALL ENGINE UNDER COVER NO.3 AND SERVICE HOLE COVER**

# OIL COOLER COMPONENTS

LU08W-08





## INSPECTION

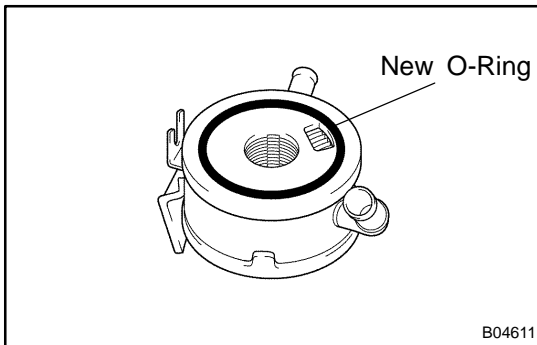
### INSPECT OIL COOLER

Check the oil cooler for damage or clogging.  
If necessary, replace the oil cooler.

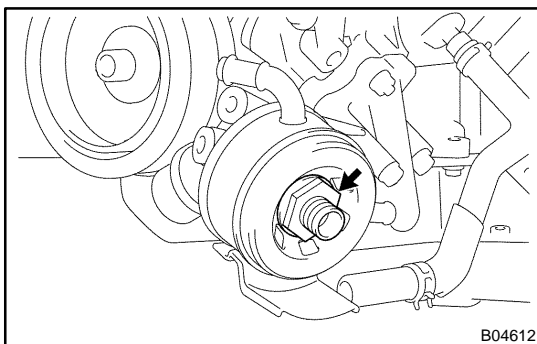
## INSTALLATION

### 1. INSTALL OIL COOLER

- (a) Clean the oil cooler contact surface on the cooler mounting.



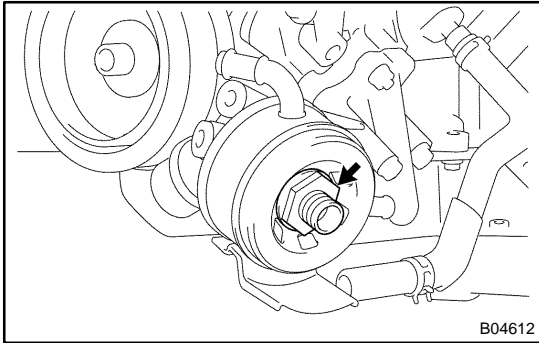
- (b) Install a new O-ring to the oil cooler.  
 (c) Apply a light coat of engine oil on the threads and under the head of the union bolt.



- (d) Install the plate washer and union bolt.  
**Torque: 68.6 N·m (700 kgf·cm, 51 ft·lbf)**  
 (e) Connect the 2 oil cooler hoses to the oil cooler.
- 2. INSTALL OIL FILTER (See page [LU-2](#))**  
**3. FILL WITH ENGINE COOLANT**  
**4. START ENGINE AND CHECK FOR ENGINE OIL LEAKS**  
**5. CHECK ENGINE OIL LEVEL**

## REMOVAL

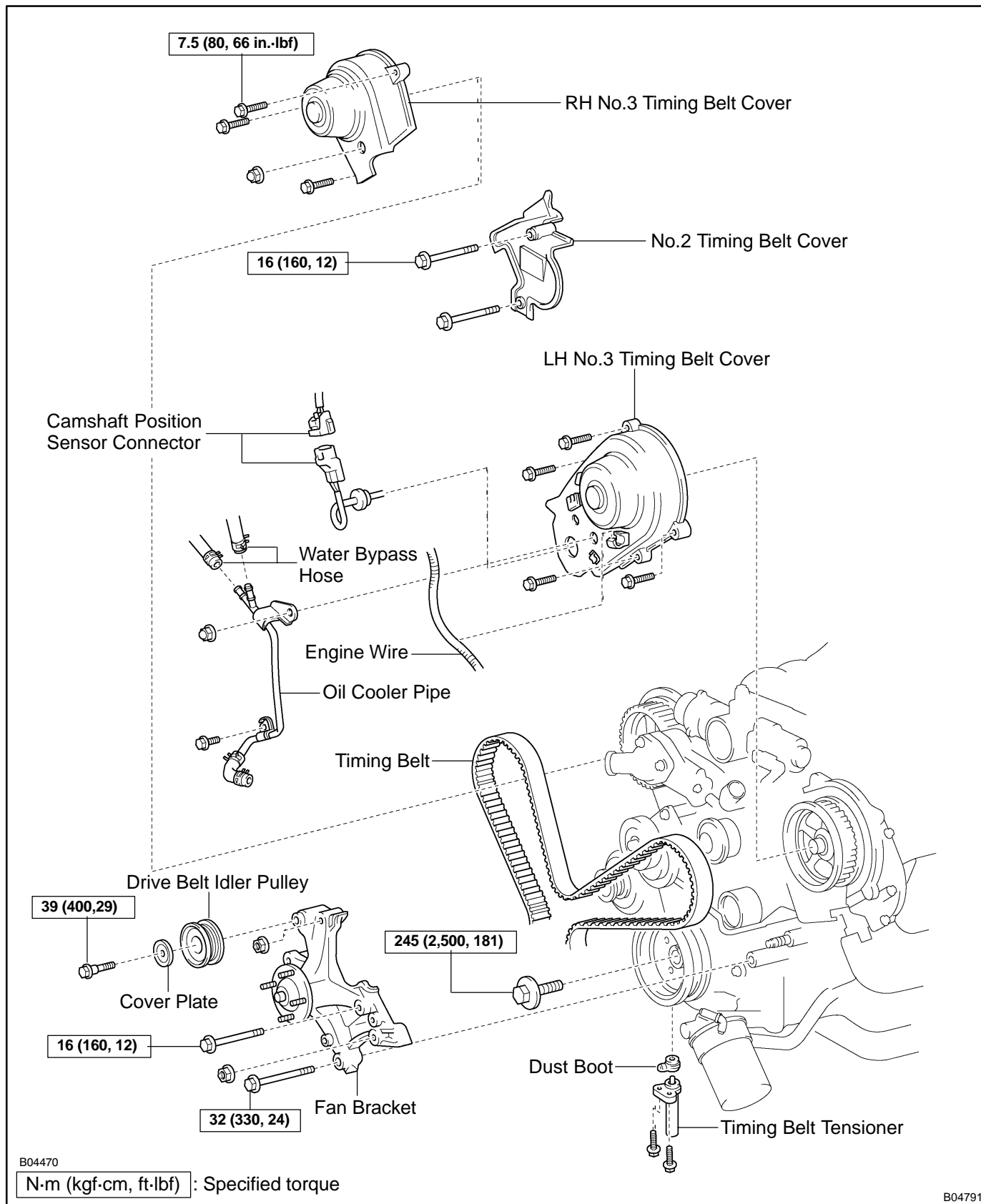
1. DRAIN ENGINE COOLANT
2. REMOVE OIL FILTER (See page [LU-2](#))



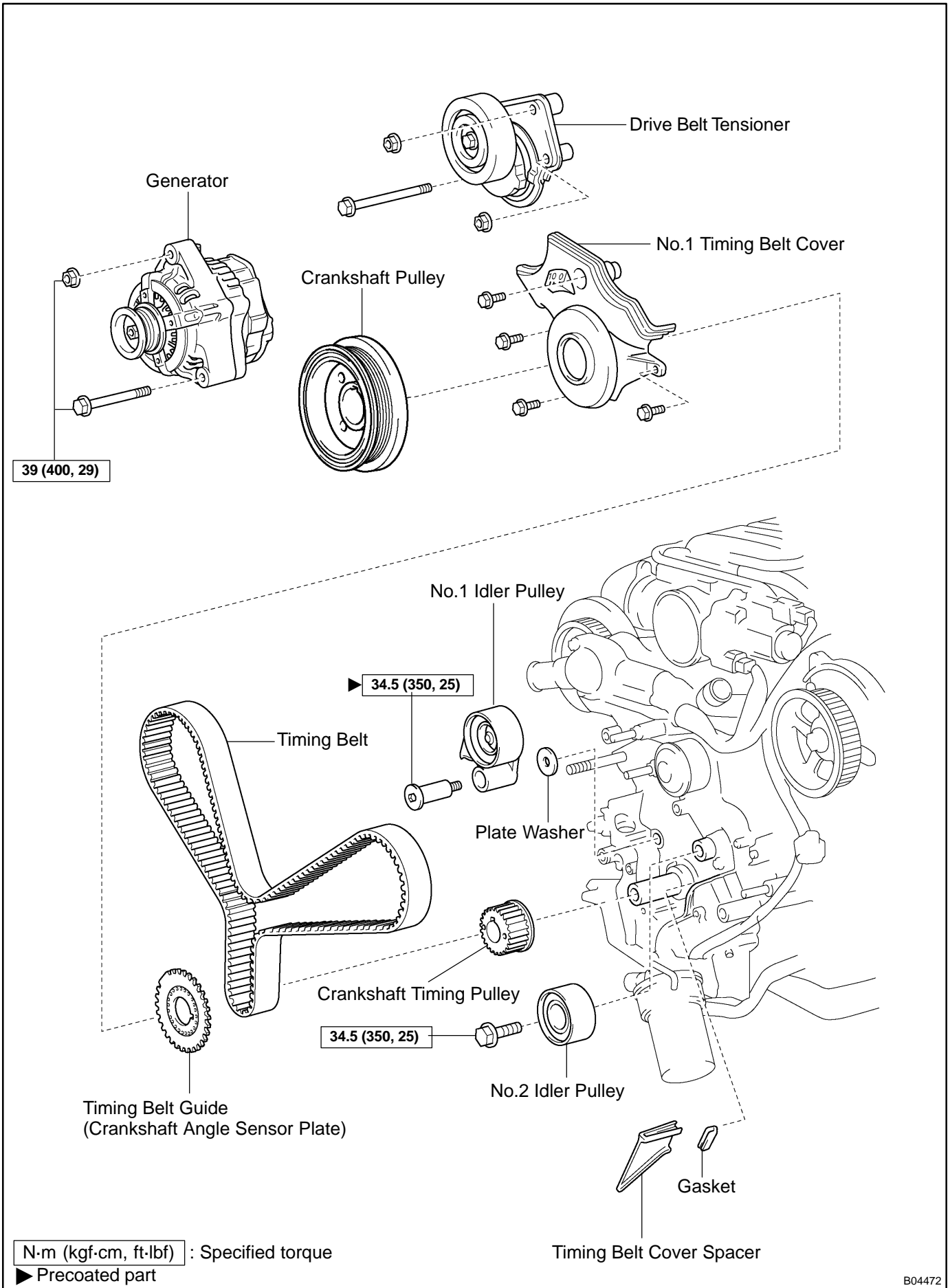
3. REMOVE OIL COOLER
  - (a) Disconnect the 2 oil cooler hoses from the oil cooler.
  - (b) Remove the union bolt, plate washer and the oil cooler.
  - (c) Remove the O-ring from the oil cooler.

# OIL PUMP COMPONENTS

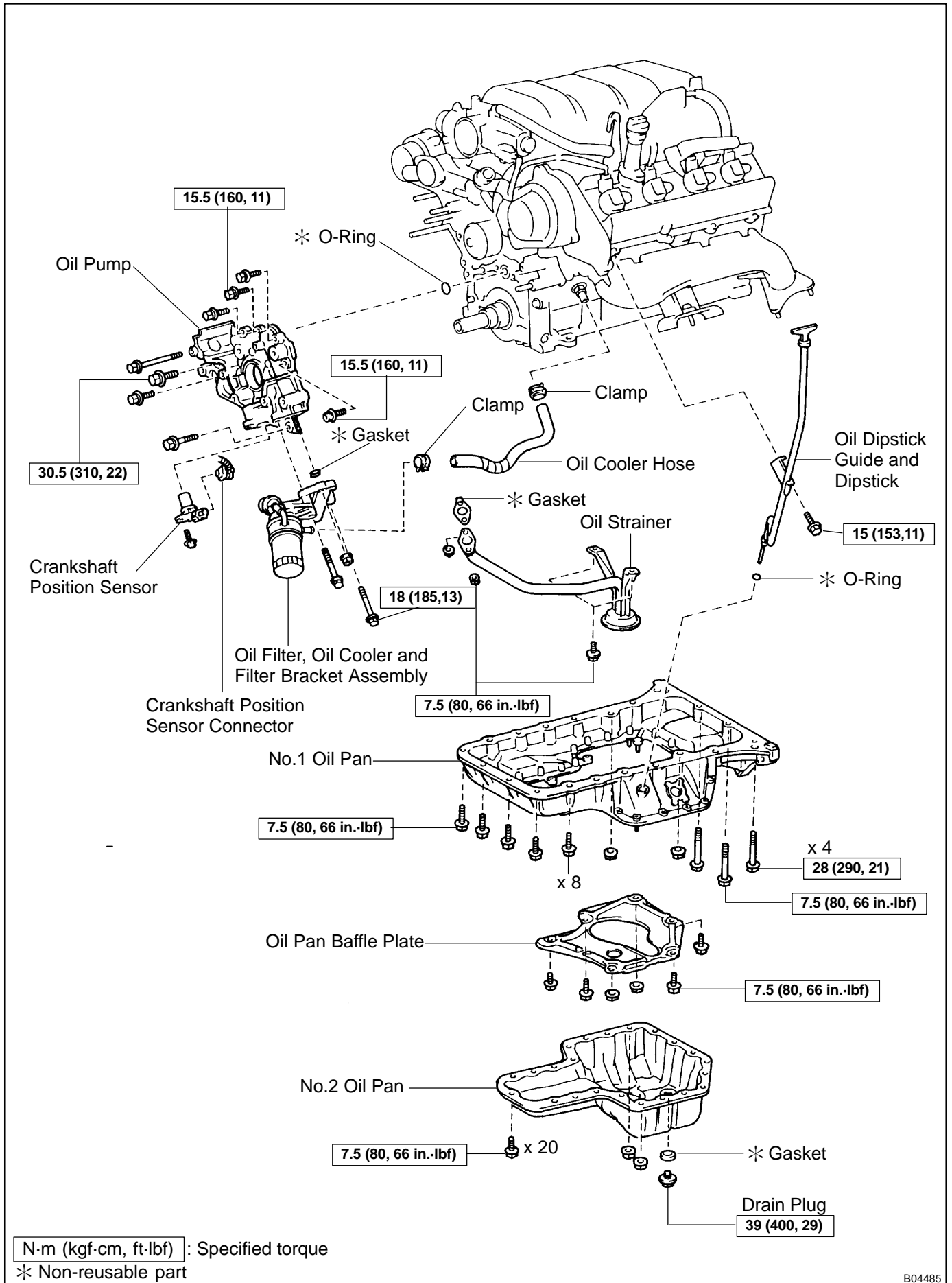
LU08P-07



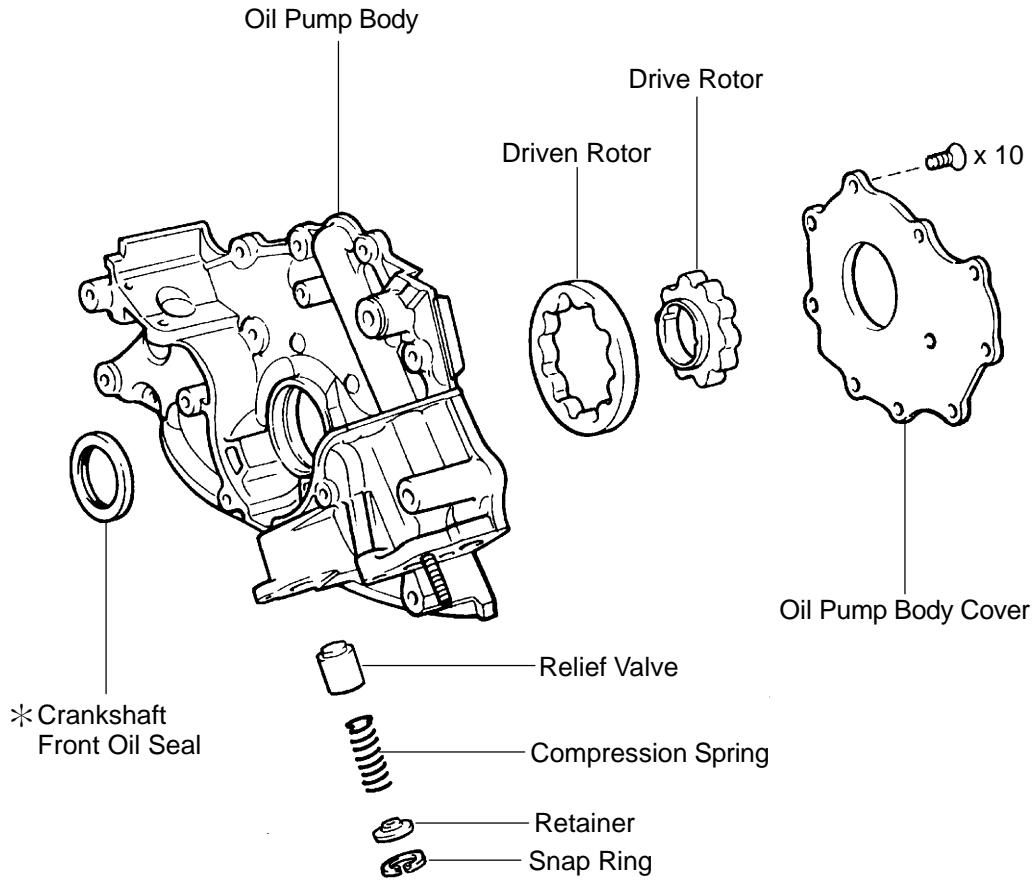




B04472

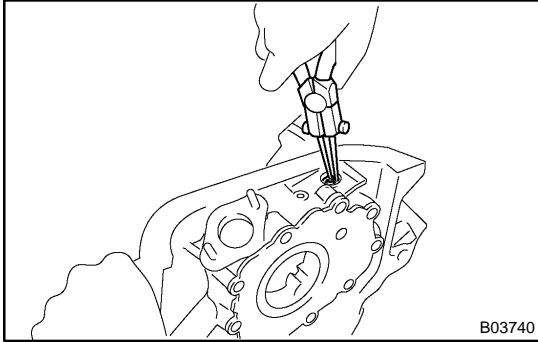


B04485



\* Non-reusable part

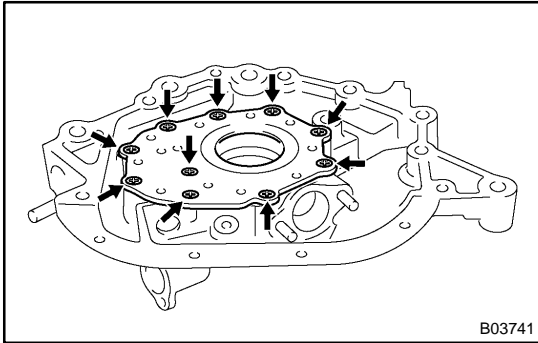
B03735



## DISASSEMBLY

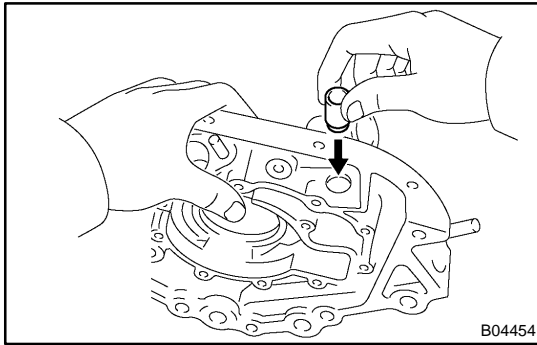
### 1. REMOVE RELIEF VALVE

- (a) Using snap ring pliers, remove the snap ring.
- (b) Remove the retainer, spring and relief valve.



### 2. REMOVE DRIVE AND DRIVEN ROTORS

Remove the 10 screws, pump body cover, the drive and driven rotors.

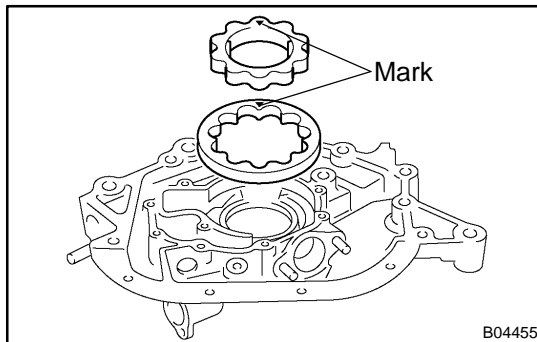


## INSPECTION

### 1. INSPECT RELIEF VALVE

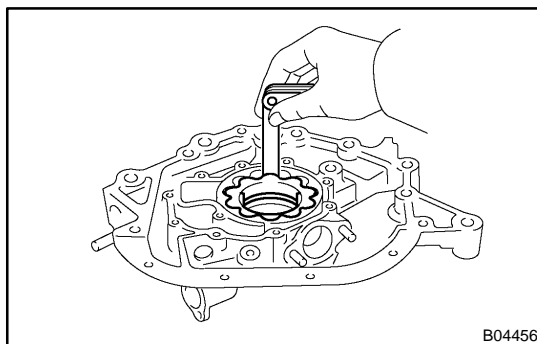
Coat the valve with engine oil and check that it falls smoothly into the valve hole by its own weight.

If it doesn't, replace the relief valve. If necessary, replace the oil pump assembly.



### 2. INSPECT DRIVE AND DRIVEN ROTORS INTO OIL PUMP BODY

Place the drive and driven rotors into the oil pump body with the mark facing upward.



### 3. INSPECT ROTORS FOR TIP CLEARANCE

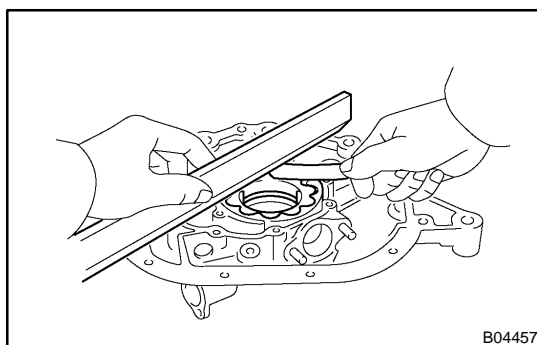
Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

**Standard tip clearance:**

**0.110 - 0.240 mm (0.0043 - 0.0094 in.)**

**Maximum tip clearance: 0.35 mm (0.0138 in.)**

If the tip clearance is greater than maximum, replace the rotors as a set.



### 4. INSPECT ROTORS FOR SIDE CLEARANCE

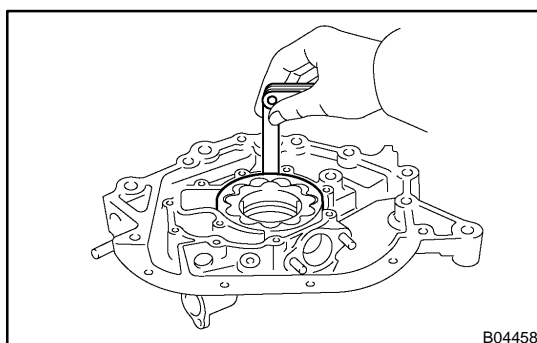
Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

**Standard side clearance:**

**0.030 - 0.090 mm (0.0012 - 0.0035 in.)**

**Maximum side clearance: 0.15 mm (0.0059 in.)**

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.



### 5. INSPECT ROTOR FOR BODY CLEARANCE

Using a feeler gauge, measure the clearance between the driven rotor and body.

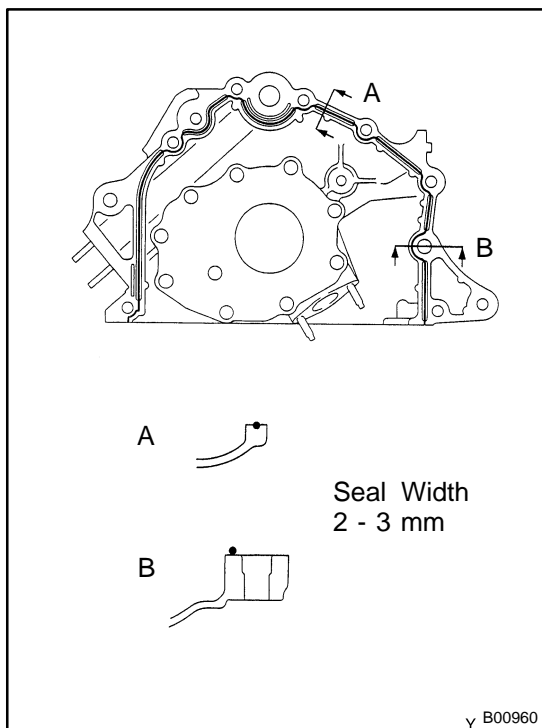
**Standard body clearance:**

**0.100 - 0.175 mm (0.0039 - 0.0069 in.)**

**Maximum body clearance: 0.30 mm (0.0118 in.)**

If the body clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

### 6. REMOVE DRIVE AND DRIVE ROTORS



## INSTALLATION

### 1. INSTALL OIL PUMP

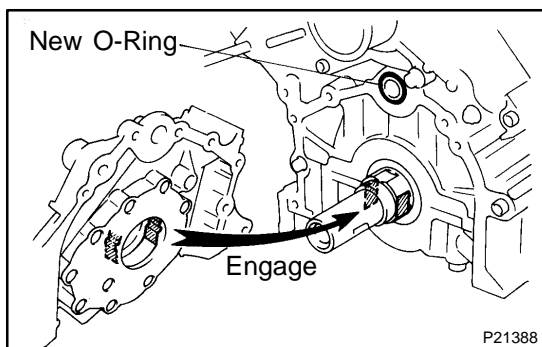
- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pump and cylinder block.
  - ▶ Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
  - ▶ Thoroughly clean all components to remove all the loose material.
  - ▶ Using a non-residue solvent, clean both sealing surfaces.
- (b) Apply seal packing to the oil pump as shown in the illustration.

**Seal packing: Part No. 08826-00080 or equivalent**

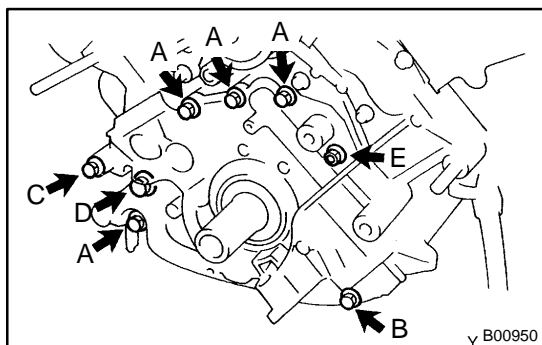
**NOTICE:**

**Avoid applying an excessive amount to the surface. Be particularly careful near oil passage.**

- ▶ Install a nozzle that has been cut to a 2 - 3 mm (0.08 - 0.12 in.) opening.
- ▶ Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- ▶ Immediately remove nozzle from the tube and reinstall cap.



- (c) Install a new O-ring to the cylinder block.
- (d) Engage the spline teeth of the oil pump drive gear with the large teeth of the crankshaft, and slide the oil pump on the crankshaft.



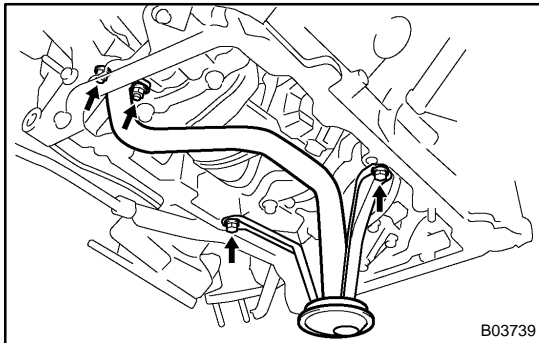
- (e) Install the oil pump with the 8 bolts. Uniformly tighten the bolts in several passes.
 

**Torque:**  
**15.5 N·m (160 kgf·cm, 11 ft·lbf)**  
**for 12 mm head and 6 mm hexagon head**  
**30.5 N·m (310 kgf·cm, 22 ft·lbf) for 14 mm head**

**HINT:**

- ▶ Use a 6 mm hexagon wrench for the hexagon head bolt.
- ▶ Each bolt length is indicated in the illustration.

Bolt length:  
 35 mm (1.38 in.) for A of 12 mm head  
 50 mm (1.97 in.) for B of 12 mm head  
 106 mm (4.17 in.) for C of 12 mm head  
 40 mm (1.57 in.) for D of 14 mm head  
 30 mm (1.18 in.) for E of 6 mm hexagon head



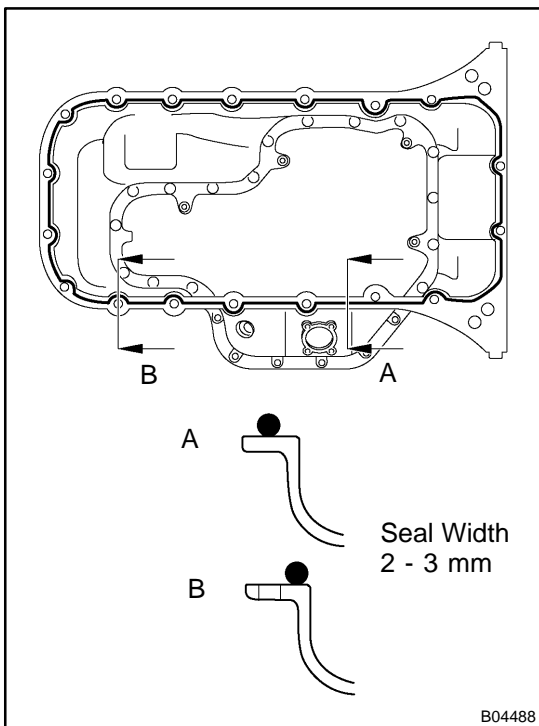
**2. INSTALL OIL STRAINER**

Install a new gasket and the oil strainer with the 2 bolts and 2 nuts.

**Torque: 7.5 N-m (80 kgf-cm, 66 in.-lbf)**

**HINT:**

Use bolt 12 mm (0.47 in.) in length.



**3. INSTALL NO.1 OIL PAN**

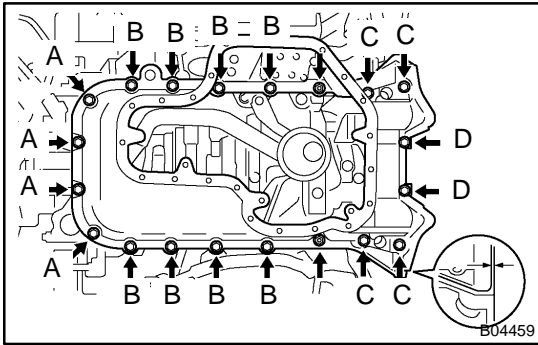
(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 oil pan, cylinder block, oil pump and rear oil seal retainer.

- ▶ Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- ▶ Thoroughly clean all components to remove all the loose material.
- ▶ Using a non-residue solvent, clean both sealing surfaces.

(b) Apply seal packing to the No.1 oil pan as shown in the illustration.

**Seal packing: Part No. 08826-00080 or equivalent**

- ▶ Install a nozzle that has been cut to a 2 - 3 mm (0.08 - 0.12 in.) opening.
- ▶ Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- ▶ Immediately remove nozzle from the tube and reinstall cap.



(c) Temporarily install the No.1 oil pan with the 19 bolts, stud bolt and 2 nuts.

**HINT:**

Each bolt length is indicated in the illustration.

**Bolt length:**

20 mm (0.79 in.) for A of 10 mm head

25 mm (0.98 in.) for B of 12 mm head

60 mm (2.36 in.) for C of 12 mm head

35 mm (1.38 in.) for D of 10 mm head

(d) Set the No.1 oil pan as shown in the illustration.

**NOTICE:**

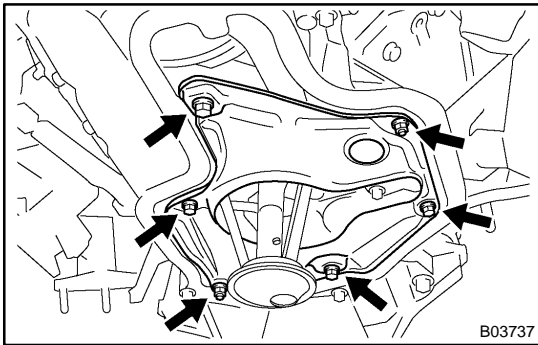
**Make sure the clearance between the rear ends of the No.1 oil pan and cylinder block is 0.2 mm (0.008 in.) or less. If the clearance is more than 0.2 mm (0.008 in.), the No.1 oil pan will be stretched.**

(e) Uniformly tighten the bolts, and nuts in several passes.

**Torque:**

**7.5 N·m (80 kgf·cm, 66 in.-lbf) for 10 mm head**

**28 N·m (290 kgf·cm, 21 ft·lbf) for 12 mm head**



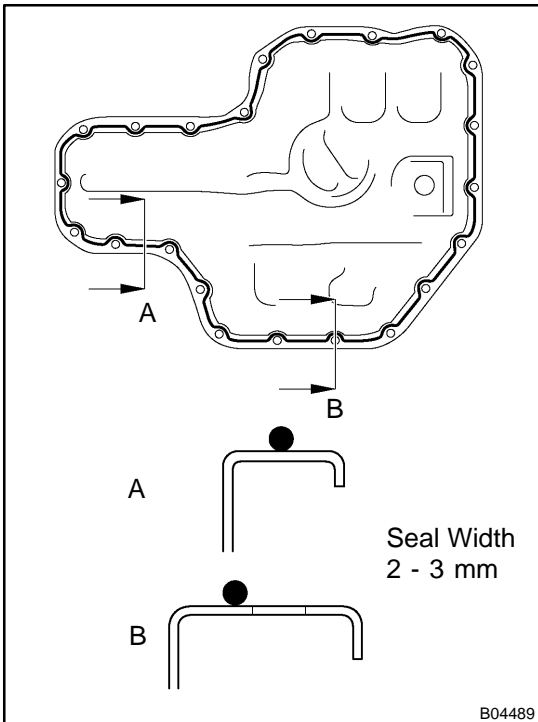
**4. INSTALL OIL PAN Baffle PLATE**

Install the baffle plate with the 4 bolts and 2 nuts.

**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**

**HINT:**

Use bolts 12 mm (0.55 in.) in length.



**5. INSTALL NO.2 OIL PAN**

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 and No.2 oil pans.

- ▶ Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- ▶ Thoroughly clean all components to remove all the loose material.
- ▶ Using a non-residue solvent, clean both sealing surfaces.

**NOTICE:**

**Do not use a solvent which will affect the painted surfaces.**

(b) Apply seal packing to the No.2 oil pan as shown in the illustration.

**Seal packing: Part No. 08826-00080 or equivalent**

- ▶ Install a nozzle that has been cut to a 3 - 4 mm (0.12 - 0.16 in.) opening.



- ▶ Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- ▶ Immediately remove nozzle from the tube and reinstall cap.

- (c) Install the No.2 oil pan with the 20 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.

**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**

**HINT:**

Use bolts 14 mm (0.55 in.) in length.

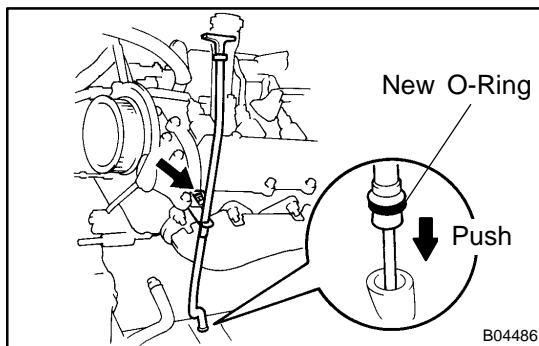
**6. INSTALL CRANKSHAFT POSITION SENSOR  
(See page IG-13)**

**7. INSTALL OIL FILTER, OIL COOLER AND FILTER BRACKET ASSEMBLY**

- (a) Install the a new gasket to the oil filter bracket.  
 (b) Install the oil filter, oil cooler and filter bracket assembly with the 2 bolts and nut.

**Torque: 18 N·m (185 kgf·cm, 13 ft-lbf)**

- (c) Connect the oil pressure switch connector.



**8. INSTALL OIL DIPSTICK GUIDE AND DIPSTICK**

- (a) Install a new O-ring to the dipstick guide.  
 (b) Apply soapy water to the O-ring.  
 (c) Push in the dipstick guide end into the guide hole of the No.1 oil pan.  
 (d) Install the dipstick guide with the bolt.  
 (e) Install the dipstick.

**Torque: 15 N·m, (155 kgf·cm, 11 ft-lbf)**

**9. INSTALL CRANKSHAFT TIMING PULLEY  
(See page EM-22)**

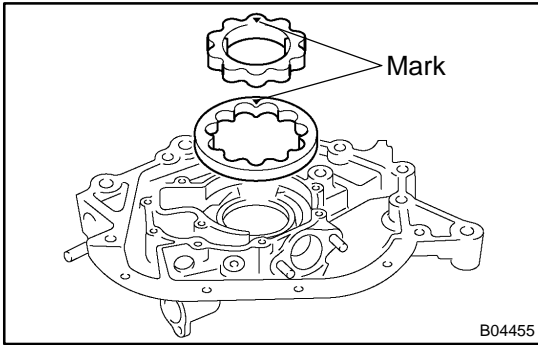
**10. INSTALL NO.1 IDLER PULLEY (See page EM-22)**

**11. INSTALL NO.2 IDLER PULLEY (See page EM-22)**

**12. INSTALL TIMING BELT (See page EM-22)**

**13. DISCONNECT ENGINE FROM ENGINE STAND**

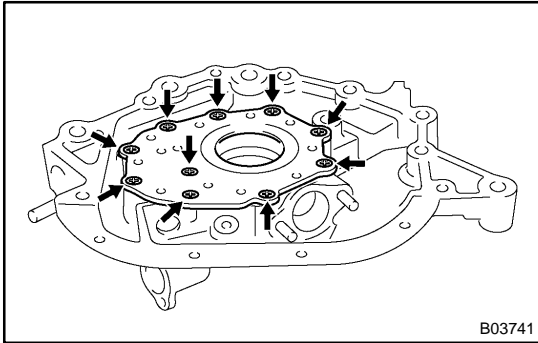
**14. INSTALL ENGINE TO VEHICLE (See page EM-81)**



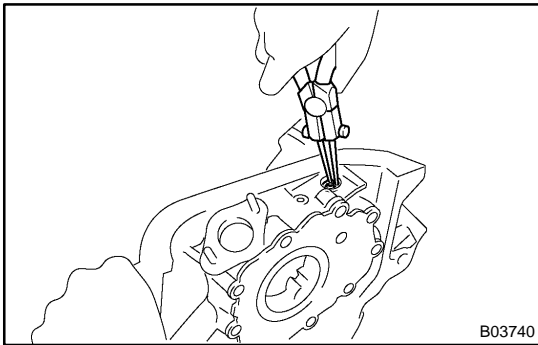
## REASSEMBLY

### 1. INSTALL DRIVE AND DRIVEN ROTORS

- (a) Place the drive and driven rotors into pump body with the marks facing the pump body cover side.



- (b) Install the pump body cover with the 10 screws.  
**Torque: 10 N·m (105 kgf-cm, 7 ft-lbf)**



### 2. INSTALL RELIEF VALVE

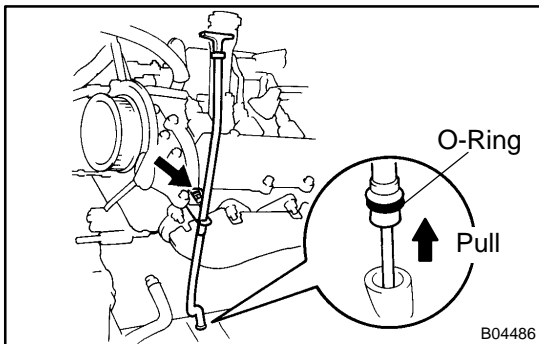
- (a) Insert the relief valve, spring and retainer into the oil pump body hole.
- (b) Using snap ring pliers, install the snap ring.

## REMOVAL

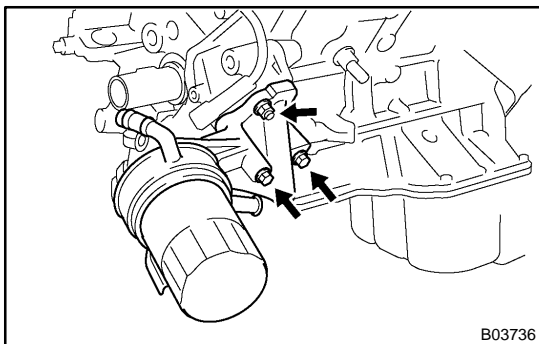
**HINT:**

When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

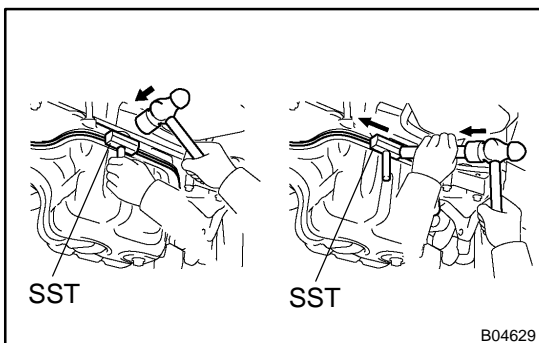
1. **REMOVE ENGINE FROM VEHICLE**  
(See page [EM-77](#) )
2. **INSTALL ENGINE TO ENGINE STAND FOR DIS-ASSEMBLY**
3. **REMOVE TIMING BELT** (See page [EM-15](#) )
4. **REMOVE NO.1 IDLER PULLEY** (See page [EM-15](#) )
5. **REMOVE NO.2 IDLER PULLEY** (See page [EM-15](#) )
6. **REMOVE CRANKSHAFT TIMING PULLEY**  
(See page [EM-15](#) )



7. **REMOVE OIL DIPSTICK AND GUIDE**
  - (a) Remove the bolt holding the oil dipstick to the LH cylinder head.
  - (b) Pull out the dipstick guide together with the dipstick from the No.1 oil pan.
  - (c) Remove the O-ring from the dipstick guide.



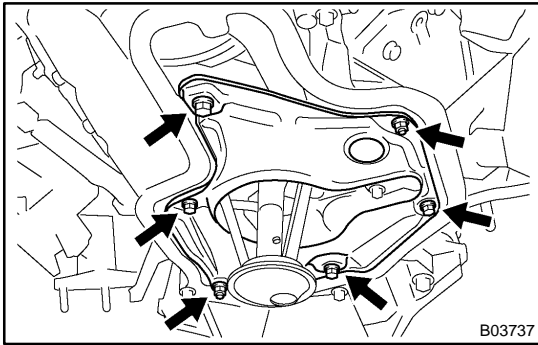
8. **REMOVE OIL FILTER, OIL COOLER AND FILTER BRACKET ASSEMBLY**
  - (a) Disconnect the oil pressure switch connector.
  - (b) Remove the 2 bolts, nut, and oil filter, oil cooler and filter bracket assembly.
  - (c) Remove the gasket from the filter bracket.
9. **REMOVE CRANKSHAFT POSITION SENSOR**  
(See page [IG-12](#) )



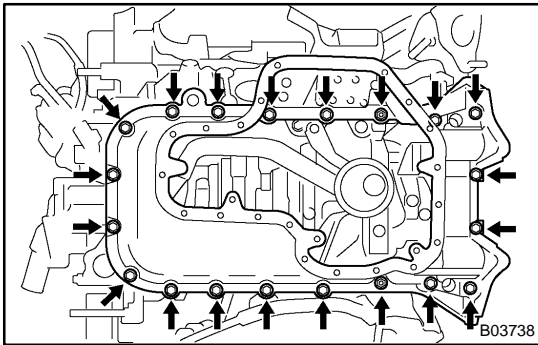
10. **REMOVE NO.2 OIL PAN**
  - (a) Remove the 20 bolts and 2 nuts.
  - (b) Insert the blade of SST between the No.1 and No.2 oil pans, cut off applied sealer and remove the No.2 oil pan.  
SST 09032-00100

**NOTICE:**

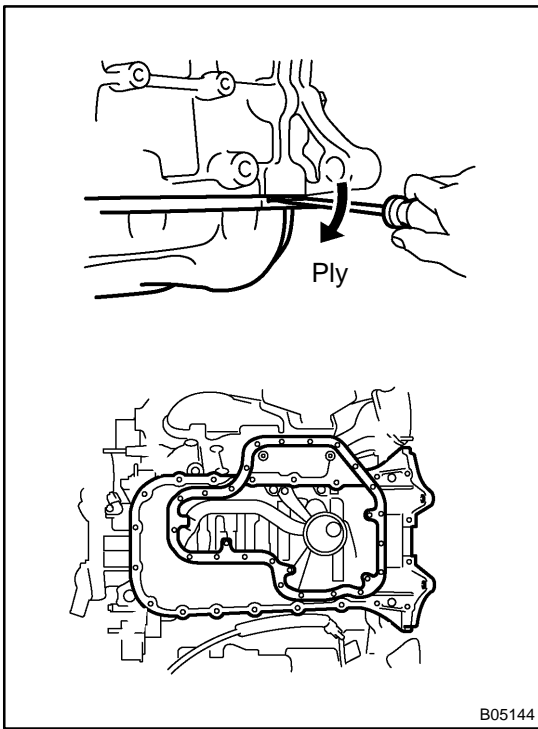
- ▶ Be careful not to damage the No.2 oil pan contact surface of the No.1 oil pan.
- ▶ Be careful not to damage the No.2 oil pan flange.



**11. REMOVE OIL PAN Baffle PLATE**  
Remove the 4 bolts, 2 nuts and baffle plate.



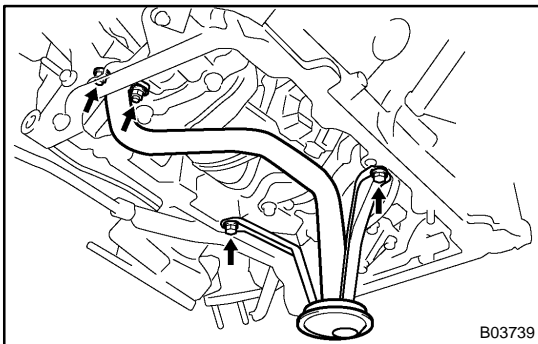
**12. REMOVE NO.1 OIL PAN**  
(a) Remove the 18 bolts and 2 nuts.



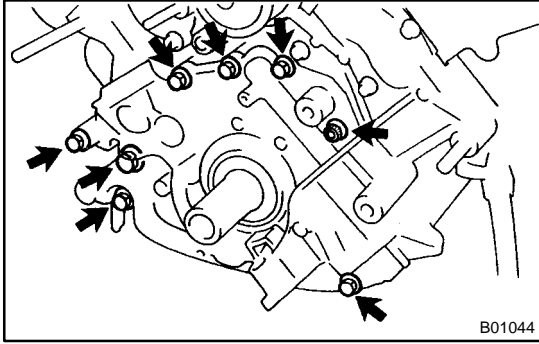
(b) Using a screwdriver, remove the No.1 oil pan by prying between the oil pan and cylinder block in the sequence shown.

**NOTICE:**

Be careful not to damage the contact surface of the cylinder block and No.1 oil pan.



**13. REMOVE OIL STRAINER**  
Remove the 2 bolt, 2 nuts, oil strainer and gasket.

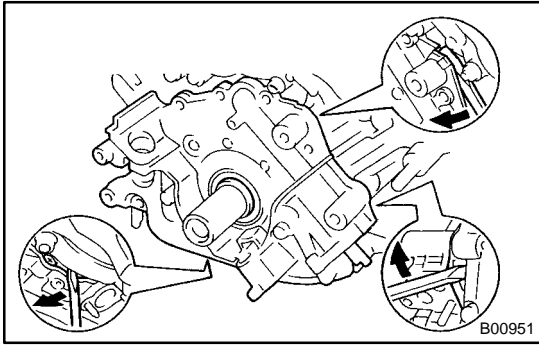


**14. REMOVE OIL PUMP**

(a) Remove the 8 bolts.

HINT:

Use a 6 mm hexagon wrench for the hexagon head bolt.



(b) Using a screwdriver, remove the oil pump by prying the portions between the oil pump and cylinder block.

**NOTICE:**

**Be careful not to damage the contact surface of the cylinder block and oil pump.**

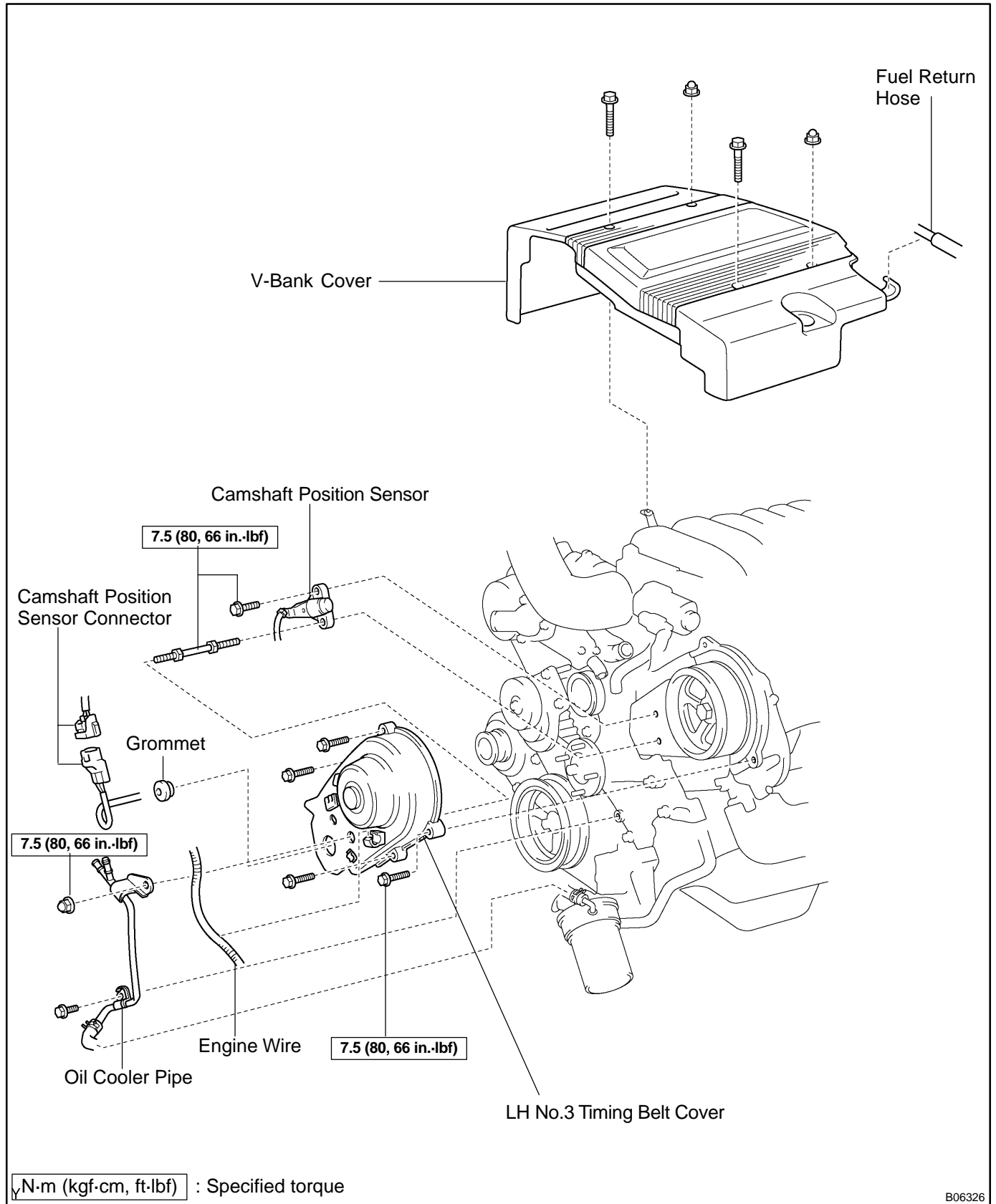
(c) Remove the O-ring from the cylinder block.

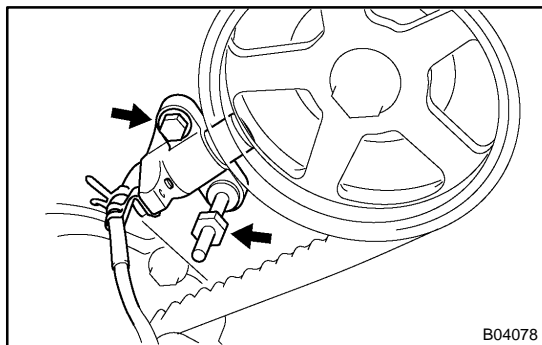
## REPLACEMENT

REPLACE CRANKSHAFT FRONT OIL SEAL (See page [EM-104](#))

# CAMSHAFT POSITION SENSOR COMPONENTS

IG08T-03





## INSTALLATION

### 1. INSTALL CAMSHAFT POSITION SENSOR

Install the camshaft position sensor with the bolt and stud bolt

**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**

### 2. INSTALL LH NO.3 TIMING BELT COVER

(See page [EM-22](#))

### 3. CONNECT RADIATOR HOSE

### 4. INSTALL V-BANK COVER

### 5. FILL ENGINE COOLANT (See page [CO-2](#))

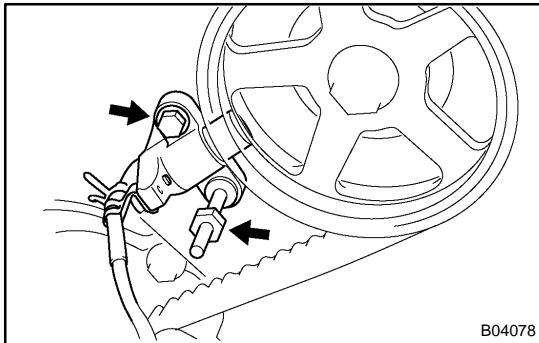
### 6. CHECK ENGINE COOLANT FOR LEAKS

### 7. CHECK IGNITION TIMING (See page [EM-9](#))



## REMOVAL

1. REMOVE V-BANK COVER
2. DRAIN ENGINE COOLANT
3. DISCONNECT UPPER RADIATOR HOSE
4. REMOVE LH NO.3 TIMING BELT COVER  
(See page [EM-15](#))

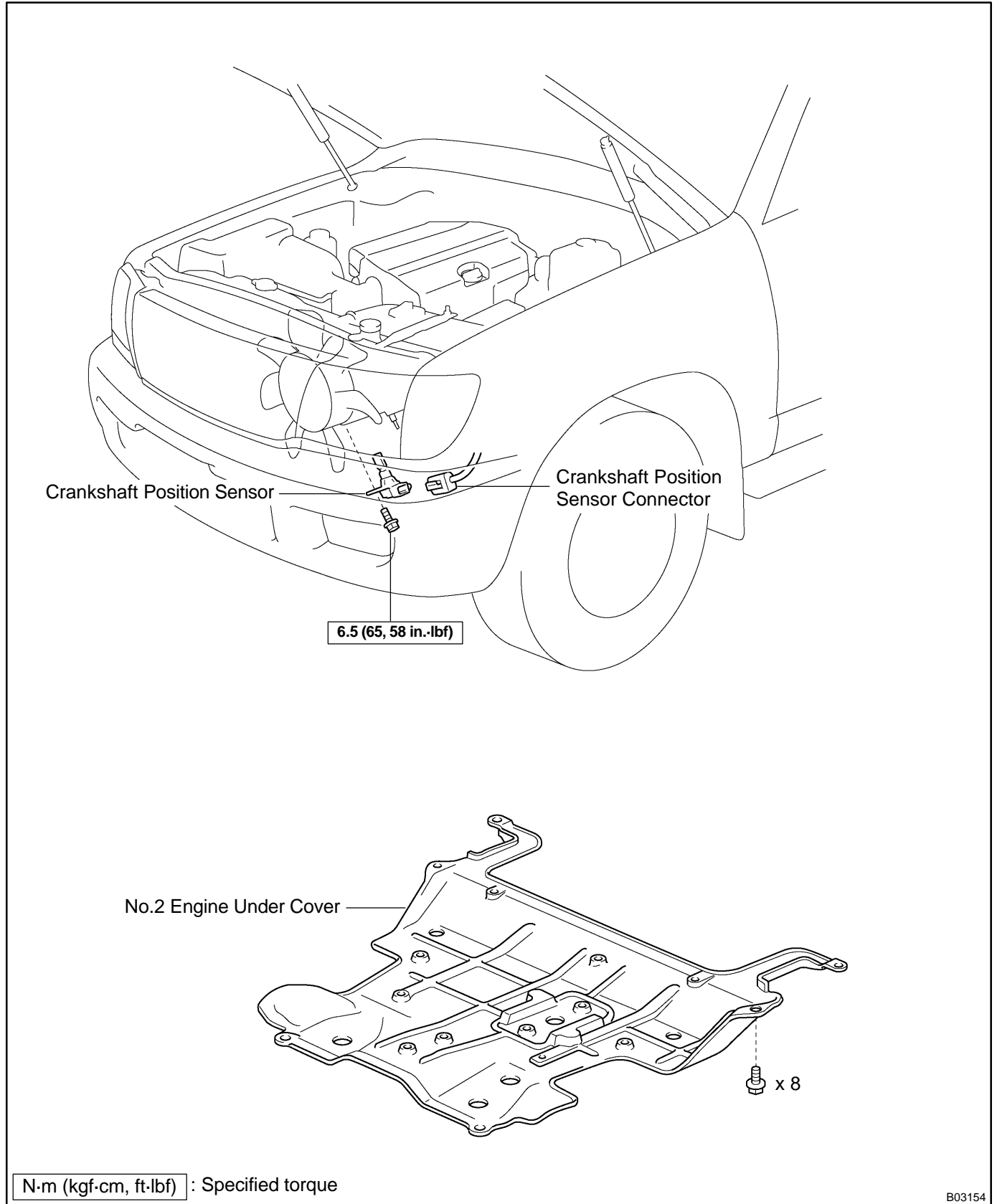


5. REMOVE CAMSHAFT POSITION SENSOR

Remove the bolt, stud bolt and camshaft position sensor.

# CRANKSHAFT POSITION SENSOR COMPONENTS

IG08W-01



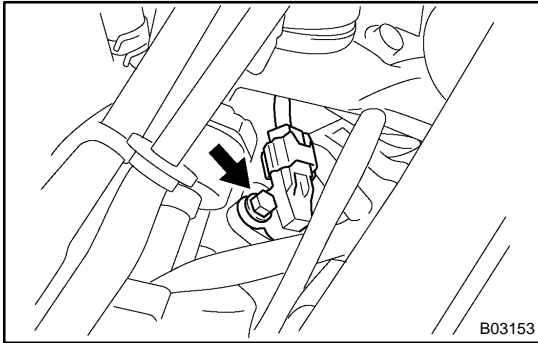
B03154

## INSTALLATION

Installation is in the reverse order of removal. (See page [IG-12](#))

## REMOVAL

### 1. REMOVE NO.2 ENGINE UNDER COVER



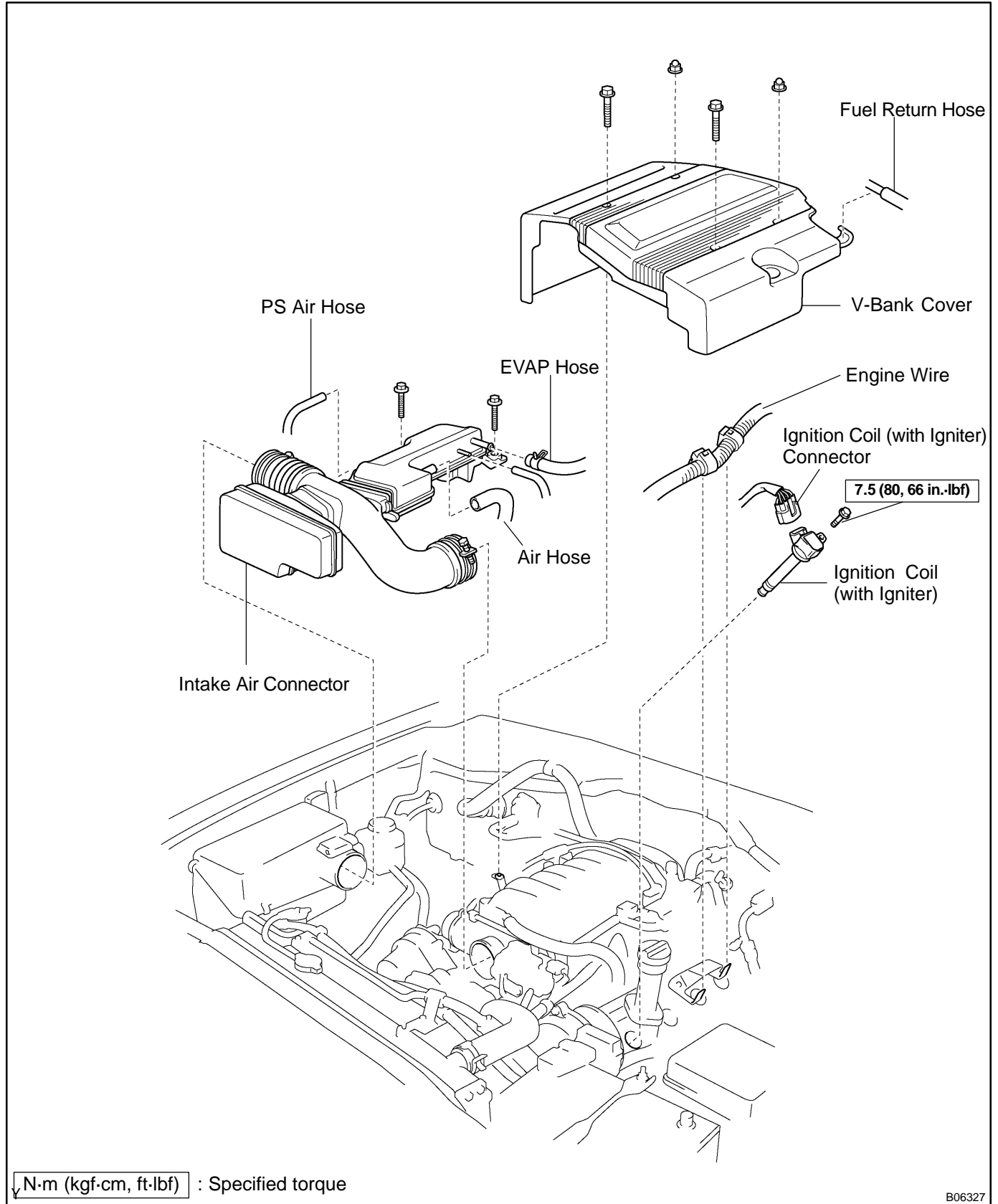
### 2. REMOVE CRANKSHAFT POSITION SENSOR

- (a) Disconnect the crankshaft position sensor connector.
- (b) Remove the bolt and crankshaft position sensor.

**Torque: 6.5 N·m (65 kgf·cm, 58 in.-lbf)**

# IGNITION COIL COMPONENTS

IG08Q-02



B06327

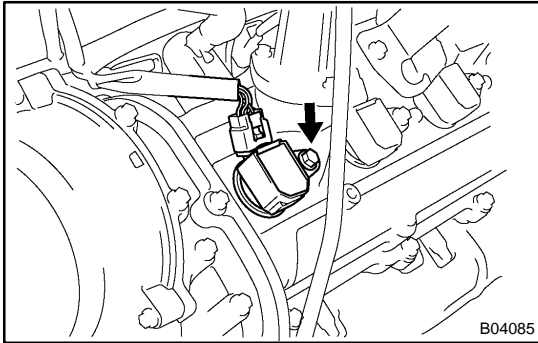
## INSTALLATION

Installation is in the reverse order of removal. (See page [IG-6](#))

## REMOVAL

1. REMOVE V-BANK COVER
2. REMOVE INTAKE AIR CONNECTOR
3. DISCONNECT ENGINE WIRE FROM LH CYLINDER HEAD COVER

Disconnect the 2 wire clamps and engine wire.



4. DISCONNECT IGNITION COIL (WITH IGNITER) CONNECTORS
5. REMOVE IGNITION COILS (WITH IGNITER) FROM SPARK PLUGS

Remove the bolt, and pull out the ignition coil (with igniter). Remove the 8 ignition coils (with igniter).

**Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**

# IGNITION SYSTEM

## ON-VEHICLE INSPECTION

IG08P-03

**NOTICE:**

"Cold" and "Hot" in these sentences express the temperature of the coils themselves. "Cold" is from  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ) to  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ ) and "Hot" is from  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ ) to  $100^{\circ}\text{C}$  ( $212^{\circ}\text{F}$ ).

**1. INSPECT IGNITION COIL (WITH IGNITER) AND SPARK TEST**

Check that the spark occurs.

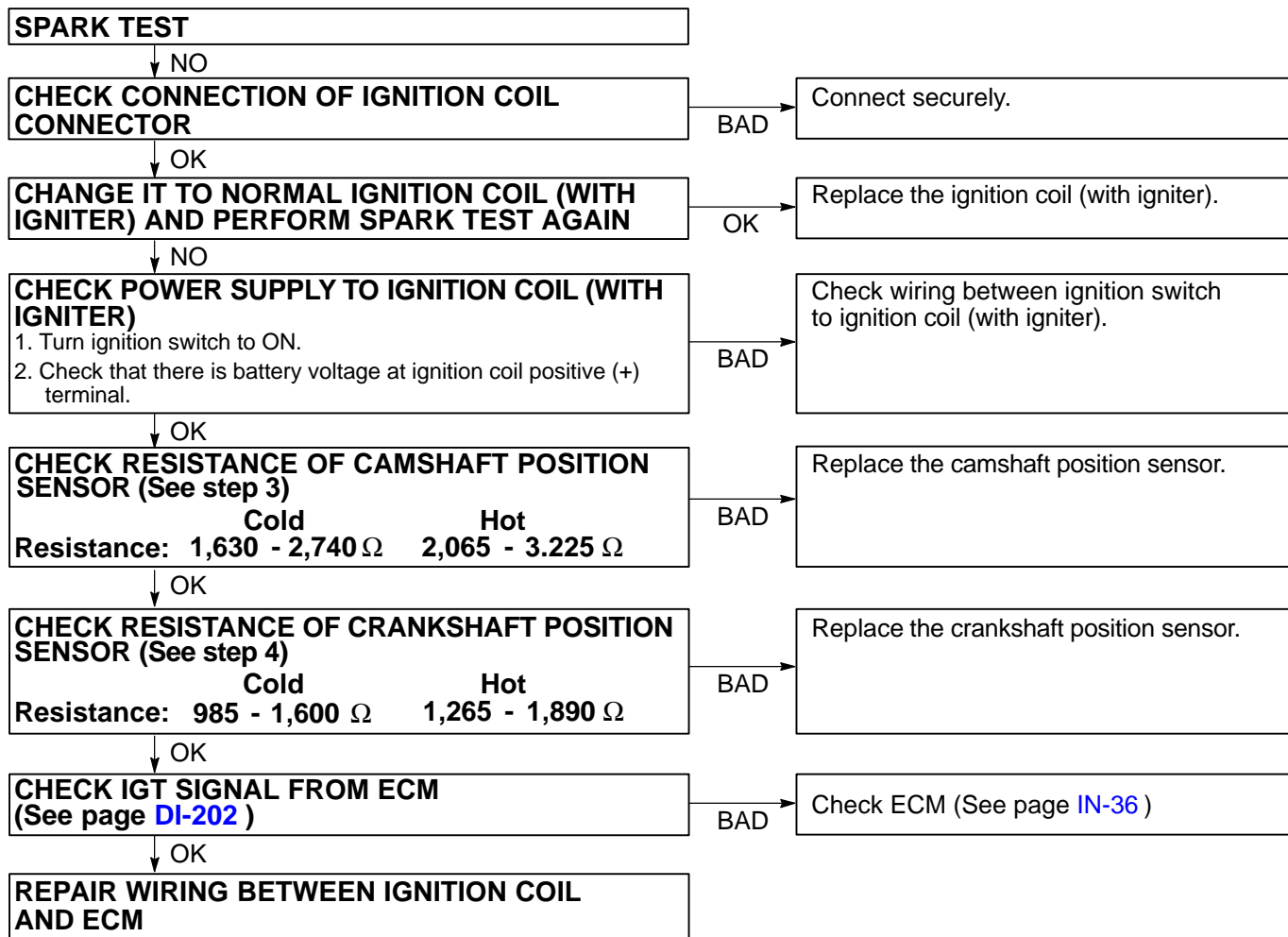
- (1) Remove the ignition coils (with igniter) (See page [IG-6](#)).
- (2) Remove the spark plugs.
- (3) Install the spark plugs to each ignition coil (with igniter), and connect the ignition coil (with igniter) connector.
- (4) Disconnect the 8 injector connectors.
- (5) Ground the spark plug.
- (6) Check if spark occurs while engine is being cranked.

**NOTICE:**

To prevent gasoline from being injected from injectors during this test, crank the engine for no more than 5 - 10 seconds at time.



If the spark does not occur, do the test as follows:



(7) Using a 16 mm plug wrench, install the spark plugs.

**Torque: 17.5 N·m (180 kgf·cm, 13 ft·lbf)**

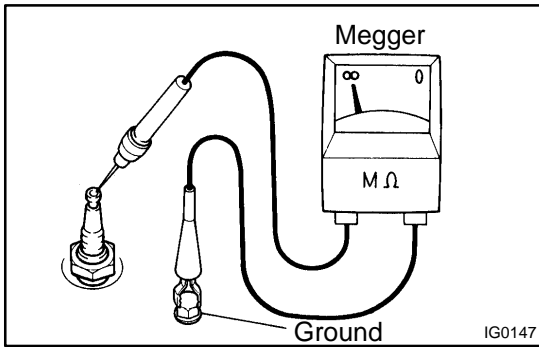
(8) Reinstall the ignition coils (with igniter) (See page IG-6).

**2. INSPECT SPARK PLUGS**

**NOTICE:**

- ▶ Never use a wire brush for cleaning.
- ▶ Never attempt to adjust the electrode gap on used spark plug.
- ▶ Spark plug should be replaced every 100,000 km (60,000 miles).

(a) Remove the ignition coils (with igniter) (See page IG-6).

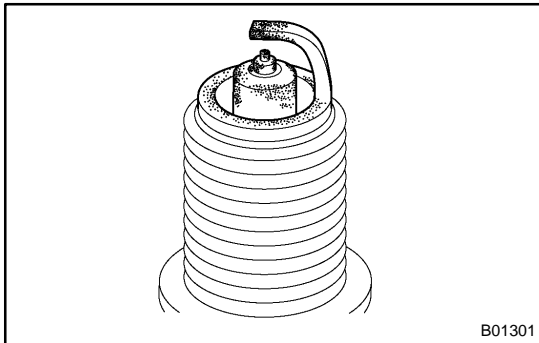


- (b) Check the electrode.
- ▶ Using a megger (insulation resistance meter), measure the insulation resistance.

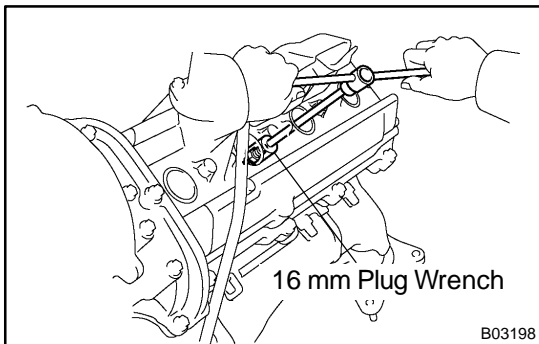
**Correct insulation resistance: 10 MΩ or more**

If the resistance is less than specified, proceed to step (d).  
HINT:

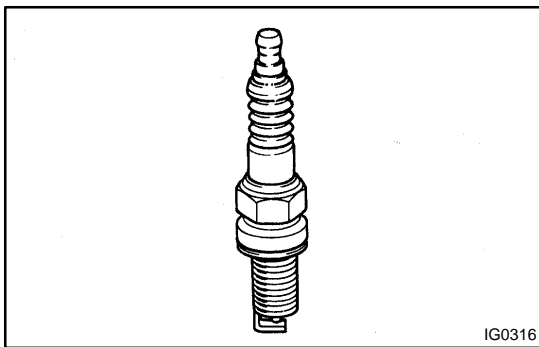
If a megger is not available, the following simple method of inspection provides fairly accurate results.



- ▶ Simple Method:
  - ▶ Quickly race the engine to 4,000 rpm 5 times.
  - ▶ Remove the spark plug. (See step (c))
  - ▶ Visually check the spark plug.  
If the electrode is dry ... OK.  
If the electrode is wet ... Proceed to step (d).
  - ▶ Reinstall the spark plug. (See step (g))



- (c) Using a 16 mm plug wrench, remove the spark plugs.

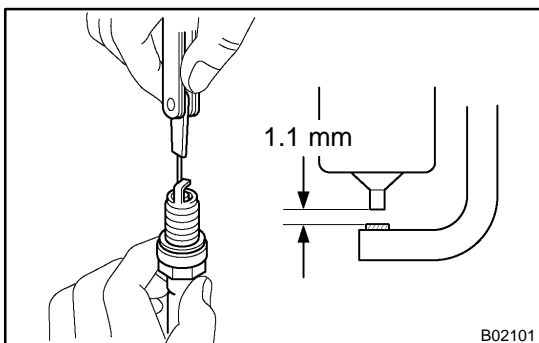


- (d) Check the spark plug for thread damage and insulator damage.

If abnormal, replace the spark plug.

**Recommended spark plug:**

DENSO made	SK20R11
NGK made	IFR6A11



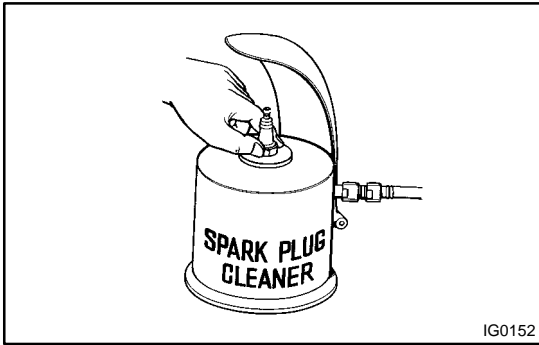
- (e) Check the spark plug electrode gap.
- Maximum electrode gap for used spark plug:  
1.3 mm (0.051 in.)**

If the gap is greater than maximum, replace the spark plug.

**Correct electrode gap for new spark plug:  
1.1 mm (0.043 in.)**

**NOTICE:**

If adjusting the gap of a new spark plug, bend only the base of the ground electrode. Do not touch the tip. Never attempt to adjust the gap on a used plug.



- (f) Clean the spark plugs.  
If the electrode has traces of wet carbon, allow it to dry and then clean with a spark plug cleaner.

**Air pressure: Below 588 kPa (6 kgf/cm<sup>2</sup>, 85 psi)**

**Duration: 20 seconds or less**

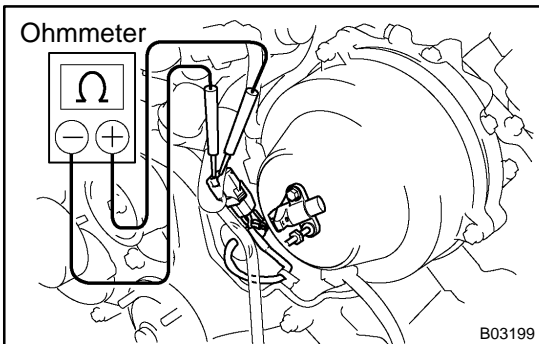
HINT:

If there are traces of oil, remove it with gasoline before using the spark plug cleaner.

- (g) Using a 16 mm plug wrench, install the spark plugs.  
**Torque: 17.5 N·m (180 kgf·cm, 13 ft·lbf)**
- (h) Reinstall the ignition coils (with igniter) (See page [IG-6](#) ).

**3. INSPECT CAMSHAFT POSITION SENSOR**

- (a) Remove the V-bank cover.
- (b) Disconnect the camshaft position sensor connector.



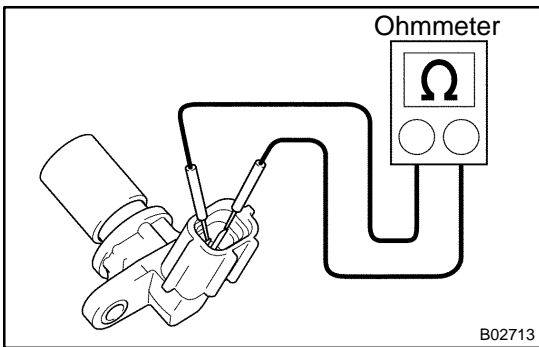
- (c) Using an ohmmeter, measure the resistance between terminals.

**Resistance:**

Cold	835 - 1,400 Ω
Hot	1,060 - 1,645 Ω

If the resistance is not as specified, replace the camshaft position sensor.

- (d) Reconnect the camshaft position sensor connector.
- (e) Reinstall the V-bank cover.



**4. INSPECT CRANKSHAFT POSITION SENSOR**

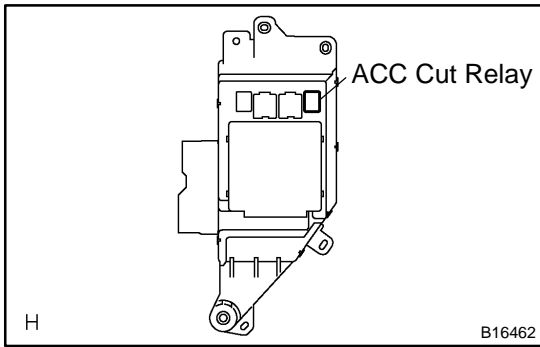
- (a) Remove the crankshaft position sensor (See page [IG-12](#) ).
- (b) Using an ohmmeter, measure the resistance between the terminals.

**Resistance:**

Cold	1,630 - 2,740 Ω
Hot	2,065 - 3,225 Ω

If the resistance is not as specified, replace the crankshaft position sensor.

- (c) Reinstall the crankshaft position sensor.

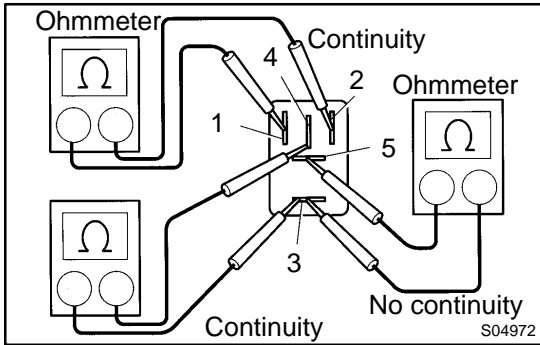


# ACC CUT RELAY INSPECTION

ST00U-01

## 1. REMOVE ACC CUT RELAY

Remove the relay box and ACC cut relay.



## 2. INSPECT ACC CUT RELAY CONTINUITY

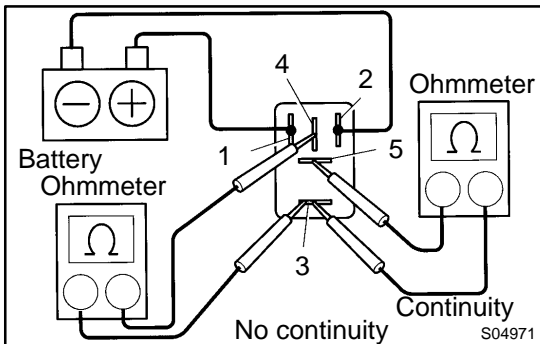
(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.

(c) Check that there is continuity between terminals 3 and 4. If there is no continuity, replace the relay.



## 3. INSPECT ACC CUT RELAY OPERATION

(a) Apply battery positive voltage across terminals 1 and 2.

(b) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If there is continuity, replace the relay.

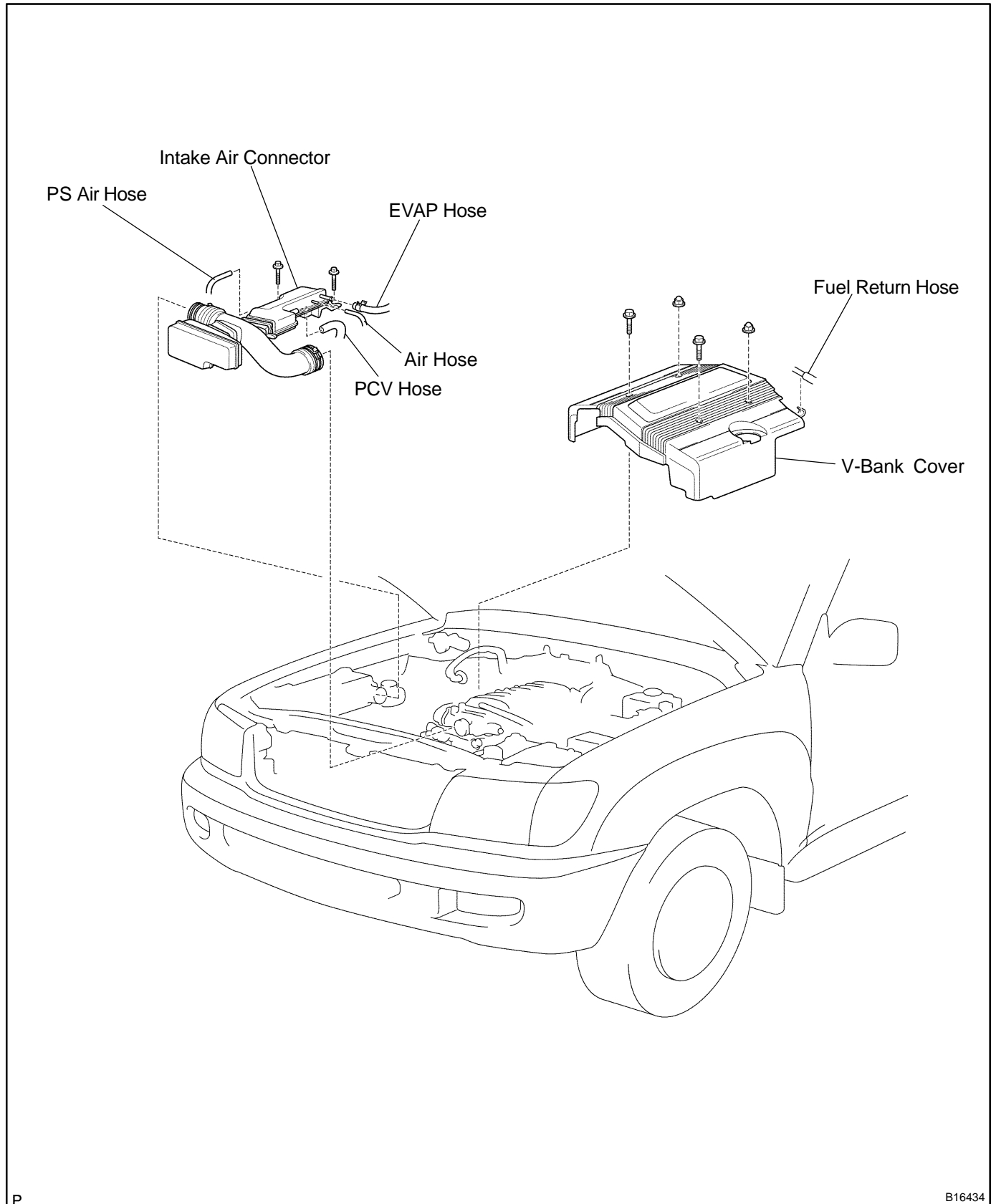
(c) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

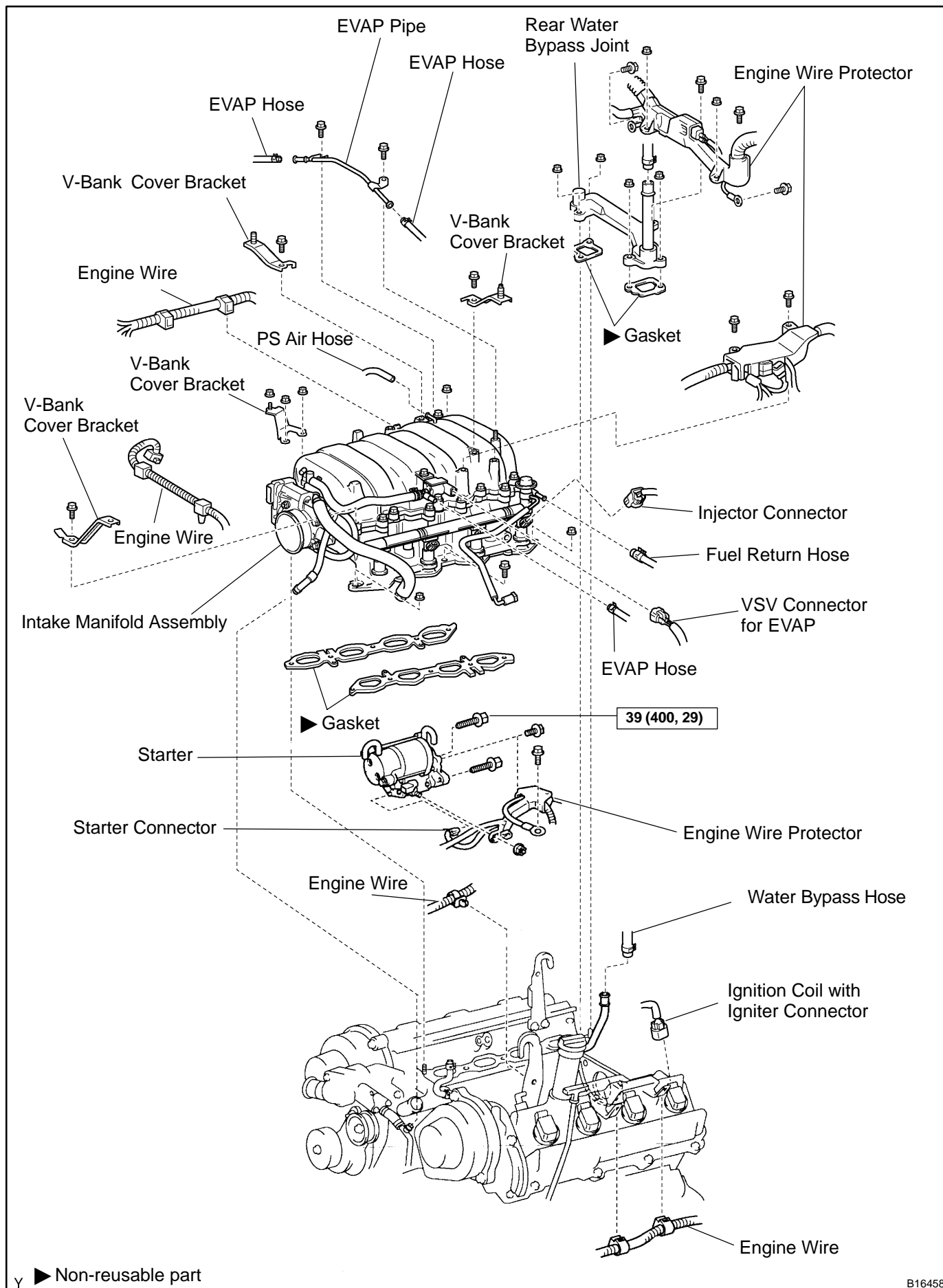
## 4. REINSTALL ACC CUT RELAY

# STARTER COMPONENTS

ST08B-03

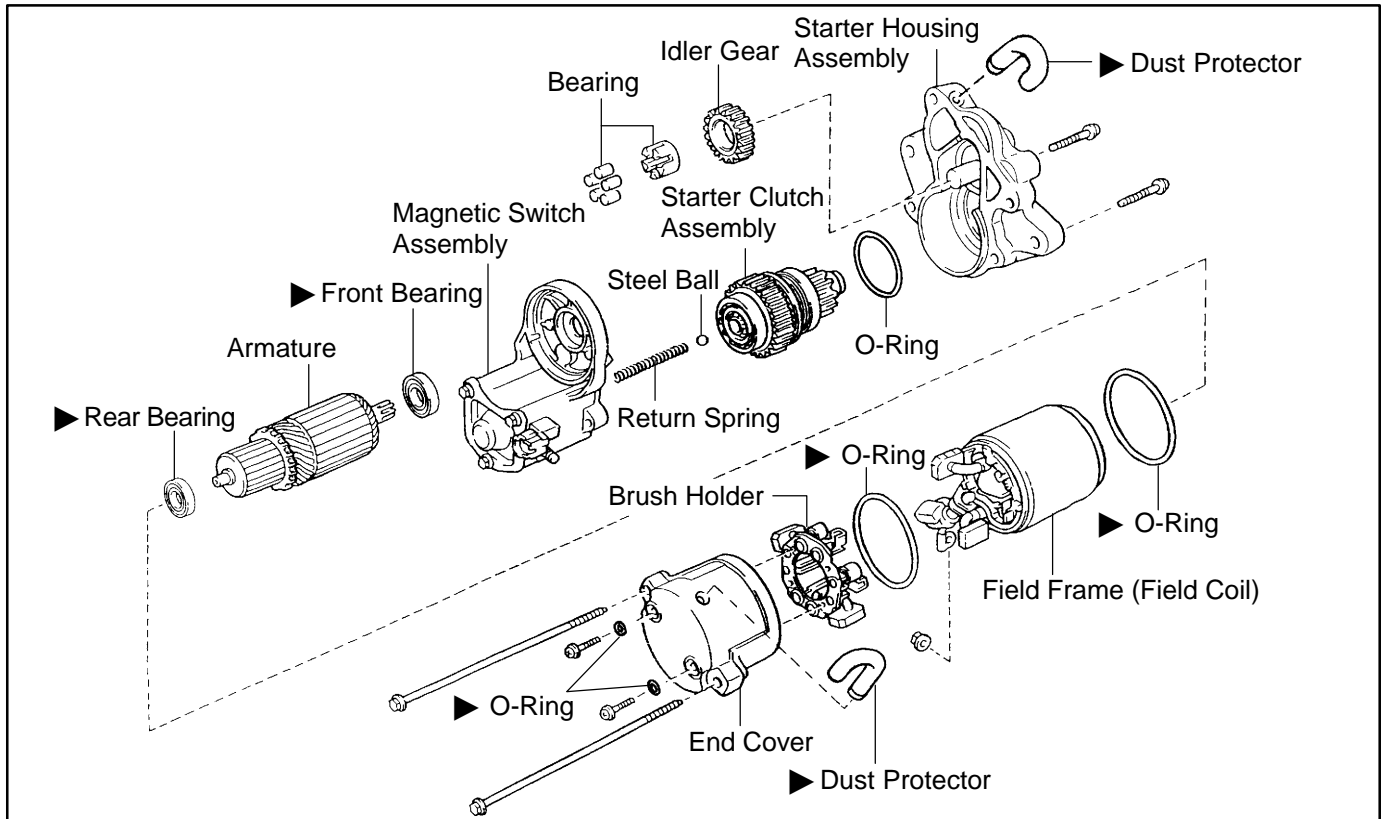


STARTING - STARTER

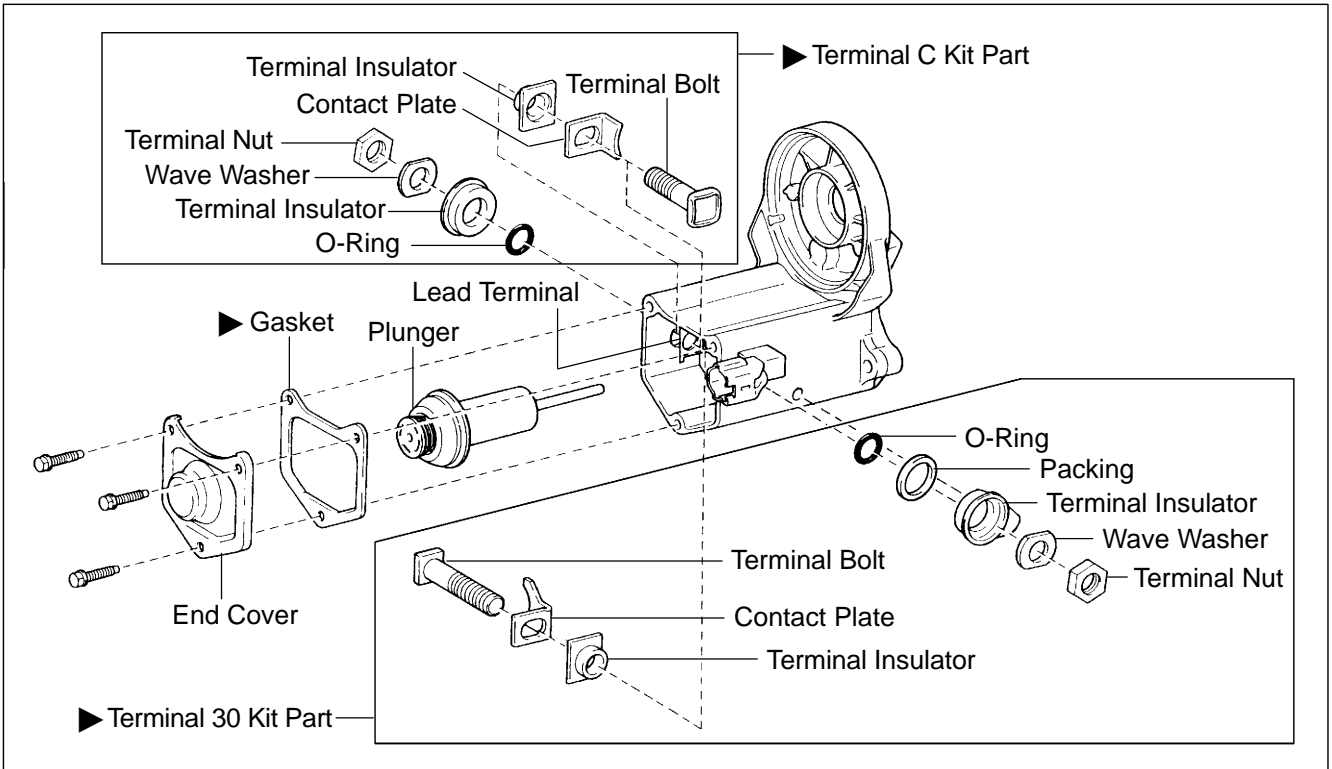


▶ Non-reusable part

B16458

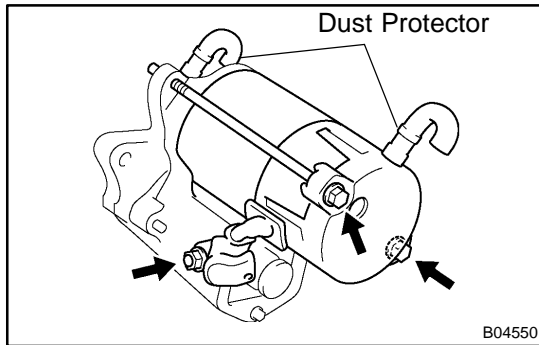


**Magnetic Switch Assembly**



▶ Non-reusable part

B04547



## DISASSEMBLY

### 1. REMOVE 2 DUST PROTECTORS

### 2. REMOVE FIELD FRAME AND ARMATURE

- (a) Remove the nut, and disconnect the lead wire from the magnetic switch terminal.

**Torque: 5.9 N·m (60 kgf·cm, 52 in.-lbf)**

- (b) Remove the 2 through bolts.

**Torque: 9.3 N·m (95 kgf·cm, 82 in.-lbf)**

- (c) Pull out the field frame together with the armature from the magnetic switch assembly.

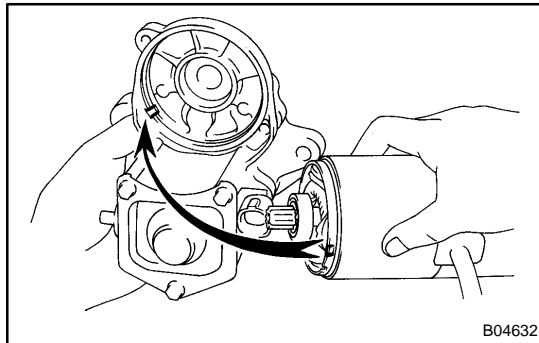
#### NOTICE:

**At the time of notice, align the protrusion of the field frame with the groove of the magnetic switch.**

- (d) Remove the O-ring from the field frame.

#### HINT:

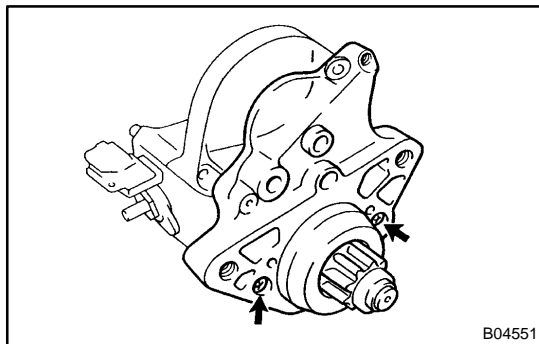
At the time of assembly, use a new O-ring.



### 3. REMOVE STARTER HOUSING, CLUTCH ASSEMBLY AND GEAR

- (a) Remove the 2 screws.

**Torque: 9.3 N·m (95 kgf·cm, 82 in.-lbf)**



- (b) Remove these parts from the magnetic switch assembly:

(1) Starter housing

(2) Return spring

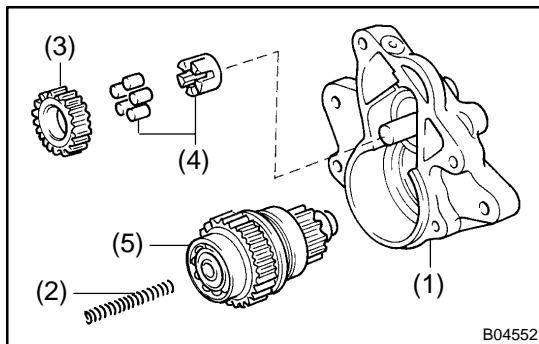
(3) Idler gear

(4) Bearing

(5) Starter clutch assembly

#### HINT:

At the time of assembly, apply grease to the return spring and insert the return spring into the clutch shaft hole.

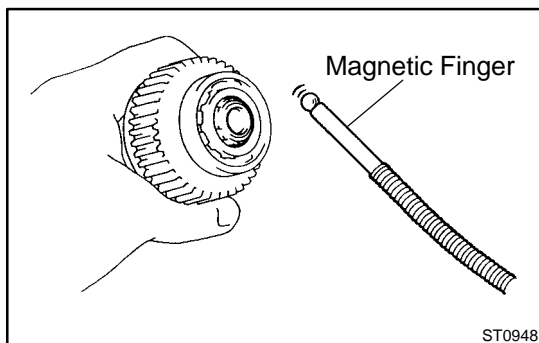


### 4. REMOVE STEEL BALL

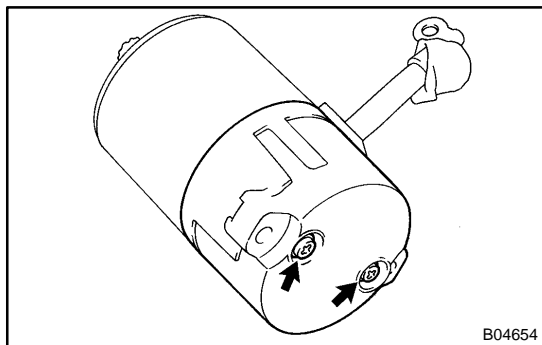
Using a magnetic finger, remove the steel ball from the clutch shaft hole.

#### HINT:

At the time of assembly, apply grease to the steel ball and insert the steel ball into the clutch shaft hole.





**5. REMOVE BRUSH HOLDER**

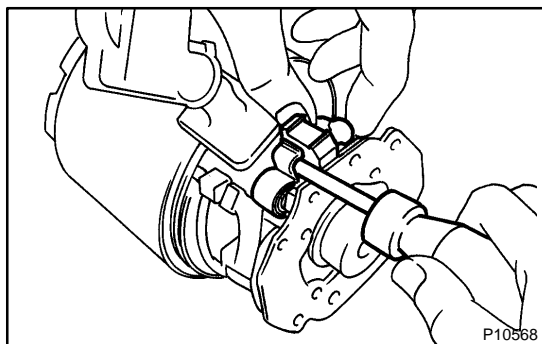
- (a) Remove the 2 screws w/ O-ring and the end cover from the field frame.

**Torque: 3.8 N·m (39 kgf·cm, 34 in.-lbf)**

- (b) Remove the O-ring from the field frame.

**HINT:**

At the time of assembly, use a new O-ring.

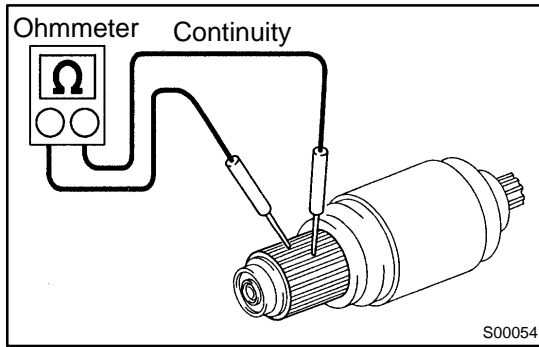


- (c) Using a screwdriver, hold the spring back and disconnect the brush from the brush holder. Disconnect the 4 brushes, and remove the brush holder.

**NOTICE:**

**Check that the positive (+) lead wires are not grounded.**

**6. REMOVE ARMATURE FROM FIELD FRAME**

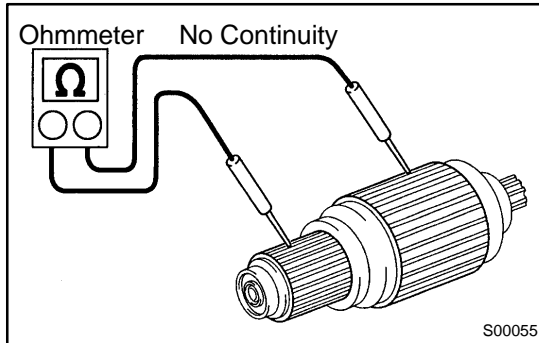


## INSPECTION

### 1. INSPECT COMMUTATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the segments of the commutator.

If there is no continuity between any segment, replace the armature.



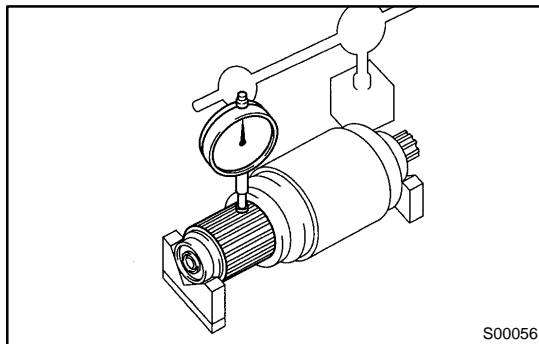
### 2. INSPECT COMMUTATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.

If there is continuity, replace the armature.

### 3. INSPECT COMMUTATOR FOR DIRTY AND BURNT SURFACE

If the surface is dirty or burnt, correct it with sandpaper (No.400) or on a lathe.



### 4. INSPECT COMMUTATOR CIRCLE RUNOUT

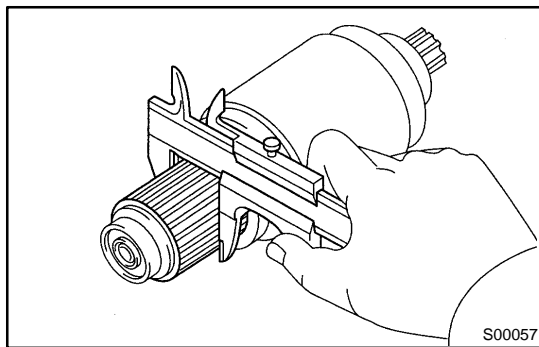
(a) Place the commutator on V-blocks.

(b) Using a dial indicator the circle runout.

**Maximum circle runout:**

**0.05 mm (0.0020 in.)**

If the circle runout is greater than maximum, correct it on a lathe.



### 5. INSPECT COMMUTATOR DIAMETER

Using vernier calipers, measure the commutator diameter.

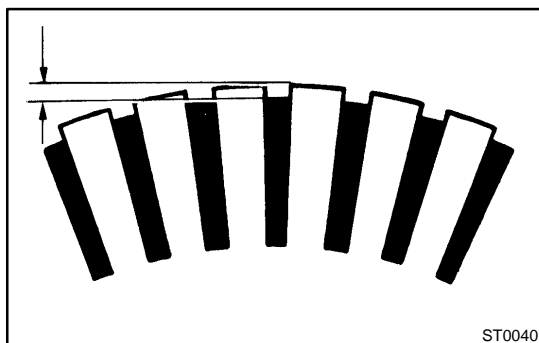
**Standard diameter:**

**35.0 mm (1.378 in.)**

**Minimum diameter:**

**34.0 mm (1.339 in.)**

If the diameter is less than minimum, replace the armature.



### 6. INSPECT UNDERCUT DEPTH

Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.

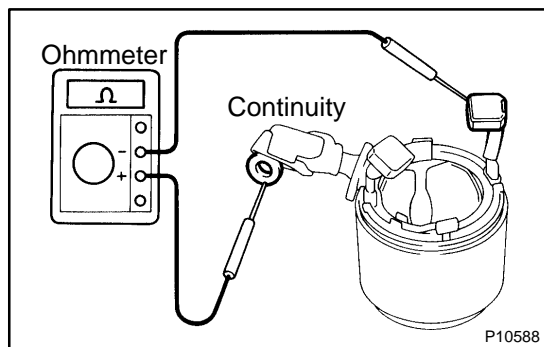
**Standard undercut depth:**

**0.7 mm (0.028 in.)**

**Minimum undercut depth:**

**0.2 mm (0.008 in.)**

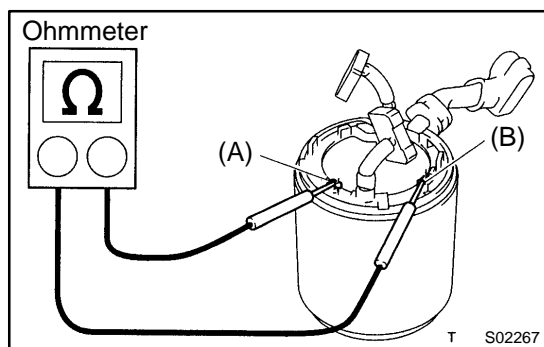
If the undercut depth is less than minimum, correct it with a hacksaw blade.



### 7. INSPECT FIELD COIL FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

If there is no continuity, replace the field frame.



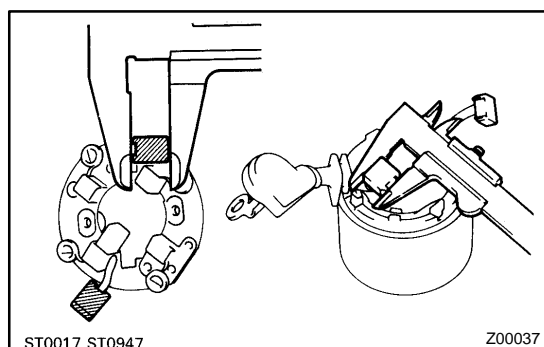
### 8. INSPECT SHUNT COIL FOR OPEN CIRCUIT

Using an ohmmeter, measure the resistance between shunt coil terminals (A) and (B).

**Resistance:**

**1.5 - 1.9 Ω at 20°C (68°F)**

If the resistance is not as specified, replace the field frame.



### 9. INSPECT BRUSH LENGTH

Using vernier calipers, measure the brush length.

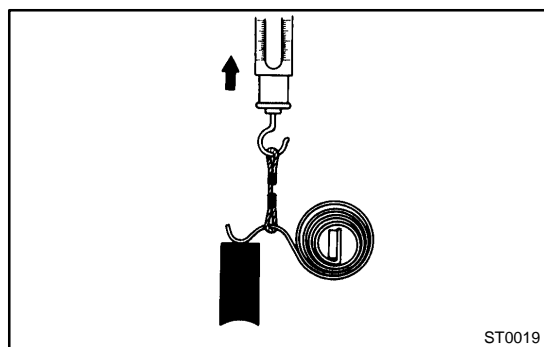
**Standard length:**

**15.0 mm (0.591 in.)**

**Minimum length:**

**9.0 mm (0.354 in.)**

If the length is less than minimum, replace the brush holder and field frame.



### 10. INSPECT BRUSH SPRING LOAD

Using a pull scale, measure the spring load by pulling the spring from the brush until they are separated.

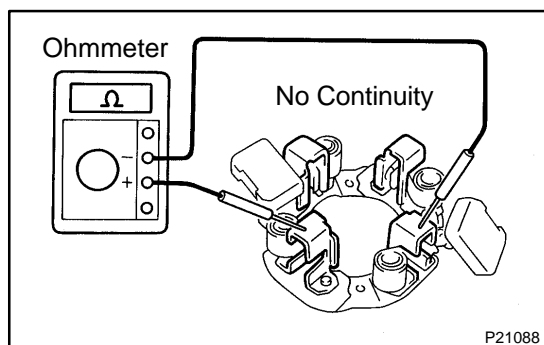
**Standard spring installed load:**

**21.5 - 27.5 N (2.2 - 2.8 kgf, 4.8 - 6.2 lbf)**

**Minimum spring installed load:**

**12.7 N (1.3 kgf, 2.9 lbf)**

If the installed load is less than minimum, replace the brush springs.



### 11. INSPECT BRUSH HOLDER INSULATION

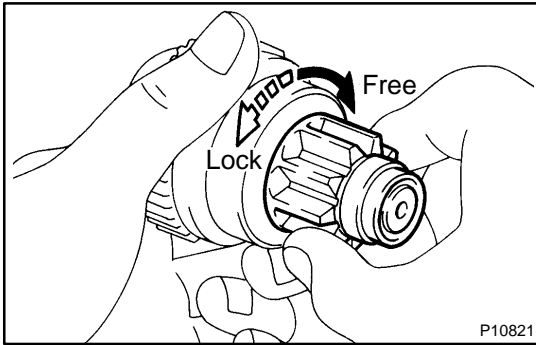
Using an ohmmeter, check that there is no continuity between the positive (+) and negative (-) brush holders.

If there is continuity, repair or replace the brush holder.

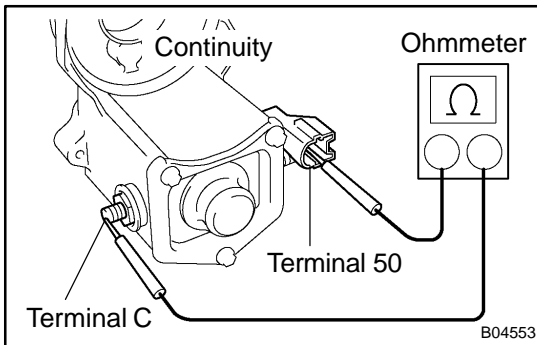
### 12. INSPECT GEAR TEETH

Check the gear teeth on the pinion gear, idle gear and the clutch assembly for wear or damage.

If any damage is found, replace the gear or clutch assembly, and also check the drive plate ring gear for wear or damage.

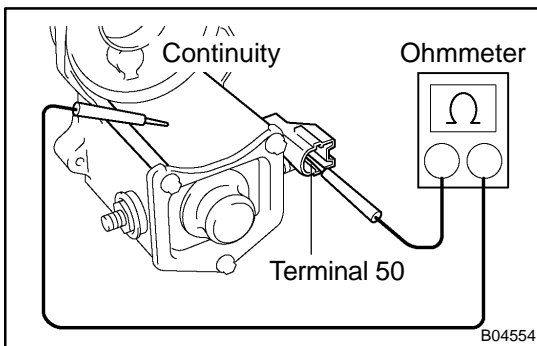
**13. INSPECT CLUTCH PINION GEAR**

Rotate the pinion gear clockwise, and check that it turns freely. Check that it locks by rotating the pinion gear counterclockwise. If necessary, replace the clutch assembly.

**14. DO PULL-IN COIL OPEN CIRCUIT TEST**

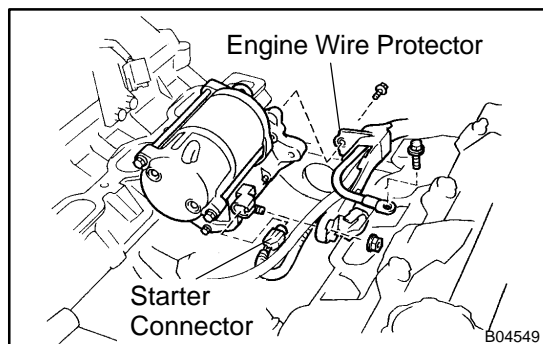
Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, replace the magnetic switch.

**15. DO HOLD-IN COIL OPEN CIRCUIT TEST**

Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

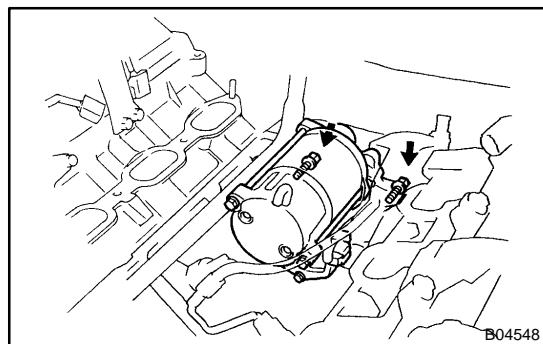
If there is no continuity, replace the magnetic switch.



## INSTALLATION

### 1. INSTALL STARTER

- (a) Install the engine wire protector to the starter with the bolt.  
**Torque: 9.81 N·m (100 kgf·cm, 84 in.-lbf)**
- (b) Connect the starter wire with the nut.  
**Torque: 9.81 N·m (100 kgf·cm, 84 in.-lbf)**
- (c) Connect the starter connector.
- (d) Connect the starter to the cylinder block.
- (e) Connect the engine wire with the bolt.



- (f) Install the starter with the 2 bolts.  
**Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)**
2. **INSTALL INTAKE MANIFOLD ASSEMBLY**  
(See page [EM-59](#) )
  3. **INSTALL INTAKE AIR CONNECTOR**
  4. **INSTALL V-BANK COVER**

## REASSEMBLY

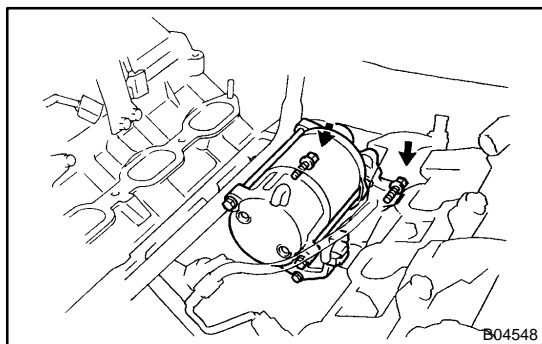
Reassembly is in the reverse order of disassembly (See page [ST-6](#)).

HINT:

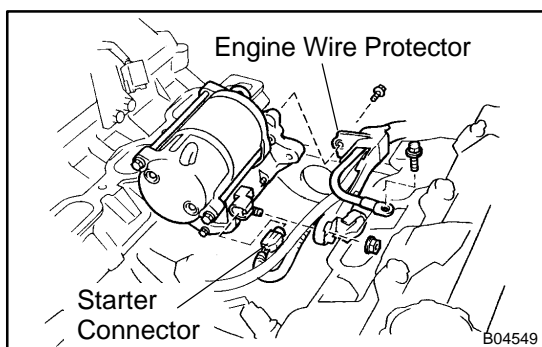
At the time of assembly, use high-temperature grease to lubricate the bearing and gears when assembling the starter.

## REMOVAL

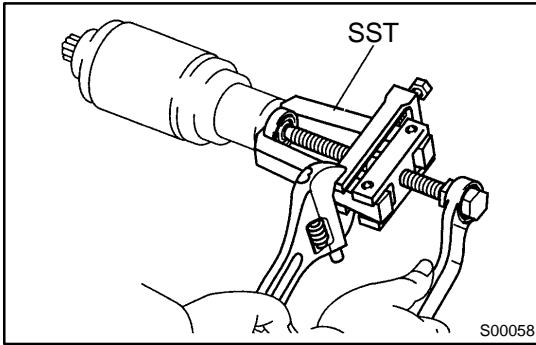
1. REMOVE V-BANK COVER
2. REMOVE INTAKE AIR CONNECTOR
3. REMOVE INTAKE MANIFOLD ASSEMBLY  
(See page [EM-35](#) )



4. REMOVE STARTER
  - (a) Remove the 2 bolts holding the starter from the cylinder block.
  - (b) Disconnect the starter from the cylinder block.



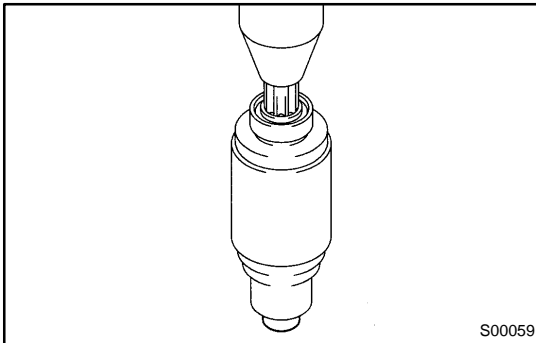
- (c) Disconnect the starter connector.
  - (d) Remove the nut, bolt and disconnect the starter wire.
  - (e) Remove the bolt, and disconnect the engine wire protector from the starter.
  - (f) Remove the starter.



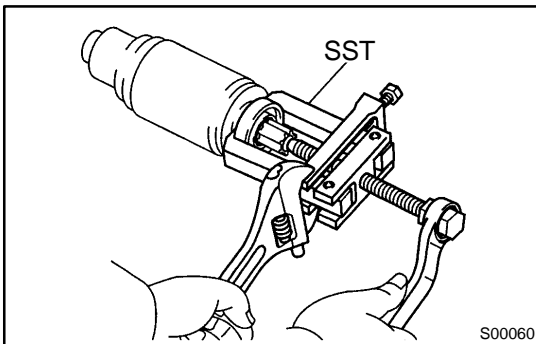
## REPLACEMENT

### 1. REPLACE REAR BEARING

- (a) Using SST, remove the bearing.  
SST 09286-4601 1

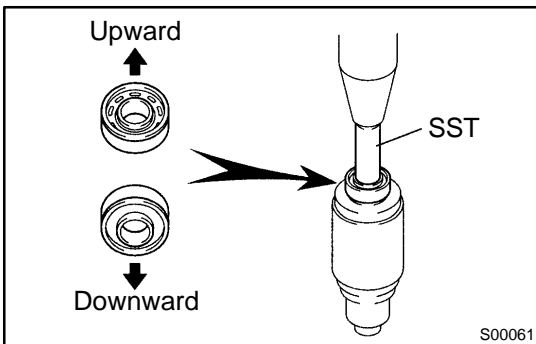


- (b) Using a press, press in a new bearing.



### 2. REPLACE FRONT BEARING

- (a) Using SST, remove the bearing.  
SST 09286-4601 1

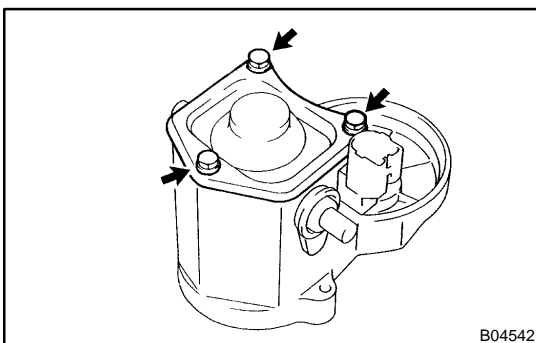


- (b) Using SST and a press, press in a new bearing.

#### NOTICE:

**Be careful of the bearing installation direction.**

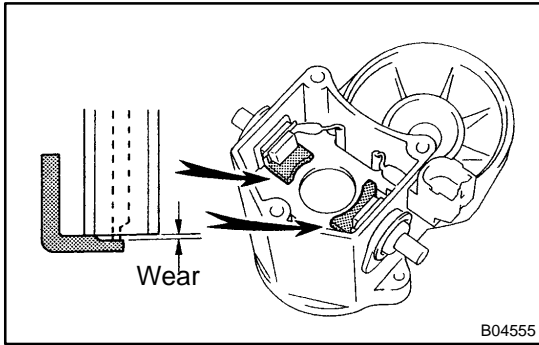
SST 09820-00031



### 3. REPLACE MAGNETIC SWITCH TERMINAL KIT PARTS

- (a) Remove the magnetic switch end cover.  
Remove the 3 bolts, the end cover, the gasket and the plunger.



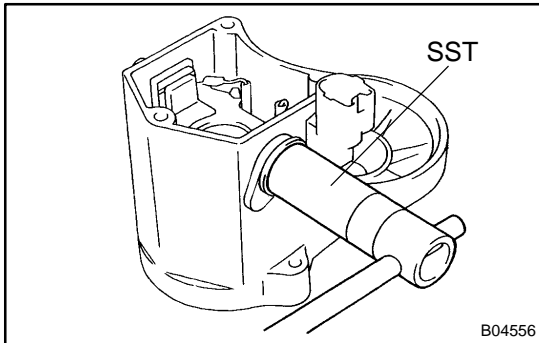


- (b) Inspect contact plate for wear.  
Using vernier calipers, measure the contact plate for depth of wear.

**Maximum wear:**

**0.9 mm (0.035 in.)**

If the depth of wear is greater than the maximum, replace the contact plate.



- (c) Remove terminal kit parts.

- (1) Using SST, loosen the terminal nuts.

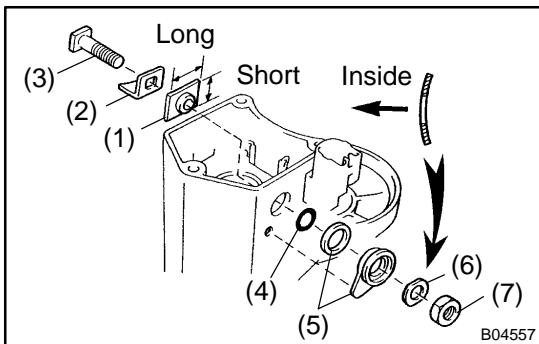
SST 09810-38140

- (2) Terminal C:

Remove the terminal nut, wave washer, terminal insulator (outside), O-ring, terminal bolt, contact plate and terminal insulator (inside).

- (3) Terminal 30:

Remove the terminal nut, wave washer, terminal insulator (outside), O-ring, terminal bolt, contact plate, terminal insulator (inside).



- (d) Temporarily install these new terminal 30 kit parts:

- (1) Terminal insulator (inside)

- (2) Contact plate

- (3) Terminal bolt

- (4) O-ring

- (5) Packing and terminal insulator (outside)

Install the packing to the terminal insulator, and install them.

**HINT:**

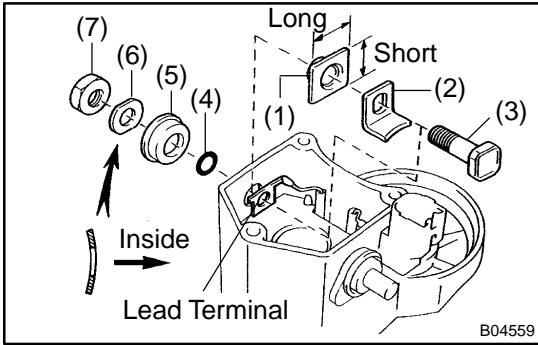
Match the protrusion of the insulator with the indentation of the housing.

- (6) Wave washer

- (7) Terminal nut

**NOTICE:**

**Be careful to install the terminal insulator (inside) and wave washer in the correct direction.**

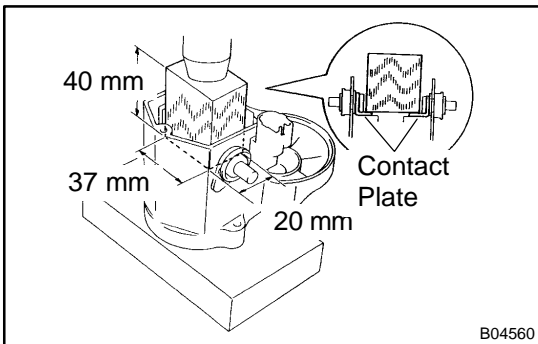


- (e) Temporarily install these new terminal C kit parts:
- (1) Terminal insulator (inside)
  - (2) Contact plate
  - (3) Terminal bolt
  - (4) O-ring
  - (5) Terminal insulator (outside)
  - (6) Wave washer
  - (7) Terminal nut

**NOTICE:**

**Be careful to install the terminal insulator (inside) and wave washer in the correct direction.**

- (f) Temporarily tighten the terminal nuts.



- (g) Tighten terminal nuts.
- (1) Put a wooden block on the contact plate and press it down with a hand press.

**Dimensions of wooden block:**

**20 x 37 x 40 mm (0.79 x 1.46 x 1.57 in.)**

**Press force:**

**981 N (100 kgf, 221 lbf)**

**NOTICE:**

- ▶ **Check the diameter of the hand press ram. Then calculate the gauge pressure of the press when 981 N (100 kgf, 221 lbf) of force is applied.**

**Gauge pressure:**

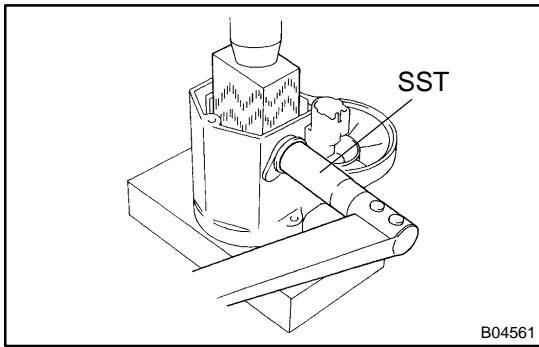
$$(\text{kgf/cm}^2) = \frac{100 \text{ kgf}}{\left(\frac{\text{Ram diameter (cm)}}{2}\right)^2 \times 3.14 (\pi)}$$

$$(\text{psi}) = \frac{221 \text{ lbf}}{\left(\frac{\text{Ram diameter (in.)}}{2}\right)^2 \times 3.14 (\pi)}$$

$$(\text{kPa}) = (\text{kgf/cm}^2) \times 98.1$$

$$(\text{kPa}) = (\text{psi}) \times 6.9$$

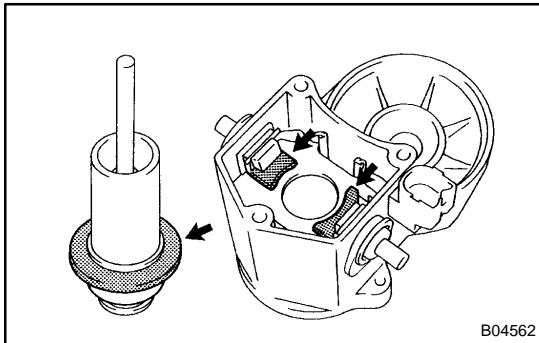
- ▶ **If the contact plate is not pressed down with the specified pressure, the contact plate may tilt due to coil deformation or the tightening of the nut.**



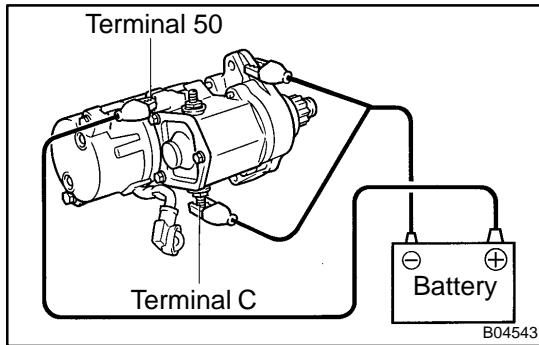
- (2) Using SST, tighten the nuts to the specified torque.  
 SST 09810-38140  
**Torque: 17 N·m (170 kgf·cm, 13 ft·lbf)**

**NOTICE:**

**If the nut is over tightened, it may cause cracks on the inside of the insulator.**



- (h) Clean contact surfaces of the contact plate and the plunger.  
 Clean the contact surfaces of the remaining contact plate and plunger with a dry shop rag.
- (i) Reinstall the magnetic switch end cover.  
 Install the plunger, the new gasket, the end cover and lead clamp with the 3 bolts.  
**Torque: 3.6 N·m (37 kgf·cm, 32 in.-lbf)**



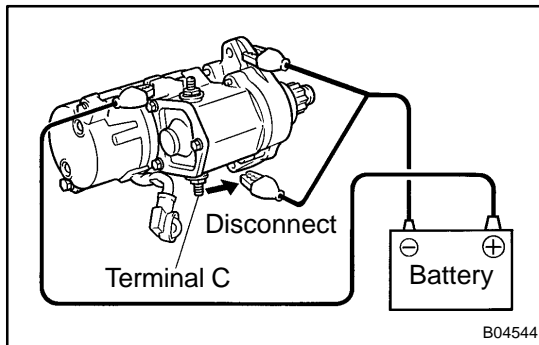
## TEST

### NOTICE:

These tests must be done within 3 to 5 seconds to avoid the coil to be burned-out.

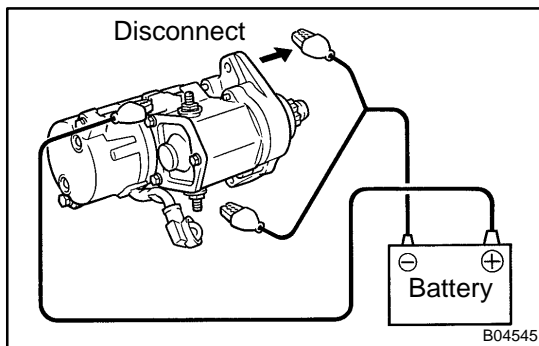
#### 1. DO PULL-IN TEST

- Disconnect the field coil lead wire from terminal C.
- Connect the battery to the magnetic switch as shown. Check that the pinion gear moves outward.



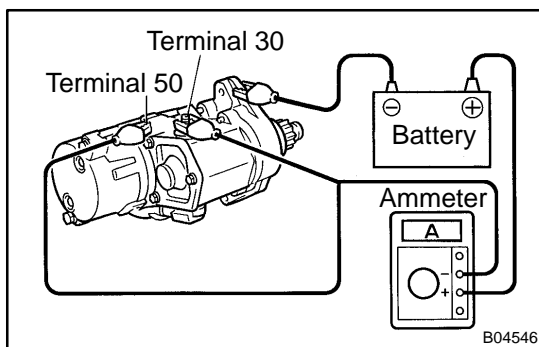
#### 2. DO HOLD-IN TEST

While connected as above with the pinion gear out, disconnect the negative (-) lead from terminal C. Check that the pinion gear remains out.



#### 3. INSPECT CLUTCH PINION GEAR RETURN

Disconnect the negative (-) lead from the starter body. Check that the pinion gear returns inward.

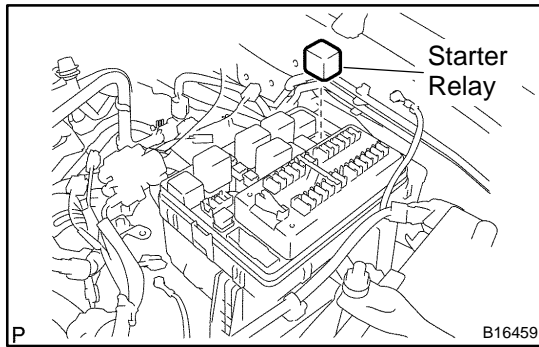


#### 4. DO NO-LOAD PERFORMANCE TEST

- Connect the battery and ammeter to the starter as shown.
- Check that the starter rotates smoothly and steadily with the pinion gear moving out. Check that the ammeter shows the specified current.

**Specified current:**

**At 11.5 V: 100 A or less**

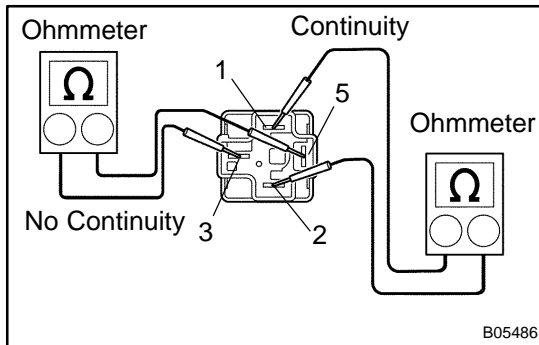


## STARTER RELAY INSPECTION

ST08J-07

### 1. REMOVE STARTER RELAY (Marking: "ST")

Remove the relay box cover and starter relay.



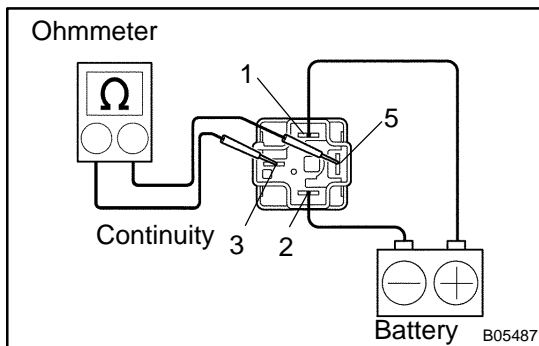
### 2. INSPECT RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



### 3. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 2.

(b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

### 4. REINSTALL STARTER RELAY

# STARTING SYSTEM

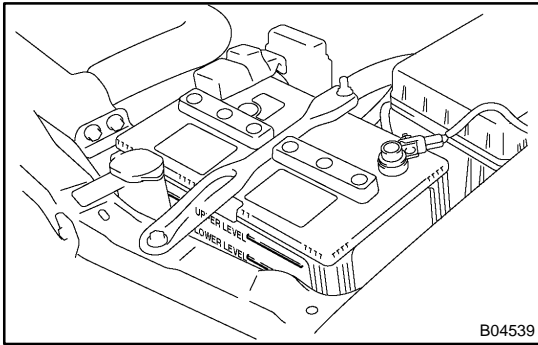
## ON-VEHICLE INSPECTION

ST08A-01

**NOTICE:**

Before changing the starter, check these items again:

- ▶ Connector connection
- ▶ Accessory installation, e.g.: theft deterrent system



## ON-VEHICLE INSPECTION

### 1. CHECK BATTERY ELECTROLYTE LEVEL

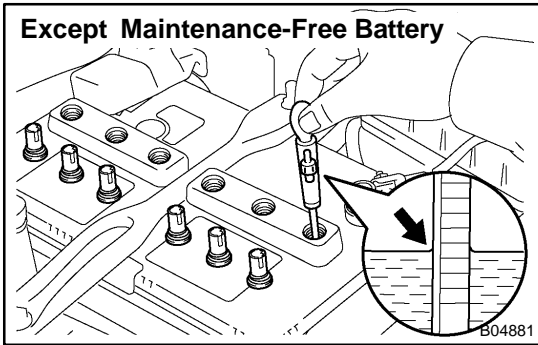
Check the electrolyte quantity of each cell.

Maintenance-Free Battery:

If under the lower level, replace the battery (or add distilled water if possible), and check the charging system.

Except Maintenance-Free Battery:

If under the lower level, add distilled water.



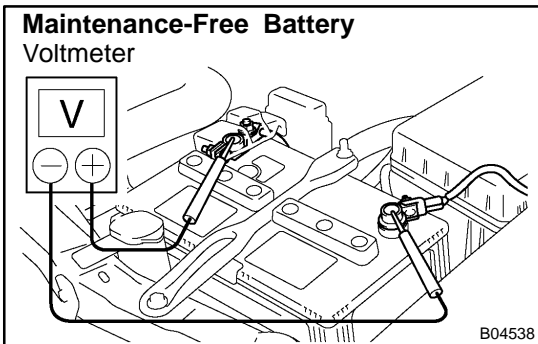
### 2. Except Maintenance-Free Battery: CHECK BATTERY SPECIFIC GRAVITY

Check the specific gravity of each cell.

**Standard specific gravity:**

**1.25 - 1.29 at 20°C (68°F)**

If the specific gravity is less than specification, charge the battery.



### 3. Maintenance-Free Battery: CHECK BATTERY VOLTAGE

(a) After having driven the vehicle and in the case that 20 minutes have not passed after having stopped the engine, turn the ignition switch ON and turn on the electrical system (headlight, blower motor, rear defogger etc.) for 60 seconds to remove the surface charge.

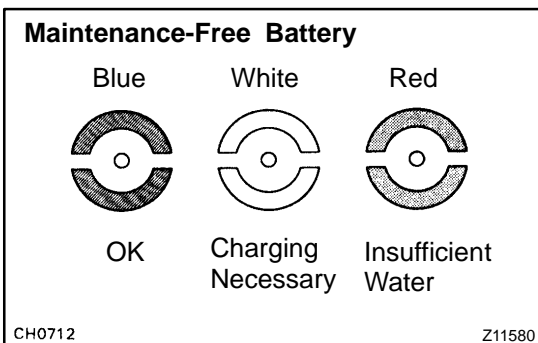
(b) Turn the ignition switch OFF and turn off the electrical systems.

(c) Measure the battery voltage between the negative (-) and positive (+) terminals of the battery.

**Standard voltage:**

**12.5 - 12.9 V at 20°C (68°F)**

If the voltage is less than specification, charge the battery.



HINT:

Check the indicator as shown in the illustration.

### 4. CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

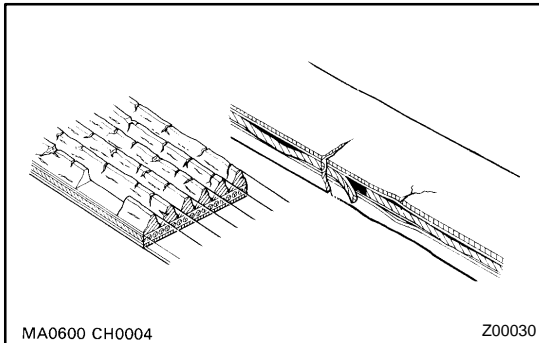
(a) Check that the battery terminals are not loose or corroded.

(b) Check the fusible link and fuses for continuity.

**5. INSPECT DRIVE BELT**

HINT:

A belt tensioner is used, so checking the belt tension is not necessary.

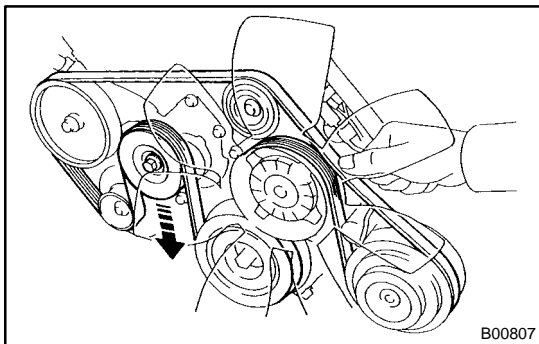


- (a) Visually check the drive belt for excessive wear, frayed cords etc.

If necessary, replace the drive belt.

HINT:

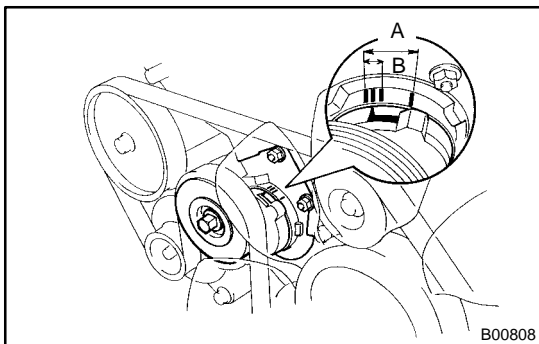
- ▶ Cracks on the rib side of a drive belt are considered acceptable. If the drive belt has chunks missing from the ribs, it should be replaced.
- ▶ The drive belt tension can be released by turning the belt tensioner counterclockwise. The pulley bolt for the belt tensioner has a left-hand thread.



- (b) Check the belt tensioner operation.

- ▶ Check that the belt tensioner moves downward when the drive belt is pressed down at the points indicated in the illustration with approx. 98 N (10 kgf, 22.0 lbf) of force.
- ▶ Check the alignment of the belt tensioner pulley to make sure the drive belt has not slipped off the pulley.

If necessary, replace the belt tensioner.

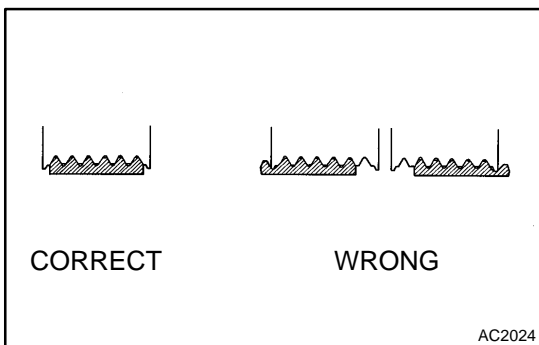


- ▶ Check that the arrow mark on the belt tensioner falls within area A of the scale.

If it is outside area A, replace the drive belt.

HINT:

- ▶ When a new belt is installed, it should lie within area B. If not, the drive belt is not correct.



- ▶ After installing a belt, check that it fits properly in the ribbed grooves.
- ▶ Check by hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.

**6. REMOVE ENGINE UNDER COVER NO.1**

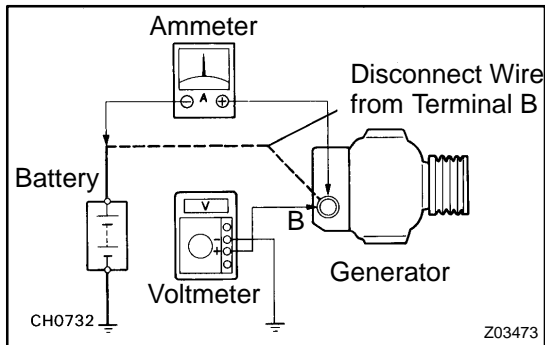
**7. VISUALLY CHECK GENERATOR WIRING AND LISTEN FOR ABNORMAL NOISES**

- (a) Check that the wiring is in good condition.
- (b) Check that there is no abnormal noise from the generator while the engine is running.



**8. CHECK CHARGE WARNING LIGHT CIRCUIT**

- (a) Warm up the engine and then turn it off.
  - (b) Switch off all accessories.
  - (c) Turn the ignition switch ON, and check that the charge warning light is lit.
  - (d) Start the engine, and check that the light goes off.
- If the light does not go off as specified, troubleshoot the charge light circuit.

**9. INSPECT CHARGING CIRCUIT WITHOUT LOAD****HINT:**

If a battery/generator tester is available, connect the tester to the charging circuit as per manufacturer's instructions.

- (a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows:
  - ▶ Disconnect the wire from terminal B of the generator, and connect it to the negative (-) tester probe of the ammeter.
  - ▶ Connect the positive (+) tester probe of the ammeter to terminal B of the generator.
  - ▶ Connect the positive (+) tester probe of the voltmeter to terminal B of the generator.
  - ▶ Ground the negative (-) tester probe of the voltmeter.
- (b) Check the charging circuit as follows:
 

With the engine running from idling to 2,000 rpm, check the reading on the ammeter and voltmeter.

**Standard amperage:**  
**10 A or less**

**Standard voltage:**  
**13.2 - 14.8 V**

If the value is not specified, check the generator.

**10. INSPECT CHARGING CIRCUIT WITH LOAD**

- (a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater blower switch at HI.
- (b) Check the reading on the ammeter.
 

**Standard amperage:**  
**30 A or more**

If the ammeter reading is less than the standard amperage, repair the generator.

**HINT:**

If the battery is fully charged, the indication will sometimes be less than standard amperage.

**11. REINSTALL ENGINE UNDER COVER NO.1**

# CHARGING SYSTEM

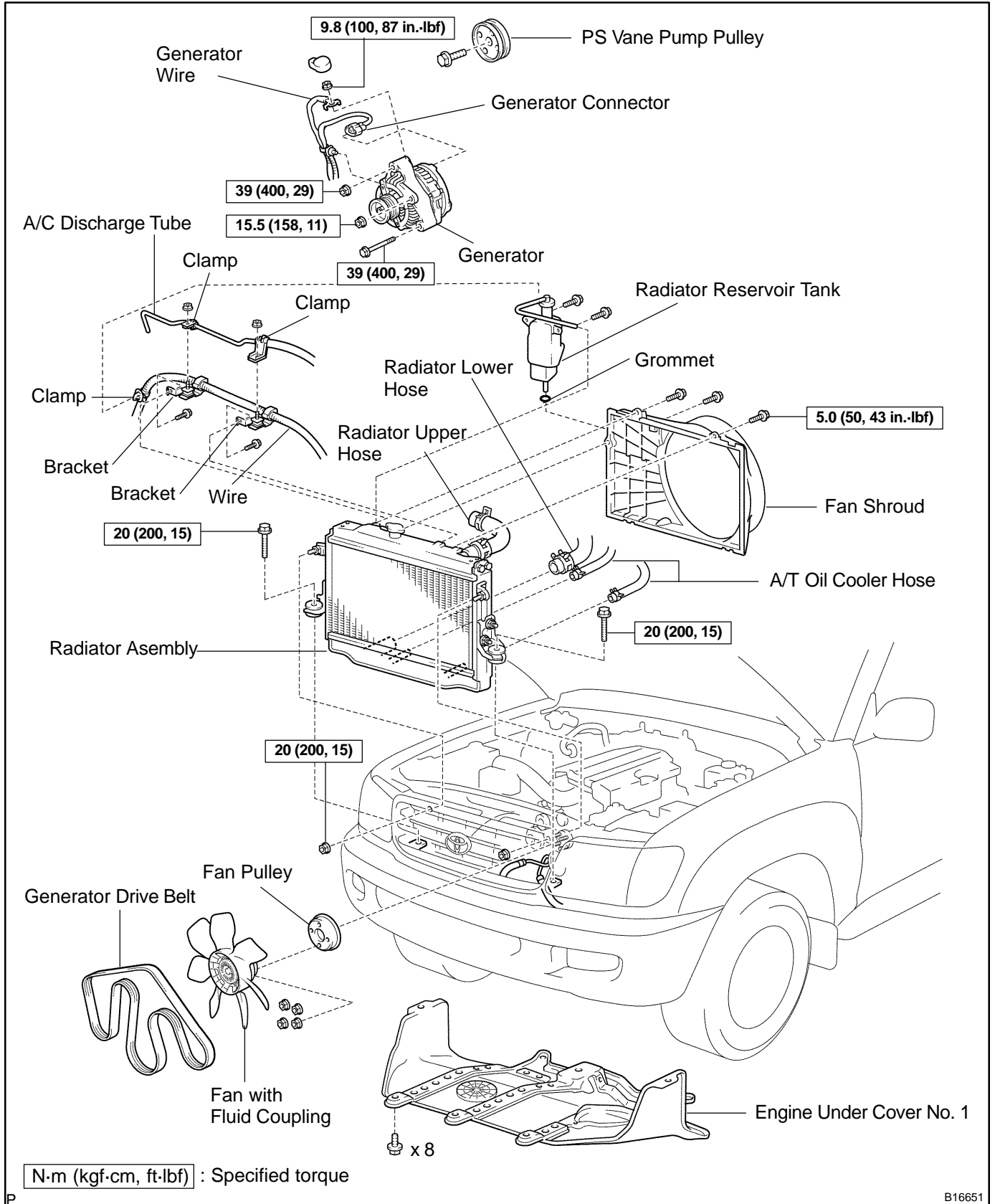
CH06F-01

## PRECAUTION

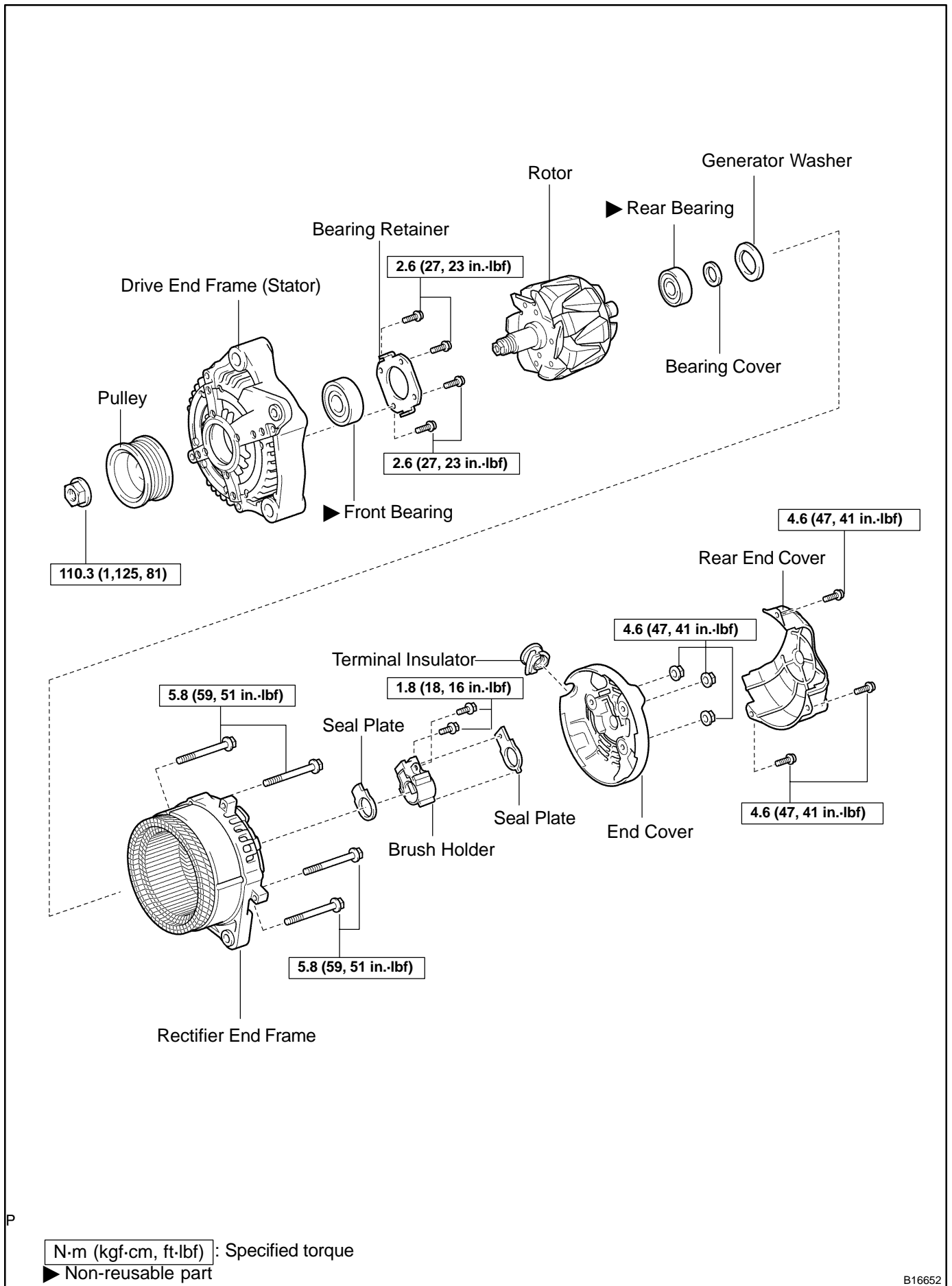
- ▶ Check that the battery cables are connected to the correct terminals.
- ▶ Disconnect the battery cables when the battery is given a quick charge.
- ▶ Do not perform tests with a high voltage insulation resistance tester.
- ▶ Never disconnect the battery while the engine is running.

# GENERATOR COMPONENTS

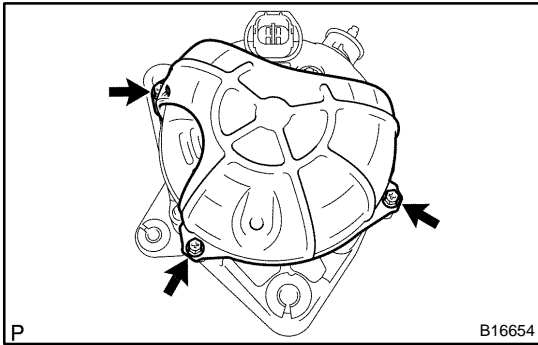
CH06H-09



B16651



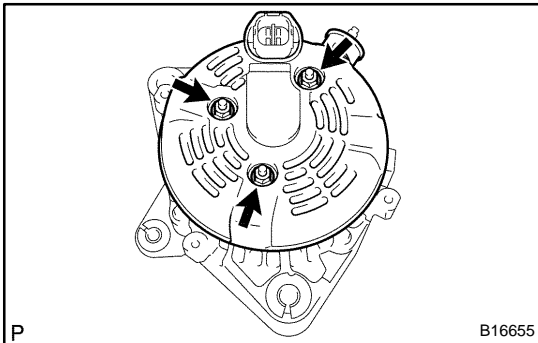
B16652



## DISASSEMBLY

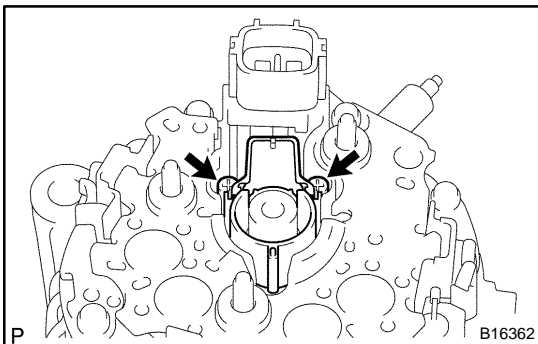
### 1. REMOVE REAR END COVER

- (a) Remove the 3 screws and rear end cover.



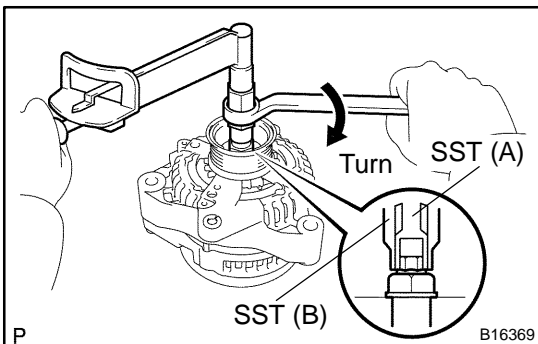
### 2. REMOVE END COVER

- (a) Remove the 3 nuts and end cover.  
 (b) Remove the terminal insulator.



### 3. REMOVE BRUSH HOLDER

- (a) Remove the rear seal plate from the brush holder.  
 (b) Remove the 2 screws and brush holder.  
 (c) Remove the front seal plate from the coil assembly.



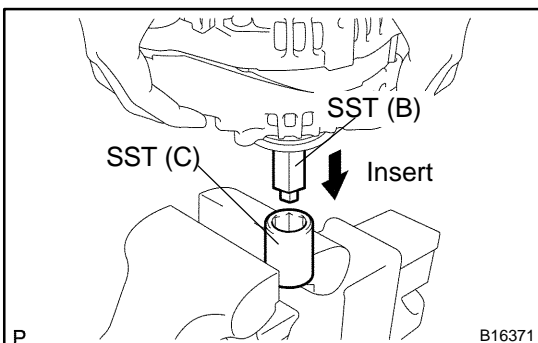
### 4. REMOVE PULLEY

- (a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

SST 09820-6301 1

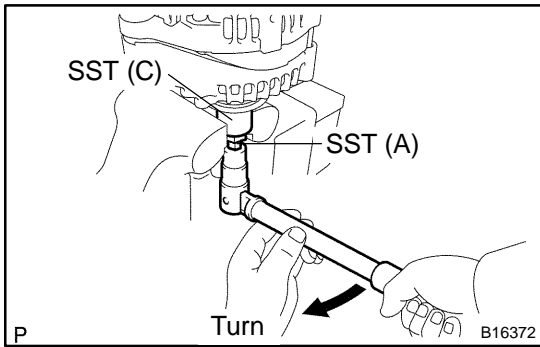
**Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)**

- (b) Check that SST (A) is secured to the rotor shaft.



- (c) Mount SST (C) in a vise.

- (d) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).

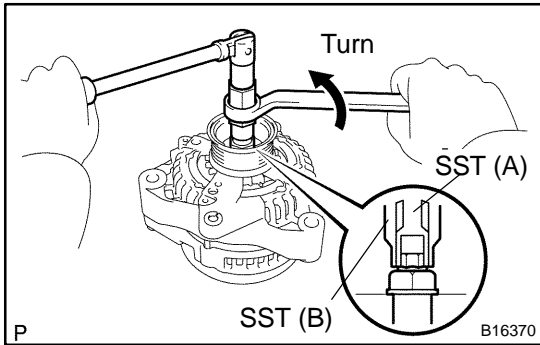


(e) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

**NOTICE:**

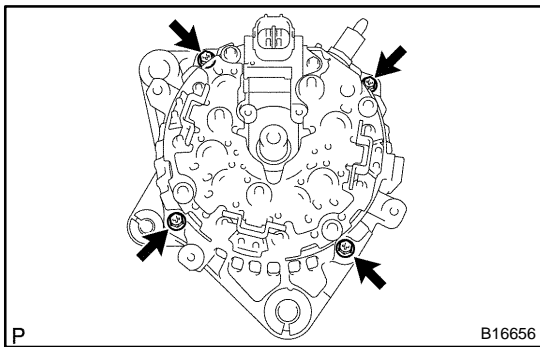
**To prevent damage to the rotor shaft, do not loosen the pulley nut more than one-half of a turn.**

(f) Remove the generator from SST (C).



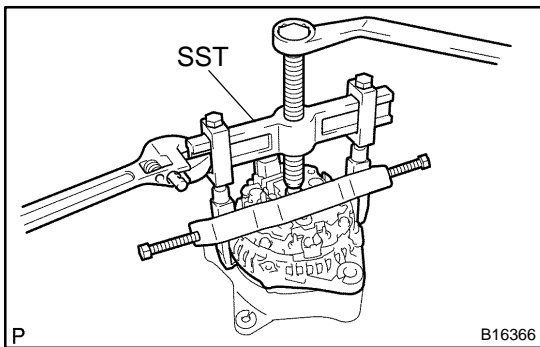
(g) Turn SST (B), and remove SST (A and B).

(h) Remove the pulley nut and pulley.



**5. REMOVE COIL ASSEMBLY**

(a) Remove the 4 bolts.

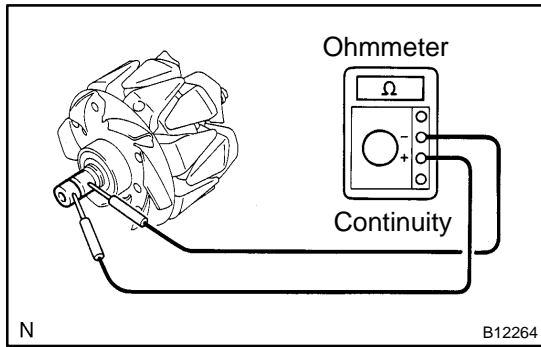


(b) Using SST, remove the coil assembly.

SST 09950-4001 1 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04071, 09958-0401 1)

(c) Remove the generator washer.

**6. REMOVE ROTOR FROM DRIVE END FRAME**



## INSPECTION

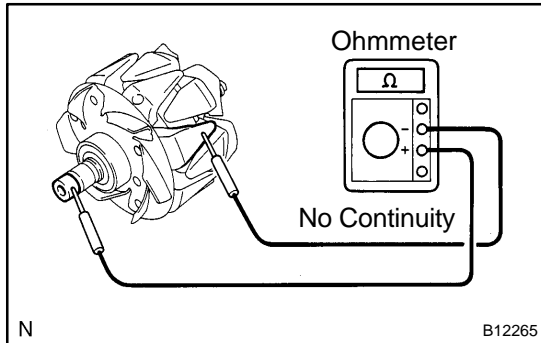
### 1. INSPECT ROTOR

- (a) Check the rotor for open circuit.

Using an ohmmeter, check that there is continuity between the slip rings.

**Standard resistance: 2.3 - 2.7  $\Omega$  at 20°C (68°F)**

If there is no continuity, replace the rotor.



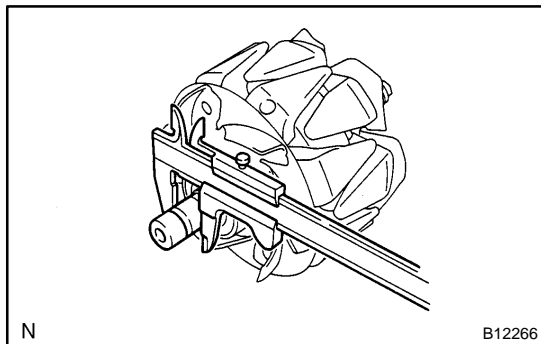
- (b) Check the rotor for ground.

Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

If there is continuity, replace the rotor.

- (c) Check that the slip rings are not rough or scored.

If rough or scored, replace the rotor.

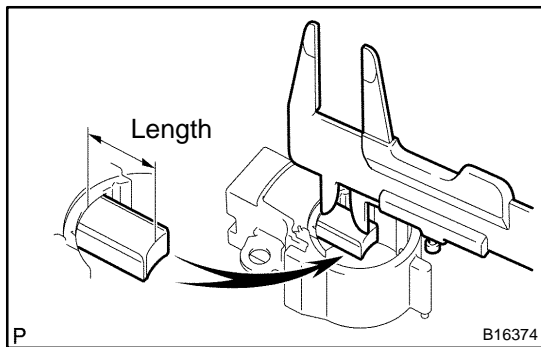


- (d) Using vernier calipers, measure the slip ring diameter.

**Standard diameter: 14.2 - 14.4 mm (0.559 - 0.567 in.)**

**Minimum diameter: 14.0 mm (0.551 in.)**

If the diameter is less than minimum, replace the rotor.



### 2. INSPECT BRUSHES

Using vernier caliper, measure the exposed brush length.

**Standard exposed length: 10.5 mm (0.413 in.)**

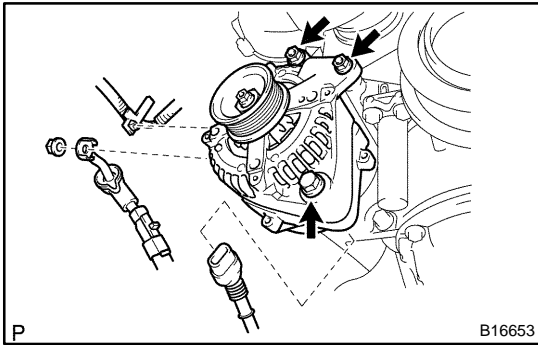
**Minimum exposed length: 4.5 mm (0.177 in.)**

If the exposed length is less than minimum, replace the brushes and brush holder assembly.

### 3. INSPECT BEARING

Check the bearing is not rough or worn.

If necessary, replace the bearing (See page [CH-1 1](#)).



## INSTALLATION

### 1. INSTALL GENERATOR

- (a) Install the generator with the bolt and 2 nuts.

**Torque:**

**Bolt: 39 N·m (400 kgf·cm, 29 ft·lbf)**

**Nut 10 mm: 39 N·m (400 kgf·cm, 29 ft·lbf)**

**Nut 8 mm: 15.5 N·m (158 kgf·cm, 11 ft·lbf)**

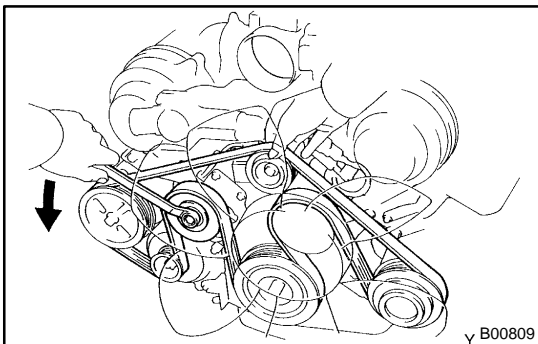
- (b) Connect the generator connector.  
 (c) Connect the generator wire with the nut.  
**Torque: 9.8 N·m (100 kgf·cm, 87 in·lbf)**  
 (d) Install the terminal cap.  
 (e) Install the wire clamp to the cord clip on the generator.

### 2. INSTALL PS VANE PUMP PULLEY

(See page [SR-47](#) )

### 3. INSTALL RADIATOR ASSEMBLY

(See page [CO-19](#) )



### 4. INSTALL GENERATOR DRIVE BELT

Install the belt by turning the belt tensioner counterclockwise.

**HINT:**

The pulley bolt for the belt tensioner has a left - hand thread.

### 5. FULL ENGINE COOLANT

### 6. START ENGINE AND CHECK FOR LEAKS

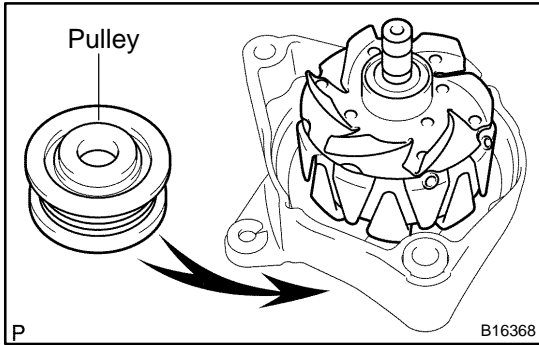
### 7. RECHECK ENGINE COOLANT LEVEL

### 8. PERFORM ON-VEHICLE INSPECTION

(See page [CH-2](#) )

### 9. INSTALL ENGINE UNDER COVER NO.1





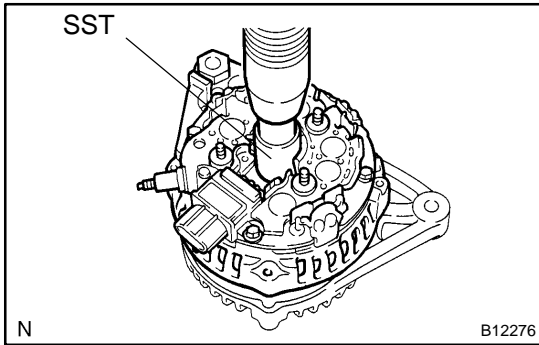
## REASSEMBLY

### 1. INSTALL ROTOR TO DRIVE END FRAME

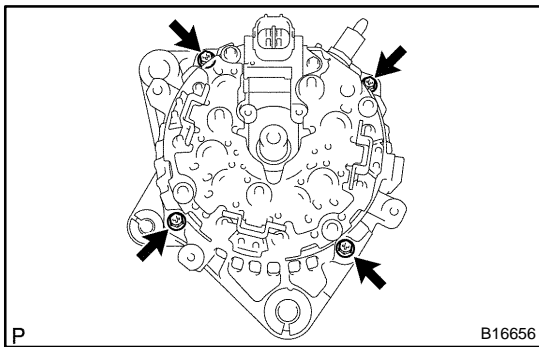
- (a) Place the drive end frame on the pulley.
- (b) Install the rotor to the drive end frame.

### 2. INSTALL COIL ASSEMBLY

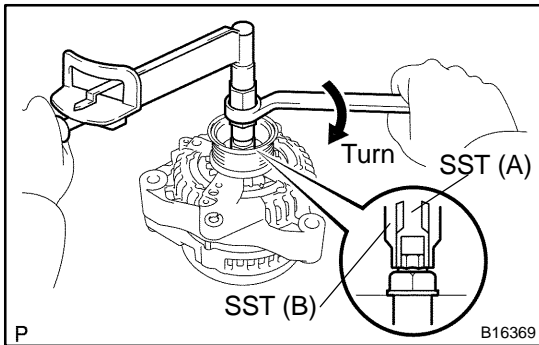
- (a) Place the generator washer on the rotor.



- (b) Using SST and a press, slowly press in the coil assembly.  
SST 09285-76010



- (c) Install the coil assembly with the 4 bolts.  
**Torque: 5.8 N·m (59 kgf·cm, 51 in.-lbf)**



### 3. INSTALL PULLEY

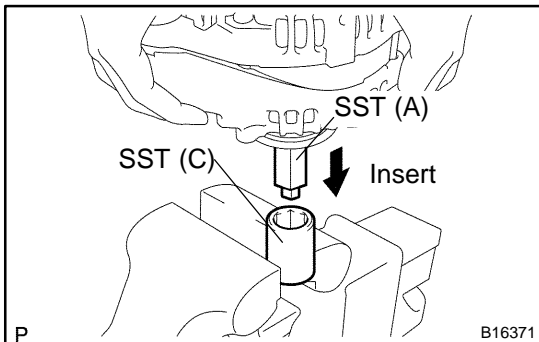
- (a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.

- (b) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

SST 09820-6301 1

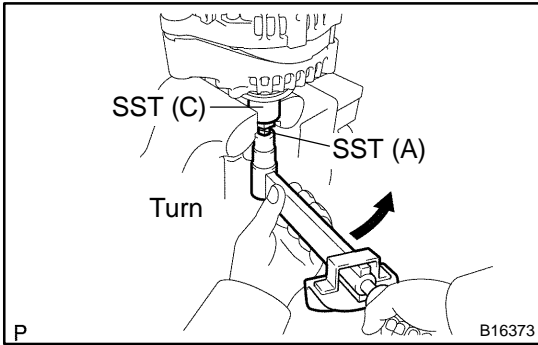
**Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)**

- (c) Check that SST (A) is secured to the pulley shaft.

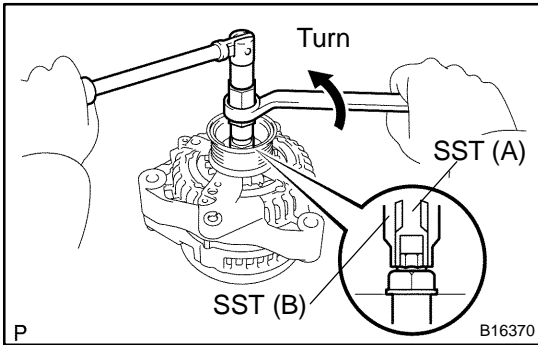


- (d) Mount SST (C) in a vise.

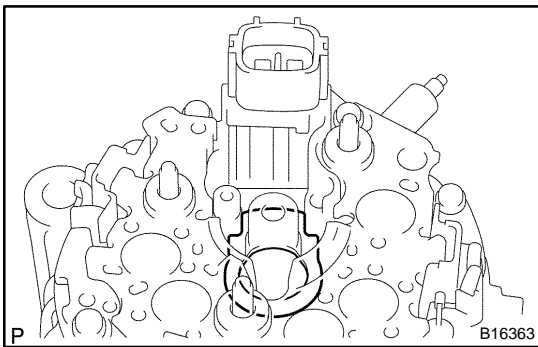
- (e) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).



- (f) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.  
**Torque: 110.3 N·m (1,125 kgf·cm, 81 ft·lbf)**
- (g) Remove the generator from SST (C).

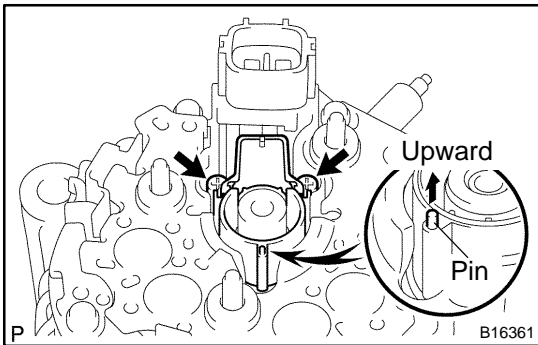


- (h) Turn SST (B), and remove SST (A and B).



**4. INSTALL BRUSH HOLDER**

- (a) Place the front seal plate on the coil assembly.

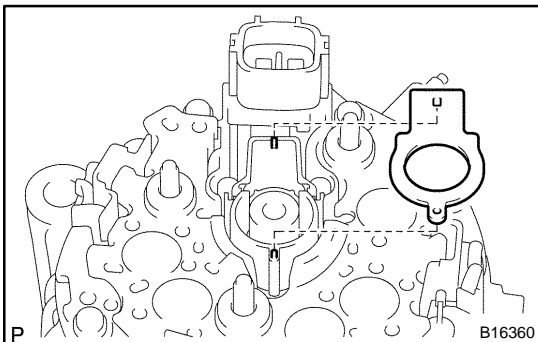


- (b) Place the brush holder on the coil assembly with the pin facing upward.

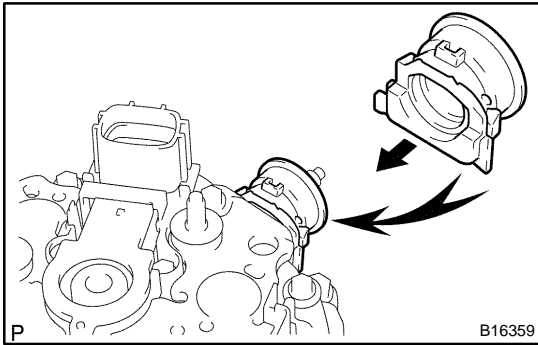
**NOTICE:**

**Be careful of the holder installation direction.**

- (c) Install the 2 screws.  
**Torque: 1.8 N·m (18 kgf·cm, 16 in.-lbf)**



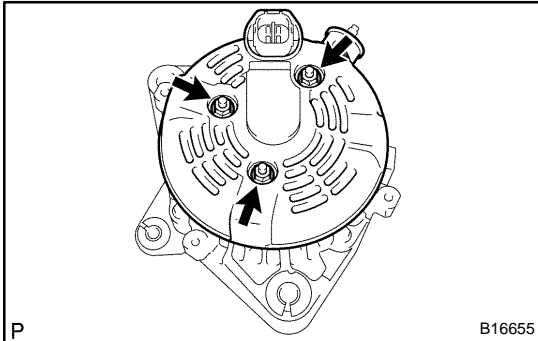
- (d) Align the pins of the brush holder with the holes of the rear seal plate, and install the rear seal plate.



### 5. INSTALL END COVER

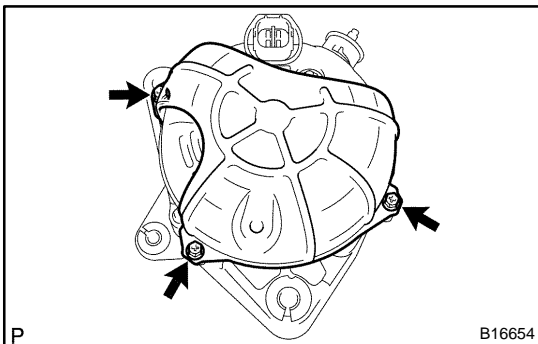
(a) Install the terminal insulator.

**NOTICE:** Be careful of the terminal insulator installation direction.



(b) Install the end cover with the 3 nuts.

**Torque: 4.6 N·m (47 kgf·cm, 41 in.-lbf)**

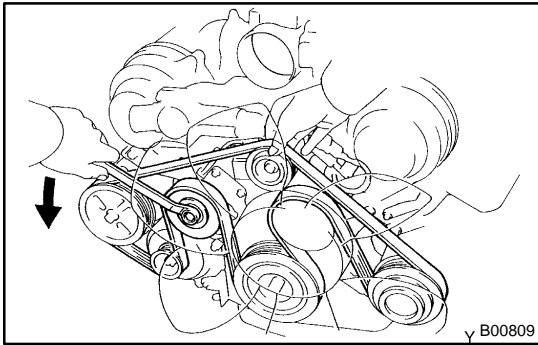


### 6. INSTALL REAR END COVER

Install the rear end cover with the 3 screws.

**Torque: 4.6 N·m (47 kgf·cm, 41 in.-lbf)**

### 7. CHECK THAT ROTOR ROTATES SMOOTHLY



## REMOVAL

1. **DRAIN ENGINE COOLANT**  
(See page [CO-2](#) )

2. **REMOVE GENERATOR DRIVE BELT**

Loosen the belt tension by turning the belt tensioner counter-clockwise, and remove the drive belt.

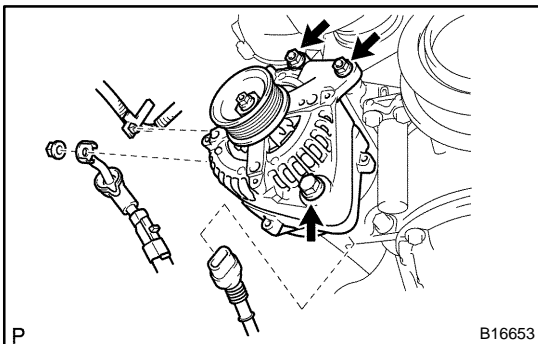
HINT:

The pulley bolt for the belt tensioner has a left - hand thread.

3. **REMOVE ENGINE UNDER COVER NO.1**

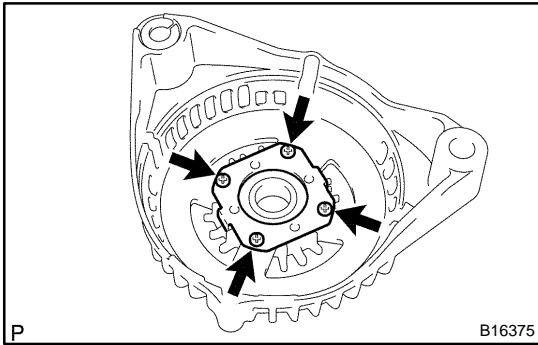
4. **REMOVE RADIATOR ASSEMBLY**  
(See page [CO-17](#) )

5. **REMOVE PS VANE PUMP PULLEY**  
(See page [SR-40](#) )



6. **REMOVE GENERATOR**

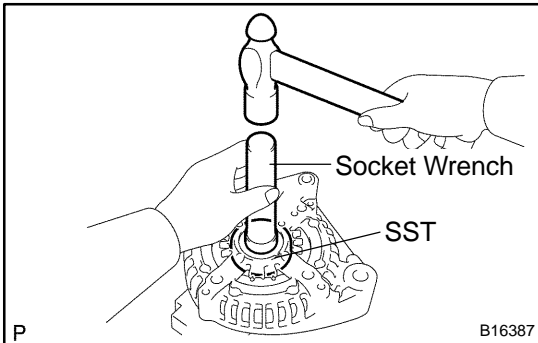
- (a) Disconnect the generator connector.
- (b) Remove the rubber cap and nut, and disconnect the generator wire.
- (c) Disconnect the generator wire clamp from the cord clip on the generator.
- (d) Remove the bolt, 2 nuts and generator.



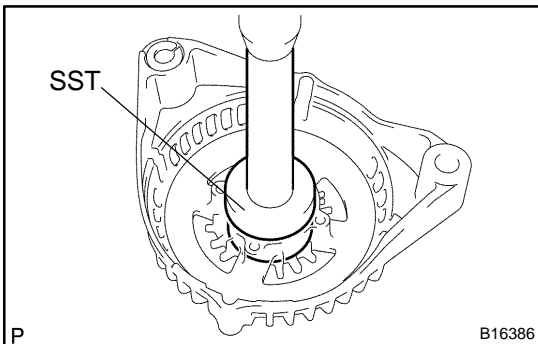
## REPLACEMENT

### 1. REPLACE FRONT BEARING

- (a) Remove the 4 screws, bearing retainer and bearing.

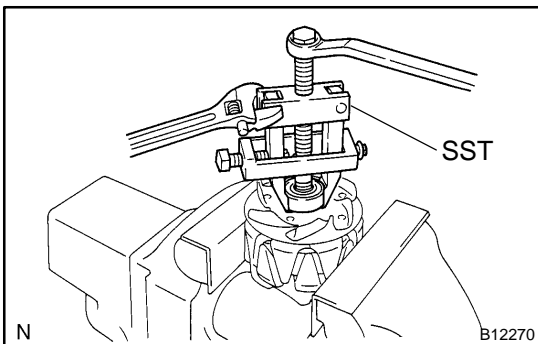


- (b) Using SST and a hammer, tap out the bearing.  
 SST 09950-60010 (09951-00250), 09950-70010 (09951-07100)



- (c) Using SST and a press, press in a new bearing.  
 SST 09950-60010 (09951-00470), 09950-70010 (09951-07100)

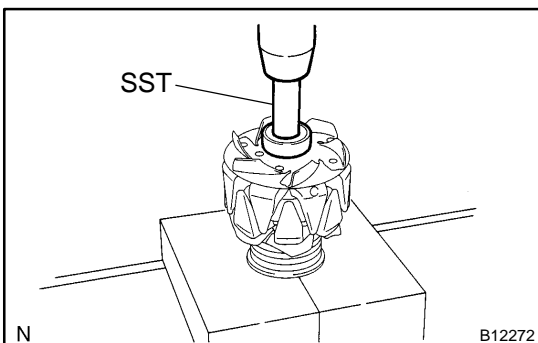
- (d) Install the bearing retainer with the 4 screws.  
**Torque: 2.6 N·m (27 kgf·cm, 23 in.-lbf)**



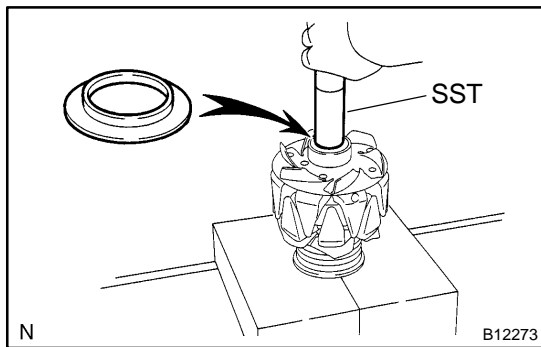
### 2. REPLACE REAR BEARING

- (a) Using SST, remove the bearing cover (outside) and bearing.  
 SST 09820-00021

**NOTICE:**  
**Be careful not to damage the fan.**



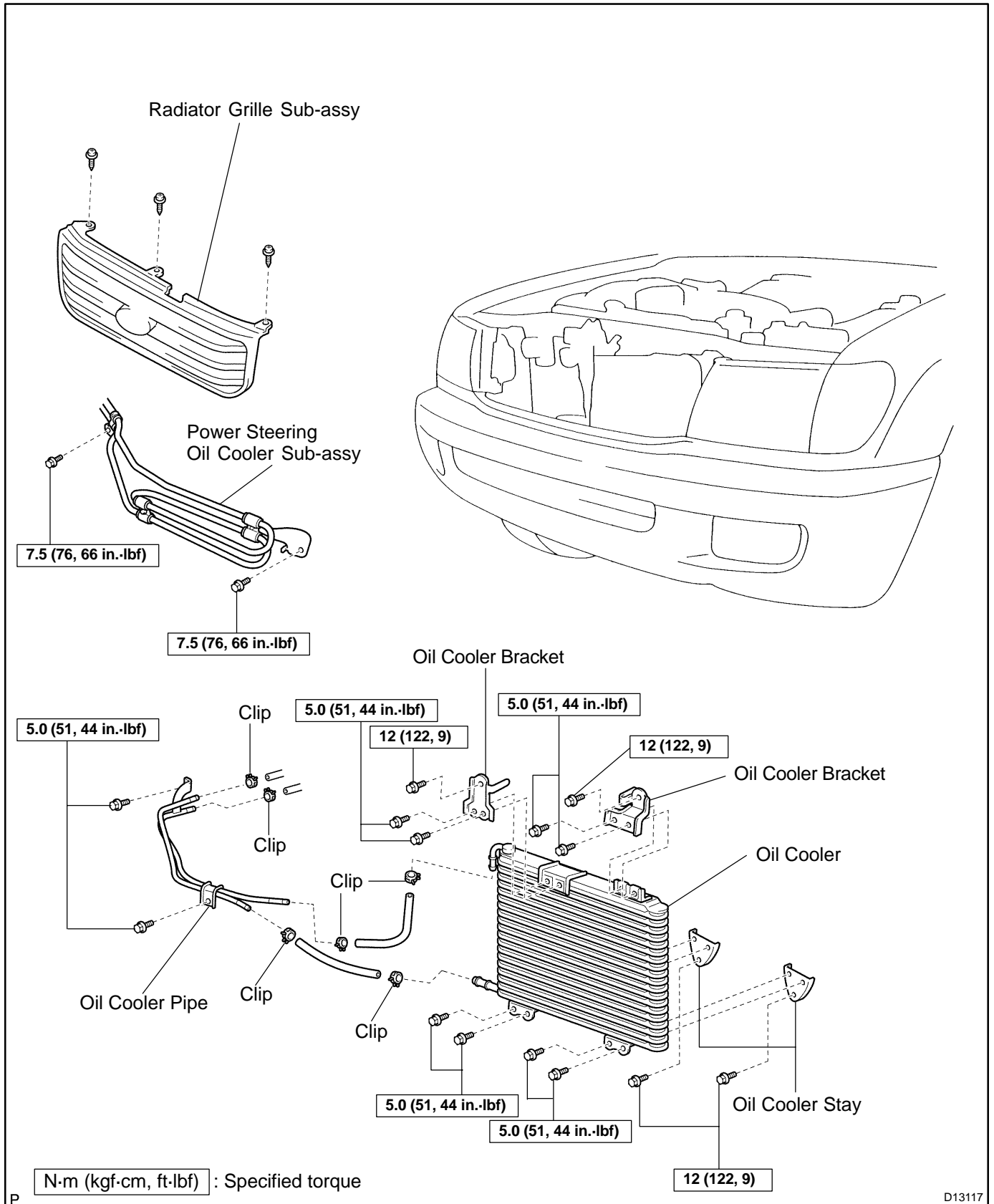
- (b) Using SST and a press, press in a new bearing.  
 SST 09820-00031



- (c) Using SST, push in the bearing cover (outside).  
SST 09285-76010

# AIR COOLED OIL COOLER COMPONENTS

AT071-05



D13117

## INSTALLATION

Installation is in the reverse order of removal (See page [AT-17](#) ).

HINT:

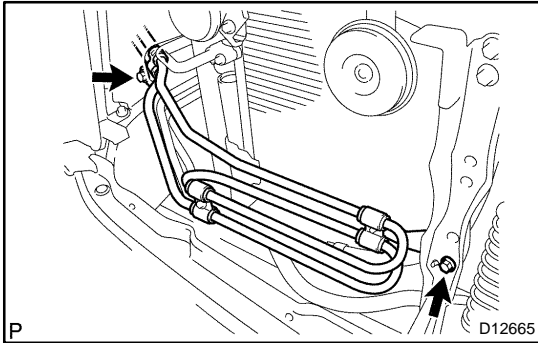
After installtion, check fluid level (See page [AT-3-1](#) ).



## REMOVAL

### 1. REMOVE RADIATOR GRILLE SUB-ASSY

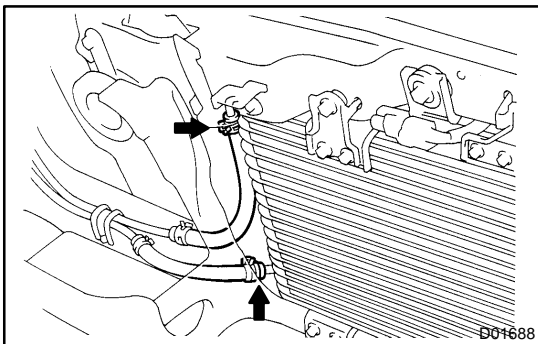
- (a) Remove the 3 screws.
- (b) Release the 2 clips and remove the radiator grille sub-assy.



### 2. SEPARATE POWER STEERING OIL COOLER SUB-ASSY

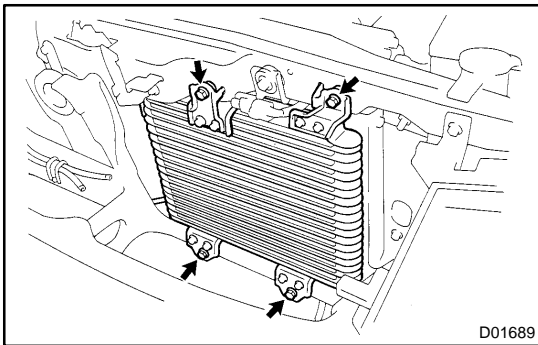
Remove the 2 bolts and separate the power steering oil cooler sub-assy .

**Torque: 7.5 N·m (76 kgf·cm, 66 in.-lbf)**

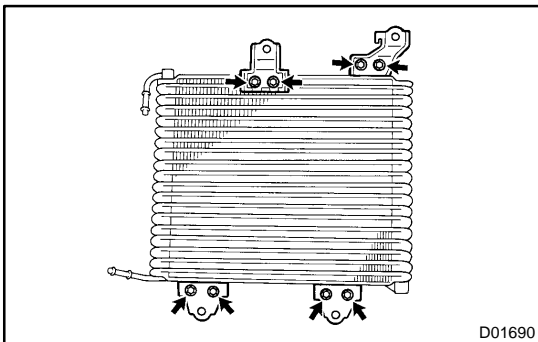


### 3. REMOVE OIL COOLER

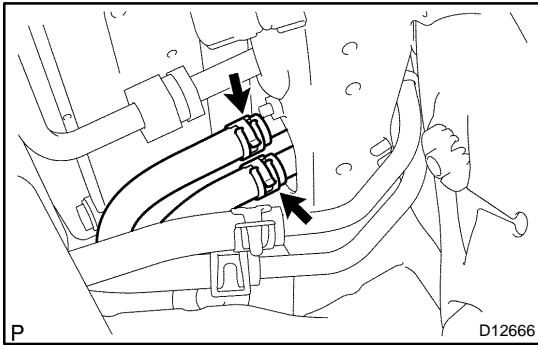
- (a) Loosen the 2 clips and disconnect the 2 hoses.



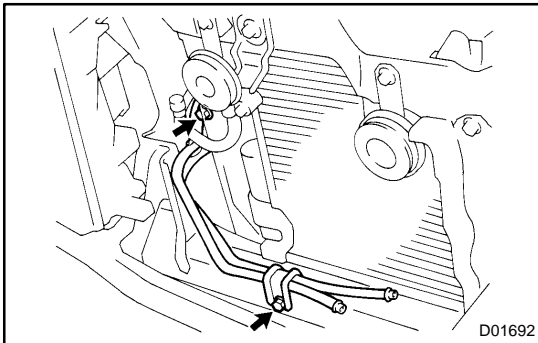
- (b) Remove the 4 bolts and oil cooler.  
**Torque: 12 N·m (117 kgf·cm, 8 ft·lbf)**



- (c) Remove the 8 bolts, the 2 oil cooler brackets and the 2 stays.  
**Torque: 4.9 N·m (50 kgf·cm, 43 in.-lbf)**

**4. REMOVE OIL COOLER PIPE BRACKET**

- (a) Loosen the 2 clips and disconnect the 2 hoses.

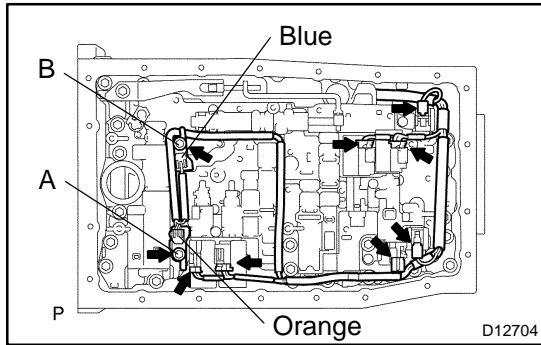


- (b) Remove the 2 bolts and the oil cooler pipe bracket.  
**Torque: 4.9 N·m (50 kgf·cm, 43 in.-lbf)**
- (c) Loosen the 2 clips and disconnect the 2 hoses.

# ATF TEMPERATURE SENSOR ON-VEHICLE REPAIR

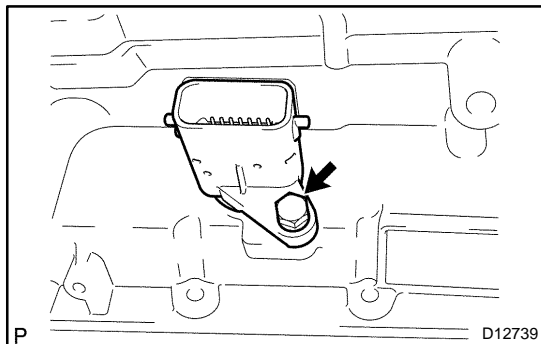
AT10Z-02

1. REMOVE ENGINE NO.2 UNDER COVER
2. DRAIN ATF
3. REMOVE OIL PAN (See page [AT-1 1](#))
4. REMOVE OIL STRAINER (See page [AT-1 1](#))



**5. REMOVE ATF TEMPERATURE SENSOR**

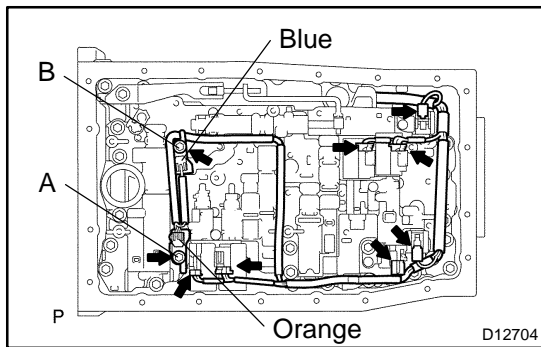
- (a) Disconnect the 7 solenoid valve connectors.
- (b) Remove the 2 bolts and disconnect the 2 ATF temperature sensors.



- (c) Disconnect the solenoid connector.
- (d) Remove the bolt and the transmission wire harness.

**6. INSTALL ATF TEMPERATURE SENSOR**

- (a) Install the transmission wire harness.
- (b) Install the bolt.  
**Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)**
- (c) Connect the solenoid connector.



- (d) Connect the 7 solenoid valve connectors.
- (e) Connect the 2 ATF temperature sensors with the 2 bolts.

**Torque:**

**A: 11 N·m (112 kgf-cm, 8 ft-lbf)**

**B: 10 N·m (100 kgf-cm, 7 ft-lbf)**

**Bolt length:**

**Bolt A: 36 mm (1.42 in.)**

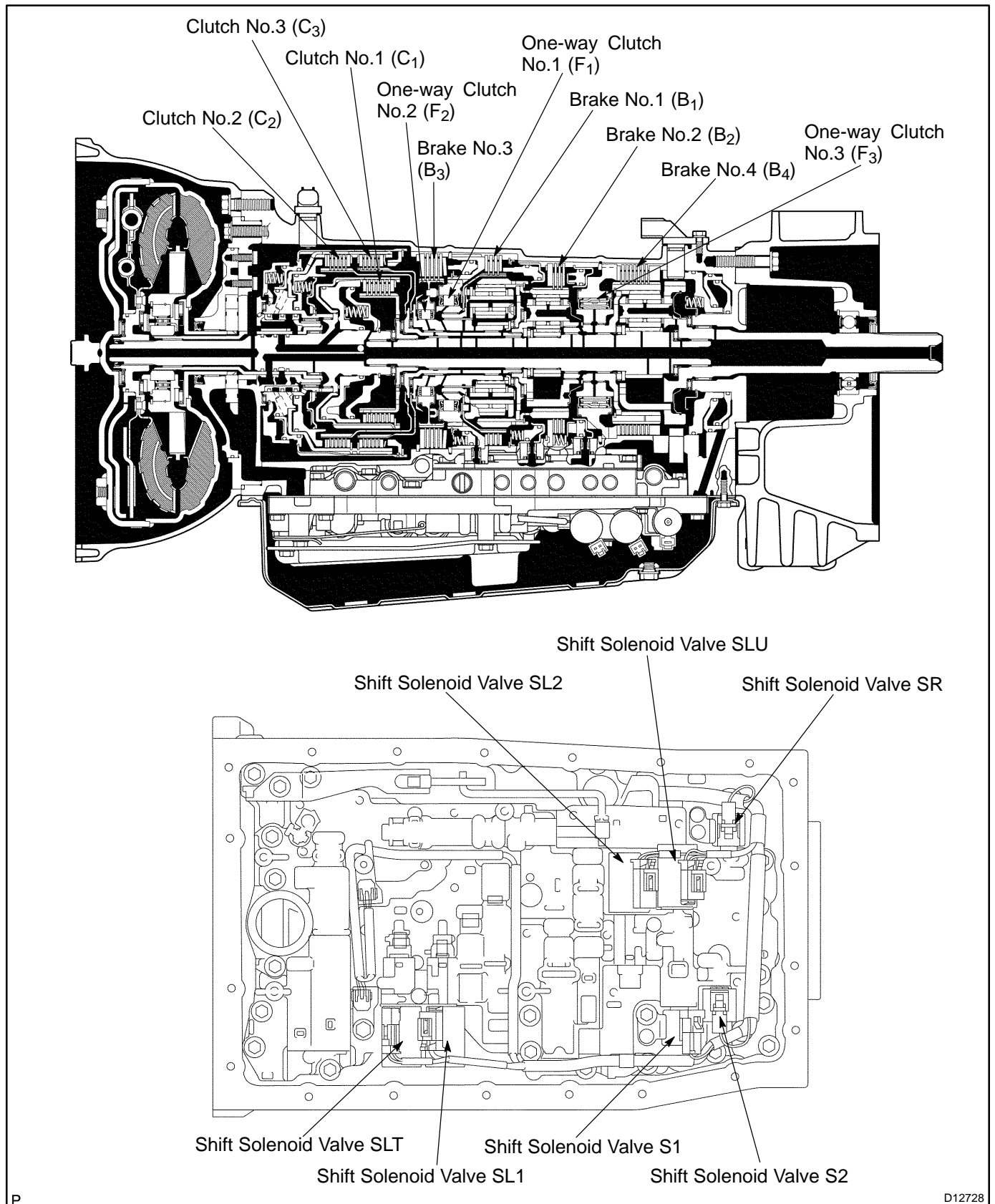
**Bolt B: 12 mm (0.47 in.)**

**Sensor wire harness:**

Wire harness	Color
for linear control	Orange
for oil temp warning lamp	Blue

7. **INSTALL OIL STRAINER (See page [AT-8](#))**
8. **INSTALL OIL PAN (See page [AT-8](#))**
9. **FILL ATF AND CHECK ATF LEVEL (See page [AT-3-1](#))**
10. **INSTALL ENGINE NO.2 UNDER COVER**

# OPERATION



P

D12728

AUTOMATIC TRANSMISSION - AUTOMATIC TRANSMISSION SYSTEM

Shift Lever Position	Gear Position	S1	S2	SR	SL1	SL2	SLU	C1	C2	C3	B1	B2	B3	B4	F1	F2	F3
P	Park	○	x	x	x	○	x	x	x	x	x	x	x	x	x	x	x
R	Reverse	○	x	x	x	○	x	x	x	○	○	x	x	○	○	x	x
N	Neutral	○	x	x	x	○	x	x	x	x	x	x	x	x	x	x	x
D	1st	○	x	x	x	○	x	○	x	x	x	x	x	x	x	x	○
	2nd	○	○	x	x	○	x	○	x	x	x	x	○	x	○	○	x
	3rd	x	○	x	x	○	x	○	x	○	x	x	○	x	○	x	x
	4th	x	x	x	x	○	○	○	○	○	x	x	○	x	x	x	x
	5th	x	x	○	○	x	○	x	○	○	○	x	○	x	x	x	x
4	1st	○	x	x	x	○	x	○	x	x	x	x	x	x	x	x	○
	2nd	○	○	x	x	○	x	○	x	x	x	x	○	x	○	○	x
	3rd	x	○	x	x	○	x	○	x	○	x	x	○	x	○	x	x
	4th	x	x	x	x	○	○	○	○	○	x	x	○	x	x	x	x
3	1st	○	x	x	x	○	x	○	x	x	x	x	x	x	x	x	○
	2nd	○	○	x	x	○	x	○	x	x	x	x	○	x	○	○	x
	3rd	x	○	x	x	x	x	○	x	○	○	x	○	x	○	x	x
2	1st	○	x	x	x	○	x	○	x	x	x	x	x	x	x	x	○
	2nd	○	○	○	x	x	x	○	x	x	x	○	○	x	○	○	x
L	1st	○	x	x	x	x	x	○	x	x	x	x	x	○	x	x	○

○ : Operating

F1, F2, F3 : Operate only when driving

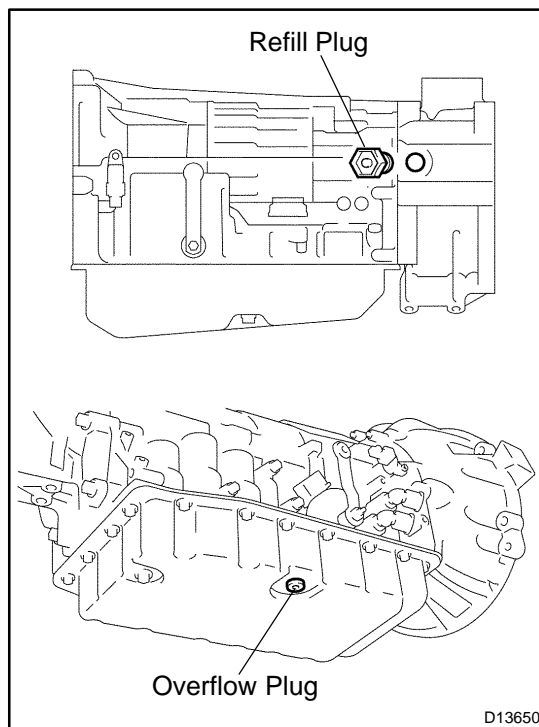
# AUTOMATIC TRANSMISSION FLUID

AT147-03

## OPERATION

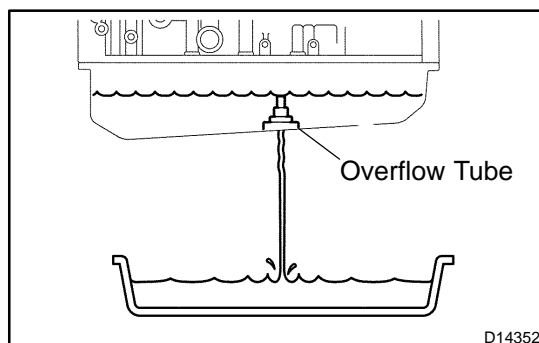
### 1. BEFORE TRANSMISSION FILL

- ▶ This transmission requires Toyota Genuine ATF WS.
- ▶ It is necessary to refill the transmission with the correct amount of fluid.
- ▶ The vehicle must remain level while adjusting the transmission fluid level.
- ▶ On vehicles equipped with active suspension, turn the suspension control switch OFF if it is necessary to jack up the vehicle with the engine running.



### 2. TRANSMISSION PAN FILL

- (a) Remove the refill plug and overflow plug.



- (b) Fill the transmission through the refill hole until fluid begins to trickle out of the overflow tube.

- (c) Reinstall the overflow plug.

**3. TRANSMISSION FILL**

- (a) Fill the transmission with the correct amount of fluid as listed in the table below.
- (b) Reinstall the refill plug to avoid fluid splash.

Repair	Fill Amount
Transmission pan and drain plug removal	1.3 liters (1.37 US qts, 1.14 Imp. qts)
Transmission valve body removal	3.9 liters (4.12 US qts, 3.43 Imp. qts)
Torque converter removal	5.3 liters (5.60 US qts, 4.66 Imp. qts)
Entire transmission assembly	5.3 liters (5.60 US qts, 4.66 Imp. qts)

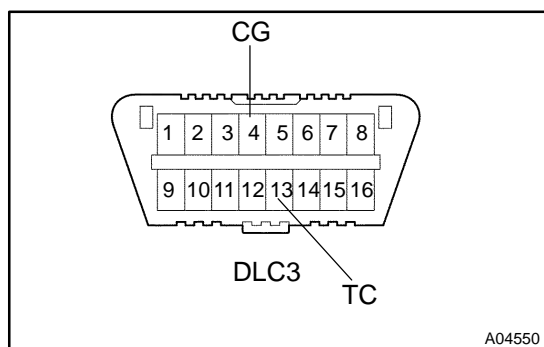
**HINT:**

If you cannot add the listed amount of fluid, do the following:

- (1) Install the refill plug.
- (2) Allow the engine to idle with air conditioning OFF.
- (3) Move the shift lever through entire gear range to circulate fluid.
- (4) Wait for 30 seconds with the engine idling.
- (5) Stop the engine.
- (6) Remove the refill plug and add fluid.
- (7) Reinstall the refill plug.

**4. FLUID CIRCULATION**

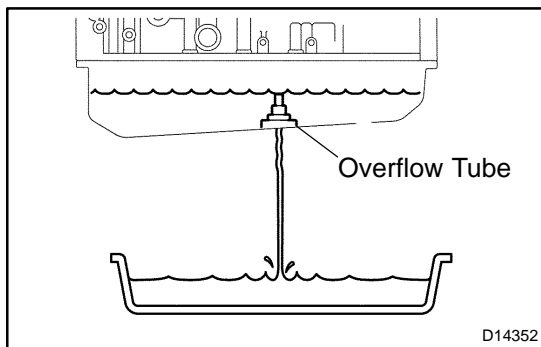
- (a) Allow the engine to idle with the air conditioning OFF.
- (b) Move the shift lever through entire gear range to circulate fluid.

**5. FLUID TEMPERATURE CHECK****NOTICE:**

The fluid temperature should be less than 30°C (86°F) before beginning the fluid temperature check.

- (a) With hand-held tester
  - (1) Connect the hand-held tester to the DLC3.
  - (2) Select the tester menus: OBD/MOBD, ENGINE, DATA LIST and A/T.
  - (3) Check A/T OIL TEMP.
  - (4) Allow the engine to idle until the fluid temperature reaches 46°C (115°F).

- (b) Without hand-held tester (Using A/T OIL TEMP indicator)
- (1) Connect terminals between CG (4) and TC (13) of the DLC3 using SST (09843-18040).
  - (2) Move the shift lever back and forth between N and D at 1.5 seconds interval for six seconds.
  - (3) The D shift indicator on the combination meter comes on for two seconds. This indicates that the fluid temperature check mode has been started.
  - (4) The D shift indicator comes on again when the fluid temperature reaches 46°C (115°F) and blinks when it exceeds 56°C (130°F).
  - (5) Allow the engine to idle until the fluid temperature reaches 46°C (115°F).



## 6. FLUID LEVEL CHECK

### NOTICE:

The fluid temperature must be between 46°C (115°F) and 56°C (130°F) to check the fluid level.

- (a) Remove the overflow plug with the engine idling.
- (b) Check that the fluid comes out of the overflow tube.
  - ▶ If fluid does not come out, proceed to step 7.
  - ▶ If fluid comes out, wait until the overflow slows to a trickle and proceed to step 8.

## 7. TRANSMISSION REFILL

- (a) Install the overflow plug.
- (b) Stop the engine.
- (c) Remove the refill plug.
- (d) Add 0.4 liters (0.42 US qts, 0.35 Imp. qts) of fluid.
- (e) Allow the engine to idle and wait for 10 seconds.
- (f) Proceed to step 6.

## 8. COMPLETE

- (a) Install the overflow plug with a new gasket.
- (b) Stop the engine.
- (c) Install the refill plug with a new gasket.

### Torque:

**20 N·m (205 kgf·cm, 15 ft·lbf) for overflow plug**  
**39 N·m (400 kgf·cm, 29 ft·lbf) for refill plug**



# AUTOMATIC TRANSMISSION SYSTEM

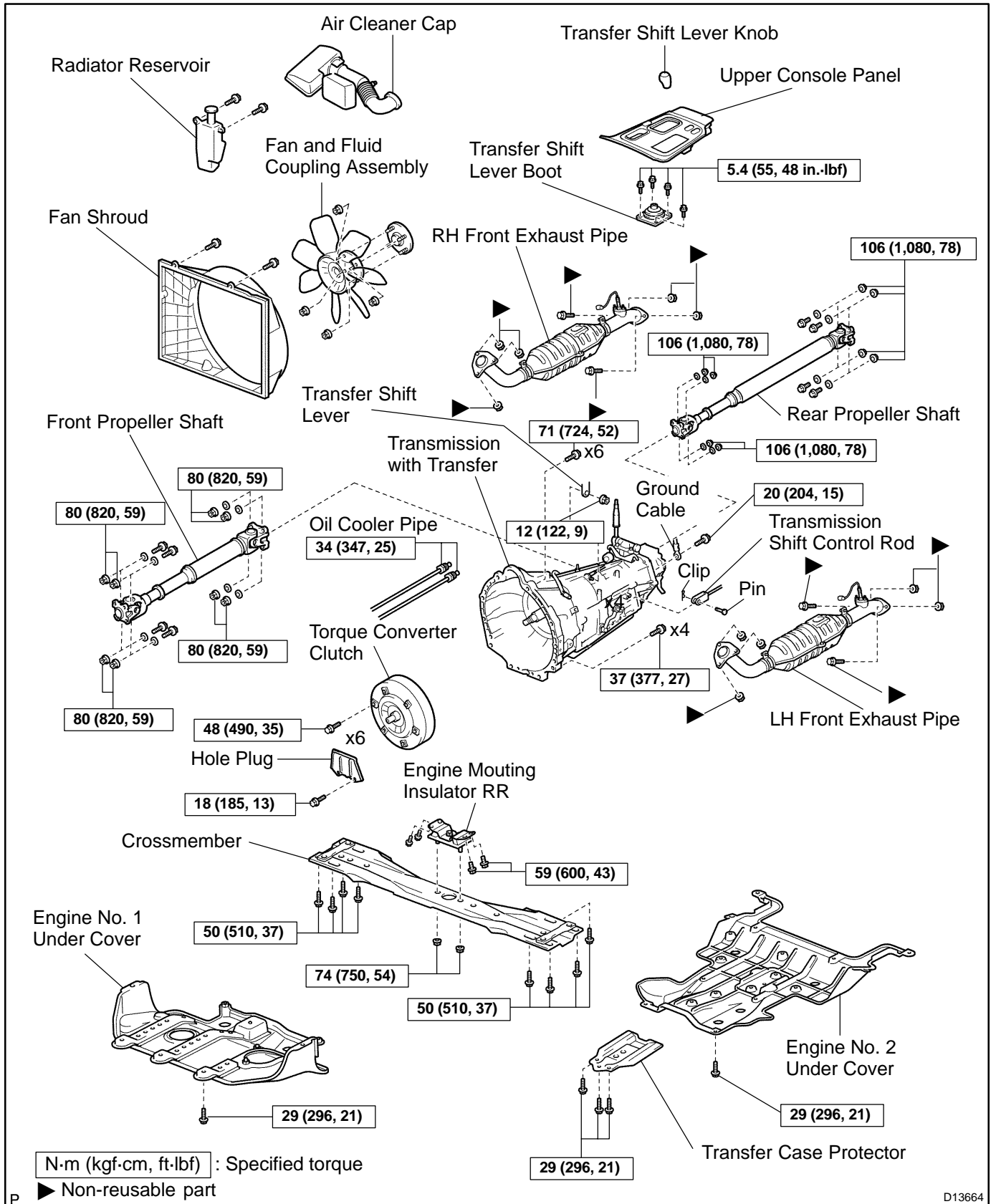
## PRECAUTION

AT07L-02

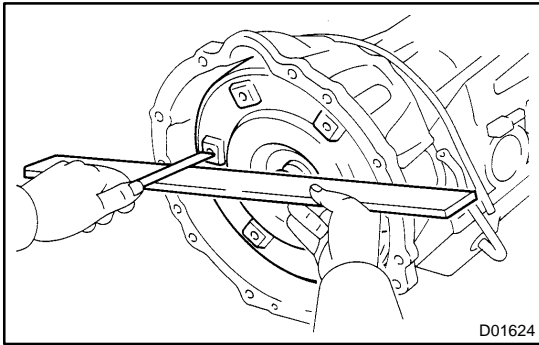
If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.

# AUTOMATIC TRANSMISSION UNIT COMPONENTS

AT080-04



D13664



## INSTALLATION

### 1. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

Using calipers and a straight edge, measure the distance from the installed surface of the transmission housing to the installed surface of the torque converter clutch.

**Correct distance: More than 17.1 mm (0.673 in.)**

### 2. TRANSMISSION INSTALLATION

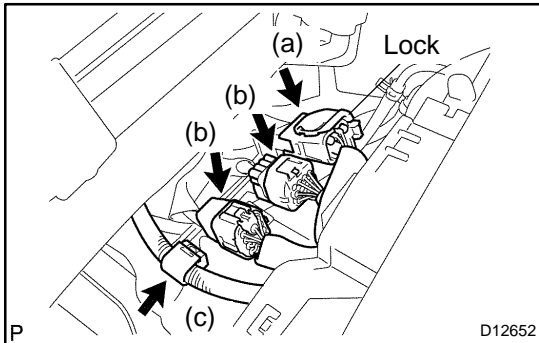
Installation is in the reverse order of removal (See page [AT-33](#) ).

HINT:

- ▶ Transmission control rod and the park/neutral position switch (See page [DI-361](#) )
- ▶ ATF level (See page [AT-3-1](#) )
- ▶ Conduct the road test of the vehicle (See page [DI-361](#) )

## REMOVAL

1. REMOVE BATTERY
2. REMOVE AIR CLEANER CAP DRIVE BELT, FAN AND FLUID COUPLING ASSEMBLY, FAN SHROUD AND RADIATOR RESERVOIR  
(See page [CO-17](#) )

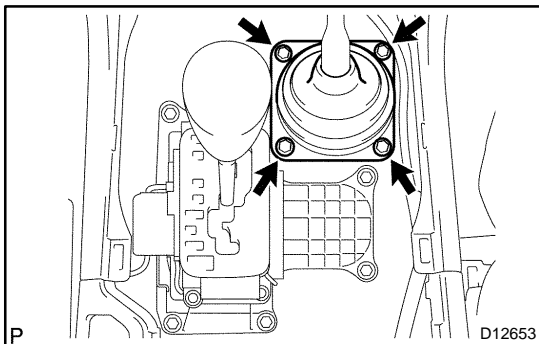


### 3. DISCONNECT CONNECTORS

- (a) Release the lock and disconnect the transmission wire connector.
- (b) Disconnect the 2 transmission wire connectors.
- (c) Separate the connector clamp.

### 4. REMOVE TRANSFER SHIFT LEVER BOOT

- (a) Remove the transfer shift lever knob.
- (b) Remove upper console panel (See page [BO-84](#) ).



- (c) Remove the 4 bolts and the transfer shift lever boot.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

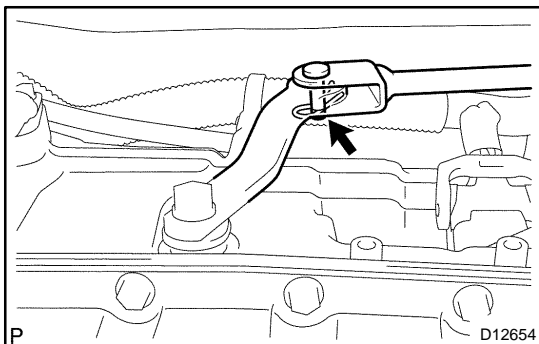
### 5. REMOVE ENGINE NO. 1 AND NO. 2 UNDER COVERS

### 6. REMOVE LH AND RH FRONT EXHAUST PIPES

(See page [EM-115](#) )

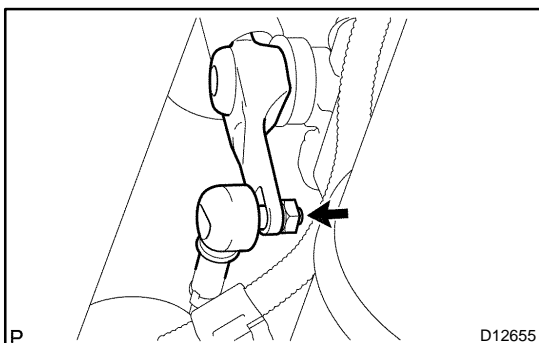
### 7. REMOVE FRONT AND REAR PROPELLER SHAFTS

(See page [PR-4](#) )



### 8. SEPARATE TRANSMISSION SHIFT CONTROL ROD

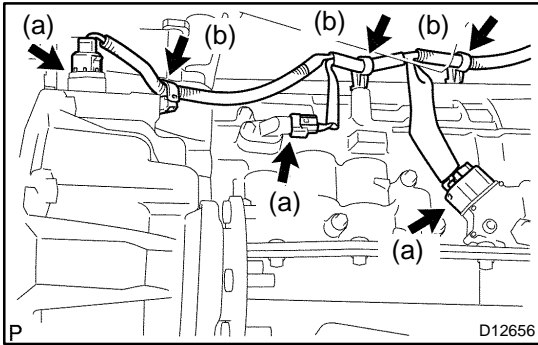
Remove the clip and pin and separate the shift control rod.



### 9. SEPARATE TRANSFER SHIFT LEVER

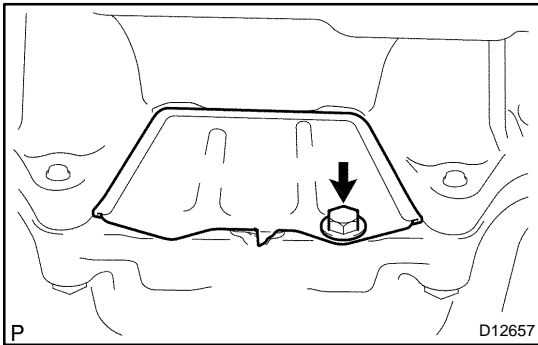
Remove the nut and separate the transfer shift lever rod assembly.

**Torque: 12 N·m (122 kgf·cm, 9 ft-lbf)**



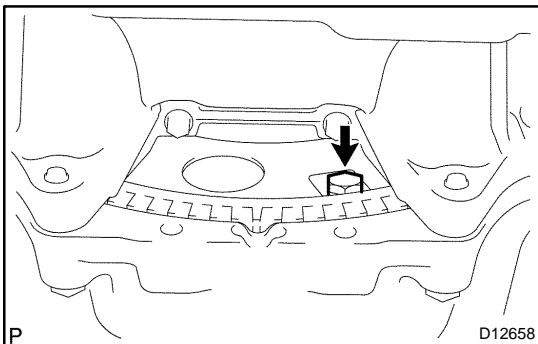
**10. SEPARATE WIRE HARNESS**

- (a) Disconnect 3 connectors.
- (b) Remove the 3 clamps from the transmission unit and separate the transmission wire.



**11. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLT**

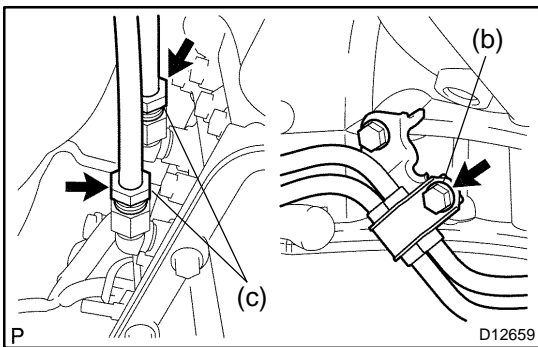
- (a) Remove the bolt and the hole plug.  
**Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)**



- (b) Turn the crankshaft to gain access to each bolt.
- (c) Hold the crankshaft pulley nut with a wrench, and remove the 6 bolts.  
**Torque: 48 N·m (490 kgf-cm, 35 ft-lbf)**

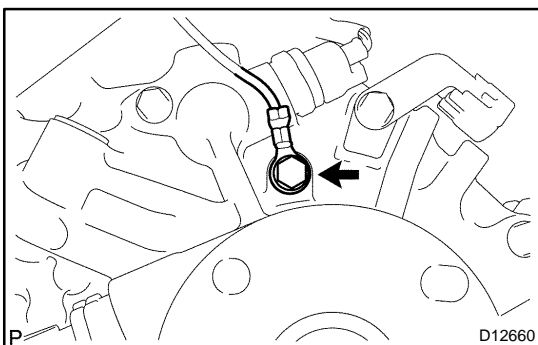
**HINT:**

At the time of installation, first install the green colored bolt. And then install the other 5 bolts.



**12. DISCONNECT OIL COOLER PIPES**

- (a) Loosen the 2 union nuts.
- (b) Remove the bolt and the clamp.  
**Torque: 12 N·m (122 kgf-cm, 9 ft-lbf)**
- (c) Remove the 2 union nuts and disconnect the 2 oil cooler pipes.  
**Torque: 34 N·m (347 kgf-cm, 25 ft-lbf)**

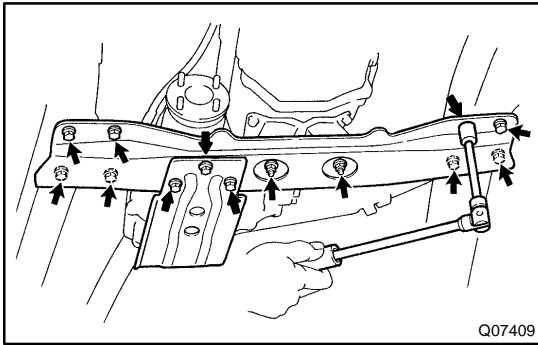


**13. SEPARATE GROUND CABLE**

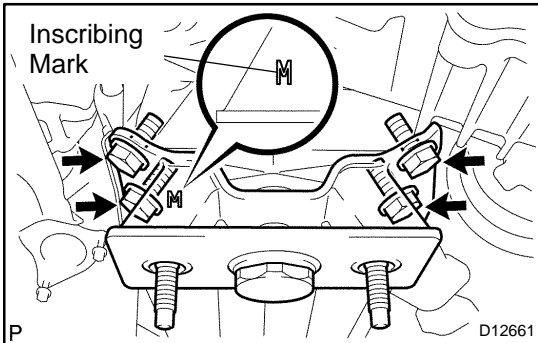
Remove the bolt and separate the ground cable.  
**Torque: 20 N·m (204 kgf-cm, 15 ft-lbf)**

**14. REMOVE CROSSMEMBER AND TRANSTER CASE PROTECTOR**

- (a) Support the transmission with a jack.



- (b) Remove the 3 bolts and the transfer case protector.  
**Torque: 29 N-m (296 kgf-cm, 21 ft-lbf)**
- (c) Remove the 8 bolts, the 2 nuts and the crossmember.  
**Torque:**  
**Bolt: 50 N-m (510 kgf-cm, 37 ft-lbf)**  
**Nut: 74 N-m (750 kgf-cm, 54 ft-lbf)**

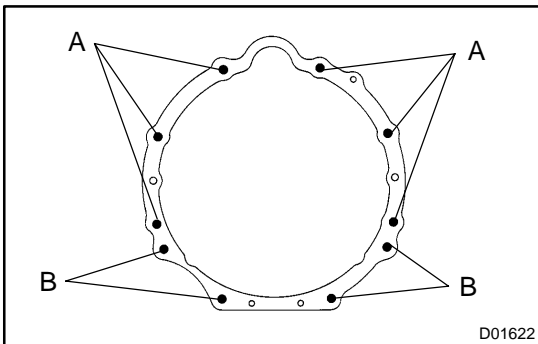


- 15. REMOVE ENGINE MOUNTING INSULATOR RR**  
Remove the 4 bolts and the engine mounting insulator RR.  
**Torque: 59 N-m (600 kgf-cm, 43 ft-lbf)**

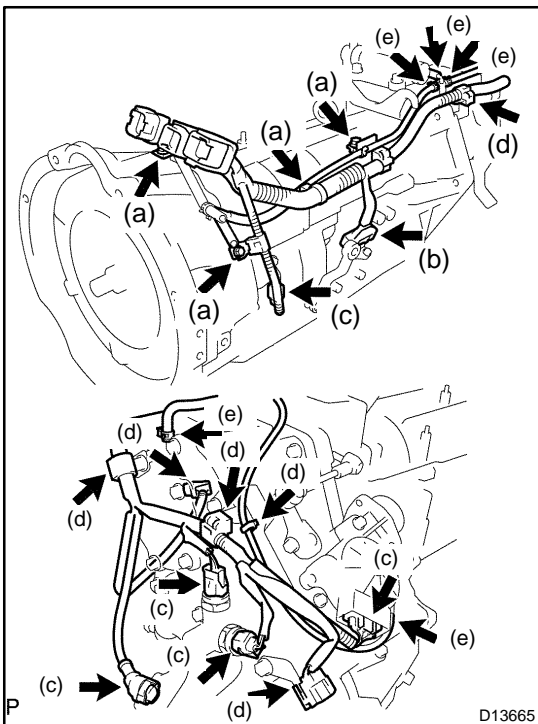
**HINT:**  
At the time of installation, install the insulator rear with the inscribing mark facing backward.

**16. REMOVE TRANSMISSION**

- (a) Lower the rear end of the transmission unit.
- (b) Remove the transmission wire clamp bolt.



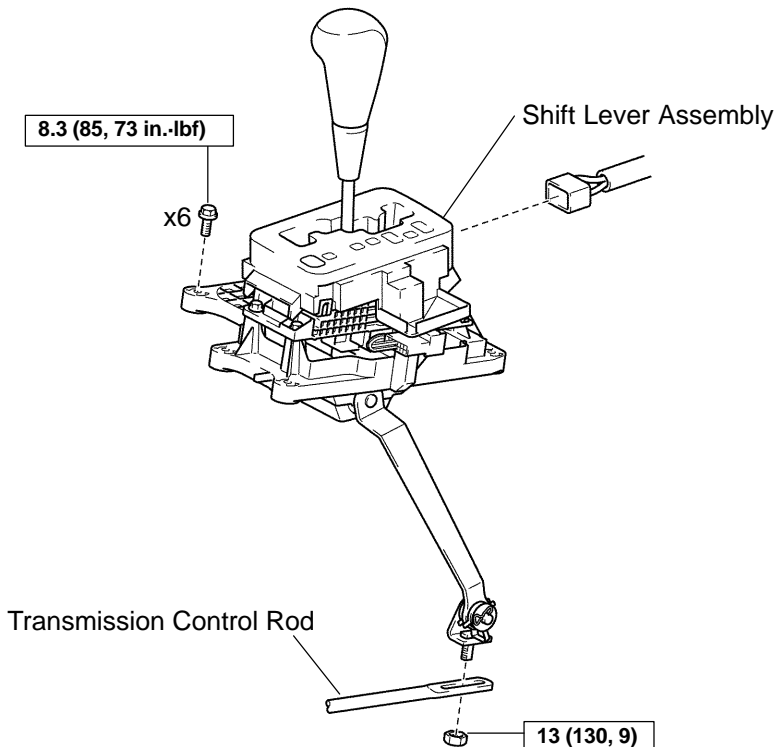
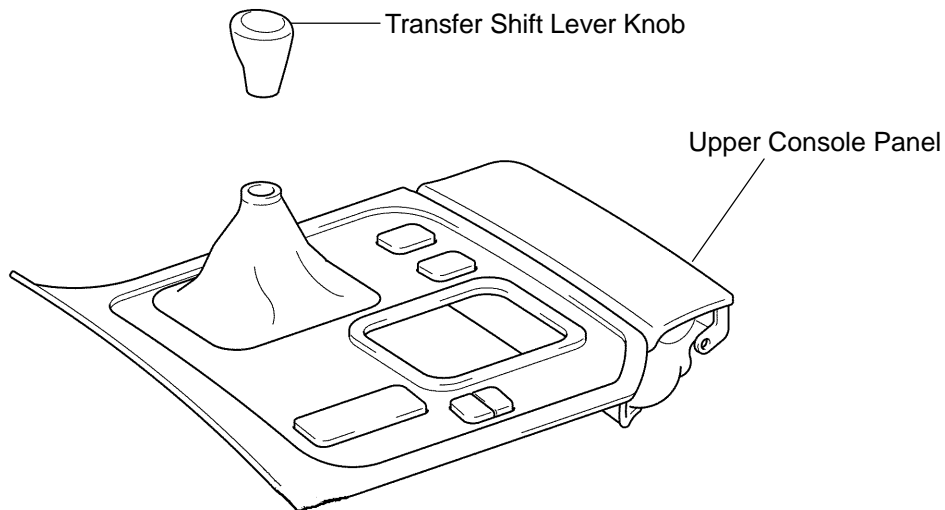
- (c) Remove the 10 bolts and the transmission unit.  
**Torque:**  
**Bolt A: 71 N-m (724 kgf-cm, 52 ft-lbf)**  
**Bolt B: 37 N-m (377 kgf-cm, 27 ft-lbf)**



- 17. REMOVE WIRE HARNESS AND HOSE**
- (a) Remove the 4 bolts.  
**Torque: 8.0 N-m (82 kgf-cm, 71 in.-lbf)**
  - (b) Release the lock and disconnect the connector.
  - (c) Disconnect the 5 connectors.
  - (d) Separate the 6 connector clamps.
  - (e) Disconnect the 5 hoses and remove the wire harness and the hose.

# FLOOR SHIFT ASSEMBLY COMPONENTS

AT07S-04

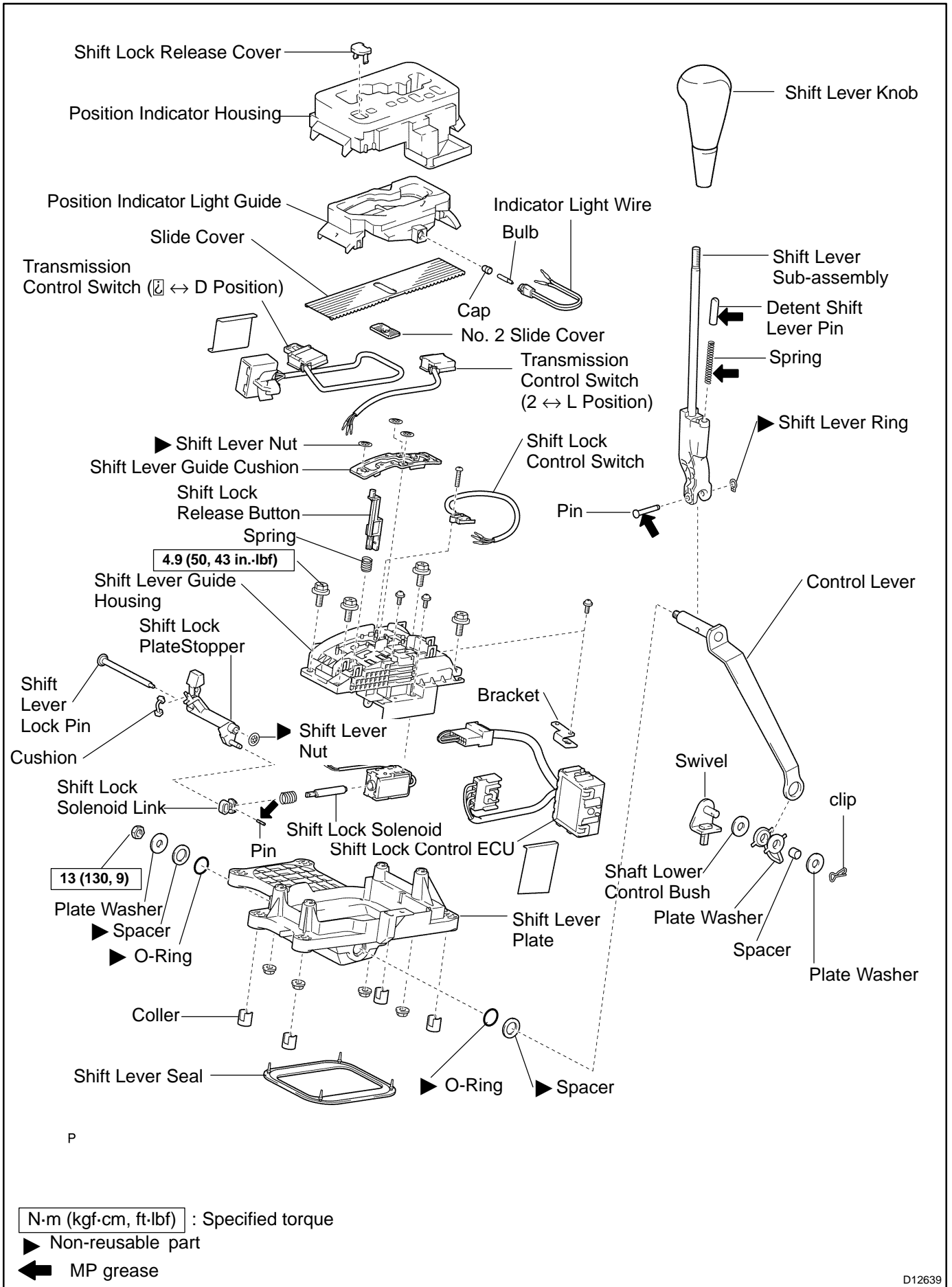


N·m (kgf·cm, ft·lbf) : Specified torque

P

D12638

AUTOMATIC TRANSMISSION - FLOOR SHIFT ASSEMBLY

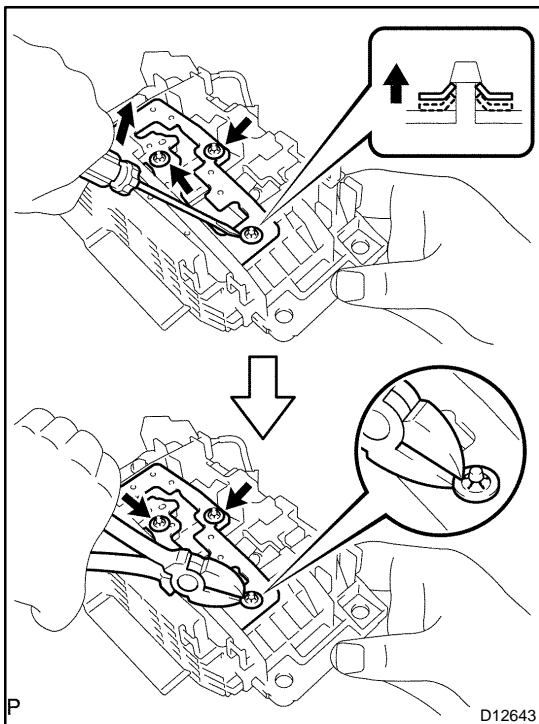
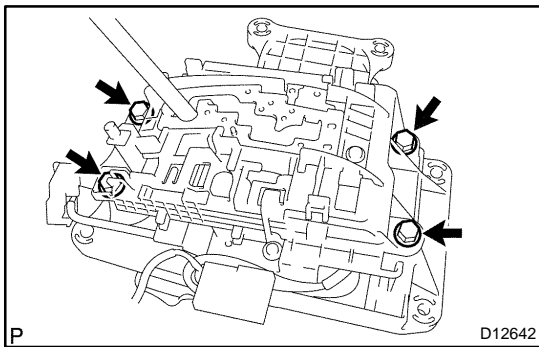


D12639



## DISASSEMBLY

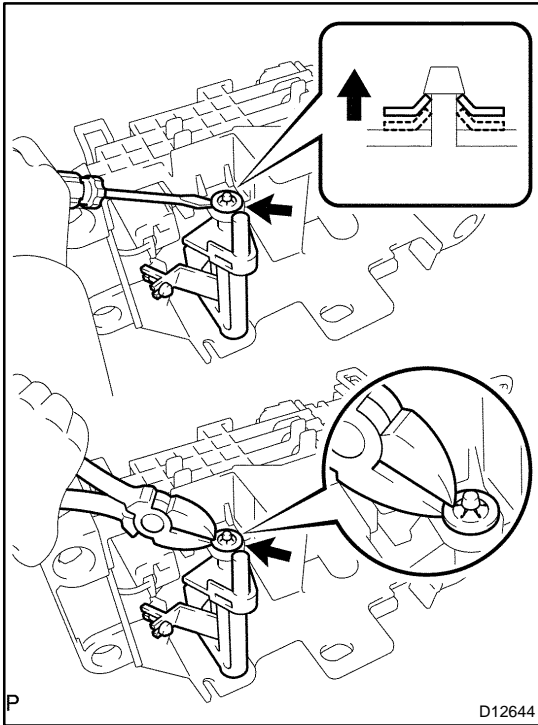
1. **REMOVE SHIFT LEVER KNOB**
2. **REMOVE POSITION INDICATOR HOUSING**
  - (a) Using a small screwdriver, remove the shift lock release cover from the position indicator housing.
  - (b) Remove the position indicator housing assembly.
3. **REMOVE POSITION INDICATOR LIGHT GUIDE**
  - (a) Disconnect the indicator lamp wire from the position indicator light guide.
  - (b) Remove the position indicator light guide.
4. **REMOVE SLIDE COVER AND NO. 2 SLIDE COVER**
5. **REMOVE SHIFT LEVER GUIDE HOUSING**
  - (a) Disconnect the shift lock control ECU connector from the shift lever plate.
  - (b) Disconnect the 2 transmission control switches and the shift lock control switch from the shift lever guide housing.
  - (c) Remove the 4 bolts, nuts and the shift lever guide housing assembly.



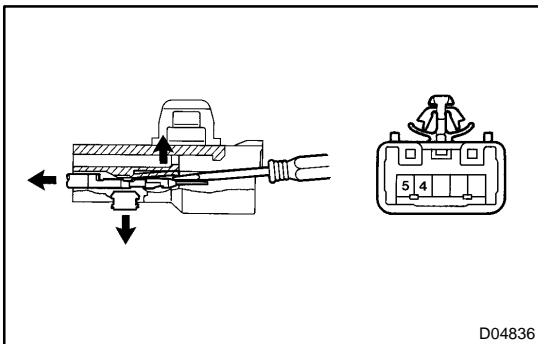
6. **DISASSEMBLE SHIFT LEVER GUIDE HOUSING**
  - (a) Using a screwdriver, pry up the 3 shift lever nuts.
  - (b) Using nippers, cut the 3 shift lever nuts off then.

HINT:  
Remove the shift lever lock pin of the shift lever nut in the same way.

  - (c) Remove the shift lever guide cushion.
  - (d) Remove the 3 screws, the shift lock control ECU and the shift lock solenoid.
  - (e) Remove the shift lock control ECU bracket from the shift lock control ECU.
  - (f) Disconnect the transmission control switch connector from the shift lever guide housing.
  - (g) Remove the shift lock release button and the spring.



- (h) Using a screwdriver, pry up the shift lever nut.
- (i) Using nipper, cut the shift lever nut off then.
- (j) Remove the shift lever lock pin, the shift lock plate stopper and the cushion.



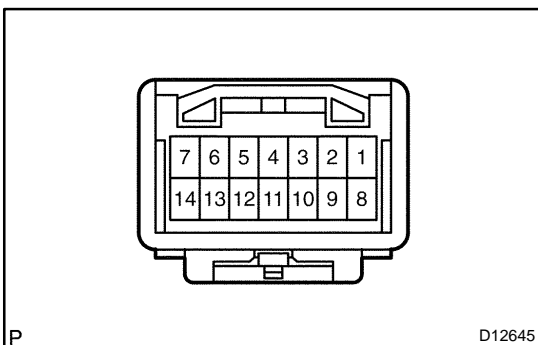
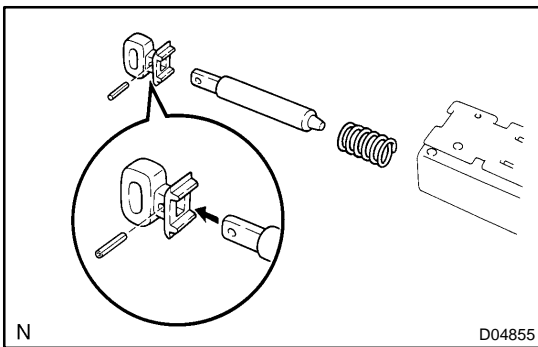
**7. DISCONNECT SHIFT LOCK CONTROL ECU, SHIFT LOCK SOLENOID, SHIFT LOCK CONTROL SWITCH AND TRANSMISSION CONTROL SWITCH**

- (a) Disengage the secondary locking device of the shift lock solenoid.
- (b) Release the locking lug of the terminal 4 and 5, and pull the terminals out from the rear.

**HINT:**

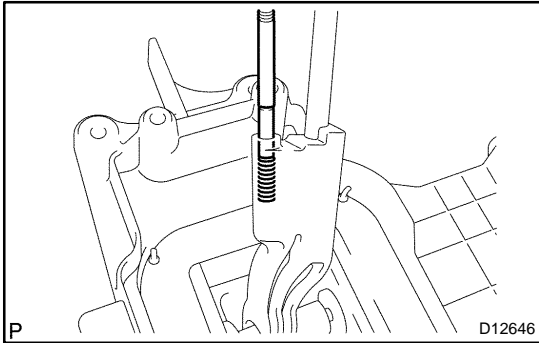
Remove the transmission control switch in the same way.

- (c) Remove the shift lock solenoid.
- (d) Using 2 mm dia. steel wire, remove the pin and the shift lock solenoid link from the shift lock solenoid plunger.



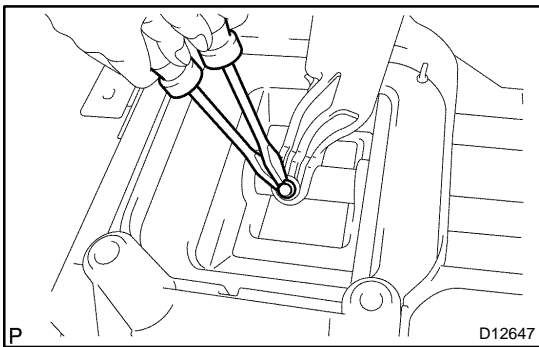
- (e) Disengage the secondary locking device of the shift lock control ECU.
- (f) Release the locking lag of the terminal 1, 2 and 8 pull the terminals out from the rear.
- (g) Remove the transmission control switch. (D↔ 4)
- (h) Release the locking lag of the terminal 5, 6 and 12 and pull the terminals out from the rear.
- (i) Remove the transmission control switch. (2↔L)
- (j) Release the locking lag of the terminal 7 and 14 and pull the terminals out from the rear.

- (k) Remove the indicator lamp wire.

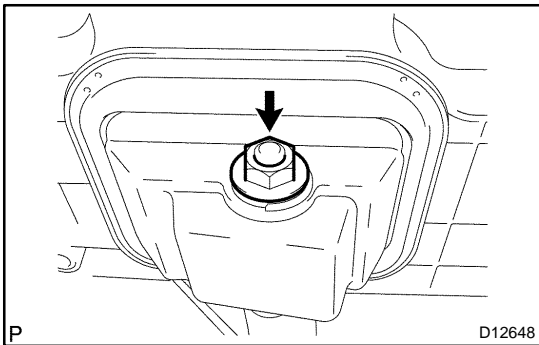


**8. REMOVE SHIFT LEVER SUB-ASSEMBLY**

- (a) Using a magnetic finger, remove the detent shift lever pin and the spring.

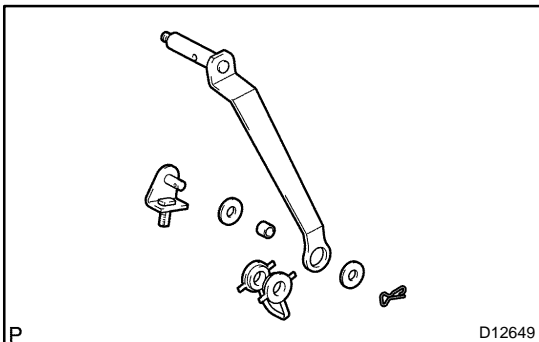


- (b) Using 2 screwdrivers, remove the shift lever ring.
- (c) Remove the pin and shift lever sub-assembly.

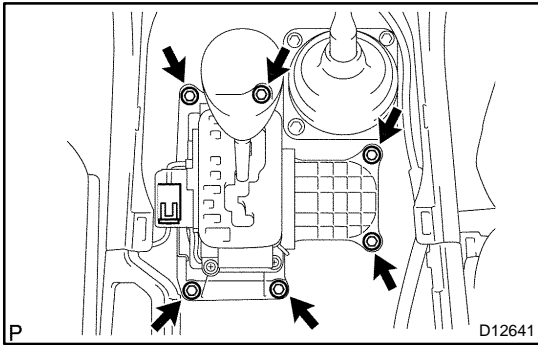


**9. DISASSEMBLE SHIFT LEVER PLATE**

- (a) Remove the nut, the control lever, the plate washer, the 2 spacers and the 2 O-rings.



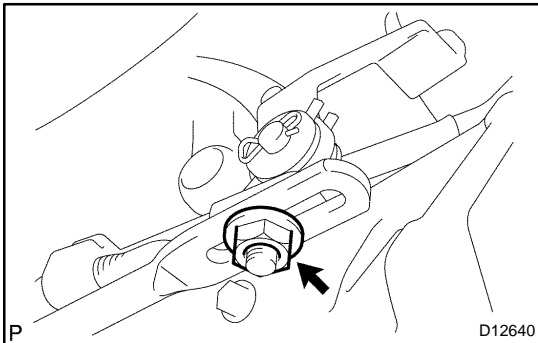
- (b) Using pliers, remove the clip.
- (c) Remove the swivel, the 2 plate washers, the shaft lower control bush and the spacer.
- (d) Remove the shift lever seal.
- (e) Remove the 4 collars.
- (f) Remove the 2 spring nuts.



## INSTALLATION

### 1. INSTALL FLOOR SHIFT LEVER ASSEMBLY

- (a) Install the floor shift lever assembly with the 6 bolts.  
**Torque: 8.3 N·m (85 kgf·cm, 73 in.-lbf)**
- (b) Connect the connector to the floor shift lever assembly.

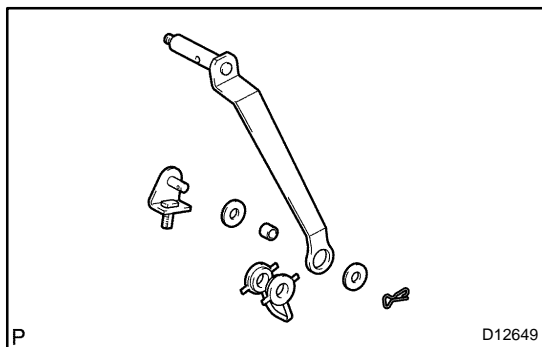


2. **INSTALL No.1 FLOOR SHIFT GEAR SHIFTING ROD**
  - (a) Shift into the N position.
  - (b) Connect the No.1 floor shift gear shifting rod and the connecting rod swivel with the nut.  
**Torque: 13 N·m (130 kgf·cm, 9 ft.-lbf)**
3. **INSTALL UPPER CONSOL PANNEL**  
(See Page [BO-84](#) )
4. **INSTALL TRANSFER SHIFT LEVER KNOB**

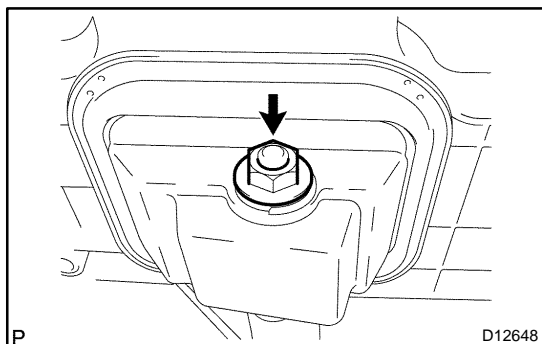
## REASSEMBLY

### 1. REASSEMBLE SHIFT LEVER PLATE

- (a) Install the 2 spring nuts.
- (b) Install the 4 collars.
- (c) Install the shift lever seal.



- (d) Install the shaft lower control bush, the spacer, the 2 plate washers and the swivel.
- (e) Using pliers, install the clip.

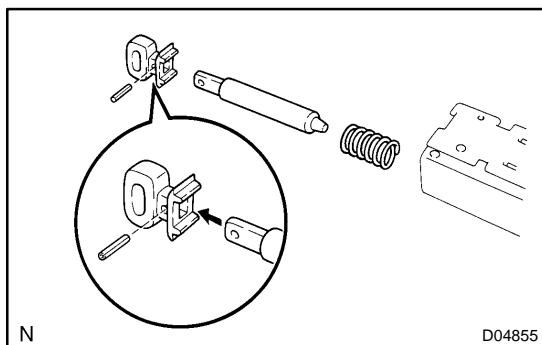


- (f) Apply MP grease to 2 new O-rings.
- (g) Install the 2 O-rings, 2 new spacers, the plate washer, the control lever and the nut.

**Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)**

### 2. INSTALL SHIFT LEVER SUB-ASSEMBLY

- (a) Apply MP grease to the pin.
- (b) Install the shift lever sub-assembly and pin.
- (c) Install the shift lever ring.
- (d) Apply MP grease to the detent shift lever pin and the spring.
- (e) Install the detent shift lever pin and spring.



### 3. REASSEMBLE SHIFT LOCK SOLENOID

- (a) Apply MP grease to the shift lock solenoid link.
- (b) Install the shift lock solenoid link and the pin to the shift lock solenoid plunger.
- (c) Install the shift lock solenoid link with shift lock solenoid plunger and the spring to the shift lock solenoid.

**4. CONNECT SHIFT LOCK CONTROL ECU, SHIFT LOCK SOLENOID, SHIFT LOCK CONTROL SWITCH, INDICATOR LAMP WIRE AND 2 TRANSMISSION CONTROL SWITCH**

**5. REASSEMBLE SHIFT LEVER GUIDE HOUSING**

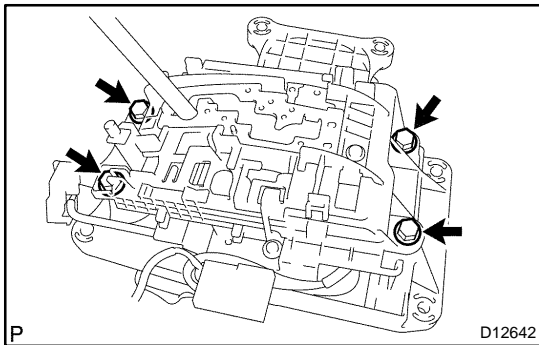
- (a) Apply MP grease to the shift lever lock pin.
- (b) Install the shift lever lock pin, the shift lock plate stopper and the cushion to the shift lever guide housing.
- (c) Install a new shift lever nut to the shift lever lock pin by knocking them lightly via the 10 mm seated nut.

**HINT:**

Install the shift lever guide cushion of the shift lever nut in the same way.

- (d) Apply MP grease to the shift lock release button.
- (e) Install the spring and the shift lock release button.
- (f) Connect the transmission control switch connector to the shift lever guide housing.
- (g) Install the shift lock control ECU bracket to the shift lock control ECU.
- (h) Install the shift lock control ECU and the shift lock solenoid with the 3 screws to the shift lever guide housing.
- (i) Install the shift lever guide cushion with 3 new shift lever nuts.

**6. INSTALL SHIFT LEVER GUIDE HOUSING**



- (a) Install the shift lever guide housing assembly with the 4 bolts and nuts to the shift lever plate.  
**Torque: 4.9 N·m (50 kgf·cm, 43 in.-lbf)**
- (b) Install the 2 transmission control switches and the shift lock control switch to the shift lever guide housing.
- (c) Connect the shift lock control ECU connector to the shift lever plate.

**7. INSTALL SLIDE COVER AND NO. 2 SLIDE COVER**

**8. INSTALL POSITION INDICATOR LIGHT GUIDE**

- (a) Install the position indicator light guide.
- (b) Connect the indicator lamp wire to the position indicator light guide.

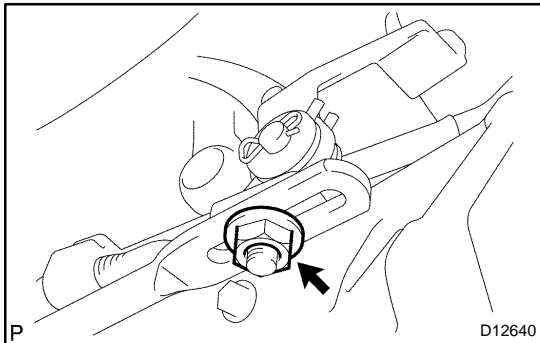
**9. INSTALL POSITION INDICATOR HOUSING**

- (a) Install the position indicator housing.
- (b) Install the shift lock release cover to the position indicator housing.

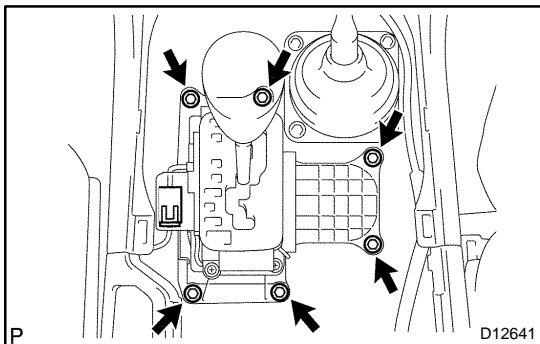
**10. INSTALL SHIFT LEVER KNOB**

## REMOVAL

1. REMOVE TRANSFER SHIFT LEVER KNOB
2. REMOVE UPPER CONSOLE PANEL  
(See page [BO-84](#))



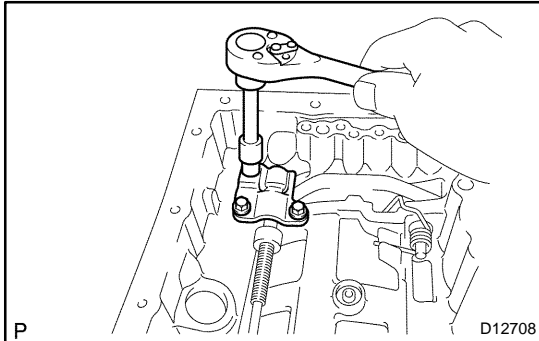
3. **SEPARATE NO. 1 FLOOR SHIFT GEAR SHIFTING ROD**
  - (a) Shift into the N position.
  - (b) Remove the nut and separate the No. 1 shift gear shifting rod from the connecting rod swivel.



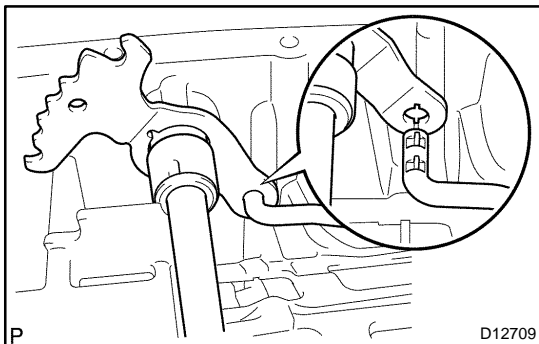
4. **REMOVE FLOOR SHIFT LEVER ASSEMBLY**
  - (a) Disconnect the connector.
  - (b) Remove the 6 bolts.  
**Torque: 8.3 N·m (85 kgf·cm, 73 in.-lbf)**
  - (c) Remove the floor shift lever assembly.

## PARKING LOCK PAWL ON-VEHICLE REPAIR

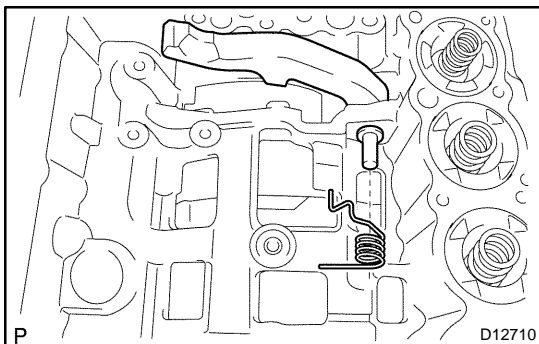
1. REMOVE VALVE BODY (See page [AT-8](#))



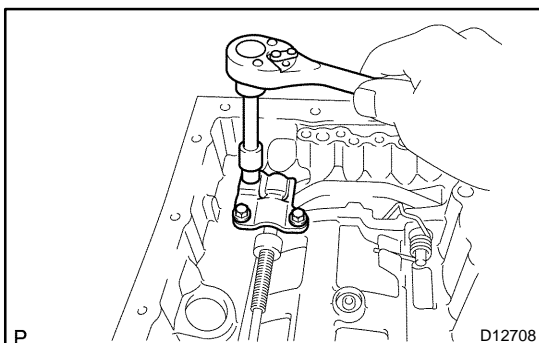
2. REMOVE PARKING LOCK PAWL BRACKET



3. REMOVE PARKING LOCK ROD



4. REMOVE SPRING FROM PARKING LOCK PAWL SHAFT
5. REMOVE PARKING LOCK PAWL AND SHAFT
6. INSTALL PARKING LOCK PAWL AND SHAFT
7. INSTALL SPRING TO PARKING LOCK PAWL SHAFT



8. INSTALL PARKING LOCK PAWL BRACKET

HINT:

- ▶ Push the lock rod fully forward.
- ▶ Check that the parking lock pawl operates smoothly.

**Torque: 7.4 N·m (75 kgf·cm, 65 in.-lbf)**

9. INSTALL VALVE BODY (See page [AT-8](#))

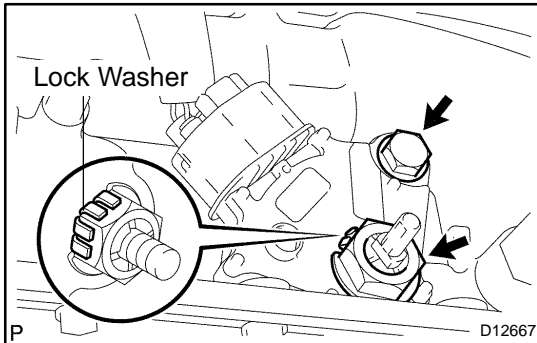


# PARK/NEUTRAL POSITION (PNP) SWITCH

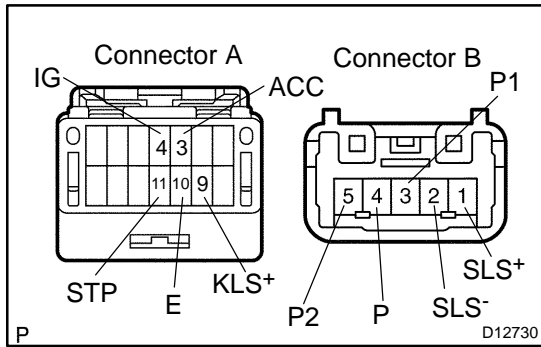
AT110-01

## ON-VEHICLE REPAIR

1. REMOVE ENGINE NO. 2 UNDER COVER
2. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR



3. REMOVE PARK/NEUTRAL POSITION SWITCH
  - (a) Pry off the lock washer and remove the nut.
  - (b) Remove the bolt and park/neutral position switch.
4. INSTALL PARK/NEUTRAL POSITION SWITCH
  - (a) Install the park/neutral position switch with the bolt.  
**Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)**
  - (b) Install a new lock washer and the nut.  
**Torque: 6.9 N·m (70 kgf·cm, 62 in·lbf)**
  - (c) Bent the claws on the lock washer to stake the nut.
  - (d) Adjust the park/neutral position switch  
(See page [DI-361](#) ).
5. CONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR
6. INSTALL ENGINE NO. 2 UNDER COVER



## INSPECTION

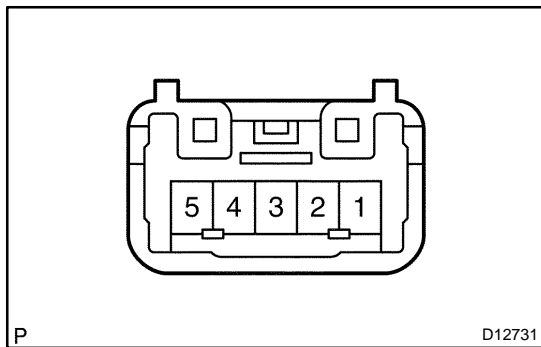
### 1. INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the ECU connector.

Terminal	Measuring Condition	Voltage (V)
<b>Connector A</b>		
3 - 10 (ACC - E)	Ignition switch ACC	10 - 14
4 - 10 (IG - E)	Ignition switch ON	10 - 14
10 - 11 (E - STP)	Depress brake pedal	10 - 14
9 - 10 (KLS+ - E)	(1) Ignition switch ACC and P position	0
	(2) Ignition switch ACC and except P position	7.5 - 10.5
	(3) (After approx. 1 second)	6 - 9
<b>Connector B</b>		
1 - 2 (SLS+ - SLS-)	(1) Ignition switch ON and P position	0
	(2) Depress brake pedal	8.5 - 13.5
	(3) Shift except P position under conditions above	0
3 - 4 (P1 - P)	(1) Ignition switch ON, P position and depress brake pedal	0
	(2) Shift except P position under condition above	9 - 13.5
4 - 5 (P - P2)	(1) Ignition switch ACC and P position	9 - 13.5
	(2) Shift except P position under condition above	0



### 2. INSPECT SHIFT LOCK SOLENOID

- (a) Disconnect the solenoid connector.
- (b) Using an ohmmeter, measure the resistance between terminal 1 and 2.

**Standard resistance: 21 - 27 Ω**

If the resistance value is not as specified, replace the solenoid.

- (c) Apply the battery positive voltage between terminals. Check that the operation noise can be heard from the solenoid.

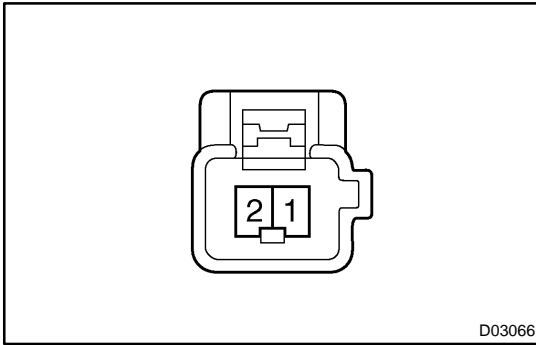
If the solenoid does not operate, replace the solenoid.

### 3. INSPECT SHIFT LOCK CONTROL SWITCH

Inspect that continuity exists between each terminal.

Shift position	Tester connection	Specified value
P position (Release button is not pushed)	3 - 4 (P - P1)	Continuity
P position (Release button is pushed)	3 - 4 (P - P1)	Continuity
	4 - 5 (P - P2)	
R, N, D, 2, L position	4 - 5 (P - P2)	Continuity

If continuity is not as specified, replace the switch.



#### 4. INSPECT KEY INTERLOCK SOLENOID

- (a) Disconnect the solenoid connector.
- (b) Using an ohmmeter, measure the resistance between terminal 1 and 2.

**Standard resistance: 12 - 17  $\Omega$**

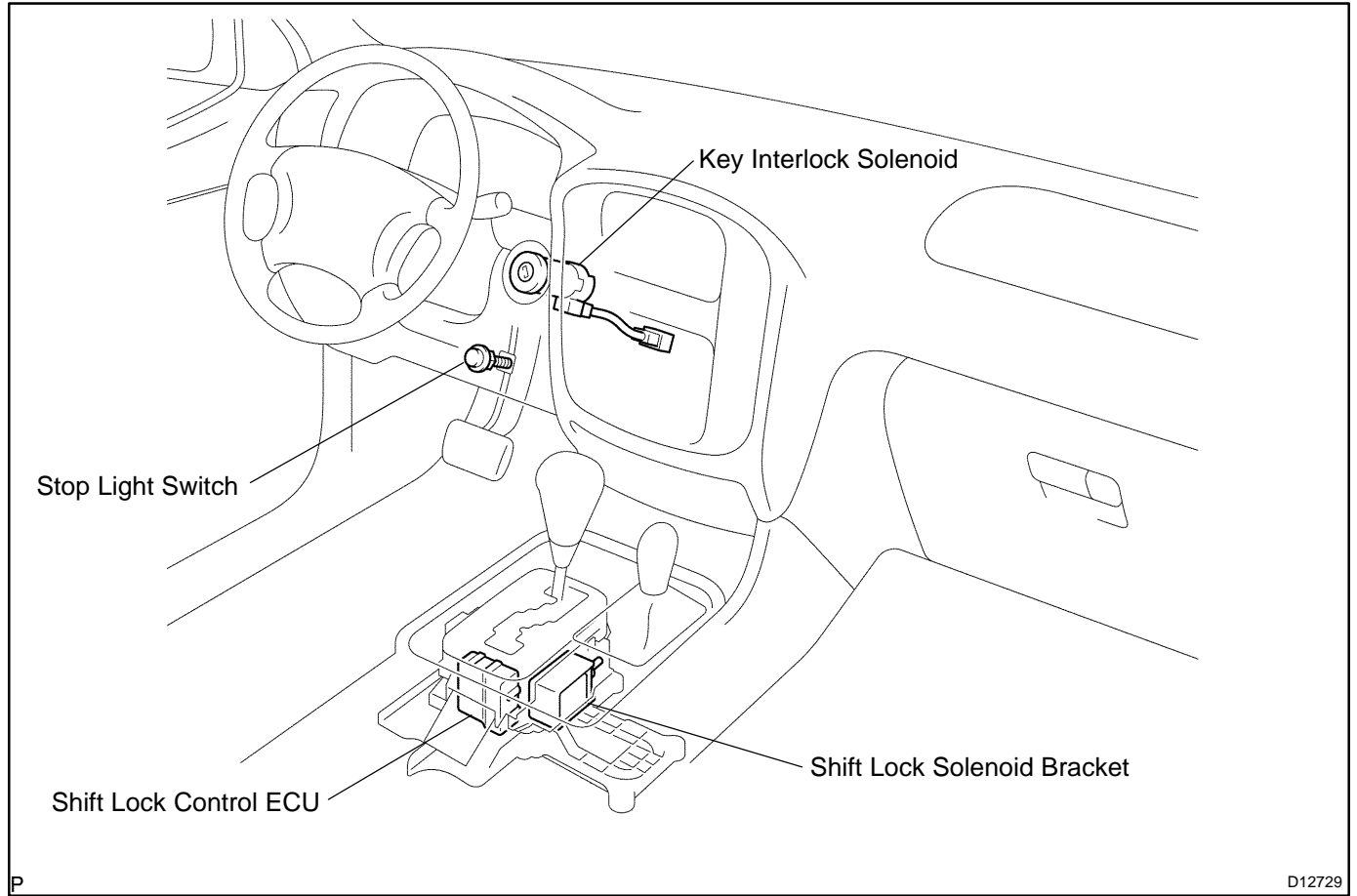
If resistance value is not as specified, replace the solenoid.

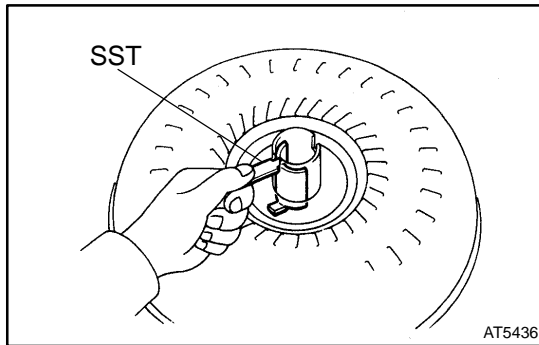
- (c) Apply the battery positive voltage between terminals 1 and 2. Check that an operation noise can be heard from the solenoid.

If the solenoid does not operate, replace the solenoid.

# SHIFT LOCK SYSTEM LOCATION

AT07Q-03



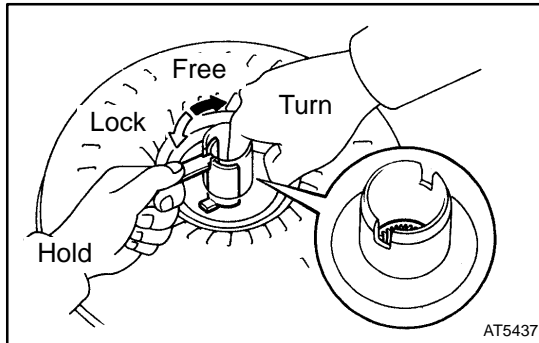


## TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

AT07X-03

### 1. INSPECT ONE-WAY CLUTCH

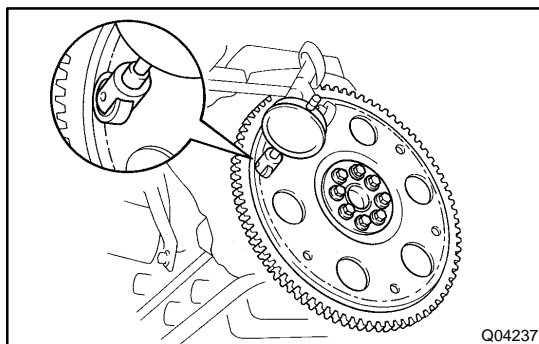
- (a) Install SST so that it fits in the notch of the converter hub and outer race of the one-way clutch.  
SST 09350-30020 (09351-32020)



- (b) Press on the serrations of stator with a finger and rotate it.
- (c) Check if it rotates smoothly when turned clockwise and locks up when turned counterclockwise.

If necessary, clean the converter clutch and retest the one-way clutch.

Replace the converter clutch if the clutch still fails in the test.



### 2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

Set up a dial indicator and measure the drive plate runout.

**Maximum runout: 0.20 mm (0.0079 in.)**

If runout is not within the specification or if the ring gear is damaged, replace the drive plate. If installing a new drive plate, note the orientation of the spacers and tighten the bolts.

**Torque:**

**1st: 49 N·m (500 kgf·cm, 36 ft·lbf)**

**2nd: Turn extra 90°**

### 3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

- (a) Temporarily mount the torque converter clutch to the drive plate.

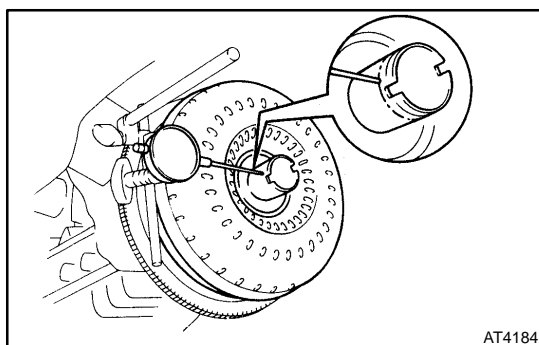
Set up a dial indicator and measure the torque converter clutch sleeve runout.

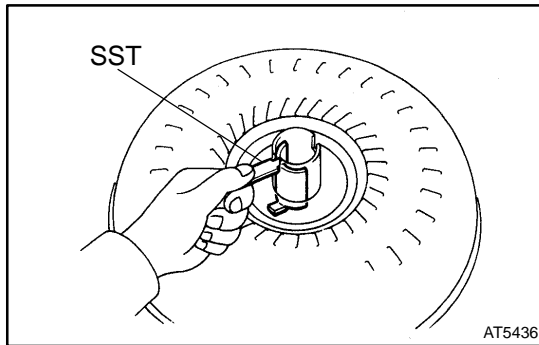
**Maximum runout: 0.30 mm (0.0118 in.)**

If runout is not within the specification, correct it by reorienting the installation of the torque converter clutch.

If excessive runout cannot be corrected, replace the torque converter clutch.

- (b) Remove the torque converter clutch.



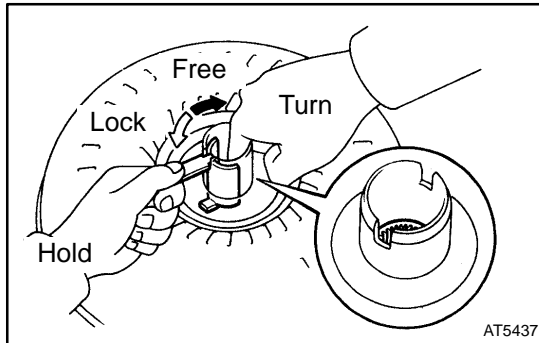


## TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

AT07X-03

### 1. INSPECT ONE-WAY CLUTCH

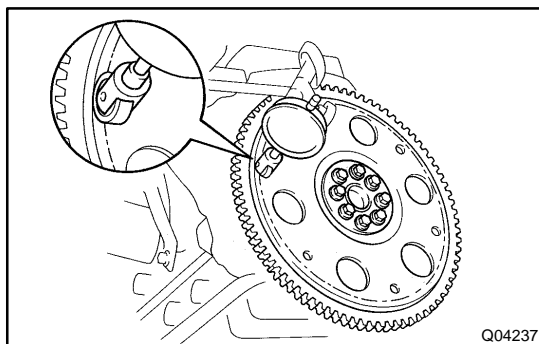
- (a) Install SST so that it fits in the notch of the converter hub and outer race of the one-way clutch.  
SST 09350-30020 (09351-32020)



- (b) Press on the serrations of stator with a finger and rotate it.
- (c) Check if it rotates smoothly when turned clockwise and locks up when turned counterclockwise.

If necessary, clean the converter clutch and retest the one-way clutch.

Replace the converter clutch if the clutch still fails in the test.



### 2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

Set up a dial indicator and measure the drive plate runout.

**Maximum runout: 0.20 mm (0.0079 in.)**

If runout is not within the specification or if the ring gear is damaged, replace the drive plate. If installing a new drive plate, note the orientation of the spacers and tighten the bolts.

**Torque:**

**1st: 49 N·m (500 kgf·cm, 36 ft·lbf)**

**2nd: Turn extra 90°**

### 3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

- (a) Temporarily mount the torque converter clutch to the drive plate.

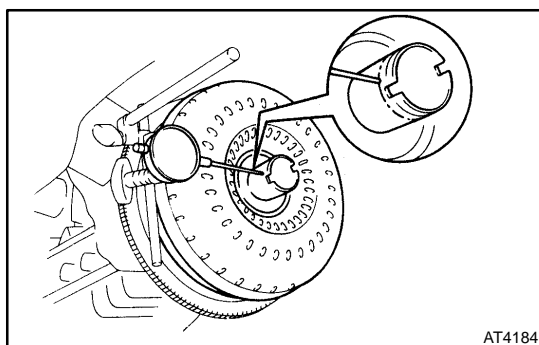
Set up a dial indicator and measure the torque converter clutch sleeve runout.

**Maximum runout: 0.30 mm (0.0118 in.)**

If runout is not within the specification, correct it by reorienting the installation of the torque converter clutch.

If excessive runout cannot be corrected, replace the torque converter clutch.

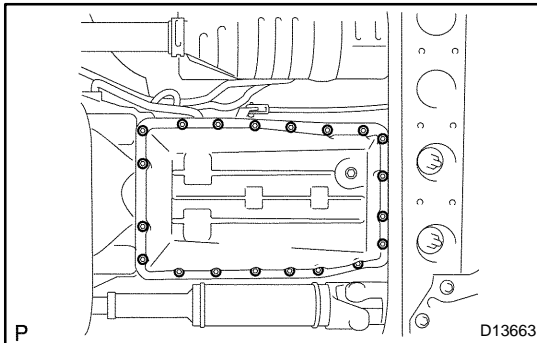
- (b) Remove the torque converter clutch.



# VALVE BODY ASSEMBLY ON-VEHICLE REPAIR

AT111-02

1. REMOVE ENGINE NO.2 UNDER COVER
2. DRAIN ATF

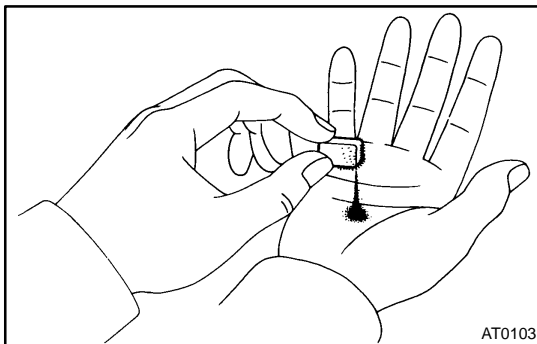


### 3. REMOVE OIL PAN

#### NOTICE:

Some fluid will remain in the oil pan.

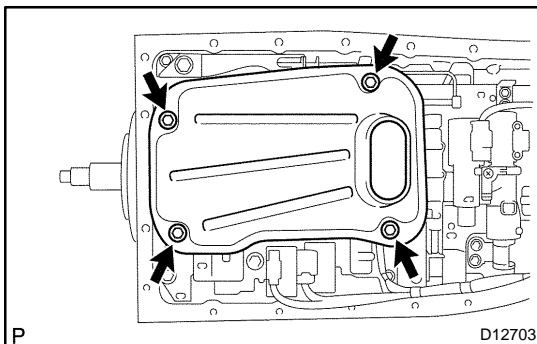
- (a) Remove the 20 bolts.
- (b) Remove the oil pan gasket.



### 4. EXAMINE PARTICLES IN PAN

Remove the magnets and use them to collect steel particles. Carefully look at the foreign matter and particles in the pan and on the magnets to anticipate the type of wear you will find in the transmission.

Steel (magnetic)...bearing, gear and clutch plate wear  
Brass (non-magnetic)...bushing wear

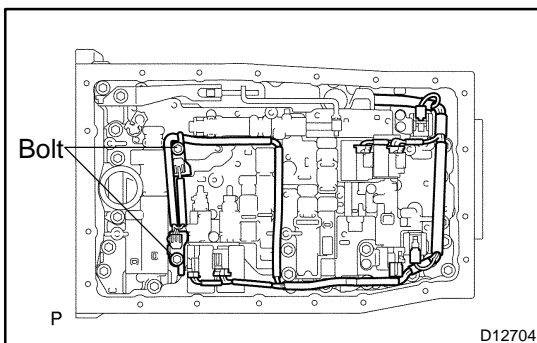


### 5. REMOVE OIL STRAINER

Remove the 4 bolts, the oil strainer and the O-ring.

#### NOTICE:

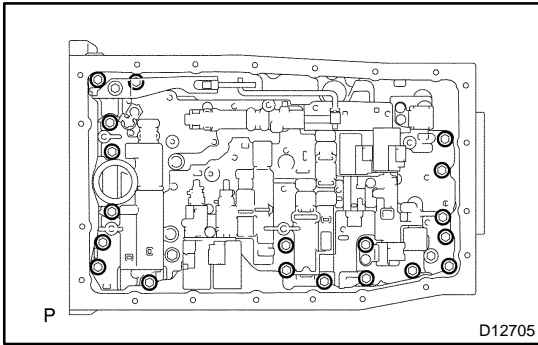
Be careful as some fluid will come out with the oil strainer.



### 6. DISCONNECT TEMPERATURE SENSOR

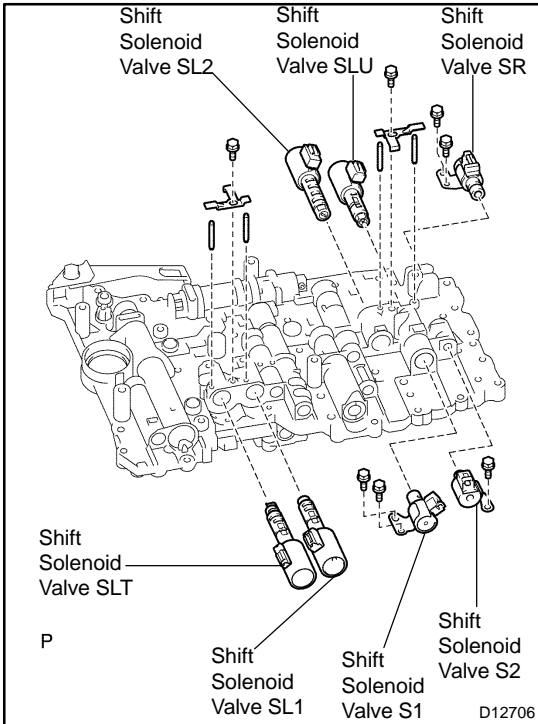
- (a) Disconnect the 7 solenoid connectors.
- (b) Remove 2 bolts and the 2 temperature sensors clamp from the valve body.
- (c) Disconnect the 2 temperature sensor from the valve body.

### 7. DISCONNECT 7 CONNECTORS FROM SHIFT SOLENOID VALVES



**8. REMOVE VALVE BODY**

- (a) Remove the 19 bolts and the valve body.
- (b) Remove the 3 drum seal gaskets.



**9. REMOVE SOLENOID VALVE**

- (a) Remove the 2 bolts and the shift solenoid valve SR.
- (b) Remove the 3 bolts and the shift solenoid valve S1 and S2.
- (c) Remove the 2 bolts, 2 solenoid lock plates and the 4 straight pins.
- (d) Remove the shift solenoid SL2 and the shift solenoid valve SLU.
- (e) Remove the shift solenoid SL1 and the shift solenoid valve SLT.
- (f) Remove the O-ring from the solenoid valve S2.

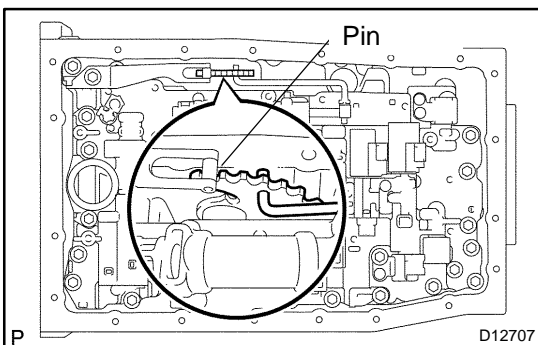
**10. INSTALL SOLENOID VALVE**

- (a) Install a new O-ring to shift solenoid valve S2.
- (b) Install the shift solenoid SL1 and the shift solenoid valve SLT.
- (c) Install the shift solenoid SL2 and the shift solenoid valve SLU.
- (d) Install the 4 straight pins and the 2 solenoid lock plates with the 2 bolts.

**Torque:6.4 N·m (65 kgf·cm,57 in·lbf)**

- (e) Install the shift solenoid valve S1 and S2 with the 2 bolts.  
**Torque:10 N·m (102 kgf·cm,7 ft·lbf)**

- (f) Install the shift solenoid valve SR with the 2 bolts.  
**Torque:6.4 N·m (65 kgf·cm,5.7 ft·lbf)**



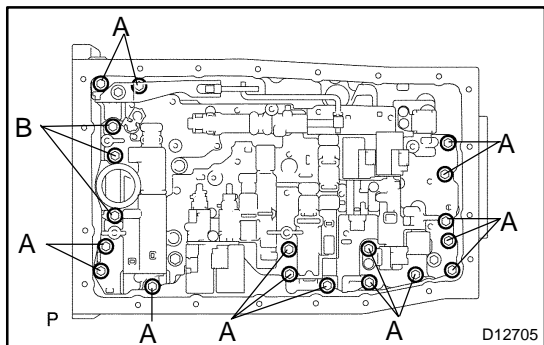
**11. INSTALL VALVE BODY**

**HINT:**

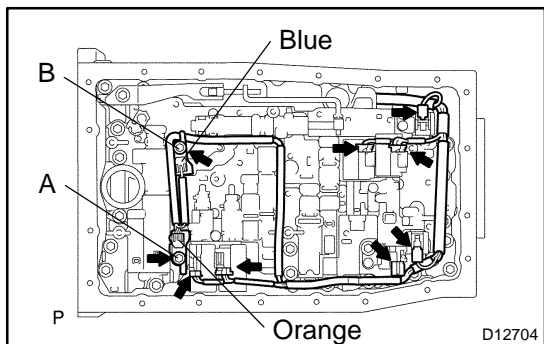
Align the groove of the manual valve with the pin of the lever.

- (a) Install the 3 new drum seal gaskets to the transmission case.





- (b) Install the 19 bolts and the valve body.  
**Torque:**  
**Bolt A: 11 N·m (110 kgf·cm, 8 ft·lbf)**  
**Bolt length:**  
**Bolt A: 25 mm (0.98 in.)**  
**Bolt B: 36 mm (1.42 in.)**



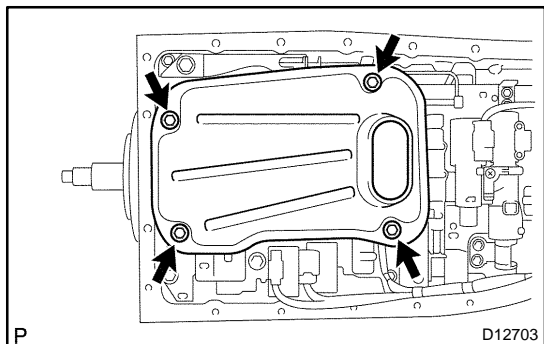
**12. CONNECT TEMPERATURE SENSOR**

- (a) Connect the 2 temperature sensors to the valve body, and install the 2 temperature sensors clamp with the 2 bolts.  
**Torque:**  
**A: 11 N·m (112 kgf·cm, 8 ft·lbf)**  
**B: 10 N·m (100 kgf·cm, 7 ft·lbf)**  
**Bolt length:**  
**Bolt A: 36 mm (1.42 in.)**  
**Bolt B: 12 mm (0.47 in.)**

**Sensor wire harness:**

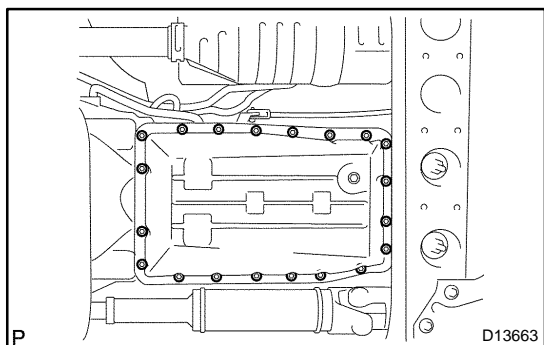
Wire harness	Color
for linear control	Orange
for oil temp warning lamp	Blue

**13. CONNECT 7 CONNECTORS TO SHIFT SOLENOID VALVES**



**14. INSTALL OIL STRAINER**

- (a) Install a new O-ring.
- (b) Install the oil strainer with the 4 bolts.  
**Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)**



**15. INSTALL OIL PAN**

**HINT:**

Remove any packing material, and be careful not to spill oil on the contacting surfaces of the transmission case and the oil pan.

- (a) Install a new gasket and oil pan.
- (b) Install the 20 bolts and oil pan.  
**Torque: 4.4 N·m (45 kgf·cm, 39 in·lbf)**

**16. FILL ATF AND CHECK ATF LEVEL**

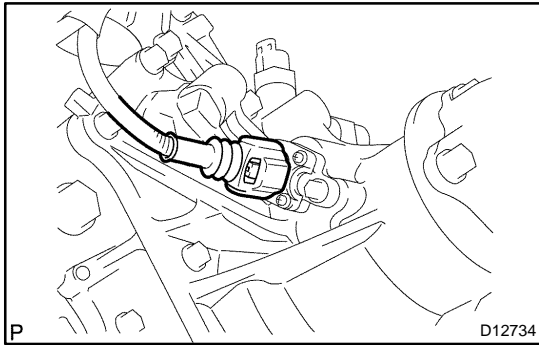
(a) Install a new gasket and a drain plug.

**Torque: 20 N·m (204 kgf-cm, 15 ft-lbf)**

(b) Remove the refill plug.

(c) Fill new fluid through the refill hole (See page [AT-3-1](#) ).

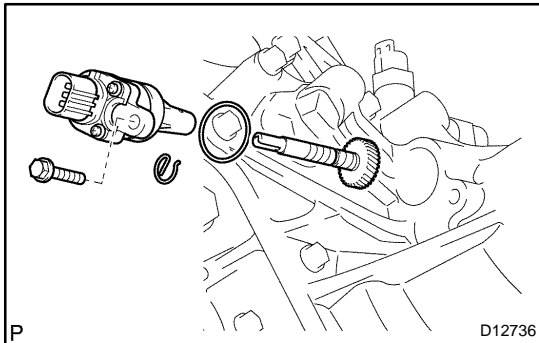
**17. INSTALL ENGINE NO.2 UNDER COVER**



## VEHICLE SPEED SENSOR ON-VEHICLE REPAIR

AT07Y-02

1. **DISCONNECT NO. 1 VEHICLE SPEED SENSOR CONNECTOR**



2. **REMOVE NO. 1 VEHICLE SPEED SENSOR**

Remove the bolt and the No. 1 vehicle speed sensor.

3. **DISASSEMBLE NO. 1 VEHICLE SPEED SENSOR**

- (a) Remove the O-ring from the speedometer driven gear assembly.
- (b) Remove the clip and the speedometer driven gear from the speedometer driven gear sleeve.

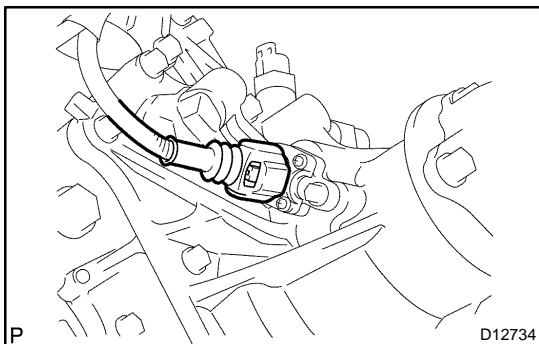
4. **ASSEMBLE NO. 1 VEHICLE SPEED SENSOR**

- (a) Install the speedometer driven gear and the clip to the speedometer driven gear sleeve.
- (b) Coat a new O-ring with ATF.
- (c) Install the O-ring to the speedometer driven gear assembly.

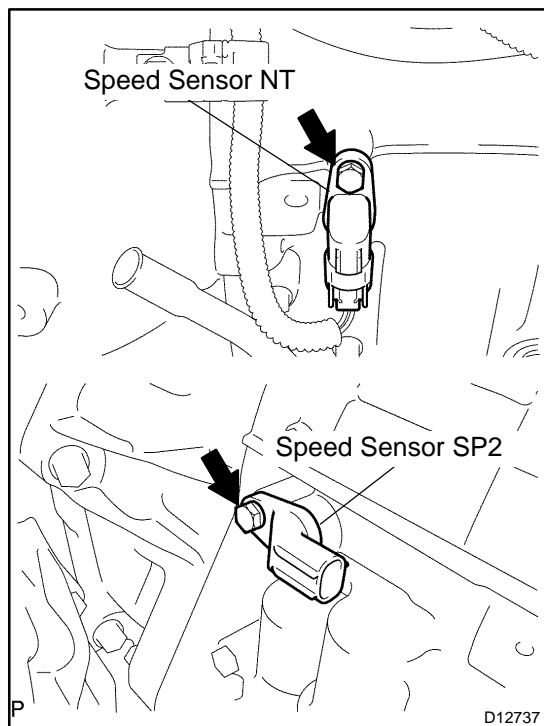
5. **INSTALL NO. 1 VEHICLE SPEED SENSOR**

Install the No. 1 vehicle speed sensor with the bolt.

**Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)**



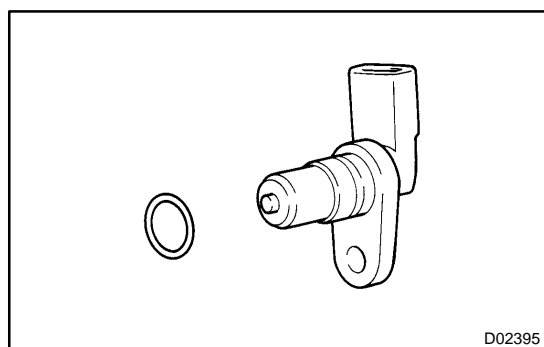
6. **CONNECT NO. 1 VEHICLE SPEED SENSOR CONNECTOR**



**7. DISCONNECT SPEED SENSOR NT AND SP2 CONNECTORS**

**8. REMOVE SPEED SENSOR NT AND SP2**

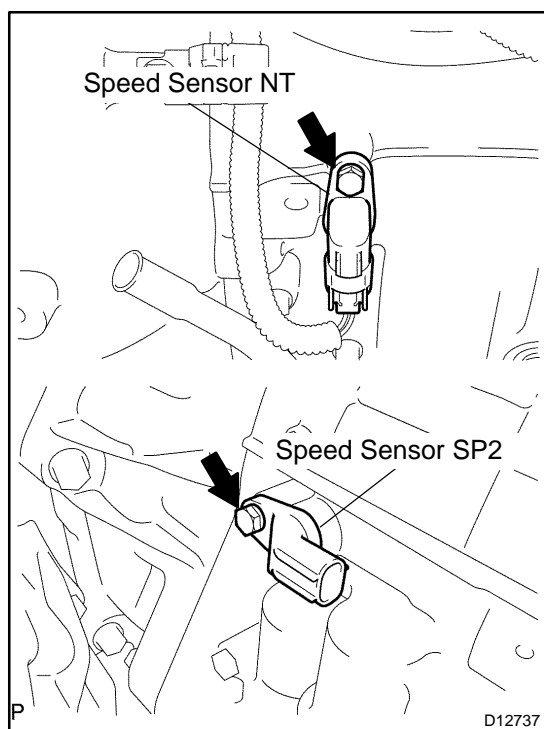
- (a) Remove the 2 bolts, speed sensor NT and SP2.



- (b) Remove 2 O-rings from the speed sensor NT and SP2.

**9. INSTALL SPEED SENSOR NT AND SP2**

- (a) Coat 2 new O-rings with ATF and install them to the speed sensor NT and SP2.



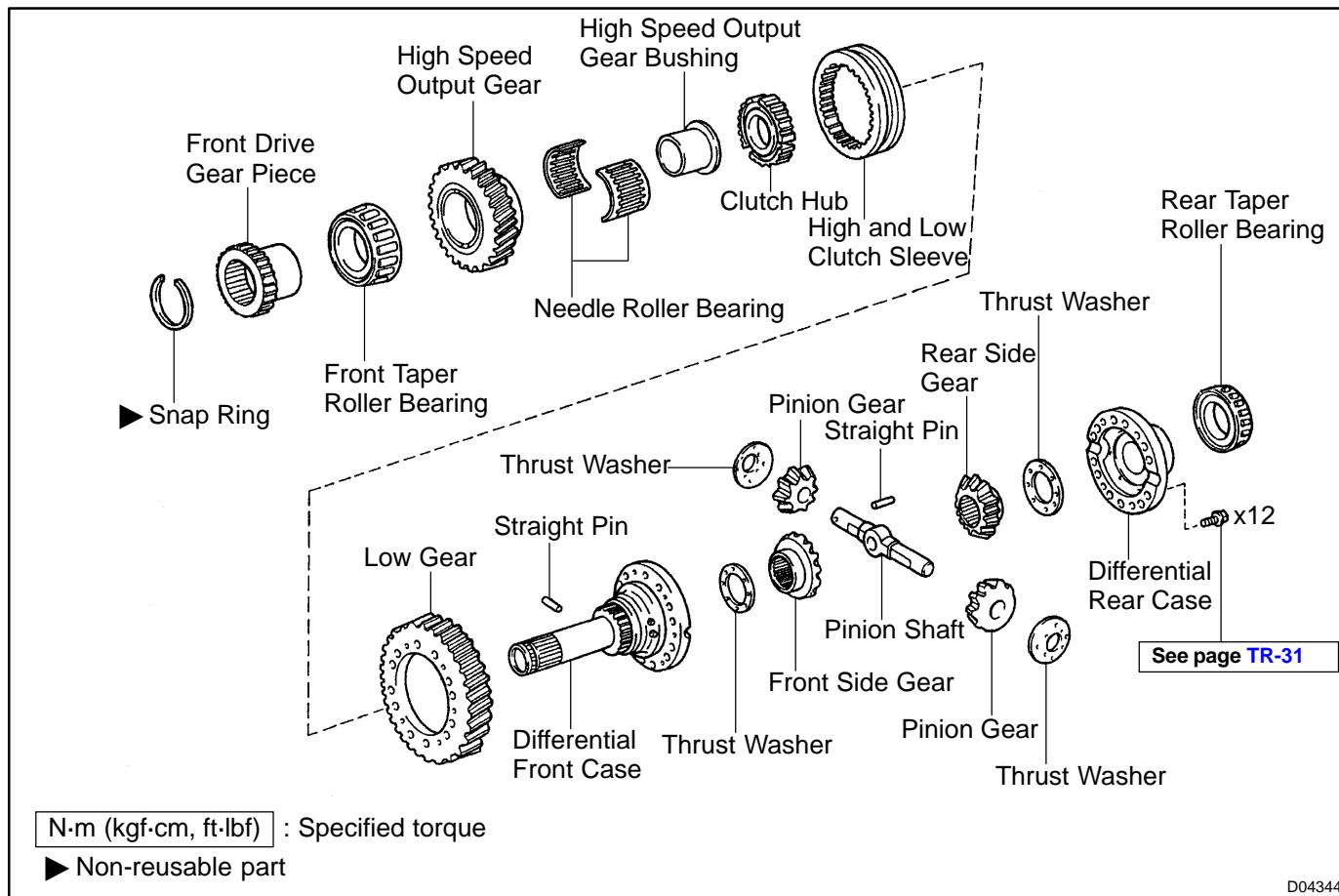
- (b) Install the speed sensor NT and SP2 with 2 bolts.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

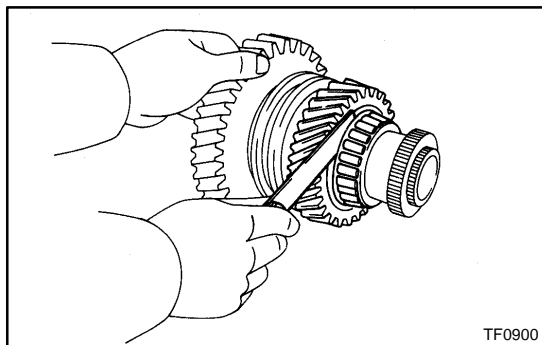
**10. CONNECT SPEED SENSOR NT AND SP2 CONNECTORS**

# CENTER DIFFERENTIAL COMPONENTS

TR06J-02



D04344



## DISASSEMBLY

### 1. INSPECT HIGH SPEED OUTPUT GEAR RADIAL AND THRUST CLEARANCE

- (a) Using a feeler gauge, measure the high speed output gear thrust clearance.

**Standard clearance:**

**0.10 - 0.25 mm (0.0039 - 0.0098 in.)**

**Maximum clearance:**

**0.25 mm (0.0098 in.)**

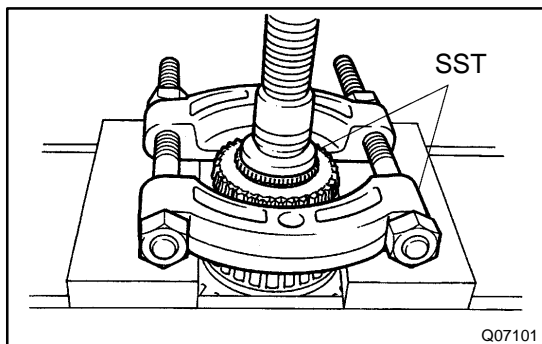
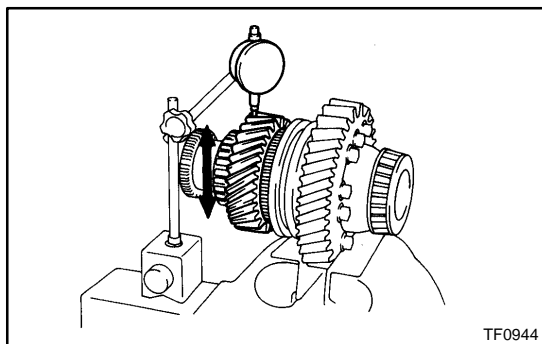
- (b) Using a dial indicator, measure the high speed output gear radial clearance.

**Standard clearance:**

**0.035 - 0.091 mm (0.00138 - 0.00358 in.)**

**Maximum clearance:**

**0.091 mm (0.00358 in.)**

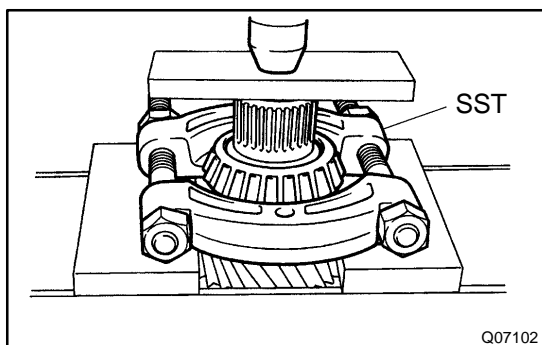


### 2. REMOVE FRONT DRIVE GEAR PIECE

- (a) Using a snap ring expander, remove the snap ring.  
 (b) Using SST and a press, remove the front drive gear piece.  
 SST 09950-00020, 09950-60010 (09951-00320)

#### NOTICE:

**Be careful not to drop the center differential assembly.**

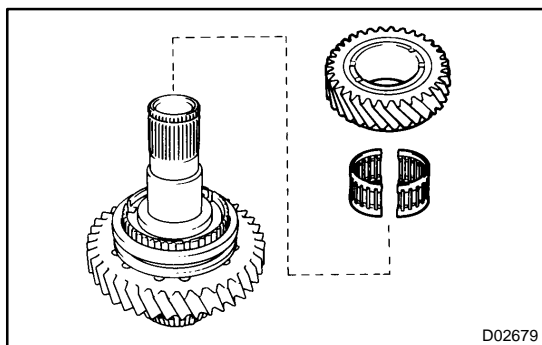


### 3. REMOVE FRONT TAPER ROLLER BEARING

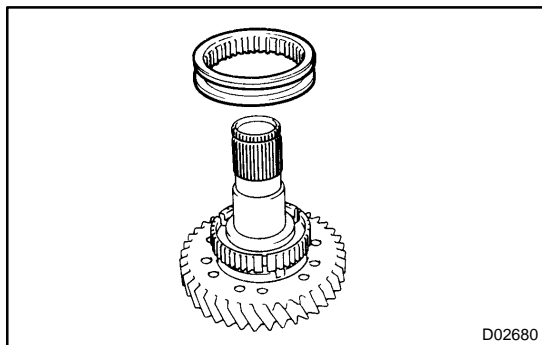
Using SST and a press, remove the front taper roller bearing.  
 SST 09950-00020

#### NOTICE:

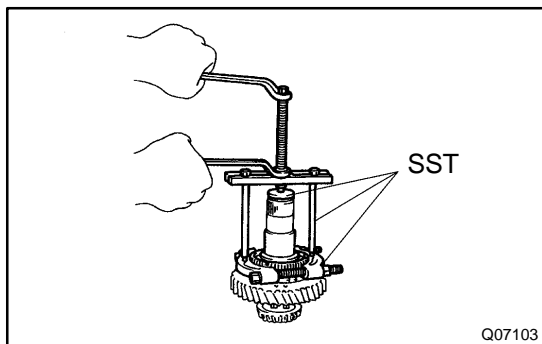
**Set the claw of SST to the bearing inner race securely.**



4. REMOVE HIGH SPEED OUTPUT GEAR  
 5. REMOVE 2 NEEDLE ROLLER BEARINGS



## 6. REMOVE HIGH AND LOW CLUTCH SLEEVE

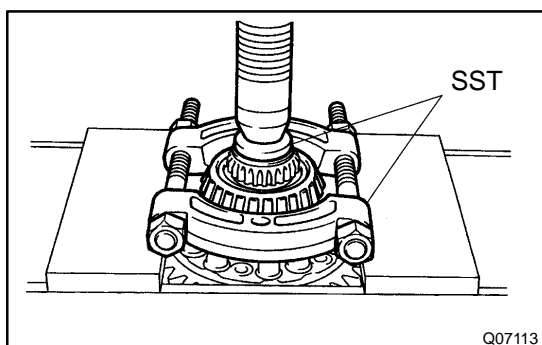


## 7. REMOVE HIGH SPEED OUTPUT GEAR BUSHING AND CLUTCH HUB

- (a) Using SST, remove the high speed output gear bushing and clutch hub.

SST 09950-00020, 09950-00030, 09950-60010 (09951-00320)

- (b) Using a magnetic finger, remove the straight pin from the differential front case.



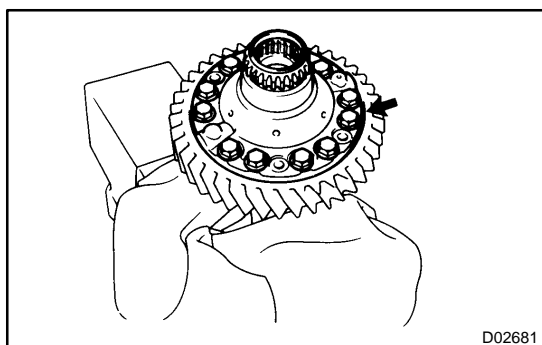
## 8. REMOVE REAR TAPER ROLLER BEARING

Using SST and a press, remove the rear taper roller bearing.

SST 09950-00020, 09950-60010 (09951-00320)

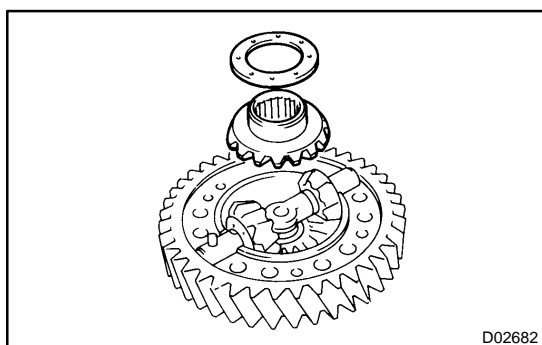
### NOTICE:

Set the claw of SST to the bearing inner race securely.

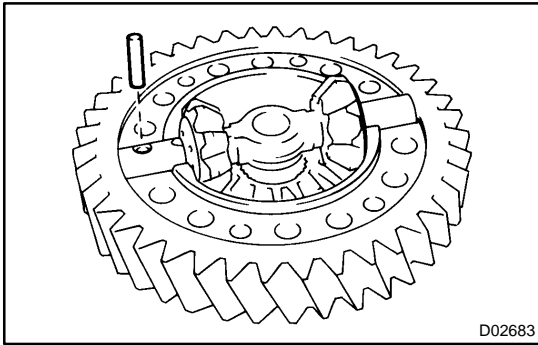


## 9. REMOVE DIFFERENTIAL REAR CASE

Remove the 12 bolts and differential rear case.

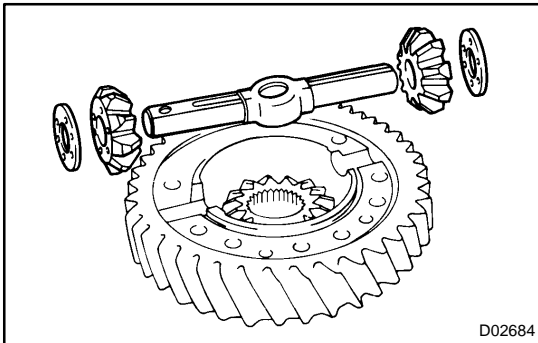


## 10. REMOVE THRUST WASHER AND REAR SIDE GEAR

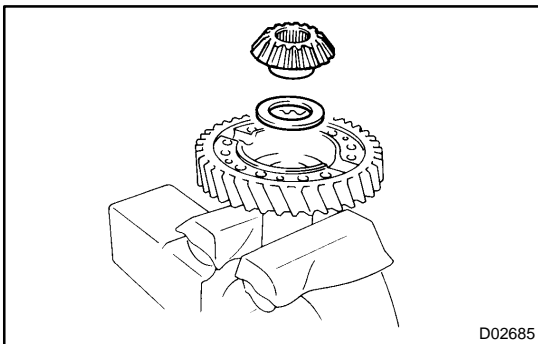


### 11. REMOVE PINION SHAFT, 2 PINION GEARS AND 2 THRUST WASHERS

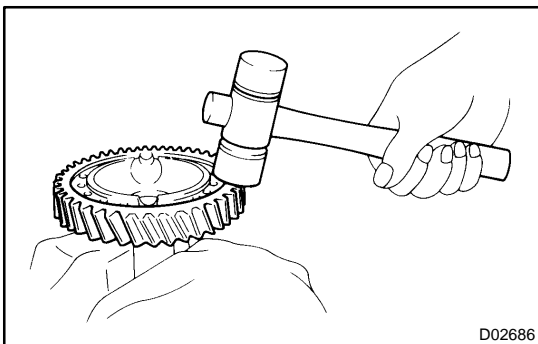
(a) Remove the straight pin from the pinion shaft.



(b) Remove the pinion shaft, 2 pinion gears and thrust washers.



(c) Remove the front side gear and thrust washer.



### 12. REMOVE LOW GEAR

Using a plastic hammer, tap and remove the low gear.

**NOTICE:**

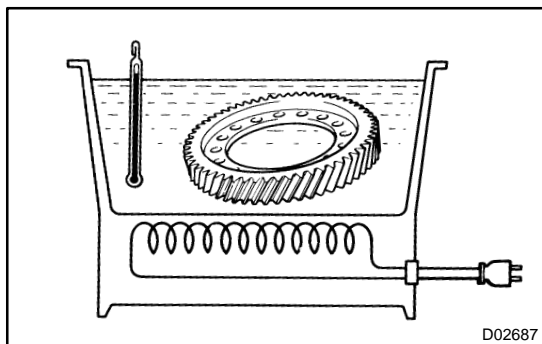
**Be careful not to damage the low gear.**



## REASSEMBLY

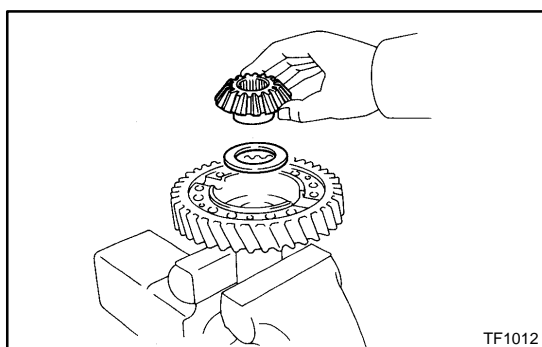
### HINT:

Coat all of the sliding and rotating surfaces with gear oil before reassembly.

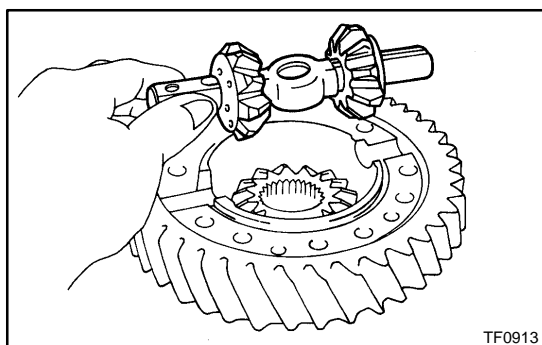


### 1. INSTALL LOW GEAR

- (a) Clean the contact surface of the differential case.
- (b) Heat the low gear in boiling water.
- (c) Carefully remove the low gear from the water.
- (d) After the moisture on the low gear has completely evaporated, quickly install the low gear to the differential case.

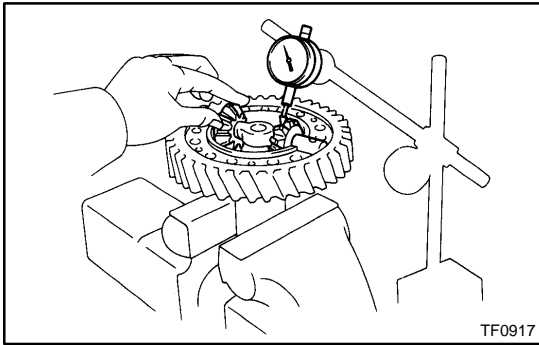


### 2. INSTALL THRUST WASHER AND FRONT SIDE GEAR



### 3. INSTALL PINION SHAFT, 2 PINION GEARS AND 2 THRUST WASHERS

- (a) Install the pinion shaft, 2 pinion gears and thrust washers to the differential front case.



(b) Using a dial indicator, measure the front case backlash.

HINT:

Push the pinion shaft.

**Maximum backlash: 0.05 mm (0.0020 in.)**

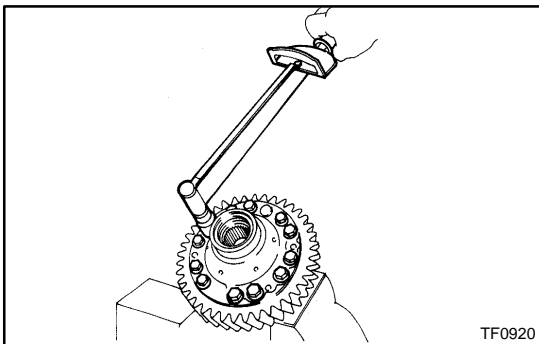
If the backlash is not within the specification, replace the thrust washer with one of the correct size and reinstall the thrust washer.

Thickness mm (in.)	Thickness mm (in.)
1.70 (0.0669)	2.45 (0.0965)
1.85 (0.0728)	2.60 (0.1024)
2.00 (0.0787)	2.75 (0.1083)
2.15 (0.0846)	2.90 (0.1142)
2.30 (0.0906)	3.05 (0.1201)

(c) In the same way, measure the rear case backlash.

**4. INSTALL STRAIGHT PIN TO PINION SHAFT**

**5. INSTALL REAR SIDE GEAR AND THRUST WASHER**



**6. INSTALL DIFFERENTIAL REAR CASE**

(a) Install the differential rear case and 12 set bolts.

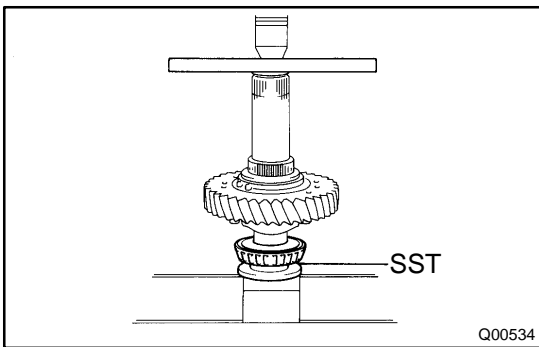
**Torque: 88 N·m (900 kgf·cm, 65 ft·lbf)**

(b) Turn the pinion gear.

(c) Loosen the 12 rear case set bolts.

(d) Torque the 12 rear case set bolts.

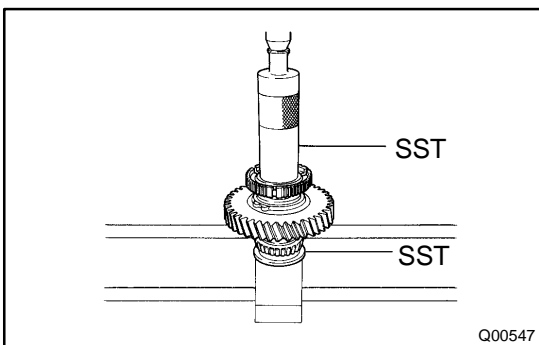
**Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf)**



**7. INSTALL REAR TAPER ROLLER BEARING**

Using SST and a press, install the rear taper roller bearing.

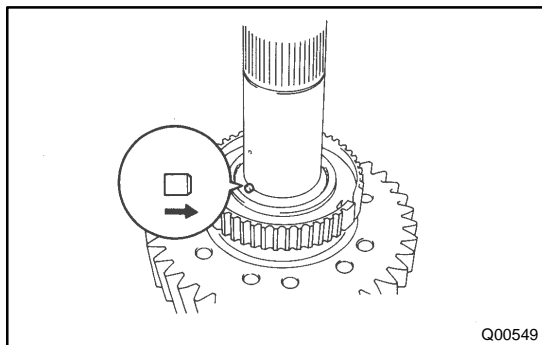
SST 09316-12010



**8. INSTALL CLUTCH HUB**

Using SST and a press, install the clutch hub.

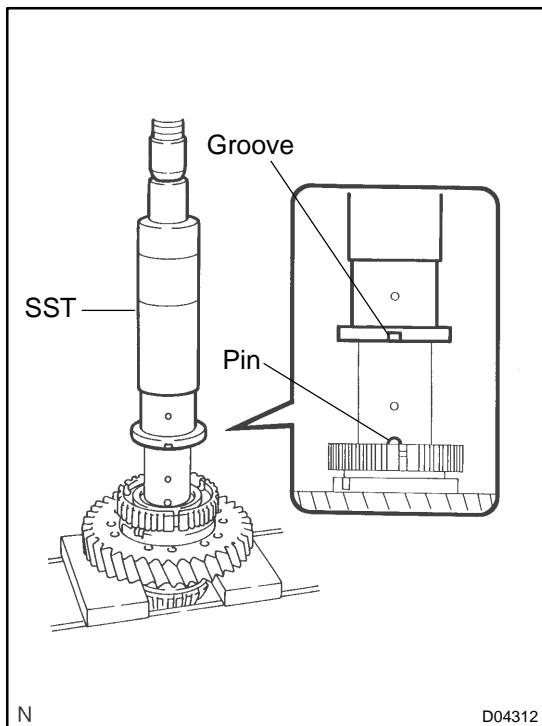
SST 09316-12010, 09316-60011 (09316-00011)



Q00549

**9. INSTALL HIGH SPEED OUTPUT GEAR BUSHING**

- (a) Apply MP grease to the straight pin.
- (b) Install the straight pin, as shown.



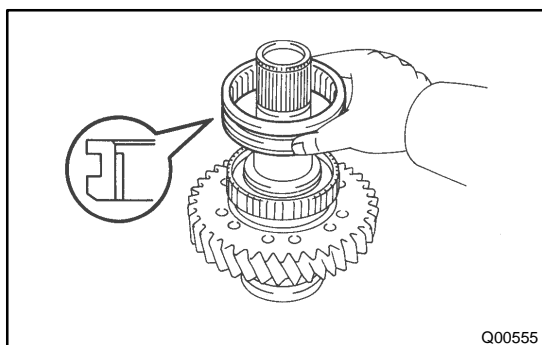
D04312

- (c) Using SST and a press, install the high speed output gear bushing.

SST 09316-12010, 09316-60011 (09316-00011)

**NOTICE:**

Before pressing on the differential front case, align the groove on the bushing with the pin on the shaft.



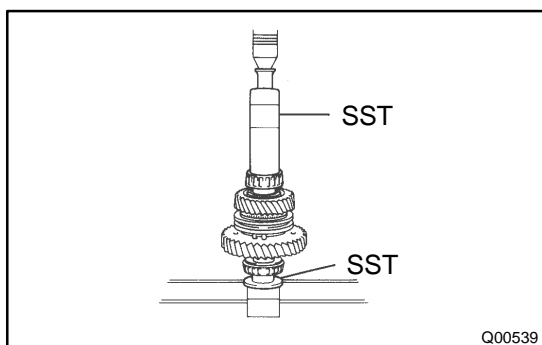
Q00555

**10. INSTALL HIGH AND LOW CLUTCH SLEEVE****HINT:**

Make sure to install the high and low clutch sleeve in the correct direction.

**11. INSTALL NEEDLE ROLLER BEARING AND HIGH SPEED OUTPUT GEAR**

- (a) Apply gear oil to the needle roller bearing.
- (b) Install the needle roller bearing and high speed output gear.

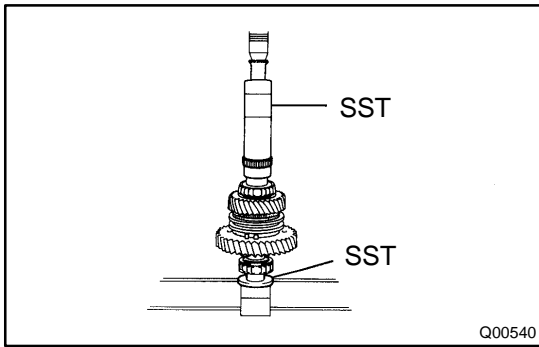


Q00539

**12. INSTALL FRONT TAPER ROLLER BEARING**

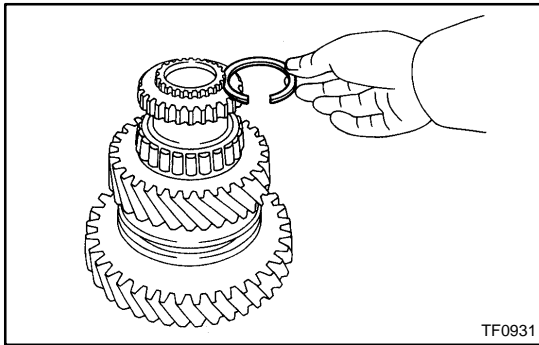
Using SST and a press, install the front taper roller bearing.

SST 09316-12010, 09316-60011 (09316-00011)



**13. INSTALL FRONT DRIVE GEAR PIECE**

Using SST and a press, install the front drive gear piece.  
 SST 09316-12010, 09316-60011 (09316-00011)



**14. INSTALL SNAP RING**

(a) Select a snap ring that will allow the minimum axial play.

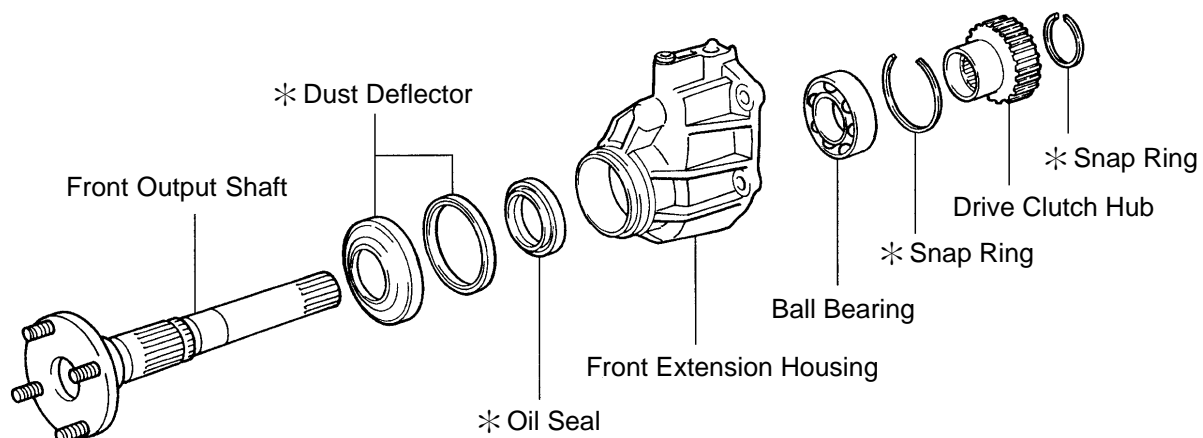
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.00 (0.0787)	G	2.60 (0.1024)
B	2.10 (0.0827)	H	2.70 (0.1063)
C	2.20 (0.0866)	J	2.80 (0.1102)
D	2.30 (0.0906)	K	1.80 (0.0709)
E	2.40 (0.0945)	L	1.90 (0.0748)
F	2.50 (0.0984)	-	-

(b) Using a snap ring expander, install a new snap ring.

**15. INSPECT HIGH SPEED OUTPUT GEAR RADIAL AND THRUST CLEARANCE (See page TR-28 )**

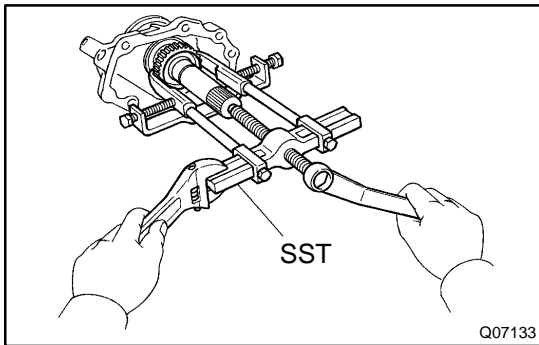
# FRONT EXTENSION HOUSING COMPONENTS

TR06M-02



\* Non-reusable part

Z18836

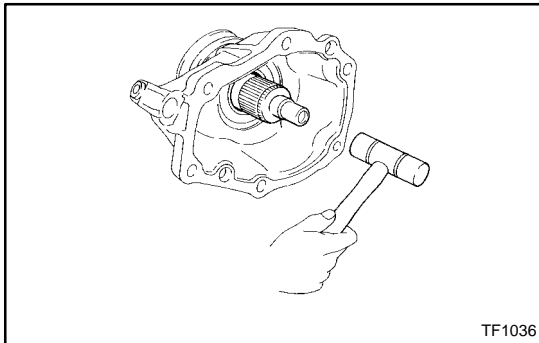


## DISASSEMBLY

### 1. REMOVE DRIVE CLUTCH HUB

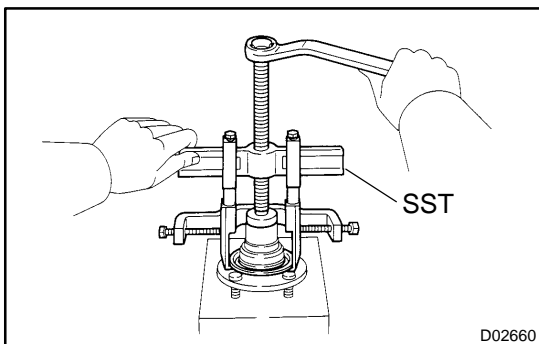
- (a) Using a snap ring expander, remove the snap ring.
- (b) Using SST, remove the drive clutch hub.

SST 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04020, 09955-04021, 09957-04010, 09958-04011)



### 2. REMOVE FRONT OUTPUT SHAFT

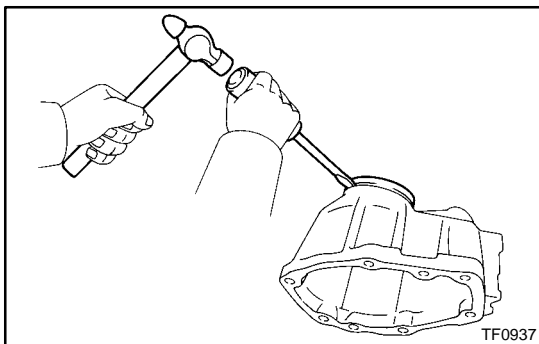
Using a plastic hammer, drive out the front output shaft.



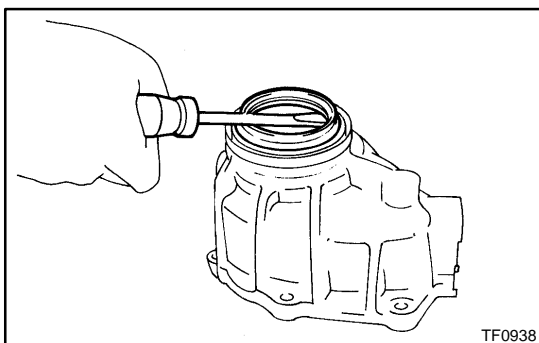
### 3. REMOVE DUST DEFLECTOR

- (a) Using SST, remove the dust deflector.

SST 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04051, 09957-04010, 09958-04011)

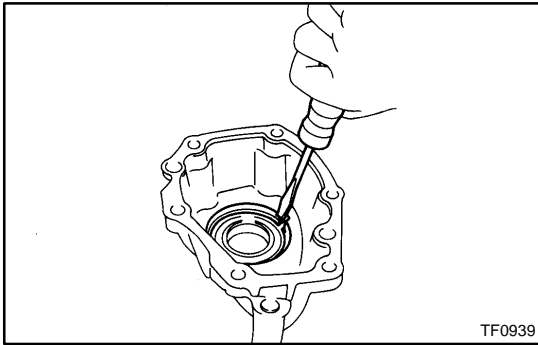


- (b) Using a screwdriver and hammer, tap the dust deflector and remove it from the extension housing.

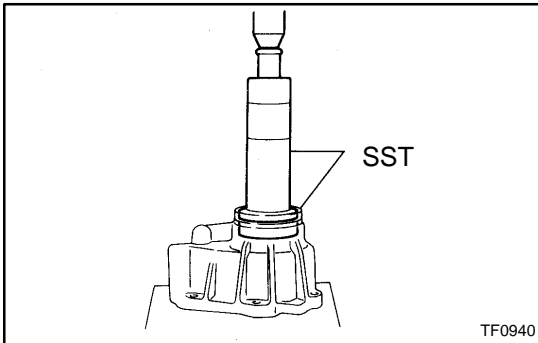


### 4. REMOVE OIL SEAL

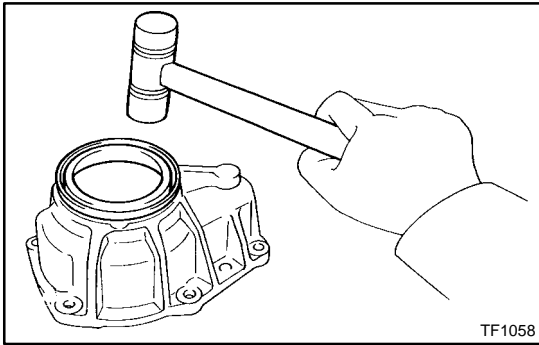
Using a screwdriver, pry out the oil seal from the front extension housing.

**5. REMOVE BALL BEARING**

- (a) Using a screwdriver, remove the snap ring.



- (b) Using SST and a press, remove the ball bearing.  
SST 09316-6001 1 (09316-00011, 09316-00071)



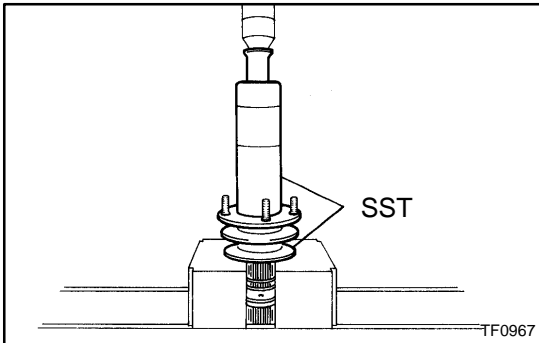
## REASSEMBLY

### HINT:

Coat all of the sliding and rotating surfaces with gear oil before reassembly.

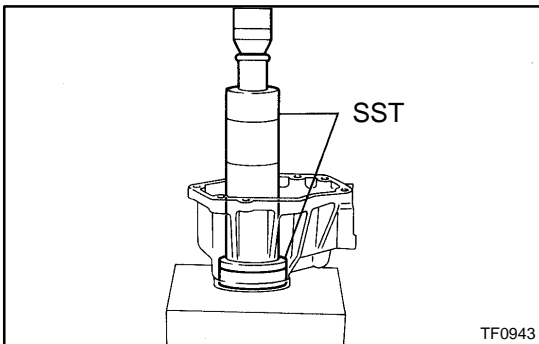
### 1. INSTALL DUST DEFLECTOR

- (a) Using a plastic hammer, install a new dust deflector to the front extension housing.



- (b) Using SST and a press, install a new dust deflector to the front output shaft.

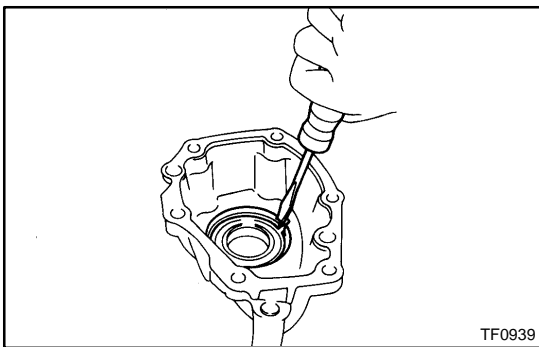
SST 09316-2001 1, 09316-60011 (09316-00011)



### 2. INSTALL BALL BEARING

- (a) Using SST and a press, install the ball bearing to the front extension housing.

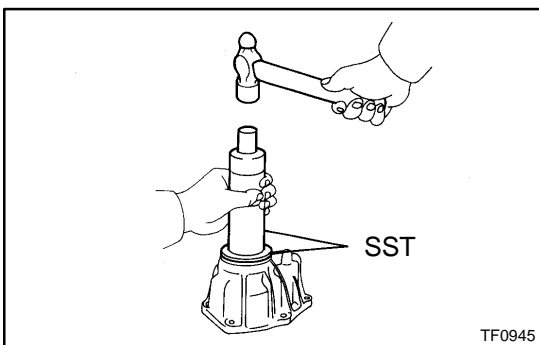
SST 09316-6001 1 (09316-00011, 09316-00031)



- (b) Select a snap ring that will allow the minimum axial play.

Mark	Thickness mm (in.)
A	1.70 (0.0669)
B	1.80 (0.0709)

- (c) Using a screwdriver, install a new snap ring.

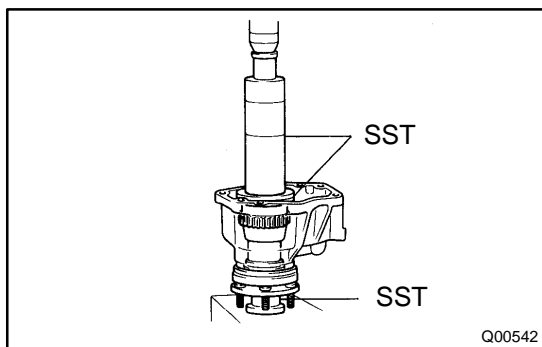


### 3. INSTALL OIL SEAL

- (a) Apply MP grease to the lip of a new oil seal.
- (b) Using SST and a hammer, drive in a new oil seal to the front extension housing.

SST 09316-6001 1 (09316-00011, 09316-00061)

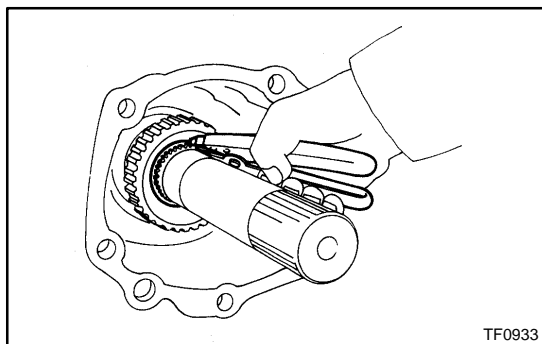




#### 4. INSTALL FRONT OUTPUT SHAFT AND DRIVE CLUTCH HUB

- (a) Using SST and a press, install the front output shaft and drive clutch hub.

SST 09316-2001 1, 09316-60011 (09316-00011, 09316-00041, 09316-00071)



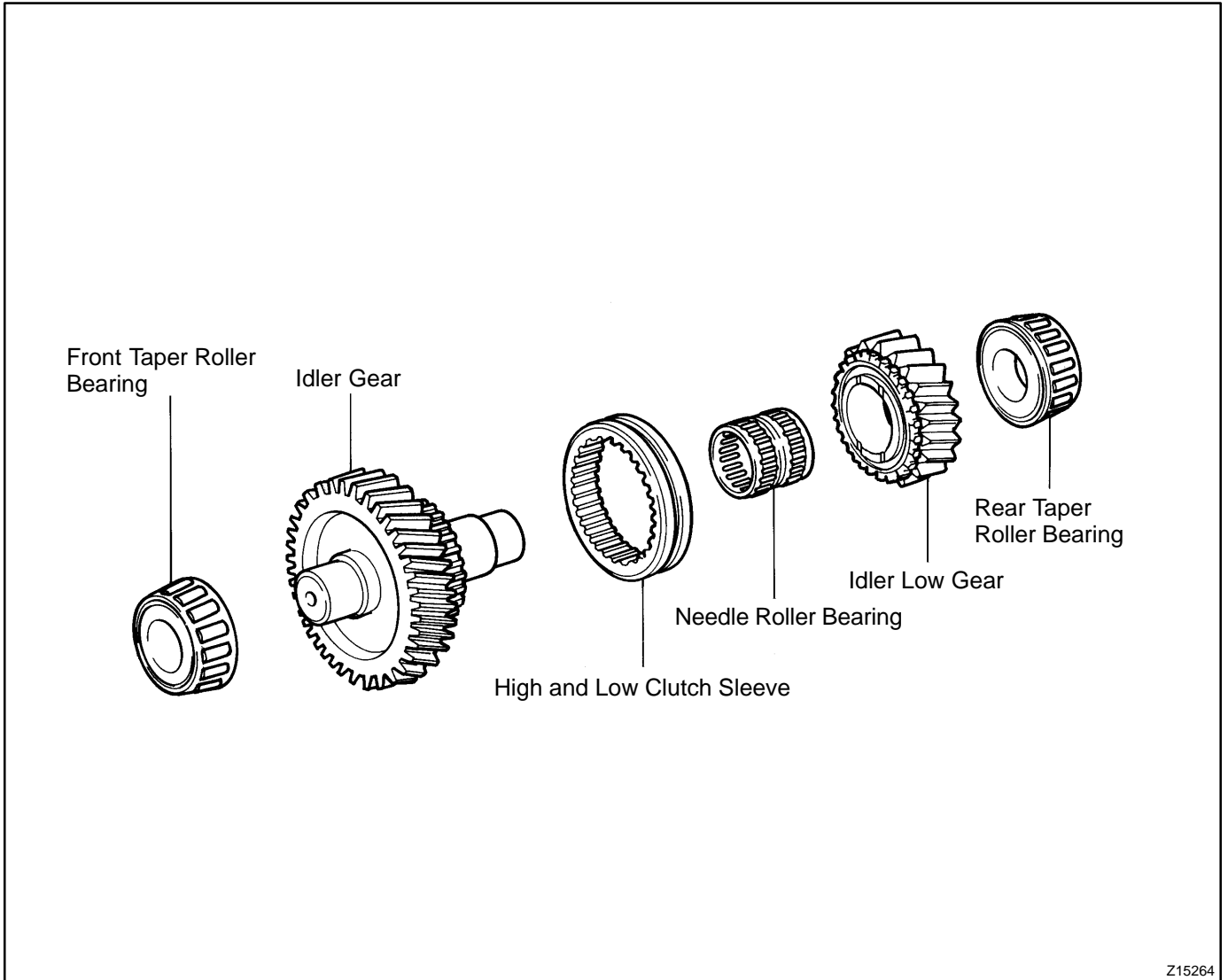
- (b) Select a snap ring that will allow the minimum axial play.

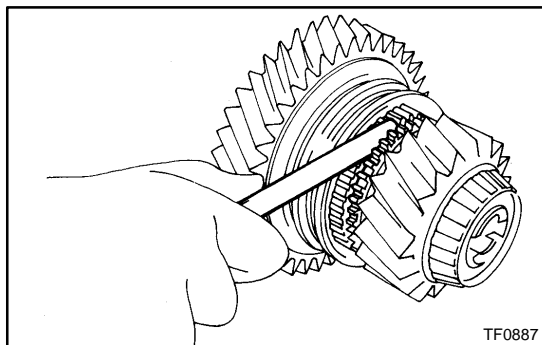
Mark	Thickness mm (in.)
A	1.80 (0.0709)
B	1.90 (0.0748)
C	2.00 (0.0787)
D	2.10 (0.0827)
E	2.20 (0.0866)

- (c) Using a snap ring expander, install a new snap ring.

# IDLER GEAR COMPONENTS

TR06F-02





## DISASSEMBLY

### 1. INSPECT IDLER LOW GEAR RADIAL AND THRUST CLEARANCE

- (a) Using a feeler gauge, measure the idler low gear thrust clearance.

**Standard clearance:**

**0.125 - 0.275 mm (0.00492 - 0.01083 in.)**

**Maximum clearance:**

**0.275 mm (0.01083 in.)**

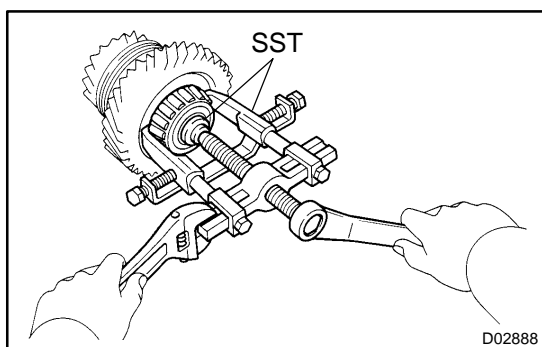
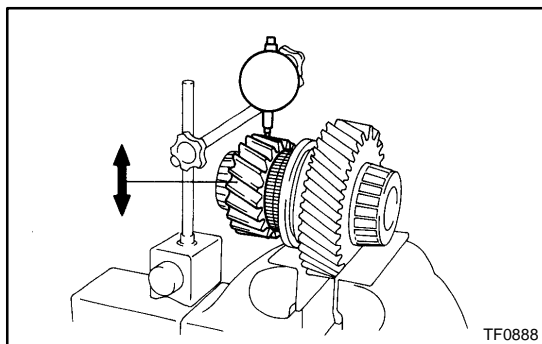
- (b) Using a dial indicator, measure the idler low gear radial clearance.

**Standard clearance:**

**0.015 - 0.068 mm (0.00059 - 0.00268 in.)**

**Maximum clearance:**

**0.068 mm (0.00268 in.)**



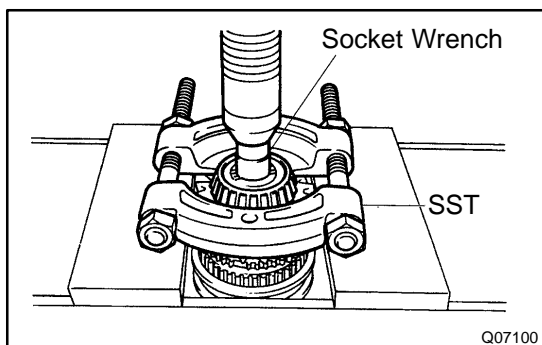
### 2. REMOVE FRONT TAPER ROLLER BEARING

Using SST, remove the front taper roller bearing.

SST 09950-40011 (09951-04010, 09952-04010, 09953-04030, 09954-04010, 09955-04061, 09957-04010, 09958-04011), 09950-60010 (09951-00330)

**NOTICE:**

**Set the claw of SST to the bearing inner race securely.**



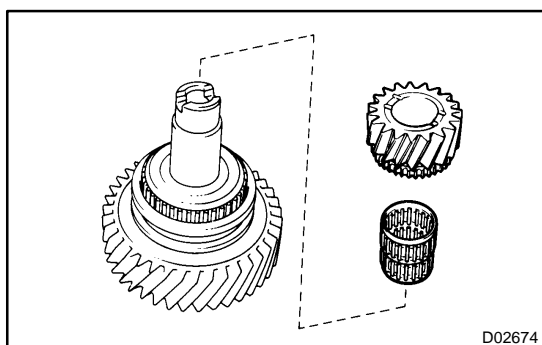
### 3. REMOVE REAR TAPER ROLLER BEARING

Using SST, a press and socket wrench, remove the rear taper roller bearing.

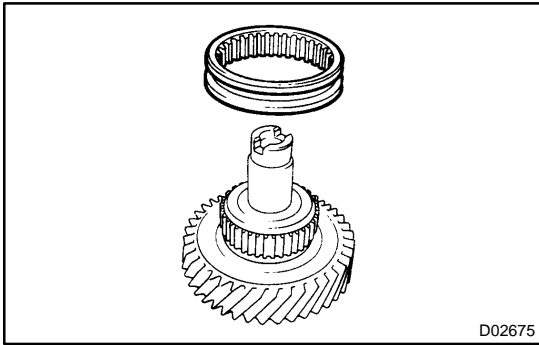
SST 09950-00020

**NOTICE:**

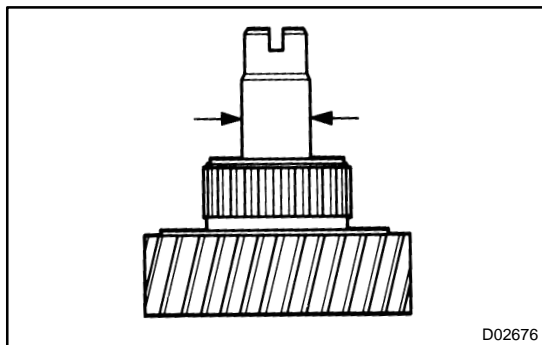
**Set the claw of SST to the bearing inner race securely.**



### 4. REMOVE IDLER LOW GEAR AND NEEDLE ROLLER BEARING FROM IDLER GEAR



5. REMOVE HIGH AND LOW CLUTCH SLEEVE FROM IDLER GEAR



## INSPECTION

### 1. INSPECT IDLER GEAR

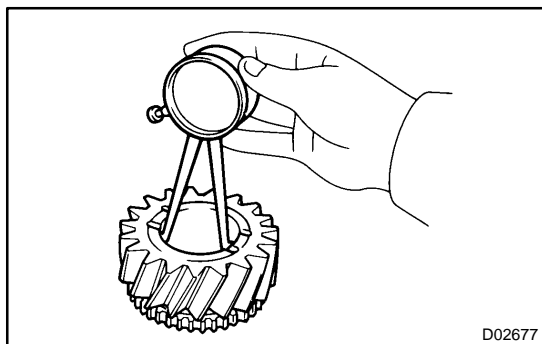
Using a micrometer, measure the idler gear diameter.

**Standard diameter:**

**38.48 - 38.50 mm (1.5149 - 1.5157 in.)**

**Maximum diameter:**

**38.50 mm (1.5157 in.)**



### 2. INSPECT IDLER LOW GEAR

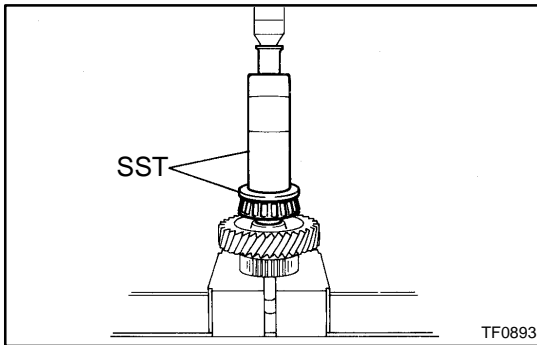
Using a cylinder gauge, measure the idler low gear diameter.

**Standard diameter:**

**45.52 - 45.54 mm (1.7922 - 1.7930 in.)**

**Maximum diameter:**

**45.54 mm (1.7930 in.)**



## REASSEMBLY

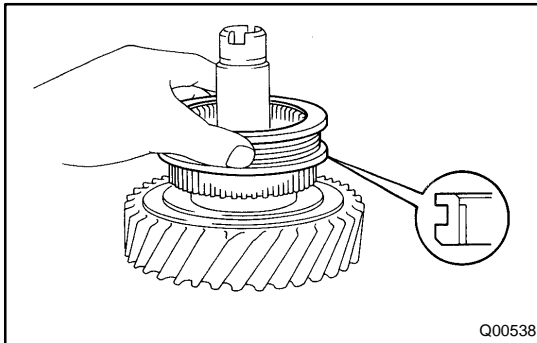
### HINT:

Coat all of the sliding and rotating surfaces with gear oil before reassembly.

### 1. INSTALL FRONT TAPER ROLLER BEARING

Using SST and a press, install the front taper roller bearing.

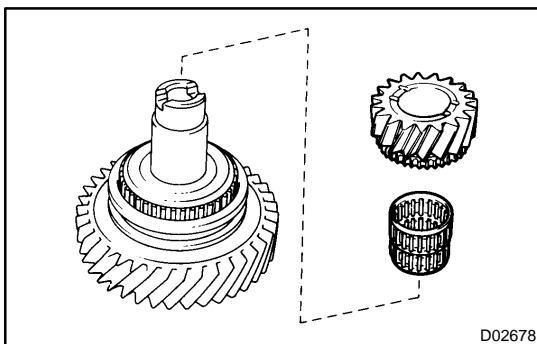
SST 09316-6001 1 (09316-00011, 09316-00031)



### 2. INSTALL HIGH AND LOW CLUTCH SLEEVE

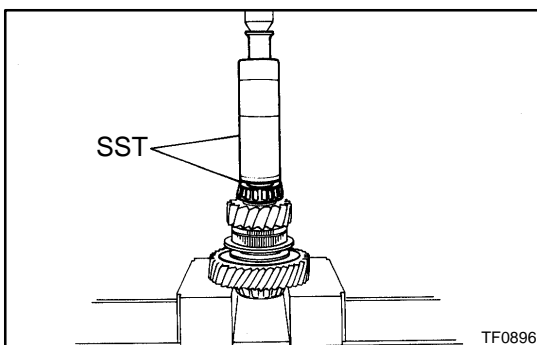
#### HINT:

Make sure to install the high and low clutch sleeve in the correct direction.



### 3. INSTALL NEEDLE ROLLER BEARING AND IDLER LOW GEAR TO IDLER GEAR

- (a) Apply gear oil to the needle roller bearing.
- (b) Install the needle roller bearing and idler low gear.



### 4. INSTALL REAR TAPER ROLLER BEARING

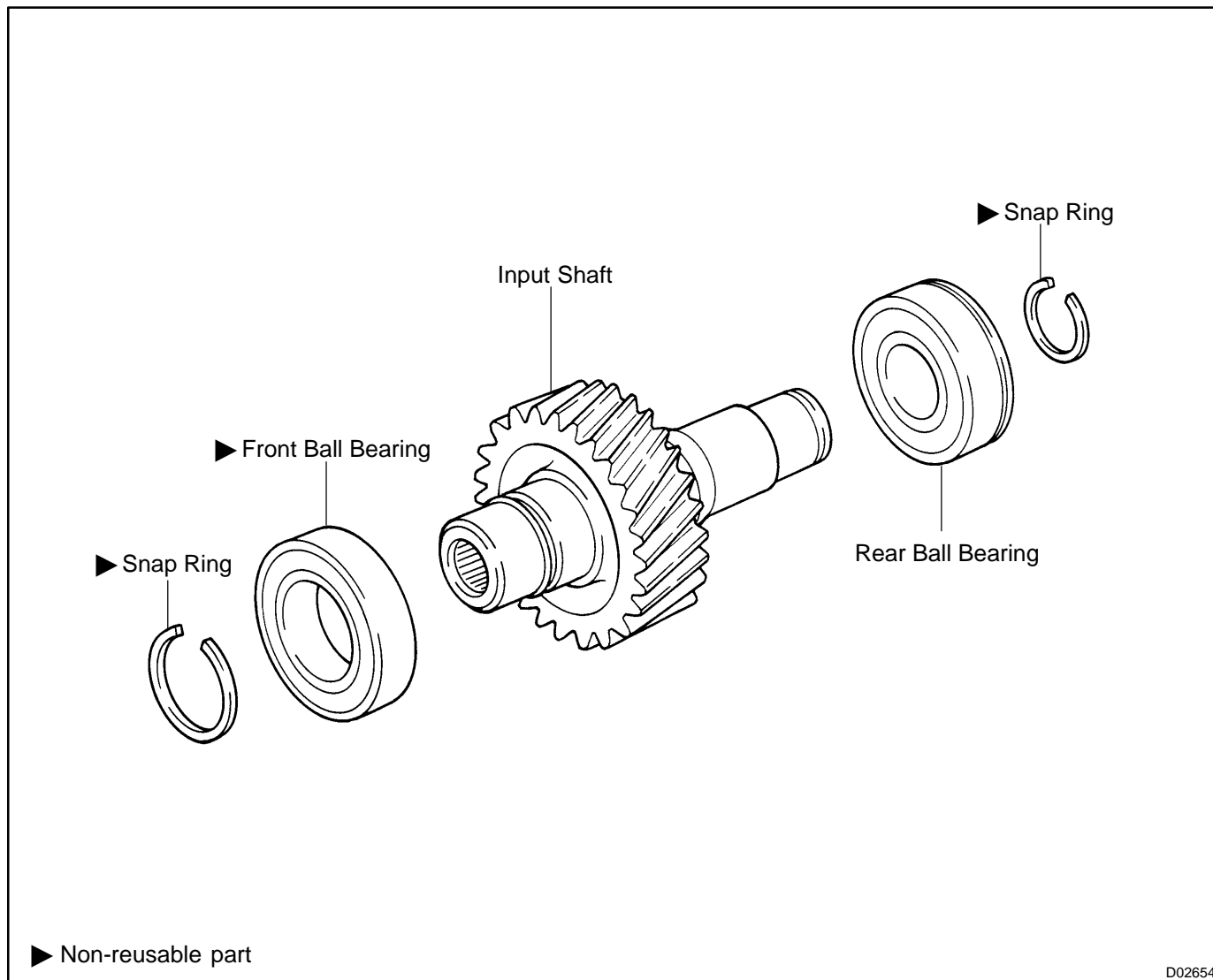
Using SST and a press, install the rear taper roller bearing.

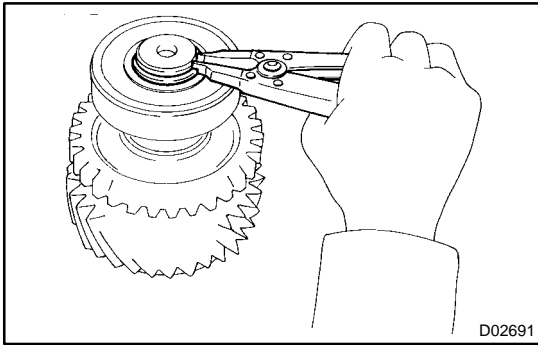
SST 09316-6001 1 (09316-00011, 09316-00071)

### 5. INSPECT IDLER LOW GEAR RADIAL AND THRUST CLEARANCE (See page [TR-25](#))

# INPUT SHAFT COMPONENTS

TR06C-02

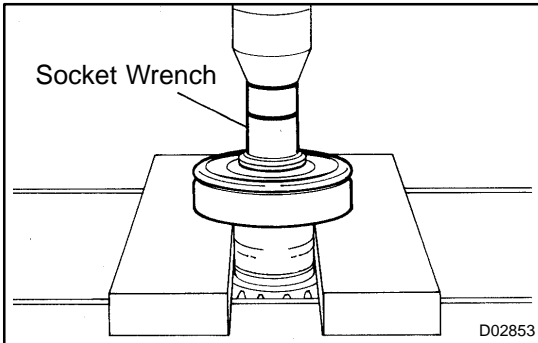




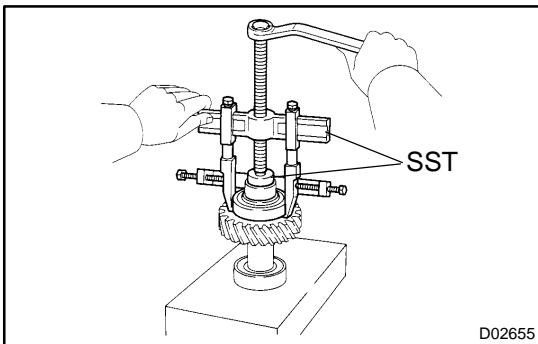
## DISASSEMBLY

### 1. REMOVE REAR BALL BEARING

- (a) Using a snap ring expander, remove the snap ring.



- (b) Using a socket wrench and press, remove the rear ball bearing.

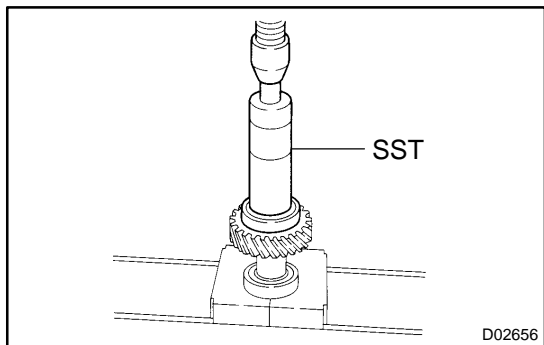


### 2. REMOVE FRONT BALL BEARING

- (a) Using a snap ring expander, remove the snap ring.  
 (b) Using SST, remove the front ball bearing.

SST 09950-40011 (09951-04020, 09952-04010,  
 09953-04030, 09954-04010, 09955-04011,  
 09957-04010, 09958-04011), 09950-60010  
 (09951-00400)





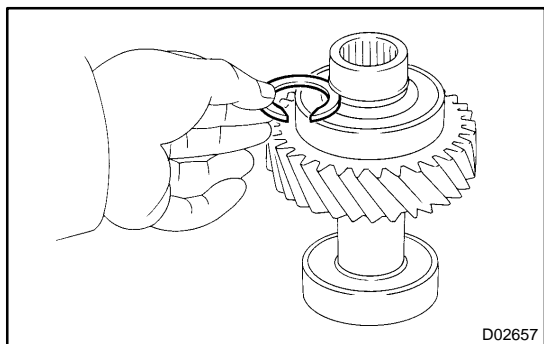
## REASSEMBLY

### HINT:

Coat all of the sliding and rotating surfaces with gear oil before reassembly.

### 1. INSTALL FRONT BALL BEARING

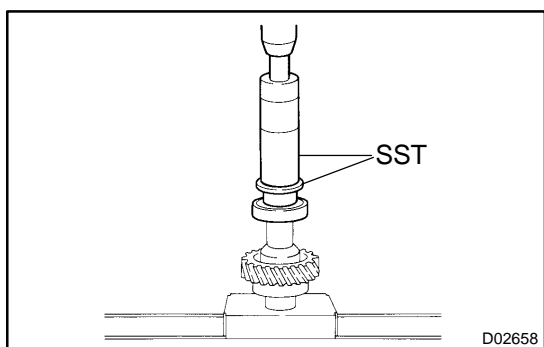
- (a) Using SST and a press, install a new front ball bearing.  
SST 09316-6001 1 (09316-00011)



- (b) Select a snap ring that will allow the minimum axial play.

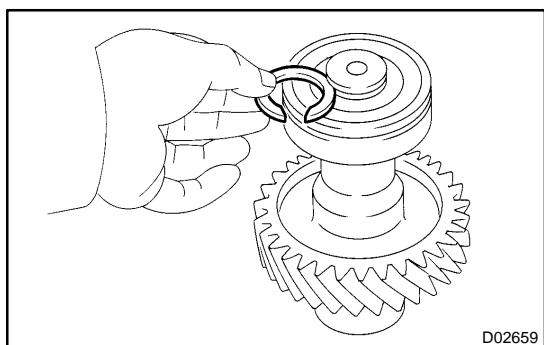
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.90 (0.1141)	D	3.05 (0.1201)
B	2.95 (0.1161)	E	3.10 (0.1220)
C	3.00 (0.1181)	F	3.15 (0.1240)

- (c) Using a snap ring expander, install a new snap ring.



### 2. INSTALL REAR BALL BEARING

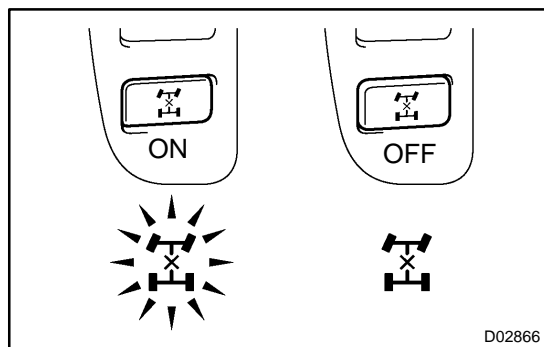
- (a) Using SST and a press, install the rear ball bearing.  
SST 09316-6001 1 (09316-00011, 09316-00031)



- (b) Select a snap ring that will allow the minimum axial play.

Mark	Thickness mm (in.)
A	2.00 (0.0787)
B	2.10 (0.0827)
C	2.20 (0.0866)
D	2.30 (0.0906)
E	2.40 (0.0945)

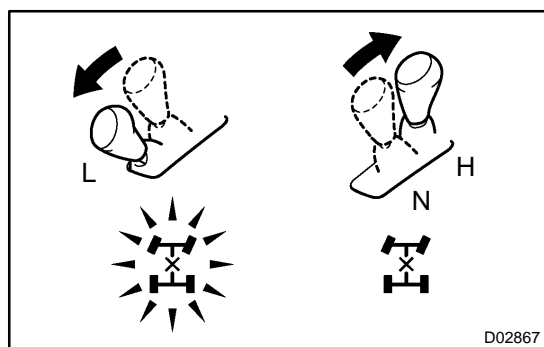
- (c) Using a snap ring expander, install a new snap ring.



## INSPECTION

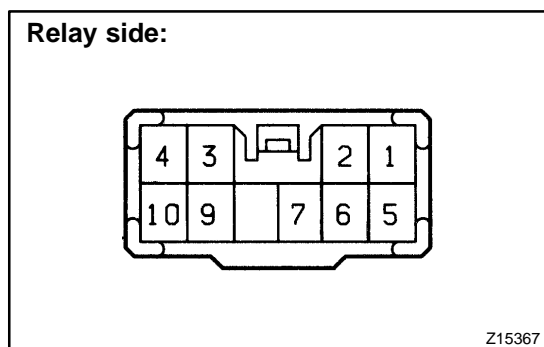
### 1. INSPECT SWITCH POSITION

- Start the engine, and shift the transfer shift lever to the "H" position.
- Check that the center diff. indicator light comes on when the the switch is in "ON" position. Check that the light goes off when the switch is in "OFF" position.



### 2. INSPECT SHIFT LEVER POSITION

- Start the engine, and turn the center diff. lock switch to OFF.
- Check that the center diff. indicator light comes on when the transfer shift lever is shifted to the "L" position. Check that the light goes off when the lever is shifted to the "N" or "H" position.



### 3. INSPECT CENTER DIFF. LOCK CONTROL RELAY

- Check that continuity exists between each terminal, as shown in the chart.

Tester connected terminal number	Specified condition
1 - 2	Continuity
2 - 4	Continuity
6 - 7	*

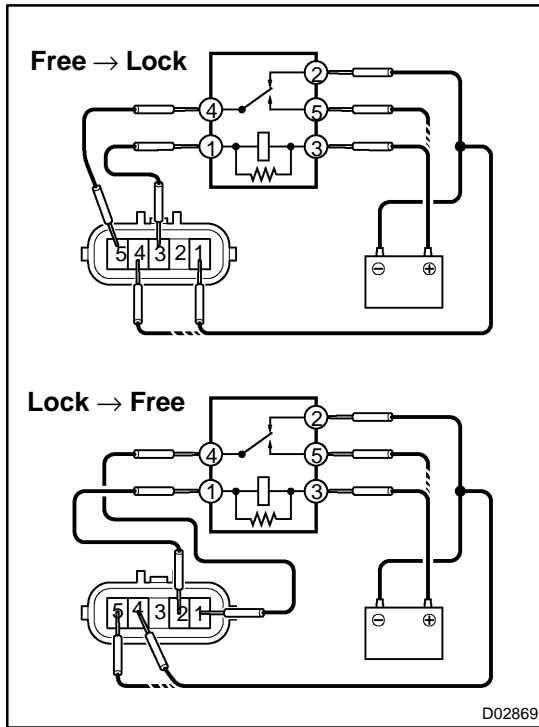
\*: There is a diode between the terminals 6 and 7.

If no continuity exists, check that continuity exists when changing the position of  $\ell$  probe for the position of negative  $\vee$  probe of tester.

- Apply battery positive voltage between each terminal and check that continuity exists between each terminal, as shown in the chart.

Battery voltage applied terminal	Tester connected terminal number	Specified condition
6 (+) - 5 (-)	1 - 3	Continuity
	1 - 2	No continuity
7 (+) - 2 (-)	9 - 10	No continuity
9 (+) - 10 (-)	3 - 4	Continuity
	2 - 4	No continuity

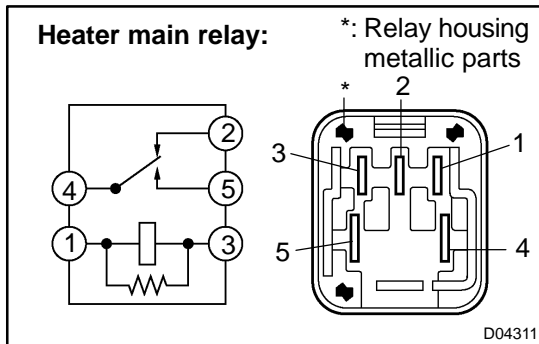
If continuity is not as specified, replace the relay.



**4. INSPECT ACTUATOR OPERATION**

- (a) Raise up the front wheels, place the stopper under the rear wheels to block them, and pull up the parking brake.
- (b) Disconnect the connector of the actuator and connect it to the relay using wire.
- (c) Check that the front propeller shaft can be rotated by hand.

Inspection Item	Standard
Center Diff. Free → Lock	Front propeller shaft cannot be rotated.
Center Diff. Lock → Free	Front propeller shaft can be rotated.

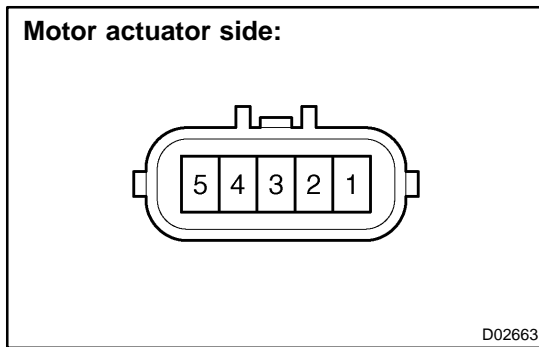


**HINT:**

When inspecting the operation described above, use a heater main relay.

**NOTICE:**

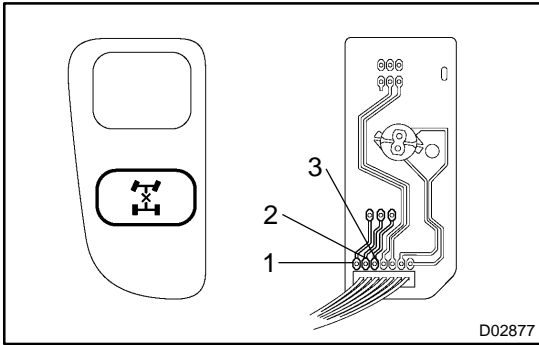
Connect the terminals being careful not to touch the neighboring terminals or metallic parts of relay housing.



**5. INSPECT MOTOR ACTUATOR (MOTOR)**

- (a) Remove the motor actuator (See page TR-8).
- (b) Measure the resistance between the terminals 1 and 5.  
**Standard resistance: 0.3 - 100 Ω**
- (c) Measure the resistance between the terminals 1 or 5 and body ground.  
**Standard resistance: More than 0.5 MΩ**

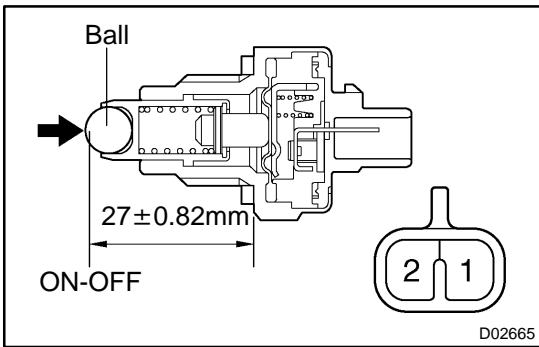
If the resistance value is not as specified, replace the motor actuator.



**6. INSPECT CENTER DIFF. LOCK SWITCH CONTINUITY**

- (a) Remove the center diff. lock switch (See page [AC-102](#) ).
- (b) Inspect the continuity between each terminal.

Center diff. lock switch condition	Tester connected terminal number	Specified condition
ON	1 - 2	No continuity
	1 - 3	No continuity
	2 - 3	Continuity
OFF	1 - 2	Continuity
	1 - 3	No continuity
	2 - 3	No continuity

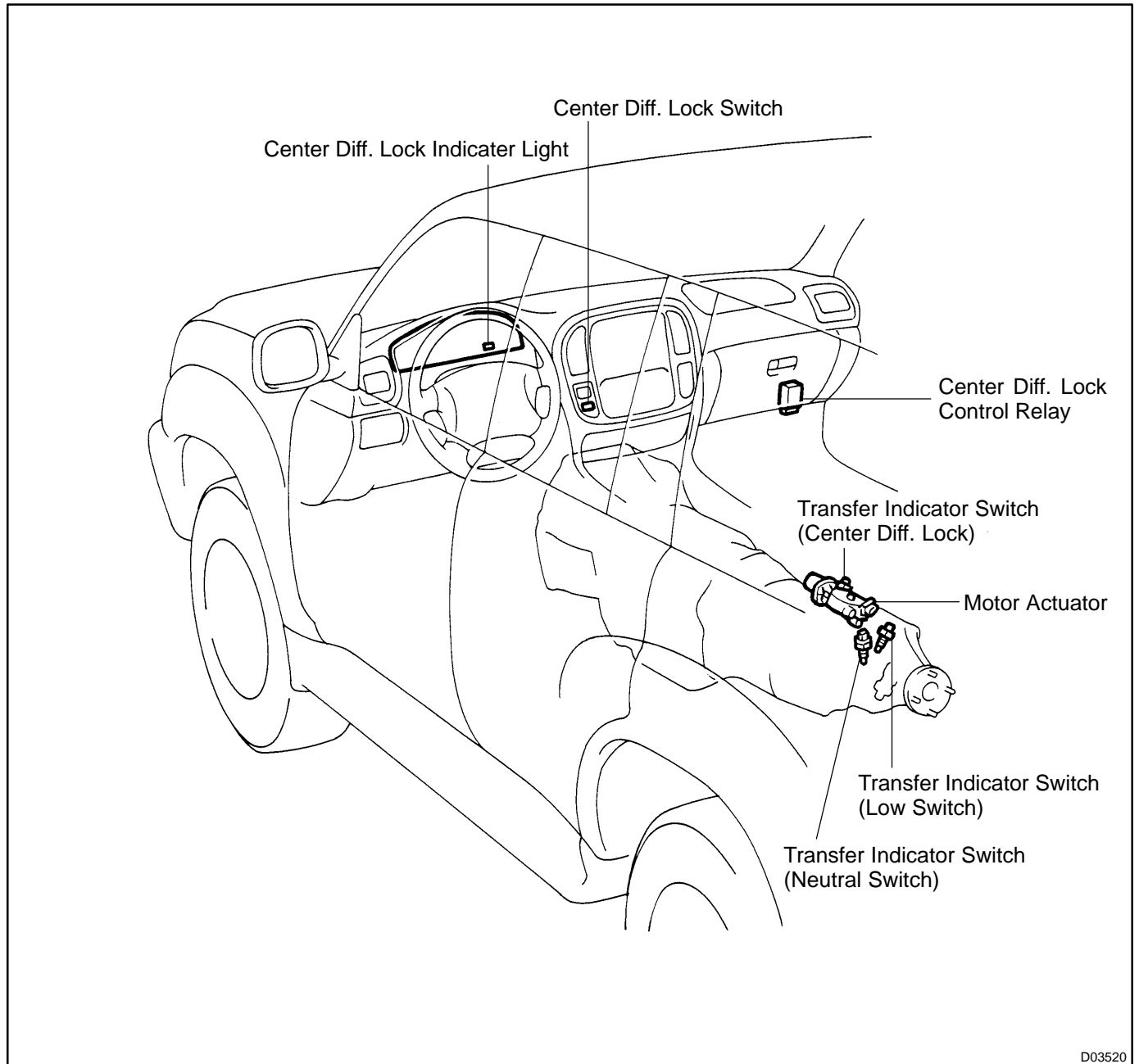


**7. INSPECT TRANSFER INDICATOR SWITCH CONTINUITY**

- (a) Remove the 3 transfer indicator switches (See page [TR-8](#) ).
- (b) Check that continuity exists between terminals 1 and 2 when pushing the ball at the tip of the switch.

# MOTOR SHIFT CONTROL SYSTEM LOCATION

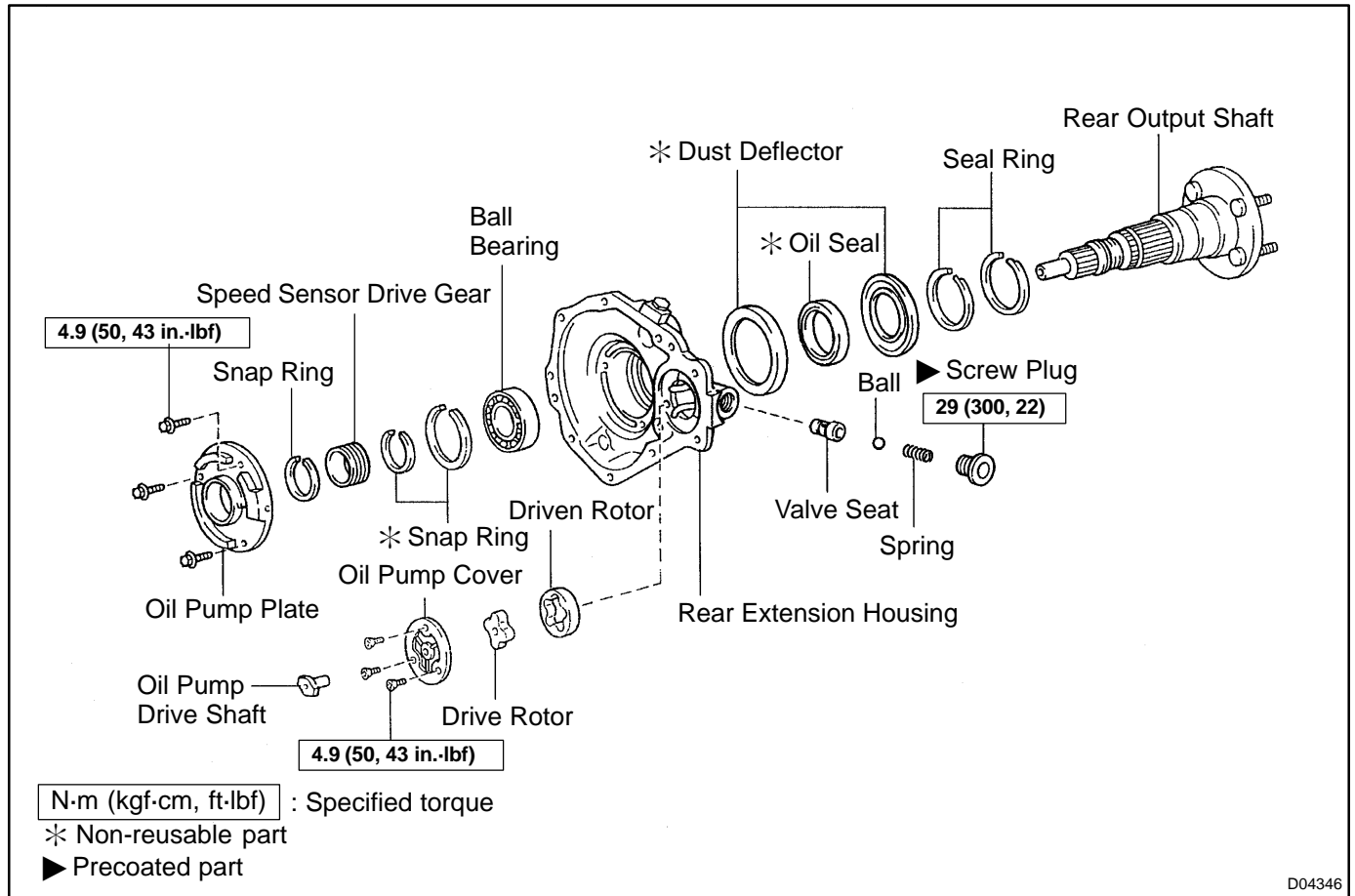
TR06U-02



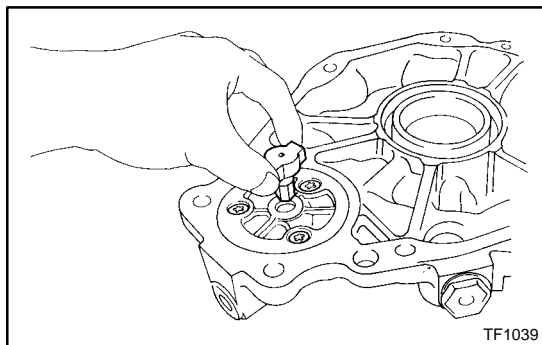
D03520

# REAR EXTENSION HOUSING COMPONENTS

TR06P-02

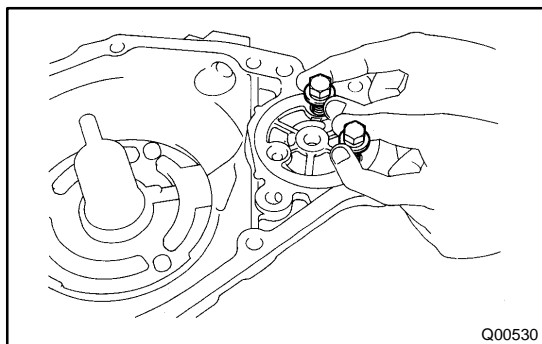


D04346



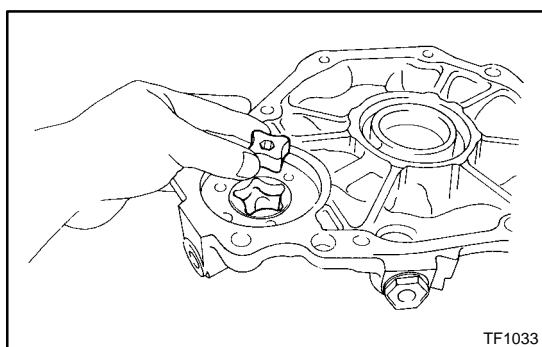
## DISASSEMBLY

### 1. REMOVE OIL PUMP DRIVE SHAFT

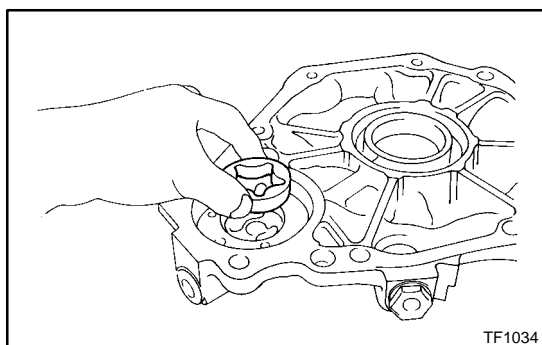


### 2. REMOVE OIL PUMP COVER

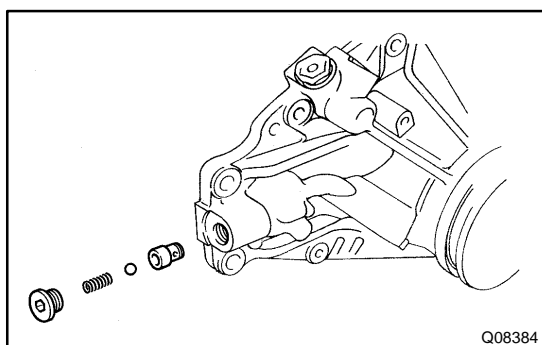
- (a) Using a torx socket wrench (T30), remove the 3 screws.
- (b) Install the 2 suitable bolts to the pump cover.
- (c) Remove the pump cover from the rear extension housing.



### 3. REMOVE DRIVE ROTOR FROM DRIVEN ROTOR

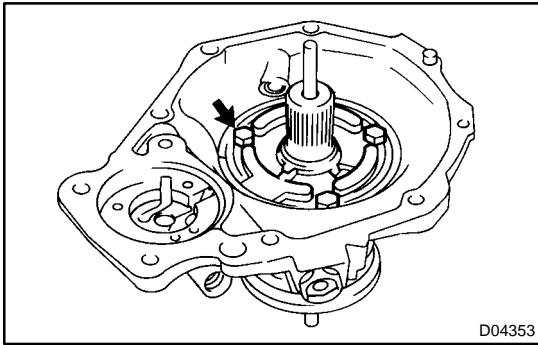


### 4. REMOVE DRIVEN ROTOR FROM REAR EXTENSION HOUSING



### 5. REMOVE SCREW PLUG, SPRING, BALL AND VALVE SEAT

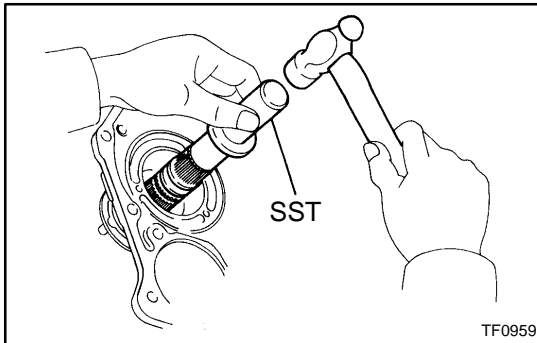
- (a) Using a hexagon wrench, remove the screw plug.
- (b) Using a magnetic finger, remove the spring, ball and valve seat from the rear extension housing.

**6. REMOVE OIL PUMP PLATE**

Remove the 3 bolts and oil pump plate.

**7. REMOVE SPEED SENSOR DRIVE GEAR**

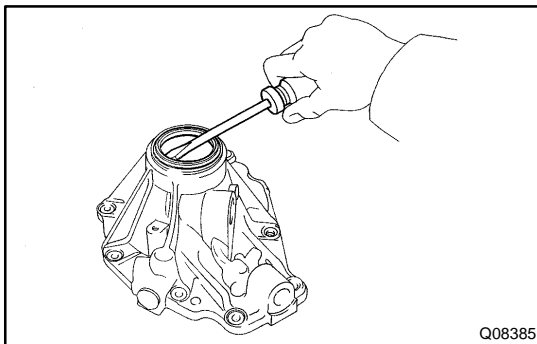
- (a) Using a snap ring expander, remove the snap ring.
- (b) Remove the speed sensor drive gear.

**8. REMOVE REAR OUTPUT SHAFT**

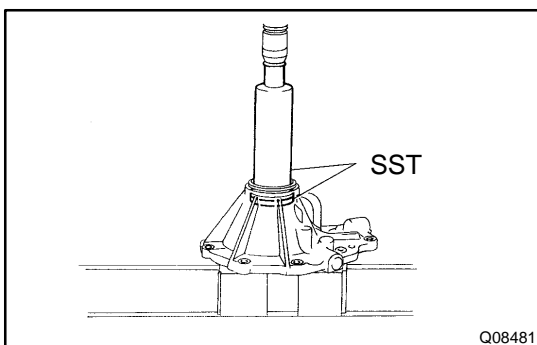
- (a) Using a snap ring expander, remove the snap ring.
- (b) Using SST and a hammer, remove the rear output shaft.  
SST 09325-12010
- (c) Remove the 2 seal rings from the rear output shaft.

**9. REMOVE DUST DEFLECTOR**

- (a) Using a screwdriver and hammer, remove the rear extension housing dust deflector.
- (b) Using a screwdriver and hammer, remove the rear output shaft dust deflector.

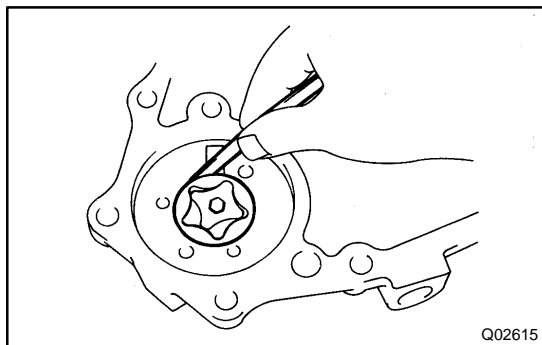
**10. REMOVE OIL SEAL**

Using a screwdriver, pry out the oil seal from the rear extension housing.

**11. REMOVE BALL BEARING**

- (a) Using a screwdriver, remove the snap ring.
- (b) Using SST and a press, remove the ball bearing from the rear extension housing.  
SST 09316-6001 1 (09316-00011, 09316-00021)





## INSPECTION

### 1. INSPECT DRIVEN ROTOR BODY CLEARANCE

- (a) Install the drive rotor and driven rotor to the rear extension housing.
- (b) Using a feeler gauge, measure the body clearance between the drive rotor and extension housing.

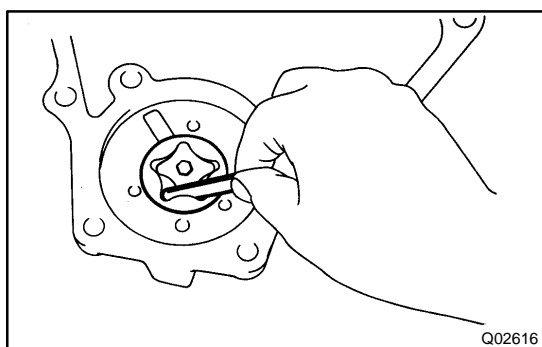
**Standard clearance:**

**0.08 - 0.17 mm (0.0031 - 0.0067 in.)**

**Maximum clearance:**

**0.17 mm (0.0067 in.)**

If the body clearance exceeds the maximum, replace the drive rotor and driven rotor.



### 2. INSPECT DRIVEN ROTOR TIP CLEARANCE

Using a feeler gauge, measure the tip clearance between the drive rotor and driven rotor.

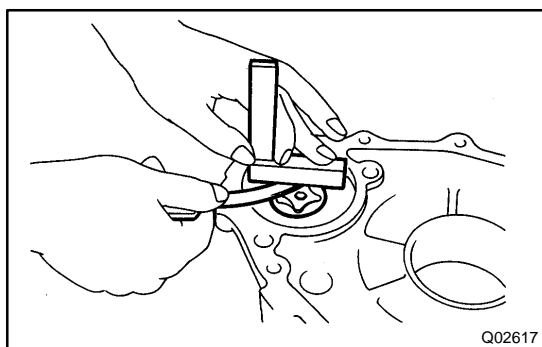
**Standard clearance:**

**0.05 - 0.15 mm (0.0020 - 0.0059 in.)**

**Maximum clearance:**

**0.15 mm (0.0059 in.)**

If the tip clearance exceeds the maximum, replace the drive rotor and driven rotor.



### 3. INSPECT OIL PUMP SIDE CLEARANCE

Using a steel straight edge and feeler gauge, measure the side clearance of oil pump.

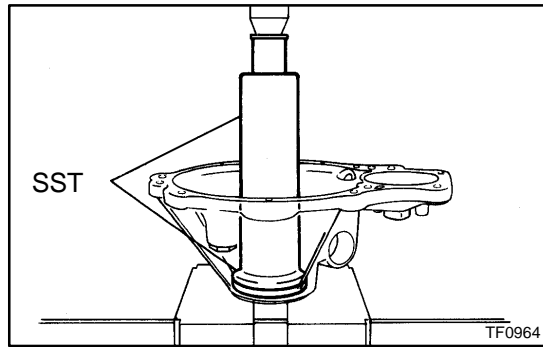
**Standard clearance:**

**0.03 - 0.10 mm (0.0012 - 0.0039 in.)**

**Maximum clearance:**

**0.10 mm (0.0039 in.)**

If the side clearance exceeds the maximum, replace the drive rotor and driven rotor.



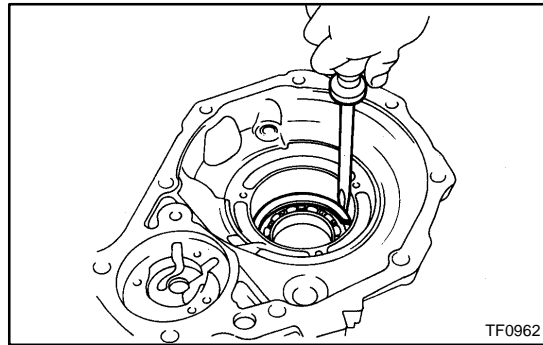
## REASSEMBLY

### HINT:

Coat all of the sliding and rotating surfaces with gear oil before reassembly.

### 1. INSTALL BALL BEARING

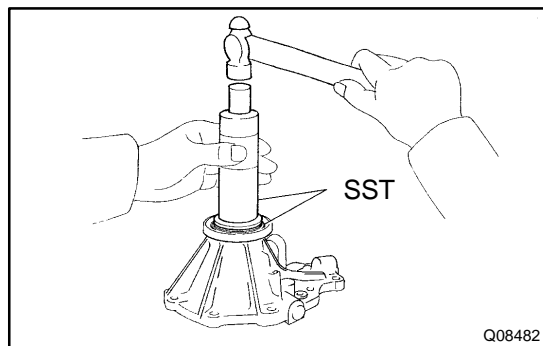
- (a) Using SST and a press, install the ball bearing.  
SST 09316-6001 1 (09316-00011, 09316-00031)



- (b) Select a snap ring that will allow the minimum axial play.

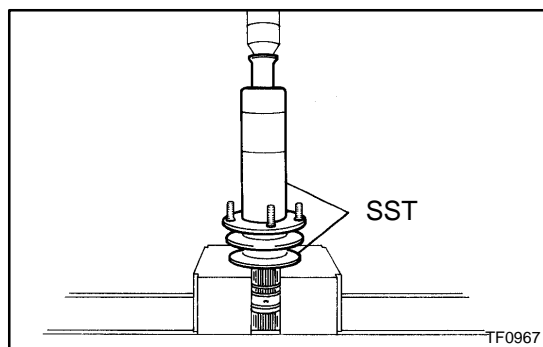
Mark	Thickness mm (in.)
A	1.70 (0.0669)
B	1.80 (0.0709)

- (c) Using a screwdriver, install a new snap ring.

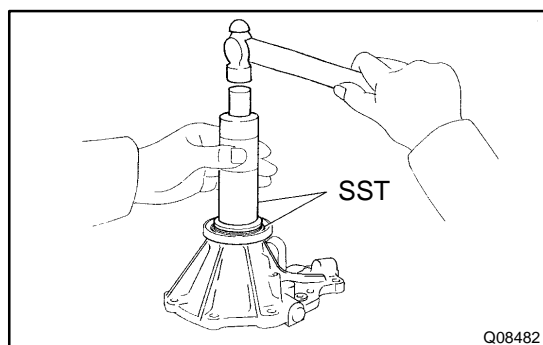


### 2. INSTALL DUST DEFLECTOR

- (a) Using SST and a hammer, install a new rear extension housing dust deflector.  
SST 09316-6001 1 (09316-00011, 09316-00041)

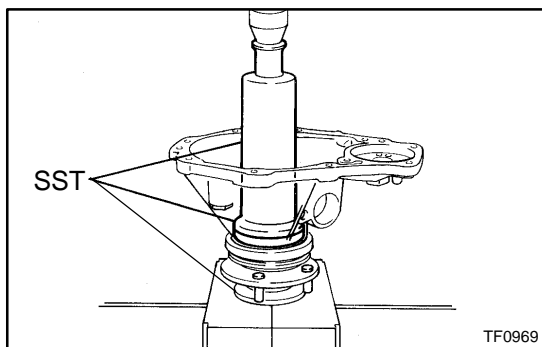


- (b) Using SST and a press, install a new rear output shaft dust deflector.  
SST 09316-2001 1, 09316-60011 (09316-00011)



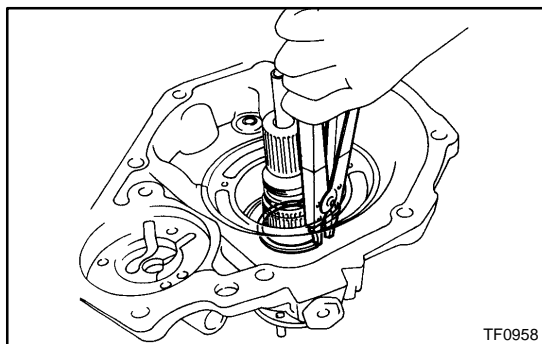
### 3. INSTALL OIL SEAL

- (a) Apply MP grease to the lip of a new oil seal.
- (b) Using SST and a hammer, drive in the oil seal.  
SST 09316-6001 1 (09316-00011, 09316-00031)



#### 4. INSTALL REAR OUTPUT SHAFT

- (a) Using SST and a press, install the rear output shaft.  
SST 09316-20011, 09316-60011 (09316-00011, 09316-00031)
- (b) Install the 2 seal rings to the rear output shaft.



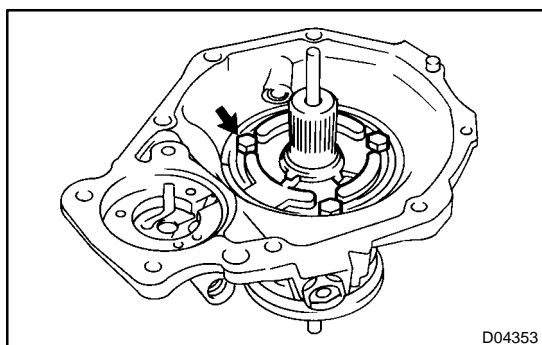
- (c) Select a snap ring that will allow the minimum axial play.

Mark	Thickness mm (in.)
1	1.95 (0.0768)
2	2.05 (0.0807)
3	2.15 (0.0847)
4	2.25 (0.0886)

- (d) Using a snap ring expander, install a new snap ring.

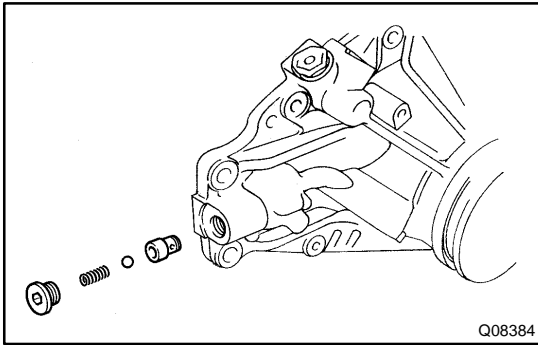
#### 5. INSTALL SPEED SENSOR DRIVE GEAR

- (a) Install the speed sensor drive gear.
- (b) Using a snap ring expander, install the snap ring.



#### 6. INSTALL OIL PUMP PLATE

- (a) Install the oil pump plate.
- (b) Install and torque the 3 bolts.  
**Torque: 4.9 N·m (50 kgf·cm, 43 in.-lbf)**



### 7. INSTALL VALVE SEAT, BALL, SPRING AND SCREW PLUG

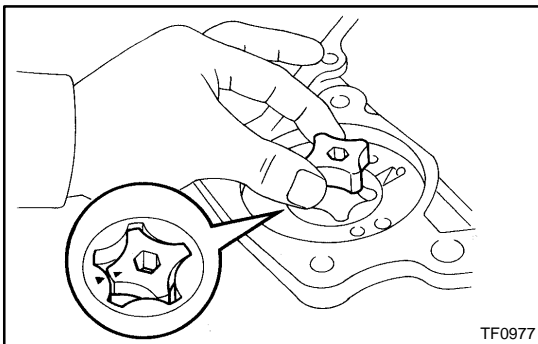
- (a) Apply gear oil to the ball.
- (b) Install the valve seat, ball and spring.
- (c) Apply liquid sealer to the screw plug threads.

#### Sealant:

**Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent**

- (d) Using a hexagon wrench, install and torque the screw plug.

**Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)**



### 8. INSTALL DRIVEN ROTOR

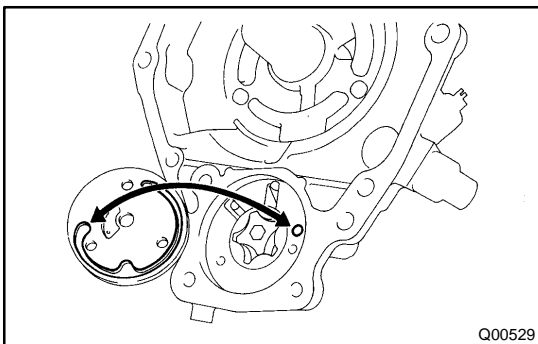
- (a) Apply gear oil to the driven rotor.
- (b) Install the driven rotor.

### 9. INSTALL DRIVE ROTOR

- (a) Apply gear oil to the drive rotor.
- (b) Install the drive rotor.

#### HINT:

Align the alignment marks.



### 10. INSTALL OIL PUMP COVER

- (a) Install the oil pump cover.
- (b) Using a torx socket wrench (T30), install and torque the 3 screws.

**Torque: 4.9 N·m (50 kgf·cm, 43 in.-lbf)**

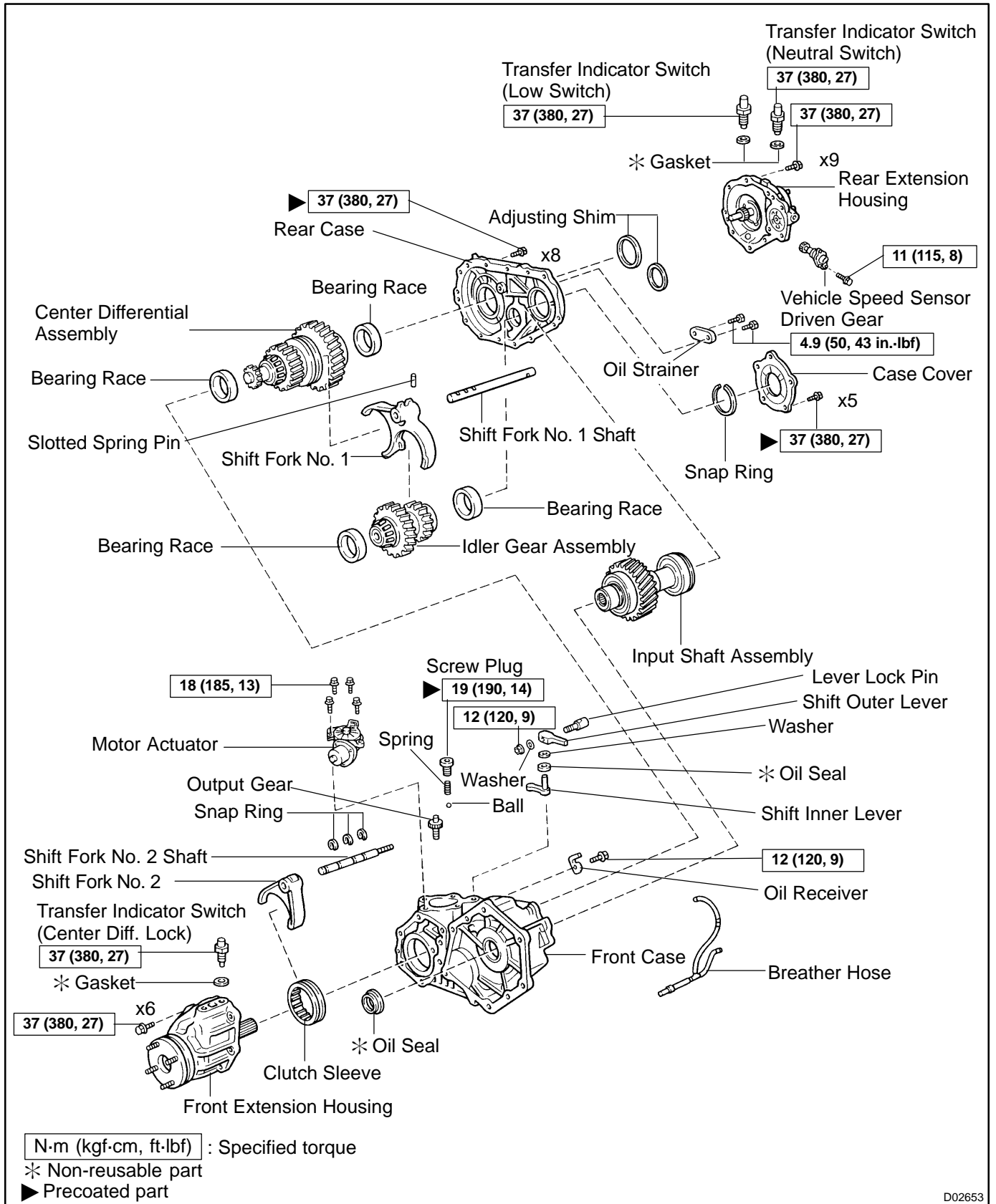
#### NOTICE:

**Align the oil hole of the rear extension housing and oil groove end of the oil pump cover.**

### 11. INSTALL OIL PUMP DRIVE SHAFT

# TRANSFER ASSEMBLY COMPONENTS

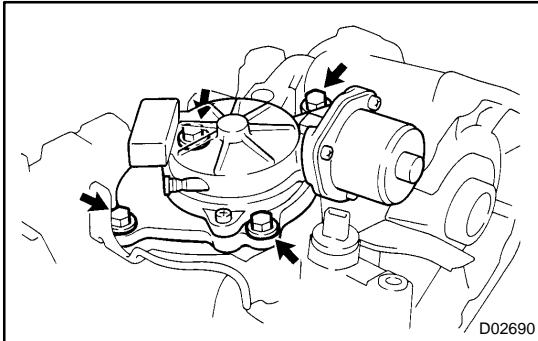
TR069-02



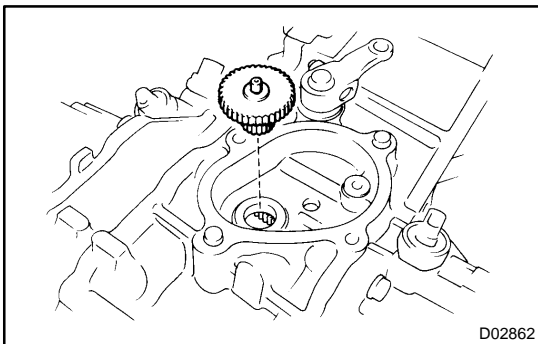
D02653

## DISASSEMBLY

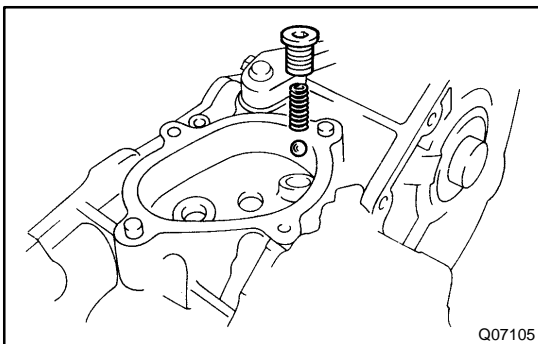
1. REMOVE BREATHER HOSE
2. REMOVE VEHICLE SPEED SENSOR DRIVEN GEAR  
Remove the bolt and driven gear.



3. REMOVE MOTOR ACTUATOR  
Remove the 4 bolts and motor actuator.

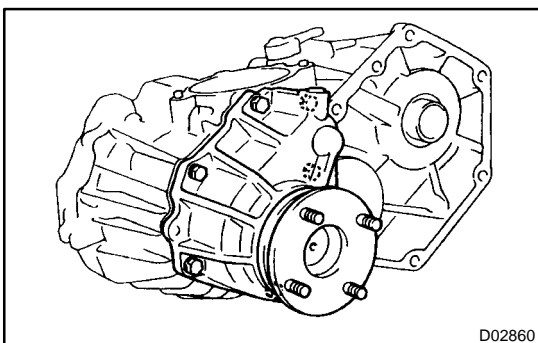


4. REMOVE OUTPUT GEAR FROM FRONT CASE

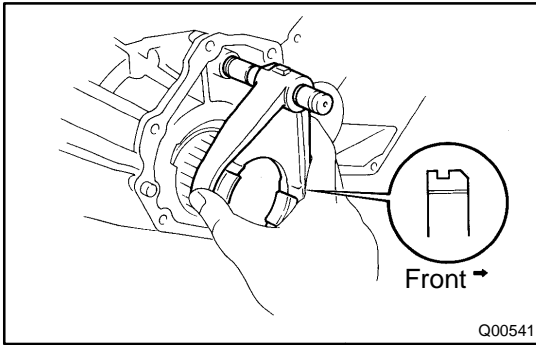


5. REMOVE SCREW PLUG, SPRING AND BALL
  - (a) Using a torx socket wrench (T40), remove the screw plug.
  - (b) Using a magnetic finger, remove the spring and ball.

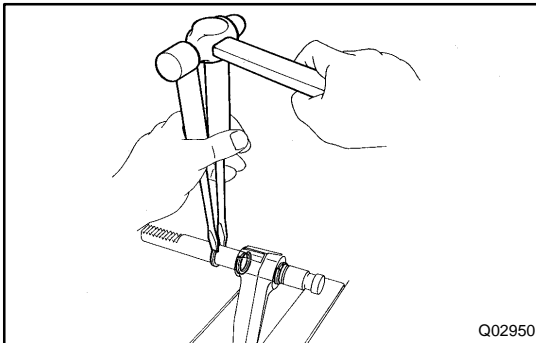
6. REMOVE TRANSFER INDICATOR SWITCH  
Remove the 3 transfer indicator switches and 3 gaskets.



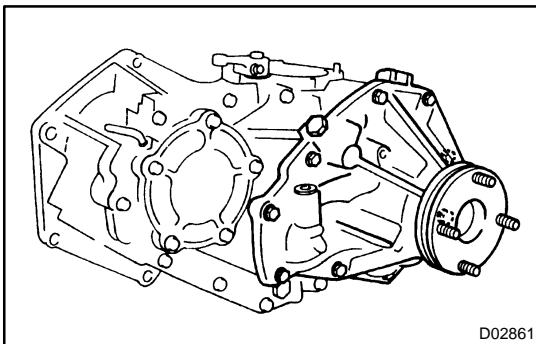
7. REMOVE FRONT EXTENSION HOUSING  
Remove the 6 bolts and front extension housing.  
HINT:  
If necessary, tap the front extension housing lightly with a plastic hammer.



- 8. REMOVE CLUTCH SLEEVE WITH SHIFT FORK NO. 2 SHAFT AND SHIFT FORK NO. 2**



- 9. SEPARATE SHIFT FORK NO. 2 SHAFT AND SHIFT FORK NO. 2**
- Using 2 screwdrivers and a hammer, tap out the 3 snap rings from the shift fork No. 2 shaft.
  - Separate the shift fork No. 2 shaft and shift fork No. 2.



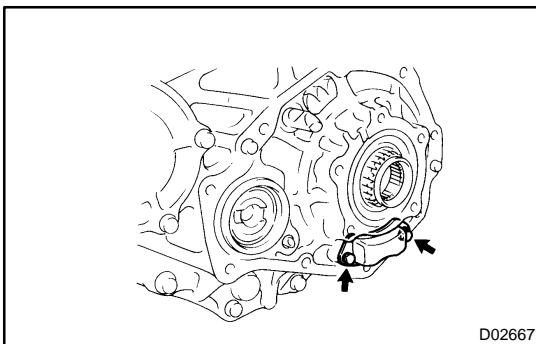
**10. REMOVE REAR EXTENSION HOUSING**

Remove the 9 bolts and rear extension housing.

HINT:

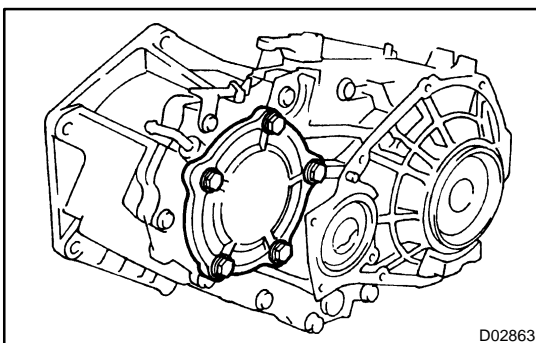
If necessary, tap the rear extension housing lightly with a plastic hammer.

**11. REMOVE ADJUSTING SHIMS**



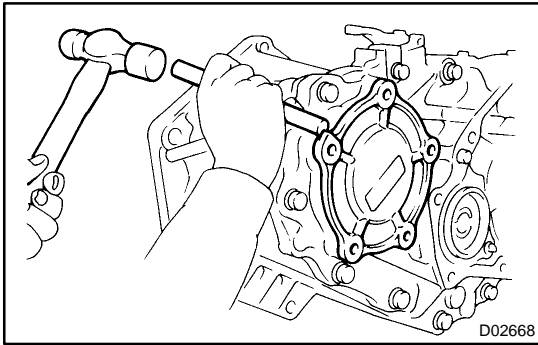
**12. REMOVE OIL STRAINER FROM REAR CASE**

Remove the 2 bolts and oil strainer.

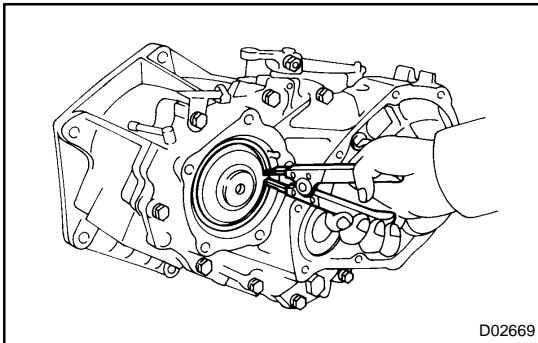


**13. REMOVE CASE COVER**

- Remove the 5 bolts.

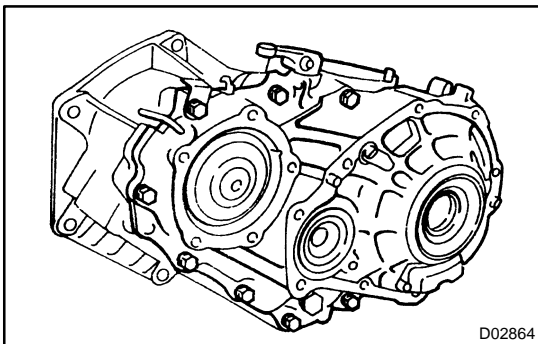


- (b) Using a brass bar and hammer, tap the case cover and remove it.

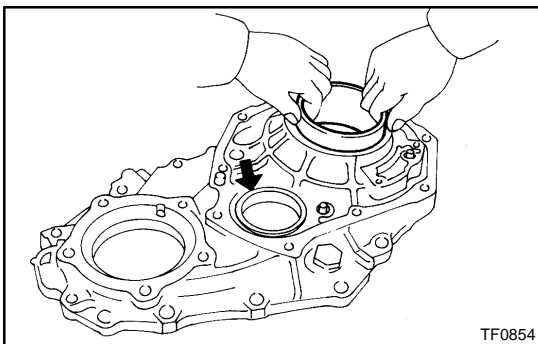


#### 14. SEPARATE FRONT CASE AND REAR CASE

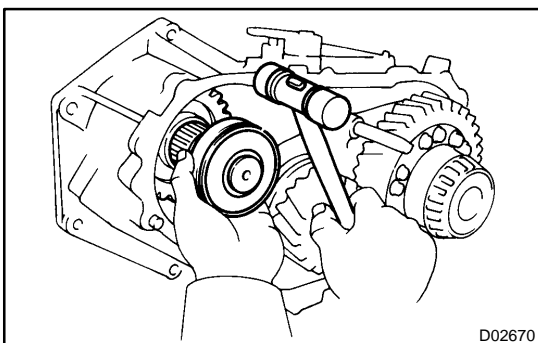
- (a) Using a snap ring expander, remove the snap ring from the rear case.



- (b) Remove the 8 bolts.  
 (c) Using a brass bar and hammer, tap the rear case and separate it.



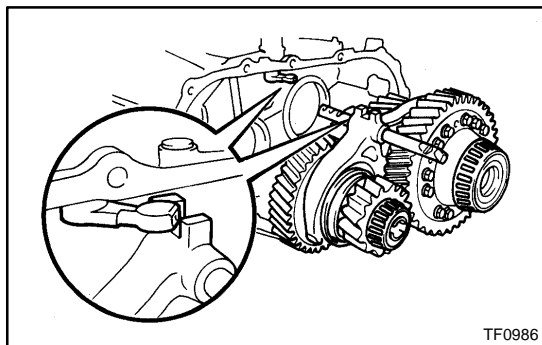
#### 15. REMOVE 2 BEARING RACES FROM REAR CASE



#### 16. REMOVE INPUT SHAFT ASSEMBLY

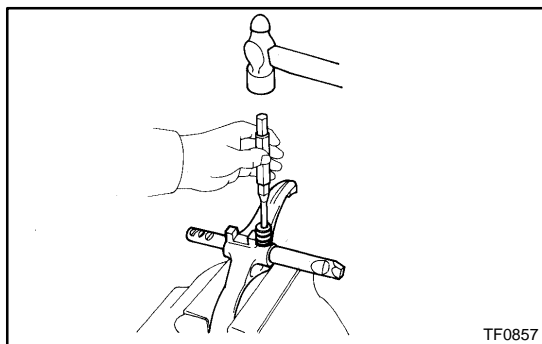
- Using a plastic hammer, remove the input shaft assembly from the front case.





TF0986

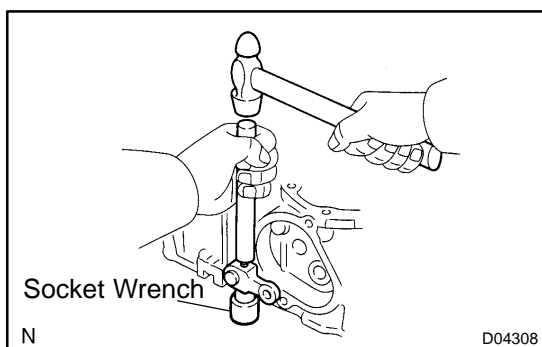
- 17. REMOVE IDLER GEAR ASSEMBLY WITH CENTER DIFFERENTIAL ASSEMBLY, SHIFT FORK NO. 1 AND SHIFT FORK NO. 1 SHAFT FROM FRONT CASE**



TF0857

- 18. SEPARATE SHIFT FORK NO. 1 AND SHIFT FORK NO. 1 SHAFT**

- (a) Using a pin punch and hammer, drive out the slotted spring pin.
- (b) Separate the shift fork No. 1 and shift fork No. 1 shaft.



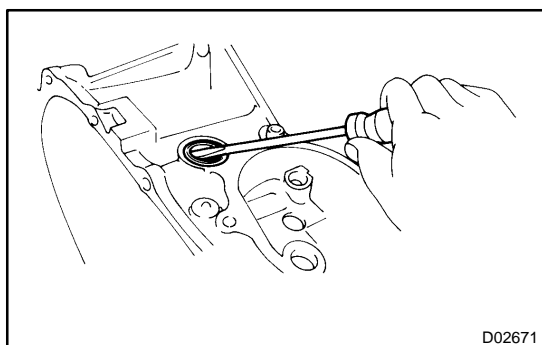
Socket Wrench

N

D04308

- 19. REMOVE SHIFT OUTER LEVER AND INNER LEVER**

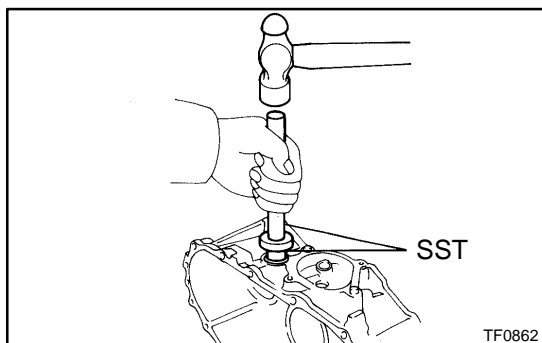
- (a) Remove the nut and washer from the shift outer lever.
- (b) Using a brass bar, hammer and socket wrench, tap out the lever lock pin.
- (c) Remove the shift outer lever, washer and inner lever from the front case.



D02671

- 20. IF NECESSARY, REPLACE INNER SHIFT LEVER OIL SEAL**

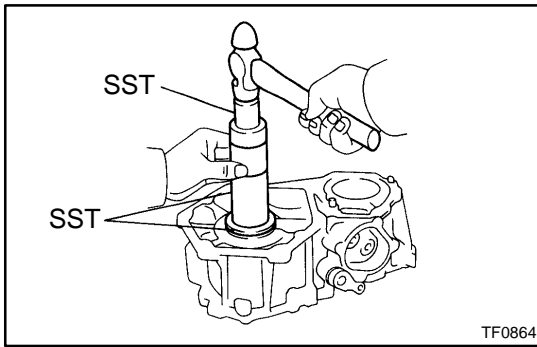
- (a) Using a screwdriver, pry out the oil seal from the front case.



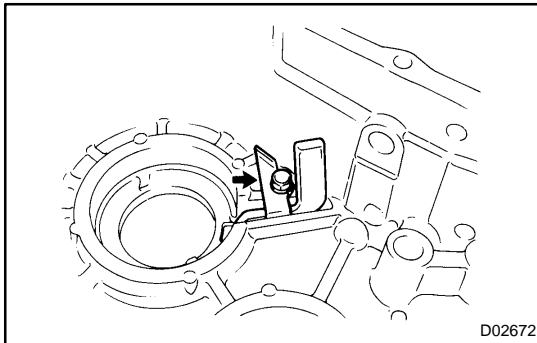
SST

TF0862

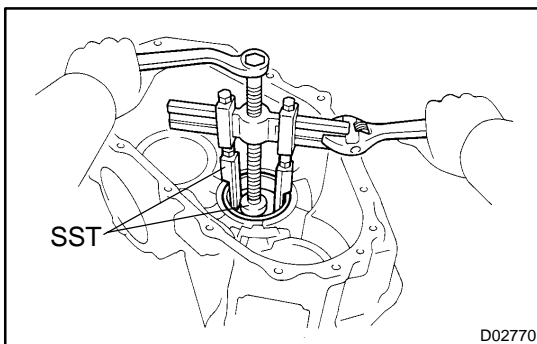
- (b) Apply MP grease to the lip of a new oil seal.
- (c) Using SST and a hammer, drive in a new oil seal.  
SST 09950-60010 (09951-00270), 09950-70010 (09951-07150)

**21. IF NECESSARY, REPLACE INPUT SHAFT OIL SEAL**

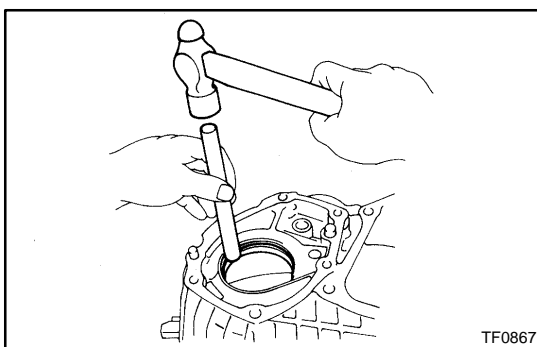
- (a) Using SST and a hammer, drive out the oil seal.  
SST 09316-6001 1 (09316-00011)
- (b) Apply MP grease to the lip of a new oil seal.
- (c) Using SST and a hammer, drive in a new oil seal.  
SST 09316-6001 1 (09316-00011, 09316-00031)

**22. REMOVE OIL RECEIVER FROM FRONT CASE**

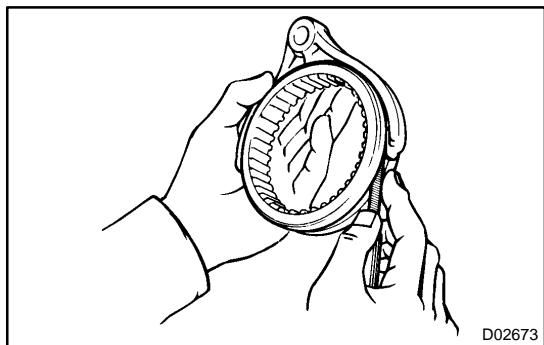
Remove the bolt and oil receiver.

**23. REMOVE 2 BEARING RACES FROM FRONT CASE**

- (a) Using SST, remove the bearing race (for the idler gear).  
SST 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04061, 09957-04010), 09950-60010 (09951-00320)



- (b) Using a brass bar and hammer, remove the bearing race (for the output shaft).



## REASSEMBLY

### 1. INSPECT SHIFT FORK NO. 2 AND CLUTCH SLEEVE CLEARANCE

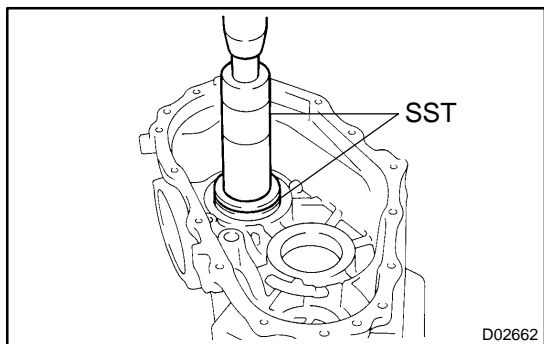
Using a feeler gauge, measure the clearance between the shift fork No. 2 and clutch sleeve.

**Standard clearance:**

**0.10 - 0.40 mm (0.0039 - 0.0157 in.)**

**Maximum clearance:**

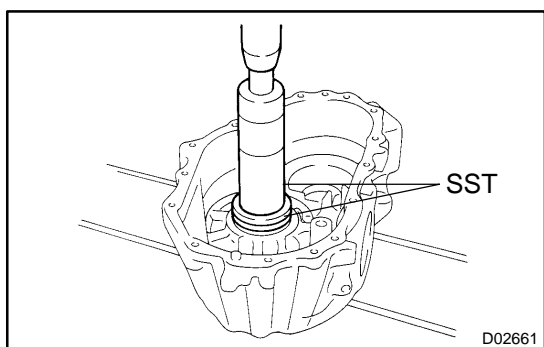
**0.40 mm (0.0157 in.)**



### 2. INSTALL THE BEARING RACE (FOR THE OUTPUT SHAFT)

Using SST and a press, install the bearing race.

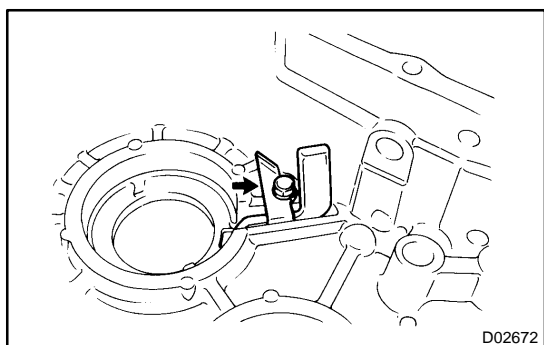
SST 09316-6001 1 (09316-00011, 09316-00031),  
09950-60020 (09951-00890)



### 3. INSTALL THE BEARING RACE (FOR THE IDLER GEAR)

Using SST and a press, install the bearing race.

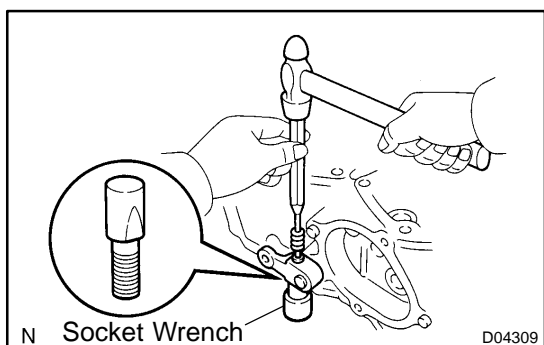
SST 09316-6001 1 (09316-00011, 09316-00031),  
09950-60020 (09951-00790)



### 4. INSTALL OIL RECEIVER TO FRONT CASE

Install the oil receiver and bolt.

**Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)**



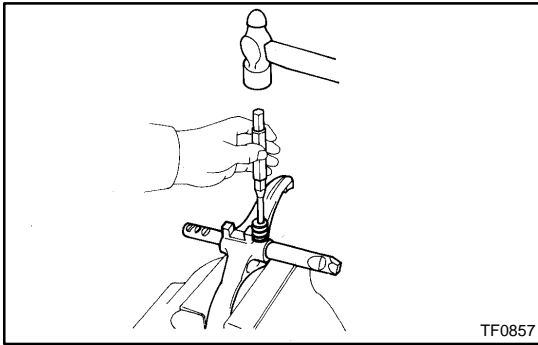
### 5. INSTALL SHIFT OUTER LEVER AND INNER LEVER

(a) Install the shift inner lever, washer and outer lever to the front case.

(b) Using a pin punch, hammer and socket wrench, tap in the lever lock pin.

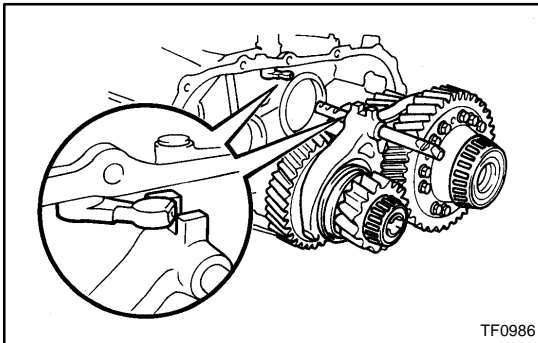
(c) Install the washer and nut to the shift outer lever.

**Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)**



## 6. ASSEMBLE SHIFT FORK NO. 1 AND SHIFT FORK NO. 1 SHAFT

- (a) Assemble the shift fork No. 1 and shift fork No. 1 shaft.
- (b) Using a pin punch and hammer, drive in the slotted spring pin.

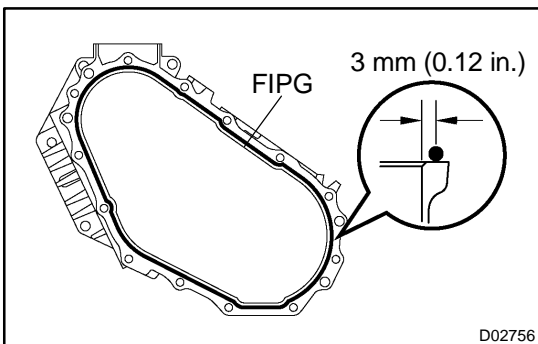


## 7. INSTALL IDLER GEAR ASSEMBLY WITH CENTER DIFFERENTIAL ASSEMBLY, SHIFT FORK NO. 1 AND SHIFT FORK NO. 1 SHAFT TO FRONT CASE

### NOTICE:

Set the shift inner lever into the fork head part of the shift fork No. 1 securely.

8. INSTALL INPUT SHAFT ASSEMBLY
9. INSTALL 2 BEARING RACES TO REAR CASE



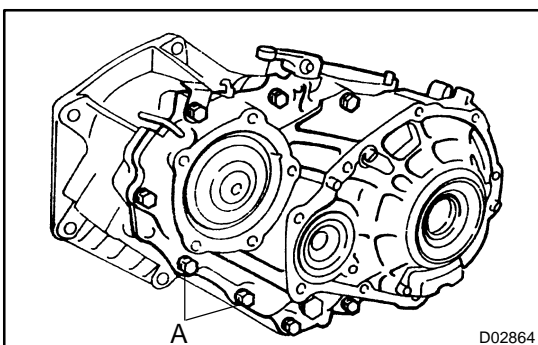
## 10. ASSEMBLY FRONT CASE AND REAR CASE

- (a) Apply FIPG to the front case.

### FIPG:

**Part No. 08826-00090, THREE BOND 1281 or equivalent**

- (b) Assemble the front case and rear case.



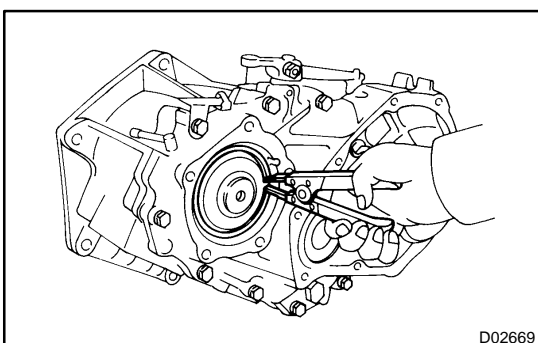
- (c) Apply liquid sealer to the "A" bolt threads.

### Sealant:

**Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent**

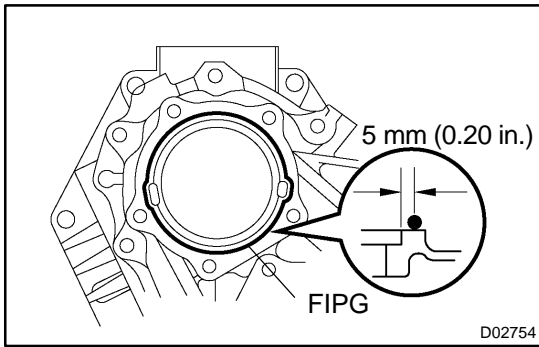
- (d) Install the 8 bolts.

**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**



## 11. ASSEMBLE FRONT CASE AND REAR CASE

Using a snap ring expander, install the snap ring to the rear case.

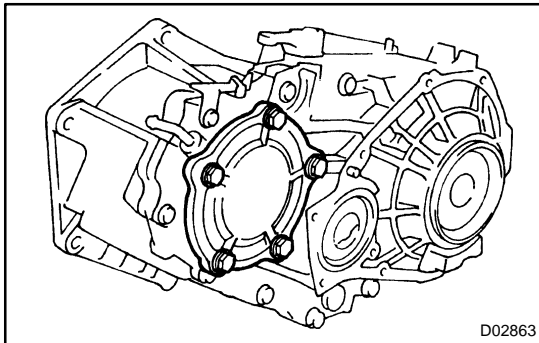
**12. INSTALL CASE COVER**

- (a) Apply FIPG to the rear case.

**FIPG:**

**Part No. 08826-00090, THREE BOND 1281 or equivalent**

- (b) Install the case cover.



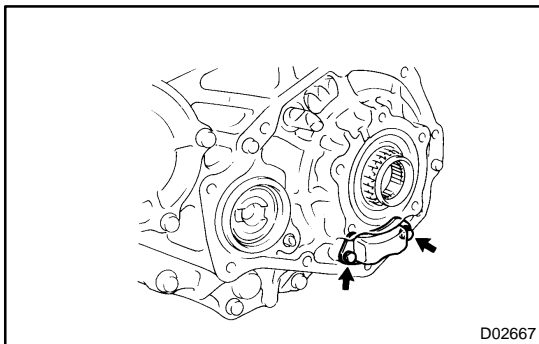
- (c) Apply liquid sealer to the bolt threads.

**Sealant:**

**Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent**

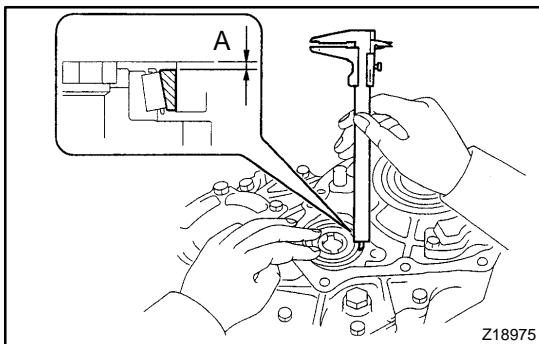
- (d) Install the 5 bolts.

**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

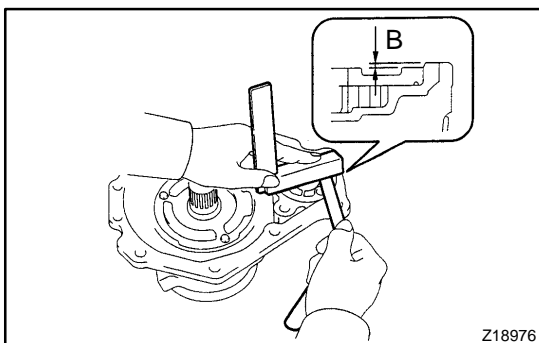
**13. INSTALL OIL STRAINER TO REAR CASE**

Install the oil strainer and 2 bolts.

**Torque: 4.9 N·m (50 kgf·cm, 43 in.-lbf)**

**14. SELECT ADJUSTING SHIM FOR IDLER GEAR REAR TAPER ROLLER BEARING**

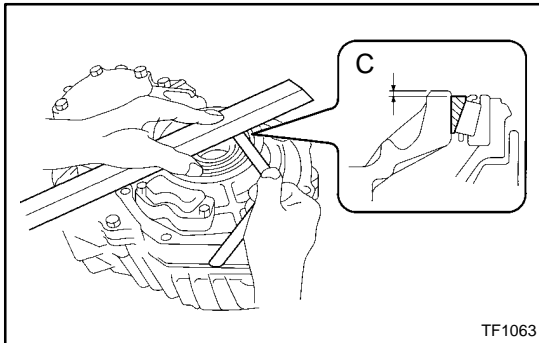
- (a) Using vernier calipers, measure dimension "A".
- (b) Lightly hole down the bearing outer race in the thrust direction to eliminate any looseness before making the measurement.



- (c) Using a steel straight edge and feeler gauge, measure the clearance of dimension "B".
- (d) Calculate the required thickness of the adjusting shim.  
**Thickness: Dimension "A" + Dimension "B" + [0.022 - 0.049 mm, (0.0009 - 0.0019 in.)]**

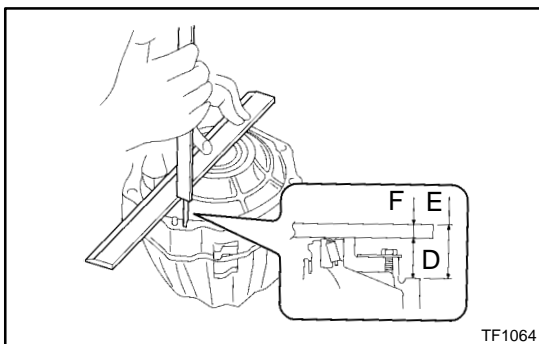
- (e) From the following table, select a shim so that its thickness is within the range of the calculation.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
2	0.30 (0.0118)	8	3.20 (0.1260)
3	0.45 (0.0177)	9	3.40 (0.1339)
4	2.40 (0.0945)	10	3.60 (0.1417)
5	2.60 (0.1024)	11	3.80 (0.1496)
6	2.80 (0.1102)	12	4.00 (0.1575)
7	3.00 (0.1181)	13	0.55 (0.0216)



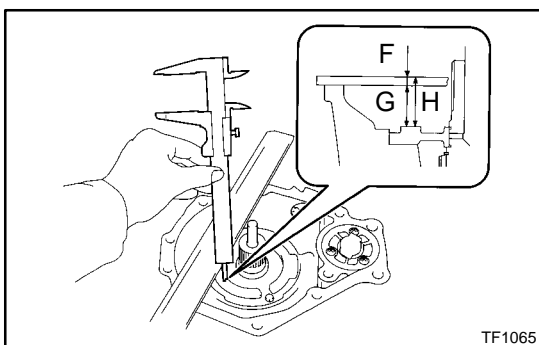
**15. SELECT ADJUSTING SHIM FOR OUTPUT SHAFT TAPER ROLLER BEARING**

- (a) Using a steel straight edge and feeler gauge, measure the clearance of dimension "C".  
 (b) Lightly hold down the bearing outer race in the thrust direction to eliminate any looseness before making the measurement.



- (c) Using a steel straight edge and vernier calipers with depth gauge, measure dimension "D".  
 (d) Dimension "D" is the straight edge thickness (Dimension "F") subtracted from dimension "E" in the illustration to the left.

**Dimension "D": Dimension "E" - Dimension "F"**



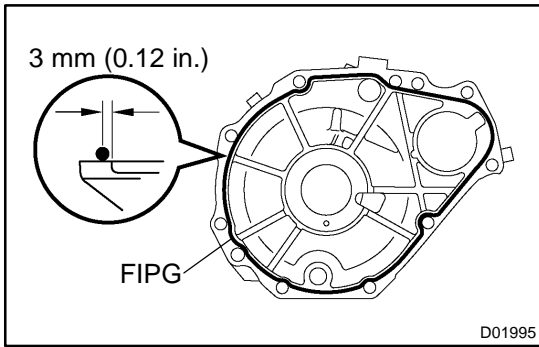
- (e) Using a steel straight edge and vernier calipers with depth gauge, measure dimension "G".  
 (f) Dimension "G" is the straight edge thickness (Dimension "F") subtracted from Dimension "H".

**Dimension "G": Dimension "H" - Dimension "F"**

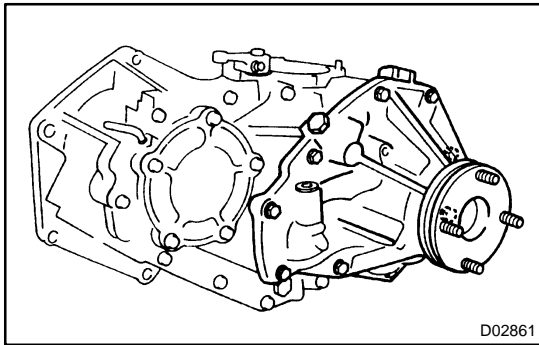
- (g) Calculate the required thickness of the adjusting shim.  
**Thickness: Dimension "G" - (Dimension "D" - Dimension "C") + [0.014 ~ 0.039 mm, (0.0006 ~ 0.0015 in.)]**

- (h) From the following table, select a shim so that its thickness is within the range of the calculation.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
B	0.30 (0.0118)	H	1.80 (0.0709)
C	0.45 (0.0177)	J	2.00 (0.0787)
D	1.00 (0.0394)	K	2.20 (0.0866)
E	1.20 (0.0472)	L	2.40 (0.0945)
F	1.40 (0.0551)	M	2.60 (0.1024)
G	1.60 (0.0630)	N	0.55 (0.0216)



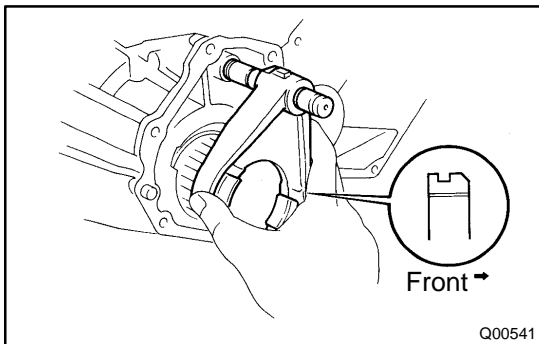
- 16. INSTALL REAR EXTENSION HOUSING**  
 (a) Apply FIPG to the rear extension housing.  
**FIPG:**  
**Part No. 08826-00090, THREE BOND 1281 or equivalent**



- (b) Install the rear extension housing and 9 bolts.  
**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

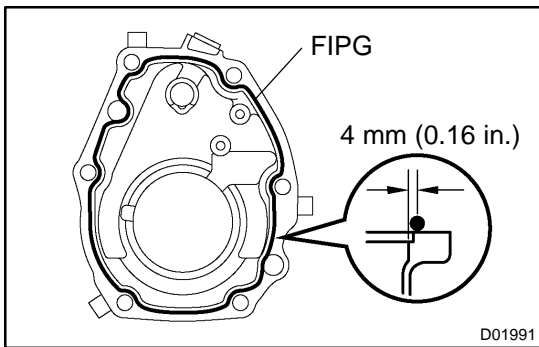
**17. ASSEMBLE SHIFT FORK NO. 2 SHAFT AND SHIFT FORK NO. 2**

- (a) Install the shift fork No. 2 to the shift fork No. 2 shaft.  
 (b) Install the 3 snap rings to the shift fork No. 2 shaft.

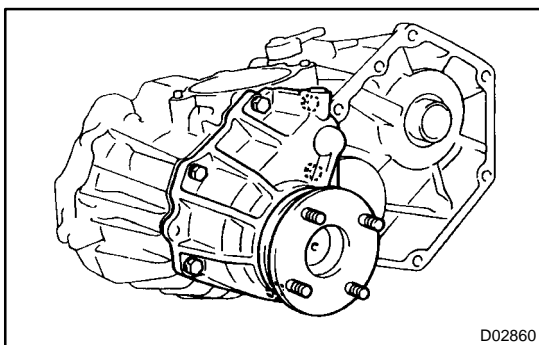


**18. INSTALL CLUTCH SLEEVE WITH SHIFT FORK NO. 2 SHAFT AND SHIFT FORK NO. 2**

- HINT:**  
 Make sure to install the clutch sleeve in the correct direction.



- 19. INSTALL FRONT EXTENSION HOUSING**  
 (a) Apply FIPG to the front extension housing.  
**FIPG:**  
**Part No. 08826-00090, THREE BOND 1281 or equivalent**

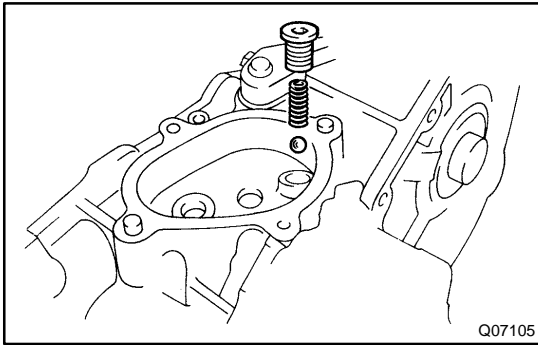


- (b) Install the front extension housing and 6 bolts.  
**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

- HINT:**  
 Set the clutch sleeve in differential lock condition.

**20. INSTALL TRANSFER INDICATOR SWITCH**

- Install the 3 transfer indicator switches with 3 new gaskets.  
**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

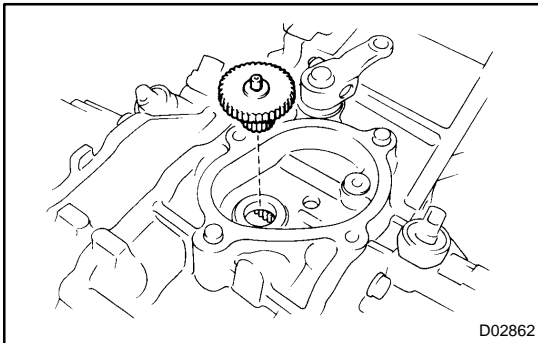
**21. INSTALL BALL, SPRING AND SCREW**

- (a) Install the ball and spring.
- (b) Apply liquid sealer to the screw plug threads.

**Sealant:**

**Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent**

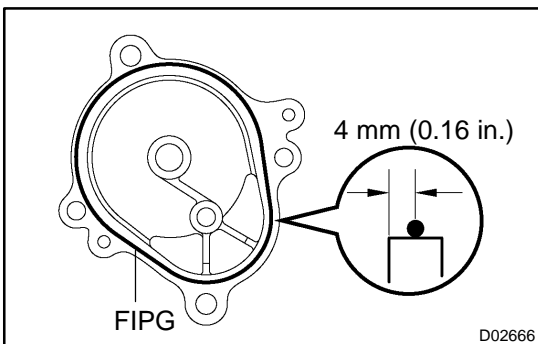
- (c) Using a torx socket wrench (T40), install the screw plug.  
**Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)**

**22. INSTALL OUTPUT GEAR TO FRONT CASE****HINT:**

Apply gear oil to the output gear.

**NOTICE:**

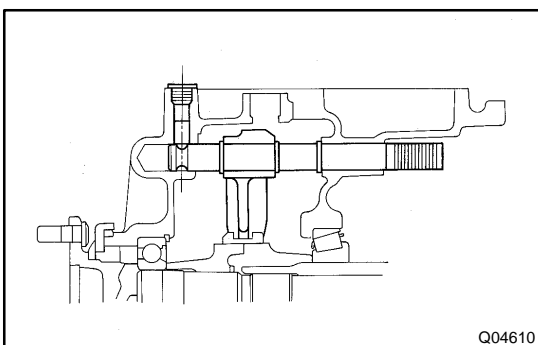
**Do not turn the output gear.**

**23. INSTALL MOTOR ACTUATOR**

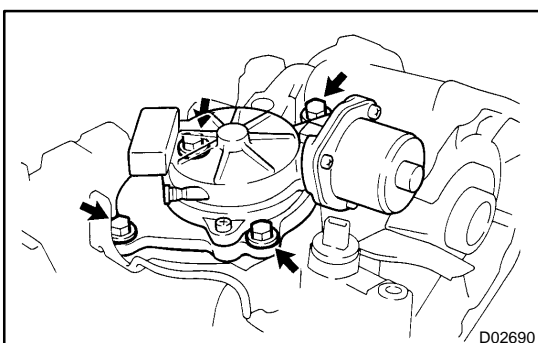
- (a) Apply FIPG to the motor actuator.

**FIPG:**

**Part No. 08826-00090, THREE BOND 1281 or equivalent**

**HINT:**

Set the motor actuator in differential lock condition.



- (b) Install the motor actuator and 4 bolts.  
**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

**24. INSTALL SPEED SENSOR DRIVE GEAR**

Install the driven gear and bolt.

**Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)**

**25. INSTALL BREATHER HOSE**



# TRANSFER SYSTEM

TR064-02

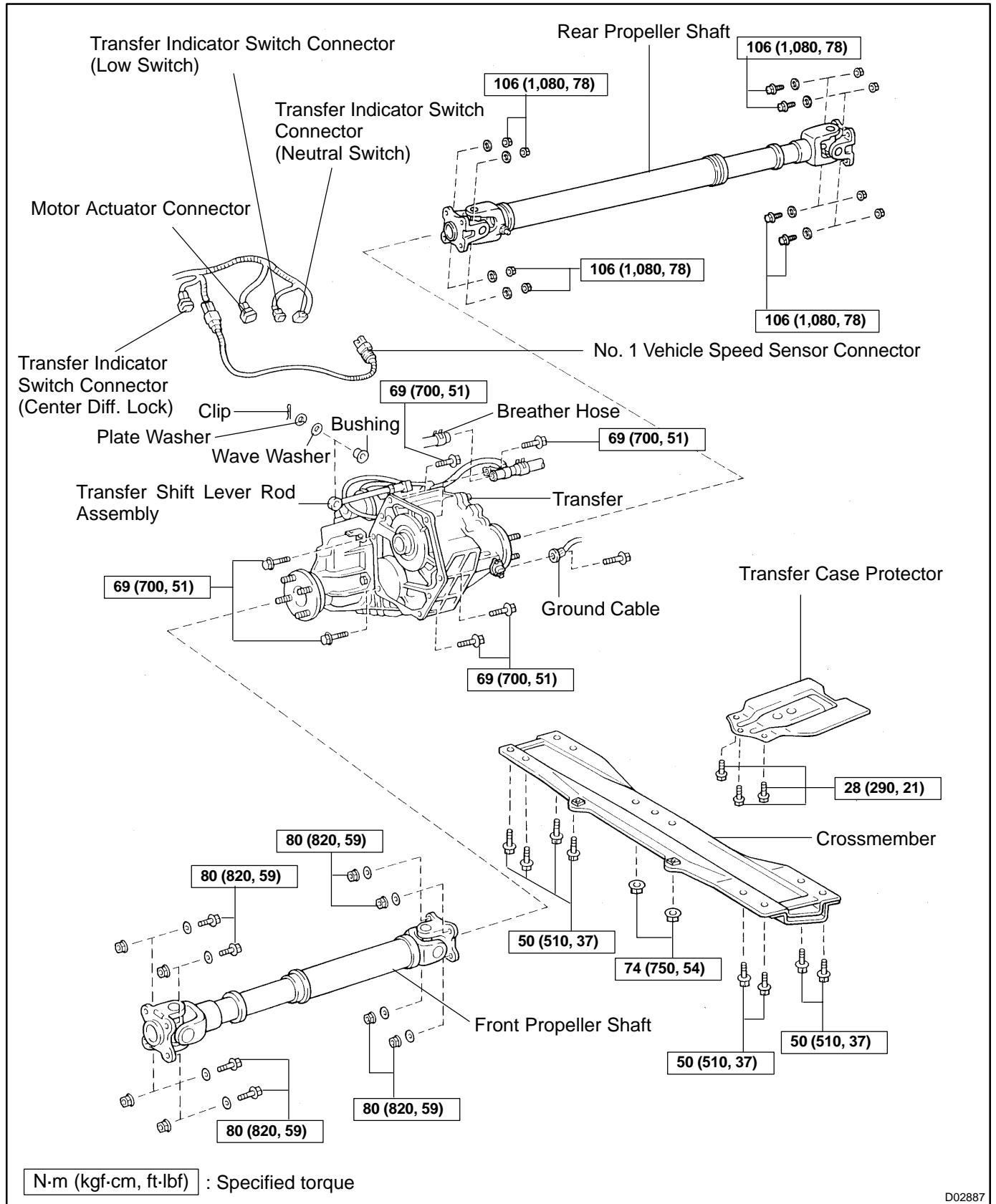
## PRECAUTION

When working with FIPG material, you must observe the following.

- ▶ Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.
- ▶ Thoroughly clean all components to remove all the loose material.
- ▶ Clean both sealing surfaces with a non-residue solvent.
- ▶ Apply FIPG in an approx. 1.2 mm (0.047 in.) wide bead along the sealing surface.
- ▶ Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.

# TRANSFER UNIT COMPONENTS

TR066-02



D02887

## INSTALLATION

Installation is in the reverse order of removal (See page [TR-4](#)).

HINT:

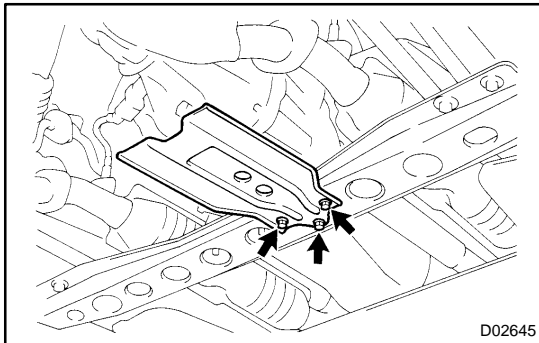
- ▶ Apply MP grease to the transfer adaptor oil seal.
- ▶ After install, do the road test.

## REMOVAL

### 1. RAISE VEHICLE

#### NOTICE:

Make sure that the vehicle is securely supported.

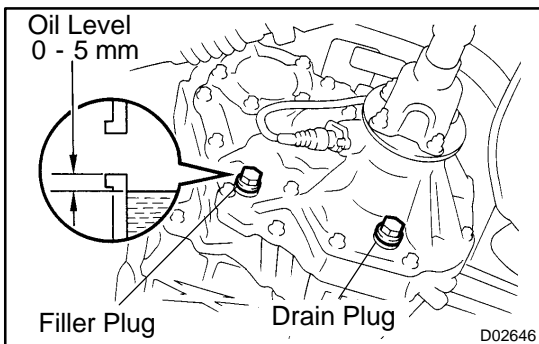


D02645

### 2. REMOVE TRANSFER CASE PROTECTOR

Remove the 3 bolts and transfer case protector.

**Torque: 28 N·m (290 kgf·cm, 21 ft·lbf)**



D02646

### 3. DRAIN TRANSFER OIL

Oil grade: API GL-4 or GL-5

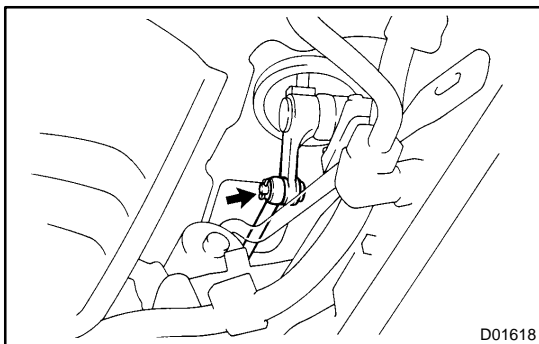
Viscosity: SAE 75 W-90

Capacity: 1.3 liters (1.4 US qts, 1.1 Imp. qts)

**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

### 4. REMOVE FRONT AND REAR PROPELLER SHAFTS

(See page [PR-4](#))



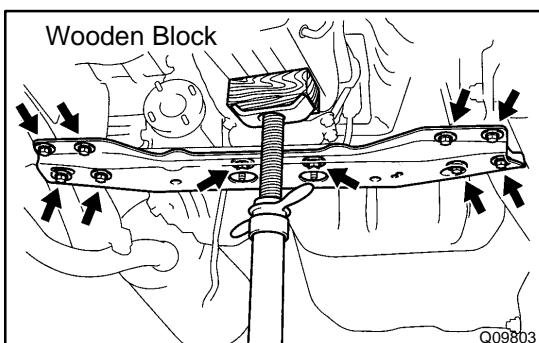
D01618

### 5. DISCONNECT TRANSFER SHIFT LEVER ROD ASSEMBLY

Remove the clip, plate washer, wave washer and bushing, and disconnect the transfer shift lever rod assembly.

### 6. DISCONNECT GROUND CABLE

Remove the bolt and disconnect the ground cable from the transfer.



Q09803

### 7. REMOVE CROSSMEMBER

(a) Support the transmission, as shown.

#### NOTICE:

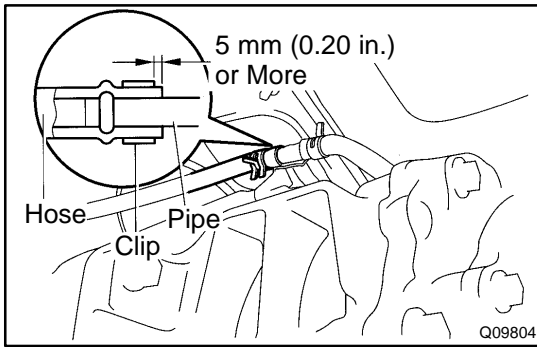
Use a wooden block so not to damage the transmission oil pan.

(b) Remove the 8 bolts, 2 nuts and crossmember.

**Torque:**

**Bolt: 50 N·m (510 kgf·cm, 37 ft·lbf)**

**Nut: 74 N·m (750 kgf·cm, 54 ft·lbf)**



### 8. DISCONNECT BREATHER HOSE

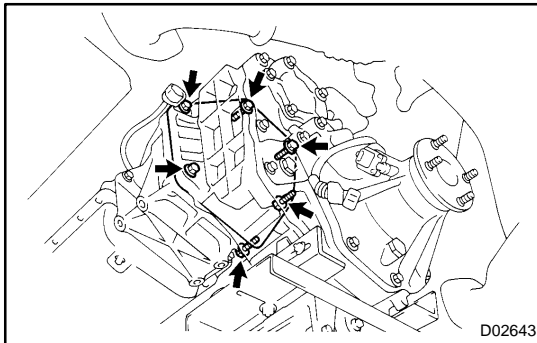
#### HINT:

At the time of installation, assemble the clip to the position shown in the illustration.

### 9. DISCONNECT NO. 1 VEHICLE SPEED SENSOR, 3 TRANSFER INDICATOR SWITCH AND MOTOR ACTUATOR CONNECTORS

### 10. JACK UP TRANSFER SLIGHTLY

Using a transmission jack, support the transfer.



### 11. REMOVE TRANSFER FROM TRANSMISSION

- (a) Disconnect the wire harness from the transfer.
- (b) Remove the 6 transfer adaptor rear mounting bolts.  
**Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)**
- (c) Pull out the transfer down and toward the rear.

# TROUBLESHOOTING

TR065-02

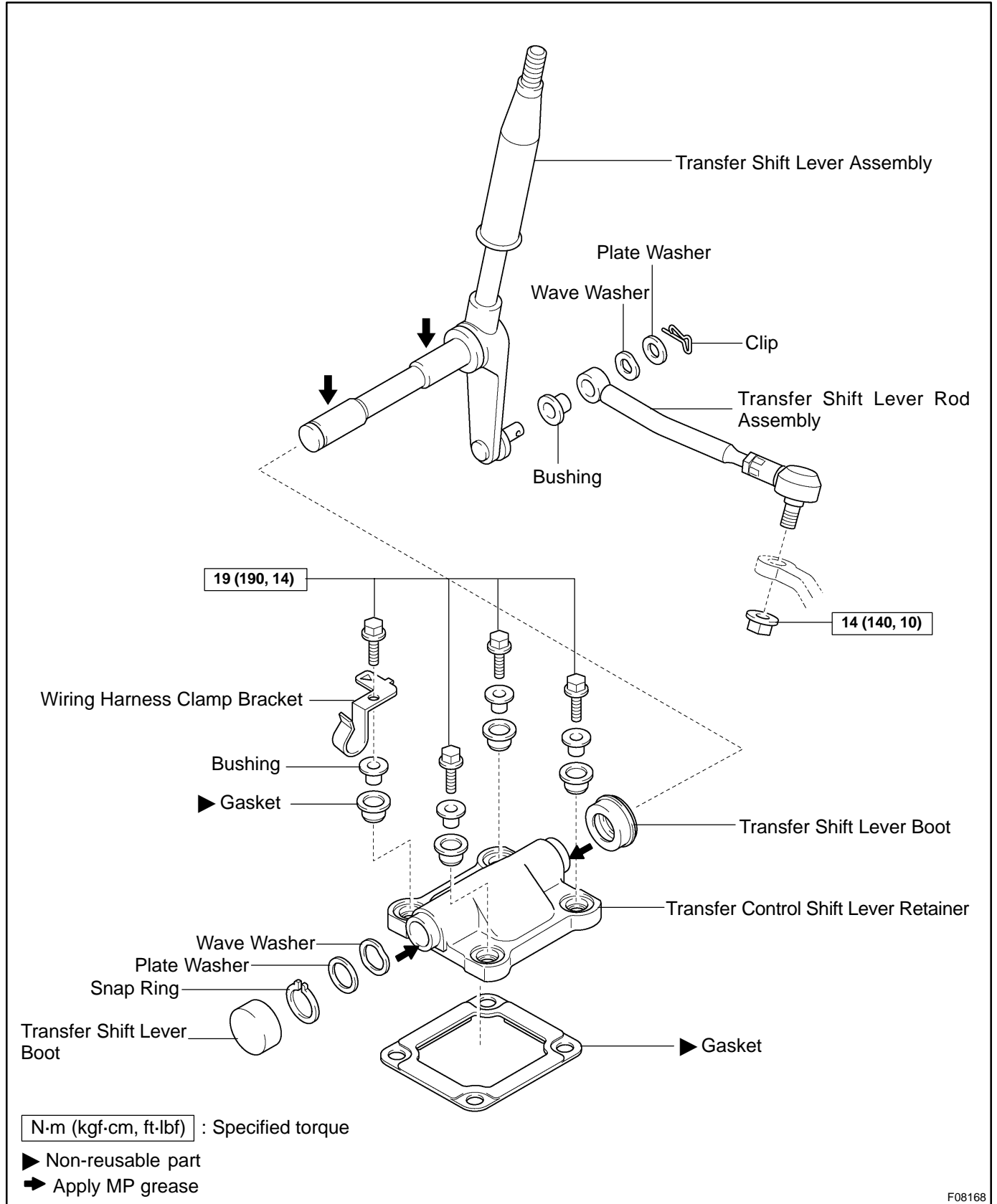
## PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Noise	6. Oil (Level low) 7. Oil (Wrong) 8. Transfer faulty	TR-4 TR-4 TR-7
Oil leakage	1. Oil (Level too high) 2. Gasket (Damaged) 3. Oil seal (Worn or damaged) 4. O-ring (Worn or damaged)	TR-4 TR-7 TR-7 -
Transfer corner braking	Center differential or transfer faulty	TR-7

# TRANSFER SHIFT LEVER ASSEMBLY COMPONENTS

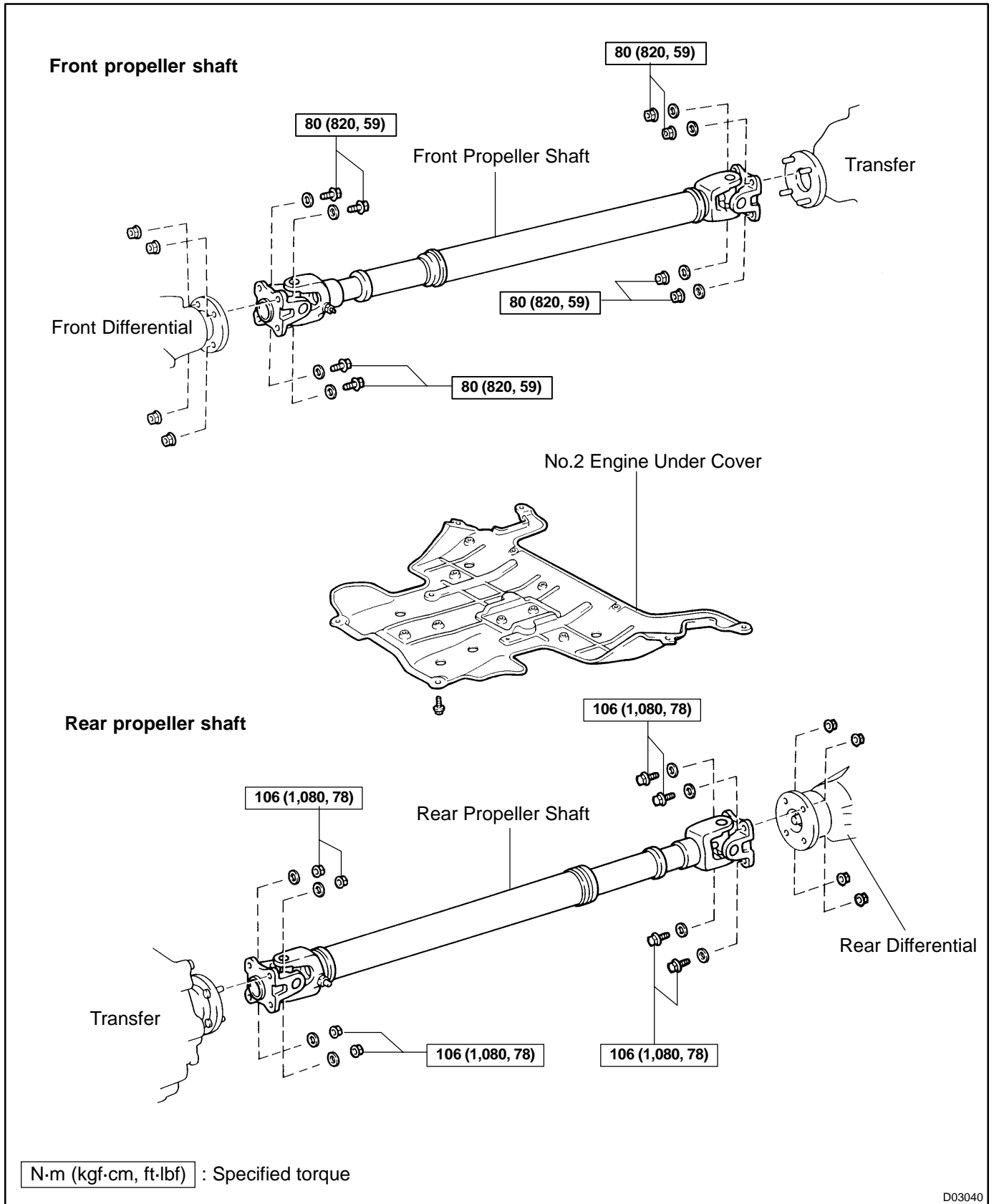
TR06Z-02



F08168

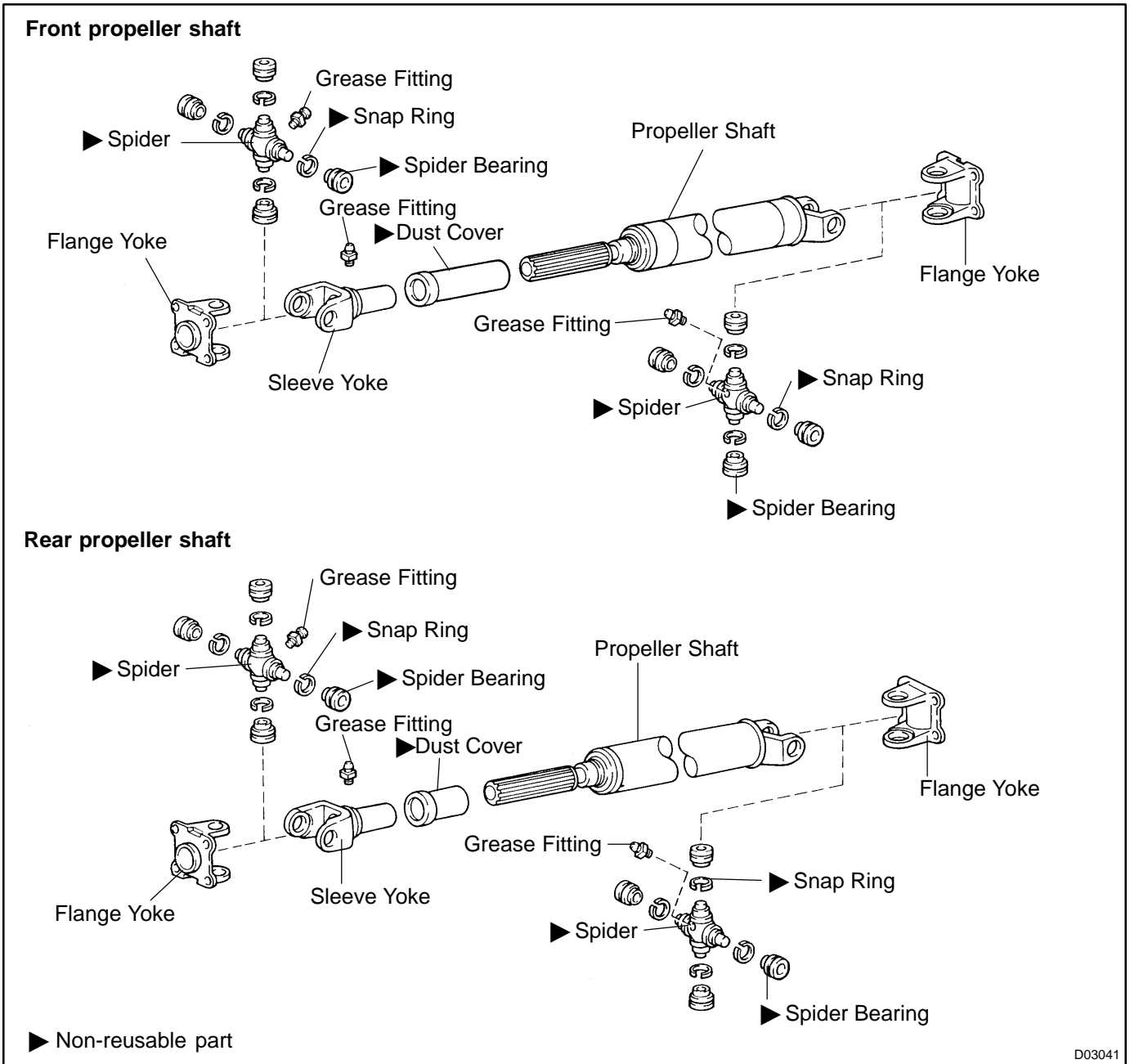
# PROPELLER SHAFT ASSEMBLY COMPONENTS

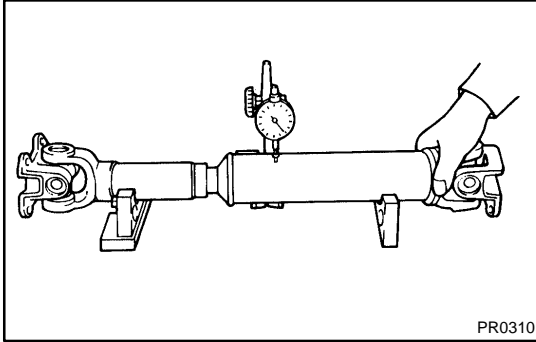
PR031-02



D03040







## INSPECTION

### NOTICE:

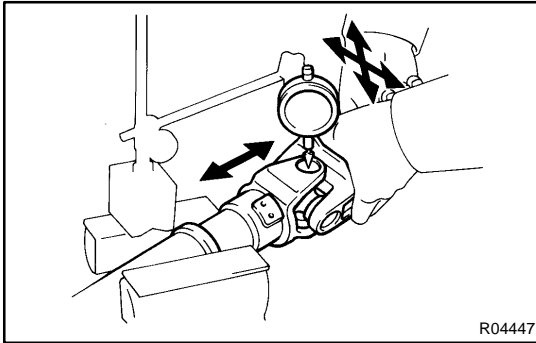
Be careful not to grip the propeller shaft tube too tightly in a vise as this will cause deformation.

### 1. INSPECT FRONT AND REAR PROPELLER SHAFTS FOR DAMAGE OR RUNOUT

Using a dial indicator, check the runout of shafts.

**Maximum runout: 0.8 mm (0.031 in.)**

If shaft runout is greater than maximum, replace the shaft.



### 2. INSPECT SPIDER BEARING

(a) Check the spider bearings for wear or damage.

(b) Check the spider bearing axial play by turning the yoke with holding the shaft tightly.

**Maximum bearing axial play: 0 mm (0 in.)**

If necessary, replace the spider bearing.

## INSTALLATION

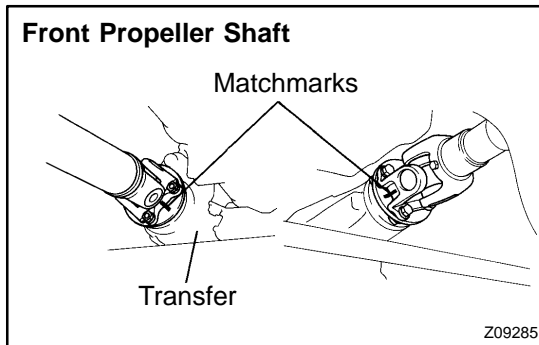
Installation is in the reverse order of removal (See page [PR-4](#)).

HINT:

After installation, pump MP grease into each fitting with a grease gun until the grease begins to flow around the oil seal.

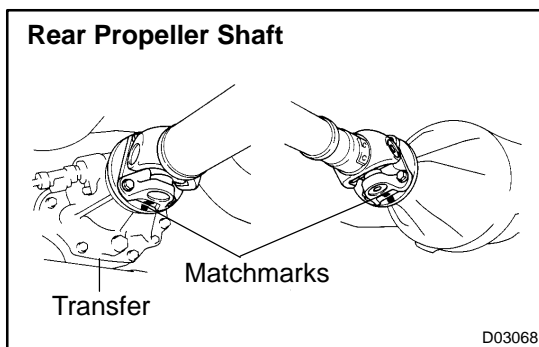
## REMOVAL

### 1. REMOVE ENGINE NO. 2 UNDER COVER



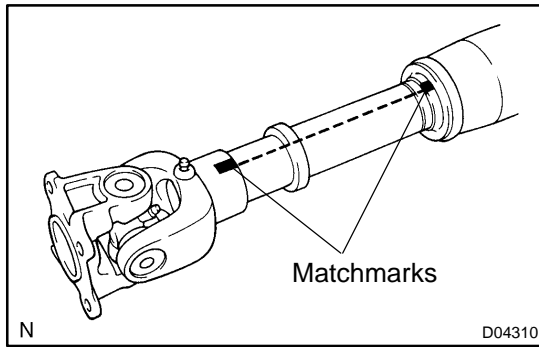
### 2. REMOVE FRONT PROPELLER SHAFT

- Place matchmarks on the propeller shaft flange and transfer.
- Remove the 4 nuts and washers.  
**Torque: 80 N·m (820 kgf-cm, 59 ft-lbf)**
- Place matchmarks on the propeller shaft flange and front differential.
- Remove the 4 nuts, bolts and washers.  
**Torque: 80 N·m (820 kgf-cm, 59 ft-lbf)**
- Remove the front propeller shaft.



### 3. REMOVE REAR PROPELLER SHAFT

- Place matchmarks on the propeller shaft flange and transfer.
- Remove the 4 nuts and washers.  
**Torque: 106 N·m (1,080 kgf-cm, 78 ft-lbf)**
- Place matchmarks on the propeller shaft flange and rear differential.
- Remove the 4 nuts, bolts and washers.  
**Torque: 106 N·m (1,080 kgf-cm, 78 ft-lbf)**
- Remove the rear propeller shaft.



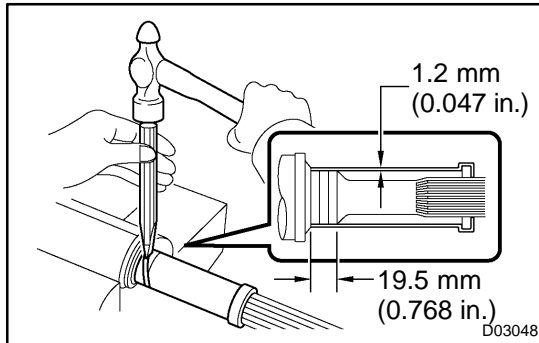
## REPLACEMENT

### NOTICE:

**Be careful not to grip the propeller shaft tube too tightly in a vise as this will cause deformation.**

### REPLACE DUST COVER

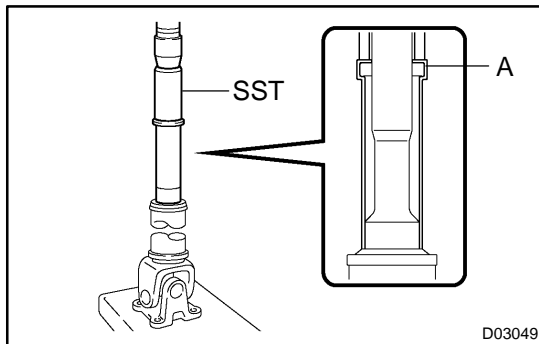
- (a) Remove the sleeve yoke from the propeller shaft.
  - (1) Place matchmarks on the sleeve yoke and shaft.
  - (2) Pull out the sleeve yoke from the shaft.



- (b) Remove the dust cover.  
Cut the dust cover spirally at the pressing-in part with a saw and pry it off with a chisel and hammer.

### NOTICE:

**Do not damage the propeller shaft. If damaged, replace the shaft with a new one.**



- (c) Install a new dust cover.  
Using SST and press, press in a new dust cover.  
SST 09636-20010

### NOTICE:

**Place the universal joint straight when pressing in the dust cover. Apply MP grease to the "A" part.**

- (d) Insert the sleeve yoke into the propeller shaft.
  - (1) Apply MP grease to the propeller shaft spline and sleeve yoke sliding surface.
  - (2) Align the matchmarks on the sleeve yoke and propeller shaft.
  - (3) Install the propeller shaft into the sleeve yoke.

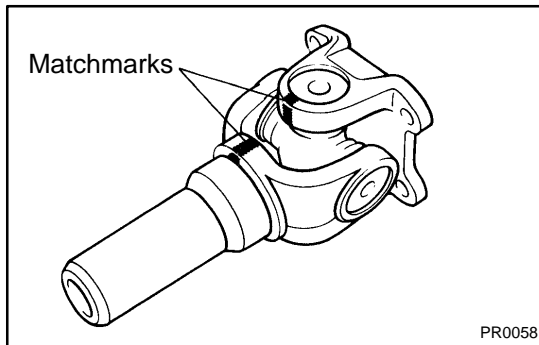
# SPIDER BEARING REPLACEMENT

PR04M-01

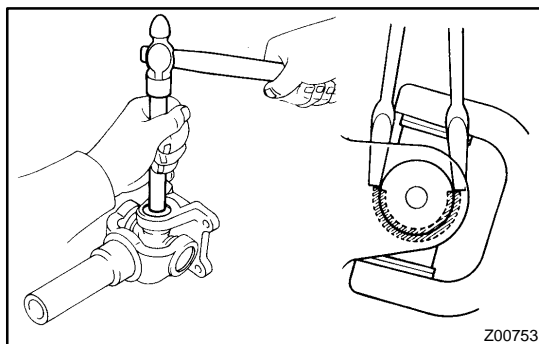
## NOTICE:

Be careful not to grip the propeller shaft tube too tightly in a vise as this will cause deformation.

1. REMOVE PROPELLER SHAFT (See page [PR-4](#) )

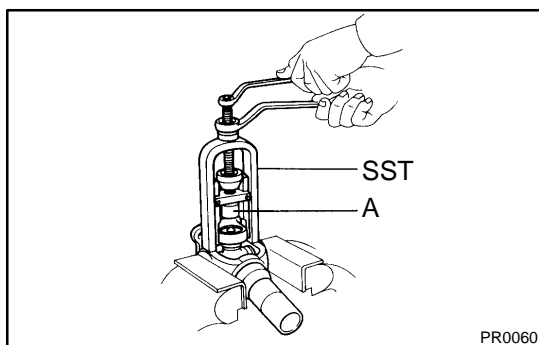


2. PLACE MATCHMARKS ON SHAFT AND FLANGE YOKE OR FLANGE YOKE AND SLEEVE YOKE
3. REMOVE SLEEVE YOKE FROM PROPELLER SHAFT



4. REMOVE SNAP RINGS

- (a) Using a brass bar and hammer, slightly tap in the bearing outer races.
- (b) Using 2 screwdrivers, remove the 4 snap rings from the grooves.

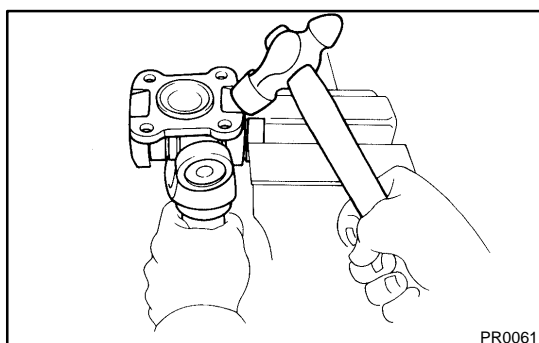


5. REMOVE SPIDER BEARINGS

- (a) Using SST, push out the bearing from the flange.  
SST 09332-25010

## HINT:

Sufficiently raise the part indicated by "A" so that it does not come into contact with the bearing.



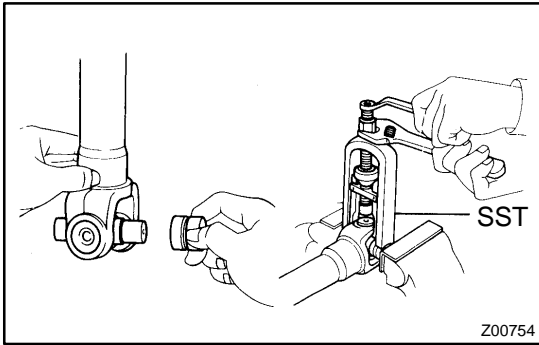
- (b) Clamp the bearing outer race in a vise and tap off the flange with a hammer.

## HINT:

Remove the bearing on the opposite side in the same procedure.

- (c) Remove the flange yoke from the sleeve yoke (or propeller shaft).

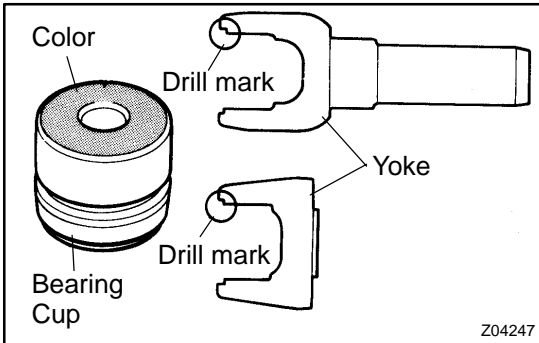
PROPELLER SHAFT - SPIDER BEARING



- (d) Install the 2 removed bearing outer races to the spider.
- (e) Using SST, push out the bearing from the yoke.  
SST 09332-25010
- (f) Clamp the outer bearing race in a vise and tap off the yoke with a hammer.

**HINT:**

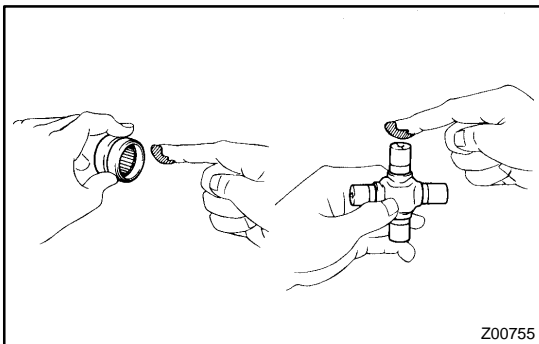
Remove the bearing on the opposite side in the same procedure.



**6. SELECT SPIDER BEARING**

Select the bearing according to whether or not there is a drill mark on the yoke section.

Yoke	Bearing
w/ drill mark	w/ color mark (Red)
No drill mark	No color mark

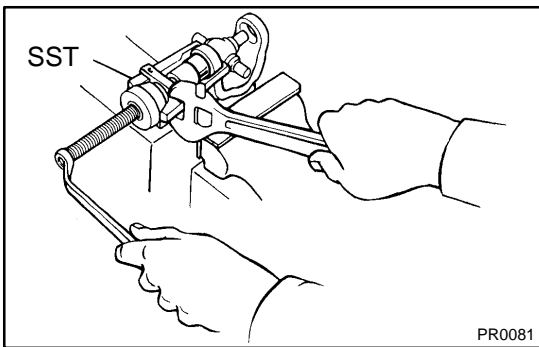


**7. INSTALL SPIDER BEARING**

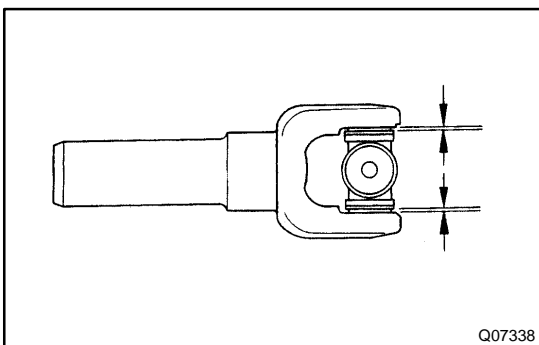
- (a) Apply MP grease to a new spider and bearings.

**NOTICE:**

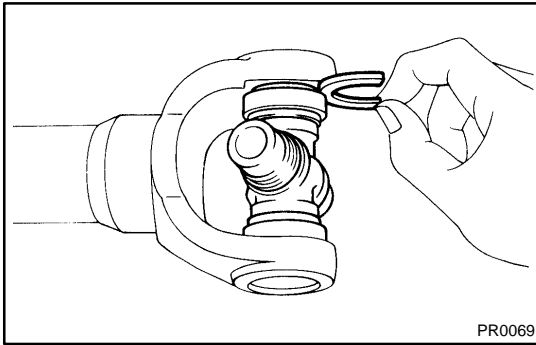
**Be careful not to apply too much grease.**



- (b) Fit the spider into the yoke.
- (c) Using SST, install the bearings on the spider.  
SST 09332-25010



- (d) Using SST, adjust both bearings so that the snap ring grooves are at maximum and equal in width.



### 8. INSTALL SNAP RING

- (a) Install 2 new snap rings of equal thickness which will allow 0 mm (0 in.) axial play.

HINT:

Do not reuse the snap rings.

#### Thickness of snap ring:

Color	Mark	Thickness mm (in.)
-	1	2.28 - 2.30 mm (0.0898 - 0.0906 in.)
-	2	2.30 - 2.32 mm (0.0906 - 0.0913 in.)
-	-	2.32 - 2.34 mm (0.0913 - 0.0921 in.)
Brown	-	2.34 - 2.36 mm (0.0921 - 0.0929 in.)
Blue	-	2.36 - 2.38 mm (0.0929 - 0.0937 in.)
-	6	2.38 - 2.40 mm (0.0937 - 0.0945 in.)
-	7	2.40 - 2.42 mm (0.0945 - 0.0953 in.)
-	8	2.42 - 2.44 mm (0.0953 - 0.0961 in.)
-	九	2.44 - 2.46 mm (0.0961 - 0.0969 in.)
-	10	2.46 - 2.48 mm (0.0969 - 0.0976 in.)

M00056

- (b) Using a hammer, tap the yoke until there is no clearance between the bearing outer race and snap ring.

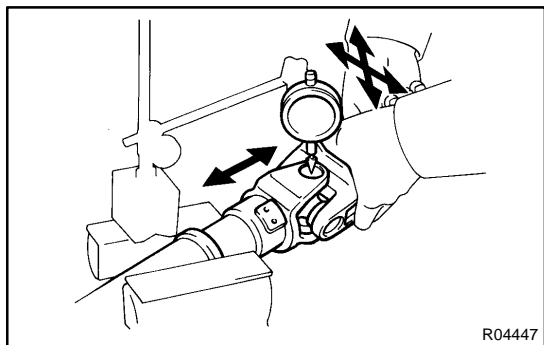
### 9. INSTALL FLANGE YOKE TO SLEEVE YOKE (OR PROPELLER SHAFT)

- (a) Align the matchmarks on the propeller shaft and flange yoke or flange yoke and sleeve yoke.
- (b) Install the flange yoke to the sleeve yoke (or propeller shaft).

HINT:

Install 2 new spider bearings and snap ring on the flange yoke side in the procedure described above.





R04447

**10. CHECK SPIDER BEARING (See page PR-5)**

- (a) Check that the spider bearing moves smoothly.
- (b) Check the spider bearing axial play.

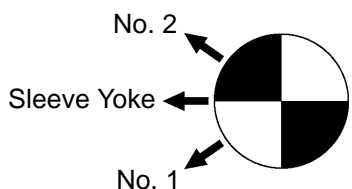
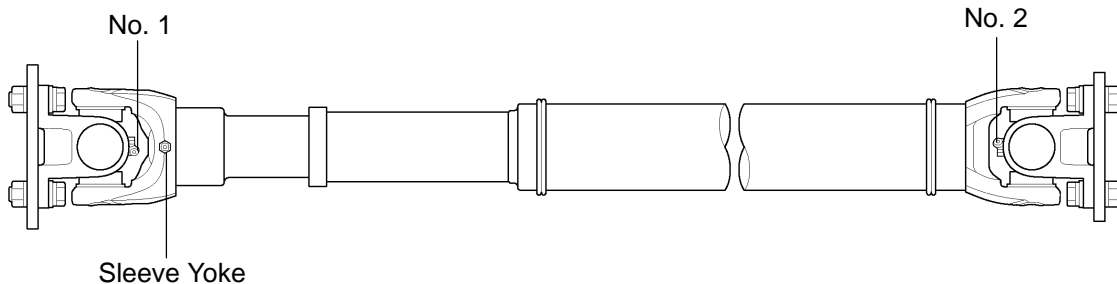
**Maximum bearing axial play: 0 mm (0 in.)**

**HINT:**

When replacing the spider bearing, be sure that the grease fitting assembly hole is facing to the direction shown in the illustration.

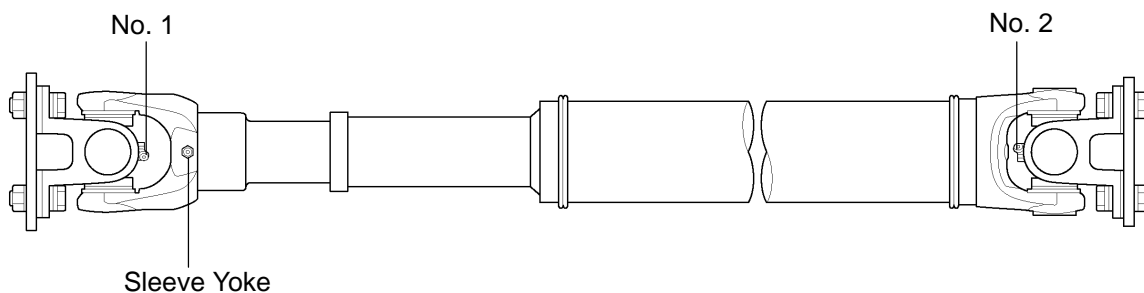
**SPIDER GREASE FITTING ASSEMBLY DIRECTION**

**Front propeller shaft**



The figure at left shows the locations of the grease fittings as seen from the rear.

**Rear propeller shaft**



D01633

# TROUBLESHOOTING

PR03H-02

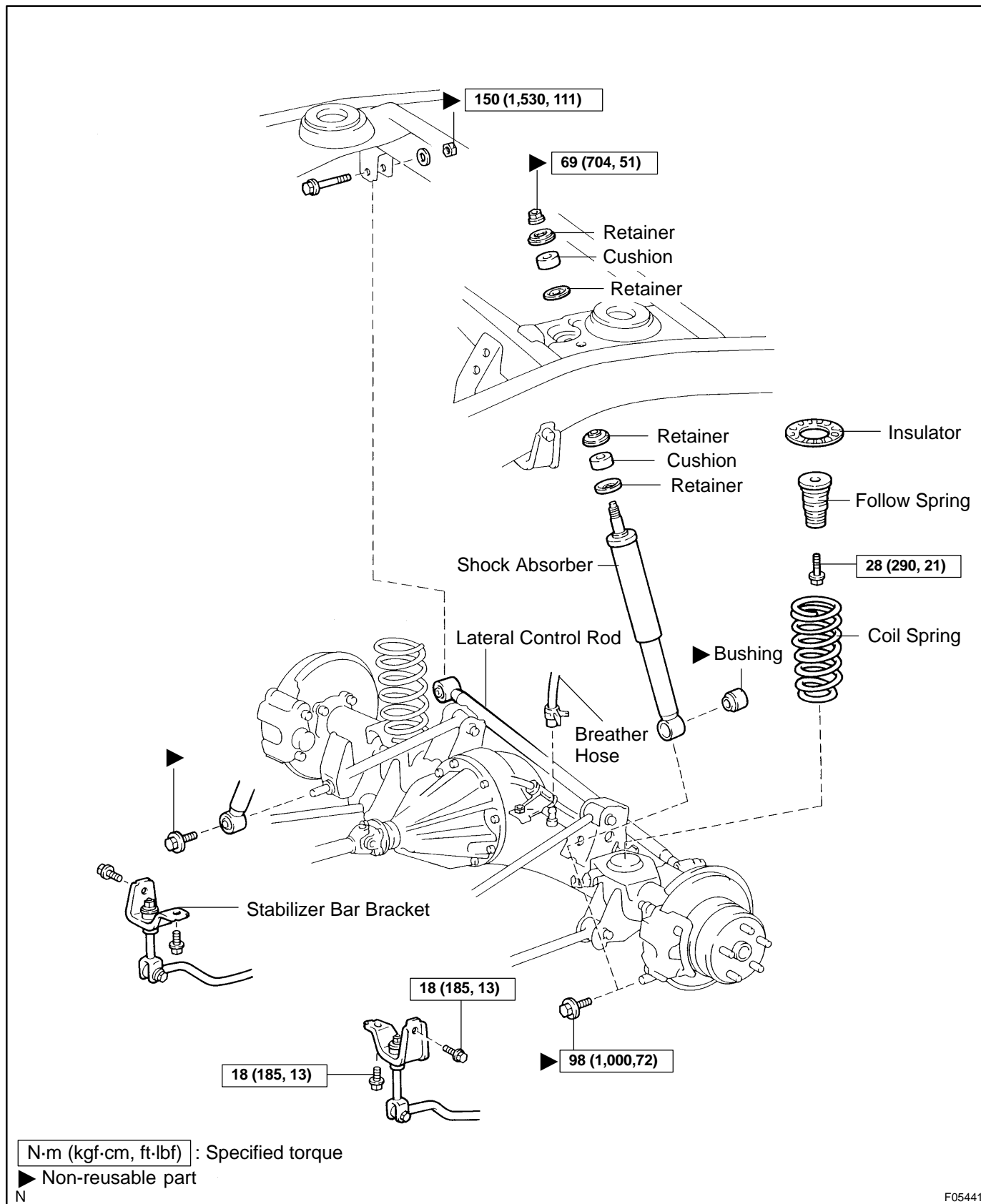
## PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

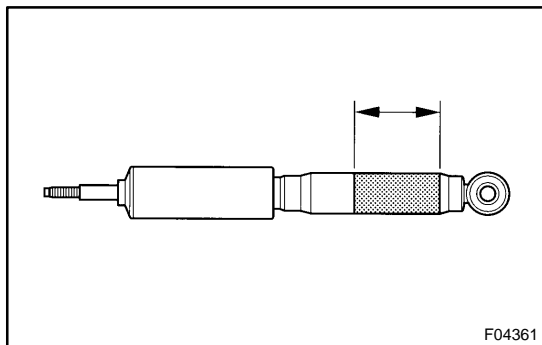
Symptoms	Suspect Area	See page
Noise	<ol style="list-style-type: none"> <li>1. Sleeve yoke spline (Worn)</li> <li>2. Spider bearing (Worn or stuck)</li> </ol>	<a href="#">PR-5</a> <a href="#">PR-5</a>
Vibration	<ol style="list-style-type: none"> <li>1. Sleeve yoke spline (Stuck)</li> <li>2. Propeller shaft (Runout)</li> <li>3. Propeller shaft (Imbalance)</li> </ol>	<a href="#">PR-5</a> <a href="#">PR-5</a> -

# COIL SPRING AND REAR SHOCK ABSORBER COMPONENTS

SA169-02



F05441



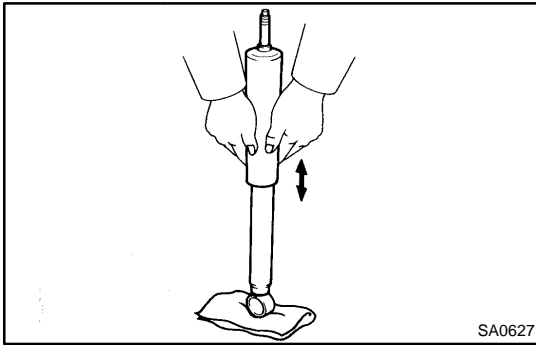
## DISPOSAL

### DISCARD SHOCK ABSORBER

Before discarding the shock absorber, drill a hole of 2 - 3 mm (0.079 - 0.118 in.) in diameter at the location shown in the illustration to discharge the gas inside.

#### NOTICE:

- ▶ When drilling, chips may fly out, work carefully.
- ▶ The gas is colorless, odorless and non-poisonous.



## INSPECTION

### INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual operation sounds. If there is any abnormality, replace the shock absorber with a new one.

#### NOTICE:

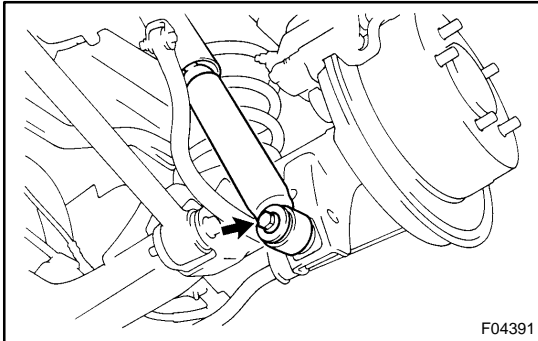
When disposing the shock absorber, see **DISPOSAL** on page [SA-175](#) .

## INSTALLATION

Installation is in the reverse order of removal (See page [SA-172](#) ).

## REMOVAL

1. REMOVE REAR WHEELS  
Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)
2. SUPPORT REAR AXLE HOUSING WITH JACK

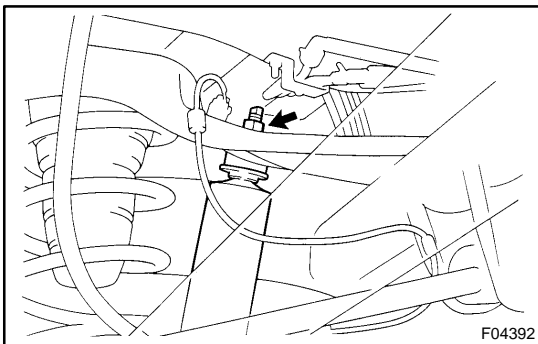


### 3. REMOVE SHOCK ABSORBER

- (a) Remove the bolt and disconnect the shock absorber from the axle housing.

**Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf)**

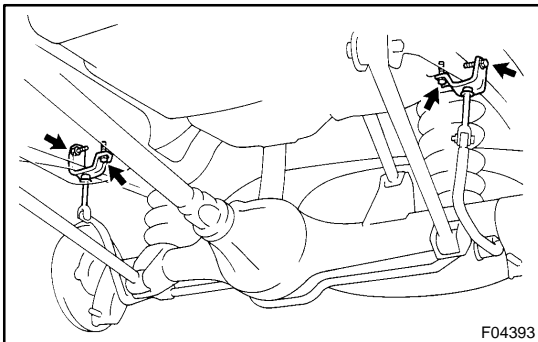
- (b) Employ the same manner described above to the other side.



- (c) While holding the piston rod, remove the nut, 2 retainers, cushion and shock absorber.

**Torque: 69 N·m (704 kgf·cm, 51 ft·lbf)**

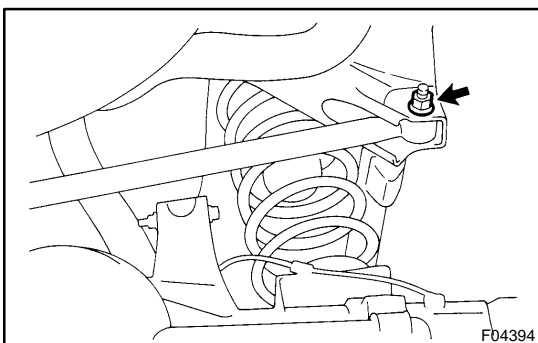
- (d) Remove the 2 retainers and cushion from the shock absorber.



### 4. DISCONNECT LH AND RH STABILIZER BAR BRACKETS

Remove the 4 bolts and disconnect the LH and RH stabilizer bar brackets.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**



### 5. DISCONNECT LATERAL CONTROL ROD

Remove the nut, washer, bolt and disconnect the lateral control rod.

**Torque: 150 N·m (1,530 kgf·cm, 111 ft·lbf)**

#### HINT:

At the time of installation, after stabilizing the suspension, torque the nut and bolt.

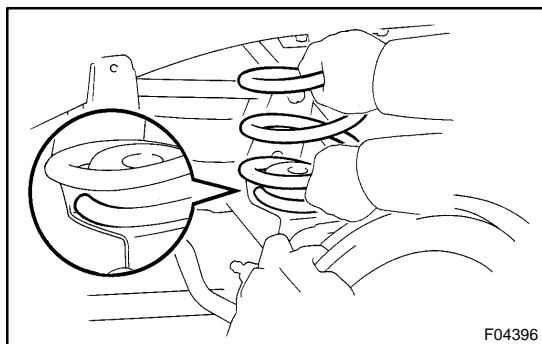
### 6. DISCONNECT BREATHER HOSE

## 7. REMOVE COIL SPRING

(a) Begin to lower the axle housing.

### NOTICE:

**Be careful not to snap the brake line and parking brake cable.**

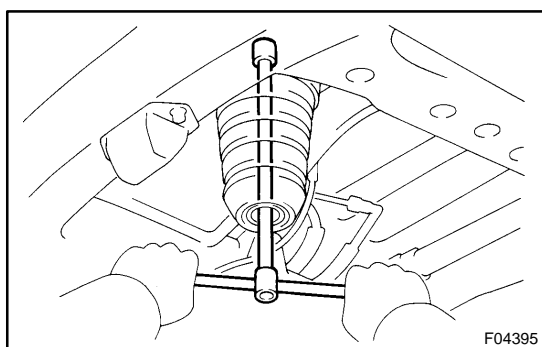


(b) While lowering the axle housing, remove the coil spring and insulator.

### HINT:

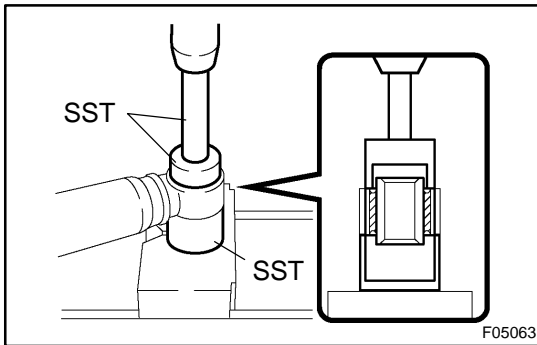
At the time of installation, please refer to the following items.

- ▶ Check that the coil spring end is installed correctly.
- ▶ If the coil spring end is not in the correct position, reinstall the coil spring.



(c) Remove the bolt and follow spring from the frame.  
**Torque: 28 N·m (290 kgf·cm, 21 ft·lbf)**



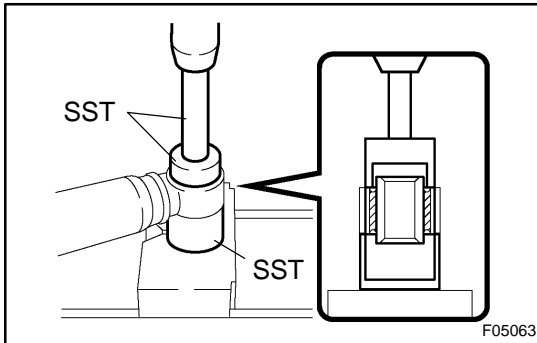


## REPLACEMENT

### 1. REMOVE BUSHING

Using SST and a press, remove the bushing.

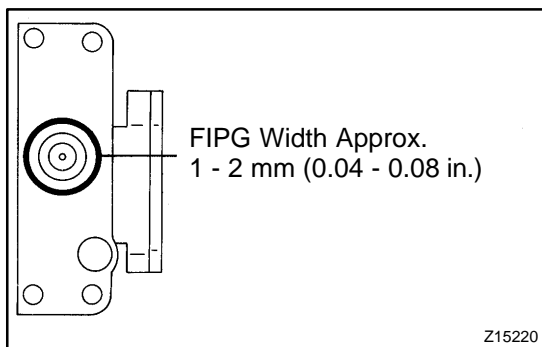
SST 09710-14013 (09710-00061),  
09710-28012 (09710-07031),  
09950-70010 (09951-07100)



### 2. INSTALL BUSHING

Using SST and a press, install a new bushing.

SST 09710-14013 (09710-00061),  
09710-28012 (09710-07031),  
09950-70010 (09951-07100)



## INSTALLATION

### 1. INSTALL ACTUATOR

- (a) Clean contacting surfaces of any FIPG material using gasoline or alcohol.
- (b) Apply FIPG to the actuator.

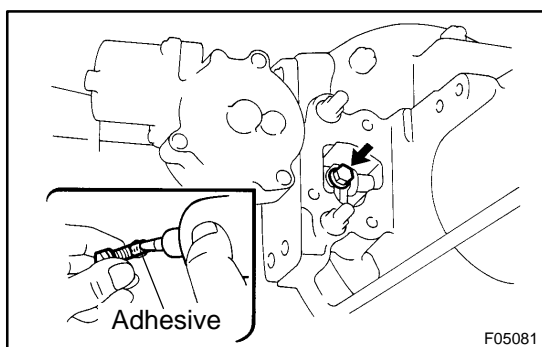
#### FIPG:

**Part No. 08826-00090, THREE BOND 1281 or equivalent**

#### HINT:

Install the actuator within 10 minutes after applying FIPG.

- (c) Install the actuator to the differential and match the shaft with the shaft fork hole.
- (d) Clean the threads of the set bolt and shaft fork with the white gasoline.

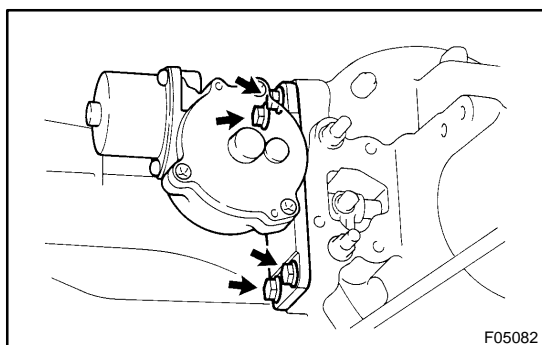


- (e) Coat the threads of the set bolt with adhesive.

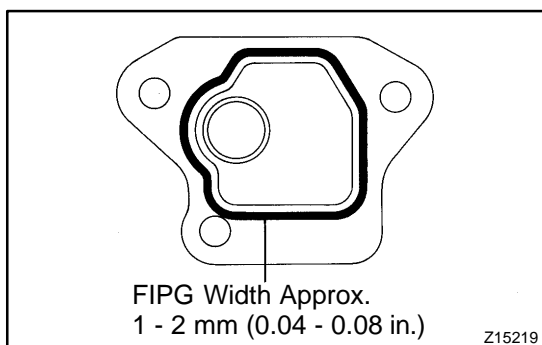
#### Adhesive:

**Part No. 08833-00070, THREE BOND 1324 or equivalent**

- (f) Tighten the shift fork set bolt.  
**Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)**



- (g) Tighten the 4 bolts uniformly, a little at time.  
**Torque: 24 N·m (240 kgf·cm, 18 ft·lbf)**



### 2. INSTALL COVER

- (a) Clean the contacting surfaces of any FIPG material using gasoline or alcohol.
- (b) Apply FIPG to the cover.

#### FIPG:

**Part No. 08826-00090, THREE BOND 1281 or equivalent**

#### HINT:

Install the cover within 10 minutes after applying FIPG.

- (c) Install the cover with the 3 bolts.

**Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)**

**3. INSTALL REAR DIFF. LOCK POSITION SWITCH**

Install the diff. lock position switch with a new gasket.

**Torque: 40 N·m (410 kgf-cm, 30 ft-lbf)**

**4. CONNECT CONNECTORS AND TUBE**

HINT:

- ▶ The depth of the insertion of the bleeder tube into the hose is approx. 15 mm (0.59 in.).
- ▶ Take care that the water or the equivalent will not adhere to the connectors and hose.

**5. INSTALL NO. 2 ACTUATOR PROTECTOR**

Install the No. 2 actuator protector with the 2 nuts.

**Torque: 36 N·m (367 kgf-cm, 27 ft-lbf)**

**6. INSTALL NO. 1 ACTUATOR PROTECTOR**

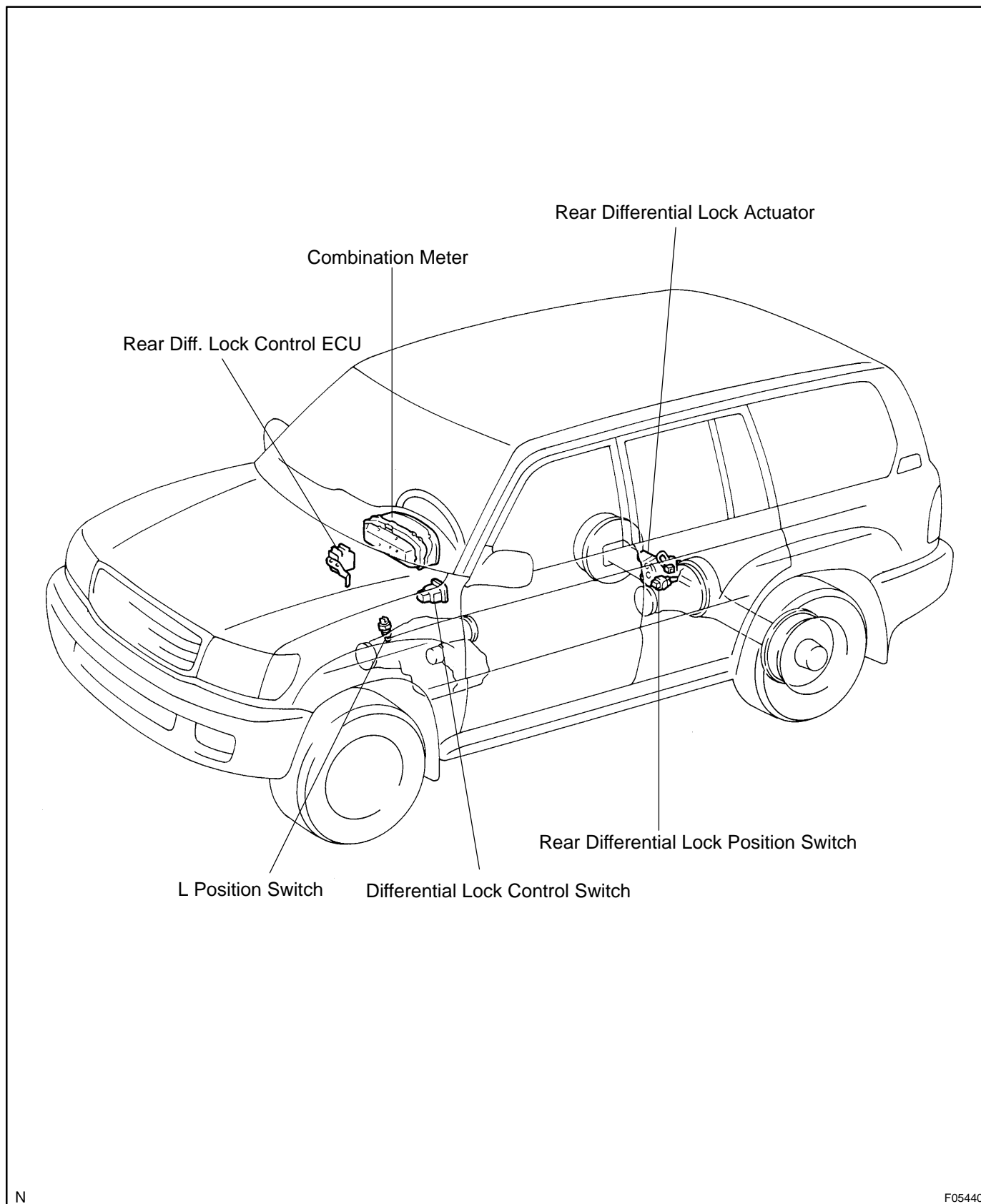
Install the No. 1 actuator protector with the nut and bolt.

**Torque: 15 N·m (150 kgf-cm, 11 ft-lbf)**

**7. CANCEL REAR DIFFERENTIAL LOCK POSITION**

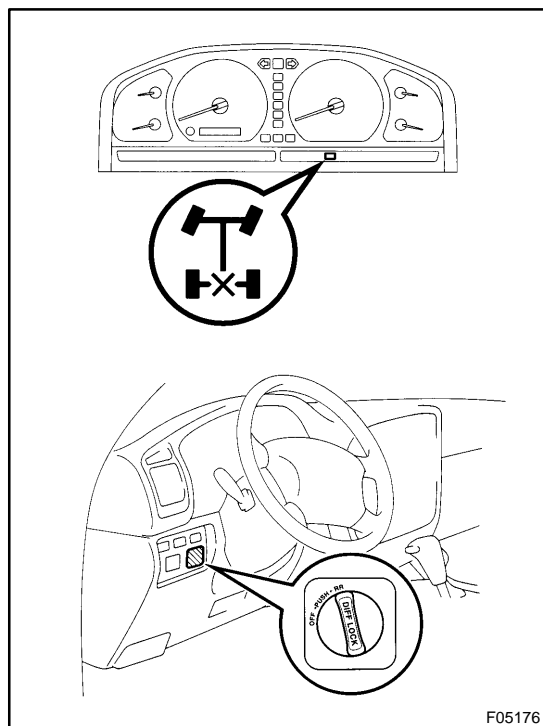
- (a) Connect the cable to the negative terminal of the battery.
- (b) Turn the ignition switch to the ON position.
- (c) Turn the differential lock control switch to the OFF position and cancel the differential lock.
- (d) Shift the transfer shift lever to H position.

# LOCATION



N

F05440



## DIFFERENTIAL LOCK SYSTEM ON-VEHICLE INSPECTION

SA165-06

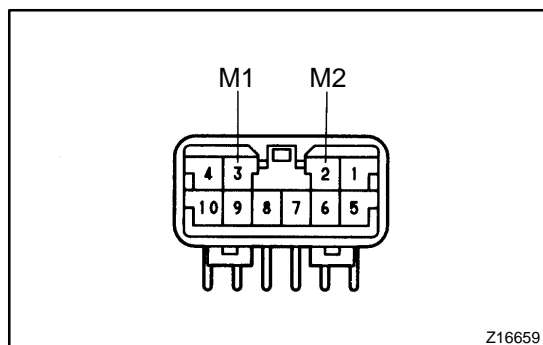
### 1. INSPECT DIFFERENTIAL LOCK SYSTEM

- (a) Inspect the indicator light.  
Check that the indicator light lights up for approx. 1 second when the ignition switch is turned ON.
- (b) Inspect the differential lock operation.
  - (1) Jack up the vehicle then start the engine.
  - (2) Shift the transfer shift lever to L position.
  - (3) When the diff. lock control switch is set to the RR position, the indicator light is turned on. Differential lock is applied to the rear wheel at this time.

#### HINT:

If the gears of the differential lock system are not meshed, the indicator light remains blinking, so rotate the tires to mesh the gear.

- (4) When the diff. lock control switch is at the OFF position, the indicator light goes off. Differential lock is released for the rear wheel at this time.



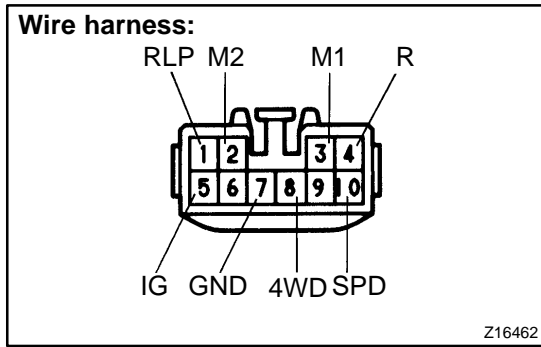
- (5) Check the voltage between the terminals of the rear diff. lock control ECU when switching the diff. lock control switch with the speedometer, registering approx. 8 km/h (5 mph) or more.

Switch position	Terminal	Specified value
ON	M1 - M2	0.5 V or less (No change)

- (6) Return the diff. lock control switch to OFF.
- (7) Stop the engine and lower the vehicle.

### 2. INSPECT DIFF. LOCK SYSTEM CIRCUIT

- (a) Inspect the battery positive voltage.  
**Battery positive voltage: 10 - 14 V**

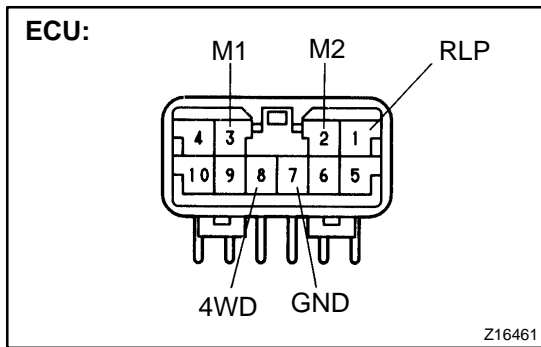


- (b) Inspect the system circuit with the connector disconnected.  
 Disconnect the connector from the rear diff. lock control ECU and inspect the connector on the wire harness side, as shown in the table.

Symbols (Terminals No.)	Trouble part	Condition	Specified value
M1 - M2	RR Diff. Lock Actuator	-	Less than 100 Ω
GND - Body ground	Body ground	-	Continuity
SPD - Body ground	Speed sensor	Vehicle moves slowly	1 pulse each 40 cm (15.75 in.)
IG - Body ground	DIFF Fuse	Ignition switch ON	10 - 14 V
RLP - Body ground	Rear Diff. Lock Indicator Switch	Ignition switch ON with indicator light ON	About 0 V
		Ignition switch ON with indicator light OFF	10 - 14 V
4WD - Body ground	L position Switch	Ignition switch ON with T/F shift lever except L	About 0 V
		Ignition switch ON with T/F shift lever L	10 - 14 V
R - Body ground	Differential Lock Control Switch	Ignition switch ON with differential lock control switch RR	10 - 14 V
		Ignition switch ON with differential lock control switch OFF	About 0 V

**HINT:**

If the circuit is not as specified value, check and repair or replace the trouble part shown in the table above.

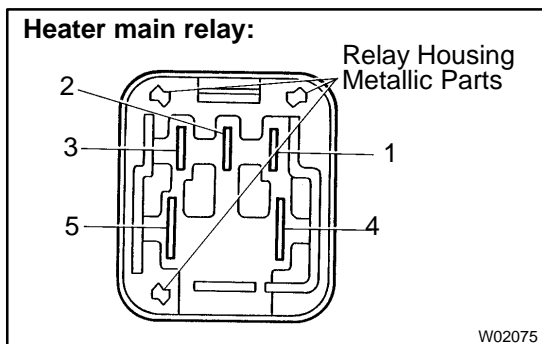


- (c) Inspect the system circuit with the connector connected.
- (1) Turn the ignition switch to the ON position.
  - (2) Shift the transfer shift lever to L position.
  - (3) Using a voltmeter, measure the voltage when the differential lock control switch is in the position, as shown in the table.

Tester Connection <i>ℓ</i> - <i>∇</i>	Switch position	Specified valve
4WD - GND	-	10 - 14 V
RLP - GND	RR*	0.5 V or less
M1 - M2	OFF → RR	0.5 V or less → 10 - 14 V (Approx. 1 sec.) → 0.5 V or less
M2 - M1	RR → OFF	

\*: The rear differential should be locked mechanically.  
 If the circuit is not as specified value, replace the ECU.

- (4) Install the ECU in place.



### 3. INSPECT DIFF. LOCK COMPONENTS

(a) Inspect the relay operation.

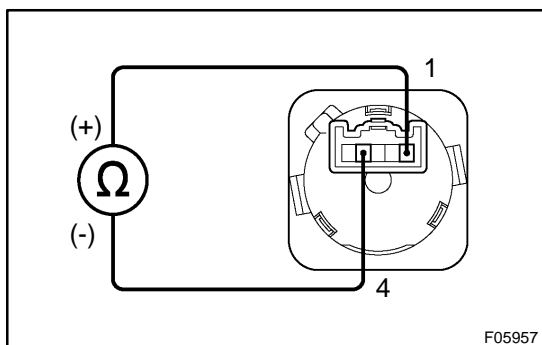
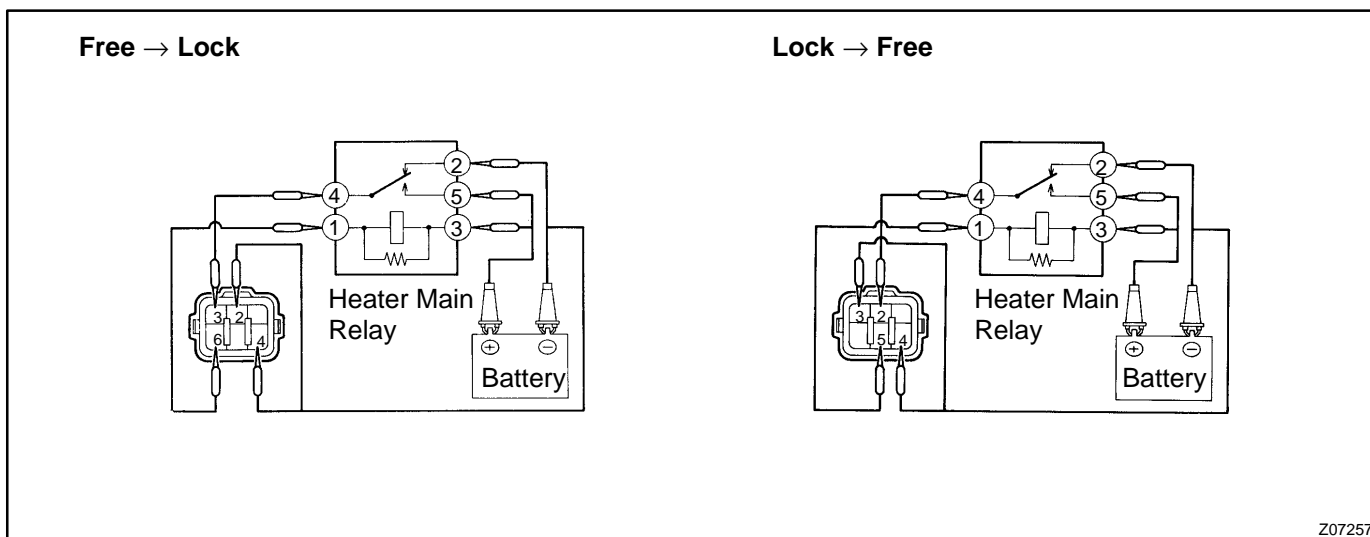
- (1) Jack up the vehicle.
- (2) Use a heater main relay and connect it, as shown below.

**NOTICE:**

**Connect the terminals being careful not to touch the neighboring terminals or metallic parts of the relay housing.**

- (3) Rotate the tire and check that differential lock has occurred.

If operation is not as specified, replace the actuator.

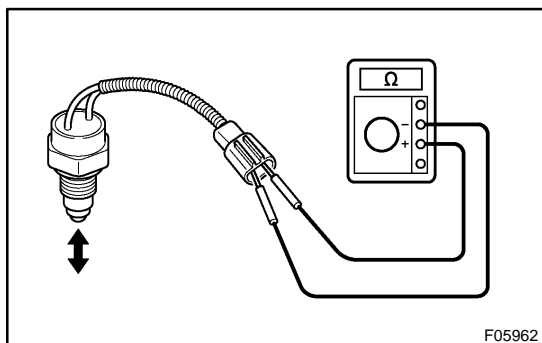


(b) Inspect the diff. lock control switch continuity.

Inspect the switch continuity between terminal 1 to terminal 4.

**HINT:**

If continuity does not exist, replace the switch.



(c) Inspect the diff. lock indicator switch.

- (1) Check that continuity exists between terminals when the switch is pushed (differential connected position).
- (2) Check that no continuity exists when the switch is free (differential disconnected position).

**HINT:**

If operation is not as specified, replace the switch.

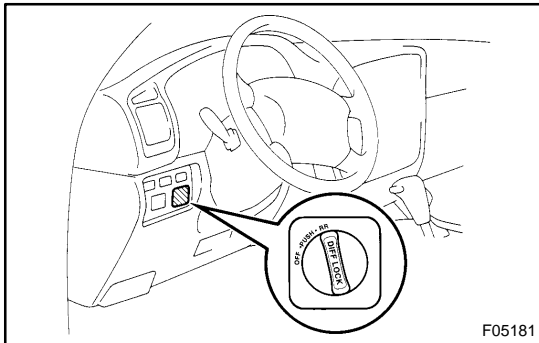
- (d) Inspect the L position switch (See page [TR-49](#) ).
- (e) Inspect the vehicle speed sensor (See page [BE-63](#) ).



## REMOVAL

### 1. SHIFTING REAR DIFF. LOCK POSITION

- (a) Turn the ignition switch to the ON position.
- (b) Shift the transfer shift lever to L position.



- (c) Turn the differential lock control switch to the RR position and lock the rear differential.

#### HINT:

While rotating the rear wheels, check they are in the differential lock condition.

- (d) Disconnect the cable from the negative terminal of the battery.

### 2. REMOVE NO. 1 ACTUATOR PROTECTOR

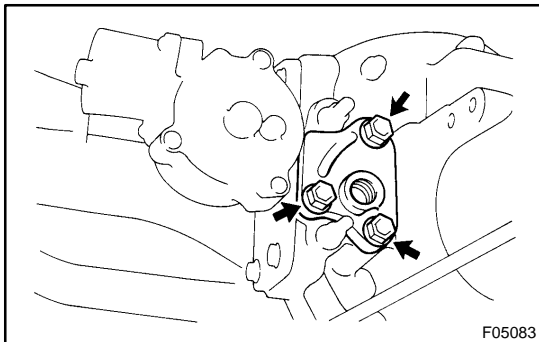
Remove the nut, bolt and No. 1 actuator protector.

### 3. REMOVE NO. 2 ACTUATOR PROTECTOR

Remove the 2 nuts and No. 2 actuator protector.

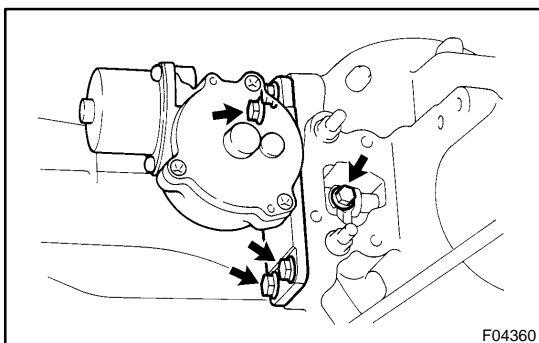
### 4. DISCONNECT CONNECTORS AND TUBE

### 5. REMOVE REAR DIFF. LOCK POSITION SWITCH



### 6. REMOVE COVER

- (a) Remove the 3 bolts.
- (b) Using a brass bar and hammer, remove the cover.

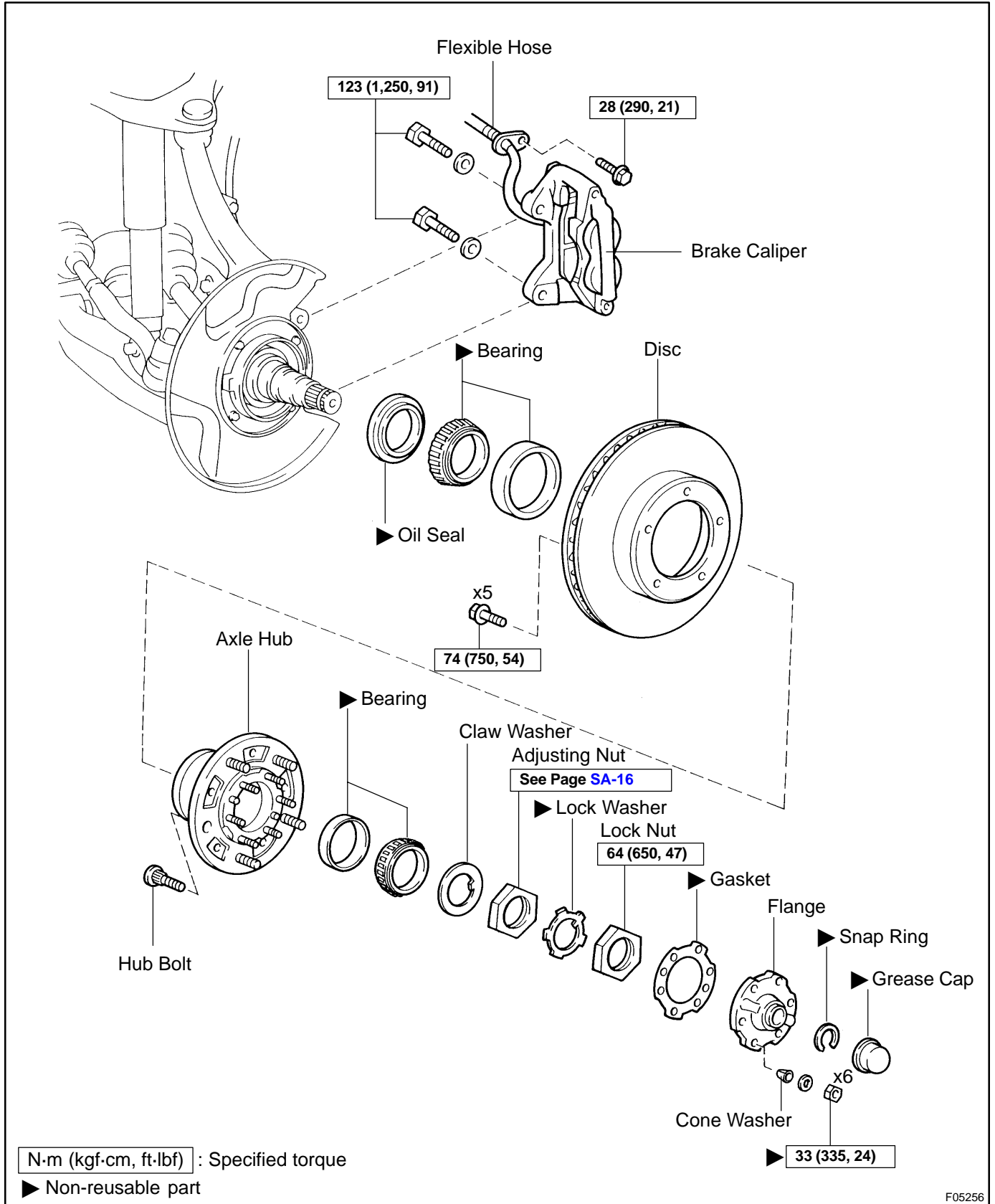


### 7. REMOVE ACTUATOR

- (a) Remove the shift fork set bolt.
- (b) Remove the 4 bolts.
- (c) Using a screwdriver, pry out the actuator.

# FRONT AXLE HUB COMPONENTS

SA143-04

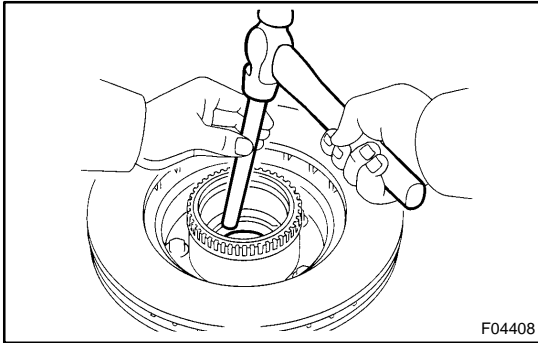


F05256

## DISASSEMBLY

### 1. REMOVE OIL SEAL AND BEARING

- (a) Using a screwdriver, pry out the oil seal.
- (b) Remove the bearing from the axle hub.

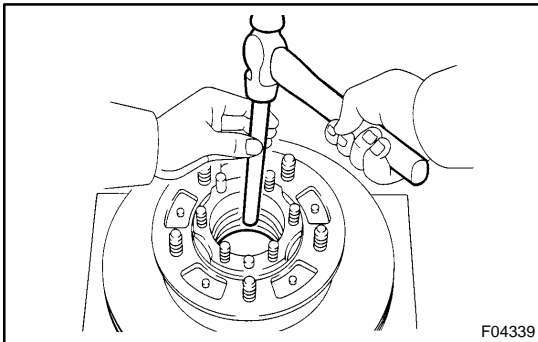


### 2. REMOVE BEARING OUTER RACES

- (a) Using a brass bar and hammer, remove the outside bearing outer race.

#### NOTICE:

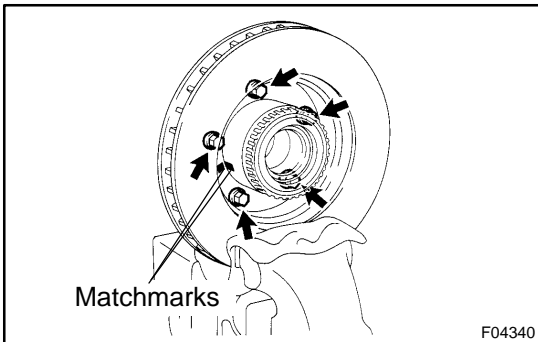
**Be careful not to damage the ABS speed sensor rotor.**



- (b) Using a brass bar and hammer, remove the inside bearing outer race.

### 3. INSPECT BEARINGS

Clean the bearings and outer races and inspect them for wear or damage.



### 4. REMOVE DISC

- (a) Mount the axle hub with the disc in a soft jaw vice.

#### NOTICE:

**Close vice until it holds disc, do not tighten further.**

- (b) Place matchmarks on the axle hub and disc.
- (c) Remove the 5 bolts and separate the axle hub and disc.

## INSTALLATION

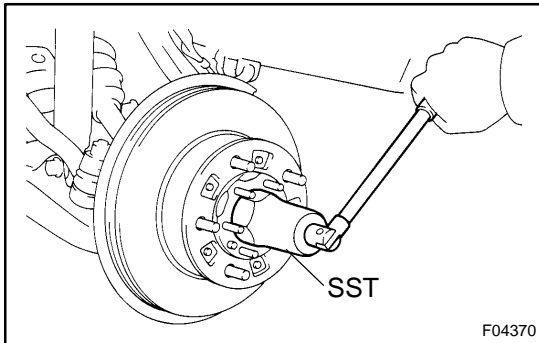
### 1. INSTALL AXLE HUB TO STEERING KNUCKLE

- (a) Place the axle hub with disc to the steering knuckle.

#### NOTICE:

**Be careful not to damage the ABS speed sensor rotor and oil seal.**

- (b) Install the outer bearing.  
(c) Install the claw washer.



### 2. ADJUST PRELOAD

- (a) Install the adjusting nut and using SST, tighten it.

SST 09607-60020

**Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)**

- (b) Turn the axle hub several times to settle down the bearing.

- (c) Using SST, loosen the adjusting nut until it can rotate by hand.

SST 09607-60020

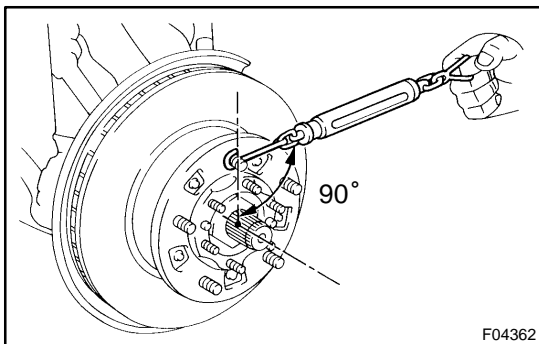
- (d) Using SST, retighten the adjusting nut.

SST 09607-60020

**Torque: 4.3 - 6.5 N·m (44 - 66 kgf·cm, 38 - 57 in.-lbf)**

#### HINT:

Check that there is no looseness on the bearing.



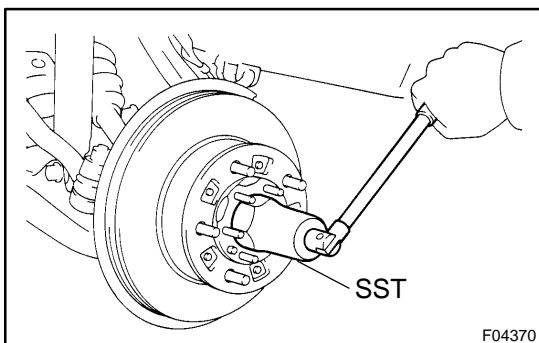
- (e) Using a spring tension gauge, measure the preload.

**Preload (at starting):**

**42 - 67 N (4.3 - 6.8 kgf, 9.5 - 15.0 lbf)**

### 3. INSTALL LOCK WASHER AND LOCK NUT

- (a) Install a new lock washer and the lock nut.

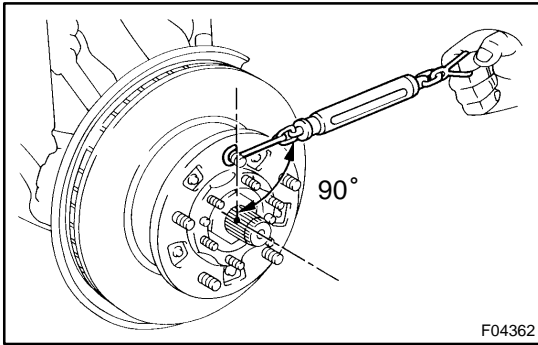


- (b) Using SST, torque the lock nut.

SST 09607-60020

**Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)**

- (c) Check that the axle hub rotates smoothly and there is no looseness on the bearing.



- (d) Using a spring tension gauge, check the preload.

**Preload (at starting):**

**42 - 67 N (4.3 - 6.8 kgf, 9.5 - 15.0 lbf)**

**HINT:**

Make sure to check preload in the direction of rotation.

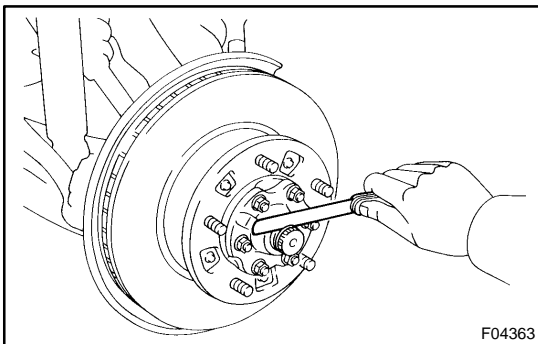
If the preload is not within the specified value, adjust it again with the adjusting nut.

- (e) Secure the lock nut by bending one of the lock washer teeth inward and the other lock washer teeth outward.

**4. INSTALL FLANGE**

- (a) Place a new gasket in position on the axle hub.  
 (b) Install the flange to the axle hub.  
 (c) Install the 6 cone washers, washers and new nuts.

**Torque: 33 N·m (335 kgf·cm, 24 ft·lbf)**



- (d) Pull out the drive shaft to the outside of the vehicle and select the snap ring which ensures the clearance between the tip of the flange and the snap ring is less than 0.2 mm (0.008 in.).

**Snap ring thickness:**

1.8 mm (0.0709 in.)	2.4 mm (0.0945 in.)
2.0 mm (0.0787 in.)	2.6 mm (0.1024 in.)
2.2 mm (0.0866 in.)	2.8 mm (0.1102 in.)

- (e) Using a snap ring expander, install a new snap ring to the drive shaft.

- (f) Install a new grease cap to the flange.

**5. INSTALL BRAKE CALIPER**

- (a) Install the brake caliper, washers and 2 bolts.

**Torque: 123 N·m (1,250 kgf·cm, 91 ft·lbf)**

- (b) Install the flexible hose and bolt to the steering knuckle.

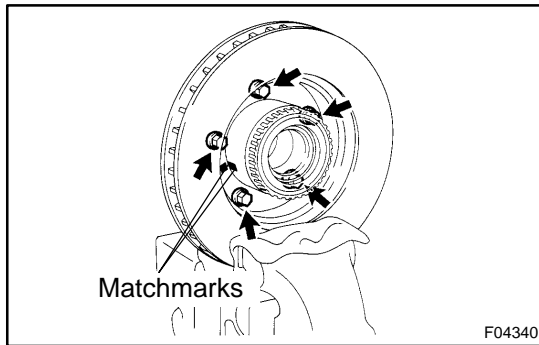
**Torque: 28 N·m (290 kgf·cm, 21 ft·lbf)**

**6. INSTALL FRONT WHEEL**

**Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)**

**7. CHECK ABS SPEED SENSOR SIGNAL**

(See page [DI-505](#))



## REASSEMBLY

### 1. INSTALL DISC

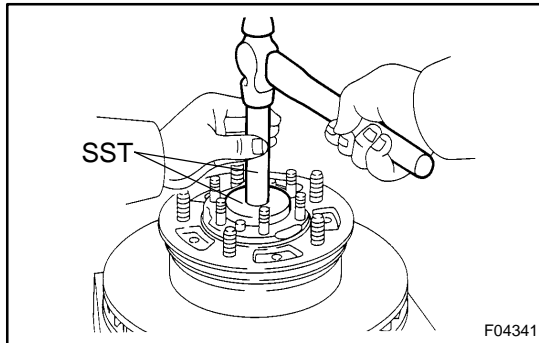
- (a) Mount the disc in a soft jaw vice.

#### NOTICE:

**Close vice until it holds disc, do not tighten further.**

- (b) Align the matchmarks on the axle hub and disc.  
 (c) Install the 5 bolts to the axle hub.

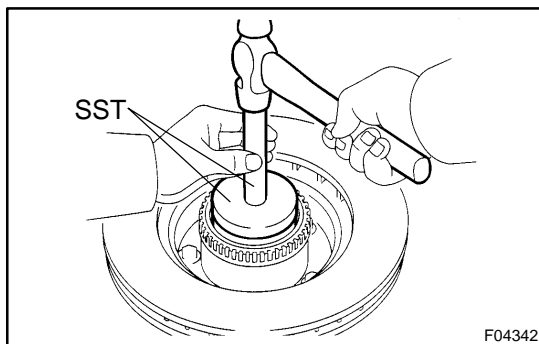
**Torque: 74 N·m (750 kgf-cm, 54 ft-lbf)**



### 2. INSTALL BEARING OUTER RACES

- (a) Using SST and a hammer, carefully install a new outside bearing outer race.

SST 09950-60020 (09951-00730),  
 09950-70010 (09951-07100)

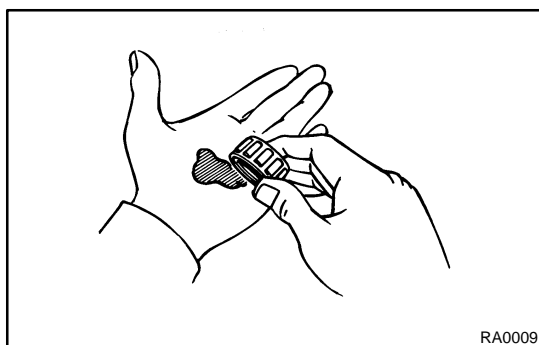


- (b) Using SST and a hammer, carefully install a new inside bearing outer race.

SST 09950-60020 (09951-00890),  
 09950-70010 (09951-07100)

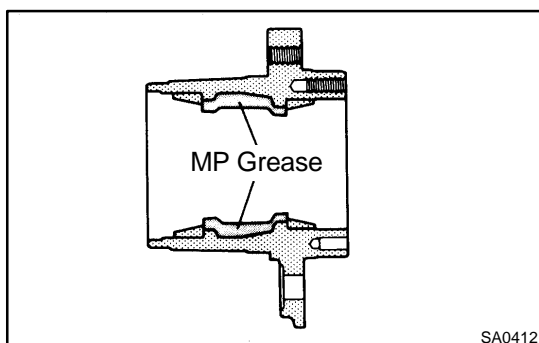
#### NOTICE:

**Be careful not to damage the ABS speed sensor rotor.**



### 3. PACK BEARING WITH MP GREASE

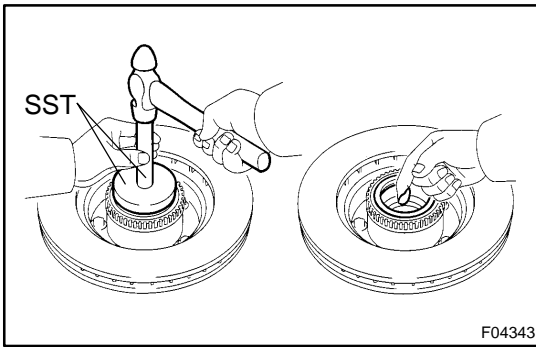
- (a) Place MP grease in the palm of your hand.  
 (b) Pack grease into a new bearing, continuing until the grease oozes out from the other side.  
 (c) Employ the same manner around the bearing circumference.



### 4. COAT INSIDE OF AXLE HUB WITH MP GREASE

### 5. INSTALL INNER BEARING AND OIL SEAL

- (a) Place the inner bearing into the axle hub.



- (b) Using SST and a hammer, install a new oil seal into the axle hub.

SST 09950-60020 (09951-01030),  
09950-70010 (09951-07100)

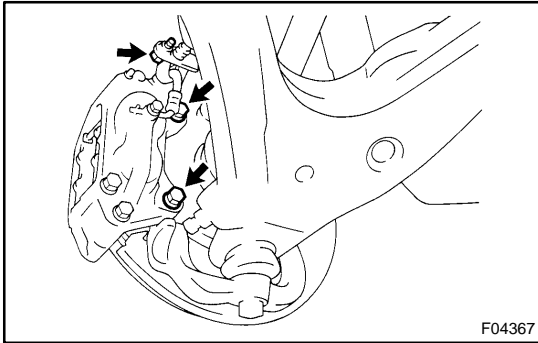
**NOTICE:**

**Be careful not to damage the ABS speed sensor rotor.**

- (c) Coat the lip of the oil seal with MP grease.

## REMOVAL

### 1. REMOVE FRONT WHEEL

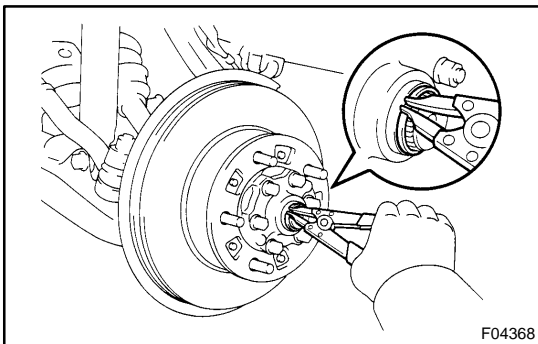


### 2. REMOVE BRAKE CALIPER

- (a) Remove the bolt and disconnect the flexible hose from the steering knuckle.
- (b) Remove the 2 bolts, washers and brake caliper.
- (c) Support the brake caliper securely.

### 3. REMOVE FLANGE

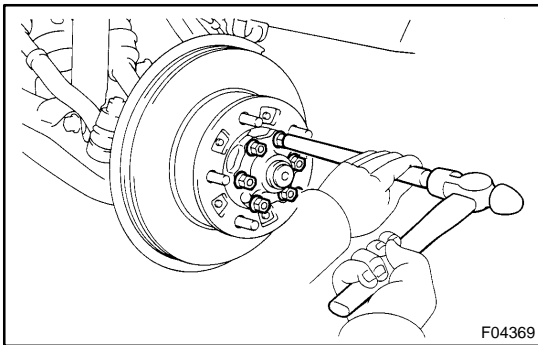
- (a) Using a screwdriver and hammer, remove the grease cap from the flange.
- (b) Using a snap ring expander, remove the snap ring.
- (c) Remove the 6 nuts and washers.
- (d) Install the 6 nuts temporarily to protect the threads of the stud bolts.



- (e) Using a brass bar and hammer, tap on the bolt heads and remove the 6 nuts and cone washers.
- (f) Remove the flange and gasket.

### 4. REMOVE AXLE HUB WITH DISC

- (a) Using a screwdriver, release the lock washer.

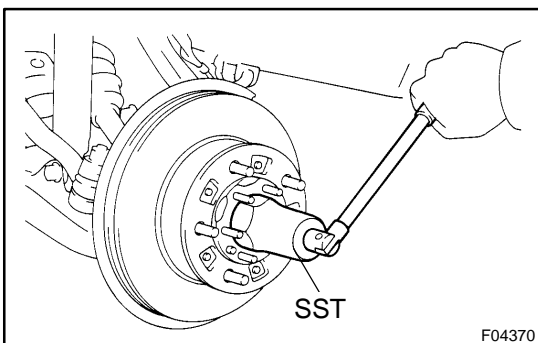


- (b) Using SST, remove the lock nut.  
SST 09607-60020
- (c) Remove the lock washer.
- (d) Using SST, remove the adjusting nut.  
SST 09607-60020
- (e) Remove the axle hub with disc.

#### NOTICE:

**Be careful not to damage the ABS speed sensor rotor and oil seal.**

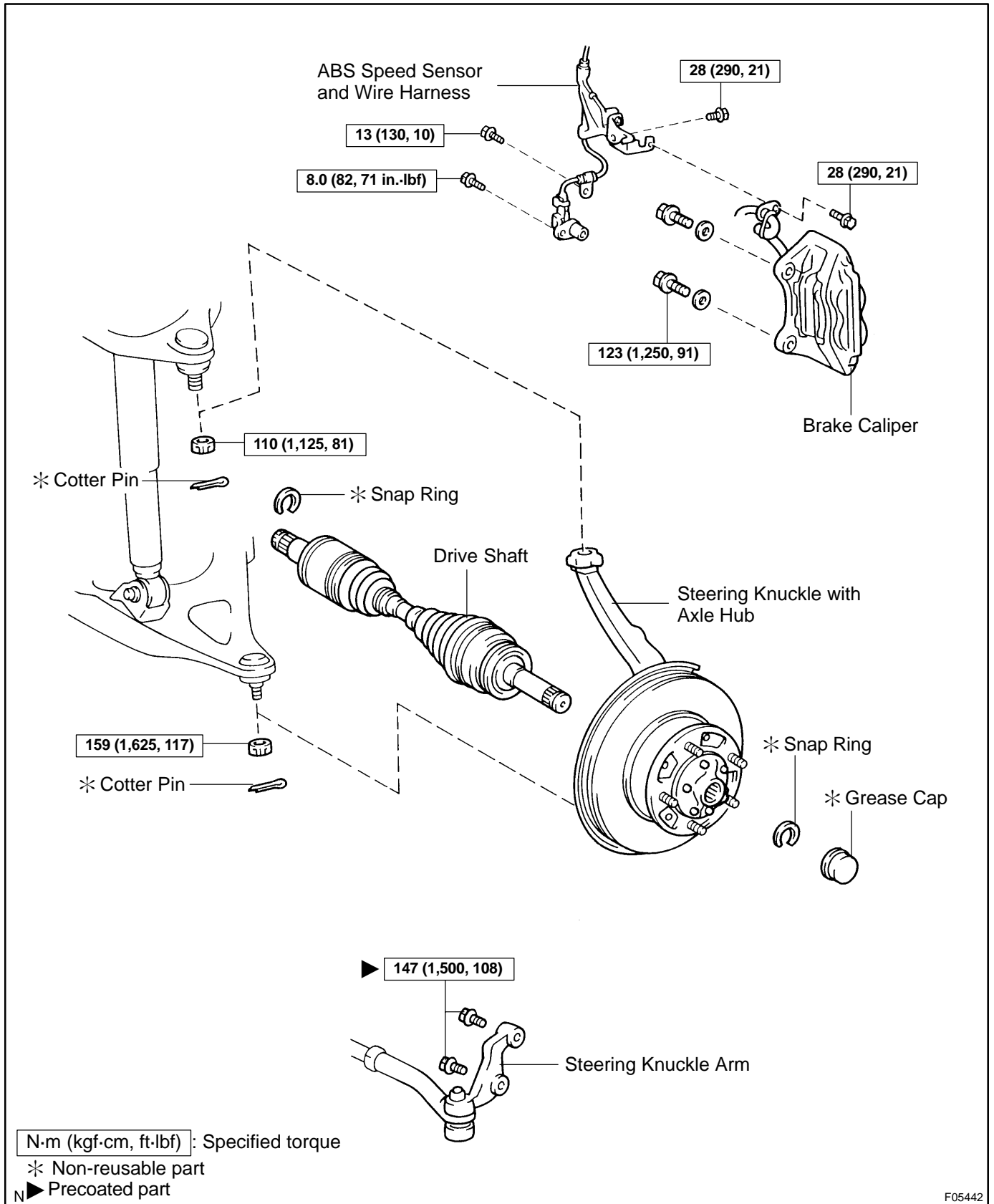
- (f) Remove the claw washer and bearing from the axle hub.





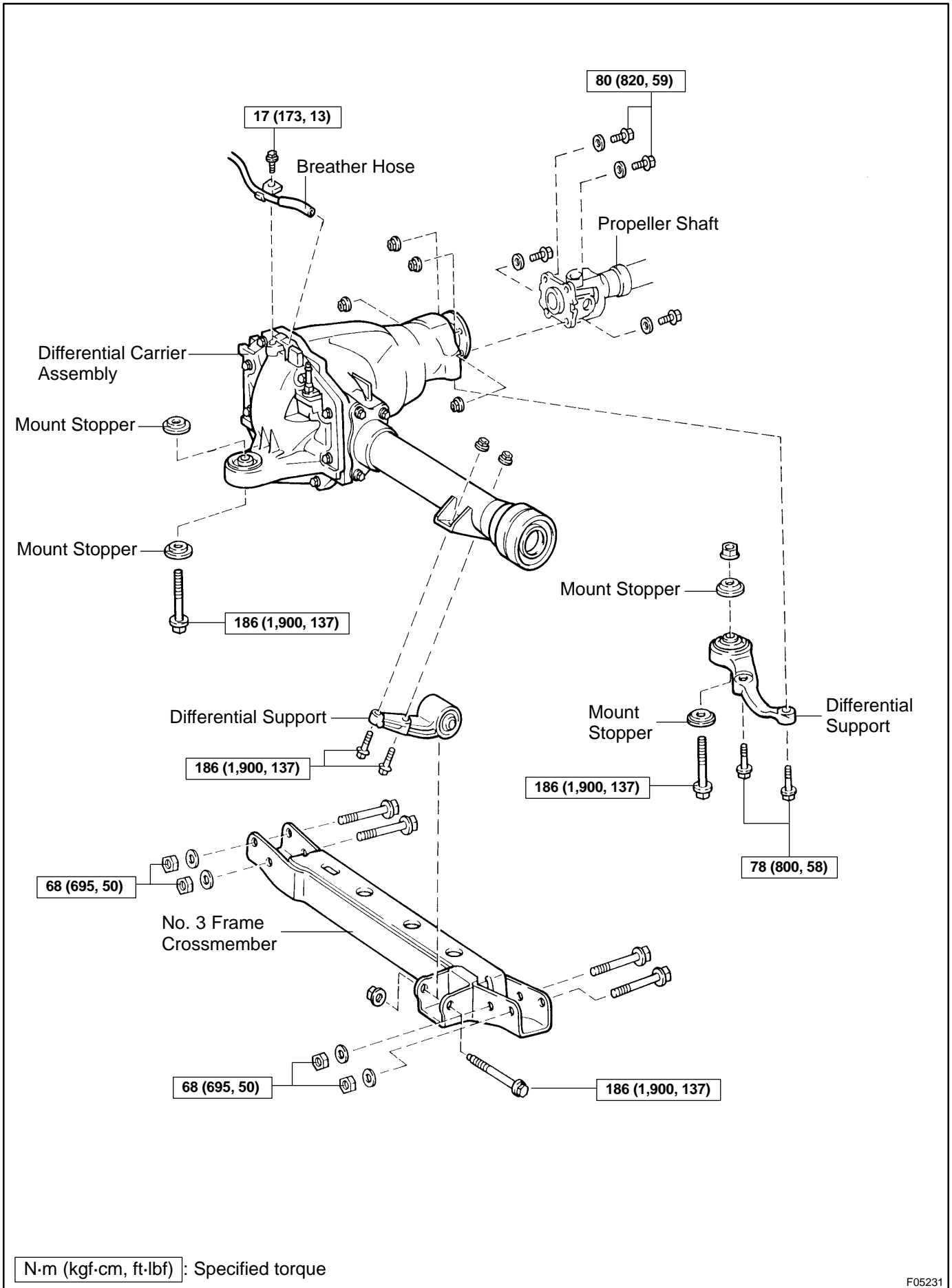
# FRONT DIFFERENTIAL CARRIER COMPONENTS

SA1SE-01



F05442

SUSPENSION AND AXLE - FRONT DIFFERENTIAL CARRIER

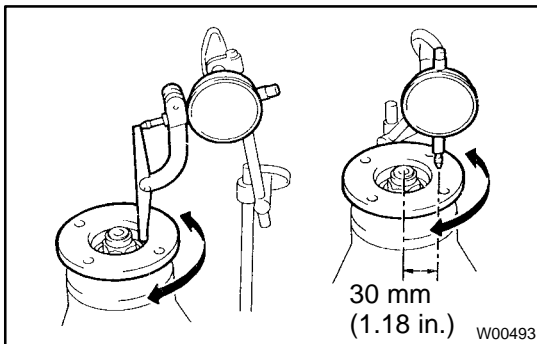




## DISASSEMBLY

### 1. REMOVE DIFFERENTIAL CARRIER COVER

- (a) Remove the 9 bolts and nut from the carrier cover.
  - (b) Using a brass bar and hammer, separate the cover from carrier.
  - (c) Remove the breather plug from the differential carrier cover.
  - (d) Remove the 2 bolts and oil deflector from the differential carrier cover.
- ### 2. SET DIFFERENTIAL CARRIER TO OVERHAUL STAND, ETC.

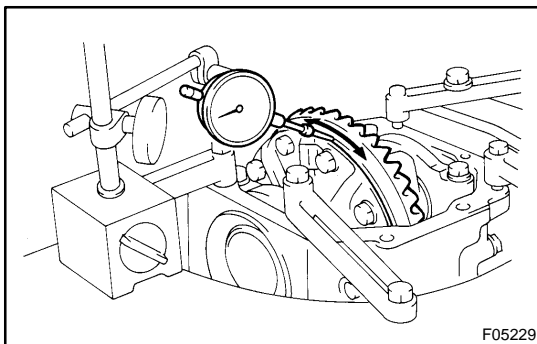


### 3. CHECK RUNOUT OF COMPANION FLANGE

Using a dial indicator, measure the vertical and lateral runout of the companion flange.

**Maximum: 0.09 mm (0.0035 in.)**

If the runout is greater than the maximum, replace the companion flange.

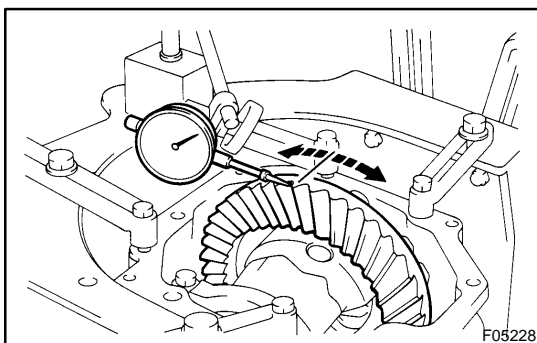


### 4. CHECK RING GEAR RUNOUT

Using a dial indicator, measure the ring gear runout.

**Maximum runout: 0.07 mm (0.0028 in.)**

If the runout is greater than the maximum, replace the ring gear and drive pinion as a set.



### 5. CHECK RING GEAR BACKLASH

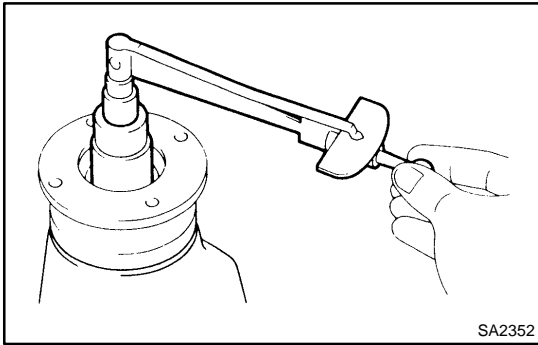
Using a dial indicator, while holding the drive pinion flange measure the ring gear backlash.

**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)**

**HINT:**

Measure at 3 or more places on the circumference of the ring gear.

If the backlash is not within the specification, adjust the backlash.

**6. MEASURE DRIVE PINION PRELOAD**

Using a torque wrench, measure the drive pinion preload using the backlash of the drive pinion and ring gear.

**Preload (at starting):**

**0.5 - 0.8 N-m (5 - 8 kgf-cm, 4.3 - 6.9 in.-lbf)**

**7. CHECK TOTAL PRELOAD**

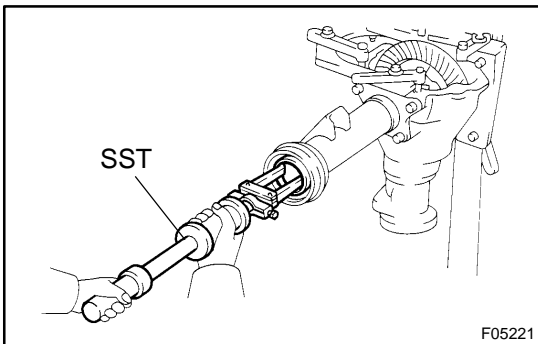
Using a torque wrench, measure the total preload.

**Total preload (at starting):**

**Drive pinion preload plus**

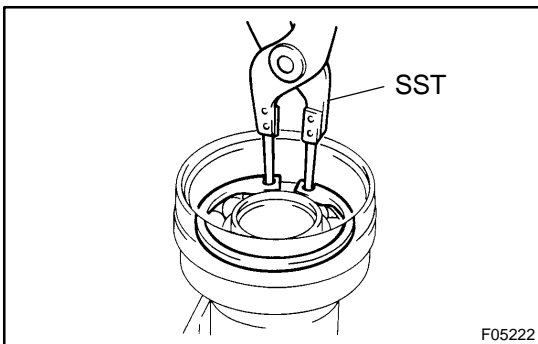
**0.4 - 0.6 N-m (4 - 6 kgf-cm, 3.5 - 5.2 in.-lbf)**

If necessary, disassemble and inspect the differential.

**8. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See page SA-47)****9. REMOVE SIDE GEAR SHAFT OIL SEALS**

Using SST, remove the 2 side gear shaft oil seals.

SST 09308-00010

**10. REMOVE DIFFERENTIAL TUBE ASSEMBLY**

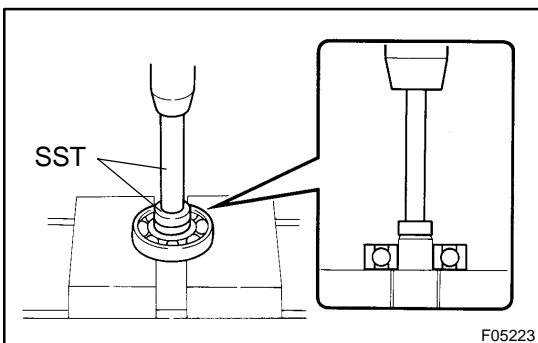
(a) Using SST, remove the snap ring.

SST 09350-30020 (09350-07060)

(b) Using a snap ring expander, remove the snap ring.

(c) Remove the 4 bolts and differential tube with side gear shaft from the differential carrier.

(d) Remove the side gear shaft from the differential tube.

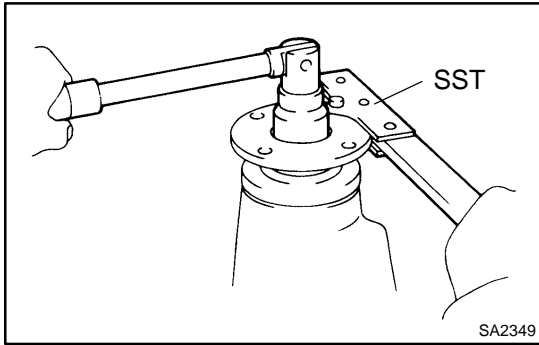
**11. REMOVE SIDE GEAR BEARING**

Using SST and a press, remove the bearing from side gear shaft.

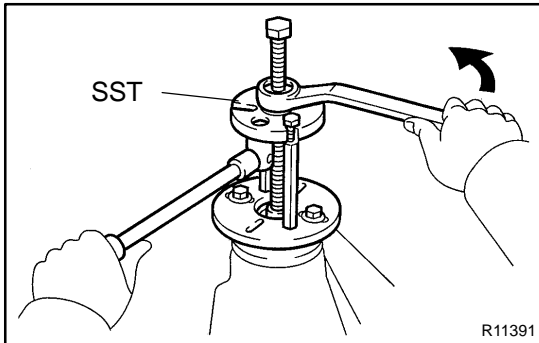
SST 09950-60010 (09951-00410), 09950-70010 (09951-07100)

**12. REMOVE COMPANION FLANGE**

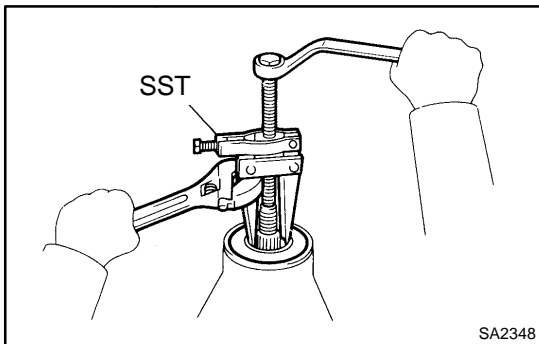
(a) Using a chisel and hammer, unstake the nut.



- (b) Using SST to hold the flange, remove the nut.  
SST 09330-00021

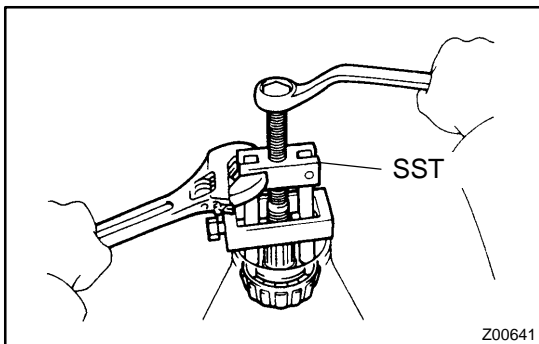


- (c) Using SST, remove the companion flange.  
SST 09950-30012 (09951-03010, 09953-03010,  
09954-03010, 09955-03030, 09956-03020)



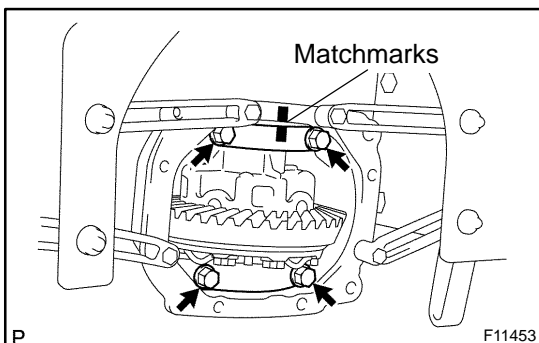
### 13. REMOVE OIL SEAL AND OIL SLINGER

- (a) Using SST, remove the oil seal from the differential carrier.  
SST 09308-10010  
(b) Remove the oil slinger.



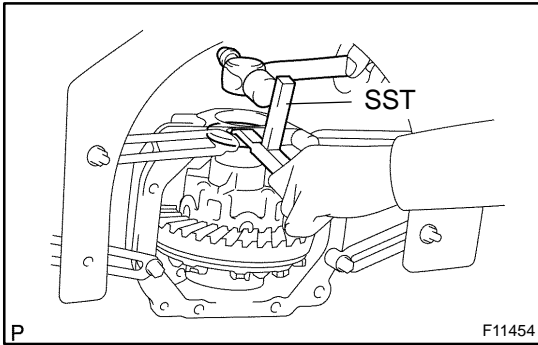
### 14. REMOVE REAR BEARING

- Using SST, remove the rear bearing from the drive pinion.  
SST 09556-22010  
If the rear bearing is damaged or worn, replace the rear bearing.



### 15. REMOVE DIFFERENTIAL CASE ASSEMBLY

- (a) Place matchmarks on the bearing cap and differential carrier.  
(b) Remove the 4 bolts and 2 bearing caps.



- (c) Using SST and a hammer, remove the 2 side bearing plate washers.

SST 09504-22012

HINT:

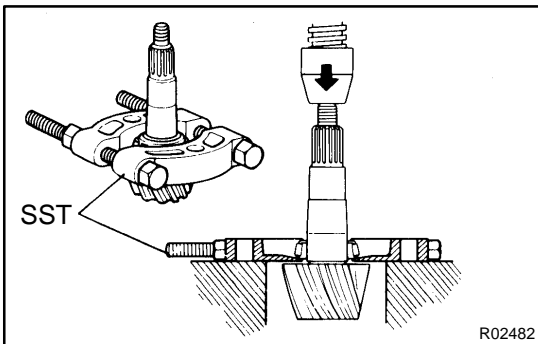
Measure the plate washer and note down the thickness.

- (d) Remove the differential case with the bearing outer races from the differential carrier.

HINT:

Tag the bearing outer races to show the location for reassembling.

### 16. REMOVE DRIVE PINION AND BEARING SPACER FROM DIFFERENTIAL CARRIER



### 17. REMOVE DRIVE PINION FRONT BEARING

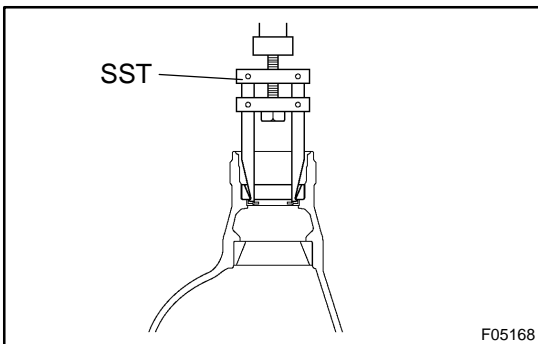
- (a) Using SST and a press, remove the front bearing from the drive pinion.

SST 09950-00020

HINT:

If the drive pinion or ring gear is damaged, replace them as a set.

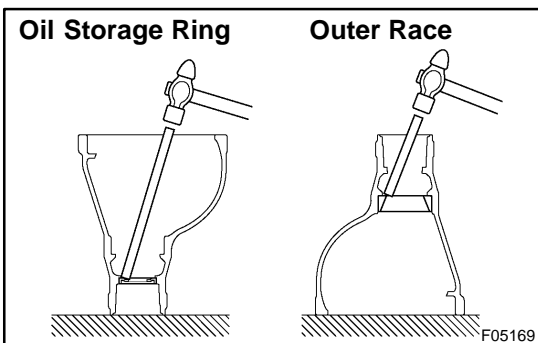
- (b) Remove the washer.



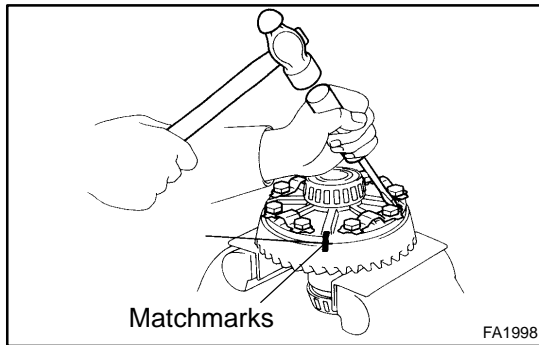
### 18. REMOVE DRIVE PINION FRONT AND REAR BEARING OUTER RACES AND OIL STORAGE RING

- (a) Using SST, remove the rear bearing outer race.

SST 09308-00010



- (b) Using a brass bar and hammer, remove the oil storage ring and front bearing outer race.

**19. REMOVE RING GEAR**

- (a) Place matchmarks on the ring gear and differential case.
- (b) Using a screwdriver and hammer, unstick the 5 lock plates.
- (c) Remove the 10 bolts and 5 lock plates.
- (d) Using a plastic hammer, tap on the ring gear to separate it from the differential case.

**20. CHECK DIFFERENTIAL CASE RUNOUT**

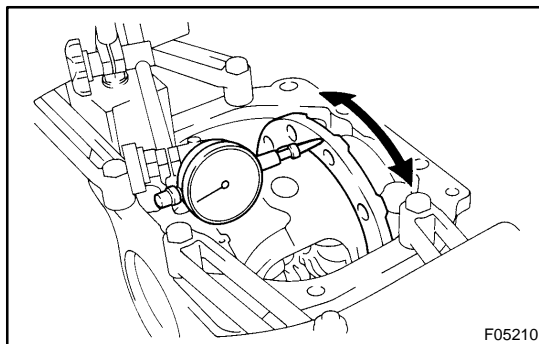
- (a) Place the bearing outer races on their respective bearings. Check that the left and right outer races are not interchanged.
- (b) Install the assembled plate washers onto the side bearing.
- (c) Install the differential case in the differential carrier.

**HINT:**

If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.

However, select a plate washer that allows no clearance between it and the carrier.

- (d) Align matchmarks on the bearing cap and differential carrier.
- (e) Install and uniformly tighten the 4 bolts a little at a time.

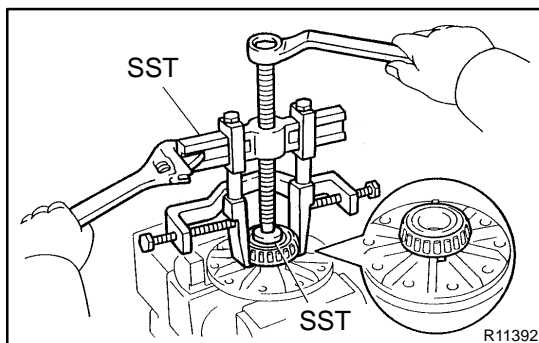


- (f) Using a dial indicator, measure the differential case runout.

**Maximum case runout: 0.07 mm (0.0028 in.)**

If the runout is greater than the maximum, replace the differential case and side bearings as a set.

- (g) Remove the differential case.

**21. REMOVE SIDE BEARINGS**

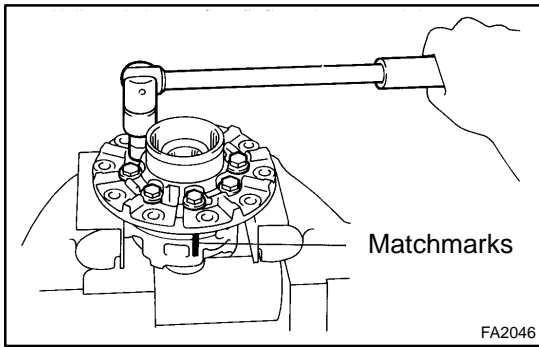
Using SST, remove the 2 side bearings from the differential case.

SST 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04061, 09957-04010, 09958-04011), 09950-60010 (09951-00480)

**HINT:**

Fix the claws of SST to the notches in the differential case.



**22. DISASSEMBLE DIFFERENTIAL CASE**

- (a) Place matchmarks on the LH and RH cases.
- (b) Remove the 8 bolts uniformly, a little at a time.
- (c) Using a plastic hammer, separate the LH and RH cases.
- (d) Remove the spider, 2 side gears, side gear thrust washers, 4 pinion gears and pinion gear thrust washers from the RH differential case.

## INSTALLATION

Installation is in the reverse order of removal (See page [SA-39](#) ).

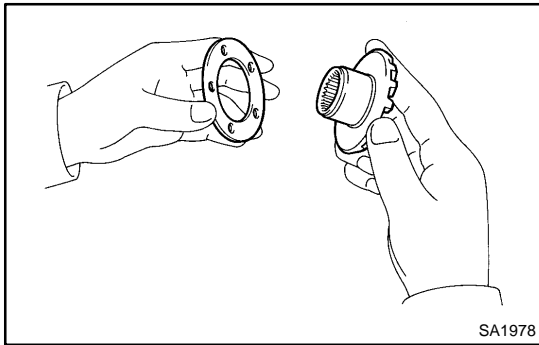
HINT:

After installation, fill the differential with hypoid gear oil (See page [SA-35](#) ).

# REASSEMBLY

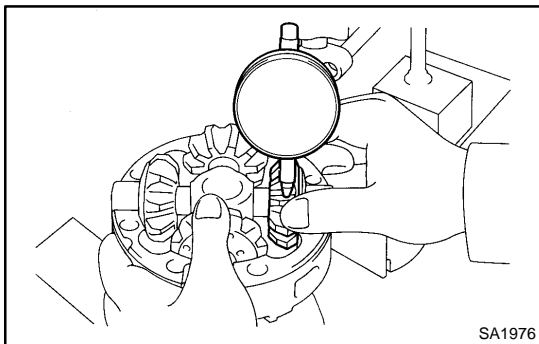
**HINT:**

- ▶ Using a shop rag, clean off any foreign object from the parts.
- ▶ Apply all of the sliding and rotating surfaces with hypoid gear oil.



**1. MEASURE SIDE GEAR BACKLASH AND ASSEMBLE DIFFERENTIAL CASE**

- (a) Install the 2 side gear thrust washers to the side gears.
- (b) Install the 2 side gears to the RH case.
- (c) Install the 4 pinion gears and pinion gear thrust washers to the spider.
- (d) Install the pinion gears with the spider to the RH case.



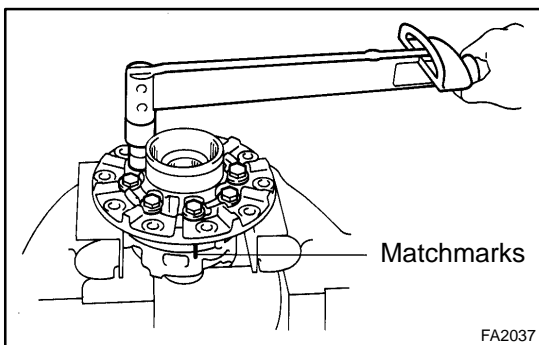
- (e) Using a dial indicator, holding the side gear and spider, measure the side gear backlash,  
**Backlash: 0.05 - 0.20 mm (0.0020 - 0.0079 in.)**

**HINT:**

- ▶ Measure at all 4 locations.
  - ▶ Measure the backlash at the RH case and at the LH case.
- If the backlash is not within the specification, install a thrust washer of a different thickness.

**Thrust washer thickness**

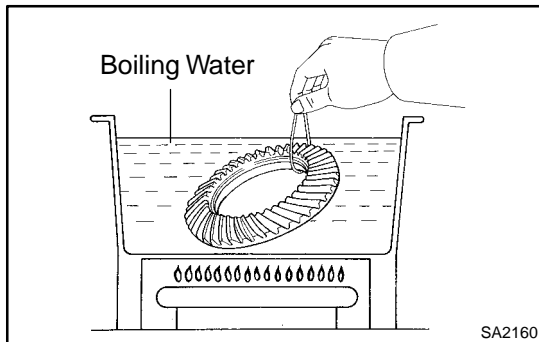
Thickness mm (in.)	Thickness mm (in.)
0.9 (0.035)	1.2 (0.047)
1.0 (0.039)	1.3 (0.051)
1.1 (0.043)	-



- (f) Align the matchmarks on the LH and RH cases.
- (g) Torque the 8 bolts uniformly a little at a time.  
**Torque: 47 N·m (480 kgf-cm, 35 ft-lbf)**

**2. INSTALL RING GEAR ON DIFFERENTIAL CASE**

- (a) Clean the contact surfaces of the differential case and ring gear.



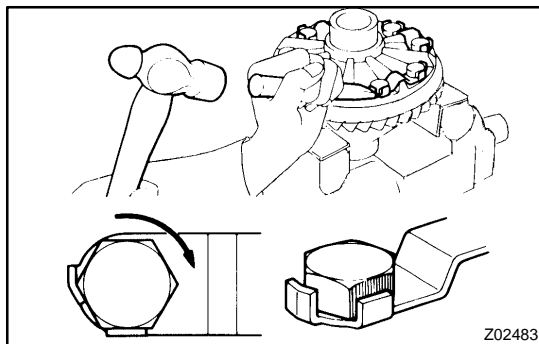
- (b) Heat the ring gear to approx. 100°C (212°F) in boiling water.  
 (c) Carefully take the ring gear out of the boiling water.  
 (d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

**HINT:**

Align the matchmarks on the ring gear and differential case.

- (e) Temporarily install 5 new lock plates and 10 bolts so that the bolt holes in the ring gear and differential case are not misaligned.  
 (f) After the ring gear has cooled sufficiently, torque the 10 ring gear set bolts.

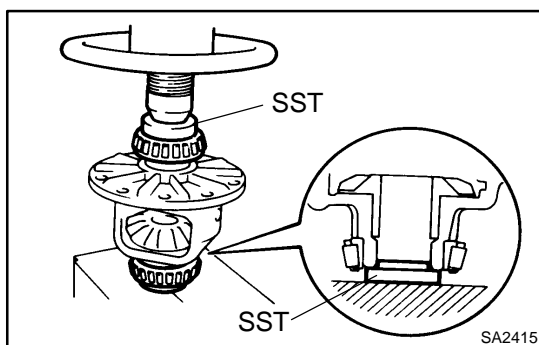
**Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)**



- (g) Using a chisel and hammer, stake the 5 lock plates.

**HINT:**

Stake the claws of the lock plates to fix the bolts. For the claw contacting the protruding portion of the bolt, stake only the half of it along the tightening direction.

**3. INSTALL SIDE BEARINGS**

Using SST and a press, install the 2 side bearings to the differential case.

SST 09223-15020, 09950-60010 (09951-00480)

**4. CHECK RING GEAR RUNOUT**

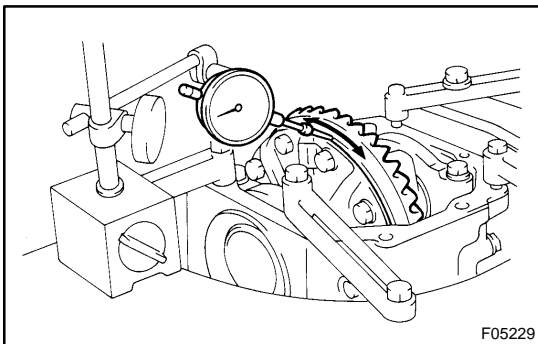
- (a) Place the bearing outer races on their respective bearings. Check that the left and right outer races are not interchanged.
- (b) Install the assembled plate washers onto the side bearing.
- (c) Install the differential case in the differential carrier.

**HINT:**

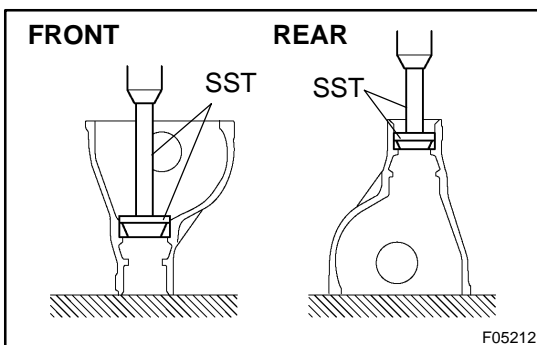
If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.

However, select a plate washer that allows no clearance between it and the carrier.

- (d) Align matchmarks on the bearing cap and differential carrier.
- (e) Install and uniformly tighten the 4 bolts a little at a time.



- (f) Using a dial indicator, measure the ring gear runout.  
**Maximum runout: 0.07 mm (0.0028 in.)**
- (g) Remove the differential carrier.

**5. INSTALL DRIVE PINION FRONT AND REAR BEARING OUTER RACES**

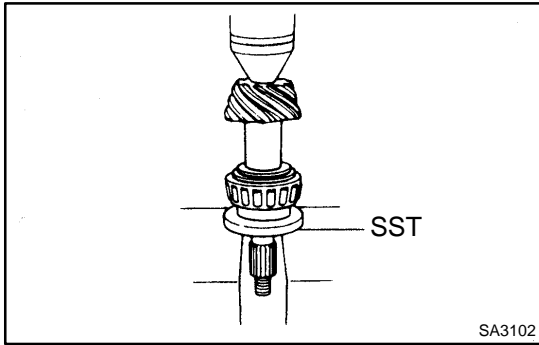
- (a) Using SST and a press, install the front bearing outer race.  
SST 09950-60020 (09951-00780), 09950-70010 (09951-07150)
- (b) Using SST and a press, install the rear bearing outer race.  
SST 09950-60020 (09951-00710), 09950-70010 (09951-07150)

**6. INSTALL DRIVE PINION FRONT BEARING**

- (a) Install the washer on the drive pinion.

**HINT:**

First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.



- (b) Using SST and a press, install the front bearing onto the drive pinion.

SST 09506-30012

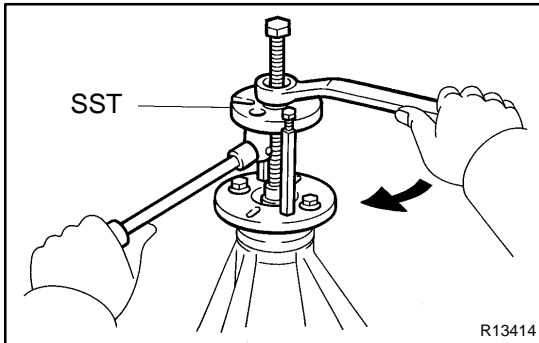
### 7. TEMPORARILY ADJUST DRIVE PINION PRELOAD

- (a) Install the drive pinion and rear bearing.

HINT:

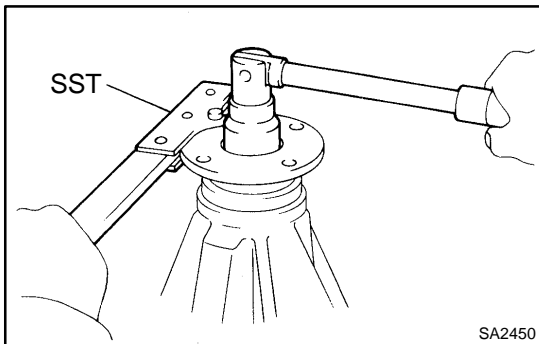
Assemble the spacer and oil seal after adjusting the gear contact pattern.

- (b) Install the oil slinger.



- (c) Using SST, install the companion flange.

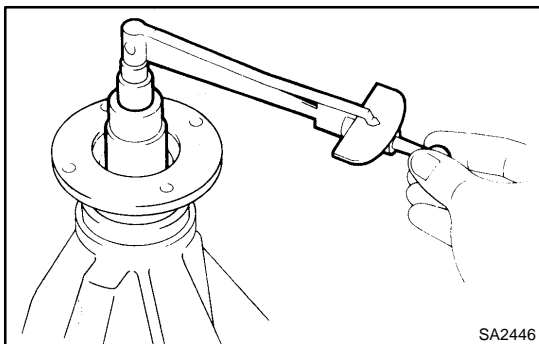
SST 09950-30012, (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)



- (d) Using SST to hold the flange and adjust the drive pinion preload by tightening the nut.

**NOTICE:**

- ▶ Coat the nut and threads of the drive pinion with gear oil.
- ▶ As there is no spacer, tighten the nut a little at a time, being careful not to overtighten.



- (e) Using a torque wrench, measure the preload.

**Preload (at starting):**

**New bearing**

**1.0 - 1.6 N-m (10 - 16 kgf-cm, 8.7 - 13.9 in.-lbf)**

**Reused bearing**

**0.5 - 0.8 N-m (5 - 8 kgf-cm, 4.3 - 6.9 in.-lbf)**

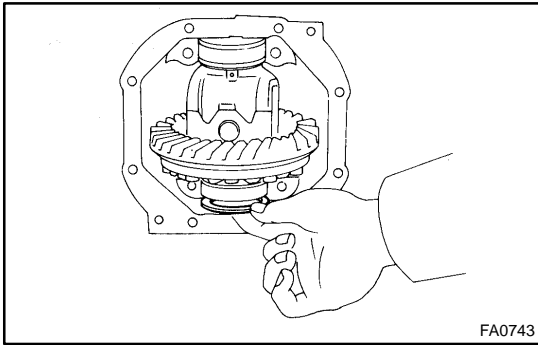
HINT:

Measure the total preload after turning the bearing clockwise and counterclockwise several times to make the bearing smooth.

### 8. INSTALL DIFFERENTIAL CASE IN DIFFERENTIAL CARRIER

- (a) Place the bearing outer races on their respective bearings. Check that the left and right outer races are not interchanged.

- (b) Install the differential case in the differential carrier.

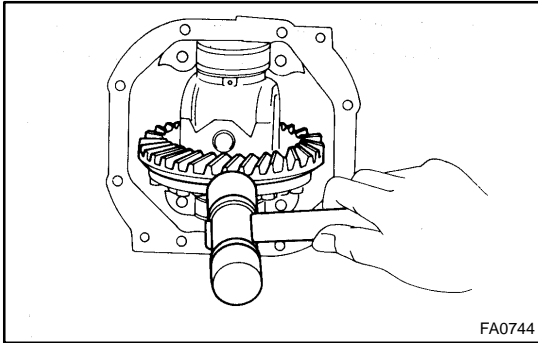


### 9. ADJUST RING GEAR BACKLASH

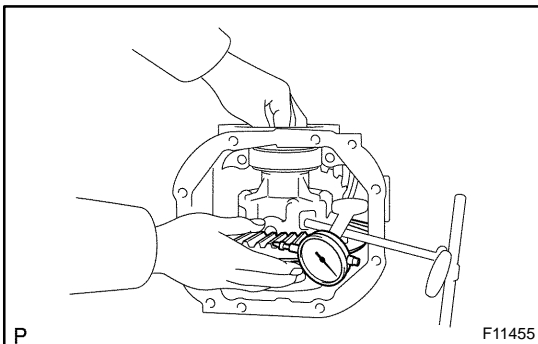
(a) Install the plate washer on the ring gear back side.

HINT:

Make sure that the ring gear has backlash.

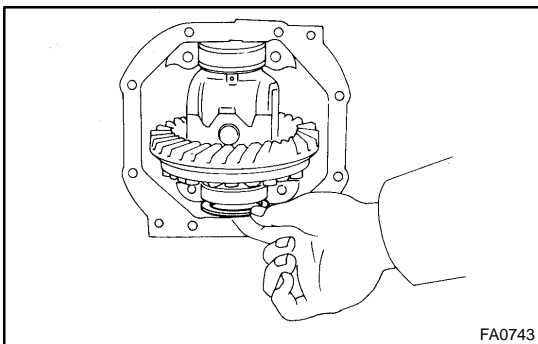


(b) Tap on the ring gear with a plastic hammer so that the washer fits to the bearing.



(c) Using a dial indicator, measure the side gear backlash while holding one pinion gear toward the differential case.

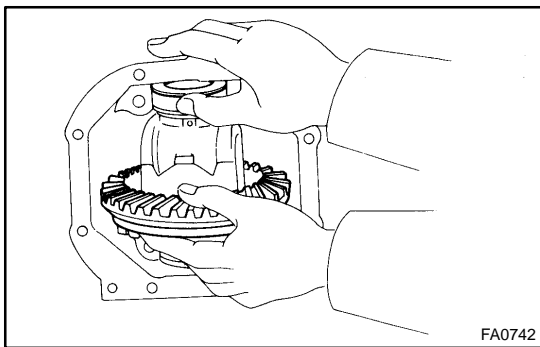
**Backlash (Reference): 0.13 mm (0.0051 in.)**



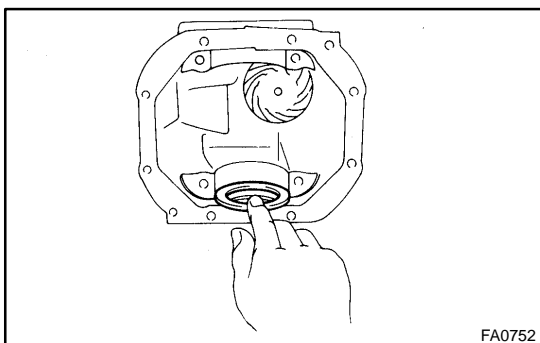
(d) Select a plate washer for back side ring gear, using the backlash as reference.

## Side plate washer thickness

Thickness mm (in.)	Thickness mm (in.)
2.58 (0.1016)	3.04 (0.1197)
2.60 (0.1024)	3.06 (0.1205)
2.62 (0.1031)	3.08 (0.1213)
2.64 (0.1039)	3.10 (0.1220)
2.66 (0.1047)	3.12 (0.1228)
2.68 (0.1055)	3.14 (0.1236)
2.70 (0.1063)	3.16 (0.1244)
2.72 (0.1071)	3.18 (0.1252)
2.74 (0.1079)	3.20 (0.1260)
2.76 (0.1087)	3.22 (0.1268)
2.78 (0.1094)	3.24 (0.1276)
2.80 (0.1102)	3.26 (0.1283)
2.82 (0.1110)	3.28 (0.1291)
2.84 (0.1118)	3.30 (0.1299)
2.86 (0.1126)	3.32 (0.1307)
2.88 (0.1134)	3.34 (0.1315)
2.90 (0.1142)	3.36 (0.1323)
2.92 (0.1150)	3.38 (0.1331)
2.94 (0.1157)	3.40 (0.1339)
2.96 (0.1165)	3.42 (0.1346)
2.98 (0.1173)	3.44 (0.1354)
3.00 (0.1181)	3.46 (0.1362)
3.02 (0.1189)	3.48 (0.1370)

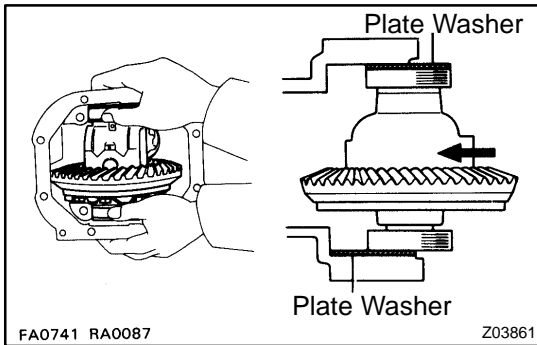


- (e) Select a ring gear teeth side plate washer so that is no clearance between the outer race and case.

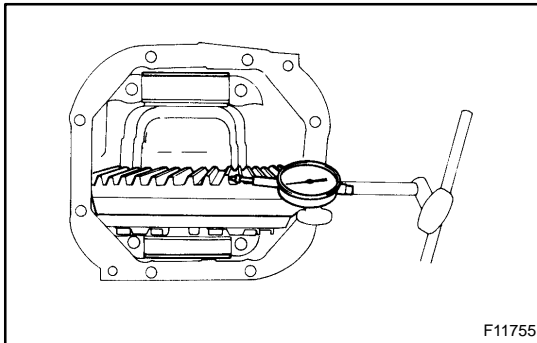


- (f) Remove the plate washers and differential case.  
 (g) Install the plate washer into the ring gear back side of the carrier.





- (h) Place the other plate washer onto the differential case together with the outer race, and install the differential case with the outer race into the carrier.
- (i) Tap on the ring gear with a plastic hammer so that the washers fit to the bearing.



- (j) Using a dial indicator, measure the ring gear backlash.  
**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0070 in.)**  
 If the backlash is not within the specification, adjust by either increasing or decreasing the thickness of washers on both sides by an equal amount.

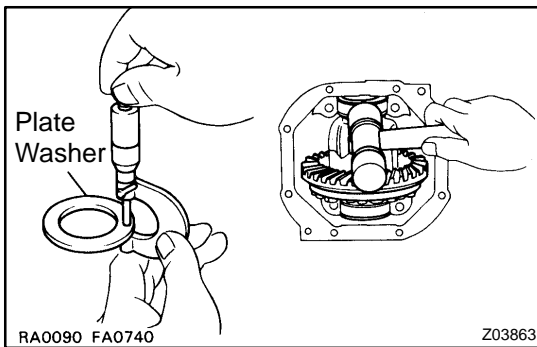
HINT:

There should be no clearance between the plate washer and case.

Make sure that there is ring gear backlash.

#### 10. ADJUST SIDE BEARING PRELOAD

- (a) Remove the ring gear teeth side plate washer and measure the thickness.



- (b) Using the backlash as a reference, install a new washer of 0.06 - 0.09 mm (0.0024 - 0.0035 in.) thicker than the washer removed.

HINT:

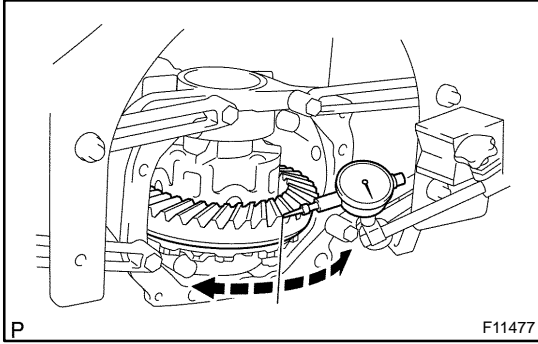
Select a washer which can be pressed in 2/3 of the way with your finger.

- (c) Using a plastic hammer, install the plate washer.
- (d) Align matchmarks on the bearing cap and differential carrier.
- (e) Tighten the 4 bolts.

**Torque: 85 N·m (870 kgf·cm, 63 ft·lbf)**

HINT:

Turn the ring gear several times to make the side bearings smooth.



- (f) Using a dial indicator, adjust the ring gear backlash until it is within the specification.

**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0070 in.)**

If the backlash is not within the specification, adjust by either increasing or decreasing the thickness of washers on both sides by an equal amount.

**HINT:**

The backlash will change by about 0.02 mm (0.0008 in.) corresponding to 0.03 mm (0.0012 in.) change in the plate washer.

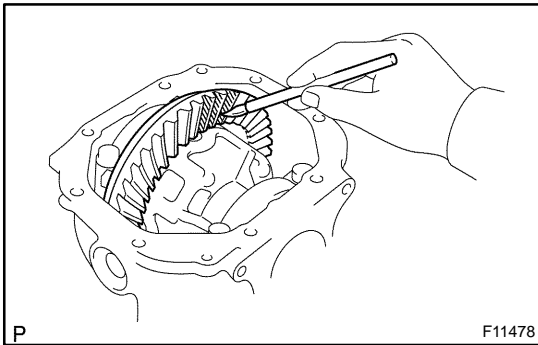
### 11. MEASURE TOTAL PRELOAD

Using a torque wrench, measure the total preload.

**Total preload (at starting):**

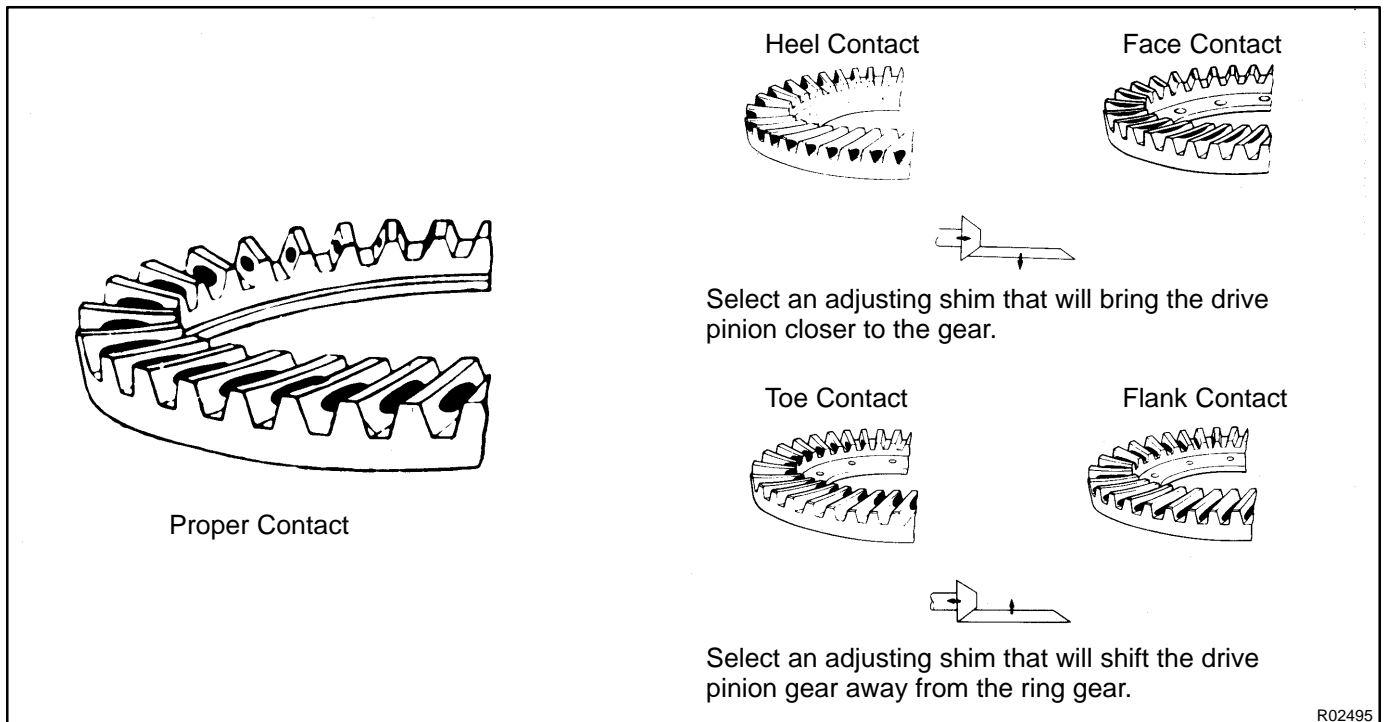
**Drive pinion preload plus**

**0.4 - 0.6 N·m (4 - 6 kgf·cm, 3.5 - 5.2 in.-lbf)**

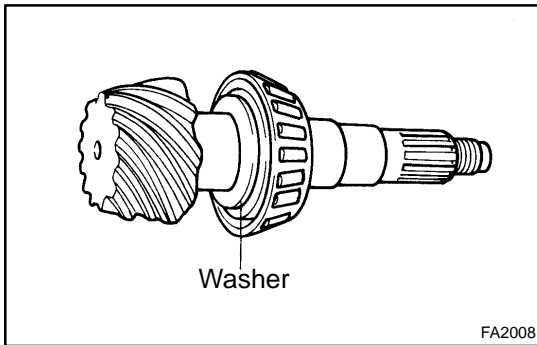


### 12. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

- Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead primer.
- Hold the companion flange firmly and rotate the ring gear in both directions.
- Inspect the tooth contact pattern.



R02495

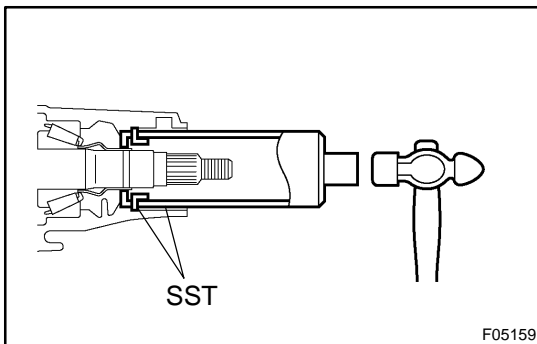


If the teeth are not contacting properly, use the following table to select a proper washer for correction.

#### Washer thickness

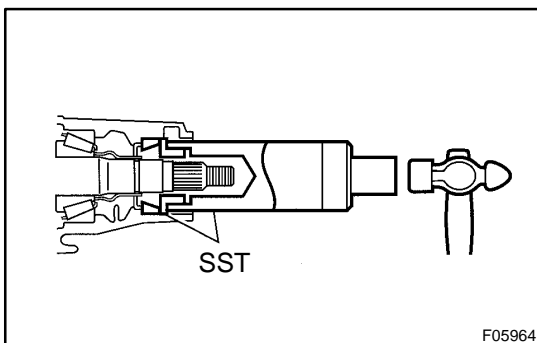
Thickness mm (in.)	Thickness mm (in.)
1.70 (0.0669)	2.03 (0.0799)
1.73 (0.0681)	2.06 (0.0811)
1.76 (0.0693)	2.09 (0.0822)
1.79 (0.0704)	2.12 (0.0835)
1.82 (0.0717)	2.15 (0.0847)
1.85 (0.0729)	2.18 (0.0858)
1.88 (0.0740)	2.21 (0.0870)
1.91 (0.0752)	2.24 (0.0882)
1.94 (0.0764)	2.27 (0.0894)
1.97 (0.0776)	2.30 (0.0906)
2.00 (0.0787)	2.33 (0.0918)

13. REMOVE COMPANION FLANGE (See page SA-40 )
14. REMOVE OIL SLINGER
15. REMOVE REAR BEARING (See page SA-40 )
16. REMOVE REAR BEARING OUTER RACE  
(See page SA-40 )



#### 17. INSTALL BEARING SPACER AND OIL STORAGE RING

- (a) Install a new bearing spacer.
- (b) Using SST and a hammer, install a new oil storage ring.  
SST 09316-6001 1 (09316-00011), 09506-35010



#### 18. INSTALL REAR BEARING OUTER RACE

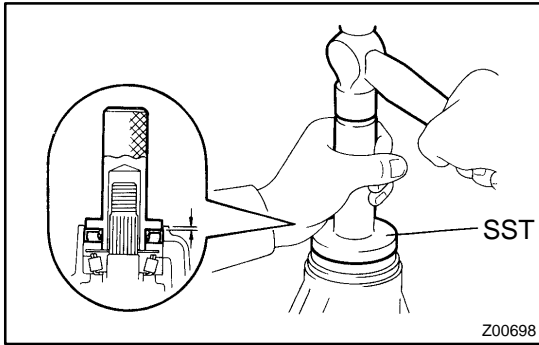
Using SST and a hammer, install the bearing outer race.

SST 09316-6001 1 (09316-00011), 09506-35010

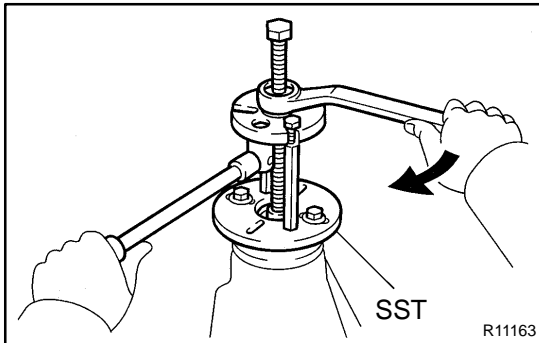
#### 19. INSTALL REAR BEARING AND OIL SLINGER

#### 20. INSTALL OIL SEAL

- (a) Coat the hypoid gear oil to a new oil seal periphery.

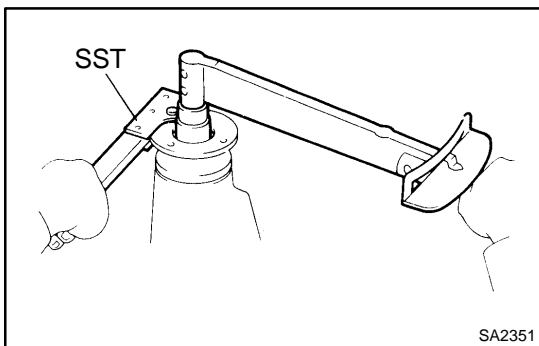


- (b) Using SST and a hammer, install a new oil seal.  
SST 09554-3001 1  
**Oil seal drive in depth: 1.5 mm (0.059 in.)**
- (c) Coat MP grease to the oil seal lip.

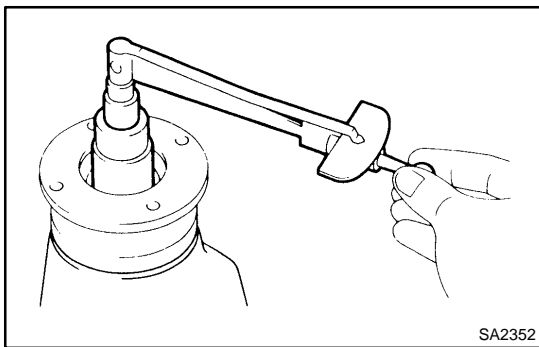


## 21. INSTALL COMPANION FLANGE

- (a) Using SST, install the companion flange.  
SST 09950-30012 (09951-03010, 09953-03010,  
09954-03010, 09955-03030, 09956-03020)
- (b) Coat the thread of a new nut with hypoid gear oil LSD.



- (c) Using SST to hold the flange, tighten the nut.  
SST 09330-00021  
**Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)**



## 22. ADJUST DRIVE PINION PRELOAD

Using a torque wrench, measure the drive pinion preload using the backlash of the drive pinion and ring gear.

**Preload (at starting):**

**New bearing**

**1.0 - 1.6 N·m (10 - 16 kgf·cm, 8.7 - 13.9 in.-lbf)**

**Reused bearing**

**0.5 - 0.8 N·m (5 - 8 kgf·cm, 4.3 - 6.9 in.-lbf)**

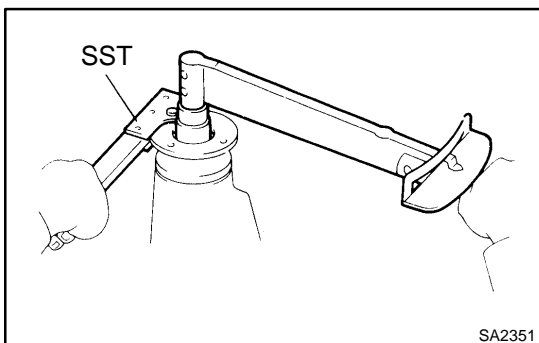
If the preload is greater than the specification, replace the bearing spacer.

If the preload is less than the specification, retighten the nut a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

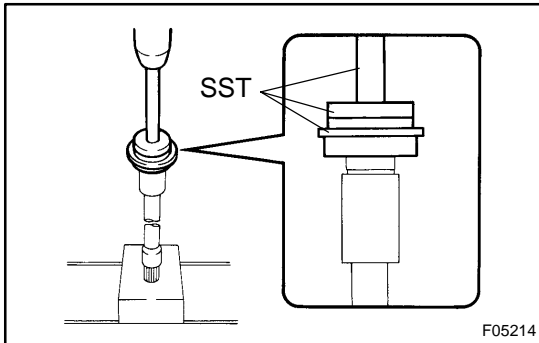
SST 09330-00021

**Torque: 338 N·m (3,447 kgf·cm, 249 ft·lbf) or less**

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not loosen the pinion nut to reduce the preload.



23. RECHECK TOTAL PRELOAD (See page SA-40 )
24. RECHECK RING GEAR BACKLASH  
(See page SA-40 )
25. RECHECK TOOTH CONTACT BETWEEN RING GEAR  
AND DRIVE PINION (See page SA-47 )
26. CHECK RUNOUT OF COMPANION FLANGE (See  
page SA-40 )
27. STAKE DRIVE PINION NUT



### 28. INSTALL SIDE GEAR BEARING

Using SST and a press, install the bearing to side gear shaft.  
SST 09502-12010, 09950-60020 (09951-00730),  
09950-70010 (09951-07100)

### 29. INSTALL DIFFERENTIAL TUBE ASSEMBLY

- (a) Clean surfaces with FIPG material attached to using gasoline or alcohol.
- (b) Apply FIPG to the differential tube.

#### FIPG:

**Part No. 08826 - 00090, THREE BOND 1281  
or equivalent.**

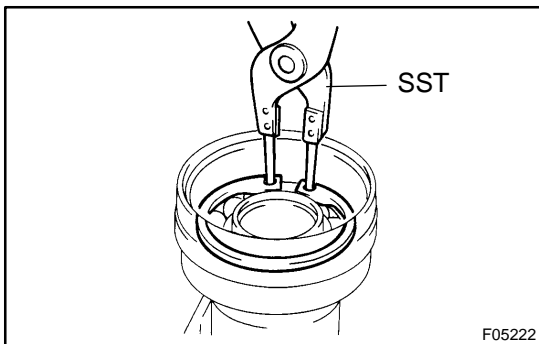
#### HINT:

Install the differential tube within 10 minutes after applying FIPG.

- (c) Install the differential tube with 4 bolts to the differential tube.

**Torque: 105 N·m (1,070 kgf·cm, 77 ft·lbf)**

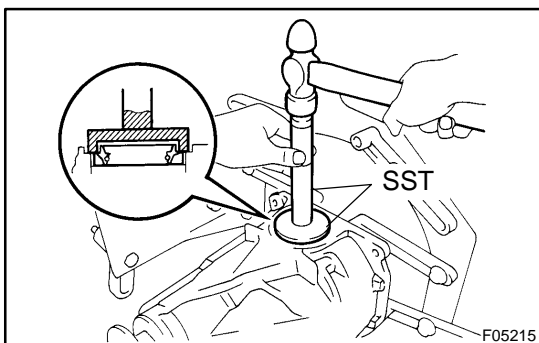
- (d) Install the side gear shaft.
- (e) Using a snap ring expander, install the snap ring.



- (f) Using SST, install the snap ring.  
SST 09350-30020 (09350-07060)

### 30. INSTALL SIDE GEAR SHAFT OIL SEALS

- (a) Coat the hypoid gear oil to a new oil seal periphery.

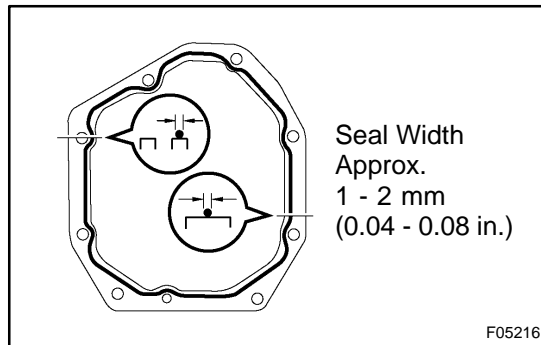


- (b) Using SST and a hammer, install 2 new oil seals.  
SST 09550-00032, 09950-70010 (09951-07150)
- (c) Coat MP grease to the oil seal lip.

### 31. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND, ETC.

**32. INSTALL DIFFERENTIAL CARRIER COVER**

- (a) Install the oil deflector with 2 bolts to the carrier cover.  
**Torque: 7.3 N·m (74 kgf·cm, 64 in.-lbf)**
- (b) Install the breather plug to the carrier cover.
- (c) Remove any old FIPG material and be careful not to drop oil on the contact surfaces of the differential carrier and carrier cover.
- (d) Clean surfaces with FIPG with material attached to using gasoline or alcohol.



- (e) Apply FIPG to the carrier cover, as shown.

**FIPG:**

**Part No. 08826-00090, THREE BOND 1281  
or equivalent.**

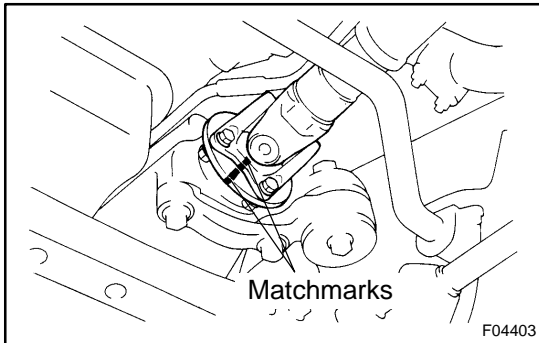
**HINT:**

Install the carrier cover within 10 minutes after applying FIPG.

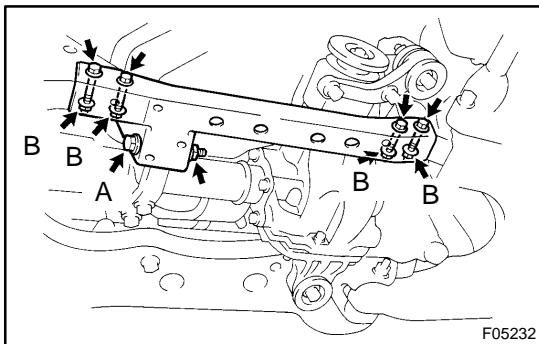
- (f) Install the differential carrier cover with the 9 bolts.  
**Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)**

## REMOVAL

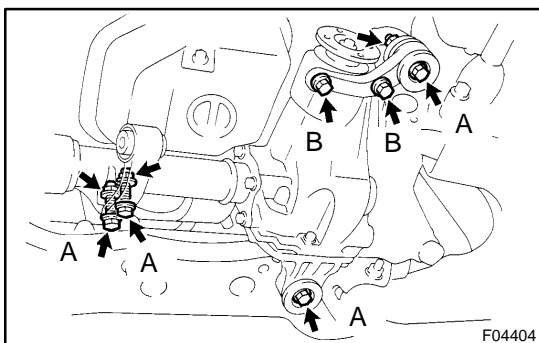
1. REMOVE FRONT WHEELS  
Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)
2. REMOVE DRIVE SHAFTS (See page SA-26)



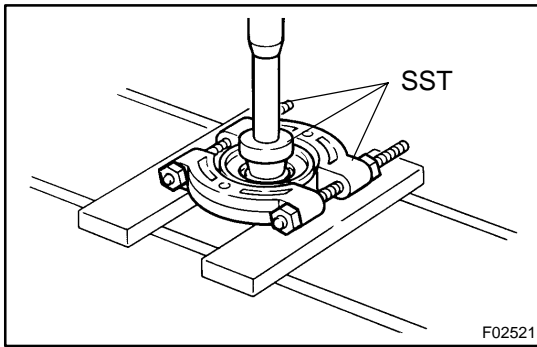
3. DISCONNECT FRONT PROPELLER SHAFT
  - (a) Place matchmarks on the propeller shaft and companion flange.
  - (b) Remove the 4 nuts, bolts, washers and disconnect the propeller shaft.  
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)
  - (c) Support the propeller shaft securely.
4. DRAIN HYPOID GEAR OIL  
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



5. REMOVE NO. 3 FRAME CROSSMEMBER  
Remove the 5 bolts, nuts, 4 washers and No. 3 frame crossmember.  
Torque:  
A: 186 N·m (1,900 kgf·cm, 137 ft·lbf)  
B: 68 N·m (695 kgf·cm, 50 ft·lbf)
6. REMOVE FRONT DIFFERENTIAL CARRIER ASSEMBLY
  - (a) Support the front differential carrier assembly with a jack.
  - (b) Remove the bolt and disconnect the breather hose.  
Torque: 17 N·m (173 kgf·cm, 13 ft·lbf)



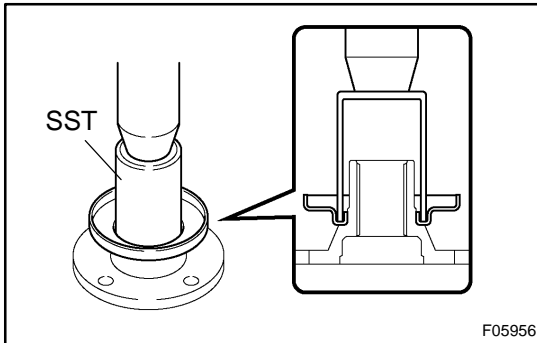
- (c) Remove the 3 nuts, 4 mount stoppers, 6 bolts, 2 differential supports and front differential carrier assembly.  
Torque:  
A: 186 N·m (1,900 kgf·cm, 137 ft·lbf)  
B: 78 N·m (800 kgf·cm, 58 ft·lbf)



## REPLACEMENT

### REPLACE COMPANION FLANGE DUST DEFLECTOR

- (a) Using SST and a press, remove the dust deflector.  
SST 09950-00020, 09950-60010 (09951-00400),  
09950-70010 (09951-07100)

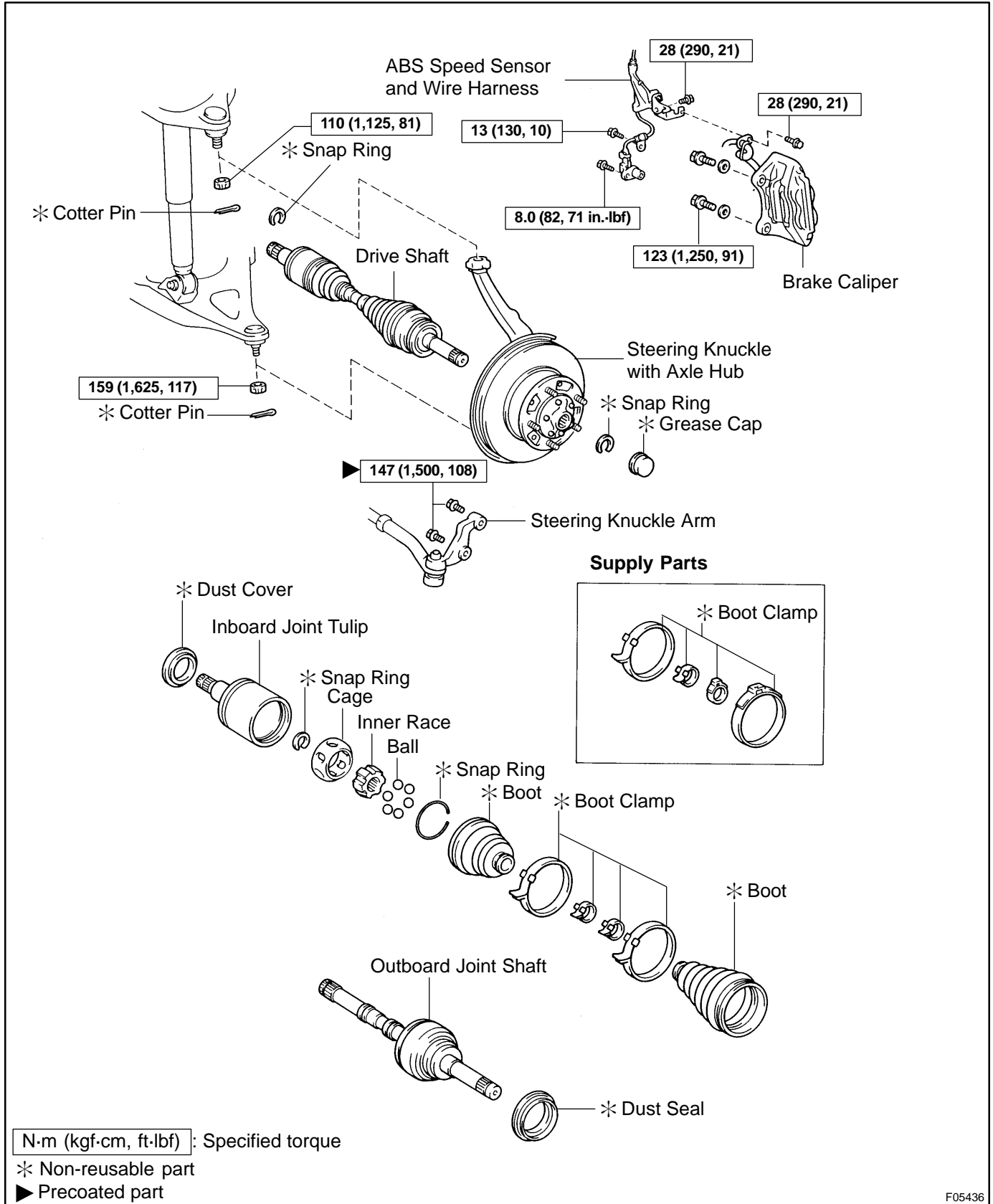


- (b) Using SST and a press, install a new dust deflector.  
SST 09223-00010

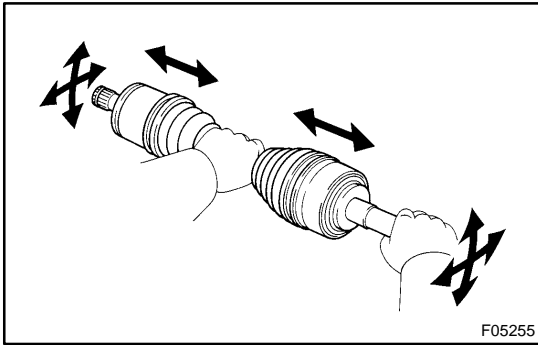


# FRONT DRIVE SHAFT COMPONENTS

SA14E-04



F05436



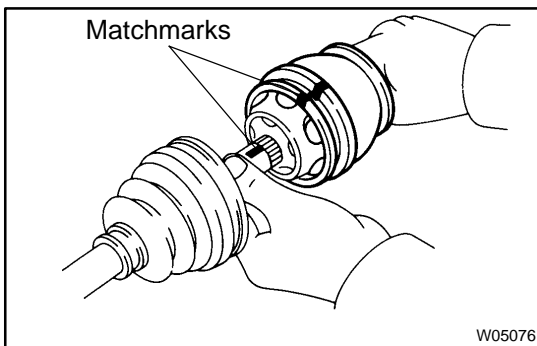
## DISASSEMBLY

### 1. CHECK DRIVE SHAFT

- Check to see that there is no remarkable play in the outboard joint.
- Check to see that the inboard joint slides smoothly in the thrust direction.
- Check to see that there is no remarkable play in the radial direction of the inboard joint.
- Check the boots for damage.

### 2. UNSTAKE INBOARD JOINT BOOT CLAMPS

Using a screwdriver, unstake the 2 inboard joint boot clamps.



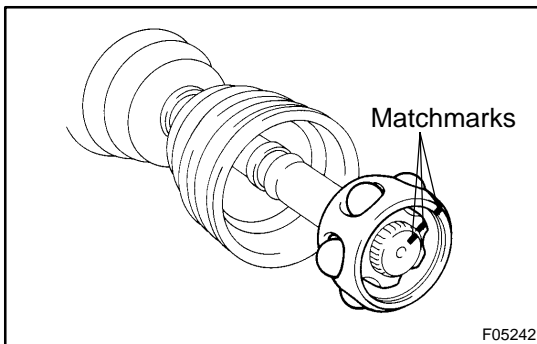
### 3. REMOVE INBOARD JOINT TULIP

- Place matchmarks on the inboard joint tulip and outboard joint shaft.

#### NOTICE:

**Do not punch the marks.**

- Using a screwdriver, remove the snap ring from the outboard joint shaft.
- Remove the inboard joint tulip from the outboard joint shaft.



### 4. DISASSEMBLE INBOARD JOINT

- Place matchmarks on the outboard joint shaft, inner race and cage.

#### NOTICE:

**Do not punch the marks.**

- Remove the 6 balls.
- Slide the cage to the outboard joint side.
- Using a snap ring expander, remove the snap ring.
- Using a brass bar and hammer, remove the inner race.

#### NOTICE:

**Be careful not to damage the inner race.**

- Remove the cage.

### 5. REMOVE INBOARD JOINT BOOT AND 2 CLAMPS

### 6. REMOVE OUTBOARD JOINT BOOT CLAMPS

- Using a screwdriver, unstake the 2 outboard joint boot clamps.

#### HINT:

If the outboard joint boot clamps that have been replaced are installed to the drive shaft, use a side cutter or pliers to remove them.

- (b) Remove the 2 outboard joint boot clamps and outboard joint boot.

**NOTICE:**

**Do not disassemble the outboard joint.**

**7. REMOVE DUST COVER**

Using a screwdriver and hammer, remove the dust cover from the inboard joint tulip.

**8. REMOVE DUST SEAL**

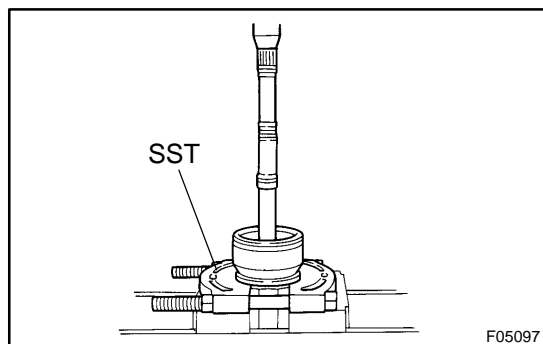
Using a screwdriver and hammer, remove the dust seal from the outboard joint shaft.

## INSTALLATION

Installation is in the reverse order of removal (See page [SA-26](#) ).

HINT:

After installation, check the ABS speed sensor signal (See page [DI-505](#) ).



## REASSEMBLY

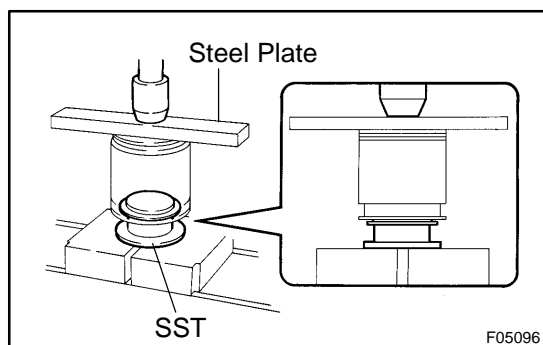
### 1. INSTALL DUST SEAL

Using SST and a press, install a new dust seal to the outboard joint shaft.

SST 09950-00020

#### NOTICE:

**Be careful not to damage the dust seal.**



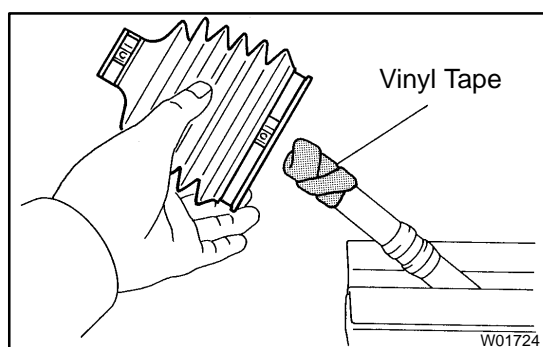
### 2. INSTALL DUST COVER

Using SST a steel plate and press, install a new dust cover.

SST 09316-2001 1

#### NOTICE:

**Be careful not to damage the dust cover.**



### 3. INSTALL OUTBOARD JOINT BOOT AND CLAMPS

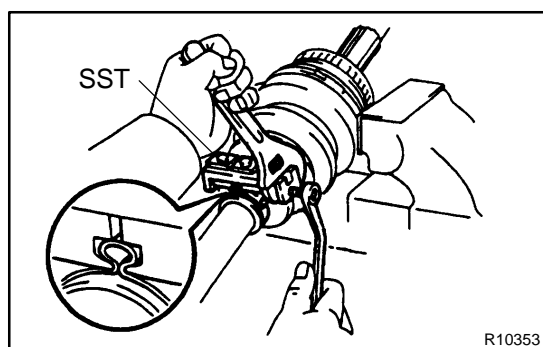
(a) Place 2 new boot clamps to boot.

#### HINT:

Before installing the boot, wrap vinyl tape around the spline of the shaft to prevent damaging the boot.

(b) Temporarily install a new boot to the outboard joint shaft.

(c) Position the inside clamp onto the boot.



(d) Using SST, pinch the inside clamp.

SST 09521-24010

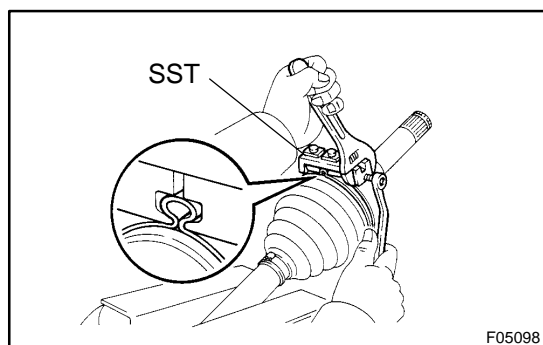
#### NOTICE:

**Do not overtighten SST.**

(e) Pack the outboard joint and boot with grease in the boot kit.

**Grease capacity: 368 - 378 g (13.0 - 13.3 oz.)**

(f) Position the outside clamp onto the boot.

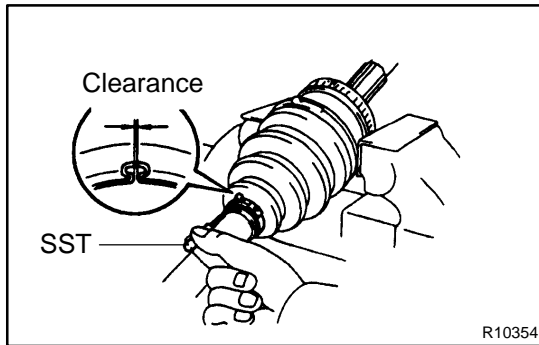


(g) Using SST, pinch the outside clamp.

SST 09521-24010

#### NOTICE:

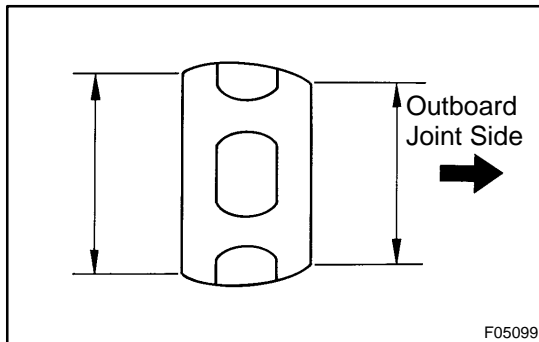
**Do not overtighten SST.**



- (h) Using SST, adjust the clearance of the clamps.  
SST 09240-00020  
**Clearance: 0.8 mm (0.031 in.)**

#### 4. TEMPORARILY INSTALL INBOARD JOINT BOOT AND CLAMPS

Temporarily install 2 new boot clamps and boot to the outboard joint shaft.



#### 5. ASSEMBLE INBOARD JOINT

- (a) Install the cage to the outboard joint shaft.

##### NOTICE:

**Insert the cage with its smaller inner diameter side facing to the outboard joint.**

- (b) Align matchmarks placed before removal.  
(c) Install the inner race.  
(d) Using a snap ring expander, install a new snap ring.  
(e) Align matchmarks placed before removal, and install the cage to the inner race.  
(f) Install the 6 balls.

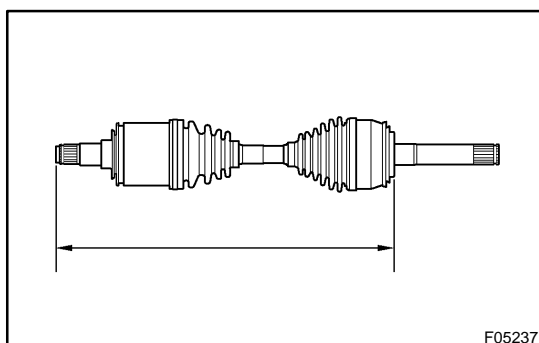
##### HINT:

Apply grease onto the balls to keep them from falling.

- (g) Pack the inboard joint tulip and boot with grease in the boot kit.

**Grease capacity: 293 - 303 g (10.3 - 10.7 oz.)**

- (h) Align matchmarks placed before removal, and install the inboard joint tulip to the outboard joint shaft.  
(i) Install a new snap ring.  
(j) Temporarily install the boot to the inboard joint tulip.  
(k) Make sure that the boot is on the shaft groove.



- (l) Make sure that the 2 boots are not stretched or contracted when the drive shaft is at standard length.

**Drive shaft standard length:  
573.9 ± 5.0 mm (22.594 ± 0.197 in.)**

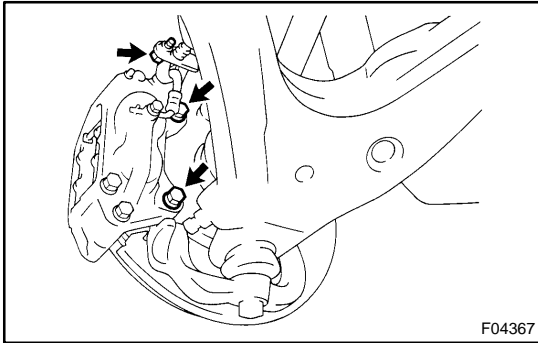
- (m) Using a screwdriver, bend the clamps and lock them.

#### 6. CHECK DRIVE SHAFT (See page SA-29 )

## REMOVAL

### 1. REMOVE FRONT WHEEL

Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)



### 2. REMOVE BRAKE CALIPER

- (a) Remove the bolt and disconnect the flexible hose from the steering knuckle.

Torque: 28 N·m (290 kgf·cm, 21 ft·lbf)

- (b) Remove the 2 bolts, washers and brake caliper.

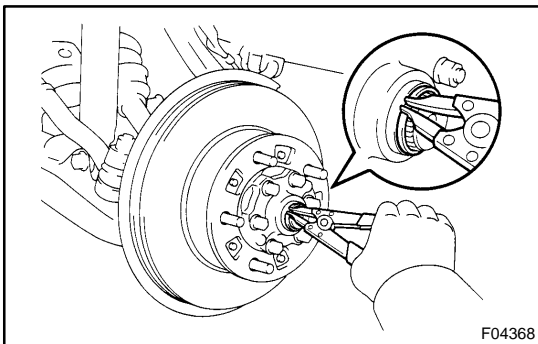
Torque: 123 N·m (1,250 kgf·cm, 91 ft·lbf)

- (c) Support the brake caliper securely.

### 3. REMOVE SNAP RING

- (a) Using a screwdriver and hammer, remove the grease cap from the flange.

- (b) Using snap ring pliers, remove the snap ring.



### 4. DISCONNECT ABS SPEED SENSOR AND WIRE HARNESS

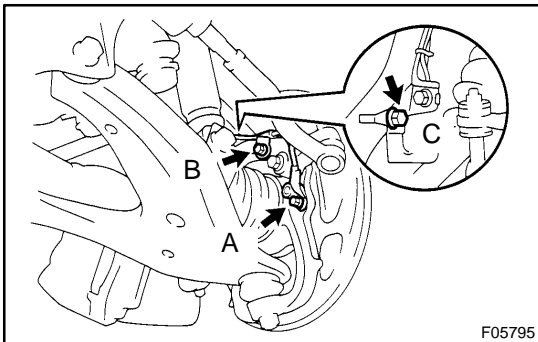
Remove the 3 bolts and disconnect the ABS speed sensor and wire harness.

Torque:

A: 8.0 N·m (82 kgf·cm, 71 in.-lbf)

B: 13 N·m (130 kgf·cm, 10 ft·lbf)

C: 28 N·m (290 kgf·cm, 21 ft·lbf)



### 5. DISCONNECT STEERING KNUCKLE ARM

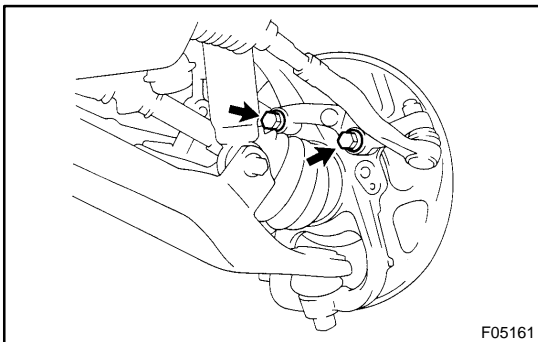
Remove the 2 bolts and disconnect the steering knuckle arm.

Torque: 147 N·m (1,500 kgf·cm, 108 ft·lbf)

HINT:

At the time of installation, please refer to the following items.

- ▶ Clean the threads of the 2 bolts and steering knuckle with toluene or trichloroethylene.



- ▶ Apply sealant to the 2 bolt threads.

**Sealant:**

**Part No. 08833-00070, THREE BOND 1324  
or equivalent**

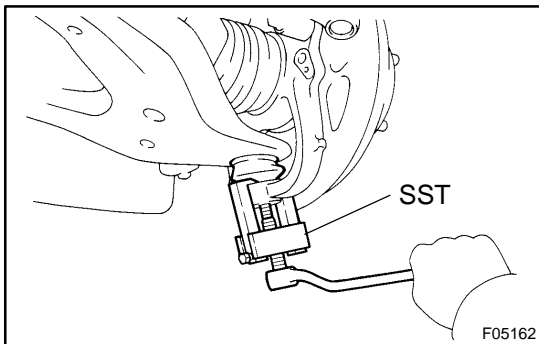
## 6. DISCONNECT STEERING KNUCKLE FROM LOWER SUSPENSION ARM

- (a) Remove the cotter pin and nut.

**Torque: 159 N·m (1,625 kgf·cm, 117 ft·lbf)**

**HINT:**

At the time of installation, if the holes for the cotter pin are not aligned, tighten the nut further up to 60°.



- (b) Using SST, disconnect the steering knuckle from the lower suspension arm.

SST 09628-6201 1

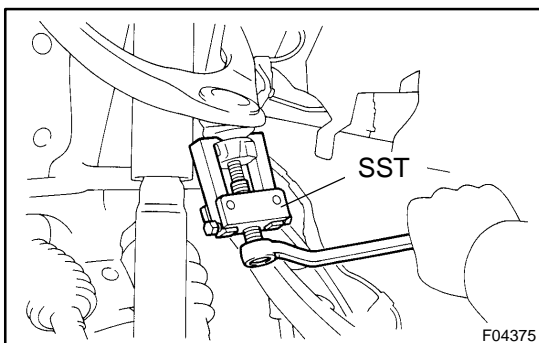
## 7. REMOVE STEERING KNUCKLE WITH AXLE HUB

- (a) Temporarily install the nut to the lower suspension arm.
- (b) Support the lower suspension arm with a jack.
- (c) Remove the cotter pin and nut.

**Torque: 110 N·m (1,125 kgf·cm, 81 ft·lbf)**

**HINT:**

At the time of installation, if the holes for the cotter pin are not aligned, tighten the nut further up to 60°.

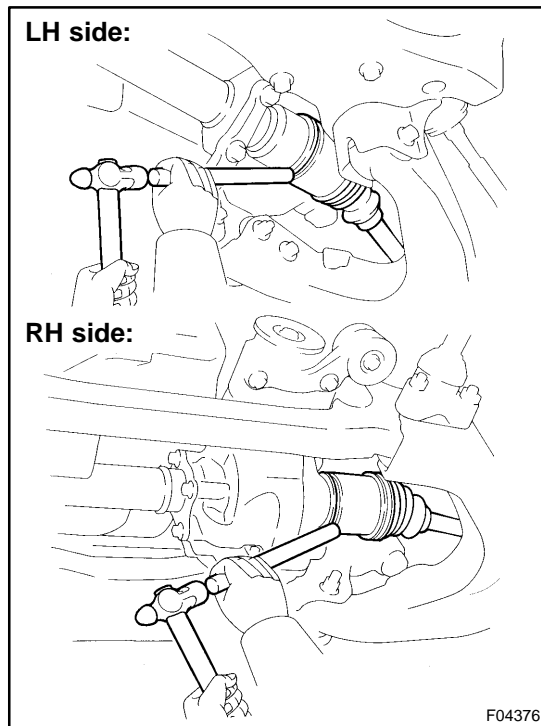


- (d) Using SST, disconnect the steering knuckle from the upper suspension arm.

SST 09628-6201 1

- (e) Remove the nut and steering knuckle with axle hub.





## 8. REMOVE DRIVE SHAFT

(a) Using a brass bar and hammer, remove the drive shaft.

### NOTICE:

**Be careful not to damage the boot, dust cover and oil seal.**

(b) Using a screwdriver, remove the snap ring from the in-board joint tulip.

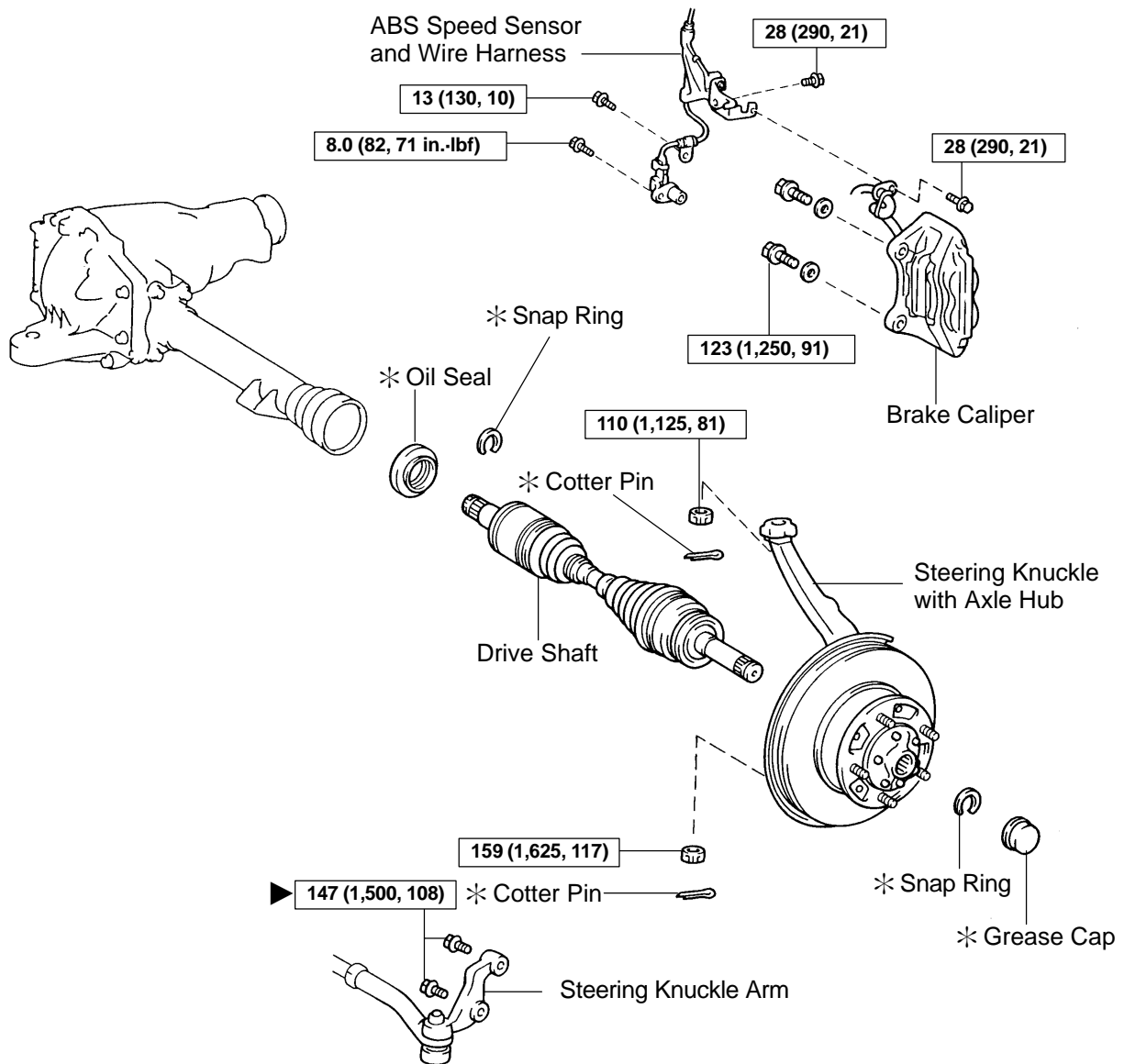
### HINT:

At the time of installation, please refer to the following items.

- ▶ Coat the oil seal lip with MP grease.
- ▶ Before installation, set a new snap ring with opening side facing downward.
- ▶ After installation, check that the drive shaft cannot be pulled out by hand.

# FRONT DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL COMPONENTS

SA14J-04



N·m (kgf·cm, ft·lbf) : Specified torque

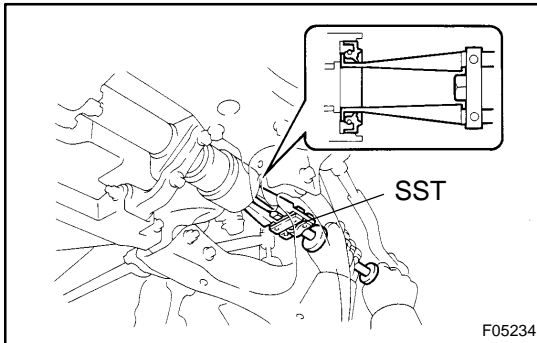
\* Non-reusable part

▶ Precoated part

F05437

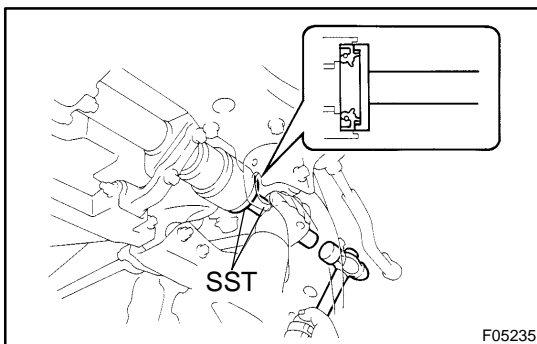
## REPLACEMENT

1. REMOVE FRONT WHEELS  
Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)
2. REMOVE FRONT DRIVE SHAFT  
(See page SA-26 )



### 3. REPLACE OIL SEAL

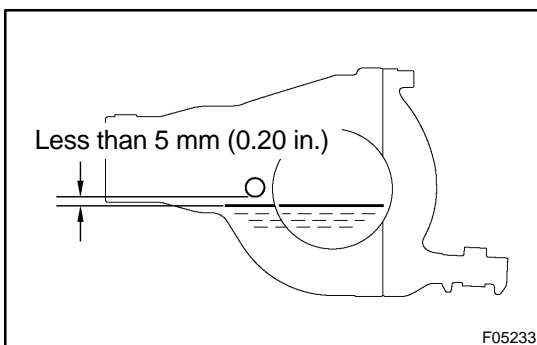
- (a) Using SST, remove the oil seal.  
SST 09308-00010
- (b) Coat the hypoid gear oil to a new oil seal periphery.



- (c) Using SST and a hammer, install the new oil seal.  
SST 09550-00032, 09950-70010 (09951-07100)
- (d) Coat the MP grease to the oil seal lip.

### 4. INSTALL FRONT DRIVE SHAFT

(See page SA-33 )



### 5. FILL DIFFERENTIAL WITH HYPOID GEAR OIL

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

Oil type: Hypoid gear oil API GL-5

Recommended oil viscosity:

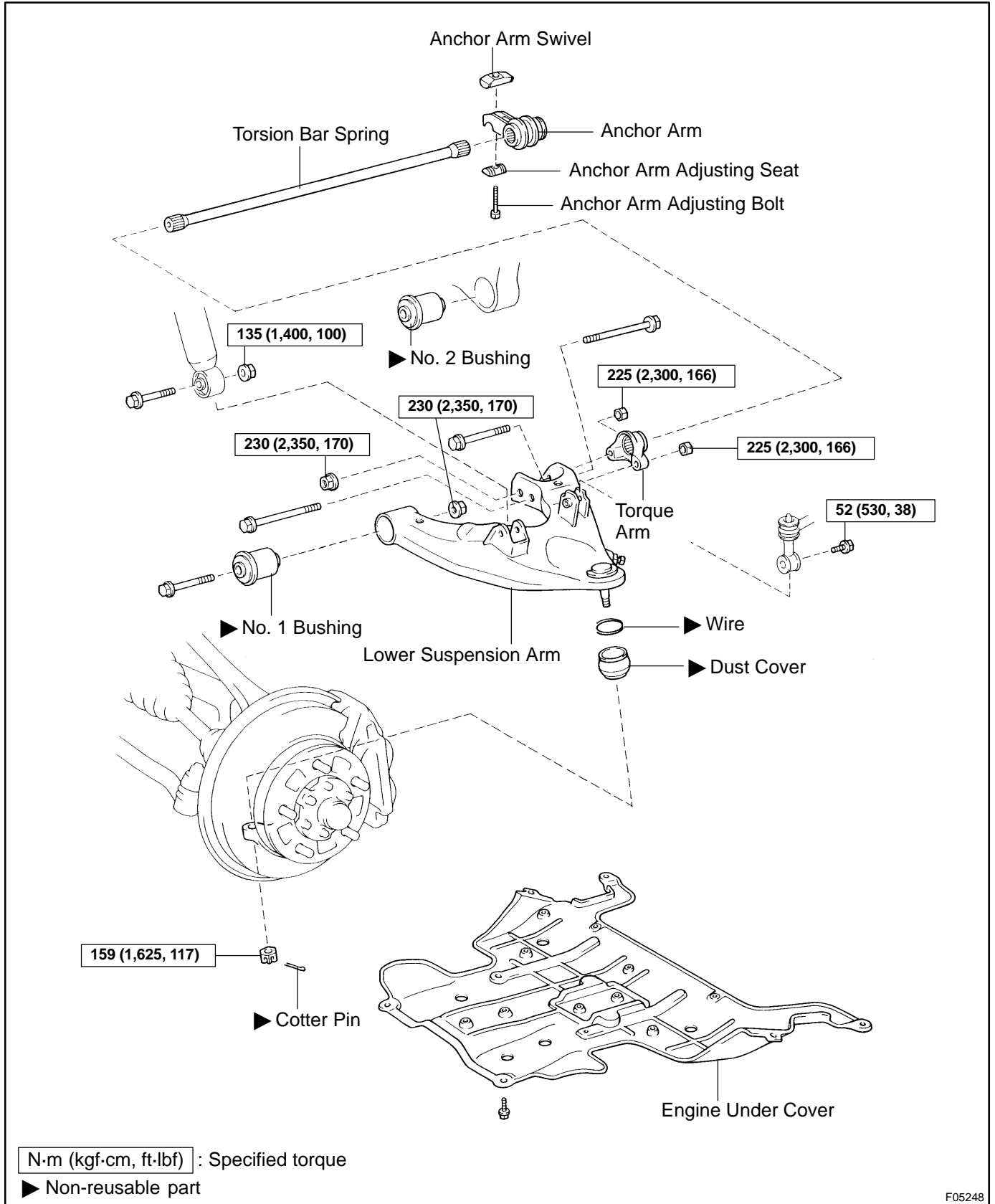
Above -18°C (0°F) SAE 90

Below -18°C (0°F) SAE 80W-90 or 80W

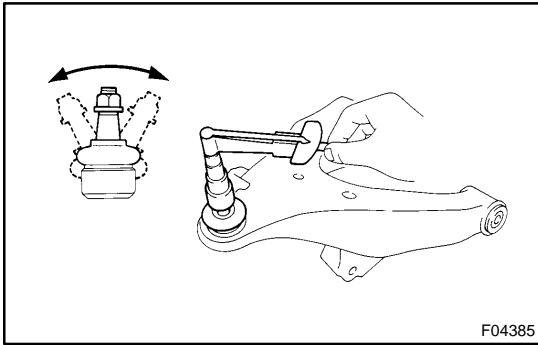
Capacity: 1.70 liters (1.80 US qts, 1.50 Imp.qts)

# FRONT LOWER SUSPENSION ARM COMPONENTS

SA154-02



F05248



## INSPECTION

### INSPECT LOWER SUSPENSION ARM BALL JOINT FOR ROTATION CONDITION

- (a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.
- (b) Using a torque wrench, turn the nut continuously one turn per 3 - 5 seconds and take the torque reading on the 5th turn.

#### Turning torque:

**0.29 - 2.94 N·m (3 - 30 kgf·cm, 2.6 - 26 in.-lbf)**

## INSTALLATION

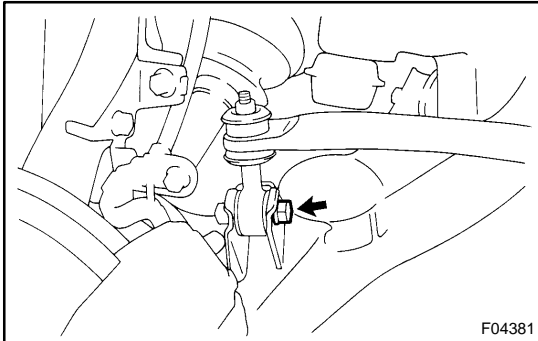
Installation is in the reverse order of removal (See page [SA-75](#)).

HINT:

After installation, check the front wheel alignment (See page [SA-6](#)).

## REMOVAL

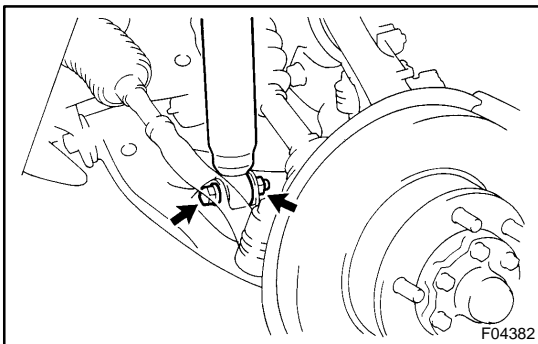
1. REMOVE FRONT WHEEL  
Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)
2. REMOVE ENGINE UNDER COVER
3. REMOVE FRONT TORSION BAR SPRING  
(See page SA-66 )



4. DISCONNECT STABILIZER BAR LINK FROM LOWER SUSPENSION ARM

Remove the bolt and disconnect the stabilizer bar link from the lower suspension arm.

**Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)**



5. DISCONNECT SHOCK ABSORBER FROM LOWER SUSPENSION ARM

Remove the nut, bolt and disconnect the shock absorber from the lower suspension arm.

**Torque: 135 N·m (1,400 kgf·cm, 100 ft·lbf)**

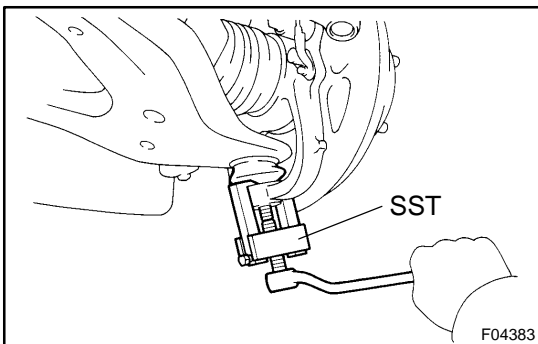
6. DISCONNECT STEERING KNUCKLE FROM LOWER SUSPENSION ARM

(a) Remove the cotter pin and nut.

**Torque: 159 N·m (1,625 kgf·cm, 117 ft·lbf)**

(b) Using SST, disconnect the steering knuckle from the lower suspension arm.

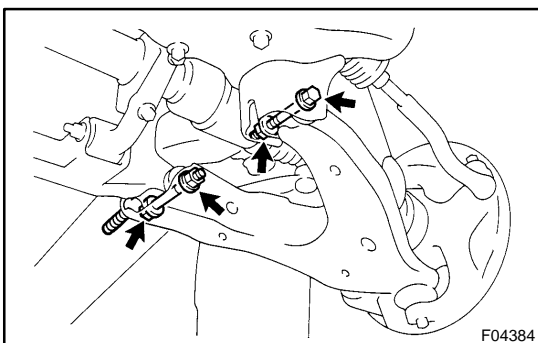
SST 09628-6201 1



7. REMOVE LOWER SUSPENSION ARM

Remove the 2 nuts, 3 bolts and lower suspension arm.

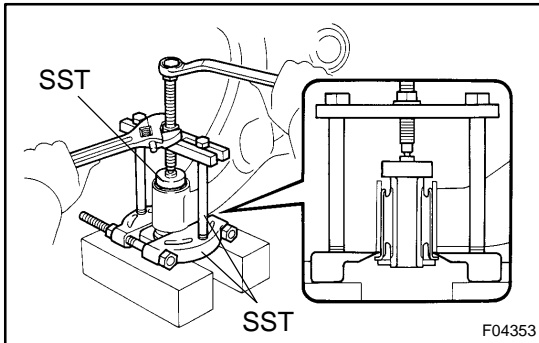
**Torque: 230 N·m (2,350 kgf·cm, 170 ft·lbf)**



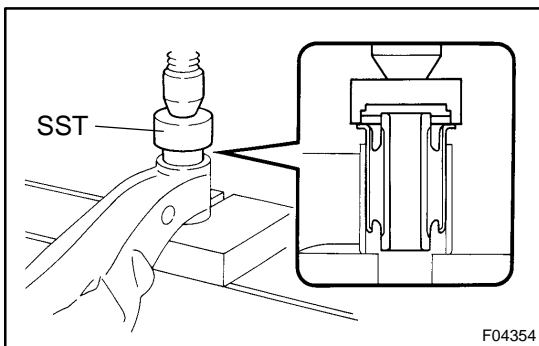
## REPLACEMENT

### 1. REPLACE NO. 1 BUSHING

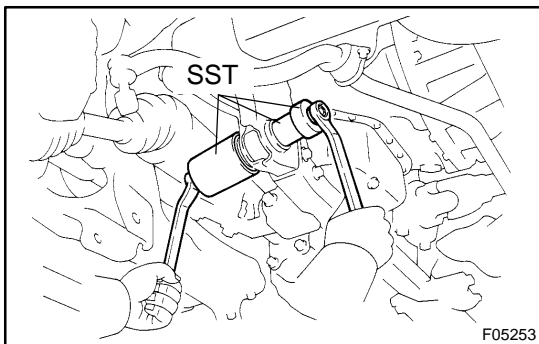
- (a) Using a chisel and hammer, pry up the flange of the No. 1 bushing.



- (b) Using SST, remove the No. 1 bushing.  
 SST 09710-30021 (09710-03101),  
 09950-00020, 09950-00030,  
 09950-4001 1 (09957-04010)

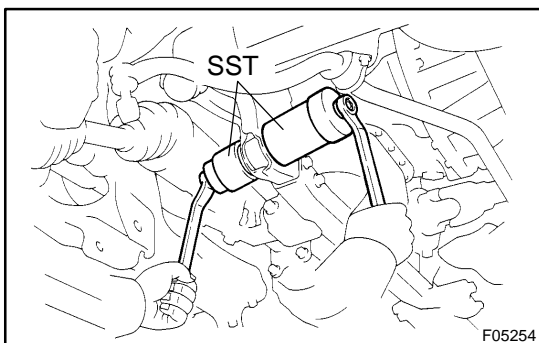


- (c) Using SST and a press, install a new No. 1 bushing.  
 SST 09726-36010



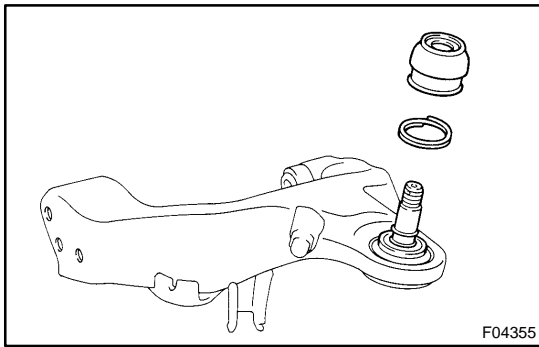
### 2. REPLACE NO. 2 BUSHING

- (a) Using SST, remove the No. 2 bushing.  
 SST 09710-22021 (09710-01071),  
 09726-3501 1 (09726-05021),  
 09830-36010



- (b) Using SST, install a new No. 2 bushing.  
 SST 09631-32020, 09830-36010

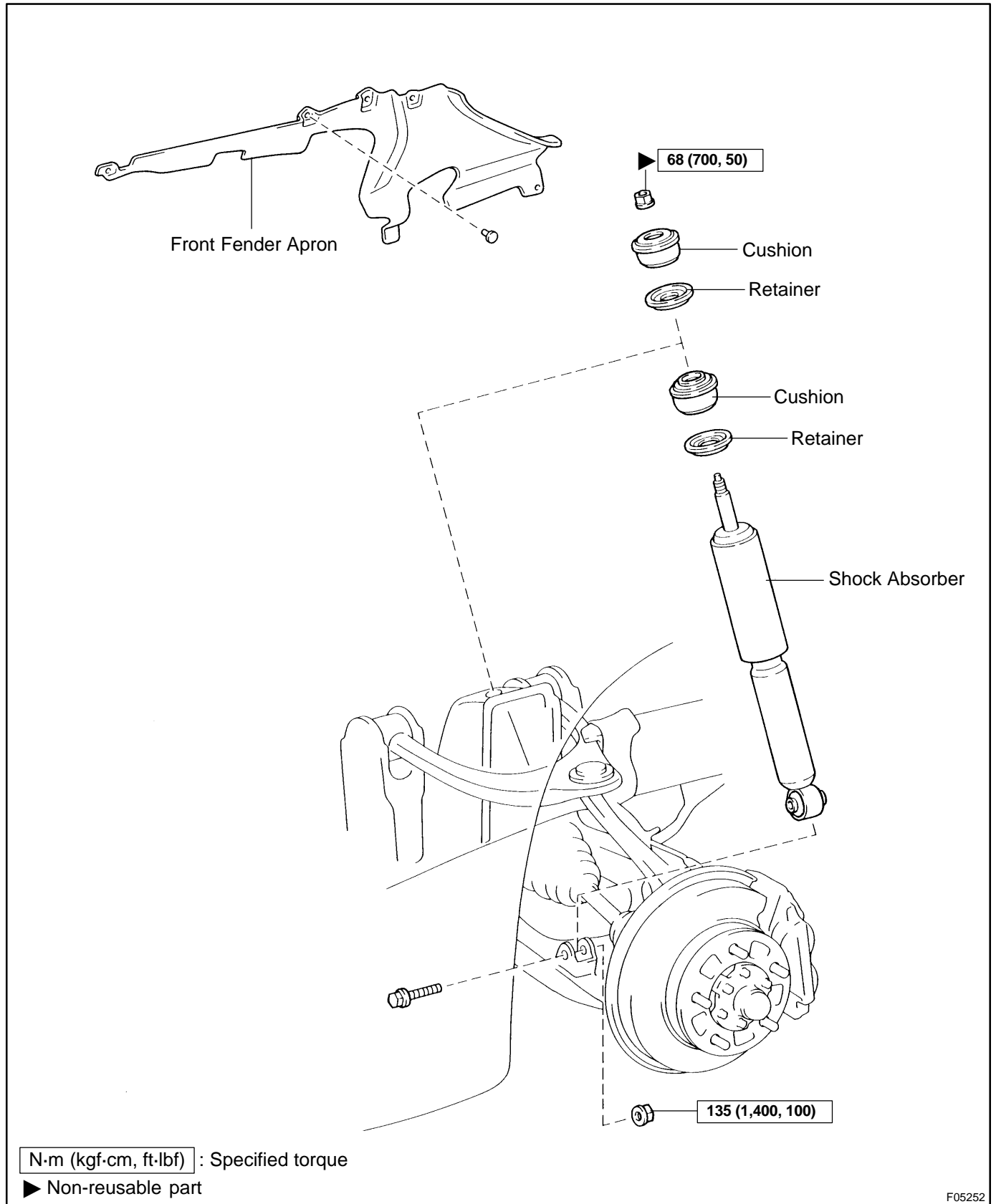


**3. REPLACE DUST COVER**

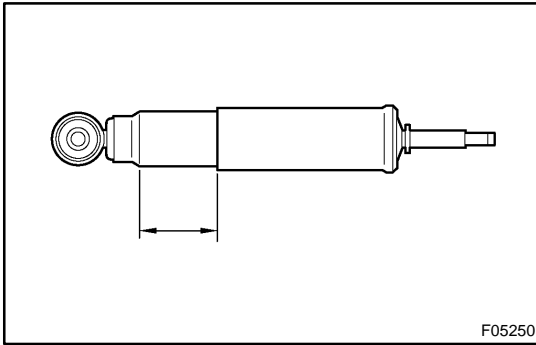
- (a) Remove the wire and dust cover.
- (b) Coat the ball joint with grease in the boot kit.
- (c) Install a new dust cover and wire.

# FRONT SHOCK ABSORBER COMPONENTS

SA14R-02



F05252



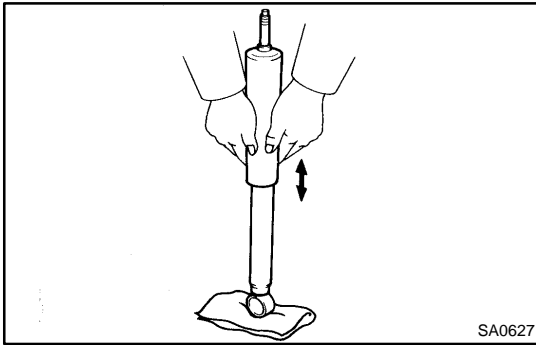
## DISPOSAL

### DISCARD SHOCK ABSORBER

Before discarding the shock absorber, drill a hole of 2 - 3 mm (0.079 - 0.118 in.) in diameter at the location shown in the illustration to discharge the gas inside.

#### NOTICE:

- ▶ When drilling, chips may fly out, work carefully.
- ▶ The gas is colorless, odorless and non-poisonous.



## INSPECTION

### INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual operation sounds. If there is any abnormality, replace the shock absorber with a new one.

#### NOTICE:

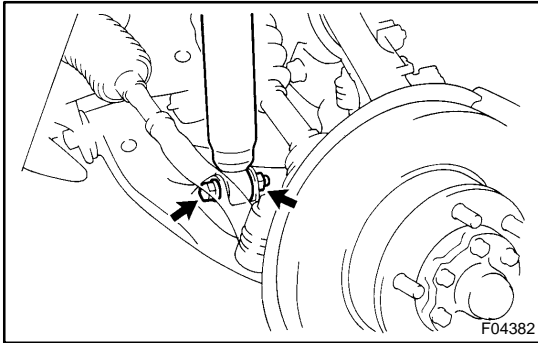
When disposing the shock absorber, see **DISPOSAL** on page [SA-63](#) .

## INSTALLATION

Installation is in the reverse order of removal (See page [SA-61](#) ).

## REMOVAL

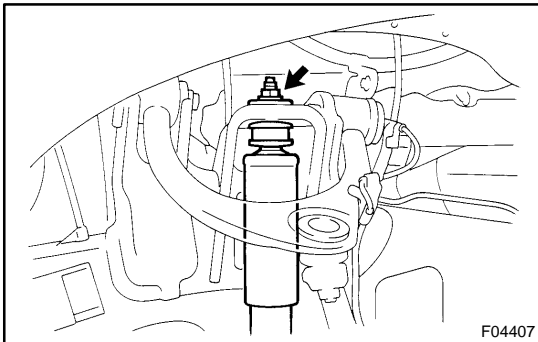
1. **REMOVE FRONT WHEEL**  
Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)
2. **REMOVE FRONT FENDER APRON**



### 3. REMOVE SHOCK ABSORBER

- (a) Remove the bolt, nut and disconnect the shock absorber from the lower suspension arm.

**Torque: 135 N·m (1,400 kgf·cm, 100 ft·lbf)**



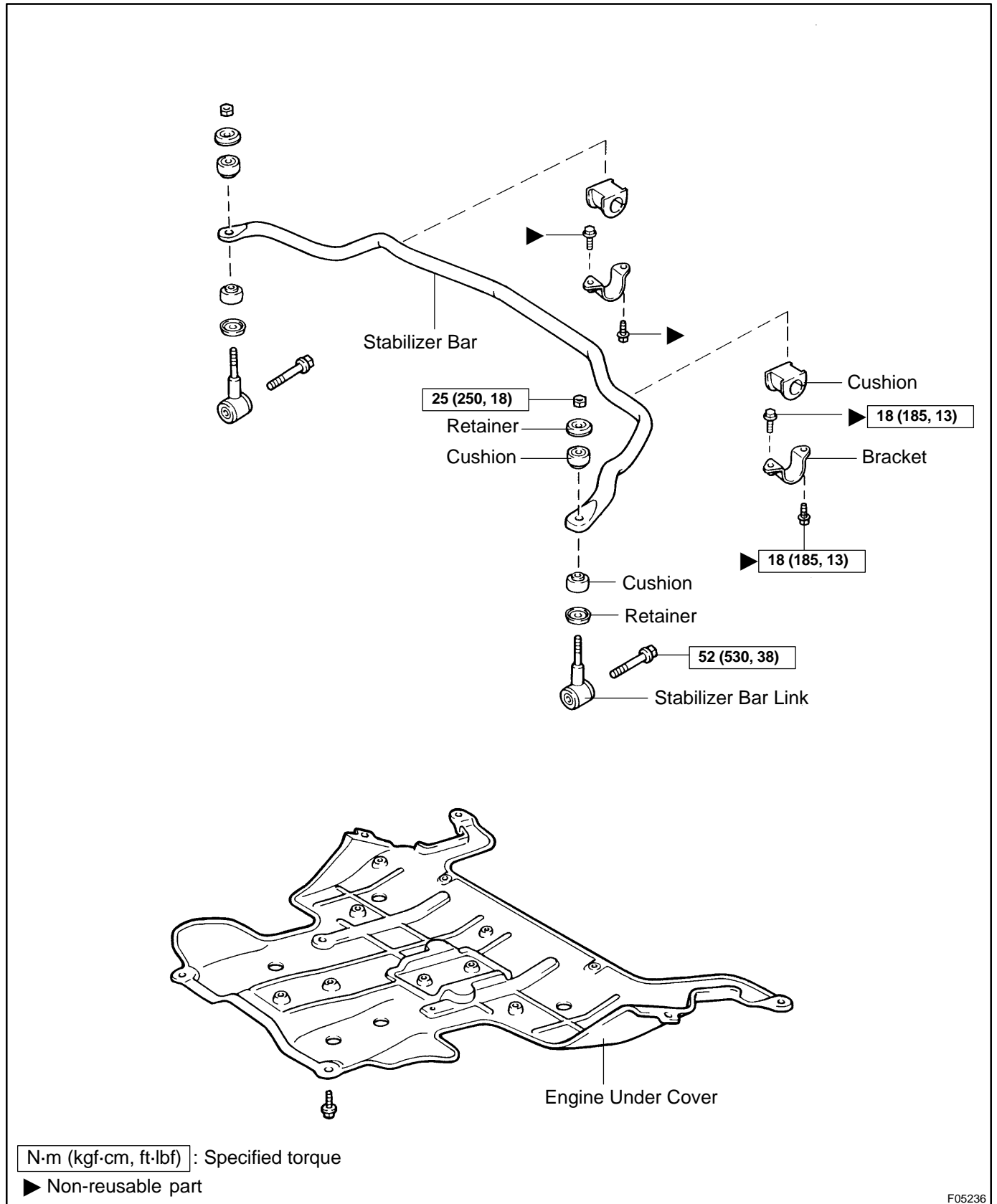
- (b) While holding the piston rod, remove the nut, cushion, retainer and shock absorber.

**Torque: 68 N·m (700 kgf·cm, 50 ft·lbf)**

- (c) Remove the cushion and retainer from the shock absorber.

# FRONT STABILIZER BAR COMPONENTS

SA159-02



F05236

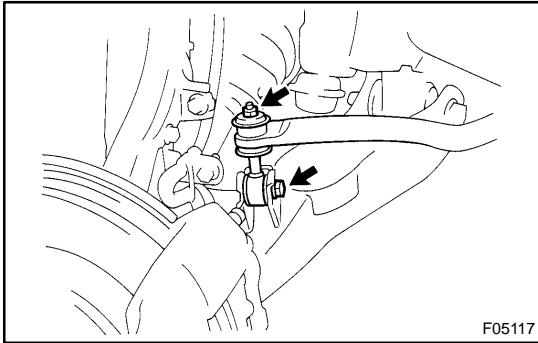
## INSTALLATION

Installation is in the reverse order of removal (See page [SA-81](#) ).



## REMOVAL

### 1. REMOVE ENGINE UNDER COVER



### 2. REMOVE LH AND RH STABILIZER BAR LINKS

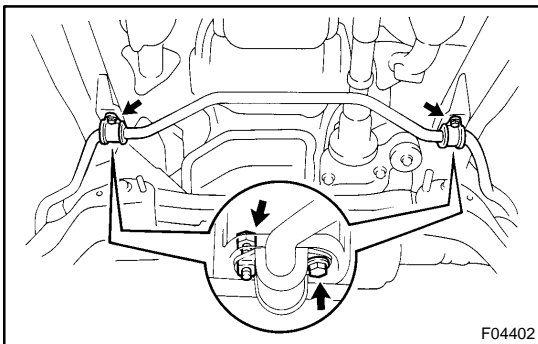
- (a) Remove the nut, bolt, 2 retainers, 2 cushions and stabilizer bar link.

**Torque:**

**Bolt: 52 N·m (530 kgf-cm, 38 ft-lbf)**

**Nut: 25 N·m (250 kgf-cm, 18 ft-lbf)**

- (b) Employ the same manner described above to the other side.



### 3. REMOVE STABILIZER BAR

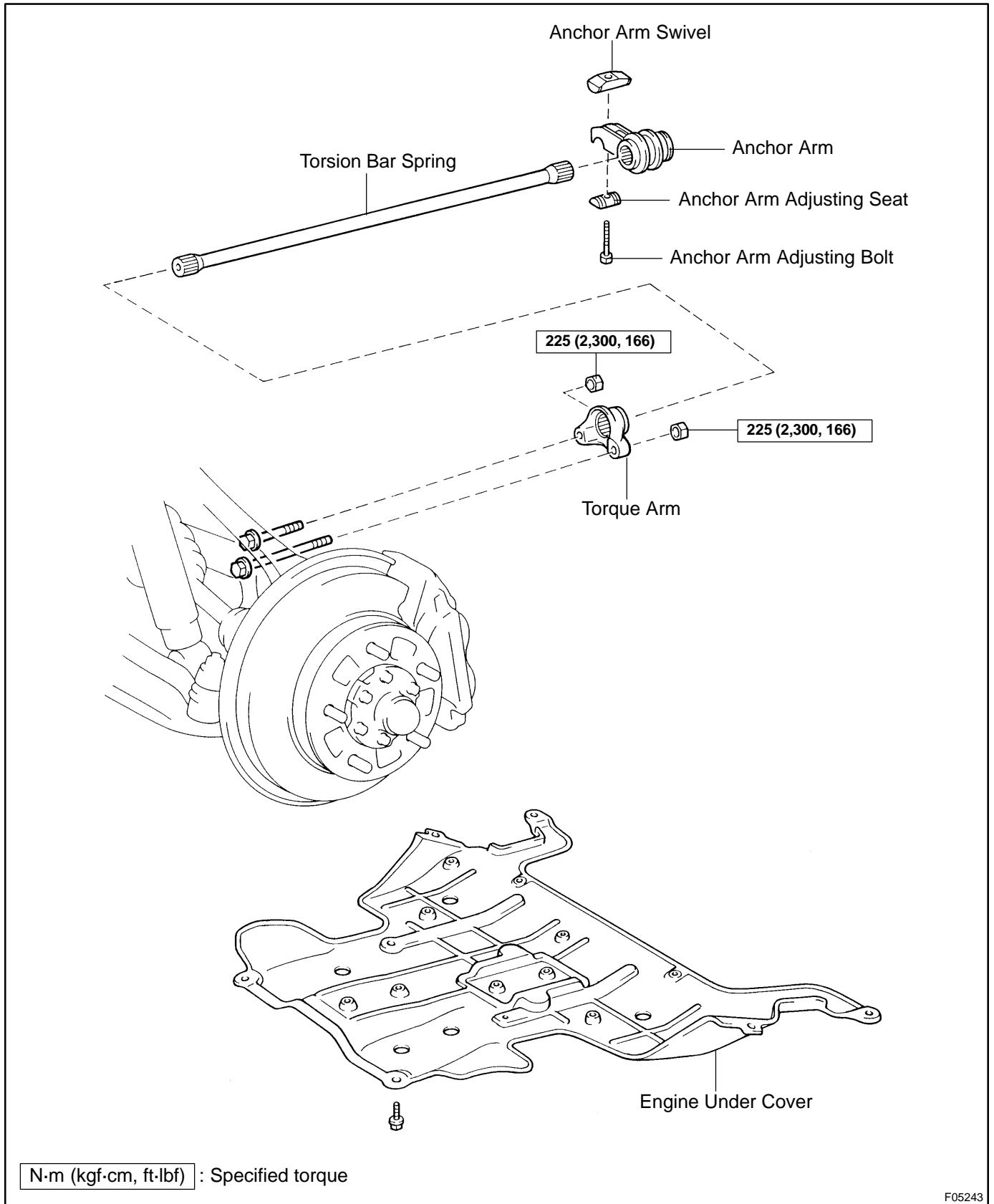
- (a) Remove the 4 bolts, 2 brackets and 2 cushions.

**Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)**

- (b) Remove the stabilizer bar.

# FRONT TORSION BAR SPRING COMPONENTS

SA14W-02



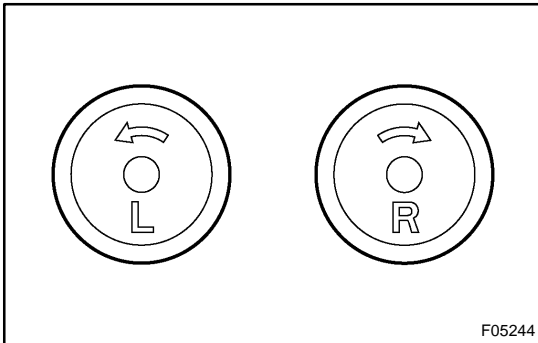
F05243

## INSTALLATION

### 1. INSTALL TORQUE ARM

Install the bolt, torque arm and 2 nuts.

**Torque: 225 N·m (2,300 kgf·cm, 166 ft·lbf)**



### 2. INSTALL TORSION BAR SPRING WITH ANCHOR ARM

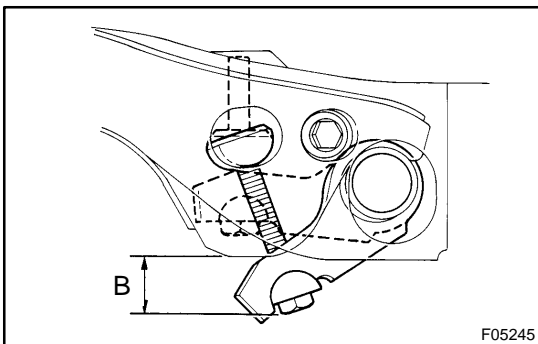
HINT:

- ▶ There are right and left matchmarks on the rear end of the torsion bar springs.
- ▶ Apply a light coat of MP grease to the spline of the torsion bar springs.

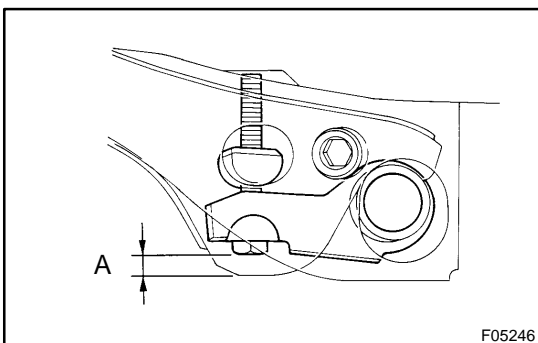
(a) New torsion bar spring:

Install a new torsion bar spring and anchor arm.

- (1) Install the anchor arm to a new torsion bar spring.
- (2) Install the torsion bar spring with the anchor arm to the torque arm.
- (3) Install the anchor arm adjusting seat, anchor arm swivel and anchor arm adjusting bolt.



- (4) Check that the length of anchor arm adjusting bolt end is almost same as dimension "B" measured when the torsion bar was removed.



- (5) Tighten the anchor arm adjusting bolt so that the dimension "A" is within the specified value in the table below.

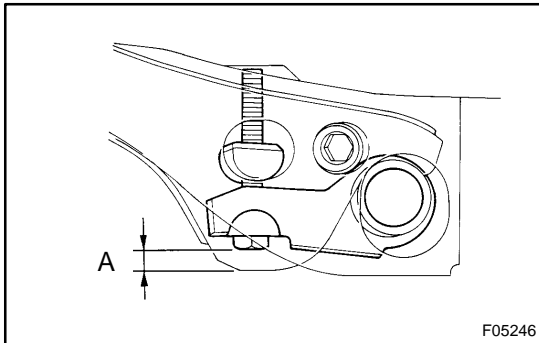
#### Reference:

LH	8 - 25 mm (0.315 - 0.984 in.)
RH	2 - 18 mm (0.079 - 0.709 in.)

(b) Reused torsion bar spring:

Install the torsion bar spring and anchor arm.

- (1) Align matchmarks on the torsion bar spring and anchor arm and install them.
- (2) Align matchmarks on the torsion bar spring and torque arm and install them.



- (3) Tighten the anchor arm bolt adjusting so that the dimension "A" is almost same as the dimension measured when the torsion bar spring was removed.

**3. INSTALL ENGINE UNDER COVER**

**4. INSTALL FRONT WHEEL**

**Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)**

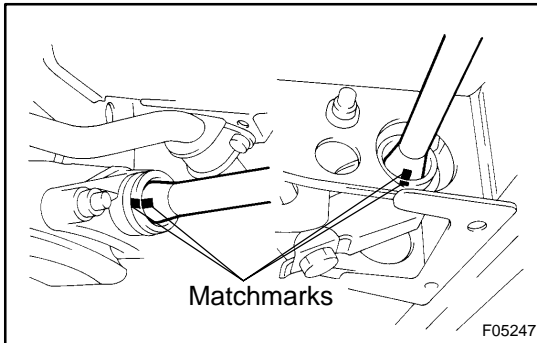
**5. CHECK VEHICLE HEIGHT (See page SA-6 )**

**HINT:**

After stabilizing the suspension, adjust the vehicle height by turning the anchor arm bolt.

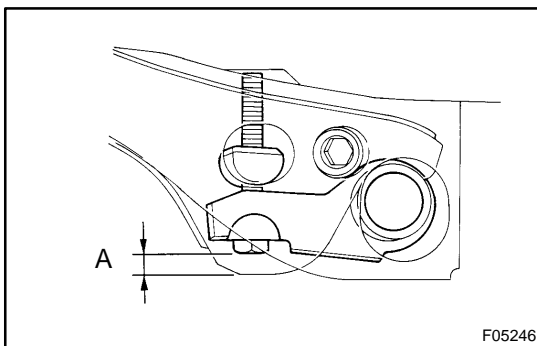
## REMOVAL

1. REMOVE FRONT WHEEL
2. REMOVE ENGINE UNDER COVER



### 3. REMOVE TORSION BAR SPRING WITH ANCHOR ARM

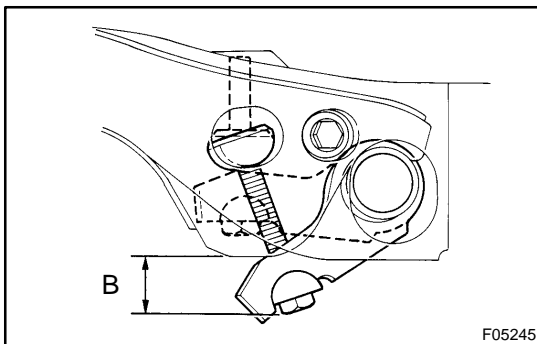
- (a) Place matchmarks on the torsion bar spring, anchor arm and torque arm.



- (b) Measure the dimension "A" between the anchor arm adjusting bolt end and the frame as shown.

#### HINT:

Use the measurement for a reference when installing the anchor arm.



- (c) Loosen the anchor arm bolt until the spring tension is free and measure the anchor arm bolt "B".

#### HINT:

Use the measurement for a reference when installing the anchor arm.

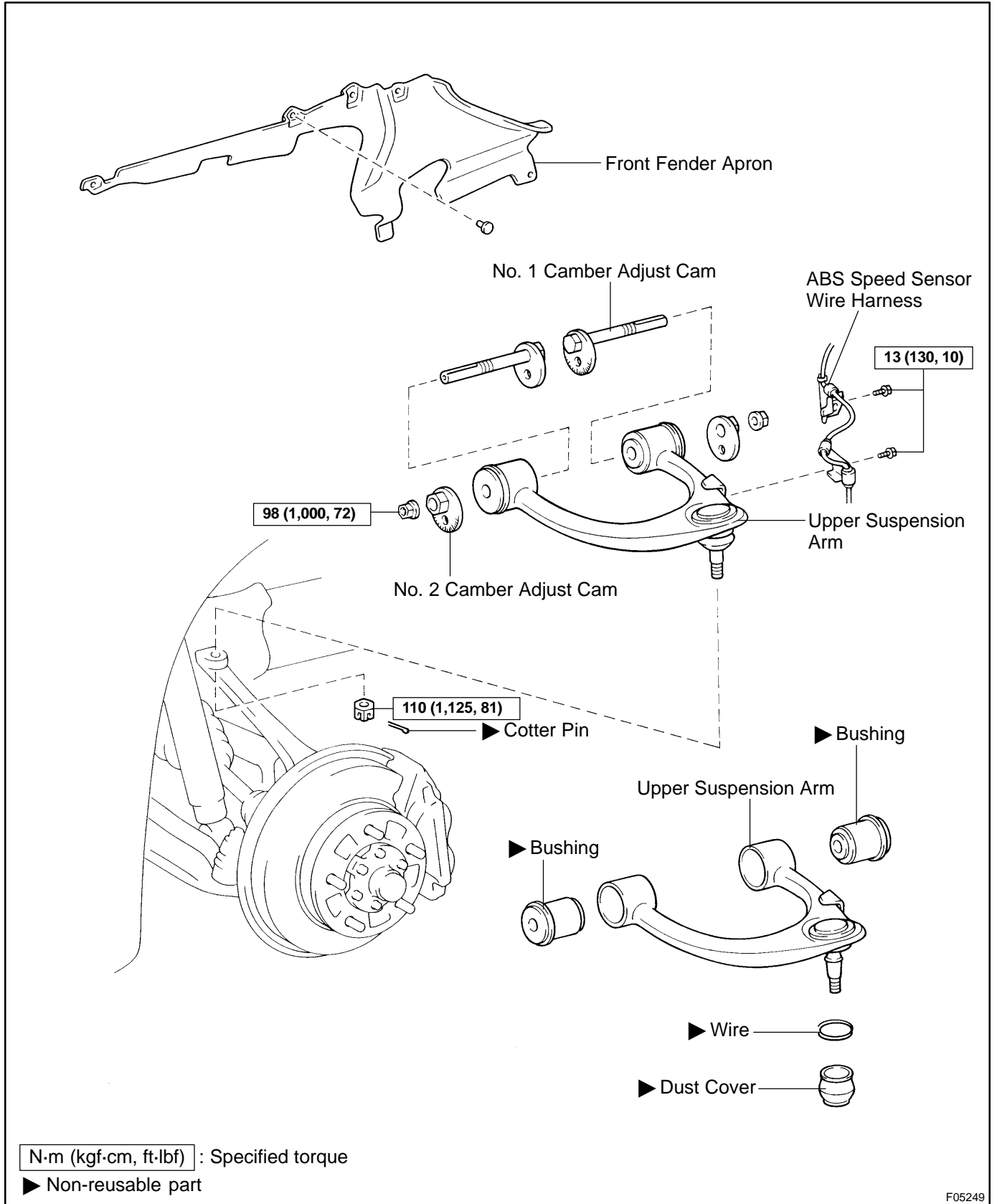
- (d) Remove the anchor arm adjusting bolt, anchor arm swivel and anchor arm adjusting seat.
- (e) Remove the torsion bar spring with the anchor arm.
- (f) Remove the anchor arm from the torsion bar spring.

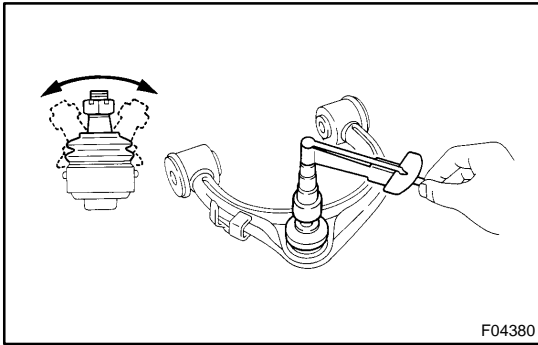
### 4. REMOVE TORQUE ARM

Remove the 2 nuts, bolt and torque arm.

# FRONT UPPER SUSPENSION ARM COMPONENTS

SA14Z-02





## INSPECTION

### INSPECT UPPER SUSPENSION ARM BALL JOINT FOR ROTATION CONDITION

- (a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.
- (b) Using a torque wrench, turn the nut continuously one turn per 3 - 5 seconds and take the torque reading on the 5th turn.

#### Turning torque:

**1.0 - 4.4 N·m (10 - 45 kgf·cm, 8.9 - 39 in.-lbf)**

## INSTALLATION

Installation is in the reverse order of removal (See page [SA-70](#)).

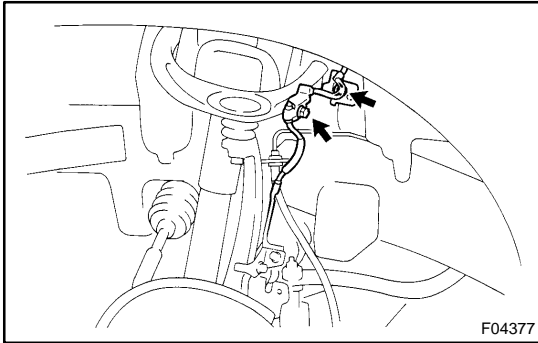
HINT:

After installation, check the front wheel alignment (See page [SA-6](#)).



## REMOVAL

1. REMOVE FRONT WHEEL  
Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)
2. REMOVE FRONT FENDER APRON



3. DISCONNECT ABS SPEED SENSOR WIRE HARNESS  
Remove the 2 bolts and disconnect the ABS speed sensor wire harness.

Torque: 13 N·m (130 kgf·cm, 10 ft·lbf)

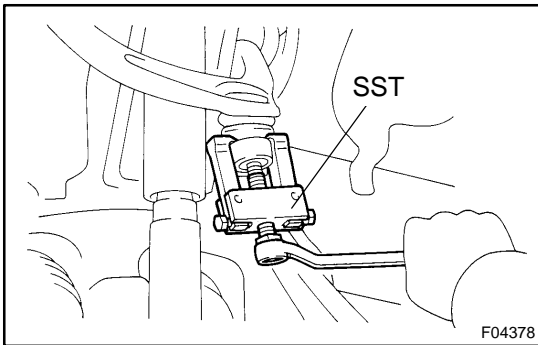
4. DISCONNECT STEERING KNUCKLE FROM UPPER SUSPENSION ARM

- (a) Support the lower suspension arm with a jack.
- (b) Remove the cotter pin and nut.

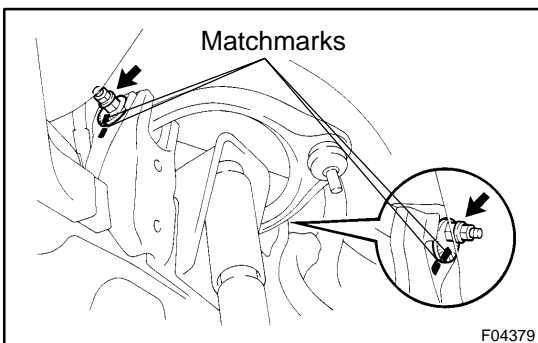
Torque: 110 N·m (1,125 kgf·cm, 81 ft·lbf)

### HINT:

At the time of installation, if the holes for the cotter pin are not aligned, tighten the nut further up to 60°.



- (c) Using SST, disconnect the steering knuckle from the upper suspension arm.  
SST 09628-6201 1



5. REMOVE UPPER SUSPENSION ARM
- (a) Place matchmarks on the front and rear No. 2 adjust cams and body.
- (b) Remove the 2 nuts, No. 1 and No. 2 camber adjust cams and upper suspension arm.

Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf)

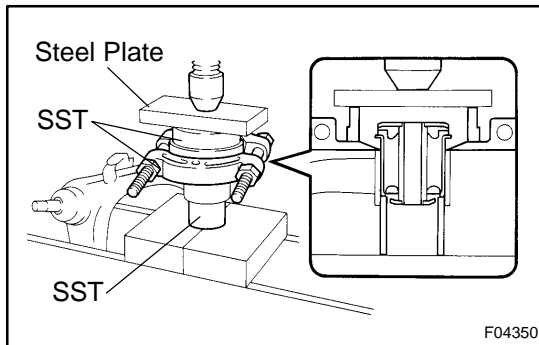
### HINT:

At the time of installation, after stabilizing the suspension, torque the nuts.

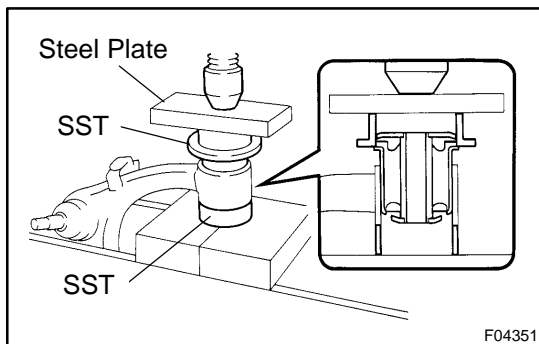
## REPLACEMENT

### 1. REPLACE BUSHING

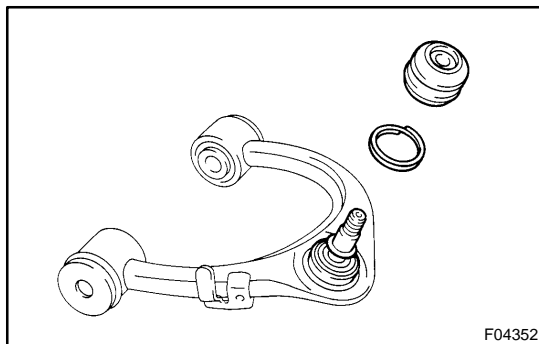
- (a) Using a chisel and hammer, pry up the flange of the bushing.



- (b) Using SST, a steel plate and press, remove the bushing.  
SST 09527-1701 1, 09710-28021 (09710-08031),  
09950-00020

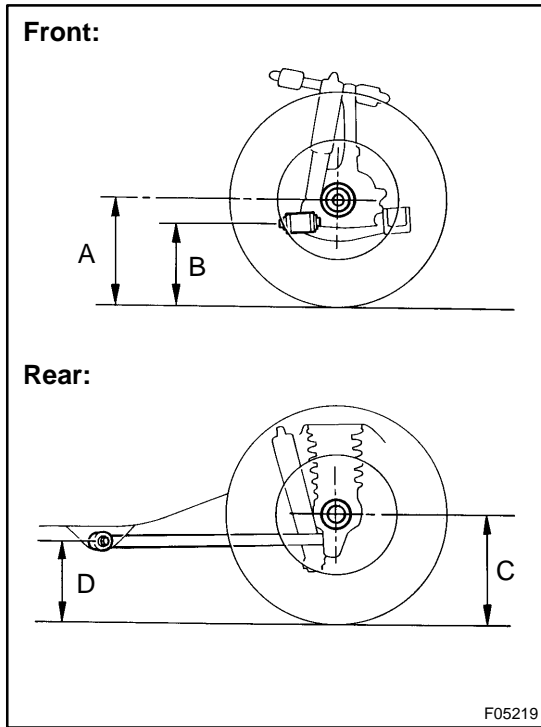


- (c) Using SST, a steel plate and press, install a new bushing.  
SST 09316-2001 1, 09710-28012 (09710-07062)



### 2. REPLACE DUST COVER

- (a) Remove the wire and dust cover.  
(b) Coat the ball joint with grease in the boot kit.  
(c) Install a new dust cover and wire.



# FRONT WHEEL ALIGNMENT INSPECTION

SA142-03

## 1. MEASURE VEHICLE HEIGHT

Vehicle height:

Front	A - B: 71 mm (2.795 in.)
Rear	C - D: 51 mm (2.008 in.)

Measuring points:

A: Ground clearance of spindle center

B: Ground clearance of lower suspension arm front bolt center

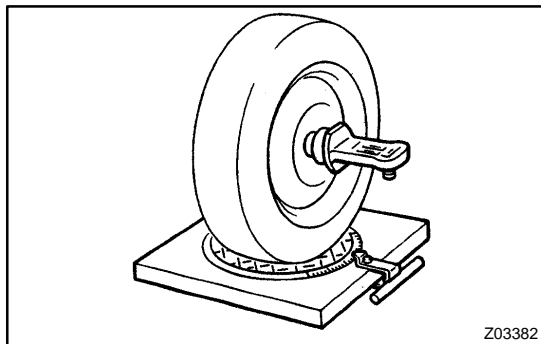
C: Ground clearance of rear axle shaft center

D: Ground clearance of lower control arm front bolt center

### NOTICE:

**Before inspecting the wheel alignment, adjust the vehicle height to the specified value.**

If the vehicle height is not the specified value, try to adjust it by pushing down on or lifting the body.



## 2. INSTALL CAMBER-CASTER-KINGPIN GAUGE OR POSITION VEHICLE ON WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

## 3. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

Camber, caster and steering axis inclination:

Camber		$0^{\circ}05' \pm 45'$ ( $0.08^{\circ} \pm 0.75^{\circ}$ )
	Right-left error	30' ( $0.5^{\circ}$ ) or less
Caster		$2^{\circ}30' \pm 45'$ ( $2.5^{\circ} \pm 0.75^{\circ}$ )
	Right-left error	30' ( $0.5^{\circ}$ ) or less
Steering axis inclination		$12^{\circ}10' \pm 45'$ ( $12.17^{\circ} \pm 0.75^{\circ}$ )
	Right-left error	30' ( $0.5^{\circ}$ ) or less

If the steering axis inclination is not within the specified value, after the camber and caster have been correctly adjusted, recheck the steering knuckle and front wheel for bearing or looseness.

#### 4. ADJUST CAMBER AND CASTER

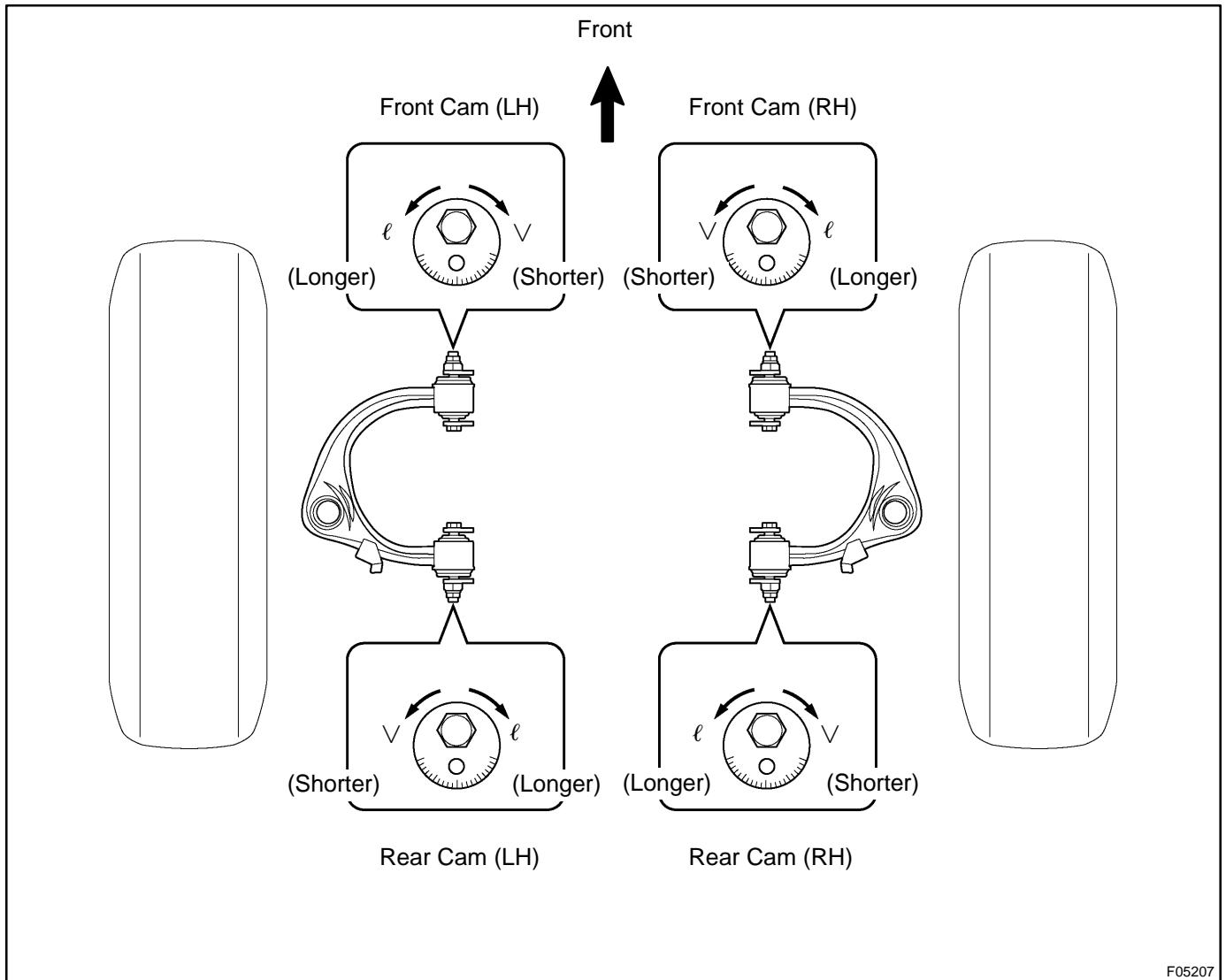
##### NOTICE:

After the camber has been adjusted, inspect the toe-in.

- Loosen the front and/or rear adjusting cam nuts.
- Adjust the camber and caster by front and/or rear adjusting cams.

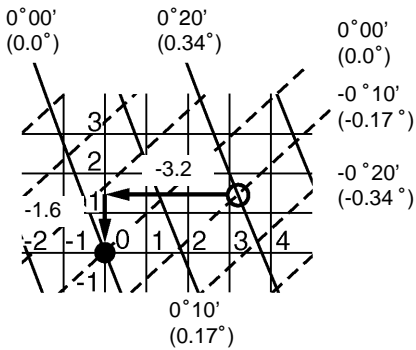
##### HINT:

Try to adjust the camber and caster to the center of the specified value.



**(Example)**

——— Camber  
 - - - - Caster  
 \* = Calculated value  
 ► = 0 point



F05095

(c) How to read adjustment chart (using examples).

(1) Measure the present alignment.

**Camber: -0°15' (-0.25°)**

**Caster: 2°40' (2.67°)**

(2) Mark the difference between the standard value (A) and the measured value (B) on the adjustment chart.

**Standard value:**

**Camber: 0°05' (0.08°)**

**Caster: 2°30' (2.5°)**

**Formula: A - B = C**

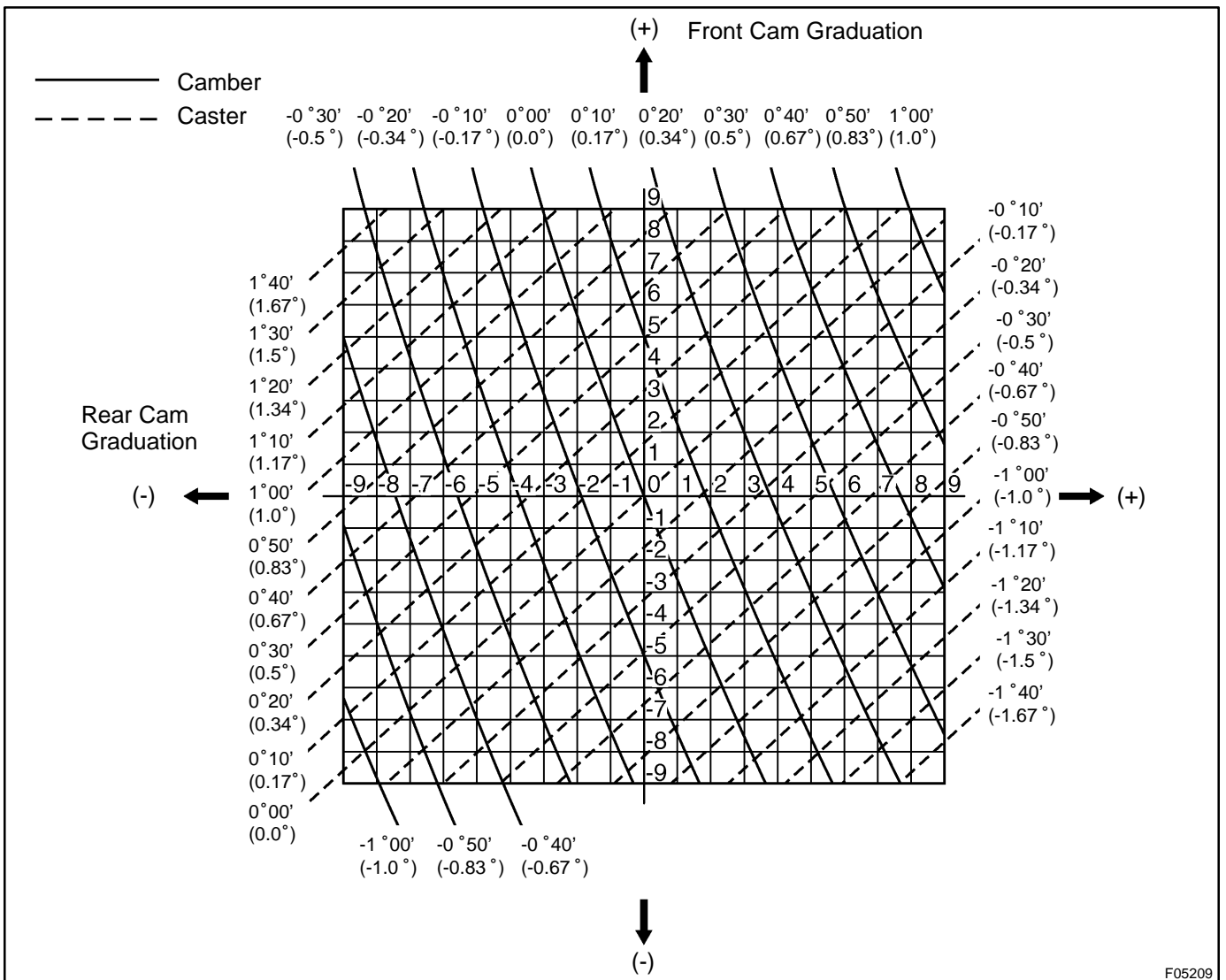
**Camber: 0°05' - (-0°15') = 0°20'**

**Caster: 2°30' - 2°40' = -0°10'**

(3) As shown in the chart, read the distances from the marked point to 0 point, and adjust the front and/or rear adjusting cams accordingly.

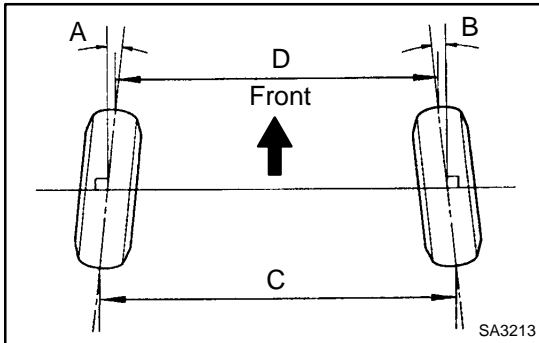
**Front cam: - (Shorter) 1.6**

**Rear cam: - (Shorter) 3.2**



F05209

- (d) Torque the front and/or rear adjusting cam nuts.  
**Torque: 98 N·m (1,000 kgf-cm, 72 ft-lbf)**

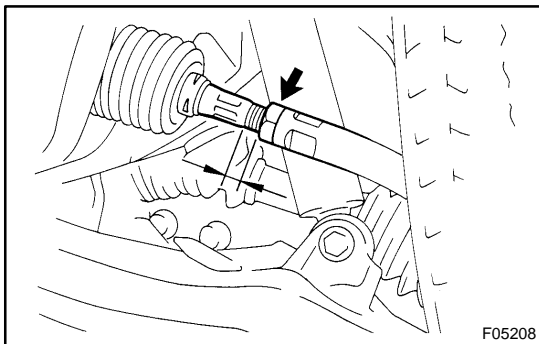


## 5. INSPECT TOE-IN

### Toe-in:

Toe-in (total)	A + B: $0^{\circ}06' \pm 12'$ ( $0.1^{\circ} \pm 0.2^{\circ}$ ) C - D: $1 \pm 2$ mm ( $0.04 \pm 0.08$ in.)
----------------	---

If the toe-in is not within the specified value, adjust it at the rack ends.



## 6. ADJUST TOE-IN

- (a) Check or adjust the lengths of the rack ends, then adjust the toe-in.  
**Rack end length difference: 3.0 mm (0.118 in.) or less**
- (b) Remove the boot clamps.
- (c) Loosen the tie rod end lock nuts.
- (d) Turn the right and left rack ends by an equal amount to adjust the toe-in.

### HINT:

Try to adjust the toe-in to the center of the specified value.

- (e) Tighten the tie rod end lock nuts.

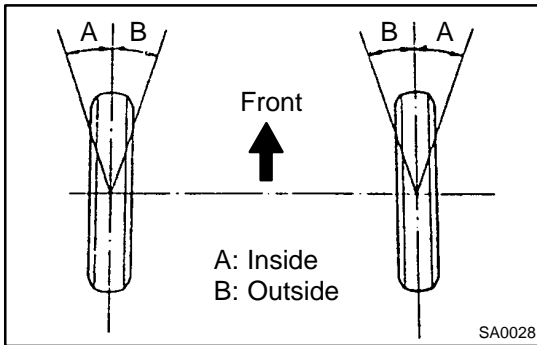
**Torque: 55 N·m (560 kgf-cm, 41 ft-lbf)**

- (f) Place the boots on the seats and install the clamps.

### HINT:

Make sure that the boots are not twisted.

- (g) Perform the zero point calibration of yaw rate and deceleration sensor (See page [DI-505](#) ).



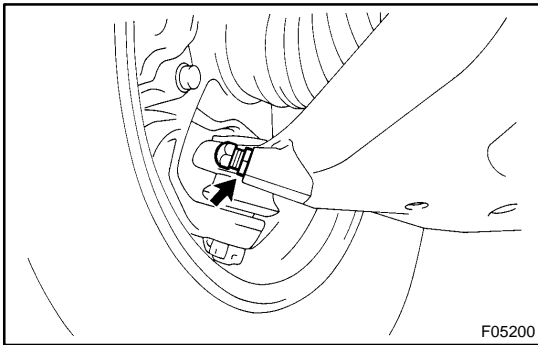
## 7. INSPECT AND ADJUST WHEEL ANGLE

- (a) Turn the steering wheel fully, and measure the turning angle.

### Wheel turning angle:

Inside wheel	36° 42' (33° 42' - 36° 42') 36.7° (33.7° - 36.7°)
Outside wheel: Reference	32° 36' 32.6°

If the right and left inside wheel angles differ from the specified value, check the right and left rack end lengths.



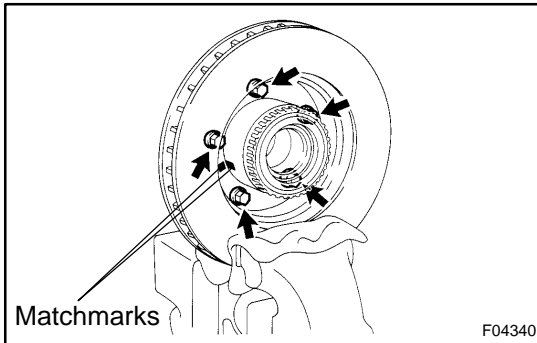
- (b) When toe-in is normal after inspection, adjust wheel angle with the knuckle stopper bolt of the lower suspension arm.

**Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)**

# FRONT WHEEL HUB BOLT REPLACEMENT

SA148-04

## 1. REMOVE FRONT AXLE HUB (See page SA-12)



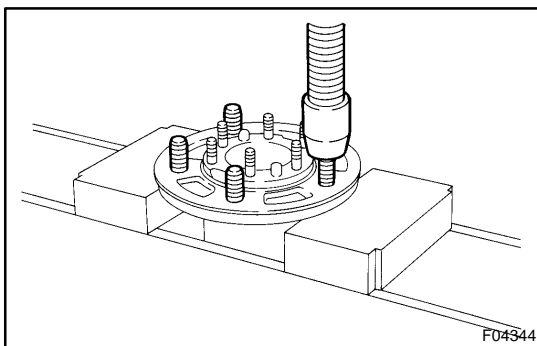
## 2. REMOVE HUB BOLT

- (a) Mount the axle hub with the disc in a soft jaw vice.

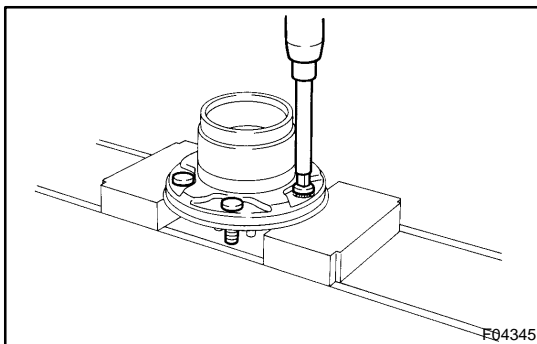
### NOTICE:

**Close vice until it holds disc, do not tighten further.**

- (b) Place matchmarks on the axle hub and disc.  
 (c) Remove the 5 bolts and separate the axle hub from the disc.

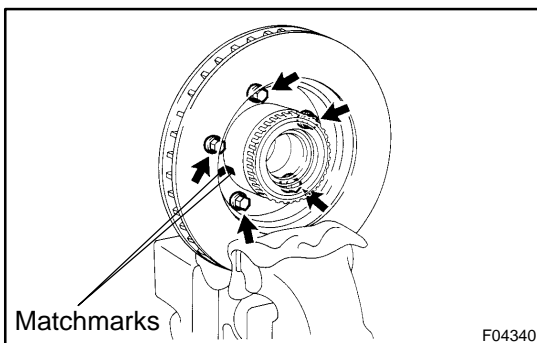


- (d) Using a press, remove the hub bolt.



## 3. INSTALL HUB BOLT

- (a) Using an extension bar and press, install a new hub bolt.



- (b) Align the matchmarks on the axle hub and disc.

- (c) Install the 5 bolts to the axle hub.

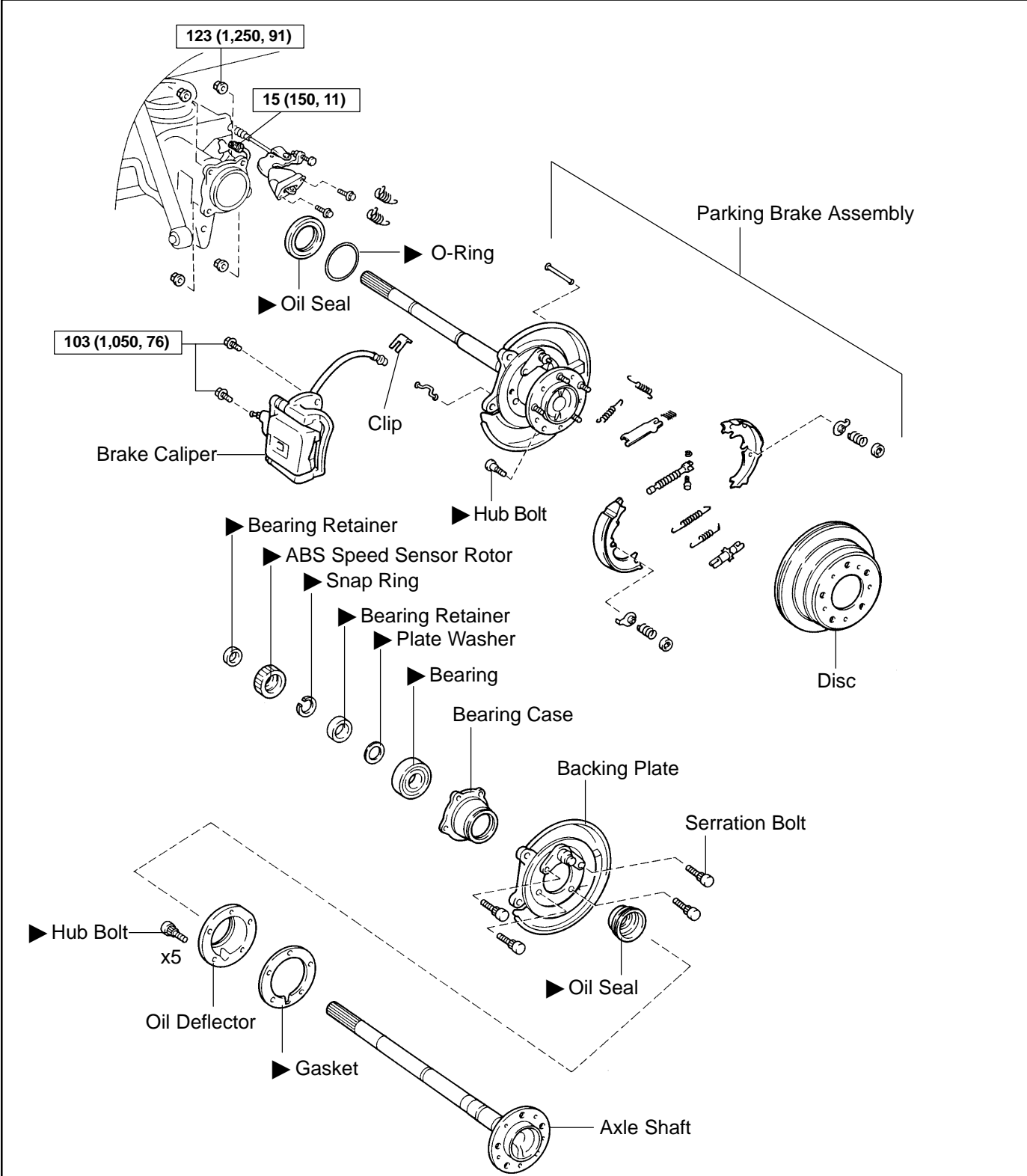
**Torque: 74 N·m (750 kgf·cm, 55 ft·lbf)**

## 4. INSTALL FRONT AXLE HUB (See page SA-16)



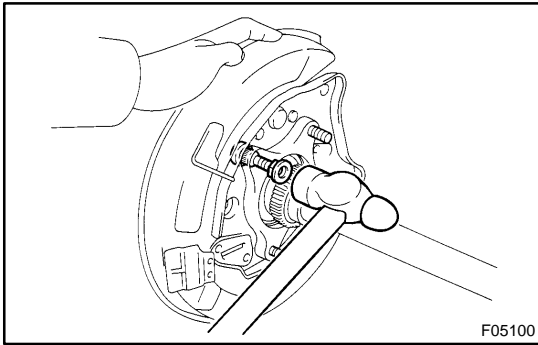
# REAR AXLE SHAFT COMPONENTS

SA15C-02



**N·m (kgf·cm, ft·lbf)** : Specified torque  
 ▶ Non-reusable part

F05438



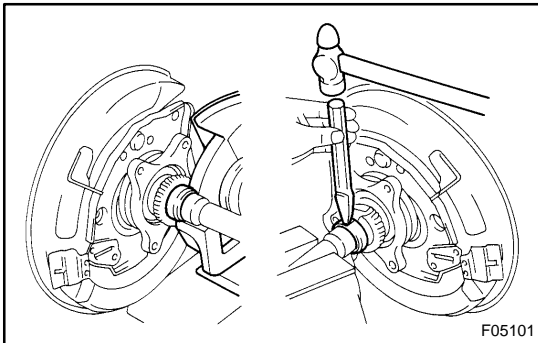
## DISASSEMBLY

### 1. REMOVE BEARING RETAINER (DIFFERENTIAL SIDE) AND ABS SPEED SENSOR ROTOR

- (a) Attach 4 nuts to the serration bolts and using a hammer, remove the serration bolts from the backing plate.

#### NOTICE:

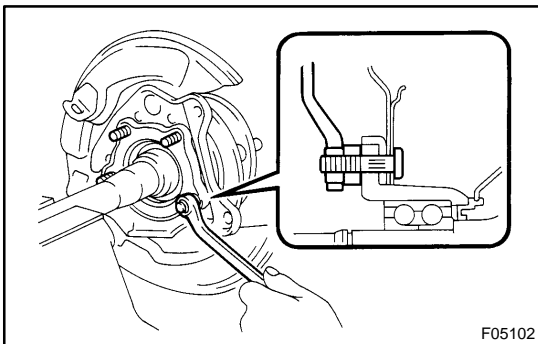
**Do not reuse the nuts previously removed from the vehicle.**



- (b) Grind the retainer and sensor rotor surfaces using a grinder, then pry them out with a chisel and hammer.

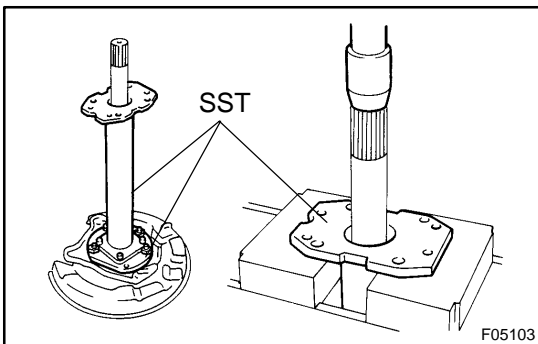
### 2. REMOVE SNAP RING FROM AXLE SHAFT

Using a snap ring expander, remove the snap ring.



### 3. REMOVE AXLE SHAFT FROM BACKING PLATE

- (a) Attach 4 washers and nut to the serration bolts, then torque the nuts to install the serration bolts to the backing plate.
- (b) Remove the 4 nuts and washers from the serration bolts.



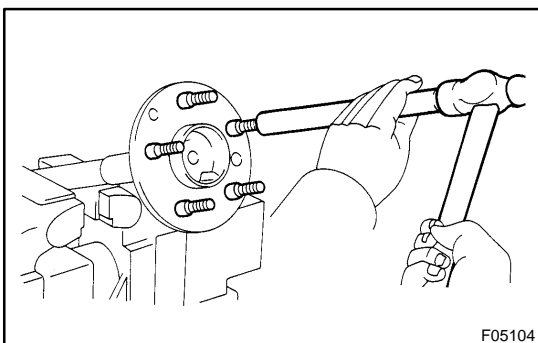
- (c) Position SST on the backing plate with the 4 nuts.

SST 09521-2501 1, 09521-25021

- (d) Using a press, remove the axle shaft, bearing retainer and plate washer from the backing plate.

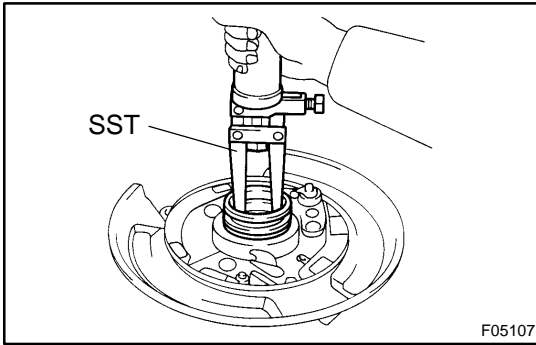
- (e) Remove the SST.

SST 09521-2501 1, 09521-25021



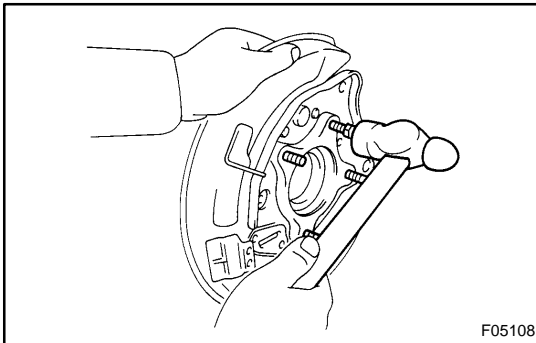
### 4. REMOVE OIL DEFLECTOR

Using a brass bar and hammer, remove the 5 hub bolts, oil deflector and gasket.



#### 5. REMOVE OUTER OIL SEAL

Using SST, remove the oil seal.  
SST 09308-00010

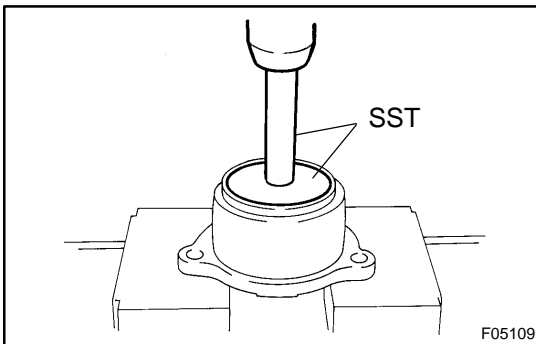


#### 6. REMOVE BEARING CASE

Attach 4 nuts to the serration bolts and remove the serration bolts and bearing case from the backing plate using a hammer.

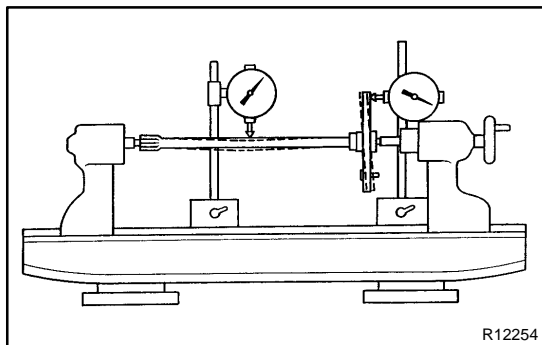
#### NOTICE:

**Do not reuse the nuts previously removed from the vehicle.**



#### 7. REMOVE REAR AXLE BEARING

Using SST and a press, remove the bearing.  
SST 09950-60020 (09951-00810),  
09950-70010 (09951-07100)



## INSPECTION

### INSPECT AXLE SHAFT

Using a dial indicator, measure the runout of the shaft and flange.

**Maximum shaft runout: 2.0 mm (0.079 in.)**

**Maximum flange runout: 0.05 mm (0.0020 in.)**

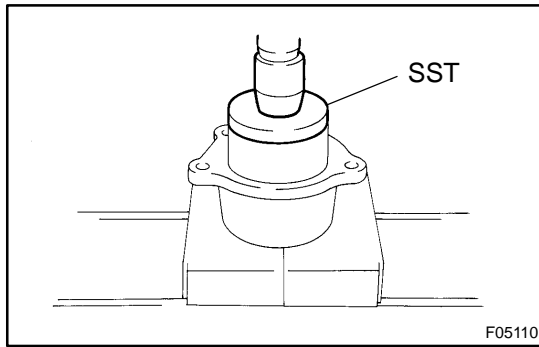
If the rear axle shaft or flange are damaged or worn, or if runout is greater than the maximum, replace the rear axle shaft.

## INSTALLATION

Installation is in the reverse order of removal (See page [SA-84](#) ).

HINT:

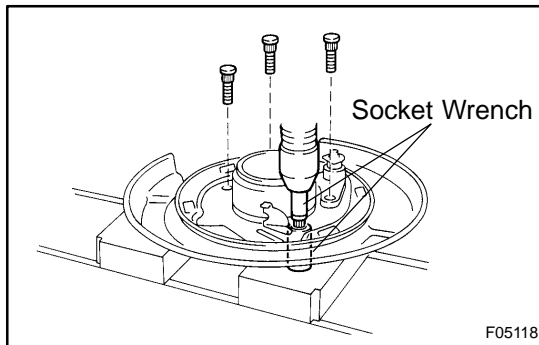
After installation, fill the brake reservoir with brake fluid, bleed the brake system (See page [BR-4](#) ), check for leaks and check the ABS speed sensor signal (See page [DI-505](#) ).



## REASSEMBLY

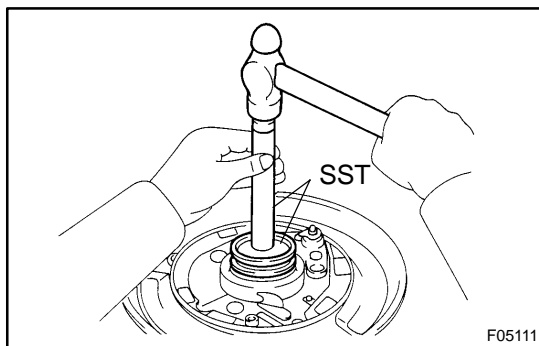
### 1. INSTALL REAR AXLE BEARING

Using SST and a press, install the bearing.  
SST 09950-60020 (09951-00890)



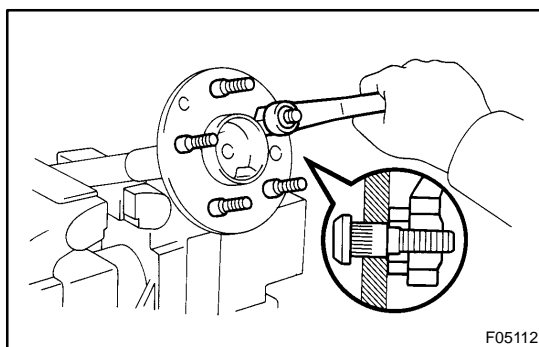
### 2. INSTALL BEARING CASE

Position the backing plate on the bearing case and using a press and 2 socket wrenches, install the 4 serration bolts.



### 3. INSTALL OUTER OIL SEAL

- (a) Using SST and a hammer, install a new oil seal.  
SST 09950-60020 (09951-00810),  
09950-70010 (09951-07100)
- (b) Coat MP grease to the oil seal lip.

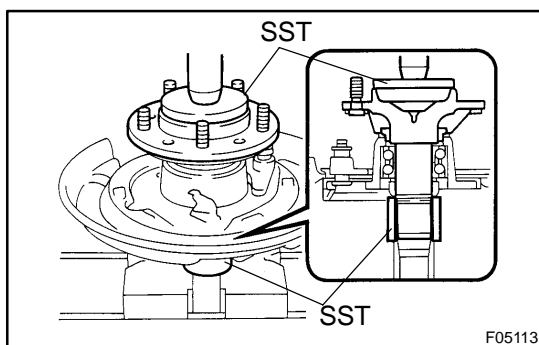


### 4. INSTALL OIL DEFLECTOR

Position a new gasket and oil deflector on the axle shaft and install a washer and nut to a new hub bolt, as shown in the illustration, and install the 5 hub bolts by torquing the nut.

### 5. INSTALL AXLE SHAFT TO BACKING PLATE

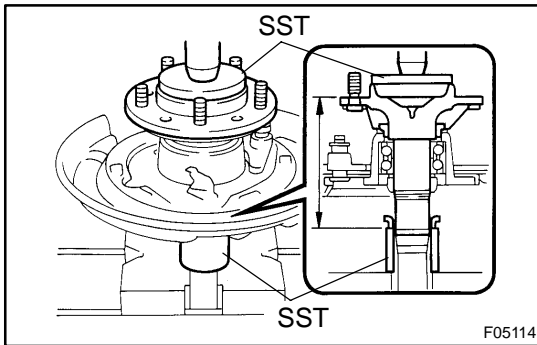
- (a) Install the backing plate, plate washer and bearing retainer on the axle shaft.



- (b) Using SST and a press, install the axle shaft into the backing plate.  
SST 09631-12090, 09950-60020 (09951-01030)

### 6. INSTALL SNAP RING TO AXLE SHAFT

Using a snap ring expander, install a new snap ring.



### 7. INSTALL ABS SPEED SENSOR ROTOR AND BEARING RETAINER

Using SST and a press, install a new ABS speed sensor rotor and bearing retainer.

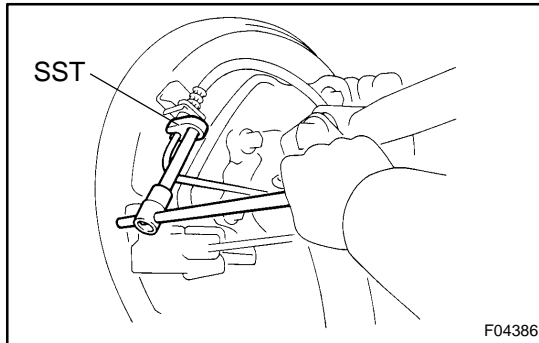
SST 09631-12090, 09950-60020 (09951-01030)

**Standard length: 170.7 ± 1.0 mm (6.720 ± 0.039 in.)**

## REMOVAL

### 1. REMOVE REAR WHEEL

Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)

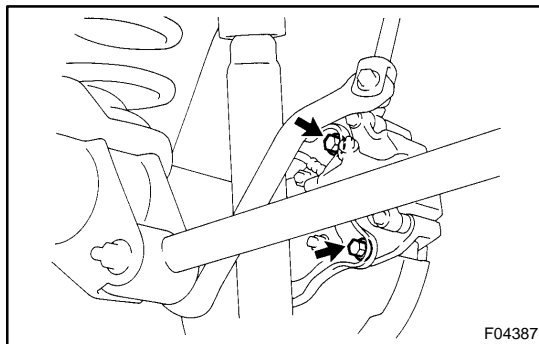


### 2. DISCONNECT BRAKE LINE

Using SST, disconnect the brake line and remove the clip.

SST 09023-00100

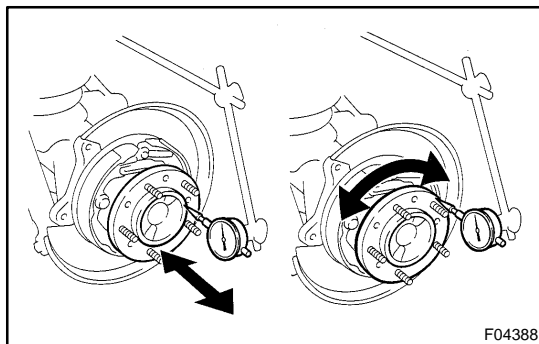
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



### 3. REMOVE BRAKE CALIPER AND DISC

Remove the 2 bolts, washers, brake caliper and disc.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



### 4. CHECK BEARING BACKLASH AND AXLE SHAFT DEVIATION

(a) Using a dial indicator, check the backlash in the bearing shaft direction.

**Maximum: 0.6 mm (0.024 in.)**

If the backlash exceeds the maximum, replace the bearing.

(b) Using a dial indicator, check the deviation at the surface of the axle shaft outside the hub bolt.

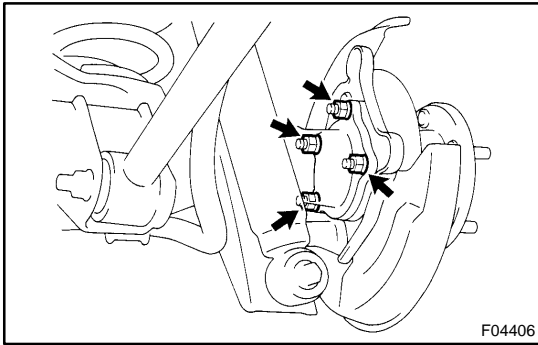
**Maximum: 0.05 mm (0.0020 in.)**

If the deviation exceeds the maximum, replace the axle shaft.

### 5. REMOVE PARKING BRAKE ASSEMBLY

(See page [BR-33](#))



**6. REMOVE AXLE SHAFT ASSEMBLY**

- (a) Remove the 4 nuts.

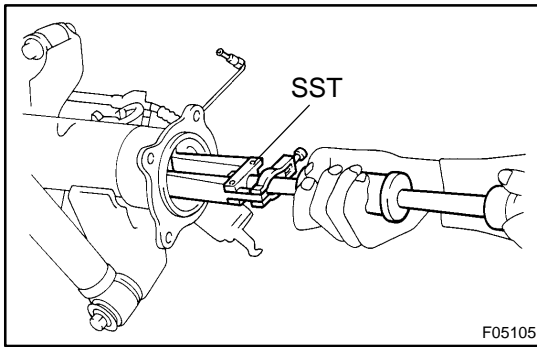
**Torque: 123 N·m (1,250 kgf·cm, 91 ft·lbf)**

- (b) Pull out the axle shaft assembly.

**NOTICE:**

**Be careful not to damage the oil seal.**

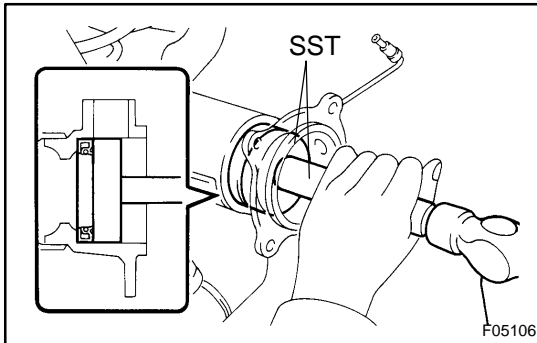
- (c) Remove the O-ring from the bearing case.



## REPLACEMENT

### REPLACE OIL SEAL (INNER SIDE)

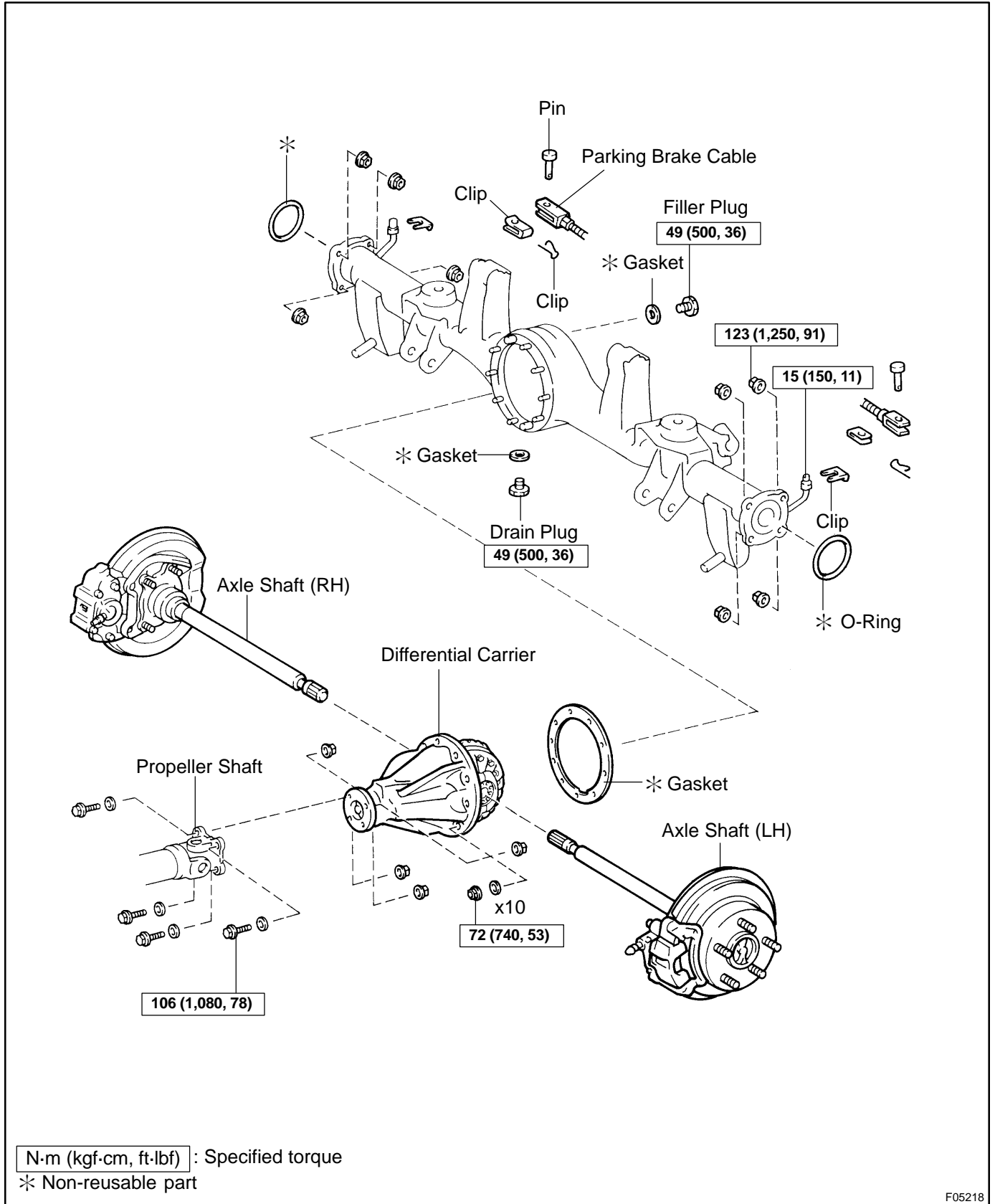
- (a) Using SST, remove the oil seal.  
SST 09308-00010



- (b) Using SST and a hammer, install a new oil seal.  
SST 09950-60020 (09951-00710),  
09950-70010 (09951-07150)
- (c) Coat MP grease to the oil seal lip.

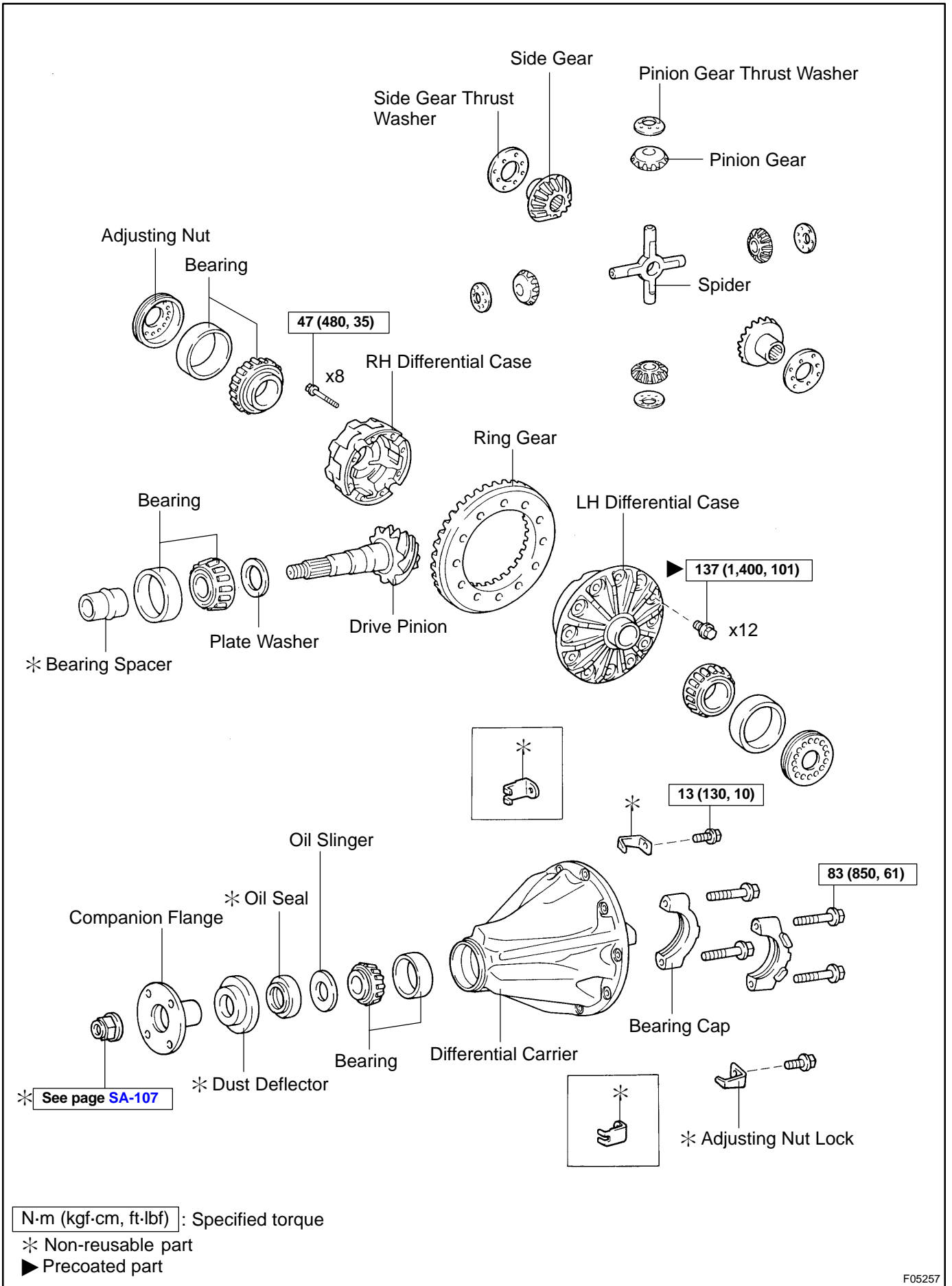
# REAR DIFFERENTIAL CARRIER COMPONENTS

SA15M-03



F05218

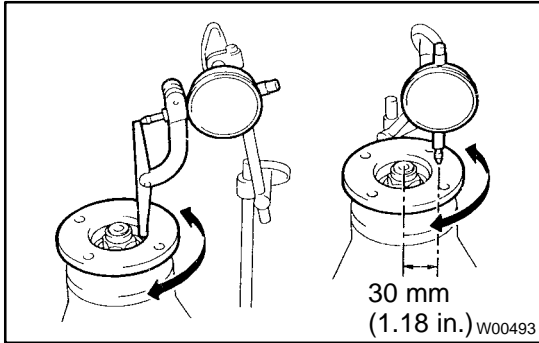
SUSPENSION AND AXLE - REAR DIFFERENTIAL CARRIER



F05257

## DISASSEMBLY

1. SET DIFFERENTIAL CARRIER TO OVERHAUL STAND, ETC.

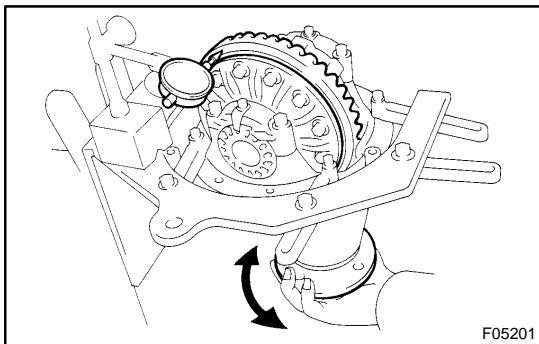


2. CHECK RUNOUT OF COMPANION FLANGE

Using a dial indicator, measure the vertical and lateral runout of the companion flange.

**Maximum runout: 0.10 mm (0.0039 in.)**

If the runout is greater than the maximum, replace the companion flange.

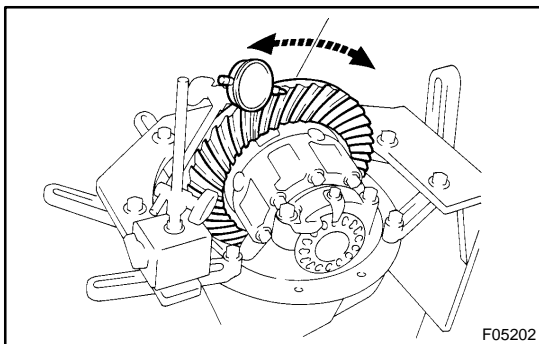


3. CHECK RING GEAR RUNOUT

Using a dial indicator, while holding the drive pinion flange, measure the ring gear runout.

**Maximum runout: 0.05 mm (0.0020 in.)**

If the runout is greater than the maximum, replace the ring gear.



4. CHECK RING GEAR BACKLASH

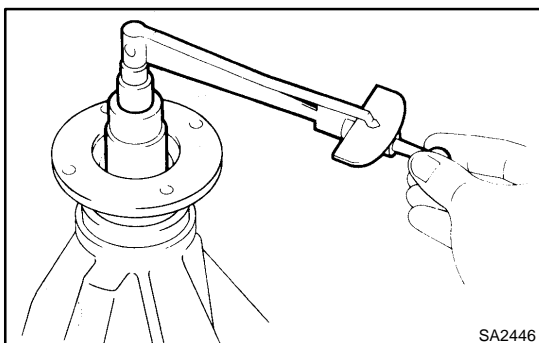
Using a dial indicator, measure the ring gear backlash.

**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)**

HINT:

Perform the measurements at 3 or more positions around the circumference of the ring gear.

If the backlash is not within the specified value, adjust the side bearing preload or repair as necessary.



5. MEASURE DRIVE PINION PRELOAD

Using a torque wrench, measure the drive pinion preload using the backlash of the drive pinion and ring gear.

**Preload (at starting):**

**0.64 - 0.92 N·m (6.5 - 9.4 kgf·cm, 5.7 - 8.1 in.-lbf)**

**6. CHECK TOTAL PRELOAD**

Using a torque wrench, measure the total preload with the teeth of the drive pinion and ring gear in contact.

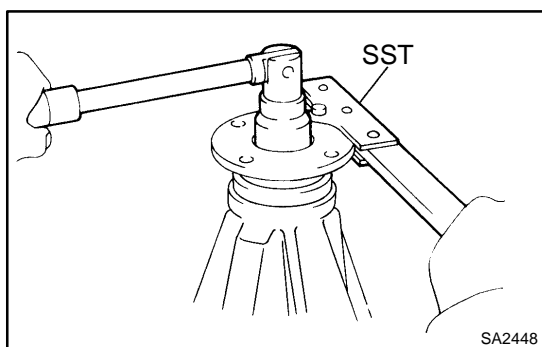
**Total preload (at starting):****Drive pinion preload plus**

**0.38 - 0.63 N·m (3.9 - 6.5 kgf·cm, 3.3 - 5.6 in.-lbf)**

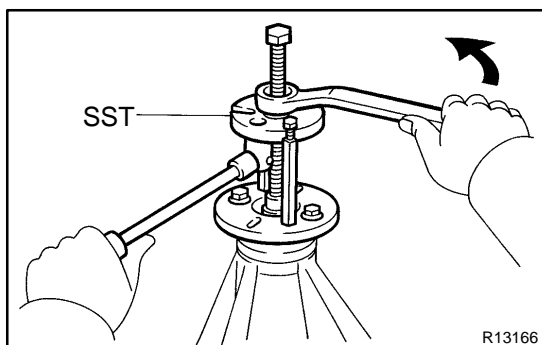
If necessary, disassemble and inspect the differential.

**7. CHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See page SA-107 )****8. REMOVE COMPANION FLANGE**

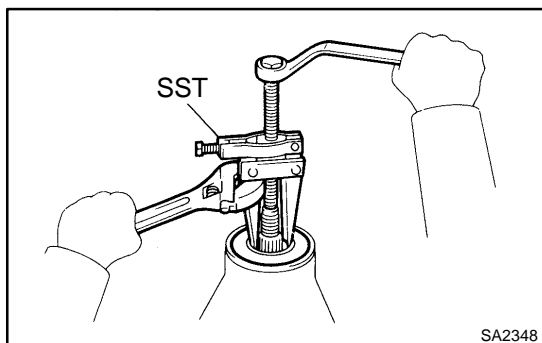
- (a) Using a chisel and hammer, unstake the nut.



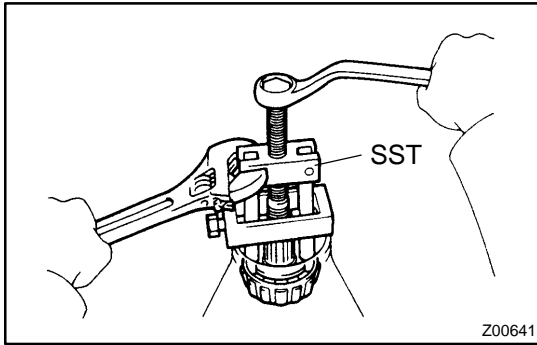
- (b) Using SST to hold the flange, remove the nut.  
SST 09330-00021



- (c) Using SST, remove the companion flange.  
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03040)

**9. REMOVE OIL SEAL AND OIL SLINGER**

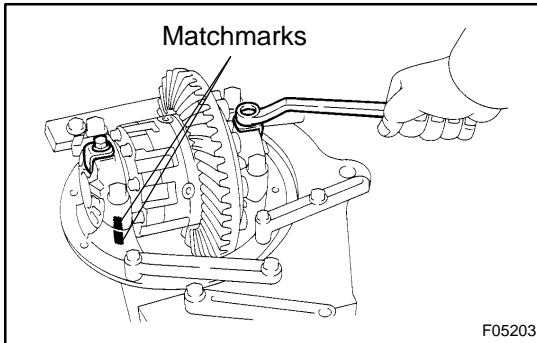
- (a) Using SST, remove the oil seal from the differential carrier.  
SST 09308-10010
- (b) Remove the oil slinger.

**10. REMOVE FRONT BEARING**

Using SST, remove the front bearing from the drive pinion.

SST 09556-22010

If the front bearing is damaged or worn, replace the bearing.

**11. REMOVE DIFFERENTIAL CASE ASSEMBLY**

(a) Place matchmarks on the bearing cap and differential carrier.

(b) Remove the 2 bolts and adjusting nut locks.

(c) Remove the 4 bolts, 2 bearing caps and adjusting nuts.

**HINT:**

Tag the disassembled parts to show the location for reassembling.

(d) Remove the differential case with the bearing outer races from the carrier.

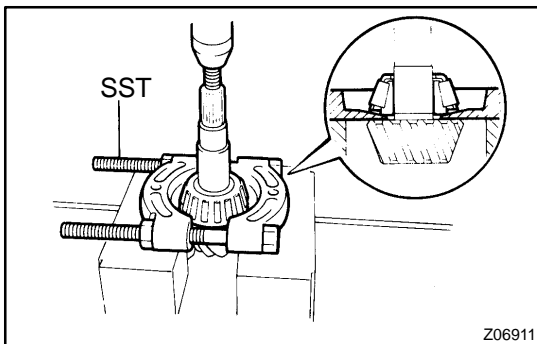
**HINT:**

Tag the disassembled parts to show the location for reassembling.

**12. REMOVE DRIVE PINION AND BEARING SPACER FROM DIFFERENTIAL CARRIER**

(a) Remove the drive pinion with the rear bearing.

(b) Remove the bearing spacer.

**13. REMOVE DRIVE PINION REAR BEARING**

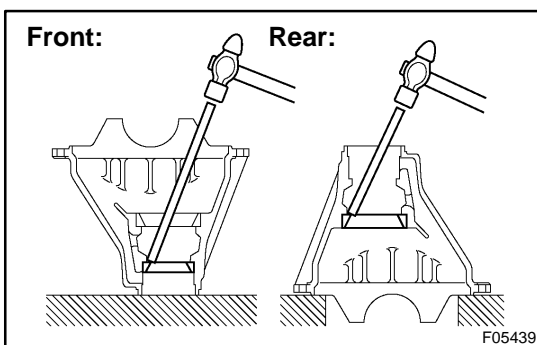
(a) Using SST and a press, remove the rear bearing from the drive pinion.

SST 09950-00020

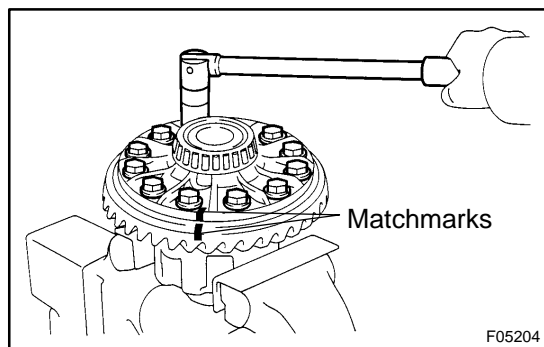
**HINT:**

If the drive pinion or ring gear is damaged, replace them as a set.

(b) Remove the plate washer from the drive pinion.

**14. REMOVE FRONT AND REAR BEARING OUTER RACES**

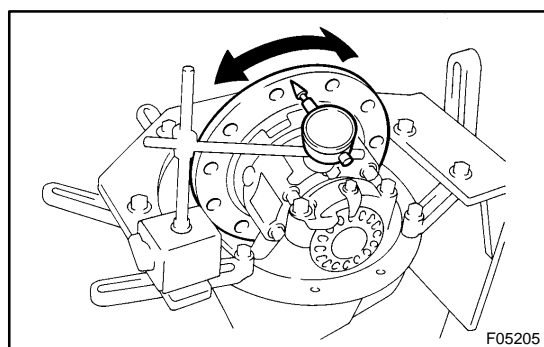
Using a brass bar and hammer, remove the outer races.

**15. REMOVE RING GEAR**

- (a) Place matchmarks on the ring gear and differential case.
- (b) Remove the 12 ring gear set bolts.
- (c) Using a plastic hammer, tap on the ring gear to remove it from the differential case.

**16. CHECK DIFFERENTIAL CASE RUNOUT**

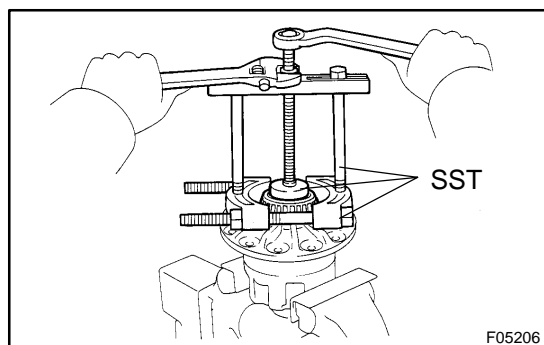
- (a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.
- (b) Install the differential case in the differential carrier.
- (c) Tighten the adjusting nut just to where there is no play in the bearing.
- (d) Align the matchmarks on the bearing cap and differential carrier.
- (e) Install and uniformly tighten the 4 bearing cap bolts a little at a time.



- (f) Using a dial indicator, measure the differential case runout.

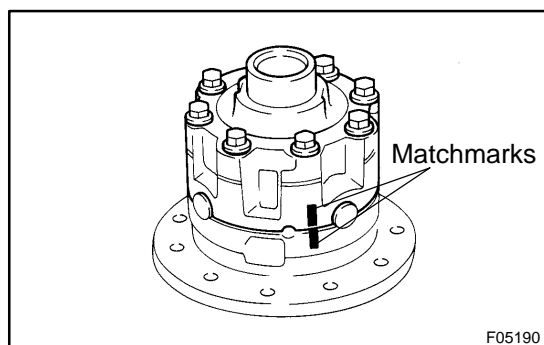
**Maximum case runout: 0.04 mm (0.0016 in.)**

- (g) Remove the differential case.

**17. REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE**

Using SST, remove the 2 side bearings from the differential case.

SST 09950-00020, 09950-00030,  
09950-4001 1 (09957-04010),  
09950-60010 (09951-00480)

**18. DISASSEMBLE DIFFERENTIAL CASE**

- (a) Place matchmarks on the RH and LH differential cases.
- (b) Remove the 8 bolts uniformly, a little at a time.
- (c) Using a plastic hammer, separate the RH and LH differential cases.
- (d) Remove the 2 side gear thrust washers, 2 side gears, spider, 4 pinion gears and pinion gear thrust washers.



## INSTALLATION

Installation is in the reverse order of removal (See page [SA-100](#) ).

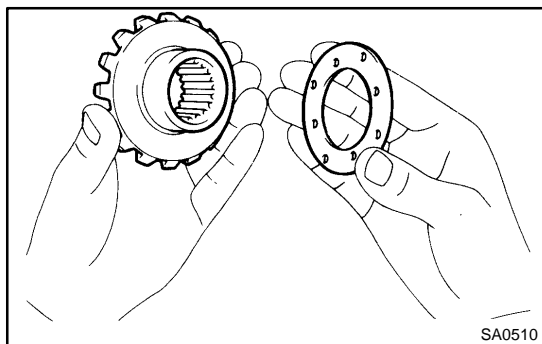
HINT:

After installation, fill the differential with hypoid gear oil (See page [SA-95](#) ), fill the brake reservoir with brake fluid, bleed the brake system (See page [BR-4](#) ), check for leaks and check the ABS speed sensor signal (See page [DI-505](#) ).

## REASSEMBLY

### HINT:

- ▶ Using a shop rag, clean off any foreign object from the parts.
- ▶ Apply all of the sliding and rotating surfaces with hypoid gear oil.

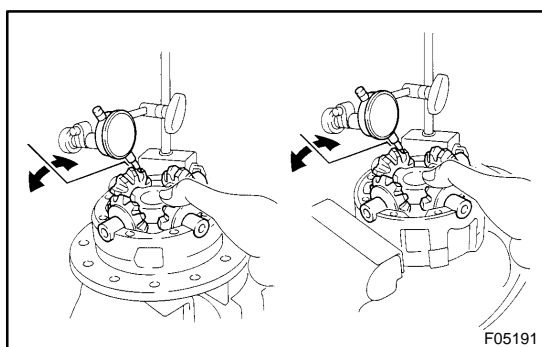


### 1. MEASURE SIDE GEAR BACKLASH

- (a) Install the 2 thrust washers to the side gears.
- (b) Install the side gear to the differential case.
- (c) Install the 4 pinion gears and thrust washers to the spider.
- (d) Install the spider assembly to the differential case.

### HINT:

Install the spider to the differential case tightly.



- (e) Using a dial indicator, measure the side gear backlash holding the side gear and spider.

**Backlash: 0.02 - 0.15 mm (0.0008 - 0.0059 in.)**

### HINT:

- ▶ Measure at all 4 locations.
- ▶ Measure the backlash at the RH and LH differential cases.

If the backlash is not within the specified value, install a thrust washer of a different thickness.

### Thrust washer thickness:

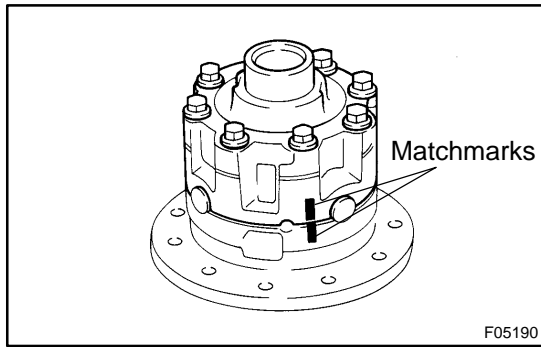
Thickness mm (in.)	Thickness mm (in.)
1.55 (0.061)	1.85 (0.073)
1.60 (0.063)	1.90 (0.075)
1.65 (0.065)	1.95 (0.077)
1.70 (0.067)	2.00 (0.079)
1.75 (0.069)	2.05 (0.081)
1.80 (0.071)	2.10 (0.083)

### 2. ASSEMBLE DIFFERENTIAL CASE

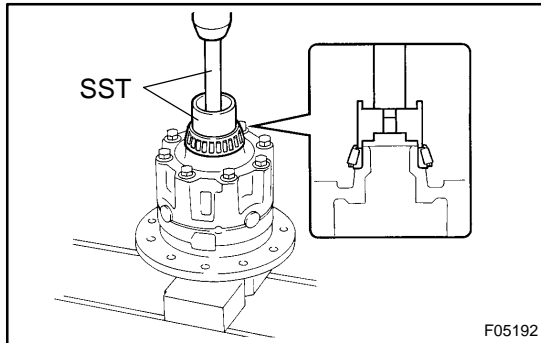
- (a) Reinstall the spider to the differential case.

### HINT:

Install the spider to the differential case tightly.

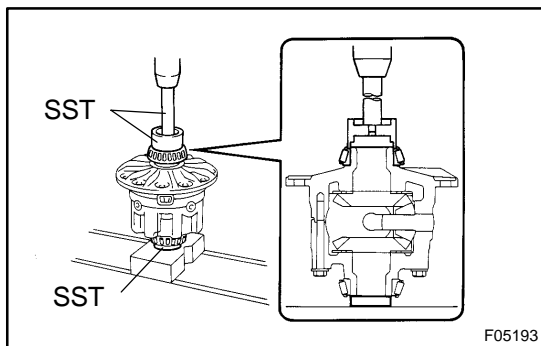


- (b) Align the matchmarks and assemble the RH and LH differential cases.
- (c) Tighten the 8 bolts uniformly, a little at a time.  
**Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)**



### 3. INSTALL SIDE BEARINGS

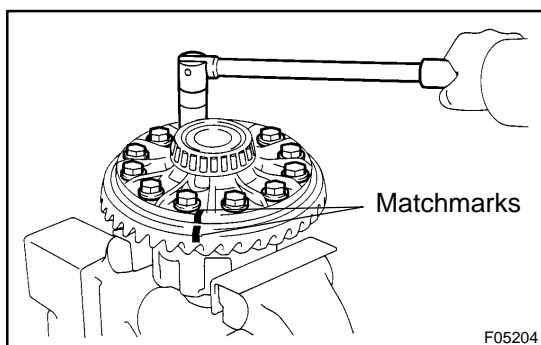
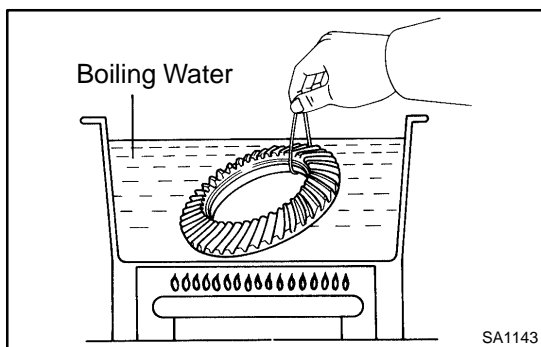
- (a) Using SST and a press, install the RH side bearing on the differential case.  
SST 09710-30050, 09950-70010 (09951-07100)



- (b) Using SST and a press, install the LH side bearing on the differential case.  
SST 09710-30050, 09950-60010 (09951-00480),  
09950-70010 (09951-07100)

### 4. INSTALL RING GEAR ON DIFFERENTIAL CASE

- (a) Clean the threads of the bolts and differential case with the white gasoline.
- (b) Clean the contact surfaces of the differential case and ring gear.
- (c) Heat the ring gear to about 100 °C (212 °F) in boiling water.
- (d) Carefully take the ring gear out of the boiling water.
- (e) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.



- (f) Align the matchmarks on the ring gear and differential case.
- (g) Temporarily install the 12 set bolts.
- (h) After the ring gear cools down enough, torque the 12 set bolts to which thread lock has been applied.

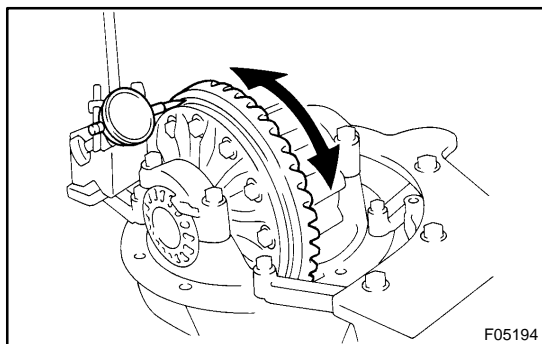
**Thread lock:**

**Part No. 08833-00100, THREE BOND 1360 K or equivalent**

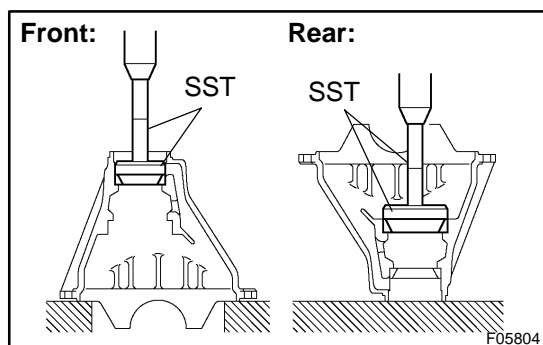
**Torque: 137 N·m (1,400 kgf·cm, 101 ft·lbf)**

**5. CHECK RING GEAR RUNOUT**

- (a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.
- (b) Install the differential case onto the carrier and tighten the adjusting nut just to where there is no play in the bearings.



- (c) Using a dial indicator, check the ring gear runout.  
**Maximum runout: 0.05 mm (0.0020 in.)**
- (d) Remove the differential case.

**6. INSTALL FRONT AND REAR BEARING OUTER RACES**

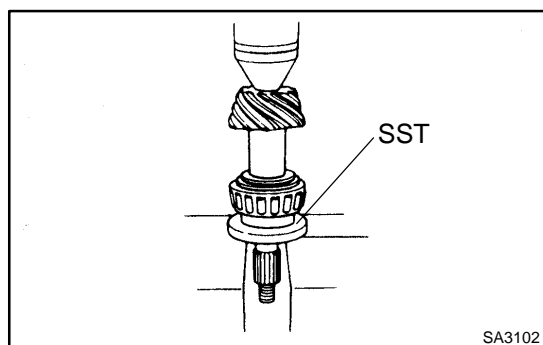
- (a) Using SST and a press, install the front bearing outer race.  
SST 09950-60020 (09951-00710),  
09950-70010 (09951-07150)
- (b) Using SST and a press, install the rear bearing outer race.  
SST 09950-60020 (09951-00890),  
09950-70010 (09951-07150)

**7. INSTALL DRIVE PINION REAR BEARING**

- (a) Install the plate washer on the drive pinion.

**HINT:**

First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.



- (b) Using SST and a press, install the rear bearing onto the drive pinion.  
SST 09506-35010

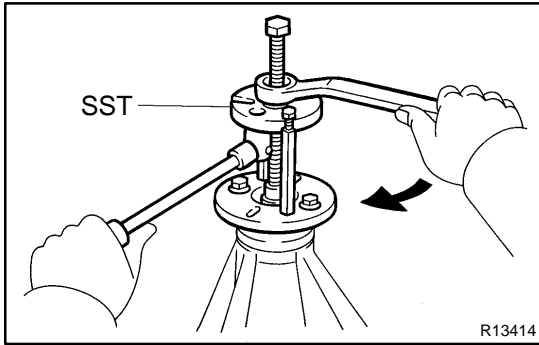
**8. TEMPORARILY ADJUST DRIVE PINION PRELOAD**

- (a) Install the drive pinion and front bearing.

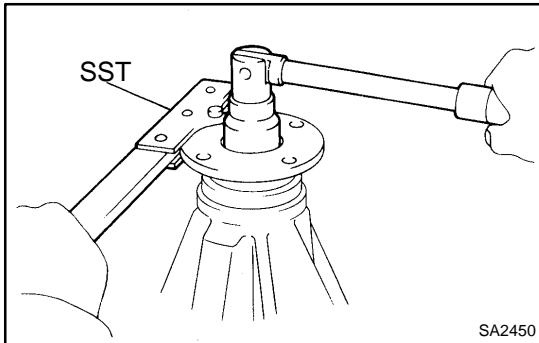
**HINT:**

Assemble the spacer and oil seal after adjusting the gear contact pattern.

- (b) Install the oil slinger.



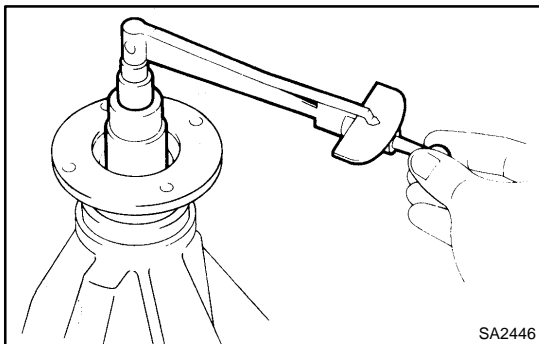
- (c) Install the companion flange with SST.  
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03040)



- (d) Using SST to hold the flange and adjust the drive pinion preload by tightening the companion flange nut.  
SST 09330-00021

**NOTICE:**

- ▶ Coat the nut and screw of the drive pinion with gear oil.
- ▶ As there is no spacer, tighten the nut a little at a time, being careful not to overtighten.



- (e) Using a torque wrench, measure the preload.

**Preload (at starting):****New bearing**

**1.3 - 1.8 N·m (13 - 19 kgf·cm, 11.5 - 15.9 in.-lbf)**

**Reused bearing**

**0.64 - 0.92 N·m (6.5 - 9.4 kgf·cm, 5.7 - 8.1 in.-lbf)**

**HINT:**

Measure the total preload after turning the bearing clockwise and counterclockwise several times to make the bearing smooth.

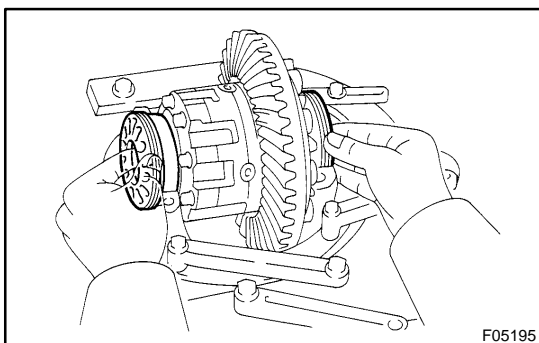
**9. INSTALL DIFFERENTIAL CASE IN CARRIER**

- (a) Place the 2 bearing outer races on their respective bearings. Make sure that the right and left outer races are not interchanged.

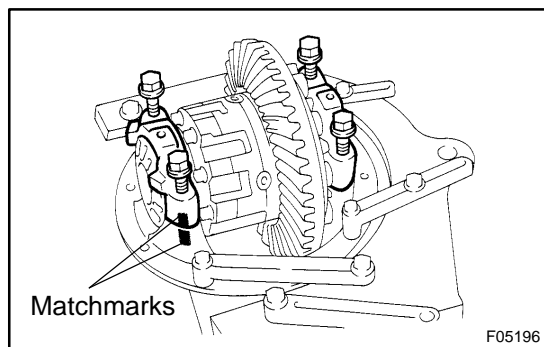
- (b) Install the differential case in the carrier.

**HINT:**

Make sure that there is backlash between the ring gear and drive pinion.

**10. INSTALL ADJUSTING NUTS**

Install the 2 adjusting nuts on the carrier, making sure the nuts are engaged properly.

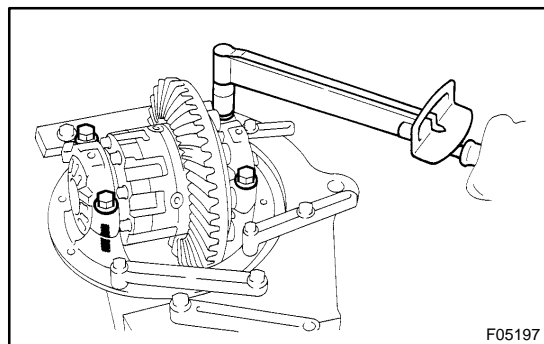


### 11. INSTALL BEARING CAPS

Align the matchmarks on the bearing cap and carrier. Screw in the 2 bearing cap bolts 2 or 3 turns and press down the bearing cap by hand.

#### HINT:

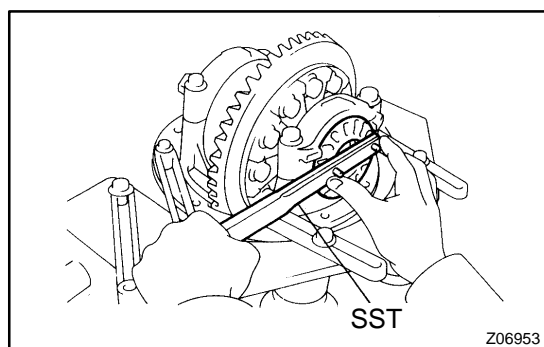
If the bearing cap does not fit tightly on the carrier, the adjusting nuts are not engaged properly. Reinstall the adjusting nuts if necessary.



### 12. ADJUST SIDE BEARING PRELOAD

(a) Torque the 4 bolts.

**Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)**



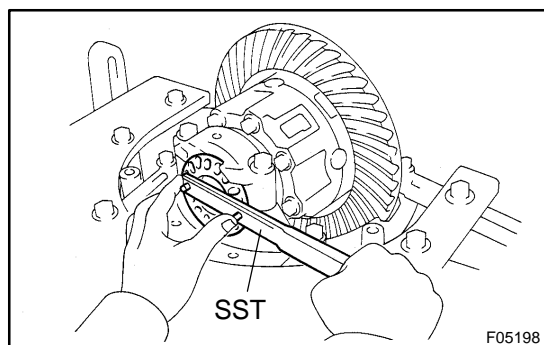
(b) Then loosen them to the point where the adjusting nuts can be turned by SST.

SST 09504-0001 1

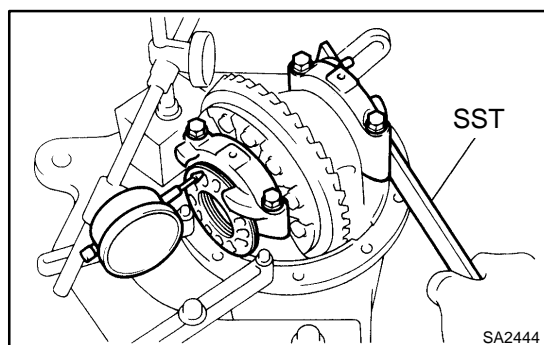
(c) Tighten the 4 bolts.

**Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)**

(d) Using SST, torque the adjusting nut on the ring gear side until the ring gear has a backlash of about 0.2 mm (0.008 in.).

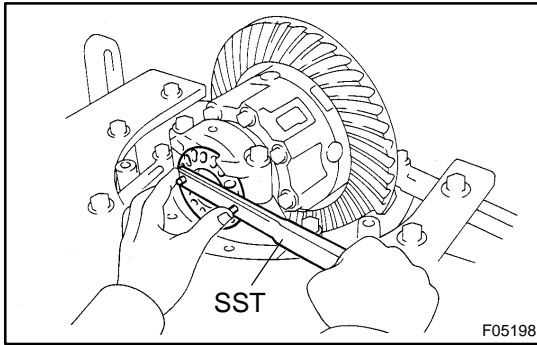


(e) While turning the ring gear, use the SST to fully tighten the adjusting nut on the drive pinion side. After the bearings are settled, loosen the adjusting nut on the drive pinion side.

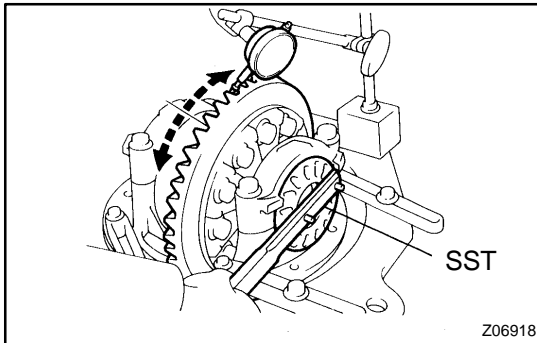


(f) Place a dial indicator on the top of the adjusting nut on the ring gear side.

(g) Adjust the side bearing to zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.



- (h) Using the SST, torque the adjusting nut 1 - 1.5 notches from the zero preload position.

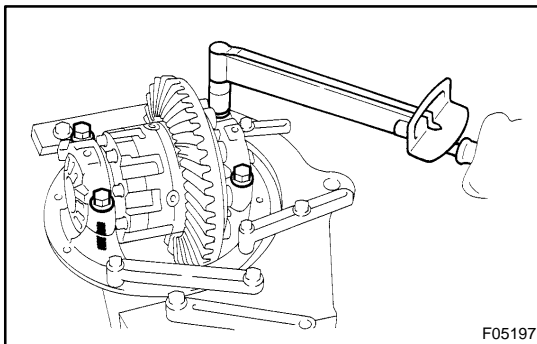


- (i) Using a dial indicator, adjust the ring gear backlash until it is within the specified value.

**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)**

**HINT:**

The backlash is adjusted by turning the right and left adjusting nuts by equal amount. For example, loosen the nut on the left side 1 notch and torque the nut on the right side 1 notch.

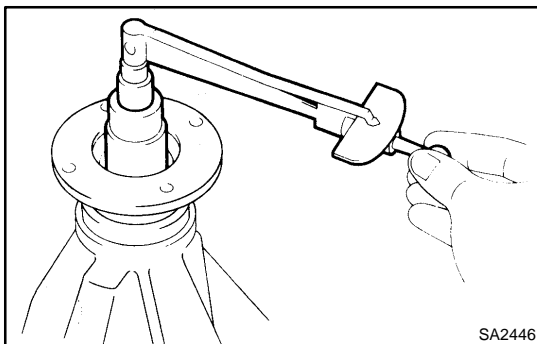


- (j) Torque the 4 bearing cap bolts.

**Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)**

- (k) After rotating the ring gear 5 turns or more, recheck the ring gear backlash.

**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)**



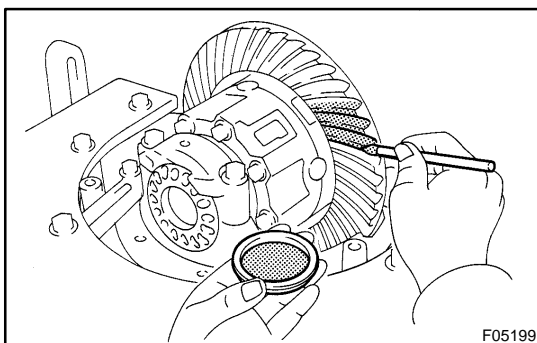
**13. MEASURE TOTAL PRELOAD**

Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

**Preload (at starting):**

**Drive pinion preload plus**

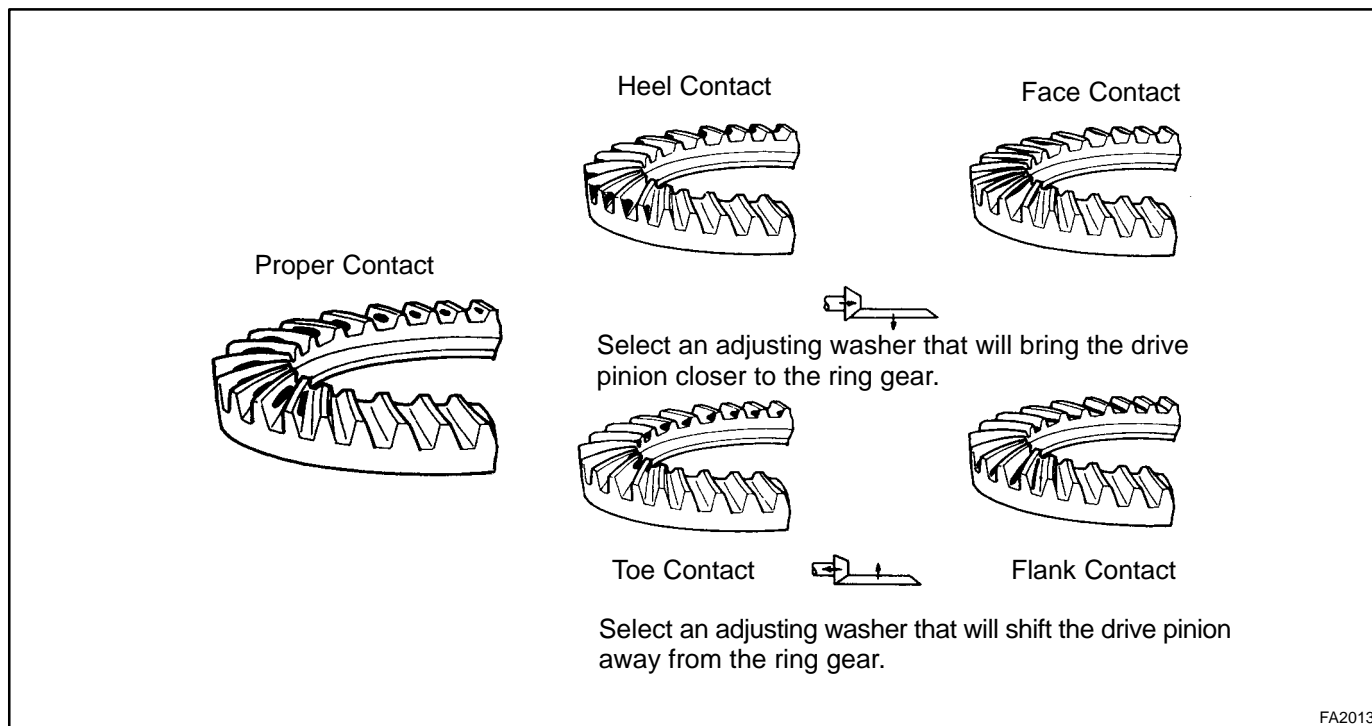
**0.38 - 0.63 N·m (3.9 - 6.5 kgf·cm, 3.3 - 5.6 in.-lbf)**



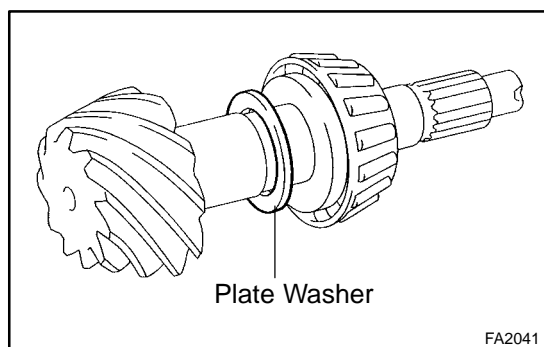
**14. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION**

- (a) Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead primer.

- (b) Turn the companion flange, in both directions to inspect the ring gear for proper tooth contact.



FA2013



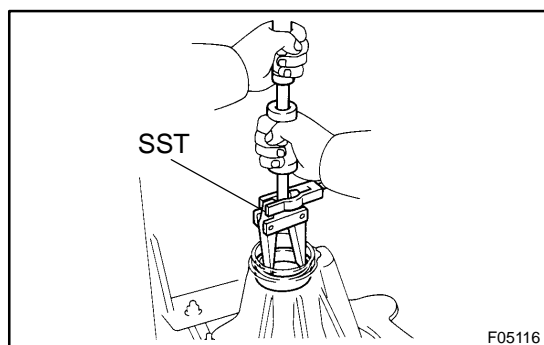
FA2041

If the teeth are not contacting properly, use the following table to select a proper washer for correction.

**Plate washer thickness:**

Thickness mm (in.)	Thickness mm (in.)
1.050 (0.04134)	1.325 (0.05217)
1.075 (0.04232)	1.350 (0.05315)
1.100 (0.04331)	1.375 (0.05413)
1.125 (0.04429)	1.400 (0.05512)
1.150 (0.04528)	1.425 (0.05610)
1.175 (0.04626)	1.450 (0.05709)
1.200 (0.04724)	1.475 (0.05807)
1.225 (0.04823)	1.500 (0.05906)
1.250 (0.04921)	1.525 (0.06004)
1.275 (0.05020)	1.550 (0.06102)
1.300 (0.05118)	-

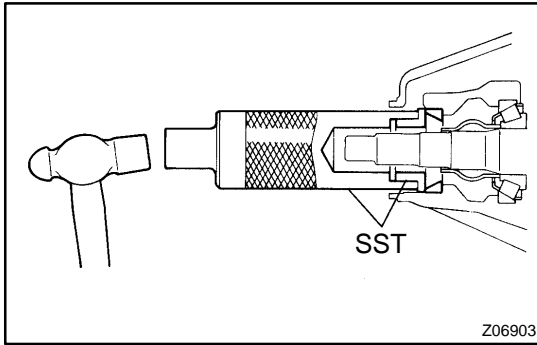
- 15. REMOVE COMPANION FLANGE (See page SA-102)
- 16. REMOVE OIL SLINGER AND FRONT BEARING (See page SA-102)



F05116

- 17. REMOVE BEARING OUTER RACE  
Using SST, remove the bearing outer race.  
SST 09308-00010
- 18. INSTALL NEW BEARING SPACER



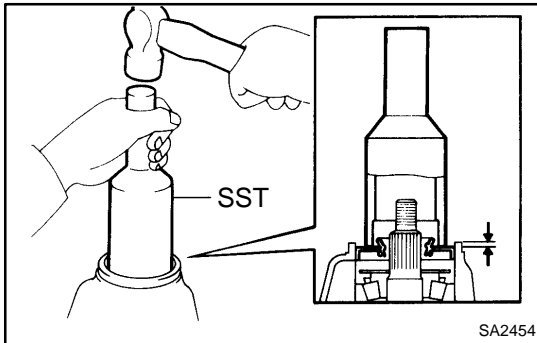
**19. INSTALL BEARING OUTER RACE**

Using SST and a hammer, install the bearing outer race.

SST 09316-6001 1 (09316-00011, 09316-00021)

**20. INSTALL FRONT BEARING AND OIL SLINGER****21. INSTALL OIL SEAL**

(a) Coat the hypoid gear oil to a new oil seal periphery.

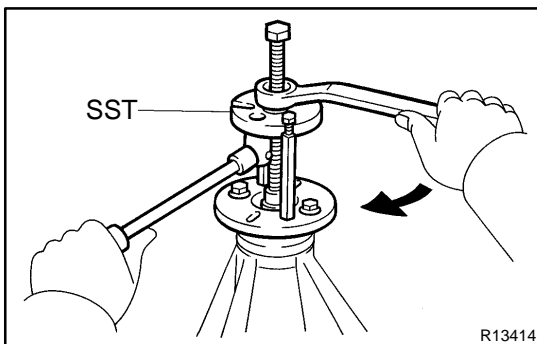


(b) Using SST and a hammer, install the oil seal.

SST 09214-7601 1

**Oil seal drive in depth: 0.5 mm (0.020 in.)**

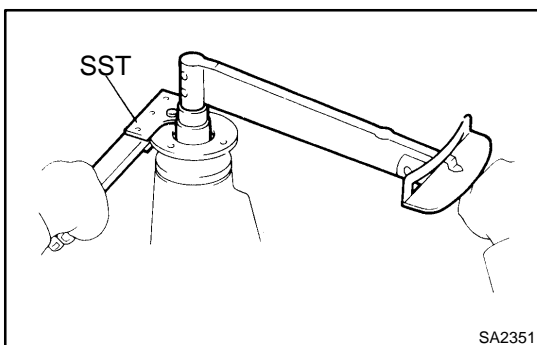
(c) Coat MP grease to the oil seal lip.

**22. INSTALL COMPANION FLANGE**

(a) Using SST, install the companion flange.

SST 09950-30012 (09951-03010, 09953-03010,  
09954-03010, 09955-03030, 09956-03040)

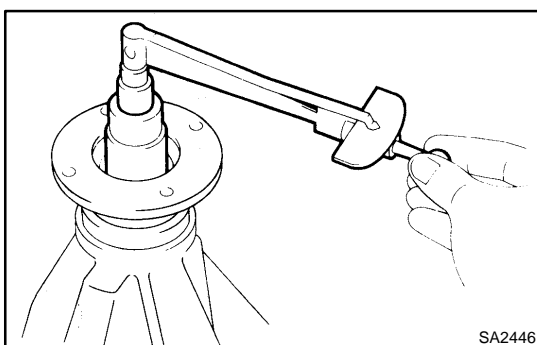
(b) Coat the threads of a new nut with gear oil.



(c) Using SST to hold the flange, install the nut.

SST 09330-00021

**Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)**

**23. ADJUST DRIVE PINION PRELOAD**

Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

**Preload (at starting):**

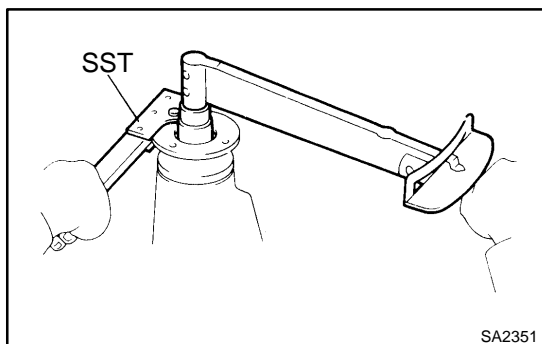
**New bearing**

**1.3 - 1.8 N·m (13 - 19 kgf·cm, 11.5 - 15.9 in.-lbf)**

**Reused bearing**

**0.64 - 0.92 N·m (6.5 - 9.4 kgf·cm, 5.7 - 18.1 in.-lbf)**

If the preload is greater than the specified value, replace the bearing spacer.



If the preload is less than the specified value, retighten the nut with a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

SST 09330-00021

**Torque: 441 N·m (4,500 kgf·cm, 326 ft·lbf) or less**

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not loosen the pinion nut to reduce the preload.

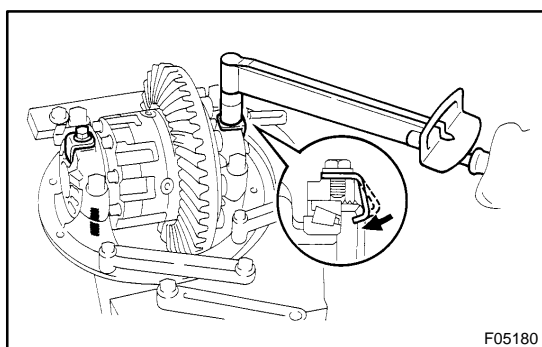
**24. RECHECK RING GEAR BACKLASH**

(See page SA-107 )

**25. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step 14)**

**26. CHECK RUNOUT OF COMPANION FLANGE (See page SA-107 )**

**27. STAKE DRIVE PINION NUT**



**28. INSTALL ADJUSTING NUT LOCKS**

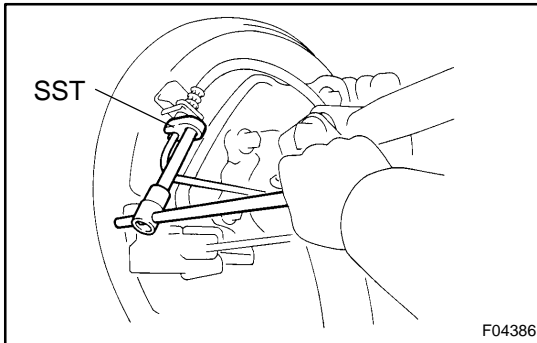
- (a) Install 2 new nut locks on the bearing caps.
- (b) Tightening 2 bolts, bend the nut locks.

**Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)**

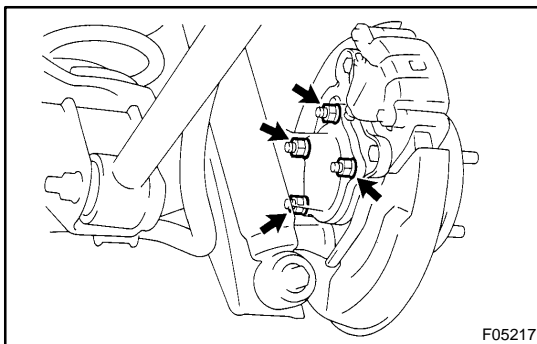
**29. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND ETC.**

## REMOVAL

1. **REMOVE 2 REAR WHEELS**  
Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)
2. **DRAIN HYPOID GEAR OIL**  
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



3. **DISCONNECT BRAKE LINES**
  - (a) Using SST, disconnect the brake line and remove the clip.  
SST 09023-00100  
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)
  - (b) Employ the same manner described above to the other side.
4. **DISCONNECT PARKING BRAKE CABLES**
  - (a) Remove the 2 clips, pin and disconnect the parking brake cable from the bellcrank.
  - (b) Employ the same manner described above to the other side.

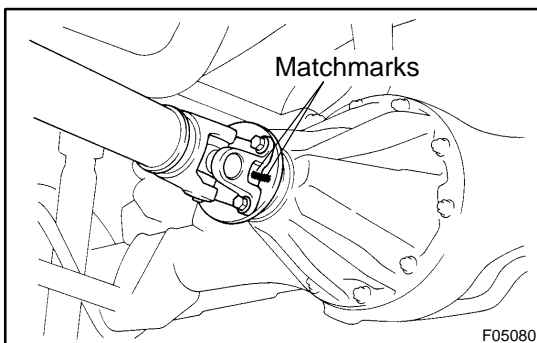


5. **REMOVE AXLE SHAFTS**
  - (a) Remove the 4 nuts.  
Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)
  - (b) Pull out the axle shaft and remove the O-ring.

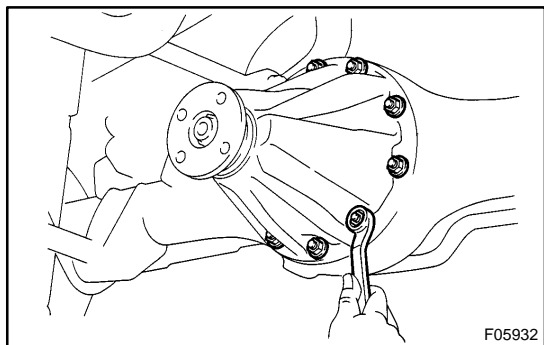
### NOTICE:

**Be careful not to damage the oil seal.**

- (c) Employ the same manner described above to the other side.



6. **DISCONNECT REAR PROPELLER SHAFT**
  - (a) Place matchmarks on the propeller shaft and differential flange.
  - (b) Remove the 4 nuts, bolts, washers and disconnect the propeller shaft.  
Torque: 106 N·m (1,080 kgf·cm, 78 ft·lbf)
  - (c) Support the propeller shaft securely.

**7. REMOVE DIFFERENTIAL CARRIER ASSEMBLY**

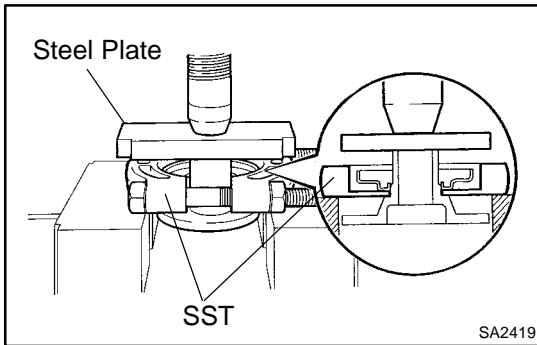
- (a) Remove the 10 nuts, washers and differential carrier assembly.

**NOTICE:**

**Be careful not to damage the installation surface.**

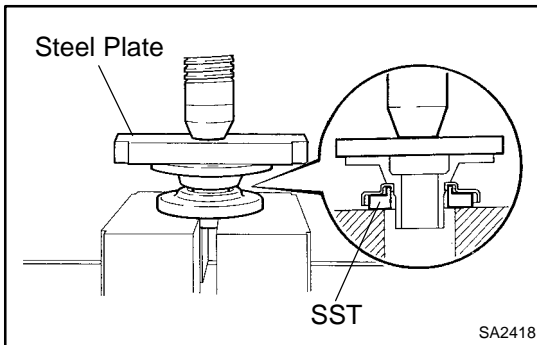
**Torque: 72 N·m (740 kgf·cm, 53 ft·lbf)**

- (b) Remove the gasket.



## REPLACEMENT

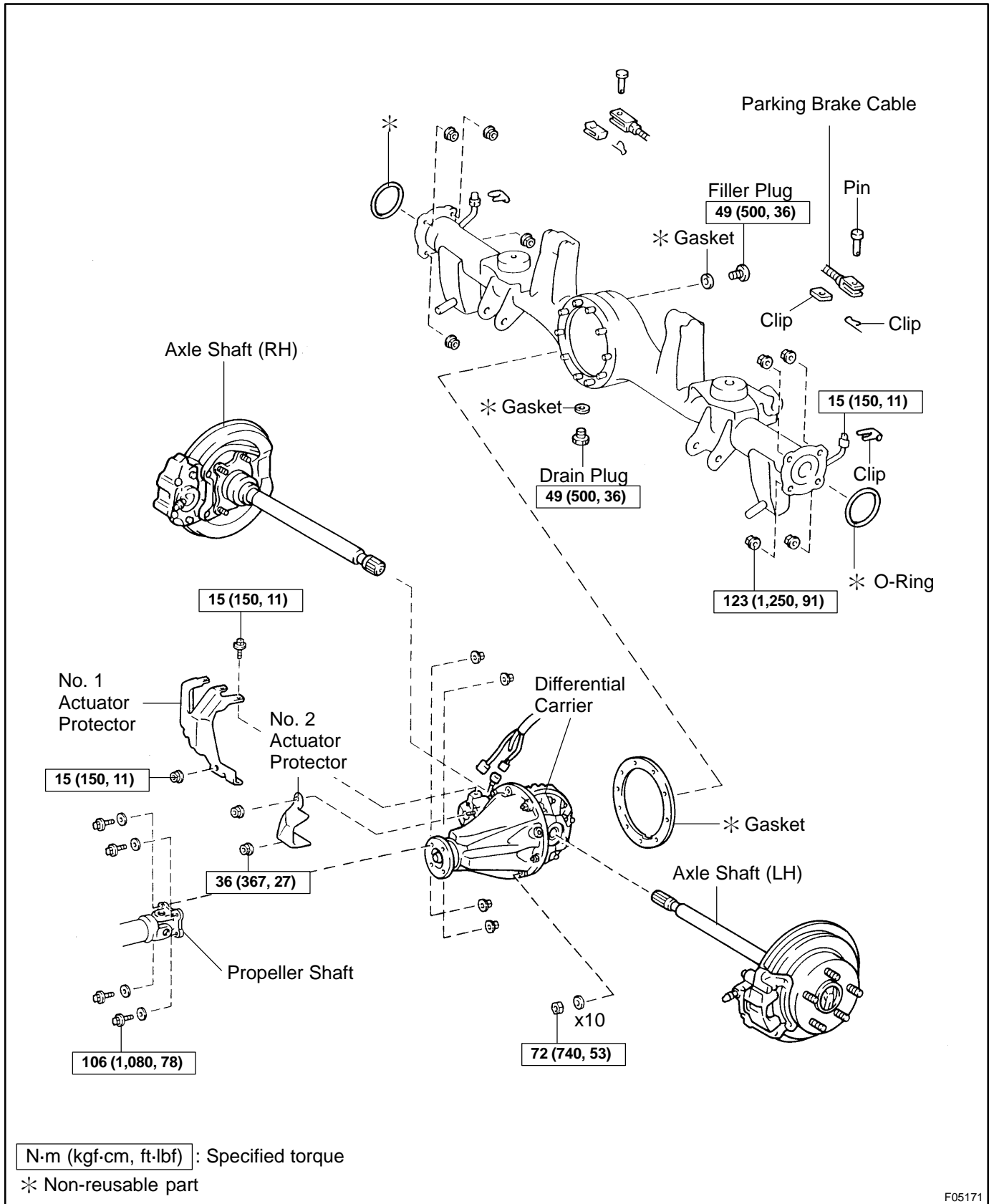
- 1. REMOVE COMPANION FLANGE DUST DEFLECTOR**  
Using SST, a steel plate and press, remove the dust deflector.  
SST 09950-00020



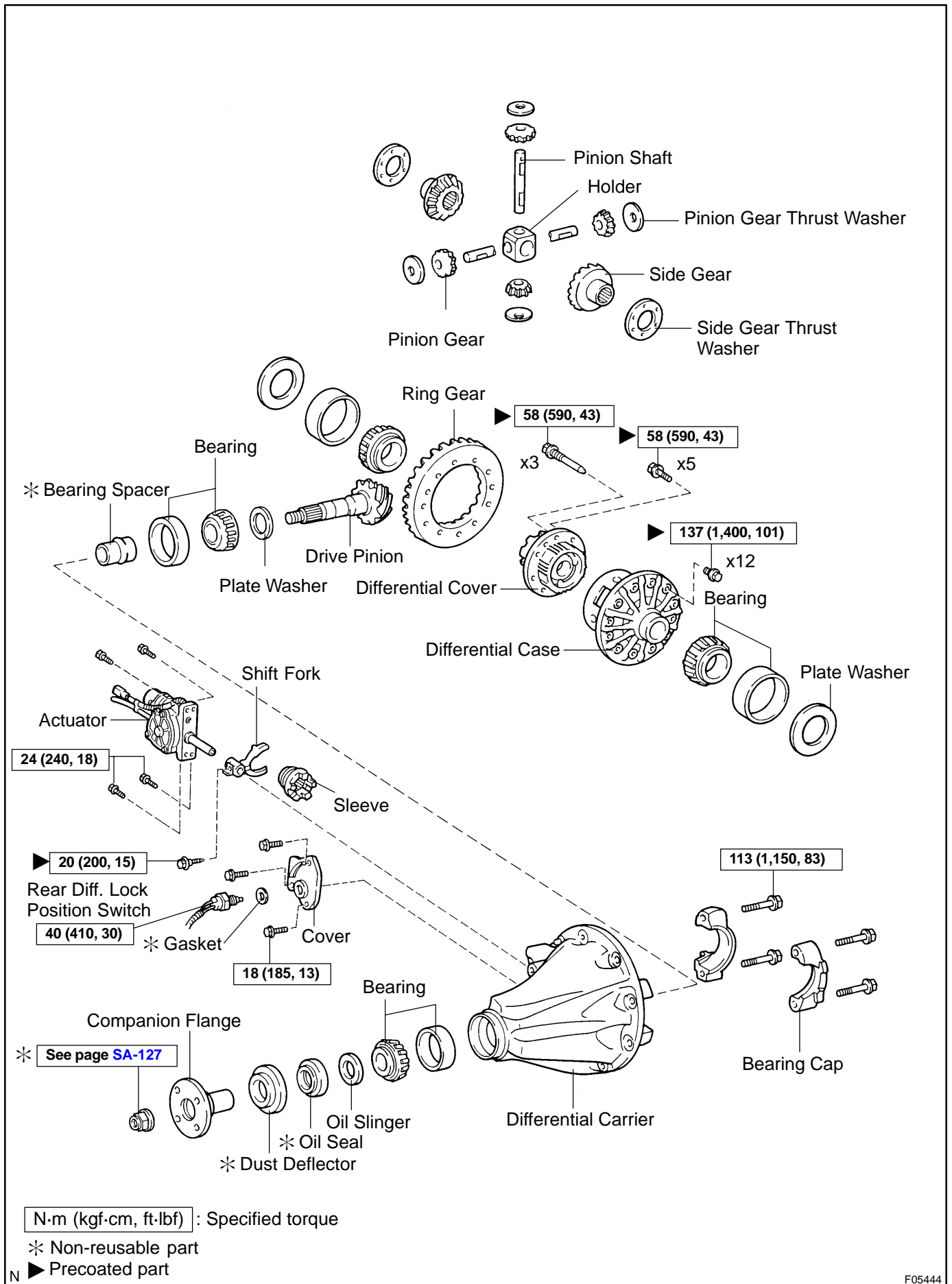
- 2. INSTALL DUST DEFLECTOR**  
Using SST, a steel plate and press, install a new dust deflector.  
SST 09726-40010

# REAR DIFFERENTIAL CARRIER (w/ Diff. Lock) COMPONENTS

SA15S-04



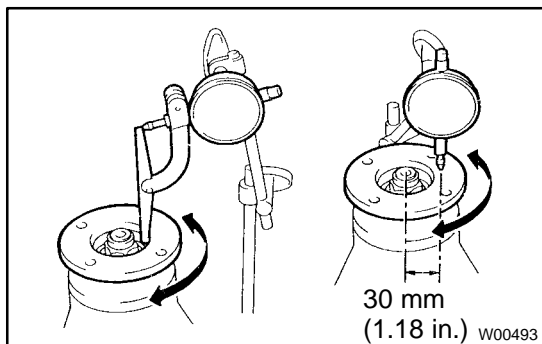
F05171



F05444

## DISASSEMBLY

1. SET DIFFERENTIAL CARRIER TO OVERHAUL STAND ETC.

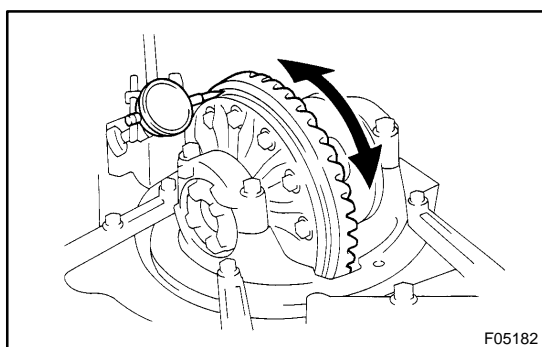


2. CHECK RUNOUT OF COMPANION FLANGE

Using a dial indicator, measure the vertical and lateral runout of the companion flange.

**Maximum runout: 0.10 mm (0.0039 in.)**

If the runout is greater than the maximum, replace the companion flange.

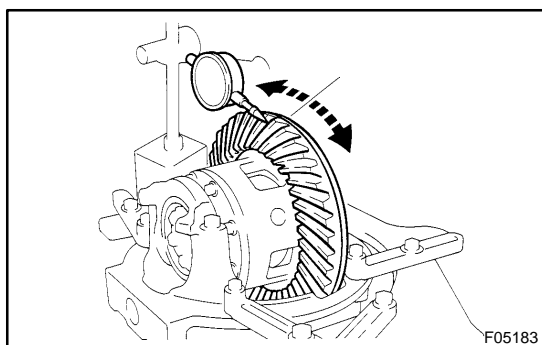


3. CHECK RING GEAR RUNOUT

Using a dial indicator, measure the ring gear runout.

**Maximum runout: 0.05 mm (0.0020 in.)**

If the runout is greater than the maximum, replace the ring gear.



4. CHECK RING GEAR BACKLASH

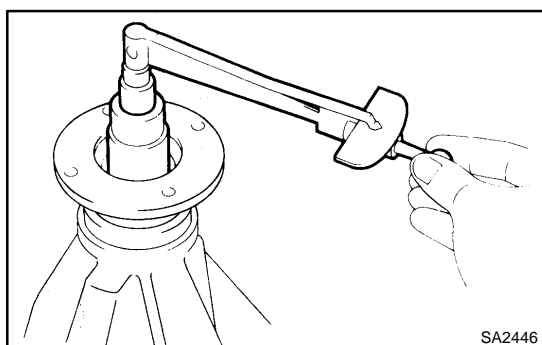
Using a dial indicator, while holding the drive pinion flange, measure the ring gear backlash.

**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)**

HINT:

Perform the measurements at 3 or more positions around the circumference of the ring gear.

If the backlash is not within the specified value, adjust the side bearing preload or repair as necessary.



5. MEASURE DRIVE PINION PRELOAD

Using a torque wrench, measure the drive pinion preload using the backlash of the drive pinion and ring gear.

**Preload (at starting):**

**0.64 - 0.92 N·m (6.5 - 9.4 kgf·cm, 5.7 - 8.1 in.-lbf)**



**6. CHECK TOTAL PRELOAD**

Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

**Total preload (at starting):****Drive pinion preload plus**

**0.3 - 0.5 N·m (3 - 5 kgf·cm, 2.7 - 4.4 in.-lbf)**

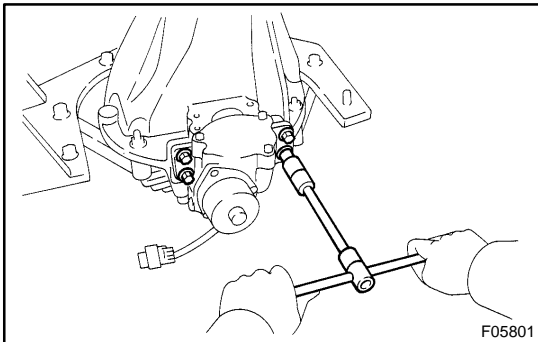
If necessary, disassemble and inspect the differential.

**7. CHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See page SA-127 )****8. REMOVE REAR DIFF. LOCK POSITION SWITCH**

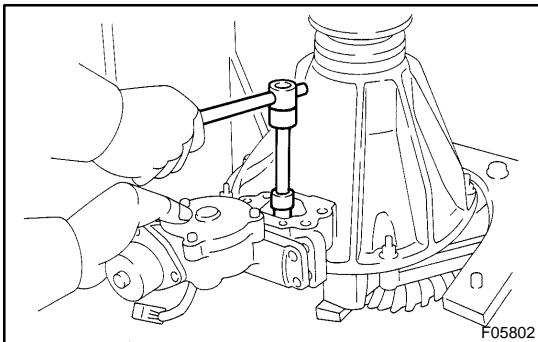
Remove the rear diff. lock position switch and gasket.

**9. REMOVE COVER**

- (a) Remove the 3 bolts.
- (b) Using a brass bar and hammer, tap on the cover to remove it.

**10. REMOVE ACTUATOR, SHIFT FORK AND SLEEVE**

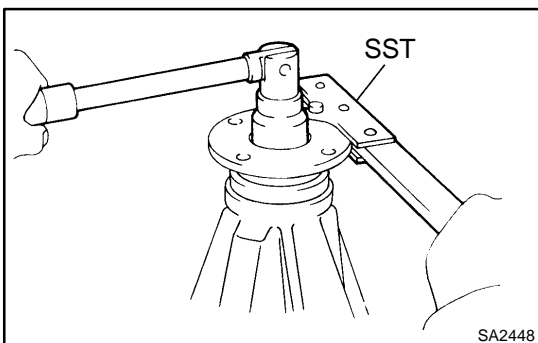
- (a) Remove the 4 bolts.



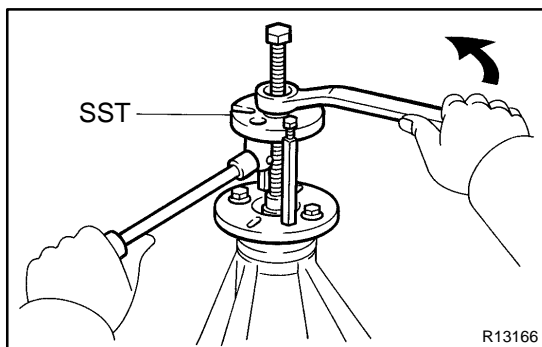
- (b) Remove the shift fork shaft bolt.
- (c) Using a screwdriver, pull out the actuator and remove the sleeve and shift fork.

**11. REMOVE COMPANION FLANGE**

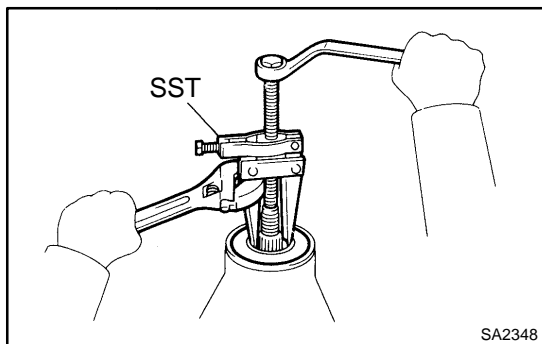
- (a) Using a chisel and hammer, unstake the nut.



- (b) Using SST to hold the flange, remove the nut.  
SST 09330-00021

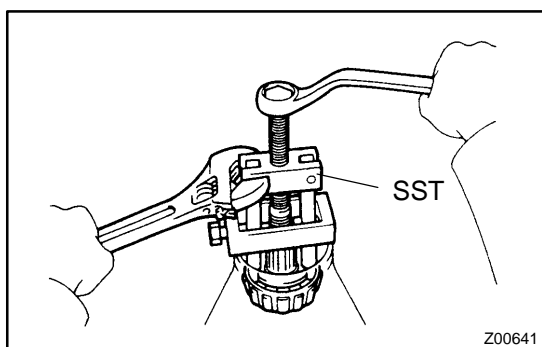


- (c) Using SST, remove the companion flange.  
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03040)



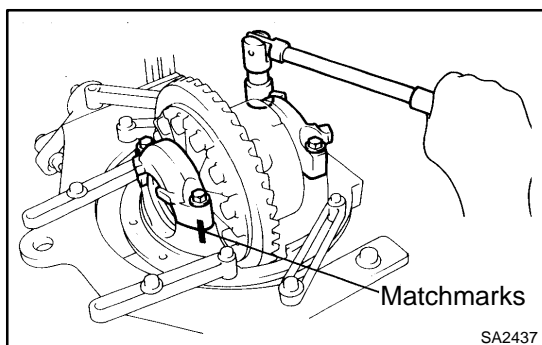
## 12. REMOVE OIL SEAL AND OIL SLINGER

- (a) Using SST, remove the oil seal from the differential carrier.  
SST 09308-10010  
(b) Remove the oil slinger.



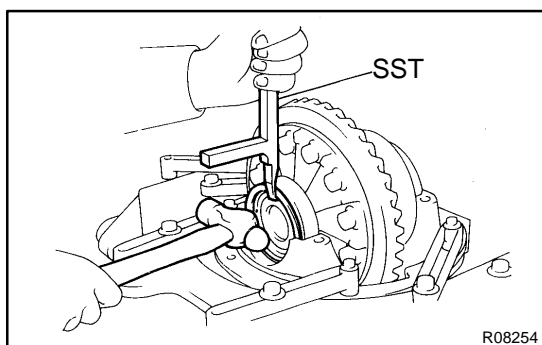
## 13. REMOVE FRONT BEARING

- Using SST, remove the front bearing from the drive pinion.  
SST 09556-22010  
If the front bearing is damaged or worn, replace the bearing.



## 14. REMOVE DIFFERENTIAL CASE ASSEMBLY

- (a) Place matchmarks on the bearing cap and differential carrier.  
(b) Remove the 4 bolts and 2 bearing caps.



- (c) Using SST and a hammer, remove the plate washers.  
SST 09504-22012

### HINT:

Measure the plate thickness and note down it.

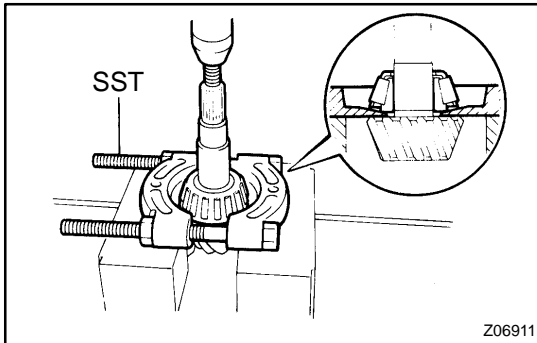
- (d) Remove the differential case with the side bearing outer races from the differential carrier.

### HINT:

Tag the bearing outer races to show the location for reassembling.

**15. REMOVE DRIVE PINION AND BEARING SPACER FROM DIFFERENTIAL CARRIER**

- (a) Remove the drive pinion with the rear bearing.
- (b) Remove the bearing spacer.

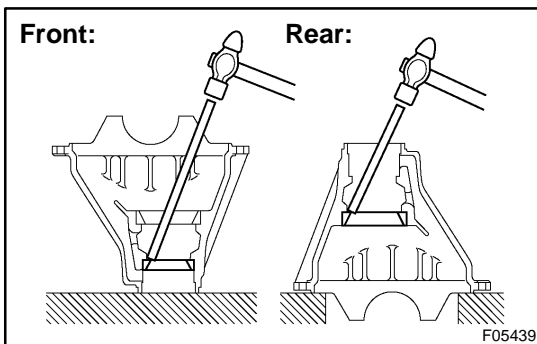
**16. REMOVE DRIVE PINION REAR BEARING**

- (a) Using SST and a press, remove the rear bearing from the drive pinion.  
SST 09950-00020

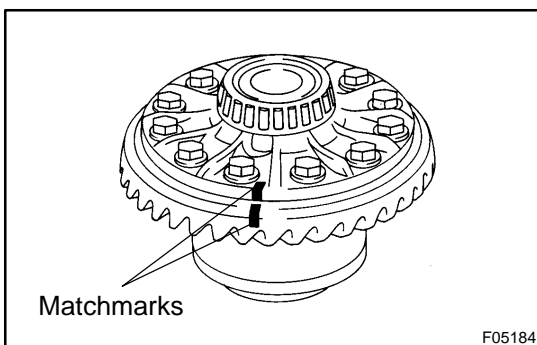
**HINT:**

If the drive pinion or ring gear is damaged, replace them as a set.

- (b) Remove the plate washer from the drive pinion.

**17. REMOVE FRONT AND REAR BEARING OUTER RACES**

Using a brass bar and hammer, remove the outer races.

**18. REMOVE RING GEAR**

- (a) Place matchmarks on the ring gear and differential case.
- (b) Remove the 12 ring gear set bolts.
- (c) Using a plastic hammer, tap on the ring gear to remove it from the differential case.

**19. CHECK DIFFERENTIAL CASE RUNOUT**

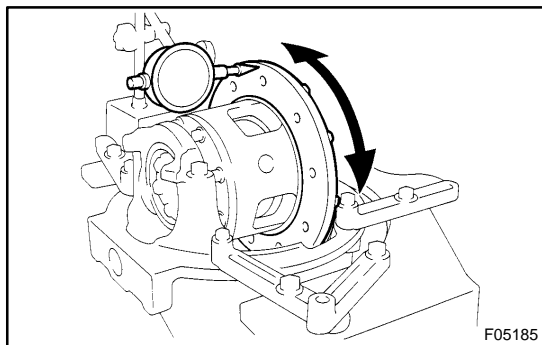
- (a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.
- (b) Install the assembled plate washers onto the side bearing.
- (c) Install the differential case in the differential carrier.

**HINT:**

If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.

However, select a plate washer that allows no clearance between it and the carrier.

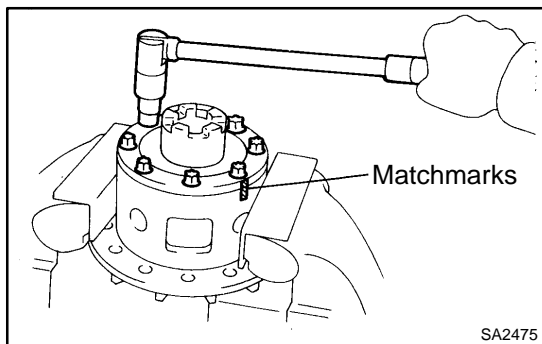
- (d) Align the matchmarks on the bearing cap and differential carrier.
- (e) Install and uniformly tighten the 4 bolts a little at a time.



(f) Using a dial indicator, measure the differential case runout.

**Maximum case runout: 0.04 mm (0.0016 in.)**

(g) Remove the differential case.



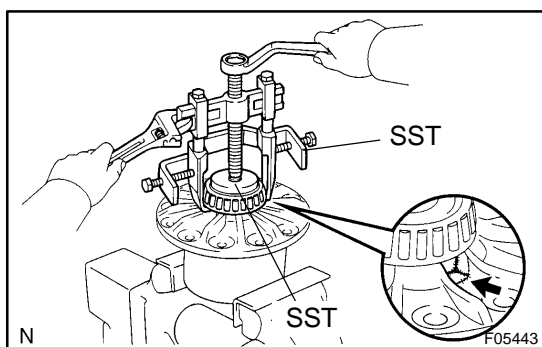
## 20. DISASSEMBLE DIFFERENTIAL CASE

(a) Place matchmarks on the case and cover.

(b) Using a torx socket (E10), remove the 5 set bolts and 3 pinion shaft pins.

(c) Separate the cover and case.

(d) Remove the 2 side gears, side gear thrust washers, 4 pinion gears, pinion gear thrust washers, 3 pinion shafts and holder from the differential case.



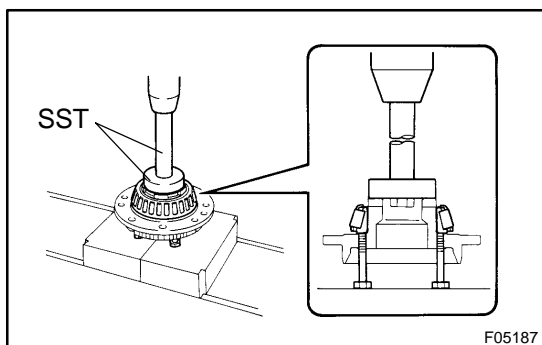
## 21. REMOVE SIDE BEARING FROM DIFFERENTIAL CASE

Using SST, remove the side bearing.

SST 09950-40011 (09951-04010, 09952-04010, 09953-04020, 09955-04061, 09957-04010, 09958-04011), 09950-60010 (09951-00580)

**HINT:**

Fix the claws of SST to the notches in the differential case.



## 22. REMOVE SIDE BEARING FROM DIFFERENTIAL COVER

Using SST, 4 bolts and a press, remove the side bearing.

SST 09950-60010 (09951-00580),  
09950-70010 (09951-07100)

## INSTALLATION

Installation is in the reverse order of removal (See page [SA-100](#) ).

**AFTER INSTALLATION, FILL DIFFERENTIAL WITH HYPOID GEAR OIL (See page [SA-95](#) )**

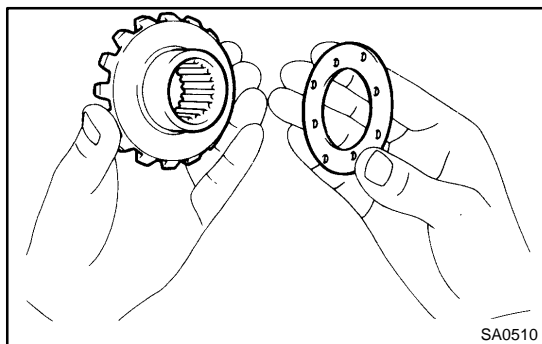
HINT:

After installation, fill the differential with hypoid gear oil (See page [SA-95](#) ), fill the brake reservoir with brake fluid, bleed the brake system (See page [BR-4](#) ), check for leaks and check the ABS speed sensor signal (See page [DI-505](#) ).

## REASSEMBLY

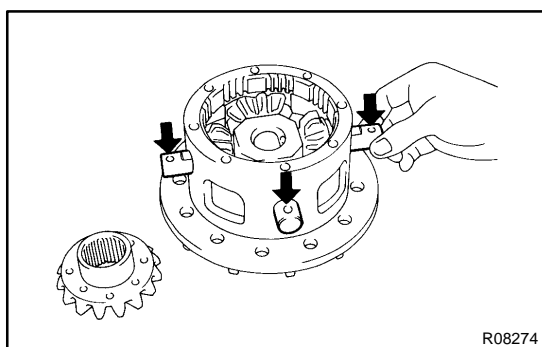
### HINT:

- ▶ Using a shop rag, clean off any foreign object from the parts.
- ▶ Apply all of the sliding and rotating surfaces with hypoid gear oil.



### 1. MEASURE SIDE GEAR BACKLASH

- (a) Install the 2 thrust washers to the 2 side gears.
- (b) Install the 4 thrust washers to the 4 pinion gears.



- (c) Install the side gear into the case.
- (d) Install the holder into the case.
- (e) Install the 4 pinion gears with the thrust washers.
- (f) Align the holes of the differential case and pinion shaft, and install the 3 pinion shafts.
- (g) Install the side gear to the cover.
- (h) Align the matchmarks and install the case and cover.
- (i) Using a torx socket (E10), install the 5 bolts and 3 pinion shaft pins.

**Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)**

- (j) Using a dial indicator, while holding the side gear, measure the backlash.

**Backlash: 0.02 - 0.15 mm (0.0008 - 0.0059 in.)**

If the backlash is not within the specified value, install the thrust washer of a different thickness.

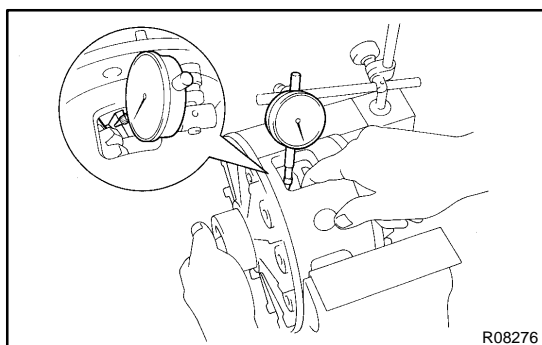
### HINT:

- ▶ Try to select washers of the same size for both sides.
- ▶ Measure at all 4 locations.

### Thrust washer thickness:

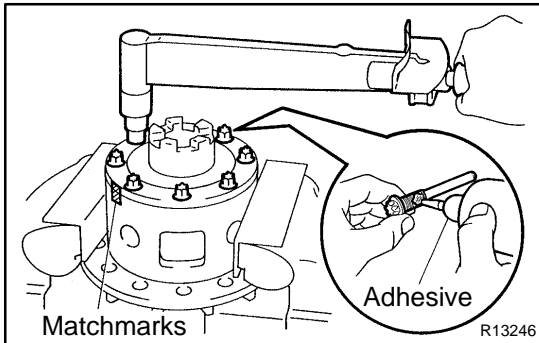
Thickness mm (in.)	Thickness mm (in.)
1.55 (0.061)	1.85 (0.073)
1.60 (0.063)	1.90 (0.075)
1.65 (0.065)	1.95 (0.077)
1.70 (0.067)	2.00 (0.079)
1.75 (0.069)	2.05 (0.081)
1.80 (0.071)	2.10 (0.083)

- (k) After measuring backlash, remove the 5 set bolts and 3 pinion shaft pins.



**2. ASSEMBLE DIFFERENTIAL CASE**

- (a) Clean the threads of the bolts, pinion shaft pins, case and cover with the white gasoline.



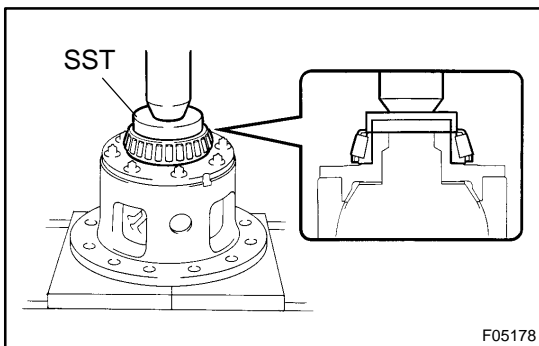
- (b) Coat the threads of the bolts and pinion shaft with adhesive.

**Adhesive:**

**Part No. 08833-00070, THREE BOND 1324 or equivalent**

- (c) Align the matchmarks, install the case and cover.  
 (d) Using a torx socket (E10), install the 5 bolts and 3 pinion shaft pins.

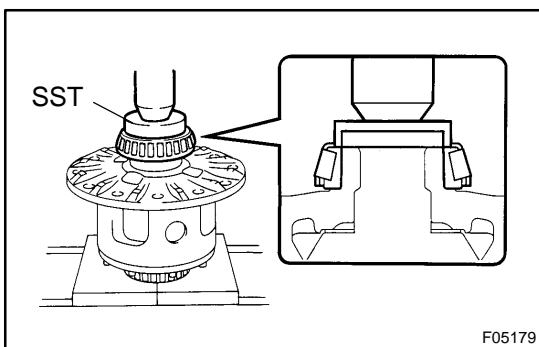
**Torque: 58 N·m (590 kgf-cm, 43 ft-lbf)**

**3. INSTALL SIDE BEARINGS**

- (a) Cover side:

Using SST and a press, install the side bearing on the differential cover.

SST 09550-60010



- (b) Ring gear side:

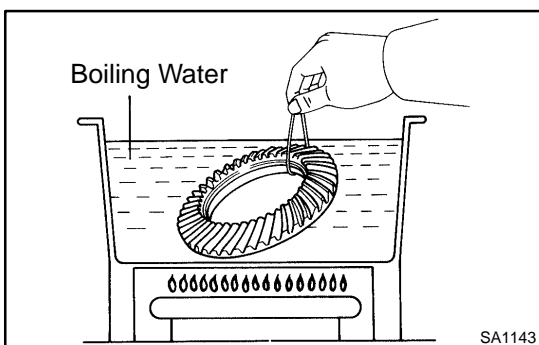
Using SST and a press, install the side bearing on the differential case.

SST 09550-60010

**4. INSTALL RING GEAR ON DIFFERENTIAL CASE**

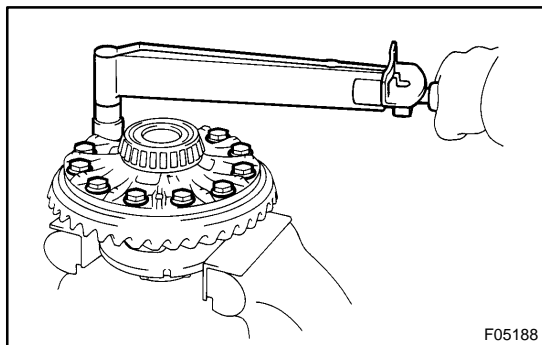
- (a) Clean the threads of the bolts and differential case with the white gasoline.

- (b) Clean the contact surfaces of the differential case and ring gear.



- (c) Heat the ring gear to about 100 °C (212 °F) in boiling water.

- (d) Carefully take the ring gear out of the boiling water.  
 (e) After the moisture on the ring gear has completely evaporated, quickly install the ring gear on the differential case.  
 (f) Align the matchmarks on the ring gear and differential case.



- (g) Temporarily install the 12 set bolts.
- (h) After the ring gear has cooled down enough, torque the 12 set bolts to which thread lock has been applied.

**Thread lock:**

**Part No.08833-00100, THREE BOND 1360K  
or equivalent**

**Torque: 137 N·m (1,400 kgf·cm, 101 ft·lbf)**

**5. CHECK RING GEAR RUNOUT**

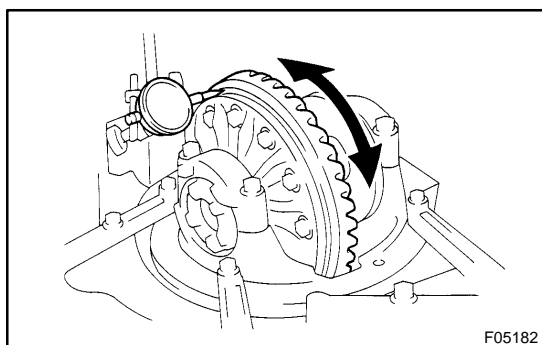
- (a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.
- (b) Install the assembled plate washers onto the side bearing.
- (c) Install the differential case in the differential carrier.

**HINT:**

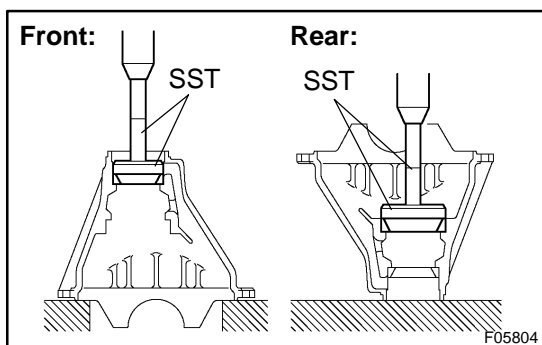
If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.

However, select a plate washer that allows no clearance between it and the carrier.

- (d) Align matchmarks on the bearing cap and differential carrier.
- (e) Install and uniformly tighten the 4 bolts a little at a time.



- (f) Using a dial indicator, check the ring gear runout.  
**Maximum runout: 0.05 mm (0.0020 in.)**
- (g) Remove the differential case.

**6. INSTALL DRIVE PINION FRONT AND REAR BEARING OUTER RACES**

- (a) Using SST and a press, install the front bearing outer race.  
SST 09950-60020 (09951-00710),  
09950-70010 (09951-07150)
- (b) Using SST and a press, install the rear bearing outer race.  
SST 09950-60020 (09951-00890),  
09950-70010 (09951-07150)

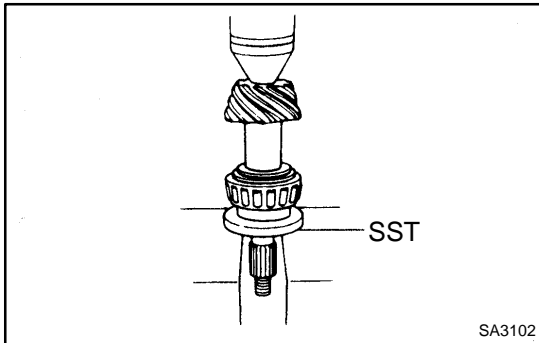


**7. INSTALL DRIVE PINION REAR BEARING**

- (a) Install the plate washer on the drive pinion.

**HINT:**

First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.



- (b) Using SST and a press, install the rear bearing onto the drive pinion.

SST 09506-35010

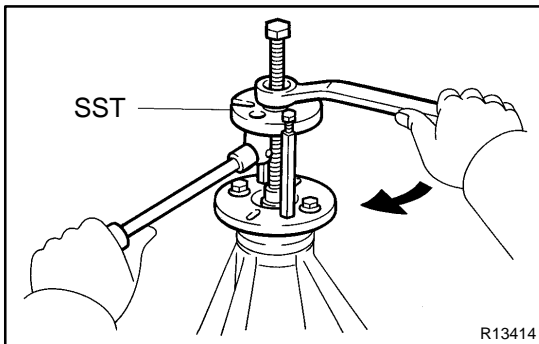
**8. TEMPORARILY ADJUST DRIVE PINION PRELOAD**

- (a) Install the drive pinion and front bearing.

**HINT:**

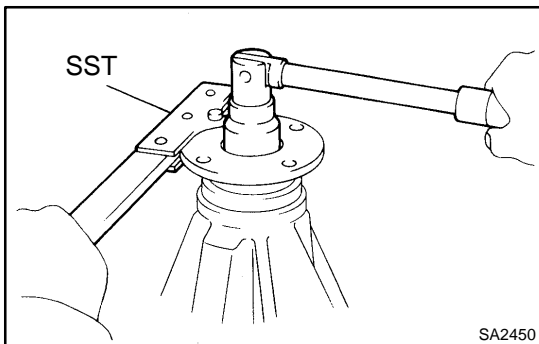
Assemble the spacer and oil seal after adjusting the gear contact pattern.

- (b) Install the oil slinger.



- (c) Install the companion flange with SST.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03040)

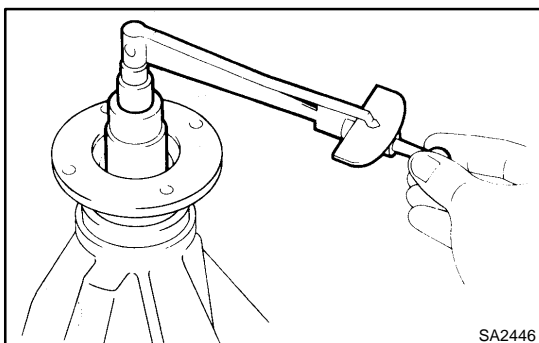


- (d) Using SST to hold the flange and adjust the drive pinion preload by tightening the companion flange nut.

SST 09330-00021

**NOTICE:**

- ▶ Coat the nut and screw of the drive pinion with gear oil.
- ▶ As there is no spacer, tighten the nut a little at a time, being careful not to overtighten.



- (e) Using a torque wrench, measure the preload.

**Preload (at starting):****New bearing**

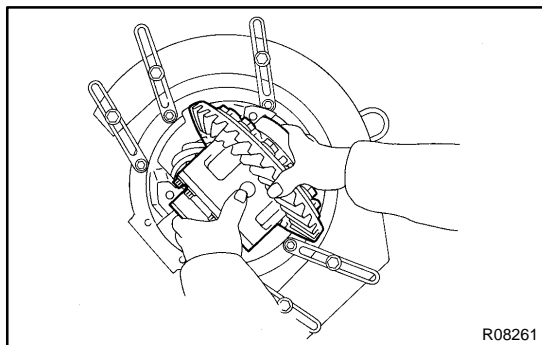
1.3 - 1.8 N·m (13 - 19 kgf·cm, 11.5 - 15.9 in.-lbf)

**Reused bearing**

0.64 - 0.92 N·m (6.5 - 9.4 kgf·cm, 5.7 - 8.1 in.-lbf)

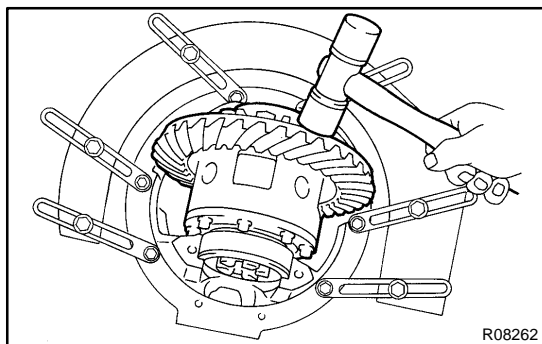
**HINT:**

Measure the total preload after turning the bearing clockwise and counterclockwise several times to make the bearing smooth.



### 9. INSTALL DIFFERENTIAL CASE IN CARRIER

- (a) Place the 2 bearing outer races on their respective bearings. Make sure that the right and left races are not interchanged.
- (b) Install the assembled plate washer onto the side bearing.
- (c) Install the differential case in the carrier.

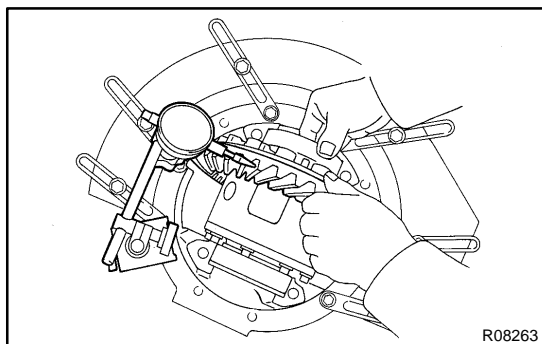


- (d) Settle down the plate washer and bearing snugly by tapping on the ring gear with a plastic hammer.

#### HINT:

If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.

However, select a plate washer that allows no clearance between it and the carrier.



### 10. ADJUST RING GEAR BACKLASH

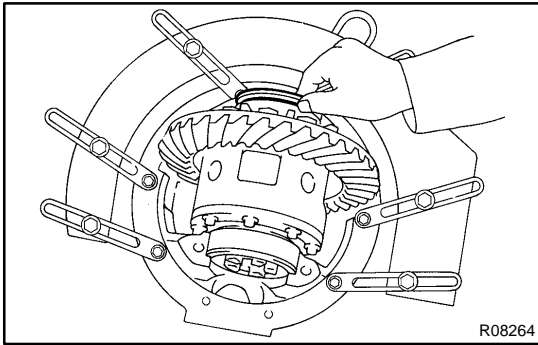
- (a) Using a dial indicator, while holding the side bearing of the ring gear side measure the backlash.

**Backlash (Reference): 0.15 mm (0.0059 in.)**

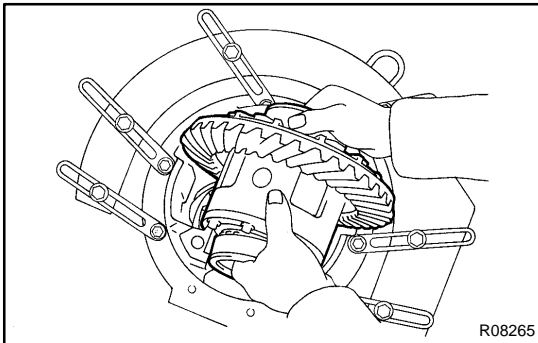
- (b) Select a cover side plate washer using the backlash as a reference.

#### Plate washer thickness:

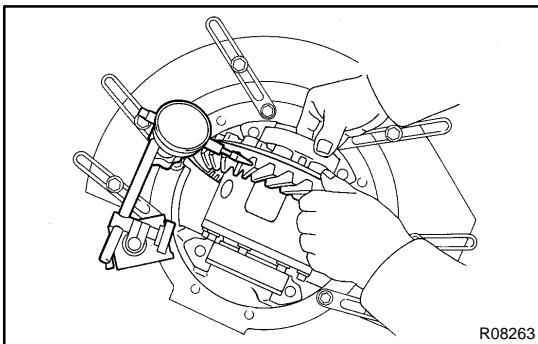
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
1	2.67 (0.1051)	13	3.03 (0.1193)
2	2.70 (0.1063)	14	3.06 (0.1205)
3	2.73 (0.1075)	15	3.09 (0.1217)
4	2.76 (0.1087)	16	3.12 (0.1228)
5	2.79 (0.1098)	17	3.15 (0.1240)
6	2.82 (0.1110)	18	3.18 (0.1252)
7	2.85 (0.1122)	19	3.21 (0.1264)
8	2.88 (0.1134)	20	3.24 (0.1276)
9	2.91 (0.1146)	21	3.27 (0.1287)
10	2.94 (0.1157)	22	3.30 (0.1299)
11	2.97 (0.1169)	23	3.33 (0.1311)
12	3.00 (0.1181)	-	-



- (c) Select a ring gear side plate washer so that there is no clearance between the outer race and case.



- (d) Remove the 2 plate washers and differential carrier.  
 (e) Install the plate washer into the lower part of the carrier.  
 (f) Place the plate washer onto the differential case together with the outer races, and install the differential case with the outer race into the carrier.  
 (g) Settle down the plate washer and bearing snugly by tapping on the ring gear with a plastic hammer.



- (h) Using a dial indicator, measure the ring gear backlash.  
**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)**

If it is not within the specified value, adjust it by either increasing or decreasing the thickness of washers on both sides by an equal amount.

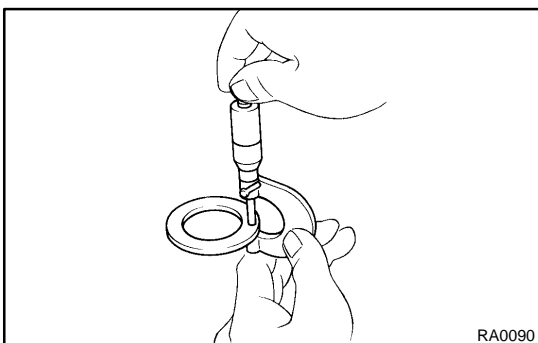
HINT:

There should be no clearance between the plate washer and case.

Ensure that there is ring gear backlash.

### 11. ADJUST SIDE BEARING PRELOAD

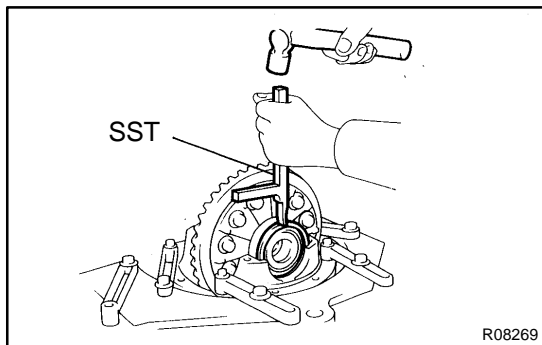
- (a) After adjustment using the backlash as reference, remove the ring gear side plate washer.



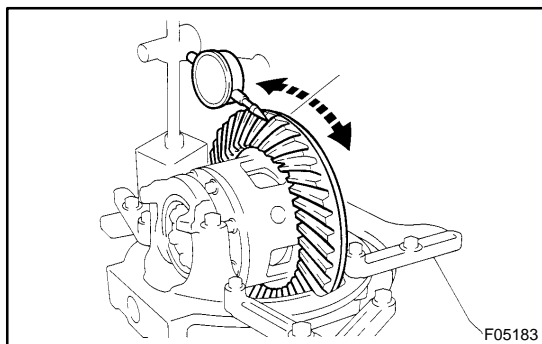
- (b) Using a micrometer, measure the thickness of the removed plate washer.  
 (c) Install a new washer 0.06 - 0.09 mm (0.0024 - 0.0035 in.) thicker than the removed washer.

HINT:

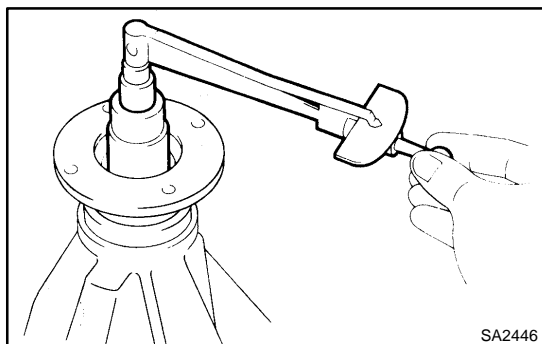
Select a washer which can be pressed in 2/3 of the way with finger.



- (d) Using SST, tap in the plate washer.  
SST 09504-22012
- (e) Align the matchmarks on the cap and carrier.
- (f) Tighten the 4 bearing cap bolts to the specified torque.  
**Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)**



- (g) Using a dial indicator, measure the ring gear backlash until it is within the specified value.  
**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)**  
If the backlash is not within the specified value, adjust by either increasing or decreasing the thickness of washers on both sides by an equal amount.
- (h) After rotating the ring gear 5 turns or more, recheck the ring gear backlash.



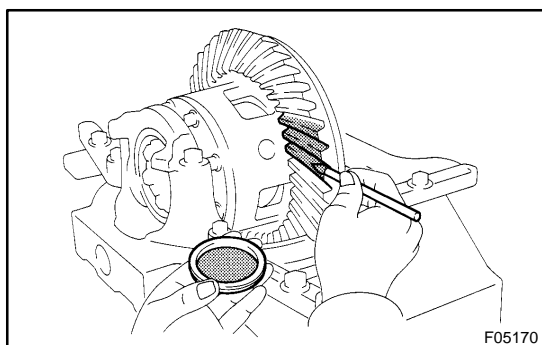
## 12. MEASURE TOTAL PRELOAD

Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

**Preload (at starting):**

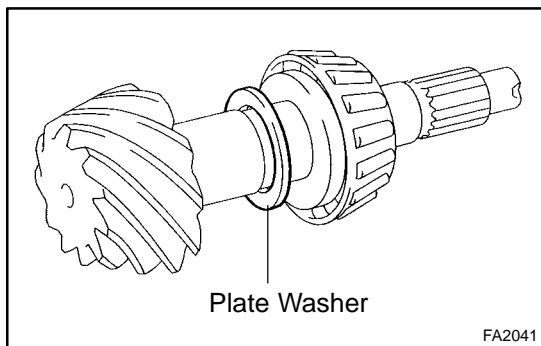
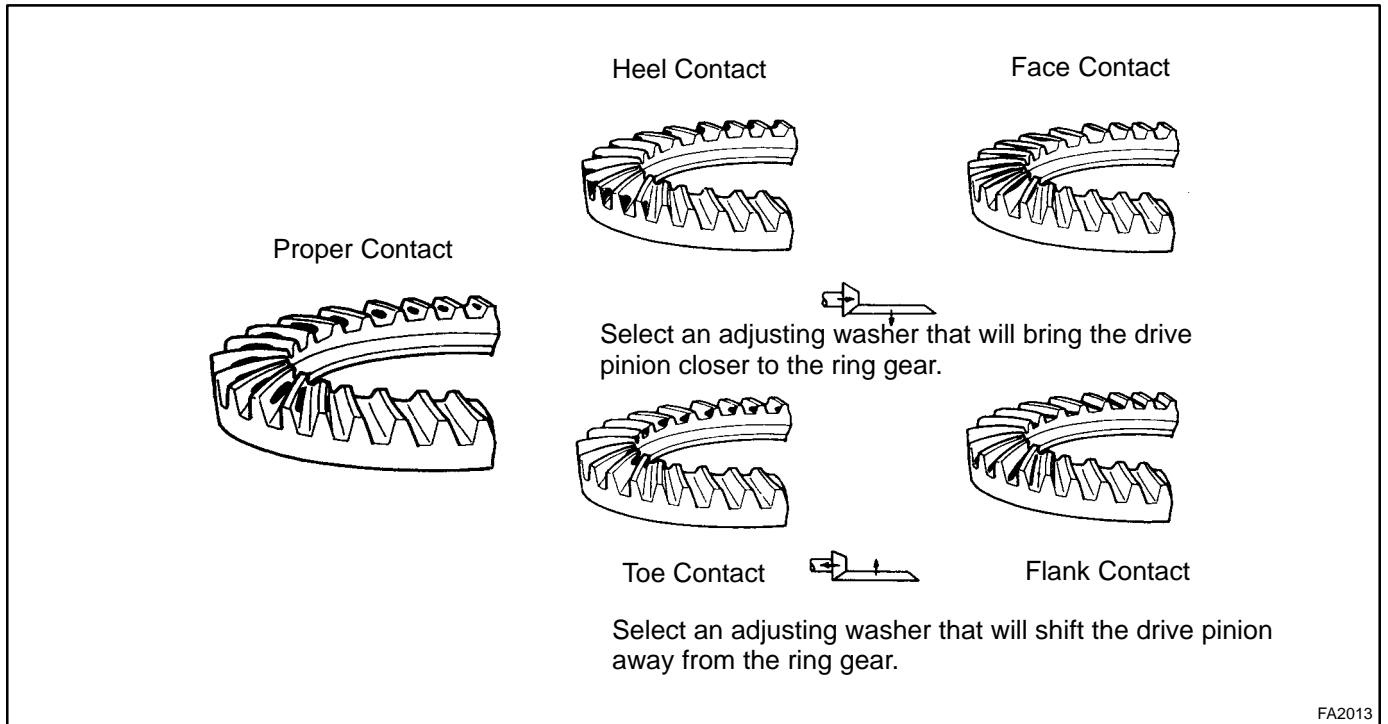
**Drive pinion preload plus**

**0.3 - 0.5 N·m (3 - 5 kgf·cm, 2.7 - 4.4 in·lbf)**



## 13. INSPECT TOOTH CONTACT BETWEEN RING GEAR

- (a) Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead primer.
- (b) Turn the companion flange, in both directions to inspect the ring gear for proper tooth contact.

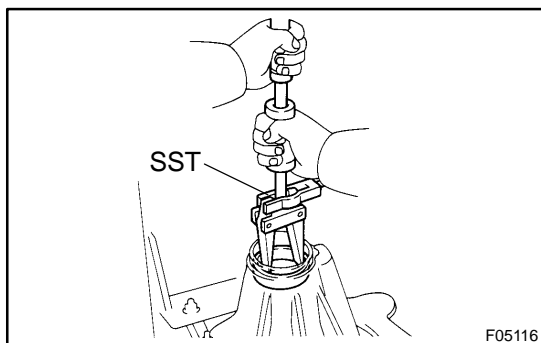


If the teeth are not contacting properly, use the following table to select a proper washer for correction.

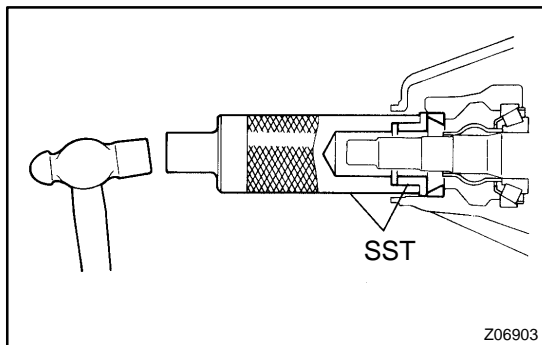
**Plate washer thickness:**

Thickness mm (in.)	Thickness mm (in.)
1.050 (0.04134)	1.325 (0.05217)
1.075 (0.04232)	1.350 (0.05315)
1.100 (0.04331)	1.375 (0.05413)
1.125 (0.04429)	1.400 (0.05512)
1.150 (0.04528)	1.425 (0.05610)
1.175 (0.04626)	1.450 (0.05709)
1.200 (0.04724)	1.475 (0.05807)
1.225 (0.04823)	1.500 (0.05906)
1.250 (0.04921)	1.525 (0.06004)
1.275 (0.05020)	1.550 (0.06102)
1.300 (0.05118)	-

- 14. REMOVE COMPANION FLANGE (See page SA-121 )
- 15. REMOVE OIL SLINGER AND FRONT BEARING (See page SA-121 )



- 16. REMOVE BEARING OUTER RACE  
Using SST, remove the bearing outer race.  
SST 09308-00010
- 17. INSTALL NEW BEARING SPACER

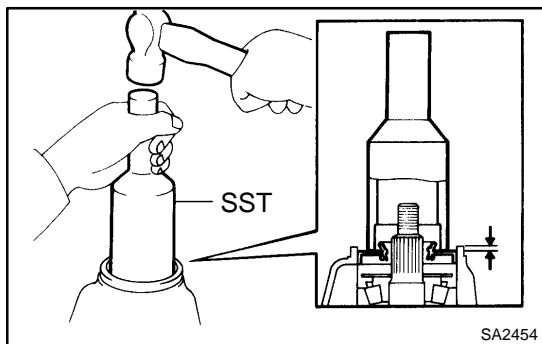
**18. INSTALL BEARING OUTER RACE**

Using SST and a hammer, install the bearing outer race.

SST 09316-6001 1 (09316-00011, 09316-00021)

**19. INSTALL FRONT BEARING AND OIL SLINGER****20. INSTALL OIL SEAL**

(a) Coat the hypoid gear oil to a new oil seal periphery.

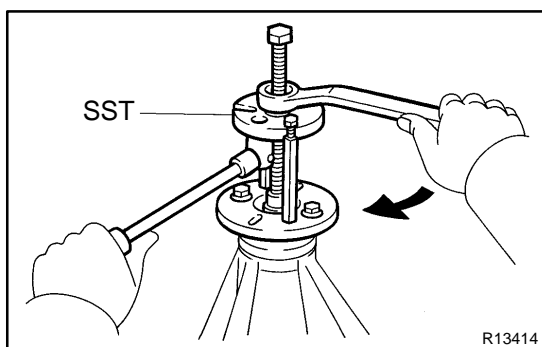


(b) Using SST and a hammer, install the oil seal, as shown.

SST 09214-7601 1

**Oil seal drive in depth: 0.5 mm (0.020 in.)**

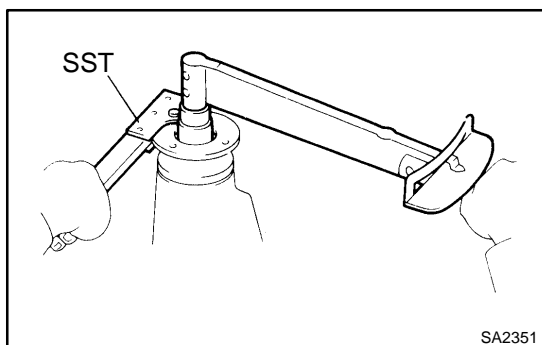
(c) Coat MP grease to the oil seal lip.

**21. INSTALL COMPANION FLANGE**

(a) Using SST, install the companion flange.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03040)

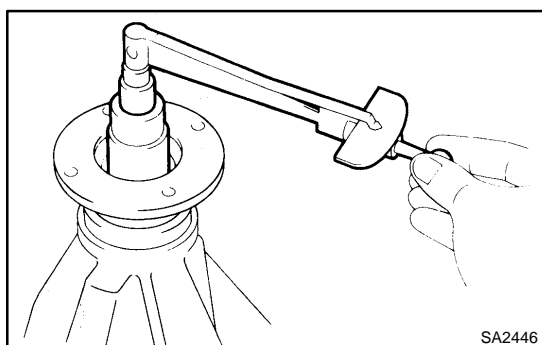
(b) Coat the threads of a new nut with gear oil.



(c) Using SST to hold the flange, install the nut.

SST 09330-00021

**Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)**

**22. ADJUST DRIVE PINION PRELOAD**

Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

**Preload (at starting):**

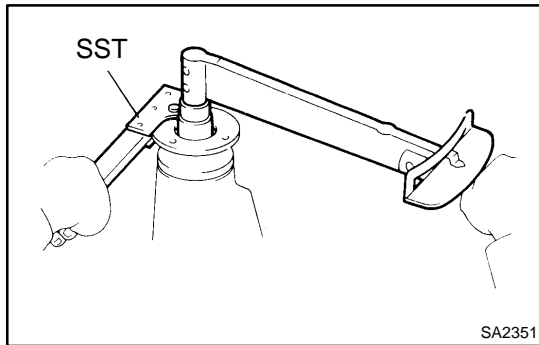
**New bearing**

**1.3 - 1.8 N·m (13 - 19 kgf·cm, 11.5 - 15.9 in.-lbf)**

**Reused bearing**

**0.64 - 0.92 N·m (6.5 - 9.4 kgf·cm, 5.7 - 8.1 in.-lbf)**

If the preload is greater than the specified value, replace the bearing spacer.



If the preload is less than the specified value, retighten the nut with a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

SST 09330-00021

**Torque: 441 N·m (4,500 kgf·cm, 326 ft·lbf) or less**

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not loosen the pinion nut to reduce the preload.

**23. RECHECK RING GEAR BACKLASH**

(See page SA-121 )

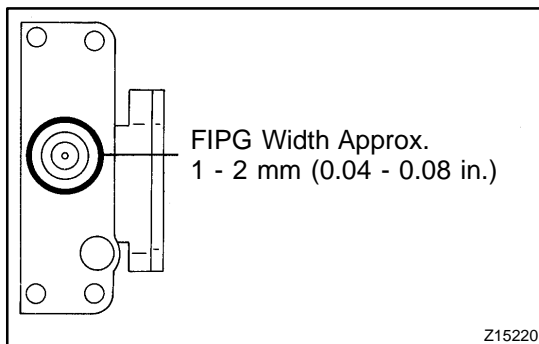
**24. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step 13)**

**25. CHECK RUNOUT OF COMPANION FLANGE (See page SA-121 )**

**26. STAKE DRIVE PINION NUT**

**27. INSTALL ACTUATOR, SHIFT FORK AND SLEEVE**

- (a) Clean contacting surfaces of any FIPG material using gasoline or alcohol.



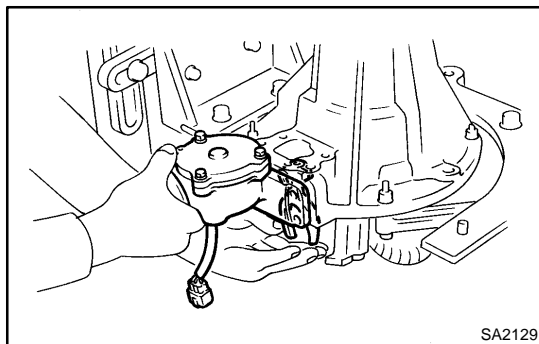
- (b) Apply FIPG to the actuator.

**FIPG:**

**Part No. 08826-00090, THREE BOND 1281 or equivalent**

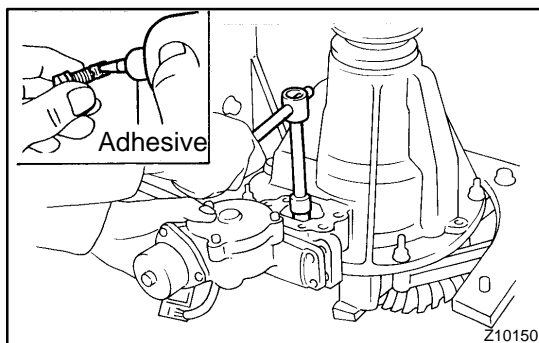
**HINT:**

Install the actuator within 10 minutes after applying FIPG.



- (c) Install the shift fork and actuator to the differential and match the shift fork hole with the shift fork.

- (d) Clean the threads of the set bolt and fork shaft with the white gasoline.



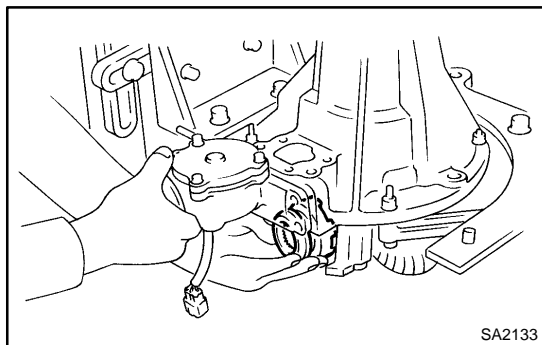
- (e) Coat the threads of the set bolt with adhesive.

**Adhesive:**

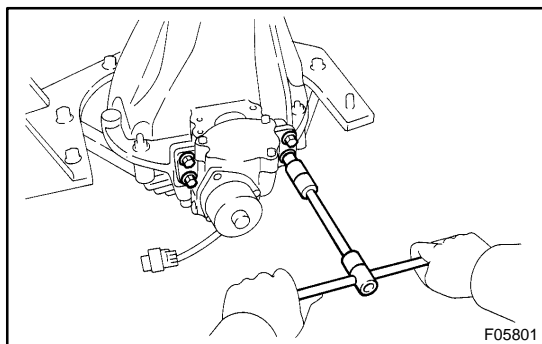
**Part No. 08833-00070, THREE BOND 1324 or equivalent**

- (f) Install the shift fork shaft set bolt.

**Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)**



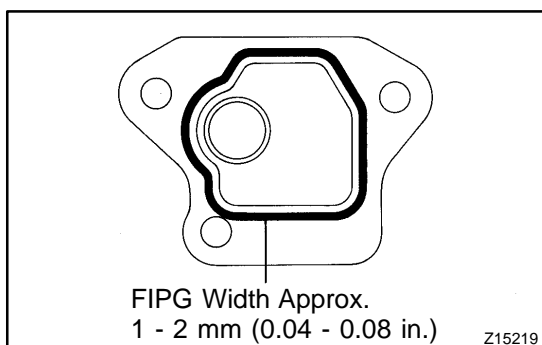
- (g) Engage the sleeve with the dog clutch of the differential case.



- (h) Install the 4 bolts.  
**Torque: 24 N·m (240 kgf-cm, 18 ft-lbf)**

### 28. INSTALL COVER

- (a) Clean contacting surfaces of any FIPG material using gasoline or alcohol.



- (b) Apply FIPG to the cover.

#### FIPG:

**Part No. 08826-00090, THREE BOND 1281  
 or equivalent**

#### HINT:

Install the cover within 10 minutes after applying FIPG.

- (c) Install the cover with the 3 bolts.

**Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)**

### 29. INSTALL REAR DIFF. LOCK POSITION SWITCH

Install the rear diff. lock position switch with a new gasket.

**Torque: 40 N·m (410 kgf-cm, 30 ft-lbf)**

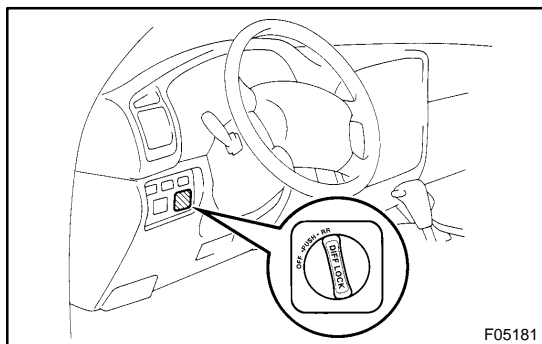
### 30. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND, ETC.



## REMOVAL

### 1. SHIFTING REAR DIFF. LOCK

- (a) Turn the ignition switch to the ON position.
- (b) Shift the transfer shift lever to L position.



- (c) Turn the differential lock control switch to the RR position and lock the rear differential.

#### HINT:

While rotating the tires, check they are in the differential lock condition.

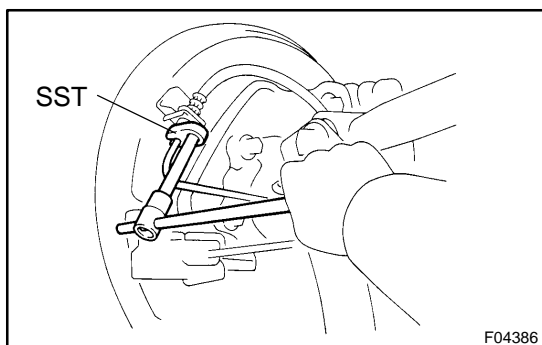
- (d) Disconnect the cable from the negative terminal of the battery.

### 2. REMOVE 2 REAR WHEELS

**Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)**

### 3. DRAIN HYPOID GEAR OIL

**Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)**



### 4. DISCONNECT BRAKE LINES

- (a) Using SST, disconnect the brake line and remove the clip.  
SST 09023-00100

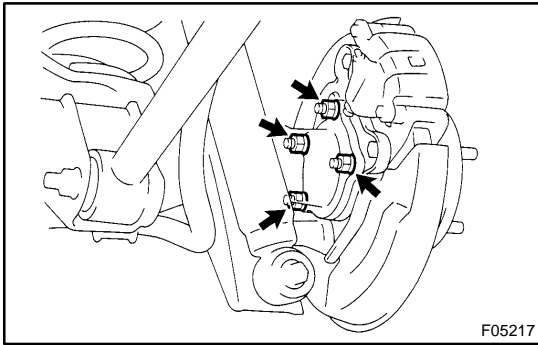
**Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)**

- (b) Employ the same manner described above to the other side.

### 5. DISCONNECT PARKING BRAKE CABLES

- (a) Remove the 2 clips, pin and disconnect the parking brake cable from the bellcrank.

- (b) Employ the same manner described above to the other side.

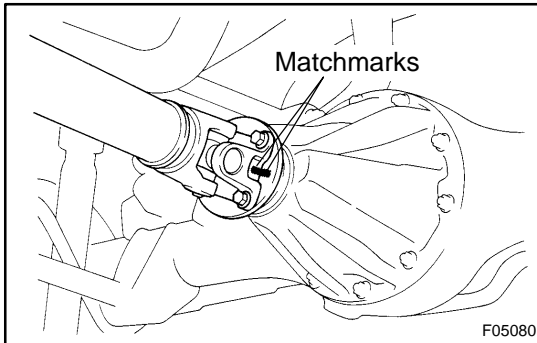
**6. REMOVE AXLE SHAFTS**

- (a) Remove the 4 nuts.  
**Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)**
- (b) Pull out the axle shaft assembly and remove the nut.

**NOTICE:**

**Be careful not to damage the oil seal.**

- (c) Employ the same manner described above to the other side.

**7. DISCONNECT REAR PROPELLER SHAFT**

- (a) Place matchmarks on the propeller shaft and differential flange.
- (b) Remove the 4 nuts, bolts, washers and disconnect the propeller shaft.

**Torque: 106 N·m (1,080 kgf·cm, 78 ft·lbf)**

- (c) Support the propeller shaft securely.

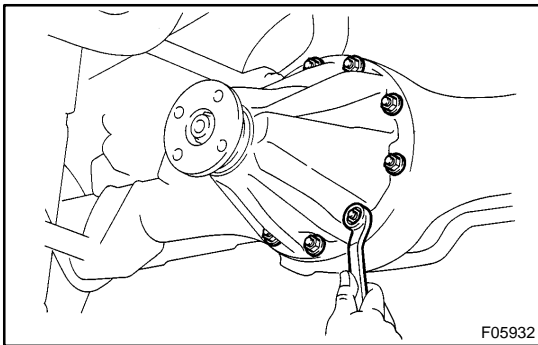
**8. REMOVE NO. 1 AND NO. 2 ACTUATOR PROTECTORS**

- (a) Remove the nut, bolt and No. 1 actuator protector.

**Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)**

- (b) Remove the 2 nuts and No. 2 actuator protector.

**Torque: 36 N·m (367 kgf·cm, 27 ft·lbf)**

**9. DISCONNECT CONNECTORS AND HOSE****10. REMOVE DIFFERENTIAL CARRIER ASSEMBLY**

- (a) Remove the 10 nuts, washers and differential carrier assembly.

**NOTICE:**

**Be careful not to damage the installation surface.**

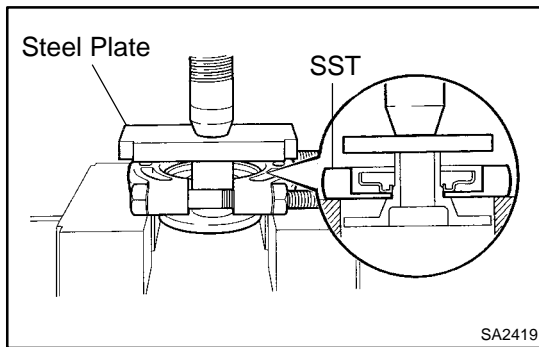
**Torque: 72 N·m (740 kgf·cm, 53 ft·lbf)**

- (b) Remove the gasket.

**HINT:**

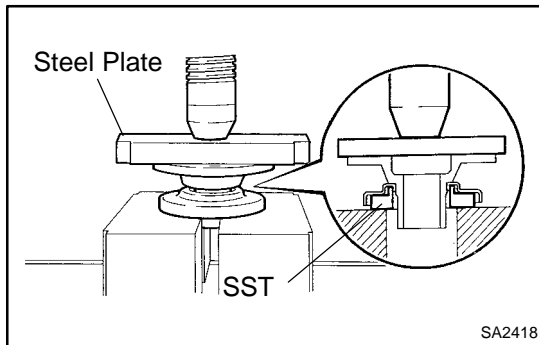
At the time of installation, please refer to the following items.

- ▶ Before installation, connect the connectors of the actuator to the connector on the vehicle side, check the differential lock is in operation.
- ▶ Before installation, check that the sleeves are in operation while switching over the differential lock control switch.
- ▶ After installation, check that the rear differential lock is in operation.



## REPLACEMENT

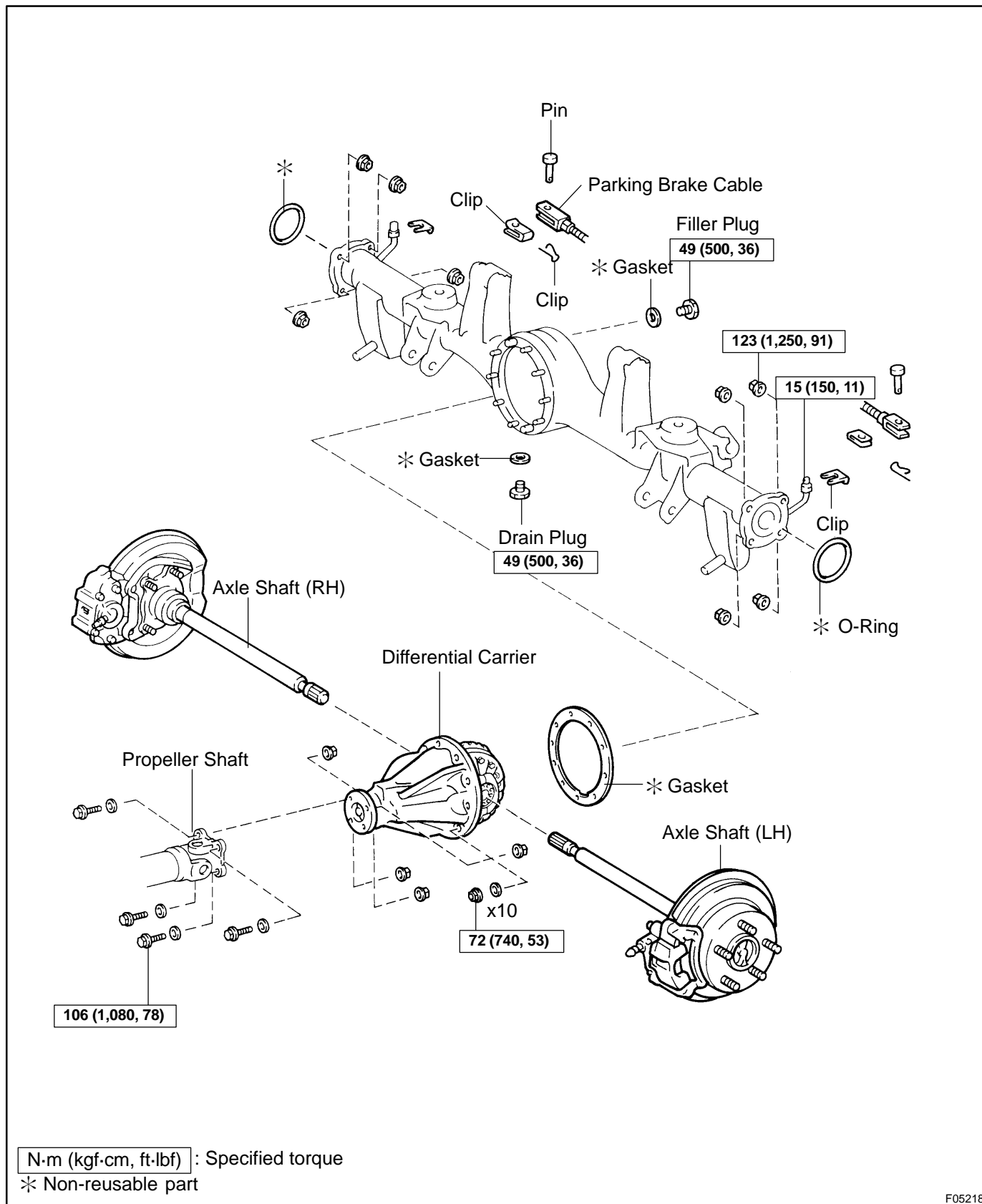
- 1. REMOVE COMPANION FLANGE DUST DEFLECTOR**  
Using SST, a steel plate and press, remove the dust deflector.  
SST 09950-00020



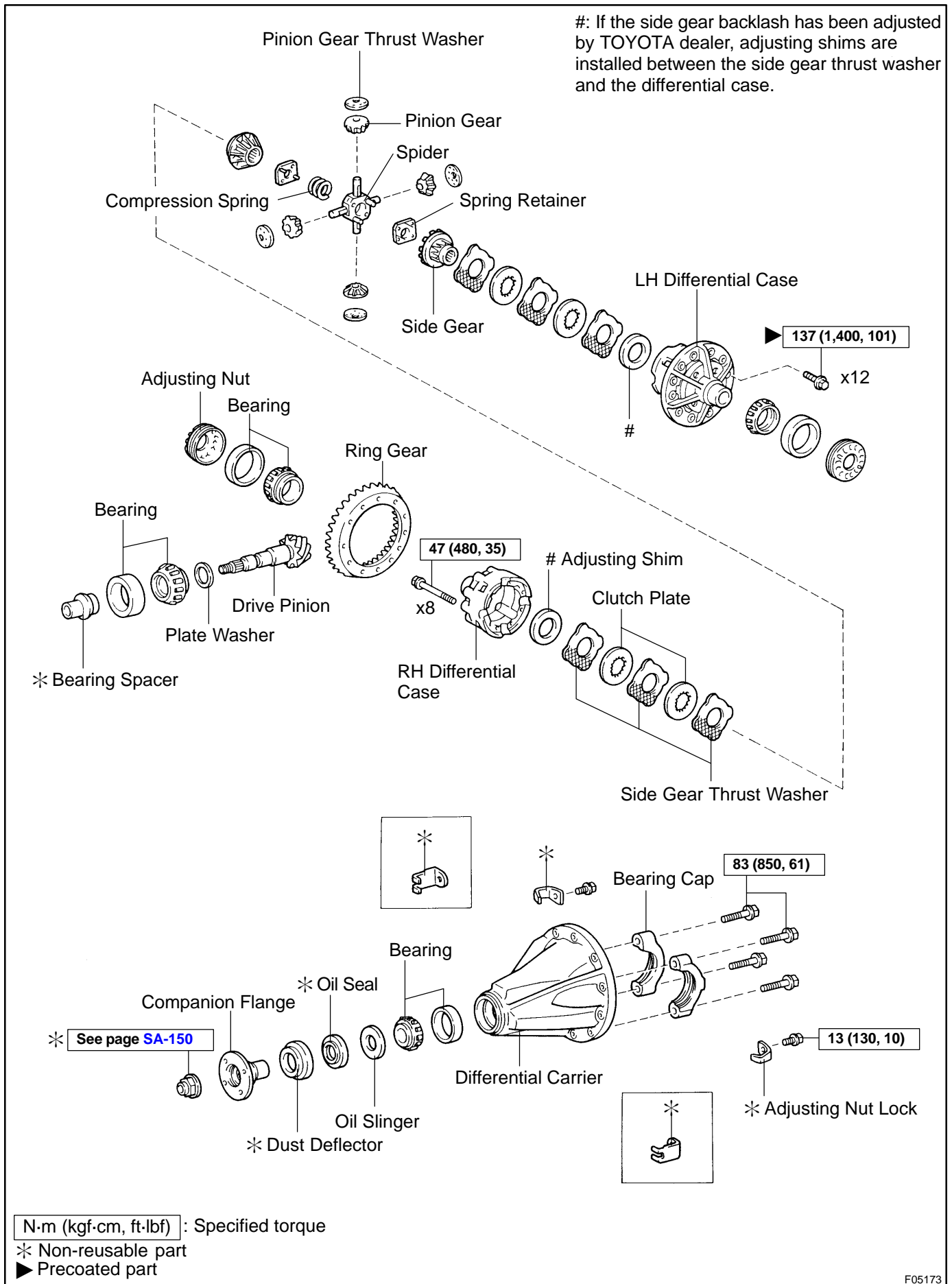
- 2. INSTALL DUST DEFLECTOR**  
Using SST, a steel plate and press, install a new dust deflector.  
SST 09726-40010

# REAR DIFFERENTIAL CARRIER (w/ LSD) COMPONENTS

SA15Y-03



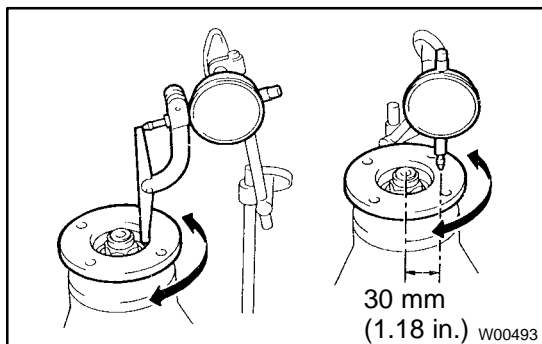
F05218



F05173

## DISASSEMBLY

1. SET DIFFERENTIAL CARRIER TO OVERHAUL STAND, ETC.

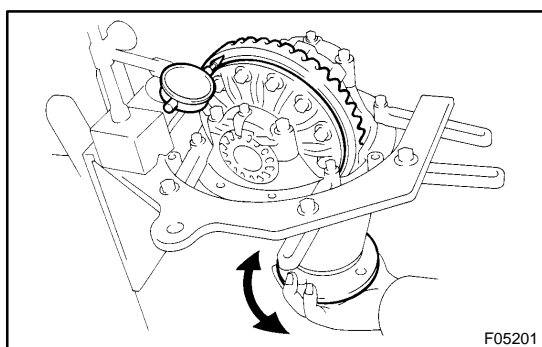


2. CHECK RUNOUT OF COMPANION FLANGE

Using a dial indicator, measure the vertical and lateral runout of the companion flange.

**Maximum runout: 0.10 mm (0.0039 in.)**

If the runout is greater than the maximum, replace the companion flange.

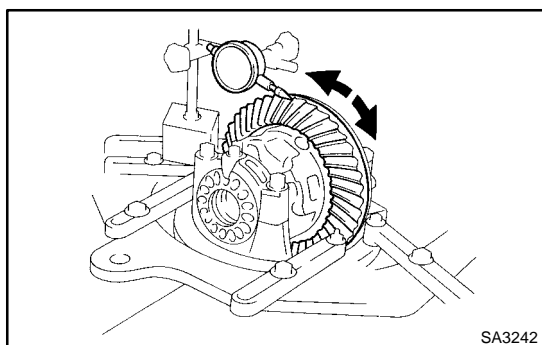


3. CHECK RING GEAR RUNOUT

Using a dial indicator, measure the ring gear runout.

**Maximum runout: 0.05 mm (0.0020 in.)**

If the runout is greater than the maximum, replace the ring gear.



4. CHECK RING GEAR BACKLASH

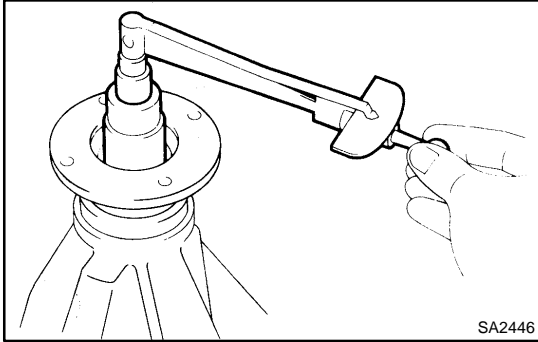
Using a dial indicator, while holding the drive pinion flange, measure the ring gear backlash.

**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)**

HINT:

Perform the measurements at 3 or more positions around the circumference of the ring gear.

If the backlash is not within the specified value, adjust the side bearing preload or repair as necessary.



### 5. MEASURE DRIVE PINION PRELOAD

Using a torque wrench, measure the drive pinion preload using the backlash of the drive pinion and ring gear.

#### Preload (at starting):

**0.64 - 0.92 N·m (6.5 - 9.4 kgf·cm, 5.7 - 8.1 in.-lbf)**

### 6. CHECK TOTAL PRELOAD

Using a torque wrench, measure the total preload with the teeth of the drive pinion and ring gear in contact.

#### Total preload (at starting):

#### Drive pinion preload plus

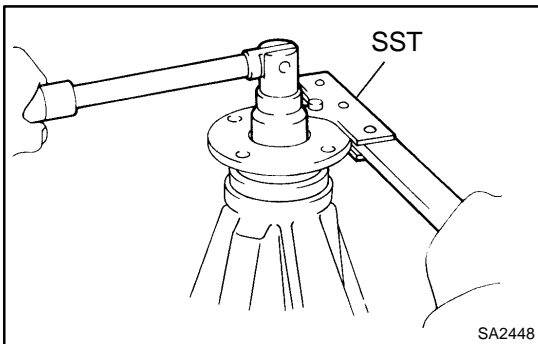
**0.38 - 0.63 N·m (3.9 - 6.5 kgf·cm, 3.3 - 5.6 in.-lbf)**

If necessary, disassemble and inspect the differential.

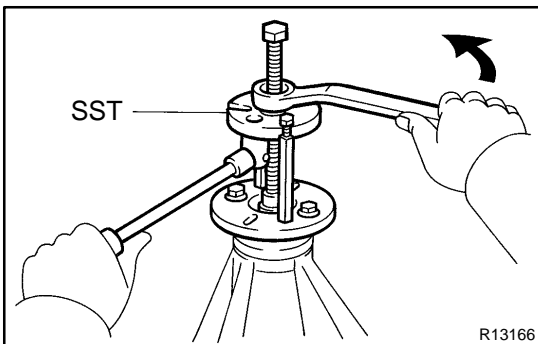
### 7. CHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See page SA-150 )

### 8. REMOVE COMPANION FLANGE

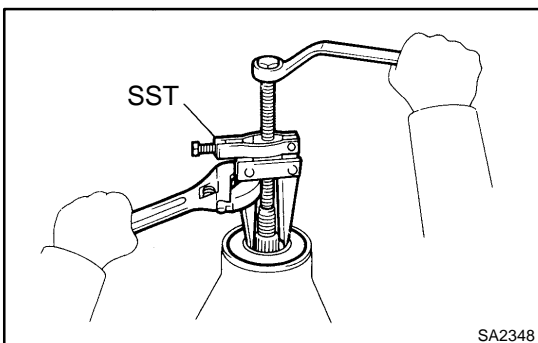
(a) Using a chisel and hammer, unstake the nut.



(b) Using SST to hold the flange, remove the nut.  
SST 09330-00021



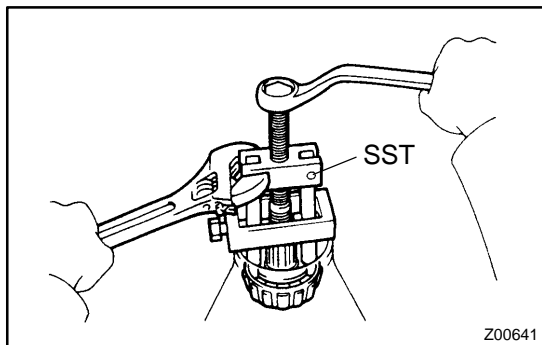
(c) Using SST, remove the companion flange.  
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03040)



### 9. REMOVE OIL SEAL AND OIL SLINGER

(a) Using SST, remove the oil seal from the differential carrier.  
SST 09308-10010

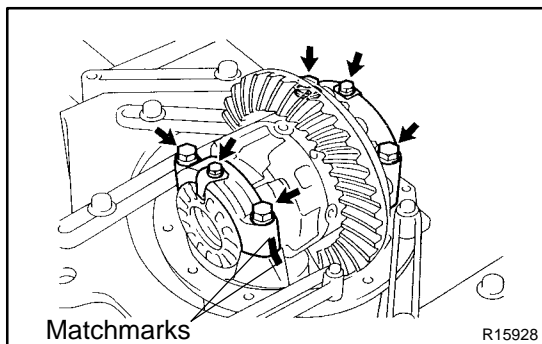
(b) Remove the oil slinger.

**10. REMOVE FRONT BEARING**

Using SST, remove the front bearing from the drive pinion.

SST 09556-22010

If the front bearing is damaged or worn, replace the bearing.

**11. REMOVE DIFFERENTIAL CASE**

(a) Place matchmarks on the bearing cap and differential carrier.

(b) Remove the 2 bolts and adjusting nut locks.

(c) Remove the 4 bolts, 2 bearing caps and adjusting nuts.

HINT:

Tag the disassembled parts to show the location for reassembling.

(d) Remove the differential case with the bearing outer races.

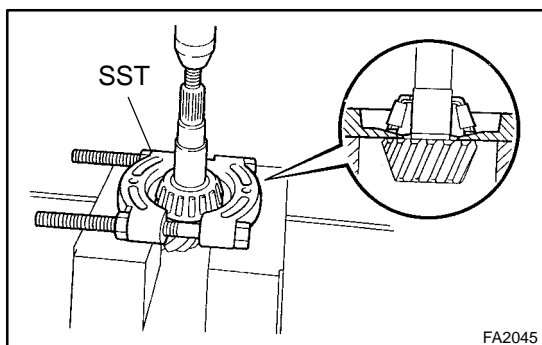
HINT:

Tag the disassembled parts to show the location for reassembling.

**12. REMOVE DRIVE PINION AND BEARING SPACER**

(a) Remove the drive pinion with the rear bearing.

(b) Remove the bearing spacer.

**13. REMOVE DRIVE PINION REAR BEARING**

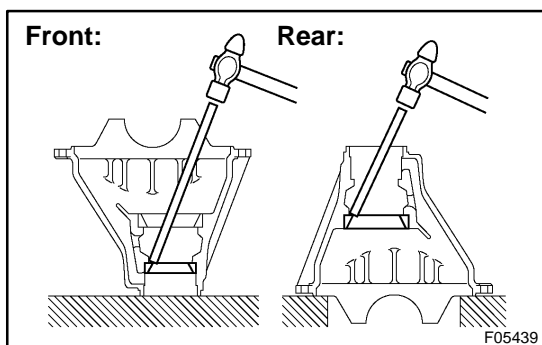
(a) Using SST and a press, remove the rear bearing from the drive pinion.

SST 09950-00020

HINT:

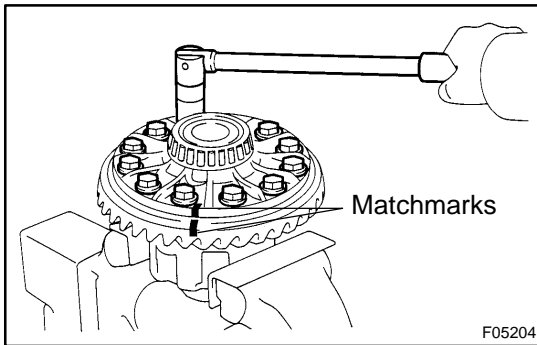
If the drive pinion or ring gear is damaged, replace them as a set.

(b) Remove the plate washer from the drive pinion.

**14. REMOVE FRONT AND REAR BEARING OUTER RACES**

Using a brass bar and hammer, remove the outer races.

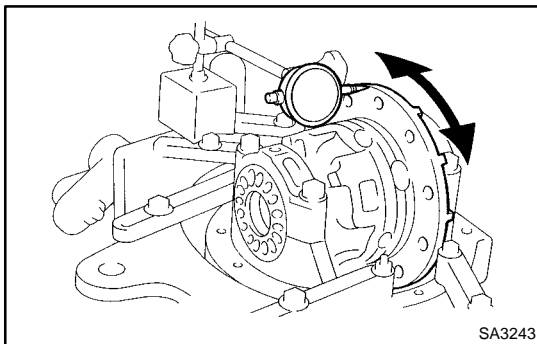


**15. REMOVE RING GEAR**

- (a) Place matchmarks on the ring gear and differential case.
- (b) Remove the 12 ring gear set bolts.
- (c) Using a plastic hammer, tap on the ring gear to remove it from the differential case.

**16. CHECK DIFFERENTIAL CASE RUNOUT**

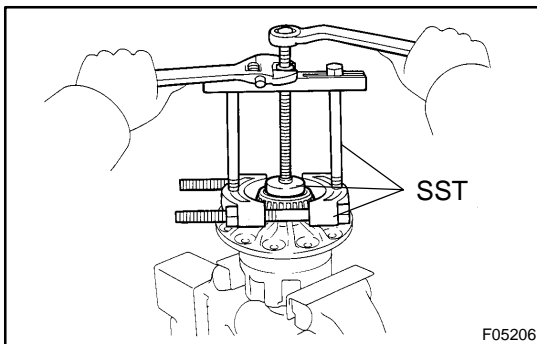
- (a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.
- (b) Install the differential case in the differential carrier.
- (c) Tighten the adjusting nut just to where there is no play in the bearing.
- (d) Align the matchmarks on the bearing cap and differential carrier.
- (e) Install and uniformly tighten the bearing cap bolts a little at a time.



- (f) Using a dial indicator, measure the differential case runout.

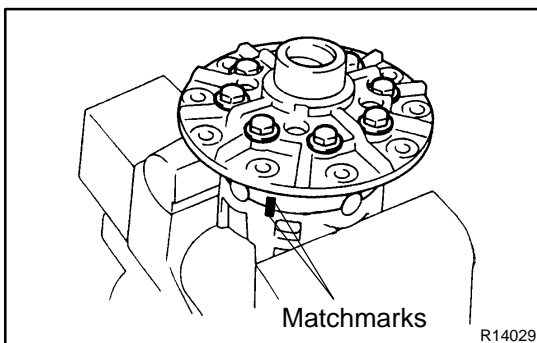
**Maximum runout: 0.04 mm (0.0016 in.)**

- (g) Remove the differential case.

**17. REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE**

Using SST, remove the 2 side bearings from the differential case.

SST 09950-00020, 09950-00030,  
09950-4001 1 (09957-04010),  
09950-60010 (09951-00480)

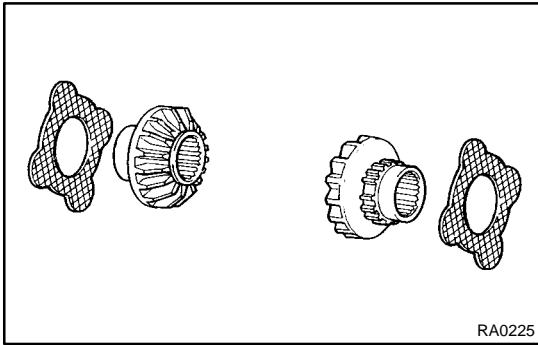
**18. DISASSEMBLE DIFFERENTIAL CASE**

- (a) Place matchmarks on the RH and LH cases.
- (b) Remove the 8 bolts uniformly, a little at a time.
- (c) Using a plastic hammer, separate the RH and LH cases.

- (d) Remove the 2 side gears, 6 side gear thrust washers, 4 clutch plates, 2 spring retainers, compression spring, 4 pinion gears, 4 pinion gear thrust washers and spider from the differential case.

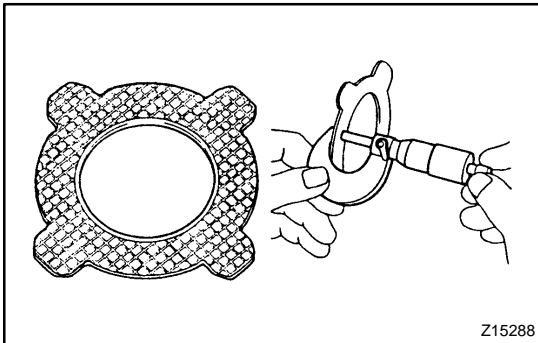
**HINT:**

- ▶ Keep the disassembled parts in order.
- ▶ If the side gear backlash has been adjusted by TOYOTA dealer, adjusting shims are installed between the side gear thrust washer and the differential case.



## INSPECTION

- 1. REPLACE PARTS THAT ARE DAMAGED OR WORN**  
**HINT:**  
 If replacing the side gear, also replace the thrust washer that contact with it.



- 2. INSPECT SIDE GEAR THRUST WASHERS FOR WEAR OR DAMAGE**

Using a micrometer, measure that the contact surface of the thrust washer is even and check that no bare metal is showing.

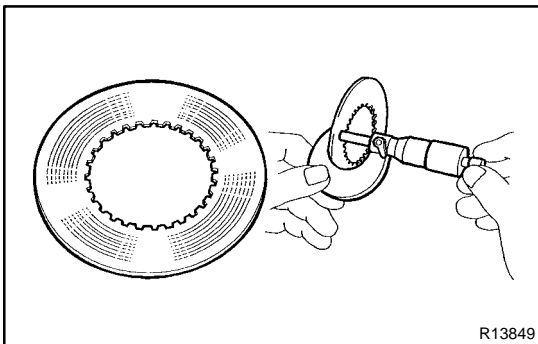
**Thickness (Reference):**

**1.97 - 2.06 mm (0.0776 - 0.0811 in.)**

If necessary, replace the thrust washer.

**HINT:**

If replacing the thrust washer, also replace the clutch plate that contacts with it.



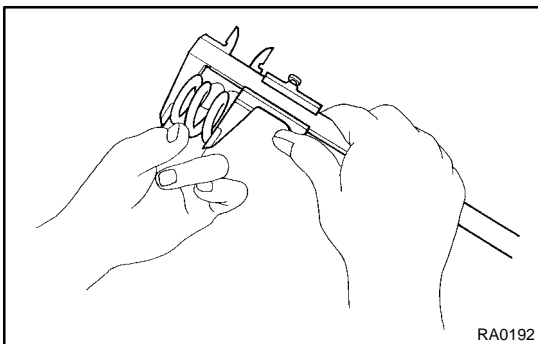
- 3. INSPECT CLUTCH PLATE FOR WEAR OR DAMAGE**

Using a micrometer, measure the contact surface of the clutch plate and check that there is no abnormal wear.

**Thickness (Reference):**

**1.97 - 2.03 mm (0.0776 - 0.0799 in.)**

If necessary, replace the clutch plate.



- 4. INSPECT COMPRESSION SPRING FREE LENGTH**  
 Using vernier calipers, measure the free length of the spring.  
**Length (Reference): 32.8 mm (1.291 in.)**

## INSTALLATION

Installation is in the reverse order of removal (See page [SA-141](#) ).

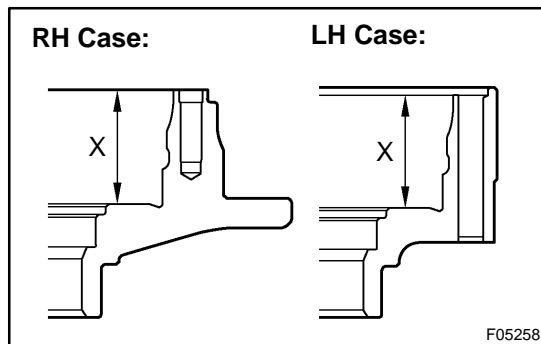
HINT:

After installation, fill the differential with hypoid gear oil for LSD (See page [SA-95](#) ), fill the brake reservoir with brake fluid, bleed the brake system (See page [BR-4](#) ), check for leaks and check the ABS speed sensor signal (See page [DI-505](#) ).

## REASSEMBLY

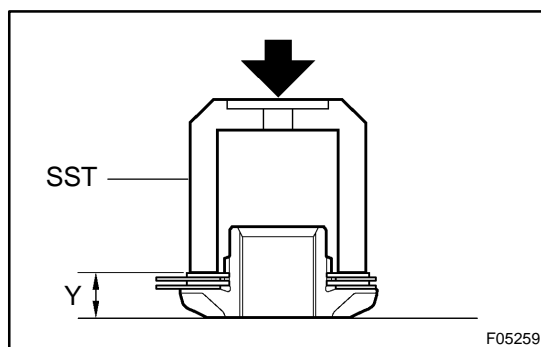
### HINT:

- ▶ When reusing the side gear, thrust washers and clutch plates, skip the STEP 1.
- ▶ Using a shop rag, clean off any foreign object from the parts.
- ▶ Apply all of the sliding and rotating surfaces with LSD oil.



### 1. SELECT ADJUSTING SHIM

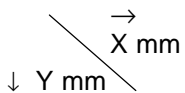
- (a) Measure the RH and LH differential case dimensions "X", as shown in the illustration.



- (b) Install the thrust washers and clutch plates on the side gear.
- (c) Using SST to press down the thrust washers and clutch plates with about pressure of 10 kgf (22 lbf), measure dimension "Y", as shown in the illustration.  
SST 09649-17010
- (d) Referring to the following selection table on the next page, select the proper adjusting shim.

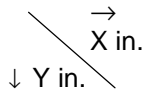
**Adjust shim thickness =**  
 **$X - Y - 19.08 \text{ mm (0.7511 in.)}$**

SUSPENSION AND AXLE - REAR DIFFERENTIAL CARRIER (w/ LSD)



	46.05	46.06	46.07	46.08	46.09	46.10	46.11	46.12	46.13	46.14	46.15	46.16	46.17	46.18	46.19	46.20	46.21	46.22
26.45																		
26.46																		
26.47																		C + D
26.48																		
26.49																		
26.50																		
26.51																		C + C
26.52																		
26.53																		
26.54																		
26.55																		
26.56																		
26.57																		
26.58																		
26.59																		
26.60																		
26.61																		
26.62																		
26.63																		
26.64																		
26.65																		
26.66																		
26.67																		
26.68																		
26.69																		
26.70																		
26.71																		
26.72																		
26.73																		
26.74																		
26.75																		
26.76																		
26.77																		
26.78																		
26.79																		
26.80																		
26.81																		
26.82																		
26.83																		
26.84																		
26.85																		
26.86																		
26.87																		
26.88																		

#: Reassemble another type shim or check the backlash after assembling A shim.



	1.8129	1.8133	1.8137	1.8141	1.8145	1.8149	1.8153	1.8157	1.8161	1.8165	1.8169	1.8173	1.8177	1.8181	1.8185	1.8188	1.8192	1.8196	
1.0413																			
1.0417																			
1.0421																			
1.0425																			
1.0429																			
1.0433																			
1.0436																			
1.0440																			
1.0444																			
1.0448																			
1.0452																			
1.0456																			
1.0460																			
1.0464																			
1.0468																			
1.0472																			
1.0476																			
1.0480																			
1.0484																			
1.0488																			
1.0492																			
1.0496																			
1.0499																			
1.0503																			
1.0507																			
1.0511																			
1.0515																			
1.0519																			
1.0523																			
1.0527																			
1.0531																			
1.0535																			
1.0539																			
1.0543																			
1.0547																			
1.0551																			
1.0555																			
1.0559																			
1.0562																			
1.0566																			
1.0570																			
1.0574																			
1.0578																			
1.0582																			

#: Reassemble another type shim or check the backlash after assembling A shim.

**Adjust shim thickness:**

Mark	Thickness	mm (in.)	Mark	Thickness	mm (in.)
A	0.20	(0.0079)	C	0.30	(0.0118)
B	0.25	(0.0098)	D	0.35	(0.0138)

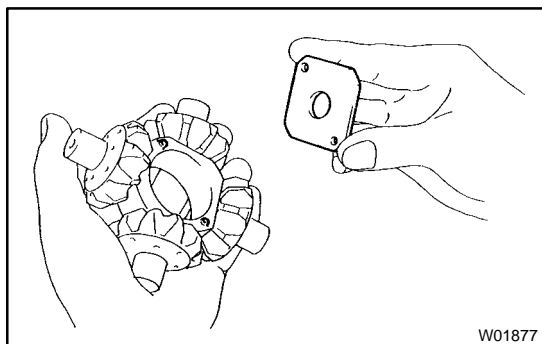
**2. CHECK SIDE GEAR BACKLASH**

- (a) Install the thrust washers, clutch plates and adjusting shim to side gear.

**HINT:**

Install the adjusting shim with its surface having no oil groove facing to the differential case side.

- (b) Install the side gear to the differential case.  
 (c) Install the 4 pinion gears and thrust washers to the spider.

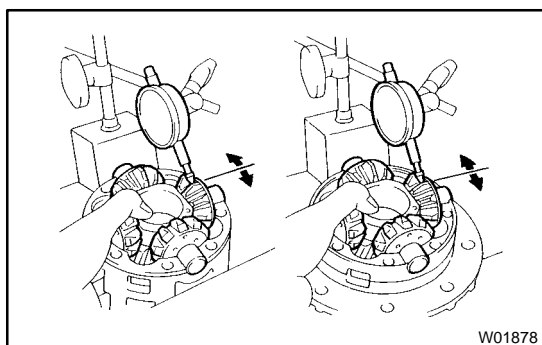


- (d) Align the spring retainer holes with the straight pins and install the retainer.

- (e) Install the spider to the differential case.

**HINT:**

Install the spider to the differential case tightly and do not move the spring retainer.



- (f) Using a dial indicator, measure the side gear backlash while holding the side gear and spider.

**Backlash: 0.02 - 0.15 mm (0.0008 - 0.0059 in.)**

**HINT:**

- ▶ Measure at all 4 locations.
- ▶ Measure the backlash at the RH and LH differential cases.

If the backlash is not within the specified value, select the adjusting shim.

**3. ASSEMBLE DIFFERENTIAL CASE**

- (a) Reinstall the spider to the LH differential case.

**HINT:**

Install the spider to the LH differential case tightly and do not move the spring retainer.

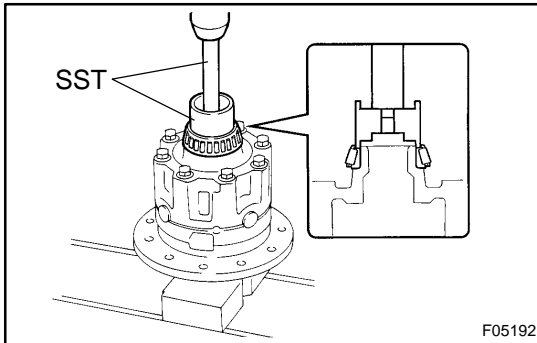
- (b) Install the compression spring and RH spring retainer.  
 (c) Install the RH side gear.  
 (d) Align the matchmarks and assemble the RH and LH differential cases.



## HINT:

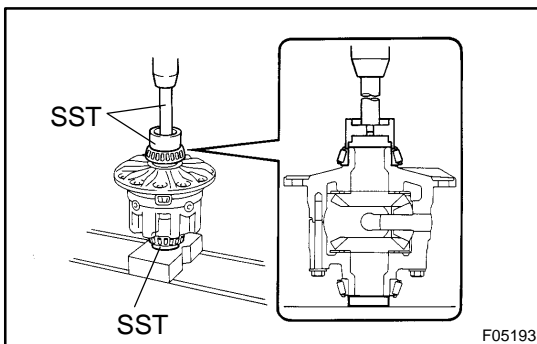
- ▶ Be careful not to drop the side gear.
- ▶ Check the pinion and side gear alignment.
- (e) Tighten the 8 bolts uniformly, a little at a time.

**Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)**

**4. INSTALL SIDE BEARING**

- (a) Using SST and a press, install the RH side bearing on the differential case.

SST 09710-30050, 09950-70010 (09951-07100)

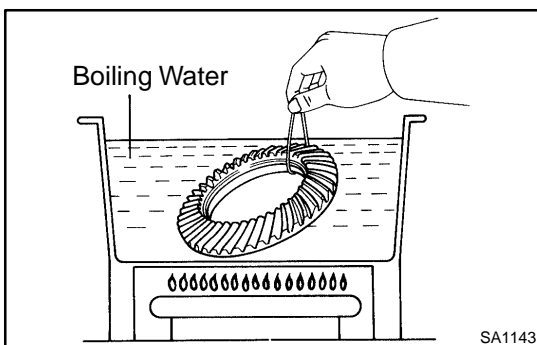


- (b) Using SST and a press, install the LH side bearing on the differential case.

SST 09710-30050, 09950-60010 (09951-00480),  
09950-70010 (09951-07100)

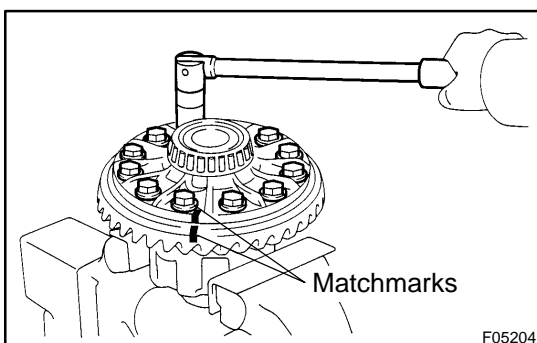
**5. INSTALL RING GEAR ON DIFFERENTIAL CASE**

- (a) Clean the threads of the bolts and differential case with the white gasoline.  
(b) Clean the contact surfaces of the differential case and ring gear.



- (c) Heat the ring gear to about 100 °C (212 °F) in boiling water.

- (d) Carefully take the ring gear out of the boiling water.  
(e) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.



- (f) Align the matchmarks on the ring gear and differential case.

- (g) Temporarily install the 12 set bolts.

- (h) After the ring gear has cooled down enough, torque the 12 set bolts to which thread lock has been applied.

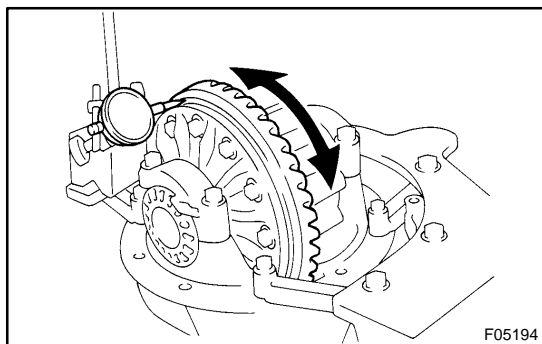
**Thread lock:**

**Part No. 08833-00100, THREE BOND 1360K  
or equivalent**

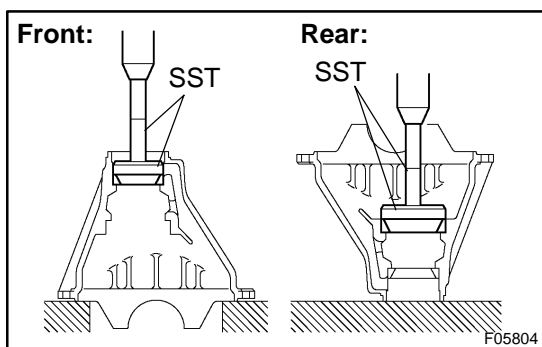
**Torque: 137 N·m (1,400 kgf·cm, 101 ft·lbf)**

**6. CHECK RING GEAR RUNOUT**

- (a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.
- (b) Install the differential case onto the carrier and tighten the adjusting nut just to where there is no play in the bearings.



- (c) Using a dial indicator, measure the ring gear runout.  
**Maximum runout: 0.05 mm (0.0020 in.)**
- (d) Remove the differential case.

**7. INSTALL DRIVE PINION FRONT AND REAR BEARING OUTER RACES**

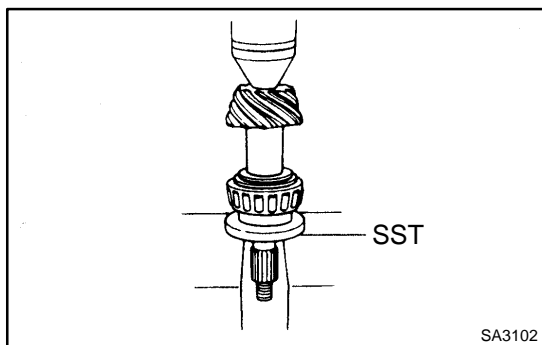
- (a) Using SST and a press, install the front bearing outer race.  
SST 09950-60020 (09951-00710),  
09950-70010 (09951-07150)
- (b) Using SST and a press, install the rear bearing outer race.  
SST 09950-60020 (09951-00890),  
09950-70010 (09951-07150)

**8. INSTALL DRIVE PINION REAR BEARING**

- (a) Install the plate washer on the drive pinion.

**HINT:**

First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.



- (b) Using SST and a press, install the rear bearing onto the drive pinion.  
SST 09506-35010

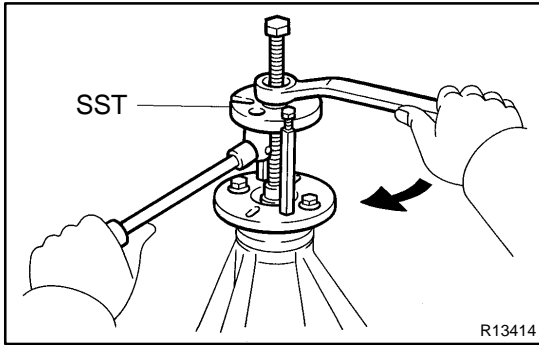
**9. TEMPORARILY ADJUST DRIVE PINION PRELOAD**

- (a) Install the drive pinion and front bearing.

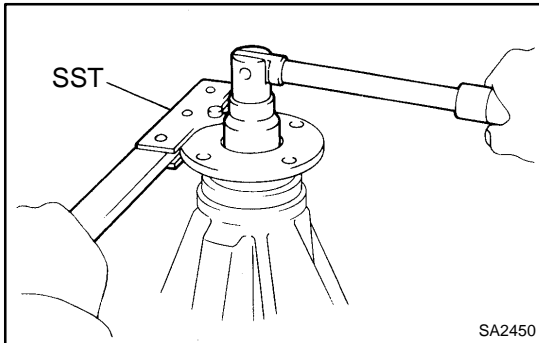
**HINT:**

Assemble the spacer and oil seal after adjusting the gear contact pattern.

- (b) Install the oil slinger.



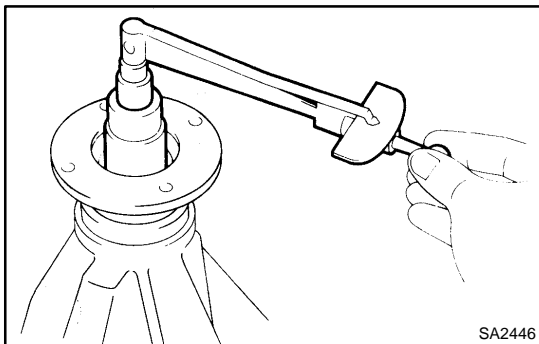
- (c) Install the companion flange with SST.  
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03040)



- (d) Using SST to hold the flange and adjust the drive pinion preload by tightening the companion flange nut.  
SST 09330-00021

**NOTICE:**

- ▶ Coat the nut and screw of the drive pinion with gear oil.
- ▶ As there is no spacer, tighten the nut a little at a time, being careful not to overtighten.



- (e) Using a torque wrench, measure the preload.

**Preload (at starting):****New bearing**

1.3 - 1.8 N·m (13 - 19 kgf·cm, 11.5 - 15.9 in.-lbf)

**Reused bearing**

0.64 - 0.92 N·m (6.5 - 9.4 kgf·cm, 5.7 - 8.1 in.-lbf)

**HINT:**

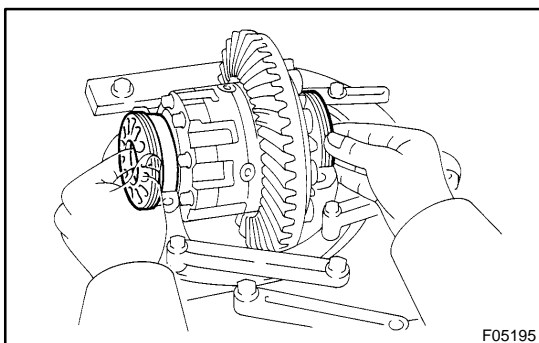
Measure the total preload after turning the bearing clockwise and counterclockwise several times to make the bearing smooth.

**10. INSTALL DIFFERENTIAL CASE IN CARRIER**

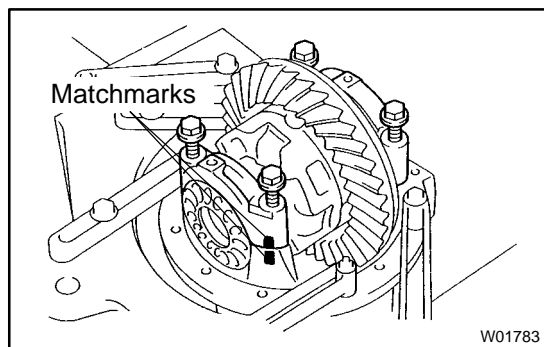
- (a) Place the 2 bearing outer races on their respective bearings. Make sure that the right and left outer races are not interchanged.
- (b) Install the differential case in the carrier.

**HINT:**

Make sure that there is backlash between the ring gear and drive pinion.

**11. INSTALL ADJUSTING NUTS**

Install the 2 adjusting nuts on the carrier, making sure the nuts are engaged properly.



## 12. INSTALL BEARING CAPS

Align the matchmarks on the bearing cap and carrier. Screw in the 2 bearing cap bolts 2 or 3 turns and press down the bearing cap by hand.

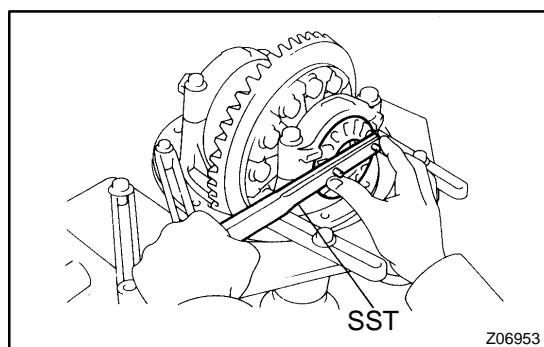
### HINT:

If the bearing cap does not fit tightly on the carrier, the adjusting nuts are not engaged properly. Reinstall the adjusting nuts if necessary.

## 13. ADJUST SIDE BEARING PRELOAD

- (a) Torque the 4 bolts.

**Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)**



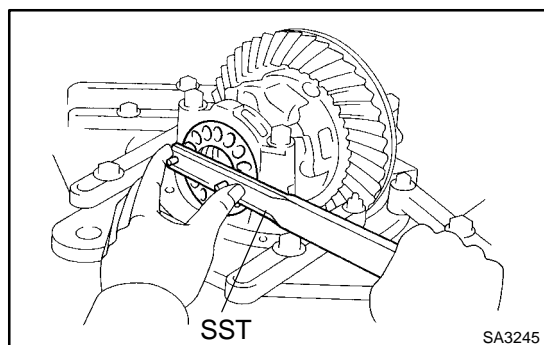
- (b) Then loosen them to the point where the adjusting nuts can be turned by SST.

SST 09504-0001 1

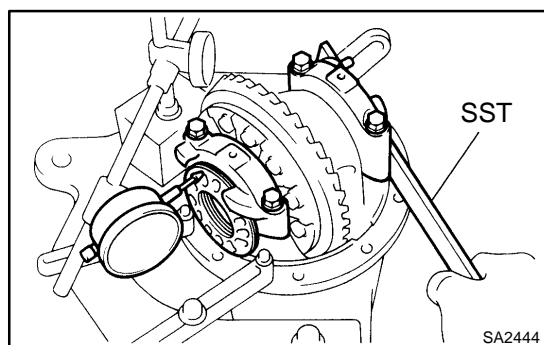
- (c) Tighten the 4 bolts.

**Torque: 9.8 N·m (100 kgf·cm, 7 ft·lbf)**

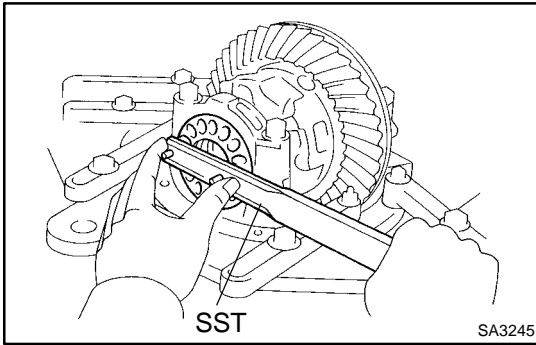
- (d) Using SST, torque the adjusting nut on the ring gear side until the ring gear has a backlash of about 0.2 mm (0.008 in.).



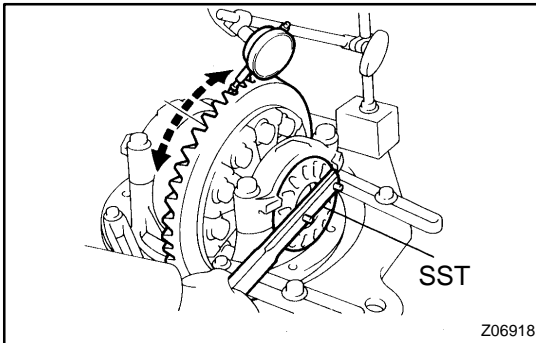
- (e) While turning the ring gear, use the SST to fully tighten the adjusting nut on the drive pinion side. After the bearings are settled, loosen the adjusting nut on the drive pinion side.



- (f) Place a dial indicator on the top of the adjusting nut on the ring gear side.
- (g) Adjust the side bearing to zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.



- (h) Using the SST, torque the adjusting nut 1 - 1.5 notches from the zero preload position.



- (i) Using a dial indicator, adjust the ring gear backlash until it is within the specified value.

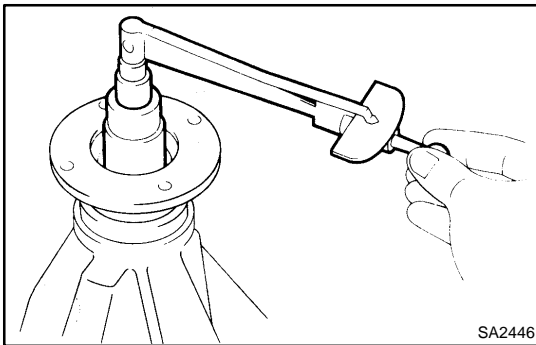
**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)**

**HINT:**

The backlash is adjusted by turning the right and left adjusting nuts equal amounts. For example, loosen the nut on the left side 1 notch and torque the nut on the right side 1 notch.

- (j) Torque the 4 bolts.  
**Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)**
- (k) After rotating the ring gear 5 turns or more, recheck the ring gear backlash.

**Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)**



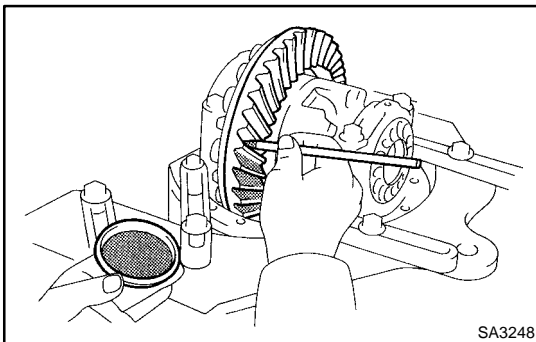
**14. MEASURE TOTAL PRELOAD**

Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

**Preload (at starting):**

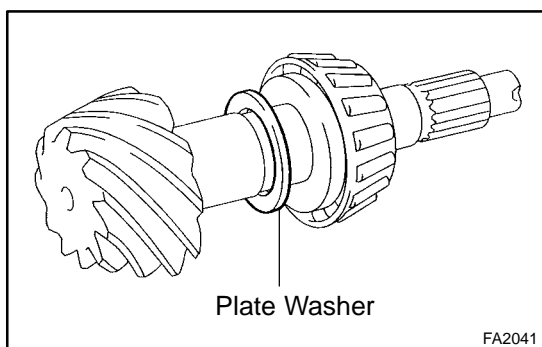
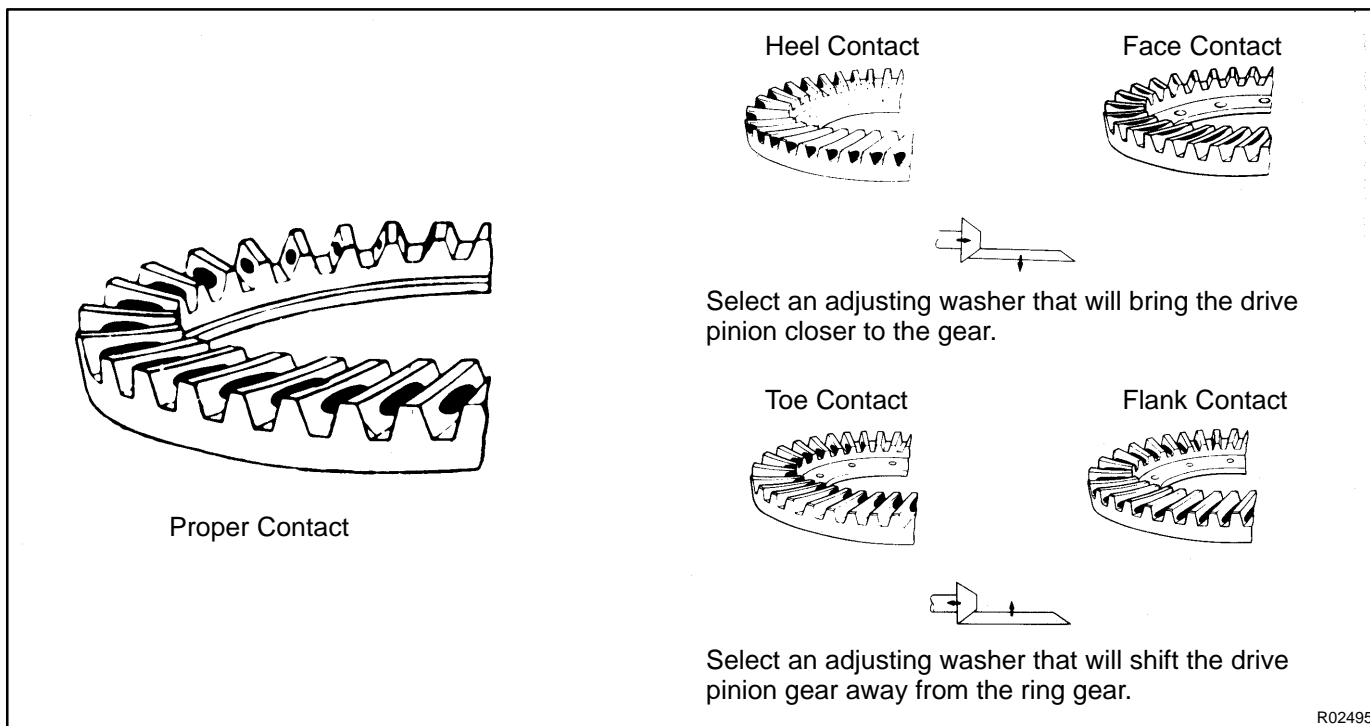
**Drive pinion preload plus**

**0.38 - 0.63 N·m (3.9 - 6.5 kgf·cm, 3.3 - 5.6 in.-lbf)**



**15. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION**

- (a) Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead primer.
- (b) Turn the companion flange, in both directions to inspect the ring gear for proper tooth contact.

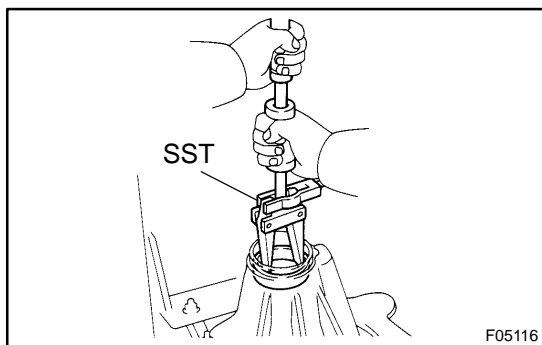


If the teeth are not contacting properly, use the following table to select a proper washer for correction.

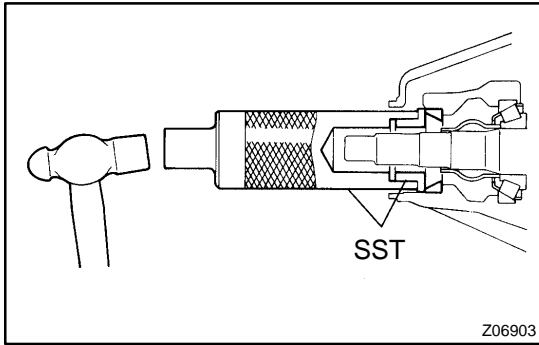
**Plate washer thickness:**

Thickness mm (in.)	Thickness mm (in.)
1.050 (0.04134)	1.325 (0.05217)
1.075 (0.04232)	1.350 (0.05315)
1.100 (0.04331)	1.375 (0.05413)
1.125 (0.04429)	1.400 (0.05512)
1.150 (0.04528)	1.425 (0.05610)
1.175 (0.04626)	1.450 (0.05709)
1.200 (0.04724)	1.475 (0.05807)
1.225 (0.04823)	1.500 (0.05906)
1.250 (0.04921)	1.525 (0.06004)
1.275 (0.05020)	1.550 (0.06102)
1.300 (0.05118)	-

- 16. REMOVE COMPANION FLANGE (See page SA-143 )
- 17. REMOVE OIL SLINGER AND FRONT BEARING (See page SA-143 )



- 18. REMOVE BEARING OUTER RACE  
Using SST, remove the bearing outer race.  
SST 09308-00010
- 19. INSTALL NEW BEARING SPACER

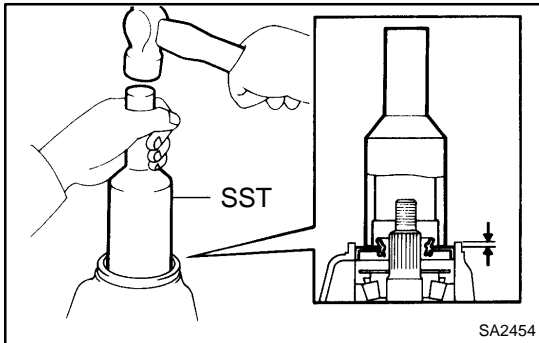
**20. INSTALL BEARING OUTER RACE**

Using SST and a hammer, install the bearing outer race.

SST 09316-6001 1 (09316-00011, 09316-00021)

**21. INSTALL FRONT BEARING AND OIL SLINGER****22. INSTALL OIL SEAL**

(a) Coat the hypoid gear oil to a new oil seal periphery.

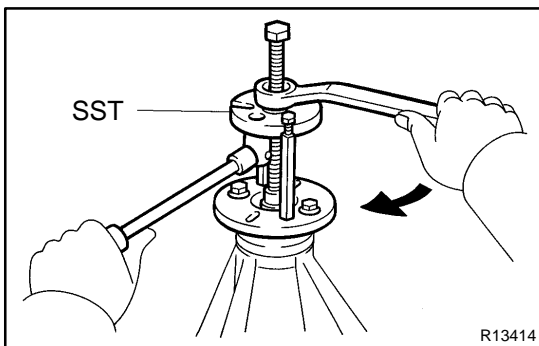


(b) Using SST and a hammer, install the oil seal, as shown.

SST 09214-7601 1

**Oil seal driven in depth: 0.5 mm (0.020 in.)**

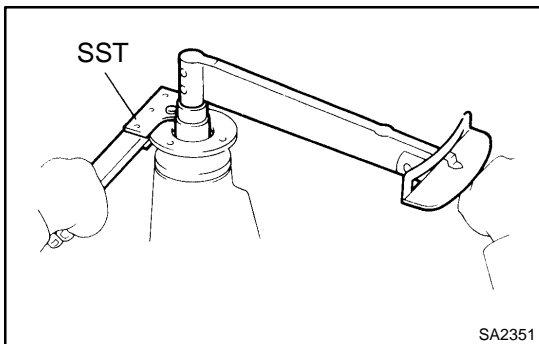
(c) Coat MP grease to the oil seal lip.

**23. INSTALL COMPANION FLANGE**

(a) Using SST, install the companion flange.

SST 09950-30012 (09951-03010, 09953-03010,  
09954-03010, 09955-03030, 09956-03040)

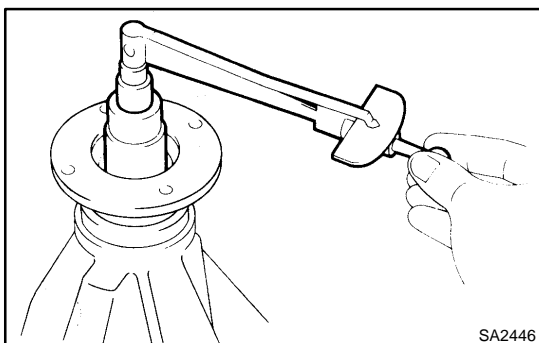
(b) Coat the threads of a new nut with gear oil.



(c) Using SST to hold the flange, install the nut.

SST 09330-00021

**Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)**

**24. ADJUST DRIVE PINION PRELOAD**

Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

**Preload (at starting):**

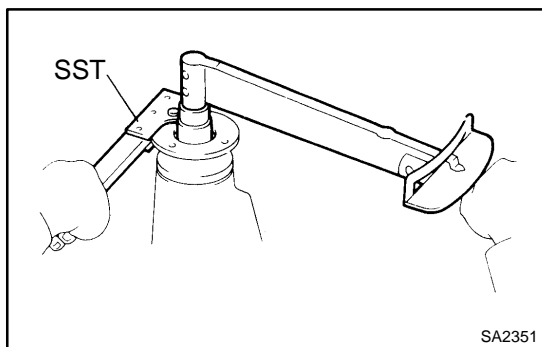
**New bearing**

**1.3 - 1.8 N·m (13 - 19 kgf·cm, 11.5 - 15.9 in.-lbf)**

**Reused bearing**

**0.64 - 0.92 N·m (6.5 - 9.4 kgf·cm, 5.7 - 8.1 in.-lbf)**

If the preload is greater than the specified value, replace the bearing spacer.



If the preload is less than the specified value, retighten the nut with a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

SST 09330-00021

**Torque: 441 N·m (4,500 kgf·cm, 326 ft·lbf) or less**

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not loosen the pinion nut to reduce the preload.

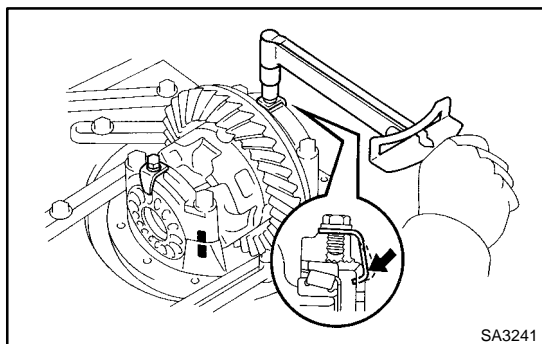
**25. RECHECK RING GEAR BACKLASH**

(See page SA-143 )

**26. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step 15)**

**27. CHECK RUNOUT OF COMPANION FLANGE (See page SA-143 )**

**28. STAKE DRIVE PINION NUT**



**29. INSTALL ADJUSTING NUT LOCKS**

(a) Install 2 new nut locks on the bearing caps.

(b) After tightening 2 bolts, bend the nut locks.

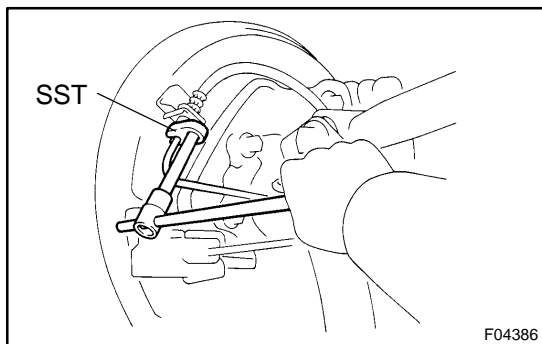
**Torque: 13 N·m (130 kgf·cm, 10 ft·lbf)**

**30. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND ETC.**

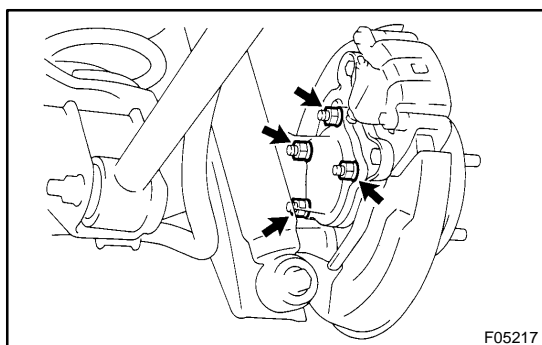


## REMOVAL

1. **REMOVE 2 REAR WHEELS**  
Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)
2. **DRAIN HYPOID GEAR OIL**  
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



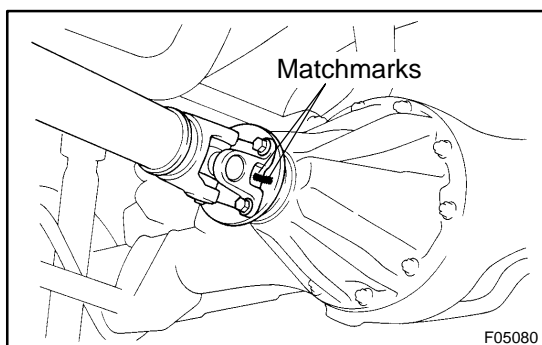
3. **DISCONNECT BRAKE LINES**
  - (a) Using SST, disconnect the brake line and remove the clip.  
SST 09023-00100  
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)
  - (b) Employ the same manner described above to the other side.
4. **DISCONNECT PARKING BRAKE CABLES**
  - (a) Remove the 2 clips, pin and disconnect the parking brake cable from the bellcrank.
  - (b) Employ the same manner described above to the other side.



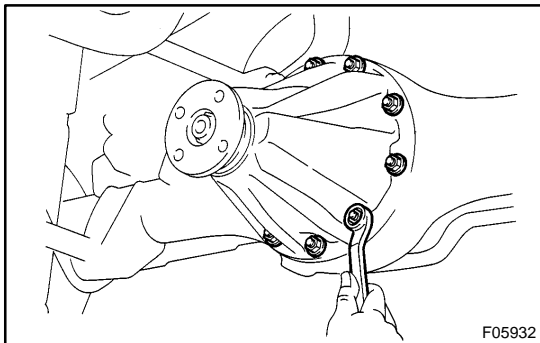
5. **REMOVE AXLE SHAFTS**
  - (a) Remove the 4 nuts.  
Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)
  - (b) Pull out the axle shaft assembly and remove the O-ring.

**NOTICE:**  
**Be careful not to damage the oil seal.**

  - (c) Employ the same manner described above to the other side.



6. **DISCONNECT REAR PROPELLER SHAFT**
  - (a) Place matchmarks on the propeller shaft and differential flange.
  - (b) Remove the 4 nuts, bolts, washers and disconnect the propeller shaft.  
Torque: 106 N·m (1,080 kgf·cm, 78 ft·lbf)
  - (c) Support the propeller shaft securely.

**7. REMOVE DIFFERENTIAL CARRIER ASSEMBLY**

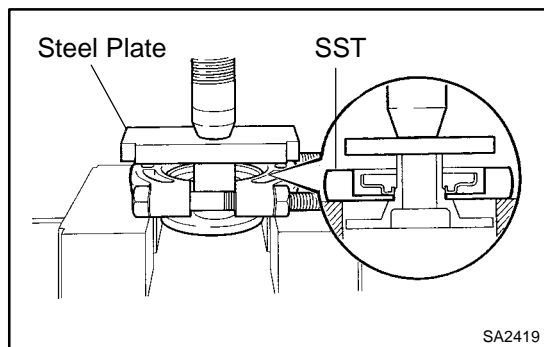
- (a) Remove the 10 nuts, washers and differential carrier assembly.

**NOTICE:**

**Be careful not to damage the installation surface.**

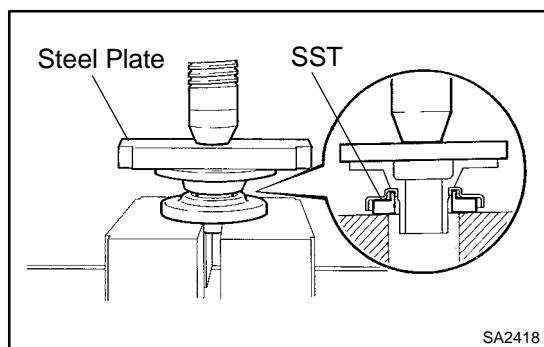
**Torque: 72 N·m (740 kgf·cm, 53 ft·lbf)**

- (b) Remove the gasket.



## REPLACEMENT

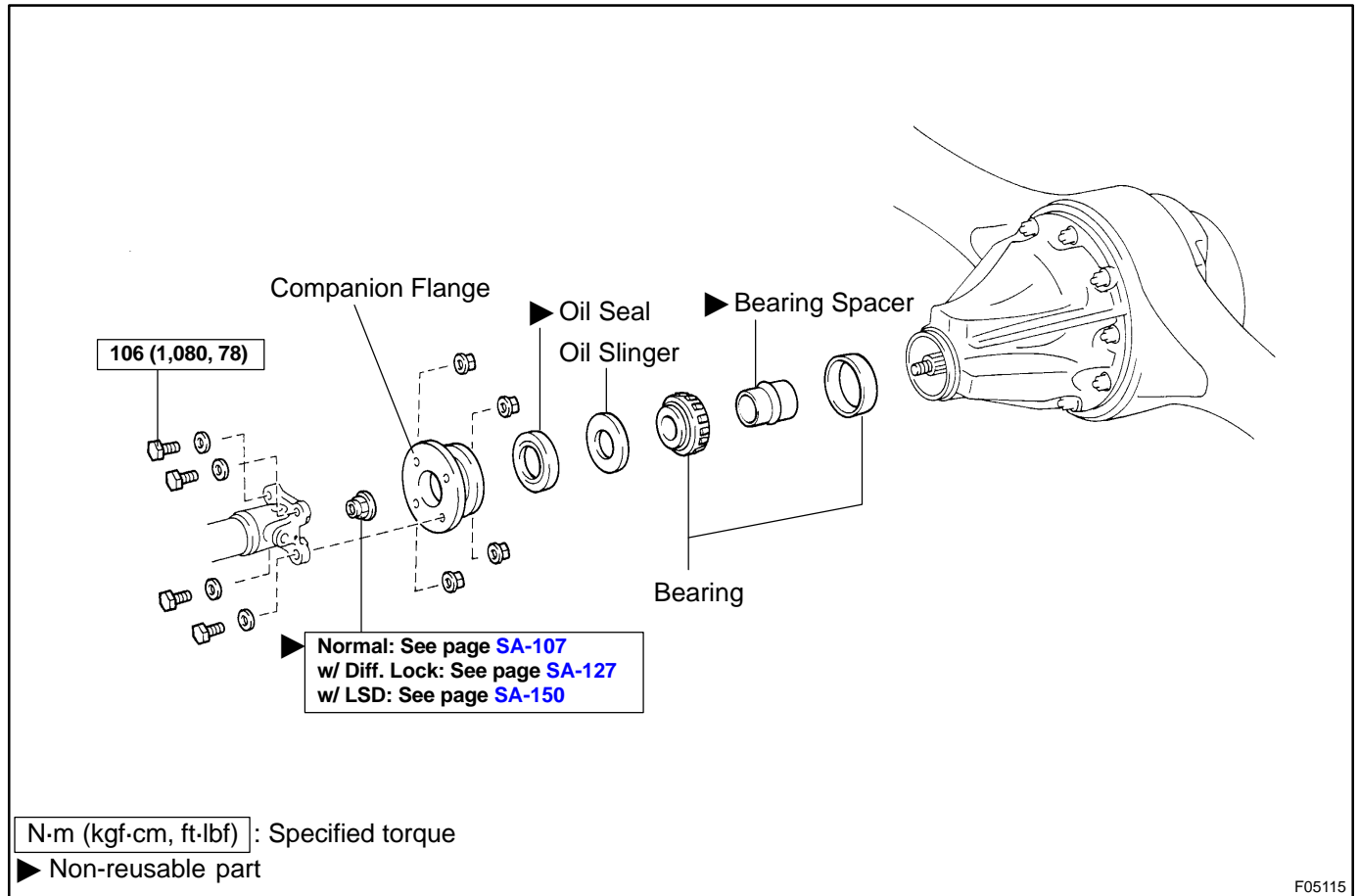
- 1. REMOVE COMPANION FLANGE DUST DEFLECTOR**  
Using SST, a steel plate and press, remove the dust deflector.  
SST 09950-00020

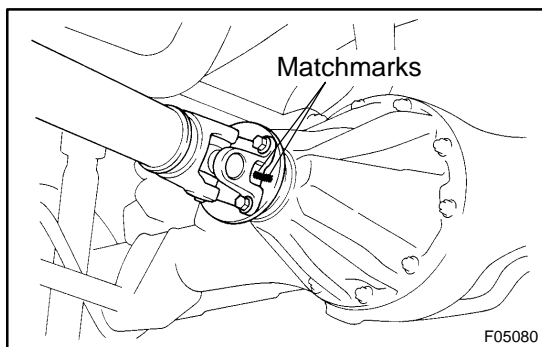


- 2. INSTALL DUST DEFLECTOR**  
Using SST, a steel plate and press, install a new dust deflector.  
SST 09726-40010

# REAR DIFFERENTIAL FRONT OIL SEAL COMPONENTS

SA15K-04



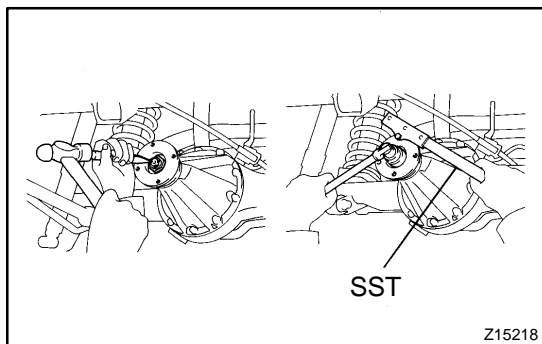


## REPLACEMENT

### 1. DISCONNECT REAR PROPELLER SHAFT

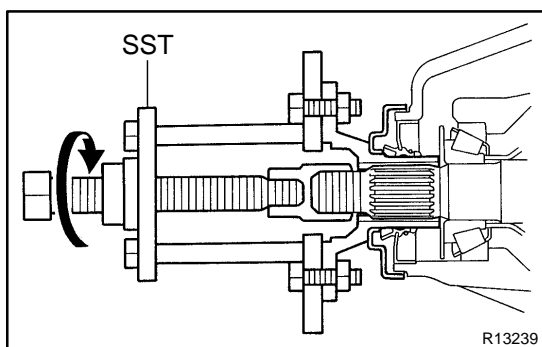
- Place matchmarks on the propeller shaft and companion flange.
- Remove the 4 nuts, bolts, washers and disconnect the propeller shaft.
- Support the propeller shaft securely.

### 2. DRAIN HYPOID GEAR OIL

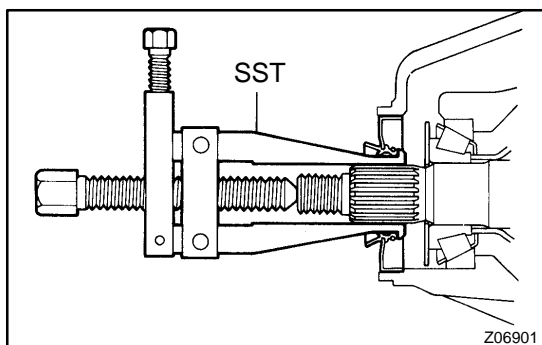


### 3. REMOVE COMPANION FLANGE

- Using a chisel and hammer, unstake the nut.
- Using SST to hold the flange, remove the nut.  
SST 09330-00021

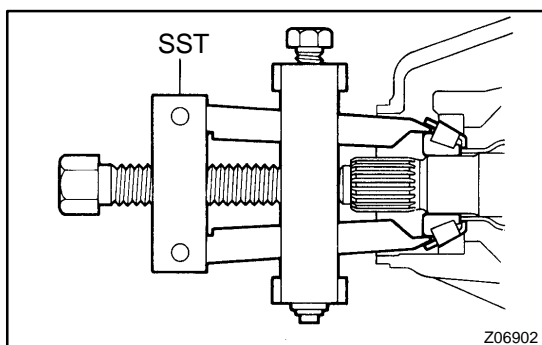


- Using SST, remove the companion flange.  
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03040)



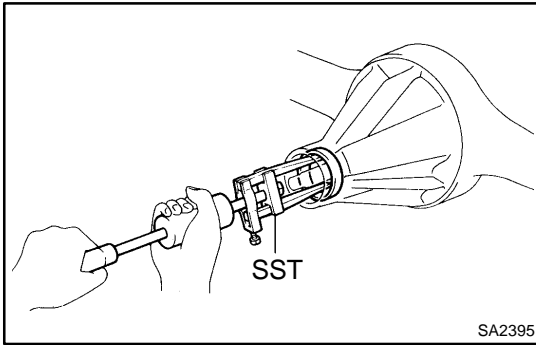
### 4. REMOVE OIL SEAL AND OIL SLINGER

- Using SST, remove the oil seal.  
SST 09308-10010
- Remove the oil slinger.



### 5. REMOVE FRONT BEARING

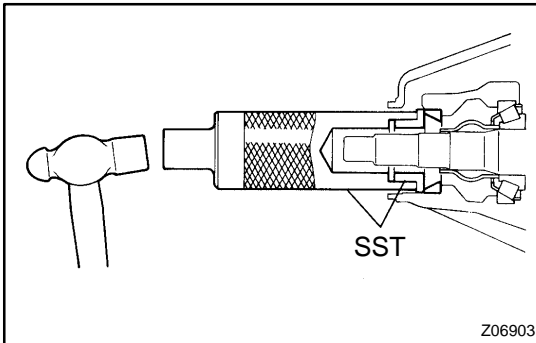
- Using SST, remove the front bearing from the drive pinion.  
SST 09556-22010

**6. REMOVE BEARING OUTER RACE**

Using SST, remove the bearing outer race.  
SST 09308-00010

**NOTICE:**

**Do not scratch the taper surface of the outer race.**

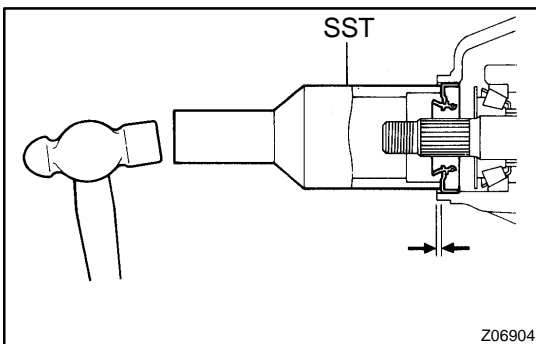
**7. REMOVE BEARING SPACER****8. INSTALL NEW BEARING SPACER****9. INSTALL BEARING OUTER RACE**

Using SST and a hammer, install the bearing outer race.  
SST 09316-6001 1 (09316-00011, 09316-00021)

**10. INSTALL FRONT BEARING****11. INSTALL OIL SLINGER AND OIL SEAL**

(a) Install the oil slinger.

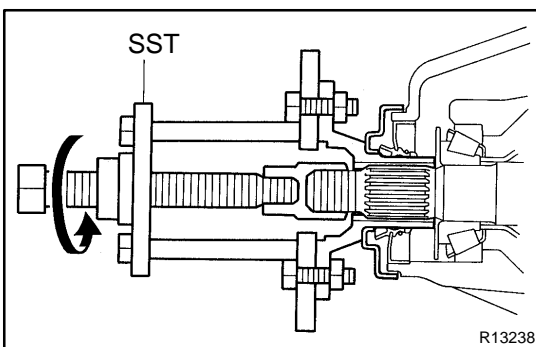
(b) Coat the hypoid gear oil to a new oil seal periphery.



(c) Using SST and a hammer, install the new oil seal.  
SST 09214-7601 1

**Oil seal drive in depth: 0.5 mm (0.020 in.)**

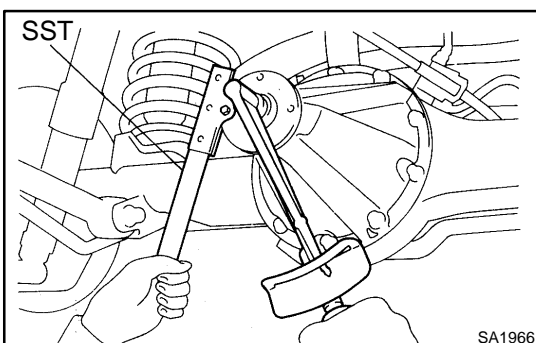
(d) Coat MP grease to the oil seal lip.

**12. INSTALL COMPANION FLANGE**

(a) Using SST, install the companion flange on the drive pinion.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03040)

(b) Coat the threads of a new companion flange nut with gear oil.



(c) Using SST to hold the flange, install a new nut.  
SST 09330-00021

**Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)**

**13. ADJUST DRIVE PINION PRELOAD**

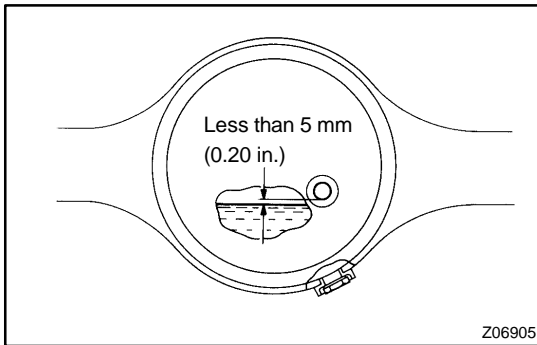
(See page [SA-107](#), [SA-127](#) or [SA-150](#))

**14. STAKE DRIVE PINION NUT****15. CONNECT REAR PROPELLER SHAFT**

(a) Align the matchmarks on the propeller shaft and flange.

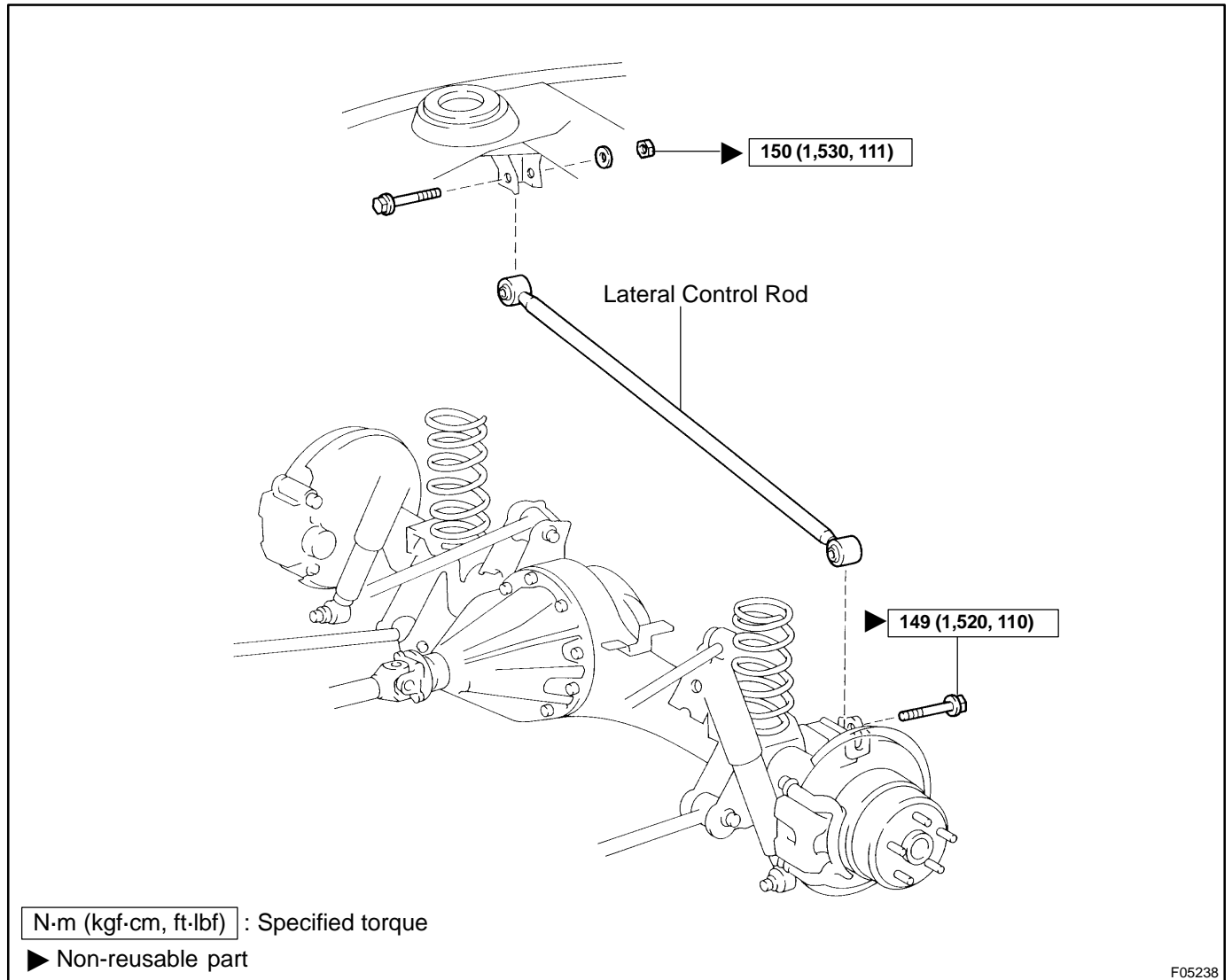
(b) Install the 4 bolts, washers and nuts.

**Torque: 106 N·m (1,080 kgf·cm, 78 ft·lbf)**

**16. FILL DIFFERENTIAL WITH HYPOID GEAR OIL****Torque: 49 N·m (500 kgf-cm, 36 ft-lbf)****Oil type:****w/o LSD: Hypoid gear oil API GL-5****w/ LSD: Hypoid gear oil LSD API GL-5****Recommended oil viscosity:****Above -18°C (0°F) SAE 90****Below -18°C (0°F) SAE 80W-90 or 80W****Capacity:****w/ Diff. Lock: 3.20 liters (3.38 US qts, 2.82 Imp.qts)****Others: 3.30 liters (3.49 US qts, 2.90 Imp.qts)**

# REAR LATERAL CONTROL ROD COMPONENTS

SA16F-02



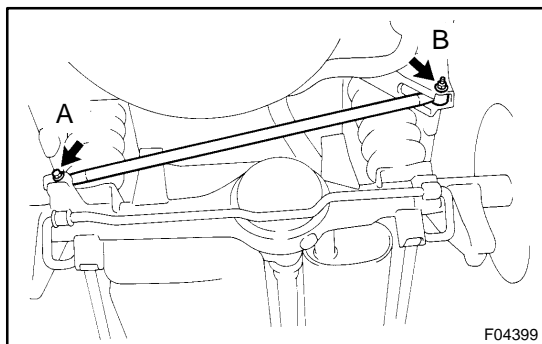


## INSTALLATION

Installation is in the reverse order of removal (See page [SA-179](#)).

## REMOVAL

### 1. SUPPORT REAR AXLE HOUSING WITH JACK



### 2. REMOVE LATERAL CONTROL ROD

Remove the 2 bolts, nut, washer and lateral control rod.

**Torque:**

**A: 149 N·m (1,520 kgf·cm, 110 ft·lbf)**

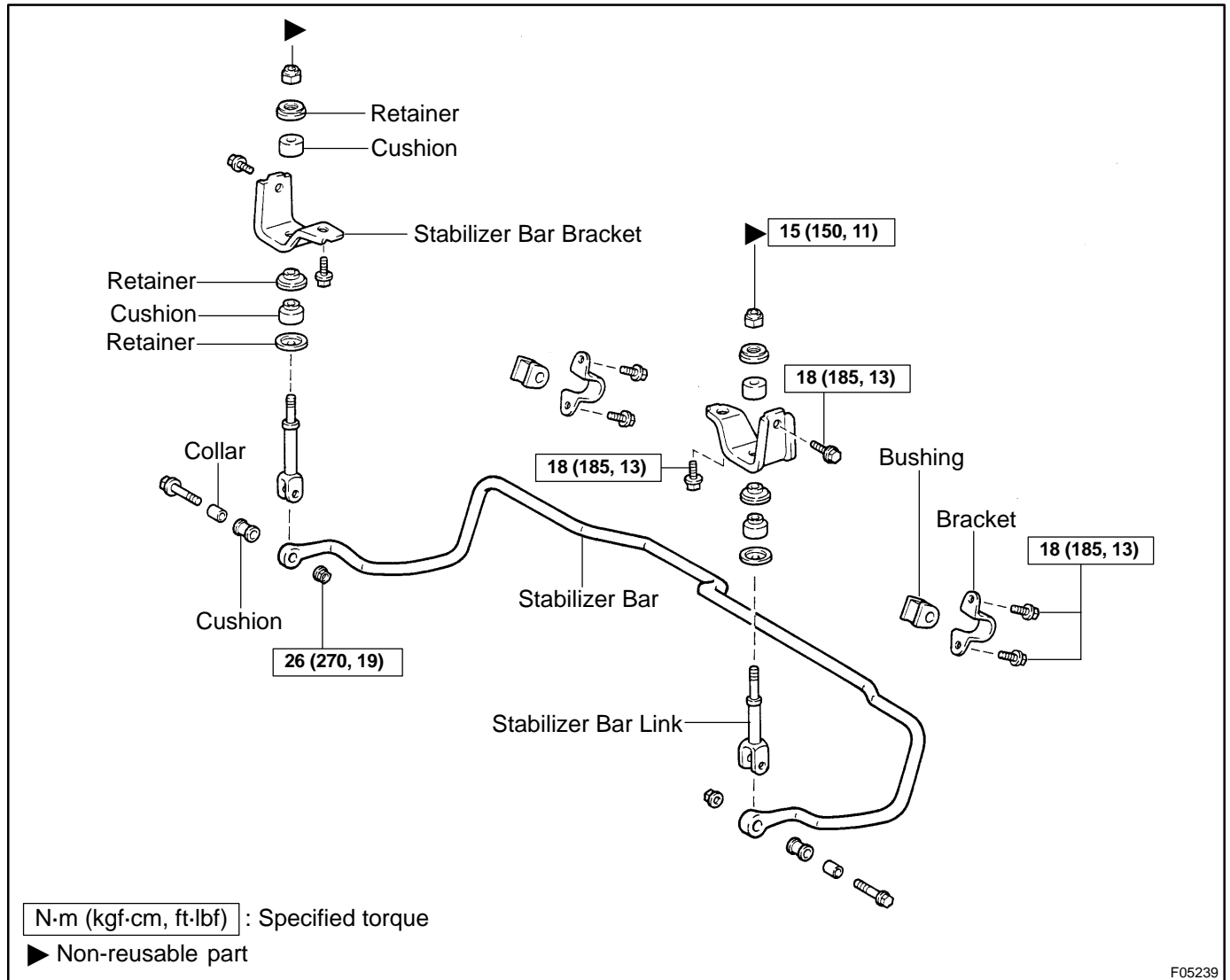
**B: 150 N·m (1,530 kgf·cm, 111 ft·lbf)**

**HINT:**

At the time of installation, after stabilizing the suspension, torque the nut and bolt.

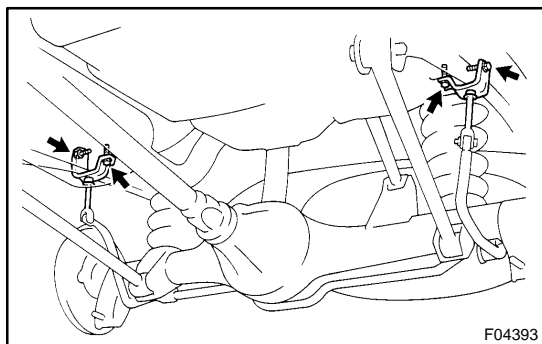
# REAR STABILIZER BAR COMPONENTS

SA16L-02



## REMOVAL

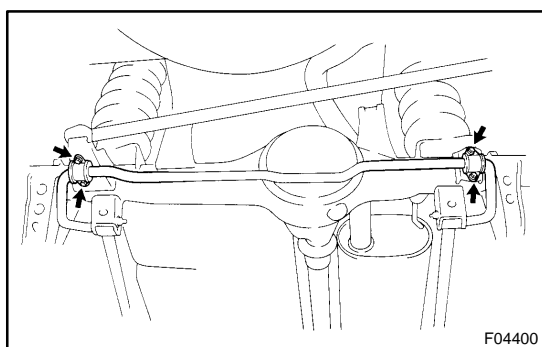
1. REMOVE REAR WHEELS  
Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)
2. SUPPORT REAR AXLE HOUSING WITH JACK



3. DISCONNECT LH AND RH STABILIZER BAR BRACKETS

Remove the 4 bolts and disconnect the LH and RH stabilizer bar brackets.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**



4. REMOVE STABILIZER BAR

(a) Remove the 4 bolts and stabilizer bar with the bushings and brackets.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

(b) Remove the 2 brackets and 2 bushings from the stabilizer bar.

5. REMOVE BOTH STABILIZER BAR LINKS FROM STABILIZER BAR

(a) Remove the nut, 3 retainers, 2 cushions and disconnect the stabilizer bar link from the bracket.

**Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)**

(b) Employ the same manner described above to the other side.

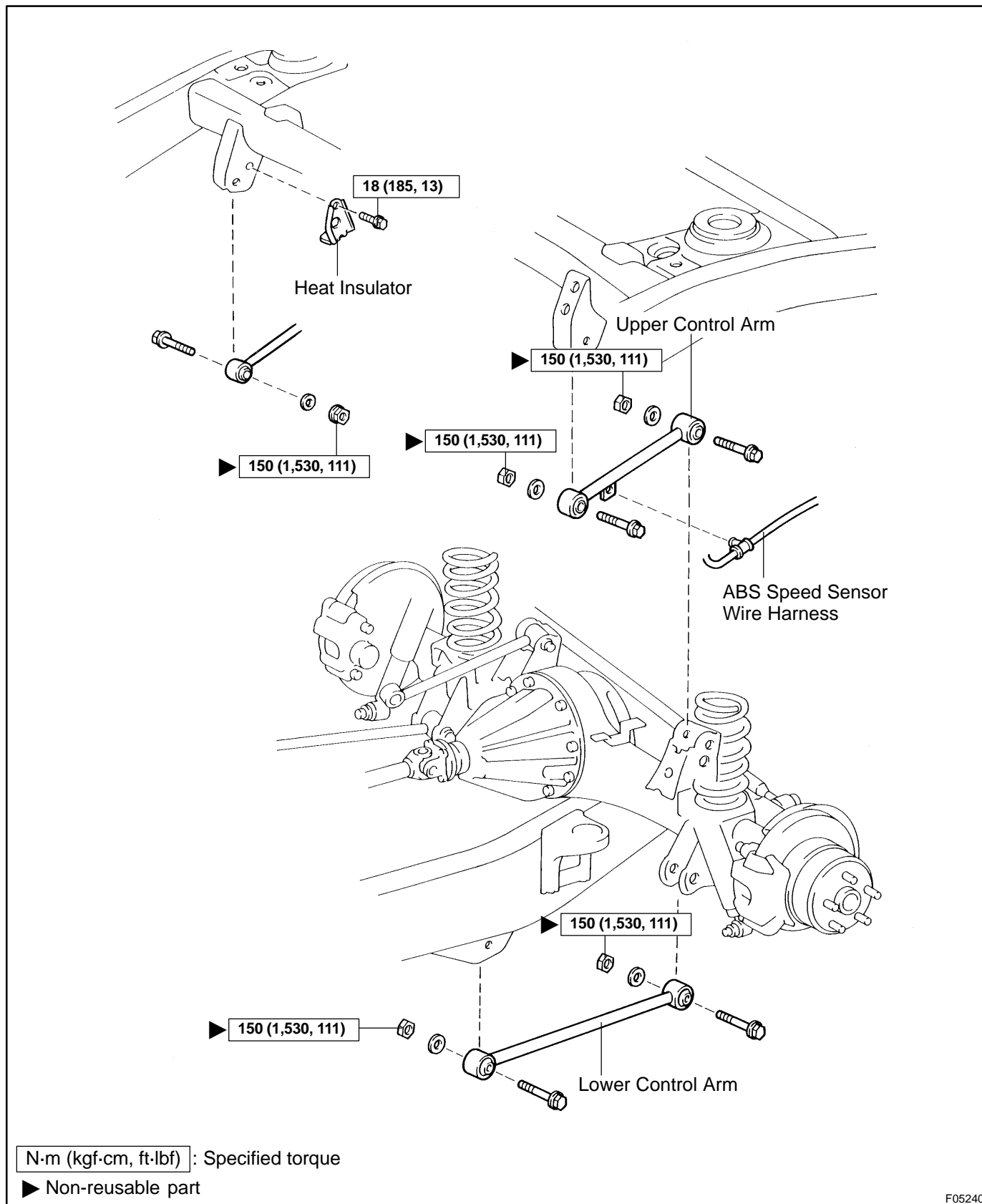
(c) Remove the 2 nuts, bolts and stabilizer bar links.

**Torque: 26 N·m (270 kgf·cm, 19 ft·lbf)**

(d) Remove the 2 collars and cushions.

# REAR UPPER AND LOWER CONTROL ARM COMPONENTS

SA16I-02



## INSTALLATION

Installation is in the reverse order of removal (See page [SA-182](#) ).

## REMOVAL

### 1. REMOVE REAR WHEEL

**Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)**

### 2. SUPPORT REAR AXLE HOUSING WITH JACK

### 3. REMOVE UPPER CONTROL ARM

(a) Disconnect the ABS speed sensor wire harness.

(b) RH side:

Remove the bolt and heat insulator.

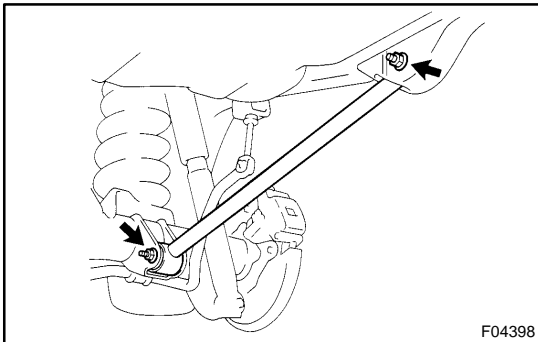
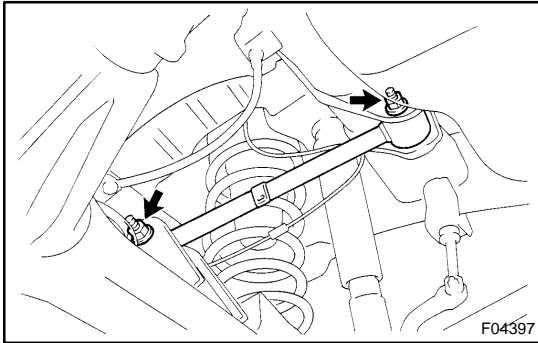
**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

(c) Remove the 2 nuts, washers, bolts and upper control arm.

**Torque: 150 N·m (1,530 kgf·cm, 111 ft·lbf)**

HINT:

At the time of installation, after stabilizing the suspension, torque the nuts.



### 4. REMOVE LOWER CONTROL ARM

Remove the 2 nuts, washers, bolts and lower control arm.

**Torque: 150 N·m (1,530 kgf·cm, 111 ft·lbf)**

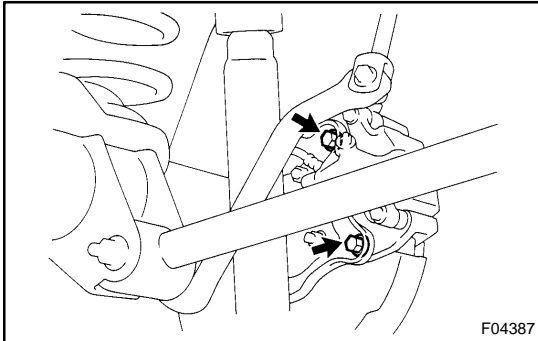
HINT:

At the time of installation, after stabilizing the suspension, torque the nuts.

# REAR WHEEL HUB BOLT REPLACEMENT

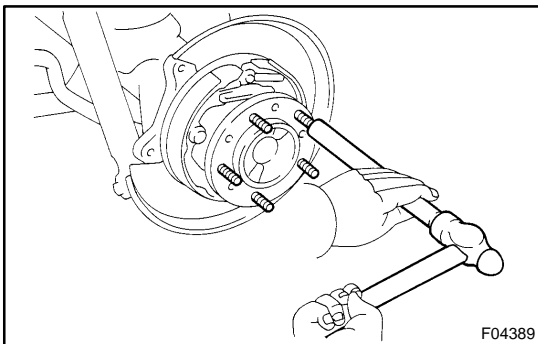
SA15J-02

## 1. REMOVE REAR WHEEL



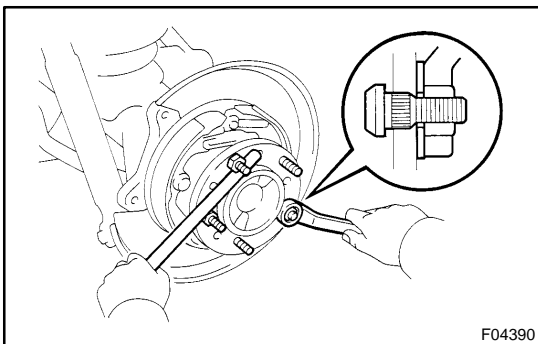
## 2. REMOVE BRAKE CALIPER AND DISC

- (a) Remove the 2 bolts, brake caliper and disc.
- (b) Support the brake caliper securely.



## 3. REMOVE HUB BOLT

Using a brass bar and hammer, remove the hub bolt.



## 4. INSTALL HUB BOLT

Install a washer and nut to a new hub bolt, as shown in the illustration, and install the hub bolt by torquing the nut.

## 5. INSTALL DISC AND BRAKE CALIPER

Install the disc and brake caliper with the 2 bolts.

**Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)**

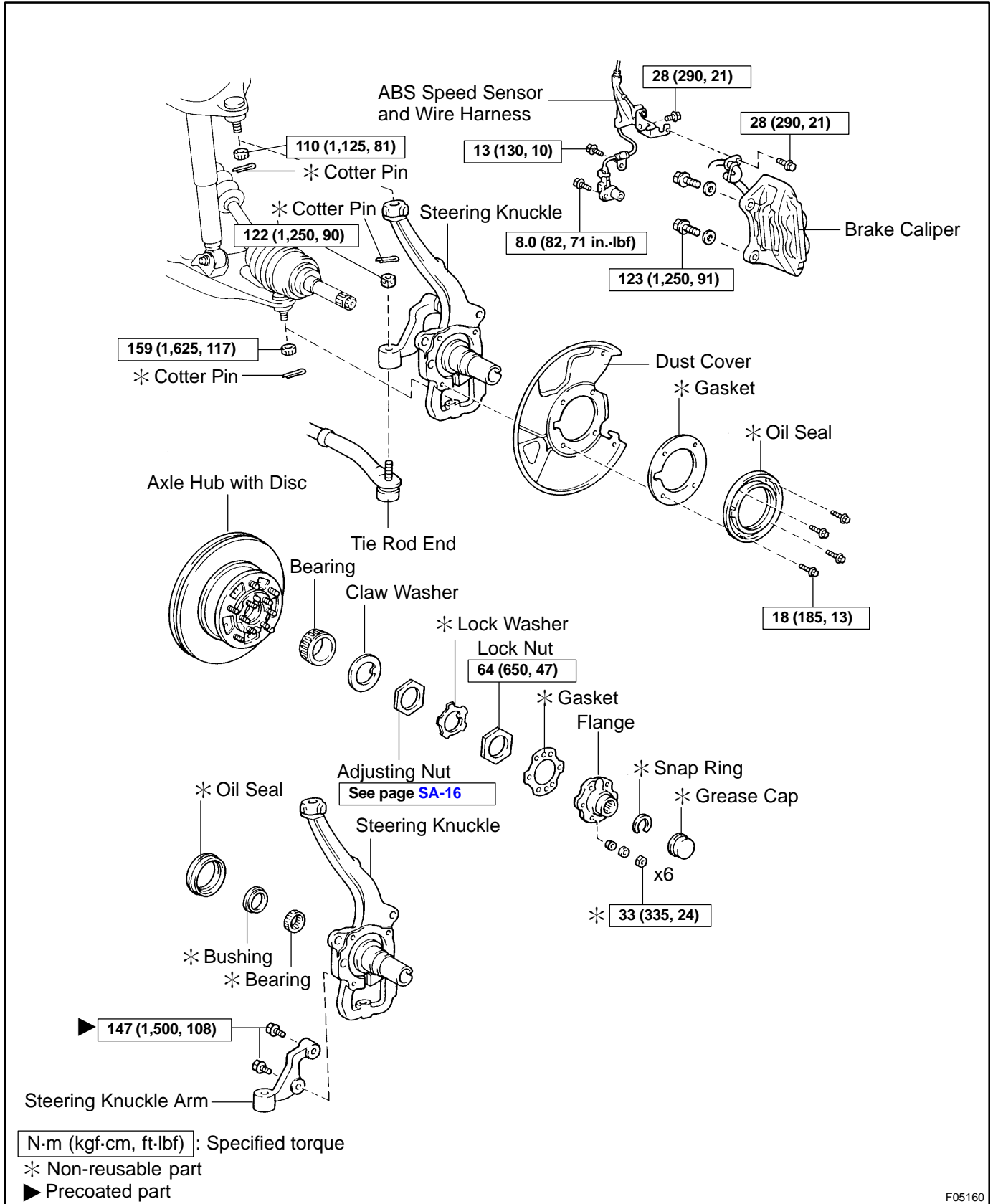
## 6. INSTALL REAR WHEEL

**Torque: 131 N·m (1,340 kgf·cm, 97 ft·lbf)**



# STEERING KNUCKLE COMPONENTS

SA149-05



F05160

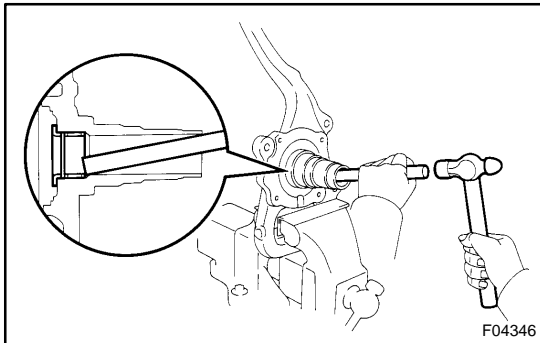
## DISASSEMBLY

### 1. REMOVE STEERING KNUCKLE ARM

Remove the 2 bolts and steering knuckle arm.

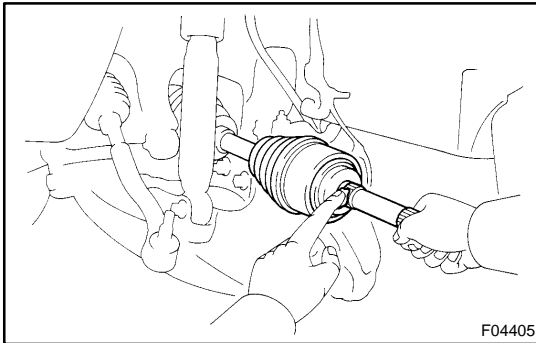
### 2. REMOVE OIL SEAL

Using a screwdriver and hammer, remove the oil seal.



### 3. REMOVE BEARING AND BUSHING

Using a brass and hammer, remove the bearing and bushing.



## INSTALLATION

### 1. INSTALL STEERING KNUCKLE

- Apply synthetic oil and lithium soap base chassis grease, NLGI No. 1 to the drive shaft.
- Support the lower suspension arm with jack and connect the steering knuckle to the lower suspension arm.

#### NOTICE:

**Be careful not to damage the oil seal.**

- Temporarily install the nut to lower suspension arm.
- Raise up the lower suspension arm using a jack and install the steering knuckle to the upper suspension arm with a nut.

**Torque: 110 N·m (1,125 kgf·cm, 81 ft·lbf)**

- Install a new cotter pin.

If the holes for the cotter pin are not aligned, tighten the nut further up to 60°.

- Torque the nut of the lower suspension arm.

**Torque: 159 N·m (1,625 kgf·cm, 117 ft·lbf)**

- Install a new cotter pin.

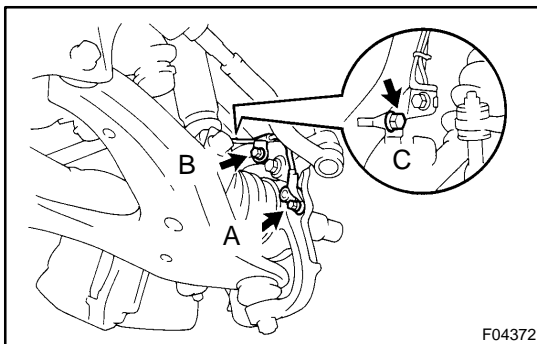
### 2. CONNECT TIE ROD END

- Connect the tie rod end to steering knuckle with nut.

**Torque: 122 N·m (1,250 kgf·cm, 91 ft·lbf)**

- Install a new cotter pin.

If the holes for the cotter pin are not aligned, tighten the nut further up to 60°.



### 3. CONNECT ABS SPEED SENSOR AND WIRE HARNESS

Install the wire harness and 3 bolts.

**Torque:**

**A: 8.0 N·m (82 kgf·cm, 71 in.-lbf)**

**B: 13 N·m (130 kgf·cm, 10 ft·lbf)**

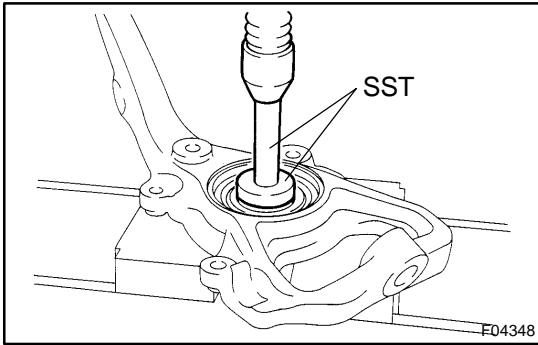
**C: 28 N·m (290 kgf·cm, 21 ft·lbf)**

### 4. INSTALL DUST COVER, GASKET AND OIL SEAL

Install the dust cover, new gasket and oil seal with the 4 bolts.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**

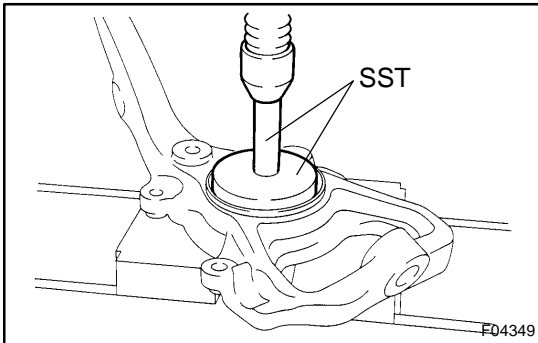
### 5. INSTALL FRONT AXLE HUB (See page SA-16 )



## REASSEMBLY

### 1. INSTALL BEARING AND BUSHING

- (a) Using SST and a press, install a new bearing and bushing.  
SST 09950-60010 (09951-00540),  
09950-70010 (09951-07100)
- (b) Apply synthetic oil and lithium soap base chassis grease, NLGI No. 1 to the steering knuckle inner side of the bushing.



### 2. INSTALL OIL SEAL

- (a) Using SST and a press, install a new oil seal.  
SST 09950-60020 (09951-00910),  
09950-70010 (09951-07100)
- (b) Coat the lip of the oil seal with MP grease.

### 3. INSTALL STEERING KNUCKLE ARM

- (a) Clean the threads of the 2 bolts and steering knuckle with toluene or trichloroethylene.
- (b) Apply sealant to the bolt threads.

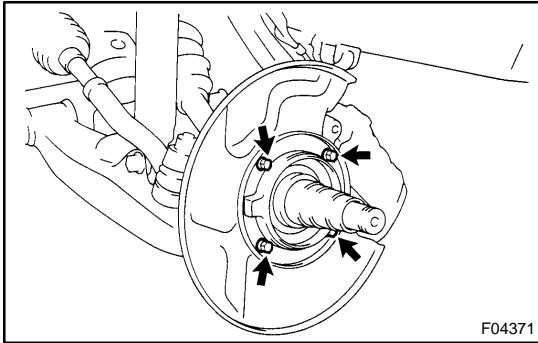
#### Sealant:

**Part No. 08833-00070, THREE BOND 1324 or equivalent**

- (c) Install the steering knuckle arm with the 2 bolts.  
**Torque: 147 N·m (1,500 kgf·cm, 108 ft·lbf)**

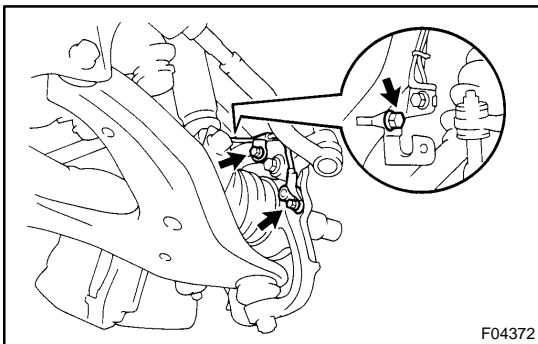
## REMOVAL

### 1. REMOVE FRONT AXLE HUB (See page SA-12)



### 2. REMOVE OIL SEAL, GASKET AND DUST COVER

Remove the 4 bolts, oil seal, gasket and dust cover.

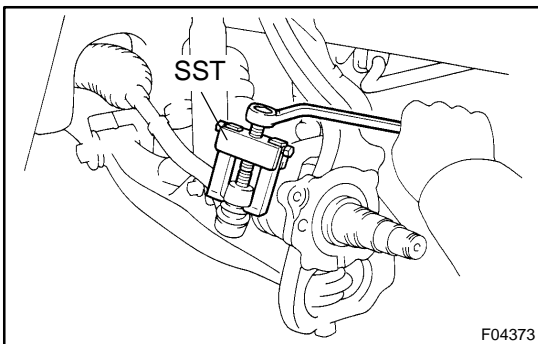


### 3. DISCONNECT ABS SPEED SENSOR AND WIRE HARNESS

Remove the 3 bolts and disconnect the ABS speed sensor and wire harness.

### 4. DISCONNECT TIE ROD END FROM STEERING KNUCKLE ARM

(a) Remove the cotter pin and nut.

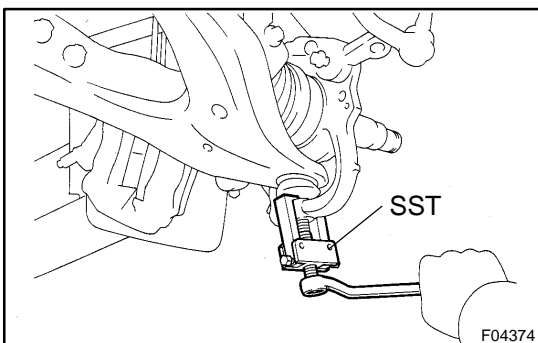


(b) Using SST, disconnect the tie rod end from the steering knuckle arm.

SST 09628-6201 1

### 5. DISCONNECT LOWER SUSPENSION ARM FROM STEERING KNUCKLE

(a) Remove the cotter pin and nut.



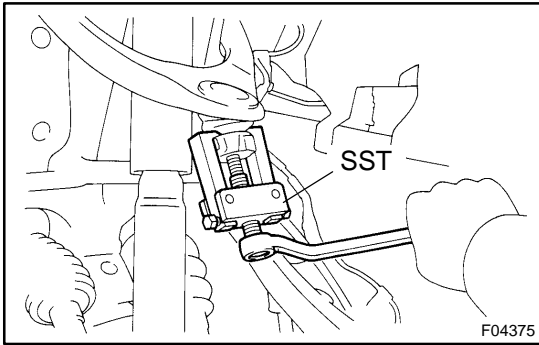
(b) Using SST, disconnect the lower suspension arm from the steering knuckle.

SST 09628-6201 1

### 6. REMOVE STEERING KNUCKLE

(a) Remove the cotter pin and nut.

(b) Temporarily install the nut to the lower suspension arm.



- (c) Using SST, disconnect the steering knuckle from the upper suspension arm.  
SST 09628-6201 1
- (d) Remove the nut and steering knuckle from the lower suspension arm.

# TIRE AND WHEEL INSPECTION

SA141-04

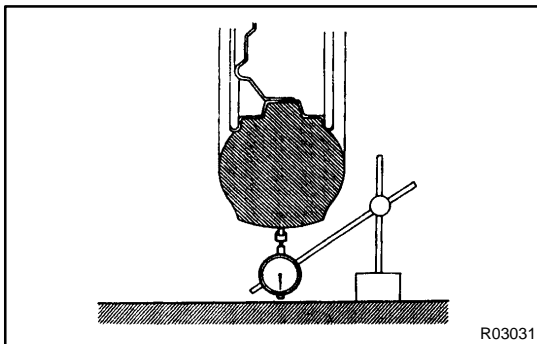
## 1. INSPECT TIRE

(a) Check the tires for wear and proper inflation pressure.

**Cold tire inflation pressure:**

Tire size	Front kPa (kgf/cm <sup>2</sup> , psi)	Rear kPa (kgf/cm <sup>2</sup> , psi)
P275/70R16	200 (2.0, 29) *220 (2.2, 32)	220 (2.2, 32) *240 (2.4, 35)

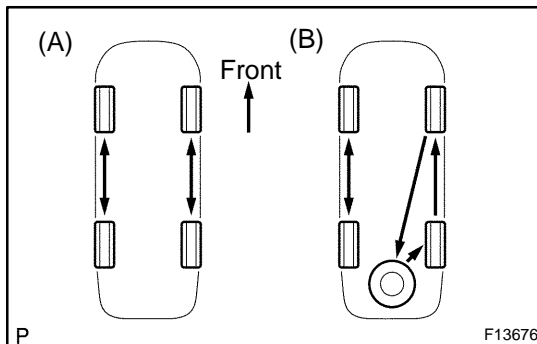
\*: Trailer towing



R03031

(b) Check the tire runout.

**Tire runout: 3.0 mm (0.118 in.) or less**



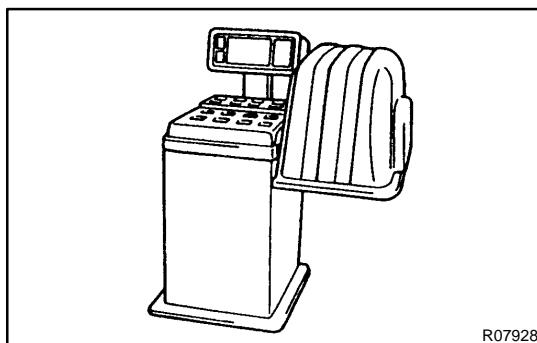
P

F13676

## 2. ROTATE TIRE

HINT:

- ▶ Rotate tires as shown in the illustration.
- ▶ Rotate as shown in (B) if the spare tire is included in the rotation.



R07928

## 3. INSPECT WHEEL BALANCE

(a) Check and adjust the Off-the car balance.

(b) If necessary, check and adjust the On-the car balance.

**Imbalance after adjustment: 14.0 g (0.031 lb) or less**

4. **CHECK FRONT SUSPENSION FOR LOOSENESS**
5. **CHECK STEERING LINKAGE FOR LOOSENESS**
6. **CHECK BALL JOINT FOR LOOSENESS**
7. **CHECK SHOCK ABSORBER WORKS PROPERLY**
  - ▶ Check that oil leaks
  - ▶ Check the mounting bushings for wear
  - ▶ Bounce front and rear of the vehicle



# TROUBLESHOOTING

## PROBLEM SYMPTOMS TABLE

SA140-09

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

**(w/ Differential locking system):**

- ▶ **Check that the transfer shift lever is shifted to the L position.**
- ▶ **When switching differential Free ↔ Lock, the indicator light will blink if the gears of the differential lock sleeve are not meshed. If this occurs, when the tires are rotated to apply differential power to the differential, the differential locks and the indicator light lights up.**

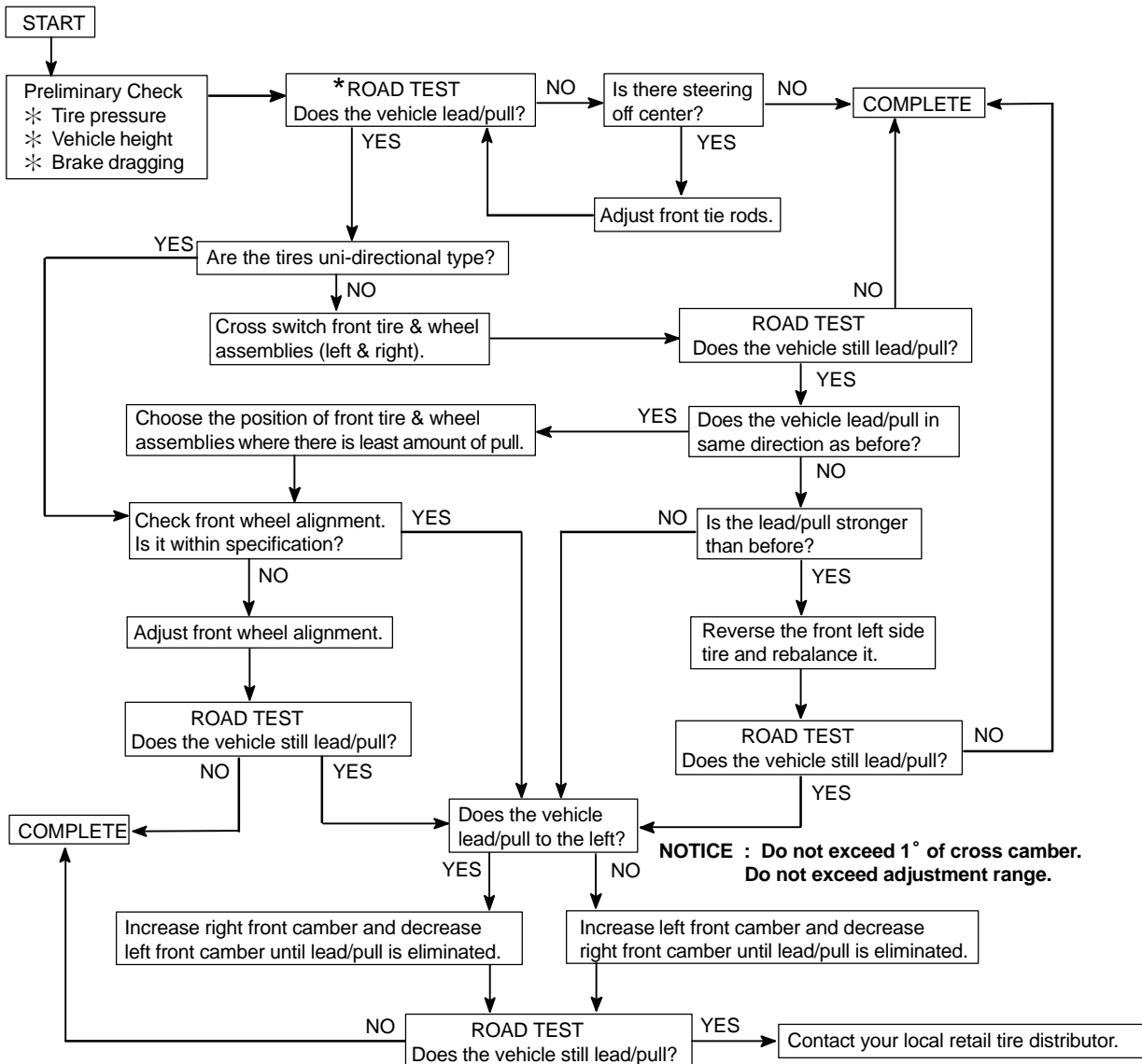
Symptom	Suspect Area	See page
Bottoming	<ol style="list-style-type: none"> <li>1. Vehicle (Overloaded)</li> <li>2. Spring (Weak)</li> <li>3. Shock absorber (Worn)</li> </ol>	<p>-</p> <p>SA-65</p> <p>SA-171</p> <p>SA-62</p> <p>SA-174</p>
Sways/pitches	<ol style="list-style-type: none"> <li>1. Tire (Worn or improperly inflated)</li> <li>2. Stabilizer bar (Bent or broken)</li> <li>3. Shock absorber (Worn)</li> </ol>	<p>SA-4</p> <p>SA-80</p> <p>SA-184</p> <p>SA-62</p> <p>SA-174</p>
Front wheel shimmy	<ol style="list-style-type: none"> <li>1. Tire (Worn or improperly inflated)</li> <li>2. Wheel (Out of balance)</li> <li>3. Shock absorber (Worn)</li> <li>4. Wheel alignment (Incorrect)</li> <li>5. Ball joint (Worn)</li> <li>6. Hub bearing (Loosen or worn)</li> <li>7. Steering linkage (Loosen or worn)</li> <li>8. Steering gear (Out of adjustment or broken)</li> </ol>	<p>SA-4</p> <p>SA-4</p> <p>SA-62</p> <p>SA-6</p> <p>SA-71</p> <p>SA-76</p> <p>SA-11</p> <p>-</p> <p>SR-48</p>
Abnormal tire wear	<ol style="list-style-type: none"> <li>1. Tire (Improperly inflated)</li> <li>2. Wheel alignment (Incorrect)</li> <li>3. Shock absorber (Worn)</li> <li>4. Suspension parts (Worn)</li> </ol>	<p>SA-4</p> <p>SA-6</p> <p>SA-62</p> <p>SA-174</p> <p>-</p>
Noise in front differential	<ol style="list-style-type: none"> <li>1. Oil level (Low or wrong grade)</li> <li>2. Excessive backlash between pinion and ring gear</li> <li>3. Ring, pinion or side gears (Worn or chipped)</li> <li>4. Pinion shaft bearing (Worn)</li> <li>5. Side bearing (Worn)</li> </ol>	<p>SA-35</p> <p>SA-40</p> <p>SA-40</p> <p>SA-40</p> <p>SA-40</p>
Oil leak from front differential	<ol style="list-style-type: none"> <li>1. Oil level (Too high or wrong grade)</li> <li>2. Front differential rear oil seal (Worn or damaged)</li> <li>3. Side gear oil seal (Worn or damaged)</li> <li>4. Companion flange (Loosen or damaged)</li> <li>5. Side gear shaft (Damaged)</li> </ol>	<p>SA-35</p> <p>SA-40</p> <p>SA-40</p> <p>SA-40</p> <p>SA-40</p>

Noise in rear axle	<ol style="list-style-type: none"> <li>1. Oil level (Low or wrong grade)</li> <li>2. Excessive backlash between pinion and ring gear</li> <li>3. Ring, pinion or side gears (Worn or chipped)</li> <li>4. Pinion shaft bearing (Worn)</li> <li>5. Axle shaft bearing (Worn)</li> </ol>	<a href="#">SA-95</a> <a href="#">SA-102</a> <a href="#">SA-121</a> <a href="#">SA-143</a> <a href="#">SA-102</a> <a href="#">SA-121</a> <a href="#">SA-143</a> <a href="#">SA-102</a> <a href="#">SA-121</a> <a href="#">SA-143</a> <a href="#">SA-83</a>
Oil leak from rear axle	<ol style="list-style-type: none"> <li>1. Oil seal (Worn or damaged)</li> <li>2. Rear axle housing (Cracked)</li> </ol>	<a href="#">SA-83</a> -
Oil leak from rear differential	<ol style="list-style-type: none"> <li>1. Oil level (Too high or wrong grade)</li> <li>2. Rear differential front oil seal (Worn or damaged)</li> <li>3. Companion flange (Loosen or damaged)</li> </ol>	<a href="#">SA-95</a> <a href="#">SA-95</a> <a href="#">SA-102</a> <a href="#">SA-121</a> <a href="#">SA-143</a>
Diff. lock Indicator lights do not light up	<ol style="list-style-type: none"> <li>1. Fusible link (Blown)</li> <li>2. GAUGE fuse (Blown)</li> <li>3. Bulb (Burned out)</li> <li>4. Wiring or ground (Faulty)</li> </ol>	- - - -
Diff. lock Indicator lights do not light up (Diff. lock control switch RR position)	<ol style="list-style-type: none"> <li>1. Diff. fuse (Blown)</li> <li>2. Diff. lock control switch (Faulty)</li> <li>3. Diff. lock ECU (Faulty)</li> <li>4. Wiring or ground (Faulty)</li> </ol>	- <a href="#">SA-163</a> <a href="#">SA-163</a> -
Differential lock does not operate	<ol style="list-style-type: none"> <li>1. Diff. lock control switch (Faulty)</li> <li>2. Diff. lock actuator (Faulty)</li> <li>3. Diff. lock ECU (Faulty)</li> <li>4. Differential carrier (Faulty)</li> <li>5. Wiring or ground (Faulty)</li> </ol>	<a href="#">SA-163</a> <a href="#">SA-163</a> <a href="#">SA-163</a> - -
After differential lock, lock is not released When vehicle speed is at 8 km/h (5 mph) or more	<ol style="list-style-type: none"> <li>1. Speed sensor (Faulty)</li> <li>2. Diff. lock ECU (Faulty)</li> <li>3. Wiring or ground (Faulty)</li> </ol>	<a href="#">SA-163</a> <a href="#">SA-163</a> -

# REPAIR PROCEDURES

HINT:

This is a flow chart for vehicle pull.



\* Select a flat road where the vehicle can be driven in a straight line for 100 meters at a constant speed of 35mph. Please confirm safety and set the steering wheel to its straight position. Drive the vehicle in a straight line for 100 meters at a constant speed of 35mph without holding the steering wheel.

(1) The vehicle can keep straight but the steering wheel has some angle. —> STEERING OFF CENTER (See page SR-10)

(2) The vehicle cannot keep straight. —> STEERING PULL

## BRAKE FLUID BLEEDING

BR12E-07

### HINT:

- ▶ If any work is done on the brake system or if air in the brake lines is suspected, bleed the air from the system.
- ▶ When bleeding, keep the amount of the fluid within the line of reservoir between Min. and Max.

### NOTICE:

- ▶ **Do not let brake fluid remain on painted surfaces. Wash it off immediately.**
- ▶ **With the reservoir cap removed, when depressing the brake pedal, the fluid will spray.**

### 1. FILL RESERVOIR WITH BRAKE FLUID

Fluid: SAE J1703 or FMVSS NO. 116 DOT3

### 2. In case of using TOYOTA hand-held tester: BLEED HYDRAULIC BRAKE BOOSTER

### HINT:

If the hydraulic brake booster has been disassembled, disconnect the brake line from the hydraulic brake booster or if the reservoir becomes empty, bleed the hydraulic brake booster.

- (a) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

### HINT:

When a pressure in power supply system is released, reaction force becomes light and stroke becomes longer.

- (b) Turn the ignition switch ON, check that the pump stops after approx. 30 to 40 sec.

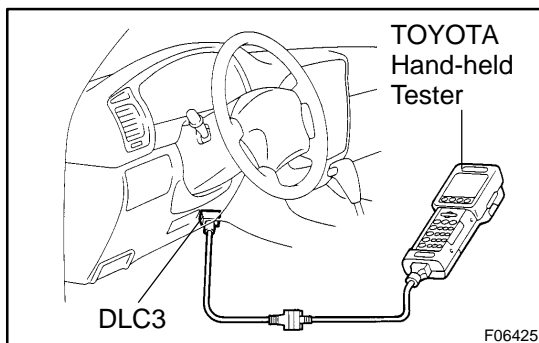
### NOTICE:

**When the pump does not stop, repeat step (a) and (b) again.**

- (c) With the ignition switch remained ON, depress the brake pedal more than 20 times.
- (d) Observe the procedure in step 4 and bleed the right and left front brake caliper.
- (e) Holding the brake pedal depressed, bleed the right and left rear brake caliper.

### HINT:

It is not necessary to depress the pedal continuously, as brake fluid flows out by first depressing.



- (f) Connect TOYOTA hand-held tester.
- (1) Turn the ignition switch OFF, connect the TOYOTA hand-held tester to DLC3.
- (2) Turn the ignition switch ON and select "AIR BLEEDING" on the TOYOTA hand-held tester.

### HINT:

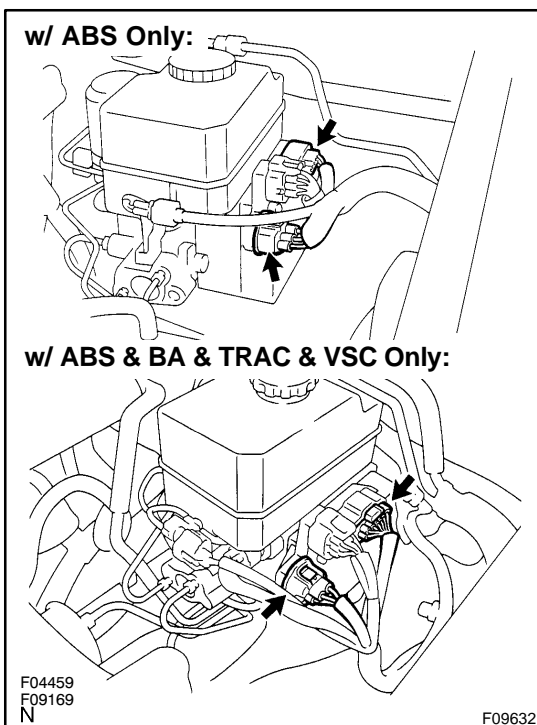
Please refer to the TOYOTA hand-held tester operator's manual for further details.

- (g) Bleed right front brake line.
  - (1) Select "FR LINE" on the TOYOTA hand-held tester.
  - (2) With "FR LINE" turned ON with the TOYOTA hand-held tester, depress the brake pedal and hold it to bleed the right front brake caliper.
  - (3) Repeat step (2) until there are no more air bubbles in the fluid.
- (h) Bleed left front brake line.
  - (1) Select "FL LINE" on the TOYOTA hand-held tester.
  - (2) With "FL LINE" turned ON with the TOYOTA hand-held tester, depress the brake pedal and hold it to bleed the left front brake caliper.
  - (3) Repeat step (2) until there are no more air bubbles in the fluid.
- (i) w/ ABS & TRAC & VSC only:  
Bleed rear brake line.
  - (1) Select "RR LINE" on the TOYOTA hand-held tester.
  - (2) With "RR LINE" turned ON with the TOYOTA hand-held tester, bleed the left and right rear brake caliper.
- (j) Disconnect the TOYOTA hand-held tester from DLC3.
- (k) Clear the DTC (See page [DI-505](#) ).

**3. In case of using ABS actuator checker (SST):  
BLEED HYDRAULIC BRAKE BOOSTER**

**HINT:**

If the hydraulic brake booster has been disassembled, disconnect the brake line from the hydraulic brake booster or if the reservoir becomes empty, bleed the hydraulic brake booster.



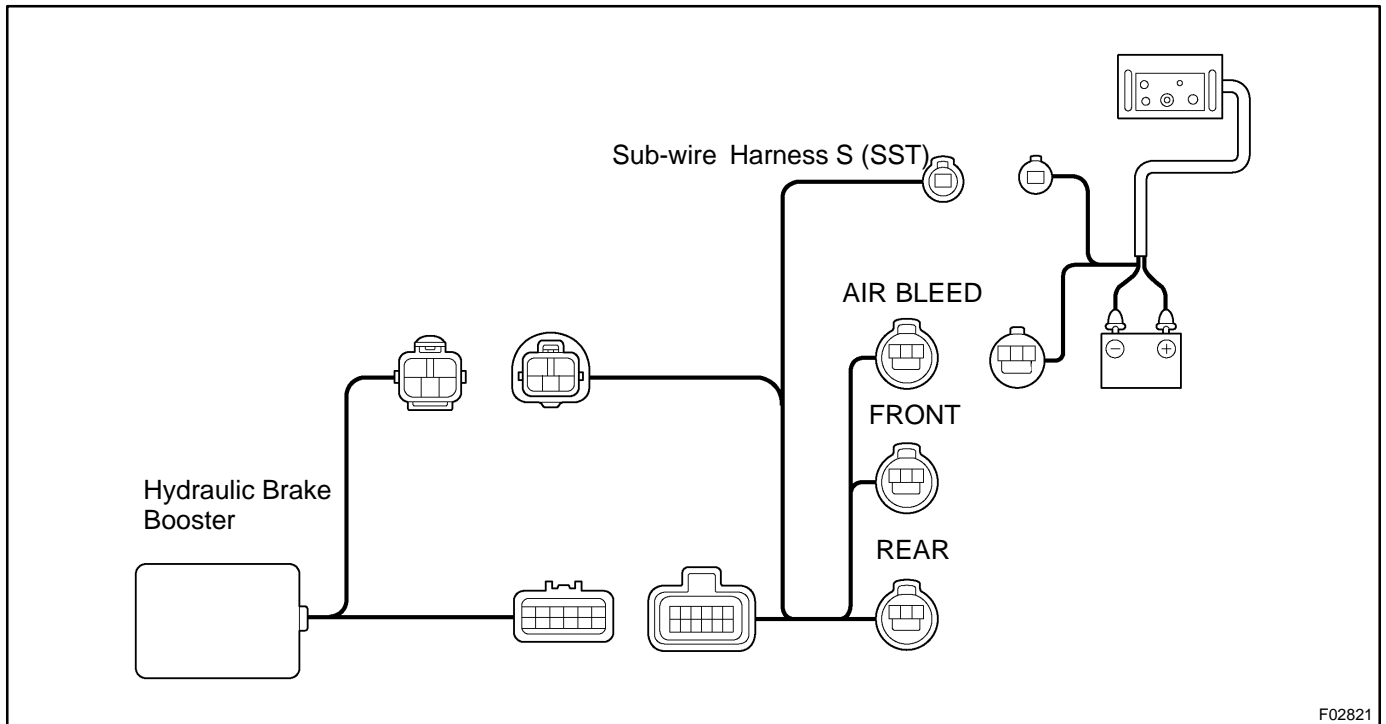
- (a) Disconnect the 2 connectors from the hydraulic brake booster.

- (b) Connect the actuator checker (SST) to the hydraulic brake booster side wire harness via the sub-wire harness (SST), as shown in the chart below.  
SST 09990-00150, 09990-00480

**HINT:**

Connect the connector with the label of "AIR BLEED" attached to the connector of actuator checker.

- (c) Connect the red cable of the checker to the battery positive (+) terminal and the black cable to the negative (-) terminal.



- (d) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

**HINT:**

When a pressure in power supply system is released, reaction force becomes light and stroke becomes longer.

- (e) Turn the ignition switch ON, check that the pump stops after 30 to 40 sec.

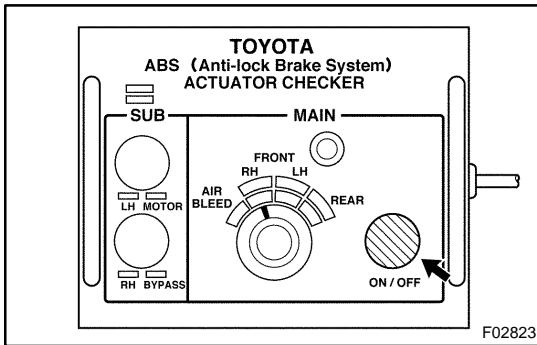
**NOTICE:**

**When the pump does not stop, repeat step (d) and (e) again.**

- (f) With the ignition switch remained ON, depress the brake pedal more than 20 times.  
(g) Observe the procedure in step 4 and bleed the right and left front wheel caliper.  
(h) Holding the brake pedal depressed, bleed the right and left rear brake caliper.

**HINT:**

It is not necessary to depress the pedal continuously, as brake fluid flows out by first depressing.

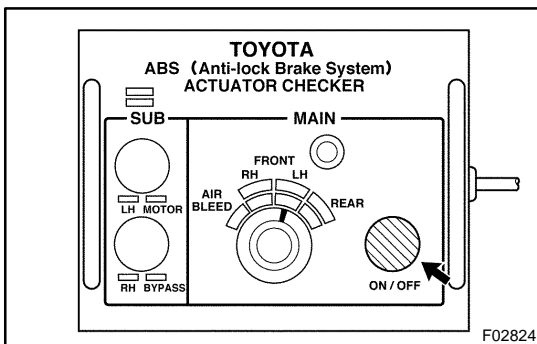


- (i) Bleed right front brake line.
- (1) Turn the selector switch of the actuator checker to the "FRONT RH" position.
  - (2) Push and hold in MAIN push switch, depress the brake pedal and hold it to bleed the right front brake caliper.

**NOTICE:**

**Do not keep the MAIN switch pushed in for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

- (3) Repeat step (2) until there are no more air bubbles in the fluid.

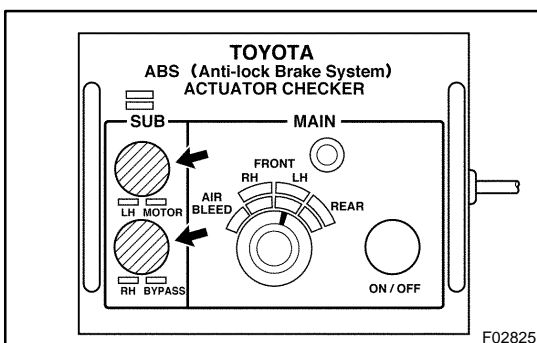


- (j) Bleed left front brake line.
- (1) Turn the selector switch of the actuator checker to the "FRONT LH" position.
  - (2) Push and hold in the MAIN push switch, depress the brake pedal and hold it to bleed the left front brake caliper.

**NOTICE:**

**Do not keep the MAIN switch pushed in for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

- (3) Repeat step (2) until there are no more air bubbles in the fluid.



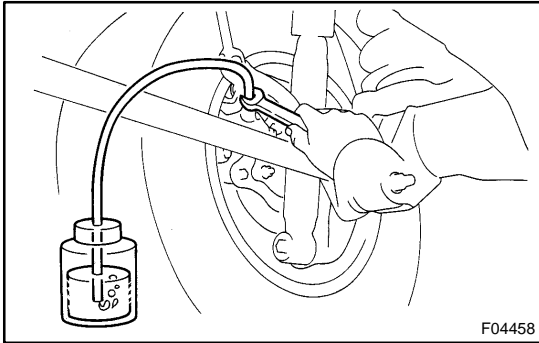
- (k) w/ ABS & TRAC & VSC only:  
Bleed right rear brake line.
- (1) Push and hold in the "SUB LH" and "SUB RH" switches, bleed the right rear brake caliper.

**NOTICE:**

**Do not keep the MAIN switch pushed in for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

- (2) Repeat step (1) until there are no more air bubbles in the fluid.

- (l) Observe the procedure in step (k) and bleed left rear brake line.
- (m) Disconnect the actuator checker (SST) and sub-wire harness (SST) from the actuator.  
SST 09990-00150, 09990-00480
- (n) Connect the 2 connectors to the hydraulic brake booster.
- (o) Clear the DTC (See page [DI-505](#)).



#### 4. BLEED BRAKE LINE

- (a) Connect the vinyl tube to the brake caliper.
- (b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.
- (c) At the point when fluid stops coming out, tighten the bleeder plug, then release the brake pedal.
- (d) Repeat (b) and (c) until all the air in the fluid has been bled out.
- (e) Repeat the above procedure to bleed the brake line for each wheel.

**Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)**

#### 5. CHECK FLUID LEVEL IN RESERVOIR

- (a) With the ignition switch OFF, depress the brake pedal more than 40 times.

#### HINT:

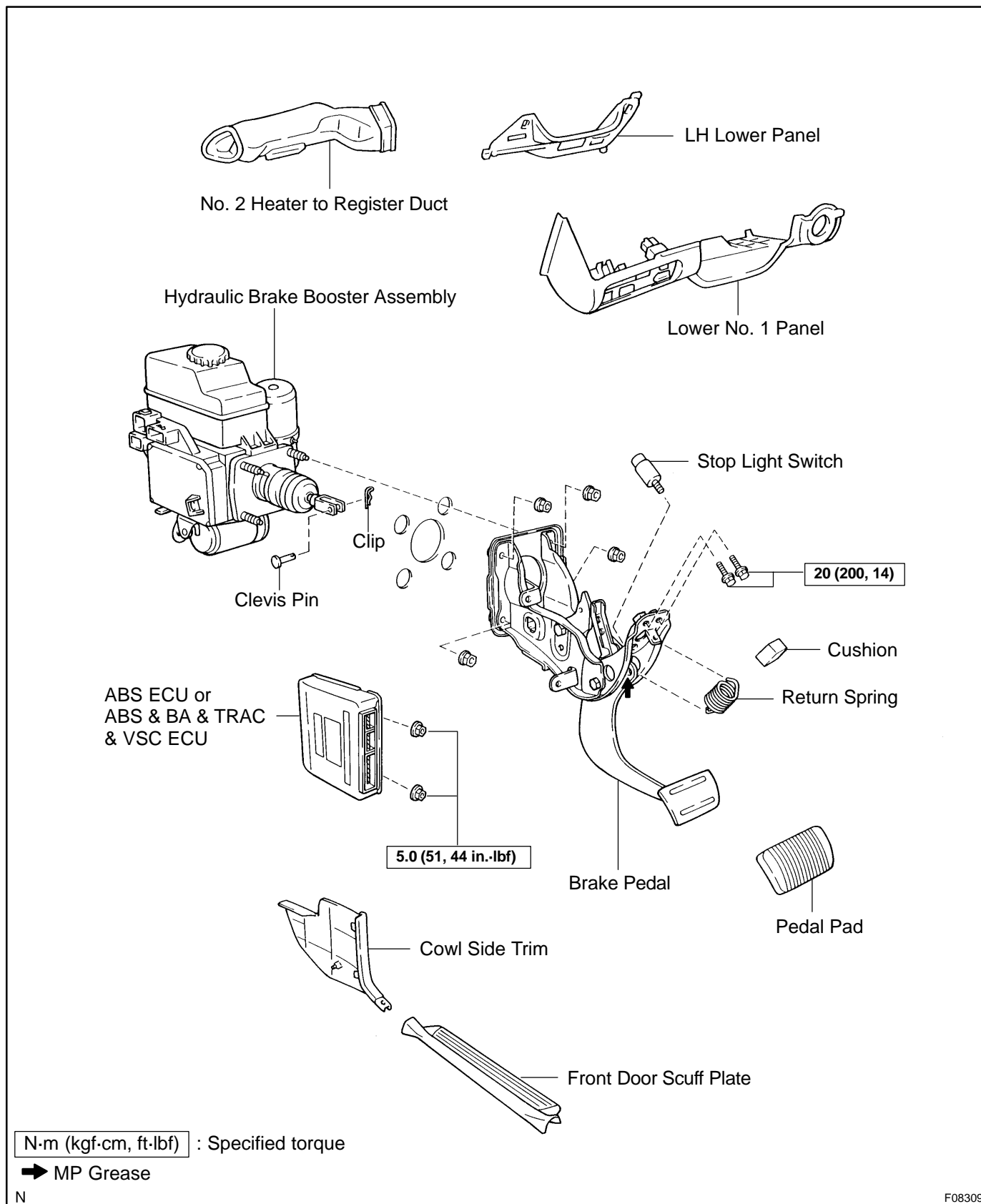
When a pressure in power supply system is released, reaction force becomes light and stroke becomes longer.

- (b) Remove the reservoir cap. Add brake fluid up to the "MAX" line.

**Fluid: SAE J1703 or FMVSS NO. 116 DOT3**



# COMPONENTS



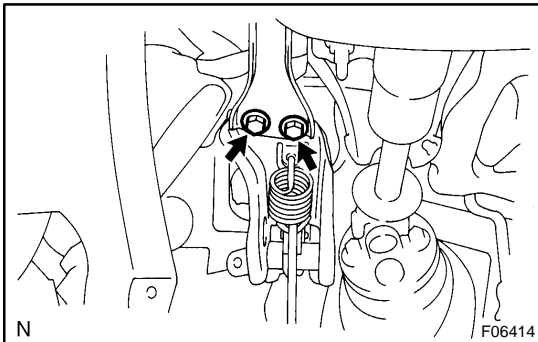
## INSTALLATION

### 1. REASSEMBLY BRAKE PEDAL

- (a) Install the pedal pad.
- (b) Install the stop light switch cushion.
- (c) Temporarily install the stop light switch to the pedal bracket.
- (d) Install the return spring with cushion and pedal pad.

#### HINT:

Apply MP grease to the parts indicates by arrow (See page [BR-1 1](#)).



### 2. INSTALL BRAKE PEDAL ASSEMBLY

Install the brake pedal assembly and temporarily fasten the 2 bolts.

### 3. INSTALL HYDRAULIC BRAKE BOOSTER

(See page [BR-67](#) )

### 4. TIGHTEN 2 BOLTS OF BRAKE PEDAL BRACKET

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

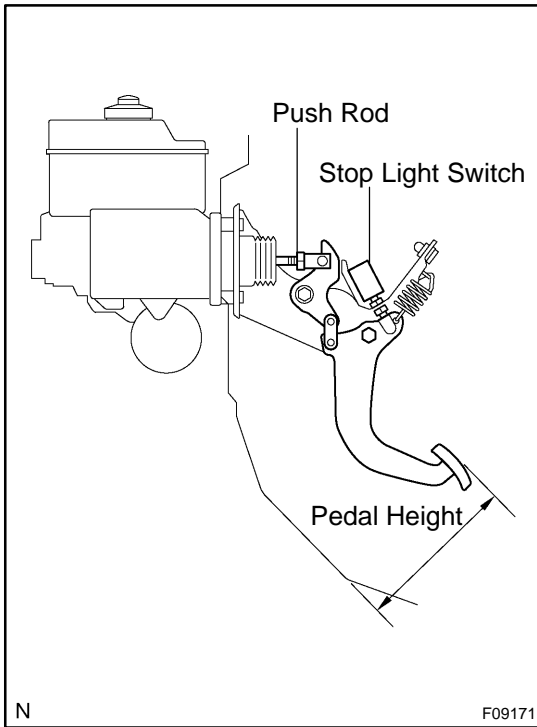
### 5. AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM

(See page [BR-4](#) )

### 6. CHECK FOR LEAKS

### 7. CHECK AND ADJUST BRAKE PEDAL

(See page [BR-9](#) )



## BRAKE PEDAL ON-VEHICLE INSPECTION

BRQJB-08

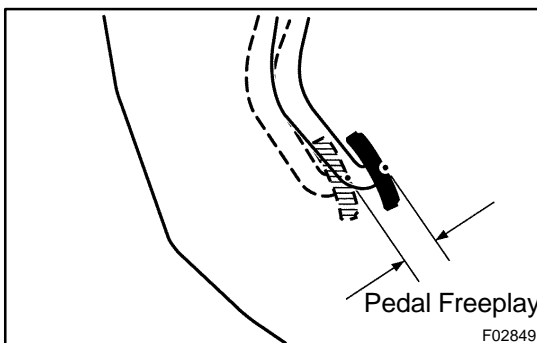
### 1. CHECK PEDAL HEIGHT

**Pedal height from asphalt sheet:  
183.7 - 193.7 mm (7.232 - 7.626 in.)**

If the pedal height is incorrect, adjust it.

### 2. IF NECESSARY, ADJUST PEDAL HEIGHT

- (a) Remove the scuff plate, cowl side trim, lower No. 1 panel, LH lower panel and No. 2 heater to register duct (See page [BO-81](#)).
- (b) Remove the steering wheel pad, steering wheel lower No. 2 and No. 3 covers, steering wheel, combination switch, column upper and lower covers, steering column assembly and thrust stopper (See page [SR-14](#) or [SR-29](#)).
- (c) Disconnect the connector from the stop light switch.
- (d) Loosen the stop light switch lock nut and remove the stop light switch.
- (e) Loosen the push rod lock nut.
- (f) Adjust the pedal height by turning the pedal push rod.
- (g) Tighten the push rod lock nut.  
**Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)**
- (h) Install the stop light switch.
- (i) Connect the connector to the stop light switch.
- (j) Push in the brake pedal 5 - 15 mm (0.20 - 0.59 in.), turn the stop light switch to lock the nut in the position where the stop light goes off.
- (k) After installation, push in the brake pedal 5 - 15 mm (0.20 - 0.59 in.), check that stop light lights up.
- (l) After adjusting the pedal height, check the pedal freeplay.
- (m) Install the thrust stopper, steering column assembly, column upper and lower covers, combination switch, steering wheel, steering wheel lower No. 2 and No. 3 covers, and steering wheel pad (See page [SR-14](#) or [SR-29](#)).
- (n) Install the No. 2 heater to register duct, LH lower panel, lower No. 1 panel, cowl side trim and scuff plate (See page [BO-81](#)).



### 3. CHECK PEDAL FREEPLAY

- (a) Stop the engine and depress the brake pedal more than 40 times until there is no more pressure left in the booster.
- (b) Push in the pedal by hand until the second point of resistance begins to be felt, then measure the distance, as shown.

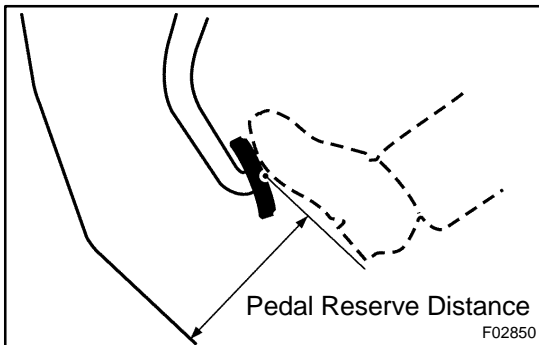
**Pedal freeplay: 1.0 - 6.0 mm (0.039 - 0.236 in.)**

If incorrect, check the stop light switch clearance. If the clearance is OK, then troubleshoot the brake system.

**Stop light switch clearance: 1.9 mm (0.075 in.)**

HINT:

The freeplay to the 1st point of resistance is due to the play between the clevis, pedal link and pin. It is 1.0 - 6.0 mm (0.039 - 0.236 in.) on the pedal.



#### 4. CHECK PEDAL RESERVE DISTANCE

- (a) Remove the floor carpet.
- (b) Release the parking brake.

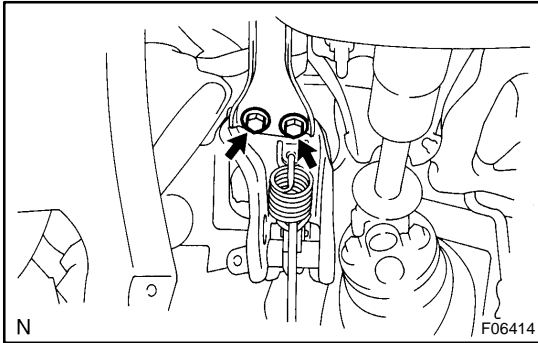
With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

**Pedal reserve distance at 490 N (50 kgf, 110.1 lbf):  
More than 116 mm (4.57 in.)**

If the reserve distance is incorrect, troubleshoot the brake system.

## REMOVAL

1. REMOVE HYDRAULIC BRAKE BOOSTER ASSEMBLY  
(See page [BR-60](#) )
2. REMOVE BRAKE PEDAL ASSEMBLY
  - (a) Disconnect the connector from the stop light switch.



- (b) Remove the 2 bolts.
  - (c) Remove the brake pedal assembly.
3. **DISASSEMBLY BRAKE PEDAL ASSEMBLY**
  - (a) Remove the return spring with cushion.
  - (b) Remove the stop light switch.
  - (c) Remove the pedal pad.

# BRAKE SYSTEM

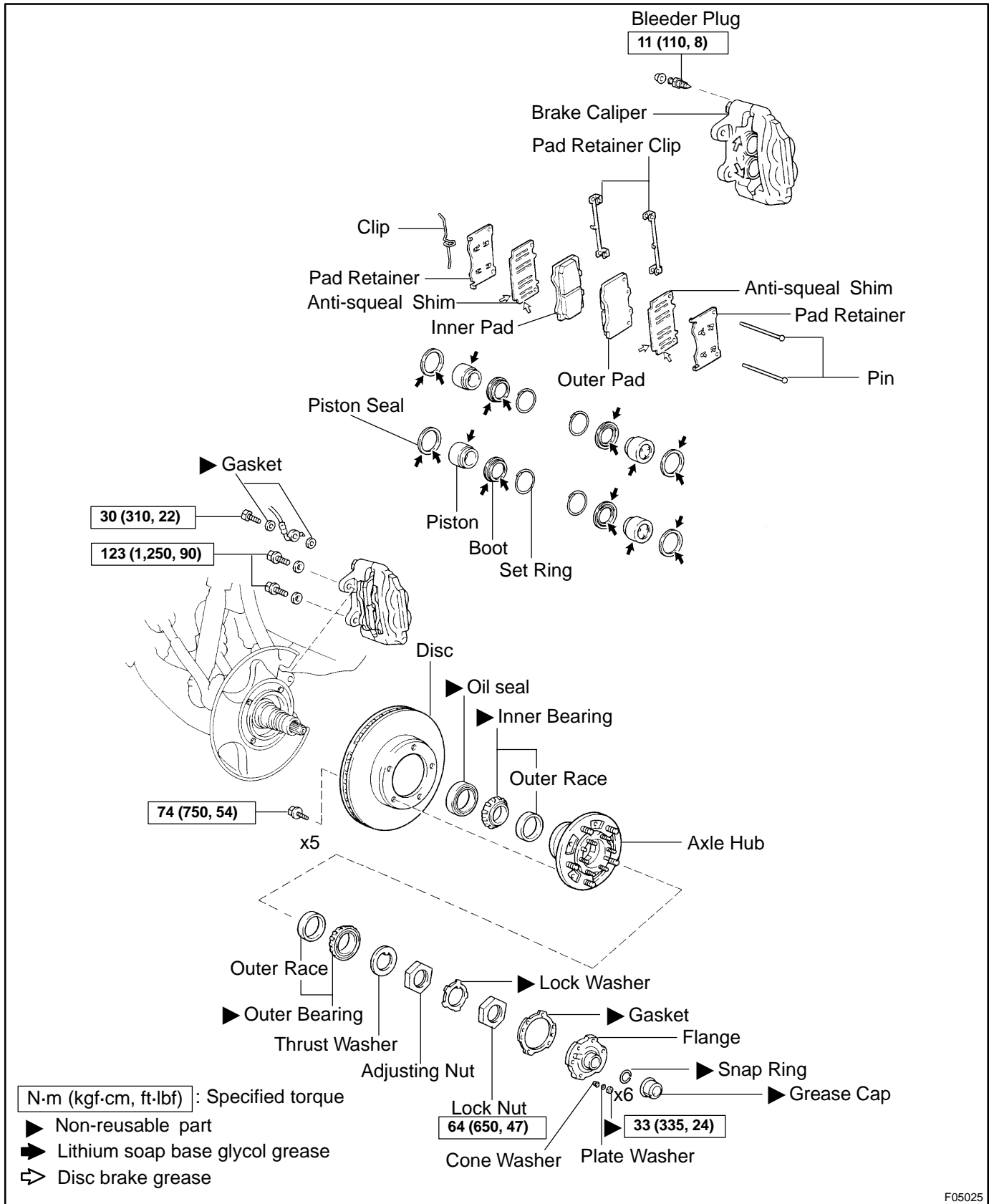
BR12F-01

## PRECAUTION

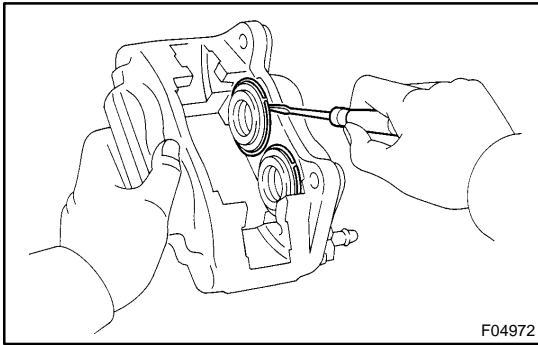
- ▶ Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts of the same part number or equivalent.
- ▶ It is very important to keep parts and the area clean when repairing the brake system.
- ▶ If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.

# FRONT BRAKE CALIPER COMPONENTS

BR0JJ-06



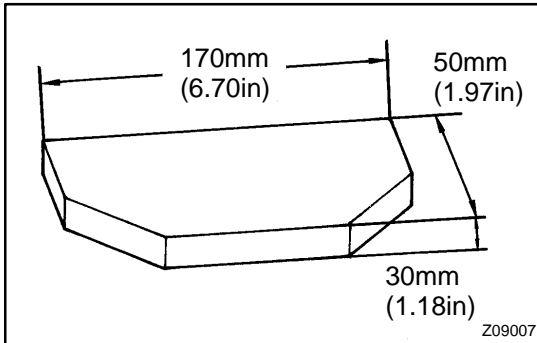
F05025



## DISASSEMBLY

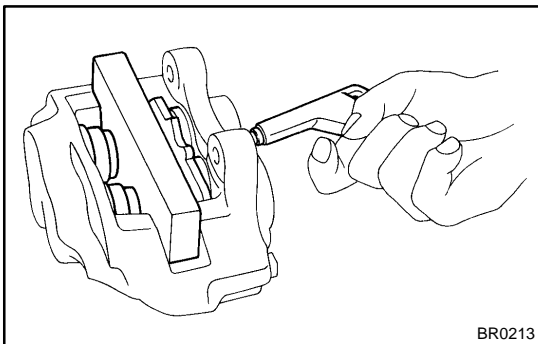
### 1. REMOVE CYLINDER BOOT SET RINGS AND CYLINDER BOOTS

Using a screwdriver, remove the 4 cylinder boot set rings and 4 cylinder boots from the caliper.



### 2. REMOVE PISTONS FROM CYLINDER

(a) Prepare the wooden plate to hold the pistons.

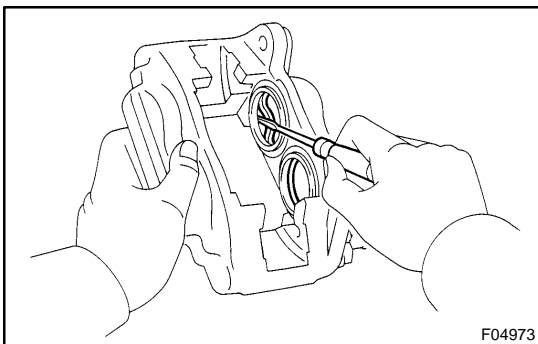


(b) Place the plate between the pistons and insert a pad at one side.

(c) Use compressed air to remove the pistons alternately from the cylinder.

#### CAUTION:

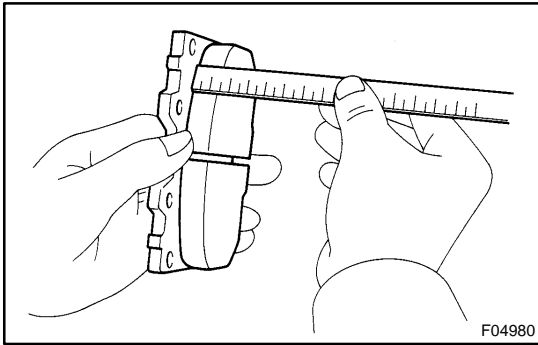
**Do not place your fingers in front of the piston when using compressed air.**



### 3. REMOVE PISTON SEALS FROM BRAKE CYLINDER

Using a screwdriver, remove the 4 piston seals from the cylinder.





## INSPECTION

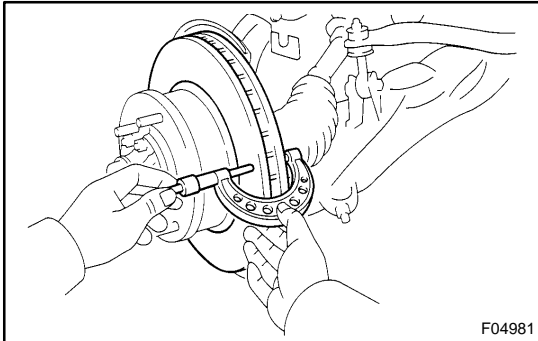
### 1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

**Standard thickness: 11.5 mm (0.453 in.)**

**Minimum thickness: 1.0 mm (0.039 in.)**

Replace the pad if the pad's thickness is at the minimum or if it shows signs of uneven wear.



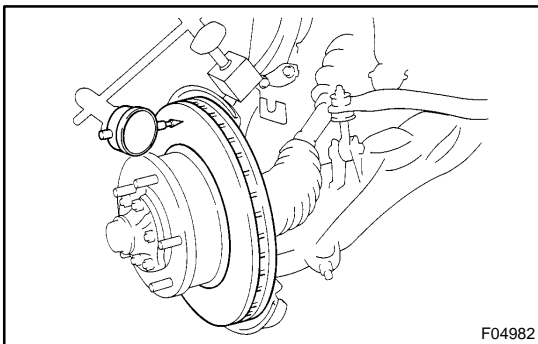
### 2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

**Standard thickness: 32.0 mm (1.260 in.)**

**Minimum thickness: 30.0 mm (1.181 in.)**

Replace the disc if the thickness of the disc is at the minimum thickness or less. Replace the disc or grind it on a lathe if it is scored or is worn unevenly.



### 3. MEASURE DISC RUNOUT

Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) from the out side edge.

**Maximum disc runout: 0.07 mm (0.0028 in.)**

If the bearing play and axle hub runout are not abnormal, replace the disc or grind it on an "On-Car brake lathe".

**HINT:**

Before measuring the runout, confirm that the front bearing preload is within the specification (See page [SA-16](#) ).

### 4. IF NECESSARY, REPLACE DISC

- (a) Remove the front axle hub (See page [SA-12](#) ).
- (b) Remove the disc from the axle hub (See page [SA-13](#) ).
- (c) Install a new disc and torque the 5 bolts.  
**Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)**
- (d) Install the axle hub and adjust the front bearing preload (See page [SA-16](#) ).

## INSTALLATION

Installation is in the reverse order of removal (See page [BR-19](#)).

HINT:

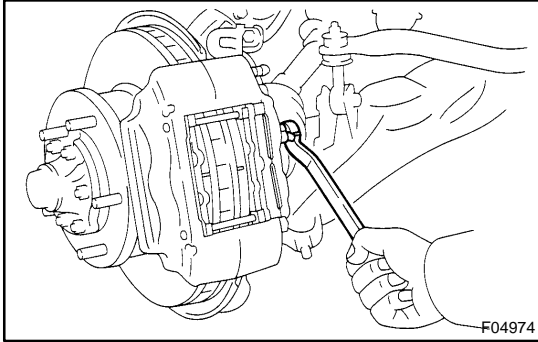
- ▶ After installation, fill the brake reservoir with brake fluid and bleed brake system (See page [BR-4](#)).
- ▶ Check for leaks.

## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-20](#)).

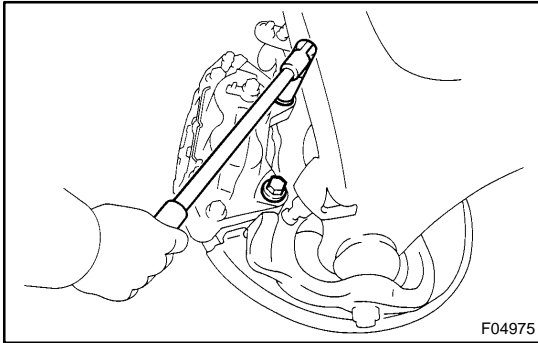
HINT:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page [BR-18](#)).



## REMOVAL

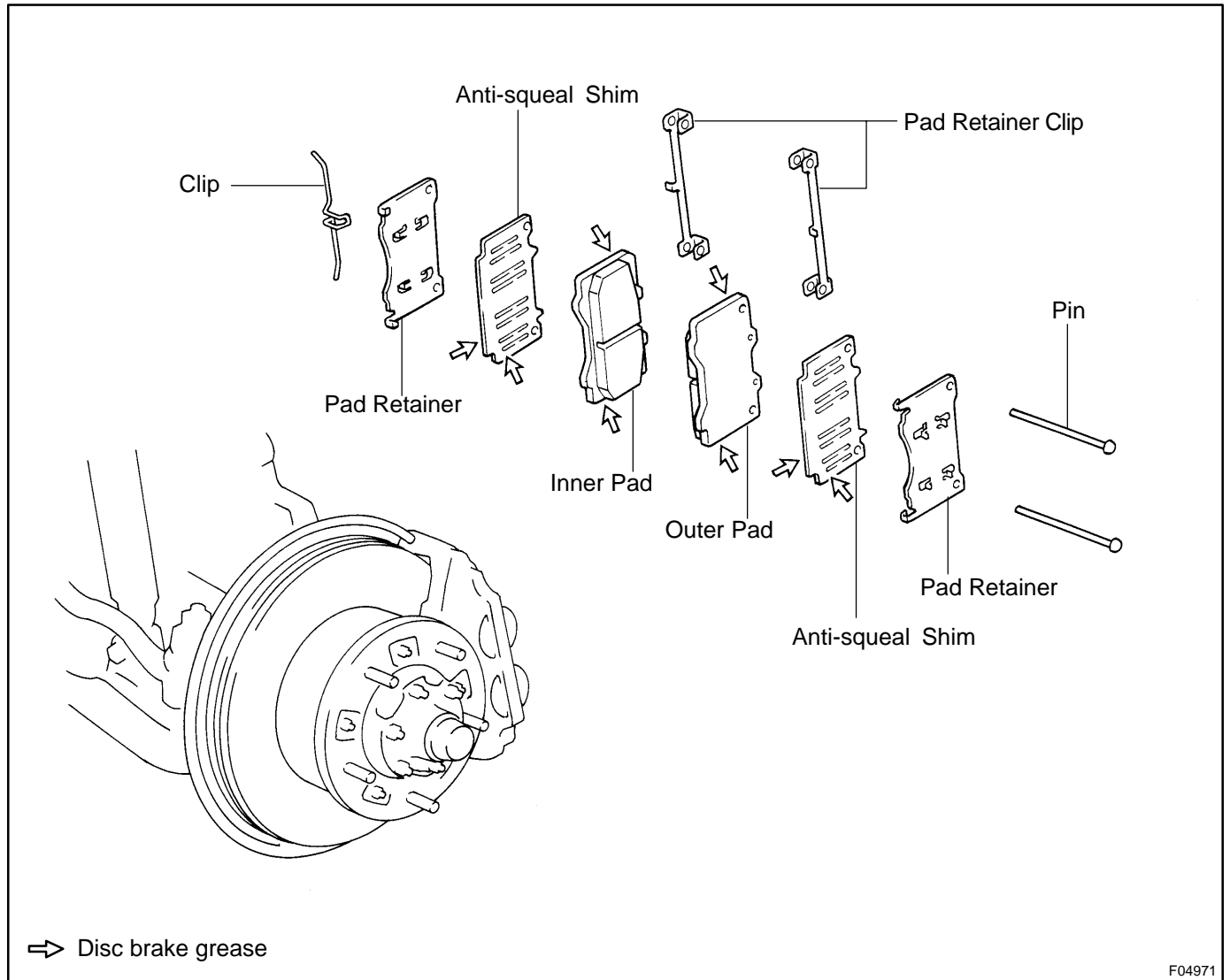
1. **REMOVE FRONT WHEEL**  
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **DISCONNECT BRAKE LINE**
  - (a) Remove the union bolt and 2 gaskets from the caliper, then disconnect the flexible hose from the caliper.  
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)
  - (b) Use a container to catch the brake fluid as it drains out.

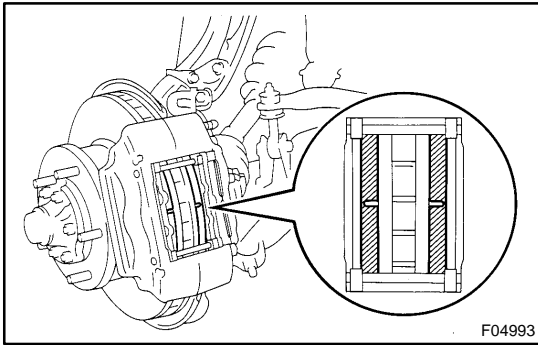


3. **REMOVE CALIPER**  
Remove the 2 mounting bolts and remove the caliper.  
Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)
4. **REMOVE CLIP AND 2 PINS**
5. **REMOVE 2 PAD RETAINER CLIPS**
6. **REMOVE 2 PADS, ANTI-SQUEAL SHIMS AND PAD RETAINERS**

# FRONT BRAKE PAD COMPONENTS

BR0JH-03



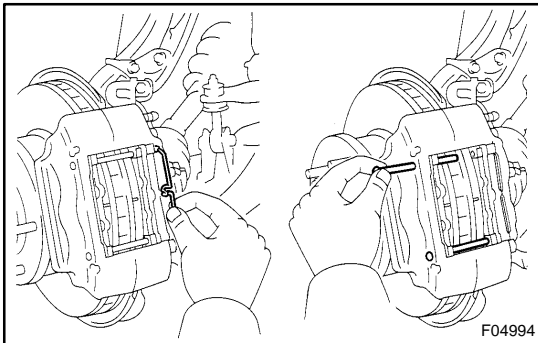


## REPLACEMENT

1. REMOVE FRONT WHEEL
2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the caliper inspection hole and replace the pads if they are not within the specification.

**Minimum thickness: 1.0 mm (0.039 in.)**



3. REMOVE CLIP AND 2 PINS
4. REMOVE 2 PAD RETAINER CLIPS
5. REMOVE 2 PADS, ANTI-SQUEAL SHIMS AND PAD RETAINERS

### NOTICE:

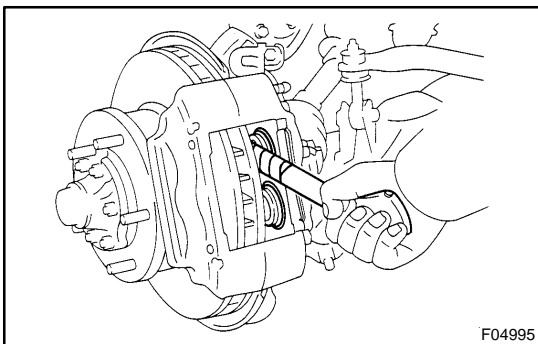
The pad retainer clip and clip can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

6. CHECK DISC THICKNESS AND DISC RUNOUT  
(See page [BR-21](#) )
7. INSTALL NEW PADS

### NOTICE:

When replacing worn pads, the anti-squeal shims must be replaced together with the pad.

- (a) Draw out a small amount of brake fluid from the reservoir.



- (b) Press in the piston with a hammer handle or an equivalent.

### HINT:

- ▶ Always change the pads on one wheel at a time as there is a possibility of opposite piston fling out.
- ▶ If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

- (c) Install the 2 pad retainers to each caliper piston.
- (d) Install the anti-squeal shim to each pad.

### HINT:

Apply disc brake grease to both sides of the anti-squeal shims (See page [BR-15](#) ).

- (e) Install the 2 pads.

### HINT:

Apply disc brake grease to the pads indicated by the arrows (See page [BR-15](#) ).

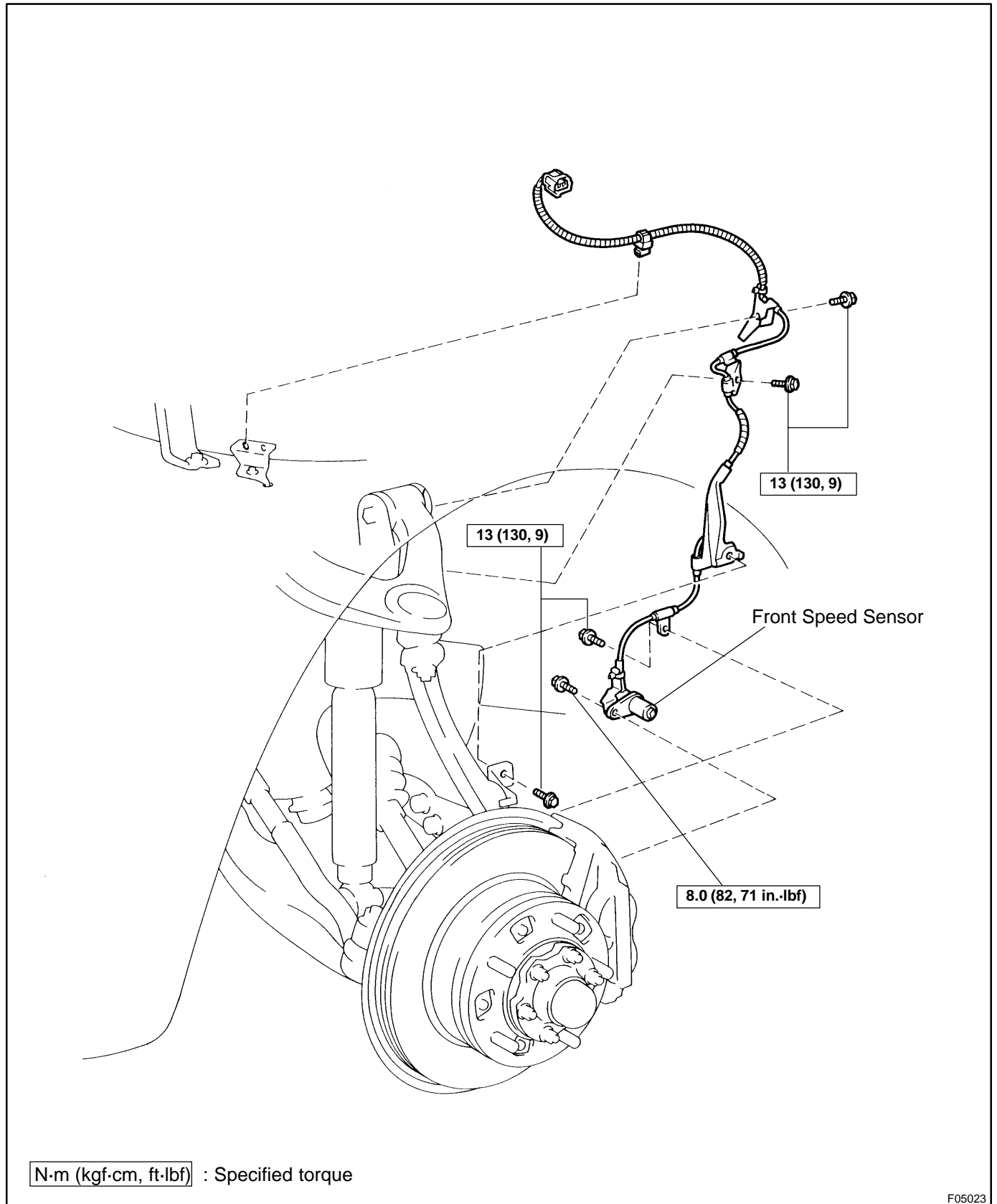
**NOTICE:**

There should be no oil or grease adhering to the friction surfaces of the pads or the disc.

8. **INSTALL 2 PAD RETAINER CLIPS AND 2 PINS**
9. **INSTALL CLIP**
10. **INSTALL FRONT WHEEL**  
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
11. **DEPRESS BRAKE PEDAL SEVERAL TIMES**
12. **CHECK THAT FLUID LEVEL IS AT MAX LINE**

# FRONT SPEED SENSOR COMPONENTS

BR0K1-06



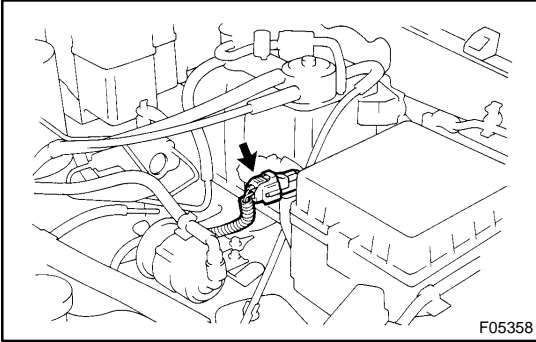


## INSTALLATION

Installation is in the reverse order of removal (See page [BR-69](#) ).

HINT:

After installation, check the speed sensor signal (See page [DI-505](#) ).

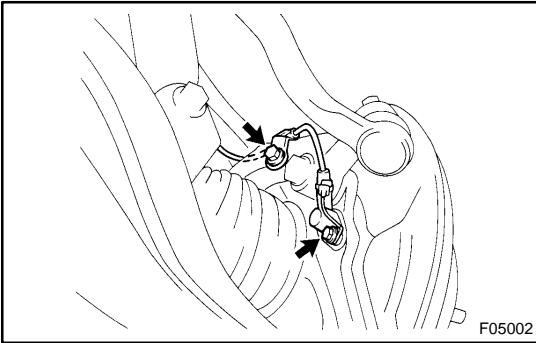


## REMOVAL

### REMOVE SPEED SENSOR

- (a) Disconnect the speed sensor connector.
- (b) Remove the resin clip and 4 clamp bolts holding the sensor harness from the steering knuckle and upper arm.

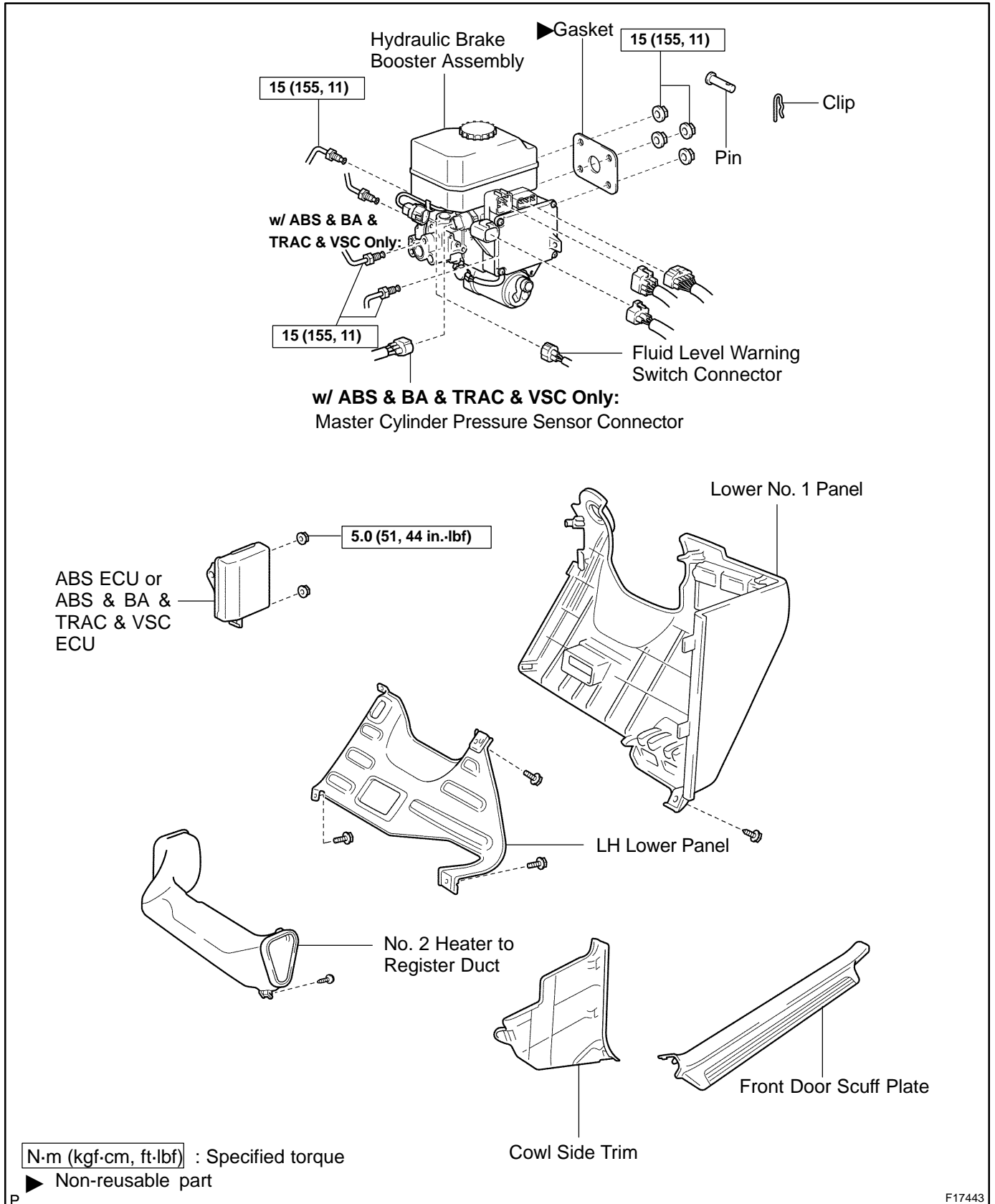
**Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)**

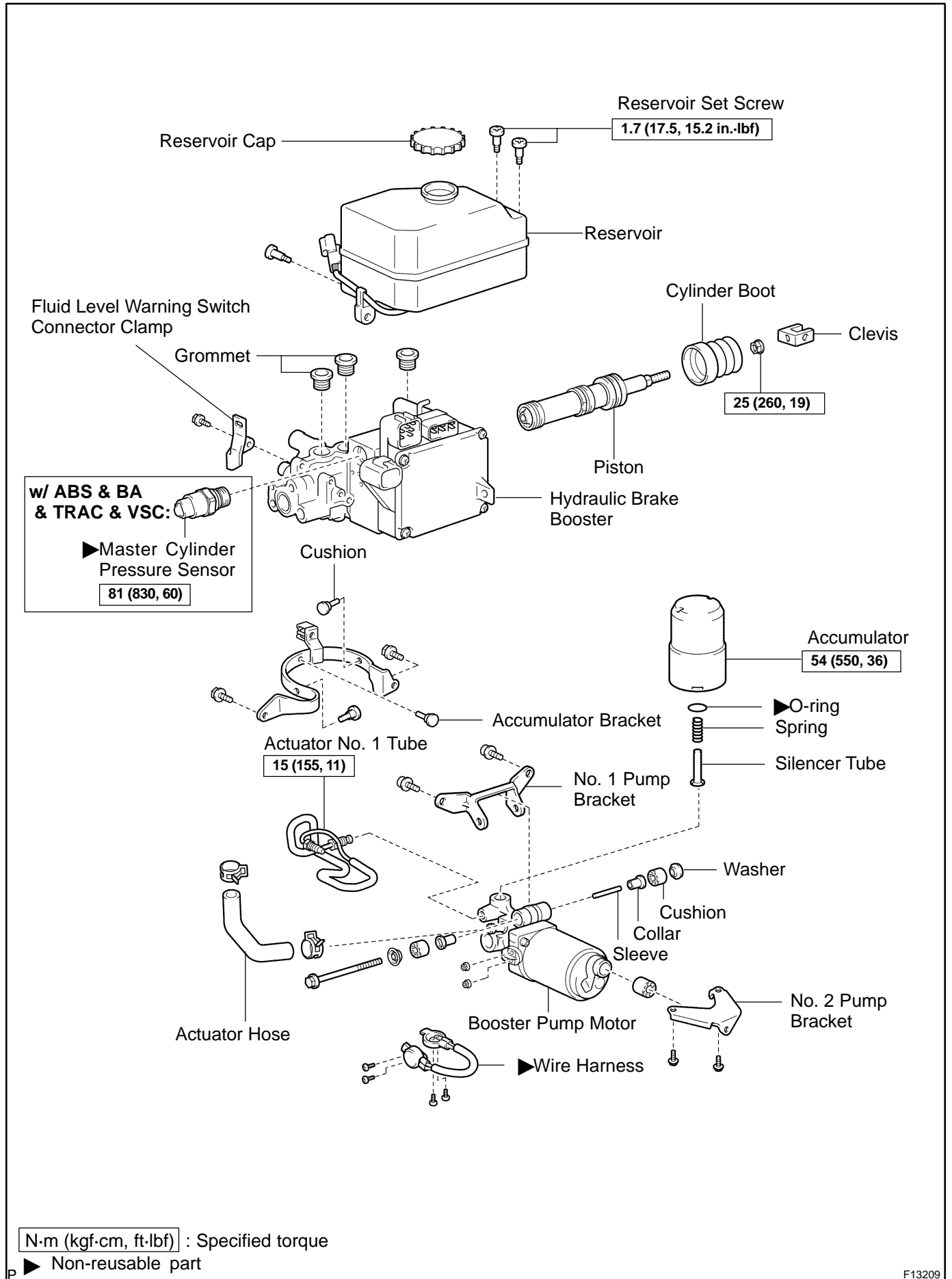


- (c) Remove the speed sensor installation bolt and speed sensor from the steering knuckle.

**Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)**

# COMPONENTS

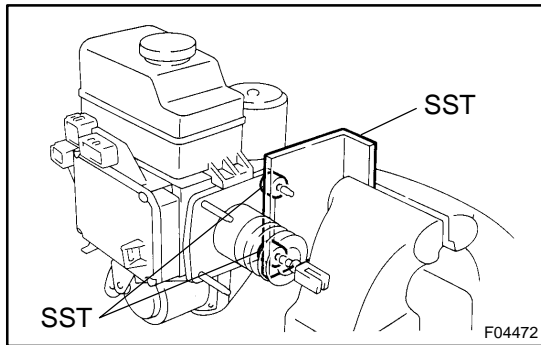




N·m (kgf·cm, ft·lbf) : Specified torque

▶ Non-reusable part

F13209



## DISASSEMBLY

### 1. PLACE HYDRAULIC BRAKE BOOSTER IN VISE

Using SST, set the hydraulic brake booster in vise.

SST 09630-00014 (09631-00142),  
09950-60010 (09951-00180, 09951-00190)

### 2. REMOVE FLUID LEVEL WARNING SWITCH CONNECTOR CLAMP

- Disconnect the connector.
- Remove the bolt and clamp.

### 3. REMOVE RESERVOIR AND GROMMETS

- Remove reservoir cap.
- Remove the 3 set screws and pull out the reservoir.

**Torque: 1.7 N·m (17.5 kgf·cm, 15.2 in.-lbf)**

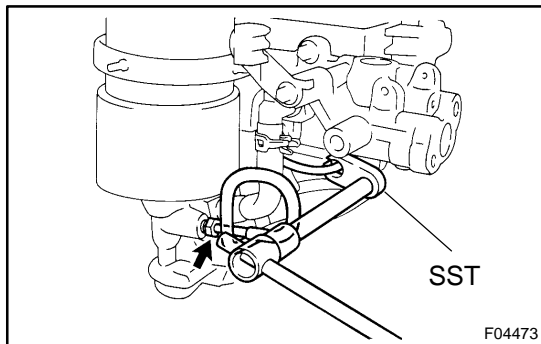
- Remove the 3 grommets.

### 4. REMOVE CLEVIS AND CYLINDER BOOT

- Loosen the lock nut, then remove the clevis and lock nut.

**Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)**

- Remove the cylinder boot.



### 5. REMOVE BRAKE ACTUATOR TUBE NO. 1

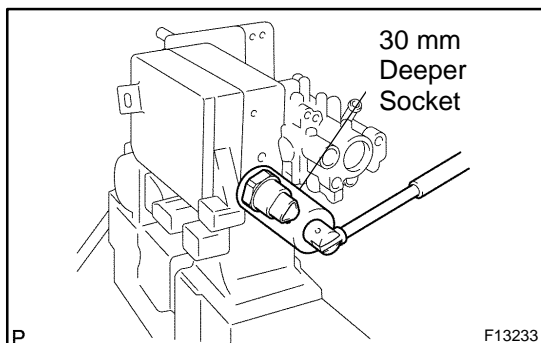
Using SST, remove the brake actuator tube No. 1.

SST 09023-00100

**Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)**

### 6. REMOVE BOOSTER PUMP AND ASSEMBLY

- Remove the actuator hose.
- Remove the 4 screws and wire harness from the booster and pump.
- Remove the 2 bolts, accumulator bracket.
- Remove the 2 bolts and booster pump motor assembly.
- Remove the bolt and No. 1 pump bracket.
- Remove the 2 washers, 2 cushions, 2 collars and sleeve.
- Remove the 2 bolts and No. 2 pump bracket.
- Remove the cushion from No. 2 pump bracket.



### 7. ABS & BA & TRAC & VSC only:

#### REMOVE MASTER CYLINDER PRESSURE SENSOR

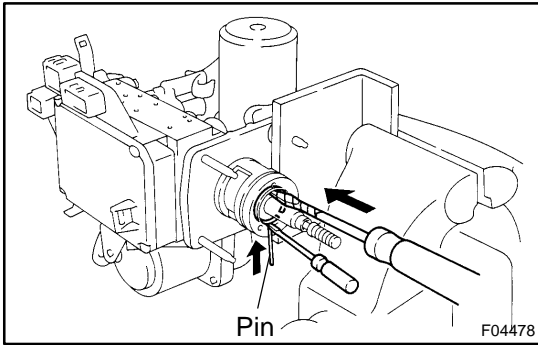
Using 30 mm deeper socket wrench and remove the oil pressure sensor.

**Torque: 81 N·m (830 kgf·cm, 60 ft·lbf)**

#### NOTICE:

If replacing the master cylinder pressure sensor, since the sensor is non-reusable, use a sensor of the supply part No shown below.

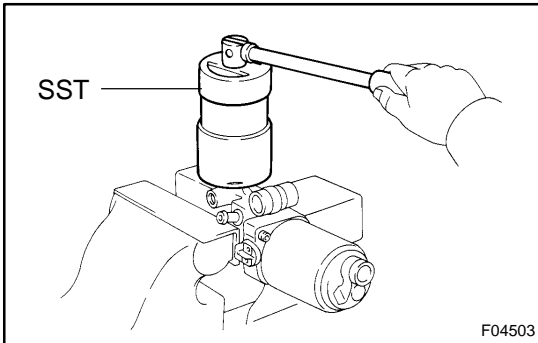
**PART NO: 89637-30050**

**8. REMOVE PISTON**

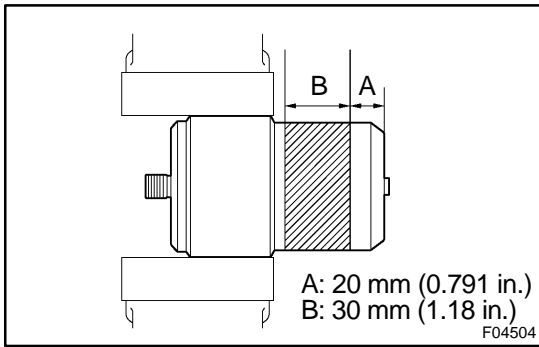
- (a) Pressing the piston in with a screwdriver, use a pin or an equivalent to push the snap ring from the hole in the body then remove it with another screwdriver.
- (b) Remove the piston, pulling straight out, not at an angle.

**NOTICE:**

- ▶ If pulled out and installed at an angle, there is a possibility that the cylinder bore could be damaged.
- ▶ At the time of reassembly, be careful not to damage the rubber lips on the pistons.

**9. REMOVE ACCUMULATOR FROM BOOSTER PUMP**

- (a) Using SST, remove the accumulator.  
SST 09318-12010  
**Torque: 54 N·m (550 kgf·cm, 36 ft·lbf)**
- (b) Remove the silencer tube, spring and O-ring.



## DISPOSAL

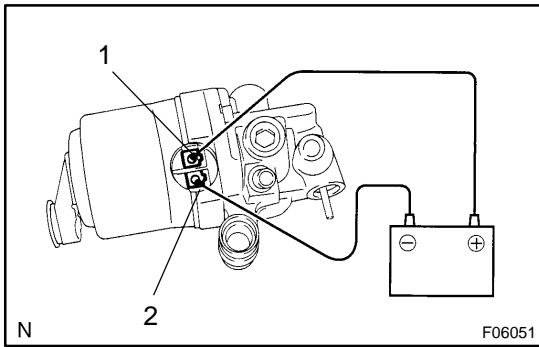
### DISPOSAL METHOD OF ACCUMULATOR

- Place the accumulator in a vise, cover it with a cloth over.
- Using a saw, then cut the accumulator body slowly.

#### CAUTION:

**Do not cut at a place except a stretch.**

- When the outer body of the accumulator is cut, gas discharges.



## INSPECTION

### INSPECT HYDRAULIC BRAKE BOOSTER PUMP MOTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 1 of pump motor, and the negative (-) lead to terminal 2.
- (b) Check that the pump motor operation.

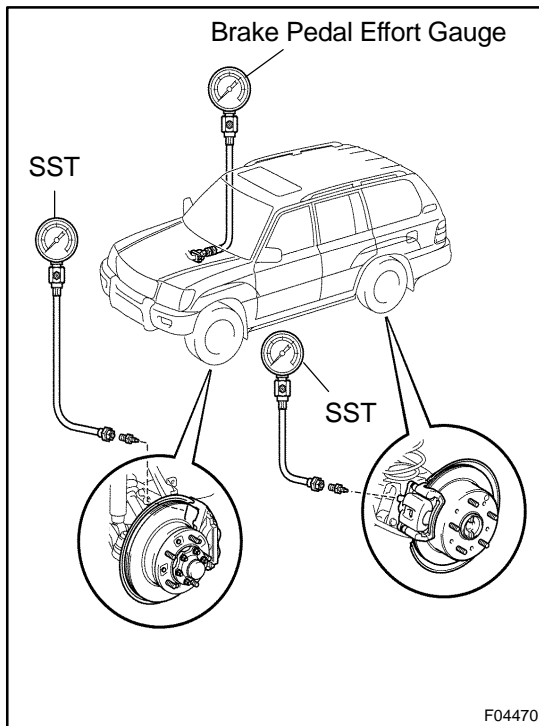


## INSTALLATION

Installation is in the reverse order of removal (See page [BR-60](#) ).

HINT:

- ▶ After installation, fill the brake reservoir with brake fluid and bleed brake system (See page [BR-4](#) ).
- ▶ Check for leaks.



## HYDRAULIC BRAKE BOOSTER ON-VEHICLE INSPECTION

BR12B-07

### 1. CHECK HYDRAULIC BRAKE BOOSTER FLUID PRESSURE CHANGE

(a) Inspect the battery positive voltage.

**Battery positive voltage: 10 - 14 V**

(b) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

HINT:

When a pressure in power supply system is released, reaction force becomes light and stroke becomes longer.

(c) Install LSPV gauge (SST) and brake pedal effort gauge, bleed air.

SST 09709-29018

(d) When booster does not operate:

Depress the brake pedal and check fluid pressure.

**At 245 N (25 kgf, 55 lbf):**

Front brake pressure	Rear brake pressure
2,700 kPa (27.5 kgf/cm <sup>2</sup> , 391 psi) or more	0 kPa (0 kgf/cm <sup>2</sup> , 0 psi)

**At 343 N (35 kgf, 77 lbf):**

Front brake pressure	Rear brake pressure
3,950 kPa (40 kgf/cm <sup>2</sup> , 568 psi) or more	0 kPa (0 kgf/cm <sup>2</sup> , 0 psi)

(e) w/ ABS only, when booster operate:

(1) Turn the ignition switch ON and wait until the pump motor has stopped.

(2) Depress the brake pedal and check fluid pressure.

**At 49 N (5 kgf, 11 lbf):**

Front brake pressure	Rear brake pressure
1,618 - 2,795 kPa (16.5 - 28.5 kgf/cm <sup>2</sup> , 234 - 405 psi)	1,716 - 2,893 kPa (17.5 - 29.5 kgf/cm <sup>2</sup> , 249 - 419 psi)

**At 98 N (10 kgf, 22 lbf):**

Front brake pressure	Rear brake pressure
4,413 - 5,624 kPa (45 - 57 kgf/cm <sup>2</sup> , 639 - 809 psi)	3,187 - 4,364 kPa (32.5 - 44.5 kgf/cm <sup>2</sup> , 462 - 632 psi)

**At 147 N (15 kgf, 33 lbf):**

Front brake pressure	Rear brake pressure
7,208 - 8,436 kPa (73.5 - 85.5 kgf/cm <sup>2</sup> , 1,043 - 1,214 psi)	4,609 - 5,786 kPa (47 - 59 kgf/cm <sup>2</sup> , 667 - 838 psi)

**At 196 N (20 kgf, 44 lbf):**

Front brake pressure	Rear brake pressure
9,905 - 11,082 kPa (101 - 113 kgf/cm <sup>2</sup> , 1,434 - 1,604 psi)	6,031 - 7,208 kPa (61.5 - 73.5 kgf/cm <sup>2</sup> , 873 - 1,044 psi)

- (f) w/ ABS & TRAC & VSC ECU only, when booster operate:
- (1) Turn the ignition switch ON and wait until the pump motor has stopped.
  - (2) Depress the brake pedal and check fluid pressure.

**At 49 N (5 kgf, 11 lbf):**

Front brake pressure	Rear brake pressure
1,618 - 2,795 kPa (16.5 - 28.5 kgf/cm <sup>2</sup> , 234 - 405 psi)	1,716 - 2,893 kPa (17.5 - 29.5 kgf/cm <sup>2</sup> , 249 - 419 psi)

**At 98 N (10 kgf, 22 lbf):**

Front brake pressure	Rear brake pressure
4,413 - 5,624 kPa (45 - 57 kgf/cm <sup>2</sup> , 639 - 809 psi)	4,609 - 5,786 kPa (47 - 59 kgf/cm <sup>2</sup> , 668 - 839 psi)

**At 147 N (15 kgf, 33 lbf):**

Front brake pressure	Rear brake pressure
7,208 - 8,436 kPa (73.5 - 85.5 kgf/cm <sup>2</sup> , 1,043 - 1,214 psi)	7,502 - 8,679 kPa (76.5 - 88.5 kgf/cm <sup>2</sup> , 1,088 - 1,259 psi)

**At 196 N (20 kgf, 44 lbf):**

Front brake pressure	Rear brake pressure
9,905 - 11,082 kPa (101 - 113 kgf/cm <sup>2</sup> , 1,434 - 1,604 psi)	10,346 - 11,523 kPa (105.5 - 117.5 kgf/cm <sup>2</sup> , 1,501 - 1,671 psi)

**2. w/ ABS only,****In case of using TOYOTA hand-held tester:****INSPECT HYDRAULIC BRAKE BOOSTER OPERATION**

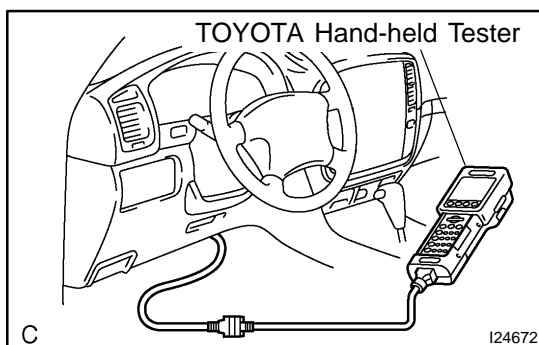
- (a) Inspect the battery positive voltage.  
**Battery positive voltage: 10 - 14 V**
- (b) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

**HINT:**

When a pressure in power supply system is released, reaction force becomes light and stroke becomes longer.

- (c) Turn the ignition switch ON, check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor (See page BR-64).



- (d) Connect the TOYOTA hand-held tester.
  - (1) Connect the TOYOTA hand-held tester to the DLC3.
  - (2) Turn the ignition switch ON.
  - (3) Select the "ACTIVE TEST" mode on the TOYOTA hand-held tester.

**HINT:**

- ▶ Please refer to the TOYOTA hand-held tester operator's manual for further details.

- ▶ To protect the solenoids, TOYOTA hand-held tester turns OFF automatically for 2 sec. after every solenoid has been turned ON.
- (e) Inspect the front ABS switching solenoid operation.
  - (1) Select "SA1" and "SA2" on the TOYOTA hand-held tester.
  - (2) With "SA1" and "SA2" turned ON simultaneously with the TOYOTA hand-held tester, depress the brake pedal with stable force and check that the pedal cannot be depressed.

**HINT:**

To protect the solenoids, TOYOTA hand-held tester turns OFF automatically for 2 sec. after every solenoid has been turned ON.

If the pedal can be depressed, replace the hydraulic brake booster.

**NOTICE:**

**When operating it continuously, set the interval of more than 20 sec.**

- (3) Once, release the brake pedal.
- (4) When the solenoids are OFF, after depressing the brake pedal again and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (f) Inspect the front ABS solenoid operation.
  - (1) Select "SFRH" and "SFLH" on the TOYOTA hand-held tester.
  - (2) With "SFRH" and "SFLH" turned ON simultaneously with the TOYOTA hand-held tester, depress the brake pedal with stable force and check that the brake pedal cannot be depressed.

**HINT:**

To protect the solenoids, TOYOTA hand-held tester turns OFF automatically for 2 sec. after every solenoid has been turned ON.

If the pedal can be depressed, replace the hydraulic brake booster.

- (3) Once, release the brake pedal when the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (4) Once, release the brake pedal. After depressing and holding the brake pedal with stable force, turn the SFRH and SFRR solenoids ON simultaneously.

**HINT:**

To protect the solenoids, TOYOTA hand-held tester turns OFF automatically for 2 sec. after every solenoid has been turned ON.

- (5) When the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (6) Once, release the brake pedal. After depressing and holding the brake pedal with stable force, turn the SFLH and SFLR solenoids ON simultaneously.

HINT:

To protect the solenoids, TOYOTA hand-held tester turns OFF automatically for 2 sec. after every solenoid has been turned ON.

- (7) Once release the brake pedal when the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

(g) Jack up and support the vehicle.

(h) Release the parking brake lever.

(i) Inspect the rear ABS solenoid.

- (1) Select the "SRH" on the TOYOTA hand-held tester.
- (2) Turn the "SRH" ON with the TOYOTA hand-held tester and depress the brake pedal with stable force, and rotate the right rear wheel by hand and check it.

HINT:

- ▶ To protect the solenoids, TOYOTA hand-held tester turns OFF automatically for 2 sec. after every solenoid has been turned ON.
- ▶ When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.
- ▶ When solenoid is OFF, the wheel might stop temporarily. However if the wheel rotates again, the function works normally.

If the rear wheels stop, replace the hydraulic brake booster.

- (3) Once, release the brake pedal and turn the "SRH" OFF, after depressing the brake pedal with stable force and stop the rear right wheel by hand and check it.

If the rear wheel rotate, replace the hydraulic brake booster.

- (4) Depress the pedal with stable force, then turn the "SRH" and "SRR" ON simultaneously.
- (5) When the solenoids are ON, rotate the rear wheel by hand and check it.

HINT:

- ▶ To protect the solenoids, TOYOTA hand-held tester turns OFF automatically for 2 sec. after every solenoid has been turned ON.

- ▶ When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

- (j) Lower the vehicle.
- (k) Disconnect the TOYOTA hand-held tester.

### 3. w/ ABS & TRAC & VSC only,

**In case of using TOYOTA hand-held tester:**

#### **INSPECT HYDRAULIC BRAKE BOOSTER OPERATION**

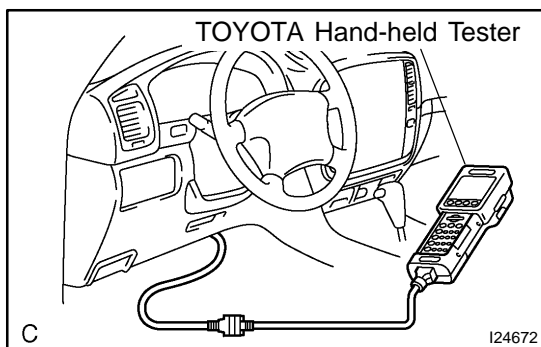
- (a) Inspect the battery positive voltage.  
**Battery positive voltage: 10 - 14 V**
- (b) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

#### HINT:

When a pressure in power supply system is released, reaction force becomes light and stroke becomes longer.

- (c) Check that the brake pedal becomes light to depress. If the pedal does not become to be light to depress, check and replace the brake line and hydraulic brake booster.
- (d) Turn the ignition switch ON, check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor (See page [BR-64](#) ).



- (e) Connect the TOYOTA hand-held tester.
  - (1) Connect the TOYOTA hand-held tester to the DLC3.
  - (2) Turn the ignition switch ON.
  - (3) Select the "ACTIVE TEST" mode on the TOYOTA hand-held tester.

#### HINT:

- ▶ Please refer to the TOYOTA hand-held tester operator's manual for further details.
- ▶ To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

- (f) Inspect the front TRAC & VSC solenoid operation.
  - (1) Select "SA1" and "SA2" on the TOYOTA hand-held tester.
  - (2) With "SA1" and "SA2" turned ON simultaneously with the TOYOTA hand-held tester, depress the brake pedal with stable force and check that the pedal cannot be depressed.

**HINT:**

To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON. If the pedal can be depressed, replace the hydraulic brake booster.

**NOTICE:**

**When operating it continuously, set the interval of more than 20 sec.**

- (3) Once, release the brake pedal.
- (4) When the solenoids are OFF, after depressing the brake pedal again and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

(g) Inspect the front ABS solenoid operation.

- (1) Select "SFRH" and "SFLH" on the TOYOTA hand-held tester.
- (2) With "SFRH" and "SFLH" turned ON simultaneously with the TOYOTA hand-held tester, depress the brake pedal with stable force and check that the brake pedal cannot be depressed.

**HINT:**

To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON. If the pedal can be depressed, replace the hydraulic brake booster.

- (3) Once, release the brake pedal when the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (4) Once, release the brake pedal. After depressing and holding the brake pedal with stable force, turn the SFRH and SFRR solenoids ON simultaneously.

**HINT:**

To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

- (5) When the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (6) Once, release the brake pedal. After depressing and holding the brake pedal with stable force, turn the SFLH and SFLR solenoids ON simultaneously.

**HINT:**

To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

- (7) When the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (h) Jack up and support the vehicle.
- (i) Release the parking brake lever.
- (j) Shift the transfer shift lever to "N" position and check that the rear wheels by rotating them by hand.
- (k) Inspect the rear TRAC & VSC solenoid operation.
  - (1) Select the "SA3" and "STR" on the TOYOTA hand-held tester.
  - (2) Turn the "SA3" and "STR" ON simultaneously with the TOYOTA hand-held tester, and check that the rear wheel does not rotate by hand.

**HINT:**

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the rear wheels rotate, replace the hydraulic brake booster.

- (3) Turn the "SA3" and "STR" OFF simultaneously, and check that the rear wheels by rotating them by hand.

**HINT:**

- ▶ To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- ▶ When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

**NOTICE:**

**When operating it continuously, set the interval of more than 20 sec.**

If the rear wheels stop, replace the hydraulic brake booster.

- (l) Inspect the right rear ABS solenoid.
  - (1) Select the "SA3", "STR" and "SRRH", on the TOYOTA hand-held tester.
  - (2) Turn the "SA3", "STR" and "SRRH" ON simultaneously with the TOYOTA hand-held tester, and check that the right rear wheel by rotating it by hand.

**HINT:**

- ▶ To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- ▶ When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.
- ▶ When solenoid is OFF, the wheel might stop temporarily. However if the wheel rotates again, the function works normally.

If the rear wheels stop, replace the hydraulic brake booster.



- (3) Turn the "SA3", "STR" and "SRRH" OFF, and check that the right rear wheel by rotating it by hand.

## HINT:

- ▶ To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- ▶ When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the right rear wheel stop, replace the hydraulic brake booster.

- (4) Depress the pedal with stable force, then turn the "SRRH" and "SRRR" ON simultaneously.
- (5) When the solenoids are ON, check that the right rear wheel by rotating it by hand.

(m) Inspect the left rear ABS solenoid operation.

- (1) Select the "SA3", "STR" and "SRLH" on the TOYOTA hand-held tester.
- (2) Turn the "SA3", "STR" and "SRLH" ON with TOYOTA hand-held tester, and check that the left rear wheel by rotating it by hand.

## HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the rear wheels stop, replace the hydraulic brake booster.

- (3) Turn the "SA3", "STR" and "SRLH" OFF and check that the left rear wheel by rotating it by hand.

## HINT:

- ▶ To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- ▶ When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.
- ▶ When solenoid is OFF, the wheel might stop temporarily. However if the wheel rotates again, the function works normally.

If the left rear wheel stop, replace the hydraulic brake booster.

- (4) Depress the pedal with stable force, then turn the "SRLH" and "SRLR" ON simultaneously.

## HINT:

To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

- (5) When the solenoids are ON, check that the left rear wheel by rotating it by hand.

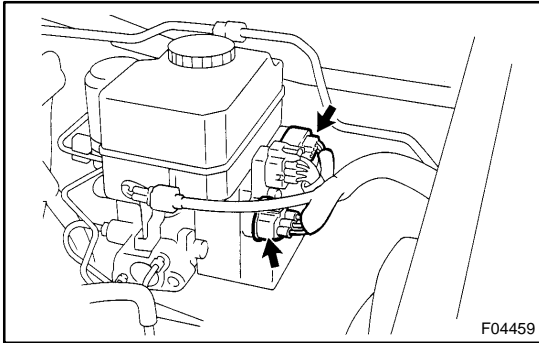
## HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

- (n) Lower the vehicle.

- (o) Disconnect the TOYOTA hand-held tester.
4. **w/ ABS only,**  
**In case of using ABS actuator checker (SST):**  
**INSPECT HYDRAULIC BRAKE BOOSTER OPERA-**  
**TION**

- (a) Inspect the battery positive voltage.  
**Battery positive voltage: 10 - 14 V**

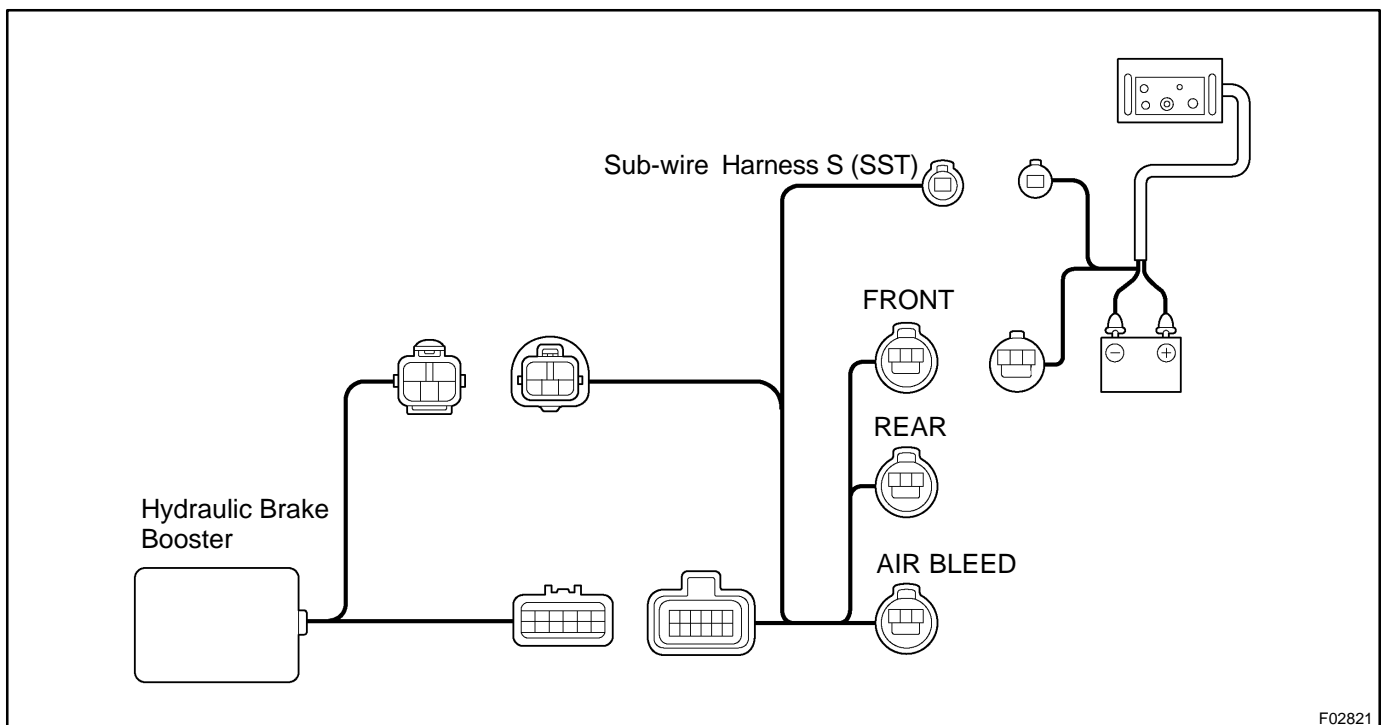


- (b) Disconnect the 2 connectors from hydraulic brake booster.
- (c) Connect the actuator checker (SST) to the hydraulic brake booster side wire harness via the sub-wire harness (SST), as shown in the following chart.  
 SST 09990-00150, 09990-00480

**HINT:**

Connect the connector with the label of "FRONT" attached to the connector of actuator checker.

- (d) Connect the red cable of the checker to the battery positive (+) terminal and the black cable to the negative (-) terminal.



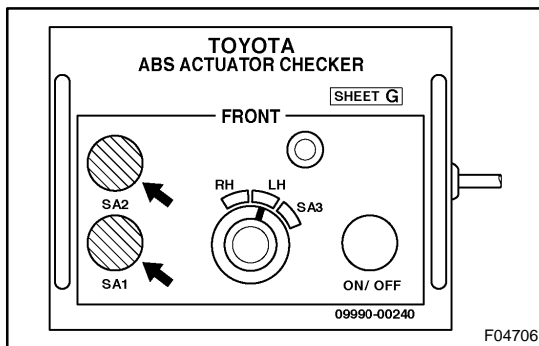
- (e) Place "SHEET G" (SST) of "FRONT" on actuator checker.
- SST 09990-00240
- (f) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

**HINT:**

When a pressure in power supply system is released, reaction force becomes light and stroke becomes longer.

- (g) Turn the ignition switch ON, check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor (See page BR-64 ).



- (h) Inspect the front switching solenoid operation.
  - (1) Push in and hold the "SA1" and "SA2" switches simultaneously, depress strongly and hold the brake pedal with stable force.

**NOTICE:**

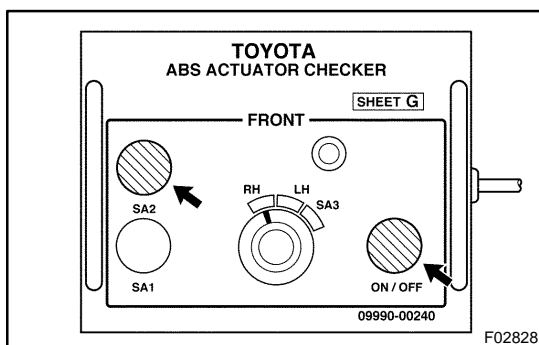
**Do not keep the "SA1" and "SA2" pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

- (2) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.
- (3) Release the "SA1" switch and check that the brake pedal can be depressed.

If the pedal can not be depressed, replace the hydraulic brake booster.

- (4) Release the "SA2" switch and check that the brake pedal can be depressed.

If the pedal can not be depressed, replace the hydraulic brake booster.



- (i) Inspect the right front solenoid operation.
  - (1) Turn the selector switch to "RH" position.
  - (2) Push and hold in the MAIN push switch and "SA2" switch simultaneously depress and hold the brake pedal with stable force.

**NOTICE:**

**Do not keep the MAIN push switch and "SA2" switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

(3) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (4) Release the MAIN push switch and "SA2" switch simultaneously and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (5) Release the brake pedal.

- (6) Depress and hold the brake pedal with stable force, push and hold in MAIN push switch.

**NOTICE:**

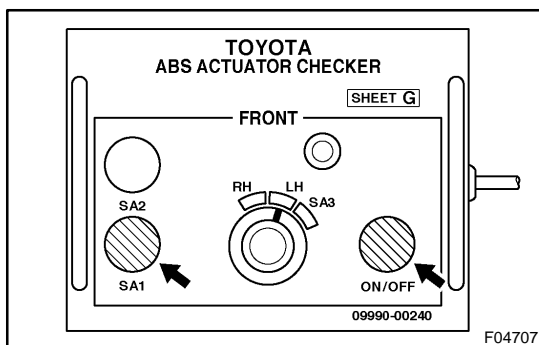
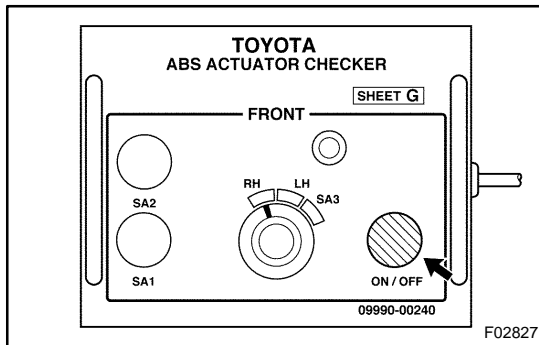
**Do not keep the MAIN push switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

(7) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (8) Release the MAIN push switch, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (9) Release the brake pedal.



(j) Inspect the left front solenoid operation.

- (1) Turn the selector switch to "LH" position.  
 (2) Push and hold in the MAIN push switch and "SA1" switch simultaneously, depress and hold the brake pedal with stable force.

**NOTICE:**

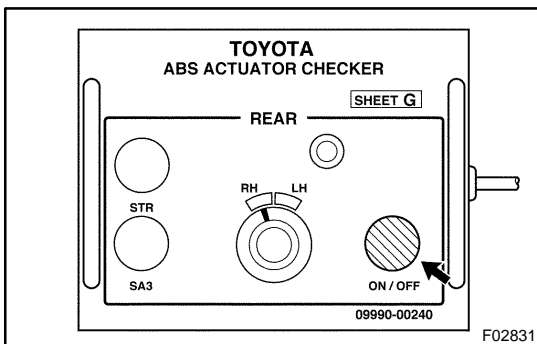
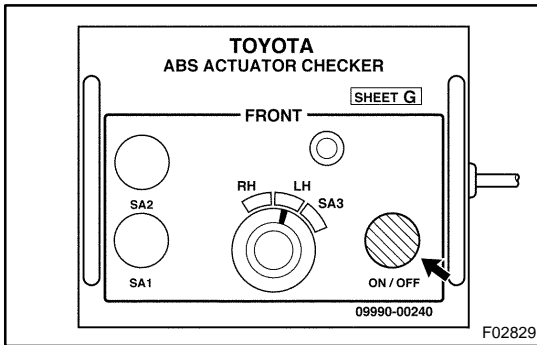
**Do not keep the MAIN push switch and "SA1" switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

(3) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (4) Release the MAIN push switch and "SA1" switch simultaneously, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (5) Release the brake pedal.



- (6) Depress and hold the brake pedal with stable force, push and hold in MAIN push switch.

**NOTICE:**

**Do not keep the MAIN push switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

- (7) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (8) Release the MAIN push switch, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (9) Release the brake pedal.

- (k) Turn the ignition switch OFF, then reconnect the connector of sub-wire harness from the one with label of "FRONT" to "REAR".

- (l) Place "SHEET G" of "REAR" on the actuator checker.

- (m) Jack up and support the vehicle.

- (n) Start the engine and run it at idle.

- (o) Inspect the rear solenoid operation.

- (1) Turn the selector switch to "RH" position.

- (2) Depress the brake pedal several times and release the pedal when the pump begins rotating. Wait until the pump stops.

- (3) Turn the ignition switch OFF.

- (4) Depress the brake pedal with a force of 343 N (35 kgf, 77 lbf), record the fluid surface in the reservoir tank of the hydraulic brake booster.

- (5) Press the MAIN push switch for 10 sec., and check that the fluid surface in the reservoir tank of the hydraulic brake booster does not rise up at this time.

If the fluid surface level rises up, replace the hydraulic brake booster.

**NOTICE:**

**Do not press MAIN push switch for more than 10 sec. When operating the switch continuously, do it an interval of more than 20 sec.**

- (6) Release the brake pedal and check that brake pedal is not hard to depress.

If pedal is hard to depress, replace the hydraulic brake booster.

- (7) Start the engine and run it at idle.

- (8) Depress the brake pedal.

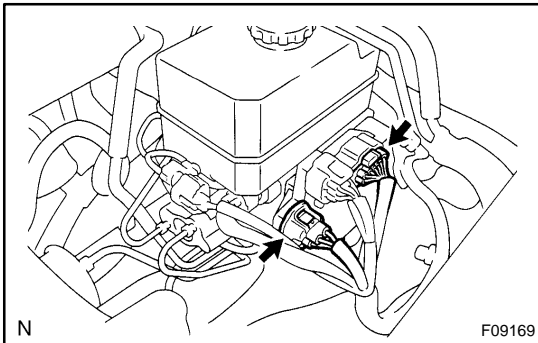
- (9) Release the parking brake lever and shift the shift lever to "L" position.

- (10) Once, release the brake pedal. After depressing the brake pedal with stable force, then push and hold MAIN push switch.

(11) Check that the right rear wheel rotates.

If the right rear wheels stops, replace the hydraulic brake booster.

- (p) Stop the engine and lower the vehicle.
- (q) Remove the "SHEET G" (SST) and disconnect the actuator checker (SST) and sub-wire harness (SST) from the hydraulic brake booster.
- (r) Connect the 2 connectors to the actuator.
- (s) Clear the DTC (See page [DI-505](#) ).



**5. w/ ABS & TRAC & VSC only,**

**In case of using ABS actuator checker (SST):**

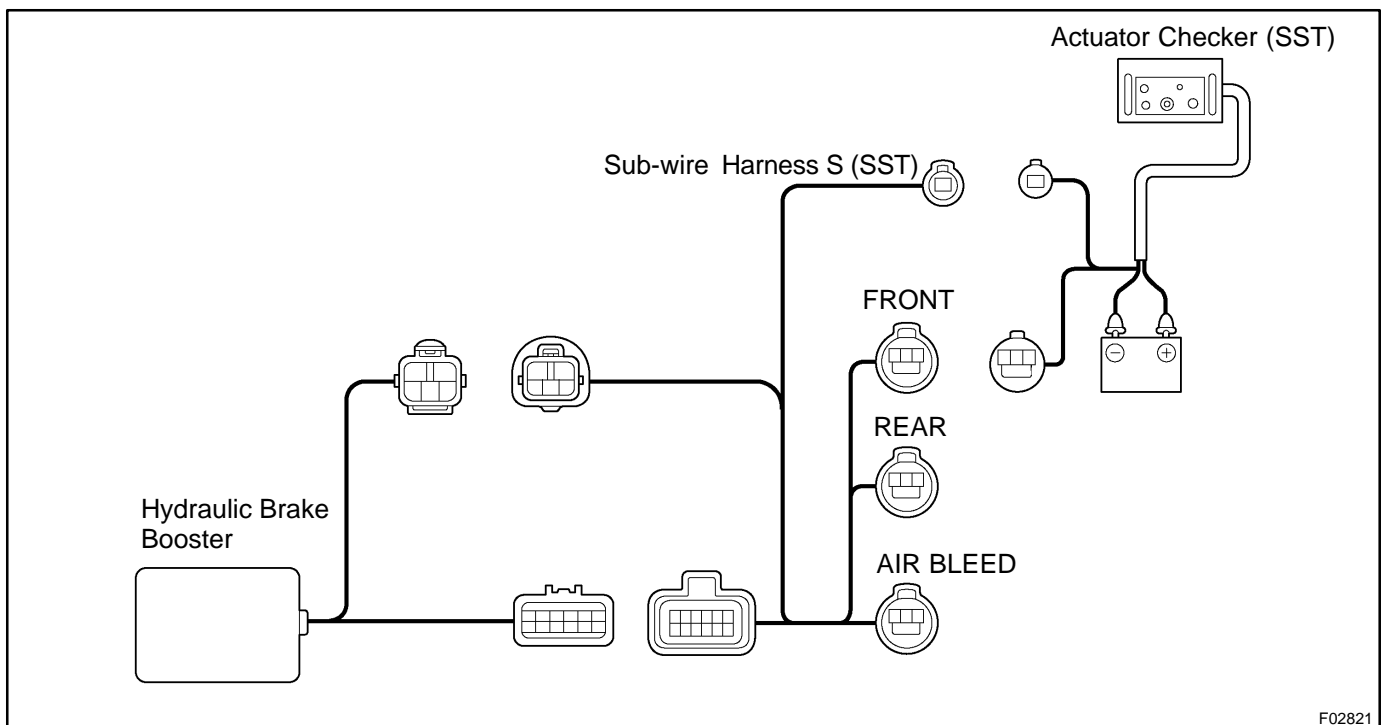
**INSPECT HYDRAULIC BRAKE BOOSTER OPERATION**

- (a) Inspect the battery positive voltage.  
**Battery positive voltage: 10 - 14 V**
- (b) Disconnect the 2 connectors from hydraulic brake booster.
- (c) Connect the actuator checker (SST) to the hydraulic brake booster side wire harness via the sub-wire harness S (SST), as shown in the following chart.  
SST 09990-00150, 09990-00480

**HINT:**

Connect the connector with the label of "FRONT" attached to the connector of actuator checker.

- (d) Connect the red cable of the checker to the battery positive (+) terminal and the black cable to the negative (-) terminal.



- (e) Place "SHEET G" (SST) of "FRONT" on actuator checker.
- SST 09990-00240
- (f) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

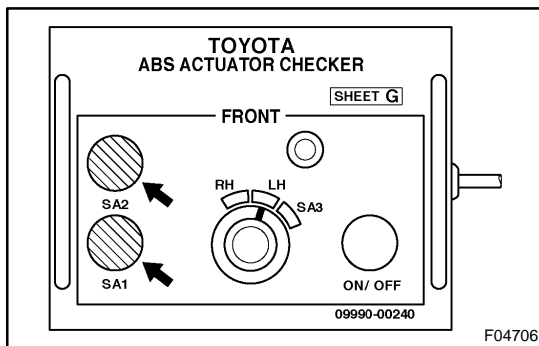
**HINT:**

When a pressure in power supply system is released, reaction force becomes light and stroke becomes longer.

- (g) Check that the brake pedal becomes light to depress. If the pedal does not become to be light to depress, check and replace the brake line and hydraulic brake booster.

- (h) Turn the ignition switch ON, check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor (See page BR-64).



- (i) Inspect the front TRAC & VSC solenoid operation.
  - (1) Push in and hold the "SA1" and "SA2" switches simultaneously, depress strongly and hold the brake pedal with stable force.

**NOTICE:**

**Do not keep the "SA1" and "SA2" pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

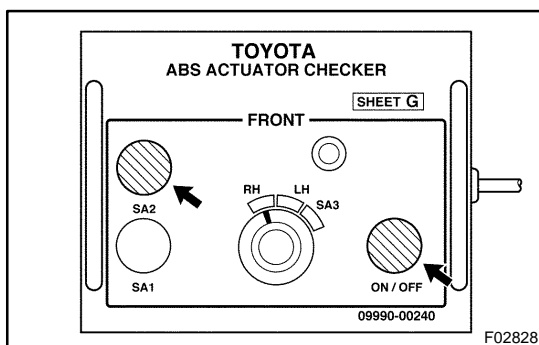
- (2) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (3) Release the "SA1" switch and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (4) Release the "SA2" switch and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.



- (j) Inspect the right front ABS solenoid operation.
  - (1) Turn the selector switch to "RH" position.
  - (2) Push and hold in the MAIN push switch and "SA2" switch simultaneously, depress and hold the brake pedal with stable force.

**NOTICE:**

**Do not keep the MAIN push switch and "SA2" switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

(3) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (4) Release the MAIN push switch and "SA2" switch simultaneously and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (5) Release the brake pedal.

- (6) Depress and hold the brake pedal with stable force, push and hold in MAIN push switch.

**NOTICE:**

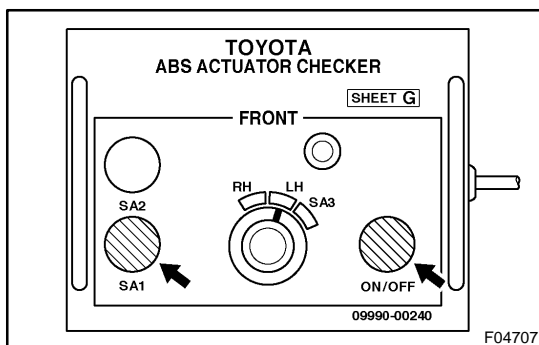
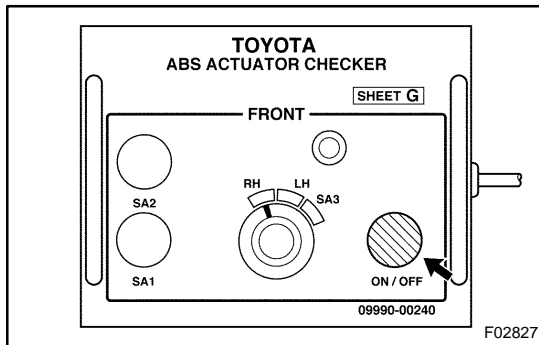
**Do not keep the MAIN push switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

(7) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (8) Release the MAIN push switch, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (9) Release the brake pedal.



(k) Inspect the left front ABS solenoid operation.

- (1) Turn the selector switch to "LH" position.  
 (2) Push and hold in the MAIN push switch and "SA1" switch simultaneously, depress and hold the brake pedal with stable force.

**NOTICE:**

**Do not keep the MAIN push switch and "SA1" switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

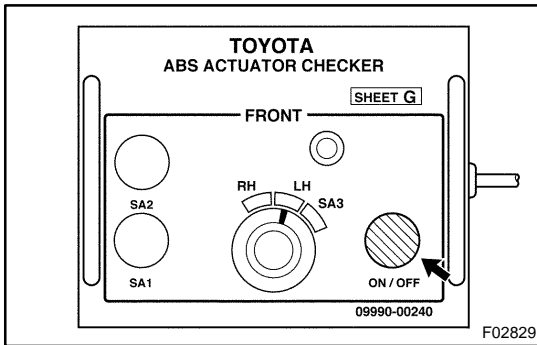
(3) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (4) Release the MAIN push switch and "SA1" switch simultaneously, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (5) Release the brake pedal.





- (6) Depress and hold the brake pedal with stable force, push and hold in MAIN push switch.

**NOTICE:**

**Do not keep the MAIN push switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.**

- (7) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (8) Release the MAIN push switch, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (9) Release the brake pedal.

- (l) Turn the ignition switch OFF, then reconnect the connector of sub-wire harness from the one with label of "FRONT" to "REAR".

- (m) Place "SHEET G" of "REAR" on the actuator checker.

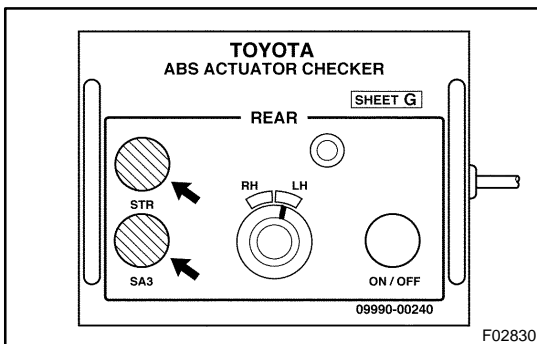
- (n) Jack up and support the vehicle.

- (o) Start the engine and run it at idle.

- (p) Inspect the rear TRAC & VSC solenoid.

- (1) Release the parking brake lever and shift the shift lever to "L" position.

- (2) Push and hold the "SA3" switch and "STR" switch simultaneously.

**NOTICE:**

- ▶ **Do not keep the "STR" switch pushed down for more than 10 sec.**

- ▶ **Do not keep the "SA3" switch pushed down for more than 5 sec.**

- ▶ **When operating it continuously, set the interval of more than 20 sec.**

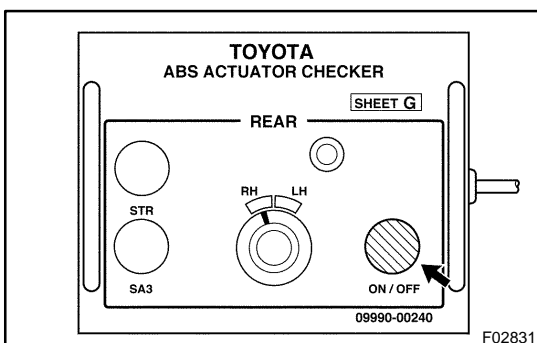
- (3) Check that the rear wheels stop.

If the rear wheels rotate, replace the hydraulic brake booster.

- (4) Release the "SA3" switch and "STR" switch simultaneously.

- (5) Check that the rear wheels rotate.

If the rear wheels stop, replace the hydraulic brake booster.



- (q) Inspect the right rear ABS solenoid.

- (1) Turn the selector switch to "RH" position.

- (2) Depress the brake pedal several times and release the brake pedal when the pump begins rotating. Wait until the pump stops.

- (3) Turn the ignition switch OFF.

- (4) Depress the brake pedal with a force of 343 N (35 kgf, 77 lbf), record the fluid surface in the reservoir tank of the hydraulic brake booster.

- (5) Press the MAIN push switch for 10 sec., and check that the fluid surface in the reservoir tank of the hydraulic brake booster does not rise up at this time.

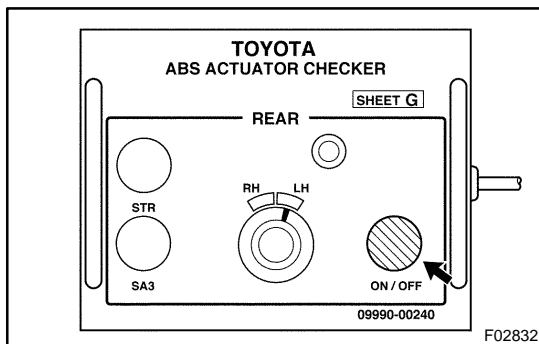
If the fluid surface level rises up, replace the hydraulic brake booster.

**NOTICE:**

**Do not press MAIN push switch for more than 10 sec. When operating the switch continuously, do it an interval of more than 20 sec.**

- (6) Start the engine and run it at idle.
- (7) Depress the brake pedal.
- (8) Release the parking brake lever and shift the shift lever to "L" position.
- (9) Once, release the brake pedal. After depressing the brake pedal with stable force, then push and hold MAIN push switch.
- (10) Check that the right rear wheel rotates.

If the right rear wheel stops, replace the hydraulic brake booster.



- (r) Inspect the left rear ABS solenoid.
  - (1) Turn the selector switch to "LH" position.
  - (2) Depress the brake pedal several times and release the brake pedal when the pump begins rotating. Wait until the pump stops.
  - (3) Turn the ignition switch OFF.
  - (4) Depress the brake pedal with a force of 343 N (35 kgf, 77 lbf), record the fluid surface in the reservoir tank of the hydraulic brake booster.
  - (5) Press the MAIN push switch for 10 sec., and check that the fluid surface in the reservoir tank of the hydraulic brake booster does not rise up at this time.

If the fluid surface level rises up, replace the hydraulic brake booster.

**NOTICE:**

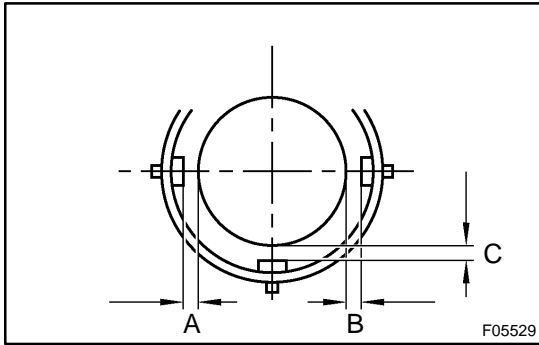
**Do not press MAIN push switch for more than 10 sec. When operating the switch continuously, do it an interval of more than 20 sec.**

- (6) Start the engine and run it at idle.
- (7) Depress the brake pedal.
- (8) Release the parking brake lever and shift the shift lever to "L" position.
- (9) Once, release the brake pedal. After depressing the brake pedal with stable force, then push and hold MAIN push switch.
- (10) Check that the left rear wheel rotates.

If the left rear wheel stops, replace the hydraulic brake booster.

- (s) Stop the engine and lower the vehicle.

- (t) Remove the "SHEET G" (SST) and disconnect the actuator checker (SST) and sub-wire harness S (SST) from the hydraulic brake booster.
- (u) Connect the 2 connectors to the actuator.
- (v) Clear the DTC (See page [DI-505](#) ).



## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-62](#) ).

### INSTALL ACCUMULATOR BRACKET

When installing the accumulator bracket, adjust to secure the clearance shown in the illustration on the left.

#### Standard clearance:

**A + B: 4.1 mm (0.161 in.) or less**

**C: 0.3 - 3.8 mm (0.012 - 0.150 in.)**

#### HINT:

Secure more than 0.3 mm (0.012 in.) clearance for A and B each.

## REMOVAL

### NOTICE:

Before starting the work, make sure that the ignition switch is OFF and depress the brake pedal more than 40 times.

### HINT:

When a pressure in power supply system is released, reaction force becomes light and stroke becomes longer.

### NOTICE:

- ▶ As high pressure is applied to the brake actuator tube No. 1, never deform it.
- ▶ Until the work is over, do not turn the ignition switch ON.

### 1. DRAW OUT FLUID WITH SYRINGE

### NOTICE:

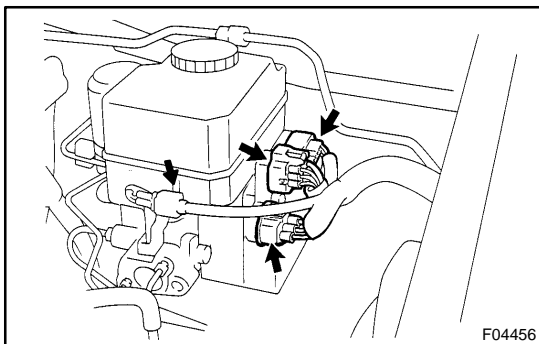
Do not let brake fluid remain on a painted surface. Wash it off immediately.

2. REMOVE SCUFF PLATE, COWL SIDE TRIM, LOWER NO. 1 PANEL, LH LOWER PANEL AND NO. 2 HEATER TO REGISTER DUCT (See page [BO-81](#) )

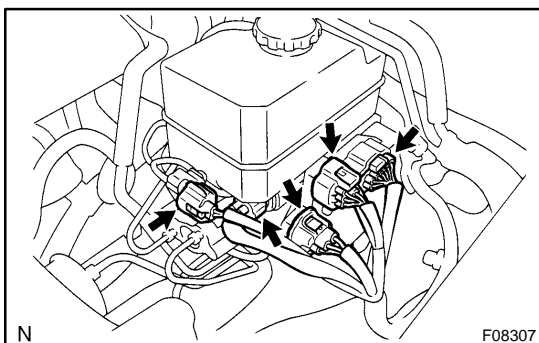
### 3. REMOVE ABS OR ABS & TRAC & VSC ECU

Remove the 2 nuts and ABS or ABS & TRAC & VSC ECU.

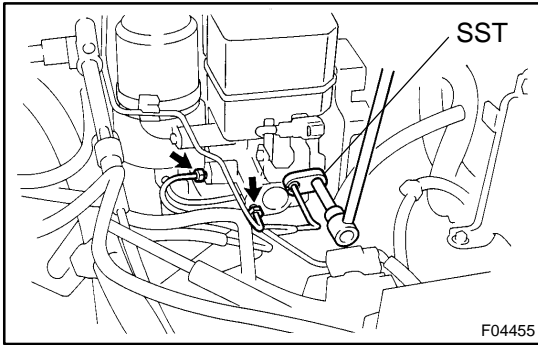
**Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)**



4. w/ ABS only:  
DISCONNECT 4 CONNECTORS



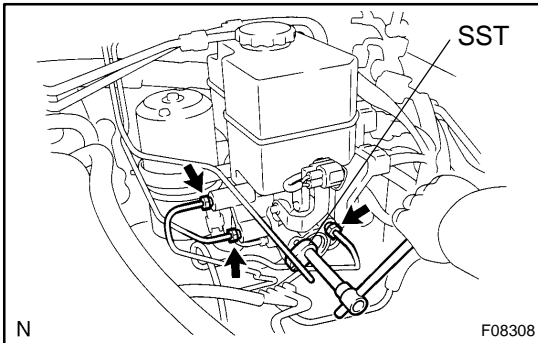
5. w/ ABS & TRAC & VSC only:  
DISCONNECT 5 CONNECTORS

**6. w/ ABS only:****DISCONNECT BRAKE LINES**

Using SST, disconnect the 3 brake lines.

SST 09023-00100

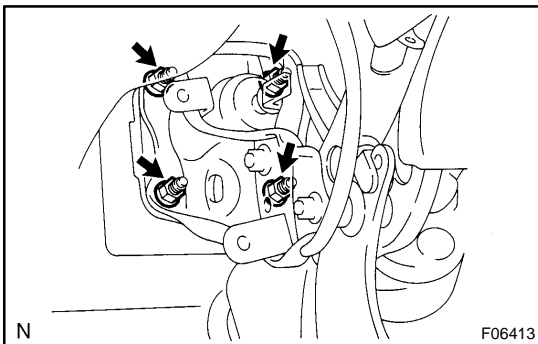
**Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)**

**7. w/ ABS & TRAC & VSC only:****DISCONNECT BRAKE LINES**

Using SST, disconnect the 4 brake lines.

SST 09023-00100

**Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)**

**8. REMOVE CLIP AND CLEVIS PIN****9. REMOVE HYDRAULIC BRAKE BOOSTER ASSEMBLY**

(a) Remove the 4 booster installation nuts.

**Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)**

(b) Remove the booster assembly and gasket.

# PROPORTIONING AND BY-PASS VALVE (P & B VALVE)

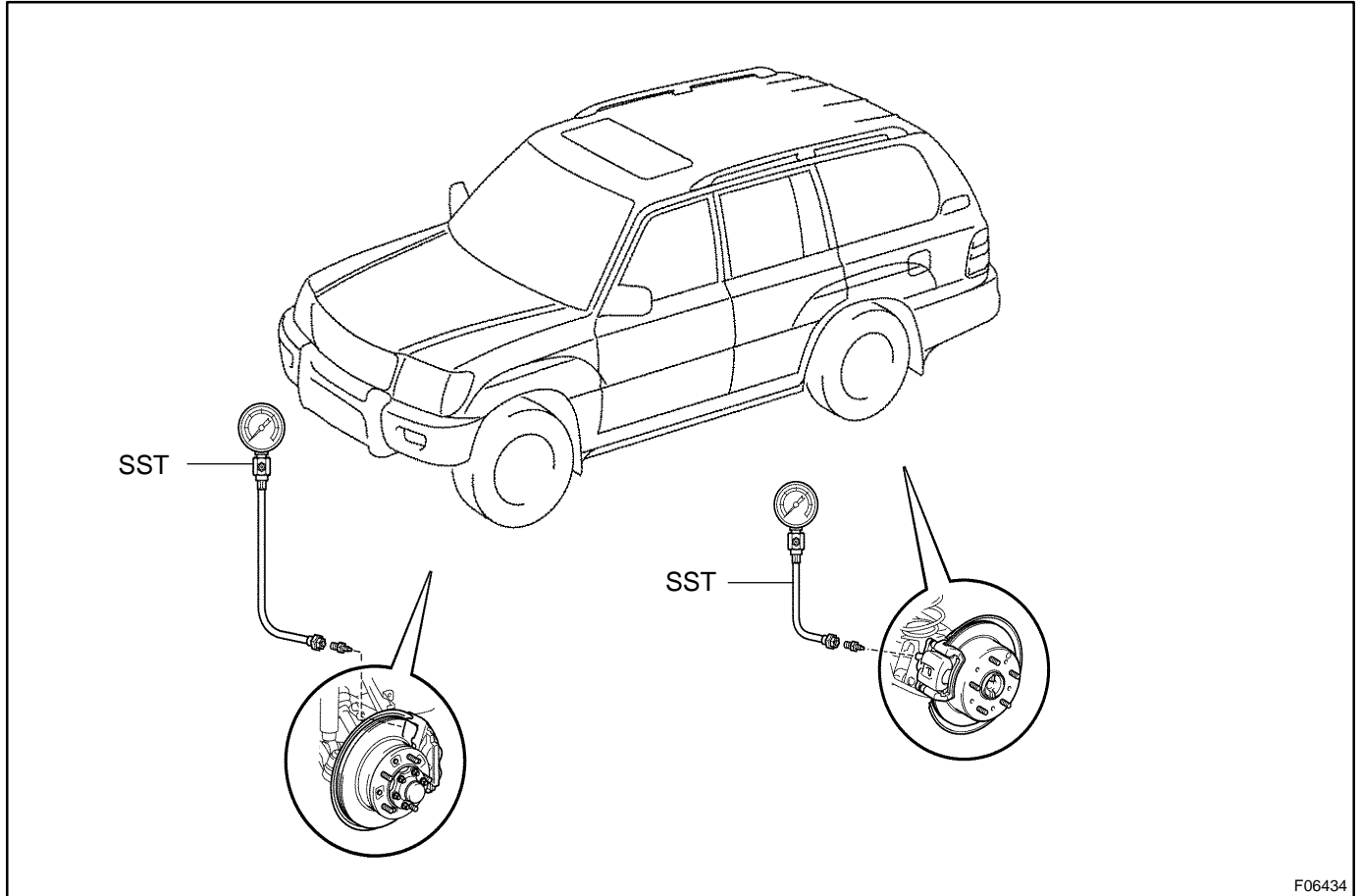
BR0NC-06

## ON-VEHICLE INSPECTION

### 1. INSTALL LSPV GAUGE (SST) AND BLEED AIR

- (a) Turn the ignition switch OFF, depress the brake pedal more than 40 times.
- (b) Install the LSPV gauge (SST) and bleed air.

SST 09709-29018



F06434

- (c) Turn the ignition switch ON, and wait until the pump motor has stopped.

### 2. RAISE FRONT BRAKE CALIPER PRESSURE AND CHECK REAR BRAKE CALIPER PRESSURE

Depress the brake pedal and check fluid pressure.

Front brake caliper pressure	Rear brake caliper pressure
2,256 kPa (23 kgf·cm <sup>2</sup> , 327 psi)	2,452 kPa (25 kgf·cm <sup>2</sup> , 356 psi)
4,413 kPa (45 kgf·cm <sup>2</sup> , 640 psi)	3,334 - 3,727 kPa (34 - 38 kgf·cm <sup>2</sup> , 484 - 540 psi)
7,845 kPa (80 kgf·cm <sup>2</sup> , 1,138 psi)	5,197 kPa (53 kgf·cm <sup>2</sup> , 754 psi)

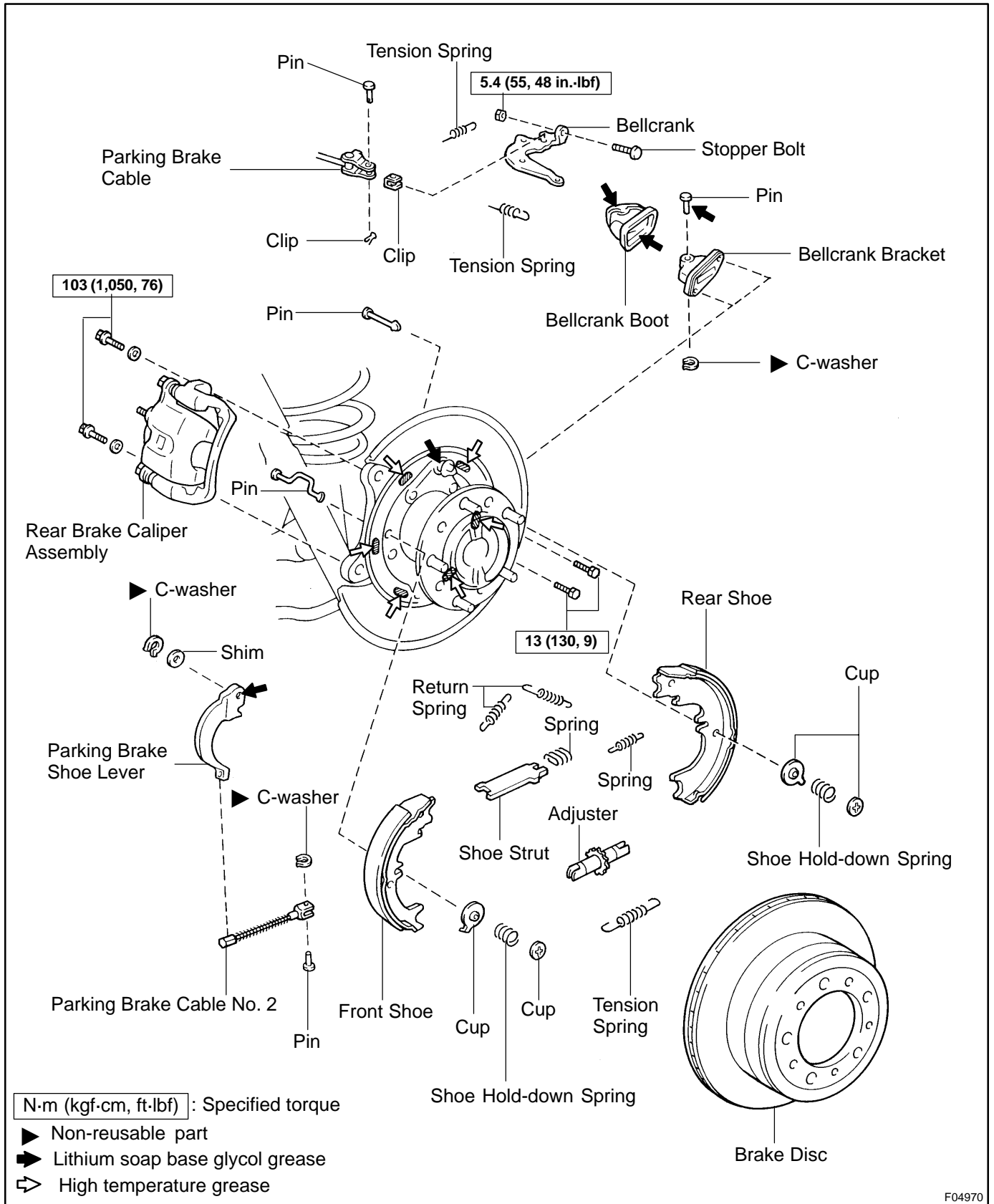
If the rear brake caliper pressure is incorrect, replace the hydraulic brake booster.

### 3. REMOVE LSPV GAUGE (SST) AND BLEED BRAKE SYSTEM (See page BR-4)

### 4. CHECK FOR FLUID LEAKAGE

# PARKING BRAKE COMPONENTS

BR0JX-05



F04970



## DISASSEMBLY

### 1. REMOVE REAR WHEEL

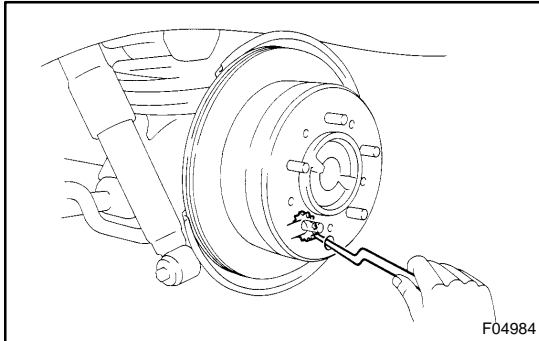
**Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)**

### 2. REMOVE REAR DISC BRAKE ASSEMBLY

- (a) Remove the 2 mounting bolts and remove the disc brake assembly.

**Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)**

- (b) Suspend the disc brake securely. Ensure that the hose is not stretched.

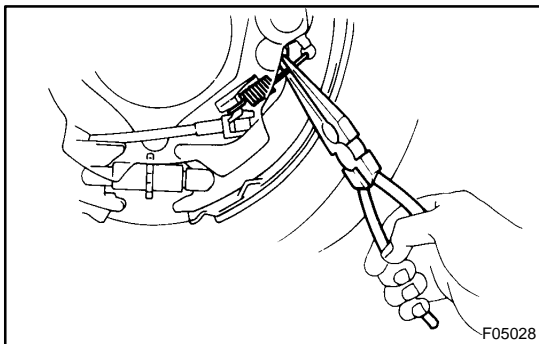


### 3. REMOVE DISC

- (a) Place matchmarks on the disc and rear hub.  
(b) Remove the disc.

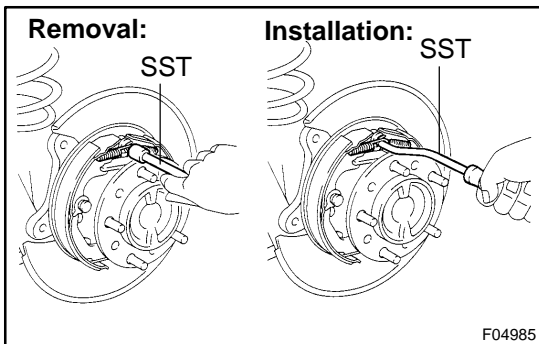
#### HINT:

If the disc cannot be removed easily, turn the shoe adjuster until the wheel turns freely.



### 4. REMOVE TENSION SPRING

- (a) Using needle-nose pliers, remove the spring from the rear shoe and backing plate.  
(b) Remove the lower side tension spring.



### 5. REMOVE SHOE RETURN SPRINGS

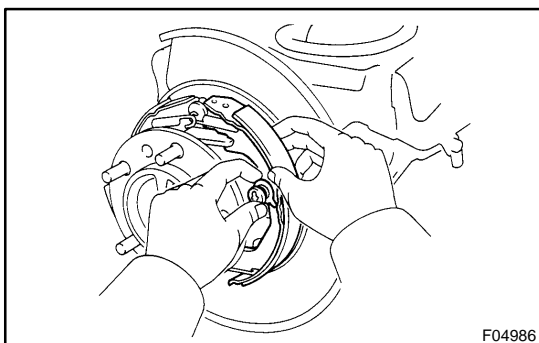
Using SST, remove the 2 shoe return springs.

SST 09717-20010

#### HINT:

At the time of installation, using SST, install the rear shoe return spring and then install the front shoe return spring.

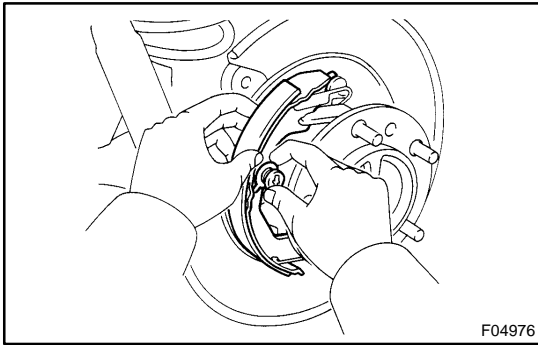
SST 09718-20010



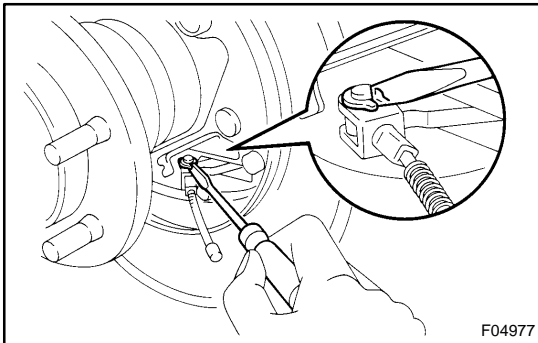
### 6. REMOVE SHOE STRUT WITH SPRING

### 7. REMOVE REAR SHOE, ADJUSTER AND TENSION SPRING

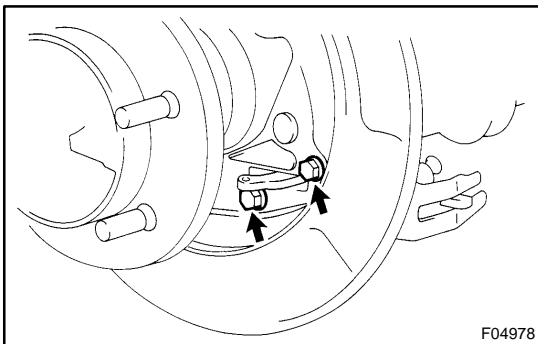
- (a) Slide out the rear shoe and remove the adjuster.  
(b) Remove the shoe hold-down spring, 2 cups and pin.

**8. REMOVE FRONT SHOE**

- (a) Slide out the front shoe.
- (b) Disconnect the parking brake cable No. 2 from the parking brake shoe lever.
- (c) Remove the shoe hold-down spring, 2 cups and pin.

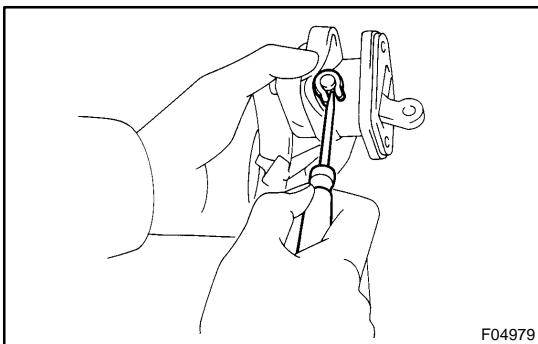
**9. IF NECESSARY, REMOVE AND DISASSEMBLE PARKING BRAKE BELLCRANK ASSEMBLY**

- (a) Using a screwdriver, remove the C-washer.
- (b) Remove the pin and disconnect the parking brake cable No. 2 from the bellcrank.
- (c) Remove the clip and pin.
- (d) Disconnect the parking brake cable and remove the clip.
- (e) Remove the 2 tension springs.



- (f) Remove the 2 bolts and parking brake bellcrank assembly.

**Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)**

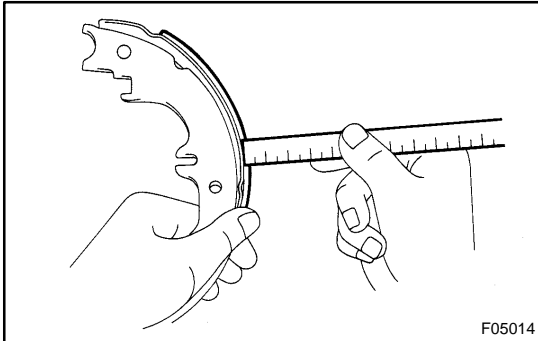


- (g) Turn the boot over from parking brake bellcrank bracket.
- (h) Using a screwdriver, remove the C-washer and pin.
- (i) Remove the parking brake bellcrank from the bellcrank bracket.
- (j) Remove the bellcrank boot from the bellcrank.

## INSPECTION

### 1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



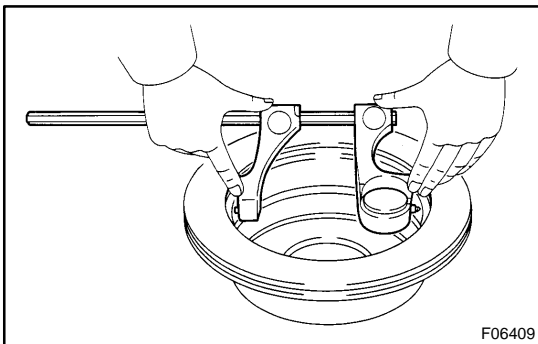
### 2. MEASURE BRAKE SHOE LINING THICKNESS

Using a ruler, measure the thickness of the shoe lining.

**Standard thickness: 4.0 mm (0.157 in.)**

**Minimum thickness: 1.0 mm (0.039 in.)**

If the lining thickness is at the minimum thickness or less, or if there is severe and uneven wear, replace the brake shoe.



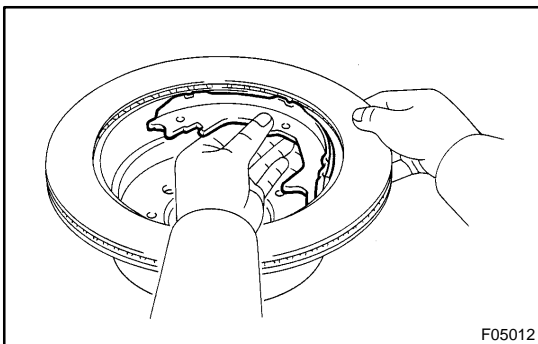
### 3. MEASURE BRAKE DISC INSIDE DIAMETER

Using brake drum gauge or equivalent, measure the inside diameter of the disc.

**Standard inside diameter: 230 mm (9.06 in.)**

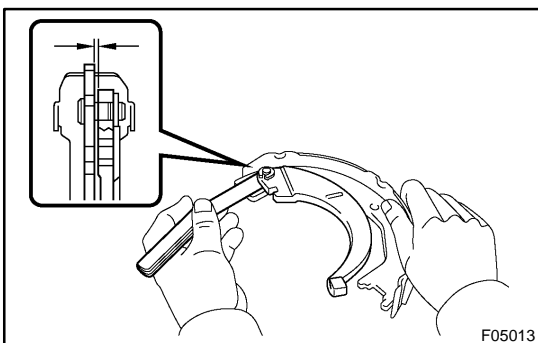
**Maximum inside diameter: 231 mm (9.09 in.)**

Replace the disc if the inside diameter is at the maximum value or more. Replace the disc or grind it with a lathe if the disc is scored or is worn unevenly.



### 4. INSPECT PARKING BRAKE LINING AND DISC FOR PROPER CONTACT

Apply chalk to the inside surface of the disc, then grind down the brake shoe lining to fit. If the contact between the disc and the brake shoe lining is improper, repair it using a brake shoe grinder or replace the brake shoe assembly.



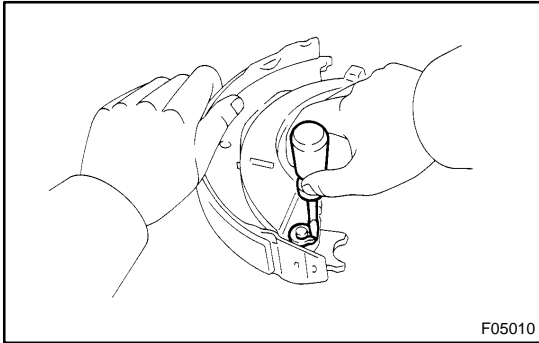
### 5. MEASURE CLEARANCE BETWEEN PARKING BRAKE SHOE AND LEVER

Using a feeler gauge, measure the clearance.

**Standard clearance: Less than 0.25 mm (0.0098 in.)**

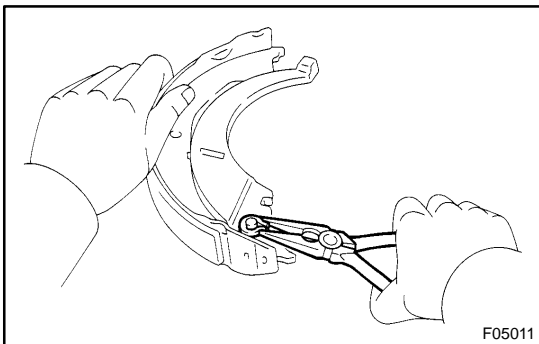
If the clearance is not within the specification, replace the shim with one of the correct size.

Thickness	mm (in.)	Thickness	mm (in.)
0.3	(0.012)	0.6	(0.024)
0.4	(0.016)	0.9	(0.035)
0.5	(0.020)	-	



**6. IF NECESSARY, REPLACE SHIM**

- (a) Using a screwdriver, remove the C-washer.
- (b) Remove the parking brake shoe lever and shim, and install the correct sized shim.



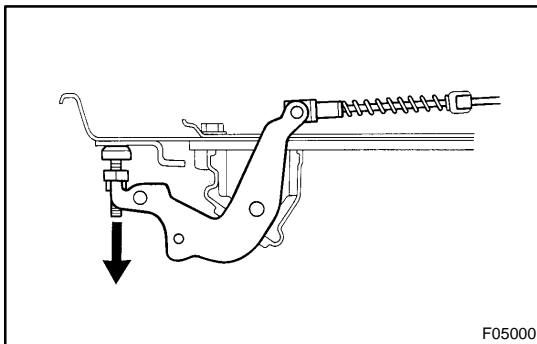
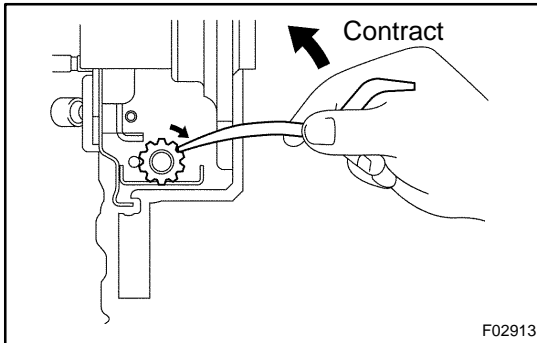
- (c) Install the parking brake shoe lever with a new C-washer.
- (d) Remeasure the clearance.

## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-34](#) ).

HINT:

Apply high temperature grease and lithium soap base glycol grease to the parts indicated by the arrows (See page [BR-33](#) ).



### 1. ADJUST PARKING BRAKE SHOE CLEARANCE

- (a) Disconnect the parking brake cable from the bellcrank.
- (b) Remove the 2 bellcrank tension springs.
- (c) Loosen the bellcrank adjusting bolt.
- (d) Temporarily install the 3 hub nuts.
- (e) Remove the hole plug.
- (f) Turn the adjuster and expand the shoes until the disc locks.
- (g) Return the adjuster 8 notches.
- (h) Install the hole plug.

### 2. ADJUST BELLCRANK

- (a) Pull the bellcrank until all play in the interior linkage is taken up.
- (b) Screw in the bellcrank adjusting bolt to where it contacts on the dust seal.
- (c) Loosen it one turn, and lock it at that position with the lock nut.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

- (d) Install the 2 bellcrank tension springs.
- (e) Connect the parking brake cable.
- (f) Remove the 3 hub nuts.

### 3. SETTLING PARKING BRAKE SHOES AND DISC

- (a) Drive the vehicle at about 50 km/h (31 mph) on a safe, level and dry road.
- (b) With the parking brake release button pushed in, pull on the lever with 88 N (9 kgf, 19.8 lbf) of force.
- (c) Drive the vehicle for about 400 meters (0.25 mile) in this condition.
- (d) Repeat this procedure 2 or 3 times.

### 4. RECHECK AND ADJUST PARKING BRAKE LEVER TRAVEL (See page [BR-14](#) )

## PARKING BRAKE LEVER ON-VEHICLE INSPECTION

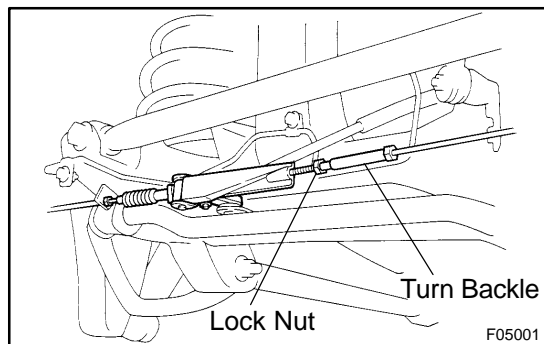
BR0XC-01

### 1. CHECK PARKING BRAKE LEVER TRAVEL

Pull the parking brake lever all the way up, and count the number of clicks.

**Parking brake lever travel at 196 N (20 kgf, 44 lbf):  
4 - 6 clicks**

If incorrect, adjust the parking brake.



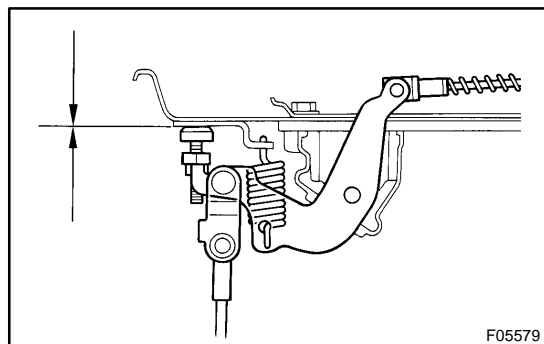
### 2. IF NECESSARY, ADJUST PARKING BRAKE

#### HINT:

Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted. For shoe clearance adjustment see page [BR-38](#).

- (a) Loosen the lock nut and turn the turn backle until the lever travel is correct.
- (b) Tighten the lock nut.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

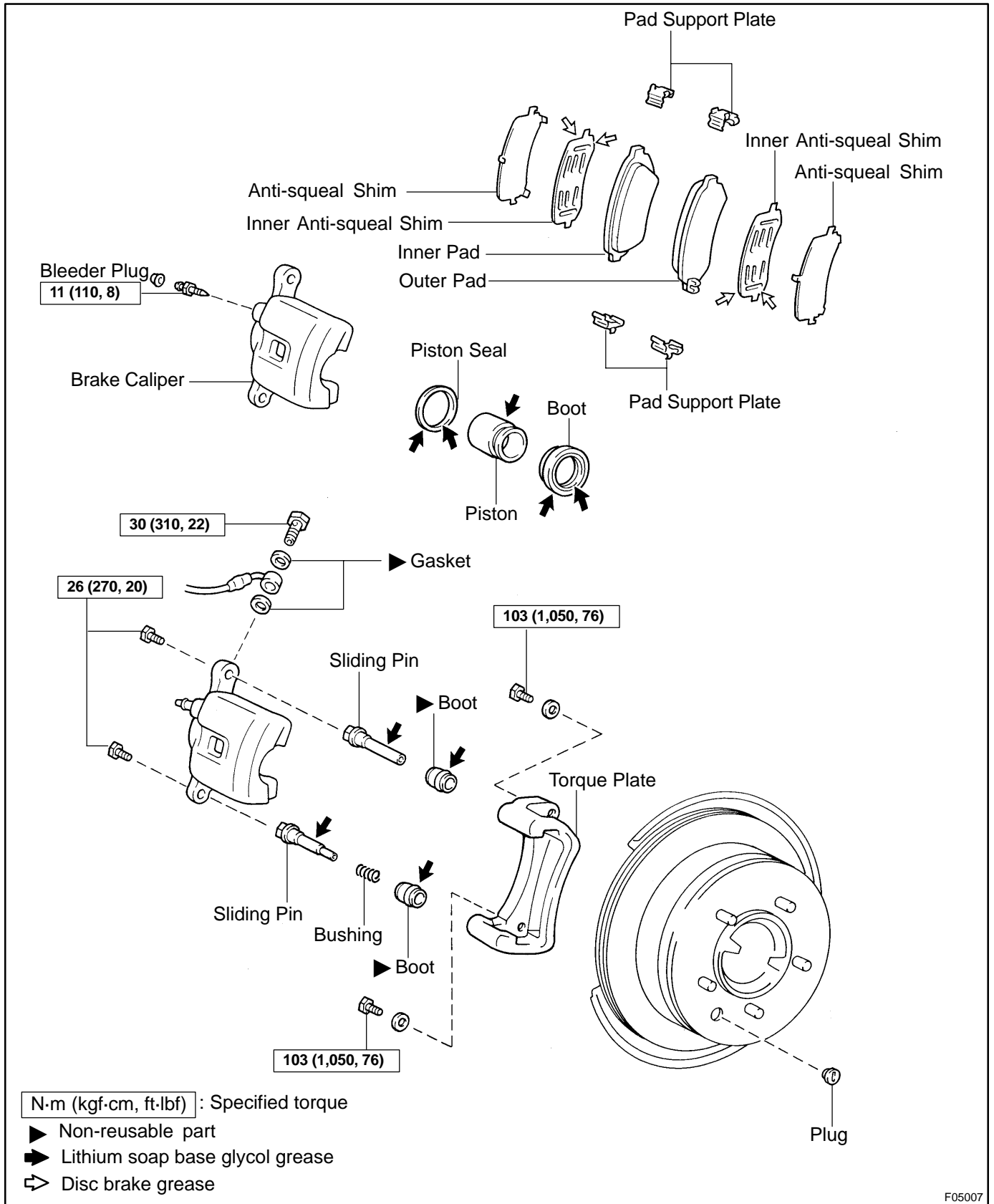


### 3. CHECK BELLCRANK

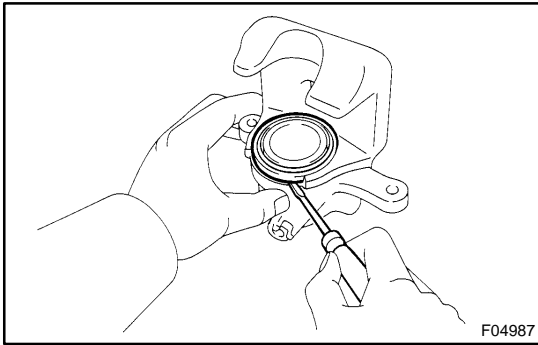
- (a) Check that the adjusting bolt on the bellcrank is not apart from the backing plate.
- (b) When the adjusting bolt on the bellcrank is apart from the backing plate adjust the parking brake cable once again.

# REAR BRAKE CALIPER COMPONENTS

BR0JR-06



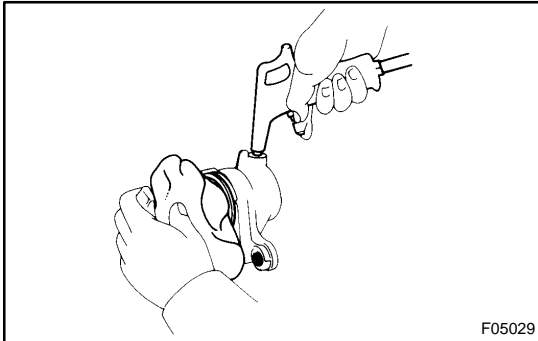
F05007



## DISASSEMBLY

### 1. REMOVE CYLINDER BOOTS

Using a screwdriver, remove the cylinder boot from the caliper.

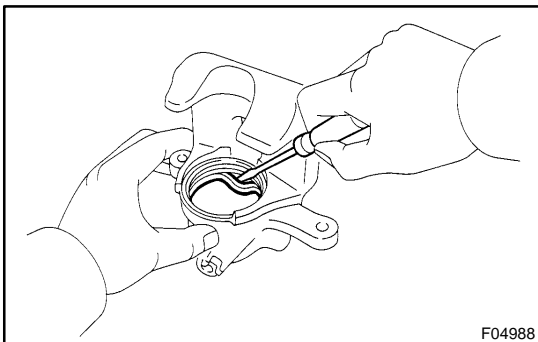


### 2. REMOVE PISTON

- (a) Place a piece of cloth or a similar, object between the piston and caliper.
- (b) Use compressed air to remove the piston from the cylinder.

#### CAUTION:

**Do not place your fingers in front of the piston when using compressed air.**



### 3. REMOVE PISTON SEALS FROM BRAKE CYLINDER

Using a screwdriver, remove the piston seals from the caliper.

### 4. REMOVE PIN BOOT AND SLIDING BUSHING

Using a screwdriver, pull out sliding pin, pin boot and sliding bushing.

#### HINT:

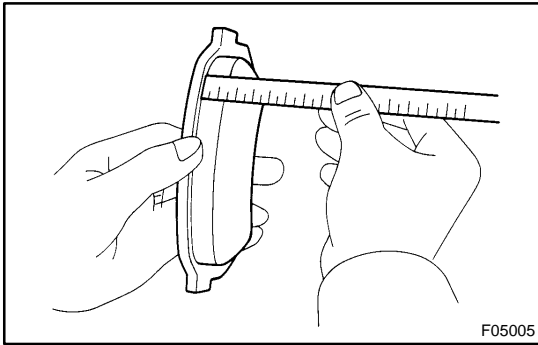
Tape the screwdriver tip before use.

#### NOTICE:

**At the time of reassembly, please refer to the following item.**

**Insert the sliding pin with sliding bushing into the lower part, and insert the sliding pin without sliding bushing into the upper part.**





## INSPECTION

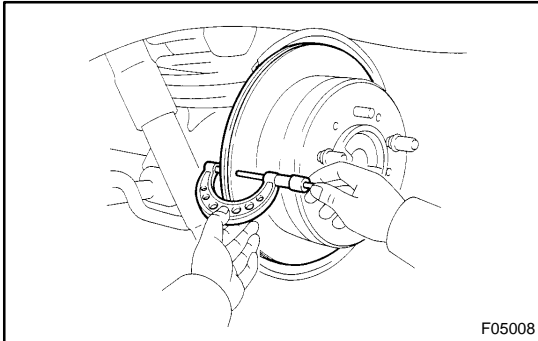
### 1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

**Standard thickness: 12.0 mm (0.472 in.)**

**Minimum thickness: 1.0 mm (0.039 in.)**

Replace the pad if the pad's thickness is at the minimum or if it shows signs of uneven wear.



### 2. MEASURE DISC THICKNESS

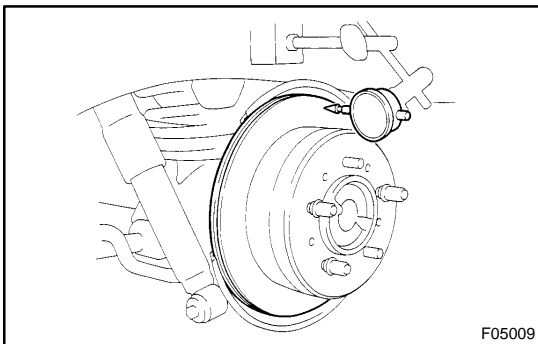
(a) Temporarily fasten the disc with the 3 hub nuts.

(b) Using a micrometer, measure the disc thickness.

**Standard thickness: 18.0 mm (0.709 in.)**

**Minimum thickness: 16.0 mm (0.611 in.)**

Replace the disc if the thickness of the disc is at the minimum thickness or less. Replace the disc or grind it on a lathe if it is scored or is worn unevenly.



### 3. MEASURE DISC RUNOUT

Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) from the outside edge.

**Maximum disc runout: 0.1 mm (0.0040 in.)**

If the disc's runout is at the maximum value or greater, check the bearing play is in the axial direction and check the axle hub runout (See page SA-84 ). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on an "On-Car" brake lathe.

### 4. IF NECESSARY, ADJUST DISC RUNOUT

(a) Remove the torque plate from the backing plate.

(b) Remove the hub nuts and the disc. Reinstall the disc rotating 1/5 of a turn from its original position on the hub. Install and torque the hub nuts.

**Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)**

Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.

(c) Repeat (b) until the disc has been installed on the 3 remaining hub positions.

(d) If the minimum runout recorded in (b) and (c) is less than 0.1 mm (0.0040 in.), install the disc in that position.

(e) If the minimum runout recorded in (b) and (c) is greater than 0.1 mm (0.0040 in.), replace the disc and repeat step 3.

(f) Install the torque plate and tighten the 2 bolts.

**Torque: 103 N·m(1,050 kgf·cm, 76 ft·lbf)**

## INSTALLATION

Installation is in the reverse order of removal (See page [BR-28](#)).

HINT:

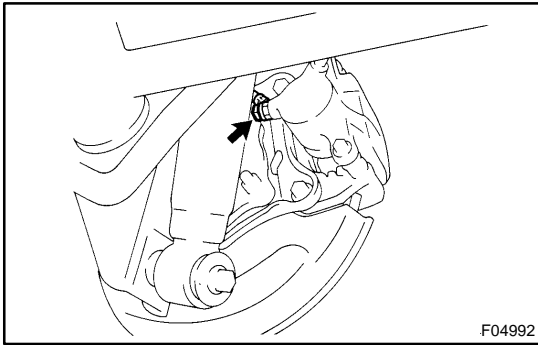
- ▶ After installation, fill the brake reservoir with brake fluid and bleed brake system (See page [BR-4](#)).
- ▶ Check for leaks.

## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-29](#)).

HINT:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page [BR-27](#)).



## REMOVAL

### 1. DISCONNECT FLEXIBLE HOSE

Remove the union bolt and gasket from the caliper, then disconnect the flexible hose from the caliper. Use a container to catch brake fluid as it drains out.

**Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)**

#### HINT:

At the time of installation, please refer to the following item. Install the flexible hose lock securely in the lock hole in the caliper.

### 2. REMOVE CALIPER

(a) Hold the sliding pin and loosen the 2 installation bolts.

**Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)**

(b) Remove the 2 installation bolts.

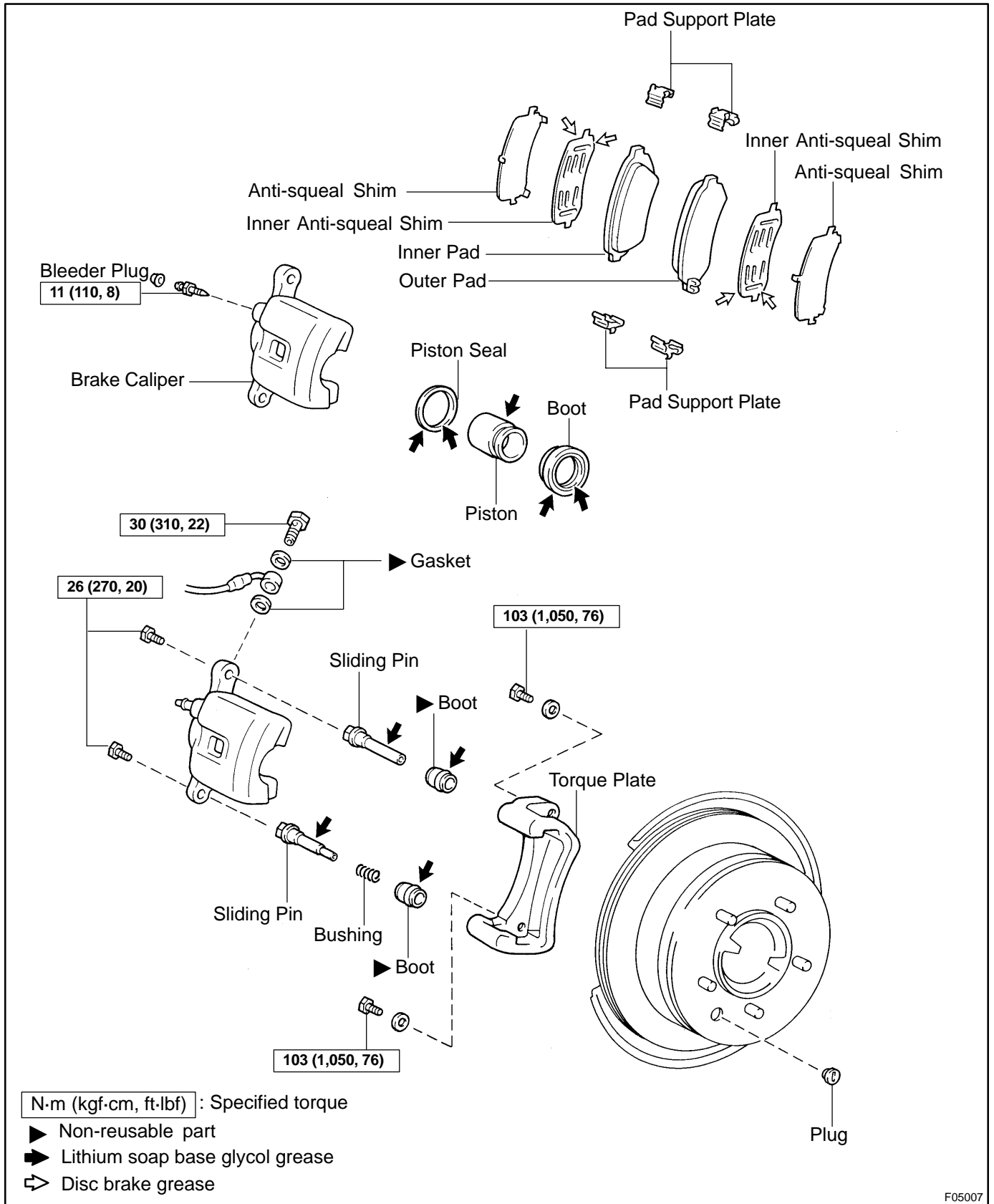
(c) Remove the caliper from the torque plate.

### 3. REMOVE 2 BRAKE PADS WITH ANTI-SQUEAL SHIMS

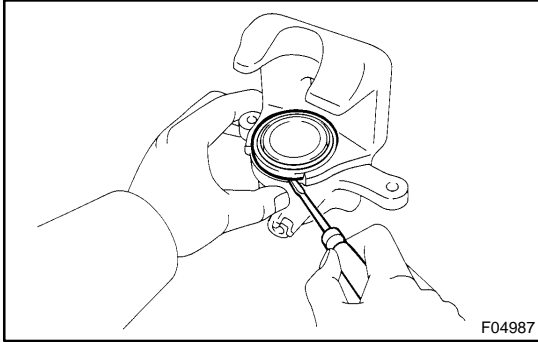
### 4. REMOVE 4 PAD SUPPORT PLATES

# REAR BRAKE CALIPER COMPONENTS

BR0JR-06



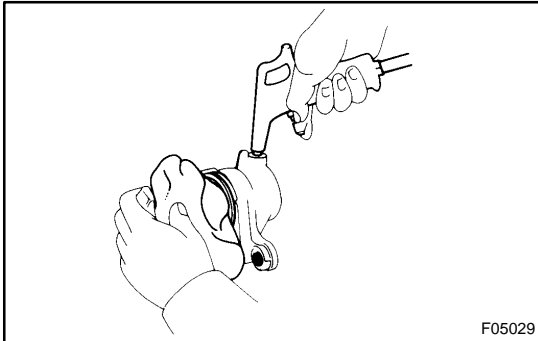
F05007



## DISASSEMBLY

### 1. REMOVE CYLINDER BOOTS

Using a screwdriver, remove the cylinder boot from the caliper.

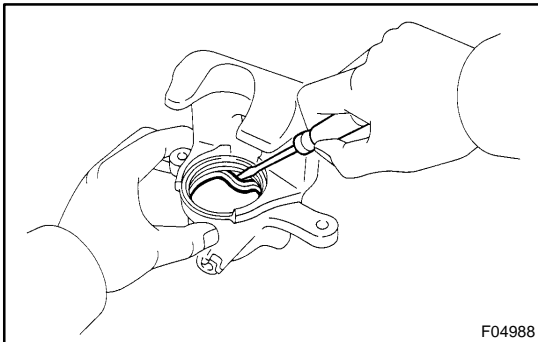


### 2. REMOVE PISTON

- (a) Place a piece of cloth or a similar, object between the piston and caliper.
- (b) Use compressed air to remove the piston from the cylinder.

#### CAUTION:

**Do not place your fingers in front of the piston when using compressed air.**



### 3. REMOVE PISTON SEALS FROM BRAKE CYLINDER

Using a screwdriver, remove the piston seals from the caliper.

### 4. REMOVE PIN BOOT AND SLIDING BUSHING

Using a screwdriver, pull out sliding pin, pin boot and sliding bushing.

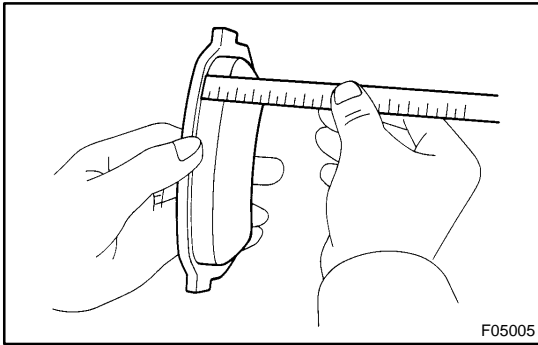
#### HINT:

Tape the screwdriver tip before use.

#### NOTICE:

**At the time of reassembly, please refer to the following item.**

**Insert the sliding pin with sliding bushing into the lower part, and insert the sliding pin without sliding bushing into the upper part.**



## INSPECTION

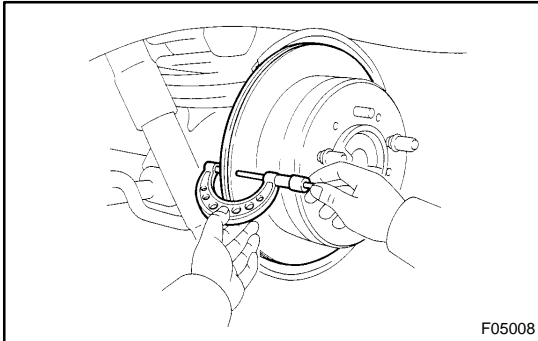
### 1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

**Standard thickness: 12.0 mm (0.472 in.)**

**Minimum thickness: 1.0 mm (0.039 in.)**

Replace the pad if the pad's thickness is at the minimum or if it shows signs of uneven wear.



### 2. MEASURE DISC THICKNESS

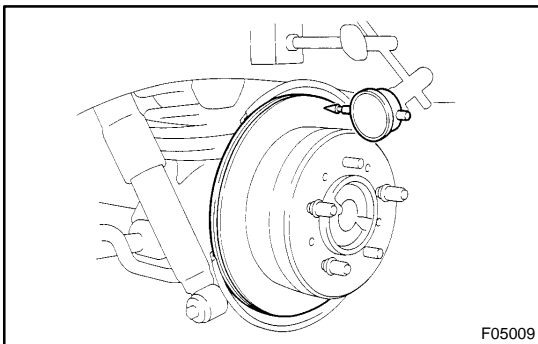
(a) Temporarily fasten the disc with the 3 hub nuts.

(b) Using a micrometer, measure the disc thickness.

**Standard thickness: 18.0 mm (0.709 in.)**

**Minimum thickness: 16.0 mm (0.611 in.)**

Replace the disc if the thickness of the disc is at the minimum thickness or less. Replace the disc or grind it on a lathe if it is scored or is worn unevenly.



### 3. MEASURE DISC RUNOUT

Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) from the outside edge.

**Maximum disc runout: 0.1 mm (0.0040 in.)**

If the disc's runout is at the maximum value or greater, check the bearing play is in the axial direction and check the axle hub runout (See page SA-84 ). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on an "On-Car" brake lathe.

### 4. IF NECESSARY, ADJUST DISC RUNOUT

(a) Remove the torque plate from the backing plate.

(b) Remove the hub nuts and the disc. Reinstall the disc rotating 1/5 of a turn from its original position on the hub. Install and torque the hub nuts.

**Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)**

Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.

(c) Repeat (b) until the disc has been installed on the 3 remaining hub positions.

(d) If the minimum runout recorded in (b) and (c) is less than 0.1 mm (0.0040 in.), install the disc in that position.

(e) If the minimum runout recorded in (b) and (c) is greater than 0.1 mm (0.0040 in.), replace the disc and repeat step 3.

(f) Install the torque plate and tighten the 2 bolts.

**Torque: 103 N·m(1,050 kgf·cm, 76 ft·lbf)**

## INSTALLATION

Installation is in the reverse order of removal (See page [BR-28](#)).

HINT:

- ▶ After installation, fill the brake reservoir with brake fluid and bleed brake system (See page [BR-4](#)).
- ▶ Check for leaks.

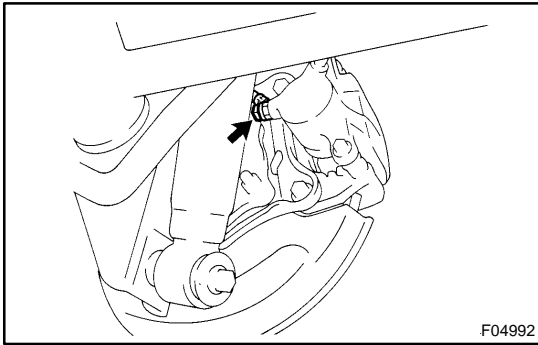


## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-29](#)).

HINT:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page [BR-27](#)).



## REMOVAL

### 1. DISCONNECT FLEXIBLE HOSE

Remove the union bolt and gasket from the caliper, then disconnect the flexible hose from the caliper. Use a container to catch brake fluid as it drains out.

**Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)**

#### HINT:

At the time of installation, please refer to the following item. Install the flexible hose lock securely in the lock hole in the caliper.

### 2. REMOVE CALIPER

(a) Hold the sliding pin and loosen the 2 installation bolts.

**Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)**

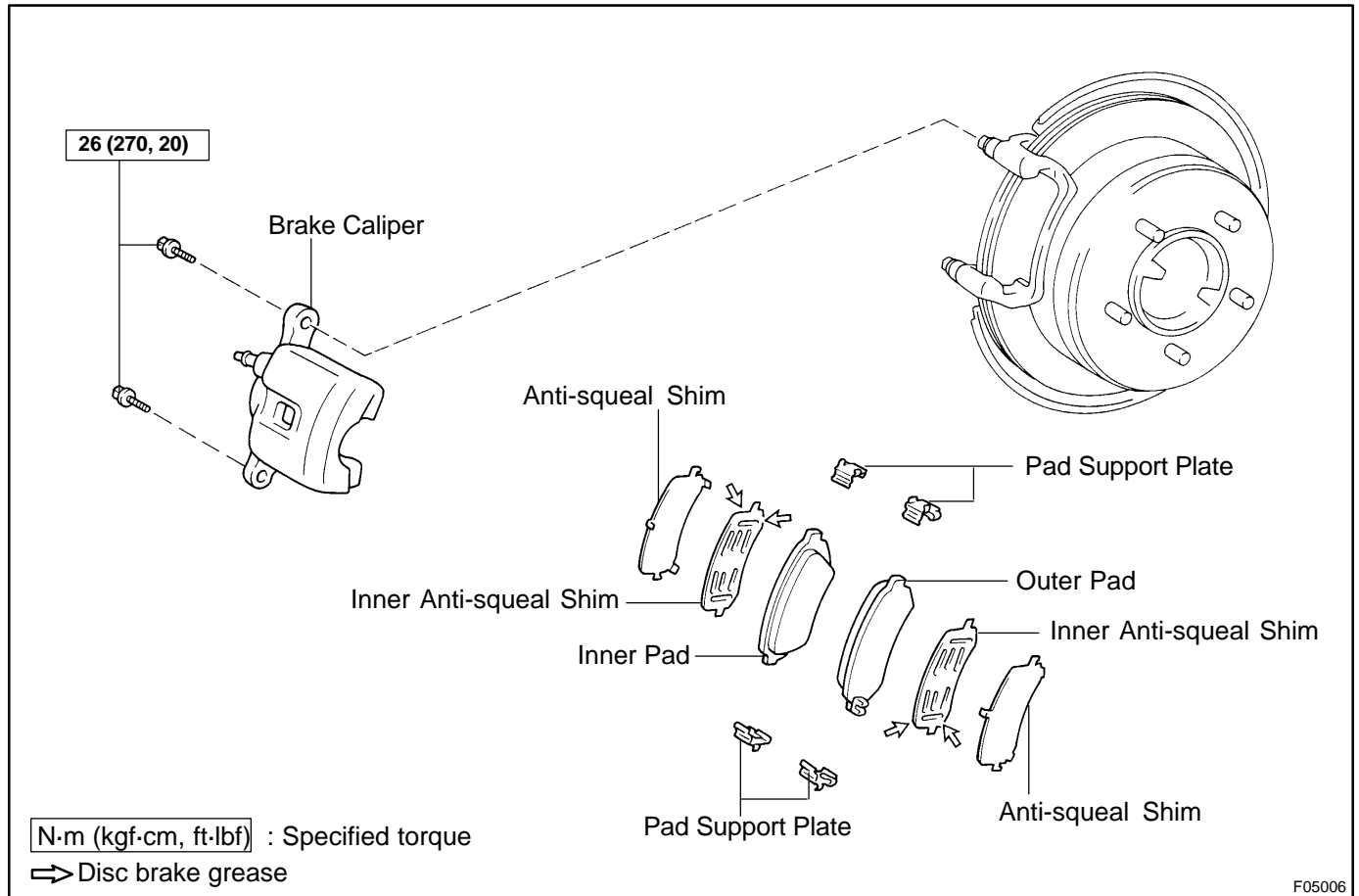
(b) Remove the 2 installation bolts.

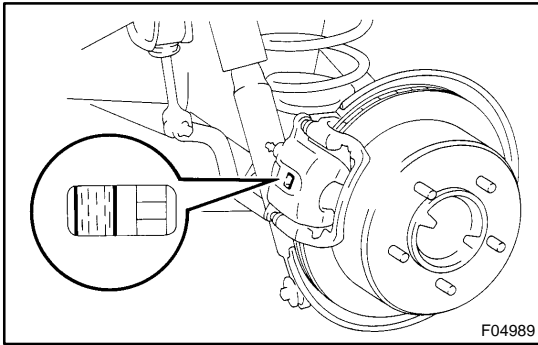
(c) Remove the caliper from the torque plate.

### 3. REMOVE 2 BRAKE PADS WITH ANTI-SQUEAL SHIMS

### 4. REMOVE 4 PAD SUPPORT PLATES

# REAR BRAKE PAD COMPONENTS



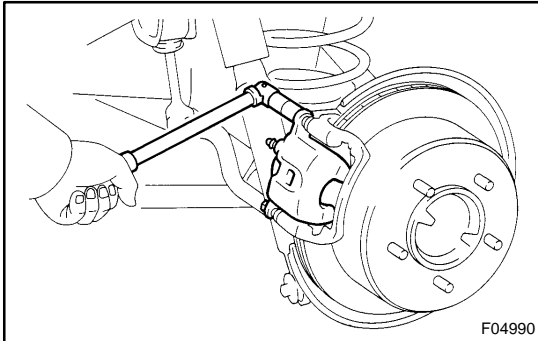


## REPLACEMENT

1. REMOVE REAR WHEEL
2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the caliper inspection hole and replace pads if not within the specification.

**Minimum thickness: 1.0 mm (0.039 in.)**



3. REMOVE BRAKE CALIPER

- (a) Remove the 2 mounting bolts.
- (b) Remove the caliper and suspend it so the hose is not stretched.

### HINT:

Do not disconnect the flexible hose.

4. REMOVE 2 PADS AND 4 ANTI-SQUEAL SHIMS
5. REMOVE 4 PAD SUPPORT PLATES

### NOTICE:

The pad support plates can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

6. CHECK DISC THICKNESS AND RUNOUT  
(See page [BR-30](#))
7. INSTALL PAD SUPPORT PLATES
8. INSTALL NEW PADS

### NOTICE:

When replacing worn pads, the anti-squeal shims must be replaced together with the pads.

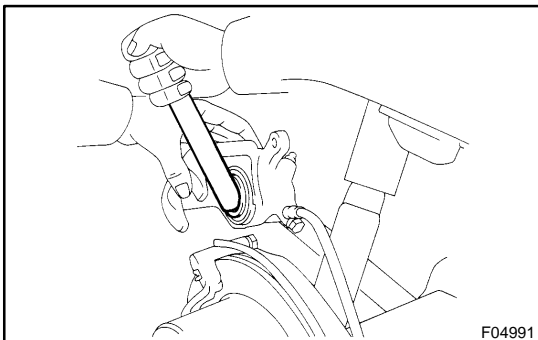
Install the 4 anti-squeal shims to the pads.

### HINT:

Apply disc brake grease to both sides of the inner anti-squeal shims (See page [BR-24](#)).

### NOTICE:

**Do not allow oil or grease to get on the rubbing face.**



9. INSTALL CALIPER

- (a) Draw out a small amount of brake fluid from the reservoir.
- (b) Press in the pistons with a hammer handle or an equivalent.

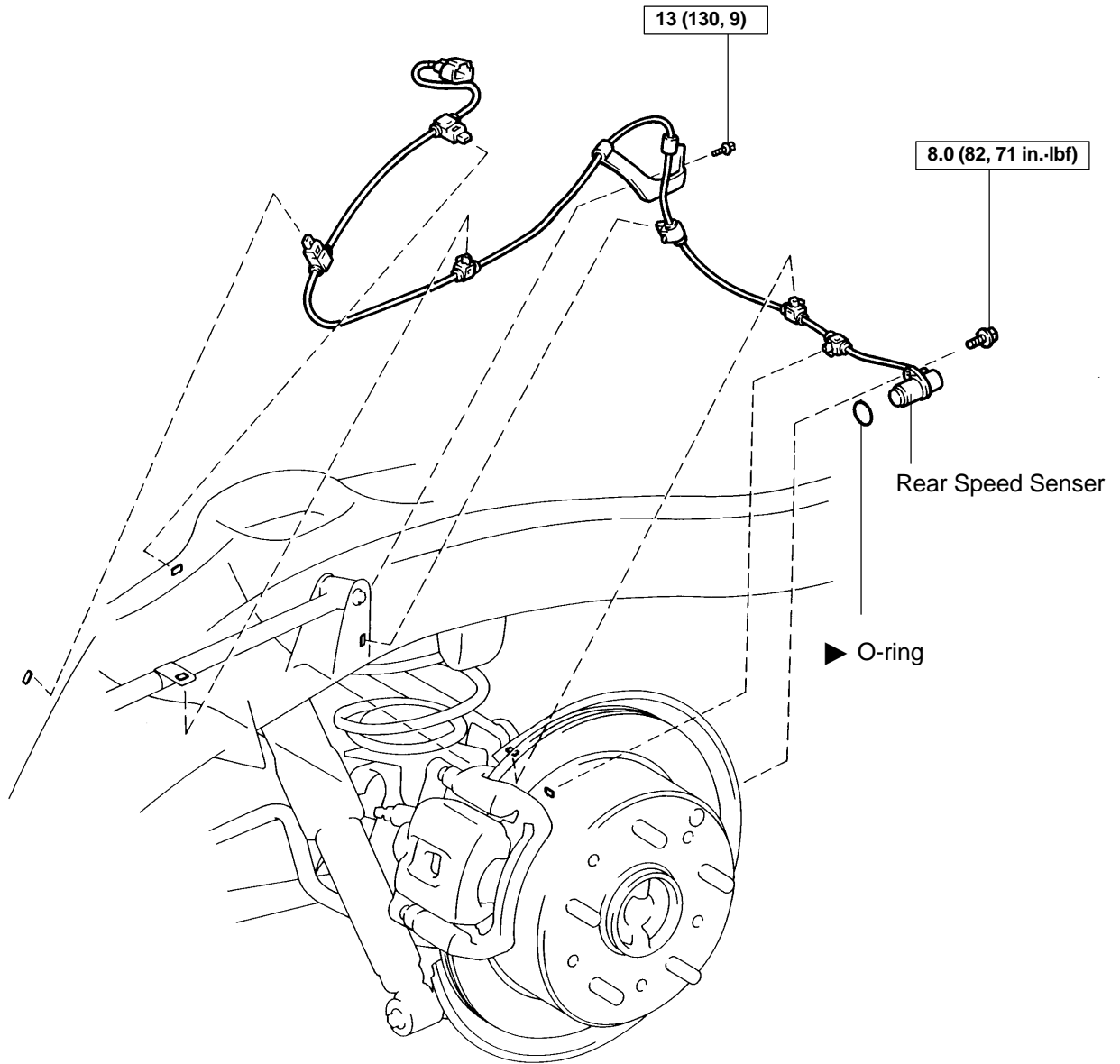
### HINT:

- ▶ Always change the pads on one wheel at a time as there is a possibility of the opposite piston flying out.
- ▶ If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some fluid escape.

- (c) Install the caliper carefully so the boot is not wedged.
- (d) Install 2 mounting bolts.  
**Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)**
- 10. INSTALL REAR WHEEL**  
**Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)**
- 11. DEPRESS BRAKE PEDAL SEVERAL TIMES**
- 12. CHECK THAT FLUID LEVEL IS AT MAX LINE**

# REAR SPEED SENSOR COMPONENTS

BR0K4-06



N·m (kgf·cm, ft·lbf) : Specified torque

▶ Non-reusable part

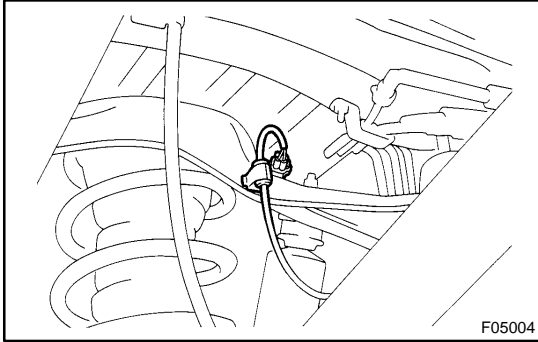
F05024

## INSTALLATION

Installation is in the reverse order of removal (See page [BR-72](#) ).

HINT:

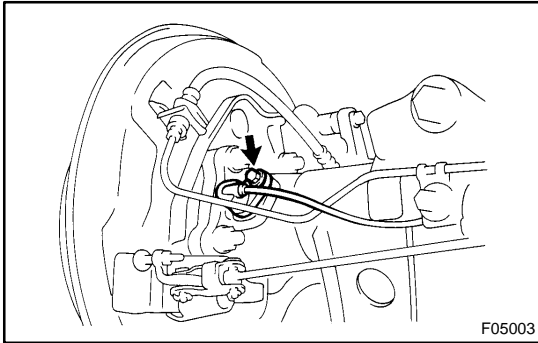
After installation, check the speed sensor signal (See page [DI-505](#) ).



## REMOVAL

### REMOVE SPEED SENSOR

- (a) Disconnect the speed sensor connector.
- (b) Remove the clamp bolt from the upper control bracket.  
**Torque: 13 N·m (130 kgf·cm, 9 ft·lbf )**
- (c) Remove the 6 resin clips, holding the sensor wire harness from the frame, upper control arm and axle housing.
- (d) Remove the mounting bolt and speed sensor.  
**Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)**
- (e) Remove the O-ring from the speed sensor.





# TROUBLESHOOTING

BR0JA-17

## PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Low pedal or spongy pedal	<ol style="list-style-type: none"> <li>1. Fluid leaks for brake system</li> <li>2. Air in brake system</li> <li>3. Piston seals (Worn or damaged)</li> <li>4. Hydraulic brake booster (Faulty)</li> </ol>	<a href="#">DI-655</a> <a href="#">BR-4</a> <a href="#">BR-18</a> <a href="#">BR-27</a> <a href="#">BR-40</a>
Brake drags	<ol style="list-style-type: none"> <li>1. Brake pedal freeplay (Minimum)</li> <li>2. Parking brake lever travel (Out of adjustment)</li> <li>3. Parking brake wire (Sticking)</li> <li>4. Parking brake (Shoe clearance out of adjustment)</li> <li>5. Pad (Cracked or distorted)</li> <li>6. Piston (Stuck)</li> <li>7. Piston (Frozen)</li> <li>8. Tension or return spring (Faulty)</li> <li>9. Hydraulic brake booster (Faulty)</li> </ol>	<a href="#">BR-9</a> <a href="#">BR-14</a> - <a href="#">BR-33</a> <a href="#">BR-15</a> <a href="#">BR-24</a> <a href="#">BR-18</a> <a href="#">BR-27</a> <a href="#">BR-18</a> <a href="#">BR-27</a> <a href="#">BR-33</a> <a href="#">BR-40</a>
Brake pulls	<ol style="list-style-type: none"> <li>1. Piston (Stuck)</li> <li>2. Pad (Cracked or distorted)</li> <li>3. Piston (Frozen)</li> <li>4. Disc (Scored)</li> <li>5. Hydraulic brake booster (Faulty)</li> </ol>	<a href="#">BR-18</a> <a href="#">BR-27</a> <a href="#">BR-15</a> <a href="#">BR-24</a> <a href="#">BR-18</a> <a href="#">BR-27</a> <a href="#">BR-21</a> <a href="#">BR-30</a> <a href="#">BR-40</a>
Hard pedal but brake inefficient	<ol style="list-style-type: none"> <li>1. Fluid leaks for brake system</li> <li>2. Air in brake system</li> <li>3. Pad (Worn)</li> <li>4. Pad (Cracked or distorted)</li> <li>5. Pad (Oily)</li> <li>6. Pad (Glazed)</li> <li>7. Disc (Scored)</li> <li>8. Hydraulic brake booster (Faulty)</li> </ol>	<a href="#">DI-655</a> <a href="#">BR-4</a> <a href="#">BR-15</a> <a href="#">BR-24</a> <a href="#">BR-15</a> <a href="#">BR-24</a> <a href="#">BR-15</a> <a href="#">BR-24</a> <a href="#">BR-15</a> <a href="#">BR-24</a> <a href="#">BR-21</a> <a href="#">BR-30</a> <a href="#">BR-40</a>

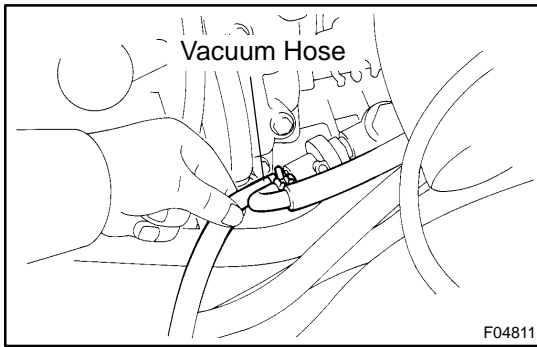
BRAKE - TROUBLESHOOTING

Noise from brakes	<ol style="list-style-type: none"> <li>1. Pad (Cracked or distorted)</li> <li>2. Installation bolt (Loose)</li> <li>3. Disc (Scored)</li> <li>4. Pad support plate (Loose)</li> <li>5. Sliding pin (Worn)</li> <li>6. Pad (Dirty)</li> <li>7. Pad (Glazed)</li> <li>8. Tension or return spring (Faulty)</li> <li>9. Anti-squeal shim (Damaged)</li> <li>10. Shoe hold-down spring (Damaged)</li> </ol>	<p>BR-15 BR-24 BR-18 BR-27 BR-21 BR-30 BR-24 BR-27 BR-15 BR-24 BR-15 BR-24 BR-33 BR-15 BR-24 BR-33</p>
Noise from hydraulic brake booster (Abnormal pump motor operation noise)	Accumulator bracket clearance (Out of adjustment)	BR-66
Brake warning light lights up*1 (Parking brake pedal released)	<ol style="list-style-type: none"> <li>1. Brake fluid level</li> <li>2. Hydraulic brake booster power supply system (Faulty)</li> </ol>	- BR-40
Brake warning light lights up and brake warning buzzer sounds*2	Hydraulic brake booster power supply system (Faulty)	BR-40
ABS warning light lights up*3	<ol style="list-style-type: none"> <li>1. Anti - lock brake system (Faulty)</li> <li>2. Hydraulic brake booster power supply system (Faulty)</li> </ol>	- BR-40

\*1, \*3: The light may stay on for about 60 seconds after the engine is started. It is normal if it goes out after a while.

\*2, \*3: Depressing the brake pedal repeatedly may turn on the warning light and buzzer. It is normal if the light goes off and the buzzer stops sounding after a few seconds.

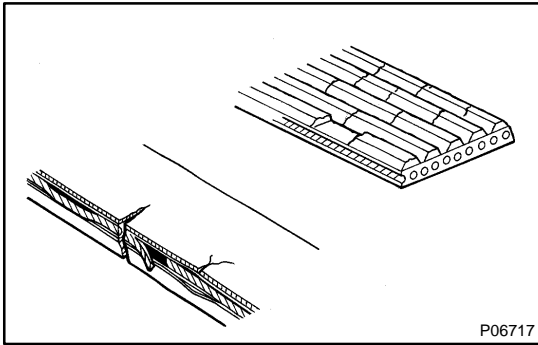
\*3: While ABS warning light is ON.



## AIR CONTROL VALVE INSPECTION

SR0LZ-06

1. **TURN AIR CONDITIONING SWITCH OFF**
2. **CHECK IDLE-UP**
  - (a) Start the engine and run it at idle.
  - (b) Fully turn the steering wheel.
  - (c) Check that the engine rotations decrease when the vacuum hose of the air control valve is pinched.
  - (d) Check that the engine rotations increase when the hose is released.



## DRIVE BELT INSPECTION

SR0LW-04

### INSPECT DRIVE BELT

Visually check the belt for excessive wear, frayed cords, etc. If any defect has been found, replace the drive belt.

#### HINT:

Cracks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.

## POWER STEERING FLUID BLEEDING

SR0LX-04

1. **CHECK FLUID LEVEL** (See page [SR-5](#))
2. **JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS**

3. **TURN STEERING WHEEL**

With the engine stopped, turn the wheel slowly from lock to lock several times.

4. **LOWER VEHICLE**

5. **START ENGINE**

Run the engine at idle for a few minutes.

6. **TURN STEERING WHEEL**

- (a) With the engine idling, turn the wheel to left or right full lock position and keep it there for 2-3 seconds, then turn the wheel to the opposite full lock position and keep it there for 2-3 seconds.

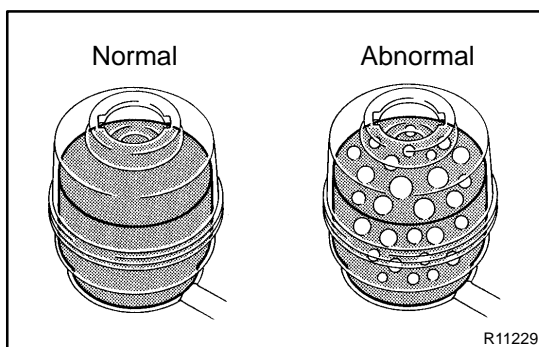
- (b) Repeat (a) several times.

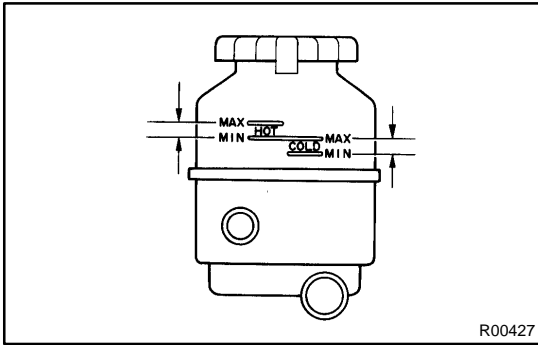
7. **STOP ENGINE**

8. **CHECK FOR FOAMING OR EMULSIFICATION**

If the system has to be bled twice specifically because of foaming or emulsification, check for fluid leaks in the system.

9. **CHECK FLUID LEVEL** (See page [SR-5](#))





## INSPECTION

### 1. CHECK FLUID LEVEL

- (a) Keep the vehicle level.
- (b) With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

**Fluid: ATF DEXRON® II or III**

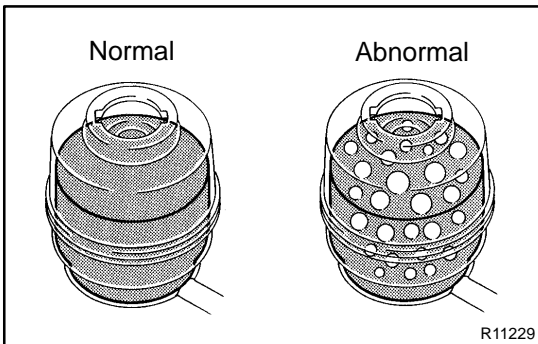
#### HINT:

Check that the fluid level is within the HOT LEVEL range on the reservoir.

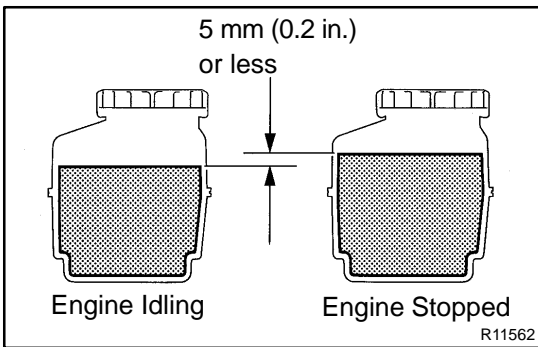
If the fluid is cold, check that it is within the COLD LEVEL range.

- (c) Start the engine and run it at idle.
- (d) Turn the steering wheel from lock to lock several times to boost fluid temperature.

**Fluid temperature: 80°C (176°F)**



- (e) Check for foaming or emulsification. If there is foaming or emulsification, bleed power steering system (See page [SR-4](#) ).



- (f) With the engine idling, measure the fluid level in the oil reservoir.
- (g) Stop the engine.
- (h) Wait a few minutes and remeasure the fluid level in the oil reservoir.

**Maximum fluid level rise: 5 mm (0.20 in.)**

If a problem is found, bleed power steering system (See page [SR-4](#) ).

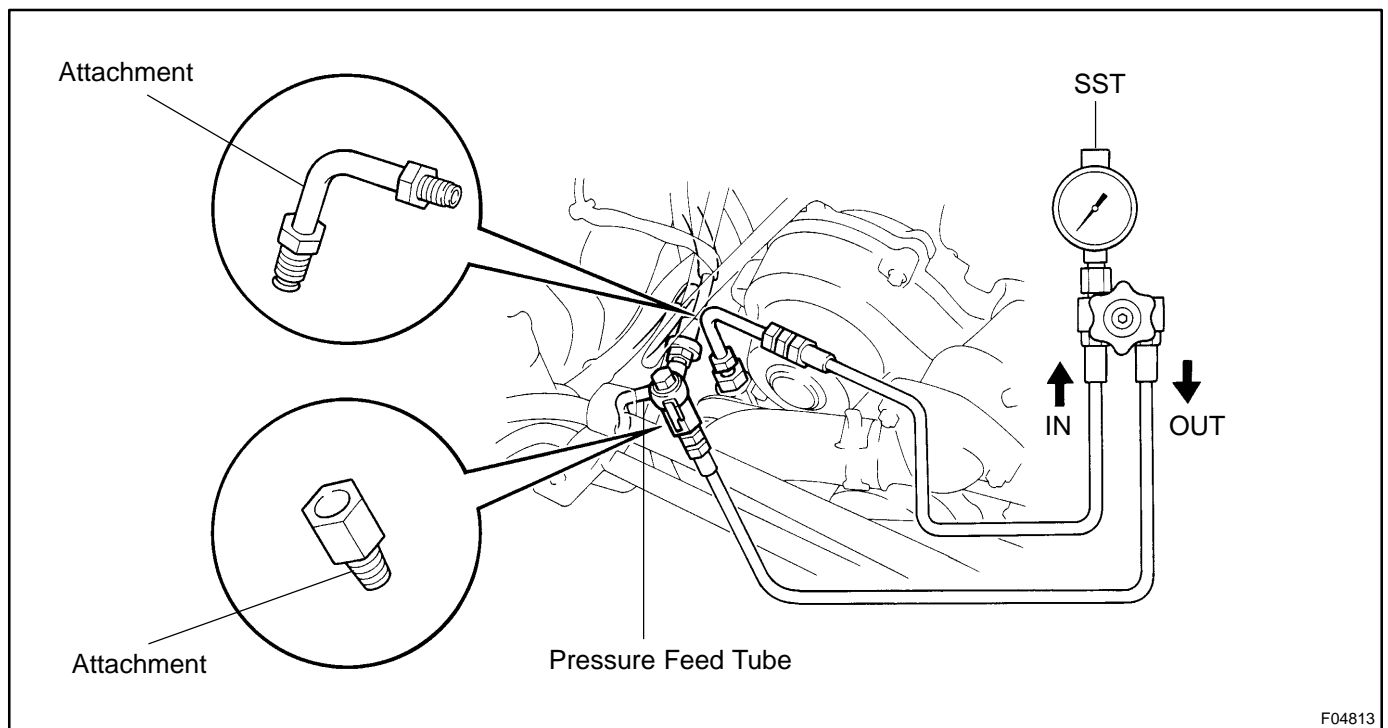
- (i) Check the fluid level.

**2. CHECK STEERING FLUID PRESSURE**

- (a) Remove the air cleaner assembly with air cleaner hose (See page [SR-40](#) ).
- (b) Disconnect the pressure feed tube from the PS vane pump (See page [SR-40](#) ).
- (c) Connect SST, as shown below.  
SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)

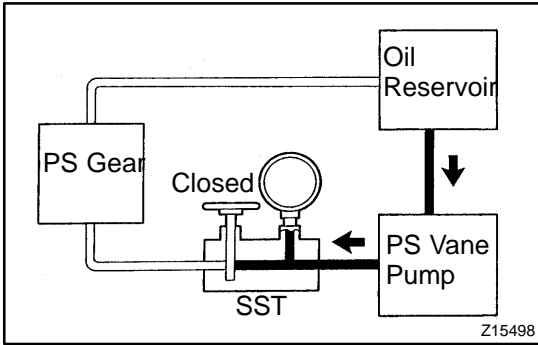
**NOTICE:**

**Check that the valve of the SST is in the open position.**



- (d) Bleed the power steering system (See page [SR-4](#) ).
- (e) Start the engine and run it at idle.
- (f) Turn the steering wheel from lock to lock several times to boost fluid temperature.

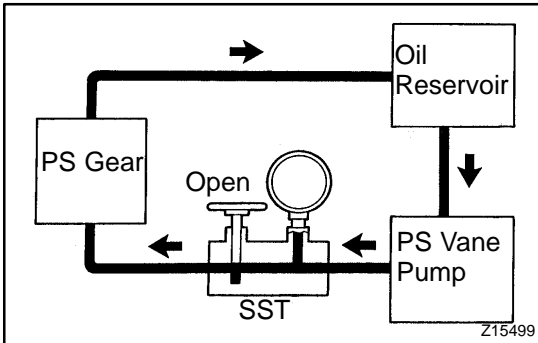
**Fluid temperature: 80 °C (176 °F)**



- (g) With the engine idling, close the valve of the SST and observe the reading on the SST.  
**Minimum fluid pressure:**  
**10,000 kPa (102 kgf/cm<sup>2</sup>, 1,451 psi)**

**NOTICE:**

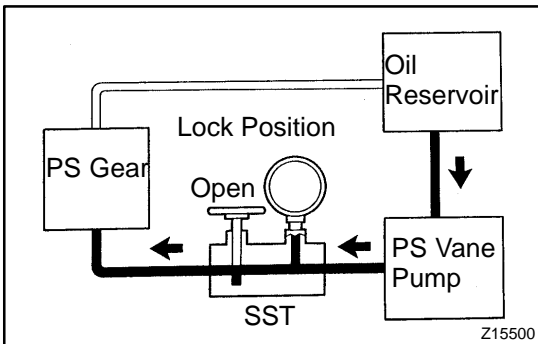
- ▶ Do not keep the valve closed for more than 10 seconds.
- ▶ Do not let the fluid temperature become too high.



- (h) With the engine idling, open the valve fully.  
 (i) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.  
**Difference fluid pressure:**  
**490 kPa (5 kgf/cm<sup>2</sup>, 71 psi) or less**

**NOTICE:**

**Do not turn the steering wheel.**



- (j) With the engine idling and valve fully opened, turn the steering wheel to full lock.  
**Minimum fluid pressure:**  
**10,000 kPa (102 kgf/cm<sup>2</sup>, 1,451 psi)**

**NOTICE:**

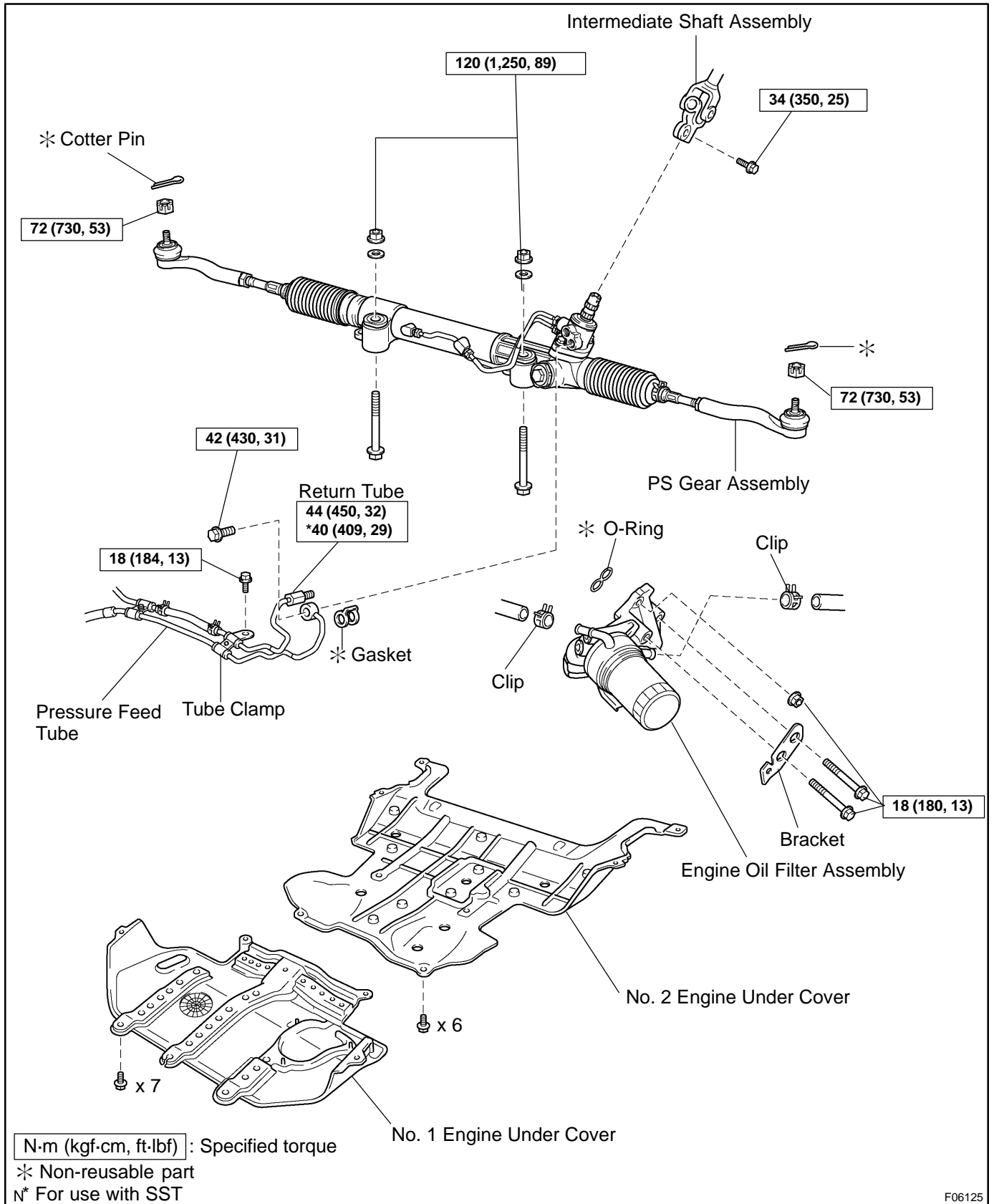
- ▶ Do not maintain lock position for more than 10 seconds.
- ▶ Do not let the fluid temperature become too high.

- (k) Disconnect the SST.  
 SST 09640- 10010 (09641- 01010, 09641- 01030, 09641-01060)  
 (l) Connect the pressure feed tube (See page [SR-47](#) ).  
 (m) Install the air cleaner assembly with air cleaner hose (See page [SR-47](#) ).  
 (n) Bleed the power steering system (See page [SR-4](#) ).



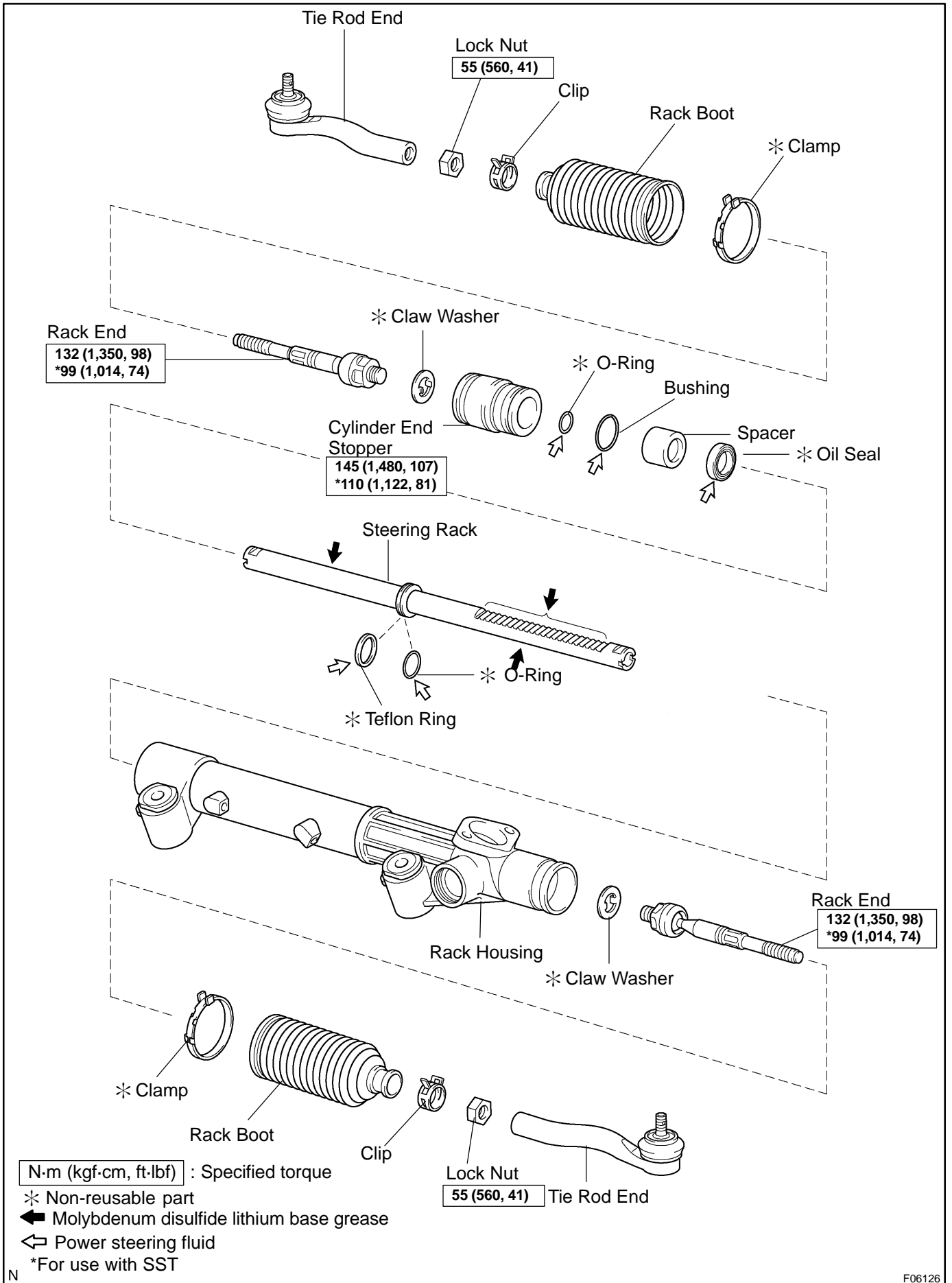
# POWER STEERING GEAR COMPONENTS

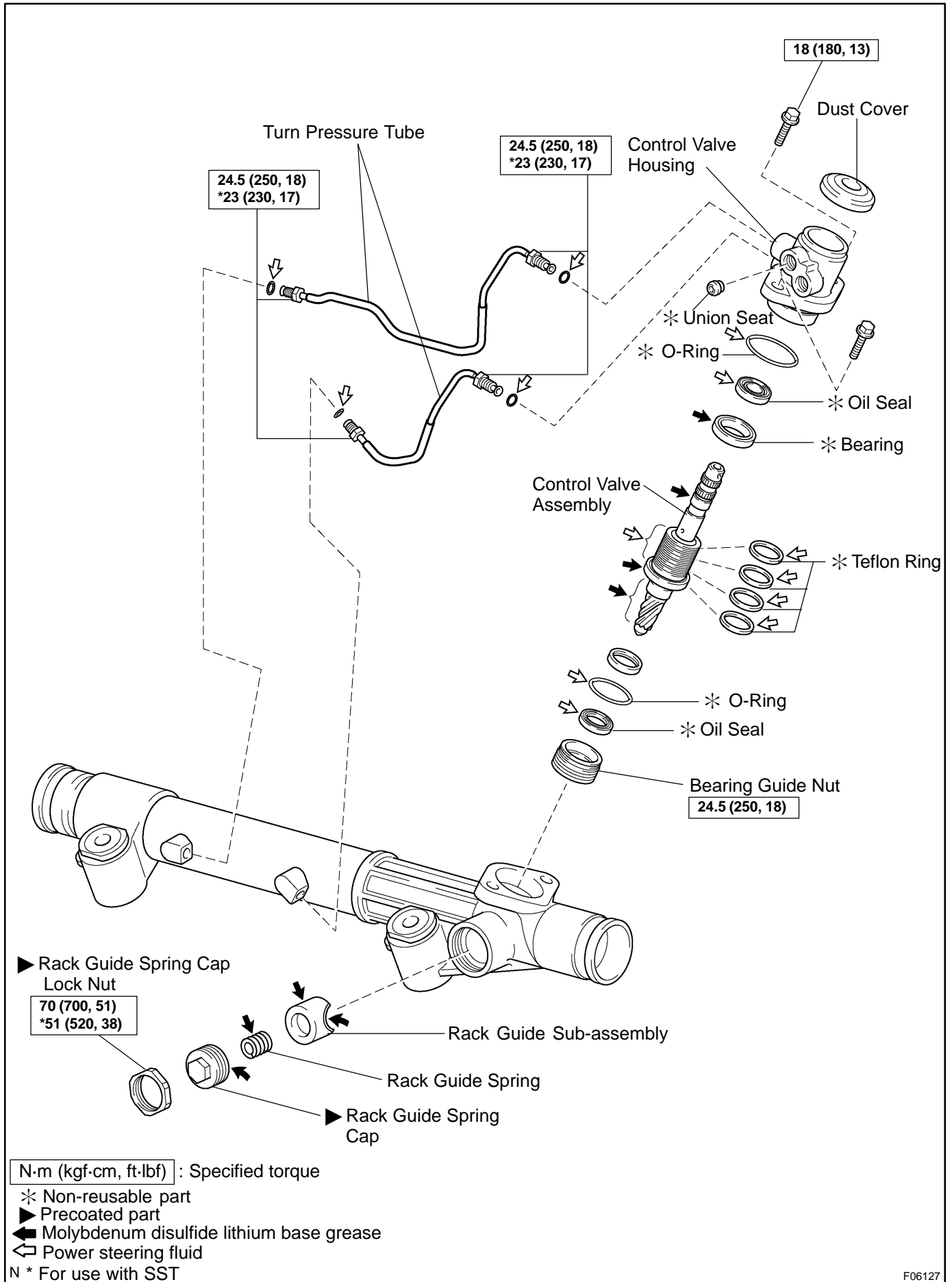
SR0MJ-06



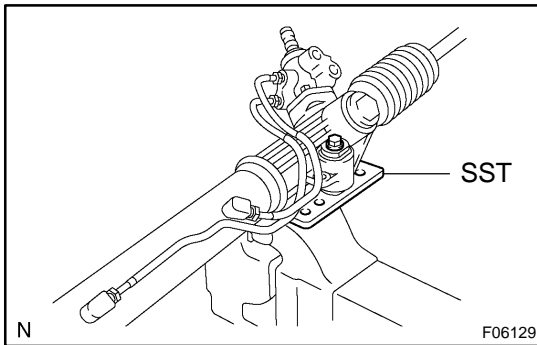
F06125

STEERING - POWER STEERING GEAR





F06127



## DISASSEMBLY

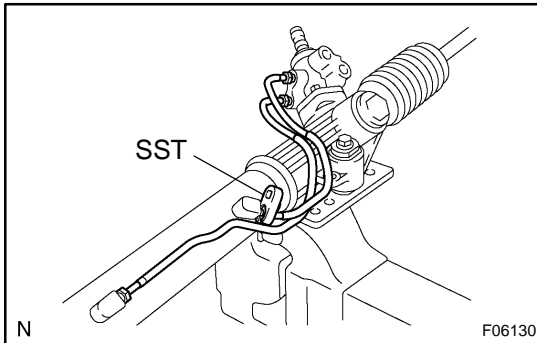
### NOTICE:

When using a vise, do not overtighten it.

#### 1. SECURE PS GEAR ASSEMBLY IN VISE

Using SST, secure the gear assembly in a vise, as shown in the illustration.

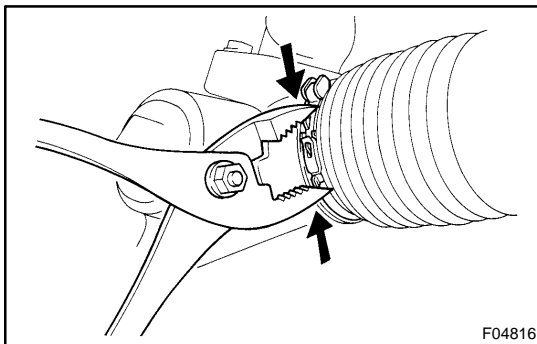
SST 09630-00014 (09631-00142)



#### 2. REMOVE 2 TURN PRESSURE TUBES

Using SST, remove the tube.

SST 09023-38200



#### 3. REMOVE RH AND LH CLIPS, RACK BOOTS AND CLAMPS

(a) Using pliers, loosen the clamp, as shown in the illustration.

### NOTICE:

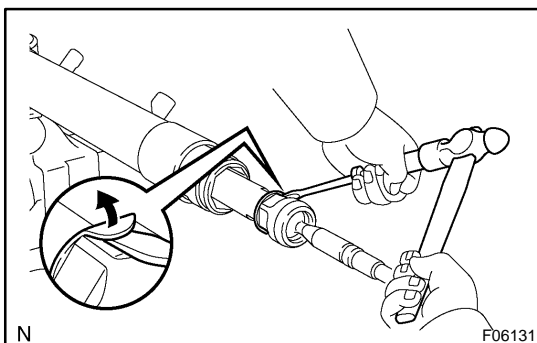
Be careful not to damage the boot.

(b) Remove the clip, rack boot and clamp.

(c) Employ the same manner described above to the other side.

### HINT:

Mark the RH and LH rack boots.

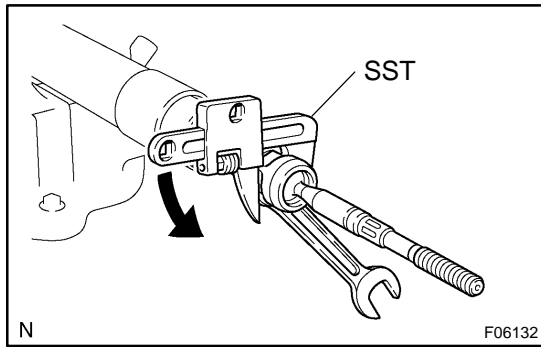


#### 4. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

(a) Using a screwdriver and hammer, stake back the washer.

### NOTICE:

Avoid and impact to the steering rack.



- (b) Using a spanner to hold the steering rack steady, and using SST, remove the rack end.  
SST 09922-10010

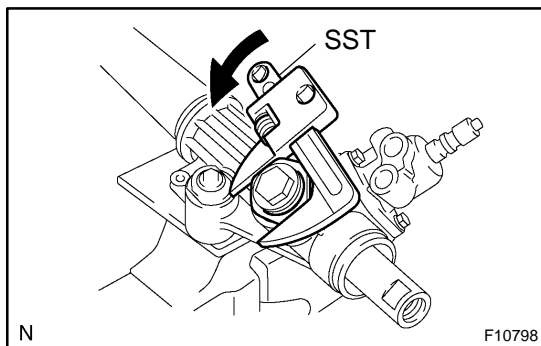
**NOTICE:**

Use SST 09922-10010 in the direction shown in the illustration.

- (c) Remove the claw washer.
- (d) Employ the same manner described above to the other side.

**HINT:**

Mark the RH and LH rack ends.



**5. REMOVE RACK GUIDE SPRING CAP LOCK NUT**

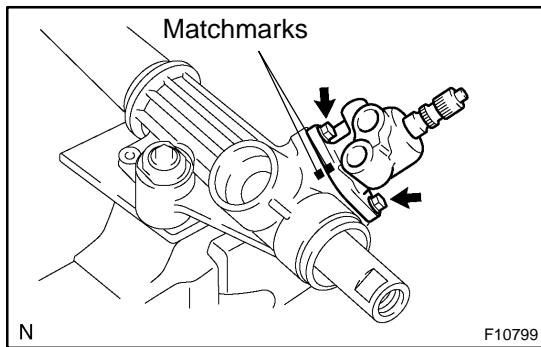
Using SST, remove the nut.

SST 09922-10010

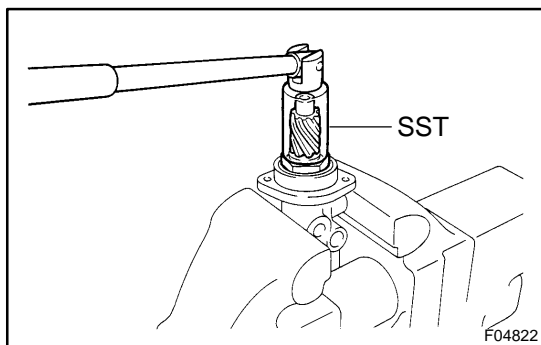
**NOTICE:**

Use SST 09922-10010 in the direction shown in the illustration.

- 6. REMOVE RACK GUIDE SPRING CAP**
- 7. REMOVE RACK GUIDE SPRING AND RACK GUIDE SUB-ASSEMBLY**
- 8. REMOVE DUST COVER**
- 9. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY**



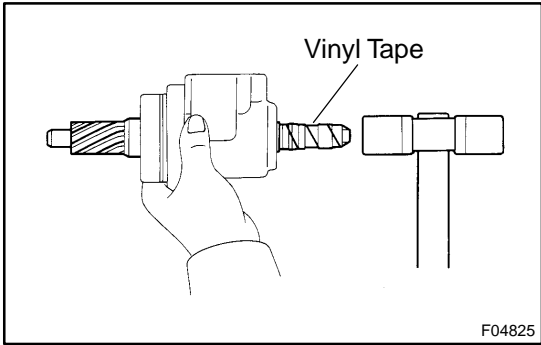
- (a) Place matchmarks on the valve housing and rack housing.
- (b) Remove the 2 bolts.
- (c) Pull out the control valve assembly with the valve housing.
- (d) Remove the O-ring from the valve housing.



**10. REMOVE CONTROL VALVE ASSEMBLY**

- (a) Using SST, loosen the bearing guide nut.

SST 09631-20060



- (b) Wind vinyl tape to the control valve shaft.
- (c) Using a plastic hammer, tap out the valve assembly with the nut from the control valve housing.

**NOTICE:**

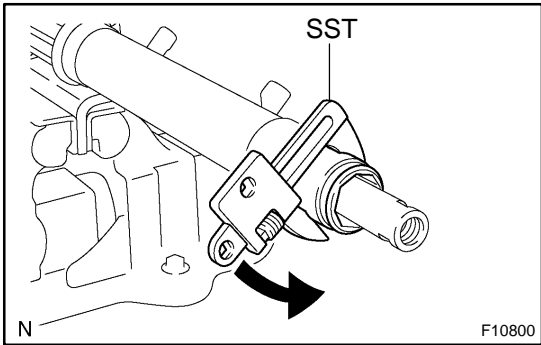
**Be careful not to damage the oil seal lip.**

- (d) Remove the nut from the valve assembly.

**NOTICE:**

**Be careful not the damage the oil seal lip.**

- (e) Remove the O-ring from the nut.



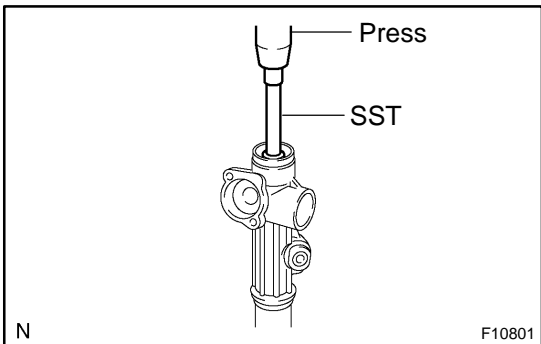
**11. REMOVE CYLINDER END STOPPER AND SPACER**

- (a) Using SST, remove the stopper.  
SST 09922-10010

**NOTICE:**

**Use SST 09922-10010 in the direction shown in the illustration.**

- (b) Remove the O-ring from the stopper.



**12. REMOVE STEERING RACK AND OIL SEAL**

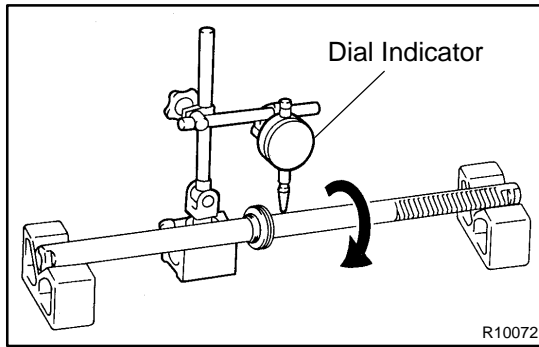
- (a) Using SST, press out the rack and oil seal.

**NOTICE:**

**Take care not to drop the rack.**

SST 09950-70010 (09951-07200)

- (b) Remove the oil seal from the rack.



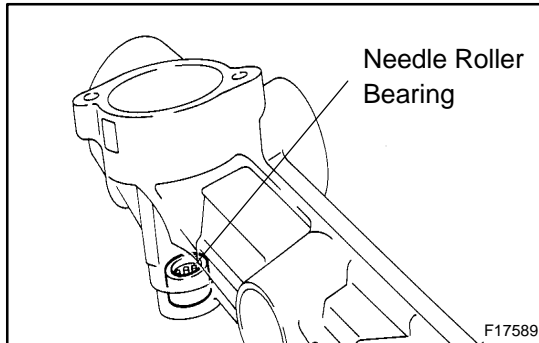
## INSPECTION

### 1. INSPECT STEERING RACK

- (a) Using a dial indicator, check the rack for runout and for teeth wear and damage.

**Maximum runout: 0.3 mm (0.012 in.)**

- (b) Check the back surface for wear and damage.

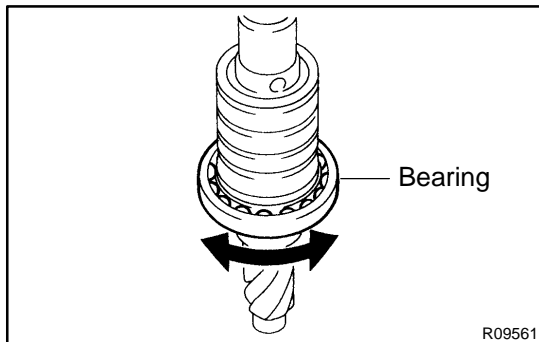


### 2. INSPECT BEARING

- (a) Check the needle roller bearing of the rack housing for pit-marks or damage.

If faulty, replace the rack housing,

- (b) Coat the inside of the bearing with molybdenum disulfide lithium base grease.

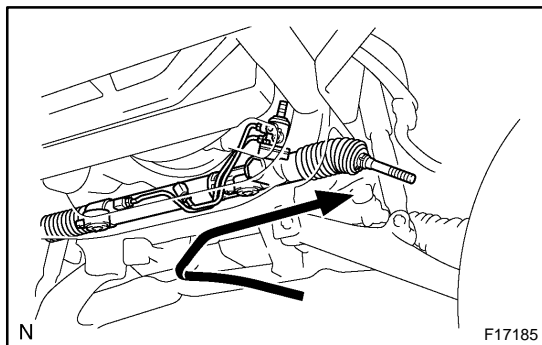


### 3. INSPECT BEARING

- (a) Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the control valve assembly.

- (b) Coat the bearing with molybdenum disulfide lithium base grease.



## INSTALLATION

### 1. INSTALL PS GEAR ASSEMBLY

Torque the 2 new gear assembly set bolts, nuts and washers.

**Torque: 120 N·m (1,250 kgf·cm, 89 ft·lbf)**

HINT:

Slide the gear assembly to the right side, slide the gear assembly to the left side and position it.

### 2. INSTALL RH AND LH TIE ROD ENDS AND LOCK NUTS

(a) Screw the lock nut and tie rod end onto the rack end until the matchmarks are aligned.

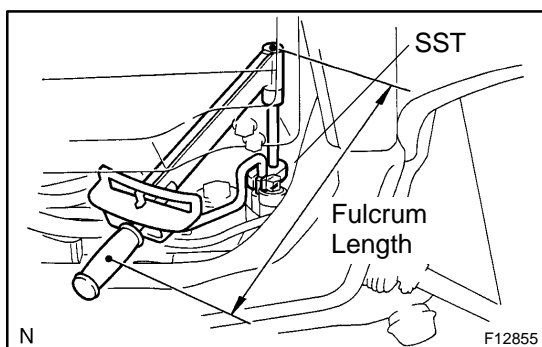
(b) After adjusting toe-in, torque the nut (See page [SA-6](#)).

**Torque: 55 N·m (560 kgf·cm, 41 ft·lbf)**

### 3. CONNECT TUBE CLAMP

Torque the bolt.

**Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)**



### 4. CONNECT RETURN TUBE

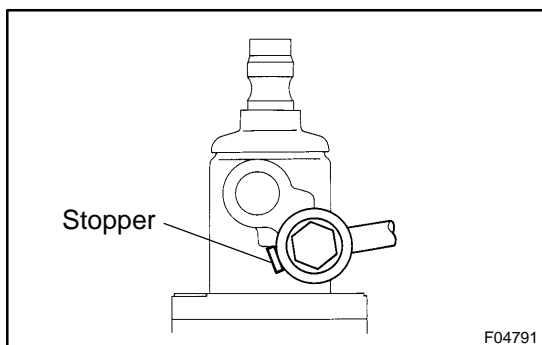
Using SST, connect the tube.

SST 09023-38400

**Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)**

HINT:

- ▶ Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- ▶ This torque value is effective in case that SST is parallel to a torque wrench.



### 5. CONNECT PRESSURE FEED TUBE

Torque the union bolt with a new gasket.

HINT:

Make sure the stopper of the pressure feed tube touches the PS gear assembly as shown in the illustration, then torque the bolt.

**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**

### 6. CONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY (See page [SR-24](#))

### 7. INSTALL ENGINE OIL FILTER ASSEMBLY

(a) Install a new O-ring.

(b) Torque the 2 bolts and nut with the bracket.

**Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)**

(c) Connect the 2 clips and hoses.

### 8. CONNECT RH AND LH TIE ROD ENDS (See page [SA-20](#))

### 9. INSTALL NO. 2 ENGINE UNDER COVER

Tighten the 6 bolts.



**10. INSTALL NO. 1 ENGINE UNDER COVER**

Tighten the 7 bolts.

**11. POSITION FRONT WHEELS FACING STRAIGHT AHEAD**

HINT:

Do it with the front of the vehicle jacked up.

**12. CENTER SPIRAL CABLE (See page [SR-24](#))****13. INSTALL STEERING WHEEL**

- (a) Align the matchmarks on the wheel and steering column main shaft.
- (b) Temporarily tighten the wheel set nut.
- (c) Connect the connector.

**14. BLEED POWER STEERING SYSTEM (See page [SR-4](#))****15. CHECK STEERING WHEEL CENTER POINT****16. TORQUE STEERING WHEEL SET NUT**

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

**17. INSTALL STEERING WHEEL PAD (See page [SR-24](#))****18. CHECK FRONT WHEEL ALIGNMENT (See page [SA-6](#))****19. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSORS (See page [DI-505](#))**

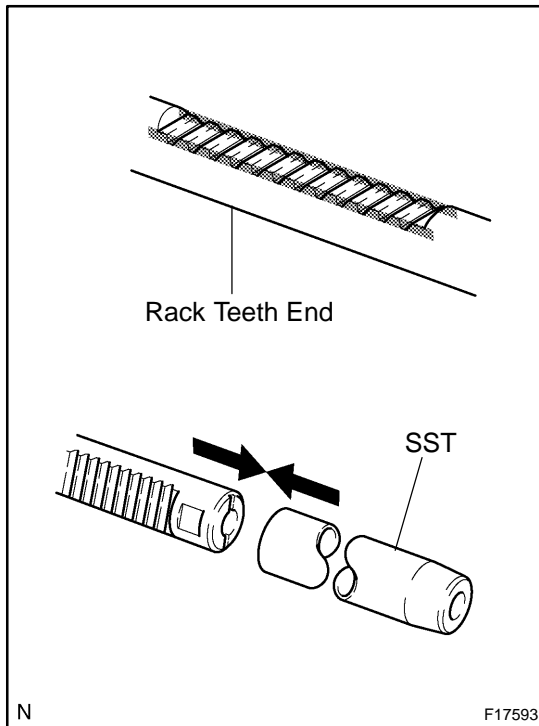
## REASSEMBLY

### NOTICE:

When using a vise, do not overtighten it.

1. **COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID OR MOLYBDENUM DISULFIDE LITHIUM BASE GREASE**

(See page [SR-48](#) )



2. **INSTALL STEERING RACK**

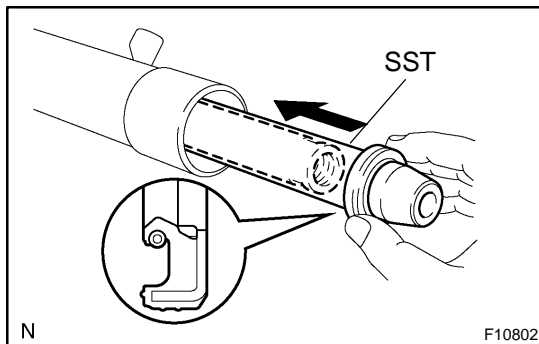
- (a) Install SST to the rack.

SST 09631-00350

### HINT:

If necessary, scrape the burrs off the rack teeth end and bur-nish.

- (b) Coat SST with power steering fluid.
- (c) Install the rack into the rack housing.
- (d) Remove the SST.



3. **INSTALL OIL SEAL**

- (a) Install SST to the steering rack opposite end.

SST 09631-00350

- (b) Coat SST with power steering fluid.
- (c) Coat a new oil seal lip with power steering fluid.
- (d) Install the oil seal by pushing it onto the SST without tilt-ing.

### NOTICE:

**Make sure to install the oil seal facing the correct direction.**

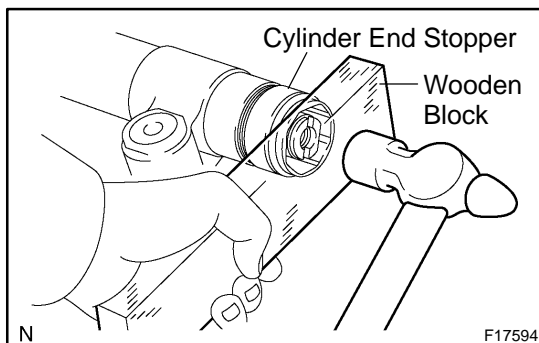
- (e) Remove the SST.

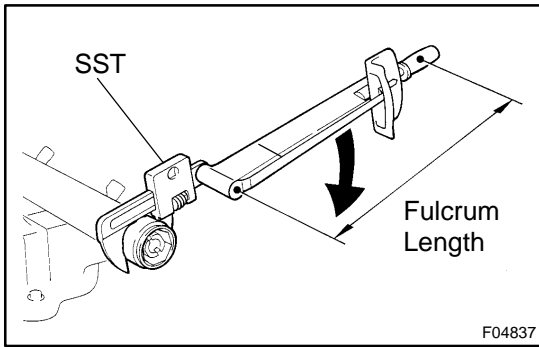
4. **INSTALL SPACER AND CYLINDER END STOPPER**

- (a) Install the spacer.
- (b) Coat a new O-ring with power steering fluid, and install it to the stopper.
- (c) Using a wooden block and hammer, drive in the stopper until it is tightly installed.

### NOTICE:

**Be careful not to damage the O-ring.**





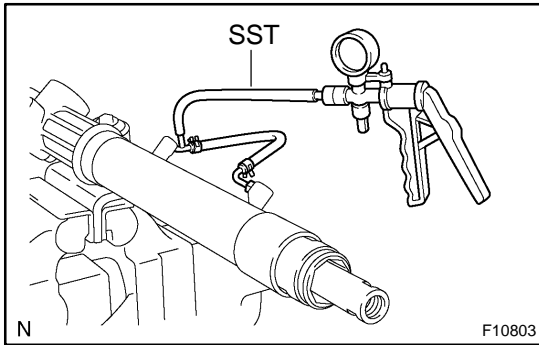
- (d) Using SST, torque the stopper.  
SST 09922-10010  
Torque: 110 N·m (1,122 kgf·cm, 81 ft·lbf)

**NOTICE:**

Use SST 09922-10010 in the direction shown in the illustration.

**HINT:**

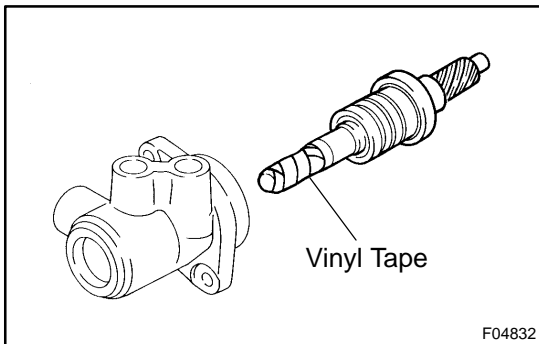
Use a torque wrench with a fulcrum length of 380 mm (14.97 in.).



**5. AIR TIGHTNESS TEST**

- (a) Install SST to the unions of the rack housing.  
SST 09631-12071
- (b) Apply 53 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.
- (c) Check that there is no change in the vacuum.

If there is change in the vacuum, check the installation of the oil seals.

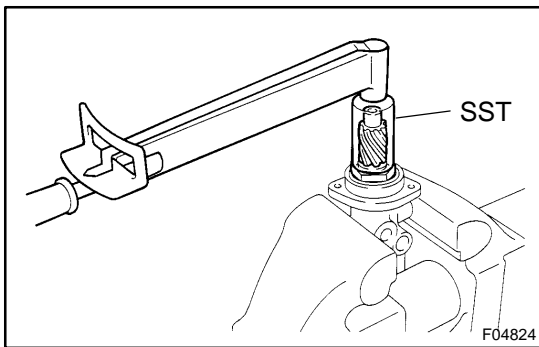


**6. INSTALL CONTROL VALVE ASSEMBLY**

- (a) Coat the teflon rings with power steering fluid.
- (b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.
- (c) Push the valve assembly into the control valve housing.

**NOTICE:**

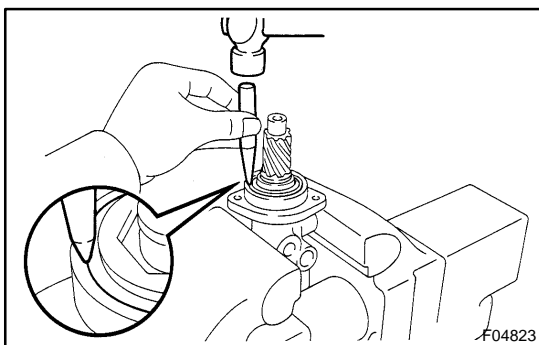
Be careful not to damage the teflon rings and oil seal lip.



- (d) Coat a new O-ring with power steering fluid, and install it to the bearing guide nut.
- (e) Using SST, torque the nut.  
SST 09631-20060  
Torque: 24.5 N·m (250 kgf·cm, 18 ft·lbf)

**NOTICE:**

Be careful not to damage the oil seal lip.



- (f) Using a punch, stake the nut.

**7. INSTALL CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY**

- (a) Coat a new O-ring with power steering fluid, and install it to the valve housing.
- (b) Align the matchmarks on the valve housing and rack housing, and install the valve housing with the valve assembly to the rack housing.
- (c) Torque the 2 bolts.

**Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)**

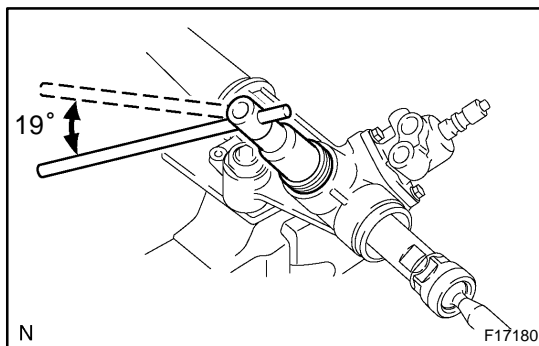
**8. INSTALL DUST COVER****9. INSTALL RACK GUIDE SUB-ASSEMBLY, RACK GUIDE SPRING AND RACK GUIDE SPRING CAP**

- (a) Apply sealant to 2 or 3 threads of the cap.

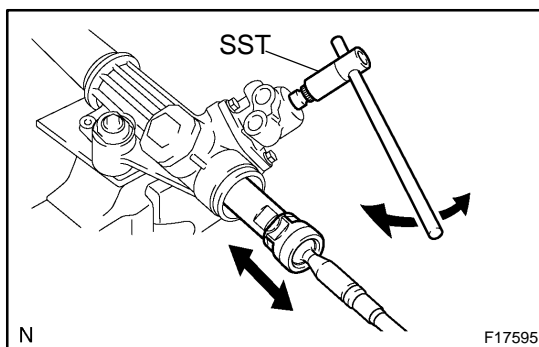
**Sealant:**

**Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent**

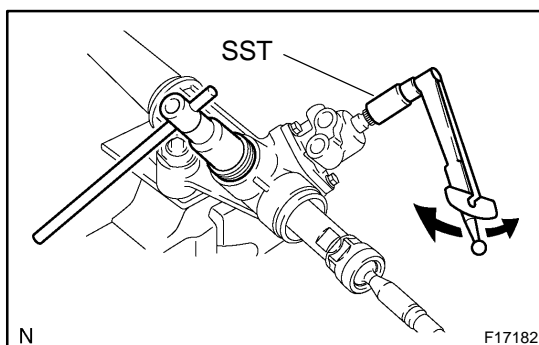
- (b) Temporarily install the cap.

**10. ADJUST TOTAL PRELOAD**

- (a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.
- (b) Torque the rack guide spring cap.  
**Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)**
- (c) Return the cap 19°.



- (d) Using SST, turn the control valve shaft right and left 1 or 2 times.  
SST 09616-0001 1
- (e) Loosen the cap until the rack guide spring is not functioning.



- (f) Using SST and a torque wrench, tighten the cap until the preload is within specification.  
SST 09616-0001 1

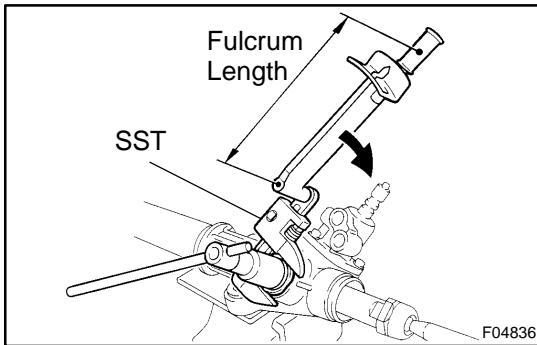
**Preload (turning):**

**Center Area**

**1.8 - 2.2 N·m (18.4 - 22.4 kgf·cm, 16.0 - 19.5 in.-lbf)**

**End Area**

**1.3 - 1.7 N·m (13.3 - 17.3 kgf·cm, 11.5 - 15.0 in.-lbf)**

**11. INSTALL RACK GUIDE SPRING CAP LOCK NUT**

- (a) Apply sealant to 2 or 3 threads of the nut.

**Sealant:**

**Part No.08833-00080, THREE BOND 1344,  
LOCTITE 242 or equivalent**

- (b) Holding the rack guide spring cap rotating, and using SST, torque the nut.

SST 09922-10010

**Torque: 52 N·m (520 kgf·cm, 38 ft·lbf)**

**NOTICE:**

**Use SST 09922-10010 in the direction shown in the illustration.**

**HINT:**

Use a torque wrench with a fulcrum length of 345 mm (14.97 in.).

- (c) Recheck the total preload.

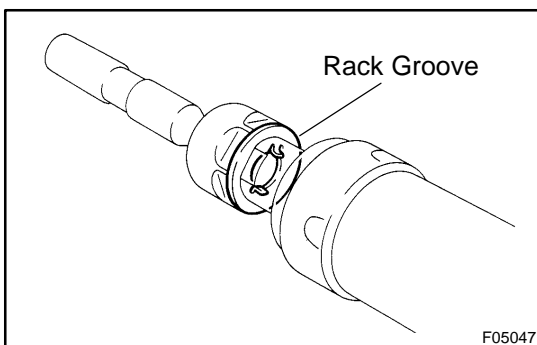
**Preload (turning):****Center Area**

**1.8 - 2.2 N·m (18.4 - 22.4 kgf·cm, 16.0 - 19.5 in.-lbf)**

**End Area**

**1.3 - 1.7 N·m (13.3 - 17.3 kgf·cm, 11.5 - 15.0 in.-lbf)**

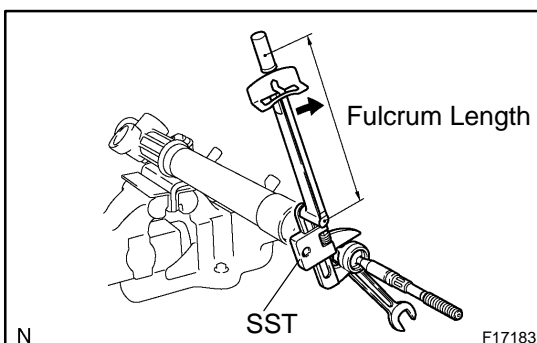
- (d) Remove the RH and LH rack ends.

**12. INSTALL RH AND LH CLAW WASHERS AND RACK ENDS**

- (a) Install a new washer, and temporarily tighten the rack end.

**HINT:**

Align the claws of the washer with the steering rack grooves.



- (b) Using a spanner to hold the steering rack steady, and using SST, torque the rack end.

SST 09922-10010

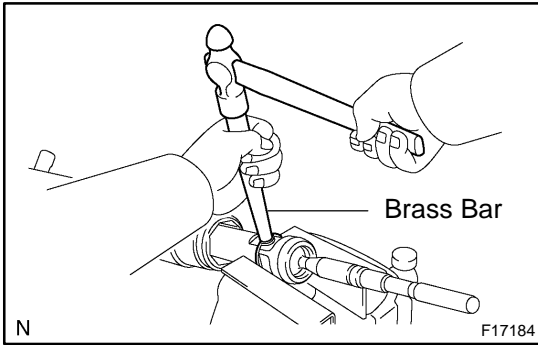
**Torque: 99 N·m (1,014 kgf·cm, 74 ft·lbf)**

**NOTICE:**

**Use SST 09922-10010 in the direction shown in the illustration.**

**HINT:**

Use a torque wrench with a fulcrum length of 380 mm (13.58 in.).

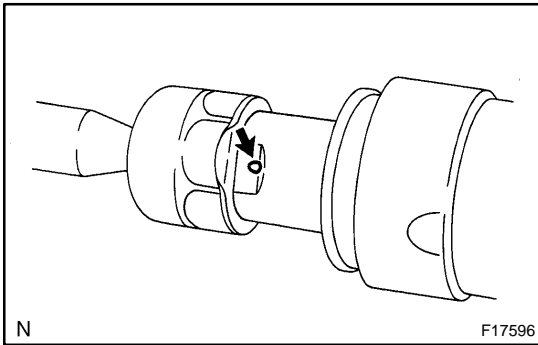


(c) Using a brass bar and hammer, stake the washer.

**NOTICE:**

**Avoid any impact to the rack.**

(d) Employ the same manner described above to the other side.

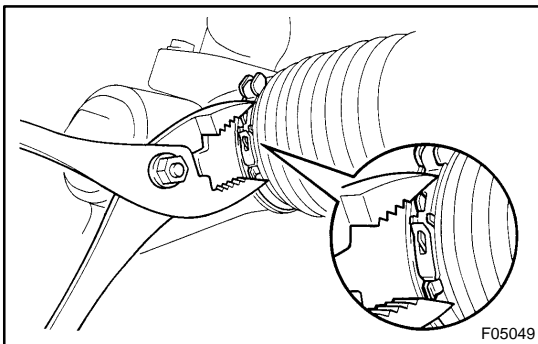


**13. INSTALL RH AND LH RACK BOOTS, CLAMPS AND CLIPS**

(a) Ensure that the tube hole is not clogged with grease.

**HINT:**

If the tube hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel is turned.



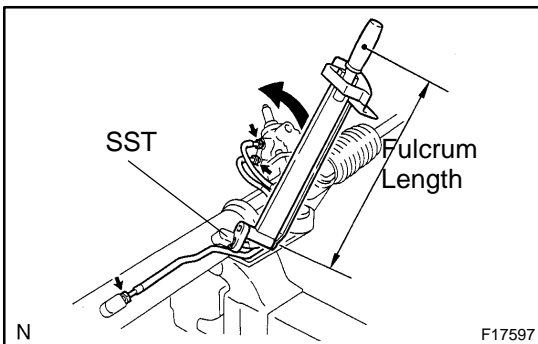
(b) Install the boot.

**NOTICE:**

**Be careful not to damage or twist the boot.**

(c) Using pliers tighten a new clamp, as shown in the illustration.

(d) Employ the same manner described above to the other side.



**14. INSTALL 2 TURN PRESSURE TUBES**

Using SST, install the tube.

SST 09023-38200

**Torque: 23 N·m (230 kgf·cm, 17 ft·lbf)**

**HINT:**

▶ Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

▶ This torque value is effective in case that SST is parallel to a torque wrench.

## REMOVAL

### NOTICE:

Remove the steering wheel assembly before the steering gear removal, because there is possibility of breaking of the spiral cable.

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
2. REMOVE STEERING WHEEL PAD  
(See page [SR-14](#))
3. REMOVE STEERING WHEEL (See page [SR-14](#))
4. REMOVE NO. 1 ENGINE UNDER COVER

Remove the 7 bolts.

5. REMOVE NO. 2 ENGINE UNDER COVER

Remove the 6 bolts.

6. DISCONNECT RH AND LH TIE ROD ENDS  
(See page [SA-20](#))

7. REMOVE ENGINE OIL FILTER ASSEMBLY

- (a) Disconnect the 2 clips and hoses.
- (b) Remove the 2 bolts and nut with the bracket.
- (c) Remove the O-ring.

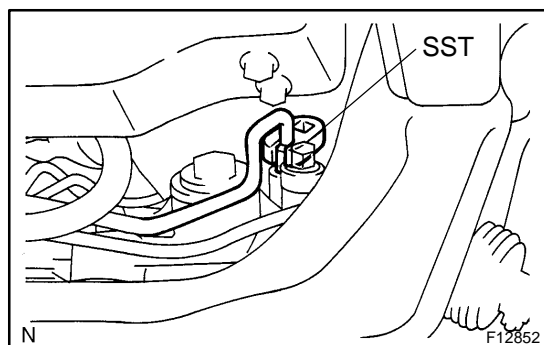
8. DISCONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY (See page [SR-14](#))

### HINT:

Turn the steering wheel fully to the right side.

9. DISCONNECT PRESSURE FEED TUBE

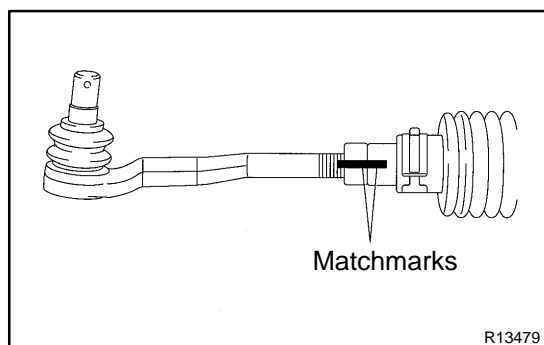
Remove the union bolt, gasket and disconnect the pressure feed tube.



10. DISCONNECT RETURN TUBE

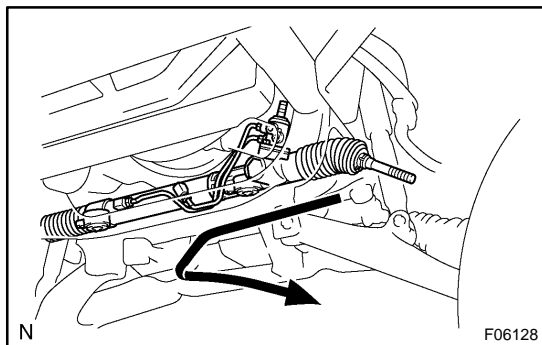
Using SST, disconnect the tube.

SST 09023-38400



11. REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS

- (a) Place matchmarks on the tie rod end and rack end.
- (b) Loosen the lock nut, and remove the tie rod end and lock nut.
- (c) Employ the same manner described above to the other side.

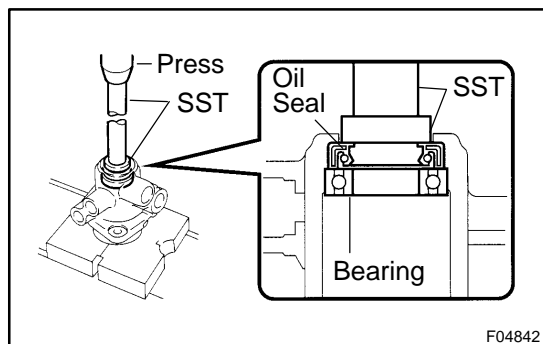
**12. REMOVE PS GEAR ASSEMBLY**

Remove the 2 gear assembly set bolts, nuts and washers.

HINT:

Slide the gear assembly to the right side, pull out the left side of the gear assembly from the member.



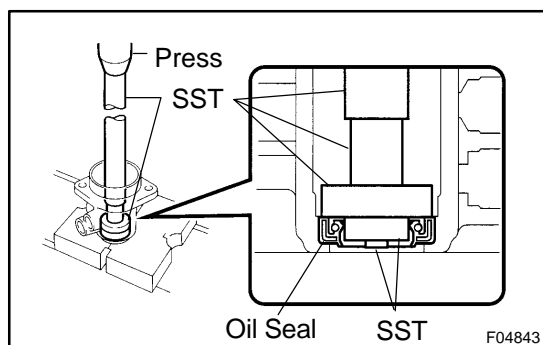


## REPLACEMENT

### 1. IF NECESSARY, REPLACE OIL SEAL AND BEARING

- (a) Using SST, press out the oil seal and bearing from the control valve housing.

SST 09950-60010 (09951-00260),  
09950-70010 (09951-07150)



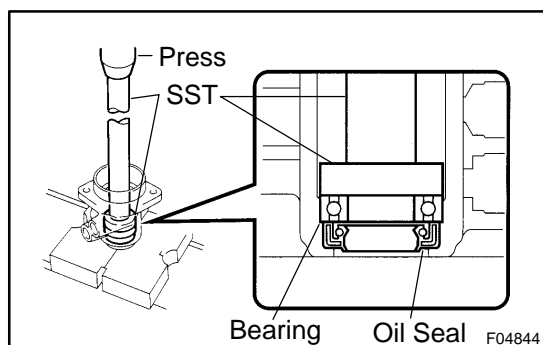
- (b) Coat a new oil seal lip with power steering fluid.

- (c) Using SST, press in the oil seal.

SST 09950-60010 (09951-00180, 09951-00330,  
09952-06010), 09950-70010 (09951-07150)

#### NOTICE:

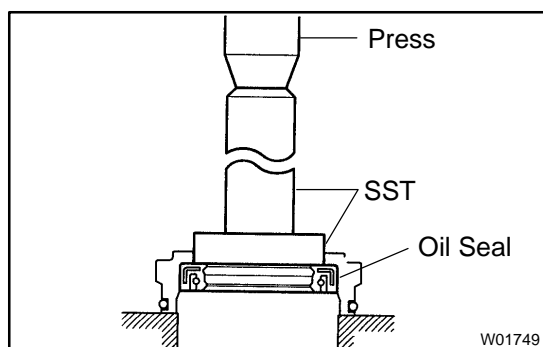
**Make sure to install the oil seal facing in the correct direction.**



- (d) Coat a new bearing with molybdenum disulfide lithium base grease.

- (e) Using SST, press in the bearing.

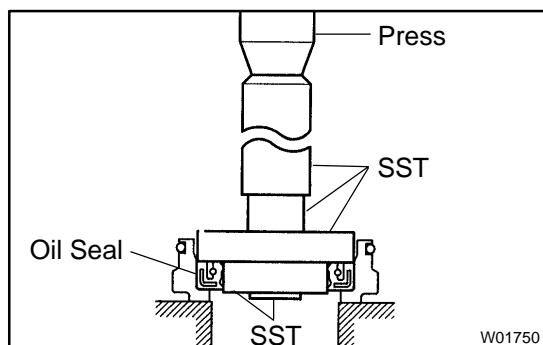
SST 09950-60010 (09951-00330),  
09950-70010 (09951-07150)



### 2. IF NECESSARY, REPLACE OIL SEAL

- (a) Using SST, press out the oil seal from the bearing guide nut.

SST 09950-60010 (09951-00320),  
09950-70010 (09951-07100)



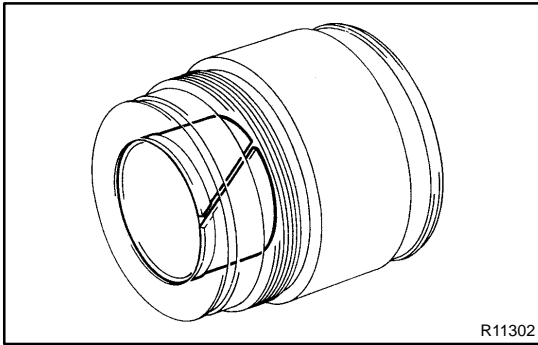
- (b) Coat a new oil seal lip with power steering fluid.

- (c) Using SST, press in the oil seal.

SST 09950-60010 (09951-00280, 09951-00360,  
09952-06010), 09950-70010 (09951-07100)

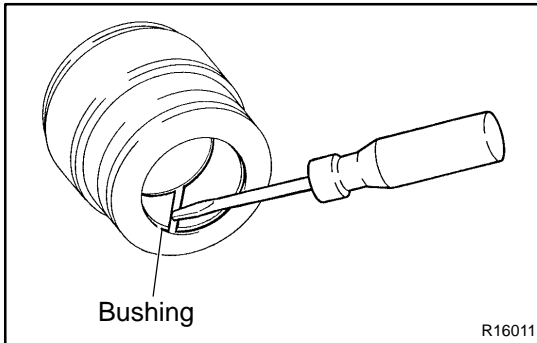
#### NOTICE:

**Make sure to install the oil seal facing in the correct direction.**



### 3. INSPECT BUSHING

- (a) Check the inside of the bushing of the cylinder end stopper for cracks. If faulty, replace the bushing.
- (b) Apply molybdenum disulfide lithium base grease to the inside of the bushing.



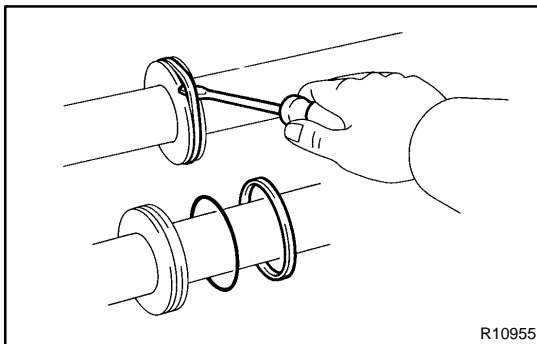
### 4. IF NECESSARY, REPLACE BUSHING

- (a) Using a screwdriver, remove the bushing from the cylinder end stopper.

#### NOTICE:

**Be careful not to damage the cylinder end stopper.**

- (b) Coat the inside of a new bushing with molybdenum disulfide lithium base grease.
- (c) Install the bushing.



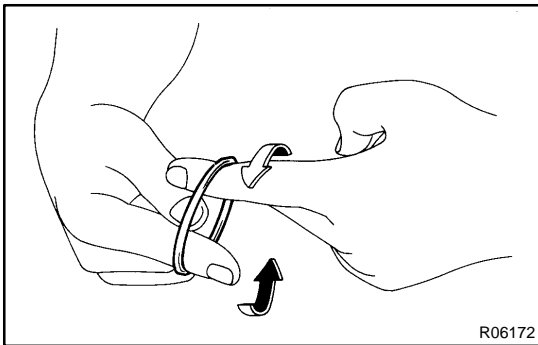
### 5. IF NECESSARY, REPLACE TEFLON RING AND O-RING

- (a) Using a screwdriver, remove the teflon ring and O-ring from the steering rack.

#### NOTICE:

**Be careful not to damage the groove for the ring.**

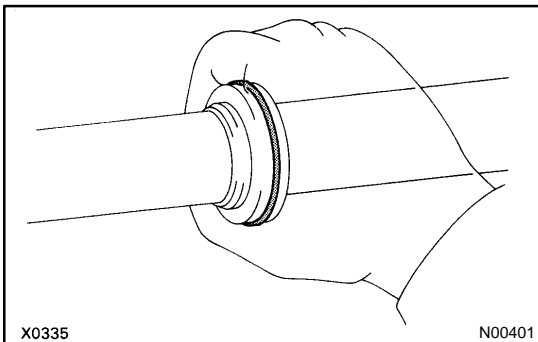
- (b) Coat a new O-ring with power steering fluid and install it.



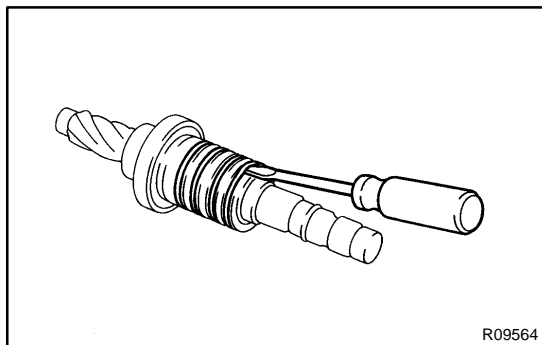
- (c) Expand a new teflon ring with your fingers.

#### NOTICE:

**Be careful not to overexpand the ring.**



- (d) Coat the ring with power steering fluid.
- (e) Install the ring to the rack, and settle it down with your fingers.

**6. IF NECESSARY, REPLACE TEFLON RINGS**

- (a) Using a screwdriver, remove the 4 teflon rings from the control valve assembly.

**NOTICE:**

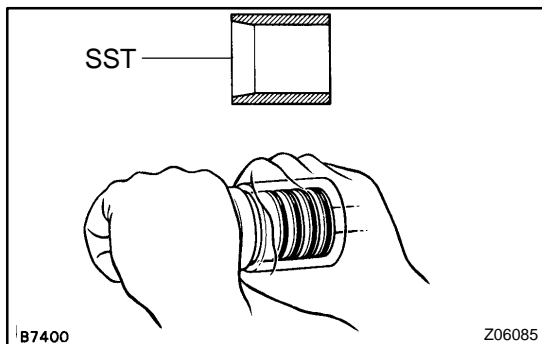
**Be careful not to damage the grooves for the ring.**

- (b) Expand 4 new rings with your fingers.

**NOTICE:**

**Be careful not to overexpand the ring.**

- (c) Coat the rings with power steering fluid.



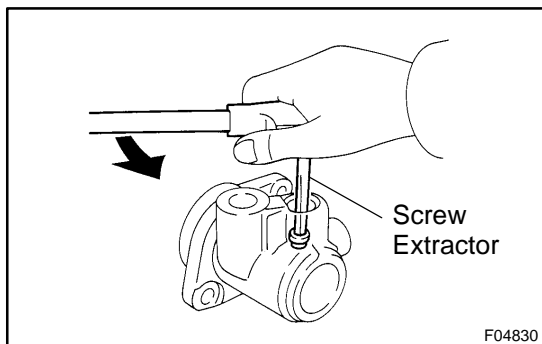
- (d) Install the rings to the control valve assembly, and settle them down with your fingers.

- (e) Carefully slide the tapered end of SST over the rings until the ring fits to the steering rack.

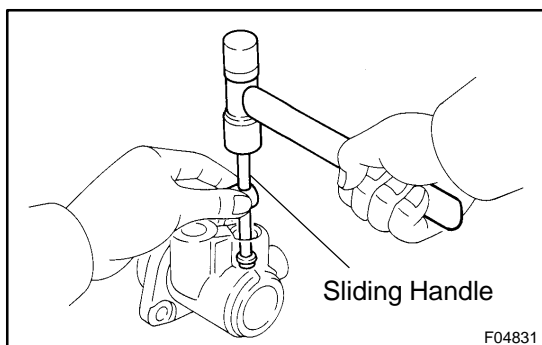
SST 09631-20081

**NOTICE:**

**Be careful not to damage the rings.**

**7. IF NECESSARY, REPLACE UNION SEAT**

- (a) Using a screw extractor, remove the union seat from the control valve housing.



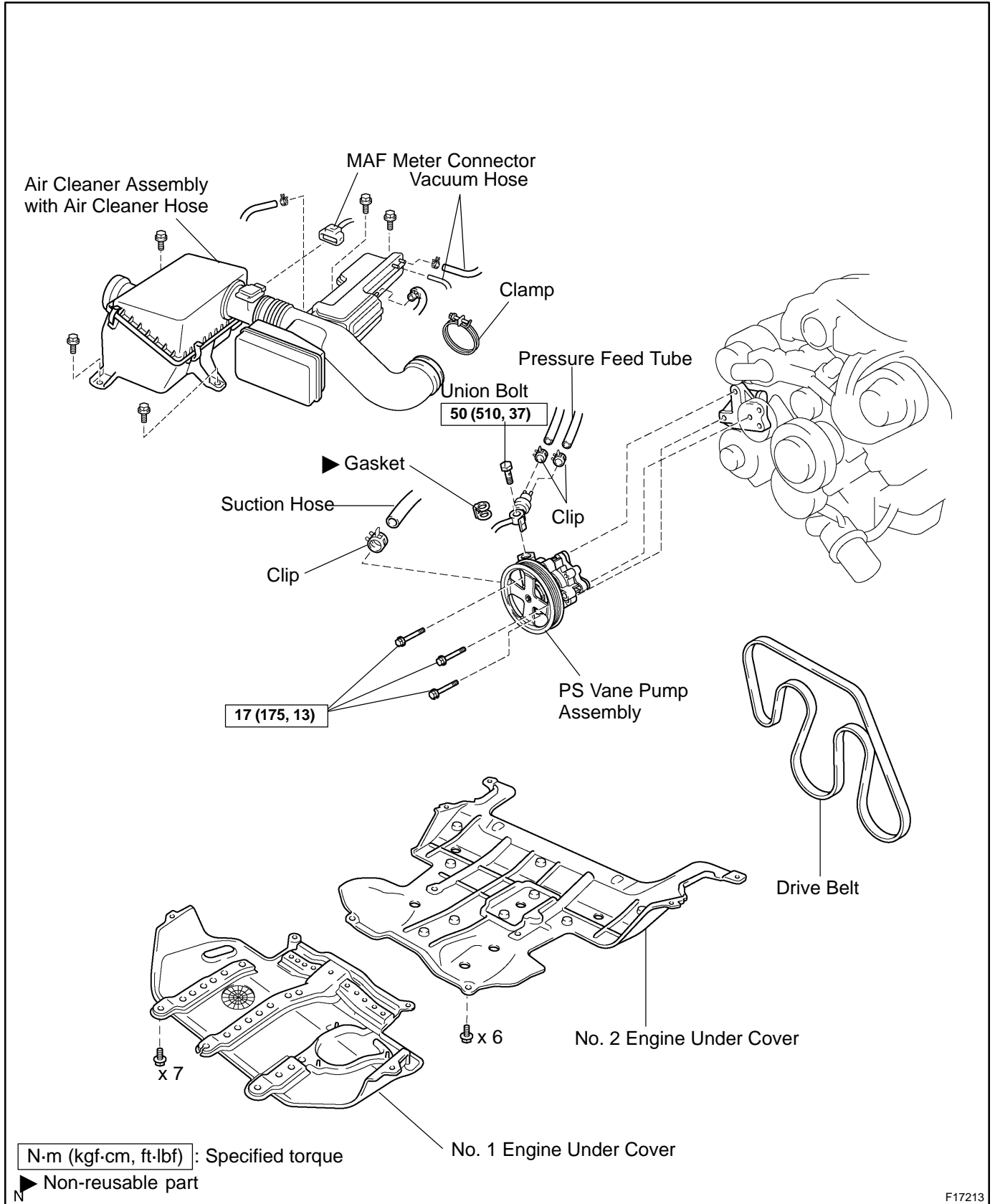
- (b) Using plastic hammer and sliding handle, lightly tap in a new union seat.

**NOTICE:**

**Before installing the union seat, remove dust sticking to the control valve housing.**

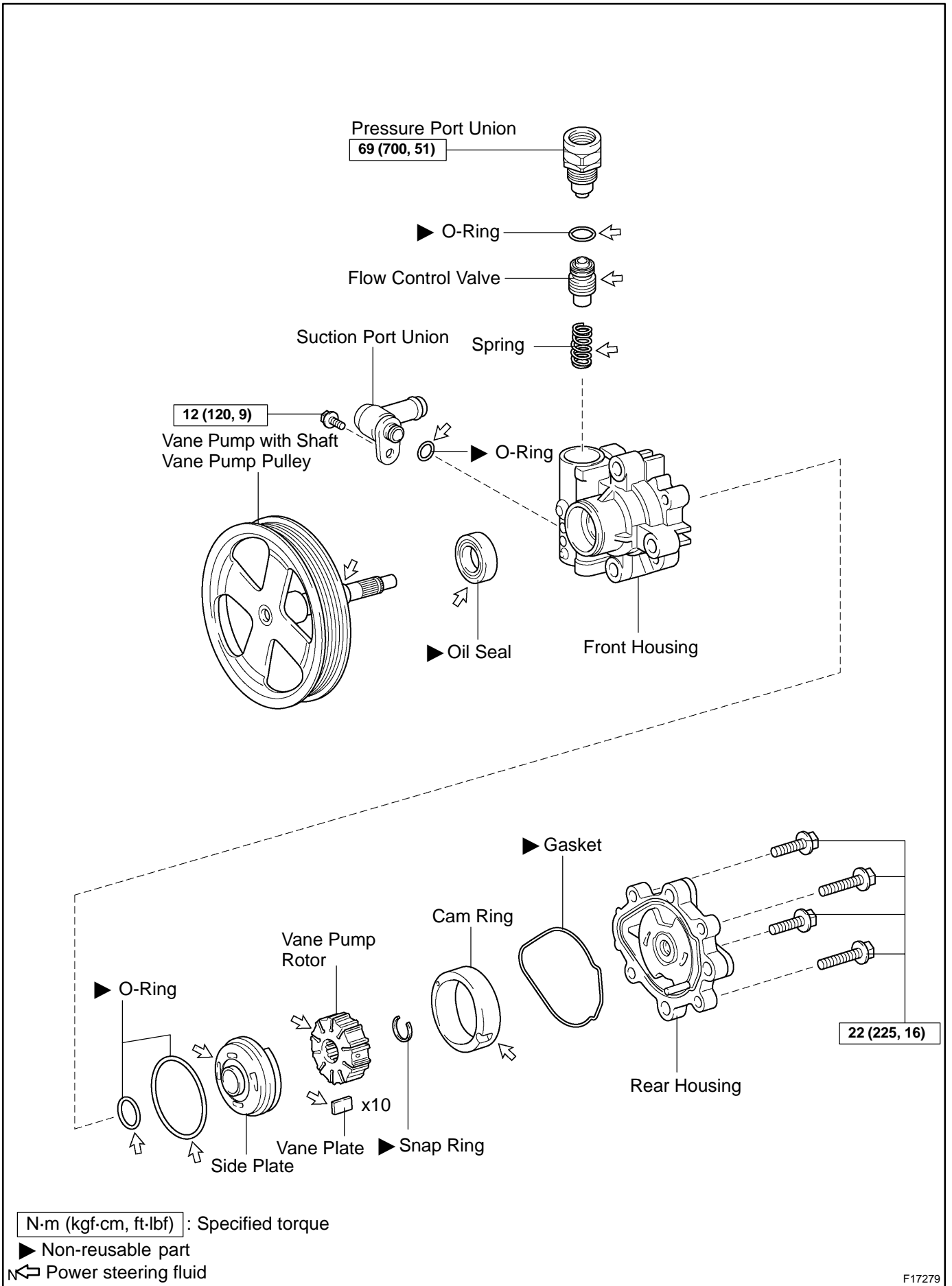
# POWER STEERING VANE PUMP COMPONENTS

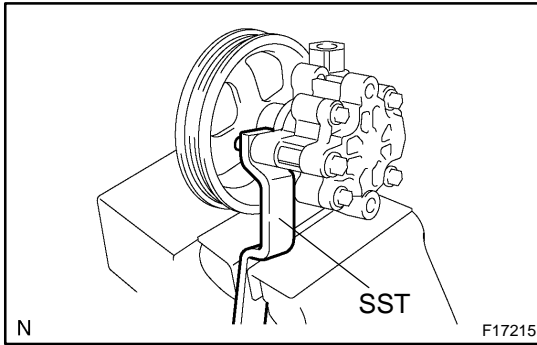
SR0MD-11



F17213

STEERING - POWER STEERING VANE PUMP



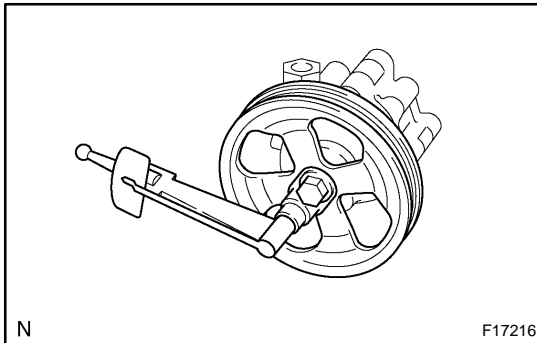


## DISASSEMBLY

### 1. FIX VANE PUMP ASSEMBLY

Using SST, hold the vane assembly in a vise.

SST 09630-00014 (09631-00132)



### 2. MEASURE PS VANE PUMP ROTATING TORQUE

(a) Check that the pump rotates smoothly without abnormal noise.

(b) Temporarily install the bolt to the shaft.

(c) Using a torque wrench, check the pump rotating torque.

**Rotating torque:**

**0.3 N·m (2.8 kgf·cm, 2.4 in.-lbf) or less**

### 3. REMOVE SUCTION PORT UNION

(a) Remove the bolt.

(b) Remove the O-ring from the union.

### 4. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

Remove the O-ring from the union.

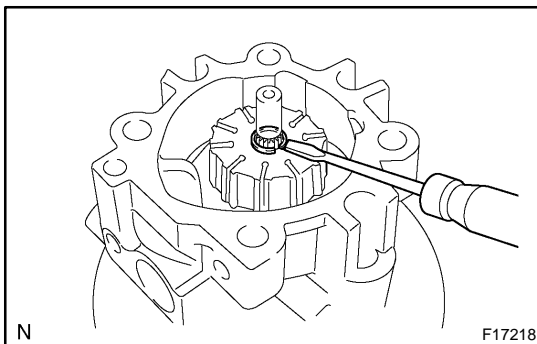
### 5. REMOVE REAR HOUSING

(a) Loosen the 4 bolts.

(b) Remove the vane pump assembly from the SST.

(c) Remove the 4 bolts and rear housing.

(d) Remove the gasket from the housing.



### 6. REMOVE CAM RING, 10 VANE PLATES AND VANE PUMP ROTOR

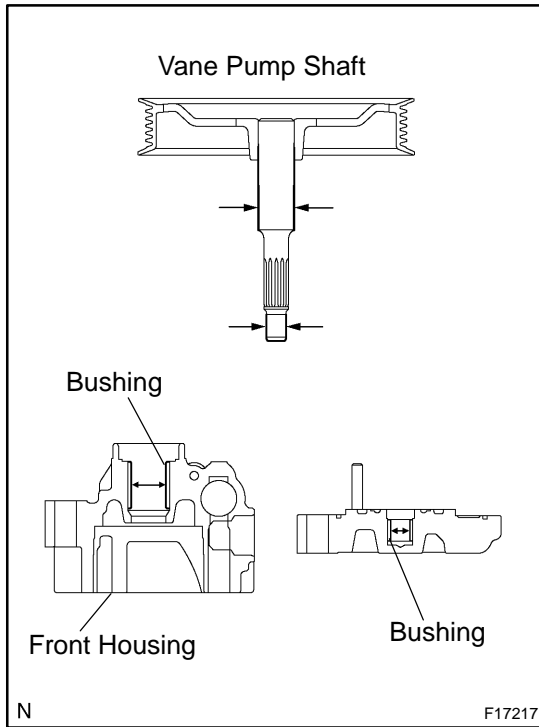
Using a screwdriver, remove the snap ring from the vane pump shaft.

**NOTICE:**

**Be careful not to drop the plate.**

### 7. REMOVE SIDE PLATE

### 8. REMOVE VANE PUMP SHAFT WITH PUMP PULLEY



## INSPECTION

### 1. CHECK OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING OF FRONT HOUSING AND REAR HOUSING

Using a micrometer and caliper gauge, measure the oil clearance.

#### Standard clearance:

Front housing and shaft

0.020 - 0.077 mm (0.00079 - 0.00303 in.)

Rear housing and shaft

0.020 - 0.077 mm (0.00079 - 0.00303 in.)

#### Maximum clearance:

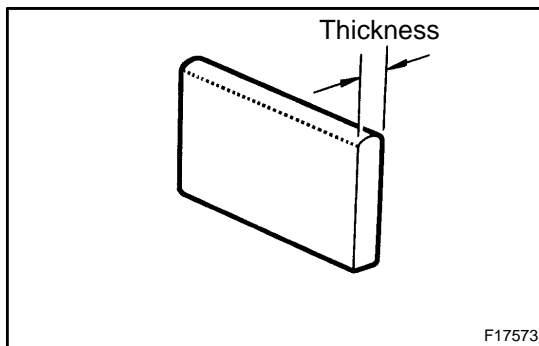
Front housing and shaft

0.070 mm (0.00276 in.)

Rear housing and shaft

0.080 mm (0.00315 in.)

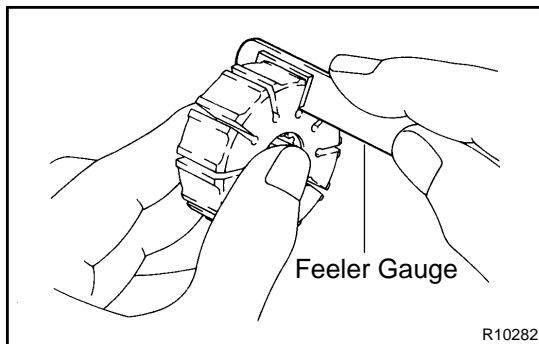
If it is more than the maximum, replace a new vane pump assembly.



### 2. INSPECT VANE PUMP ROTOR AND VANE PLATES

- (a) Using a micrometer, measure the height, thickness and length of the 10 plates.

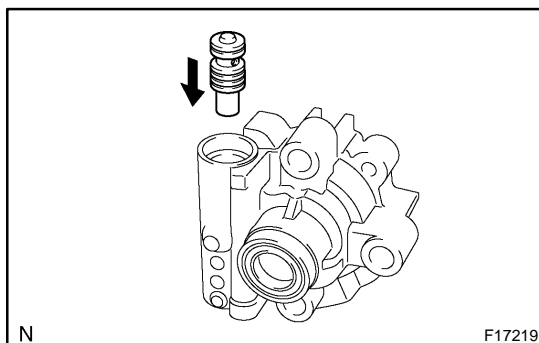
**Minimum thickness: 1.405 mm (0.05531 in.)**



- (b) Using a feeler gauge, measure the clearance between the rotor groove and plate.

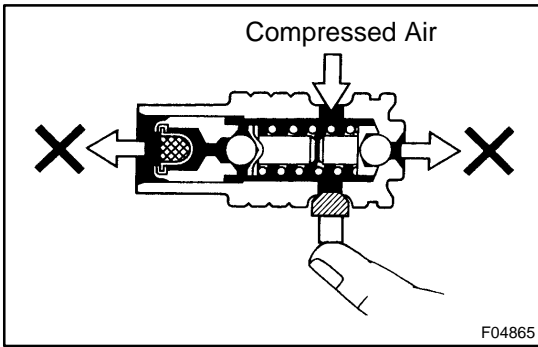
**Maximum clearance: 0.03 mm (0.0012 in.)**

If it is more than the maximum, replace a new vane pump assembly.

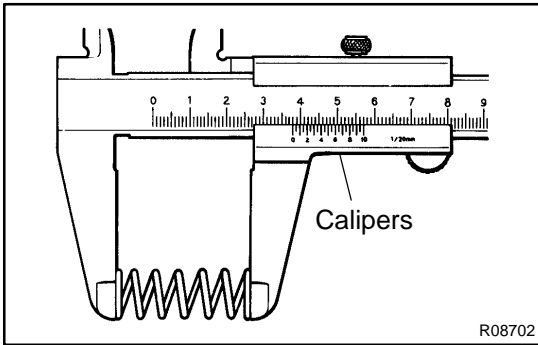


### 3. INSPECT FLOW CONTROL VALVE

- (a) Coat the valve with power steering fluid and check that it falls smoothly into the valve hole by its own weight.



- (b) Check the flow control valve for leakage.  
 Close one of the holes and apply compressed air 392-490 kPa (4-5 kgf/cm<sup>2</sup>, 57-71 psi) into the opposite side hole, and confirm that air does not come out from the end holes.  
 If necessary, replace a new vane pump assembly.



**4. INSPECT SPRING**

Using calipers, measure the free length of the spring.

**Minimum free length: 31.3 mm (1.2323 in.)**

If it is not within the specification, replace a new vane pump assembly.

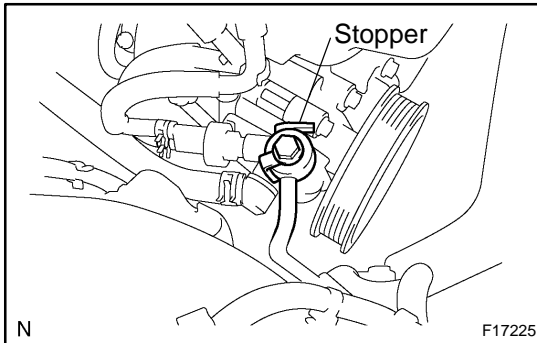


## INSTALLATION

### 1. INSTALL PS VANE PUMP ASSEMBLY

Torque the 3 bolts.

**Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)**



### 2. INSTALL PRESSURE FEED TUBE

Install new gaskets on each side of the tube and torque the union bolt.

**Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)**

**HINT:**

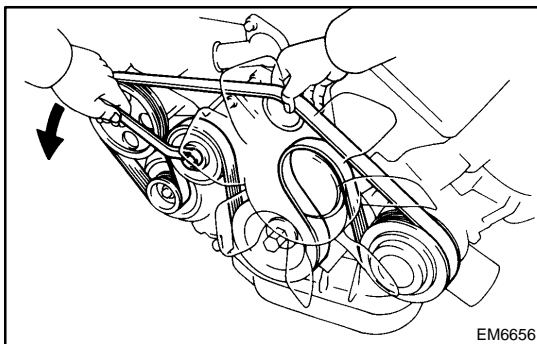
Make sure that the stopper of the tube touches the PS vane pump body as shown in the illustration, then torque the bolt.

### 3. CONNECT RETURN HOSE

Install the clip.

### 4. CONNECT 2 VACUUM HOSES

Install the 2 clips.



### 5. INSTALL DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner counterclockwise, and install the belt.

### 6. INSTALL AIR CLEANER ASSEMBLY WITH AIR CLEANER HOSE

- Tighten the 3 bolts.
- Tighten the clamp.
- Connect the hose.
- Connect the MAF meter connector.

### 7. INSTALL NO. 2 ENGINE UNDER COVER

Tighten the 8 bolts.

### 8. INSTALL NO. 1 ENGINE UNDER COVER

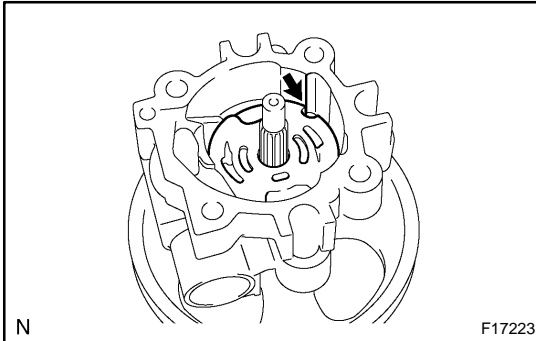
Tighten the 6 bolts.

### 9. BLEED POWER STEERING SYSTEM

(See page [SR-4](#))

## REASSEMBLY

1. COAT WITH POWER STEERING FLUID (See page [SR-38](#))
2. INSTALL VANE PUMP SHAFT

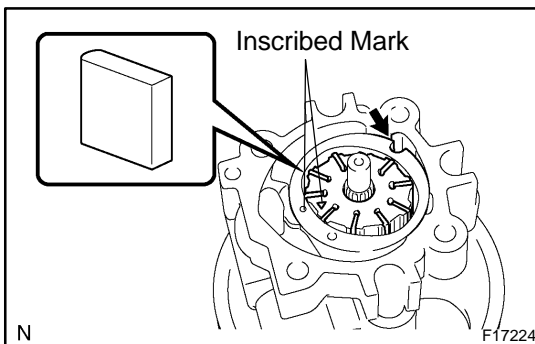


### 3. INSTALL SIDE PLATE

- (a) Install a new O-ring to the front housing.
- (b) Install a new O-ring to side plate.
- (c) Install the side plate as shown in the illustrating.

HINT:

Align the hole of the side plate with the hole of the front housing.



### 4. INSTALL CAM RING

Install the ring with the inscribed mark facing outward.

HINT:

Align the hole of the cam ring with the hole of the front housing.

### 5. INSTALL VANE PUMP ROTOR

- (a) Install the rotor with the inscribed mark facing outward.
- (b) Install a new snap ring to the vane pump shaft.

### 6. INSTALL 10 VANE PLATES

- (a) Install the plates with the round end facing outward.

### 7. INSTALL REAR HOUSING

- (a) Coat new gasket with power steering fluid and install it to the housing.
- (b) Temporarily install the 4 bolts.
- (c) Using SST, hold the vane pump assembly in a vise.
- (d) Torque the 4 bolts.

**Torque: 22 N·m (225 kgf-cm, 16 ft-lbf)**

### 8. INSTALL SPRING, FLOW CONTROL VALVE AND PRESSURE PORT UNION

- (a) Install the valve facing the correct direction (See page [SR-38](#)).
- (b) Coat a new O-ring with power steering fluid and install it to the union.
- (c) Torque the union.

**Torque: 69 N·m (700 kgf-cm, 51 ft-lbf)**

### 9. INSTALL SUCTION PORT UNION

- (a) Coat a new O-ring with power steering fluid and install it to the union.
- (b) Torque the bolt.

**Torque: 12 N·m (120 kgf-cm, 9 ft-lbf)**

**10. MEASURE PS VANE PUMP ROTATING TORQUE**  
(See page [SR-41](#) )

## REMOVAL

### 1. REMOVE NO. 1 ENGINE UNDER COVER

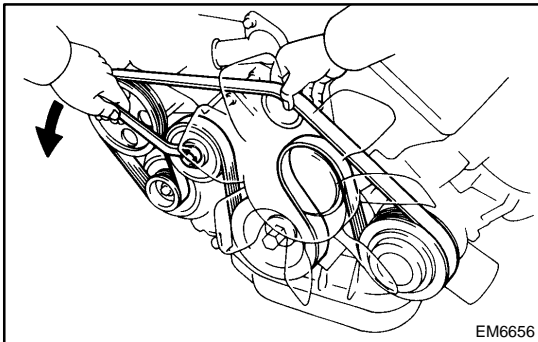
Remove the 6 bolts.

### 2. REMOVE NO. 2 ENGINE UNDER COVER

Remove the 8 bolts.

### 3. REMOVE AIR CLEANER ASSEMBLY WITH AIR CLEANER HOSE

- (a) Disconnect the MAF meter connector.
- (b) Disconnect the hoses.
- (c) Loosen the clamp.
- (d) Remove the 3 bolts.



### 4. REMOVE DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner counterclockwise, and remove the drive belt.

### 5. DISCONNECT 2 VACUUM HOSES

Remove the 2 clips.

### 6. DISCONNECT RETURN HOSE

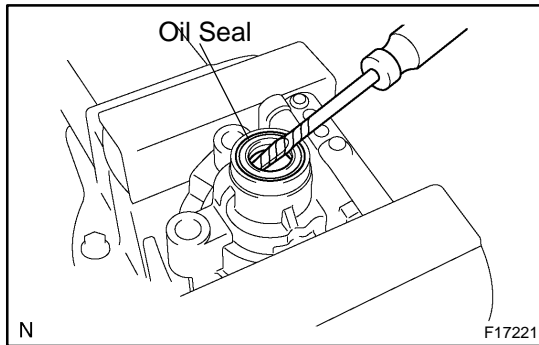
Remove the clip.

### 7. REMOVE PRESSURE FEED TUBE

Remove the union bolt and 2 gaskets.

### 8. REMOVE PS VANE PUMP ASSEMBLY

Remove the 3 bolts.



## REPLACEMENT

### NOTICE:

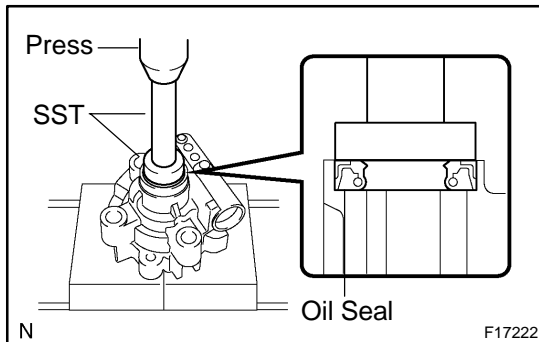
**When using a vise, do not overtighten it.**

### IF NECESSARY, REPLACE OIL SEAL

- (a) Using a screwdriver with vinyl tape wound around its tip, remove the oil seal.

### NOTICE:

**Be careful not to damage the front housing.**



- (b) Coat a new oil seal lip with power steering fluid.

- (c) Using SST, press in the oil seal.

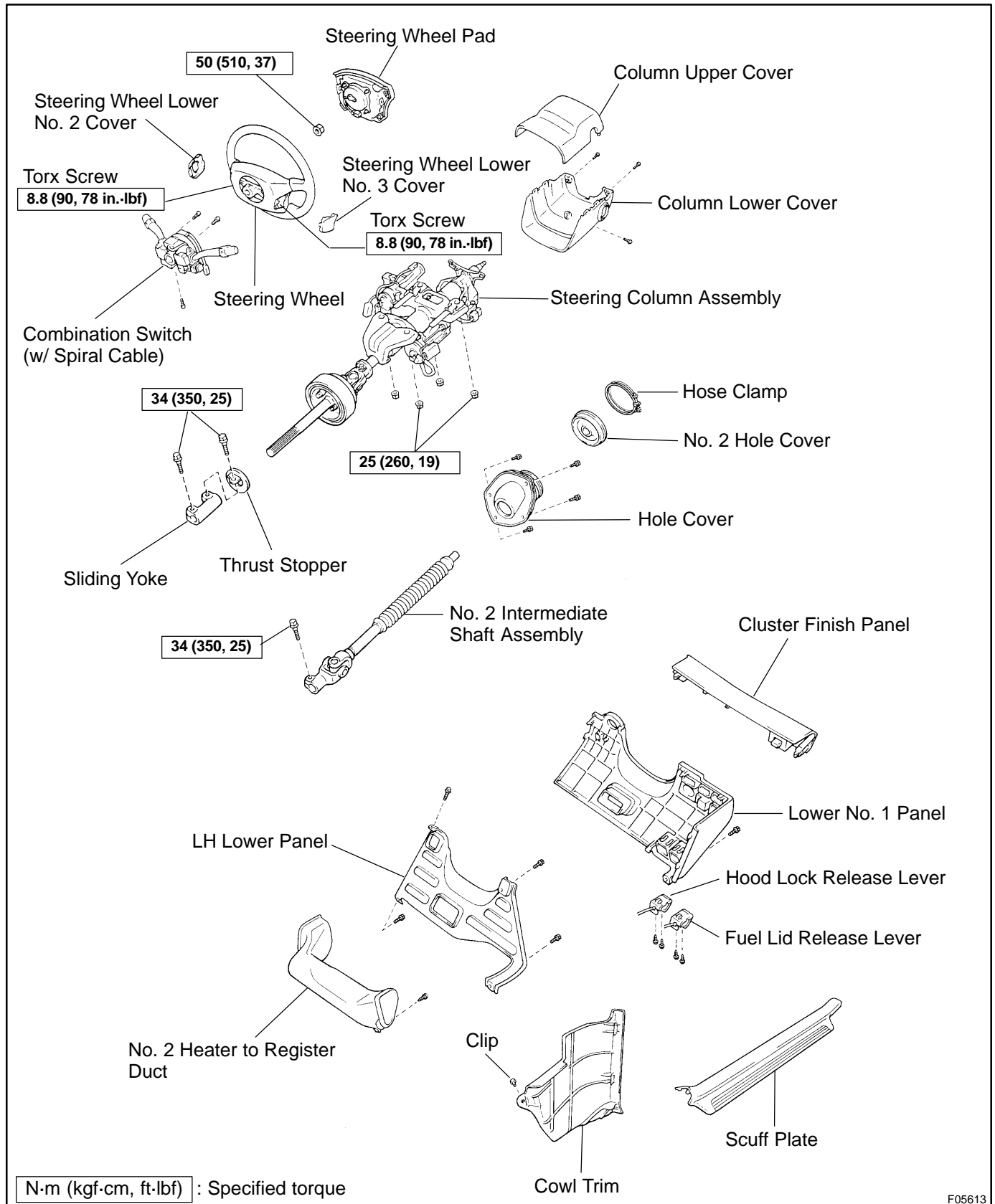
SST 09950-60010 (09951-00280),  
09950-70010 (09951-07100)

### NOTICE:

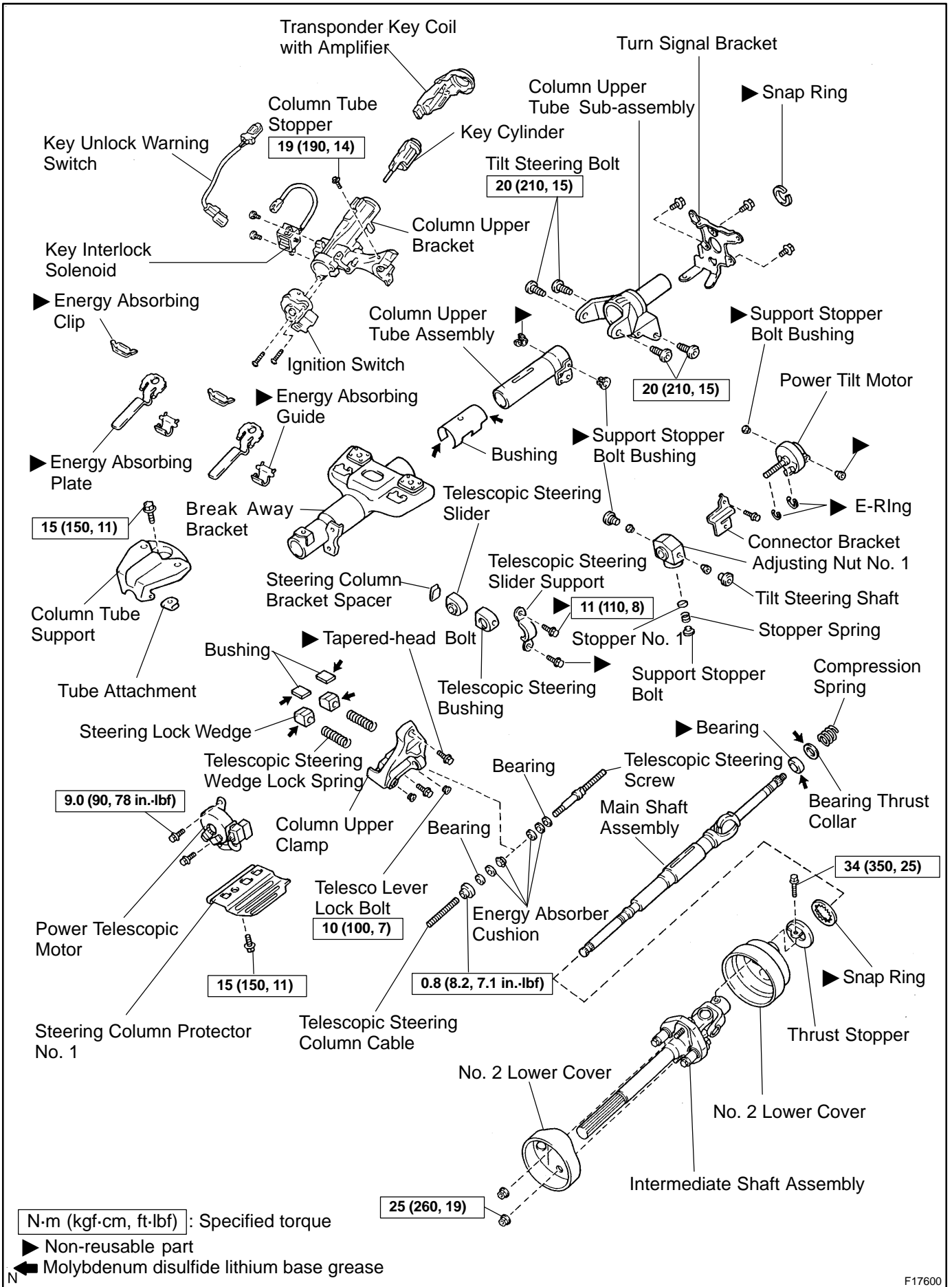
**Make sure to install the oil seal facing the correct direction.**

# POWER TILT AND POWER TELESCOPIC STEERING COLUMN COMPONENTS

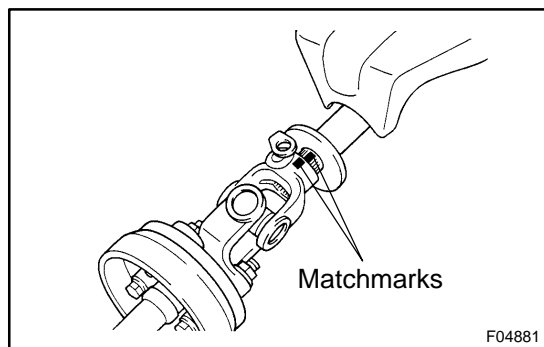
SR0M7-04



F05613



F17600



## DISASSEMBLY

### NOTICE:

When using a vise, do not overtighten it.

#### 1. REMOVE NO. 2 LOWER COVER

Remove the 2 nuts and lower side No. 2 lower cover.

#### 2. REMOVE INTERMEDIATE SHAFT ASSEMBLY

(a) Place matchmarks on the intermediate shaft assembly and main shaft assembly.

(b) Remove the bolt and intermediate shaft assembly with the upper side No. 2 lower cover.

(c) Remove the thrust stopper from the main shaft assembly.

#### 3. REMOVE TRANSPONDER KEY AMPLIFIER

(a) Widen the claw hung on the upper bracket by approx. 1.0 mm (0.039 in.) using a screwdriver.

(b) Pull the transponder key amplifier toward the rear of the vehicle with the claw open.

### NOTICE:

Take care not to use excessive force to prevent the case from being damaged.

#### 4. REMOVE CONNECTOR BRACKET

Remove the bolt and connector bracket.

#### 5. REMOVE STEERING COLUMN PROTECTOR NO. 1

Remove the bolt and steering column protector No. 1.

#### 6. REMOVE TURN SIGNAL BRACKET

Remove the 3 bolts and turn signal bracket.

#### 7. REMOVE POWER TILT MOTOR

(a) Using a hexagon wrench, remove the support stopper bolt.

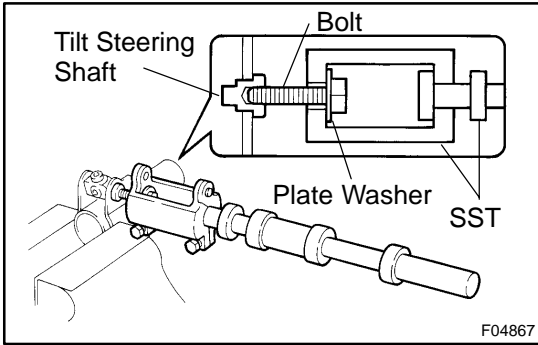
(b) Remove the stopper spring and stopper No. 1.

(c) Using a hexagon wrench, remove the 2 tilt steering bolts and power tilt motor.

(d) Using a screwdriver, remove the 2 E-rings.

(e) Remove the 2 support stopper bolt bushings from the power tilt motor.





**8. REMOVE ADJUSTING NUT NO. 1**

- (a) Set SST, a plate washer (36 mm outer diameter) and bolt (6 mm normal diameter, 1.0 mm pitch, 50 mm length), as shown.

SST 09910-00015 (09911-0001 1, 09912-00010)

Reference:

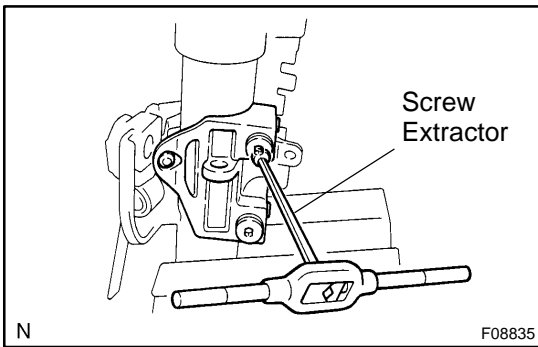
Plate washer 90201-10201

Bolt 91111-51050

- (b) Remove the 2 tilt steering shafts by using the sliding hammer on SST.
- (c) Remove the adjusting nut No. 1.
- (d) Remove the 2 support stopper bolt bushings from the adjusting nut No. 1.

**9. REMOVE POWER TELESCOPIC MOTOR**

- (a) Remove the 2 bolts and power telescopic motor.
- (b) Remove the telescopic steering column cable.

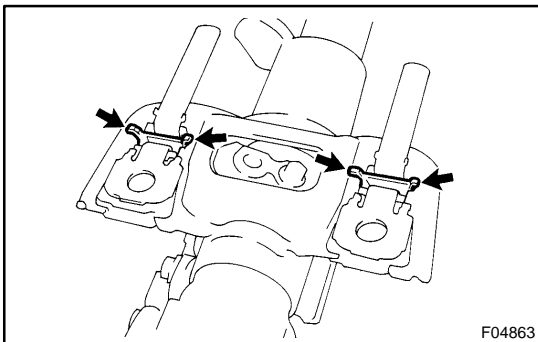


**10. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP**

- (a) Remove the column tube stopper.
- (b) Using a centering punch, mark the center of the 2 tapered-head bolts.
- (c) Using a 3 - 4 mm (0.12 - 0.16 in.) drill, drill into the 2 bolts.
- (d) Using a screw extractor, remove the 2 bolts, column upper bracket and column upper clamp.
- (e) Using a hexagon wrench, remove the 2 telescopic lever lock bolts.
- (f) Remove the 2 telescopic steering wedge lock springs, 2 steering lock wedges and column upper bracket and column upper clamp.

**11. REMOVE COLUMN TUBE SUPPORT**

- (a) Remove the bolt.
- (b) Remove the column tube support with tube attachment.
- (c) Remove the tube attachment from the column tube support.



**12. REMOVE 2 ENERGY ABSORBING PLATES**

- (a) Using pliers, remove the 2 energy absorbing clips.
- (b) Remove the 2 energy absorbing plates and 2 energy absorbing guides.

**13. REMOVE TELESCOPIC STEERING SLIDER SUPPORT**

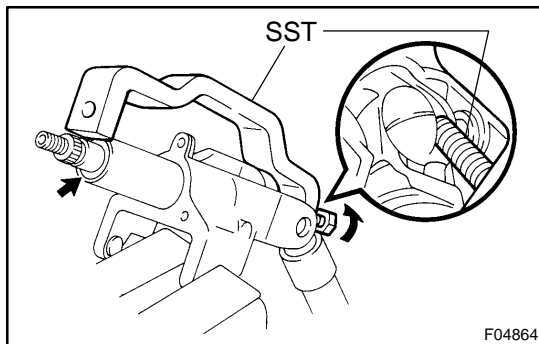
Remove the 2 bolts and telescopic steering slider support.

**14. REMOVE TELESCOPIC STEERING BUSHING****15. REMOVE TELESCOPIC STEERING SLIDER****16. REMOVE STEERING COLUMN BRACKET SPACER****17. REMOVE TELESCOPIC STEERING SCREW**

Remove the nut, 4 energy absorber cushions, 2 bearings and telescopic steering screw.

**18. REMOVE COLUMN UPPER TUBE SUB-ASSEMBLY WITH MAIN SHAFT ASSEMBLY**

- (a) Using a screwdriver, remove the lower side snap ring from the main shaft assembly.
- (b) Using a hexagon wrench, remove the 2 tilt steering bolts and column upper tube sub-assembly with the main shaft assembly.
- (c) Remove the column upper tube assembly from the break away bracket.
- (d) Remove the 2 support stopper bolt bushings from the column upper tube assembly.
- (e) Remove the 3 bushings from the break away bracket.

**19. REMOVE MAIN SHAFT ASSEMBLY**

- (a) Using SST, compress the compression spring.  
SST 09950-4001 1 (09958-04011)

**NOTICE:**

**Do not bend the universal joint of the shaft assembly more than 20°.**

- (b) Using a snap ring expander, remove the upper side snap ring.
- (c) Remove the main shaft assembly from the column upper tube sub-assembly.
- (d) Remove the compression spring and bearing thrust collar from the main shaft assembly.

# INSPECTION

(See page [SR-20](#))

# INSTALLATION

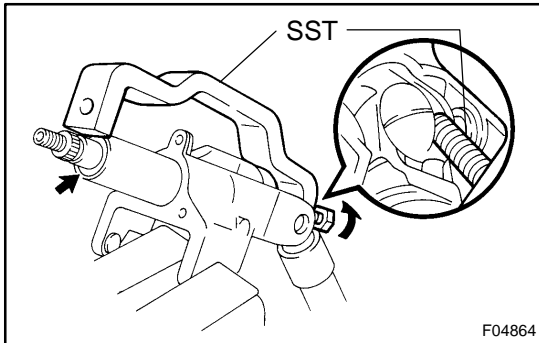
(See page [SR-24](#))

## REASSEMBLY

### NOTICE:

When using a vise, do not over tighten it.

1. **COAT WITH PARTS INDICATED BY ARROWS MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page SR-27 )**



### 2. INSTALL MAIN SHAFT ASSEMBLY

- (a) Install the bearing thrust collar and compression spring to the shaft.
- (b) Install the shaft assembly to the column upper tube sub-assembly.
- (c) Using SST, compress the compression spring.  
SST 09950-4001 1 (09958-04011)

### NOTICE:

**Do not bend the universal joint of the shaft more than 20°.**

- (d) Using a snap ring expander, install a new snap ring to the shaft.

### 3. INSTALL COLUMN UPPER TUBE SUB-ASSEMBLY WITH MAIN SHAFT ASSEMBLY

- (a) Install the 3 bushings to the break away bracket.
- (b) Install 2 new support stopper bolt bushings to the column tube assembly.
- (c) Install the column upper tube assembly to the break away bracket.
- (d) Install the column upper tube sub-assembly with the main shaft assembly to the break away bracket.
- (e) Using a hexagon wrench, install the 2 tilt steering bolts.  
**Torque: 20 N·m (210 kgf·cm, 15 ft·lbf)**
- (f) Install a new snap ring.

### 4. INSTALL TELESCOPIC STEERING SCREW

- (a) Install the 4 energy absorber cushions, 2 bearings and telescopic steering screw.
- (b) Install the nut.  
**Torque: 0.8 N·m (8.2 kgf·cm, 7.1 in.-lbf)**
- (c) Using a punch, stake the nut.

### 5. INSTALL STEERING COLUMN BRACKET SPACER

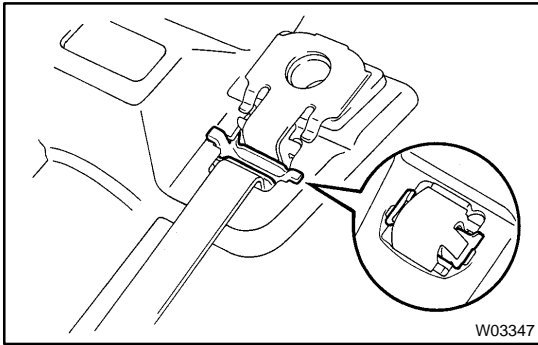
### 6. INSTALL TELESCOPIC STEERING SLIDER

### 7. INSTALL TELESCOPIC STEERING BUSHING

### 8. INSTALL TELESCOPIC STEERING SLIDER SUPPORT

Install the telescopic steering slider support with the 2 bolts.

**Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)**



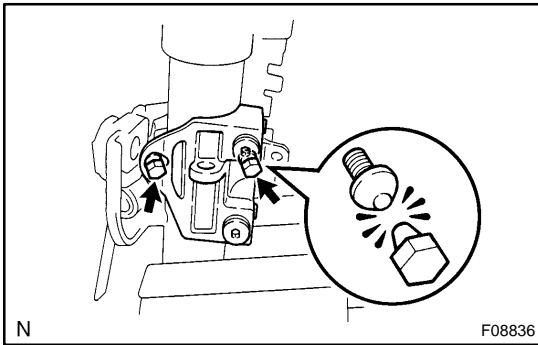
**9. INSTALL 2 ENERGY ABSORBING GUIDES, PLATES AND CLIPS**

- (a) Install the 2 new energy absorbing guides and 2 new absorbing plates.
- (b) Install the 2 new energy absorbing clips.

**10. INSTALL COLUMN TUBE SUPPORT**

- (a) Install the tube attachment to the column tube support.
- (b) Install the column tube support with the bolt.

**Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)**



**11. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP**

- (a) Install the 2 telescopic steering wedge lock springs, 2 steering lock wedges and column upper bracket and column upper clamp.
- (b) Using a hexagon wrench, install the 2 telescopic lever lock bolts.

**Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)**

- (c) Install and tighten the 2 new tapered-head bolts until the bolt heads break off.

- (d) Install the column tube stopper.

**Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)**

**12. INSTALL POWER TELESCOPIC MOTOR**

- (a) Install the telescopic steering column cable.
- (b) Install the power telescopic motor with the 2 bolts.

**Torque: 9.0 N·m (90 kgf·cm, 78 in.-lbf)**

**13. INSTALL ADJUSTING NUT NO. 1**

- (a) Install 2 new support stopper bolt bushings to the adjusting nut No. 1.

- (b) Install the adjusting nut No. 1 to the column upper tube.

- (c) Install the 2 tilt steering shafts.

**14. INSTALL POWER TILT MOTOR**

- (a) Install 2 new support stopper bolt bushings to the power tilt motor.

- (b) Install 2 new E-rings.

- (c) Using a hexagon wrench, install the power tilt motor and 2 tilt steering bolts.

**Torque: 20 N·m (210 kgf·cm, 15 ft·lbf)**

- (d) Install the stopper No. 1 and stopper spring.

- (e) Using a hexagon wrench, install the support stopper bolt.

**15. INSTALL TURN SIGNAL BRACKET**

Install the turn signal bracket with the 3 bolts.

**16. INSTALL STEERING COLUMN PROTECTOR NO. 1**

Install the steering column protector No. 1 with the bolt.

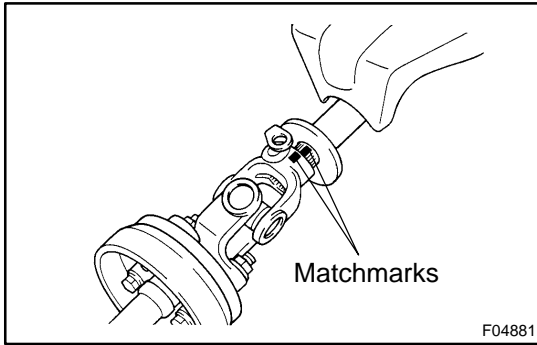
**Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)**

**17. INSTALL CONNECTOR BRACKET**

Install the connector bracket with the bolt.

**18. INSTALL TRANSPONDER KEY AMPLIFIER ASSEMBLY**

**19. INSTALL NO. 2 LOWER COVER**

**20. INSTALL INTERMEDIATE SHAFT ASSEMBLY**

- (a) Install the thrust stopper and upper side No. 2 lower cover.
- (b) Align the matchmarks on the intermediate shaft assembly and main shaft assembly.
- (c) Install the bolt.

**Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)**

**21. INSTALL NO. 2 LOWER COVER**

Install the No. 2 lower cover with the 2 nuts.

**Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)**

# REMOVAL

(See page [SR-14](#))

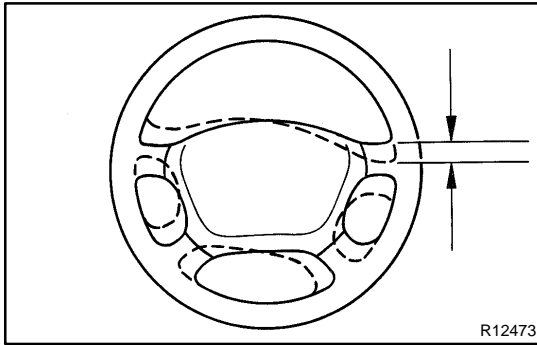


# STEERING SYSTEM

SR0LU-03

## PRECAUTION

- ▶ Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.
- ▶ The LAND CRUISER is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.



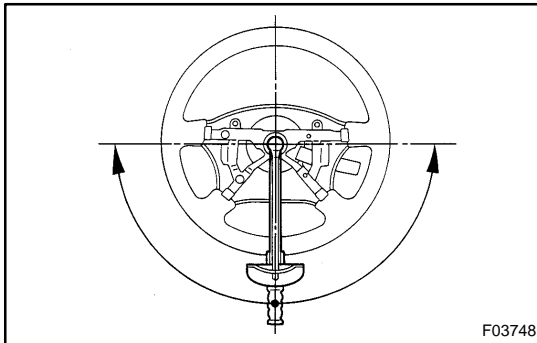
## STEERING WHEEL INSPECTION

SR0M0-06

### 1. CHECK STEERING WHEEL FREEPLAY

- (a) Stop the vehicle and face the tires straight ahead.
- (b) Rock the steering wheel gently up and down with a finger lightly, check the steering wheel freeplay.

**Maximum freeplay: 40 mm (1.58 in.)**



### 2. CHECK STEERING EFFORT

- (a) Center the steering wheel.
- (b) Remove the steering wheel pad (See page [SR-14](#) ).
- (c) Start the engine and run it at idle.
- (d) Measure the steering effort in both directions.

**Steering effort (Reference):**

**4.9 N·m (50 kgf·cm, 43 in.-lbf)**

#### HINT:

Be sure to consider the tire type, pressure and contact surface before making your diagnosis.

- (e) Torque the steering wheel set nut.

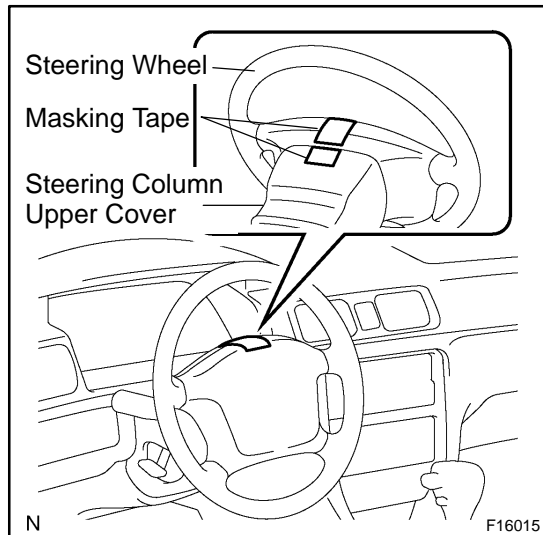
**Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)**

- (f) Install the steering wheel pad (See page [SR-24](#) ).

## REPAIR PROCEDURES

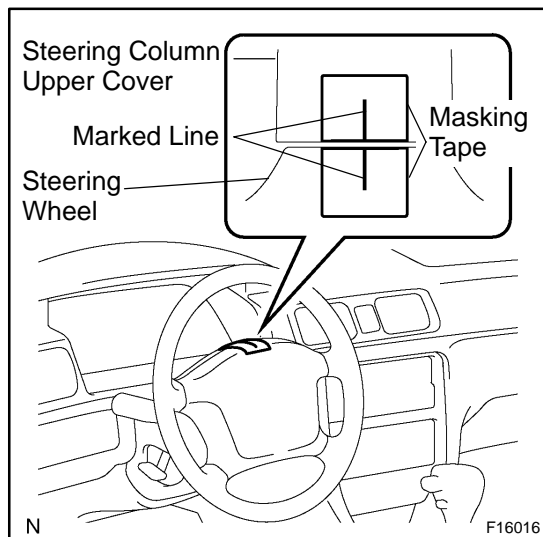
### HINT:

This is the repair procedure for steering off center.

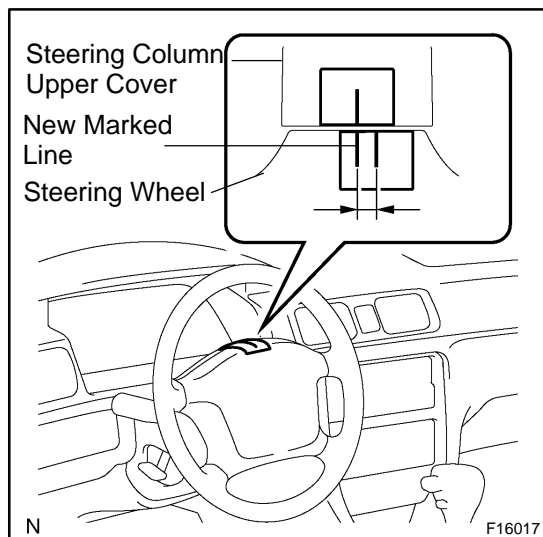


### 1. INSPECT STEERING WHEEL OFF CENTER

- (a) Apply masking tape on the top center of the steering wheel and steering column upper cover.



- (b) Drive the vehicle in a straight line for 100 meters at a constant speed of 35 mph (56 km/h), and hold the steering wheel to maintain the course.
- (c) Draw a line on the masking tape as shown in the illustration.



(d) Turn the steering wheel to its straight position.

HINT:

Refer to the upper surface of the steering wheel, steering spoke and SRS airbag line for the straight position.

(e) Draw a new line on the masking tape of the steering wheel as shown in the illustration.

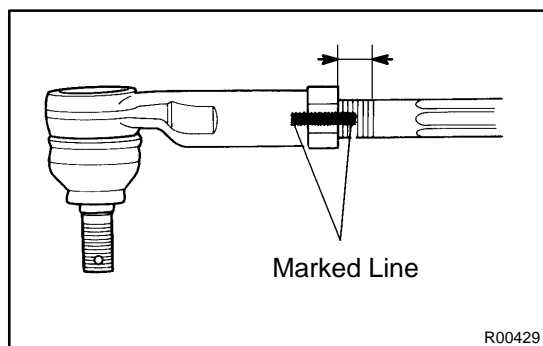
(f) Measure the distance between the 2 lines on the masking tape of the steering wheel.

(g) Convert the measured distance to steering angle.

**Measured distance 1 mm (0.04 in.) = Steering angle approximately 1 deg.**

HINT:

Make a note of the steering angle.



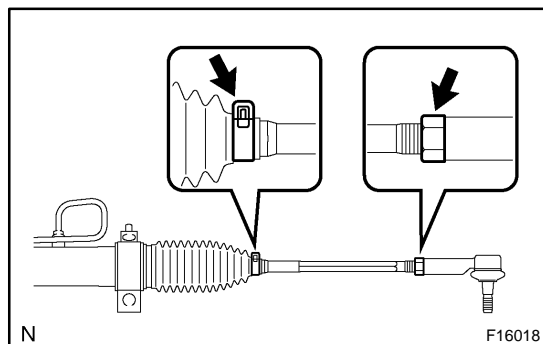
## 2. ADJUST STEERING ANGLE

(a) Draw a line on the RH and LH tie rod and rack ends where it can easily be seen.

(b) Using a paper gauge, measure the distance from RH and LH tie rod ends to the rack end screws.

HINT:

- ▶ Measure the RH side and LH side.
- ▶ Make a note of the measured values.



(c) Remove the RH and LH boot clips from the rack boots.

(d) Loosen the RH and LH lock nuts.

(e) Turn the RH and LH rack end by the same amount (but in different directions) according to the steering angle.

**1 turn 360 deg. of rack end (1.5 mm (0.059 in.) horizontal movement) = 12 deg. of steering angle**

(f) Tighten the RH and LH lock nuts.

**Torque: 55 N·m (560 kgf·cm, 41 ft·lbf)**

**NOTICE:**

**Make sure that the difference in length between RH and LH tie rod ends and rack end screws are within 1.5 mm (0.059 in.).**

(g) Install the RH and LH boot clips.

(h) Perform the zero point calibration of yaw rate and deceleration sensors (See page [DI-505](#)).

# TROUBLESHOOTING

## PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in the order shown. If necessary, repair or replace these parts.

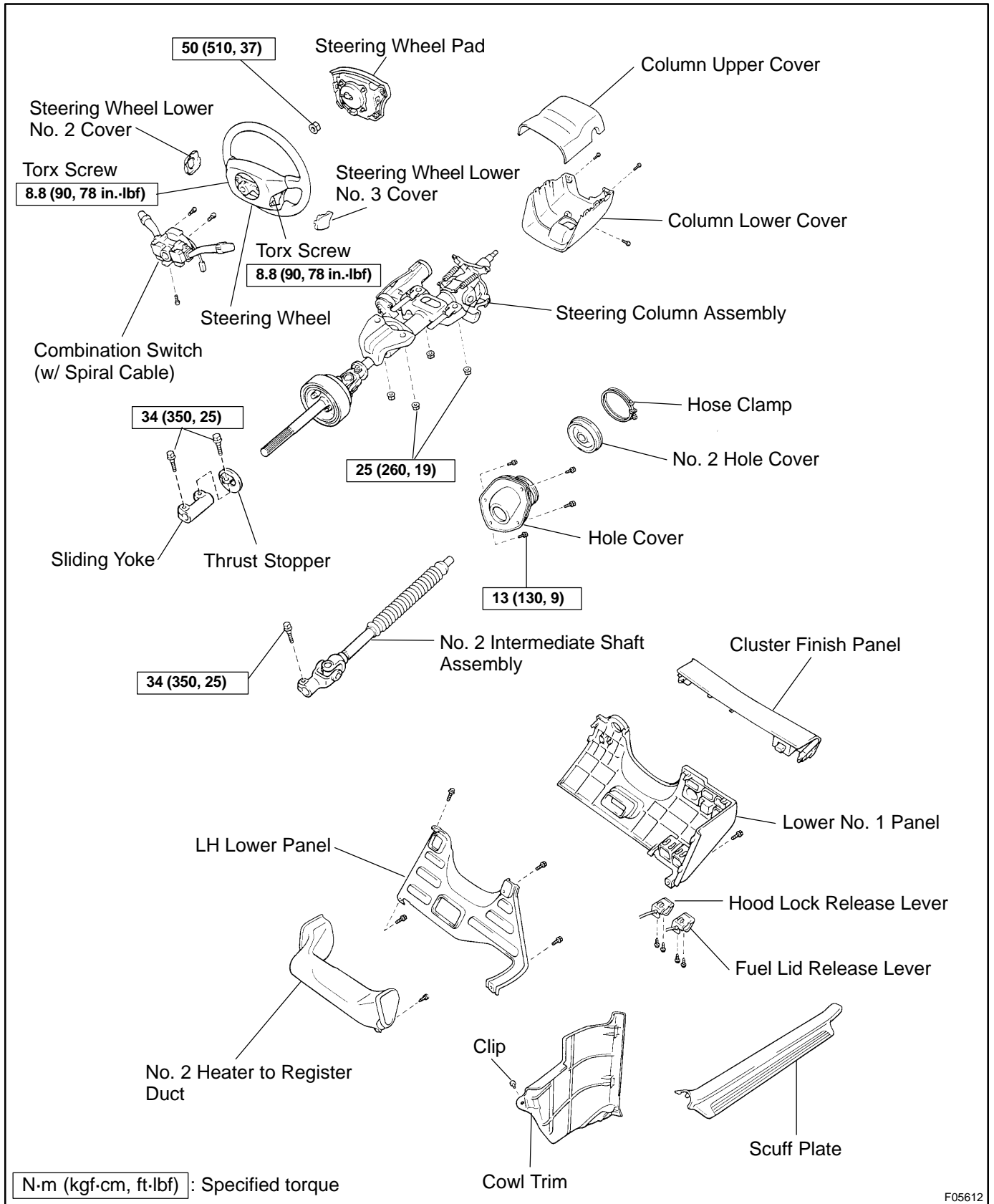
Symptom	Suspect Area	See page
Hard steering	3. Tires (Improperly inflated) 4. Power steering fluid level (Low) 5. Drive belt (Loose) 6. Front wheel alignment (Incorrect) 7. Steering system joints (Worn) 8. Suspension arm ball joints (Worn) 9. Steering column (Binding) 10. Power steering gear	<a href="#">SA-4</a> <a href="#">SR-5</a> - <a href="#">SA-6</a> - <a href="#">SA-71</a> <a href="#">SA-76</a> - <a href="#">SR-48</a>
Poor return	1. Tires (Improperly inflated) 2. Front wheel alignment (Incorrect) 3. Steering column (Binding) 4. Power steering gear	<a href="#">SA-4</a> <a href="#">SA-6</a> - <a href="#">SR-48</a>
Excessive play	1. Steering system joints (Worn) 2. Suspension arm ball joints (Worn) 3. Intermediate shaft, Universal joint, Sliding yoke (Worn) 4. Front wheel bearing (Worn) 5. Power steering gear	- <a href="#">SA-71</a> <a href="#">SA-76</a> - <a href="#">SA-11</a> <a href="#">SR-48</a>
Abnormal noise	1. Power steering fluid level (Low) 2. Steering system joints (Worn) 3. Power steering gear	<a href="#">SR-5</a> - <a href="#">SR-48</a>

### HINT:

When the problem occurs on the power tilt and telescopic steering system, refer to the DI section (See page [DI-656](#) ).

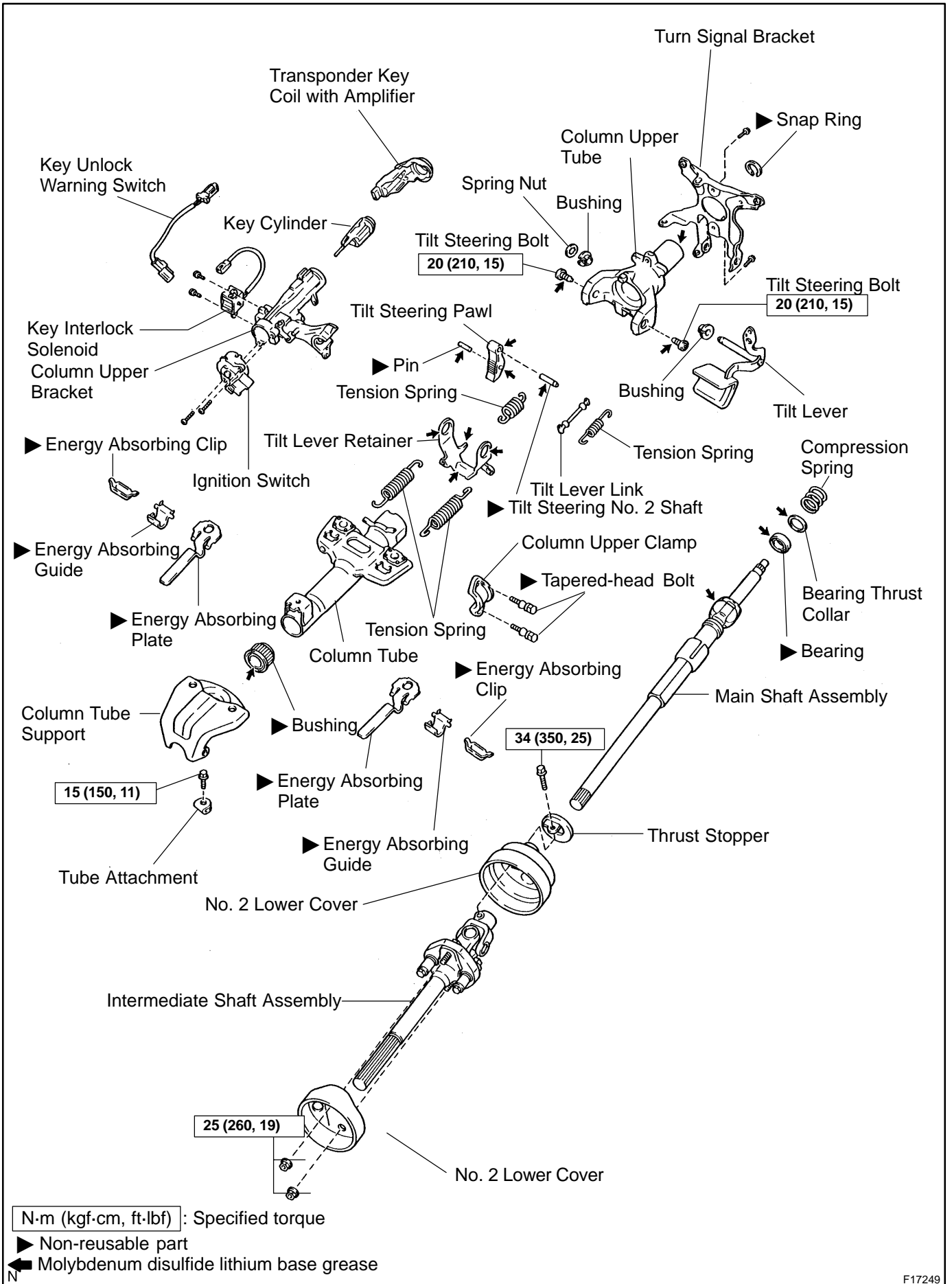
# TILT STEERING COLUMN COMPONENTS

SR0M1-04

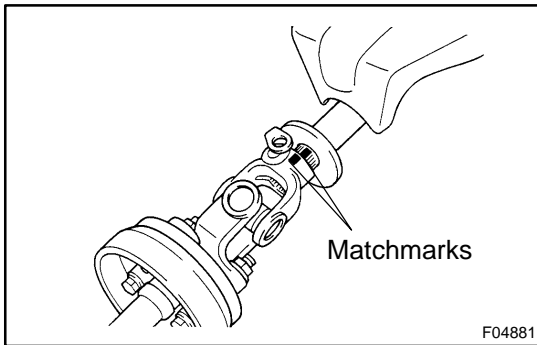


F05612

STEERING - TILT STEERING COLUMN



F17249



## DISASSEMBLY

### NOTICE:

When using a vise, do not overtighten it.

#### 1. REMOVE NO. 2 LOWER COVER

Remove the 2 nuts and lower side No. 2 lower cover.

#### 2. REMOVE INTERMEDIATE SHAFT ASSEMBLY

(a) Place matchmarks on the intermediate shaft assembly and main shaft assembly.

(b) Remove the bolt and intermediate shaft assembly with the upper side No. 2 lower cover.

(c) Remove the thrust stopper from the main shaft assembly.

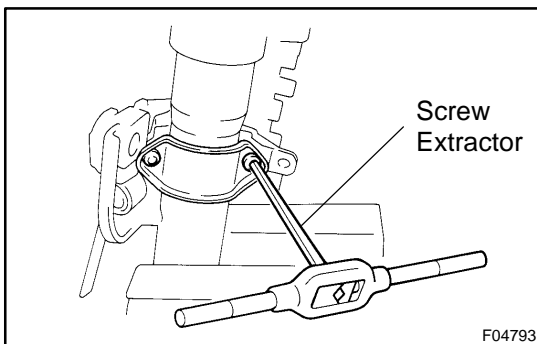
#### 3. REMOVE TRANSPONDER KEY AMPLIFIER

(a) Widen the claw hung on the upper bracket by approx. 1.0 mm (0.039 in.) using a screwdriver.

(b) Pull the transponder key amplifier toward the rear of the vehicle with the claw open.

### NOTICE:

Take care not to use excessive force to prevent the case from being damage.



#### 4. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

(a) Using a centering punch, mark the center of the 2 tapered-head bolts.

(b) Using a 3-4 mm (0.12-0.16 in.) drill, drill into the 2 bolts.

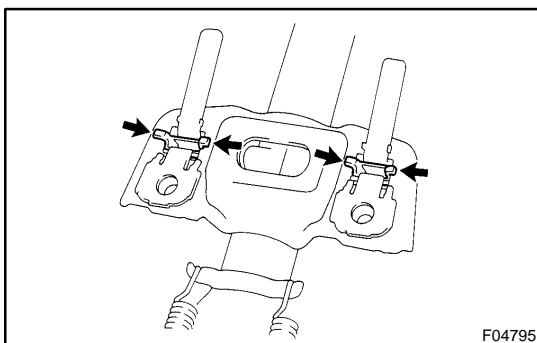
(c) Using a screw extractor, remove the 2 bolts, column upper bracket and column upper clamp.

#### 5. REMOVE COLUMN TUBE SUPPORT

(a) Remove the bolt.

(b) Remove the column tube support with tube attachment.

(c) Remove the tube attachment from the column tube support.



#### 6. REMOVE 2 ENERGY ABSORBING PLATES

(a) Using pliers, remove the 2 energy absorbing clips.

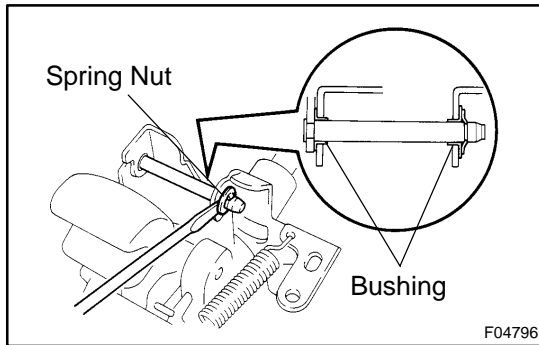
(b) Remove the 2 energy absorbing plates and 2 energy absorbing guides.

#### 7. REMOVE 4 TENSION SPRINGS

### HINT:

Remove the springs with the tilt function at maximum tilt up.

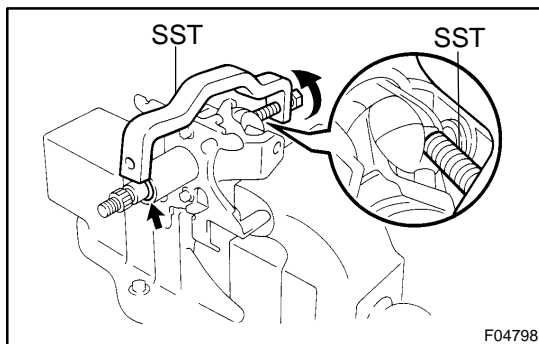


**8. REMOVE TILT LEVER**

- (a) Using a screwdriver, remove the spring nut.
- (b) Remove the tilt lever.
- (c) Remove the 2 bushings from the column upper tube.

**9. REMOVE TILT LEVER LINK****10. REMOVE COLUMN UPPER TUBE WITH MAIN SHAFT ASSEMBLY**

- (a) Using a hexagon wrench, remove the 2 tilt steering bolts.
- (b) Remove the upper tube with the main shaft assembly from the column tube.

**11. REMOVE TILT LEVER RETAINER****12. REMOVE MAIN SHAFT ASSEMBLY**

- (a) Using SST, compress the compression spring.  
SST 09950-4001 1 (09958-04011)

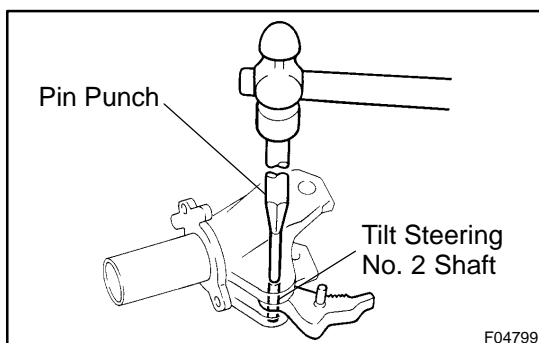
**NOTICE:**

**Do not bend the universal joint of the shaft more than 20°.**

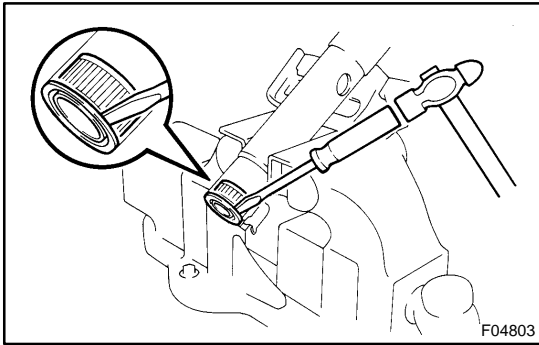
- (b) Using a snap ring expander, remove the snap ring from the shaft.
- (c) Remove the shaft assembly from the column upper tube.
- (d) Remove the compression spring and bearing thrust collar from the shaft.

**13. REMOVE TURN SIGNAL BRACKET**

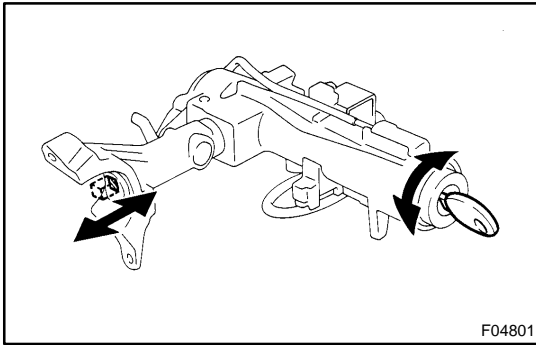
Remove the 2 bolts and turn signal bracket.

**14. REMOVE TILT STEERING PAWL**

- (a) Using a pin punch and hammer, tap out the tilt steering No. 2 shaft.
- (b) Remove the pawl from the column upper tube.
- (c) Remove the pin from the pawl.

**15. REMOVE BUSHING**

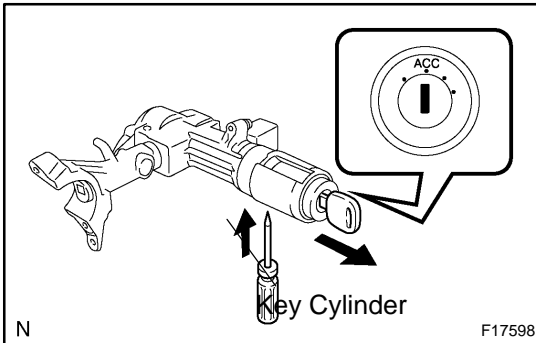
Using a screwdriver, tap out the bushing.



## INSPECTION

### 1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.



### 2. IF NECESSARY, REPLACE KEY CYLINDER

- (a) Place the ignition key at the ACC position.
- (b) Using a screwdriver, push down the stop pin of the cylinder, and pull out the key cylinder.
- (c) Install a new cylinder.

HINT:

Make sure the key is at the ACC position.

### 3. INSPECT IGNITION SWITCH (See page [BE-29](#) )

### 4. IF NECESSARY, REPLACE IGNITION SWITCH

- (a) Remove the 2 screws and ignition switch.
- (b) Install a new ignition switch with the 2 screws.

### 5. INSPECT KEY UNLOCK WARNING SWITCH (See page [BE-29](#) )

### 6. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH

- (a) Slide out the key unlock warning switch.
- (b) Slide in a new key unlock warning switch.

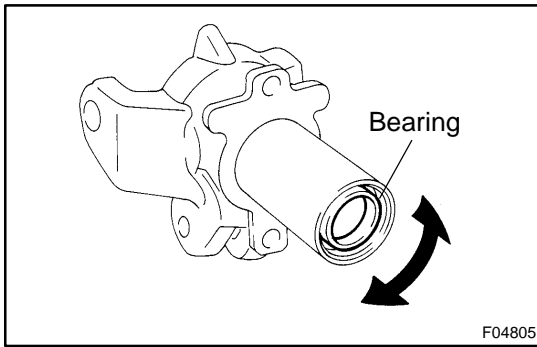
### 7. INSPECT KEY INTERLOCK SOLENOID (See page [AT-14](#) )

### 8. IF NECESSARY, REPLACE KEY INTERLOCK SOLENOID

- (a) Remove the 2 screws and key interlock solenoid.
- (b) Install a new key interlock solenoid with the 2 screws.

### 9. INSPECT TRANSPONDER KEY COIL (See page [BE-196](#) )

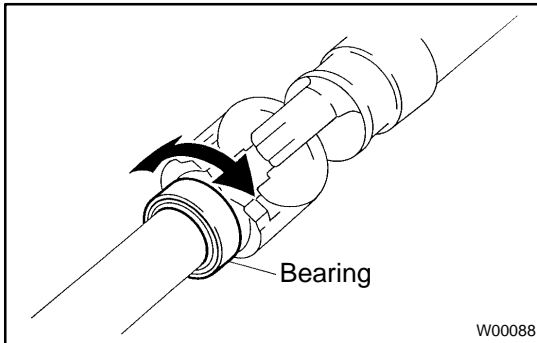
### 10. IF NECESSARY, REPLACE TRANSPONDER KEY AMPLIFIER

**11. INSPECT UPPER BEARING**

- (a) Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the column upper tube.

- (b) Coat the bearing with molybdenum disulfide lithium base grease.

**12. INSPECT LOWER BEARING**

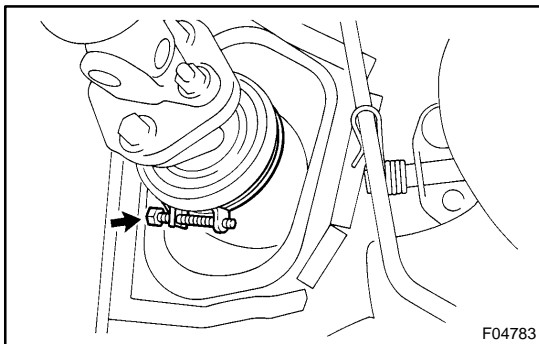
- (a) Check the bearing rotation condition of the main shaft assembly and check for abnormal noise.

If necessary, replace bearing.

- (b) Coat the bearing with molybdenum disulfide lithium base grease.

## INSTALLATION

1. **INSTALL NO. 2 HOLE COVER**
2. **INSTALL HOSE CLAMP**
3. **INSTALL SLIDING YOKE**
  - (a) Install the thrust stopper and sliding yoke to the steering column assembly.
  - (b) Install and temporarily tighten the bolt A.
4. **INSTALL STEERING COLUMN ASSEMBLY**
  - (a) Install the steering column assembly with the 4 nuts.  
**Torque: 25 N·m (260 kgf-cm, 19 ft-lbf)**



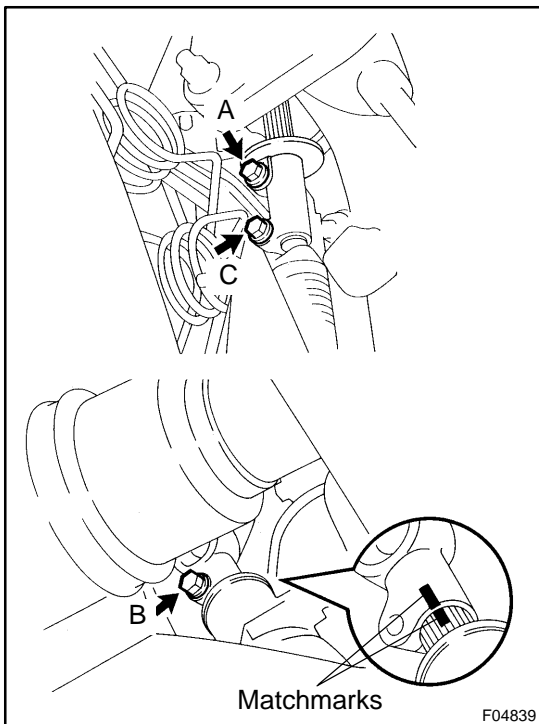
- (b) Tighten the hose clamp.
- (c) Connect the connectors.

### 5. **INSTALL HOLE COVER**

Install the hole cover with the 4 bolts.

**Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)**

### 6. **INSTALL NO. 2 INTERMEDIATE SHAFT ASSEMBLY TO STEERING COLUMN ASSEMBLY**



### 7. **CONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY**

- (a) Align the matchmarks on the No. 2 intermediate shaft and control valve shaft.

- (b) Install the bolt C.

**Torque: 34 N·m (350 kgf-cm, 25 ft-lbf)**

- (c) Install the bolt B.

**Torque: 34 N·m (350 kgf-cm, 25 ft-lbf)**

- (d) Torque the bolt A.

**Torque: 34 N·m (350 kgf-cm, 25 ft-lbf)**

### 8. **INSTALL NO. 2 HEATER TO REGISTER DUCT**

Install the No. 2 heater to register duct with the screw.

### 9. **INSTALL LH LOWER PANEL**

Install the LH lower panel with the 4 bolts.

### 10. **INSTALL LOWER NO. 1 PANEL**

- (a) Install the lower No. 1 panel with the screw.

- (b) Connect the hood lock release lever and fuel lid release lever with the 4 screws.

### 11. **INSTALL CLUSTER FINISH PANEL**

Install the cluster finish panel and connector.

**12. INSTALL COWL TRIM**

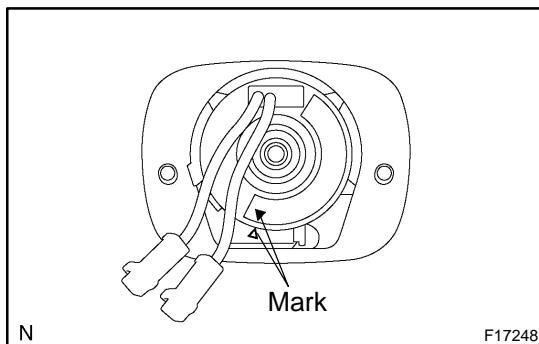
Install the cowl trim with the clip.

**13. INSTALL SCUFF PLATE****14. INSTALL SPIRAL CABLE (See page BE-31 )****15. INSTALL COMBINATION SWITCH WITH SPIRAL CABLE**

- (a) Install the combination switch with the 3 screws.
- (b) Connect the airbag connector.
- (c) Tilt steering column:  
Connect the 3 connectors.
- (d) w/ Power tilt and power telescopic steering column:  
Connect the 5 connectors.

**16. INSTALL UPPER AND LOWER COLUMN COVERS**

Install the upper and lower column covers with the 3 screws.

**17. CENTER SPIRAL CABLE**

- (a) Check that the front wheels are facing straight ahead.
- (b) Turn the cable counterclockwise by hand until it becomes harder to turn the cable.
- (c) Then rotate the cable clockwise about 2.5 turns to align the mark.

**HINT:**

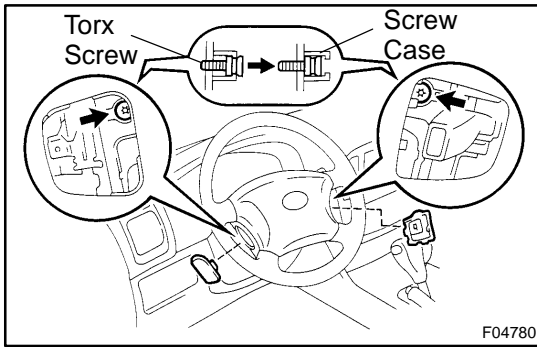
The cable will rotate about 2.5 turns to either left or right of the center.

**18. INSTALL STEERING WHEEL**

- (a) Align the matchmarks on the steering wheel and main shaft.
- (b) Install the steering wheel set nut.  
**Torque: 50 N·m (510 kgf-cm, 37 ft-lbf)**
- (c) Connect the connector.

**19. INSTALL STEERING WHEEL PAD****NOTICE:**

- ▶ **Never use airbag parts from another vehicle. When replacing parts, replace with new ones.**
- ▶ **Make sure the wheel pad is installed to the specified torque.**
- ▶ **If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.**
- ▶ **When installing the wheel pad, take care that the wirings do not interfere with other parts and are not pinched between other parts.**



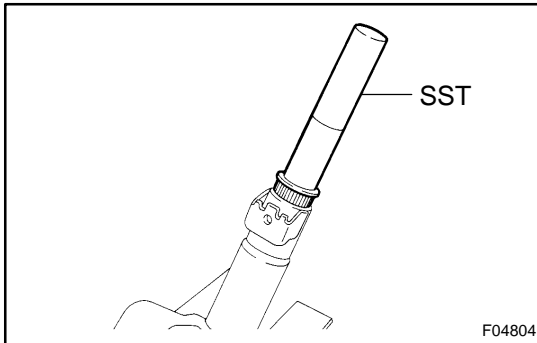
- (a) Connect the connector.
  - (b) Connect the airbag connector.
  - (c) Install the pad after confirming that the circumference groove of the torx screw is caught on the screws case.
  - (d) Using a torx socket wrench, torque the 2 screws.  
**Torque: 8.8 N·m (90 kgf·cm, 78 in.-lbf)**
  - (e) Install the steering wheel lower No. 2 and No. 3 covers.
- 20. CHECK STEERING WHEEL CENTER POINT**

## REASSEMBLY

### NOTICE:

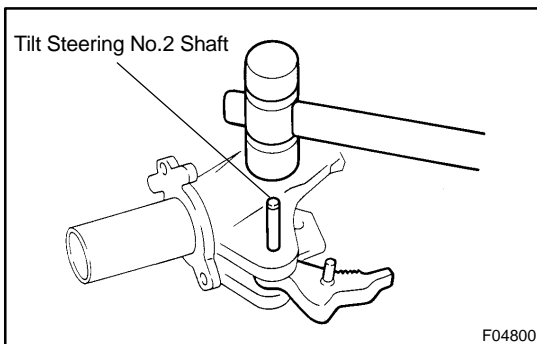
When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page [SR-12](#))



### 2. INSTALL BUSHING

- (a) Coat a new bushing with molybdenum disulfide lithium base grease.
- (b) Using SST and a hammer, tap in the bushing.  
SST 09612-2201 1



### 3. INSTALL TILT STEERING PAWL

- (a) Install a new pin to the pawl.
- (b) Install the pawl to the column upper tube.
- (c) Using a plastic hammer, tap in a new tilt steering No. 2 shaft.

### NOTICE:

Tap the shaft completely into the steering column upper tube.

### 4. INSTALL TURN SIGNAL BRACKET

Install the turn signal bracket with the 2 bolts.

### 5. INSTALL MAIN SHAFT ASSEMBLY

- (a) Install the bearing thrust collar and compression spring to the shaft.
- (b) Install the shaft assembly to the column upper tube.
- (c) Using SST, compress the compression spring.  
SST 09950-4001 1 (09958-04011)

### NOTICE:

Do not bend the universal joint of the shaft more than 20°.

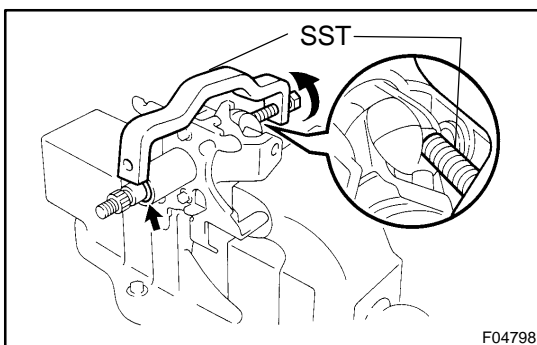
- (d) Using a snap ring expander, install a new snap ring to the shaft.

### 6. INSTALL TILT LEVER RETAINER

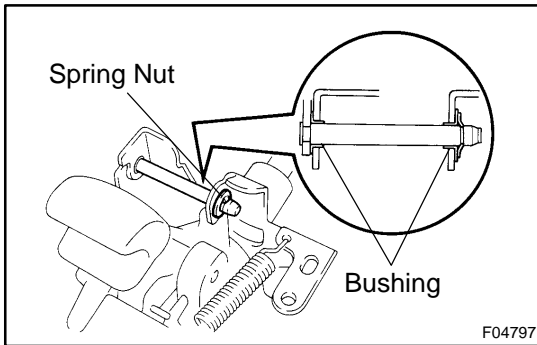
### 7. INSTALL COLUMN UPPER TUBE WITH MAIN SHAFT ASSEMBLY

- (a) Install the column upper tube with the main shaft to the column tube.
- (b) Using a hexagon wrench, torque the 2 tilt steering bolts.  
**Torque: 20 N·m (210 kgf·cm, 15 ft·lbf)**
- (c) Check that the upper tube turns smoothly.

### 8. INSTALL TILT LEVER LINK





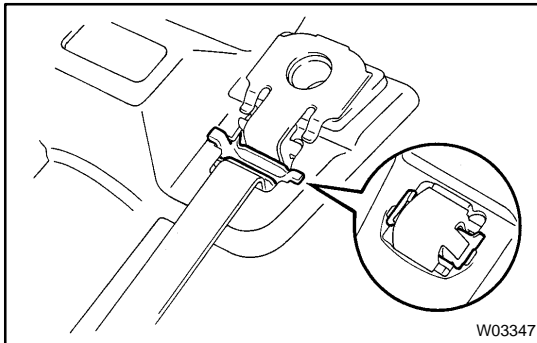
**9. INSTALL TILT LEVER**

- (a) Install the 2 bushings and tilt lever to the column upper tube, as shown in the illustration.
- (b) Install a new spring nut to the lever.

**10. INSTALL 4 TENSION SPRINGS**

HINT:

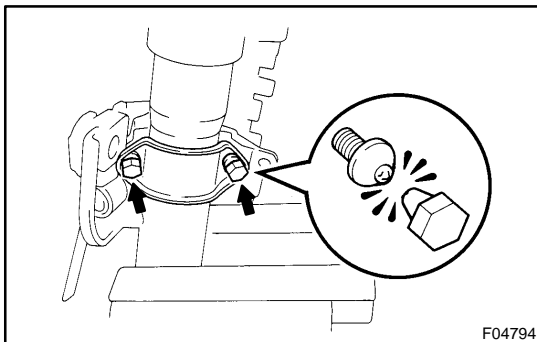
Install the springs with the tilt function at maximum tilt up.

**11. INSTALL 2 ENERGY ABSORBING PLATES**

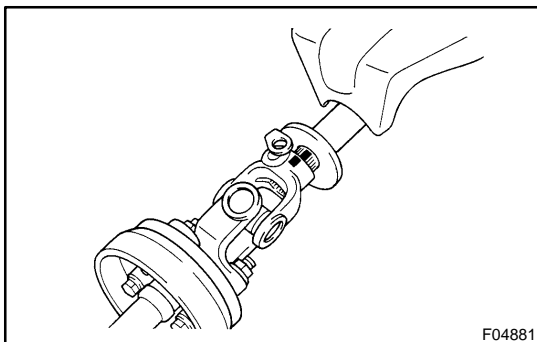
- (a) Install the 2 new energy absorbing guides and 2 new absorbing plates.
- (b) Install the 2 new energy absorbing clips.

**12. INSTALL COLUMN TUBE SUPPORT**

Install the tube attachment with the bolt to the column tube support.

**Torque: 15 N·m (150 kgf-cm, 11 ft-lbf)****13. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP**

- (a) Install the column upper bracket and column upper clamp with 2 new tapered-head bolts.
- (b) Tighten the 2 new tapered-head bolts until the bolt heads break off.

**14. INSTALL TRANSPONDER KEY AMPLIFIER ASSEMBLY****15. INSTALL INTERMEDIATE SHAFT ASSEMBLY**

- (a) Install the thrust stopper and upper side No. 2 lower cover.
- (b) Align the matchmarks on the intermediate shaft assembly and main shaft assembly.
- (c) Install the bolt.

**Torque: 34 N·m (350 kgf-cm, 25 ft-lbf)****16. INSTALL NO. 2 LOWER COVER**

Install the No. 2 lower cover with the 2 nuts.

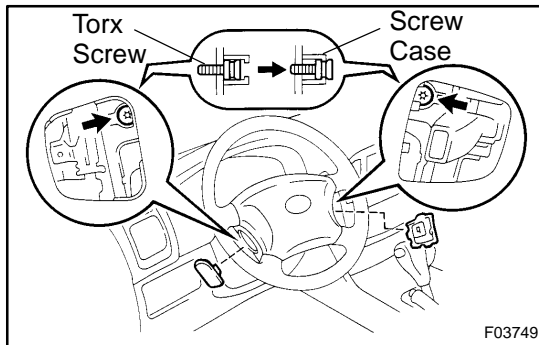
**Torque: 25 N·m (260 kgf-cm, 19 ft-lbf)**

## REMOVAL

### 1. REMOVE STEERING WHEEL PAD

#### NOTICE:

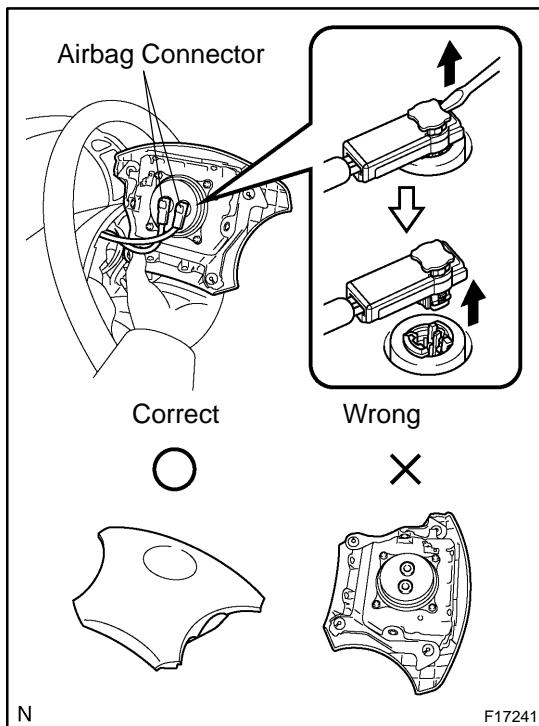
If the airbag connector is disconnected with the ignition switch at ON or ACC, DTCs will be recorded.



- Place the front wheels facing straight ahead.
- Remove the steering wheel lower No. 2 and No. 3 covers.
- Using a torx socket wrench, loosen the 2 torx screws.

#### HINT:

Loosen the 2 screws until the groove along the screw circumference catches on the screw case.



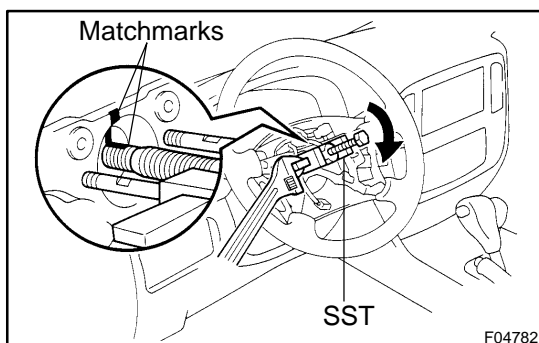
- Pull the pad out from the steering wheel and disconnect the 2 airbag connectors.
- Disconnect the connector.

#### CAUTION:

- ▶ When storing the wheel pad, keep the upper surface of the pad facing upward.
- ▶ Never disassemble the wheel pad.

#### NOTICE:

When removing the wheel pad, take care not to pull the airbag wire harness.



### 2. REMOVE STEERING WHEEL

- Disconnect the connector.
- Remove the steering wheel set nut.
- Place matchmarks on the steering wheel and main shaft assembly.
- Using SST, remove the wheel.

SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)

**3. REMOVE UPPER AND LOWER COLUMN COVERS**  
Remove the 3 screws, upper and lower column covers.

**4. REMOVE COMBINATION SWITCH WITH SPIRAL CABLE**

- (a) Tilt steering column:  
Disconnect the 3 connectors.
- (b) w/ Power tilt and power telescopic steering column:  
Disconnect the 5 connectors.
- (c) Disconnect the airbag connector.
- (d) Remove the 3 screws and combination switch.

**5. REMOVE SPIRAL CABLE (See page BE-31 )**

**NOTICE:**

**Do not disassembly the cable or apply oil to it.**

**6. REMOVE SCUFF PLATE**

**7. REMOVE COWL TRIM**

Remove the clip and cowl trim.

**8. REMOVE CLUSTER FINISH PANEL**

Remove the connector and cluster finish panel.

**9. REMOVE LOWER NO. 1 PANEL**

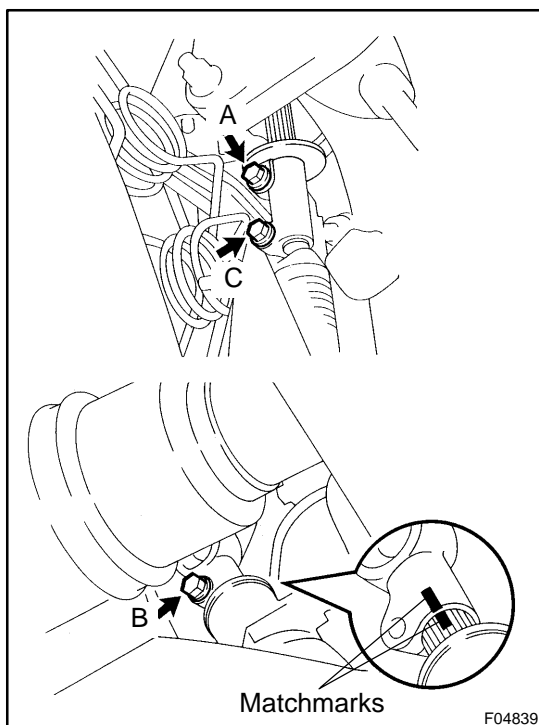
- (a) Remove the 2 screws and disconnect the hood lock release lever from the panel.
- (b) Remove the 2 screws and disconnect the fuel lid release lever from the panel.
- (c) Remove pad set screw and lower No. 1 panel.

**10. REMOVE LH LOWER PANEL**

Remove the 4 bolts and LH lower panel.

**11. REMOVE NO. 2 HEATER TO REGISTER DUCT**

Remove the screw and No. 2 heater to register duct.



**12. DISCONNECT NO. 2 INTERMEDIATE SHAFT ASSEMBLY**

- (a) Place matchmarks on the No. 2 intermediate shaft and control valve shaft.
- (b) Loosen the bolt A.
- (c) Remove the bolt B and the bolt C, disconnect the No. 2 intermediate shaft from the control valve shaft and sliding yoke.

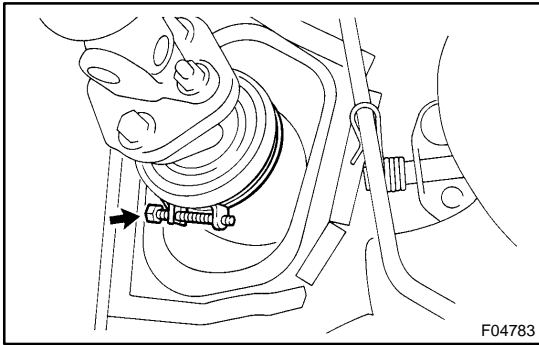
**13. REMOVE NO. 2 INTERMEDIATE SHAFT ASSEMBLY**

**14. REMOVE HOLE COVER**

Remove the 4 bolts and hole cover.

**15. REMOVE STEERING COLUMN ASSEMBLY**

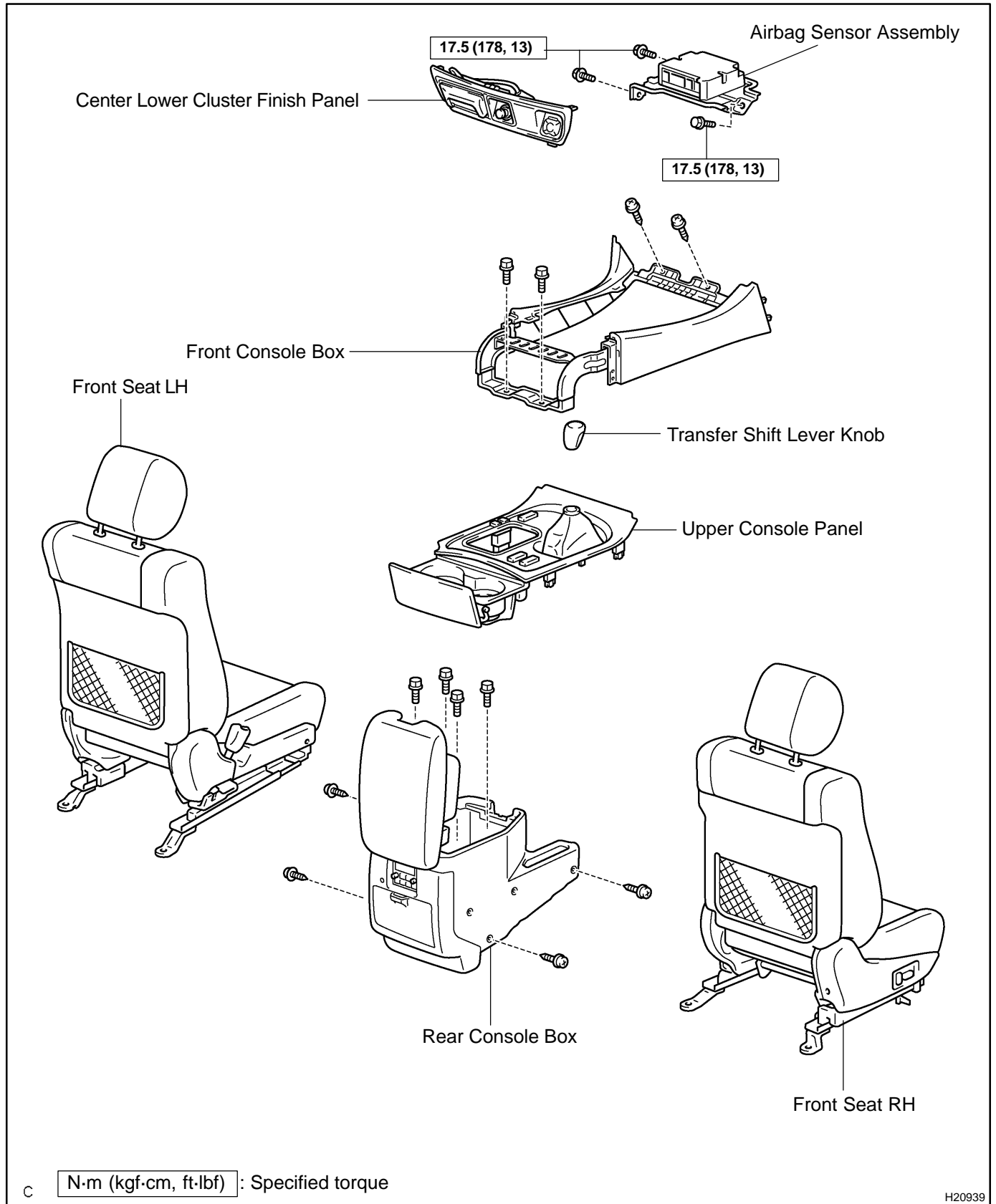
- (a) Disconnect the connectors.



- (b) Loosen the hose clamp.
  - (c) Remove the 4 nuts and steering column assembly.
- 16. REMOVE SLIDING YOKE**
- (a) Remove the bolt A and sliding yoke.
  - (b) Remove the thrust stopper from the intermediate shaft assembly.
- 17. REMOVE HOSE CLAMP**
- 18. REMOVE NO. 2 HOLE COVER**

# AIRBAG SENSOR ASSEMBLY COMPONENTS

RS0BK-08



H20939

## INSPECTION

**1. Vehicle not involved in collision:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

**2. Vehicle involved in collision and airbag is not deployed:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

**3. Vehicle involved in collision and airbag is deployed:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Replace the airbag sensor assembly (See page [RS-69](#) ).

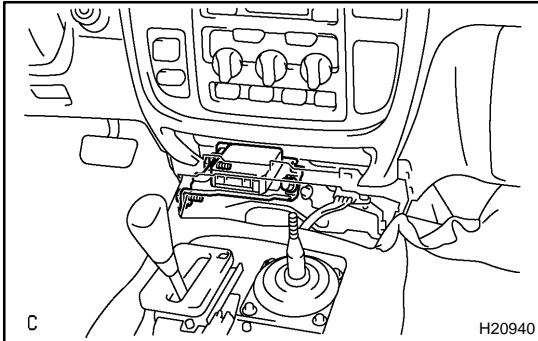
## INSTALLATION

### NOTICE:

- ▶ Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- ▶ Never reuse the airbag sensor assembly involved in a collision when the airbag has deployed.
- ▶ Never repair a sensor in order to reuse it.

### HINT:

For step 2 to 6, refer to page [BO-91](#) .



### 1. INSTALL AIRBAG SENSOR ASSEMBLY

- (a) Install the airbag sensor assembly with the 3 bolts.  
**Torque: 17.5 N·m (178 kgf·cm, 13 ft·lbf)**
- (b) Connect the airbag sensor connectors.

### NOTICE:

- ▶ Connection of the connector is done after the sensor assembly has been installed.
- ▶ Make sure the sensor assembly is installed with the specified torque.
- ▶ If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.
- ▶ When installing the sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.
- ▶ After installing, shake the sensor assembly to check that there is no looseness.

2. INSTALL CENTER LOWER INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY
3. INSTALL FRONT CONSOLE BOX
4. INSTALL REAR CONSOLE BOX WITH CONSOLE REAR END PANEL
5. INSTALL UPPER CONSOLE PANEL
6. INSTALL TRANSFER SHIFT LEVER KNOB
7. INSTALL FRONT SEAT (See page [BO-1 17](#))
8. INSPECT SRS WARNING LIGHT (See page [DI-692](#) )

## REMOVAL

### NOTICE:

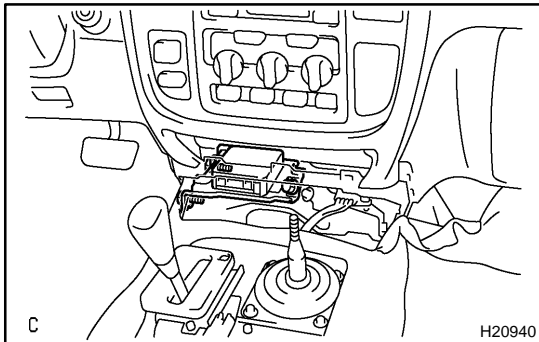
Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary.

(If the IC terminals are touched, the IC may be destroyed by static electricity.)

### HINT:

For step 2 to 6, refer to page [BO-84](#) .

1. REMOVE FRONT SEAT (See page [BO-105](#) )
2. REMOVE TRANSFER SHIFT LEVER KNOB
3. REMOVE UPPER CONSOLE PANEL
4. REMOVE REAR CONSOLE BOX WITH CONSOLE REAR END PANEL
5. REMOVE FRONT CONSOLE BOX
6. REMOVE CENTER LOWER CLUSTER FINISH PANEL ASSEMBLY



### 7. REMOVE AIRBAG SENSOR ASSEMBLY

- (a) Disconnect the airbag sensor connectors.

### NOTICE:

Disconnect the connectors with the airbag sensor assembly installed.

- (b) Remove the 3 bolts and the airbag sensor assembly.



## REPLACEMENT

### REPLACEMENT REQUIREMENTS

In the following cases, replace the airbag sensor assembly.

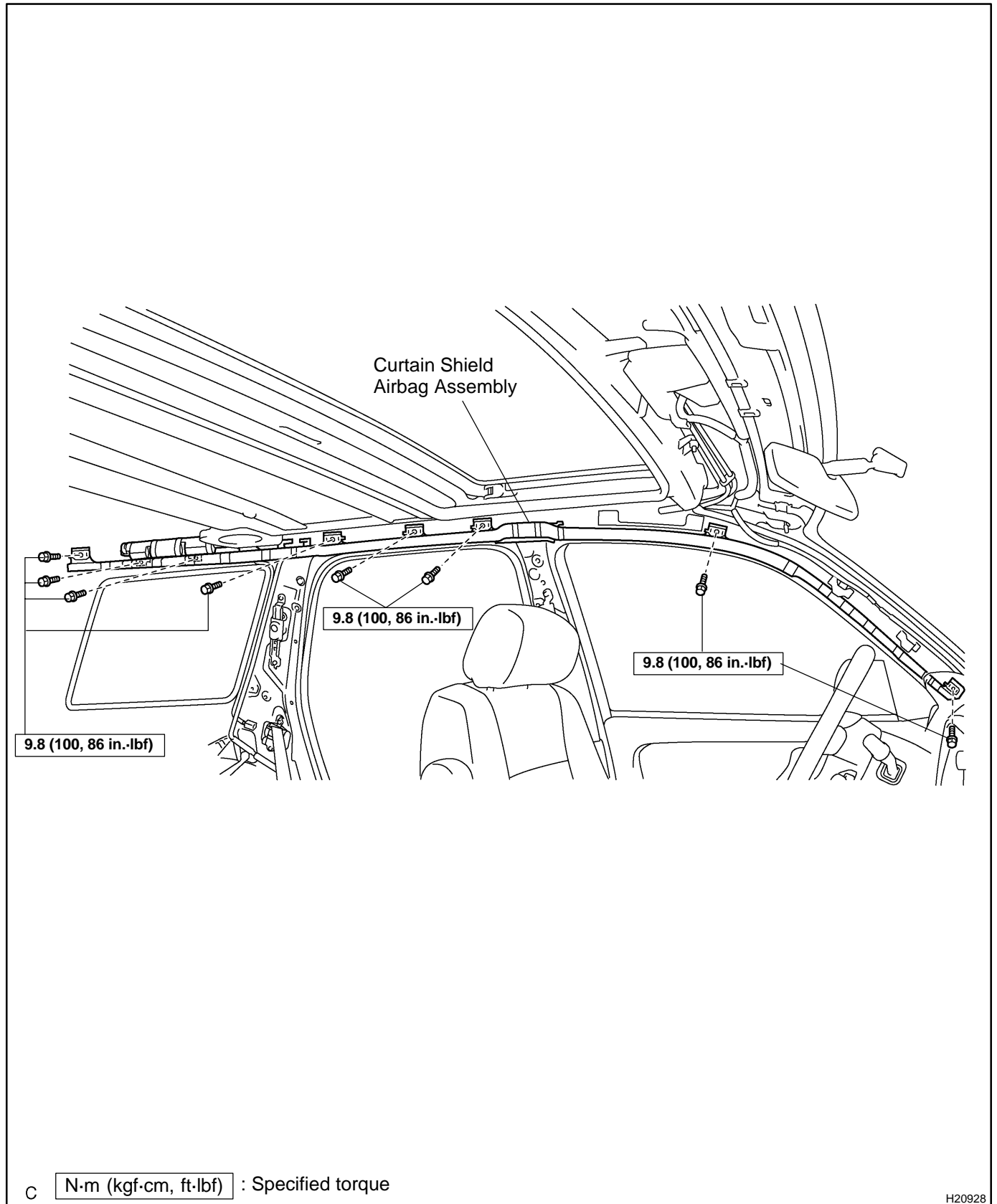
- ▶ If the SRS has been deployed in a collision.
- ▶ If the airbag sensor assembly has been found to be faulty in troubleshooting.
- ▶ If the airbag sensor assembly has been dropped.

### CAUTION:

For removal and installation of the airbag sensor assembly, see page [RS-70](#) and [RS-73](#) . Be sure to follow the correct procedure.

# CURTAIN SHIELD AIRBAG ASSEMBLY COMPONENTS

RS0N2-11



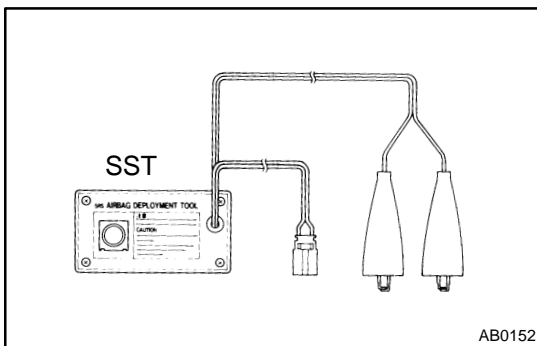
## DISPOSAL

### HINT:

When scrapping vehicles equipped with an SRS or disposing of the side airbag assembly always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

### CAUTION:

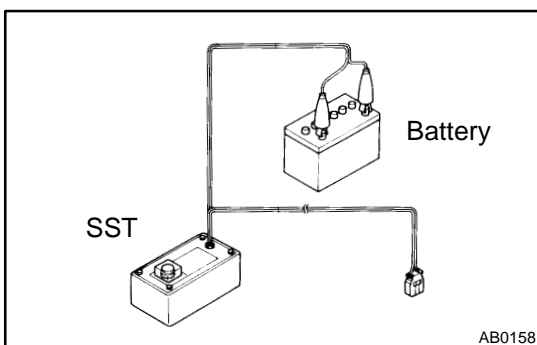
- ▶ Never dispose of a curtain shield airbag assembly of which airbag has not been deployed.
- ▶ The airbag produces a sizeable exploding sound when it deploys, so perform the operation out-of-doors and where it will not create a nuisance to nearby residents.



- ▶ When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool), perform the operation in a place away from electrical noise.

SST 09082-00700

- ▶ When deploying an airbag, perform the operation at least 10 m (33 ft) away from the airbag assembly.
- ▶ The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling side airbag assembly with the deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a side airbag assembly with the deployed airbag.



## 1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

### HINT:

Have a battery ready as the power source to deploy the airbag.

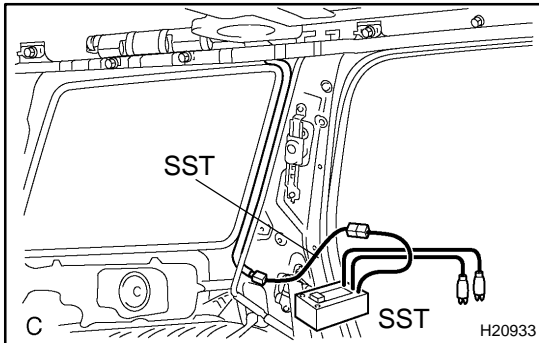
- (a) Check the function of the SST (See step 1-(a) on page [RS-20](#)).

SST 09082-00700

- (b) Disconnect the curtain shield airbag connector.

**NOTICE:**

When handling the airbag connector, take care not to damage the airbag wire harness.



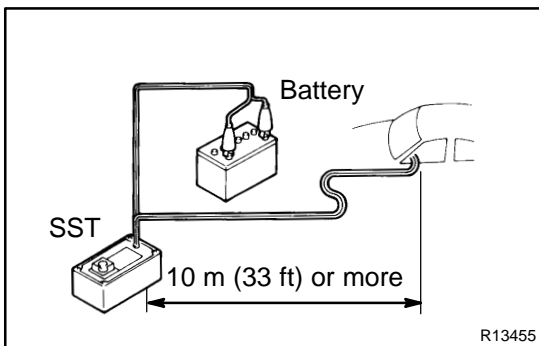
- (c) Install the SST.

- (1) Connect the connectors of the SST to the airbag connector.

SST 09082-00700, 09082-00760

**NOTICE:**

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



- (2) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

- (3) Close all the doors and windows of the vehicle.

**NOTICE:**

Take care not to damage the SST wire harness.

- (4) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.

- (d) Deploy the airbag.

- (1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

- (2) Press the SST activation switch and deploy the airbag.

**CAUTION:**

- ▶ The curtain shield airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling the curtain shield airbag assembly with the deployed airbag.
- ▶ Do not apply water, etc. to the curtain shield airbag assembly with the deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ When scrapping a vehicle, deploy the airbag and scrap the vehicle with the curtain shield airbag assembly still installed.

**HINT:**

The airbag deploys as the LED of the SST activation switch comes on.

## 2. DEPLOYMENT WHEN DISPOSING OF CURTAIN SHIELD AIRBAG ASSEMBLY

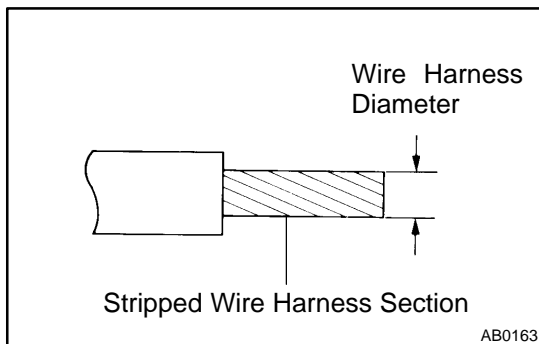
### NOTICE:

- ▶ When disposing of the curtain shield airbag assembly only, never use the customer's vehicle to deploy the airbag.
- ▶ Be sure to follow the procedure given below when deploying the airbag.

### HINT:

Have a battery ready as the power source to deploy the airbag.

- (a) Remove the curtain shield airbag assembly (See page [RS-59](#)).
- (b) Cut off the deployment section in airbag from inflator.



- (c) Using a service-purpose wire harness, tie down the curtain shield airbag assembly to the tire.

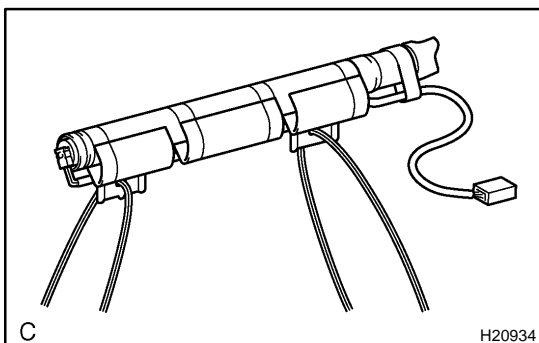
**Wire harness: Stripped wire harness section  
1.25 mm<sup>2</sup> or more (0.0019 in<sup>2</sup>. or more)**

### CAUTION:

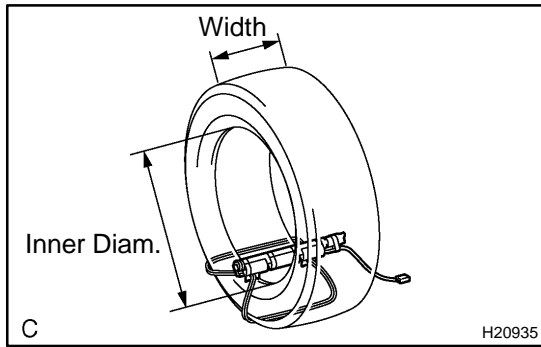
If a wire harness which is too thin or some other thing is used to tie down the curtain shield airbag assembly, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm<sup>2</sup> (0.0019 in<sup>2</sup>.).

### HINT:

To calculate the square of the stripped wire harness section-  
**Square = 3.14 x (Diameter)<sup>2</sup> divided by 4**



- (1) Passing the wire harness through the installation holes as shown in the illustration.



- (2) Position the curtain shield airbag assembly inside the tire with the airbag deployment direction facing inside.

**Tire size: Must exceed the following dimensions-**

**Width: 185 mm (7.28 in.)**

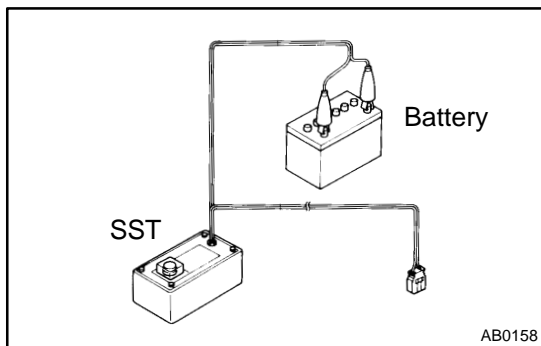
**Inner diameter: 360 mm (14.17 in.)**

**CAUTION:**

**Make sure that the wire harness is tight. It is very dangerous when a loose wire harness results in the curtain shield airbag assembly coming free due to the shock from the airbag deploying.**

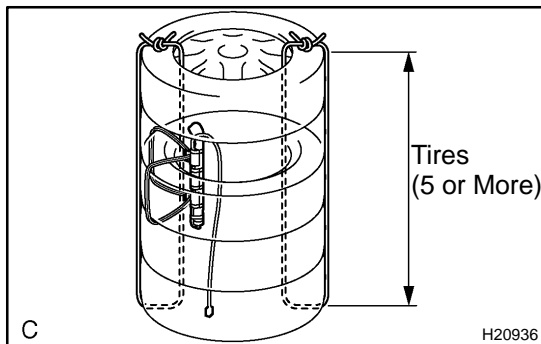
**NOTICE:**

**The tire will be marked by the airbag deployment, so when disposing of the airbag use a redundant tire.**



- (d) Check the function of the SST (See step 1-(a) on page [RS-20](#) ).

SST 09082-00700

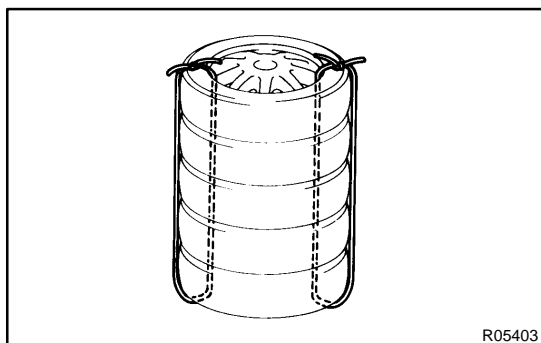


- (e) Place the tires.

**CAUTION:**

**Place the tire so that the deployment direction of the curtain shield airbag will be downward.**

- (1) Place at least 2 tires under the tire to which the side airbag assembly is tied.
- (2) Place at least 2 tires over the tire to which the side airbag assembly is tied. The top tire should have the wheel installed.



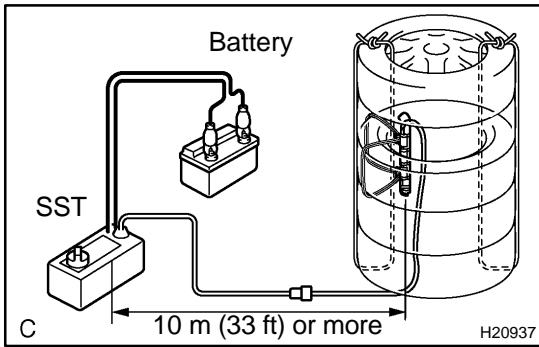
- (3) Tie the tires together with 2 wire harnesses.

**CAUTION:**

**Make sure that the wire harnesses are tight. It is very dangerous when loose wire harness results in the tires coming free due to the shock from the airbag deploying.**

**HINT:**

Place the SST connector and wire harness inside tires. Secure at least 1 m (3 ft) of slack for the wire harness.



- (f) Install the SST.  
Connect the connectors of the SST to the curtain shield airbag assembly connector.  
SST 09082-00700, 09082-00760

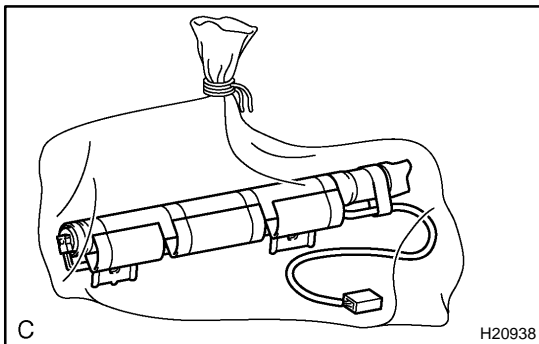
**NOTICE:**

**To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.**

- (g) Deploy the airbag.
- (1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.
  - (2) Check that no one is within 10 m (33 ft) area around the tire which the side airbag assembly is tied to.
  - (3) Press the SST activation switch and deploy the airbag.

**HINT:**

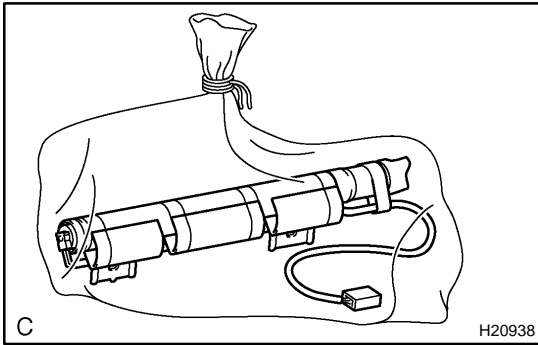
The airbag deploys as the LED of the SST activation switch comes on.



- (h) Dispose of the curtain shield airbag assembly.

**CAUTION:**

- ▶ **The curtain shield airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
  - ▶ **Use gloves and safety glasses when handling a curtain shield airbag assembly with the deployed airbag.**
  - ▶ **Do not apply water etc. to a curtain shield airbag assembly with the deployed airbag.**
  - ▶ **Always wash your hands with water after completing the operation.**
- (1) Remove the curtain shield airbag assembly from the tire.
  - (2) Place the curtain shield airbag assembly in a plastic bag, tie the end tightly and dispose of it as the other general parts disposal.



### 3. DEPLOYMENT WHEN DISPOSING OF CURTAIN SHIELD AIRBAG ASSEMBLY WITH AIRBAG DEPLOYED IN COLLISION

Dispose of the curtain shield airbag assembly.

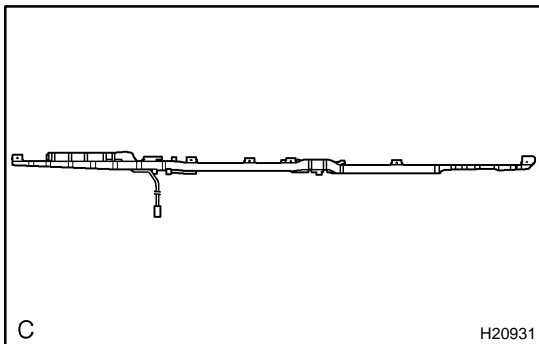
#### CAUTION:

- ▶ The curtain shield airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
  - ▶ Use gloves and safety glasses when handling a curtain shield airbag assembly with the deployed airbag.
  - ▶ Do not apply water etc. to a curtain shield airbag assembly with the deployed airbag.
  - ▶ Always wash your hands with water after completing the operation.
- (1) Remove the curtain shield airbag assembly (See page [RS-59](#) ).
  - (2) Place the curtain shield airbag assembly in a plastic bag, tie the end tightly and dispose of it as the other general parts disposal.



## INSPECTION

1. **Vehicle not involved in collision:**  
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**
  - (a) Do a diagnostic system check (See page [DI-692](#) ).
  - (b) Do a visual check which includes the following items with the curtain shield airbag assembly installed in the vehicle. Check cuts, minute cracks or marked discoloration on the front pillar garnish and roof headlining.
2. **Vehicle involved in a collision and airbag is not deployed:**  
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**
  - (a) Do a diagnostic system check (See page [DI-692](#) ).

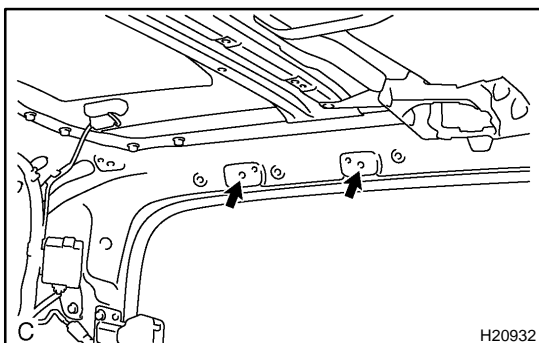


- (b) Do a visual check which includes the following items with the curtain shield airbag assembly removed from the vehicle.
  - ▶ Check cuts, tears and cracks, or marked discoloration of the curtain shield airbag assembly.
  - ▶ Check cuts and cracks in wire harness, and chipping in connectors.

### CAUTION:

For removal and installation of the curtain shield airbag assembly, see page [RS-59](#) and [RS-68](#) . Be sure to follow the correct procedure.

3. **Vehicle involved in a collision and airbag is deployed:**  
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**
  - (a) Do a diagnostic system check (See page [DI-692](#) ).
  - (b) Do a visual check which includes the following items with the curtain shield airbag assembly removed from the vehicle.
    - ▶ Check the deformation or cracks on the body that the curtain shield airbag installed on.
    - ▶ Check the damage to the connector and wire harness.



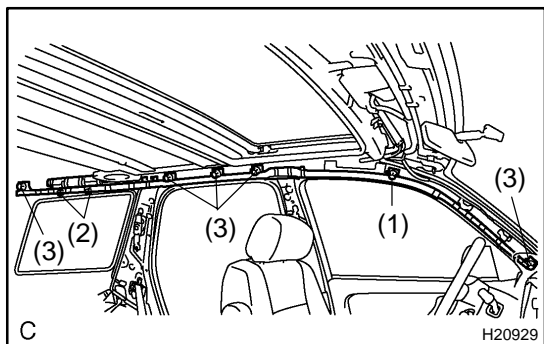
### HINT:

If the body that the curtain shield airbag was installed on is deformed or cracked, replace it.

## INSTALLATION

### NOTICE:

Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.



### 1. INSTALL CURTAIN SHIELD AIRBAG ASSEMBLY

- (a) In the order shown in the illustration, install the curtain shield airbag with the 8 bolts.

**Torque: 9.8 N·m (100 kgf·cm, 86 in.-lbf)**

### CAUTION:

Pay due attention not to twist the deployment section of the curtain shield airbag assembly.

### NOTICE:

- ▶ Make sure that the curtain shield airbag assembly is installed to the specified torque.
  - ▶ If the curtain shield airbag assembly has been dropped, or there are cracks, dents or other defects in the case or connector, replace the curtain shield airbag assembly with a new one.
  - ▶ When installing the curtain shield airbag assembly, take care it is not pinched between other parts.
- (b) Connect the connector of the curtain shield airbag assembly.
2. **INSTALL ROOF HEADLINING (See page [BO-101](#) )**
  3. **INSPECT SRS WARNING LIGHT (See page [DI-692](#) )**

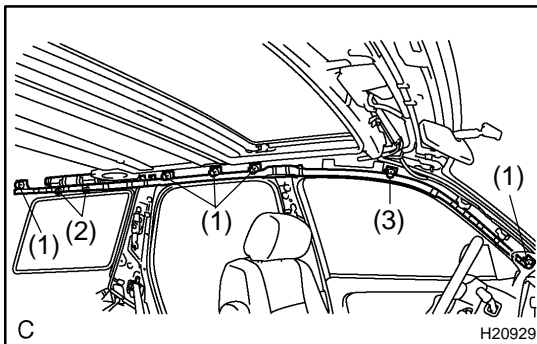
## REMOVAL

### NOTICE:

- ▶ If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.
  - ▶ Never use the airbag parts from another vehicle. When replacing parts, replace them with new parts.
1. REMOVE ROOF HEADLINING (See page [BO-97](#))
  2. REMOVE CURTAIN SHIELD AIRBAG ASSEMBLY
    - (a) Disconnect the curtain shield airbag connector.

### NOTICE:

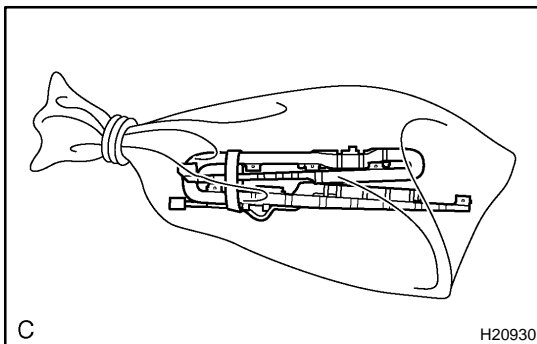
When handling the airbag connector, take care not to damage the airbag wire harness.



- (b) In the order shown in the illustration, remove the bolts and curtain shield airbag assembly.

### HINT:

- ▶ Loosen the bolt (3) before removing the bolt (2).
- ▶ Bind the front and rear parts of the curtain shield airbag assembly before removing the bolt (3).



- (c) Put the removed curtain shield airbag in a clear plastic bag and keep it in a safe place.

### CAUTION:

Never disassemble the curtain shield airbag assembly.

### NOTICE:

Plastic bag is not reusable.

# REPLACEMENT

## REPLACEMENT REQUIREMENTS

In the following cases, replace the curtain shield airbag assembly or curtain shield airbag cover.

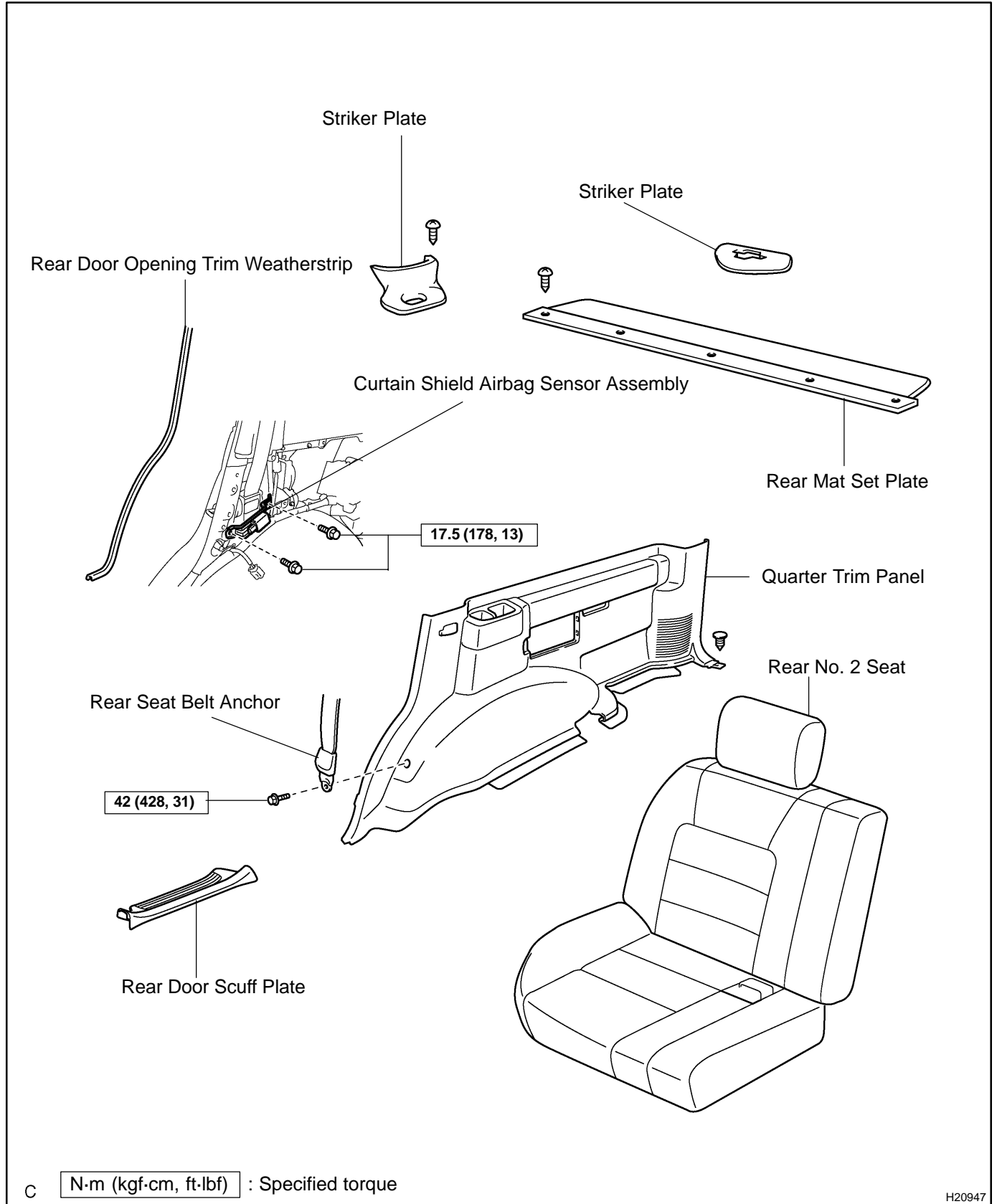
Case	Replacing part
If the curtain shield airbag has been deployed.	Curtain shield airbag assembly
If the curtain shield airbag assembly has been found to be faulty in trouble-shooting.	Curtain shield airbag assembly
If the curtain shield airbag assembly has been found to be faulty during checking items (See page <a href="#">RS-60</a> ).	Curtain shield airbag assembly
If the front pillar garnish has been found to be faulty during checking items (See page <a href="#">RS-60</a> ).	Front pillar garnish
If the roof headlining has been found to be faulty during checking items (See page <a href="#">RS-60</a> ).	Roof headlining
If the curtain shield airbag assembly has been dropped.	Curtain shield airbag assembly

### CAUTION:

For removal and installation of the curtain shield airbag assembly, see page [RS-59](#) and [RS-68](#) . Be sure to follow the correct procedure.

# CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY COMPONENTS

RS0SH-04



## INSPECTION

**1. Vehicle not involved in collision:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

**2. Vehicle involved in collision and airbag is not deployed:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

**3. Vehicle involved in collision and airbag is deployed:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Replace the curtain shield airbag sensor assembly (See page [RS-85](#) ).

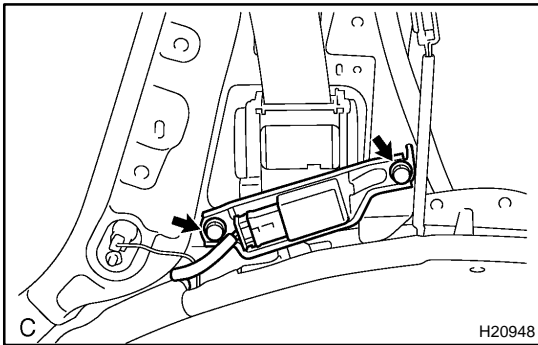
## INSTALLATION

### NOTICE:

- ▶ Never use SRS parts from another vehicle. When replacing parts, replace them with new ones.
- ▶ Never reuse the curtain shield airbag sensor assembly involved in a collision when the airbag has deployed.
- ▶ Never repair a sensor in order to reuse it.

### HINT:

For step 2 to 8, refer to page [BO-101](#) .



### 1. INSTALL CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY

- (a) Install the curtain shield airbag sensor assembly with the 2 bolts.

**Torque: 17.5 N·m (178 kgf·cm, 13 ft·lbf)**

- (b) Connect the connector.

### NOTICE:

- ▶ Connection of the connector is done after the sensor assembly has been installed.
- ▶ Make sure that the sensor assembly is installed with the specified torque.
- ▶ If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.
- ▶ When installing the sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.
- ▶ After installation, shake the sensor assembly to check that there is no looseness.

### 2. INSTALL QUARTER TRIM PANEL

### 3. INSTALL STRIKER PLATES

### 4. INSTALL REAR NO. 2 SEAT

### 5. INSTALL REAR MAT SET PLATE

### 6. INSTALL REAR SEAT BELT ANCHOR

### 7. INSTALL REAR DOOR OPENING TRIM

### 8. INSTALL REAR DOOR SCUFF PLATE

### 9. INSPECT SRS WARNING LIGHT (See page [DI-692](#) )

## REMOVAL

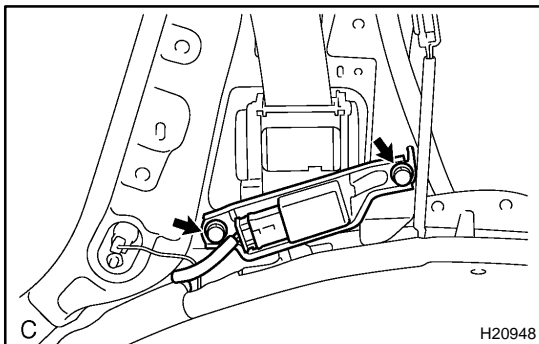
### NOTICE:

- ▶ Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)
- ▶ If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.

### HINT:

For the step 1 to 7, refer to page [BO-97](#) .

1. REMOVE REAR DOOR SCUFF PLATE
2. REMOVE REAR DOOR OPENING TRIM
3. REMOVE REAR SEAT BELT ANCHOR
4. REMOVE REAR MAT SET PLATE
5. REMOVE REAR NO. 2 SEAT
6. REMOVE STRIKER PLATES
7. REMOVE QUARTER TRIM PANEL



8. REMOVE CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY

(a) Disconnect the connector.

### NOTICE:

Disconnect the connector with the sensor assembly installed.

(b) Remove the 2 bolts and curtain shield airbag sensor assembly.



## REPLACEMENT

### REPLACEMENT REQUIREMENTS

In the following cases, replace the curtain shield airbag sensor assembly.

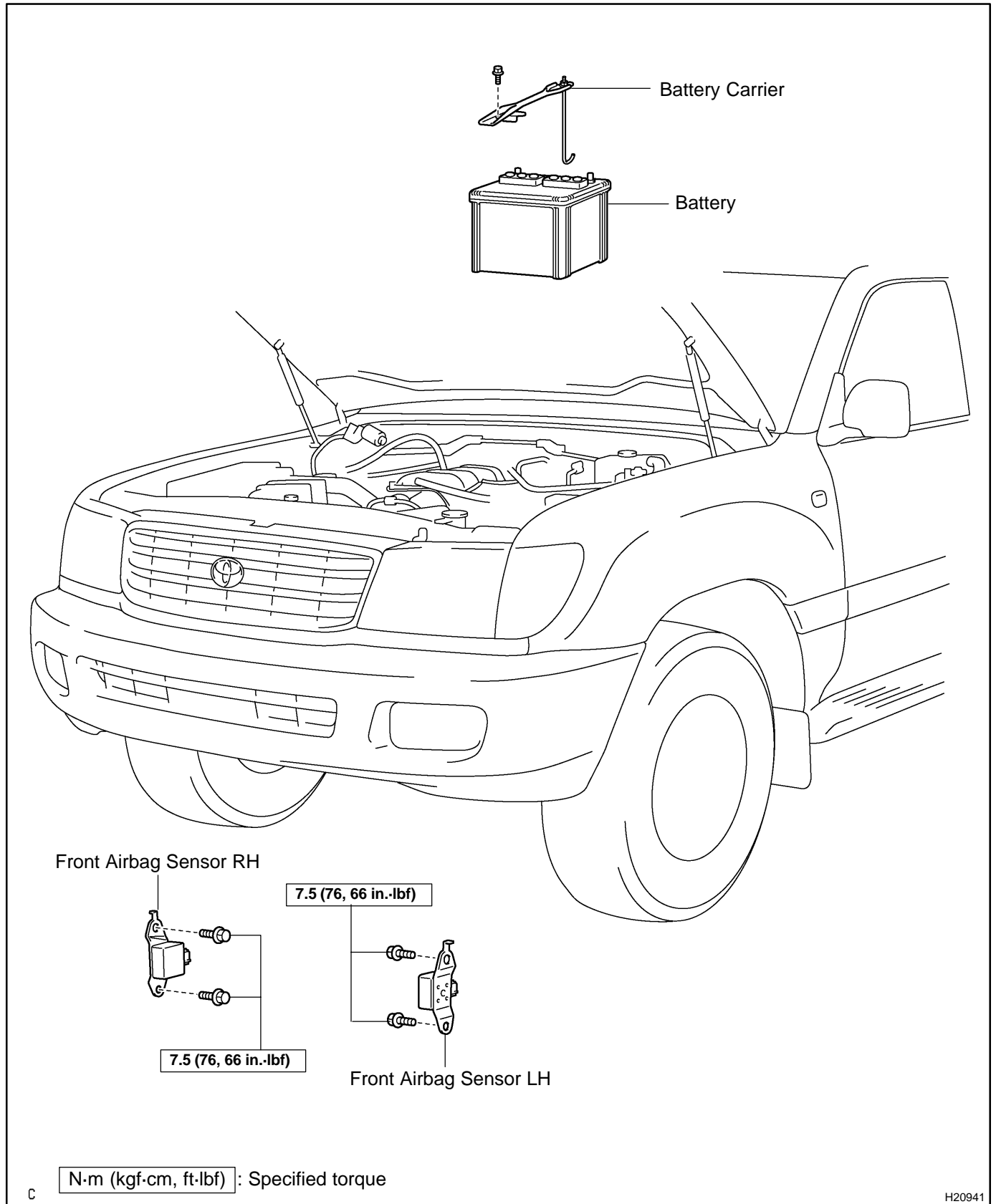
- ▶ If the curtain shield airbag sensor assembly has been deployed in a collision.
- ▶ If the curtain shield airbag sensor assembly has been found to be faulty in troubleshooting.
- ▶ If the curtain shield airbag sensor assembly has been dropped.

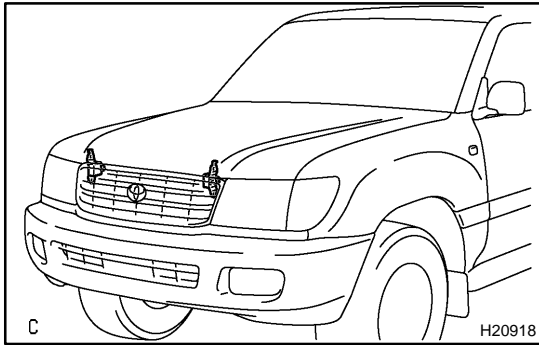
### CAUTION:

**For removal and installation of the curtain shield airbag sensor assembly, see page [RS-86](#) and [RS-89](#) . Be sure to follow the correct procedure.**

# FRONT AIRBAG SENSOR COMPONENTS

RS0BP-08





## INSPECTION

### 1. Vehicle not involved in collision:

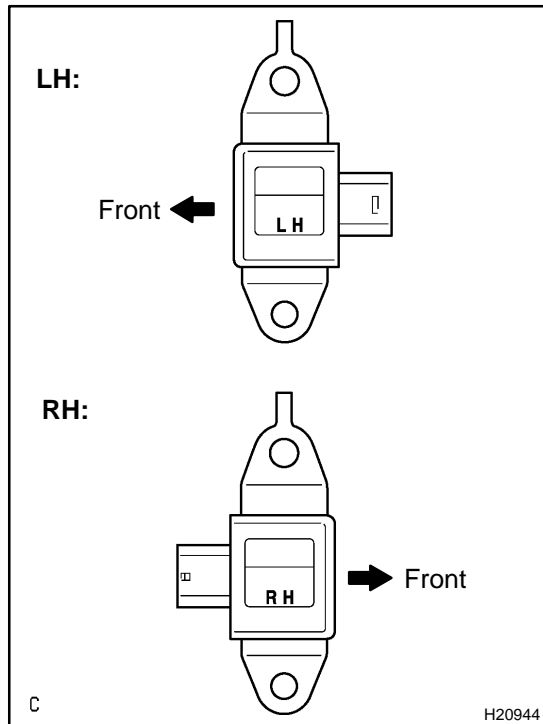
#### INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

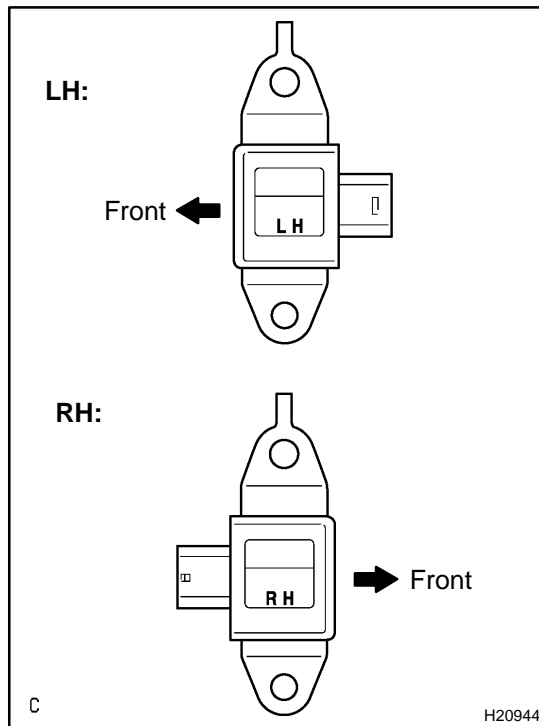
Do a diagnostic system check (See page [DI-692](#) ).

### 2. Vehicle involved in collision:

#### INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

- (a) Do a diagnostic system check (See page [DI-692](#) ).
- (b) If the front fender of the vehicle or its periphery is damaged, do a visual check for damage to the front airbag sensor, which includes the following items even if the airbag was not deployed:
  - ▶ Bracket deformation.
  - ▶ Paint peeling off the bracket.
  - ▶ Cracks, dents or chips in the case.
  - ▶ Cracks, dents, chipping and scratches in the connector.
  - ▶ Peeling off of the label or damage to the serial number.





## INSTALLATION

### NOTICE:

- ▶ Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- ▶ Never reuse the sensor involved in a collision when the SRS has deployed.
- ▶ Never repair a sensor in order to reuse it.

### 1. INSTALL FRONT AIRBAG SENSOR

- (a) Install the front airbag sensor with the arrow on the sensor facing toward the front of the vehicle.

**Torque: 7.5 N·m (76 kgf·cm, 66 in.-lbf)**

### NOTICE:

- ▶ Make sure that the sensor is installed with the specified torque.
- ▶ If the sensor has been dropped, or there are cracks, dents or other defects in the case, brackets or connector, replace the removed sensor with a new one.
- ▶ The front sensor is equipped with an electrical connection check mechanism. Be sure to lock this mechanism securely when connecting the connector. If the connector is not securely locked, a malfunction code will be detected by the diagnostic system.

- (b) Connect the front airbag sensor connector.

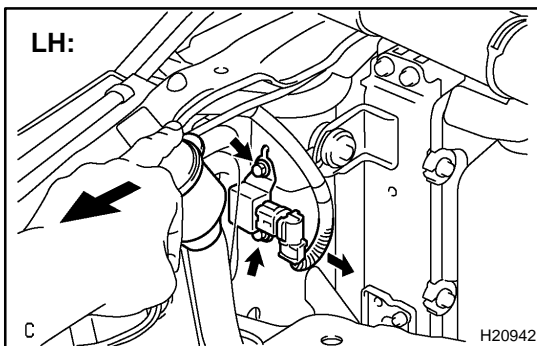
### 2. INSTALL BATTERY AND BATTERY CARRIER

### 3. INSPECT SRS WARNING LIGHT (See page [DI-692](#))

## REMOVAL

### NOTICE:

- ▶ If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.
- ▶ Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- ▶ Never reuse the sensor involved in a collision when the SRS has deployed.
- ▶ Never repair a sensor in order to reuse it.



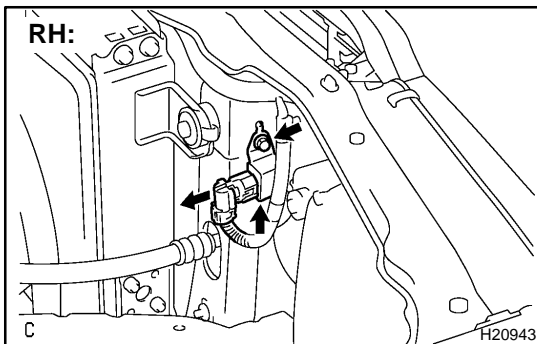
### 1. REMOVE FRONT AIRBAG SENSOR LH

- (a) Remove the battery carrier and battery.
- (b) Disconnect the front airbag sensor connector.

### NOTICE:

**Disconnect the connector with sensor assembly installed.**

- (c) Pull the windshield washer tank opening as shown in the illustration.
- (d) Remove the 2 bolts and front airbag sensor LH.



### 2. REMOVE FRONT AIRBAG SENSOR RH

- (a) Disconnect the front airbag sensor connector.

### NOTICE:

**Disconnect the connector with sensor assembly installed.**

- (b) Remove the 2 bolts and front airbag sensor RH.

## REPLACEMENT

### REPLACEMENT REQUIREMENTS

In the following cases, replace the front airbag sensor.

- ▶ If the SRS has been deployed in a collision. (Replace both the left and right airbag sensors.)
- ▶ If the front airbag sensor has been found to be faulty in troubleshooting.
- ▶ If the front airbag sensor has been found to be faulty during checking items (See page [RS-76](#)).
- ▶ If the front airbag sensor has been dropped.

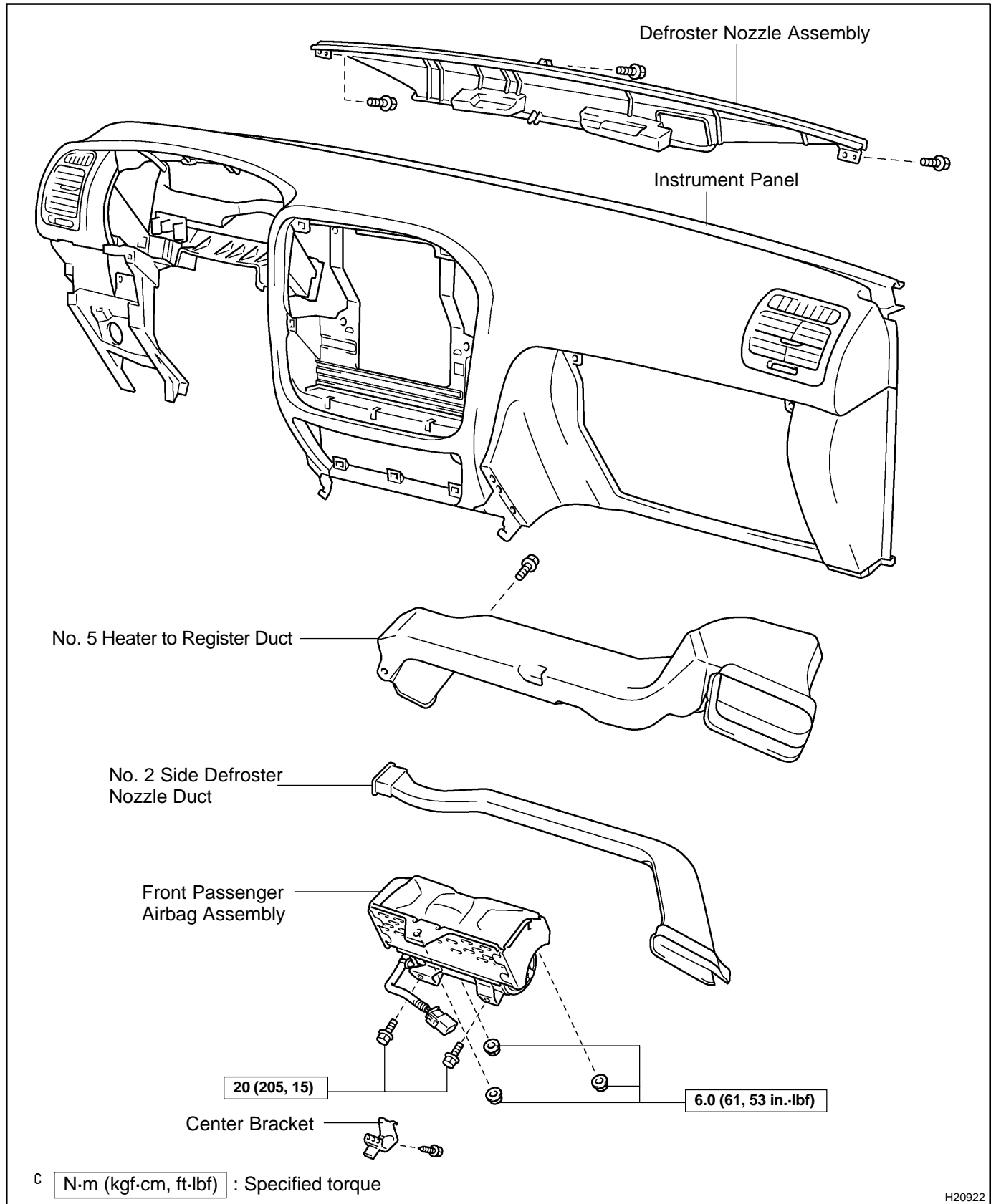
### CAUTION:

**For removal and installation of the front airbag sensor, see page [RS-75](#) and [RS-78](#).**

**Be sure to follow the correct procedure.**

# FRONT PASSENGER AIRBAG ASSEMBLY COMPONENTS

RS0BE-08



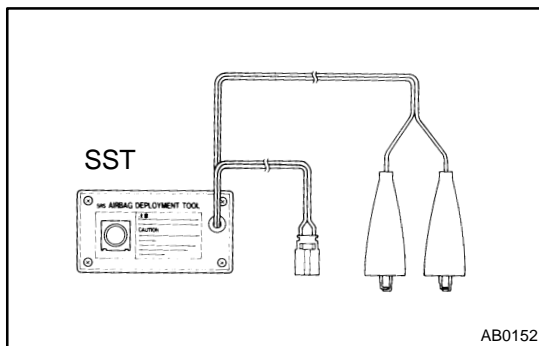
## DISPOSAL

### HINT:

When scrapping vehicle equipped with an SRS or disposing of a front passenger airbag assembly, always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

### CAUTION:

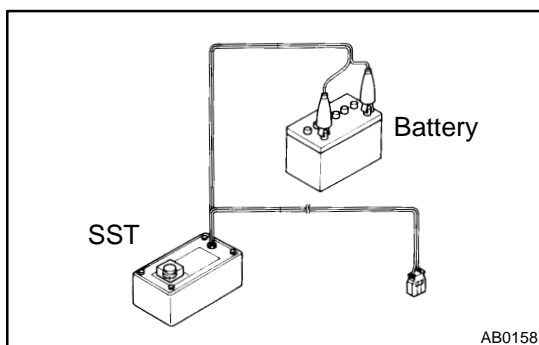
- ▶ Never dispose of a front passenger airbag assembly of which airbag has not been deployed.
- ▶ The airbag produces a sizeable exploding sound when it deploys, so perform the operation out of doors and where it will not create a nuisance to nearby residents.



- ▶ When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.

SST 09082-00700

- ▶ When deploying an airbag, perform the operation at least 10 m (33 ft) away from the front passenger airbag assembly.
- ▶ The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling a front passenger airbag assembly with deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a front passenger airbag assembly with deployed airbag.



### 1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

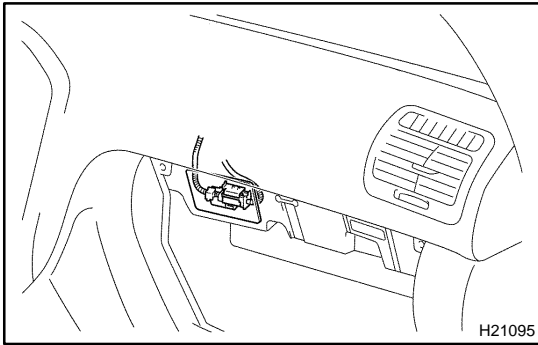
#### HINT:

Have a battery ready as the power source to deploy the airbag.

- (a) Check the function of the SST (See page [RS-20](#)).



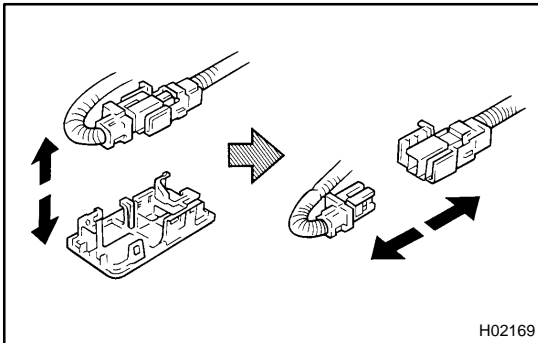
## SUPPLEMENTAL RESTRAINT SYSTEM - FRONT PASSENGER AIRBAG ASSEMBLY



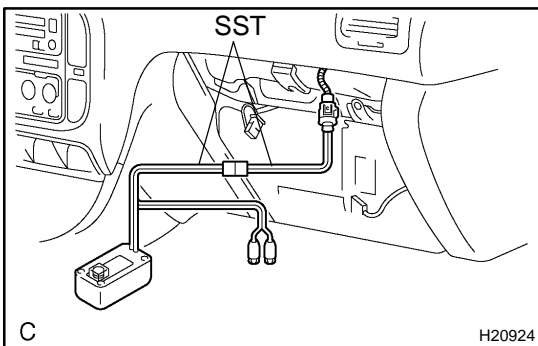
- (b) Disconnect the airbag connector.
- (1) Remove the glove compartment door.
  - (2) Remove the No. 1 under cover.

**NOTICE:**

**When handling the airbag connector, take care not to damage the airbag wire harness.**



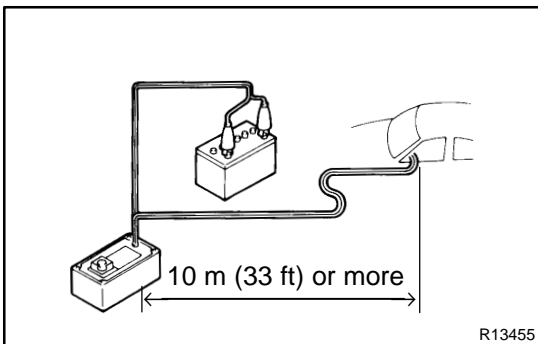
- (3) Pull up the connector.
- (4) Disconnect the airbag connector.



- (c) Install the SST.
- (1) Connect the connector of SST to the front passenger airbag assembly connector.
- SST 09082-00700, 09082-00780

**NOTICE:**

**To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.**

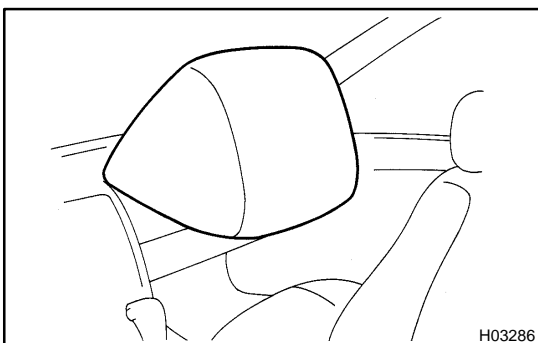


- (2) Move the SST at least 10 m (33 ft) away from the front of the vehicle.
- (3) Close all the doors and windows of the vehicle.

**NOTICE:**

**Take care not to damage the SST wire harness.**

- (4) Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the negative (-) terminal.



- (d) Deploy the airbag.
- (1) Check that no one is inside the vehicle, nor within 10 m (33 ft) area around the vehicle.
  - (2) Press the SST activation switch and deploy the airbag.

**CAUTION:**

- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**

- ▶ Use gloves and safety glasses when handling a front passenger airbag assembly with deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a front passenger airbag assembly with deployed airbag.
- ▶ When scrapping a vehicle, deploy the airbag and scrap the vehicle with the front passenger airbag assembly still installed.
- ▶ When moving a vehicle for scrapping which has a front passenger airbag assembly with deployed airbag, use gloves and safety glasses.

**HINT:**

The airbag deploys as the LED of the SST activation switch comes on.

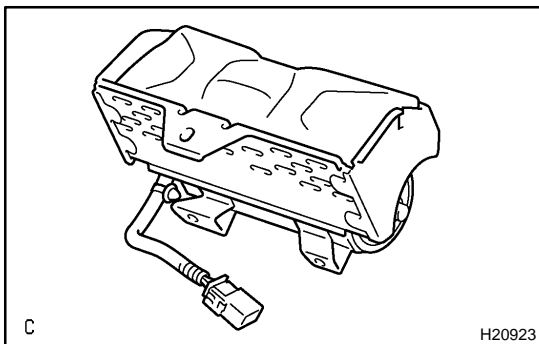
## 2. DEPLOYMENT WHEN DISPOSING OF FRONT PASSENGER AIRBAG ASSEMBLY ONLY

**NOTICE:**

- ▶ When disposing of the front passenger airbag assembly only, never use the customer's vehicle to deploy the airbag.
- ▶ Be sure to follow the procedure given below when deploying the airbag.

**HINT:**

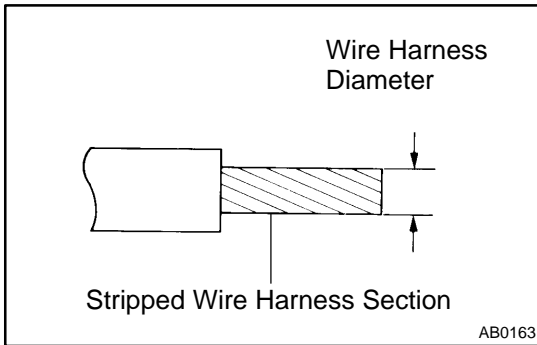
Have a battery ready as the power source to deploy the airbag.



- (a) Remove the front passenger airbag assembly  
(See page [RS-31](#) ).

**CAUTION:**

- ▶ When removing the front passenger airbag assembly, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.
- ▶ When storing the front passenger airbag assembly, keep the upper surface of the airbag deployment side facing upward.



- (b) Using a service-purpose wire harness for the vehicle, tie down the front passenger airbag assembly to the tire.  
**Wire harness: Stripped wire harness section 1.25 mm<sup>2</sup> or more (0.0019 in.<sup>2</sup> or more)**

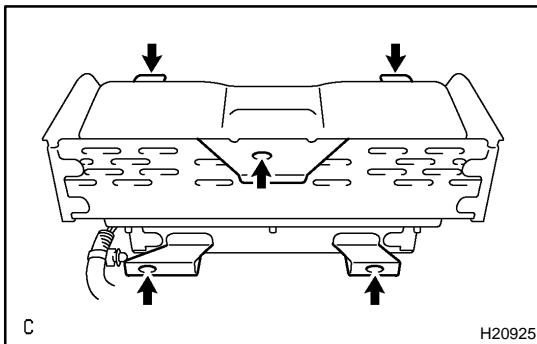
**CAUTION:**

If a wire harness which is too thin or some other thing is used to tie down the front passenger airbag assembly, it may be snapped by the shock when the airbag is deployed. **This is highly dangerous. Always use a wire harness which is at least 1.25 mm<sup>2</sup> (0.0019 in.<sup>2</sup>).**

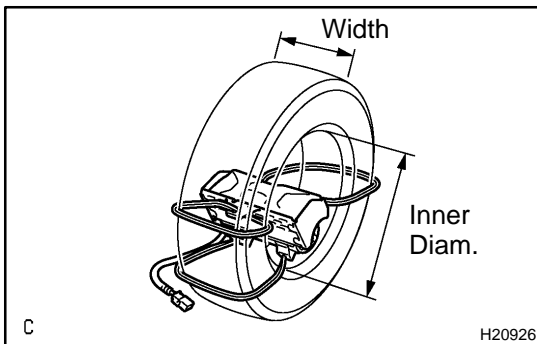
**HINT:**

To calculate the square of the stripped wire harness section:

$$\text{Square} = 3.14 \times (\text{Diameter})^2 \text{ divided by } 4$$



- (1) While passing the wire harness through the installation holes indicated by arrows in the illustration, wind the wire harness around the tire.



- (2) Position the front passenger airbag assembly inside the tire with the airbag deployment side facing inside.

**Tire size: Must exceed the following dimensions-**

**Width: 185 mm (7.28 in.)**

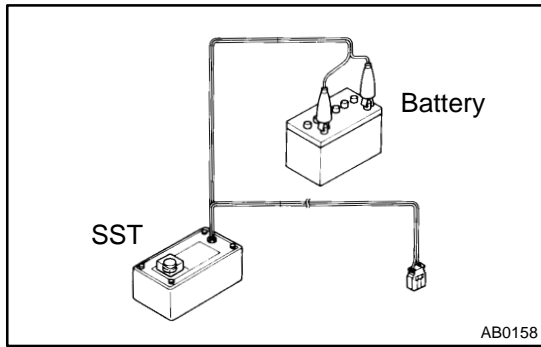
**Inner diameter: 360 mm (14.17 in.)**

**CAUTION:**

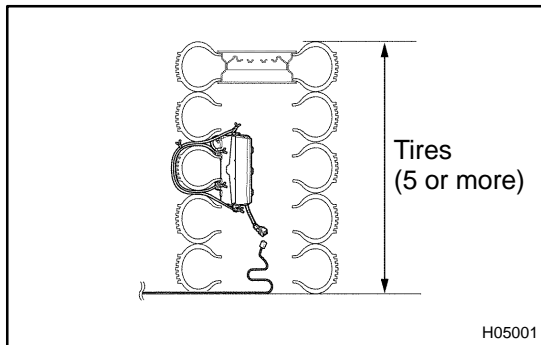
- ▶ **Make sure that the wire harness is tight. It is very dangerous if looseness in the wire harness results in the front passenger airbag assembly coming free due to the shock from the airbag deployment.**
- ▶ **Always tie down the front passenger airbag assembly with the airbag deployment side facing inside.**

**NOTICE:**

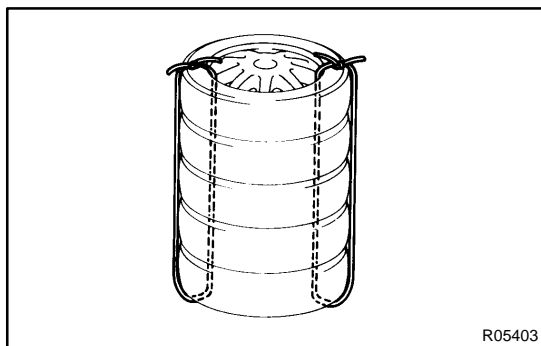
**The tire will be marked by the airbag deployment, so use a redundant tire.**



- (c) Check the functioning of the SST (See step 1-(a) on page RS-20 ).  
SST 09082-00700



- (d) Place tires.
  - (1) Place at least 2 tires under the tire to which the front passenger airbag assembly is tied.
  - (2) Place at least 2 tires over the tire to which the front passenger airbag assembly is tied. The top tire should have the wheel installed.



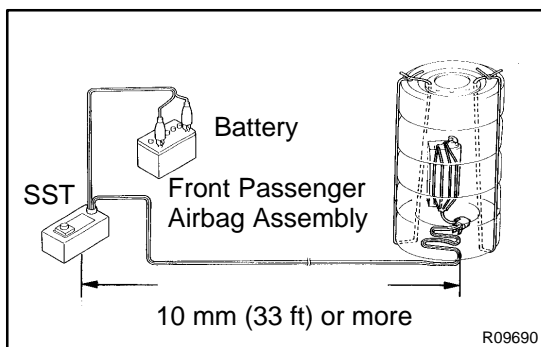
- (3) Tie the tires together with 2 wire harnesses.

**CAUTION:**

Make sure that the wire harnesses are tight. It is very dangerous if loose wire harnesses result in the tires coming free due to the shock from the airbag deploying.

**HINT:**

Place the SST connector and wire harness inside tires. Provide at least 1 m (3 ft) of slack for the wire harness.



- (e) Install the SST.  
Connect the connector of the SST to the front passenger airbag assembly connector.  
SST 09082-00700, 09082-00780

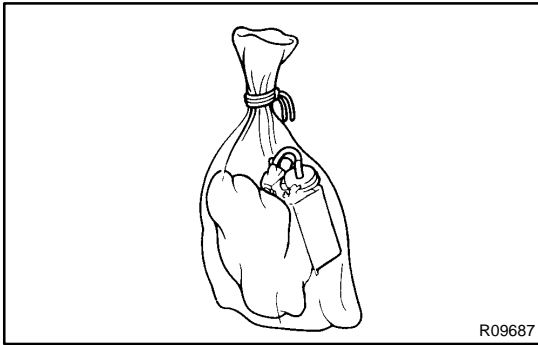
**NOTICE:**

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tires.

- (f) Deploy the airbag.
  - (1) Connect the red clip to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.
  - (2) Confirm that no one is within 10 m (33 ft) area around the tire which the front passenger airbag assembly is tied to.
  - (3) Press the SST activation switch and deploy the airbag.

**HINT:**

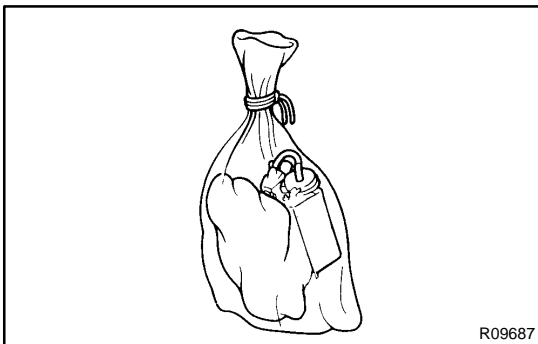
The airbag deploys as the LED of the SST activation switch comes on.



(g) Dispose of the front passenger airbag assembly.

**CAUTION:**

- ▶ The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling a front passenger airbag assembly with deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a front passenger airbag assembly with deployed airbag.
  - (1) Remove the front passenger airbag assembly from the tire.
  - (2) Place the front passenger airbag assembly in a plastic bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

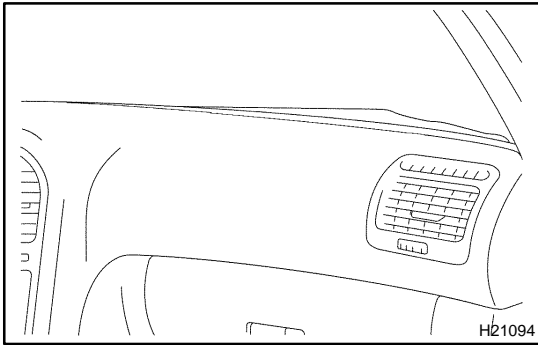


**3. DEPLOYMENT WHEN-DISPOSING OF FRONT PASSENGER AIRBAG ASSEMBLY DEPLOYED IN A COLLISION**

Dispose of the front passenger airbag assembly.

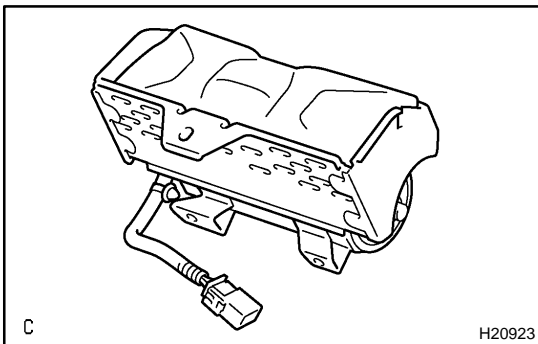
**CAUTION:**

- ▶ The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling a front passenger airbag assembly with deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a front passenger airbag assembly with deployed airbag.
  - (1) Remove the front passenger airbag assembly from the tire.
  - (2) Place the front passenger airbag assembly in a plastic bag, tie the end tightly and dispose of it as the other general parts disposal.

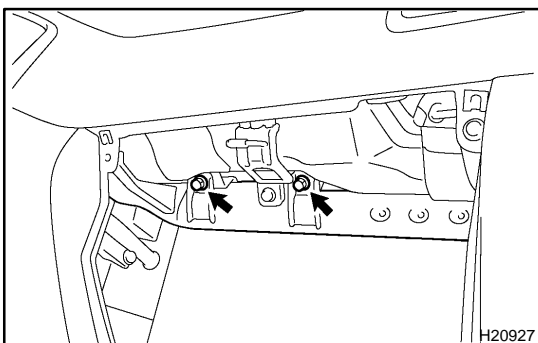


## INSPECTION

1. **Vehicle not involved in collision:**  
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**
  - (a) Do a diagnostic system check  
(See page [DI-692](#) ).
  - (b) Do a visual check which includes the following items with the front passenger airbag assembly installed in the vehicle.  
 Check cuts, minute cracks or marked discoloration on the front passenger airbag assembly and instrument panel.



2. **Vehicle involved in collision and airbag is not deployed:**  
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**
  - (a) Do a diagnostic system check  
(See page [DI-692](#) ).
  - (b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.
    - ▶ Check cuts, minute cracks or marked discoloration on the front passenger airbag assembly.
    - ▶ Check cuts and cracks in wire harnesses, and for chipping in connectors.
    - ▶ Check the deformation or cracks on the instrument panel and instrument panel reinforcement.



### HINT:

If the instrument panel or instrument panel reinforcement is deformed or cracked, never repair it. Always replace it with a new one.

### CAUTION:

**For removal and installation of the front passenger airbag assembly, see page [RS-31](#) and [RS-41](#) and be sure to follow the correct procedure.**

**3. Vehicle involved in collision and airbag is deployed:  
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

- (a) Do a diagnostic system check  
(See page [DI-692](#) ).
- (b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.
  - ▶ Check the deformation or cracks on the instrument panel and instrument panel reinforcement.
  - ▶ Check the damage on the connector and wire harness.

**HINT:**

If the instrument panel or instrument panel reinforcement is deformed or cracked, never repair it. Always replace it with a new one.

## INSTALLATION

### NOTICE:

Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.

### HINT:

For step 2 to 5, refer to page [BO-91](#) .

### 1. INSTALL FRONT PASSENGER AIRBAG ASSEMBLY

Install the front passenger airbag assembly to the instrument panel with the 3 nuts.

**Torque: 6.0 N·m (61 kgf·cm, 53 in.-lbf)**

### CAUTION:

- ▶ Make sure that no foreign objects are trapped between the airbag bag and the module.
- ▶ Do not damage the strap when installing the module.

### NOTICE:

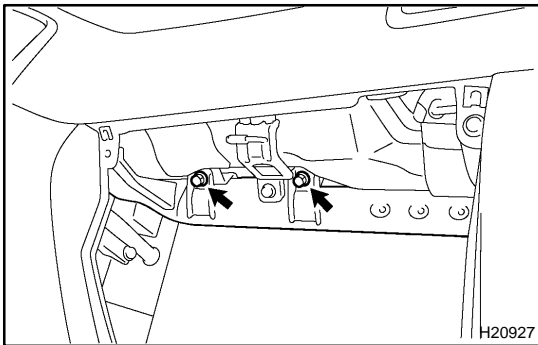
If the front passenger airbag assembly has been dropped, or there are cracks, dents or other defects in the case or connector, replace the front passenger airbag assembly with a new one.

### 2. INSTALL NO. 2 SIDE DEFROSTER NOZZLE DUCT

### 3. INSTALL NO. 5 HEATER TO REGISTER DUCT

### 4. INSTALL DEFROSTER NOZZLE ASSEMBLY

### 5. INSTALL CENTER BRACKET



### 6. INSTALL INSTRUMENT PANEL

(See page [BO-91](#) )

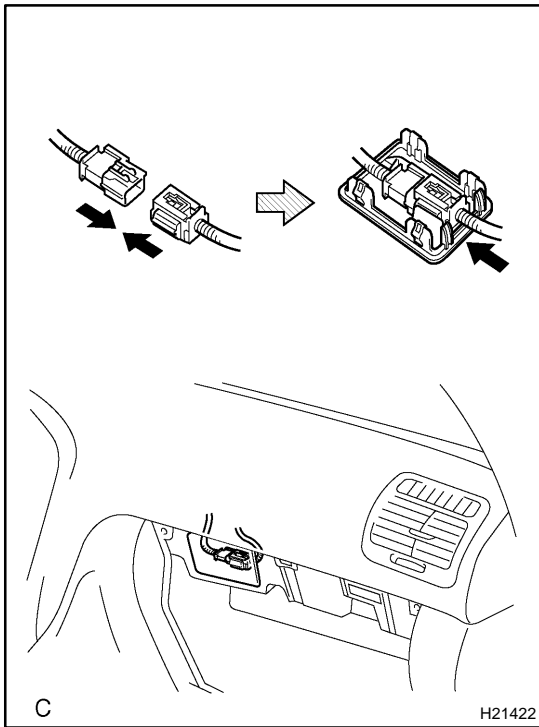
Install the 2 bolts to instrument panel reinforcement.

**Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)**

### NOTICE:

- ▶ Make sure the front passenger airbag assembly is installed with the specified torque.
- ▶ When installing the instrument panel, take care that the airbag wire harness does not interfere with other parts and is not pinched between other parts.
- ▶ When installing the instrument panel box, carefully pull out the airbag wire harness from the glove compartment upper hole.



**7. CONNECT AIRBAG CONNECTOR**

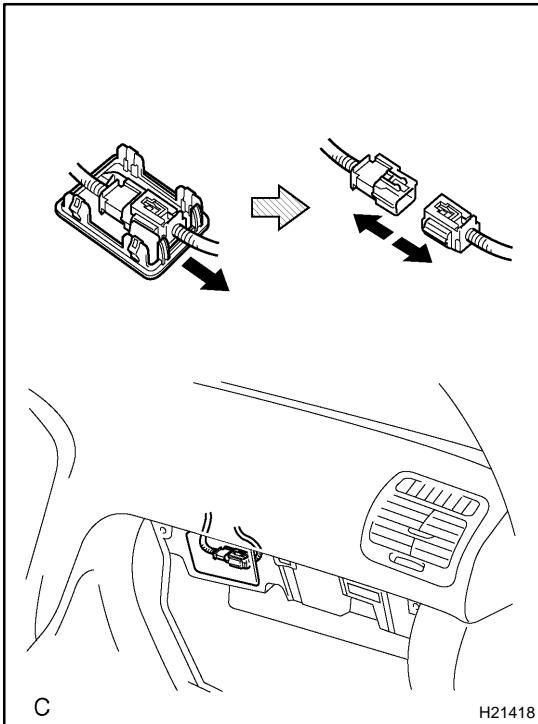
- (a) Connect the airbag connector.
- (b) Set the connector on the No. 1 under cover.
- (c) Install the No. 1 under cover to the lower No. 2 finish panel.
- (d) Install the glove compartment door (See page [BO-91](#) ).

**8. INSPECT SRS WARNING LIGHT (See page [DI-692](#) )**

## REMOVAL

### NOTICE:

- ▶ If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.
- ▶ Never use the airbag parts from another vehicle. When replacing parts, replace them with new parts.



### 1. DISCONNECT AIRBAG CONNECTOR

- (a) Remove the glove compartment door.
- (b) Remove the No. 1 under cover from the lower No. 2 finish panel.

### NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

- (c) Pull up the connector.
- (d) Disconnect the front passenger airbag connector.

### 2. REMOVE INSTRUMENT PANEL

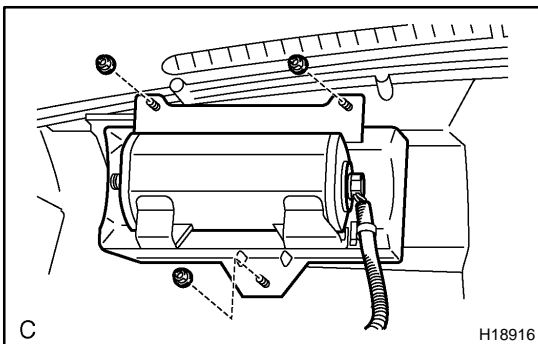
(See page [BO-84](#))

### 3. REMOVE CENTER BRACKET

### 4. REMOVE DEFROSTER NOZZLE ASSEMBLY

### 5. REMOVE NO. 5 HEATER TO REGISTER DUCT

### 6. REMOVE NO. 2 SIDE DEFROSTER NOZZLE DUCT



### 7. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

Remove the 3 nuts, then remove the front passenger airbag assembly.

### CAUTION:

- ▶ Do not store the front passenger airbag assembly with the airbag deployment side facing downward.
- ▶ Never disassemble the front passenger airbag assembly.

## REPLACEMENT

### REPLACEMENT REQUIREMENTS

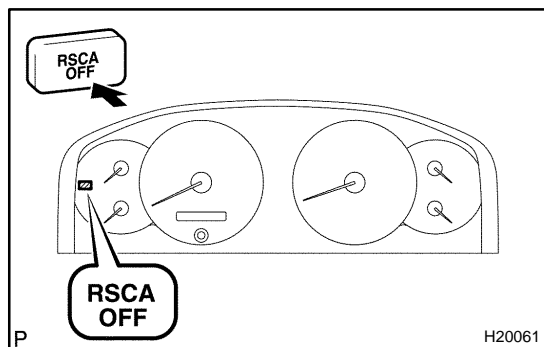
In the following cases, replace the front passenger airbag assembly, instrument panel or instrument panel reinforcement.

Case	Replacing part
If the airbag has been deployed.	Front passenger airbag assembly
If the front passenger airbag assembly has been found to be faulty in troubleshooting.	Front passenger airbag assembly
If the front passenger airbag assembly has been found to be faulty during checking items (See page <a href="#">RS-32</a> ).	Front passenger airbag assembly
If the instrument panel has been found to be faulty during checking items (See page <a href="#">RS-32</a> ).	Instrument panel
If the instrument panel reinforcement has been found to be faulty during checking items (See page <a href="#">RS-32</a> ).	Instrument panel reinforcement
If the front passenger airbag assembly has been dropped.	Front passenger airbag assembly

#### CAUTION:

For replacement of the front passenger airbag assembly, see page [RS-31](#) and [RS-41](#) .

Be sure to follow the correct procedure.



## RSCA OFF SWITCH INSPECTION

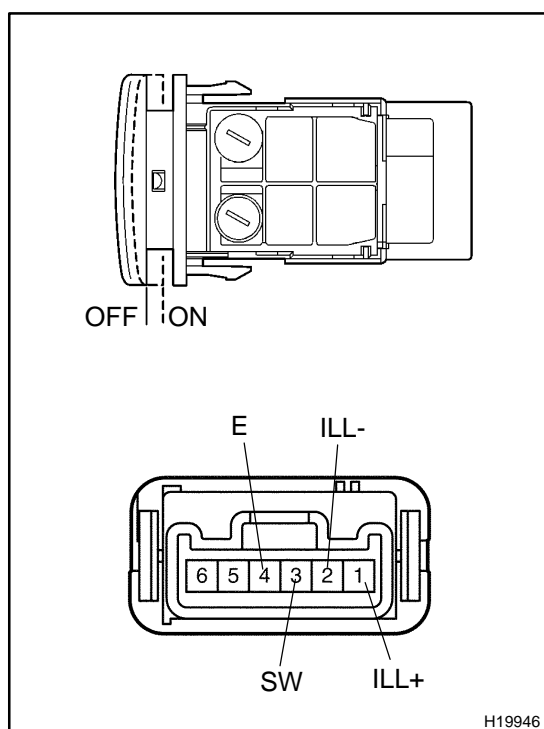
RS0XJ-01

### 1. INSPECT RSCA OFF INDICATOR LIGHT

- Turn the ignition switch to ON.
- Check that the RSCA OFF indicator light goes off after it comes on for 3 seconds.
- Check that the RSCA OFF indicator light comes on after pressing the RSCA OFF switch approx. 2 seconds.

### 2. INSPECT RSCA OFF SWITCH CONTINUITY

- Remove the LWR instrument panel finish panel (See page [BO-84](#)).
- Remove the RSCA OFF switch from the LWR instrument panel finish panel.



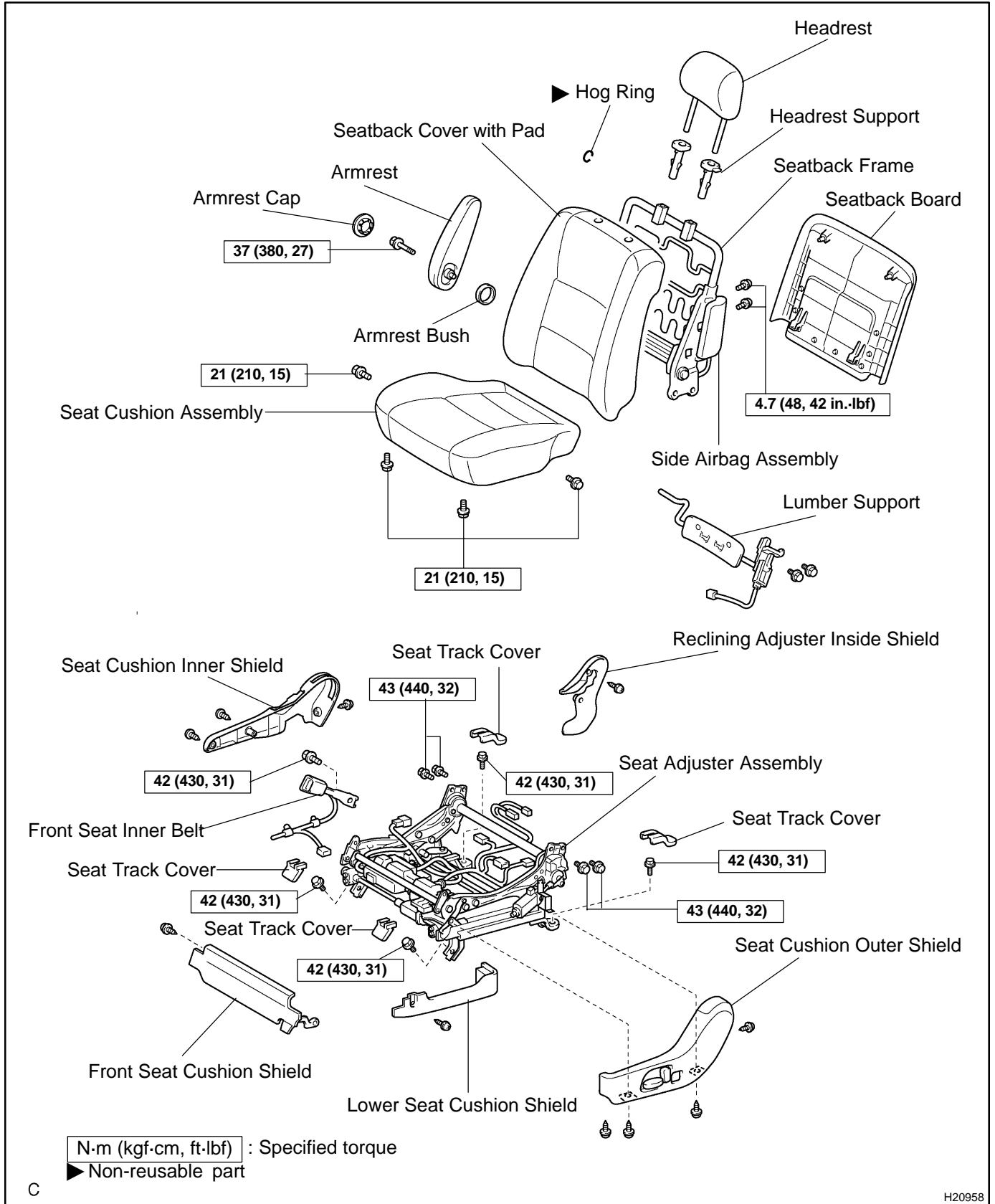
- Inspect the continuity between the each terminals.

Switch position	Tester connection	Specified condition
OFF	SW (3) ↔ E (4)	No continuity
Hold ON	SW (3) ↔ E (4)	Continuity
Illumination	ILL+ (1) ↔ ILL- (2)	Continuity

If continuity is not as specified, replace the RSCA OFF switch or bulb.

# SIDE AIRBAG ASSEMBLY COMPONENTS

RS079-03



C

H20958

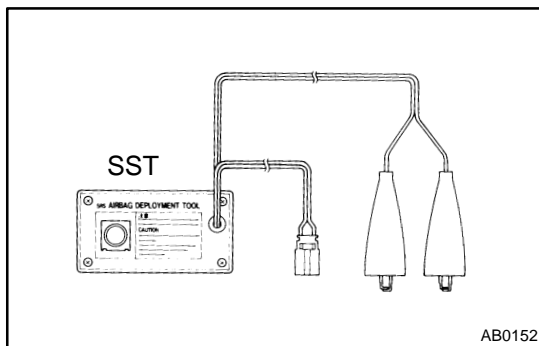
## DISPOSAL

### HINT:

When scrapping vehicles equipped with an SRS or disposing of the side airbag assembly always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

### CAUTION:

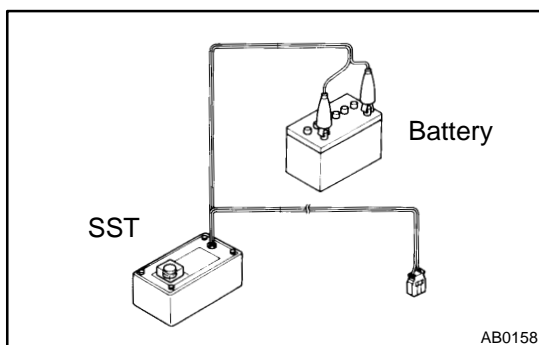
- ▶ Never dispose of a side airbag assembly of which airbag has not been deployed.
- ▶ The airbag produces a sizeable exploding sound when it deploys, so perform the operation out-of-doors and where it will not create a nuisance to nearby residents.



- ▶ When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool), perform the operation in a place away from electrical noise.

SST 09082-00700

- ▶ When deploying an airbag, perform the operation at least 10 m (33 ft) away from the airbag assembly.
- ▶ The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling side airbag assembly with the deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a side airbag assembly with the deployed airbag.



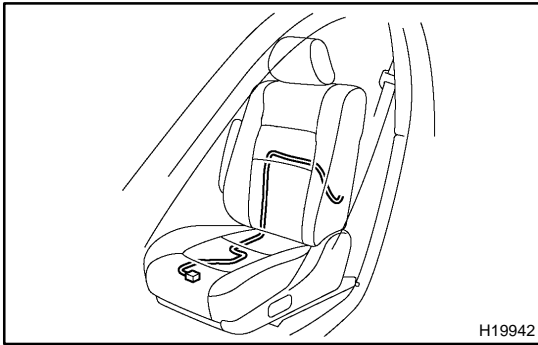
### 1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

#### HINT:

Have a battery ready as the power source to deploy the airbag.

- (a) Check the function of the SST (See step 1-(a) on page [RS-20](#)).

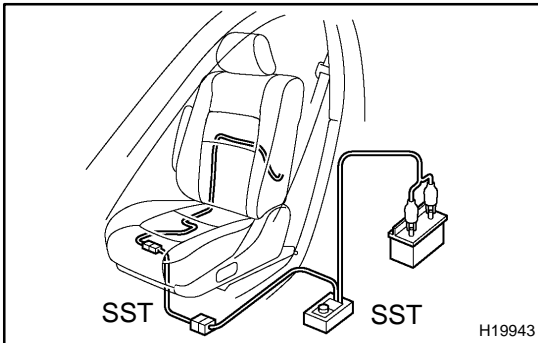
SST 09082-00700



(b) Disconnect the side airbag connector.

**NOTICE:**

When handling the airbag connector, take care not to damage the airbag wire harness.



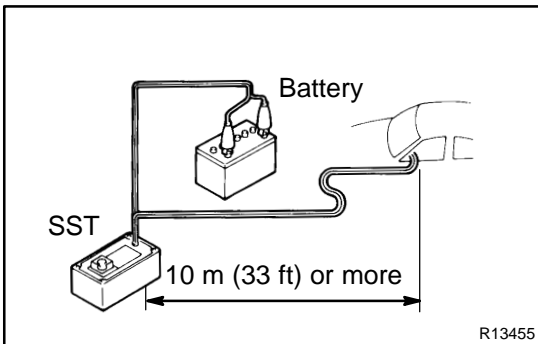
(c) Install the SST.

(1) Connect the connectors of the SST to the airbag connector.

SST 09082-00700, 09082-00750

**NOTICE:**

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



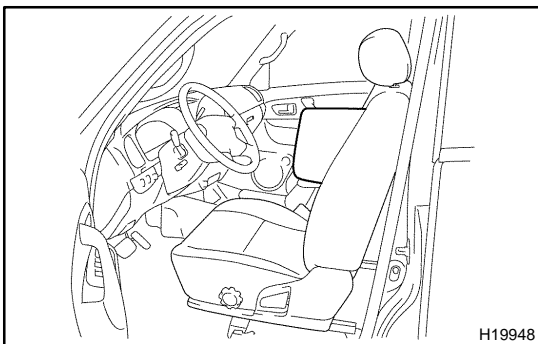
(2) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

(3) Close all the doors and windows of the vehicle.

**NOTICE:**

Take care not to damage the SST wire harness.

(4) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.



(d) Deploy the airbag.

(1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

(2) Press the SST activation switch and deploy the airbag.

**CAUTION:**

- ▶ The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling the side airbag assembly with the deployed airbag.
- ▶ Do not apply water, etc. to the side airbag assembly with the deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ When scrapping a vehicle, deploy the airbag and scrap the vehicle with the side airbag assembly still installed.

**HINT:**

The airbag deploys as the LED of the SST activation switch comes on.

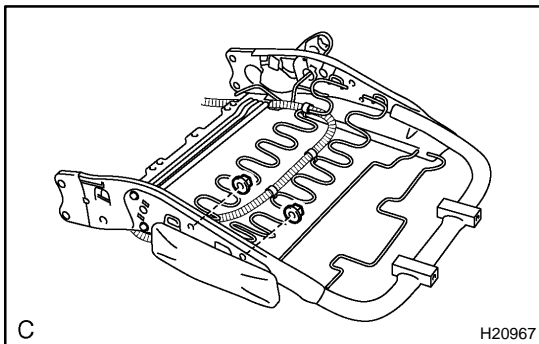
## 2. DEPLOYMENT WHEN DISPOSING OF SIDE AIRBAG ASSEMBLY

**NOTICE:**

- ▶ When disposing of the side airbag assembly only, never use the customer's vehicle to deploy the airbag.
- ▶ Be sure to follow the procedure given below when deploying the airbag.

**HINT:**

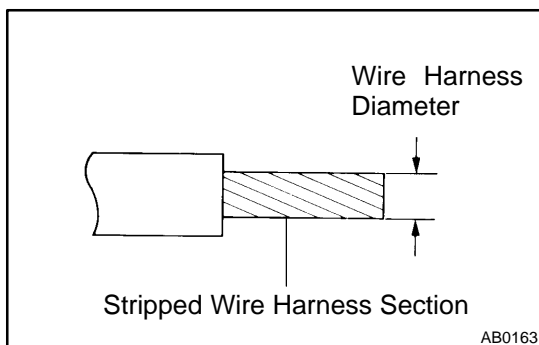
Have a battery ready as the power source to deploy the airbag.



- (a) Remove the 2 nuts and side airbag assembly from the seatback assembly, then disengage the clamps.

**CAUTION:**

When storing the side airbag assembly, keep the upper surface of the airbag deployment side facing upward.



- (b) Using a service-purpose wire harness, tie down the side airbag assembly to the tire.

**Wire harness: Stripped wire harness section  
1.25 mm<sup>2</sup> or more (0.0019 in<sup>2</sup>. or more)**

**CAUTION:**

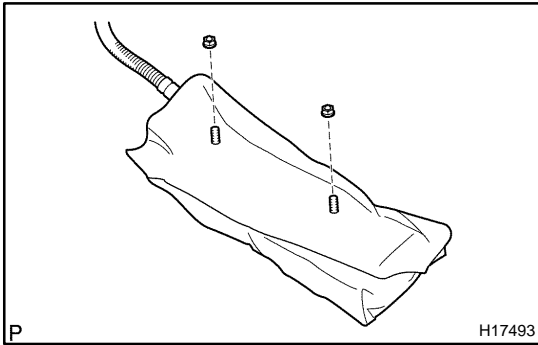
If a wire harness which is too thin or some other thing is used to tie down the side airbag assembly, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm<sup>2</sup> (0.0019 in<sup>2</sup>.).

**HINT:**

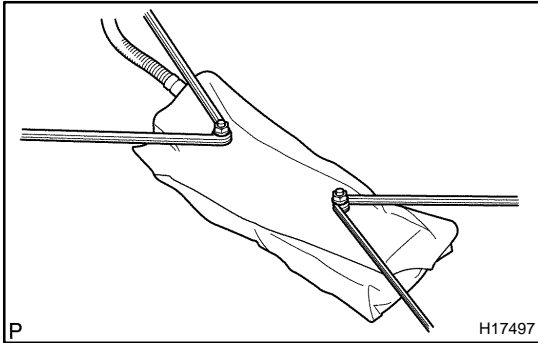
To calculate the square of the stripped wire harness section-

$$\text{Square} = 3.14 \times (\text{Diameter})^2 \text{ divided by } 4$$

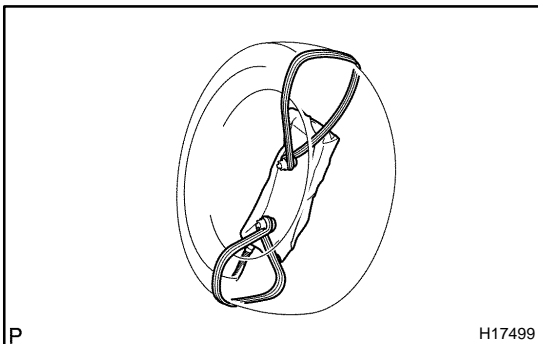




(1) Install the 2 nuts to the side airbag assembly.



(2) Wind the wire harness around the stud bolts of the side airbag assembly as shown in the illustration.



(3) Position the side airbag assembly inside the tire with the airbag deployment direction facing inside.

**Tire size: Must exceed the following dimensions-**

**Width: 185 mm (7.28 in.)**

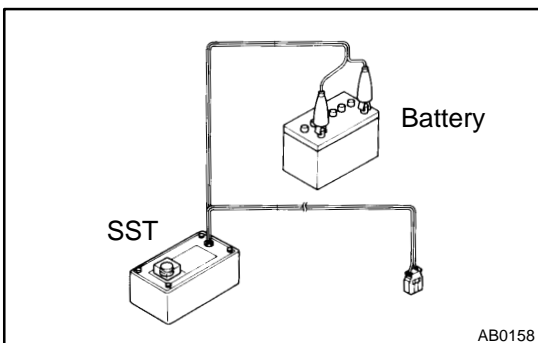
**Inner diameter: 360 mm (14.17 in.)**

**CAUTION:**

- ▶ Make sure that the wire harness is tight. It is very dangerous when a loose wire harness results in the side airbag assembly coming free due to the shock from the airbag deploying.
- ▶ Always tie down the side airbag assembly with the airbag deployment side facing inside.

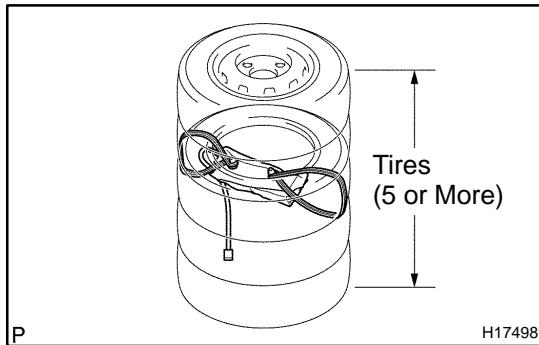
**NOTICE:**

The tire will be marked by the airbag deployment, so when disposing of the airbag, use a redundant tire.

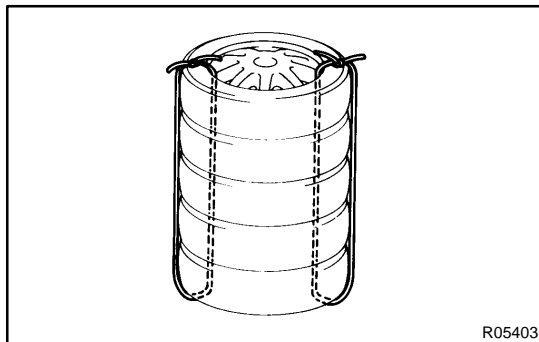


(c) Check the function of the SST (See step 1-(a) on page [RS-20](#)).

SST 09082-00700



- (d) Place the tires.
- (1) Place at least 2 tires under the tire to which the side airbag assembly is tied.
  - (2) Place at least 2 tires over the tire to which the side airbag assembly is tied. The top tire should have the wheel installed.



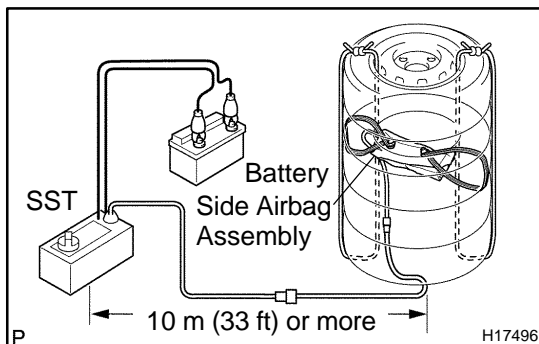
- (3) Tie the tires together with 2 wire harnesses.

**CAUTION:**

**Make sure that the wire harnesses are tight. It is very dangerous when loose wire harness results in the tires coming free due to the shock from the airbag deployment.**

**HINT:**

Place the SST connector and wire harness inside tires. Secure at least 1 m (3 ft) of slack for the wire harness.



- (e) Install the SST.  
Connect the connectors of the SST to the side airbag assembly connector.

SST 09082-00700, 09082-00750

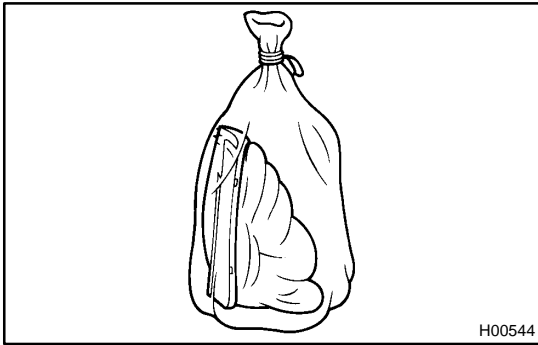
**NOTICE:**

**To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.**

- (f) Deploy the airbag.
- (1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.
  - (2) Check that no one is within 10 m (33 ft) area around the tire which the side airbag assembly is tied to.
  - (3) Press the SST activation switch and deploy the airbag.

**HINT:**

The airbag deploys as the LED of the SST activation switch comes on.



(g) Dispose of the side airbag assembly.

**CAUTION:**

- ▶ The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling a side airbag assembly with the deployed airbag.
- ▶ Do not apply water etc. to a side airbag assembly with the deployed airbag.
- ▶ Always wash your hands with water after completing the operation.

- (1) Remove the side airbag assembly from the tire.
- (2) Place the side airbag assembly in a plastic bag, tie the end tightly and dispose of it as the other general parts disposal.



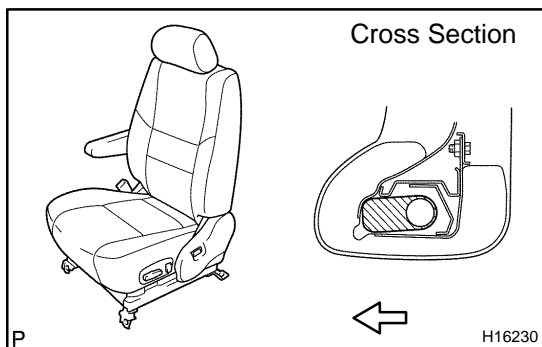
**3. DEPLOYMENT WHEN DISPOSING OF SIDE AIRBAG ASSEMBLY WITH AIRBAG DEPLOYED IN COLLISION**

Dispose of the side airbag assembly.

**CAUTION:**

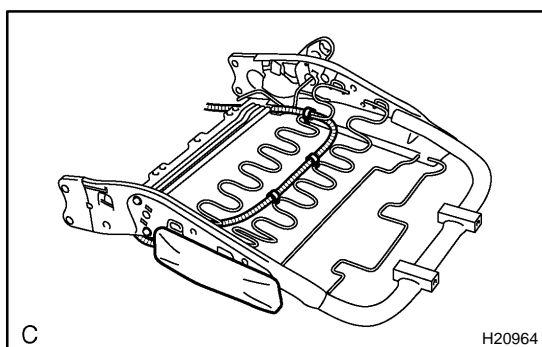
- ▶ The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling a side airbag assembly with the deployed airbag.
- ▶ Do not apply water etc. to a side airbag assembly with the deployed airbag.
- ▶ Always wash your hands with water after completing the operation.

- (1) Remove the side airbag assembly from the seat (See page [BO-105](#) and see step 2. on page [RS-48](#) ).
- (2) Place the side airbag assembly in a plastic bag, tie the end tightly and dispose of it as the other general parts disposal.



## INSPECTION

1. **Vehicle not involved in collision:**  
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**
  - (a) Do a diagnostic system check (See page [DI-692](#) ).
  - (b) Do a visual check which includes the following item with the seatback assembly installed in the vehicle.  
 Check that there are no cuts or frayed in seams and outside of seatback cover.
2. **Vehicle involved in a collision and airbag is not deployed:**  
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**
  - (a) Do a diagnostic system check (See page [DI-692](#) ).



- (b) Do a visual check which includes the following items with the seatback assembly removed from the vehicle.
  - ▶ Check cuts, tears and cracks of the side airbag assembly.
  - ▶ Check cuts and cracks in wire harness, and chipping in connectors.
  - ▶ Check cuts and cracks of the side airbag bracket.

### CAUTION:

**For removal and installation of the seatback assembly, see page [BO-105](#) and [BO-117](#). Be sure to follow the correct procedure.**

3. **Vehicle involved in a collision and airbag is deployed:**  
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**
  - (a) Do a diagnostic system check (See page [DI-692](#) ).
  - (b) Do a visual check which includes the following items with the seatback assembly removed from the vehicle.
    - ▶ Check the seatback installation part of the seat adjuster.
    - ▶ Check the damage to the connector and wire harness.

### CAUTION:

**For removal and installation of the seatback assembly, see page [BO-105](#) and [BO-117](#). Be sure to follow the correct procedure.**

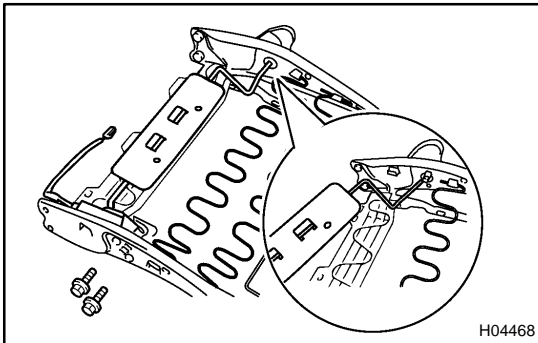
### HINT:

If the seat adjuster is deformed, never repair it. Always replace it with a new one.

## INSTALLATION

### NOTICE:

Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.

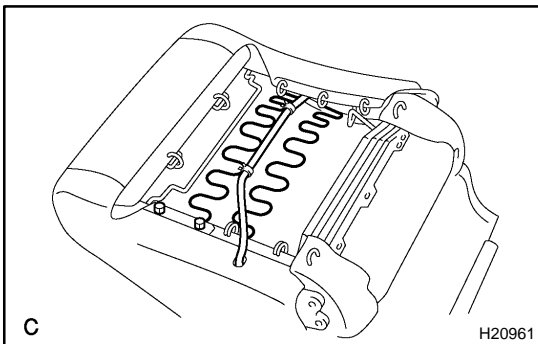


### 1. INSTALL LUMBER SUPPORT

Install the lumbar support with the 2 bolts.

### 2. INSTALL SEATBACK FRAME

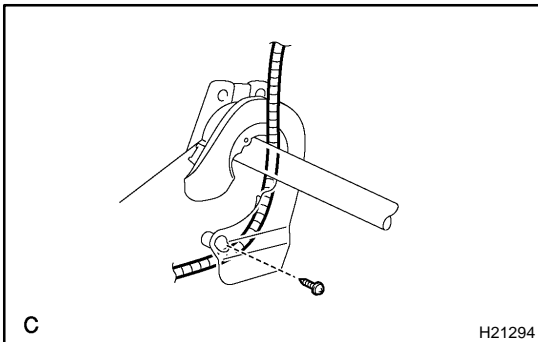
- (a) Install the seatback cover with pad to the seatback frame.



- (b) Install new hog rings, clamps and the 2 bolts.

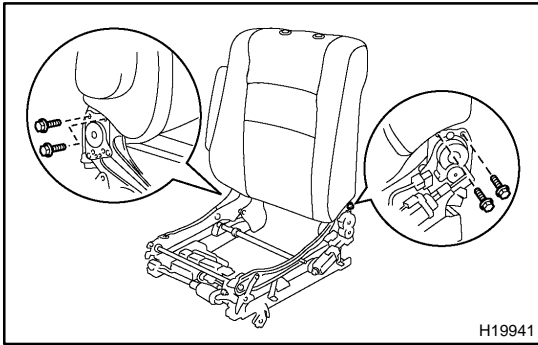
**Torque: 4.7 N·m (48 kgf·cm, 42 in.-lbf)**

- (c) Install the 2 headrest supports.



### 3. INSTALL SEATBACK ASSEMBLY

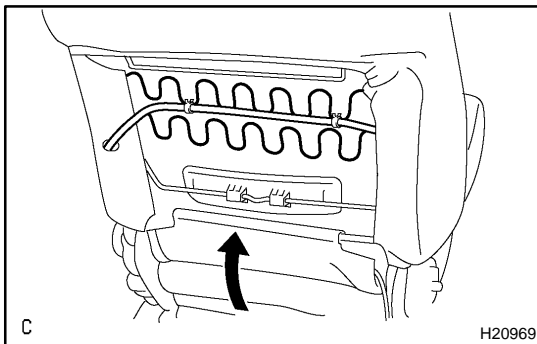
- (a) Place the airbag connector along the inner seat adjuster, and then install the RH reclining adjuster inside shield so that the connector is placed in between.



- (b) Install the seatback assembly with the 4 bolts.  
**Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)**

**NOTICE:**

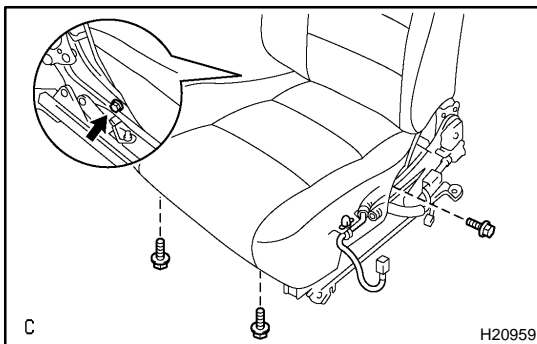
- ▶ **Make sure that the seatback assembly is installed to the specified torque.**
  - ▶ **If the seatback assembly has been dropped, or there are cracks, dents or other defects in the case or connector, replace the seatback assembly with a new one.**
  - ▶ **When installing the seatback assembly, take care it is not to be pinched between other parts.**
- (c) Install new hog rings.



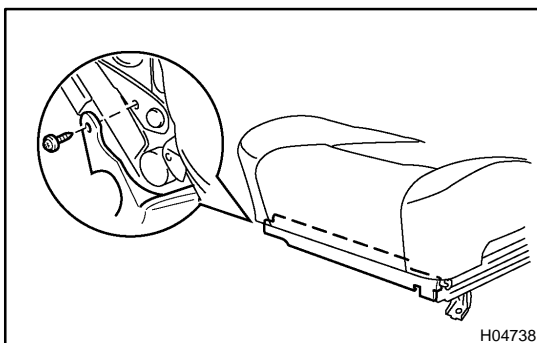
- (d) Hang the hook.  
 (e) Connect the connectors.

**4. INSTALL ARMREST**

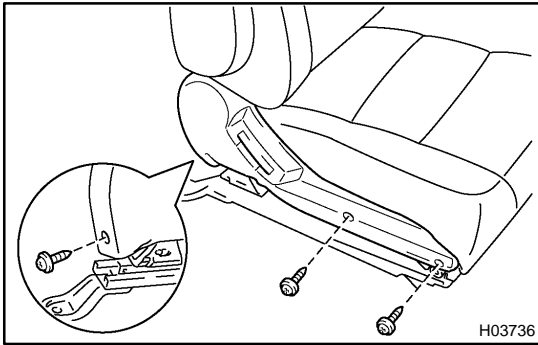
**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

**5. INSTALL HEADREST****6. INSTALL SEAT CUSHION ASSEMBLY**

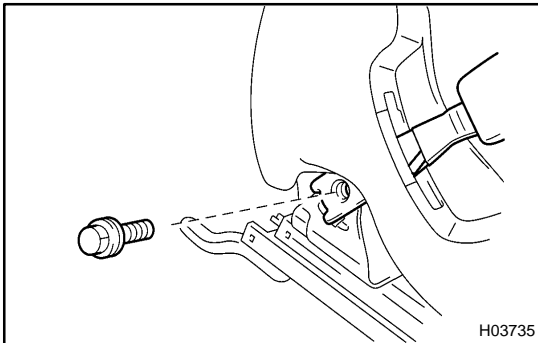
- (a) Install the seat cushion assembly with the 4 bolts.  
**Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)**  
 (b) Engage the wire harness clamp.

**7. INSTALL FRONT SEAT CUSHION SHIELD**

Install the seat cushion shield with the screw.

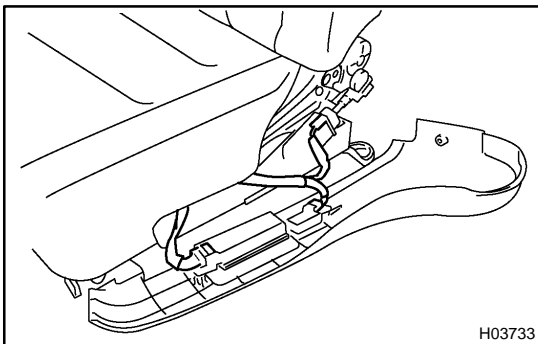
**8. INSTALL LOWER SEAT CUSHION SHIELD**

Install the lower seat cushion shield with the screws.

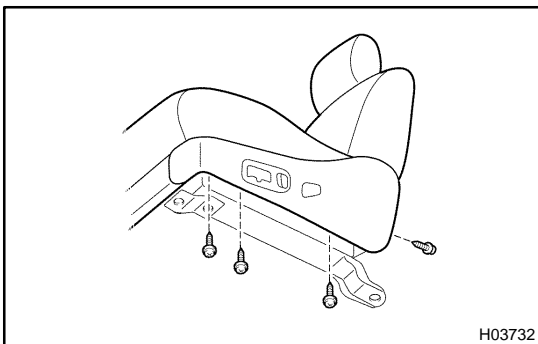
**9. INSTALL FRONT SEAT INNER BELT**

- (a) Engage the clamp, then connect the connector.
- (b) Install the inner belt with the bolt.

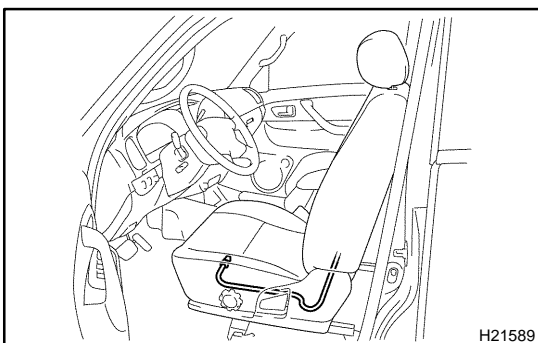
**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**

**10. INSTALL SEAT CUSHION OUTER SHIELD**

- (a) Connect the connectors as shown in the illustration.



- (b) Install the seat cushion outer shield with the 4 screws.

**11. INSTALL SEATBACK BOARD****12. INSTALL FRONT SEAT**

- (a) Install the front seat.

**NOTICE:**

**Be careful not to damage body.**

- (b) Connect the connectors.
- (c) Install the 4 bolts.

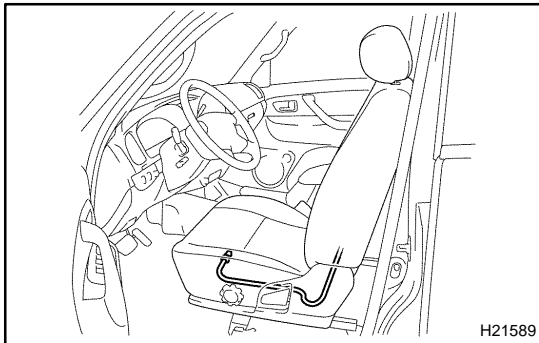
**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**

- (d) Install the 4 track covers.

## REMOVAL

### NOTICE:

- ▶ If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.
- ▶ Never use the airbag parts from another vehicle. When replacing parts, replace them with new parts.



### 1. REMOVE FRONT SEAT

- (a) Remove the 4 seat track covers and 4 bolts.
- (b) Disconnect the power seat and side airbag connector.

### NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

- (c) Remove the front seat.

### NOTICE:

Be careful not to damage the body.

### 2. REMOVE HEADREST

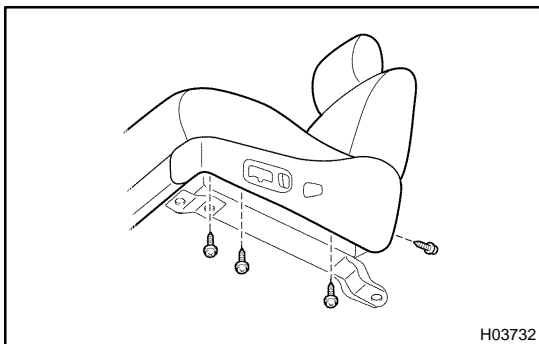
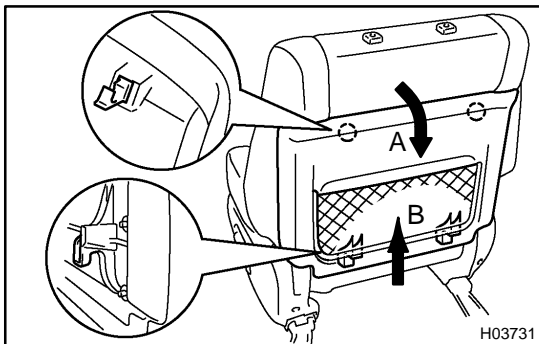
### 3. REMOVE SEATBACK BOARD

Remove the seatback board as shown in the illustration.

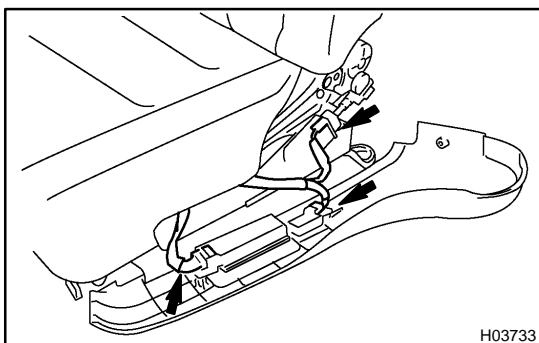
### HINT:

Remove the seatback board in order "A" and "B" as shown in the illustration.

### 4. REMOVE SEAT CUSHION OUTER SHIELD

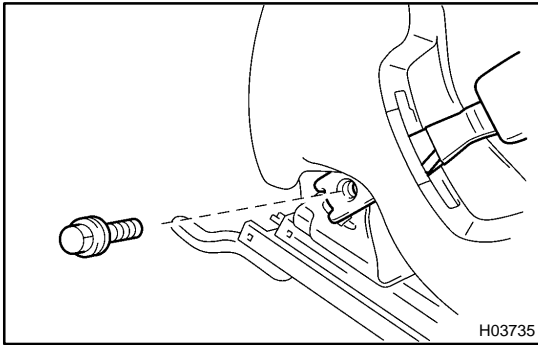


- (a) Remove the 4 screws.

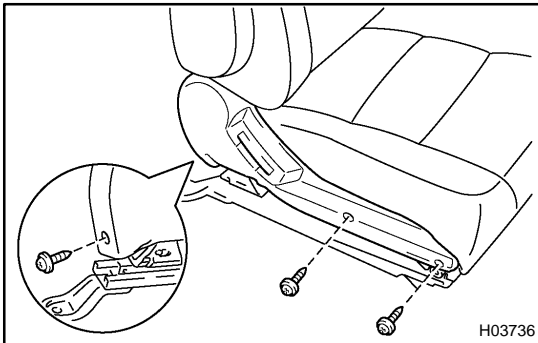


- (b) Disconnect the connectors as shown in the illustration.
- (c) Remove the seat cushion outer shield.

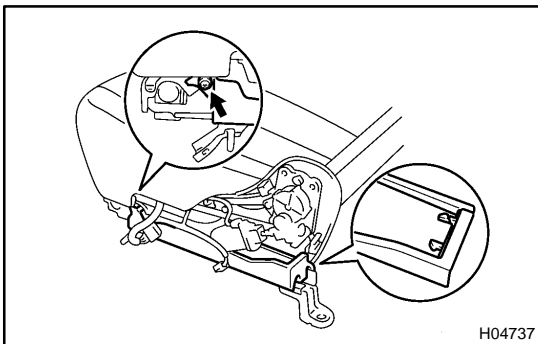


**5. REMOVE FRONT SEAT INNER BELT**

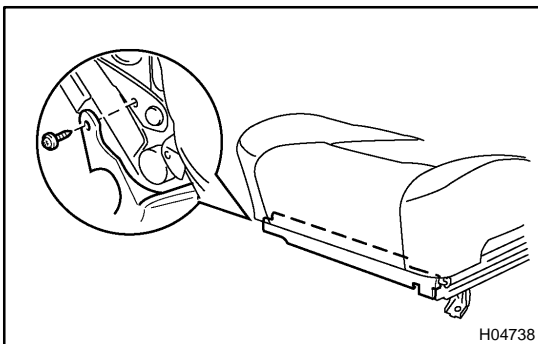
- (a) Remove the clump, then disconnect the connector.
- (b) Remove the bolt and inner belt.

**6. REMOVE SEAT CUSHION INNER SHIELD**

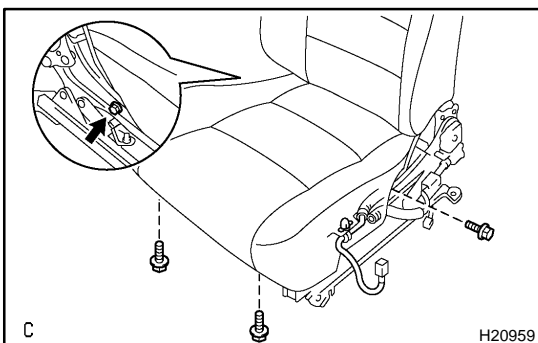
Remove the 3 screws and seat cushion inner shield.

**7. REMOVE LOWER SEAT CUSHION SHIELD**

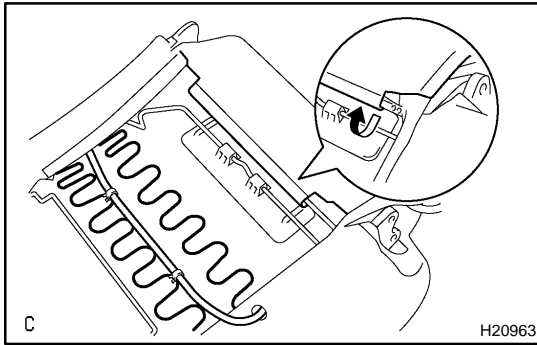
Remove the screw and lower seat cushion shield as shown in the illustration.

**8. REMOVE FRONT SEAT CUSHION SHIELD**

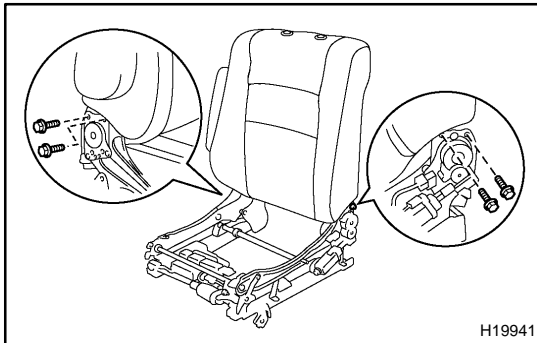
Remove the screw and front seat cushion shield.

**9. REMOVE SEAT CUSHION ASSEMBLY**

- (a) Remove the 4 bolts.
- (b) Remove the clamps from the seat cushion assembly.

**10. REMOVE SEATBACK ASSEMBLY**

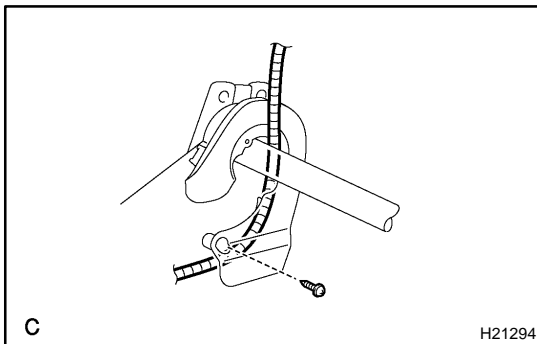
- (a) Remove the hog rings.
- (b) Disengage the hook as shown in the illustration.
- (c) Disconnect the connectors.



- (d) Remove the 4 bolts and seatback assembly.

**NOTICE:**

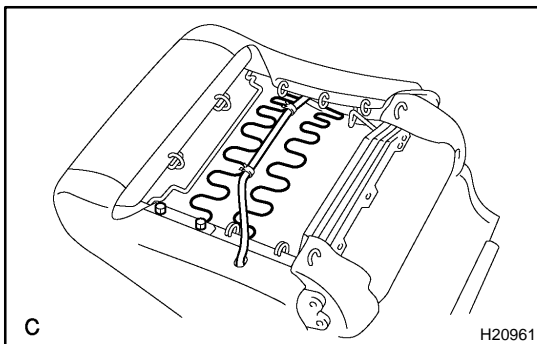
**When handling the airbag connector take care not to damage the airbag wire harness.**



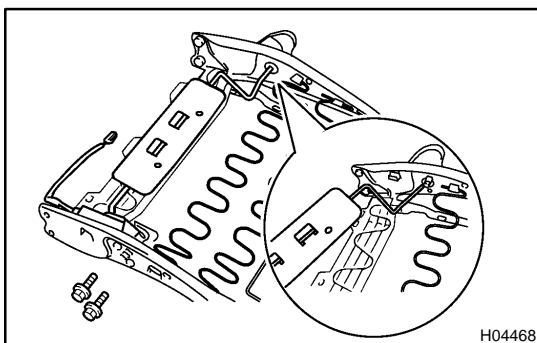
- (e) Remove the 2 screws and RH reclining adjuster inside shield, then disconnect the side airbag connector.

**NOTICE:**

**When handling the airbag connector take care not to damage the airbag wire harness.**

**11. REMOVE ARMREST****12. REMOVE SEATBACK FRAME**

- (a) Remove the hog rings, clamps and the 2 bolts.
- (b) Remove the 2 headrest supports.
- (c) Remove the seatback frame from the seatback cover with pad.

**13. REMOVE LUMBER SUPPORT**

Remove the 2 bolts and lumbar support.

# REPLACEMENT

## REPLACEMENT REQUIREMENTS

In the following cases, replace the seatback assembly or seatback cover.

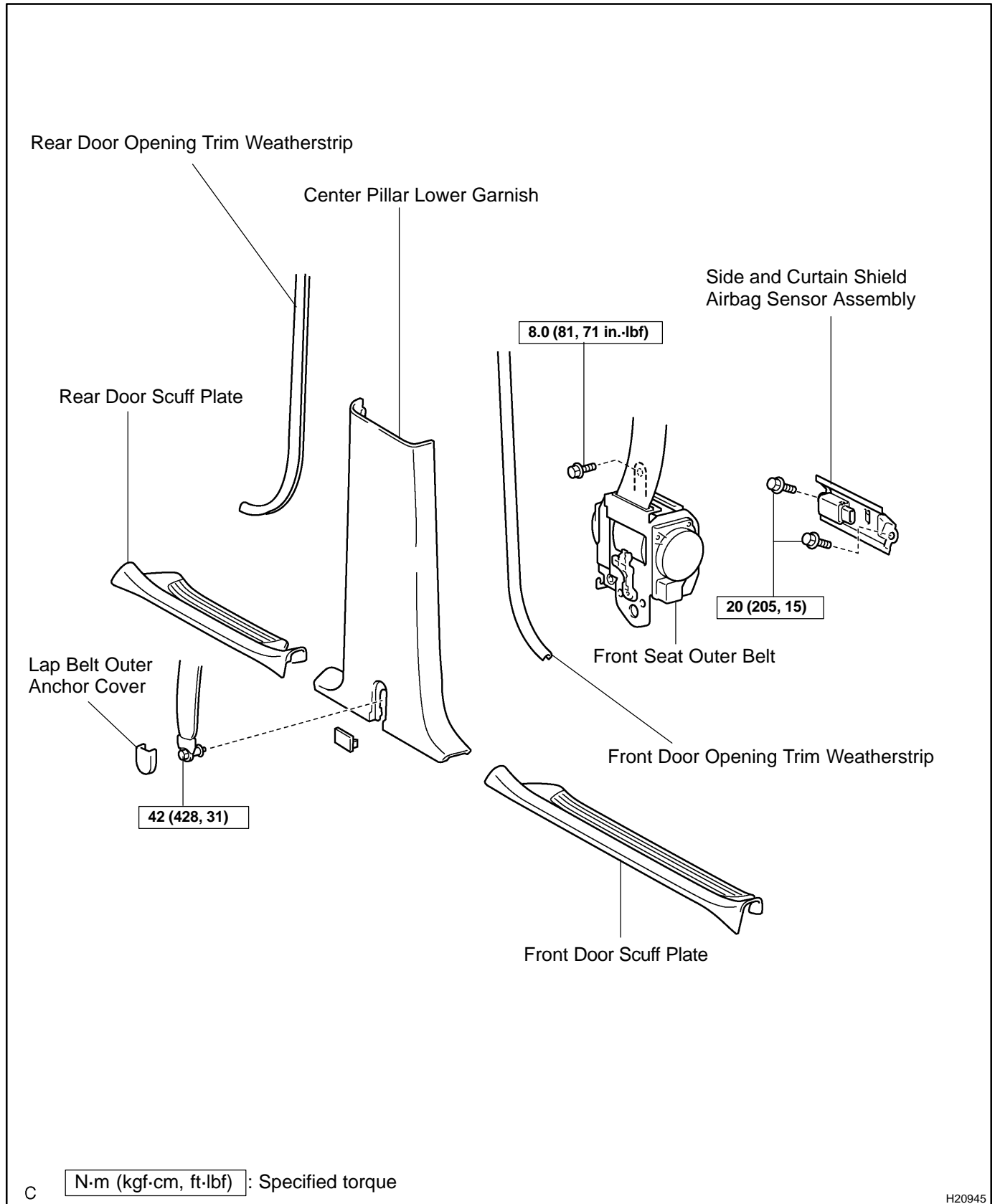
Case	Replacing part
If the side airbag has been deployed.	Seatback assembly
If the side airbag assembly has been found to be faulty in troubleshooting.	Seatback assembly
If the side airbag assembly has cuts during checking items (See page <a href="#">RS-47</a> ).	Seatback assembly
If the seatback cover has cuts and frayed seams during checking items (See page <a href="#">RS-47</a> ).	Seatback cover
If the side airbag assembly has been found to be faulty during checking items (See page <a href="#">RS-47</a> ).	Seatback assembly
If the seatback cover has been found to be faulty during checking items (See page <a href="#">RS-47</a> ).	Seatback cover
If the seatback assembly has been dropped.	Seatback assembly

### CAUTION:

**For removal and installation of the seatback assembly, see page [RS-44](#) and [RS-55](#) . Be sure to follow the correct procedure.**

# SIDE AND CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY COMPONENTS

RS0N1-07



## INSPECTION

**1. Vehicle not involved in collision:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

**2. Vehicle involved in collision and airbag is not deployed:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

**3. Vehicle involved in collision and airbag is deployed:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Replace the side and curtain shield airbag sensor assembly (See page [RS-79](#) ).

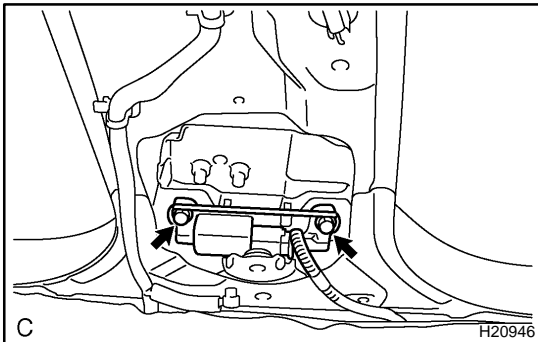
## INSTALLATION

### NOTICE:

- ▶ Never use SRS parts from another vehicle. When replacing parts, replace them with new ones.
- ▶ Never reuse the side and curtain shield airbag sensor assembly involved in a collision when the airbag has deployed.
- ▶ Never repair a sensor in order to reuse it.

### HINT:

For step 2 to 9, refer to page [BO-101](#) .



### 1. INSTALL SIDE AND CURTAIN SHIELD AIRBAG SENSOR

- (a) Install the side and curtain shield airbag sensor assembly with the 2 bolts.

**Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)**

- (b) Connect the connector of the side and curtain shield airbag sensor assembly.

### NOTICE:

- ▶ Connection of the connector is done after the sensor assembly has been installed.
- ▶ Make sure that the sensor assembly is installed with the specified torque.
- ▶ If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.
- ▶ When installing the sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.
- ▶ After installation, shake the sensor assembly to check that there is no looseness.

### 2. INSTALL FRONT SEAT OUTER BELT

**Torque:**

**Upper bolt: 8.0 N·m (81 kgf·cm, 71 in·lbf)**

3. INSTALL CENTER PILLAR LOWER GARNISH
4. INSTALL REAR DOOR OPENING TRIM WEATHERSTRIP
5. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP

6. **INSTALL FRONT SEAT OUTER BELT FLOOR ANCHOR**  
Torque: 42 N·m (428 kgf·cm, 31 ft·lbf)
7. **INSTALL LAP BELT OUTER ANCHOR COVER**
8. **INSTALL FRONT DOOR SCUFF PLATE**
9. **INSTALL REAR DOOR SCUFF PLATE**
10. **INSPECT SRS WARNING LIGHT (See page [DI-692](#) )**

## REMOVAL

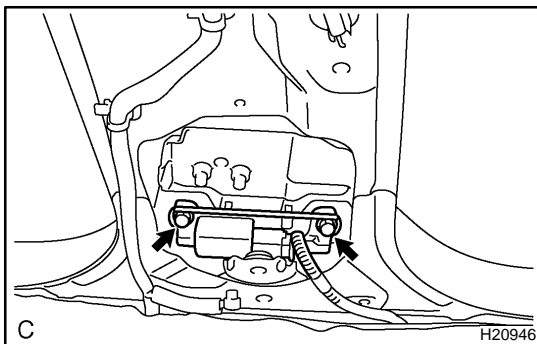
### NOTICE:

- ▶ If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.
- ▶ Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary (If the IC terminals are touched, the IC may be destroyed by static electricity.).

### HINT:

For step 1 to 8, refer to page [BO-97](#) .

1. REMOVE REAR DOOR SCUFF PLATE
2. REMOVE FRONT DOOR SCUFF PLATE
3. REMOVE LAP BELT OUTER ANCHOR COVER
4. REMOVE FRONT SEAT OUTER BELT FLOOR ANCHOR
5. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP
6. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP
7. REMOVE CENTER PILLAR LOWER GARNISH
8. REMOVE FRONT SEAT OUTER BELT



### 9. REMOVE SIDE AND CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY

- (a) Disconnect the connector.

### NOTICE:

**Disconnect the connector with the sensor assembly installed.**

- (b) Remove the 2 bolts and side and curtain shield airbag sensor assembly.



## REPLACEMENT

### REPLACEMENT REQUIREMENTS

In the following cases, replace the side and curtain shield airbag sensor assembly.

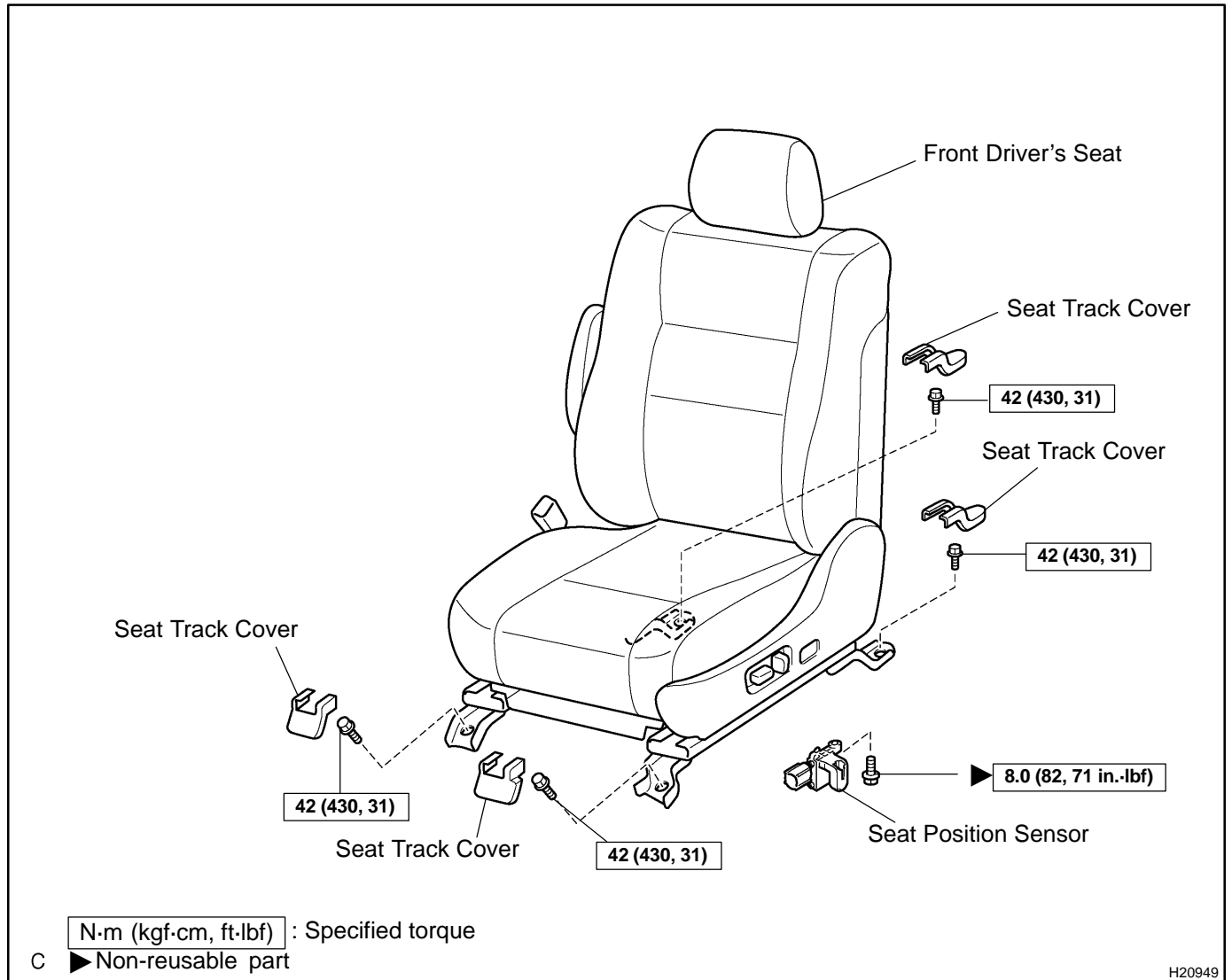
- ▶ If the side and curtain shield airbag assembly has been deployed in a collision.
- ▶ If the side and curtain shield airbag sensor assembly has been found to be faulty in troubleshooting.
- ▶ If the side and curtain shield airbag sensor assembly has been dropped.

### CAUTION:

**For removal and installation of the side and curtain shield airbag sensor assembly, see page [RS-80](#) and [RS-83](#) . Be sure to follow the correct procedure.**

# SEAT POSITION SENSOR ASSEMBLY COMPONENTS

RS0UN-02



## INSPECTION

**1. Vehicle not involved in collision:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

**2. Vehicle involved in collision and airbag is not deployed:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

**3. Vehicle involved in collision and airbag is deployed:**

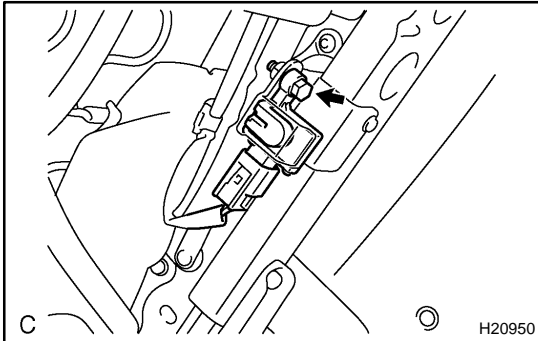
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Replace the seat position sensor assembly (See page [RS-90](#) ).

## INSTALLATION

### NOTICE:

- ▶ Never use SRS parts from another vehicle. When replacing parts, replace them with new ones.
- ▶ Never reuse the seat position sensor assembly involved in a collision when the airbag has deployed.
- ▶ Never repair a sensor in order to reuse it.



### 1. INSTALL SEAT POSITION SENSOR ASSEMBLY

- (a) Connect the connector.
- (b) Install the seat position sensor assembly with a new bolt.

#### Part No.:

**Bolt: 90119-06871**

**Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)**

### NOTICE:

- ▶ Connection of the connector is done after the sensor assembly has been installed.
- ▶ Make sure that the sensor assembly is installed with the specified torque.
- ▶ If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.
- ▶ When installing the sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.
- ▶ After installation, shake the sensor assembly to check that there is no looseness.

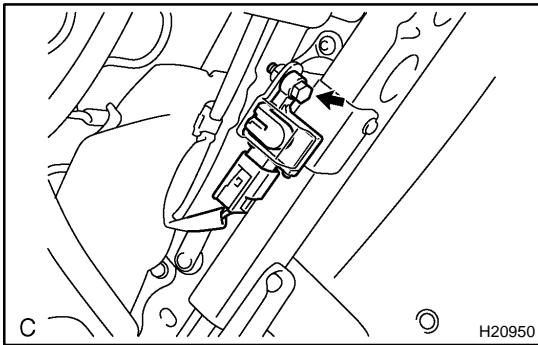
2. INSTALL FRONT SEAT ASSEMBLY (DRIVER SIDE)  
(See page [BO-117](#))
3. INSPECT SRS WARNING LIGHT (See page [DI-692](#))

## REMOVAL

### NOTICE:

- ▶ Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)
- ▶ If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.

1. REMOVE FRONT SEAT ASSEMBLY (DRIVER SIDE)  
(See page [BO-105](#) )



2. REMOVE SEAT POSITION SENSOR ASSEMBLY
  - (a) Remove the bolt and seat position sensor assembly.
  - (b) Disconnect the connector.

## REPLACEMENT

### REPLACEMENT REQUIREMENTS

In the following cases, replace the seat position sensor assembly.

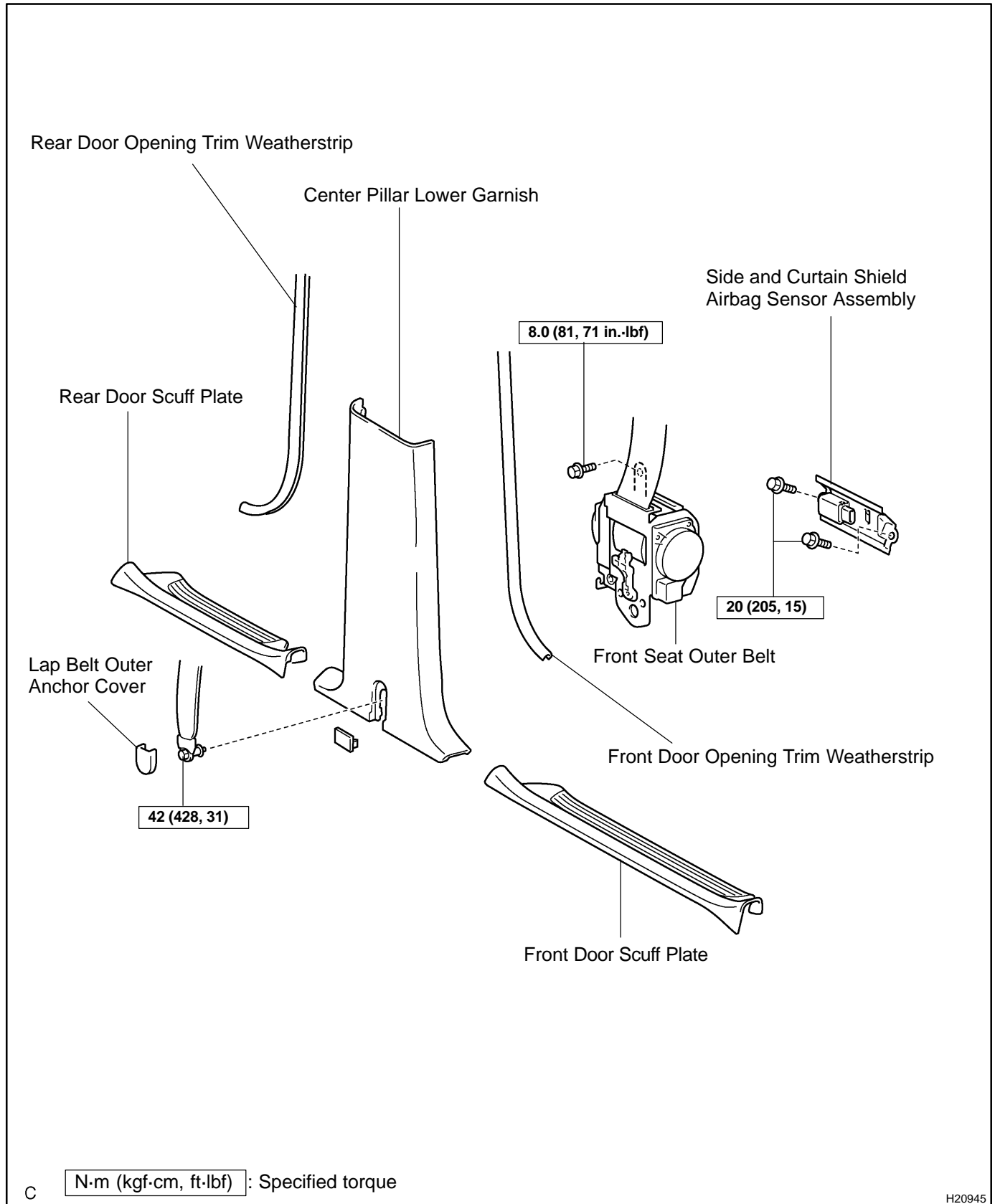
- ▶ If the seat position sensor assembly has been found to be faulty in troubleshooting.
- ▶ If the seat position sensor assembly has been dropped.

### CAUTION:

For removal and installation of the seat position sensor assembly, see page [RS-91](#) and [RS-94](#) . Be sure to follow the correct procedure.

# SIDE AND CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY COMPONENTS

RS0N1-07



## INSPECTION

**1. Vehicle not involved in collision:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

**2. Vehicle involved in collision and airbag is not deployed:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

**3. Vehicle involved in collision and airbag is deployed:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Replace the side and curtain shield airbag sensor assembly (See page [RS-79](#) ).



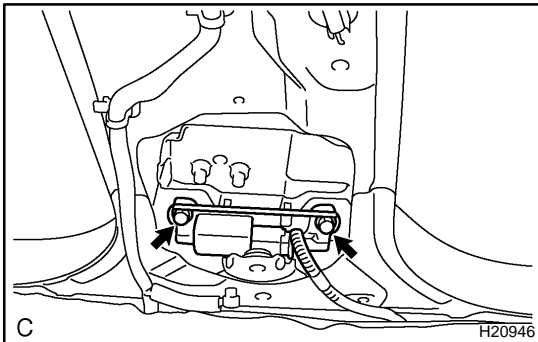
## INSTALLATION

### NOTICE:

- ▶ Never use SRS parts from another vehicle. When replacing parts, replace them with new ones.
- ▶ Never reuse the side and curtain shield airbag sensor assembly involved in a collision when the airbag has deployed.
- ▶ Never repair a sensor in order to reuse it.

### HINT:

For step 2 to 9, refer to page [BO-101](#) .



### 1. INSTALL SIDE AND CURTAIN SHIELD AIRBAG SENSOR

- (a) Install the side and curtain shield airbag sensor assembly with the 2 bolts.

**Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)**

- (b) Connect the connector of the side and curtain shield airbag sensor assembly.

### NOTICE:

- ▶ Connection of the connector is done after the sensor assembly has been installed.
- ▶ Make sure that the sensor assembly is installed with the specified torque.
- ▶ If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.
- ▶ When installing the sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.
- ▶ After installation, shake the sensor assembly to check that there is no looseness.

### 2. INSTALL FRONT SEAT OUTER BELT

**Torque:**

**Upper bolt: 8.0 N·m (81 kgf·cm, 71 in·lbf)**

3. INSTALL CENTER PILLAR LOWER GARNISH
4. INSTALL REAR DOOR OPENING TRIM WEATHERSTRIP
5. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP

6. **INSTALL FRONT SEAT OUTER BELT FLOOR ANCHOR**  
Torque: 42 N·m (428 kgf·cm, 31 ft·lbf)
7. **INSTALL LAP BELT OUTER ANCHOR COVER**
8. **INSTALL FRONT DOOR SCUFF PLATE**
9. **INSTALL REAR DOOR SCUFF PLATE**
10. **INSPECT SRS WARNING LIGHT (See page [DI-692](#) )**

## REMOVAL

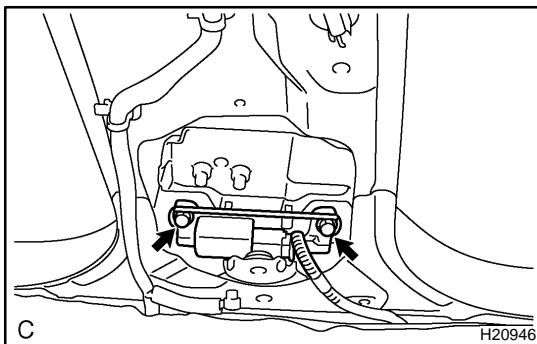
### NOTICE:

- ▶ If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.
- ▶ Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary (If the IC terminals are touched, the IC may be destroyed by static electricity.).

### HINT:

For step 1 to 8, refer to page [BO-97](#) .

1. REMOVE REAR DOOR SCUFF PLATE
2. REMOVE FRONT DOOR SCUFF PLATE
3. REMOVE LAP BELT OUTER ANCHOR COVER
4. REMOVE FRONT SEAT OUTER BELT FLOOR ANCHOR
5. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP
6. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP
7. REMOVE CENTER PILLAR LOWER GARNISH
8. REMOVE FRONT SEAT OUTER BELT



### 9. REMOVE SIDE AND CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY

- (a) Disconnect the connector.

### NOTICE:

**Disconnect the connector with the sensor assembly installed.**

- (b) Remove the 2 bolts and side and curtain shield airbag sensor assembly.

## REPLACEMENT

### REPLACEMENT REQUIREMENTS

In the following cases, replace the side and curtain shield airbag sensor assembly.

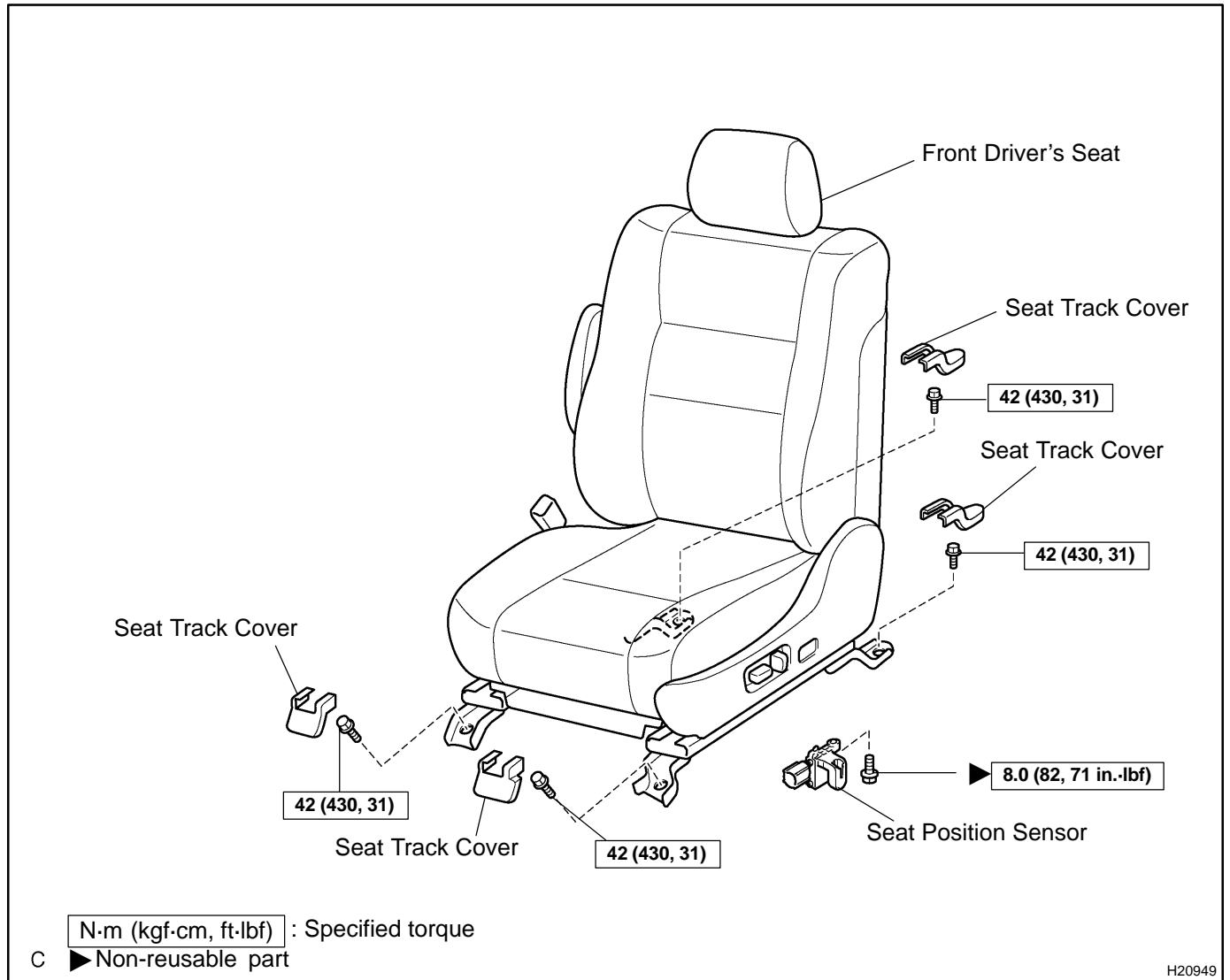
- ▶ If the side and curtain shield airbag assembly has been deployed in a collision.
- ▶ If the side and curtain shield airbag sensor assembly has been found to be faulty in troubleshooting.
- ▶ If the side and curtain shield airbag sensor assembly has been dropped.

### CAUTION:

**For removal and installation of the side and curtain shield airbag sensor assembly, see page [RS-80](#) and [RS-83](#) . Be sure to follow the correct procedure.**

# SEAT POSITION SENSOR ASSEMBLY COMPONENTS

RS0UN-02



## INSPECTION

**1. Vehicle not involved in collision:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#)).

**2. Vehicle involved in collision and airbag is not deployed:**

**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#)).

**3. Vehicle involved in collision and airbag is deployed:**

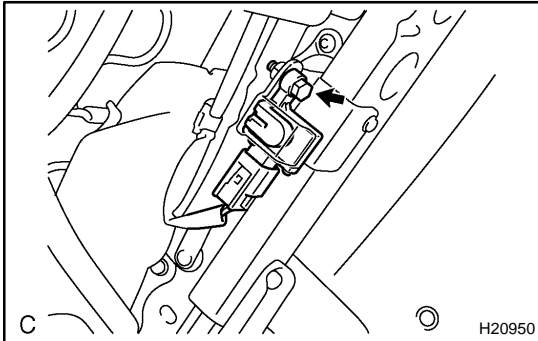
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Replace the seat position sensor assembly (See page [RS-90](#)).

## INSTALLATION

### NOTICE:

- ▶ Never use SRS parts from another vehicle. When replacing parts, replace them with new ones.
- ▶ Never reuse the seat position sensor assembly involved in a collision when the airbag has deployed.
- ▶ Never repair a sensor in order to reuse it.



### 1. INSTALL SEAT POSITION SENSOR ASSEMBLY

- (a) Connect the connector.
- (b) Install the seat position sensor assembly with a new bolt.

#### Part No.:

**Bolt: 90119-06871**

**Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)**

### NOTICE:

- ▶ Connection of the connector is done after the sensor assembly has been installed.
- ▶ Make sure that the sensor assembly is installed with the specified torque.
- ▶ If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.
- ▶ When installing the sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.
- ▶ After installation, shake the sensor assembly to check that there is no looseness.

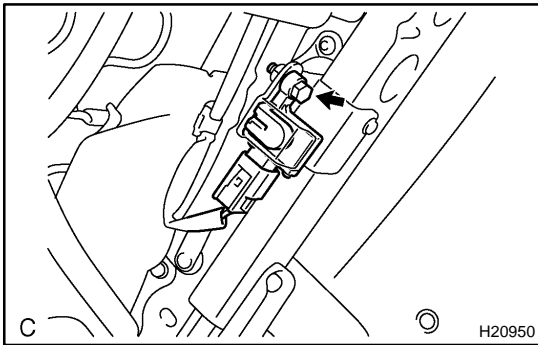
2. INSTALL FRONT SEAT ASSEMBLY (DRIVER SIDE)  
(See page [BO-117](#))
3. INSPECT SRS WARNING LIGHT (See page [DI-692](#))

## REMOVAL

### NOTICE:

- ▶ Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)
- ▶ If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.

1. REMOVE FRONT SEAT ASSEMBLY (DRIVER SIDE)  
(See page [BO-105](#) )



2. REMOVE SEAT POSITION SENSOR ASSEMBLY
  - (a) Remove the bolt and seat position sensor assembly.
  - (b) Disconnect the connector.



## REPLACEMENT

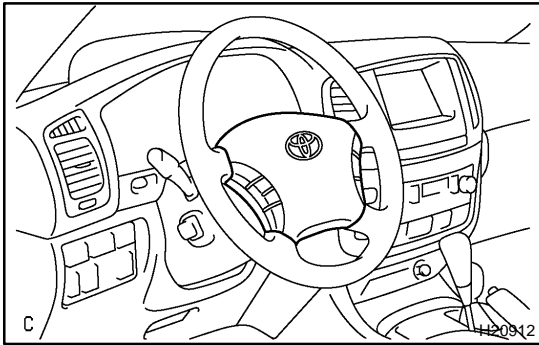
### REPLACEMENT REQUIREMENTS

In the following cases, replace the seat position sensor assembly.

- ▶ If the seat position sensor assembly has been found to be faulty in troubleshooting.
- ▶ If the seat position sensor assembly has been dropped.

### CAUTION:

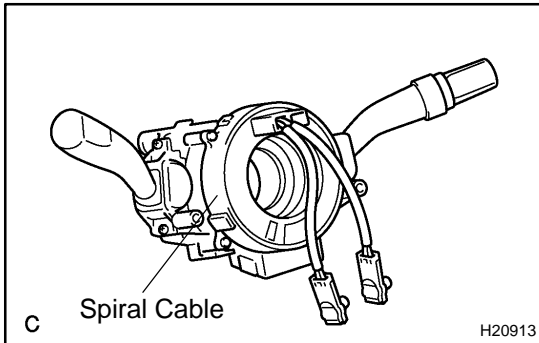
For removal and installation of the seat position sensor assembly, see page [RS-91](#) and [RS-94](#) . Be sure to follow the correct procedure.



## OPERATION

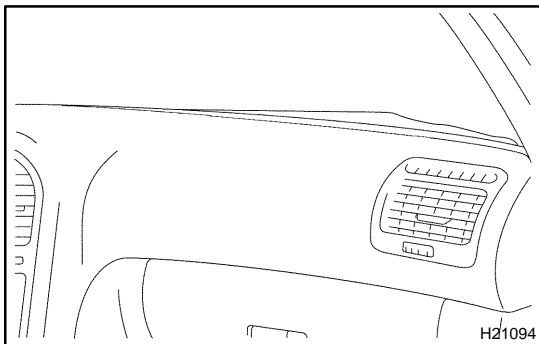
### 1. STEERING WHEEL PAD (with AIRBAG)

The inflator and bag of the SRS are stored in the steering wheel pad and cannot be disassembled. The inflator contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the airbag sensor assembly.



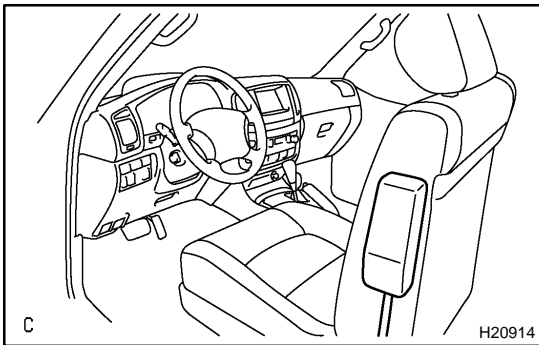
### 2. SPIRAL CABLE (in COMBINATION SWITCH)

A spiral cable is used as an electrical joint from the vehicle body side to the steering wheel.



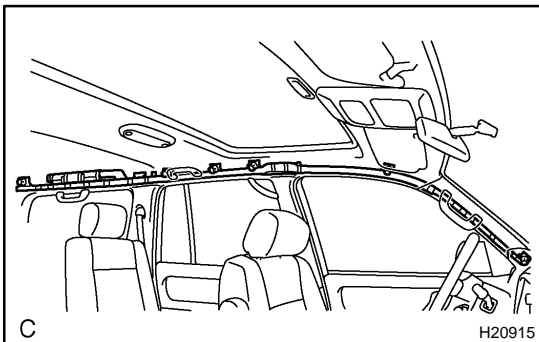
### 3. FRONT PASSENGER AIRBAG ASSEMBLY

The inflator and bag of the SRS are stored in the front passenger airbag assembly and cannot be disassembled. The inflator contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the airbag sensor assembly.



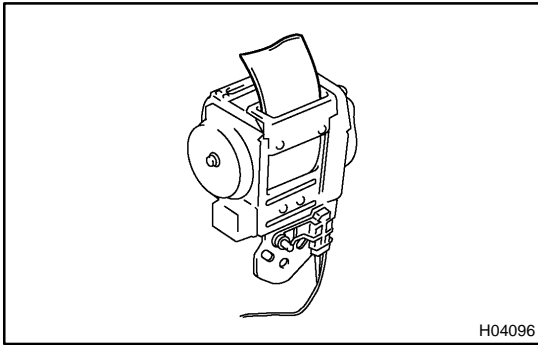
### 4. SIDE AIRBAG ASSEMBLY

The inflator and bag of the SRS side airbag are stored in the side airbag assembly and cannot be disassembled. The inflator contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the side airbag sensor assembly.



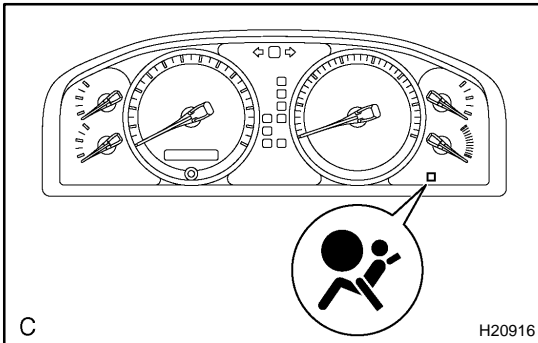
### 5. CURTAIN SHIELD AIRBAG ASSEMBLY

The inflator and bag of the SRS are stored in the curtain shield airbag assembly and cannot be disassembled. The inflator contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the side airbag sensor assembly.



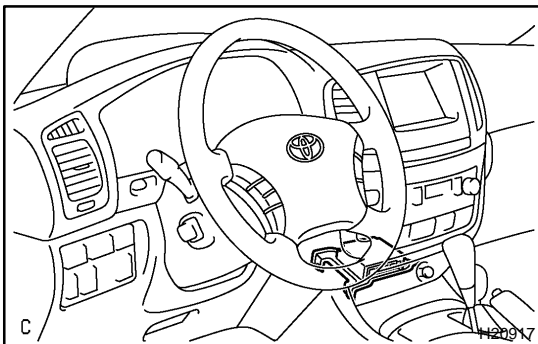
### 6. SEAT BELT PRETENSIONER

The seat belt pretensioner system is a component of the front seat outer belt. The seat belt pretensioner cannot be disassembled.



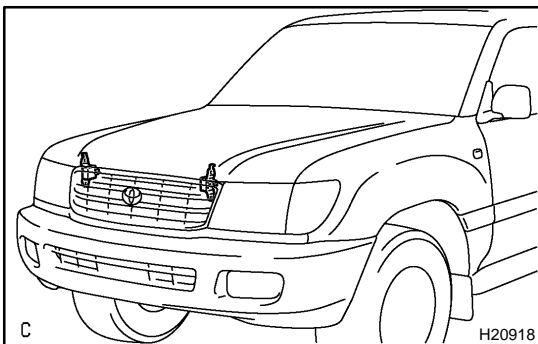
### 7. SRS WARNING LIGHT

The SRS warning light is located on the combination meter. It goes on to alert the driver of trouble in the system when a malfunction is detected in the airbag sensor assembly self-diagnosis. In normal operating conditions when the ignition switch is turned to the ON position, the light comes on for about 3 seconds and then goes off.



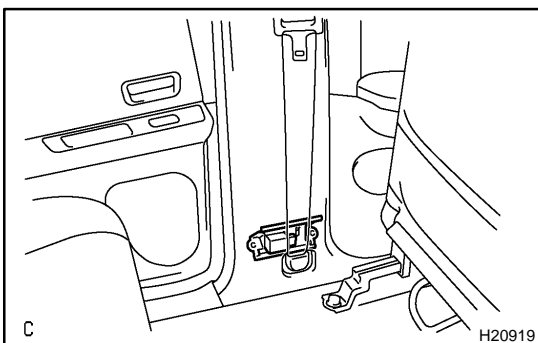
### 8. AIRBAG SENSOR ASSEMBLY

The airbag sensor assembly is mounted on the floor inside the front console box. The airbag sensor assembly consists of an airbag sensor, safing sensor, diagnosis circuit, ignition control, drive circuit, etc. It receives signals from the airbag sensor, front airbag sensor, side and curtain shield airbag sensor assembly, curtain shield airbag sensor assembly and judges whether the SRS must be activated or not. The airbag sensor assembly cannot be disassembled.



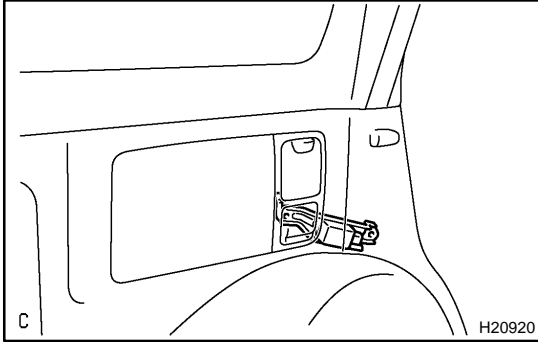
### 9. FRONT AIRBAG SENSOR

The front airbag sensor is mounted on each of the radiator side supports. The front airbag sensor consists of a frontal deceleration sensor, diagnosis circuit, etc. These send signals to the airbag sensor assembly. The front airbag sensor cannot be disassembled.



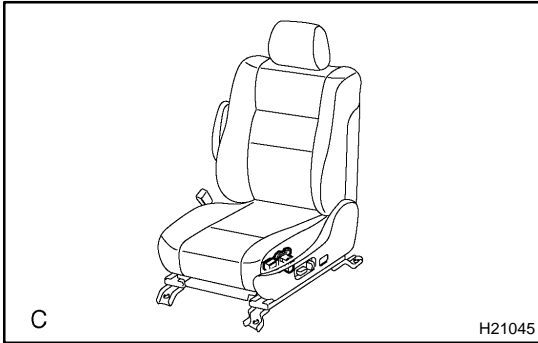
### 10. SIDE AND CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY

The side and curtain shield airbag sensor assembly is mounted in the LH and RH center pillars. The side and curtain shield airbag sensor assembly consist of a lateral deceleration sensor, safing sensor, diagnosis circuit, etc. These send signals to the airbag sensor assembly to judge whether the SRS side airbag and curtain shield airbag must be activated or not. The side and curtain shield airbag sensor assembly cannot be disassembled.



### 11. CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY

The curtain shield airbag sensor assembly is mounted in the LH and RH rear pillars. The curtain shield airbag sensor assembly consists of a lateral deceleration sensor, safing sensor, diagnosis circuit, etc. These sensors send signals to the airbag sensor assembly to judge whether the SRS curtain shield airbag must be activated or not. The curtain shield airbag sensor assembly cannot be disassembled.



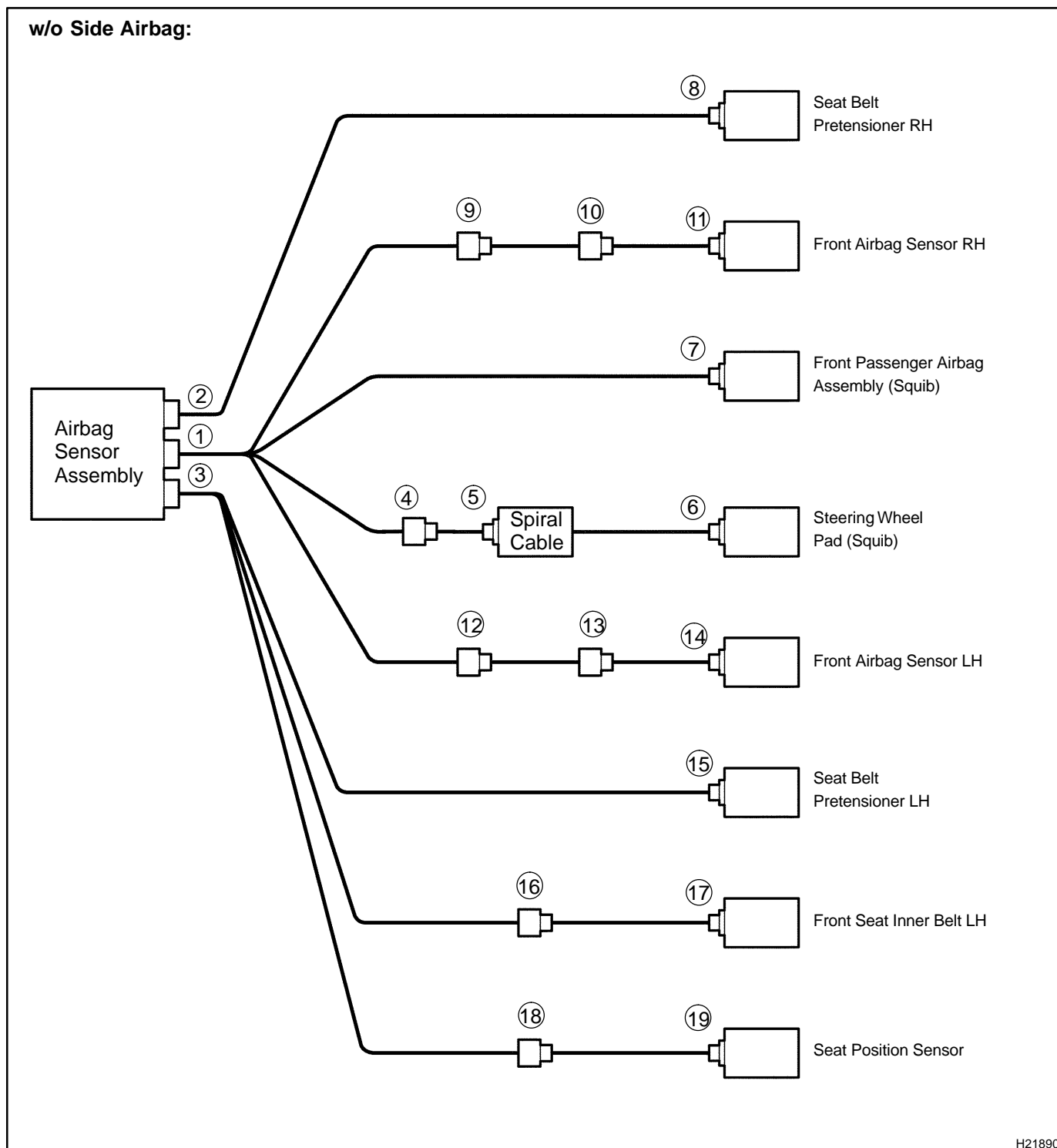
### 12. SEAT POSITION SENSOR ASSEMBLY

The seat position sensor assembly is mounted on the seat rail of the driver's seat. The sensor unit consists of a magnet sensor, diagnosis circuit, etc. It judges the seat sliding position and sends the signal to the airbag sensor assembly. The seat position sensor assembly cannot be disassembled.

### 13. SRS CONNECTORS

HINT:

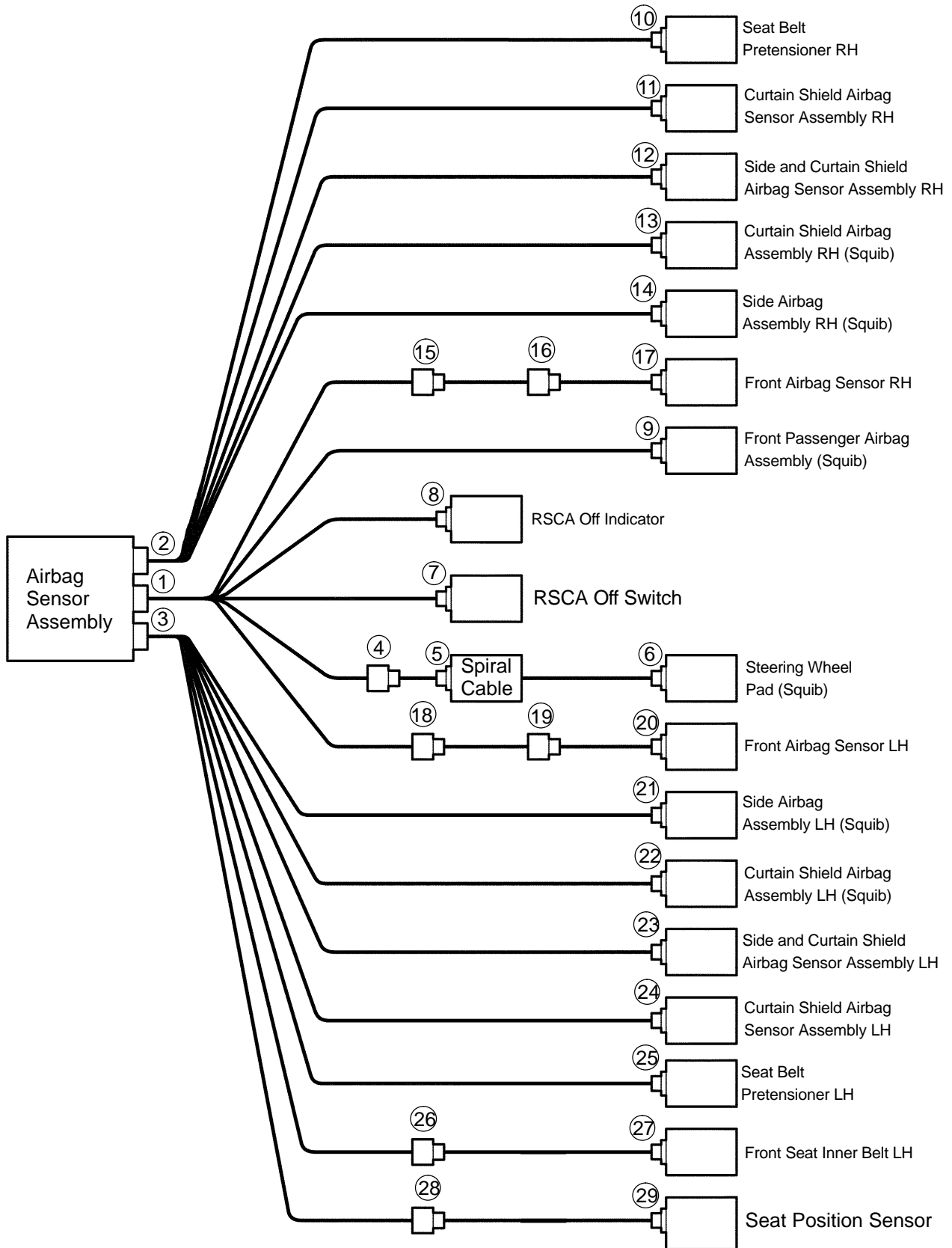
SRS connectors are located as shown in the following illustration.



**SUPPLEMENTAL RESTRAINT SYSTEM - SRS AIRBAG**

No.	Item	Application
(1)	Terminal Twin-Lock Mechanism	Connectors 1, 2, 3, 4, 5, 7, 9, 10, 11, 12, 13, 14
(2)	Activation Prevention Mechanism	Connectors 1, 2, 3, 4, 5, 6, 7, 8, 15
(3)	Electrical Connection Check Mechanism	Connectors 1, 2, 3
(4)	Half Connection Prevention Mechanism	Connectors 4, 5, 7, 9, 10, 11, 12, 13, 14
(5)	Connector Lock Mechanism	Connectors 6

w/ Side Airbag:



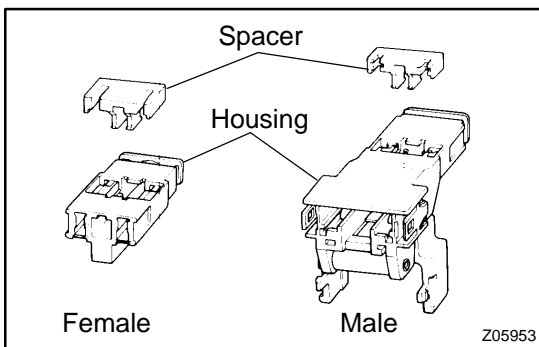
P

H21159

SUPPLEMENTAL RESTRAINT SYSTEM - SRS AIRBAG

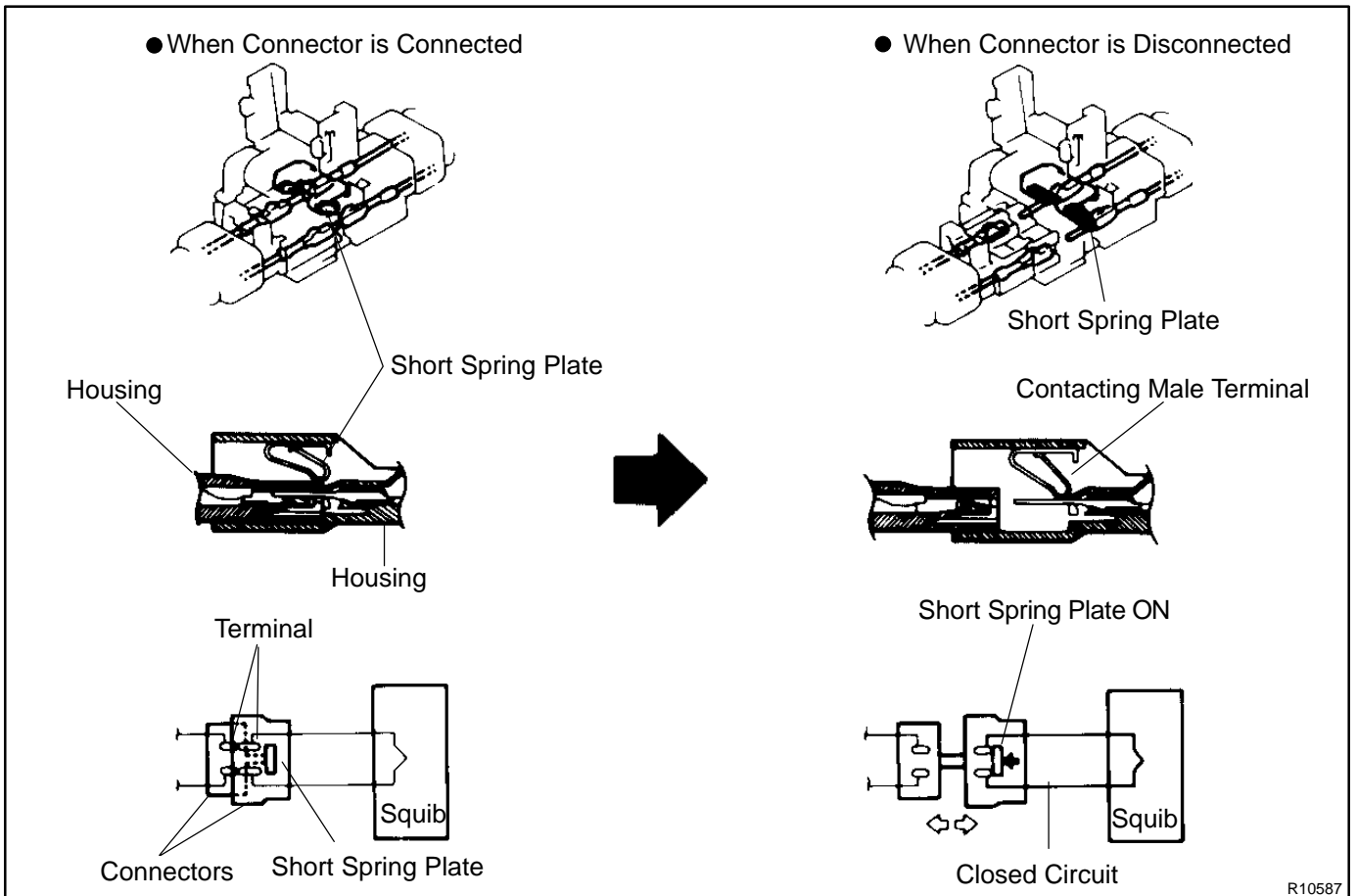
No.	Item	Application
(1)	Terminal Twin-Lock Mechanism	Connectors 1, 2, 3, 4, 5, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24
(2)	Activation Prevention Mechanism	Connectors 1, 2, 3, 4, 5, 6, 10, 13, 14, 21, 22, 25
(3)	Electrical Connection Check Mechanism	Connectors 1, 2, 3
(4)	Half Connection Prevention Mechanism	Connectors 4, 5, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24
(5)	Connector Lock Mechanism	Connectors 6

(a) All connectors in the SRS are colored in yellow to distinguish them from other connectors. Connectors having special functions and specifically designed for the SRS are used in the locations shown on the previous page to ensure high reliability. These connectors use durable gold-plated terminals.



(1) Terminal Twin-Lock Mechanism  
Each connector has a two-piece component consisting of a housing and a spacer. This design allows the terminal to be locked securely by two locking devices (the retainer and the lance) to prevent terminals from coming out.

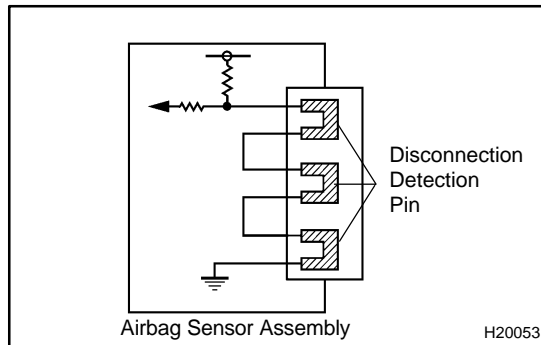
(2) Activation Prevention Mechanism  
Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects positive (+) terminal and negative (-) terminal of the squib.





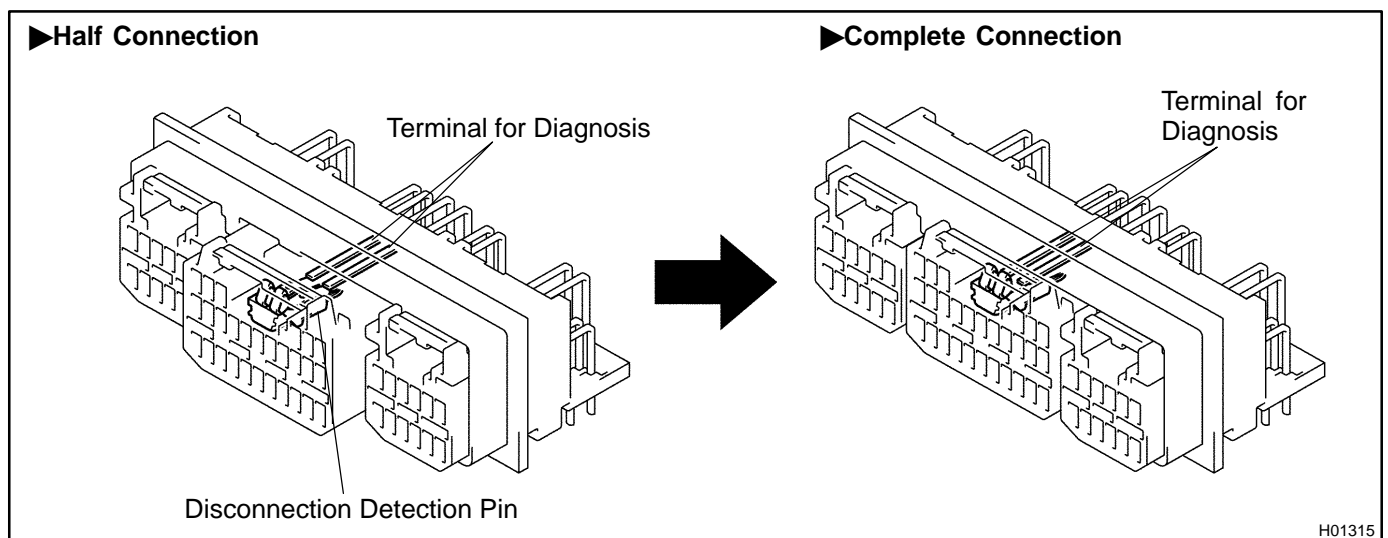
## HINT:

The type of connector is shown in the diagram on the previous page.



## (3) Electrical Connection Check Mechanism

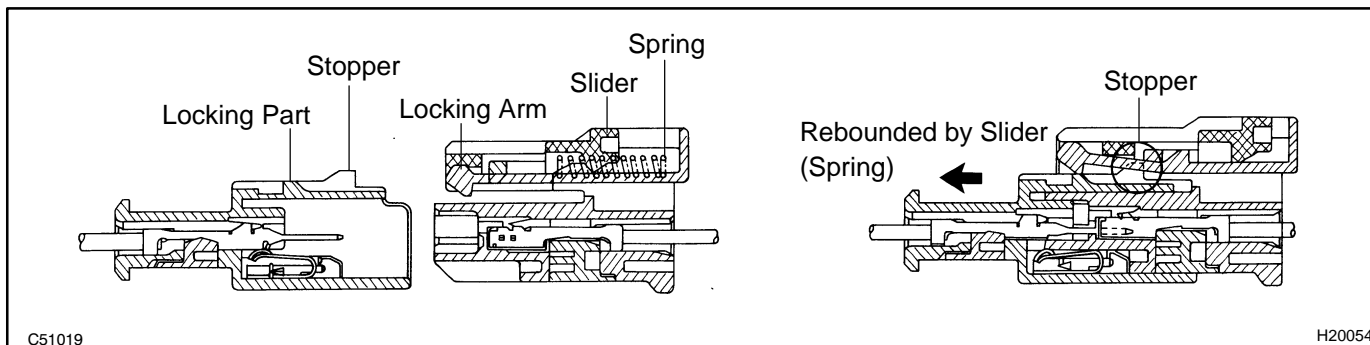
This mechanism electrically checks that connectors are connected correctly and completely. The electrical connection check mechanism is designed so that the disconnection detection pin is connected with the diagnosis terminals when the connector housing lock is locked.



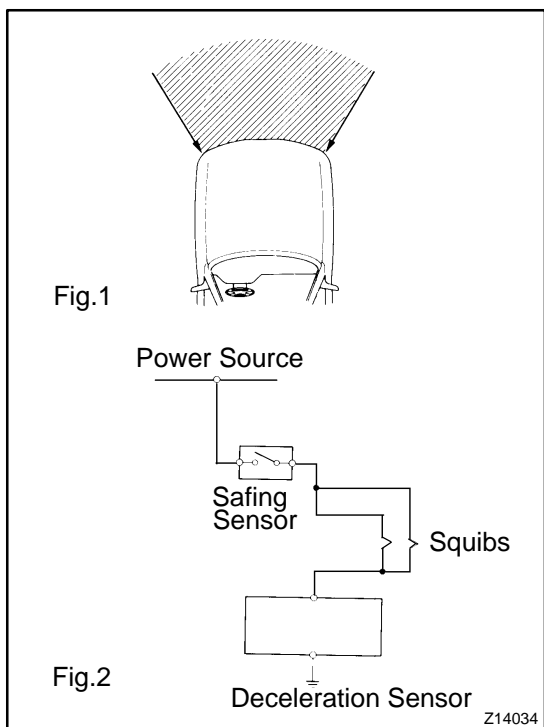
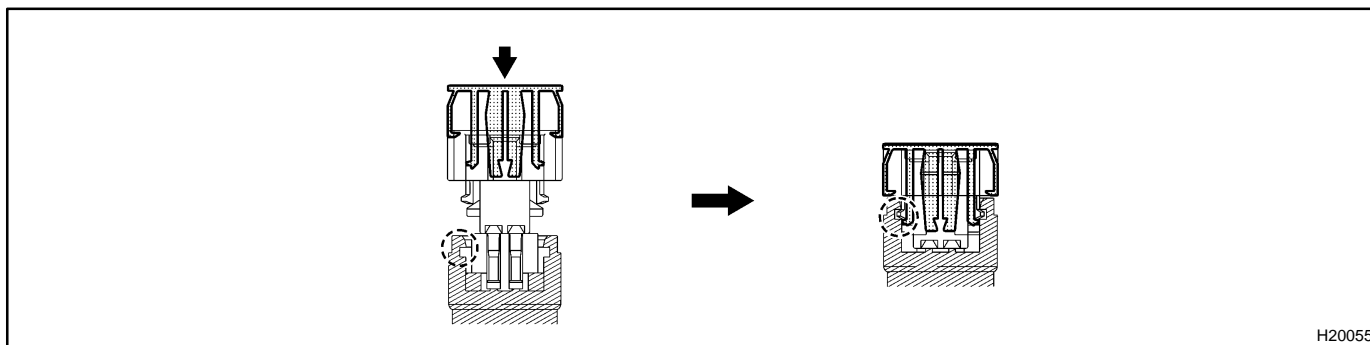
## HINT:

- \* The illustration shows connectors "1", "2" and "3" in step 13.
- \* Connectors 2 and 3 also have similar mechanism.

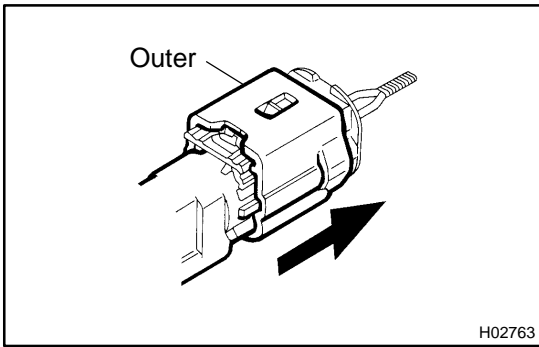
- (4) Half connection prevention mechanism:  
If the connector is not completely connected, the connector is disconnected due to the spring operation to the extent that no continuity exists.



- (5) Connector lock mechanism:  
Locking the connector lock button securely connects the connector.



- (b) When the vehicle is involved in a frontal collision in the hatched area (Fig. 1) and the shock is larger than the predetermined level, the SRS is activated automatically. A safing sensor is designed to go on at a smaller deceleration rate than the airbag sensor. As illustrated in Fig. 2, ignition is caused when current flows to the squib, which happens when a safing sensor and the deceleration sensor go on simultaneously. When a deceleration force acts on the sensors, 2 squibs in the driver airbag and front passenger airbag ignite and generate gas. The gas discharging into the driver airbag and front passenger airbag rapidly increases the pressure inside the bags, breaking open the steering wheel pad and instrument panel. Bag inflation then ends, and the bags deflate as the gas is discharged through discharge holes at the bag's rear or side.

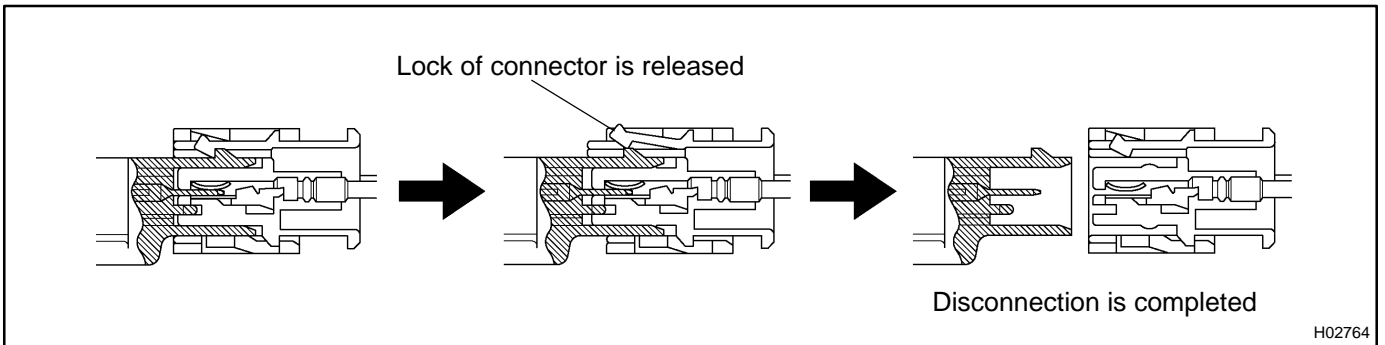


**14. DISCONNECTION OF CONNECTORS FOR FRONT AIRBAG SENSOR, SIDE AND CURTAIN SHIELD AIRBAG SENSOR AND CURTAIN SHIELD AIRBAG SENSOR**

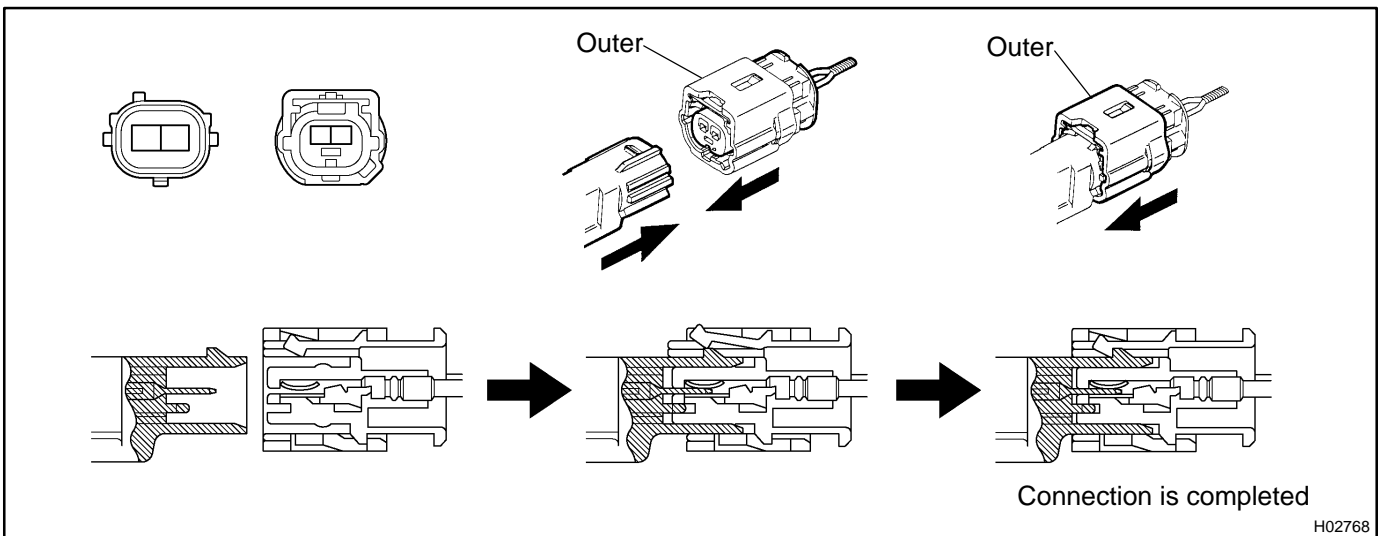
- (a) While holding both flank sides of the outer, slide the outer in the direction shown by an arrow.
- (b) Lock of the connectors is released, and then disconnect the connectors.

**HINT:**

Be sure to hold both flank sides of the outer. If holding the top and bottom sides, it will obstruct disconnection.



**15. CONNECTION OF CONNECTORS FOR FRONT AIRBAG SENSOR, SIDE AND CURTAIN SHIELD AIRBAG SENSOR AND CURTAIN SHIELD AIRBAG SENSOR**



- (a) Align the male connector (of the side of sensor) and female connector in the same direction as shown in the illustration and fit them in without rubbing.
- (b) As they are fitted in, the outer slides rearward. Press it until the outer returns to its original position again.

If fitting stops half way, connectors will separate.

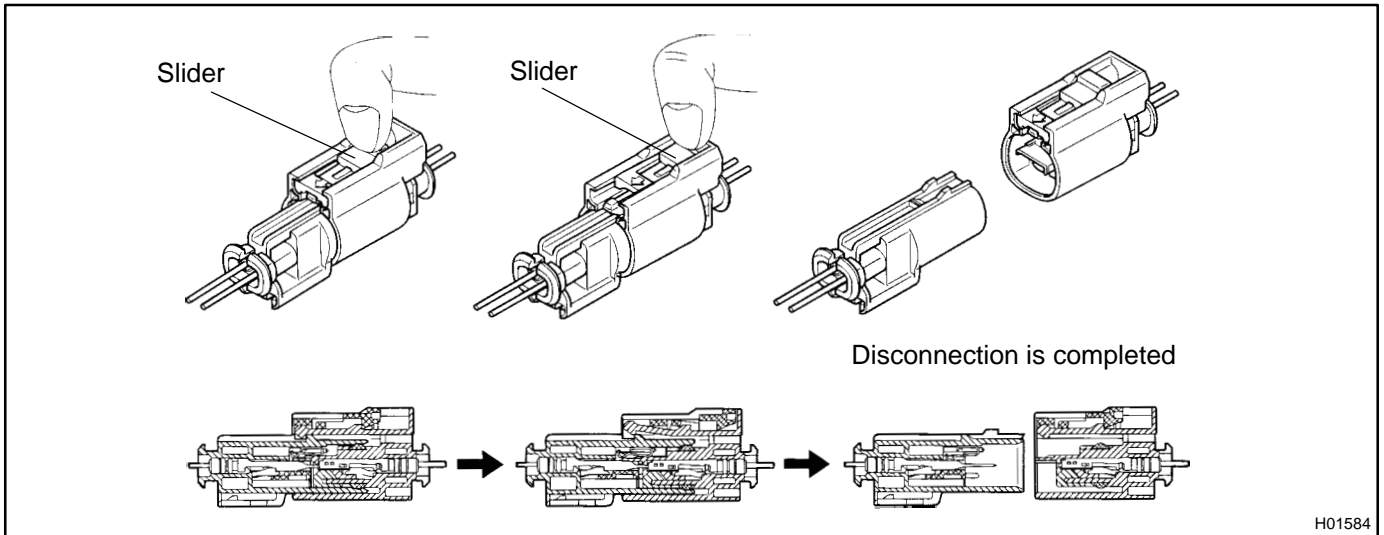
- (c) Be sure to insert until they are locked. After fitting in, pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound to be fit in can be heard.)

HINT:

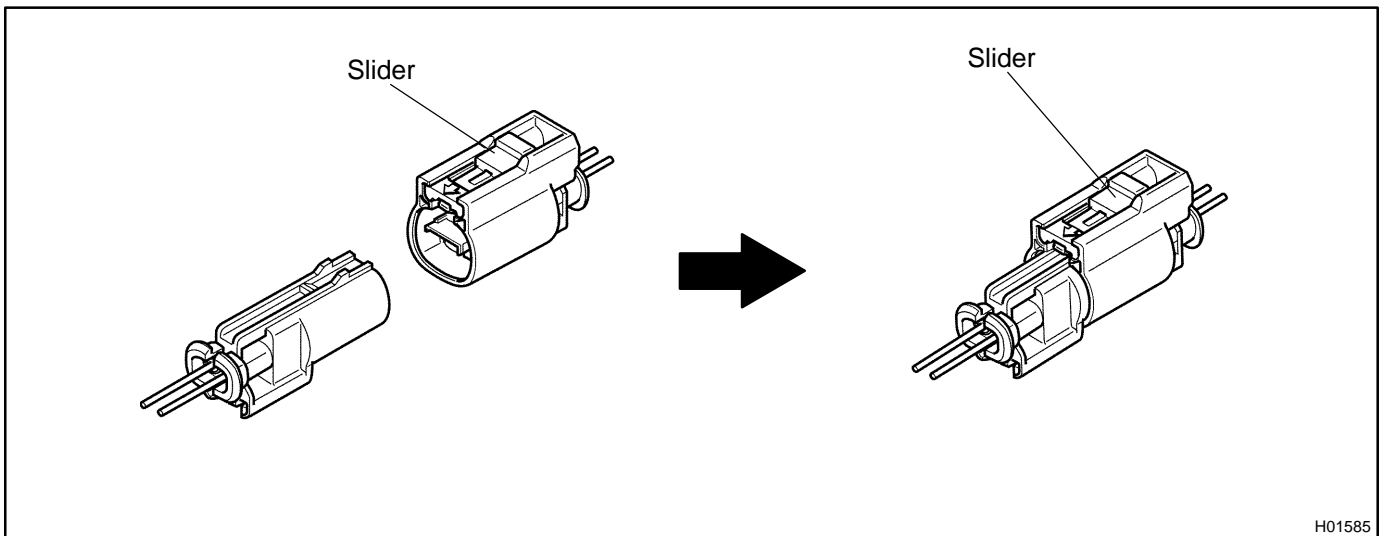
- \* Do not fit in while holding the outer.
- \* When fitting in, the outer slides. Do not touch it.

**16. DISCONNECTION OF SIDE AIRBAG CONNECTOR**

- (a) Place a finger on the slider.
- (b) Slide the slider to release lock.
- (c) Disconnect the connector.



**17. CONNECTION OF SIDE AIRBAG CONNECTOR**



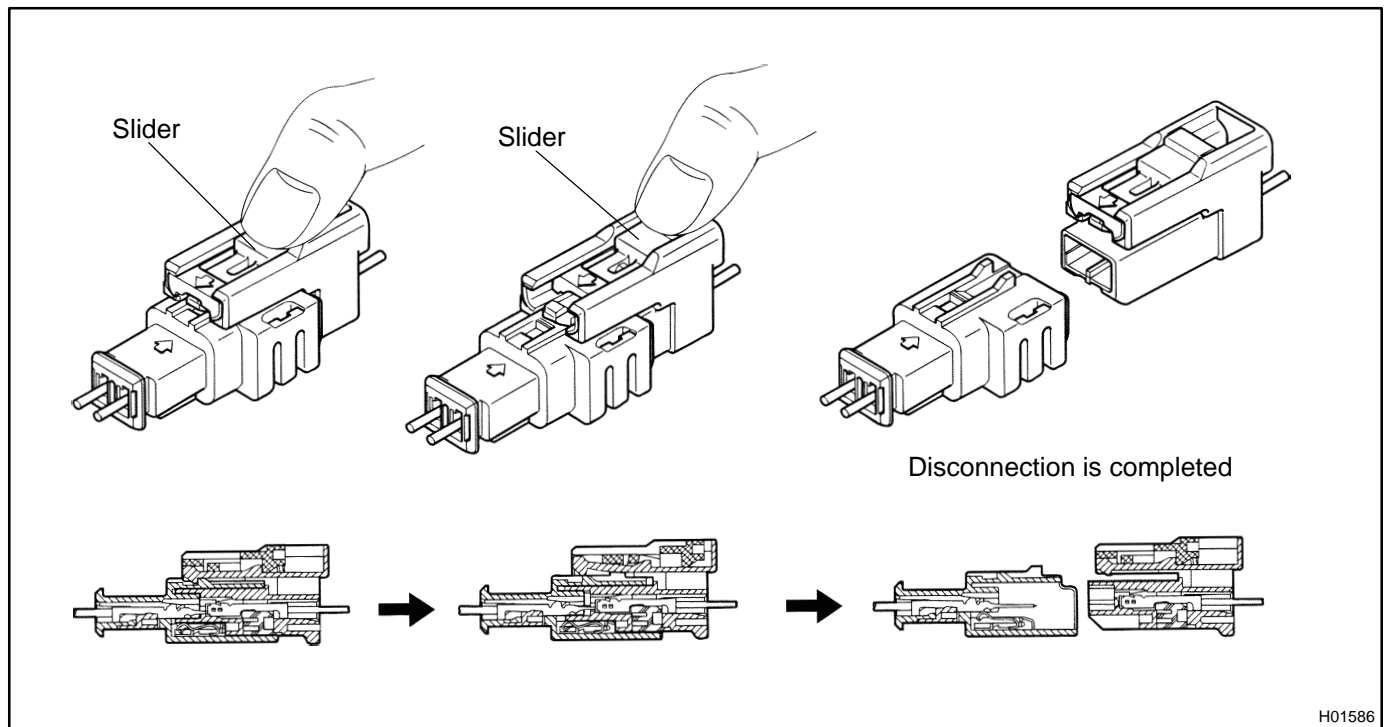
- (a) Align a lock part of male connector and a slider of female connector in the same direction as shown in the illustration, fit them in without rubbing.
- (b) Be sure to insert until they are locked. After fitting in pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound to be fit in can be heard.)

HINT:

- \* As the slider slides, do not touch it.
- \* Be careful not to deform the release board. If the release board is deformed, replace it with a new one.

**18. DISCONNECTION OF CONNECTORS FOR CURTAIN SHIELD AIRBAG ASSEMBLY AND FRONT PASSENGER AIRBAG ASSEMBLY**

- (a) Place a finger on the slider.
- (b) Slide the slider to release lock.
- (c) Disconnect the connector.

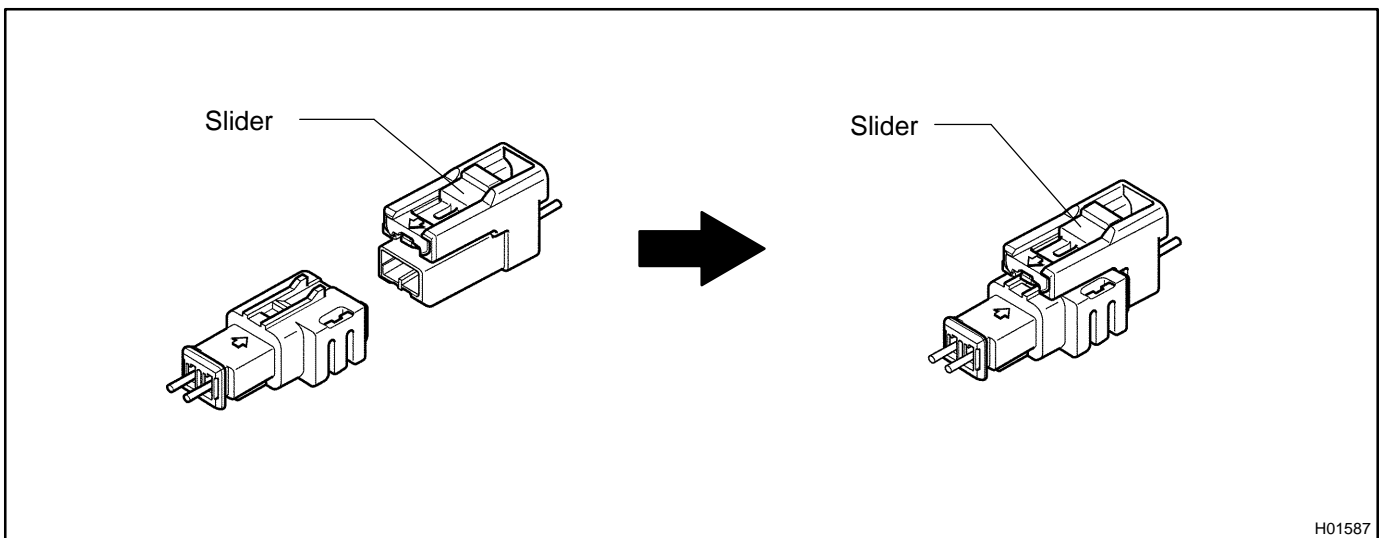


**19. CONNECTION OF CONNECTORS FOR CURTAIN SHIELD AIRBAG ASSEMBLY AND FRONT PASSENGER AIRBAG ASSEMBLY**

- (a) Align a lock part of male connector and a slider of female connector in the same direction as shown in the illustration, fit them in without rubbing.
- (b) Be sure to insert until they are locked. After fitting in pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound to be fit in can be heard.)

**HINT:**

- \* As the slider slides, do not touch it.
- \* Be careful not to deform the release board. If the release board is deformed, replace it with a new one.



H01587

# SRS AIRBAG

## PRECAUTION

RS0B6-06

### CAUTION:

- ▶ The LAND CRUISER is equipped with SRS, which comprises a driver airbag, front passenger airbag, side airbag and curtain shield airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible that the SRS may fail to operate when required. Before performing servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedures described in the repair manual.
- ▶ Work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.  
(The SRS is equipped with a back-up power source so that if work is started within 90 seconds from disconnecting the negative (-) terminal cable of the battery, the SRS may be deployed.)
- ▶ Do not expose the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, airbag sensor assembly, front airbag sensor, side and curtain shield airbag sensor assembly, curtain shield airbag sensor assembly or seat position sensor assembly directly to hot air or flames.

### NOTICE:

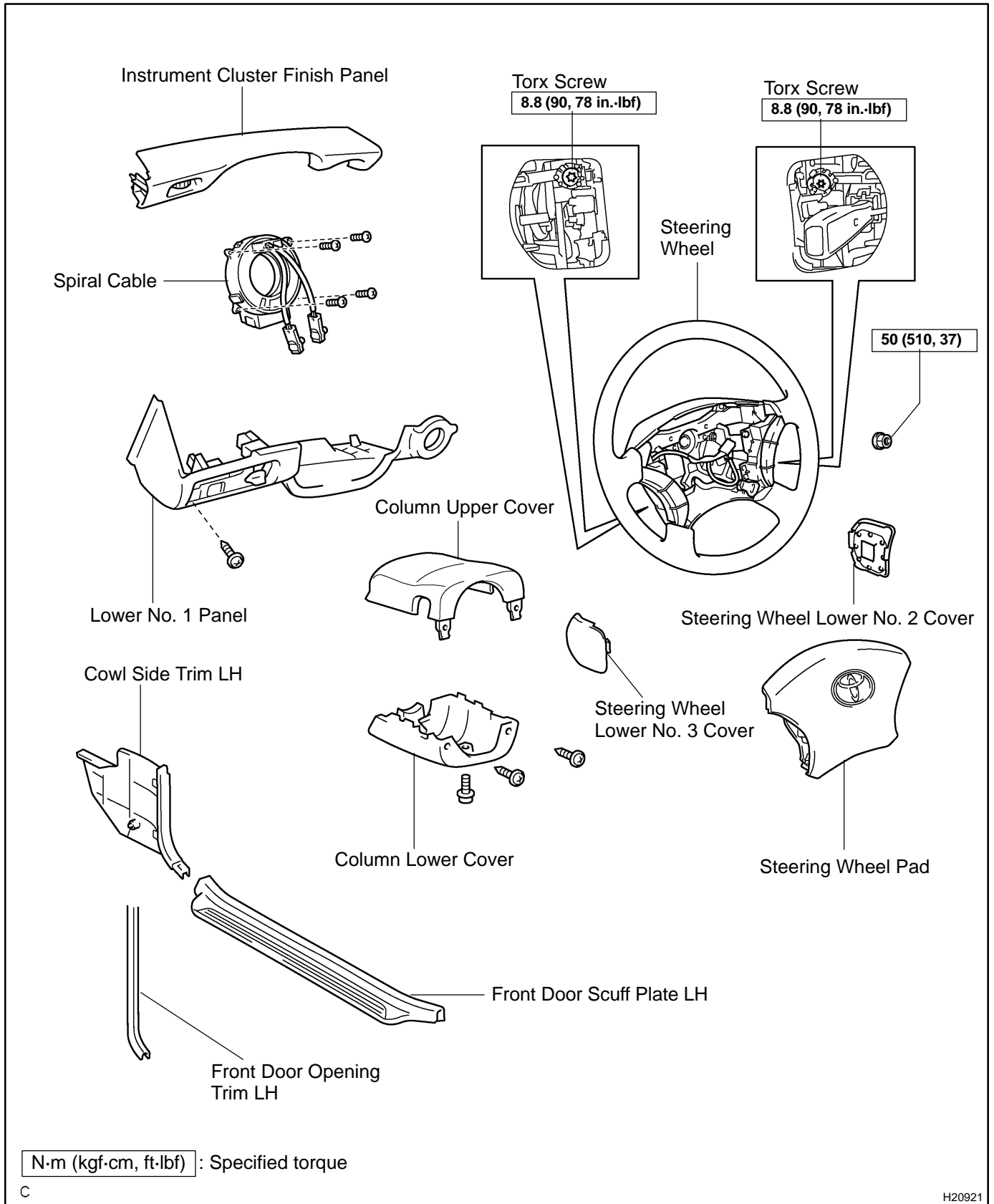
- ▶ Malfunction symptoms of the SRS are difficult to confirm, so the DTCs become the most important source of information when troubleshooting. When troubleshooting the SRS, always inspect the DTCs before disconnecting the battery.
- ▶ Even in the case of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, airbag sensor assembly, front airbag sensor, side and curtain shield airbag sensor assembly, curtain shield airbag sensor assembly and seat position sensor assembly should be inspected (See page [RS-18](#) , [RS-32](#) , [RS-47](#) , [RS-60](#) , [RS-71](#) , [RS-76](#) , [RS-81](#) , [RS-87](#) and [RS-92](#) ).
- ▶ Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- ▶ Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- ▶ Never disassemble and repair the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, airbag sensor assembly, front airbag sensor, side and curtain shield airbag sensor assembly, curtain shield airbag sensor assembly or seat position sensor assembly in order to reuse it.
- ▶ If the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, airbag sensor assembly, front airbag sensor, side and curtain shield airbag sensor assembly, curtain shield airbag sensor assembly or seat position sensor assembly has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace it with new one.
- ▶ Use a volt/ohmmeter with high impedance (10 k $\Omega$ /V minimum) for troubleshooting the system's electrical circuits.
- ▶ Information labels are attached to the periphery of the SRS components. Follow the instructions on the notice.
- ▶ After work on the SRS is completed, perform the SRS warning light check (See page [DI-692](#) ).

- ▶ **When the negative (-) terminal cable is disconnected from the battery, the memory of the clock and audio system will be canceled. So before starting work, make a record of the contents memorized in the audio memory system. When work is finished, reset the audio systems as they were before and adjust the clock. To avoid erasing the memory in each memory system, never use a back- up power supply from outside the vehicle.**
- ▶ **If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.**



# STEERING WHEEL PAD AND SPIRAL CABLE COMPONENTS

RS088-10



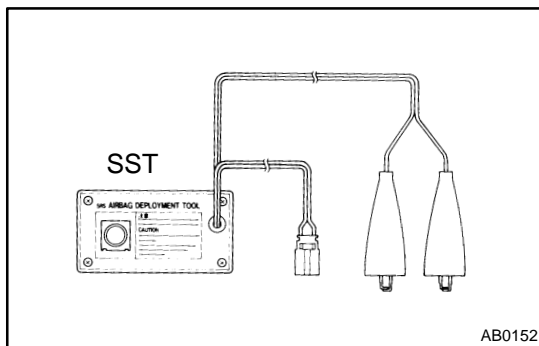
## DISPOSAL

### HINT:

When scrapping vehicle equipped with an SRS or disposing of a steering wheel pad (with airbag), always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

### CAUTION:

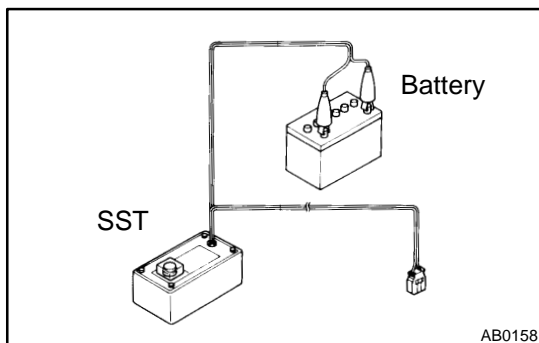
- ▶ Never dispose of a steering wheel pad of which airbag has not been deployed.
- ▶ The airbag produces a sizeable exploding sound when it deploys, so perform the operation out-of-doors and where it will not create a nuisance to nearby residents.



- ▶ When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.

SST 09082-00700

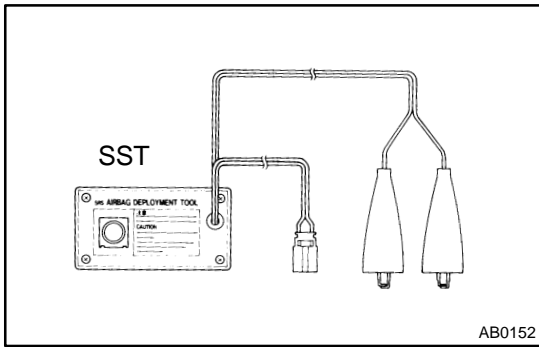
- ▶ When deploying an airbag, perform the operation at least 10 m (33 ft) away from the steering wheel pad.
- ▶ The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a steering wheel pad with the deployed airbag.



### 1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

#### HINT:

Have a battery ready as the power source to deploy the airbag.

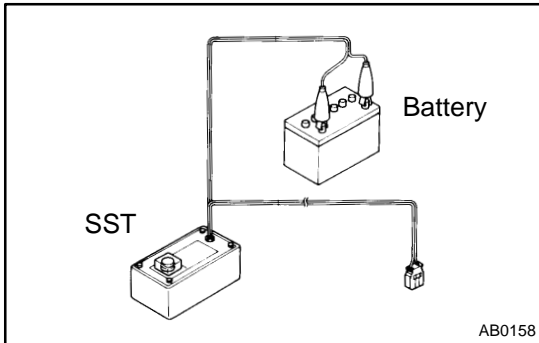


(a) Check the function of the SST.

**CAUTION:**

**When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.**

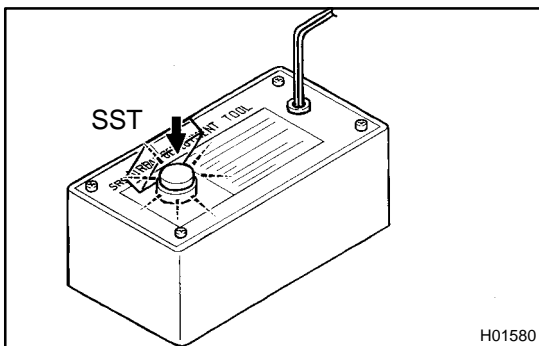
SST 09082-00700



- (1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.

**HINT:**

Do not connect the yellow connector of the SST which will be connected with the supplemental restraint system.

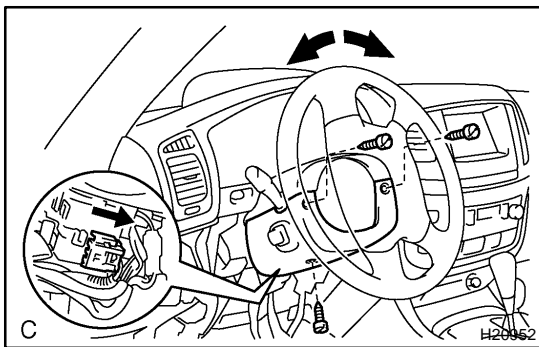


- (2) Press the SST activation switch, and check that the LED of the SST activation switch comes on.

**CAUTION:**

**If the LED lights up while the activation switch is not being pressed, a malfunction on SST is probable, so never use the SST.**

- (3) Disconnect the SST from the battery.

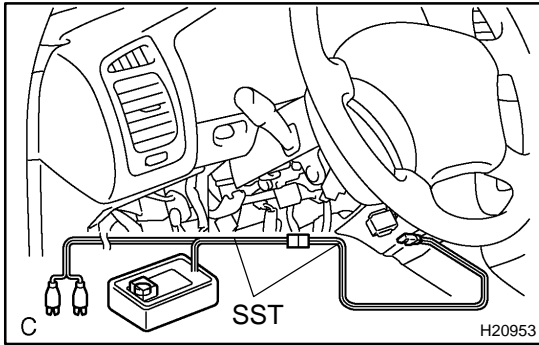


(b) Install the SST.

**CAUTION:**

**Check that there is no looseness in the steering wheel and steering wheel pad.**

- (1) Remove the front door scuff plate LH.
- (2) Remove the cowl side trim LH.
- (3) Remove the front door opening trim LH.
- (4) Remove the lower No. 1 panel.
- (5) While turning the steering wheel right or left, remove the 3 screws and column lower cover.
- (6) Disconnect the airbag connector of the spiral cable.

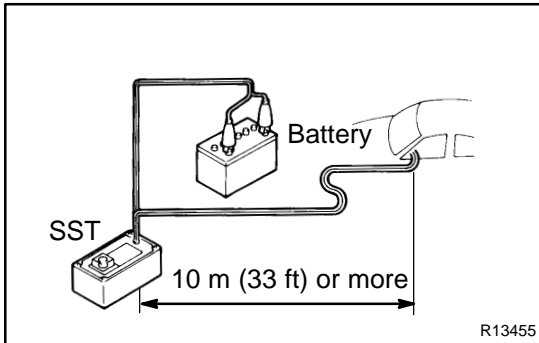


- (7) Connect the connector of SST to the airbag connector of the spiral cable.

SST 09082-00700, 09082-00780

**NOTICE:**

To avoid damaging the connector of the SST and wire harness, do not lock the secondary lock of the twin lock.



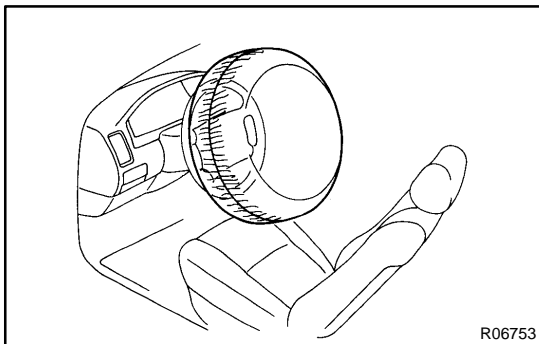
- (8) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

- (9) Close all the doors and windows of the vehicle.

**NOTICE:**

Take care not to damage the SST wire harness.

- (10) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (-) terminal.



- (c) Deploy the airbag.

- (1) Confirm that no one is inside the vehicle nor within 10 m (33 ft) area around the vehicle.

- (2) Press the SST activation switch and deploy the airbag.

**CAUTION:**

- ▶ The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ When moving a vehicle for scrapping which has a steering wheel pad with deployed airbag, use gloves and safety glasses.
- ▶ Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a steering wheel pad with the deployed airbag.

**HINT:**

The airbag deploys as the LED of the SST activation switch comes on.

**2. DEPLOYMENT WHEN DISPOSING OF STEERING WHEEL PAD ONLY**

**NOTICE:**

- ▶ When disposing of the steering wheel pad (with airbag) only, never use the customer's vehicle to deploy the airbag.
- ▶ Be sure to follow the procedure given below when deploying the airbag.

## HINT:

Have a battery ready as the power source to deploy the airbag.  
 (a) Remove the steering wheel pad (See page [SR-14](#)).

## CAUTION:

- ▶ When storing the steering wheel pad, keep the upper surface of the pad facing upward.
- ▶ When removing the steering wheel pad, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

(b) Using a service-purpose wire harness for the vehicle, tie down the steering wheel pad to the disc wheel.

**Wire harness: Stripped wire harness section  
 1.25 mm<sup>2</sup> or more (0.0019 in<sup>2</sup>. or more).**

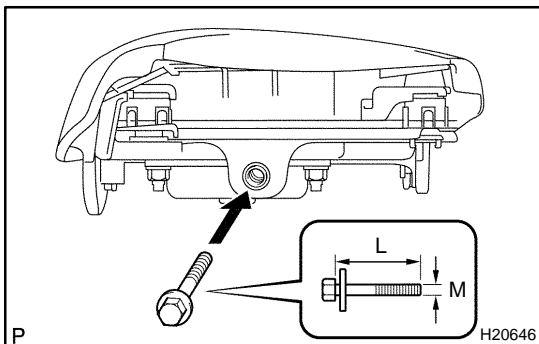
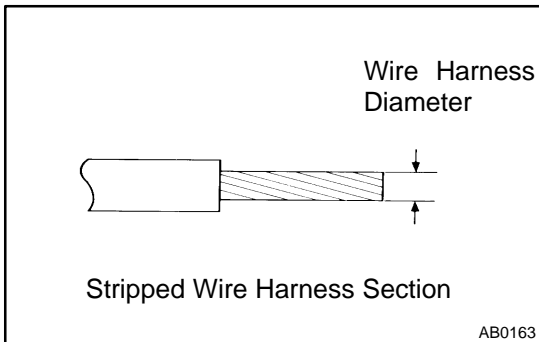
## CAUTION:

If a wire harness which is too thin or some other thing is used to tie down the steering wheel pad, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm<sup>2</sup> (0.0019 in<sup>2</sup>).

## HINT:

To calculate the square of the stripped wire harness section:

$$\text{Square} = 3.14 \times (\text{Diameter})^2 \text{ divided by } 4$$



(1) Install the 2 bolts with washers in the 2 bolt holes in the steering wheel pad.

## Bolt:

**L: 35.0 mm (1.387 in.)**

**M: 6.0 mm (0.236 in.)**

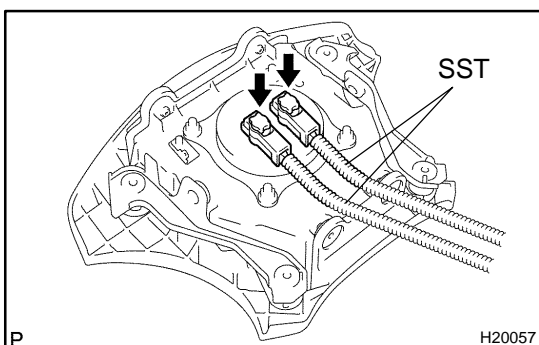
**Pitch: 1.0 mm (0.039 in.)**

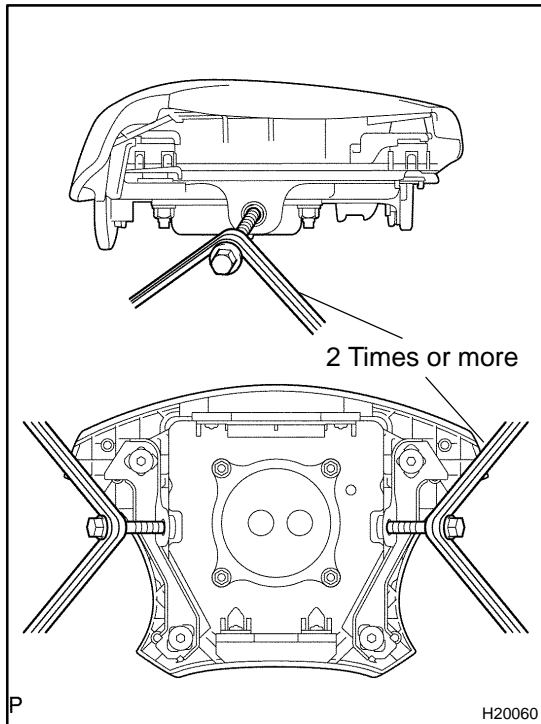
## NOTICE:

- ▶ Tighten the bolts by hand until the bolts become difficult to turn.
- ▶ Do not tighten the bolts excessively.

(2) Connect the connectors of the SST to the steering wheel pad connectors.

SST 09082-00802 (09082-10801, 09082-30801)

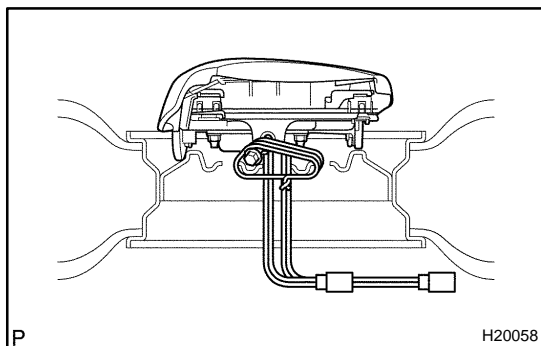




- (3) Using 3 wire harness, wind the wire harness at least 2 times each around the bolts installed on the left and right sides of the steering wheel pad.

**CAUTION:**

- ▶ **Tightly wind the wire harness around the bolts so that there is no slack.**
- ▶ **If there is slackness in the wire harness, the steering wheel pad may come loose due to the shock when the airbag is deployed. This is highly dangerous.**



- (4) Face the upper surface of the steering wheel pad upward. Separately tie the left and right sides of the steering wheel pad to the disc wheel through the hub nut holes. Position the steering wheel pad connector so that it hangs downward through a hub hole in the disc wheel.

**CAUTION:**

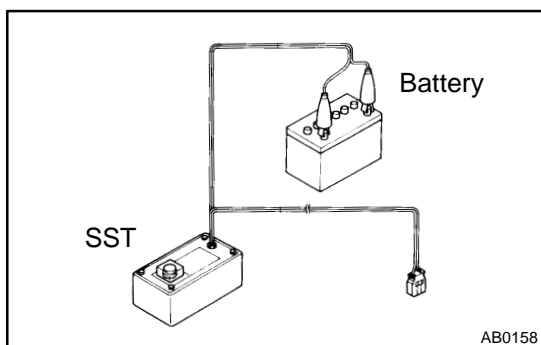
- ▶ **Make sure that the wire harness is tight. It is very dangerous when looseness in the wire harness results in the steering wheel pad coming free through the shock from the airbag deploying.**
- ▶ **Always tie down the steering wheel pad with the pad side facing upward. It is very dangerous if the steering wheel pad is tied down with the metal surface facing upward as the wire harness will be cut by the shock caused by the airbag is deployment and the steering wheel pad will be thrown into the air.**

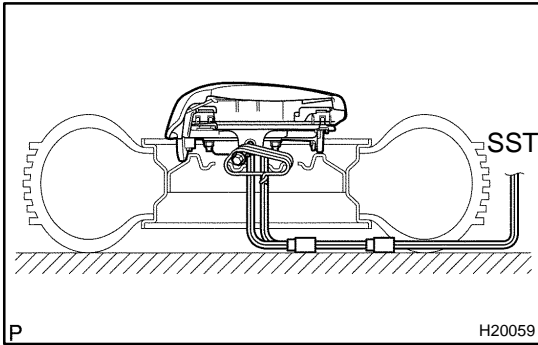
**NOTICE:**

**The disc wheel will be marked by airbag deployment, so when disposing of the airbag, use a redundant disc wheel.**

- (c) Check the function of the SST (See step 1-(a)).

SST 09082-00700





(d) Install the SST.

**CAUTION:**

**Place the disc wheel on the level ground.**

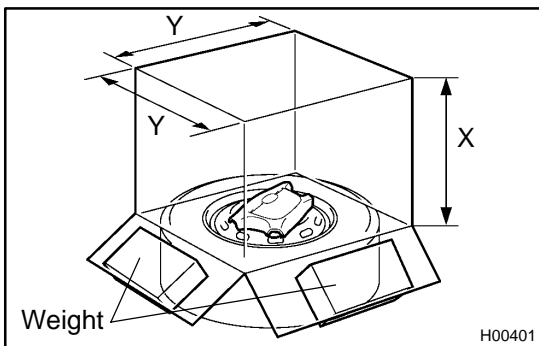
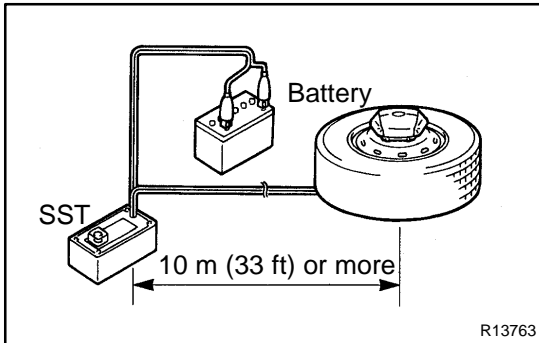
(1) Connect the connector of the SST.

SST 09082-00700

**NOTICE:**

**To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the disc wheel.**

(2) Move the SST at least 10 m (33 ft) away from the steering wheel pad tied down on the disc wheel.



(e) Cover the steering wheel pad with a cardboard box or tires.

► **Covering method using a cardboard box:**

Cover the steering wheel pad with the cardboard box and weight the cardboard box down in 4 places with at least 190 N (20 kg, 44 lb).

**Size of cardboard box:**

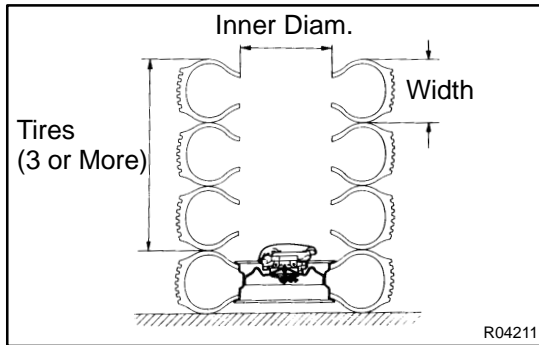
**Must exceed the following dimensions:**

**X = 460 mm (18.11 in.)**

**Y = 650 mm (25.59 in.)**

**NOTICE:**

- **When dimension Y of the cardboard box exceeds the diameter of the disc wheel with tire to which the steering wheel pad is tied, X should be the following size.  
X = 460 mm (18.11 in.) + width of tire**
- **If a cardboard box smaller than the specified size is used, the cardboard box will be broken by the shock from the airbag deployment.**



- ▶ Covering method using tires:  
Place at least 3 tires with no disc wheels on top of the tire with disc wheel to which the steering wheel pad is tied.

**Tire size: Must exceed the following dimensions-**

**Width: 185 mm (7.28 in.)**

**Inner diameter: 360 mm (14.17 in.)**

**CAUTION:**

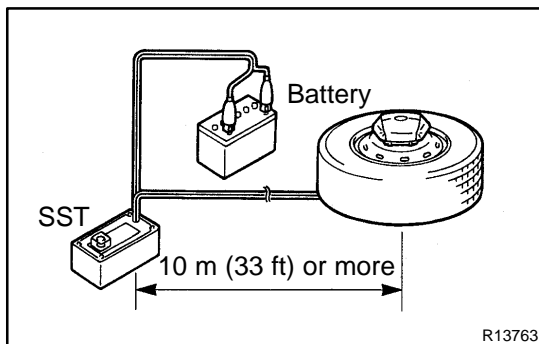
**Do not use tires with disc wheels.**

**NOTICE:**

**The tires may be marked by the airbag deployment, so use the redundant tires.**

(f) Deploy the airbag.

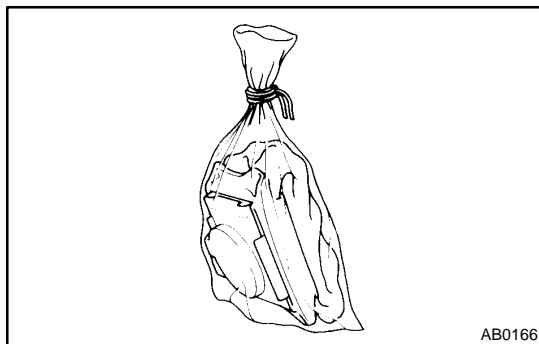
- (1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.



- (2) Check that no one is within 10 m (33 ft) area around the disc wheel which the steering wheel pad is tied to.
- (3) Press the SST activation switch and deploy the airbag.

**HINT:**

The airbag deploys as the LED of the SST activation switch comes on.



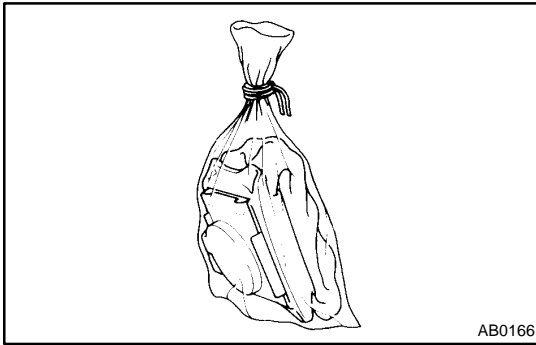
(g) Dispose of the steering wheel pad (with airbag).

**CAUTION:**

- ▶ The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ Use gloves and safety glasses when handling a steering wheel pad with deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a steering wheel pad with deployed airbag.

- (1) Remove the steering wheel pad from the disc wheel.
- (2) Place the steering wheel pad in a plastic bag, tie the end tightly and dispose of it as the other general parts disposal.



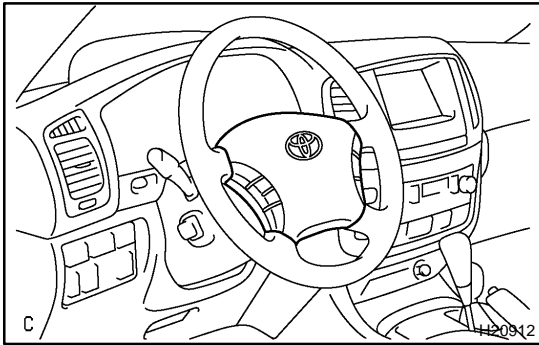


### 3. DEPLOYMENT WHEN DISPOSING OF STEERING WHEEL PAD WITH AN AIRBAG DEPLOYED IN A COLLISION

Dispose of the steering wheel pad (with airbag).

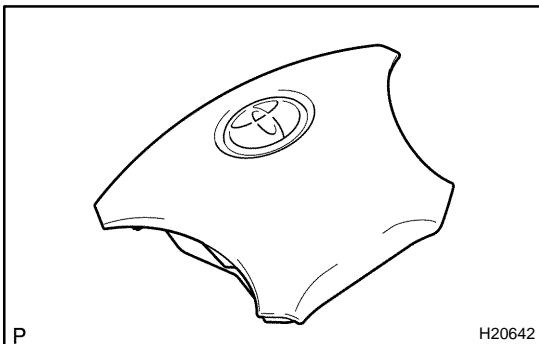
#### CAUTION:

- ▶ The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.
- ▶ When moving a vehicle for scrapping which has a steering wheel pad with the deployed airbag, use gloves and safety glasses.
- ▶ Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a steering wheel pad with the deployed airbag.
  - (1) Remove the steering wheel pad from the steering wheel (See page [SR-14](#) ).
  - (2) Place the steering wheel pad in a plastic bag, tie the end tightly and dispose of it as the other general parts disposal.

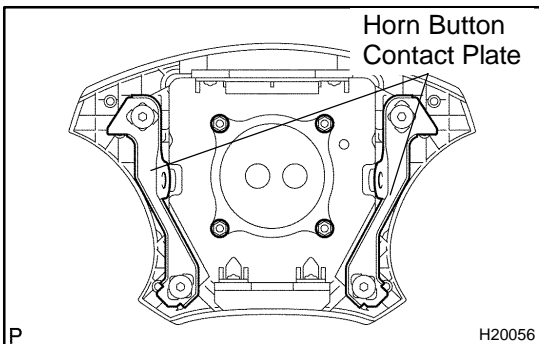


## INSPECTION

1. **Vehicle not involved in collision:**  
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**
  - (a) Do a diagnostic system check (See page [DI-692](#) ).
  - (b) Do a visual check which includes the following item with the steering wheel pad (with airbag) installed in the vehicle.  
 Check cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.
2. **Vehicle involved in collision and airbag is not deployed:**  
**INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**
  - (a) Do a diagnostic system check (See page [DI-692](#) ).



- (b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.
  - ▶ Check cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.
  - ▶ Check cuts and cracks in wire harness, and chipping in connectors.
  - ▶ Check the deformation of the horn button contact plate on the steering wheel pad (with airbag).

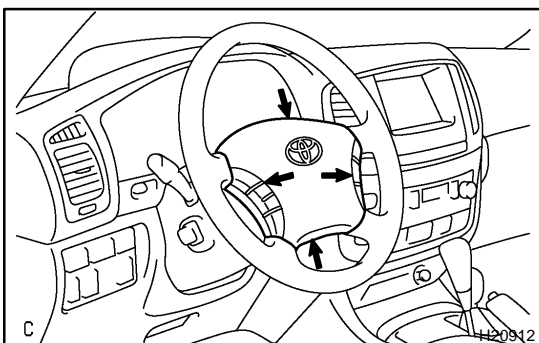


### CAUTION:

For removal and installation of the steering wheel pad, see page [SR-14](#) and [SR-24](#) , and be sure to follow the correct procedure.

### HINT:

- ▶ If the horn button contact plate of the steering wheel pad (with airbag) is deformed, never repair it. Always replace the steering wheel assembly with a new one.
- ▶ There should be no interference between the steering wheel pad and steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

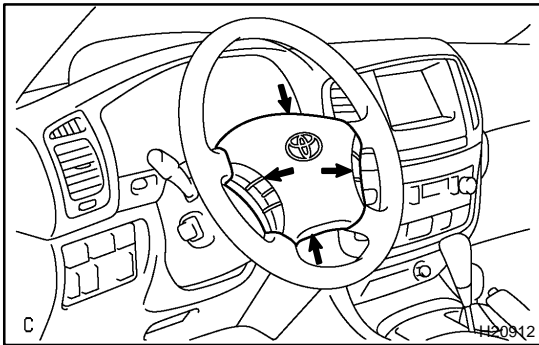


**3. Vehicle involved in collision and airbag is deployed:  
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

- (a) Do a diagnostic system check (See page [DI-692](#) ).
- (b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.
  - ▶ Check that the metal part where the steering wheel pad is to be installed is not deformed.
  - ▶ Check the damage on the spiral cable connector and wire harness.

**HINT:**

- ▶ Do not repair the metal part where the steering wheel pad is to be installed even if any deformation is found. Always replace the steering wheel assembly with a new one.



- ▶ There should be no interference between the steering wheel pad and steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

## INSTALLATION

HINT:

For step 1 to 9, refer to page [SR-24](#) .

1. **INSTALL SPIRAL CABLE**
2. **INSTALL COLUMN UPPER AND LOWER COVERS**
3. **INSTALL LOWER NO. 1 PANEL**
4. **INSTALL INSTRUMENT CLUSTER FINISH PANEL**
5. **INSTALL FRONT DOOR OPENING TRIM LH**
6. **INSTALL COWL SIDE TRIM LH**
7. **INSTALL FRONT DOOR SCUFF PLATE LH**
8. **INSTALL STEERING WHEEL**
9. **INSTALL STEERING WHEEL PAD**
10. **INSPECT SRS WARNING LIGHT (See page [DI-692](#) )**

## REMOVAL

HINT:

For step 1 to 9, refer to page [SR-14](#) .

1. REMOVE STEERING WHEEL PAD
2. REMOVE STEERING WHEEL
3. REMOVE FRONT DOOR SCUFF PLATE LH
4. REMOVE COWL SIDE TRIM LH
5. REMOVE FRONT DOOR OPENING TRIM LH
6. REMOVE INSTRUMENT CLUSTER FINISH PANEL
7. REMOVE LOWER NO. 1 PANEL
8. REMOVE COLUMN UPPER AND LOWER COVERS
9. REMOVE SPIRAL CABLE

# REPLACEMENT

## REPLACEMENT REQUIREMENTS

In the following cases, replace the steering wheel pad, steering wheel or spiral cable.

Case	Replacing part
If the airbag has been deployed.	Steering wheel pad
If the steering wheel pad has been found to be faulty in troubleshooting.	Steering wheel pad
If the spiral cable has been found to be faulty in troubleshooting.	Spiral cable
If the steering wheel pad has been found to be faulty during checking items (See page <a href="#">RS-18</a> ).	Steering wheel pad
If the steering wheel has been found to be faulty during checking items (See page <a href="#">RS-18</a> ).	Steering wheel
If the spiral cable has been found to be faulty during checking items (See page <a href="#">RS-18</a> ).	Spiral cable
If the steering wheel pad has been dropped.	Steering wheel pad

### CAUTION:

For removal and installation of the steering wheel pad, see page [SR-14](#) and [SR-24](#) , and be sure to follow the correct procedure.

## INSPECTION

### HINT:

The SRS wire harness is integrated with the cowl wire harness assembly. The wires for the SRS wire harness are encased in a yellow corrugated tube and all the connectors in the system are a standard yellow color.

#### 1. Vehicle not involved in collision:

##### **INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

Do a diagnostic system check (See page [DI-692](#) ).

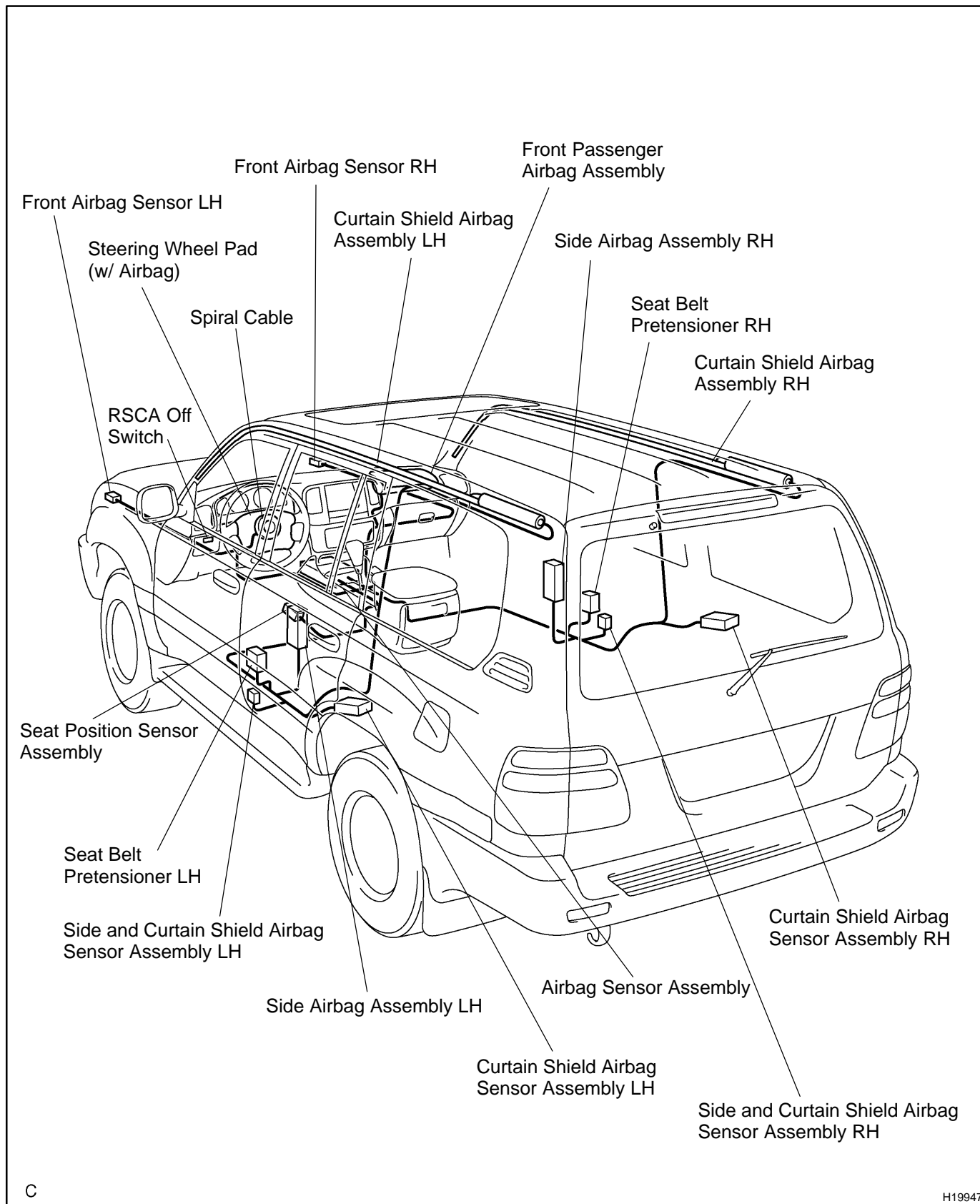
#### 2. Vehicle involved in collision:

##### **INSPECT SUPPLEMENTAL RESTRAINT SYSTEM**

- (a) Do a diagnostic system check (See page [DI-692](#) ).
- (b) Check for breaks in all wires of the SRS wire harness, and for exposed conductors.
- (c) Check to see if the SRS wire harness connectors are cracked or chipped.

# WIRE HARNESS AND CONNECTOR LOCATION

RS0BU-07





## REPLACEMENT

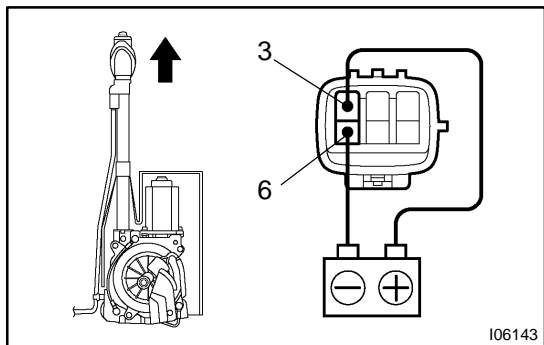
### REPLACEMENT REQUIREMENTS

In the following cases, replace the wire harness or connector.

- ▶ If any part of the SRS wire harness or any connector has been found to be faulty in troubleshooting.
- ▶ If any part of the SRS wire harness or any connector has been found to be faulty during checking items 2-(b) or (c) (See page [RS-97](#) ).

### NOTICE:

**If the wire harness used in the SRS is damaged, replace the whole wire harness assembly.**



## INSPECTION

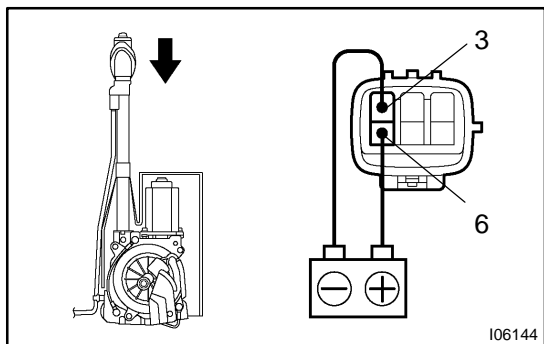
### 1. Auto Antenna Models:

#### INSPECT ANTENNA MOTOR

- (a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 6.
- (b) Check that the motor turns (moves upward).

**NOTICE:**

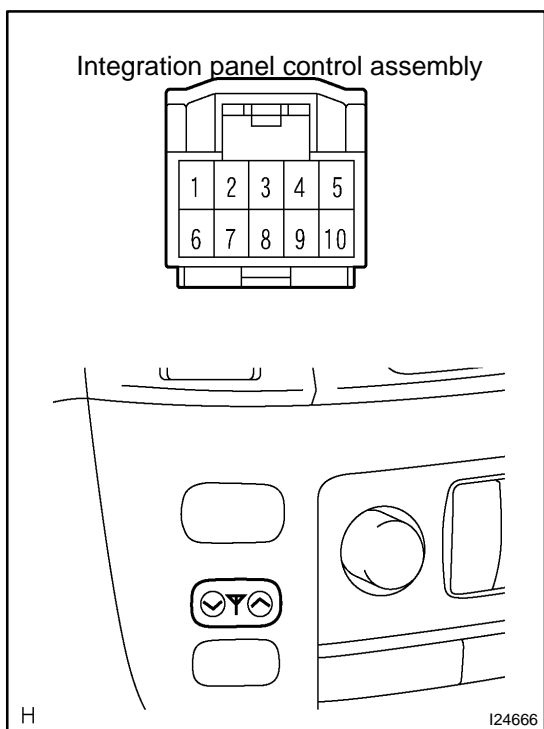
**These tests must be done quickly (within 3 - 5 seconds) to prevent the coil from burning out.**



- (c) Then, reverse the polarity, check that the motor turns the opposite way (moves downward).

**NOTICE:**

**These tests must be done quickly (within 3 - 5 seconds) to prevent the coil from burning out.**

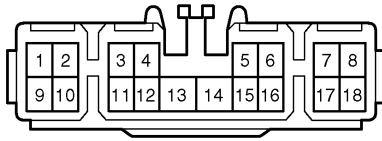


### 2. INSPECT ANTENNA SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
UP button FREE	4 - 5	No continuity
UP button Pushed in	4 - 5	Continuity
DOWN button FREE	9 - 5	No continuity
DOWN button Pushed in	9 - 5	Continuity

If continuity is not as specified, replace the switch.

## Wire Harness Side



I06145

### 3. Auto Antenna Models: INSPECT ANTENNA MOTOR CONTROL RELAY CIRCUIT

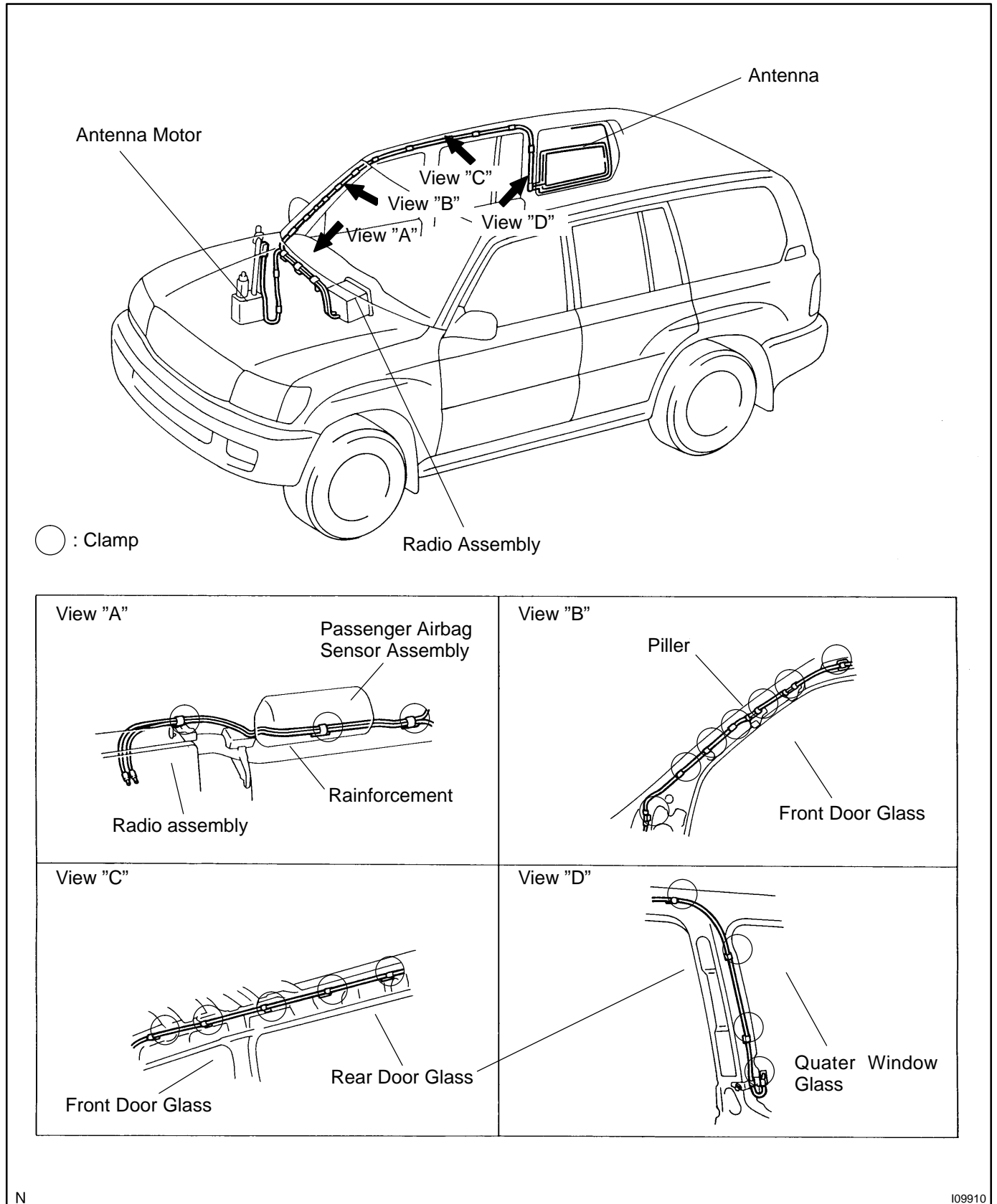
Disconnect the connector from the relay and inspect the connector on wire harness side, as shown in the chart on the next page.

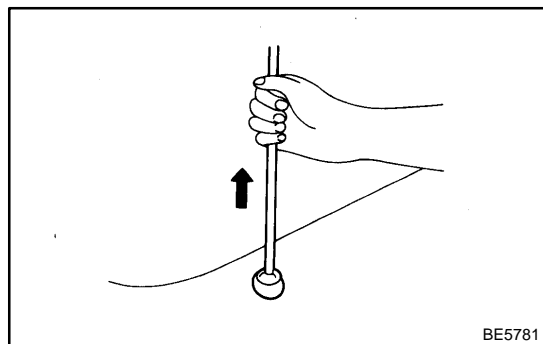
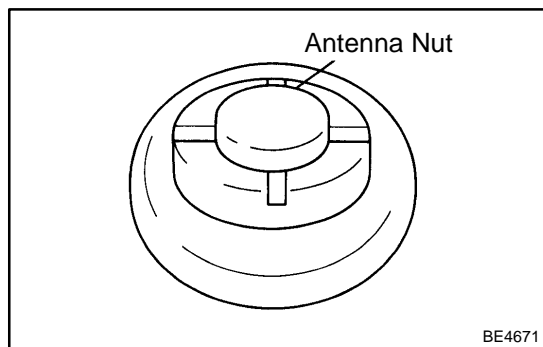
Tester connection	Condition	Specified condition
1 - Ground	Antenna "UP" switch OFF	No continuity
1 - Ground	Antenna "UP" switch ON	Continuity
5 - Ground	Constant	Continuity
9 - Ground	Antenna "DOWN" switch OFF	No continuity
9 - Ground	Antenna "DOWN" switch ON	Continuity
4 - Ground	Constant	Battery positive voltage
7 - Ground	Ignition switch ACC or LOCK	No voltage
7 - Ground	Ignition switch ON	Battery positive voltage
17 - Ground	Ignition switch LOCK	No voltage
17 - Ground	Ignition switch ACC or ON	Battery positive voltage

If circuit is as specified, replace the relay.

# ANTENNA LOCATION

BE0G9-04





## REPLACEMENT

### 1. Auto antenna models: REMOVE ANTENNA ROD

#### HINT:

Do this operation with the battery negative (-) cable connected to the battery terminal.

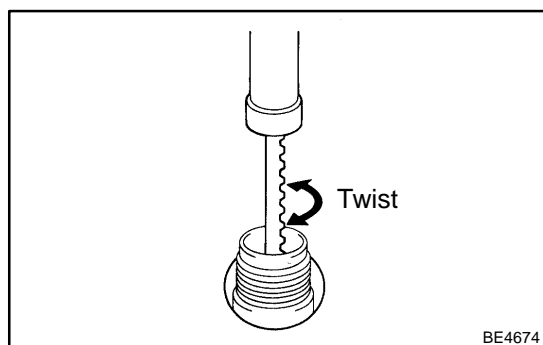
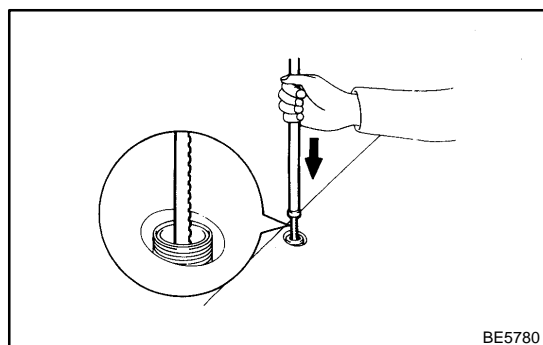
- (a) Remove the antenna nut.
- (b) Turn the radio switch "ON" position.
- (c) Turn the antenna switch to "UP".
- (d) Catch the antenna rod by hand and turn the radio switch "OFF".
- (e) Try again to turn the radio switch "ON" and antenna switch "UP".
- (f) Remove antenna rod.

#### HINT:

The rod will extend fully and be released from the motor antenna.

#### NOTICE:

To prevent body damage when the antenna rod is released, hold the rod while it comes out.



### 2. Auto antenna models: INSTALL ANTENNA ROD

- (a) Insert the cable of the rod until it reaches the bottom.

#### HINT:

- ▶ When inserting the cable, the teeth on the cable must face toward the rear of the vehicle.
  - ▶ Insert the antenna approx. 350 mm.
- (b) Turn the radio switch to "OFF".

#### HINT:

- ▶ In case the cable is not wound, twist it, as shown in the illustration.
  - ▶ Even if the rod has not retracted fully, install the antenna nut and inspect the antenna rod operation. It will finally retract fully.
- (c) Inspect the antenna rod operation by pushing the radio wave band select buttons.

# AUDIO SYSTEM DESCRIPTION

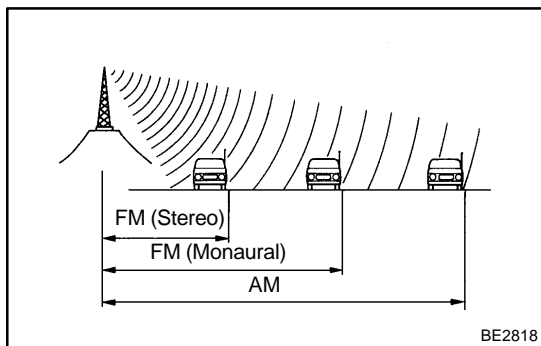
BE2E8-01

## 1. RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM		FM	
Modulation	Amplitude modulation			Frequency modulation	

LF: Low Frequency  
 MF: Medium Frequency  
 HF: High Frequency  
 VHF: Very High Frequency

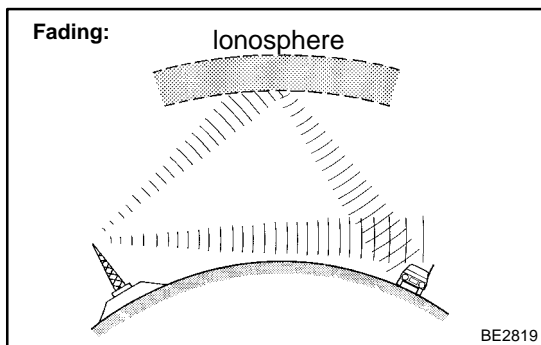


## 2. SERVICE AREA

There are great differences in the size of the service area for AM and FM monaural. Sometimes FM stereo broadcasts cannot be received even though AM can be received very clearly. Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference ("noise") easily.

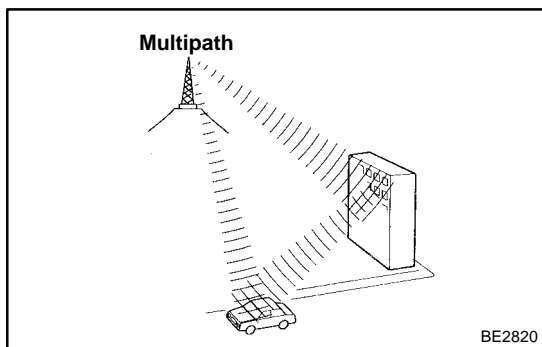
## 3. RECEPTION PROBLEMS

Besides the problem of static, there are also the problems called "fading", "multipath" and "fade out". These problems are caused not by electrical noise but by the nature of the radio waves themselves.

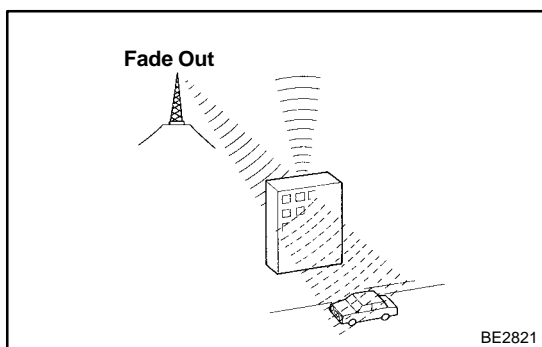


### (1) Fading

Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle's antenna directly. This type of interference is called "fading".



- (2) **Multipath**  
One type of interference caused by the bounce of radio waves off of obstructions is called "multipath". Multipath occurs when a signal from the broadcast transmitter antenna bounces off buildings and mountains and interferes with the signal that is received directly.



- (3) **Fade Out**  
Because FM radio waves are of higher frequencies than AM radio waves, they bounce off buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstruction. This is called "fade out".

**4. NOISE PROBLEMS**

- (a) **Questionnaire for noise:**  
It is very important for noise trouble shooting to have good understanding of the claims from the customers. Refer to the following questionnaire to diagnose the problem accurately.

AM	Noise occurs at a specific place.	Strong possibility of foreign noise.
	Noise occurs when listening to faint broadcasting.	There is a possibility that the same program is broadcasted from different local stations, and that might be listening a program from other station.
	Noise occurs only at night.	Strong possibility of the beat from a distant broadcasting.
FM	Noise occurs while driving on a particular area..	Strong possibility of multipath noise and fading noise caused by the changes of FM waves.

**HINT:**  
In the condition of noise occurrence does not meet any of the above questionnaire, check the problems to "Reception Problem" on the previous page.

- (b) Matters that require attention when checking:
- ▶ Noise coming into the radio usually has no harm for daily use as the noise protection is taken, and it is very rare for an extremely loud noise to come in. When extremely loud noise comes into the radio, check if the grounding is normal where the antenna is installed.
  - ▶ Check if all the regular noise prevention parts are properly installed, and if there is any installation of non-authorized parts and non-authorized wiring.
  - ▶ If you leave the radio out of tune (not turning), it is easy to diagnose the phenomenon as noise occurs frequently.
- (c) Antenna and noise:  
Electronic signal received by the antenna will reach to the radio transmitting through the core wire of the coaxial cable. Any noise wave other than radio wave is mixed into this core wire, that naturally causes noise in the radio and poor sound quality. In order to prevent the noise from coming into radio, the core wire inside the coaxial cable is covered with a mesh wire called shield wire which transmits the noise to the ground.

## 5. COMPACT DISC PLAYER

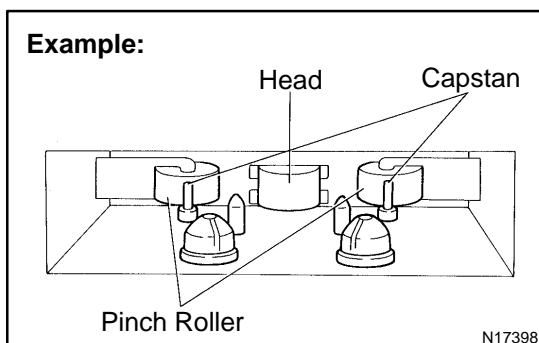
Compact Disc Players use a laser beam pick-up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc.

HINT:

Never attempt to disassemble or oil any part of the player unit. Do not insert any object other than a disc into the magazine.

**NOTICE:**

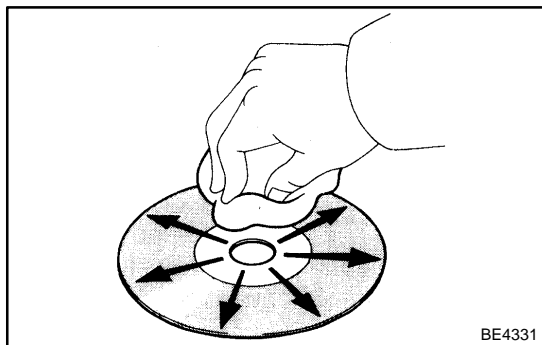
**CD players use an invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.**



## 6. Tape player/head cleaning: MAINTENANCE

- (a) Raise the cassette door with your finger. Next, using a pencil or similar object, push in the guide.
- (b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.





### 7. CD player/disc cleaning: MAINTENANCE

If the disc gets dirty, clean the disc by wiping the surface from the center to outside in the radial directions with a soft cloth.

#### NOTICE:

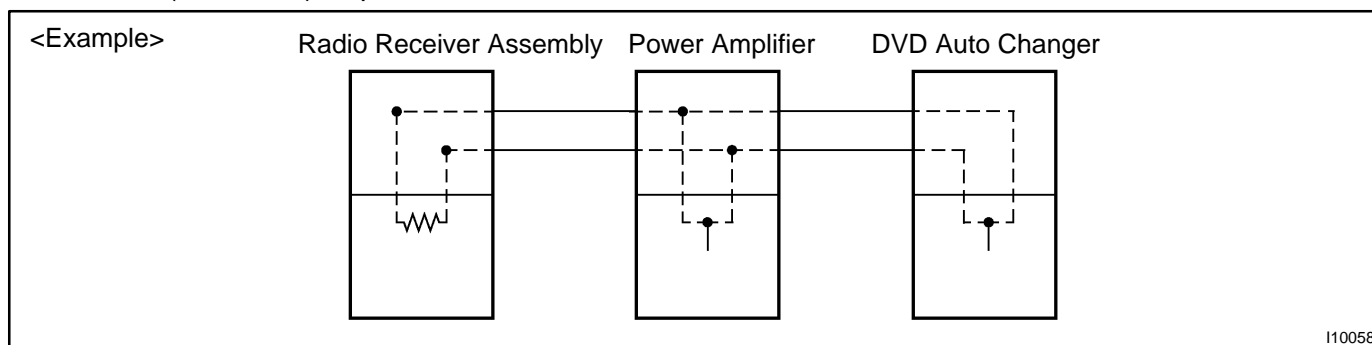
**Do not use a conventional record cleaner or anti-static preservative.**

### 8. OUTLINE OF AVC-LAN

#### (a) What is AVC-LAN?

AVC-LAN is the abbreviation, which stands for Audio Visual Communication-Local Area Network. This is a unified standard co-developed by 6 audio manufactures associated with Toyota Motor Corporation.

The Unified standard covers signals, such as audio signal, visual signal, signal for switch indication and communication signal. Radio receiver assembly and RSA (Rear Seat Audio) panel have a resistance (60 - 80  $\Omega$ ) required for communication.



#### (b) Objectives

Recently the car audio system has been rapidly developed and functions have been changed drastically. The conventional system has been switched to the multi-media type such as a navigation system. At the same time the level of customers needs to audio system has been upgraded. This lies behind this standardization.

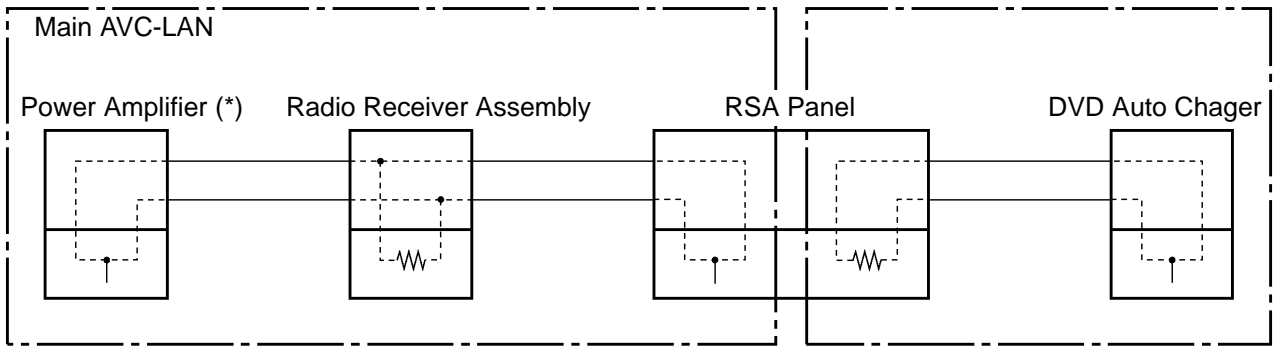
The concrete objectives are explained below.

- (1) When products by different manufactures were combined together, there used to be a case that malfunction occurred such as sound did not come out. This problem has been resolved by standardization of signals.
  - (2) Various types of after market products have been able to add or replace freely.
  - (3) Because of the above (2), each manufacture has become able to concentrate on developing products in their strongest field. This has enabled many types of products provided inexpensively.
  - (4) In general, a new product developed by one particular manufacture could not be used due to a lack of compatibility with other manufactures products. Because of this new standard, users can enjoy many compatible products from different manufacture anytime they went.
- (c) The above descriptions are the objectives to introduce AVC-LAN. By this standardization, development of new products will no longer cause systematic errors.

HINT:

- ▶ When +B short or GND short is detected in AVC-LAN circuit, communication stops. And audio system does not function normally.
- ▶ When audio system is not equipped with a navigation system, audio head unit is the master unit. When audio system is equipped with a navigation system, multi-display is the master unit.
- ▶ This system has 2 kinds of AVC-LAN, Main AVC-LAN and Sub AVC-LAN.
- ▶ RSA panel works as a master unit in the Sub AVC-LAN, but not in the Main AVC-LAN.
- ▶ The car audio system using AVC-LAN circuit has a diagnosis function.  
(w/ Navigation system (see page [DI-1263](#) )
- ▶ Each product has its own specified numbers called physical address. Numbers are also allotted to each function in one product, which are called logical address.

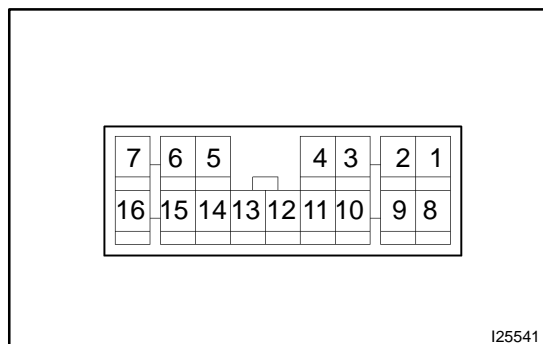
AVC-LAN:



\*: Except JBL System

H

125240



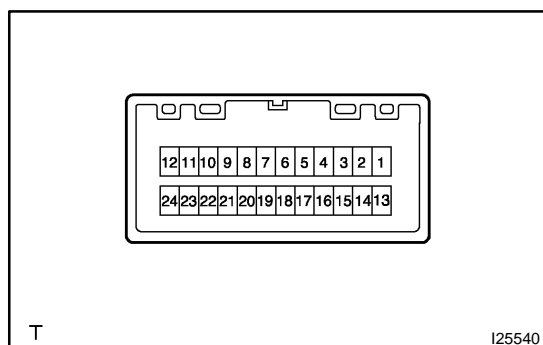
## INSPECTION

### 1. INSPECT POWER AMPLIFIER CIRCUIT

Disconnect the connector from power amplifier and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
12 - Ground	Constant	Continuity
13 - Ground	Constant	Continuity
7 - Ground	Constant	Battery voltage
16 - Ground	Constant	Battery voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

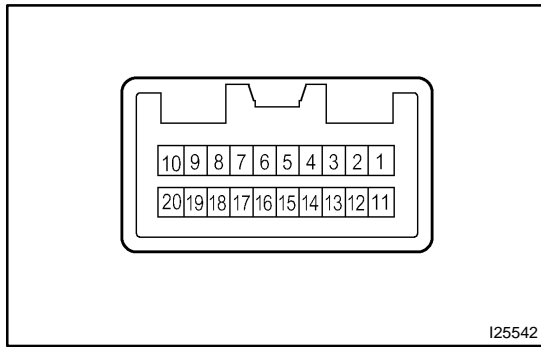


### 2. INSPECT REAR SEAT AUDIO CIRCUIT

Disconnect the connector from RSA controller and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
17 - Ground	Constant	Continuity
24 - Ground	Ignition switch LOCK and radio switch ON	No voltage
24 - Ground	Ignition switch ACC or ON and radio switch ON	Battery voltage
12 - Ground	Constant	Battery voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

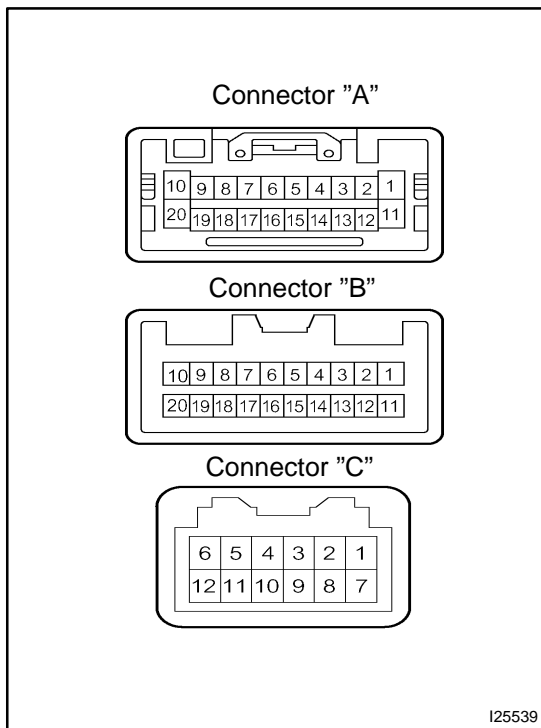


**3. INSPECT DVD CHANGER CIRCUIT**

Disconnect the connector from DVD changer and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
20 - Ground	Constant	Continuity
1 - Ground	Ignition switch LOCK	No voltage
1 - Ground	Ignition switch ACC or ON	Battery voltage
10 - Ground	Constant	Battery voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



**4. INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT**

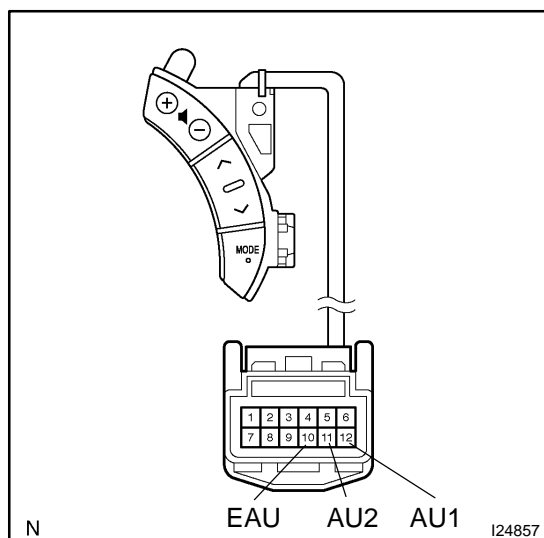
Disconnect the connectors from the radio receiver assembly, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
A20 - Ground	Constant	Continuity
A1 - Ground	Constant	Battery voltage
A11 - Ground	Ignition switch LOCK	No voltage
A11 - Ground	Ignition switch ACC or ON	Battery voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

**HINT:**

Check the wire harness between radio receiver assembly and the CD auto changer, between radio receiver assembly and power amplifier.

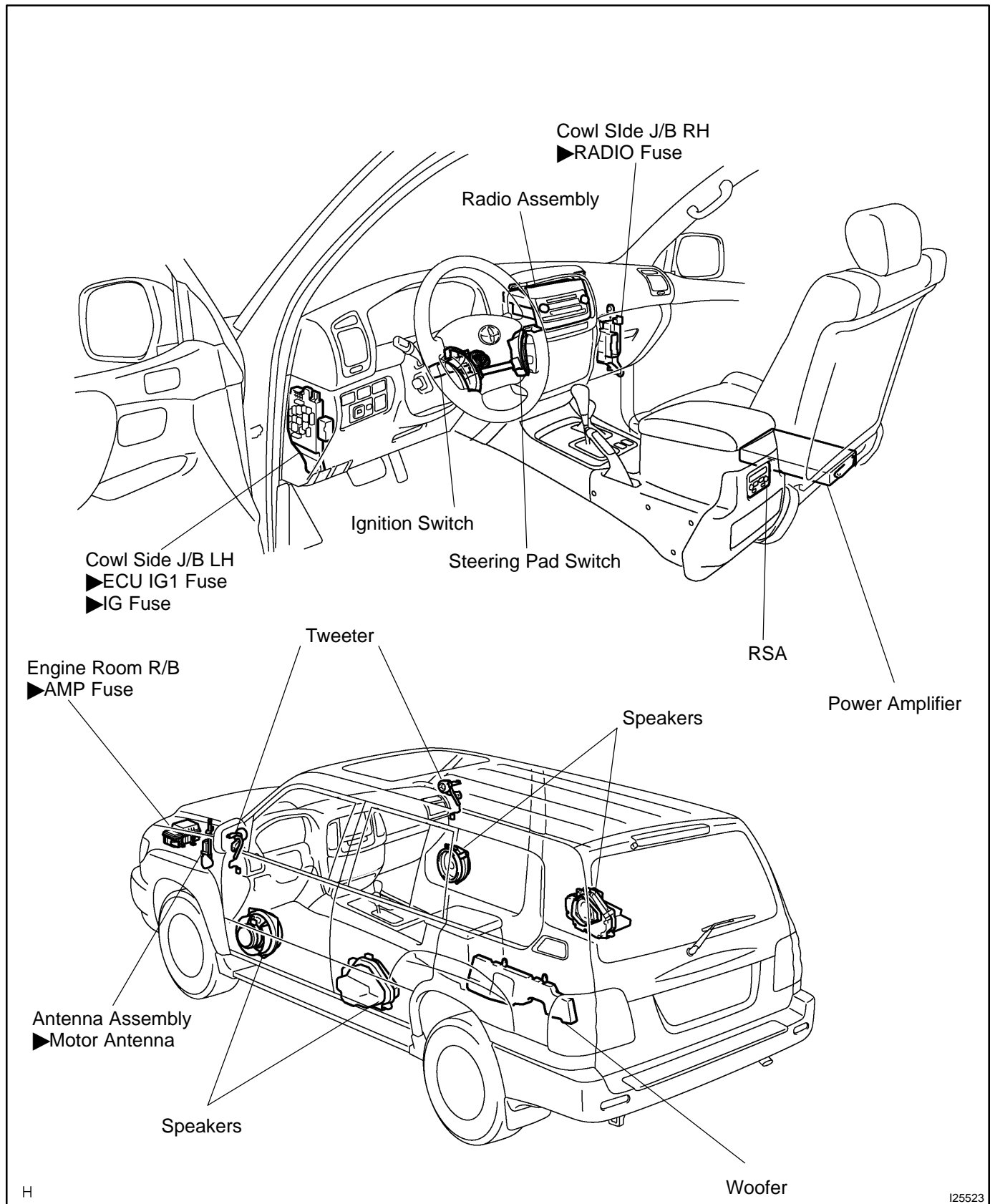
**5. INSPECT STEERING PAD SWITCH CIRCUIT**

Disconnect the connectors from the steering pad switch, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
AU1 - EAU	Do not switch position	Approx. 100 k $\Omega$
AU1 - EAU	SEEK+ switch: push	0 $\Omega$
AU1 - EAU	SEEK- switch: push	Approx. 0.3 $\Omega$
AU1 - EAU	VOL+ switch: push	Approx. 1k $\Omega$
AU1 - EAU	VOL- switch: push	Approx. 3.2 k $\Omega$
AU2 - EAU	Do not switch position	Approx. 100 k $\Omega$
AU2 - EAU	MODE switch: push	0 $\Omega$

If the circuit is not as specified, inspect the circuits connected to other parts.

# LOCATION



## TROUBLESHOOTING

### 1. DIAGNOSIS FUNCTION (Main AVC-LAN)

#### (a) Diagnosis start-up

For shifting to diagnosis mode, turn the ignition switch ON and push the "DISC" switch 3 times while pressing "ch1" and "ch6" switches.

#### HINT:

To exit the diagnosis mode, push the "DISC" switch for 1.7 sec. or turn the ignition switch to ACC or OFF.

#### (b) Element check mode

After the diagnosis start-up, the system enters the element check mode. Check that the all elements light up.

#### HINT:

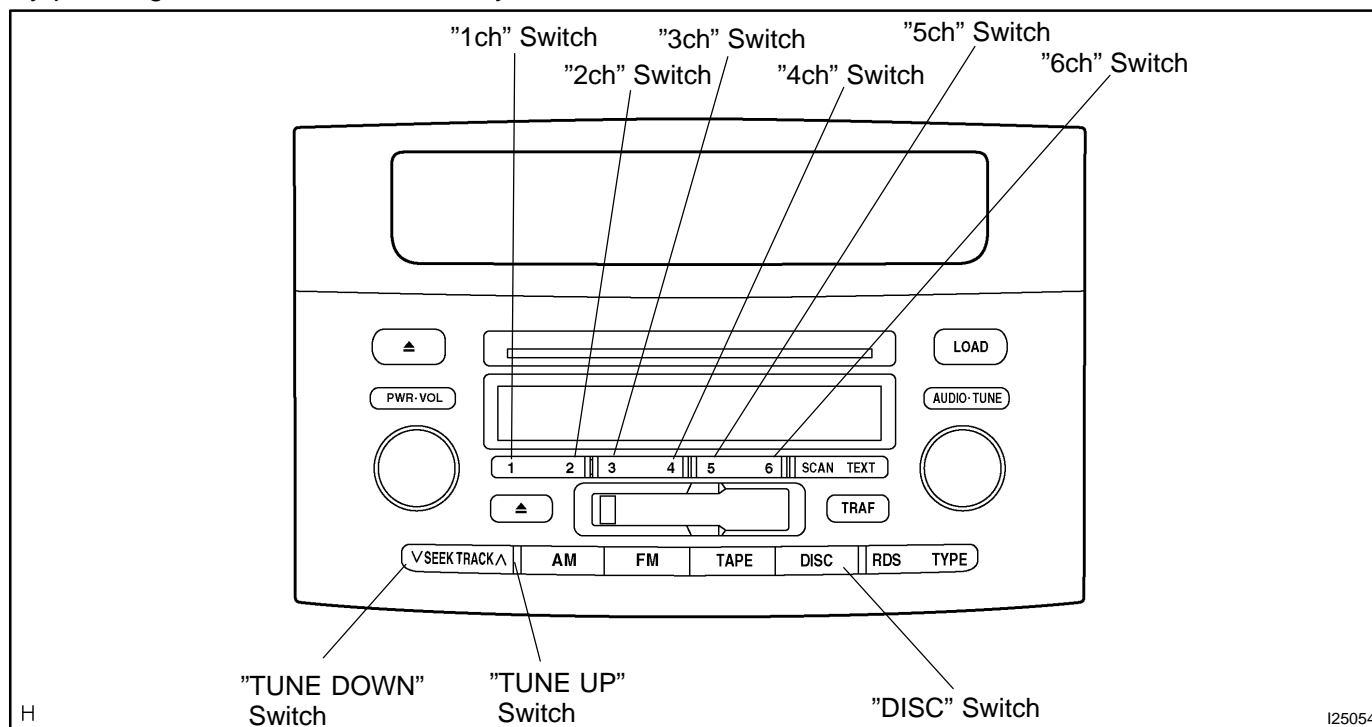
By pressing the "TUNE UP" switch, the system enters the "Service Check Mode".

#### (c) Switch check mode

- (1) Element check mode is started at the same time with the switch check mode.
- (2) Check that there is a beep sound when any switch is pressed.

#### HINT:

By pressing "TUNE UP" switch, the system enters the "Service Check Mode".



H

I25054

## (d) Service check mode

(1) After the element check and switch check is completed, the system enters service check mode when "TUNE UP" switch is pressed.

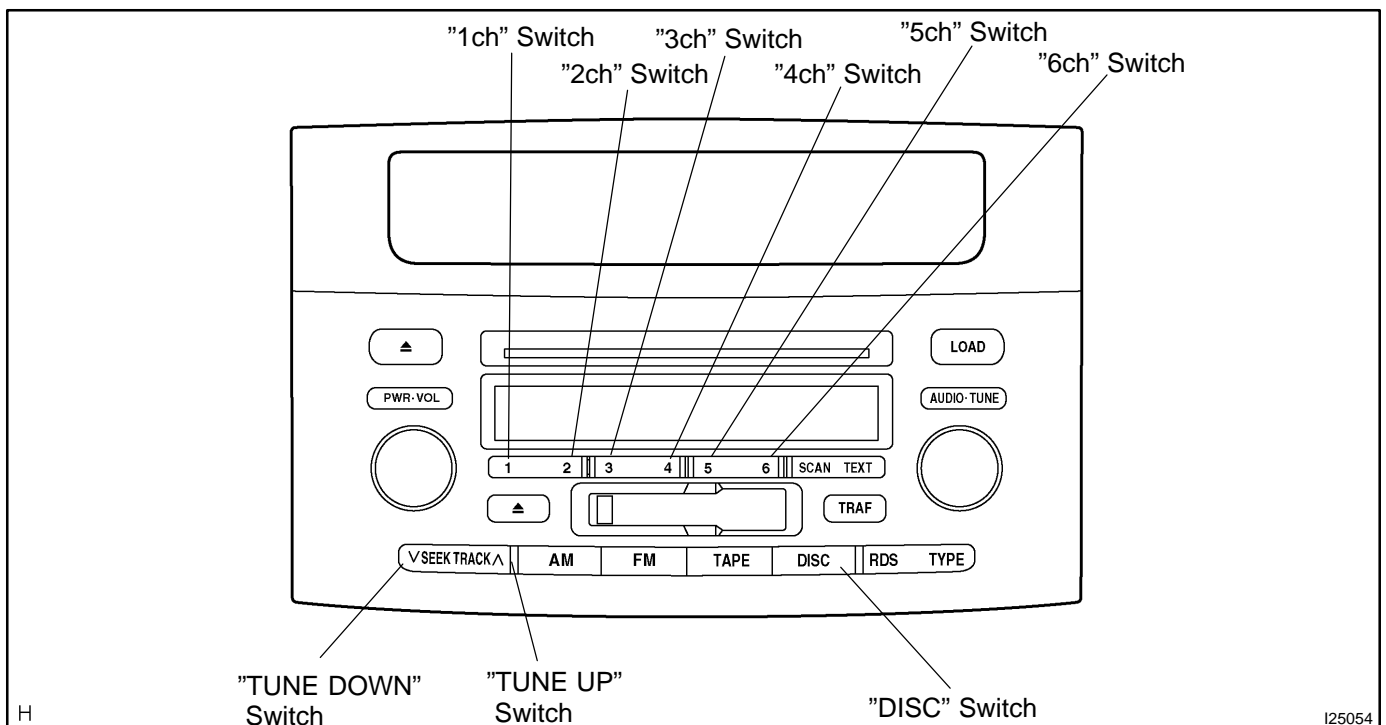
(2) Error codes over the tuner and connected equipments are displayed on the screen of the tuner.

Results for each check are displayed as follows:

- ◀ good:  
No DTC is detected for both "System Check Confirmation" and "Diagnosis Memory Response".
- ◀ nCon:  
The component does not respond to the "Diagnosis On Instruction" command.  
Applicable to only the system where connected components are limited to be used.
- ◀ ECHn:  
Application of new version has been confirmed by the "Diagnosis On Check", and there is one or more DTC which indicates "Replacement" in the "System Check Result Response" or "Diagnosis Memory Response".
- ◀ CHEC:  
Application of new version has been confirmed by the "Diagnosis On Check", and there is no DTC which indicates "Replacement" in the "System Check Result Response" or "Diagnosis Memory Response", but one or more DTC which indicates "Check" is identified.
- ◀ Old:  
Application of old version is confirmed by the "Diagnosis On Check", and DTC is identified in the "System Check Result Response" or "Diagnosis Memory Response".
- ◀ nrES:  
No response is identified to the "System Check Start Instruction" and "Request for System Check Result" commands.

## HINT:

- ◀ Check the present and past condition of components by performing the System Check and collecting stored DTC memories.
- ◀ Check results are displayed as one of the following six indications: "good", "ECHn", "CHEC", "nCon", "Old" or "nrES".



H

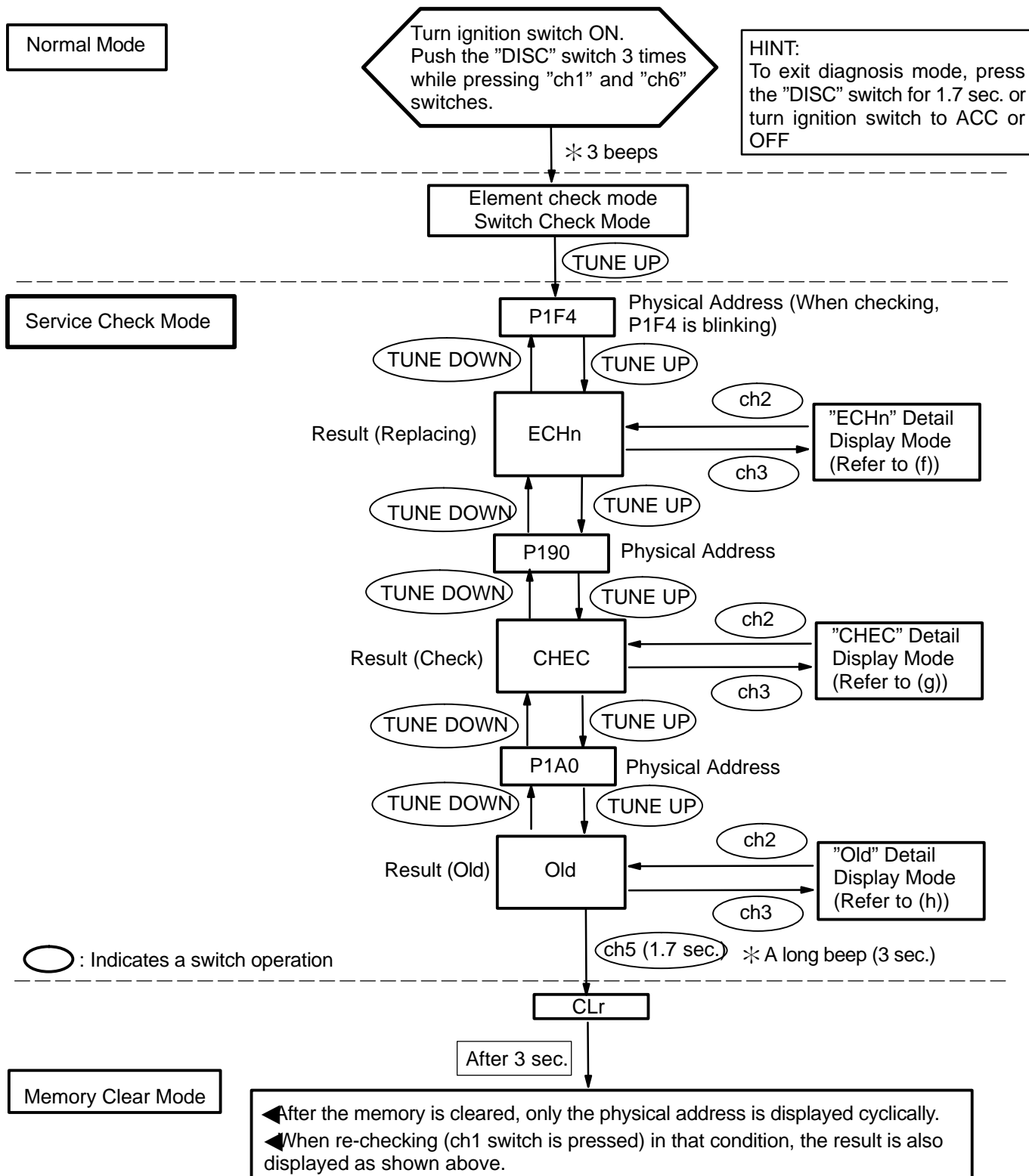
I25054



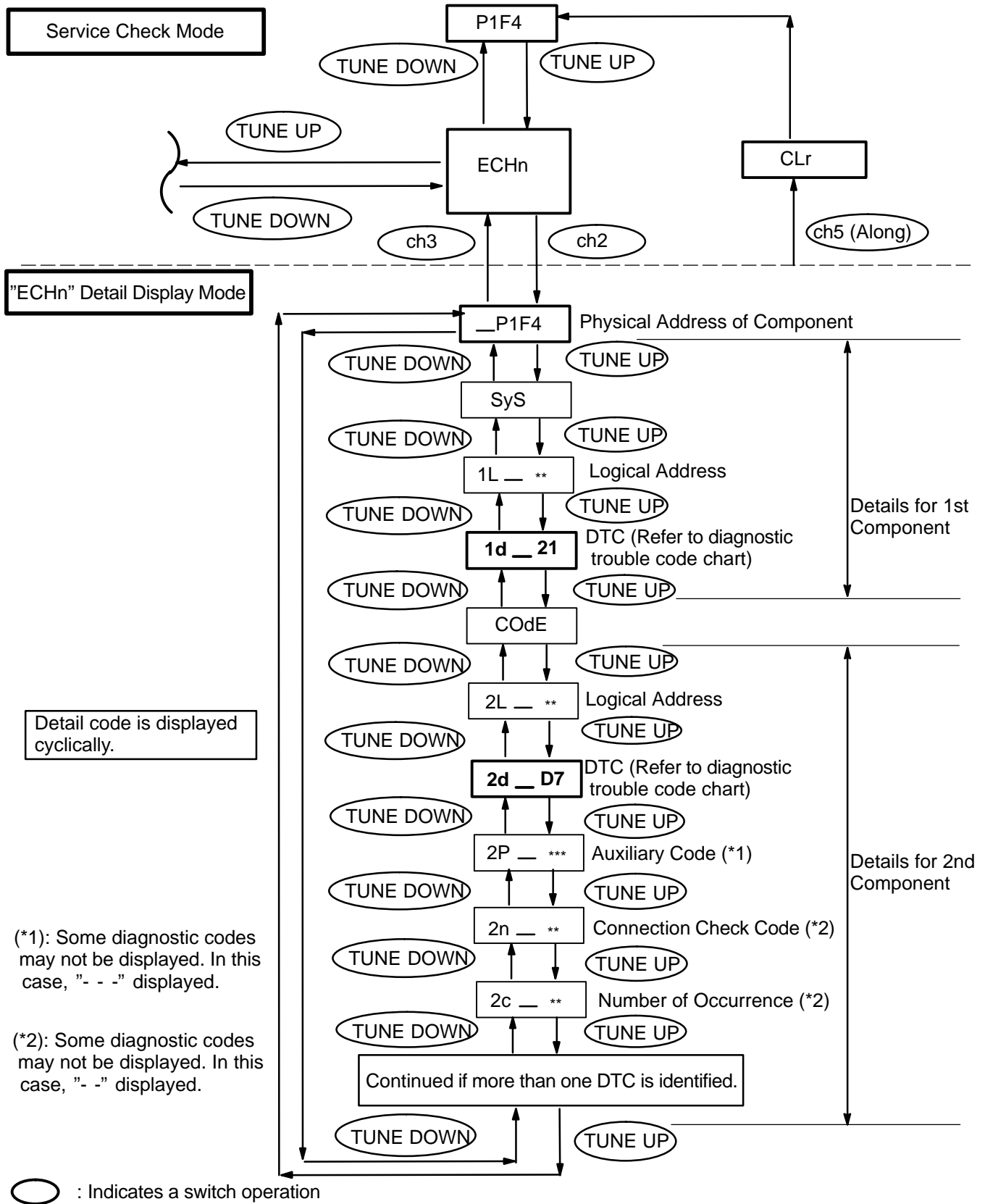
(e) Display Screen for Service Check.

**Example:**

Connection parts ( physical address): Radio receiver (P190), RSA ECU (P1F4), DVD player (P1A0)



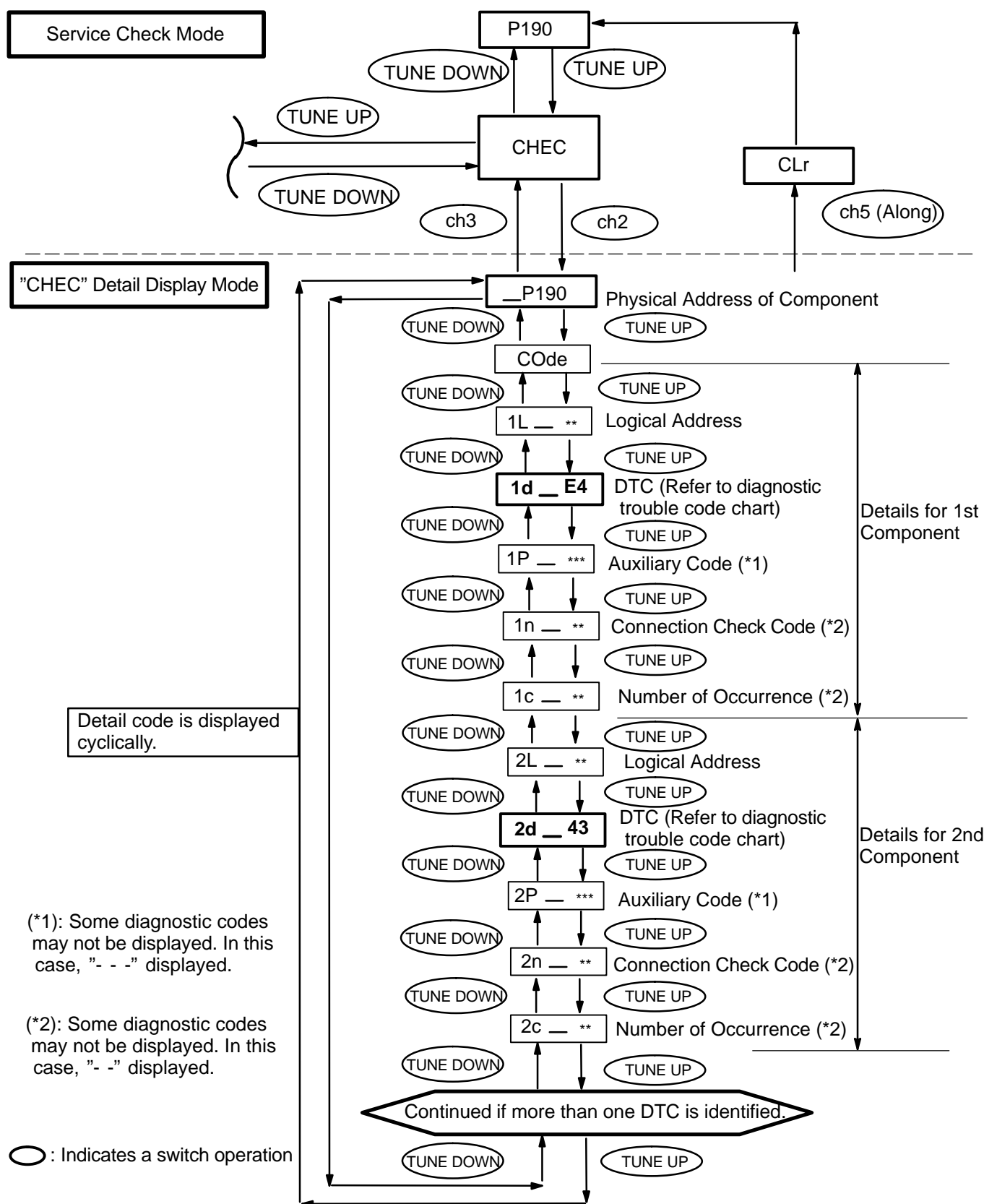
(f) "ECHn" Detail Display Mode Screen



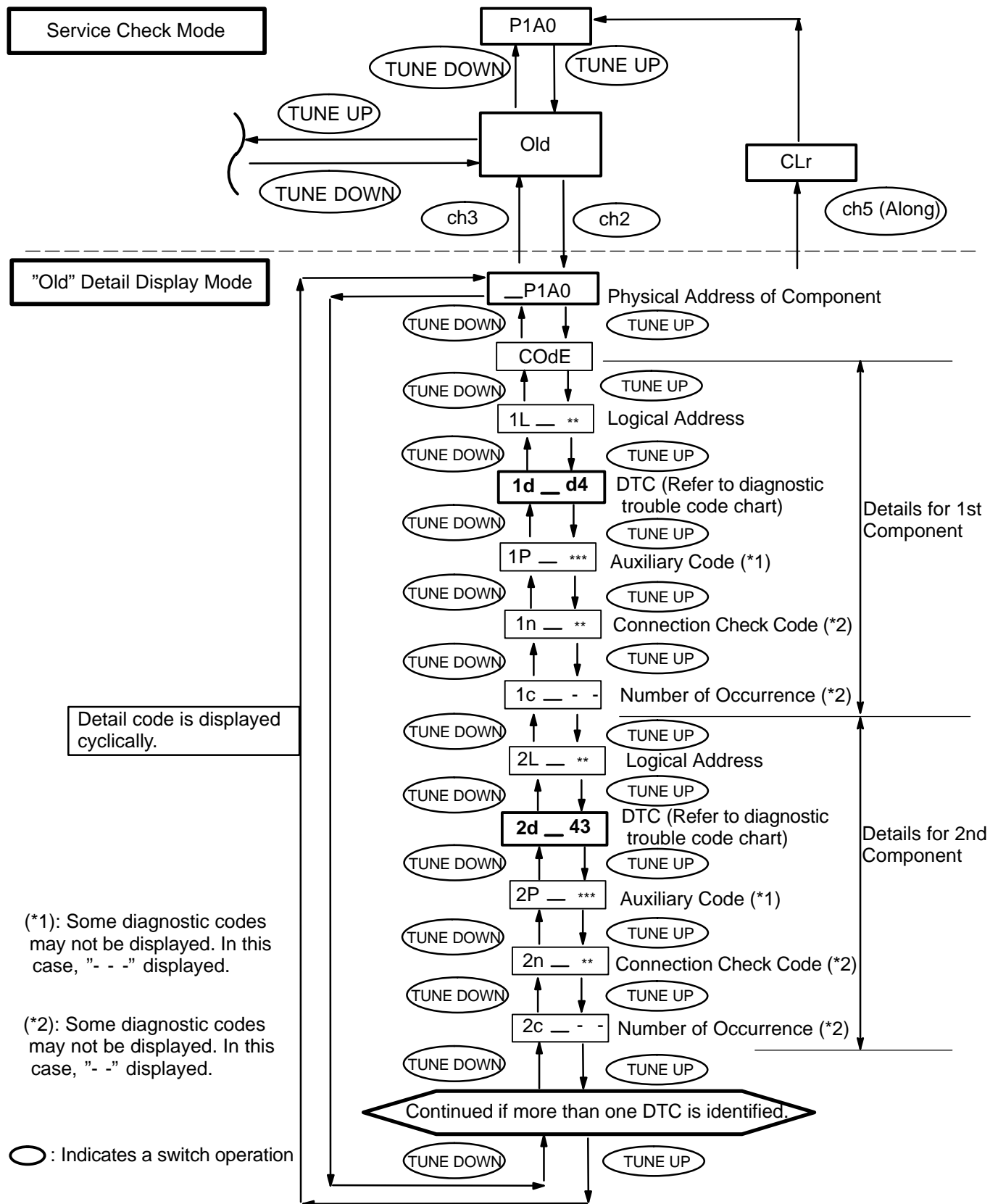
(\*1): Some diagnostic codes may not be displayed. In this case, "- -" displayed.

(\*2): Some diagnostic codes may not be displayed. In this case, "- -" displayed.

(g) "CHEC" Detail Display Mode Screen



(h) "Old" Detail Display Mode Screen



## 2. DIAGNOSIS FUNCTION (Sub AVC-LAN)

HINT:

As starting Main AVC-LAN to operate the diagnosis mode, Sub AVC-LAN is automatically to the mode. Perform the diagnosis mode operation on the RSA panel.

(a) Element check mode

After the diagnosis start-up, the system enters the element check mode. Check that the all elements light up.

HINT:

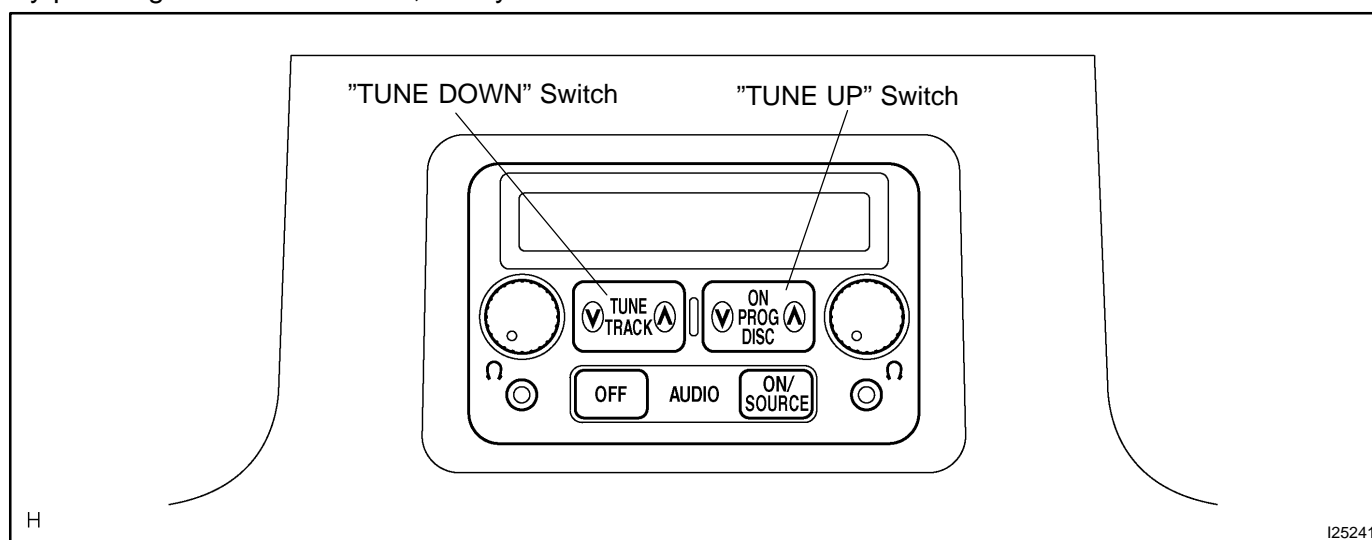
By pressing the "TUNE UP" switch, the system enters the "Service Check Mode".

(b) Switch check mode

- (1) Element check mode is started at the same time with the switch check mode.
- (2) Check that there is a beep sound when any switch is pressed.

HINT:

By pressing "TUNE UP" switch, the system enters the "Service Check Mode".

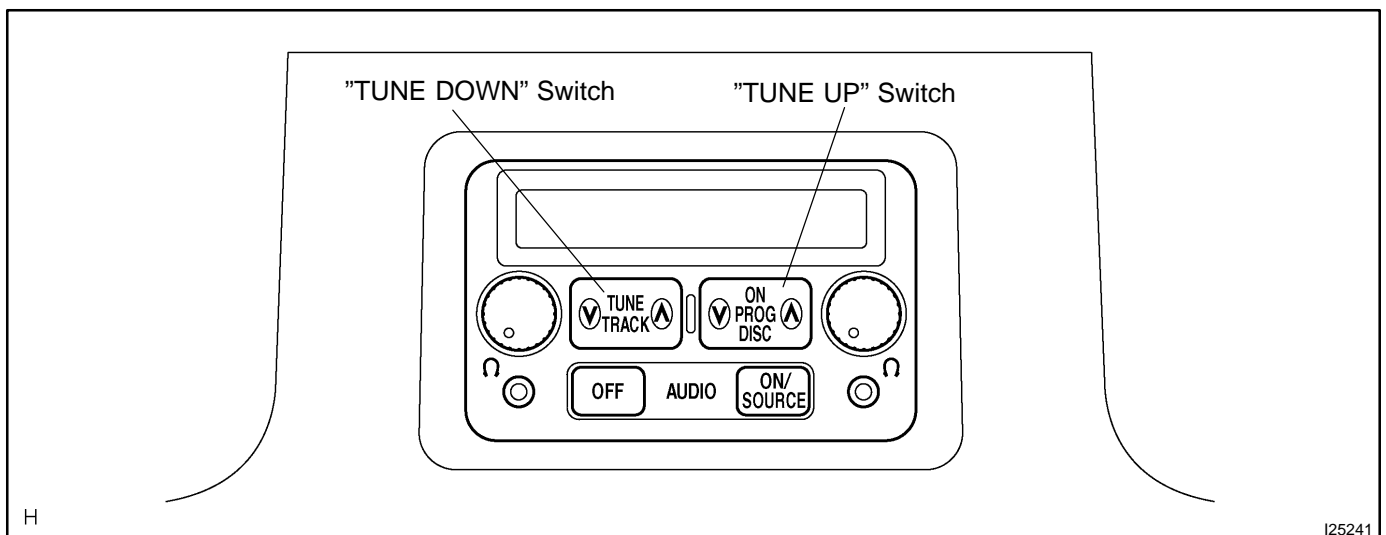


## (c) Service check mode

- (1) After the element check and switch check is completed, the system enters service check mode when "TUNE UP" switch is pressed.
- (2) Error codes over the tuner and connected equipments are displayed on the screen of the tuner. Results for each check are displayed as follows:
  - ◀ good:  
No DTC is detected for both "System Check Confirmation" and "Diagnosis Memory Response".
  - ◀ nCon:  
The component does not respond to the "Diagnosis On Instruction" command.  
Applicable to only the system where connected components are limited to be used.
  - ◀ ECHn:  
Application of new version has been confirmed by the "Diagnosis On Check", and there is one or more DTC which indicates "Replacement" in the "System Check Result Response" or "Diagnosis Memory Response".
  - ◀ CHEC:  
Application of new version has been confirmed by the "Diagnosis On Check", and there is no DTC which indicates "Replacement" in the "System Check Result Response" or "Diagnosis Memory Response", but one or more DTC which indicates "Check" is identified.
  - ◀ Old:  
Application of old version is confirmed by the "Diagnosis On Check", and DTC is identified in the "System Check Result Response" or "Diagnosis Memory Response".
  - ◀ nrES:  
No response is identified to the "System Check Start Instruction" and "Request for System Check Result" commands.

## HINT:

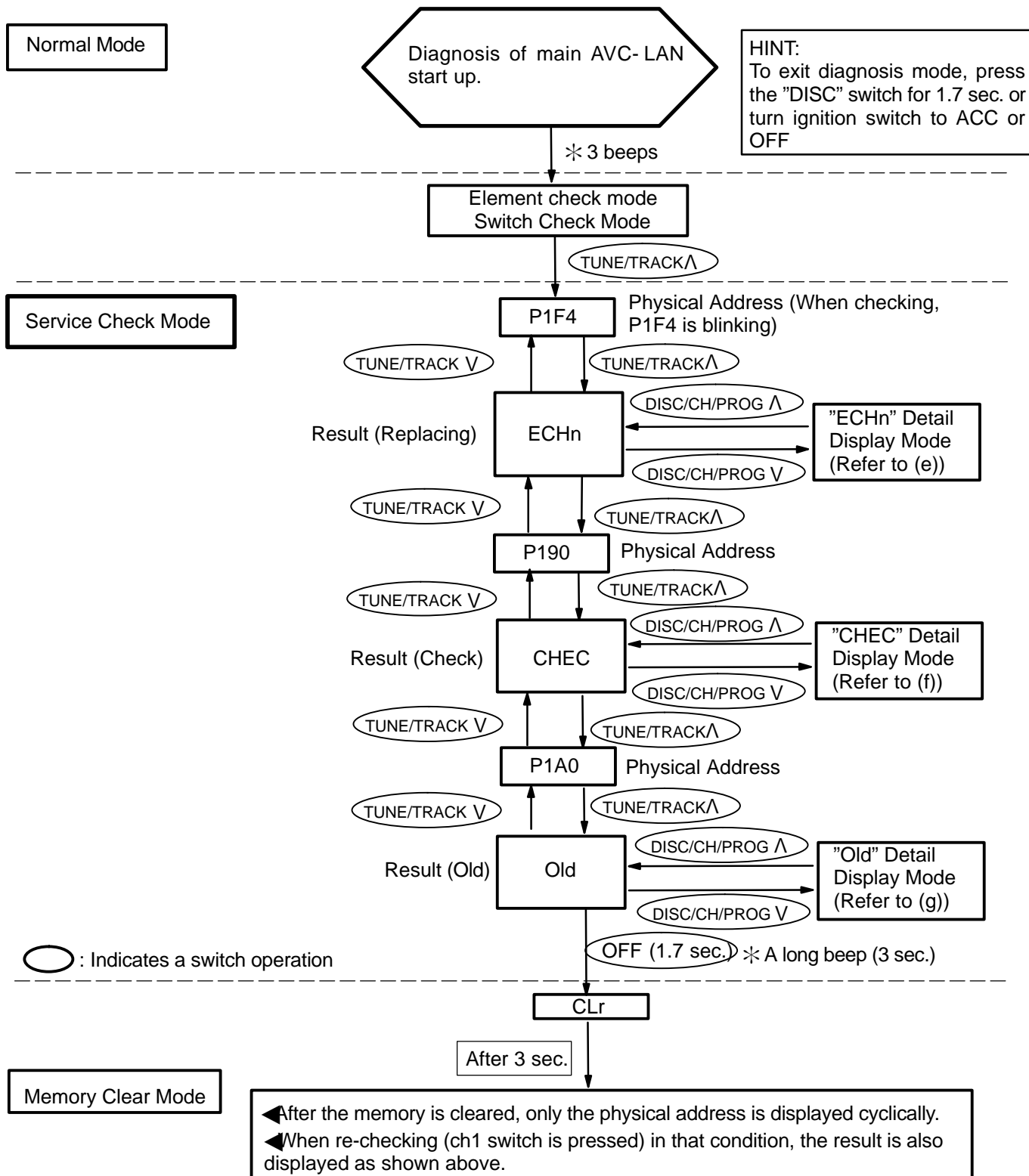
- ◀ Check the present and past condition of components by performing the System Check and collecting stored DTC memories.
- ◀ Check results are displayed as one of the following six indications: "good", "ECHn", "CHEC", "nCon", "Old" or "nrES".



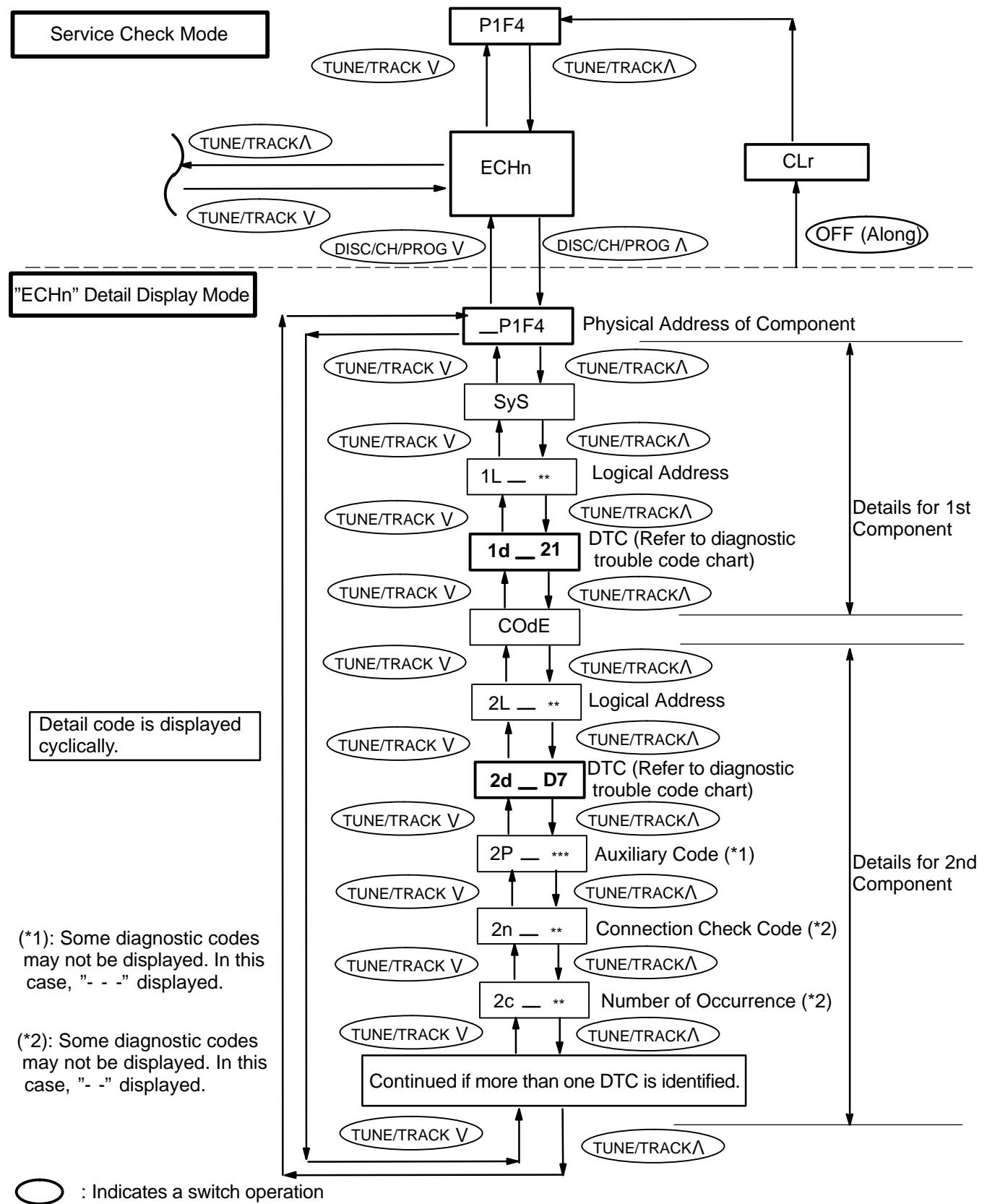
(d) Display Screen for Service Check.

**Example:**

Connection parts ( physical address): Radio receiver (P190), RSA ECU (P1F4), DVD player (P1A0)

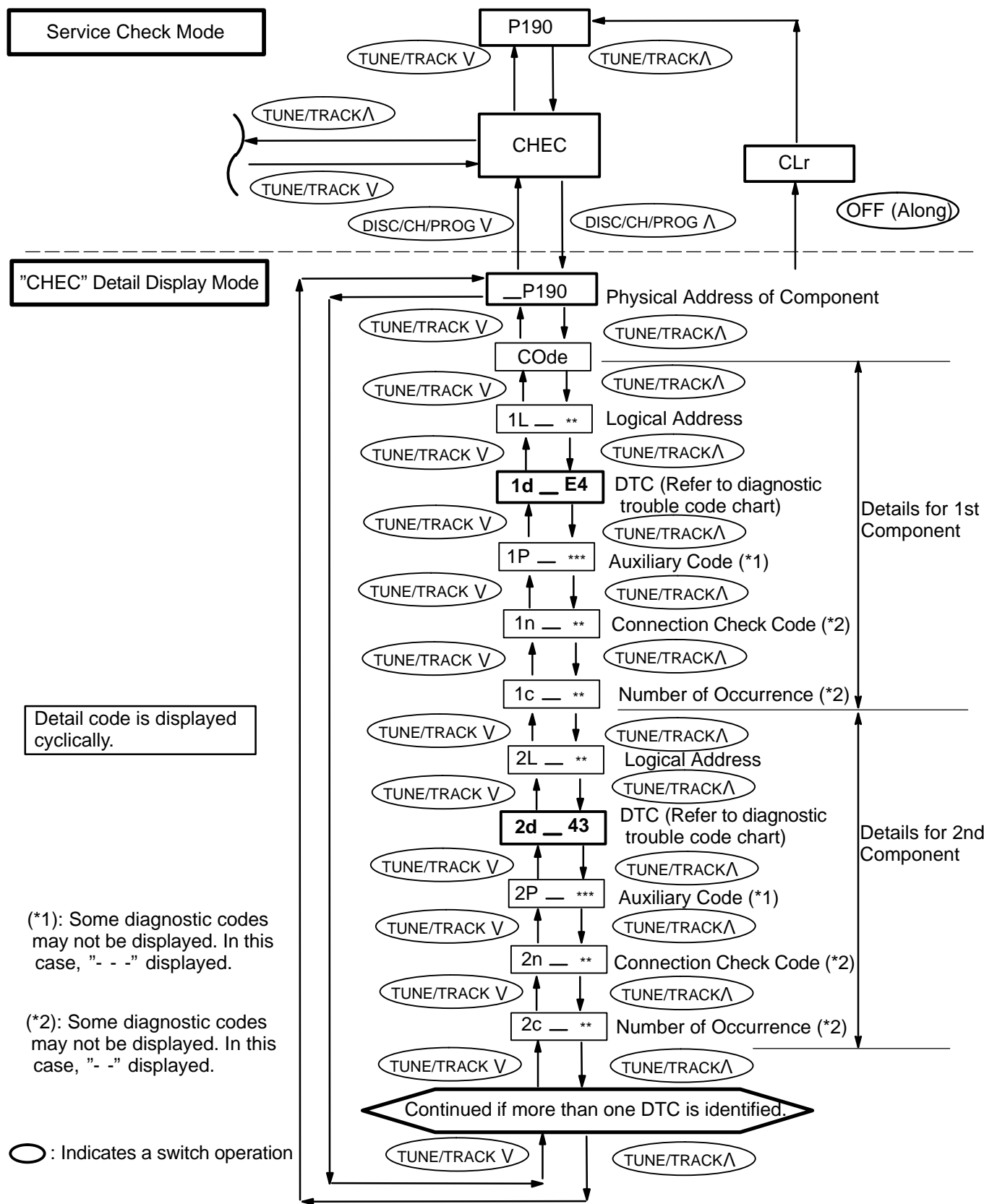


(e) "ECHn" Detail Display Mode Screen

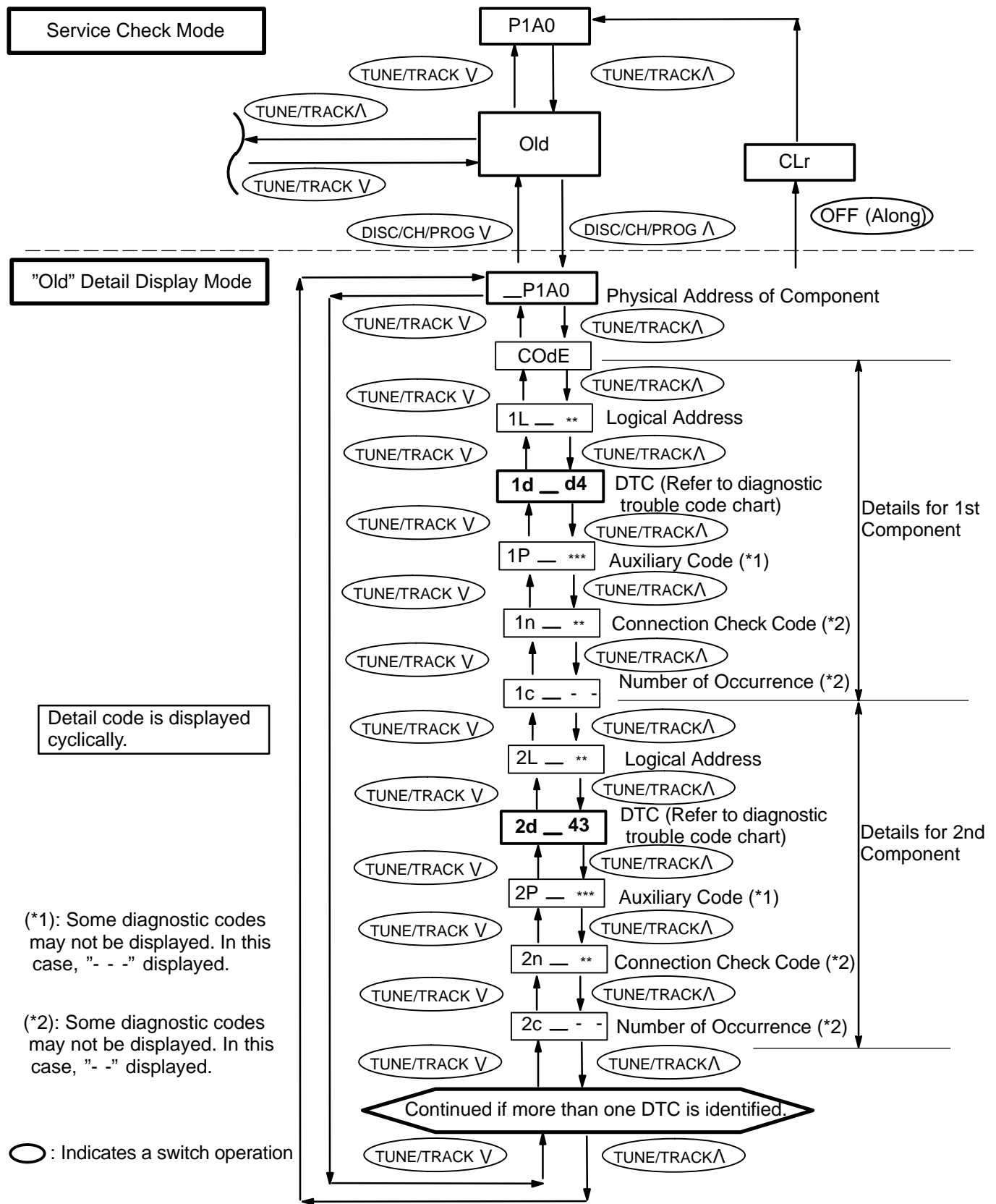




(f) "CHEC" Detail Display Mode Screen



(g) "Old" Detail Display Mode Screen



### 3. DIAGNOSIS CODE LIST

w/ Navigation system (See page)

Physical address: 190 Radio receiver assembly

HINT:

\*1: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.

\*2: It may be stored when the engine key is turned 1 min. again after engine start.

\*3: It may be stored when the engine key is turned again after engine start.

\*4: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

Logical address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
01 (Communication Control)	21	ROM Error	Error is detected in internal ROM.	Replace radio receiver assembly.
01 (Communication Control)	22	RAM Error	Error is detected in internal RAM.	Replace radio receiver assembly.
01 *2 (Communication Control)	D6	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, radio receiver assembly was disconnected.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply system of radio receiver assembly.</li> <li>▶ Check harness for communication system of radio receiver assembly.</li> </ul>
01 *3 (Communication Control)	D8	No Response to Connection Check	Component shown by auxiliary code is or had been disconnected from system after engine start. D9	<ul style="list-style-type: none"> <li>▶ Check harness for power supply system of component shown by auxiliary code.</li> <li>▶ Check harness for communication system of component shown by auxiliary code.</li> </ul>
01 *2 (Communication Control)	D9	Last Mode Error	Component operated (sounds and/or images were provided) before engine stop is or has been disconnected with ignition switch in ACC or ON.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply system of component shown by auxiliary code.</li> <li>▶ Check harness for communication system of component shown by auxiliary code.</li> </ul>
01 (Communication Control)	DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Detected when sound and picture does not change by button operation.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply of component shown by auxiliary code.</li> <li>▶ Check harness for communication system of component shown by auxiliary code.</li> <li>▶ If error occurs again, replace component shown by auxiliary code.</li> </ul>
01 *2 (Communication Control)	DB	Mode Status Error	Dual alarm is detected.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply of component shown by auxiliary code.</li> <li>▶ Check harness for communication system of component shown by auxiliary code.</li> </ul>

01 *4 (Communication Control)	DC	Transmission Error	Transmission to component shown by auxiliary code has been failed. (Detecting this DTC does not necessarily mean actual failure.)	▶If same auxiliary code is recorded in other component, check harness for power supply and communication system of components shown sub code.
01 *3 (Communication Control)	DD	Master Reset (Momentary Interruption)	After engine is started, radio receiver assembly assembly was disconnected from system.	▶If this error occurs frequently, replace radio receiver assembly.
01 *3 (Communication Control)	DE	Slave Reset (Momentary Interruption)	After engine is started, slave component was disconnected from system.	▶Check harness for power supply of component shown by auxiliary code. ▶Check harness for communication system of component shown by auxiliary code.
01 *4 (Communication Control)	DF	Master Error	Due to defective condition of radio receiver assembly, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and radio receiver assembly.	▶Check harness for power supply of radio receiver assembly. ▶Check harness for communication system of radio receiver assembly . ▶Check harness for communication system between radio receiver assembly and sub-master component.
01 (Communication Control)	E0	Registration Completion Instruction Error	"Registration Completion Instruction" command from radio receiver assembly cannot be received.	▶Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
01 *2 (Communication Control)	E1	Audio processor ON error	While source equipment is operating, AMP output is stopped.	▶Check harness for power supply of radio receiver assembly. ▶Check harness for communication system of radio receiver assembly.
01 (Communication Control)	E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from radio receiver assembly assembly.	▶Replace radio receiver assembly .
01 (Communication Control)	E3	Registration Request Transmission	Registration Request command is output from slave component. Receiving Connection Check Instruction, Registration Request command is output from sub-master component.	▶Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
01 (Communication Control)	E4	Plural Frame Abort	Plural frame transmission is aborted.	▶Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
60 (Radio receiver assembly)	43	AM Tuner Error	Abnormal condition is detected in AM tuner. Inspect radio receiver assembly.	Replace radio receiver assembly.
60 (Radio receiver assembly)	44	FM Tuner Error	Abnormal condition is detected in FM tuner.	Replace radio receiver assembly.

61 (Cassette switch)	40	Mechanical or Media Error	Malfunction due to mechanical failure is identified. Or, cassette tape is cut or entangled.	Inspect cassette tape.
61 (Cassette switch)	41	EJECT Malfunction	Malfunction due to mechanical failure.	Replace radio receiver assembly.
63 (In-dash CD auto changer)	42	No Disc Readout	Disc cannot be read.	Inspect CD.
63 (In-dash CD auto changer)	44	CD Error	Error is detected in CD auto changer.	Replace radio receiver assembly.
63 (In-dash CD auto Changer)	45	EJECT Error	CD cannot be ejected.	Replace radio receiver assembly.
63 (In-dash CD auto Changer)	47	CD High Temp.	High temperature is detected in CD auto changer.	Replace radio receiver assembly.
63 (In-dash CD auto Changer)	48	CD Excess Current	Excess current is applied to CD auto changer.	Replace radio receiver assembly.

Physical address: 440 Stereo component amplifier

**HINT:**

\*1: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.

\*2: It may be stored when the engine key is turned 1 min. again after engine start.

\*3: It may be stored when the engine key is turned again after engine start.

\*4: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

Logical address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
01 (Communication Control)	21	ROM Error	Abnormal condition of ROM is detected.	Replace stereo component amplifier.
01 (Communication Control)	22	RAM Error	Abnormal condition of RAM is detected.	Replace stereo component amplifier.
01 (Communication Control)	D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, radio receiver assembly was disconnected.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of radio receiver assembly.</li> <li>▶Check harness for communication system of radio receiver assembly.</li> <li>▶Check harness for power supply of stereo component amplifier.</li> <li>▶Check harness for communication system of stereo component amplifier.</li> </ul>

01*6 (Communication Control)	D7	Connection Check Error	Component in which this code is recorded has been disconnected from system after engine start. Or, when this code was recorded, radio receiver assembly was disconnected.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply of radio receiver assembly.</li> <li>▶ Check harness for communication system of radio receiver assembly.</li> <li>▶ Check harness for power supply of stereo component amplifier.</li> <li>▶ Check harness for communication system of stereo component amplifier.</li> </ul>
01 (Communication Control)	DC*2	Transmission Error	Transmission to component shown by auxiliary code has been failed. (This code does not necessarily mean actual failure.)	If same auxiliary code is recorded in other component(s), check harness for power supply and communication system of components shown sub code.
01 (Communication Control)	DD*3	Master Reset (Momentary Interruption)	After engine is started, radio receiver assembly was disconnected from system.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply of radio receiver assembly.</li> <li>▶ Check harness for communication system of radio receiver assembly.</li> <li>▶ If error occurs frequently, replace radio receiver assembly.</li> </ul>
01 (Communication Control)	DF*4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply of radio receiver assembly.</li> <li>▶ Check harness for communication system of radio receiver assembly.</li> <li>▶ Check harness for communication system between radio receiver assembly and sub-master component.</li> </ul>
01 (Communication Control)	E0*1	Registration Completion Instruction Error	"Registration Completion Instruction" command from radio receiver assembly cannot be received.	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
01 (Communication Control)	E1*1	Audio processor ON error	While source equipment is operating, AMP output is stopped.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply of radio receiver assembly</li> <li>▶ Check harness for communication system of radio receiver assembly.</li> </ul>
01 (Communication Control)	E2	ON/OFF Instruction Parameter Error	Error is detected in ON/OFF control command from radio receiver assembly.	Replace radio receiver assembly.
01 (Communication Control)	E3	Registration Request Transmission	<ul style="list-style-type: none"> <li>▶ Registration Request command is output from slave component.</li> <li>▶ By reception of connection check instruction, Registration Request command is output from sub-master component.</li> </ul>	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
01 (Communication Control)	E4	Plural Frame Abort	Plural frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

Physical address: 1F4 RSA Panel (Main AVC-LAN)

**HINT:**

\*1: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.

\*2: It may be stored when the engine key is turned 1 min. again after engine start.

\*3: It may be stored when the engine key is turned again after engine start.

\*4: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

Logical address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
01 (Communication Control)	D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, radio receiver assembly was disconnected.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of radio receiver assembly.</li> <li>▶Check harness for communication system of radio receiver assembly.</li> <li>▶Check harness for power supply of RSA panel.</li> <li>▶Check harness for communication system of RSA panel.</li> </ul>
01*6 (Communication Control)	D7	Connection Check Error	Component in which this code is recorded has been disconnected from system after engine start. Or, when this code was recorded, radio receiver assembly was disconnected.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of radio receiver assembly.</li> <li>▶Check harness for communication system of radio receiver assembly.</li> <li>▶Check harness for power supply of RSA panel.</li> <li>▶Check harness for communication system of RSA panel.</li> </ul>
01 (Communication Control)	DC *2	Transmission Error	Transmission to component shown by auxiliary code has been failed. (This code does not necessarily mean actual failure.)	If same auxiliary code is recorded in other component(s), check harness for power supply and communication system of components shown sub code.
01 (Communication Control)	DD *3	Master Reset (Momentary Interruption)	After engine is started, radio receiver assembly was disconnected from system.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of radio receiver assembly.</li> <li>▶Check harness for communication system of radio receiver assembly.</li> <li>▶If error occurs frequently, replace radio receiver assembly.</li> </ul>
01 (Communication Control)	DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of radio receiver assembly.</li> <li>▶Check harness for communication system of radio receiver assembly.</li> <li>▶Check harness for communication system between radio receiver assembly and sub-master component.</li> </ul>
01 (Communication Control)	E0 *1	Registration Completion Instruction Error	"Registration Completion Instruction" command from radio receiver assembly cannot be received.	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
01 (Communication Control)	E3	Registration Request Transmission	<ul style="list-style-type: none"> <li>▶Registration Request command is output from slave component.</li> <li>▶By reception of connection check instruction, Registration Request command is output from sub-master component.</li> </ul>	Since this DTC is provided for engineering, it may be detected when no actual failure exists.

01 (Communication Control)	E4	Plural Frame Abort	Plural frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
-------------------------------	----	--------------------	---------------------------------------	---

Physical address: 16A, 16C RSA Panel (Sub AVC-LAN)

HINT:

\*1: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.

\*2: It may be stored when the engine key is turned 1 min. again after engine start.

\*3: It may be stored when the engine key is turned again after engine start.

\*4: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

Logical address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
01 *3 (Communication Control)	D8	No Response to Connection Check	Component shown by auxiliary code is or had been disconnected from system after engine start. D9	<ul style="list-style-type: none"> <li>▶Check harness for power supply system of component shown by auxiliary code.</li> <li>▶Check harness for communication system of component shown by auxiliary code.</li> </ul>
01 *2 (Communication Control)	D9	Last Mode Error	Component operated (sounds and/or images were provided) before engine stop is or has been disconnected with ignition switch in ACC or ON.	<ul style="list-style-type: none"> <li>▶Check harness for power supply system of component shown by auxiliary code.</li> <li>▶Check harness for communication system of component shown by auxiliary code.</li> </ul>
01 (Communication Control)	DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Detected when sound and picture does not change by button operation.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of component shown by auxiliary code.</li> <li>▶Check harness for communication system of component shown by auxiliary code.</li> <li>▶If error occurs again, replace component shown by auxiliary code.</li> </ul>
01 *2 (Communication Control)	DB	Mode Status Error	Dual alarm is detected.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of component shown by auxiliary code.</li> <li>▶Check harness for communication system of component shown by auxiliary code.</li> </ul>
01 *4 (Communication Control)	DC	Transmission Error	Transmission to component shown by auxiliary code has been failed. (Detecting this DTC does not necessarily mean actual failure.)	▶If same auxiliary code is recorded in other component, check harness for power supply and communication system of components shown sub code.
01 *3 (Communication Control)	DE	Slave Reset (Momentary Interruption)	After engine is started, slave component was disconnected from system.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of component shown by auxiliary code.</li> <li>▶Check harness for communication system of component shown by auxiliary code.</li> </ul>
01 (Communication Control)	E4	Plural Frame Abort	Plural frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.



Physical address: 1A0 DVD Auto Player

**HINT:**

\*1: Even if no failure is detected, this code may be stored depending on the battery condition or voltage for starting an engine.

\*2: This code may be stored when the engine key is turned again 1 min. after engine start.

\*3: This code may be stored when the engine key is turned again after engine start.

\*4: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

Logical address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
01 (Communication Control)	D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, RSA Panel was disconnected.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of RSA Panel.</li> <li>▶Check harness for communication system of RSA Panel.</li> <li>▶Check harness for power supply of DVD player.</li> <li>▶Check harness for communication system of DVD player.</li> </ul>
01 (Communication Control)	D7	Communication Check Error	Component in which this code is recorded is was disconnected from system after engine start. Or, when recorded this code, RSA Panel was disconnected.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of RSA Panel.</li> <li>▶Check harness for communication system of RSA Panel.</li> <li>▶Check harness for power supply of DVD player.</li> <li>▶Check harness for communication system of DVD player.</li> </ul>
01 *4 (Communication Control)	DC	Transmission Error	Transmission to component shown by sub-code has been failed. (Detecting this DTC does not necessary mean actual failure.)	▶If same sub-code is recorded in other component, check harness for power supply and communication system of components shown sub code.
01 (Communication Control)	DD *3	Master Reset (Momentary Interruption)	After engine is started, radio receiver assembly assembly was disconnected from system.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of RSA Panel.</li> <li>▶Check harness for communication system of RSA Panel.</li> <li>▶Check harness for power supply of DVD player.</li> <li>▶Check harness for communication system of DVD player.</li> </ul>
01 (Communication Control)	DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment . Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of RSA Panel.</li> <li>▶Check harness for communication system of RSA Panel.</li> <li>▶Check harness for communication system between RSA Panel.</li> </ul>
01 (Communication Control)	E0 *1	Registration Completion Instruction Error	"Registration Completion Instruction" command from master cannot be received.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

01 (Communication Control)	E2	ON/OFF Instruction Parameter Error	Error is detected in ON/OFF control command from DVD player.	Replace DVD player.
01 (Communication Control)	E3	Registration Request Transmission	<ul style="list-style-type: none"> <li>▶ Registration Request command is output from slave component.</li> <li>▶ Registration connection check Instruction, Registration Request command is output from sub-master component.</li> </ul>	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
01 (Communication Control)	E4	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
01 (Communication Control)	22	RAM Error	Abnormal condition of RAM is detected.	Replace DVD player.

Physical address: 250 (DVD Auto Changer) (Sub AVC-LAN)

Logical address	DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
01 (Communication Control)	D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, radio receiver assembly was disconnected.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply of radio receiver assembly.</li> <li>▶ Check harness for communication system of radio receiver assembly.</li> <li>▶ Check harness for power supply of DVD auto changer.</li> <li>▶ Check harness for communication system of DVD auto changer.</li> </ul>
01*6 (Communication Control)	D7	Connection Check Error	Component in which this code is recorded has been disconnected from system after engine start. Or, when this code was recorded, radio receiver assembly was disconnected.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply of radio receiver assembly.</li> <li>▶ Check harness for communication system of radio receiver assembly.</li> <li>▶ Check harness for power supply of DVD auto changer.</li> <li>▶ Check harness for communication system of DVD auto changer.</li> </ul>
01 (Communication Control)	DC *2	Transmission Error	Transmission to component shown by auxiliary code has been failed. (This code does not necessarily mean actual failure.)	If same auxiliary code is recorded in other component(s), check harness for power supply and communication system of components shown sub code.
01 (Communication Control)	DD *3	Master Reset (Momentary Interruption)	After engine is started, radio receiver assembly assembly was disconnected from system.	<ul style="list-style-type: none"> <li>▶ Check harness for power supply of radio receiver assembly.</li> <li>▶ Check harness for communication system of radio receiver assembly.</li> <li>▶ If error occurs frequently, replace radio receiver assembly.</li> </ul>

## BODY ELECTRICAL - AUDIO SYSTEM

01 (Communication Control)	DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	<ul style="list-style-type: none"> <li>▶Check harness for power supply of radio receiver assembly.</li> <li>▶Check harness for communication system of radio receiver assembly.</li> <li>▶Check harness for communication system between radio receiver assembly and sub-master component.</li> </ul>
01 (Communication Control)	E0 *1	Registration Completion Instruction Error	"Registration Completion Instruction" command from radio receiver assembly cannot be received.	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
01 (Communication Control)	E2	ON/OFF Instruction Parameter Error	Error is detected in ON/OFF control command from radio receiver assembly.	Replace radio receiver assembly.
01 (Communication Control)	E3	Registration Request Transmission	<ul style="list-style-type: none"> <li>▶Registration Request command is output from slave component.</li> <li>▶By reception of connection check instruction, Registration Request command is output from sub-master component.</li> </ul>	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
45 (DVD)	42	No Disk Readout	Disk cannot be read.	Inspect disk.
45 (DVD)	44	DVD error	Error is detected in DVD player.	Replace radio and player.
45 (DVD)	45	EJECT error	Disk cannot be ejected.	Check whether foreign matters enter inspection.
45 (DVD)	46	Disk Crack	A crack and dirt are in a disk.	Inspect disk.
45 (DVD)	52	Player Error	Clamp unusually generating.	DVD player.
45 (DVD)	47	DVD High Temp	High temperature is detected in DVD auto changer.	Do not stop the operation for a period of time.
45 (DVD)	48	DVD Excess Current	Excess current is applied to DVD auto changer.	Replace DVD auto changer.
45 (DVD)	50	A Malfunction in insertion/ejection	Operation malfunction in insertion/ ejection.	Replace DVD auto changer.
45 (DVD)	51	A Malfunction in switching disk	Operation malfunction in switching disk.	Replace DVD auto changer.

#### 4. PROBLEM SYMPTOMS TABLE

##### NOTICE:

When replacing the internal mechanism (computer part) of the audio system, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement part (spare part).

##### HINT:

This inspection procedure is a simple troubleshooting which should be carried out on the vehicle during system operation and was prepared on the assumption of system component troubles (except for the wires and connectors, etc.).

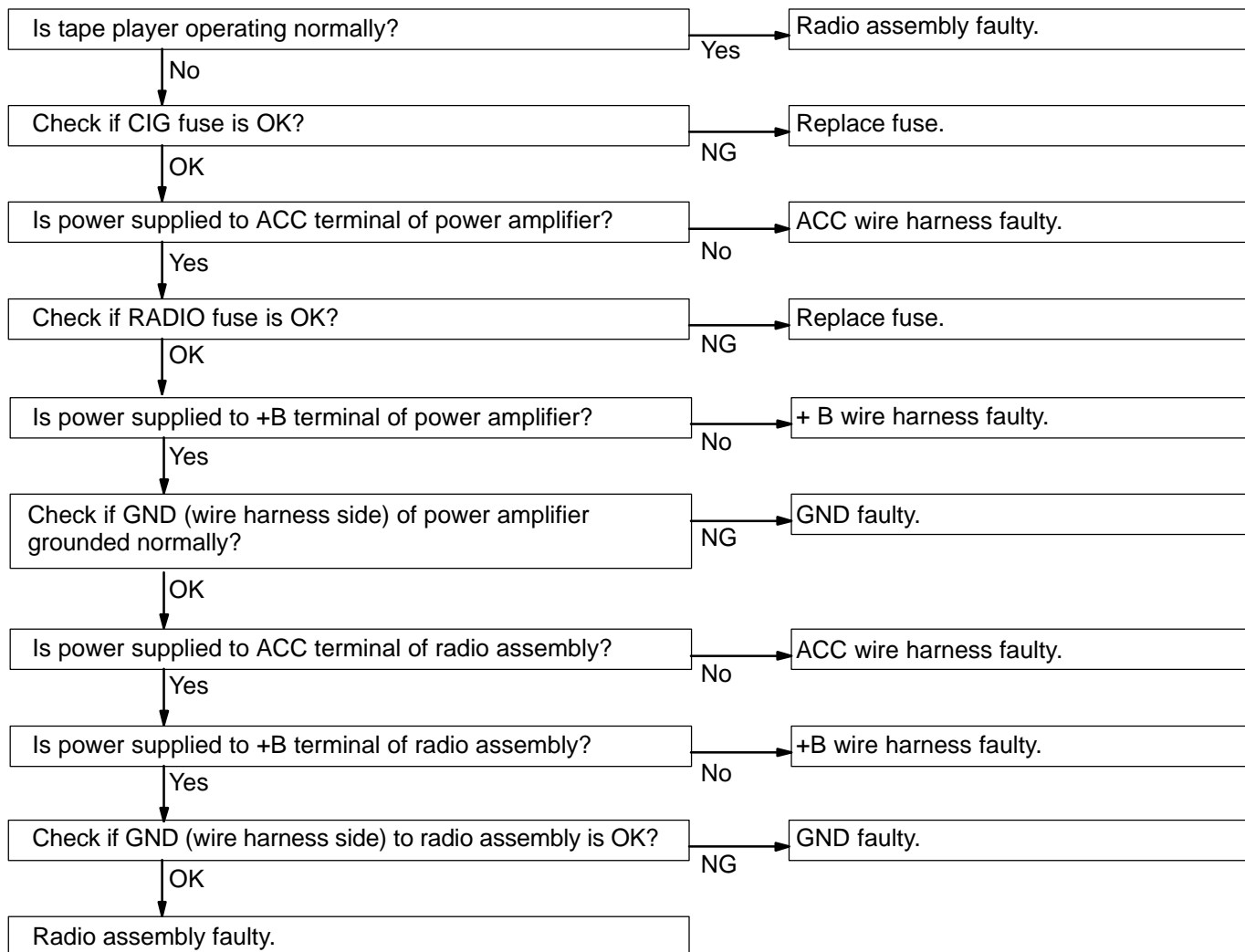
Always inspect the trouble taking the following items into consideration.

- ◀ Open or short circuit of the wire harness
- ◀ Connector or terminal connection fault

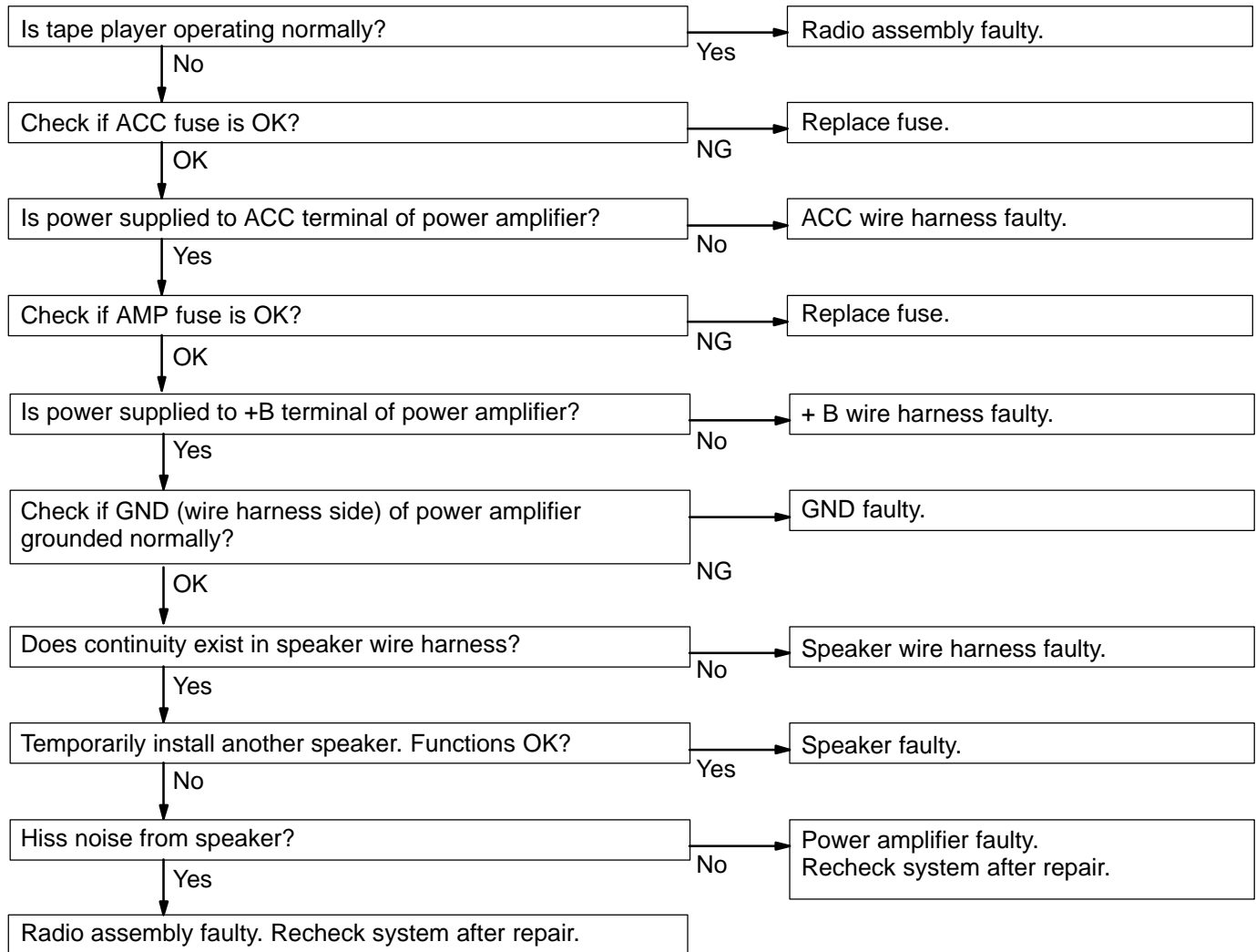
	Problem	Flow chart No.
Radio	Radio not operating when power switch turned to 'ON'.	1
	Display indicates when power switch turned to 'ON', but no sound (including 'noise') is produced.	2
	Noise present, but AM - FM not operating.	3
	Any speaker does not work.	4
	Any AM or FM does not work.	5
	Few preset turning bands.	5
	Reception poor.	6
	Sound quality poor.	7
	Preset memory disappears.	8
Tape Player	Cassette tape cannot be inserted.	9
	Cassette tape inserted, but no power.	10
	Power coming in, but tape player not operating.	11
	Any speaker does not work.	12
	Sound quality poor.	13
	Tape jammed, malfunction with tape speed or auto-reverse.	14
	Cassette tape will not eject.	15
CD Player	CD cannot be inserted.	16
	CD inserted but no power/	17
	Power coming in, but CD player not operating.	18
	Sound jumps.	19
	Sound quality poor (Volume faint)	20
	Any speaker does not work.	21
	CD will not be ejected.	22
Power Amplifier	No power coming in.	23
	Power coming in, but power amplifier not operating.	24
	Any speaker does not work.	25
Noise	Noise occurs	26
	Noise produced by vibration or shock while driving.	27
	Noise produced when engine starts.	28
Steering Pad Switch	A audio system cannot be operated with steering pad switch.	29
Rear Seat Audio	Quality of sound from headphone connected to headphone terminal is poor or no sound can be heard.	30

The term "AM" includes LW,MW and SW, and the term "FW" includes UKW.

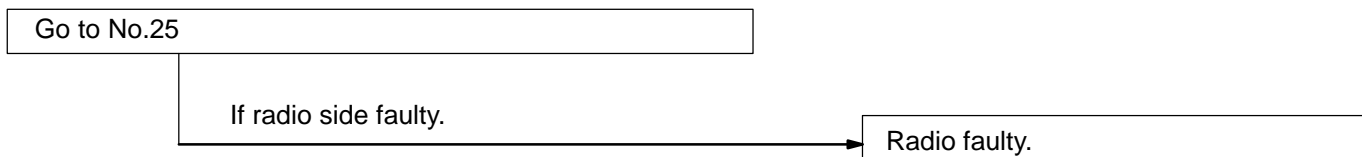
1	<b>Radio</b>	<b>RADIO NOT OPERATING WHEN POWER SWITCH TURNED TO "ON"</b>
---	--------------	---



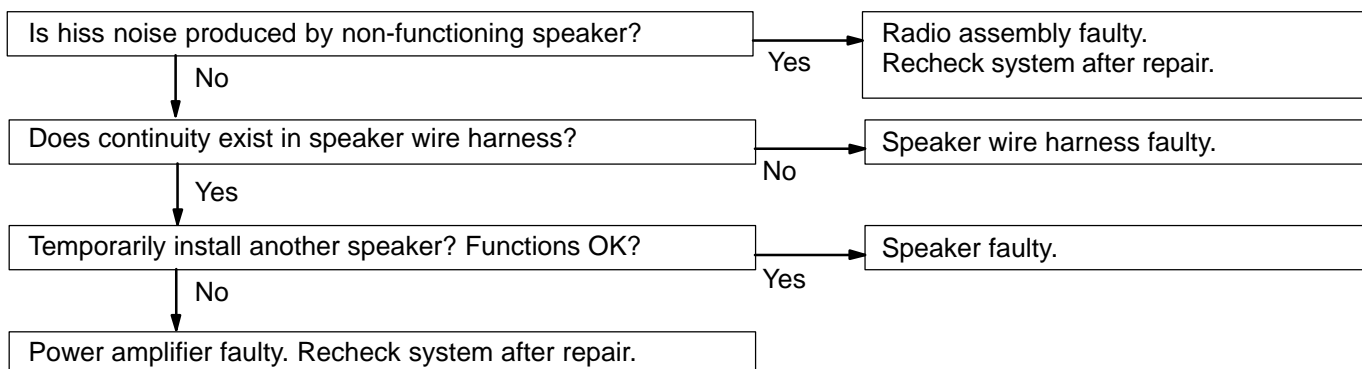
2	Radio	<b>DISPLAY INDICATES WHEN POWER SWITCH TURNED TO "ON", BUT NO SOUND (INCLUDING "NOISE") IS PRODUCED</b>
---	-------	---



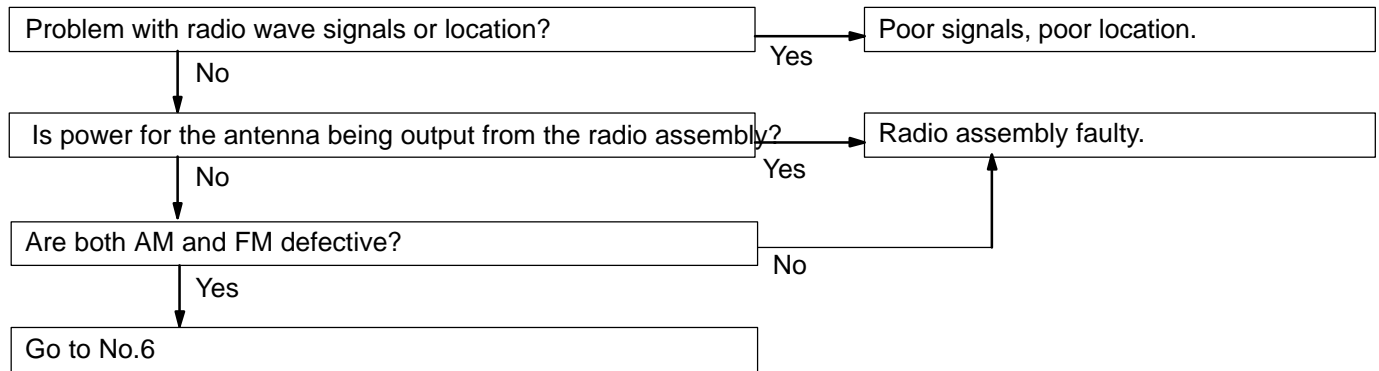
<b>3</b>	<b>Radio</b>	<b>NOISE PRESENT, BUT AM-FM NOT OPERATING</b>
----------	--------------	---



<b>4</b>	<b>Radio</b>	<b>ANY SPEAKER DOSE NOT WORK</b>
----------	--------------	----------------------------------

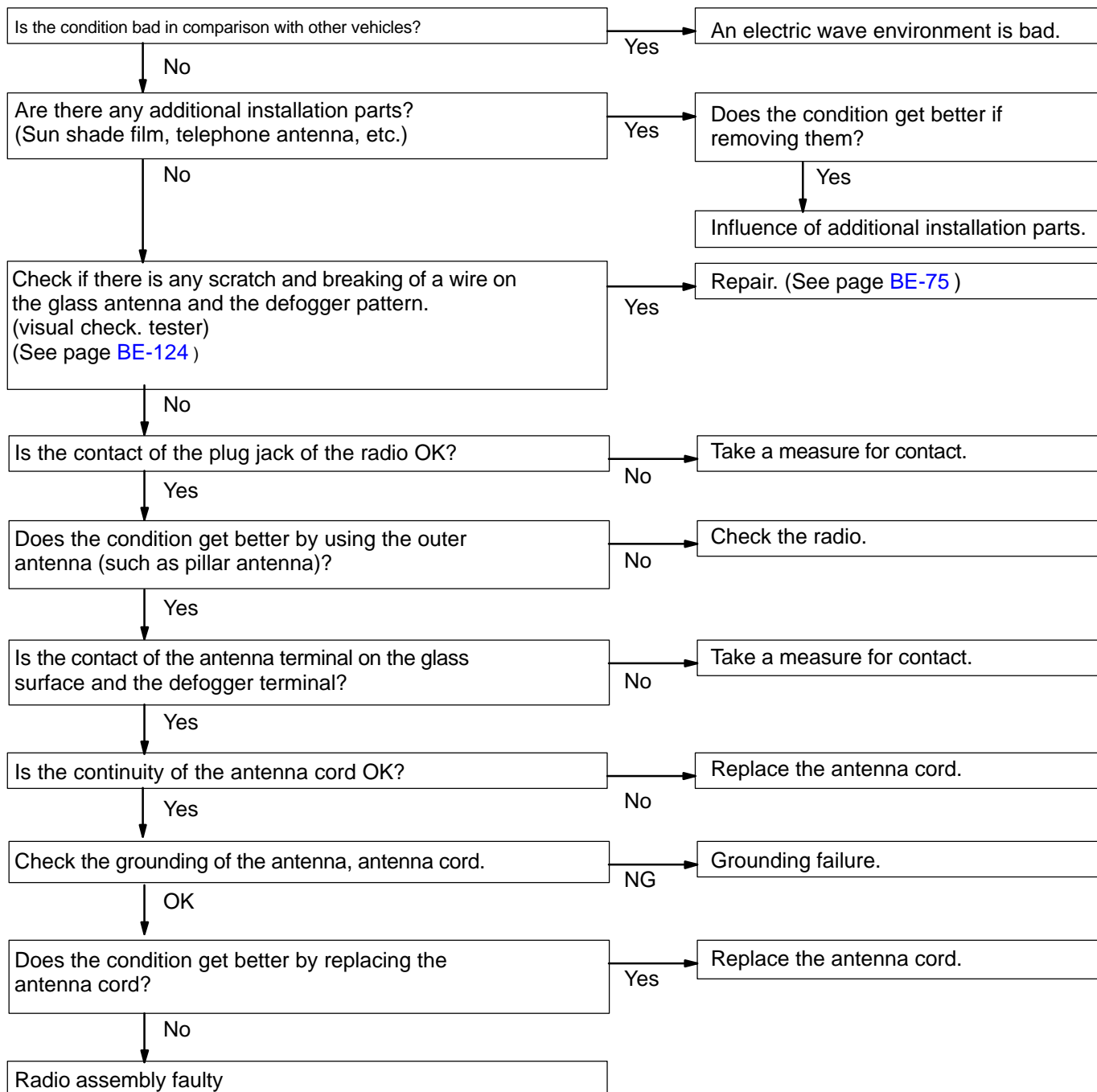


5	Radio	ANY AM OR FM DOES NOT WORK FEW PRESET TUNING BANDS
---	-------	---

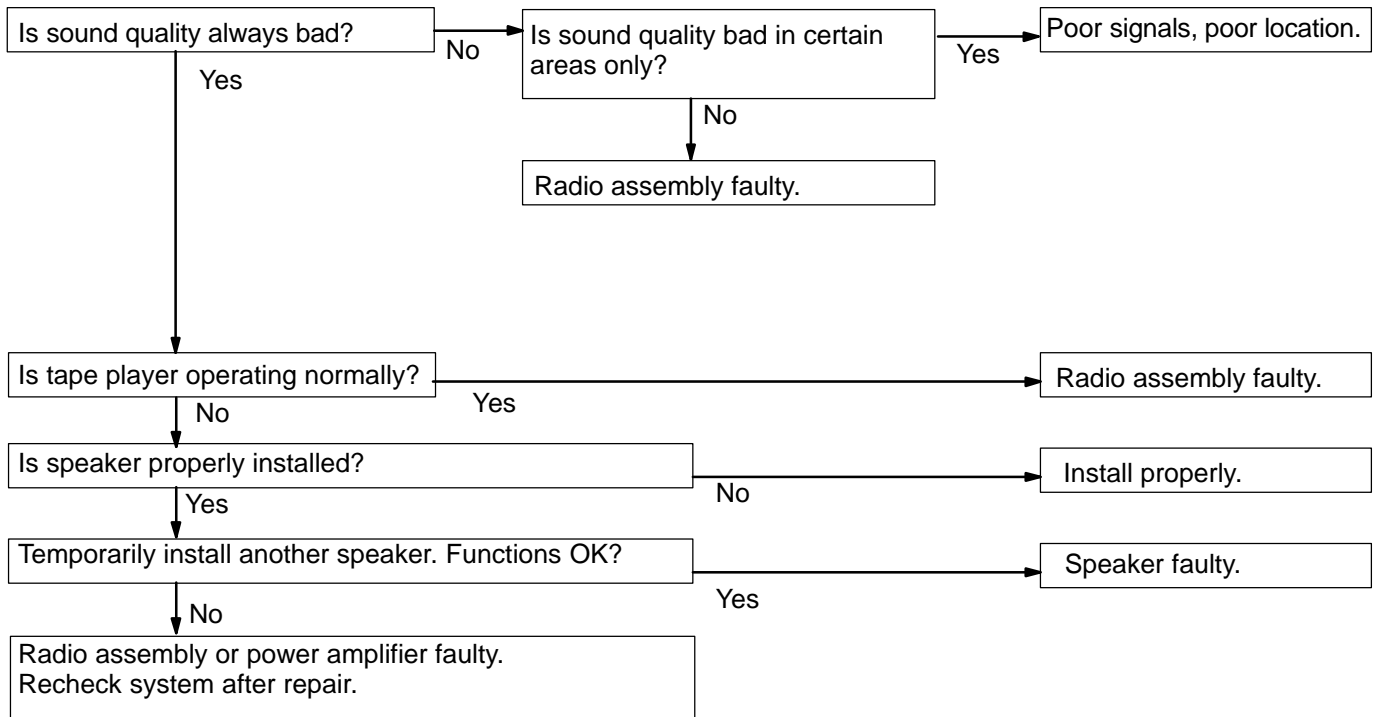




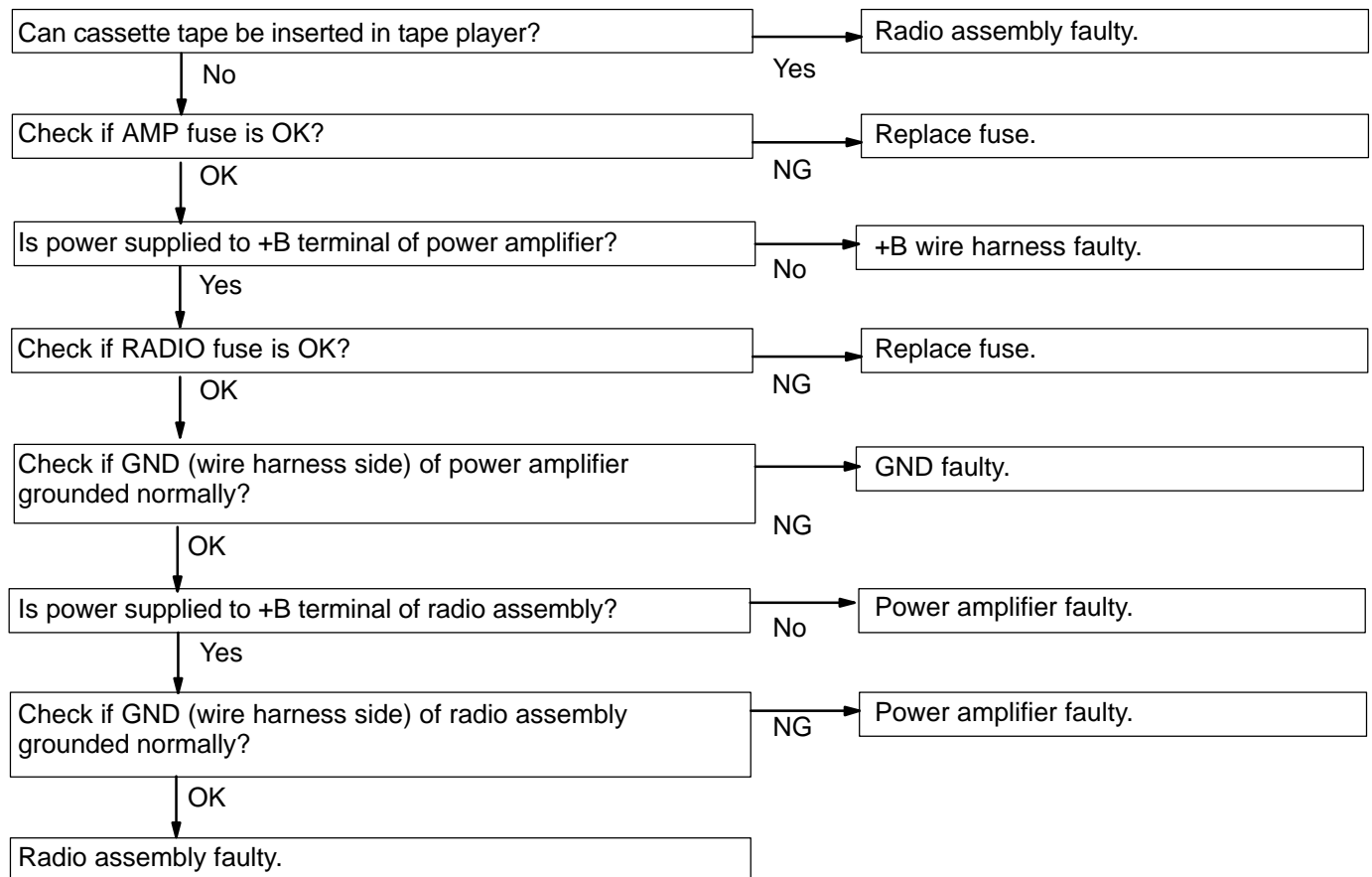
<b>6</b>	<b>Radio</b>	<b>POOR RECEPTION</b>
----------	--------------	-----------------------



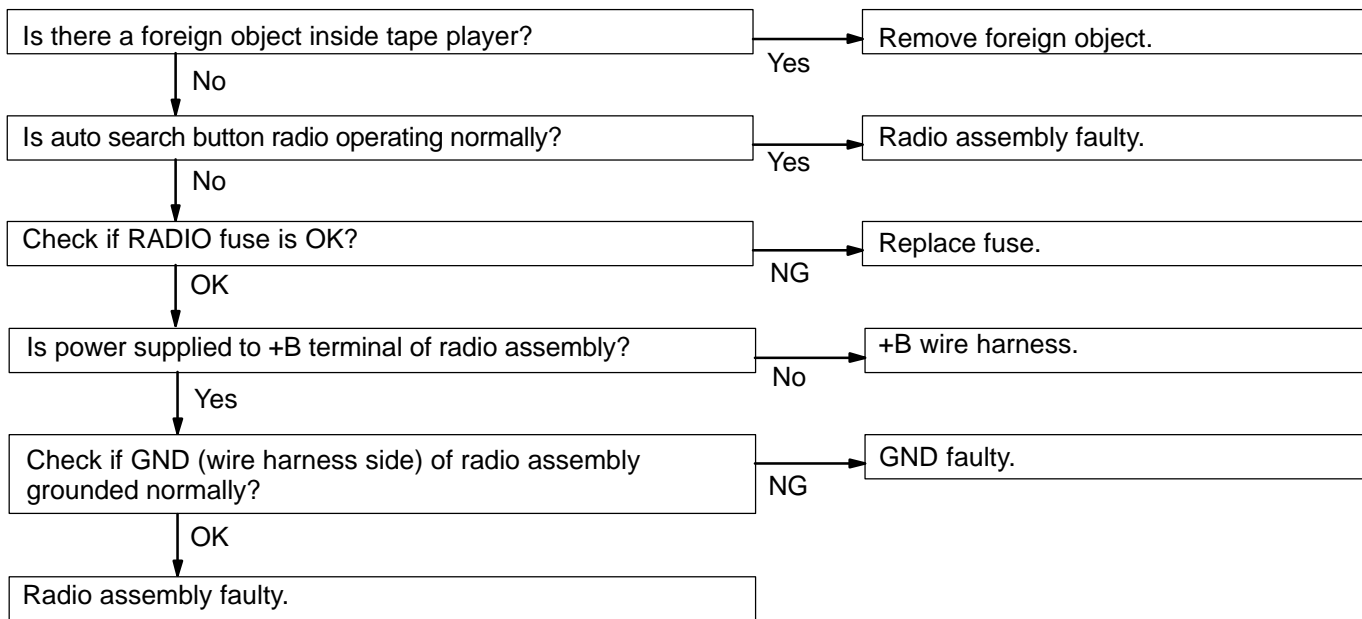
<b>7</b>	<b>Radio</b>	<b>SOUND QUALITY POOR</b>
----------	--------------	---------------------------



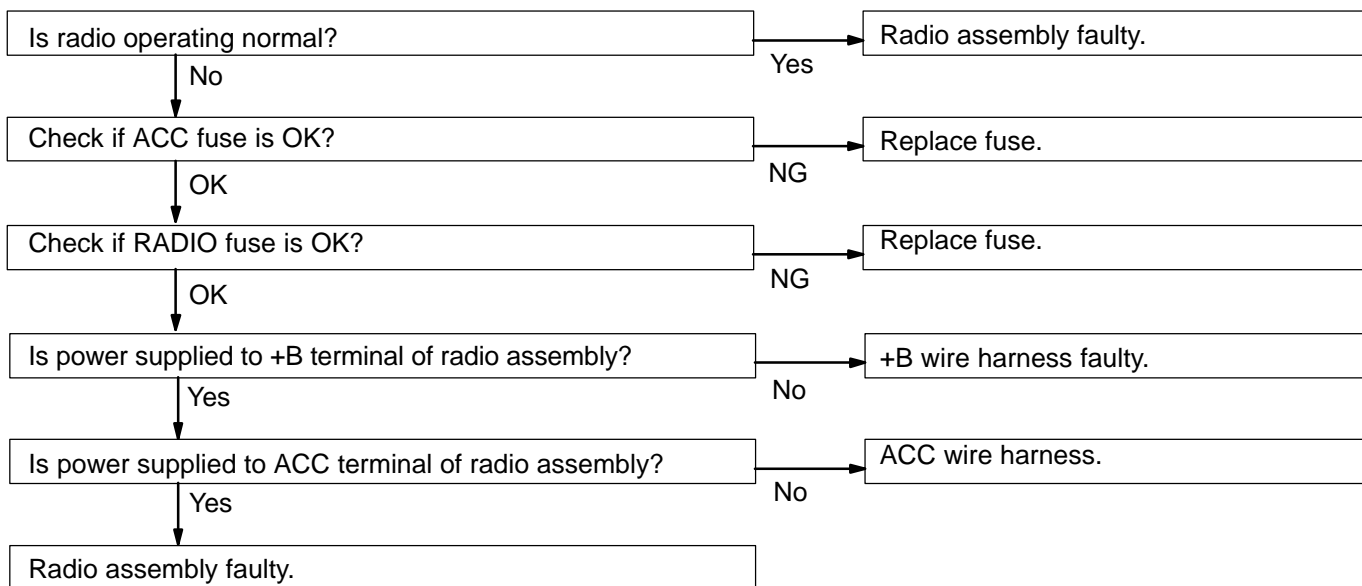
<b>8</b>	<b>Radio</b>	<b>PRESET MEMORY DISAPPEARS</b>
----------	--------------	---------------------------------



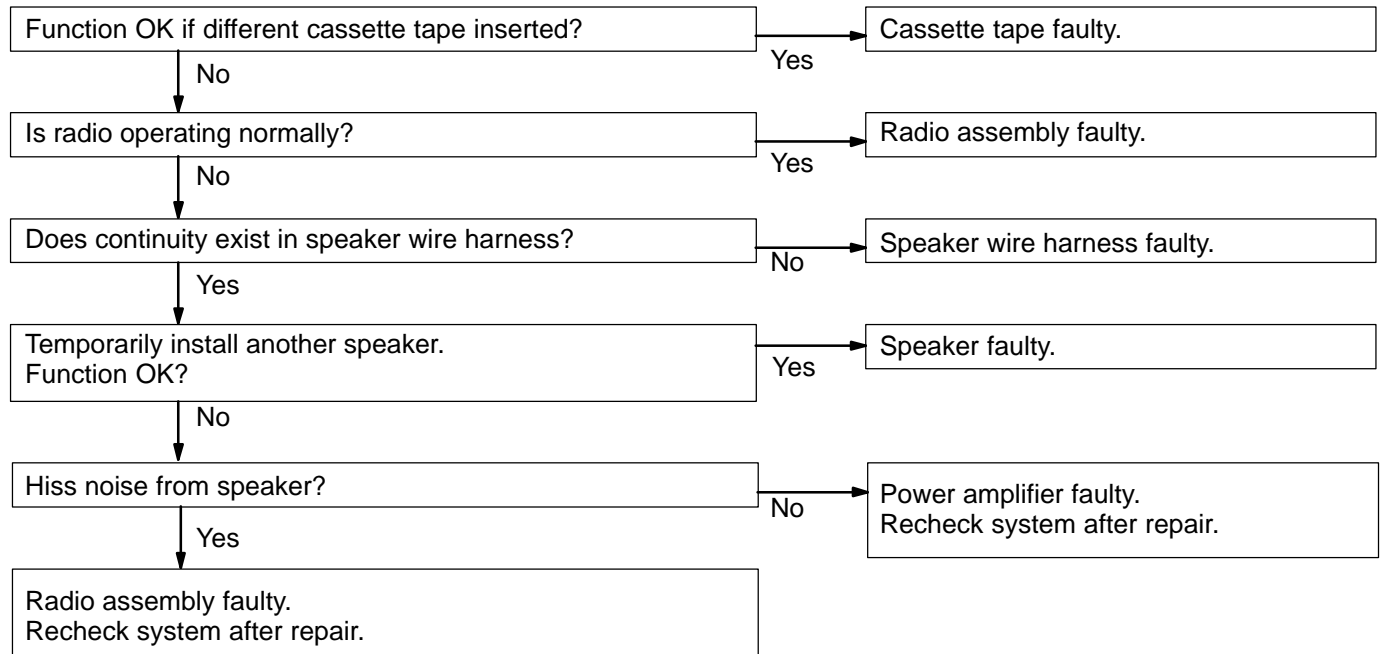
<b>9</b>	<b>Tape Player</b>	<b>CASSETTE TAPE CANNOT BE INSERTED</b>
----------	--------------------	---



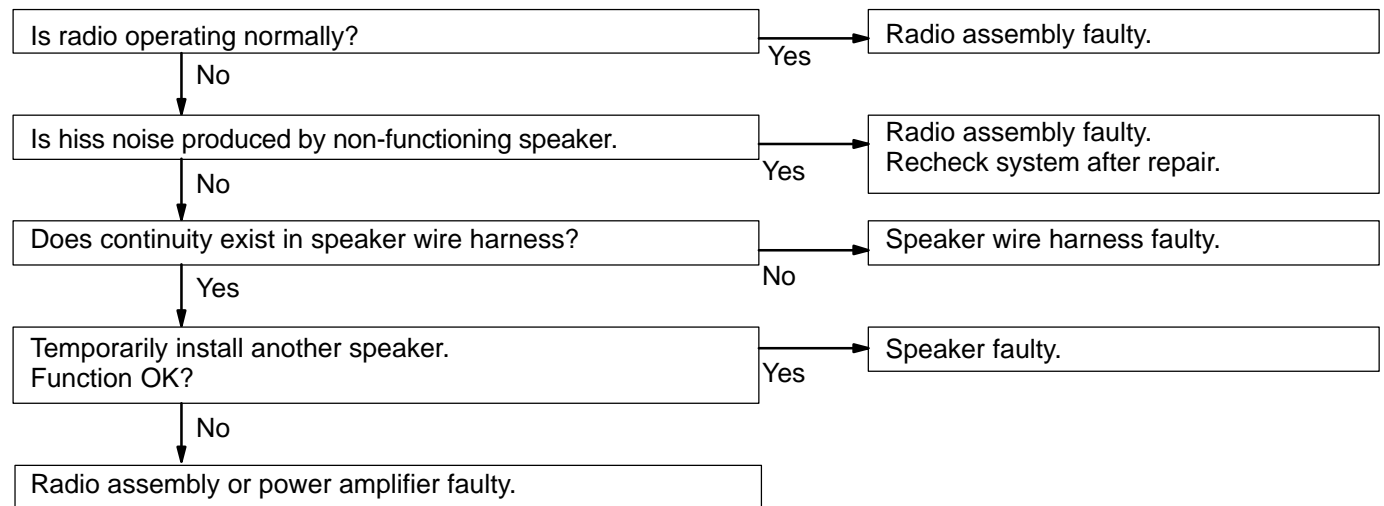
<b>10</b>	<b>Tape Player</b>	<b>CASSETTE TAPE INSERTED, BUT NO POWER</b>
-----------	--------------------	---



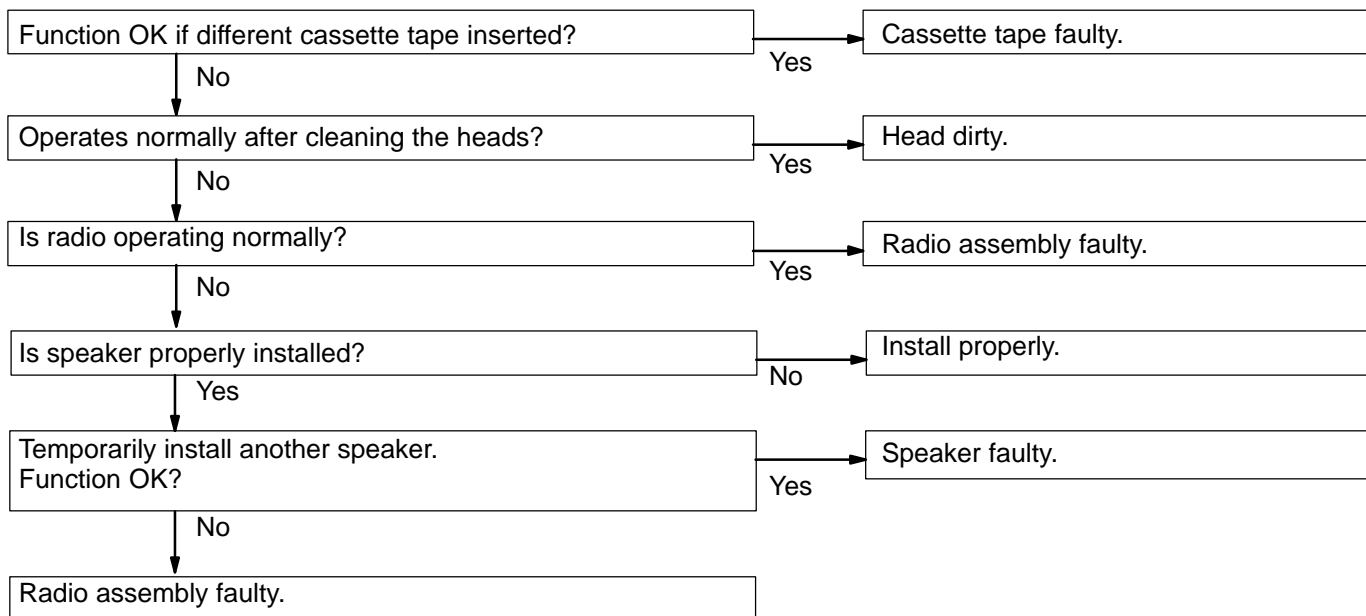
<b>11</b>	<b>Tape Player</b>	<b>POWER COMING IN, BUT TAPE PLAYER NOT OPERATING</b>
-----------	--------------------	---



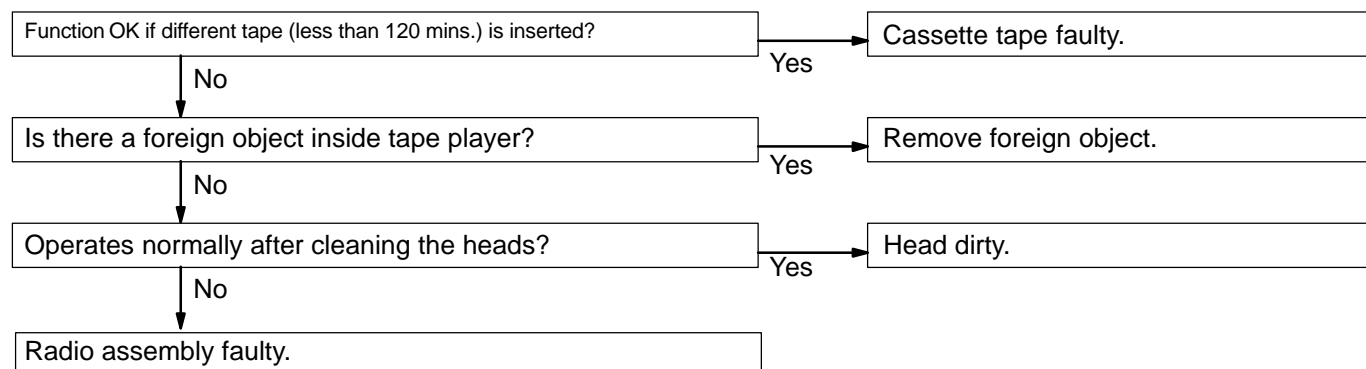
<b>12</b>	<b>Tape Player</b>	<b>ANY SPEAKER DOES NOT WORK</b>
-----------	--------------------	----------------------------------



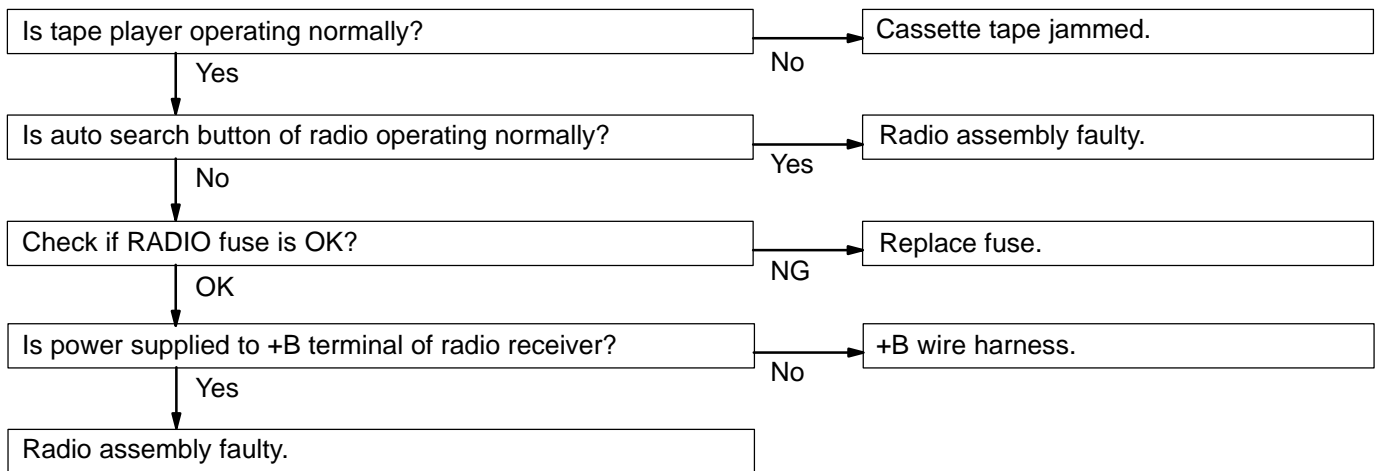
<b>13</b>	<b>Tape Player</b>	<b>SOUND QUALITY POOR (VOLUME FAINT)</b>
-----------	--------------------	--



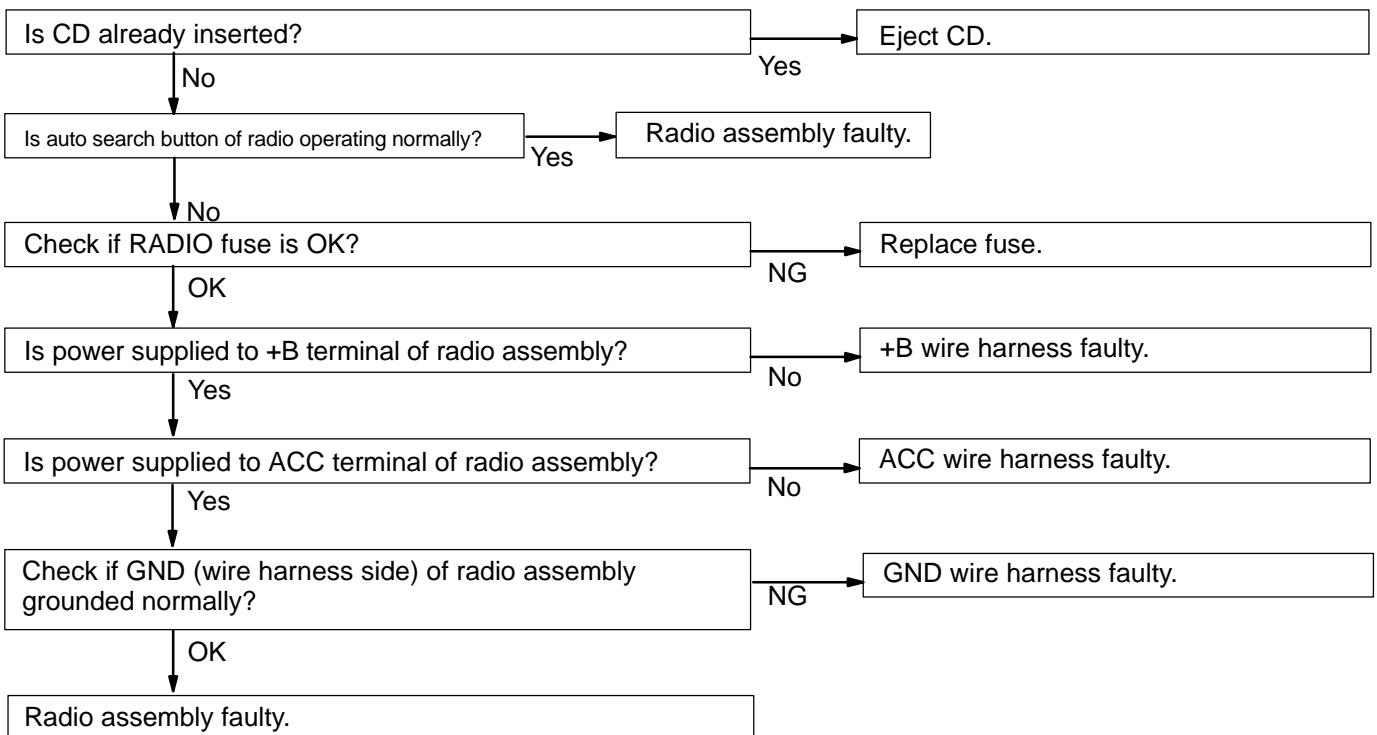
<b>14</b>	<b>Tape Player</b>	<b>TAPE JAMMED MALFUNCTION WITH TAPE SPEED OR AUTO-REVERSE</b>
-----------	--------------------	--



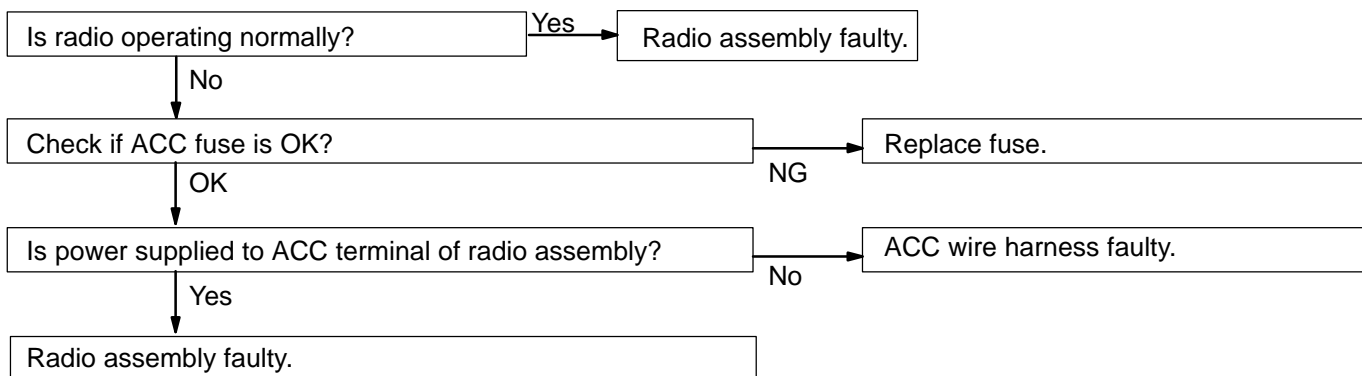
<b>15</b>	<b>Tape Player</b>	<b>CASSETTE TAPE WILL NOT BE EJECTED</b>
-----------	--------------------	--



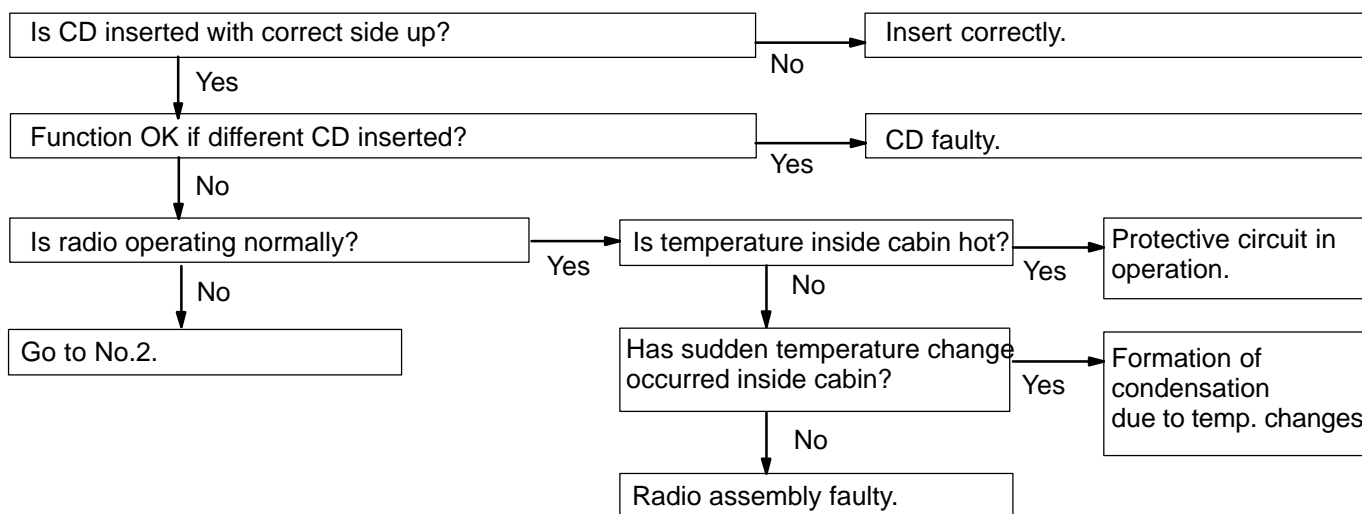
<b>16</b>	<b>CD Player</b>	<b>CD CANNOT BE INSERTED</b>
-----------	------------------	------------------------------



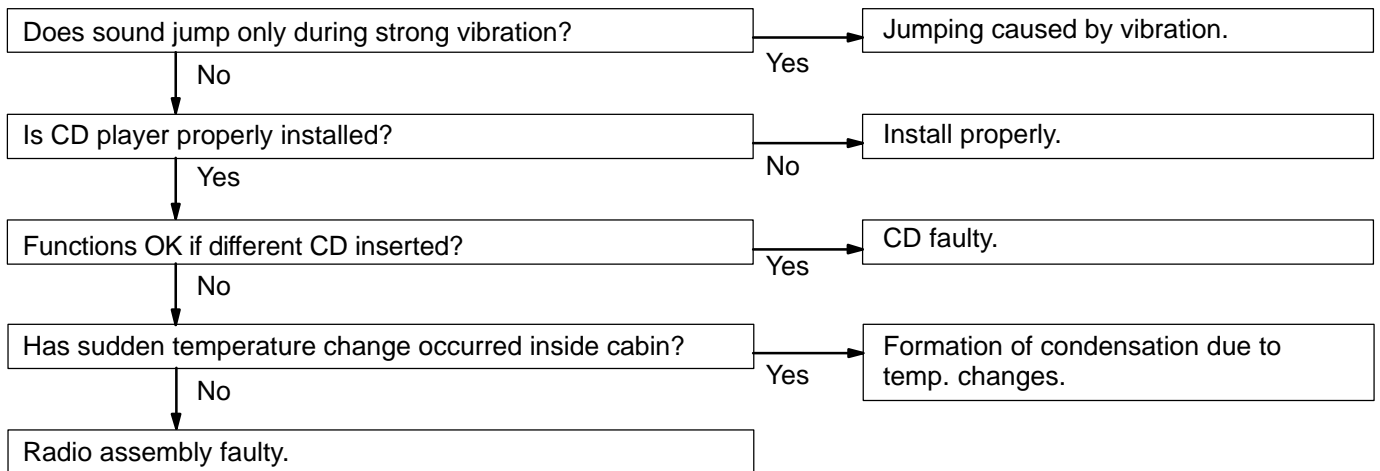
<b>17</b>	<b>CD Player</b>	<b>CD INSERTED, BUT NO POWER</b>
-----------	------------------	----------------------------------



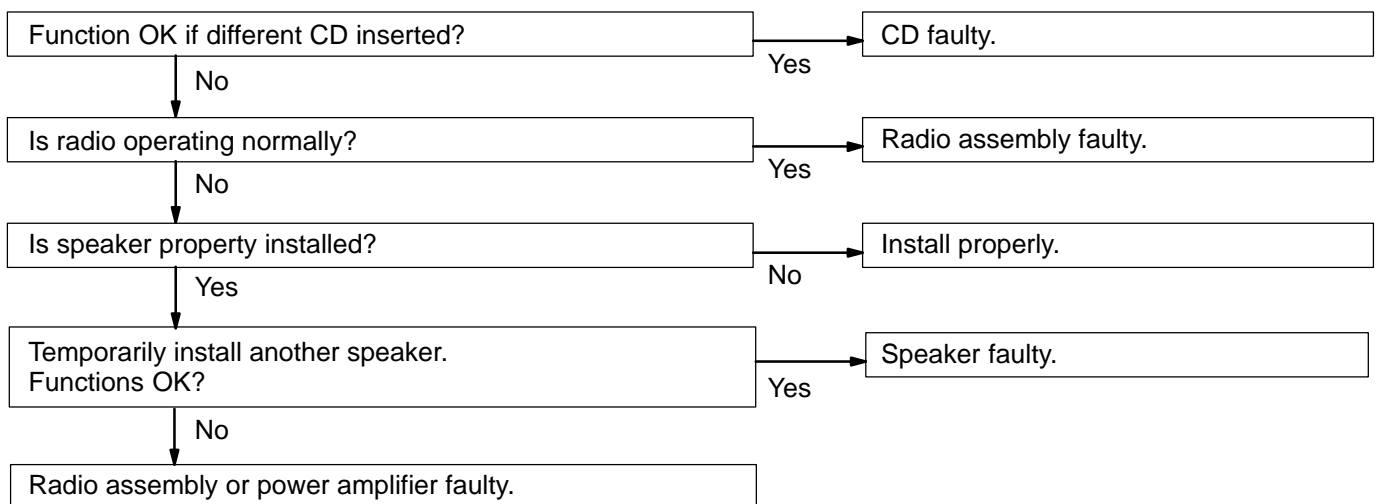
<b>18</b>	<b>CD Player</b>	<b>POWER COMING IN, BUT CD PLAYER NOT OPERATING</b>
-----------	------------------	---



<b>19</b>	<b>CD Player</b>	<b>SOUND JUMPS</b>
-----------	------------------	--------------------

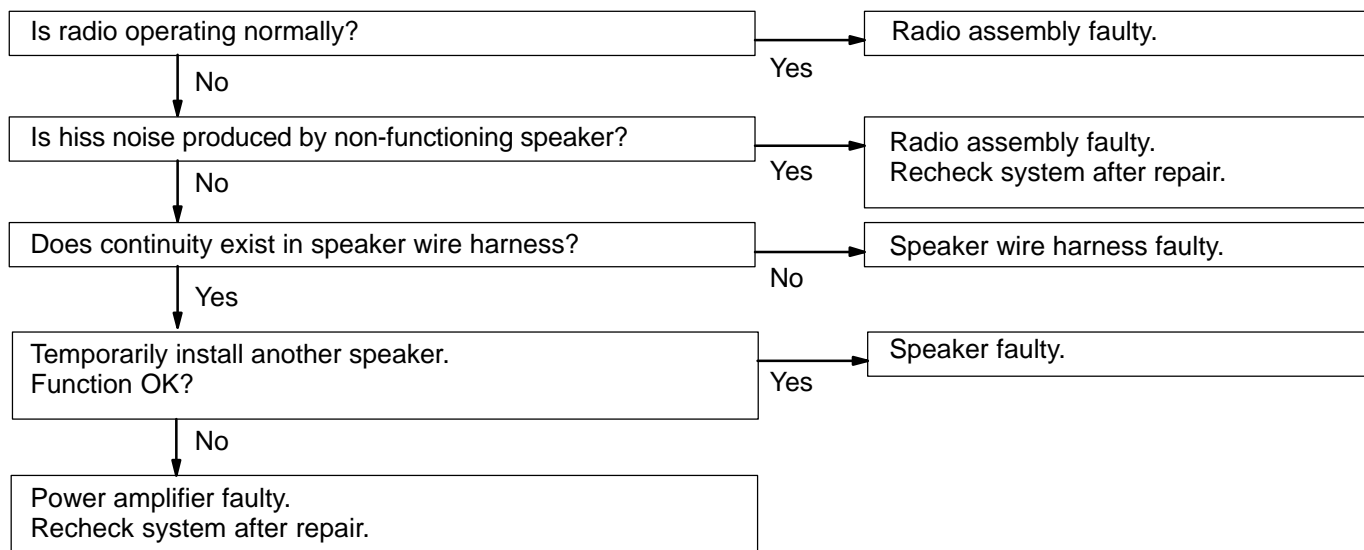


<b>20</b>	<b>CD Player</b>	<b>SOUND QUALITY POOR (VOLUME FAINT)</b>
-----------	------------------	--

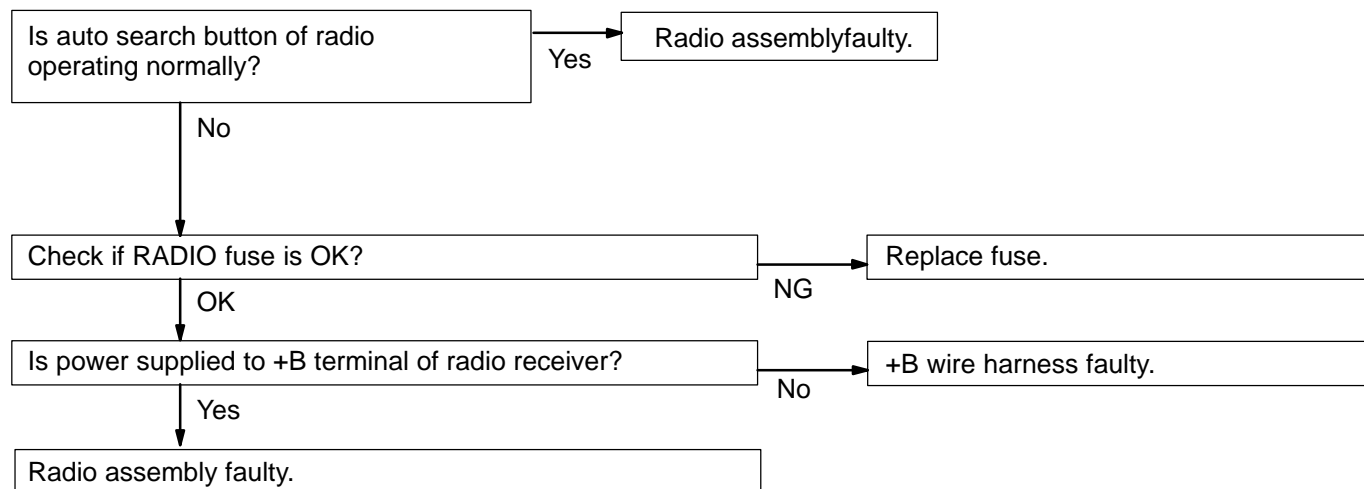


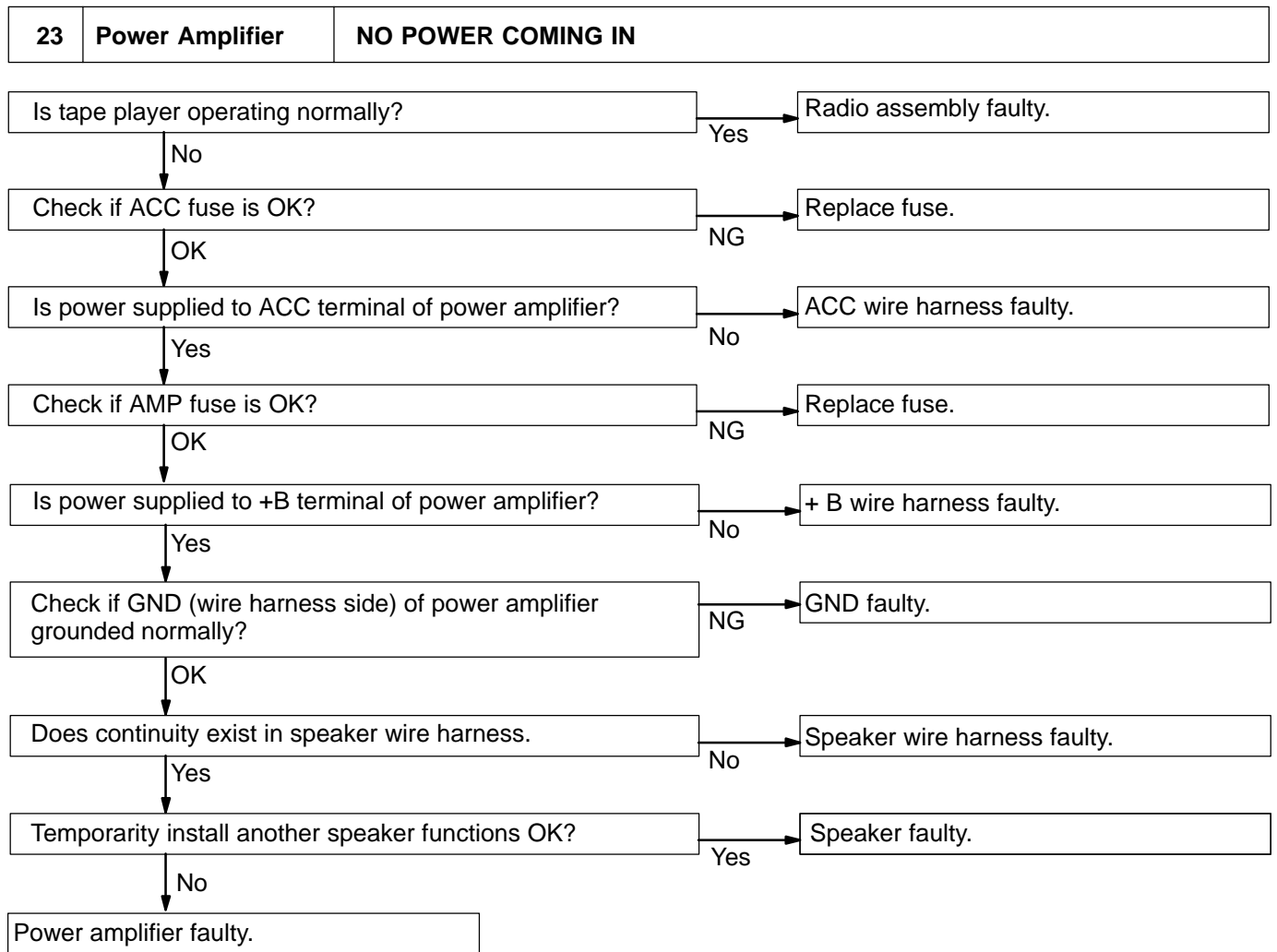


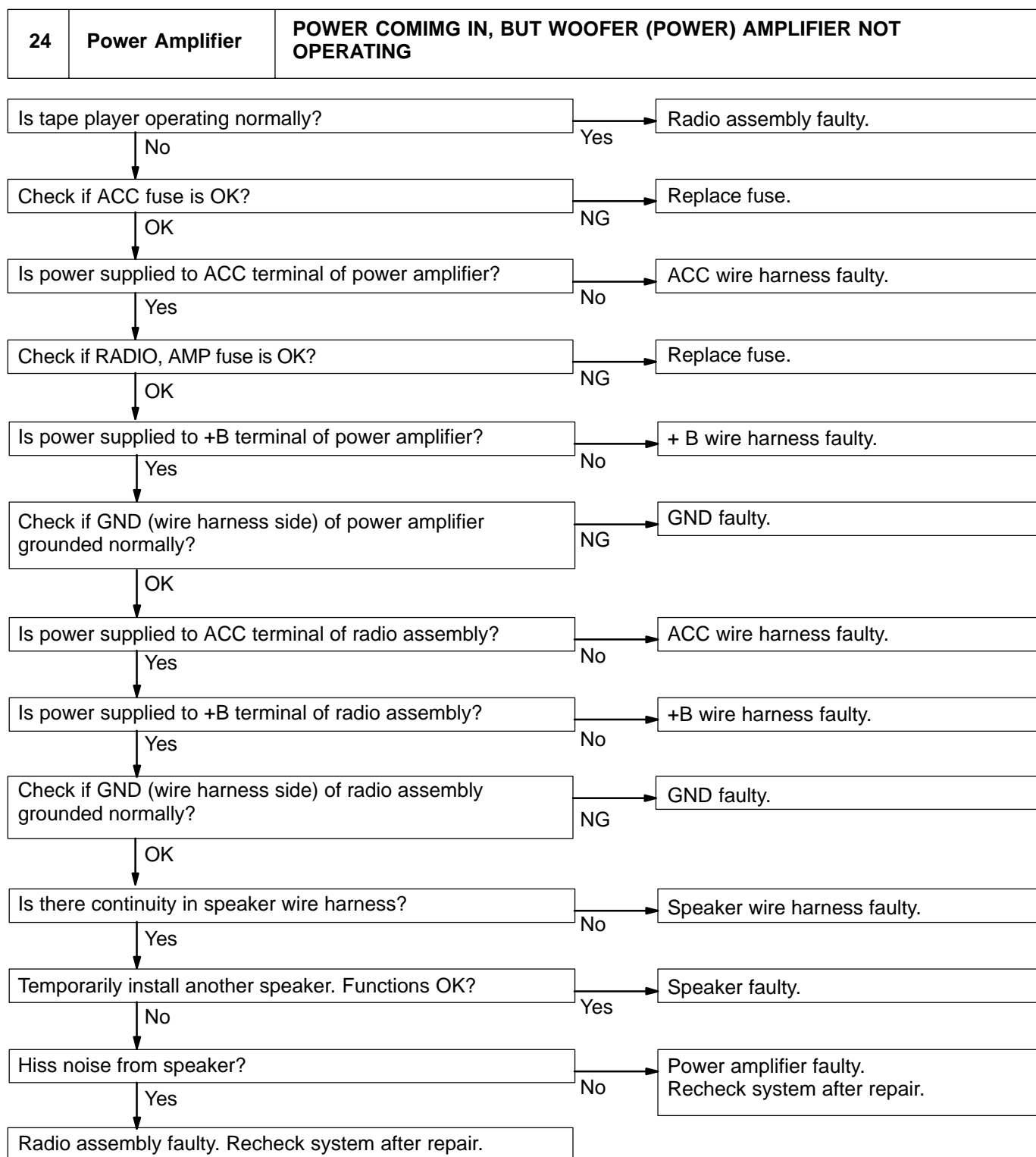
<b>21</b>	<b>CD Player</b>	<b>ANY SPEAKER DOES NOT WORK</b>
-----------	------------------	----------------------------------



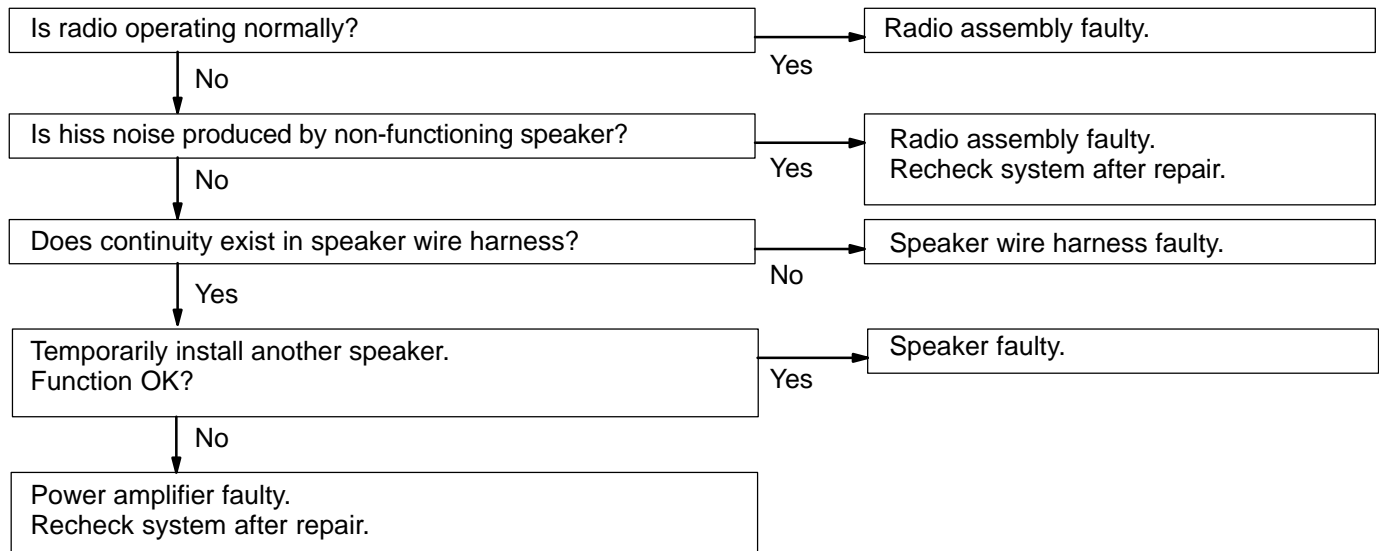
<b>22</b>	<b>CD Player</b>	<b>CD WILL NOT BE EJECTED</b>
-----------	------------------	-------------------------------

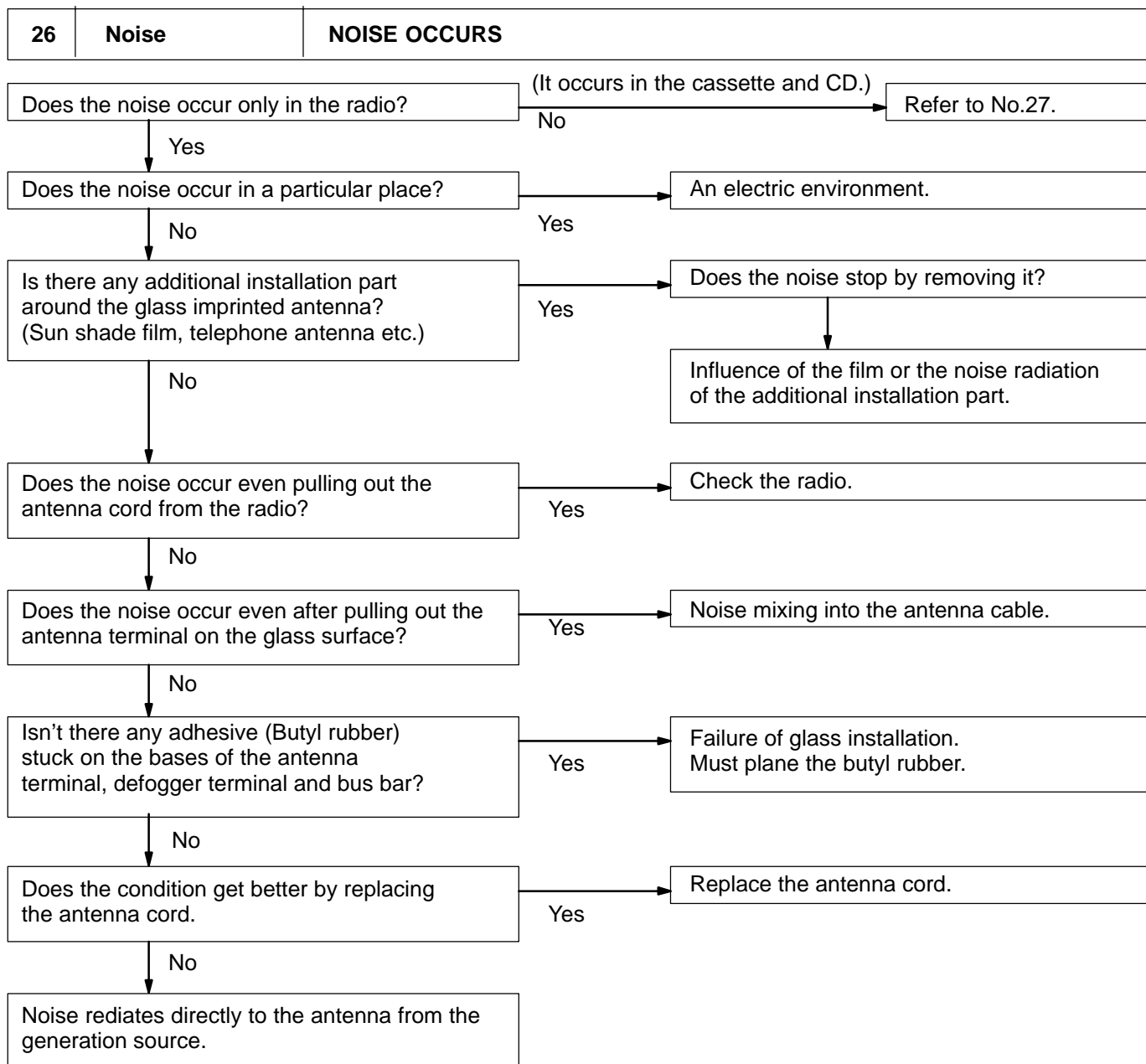




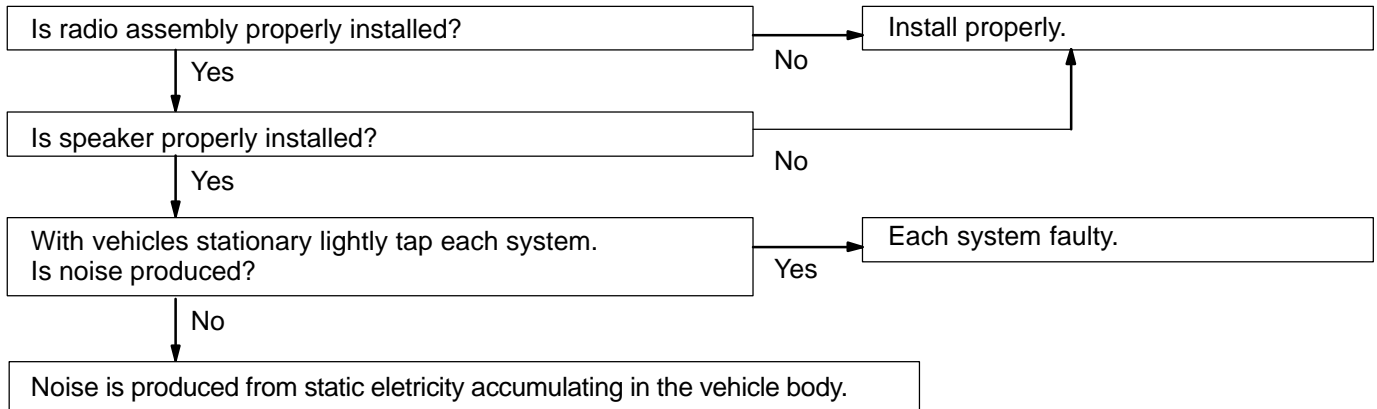


<b>25</b>	<b>Power Amplifier</b>	<b>ANY SPEAKER DOES NOT WORK</b>
-----------	------------------------	----------------------------------

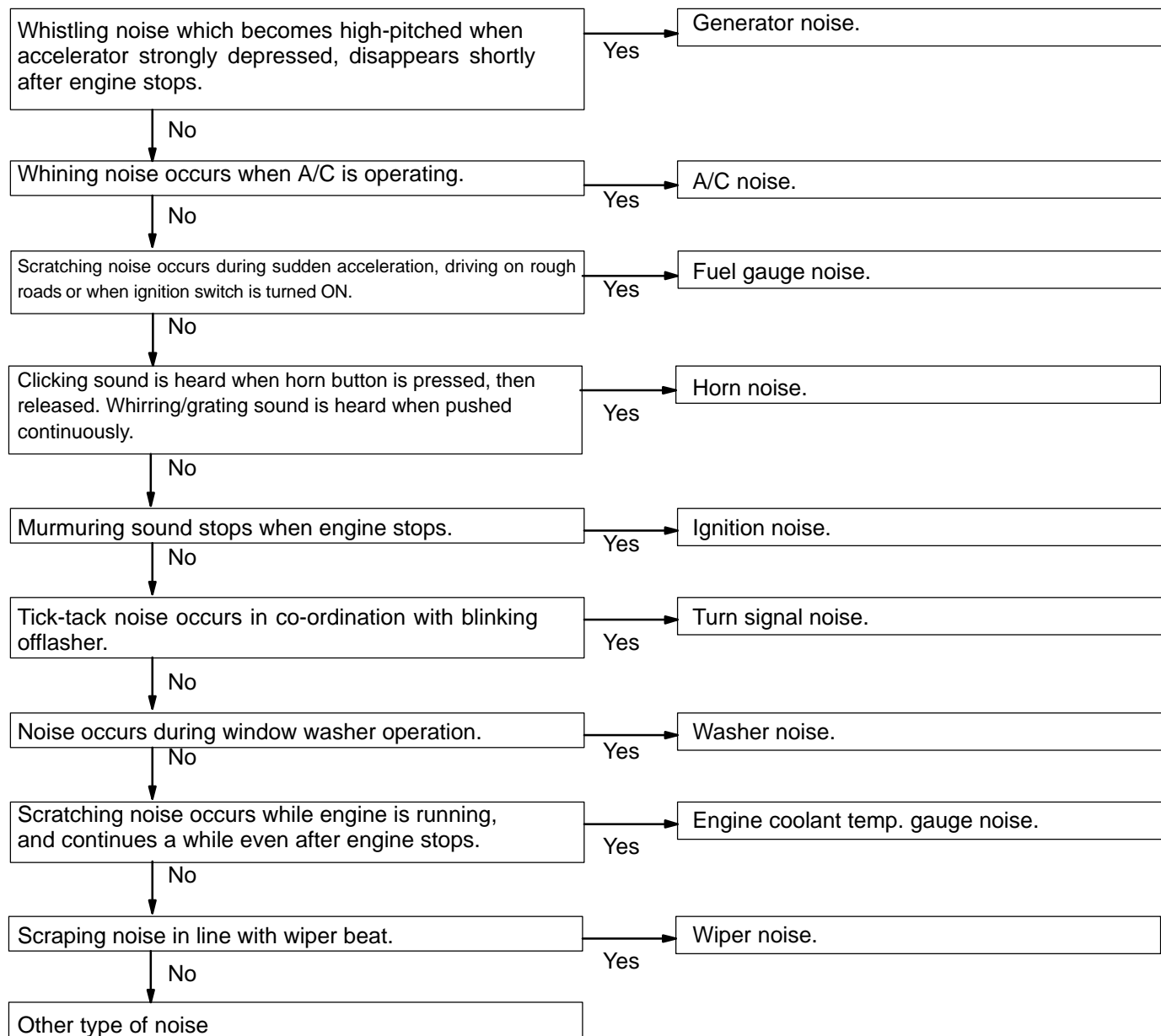




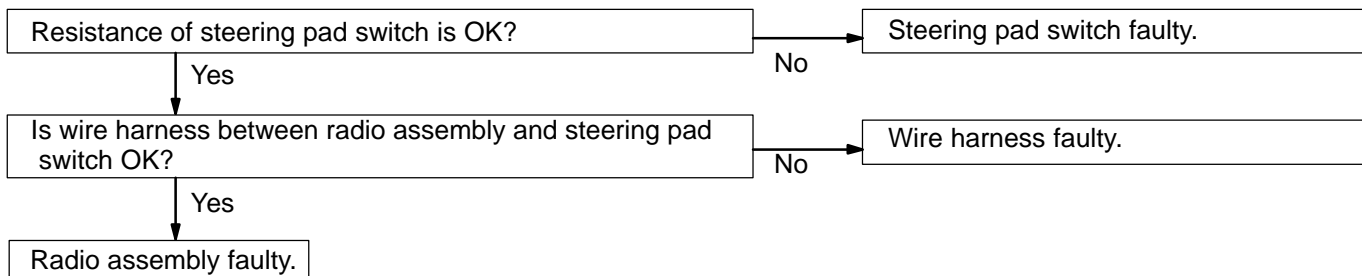
<b>27</b>	<b>Noise</b>	<b>NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING</b>
-----------	--------------	---



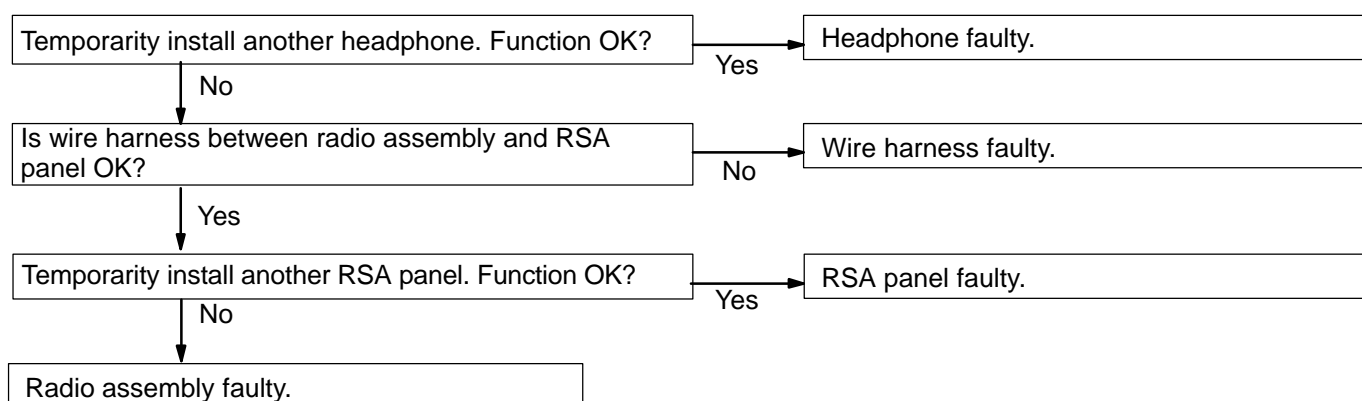
<b>28</b>	<b>Noise</b>	<b>NOISE PRODUCED WHEN ENGINE STARTS</b>
-----------	--------------	--



<b>29</b>	<b>Steering Pad Switch</b>	<b>A AUDIO SYSTEM CANNOT BE OPERATED WITH STEERING PAD SWITCH</b>
-----------	----------------------------	---



<b>30</b>	<b>Rear Seat Audio</b>	<b>QUALITY OF SOUND FROM HEADPHONE TERMINAL IS POOR OR NO SOUND CAN BE HEARD</b>
-----------	------------------------	--



# BODY ELECTRICAL SYSTEM

## PRECAUTION

BE01-05

### HINT:

Take care to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

#### 1. HEADLIGHT SYSTEM

Halogen bulbs have pressurized gas inside and require special handling. They can burst if scratched or dropped. Hold a bulb only by its plastic or metal case. Don't touch the glass part of a bulb with bare hands.

#### 2. SRS (SUPPLEMENTAL RESTRAINT SYSTEM)

The LAND CRUISER is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

#### 3. AUDIO SYSTEM

- ▶ If the negative (-) terminal cable is disconnected from the battery, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so be sure to note the stations and reset them after the negative (-) terminal cable is reconnected to the battery.
- ▶ If the negative (-) terminal cable is disconnected from the battery, the "ANTI-THEFT SYSTEM" will operate when the cable is reconnected, but the radio, tape player and CD player will not operate. Be sure to input the correct ID number so that the radio, tape player and CD player can be operated again.

#### 4. MOBILE COMMUNICATION SYSTEM

If the vehicle is equipped with a mobile communication system, refer to precautions in the IN section.

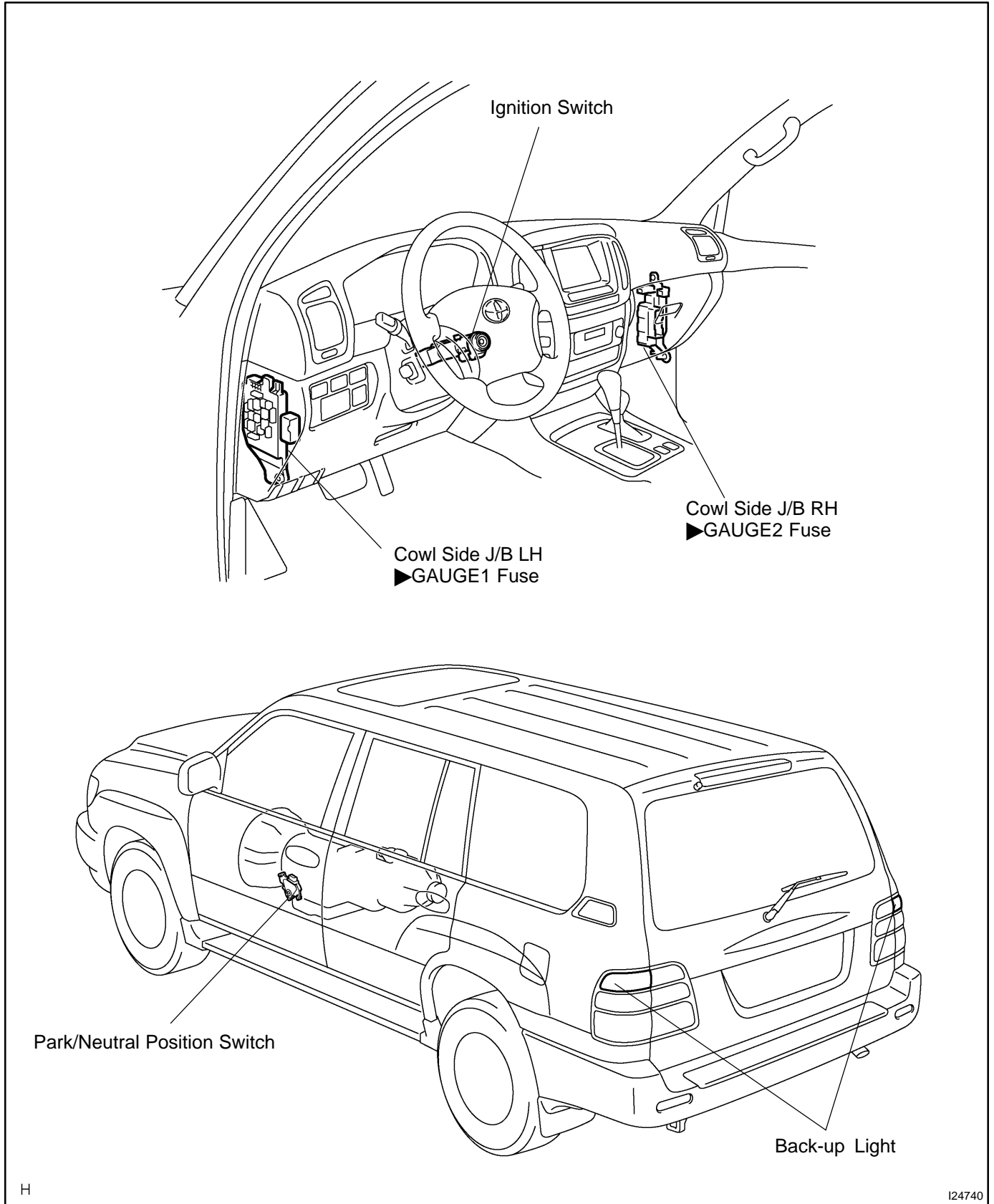


## INSPECTION

INSPECT PARK/ NEUTRAL POSITION SWITCH CONTINUITY (See page [DI-402](#) )

# BACK-UP LIGHT SYSTEM LOCATION

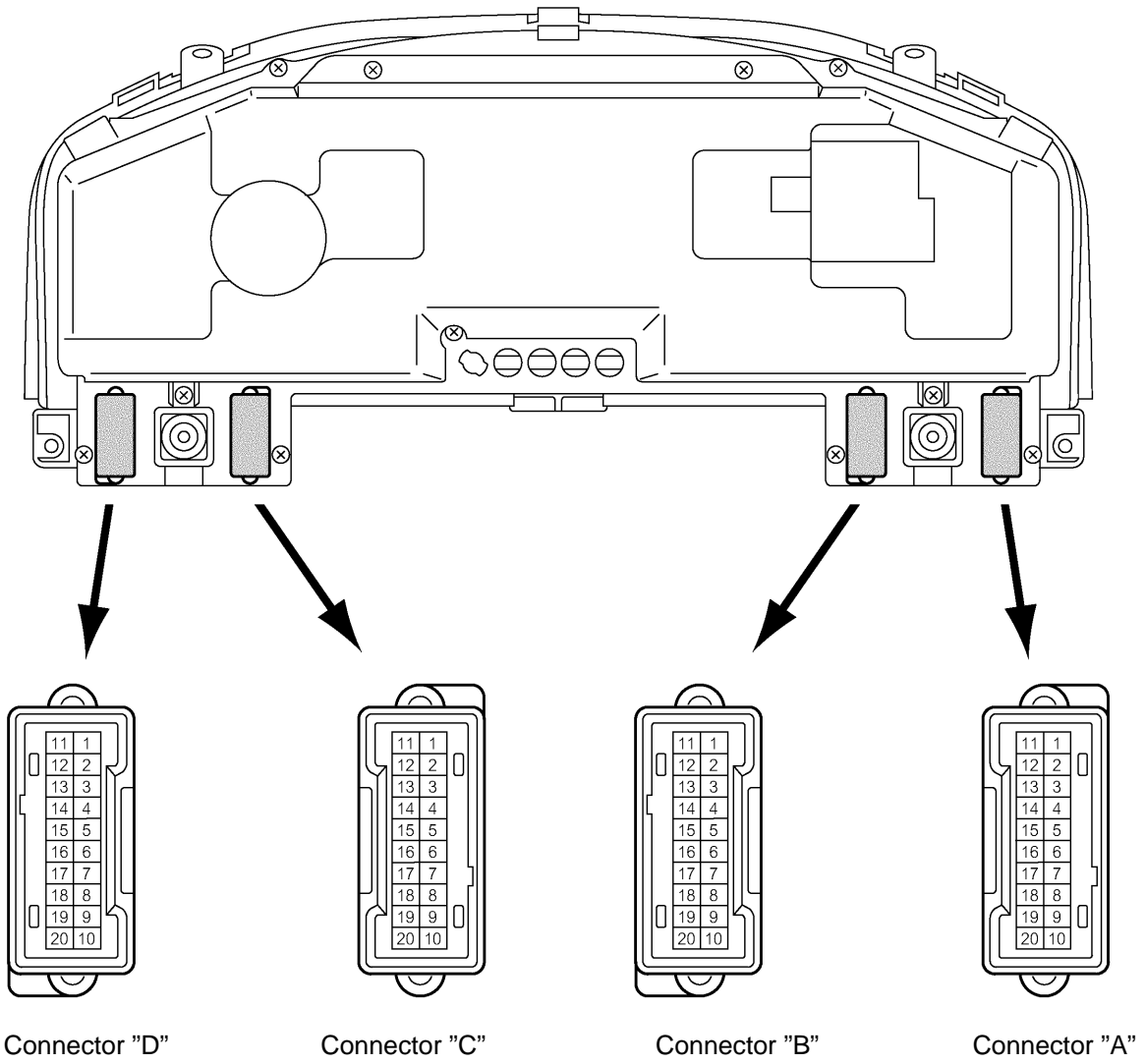
BEOGW-12



H

124740

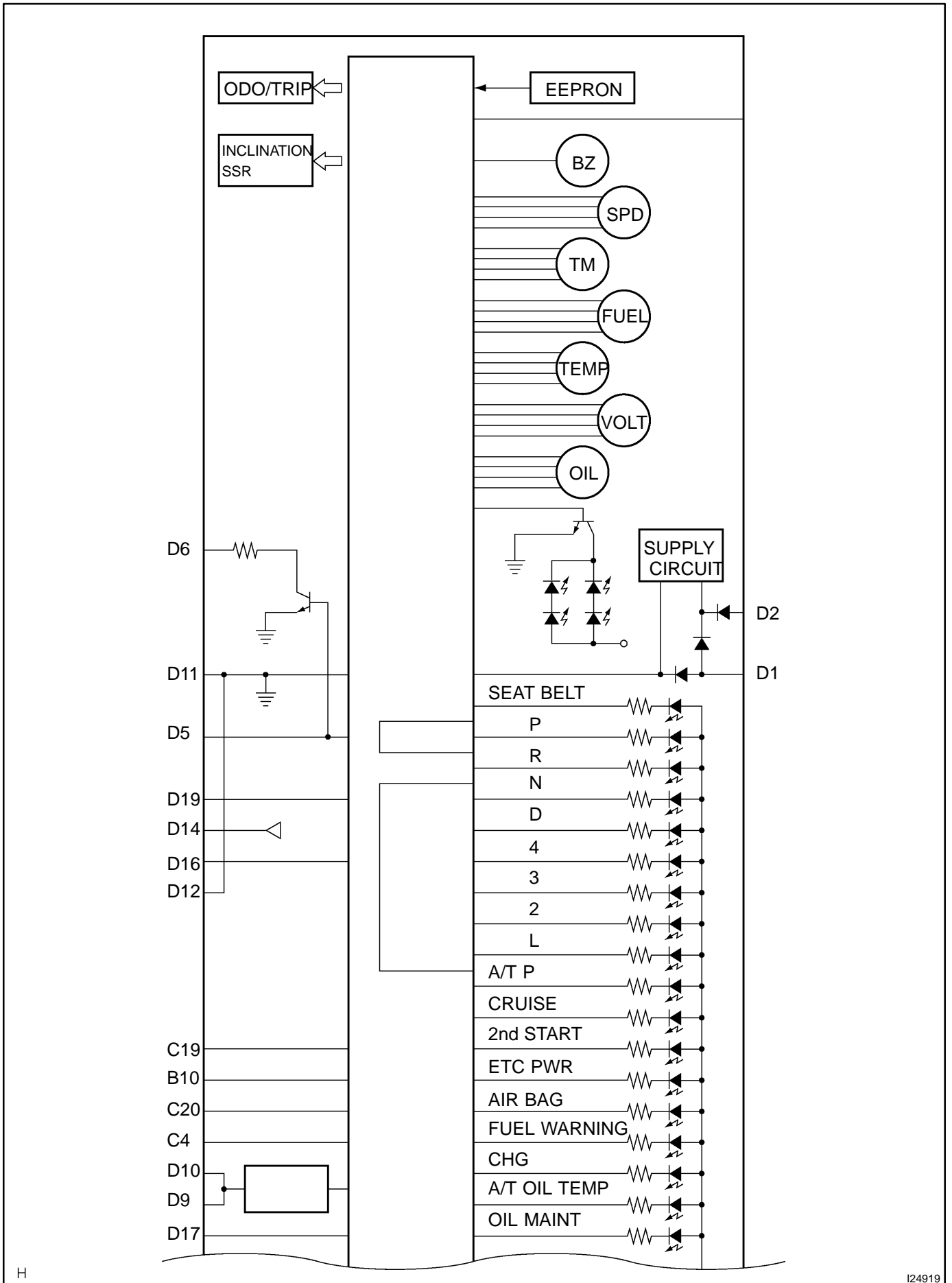
# CIRCUIT



H

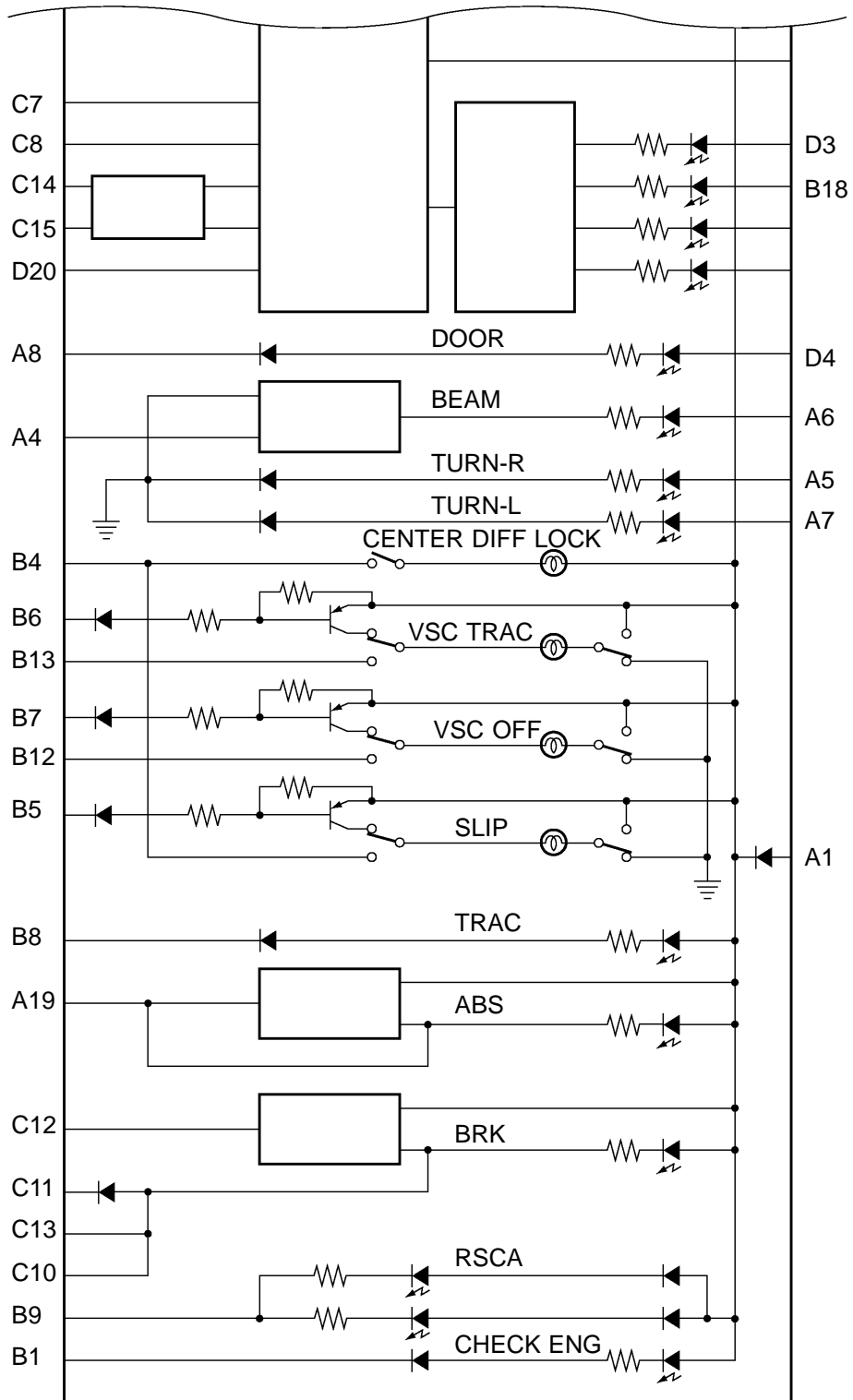
I25532

BODY ELECTRICAL - COMBINATION METER



H

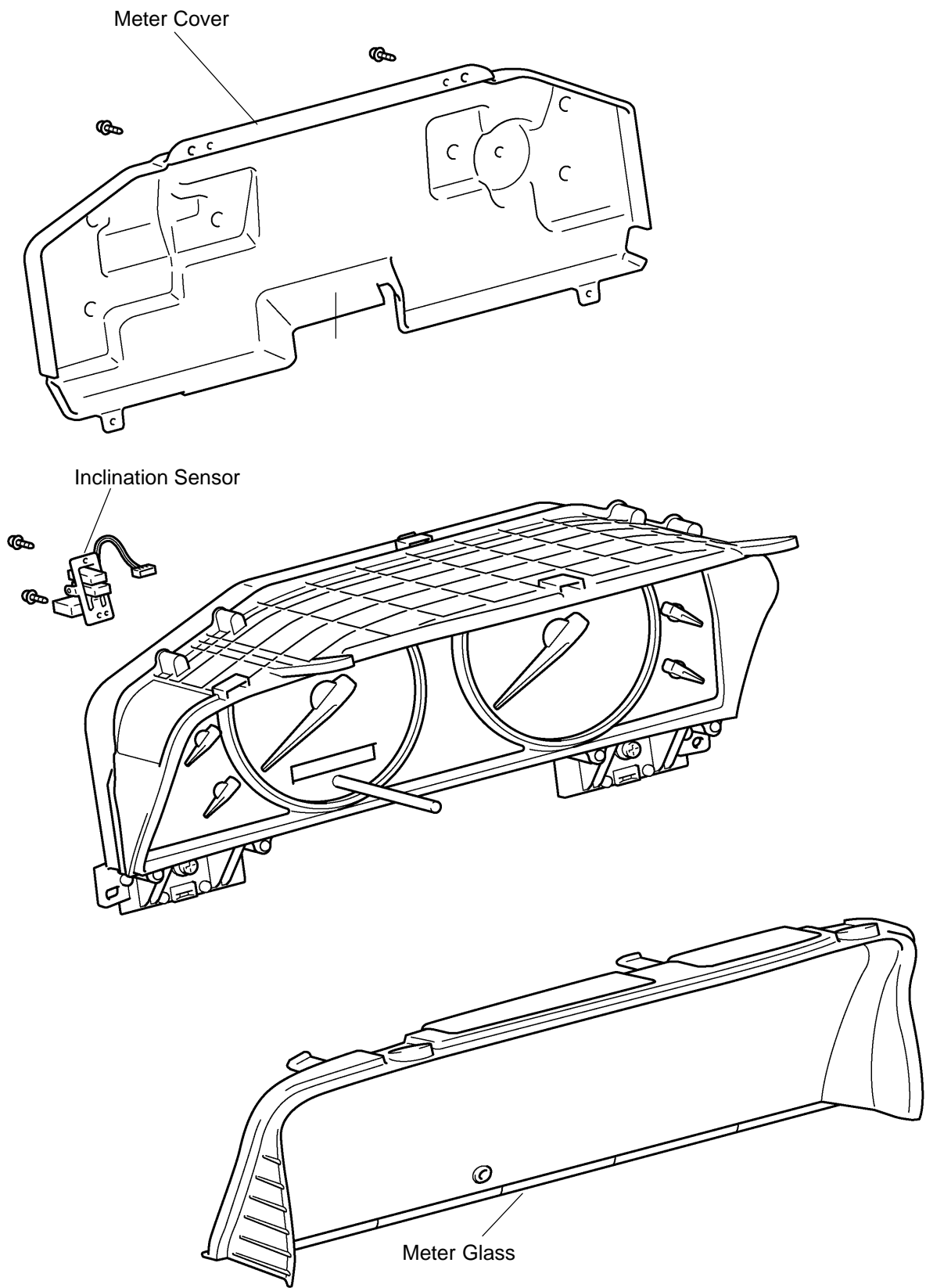
I24919



## BODY ELECTRICAL - COMBINATION METER

No.		Wiring connector side
C12	3	Body ECU
	4	Flasher Relay
	5	H/L R-HI Fuse
	6	Flasher Relay
	7	Light Control Switch
	10	MET Fuse
	12	ABS, TRC, VSC ECU
C13	8	PANEL Fuse
	9	Body Ground
	11	ECM
	14	CTR DIFF Switch
	15	ABS, TRC, VSC ECU
	16	ABS, TRC, VSC ECU
	17	ABS, TRC, VSC ECU
	18	ABS, TRC, VSC ECU
19	Airbag ECU	
C14	1	Body ECU
	4	Airbag ECU
	7	Oil Pressure Sender Gauge
	10	ECM
	11	Driver Seat Belt Buckle Switch
	16	Drive Monitor
	17	Drive Monitor
	18	ABS, TRC, VSC ECU
	19	ABS, TRC, VSC ECU
20	ABS & BA & TRAC & VSC Actuator	
C15	1	Engine Ground
	2	Main Fuel Sender Gauge
	4	Main Fuel Sender Gauge
	6	Main Fuel Sender Gauge
	7	Light Control Rheostat
	9	Key Unlock Warning Switch
	10	Body (Door Courtesy Switch Signal)
	11	GAUGE1 Fuse
	12	ECU-B2 Fuse
	13	ACC Fuse
	14	DOME Fuse
	15	Speed Sensor
	16	Speed Control Unit
19	Gateway ECU	
20	ECM	

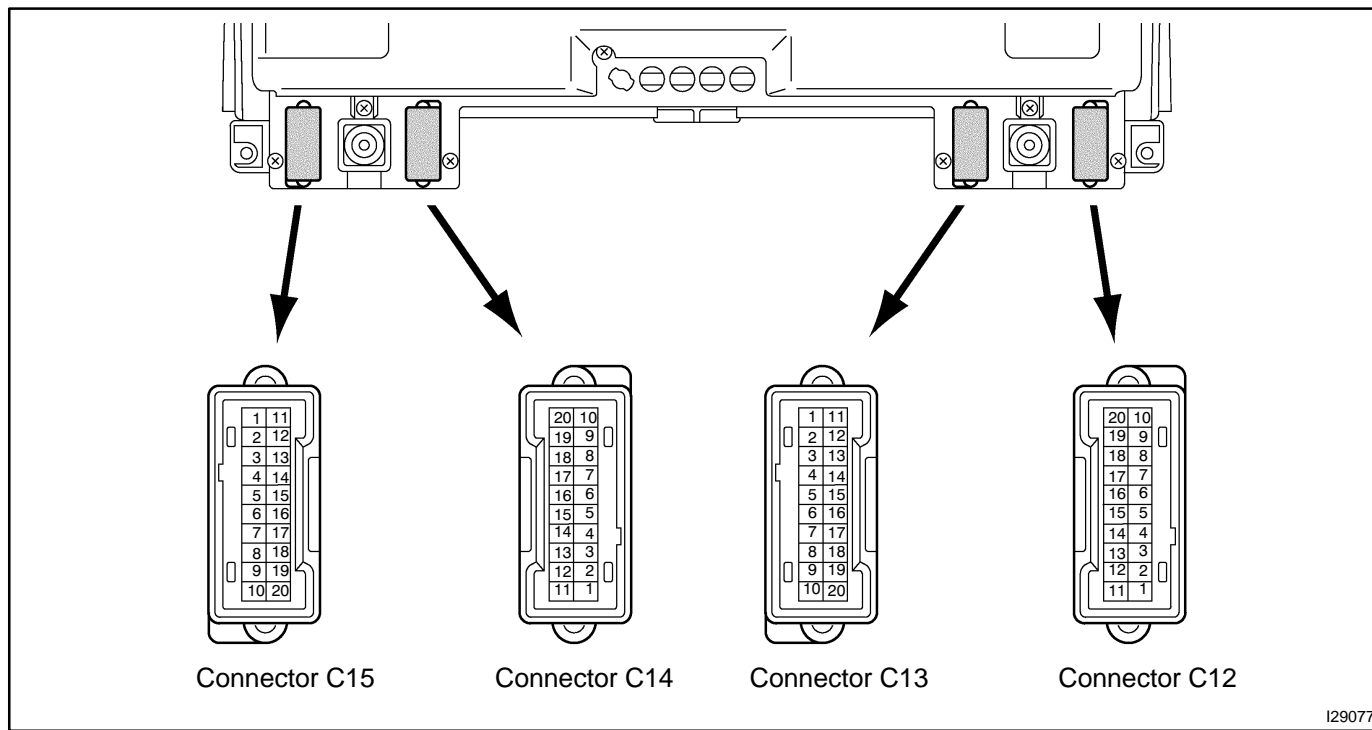
# COMPONENTS



## INSPECTION

### 1. INSPECT COMBINATION METER CIRCUIT

Connect the connector C12, C13, C14 and C15 to the combination meter and inspect the wire harness side connectors from the back side as shown in the table.



Tester connection	Condition	Specified condition
C12-3 (DOOR-) - Ground	Either door is opened	Below 1 V
	Either door is closed	10 - 14 V
C12-4 (TURN-L) - Ground	Ignition switch ON and turn signal switch OFF or RIGHT	Below 1 V
	Ignition switch ON and turn signal switch LEFT	Pulse signal is output 10 - 14 V ↔ Below 1 V
C12-5 (BEAM+) - Ground	IG switch ON, light control switch OFF	Below 1 V
	IG switch ON, light control switch ON	10 - 14 V
C12-6 (TURN-R) - Ground	Ignition switch ON and turn signal switch OFF or LEFT	Below 1 V
	Ignition switch ON and turn signal switch RIGHT	Pulse signal is output 10 - 14 V ↔ Below 1 V
C12-7 (BEAM-) - Ground	IG switch ON, light control switch ON	Below 1 V
C12-10 (CHG+) - Ground	Ignition switch OFF	Below 1 V
	Ignition switch ON	10 - 14 V
C12-12 (ABS) - Ground	Ignition switch ON and ABS warning light lights up	Below 1 V
	Ignition switch ON and ABS warning light does not light up	10 - 14 V
C13-8 (ILL+) - Ground	IG switch OFF	Below 1 V
	IG switch ON	10 - 14 V



C13-11 (CHECK E/G) - Ground	Ignition switch ON and engine is stopped	Below 1 V
	Ignition switch ON and engine is running	10 - 14 V
C13-14 (CTR DIFF/4WD) - Ground	Ignition switch ON and center diff. lock switch OFF	Below 1 V
C13-14 (CTR DIFF/4WD) - Ground	Ignition switch ON and center diff. lock switch ON	10 - 14 V
C13-15 (SLIP) - Ground	IG switch ON, SLIP warning light ON	Below 1.5 V
	IG switch ON, SLIP warning light OFF	10 - 14 V
C13-16 (VSC TRC) - Ground	IG switch ON, VSC TRC indicator light ON	Below 1.5 V
	IG switch ON, VSC TRC indicator light OFF	10 - 14 V
C13-17 (VSC OFF) - Ground	IG switch ON, VSC OFF indicator light ON	Below 1.5 V
	IG switch ON, VSC OFF indicator light OFF	10 - 14 V
C13-18 (ACTIVE TRC) - Ground	IG switch ON, TRC OFF indicator light ON	Below 1.5 V
	IG switch ON, TRC OFF indicator light OFF	10 - 14 V
C13-19 (RSCA OFF) - Ground	IG switch ON, RSCA warning light ON	Below 2.0 V
	IG switch ON, RSCA warning light OFF	10 - 14 V
C14-4 (AIR BAG-) - Ground	Ignition switch ON and SRS indicator light lights up	Below 1 V
C14-4 (AIR BAG-) - Ground	Ignition switch ON and SRS indicator does not light up	10 - 14 V
C14-7 (OIL PRS SDR) - Ground	Ignition switch ON and indicator ON	Below 1 V
	Ignition switch ON and indicator OFF	10 - 14 V
C14-10 (T/M PULSE) - Ground	Engine is Running	Pulse generation
C14-11 (D-BKL SW) - Ground	Ignition switch ON and seat belt is unfastened	10 - 14 V
	Ignition switch ON and seat belt is fastened	Below 1 V
C14-18 (PKB SW) - Ground	Ignition switch ON and parking brake lever is pulled	Below 1 V
	Ignition switch ON and parking brake lever is released	10 - 14 V
C14-20 (BRAKE) - Ground	Ignition switch ON and brake system indicator ON	Below 1 V
	Ignition switch ON and brake system indicator OFF	10 - 14 V
C15-1 (E/G EARTH) - Ground	Constant	Continuity
C15-2 (MAIN FE) - Ground	Constant	Continuity
C15-4 (MAIN FV) - Ground	Ignition switch ON	4.5 - 5.5 V
C15-6 (MAIN FR) - Ground	Ignition switch ON and fuel sender gauge float UP	Approx. 0.5 V
	Ignition switch ON and fuel sender gauge float DOWN	Approx. 5.5 V
C15-7 (ILL-) - Ground	Ignition switch ON and light control rheostat volume minimum	Below 1 V
	Ignition switch ON and light control rheostat volume maximum	10 - 14 V
C15-9 (KEY SW) - Ground	Key unlock warning switch ON (Key is inserted)	Below 1 V
	Key unlock warning switch OFF (Key is removed)	10 - 14 V

## BODY ELECTRICAL - COMBINATION METER

C15-10 (D-CTY SW) - Ground	Ignition switch ON and driver door is opened	Below 1 V
	Ignition switch ON and driver door is closed	10 - 14 V
C15-11 (IGN+) - Ground	Ignition switch OFF	Below 1 V
	Ignition switch ON	10 - 14 V
C15-12 (ECU-B2) - Ground	Constant	10 - 14 V
C15-13 (ACC+) - Ground	Ignition switch OFF	Below 1 V
	Ignition switch ACC or ON	10 - 14 V
C15-14 (DOOR+) - Ground	Constant	10 - 14 V
C15-15 (SP IN) - Ground	Ignition switch ON and slowly move the wheel	Pulse signal is output below 1.5 V ↔ battery positive voltage
C15-16 (4P OUT) - Ground	Ignition switch ON and slowly move the wheel	Pulse signal is output below 1.5 V ↔ approx. 5 V or below 1.5 V ↔ battery positive voltage

If a circuit is not as specified, inspect the applicable circuit.

## 2. INSPECT SPEEDOMETER/ ON-VEHICLE

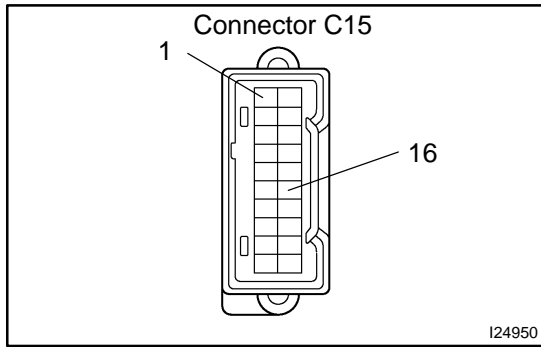
Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.

HINT:

Tire wear and tire over or under inflation will increase the indication error.

USA (mph)		CANADA (km/h)	
Standard indication	Allowable range	Standard indication	Allowable range
20	18 - 24	20	17 - 24
40	38 - 44	40	38 - 46
60	56 - 66	60	57.5 - 67
80	78 - 88	80	77 - 88
100	98 - 110	100	96 - 109
120	118 - 132	120	115 - 130
		140	134 - 151.5
		160	153 - 173

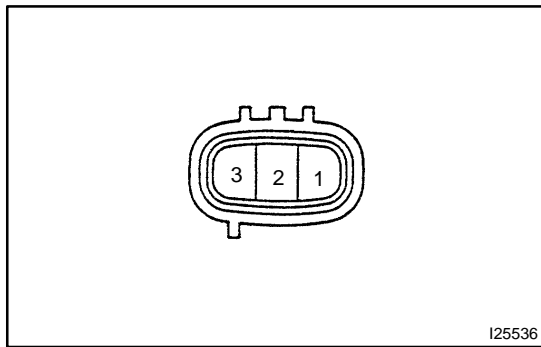
If error is excessive, replace the combination meter.



**3. INSPECT SPEEDOMETER VOLTAGE**

- (a) While driving the vehicle at the speed of 10 km/h, check the voltage between the terminals 16 and 1 of the combination meter assy.

**STANDARD: Fluctuation between 10 to 14 V or less is repeated 7 times within 1 sec.**



**4. INSPECT VEHICLE SPEED SENSOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 1 and negative (-) lead to terminal 2.
- (b) Connect the positive (+) lead from the tester to terminal 3 and the negative (-) lead to terminal 2.
- (c) Rotate the shaft.
- (d) Check that there is voltage change from approx. 0V to 11 V or more between terminals 2 and 3.

**HINT:**

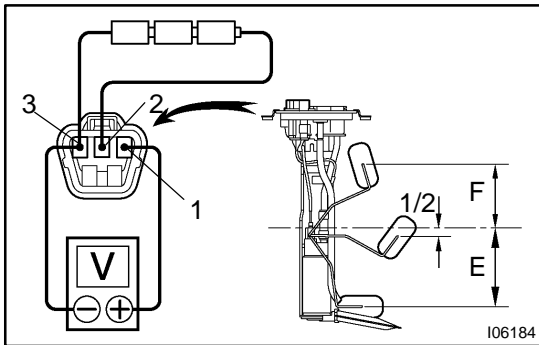
The voltage change should be performed 4 times for every revolution is not as specified, replace the sensor.

**5. INSPECT TACHOMETER / ON-VEHICLE**

- (a) Connect a tune-up test tachometer, and start the engine.
- (b) Compare the tester and tachometer indications.

**DC 13.5 V 25 °C at (77 °F):**

Standard indication (rpm)	Allowable range (rpm) ( ): estimated reference values
700	630 - 770
1,000	900 - 1,100
2,000	1,850 - 2,150
3,000	2,800 - 3,200
4,000	3,800 - 4,200
5,000	4,800 - 5,200
6,000	5,750 - 6,250
7,000	6,700 - 7,300

**6. INSPECT FUEL SENDER GAUGE VOLTAGE**

- (a) Apply voltage (4.5 V - 5.0 V) between terminals 2 and 3.
- (b) Measure voltage between terminals 1 and 2 for each float position.

Float position mm (in.)	Voltage (V)
F: Approx. 85.3 (3.36)	Approx. 4.60 ± 0.1
1/2: Approx. 1.7 (0.67)	Approx. 2.45 ± 0.1
E: Approx. 91.9 (3.62)	Approx. 0.30 ± 0.1

If voltage value is not as specified, replace main sender gauge.

**7. INSPECT LOW OIL PRESSURE WARNING LIGHT**

- (a) Disconnect the connector from the low oil pressure switch.
- (b) Turn the ignition switch ON.
- (c) Connect the terminal of wire harness side connector and ground, then check the warning light.

**8. INSPECT PARKING BRAKE WARNING LIGHT**

- (a) Disconnect the connector from the parking brake switch and ground terminal on the wire harness side connector.
- (b) Turn the ignition switch ON and check that the warning light lights up.

**9. INSPECT BRAKE WARNING LIGHT**

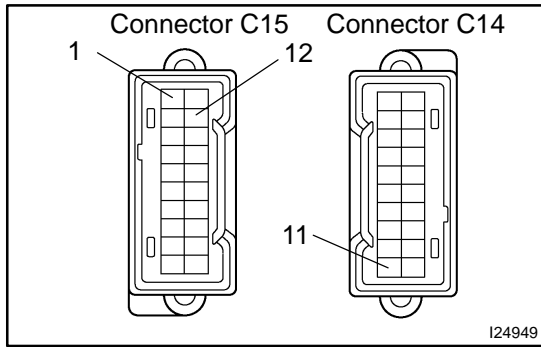
- (a) Disconnect the connector from the brake fluid level warning switch and ground terminal on the wire harness side connector.
- (b) Turn the ignition switch ON and check that the warning light lights up.

**10. INSPECT BRAKE FLUID LEVEL WARNING SWITCH**

- (a) Remove the reservoir tank cap and retainer.
- (b) Disconnect the connector.
- (c) Check that the continuity exists between the terminal.
- (d) Use syphon, etc., to take fluid out of the reservoir tank.
- (e) Check that the continuity exists between terminals.
- (f) Pour the fluid back in the reservoir tank.

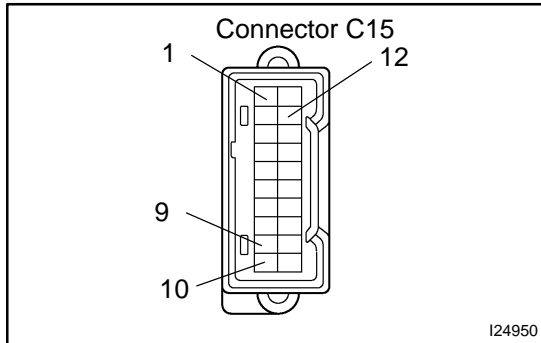
**11. INSPECT OPEN DOOR WARNING LIGHT**

- (a) Disconnect the connector from the driver door courtesy switch and ground terminal on the wire harness side connector.
- (b) Turn the ignition switch ON and check that the warning light lights up.



**12. INSPECT SEAT BELT WARNING BUZZER**

- (a) Disconnect the connector from the combination meter.
- (b) Connect the positive (+) lead from the battery terminal 12 and negative (-) lead terminal 1.
- (c) Check that the buzzer stop after 4 to 8 seconds.
- (d) Check that the buzzer stops when connecting the terminal 11 to the GND.

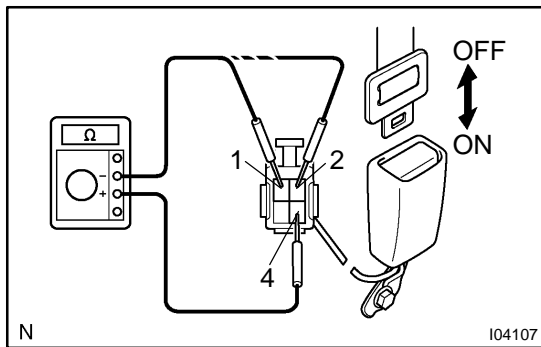


**13. INSPECT KEY UNLOCK WARNING BUZZER**

- (a) Disconnect the connector from the combination meter.
- (b) Connect the positive (+) lead from the battery terminal 12 and negative (-) lead terminal 1.
- (c) Connect the negative (-) lead from battery terminal 9 and 10, check that the buzzer sound.

**14. INSPECT SEAT BELT WARNING LIGHT**

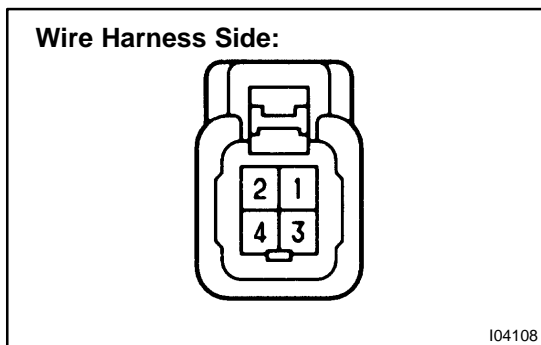
- (a) Disconnect the connector from the seat belt buckle switch and ground terminal on the wire harness side connector.
- (b) Turn the ignition switch ON and check that the warning light lights up.



**15. INSPECT SEAT BELT BUCKLE SWITCH CONTINUITY**

	Tester connection	Belt fastened (Belt unfastened)
Seat belt buckle SW (D)	1 - 4	ON (OFF)
Seat belt buckle SW (P)	2 - 4	OFF (ON)

If operation is not as specified, replace the switch.

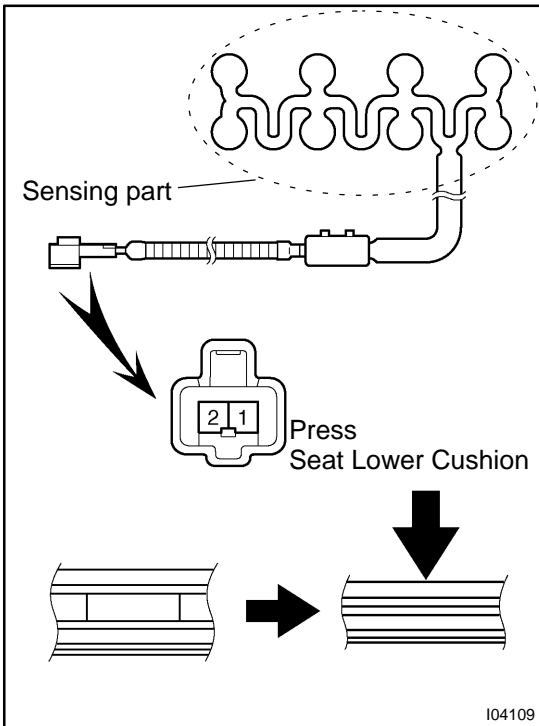


**16. INSPECT SEAT BELT BUCKLE SWITCH CIRCUIT**

Disconnect the switch connector and inspect the connector on wire harness side, as shown.

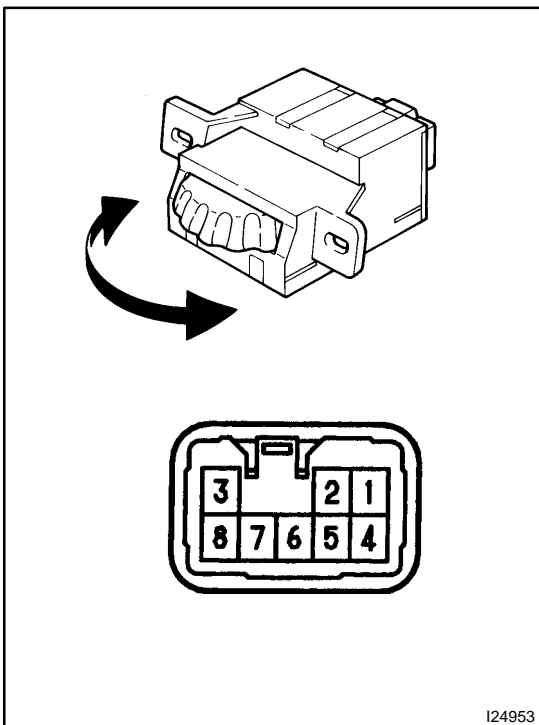
Tester connection	Condition	Specified condition
4 - Ground	Constant	Continuity

If continuity is not as specified, inspect the ground circuit.



**17. Passenger seat only:  
INSPECT SEAT BELT WARNING OCCUPANT DETECTION SENSOR CONTINUITY**

Check that continuity exists between the terminals 1 and 2 when pressing the sensing part of the lower seat cushion. If operation is not as specified, replace the sensor.



**18. INSPECT LIGHT CONTROL RHEOSTAT**

- (a) Turn the rheostat knob OFF, and check that there is no continuity between terminal 5 and 4 (Rheostat knob turned to fully counterclockwise).
  - (b) Gradually, turn the rheostat knob from the dark side to bright side, and check that there is continuity between terminal 5 and 4 (Rheostat knob turned to clockwise).
- If operation is not as specified, replace the rheostat.

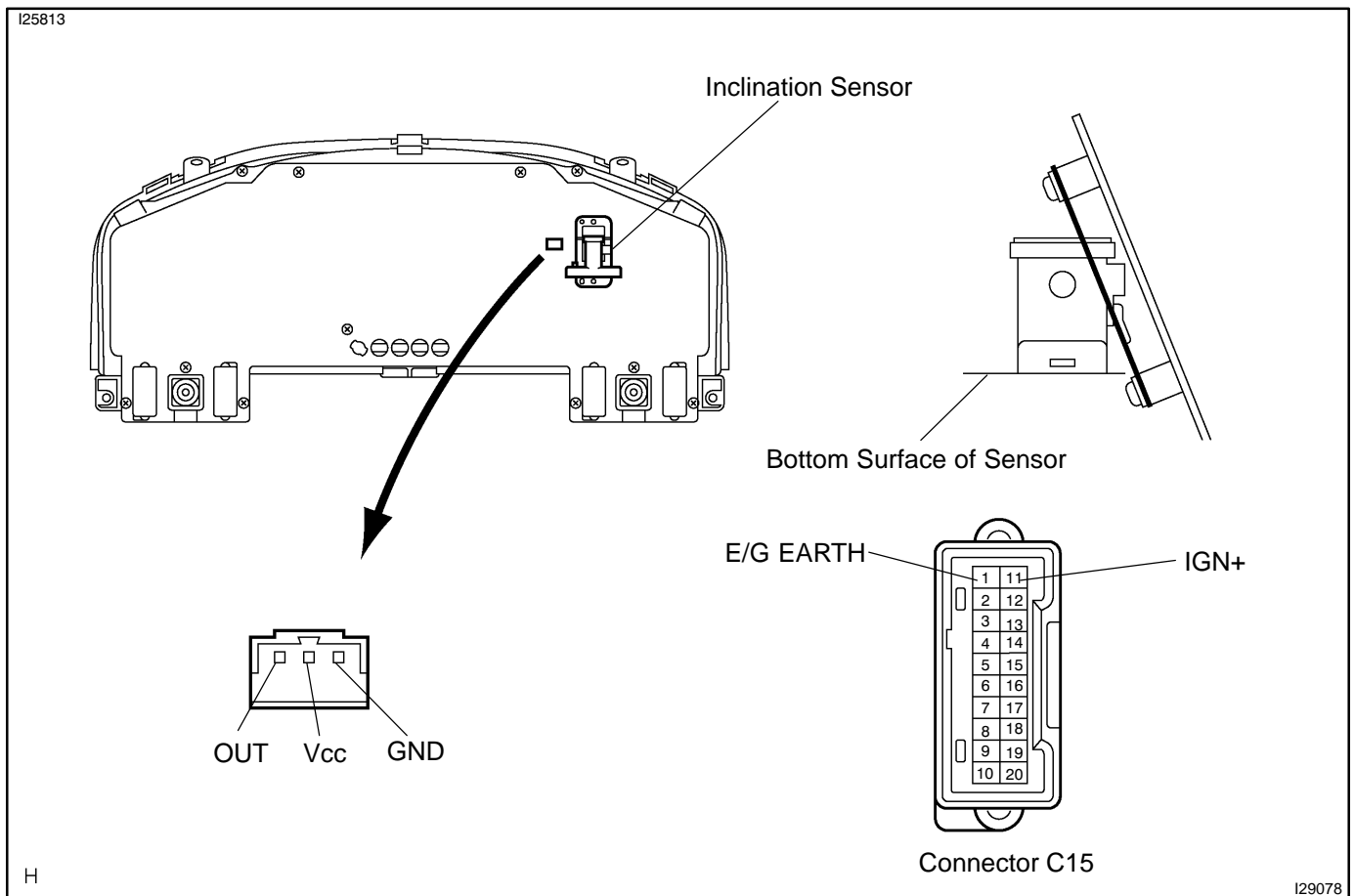
**19. INSPECT INCLINATION SENSOR**

- (a) The inclination sensor is installed in the combination meter. Inspect the inclination sensor by connecting a battery positive (+) lead to terminal 11 (IGN+) of the meter connector, and a battery negative (-) lead to terminal 1 (E/G EARTH).
- (b) Check if the voltage between terminal Vcc and GND of the inclination sensor connector is 5 V.
- (c) Check the voltage between terminal OUT and GND when the bottom surface of the inclination sensor is in a level position. Also check the voltage when it is inclined backward or forward.

**Standard Value:**

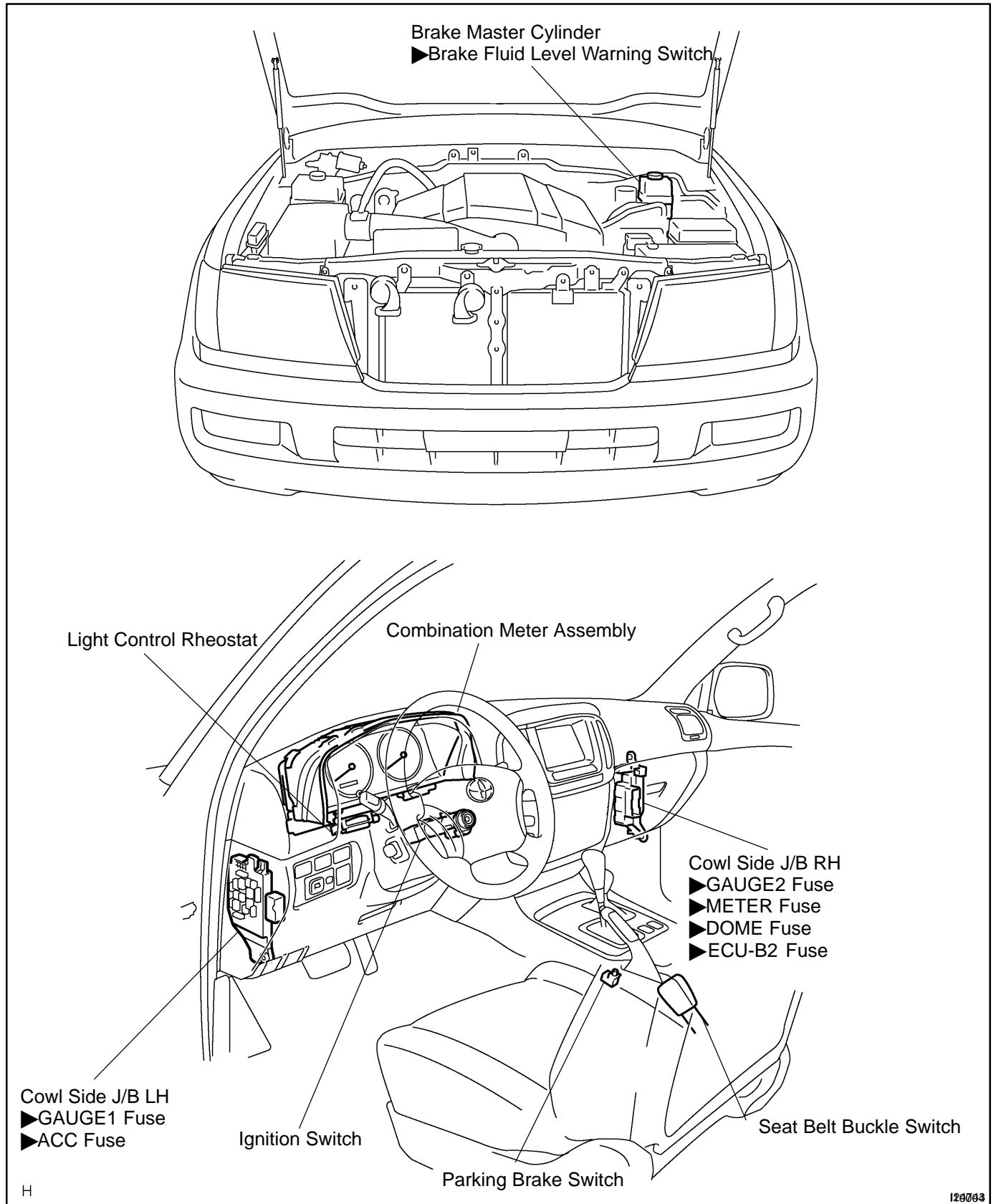
**Bottom surface of sensor is set in a level position:  
about 4.5 V**

**Bottom surface of sensor is inclined:  
about 0.5 V**

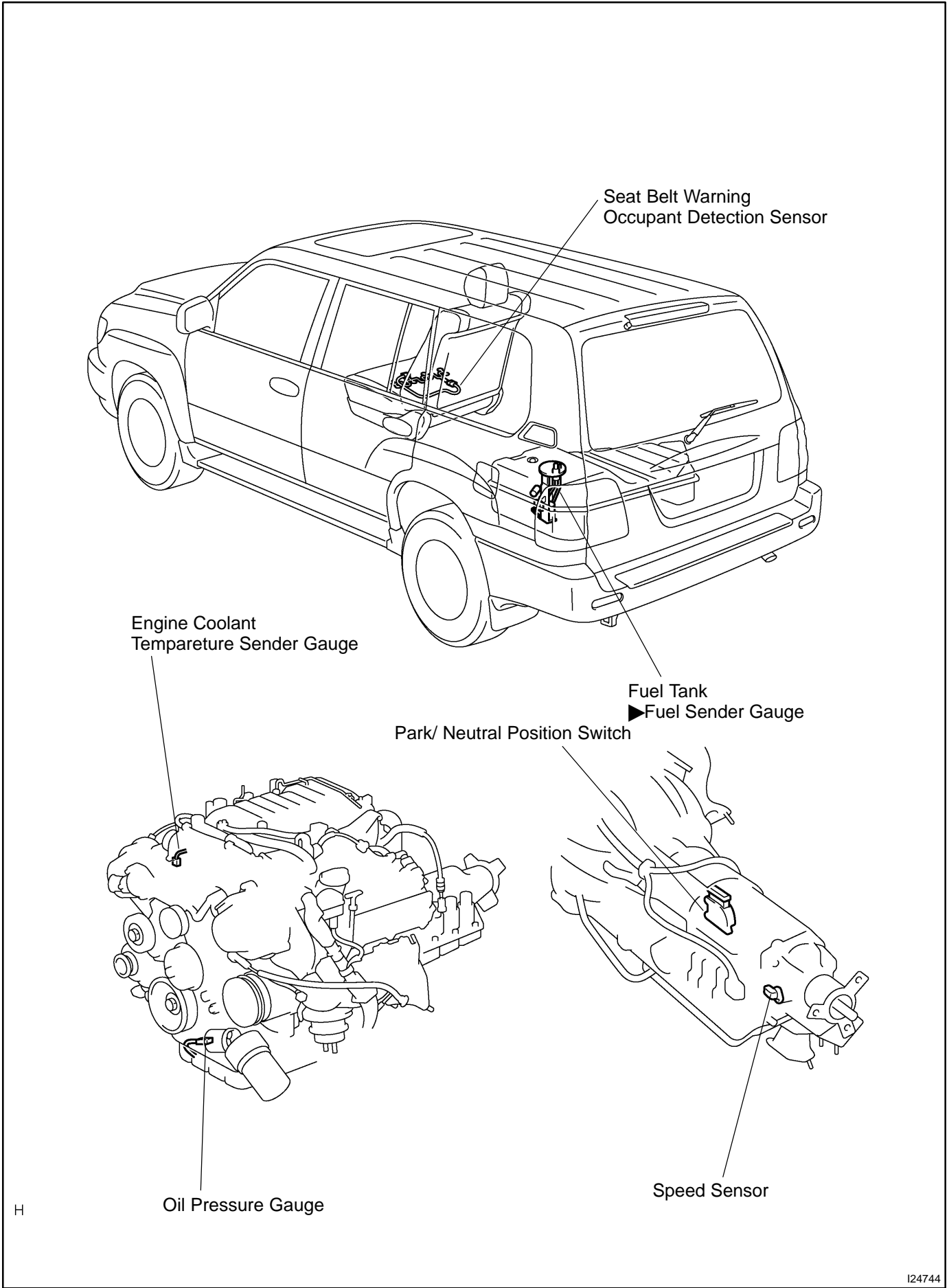


# COMBINATION METER LOCATION

BE0HH-12







# COMPASS

BE129-01

## PRE-CHECK

### 1. SELECTING COMPASS DISPLAY MODE

The mode select switch allows you to select a Display or Non-display mode of the compass.

The mode select is operated by the automatic glare-proof / non-glare proof switch on the inner mirror.

### 2. SETTING ZONE

Deviation between the magnetic north and "actual north" differs depending on the terrestrial location, therefore, an adjustment in magnetism is required. Since the magnetic condition differs according to the area where the vehicle will be used, it is necessary for each user to set the zone. (Refer to "Compass Zone Map").

The zone setting can be changed using the mode select switch of the inner mirror.

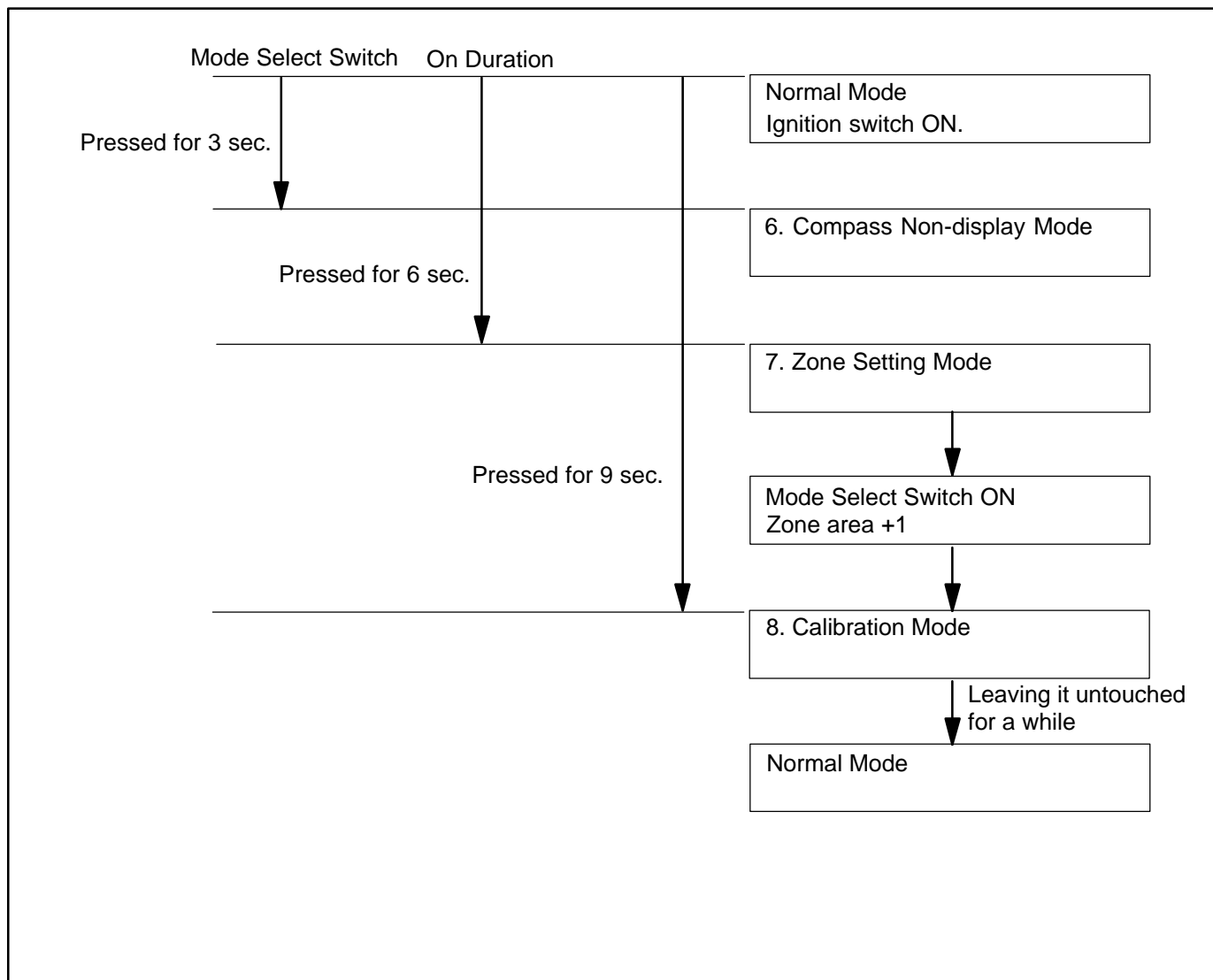
### 3. PERFORMING CALIBRATION

Because each vehicle has its own magnetic field, calibration should be performed for each vehicle. This compass function is used when storing the record of the vehicle's magnetic field.

### 4. WHEN COMPASS MAGNETIZED:

A compass could be magnetized during shipping by vessels or freight cars. Before delivery, therefore, make sure to perform calibration and ensure that calibration can be done. If it cannot be done (cannot complete in spite of driving round several times), it may be caused by magnetization. Demagnetize the vehicle using a demagnetizer and perform calibration again.

### 5. SETTING COMPASS



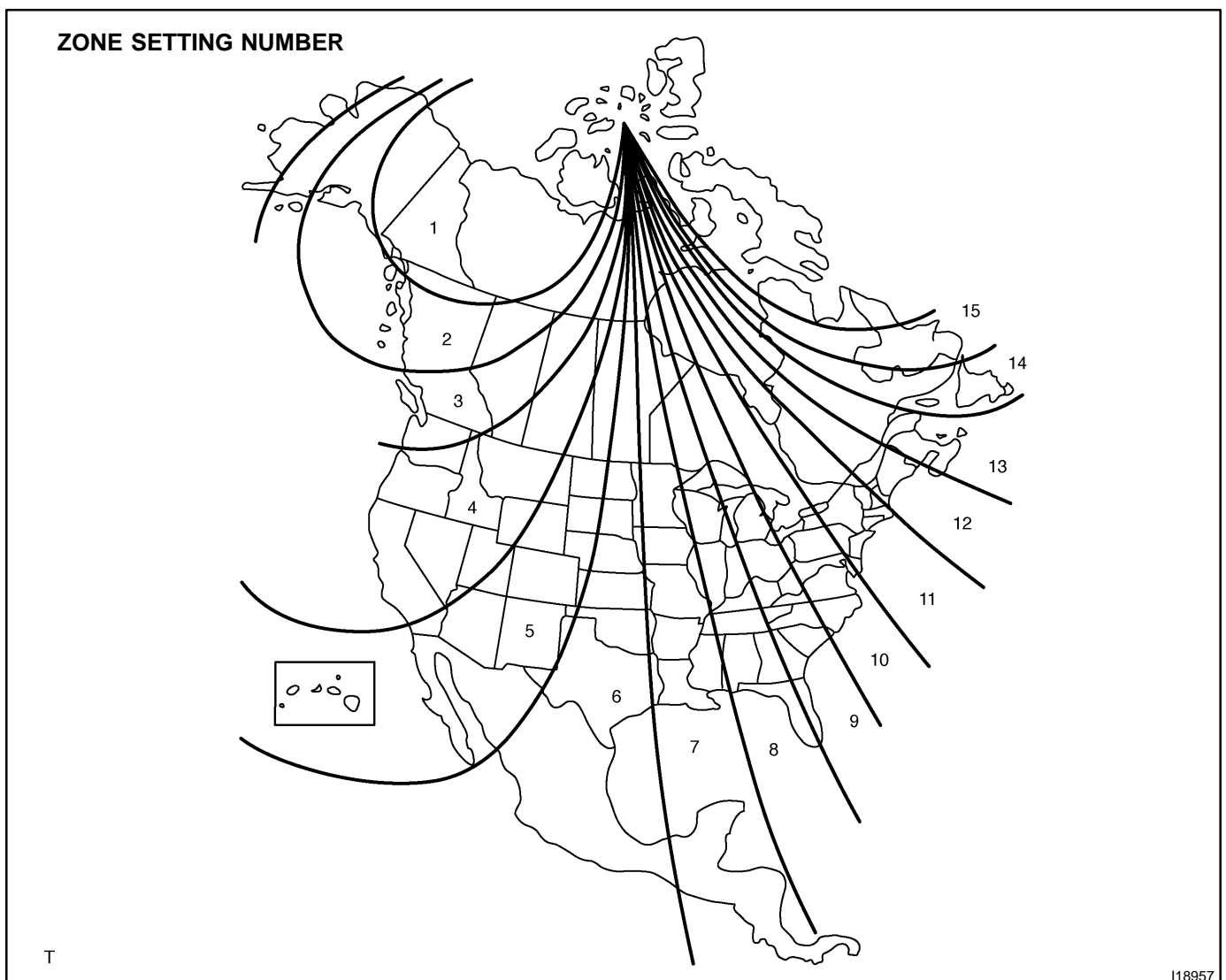
## 6. SELECTING DISPLAY MODE

- (a) Turn the ignition switch ON.
- (b) Check that the LED on the inner mirror is lit (green).
- (c) Check that the compass display indicates an azimuthal direction (N, NE, E, SE, S, SW, W, or NW) or "C".
- (d) Pressing the mode select switch on the inner mirror for 3 sec. or more erases the above mentioned display and activates the Non-display mode.

### HINT:

- ▶ Immediately after pressing the mode select switch, the LED goes off activating the Non-glare-proof mode. However, when the switch remains pressed, the LED is lit again after 3 sec. and the system enters the automatic glare-proof mode.
- ▶ Keep pressing the mode select switch for 3 sec. after selection of the compass display mode will activate the zone setting mode, showing a number (1-15) on the compass display.

## 7. ZONE SETTING MODE



Pressing the mode select switch for 6 sec. from the normal mode will activate the zone setting mode, showing a number (1-15) on the compass display.

HINT:

In the initial status, "8" is displayed.

- (1) The displayed number increases +1 every time the mode select switch is pressed. Referring to the map, check the number for the area where the vehicle will be used and set the zone number.
- (2) Leave it untouched for several seconds after setting and check that the compass display shows an azimuthal direction (N, NE, E, SE, S, SW, W, or NW) or "C".

#### **8. CALIBRATION SETTING MODE**

- (a) After the set zone is displayed, if the switch remains pressed another 3 sec. will activate the calibration setting mode.
- (b) Pressing the switch for 9 sec. from the normal mode will also activate this mode.
- (c) Drive the vehicle at a slow speed of 8 km/h (5MPH) or less in the circular direction.
- (d) Driving round the circle 1 to 3 times will display the azimuthal direction on the display, completing the calibration.

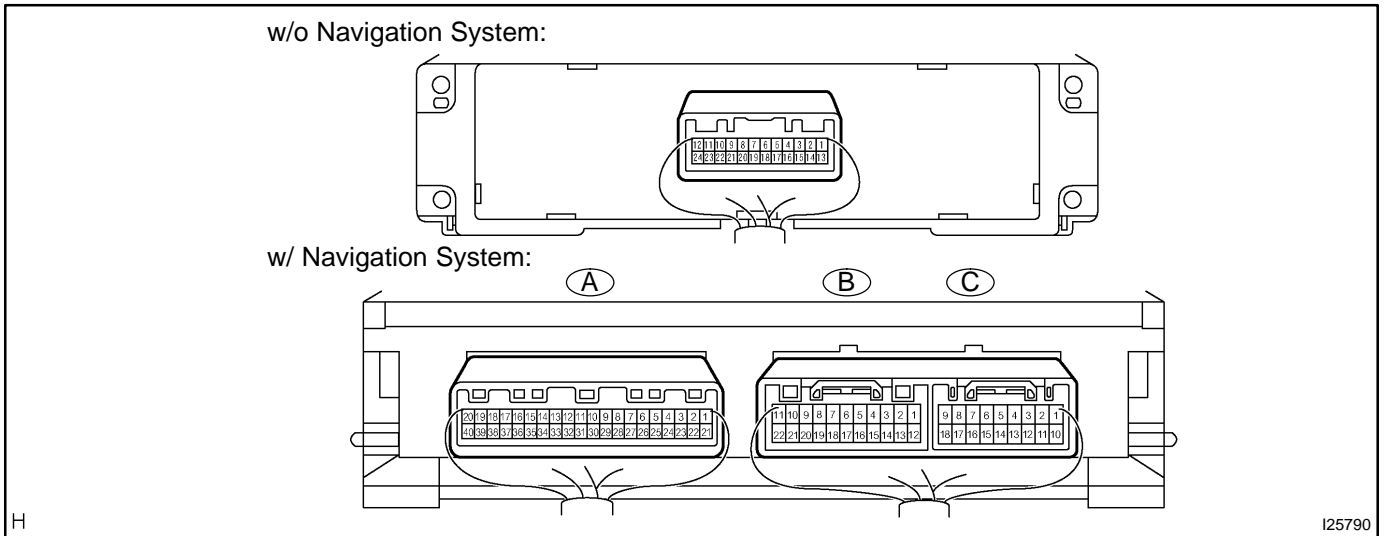
HINT:

Once calibration is completed, it is not necessary to perform the above procedures unless the magnetic field strength is drastically changed. If this happens, the azimuthal display will be changed to "C".

# INSPECTION

## 1. INSPECT DEFOGGER SWITCH CIRCUIT

Disconnect the connector from the panel switch and inspect the connector on wire harness side, as shown in the chart.



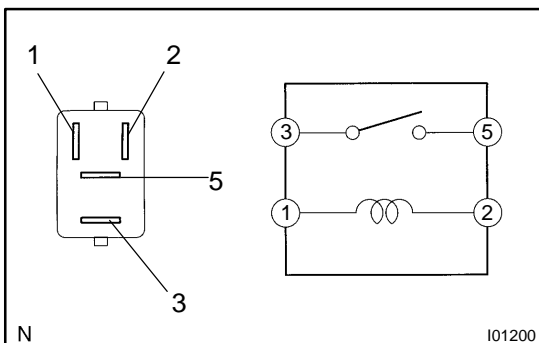
### w/ Navigation:

Tester connection	Condition	Specified condition
B12 (GND) - Ground	Constant	Continuity
B11 (+B) - Ground	Constant	Battery positive voltage
B22 (IG) - Ground	Ignition switch LOCK or ACC	No voltage
B22 (IG) - Ground	Ignition switch ON	Battery positive voltage
A10 (RDFGR) - Ground	Constant	Battery positive voltage

### w/o Navigation:

Tester connection	Condition	Specified condition
16 (GND) - Ground	Constant	Continuity
8 (IG) - Ground	Ignition switch LOCK or ACC	No voltage
8 (IG) - Ground	Ignition switch ON	Battery positive voltage
2 (DEFC) - Ground	Constant	Battery positive voltage

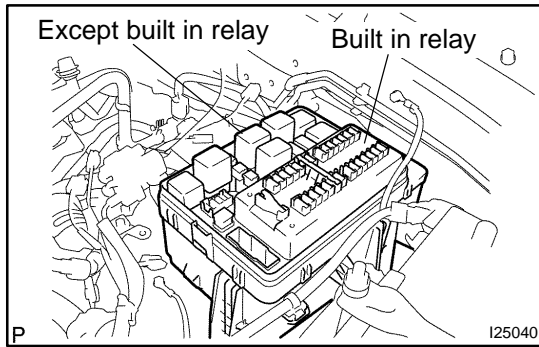
If the circuit is not as specified, replace the switch.



## 2. INSPECT DEFOGGER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 - 2	Continuity
Apply B+ between terminals 1 and 2.	3 - 5	Continuity

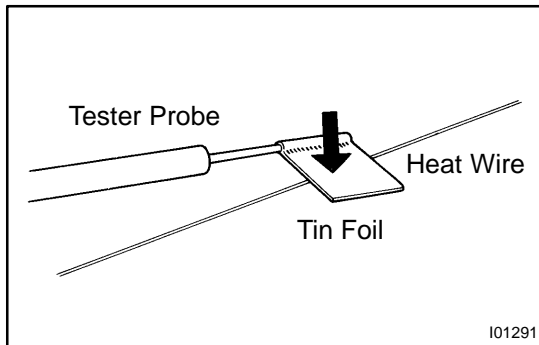
If continuity is not as specified, replace the relay.



**3. INSPECT ENGINE ROOM R/B RELAY CIRCUIT (See Page BE-15)**

**HINT:**

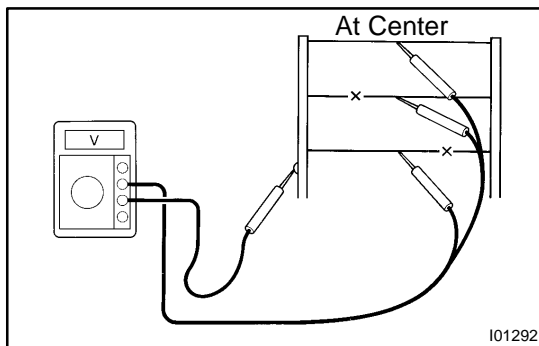
The mirror heater relay is built in engine room junction block. Also the relay is constructed with a relay block that is in the junction block as a unit. To disconnect the wire harness connecting with relay block is impossible. If the relay has a malfunction, replace it with junction block assembly wire harness together.



**4. INSPECT DEFOGGER WIRE**

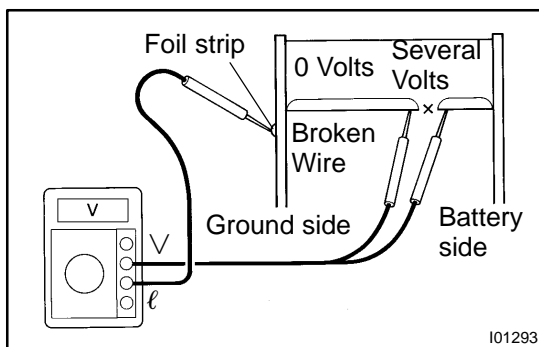
**NOTICE:**

- ▶ When cleaning the glass, use a soft, dry cloth, and wipe the glass in the direction of the wire. Take care not to damage the wires.
- ▶ Do not use detergents or glass cleaners with abrasive ingredients.
- ▶ When measuring voltage, wrap a piece of tin foil around the tip of the negative probe and press the foil against the wire with your finger, as shown.



- (a) Turn the ignition switch ON.
- (b) Turn the defogger switch ON.
- (c) Inspect the voltage at the center of each heat wire, as shown.

Voltage	Criteria
Approx. 5V	Okay (No break in wire)
Approx. 10V or 0V	Broken wire



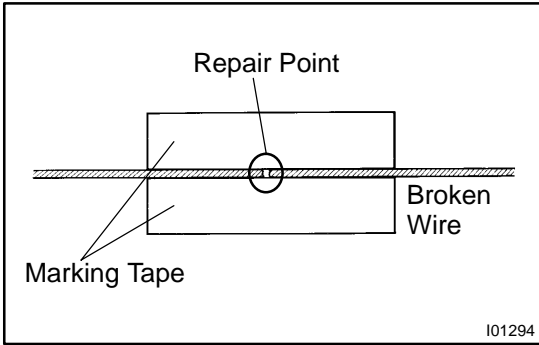
**HINT:**

If there is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.

- (d) Place the voltmeter positive (+) lead against the defogger wire on the battery side.
- (e) Place the voltmeter negative (-) lead with the foil strip against the wire on the ground side.
- (f) Slide the positive (+) lead from battery to ground side.
- (g) The point where the voltmeter deflects from several V to zero V is the place where the defogger wire is broken.

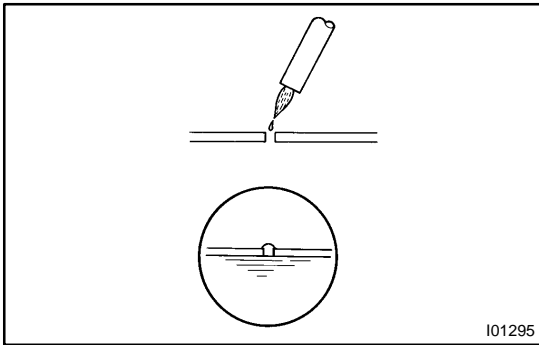
**HINT:**

If the heat wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the heat wire but voltage gradually increases to about 12 V as the meter probe moves to the other end.

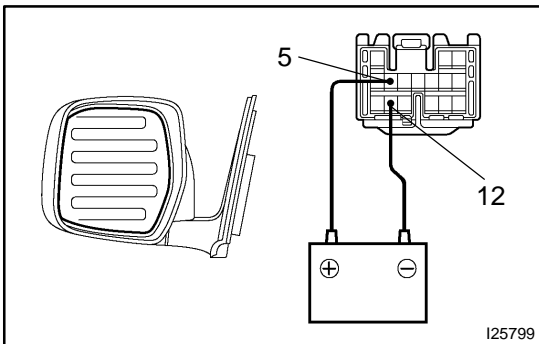


**5. IF NECESSARY, REPAIR DEFOGGER WIRE**

- (a) Clean the broken wire tips with grease, wax and silicone remover.
- (b) Place the masking tape along both sides of the wire for repair.
- (c) Thoroughly mix the repair agent (Dupont paste No. 4817).



- (d) Using a fine tip brush, apply a small amount of the agent to the wire.
- (e) After a few minutes, remove the masking tape.
- (f) Do not repair the defogger wire for at least 24 hours.



**6. w/ Mirror heater:  
INSPECT MIRROR HEATER OPERATION**

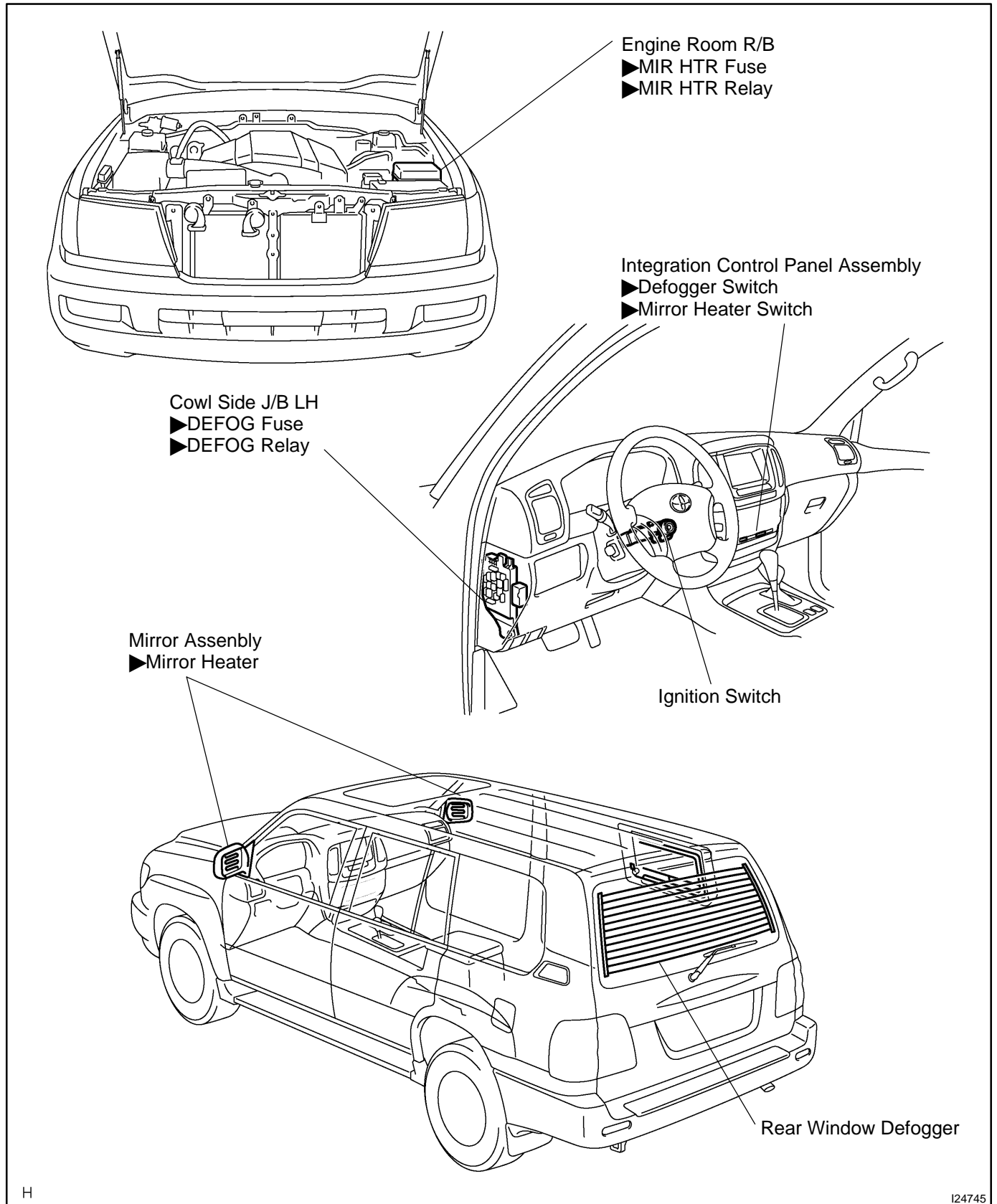
- (a) Connect the positive (+) lead from the battery to terminal 5 and the negative (-) lead to terminal 12.
- (b) Check that the mirror becomes warm.

HINT:

It will take a short time for the mirror to become warm.

# DEFOGGER SYSTEM LOCATION

BE0GS-19

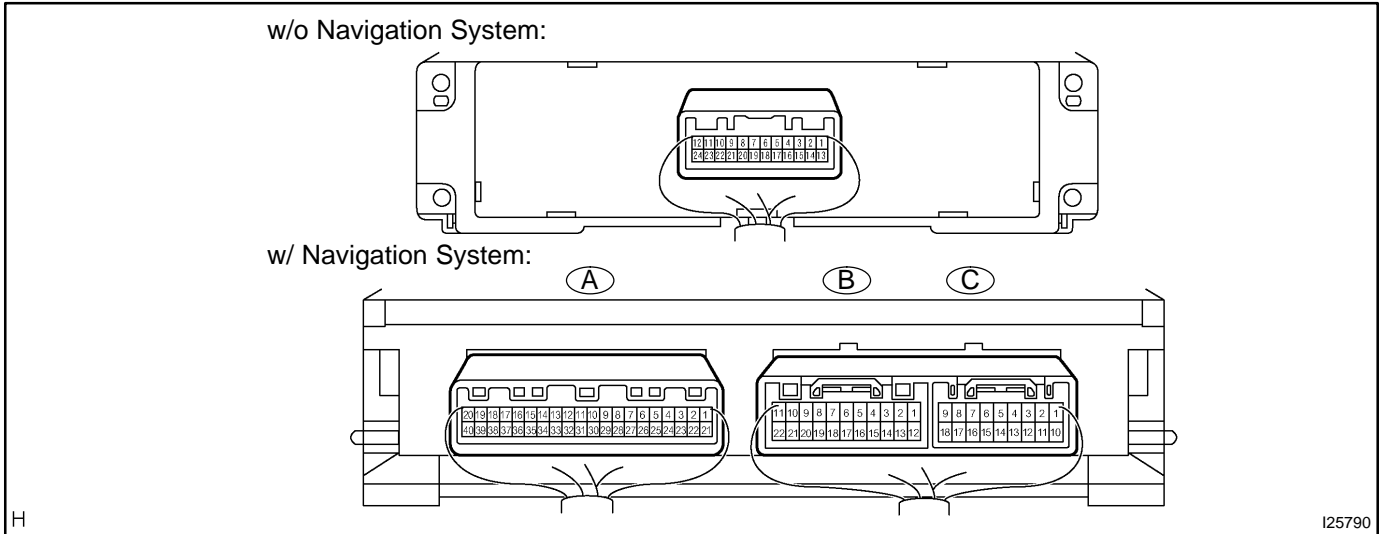




# INSPECTION

## 1. INSPECT DEFOGGER SWITCH CIRCUIT

Disconnect the connector from the panel switch and inspect the connector on wire harness side, as shown in the chart.



H

I25790

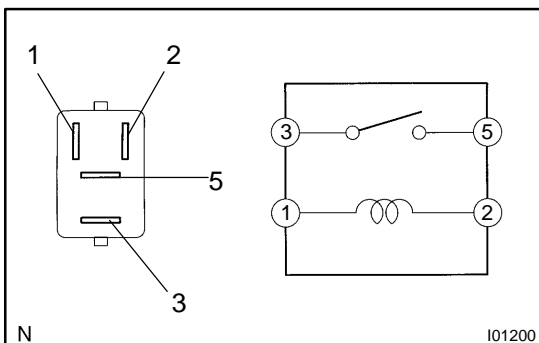
### w/ Navigation:

Tester connection	Condition	Specified condition
B12 (GND) - Ground	Constant	Continuity
B11 (+B) - Ground	Constant	Battery positive voltage
B22 (IG) - Ground	Ignition switch LOCK or ACC	No voltage
B22 (IG) - Ground	Ignition switch ON	Battery positive voltage
A10 (RDFGR) - Ground	Constant	Battery positive voltage

### w/o Navigation:

Tester connection	Condition	Specified condition
16 (GND) - Ground	Constant	Continuity
8 (IG) - Ground	Ignition switch LOCK or ACC	No voltage
8 (IG) - Ground	Ignition switch ON	Battery positive voltage
2 (DEFC) - Ground	Constant	Battery positive voltage

If the circuit is not as specified, replace the switch.



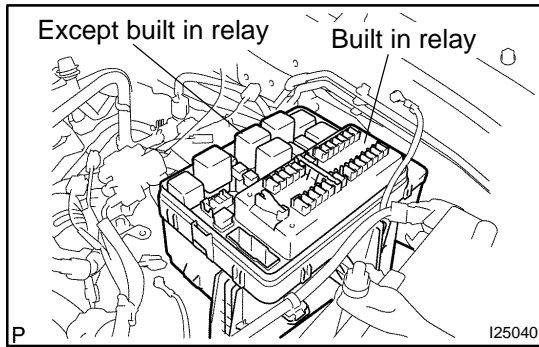
N

I01200

## 2. INSPECT DEFOGGER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 - 2	Continuity
Apply B+ between terminals 1 and 2.	3 - 5	Continuity

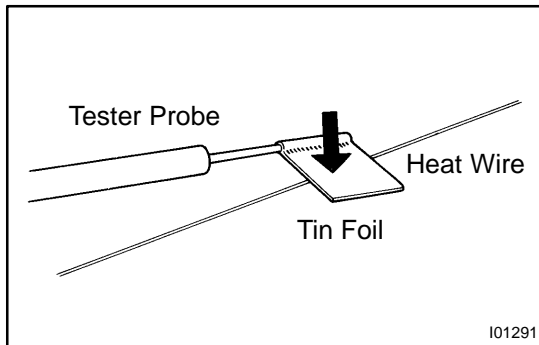
If continuity is not as specified, replace the relay.



**3. INSPECT ENGINE ROOM R/B RELAY CIRCUIT (See Page BE-15)**

**HINT:**

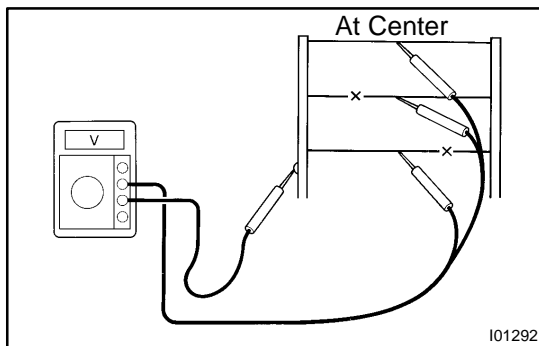
The mirror heater relay is built in engine room junction block. Also the relay is constructed with a relay block that is in the junction block as a unit. To disconnect the wire harness connecting with relay block is impossible. If the relay has a malfunction, replace it with junction block assembly wire harness together.



**4. INSPECT DEFOGGER WIRE**

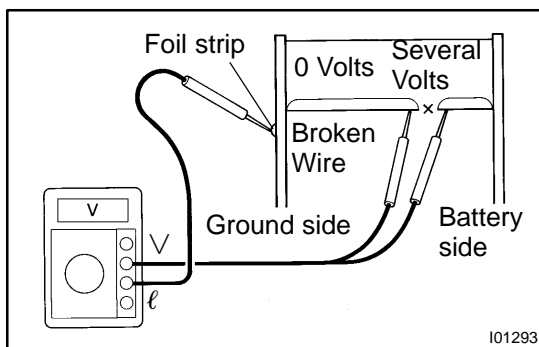
**NOTICE:**

- ▶ When cleaning the glass, use a soft, dry cloth, and wipe the glass in the direction of the wire. Take care not to damage the wires.
- ▶ Do not use detergents or glass cleaners with abrasive ingredients.
- ▶ When measuring voltage, wrap a piece of tin foil around the tip of the negative probe and press the foil against the wire with your finger, as shown.



- (a) Turn the ignition switch ON.
- (b) Turn the defogger switch ON.
- (c) Inspect the voltage at the center of each heat wire, as shown.

Voltage	Criteria
Approx. 5V	Okay (No break in wire)
Approx. 10V or 0V	Broken wire



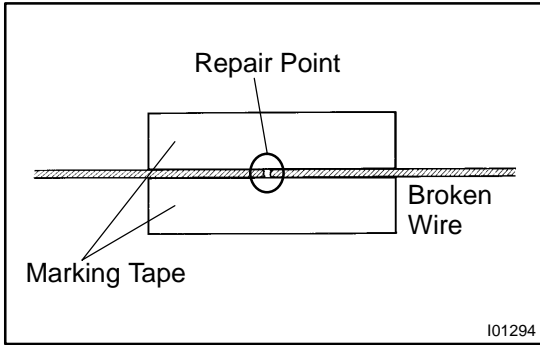
**HINT:**

If there is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.

- (d) Place the voltmeter positive (+) lead against the defogger wire on the battery side.
- (e) Place the voltmeter negative (-) lead with the foil strip against the wire on the ground side.
- (f) Slide the positive (+) lead from battery to ground side.
- (g) The point where the voltmeter deflects from several V to zero V is the place where the defogger wire is broken.

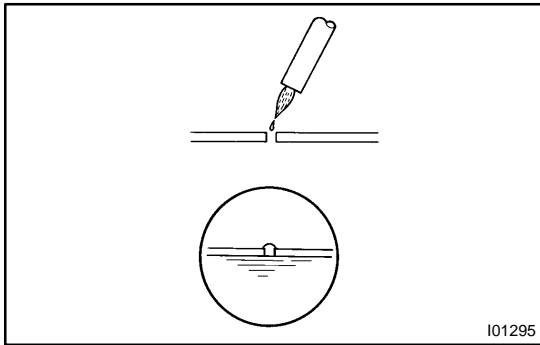
**HINT:**

If the heat wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the heat wire but voltage gradually increases to about 12 V as the meter probe moves to the other end.

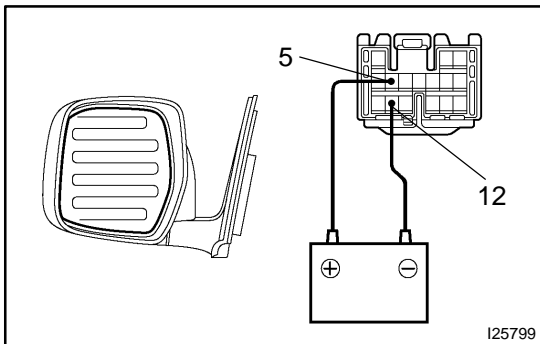


**5. IF NECESSARY, REPAIR DEFOGGER WIRE**

- (a) Clean the broken wire tips with grease, wax and silicone remover.
- (b) Place the masking tape along both sides of the wire for repair.
- (c) Thoroughly mix the repair agent (Dupont paste No. 4817).



- (d) Using a fine tip brush, apply a small amount of the agent to the wire.
- (e) After a few minutes, remove the masking tape.
- (f) Do not repair the defogger wire for at least 24 hours.



**6. w/ Mirror heater:**

**INSPECT MIRROR HEATER OPERATION**

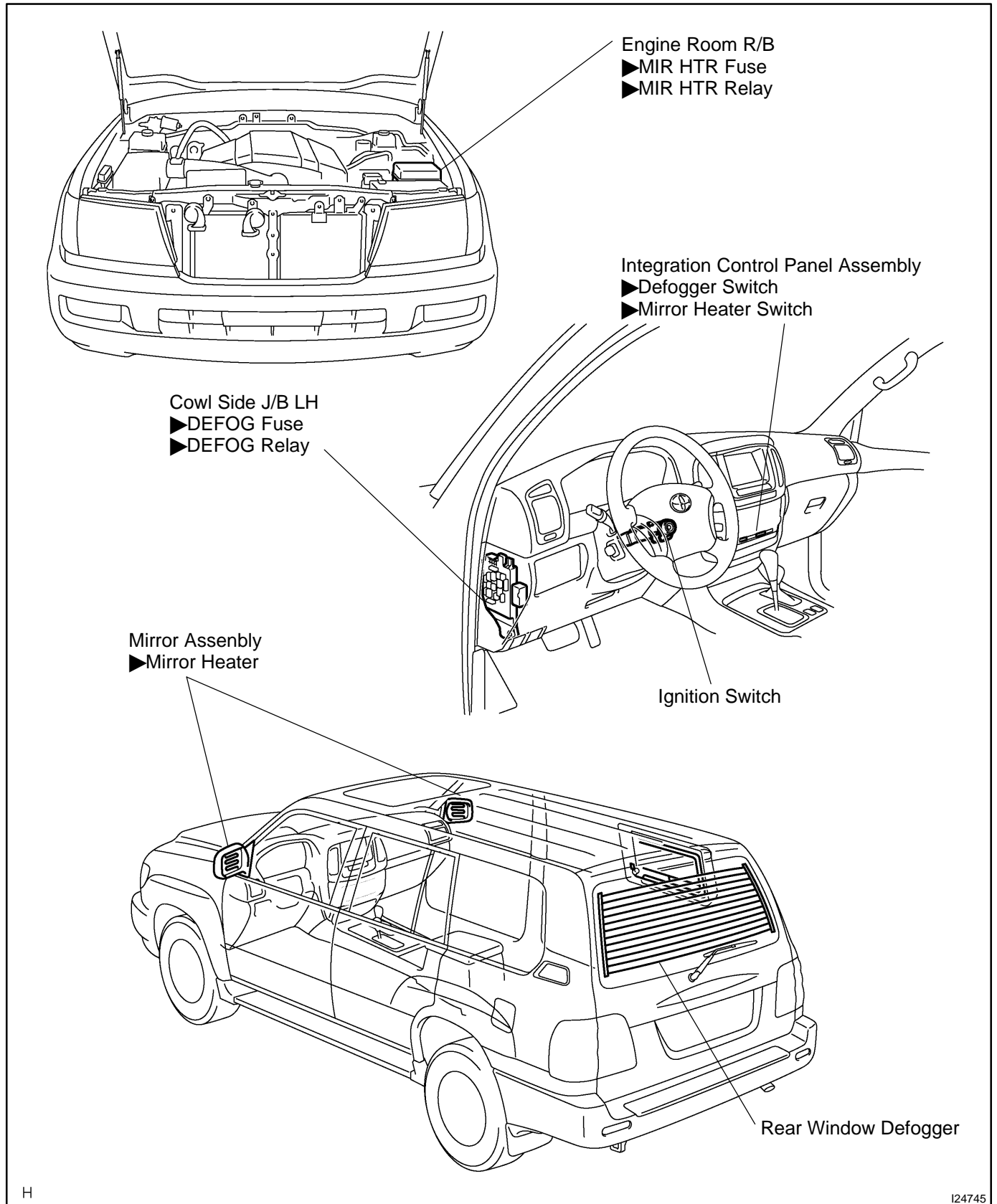
- (a) Connect the positive (+) lead from the battery to terminal 5 and the negative (-) lead to terminal 12.
- (b) Check that the mirror becomes warm.

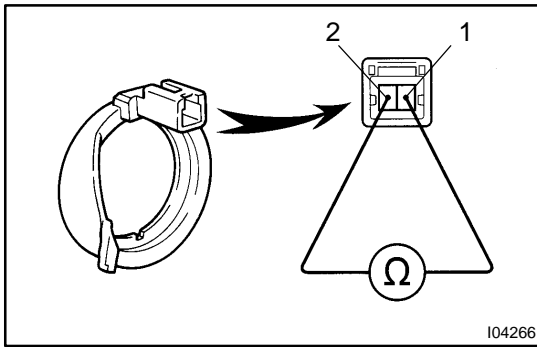
HINT:

It will take a short time for the mirror to become warm.

# DEFOGGER SYSTEM LOCATION

BE0GS-19





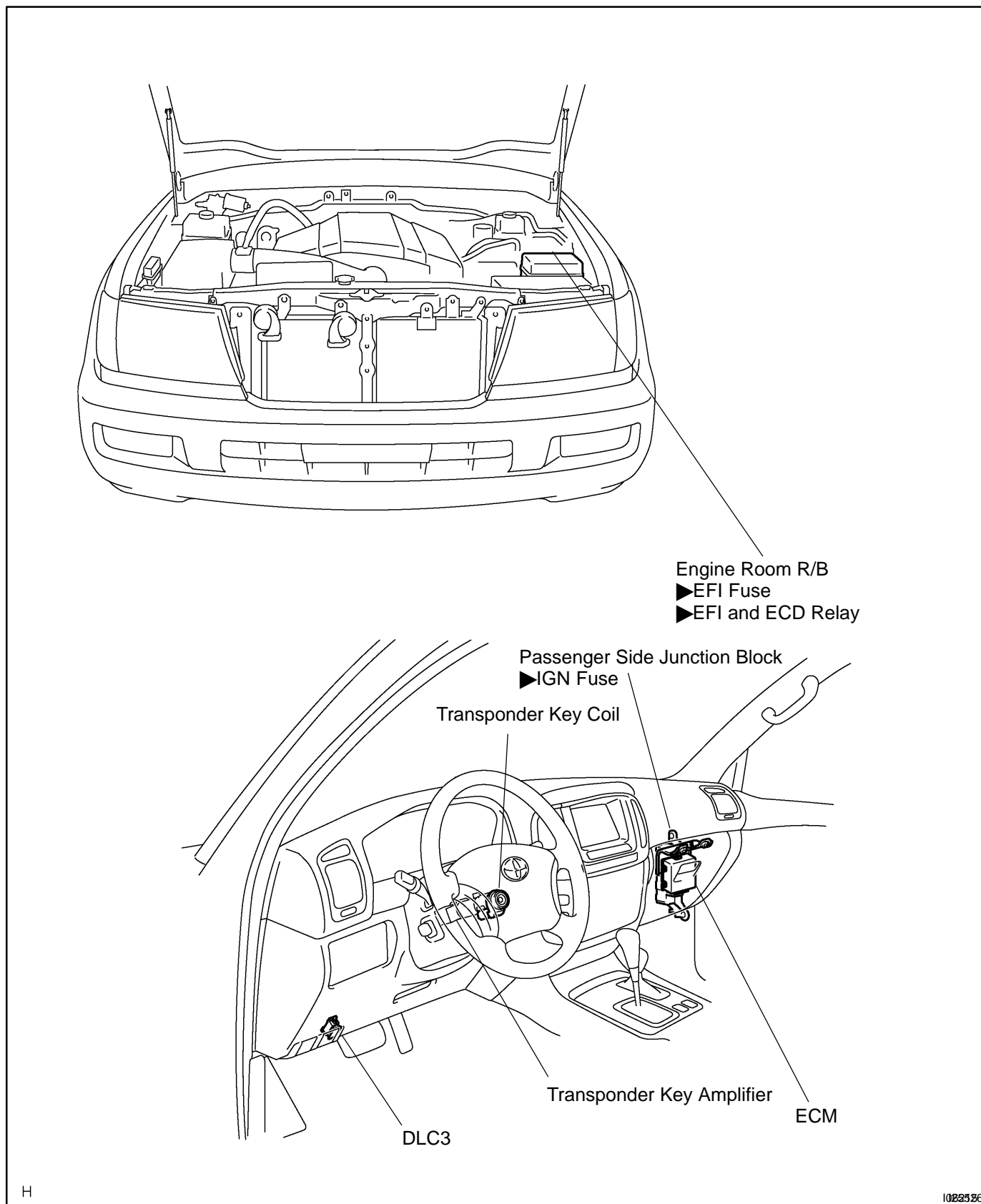
## INSPECTION

### INSPECTION TRANSPONDER KEY COIL CONTINUITY

Check that continuity exists between terminals 1 and 2.

If continuity is not as specified, replace the coil.

# LOCATION



# ENGINE IMMOBILISER SYSTEM

## REGISTRATION PROCEDURE

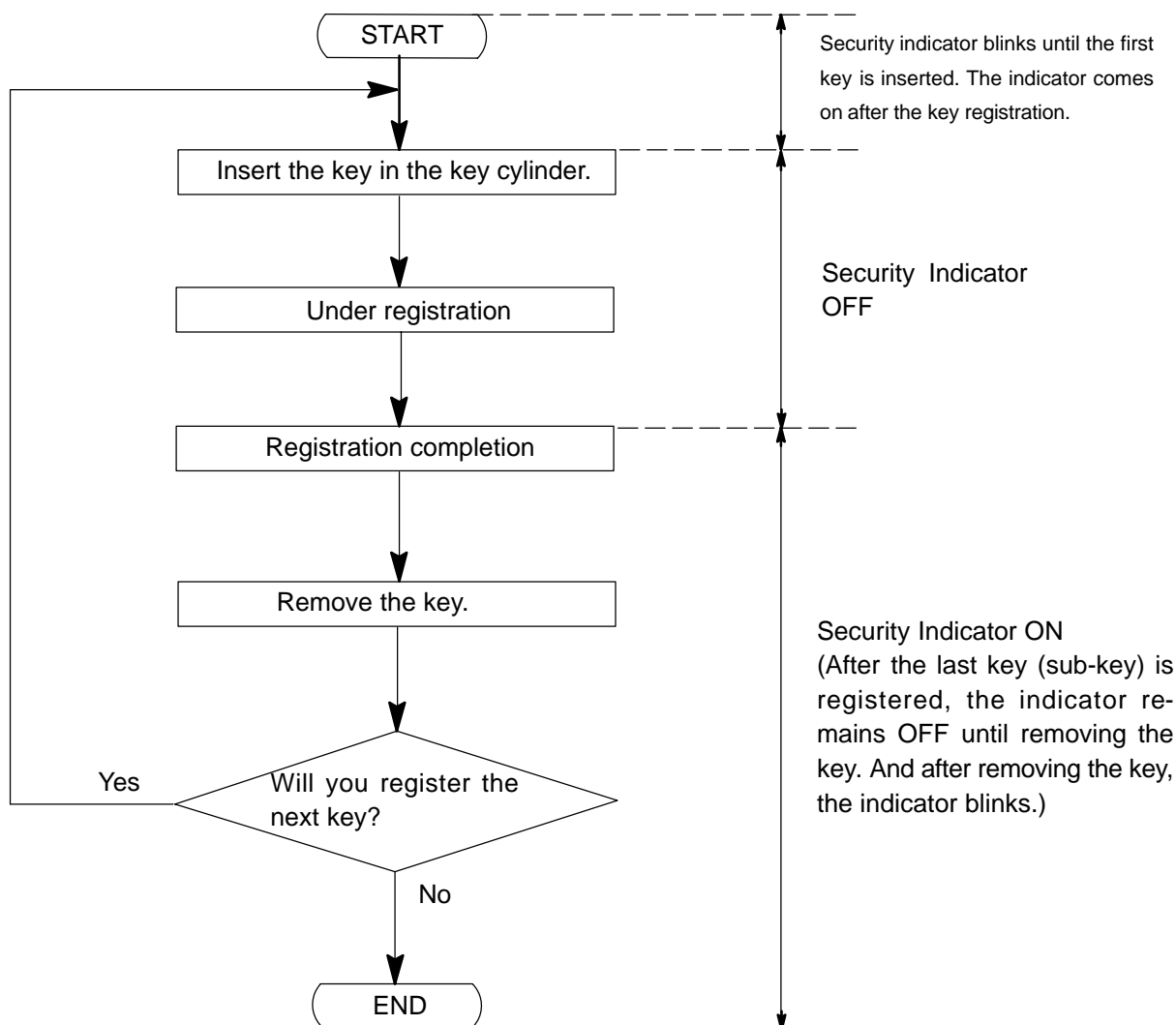
BE126-03

### 1. KEY REGISTRATION IN AUTOMATIC REGISTRATION MODE

(a) Registration of a new transponder key.

HINT:

- ▶ This must be done when you install a new Transponder key ECU.
- ▶ The new Transponder key ECU is on the automatic key code registration mode. The already fixed of key codes for this Transponder key ECU can be registered.  
On this type of vehicle, up to 4 key codes can be registered.
- ▶ A master and sub key are registered automatically.



HINT:

- ▶ When a key is not inserted in the key cylinder on the automatic registration mode, the security indicator always comes.
  - ▶ When the immobiliser system operates normally and the key is pulled out, the security indicator blinks.
- (b) Automatic registration mode completion  
If completing the mode forcibly when registering more than 1 key code on the automatic registration mode, perform the following procedures.

After registering 1 more key code with master key, perform step (1) or (2) without pulling the key out or inserting the already registered key.

- (1) Turn the ignition switch LOCK → ON 5 times within 10 sec.
- (2) With the hand-held tester, require automatic registration mode completion.

**2. REGISTRATION OF ADDITIONAL MASTER KEY AND SUB KEY**

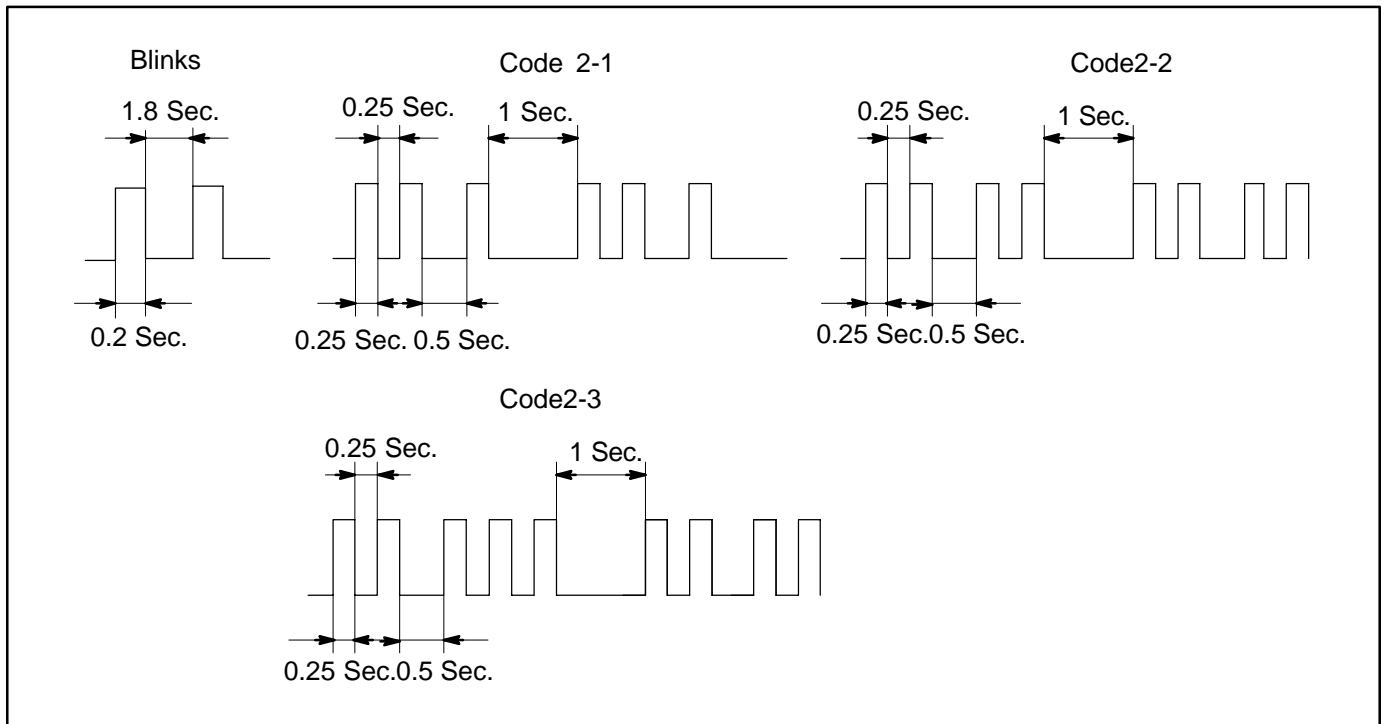
It is possible to carry out additional registration of the supply key.

HINT:

- ▶ It is possible to register up to 5 master key codes including the already registered key code.
- ▶ It is possible to register up to 3 sub key codes including the already registered key code.
- ▶ When any operation period described below is over, registration mode cannot be completed.
- ▶ When the next procedure is performed while the previous timer is working, the timer stops counting time, and then the next timer starts.
- ▶ When replacing "Ignition Cylinder Key Set" or "Lock Cylinder Set", perform registration following the procedure using the original master key. However, after the registration of the additional master key, as the original master key and the original sub-key is not necessary any more, erase registration of those key codes.
- ▶ For the registration order, it is not necessary to distinguish between Main and Sub. (Main key and Sub key are automatically identified)

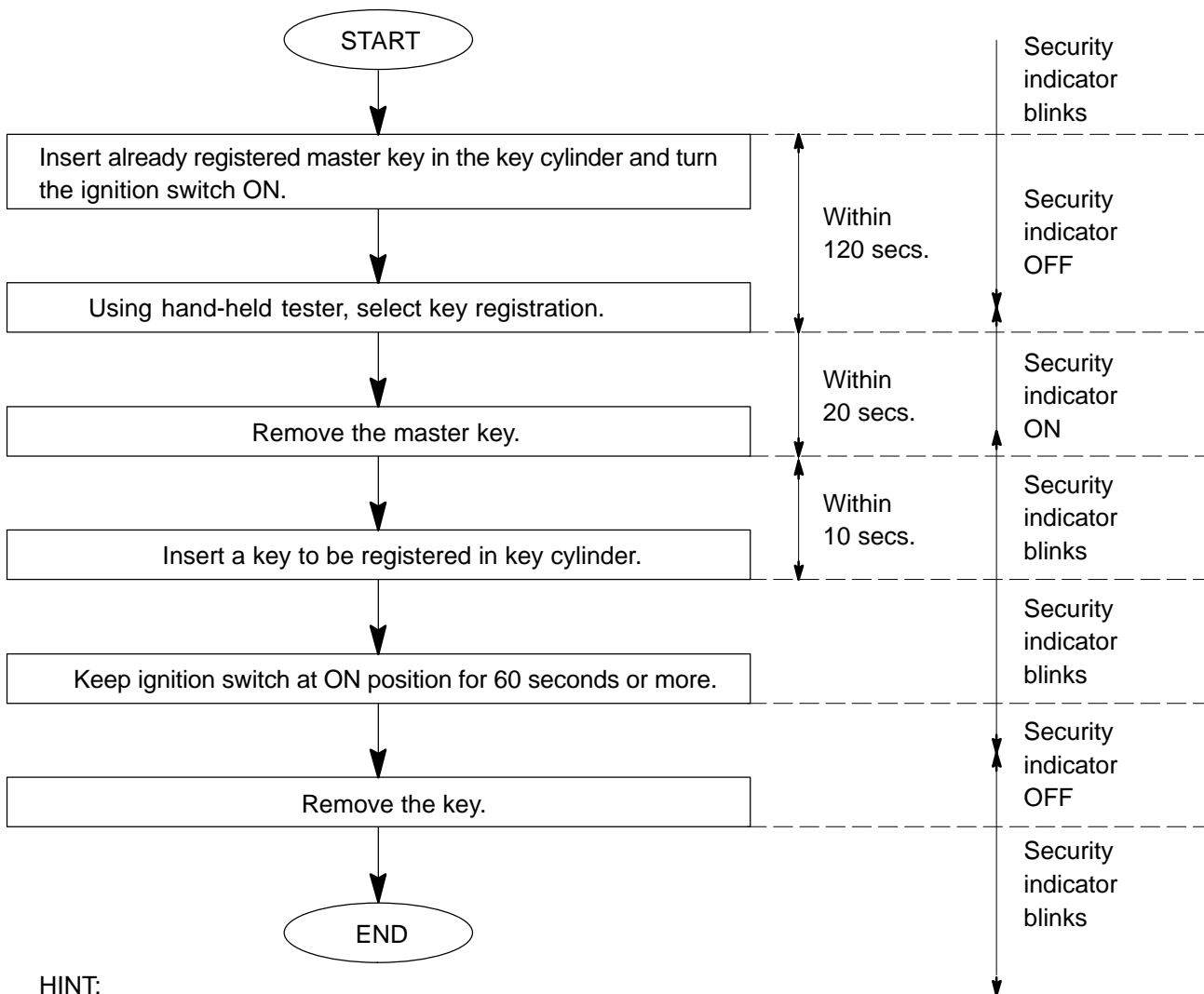
When a registration error in the transponder key ECU is detected, the security indicator indicates the following codes.

2 - 1	Communication error between the key to be registered and the transponder key ECU
2 - 2	When trying to register the key that is already registered
2 - 3	When exceeding the number of keys which can be registered (Master key: 5, Sub key: 3)





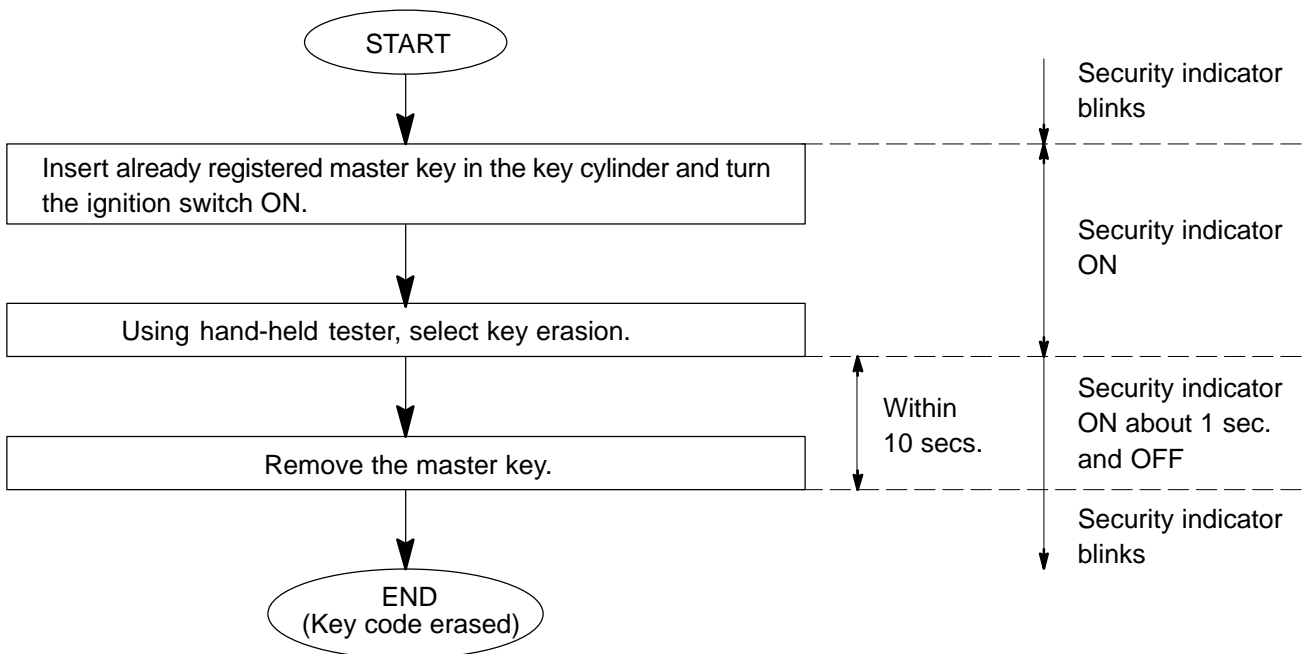
Using hand-held tester:



HINT:  
Follow the screen of the hand-held tester for detailed procedure.

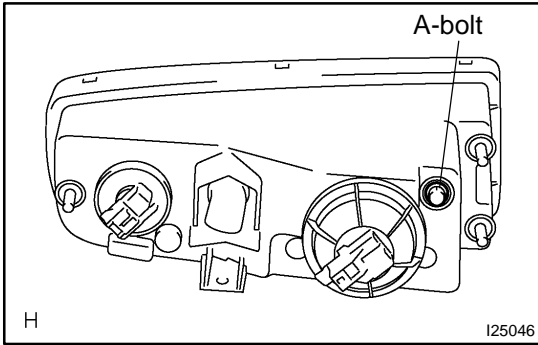
### 3. ERASURE OF TRANSPONDER KEY CODE

Using hand-held tester:

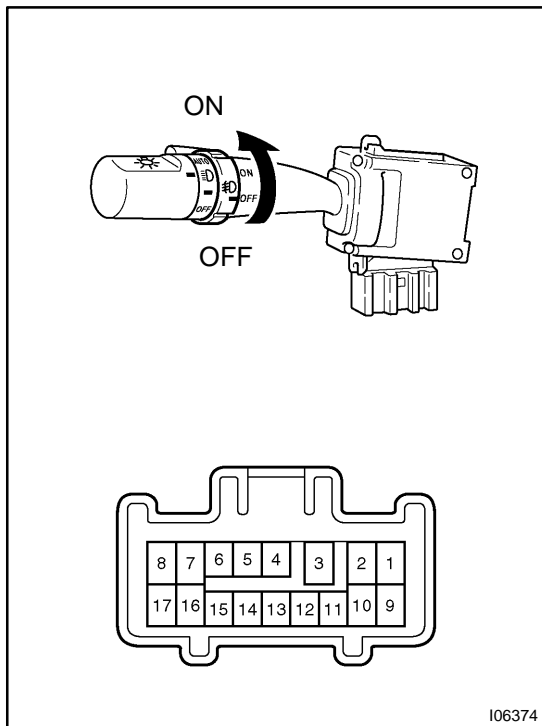


HINT:

► Follow the screen of the hand-held tester for more detailed procedure.



**ADJUSTMENT**  
**ADJUST FOGLIGHT AIM**  
A-bolt : Vertical Direction

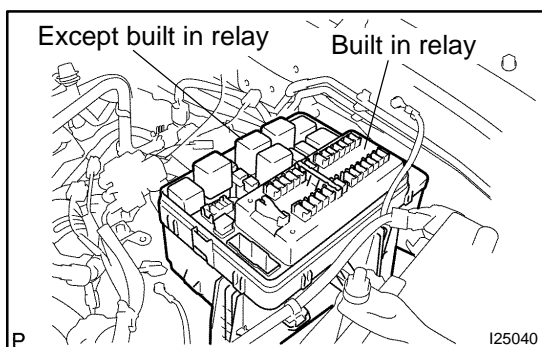


## INSPECTION

### 1. INSPECT FOG LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	-	No continuity
ON	10 - 11	Continuity

If continuity is not as specified, replace the switch.



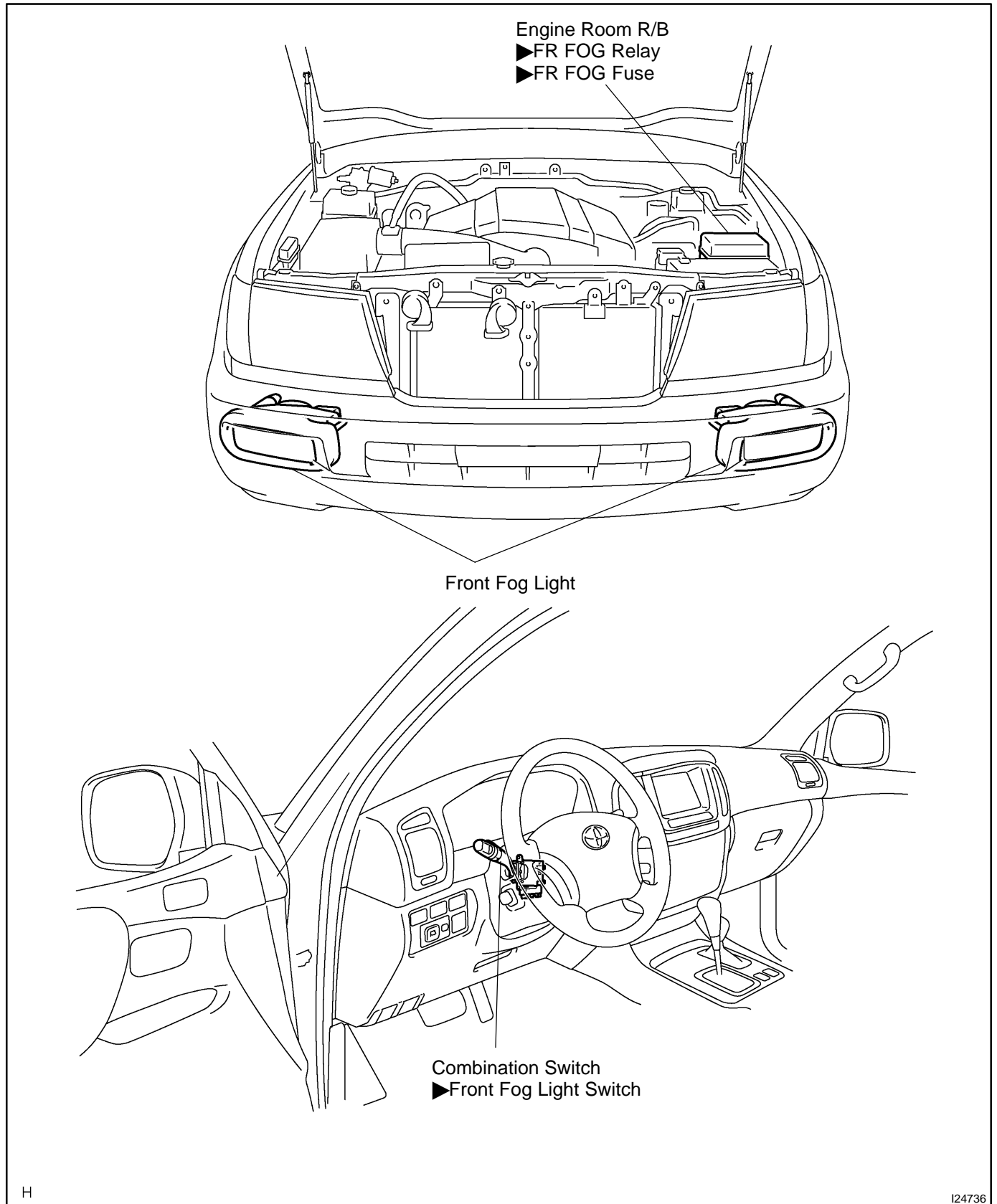
### 2. INSPECT ENGINE ROOM R/B RELAY CIRCUIT(See Page BE-15 )

**HINT:**

The foglight relay is built in engine room junction block. Also the relay is constructed with a relay block that is in the junction block as a unit. To disconnect the wire harness connecting with relay block is impossible. If the relay has a malfunction, replace it with junction block assembly wire harness together.

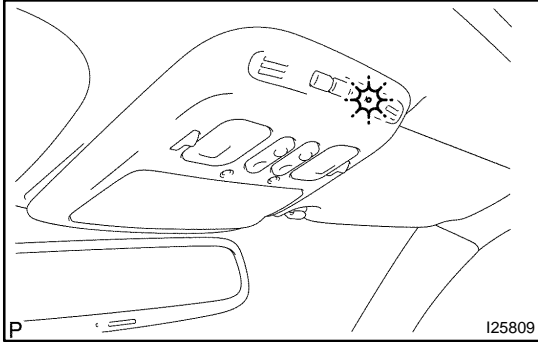
# FOG LIGHT SYSTEM LOCATION

BE0H2-16



H

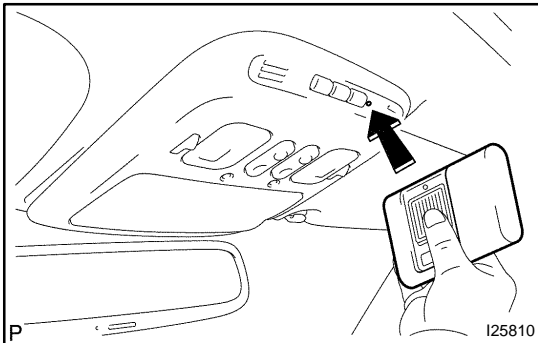
I24736



## INSPECTION

### 1. INSPECT GARAGE DOOR OPENER SWITCH

Press the switch and check that each LED (red) lights up. Even if only one switch is found not to light up, replace it.



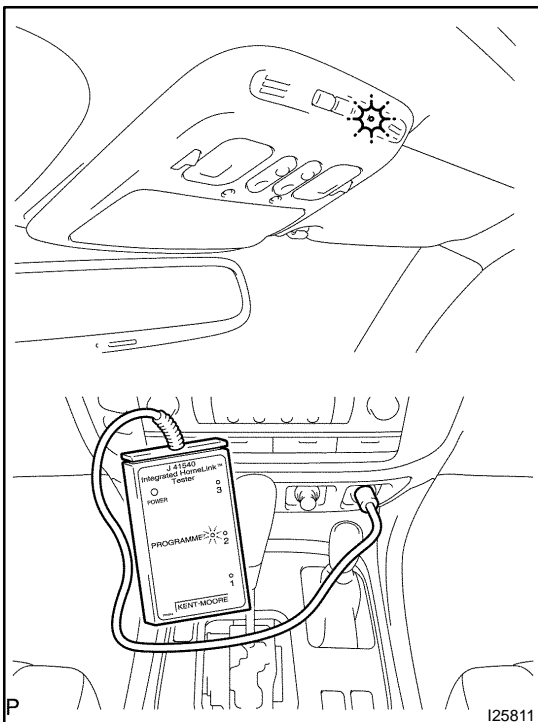
### 2. INSPECT GARAGE DOOR OPENER REGISTRATION AND TRANSMITTING

#### HINT:

Use the home link tester made by KENT MORE for this test. As it is necessary to record the code of the hand held transmitter, customer's code will be erased. When the inspection completes, please register the customer's again.

(a) Check that the code of hand held transmitter for inspection can be recorded (See page [BE-186](#)).

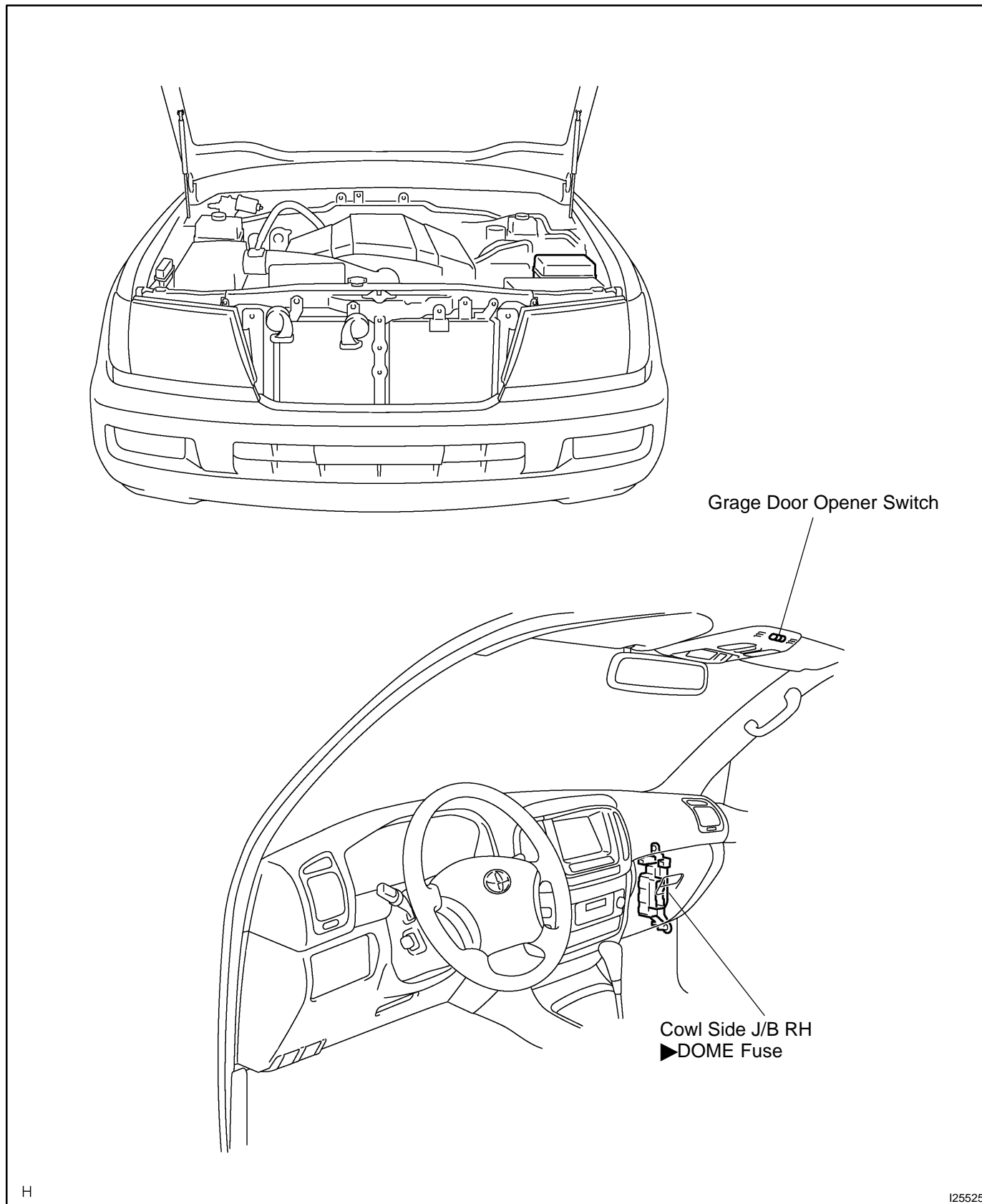
If the code can not be registered, replace garage door opener.



(b) Press the switch which an inspection code has been registered for and check that LED (green) of the home link tester lights up.

If the LED (green) does not light up, replace the garage door opener.

# LOCATION



H

125525

# GARAGE DOOR OPENER SYSTEM REGISTRATION PROCEDURE

BE0TY-04

## 1. NEW CODE REGISTRATION

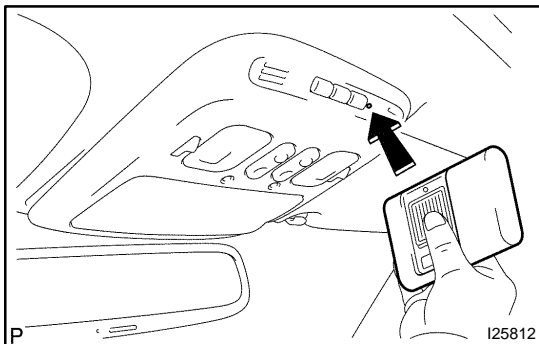
### NOTICE:

- ▶ If pressing the switch of the original transmitter to register the code, the system might operate.
- ▶ When registering the transmitter codes such as for garage or gate, check that there is nobody around those places then register.

- (a) Press the switch for the item to be registered for 20 seconds

### HINT:

When transferring to registration mode, LED (red) blinks in 1 Hz cycle.



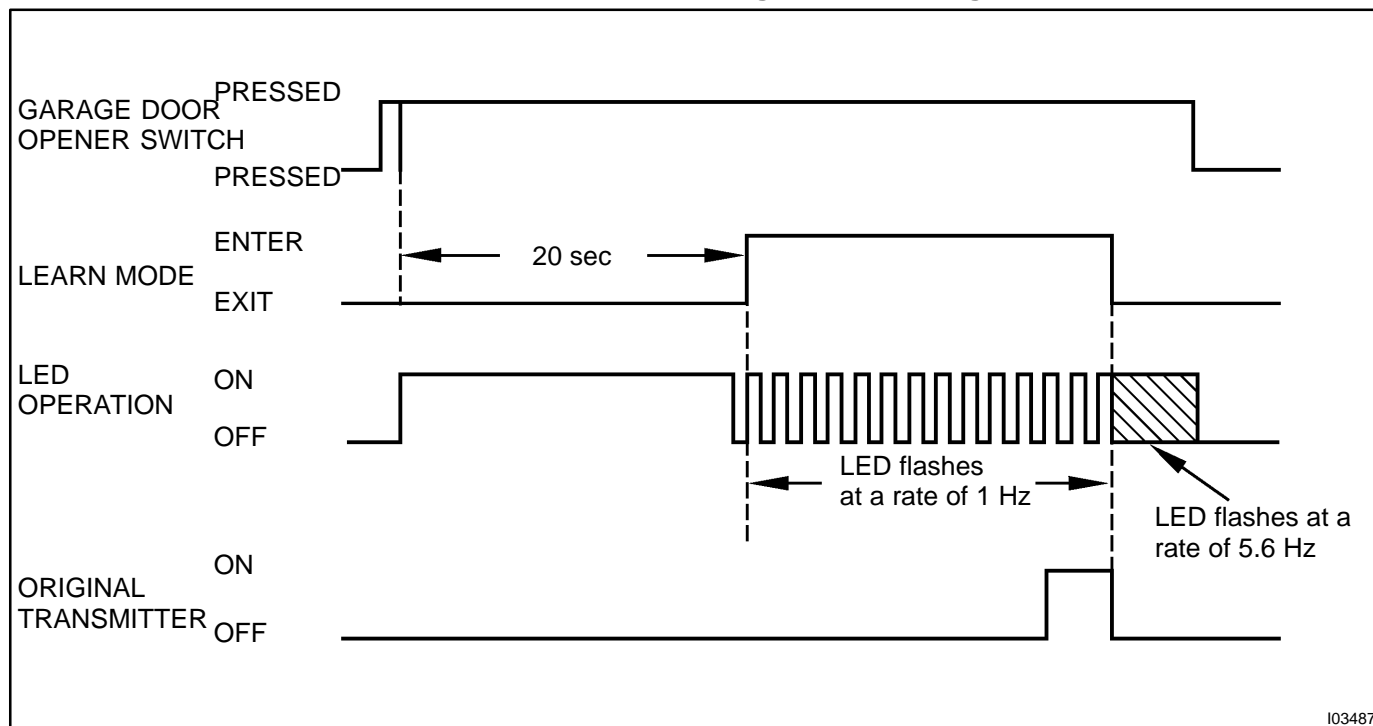
- (b) In the condition of (a), bring the original transmitter to within 1-inch area around the garage door opener and press the switch. (code transmitting).

### HINT:

When code registration completes correctly, LED (red) blinks in 5.6 Hz cycle.



## New code registration timing chart



103487

If a code can not be registered, observe the following conditions.

HINT:

- ▶ If the battery of original transmitter is consumed.
- ▶ Press the switch of the transmitter repeatedly in registration mode, as some transmitters stop transmitting for 1 to 2 seconds.
- ▶ This system is not applicable to the garage door opener which had been made before 1982.

## 2. CODE DELETION

- (a) Press the switches at both ends of garage door opener simultaneously for 20 seconds.

HINT:

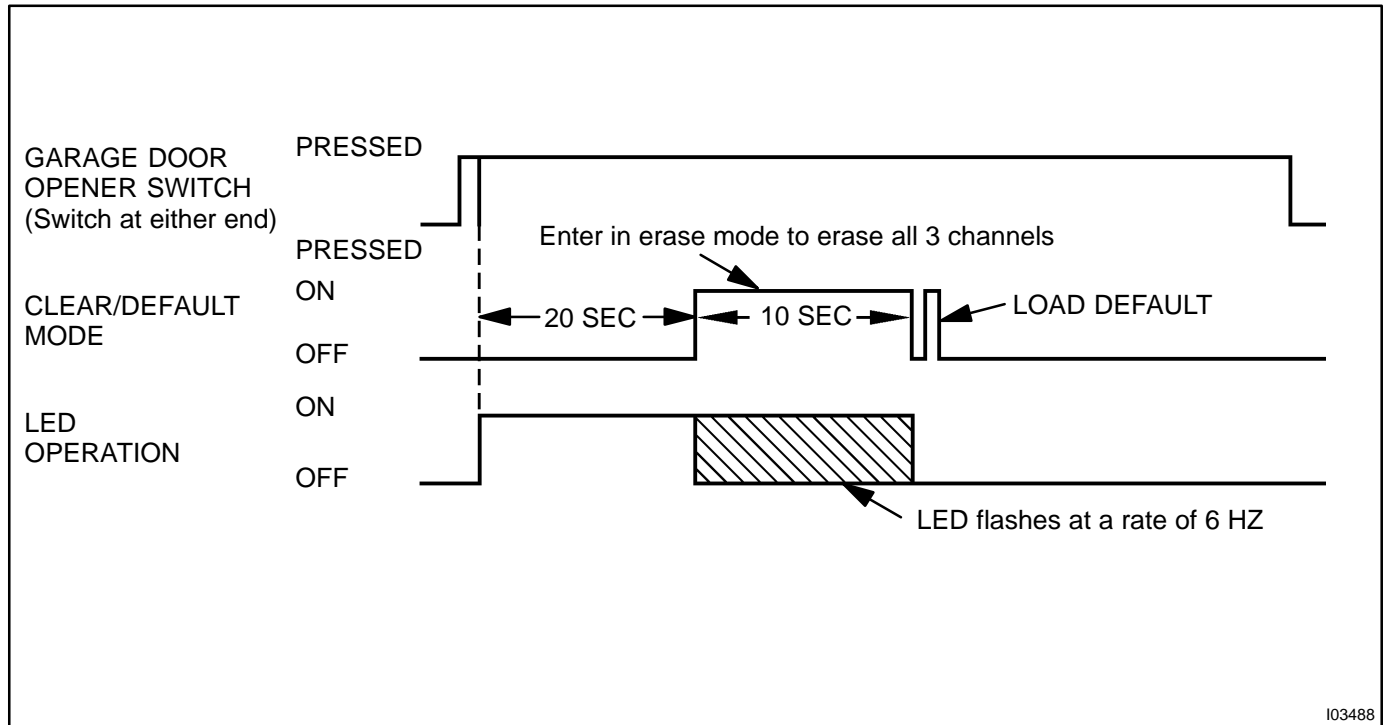
When transferring to deletion mode, LED (red) blinks in 6 Hz cycle.

- (b) When releasing the switch within 10 seconds after transferring to deletion mode, all the registered codes will be erased.

HINT:

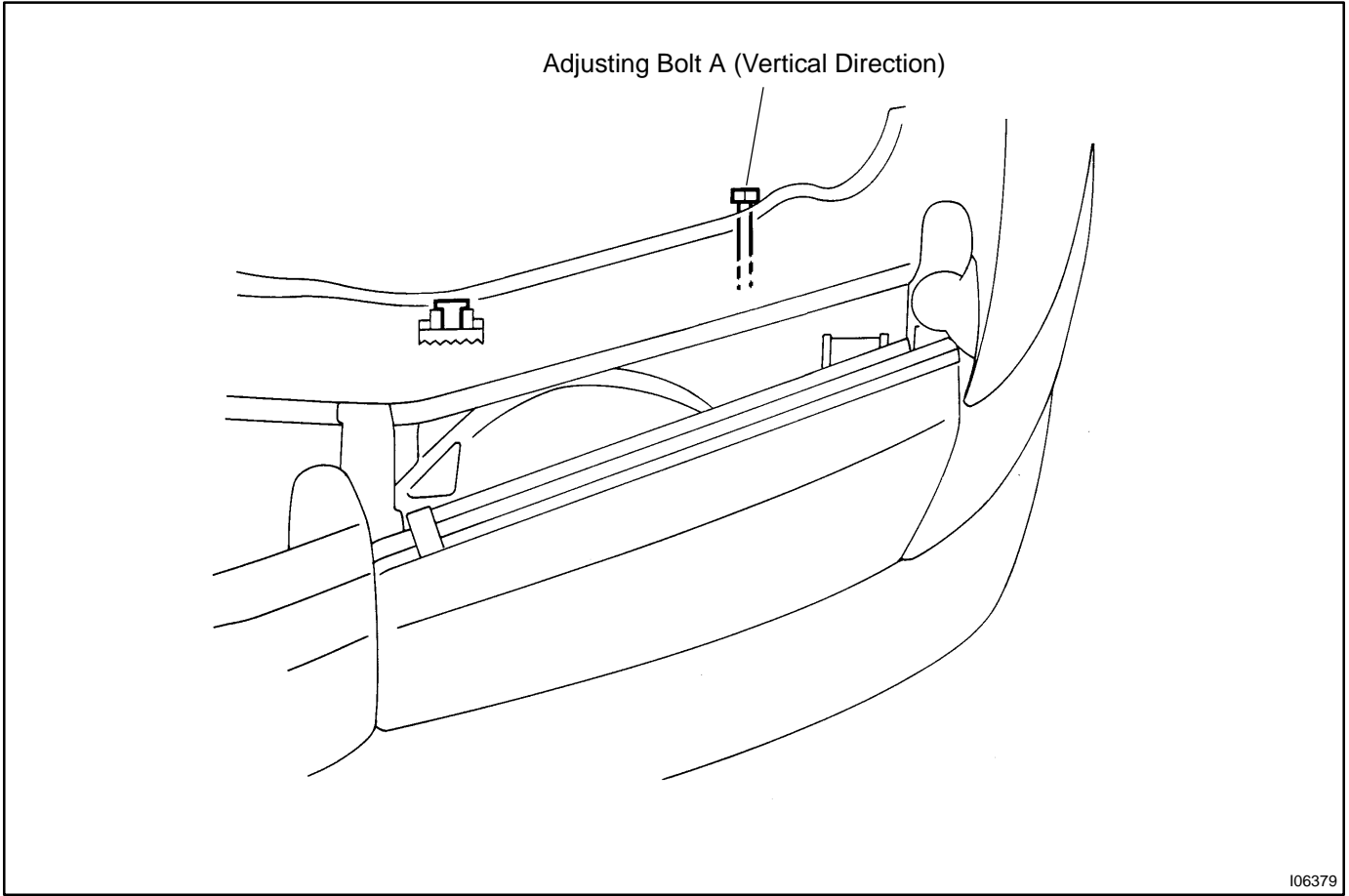
Press the switch until blinking in 6 Hz cycle stops, so that the default code for check is set.

Code deletion timing chart



I03488

# ADJUSTMENT



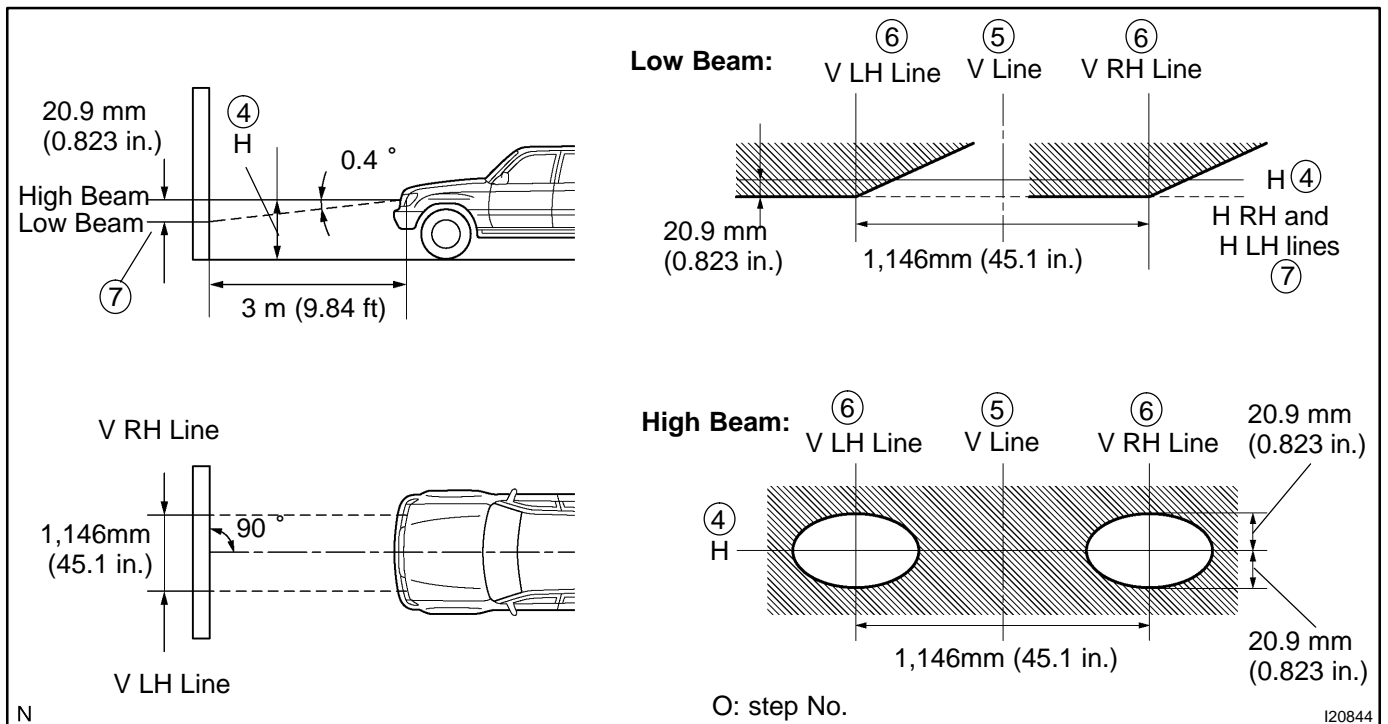
**ADJUST HEADLIGHT AIM ONLY**

- (a) Place the vehicle in the following conditions.
  - ▶ The area around the headlight is not deformed.
  - ▶ The vehicle is parked on a level surface.
  - ▶ Tire inflation pressure is the specified value.
  - ▶ A driver is in the driver's seat and the vehicle is in a state ready for driving (with a tank full).
  - ▶ The vehicle has been bounced several times.
- (b) Check the headlight aiming.
  - (1) Prepare a thick white paper.
  - (2) Stand the paper perpendicular to the ground at the position 9.84 ft away from the headlights.
  - (3) Ensure that the center line of the vehicle and the paper face forms a 90-degree angle as shown in the illustration.
  - (4) Draw a horizontal line (H line) on the paper, showing where the headlights should strike.
  - (5) Draw a vertical line (V line) to where the center line of the vehicle is to be.
  - (6) Draw 2 vertical lines (by connecting the low and high beam center marks) to where the both headlights should strike (V RH and V LH lines).
  - (7) Draw a horizontal line (by connecting the both low beam center marks) to where the headlights should strike (H RH and H LH lines).

**HINT:**

The H RH and H LH line is 0.4° below the horizontal line (H line) of the light axis.

- (8) Start the engine.
- (9) Turn the headlights ON.
- (10) Check that the headlights properly strike the position shown in the illustration.
- (11) If not, adjust the lights in the vertical direction.

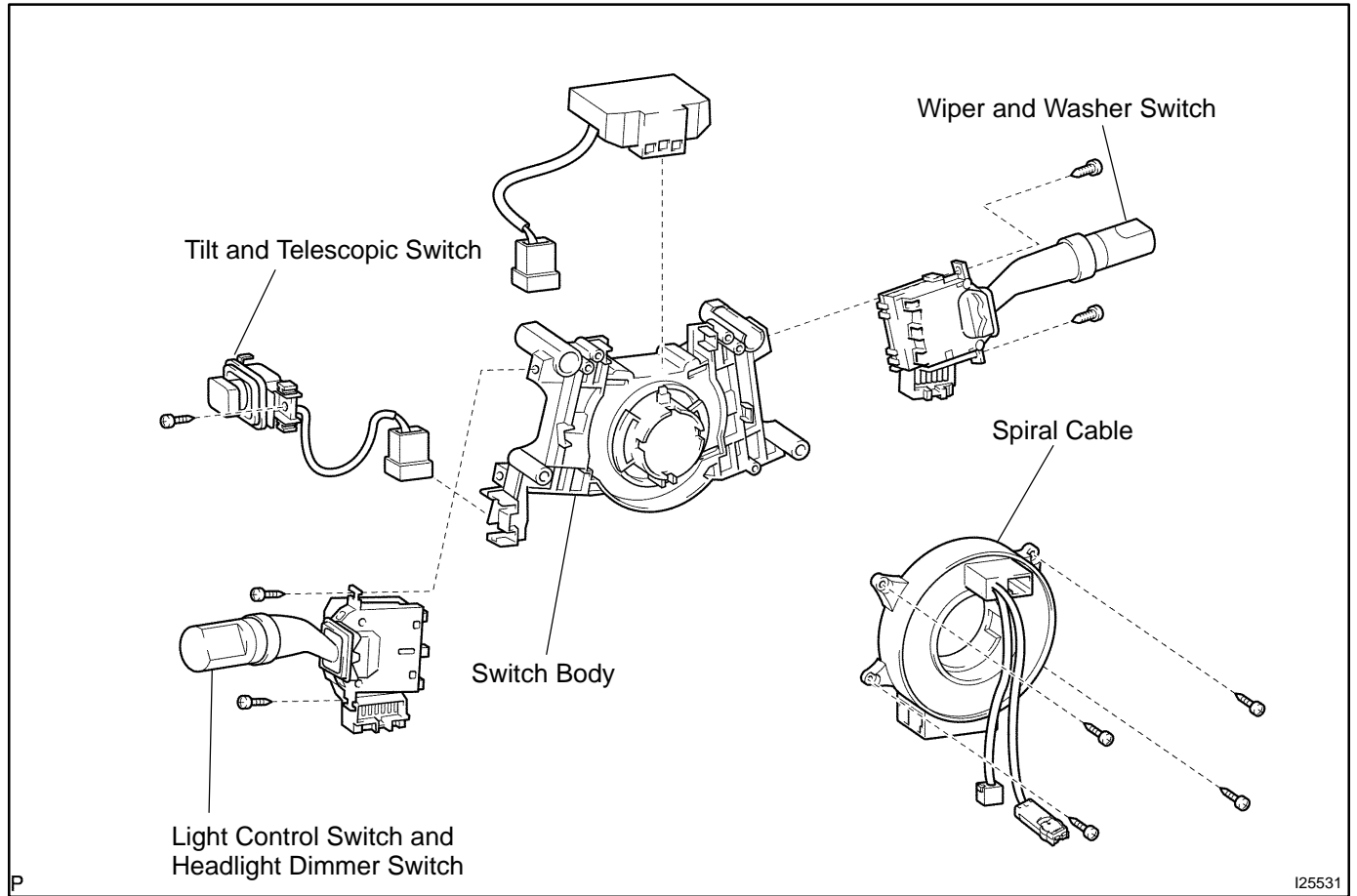


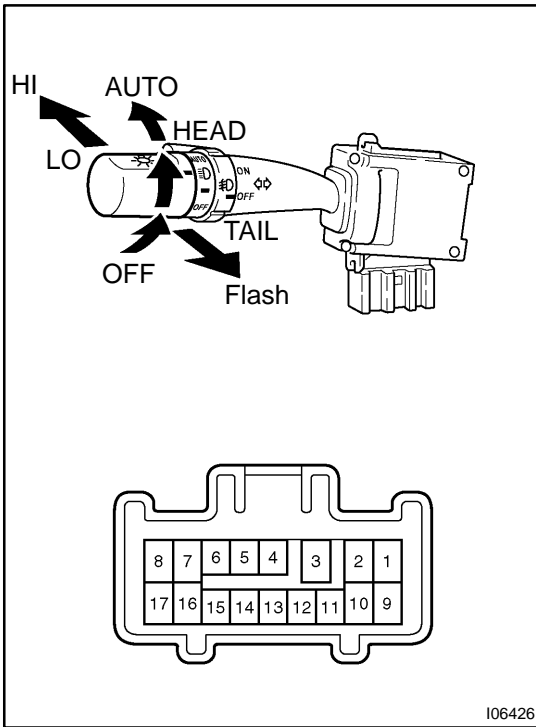
**HINT:**

As shown in the illustration, adjust each aim of the RH and LH lights.

- (c) When adjusting it in the vertical direction:
  - Using adjusting bolt A, adjust the headlight aim to within the specified range.

# COMPONENTS





## INSPECTION

### 1. INSPECT LIGHT CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	-	No continuity
TAIL	14 - 16	Continuity
HEAD	13 - 14 - 16	Continuity
AUTO	12 - 16	Continuity

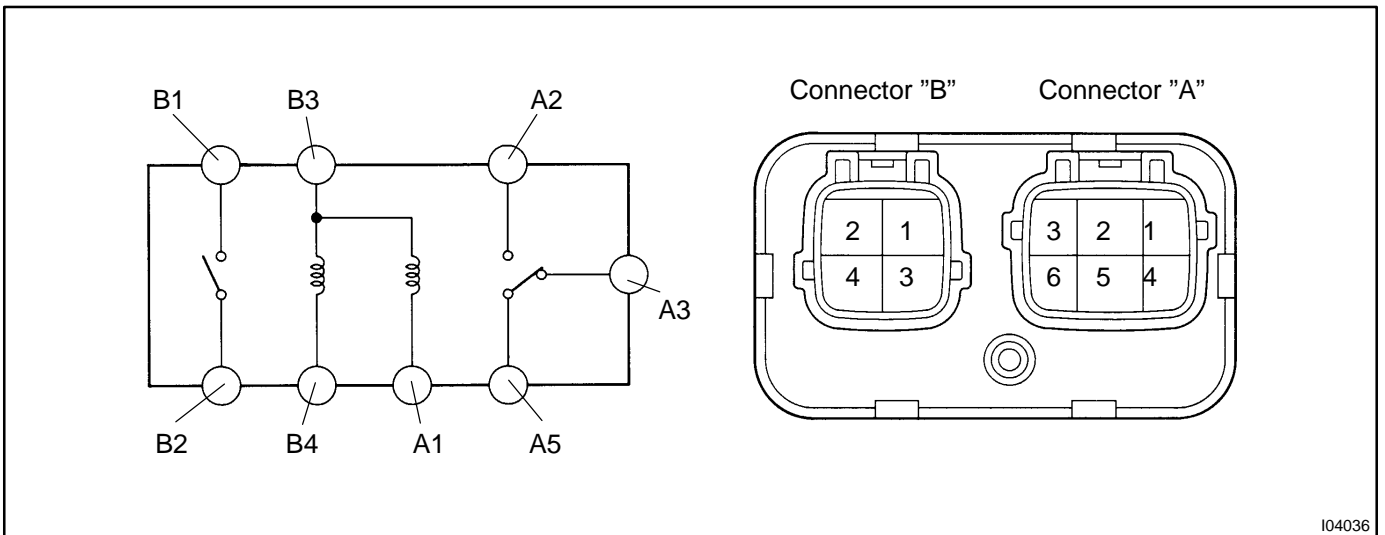
If continuity is not as specified, replace the switch.

### 2. INSPECT HEADLIGHT DIMMER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Low beam	16 - 17	Continuity
High beam	7 - 16	Continuity
Flash	7 - 8 - 16	Continuity

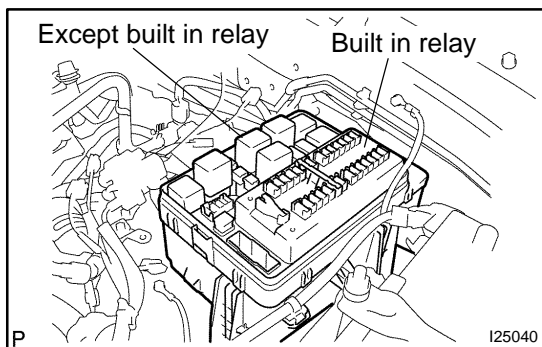
If continuity is not as specified, replace the switch.

### 3. INSPECT DAYTIME RUNNING LIGHT NO.3 AND NO.4 RELAY CONTINUITY



Tester connection	Condition	Specified condition
A1 - B3	Constant	Continuity
A3 - A5	Constant	Continuity
B3 - B4	Constant	Continuity
A2 - A5	Apply battery positive voltage between terminals A1 and B3.	Continuity
B1 - B2	Apply battery positive voltage between terminals B3 and B4.	Continuity

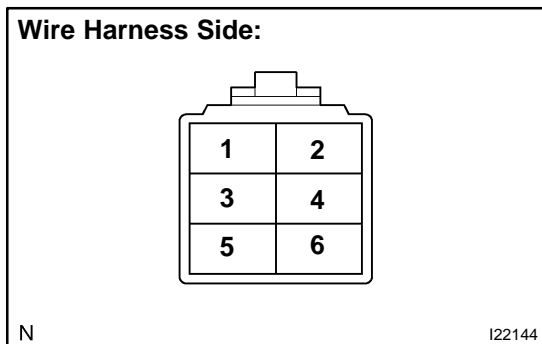
If continuity is not as specified, replace the relay.



**4. INSPECT ENGINE ROOM R/B RELAY CIRCUIT (See Page BE-15)**

**HINT:**

The (Headlight, DIM, Tail relay) is built in engine room junction block. Also the relay is constructed with a relay block that is in the junction block as a unit. To disconnect the wire harness connecting with relay block is impossible. If the relay has a malfunction, replace it with junction block assembly wire harness together.



**5. Connector disconnected: INSPECT AUTOMATIC LIGHT CONTROL SENSOR CIRCUIT**

Disconnect the connector from the sensor and inspect the connector on the wire harness side, as shown in the chart.

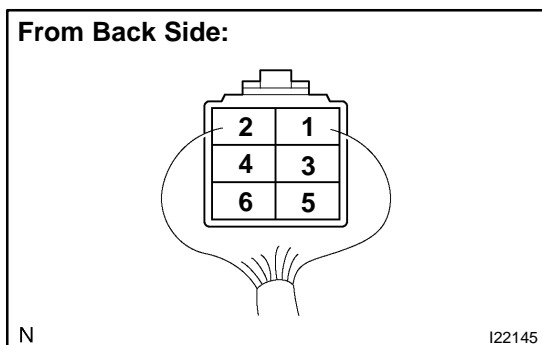
**HINT:**

- ▶ Ignition switch is ON.
- ▶ Light control switch is in AUTO.
- ▶ Vehicle's surroundings are bright.

Tester connection	Condition	Specified condition
6 - Ground	Constant	Continuity
3 - Ground	Close the driver's door again while the ignition switch OFF	No voltage
3 - Ground	Ignition switch position ON	5.2 - 9.0V

If circuit is as specified, perform the inspection on the following page.

If the circuits is not as specified, inspect the circuit connected to other parts.



**6. Connector disconnected: INSPECT AUTOMATIC LIGHT CONTROL SENSOR CIRCUIT**

Connect the wire harness side connector to the sensor and inspect wire harness side connector from the back side, as shown.

**HINT:**

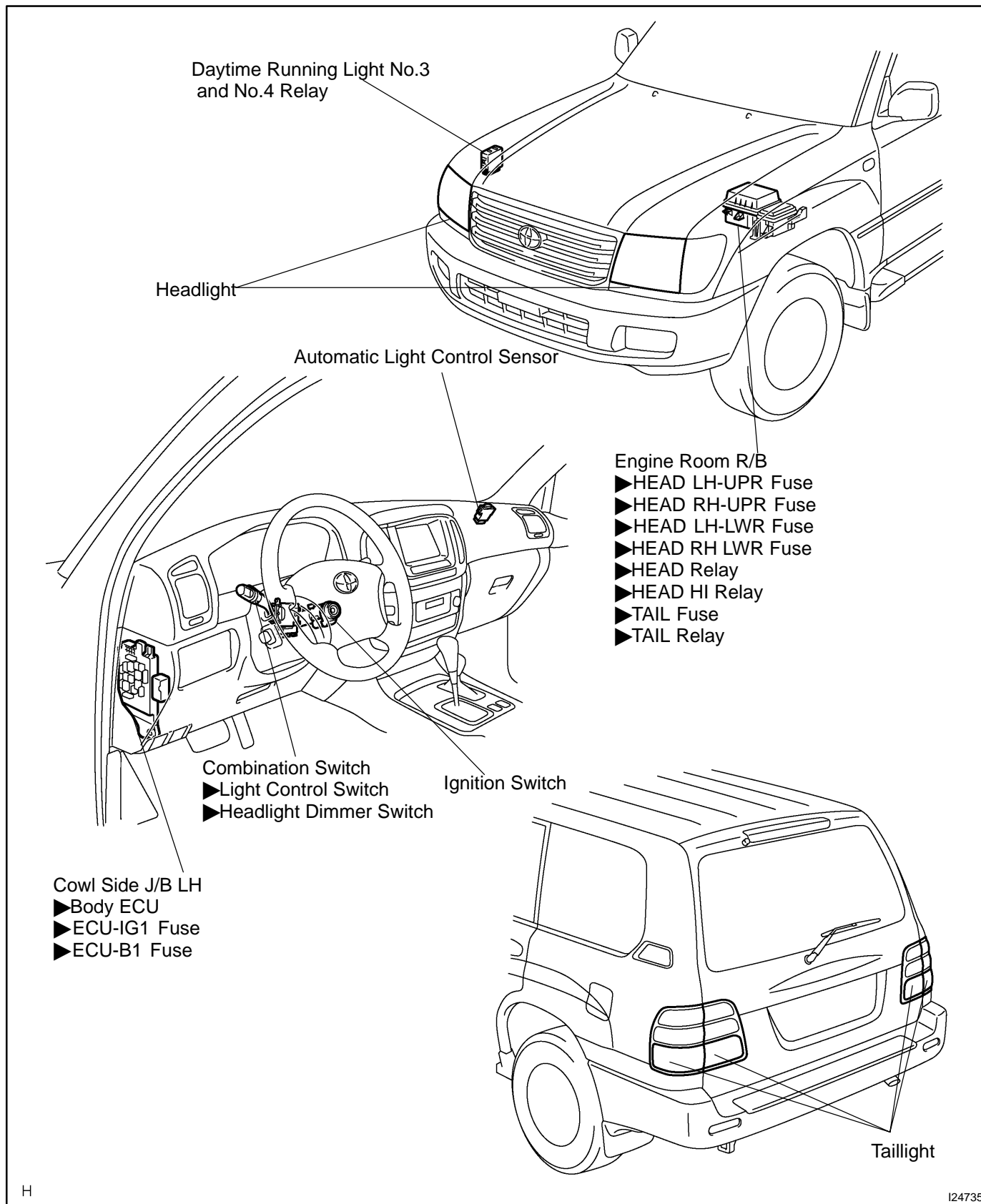
- ▶ Ignition switch is ON.
- ▶ Light control switch is in AUTO.
- ▶ Vehicle's surroundings are bright.

Tester connection	Condition	Specified condition
4 - Ground (CLTS - Body ground)	Constant	Pulse generation
3 - Ground (CLTB - Body ground)	Ignition switch ON	10 - 14V

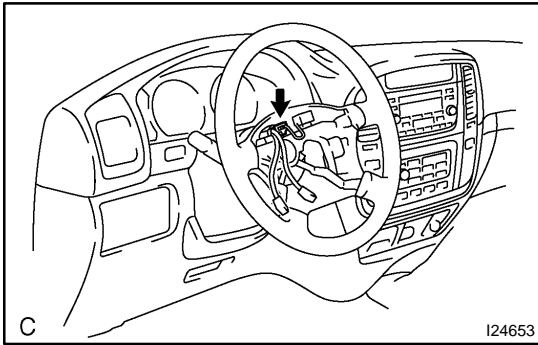
If the circuits is not as specified, try replacing the sensor with a new one.

# HEADLIGHT AND TAILLIGHT SYSTEM LOCATION

BE0H8-11







## INSPECTION

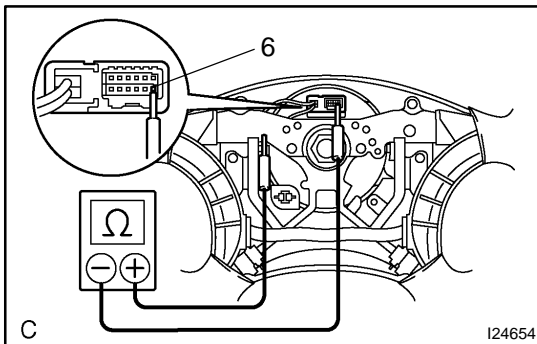
### 1. INSPECT HORN SWITCH

- Disconnect the negative (-) terminal from the battery.
- Remove the left and right covers from the steering wheel.
- Using a torx socket wrench, loosen the 2 bolts.
- Pull up the horn pad and place it on the steering column, as shown.

#### HINT:

Do not disconnect the connector from the horn pad.

- Disconnect the connector from the slip ring.



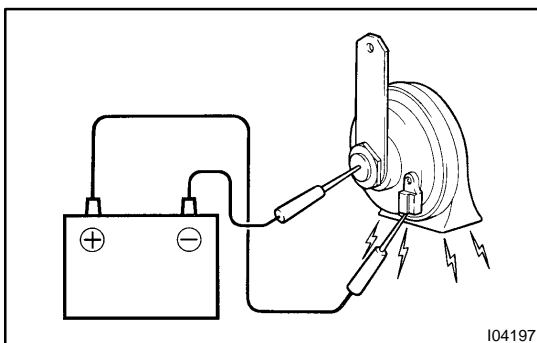
- Check that no continuity exists between terminal 6 of the connector and body ground.
- Check that continuity exists between terminal 6 of the connector and body ground when the horn contact plate is pressed against the steering spoke assembly.

If continuity is not as specified, repair or replace the steering wheel or wire harness as necessary.

- Install the horn pad in place and using a torx socket wrench, torque the 2 bolts.

**Torque: 7.1 N·m (72 kgf·cm, 62 in.-lbf)**

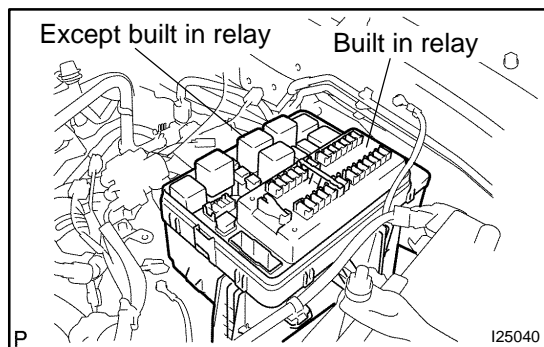
- Install the left and right covers.
- Connect the negative (-) terminal to the battery.



### 2. INSPECT HORN OPERATION

Connect the positive (+) lead from the battery to the terminal and negative (-) lead to the horn body and check that the horn blows.

If operation is not as specified, replace the horn.



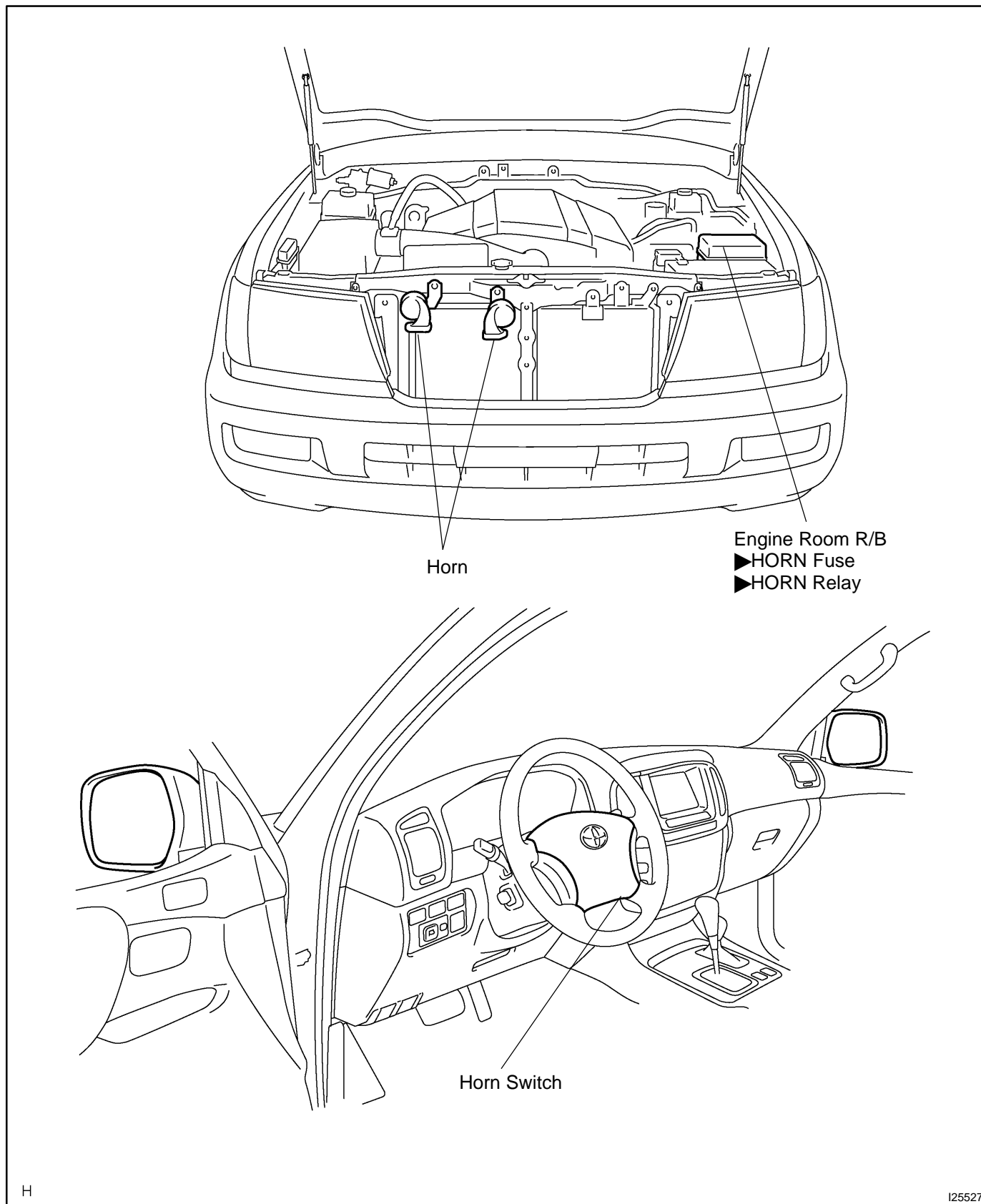
### 3. INSPECT ENGINE ROOM R/B RELAY CIRCUIT (See Page [BE-15](#))

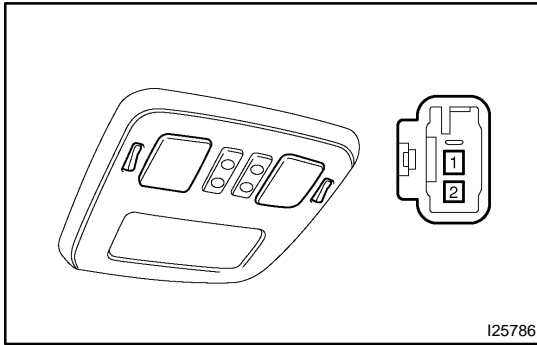
#### HINT:

The horn relay is built in engine room junction block. Also the relay is constructed with a relay block that is in the junction block as a unit. To disconnect the wire harness connecting with relay block is impossible. If the relay has a malfunction, replace it with junction block assembly wire harness together.

# HORN SYSTEM LOCATION

BE0FY-27





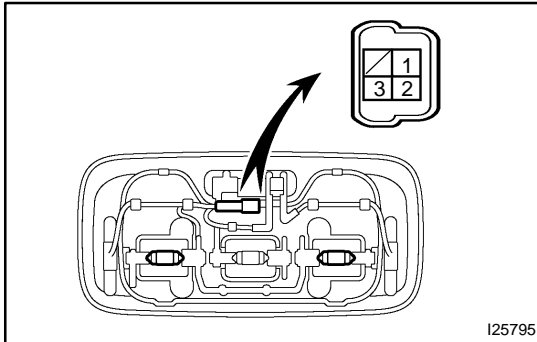
I25786

## INSPECTION

### 1. INSPECT FRONT PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	-	No continuity
ON	1 - 2	Continuity

If continuity is not as specified, replace the light assembly or bulb.

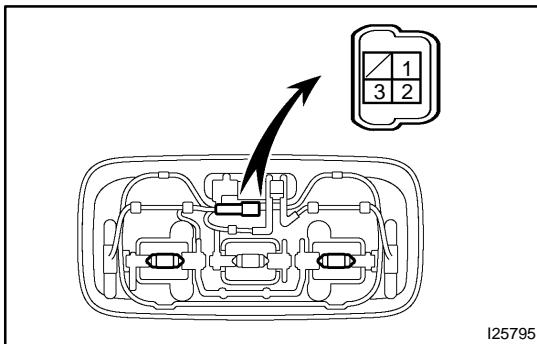


I25795

### 2. INSPECT REAR PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	-	No continuity
ON	1 - 3	Continuity

If continuity is not as specified, replace the light assembly or bulb.

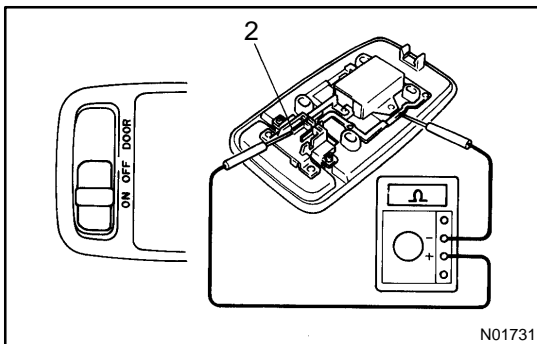


I25795

### 3. INSPECT ROOM LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Room Light Switch OFF	-	No continuity
Room Light Switch DOOR	2 - 3	Continuity
Room Light Switch ON	1 - 3	Continuity

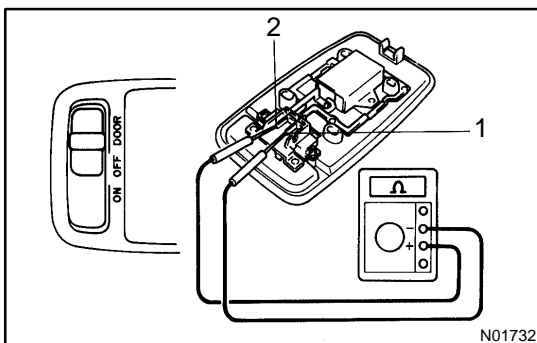
If continuity is not as specified, replace the light assembly or bulb.



N01731

### 4. INSPECT REAR ROOM LIGHT SWITCH CONTINUITY

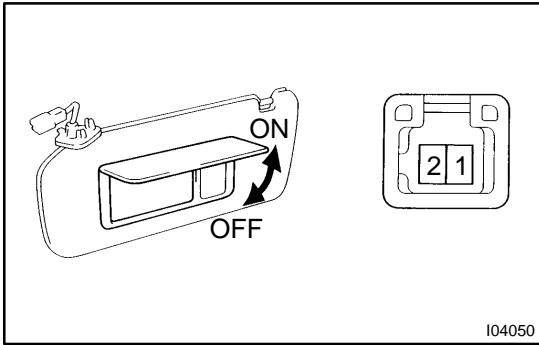
- Disconnect the connector from room light assembly.
- Turn the room light switch ON, check that continuity exists between terminal 2 and body ground.



N01732

- Turn the room light switch DOOR, check that continuity exists between terminal 1 and 2.

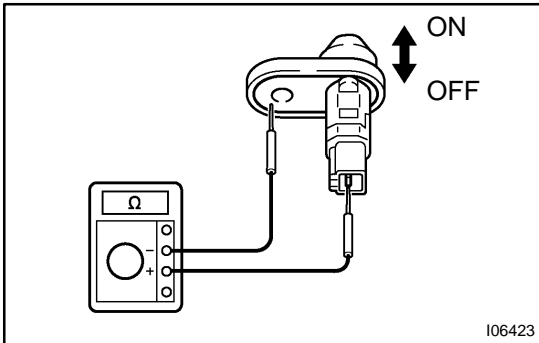
If operation is not as specified, replace the light assembly or bulb.



**5. INSPECT VANITY LIGHT CONTINUITY**

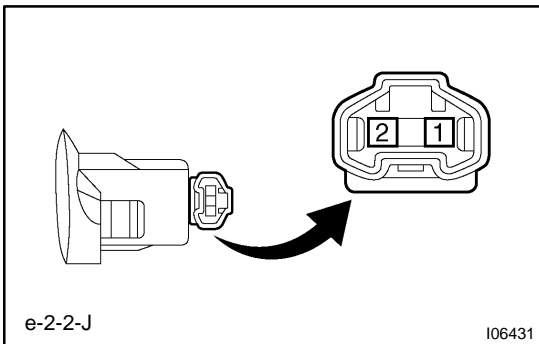
Switch position	Tester connection	Specified condition
OFF (closed)	-	No continuity
ON (opened)	1 - 2	Continuity

If continuity is not as specified, replace the vanity light assembly or bulb.



**6. INSPECT DOOR COURTESY SWITCH CONTINUITY**

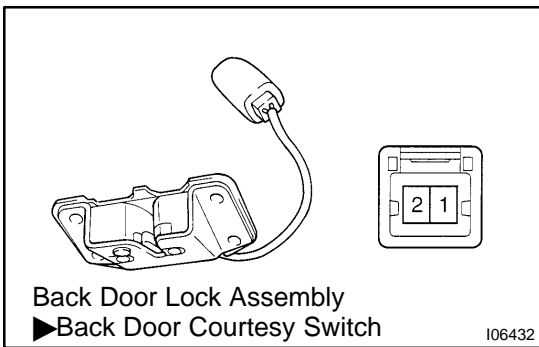
- (a) Check that continuity exists between terminal and switch body with the switch ON (switch pin released).
  - (b) Check that no continuity exists between terminal and switch body with the switch OFF (switch pin pushed).
- If continuity is not as specified, replace the switch.



**7. INSPECT DOOR COURTESY LIGHT CONTINUITY**

Using an ohmmeter, check that continuity exists between terminals.

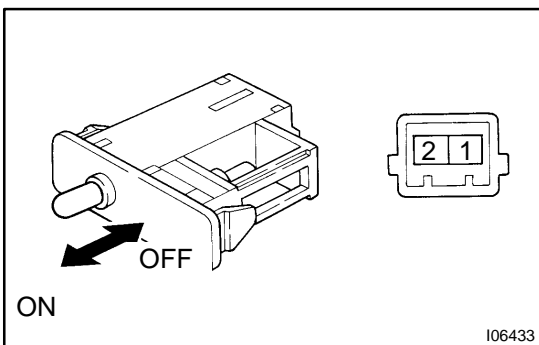
If continuity is not as specified, replace the light assembly or bulb.



**8. INSPECT BACK DOOR COURTESY SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
OFF (closed)	-	No continuity
ON (opened)	1 - 2	Continuity

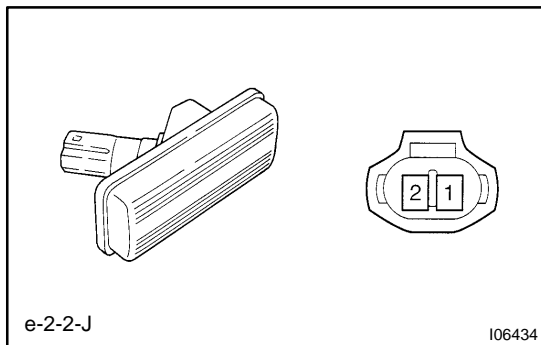
If continuity is not as specified, replace the back door lock assembly.



**9. INSPECT GLOVE COMPARTMENT DOOR COURTESY SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
OFF (closed)	-	No continuity
ON (opened)	1 - 2	Continuity

If continuity is not as specified, replace the switch.



e-2-2-J

106434

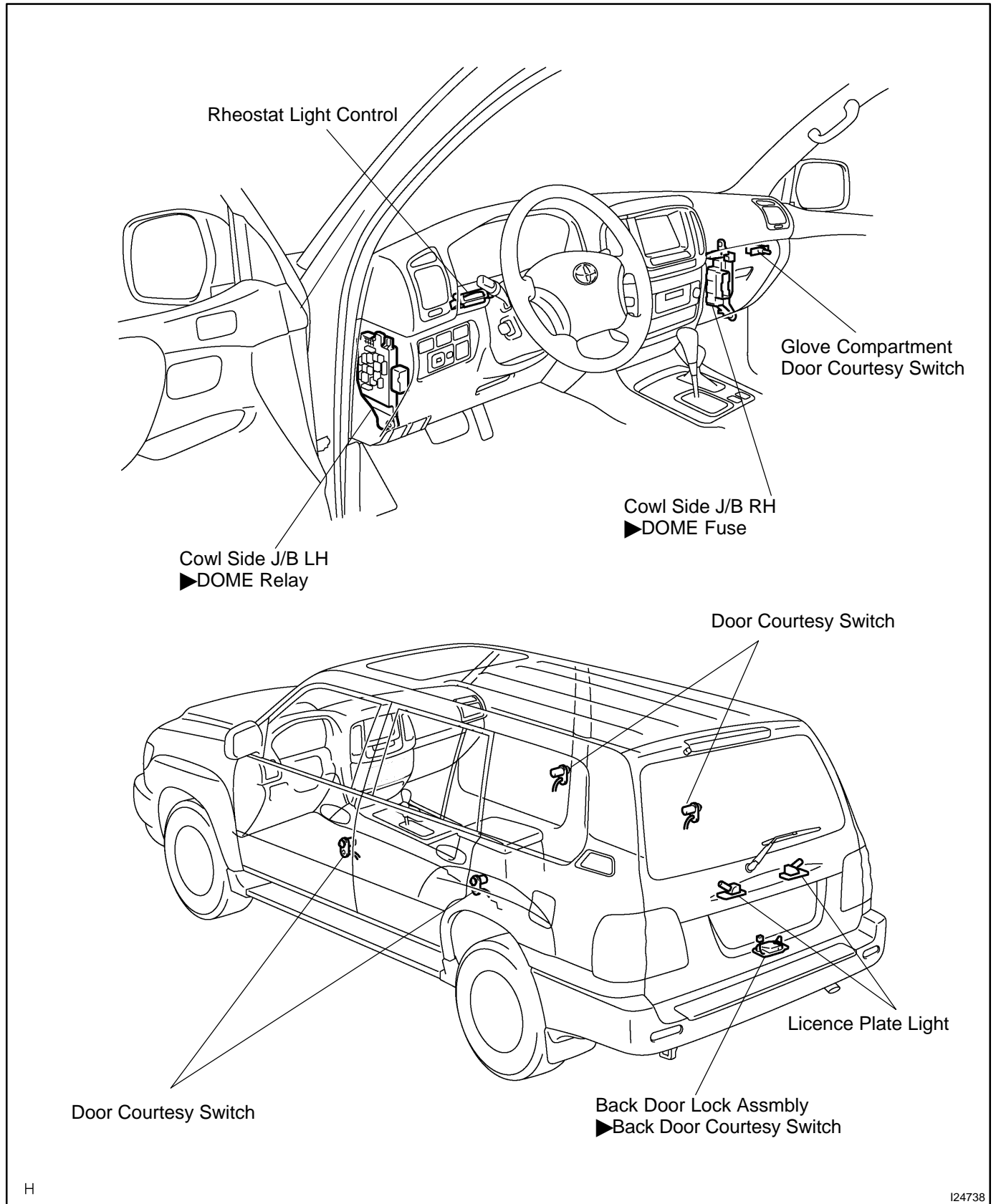
**10. INSPECT LICENCE PLATE LIGHT CONTINUITY**

Using an ohmmeter, check that continuity exists between terminals.

If continuity is not as specified, replace the light assembly or bulb.

# INTERIOR LIGHT SYSTEM LOCATION

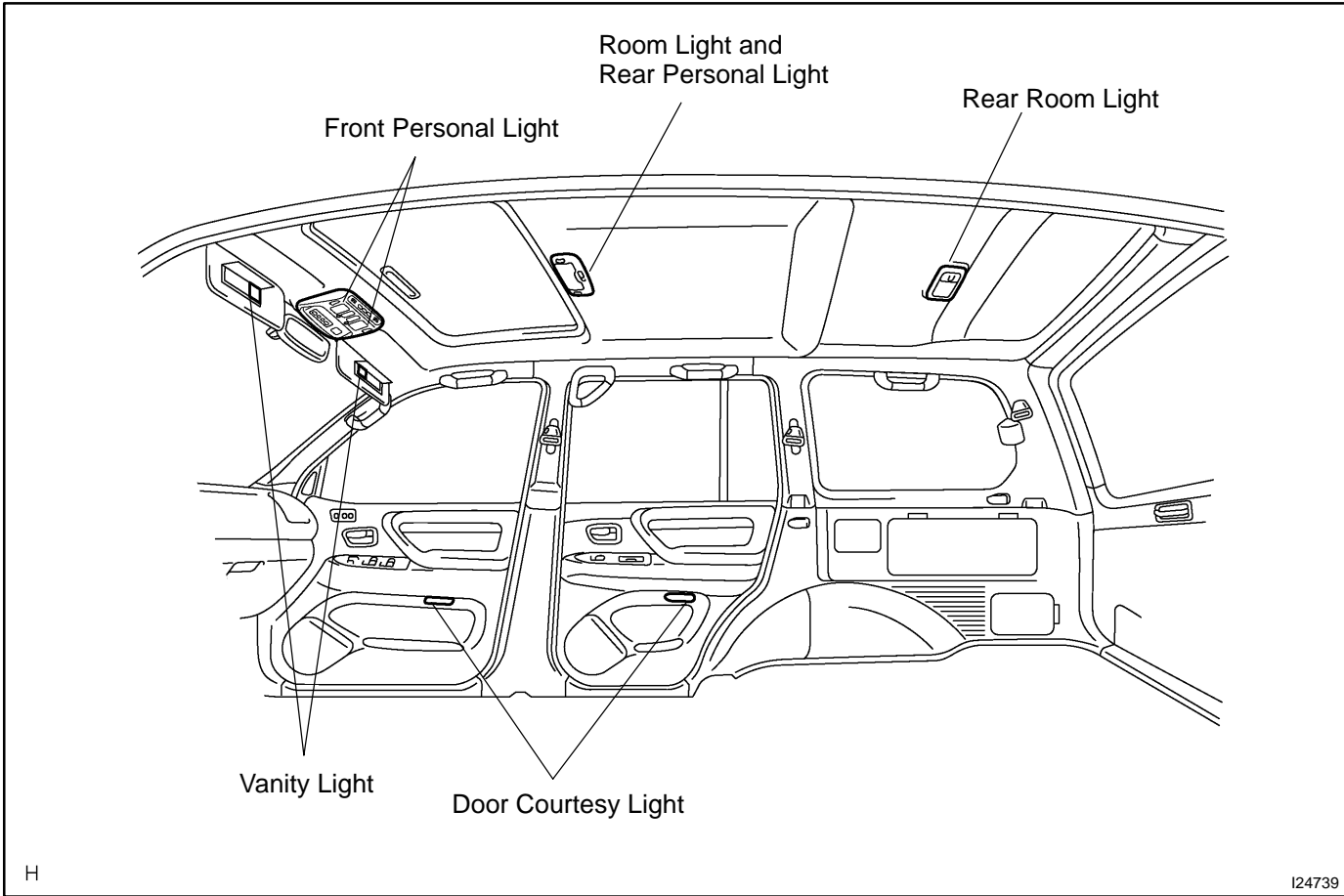
BEORW-03



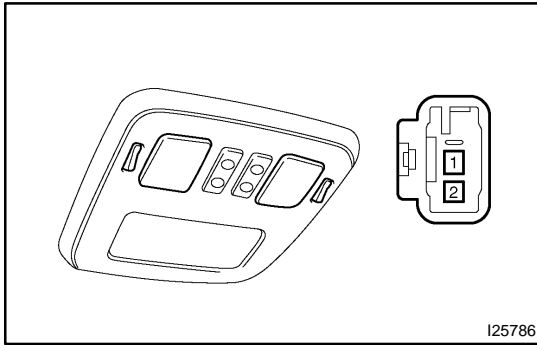
H

124738

BODY ELECTRICAL - INTERIOR LIGHT SYSTEM







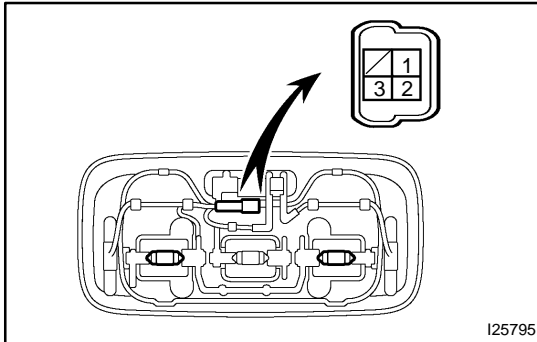
I25786

## INSPECTION

### 1. INSPECT FRONT PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	-	No continuity
ON	1 - 2	Continuity

If continuity is not as specified, replace the light assembly or bulb.

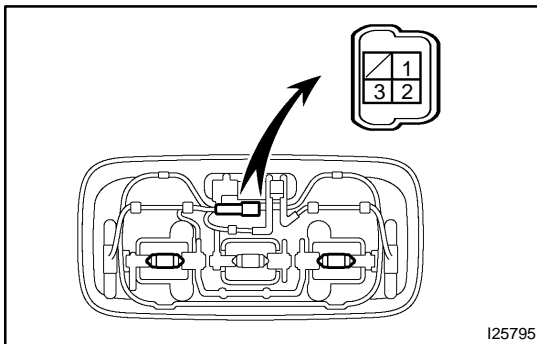


I25795

### 2. INSPECT REAR PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	-	No continuity
ON	1 - 3	Continuity

If continuity is not as specified, replace the light assembly or bulb.

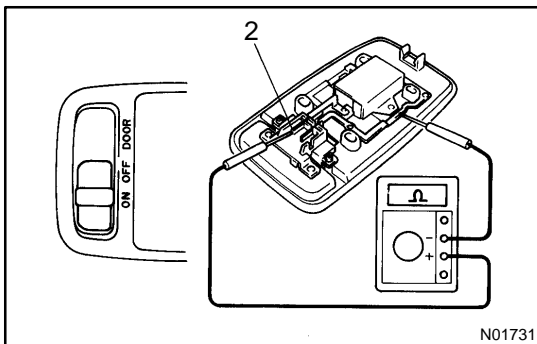


I25795

### 3. INSPECT ROOM LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Room Light Switch OFF	-	No continuity
Room Light Switch DOOR	2 - 3	Continuity
Room Light Switch ON	1 - 3	Continuity

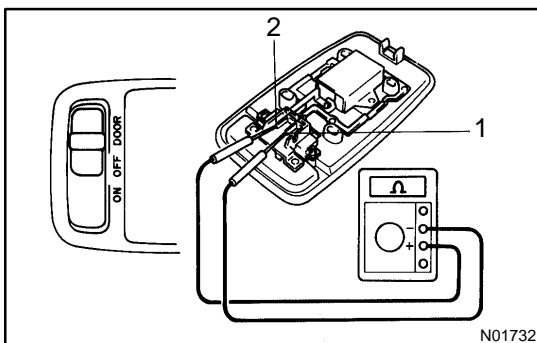
If continuity is not as specified, replace the light assembly or bulb.



N01731

### 4. INSPECT REAR ROOM LIGHT SWITCH CONTINUITY

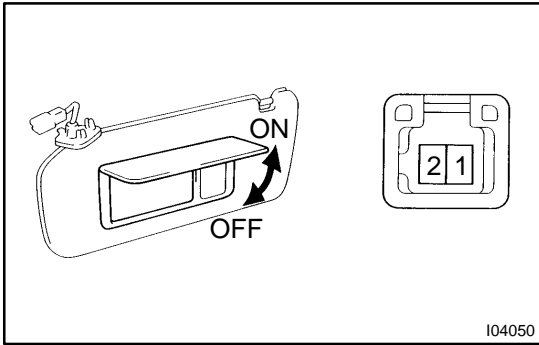
- Disconnect the connector from room light assembly.
- Turn the room light switch ON, check that continuity exists between terminal 2 and body ground.



N01732

- Turn the room light switch DOOR, check that continuity exists between terminal 1 and 2.

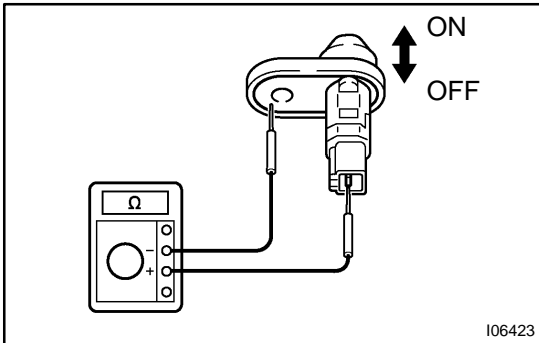
If operation is not as specified, replace the light assembly or bulb.



**5. INSPECT VANITY LIGHT CONTINUITY**

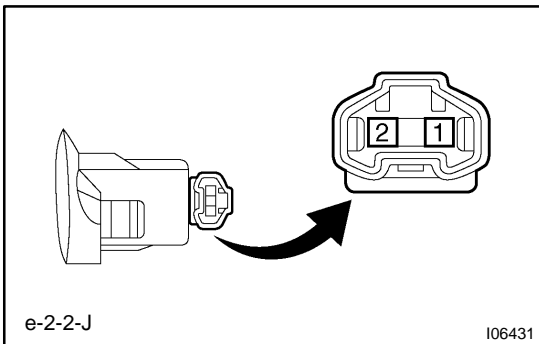
Switch position	Tester connection	Specified condition
OFF (closed)	-	No continuity
ON (opened)	1 - 2	Continuity

If continuity is not as specified, replace the vanity light assembly or bulb.



**6. INSPECT DOOR COURTESY SWITCH CONTINUITY**

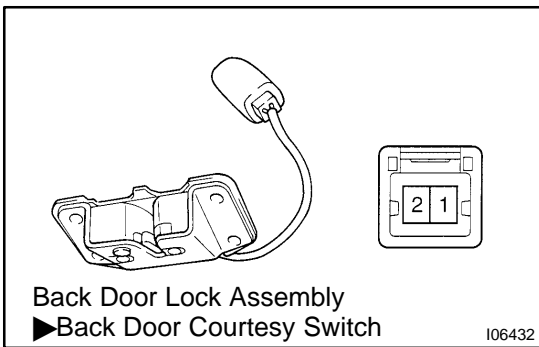
- (a) Check that continuity exists between terminal and switch body with the switch ON (switch pin released).
  - (b) Check that no continuity exists between terminal and switch body with the switch OFF (switch pin pushed).
- If continuity is not as specified, replace the switch.



**7. INSPECT DOOR COURTESY LIGHT CONTINUITY**

Using an ohmmeter, check that continuity exists between terminals.

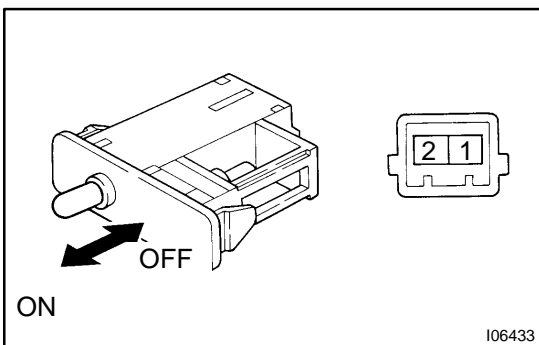
If continuity is not as specified, replace the light assembly or bulb.



**8. INSPECT BACK DOOR COURTESY SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
OFF (closed)	-	No continuity
ON (opened)	1 - 2	Continuity

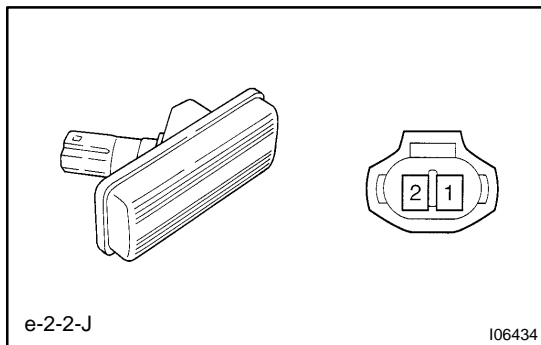
If continuity is not as specified, replace the back door lock assembly.



**9. INSPECT GLOVE COMPARTMENT DOOR COURTESY SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
OFF (closed)	-	No continuity
ON (opened)	1 - 2	Continuity

If continuity is not as specified, replace the switch.

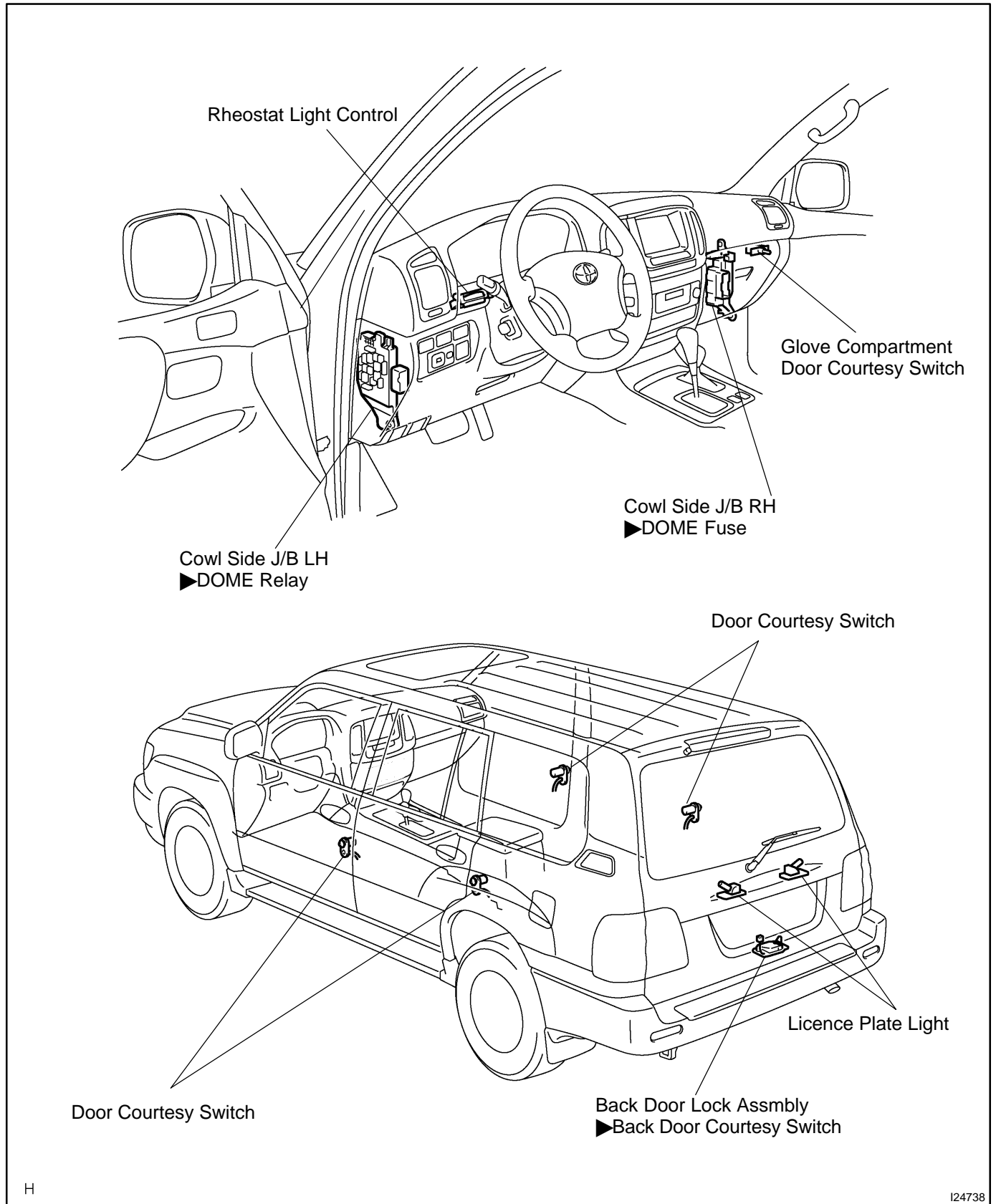
**10. INSPECT LICENCE PLATE LIGHT CONTINUITY**

Using an ohmmeter, check that continuity exists between terminals.

If continuity is not as specified, replace the light assembly or bulb.

# INTERIOR LIGHT SYSTEM LOCATION

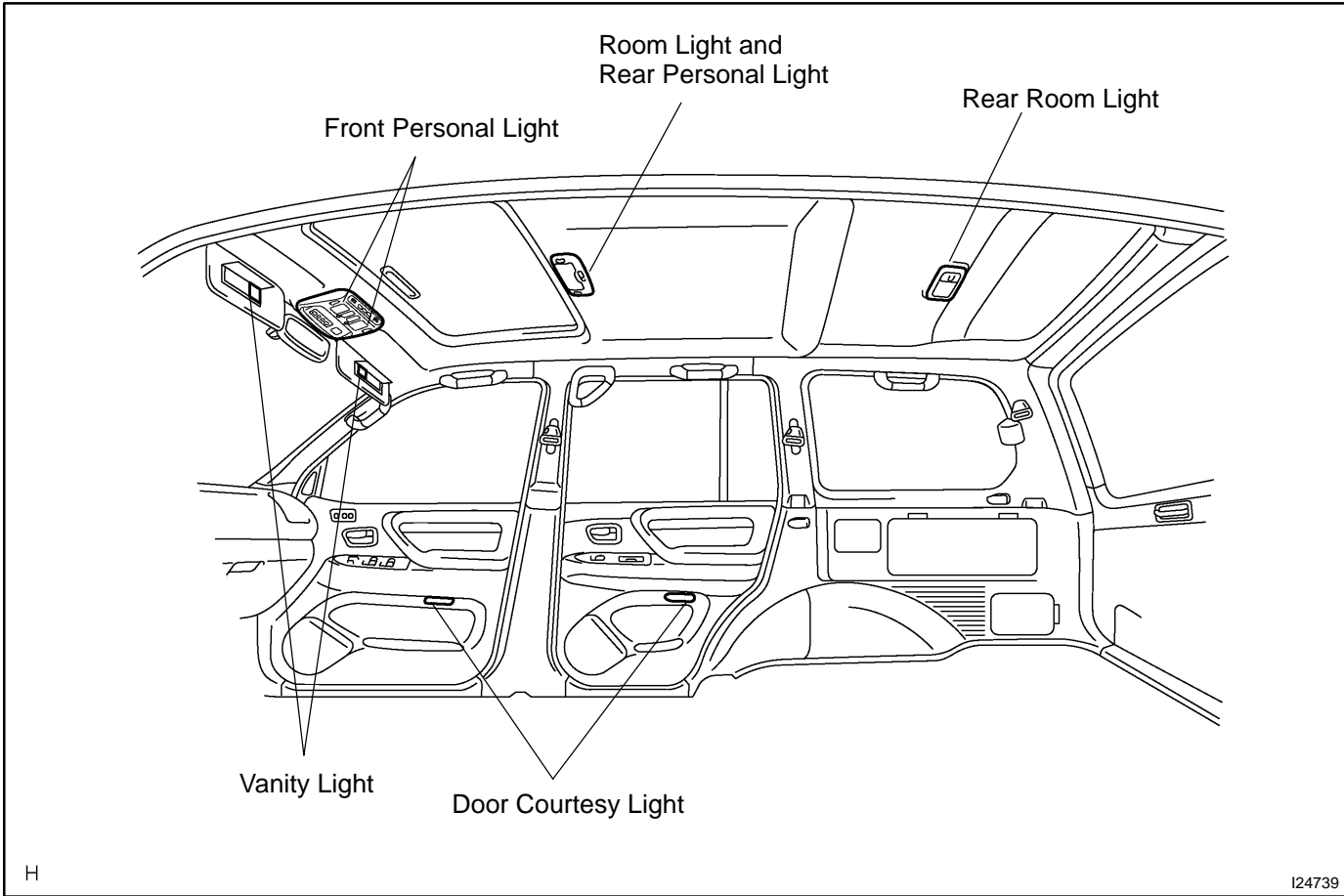
BEORW-03

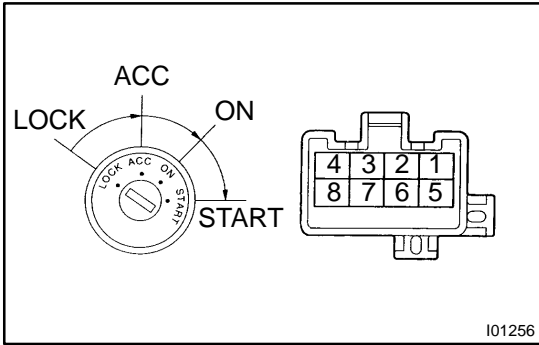


H

124738

BODY ELECTRICAL - INTERIOR LIGHT SYSTEM



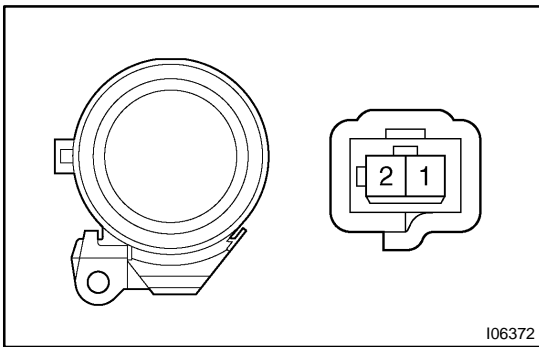


## INSPECTION

### 1. INSPECT IGNITION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	-	No continuity
ACC	2 - 3	Continuity
ON	2 - 3 - 4 6 - 7	Continuity
START	1 - 2 - 4 6 - 7 - 8	Continuity

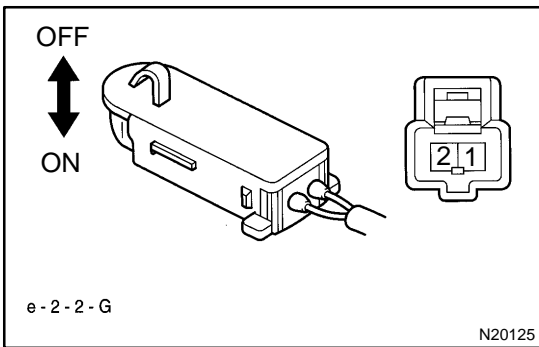
If continuity is not as specified, replace the switch.



### 2. INSPECT IGNITION KEY ILLUMINATION OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the indicator light lights up.

If operation is not as specified, replace the switch.



### 3. INSPECT KEY UNLOCK WARNING SWITCH CONTINUITY

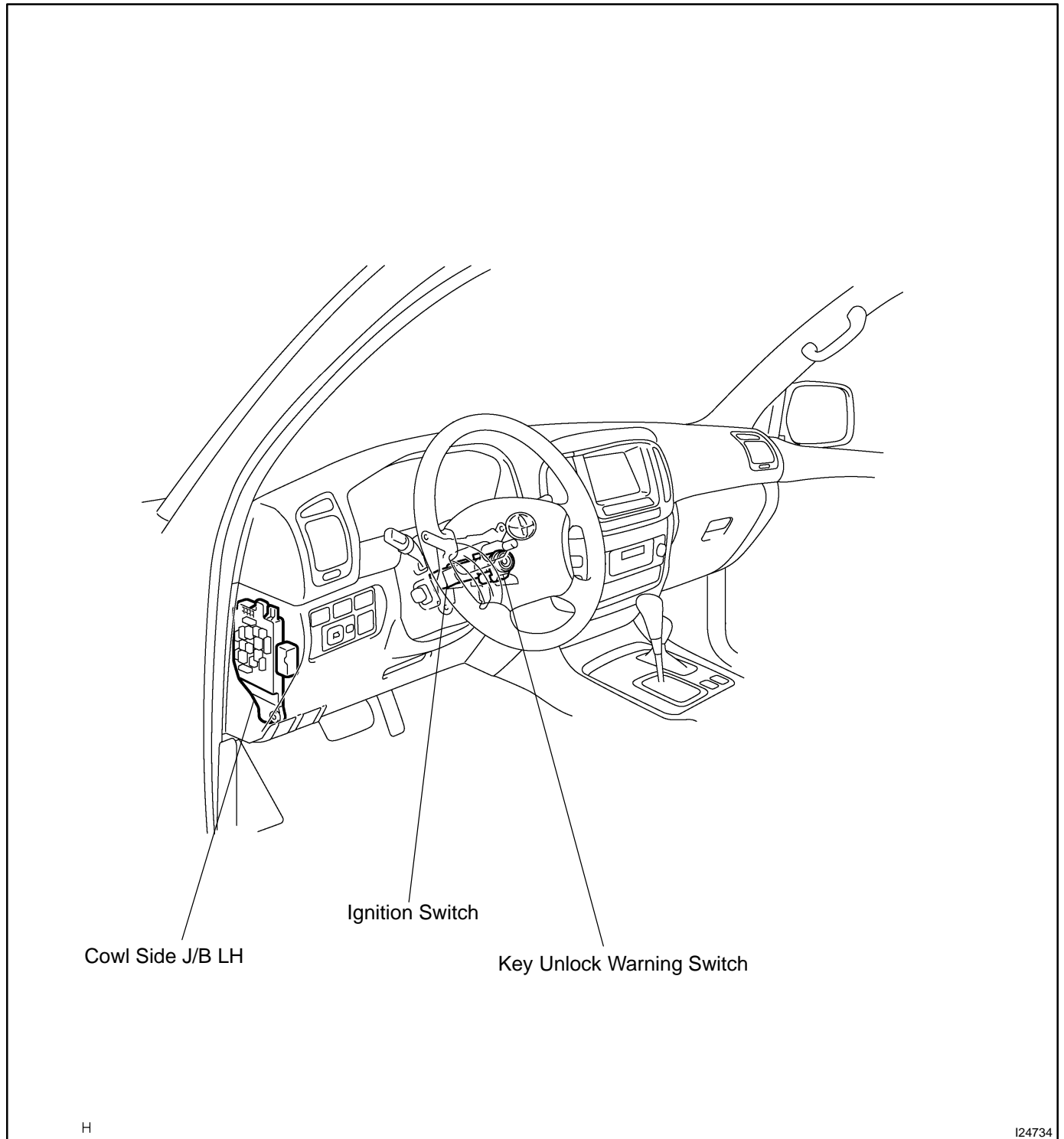
Switch position	Tester connection	Specified condition
OFF (Key removed)	-	No continuity
ON (Key set)	1 - 2	Continuity

If continuity is not as specified, replace the switch.

Connect the switch connector and inspect the connector on wire harness side from the back side, as shown.

# IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH LOCATION

BE01L-17



# MULTI DISPLAY TROUBLESHOOTING

BE2E1-01

**HINT:**

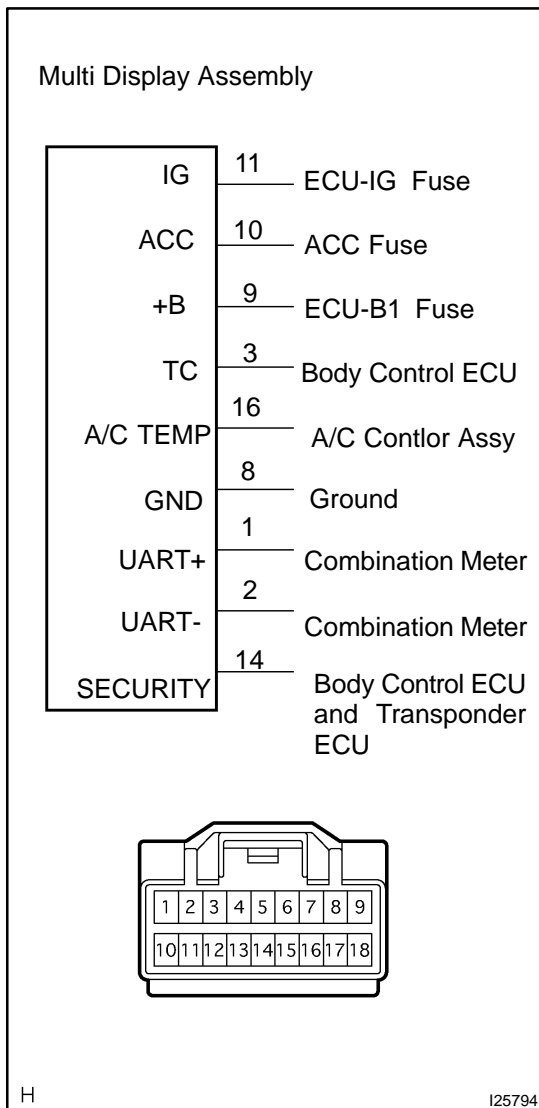
- ▶ Troubleshoot the Multi Display according to the table below.
- ▶ w/ Navigation System (See Page [DI-1 151](#))

Troubleshooting	No.
Multi display does not operate.	1
Clock loses or gains time.	2
Drive monitor function malfunction.	3
Outer temperature display malfunction.	4
Security indicator does not light up.	(See page <a href="#">DI-953</a> )

**± 1.5 seconds / day**

## 1. TROUBLESHOOTING NO.1

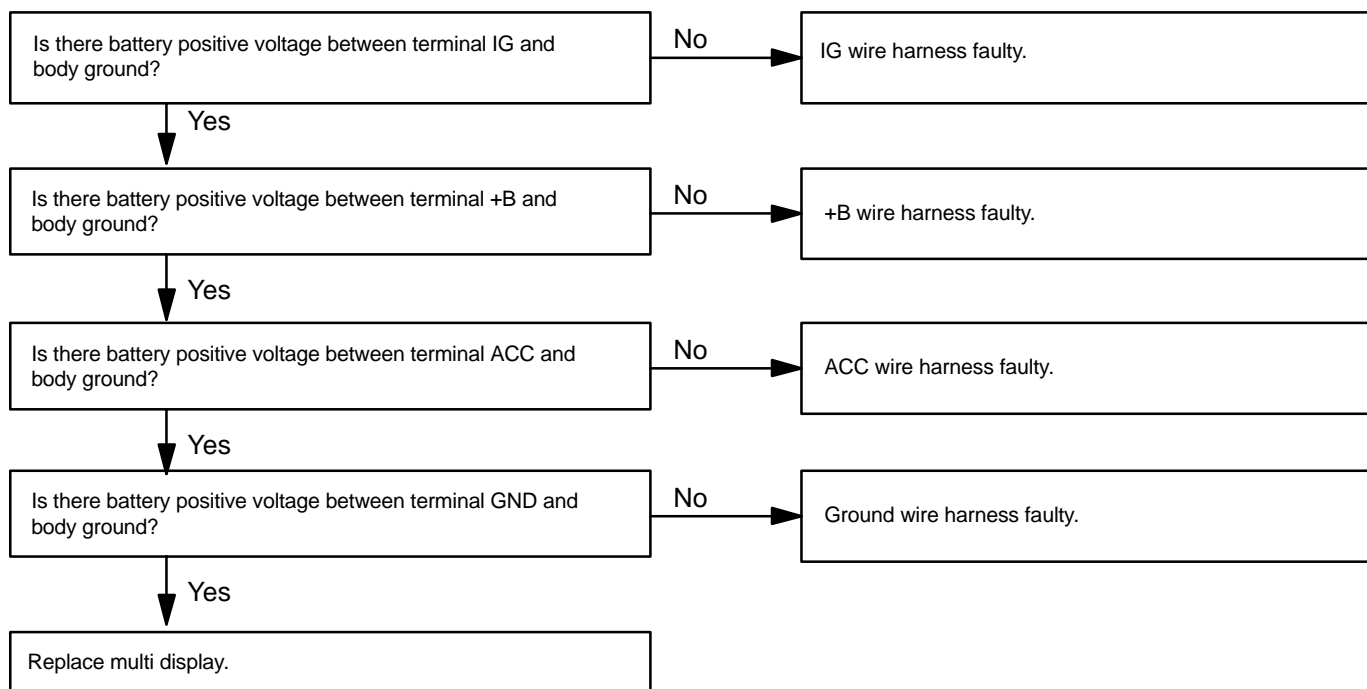
<b>1</b>	<b>MULTI DISPLAY DOES NOT OPERATE</b>
----------	---------------------------------------



- (a) Check that the battery positive voltage is 10 - 16 V. If voltage is not as specified, replace the battery.
  - (b) Check that the ECU-IG, ECU-B and ACC fuses are not blown. If the fuse is blown, replace the fuse and check for short.
  - (c) Troubleshoot the multi display as follows.
- HINT:**  
Inspect the connector on the wire harness side.



## BODY ELECTRICAL - MULTI DISPLAY



## 2. TROUBLESHOOTING NO.2

2	<b>CLOCK LOSES OR GAINS TIME</b>
---	----------------------------------

(a) Check that the battery positive voltage is 10 - 16 V.

If voltage is not as specified, replace the battery.

(b) Inspect the error of the clock.

**Allowable error (per day):  $\pm 1.5$  seconds**

If the error exceeds the allowable error, replace the multi display.

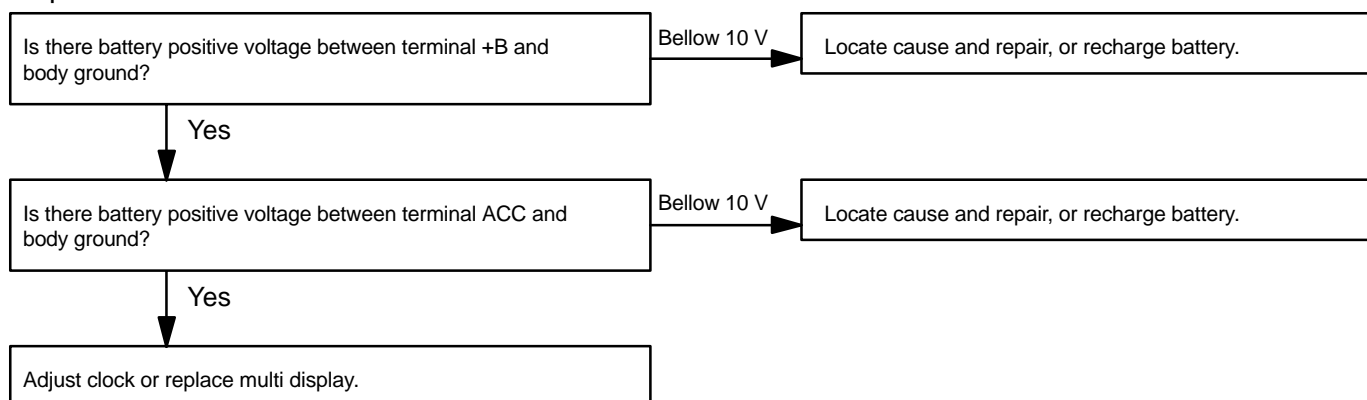
(c) Check that the clock adjusting button is sticking in position and has failed to return.

If the error exceeds the allowable error, replace the multi display.

(d) Troubleshoot the clock as follows.

HINT:

Inspect the connector on the wire harness side.



**3. TROUBLESHOOTING NO.3**

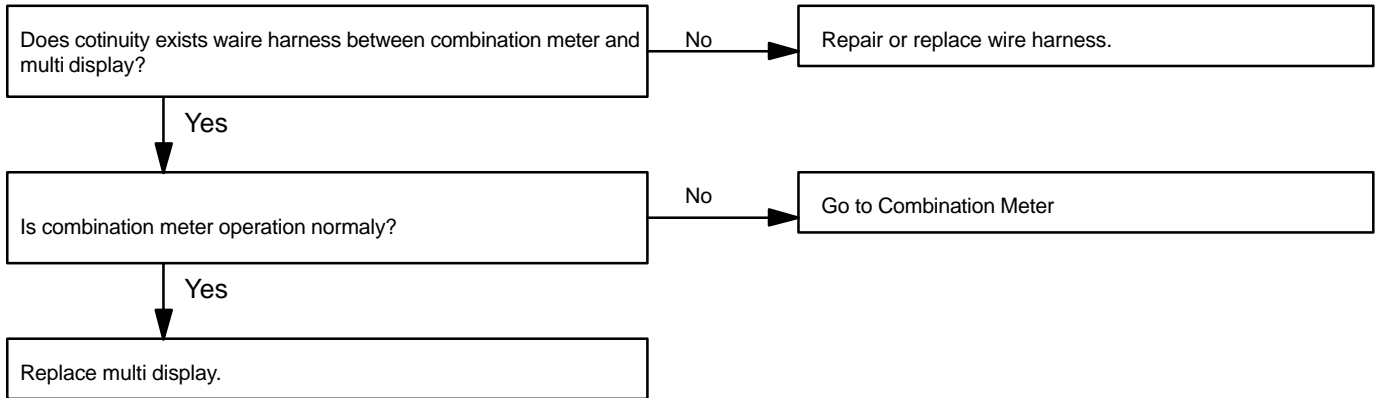
<b>3</b>	<b>DRIVE MONITOR FUNCTION MALFUNCTION</b>
----------	---

(a) Check that the battery positive voltage is 10 - 16 V.  
If voltage is not as specified, replace the battery.

(b) Troubleshoot the drive monitor function as follows.

HINT:

Inspect the connector on the wire harness side.



**4. TROUBLESHOOTING NO.4**

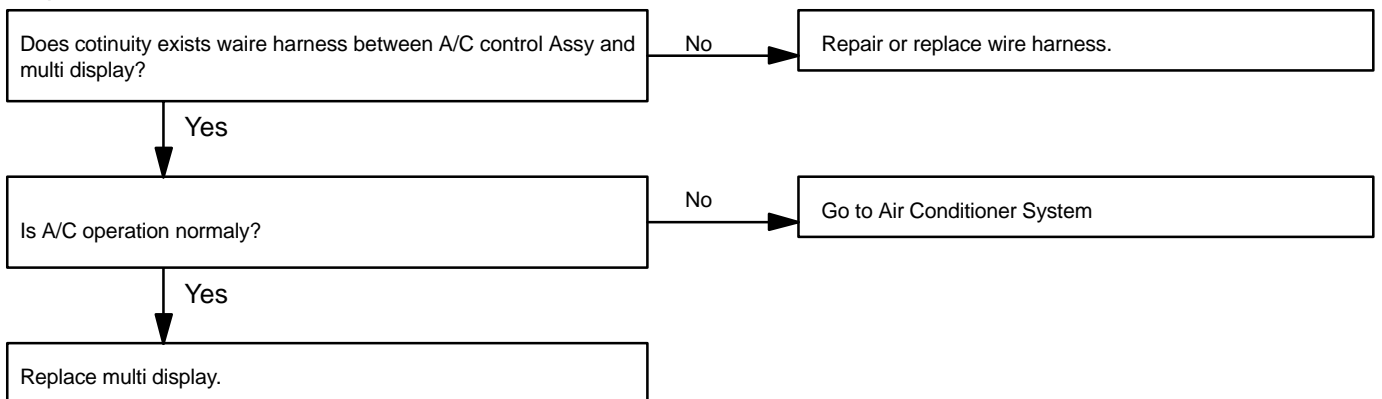
<b>4</b>	<b>OUTER TEMPERATURE DISPLAY MALFUNCTION</b>
----------	--

(a) Check that the battery positive voltage is 10 - 16 V.  
If voltage is not as specified, replace the battery.

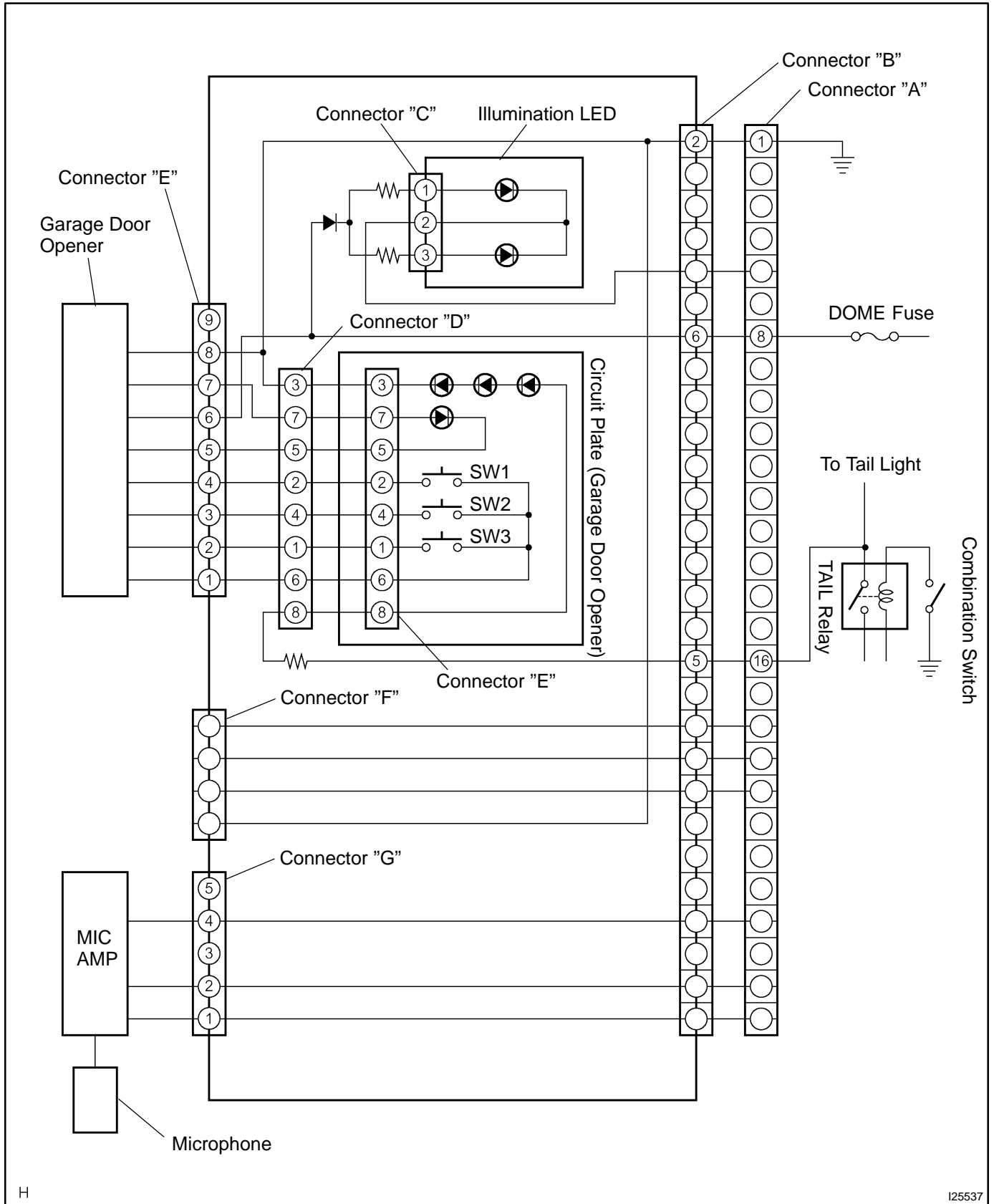
(b) Troubleshoot the outer temperature display as follows.

HINT:

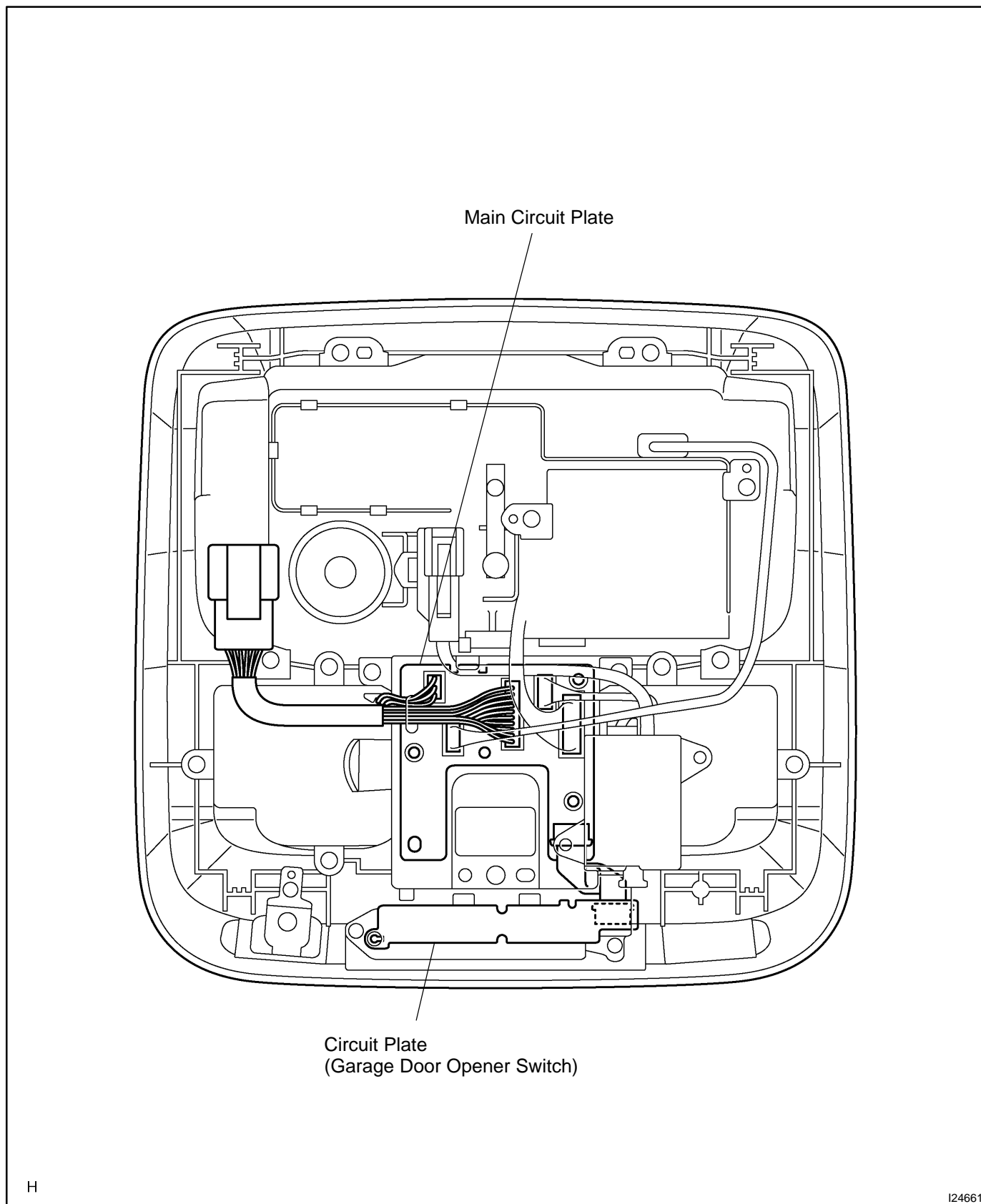
Inspect the connector on the wire harness side.

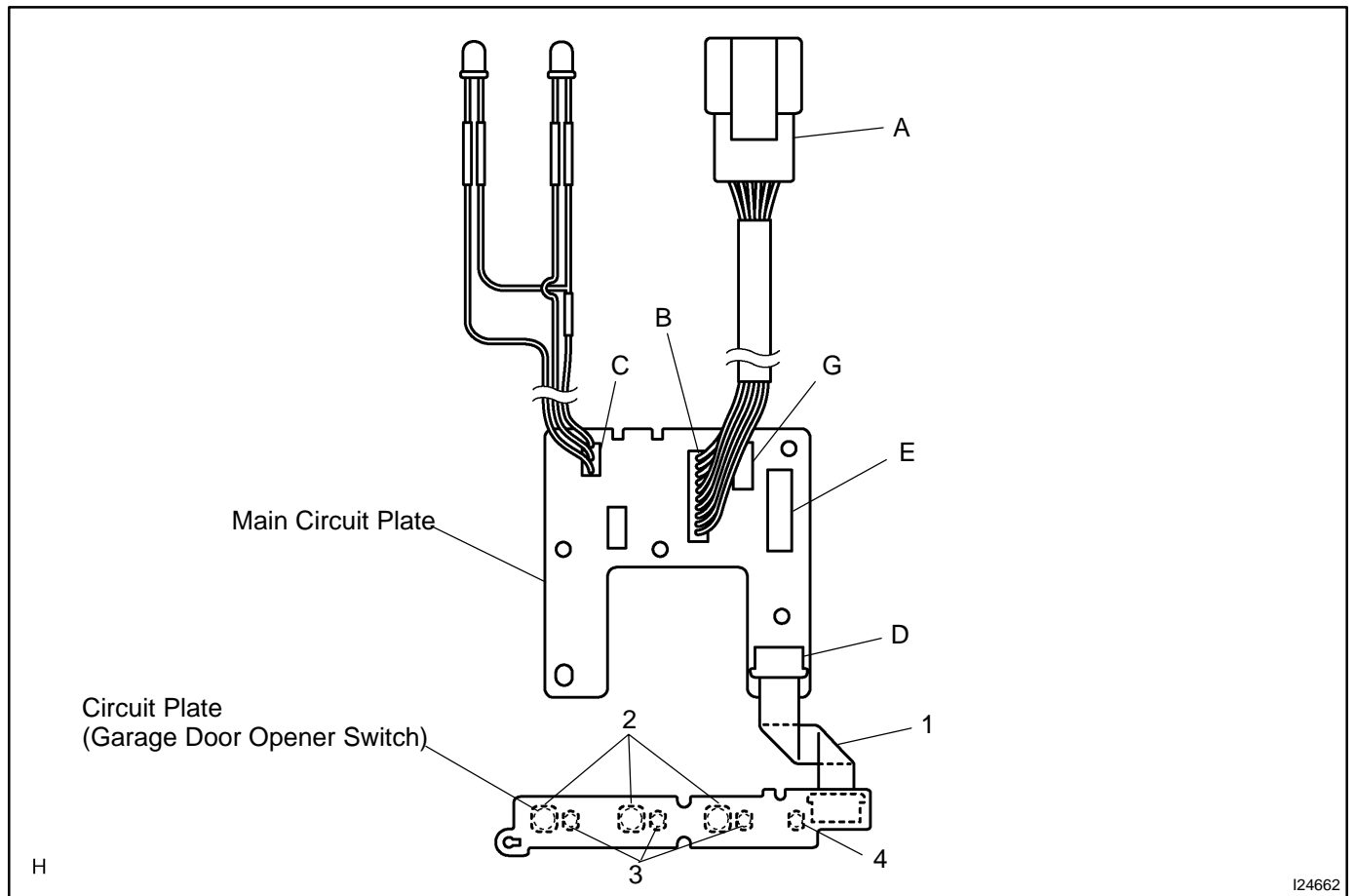


# CIRCUIT

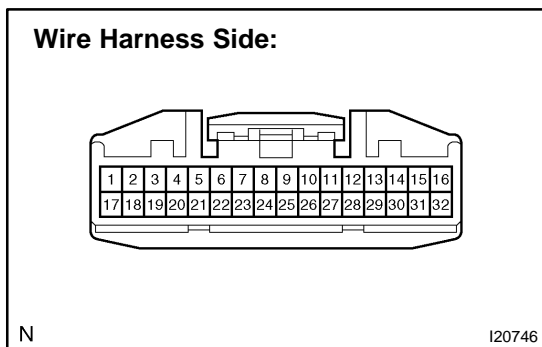


# COMPONENTS





Parts No.	Connector name	Related to systems
A, B	Vehicle wire harness connector	-
C	Overhead console illumination connector (Unbar)	Overhead junction block illumination
D	Garage door opener ECU connector	Garage door opener system
E	Garage door opener ECU connector	Garage door opener system
G	Voice recognition connector	Navigation system
1	Garage door opener substrate flat harness connector	Garage door opener system
2	Garage door opener switch	Garage door opener system
3	Garage door opener LED (Green)	Garage door opener system
4	Garage door opener operate indicator LED (Red)	Garage door opener system

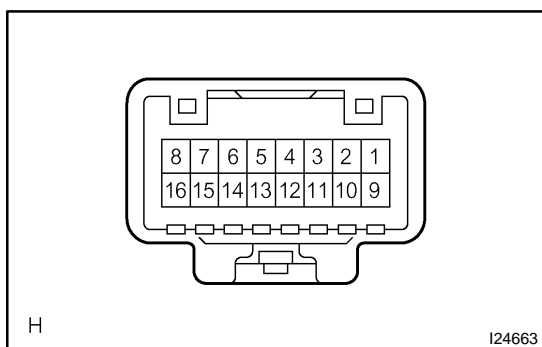


## INSPECTION

- 1. INSPECT OVERHEAD JUNCTION BLOCK ASSEMBLY**  
Disconnect the connector from the overhead J/B and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
1 - Ground	Constant	Continuity
8 - Ground	Constant	Battery positive voltage
11 - Ground	Ignition switch OFF or ACC	No voltage
	Ignition switch ON	Battery positive voltage

If continuity is not as specified, repair or replace the wire harness.



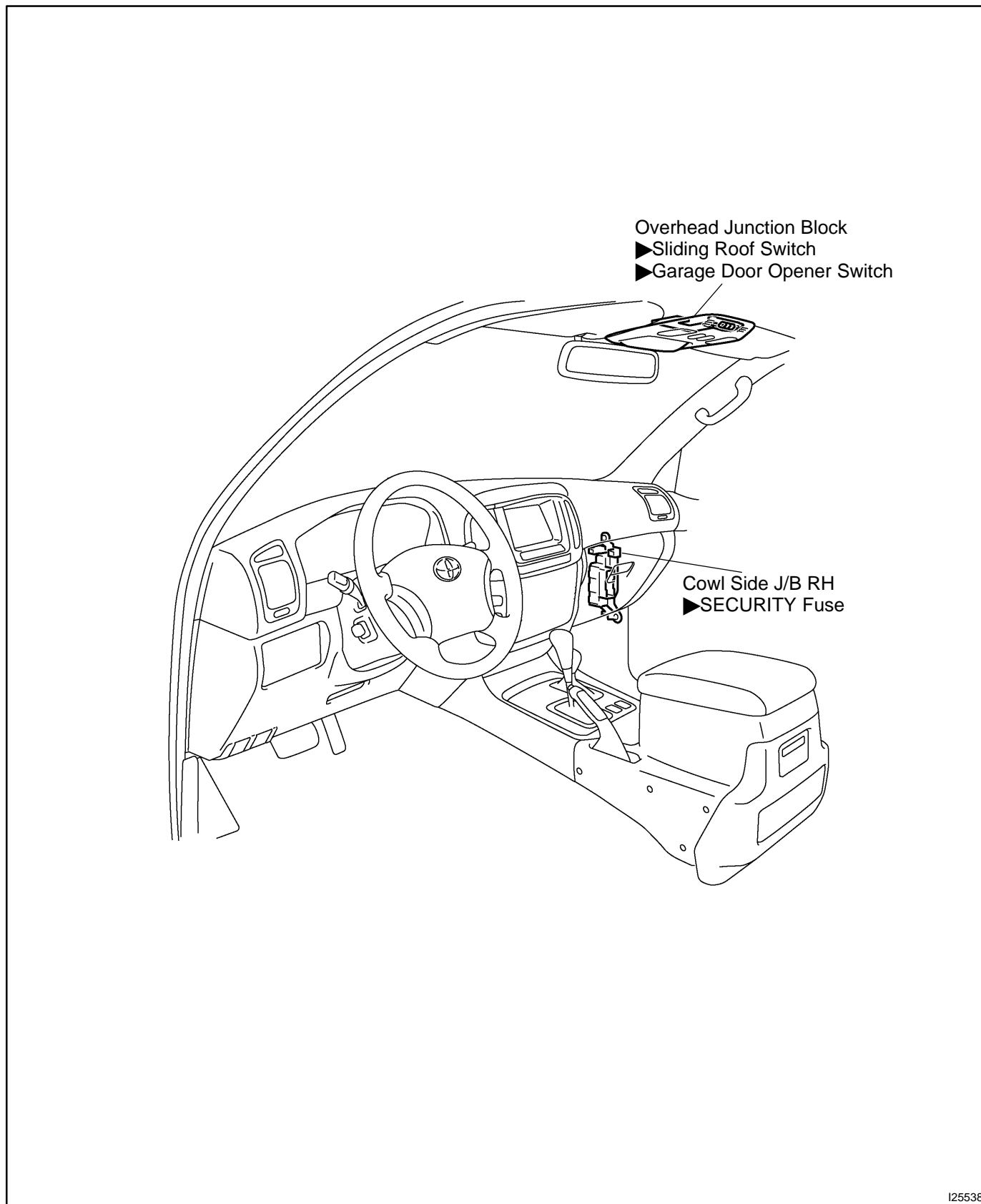
- 2. Overhead J/B side:**  
**INSPECT OVERHEAD JUNCTION BLOCK ASSEMBLY**

Circuit name	Tester connection	Specified condition
Power source circuit	A8 - B6 - E6	Continuity
Ground circuit	A1 - B2 - E8 - D3	Continuity
Microphone circuit	B10 - G4	Continuity
Microphone circuit	B9 - G2	Continuity

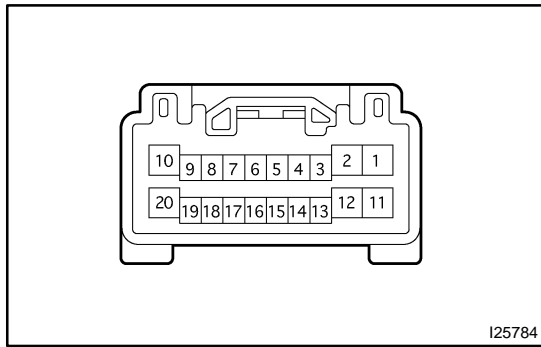
If continuity is not as specified, replace the overhead J/B assembly.

# OVERHEAD JUNCTION BLOCK LOCATION

BE2E4-01



125538



I25784

## INSPECTION

### 1. Master switch: INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH CONTINUITY

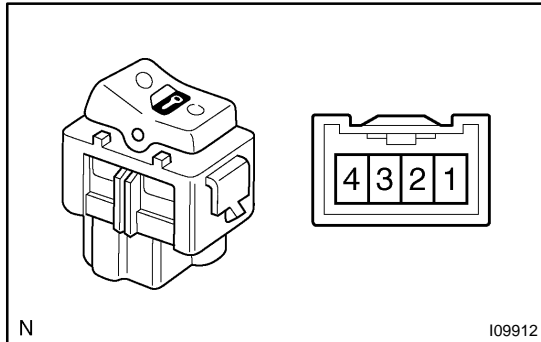
Switch position	Tester connection	Specified condition
LOCK	3 - 4	Continuity
OFF	-	No continuity
UNLOCK	3 - 14	Continuity

If continuity is not as specified, replace the switch.

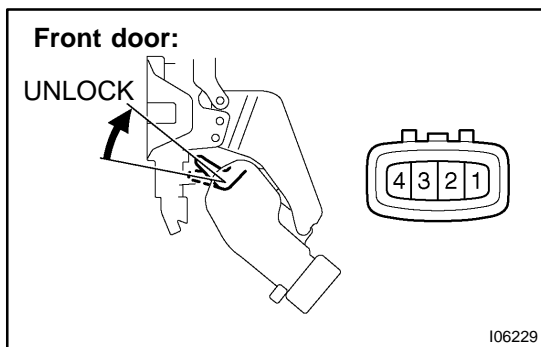
### 2. INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	3 - 2	Continuity
OFF	-	No continuity
UNLOCK	1 - 2	Continuity

If continuity is not as specified, replace the switch.



I09912

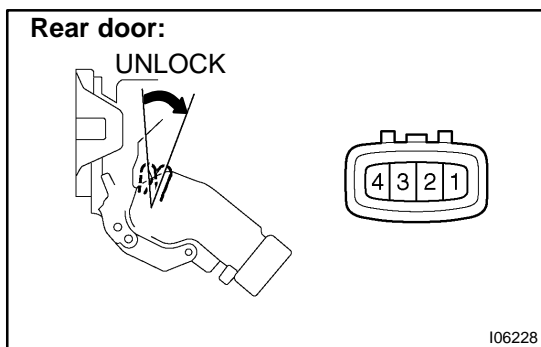


I06229

### 3. Front door: INSPECT DOOR UNLOCK DETECTION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	-	No continuity
ON (Door Lock set to UNLOCK)	1 - 4	Continuity

If continuity is not as specified, replace the switch.

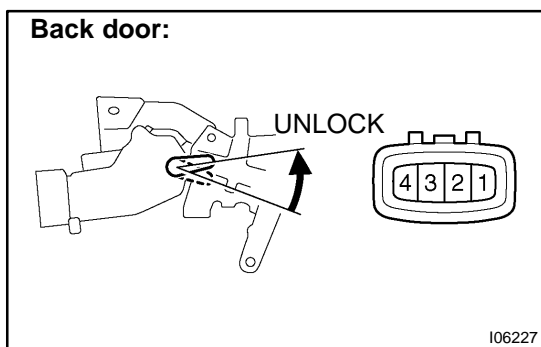


I06228

### 4. Rear door: INSPECT DOOR UNLOCK DETECTION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	-	No continuity
ON (Door Lock set to UNLOCK)	1 - 4	Continuity

If continuity is not as specified, replace the switch.



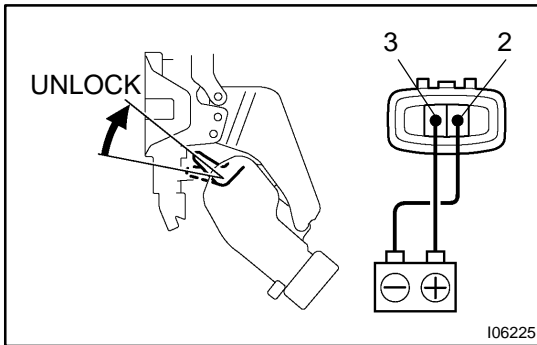
I06227

### 5. Back door: INSPECT DOOR UNLOCK DETECTION SWITCH CONTINUITY

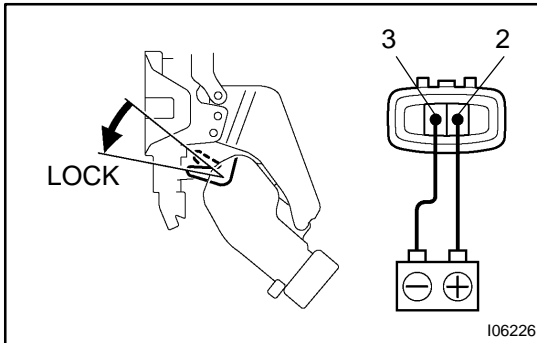
Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	-	No continuity
ON (Door Lock set to UNLOCK)	1 - 4	Continuity

If continuity is not as specified, replace the switch.



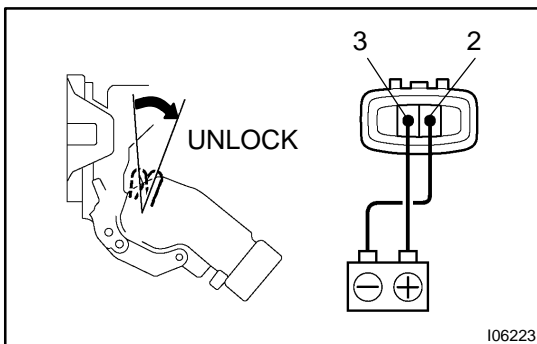
**6. Front door:****INSPECT DOOR LOCK MOTOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2, and check that the door lock link moves to UNLOCK position.

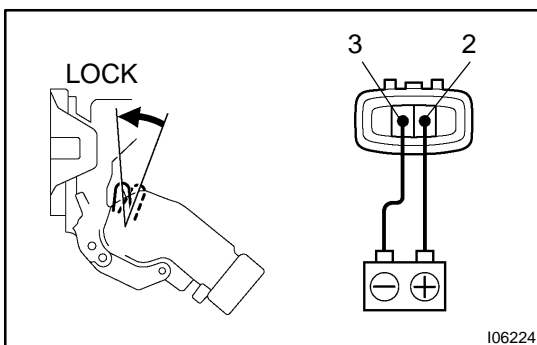


- (b) Reverse the polarity and check that the door lock link moves to LOCK position.

If operation is not as specified, replace the door lock assembly.

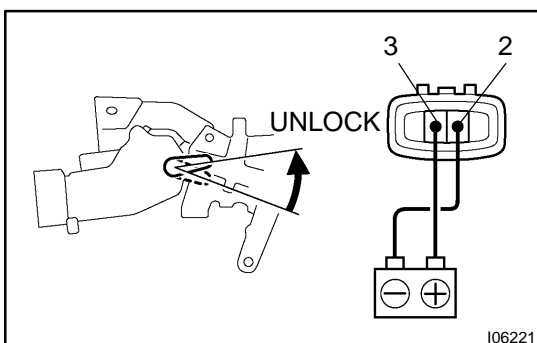
**7. Rear door:****INSPECT DOOR LOCK MOTOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2, and check that the door lock link moves to UNLOCK position.

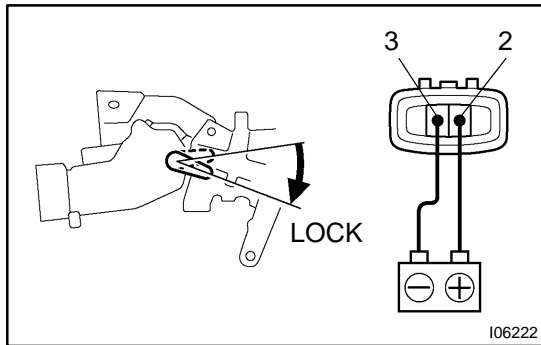


- (b) Reverse the polarity and check that the door lock link moves to LOCK position.

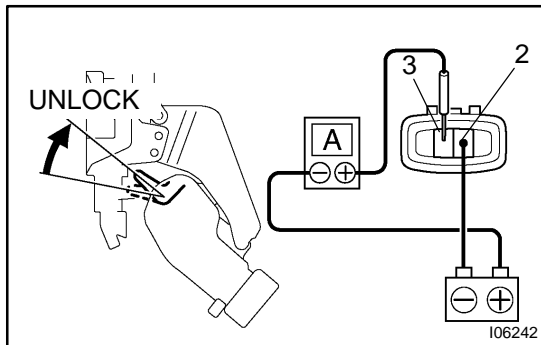
If operation is not as specified, replace the door lock assembly.

**8. Back door:****INSPECT DOOR LOCK MOTOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2, and check that the door lock link moves to UNLOCK position.

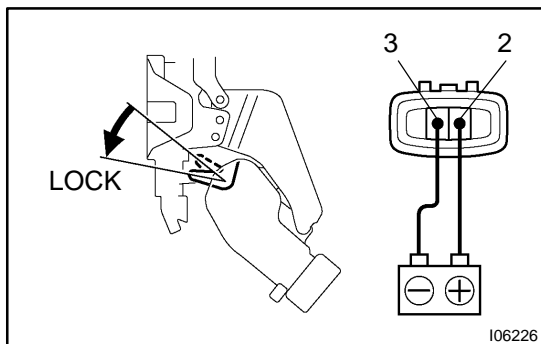


- (b) Reverse the polarity and check that the door lock link moves to LOCK position.  
If operation is not as specified, replace the door lock assembly.



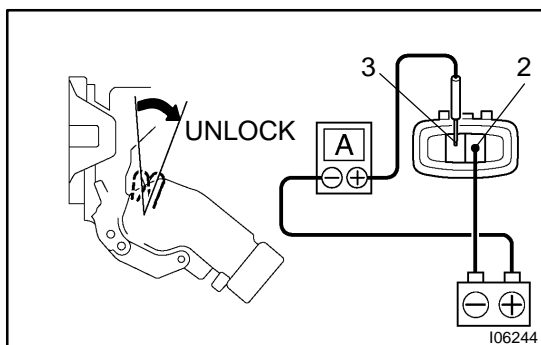
**9. Front door:  
INSPECT PTC THERMISTOR OPERATION (Using an ammeter)**

- (a) Connect the negative (-) lead from the battery to terminal 2.  
(b) Connect the positive (+) lead from the ammeter to terminal 3 and the negative (-) lead to battery negative (-) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



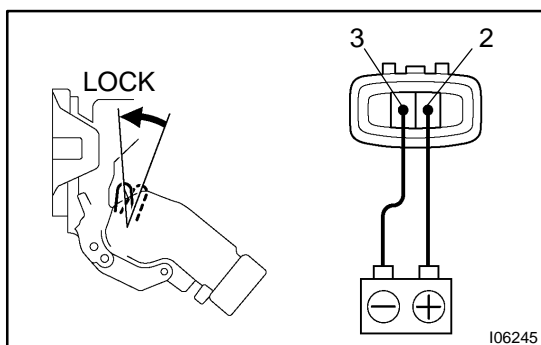
- (c) Disconnect the leads from terminals.  
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 3, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.



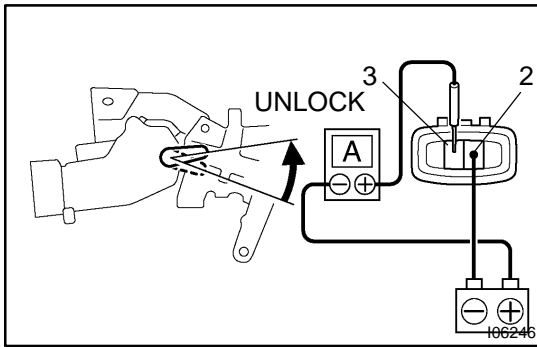
**10. Rear door:  
INSPECT PTC THERMISTOR OPERATION (Using an ammeter)**

- (a) Connect the negative (-) lead from the battery to terminal 2.  
(b) Connect the positive (+) lead from the ammeter to terminal 3 and the negative (-) lead to battery negative (-) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



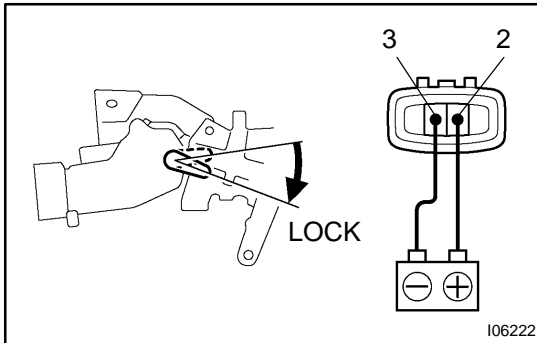
- (c) Disconnect the leads from terminals.  
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 3, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.



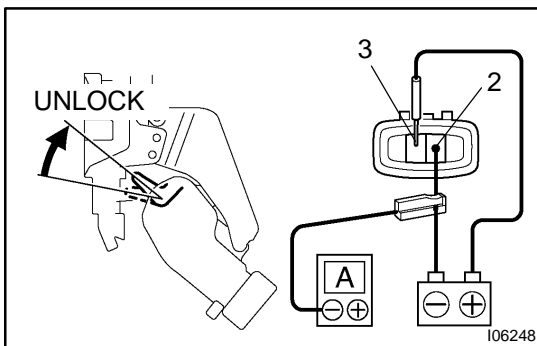
**11. Back door:  
INSPECT PTC THERMISTOR OPERATION (Using an ammeter)**

- Connect the negative (-) lead from the battery to terminal 2.
- Connect the positive (+) lead from the ammeter to terminal 3 and the negative (-) lead to battery negative (-) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



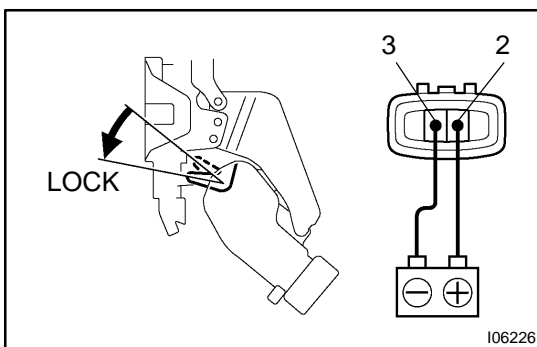
- Disconnect the leads from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 3, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.



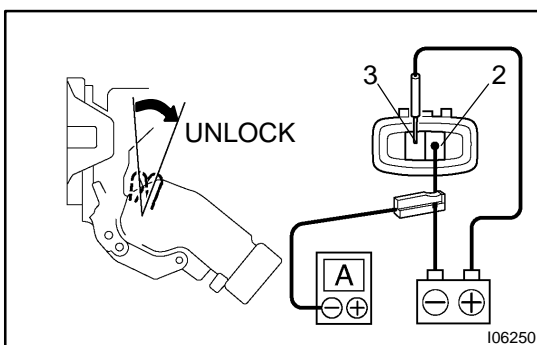
**12. Front door:  
INSPECT PTC THERMISTOR OPERATION (Using an ammeter with a current-measuring probe)**

- Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2.
- Attach a current-measuring probe to either the positive (+) lead or the negative (-) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



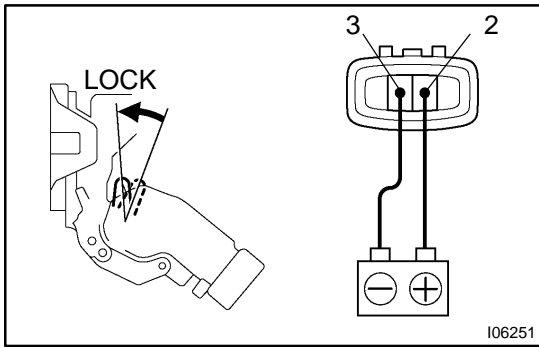
- Disconnect the leads from terminals.
- Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.

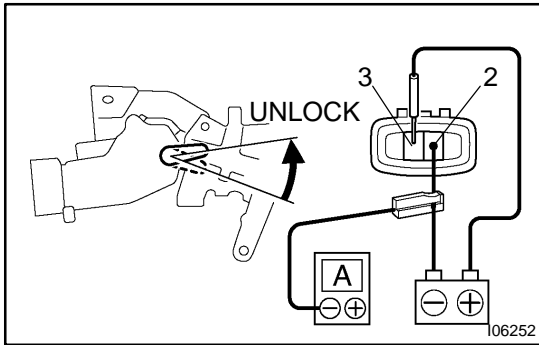


**13. Rear door:  
INSPECT PTC THERMISTOR OPERATION (Using an ammeter with a current-measuring probe)**

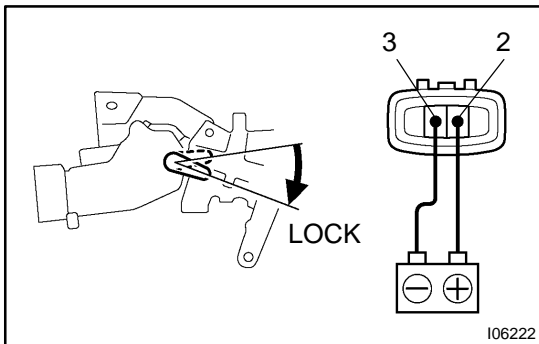
- Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2.
- Attach a current-measuring probe to either the positive (+) lead or the negative (-) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



- (c) Disconnect the leads from terminals.
  - (d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.
- If operation is not as specified, replace the door lock assembly.



- 14. Back door:**  
**INSPECT PTC THERMISTOR OPERATION (Using an ammeter with a current-measuring probe)**
- (a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2.
  - (b) Attach a current-measuring probe to either the positive (+) lead or the negative (-) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.

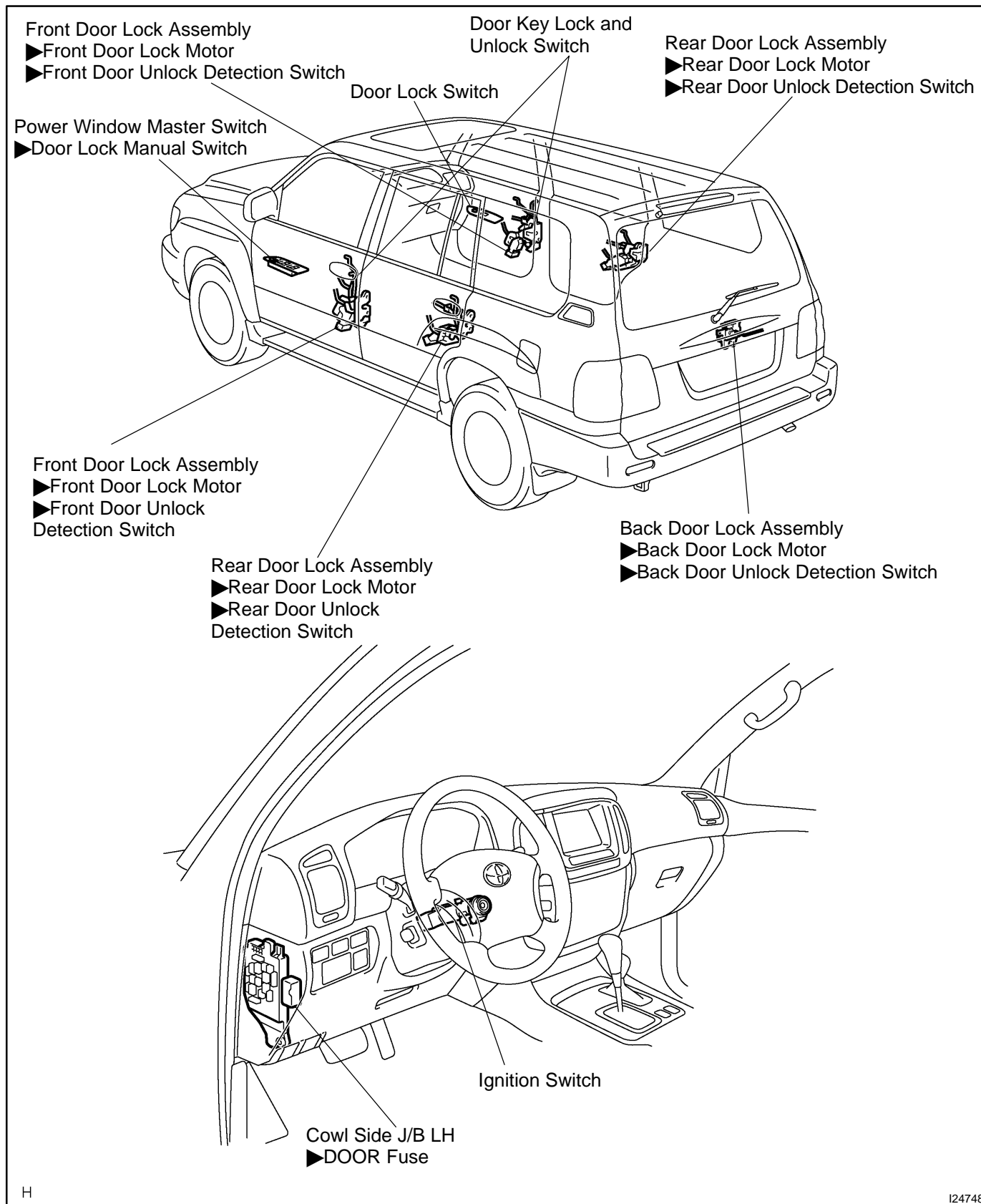


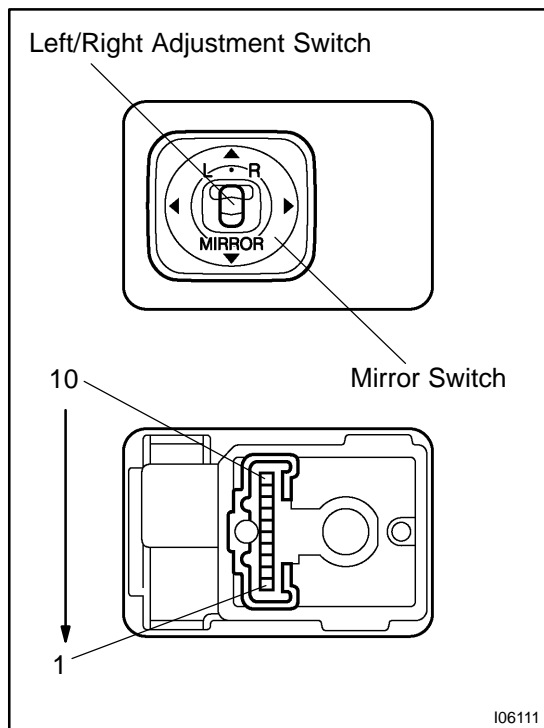
- (c) Disconnect the leads from terminals.
  - (d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.
- If operation is not as specified, replace the door lock assembly.

# POWER DOOR LOCK CONTROL SYSTEM

BE0HQ-19

## LOCATION





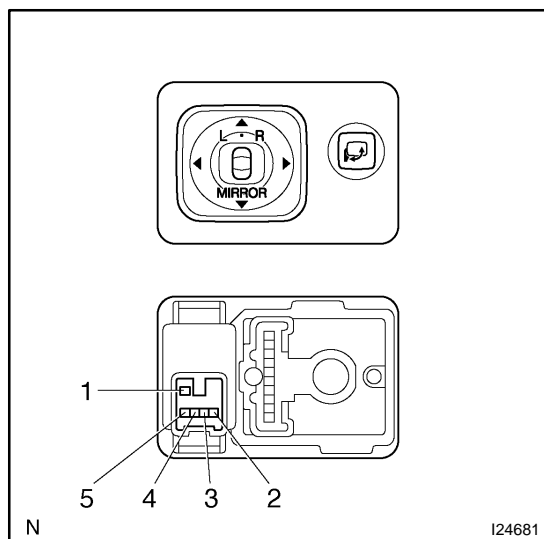
## INSPECTION

### 1. INSPECT LEFT SIDE MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	-	No continuity
UP	3 - 4 7 - 8	Continuity
DOWN	3 - 8 4 - 7	Continuity
LEFT	4 - 9 7 - 8	Continuity
RIGHT	4 - 7 8 - 9	Continuity

### 2. INSPECT RIGHT SIDE MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	-	No continuity
UP	2 - 4 1 - 7 - 8	Continuity
DOWN	4 - 7 1 - 2 - 8	Continuity
LEFT	4 - 10 1 - 7 - 8	Continuity
RIGHT	4 - 7 1 - 8 - 10	Continuity

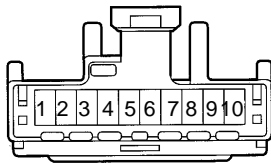


### 3. INSPECT RETRACT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
RETURN	1 - 5 2 - 4	Continuity
RETRACT	1 - 2 4 - 5	Continuity

If continuity is not as specified, replace the switch.

**Wire Harness Side:**



h-10-1-c

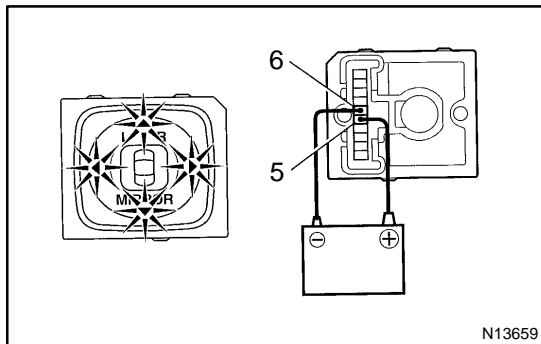
N21376

**4. INSPECT MIRROR SWITCH CIRCUIT**

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
8 - Ground	Constant	Continuity
4 - Ground	Ignition switch position LOCK	No voltage
4 - Ground	Ignition switch position ACC or ON	Battery positive voltage

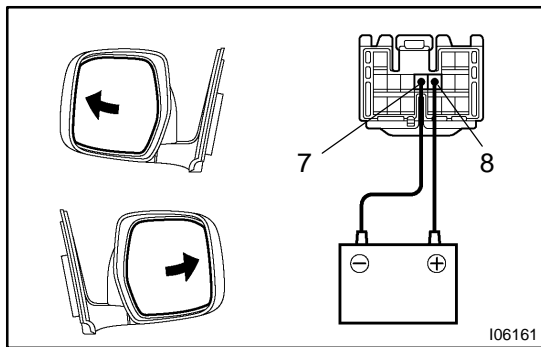
If the circuit is not as specified, inspect the circuits connected to other parts.



N13659

**5. INSPECT INDICATOR LIGHT OPERATION**

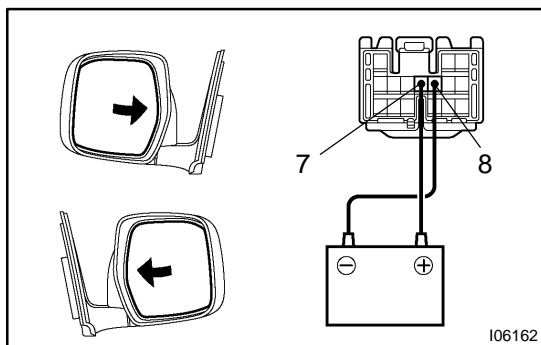
Connect the positive (+) lead from the battery to terminal 5 and the negative (-) lead to terminal 6, and check that the indicator light does not light up, replace the switch.



I06161

**6. INSPECT MIRROR MOTOR OPERATION**

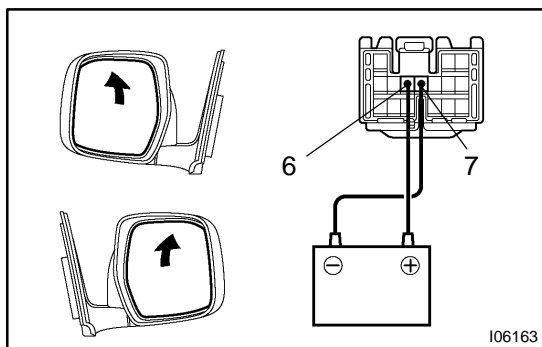
(a) Connect the positive (+) lead from the battery to terminal 8 and the negative (-) lead to terminal 7, and check that the mirror turns to the left side.



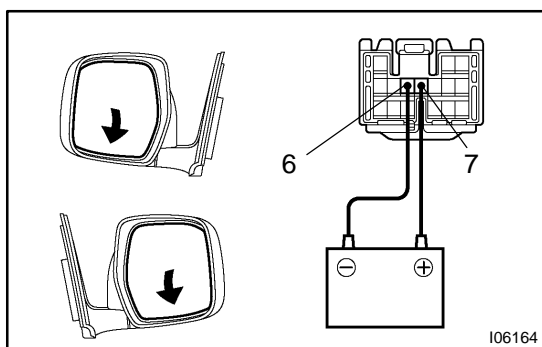
I06162

(b) Reverse the polarity, and check that the mirror turns to the right side.

## BODY ELECTRICAL - POWER MIRROR CONTROL SYSTEM



- (c) Connect the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 7, and check that the mirror turns upward.

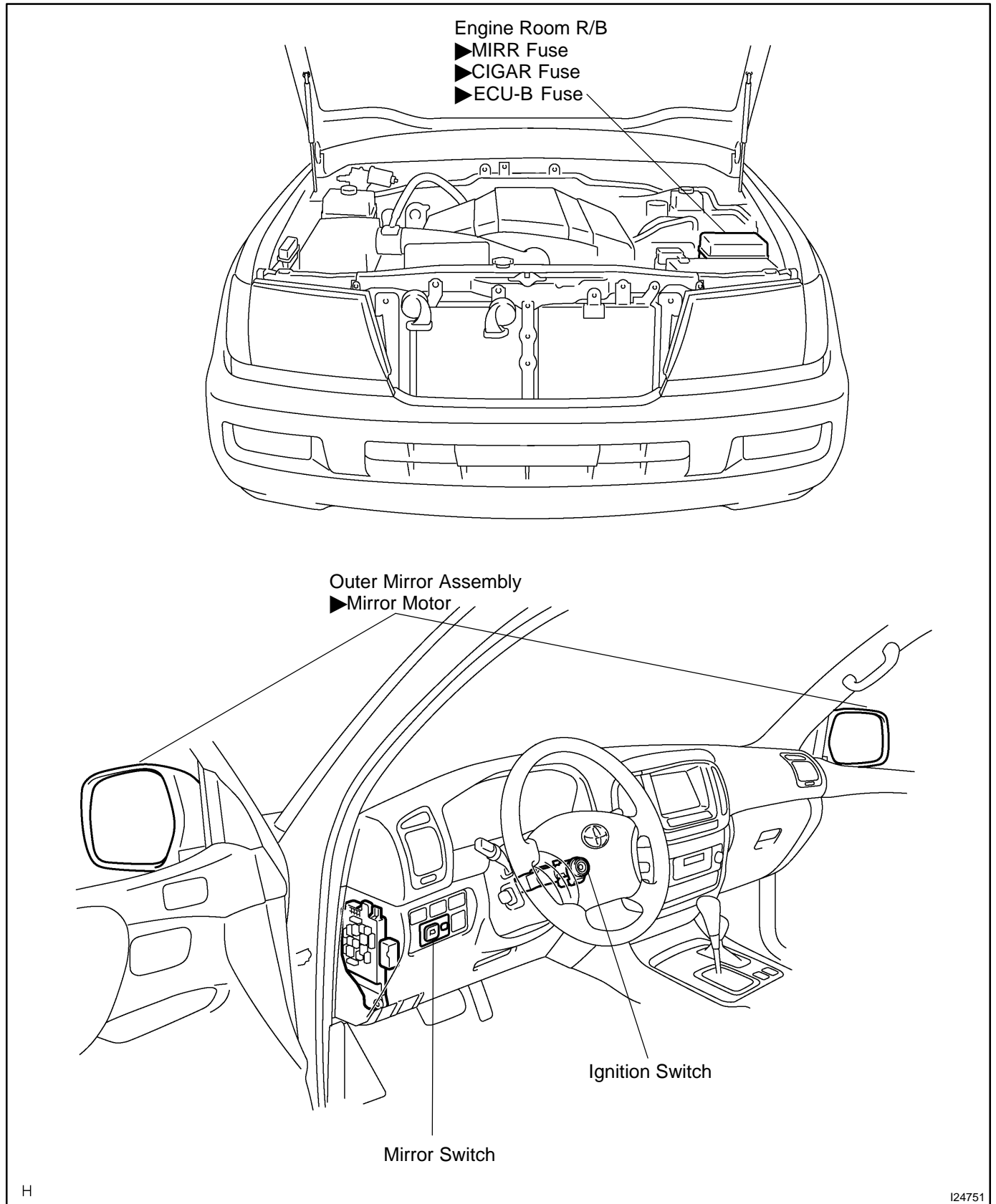


- (d) Reverse the polarity, and check that the mirror turns downward.  
If operation is not as specified, replace the mirror assembly.



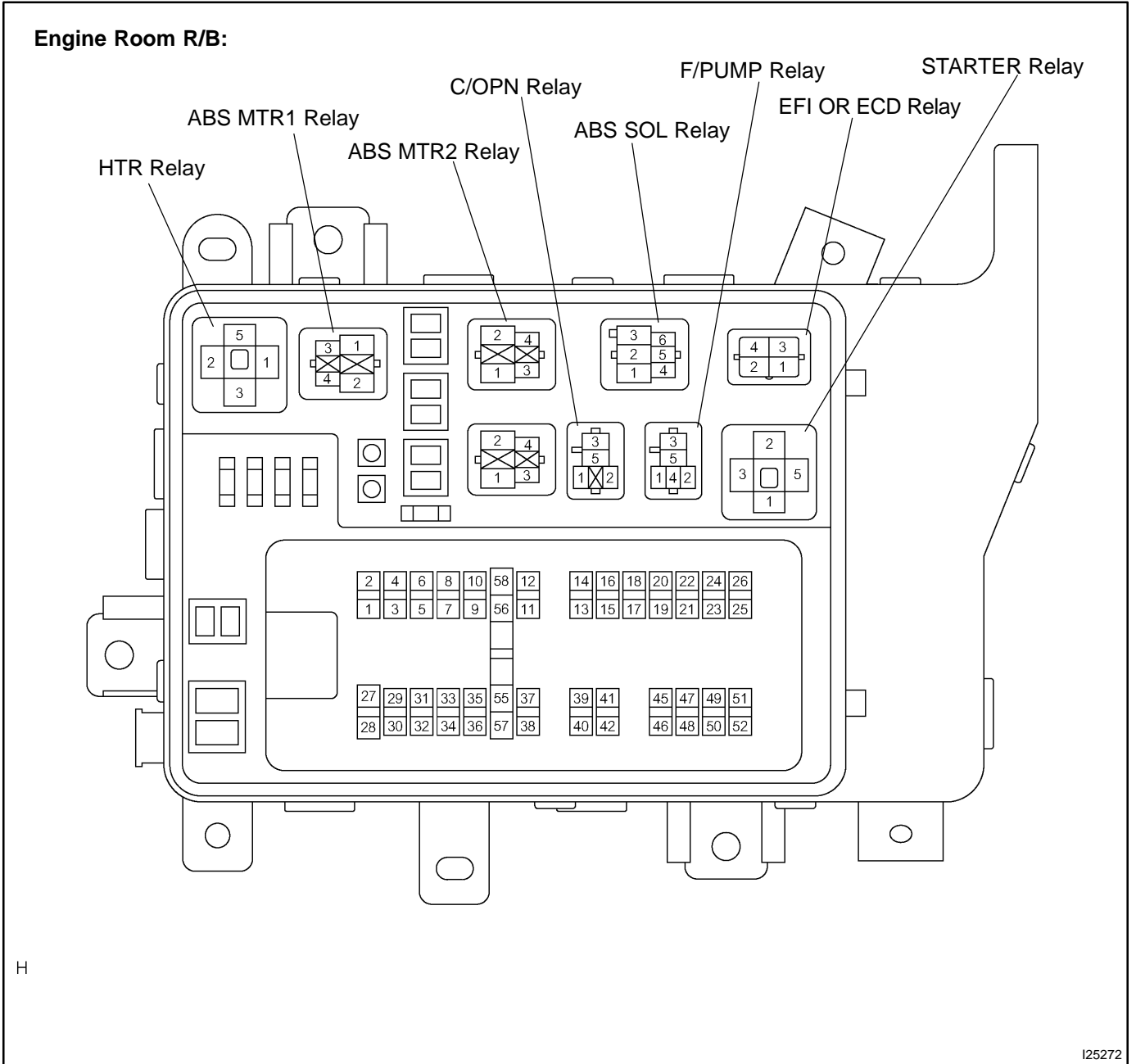
# POWER MIRROR CONTROL SYSTEM LOCATION

BE02J-16

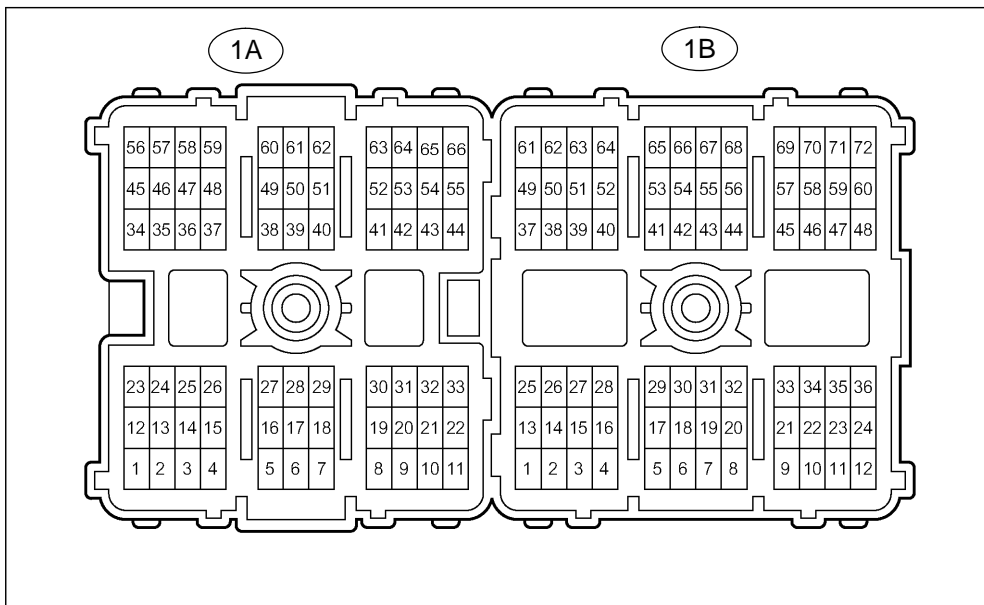
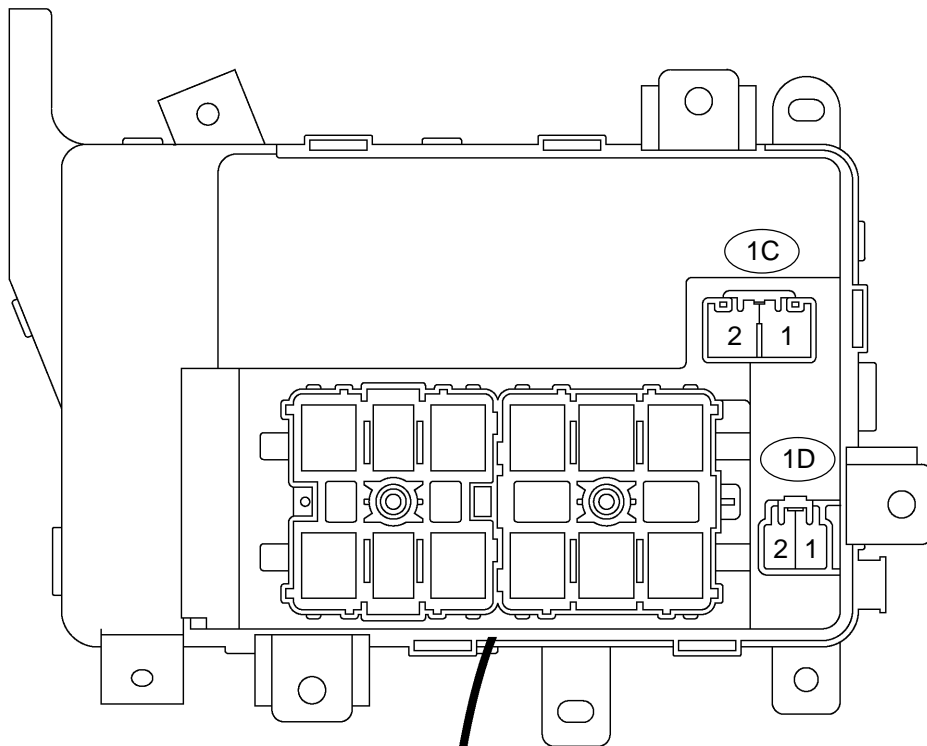


# INSPECTION

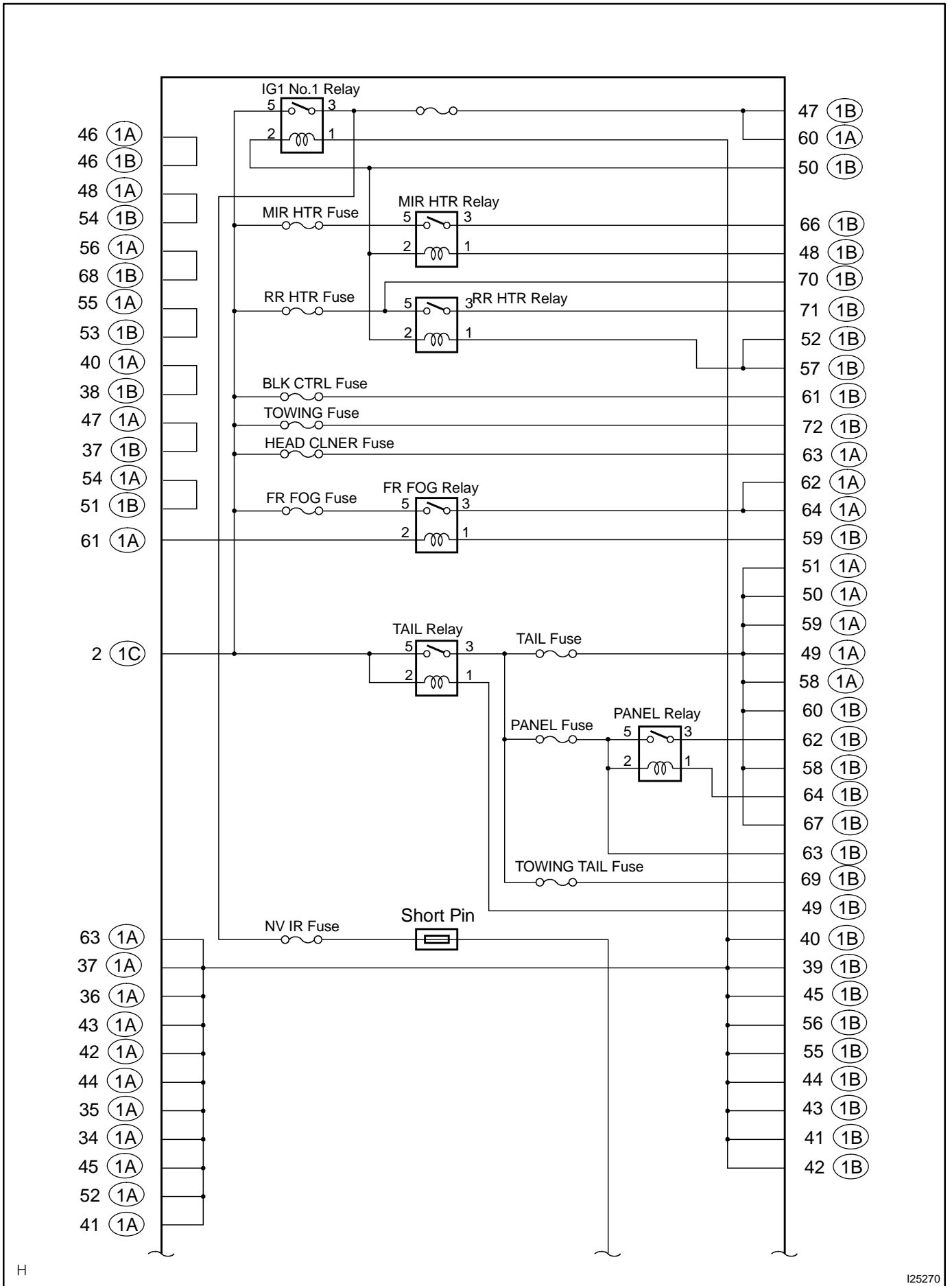
## 1. INSPECT ENGINE ROOM R/B CIRCUIT



Engine Room R/B (Back Side):

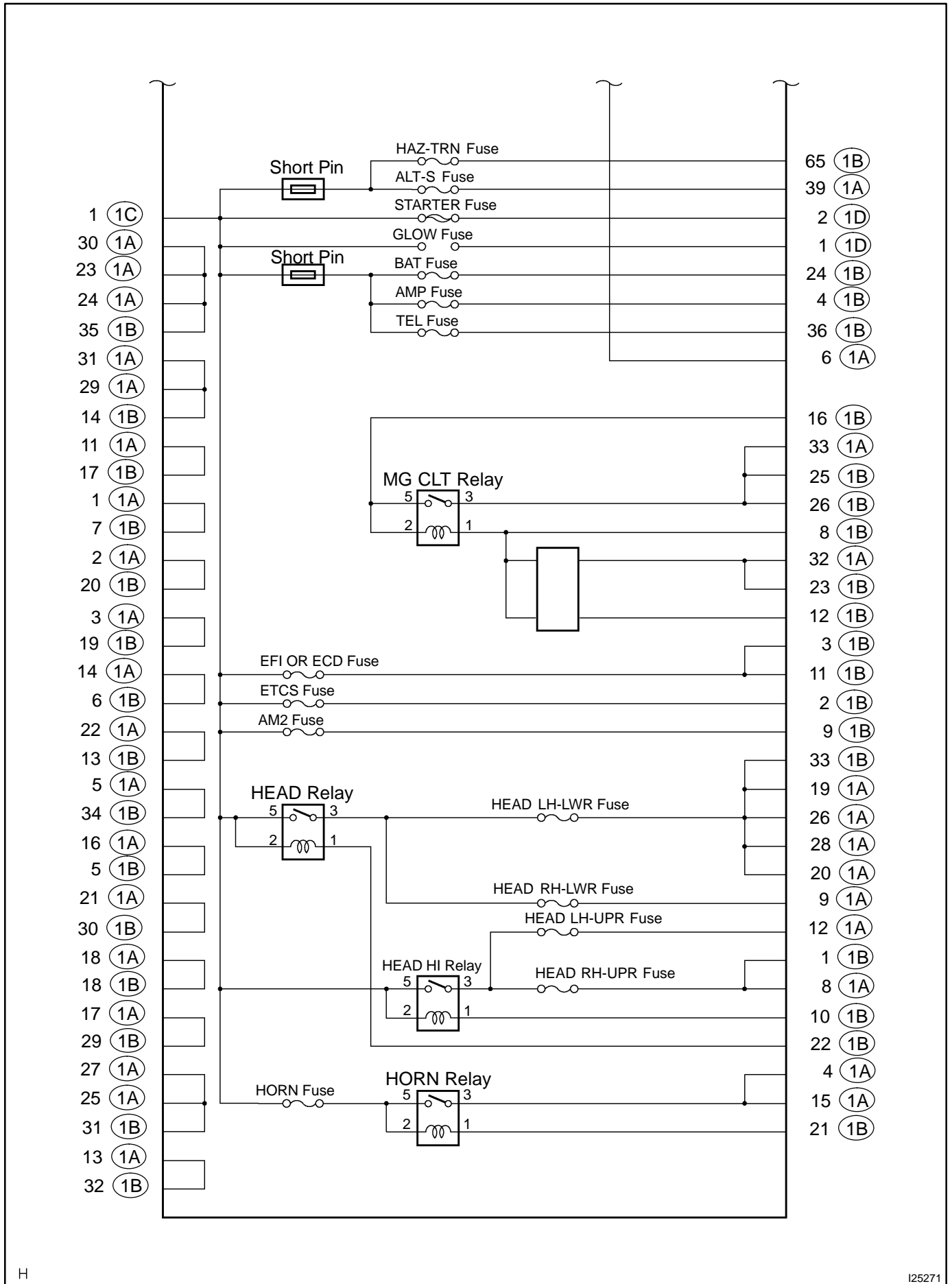


BODY ELECTRICAL - POWER SOURCE



H

I25270



## BODY ELECTRICAL - POWER SOURCE

- (a) Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
TOWING	1 - Ground	Constant	Battery positive voltage
MIR HTR	3 - Ground	Constant	Battery positive voltage
RR HTR	5 - Ground	Constant	Battery positive voltage
HAZ-TRN	7 - Ground	Constant	Battery positive voltage
ALT-S	9 - Ground	Constant	Battery positive voltage
NV-IR	13 - Ground	Constant	Battery positive voltage
FR FOG	13 - Ground	Constant	Battery positive voltage
BRK CTRL	15 - Ground	Constant	Battery positive voltage
HEAD CLNER	17 - Ground	Ignition switch ON	Battery positive voltage
FR-IG	19 - Ground	Ignition switch ON	Battery positive voltage
PANEL	21 - Ground	Light control switch HEAD or TAIL	Battery positive voltage
TOWING TAIL	23 - Ground	Light control switch HEAD or TAIL	Battery positive voltage
TAIL	25 - Ground	Light control switch HEAD or TAIL	Battery positive voltage
BAT	29 - Ground	Constant	Battery positive voltage
TEL	31 - Ground	Constant	Battery positive voltage
AMP	33 - Ground	Constant	Battery positive voltage
EFI or ECD NO.1	35 - Ground	Constant	Battery positive voltage
AM2	37 - Ground	Constant	Battery positive voltage
ETCS	39 - Ground	Constant	Battery positive voltage
HORN	41 - Ground	Constant	Battery positive voltage
HEAD LH-UPR	51 - Ground	Light control switch HI or Flash	Battery positive voltage
HEAD RH-UPR	49 - Ground	Light control switch HI or Flash	Battery positive voltage
HEAD LH-LWR	47 - Ground	Light control switch HEAD	Battery positive voltage
HEAD RH-LWR	45 - Ground	Light control switch HEAD	Battery positive voltage
ST1	1 - Ground	Constant	Battery positive voltage
AHC	1 - Ground	Constant	Battery positive voltage
ABS NO.1	1 - Ground	Constant	Battery positive voltage
ABS NO.2	1 - Ground	Constant	Battery positive voltage
STARTER	1 - Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

- (b) Remove the relay from the junction block and inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
AHC	1 - Ground	Ignition switch ON	Battery positive voltage
ABS SOL	1 - Ground	Ignition switch ON	Battery positive voltage
ABS MTR1	1 - Ground	Constant	Battery positive voltage
ABS MTR2	1 - Ground	Ignition switch ON	Battery positive voltage
STARTER	5 - Ground	Constant	Continuity
STARTER	2 - Ground	Ignition switch ON	Battery positive voltage
EFI or ECD	3 - Ground	Constant	Battery positive voltage
C/OPN SPIL VLV	5 - Ground	Constant	Battery positive voltage
C/OPN SPIL VLV	2 - Ground	Ignition switch ON	Continuity

F/P PUMP ST CUT VISC MG 2 - Ground	Ignition switch ON	Battery positive voltage
F/P PUMP ST CUT VISC MG 3 - Ground	Ignition switch ON	Continuity
HTR 5 - Ground	Constant	Battery positive voltage
HTR 1 - Ground	Ignition switch ON	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.

- (c) Inspect Engine Room Junction Block Inner Circuit:  
Inspect the connector on junction block side.

HINT:

Remove the junction block from the vehicle.

Relay	Tester connection	Condition	Specified condition
IG1 NO.1	50 (1B) - 40 (1B)	Constant	Continuity
IG1 NO.1	50 (1B) - 39 (1B)	Constant	Continuity
IG1 NO.1	50 (1B) - 45 (1B)	Constant	Continuity
IG1 NO.1	50 (1B) - 56 (1B)	Constant	Continuity
IG1 NO.1	50 (1B) - 55 (1B)	Constant	Continuity
IG1 NO.1	50 (1B) - 44 (1B)	Constant	Continuity
IG1 NO.1	50 (1B) - 43 (1B)	Constant	Continuity
IG1 NO.1	50 (1B) - 41 (1B)	Constant	Continuity
IG1 NO.1	50 (1B) - 42 (1B)	Constant	Continuity
IG1 NO.1	2 (1C) - 47 (1B)	Apply B+ between terminals 50 (1B) and 40 (1B).	Continuity
IG1 NO.1	2 (1C) - 60 (1A)	Apply B+ between terminals 50 (1B) and 40 (1B).	Continuity
MIR HTR	50 (1B) - 48 (1B)	Constant	Continuity
MIR HTR	2 (1C) - 66 (1B)	Apply B+ between terminals 50 (1B) and 48 (1B).	Continuity
RR HTR	50 (1B) - 52 (1B)	Constant	Continuity
RR HTR	50 (1B) - 57 (1B)	Constant	Continuity
RR HTR	2 (1C) - 71 (1B)	Apply B+ between terminals 50 (1B) and 52 (1B).	Continuity
RR HTR	70 (1B) - 71 (1B)	Apply B+ between terminals 50 (1B) and 52 (1B).	Continuity
FR FOG	61 (1A) - 59 (1B)	Constant	Continuity
FR FOG	2 (1C) - 62 (1A)	Apply B+ between terminals 61 (1A) and 59 (1B).	Continuity
FR FOG	2 (1C) - 64 (1A)	Apply B+ between terminals 61 (1A) and 59 (1B).	Continuity
TAIL	2 (1C) - 49 (1B)	Constant	Continuity
TAIL	2 (1C) - 51 (1A)	Apply B+ between terminals 2 (1C) and 49 (1B).	Continuity
TAIL	2 (1C) - 50 (1A)	Apply B+ between terminals 2 (1C) and 49 (1B).	Continuity
TAIL	2 (1C) - 59 (1A)	Apply B+ between terminals 2 (1C) and 49 (1B).	Continuity
TAIL	2 (1C) - 49 (1A)	Apply B+ between terminals 2 (1C) and 49 (1B).	Continuity
TAIL	2 (1C) - 58 (1A)	Apply B+ between terminals 2 (1C) and 49 (1B).	Continuity
TAIL	2 (1C) - 60 (1B)	Apply B+ between terminals 2 (1C) and 49 (1B).	Continuity
TAIL	2 (1C) - 58 (1B)	Apply B+ between terminals 2 (1C) and 49 (1B).	Continuity
TAIL	2 (1C) - 67 (1B)	Apply B+ between terminals 2 (1C) and 49 (1B).	Continuity
TAIL	2 (1C) - 69 (1B)	Apply B+ between terminals 2 (1C) and 49 (1B).	Continuity
PANEL	2 (1C) - 64 (1B)	Apply B+ between terminals 2 (1C) and 49 (1B).	Continuity

## BODY ELECTRICAL - POWER SOURCE

HEAD	1 (1C) - 22 (1B)	Constant	Continuity
HEAD	1 (1C) - 33 (1B)	Apply B+ between terminals 1 (1C) and 22 (1B).	Continuity
HEAD	1 (1C) - 19 (1A)	Apply B+ between terminals 1 (1C) and 22 (1B).	Continuity
HEAD	1 (1C) - 26 (1A)	Apply B+ between terminals 1 (1C) and 22 (1B).	Continuity
HEAD	1 (1C) - 28 (1A)	Apply B+ between terminals 1 (1C) and 22 (1B).	Continuity
HEAD	1 (1C) - 20 (1A)	Apply B+ between terminals 1 (1C) and 22 (1B).	Continuity
HEAD	1 (1C) - 9 (1A)	Apply B+ between terminals 1 (1C) and 22 (1B).	Continuity
HEAD HI	1 (1C) - 10 (1B)	Constant	Continuity
HEAD HI	1 (1C) - 12 (1A)	Apply B+ between terminals 1 (1C) and 10 (1B).	Continuity
HEAD HI	1 (1C) - 1 (1B)	Apply B+ between terminals 1 (1C) and 10 (1B).	Continuity
HEAD HI	1 (1C) - 8 (1A)	Apply B+ between terminals 1 (1C) and 10 (1B).	Continuity
HORN	1 (1C) - 21 (1B)	Constant	Continuity
HORN	1 (1C) - 4 (1A)	Apply B+ between terminals 1 (1C) and 21 (1B).	Continuity
HORN	1 (1C) - 15 (1A)	Apply B+ between terminals 1 (1C) and 21 (1B).	Continuity

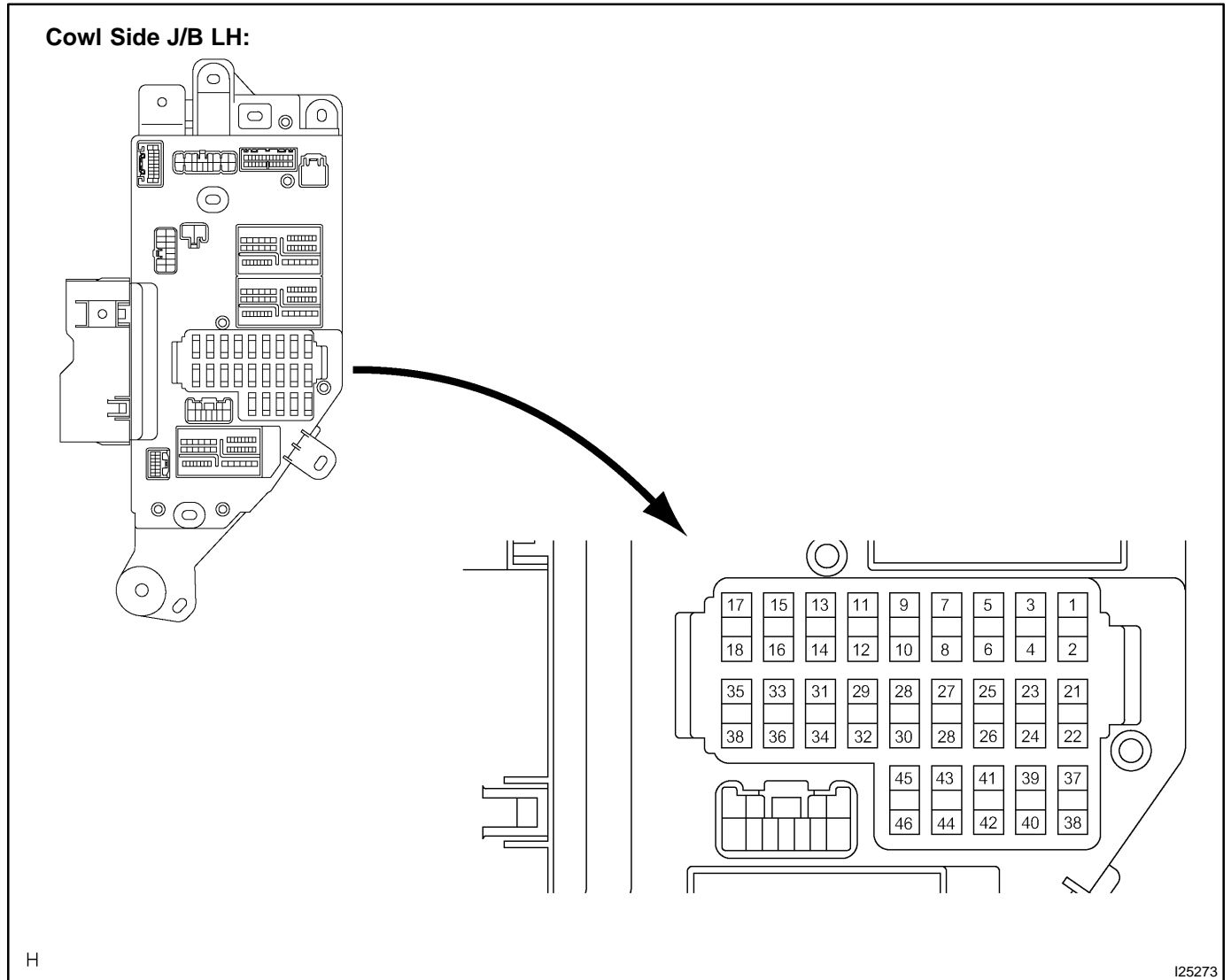
If the circuit is not as specified, replace it with junction block assembly.

**HINT:**

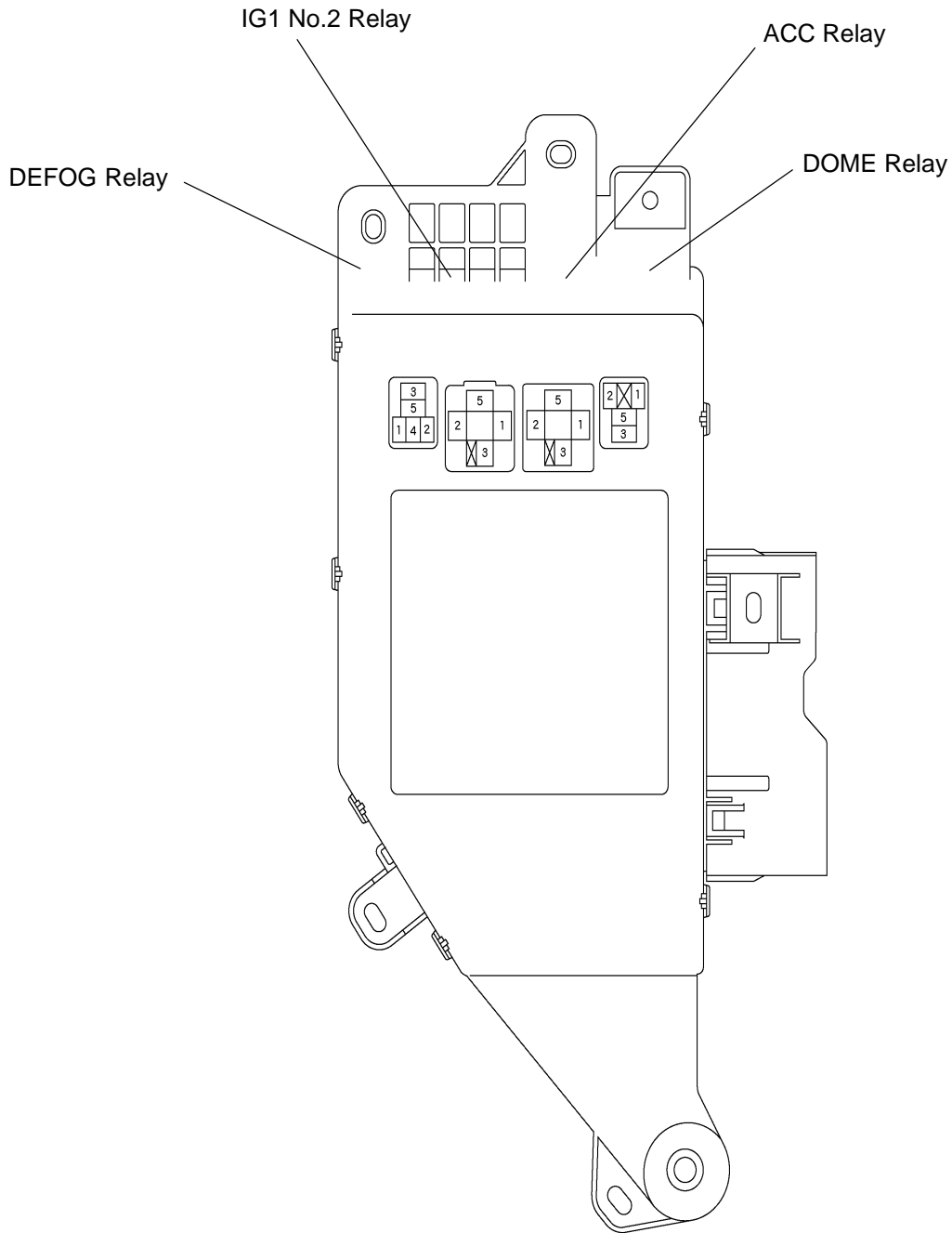
The relay is built in engine room junction block. Also the relay is constructed with a relay block that is in the junction block as a unit. To disconnect the wire harness connecting with relay block is impossible. If the relay has a malfunction, replace it with junction block assembly wire harness together.



2. INSPECT COWL SIDE J/B LH CIRCUIT



**Cowl Side J/B LH (Back Side):**



I25274

(a) Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
AHC-IG	2 - Ground	Ignition switch ON	Battery positive voltage
POWER HTR	4 - Ground	Ignition switch ON	Battery positive voltage
FUEL HTR	6 - Ground	Ignition switch ON	Battery positive voltage
AHC-B	8 - Ground	Constant	Battery positive voltage
DEFOG	10 - Ground	Constant	Battery positive voltage
AM1	12 - Ground	Constant	Battery positive voltage

ACC	13 - Ground	Ignition switch ACC	Battery positive voltage
CIG	15 - Ground	Ignition switch ACC	Battery positive voltage
PWR OUTLET	17 - Ground	Ignition switch ACC	Battery positive voltage
OBD-2	20 - Ground	Constant	Battery positive voltage
STOP	22 - Ground	Constant	Battery positive voltage
A/C	24 - Ground	Ignition switch ON	Battery positive voltage
BATT CHARGE	26 - Ground	Constant	Battery positive voltage
DBL LOCK	39 - Ground	Constant	Battery positive voltage
ECU-B1	29 - Ground	Constant	Battery positive voltage
ECU-IG1	32 - Ground	Ignition switch ON	Battery positive voltage
GAUGE1	34 - Ground	Ignition switch ON	Battery positive voltage
EFI or ECD NO.2	35 - Ground	Constant	Battery positive voltage
RR WIPER	37 - Ground	Ignition switch ON	Battery positive voltage
SUN ROOF	39 - Ground	Constant	Battery positive voltage
DOOR	41 - Ground	Constant	Battery positive voltage
LH SEAT	43 - Ground	Constant	Battery positive voltage
IDLE UP	46 - Ground	Rear defogger system ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

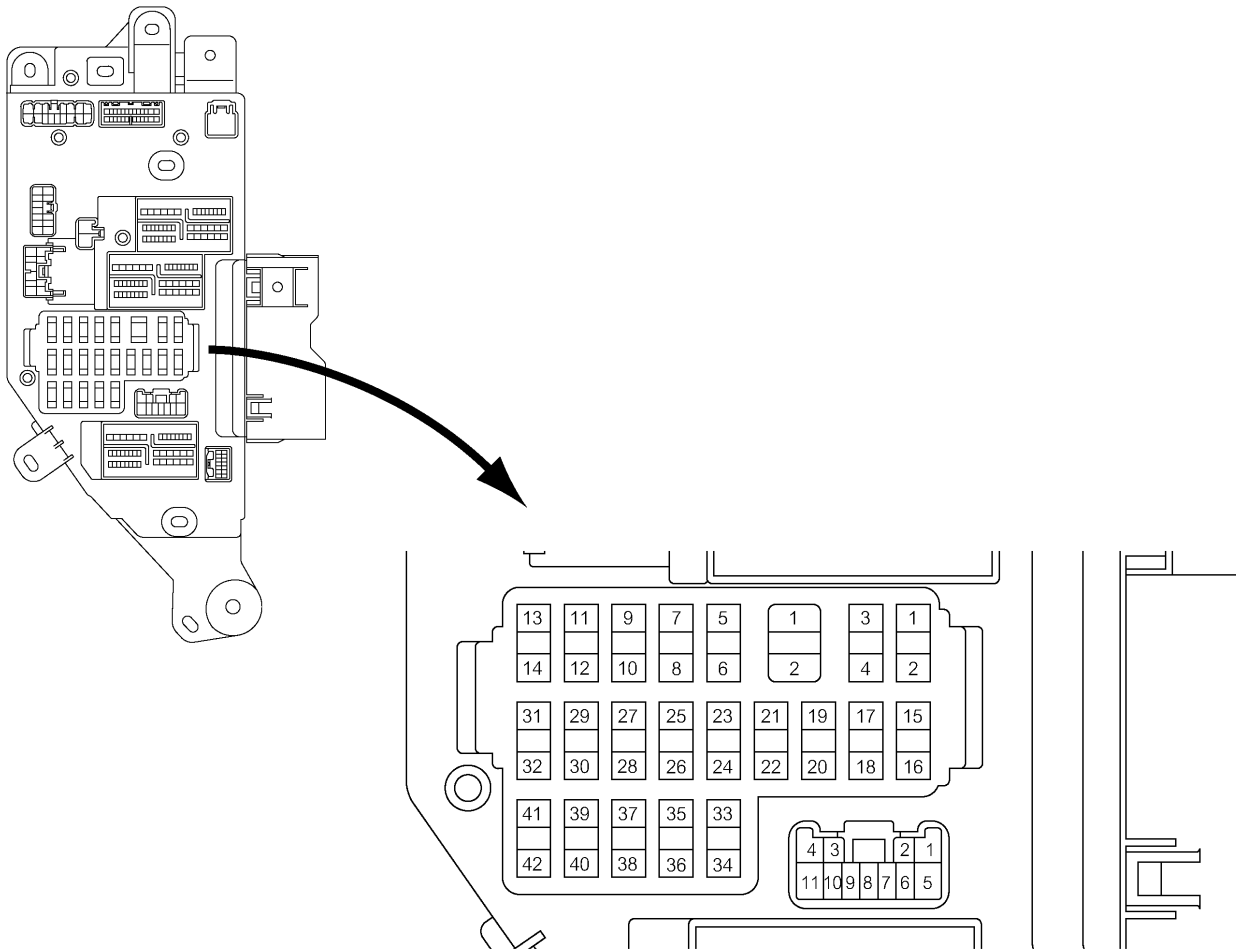
(b) Remove the relay from the junction block and inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
DOME	1 - Ground	Constant	Battery positive voltage
DOME	5 - Ground	Constant	Battery positive voltage
ACC	5 - Ground	Constant	Battery positive voltage
ACC	2 - Ground	Ignition switch ON	Battery positive voltage
IG1 NO.2	5 - Ground	Constant	Battery positive voltage
IG1 NO.2	2 - Ground	Ignition switch ON	Battery positive voltage
DEFOG	5 - Ground	Constant	Battery positive voltage
DEFOG	1 - Ground	Ignition switch ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

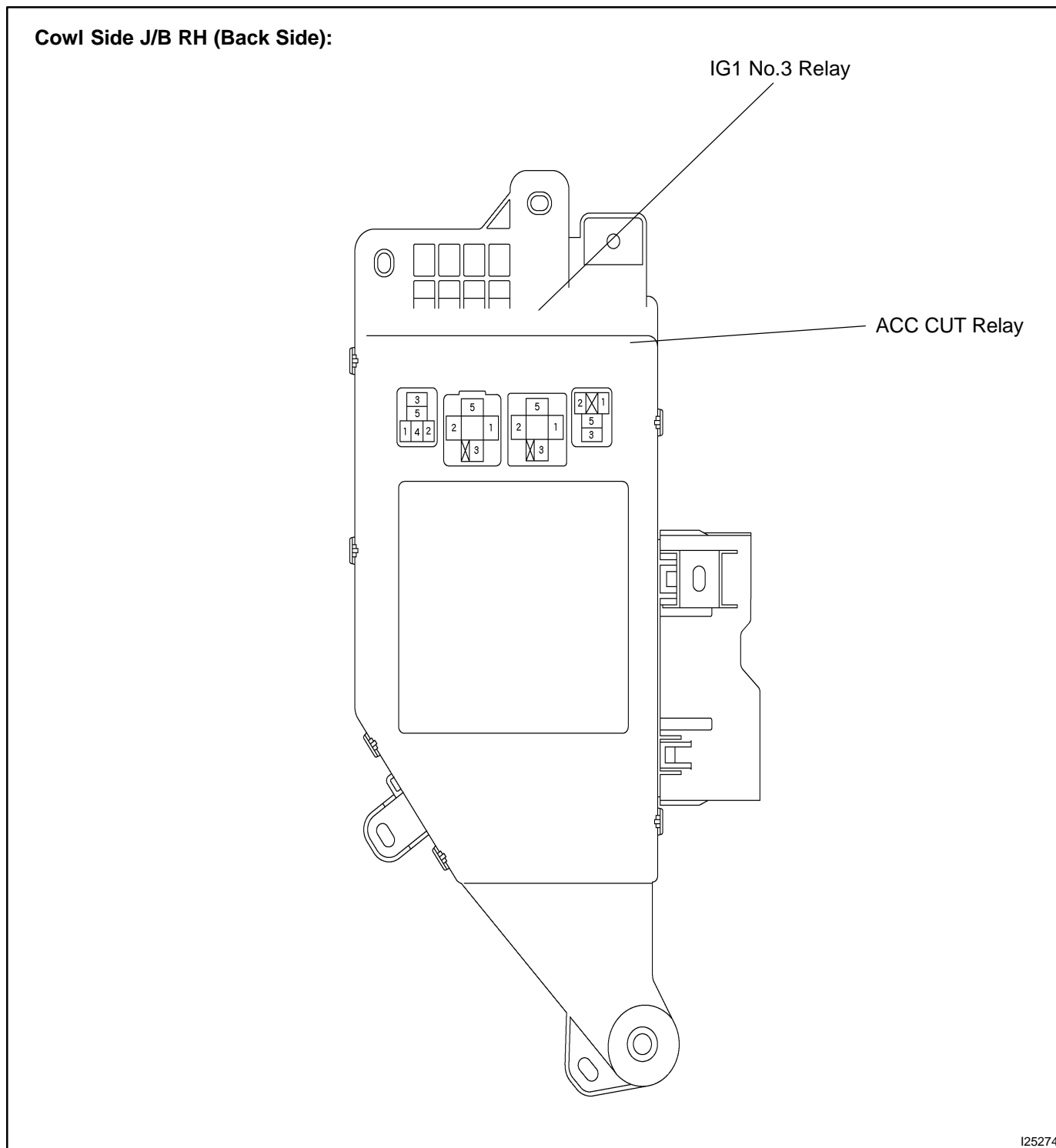
3. INSPECT COWL SIDE J/B RH CIRCUIT

Cowl Side J/B RH:



H

125276



(a) Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
P/W (RL)	2 - Ground	Constant	Battery positive voltage
P/W (FL)	4 - Ground	Constant	Battery positive voltage
VGRS	2 - Ground	Constant	Battery positive voltage
DOME	5 - Ground	Constant	Battery positive voltage
RADIO	7 - Ground	Constant	Battery positive voltage
WASHER	10 - Ground	Ignition switch ON	Battery positive voltage

BODY ELECTRICAL - POWER SOURCE

DIFF	12 - Ground	Ignition switch ON	Battery positive voltage
ECU-B2	13 - Ground	Constant	Battery positive voltage
P/W (FR)	15 - Ground	Constant	Battery positive voltage
P/W (RR)	17 - Ground	Constant	Battery positive voltage
SECURITY	20 - Ground	Constant	Battery positive voltage
IGN	21 - Ground	Ignition switch ON	Battery positive voltage
MET	23 - Ground	Ignition switch ON	Battery positive voltage
GAUGE2	25 - Ground	Ignition switch ON	Battery positive voltage
SEAT HTR	27 - Ground	Ignition switch ON	Battery positive voltage
ECU-IG2	29 - Ground	Ignition switch ON	Battery positive voltage
WIPER	31 - Ground	Ignition switch ON	Battery positive voltage
RH SEAT	33 - Ground	Constant	Battery positive voltage
RR A/C	35 - Ground	Constant	Battery positive voltage
TIL & TEL	37 - Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

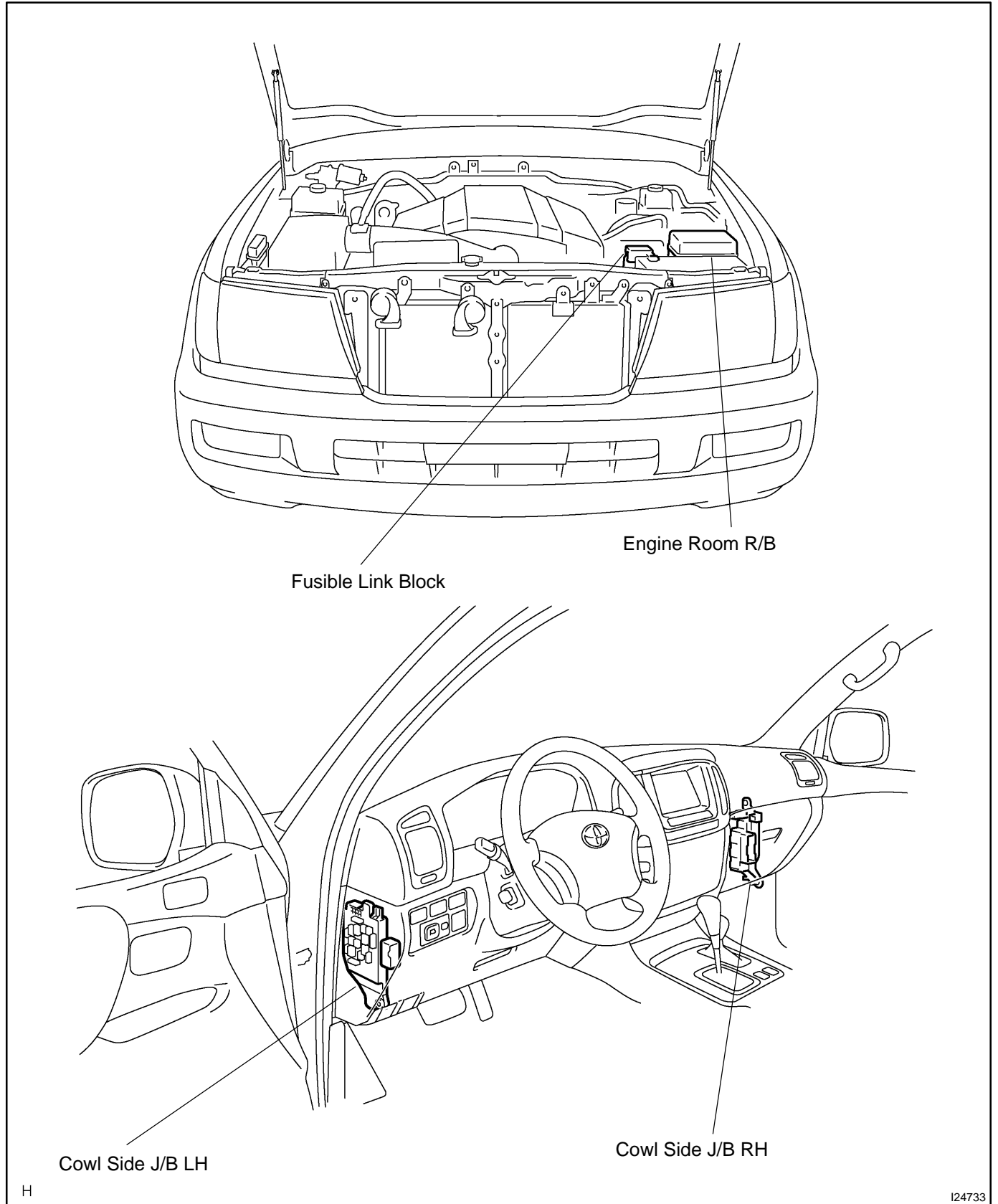
Remove the relay from the junction block and inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
ACC CUT	2 - Ground	Constant	Battery positive voltage
ACC CUT	4 - Ground	Ignition Switch ACC	Battery positive voltage
IG1 NO.3	5 - Ground	Constant	Battery positive voltage
IG1 NO.3	2 - Ground	Ignition Switch ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

# POWER SOURCE LOCATION

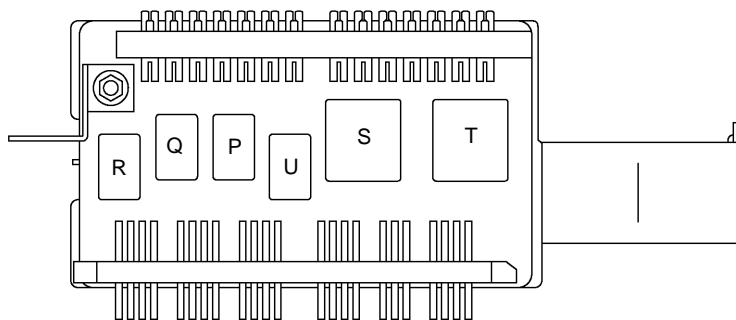
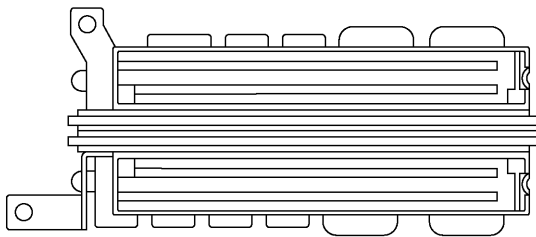
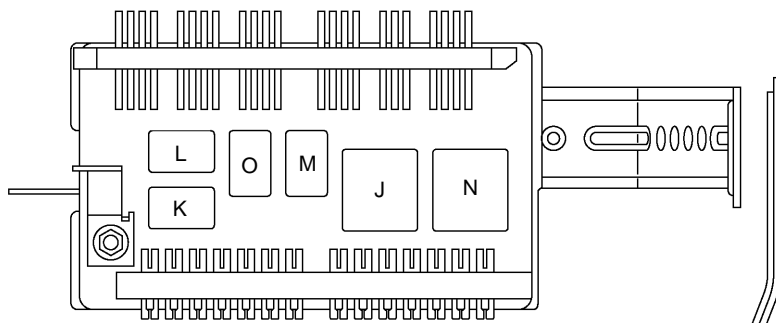
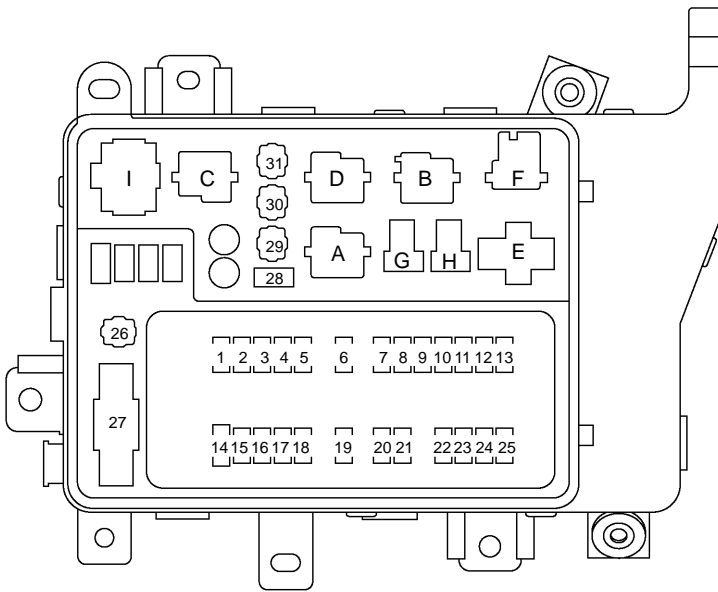
BE2E1-01



H

124733

Engine Room R/B



Fuses:

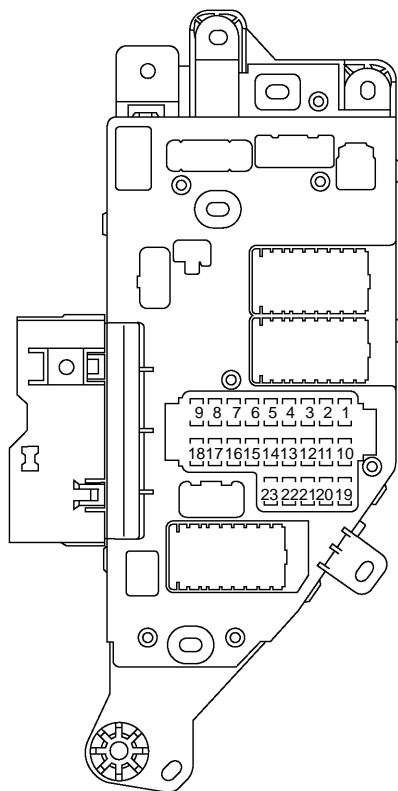
1. TOWING
2. MIR HTR
3. RR HTR
4. HAZ-TEN
5. ALT-S
6. NV-IR
7. FR FOG
8. TOWING BRK
9. HEAD CLNER
10. FR-IG
11. PANEL
12. TOWING TAIL
13. TAIL
14. -
15. BAT
16. TEL
17. AMP
18. EFI or ECD NO.1
19. AM2
20. ETCS
21. HORN
22. HEAD RH-LWR
23. HEAD LH-LWR
24. HEAD RH-UPR
25. HEAD LH-UPR
26. STARTER
27. GLOW
28. ST1
29. AHC
30. ABS NO.1
31. ABS NO.2

Relays:

- A. AHC
- B. ABS SOL
- C. ABS MTR1
- D. ABS MTR2
- E. STARTER
- F. EFI or ECD
- G. C/OPN
- H. F/PUMP
- I. HTR
- J. IG1 NO.1
- K. MIR HTR
- L. RR HTR
- M. FR FOG
- N. TAIL
- O. PANEL
- P. CDS FAN
- Q. MG CLT
- R. W/TEMP CUT
- S. HEAD
- T. HEAD HI
- U. HORN

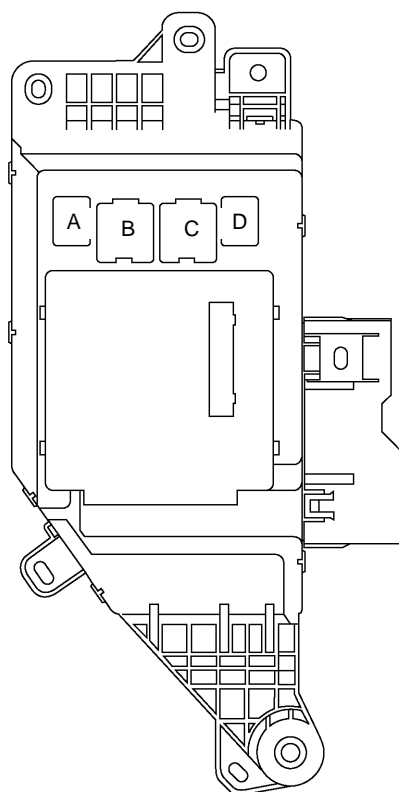


## Cowl Side J/B LH



## Fuses:

1. AHC-IG
2. POWER HTR
3. FUEL HTR
4. AHC-B
5. DEFOG
6. AM1
7. ACC
8. CIG
9. PWR OUTLET
10. OBD-2
11. STOP
12. A/C
13. BATT CHARGE
14. DBL LOCK
15. ECU-B1
16. ECU-IG1
17. GAUGE1
18. EFI or ECD NO.2
19. RR WIPER
20. SUN ROOF
21. DOOR
22. LH SEAT
23. IDLE UP



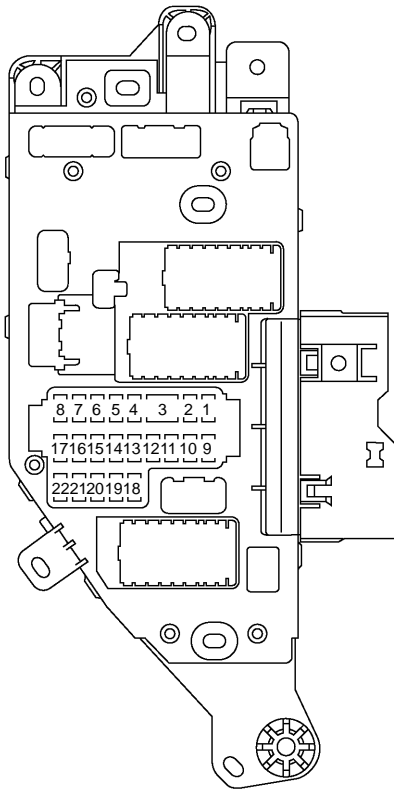
## Relays:

- A. DEFOG
- B. IG1 No.2
- C. ACC
- D. DOME

H

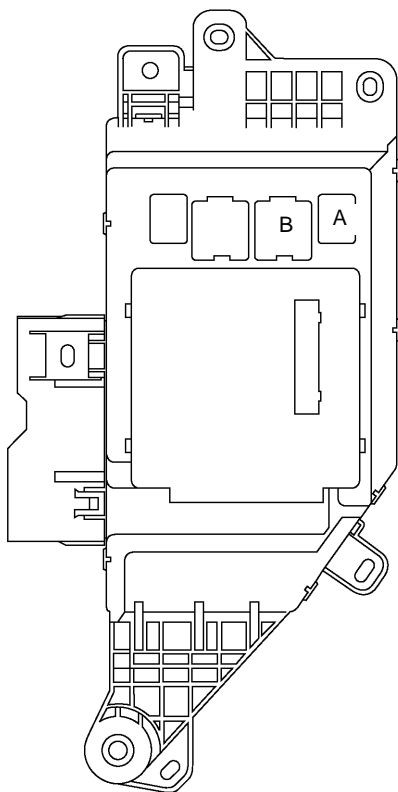
I24922

Cowl Side J/B RH



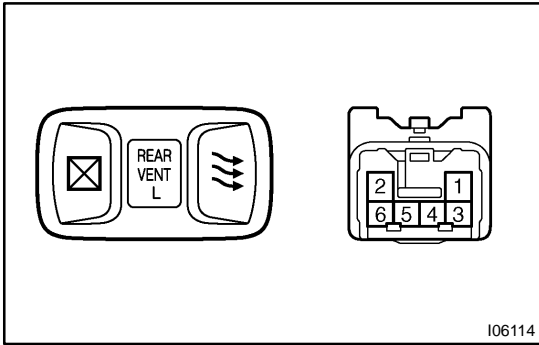
Fuses:

1. P/W (RL)
2. P/W (FL)
3. VGRS
4. DOME
5. RADIO
6. WASHER
7. DIFF
8. ECU-B2
9. P/W(FR)
10. P/W(RR)
11. SECURITY
12. IGN
13. MET
14. GAUGE 2
15. SEAT HTR
16. ECU-IG2
17. WIPER
18. RH SEAT
19. RR A/C
20. TIL&TEL



Relays:

- A. ACC CUT
- B. IG1 NO.3
- C. POWER MAIN



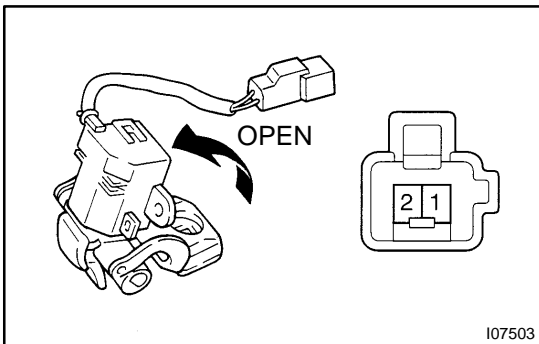
I06114

## INSPECTION

### 1. INSPECT POWER QUARTER WINDOW SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
CLOSE	3 - 6 4 - 5	Continuity
OFF	-	Continuity
OPEN	3 - 4 5 - 6	Continuity
Illumination Circuit	1 - 2	Continuity

If continuity is not as specified, replace the switch.



I07503

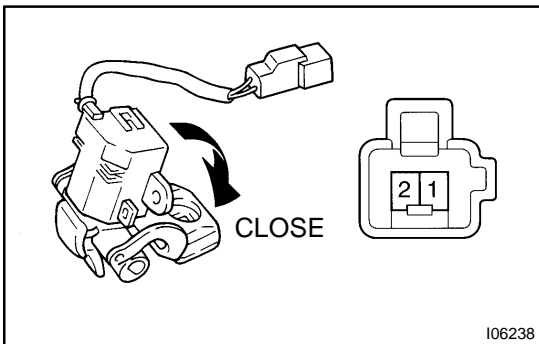
### 2. Left side:

#### INSPECT POWER VENT WINDOW MOTOR OPERATION

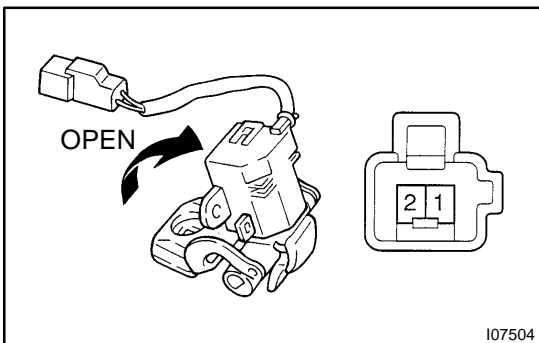
- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the window link moves to OPEN position.

- (b) Remove the polarity and check that the window link moves to CLOSE position.

If operation is not as specified, replace the window motor.



I06238

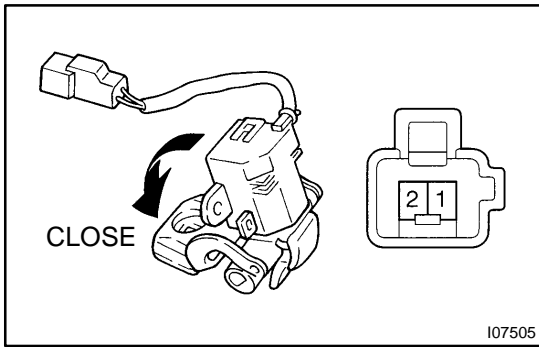


I07504

### 3. Right side:

#### INSPECT POWER VENT WINDOW MOTOR OPERATION

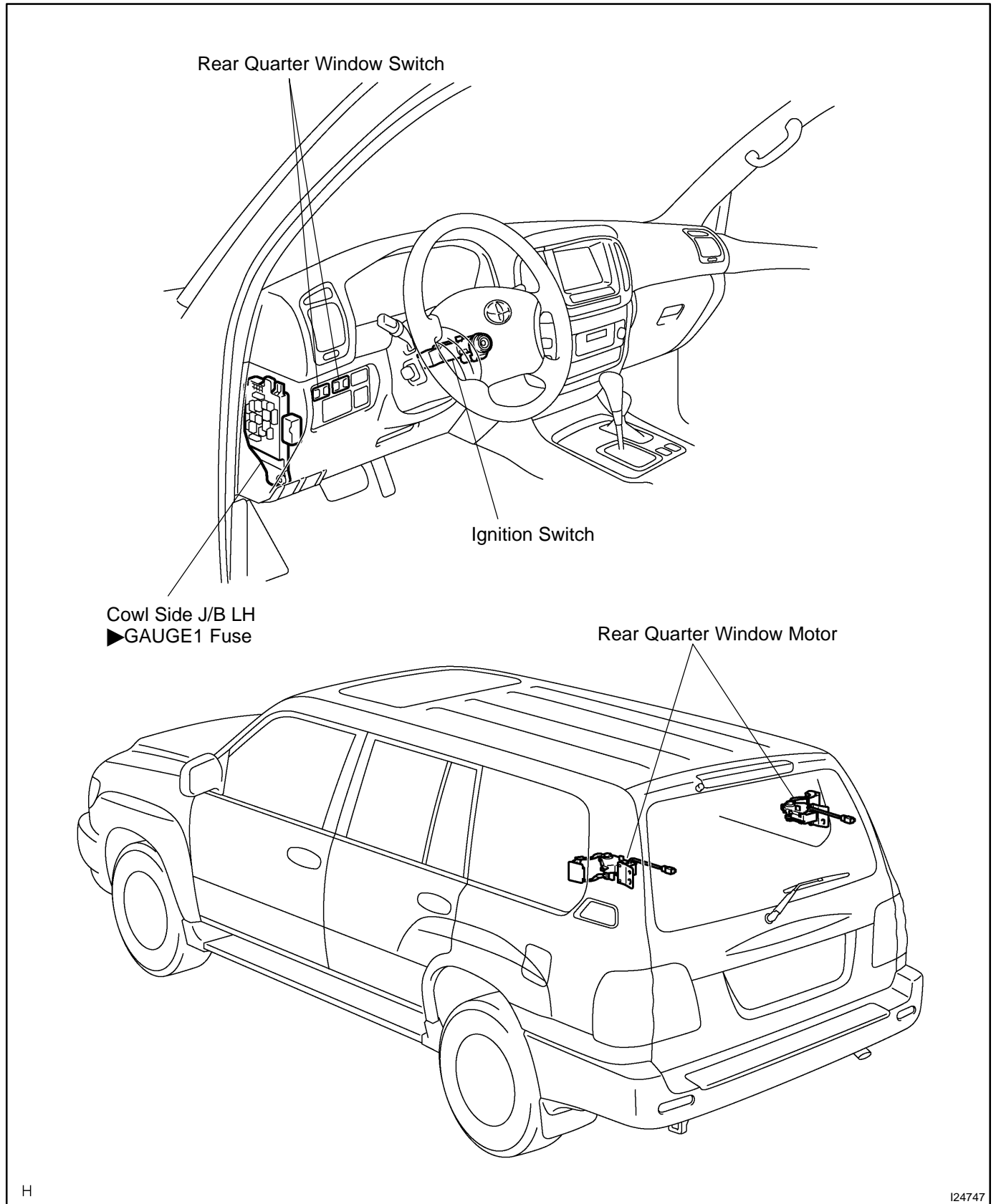
- (a) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, and check that the window link moves to OPEN position.



- (b) Remove the polarity and check that the window link moves to CLOSE position.

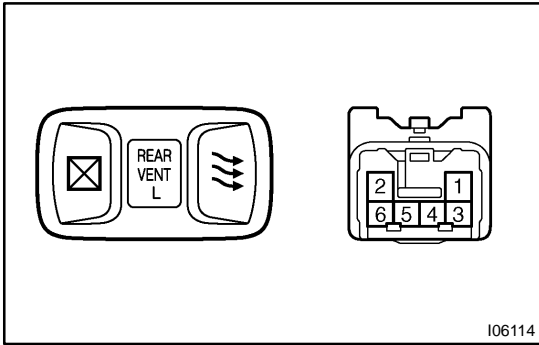
# POWER REAR QUARTER WINDOW SYSTEM LOCATION

BE0S4-06



H

124747



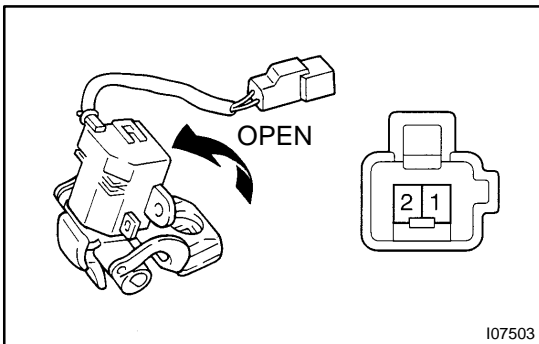
I06114

## INSPECTION

### 1. INSPECT POWER QUARTER WINDOW SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
CLOSE	3 - 6 4 - 5	Continuity
OFF	-	Continuity
OPEN	3 - 4 5 - 6	Continuity
Illumination Circuit	1 - 2	Continuity

If continuity is not as specified, replace the switch.



I07503

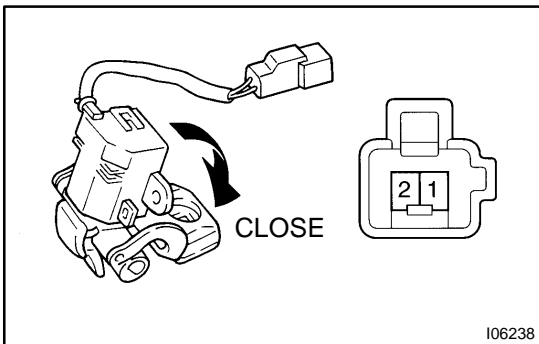
### 2. Left side:

#### INSPECT POWER VENT WINDOW MOTOR OPERATION

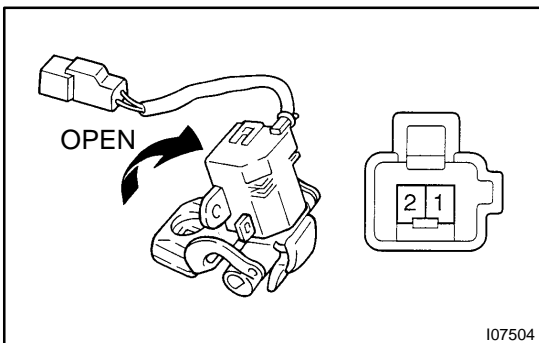
- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the window link moves to OPEN position.

- (b) Remove the polarity and check that the window link moves to CLOSE position.

If operation is not as specified, replace the window motor.



I06238

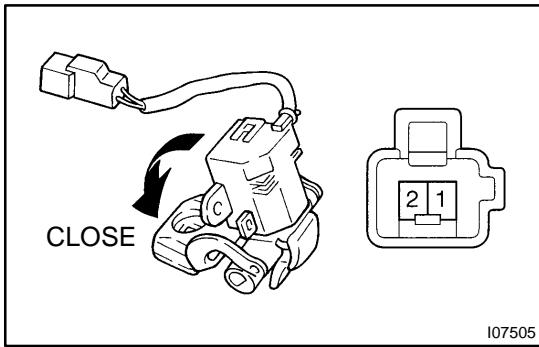


I07504

### 3. Right side:

#### INSPECT POWER VENT WINDOW MOTOR OPERATION

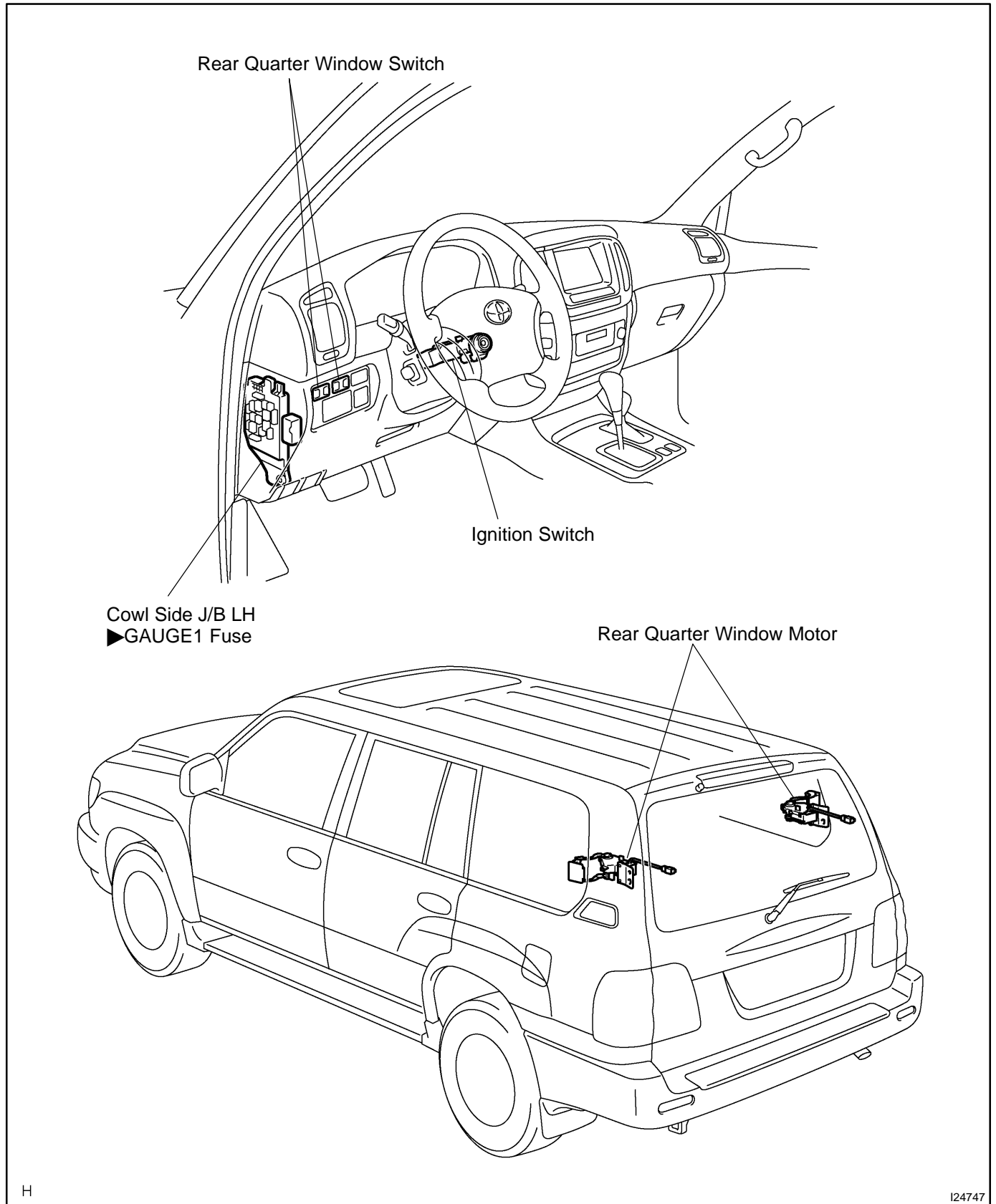
- (a) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, and check that the window link moves to OPEN position.



- (b) Remove the polarity and check that the window link moves to CLOSE position.

# POWER REAR QUARTER WINDOW SYSTEM LOCATION

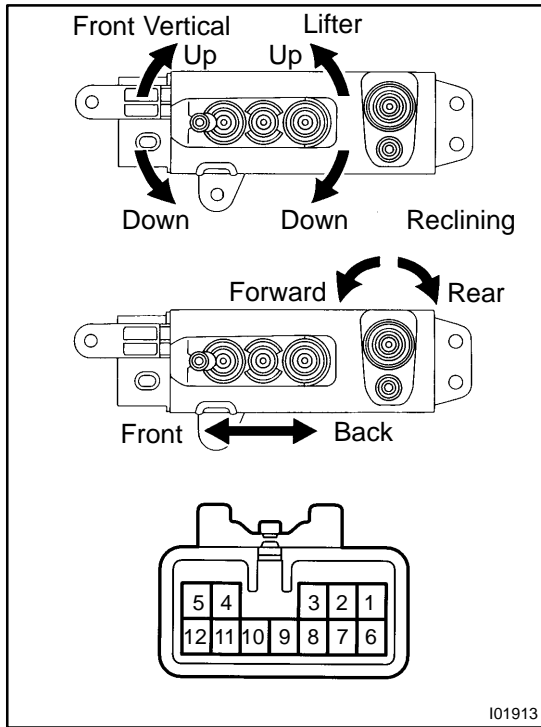
BE0S4-06



H

124747





**INSPECTION**

**1. INSPECT DRIVER'S POWER SEAT SWITCH CONTINUITY**

**Slide Switch:**

Switch position	Tester connection	Specified condition
FRONT	4 - 7    8 - 11	Continuity
OFF	4 - 7 - 8	Continuity
BACK	4 - 11    7 - 8	Continuity

**Front vertical switch:**

Switch position	Tester connection	Specified condition
UP	7 - 9    10 - 11	Continuity
OFF	7 - 9 - 10	Continuity
DOWN	7 - 10    9 - 11	Continuity

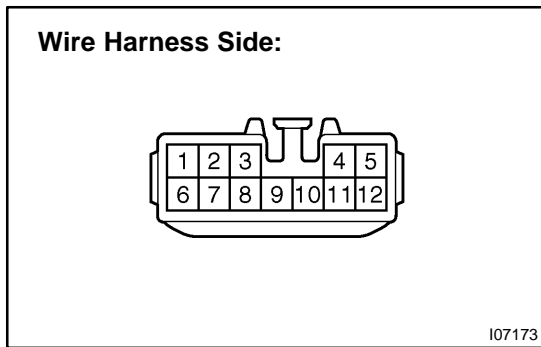
**Lifter switch:**

Switch position	Tester connection	Specified condition
UP	2 - 11    3 - 7	Continuity
OFF	2 - 3 - 7	Continuity
DOWN	2 - 7    3 - 11	Continuity

**Reclining switch:**

Switch position	Tester connection	Specified condition
FORWARD	1 - 11    5 - 7	Continuity
OFF	1 - 5 - 7	Continuity
REAR	1 - 7    5 - 11	Continuity

If continuity is not as specified, replace the switch.

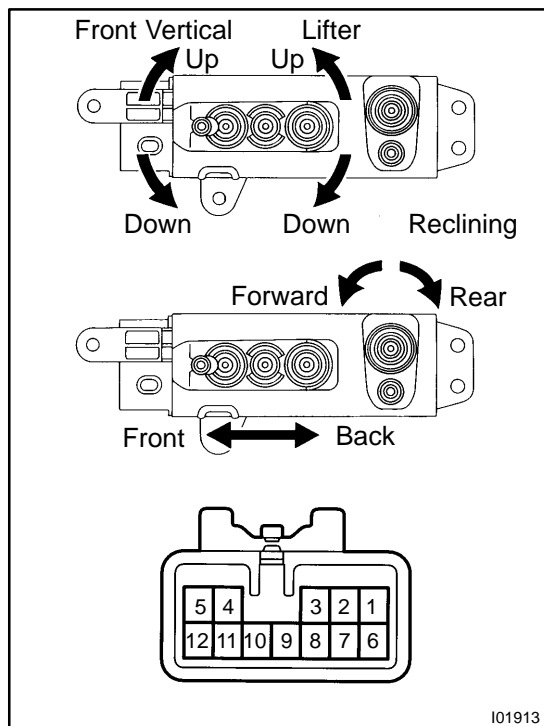


**2. INSPECT DRIVER'S POWER SEAT SWITCH CIRCUIT**

- (a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.
- (b) Inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
7 - Ground	Constant	Continuity
11 - Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.



**3. INSPECT PASSENGER'S POWER SEAT SWITCH CONTINUITY**

**Slide switch:**

Switch position	Tester connection	Specified condition
FRONT	4 - 7    8 - 11	Continuity
OFF	4 - 7 - 8	Continuity
BACK	4 - 11    7 - 8	Continuity

**Front vertical switch:**

Switch position	Tester connection	Specified condition
UP	7 - 10    9 - 11	Continuity
OFF	7 - 9 - 10	Continuity
DOWN	6 - 9    10- 11	Continuity

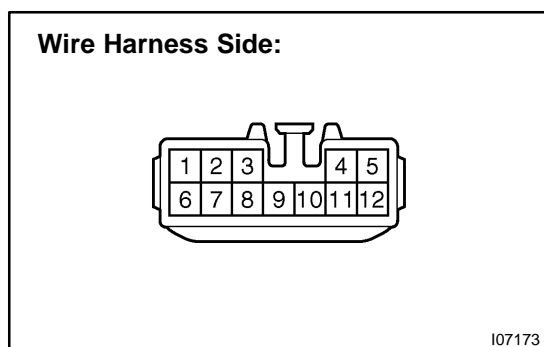
**Lifter switch:**

Switch position	Tester connection	Specified condition
UP	2 - 7    3 - 11	Continuity
OFF	2 - 3 - 7	Continuity
DOWN	2 - 11    3 - 7	Continuity

**Reclining switch:**

Switch position	Tester connection	Specified condition
FORWARD	1 - 11    5 - 7	Continuity
OFF	1 - 5 - 7	Continuity
REAR	1 - 7    5 - 11	Continuity

If continuity is not as specified, replace the switch.

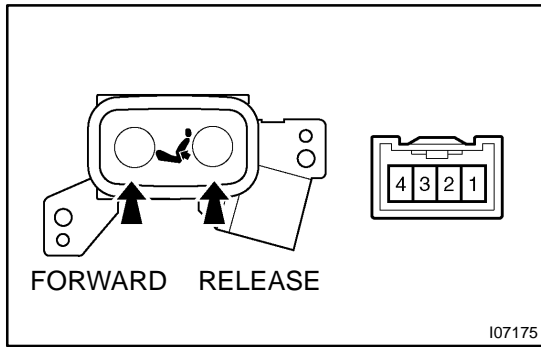


**4. INSPECT PASSENGER'S POWER SEAT SWITCH CIRCUIT**

- (a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.
- (b) Inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
7 - Ground	Constant	Continuity
11 - Ground	Constant	Battery positive voltage

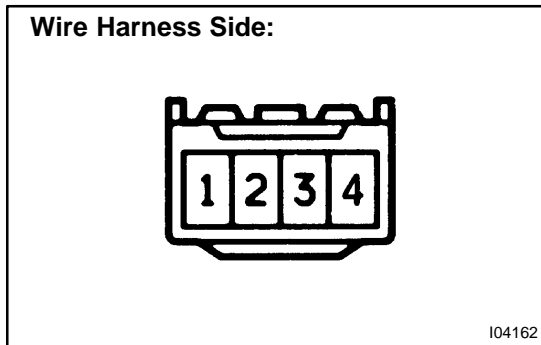
If circuit is not as specified, inspect the circuits connected to other parts.



**5. INSPECT DRIVER'S LUMBAR SUPPORT SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
FORWARD	1 - 4	Continuity
	2 - 3	
OFF	1 - 2 - 3	Continuity
RELEASE	1 - 3	Continuity
	2 - 4	

If continuity is not as specified, replace the switch.

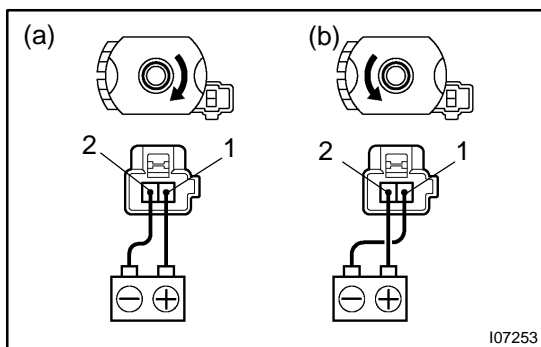


**6. INSPECT DRIVER'S LUMBAR SUPPORT SWITCH CIRCUIT**

- (a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.
- (b) Inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
3 - Ground	Constant	Continuity
4 - Ground	Constant	Battery positive voltage

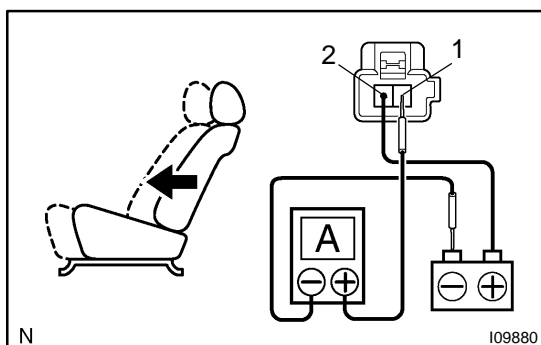
If circuit is not as specified, inspect the circuits connected to other parts.



**7. INSPECT SLIDE MOTOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the motor turns clockwise.
- (b) Reverse the polarity, check that the motor turns counter-clockwise.

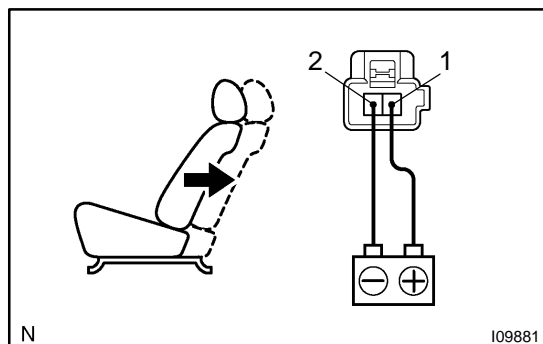
If operation is not as specified, replace the seat adjuster.



**8. INSPECT SLIDE MOTOR PTC THERMISTOR OPERATION**

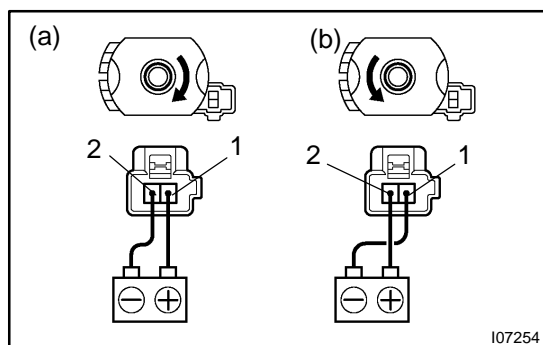
**( ): Passenger side**

- (a) Connect the positive (+) lead from the battery to terminal 2 (1), the positive (+) lead from the ammeter to terminal 1 (2) and the negative (-) lead to the battery negative (-) terminal, then move the seat cushion to the front position.
- (b) Continue to apply voltage, check that current changes to less than 1 ampere within 4 to 90 seconds.



- (c) Disconnect the leads from terminals.
- (d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 (2) and the negative (-) lead to terminal 2 (1), check that the seat cushion begins to move backwards.

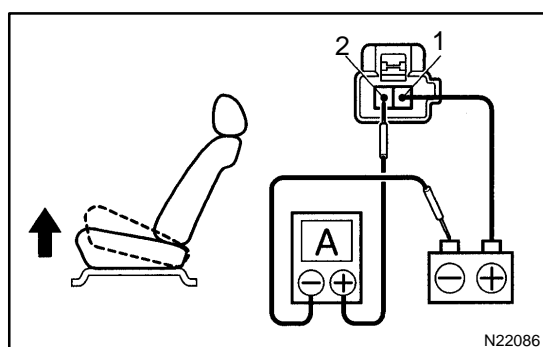
If operation is not as specified, replace the seat adjuster.



#### 9. INSPECT FRONT VERTICAL MOTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the motor turns clockwise.
- (b) Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the seat adjuster.

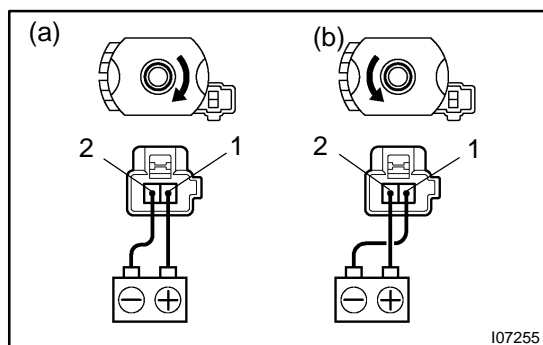
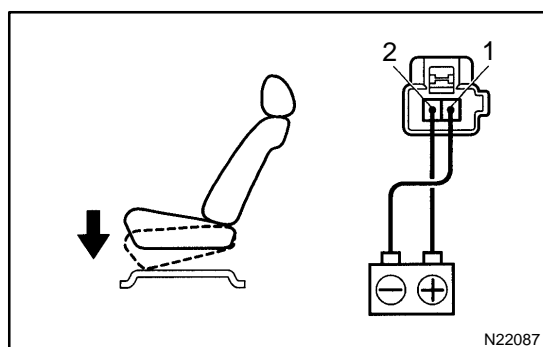


#### 10. INSPECT FRONT VERTICAL MOTOR PTC THERMISTOR OPERATION

( ): Passenger side

- (a) Connect the positive (+) lead from the battery to terminal 1 (2), the positive (+) lead from the ammeter to terminal 2 (1) and the negative (-) lead to the battery negative (-) terminal, then move the seat cushion to the highest position.
- (b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.
- (c) Disconnect the leads from the terminals.
- (d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 (1) and the negative (-) lead to terminal 1 (2), check that the seat cushion begins to descend.

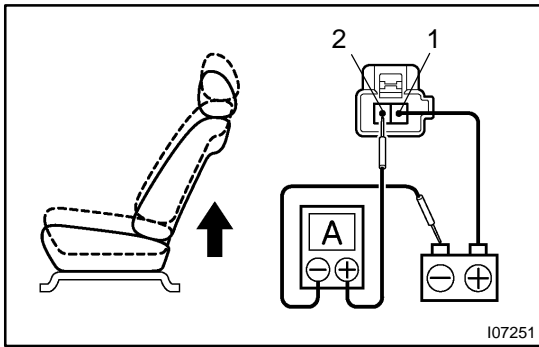
If operation is not as specified, replace the seat adjuster.



#### 11. INSPECT LIFTER MOTOR OPERATION

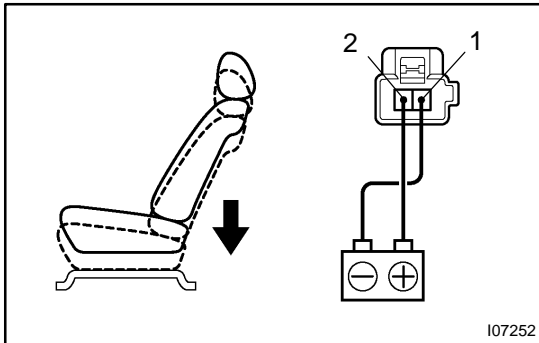
- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the motor turns clockwise.
- (b) Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the seat adjuster.



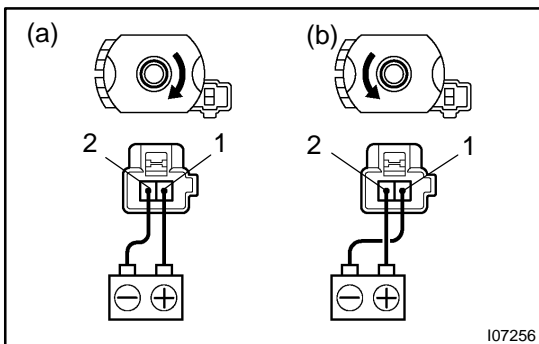
## 12. INSPECT LIFTER MOTOR PTC THERMISTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 1 (2), the positive (+) lead from the ammeter to terminal 2 (1) and the negative (-) lead to the battery negative (-) terminal, then move the seat cushion to the highest position.
- Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



- Disconnect the leads from the terminals.
- Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 (1) and the negative (-) lead to terminal 1 (2), check that the seat cushion begins to descend.

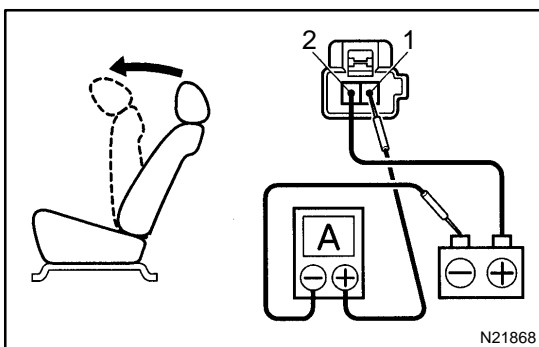
If operation is not as specified, replace the seat adjuster.



## 13. INSPECT RECLINING MOTOR OPERATION

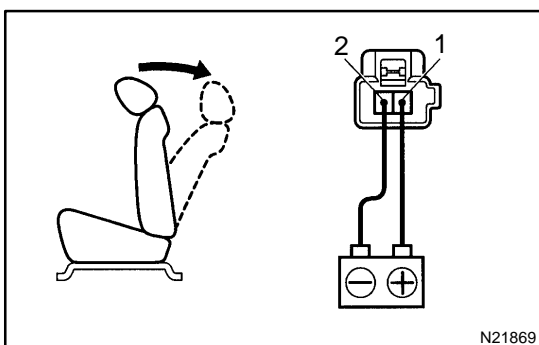
- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the motor turns clockwise.
- Reverse the polarity, check that the motor turns counter-clockwise.

If operation is not as specified, replace the seat adjuster.



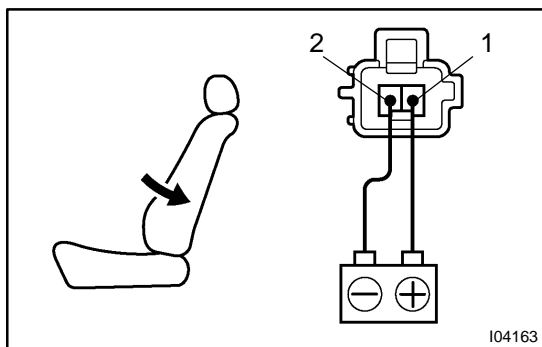
## 14. INSPECT RECLINING MOTOR PTC THERMISTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 2, the positive (+) lead from the ammeter to terminal 1 and the negative (-) lead to the battery negative (-) terminal, then recline the seat back to the most forward position.
- Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.

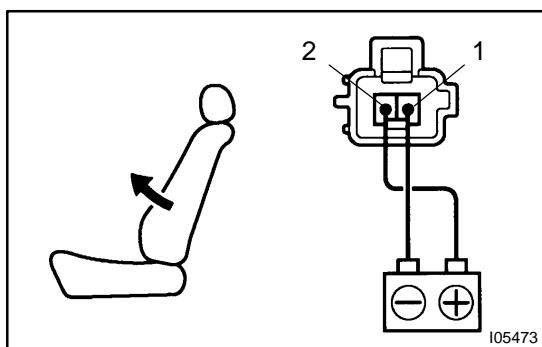


- Disconnect the leads from the terminals.
- Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the seat back begins to fall backward.

If operation is not as specified, replace the seat adjuster.

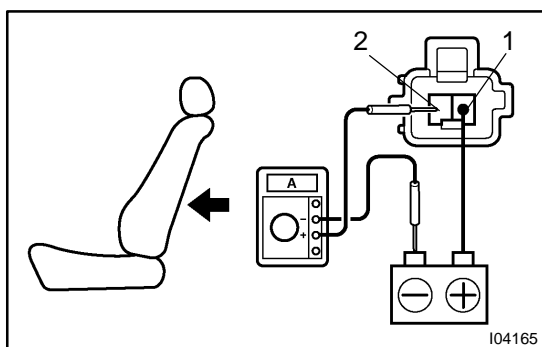
**15. INSPECT LUMBAR SUPPORT MOTOR OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the lumbar support moves to release side.

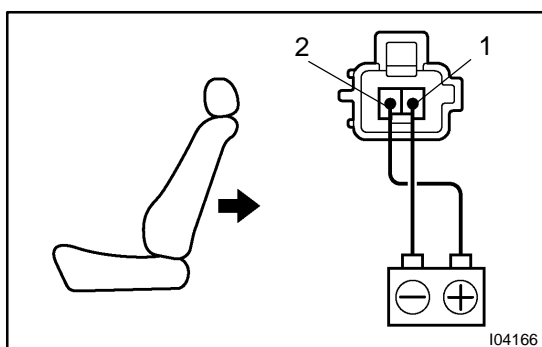


- (b) Reverse the polarity, check that the lumbar support moves forward.

If operation is not as specified, replace the seat adjuster.

**16. INSPECT LUMBAR SUPPORT MOTOR CIRCUIT BREAKER OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1 on the lumbar support motor connector and move the lumbar support to front end position.



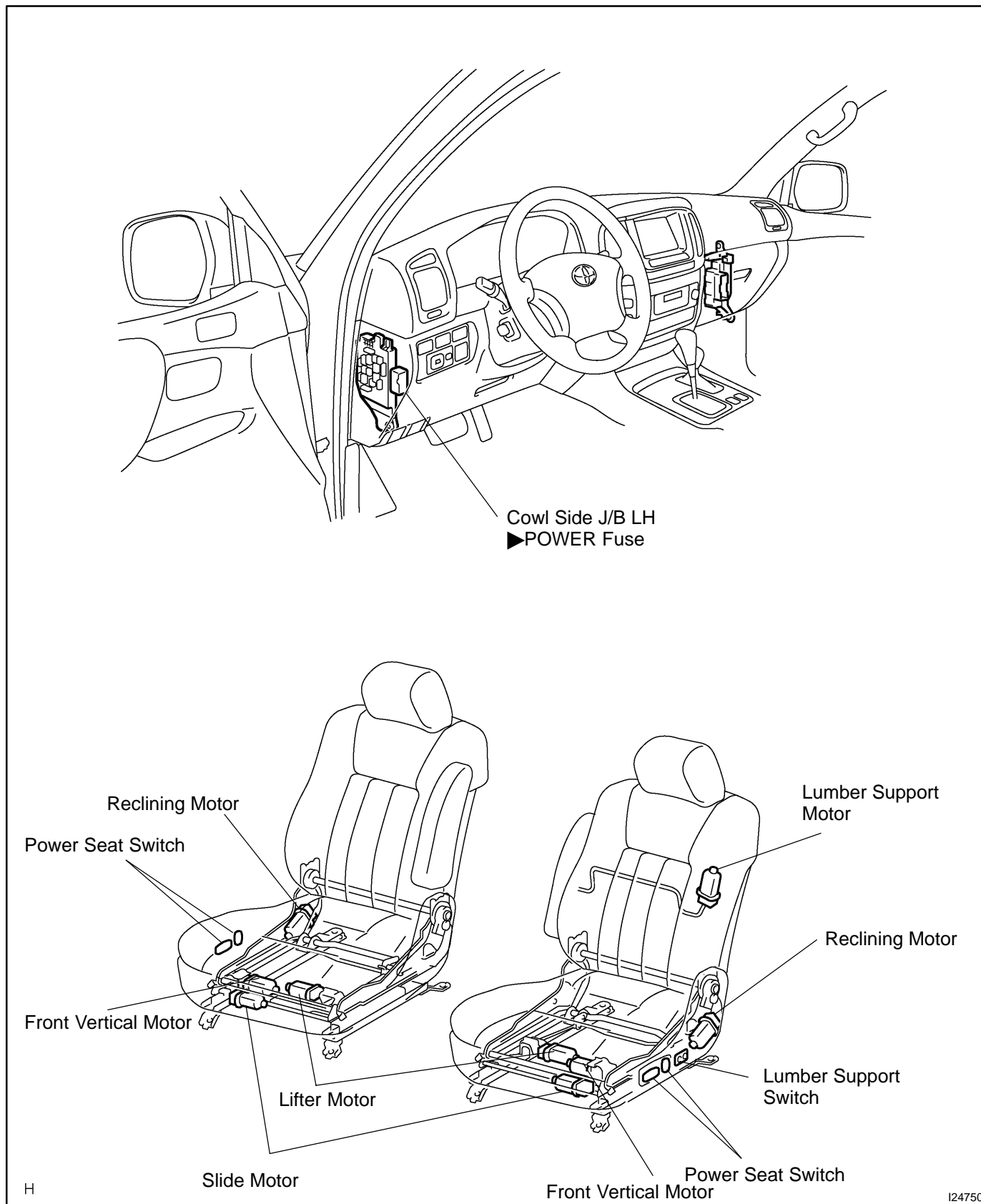
- (b) Continue to apply voltage, check that a circuit breaker operation noise can be heard within 4 to 60 seconds.

- (c) Reverse the polarity, check that the lumbar support begins to move to release side within approximately 60 seconds.

If operation is not as specified, replace the motor.

# POWER SEAT CONTROL SYSTEM LOCATION

BE05S-08



H

124750

## ADJUSTMENT

### HOW TO RESET POWER WINDOW MOTOR (RESET SWITCH AND PULSE SWITCH)

If the jam protection is not functioned properly, perform the following procedure.

HINT:

It is necessary to reset the power window motor (in initial position for the limit switch) when separating the window regulator from the power window motor or operating the window regulator with the door glass not installed.

(a) Remove the power window motor.

HINT:

Place the matchmarks on the power window motor and window regulator gear.

(b) Connect the power window motor and power window switch to wire harness of the vehicle.

(c) Turn the ignition switch ON and operate the power window switch to idle the power window motor in UP side direction for more than 6 rotations or less than 10 rotates (4 seconds or more).

(d) Assemble the power window motor and regulator.

HINT:

▶ Install the motor when the regulator arm is below the middle point.

▶ Align the matchmarks on the power window motor and window regulator gear when install the power window motor.

(e) Assemble the power window regulator and door glass.

HINT:

Never rotate the motor to the down direction until the completion of the window glass installation.

(f) Connect power window switch to wire harness and turn the ignition switch ON.

(g) Repeat UP and DOWN operation several times manually.

(h) Check if AUTO UP → AUTO DOWN operates in automatic operation.

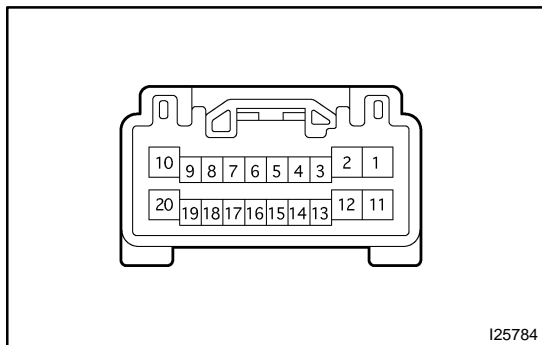
HINT:

▶ Take care that the jam protection function does not operate just after resetting.

▶ Reset the regulator again when performing the reverse operating after closing the window fully by AUTO UP operation.

(i) Check the power window function.





I25784

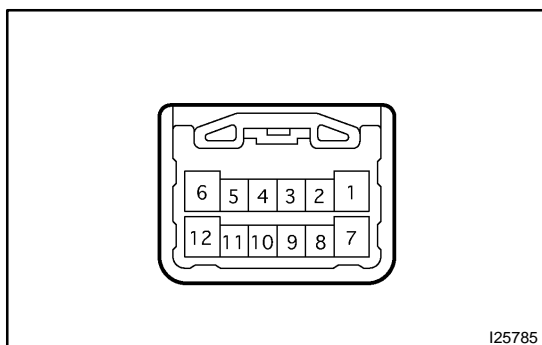
## INSPECTION

### 1. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT

Check the voltage and continuity of each terminal of the wire harness side connector.

Tester connection	Condition	Specified condition
2 (GND) - Body ground	Constant	Continuity
10 (BDR) - 2 (GND)	Constant	10 - 14V
9 (CPUB) - 2 (GND)	Constant	10 - 14V
20 (SIG) - 2 (GND)	Ignition switch OFF → ON	0V → 10 - 14V
1 (UP) - 11 (DN)	Constant	Continuity
5 (LMT) - 13 (SGND)	Driver door glass fully closed	No continuity
	Driver door glass opened by 4 mm (1.06in.)	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.



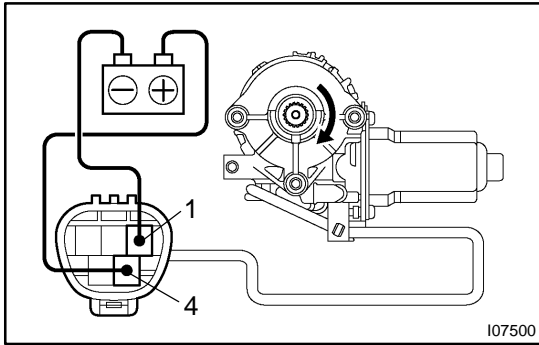
I25785

### 2. INSPECT POWER WINDOW SWITCH CIRCUIT

Check the voltage and continuity of each terminal of the wire harness side connector.

Tester connection	Condition	Specified condition
7 (GND) - Body ground	Constant	Continuity
12 (BDR) - 7 (GND)	Constant	10 - 14V
6 (UP) - 1 (DN)	Constant	Continuity
3 (LMT) - 5 (SGND)	Driver door glass fully closed	No continuity
	Driver door glass opened by 4 mm (1.06in.)	Continuity

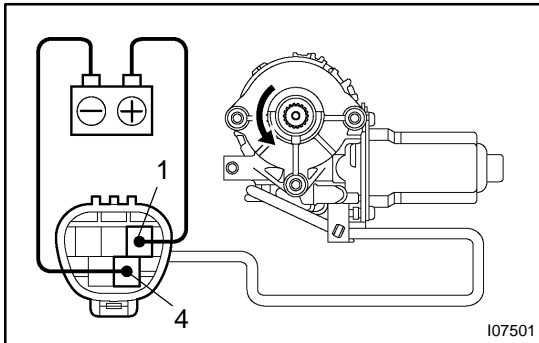
If the circuit is not as specified, inspect the circuits connected to other parts.



### 3. Driver's door and rear right door:

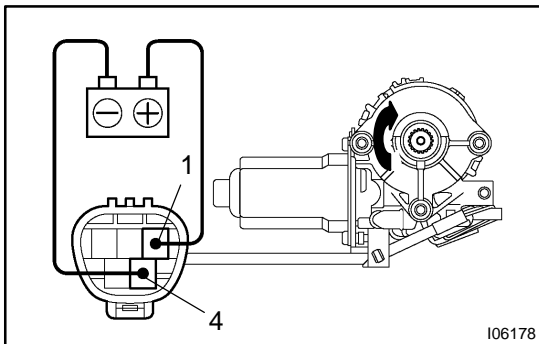
#### INSPECT POWER WINDOW MOTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 4, check that the motor turns counterclockwise.



- (b) Reverse the polarity, check that the motor turns clockwise.

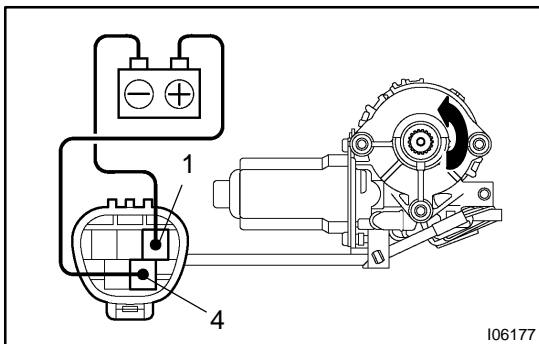
If operation is not as specified, replace the motor.



### 4. Passenger's door and rear left door:

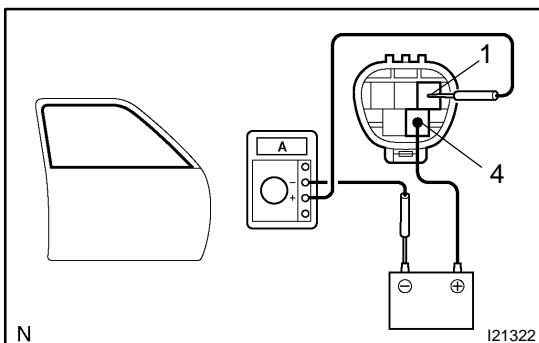
#### INSPECT POWER WINDOW MOTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 1, check that the motor turns clockwise.



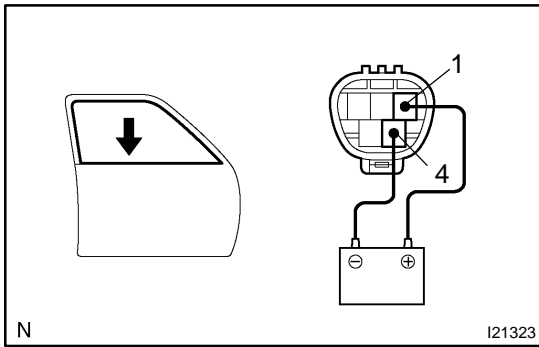
- (b) Reverse the polarity, check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.



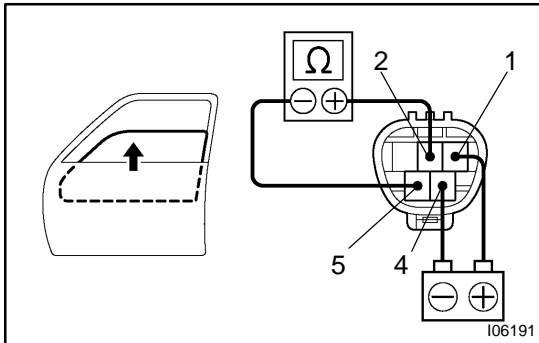
### 5. INSPECT POWER WINDOW MOTOR PTC THERMISTOR OPERATION

- (a) Disconnect the connector from the power window motor.  
 (b) Connect the positive (+) lead from the ammeter to terminal 1 on the wire harness side connector and the negative (-) lead to negative terminal of the battery.  
 (c) Connect the positive (+) lead from the battery to terminal 4 on the wire harness side connector, and raise the window to the fully position.



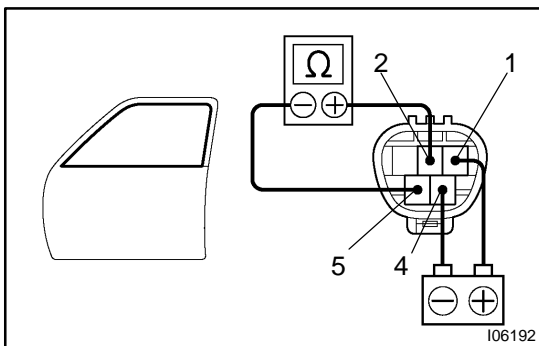
- (d) Continue to apply voltage and check that the current changes to less than 1 A within 4 to 90 seconds.
- (e) Disconnect the leads from the terminals.
- (f) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 4, and check that the window begins to descend.

If operation is not as specified, replace the motor.



## 6. INSPECT JAM PROTECTION LIMIT SWITCH OPERATION

- (a) Connect the positive (+) lead from the ohmmeter to terminal 2 and the negative (-) lead to terminal 5.
- (b) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 4.
- (c) Check that the continuity exists when the window goes up.

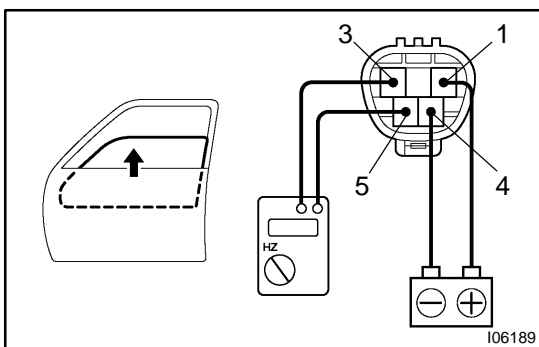


- (d) Check that no continuity exists when the window is in the fully closed position.

If operation is not as specified, replace the motor.

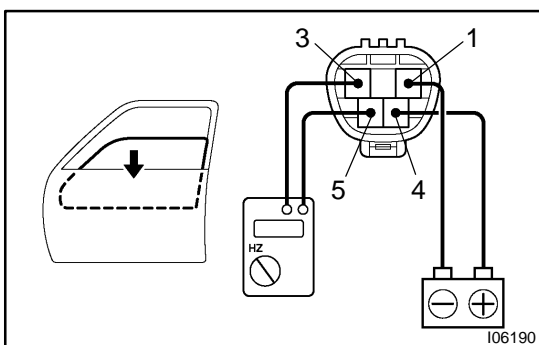
### NOTICE:

**If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.**



## 7. INSPECT JAM PROTECTION PULSE SWITCH OPERATION

- (a) Connect the positive (+) lead from the TOYOTA electrical tester to terminal 3 and the negative (-) lead to terminal 5.
- (b) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 4.
- (c) Check that a pulse is generated during the motor running.



- (d) Reverse the polarity and check that a pulse is generated.
- If operation is not as specified, replace the motor.

### NOTICE:

**If connecting the wire harness wrongly, the sensor might be damaged so caution is necessary.**

**8. INSPECT JAM PROTECTION FUNCTION****NOTICE:**

**Never, ever be caught any part of your body when checking.**

**HINT:**

In case of performing resetting of the limit switch, do checking after repeating up and down of the glass with automatic operation.

- (a) Confirmation of AUTO up operation:  
Confirm that the window will be fully close with AUTO up operation.
- (b) Checking of the operation of the jam protection function:
  - (1) Move up the window with AUTO up operation and check that the window will go down when it touches the handle of the hammer studded.
  - (2) Confirm that the window will then stop going down about 200 mm.

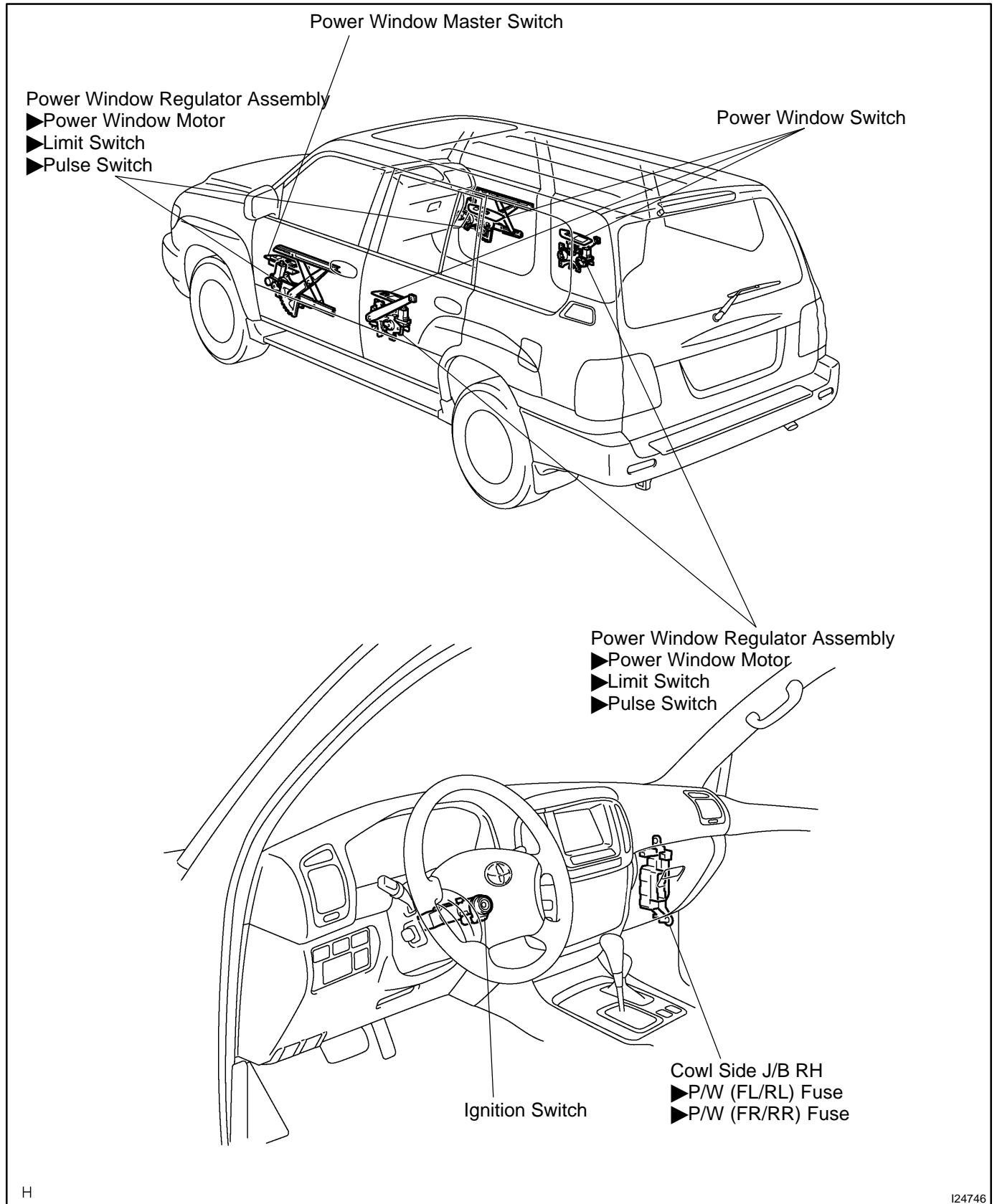
**HINT:**

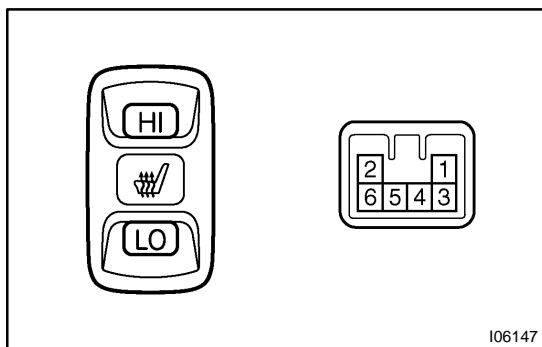
In case of removing the glass, glass guide, regulator and etc. be sure to perform checking of the jam protection function.

If the jam protection is not function properly, adjust power window motor reset switch and pulse switch.

# POWER WINDOW CONTROL SYSTEM LOCATION

BE0TF-05



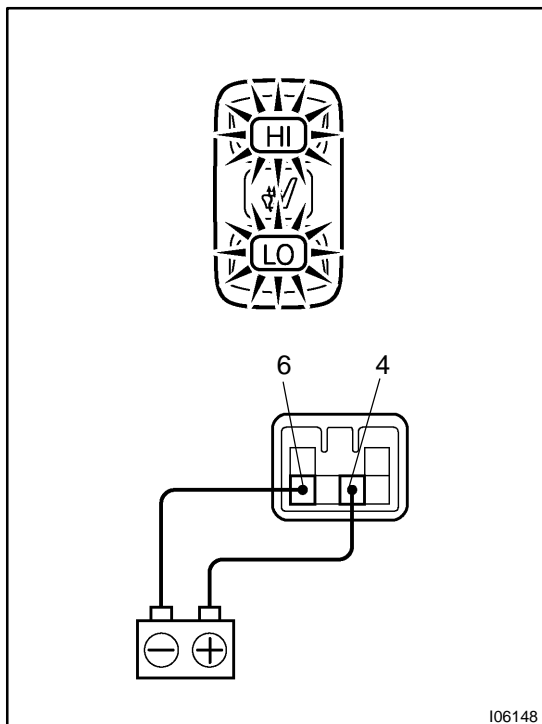


## INSPECTION

### 1. INSPECT SEAT HEATER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
HI	3 - 4 5 - 6	Continuity
OFF	-	No continuity
LO	4 - 5	Continuity
Illumination circuit	1 - 2	Continuity

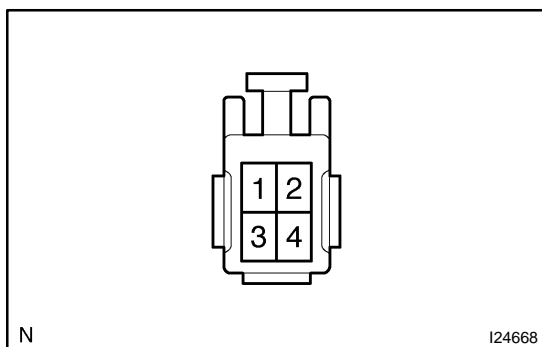
If continuity is not as specified, replace the switch.



### 2. INSPECT SEAT HEATER INDICATOR LIGHT OPERATION

- Connect the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 4.
- Push the seat heater switch Right or Left side and check that the indicator light lights up.

If operation is not as specified, replace the switch and inspect the circuits connected to other parts.

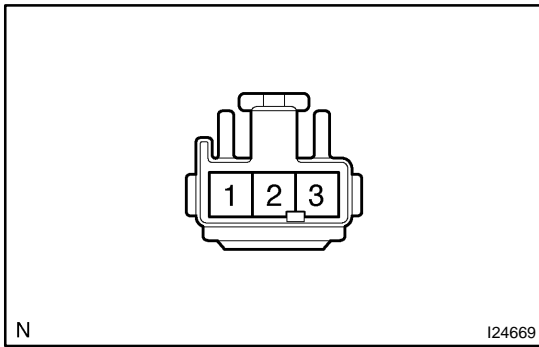


### 3. INSPECT SEAT HEATER ASSY (SEAT CUSHION) CONTINUITY

Inspect the seat heater assy between terminals, as shown.

Tester connection	Condition	Specified condition
1 - 4	Constant	Continuity
2 - 3	Constant	Continuity

If continuity is not as specified, replace the seat heater assy.

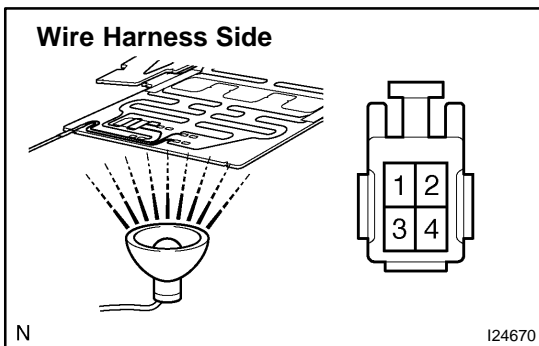


**4. INSPECT SEAT HEATER ASSY (SEAT BACK) CONTINUITY**

Inspect the seat heater assy between terminals, as shown.

Tester connection	Condition	Specified condition
1 - 2 - 3	Constant	Continuity

If continuity is not as specified, replace the seat heater assy.

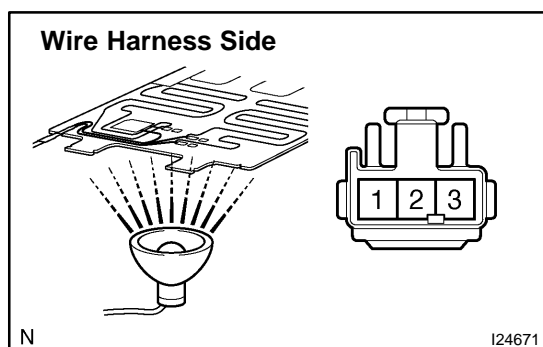


**5. INSPECT SEAT HEATER ASSY (SEAT CUSHION) OPERATION**

- (a) Heat the thermostat with a light.
- (b) Connect the seat cushion and seat back connector.
- (c) Inspect the seat heater assy continuity between terminals, as shown.

Tester connection	Condition	Specified condition
1 ↔ 4, 2 ↔ 3	25 - 35 °C	Continuity
1 ↔ 4	35 - 45 °C	Continuity
2 ↔ 3	35 - 45 °C	No continuity

If continuity is not as specified, replace the seat heater assy.



## 6. INSPECT SEAT HEATER ASSY (SEAT BACK) OPERATION

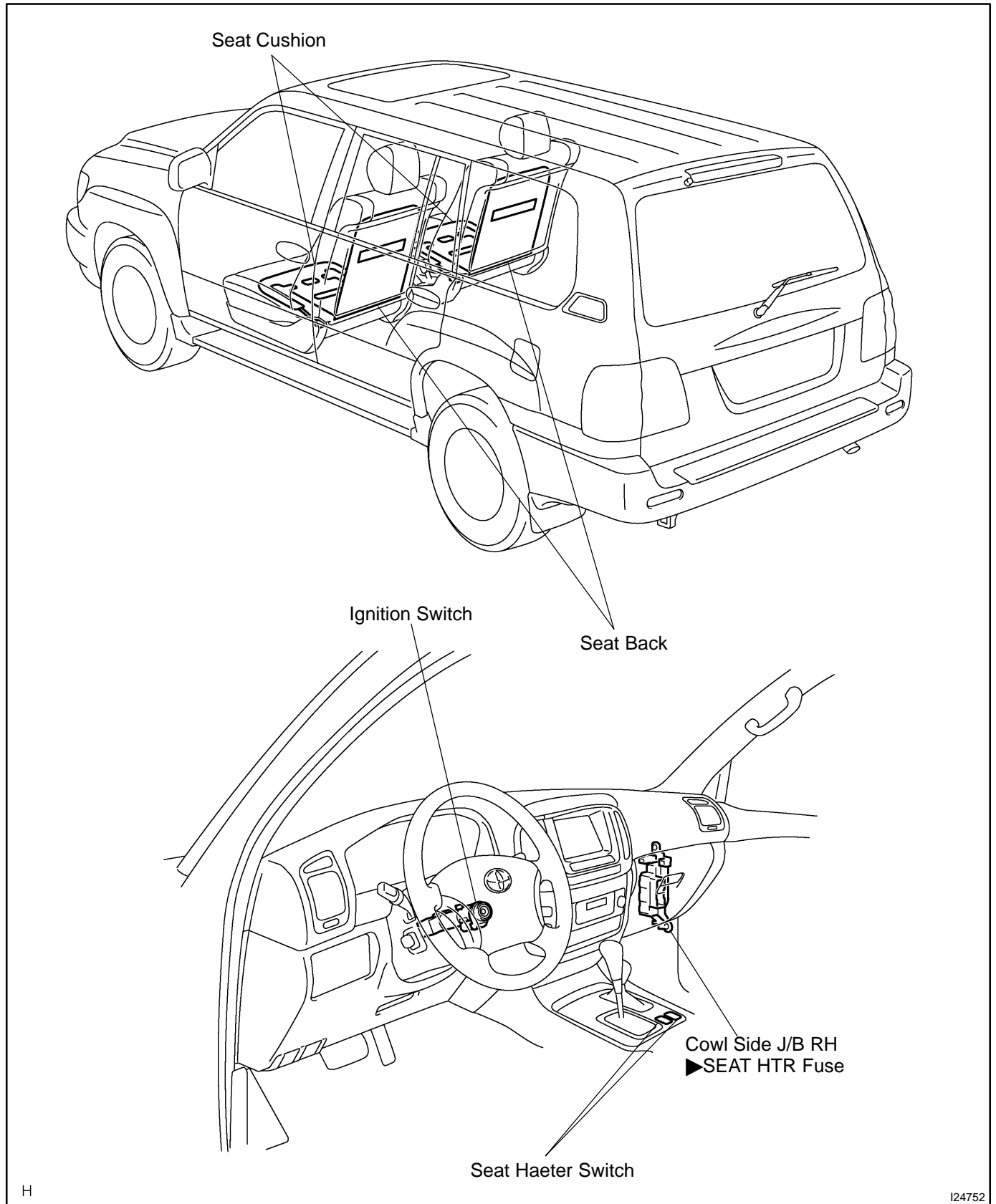
- (a) Heat the thermostat with a light.
- (b) Connect the seat cushion and seat back connector.
- (c) Inspect the seat heater assy continuity between terminals, as shown.

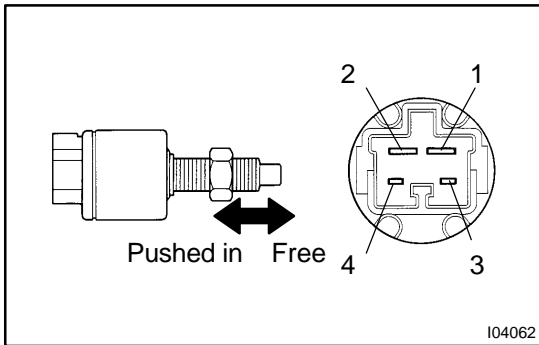
Tester connection	Condition	Specified condition
1 - 2 - 3	25 - 35 °C	Continuity
1 - 2	35 - 45 °C	Continuity
1 - 3, 2 - 3	35 - 45 °C	No continuity



# SEAT HEATER SYSTEM LOCATION

BE0GH-20



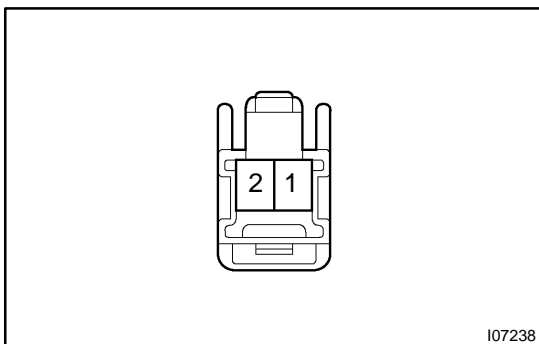


## INSPECTION

### 1. INSPECT STOP LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch pin free (Pedal depressed)	1 - 2	Continuity
Switch pin pushed in (Pedal released)	-	No continuity
Switch pin free (Pedal depressed)	-	No continuity
Switch pin pushed in (Pedal released)	3 - 4	Continuity

If continuity is not as specified, replace the switch.



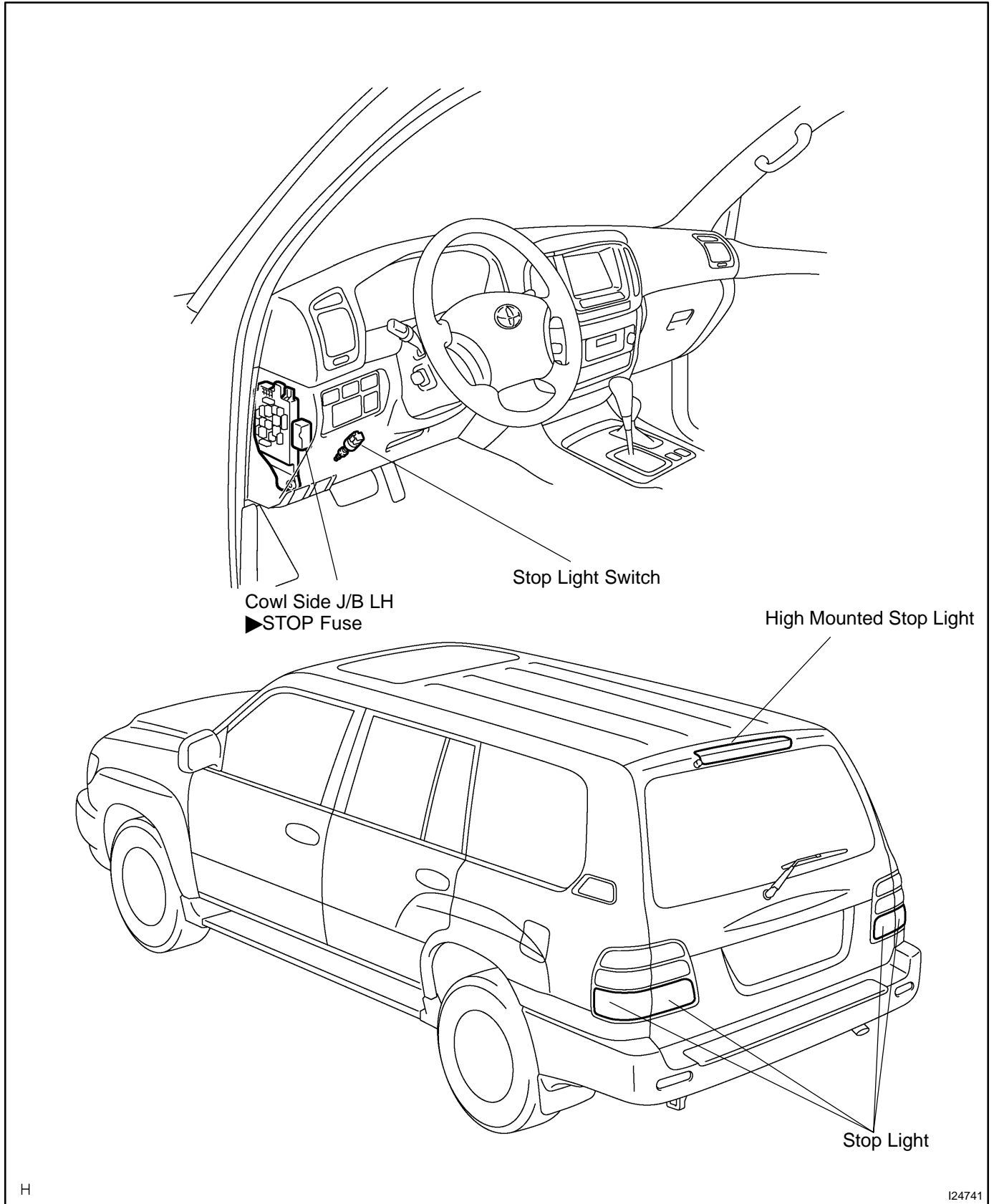
### 2. INSPECT HI-MOUNTED STOP LIGHT CONTINUITY

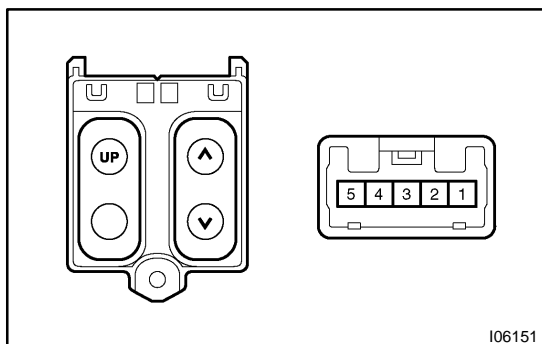
Using an ohmmeter, check that continuity exists between terminals.

If continuity is not as specified, replace the light assembly.

# STOP LIGHT SYSTEM LOCATION

BE0H6-13



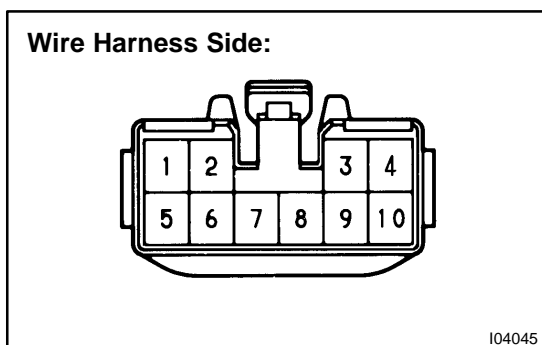


## INSPECTION

### 1. INSPECT SLIDING ROOF SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
SLIDE OPEN	3 - 5	Continuity
SLIDE OFF	-	No continuity
SLIDE CLOSE	3 - 4	Continuity
TILT DOWN	2 - 3	Continuity
TILT OFF	-	No continuity
TILT UP	1 - 3	Continuity

If continuity is not as specified, replace the switch.



### 2. INSPECT SLIDING ROOF CONTROL ASSEMBLY CIRCUIT

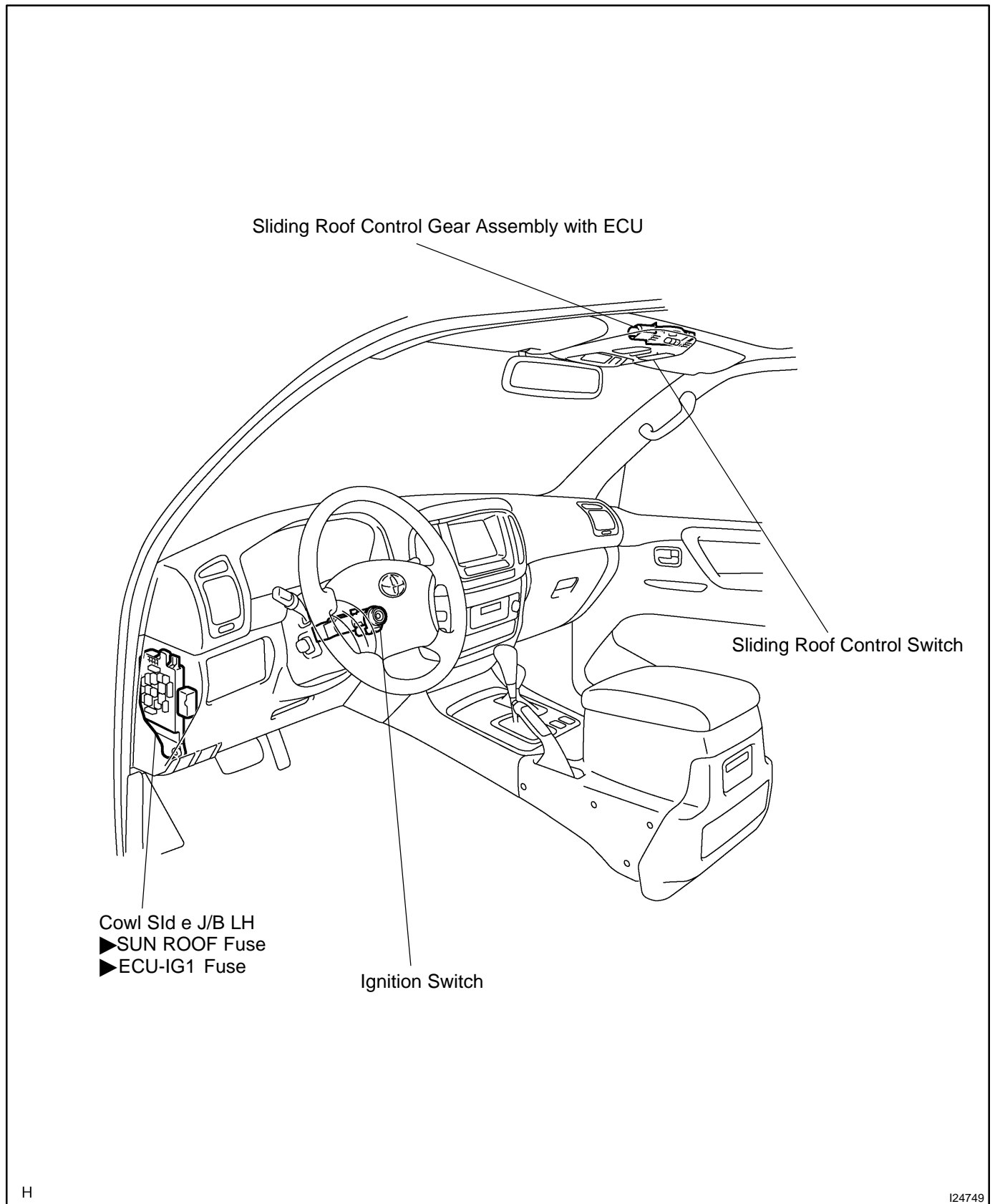
Disconnect the connector from the ECU and inspect the connector on the wire harness side, as shown in the chart.

Tester connection	Condition	Specified condition
1 - Ground	Constant	Continuity
4 - Ground	Sliding roof control switch (TILT) OFF or CLOSE	No continuity
4 - Ground	Sliding roof control switch (TILT) UP	Continuity
5 - Ground	Constant	Battery positive voltage
3 - Ground	Constant	Continuity
3 - Ground	Sliding roof control switch (TILT) OFF or UP	No continuity
7 - Ground	Sliding roof control switch (TILT) DOWN	Continuity
8 - Ground	Ignition switch LOCK or ACC	* No voltage
8 - Ground	Ignition switch ON	Battery positive voltage
9 - Ground	Sliding roof control switch (SLIDE) OFF or CLOSE	No continuity
9 - Ground	Sliding roof control switch (SLIDE) OPEN	Continuity
10 - Ground	Sliding roof control switch (SLIDE) OFF or OPEN	No continuity
10 - Ground	Sliding roof control switch (SLIDE) CLOSE	Continuity

\*: Exceptions: During 45 second period after ignition switch ON→OFF (ACC) or until driver or passenger door is opened after ignition switch ON→OFF (ACC).

If circuit is as specified, replace the relay.

# LOCATION

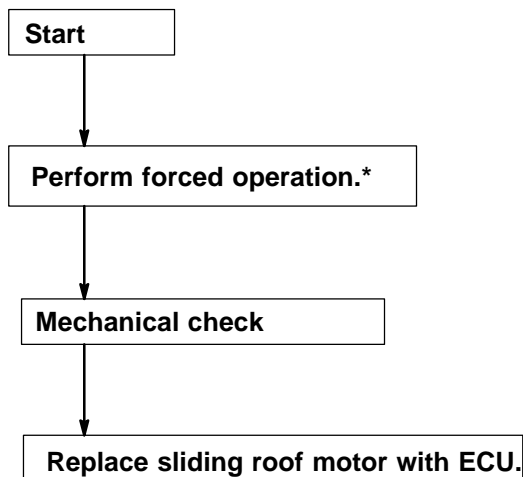


# SLIDING ROOF SYSTEM

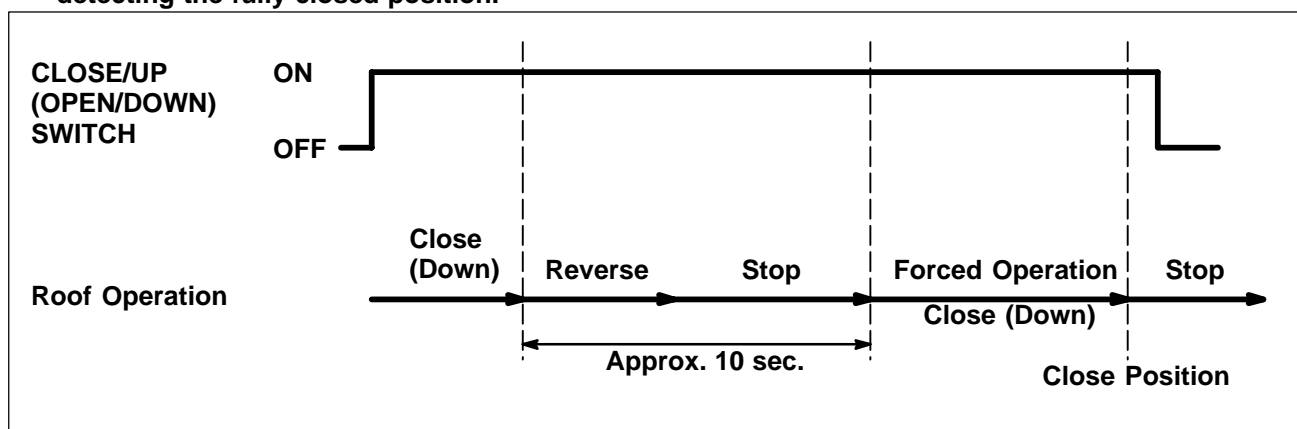
## TROUBLESHOOTING

BE009-02

Sliding Roof reverses during close (down) operation.



\*: Holding the CLOSE/UP (OPEN/DOWN) switch pressed inhibits the jam protection function at approx. 10 sec. after starting the reverse operation.  
 If the switch remains pressed any longer, the sliding door starts close operation and it stops when detecting the fully closed position.

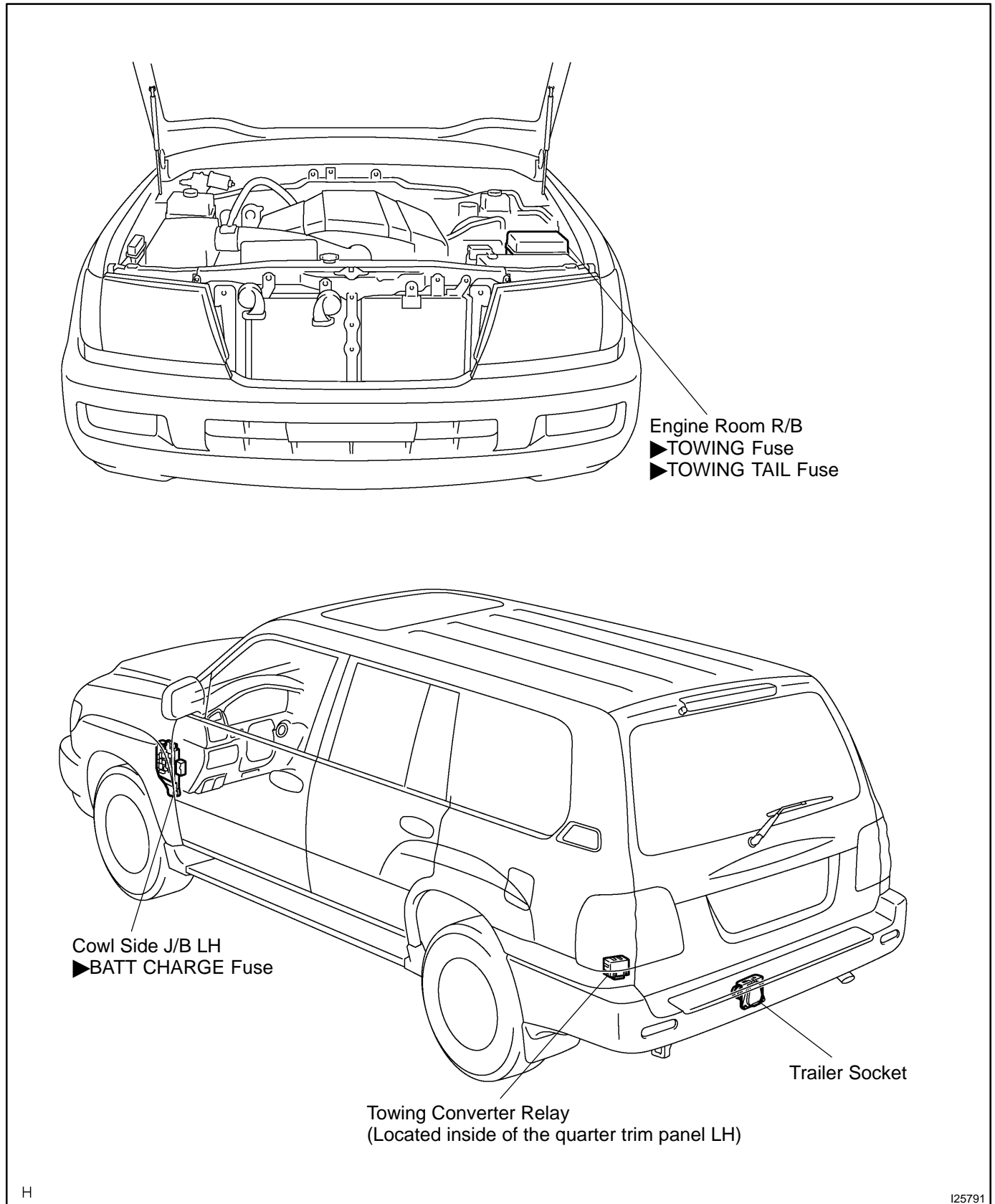


**HINT:**

At approx. 10 sec. after starting the reverse operation, it is switched to the forced close (down) operation.

# TRAILER TOWING LOCATION

BE2E2-01





# TROUBLESHOOTING

## PROBLEM SYMPTOMS TABLE

### IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH:

This system uses the body control system, so check the body control system before you proceed with troubleshooting (See page [DI-1038](#) ).

Symptom	Suspect Area	See page
Ignition switch is not set to each position.	4. Ignition switch 5. Power source circuit	<a href="#">BE-29</a> -
Ignition key illumination does not light up.	1. Bulb 2. Body ECU 3. Wire Hauness	- <a href="#">DI-1038</a> -
Key unlock warning system does not operate. (The buzzer does not sound when the driver's door is opened with the ignition OFF and key inserted)	1. Key Unlock Warning Switch 2. Door Courtesy Switch 3. Wire Harness	<a href="#">BE-29</a> <a href="#">BE-44</a> -
Key unlock warning system does not operate. (The buzzer sounds when the ignition key is in ACC or ON)	1. Ignition Switch 2. Wire Harness	<a href="#">BE-29</a> -

### HEADLIGHT AND TAILLIGHT SYSTEM:

This system uses the body control system, so check the body control system before you proceed with troubleshooting (See page [DI-1038](#) ).

Symptom	Suspect Area	See page
"Automatic light control system" does not operate.	1. Automatic Light Control Sensor 2. Light Control Switch 3. Door Courtesy Switch 4. Wire Harness	<a href="#">BE-32</a> <a href="#">BE-32</a> <a href="#">BE-44</a> -
Auto turn-off system does not operate when the driver's door is opened.	1. Drivers Door Courtesy Switch	<a href="#">BE-44</a>
Auto turn-off system: Headlight and taillight do not come on.	1. Body ECU 2. Wire Harness	<a href="#">DI-1038</a> -
Auto turn-off system: Headlight and taillight stay on.	1. Body ECU 2. Wire Harness	<a href="#">DI-1038</a> -
Only one headlight comes on.	1. Daytime Running Light No.3, 4 Relays 2. Body ECU 3. Bulb 4. Wire Harness	<a href="#">BE-32</a> <a href="#">BE-32</a> - -
"LO-beam" does not light (All).	1. Engine Room J/B Relay Circuit 2. Wire Harness	<a href="#">BE-15</a> -
"LO-beam" does not light (One side).	1. Bulb 2. H-LP L-LWR Fuse 3. H-LP R-LWR Fuse 4. Wire Harness	- - - -
"HI-beam" does not light (All).	1. Headlight Dimmer Switch 2. Body ECU 3. Wire Harness	<a href="#">BE-32</a> <a href="#">BE-32</a> -
"HI-beam" does not light (One side).	1. Bulb 2. H-LP L-UPR Fuse 3. H-LP R-UPR Fuse 4. Daytime Running Light No.3, 4 Relays 5. Wire Harness	- - - <a href="#">BE-32</a> -
"Flash" does not light.	1. Headlight Dimmer Switch 2. Body ECU 3. Wire Harness	<a href="#">BE-32</a> <a href="#">BE-32</a> -

BODY ELECTRICAL - TROUBLESHOOTING

Headlight does not come on.	<ol style="list-style-type: none"> <li>1. Engine Room J/B Relay Circuit</li> <li>2. Body ECU</li> <li>3. Daytime Running Light No.3, 4 Relays</li> <li>4. Headlight Dimmer Switch</li> <li>5. Light Control Switch</li> <li>6. Wire Harness</li> <li>7. Bulb</li> </ol>	<p>BE-15 BE-32 BE-32 BE-32 BE-32 - -</p>
Headlight does not come on with light control switch in HEAD.	<ol style="list-style-type: none"> <li>1. Light Control Switch</li> <li>2. Wire Harness</li> </ol>	<p>BE-32 -</p>
Headlight does not go out with light control switch in OFF.	<ol style="list-style-type: none"> <li>1. Engine Room J/B Relay Circuit</li> <li>2. Wire Harness</li> </ol>	<p>BE-15 -</p>
Headlight flickers.	<ol style="list-style-type: none"> <li>1. Bulb</li> <li>2. Wire Harness</li> </ol>	<p>- -</p>
Headlight is dark.	<ol style="list-style-type: none"> <li>1. Bulb</li> <li>2. Wire Harness</li> </ol>	<p>- -</p>
Taillight does not come on with light control switch in TAIL.	<ol style="list-style-type: none"> <li>1. Engine Room J/B Relay Circuit</li> <li>2. Light Control Switch</li> <li>3. Wire Harness</li> </ol>	<p>BE-15 BE-32 -</p>
Taillight does not go out with light control switch in OFF.	<ol style="list-style-type: none"> <li>1. Engine Room J/B Relay Circuit</li> <li>2. Light Control Switch</li> <li>3. Wire Harness</li> </ol>	<p>BE-15 BE-32 -</p>
Headlight does not come on with engine running and light control switch in OFF.	<ol style="list-style-type: none"> <li>1. ECU-B1 Fuse</li> <li>2. ECU-IG1 Fuse</li> <li>3. Body ECU</li> <li>4. Daytime Running Light No.3, 4 Relays</li> <li>5. Generator L Terminal</li> <li>6. Parking Brake Switch</li> <li>7. Wire Harness</li> </ol>	<p>- - BE-32 BE-32 CH-10 BE-63 -</p>

**FOG LIGHT SYSTEM:**

Symptom	Suspect Area	See page
Fog light does not light up with light control SW HEAD (Headlight is normal.)	<ol style="list-style-type: none"> <li>1. FOG Fuse</li> <li>2. Engine Room J/B Relay Circuit</li> <li>3. Fog Light Switch</li> <li>4. Wire Harness</li> </ol>	<p>- BE-15 BE-37 -</p>
Fog light does not light up with light control SW HEAD (Headlight does not light).	<ol style="list-style-type: none"> <li>1. *1 Other Parts</li> <li>2. Wire Harness</li> </ol>	<p>- -</p>
Only one light does not light up.	<ol style="list-style-type: none"> <li>1. Bulb</li> <li>2. Wire Harness</li> </ol>	<p>- -</p>

\*1: Inspect Headlight System

**TURN SIGNAL AND HAZARD WARNING SYSTEM:**

Symptom	Suspect Area	See page
"Hazard" and "Turn" do not light up.	<ol style="list-style-type: none"> <li>1. ECU-IG2 Fuse</li> <li>2. TURN HAZ Fuse</li> <li>3. Ignitioin Switch</li> <li>4. Turn Signal Flasher Relay</li> <li>5. Wire Harness</li> </ol>	<p>- - BE-29 BE-40 -</p>
Hazard warning light does not light up. (Turn is normal)	<ol style="list-style-type: none"> <li>1. Hazard Warning Switch</li> <li>2. Wire Harness</li> </ol>	<p>BE-40 -</p>
Turn signal does not light up. (Hazard is normal)	<ol style="list-style-type: none"> <li>1. Turn Signal Switch</li> <li>2. Wire Harness</li> </ol>	<p>BE-40 -</p>

Turn signal does not light up in one direction.	1. Turn Signal Switch 2. Wire Harness	BE-40 -
Only one bulb does not light up.	1. Bulb 2. Wire Harness	- -

**INTERIOR LIGHT SYSTEM:**

This system uses the body control system, so check the body control system before you proceed with troubleshooting(See page [DI-1038](#) ).

Symptom	Suspect Area	See page
All the lights do not come ON.	1. DOME Fuse 2. Body ECU 3. DOME Relay(Cowl Side J/B LH)	- <a href="#">DI-1038</a> -
The light does not come ON when the driver's door is opened.	1. Driver's Door Courtesy Switch 2. Wire Harness	<a href="#">BE-44</a> -
The light does not come ON when the passenger's door is opened.	1. Passenger's Door Courtesy Switch 2. Wire Harness	<a href="#">BE-44</a> -
The light does not come on when the rear-right door is opened.	1. Rear-Right Door Courtesy Switch 2. Wire Harness	<a href="#">BE-44</a> -
The light does not come on when the rear-left door is opened.	1. Rear-Left Door Courtesy Switch 2. Wire Harness	<a href="#">BE-44</a> -
Only one of the bulbs comes ON.	1. Bulb	-
The illumination does not fade out when all the doors are closed.	1. Courtesy Switch 2. Wire Harness 3. Body ECU	<a href="#">BE-44</a> - <a href="#">DI-1038</a>
The illumination does not fade out immediately when the ignition switch is turned to ACC or ON within 15 seconds after all the doors are closed.	1. Ignition Switch 2. ACC Fuse 3. ECU-IG1 Fuse 4. Body ECU 5. Wire Harness	<a href="#">BE-29</a> - - <a href="#">DI-1038</a> -
The illumination does not fade out immediately when all the doors are locked within 15 seconds after they are closed.	1. Door Unlock Detection Switch 2. Wire Harness	<a href="#">BE-88</a> -
Room light does not light up.	1. Bulb 2. Room Light 3. Rear Personal Light 4. Wire Harness	- <a href="#">BE-44</a> <a href="#">BE-44</a> -
Front personal light does not light up.	1. Bulb 2. Front Personal Light 3. Room Light 4. Wire Harness	- <a href="#">BE-44</a> <a href="#">BE-44</a> -
Rear Room light does not light up.	1. Bulb 2. Rear Room Light 3. Wire Harness	- <a href="#">BE-44</a> -
Vanity light does not light up.	1. Bulb 2. Vanity Light 3. Wire Harness	- <a href="#">BE-44</a> -
Glove compartment light does not light up.	1. Bulb 2. Glove Compartment Courtesy Switch 3. Wire Harness	- <a href="#">BE-44</a> -
Courtesy light does not light up.	1. Bulb 2. Door Courtesy Switch 3. Wire Harness	- <a href="#">BE-44</a> -

**BACK-UP LIGHT SYSTEM:**

Symptom	Suspect Area	See page
Back-up Light does not light up.	1. GAUGE2 Fuse 2. Ignition Switch 3. Wire Harness 4. Bulb	- <a href="#">BE-29</a> - -
Back-up Light remains always on.	1. Park/ Neutral Position Switch 2. Wire Harness	<a href="#">DI-402</a> -
Only one light does not light up.	1. Bulb 2. Wire Harness	- -

**STOP LIGHT SYSTEM:**

Symptom	Suspect Area	See page
Stop light does not light up.	1. STOP Fuse 2. Stop Light Switch 3. Wire Harness	- <a href="#">BE-50</a> -
Stop light always lights up.	1. Stop Light Switch 2. Wire Harness	<a href="#">BE-50</a> -
Only one light always lights up.	1. Wire Harness	-
Only one light does not light up.	1. Bulb 2. Wire Harness	- -

**WIPER AND WASHER SYSTEM:**

Symptom	Suspect Area	See page
Front wiper and washer do not operate.	1. WIPER Fuse 2. Wiper Switch 3. Wiper Motor 4. Wire Harness	- <a href="#">BE-52</a> <a href="#">BE-52</a> -
Front wiper does not operate in LO or HI.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	<a href="#">BE-52</a> <a href="#">BE-52</a> -
Front wiper does not operate in INT.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	<a href="#">BE-52</a> <a href="#">BE-52</a> -
Front washer motor does not operate.	1. WASHER Fuse 2. Washer Switch 3. Washer Motor 4. Wire Harness	- <a href="#">BE-52</a> <a href="#">BE-52</a> -
Front wiper does not operate when washer switch is ON.	1. WASHER Fuse 2. Washer Switch 3. Wiper Motor 4. Wire Harness	- <a href="#">BE-52</a> <a href="#">BE-52</a> -
Rear wiper does not operate.	1. RR WIPER Fuse 2. Rear Wiper Motor 3. Rear Wiper Switch 4. Rear Wiper Relay 5. Wire Harness	- <a href="#">BE-52</a> <a href="#">BE-52</a> <a href="#">BE-52</a> -
Rear wiper does not operate in INT or ON position.	1. Rear Wiper Switch 2. Rear Wiper Relay 3. Wire Harness	<a href="#">BE-52</a> <a href="#">BE-52</a> -
Rear wiper does not return to OFF position.	1. Rear Wiper Motor 2. Wire Harness	<a href="#">BE-52</a> -

Rear washer motor does not operate.	1. Rear Washer Motor 2. Rear Washer Switch 3. Wire Harness	BE-52 BE-52 -
Washer fluid does not operate.	1. Washer Hose and Nozzle	-

\*1: Inspect wiper arm and blade set positions.

### COMBINATION METER (Meter Gauges and Illumination):

Symptom	Suspect Area	See page
Tachometer, fuel gauge and engine coolant temperature gauge do not operate.	1. GAUGE2 Fuse 2. Combination Meter 3. Wire Harness	- BE-58 -
Speedometer does not operate.	1. Speed Sensor 2. Combination Meter 3. Wire Harness	BE-63 BE-58 -
Tachometer does not operate.	1. Igniter 2. Combination Meter 3. Wire Harness	IG-1 BE-58 -
Fuel gauge does not operate or is in abnormal operation.	1. Fuel Receiver Gauge 2. Fuel Sender Gauge 3. Combination Meter 4. Wire Harness	BE-63 BE-63 BE-58 -
Oil pressure gauge does not operate.	1. Oil Pressure Receiver Gauge 2. Oil Pressure Sender Gauge 3. Combination Meter 4. Wire Harness	BE-63 BE-63 BE-58 -
Voltmeter does not operate.	1. Voltmeter 2. Combination Meter 3. Wire Harness	BE-63 BE-58 -
Engine coolant temperature gauge does not operate or is in abnormal operation	1. Engine Coolant Temperature Receiver Gauge 2. Engine Coolant Temperature Sender Gauge 3. Combination Meter 4. Wire Harness	BE-63 BE-63 BE-58 -
All illumination lights do not light up.	1. Light Control Rheostat 2. Wire Harness	BE-63 -
Brightness does not change even when rheostat is turned.	1. Bulb 2. Wire Harness	- -
Only one illumination light does not light up.	1. Bulb 2. Wire Harness	- -

### COMBINATION METER (Warning Light):

Symptom	Suspect Area	See page
Warning lights do not light up. (Except discharge, open door and SRS)	1. GAUGE1 Fuse 2. Combination Meter 3. Wire Harness	- BE-58 -
Fuel level warning light does not light up.	1. LED 2. Combination Meter 3. Fuel Sender Gauge 4. Wire Harness	- BE-58 BE-63 -
ABS warning light does not light up.	1. LED 2. ABS ECU 3. Wire Harness	- DI-502 -

**BODY ELECTRICAL - TROUBLESHOOTING**

Seat belt warning light does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Seat Belt Buckle Switch</li> <li>3. Wire Harness</li> <li>4. Body ECU</li> </ol>	<p>-</p> <p><a href="#">BE-63</a></p> <p><a href="#">BE-63</a></p> <p><a href="#">DI-1038</a></p>
Discharge warning light does not light up.	<ol style="list-style-type: none"> <li>1. METER Fuse</li> <li>2. LED</li> <li>3. Wire Harness</li> <li>4. Generator</li> </ol>	<p>-</p> <p>-</p> <p>-</p> <p><a href="#">CH-2</a></p>
Brake warning light does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Parking Brake Switch</li> <li>3. Brake Fluid Level Warning Switch</li> <li>4. LED Check Relay</li> <li>5. Combination Meter</li> <li>6. Wire Harness</li> </ol>	<p>-</p> <p><a href="#">BE-63</a></p> <p><a href="#">BE-63</a></p> <p><a href="#">BE-63</a></p> <p><a href="#">BE-58</a></p> <p>-</p>
SRS warning light does not light up.	<ol style="list-style-type: none"> <li>1. ECU-B2 Fuse</li> <li>2. LED</li> <li>3. Airbag Sensor Assembly</li> <li>4. Combination Meter</li> <li>5. Wire Harness</li> </ol>	<p>-</p> <p>-</p> <p><a href="#">DI-690</a></p> <p><a href="#">BE-58</a></p> <p>-</p>
Open door warning light does not light up.	<ol style="list-style-type: none"> <li>1. DOME Fuse</li> <li>2. LED</li> <li>3. Door Courtesy Switch</li> <li>4. Combination Meter</li> <li>5. Wire Harness</li> </ol>	<p>-</p> <p>-</p> <p><a href="#">BE-44</a></p> <p><a href="#">BE-58</a></p> <p>-</p>
A/T oil temperature warning light does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Combination Meter</li> <li>3. Wire Harness</li> <li>4. ECM</li> </ol>	<p>-</p> <p><a href="#">BE-63</a></p> <p><a href="#">BE-58</a></p> <p><a href="#">DI-1</a></p>

**COMBINATION METER (Indicator Light):**

Symptom	Suspect Area	See page
Cruise control indicator light does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Combination Meter</li> <li>3. Wire Harness</li> <li>4. ECM</li> </ol>	<p>-</p> <p><a href="#">BE-58</a></p> <p>-</p> <p><a href="#">DI-1</a></p>
High-beam indicator light does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Combination Meter</li> <li>3. Wire Harness</li> <li>4. Headlight System</li> </ol>	<p>-</p> <p><a href="#">BE-58</a></p> <p>-</p> <p><a href="#">BE-30</a></p>
Turn indicator light does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Combination Meter</li> <li>3. Wire Harness</li> <li>4. Turn Signal and Hazard Warning System</li> </ol>	<p>-</p> <p><a href="#">BE-58</a></p> <p>-</p> <p><a href="#">BE-39</a></p>
Shift indicator lights do not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Combination Meter</li> <li>3. Park/Neutral Position Switch</li> <li>4. Wire Harness</li> </ol>	<p>-</p> <p><a href="#">BE-58</a></p> <p>-</p> <p>-</p>
Only one shift indicator does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Combination Meter</li> </ol>	<p>-</p> <p><a href="#">BE-58</a></p>
Malfunction indicator light does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Combination Meter</li> <li>3. Wire Harness</li> <li>4. ECM</li> </ol>	<p>-</p> <p><a href="#">BE-58</a></p> <p>-</p> <p><a href="#">DI-1</a></p>

ECT PWR indicator light does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. ECT Pattern Select Switch</li> <li>3. Combination Meter</li> <li>4. Wire Harness</li> <li>5. ECT System</li> </ol>	<p>-</p> <p>-</p> <p><a href="#">BE-58</a></p> <p>-</p> <p><a href="#">DI-358</a></p>
2nd start ETCS indicator light does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Combination Meter</li> <li>3. Wire Harness</li> <li>4. ECM</li> </ol>	<p>-</p> <p><a href="#">BE-58</a></p> <p>-</p> <p><a href="#">DI-1</a></p>
Center Diff. lock indicator light does not light up.	<ol style="list-style-type: none"> <li>1. LED</li> <li>2. Combination Meter</li> <li>3. Transfer 4WD Position Detection Switch</li> <li>4. Wire Harness</li> </ol>	<p>-</p> <p><a href="#">BE-58</a></p> <p><a href="#">TR-49</a></p> <p>-</p>
Indicator lights do not light up. (Except Turn, Hi-beam and security)	<ol style="list-style-type: none"> <li>1. GAUGE2 Fuse</li> <li>2. Wire Harness</li> </ol>	<p>-</p> <p>-</p>

**DEFOGGER SYSTEM:**

Symptom	Suspect Area	See page
All defogger systems do not operate.	<ol style="list-style-type: none"> <li>1. DEFOG Fuse</li> <li>2. DEFOG Relay</li> <li>3. Defogger Switch (Integration Control Panel Assembly)</li> <li>4. Wire Harness</li> </ol>	<p>-</p> <p>-</p> <p><a href="#">BE-75</a></p> <p>-</p>
Rear window defogger does not operate.	<ol style="list-style-type: none"> <li>1. Defogger Wire</li> <li>2. Choke Coil</li> <li>3. Wire Harness</li> </ol>	<p><a href="#">BE-75</a></p> <p>-</p> <p>-</p>
Mirror defogger does not operate.	<ol style="list-style-type: none"> <li>1. MIR HTR Fuse</li> <li>2. Engine Room J/B Relay Circuit</li> <li>3. Mirror Defogger</li> <li>4. Wire Harness</li> </ol>	<p>-</p> <p><a href="#">BE-15</a></p> <p><a href="#">BE-75</a></p> <p>-</p>

**POWER WINDOW CONTROL SYSTEM:**

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
All the power windows do not operate. (Power Door Lock System is normal.)	<ol style="list-style-type: none"> <li>1. P/W (FL, FR, RL, RR) Fuse</li> <li>2. Power Window Master Switch</li> <li>3. Wire Harness</li> </ol>	<p>-</p> <p><a href="#">BE-79</a></p> <p>-</p>
Only the driver's window does not operate.	<ol style="list-style-type: none"> <li>1. Power Window Master Switch</li> <li>2. Body ECU</li> <li>3. Power Window Motor</li> <li>4. Wire Harness</li> </ol>	<p><a href="#">BE-79</a></p> <p><a href="#">DI-1038</a></p> <p><a href="#">BE-79</a></p> <p>-</p>
"Window lock function" does not operate.	<ol style="list-style-type: none"> <li>1. Power Window Master Switch</li> </ol>	<p><a href="#">BE-79</a></p>

**POWER DOOR LOCK CONTROL SYSTEM:**

This system uses the body control system, so check diagnosis system of the body control system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
All the doors cannot be locked or unlocked. (Power Window Control System is normal.)	<ol style="list-style-type: none"> <li>1. DOOR Fuse</li> <li>2. Door Lock Control Switch</li> <li>3. Wire Harness</li> <li>4. Body ECU</li> </ol>	<p>-</p> <p><a href="#">BE-88</a></p> <p>-</p> <p><a href="#">DI-1038</a></p>
Only one side door lock control does not operate.	<ol style="list-style-type: none"> <li>1. Door Lock Motor</li> <li>2. Wire Harness</li> </ol>	<p><a href="#">BE-88</a></p> <p>-</p>

**BODY ELECTRICAL - TROUBLESHOOTING**

Door key related function does not operate.	1. Door Key Lock and Unlock Switch 2. Wire Harness 3. Body ECU	BE-88 - DI-1038
Key confinement prevention function does not operate.	1. Key Unlock Warning Switch 2. Door Courtesy Switch 3. Wire Harness	BE-29 BE-44 -

**POWER SEAT CONTROL SYSTEM:**

Symptom	Suspect Area	See page
Both driver and passenger power seats do not operate. (Door lock does not operate.)	1. ALTS Fuse 2. Wire Harness	- -
Driver's seat does not operate.	1. LH SEAT Fuse 2. Power Seat Switch (D) 3. Wire Harness	- BE-110 -
Passenger's seat does not operate.	1. RH SEAT Fuse 2. Power Seat Switch (P) 3. Wire Harness	- BE-110 -
"Slide operation" does not operate.	1. Power Seat Switch (D, P) 2. Wire Harness 3. Slide Motor (D, P)	BE-110 - BE-110
"Front vertical operation" does not operate.	1. Power Seat Switch (D, P) 2. Wire Harness 3. Front Vertical Motor (D, P)	BE-110 - BE-110
"Lifter operation" does not operate.	1. Power Seat Switch (D, P) 2. Wire Harness 3. Lifter Motor (D, P)	BE-110 - BE-110
"Reclining operation" does not operate.	1. Power Seat Switch (D, P) 2. Wire Harness 3. Reclining Motor (D, P)	BE-110 - BE-110
"Lumbar support operation" does not operate.	1. Power Seat Switch (D) 2. Wire Harness 3. Lumbar Support Motor (D)	BE-110 - BE-110

(D): Driver's Seat

(P): Passenger's Seat

**POWER MIRROR CONTROL SYSTEM:**

Symptom	Suspect Area	See page
Mirror does not operate.	1. ACC Fuse 2. Mirror Switch 3. Wire Harness	- BE-117 -
Mirror operates abnormally.	1. Mirror Switch 2. Mirror Motor 3. Wire Harness	BE-117 BE-117 -

**SEAT HEATER SYSTEM:**

Symptom	Suspect Area	See page
Seat heaters do not operate. (Driver's and Passenger's)	1. SEAT HTR Fuse 2. Seat Heater Switch (D, P) 3. Wire Harness 4. Seat Heater	- BE-121 - BE-121
Driver's seat heater does not operate.	1. Seat Heater Switch (D, P) 2. Wire Harness	BE-121 -



Passenger's seat heater does not operate.	1. Seat Heater Switch (D, P) 2. Wire Harness	BE-121 -
Seat heater temperature is too hot.	1. Seat Heater	BE-121

**AUDIO SYSTEM:**

Symptom	Suspect Area	See page
Audio system abnormal operation.	TROUBLESHOOTINGS	BE-129

**MULTI DISPLAY:**

Symptom	Suspect Area	See page
Clock will not operate.	TROUBLESHOOTING	BE-178
Clock loses or gains time.	TROUBLESHOOTING	BE-178

**GARAGE DOOR OPENER SYSTEM:**

Symptom	Suspect Area	See page
The equipment of which code has been registered does not operate.	1. Garage Door Opener Switch 2. Wire Harness 3. *	BE-190 - -
LED does not light up. (Even though either switch is pressed.)	1. Garage Door Opener Switch 2. Wire Harness	BE-190 -
LED does not light up. (Only one switch is pressed.)	Garage Door Opener Switch	BE-190

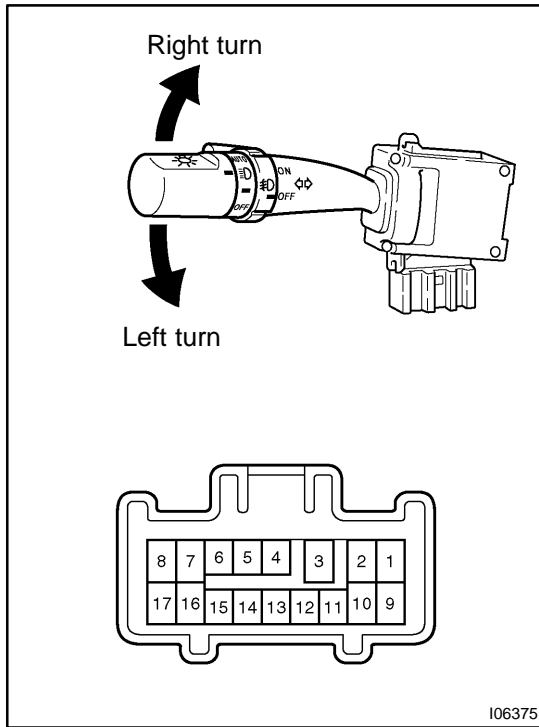
\* As the GARAGE DOOR OPENER on the vehicle side seems to be normal, check the OPENER on the equipment side, of which code has been registered.

**ENGINE IMMOBILIZER SYSTEM:**

Symptom	Suspect Area	See page
Engine immobilizer system does not operate.	See DIAGNOSIS SYSTEM	DI-1002

**HORN SYSTEM:**

Symptom	Suspect Area	See page
Horn system does not operate.	1. HORN Fuse 2. Engine Room J/B Relay Circuit 3. Horn Switch 4. Horn 5. Wire Harness	- BE-15 BE-198 BE-198 -
Horns blow all the time.	1. Engine Room J/B Relay Circuit 2. Horn Switch 3. Wire Harness	BE-15 BE-198 -
One horn operates but the other horn does not operate.	1. Horn 2. Wire Harness	BE-198 -
Horns operate abnormally.	1. Engine Room J/B Relay Circuit 2. Horn 3. Wire Harness	BE-15 BE-198 -

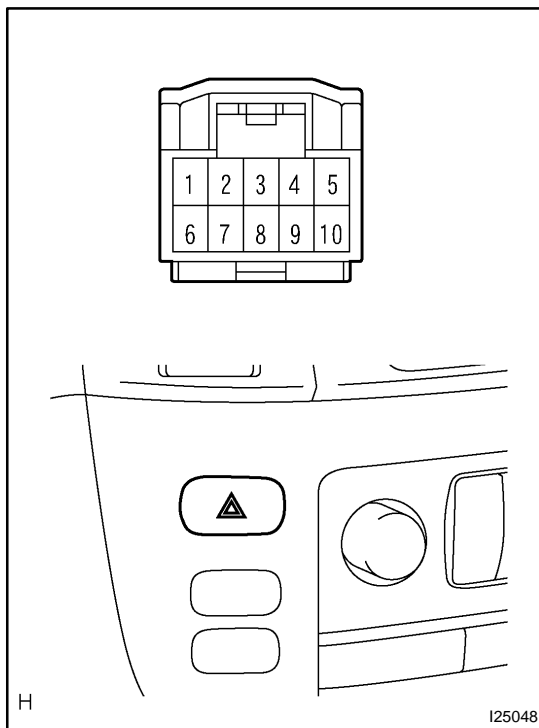


## INSPECTION

### 1. INSPECT TURN SIGNAL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Left turn	7 - 8	Continuity
Neutral	-	No continuity
Right turn	6 - 7	Continuity

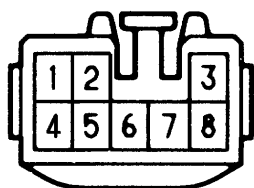
If continuity is not as specified, replace the switch.



### 2. INSPECT HAZARD WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Hazard button FREE	3 - 5	No continuity
Hazard button Pushed in	3 - 5	Continuity

If continuity is not as specified, replace the switch.

**Wire Harness Side:**

I04046

**3. INSPECT TURN SIGNAL FLASHER CIRCUIT**

Disconnect the connector from the combination switch and inspect the connector on the wire harness side, as shown.

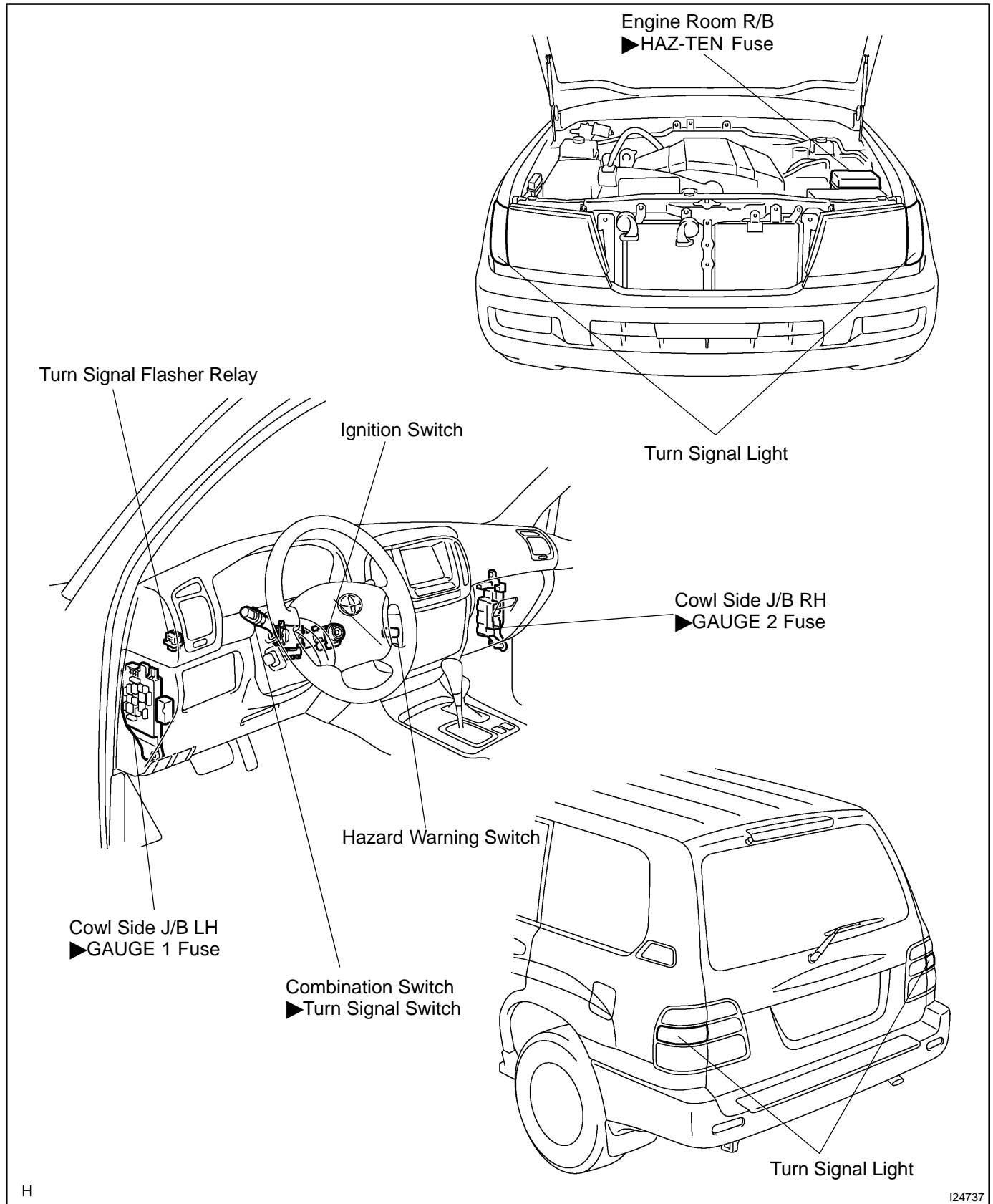
Tester connection	Condition	Specified condition
2 - Ground	Constant	Continuity
3 - Ground	Constant	Continuity
5 - Ground	Turn signal switch RIGHT or OFF	No continuity
5 - Ground	Turn signal switch LEFT	Continuity
6 - Ground	Turn signal switch LEFT or OFF	No continuity
6 - Ground	Turn signal switch RIGHT	Continuity
7 - Ground	Constant	Continuity
8 - Ground	Hazard warning switch OFF	No continuity
8 - Ground	Hazard warning switch ON	Continuity
1 - Ground	Ignition switch LOCK or ACC	No voltage
1 - Ground	Ignition switch ON	Battery positive voltage
4 - Ground	Constant	Battery positive voltage

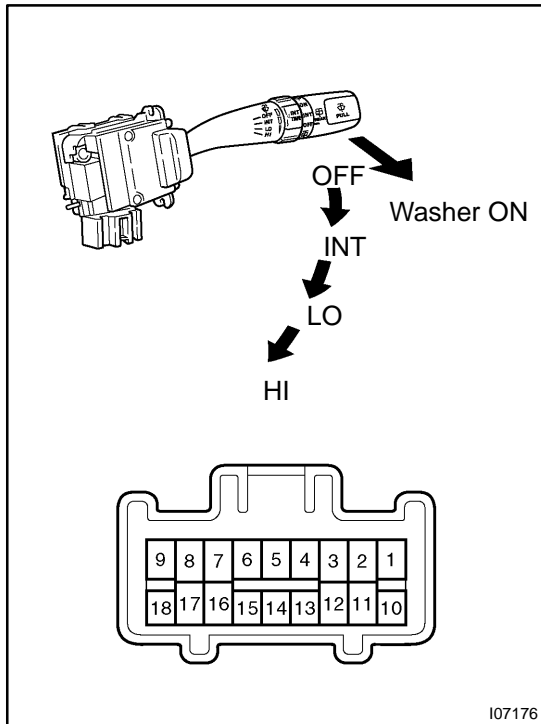
If circuit is as specified, replace the relay.

If circuit is not as specified, inspect the circuits connected to other parts.

# TURN SIGNAL AND HAZARD WARNING SYSTEM LOCATION

BE0H0-12



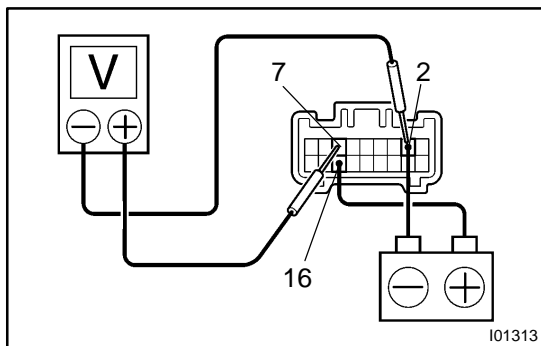


## INSPECTION

### 1. INSPECT FRONT WIPER AND WASHER SWITCH CONTINUITY

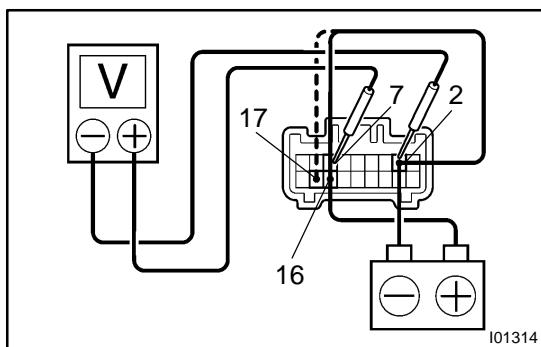
Switch position	Tester connection	Specified condition
OFF	7 - 16	Continuity
INT	7 - 16	Continuity
LO	7 - 17	Continuity
HI	8 - 17	Continuity
Washer OFF	-	No continuity
Washer ON	2 - 11	Continuity

If continuity is not as specified, replace the switch.



### 2. INSPECT FRONT WIPER INTERMITTENT OPERATION

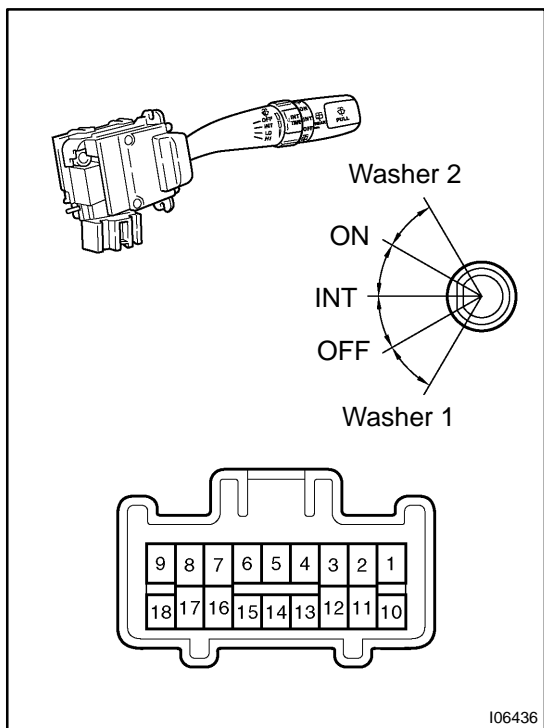
- Turn the wiper switch to INT position.
- Turn the intermittent time control switch to FAST position.
- Connect the positive (+) lead from the battery to terminal 16 and the negative (-) lead to terminal 2.
- Connect the positive (+) lead from the voltmeter to terminal 7 and the negative (-) lead to terminal 2, check that the meter needle indicates battery voltage.



- After connecting terminal 16 to terminal 17, connect to terminal 2 to terminal 17, check the voltage rises from 0 volts to battery voltage within the times, as shown in the table.

INT time control switch position	Voltage
FAST	0.6 - 2.6 secs. 
SLOW	5.7 - 15.7 secs. 

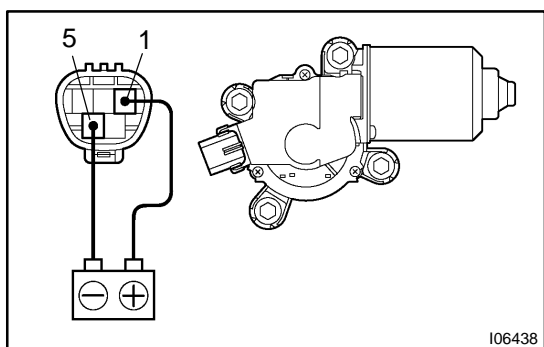
If operation is not as specified, replace the wiper and washer switch.



**3. INSPECT REAR WIPER AND WASHER SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
Washer 1	2 - 12	Continuity
OFF	-	No Continuity
INT	2 - 13	Continuity
ON	2 - 10	Continuity
Washer 2	2 - 10 - 12	Continuity

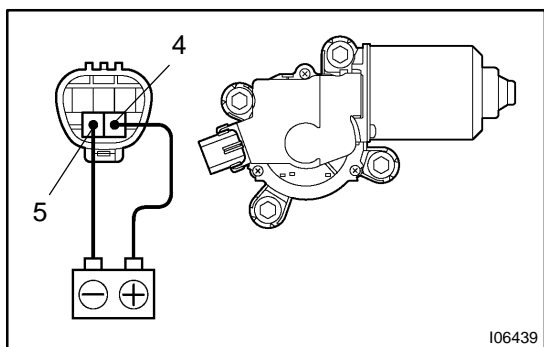
If continuity is not as specified, replace the switch.



**4. Low speed: INSPECT FRONT WIPER MOTOR OPERATION**

Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 5, check that the motor operates at low speed.

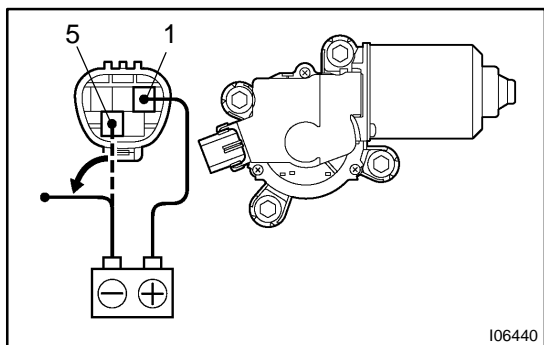
If operation is not as specified, replace the motor.



**5. High speed: INSPECT FRONT WIPER MOTOR OPERATION**

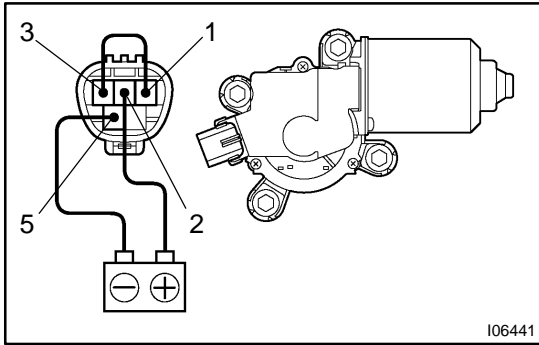
Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 5, check that the motor operates at high speed.

If operation is not as specified, replace the motor.

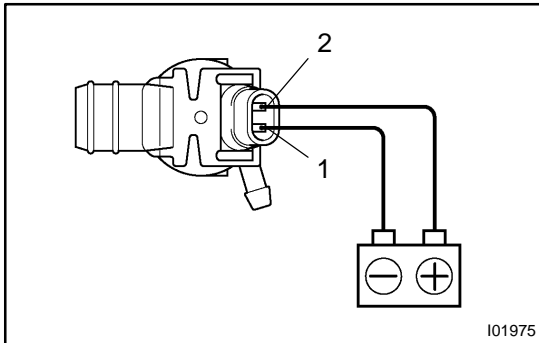


**6. Stopping at stop position: INSPECT FRONT WIPER MOTOR OPERATION**

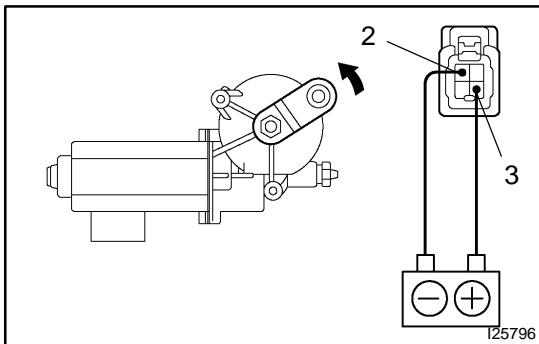
- (a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 1.



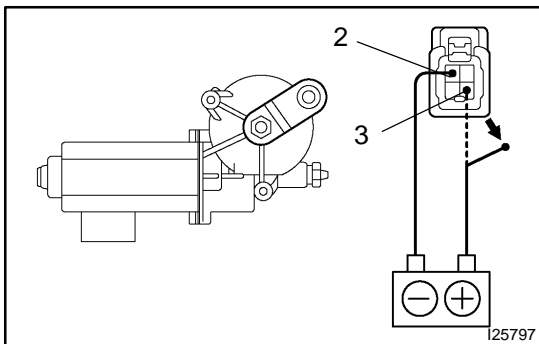
- (b) Connect terminals 1 and 3.
  - (c) Connect the positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 5, check that the motor stops running at the stop position after the motor operates again.
- If operation is not as specified, replace the motor.



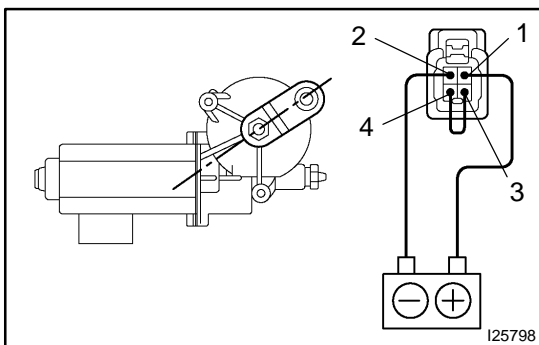
- 7. INSPECT FRONT WASHER MOTOR OPERATION**  
 Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, check that the motor operates.



- 8. Low speed: INSPECT REAR WIPER MOTOR OPERATION**  
 Connect the positive (+) lead from the battery to terminal 3 and negative (-) lead to terminal 2, check that the motor operates at low speed.  
 If operation is not as specified, replace the motor.

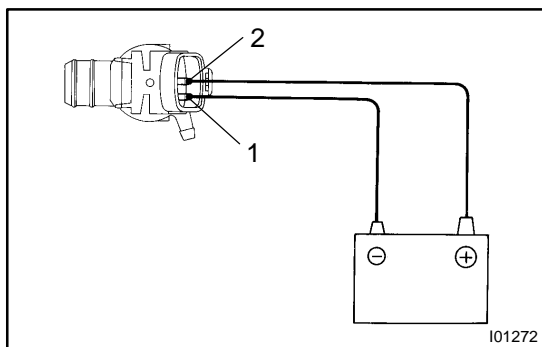


- 9. Stopping at stop position: INSPECT REAR WIPER MOTOR OPERATION**  
 (a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 3.



- (b) Connect terminals 3 and 4.
  - (c) Connect the positive (+) lead from the battery to terminal 1 and negative (-) lead to terminal 2, check that the motor stops running at the stop position after the motor operates again.
- If operation is not as specified, replace the motor.

**NOTICE:**  
 These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.  
 If operation is not as specified, replace the motor.

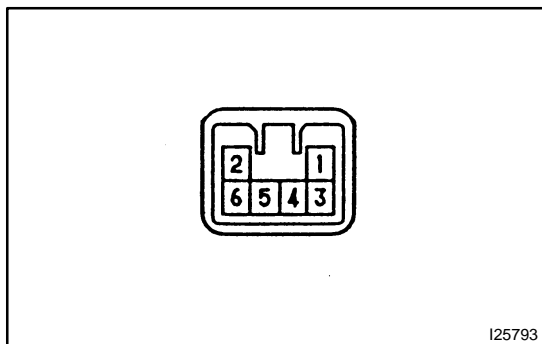
**10. INSPECT REAR WASHER MOTOR OPERATION**

Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, check that the motor operates.

**NOTICE:**

**These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.**

If operation is not as specified, replace the motor.

**11. INSPECT REAR WIPER RELAY CONTINUITY**

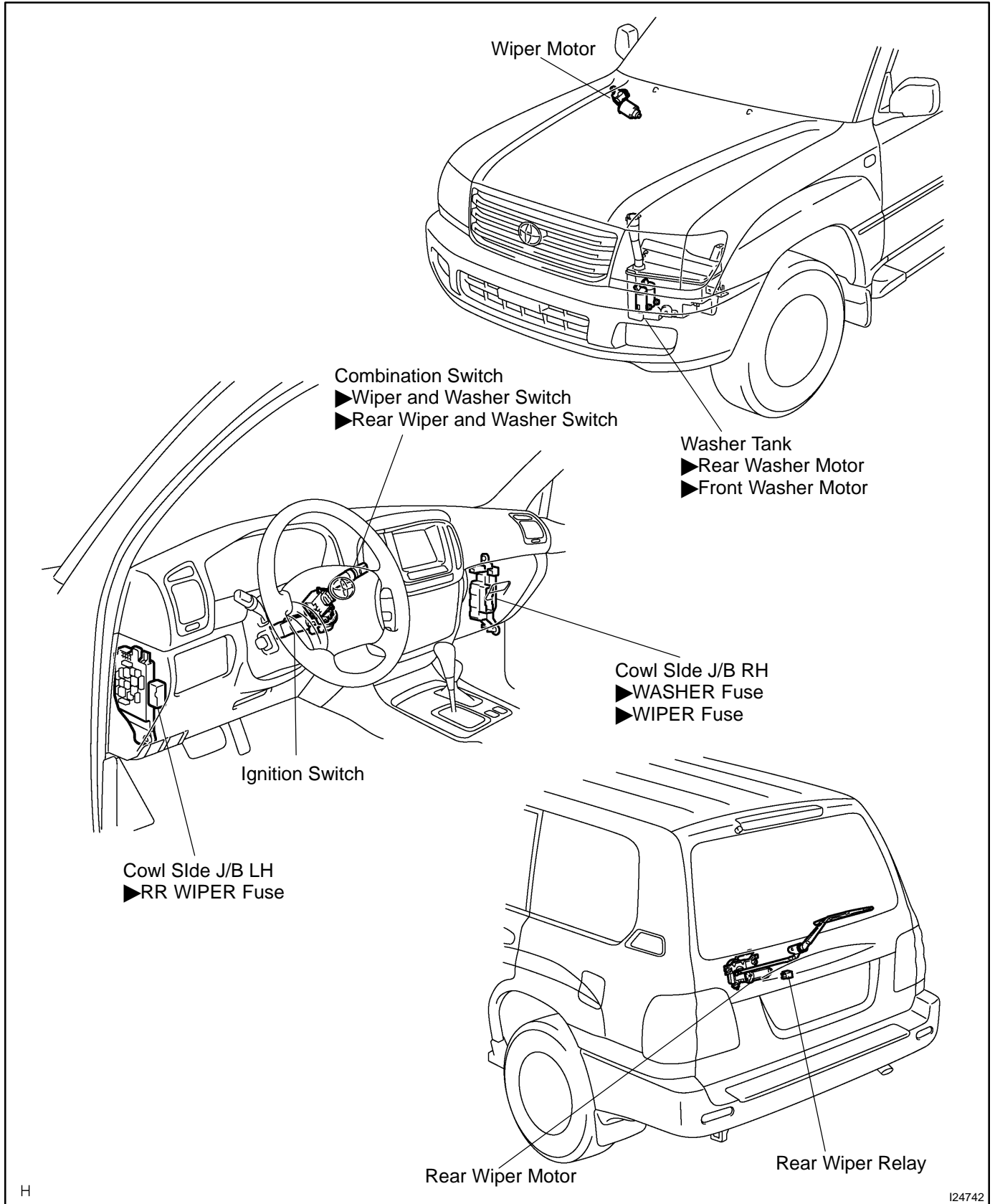
Switch position	Tester connection	Specified condition
OFF	-	-
INT	1 - 4 - 6	Continuity
LO	3 - 5 - 6	Continuity
Wash2	3 - 5 - 6	Continuity

If continuity is not as specified, replace the relay.



# WIPER AND WASHER SYSTEM LOCATION

BE0HN-11



## INSPECTION

### 1. CHARACTERS OF WIRELESS DOOR LOCK

- (a) The operation distance changes according to how customers hold the transmitter or where it is used.
- (b) Because of using the very weak radio wave, if there is a strong wave or noise on the frequency being used, the operation distance may become shorter.

### 2. WIRELESS DOOR LOCK BASIC FUNCTION

- (a) Stand on the driver's side. Stay 1 m away from the vehicle.
- (b) Turn the transmitter toward the vehicle and press any one of the transmission switched for 1 sec.

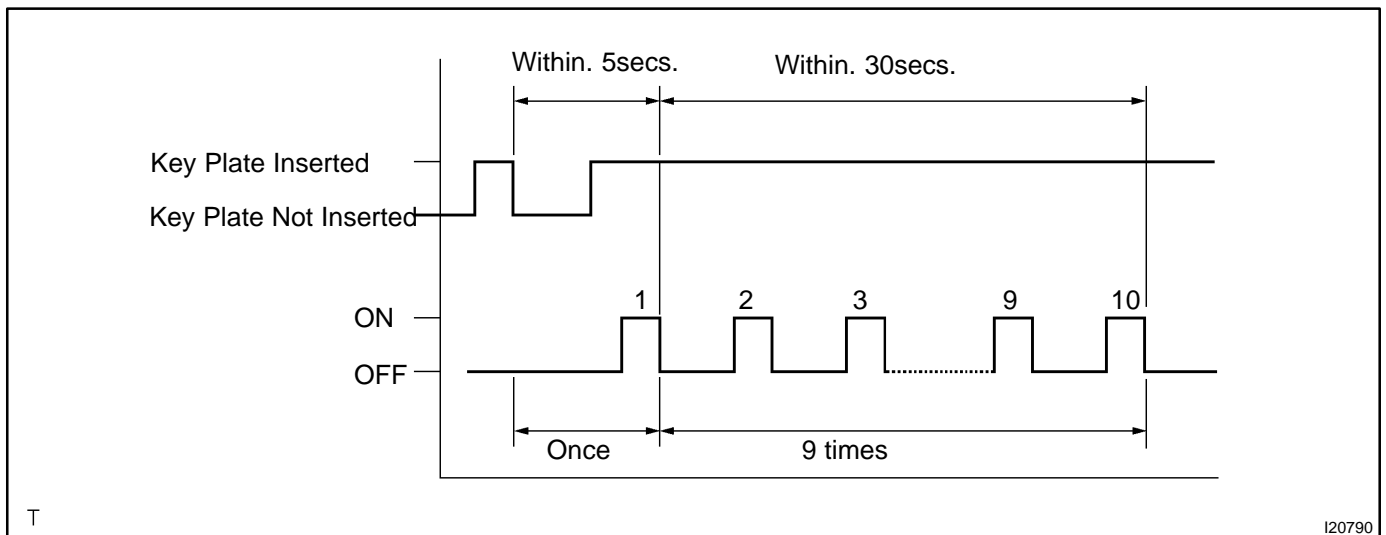
### 3. INSPECT WIRELESS DOOR LOCK DIAGNOSIS MODE

- (a) Start up diagnosis mode.

HINT:

Follow the method below.

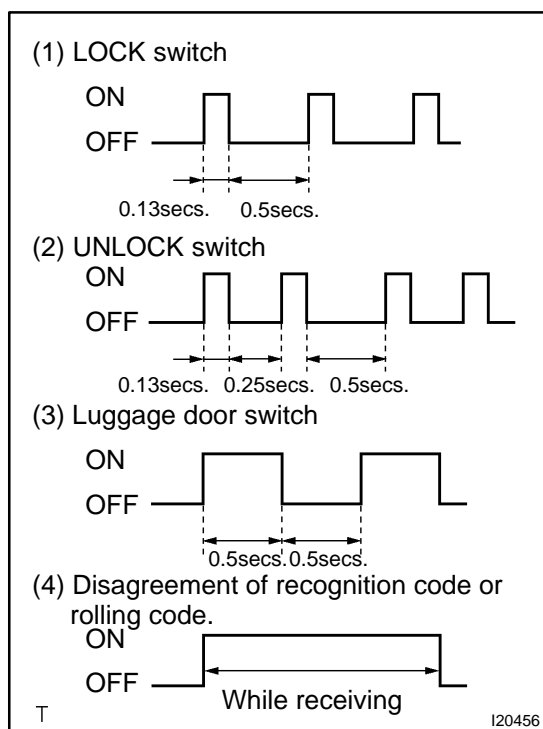
- (1) Insert the ignition key into the ignition key cylinder.
- (2) Remove the ignition key from the ignition key cylinder.
- (3) Insert the key into the ignition switch.
- (4) Turn the ignition switch ON once within 5 sec.
- (5) Repeat turning the ignition switch OFF → ON 9 times within 30 sec.
- (6) Enter the diagnosis mode, and make sure that the taillight lights up.



- (b) Finishing the Diagnosis Mode.

During the Diagnosis mode, turn the ignition switch OFF → ON to go back to the normal mode.

At this time make sure that the taillight lights up.



(c) Diagnosis Mode Check.

HINT:

Check how the taillight lights up when pressing each transmitter switch.

- (1) LOCK switch
- (2) UNLOCK switch
- (3) Luggage door switch
- (4) Disagreement of recognition code or rolling code.

HINT:

If (4) is detected in the Diagnosis Check, conduct the recognition code registration.

- (5) No response from the taillight.

HINT:

Conduct the following checks.

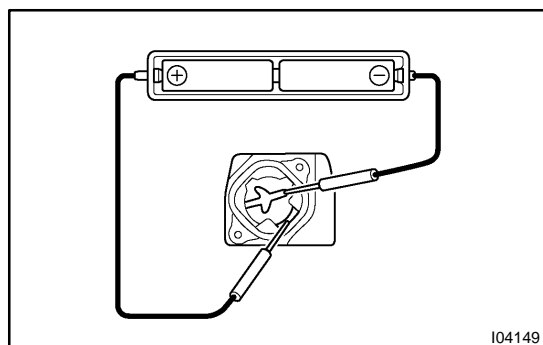
- ▶ Wireless door lock transmitter.
- ▶ Wireless door lock receiver.

#### 4. INSPECT WIRELESS DOOR LOCK TRANSMITTER OPERATION

HINT:

Refer to "Wireless door lock control receiver and transmitter replacement".

- (a) Using a screwdriver, remove the screw and cover.
- (b) Remove the battery (lithium battery).



(c) Install a new or normal battery (lithium battery).

HINT:

When a new or normal battery can not be obtained, connect 2 new 1.5 V batteries in series, connect the battery (+) to the battery receptacle side terminal and battery (-) to the bottom terminal, then apply 3 V voltage to the transmitter.

- (d) In the location where is approx. 1 M away from driver's outside handle in the right direction, face the key plate of the transmitter to the vehicle, and check the transmitter operation when pressing transmission switch on the side of the transmitter body.
- (e) Install the battery (lithium battery).
- (f) Install a cover so that O-ring is not distorted or slipped off.
- (g) Using a screwdriver, tighten the screw.

**Standard:**

- ▶ Remote control of vehicle door lock can be operated.
- ▶ LED lights up more than once.

HINT:

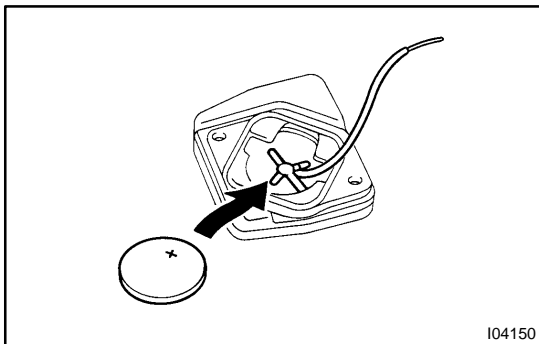
- ▶ The minimum operation distance differs according to operator, the way of holding, and location.

- ▶ As weak wave is used, operation distance might be shortened when noise is detected in strong wave or used frequency.

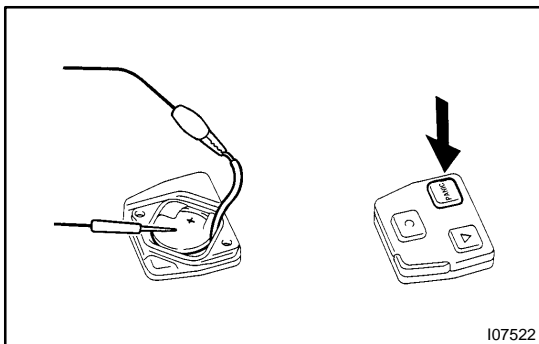
## 5. CHECK BATTERY CAPACITY

### HINT:

- ▶ Make sure to use the TOYOTA electrical tester.
- ▶ With the battery unloaded, judge can not be made whether the battery is available or not on the test.
- ▶ When the transmitter is faulty, the energy amount left in the battery might not be checked correctly.
- ▶ On the lithium battery used for the transmitter, the voltage more than 2.5 V with the battery unloaded is shown on the tester until the energy is completely consumed. Accordingly when inspecting the energy amount left in the battery, it is necessary to measure the voltage when the battery is loaded. (1.2 k $\Omega$ ).



- (a) Remove the 2 screws and cover using a (-) driver.
- (b) Remove the battery (lithium battery) from the transmitter.
- (c) Connect the lead to the (-) terminal of the transmitter and install the battery.



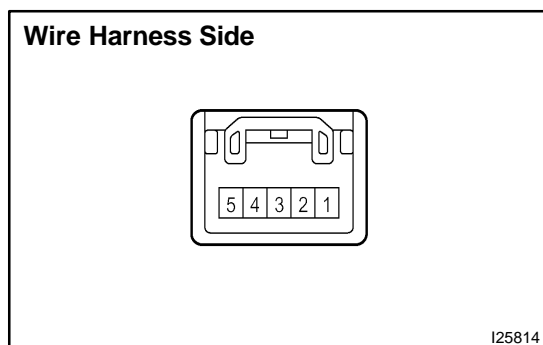
- (d) Connect the (+) tester to the (+) battery (lithium battery), and (-) tester to the lead respectively.
- (e) Press one of the transmitting switches on the transmitter for approx. 1 second.
- (f) Press the transmitting switch on the transmitter again to check the voltage.

**Standard: 2.1 V or more**

### HINT:

- ▶ When the temperature of the battery is low, the judge can not be made correctly. When the outcome of the test is less than 2.1 V, conduct the test again after leaving the battery in the place at 18 °C for more than 30 minutes.
- ▶ By auto power off function, the voltage becomes no load voltage (more than 2.5 V) condition 20 seconds after the switch was pressed. Make sure to read the voltage before of it.

- ▶ High voltage might be shown 1 to 2 times after leaving the battery, judge should be made with the voltage shown at the 3rd time or later.
- (g) Disconnect the lead.
- (h) Set the battery (lithium battery) in the transmitter.
- (i) Install the cover, so that the O-ring is not distorted or slipped off.
- (j) Using a screwdriver, tighten the 2 screws.



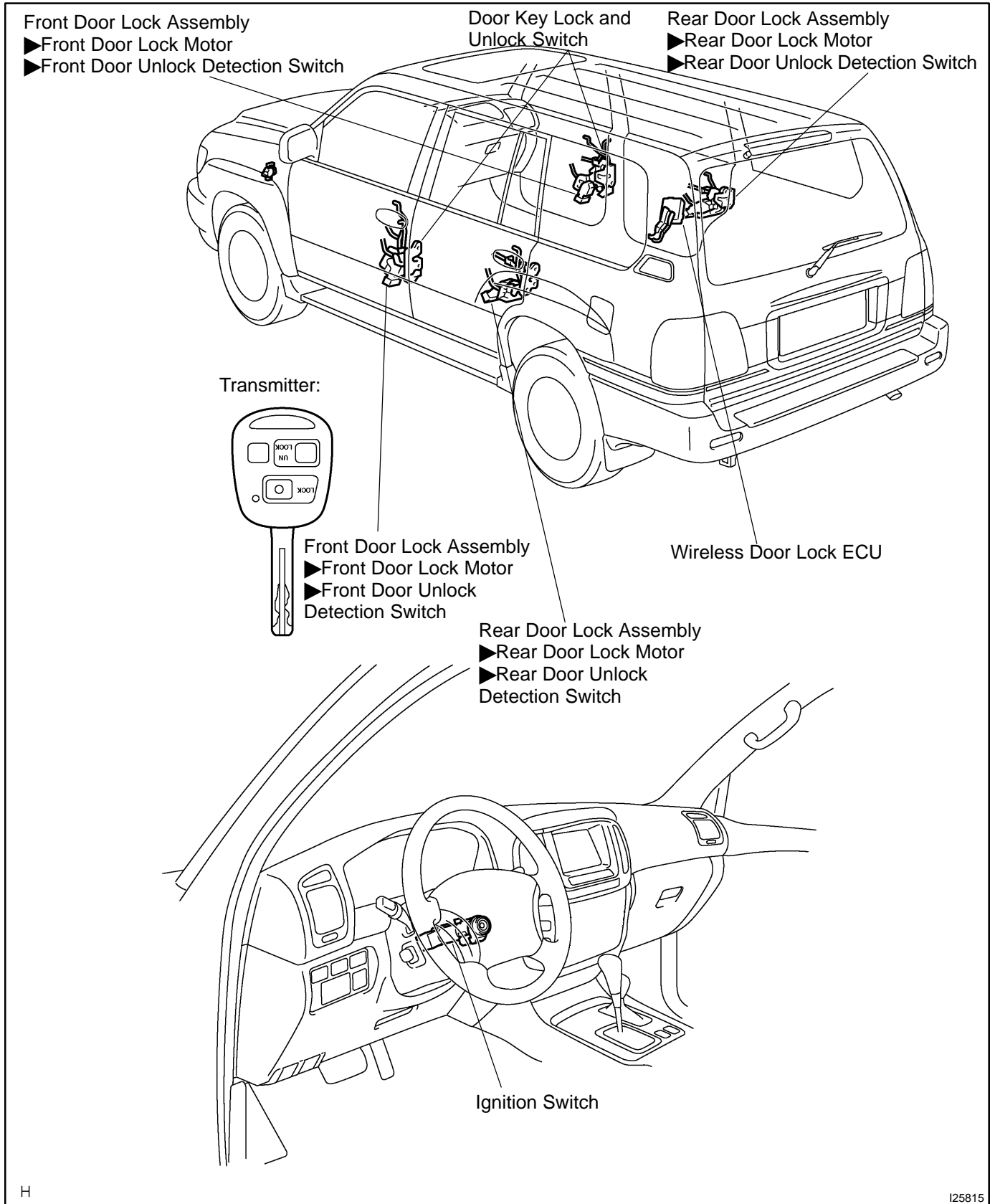
## 6. INSPECT WIRELESS DOOR LOCK CONTROL TUNER CIRCUIT

Disconnect the connector from the tuner and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
1 (E) - Ground	Constant	Continuity
2 (RDA) - Ground	Ignition switch OFF, without key, all doors closed,, and transmitter switch OFF → ON	Below 1 V ↔ 6 V
5 (+B) - Ground	-	Repeatedly chage 0 - 5V

If the circuit is not as specified, inspect the circuit connected to other parts.

# LOCATION



## PRE-CHECK

### 1. CHARACTERS OF WIRELESS DOOR LOCK

- (a) The operation distance changes according to how customers hold the transmitter or where it is used.
- (b) Because of using the very weak radio wave, if there is a strong wave or noise on the frequency being used, the operation distance may become shorter.

### 2. WIRELESS DOOR LOCK BASIC FUNCTION

- (a) Stand on the driver's side. Stay 1 m away from the vehicle.
- (b) Turn the transmitter toward the vehicle and press any one of the transmission switched for 1 sec.

# WIRELESS DOOR LOCK CONTROL SYSTEM

## REGISTRATION PROCEDURE

BE226-04

### HOW TO CODE REGISTRATION

#### NOTICE:

**When replacing the theft deterrent ECU or transmitter, registration of recognition code is necessary because they are provided as a single components.**

- (a) Select the operation mode to perform from the following operation modes.
- \* Add mode
  - \* Rewrite mode
  - \* Prohibition mode
  - \* Confirmation mode

#### HINT:

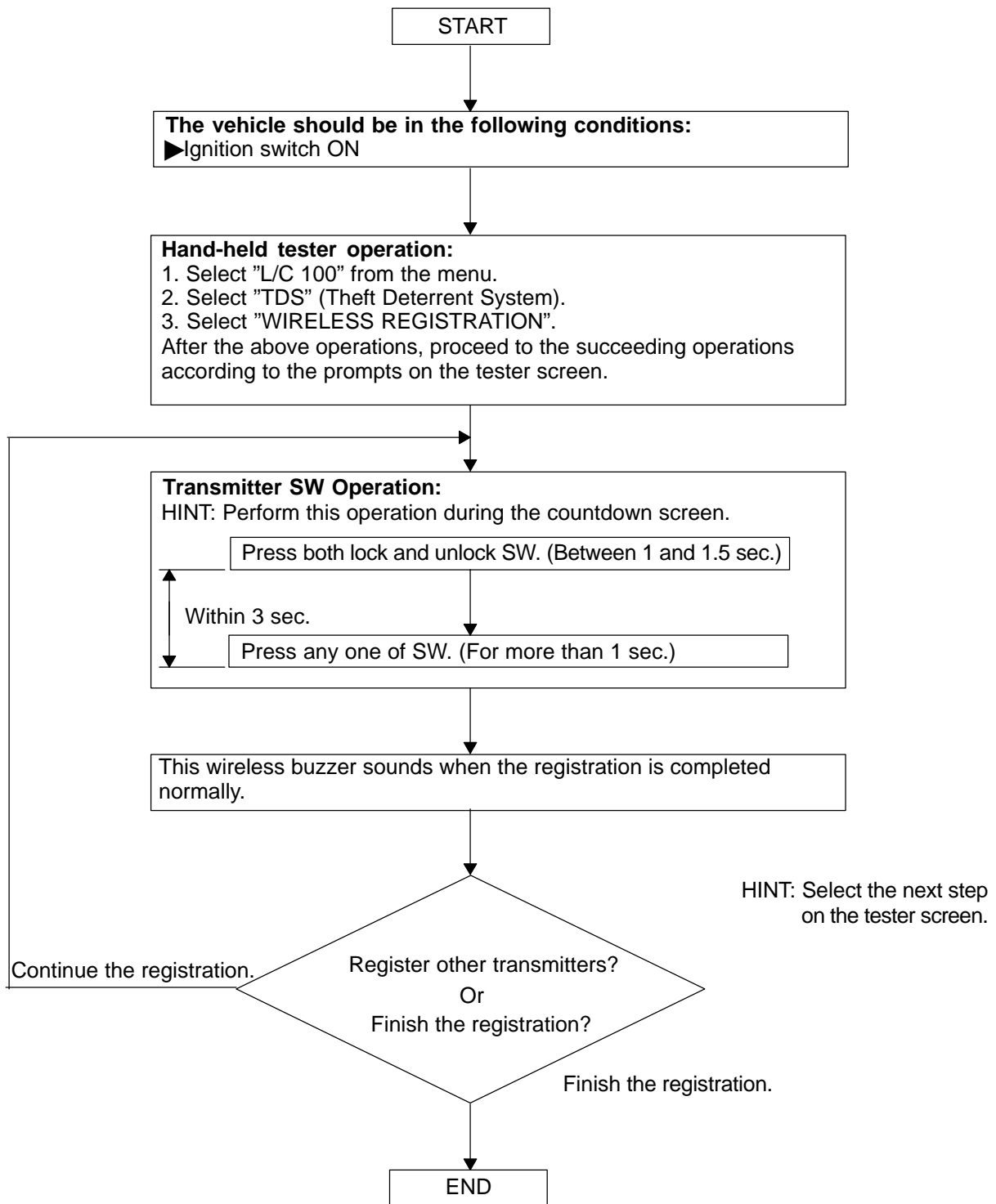
- \* The "Add mode" is for adding the newly recognized codes for registration while the already registered codes are retained. This mode is used when the transmitter is added. When the number of the registered codes exceeds 4 codes, the previously registered codes will be erased in order, starting from the first registered code.
  - \* The "Rewrite mode" is for erasing all the registered codes and registering newly recognized codes only. This mode is used when the transmitter or the door control receiver is replaced.
  - \* The "Prohibition mode" is for erasing all the registered codes to prohibit the wireless door lock operation. This mode is used when the transmitter is lost.
  - \* The "Confirmation mode" is for confirming the number of recognition codes that are registered. This mode is used to check the number of registered codes when new codes are added to the registration, etc.
- (b) Follow the chart on the following page to register the transmitter recognition code to the theft deterrent ECU.

#### HINT:

- \* When procedure is out of the specified, the registration operation is cancelled.
- \* Maximum 4 recognition codes can be registered.



(c) By TOYOTA Hand-Held Tester



**HINT:**

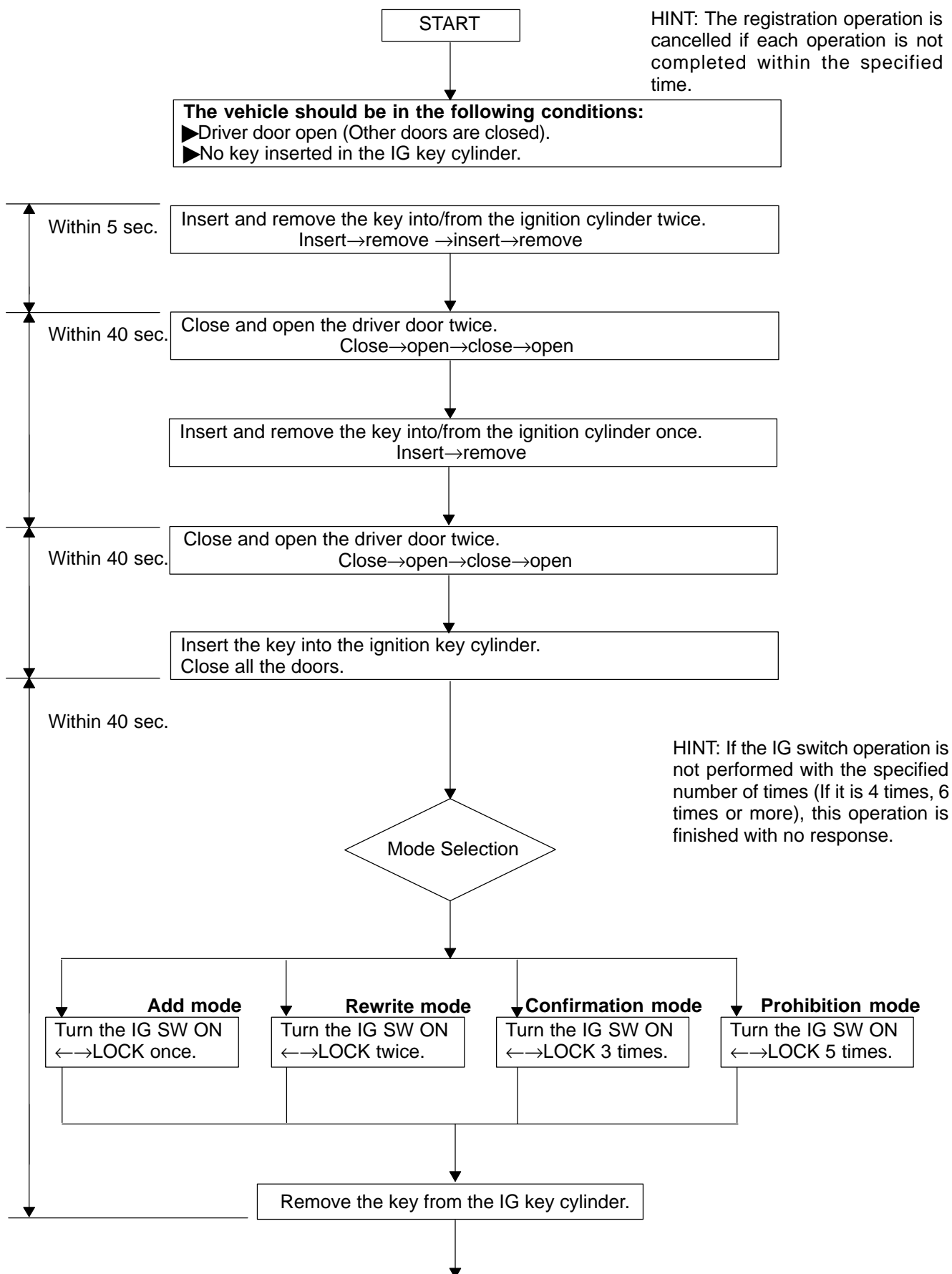
This page is to show briefly the registration procedure using the hand-held tester.

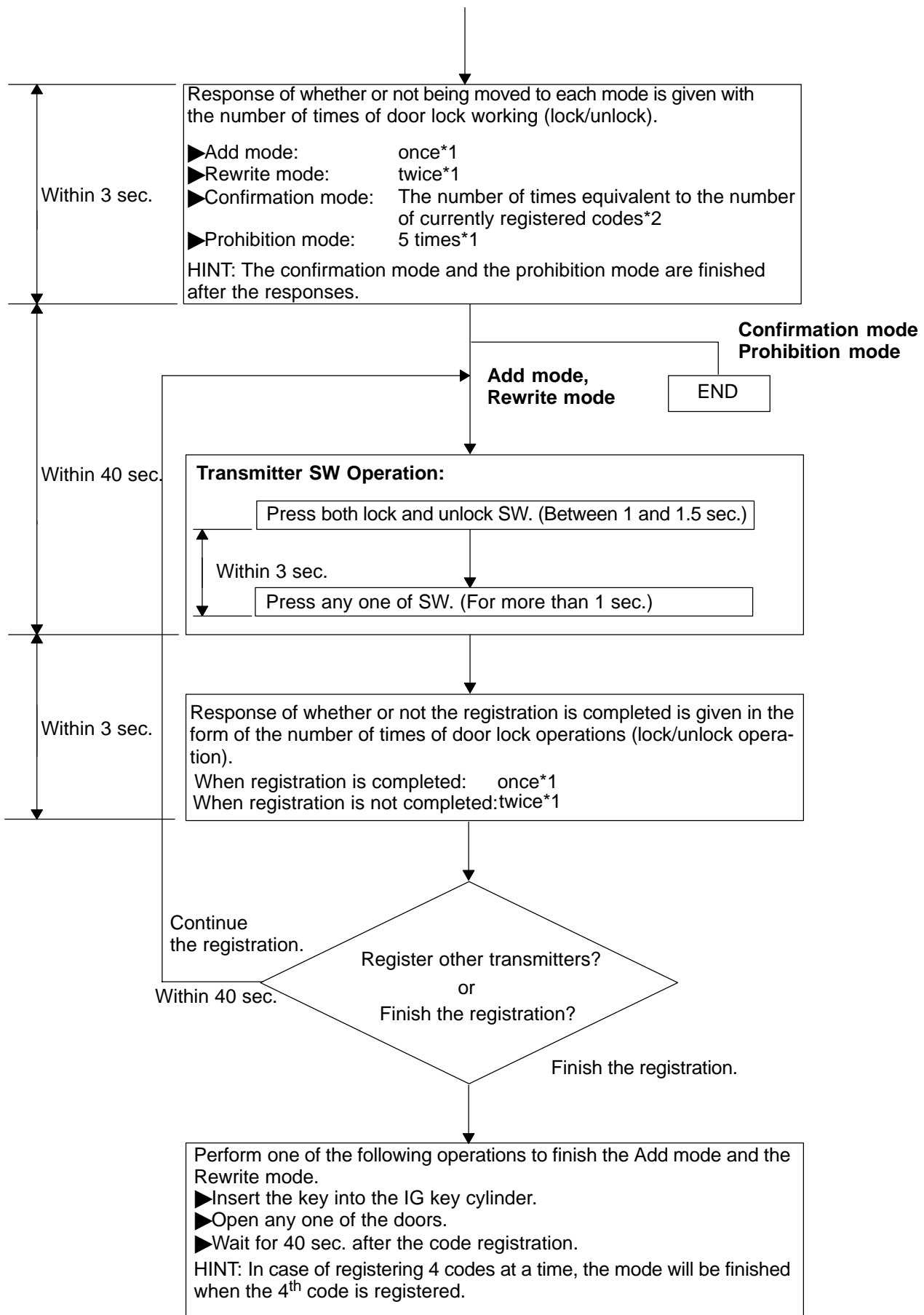
For detailed procedures, please refer to the prompts on the tester screen.

The number of currently registered codes can be checked out on the first screen of the WIRELESS REGISTRATION.

2004 LAND CRUISER (RM1071U)

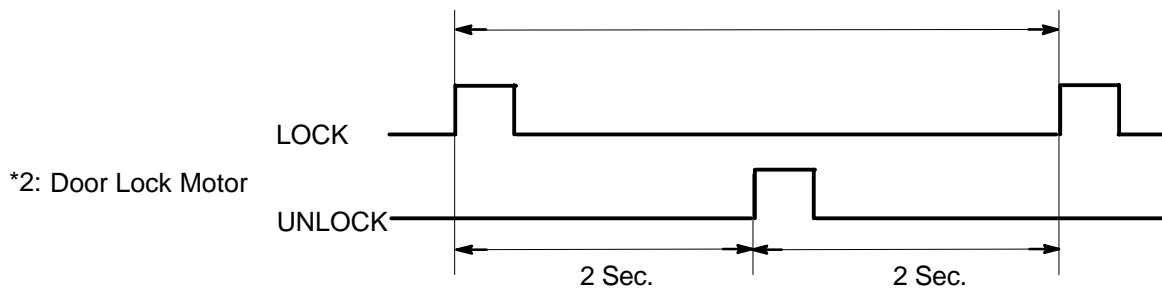
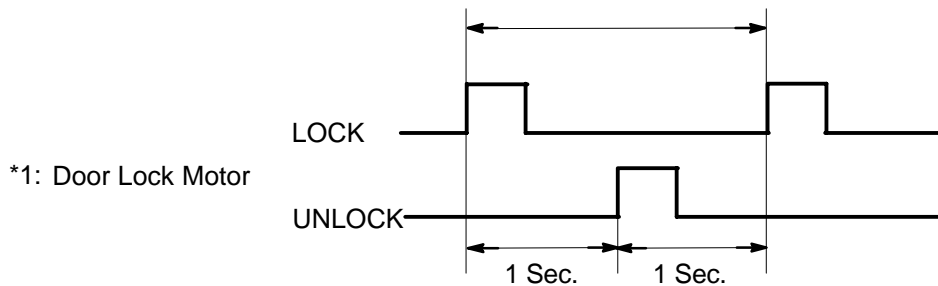
(d) By Switch Operation:

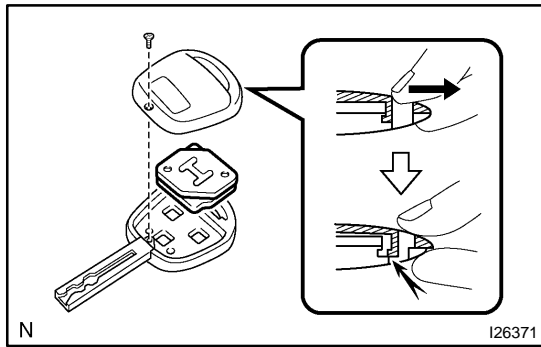




HINT:

Operation cycle of the door lock (lock/unlock operation)





**REPLACEMENT**

**REPLACE TRANSMITTER (LITHIUM) BATTERY**

**NOTICE:**

Special caution should be taken for handling each component as they are precision electronic components.

(a) Using a screwdriver, remove the screw and cover.

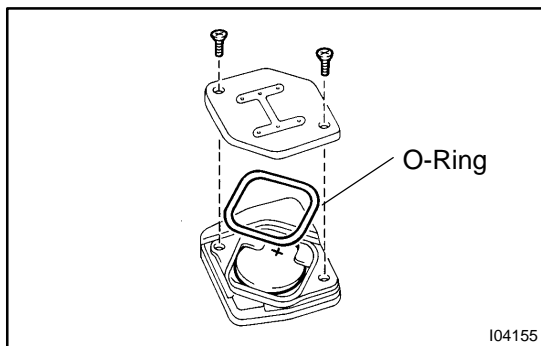
**NOTICE:**

Do not pry out the cover forcibly.

**HINT:**

Push the cover with a finger as shown in the illustration, so that there becomes clearance, then pry out the cover from that clearance.

(b) Remove the transmitter.

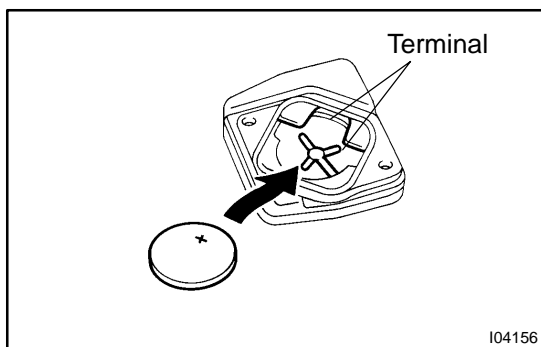


(c) Using a screwdriver, remove the 2 screws and cover.

(d) Remove the battery (lithium battery).

**NOTICE:**

- ▶ Do not push the terminals with a finger.
- ▶ If prying up the battery (lithium battery) forcibly to remove, the terminals are deformed.



(e) Install a battery (lithium battery) as shown in the illustration.

**NOTICE:**

Face the battery upward. Take care not to deform the terminals.

(f) Check that O-ring is not distorted or slipped off, and install the cover.

(g) Using a screwdriver, tighten the 2 screws.

**NOTICE:**

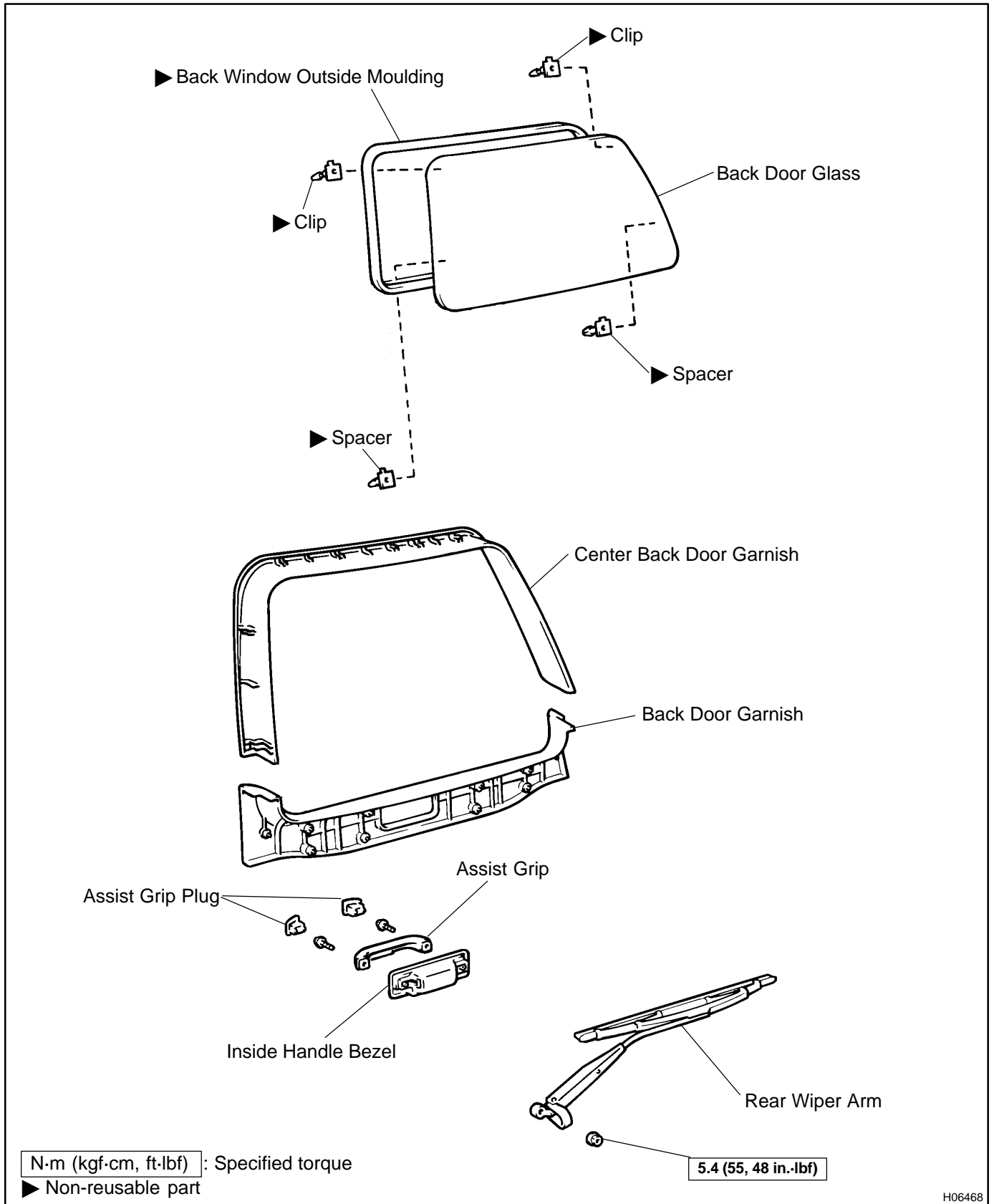
When the screws are tightened loosely, it might cause faulty contact of battery (lithium battery) and terminals.

(h) Assemble the transmitter to the key plate and the cover.

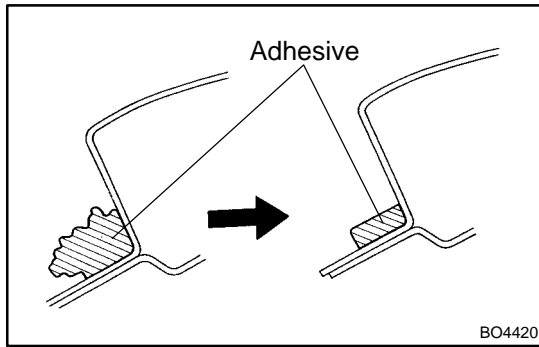
(i) Using a screwdriver, tighten the screw.

# BACK DOOR GLASS COMPONENTS

BO1KA-02



H06468



## INSTALLATION

### 1. CLEAN AND SHAPE CONTACT SURFACE OF DOOR PANEL

- (a) Using a knife, cut away any rough areas on the door panel.

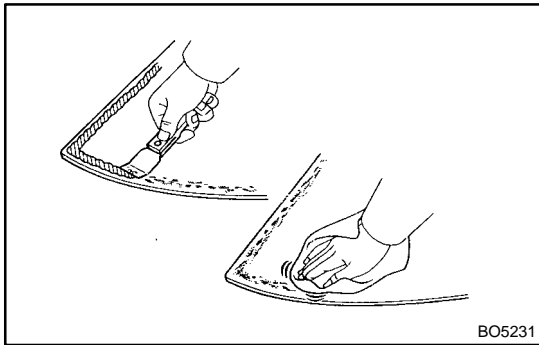
#### HINT:

Leave as much of the adhesive on the door panel as possible.

- (b) Clean the cutting surface of the adhesive with a piece of shop rag saturated in cleaner.

#### HINT:

Even if all the adhesive has been removed, clean the door panel.

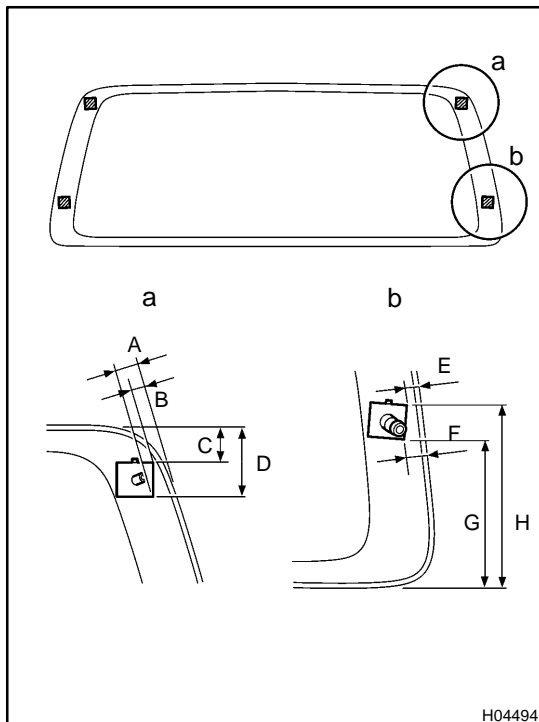


### 2. CLEAN REMOVED GLASS

- (a) Remove the damaged clips and spacers.
- (b) Using a scraper, remove the adhesive sticking to the glass.
- (c) Clean the glass with cleaner.

#### NOTICE:

**Do not touch the glass after cleaning it.**



### 3. INSTALL NEW CLIPS AND SPACERS

Install new clips and spacers onto the glass as shown in the illustration.

**A: 24.3 mm (0.957 in.)**

**B: 18.6 mm (0.732 in.)**

**C: 33.1 mm (1.303 in.)**

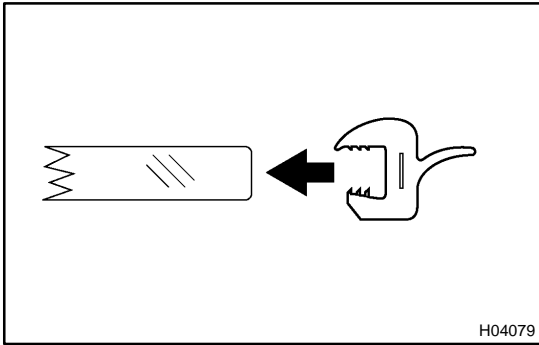
**D: 52.8 mm (2.079 in.)**

**E: 14.4 mm (0.567 in.)**

**F: 18.0 mm (0.709 in.)**

**G: 156.6 mm (6.165 in.)**

**H: 176.8 mm (6.961 in.)**

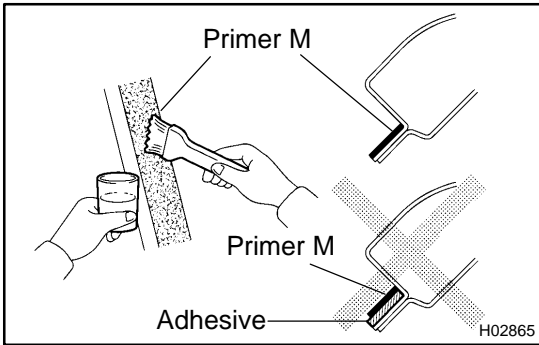


**4. INSTALL BACK WINDOW MouldING**

Install a new back window moulding as shown in the illustration.

**NOTICE:**

**Do not touch the glass face after cleaning it.**

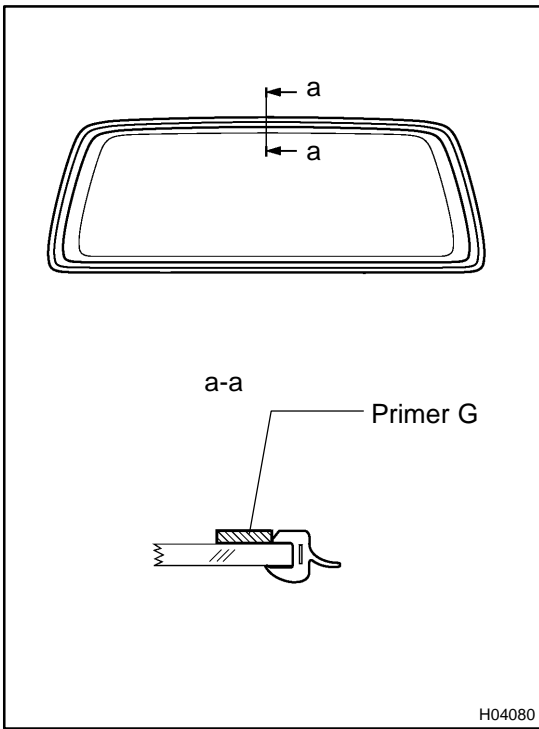


**5. COAT CONTACT SURFACE OF DOOR PANEL WITH PRIMER "M"**

Using a brush, coat Primer M to the exposed part of door panel on the vehicle side.

**NOTICE:**

- ▶ Let the primer coating dry for 3 minutes or more.
- ▶ Do not coat Primer M to the adhesive.
- ▶ Do not keep any of the opened Primer M for later use.



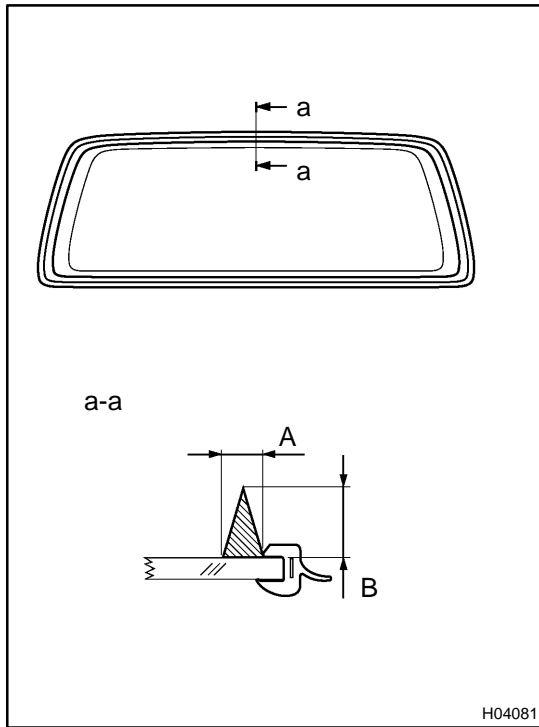
**6. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"**

- (a) Using a brush or sponge, coat the edge of the glass and contact surface with Primer G.
- (b) When the primer coated wrongly to the area other than the specified, wipe it off with a clean shop rag before the primer dries.

**NOTICE:**

- ▶ Let the primer coating dry for 3 minutes or more.
- ▶ Do not keep any of the opened Primer G for later use.





**7. APPLY ADHESIVE**

- (a) Cut off the tip of the cartridge nozzle.

HINT:

After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35 °C (95 °F)	15 minutes
20 °C (68 °F)	100 minutes
5 °C (41 °F)	8 hours

- (b) Load the cartridge into the sealer gun.
- (c) Coat the glass with adhesive, as shown in the illustration.

**A: 8.0 mm (0.315 in.)**

**B: 12.0 mm (0.472 in.)**

**8. INSTALL BACK DOOR GLASS**

- (a) Install the glass to the body.
- (b) Hold back window glass in place securely with protective tape or equivalent until the adhesive hardens.

**NOTICE:**

**Take care not to drive the vehicle during the time described in the table below.**

Temperature	Minimum time prior to moving a car
35 °C (95 °F)	1.5 hours
20 °C (68 °F)	5 hours
5 °C (41 °F)	24 hours

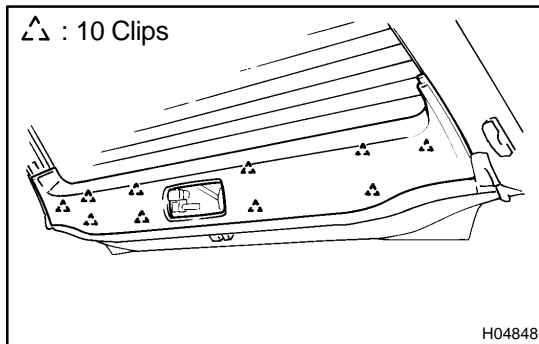
**9. INSPECT FOR LEAKS AND REPAIR**

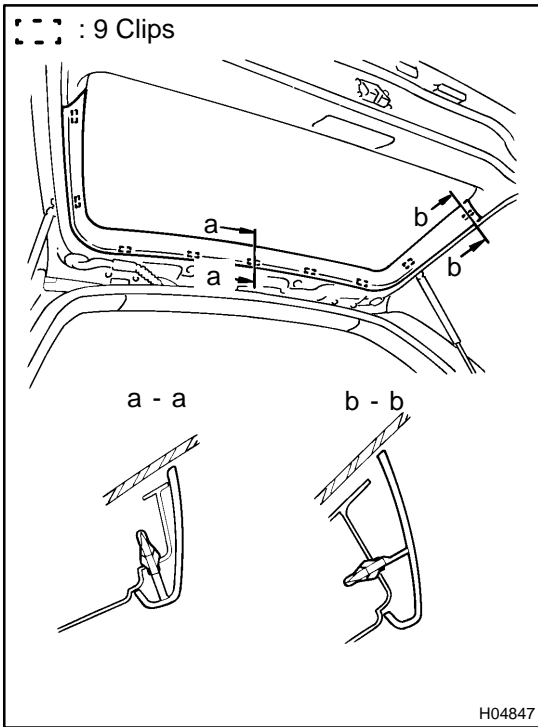
- (a) Conduct a leak test after the hardening time has elapsed.
- (b) Seal any leak with sealant.

**Part No. 08833-00030 or equivalent.**

**10. INSTALL REAR WIPER ARM (See page BO-42 )**

**11. INSTALL BACK DOOR GARNISH**





**12. INSTALL CENTER BACK DOOR GARNISH**

**13. INSTALL INSIDE HANDLE BEZEL**

**14. INSTALL ASSIST GRIP**

Install the assist grip with the 2 screws, then install 2 assist grip plugs.

## REMOVAL

### 1. REMOVE ASSIST GRIP

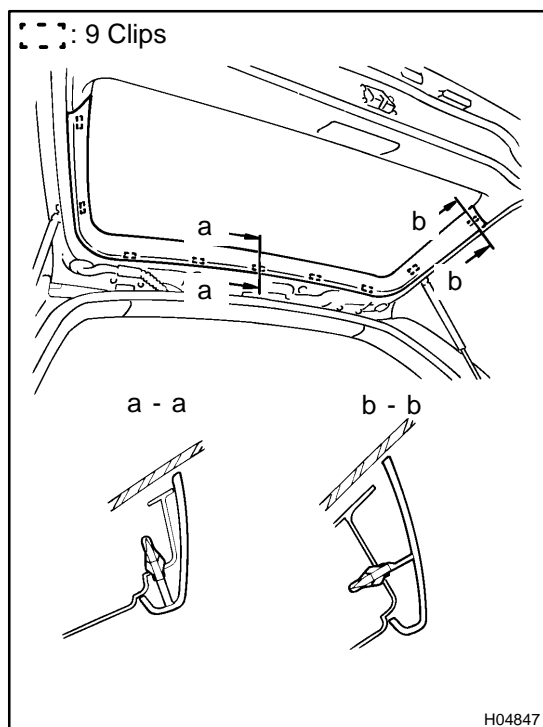
(a) Using a screwdriver, remove the 2 assist grip plugs.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 screws and assist grip.

### 2. REMOVE INSIDE HANDLE BEZEL

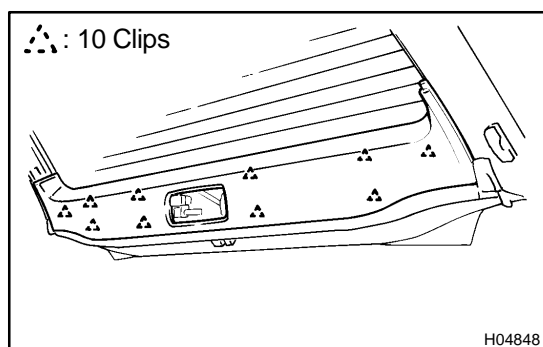


### 3. REMOVE CENTER BACK DOOR GARNISH

Using a screwdriver, remove the center back door garnish.

HINT:

Tape the screwdriver tip before use.



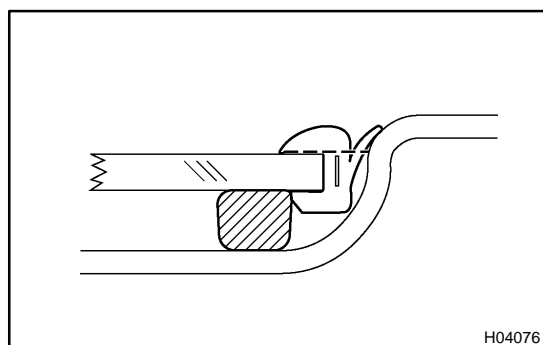
### 4. REMOVE BACK DOOR GARNISH

Using a screwdriver, remove the back door garnish.

HINT:

Tape the screwdriver tip before use.

### 5. REMOVE REAR WIPER ARM (See page [BO-38](#))

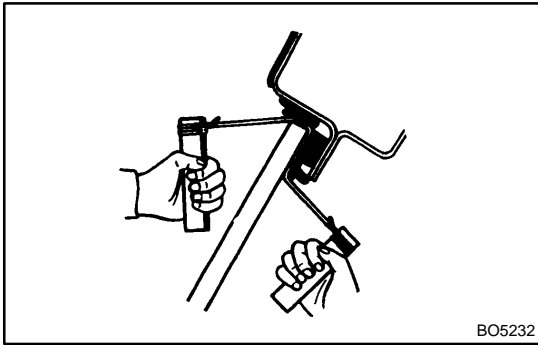


### 6. REMOVE OUTSIDE BACK WINDOW MOULDING

Using a knife, cut off the moulding as shown in the illustration.

**NOTICE:**

**Do not damage the body with the knife.**

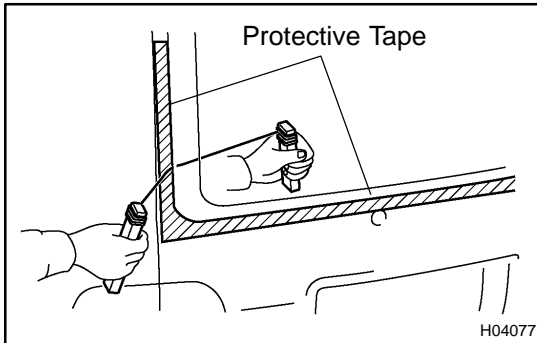


### 7. REMOVE BACK DOOR GLASS

- (a) Disconnect the connector.
- (b) Push piano wire through between the body and glass from the interior.
- (c) Tie both wire ends to wooden blocks or similar objects.

#### HINT:

Apply protective tape to the outer surface to keep the surface from being scratched.



#### NOTICE:

**When separating the glass, take care not to damage the paint and exterior ornaments.**

- (d) Cut the adhesive by pulling the piano wire around it.
- (e) Remove the glass.

#### NOTICE:

**Leave as much of the adhesive on the body as possible when cutting off the glass.**

## BACK DOOR STAY REPLACEMENT

BO1JQ-03

### 1. REMOVE BACK DOOR STAY

- (a) Remove the bolts and back door stay from the back door.

HINT:

While supporting the back door with your hand, remove the back door stay.

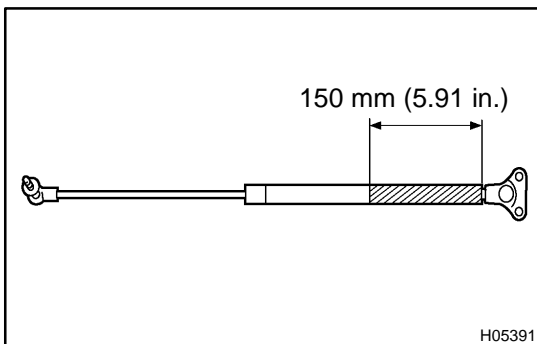
- (b) Remove the bolt and back door stay from the body.

### 2. IF NECESSARY, REPLACE BACK DOOR STAY

**NOTICE:**

**When handling the back door stay.**

- ▶ **Do not disassemble the back door stay because the cylinder is filled with pressurized gas.**



- ▶ **If the back door stay is to be replaced, drill a 2.0 - 3.0 mm (0.079 - 0.118 in.) hole in the bottom of the back door stay as shown in the illustration to completely release the high-pressure gas before disposing of it.**
- ▶ **When drilling, chips may fly out so work carefully.**
- ▶ **The gas is colorless, odorless and non-toxic.**
- ▶ **When working, handle the back door stay carefully. Never score or scratch the exposed part of the piston rod, and never allow paint or oil to get on it.**
- ▶ **Do not turn the piston rod and cylinder with the back door stay fully extended.**

### 3. INSTALL BACK DOOR STAY

- (a) Install the bolt and back door stay to the body.

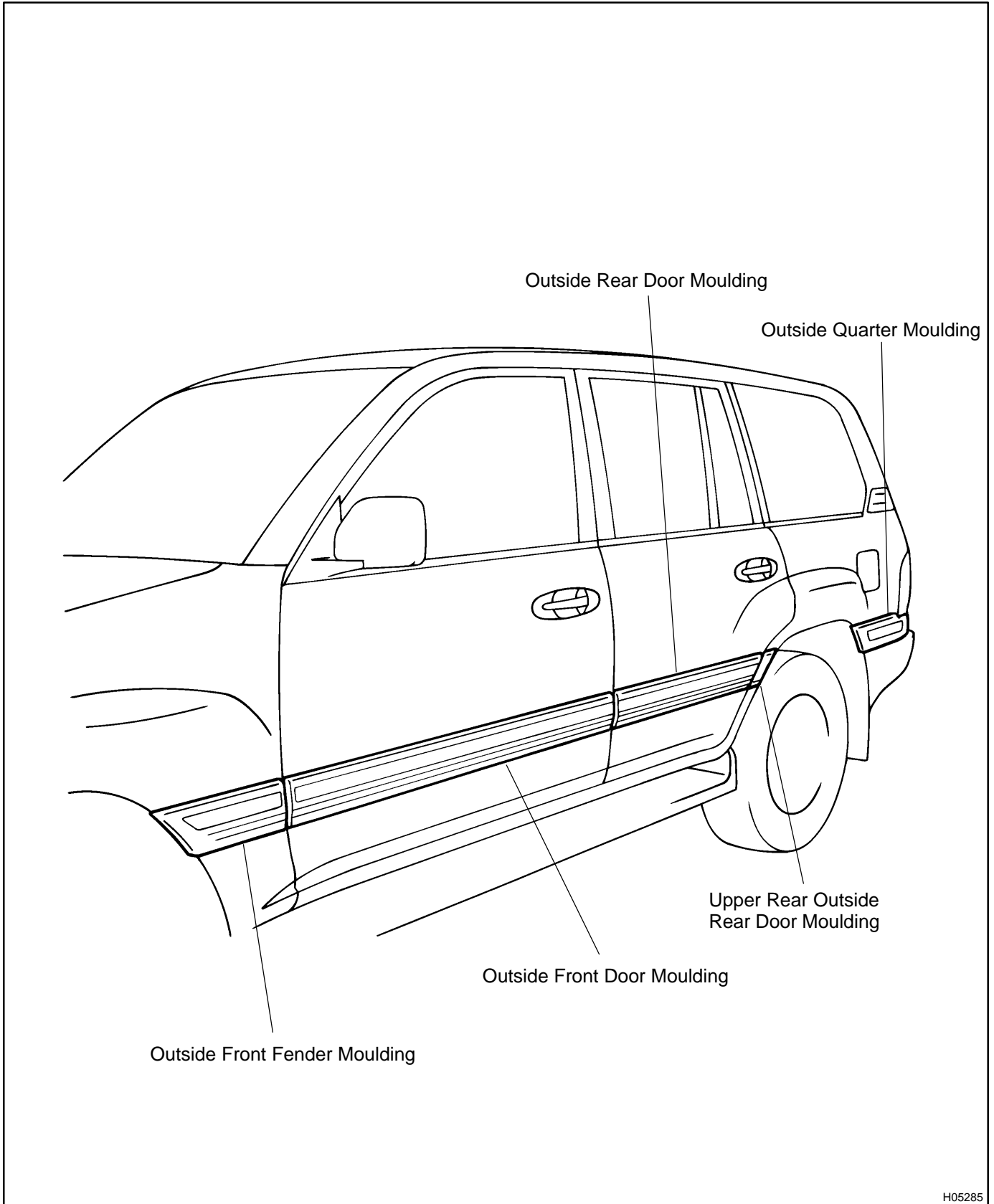
**Torque: 17.5 N·m (178 kgf·cm, 13 ft·lbf)**

- (b) Install the bolts and back door stay to the back door.

**Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)**

# BODY OUTSIDE MOULDING COMPONENTS

BO1K1-02



H05285

## INSTALLATION

### 1. CLEAN BODY MOUNTING SURFACE

- (a) Using a heat light, heat the body mounting surface to 40 - 60 °C (104 - 140 °F).

#### NOTICE:

**Do not heat the body excessively.**

- (b) Wipe off stains with cleaner.

### 2. If reusing the moulding:

#### CLEAN MOULDING

- (a) Using a heat light, heat the moulding surface to 20 - 30 °C (68 - 86 °F).

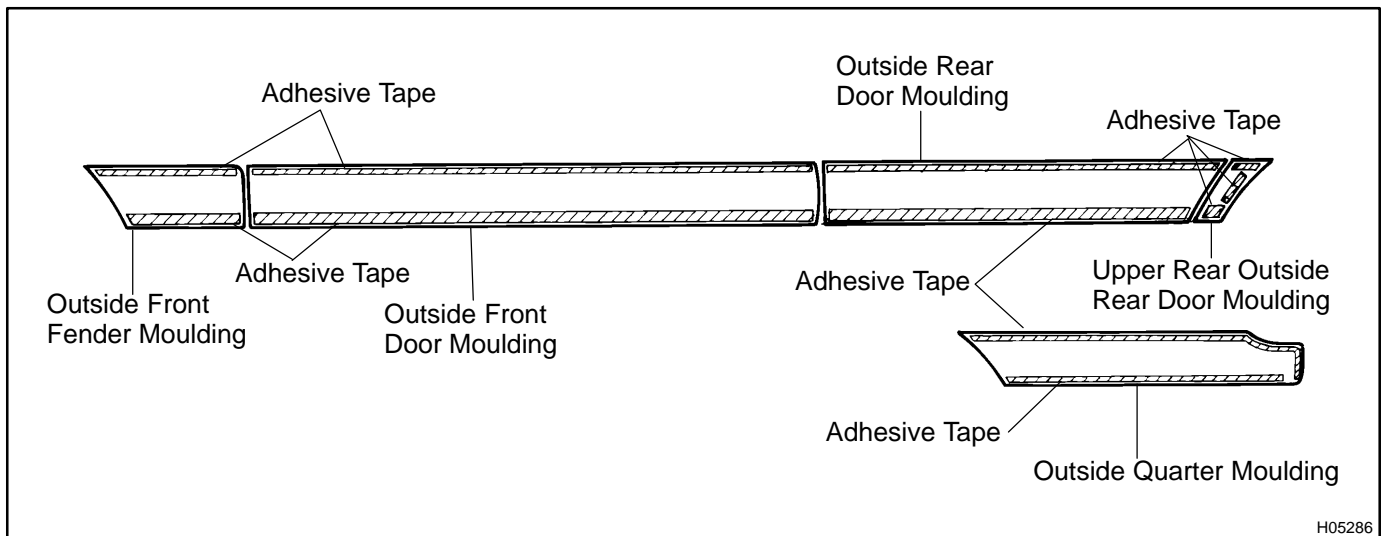
#### NOTICE:

**Do not heat the moulding excessively.**

- (b) Remove the adhesive tape from the moulding.

- (c) Wipe off stains with cleaner.

- (d) Apply new adhesive tape to moulding as shown in the illustration.



H05286

### 3. INSTALL MOULDING

- (a) Using a heat light, heat the body and moulding.

**Body: 40 - 60 °C (104 - 140 °F)**

**Moulding: 20 - 30 °C (68 - 86 °F)**

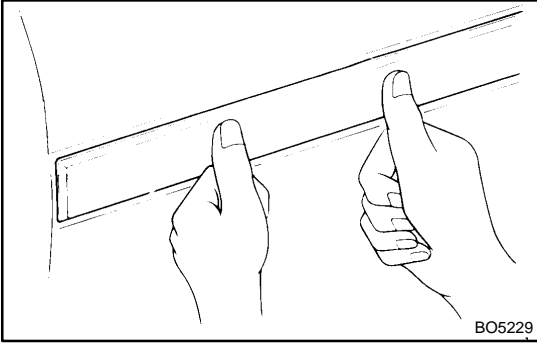
#### NOTICE:

**Do not heat the body and moulding excessively.**

- (b) Lift moulding release sheet from the face of moulding.

#### NOTICE:

**When the moulding release sheet is removed, make sure that no dirt or dust can get onto the uncoated area.**

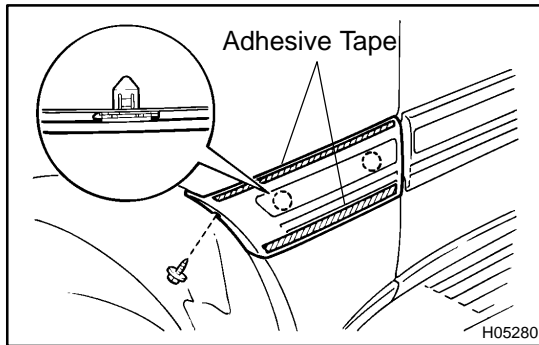


- (c) Press firmly on the moulding. Refer to the illustration for the moulding application procedures.

**NOTICE:**

**Do not apply excessive force onto the moulding, but steady pressure with your thumbs.**





## REMOVAL

### 1. REMOVE OUTSIDE FRONT FENDER MOULDING

- (a) Remove the screw.
- (b) Using a heat light, heat the moulding to 40 - 60 °C (104 - 140 °F).

#### NOTICE:

**Do not heat the moulding excessively.**

- (c) Cut the adhesive tape with a knife.

#### NOTICE:

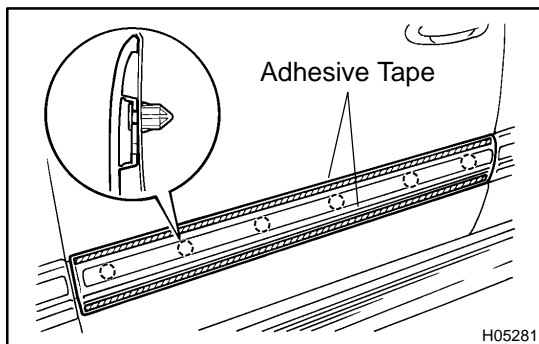
▶ **If reusing the moulding, take care not to damage the moulding.**

▶ **Do not damage the body.**

- (d) Using a screwdriver, remove the moulding.

#### HINT:

Tape the screwdriver tip before use.



### 2. REMOVE OUTSIDE FRONT DOOR MOULDING

- (a) Using a heat light, heat the moulding to 40 - 60 °C (104 - 140 °F).

#### NOTICE:

**Do not heat the moulding excessively.**

- (b) Cut the adhesive tape with a knife.

#### NOTICE:

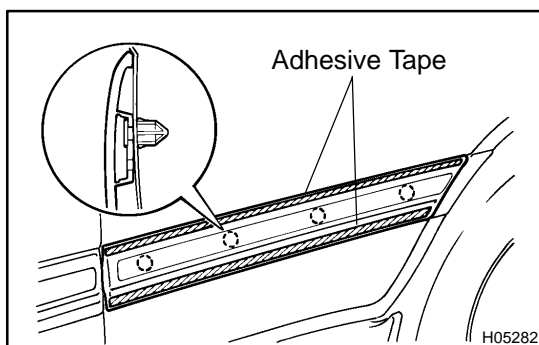
▶ **If reusing the moulding, take care not to damage the moulding.**

▶ **Do not damage the body.**

- (c) Using a screwdriver, remove the moulding.

#### HINT:

Tape the screwdriver tip before use.



### 3. REMOVE OUTSIDE REAR DOOR MOULDING

- (a) Using a heat light, heat the moulding to 40 - 60 °C (104 - 140 °F).

#### NOTICE:

**Do not heat the moulding excessively.**

- (b) Cut the adhesive tape with a knife.

#### NOTICE:

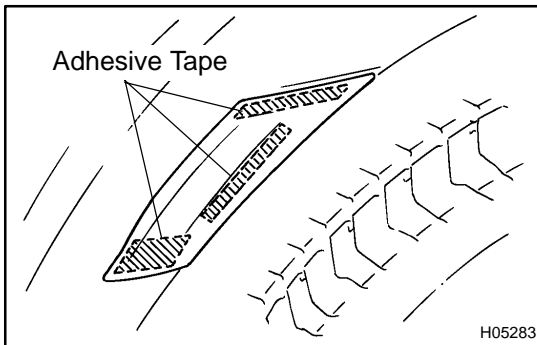
▶ **If reusing the moulding, take care not to damage the moulding.**

▶ **Do not damage the body.**

(c) Using a screwdriver, remove the moulding.

HINT:

Tape the screwdriver tip before use.



#### 4. REMOVE UPPER REAR OUTSIDE REAR DOOR MOULDING

(a) Using a heat light, heat the moulding to 40 - 60 °C (104 - 140 °F).

**NOTICE:**

**Do not heat the moulding excessively.**

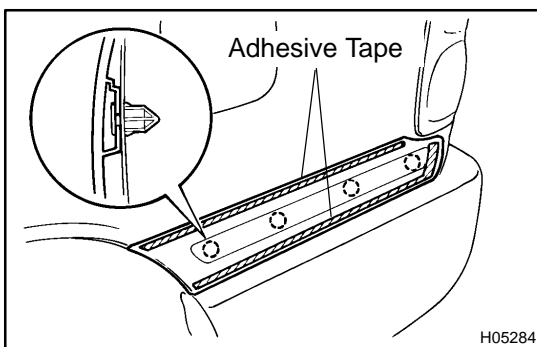
(b) Cut the adhesive tape with a knife.

**NOTICE:**

▶ **If reusing the moulding, take care not to damage the moulding.**

▶ **Do not damage the body.**

(c) Remove the moulding.



#### 5. REMOVE OUTSIDE QUARTER MOULDING

(a) Using a heat light, heat the moulding to 40 - 60 °C (104 - 140 °F).

**NOTICE:**

**Do not heat the moulding excessively.**

(b) Cut the adhesive tape with a knife.

**NOTICE:**

▶ **If reusing the moulding, take care not to damage the moulding.**

▶ **Do not damage the body.**

(c) Using a screwdriver, remove the moulding.

HINT:

Tape the screwdriver tip before use.

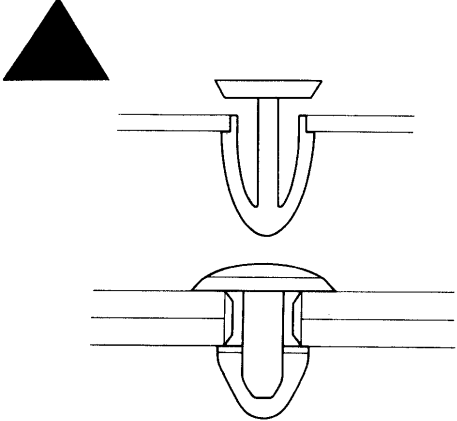
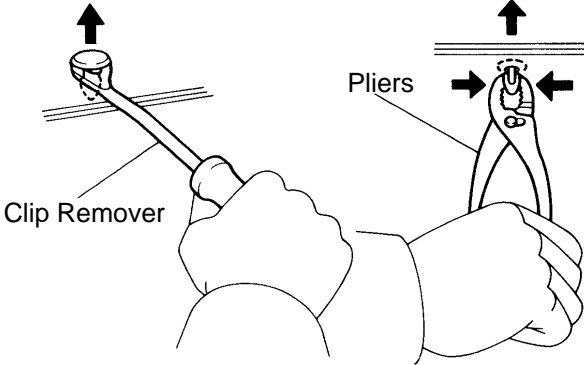
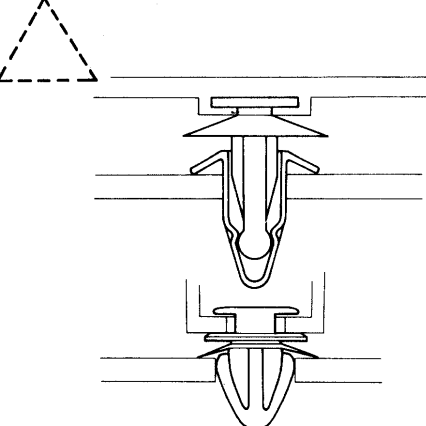
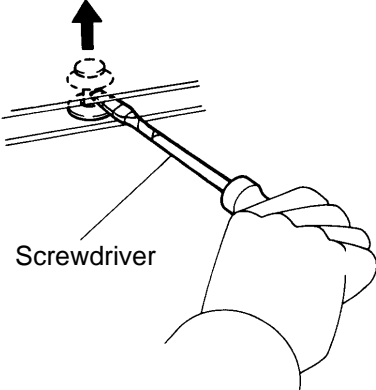
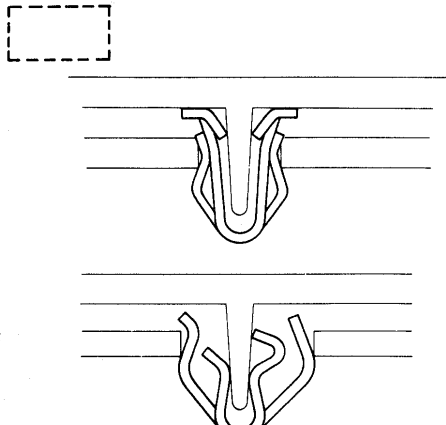
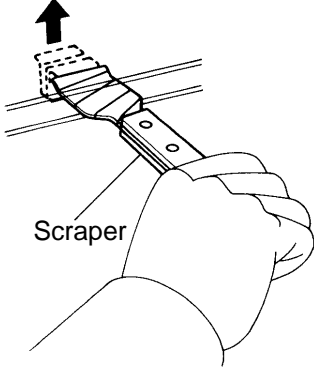
# CLIP REPLACEMENT

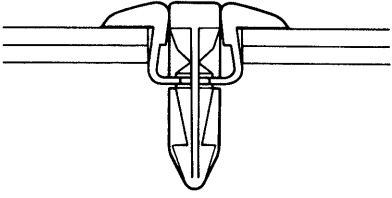
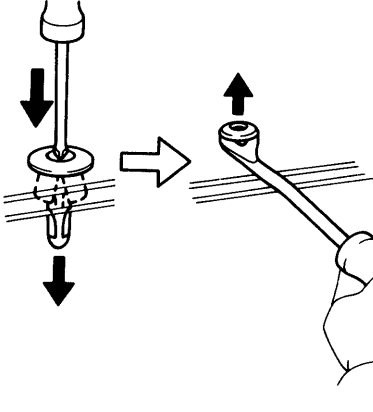
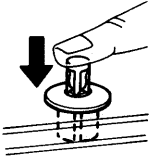
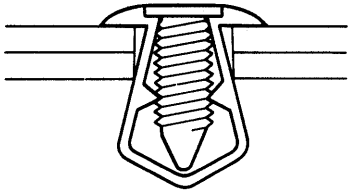
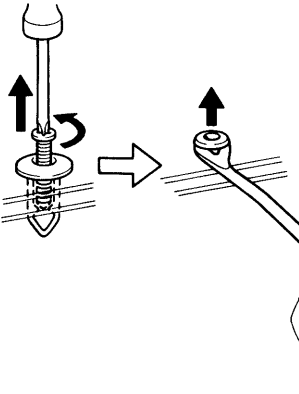
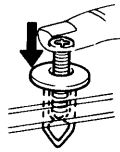
BO023-04

The removal and installation methods of typical clips used in body parts are shown in the table below.

HINT:

If the clip is damaged during the operation, always replace it with a new clip.

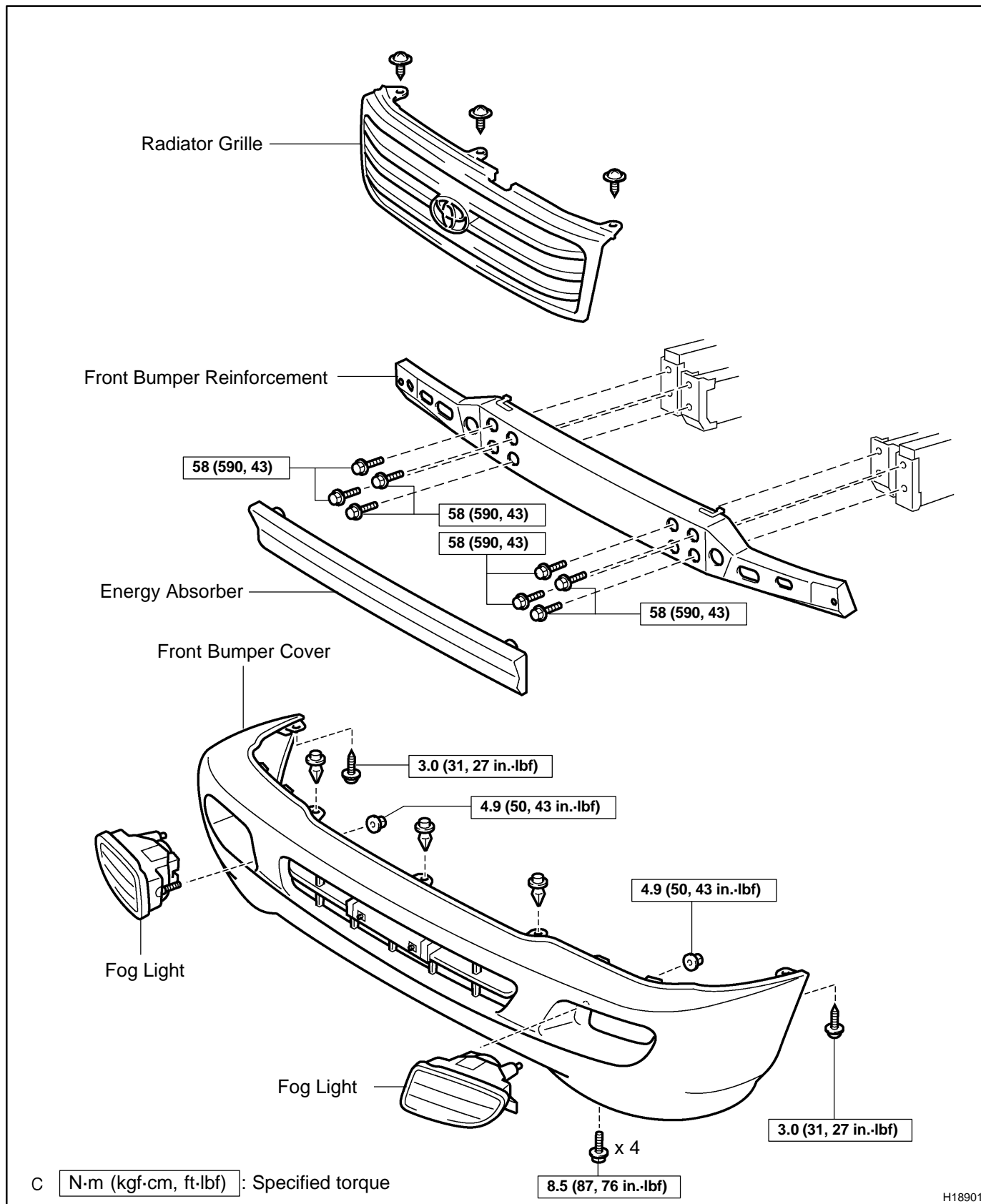
Shape (Example)	Removal/Installation
	
	
	

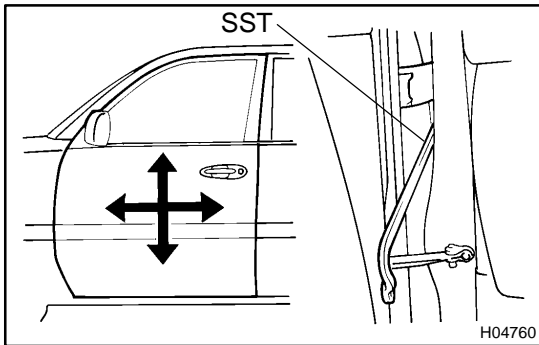
Shape (Example)	Removal/Installation	
 <p>A technical drawing of a clip with a smooth shaft. The clip has a wide, flat base with two raised edges and a central opening. A smooth shaft passes through the opening, and the clip's base is seated on a surface with a matching hole.</p>	<p>Removal</p>  <p>The diagram shows the clip being pushed down onto the shaft. A hand is shown pulling the clip upwards, away from the shaft, as indicated by an upward-pointing arrow.</p>	<p>Installation</p>  <p>The diagram shows a hand pushing the clip down onto the shaft, as indicated by a downward-pointing arrow.</p>
 <p>A technical drawing of a clip with a threaded shaft. The clip has a wide, flat base with two raised edges and a central opening. A threaded shaft passes through the opening, and the clip's base is seated on a surface with a matching hole.</p>	<p>Removal</p>  <p>The diagram shows the clip being pushed down onto the shaft. A hand is shown pulling the clip upwards, away from the shaft, as indicated by an upward-pointing arrow.</p>	<p>Installation</p>  <p>The diagram shows a hand pushing the clip down onto the shaft, as indicated by a downward-pointing arrow.</p>

V00012

# FRONT BUMPER COMPONENTS

BO1J6-03





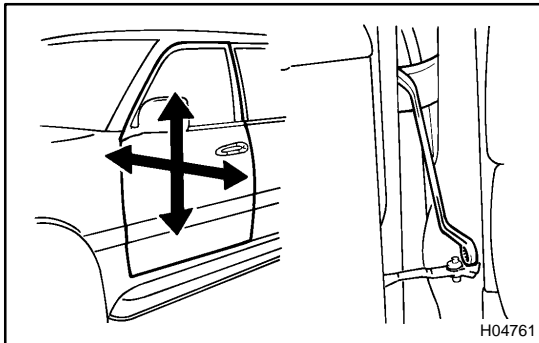
## ADJUSTMENT

### 1. ADJUST DOOR IN FORWARD/BACKWARD AND VERTICAL DIRECTIONS

Using SST, loosen the body side hinge bolts to adjust.

SST 09812-00010

**Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)**



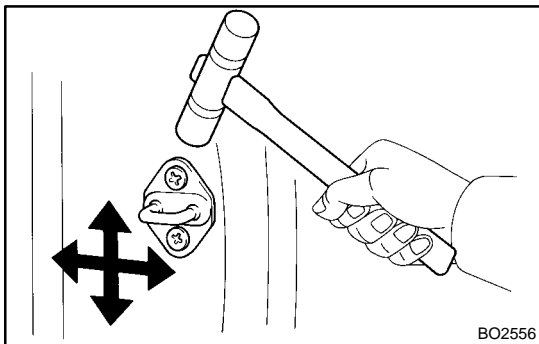
### 2. ADJUST DOOR IN RIGHT/LEFT AND VERTICAL DIRECTIONS

Loosen the door side hinge bolts to adjust.

HINT:

Substitute the bolt with washer for the centering bolt (See page [BO-6](#)).

**Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)**



### 3. ADJUST DOOR LOCK STRIKER

(a) Check that the door fit and door lock linkages are adjusted correctly.

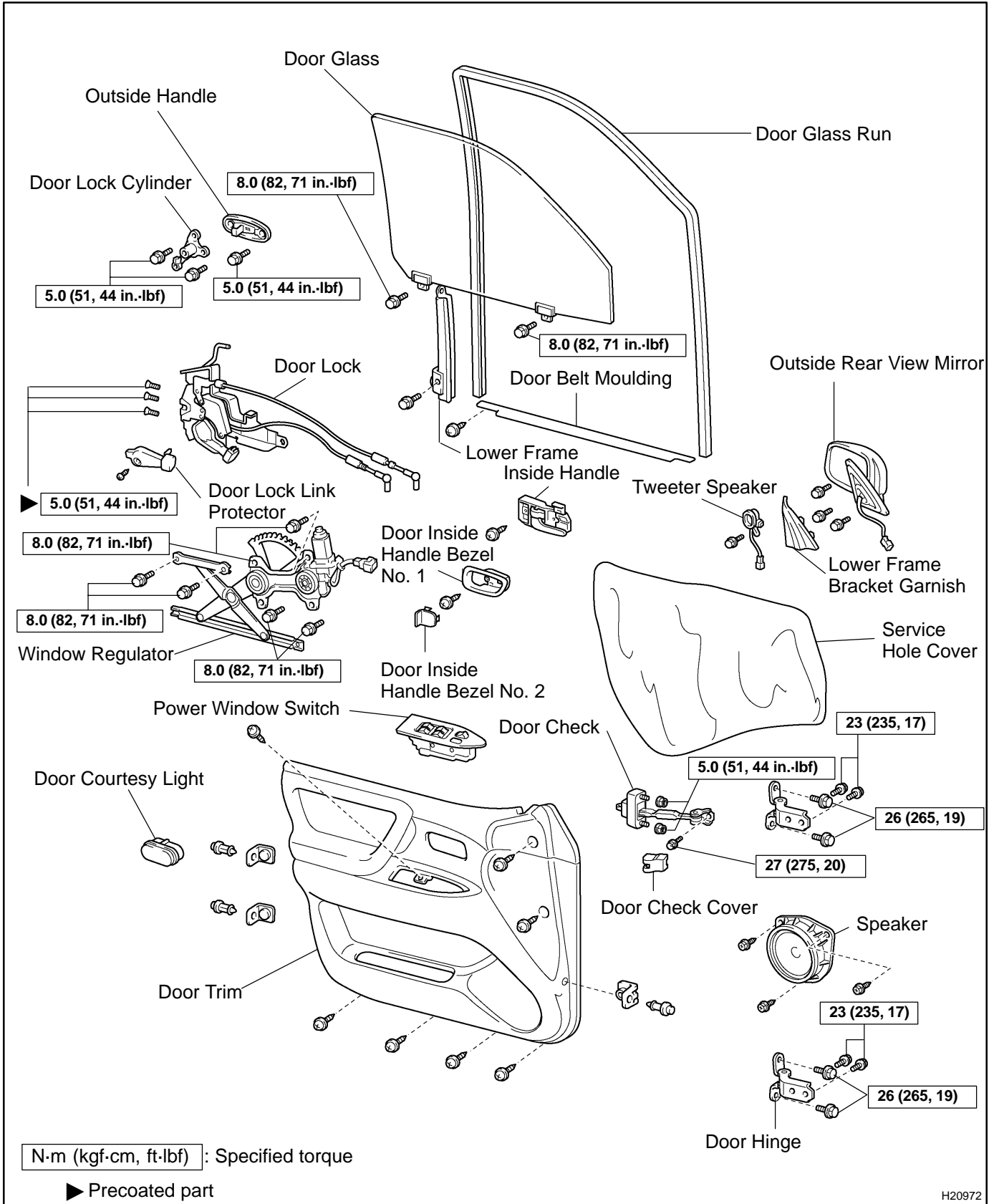
(b) Loosen the striker mounting screws.

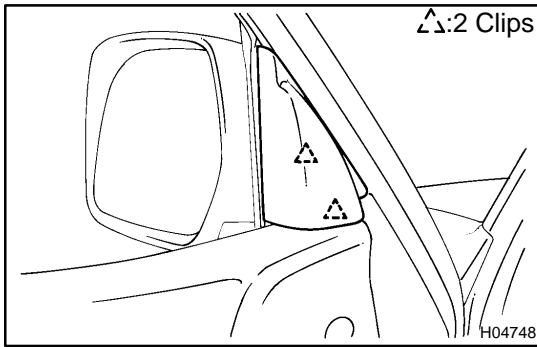
**Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)**

(c) Using a plastic hammer, tap the striker to adjust it.

# FRONT DOOR COMPONENTS

BO1JA-04





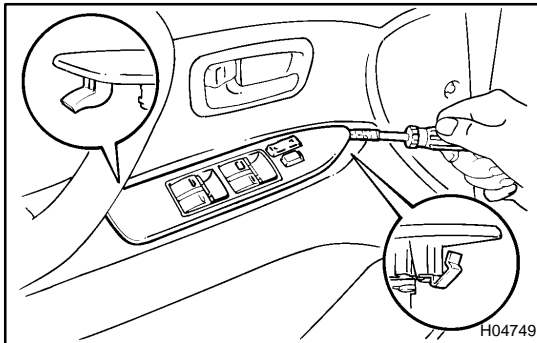
## DISASSEMBLY

### 1. REMOVE LOWER FRAME BRACKET GARNISH

Using a screwdriver, remove the lower frame bracket garnish.

HINT:

Tape up the screwdriver tip before use.



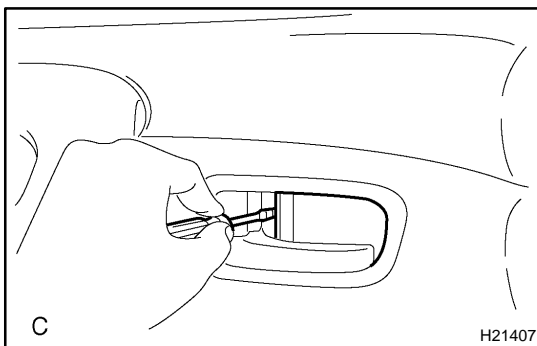
### 2. REMOVE POWER WINDOW SWITCH

(a) Using a screwdriver, remove the power window switch as shown in the illustration.

HINT:

Tape up the screwdriver tip before use.

(b) Disconnect the connector.

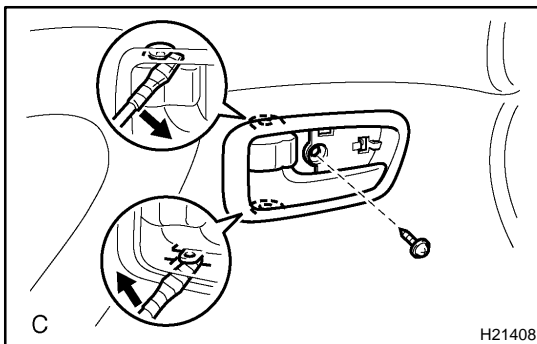


### 3. REMOVE DOOR INSIDE HANDLE BEZEL No. 2

Using a screwdriver, remove the door inside handle bezel No. 2 as shown in the illustration.

HINT:

Tape up the screwdriver tip before use.



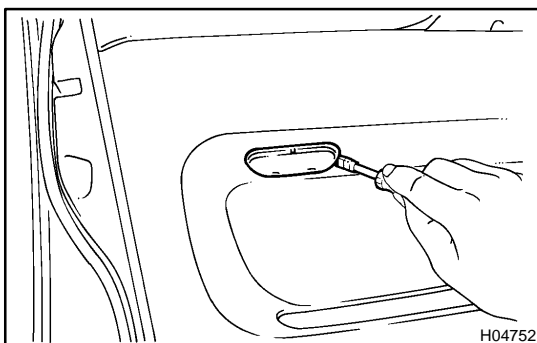
### 4. REMOVE DOOR INSIDE HANDLE BEZEL No. 1

(a) Remove the screw.

(b) Using a screwdriver, remove the door inside handle bezel No. 1 as shown in the illustration.

HINT:

Tape up the screwdriver tip before use.



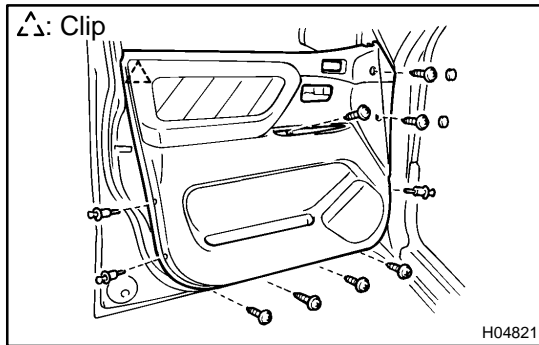
### 5. REMOVE DOOR COURTESY LIGHT

Using a screwdriver, remove the door courtesy light, then disconnect the connector.

HINT:

Tape up the screwdriver tip before use.



**6. REMOVE DOOR TRIM**

- (a) Remove the 2 caps and the 7 screws.
- (b) Remove the 3 clips.
- (c) Insert a screwdriver between the door and the door trim to pry the trim.

**NOTICE:**

**Be careful not to damage the door and the door trim.**

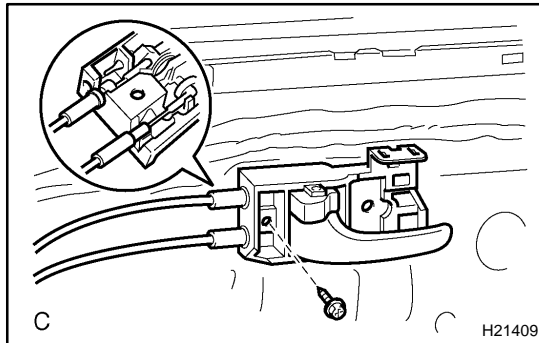
**HINT:**

Tape up the screwdriver tip before use.

- (d) Pull the trim upward to remove it.

**7. REMOVE INSIDE HANDLE**

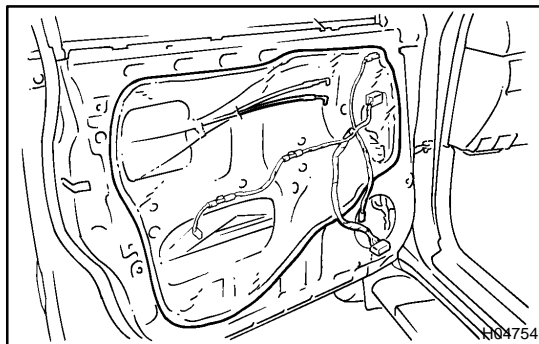
- (a) Remove the screw and the inside handle.
- (b) Disconnect the 2 control cables from the inside handle as shown in the illustration.

**8. REMOVE TWEETER SPEAKER**

Disconnect the connector, then remove the bolt and the tweeter speaker.

**9. REMOVE OUTSIDE REAR VIEW MIRROR**

Disconnect the connector, then remove the 3 bolts and the outside rear view mirror.

**10. REMOVE SERVICE HOLE COVER**

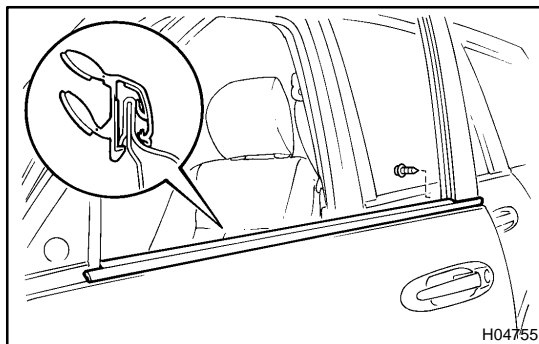
- (a) Remove the clamps and the wire harness.
- (b) Remove the service hole cover.

**NOTICE:**

**Do not tear the cover.**

**HINT:**

At the time of reassembly, pull out the 2 control cables and wire harness through the service hole cover.

**11. REMOVE DOOR BELT MOULDING**

- (a) Remove the screw.
- (b) Using a scraper, remove the door belt moulding.

**HINT:**

Tape up the scraper tip before use.

**12. REMOVE DOOR GLASS**

- (a) Open the door glass until the bolts appear in the service hole.
- (b) Remove the 2 bolts and the door glass.

**Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)**

**NOTICE:**

**Do not damage the door glass.**

**HINT:**

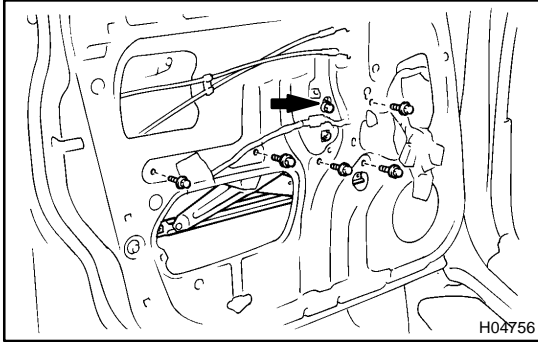
Pull the glass upward to remove it.

**13. REMOVE SPEAKER**

Remove the 3 screws and the speaker, then disconnect the connector.

**14. REMOVE DOOR GLASS RUN****15. REMOVE LOWER FRAME**

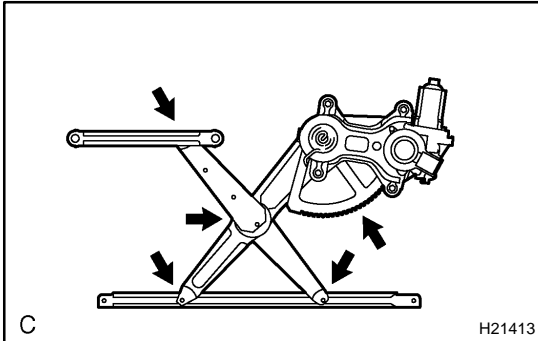
Remove the bolt and the lower frame.

**16. REMOVE WINDOW REGULATOR**

- (a) Disconnect the connector, then remove the 5 bolts.  
**Torque: 8.0 N-m (82 kgf-cm, 71 in.-lbf)**
- (b) Loosen the bolt and the window regulator.  
**Torque: 8.0 N-m (82 kgf-cm, 71 in.-lbf)**

**HINT:**

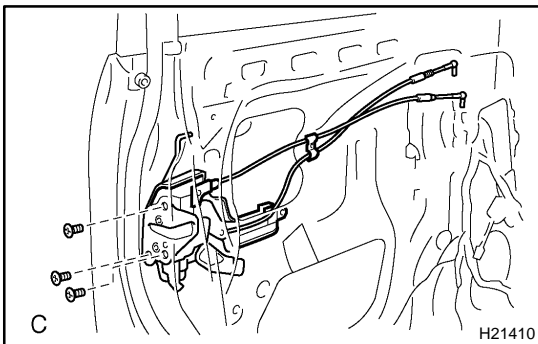
- ▶ Remove the regulator through the service hole.



- ▶ At the time of reassembly, apply MP grease to the window regulator.

**NOTICE:**

At the time of reassembly, do not apply grease to the spring of the window regulator.

**17. REMOVE DOOR LOCK**

- (a) Remove the clip and the door lock link protector.
- (b) Disconnect the connector.
- (c) Disconnect the 2 links from the outside handle and the door lock cylinder.
- (d) Using a torx wrench, remove the 3 screws and the door lock through the service hole.

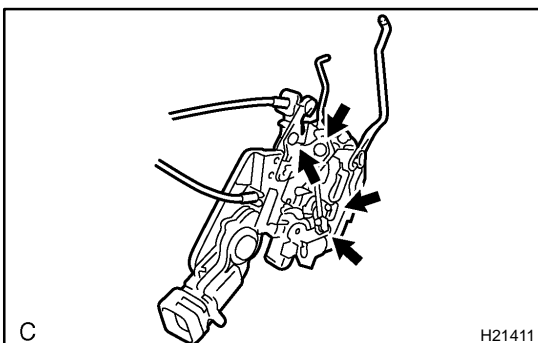
**Torx wrench: T30 (Part No. 09042-00010 or locally manufactured tool)**

**Torque: 5.0 N-m (51 kgf-cm, 44 in.-lbf)**

**HINT:**

At the time of reassembly:

- ▶ Apply adhesive to the 3 screws.  
**Part No. 08833-00070, THREE BOND 1324 or equivalent.**



- ▶ Remove the protector, and apply MP grease to the sliding and rotating parts of the door lock.

**18. REMOVE OUTSIDE HANDLE WITH DOOR LOCK CYLINDER**

- (a) Remove the 2 bolts and the outside handle with the door lock cylinder.

**Torque: 5.0 N-m (51 kgf-cm, 44 in.-lbf)**

- (b) Remove the bolt and the door lock cylinder from the outside handle.

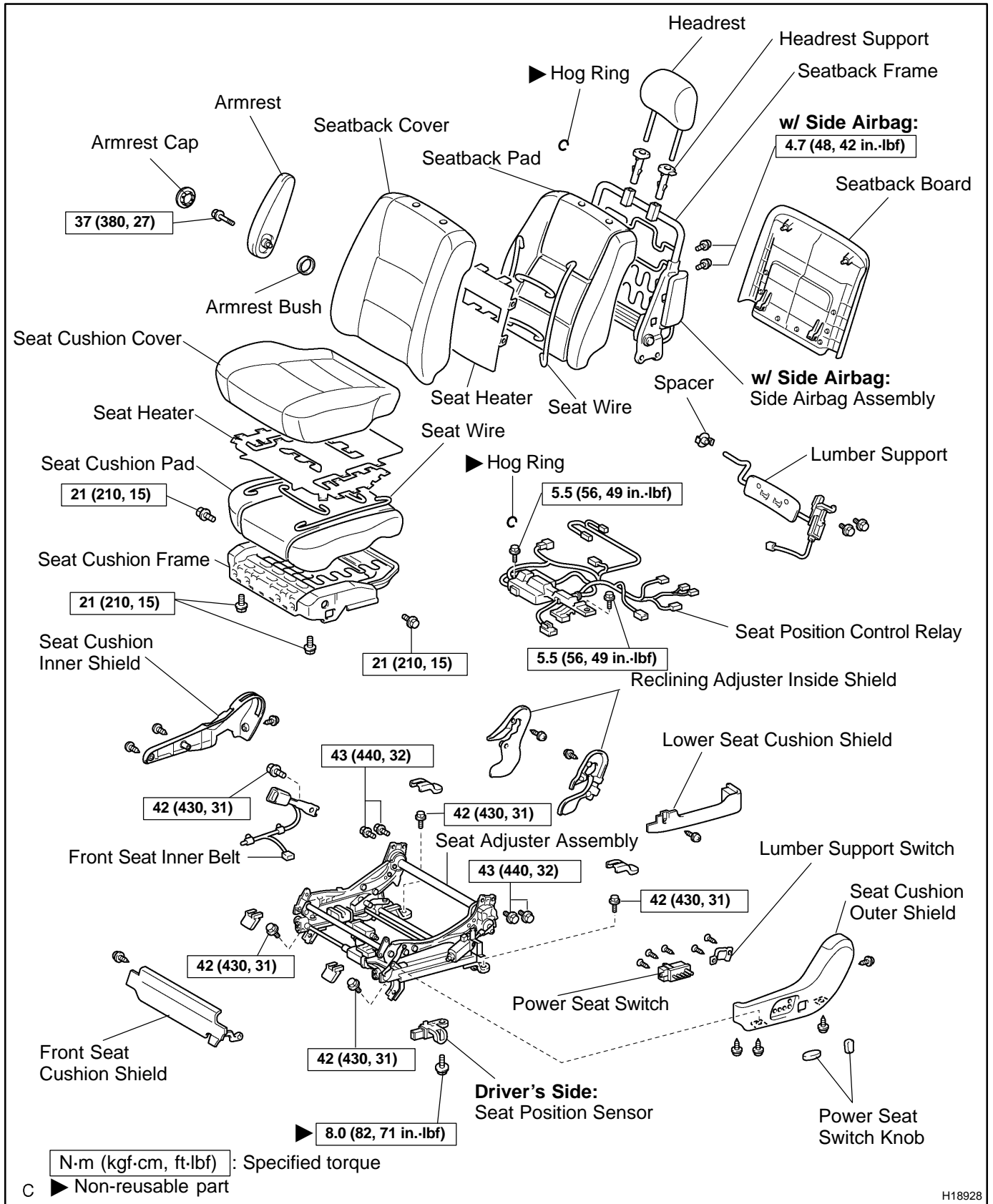
**Torque: 5.0 N-m (51 kgf-cm, 44 in.-lbf)**

## REASSEMBLY

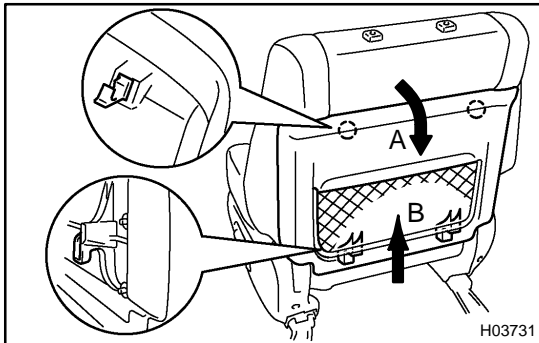
Reassembly is in the reverse order of disassembly (See page [BO-9](#) ).

# FRONT SEAT COMPONENTS

BO1KT-04



H18928

**DISASSEMBLY****1. REMOVE HEADREST****2. REMOVE SEATBACK BOARD**

Remove the seatback board as shown in the illustration.

HINT:

Remove the seatback board in the order of "A" and "B" as shown in the illustration.

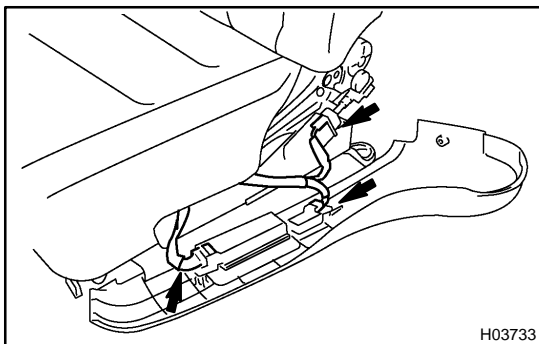
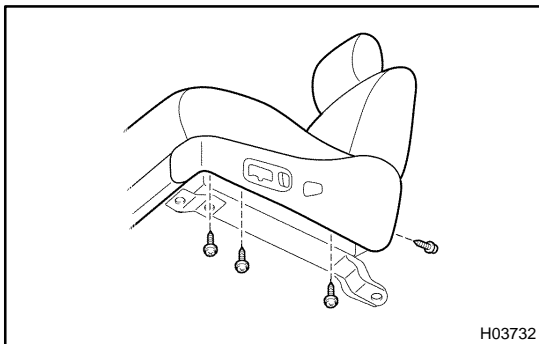
**3. REMOVE SEAT CUSHION OUTER SHIELD**

(a) Using a screwdriver, remove the power seat switch knobs.

HINT:

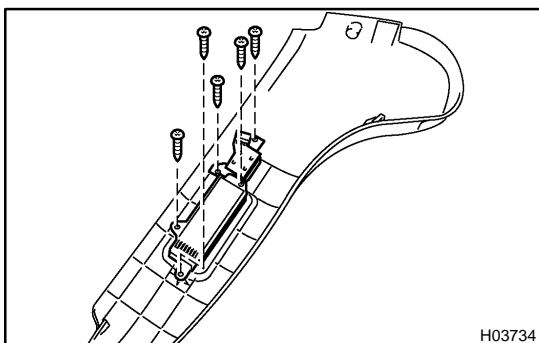
Tape up the screwdriver tip before use.

(b) Remove the 4 screws.



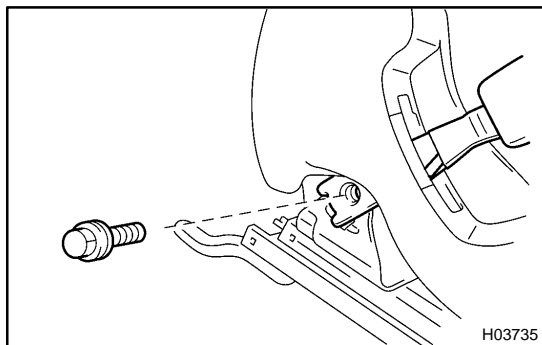
(c) Disconnect the connectors as shown in the illustration.

(d) Remove the seat cushion outer shield.

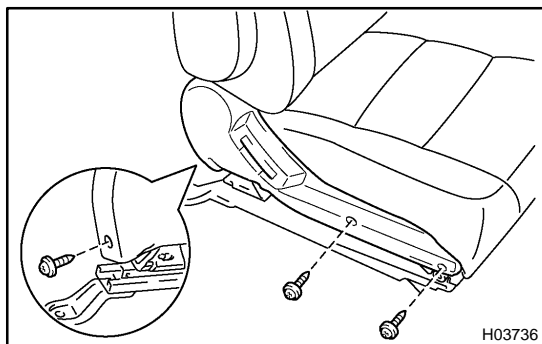


(e) Remove the 3 screws and the power seat switch from the seat cushion outer shield.

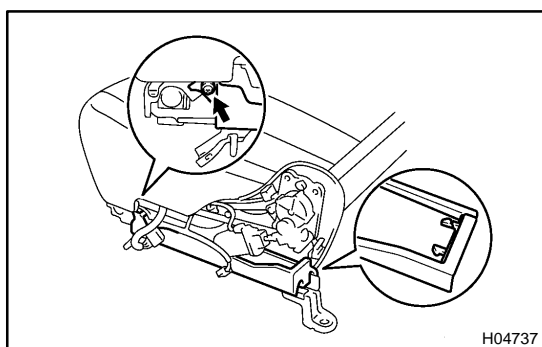
(f) Remove the 2 screws and lumber support switch from the seat cushion outer shield.

**4. REMOVE FRONT SEAT INNER BELT**

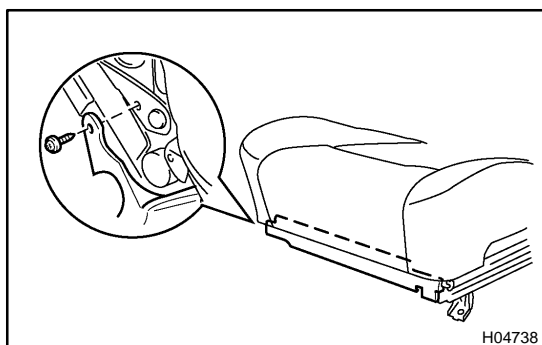
- (a) Remove the clamp, then disconnect the connector.
- (b) Remove the bolt and the inner belt.

**5. REMOVE SEAT CUSHION INNER SHIELD**

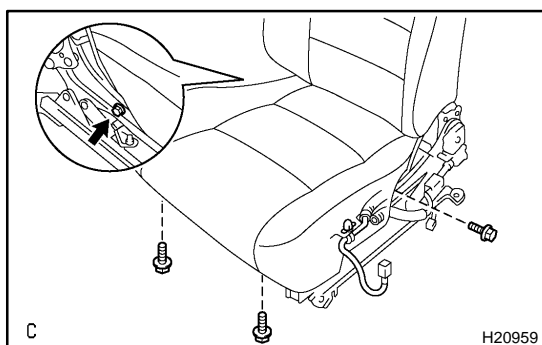
Remove the 3 screws and the seat cushion inner shield.

**6. REMOVE LOWER SEAT CUSHION SHIELD**

Remove the screw and the lower seat cushion shield as shown in the illustration.

**7. REMOVE FRONT SEAT CUSHION SHIELD**

Remove the screw and the front seat cushion shield.

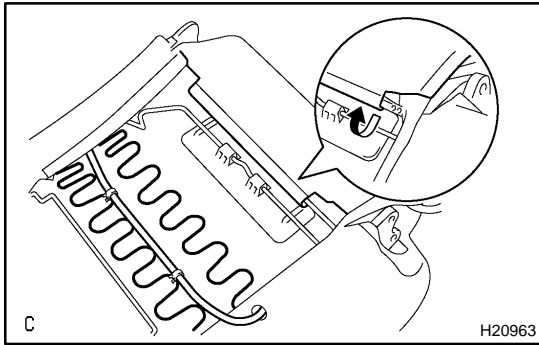
**8. REMOVE SEAT CUSHION ASSEMBLY**

- (a) Remove the 4 bolts.
- (b) Remove the clamps from the seat cushion assembly.

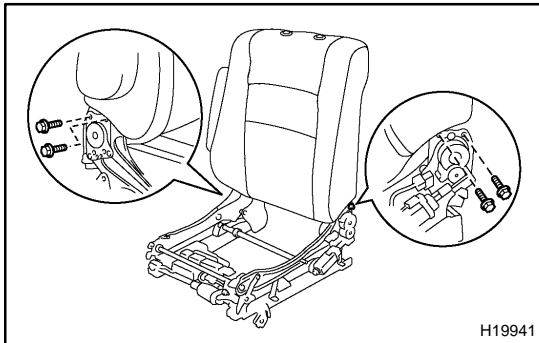
**9. REMOVE SEAT CUSHION FRAME**

- (a) Disengage the hook.
- (b) Remove the hog rings and the seat cushion frame from the seat cushion cover with pad.

**10. REMOVE SEAT CUSHION COVER (See page [BO-110](#))****11. IF NECESSARY, REPLACE SEAT CUSHION HEATER (See page [BO-110](#))**

**12. REMOVE SEATBACK ASSEMBLY**

- (a) Remove the hog rings.
- (b) Disengage the hook as shown in the illustration.
- (c) Disconnect the connectors.



- (d) Remove the 4 bolts and the seatback assembly.

**NOTICE:**

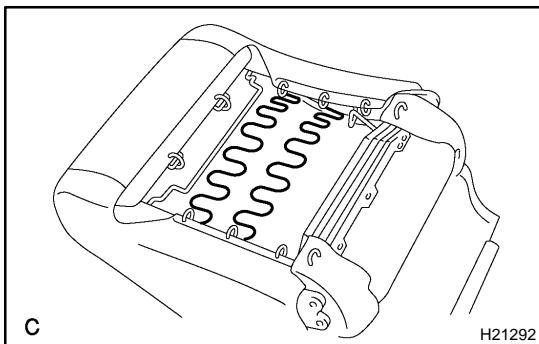
**When handling the airbag connector take care not to damage the airbag wire harness.**

- (e) Remove the screw and the RH reclining adjuster inside shield.
- (f) w/ Side Airbag:  
Disconnect the side airbag connector.

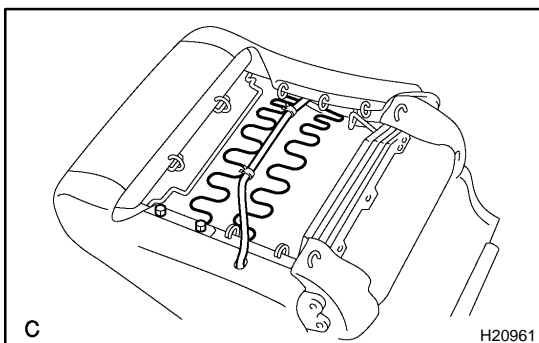
**NOTICE:**

**When handling the airbag connector take care not to damage the airbag wire harness.**

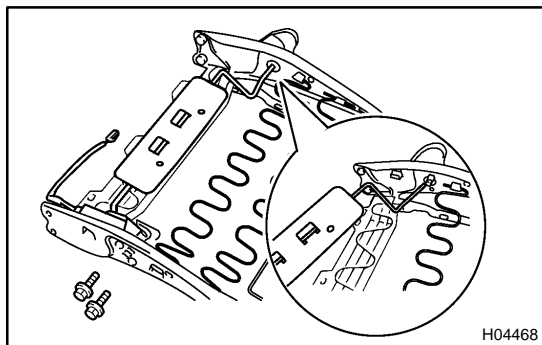
- (g) Remove the screw and the LH reclining adjuster inside shield.

**13. REMOVE ARMREST****14. w/o Side Airbag:  
REMOVE SEATBACK FRAME**

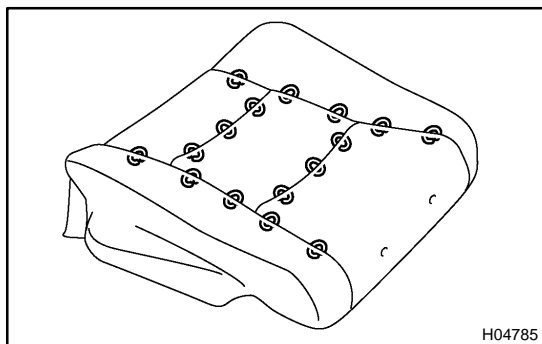
- (a) Remove the hog rings.
- (b) Remove the 2 headrest supports.
- (c) Remove the seatback frame from the seatback cover with pad.

**15. w/ Side Airbag:  
REMOVE SEATBACK FRAME**

- (a) Remove the hog rings, the clamps and the 2 bolts.
- (b) Remove the 2 headrest supports.
- (c) Remove the seatback frame from the seatback cover with pad.

**16. REMOVE LUMBER SUPPORT**

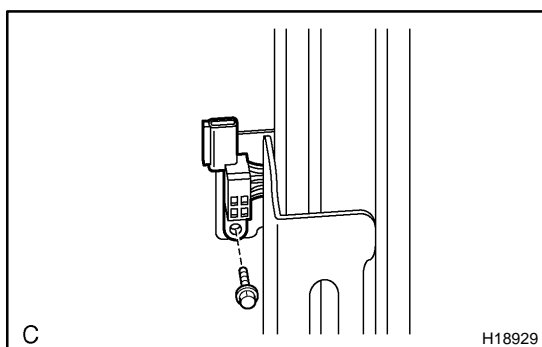
Remove the 2 bolts, the lumbar support and the spacer.

**17. REMOVE SEATBACK COVER**

Remove the hog rings and the seatback cover from the seatback pad.

**18. IF NECESSARY, REPLACE SEATBACK HEATER**  
(See page [BO-1 10](#))**19. REMOVE SEAT POSITION CONTROL RELAY**

- (a) Disconnect the connectors.
- (b) Remove the 2 bolts and the seat position control relay.

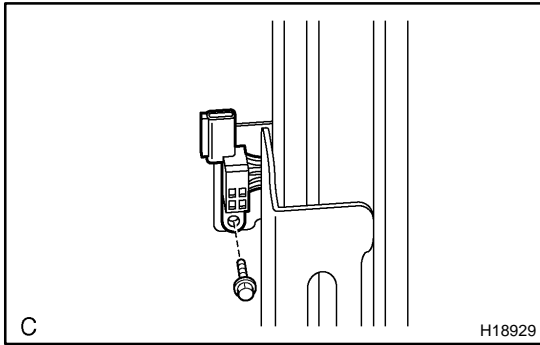
**20. Driver's Side:****REMOVE SEAT POSITION SENSOR**

Remove the bolt and the seat position sensor then disconnect the connector.



## INSTALLATION

Installation is in the reverse order of removal (See page [BO-105](#) ).



## REASSEMBLY

### 1. Driver's Side:

#### INSTALL SEAT POSITION SENSOR

Install the seat position sensor with a new bolt, then connect the connector.

**Part No.:**

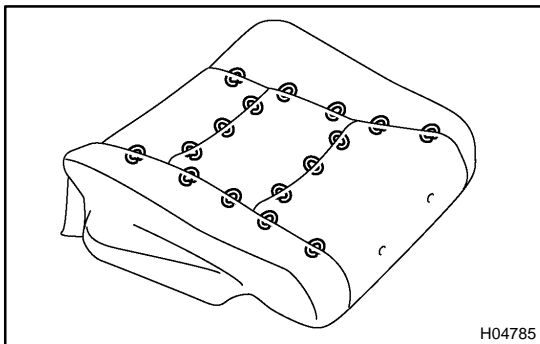
**Bolt: 90119-06871**

**Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)**

### 2. INSTALL SEAT POSITION CONTROL RELAY

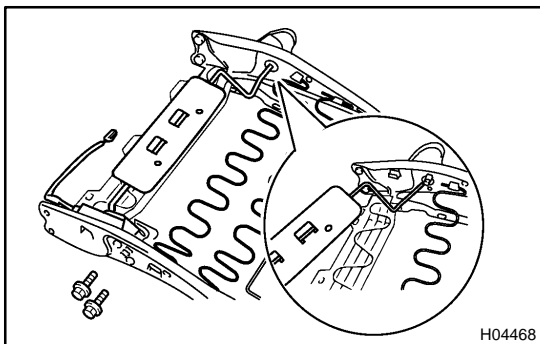
Install the seat position control relay with the 2 bolts, then connect the connectors.

**Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)**



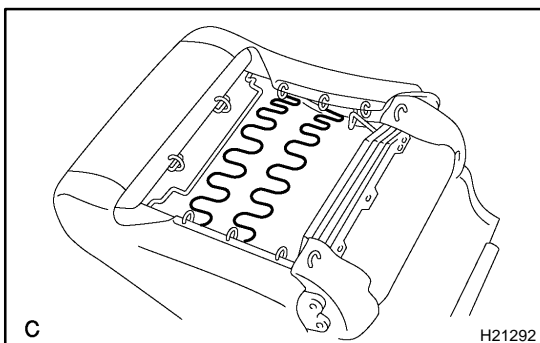
### 3. INSTALL SEATBACK COVER

Install the seatback cover to the seatback pad with new hog rings.



### 4. INSTALL LUMBER SUPPORT

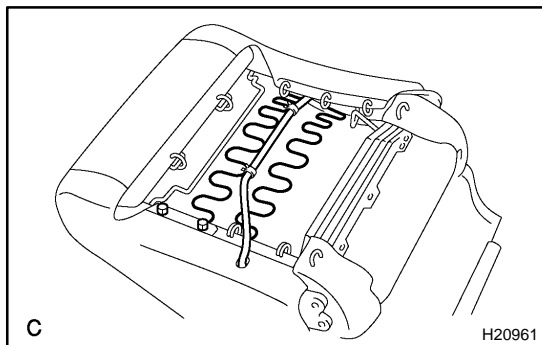
Install the lumbar support and the spacer with the 2 bolts.



### 5. w/o Side Airbag:

#### INSTALL SEATBACK FRAME

- (a) Install the seatback cover to the seatback frame.
- (b) Install new hog rings.
- (c) Install the 2 headrest supports.

**6. w/ Side Airbag:****INSTALL SEATBACK FRAME**

- (a) Install the seatback cover to the seatback frame.
- (b) Install new hog rings, the clamps and the 2 bolts.  
**Torque: 4.7 N-m (48 kgf-cm, 42 in.-lbf)**
- (c) Install the 2 headrest supports.

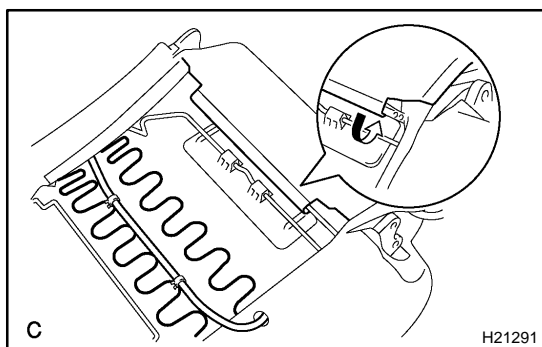
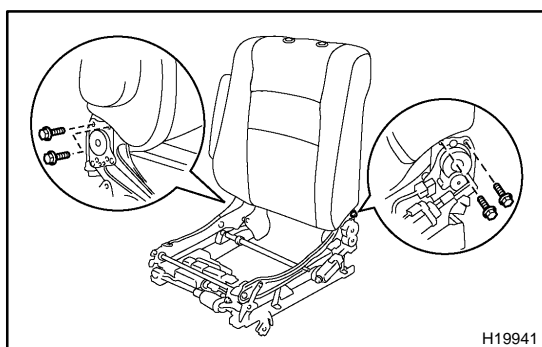
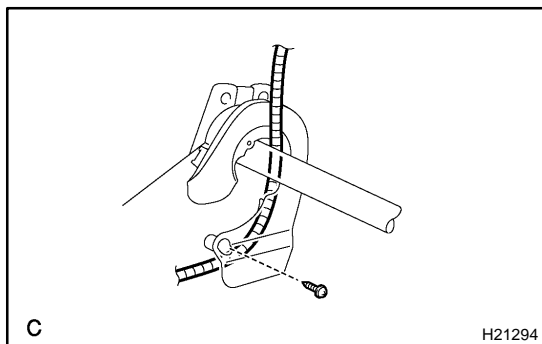
**7. INSTALL SEATBACK ASSEMBLY**

- (a) w/o Side Airbag:  
Install the RH reclining adjuster inside shield with a screw.
- (b) w/ Side Airbag:  
Place the airbag connector along the inner seat adjuster, and then install the RH reclining adjuster inside shield with a screw so that the connector is placed in between.

**NOTICE:**

**When handling the airbag connector, take care not to damage the airbag wire harness.**

- (c) Install the LH reclining adjuster inside shield with a screw.
- (d) Install the seatback assembly with the 4 bolts.  
**Torque: 43 N-m (440 kgf-cm, 32 ft-lbf)**
- (e) Install new hog rings.



- (f) Hang the hook.
- (g) Connect the connectors.

**8. INSTALL ARMREST**

**Torque: 37 N-m (380 kgf-cm, 27 ft-lbf)**

**9. INSTALL HEADREST****10. INSTALL SEAT CUSHION COVER (See page [BO-1 10](#))****11. INSTALL SEAT CUSHION FRAME**

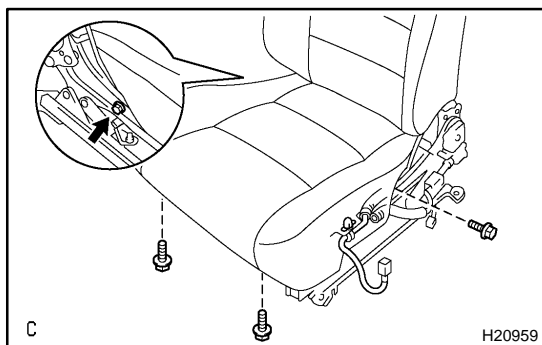
- (a) Install the seat cushion frame with new hog rings to the seat cushion cover with pad.
- (b) Hang the hook.

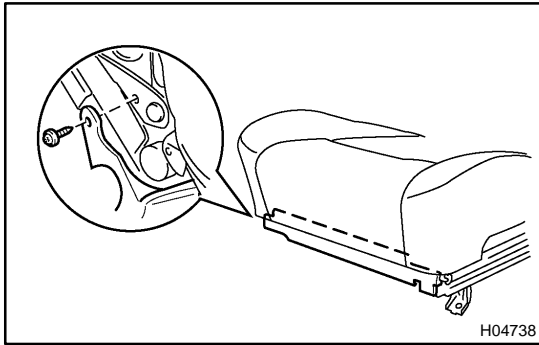
**12. INSTALL SEAT CUSHION ASSEMBLY**

- (a) Install the seat cushion assembly with the 4 bolts to the seat adjuster.

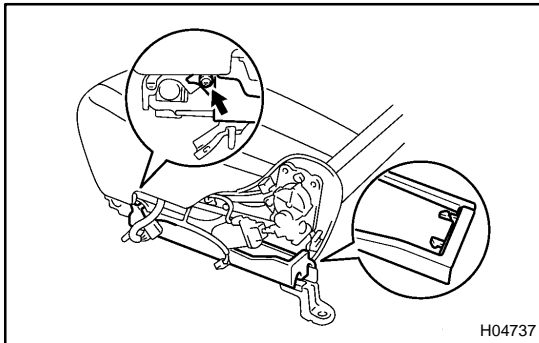
**Torque: 21 N-m (210 kgf-cm, 15 ft-lbf)**

- (b) Engage the wire harness clamp.

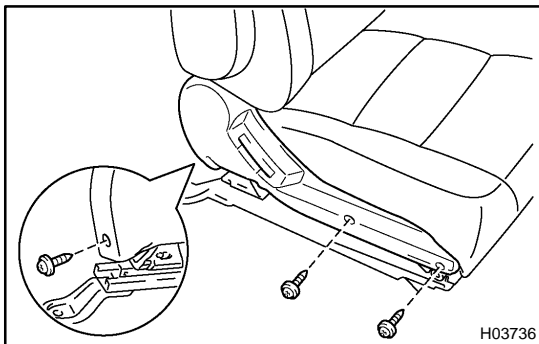


**13. INSTALL FRONT SEAT CUSHION SHIELD**

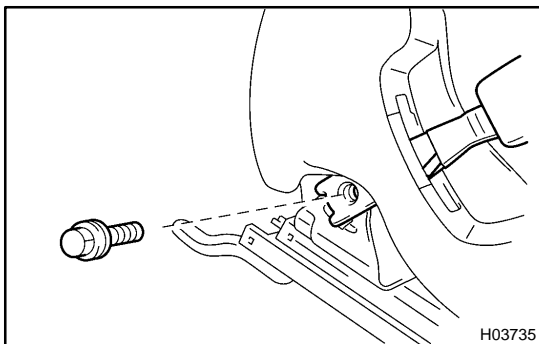
Install the seat cushion shield with the screw.

**14. INSTALL LOWER SEAT CUSHION SHIELD**

Install the seat cushion shield with the screw.

**15. INSTALL SEAT CUSHION INNER SHIELD**

Install the seat cushion inner shield with the 3 screws.

**16. INSTALL FRONT SEAT INNER BELT**

(a) Engage the clamp, then connect the connector.

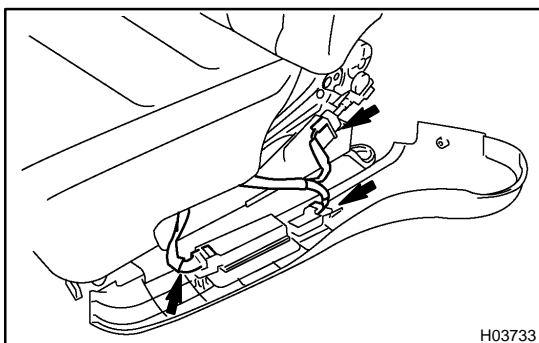
(b) Install the inner belt with the bolt.

**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**

**17. INSTALL SEAT CUSHION OUTER SHIELD**

(a) Install the power seat switch with the 3 screws.

(b) Install the lumbar support switch with the 2 screws.



(c) Connect the connectors as shown in the illustration.

(d) Install the seat cushion outer shield with the 4 screws.

(e) Install the power seat switch knobs.

**18. INSTALL SEATBACK BOARD**

## REMOVAL

### 1. REMOVE SEAT TRACK OUTER COVERS

Using a screwdriver, remove the 4 seat track outer covers.

HINT:

Tape up the screwdriver tip before use.

### 2. REMOVE FRONT SEAT

(a) Remove the 4 bolts.

**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**

(b) Disconnect the connectors, then remove the front seat.

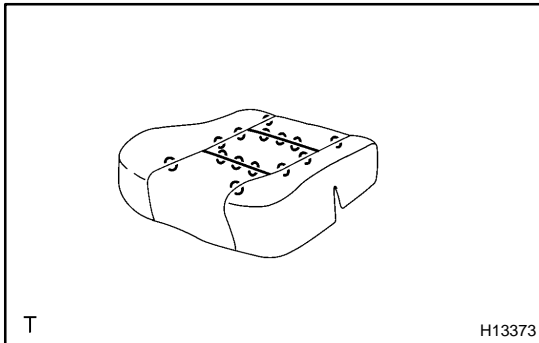
**NOTICE:**

- ▶ **When handling the airbag connector, take care not to damage the airbag wire harness.**
- ▶ **Be careful not to damage the body.**

## REPLACEMENT

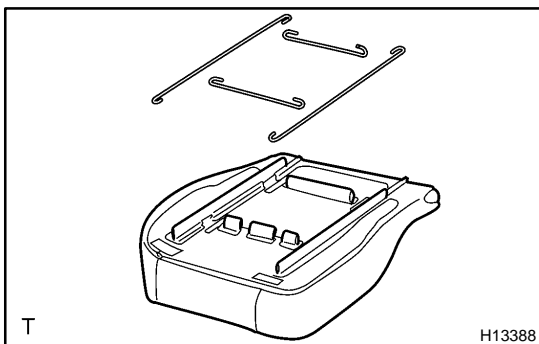
### HINT:

- ▶ Following is the seat heater replacement procedure.
- ▶ Care should be taken during operation to protect the seat cover from scratches, dirt or accidental cut of thread.

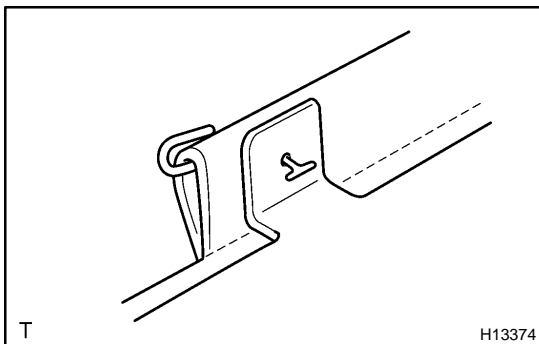


### 1. Seat cushion cover: REMOVE SEAT HEATER

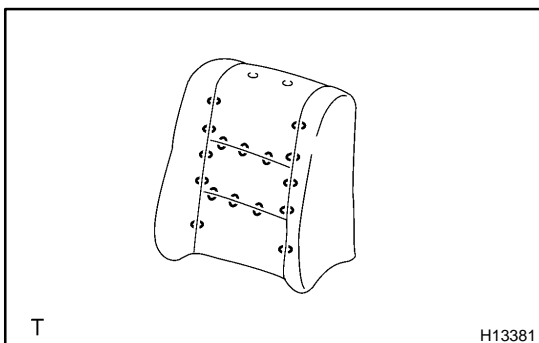
- (a) Remove the hog rings.
- (b) Remove the seat cushion cover from the pad.
- (c) Turn the seat cushion cover inside out.



- (d) Disconnect the seat wires.



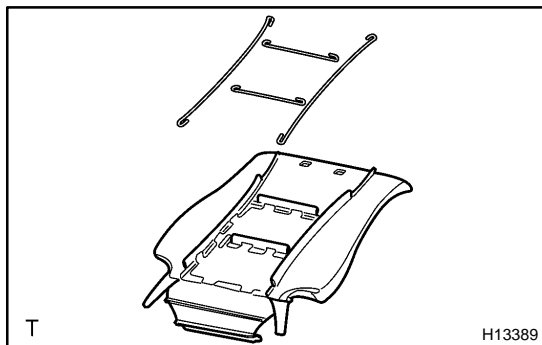
- (e) Remove the tack pins which are fastened to the heater.
- (f) Remove the seat heater from the seat cushion cover.



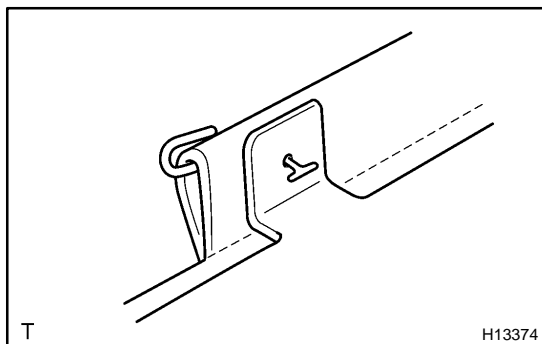
### 2. Seatback cover: REMOVE SEAT HEATER

- (a) Remove the hog rings and the wires.
- (b) Remove the seatback cover from the pad.
- (c) Turn the seatback cover inside out.

## BODY - FRONT SEAT



(d) Disconnect the seat wires.



(e) Remove the tack pins which are fastened to the seat heater.

(f) Remove the seat heater from the seatback cover.

### 3. INSTALL SEAT HEATER TO SEAT COVER

Using a tacker, install a new seat heater to the seat cushion cover with tack pins.

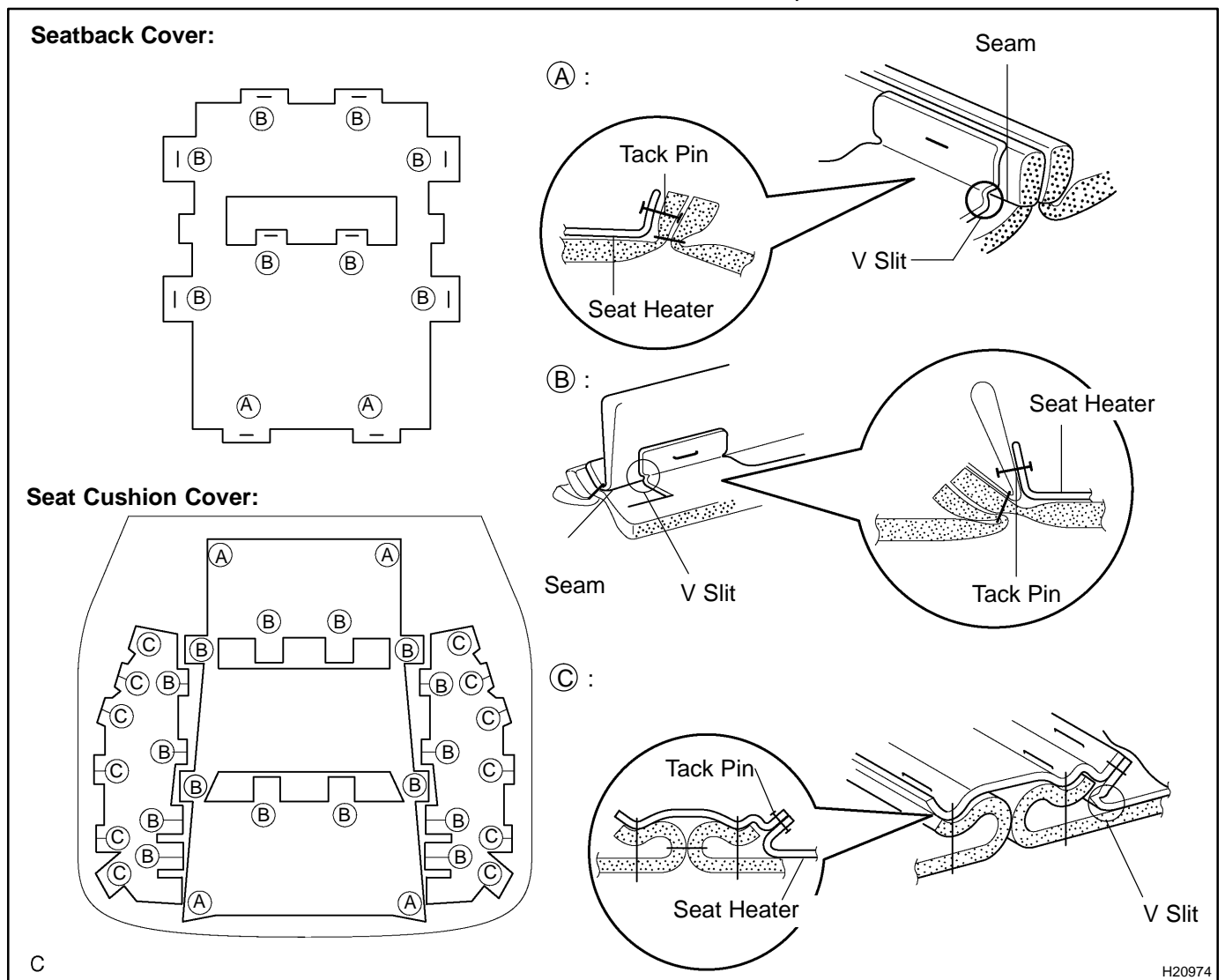
**Tacker: BANZAI 303XT or equivalent**

#### NOTICE:

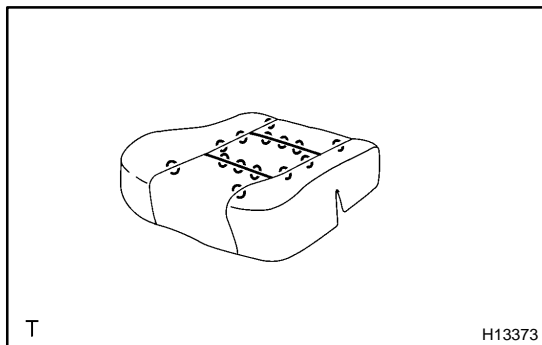
**Do not substitute other metal parts for the of tack pins. Insufficient distance between the heater and the cover may result in damage to the heater.**

HINT:

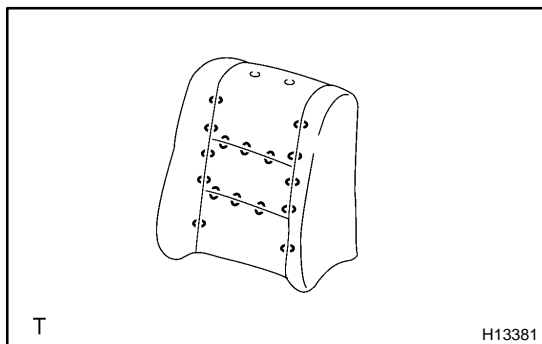
- ▶ Illustration "A" and "B":  
Fasten the cover and the heater with the tack pins matching the seam with the V slit of the heater.
- ▶ Illustration "C":  
Fasten the out-stretch cloth pad and the heater with the tack pins matching the edge of the cloth pad with the V slit of the heater.
- ▶ Sewing thread can be substituted for the tack pins. However, allow a distance of 6 - 7 mm (0.24 - 0.28 in.) between both sewed parts of the heater and the cover.



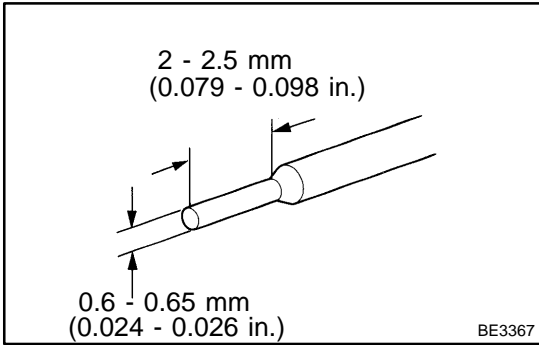


**4. INSTALL SEAT CUSHION COVER TO SEAT CUSHION PAD**

- (a) Thread the wires through the listing pocket.
- (b) Install the seat cushion cover with new hog rings.
- (c) Turn the seat cushion cover inside out to put it back to its original position.

**5. INSTALL SEATBACK COVER TO PAD**

- (a) Thread the wires through the listing pocket.
- (b) Turn the seatback cover inside out to put it back to its original position.
- (c) Install the seatback cover to pad with new hog rings.



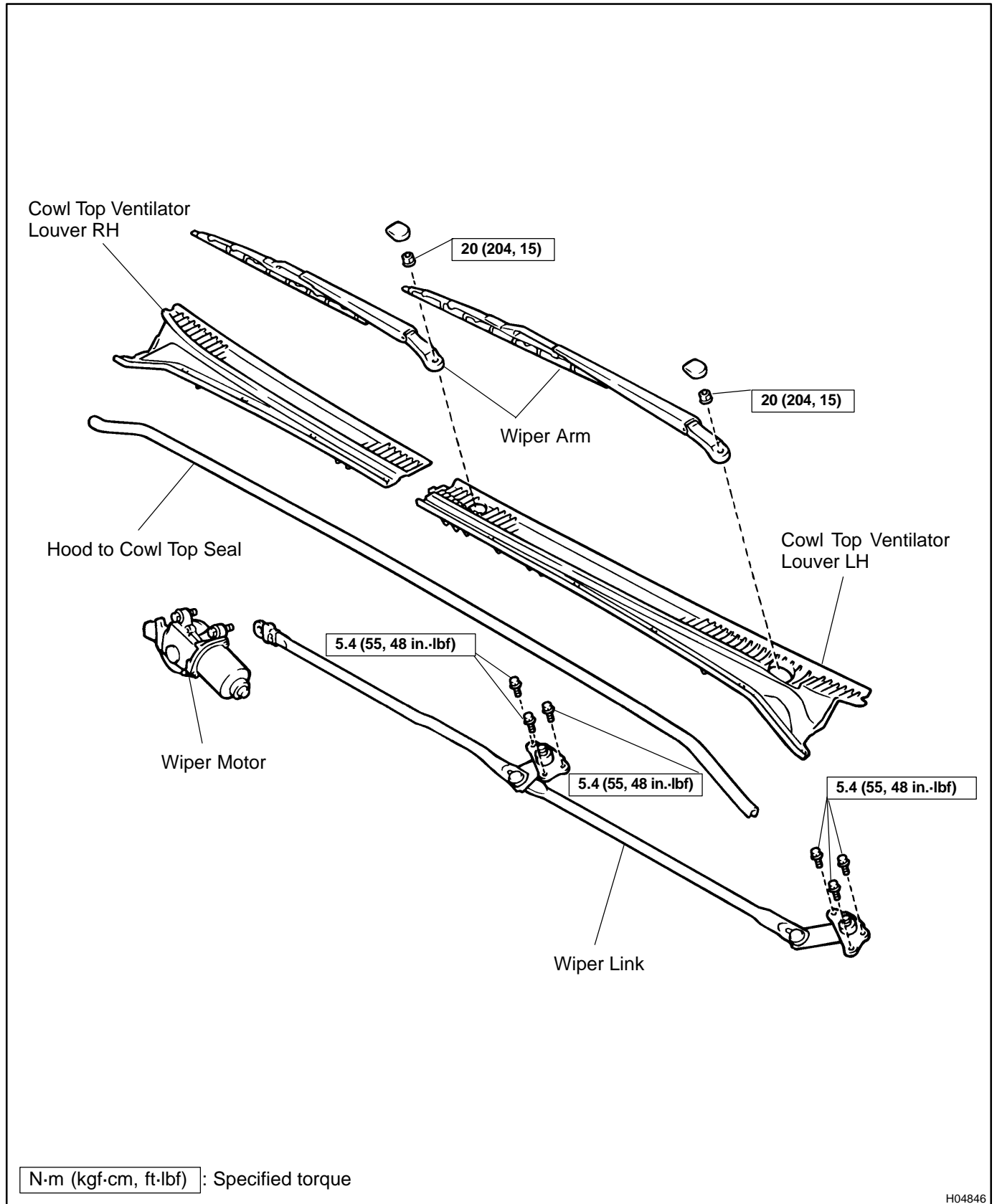
## ADJUSTMENT

### ADJUST WASHER NOZZLE

Using a tool like the one shown in the illustration, change the direction of the nozzle hole to adjust the point where washer fluid hits the windshield.

# FRONT WIPER AND WASHER COMPONENTS

BO1JR-03



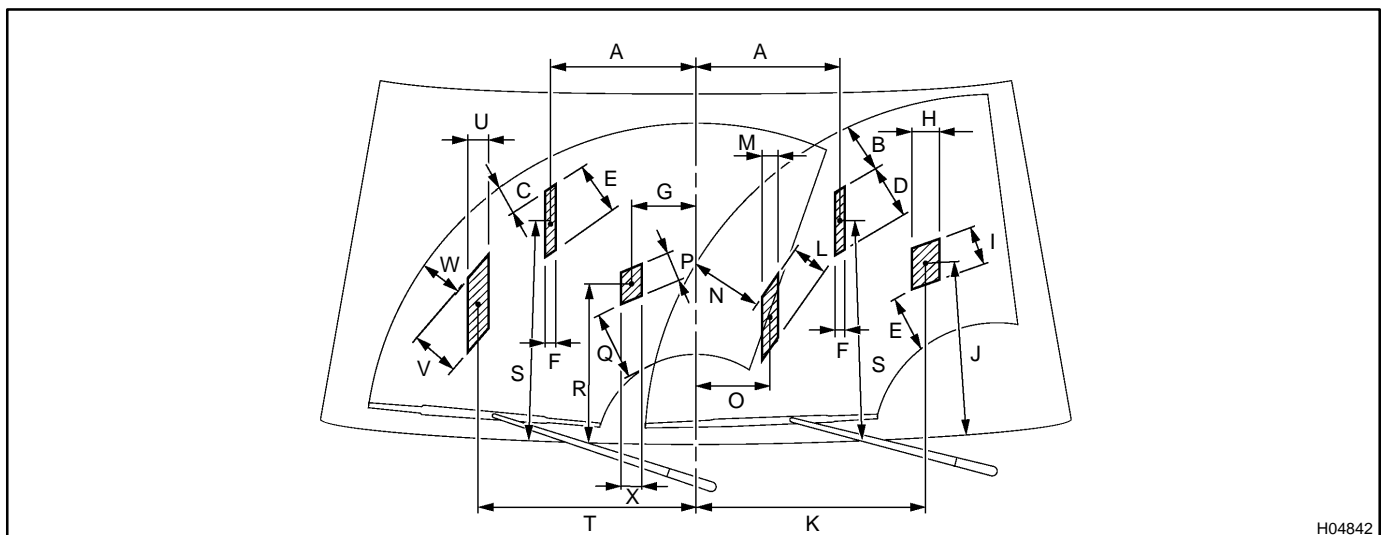
H04846

## INSPECTION

### INSPECT WASHER NOZZLE

While operating the washer, check if the point where the washer fluid hits the windshield is within the range indicated by the hatched line.

- A: Approx. 311 mm (12.24 in.)
- B: Approx. 110 mm (4.33 in.)
- C: Approx. 86 mm (3.39 in.)
- D: Approx. 116 mm (4.57 in.)
- E: Approx. 205 mm (8.07 in.)
- F: Approx. 22 mm (0.87 in.)
- G: Approx. 138 mm (5.43 in.)
- H: Approx. 60 mm (2.36 in.)
- I: Approx. 85 mm (3.35 in.)
- J: Approx. 364 mm (14.33 in.)
- K: Approx. 496 mm (19.53 in.)
- L: Approx. 81 mm (3.19 in.)
- M: Approx. 35 mm (1.38 in.)
- N: Approx. 157 mm (6.18 in.)
- O: Approx. 159 mm (6.26 in.)
- P: Approx. 63 mm (2.48 in.)
- Q: Approx. 169 mm (6.65 in.)
- R: Approx. 331 mm (13.03 in.)
- S: Approx. 465 mm (18.31 in.)
- T: Approx. 468 mm (18.43 in.)
- U: Approx. 45 mm (1.77 in.)
- V: Approx. 104 mm (4.09 in.)
- W: Approx. 119 mm (4.69 in.)
- X: Approx. 44 mm (1.73 in.)



H04842

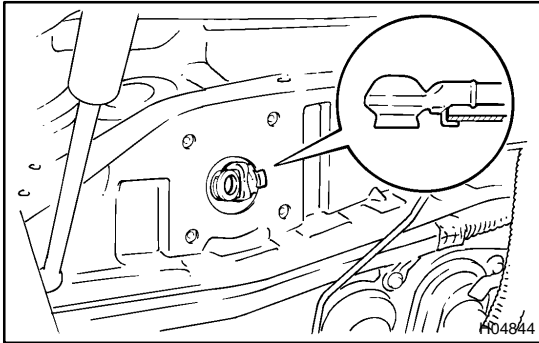
## INSTALLATION

### 1. INSTALL WASHER NOZZLES

### 2. INSTALL WIPER LINK

Install the wiper link through the service hole, then torque the 6 bolts.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**



#### HINT:

When installing the wiper link, connect the claw of wiper link to the panel.

### 3. INSTALL WIPER MOTOR

- (a) Connect the wiper motor to wiper link.
- (b) Torque the 4 bolts.
- (c) Connect the connector.

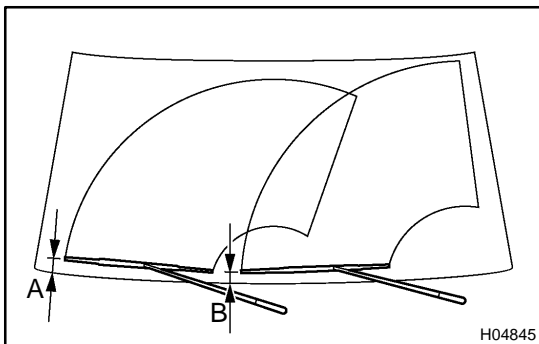
### 4. INSTALL COWL TOP VENTILATOR LOUVERS

- (a) Install the cowl top ventilator louver LH.
- (b) Install the cowl top ventilator louver RH.

### 5. INSTALL HOOD TO COWL TOP SEAL

### 6. INSTALL WIPER ARMS

- (a) Operate the wipers once and turn the wiper switch OFF.
- (b) Install the wiper arms and tighten nuts by hand.



- (c) Adjust the installation position of the wiper arms to the positions shown in the illustration.

**A: Approx. 40 mm (1.57 in.)**

**B: Approx. 16 - 26 mm (0.63 - 1.02 in.)**

- (d) Torque the nuts.

**Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)**

- (e) Install the wiper arm caps.

## REMOVAL

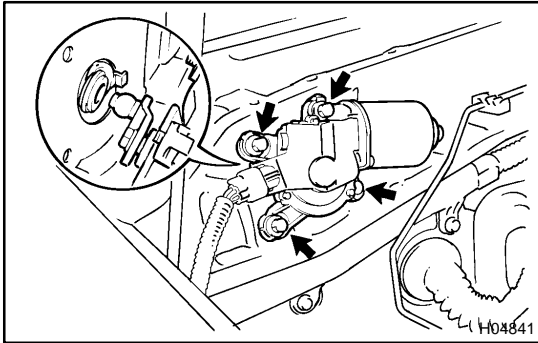
### 1. REMOVE WIPER ARMS

- (a) Remove the 2 caps and 2 nuts.
- (b) Remove the 2 wiper arms.

### 2. REMOVE HOOD TO COWL TOP SEAL

### 3. REMOVE COWL TOP VENTILATOR LOUVERS

- (a) Remove the cowl top ventilator louver RH.
- (b) Remove the cowl top ventilator louver LH.

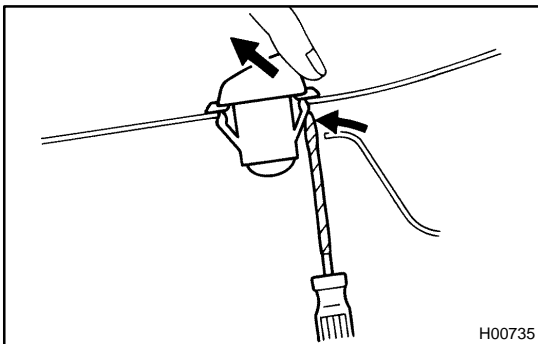


### 4. REMOVE WIPER MOTOR

- (a) Disconnect the connector, unfasten the 4 bolts.
- (b) Disconnect the wiper motor from the wiper link, then remove the wiper motor.

### 5. REMOVE WIPER LINK

- (a) Loosen the 6 bolts.
- (b) Remove the wiper link through the service hole.



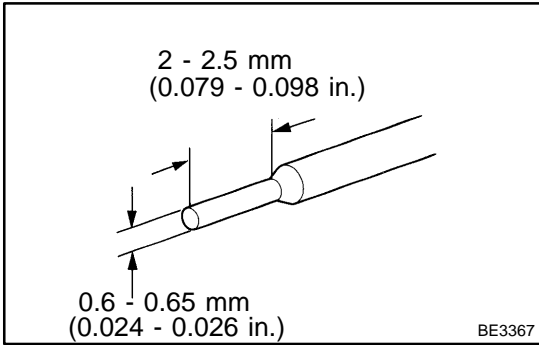
### 6. REMOVE WASHER NOZZLE

- (a) Disconnect the washer hose.
- (b) Using a screwdriver, remove the washer nozzle.

#### HINT:

Tape the screwdriver tip before use.

- (c) Employ the same manner described above to the other side.



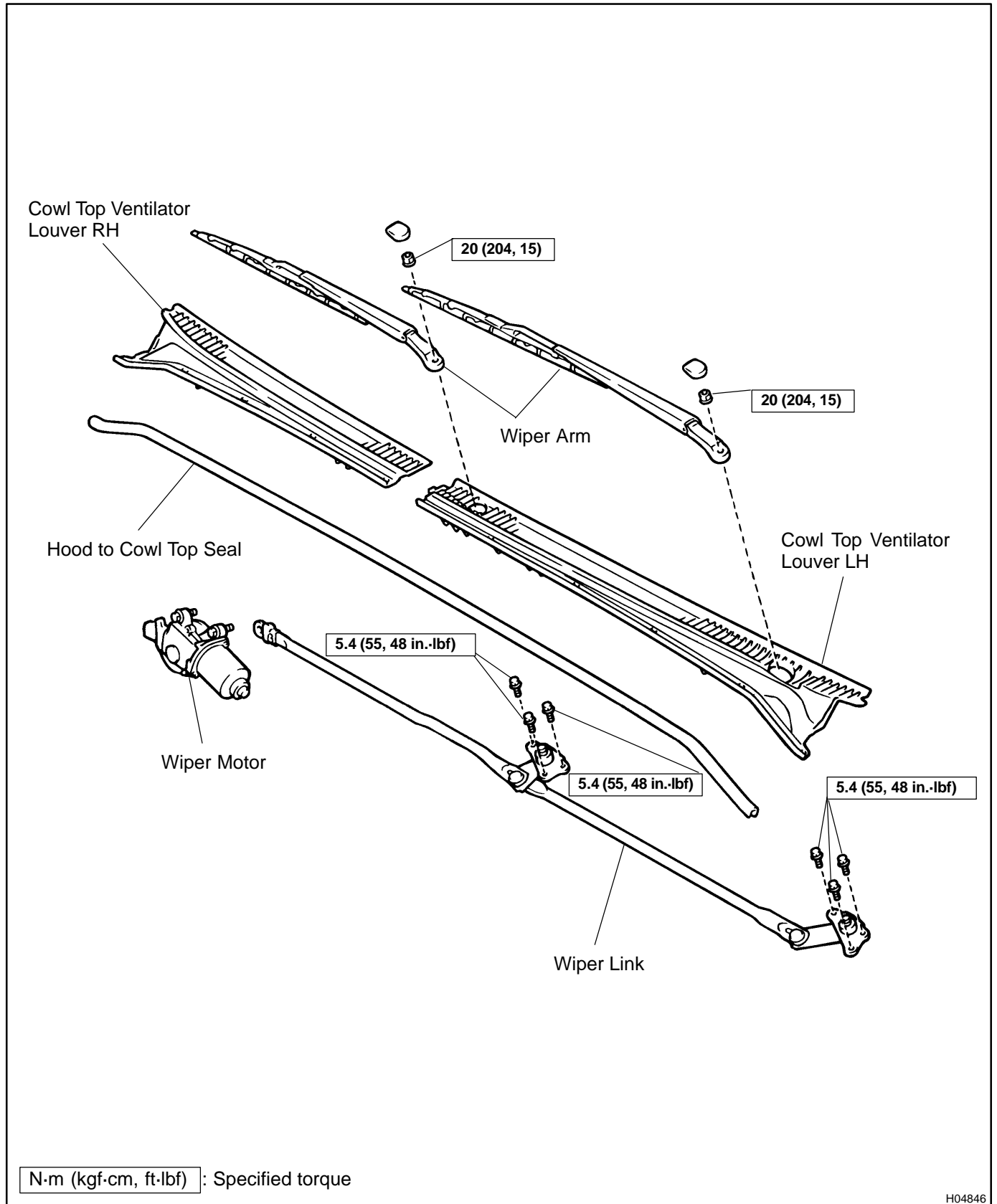
## ADJUSTMENT

### ADJUST WASHER NOZZLE

Using a tool like the one shown in the illustration, change the direction of the nozzle hole to adjust the point where washer fluid hits the windshield.

# FRONT WIPER AND WASHER COMPONENTS

BO1JR-03



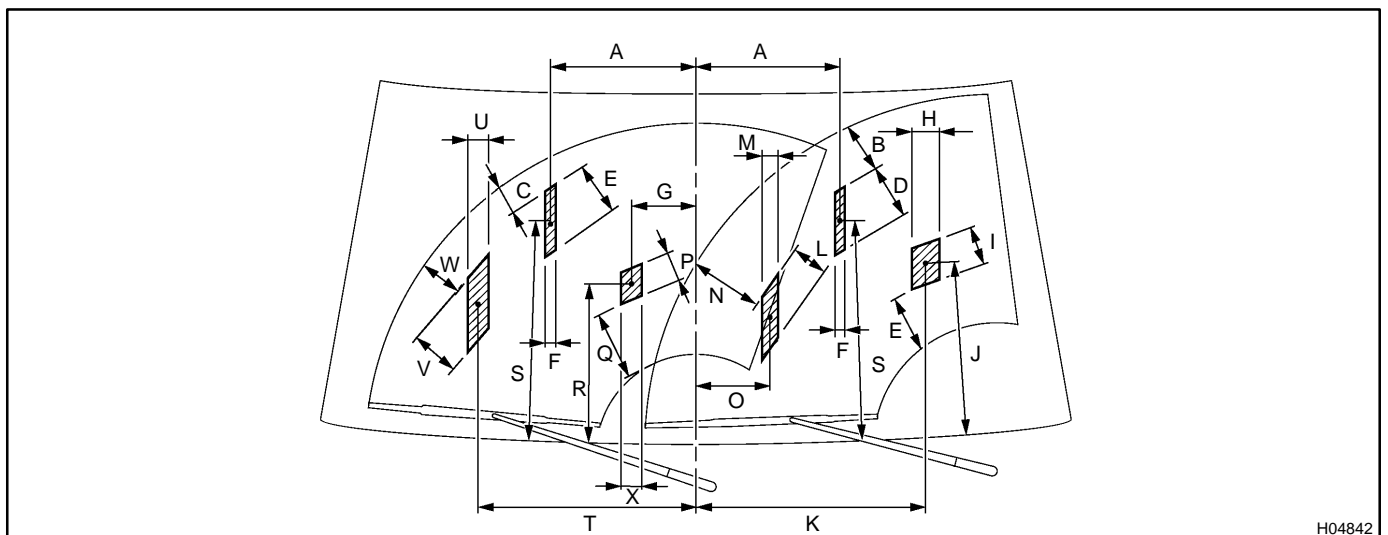


## INSPECTION

### INSPECT WASHER NOZZLE

While operating the washer, check if the point where the washer fluid hits the windshield is within the range indicated by the hatched line.

- A: Approx. 311 mm (12.24 in.)
- B: Approx. 110 mm (4.33 in.)
- C: Approx. 86 mm (3.39 in.)
- D: Approx. 116 mm (4.57 in.)
- E: Approx. 205 mm (8.07 in.)
- F: Approx. 22 mm (0.87 in.)
- G: Approx. 138 mm (5.43 in.)
- H: Approx. 60 mm (2.36 in.)
- I: Approx. 85 mm (3.35 in.)
- J: Approx. 364 mm (14.33 in.)
- K: Approx. 496 mm (19.53 in.)
- L: Approx. 81 mm (3.19 in.)
- M: Approx. 35 mm (1.38 in.)
- N: Approx. 157 mm (6.18 in.)
- O: Approx. 159 mm (6.26 in.)
- P: Approx. 63 mm (2.48 in.)
- Q: Approx. 169 mm (6.65 in.)
- R: Approx. 331 mm (13.03 in.)
- S: Approx. 465 mm (18.31 in.)
- T: Approx. 468 mm (18.43 in.)
- U: Approx. 45 mm (1.77 in.)
- V: Approx. 104 mm (4.09 in.)
- W: Approx. 119 mm (4.69 in.)
- X: Approx. 44 mm (1.73 in.)



H04842

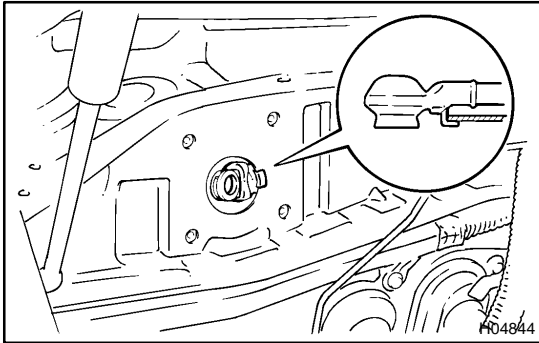
## INSTALLATION

### 1. INSTALL WASHER NOZZLES

### 2. INSTALL WIPER LINK

Install the wiper link through the service hole, then torque the 6 bolts.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**



#### HINT:

When installing the wiper link, connect the claw of wiper link to the panel.

### 3. INSTALL WIPER MOTOR

- Connect the wiper motor to wiper link.
- Torque the 4 bolts.
- Connect the connector.

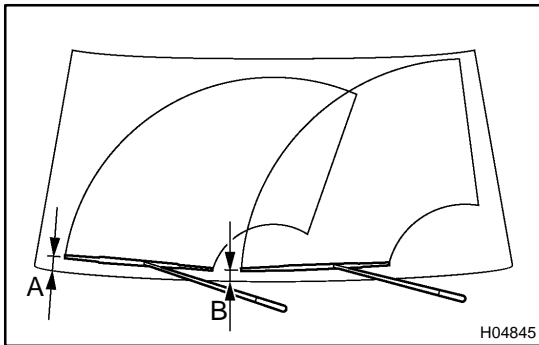
### 4. INSTALL COWL TOP VENTILATOR LOUVERS

- Install the cowl top ventilator louver LH.
- Install the cowl top ventilator louver RH.

### 5. INSTALL HOOD TO COWL TOP SEAL

### 6. INSTALL WIPER ARMS

- Operate the wipers once and turn the wiper switch OFF.
- Install the wiper arms and tighten nuts by hand.



- Adjust the installation position of the wiper arms to the positions shown in the illustration.

**A: Approx. 40 mm (1.57 in.)**

**B: Approx. 16 - 26 mm (0.63 - 1.02 in.)**

- Torque the nuts.

**Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)**

- Install the wiper arm caps.

## REMOVAL

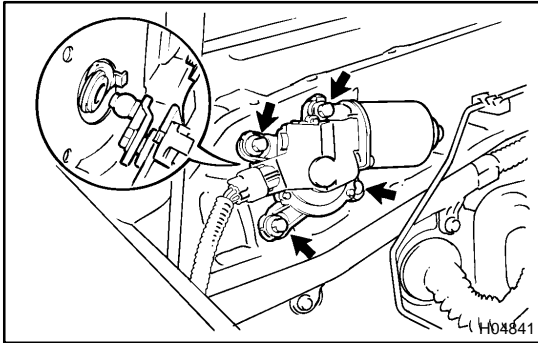
### 1. REMOVE WIPER ARMS

- (a) Remove the 2 caps and 2 nuts.
- (b) Remove the 2 wiper arms.

### 2. REMOVE HOOD TO COWL TOP SEAL

### 3. REMOVE COWL TOP VENTILATOR LOUVERS

- (a) Remove the cowl top ventilator louver RH.
- (b) Remove the cowl top ventilator louver LH.

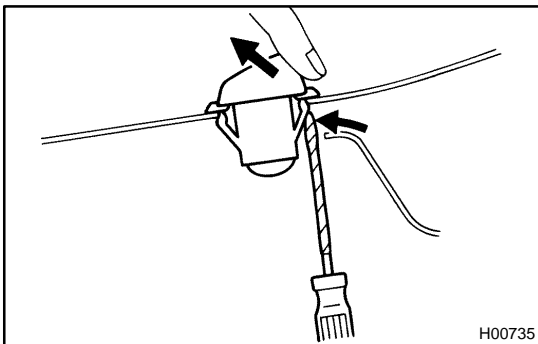


### 4. REMOVE WIPER MOTOR

- (a) Disconnect the connector, unfasten the 4 bolts.
- (b) Disconnect the wiper motor from the wiper link, then remove the wiper motor.

### 5. REMOVE WIPER LINK

- (a) Loosen the 6 bolts.
- (b) Remove the wiper link through the service hole.



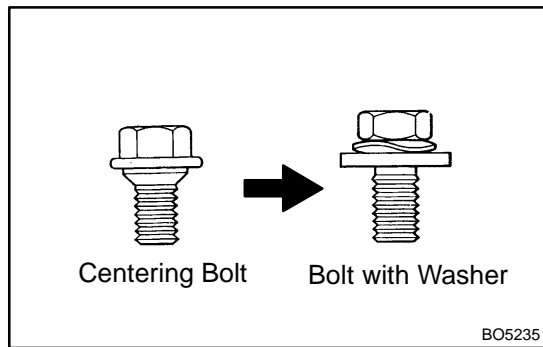
### 6. REMOVE WASHER NOZZLE

- (a) Disconnect the washer hose.
- (b) Using a screwdriver, remove the washer nozzle.

#### HINT:

Tape the screwdriver tip before use.

- (c) Employ the same manner described above to the other side.

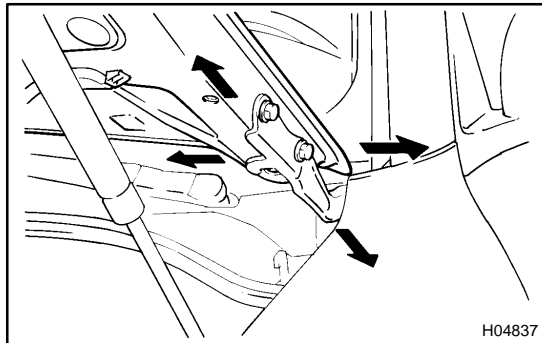


## HOOD ADJUSTMENT

BO1J8-03

### HINT:

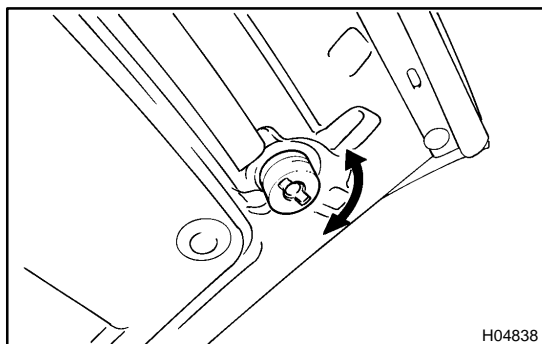
Since the centering bolt is used as a hood hinge set bolt, the hood cannot be adjusted with it on. Substitute the bolt with a washer for the centering bolt.



### 1. ADJUST HOOD IN FORWARD/REARWARD AND LEFT/RIGHT DIRECTIONS

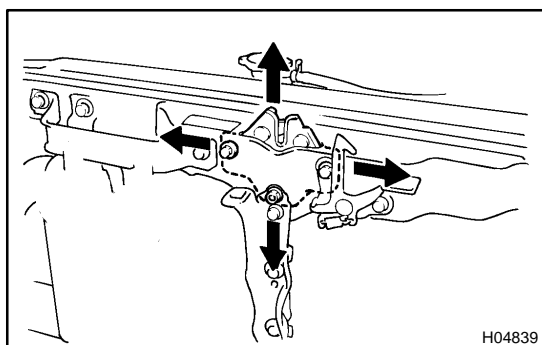
Adjust the hood by loosening the hood side hinge bolts.

**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**



### 2. ADJUST FRONT EDGE OF HOOD IN VERTICAL DIRECTION

Adjust the hood by turning the cushions.



### 3. ADJUST HOOD LOCK

Adjust the lock by loosening the bolts.

# HOOD SUPPORT REPLACEMENT

BO1J9-03

## 1. REMOVE HOOD SUPPORT

- (a) Remove the bolt and hood support from the hood.

HINT:

While supporting the hood by hand, remove the hood support from the hood.

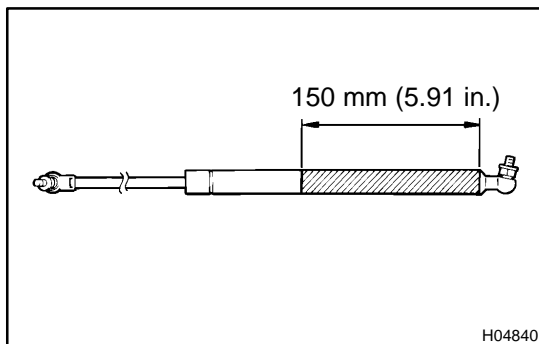
- (b) Remove the bolt and hood support.

## 2. IF NECESSARY, REPLACE HOOD SUPPORT

**NOTICE:**

**Handling the hood support**

- ▶ Do not disassemble the support as the cylinder is filled with pressurized gas.



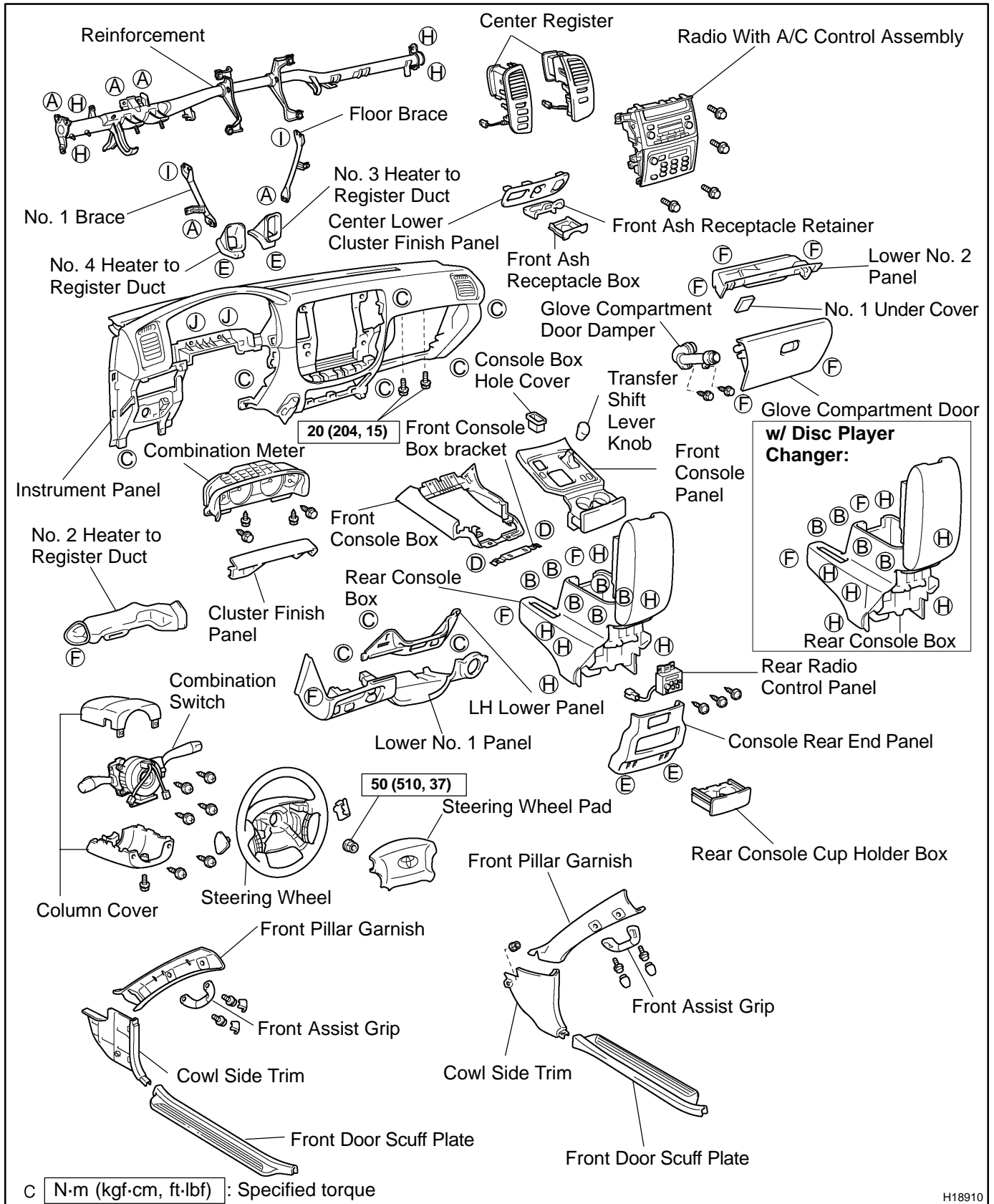
- ▶ If the hood support is to be replaced, drill a 2.0 - 3.0 mm (0.079 - 0.118 in.) hole in the area shown in the illustration to completely release the high pressure gas before disposing of it.
- ▶ When drilling, chips may fly out so work carefully.
- ▶ The gas is colorless, odorless and non - toxic.
- ▶ When working, handle the hood support carefully. Never score or scratch the exposed part of the piston rod, and allow any paint or oil to get on it.
- ▶ Do not turn the piston rod and cylinder with the hood support fully extended.

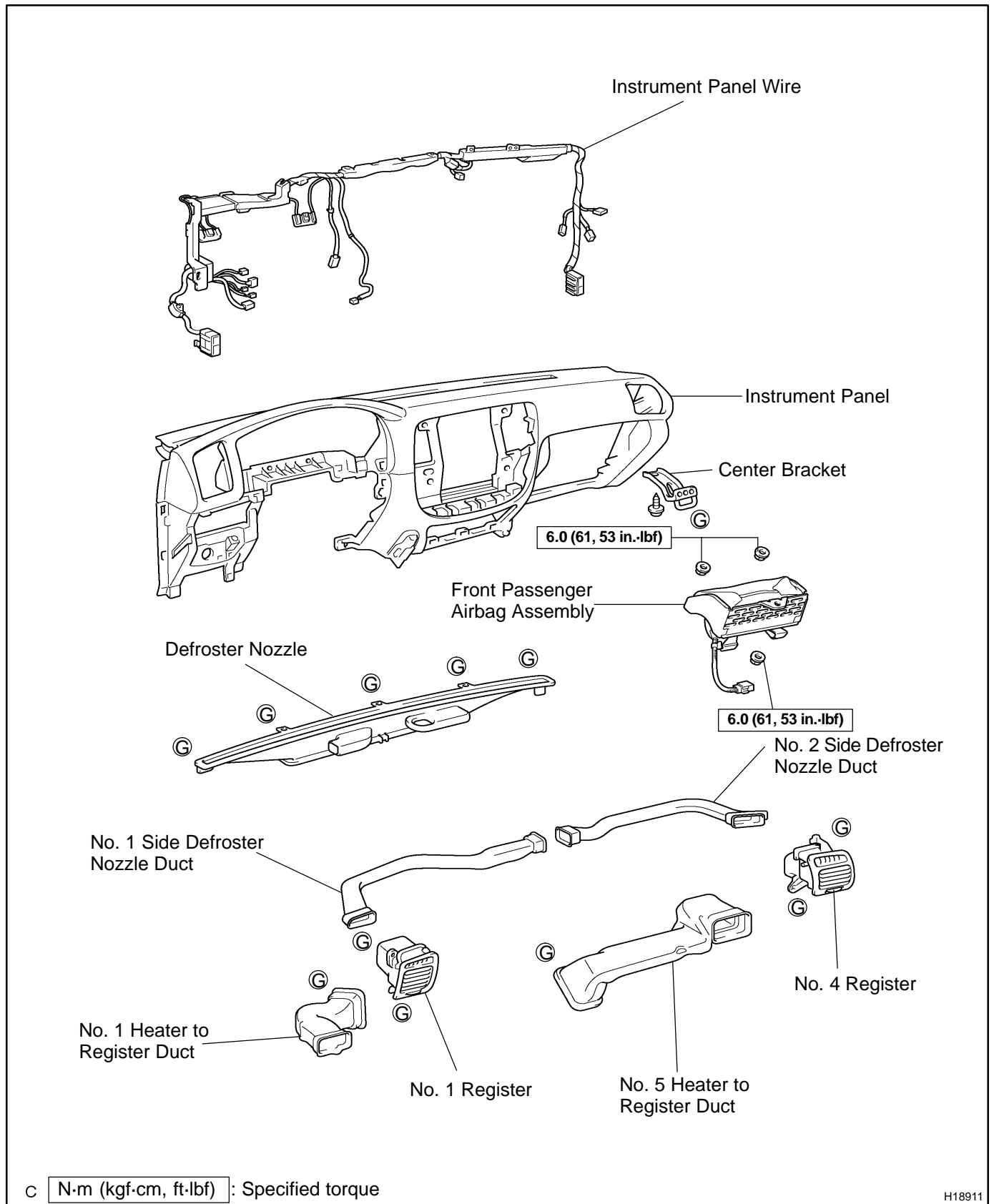
## 3. INSTALL HOOD SUPPORT

- (a) Install the bolt and hood support to the body.  
 (b) Install the bolt and hood support to the hood.

# INSTRUMENT PANEL COMPONENTS

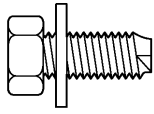
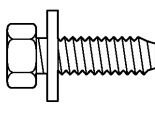
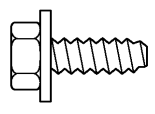
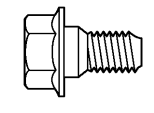
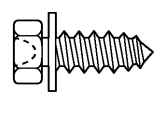
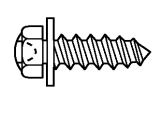
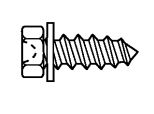
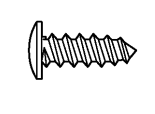
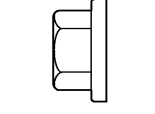
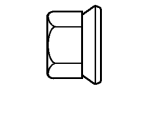
BO1KK-04





HINT:

Screw shapes and sizes are indicated in the table below. The codes ("A" to "I") correspond to those indicated on the previous page.

		mm (in.)						
	Shape	Size		Shape	Size		Shape	Size
Ⓐ		∅ = 8 (0.31) L = 16 (0.63)	Ⓑ		∅ = 6 (0.24) L = 18 (0.71)	Ⓒ		∅ = 6 (0.24) L = 16 (0.63)
Ⓓ		∅ = 6 (0.24) L = 11 (0.43)	Ⓔ		∅ = 6 (0.24) L = 16 (0.63)	Ⓕ		∅ = 5 (0.20) L = 16 (0.63)
Ⓖ		∅ = 5 (0.20) L = 14 (0.55)	Ⓖ		∅ = 5 (0.20) L = 14 (0.55)	Ⓖ		∅ = 8 (0.31)
Ⓙ		∅ = 6 (0.24)						

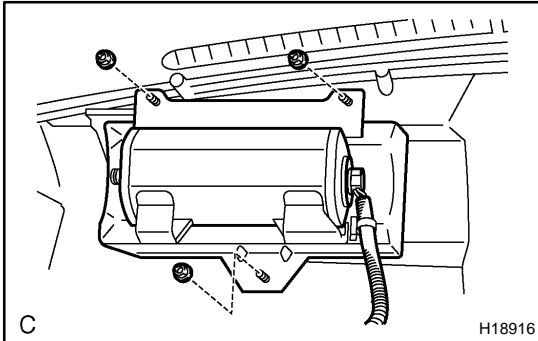
C

H21419



## DISASSEMBLY

1. REMOVE NO. 2 SIDE DEFROSTER NOZZLE DUCT
2. REMOVE NO. 1 SIDE DEFROSTER NOZZLE DUCT
3. REMOVE DEFROSTER NOZZLE
4. REMOVE CENTER BRACKET
5. REMOVE NO. 1 HEATER TO REGISTER DUCT
6. REMOVE INSTRUMENT PANEL WIRE HARNESS
7. REMOVE NO. 5 HEATER TO REGISTER DUCT



8. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY  
Remove the 3 nuts and the front passenger airbag assembly.  
Torque: 6.0 N·m (61 kgf·cm, 53 in.-lbf)

### CAUTION:

- ▶ Do not store the front passenger airbag assembly with the airbag deployment side facing down.
- ▶ Never disassemble the front passenger airbag assembly.

### NOTICE:

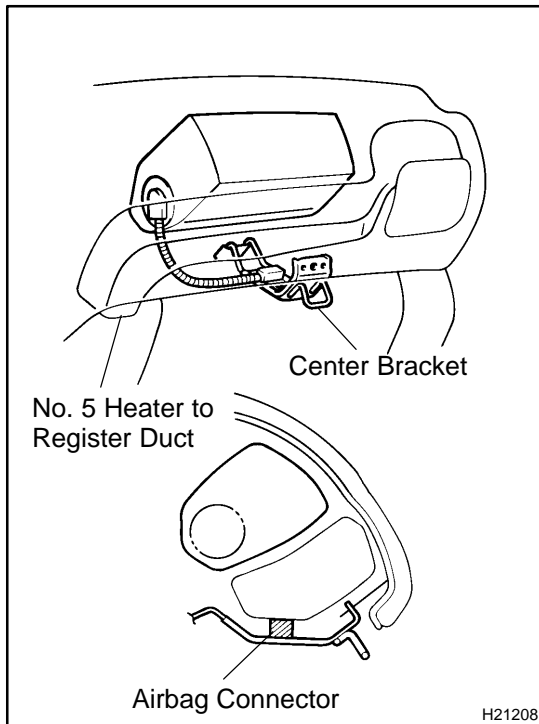
At the time of reassembly, please refer to the following items.

- ▶ Make sure that the front passenger airbag assembly is installed with the specified torque.
- ▶ If the front passenger airbag assembly has been dropped, or if there are cracks, dents or other defects in the case or the connector, replace the front passenger airbag assembly with a new one.
- ▶ When installing the front passenger airbag assembly, take care that the wiring does not interfere with other parts and is not pinched between other parts.

9. REMOVE NO. 1 REGISTER
10. REMOVE NO. 4 REGISTER

## INSTALLATION

1. INSTALL REINFORCEMENT
2. INSTALL NO. 1 BRACE
3. INSTALL FLOOR BRACE
4. INSTALL GLOVE COMPARTMENT DOOR DAMPER
5. INSTALL NO. 4 HEATER TO REGISTER DUCT
6. INSTALL NO. 3 HEATER TO REGISTER DUCT
7. INSTALL ECM (See page [SF-60](#))



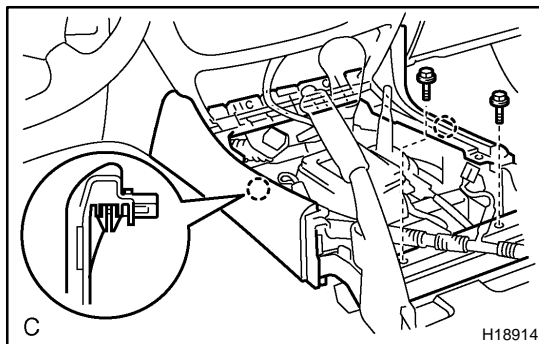
### 8. INSTALL INSTRUMENT PANEL

#### HINT:

- ▶ Install the airbag connector between the No. 5 heater to register duct and the center bracket temporarily, then install the instrument panel.
  - ▶ Remove the airbag connector before installing the lower No. 2 panel.
- (a) Install the 6 bolts, the 2 nuts and the instrument panel, then connect the connectors.
  - (b) Install the 2 bolts to the front passenger airbag assembly.  
**Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)**
  - (c) Connect the junction connectors.

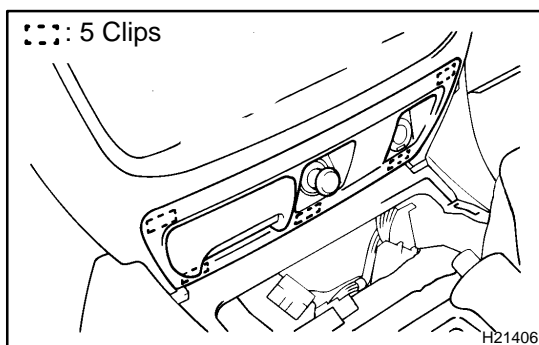
#### HINT:

The connectors can be connected by tightening the bolts.



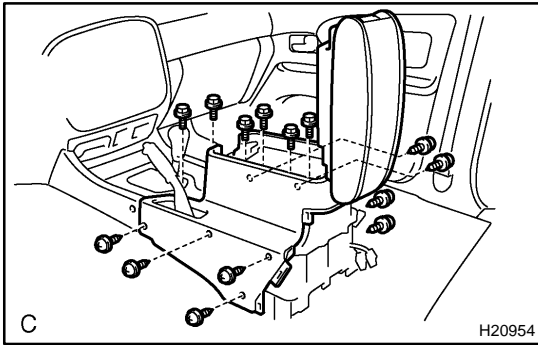
### 9. INSTALL FRONT CONSOLE BOX AND FRONT CONSOLE BOX BRACKET

Install the front console box and the front console box bracket with the 2 bolts.

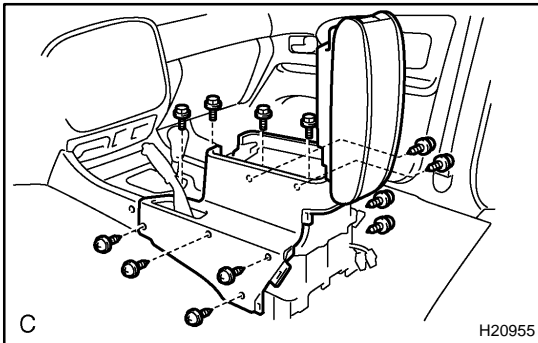


### 10. INSTALL CENTER LOWER CLUSTER FINISH PANEL

Connect the connector, then install the center lower cluster finish panel.

**11. INSTALL REAR CONSOLE BOX**

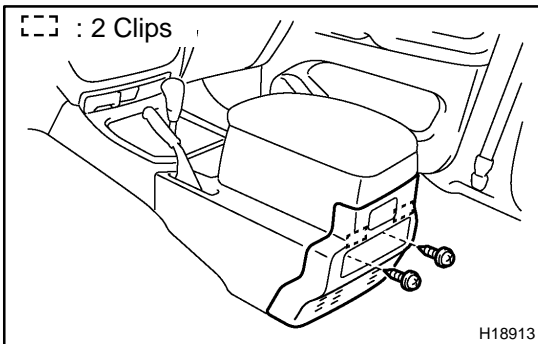
- (a) w/o Disc player changer:  
Install the rear console box with the 6 bolts and the 8 screws.



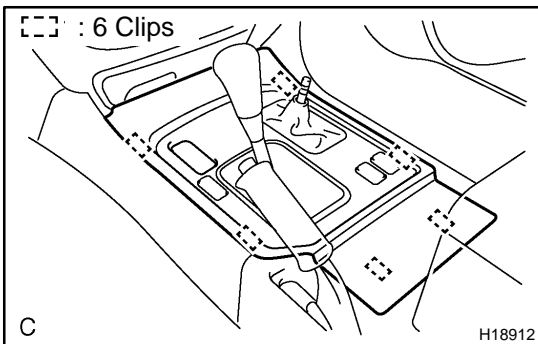
- (b) w/ Disc player changer:  
Install the rear console box with the 4 bolts and the 8 screws.

**12. INSTALL REAR RADIO CONTROL PANEL**

Install the rear radio control panel with the 3 screws, then connect the connector.

**13. INSTALL CONSOLE REAR END PANEL**

- (a) Install the console rear end panel with the 2 screws.  
(b) Install the rear console cup holder box.

**14. INSTALL FRONT CONSOLE PANEL**

Install the front console panel, then install the transfer shift lever knob.

**15. INSTALL RADIO WITH A/C CONTROL ASSEMBLY****HINT:**

w/ Navigation System:

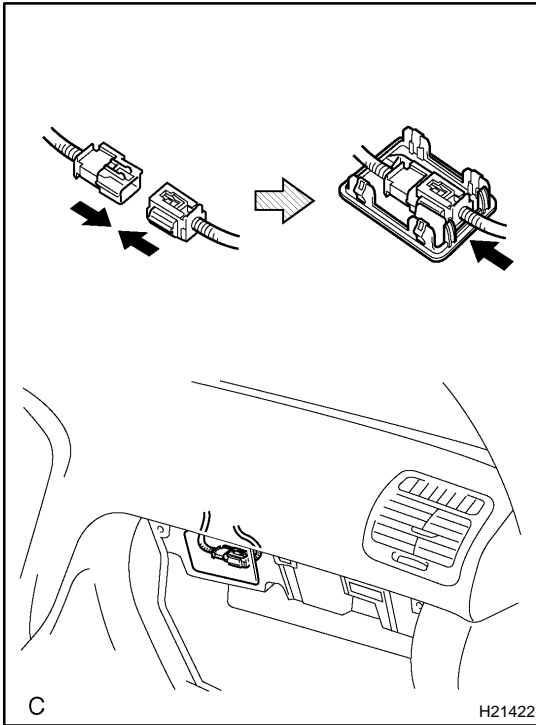
When removing/installing or replacing EMV, or when disconnecting/connecting the battery terminal, turn the IG ON and OFF twice for initial display setting.

**16. INSTALL CENTER REGISTERS**

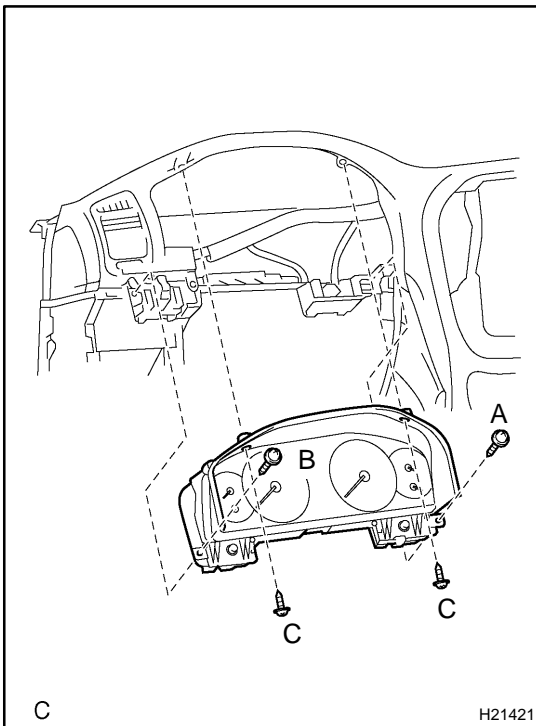
Connect the connectors, then install the center registers.

**17. INSTALL LOWER NO. 2 PANEL**

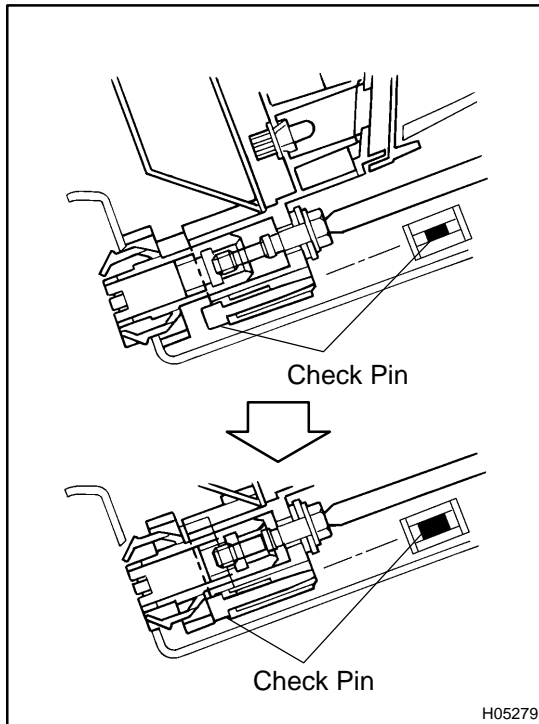
Install the lower No. 2 panel with the 3 screws.



- 18. CONNECT AIRBAG CONNECTOR (See page RS-41 )**
- 19. INSTALL GLOVE COMPARTMENT DOOR**
- (a) Connect the glove compartment door damper clip, then install the glove compartment door.
- (b) Install the 2 screws.



- 20. INSTALL COMBINATION METER**
- (a) Check that the set-in connectors are connected securely in the installation holes on the instrument panel.
- (b) Place the combination meter on the instrument panel.
- (c) Install the combination meter by tightening the screws, "A", "B" and "C" in order.



(d) Tighten the connection bolts.

HINT:

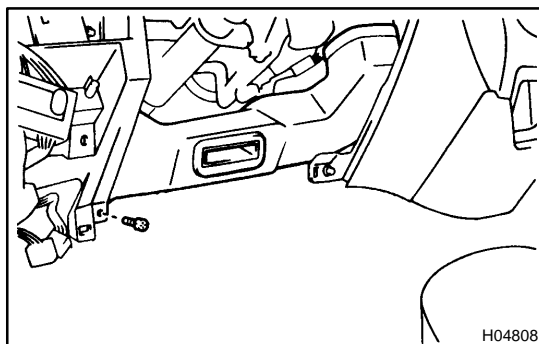
- ▶ When connection completes, the bolts turn idly, causing turning noise.
- ▶ Check that the connection check pins protrude from the lower side of the connection bolts.

**NOTICE:**

Follow the procedures in the order of (c) and (d). Otherwise, set-in connectors on the wire harness side and connectors on the meter side might not be connected properly.

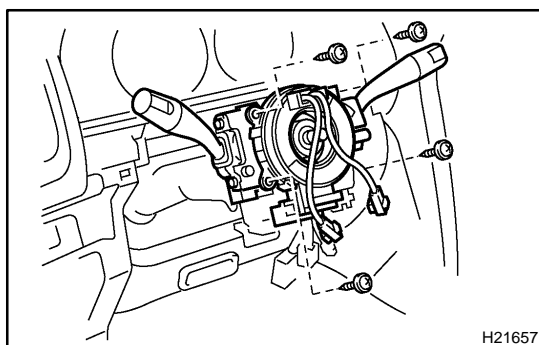
## 21. INSTALL STEERING COLUMN

(See page [SR-24](#) or [SR-37](#))



## 22. INSTALL NO. 2 HEATER TO REGISTER DUCT

Install the No. 2 heater to register duct with the screw.



## 23. INSTALL COMBINATION SWITCH

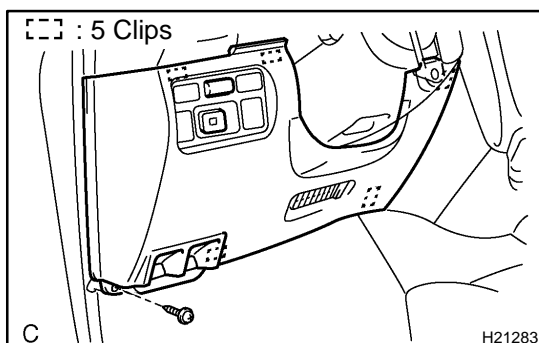
- (a) Install the combination switch with the 4 screws.
- (b) Install the clamp, then connect the connectors.

## 24. INSTALL COLUMN COVERS

Install the column covers with the 3 screws.

## 25. INSTALL LH LOWER PANEL

Install the LH lower panel with the 3 bolts.

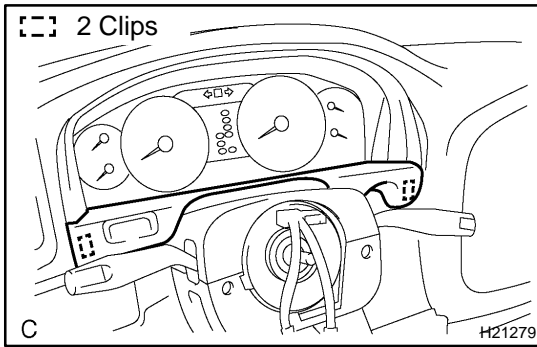


## 26. INSTALL LOWER NO. 1 PANEL

Connect the connector, then install the lower No. 1 panel with the screw.

## 27. INSTALL HOOD LOCK CONTROL CABLE LEVER AND FUEL LID CONTROL CABLE LEVER

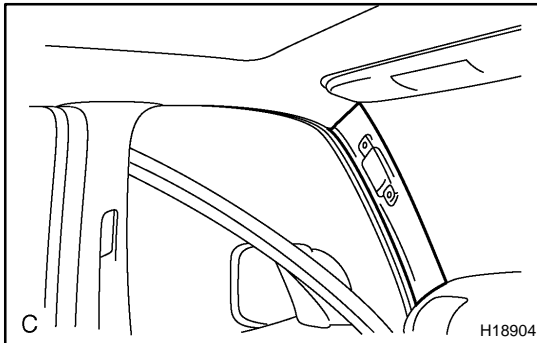
- (a) Install the fuel lid control cable lever with the 2 screws.
- (b) Install the hood lock control cable lever with the 2 screws.

**28. INSTALL CLUSTER FINISH PANEL**

Connect the connector, then install the cluster finish panel.

**29. INSTALL STEERING WHEEL**

(See page [SR-24](#) or [SR-37](#))

**30. INSTALL FRONT PILLAR GARNISH**

(a) Install the front pillar garnish.

(b) Use the same manner described above to the other side.

**31. INSTALL FRONT ASSIST GRIP**

(a) Install the assist grip with the 2 screws, then install the 2 assist grip plugs.

(b) Use the same manner described above to the other side.

**32. INSTALL FRONT DOOR OPENING TRIMS****33. INSTALL COWL SIDE TRIMS****34. INSTALL FRONT DOOR SCUFF PLATES**

## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-89](#)).

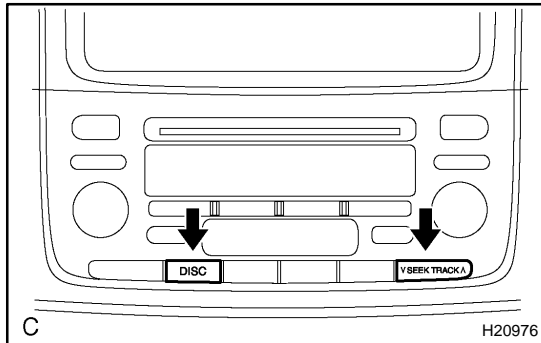
## REMOVAL

### 1. w/ CD Changer Built In The Audio System: SHIP MODE SETTING

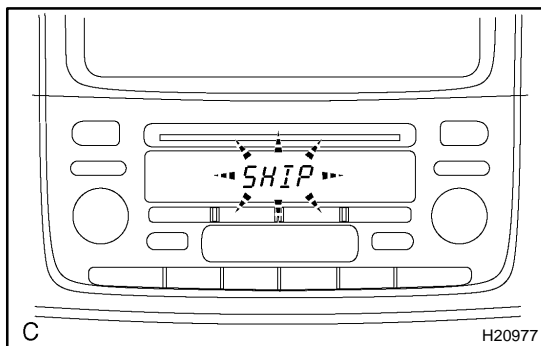
- (a) Take out all of the CDs.

#### NOTICE:

If they cannot be taken out, do not attempt to take out forcibly and send the unit for repair.



- (b) Turn the ignition switch to ACC as pressing the "SEEK UP" and "DISC" switches at the same time.



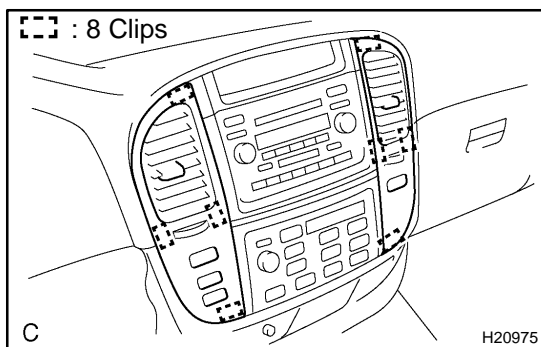
#### HINT:

When the ship mode has been set, "SHIP" must be displayed.

- (c) Turn the ignition switch to OFF and disconnect the battery negative cable.

#### NOTICE:

Connecting the battery negative cable automatically end the ship mode.

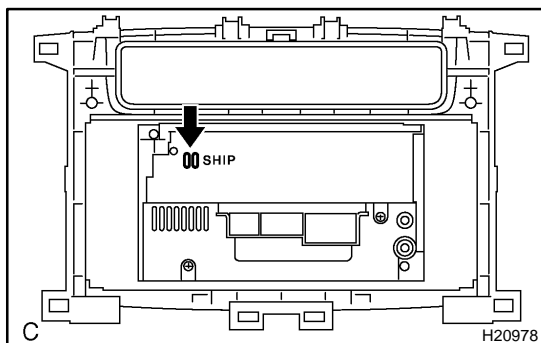


### 2. REMOVE CENTER REGISTER

- (a) Using a moulding remover, remove the center register.  
(b) Disconnect the connector.  
(c) Use the same manner described above to the other side.

### 3. REMOVE RADIO WITH A/C CONTROL ASSEMBLY

- (a) Remove the 4 bolts.  
(b) Disconnect the radio with A/C control assembly cable and remove the radio with A/C control assembly.



### 4. w/ CD Changer Built In The Audio System: SHIP MODE CONFIRMATION

Check that a metal can be seen from holes marked "SHIP" on the back of the radio with A/C control assembly.

#### NOTICE:

If a metal cannot be seen from a hole on the back of the radio with A/C control assembly, repeat "SHIP MODE".

5. REMOVE FRONT DOOR SCUFF PLATES
6. REMOVE COWL SIDE TRIMS
7. REMOVE FRONT DOOR OPENING TRIMS



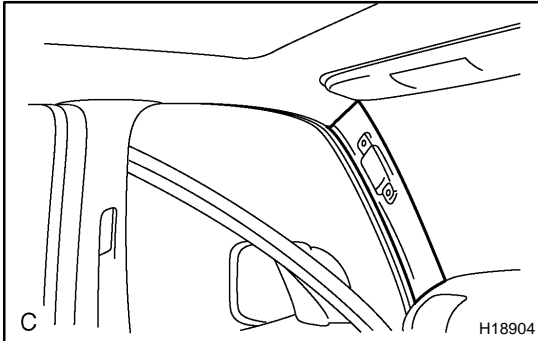
**8. REMOVE FRONT ASSIST GRIP**

- (a) Using a screwdriver, remove the assist grip plugs, then remove the 2 screws and assist grip.

HINT:

Tape up the screwdriver tip before use.

- (b) Use the same manner described above to the other side.

**9. REMOVE FRONT PILLAR GARNISH**

- (a) Using a screwdriver, remove the front pillar garnish.

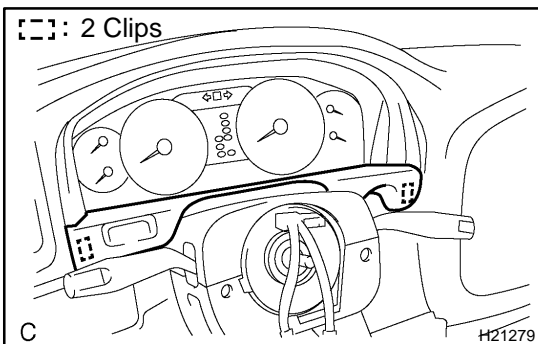
HINT:

Tape up the screwdriver tip before use.

- (b) Use the same manner described above to the other side.

**10. REMOVE STEERING WHEEL**

(See page [SR-14](#) or [SR-29](#))

**11. REMOVE CLUSTER FINISH PANEL**

Using a screwdriver, remove the cluster finish panel, then disconnect the connector.

HINT:

Tape up the screwdriver tip before use.

**12. REMOVE HOOD LOCK CONTROL CABLE LEVER AND FUEL LID CONTROL CABLE LEVER**

- (a) Remove the 2 screws and the hood lock control cable lever.

- (b) Remove the 2 screws and the fuel lid control cable lever.

**13. REMOVE LOWER NO. 1 PANEL**

- (a) Remove the screw.

- (b) Using a screwdriver, remove the lower No. 1 panel, then disconnect the connectors.

HINT:

Tape up the screwdriver tip before use.

**14. REMOVE LH LOWER PANEL**

Remove the 3 bolts and the LH lower panel.

**15. REMOVE COLUMN COVERS**

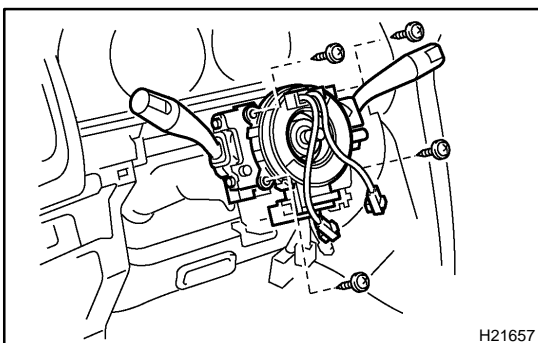
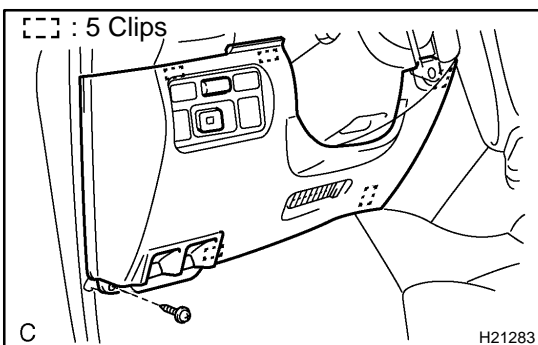
Remove the 3 screws and the column covers.

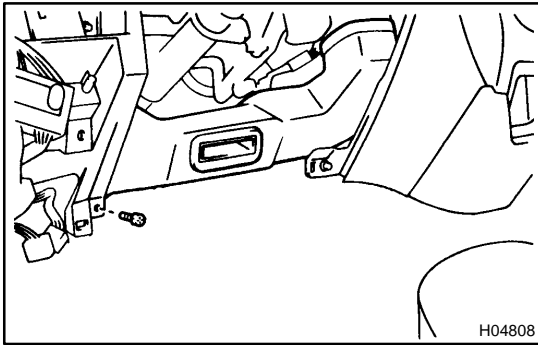
**16. REMOVE COMBINATION SWITCH**

- (a) Disconnect the connectors.

- (b) Remove the clamp.

- (c) Remove the 4 screws and the combination switch.

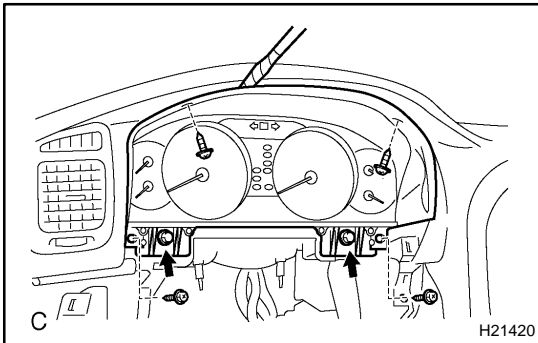


**17. REMOVE NO. 2 HEATER TO REGISTER DUCT**

Remove the screw and the No. 2 heater to register duct as shown in the illustration.

**18. REMOVE STEERING COLUMN**

(See page [SR-14](#) or [SR-29](#))

**19. REMOVE COMBINATION METER**

(a) Disconnect the connectors.

HINT:

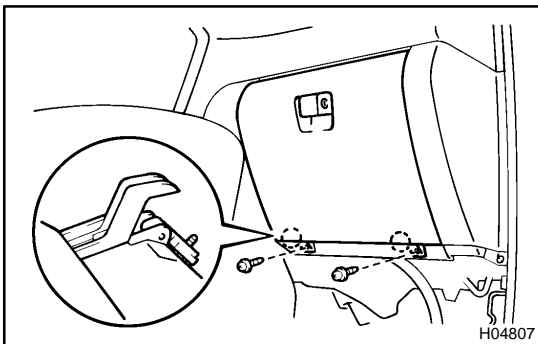
The connectors can be disconnected by loosening the bolts.

(b) Remove the 4 screws.

(c) Using a screwdriver, remove the combination meter.

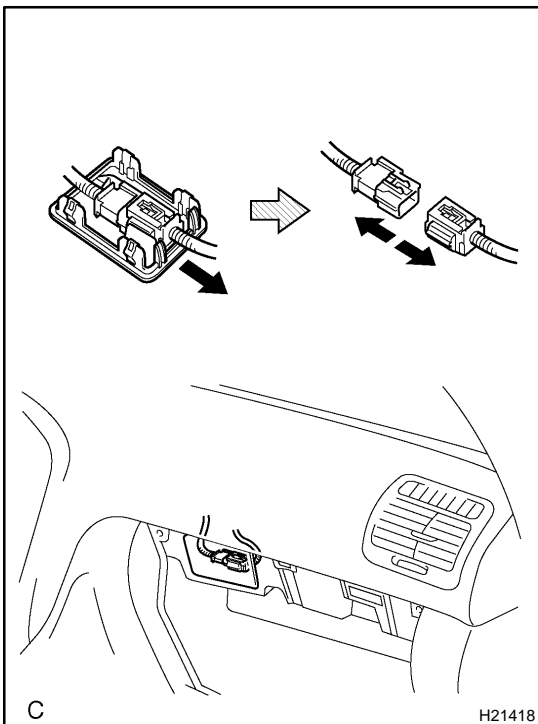
HINT:

Tape up the screwdriver tip before use.

**20. REMOVE GLOVE COMPARTMENT DOOR**

(a) Remove the 2 screws.

(b) Remove the glove compartment door, then disconnect the glove compartment door damper clip.

**21. DISCONNECT AIRBAG CONNECTOR**

(See page [RS-31](#))

(a) Using a screwdriver, remove the No. 1 under cover.

HINT:

Tape up the screwdriver tip before use.

(b) Slide the airbag connector to pull out from the No. 1 under cover.

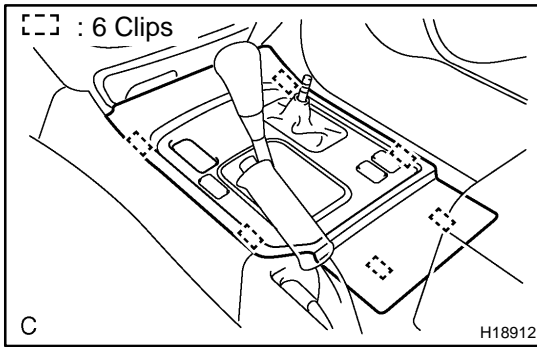
(c) Disconnect the airbag connector.

**NOTICE:**

**When handling the airbag connector, take care not to damage the airbag wire harness.**

**22. REMOVE LOWER NO. 2 PANEL**

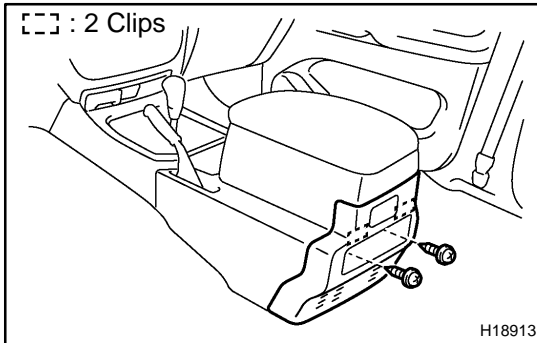
Remove the 3 screws and the lower No. 2 panel.

**23. REMOVE FRONT CONSOLE PANEL**

- (a) Remove the transfer shift lever knob.
- (b) Using a screwdriver, remove the front console panel.

HINT:

Tape up the screwdriver tip before use.

**24. REMOVE CONSOLE REAR END PANEL**

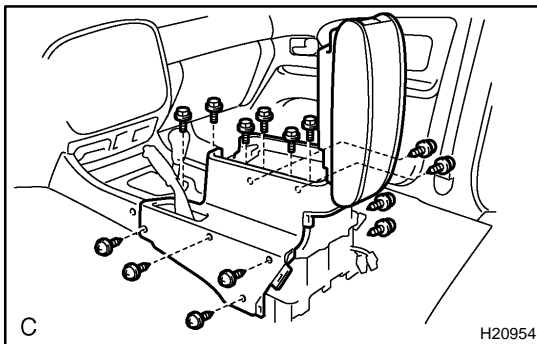
- (a) Remove the rear console cup holder box.
- (b) Remove the 2 screws.
- (c) Using a screwdriver, remove the console rear end panel.

HINT:

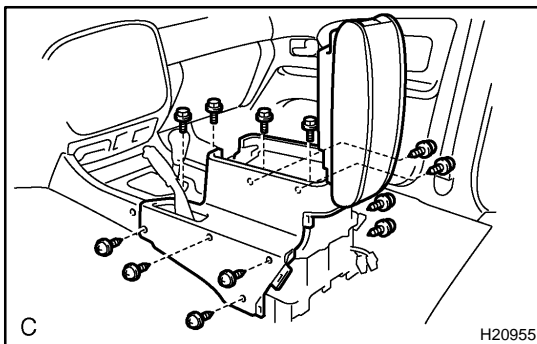
Tape up the screwdriver tip before use.

**25. REMOVE REAR RADIO CONTROL PANEL**

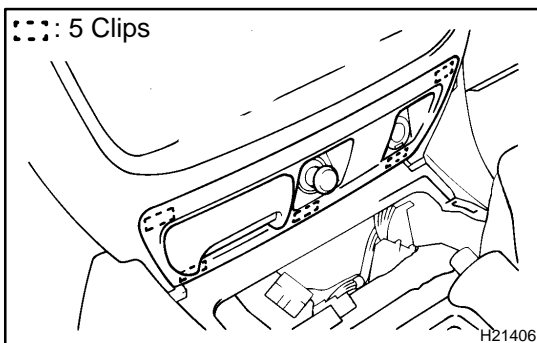
Disconnect the connector, then remove the 3 screws and the rear radio control panel.

**26. REMOVE REAR CONSOLE BOX**

- (a) w/o Disc player changer :  
Remove the 6 bolts, the 8 screws and the rear console box.



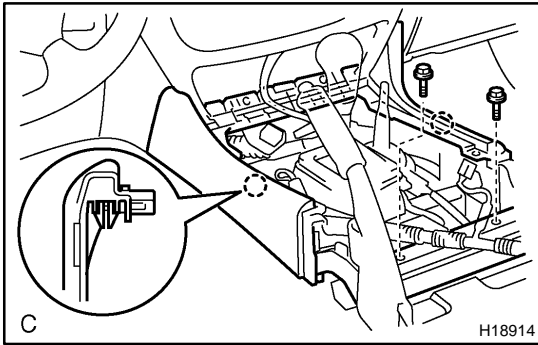
- (b) w/ Disc player changer :  
Remove the 4 bolts, the 8 screws and the rear console box.

**27. REMOVE CENTER LOWER CLUSTER FINISH PANEL**

Using a screwdriver, remove the center lower cluster finish panel, then disconnect the connector.

HINT:

Tape up the screwdriver tip before use.



**28. REMOVE FRONT CONSOLE BOX AND FRONT CONSOLE BOX BRACKET**

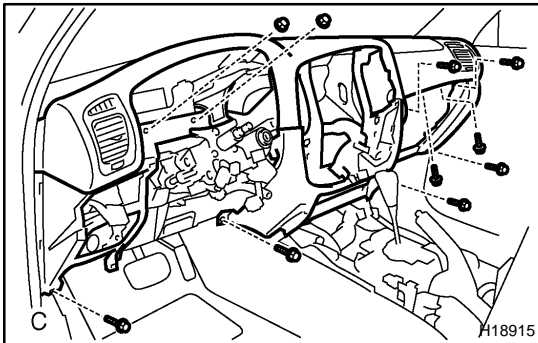
Remove the 2 bolts, the front console box and the front console box bracket.

**29. REMOVE INSTRUMENT PANEL**

(a) Disconnect the junction connectors.

HINT:

The connectors can be disconnected by loosening the bolts.



(b) Disconnect the connector, then remove the 8 bolts, the 2 nuts and the instrument panel.

**30. REMOVE ECM (See page SF-60 )**

**31. REMOVE NO. 3 HEATER TO REGISTER DUCT**

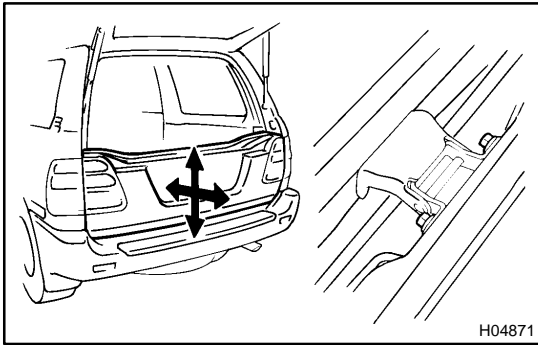
**32. REMOVE NO. 4 HEATER TO REGISTER DUCT**

**33. REMOVE GLOVE COMPARTMENT DOOR DAMPER**

**34. REMOVE FLOOR BRACE**

**35. REMOVE NO. 1 BRACE**

**36. REMOVE REINFORCEMENT**

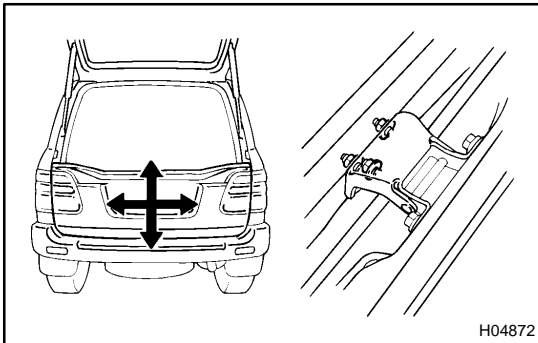


## ADJUSTMENT

### 1. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

Loosen the door side hinge bolts to adjust.

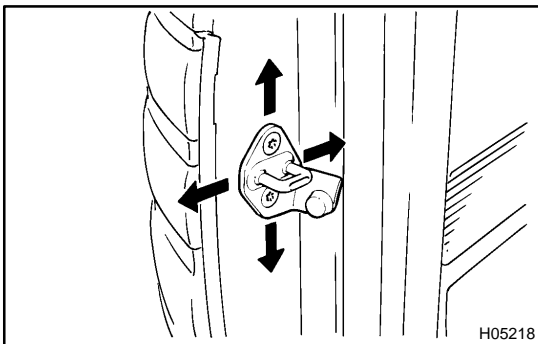
**Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)**



### 2. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

Loosen the body side hinge bolts and nut to adjust.

**Torque: 31 N·m (316 kgf·cm, 23 ft·lbf)**



### 3. ADJUST DOOR LOCK STRIKER

(a) Check that the door fit and door linkages are adjusted correctly.

(b) Using a torx wrench, loosen the door lock striker mounting screws.

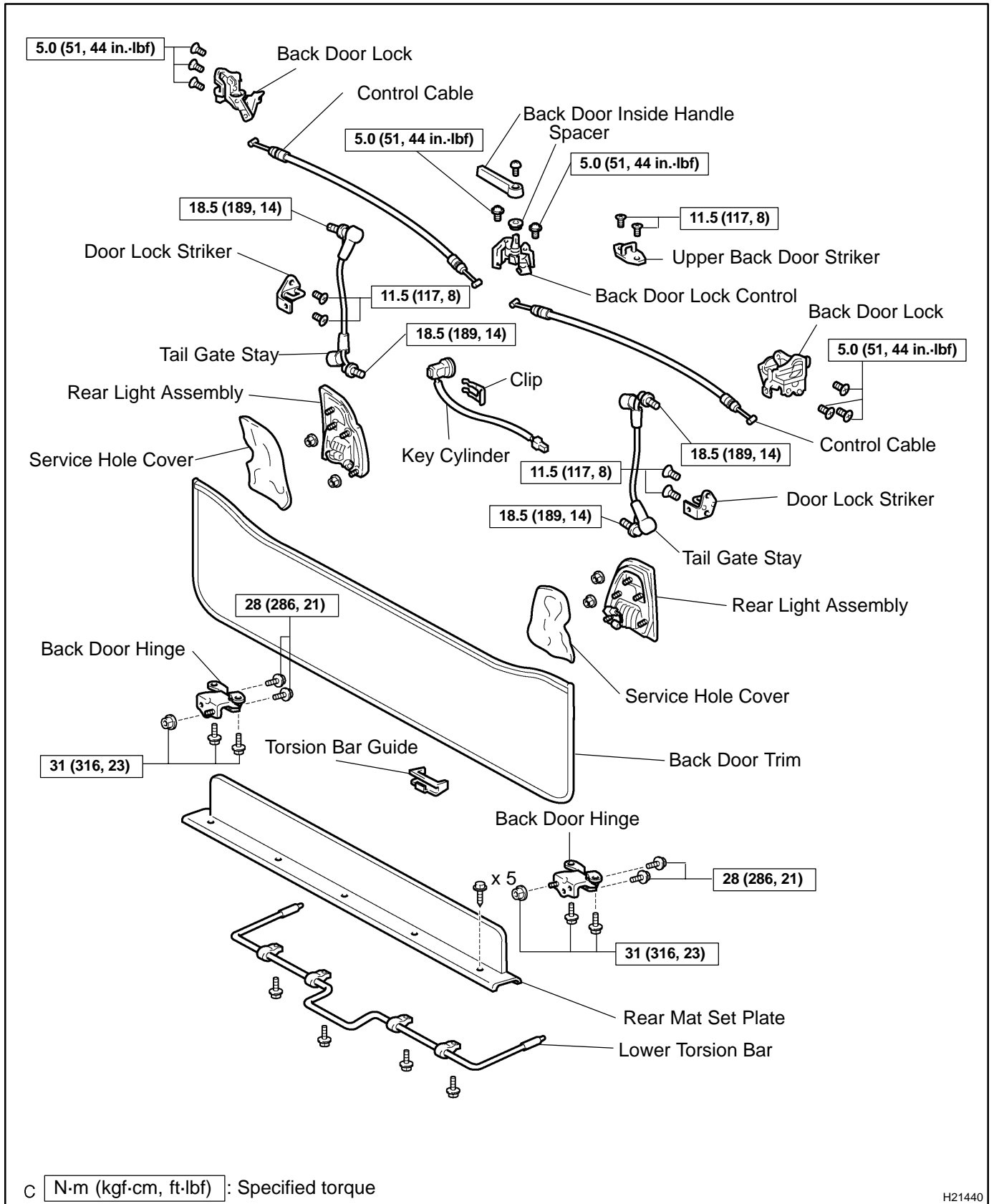
**Torx wrench: T40 (Part No. 09042-00020 or locally manufactured tool)**

**Torque: 11.5 N·m (117 kgf·cm, 8 ft·lbf)**

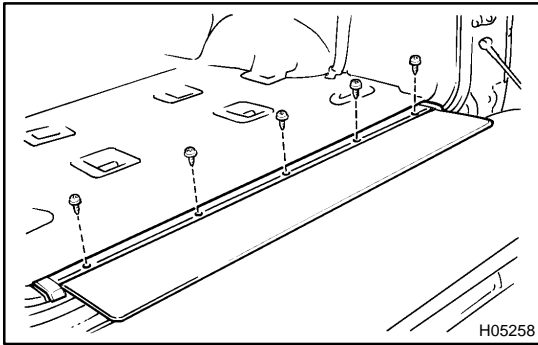
(c) Using a plastic hammer, tap the striker to adjust it.

# LOWER BACK DOOR COMPONENTS

BO1JM-03



H21440



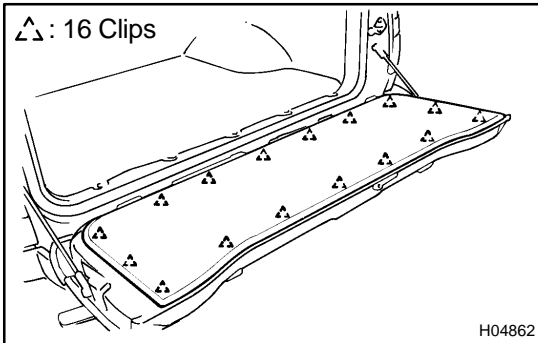
## DISASSEMBLY

### 1. REMOVE REAR MAT SET PLATE

- (a) Remove the 5 screws.
- (b) Using a screwdriver, remove the rear mat set plate.

#### HINT:

Tape the screwdriver tip before use.



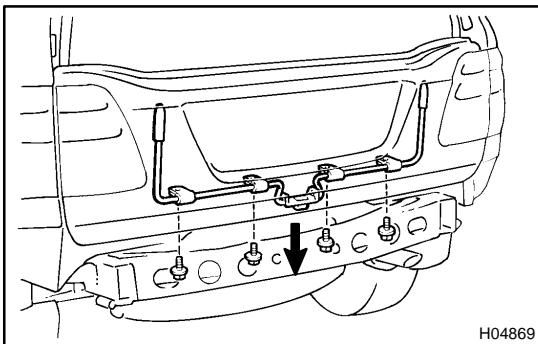
### 2. REMOVE BACK DOOR TRIM

- (a) Insert a screwdriver between the door and door trim to pry out.

#### HINT:

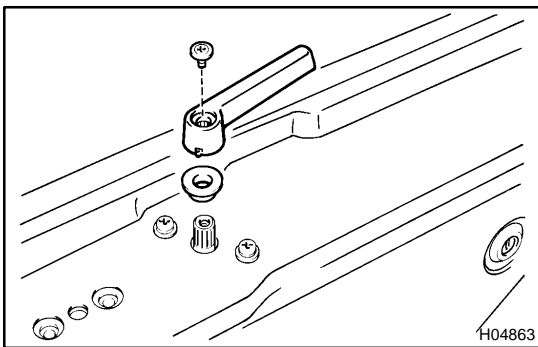
Tape the screwdriver tip before use.

- (b) Remove the back door trim.



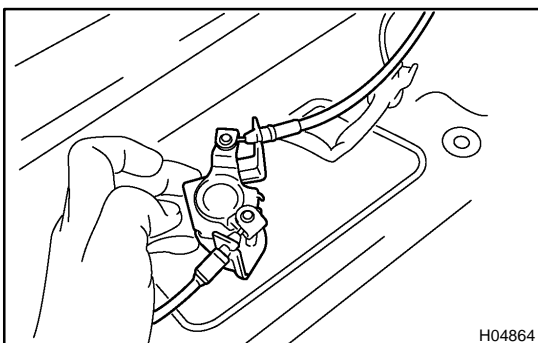
### 3. REMOVE LOWER TORSION BAR

- (a) Remove the rear bumper (See page [BO-5](#) ).
- (b) Remove the 4 bolts and lower torsion bar as shown in the illustration.
- (c) Remove the torsion bar guide.



### 4. REMOVE BACK DOOR INSIDE HANDLE

- (a) Remove the screw and back door inside handle.
- (b) Remove the spacer.



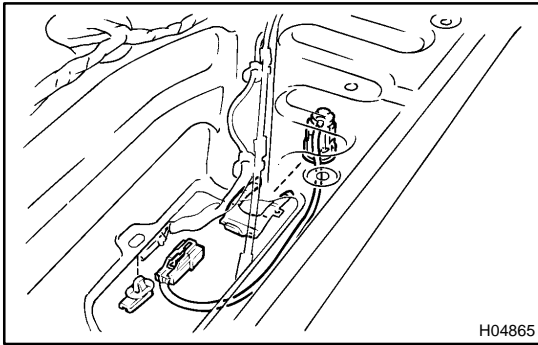
### 5. REMOVE BACK DOOR LOCK CONTROL

- (a) Remove the 2 screws.  
**Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)**
- (b) Disconnect the back door lock control cables, then remove the back door control.

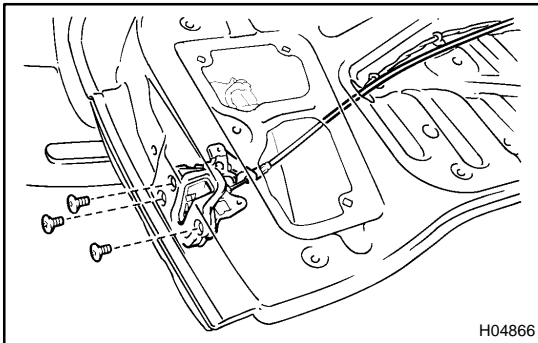
### 6. REMOVE SERVICE HOLE COVERS

#### NOTICE:

Do not tear the service hole cover.

**7. REMOVE KEY CYLINDER**

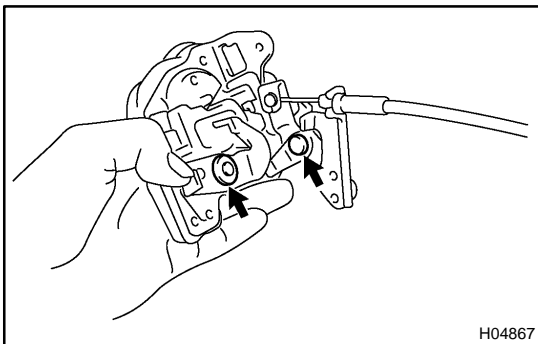
- (a) Disconnect the connector.
- (b) Remove the clip and key cylinder.

**8. REMOVE BACK DOOR LOCK**

- (a) Disconnect the control cable from the clamp.
- (b) Using a torx wrench, remove the 3 screws and back door lock.

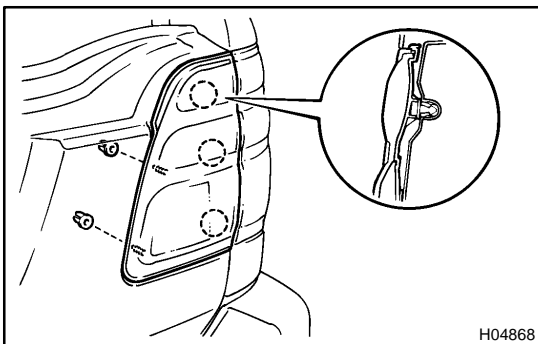
**Torx wrench: T30 (Part No. 09042-00010 or locally manufactured tool)**

**Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)**

**HINT:**

At the time of reassembly, please refer to the following item.  
Apply MP grease to the rotating parts of the door lock.

- (c) Employ the same manner described above to the other side.

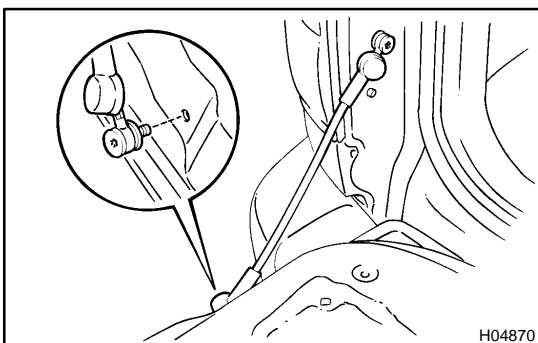
**9. REMOVE REAR LIGHT ASSEMBLY**

- (a) Disconnect the connector.
- (b) Remove the 2 nuts.
- (c) Using a screwdriver, remove the rear light assembly.

**HINT:**

Tape the screwdriver tip before use.

- (d) Employ the same manner described above to the other side.

**10. REMOVE TAIL GATE STAY**

- (a) Using a torx wrench, remove the 2 screws and tail gate stay.

**Torx wrench: T30 (Part No. 09042-00010 or locally manufactured tool)**

**Torque: 18.5 N·m (189 kgf·cm, 14 ft-lbf)**

- (b) Employ the same manner described above to the other side.

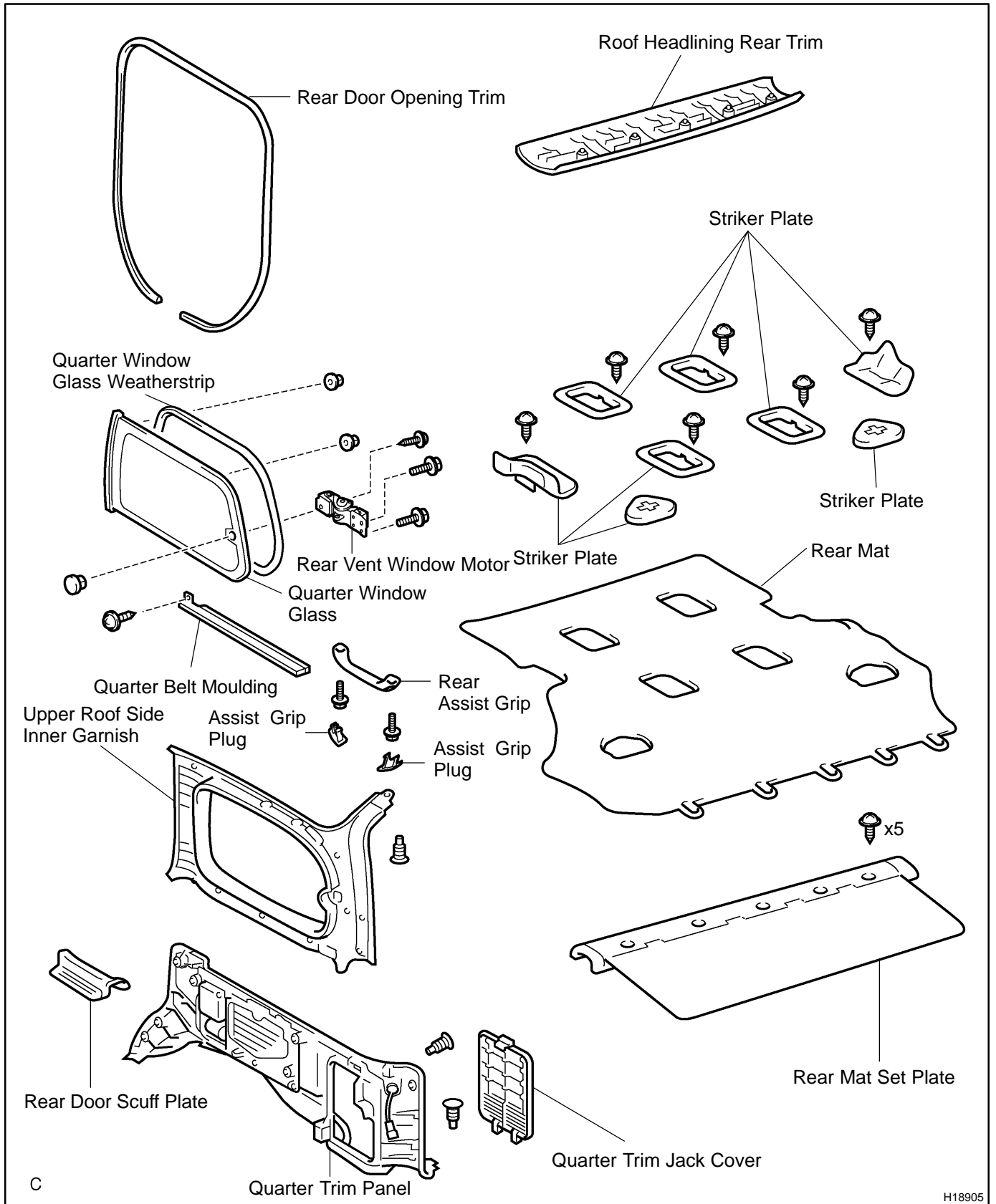


## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-27](#)).

# QUARTER WINDOW GLASS COMPONENTS

BO1LD-03

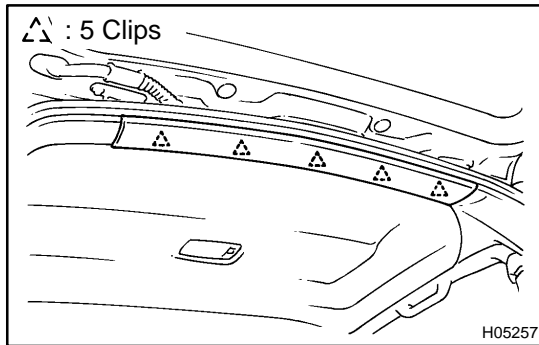


C

H18905

## INSTALLATION

Installation is in the reverse order of removal (See page [BO-62](#) ).



## REMOVAL

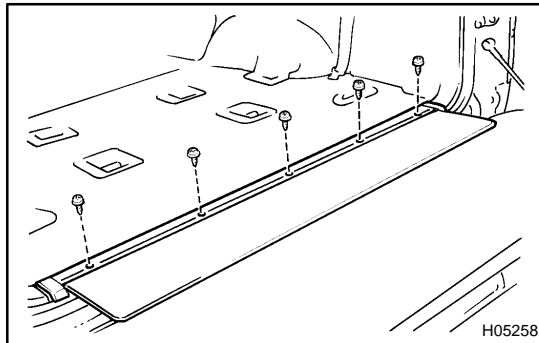
### 1. REMOVE ROOF HEADLINING REAR TRIM

Using a screwdriver, remove the roof headlining rear trim.

HINT:

Tape up the screwdriver tip before use.

### 2. REMOVE REAR NO. 2 SEATS



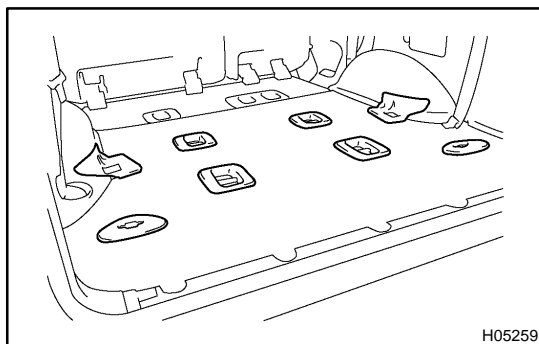
### 3. REMOVE REAR MAT SET PLATE

(a) Remove the 5 screws.

(b) Using a screwdriver, remove the rear mat set plate.

HINT:

Tape up the screwdriver tip before use.



### 4. REMOVE STRIKER PLATE

(a) Remove the 6 screws.

(b) Using a screwdriver, remove the striker plates.

HINT:

Tape up the screwdriver tip before use.

### 5. REMOVE REAR MAT

### 6. REMOVE REAR NO. 2 SEAT OUTER BELT FLOOR ANCHOR

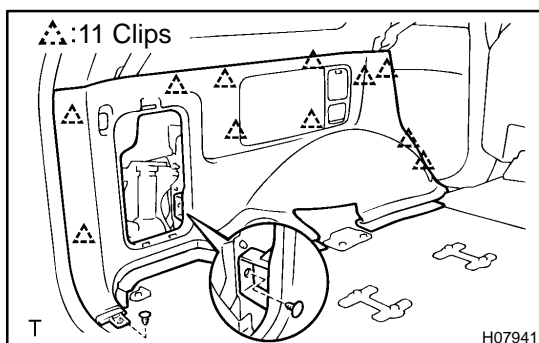
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

### 7. REMOVE REAR NO. 1 SEAT OUTER BELT FLOOR ANCHOR

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

### 8. REMOVE REAR DOOR SCUFF PLATE

### 9. REMOVE REAR DOOR OPENING TRIM



### 10. REMOVE QUARTER TRIM PANEL

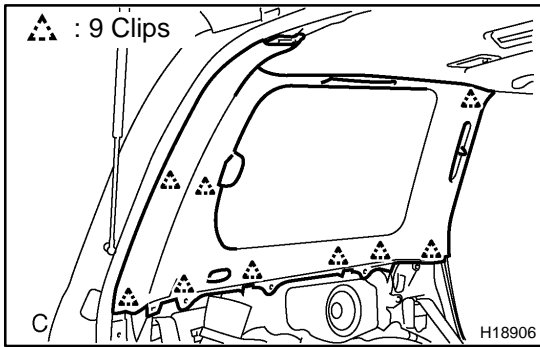
(a) Remove the quarter trim jack cover.

(b) Using a clip remover, remove the 2 clips.

(c) Remove the quarter trim panel, then disconnect the connector.

### 11. REMOVE REAR NO. 2 SEAT OUTER BELT SHOULDER ANCHOR

### 12. REMOVE REAR NO. 1 SEAT OUTER BELT SHOULDER ANCHOR



**13. REMOVE UPPER ROOF SIDE INNER GARNISH**

- (a) Using a screwdriver, remove the assist grip plugs, then remove the 2 screws and the rear assist grip.

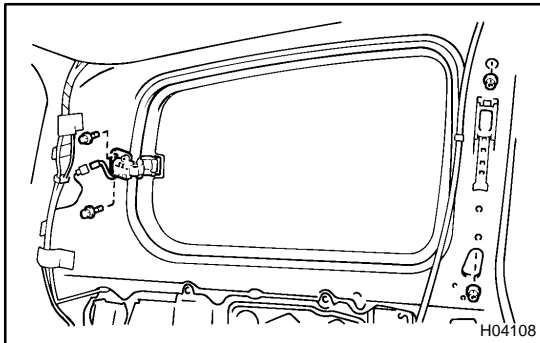
HINT:

Tape up the screwdriver tip before use.

- (b) Using a clip remover, remove the clip.
- (c) Using a screwdriver, remove the upper roof side inner garnish.

HINT:

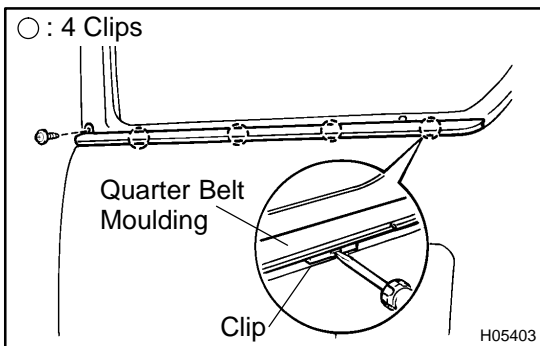
Tape the screwdriver tip before use.



**14. REMOVE QUARTER WINDOW GLASS**

- (a) Disconnect the connector.
- (b) w/ Antenna:  
Disconnect the connector.
- (c) Remove the 2 bolts, the 2 nuts and the quarter window glass.

**15. REMOVE QUARTER WINDOW GLASS WEATHERSTRIP**

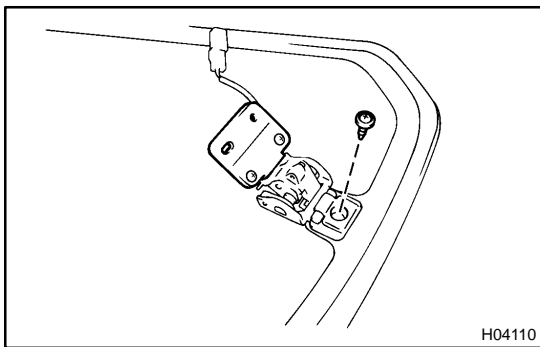


**16. REMOVE QUARTER BELT MOULDING**

- (a) Remove the screw.
- (b) Using a screwdriver, remove the quarter belt moulding.

HINT:

Tape up the screwdriver tip before use.



**17. REMOVE REAR VENT WINDOW MOTOR**

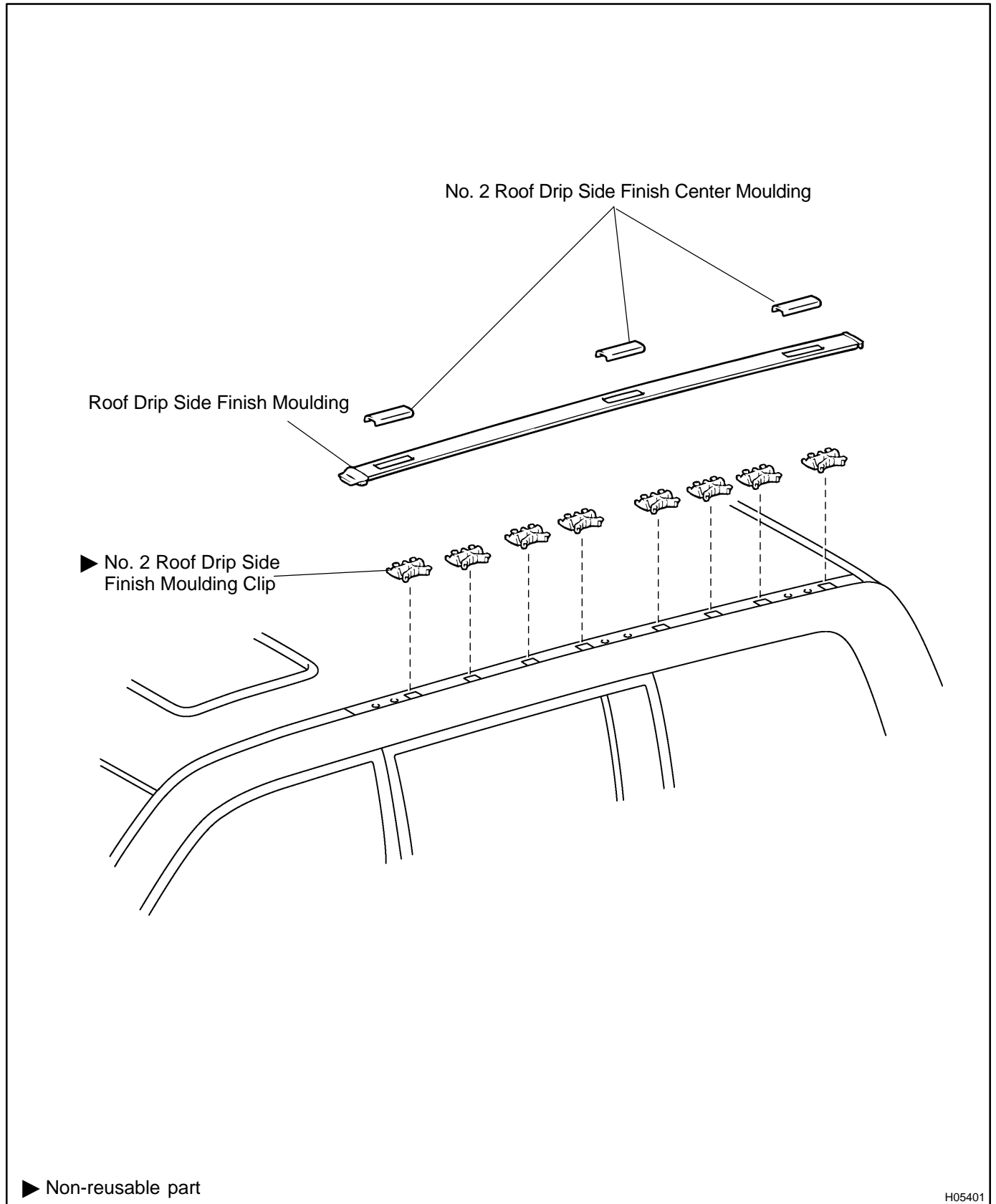
Remove the screw and the rear vent window motor.

**18. REMOVE QUARTER WINDOW LOCK**

Remove the screw and the quarter window lock.

# ROOF DRIP SIDE FINISH MOULDING COMPONENTS

BO1K4-05



## INSTALLATION

### 1. INSTALL NO. 2 ROOF DRIP SIDE FINISH MOULDING CLIP

If the No. 2 roof drip side finish moulding clip comes off.

- (a) Using a heat light, heat the body mounting surface to 40 - 60 °C (104 - 140 °F).

**NOTICE:**

**Do not heat the body excessively.**

- (b) Remove the adhesive tape and adhesive from the body.  
(c) Wipe off stains with cleaner.  
(d) Using a heat light, heat the body and clip.

**Body: 40 - 60 °C (104 - 140 °F)**

**Clip: 20 - 30 °C (68 - 86 °F)**

**NOTICE:**

**Do not heat the body and clip excessively.**

- (e) Install the clip.

### 2. INSTALL NO. 2 ROOF DRIP SIDE FINISH CENTER MOULDING

Install the No. 2 roof drip side finish center moulding to the roof drip side finish moulding.

### 3. INSTALL ROOF DRIP SIDE FINISH MOULDING

## REMOVAL

1. REMOVE NO. 2 ROOF DRIP SIDE FINISH CENTER MOULDINGS
2. REMOVE ROOF DRIP SIDE FINISH MOULDING

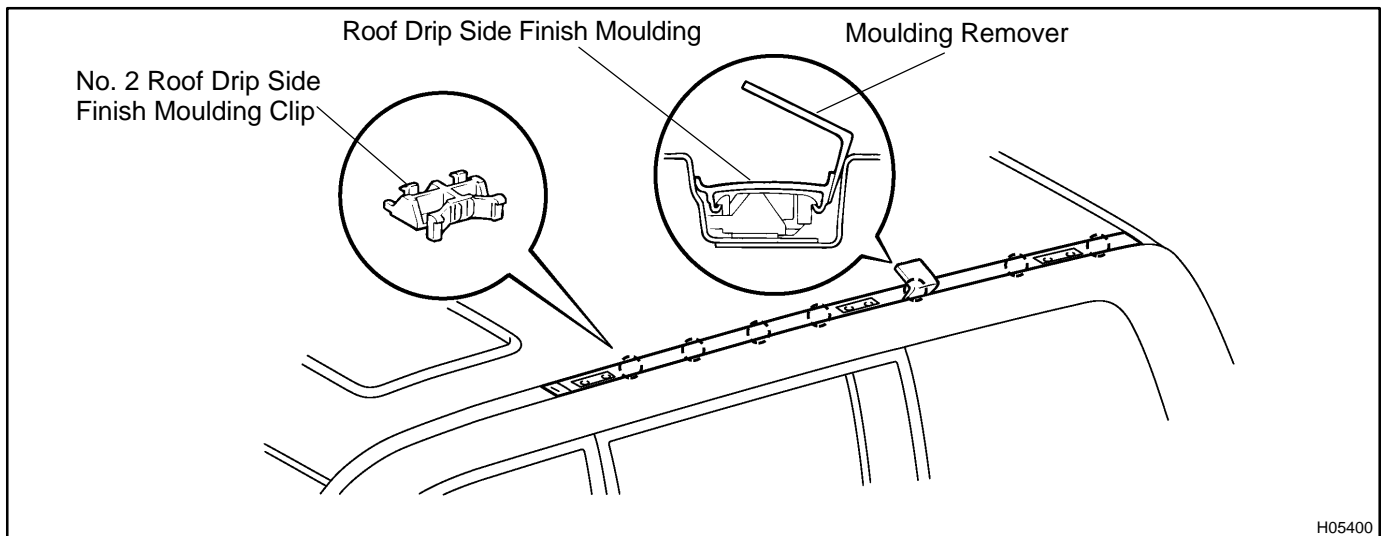
Using a moulding remover, remove the roof drip side finish moulding.

### NOTICE:

- ▶ Do not damage the body.
- ▶ Do not remove the No. 2 roof drip side finish moulding clip.
- ▶ When the clip comes off, replace it with a new one.

### HINT:

Tape the moulding remover tip before use.

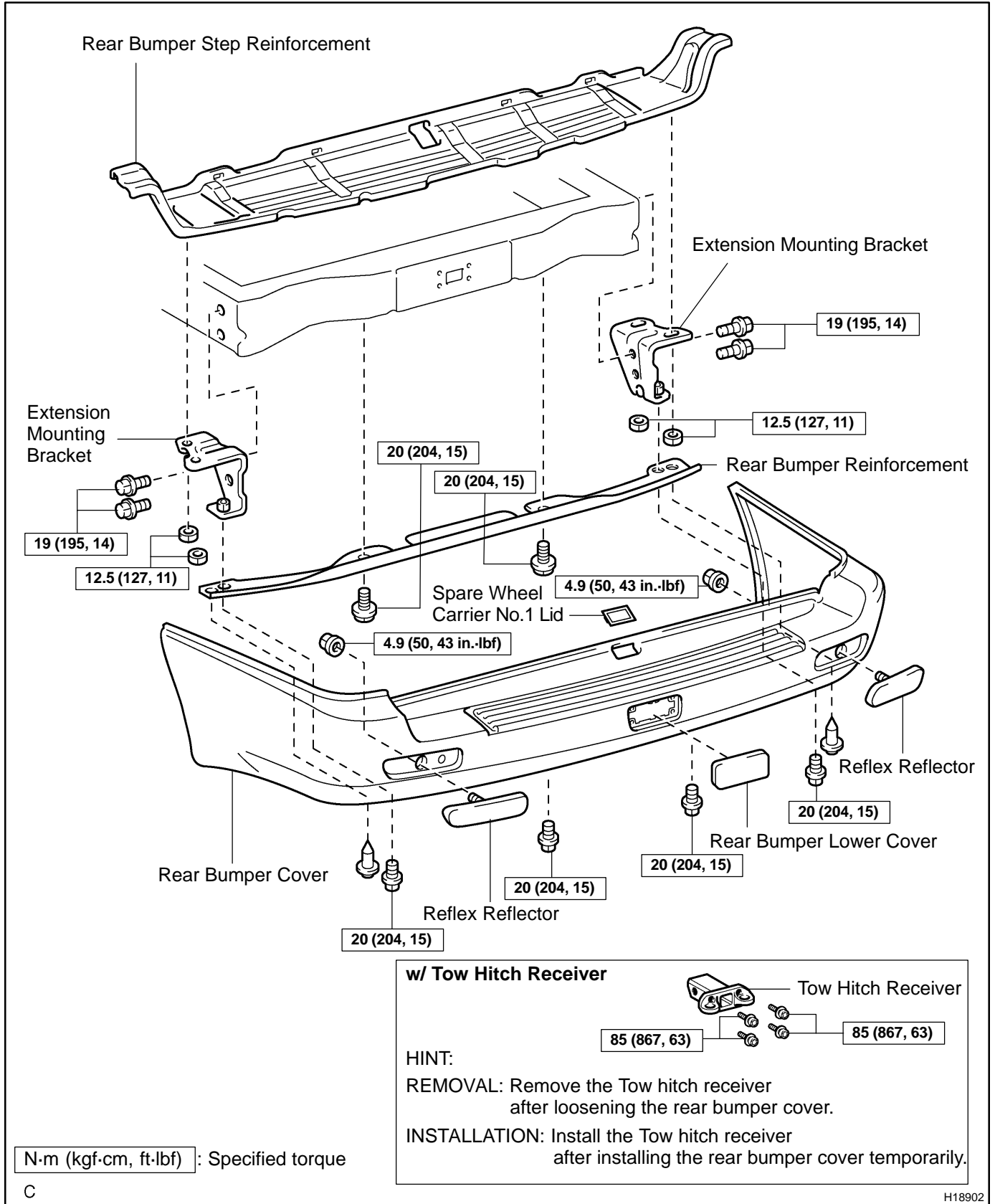


H05400



# REAR BUMPER COMPONENTS

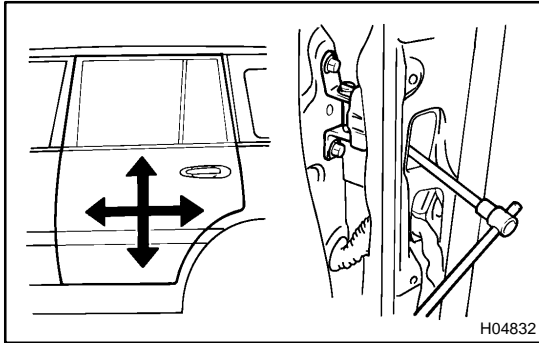
BO1J7-03



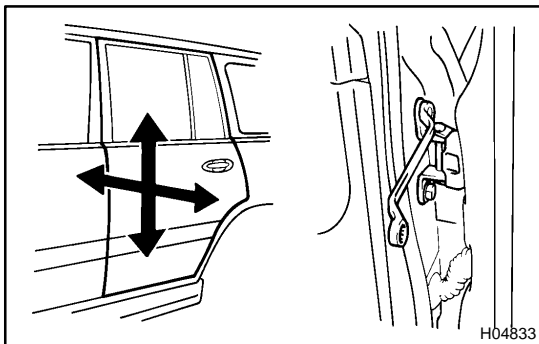
## ADJUSTMENT

### 1. ADJUST DOOR IN FORWARD/BACKWARD AND VERTICAL DIRECTIONS

- (a) Remove the front door scuff plate.
- (b) Remove the rear door scuff plate.
- (c) Remove the front door opening trim.
- (d) Remove the rear door opening trim.
- (e) Remove the center pillar lower garnish.



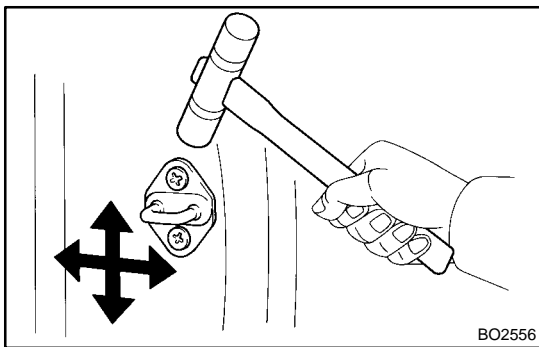
- (f) Loosen the body side hinge nuts to adjust.  
**Torque: 23 N·m (235 kgf-cm, 17 ft-lbf)**
- (g) Install the removed parts.



### 2. ADJUST DOOR IN RIGHT/LEFT AND VERTICAL DIRECTIONS

Loosen the door side hinge bolts to adjust.

**Torque: 26 N·m (265 kgf-cm, 19 ft-lbf)**

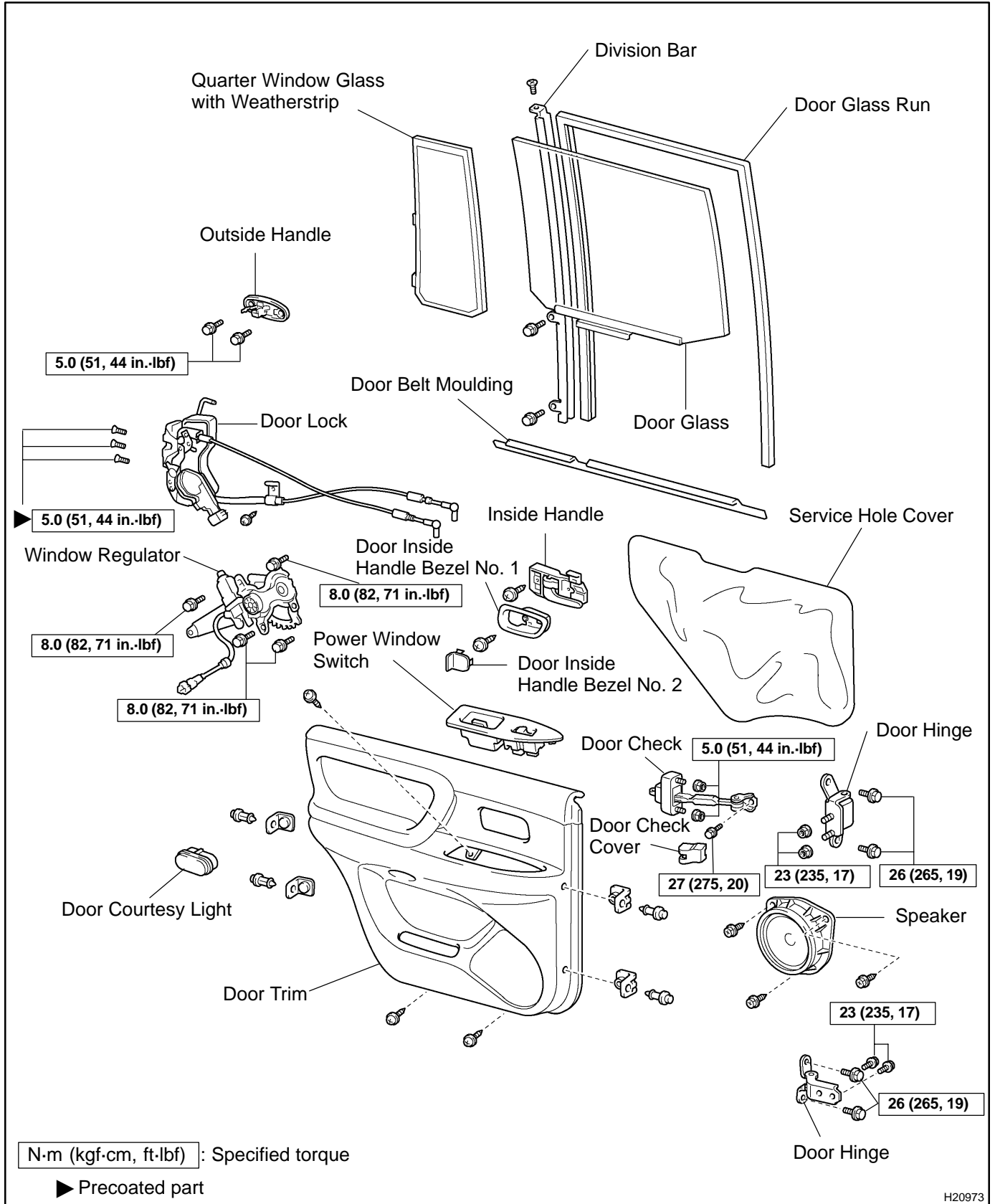


### 3. ADJUST DOOR LOCK STRIKER

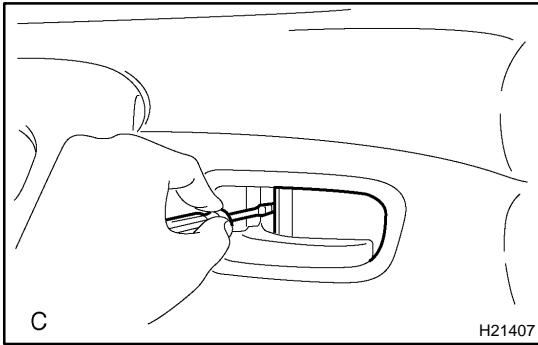
- (a) Check that the door fit and door lock linkages are adjusted correctly.
- (b) Loosen the striker mounting screws to adjust.  
**Torque: 11 N·m (115 kgf-cm, 8 ft-lbf)**
- (c) Using a plastic hammer, tap the striker to adjust it.

# REAR DOOR COMPONENTS

BO1JE-03



H20973



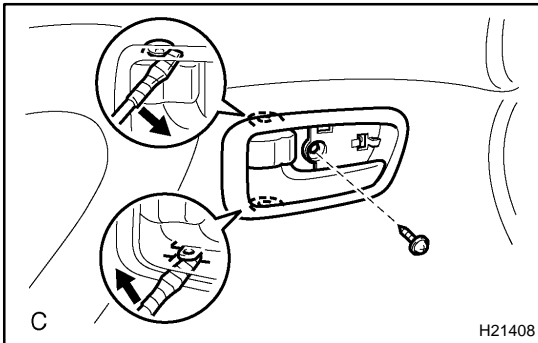
## DISASSEMBLY

### 1. REMOVE DOOR INSIDE HANDLE BEZEL No. 2

Using a screwdriver, remove the door inside handle bezel No. 2 as shown in the illustration.

HINT:

Tape up the screwdriver tip before use.



### 2. REMOVE DOOR INSIDE HANDLE BEZEL No. 1

(a) Remove the screw.

(b) Using a screwdriver, remove the door inside handle bezel No. 1 as shown in the illustration.

HINT:

Tape up the screwdriver tip before use.



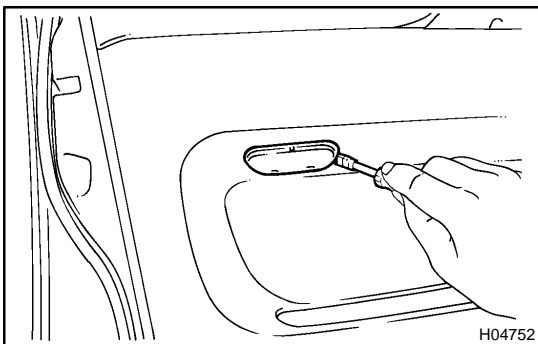
### 3. REMOVE POWER WINDOW SWITCH

(a) Using a screwdriver, remove the power window switch as shown in the illustration.

HINT:

Tape up the screwdriver tip before use.

(b) Disconnect the connector.

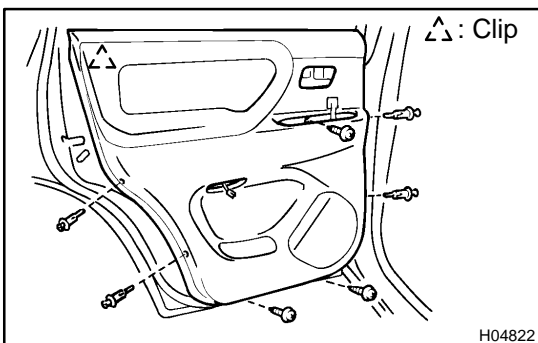


### 4. REMOVE DOOR COURTESY LIGHT

Using a screwdriver, remove the door courtesy light, then disconnect the connector.

HINT:

Tape up the screwdriver tip before use.



### 5. REMOVE DOOR TRIM

(a) Remove the 3 screws and 4 clips.

(b) Insert a screwdriver between the door and door trim to pry the trim.

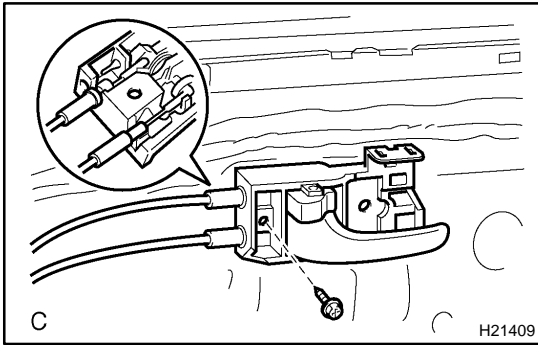
**NOTICE:**

**Be careful not to damage the door and door trim.**

HINT:

Tape up the screwdriver tip before use.

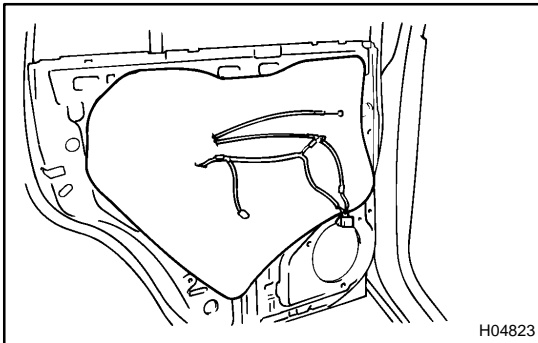
(c) Pull the trim upward to remove it.

**6. REMOVE INSIDE HANDLE**

- (a) Remove the screw and the inside handle.
- (b) Disconnect the 2 control cables from the inside handle as shown in the illustration.

**7. REMOVE SPEAKER**

Remove the 3 screws and speaker, then disconnect the connector.

**8. REMOVE SERVICE HOLE COVER**

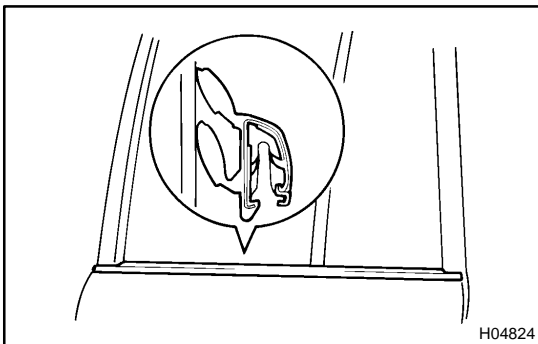
- (a) Remove the clamps and wire harness.
- (b) Remove the service hole cover.

**NOTICE:**

**Do not tear the cover.**

**HINT:**

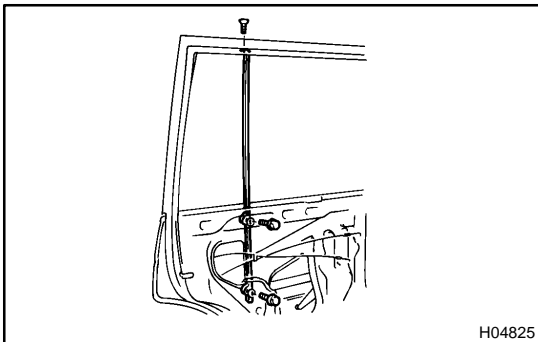
At the time of reassembly, bring out the 2 control cables and wire harness through the service hole cover.

**9. REMOVE DOOR BELT MOULDING**

Using a scraper, remove the door belt moulding.

**HINT:**

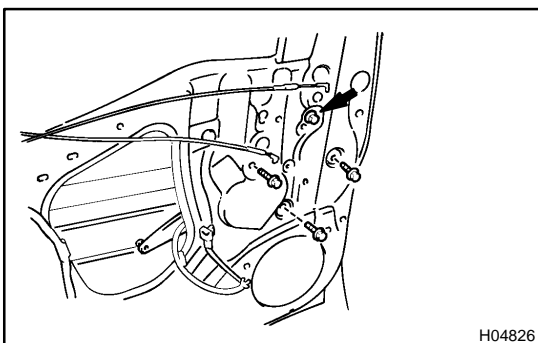
Tape up the scraper tip before use.

**10. REMOVE DOOR GLASS RUN****11. REMOVE DIVISION BAR**

Remove the 2 bolts, screw and division bar.

**12. REMOVE DOOR GLASS**

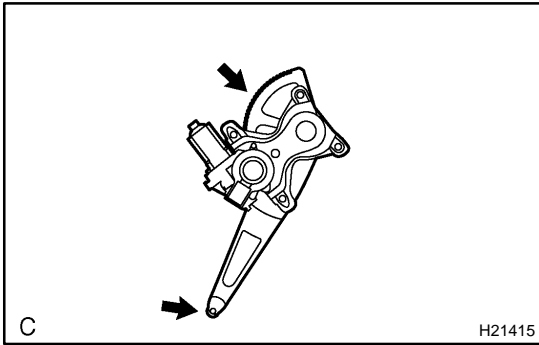
Disconnect the glass from the regulator arm and remove the door glass by pulling it upward.

**13. REMOVE QUARTER WINDOW GLASS WITH WEATHERSTRIP****14. REMOVE WINDOW REGULATOR**

- (a) Disconnect the connector, then remove the 3 bolts.  
**Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)**
- (b) Loosen the bolt and window regulator.  
**Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)**

**HINT:**

- ▶ Remove the regulator through the service hole.

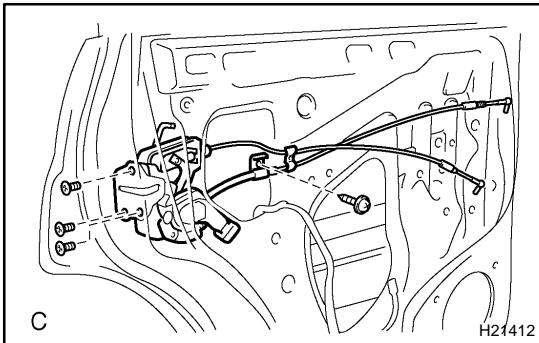


▶ At the time of reassembly, apply MP grease to the window regulator.

**NOTICE:**

At the time of reassembly, please refer to the following item.

Do not apply grease to the spring of the window regulator.



**15. REMOVE DOOR LOCK**

- (a) Remove the screw.
- (b) Disconnect the connector.
- (c) Disconnect the link from outside handle.
- (d) Using a torx wrench, remove the 3 screws and door lock through the service hole.

**Torx wrench: T30 (Part No. 09042-00010 or locally manufactured tool)**

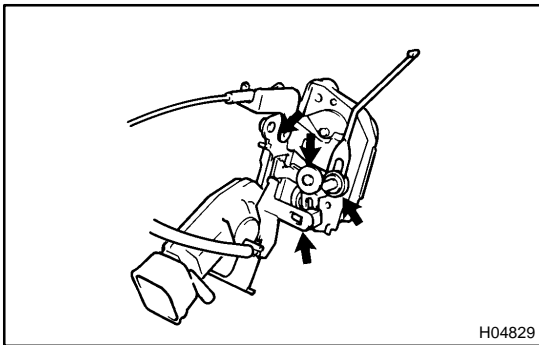
**Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)**

**HINT:**

At the time of reassembly:

▶ Apply adhesive to the 3 screws.

**Part No. 08833-00070, THREE BOND 1324 or equivalent.**



▶ Remove the protector, and apply MP grease to the sliding and rotating parts of the door lock.

**16. REMOVE OUTSIDE HANDLE**

Remove the 2 bolts and outside handle.

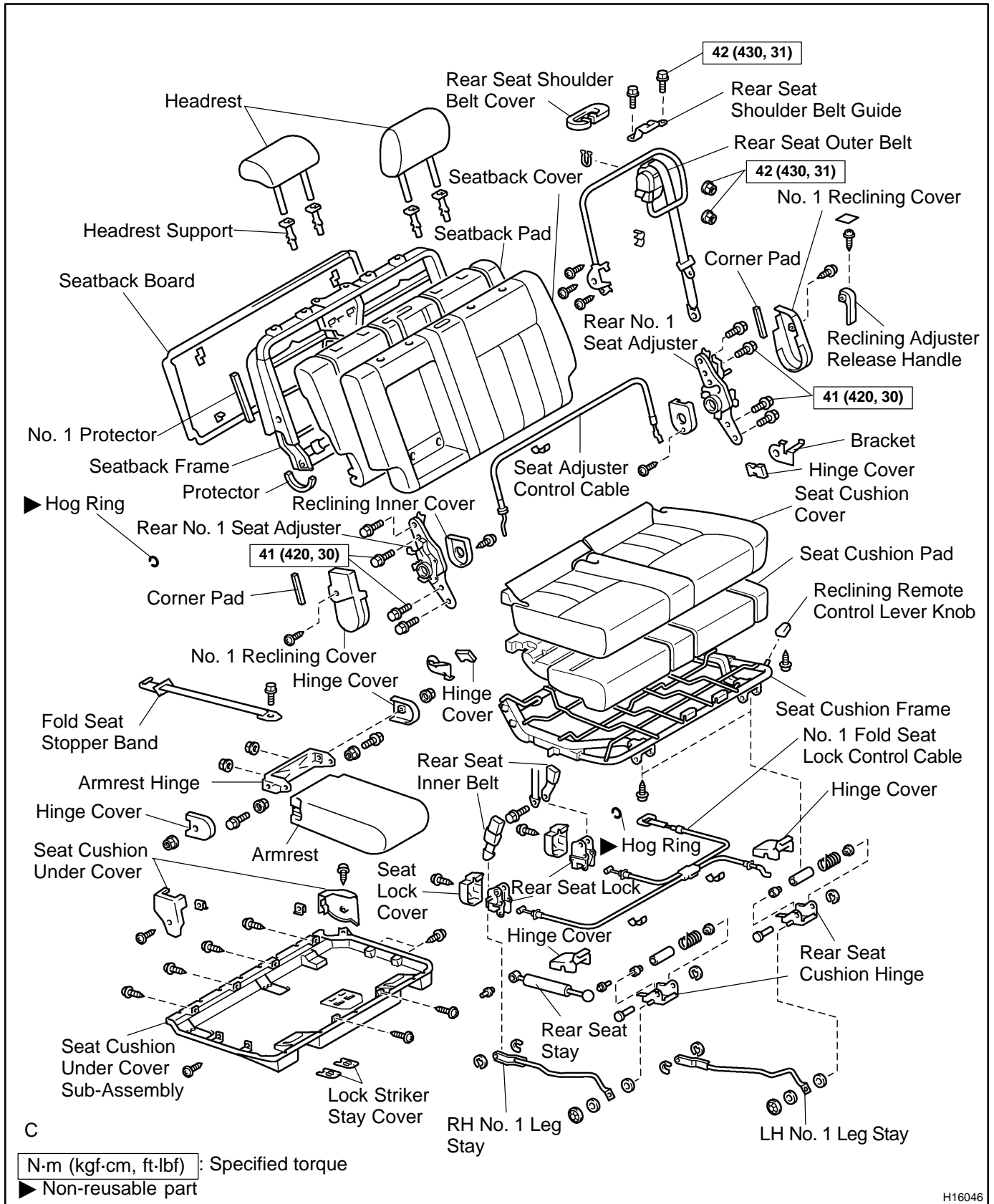
**Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)**

## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-15](#)).

# REAR NO.1 SEAT (LH) COMPONENTS

BO1L0-05

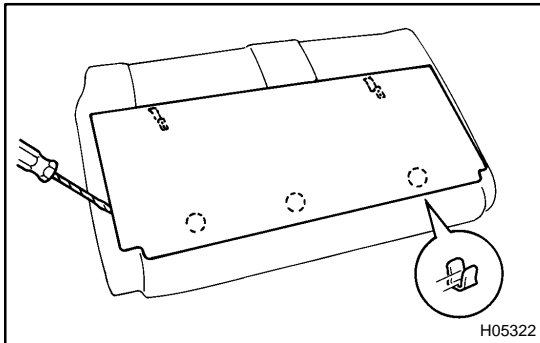


H16046



## DISASSEMBLY

### 1. REMOVE HEADRESTS



### 2. REMOVE SEATBACK BOARD

Using a screwdriver, remove the seatback board as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

### 3. REMOVE RECLINING ADJUSTER RELEASE HANDLE

(a) Using a screwdriver, remove the cover.

HINT:

Tape the screwdriver tip before use.

(b) Remove the screw and reclining adjuster release handle.

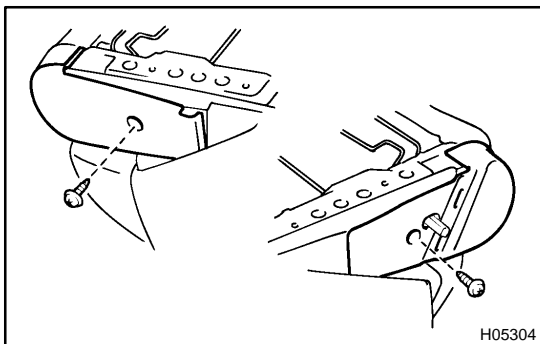
### 4. REMOVE NO. 1 RECLINING COVERS

(a) Remove the 4 hog rings and open the seatback cover.

HINT:

At the time of reassembly, please refer to the following item.  
When installing hog rings, take care to prevent wrinkles as little as possible.

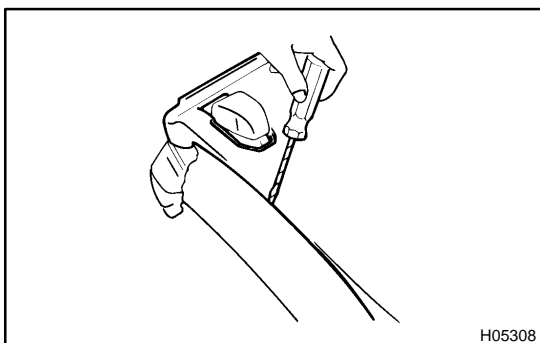
(b) Remove the 2 corner pads.



(c) Remove the 2 screws and 2 No. 1 reclining covers as shown in the illustration.

### 5. REMOVE SEAT CUSHION UNDER COVERS

Remove the 2 screws and 2 seat cushion under covers.

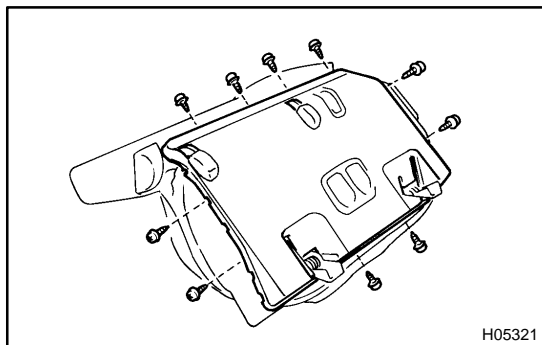


### 6. REMOVE SEAT CUSHION UNDER COVER SUB-ASSEMBLY

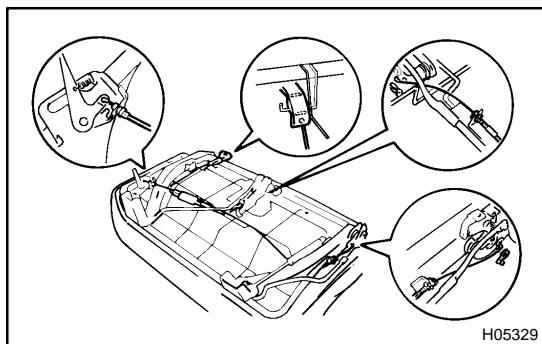
(a) Using a screwdriver, disengage the hooks as shown in the illustration.

HINT:

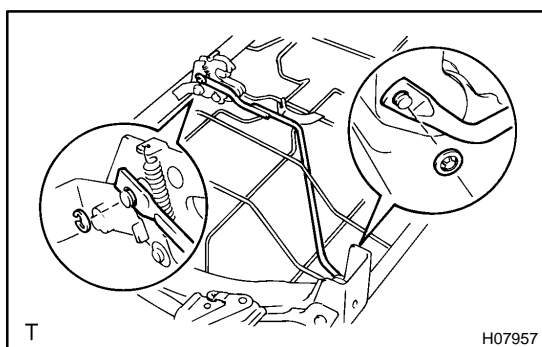
Tape the screwdriver tip before use.



- (b) Remove 10 screws and seat cushion under cover sub-assembly.



- 7. REMOVE NO. 1 FOLD SEAT LOCK CONTROL CABLE**  
Remove the 2 clamps and No. 1 fold seat lock control cable as shown in the illustration.

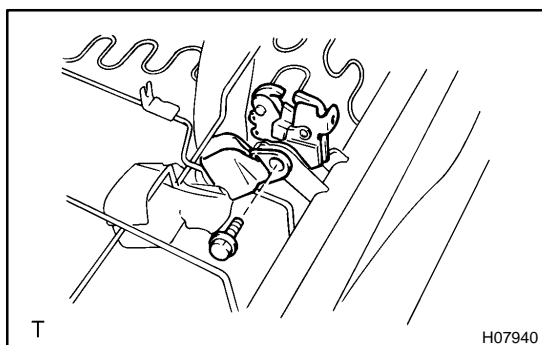


**8. REMOVE RH NO. 1 SEAT LEG STAY**

Using a screwdriver, remove the 2 E-rings and No. 1 seat leg stay.

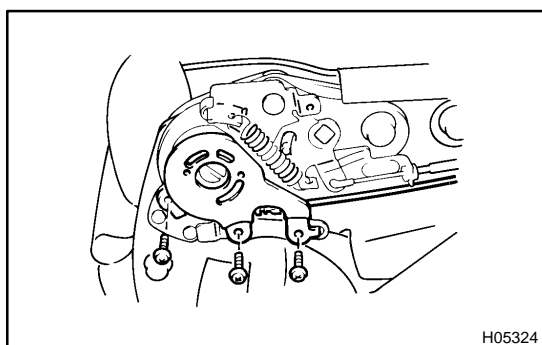
HINT:

Tape the screwdriver tip before use.



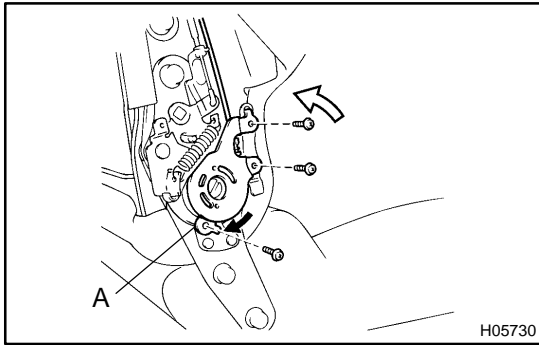
**9. REMOVE RH REAR SEAT LOCK**

- (a) Remove the screw and rear seat lock cover.  
 (b) Remove the bolt, seat belt anchor and inner belt.  
**Torque: 42 N·m (430 kgf-cm, 31 ft-lbf)**  
 (c) Remove the RH rear seat lock.



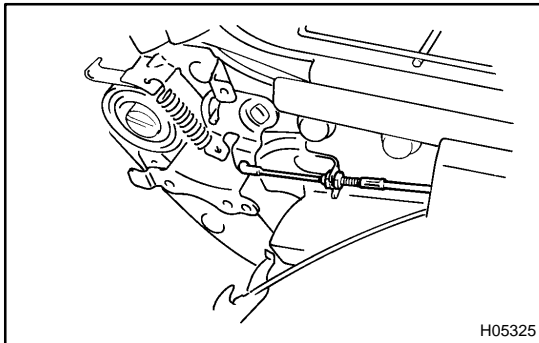
**10. REMOVE SEATBACK ASSEMBLY**

- (a) Remove the 3 screws and seat belt reclining detecting part.  
**Torque: 3.9 N·m (40 kgf-cm, 35 in.-lbf)**

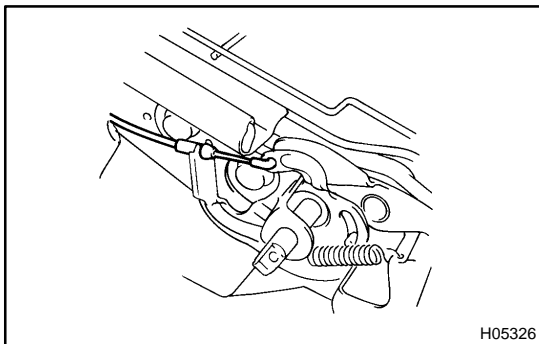
**HINT:**

At the time of reassembly, please refer to the following items.

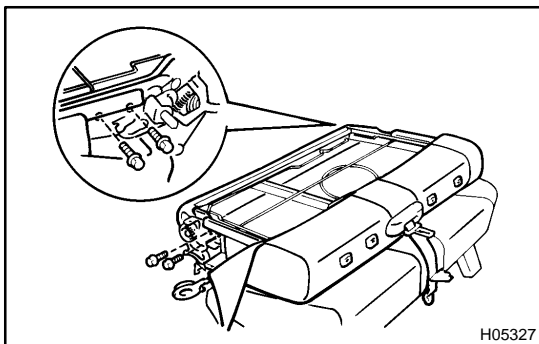
- ▶ Tighten the 2 screws on the seatback side.
- ▶ Fold down the seatback forward and raise it up to the first lock position.
- ▶ Turn A to the rear side of the seat cushion for initial positioning.
- ▶ Check visually that the reference holes are penetrated.
- ▶ Tighten the screws on the cushion side of seat belt reclining detecting part.



- (b) Loosen the nut, remove the reclining connecting wire of LH side edge.



- (c) Remove the reclining connecting wire of RH side edge.

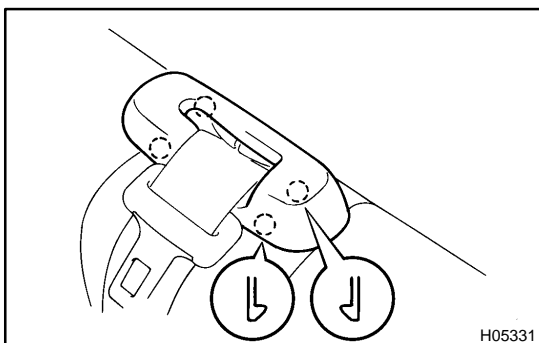


- (d) Remove the 4 bolts and seatback assembly.

**Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)**

**11. w/ Armrest:****REMOVE ARMREST**

- (a) Remove the 2 nuts and armrest.  
 (b) Remove the 2 screws and 2 hinge covers.  
 (c) Remove the 2 bolts and hinges.

**12. REMOVE SEATBACK FRAME**

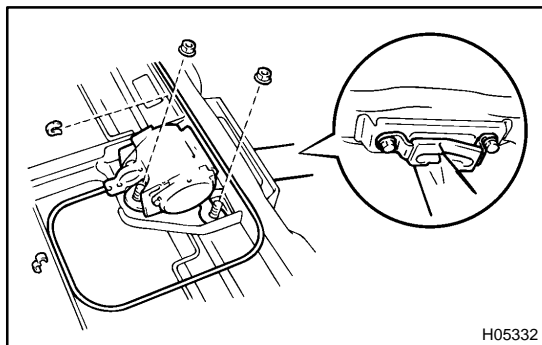
- (a) Using a screwdriver, remove the rear seat shoulder belt cover.

**HINT:**

Tape the screwdriver tip before use.

- (b) Remove the 4 headrest supports.  
 (c) Disengage the hooks, remove the seatback frame.

**13. REMOVE SEAT ADJUSTER CONTROL CABLE**

**14. REMOVE REAR SEAT OUTER BELT**

- (a) Remove the 2 bolts and rear seat shoulder belt guide.

**Torque: 42 N·m (430 kgf-cm, 31 ft-lbf)**

**HINT:**

At the time of reassembly, please refer to the following item. Install the shoulder belt guide to the seatback frame with a slit the guide facing to the rear side of the vehicle.

- (b) Remove the 2 nuts and rear seat outer belt.

**Torque: 42 N·m (430 kgf-cm, 31 ft-lbf)**

**15. REMOVE NO. 1 PROTECTOR****16. REMOVE SEATBACK COVER**

Remove the hog rings and seatback cover.

**HINT:**

At the time of reassembly, please refer to the following item. When installing hog rings, take care to prevent wrinkles as little as possible.

**17. REMOVE SEAT CUSHION FRAME**

Remove the hog rings and seat cushion frame.

**HINT:**

At the time of reassembly, please refer to the following item. When installing hog rings, take care to prevent wrinkles as little as possible.

**18. REMOVE REAR NO. 1 SEAT ADJUSTER**

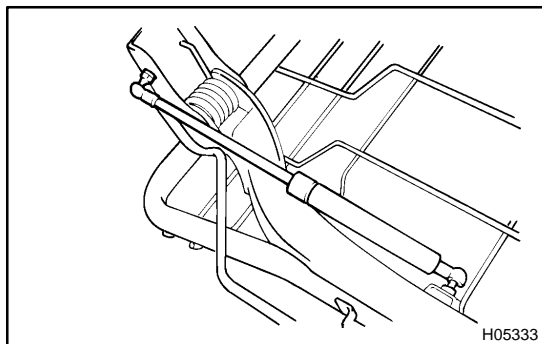
- (a) Remove the 2 bolts and rear No. 1 seat outer adjuster.

**Torque: 41 N·m (420 kgf-cm, 30 ft-lbf)**

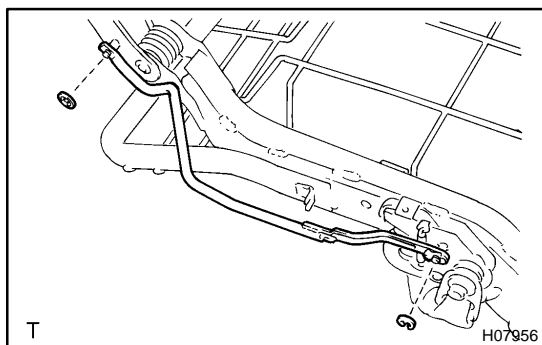
- (b) Remove the 2 bolts and rear No. 1 seat inner adjuster.

**Torque: 41 N·m (420 kgf-cm, 30 ft-lbf)**

- (c) Remove the 2 hinge covers from the outer and inner adjuster.

**19. REMOVE REAR SEAT STAY**

Remove the 2 bolts and rear seat stay.

**20. REMOVE LH NO. 1 SEAT LEG STAY**

Using a screwdriver, remove the spring nut, E-ring and LH No. 1 seat leg stay.

**21. REMOVE REAR SEAT CUSHION HINGE**

- (a) Using a screwdriver, remove the spring nut and E-ring.  
 (b) Remove the 2 hinge pins, 2 cushion spacers, 2 cushion support springs and 2 rear seat cushion hinges.

**22. REMOVE LH REAR SEAT LOCK**

Unfasten the bolt, then remove the inner belt and LH rear seat lock.

## INSTALLATION

Installation is in the reverse order of removal (See page [BO-1 19](#)).

## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-120](#) ).

## REMOVAL

### REMOVE REAR NO. 1 SEAT

- (a) Fold the seatback down.
- (b) Unlock the seat lock, and swing the whole seat up and forward.
- (c) Using a screwdriver, remove the seat leg covers.

#### HINT:

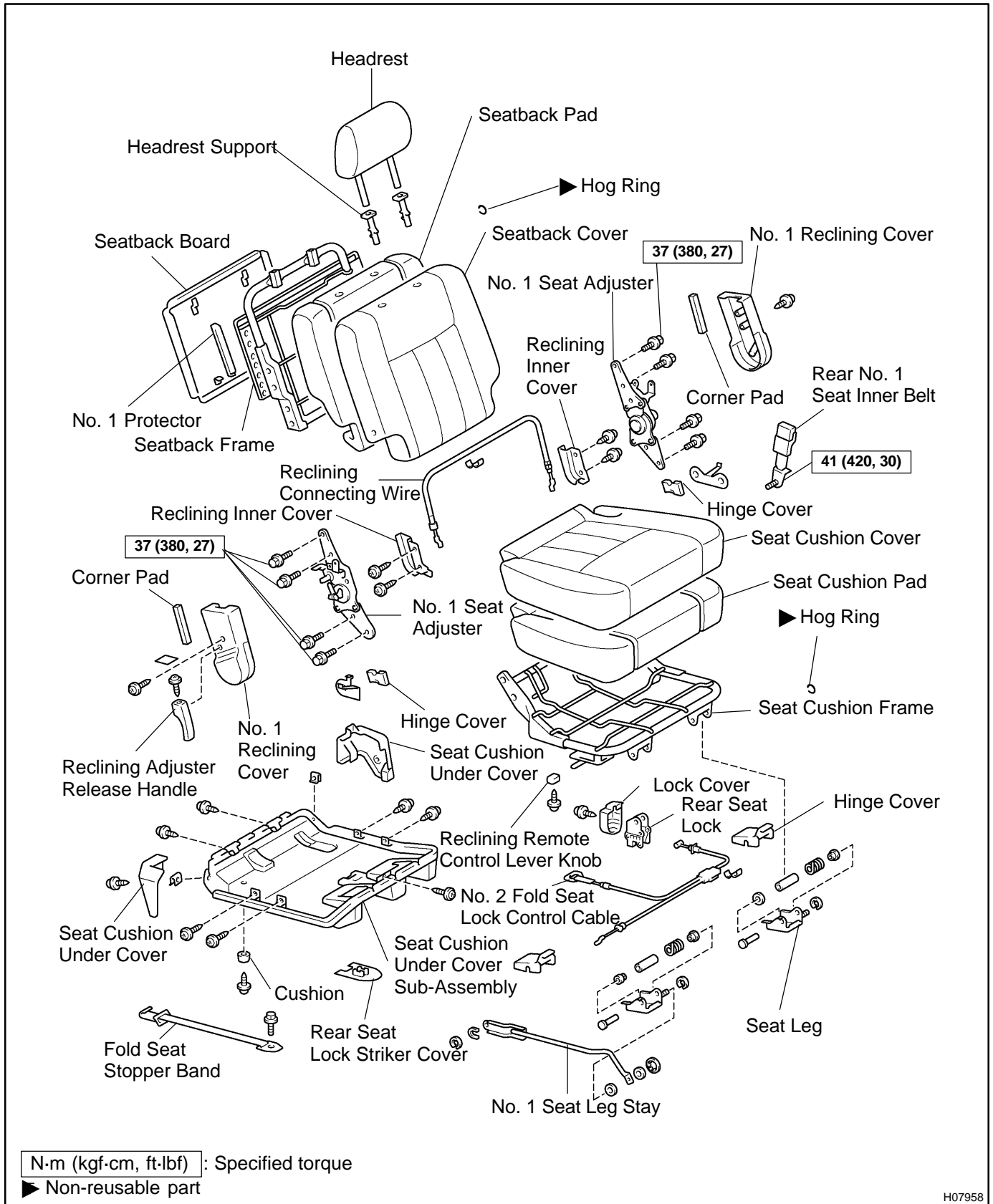
Tape the screwdriver tip before use.

- (d) Remove the 4 bolts and rear No. 1 seat.

**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

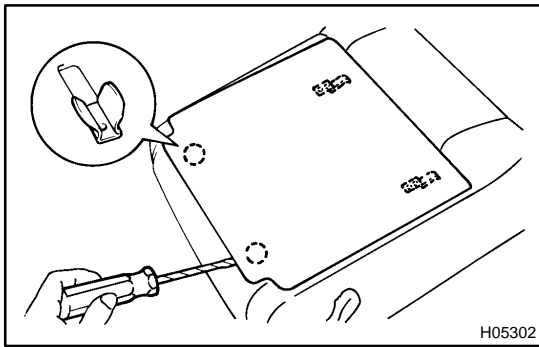
# REAR NO.1 SEAT (RH) COMPONENTS

BO1L5-05



H07958





## DISASSEMBLY

### 1. REMOVE HEADREST

### 2. REMOVE SEATBACK BOARD

Using a screwdriver, remove the seatback board as shown in the illustration.

HINT:

Tap the screwdriver tip before use.

### 3. REMOVE RECLINING ADJUSTER RELEASE HANDLE

(a) Using a screwdriver, remove the cover.

HINT:

Tap the screwdriver tip before use.

(b) Remove the screw and reclining adjuster release handle.

### 4. REMOVE NO. 1 RECLINING COVER

(a) Remove the 4 hog rings and open the seatback cover.

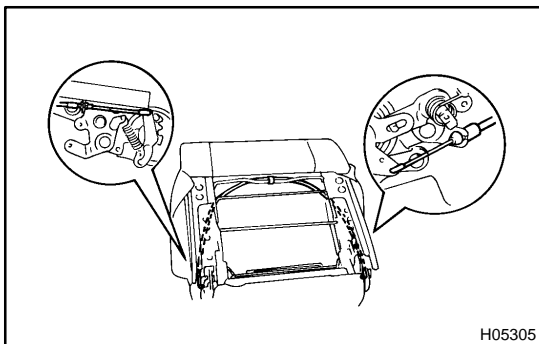
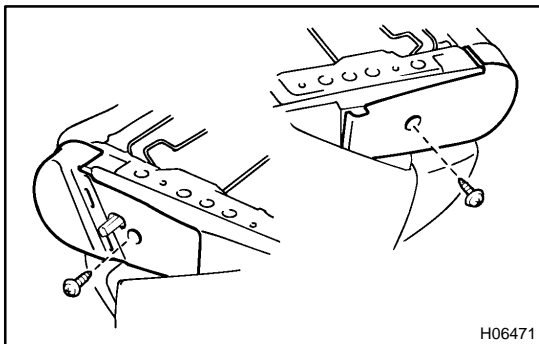
HINT:

At the time of reassembly, please refer to the following item.

When installing hog rings, take care to prevent wrinkles as little as possible.

(b) Remove the 2 corner pads.

(c) Remove the 2 screws and 2 No. 1 reclining covers as shown in the illustration.

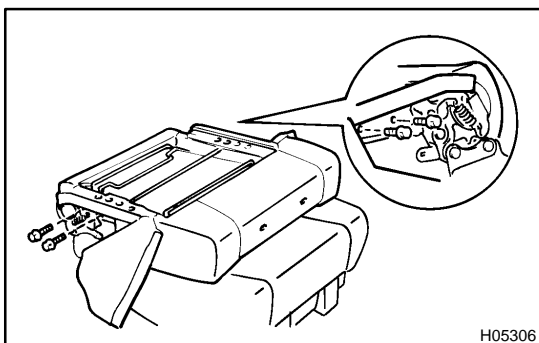


### 5. REMOVE RECLINING CONNECTING WIRE

(a) Loosen the nuts, then remove the reclining connecting wire of RH side edge.

(b) Remove the reclining connecting wire of LH side edge.

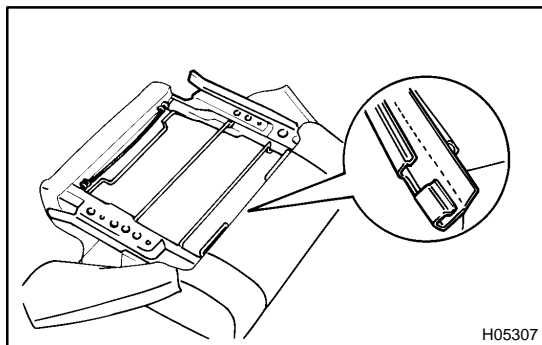
(c) Remove the clamp and reclining connecting wire.



### 6. REMOVE SEATBACK ASSEMBLY

Remove the 4 bolts and seatback assembly.

**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

**7. REMOVE SEATBACK FRAME**

- (a) Remove the 4 screws and reclining inner cover.
- (b) Remove the 2 hog rings.

HINT:

At the time of reassembly, please refer to the following item.  
When installing hog rings, take care to prevent wrinkles as little as possible.

- (c) Disengage the hook, then remove the headrest supports.
- (d) Remove the seatback frame.
- (e) Remove the 2 No. 1 protectors from the seatback frame.

**8. REMOVE SEATBACK COVER**

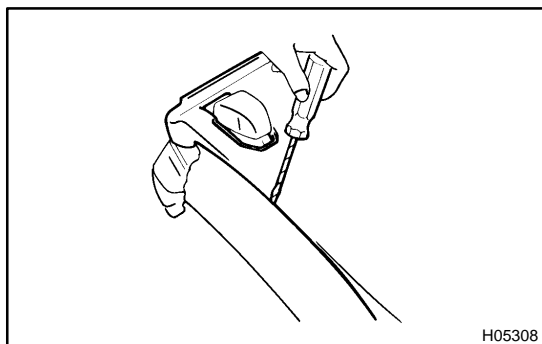
Remove the hog rings and seatback cover.

HINT:

At the time of reassembly, please refer to the following item.  
When installing hog rings, take care to prevent wrinkles as little as possible.

**9. REMOVE SEAT CUSHION UNDER COVER**

Remove the 2 screws and 2 seat cushion under covers.

**10. REMOVE SEAT CUSHION COVER WITH PAD**

- (a) Using a screwdriver, disengage the hooks as shown in the illustration.

HINT:

Tap the screwdriver tip before use.

- (b) Remove the seat cushion cover with pad.

**11. REMOVE SEAT CUSHION COVER**

Remove the hog rings and seatback cover.

HINT:

At the time of reassembly, please refer to the following item.  
When installing hog rings, take care to prevent wrinkles as little as possible.

**12. REMOVE CUSHION**

Remove the screw and cushion from the seat cushion under cover sub-assembly.

**13. REMOVE LOCK COVER**

Remove the screw and lock cover.

**14. REMOVE RECLINING REMOTE CONTROL LEVER KNOB**

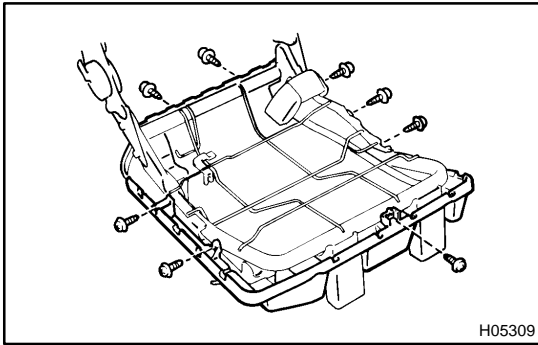
Remove the screw and reclining remote control lever knob.

**15. REMOTE FOLD SEAT STOPPER BAND**

Remove the bolt and fold seat stopper band.

**16. REMOVE SEAT CUSHION UNDER COVERS**

Remove the 2 screws and 2 seat cushion under covers.



**17. REMOVE REAR SEAT CUSHION UNDER COVER SUB-ASSEMBLY**

Remove the 8 screws and rear seat cushion under cover.

**18. REMOVE REAR NO. 1 SEAT ADJUSTER**

(a) Remove the 2 bolts and rear No. 1 seat outer adjuster.

**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

(b) Remove the 2 bolts and rear No. 1 seat inner adjuster.

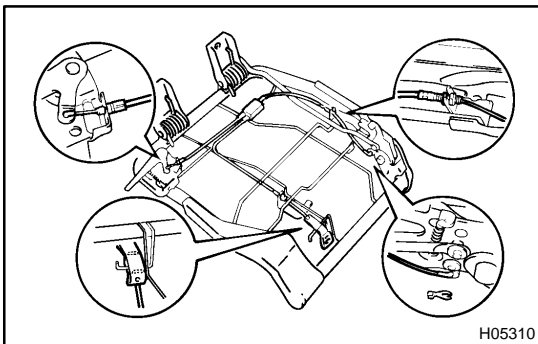
**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

(c) Remove the 2 hinge covers from the outer and inner adjusters.

**19. REMOVE REAR NO. 1 SEAT INNER BELT**

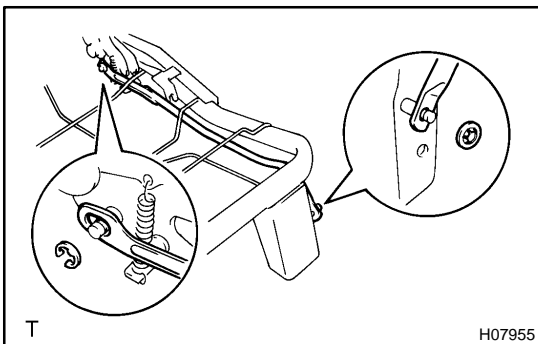
Loosen the bolt, then remove the rear No. 1 seat inner belt.

**Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)**



**20. REMOVE NO. 2 FOLD SEAT LOCK CONTROL CABLE**

Loosen the clamp and No. 2 fold seat lock control cable as shown in the illustration.



**21. REMOVE NO. 1 SEAT LEG STAY**

(a) Using a screwdriver, remove the spring nut and E-ring.

**HINT:**

Tape the screwdriver tip before use.

(b) Remove the No. 1 seat leg stay.

**22. REMOVE REAR SEAT CUSHION HINGE**

(a) Using a screwdriver, remove the 2 E-rings.

**HINT:**

Tape the screwdriver tip before use.

(b) Remove the 2 hinge pins, 2 cushion spacers, 2 cushion support springs and 2 rear seat cushion hinges.

**23. REMOVE REAR SEAT LOCK**

## INSTALLATION

Installation is in the reverse order of removal (See page [BO-127](#) ).

## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-128](#) ).

## REMOVAL

### REMOVE REAR NO.1 SEAT

- (a) Fold the seatback down.
- (b) Unlock the seat lock, and swing the whole seat up and forward.
- (c) Using a screwdriver, remove the seat leg covers.

#### HINT:

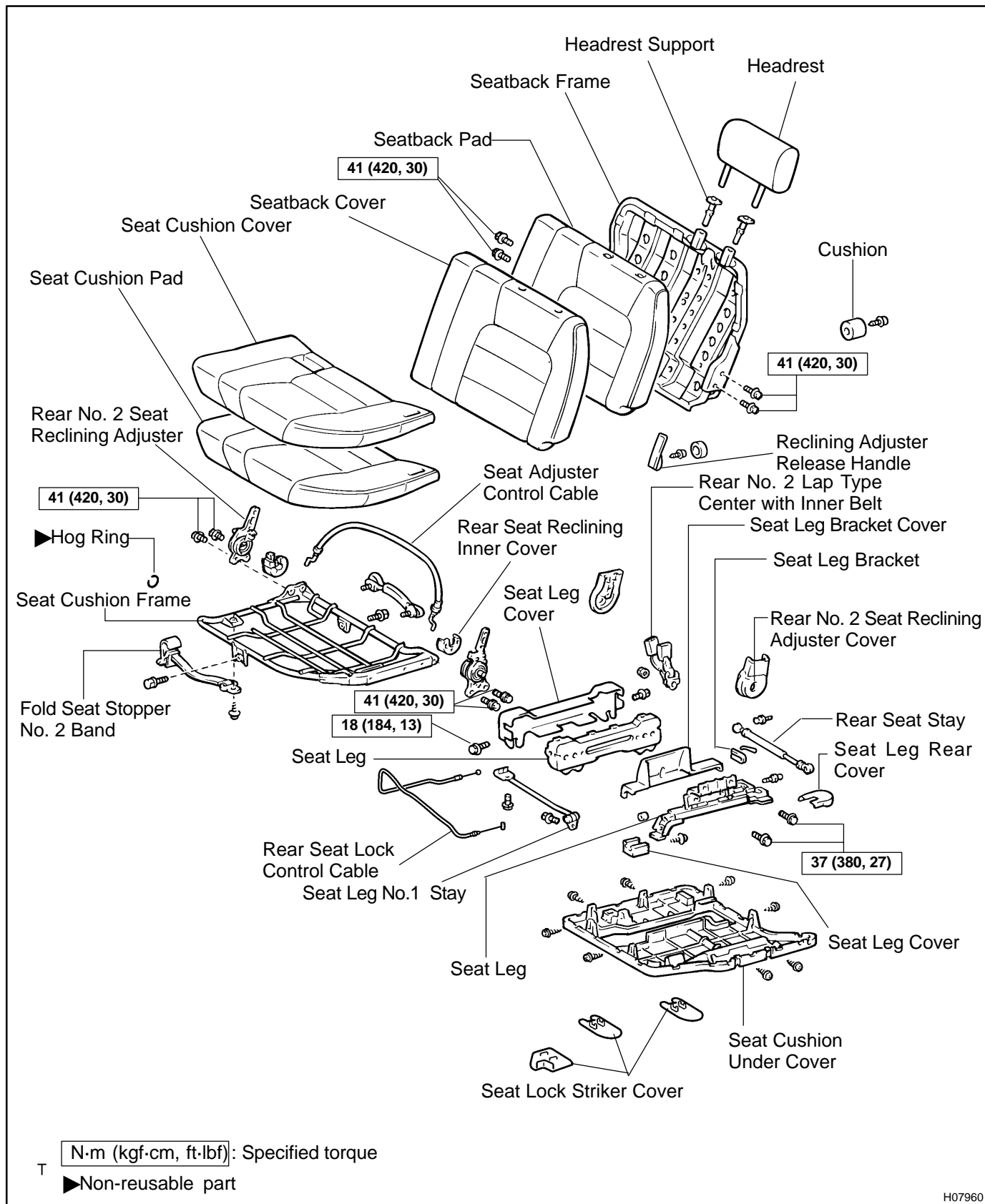
Tape the screwdriver tip before use.

- (d) Remove the 4 bolts and rear No.1 seat.

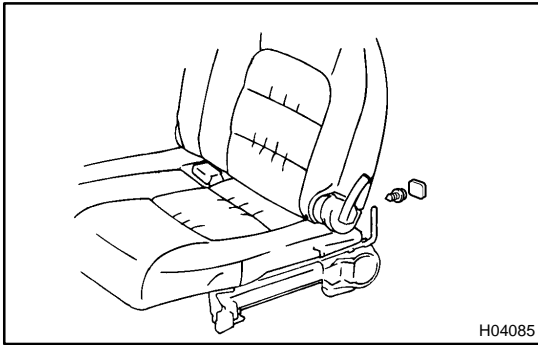
**Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)**

# REAR NO.2 SEAT COMPONENTS

BO1LG-03



H07960



## DISASSEMBLY

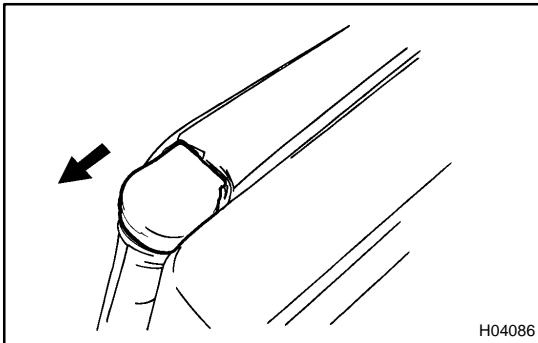
### 1. REMOVE RECLINING ADJUSTER RELEASE HANDLE

- (a) Using a screwdriver, remove the cover.

HINT:

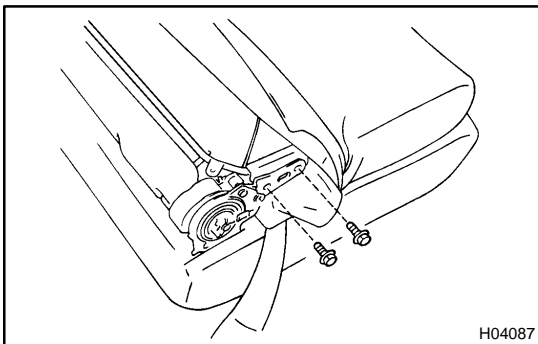
Tape the screwdriver tip before use.

- (b) Remove the screw and reclining adjuster release handle.



### 2. REMOVE REAR NO. 2 SEAT RECLINING ADJUSTER COVERS

Remove the No. 2 rear seat reclining covers.



### 3. REMOVE SEATBACK ASSEMBLY

- (a) Disengage the hook.  
 (b) Remove the 4 bolts and seatback assembly.

**Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)**

### 4. REMOVE HEADREST

Remove the headrest.

### 5. REMOVE SEATBACK COVER

- (a) Remove the headrest supports.  
 (b) Remove the cushion.  
 (c) Remove the seatback cover with pad from the seatback frame.  
 (d) Remove the seatback cover from the seatback pad.

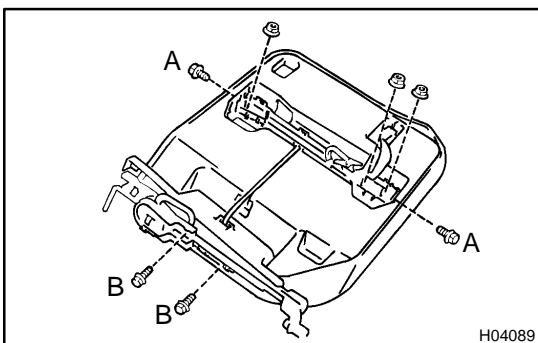
### 6. REMOVE REAR NO. 2 LAP TYPE CENTER WITH INNER BELT

Remove the nut and rear No. 2 lap type center with inner belt.

### 7. REMOVE REAR SEAT LOCK CONTROL CABLE

### 8. REMOVE REAR SEAT STAY

Remove the 2 bolts and rear seat stay.



### 9. REMOVE ADJUSTER

- (a) Remove the 3 nuts.  
 (b) Remove the 4 bolts.

**Torque:**

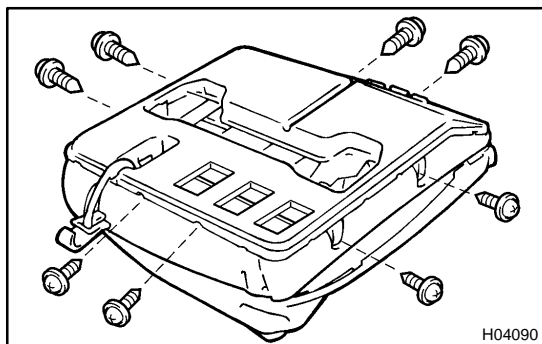
**A bolt: 18 N·m (185 kgf·cm, 13 ft·lbf)**

**B bolt: 37 N·m (380 kgf·cm, 27 ft·lbf)**

- (c) Remove the adjuster.  
 (d) Remove the seat leg bracket cover.  
 (e) Remove the 2 screws and seat leg No. 1 stay.



10. REMOVE SEAT LEG BRACKET
11. REMOVE SEAT LEG REAR COVER
12. REMOVE SEAT LEG COVER



**13. REMOVE SEAT CUSHION UNDER COVER**

- (a) Remove the assist grip.
- (b) Using a screwdriver, disengage the hooks.

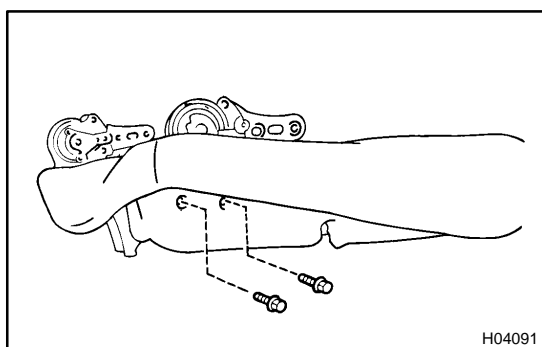
**HINT:**

Tape the screwdriver tip before use.

- (c) Remove the 8 screws.
- (d) Remove the seat cushion under cover.

**14. REMOVE SEAT ADJUSTER CONTROL CABLE**

**15. REMOVE SEAT RECLINING INNER COVERS**



**16. REMOVE REAR NO. 2 SEAT RECLINING ADJUSTERS**

- (a) Remove the 4 bolts.

**Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)**

- (b) Remove the rear No. 2 seat reclining adjusters.

**17. REMOVE SEAT CUSHION COVER**

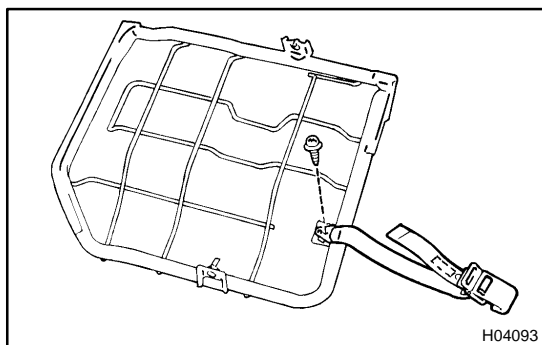
- (a) Remove hog rings and seat cushion frame.

**HINT:**

At the time of reassembly, please refer to the following item.

When installing hog rings, take care to prevent wrinkles as little as possible.

- (b) Remove the seat cushion cover from the seat cushion pad.



**18. REMOVE HOLD SEAT STOPPER NO. 2 BAND**

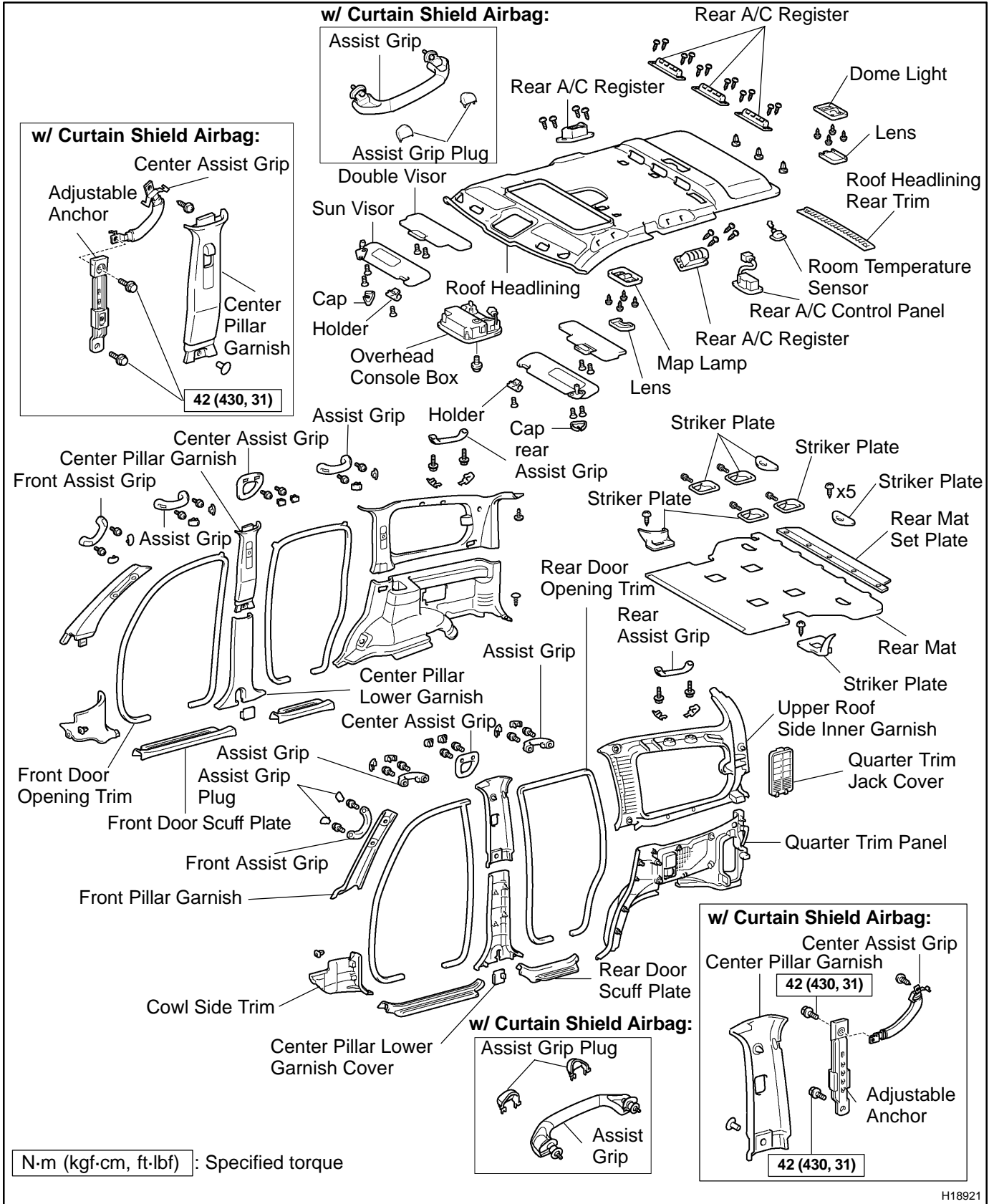
- (a) Remove the screw.
- (b) Remove the hold seat stopper No. 2 band.

## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-134](#) ).

# ROOF HEADLINING COMPONENTS

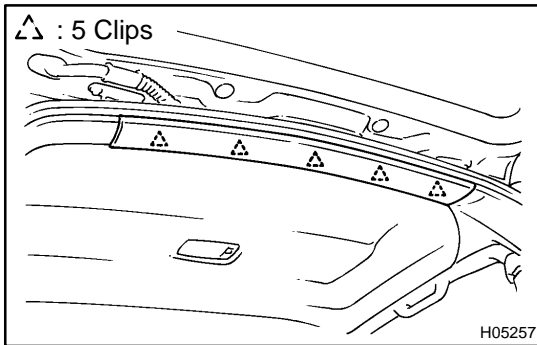
BO1KP-04



H18921

## INSTALLATION

Installation is in the reverse order of removal (See page [BO-97](#) ).



## REMOVAL

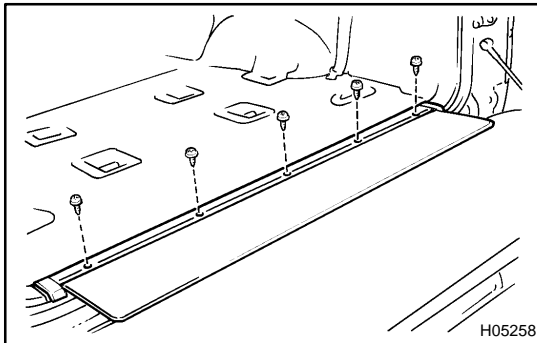
### 1. REMOVE ROOF HEADLINING REAR TRIM

Using a screwdriver, remove the roof headlining rear trim.

HINT:

Tape up the screwdriver tip before use.

### 2. REMOVE REAR NO. 2 SEATS



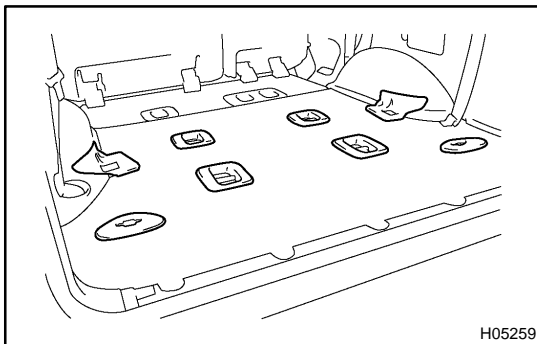
### 3. REMOVE REAR MAT SET PLATE

(a) Remove the 5 screws.

(b) Using a screwdriver, remove the rear mat set plate.

HINT:

Tape up the screwdriver tip before use.



### 4. REMOVE STRIKER PLATES

(a) Remove the 6 screws.

(b) Using a screwdriver, remove the striker plates.

HINT:

Tape up the screwdriver tip before use.

### 5. REMOVE REAR MAT

### 6. REMOVE REAR NO. 2 SEAT OUTER BELT FLOOR ANCHOR

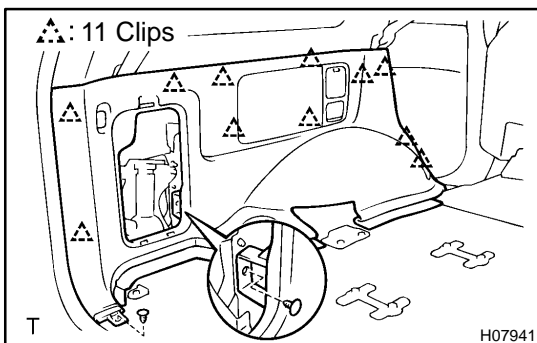
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

### 7. REMOVE REAR NO. 1 SEAT OUTER BELT FLOOR ANCHOR

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

### 8. REMOVE REAR DOOR SCUFF PLATES

### 9. REMOVE REAR DOOR OPENING TRIMS

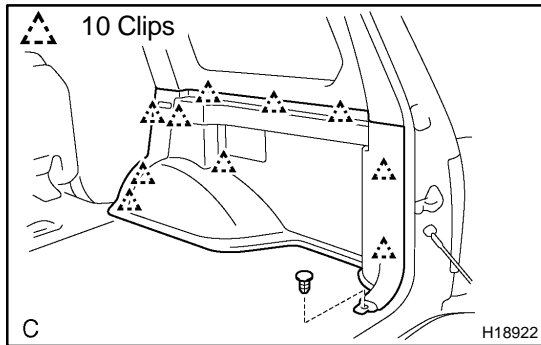


### 10. REMOVE QUARTER TRIM PANEL LH

(a) Remove the quarter trim jack cover.

(b) Using a clip remover, remove the 2 clips.

(c) Remove the quarter trim panel LH, then disconnect the connector.

**11. REMOVE QUARTER TRIM PANEL RH**

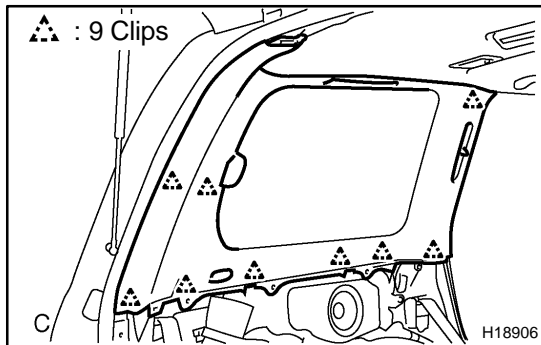
- (a) Using a clip remover, remove the clip.
- (b) Remove the quarter trim panel RH.

**12. REMOVE REAR NO. 2 SEAT OUTER BELT SHOULDER ANCHORS**

**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**

**13. REMOVE REAR NO. 1 SEAT OUTER BELT SHOULDER ANCHORS**

**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**

**14. REMOVE UPPER ROOF SIDE INNER GARNISHES**

- (a) Using a screwdriver, remove the 2 assist grip plugs, then remove the 2 screws and the assist grip.

**HINT:**

Tape up the screwdriver tip before use.

- (b) Using a clip remover, remove the clip.
- (c) Using a screwdriver, remove the upper roof side inner garnish.

**HINT:**

Tape up the screwdriver tip before use.

- (d) Use the same manner described above to the other side.

**15. REMOVE FRONT DOOR SCUFF PLATES****16. REMOVE COWL SIDE TRIMS****17. REMOVE FRONT DOOR OPENING TRIMS****18. REMOVE FRONT ASSIST GRIP**

- (a) Using a screwdriver, remove the 2 assist grip plugs, then remove the 2 screws and front assist grip.

**HINT:**

Tape up the screwdriver tip before use.

- (b) Use the same manner described above to the other side.

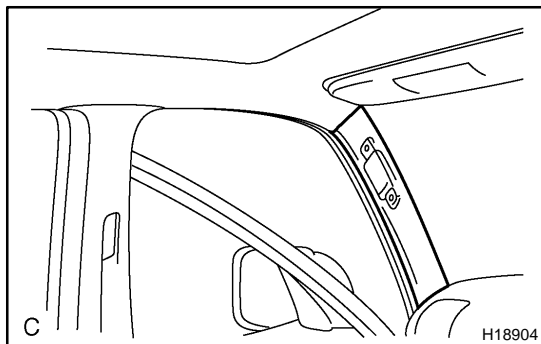
**19. REMOVE FRONT PILLAR GARNISH**

- (a) Using a screwdriver, remove the front pillar garnish.

**HINT:**

Tape up the screwdriver tip before use.

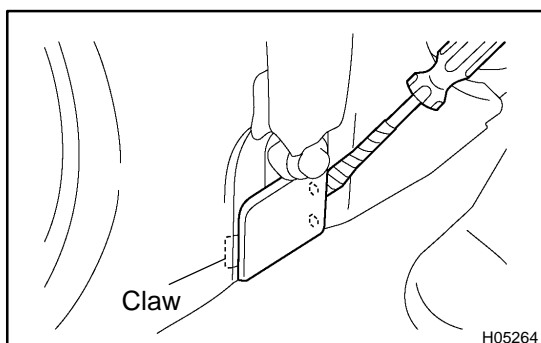
- (b) Use the same manner described above to the other side.

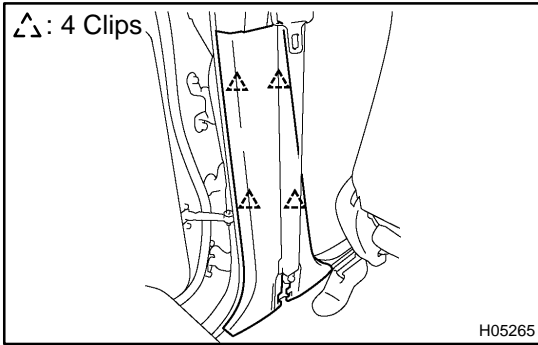
**20. REMOVE CENTER PILLAR LOWER GARNISH**

- (a) Using a screwdriver, remove the center pillar garnish cover.

**HINT:**

Tape up the screwdriver tip before use.



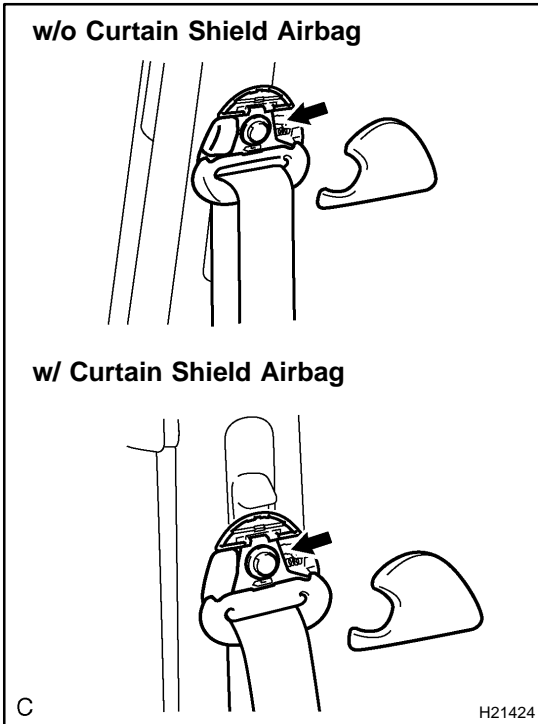


- (b) Using a screwdriver, remove the center pillar lower garnish as shown in the illustration.

HINT:

Tape up the screwdriver tip before use.

- (c) Use the same manner described above to the other side.



**21. REMOVE CENTER PILLAR GARNISH**

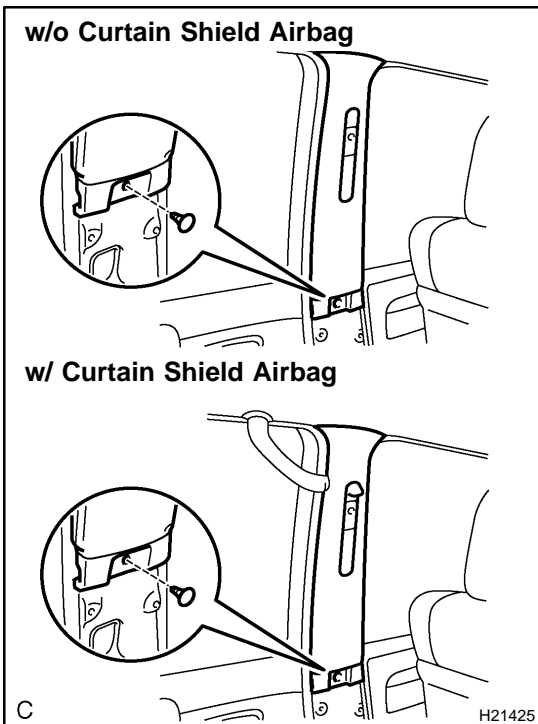
- (a) Using a screwdriver, remove the seat belt anchor cover cap.

HINT:

Tape up the screwdriver tip before use.

- (b) Remove the bolt and the front seat outer belt shoulder anchor.

**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**



- (c) Using a clip remover, remove the clip.
- (d) Using a screwdriver, remove the center pillar garnish.

HINT:

Tape up the screwdriver tip before use.

- (e) Use the same manner described above to the other side.

**22. REMOVE SUN VISOR**

- (a) Using a screwdriver, remove the caps.

HINT:

Tape the screwdriver tip before use.

- (b) Remove the screws, then disconnect the connectors.

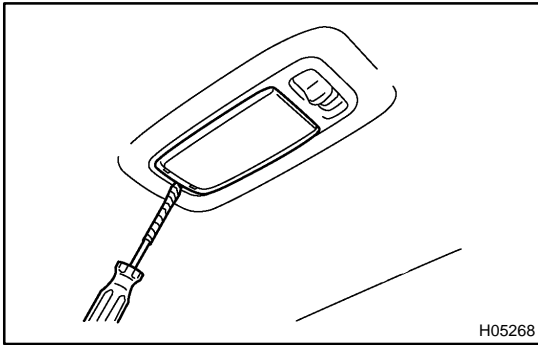
- (c) Remove the sun visors.

**23. REMOVE DOUBLE VISOR**

Remove the screws and the double visors.

**24. REMOVE HOLDER**

Remove the screws and the holders.

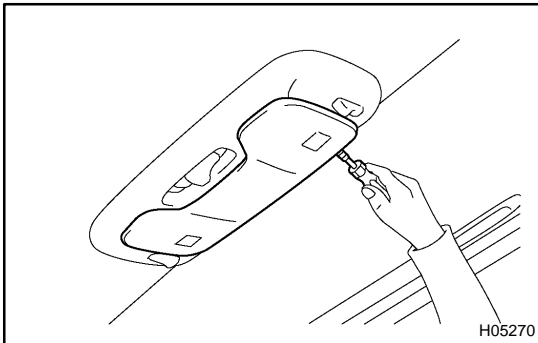
**25. REMOVE DOME LIGHT**

- (a) Using a screwdriver, remove the lens as shown in the illustration.

HINT:

Tape up the screwdriver tip before use.

- (b) Remove the 4 screws and the dome light, then disconnect the connector.

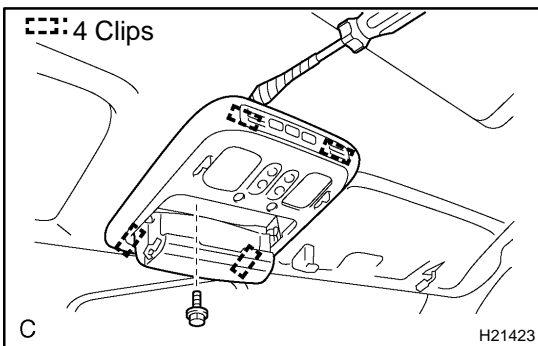
**26. REMOVE MAP LAMP**

- (a) Using a screwdriver, remove the lens as shown in the illustration.

HINT:

Tape up the screwdriver tip before use.

- (b) Remove the 4 screws and the map lamp, then disconnect the connector.

**27. REMOVE OVERHEAD CONSOLE BOX**

- (a) Remove the bolt.
- (b) Using a screwdriver, remove the overhead console box, then disconnect the connector.

HINT:

Tape up the screwdriver tip before use.

**28. REMOVE REAR A/C CONTROL PANEL**

Using a screwdriver, release the 4 claws and pull out the rear A/C control panel, then disconnect the connector.

HINT:

Tape up the screwdriver tip before use.

**29. REMOVE ROOM TEMPERATURE SENSOR**

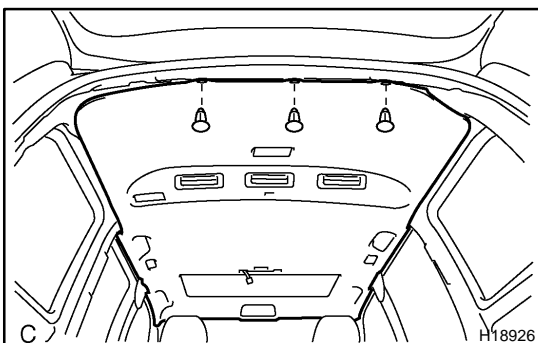
Using a screwdriver, pull out the room temperature sensor, then disconnect the connector.

HINT:

Tape up the screwdriver tip before use.

**30. REMOVE ASSIST GRIPS**

- 31. w/o Curtain Shield Airbag:  
REMOVE CENTER ASSIST GRIPS**

**32. REMOVE ROOF HEADLINING**

Using a clip remover, remove the 3 clips and the roof headlining.

**33. REMOVE REAR A/C REGISTER**

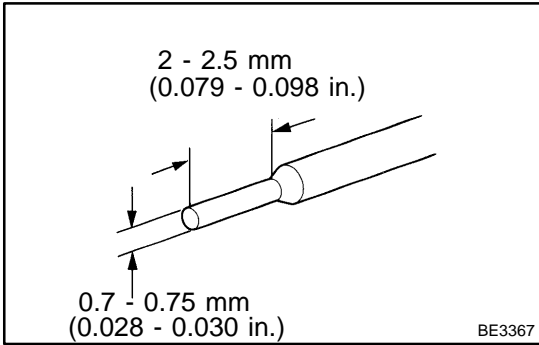
- 34. w/ Curtain Shield Airbag:  
REMOVE ADJUSTABLE ANCHOR**

Remove the 2 bolts and the adjustable anchor.

**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**

- 35. w/ Curtain Shield Airbag:  
REMOVE CENTER ASSIST GRIPS**





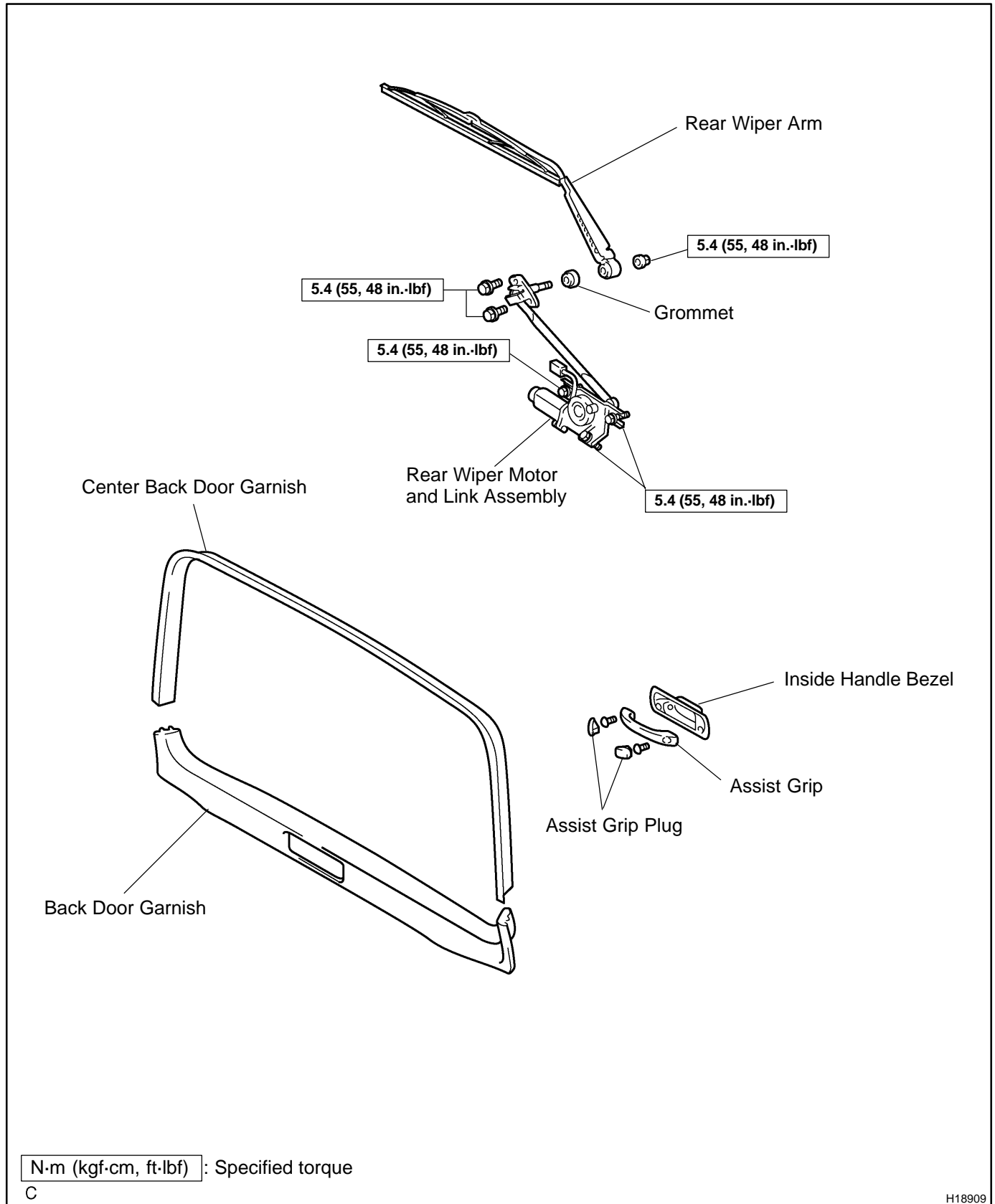
## ADJUSTMENT

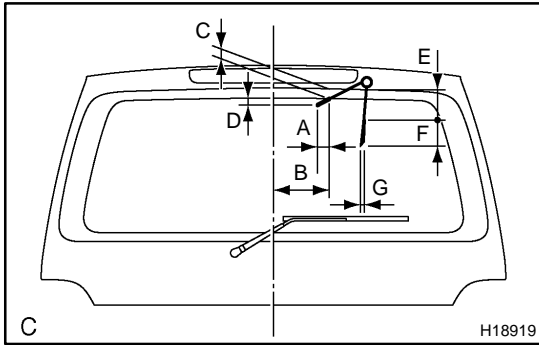
### ADJUST WASHER NOZZLE

Using a tool like the one shown in the illustration, change the direction of the nozzle hole to adjust the point where washer fluid hits the back door glass.

# REAR WIPER AND WASHER COMPONENTS

BO1JW-03



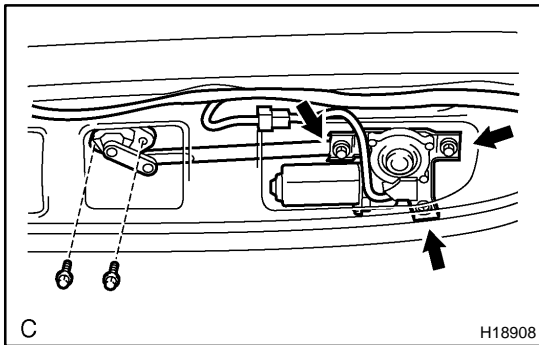


## INSPECTION

### INSPECT WASHER NOZZLE

While operating the washer, check if the point where the washer fluid hits the back door glass is within the range indicated in the illustration.

- A: Approx. 40 mm (1.57 in.)**
- B: Approx. 180 mm (7.09 in.)**
- C: Approx. 40 mm (1.57 in.)**
- D: Approx. 30 mm (1.18 in.)**
- E: Approx. 120 mm (4.72 in.)**
- F: Approx. 90 mm (3.54 in.)**
- G: Approx. 15 mm (0.59 in.)**



## INSTALLATION

### 1. INSTALL REAR WIPER MOTOR AND LINK ASSEMBLY

- (a) Install the wiper motor and link assembly with 5 bolts.  
**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

- (b) Connect the connector.

### 2. INSTALL BACK DOOR GARNISH

### 3. INSTALL CENTER BACK DOOR GARNISH

### 4. INSTALL INSIDE HANDLE BEZEL

### 5. INSTALL ASSIST GRIP

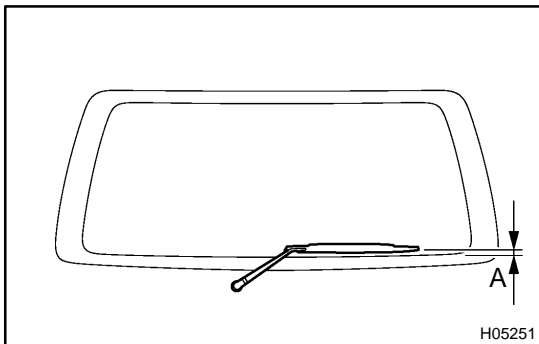
Install the assist grip with the 2 screws, then install the 2 assist grip plugs.

### 6. INSTALL REAR WIPER ARM

- (a) Install the grommet.

- (b) Operate the wiper once and turn the wiper switch OFF.

- (c) Install the wiper arm and tighten the nut by hand.



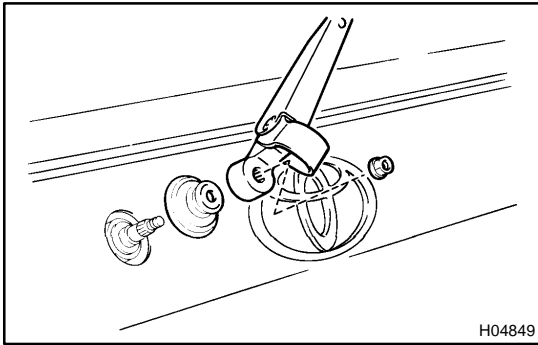
- (d) Adjust the installation position of the wiper arm to the position as shown in the illustration.

**A: Approx. 38 ± 10 mm (1.50 ± 0.39 in.)**

- (e) Torque the nut.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

- (f) Close the cover.



## REMOVAL

### 1. REMOVE REAR WIPER ARM

- (a) Open the cover.
- (b) Remove the nut and rear wiper arm.
- (c) Remove the grommet.

### 2. REMOVE ASSIST GRIP

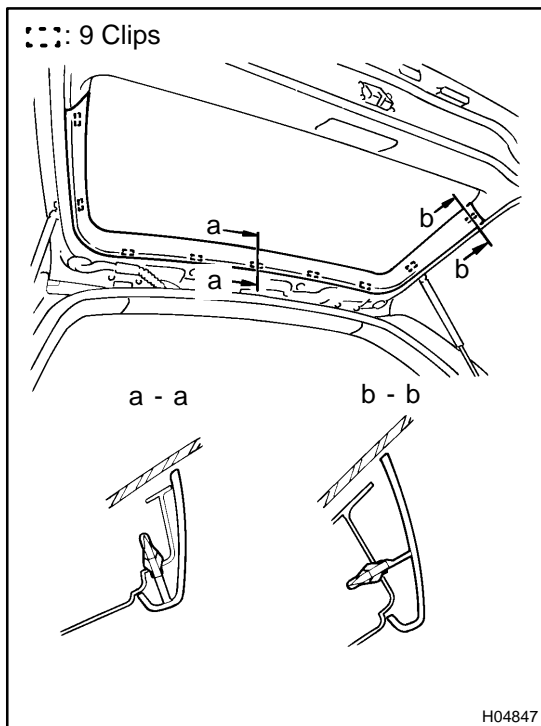
- (a) Using a screwdriver, remove the 2 assist grip plugs.

HINT:

Tape up the screwdriver tip before use.

- (b) Remove the 2 screws and assist grip.

### 3. REMOVE INSIDE HANDLE BEZEL

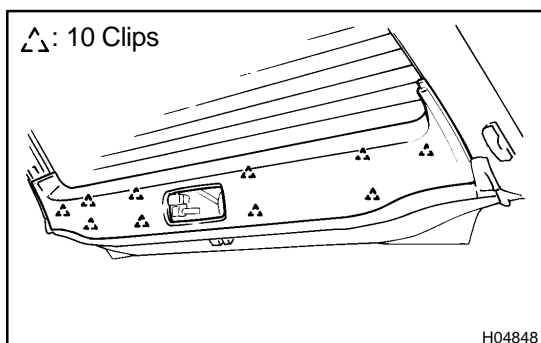


### 4. REMOVE CENTER BACK DOOR GARNISH

Using a screwdriver, remove the center back door garnish.

HINT:

Tape up the screwdriver tip before use.

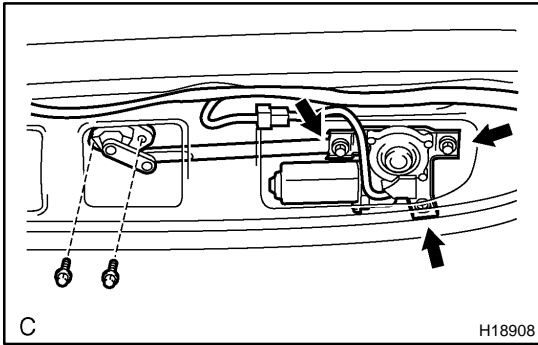


### 5. REMOVE BACK DOOR GARNISH

Using a screwdriver, remove the back door garnish.

HINT:

Tape up the screwdriver tip before use.



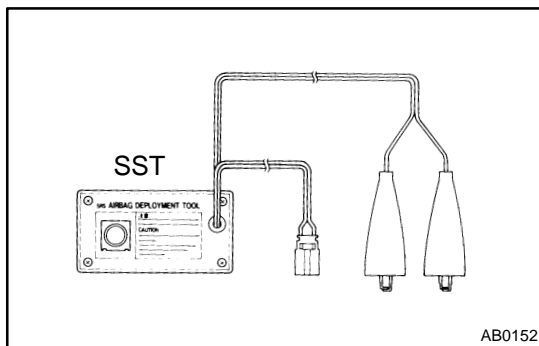
## 6. REMOVE REAR WIPER MOTOR AND LINK ASSEMBLY

- (a) Disconnect the connector.
- (b) Remove the 2 bolts.
- (c) Unfasten the 3 bolts and remove the rear wiper motor with link assembly.

## DISPOSAL

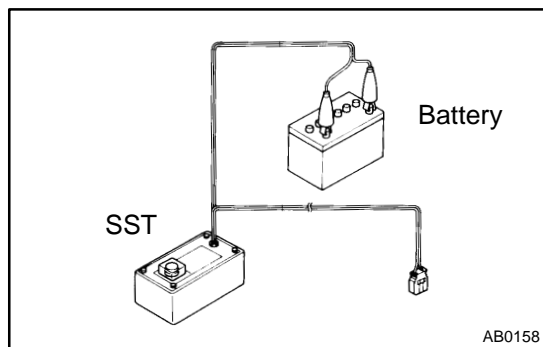
### HINT:

When scrapping vehicle equipped with an SRS or disposing of a front seat outer belt (with seat belt pretensioner), always first deploy the airbag in accordance with the procedure given in RS section or activate the seat belt pretensioner. If any abnormality occurs with the airbag deployment or seat belt pretensioner activation, contact the SERVICE DEPT. of TOYOTA MOTORS SALES, U.S.A., INC.. When disposing of a front seat outer belt (with seat belt pretensioner) activated in a collision, follow the same procedure given in step 1-(d) in "DISPOSAL".



### CAUTION:

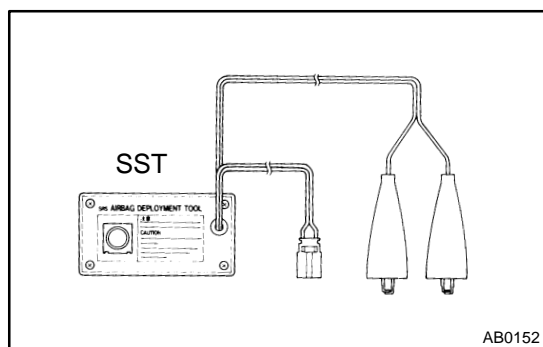
- ▶ Never dispose of front seat outer belt which has inactivated pretensioner.
- ▶ The seat belt pretensioner produces a sizeable exploding sound when it activates, so perform the operation out-of-door and where it will not create a nuisance to nearby residents.
- ▶ When activating the seat belt pretensioner, always use the specified SST. (SRS Airbag Deployment Tool) Perform the operation in a place away from electrical noise.  
SST 09082-00700, 09082-00740
- ▶ When activating a front seat outer belt (with seat belt pretensioner), perform the operation at least 10 m (33 ft) away from the front seat outer belt.
- ▶ Use gloves and safety glasses when handling a front seat outer belt with activated pretensioner.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a front seat outer belt with activated pretensioner.



## 1. SEAT BELT PRETENSIONER ACTIVATION WHEN SCRAPPING VEHICLE

### HINT:

Have a battery ready as the power source to activate the seat belt pretensioner.

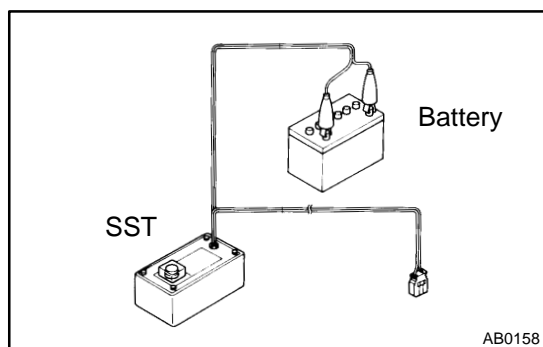


(a) Check functioning of SST.

### CAUTION:

When activating the seat belt pretensioner, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082-00700, 09082-00740

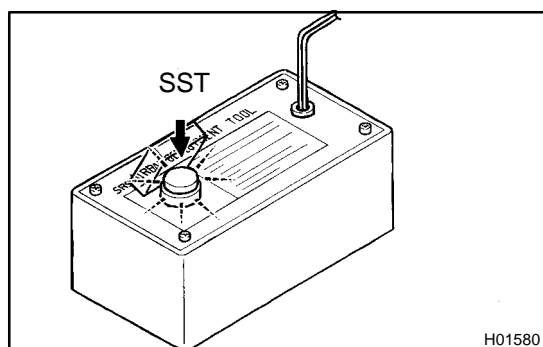


(1) Connect the SST to battery.

Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.

### HINT:

Do not connect the yellow connector which will be connected with the seat belt pretensioner.



(2) Check functioning of SST.

Press the SST activation switch, and check the LED of the SST activation switch lights up.

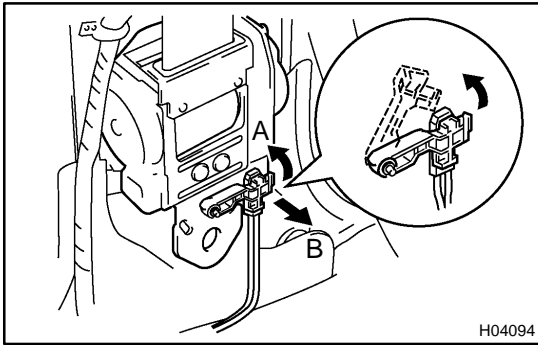
### CAUTION:

If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.

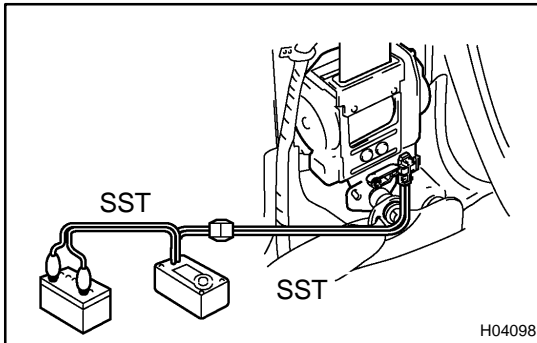
(b) Disconnect the pretensioner connector.

- (1) Remove the front door scuff plate.
- (2) Remove the front door opening trim.
- (3) Remove the rear door scuff plate.
- (4) Remove the rear door opening trim.
- (5) Remove the center pillar lower garnish.





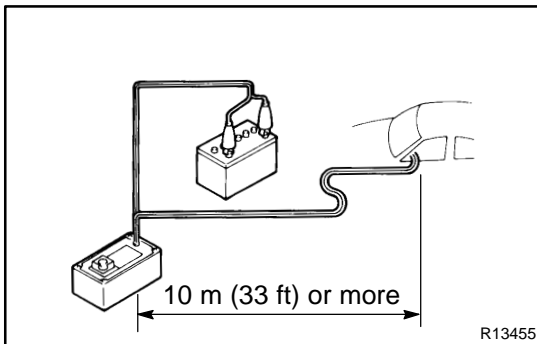
- (6) Disconnect the pretensioner connector in the order "A" and "B" as shown in the illustration.



- (c) Install the SST.  
 (1) Connect the 2 SST each other, then connect them to the seat belt pretensioner.  
 SST 09082-00700, 09082-00740

**NOTICE:**

To avoid damaging the SST connector and wire harness, do not lock secondary lock of the twin lock.



- (2) Move the SST to at least 10 m (33 ft) away from the front of the vehicle.  
 (3) Close all the doors and windows of the vehicle.

**NOTICE:**

Take care not to damage the SST wire harness.

- (4) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (-) terminal.

- (d) Activate seat belt pretensioner.  
 (1) Confirm that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.  
 (2) Press the SST activation switch and activate the seat belt pretensioner.

**HINT:**

The seat belt pretensioner operates simultaneously as the LED of the SST activation switch lights up.

- (e) Dispose of the front seat outer belt (with seat belt pretensioner).

**CAUTION:**

- ▶ The front seat outer belt is very hot when the seat belt pretensioner is activated, so leave it alone for at least 30 minutes after activation.
- ▶ Use gloves and safety glasses when handling a front seat outer belt with activated seat belt pretensioner.
- ▶ Always wash your hands with water after completing the operation.
- ▶ Do not apply water, etc. to a front seat outer belt with activated seat belt pretensioner.

## 2. ACTIVATION WHEN DISPOSING OF FRONT SEAT OUTER BELT ONLY

**HINT:**

When scrapping a vehicle, activate the seat belt pretensioner and scrap the vehicle with activated front seat outer belt still installed.

**NOTICE:**

- ▶ **When disposing of the front seat outer belt (with seat belt pretensioner) only, never use the customer's vehicle to activate the seat belt pretensioner.**
- ▶ **Be sure to follow the procedure given below when activating the seat belt pretensioner.**

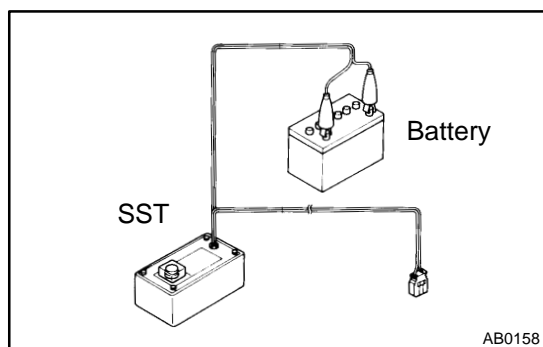
**HINT:**

Have a battery ready as the power source to activate the seat belt pretensioner.

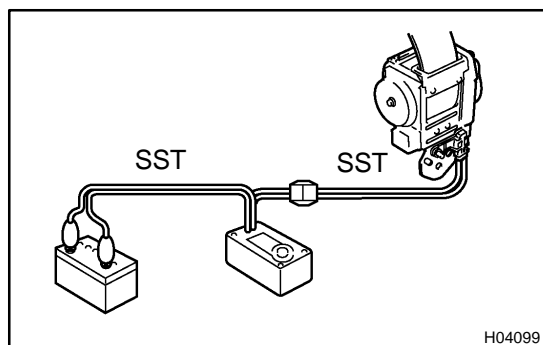
- (a) Remove the front seat outer belt (See page [BO-137](#) ).

**HINT:**

Cut the belt near the seat belt retractor.



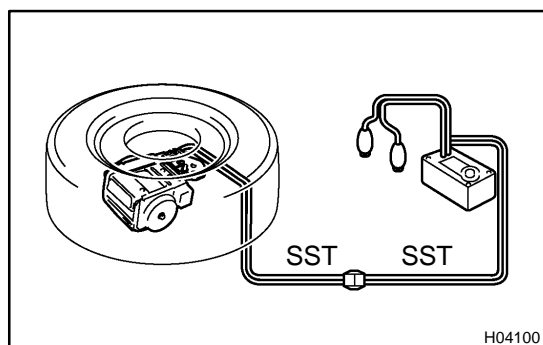
- (b) Check functioning of SST (See step 1-(a)).  
SST 09082-00700, 09082-00740



- (c) Install the SST.  
(1) Connect the 2 SST each other, then connect them to the seat belt pretensioner.  
SST 09082-00700, 09082-00740

**NOTICE:**

**To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.**



- (2) Place the front seat outer belt on the ground and cover it with the disc wheel with tire.

**NOTICE:**

**Place the front seat outer belt as shown in the illustration.**

- (3) Move the SST to at least 10 m (33 ft) away from the disc wheel.

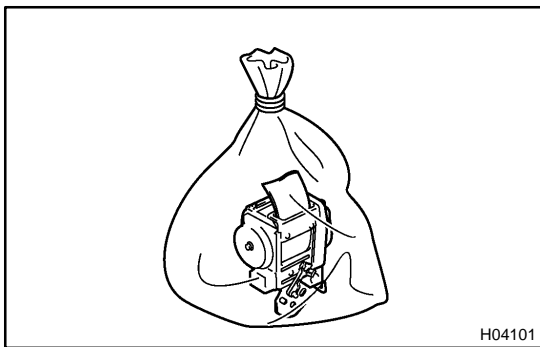
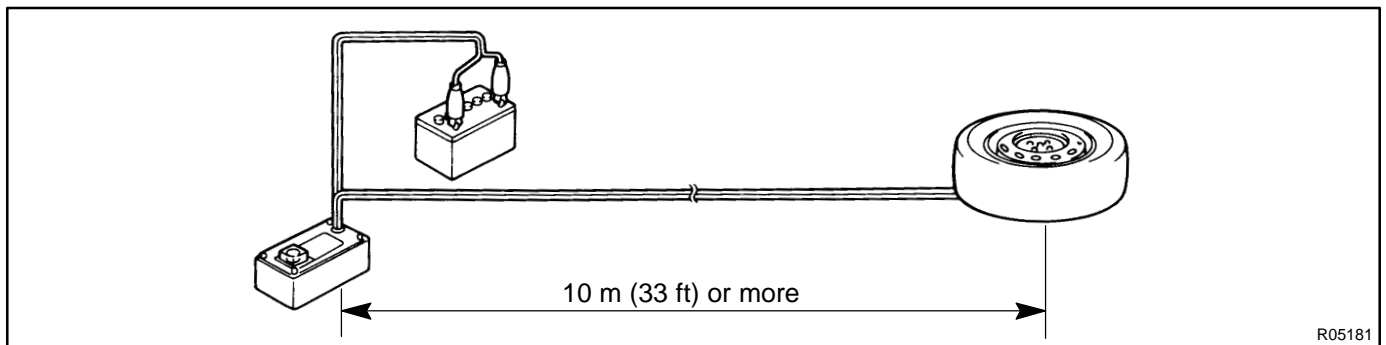
**NOTICE:**

**Take care not to damage the SST wire harness.**

- (d) Activate the seat belt pretensioner.
- (1) Connect the SST red clip to the battery positive (+) terminal and black clip to the battery negative (-) terminal.
  - (2) Check that no one is within 10 m (33 ft) area around the disc wheel.
  - (3) Press the SST activation switch and activate the seat belt pretensioner.

**HINT:**

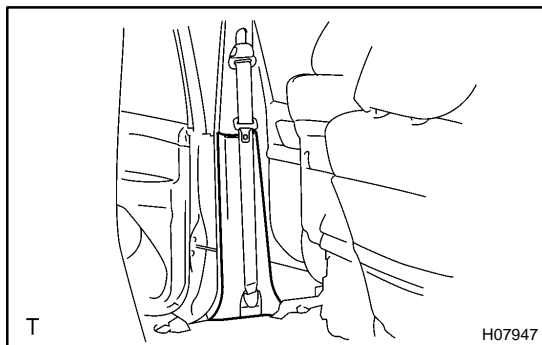
The seat belt pretensioner operates simultaneously as the LED of the SST activation switch lights up.



- (e) Dispose of the front seat outer belt (with seat belt pretensioner).

**CAUTION:**

- ▶ The front seat outer belt is very hot when the seat belt pretensioner is activated, so leave it alone for at least 30 minutes after activation.
  - ▶ Use gloves and safety glasses when handling a front seat outer belt with activated seat belt pretensioner.
  - ▶ Always wash your hands with water after completing the operation.
  - ▶ Do not apply water, etc. to a front seat outer belt with activated seat belt pretensioner.
- (1) Remove the disc wheel and SST.
  - (2) Place the front seat outer belt in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.



H07947

## INSPECTION

### 1. PRETENSIONER IS NOT ACTIVATED

- (a) Perform a diagnostic system check (See page [DI-692](#)).
- (b) Perform a visual check which includes the following items with the front seat outer belt removed from the vehicle.
  - ▶ Check for cuts and cracks in, or marked discoloration of the center pillar lower garnish.
  - ▶ Check for cuts and cracks in wire harness, and for chipping in connectors.
  - ▶ Check for deformation of the center pillar.

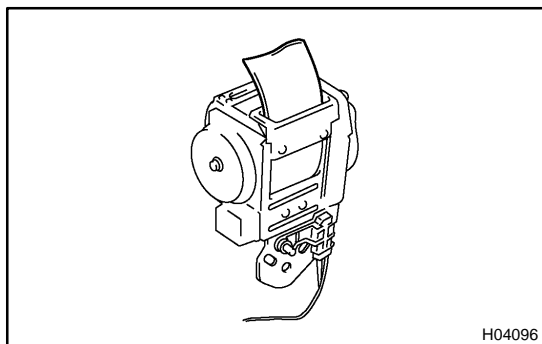
### CAUTION:

For removal and installation of the front seat outer belt, see page [BO-141](#) and [BO-150](#).

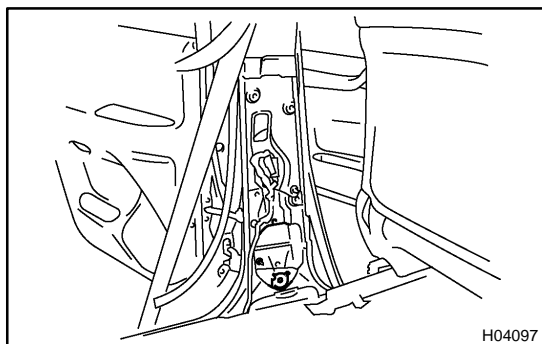
Be sure to follow the correct procedure.

### 2. PRETENSIONER IS ACTIVATED

- (a) Perform a diagnostic system check (See page [DI-692](#)).
- (b) Perform a visual check which includes the following items with the front seat outer belt removed from the vehicle.
  - ▶ Check for deformation of the center pillar.
  - ▶ Check for damage on the connector and wire harness.



H04096



H04097

## INSTALLATION

### NOTICE:

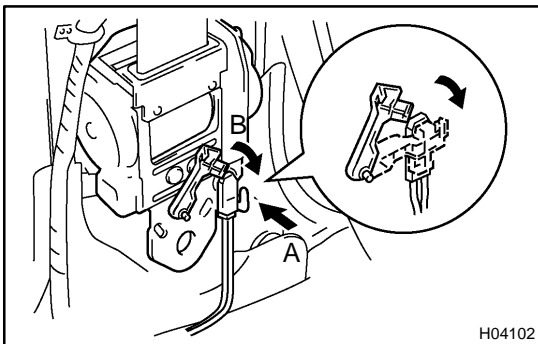
- ▶ Never use seat belt pretensioner from another vehicle. When replacing parts, replace them with new parts.
- ▶ Make sure that the front seat outer belt is installed with the specified torque.
- ▶ If the front seat outer belt has been dropped, or there are cracks, dents or other defects in the case or connector, replace the front seat outer belt with a new one.
- ▶ When installing the front seat outer belt, take care that the wiring does not interfere with other parts and is not pinched between other parts.

### 1. INSTALL RETRACTOR OF FRONT SEAT OUTER BELT

- (a) Install the retractor of front seat outer belt with the bolt.

#### Torque:

Upper bolt: 4.9 N·m (50 kgf·cm, 43 in.-lbf)



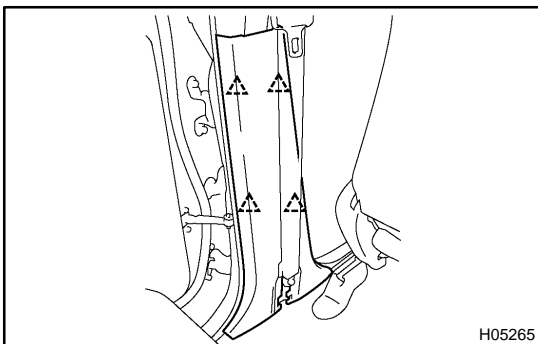
- (b) Connect the pretensioner connector in the order "A" and "B" as shown in the illustration.

### 2. INSTALL FRONT SEAT OUTER BELT SHOULDER ANCHOR

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

### 3. INSTALL FRONT SEAT OUTER BELT FLOOR ANCHOR

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



### 4. INSTALL CENTER PILLAR LOWER GARNISH

- (a) Install the center pillar lower garnish.

- (b) Install the center pillar garnish cover.

### 5. INSTALL REAR DOOR OPENING TRIM

### 6. INSTALL REAR DOOR SCUFF PLATE

### 7. INSTALL FRONT DOOR OPENING TRIM

### 8. INSTALL FRONT DOOR SCUFF PLATE

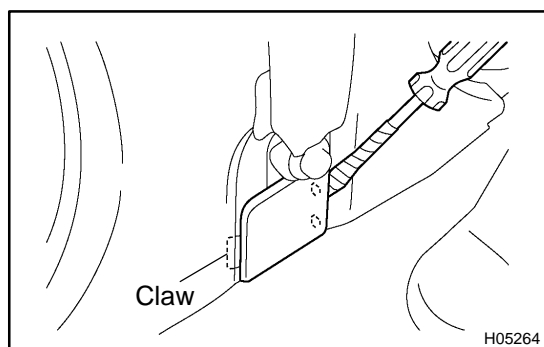
## SEAT BELT PRETENSIONER REMOVAL

BO21G-03

### NOTICE:

- ▶ If the wiring connector of the seat belt pretensioner is disconnected with the ignition switch at ON or ACC, diagnostic trouble codes will be recorded.
- ▶ Never use seat belt pretensioner from another vehicle. When replacing seat belt pretensioner, replace it with a new one.

1. REMOVE FRONT DOOR SCUFF PLATE
2. REMOVE FRONT DOOR OPENING TRIM
3. REMOVE REAR DOOR SCUFF PLATE
4. REMOVE REAR DOOR OPENING TRIM

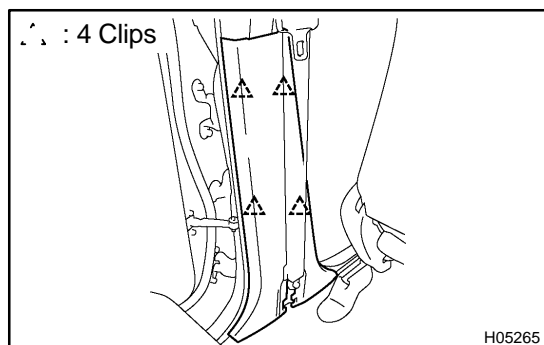


### 5. REMOVE CENTER PILLAR LOWER GARNISH

- (a) Using a screwdriver, remove the center pillar garnish cover.

#### HINT:

Tape the screwdriver tip before use.



- (b) Using a screwdriver, remove the center pillar lower garnish as shown in the illustration.

#### HINT:

Tape the screwdriver tip before use.

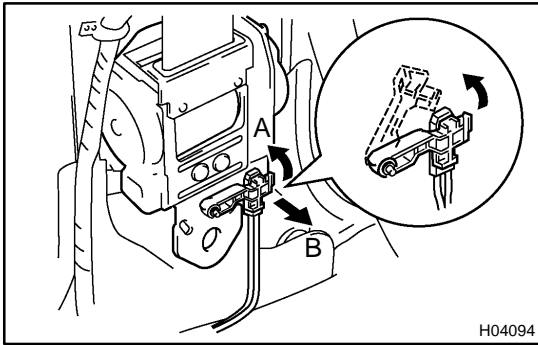
6. REMOVE FRONT SEAT OUTER BELT SHOULDER ANCHOR
7. REMOVE FRONT SEAT OUTER BELT FLOOR ANCHOR
8. REMOVE RETRACTOR OF FRONT SEAT OUTER BELT

### CAUTION:

Never disassemble the retractor of front seat outer belt.

### NOTICE:

When removing the retractor of front seat outer belt, take care not to pull the seat belt pretensioner wire harness.



- (a) Disconnect the pretensioner connector in the order "A" and "B" as shown in the illustration.

**CAUTION:**

**When removing the seat belt pretensioner, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.**

- (b) Remove the bolt and retractor of front seat outer belt.

## REPLACEMENT

### REPLACE REQUIREMENTS

In the following cases, replace the seat belt pretensioner.

- ▶ If the seat belt pretensioner has been activated.
- ▶ If the seat belt pretensioner has been found to be faulty in troubleshooting.
- ▶ If the front seat outer belt has been found to be faulty during the check of items 1-(b) or 2-(b).
- ▶ If the front seat outer belt has been dropped.

### CAUTION:

**For removal and installation of the seat belt pretensioner, see page [BO-141](#) and [BO-150](#) .**

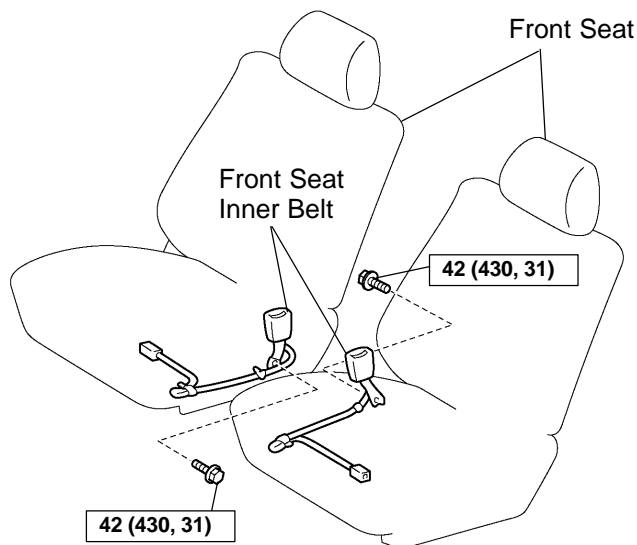
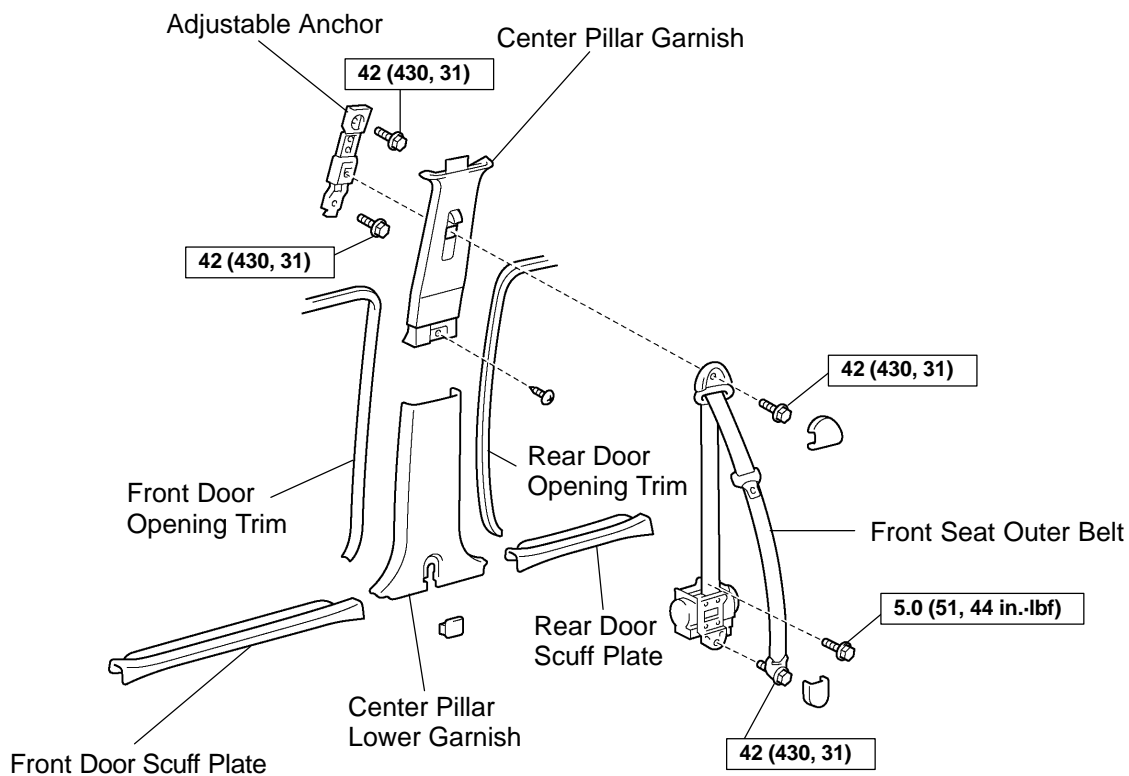
**Be sure to follow the correct procedure.**



# SEAT BELT COMPONENTS

BO1KY-04

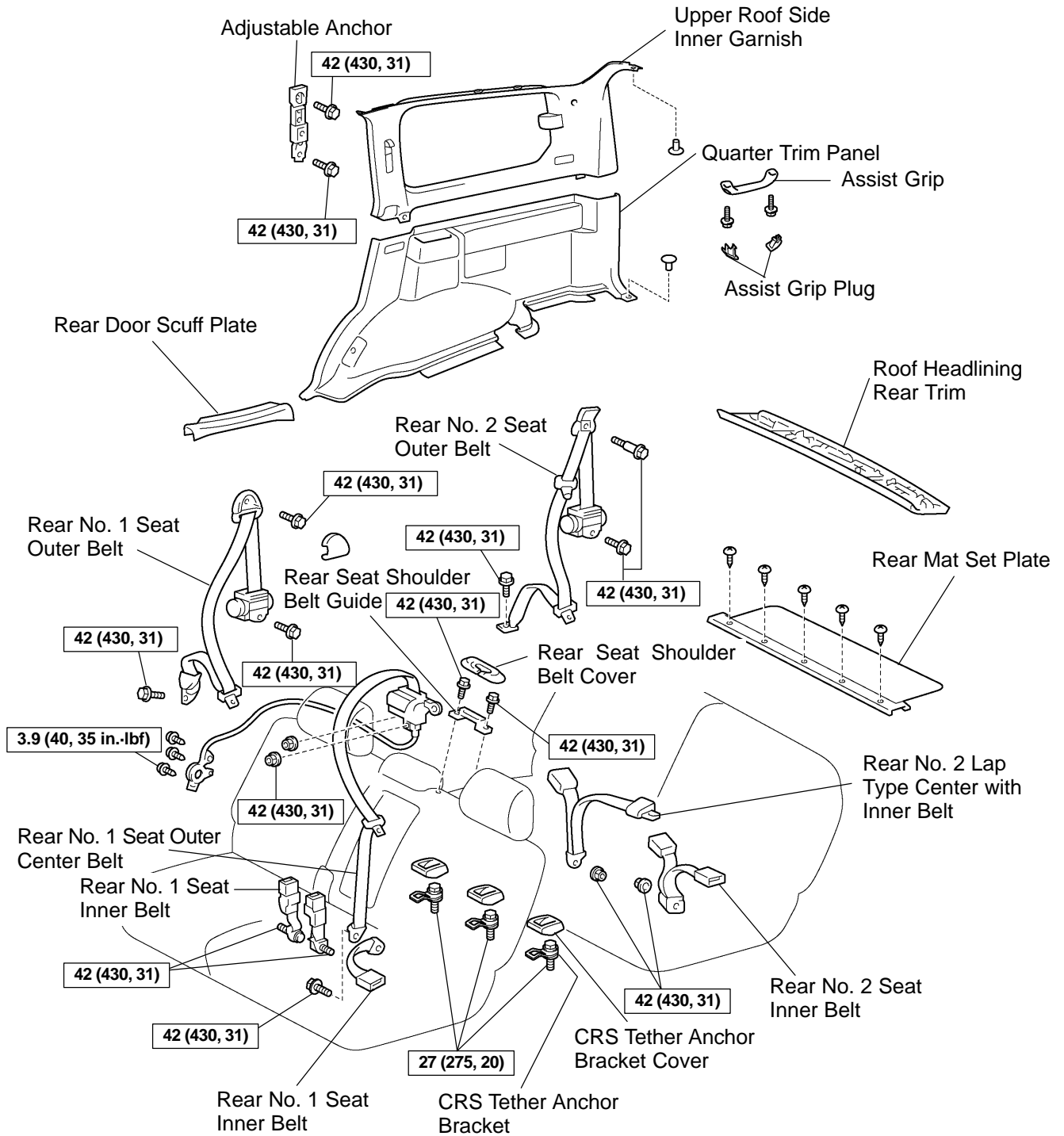
## Front Seat Belt:



C N·m (kgf·cm, ft·lbf) : Specified torque

H18930

Rear Seat Belt:



N·m (kgf·cm, ft·lbf) : Specified torque

H18931

## INSPECTION

### CAUTION:

Replace the seat belt assembly (outer belt, inner belt, bolts, nuts or sill-bar) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

#### 1. Except manual type:

##### RUNNING TEST (IN SAFE AREA)

- (a) Fasten the front seat belts.
- (b) Drive the car at 10 mph (16 km/h) and slam on the brakes. Check that the belt locks and cannot be extended at this time.

#### HINT:

Conduct this test in a safe area. If the belt does not lock, remove the belt mechanism assembly and conduct the following static check. Also, whenever installing a new belt assembly.

#### 2. Driver's seat belt (ELR):

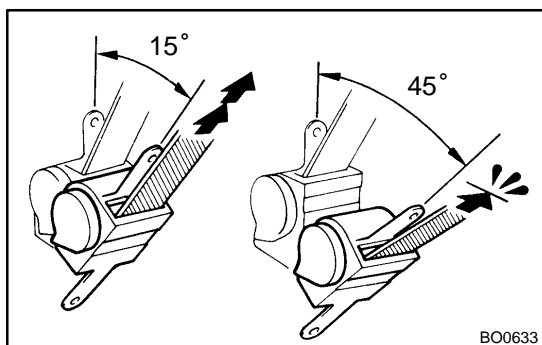
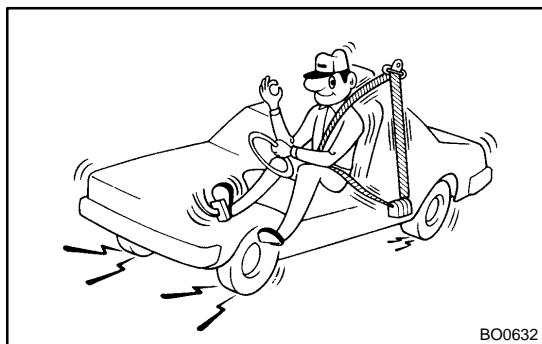
##### STATIC TEST

- (a) Make sure that the belt locks when pulled out quickly.
- (b) Remove the locking retractor assembly.

#### HINT:

Before removing the pretensioner connector, be sure to read the precautionary notice in the RS section.

- (c) Tilt the retractor slowly.



- (d) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out over 45 degrees of tilt.

If a problem is found, replace the assembly.

#### 3. Except driver's seat belt (ELR/ALR):

##### STATIC TEST

- (a) Make sure that the belt locks when pulled out quickly.
- (b) Remove the locking retractor assembly.

#### HINT:

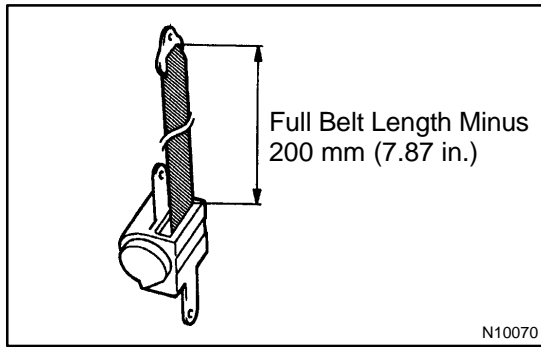
Before removing the pretensioner connector, be sure to read the precautionary notice in the RS section.

- (c) Pull out the whole belt and measure the length of the whole belt.

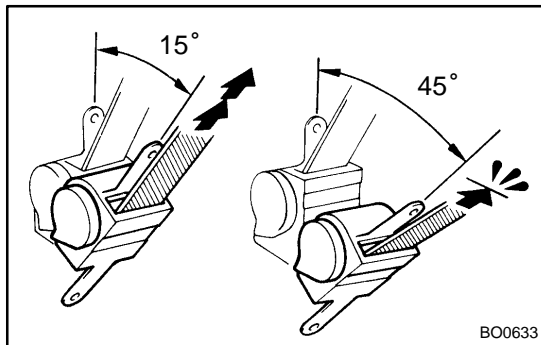
Then retract the belt slightly and pull it out again

- (d) Make sure that the belt cannot be extended further.

If a problem is found, replace the assembly.

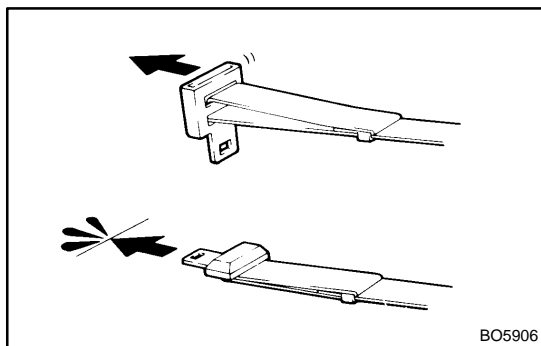


- (e) Retract the whole belt, then pull out the belt until 200 mm (7.87 in.) of the belt remaining in the retractor.
- (f) Tilt the retractor slowly.



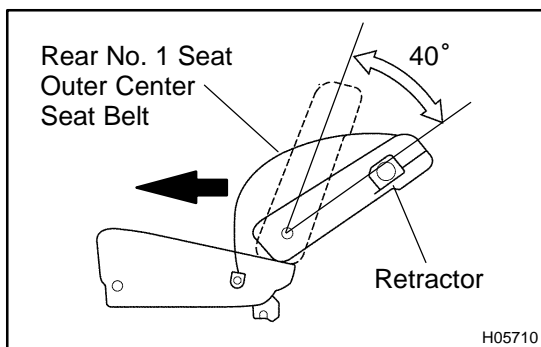
- (g) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out at over 45 degrees of tilt.

If a problem is found, replace the assembly.



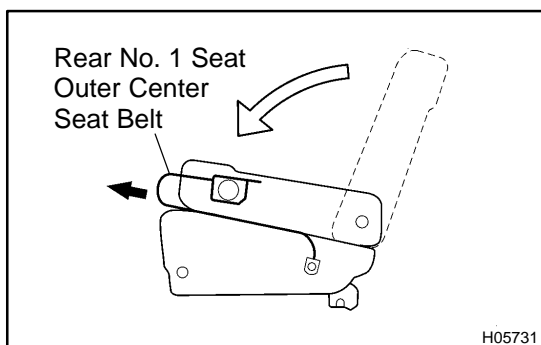
**4. Manual type:  
TESTING**

- (a) Adjust the belt to the proper length.
- (b) Apply a firm load to the belt.
- (c) Make sure that the belt does not extend.



**5. INSPECT REAR NO. 1 SEAT CENTER BELT**

- (a) After pulling out 300 mm (11.81 in.) of the seat belt, check that the belt is locked when pulled out quickly.
- (b) Check that the belt can be pulled out 300 mm (11.81 in.) without being locked when the seat is reclined as shown in the illustration.
- (c) Check that the belt is locked when the belt is pulled out by a certain amount under (a) condition.

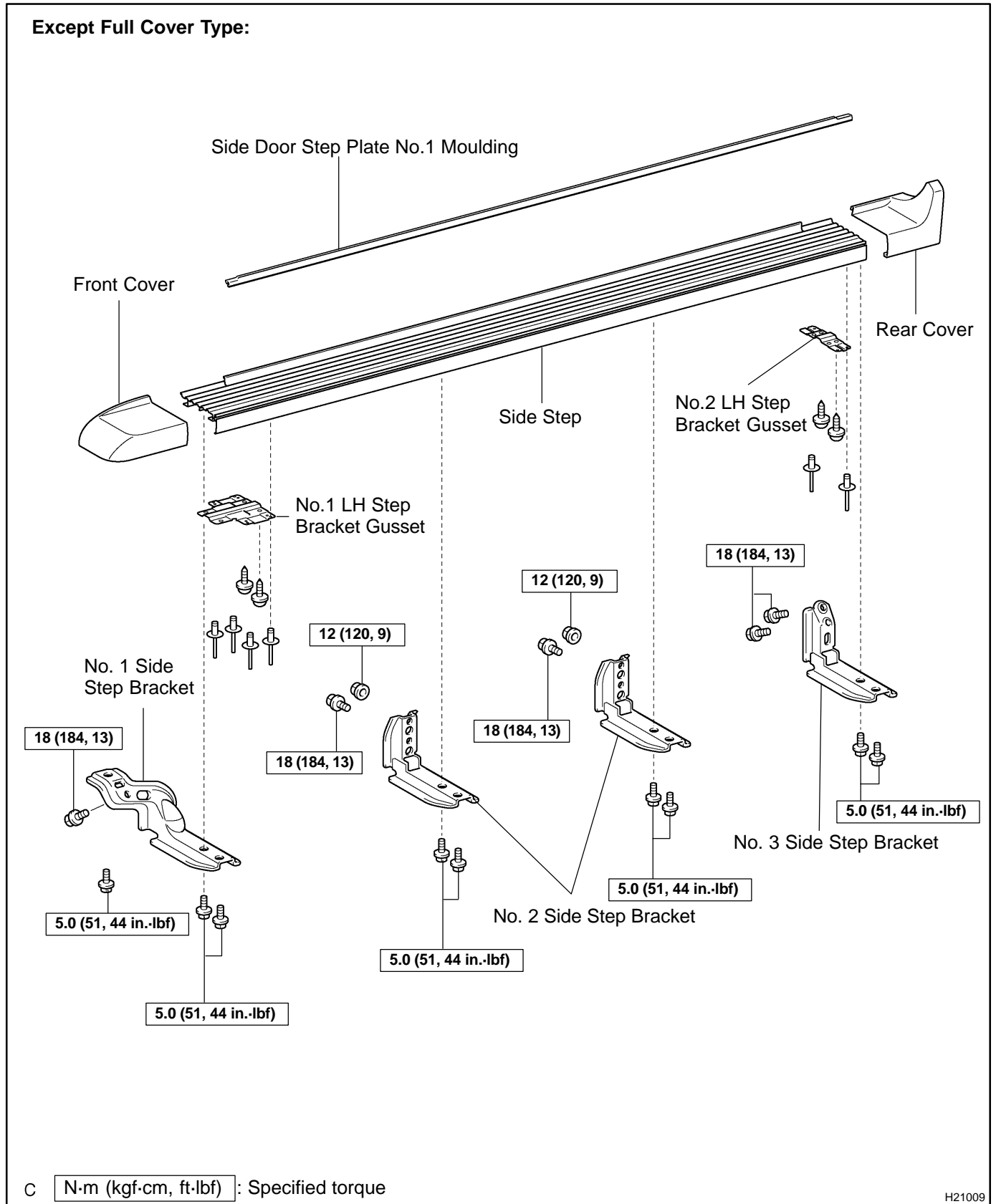


- (d) When folding down the seatback forward and extracting the seat belt slowly, check that the belt is locked after a certain length (approx. 500 mm (19.69 in.)) of the belt has been extracted.

# SIDE STEP COMPONENTS

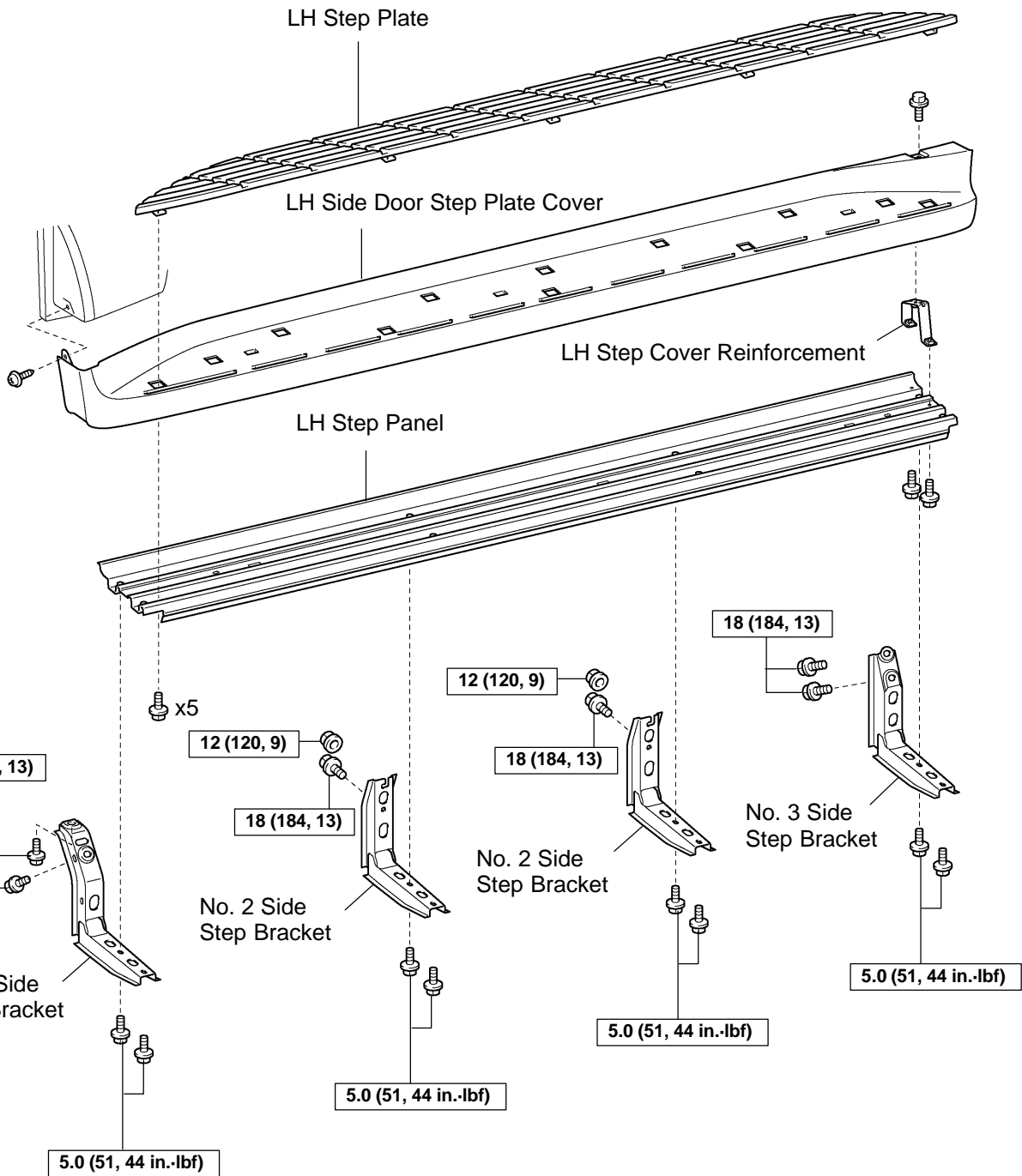
BO4J0-01

Except Full Cover Type:



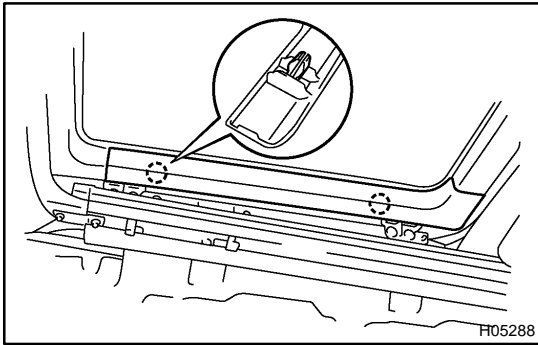
H21009

Full Cover Type:



C N·m (kgf·cm, ft·lbf) : Specified torque

H21008



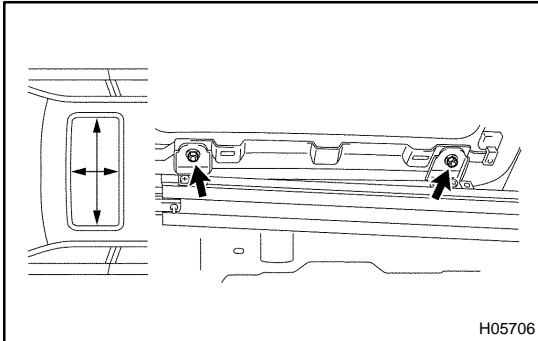
## ADJUSTMENT

### 1. REMOVE SIDE GARNISH

Before making adjustment, using a screwdriver, remove the side garnishes.

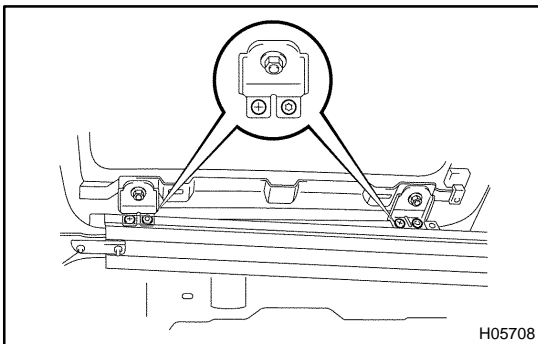
HINT:

- ▶ Tape the screwdriver tip before use.
- ▶ After adjustment, reinstall the side garnishes.



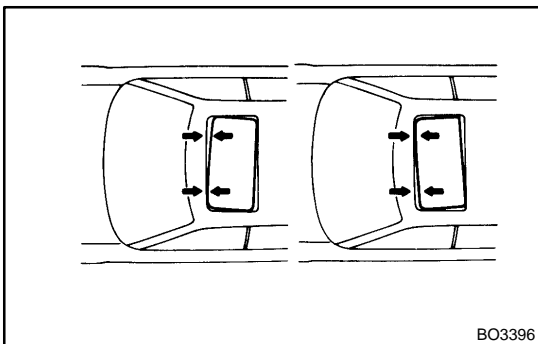
### 2. ADJUST SLIDING ROOF GLASS IN FORWARD/REARWARD AND LEFT/RIGHT DIRECTIONS

- (a) Loosen the sliding roof glass installation nuts.
- (b) Adjust the sliding roof glass forward/rearward or left/right.



### 3. ADJUST SLIDING ROOF GLASS IN UPWARD OR DOWNWARD DIRECTIONS

- (a) Loosen the screws shown in the illustration.
- (b) Adjust the sliding roof glass upward or downward.

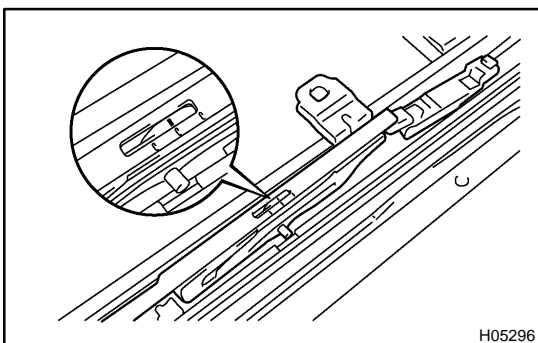


### 4. ADJUST SLIDING ROOF GLASS IN CLEARANCE (Difference in left and right clearance)

- (a) When the front or rear alignment is not correct, remove the drive gear and sliding roof glass, then adjust the drive cables.

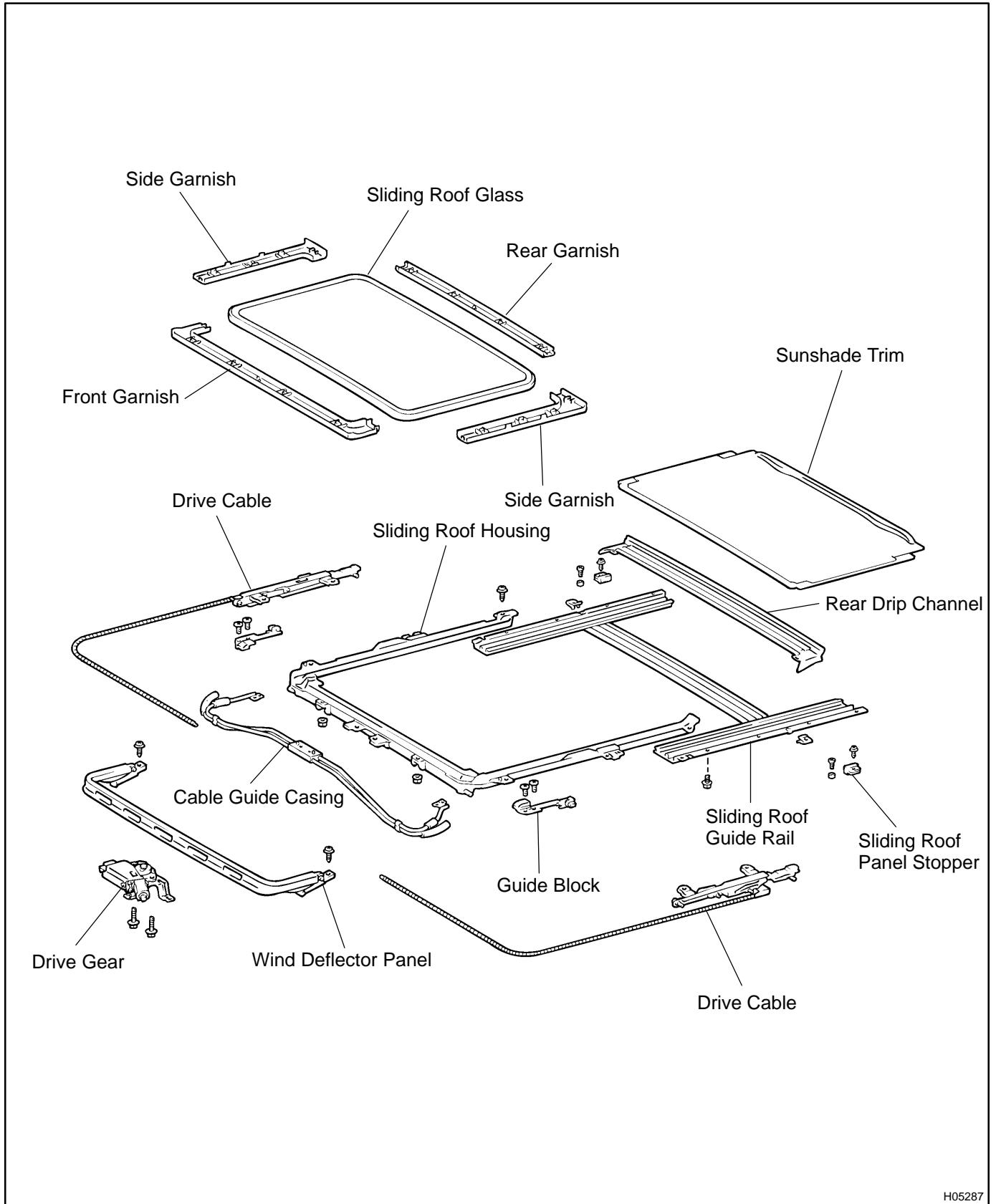
**NOTICE:**

**Remove the drive gear with the sliding roof fully closed.**



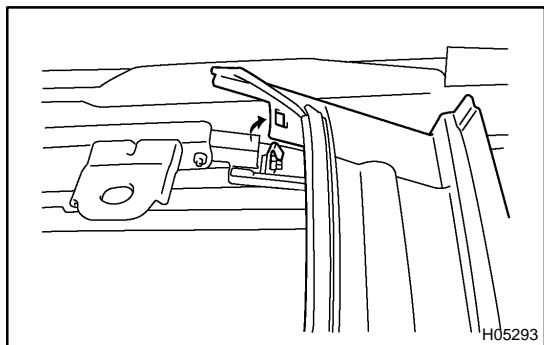
- (b) Adjust by sliding the cables forward or rearward to align the 2 marks as shown.
- (c) Install the drive gear and sliding roof glass.

# COMPONENTS



H05287





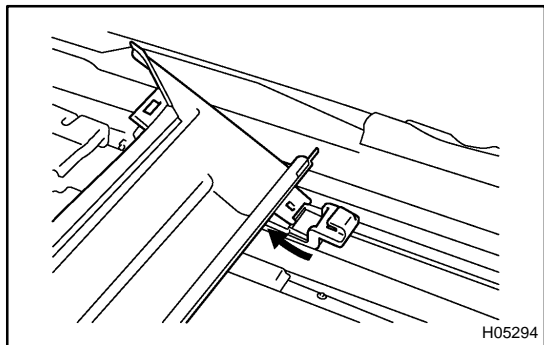
## DISASSEMBLY

### 1. REMOVE REAR DRIP CHANNEL

- (a) Using a screwdriver, remove the front side of rear drip channel.

HINT:

Tape the screwdriver tip before use.

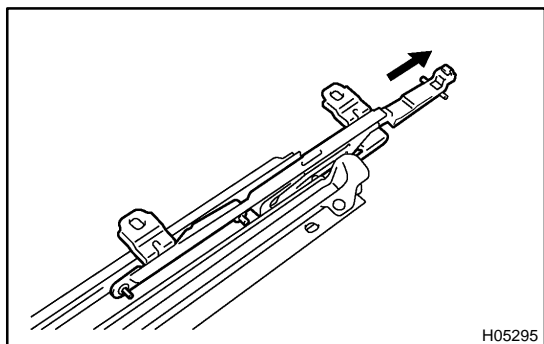


- (b) Remove the rear drip channel as shown in the illustration.

### 2. REMOVE SLIDING ROOF PANEL STOPPERS

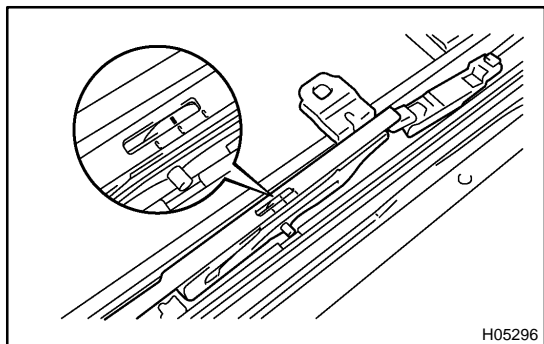
Remove the 2 screws and 2 stoppers.

### 3. REMOVE SUNSHADE TRIM



### 4. REMOVE DRIVE CABLE

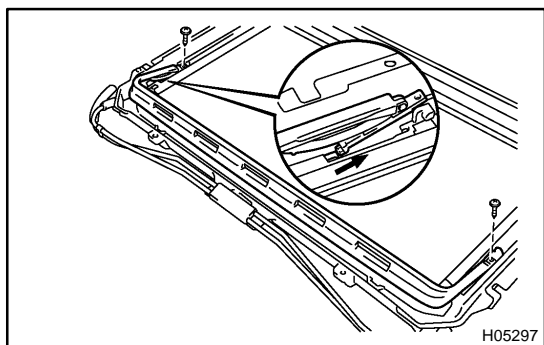
- (a) Remove the screw and guide rail stopper.  
 (b) Slide the drive cable rearward, then remove it.



HINT:

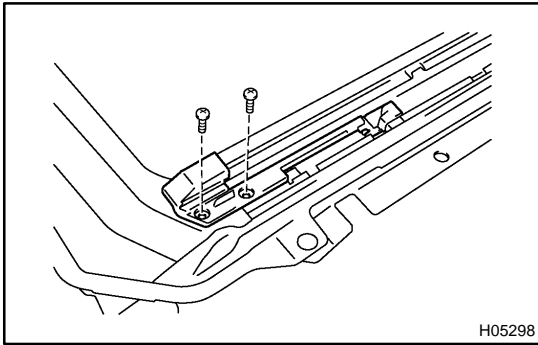
At the time of reassembly, please refer to the following items.

- ▶ Adjust the drive cable to a closed and tilted down position.
  - ▶ Slide the cable forward or backward to align the 2 marks as shown.
  - ▶ Slide the cable to the forefront with your hand.
- (c) Employ the same manner described above to the other side.

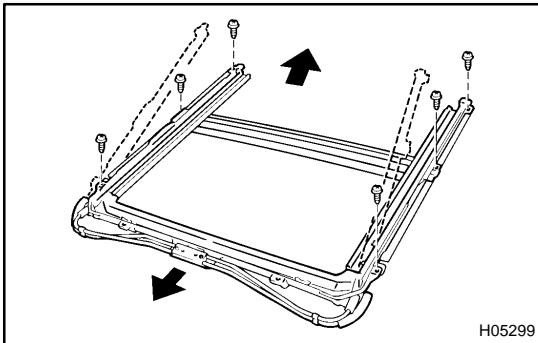


### 5. REMOVE WIND DEFLECTOR PANEL

Remove the 2 screws and wind deflector panel as shown in the illustration.

**6. REMOVE GUIDE BLOCK**

- (a) Remove the 2 screws and guide block.
- (b) Employ the same manner described above to the other side.

**7. REMOVE SLIDING ROOF HOUSING**

Remove the 6 screws and sliding roof housing.

**8. REMOVE CABLE GUIDE CASING**

## INSTALLATION

Installation is in the reverse order of removal (See page [BO-74](#) ).

## SLIDING ROOF ON-VEHICLE INSPECTION

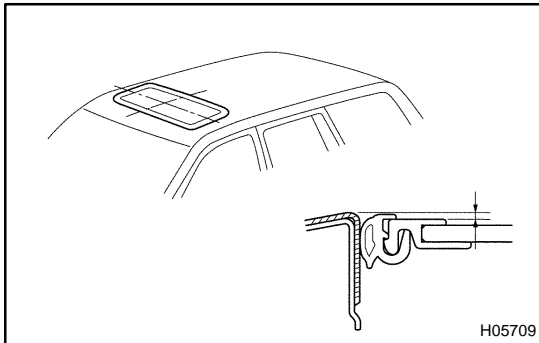
### 1. INSPECT SLIDING ROOF GLASS

- (a) Start the engine and check the operation time of the sliding roof.

**Operation time:**

**Approx. 6 secs.**

- (b) Check for abnormal noise or binding during operation.  
(c) With the sliding roof fully closed, check for water leakage.



### 2. INSPECT DIFFERENCE IN LEVEL

Inspect the difference in level between the roof panel and sliding roof glass (weatherstrip part) when the sliding roof glass is fully closed.

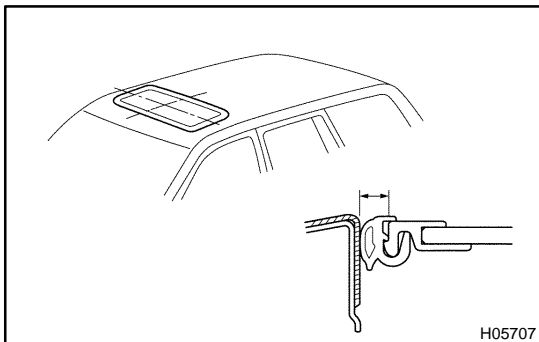
**Except rear end:**

**0 + 1.5 mm (0 + 0.059 in.)**

**0 - 1.0 mm (0 - 0.039 in.)**

**Rear end:**

**0 ± 1.5 mm (0 ± 0.059 in.)**



### 3. INSPECT SLIDING ROOF GLASS CLEARANCE

Inspect the clearance between the roof panel and sliding roof glass when the sliding roof is fully closed.

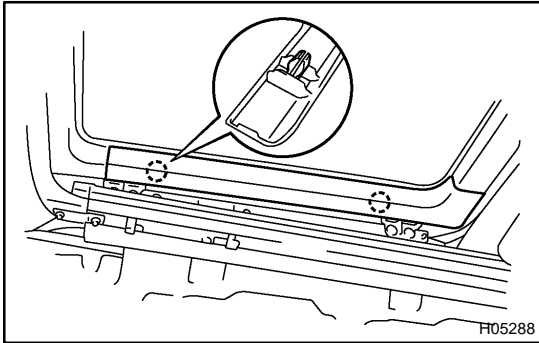
**Clearance: Uniform all around**

## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-76](#)).

## REMOVAL

### 1. REMOVE ROOF HEADLINING (See page [BO-97](#))



### 2. REMOVE SIDE GARNISH

- (a) Using a screwdriver, remove the garnish.

HINT:

Tape the screwdriver tip before use.

- (b) Employ the same manner described above to the other side.

### 3. REMOVE FRONT AND REAR GARNISHES

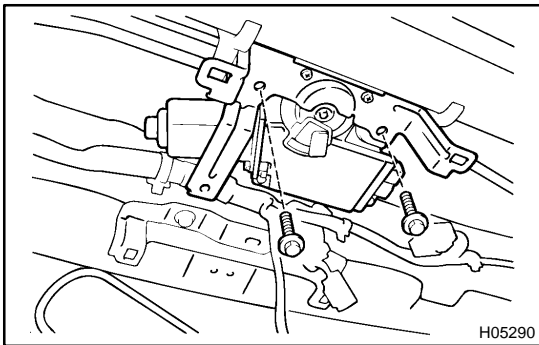
Using a screwdriver, remove the front and rear garnishes.

HINT:

Tape the screwdriver tip before use.

### 4. REMOVE SLIDING ROOF GLASS

- (a) Remove the 4 nuts.  
 (b) Pull the glass upward to remove it.

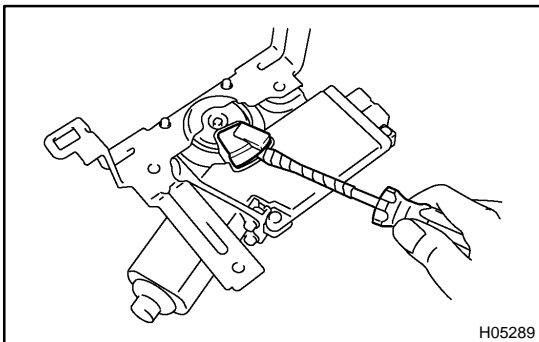


### 5. REMOVE DRIVE GEAR

**NOTICE:**

**Remove the drive gear with the sliding roof fully closed.**

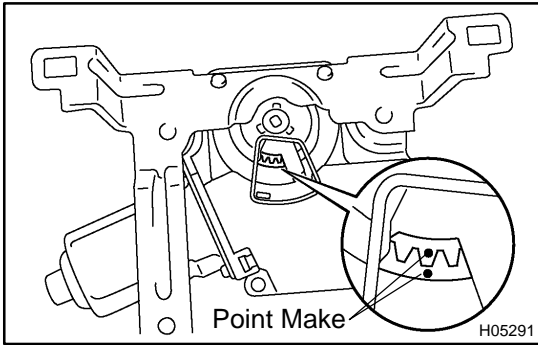
- (a) Disconnect the connector.  
 (b) Remove the 2 bolts and drive gear.



- (c) Using a screwdriver, remove the cam plate cover.

HINT:

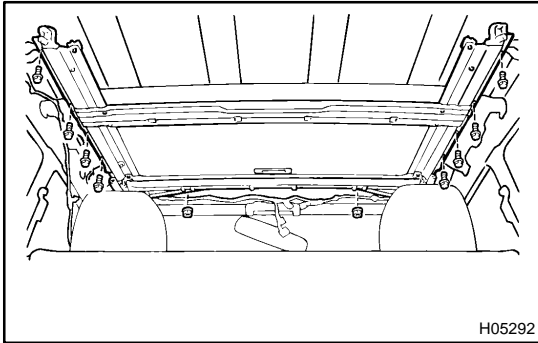
Tape the screwdriver tip before use.



- (d) Turn the drive gear to align the point marks as shown in the illustration.
- (e) Install the cam plate cover.

**NOTICE:**

**At the time of installation, please refer to the following item. If the sliding roof position and drive gear fully closed position are not matched, the sliding roof does not operate normally.**

**6. REMOVE SLIDING ROOF HOUSING**

- (a) Remove the 4 drain hoses from the housing.
- (b) Disengage the room light wire harness clamps.
- (c) Remove the 8 bolts, 2 nuts and sliding roof housing.

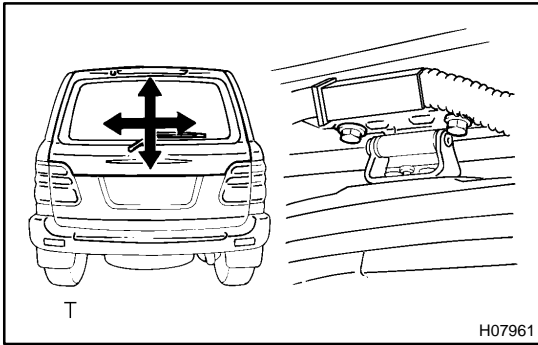
# SRS AIRBAG

BOORW-09

## PRECAUTION

The LAND CRUISER is equipped with SRS (Supplemental Restraint System) such as the driver airbag and the front passenger airbag. (The side airbag and the curtain shield airbag are optional.) Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during the servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.



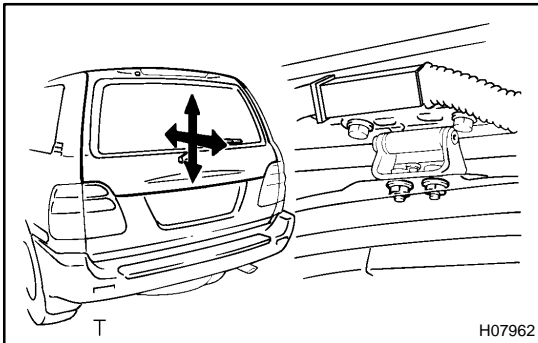


## ADJUSTMENT

### 1. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

Loosen the door side hinge bolts to adjust.

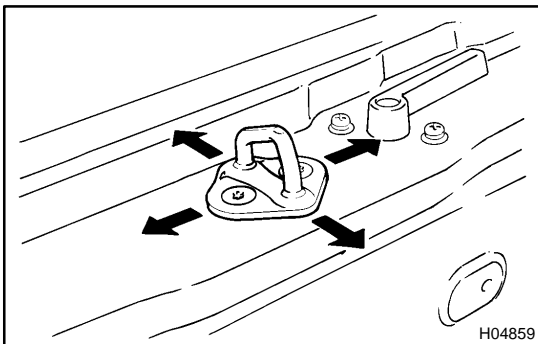
**Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)**



### 2. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

Loosen the body side hinge nuts to adjust.

**Torque: 31 N·m (316 kgf·cm, 23 ft·lbf)**



### 3. ADJUST DOOR LOCK STRIKER

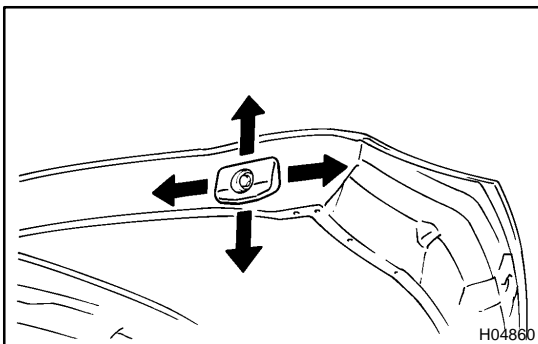
(a) Check that the door fit and door linkages are adjusted correctly.

(b) Using a torx wrench, loosen the door lock striker mounting screws.

**Torx wrench: T40 (Part No. 09042-00020 or locally manufactured tool)**

**Torque: 11.5 N·m (117 kgf·cm, 8 ft·lbf)**

(c) Using a plastic hammer, tap the door lock striker to adjust.



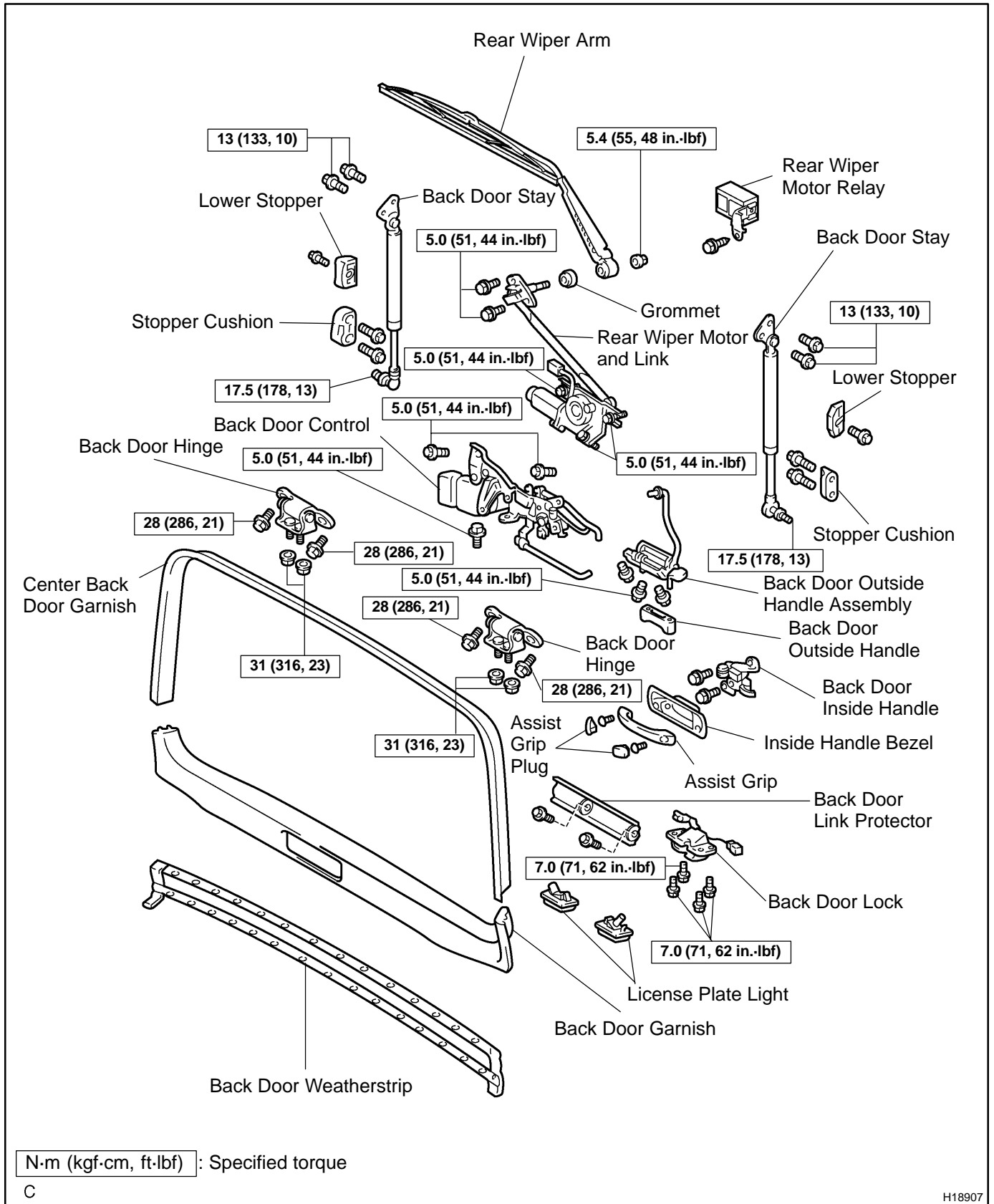
### 4. ADJUST LOWER STOPPER

(a) Loosen the stopper mounting bolt to adjust.

(b) Use the same manner described above to the other side.

# UPPER BACK DOOR COMPONENTS

BO1JI-04



H18907

## DISASSEMBLY

### 1. REMOVE ASSIST GRIP

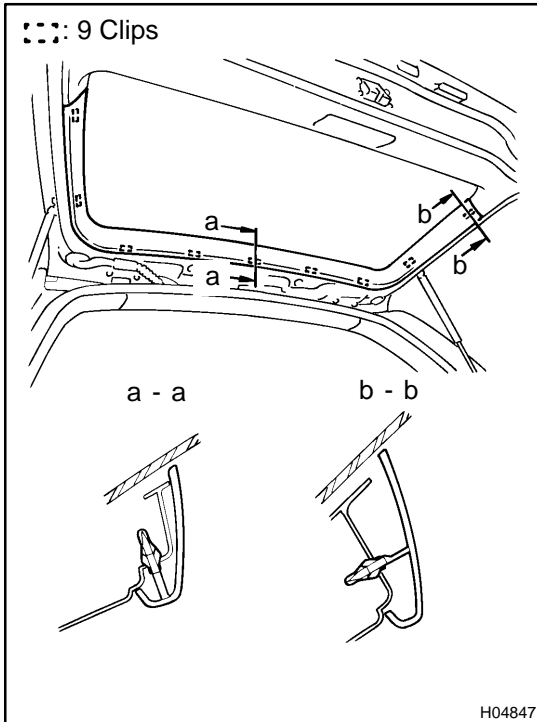
(a) Using a screwdriver, remove the 2 assist grip plugs.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 screws and assist grip.

### 2. REMOVE INSIDE HANDLE BEZEL

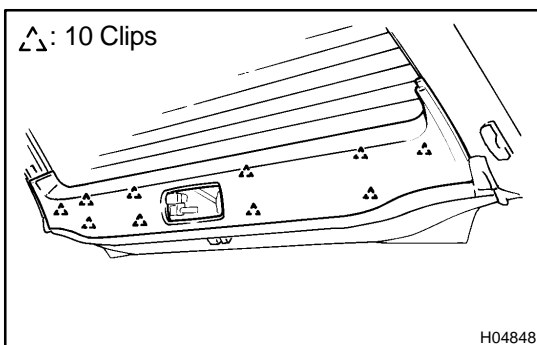


### 3. REMOVE CENTER BACK DOOR GARNISH

Using a screwdriver, remove the center back door garnish.

HINT:

Tape up the screwdriver tip before use.

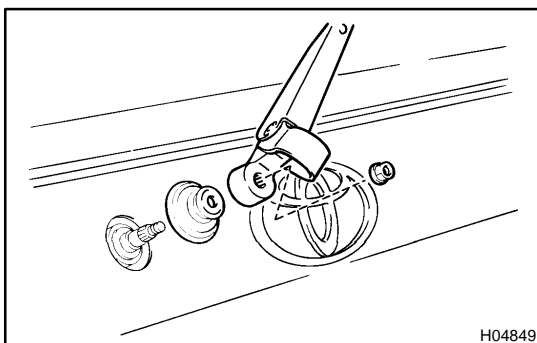


### 4. REMOVE BACK DOOR GARNISH

Using a screwdriver, remove the back door garnish.

HINT:

Tape up the screwdriver tip before use.



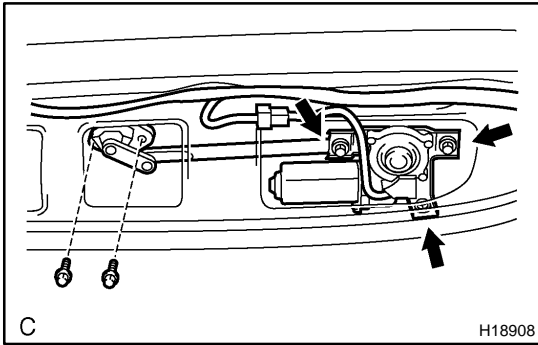
### 5. REMOVE REAR WIPER ARM

(a) Open the cover.

(b) Remove the nut and rear wiper arm.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

(c) Remove the grommet.



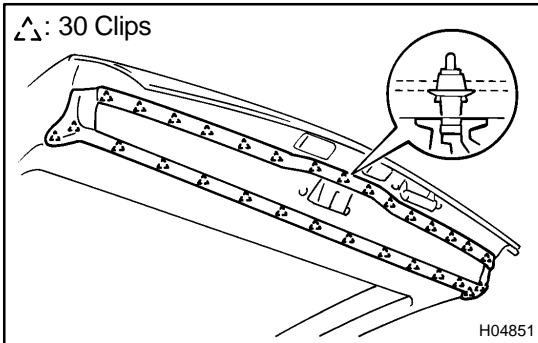
## 6. REMOVE REAR WIPER MOTOR AND LINK ASSEMBLY

- (a) Disconnect the connector.
- (b) Remove the 2 bolts.
- (c) Unfasten the 3 bolts and remove the rear wiper motor and link assembly.

**Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)**

## 7. REMOVE REAR WIPER MOTOR RELAY

Remove the bolt and rear wiper motor relay.

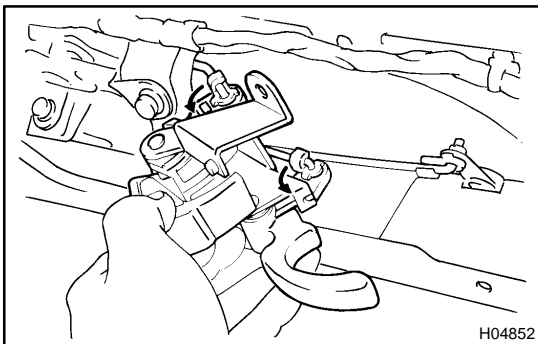


## 8. REMOVE BACK DOOR WEATHERSTRIP

Remove the back door weatherstrip.

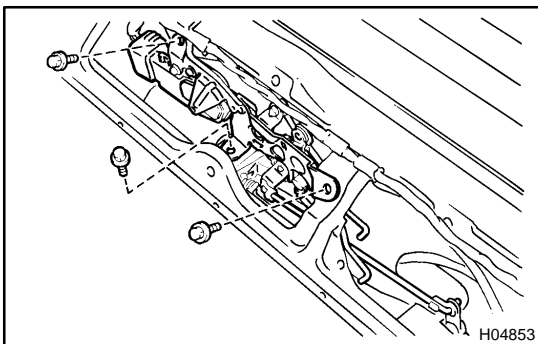
### NOTICE:

**Do not pull strongly on the weatherstrip as it may tear.**



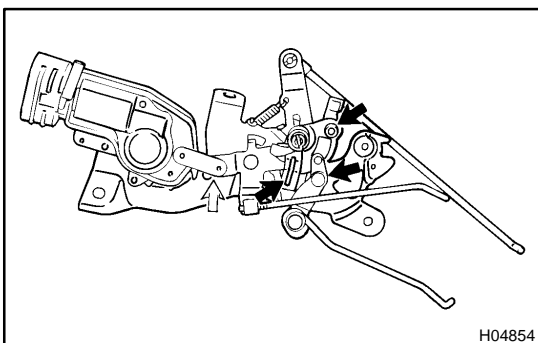
## 9. REMOVE BACK DOOR INSIDE HANDLE

- (a) Remove the 2 bolts.
- (b) Disconnect the back door lock locking rod and back door lock inside opening link, then remove the back door inside handle.



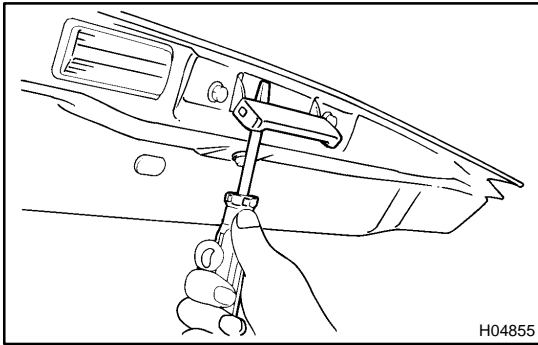
## 10. REMOVE BACK DOOR CONTROL

- (a) Disconnect the links.
  - (b) Remove the 3 bolts.
- Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)**
- (c) Disconnect the connector, then remove the back door control.



### HINT:

At the time of reassembly, please refer to the following item.  
Apply MP grease to the sliding surface of the back door control.

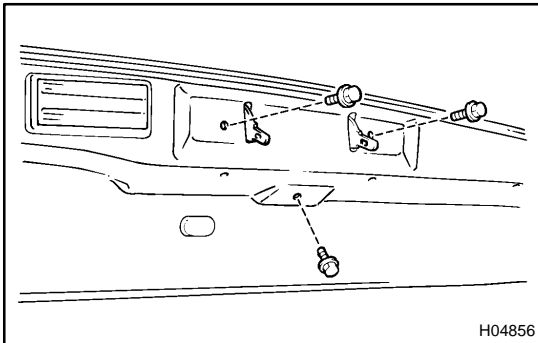


**11. REMOVE BACK DOOR OUTSIDE HANDLE ASSEMBLY**

- (a) Using a screwdriver, remove the back door outside handle.

**HINT:**

Tape up the screwdriver tip before use.



- (b) Remove the 3 bolts and back door outside handle assembly.

**Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)**

**12. REMOVE LICENSE PLATE LIGHTS**

**13. REMOVE BACK DOOR LOCK**

Remove the 4 bolts and back door lock.

**Torque: 7.0 N·m (71 ft.-lbf, 62 in.-lbf)**

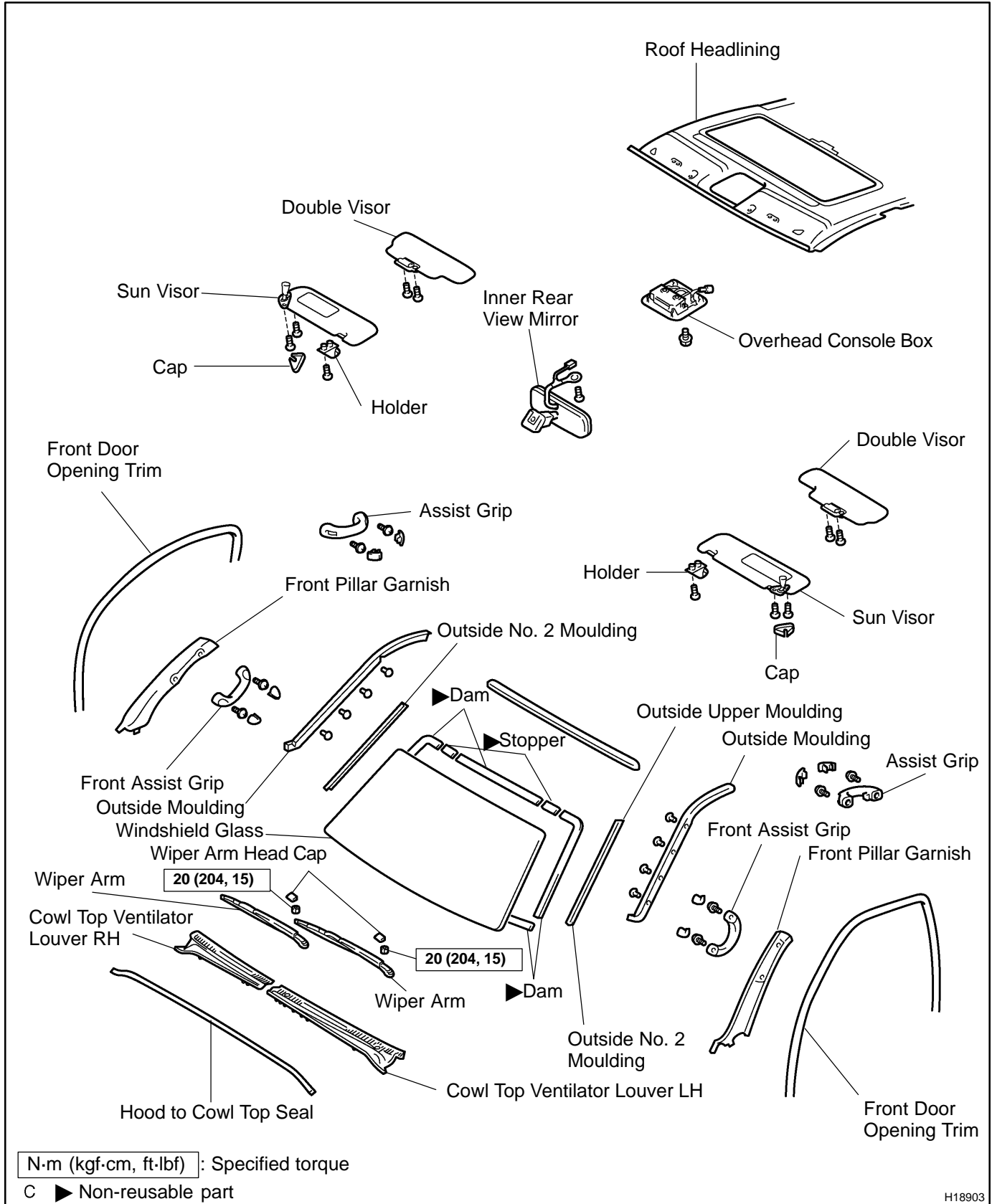
**14. REMOVE BACK DOOR LINK PROTECTOR**

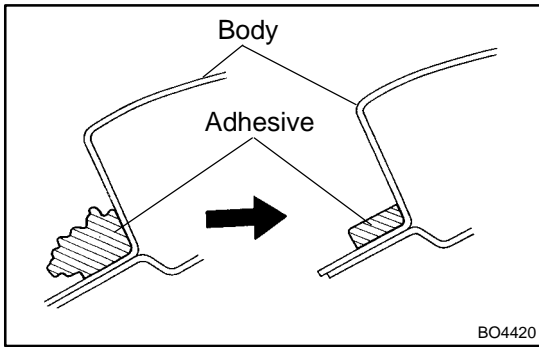
## REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-21](#) ).

# WINDSHIELD COMPONENTS

BO1K7-04



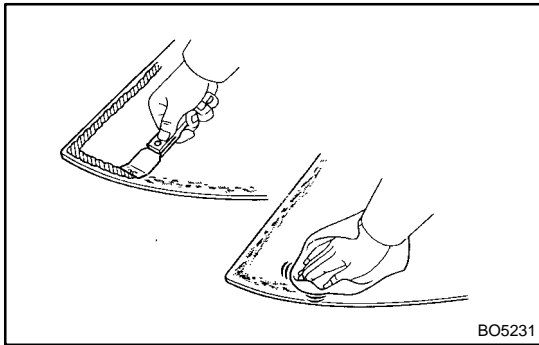


**INSTALLATION**

1. **CLEAN AND SHAPE CONTACT SURFACE OF BODY**
  - (a) Using a knife, cut away any rough areas on the body.

HINT:  
Leave as much adhesive on the body as possible.

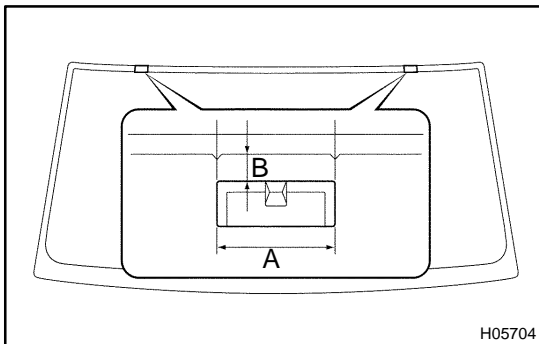
  - (b) Clean the cutting surface of the adhesive with a piece of shop rag dampen with cleanser.



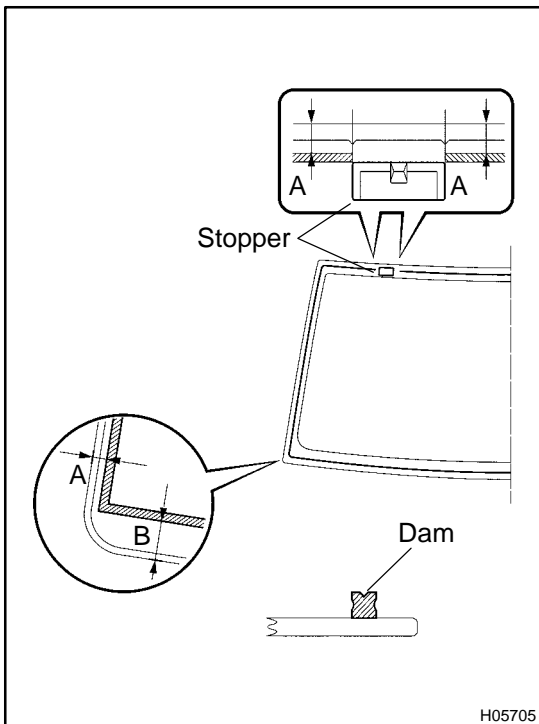
2. **CLEAN REMOVED GLASS**
  - (a) Remove the damaged stoppers and dams.
  - (b) Using a scraper, remove the adhesive sticking to the glass.
  - (c) Clean the glass with cleanser.

**NOTICE:**

- ▶ Do not touch the glass surface after cleaning it.
- ▶ Be careful not to damage the glass.



3. **INSTALL NEW STOPPERS**  
Install new stoppers onto the glass.  
**A: 9 mm (0.35 in.)**  
**B: 25 mm (0.98 in.)**

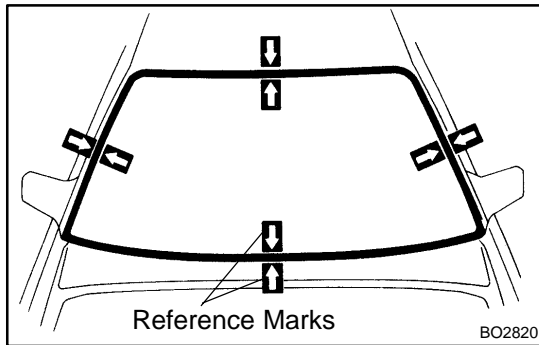


4. **INSTALL NEW DAMS**  
Install new dams with adhesive tape as shown in the illustration.  
**A: 7 mm (0.28 in.)**  
**B: 20 mm (0.79 in.)**

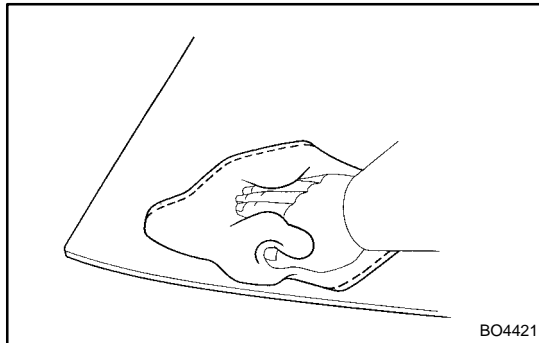
**NOTICE:**

Do not touch the glass surface after cleaning it.



**5. POSITION GLASS**

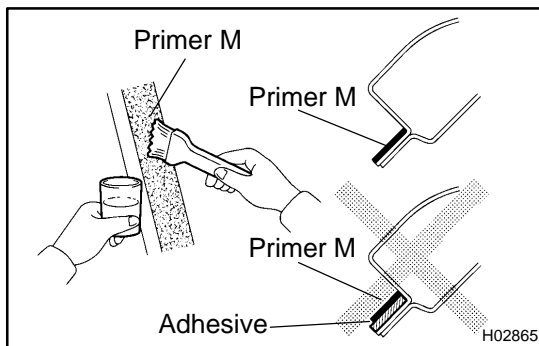
- (a) Place the glass in the correct position.
- (b) Check that all contacting parts of the glass rim are perfectly even.
- (c) Place reference marks between the glass and the body.
- (d) Remove the glass.

**6. CLEAN CONTACT SURFACE OF GLASS**

Using cleanser, clean the contact surface which is black-colored area around the entire glass rim.

**NOTICE:**

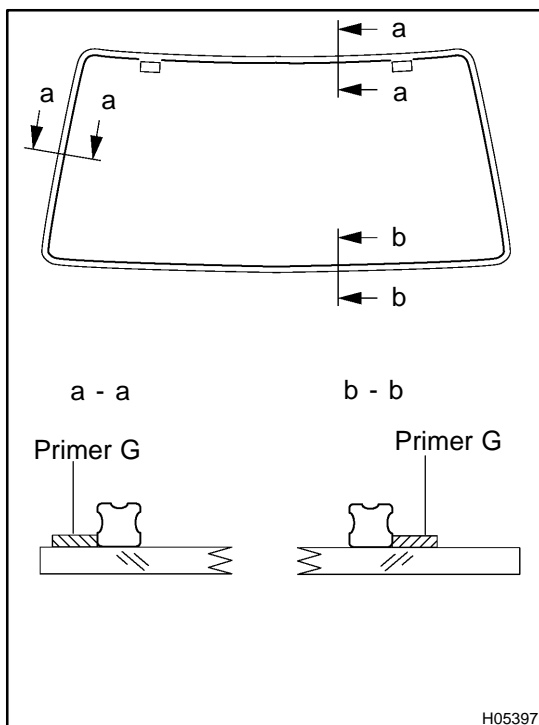
**Do not touch the glass surface after cleaning it.**

**7. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"**

Using a brush, apply Primer M to the exposed part of the body on the vehicle side.

**NOTICE:**

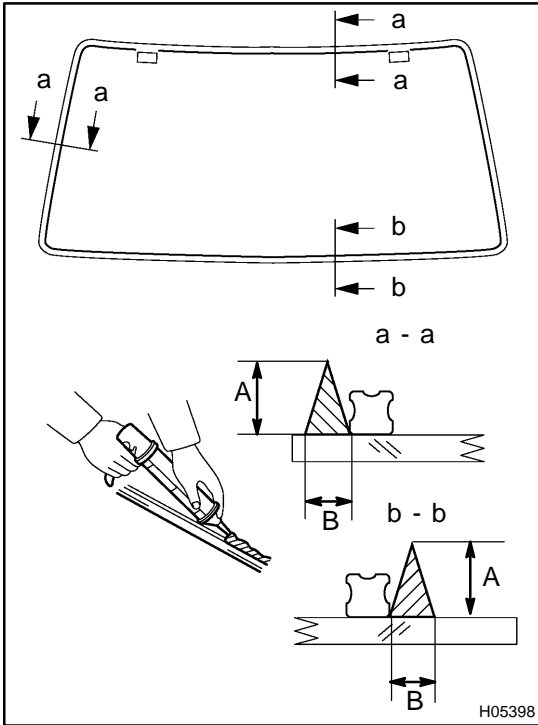
- ▶ Let the primer coating dry for more than 3 minutes.
- ▶ Do not coat Primer M to the adhesive.
- ▶ Do not keep remaining Primer M for later use.

**8. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"**

- (a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G.
- (b) If the primer is coated wrongly to the area not specified by accident, wipe it off with a clean shop rag before the primer dries.

**NOTICE:**

- ▶ Let the primer coating dry for more than 3 minutes.
- ▶ Do not keep remaining Primer G for later use.



**9. APPLY ADHESIVE**

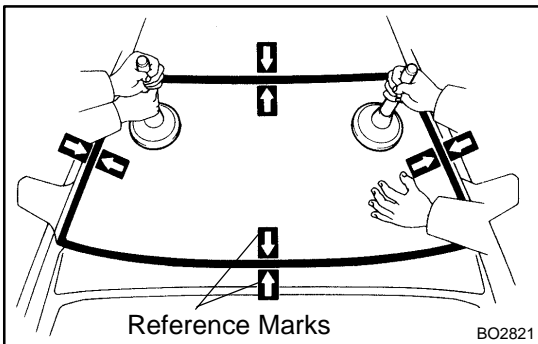
- (a) Cut off the tip of the cartridge nozzle.  
**Part No.08850-00801 or equivalent.**

**HINT:**

After cutting off the tip, finish up all adhesive within the time described in the table below.

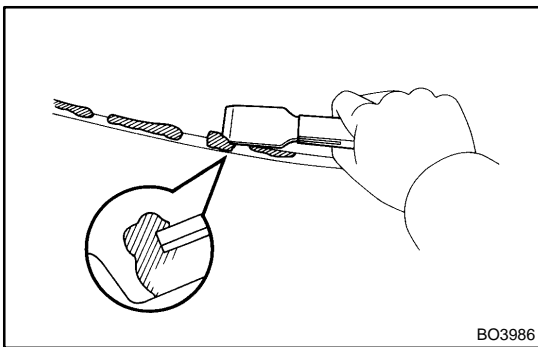
Temperature	Tackfree time
35 °C (95 °F)	15 minutes
20 °C (68 °F)	100 minutes
5 °C (41 °F)	8 hours

- (b) Load the cartridge into the sealer gun.
- (c) Coat the glass with adhesive as shown.  
**A: 12.0 mm (0.472 in.)**  
**B: 8.0 mm (0.315 in.)**

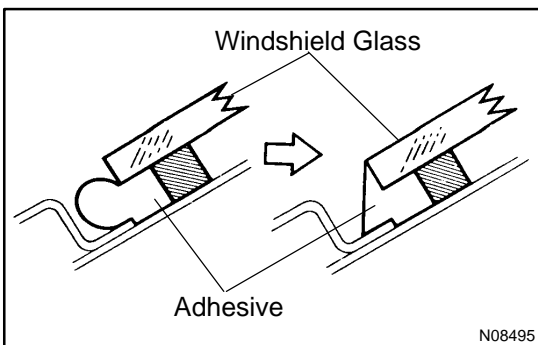


**10. INSTALL WINDSHIELD GLASS**

- (a) Position the glass so that the reference marks are lined up, and press in gently along the rim.
- (b) Using a spatula, apply adhesive on the glass rim.



- (c) Use a scraper to remove any excess or protruding adhesive.



**HINT:**

Make sure the dam is attached to the body panel, as shown in the illustration.

- (d) Hold the windshield glass in place securely with a protective tape or equivalent until the adhesive hardens.

**NOTICE:**

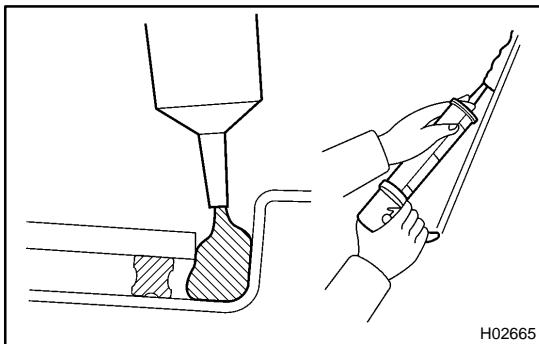
Take care not to drive the vehicle within the time described in the table below.

Temperature	Minimum time prior to driving the vehicle
35 °C (95 °F)	1.5 hours
20 °C (68 °F)	5 hours
5 °C (41 °F)	24 hours

**11. INSPECT FOR LEAK AND REPAIR**

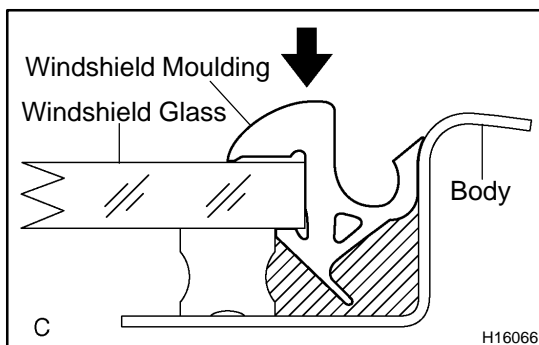
- Conduct a leak test after the adhesive dried completely.
- Seal any leak with sealant.

**Part No. 08833-00030 or equivalent.**

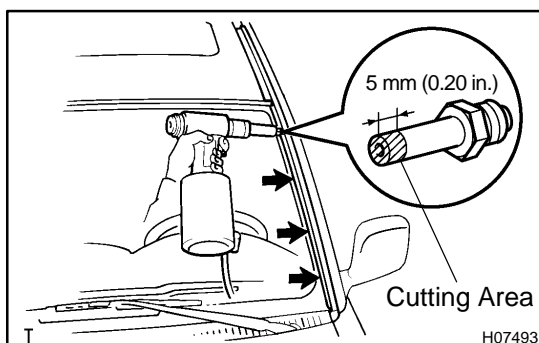
**12. APPLY ADHESIVE TO MOULDING INSTALLATION AREA**

Apply adhesive to the moulding installation area between the glass and the body.

**Part No. 08833-00030 or equivalent.**

**13. INSTALL UPPER OUTSIDE MOULDING**

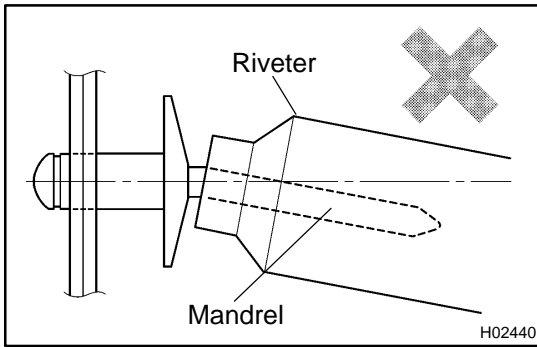
Place a new moulding onto the body and tap it by hand.

**14. INSTALL OUTSIDE NO. 2 MOULDING**

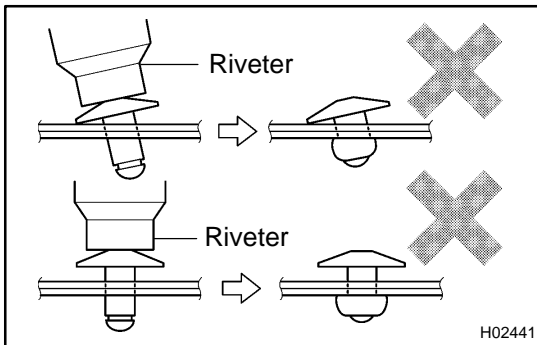
- Using an air riveter with nose piece No. 4, install 4 new rivets and the outside No. 2 moulding.

**HINT:**

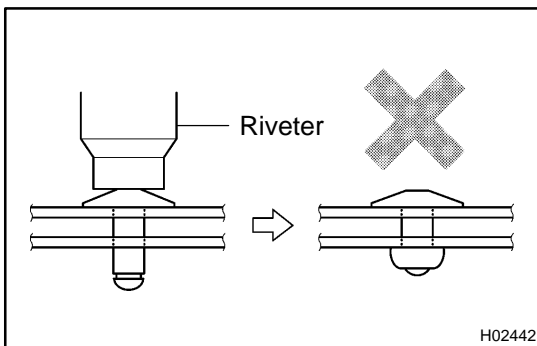
Before using the air riveter with nose piece No. 4, cut 5 mm (0.20 in.) from the edge of nose piece No. 4 as shown in the illustration.

**NOTICE:**

- ▶ Do not prize a riveter. It could damage the riveter and cause loose fitting and mandrel bend.



- ▶ Do not tilt the riveter when fasten the rivet to the material to avoid loose fitting.
- ▶ Do not allow gap spacing between the rivet head and the material.



- ▶ Do not allow gap spacing between the materials.
- (b) Use the same manner described above to the other side.

**15. INSTALL COWL TOP VENTILATOR LOUVERS**

- (a) Install the cowl top ventilator louver LH.
- (b) Install the cowl top ventilator louver RH.

**16. INSTALL HOOD TO COWL TOP SEAL****17. INSTALL WIPER ARMS**

- (a) Operate the wiper motor once and turn the wiper switch OFF.
- (b) Install the wiper arms and tighten the nuts by hand.
- (c) Adjust the installation positions of the wiper arms to the positions as shown in the illustration.

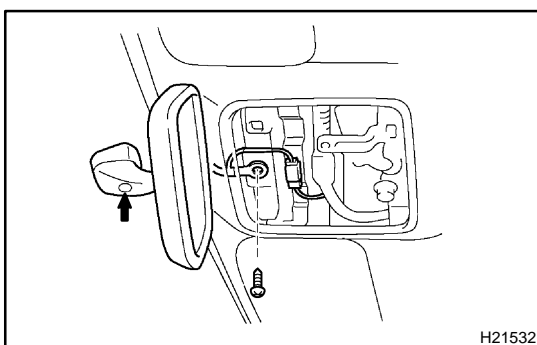
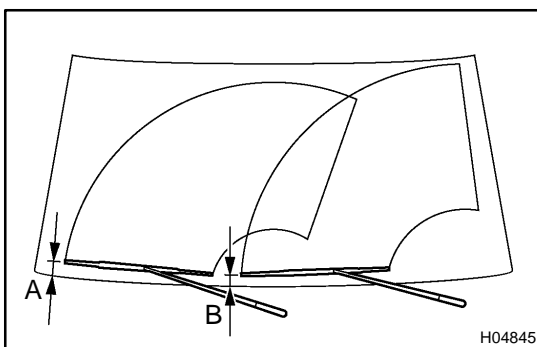
**A: Approx. 33 mm (1.30 in.)**

**B: Approx. 21 mm (0.83 in.)**

- (d) Torque the nuts.

**Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)**

- (e) Install the 2 wiper arm head caps.

**18. INSTALL INNER REAR VIEW MIRROR**

- (a) Install the inner rear view mirror with the 2 screws.
- (b) Connect the connector.

**19. INSTALL FRONT SIDE OF ROOF HEADLINING****20. INSTALL ASSIST GRIPS****21. INSTALL OVERHEAD CONSOLE BOX**

Connect the connector, then install the overhead console box with the bolt.

**22. INSTALL HOLDER**

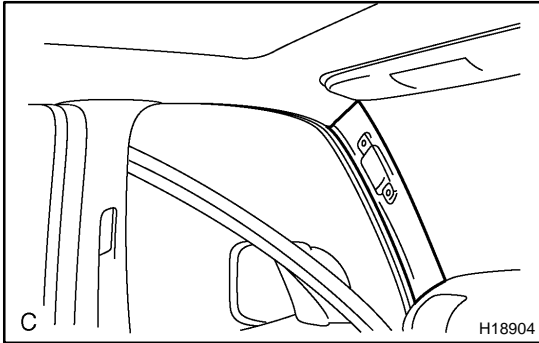
Install the holders with the screws.

**23. INSTALL DOUBLE VISOR**

Install the double visors with the screws.

**24. INSTALL SUN VISOR**

- (a) Install the sun visors with the screws, then connect the connectors.
- (b) Install the caps.

**25. INSTALL FRONT PILLAR GARNISH**

- (a) Install the front pillar garnish.
- (b) Use the same manner described above to the other side.

**26. INSTALL FRONT ASSIST GRIP**

- (a) Install the front assist grip with the 2 screws, then install the 2 assist grip plugs.
- (b) Use the same manner described above to the other side.

**27. INSTALL FRONT DOOR OPENING TRIMS**

## REMOVAL

### 1. REMOVE FRONT DOOR OPENING TRIMS

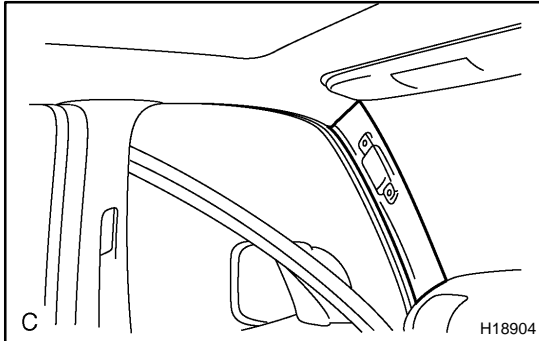
### 2. REMOVE FRONT ASSIST GRIP

- (a) Using a screwdriver, remove the 2 assist grip plugs, then remove the 2 screws and the front assist grip.

#### HINT:

Tape up the screwdriver tip before use.

- (b) Use the same manner described above to the other side.



### 3. REMOVE FRONT PILLAR GARNISH

- (a) Using a screwdriver, remove the front pillar garnish.

#### HINT:

Tape up the screwdriver tip before use.

- (b) Use the same manner described above to the other side.

### 4. REMOVE SUN VISOR

- (a) Using a screwdriver, remove the caps.

#### HINT:

Tape up the screwdriver tip before use.

- (b) Remove the screws, then disconnect the connectors.

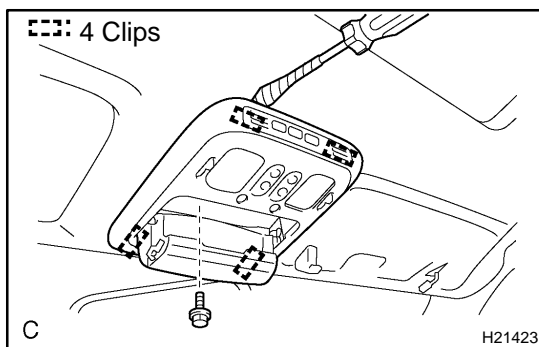
- (c) Remove the sun visors.

### 5. REMOVE DOUBLE VISOR

Remove the screws and the double visors.

### 6. REMOVE HOLDER

Remove the screws and the holders.



### 7. REMOVE OVERHEAD CONSOLE BOX

- (a) Remove the bolt.

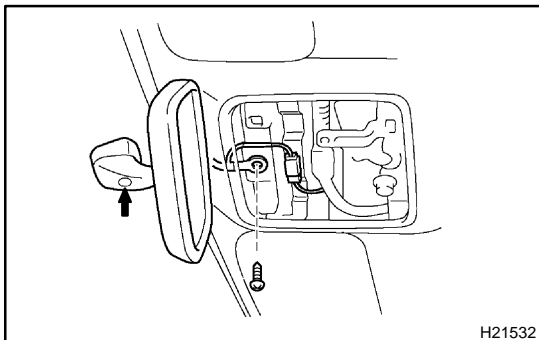
- (b) Using a screwdriver, remove the overhead console box, then disconnect the connector.

#### HINT:

Tape up the screwdriver tip before use.

### 8. REMOVE ASSIST GRIPS

### 9. PULL DOWN FRONT SIDE OF ROOF HEADLINING



### 10. REMOVE INNER REAR VIEW MIRROR

- (a) Disconnect the connector.

- (b) Unfasten a screw, and remove the other screw and the inner rear view mirror.

### 11. REMOVE WIPER ARMS

- (a) Remove the 2 wiper arm head caps and the 2 nuts.

- (b) Remove the 2 wiper arms.

### 12. REMOVE HOOD TO COWL TOP SEAL

### 13. REMOVE COWL TOP VENTILATOR LOUVERS

- (a) Remove the cowl top ventilator louver RH.

(b) Remove the cowl top ventilator louver LH.

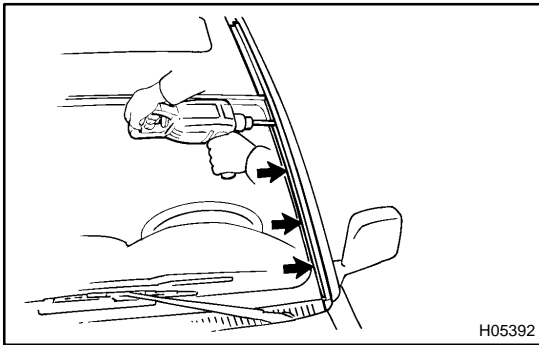
**14. REMOVE OUTSIDE NO. 2 MOULDING**

(a) Using a screwdriver, remove the outside No. 2 moulding.

HINT:

Tape up the screwdriver tip before use.

(b) Using a drill of less than  $\varnothing$  4 mm (0.16 in.).



(c) Gently and vertically put the drill to the rivet and cut the rivet flanges.

**NOTICE:**

▶ **Prizing the hole with a drill can lead to damage to the rivet hole or breaking the drill.**

▶ **Take care as the cut rivet is hot.**

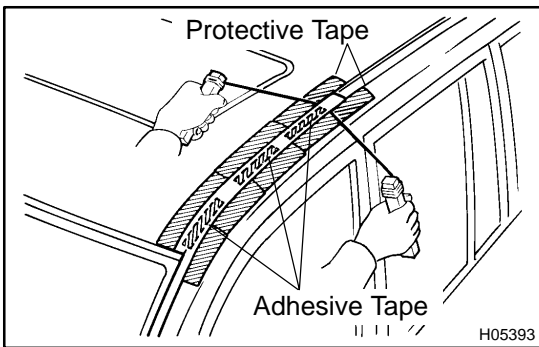
(d) Even if flange is taken off, continue drilling and push out remaining fragments with the drill.

(e) Using a heat light, heat the moulding to 20 - 30 °C (68 - 86 °F).

**NOTICE:**

**Do not heat the moulding excessively.**

(f) Tie both piano wire ends to wooden blocks or similar objects.



(g) Cut the adhesive tape by pulling the piano wire as shown.

**NOTICE:**

▶ **If reusing the moulding, take care not to damage the moulding.**

▶ **Do not damage the body.**

HINT:

Apply protective tape to the outer surface to keep the surface from being scratched.

(h) Remove the moulding.

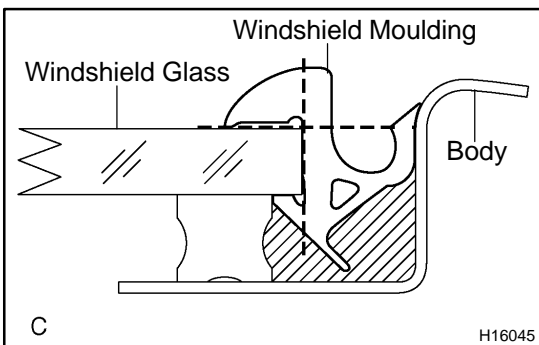
(i) Use the same manner described above to the other side.

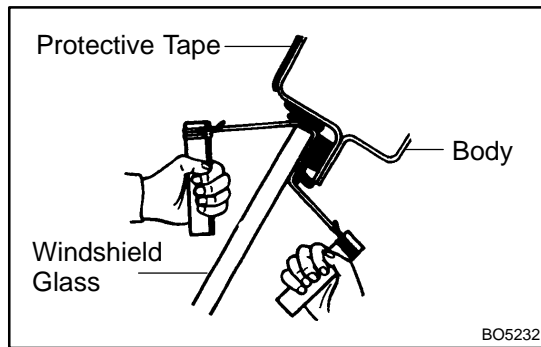
**15. REMOVE OUTSIDE UPPER MOULDING**

Using a knife, cut off the moulding as shown in the illustration.

**NOTICE:**

**Do not damage the body with the knife.**

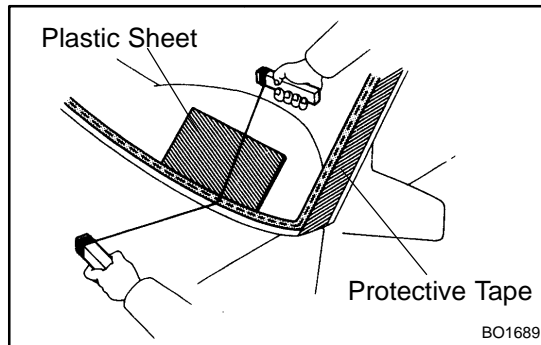


**16. REMOVE WINDSHIELD GLASS**

- (a) Push piano wire through between the body and glass from the interior.
- (b) Tie both wire ends to wooden blocks or similar objects.

**HINT:**

Apply protective tape to the outer surface to keep the surface from being scratched.

**NOTICE:**

**When separating the glass, take care not to damage the paint and interior and exterior ornaments. To prevent scratching the safety pad from scratching when removing the windshield, place a plastic sheet between the piano wire and the safety pad.**

- (c) Cut the adhesive by pulling the piano wire around it.
- (d) Remove the windshield glass.

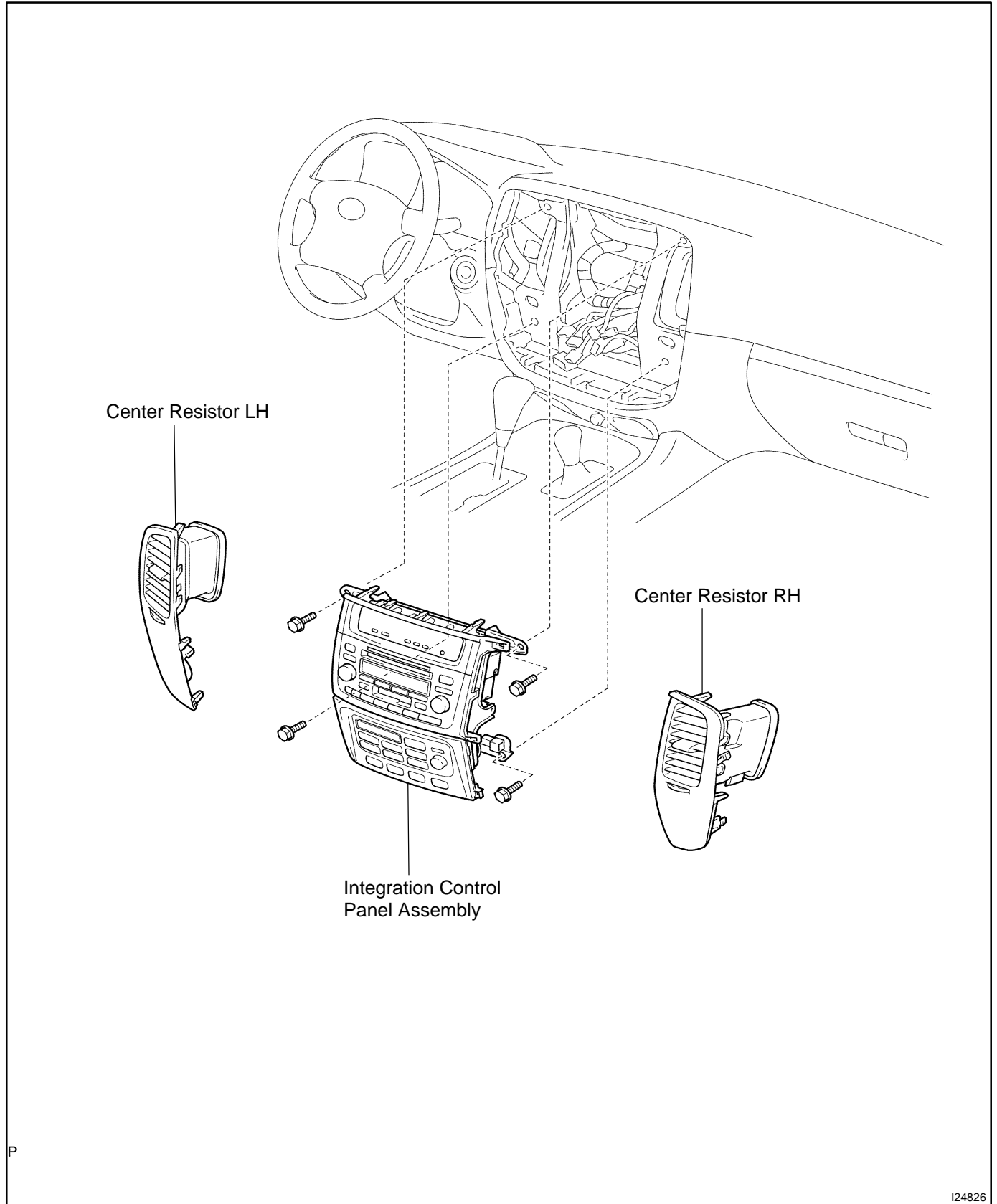
**NOTICE:**

**Leave as much of the adhesive on the body as possible when cutting the glass.**



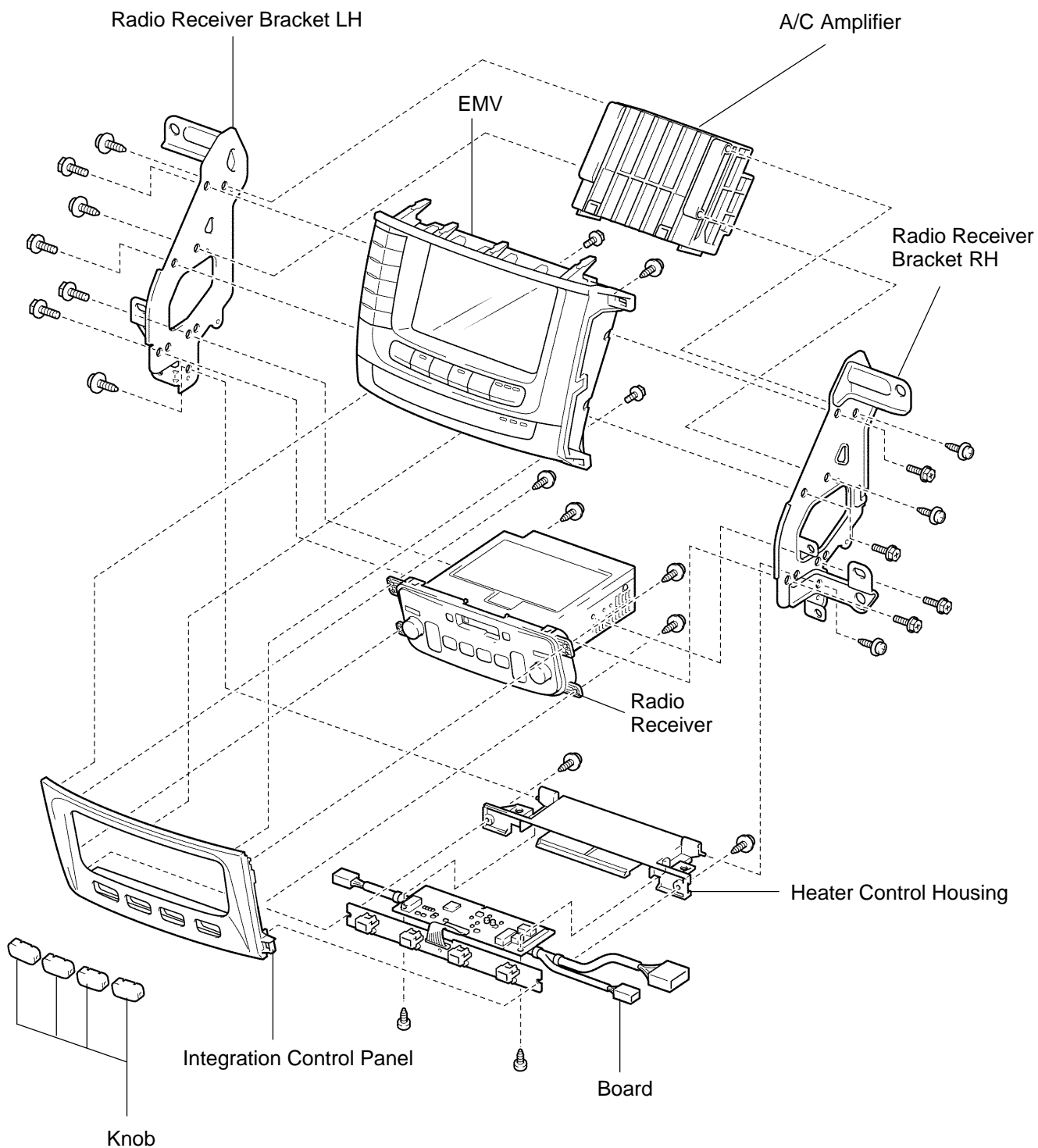
# AIR CONDITIONING CONTROL ASSEMBLY COMPONENTS

AC3P2-01



124826

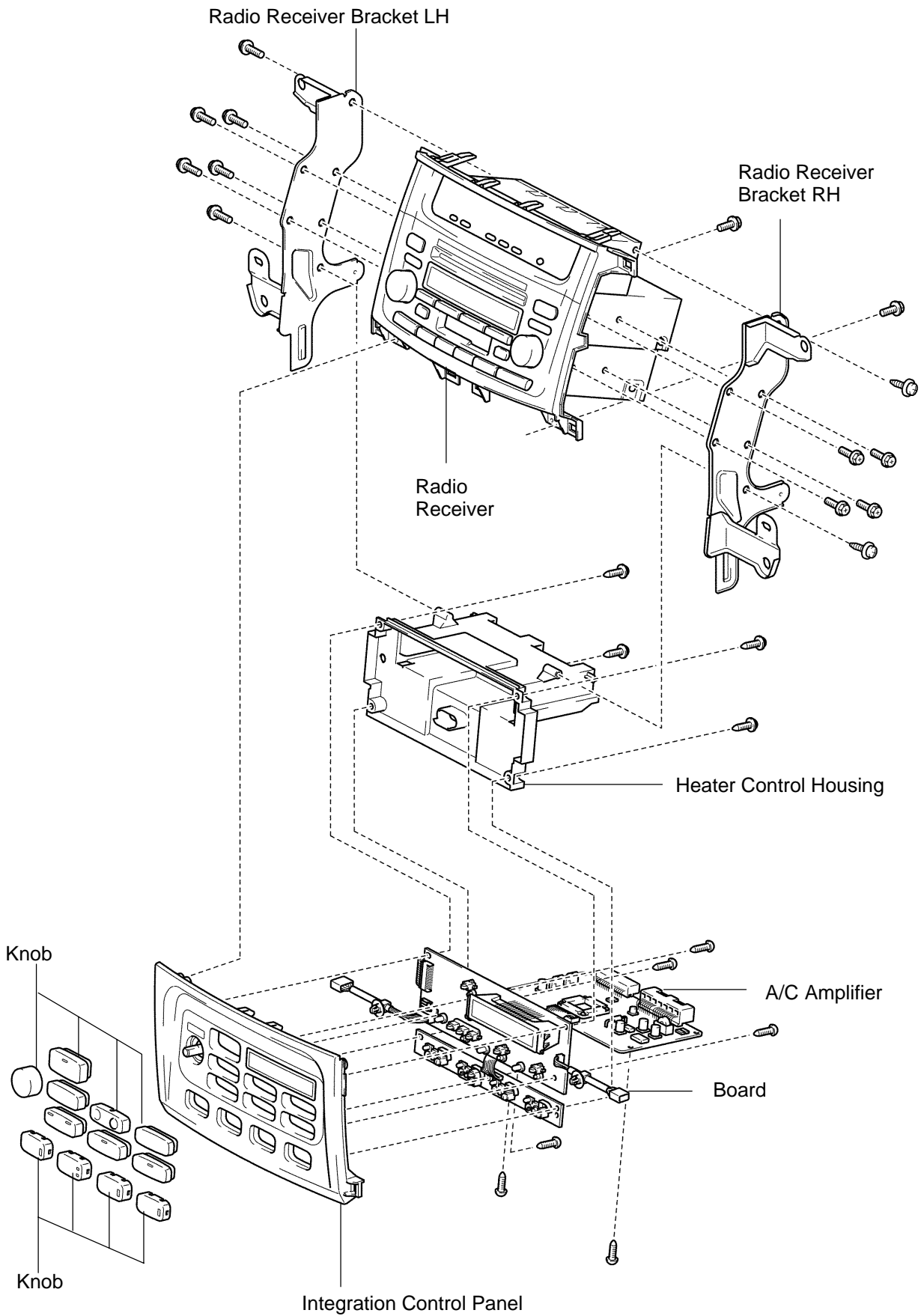
w/ Navigation System:



P

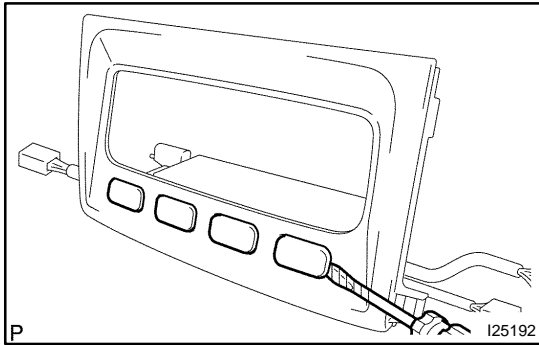
I24827

w/o Navigation System:



P

I25152



## DISASSEMBLY

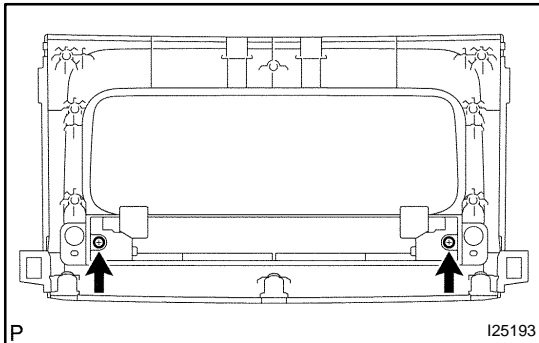
### 1. w/ navigation system:

#### REMOVE KNOB

Using a screwdriver, pull out the knobs.

HINT:

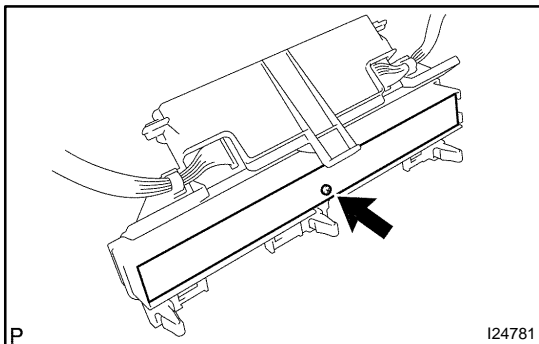
Tape up the screwdriver tip before use.



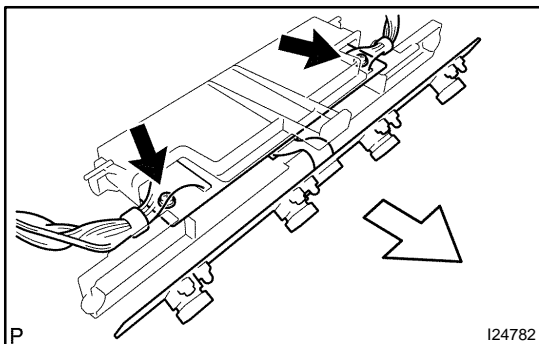
### 2. w/ navigation system:

#### REMOVE INTEGRATION CONTROL PANEL

(a) Remove the 2 screws.



(b) Remove the screw and the board.



### 3. w/ navigation system:

#### REMOVE HEATER CONTROL HOUSING

(a) Disconnect the connector clamps.

(b) Remove the 2 screws and pull out the board from the heater control housing.

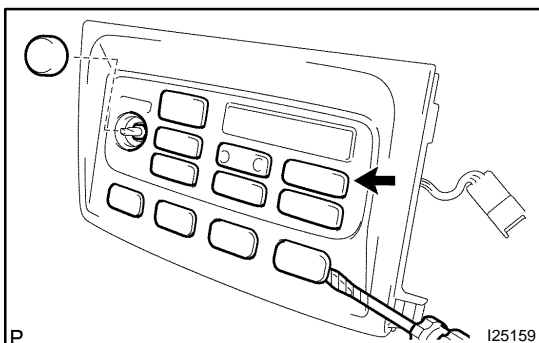
### 4. REMOVE KNOB

(a) Using a screwdriver, pull out the knobs.

HINT:

Tape up the screwdriver tip before use.

(b) Remove the nut.



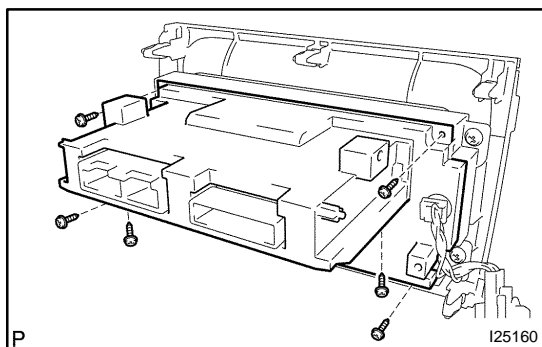
### 5. w/o LEXUS navigation system:

#### REMOVE KNOB

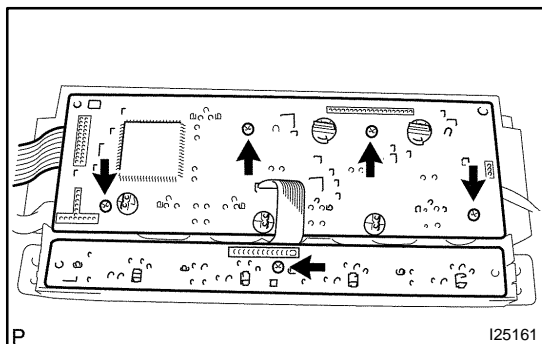
Using a screwdriver, pull out the knobs.

HINT:

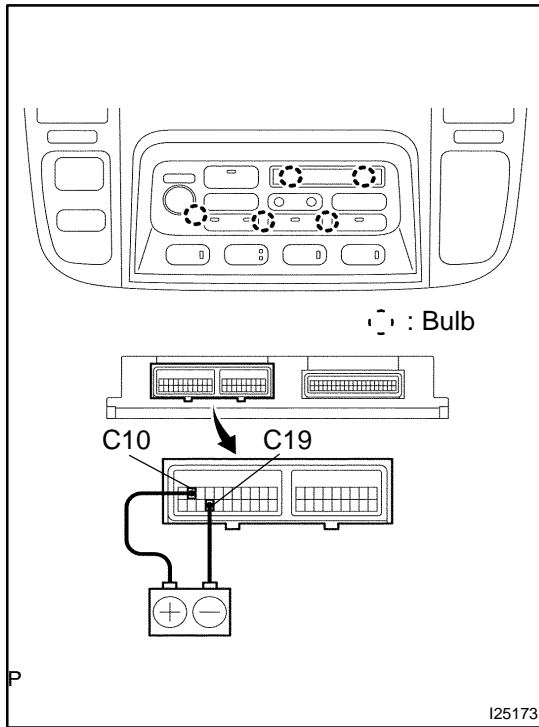
Tape up the screwdriver tip before use.



6. **w/o navigation system:**  
**REMOVE INTEGRATION CONTROL PANEL**  
(a) Remove the 6 screws and pull out the A/C amplifier.



- (b) Remove the 5 screws and the board.



## INSPECTION

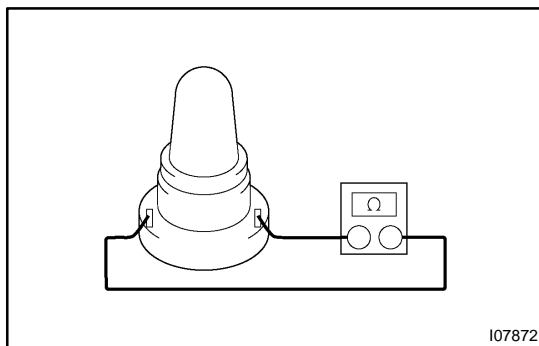
### 1. w/o Navigation system:

#### INSPECT ILLUMINATION OPERATION

- (a) Connect the positive (+) lead from the battery to terminal C10 and negative (-) lead to terminal C19, then check that the indicators illuminate.

If operation is not as specified, check the faulty bulb.

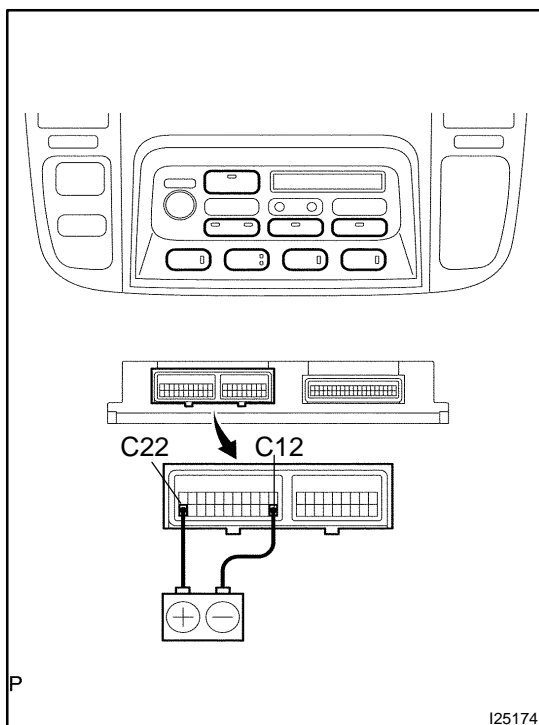
- (b) Remove the bulb.



- (c) Using the tester as shown in the illustration, test the continuity.

If continuity exists, replace the heater control.

If no continuity exists, replace the bulb.



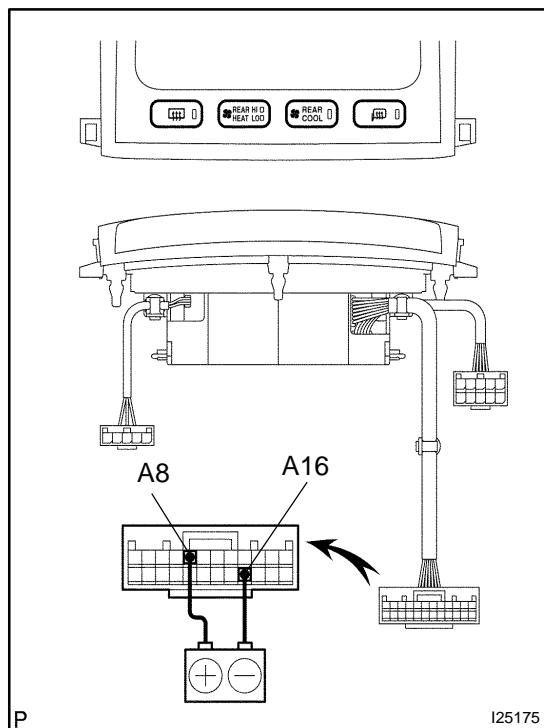
### 2. w/o Navigation system:

#### INSPECT INDICATORS OPERATION

- (a) Connect the positive (+) lead from the battery to terminal C22 and negative (-) lead to terminal C12.
- (b) Check that the indicators come on while operate the switches.

If operation is not as specified, replace the heater control.

### 3. INSPECT A/C CONTROL ASSEMBLY CIRCUIT (See page [DI-1309](#))

**4. w/ Navigation system:****INSPECT ILLUMINATION OPERATION**

- (a) Connect the positive (+) lead from the battery to terminal A8 and negative (-) lead to terminal A16.
- (b) Check that the indicators come on while operating the switches.

If operation is not as specified, replace the heater control.

**5. INSPECT A/C CONTROL ASSEMBLY CIRCUIT**

(See page [DI-1309](#))

## INSTALLATION

Installation is in the reverse of removal (See page [AC-100](#)).

HINT:

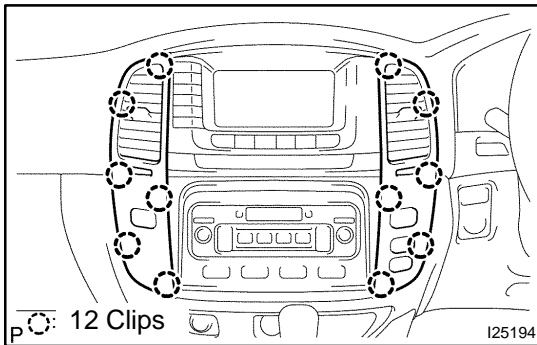
w/ Navigation System:

When removing/installing or replacing EMV, or when disconnecting/connecting the battery terminal, turn the IG ON and OFF twice for initial display setting.



## REASSEMBLY

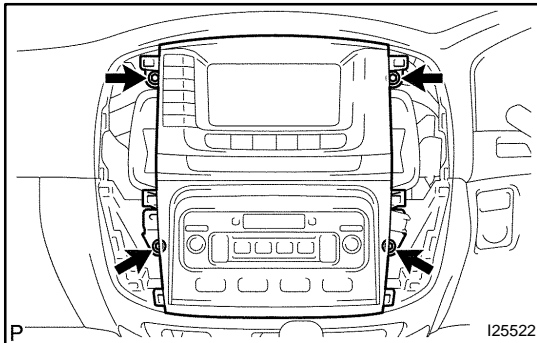
Reassembly is in the reverse of disassembly (See page [AC-102](#)).



## REMOVAL

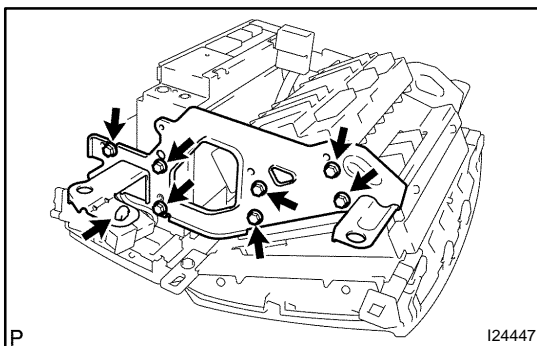
### 1. REMOVE CENTER RESISTORS

Disengage the 12 clips and remove the center resistors, then disconnect the connectors.



### 2. REMOVE INTEGRATION CONTROL PANEL ASSEMBLY

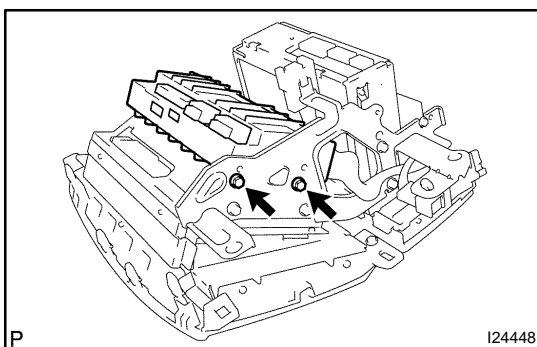
- (a) Remove the 4 bolts.
- (b) Remove the integration control panel assembly, then disconnect the connectors.



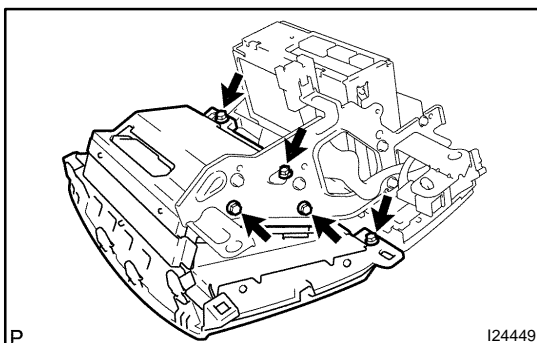
### 3. w/ navigation system:

#### REMOVE A/C AMPLIFIER

- (a) Disconnect the connector clamp.
- (b) Remove the 3 screws, the 4 bolts and the radio receiver bracket LH.



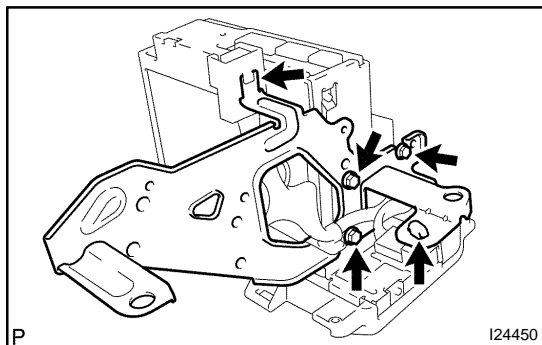
- (c) Remove the 2 screws and the A/C amplifier.



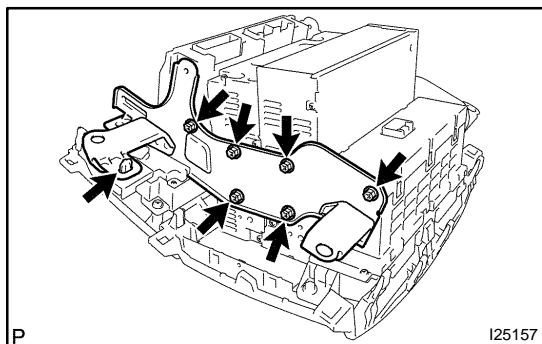
### 4. w/ LEXUS navigation system:

#### REMOVE EMV

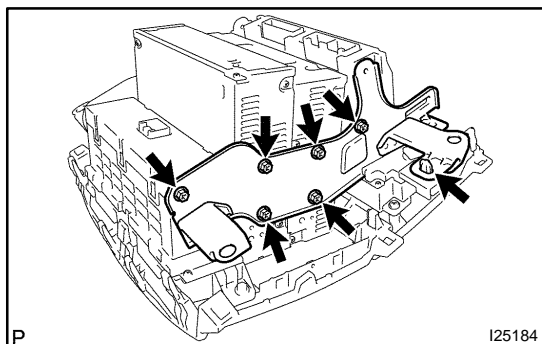
Remove the 3 screws, the 2 bolts and the EMV.

5. **w/ navigation system:****REMOVE INTEGRATION CONTROL PANEL**6. **Disconnect the connector clamps.**

- (a) Remove the screw, the 2 bolts and the radio receiver bracket RH.
- (b) Remove the integration control panel from the radio receiver.

7. **w/o navigation system:****REMOVE INTEGRATION CONTROL PANEL**

- (a) Disconnect the connector clamp.
- (b) Remove the 2 screws, 4 bolts and the radio receiver bracket LH.

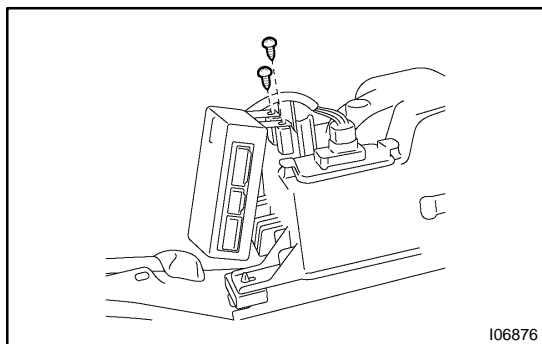


- (c) Disconnect the connector clamp.
- (d) Remove the 2 screws, 4 bolts and the radio receiver bracket RH.
- (e) Remove the integration control panel.

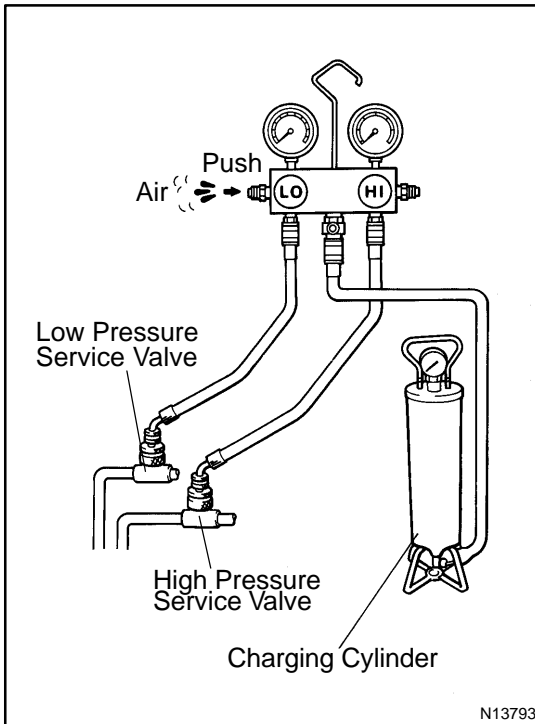
## AIR CONDITIONING AMPLIFIER (for Rear A/C) INSPECTION

AC22D-03

1. REMOVE REAR DOOR SCUFF PLATE RH
2. REMOVE REAR FLOOR MAT SUPPORT PLATE
3. REMOVE QUARTER TRIM PANEL RH



4. REMOVE A/C AMPLIFIER
  - (a) Disconnect the connectors.
  - (b) Remove the 2 screws and the A/C amplifier.
5. INSPECT REAR A/C AMPLIFIER CIRCUIT  
(See page [DI-1309](#))



## CHARGING

### 1. INSTALL CHARGING CYLINDER

#### HINT:

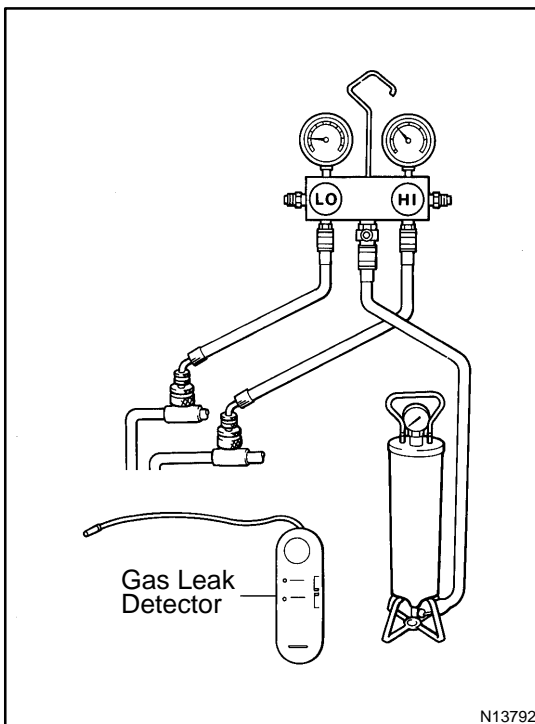
When handling the charging cylinder, always follow the directions given in the instruction manual.

- (a) Charge the proper amount of refrigerant into the charging cylinder.
- (b) Connect the center hose to the charging cylinder.

#### CAUTION:

**Do not open both high and low hand valves of manifold gauge set.**

- (c) Open the valve of the charging cylinder.
- (d) Press the valve core on the side of manifold gauge and expel the air inside the center hose.



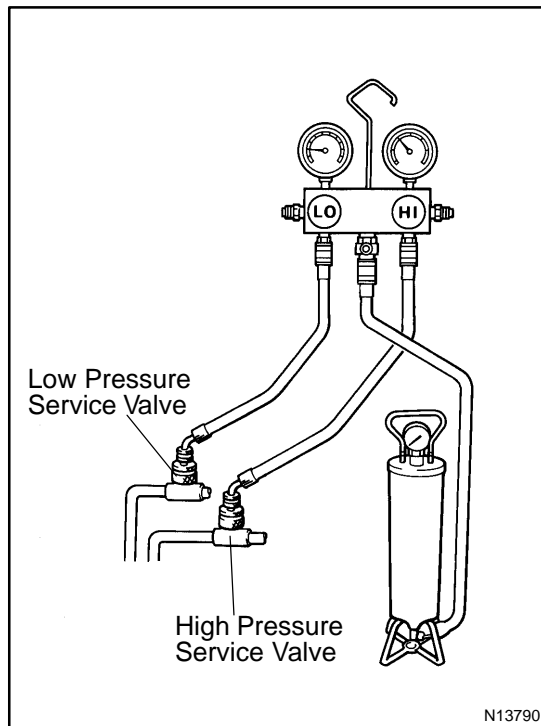
### 2. INSPECT REFRIGERATION SYSTEM FOR LEAKS

- (a) Open the high pressure hand valve and the charge refrigerant.
- (b) When the low pressure gauge indicates 98 kPa (1 kgf/cm<sup>2</sup>, 14 psi), close the high pressure hand valve.
- (c) Using a gas leak detector, check the system for any leakage.

If leaks are found, repair the faulty component or connection.

#### CAUTION:

**Use the refrigerant recovery/ recycling machine to recover the refrigerant whenever replacing parts.**



### 3. CHARGE REFRIGERANT INTO REFRIGERATION SYSTEM

If there is no leak after refrigerant leak check, charge the proper amount of refrigerant into the refrigeration system.

#### CAUTION:

- ▶ Do not run the engine when charging the system through the high pressure side.
  - ▶ Do not open the low pressure hand valve when the system is being charged with liquid refrigerant.
- (a) Open the high pressure hand valve fully.
  - (b) Charge specified amount of refrigerant, then close the high pressure hand valve.

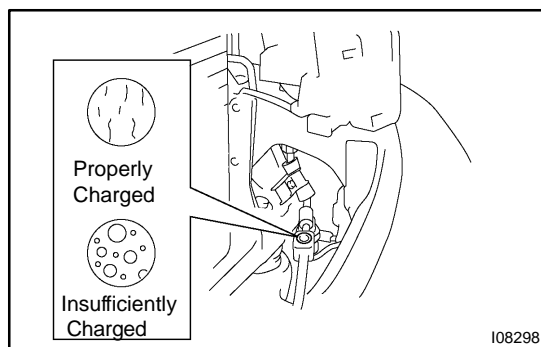
#### HINT:

No bubbles in the sight glass indicates that the system is fully charged.

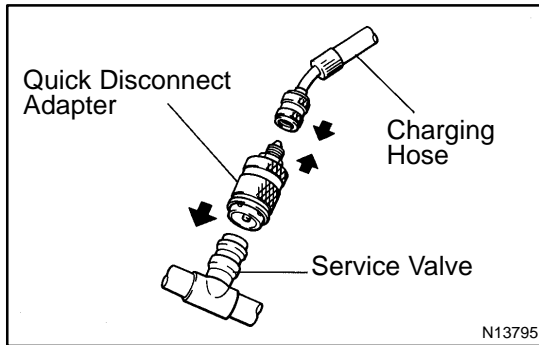
- (c) Partially charge the refrigeration system with refrigerant.
  - (1) Start engine and race engine at 1,500 rpm.
  - (2) Set fan speed selector to "HI".
  - (3) Set temperature control to "MAX. COOL".
  - (4) Set air inlet control to "RECIRC".
  - (5) Fully open doors (Sliding roof: closed).
  - (6) Open the low pressure hand valve.

#### CAUTION:

**Do not open the high pressure hand valve.**

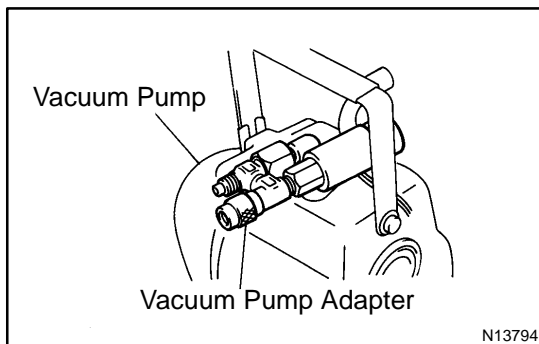


- (d) Charge refrigerant until bubbles disappear and check the pressure on the gauge through the sight glass.

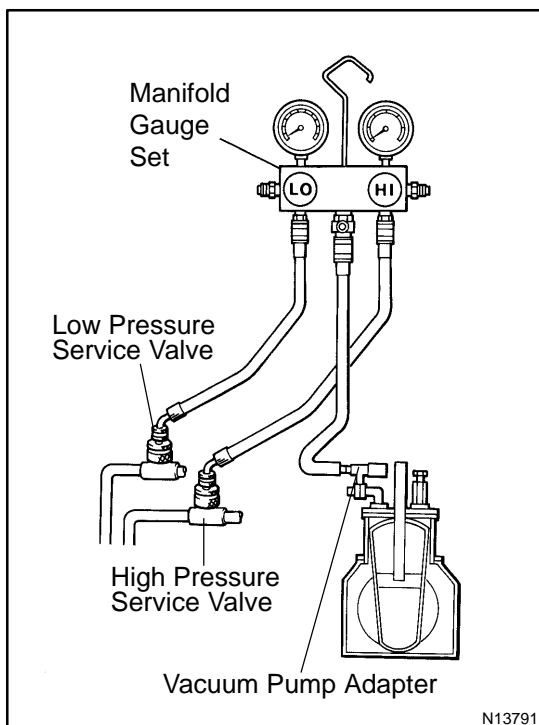


## EVACUATING

1. **CONNECT QUICK DISCONNECT ADAPTER TO CHARGING HOSES**
2. **REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINES**
3. **SET ON MANIFOLD GAUGE SET**
  - (a) Close both the hand valves of the manifold gauge set.
  - (b) Connect the quick disconnect adapters to the service valves.



4. **EVACUATE AIR FROM REFRIGERATION SYSTEM**
  - (a) Connect the vacuum pump adapter to the vacuum pump.



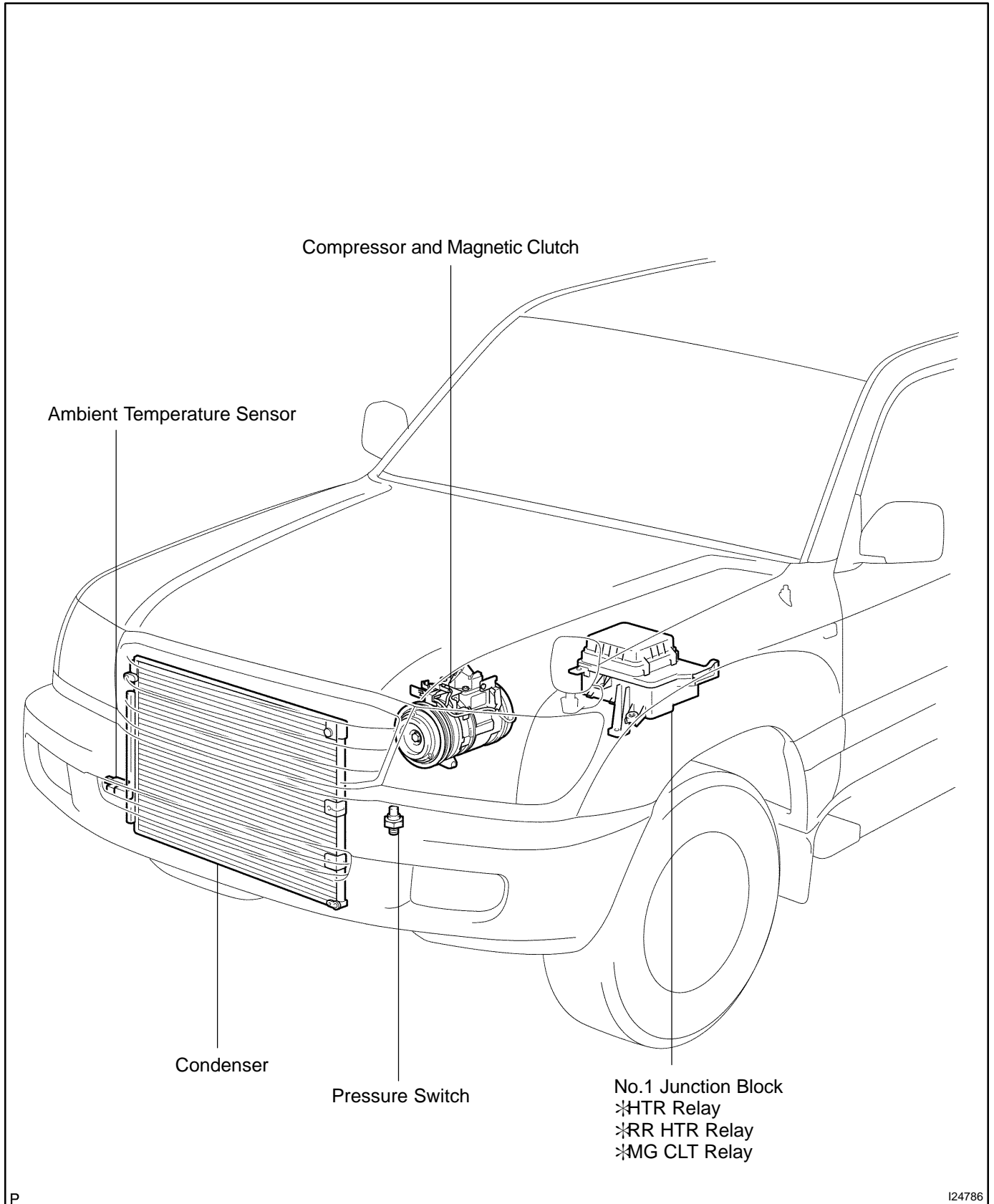
- (b) Connect the center hose of the manifold gauge set to the vacuum pump adapter.
- (c) Open both the high and low hand valves and run the vacuum pump.
- (d) After 10 minutes or later, check that the low pressure gauge indicates 750 mmHg (30 in. Hg) minimum.

### HINT:

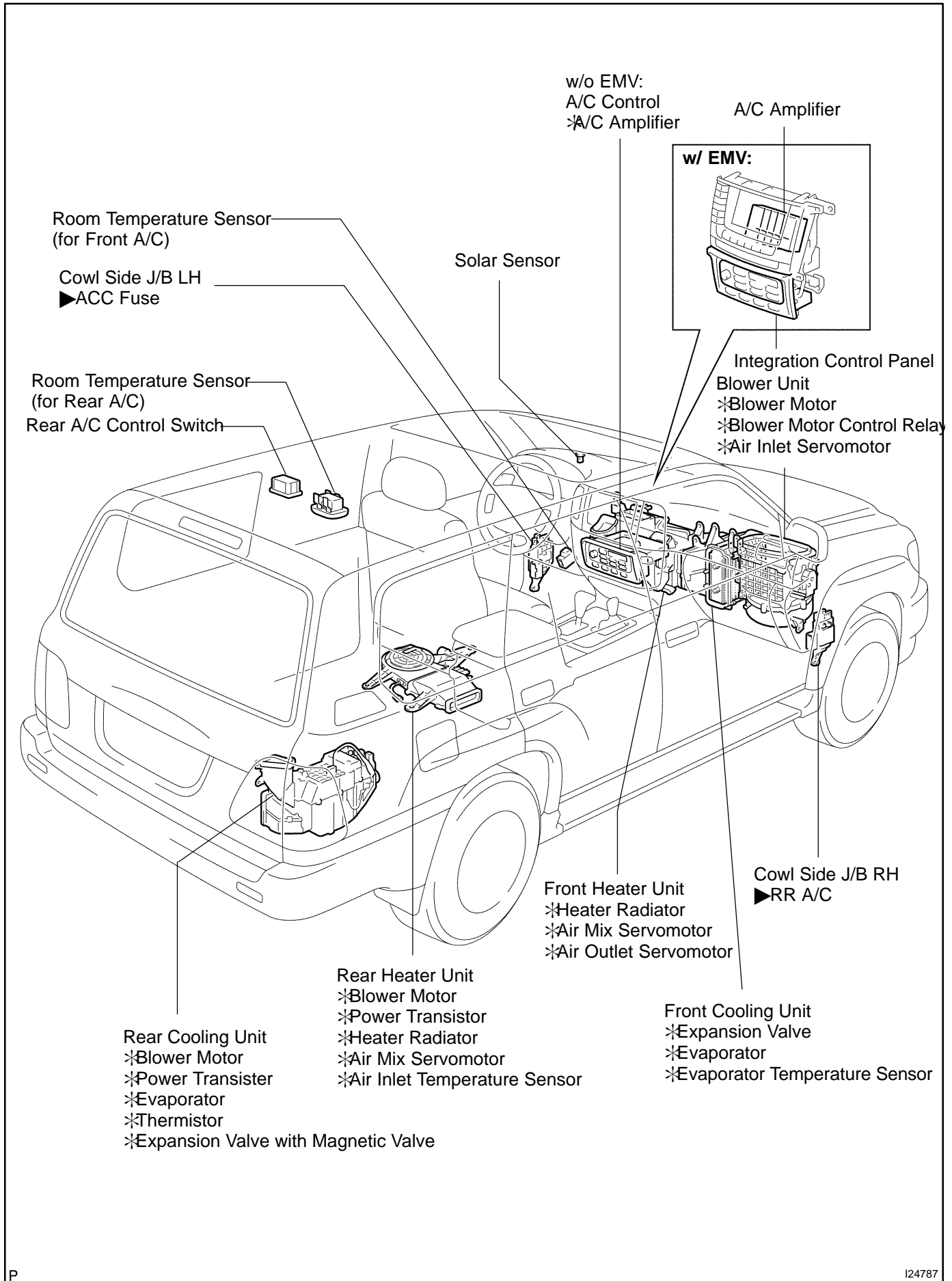
If the reading is 750 mmHg (30 in. Hg) close both hand valves of the manifold gauge set and stop the vacuum pump. Check the system for leaks and repair if necessary.

- (e) Close both the high and low hand valves and stop the vacuum pump.
- (f) Leave the system in this condition for at least 5 minutes and check that there is no gauge indicator.

# LOCATION

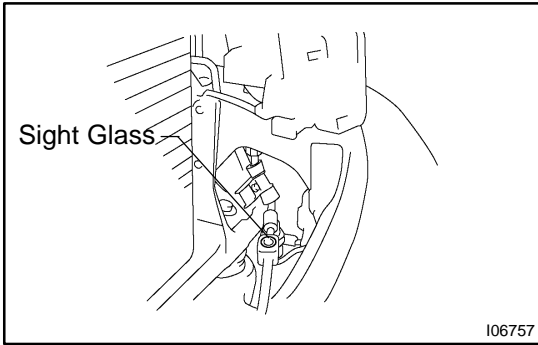






P

124787



## ON-VEHICLE INSPECTION

### 1. INSPECT REFRIGERANT VOLUME

Observe the sight glass on the liquid tube.

Test conditions:

- ▶ Engine speed at 1,500 rpm
- ▶ Fan speed selector at "HI" position
- ▶ A/C switch ON
- ▶ Temperature control dial at "COOL" position
- ▶ Doors fully opened

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles appear in sight glass	Insufficient*	(1) Check for gas leakage with gas leak detector and repair, if necessary (2) Add refrigerant until bubbles disappear
2	No bubbles appear in sight glass	None, sufficient or too much	Refer to item 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	(1) Check for gas leakage with gas leak detector and repair, if necessary (2) Add refrigerant until bubbles disappear
4	Temperature between compressor inlet and outlet is noticeably different	Correct or too much	Refer to items 5 and 6
5	Immediately after air conditioning system is turned off, refrigerant in sight glass stays clear	Too much	(1) Discharge refrigerant (2) Evacuate air and charge proper amount of purified refrigerant
6	When air conditioning system is turned off, refrigerant foams and then stays clear	Correct	-

\*: Bubbles in the sight glass with ambient temperatures higher than usual can be considered normal if cooling is sufficient.

## 2. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

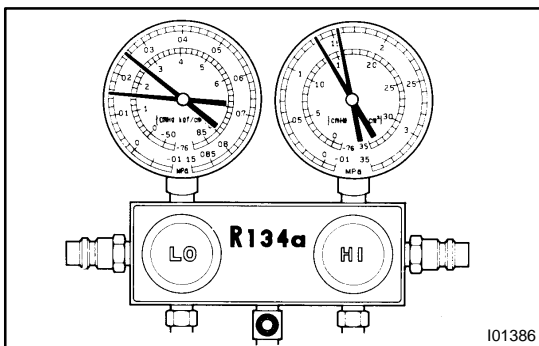
Check the trouble area using a set of manifold gauge set. Read the manifold gauge pressure when following conditions are detected.

Test conditions:

- ▶ Temperature at the air inlet with the switch set at RECIRC is 30 - 35 °C (86 - 95 °F)
- ▶ Engine running at 2,000 rpm
- ▶ Fan speed selector at "HI" position
- ▶ Temperature control dial on "COOL" position

HINT:

It should be noted that the gauge indications may vary depending on ambient temperature conditions.



(1) Normally functioning refrigeration system.

**Gauge reading:**

**Low pressure side:**

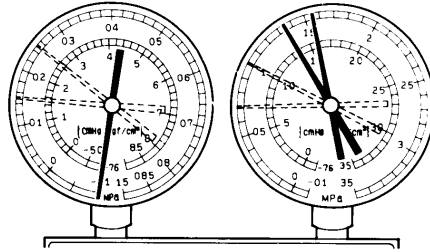
**0.15 - 0.25 MPa (1.5 - 2.5 kgf/cm<sup>2</sup>)**

**High pressure side:**

**1.37 - 1.57 MPa (14 - 15 kgf/cm<sup>2</sup>)**

(2) Moisture present in refrigeration system.

Condition : Periodically cools and then fails to cool

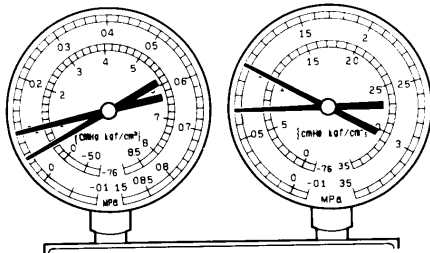


I01387

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
During operation, pressure on low pressure side sometimes become a vacuum and sometime normal	Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts	<ul style="list-style-type: none"> <li>▶Drier in over-saturated state</li> <li>▶Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant</li> </ul>	<ol style="list-style-type: none"> <li>(1) Replace condenser</li> <li>(2) Remove moisture in cycle through repeatedly evacuating air</li> <li>(3) Charge proper amount of new refrigerant</li> </ol>

(3) Insufficient cooling.

Condition: Insufficient cooling

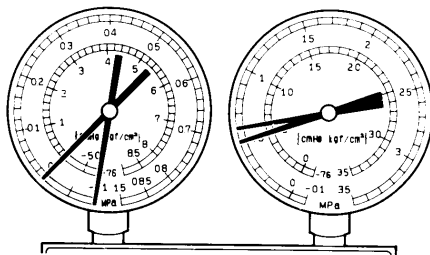


I01388

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> <li>▶Pressure low on both low and high pressure sides</li> <li>▶Bubbles seen in sight glass continuously</li> <li>▶Insufficient cooling performance</li> </ul>	Gas leakage at some place in refrigeration system	<ul style="list-style-type: none"> <li>▶Insufficient refrigerant in system</li> <li>▶Refrigerant leaking</li> </ul>	<ol style="list-style-type: none"> <li>(1) Check for gas leakage with gas leak detector and repair if necessary</li> <li>(2) Charge proper amount of refrigerant</li> <li>(3) If indicated pressure value is near 0 when connected to gauge, create the vacuum after inspecting and repairing the location of the leak</li> </ol>

(4) Poor circulation of refrigerant.

Condition: Insufficient cooling

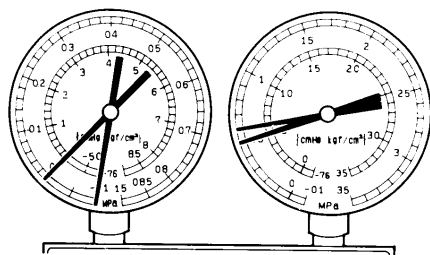


I01389

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> <li>▶ Pressure low in both low and high pressure sides</li> <li>▶ Frost on tube from condenser to unit</li> </ul>	Refrigerant flow obstructed by dirt in condenser	condenser clogged	Replace condenser

(5) Refrigerant does not circulate.

Condition: Does not cool (Cools from time to time in some cases)

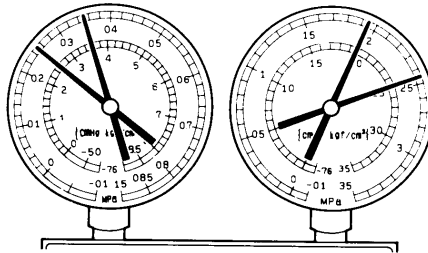


I01449

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> <li>▶ Vacuum indicated on low pressure side, very low pressure indicated on high pressure side</li> <li>▶ Frost or dew seen on piping before and after condenser/ drier or expansion valve</li> </ul>	<ul style="list-style-type: none"> <li>▶ Refrigerant flow obstructed by moisture or dirt in refrigeration system</li> <li>▶ Refrigerant flow obstructed by gas leakage from expansion valve</li> </ul>	Refrigerant does not circulate	<ol style="list-style-type: none"> <li>(1) Check expansion valve</li> <li>(2) Clean out dirt in expansion valve by blowing with air</li> <li>(3) Replace condenser</li> <li>(4) Evacuate air and charge new refrigerant to proper amount</li> <li>(5) For gas leakage from expansion valve, replace expansion valve</li> </ol>

(6) Refrigerant overcharged or insufficient cooling of condenser.

Condition: Insufficient cooling

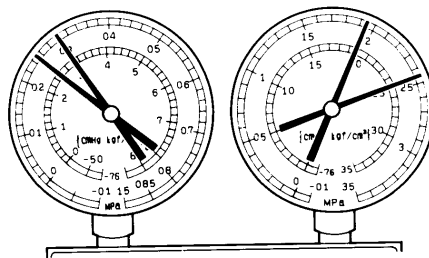


I01390

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> <li>▶ Pressure too high on both low and high pressure sides</li> <li>▶ No air bubbles seen through the sight glass even when the engine rpm is lowered</li> </ul>	<ul style="list-style-type: none"> <li>▶ Unable to develop sufficient performance due to excessive refrigeration system</li> <li>▶ Insufficient cooling of condenser</li> </ul>	<ul style="list-style-type: none"> <li>▶ Excessive refrigerant in cycle → refrigerant over charged</li> <li>▶ Condenser cooling → condenser fins clogged or cooling fan faulty</li> </ul>	<ul style="list-style-type: none"> <li>(1) Clean condenser</li> <li>(2) Check cooling fan with fluid coupling operation</li> <li>(3) If (1) and (2) are in normal state, check amount of refrigerant, and charge proper amount of refrigerant</li> </ul>

(7) Air present in refrigeration system.

Condition: Insufficient cooling



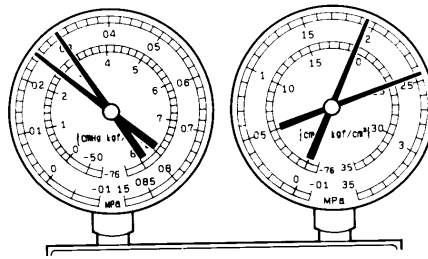
NOTE : These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without vacuum purging.

I01392

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> <li>▶ Pressure too high on both low and high pressure sides</li> <li>▶ The low pressure piping hot to touch</li> <li>▶ Bubbles seen in sight glass</li> </ul>	<p>Air entered in refrigeration system</p>	<ul style="list-style-type: none"> <li>▶ Air present in refrigeration system</li> <li>▶ Insufficient vacuum purging</li> </ul>	<ul style="list-style-type: none"> <li>(1) Check compressor oil to see if it is dirty or insufficient</li> <li>(2) Evacuate air and charge new refrigerant</li> </ul>

(8) Expansion valve improperly.

Condition: Insufficient cooling

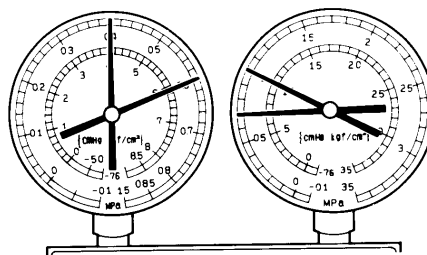


I01450

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> <li>▶ Pressure too high on both low and high pressure sides</li> <li>▶ Frost or large amount of dew on piping on low pressure side</li> </ul>	Trouble in expansion valve	<ul style="list-style-type: none"> <li>▶ Excessive refrigerant in low pressure piping</li> <li>▶ Expansion valve opened too wide</li> </ul>	Check expansion valve, and replace if defective

(9) Defective compression compressor.

Condition : Does not cool



I01393

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> <li>▶ Pressure too high on low and high pressure sides</li> <li>▶ Pressure too low on high pressure side</li> </ul>	Internal leak in compressor	<ul style="list-style-type: none"> <li>▶ Compression defective</li> <li>▶ Valve leaking or broken sliding parts</li> </ul>	Repair or replace compressor

**3. INSPECT IDLE-UP SPEED**

- (a) Warm up engine
- (b) Inspect idle-up speed when following conditions are established.

Test conditions:

- ▶ Fan speed selector at "HI" position
- ▶ Temperature control dial at "COOL" position
- ▶ A/C switch ON
- ▶ Put gear shift in neutral

Magnetic clutch condition	Idle-up speed
Magnetic clutch not engaged	700 ± 50 rpm
Magnetic clutch engaged	780 ± 50 rpm

If idle speed is not as specified, check the idle control system.

**4. INSPECT FOR LEAKAGE OF REFRIGERANT**

- (a) Stop engine.
- (b) Secure good ventilation (The gas leak detector may not react to volatile gases which are not refrigerant, such as evaporated gasoline and exhaust gas)
- (c) Repeat the test 2 or 3 times
- (d) Make sure that there is some refrigerant remaining in the refrigeration system.

When compressor is OFF: approx. 392 - 588 kPa (4 - 6 kgf-cm<sup>2</sup>, 57 - 85 psi)

- (e) Bring the gas leak detector close to the drain hose before performing the test.

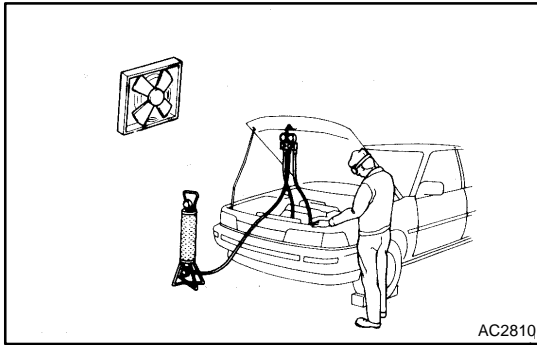
HINT:

- ▶ After the blower motor stops, leave the cooling for more than 15 minutes.
- ▶ Expose the gas leak detector sensor under the drain hose.
- ▶ When bring the gas leak detector close to the drain hose, make sure that the gas leak detector does not react to the volatile gases.

If gas leaks are detected, lift up the vehicle.

- (f) If gas leaks are not detected on the drain hose, remove the blower resistor from the cooling unit. Then insert the gas leak detector sensor into the unit to perform the test.
- (g) Disconnect the connector and leave the pressure switch for approx. 20 minutes. Then bring the gas leak detector close to the pressure switch to perform the test.
- (h) Bring the gas leak detector close to the refrigerant lines.



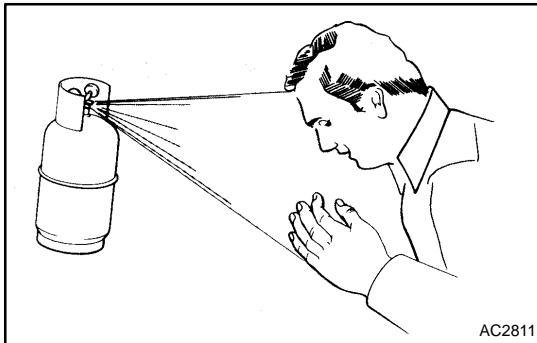


AC2810

## AIR CONDITIONING SYSTEM PRECAUTION

AC1HK-04

1. **DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR NEAR AN OPEN FLAME**
2. **ALWAYS WEAR SAFETY GLASSES FOR EYE PROTECTION**



AC2811

3. **AVOID YOUR EYES AND SKIN TO CONTACT WITH LIQUID REFRIGERANT**

If you get the liquid refrigerant in your eyes or on your skin:

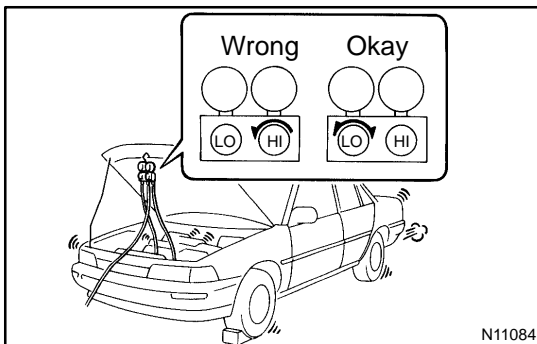
- (a) Wash out the area with lots of cold water.

### CAUTION:

**Do not rub your eyes or skin.**

- (b) Apply clean petroleum jelly to the skin.
- (c) Go immediately to a physician or hospital for professional treatment.

4. **NEVER HEAT CONTAINER OR EXPOSE IT TO NAKED FLAME**
5. **DO NOT DROP CONTAINER NOR APPLY PHYSICAL SHOCKS TO IT.**



N11084

6. **DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERANT SYSTEM**

If there is not enough refrigerant in the refrigerant system, oil lubrication will be insufficient and compressor burnout may occur. To avoid this, always keep enough refrigerant in the refrigerant system.

7. **DO NOT OPEN HIGH PRESSURE MANIFOLD VALVE WHILE COMPRESSOR IS OPERATING**

If the high pressure valves opened, refrigerant flows in the reverse direction and could cause the charging cylinder to rupture, so open and close the only low pressure valve.

8. **DO NOT OVERCHARGE REFRIGERANT SYSTEM WITH REFRIGERANT**

If refrigerant is overcharged, it causes problems such as insufficient cooling, poor fuel economy, engine overheating etc.

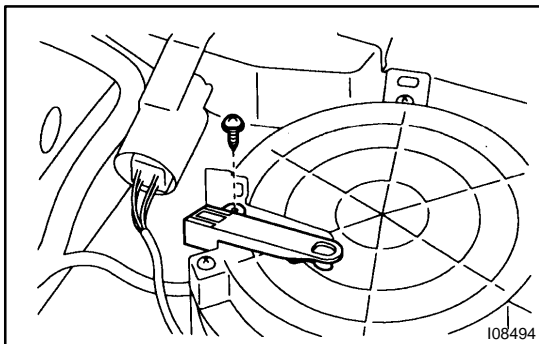
**9. SUPPLEMENTAL RESTRAINT SYSTEM (SRS)**

The LAND CRUISER is equipped with SRS (Supplemental Restraint System) such as the driver airbag and the front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

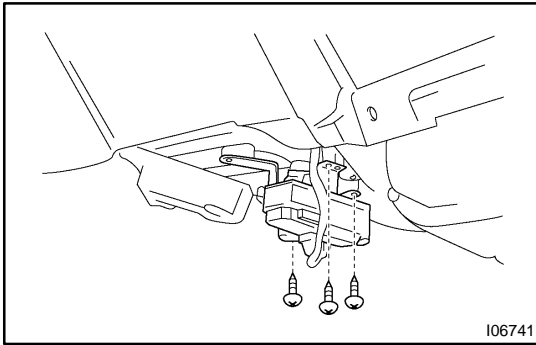
# AIR INLET TEMPERATURE SENSOR INSPECTION

AC1LQ-04

1. REMOVE FRONT SEATS
2. REMOVE REAR CONSOLE BOX
3. REMOVE FRONT CONSOLE BOX COVER
4. REMOVE LOWER CENTER CLUSTER FINISH PANEL
5. REMOVE FRONT DOOR SCUFF PLATES
6. REMOVE COWL SIDE TRIMS
7. REMOVE REAR DOOR SCUFF PATES
8. REMOVE CENTER PILLAR GARNISHES
9. REMOVE AIR INLET TEMPERATURE SENSOR
- (a) Slide the floor carpet backward.



- (b) Disconnect the connector.
- (c) Remove the screw and the air inlet temperature sensor.
10. **INSPECT AIR INLET TEMPERATURE SENSOR CIRCUIT (See page [DI-1342](#) )**
11. **INSTALL AIR INLET TEMPERATURE SENSOR**
  - (a) Install the air inlet temperature sensor with the screw.
  - (b) Connect the connector.
  - (c) Install the floor carpet.
12. **INSTALL CENTER PILLAR GARNISHES**
13. **INSTALL REAR DOOR SCUFF PLATES**
14. **INSTALL COWL SIDE TRIMS**
15. **INSTALL FRONT DOOR SCUFF PLATES**
16. **INSTALL REAR CONSOLE BOX**
17. **INSTALL FRONT SEATS**



## AIR MIX SERVOMOTOR (for Front A/C)

AC1LK-06

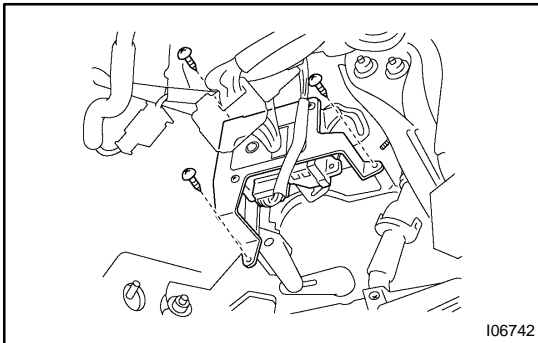
### INSPECTION

1. **REMOVE AIR MIX SERVOMOTOR**
  - (a) Disconnect the connector.
  - (b) Remove the 2 screws and the air mix servomotor.
2. **INSPECT AIR MIX SERVOMOTOR OPERATION**  
(See page [DI-1354](#) )
3. **INSPECT AIR MIX DAMPER POSITION SENSOR**  
(See page [DI-1345](#) )
4. **INSTALL SERVOMOTOR**
  - (a) Install the servomotor with the 3 screws.
  - (b) Connect the connector.

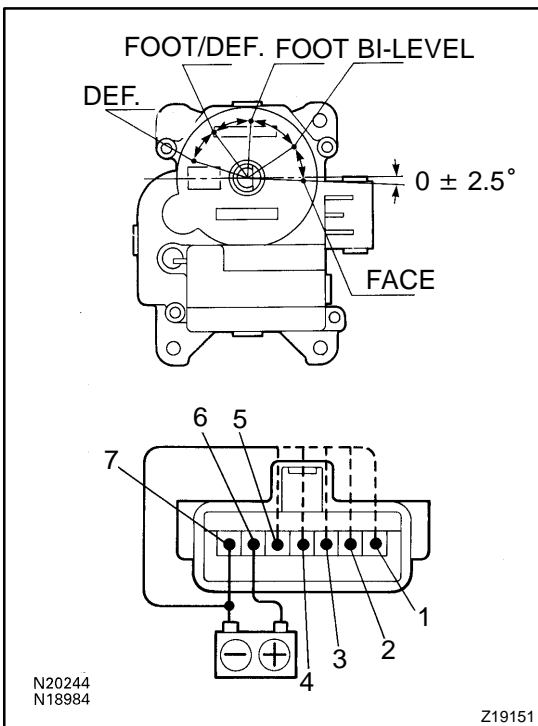
# AIR OUTLET SERVOMOTOR INSPECTION

AC1LL-06

1. REMOVE LOWER NO. 1 PANEL (See page [BO-84](#))



2. REMOVE AIR OUTLET SERVOMOTOR
  - (a) Disconnect the connector.
  - (b) Remove the 3 screws and the air outlet servomotor.

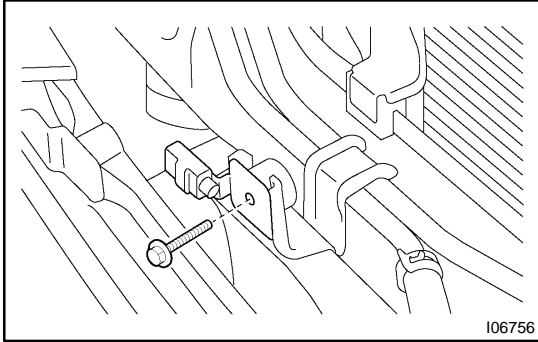


3. INSPECT AIR OUTLET SERVOMOTOR OPERATION
  - (a) Connect the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 7.
  - (b) Connect the negative (-) lead from the battery to each terminal and check that the shaft rotates at each position, as shown in the illustration.

Connected terminal	Position
5	DEF.
4	FOOT/DEF.
3	FOOT
2	B/L
1	FACE

If operation is not as specified, replace the servomotor.

4. INSTALL AIR OUTLET SERVOMOTOR
  - (a) Install the air outlet servomotor with the 3 screws.
  - (b) Connect the connector.



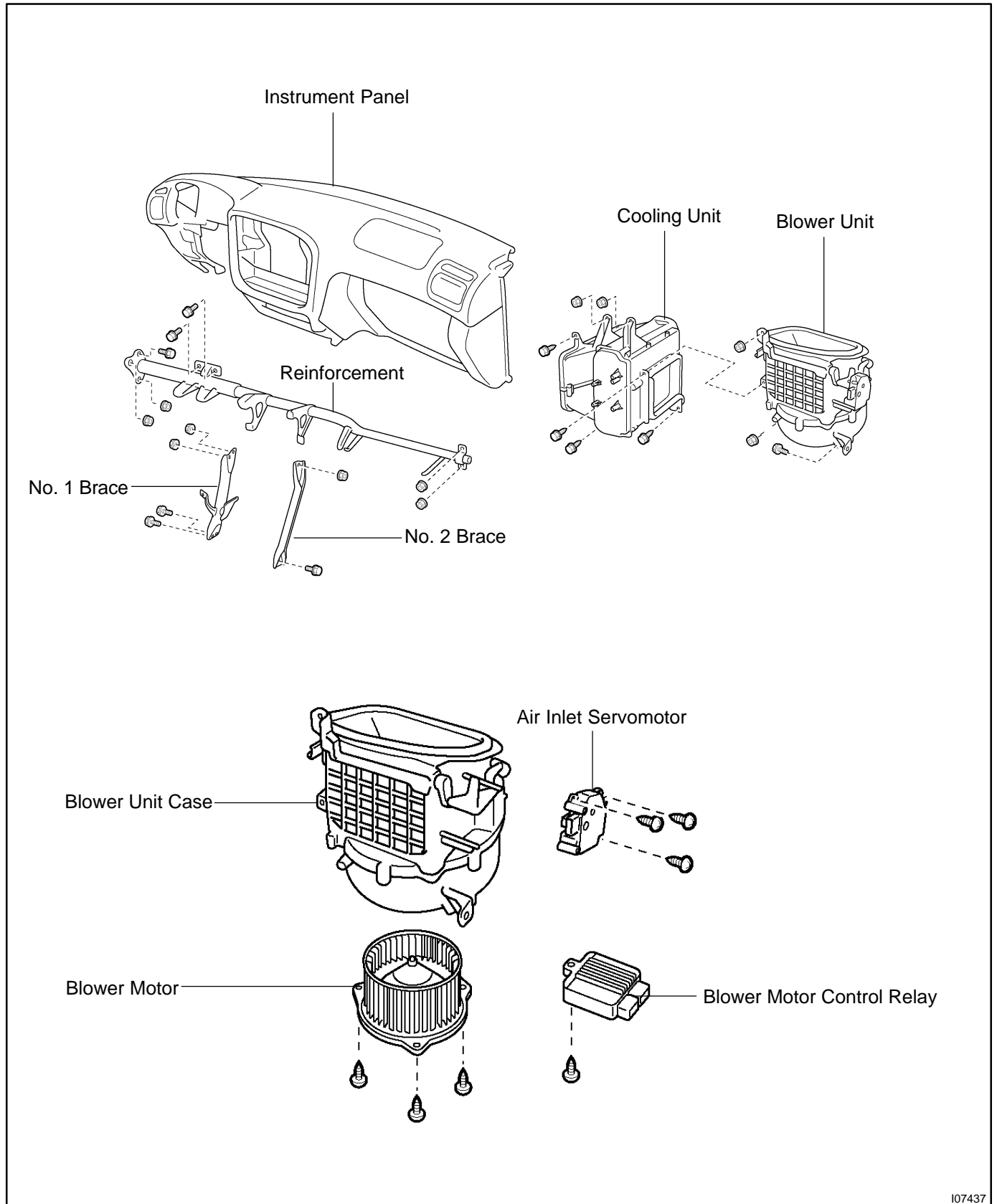
## AMBIENT TEMPERATURE SENSOR INSPECTION

AC1LP-05

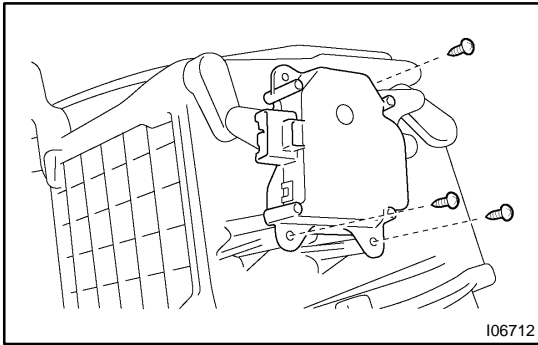
- 1. REMOVE AMBIENT TEMPERATURE SENSOR**
  - (a) Disconnect the connector.
  - (b) Remove the bolt and the ambient temperature sensor.
- 2. INSPECT AMBIENT TEMPERATURE SENSOR CIRCUIT (See page [DI-1319](#) )**
- 3. INSTALL AMBIENT TEMPERATURE SENSOR**
  - (a) Install the ambient temperature sensor to the condenser upper bracket.
  - (b) Connect the connector.

# BLOWER UNIT COMPONENTS

AC1KT-03



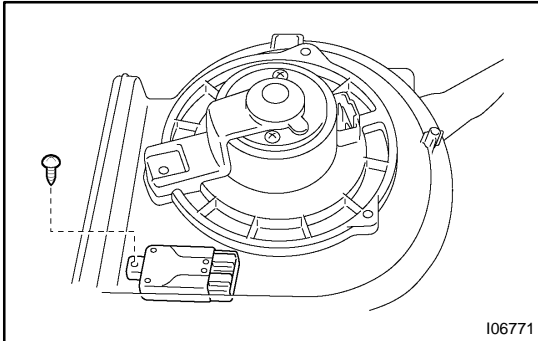
107437



## DISASSEMBLY

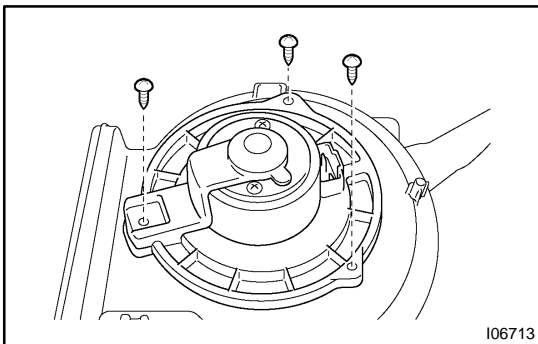
### 1. REMOVE AIR INLET SERVOMOTOR

Remove the 3 screws and the air inlet servomotor.



### 2. REMOVE BLOWER MOTOR CONTROL RELAY

- (a) Disconnect the connector.
- (b) Remove the screw and the blower motor control relay.



### 3. REMOVE BLOWER MOTOR

- (a) Disconnect the connector.
- (b) Remove the 3 screws and the blower motor.

### 4. REMOVE WIRE HARNESS

Remove the screw and the wire harness.



## INSPECTION

1. INSPECT AIR INLET SERVOMOTOR OPERATION (See page [DI-1357](#) )
2. INSPECT AIR INLET DAMPER POSITION SENSOR CIRCUIT (See page [DI-1348](#) )

## INSTALLATION

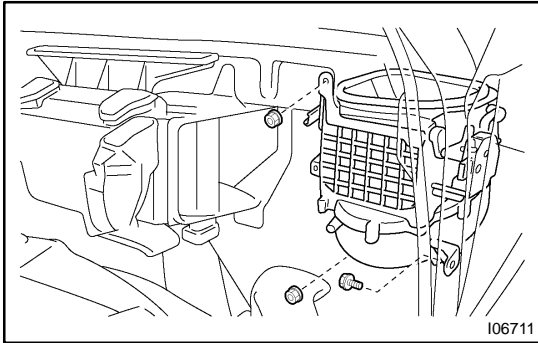
Installation is in the reverse of removal (See page [AC-55](#)).

## REASSEMBLY

Reassembly is in the reverse of disassembly (See page [AC-56](#)).

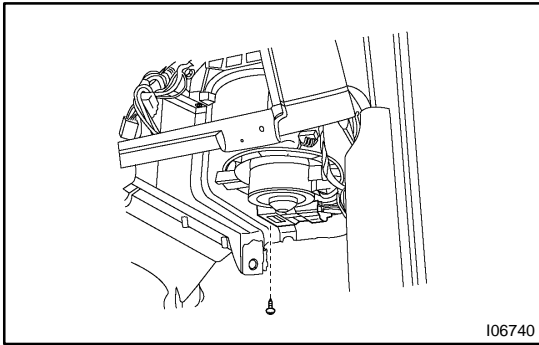
## REMOVAL

1. REMOVE FRONT COOLING UNIT (See page [AC-24](#))



2. REMOVE BLOWER UNIT

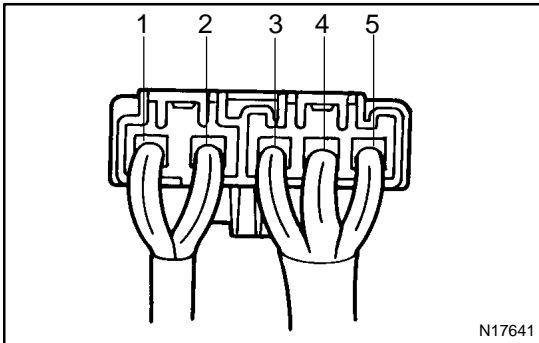
- (a) Disconnect the connectors.
- (b) Remove the bolt, 2 nuts and the blower unit.



# BLOWER MOTOR CONTROL RELAY INSPECTION

AC1LH-03

1. REMOVE BLOWER MOTOR CONTROL RELAY
  - (a) Disconnect the connectors.
  - (b) Remove the screw and the blower motor control relay.



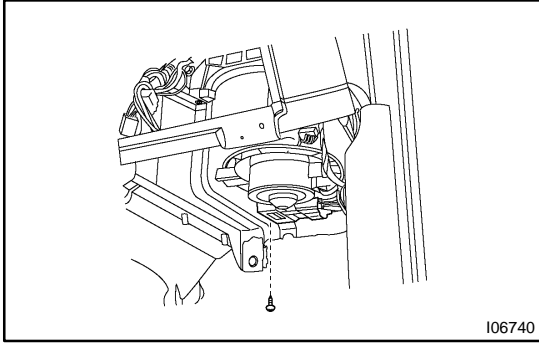
2. INSPECT BLOWER MOTOR CONTROL RELAY  
Connect the connector to the blower motor control relay and inspect the wire harness side connector from the back side as shown in the illustration.

Test condition:

- ▶ Turn ignition switch to ON

Tester connection	Condition	Specified condition
1 - Ground	Constant	Continuity
2 - Ground	Blower speed control switch at "LO" position	Approx. 3.5 V
	Blower speed control switch at "M1" position	Approx. 2.2 V
3 - Ground	Operate blower motor	Battery positive voltage
	Blower speed control switch at "OFF" position	No voltage
4 - 5	Blower speed control switch at "LO" position	Approx. 3.6 V
	Blower speed control switch at "M2" position	Approx. 8.3 V
	Blower speed control switch at "HI" position	Approx. 13.0 V

If circuit is not as specified, replace the relay.

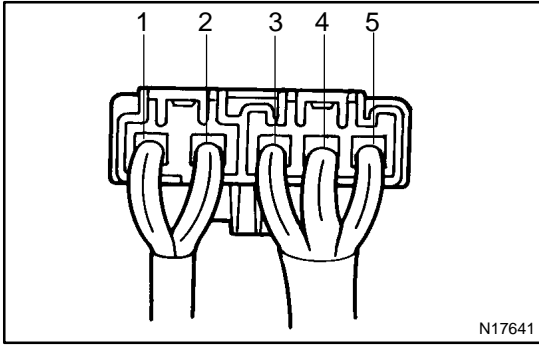


# BLOWER MOTOR CONTROL RELAY INSPECTION

AC1LH-03

## 1. REMOVE BLOWER MOTOR CONTROL RELAY

- (a) Disconnect the connectors.
- (b) Remove the screw and the blower motor control relay.



## 2. INSPECT BLOWER MOTOR CONTROL RELAY

Connect the connector to the blower motor control relay and inspect the wire harness side connector from the back side as shown in the illustration.

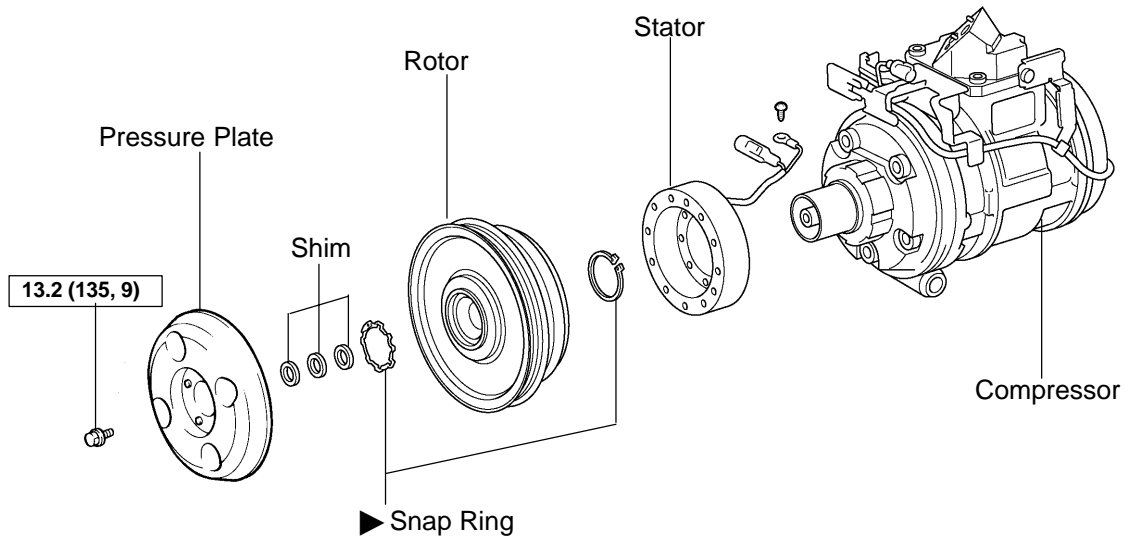
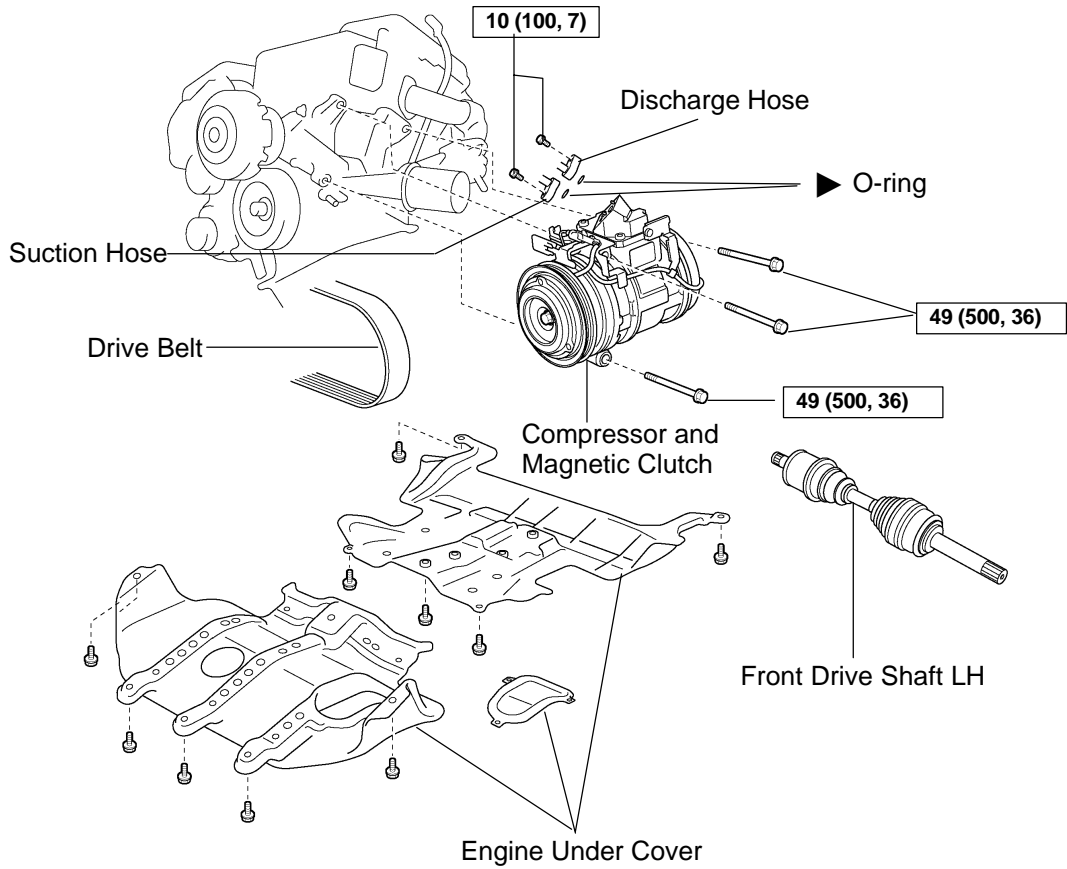
Test condition:

- ▶ Turn ignition switch to ON

Tester connection	Condition	Specified condition
1 - Ground	Constant	Continuity
2 - Ground	Blower speed control switch at "LO" position	Approx. 3.5 V
	Blower speed control switch at "M1" position	Approx. 2.2 V
3 - Ground	Operate blower motor	Battery positive voltage
	Blower speed control switch at "OFF" position	No voltage
4 - 5	Blower speed control switch at "LO" position	Approx. 3.6 V
	Blower speed control switch at "M2" position	Approx. 8.3 V
	Blower speed control switch at "HI" position	Approx. 13.0 V

If circuit is not as specified, replace the relay.

# COMPONENTS

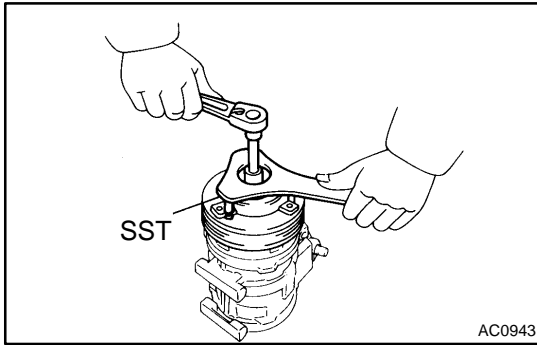


I06761  
I06762

**N·m (kgf·cm, ft·lbf)** : Specified torque

▶ Non reusable part

I08106



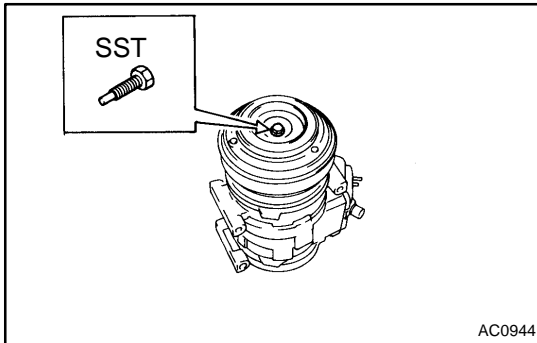
## DISASSEMBLY

### 1. REMOVE PRESSURE PLATE

- (a) Using SST and a socket wrench, remove the shaft bolt.

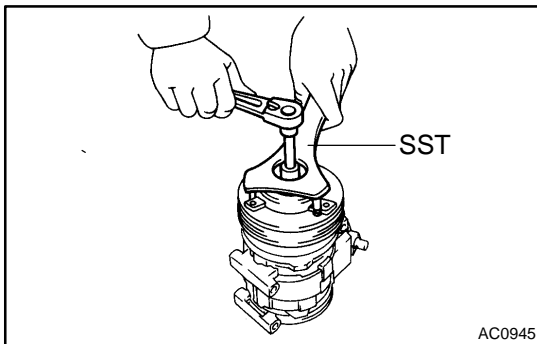
**Torque: 13.2 N·m (135 kgf·cm, 9 ft·lbf)**

SST 07112-76060



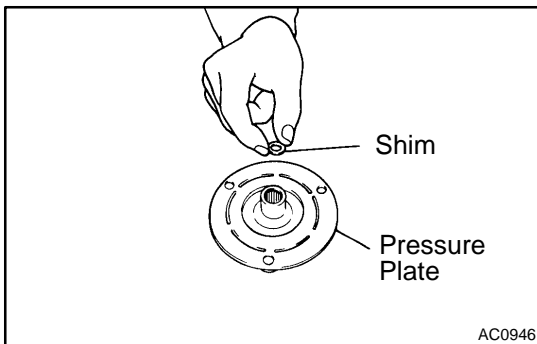
- (b) Install SST on the pressure plate.

SST 07112-66040

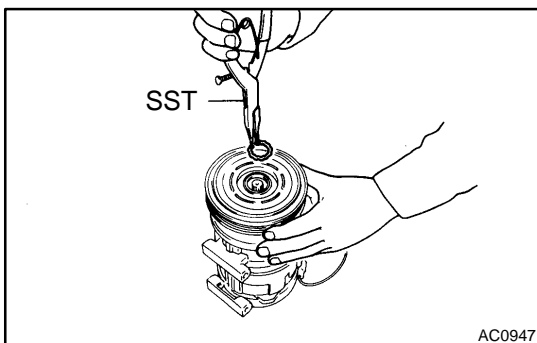


- (c) Using SST and socket wrench, remove the pressure plate.

SST 07112-66040, 07112-76060



- (d) Remove the shims from the pressure plate.

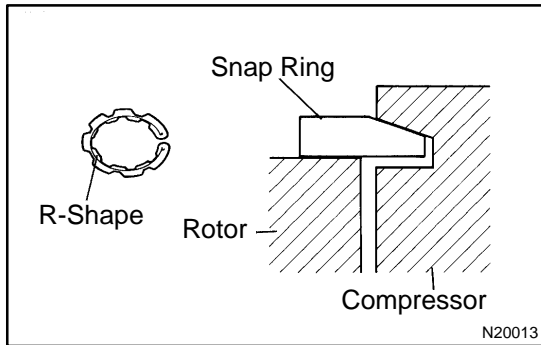


### 2. REMOVE ROTOR

- (a) Using SST, remove the snap ring.

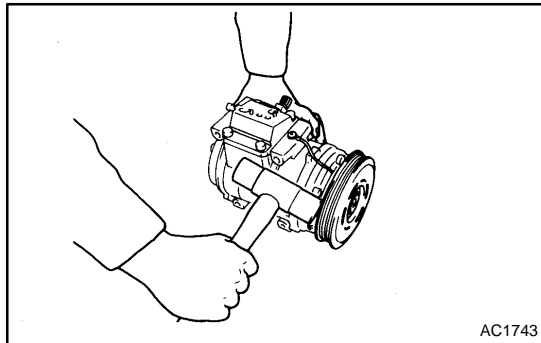
SST 95994-10020





**NOTICE:**

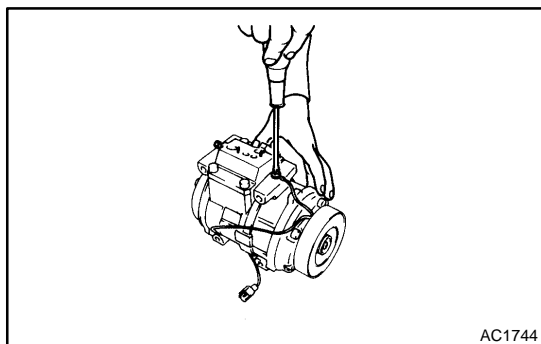
At the time of reassembly, the snap ring should be installed so that beveled side facing up.



(b) Using a plastic hammer, tap the rotor off the shaft.

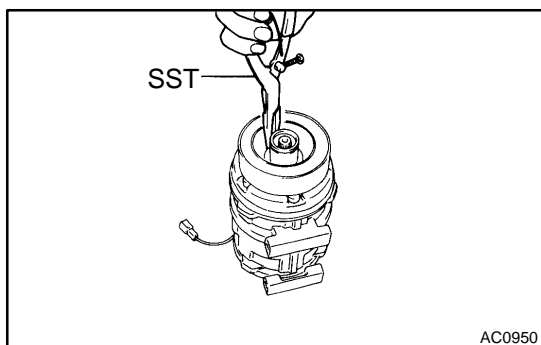
**NOTICE:**

Be careful not to damage the pulley when tapping on the rotor.



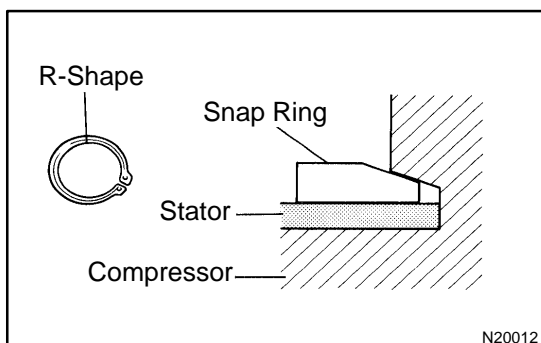
**3. REMOVE STATOR**

(a) Disconnect the stator lead wire from the compressor housing.



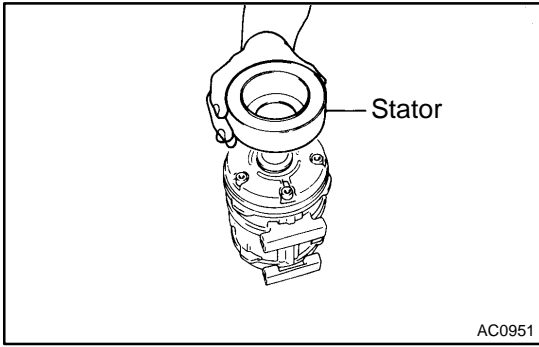
(b) Using SST, remove the snap ring.

SST 95994-10020

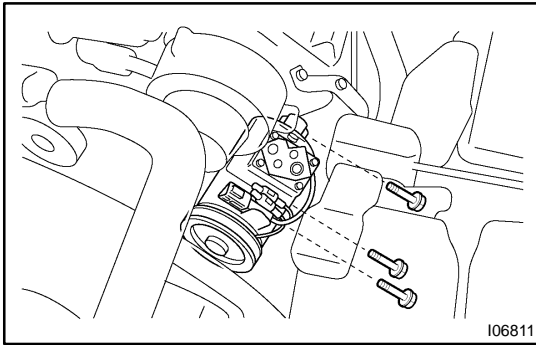


**NOTICE:**

At the time of reassembly, the snap ring should be installed so that its beveled side facing up.



(c) Remove the stator.

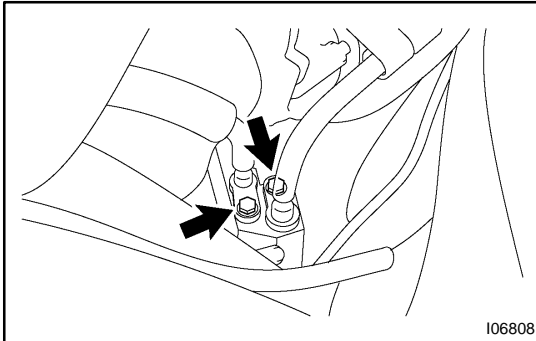


## INSTALLATION

### 1. INSTALL COMPRESSOR

- (a) Install the compressor with 3 bolts.  
**Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)**
- (b) Connect the connector.

### 2. INSTALL FRONT DRIVE SHAFT LH (See page SA-33 )



### 3. CONNECT DISCHARGE AND SUCTION HOSES

- (a) Lubricate 2 new O-rings with compressor oil and install them to the hoses.
- (b) Connect the both hoses with 2 bolts.  
**Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)**

#### NOTICE:

Hose should be connected immediately after the caps have been removed.

### 4. INSTALL AND CHECK DRIVE BELT (See page AC-17 and AC-15 )

### 5. CONNECT NEGATIVE (-) TERMINAL CABLE TO BATTERY

### 6. EVACUATE AIR FROM REFRIGERATION SYSTEM AND CHARGE SYSTEM WITH REFRIGERANT Specified amount: 1,050 ± 50 g (37.03 ± 1.76 oz.)

### 7. INSPECT FOR LEAKAGE OF REFRIGERANT

Using a gas leak detector, check for leaks of the refrigerant. If there is a leakage, check the tightening torque at the joints.

### 8. INSPECT A/C OPERATION

# COMPRESSOR AND MAGNETIC CLUTCH

AC11K-03

## ON-VEHICLE INSPECTION

### 1. INSPECT COMPRESSOR FOR METALLIC SOUND

Check there is abnormal metallic sound from the compressor when the A/C switch is ON.

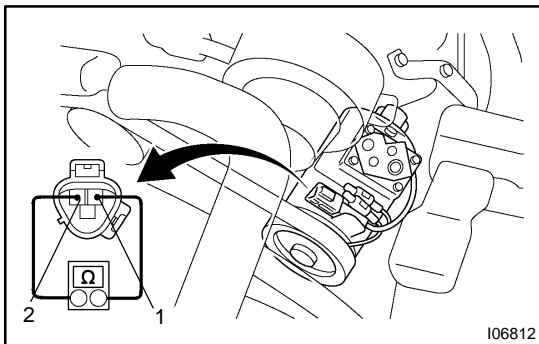
If abnormal metallic sound is heard, replace the compressor assembly.

### 2. INSPECT REFRIGERANT PRESSURE

(See page AC-3)

### 3. INSPECT VISUALLY FOR LEAKAGE OF REFRIGERANT

Using a gas leak detector, check for leakage of refrigerant. If there is any leakage, replace the compressor assembly.



### 4. INSPECT COMPRESSOR LOCK SENSOR RESISTANCE

- Disconnect the connector.
- Measure resistance between terminal 1 and 2.

**Standard resistance:**

**570 - 1,050  $\Omega$  at 20°C (68 °F)**

If resistance is not as specified, replace the compressor.

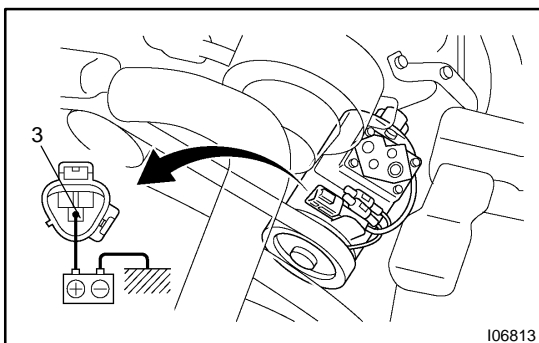
### 5. CHECK FOR LEAKAGE OF GREASE FROM CLUTCH BEARING

### 6. CHECK FOR SIGNS OF OIL ON PRESSURE PLATE OR ROTOR

### 7. INSPECT MAGNETIC CLUTCH BEARING FOR NOISE

- Start engine.
- Check for abnormal noise from the compressor when the A/C switch is OFF.

If abnormal noise is being emitted, replace the rotor of magnetic clutch.



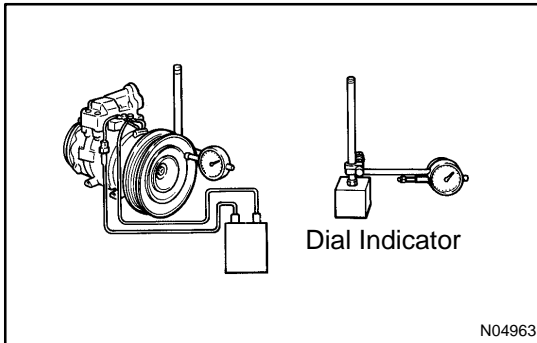
### 8. INSPECT MAGNETIC CLUTCH OPERATION

- Disconnect the connector.
- Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to the body ground.
- Check that the magnetic clutch is energized.

If operation is not as specified, replace the magnetic clutch.

## REASSEMBLY

Reassembly is in the reverse of disassembly  
(See page [AC-63](#) ).



### AFTER REASSEMBLY, CHECK MAGNETIC CLUTCH CLEARANCE

- Set the dial indicator to the pressure plate of the magnetic clutch.
- Connect the magnetic clutch lead wire to the battery positive (+) terminal.
- Check the clearance between the pressure plate and rotor when connecting the negative (-) terminal to the battery.

#### Standard clearance:

**0.5 ± 0.15 mm (0.020 ± 0.0059 in.)**

If the clearance is not within the standard clearance, adjust the clearance using shims to obtain the standard clearance.

#### Shim thickness:

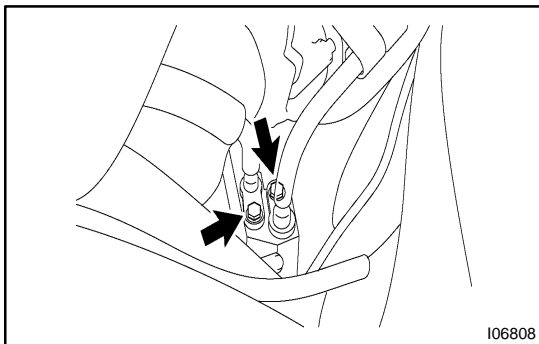
**0.1 mm (0.004 in.)**

**0.3 mm (0.012 in.)**

**0.5 mm (0.020 in.)**

## REMOVAL

1. RUN ENGINE AT IDLE SPEED WITH A/C ON FOR APPROX. 10 MINUTES
2. STOP ENGINE
3. DISCONNECT NEGATIVE (-) TERMINAL CABLE FROM BATTERY
4. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM
5. REMOVE ENGINE UNDER COVER
6. REMOVE DRIVE BELT (See page [AC-16](#))



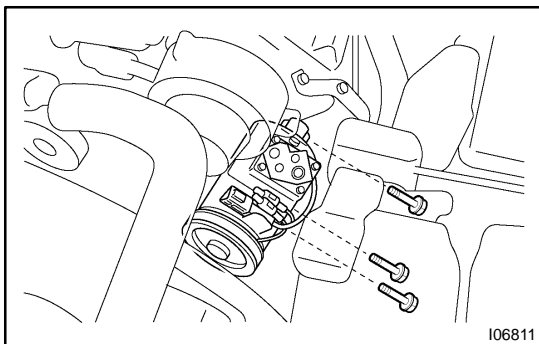
### 7. DISCONNECT DISCHARGE AND SUCTION HOSES

Remove the 2 bolts and disconnect the both hoses.

#### NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

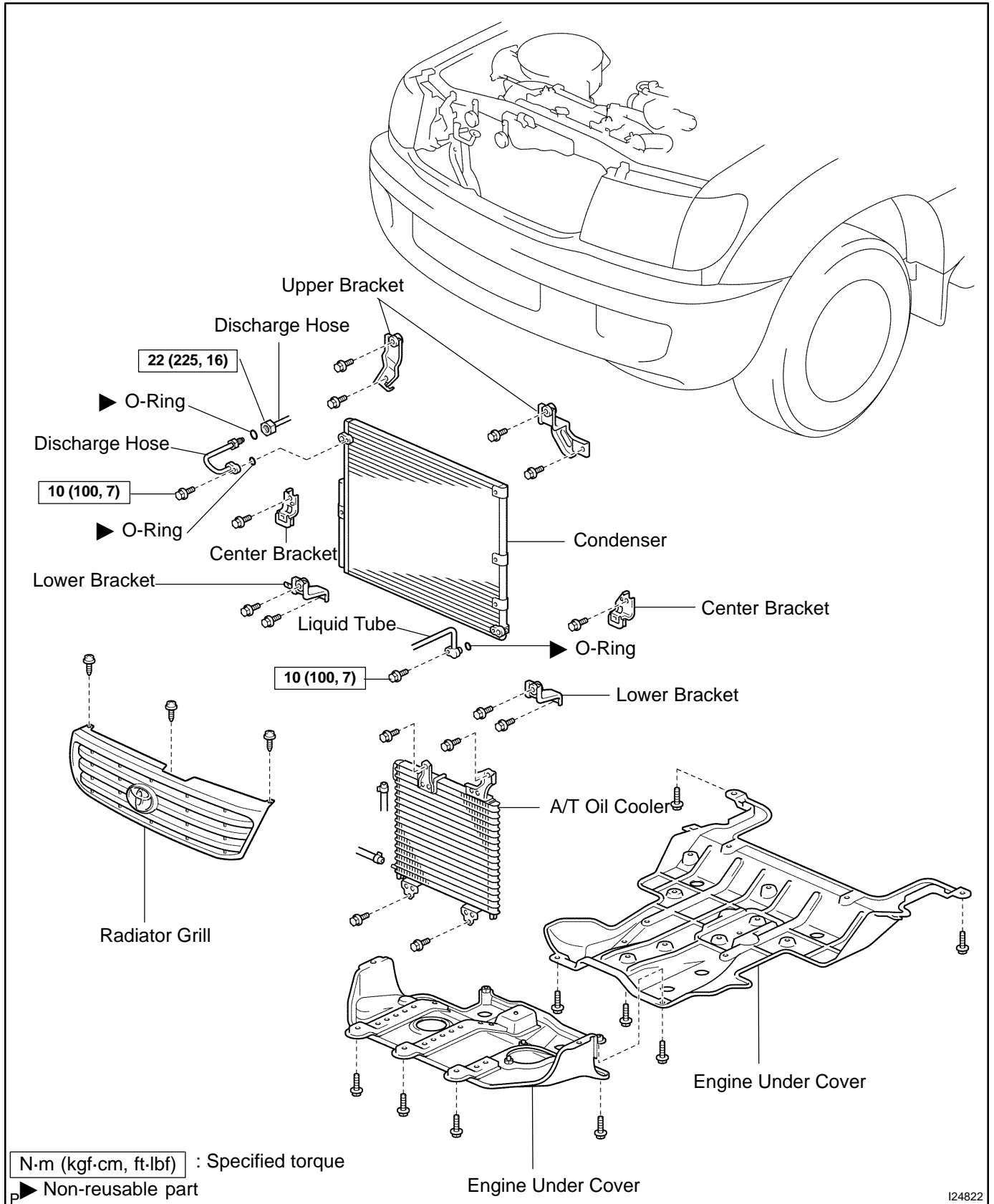
8. REMOVE FRONT DRIVE SHAFT LH  
(See page [SA-26](#))



### 9. REMOVE COMPRESSOR

- (a) Disconnect the connector.
- (b) Remove the 3 bolts and the compressor.

# COMPONENTS



124822

## INSTALLATION

Installation is in the reverse of removal (See page [AC-70](#)).



# CONDENSER

AC11Q-02

## ON-VEHICLE INSPECTION

### 1. INSPECT CONDENSER FINS FOR BLOCKAGE OR DAMAGE

If the fins are clogged, wash them with water and dry with compressed air.

#### **NOTICE:**

**Be careful not to damage the fins.**

If the fins are bent, straighten them with a screwdriver or pliers.

### 2. INSPECT CONDENSER AND FITTINGS FOR LEAKAGE

Using a gas leak detector, check for leaks of refrigerant.

If there is a leakage, check the tightening torque at the joints.

## REMOVAL

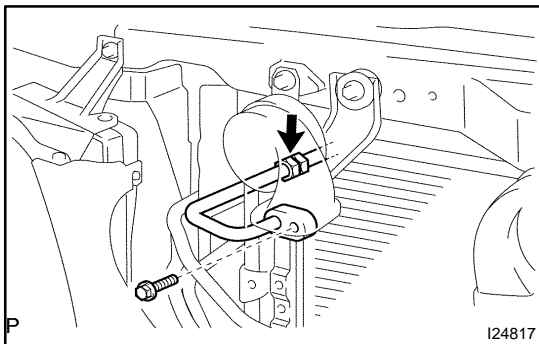
### 1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

#### HINT:

At the time of installation, refer to the following items evacuate air from the refrigeration system and charge system with the refrigerant and inspect for leaks of the refrigerant.

**Specified amount: 1,050 ± 50 g (37.03 ± 1.76 oz.)**

2. REMOVE RADIATOR GRILL
3. REMOVE A/T AIR COOLED OIL COOLER  
(See page [AT-17](#))
4. REMOVE ENGINE UNDER COVER



### 5. REMOVE DISCHARGE TUBE

- (a) Remove the bolt and disconnect the tube from the condenser.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

- (b) Loosen the nut and remove the tube.

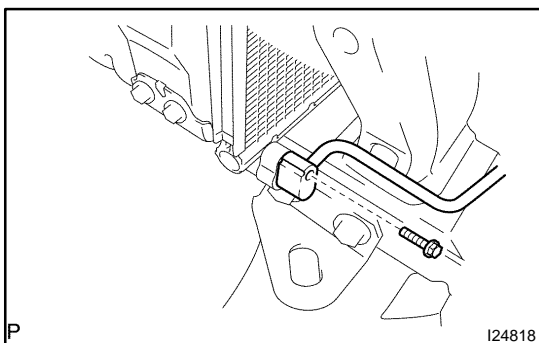
**Torque: 22 N·m (225 kgf·cm, 16 ft-lbf)**

#### NOTICE:

**Cap the open fittings immediately to keep moisture or dirt out of the system.**

#### HINT:

At the time of installation, lubricate 2 new O-rings with compressor oil and install them on the tube.



### 6. DISCONNECT LIQUID TUBE

Remove the bolt and disconnect the tube.

**Torque: 10 N·m (100 kgf·cm, 7 ft-lbf)**

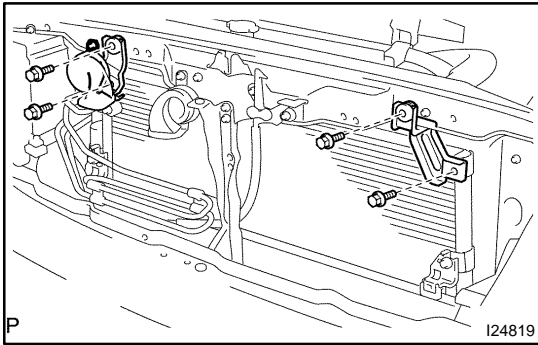
#### NOTICE:

**Cap the open fittings immediately to keep moisture or dirt out of the system.**

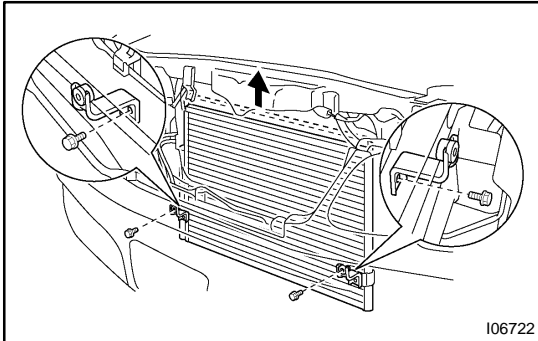
#### HINT:

At the time of installation, lubricate a new O-ring with compressor oil and install them on the tube.

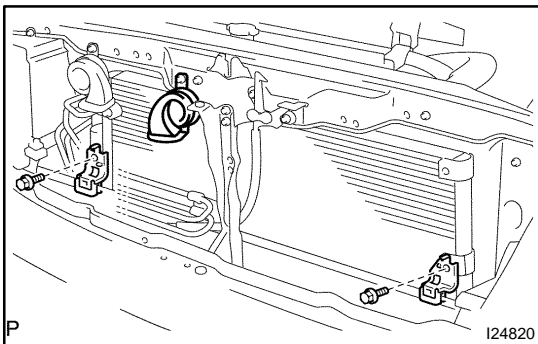
## AIR CONDITIONING - CONDENSER

**7. REMOVE CONDENSER**

- (a) Remove the 4 bolts and the 2 upper bracket.



- (b) Lift up condenser, then remove the 4 bolts and the 2 center bracket.



- (c) Remove the 2 bolts and the 2 center bracket.  
 (d) Remove the condenser.

**HINT:**

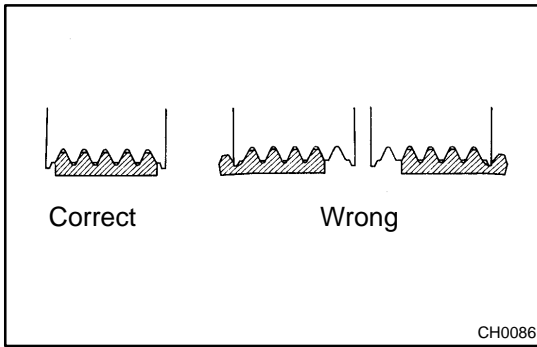
At the time of installation, please refer to the following item.  
 If condenser is replaced, add compressor oil to condenser.

**Add: 40 - 50 cc (1.4 - 1.7 fl.oz.)**

**Compressor oil: ND-OIL 8 or equivalent**

## INSTALLATION

Installation is in the reverse of removal (See page [AC-16](#)).

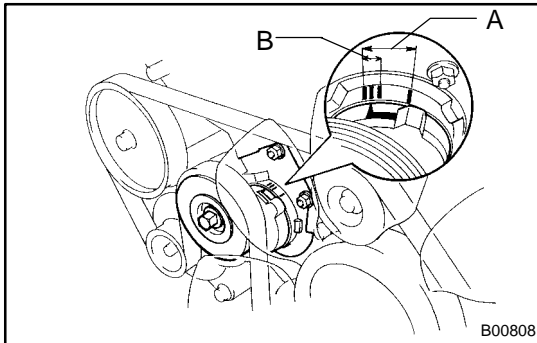


## DRIVE BELT ON-VEHICLE INSPECTION

AC1HP-03

### 1. INSPECT DRIVE BELT'S INSTALLATION CONDITION

Check that drive belt fits properly in the ribbed grooves.



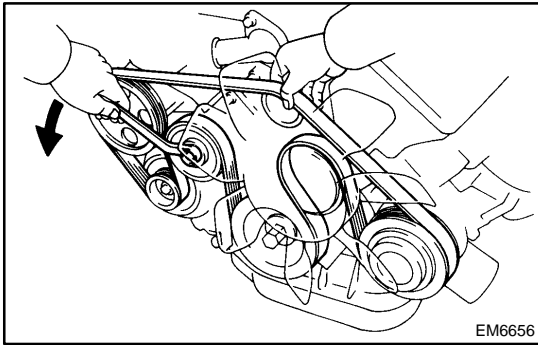
### 2. INSPECT DRIVE BELT TENSION

Check that the tension is within A range on the auto tensioner scale.

If the tension is not within the A range on the scale, replace the belt with a new one.

HINT:

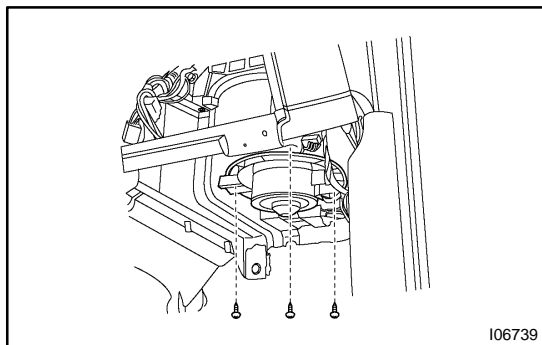
When replacing the drive belt with a new one, the belt's tension should be within the B range on the belt tensioner scale.



## REMOVAL

### REMOVE DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner counterclockwise, and remove the drive belt.

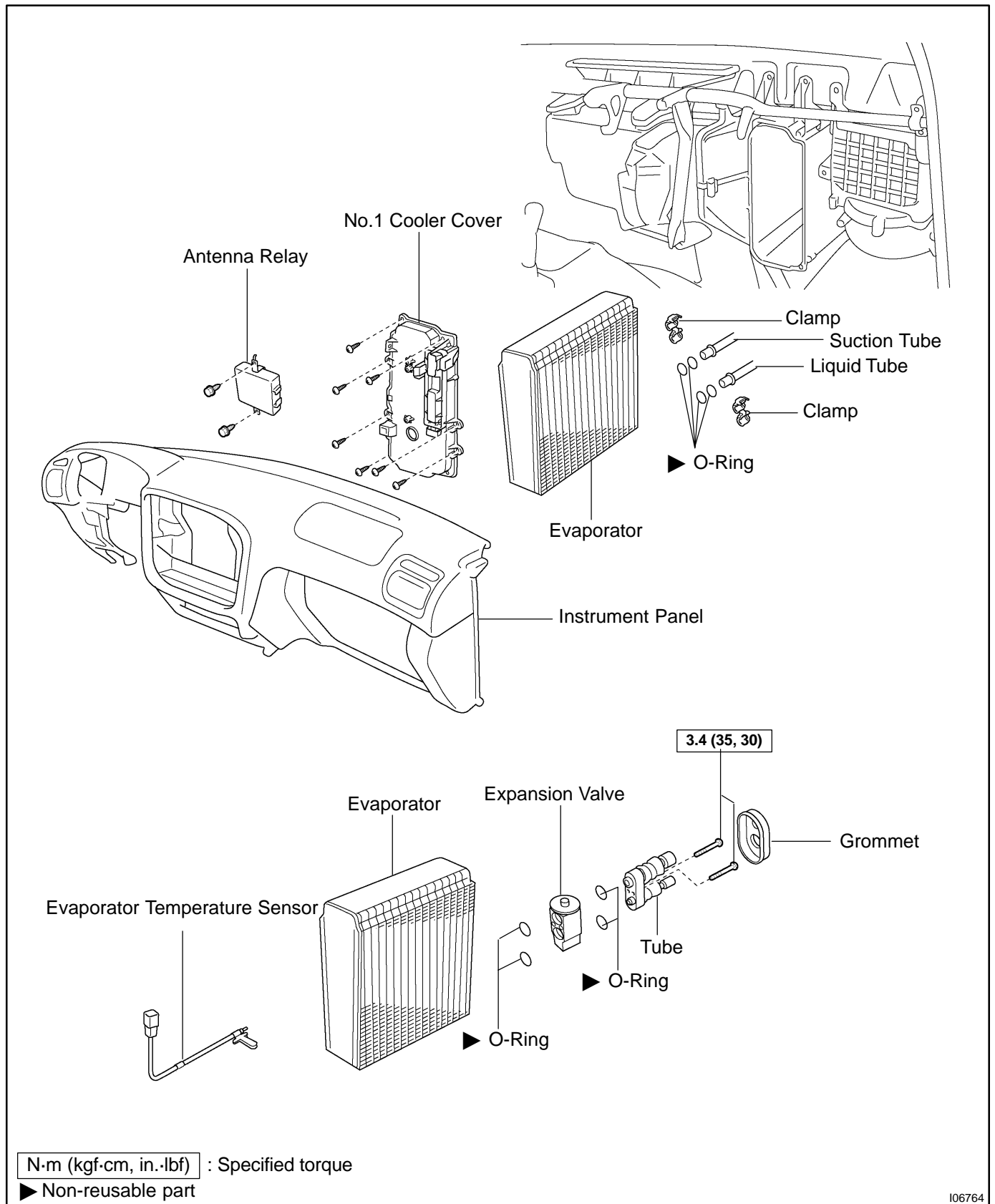


## FRONT A/C BLOWER MOTOR INSPECTION

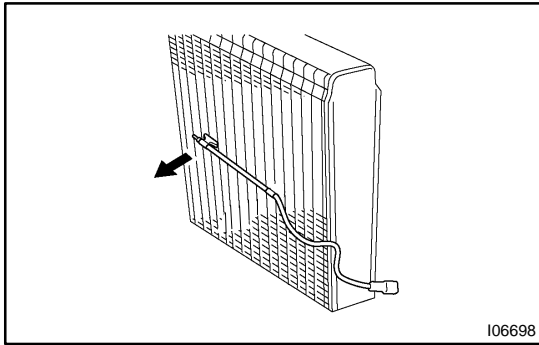
AC1LG-03

- 1. REMOVE BLOWER MOTOR**
  - (a) Disconnect the connector.
  - (b) Remove the 3 screws and the blower motor.
- 2. INSPECT BLOWER MOTOR CIRCUIT**  
(See page [DI-1369](#))
- 3. INSTALL BLOWER MOTOR**
  - (a) Install the blower motor with 3 screws.
  - (b) Connect the connector.

# COMPONENTS

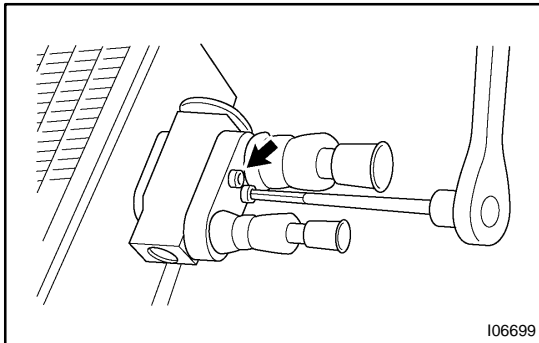






## DISASSEMBLY

### 1. PULL OUT EVAPORATOR TEMPERATURE SENSOR



### 2. REMOVE EXPANSION VALVE

Using a hexagon wrench (5.0mm, 0.20 in.), remove the 2 bolts and separate the expansion valve and the evaporator.

**Torque: 3.4 N·m (35 kgf·cm, 30 in.-lbf)**

#### NOTICE:

**Cap the open fittings immediately to keep moisture or dirt out of the system.**

#### HINT:

At the time of reassembly, lubricate 4 new O-rings with compressor oil and install them to the valve. If evaporator is replaced, add compressor oil to the evaporator.

**Add: 40 cc (1.4 fl.oz.)**

**Compressor oil: ND-OIL8 or equivalent**

## INSPECTION

### 1. CHECK EVAPORATOR FINS FOR BLOCKAGE

If the fins are clogged, remove them with compressed air.

#### **NOTICE:**

**Never use water to clean the evaporator.**

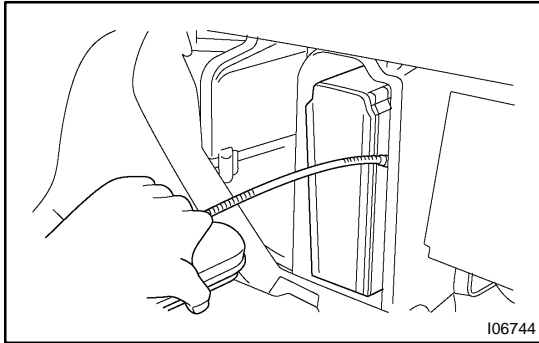
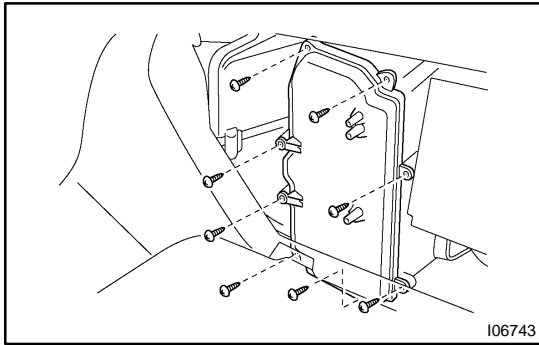
### 2. CHECK FITTINGS FOR CRACKS OR SCRATCHES

If necessary, repair or replace.

### 3. INSPECT EVAPORATOR TEMPERATURE CIRCUIT (See page [DI-1322](#) )

## INSTALLATION

Installation is in the reverse of removal (See page [AC-75](#)).



## FRONT A/C EVAPORATOR ON-VEHICLE INSPECTION

AC1L9-05

### 1. INSPECT FOR LEAKAGE OF REFRIGERANT

- (a) Remove the glove compartment door.
- (b) Remove the lower No. 2 finish panel  
(See page [BO-84](#)).
- (c) Remove the No. 1 cooler cover.
  - (1) Disconnect the connector clamp.
  - (2) Remove the 8 screws and No. 1 cooler cover.
- (d) Using a gas leak detector, check for leaks of refrigerant. If there is a leakage of refrigerant, check the tightening torque at the joints or check the evaporator.
- (e) Install the No. 1 cooler cover.

### 2. INSPECT EXPANSION VALVE

- (a) Check amount of gas during refrigeration cycle.
- (b) Set on manifold gauge set.
- (c) Operate A/C system at "MAX. COOL" for approx. 5 minutes.
- (d) Check expansion valve.  
Check the low pressure reading drops to 0 kPa (0 kgf/cm<sup>2</sup>, 0 psi).

If the low pressure reading is not as specified, replace the expansion valve with the tubes.

## REASSEMBLY

Reassembly is in the reverse of disassembly (See page [AC-76](#)).

## REMOVAL

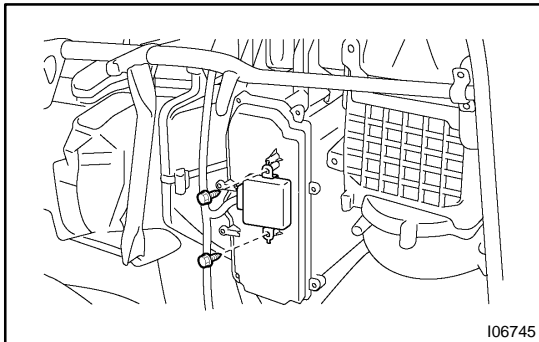
### 1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

#### HINT:

At the time of installation, evacuate air from refrigeration system and charge the system with the refrigerant and inspect for leaks of the refrigerant.

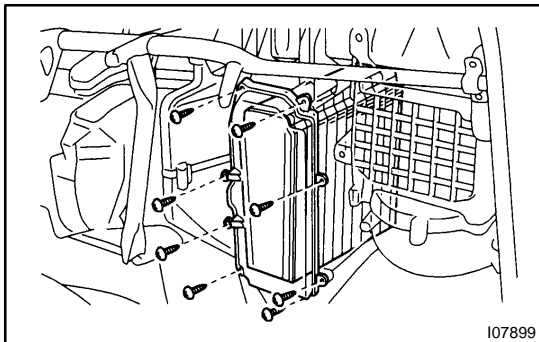
**Specified amount: 1,050 ± 50 g (37.03 ± 1.76 oz.)**

2. DISCONNECT LIQUID AND SUCTION TUBES FROM FRONT COOLING UNIT (See page [AC-24](#) )
3. REMOVE INSTRUMENT PANEL (See page [BO-84](#) )



### 4. REMOVE ANTENNA RELAY

- (a) Disconnect the connector.
- (b) Remove the 2 screws and the antenna relay.

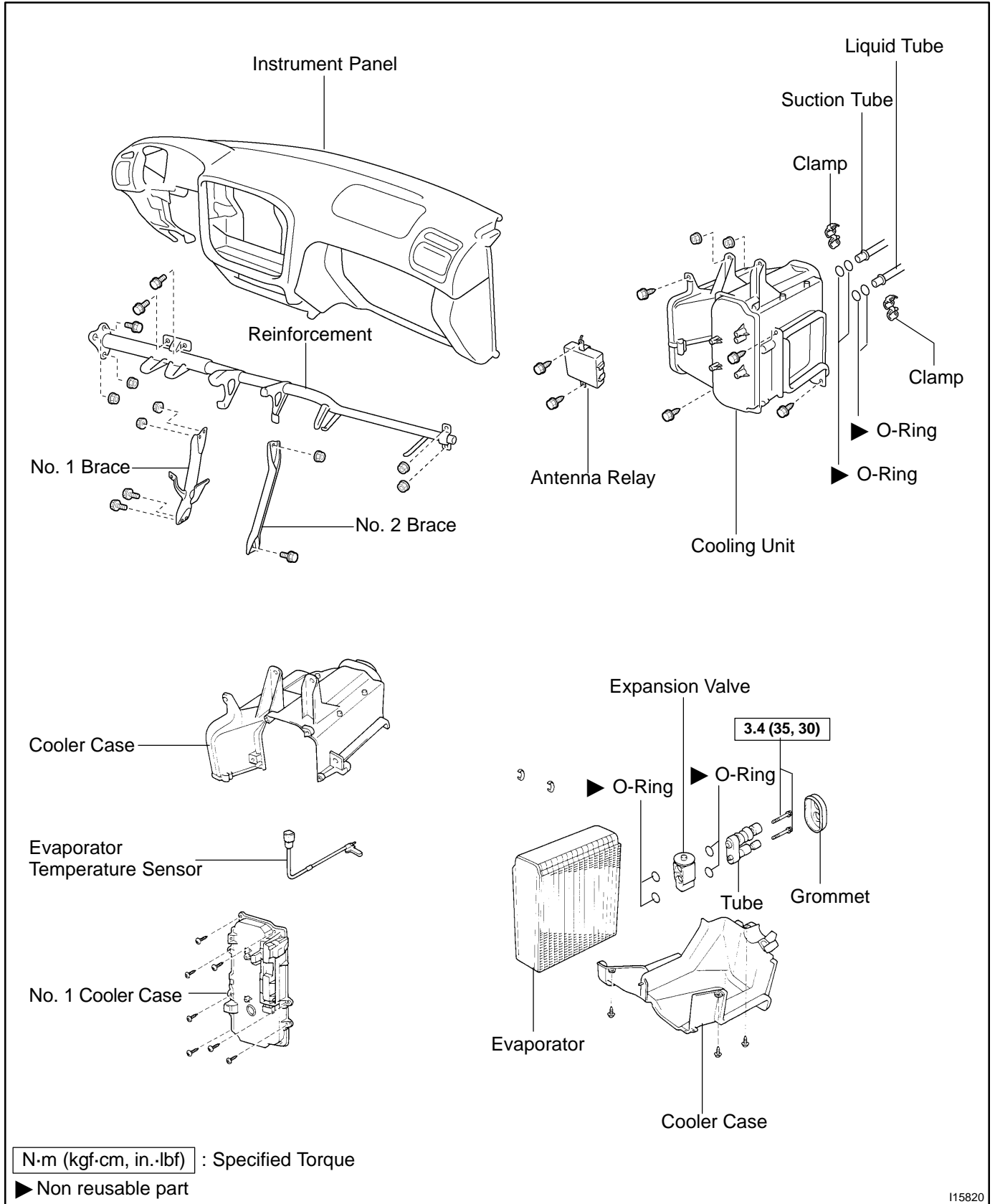


### 5. REMOVE EVAPORATOR

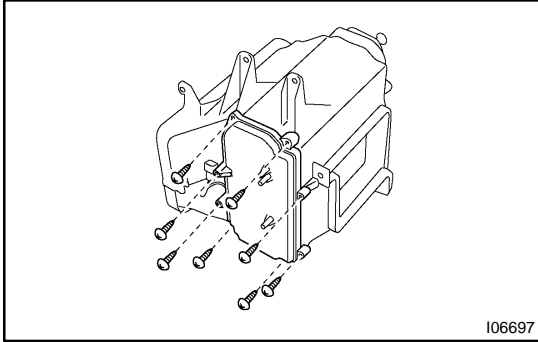
- (a) Disconnect the connector.
- (b) Disconnect the connector clamp.
- (c) Remove the 8 screws and the No .1 cooler cover.
- (d) Pull out the evaporator.

# FRONT COOLING UNIT COMPONENTS

AC1K5-06



115820



## DISASSEMBLY

### 1. REMOVE EVAPORATOR

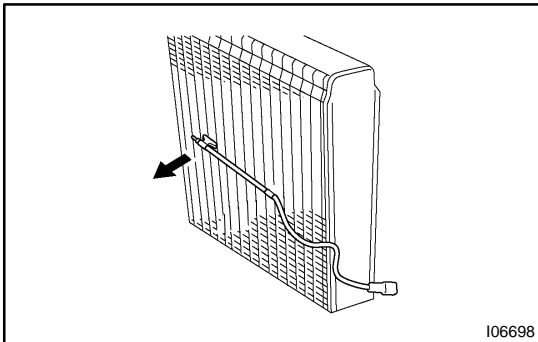
- (a) Disconnect the connector clamp.
- (b) Remove the 8 screws and No. 1 cooler cover.
- (c) Pull out the evaporator

#### HINT:

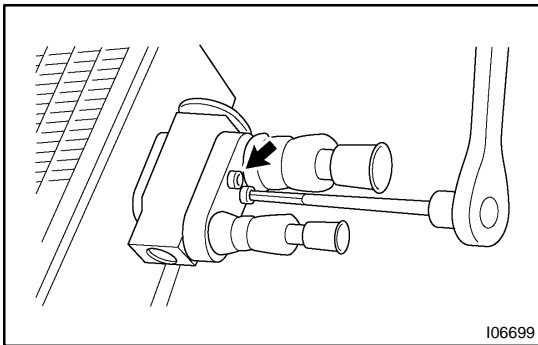
At the time of reassembly, if evaporator is replaced, add compressor oil to the evaporator.

**Add: 40 cc (1.4 fl.oz.)**

**Compressor oil: ND-OIL 8 or equivalent**



### 2. PULL OUT EVAPORATOR TEMPERATURE SENSOR FROM EVAPORATOR



### 3. REMOVE EXPANSION VALVE

- (a) Remove the grommet.
- (b) Pry out the packing.

#### HINT:

At the time of reassembly, do not reuse the packing.

- (c) Using a hexagon wrench (5.0 mm, 0.20 in.), remove the 2 bolts and separate the expansion valve, tube and evaporator.

**Torque: 3.4 N·m (35 kgf·cm, 30 in.-lbf)**

#### NOTICE:

**Cap the open fittings immediately to keep moisture or dirt out of the system.**

#### HINT:

At the time of reassembly, lubricate 4 new O-rings with compressor oil and install them in the tube.

### 4. REMOVE DRAIN HOSE



## INSTALLATION

Installation is in the reverse of removal (See page [AC-24](#)).

## REASSEMBLY

Reassembly is in the reverse of disassembly (See page [AC-26](#)).

## REMOVAL

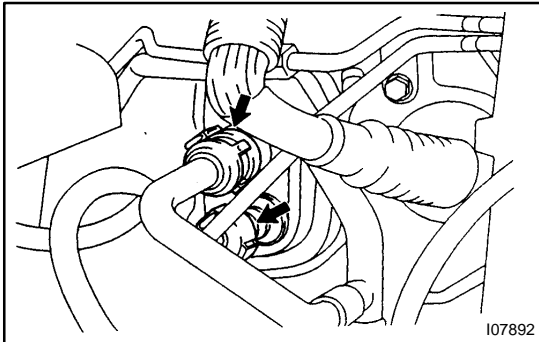
### 1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

#### HINT:

At the time of installation, first evacuate air from refrigeration system.

Then, charge the system with the refrigerant and inspect for leaks of the refrigerant.

**Specified amount: 1,050 ± 50 g (37.03 ± 1.76 oz.)**

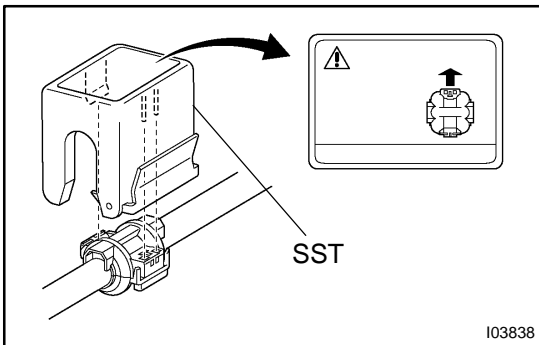


### 2. DISCONNECT LIQUID AND SUCTION TUBES

- (a) Using SST, remove the 2 piping clamps.

SST 09870-00025 (Liquid tube)

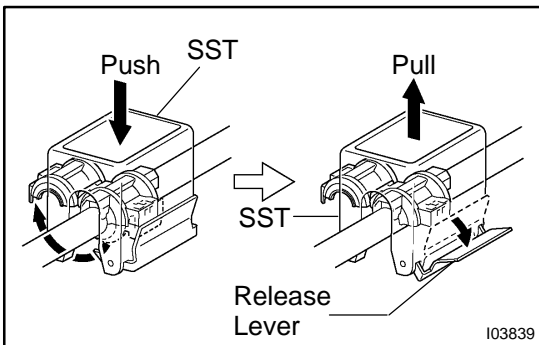
09870-00015 (Suction tube)



- (1) Insert SST to piping clamp.

#### HINT:

Confirm the direction of the piping clamp claw and SST referring to the illustration on the caution label.



- (2) Push down SST and release the clamp lock.

#### NOTICE:

**Be careful not to deform the tubes when pushing SST.**

- (3) Pull SST slightly and push the release lever, then remove the piping clamp with SST.

- (4) Remove the piping clamp from SST.

- (b) Disconnect the both tubes.

#### NOTICE:

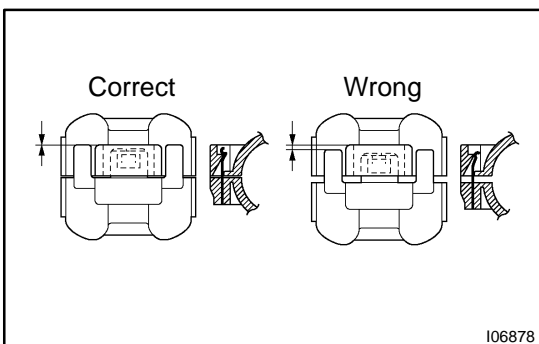
**Cap the open fittings immediately to keep moisture or dirt out of the system.**

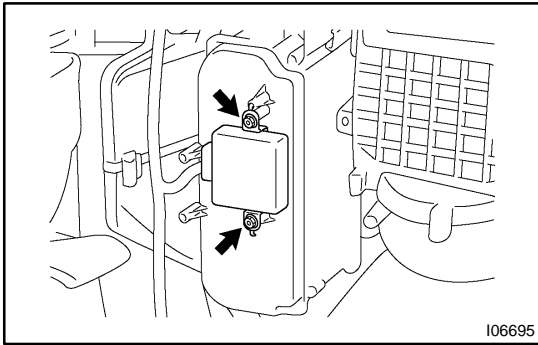
#### HINT:

At the time of installation:

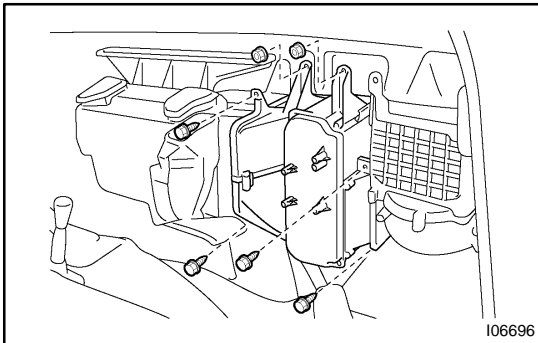
- ▶ Lubricate 4 new O-rings with compressor oil and install them to the tubes.
- ▶ After connection, check the fitting for claw of the piping clamp.

### 3. REMOVE INSTRUMENT PANEL AND REINFORCEMENT (See page [BO-84](#))



**4. REMOVE ANTENNA RELAY**

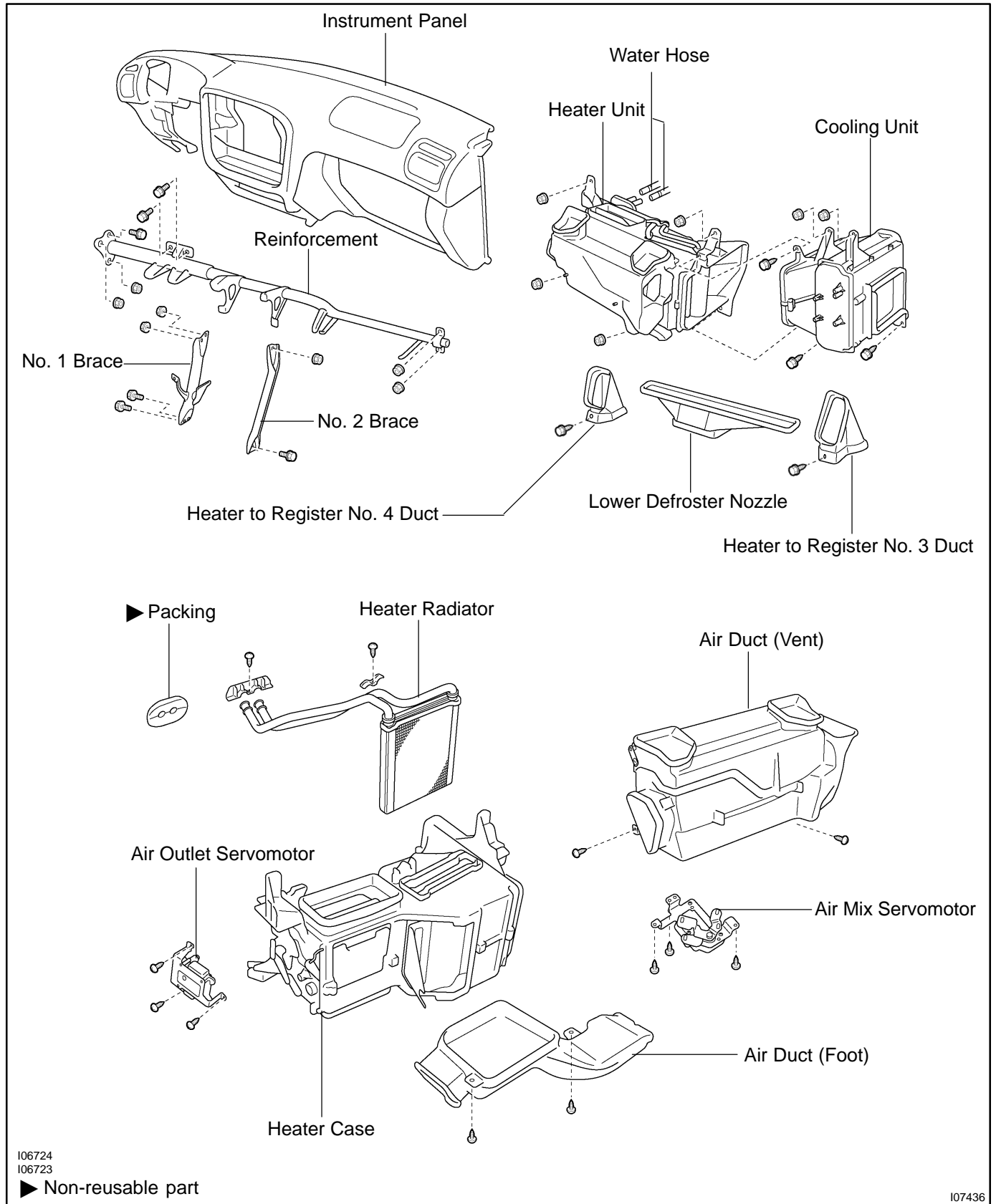
- (a) Disconnect the connector.
- (b) Remove the 2 screws and antenna relay.

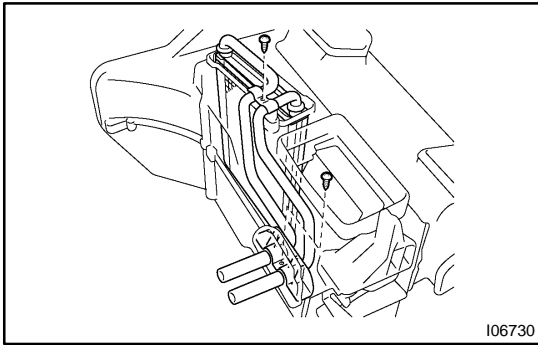
**5. REMOVE COOLING UNIT**

- (a) Disconnect the connector.
- (b) Remove the 4 screws, 2 nuts and cooling unit.

# FRONT HEATER UNIT COMPONENTS

AC1KH-03

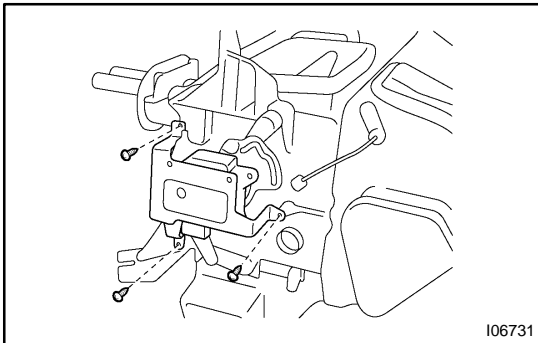




## DISASSEMBLY

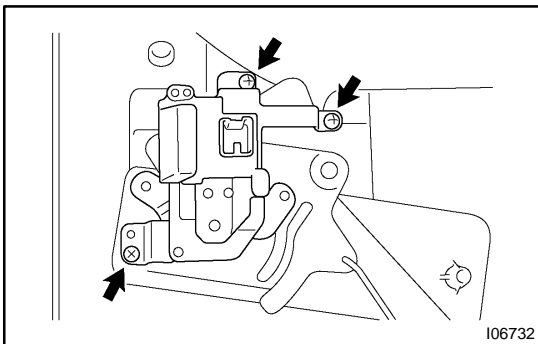
### 1. REMOVE HEATER RADIATOR

- (a) Pry out the packing.
- (b) Remove the screw and the bracket.
- (c) Remove the screw and the clamp.
- (d) Pull out the heater radiator.



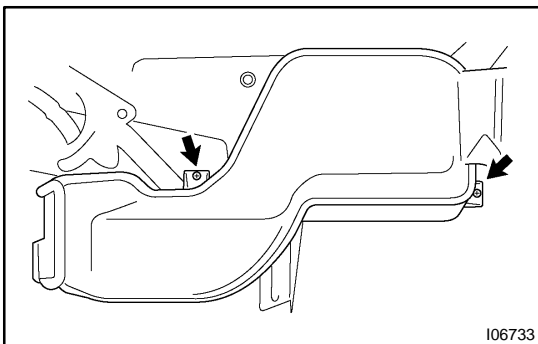
### 2. REMOVE AIR OUTLET SERVOMOTOR

Remove the 3 screws and the air outlet servomotor.



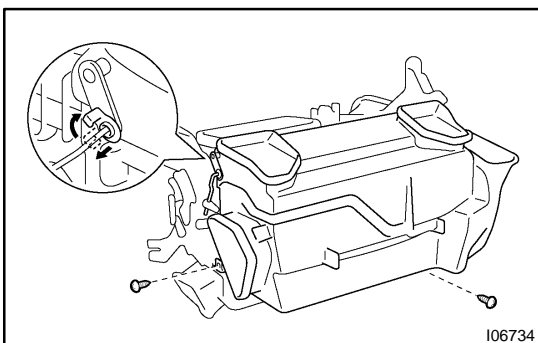
### 3. REMOVE AIR MIX SERVOMOTOR

- (a) Disconnect the connector.
- (b) Remove the 3 screws and the air mix servomotor.
- (c) Release the claw and remove the wire harness.



### 4. REMOVE AIR DUCT (Foot Duct)

Remove the 2 screws and air duct.



### 5. REMOVE AIR DUCT (Vent Duct)

- (a) Disconnect the mode damper control link.
- (b) Remove the 2 screws and the air duct.

## INSPECTION

### 1. CHECK HEATER RADIATOR FINS FOR BLOCKAGE

If the fins are clogged, remove them with compressed air.

### 2. CHECK FITTING FRO CRACKS OR SCRATCHES

If necessary repair or replace.

## INSTALLATION

Installation is in the reverse of removal (See page [AC-40](#)).



## REASSEMBLY

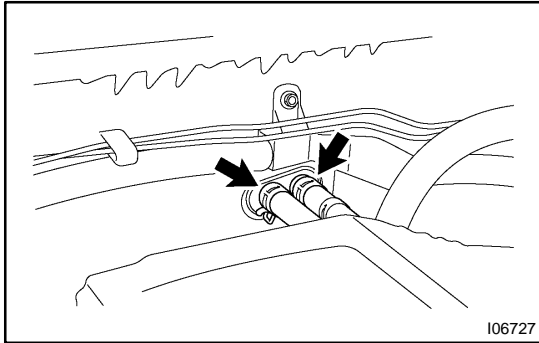
Reassembly is in the reverse of disassembly (See page [AC-41](#) ).

## REMOVAL

### 1. DRAIN ENGINE COOLANT FROM RADIATOR

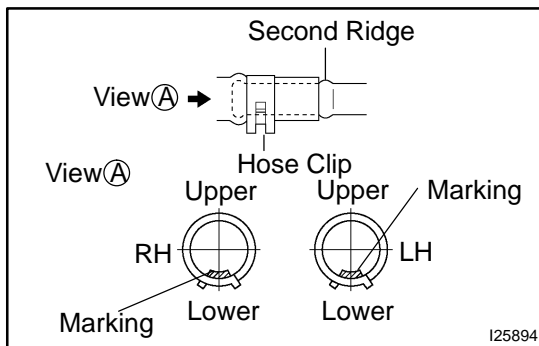
HINT:

It is not necessary to drain out all coolant.



### 2. DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES

- (a) Using pliers, grip the claws of the hose clip and slide the clip along the hose.
- (b) Disconnect the water hoses from the heater radiator pipes.



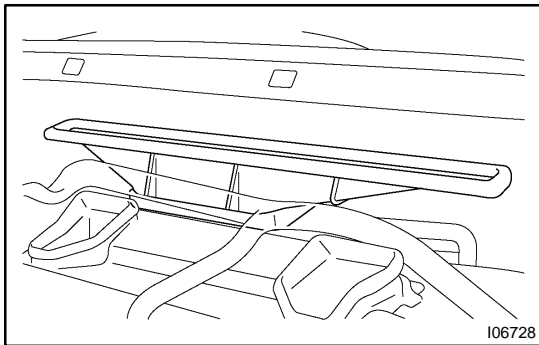
HINT:

At the time of installation, please refer to the following items.

- ▶ Push the water hose onto the heater radiator pipe to the second ridge on the pipe.
- ▶ Install a hose clip in the position as shown in the illustration.

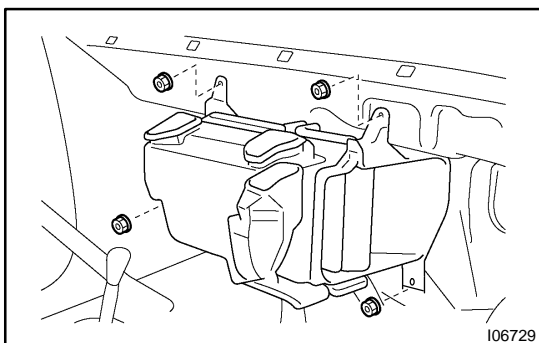
### 3. REMOVE INSTRUMENT PANEL AND REINFORCEMENT (See page [BO-84](#))

### 4. REMOVE FRONT COOLING UNIT (See page [AC-24](#))

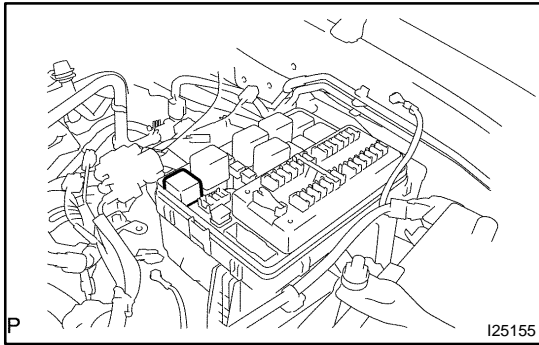


### 5. REMOVE HEATER UNIT

- (a) Remove the lower defroster nozzle.



- (b) Disconnect the connector.
- (c) Remove the 4 nuts and heater unit.

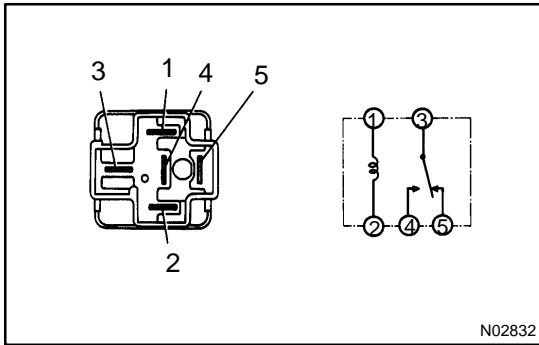


# HEATER MAIN RELAY INSPECTION

AC30X-01

## 1. REMOVE HEATER MAIN RELAY

Remove the heater main relay.

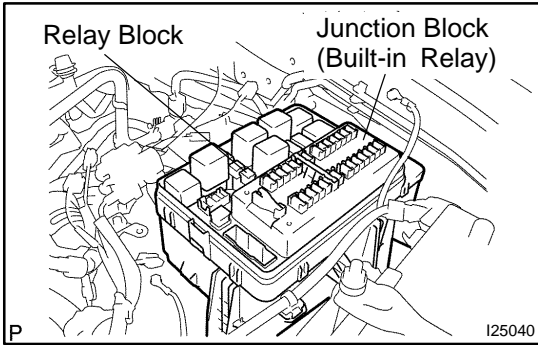


## 2. INSPECT HEATER MAIN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 - 2	Continuity
	3 - 4	
Apply B+ between terminals 1 and 2.	3 - 5	Continuity

If continuity is not as specified, replace the relay.

## 3. INSTALL HEATER MAIN RELAY



# MAGNETIC CLUTCH RELAY INSPECTION

AC1LY-03

**HINT:**

The magnetic clutch relay is built in the engine room junction block. Since the relay is constructed with a relay block that is in the junction block as a unit, it is impossible to disconnect the wire harness connecting with the relay block.

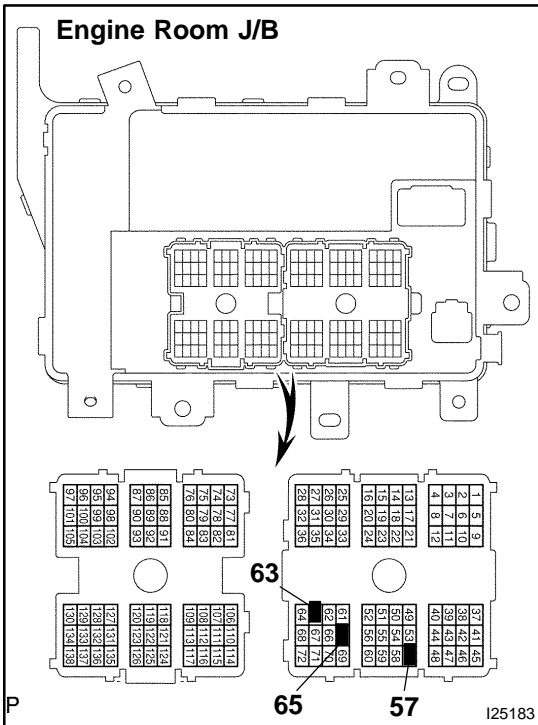
If the relay has a malfunction, replace it with the junction block assembly wire harness together.

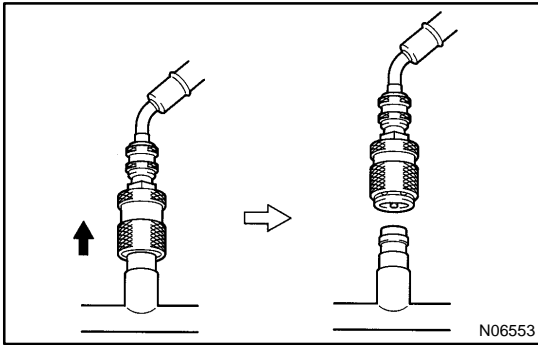
1. REMOVE ENGINE ROOM J/B
2. INSPECT MAGNETIC CLUTCH RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	57 - 65	Continuity
Apply B+ between terminals 57 and 65.	63 - 65	Continuity

If continuity is not as specified, replace the engine room J/B.

3. INSTALL ENGINE ROOM J/B





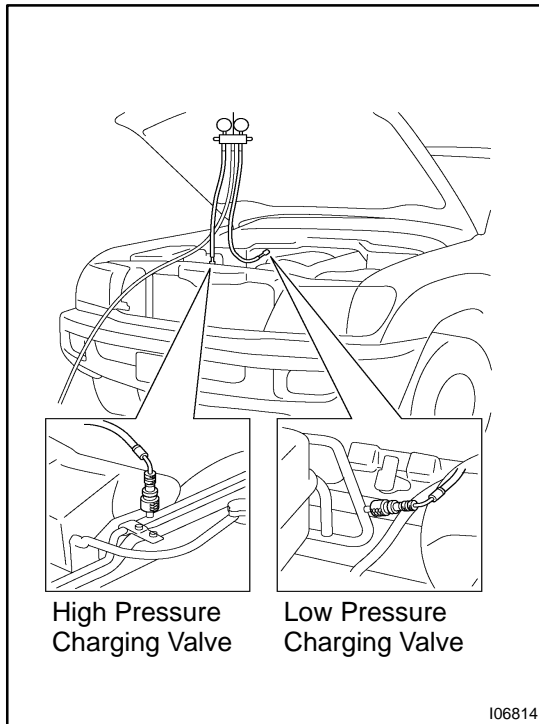
## SET OFF

1. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET
2. DISCONNECT QUICK DISCONNECT ADAPTERS FROM SERVICE VALVES ON REFRIGERANT LINE

### HINT:

Slide the sleeve of the quick disconnect adapter upward to unlock the adapter and remove it from the service valve.

3. INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINE



## MANIFOLD GAUGE SET SET ON

AC1HS-05

### 1. CONNECT CHARGING HOSE TO MANIFOLD GAUGE SET

Tighten the nuts by hand.

#### CAUTION:

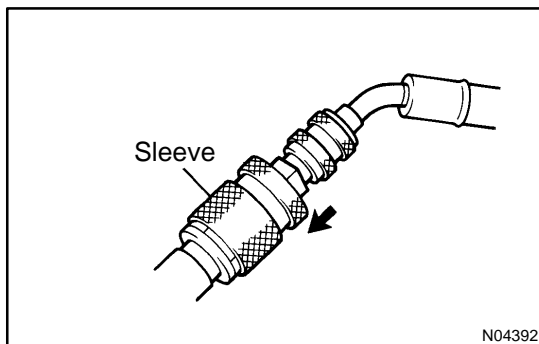
Do not connect the wrong hoses.

### 2. CONNECT QUICK DISCONNECT ADAPTERS TO CHARGING HOSES

Tighten the nuts by hand.

### 3. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET

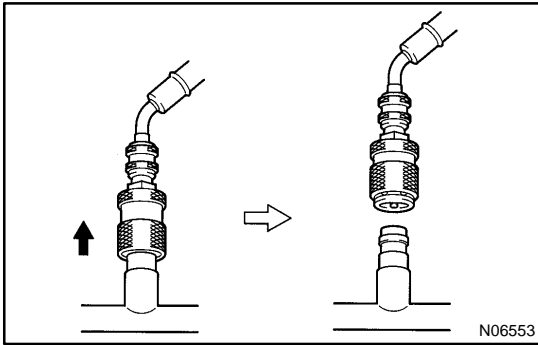
### 4. REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINES



### 5. CONNECT QUICK DISCONNECT ADAPTERS TO SERVICE VALVES

#### HINT:

Push the quick disconnect adapter onto the service valve, then the sleeve of the quick disconnect adapter downward to lock it.



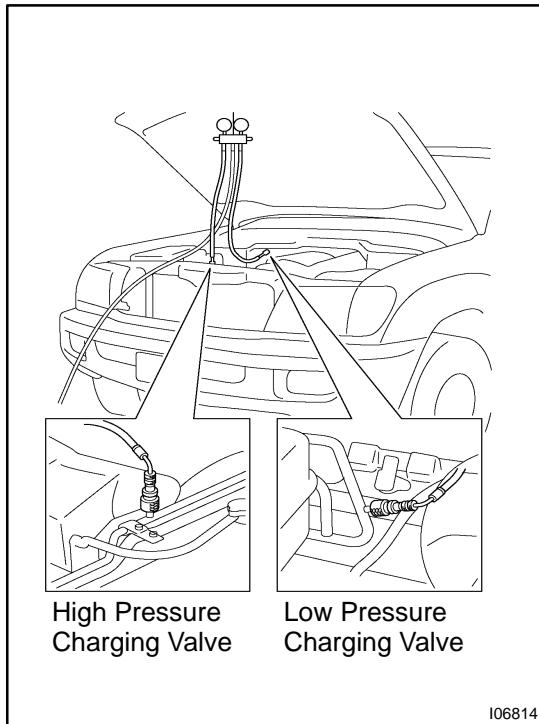
## SET OFF

1. **CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET**
2. **DISCONNECT QUICK DISCONNECT ADAPTERS FROM SERVICE VALVES ON REFRIGERANT LINE**

### HINT:

Slide the sleeve of the quick disconnect adapter upward to unlock the adapter and remove it from the service valve.

3. **INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINE**



## MANIFOLD GAUGE SET SET ON

AC1HS-05

### 1. CONNECT CHARGING HOSE TO MANIFOLD GAUGE SET

Tighten the nuts by hand.

#### CAUTION:

Do not connect the wrong hoses.

### 2. CONNECT QUICK DISCONNECT ADAPTERS TO CHARGING HOSES

Tighten the nuts by hand.

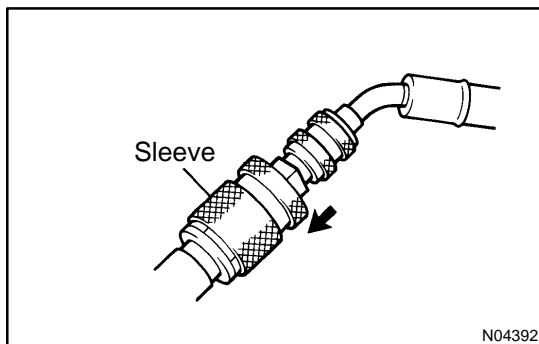
### 3. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET

### 4. REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINES

### 5. CONNECT QUICK DISCONNECT ADAPTERS TO SERVICE VALVES

#### HINT:

Push the quick disconnect adapter onto the service valve, then the sleeve of the quick disconnect adapter downward to lock it.



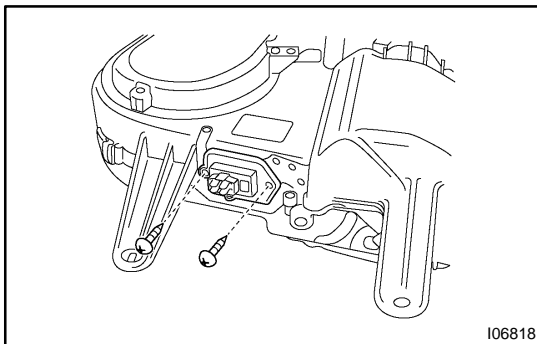


## POWER TRANSISTOR (for Rear Heater)

AC1LJ-04

### INSPECTION

1. REMOVE FRONT SEATS
2. REMOVE REAR CONSOLE BOX
3. REMOVE FRONT CONSOLE BOX COVER
4. REMOVE LOWER CENTER CLUSTER FINISH PANEL
5. REMOVE FRONT DOOR SCUFF PLATES
6. REMOVE COWL SIDE TRIMS
7. REMOVE REAR DOOR SCUFF PATES
8. REMOVE CENTER PILLAR GARNISHES
9. REMOVE POWER TRANSISTOR
- (a) Slide the floor carpet backward.



- (b) Disconnect the connector.
- (c) Remove the 2 screws and power transistor.

### 10. INSPECT POWER TRANSISTOR

Check the power transistor in the same way as for "POWER TRANSISTOR (For Rear Cooler)" on page [AC-82](#) .

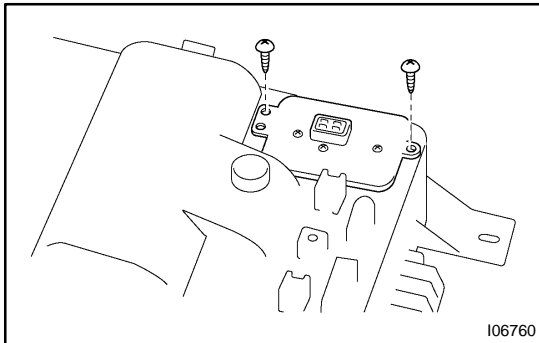
11. INSTALL POWER TRANSISTOR
12. INSTALL CENTER PILLAR GARNISHES
13. INSTALL REAR DOOR SCUFF PATES
14. INSTALL COWL SIDE TRIMS
15. INSTALL FRONT DOOR SCUFF PLATES
16. INSTALL LOWER CENTER CLUSTER FINISH PANEL
17. INSTALL FRONT CONSOLE BOX COVER
18. INSTALL REAR CONSOLE BOX
19. INSTALL FRONT SEATS

# POWER TRANSISTOR (for Rear Cooler)

AC1LI-04

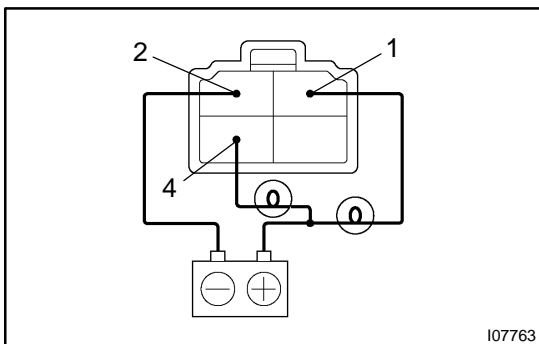
## INSPECTION

1. REMOVE REAR DOOR SCUFF PLATE RH
2. REMOVE REAR FLOOR MAT SUPPORT PLATE
3. REMOVE QUARTER TRIM PANEL RH



### 4. REMOVE POWER TRANSISTOR

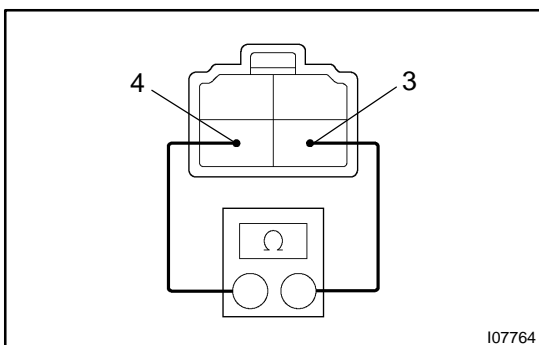
- (a) Disconnect the connector.
- (b) Remove the 2 screws and the power transistor.



### 5. INSPECT POWER TRANSISTOR OPERATION

- (a) Connect the positive (+) lead to terminal 1 through a 12 V - 3.4 W test bulb and negative (-) lead to terminal 2.
- (b) Check the test bulb comes on when another positive (+) lead is connected to terminal 4 through a 12 V - 3.4 W test bulb.

If operation is not as specified, replace the power transistor.



### 6. INSPECT POWER TRANSISTOR RESISTANCE

Measure resistance between terminals 3 and 4.

**Standard resistance: 2.0 - 2.4 kΩ**

If resistance is not as specified, replace the power transistor.

### 7. INSTALL POWER TRANSISTOR

- (a) Install the power transistor with 2 screws.
- (b) Connect the connector.

### 8. INSTALL QUARTER TRIM PANEL RH

### 9. INSTALL REAR FLOOR MAT SUPPORT PLATE

### 10. INSTALL REAR DOOR SCUFF PLATE RH

## INSTALLATION

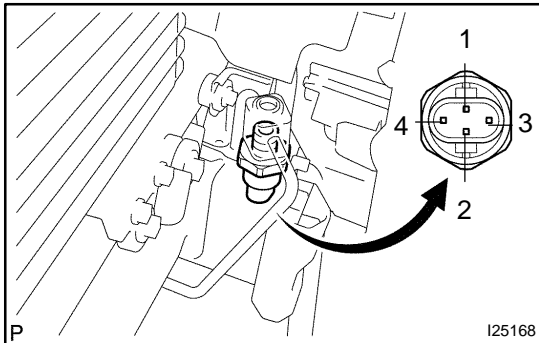
Installation is in the reverse of removal (See page [AC-92](#)).

# PRESSURE SWITCH ON-VEHICLE INSPECTION

AC30W-01

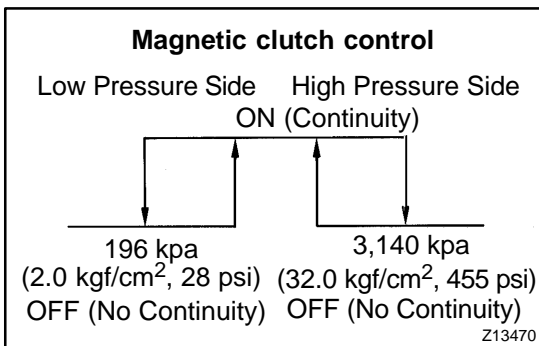
## 1. SET VEHICLE IN THESE CONDITION

- (a) Engine speed at 1,500 rpm
- (b) Blower speed control switch at "HI" position
- (c) Temperature control dial at "MAX. COOL" position
- (d) Manifold gauge set setting



## 2. INSPECT PRESSURE SWITCH OPERATION

- (a) Disconnect the connector.



- (b) Inspect pressure switch continuity (Magnetic Clutch Control)
  - (1) Connect the positive (+) lead from the ohmmeter to terminal 1 and the negative (-) lead to terminal 2.
  - (2) Check continuity between terminals when the refrigerant pressure is changed, as shown in the illustration.

If continuity is not as specified, replace the pressure switch.

## REMOVAL

### 1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

#### HINT:

At the time of installation, evacuate air from refrigeration system and charge system with refrigerant and inspect for leakage of refrigerant.

**Specified amount: 1,050 ± 50 g (37.03 ± 1.76 oz.)**

### 2. REMOVE RADIATOR GRILL

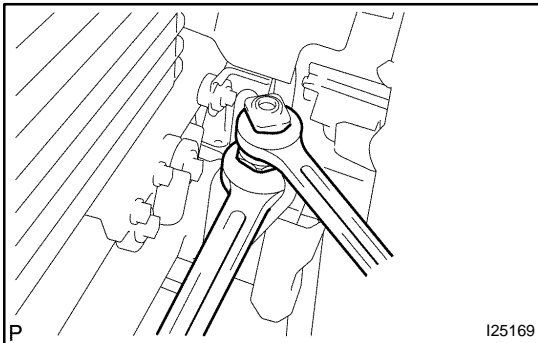
### 3. REMOVE PRESSURE SWITCH FROM LIQUID TUBE

Disconnect the connector and remove the pressure switch.

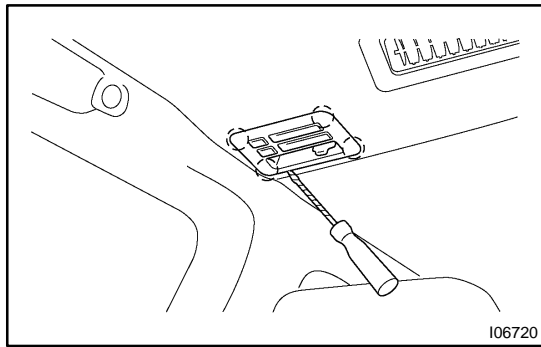
**Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)**

#### HINT:

- ▶ Lock the switch mount on the tube with an open-end wrench, be careful not to deform the tube, and remove the switch.
- ▶ At the time of installation, lubricate a new O-ring with compressor oil and install the switch.



I25169

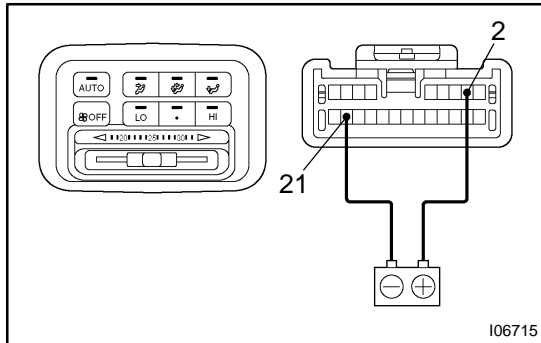


## REAR A/C CONTROL ASSEMBLY INSPECTION

AC1MC-04

### 1. REMOVE REAR HEATER CONTROL ASSEMBLY

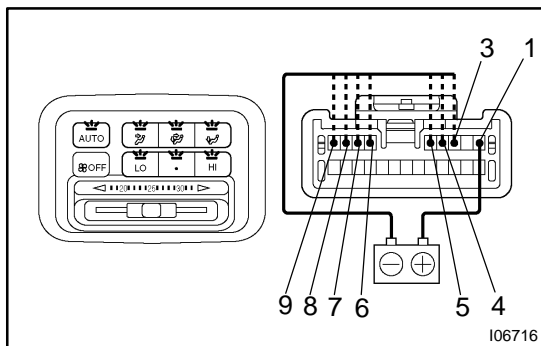
Using a screwdriver, release the 4 claws and pull out the rear heater control assembly, then disconnect the connector.



### 2. INSPECT ILLUMINATION OPERATION

Connect battery positive (+) lead to terminal 2 and battery negative (-) lead to terminal 21 then check that the indicators come on.

If operation is not as specified, replace the rear A/C control assembly.

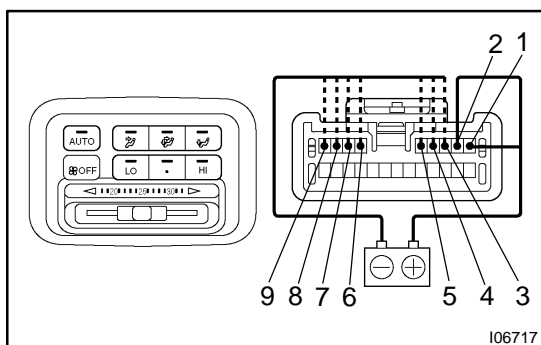


### 3. INSPECT INDICATOR OPERATION

(a) Connect battery positive (+) lead to terminal 1 and battery negative (-) lead to all the other terminals, then check that the indicator come on, as shown in the chart.

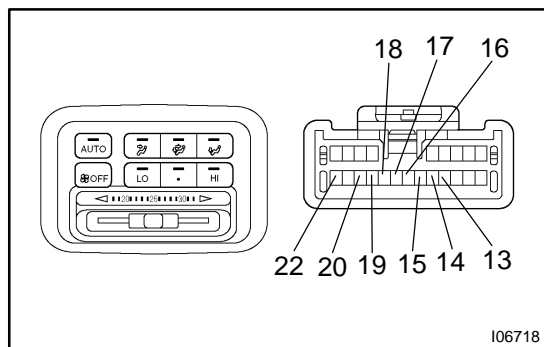
Switch	Tester connection
Auto	3
LO	4
ME	5
HI	6
FACE	7
Bi-Level	8
FOOT	9

If operation is not as specified, replace the rear A/C control assembly.



(b) Connect the positive (+) lead from the battery to terminal 2, then check where the indicators dim.

If operation is not as specified, replace the rear A/C control assembly.

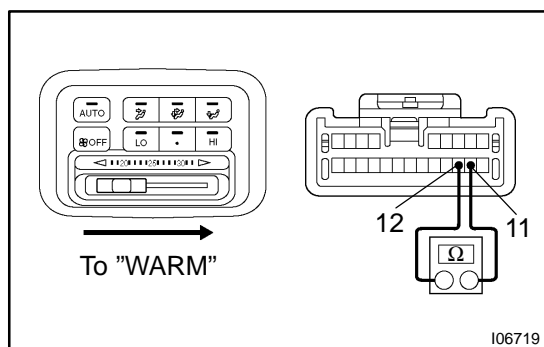


#### 4. INSPECT SWITCH CONTINUITY

Check the continuity between terminals while switch is pressed, as shown in the chart.

Switch	Tester connection	Specified condition
Auto	13 - 22	Continuity
OFF	14 - 22	Continuity
LO	15 - 22	Continuity
ME	16 - 22	Continuity
HI	17 - 22	Continuity
FACE	18 - 22	Continuity
Bi-Level	19 - 22	Continuity
FOOT	20 - 22	Continuity

If continuity is not as specified, replace the rear A/C control assembly.



#### 5. INSPECT VARIABLE RESISTOR OPERATION

- (a) Measure resistance between terminal 10 and 12.

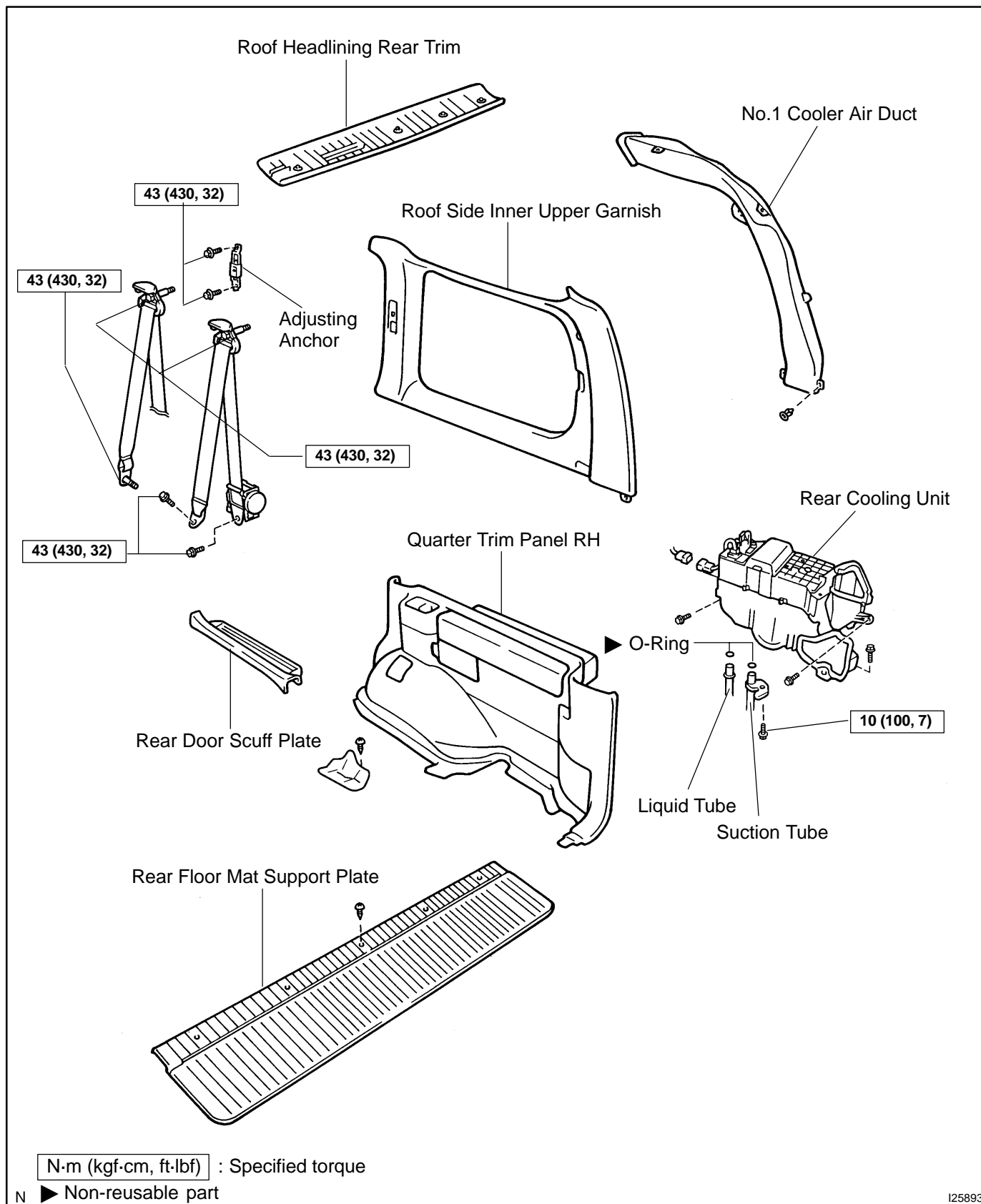
**Standard resistance: 3.0 kΩ**

- (b) Gradually move the temperature control lever from "COOL" side to "WARM" side, then check that the resistance between terminal 11 and 12 increase to 3.0 kΩ.

If operation is not as specified, replace the rear A/C control assembly.

#### 6. INSTALL HEATER CONTROL ASSEMBLY

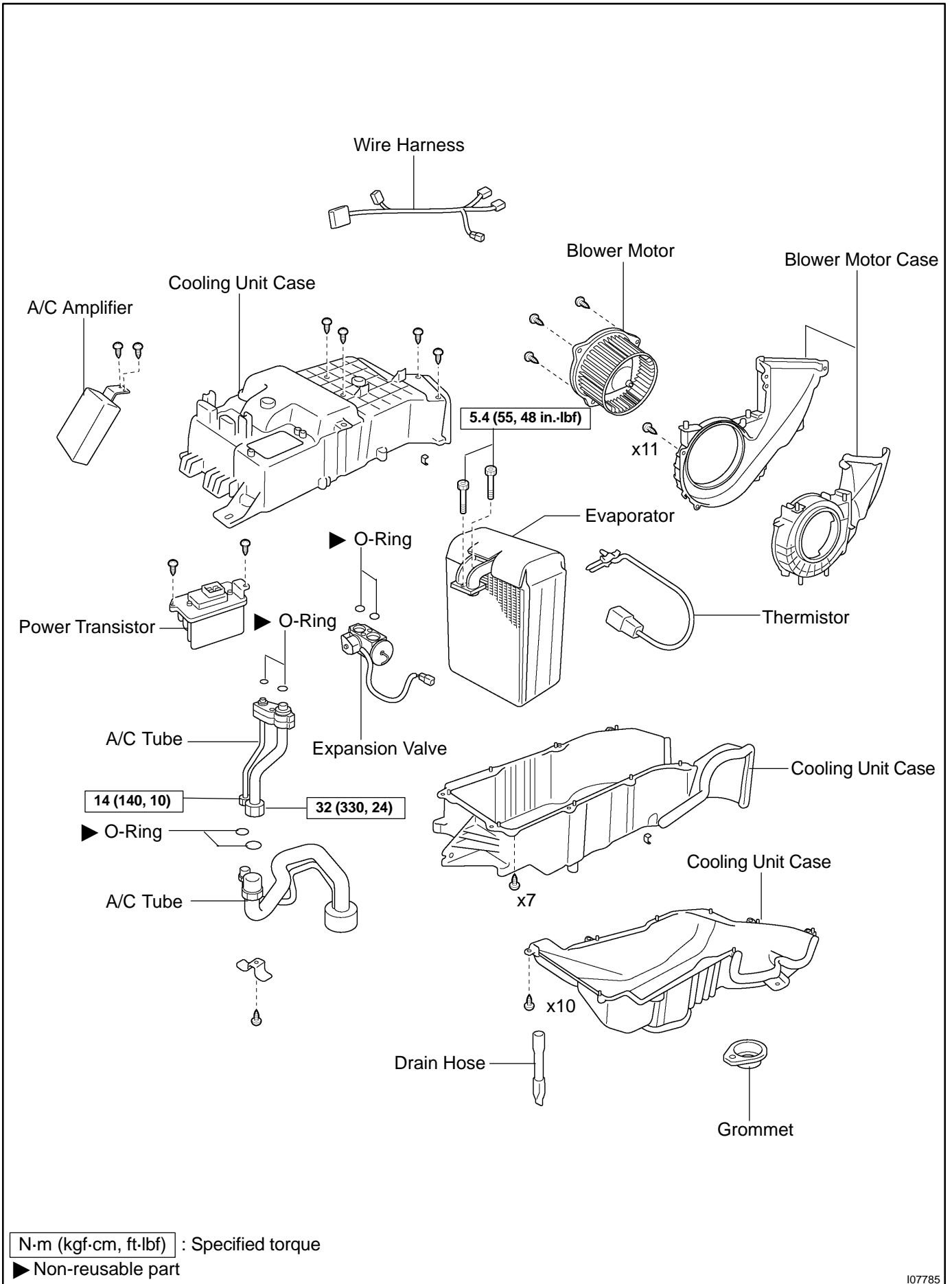
# COMPONENTS



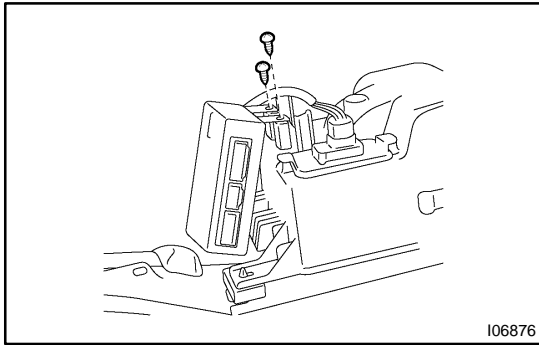
I25893



AIR CONDITIONING - REAR COOLING UNIT



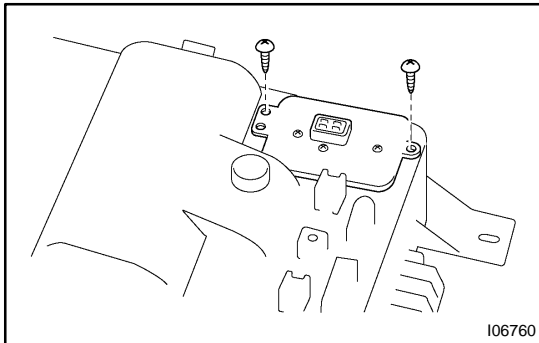
I07785



## DISASSEMBLY

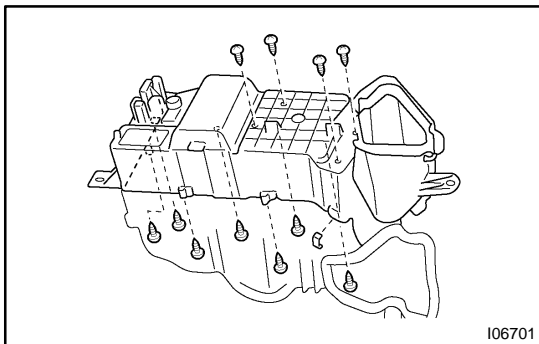
### 1. REMOVE A/C AMPLIFIER

Remove the 2 screws and the A/C amplifier.



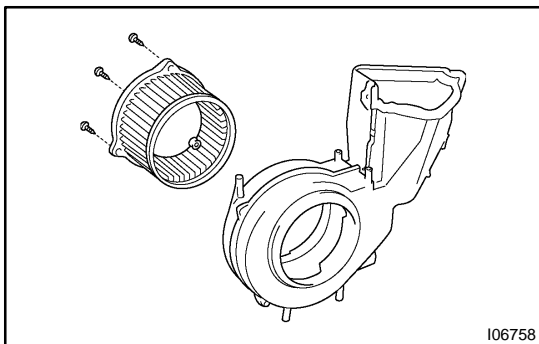
### 2. REMOVE POWER TRANSISTOR

- (a) Disconnect the connector.
- (b) Remove the 2 screws and the power transistor.



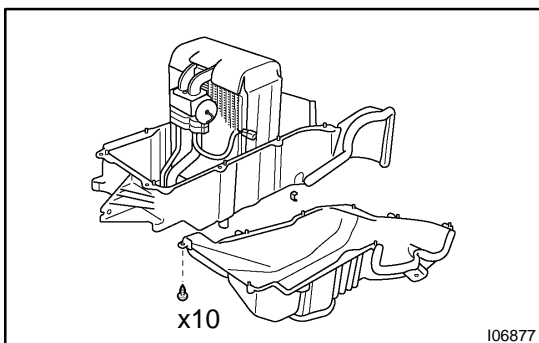
### 3. REMOVE BLOWER CASE

- (a) Remove the wire harness.
- (b) Remove the 11 screws, 3 holding springs and separate the cooling unit cases.
- (c) Disconnect the connector.
- (d) Remove the blower case.



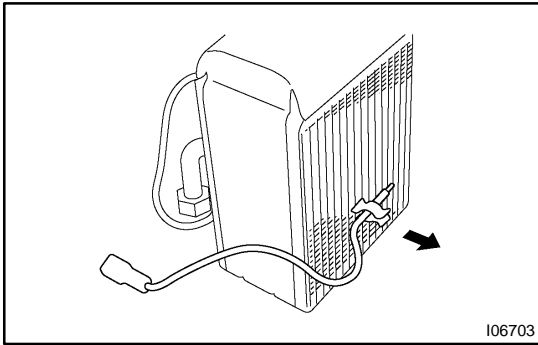
### 4. REMOVE BLOWER MOTOR

Remove the 3 screws and the blower motor.

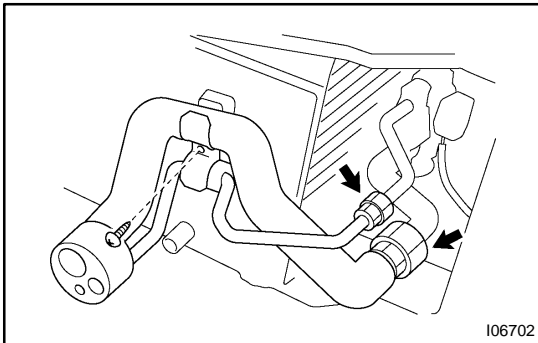


### 5. REMOVE EVAPORATOR

- (a) Disconnect the 2 connector clamps.
- (b) Remove the 10 screws and the 2 holding springs, and separate the cooling unit cases.



- (c) Pull out the thermistor from the evaporator.



- (d) Remove the screw and the piping clamp.  
 (e) Loosen the 2 nuts and remove the tube and accessory.

**Torque:**

**Liquid line: 14 N·m (140 kgf·cm, 10 ft·lbf)**

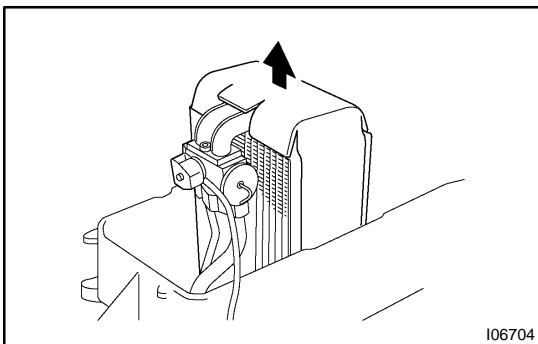
**Suction line: 32 N·m (330 kgf·cm, 24 ft·lbf)**

**NOTICE:**

**Cap the open fittings immediately to keep moisture or dirt out of the system.**

**HINT:**

At the time of reassembly, lubricate 2 new O-rings with compressor oil and install them in the tubes.



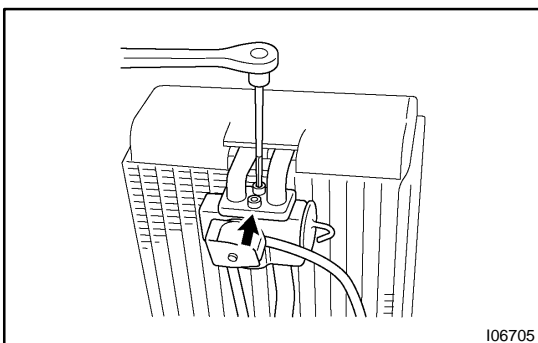
- (f) Remove the evaporator.

**HINT:**

At the time of reassembly, if evaporator was replaced, add compressor oil to the new evaporator.

**Add 40 cc: (1.4 fl.oz.)**

**Compressor oil: ND-OIL 8 or equivalent**



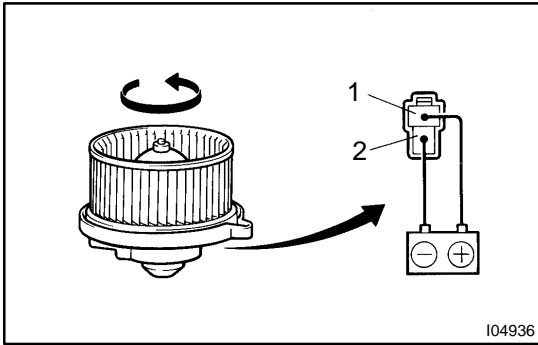
**6. REMOVE EXPANSION VALVE**

Using a hexagon wrench (5.0 mm, 0.20 in.), remove the 2 bolts and separate the expansion valve and evaporator.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

**HINT:**

At the time of reassembly, lubricate 4 new O-rings with compressor oil and install them in the tubes.

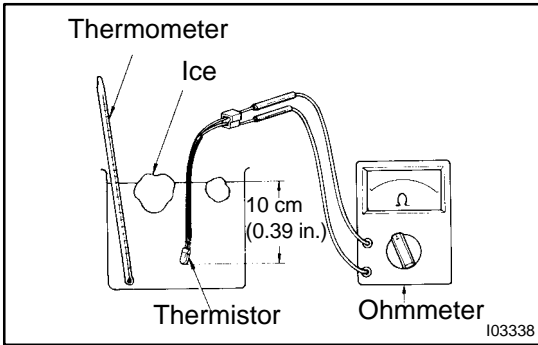


## INSPECTION

### 1. INSPECT BLOWER MOTOR OPERATION

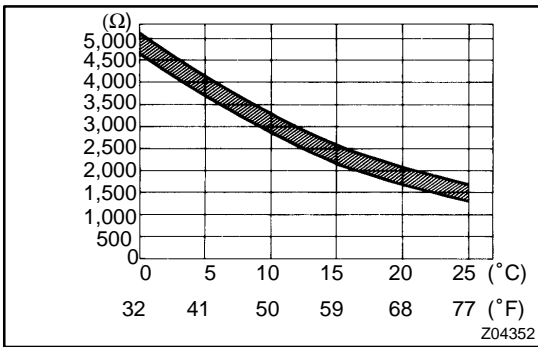
Connect the battery positive (+) lead to terminal 1 and battery negative (-) lead to terminal 2, then check that the motor rotates smoothly.

If the motor rotates smoothly, check the wire harness. Otherwise, replace the blower motor.

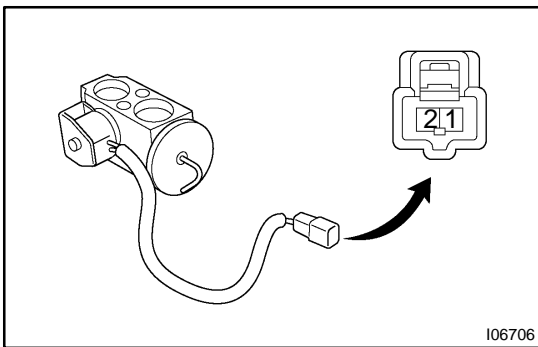


### 2. INSPECT THERMISTOR RESISTANCE

- (a) Place the thermistor in cold water.
- (b) Measure resistance of the thermistor as the water temperature increases.



- (c) Compare the readings with the chart.
- If the values meet the specifications, check the wire harness. Otherwise, replace the thermistor.



### 3. INSPECT MAGNETIC VALVE OPERATION

Check the air passage through the valve, with and without the battery positive voltage applied, between terminals as shown in the chart.

Condition	Air passage
Apply B+ between terminals	Free passage
Not apply B+ between terminals	No passage

Otherwise replace the magnetic valve with the expansion valve. If operation is as specified, check the wire harness.

### 4. INSPECT EVAPORATOR

- (a) Check the evaporator fins for blockage.
- If the fins are clogged, remove them with compressed air.

**NOTICE:**

**Never use water to clean the evaporator.**

- (b) Check the fitting for cracks or scratches.
- If necessary, repair or replace.

## INSTALLATION

Installation is in the reverse of removal (See page [AC-32](#)).

## REAR COOLING UNIT ON-VEHICLE INSPECTION

AC1KA-04

### 1. INSPECT EXPANSION VALVE

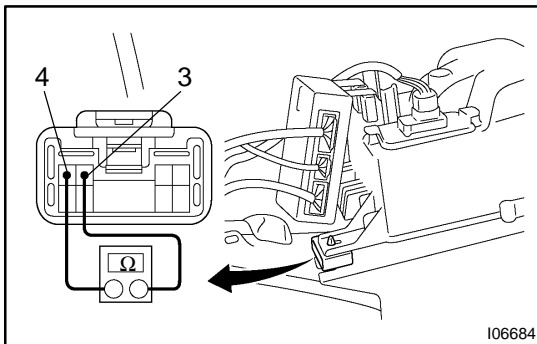
- (a) Check amount of gas during refrigeration cycle.
- (b) Set on manifold gauge set.
- (c) Start the engine.
- (d) Operate the A/C system.
- (e) Inspect the expansion valve.
  - (1) Run the engine at 1,500 rpm for at least 5 minutes.
  - (2) Check the high pressure reading is 1.37 - 1.57 MPa (14 - 16 kgf/cm<sup>2</sup>, 199 - 288 psi).
  - (3) Check the low pressure reading.

If the low pressure reading is 0 kPa (0 kgf/cm<sup>2</sup>, 0psi), replace the expansion valve.

### 2. REMOVE REAR DOOR SCUFF PLATE RH

### 3. REMOVE REAR FLOOR MAT SUPPORT PLATE

### 4. REMOVE QUARTER TRIM PANEL RH

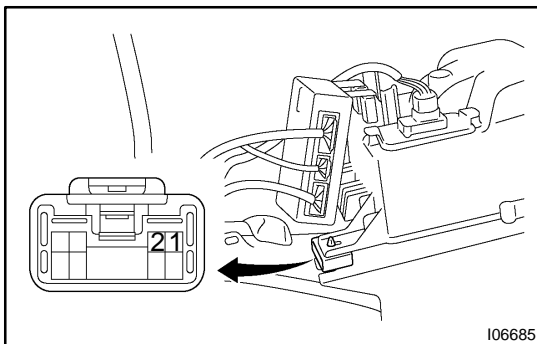


I06684

### 5. INSPECT THERMISTOR RESISTANCE

- (a) Disconnect the connector.
- (b) Measure resistance between terminal 3 and 4.  
**Standard resistance: Approx. 1.5 kΩ at 25 °C (77 °F)**

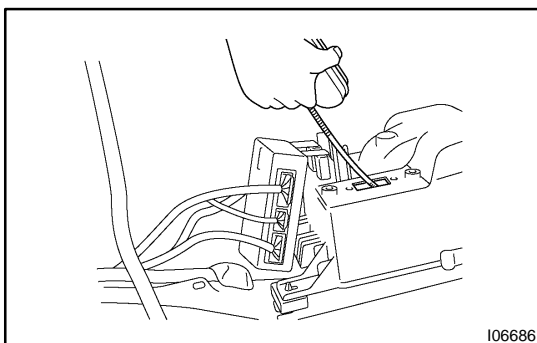
If resistance is not as specified, proceed "INSPECTION" on page [AC-36](#).



I06685

### 6. INSPECT MAGNETIC VALVE CONTINUITY

- (a) Disconnect the connector.
  - (b) Check the continuity exists between terminal 1 and 2.
- If resistance is not as specified, proceed "INSPECTION" on page [AC-36](#).



I06686

### 7. CHECK FOR LEAKAGE OF REFRIGERANT

- (a) Remove the power transistor.
  - (b) Using a gas leak detector, check for leaks of refrigerant.
- If there is a leakage, check the evaporator or tightening torque at the joints.

## REASSEMBLY

Reassembly is in the reverse of disassembly (See page [AC-34](#) ).

## REMOVAL

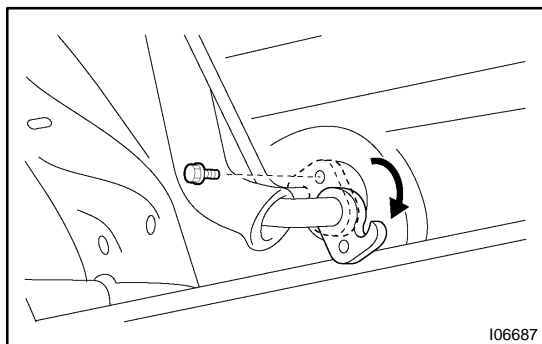
### 1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

#### HINT:

At the time of installation, first evacuate air from refrigeration system.

Then, charge the system with the refrigerant and inspect for leaks of the refrigerant.

**Specified amount: 1,050 ± 50 g (37.04 ± 1.76 oz.)**



### 2. DISCONNECT LIQUID AND SUCTION TUBES

Remove the bolt and slide the plate, then disconnect both tubes.

**Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)**

#### NOTICE:

**Cap the open fittings immediately to keep moisture or dirt out of the system.**

#### HINT:

At the time of installation, lubricate 2 new O-rings with compressor oil and install them to the tubes.

### 3. REMOVE REAR DOOR SCUFF PLATE RH

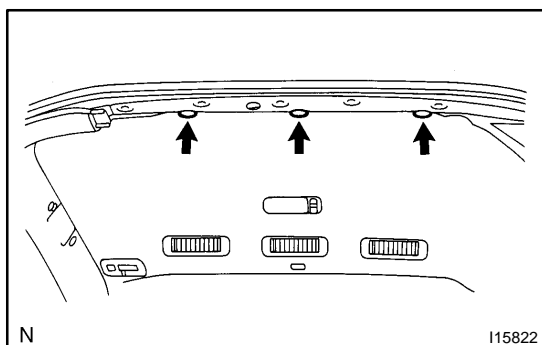
### 4. REMOVE REAR FLOOR MAT SUPPORT PLATE

### 5. REMOVE ROOF HEADLINING REAR TRIM

### 6. REMOVE QUARTER TRIM PANEL RH

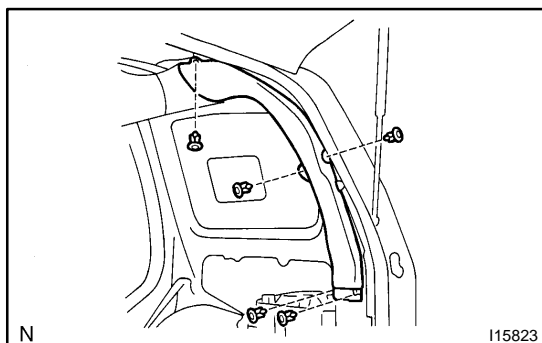
### 7. REMOVE ROOF SIDE INNER UPPER GARNISH

(See page [BO-97](#))



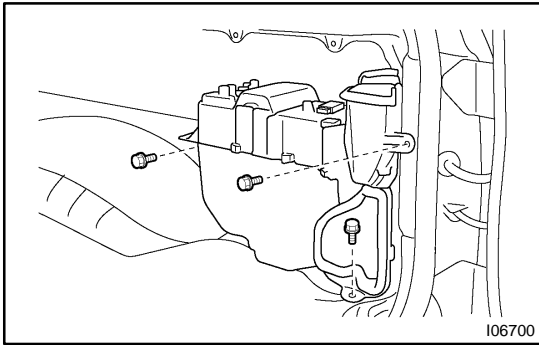
### 8. REMOVE NO. 1 COOLER AIR DUCT

(a) Remove the 3 roof headlining set clips.



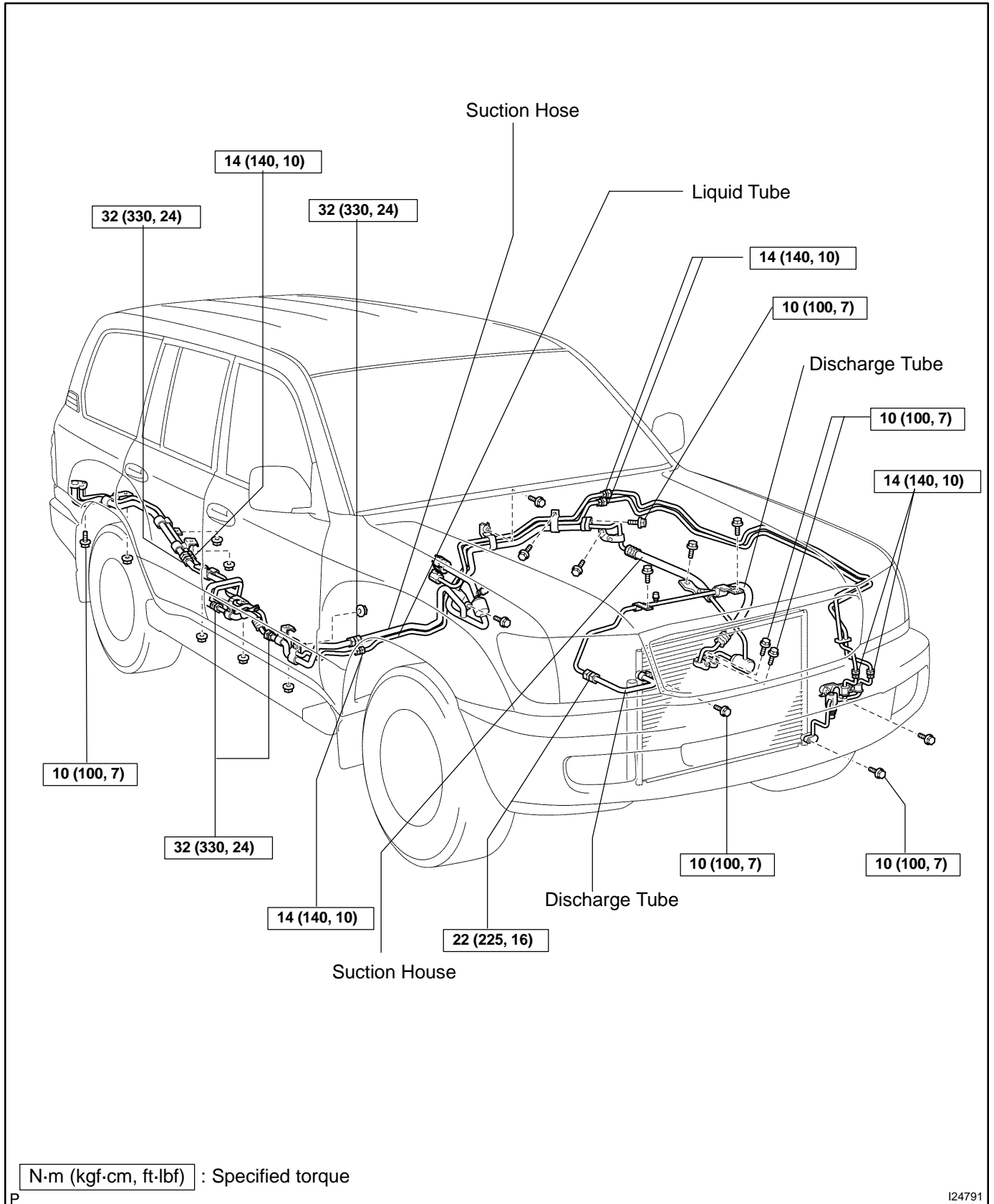
(b) Remove the 5 clips and the No. 1 cooler air duct.



**9. REMOVE REAR COOLING UNIT**

- (a) Disconnect the connectors.
- (b) Remove the 3 bolts and the rear cooling unit.

# COMPONENTS



# REFRIGERANT LINE

AC1HU-01

## ON-VEHICLE INSPECTION

1. INSPECTION HOSE AND TUBE CONNECTIONS FOR LOOSENESS
2. INSPECT HOSES AND TUBES FOR LEAKAGE

Using a gas leak detector, check for leakage of refrigerant.

## REPLACEMENT

### 1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

### 2. REPLACE FAULTY TUBE OR HOSE

#### NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

### 3. TIGHTEN JOINT OF BOLT OR NUT TO SPECIFIED TORQUE

#### NOTICE:

Do not tighten the connections more than specified.

Part tightened		N-m	kgf-cm	ft-lbf	
Compressor x Discharge hose		10	100	7	
Compressor x Suction hose		10	100	7	
Condenser x Discharge tube		5.4	55	48 in.-lbf	
Condenser x Liquid tube		10	100	7	
Liquid line	Nut	14	140	10	
	Bolt	10	100	7	
Discharge line		Nut	22	225	16
Suction line	Nut (5/8")	32	330	24	
	Nut (3/4")	42	425	31	
	Bolt	10	100	7	

### 4. EVACUATE AIR FROM REFRIGERATION SYSTEM AND CHARGE SYSTEM WITH REFRIGERANT

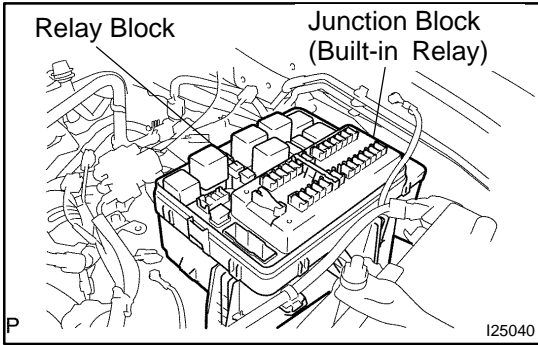
Specified amount: 1,050 ± 50 g (37.03 ± 1.76 oz.)

### 5. INSPECT FOR LEAKAGE OF REFRIGERANT

Using a gas leak detector, check for leaks of refrigerant

If there is leakage, check the tightening torque at the joints.

### 6. INSPECT AIR CONDITIONING OPERATION



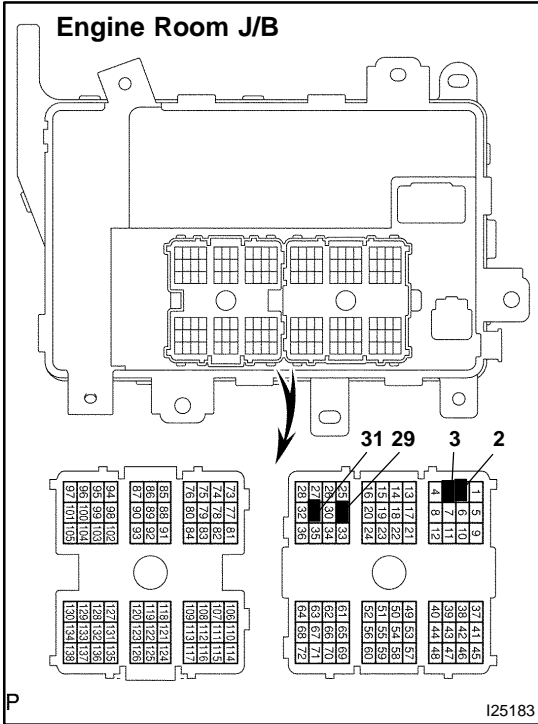
# REAR HEATER RELAY INSPECTION

AC30Y-01

**HINT:**

The rear heater relay is built in the engine room junction block. Since the relay is constructed with a relay block that is in the junction block as a unit, it is impossible to disconnect the wire harness connecting with the relay block.

If the relay has a malfunction, replace it with the junction block assembly wire harness together.



1. REMOVE ENGINE ROOM J/B
2. INSPECT REAR HEATER RELAY CONTINUITY

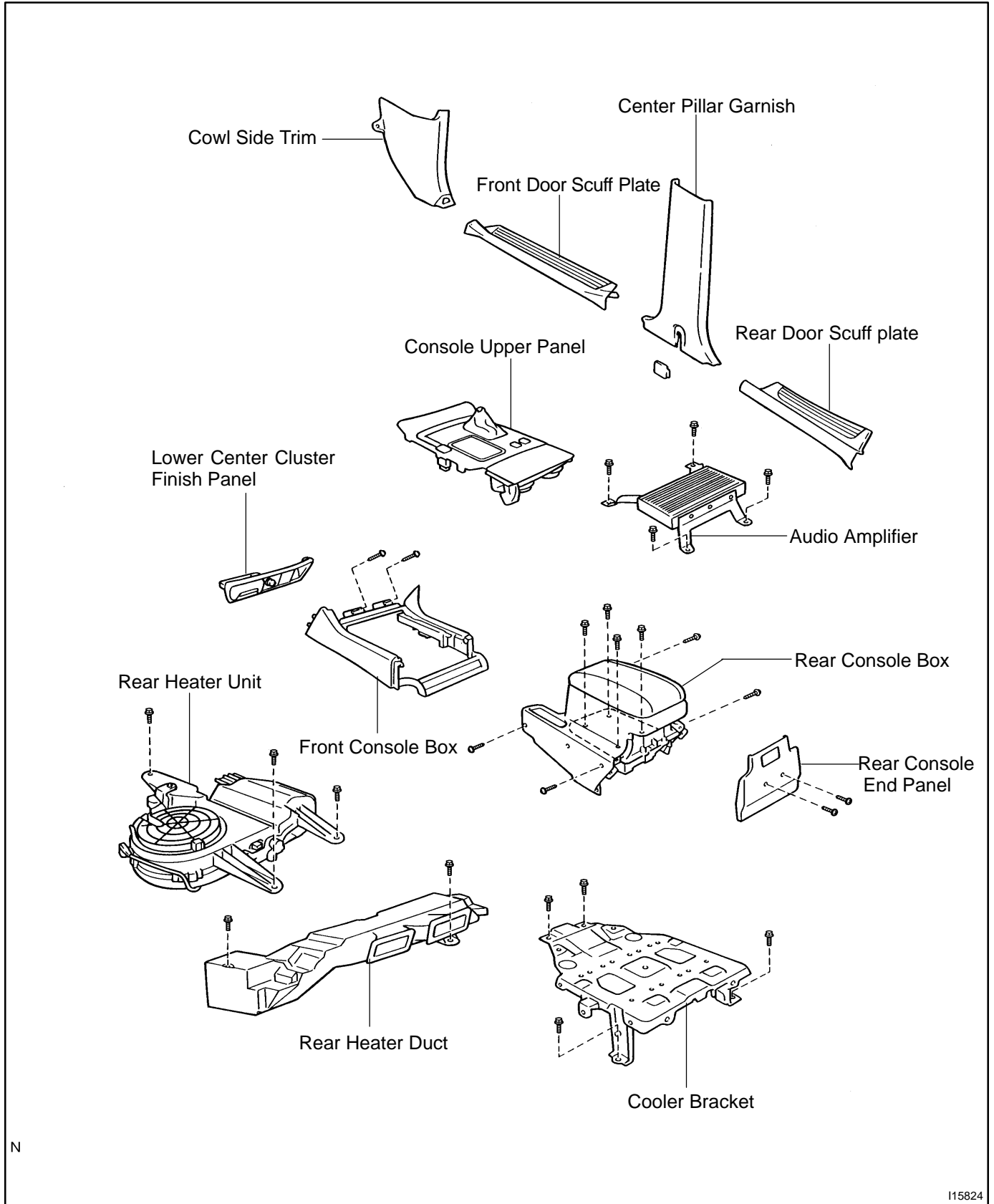
Condition	Tester connection	Specified condition
Constant	29 - 31	Continuity
Apply B+ between terminals 29 and 31.	2 - 3	Continuity

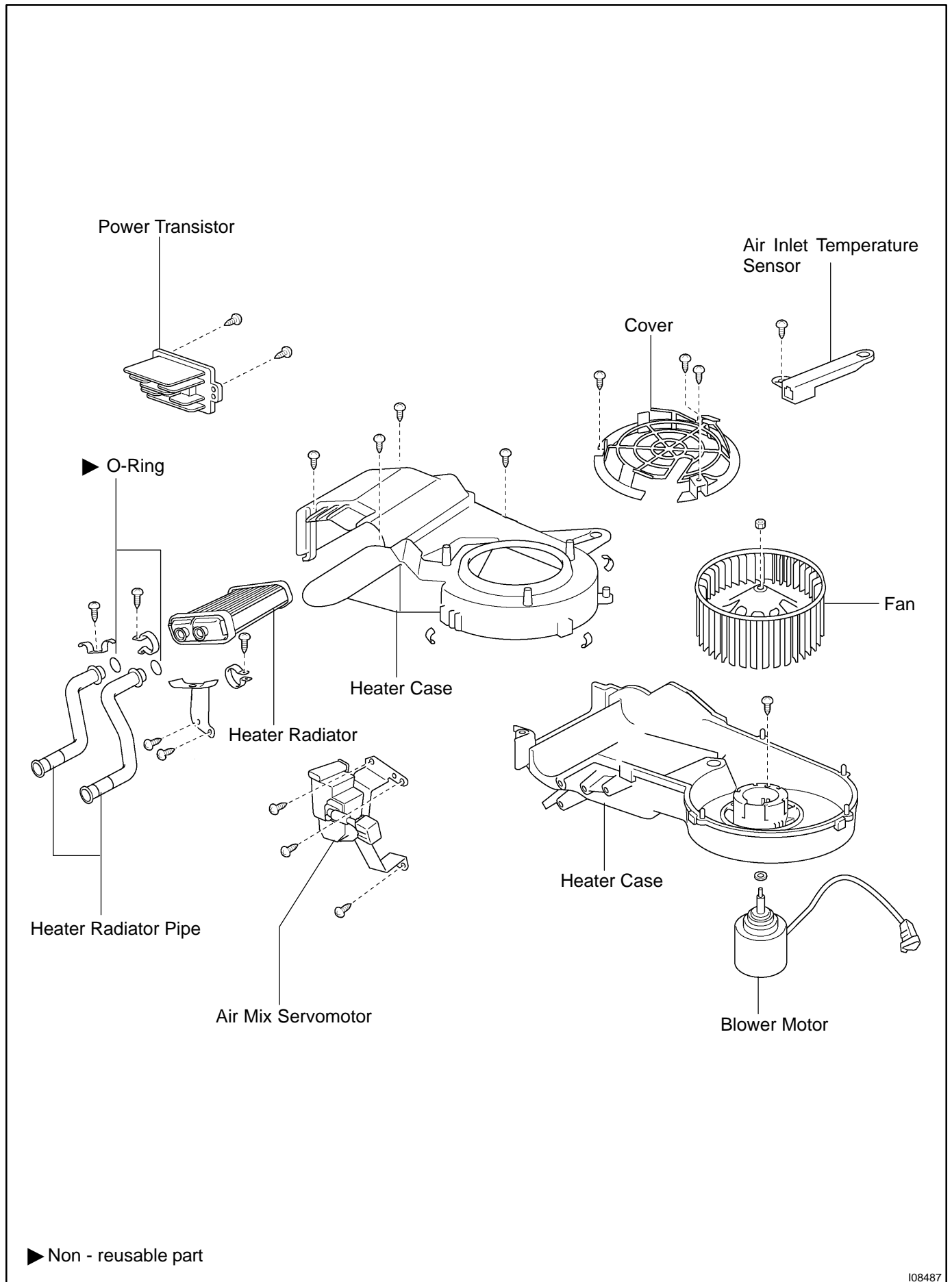
If continuity is not as specified, replace the engine room J/B.

3. INSTALL ENGINE ROOM J/B

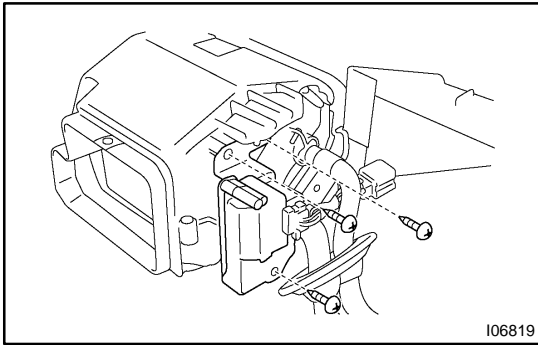
# REAR HEATER UNIT COMPONENTS

AC1KN-05





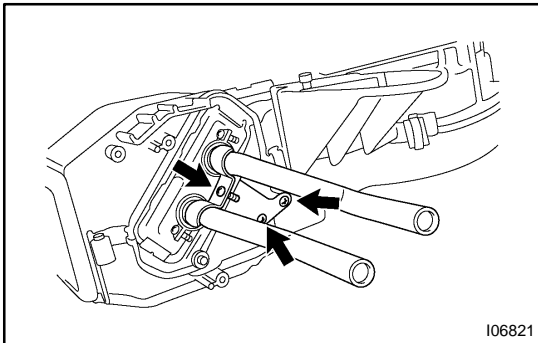
I08487



## DISASSEMBLY

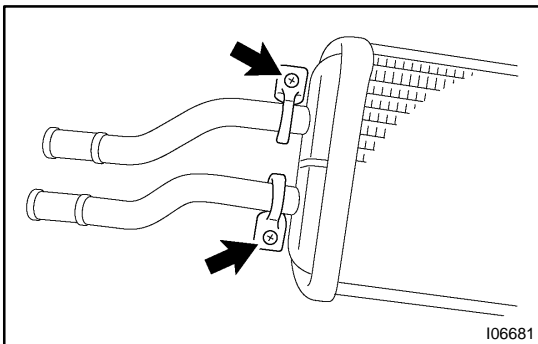
### 1. REMOVE AIR MIX SERVOMOTOR

Remove the 3 screws and the air mix servomotor.



### 2. REMOVE HEATER RADIATOR

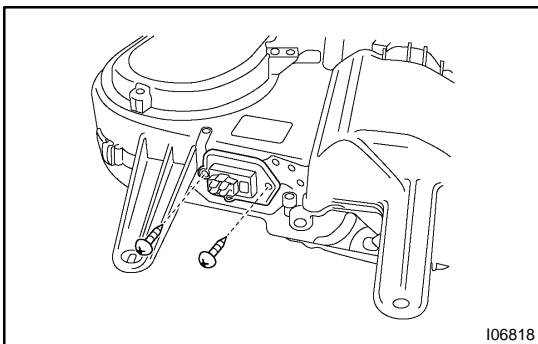
- (a) Remove the 3 screws and 2 clamps
- (b) Pull out the heater radiator.



- (c) Remove the 2 screws, 2 clamps and the heater radiator pipes.
- (d) Remove the 2 O-rings.

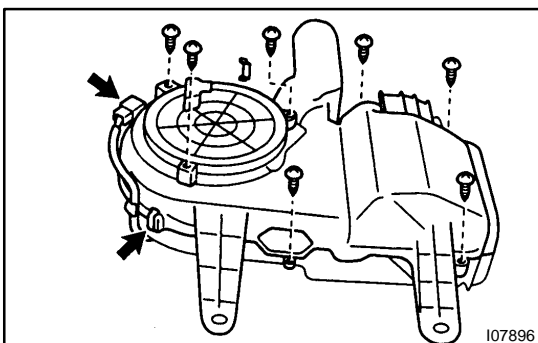
#### HINT:

At the time of reassembly, do not reuse the O-rings



### 3. REMOVE POWER TRANSISTOR

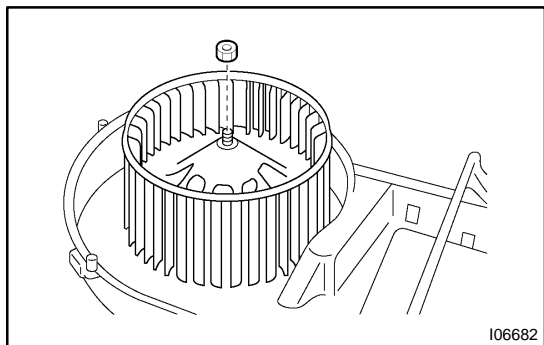
Remove the 2 screws and the power transistor.



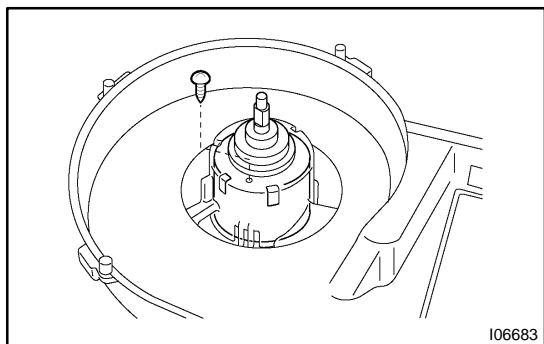
### 4. REMOVE BLOWER MOTOR

- (a) Remove the 3 screws and the cover.
- (b) Remove the 4 screws, the 3 holding springs and separate the heater cases.





(c) Remove the nut and the fan.

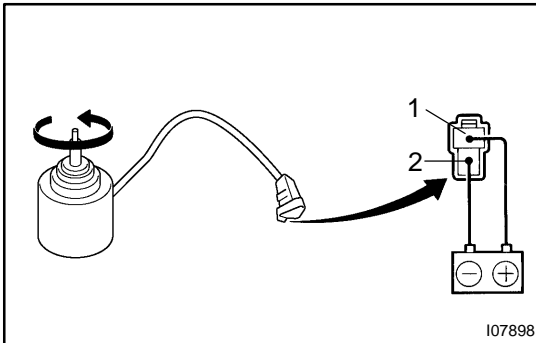


(d) Remove the screws and the blower motor.

## INSPECTION

### 1. INSPECT HEATER RADIATOR

If the fins are clogged, clean them with compressed air.



### 2. INSPECT BLOWER MOTOR OPERATION

Connect battery positive (+) lead to terminal 1 and battery negative (-) lead to terminal 2, then check that the motor rotates smoothly.

If operation is not as specified, replace the blower motor.

### 3. INSPECT AIR MIX SERVOMOTOR (See page [DI-1354](#))

### 4. INSPECT AIR MIX DAMPER POSITION SENSOR (See page [DI-1345](#))

## INSTALLATION

Installation is in the reverse of removal (See page [AC-47](#)).

## REASSEMBLY

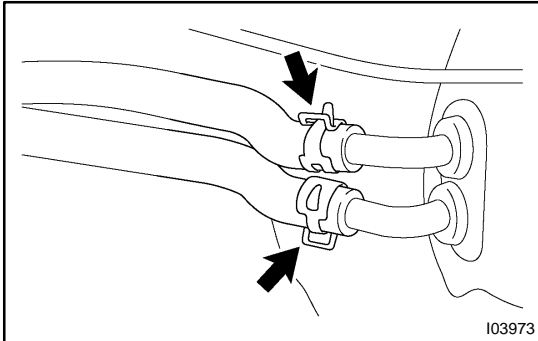
Reassembly is in the reverse of disassembly (See page [AC-49](#)).

## REMOVAL

### 1. DRAIN ENGINE COOLANT FROM RADIATOR

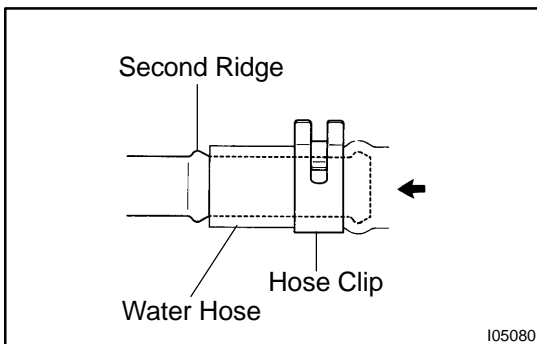
HINT:

It is not necessary to drain out all the coolant.



### 2. DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES

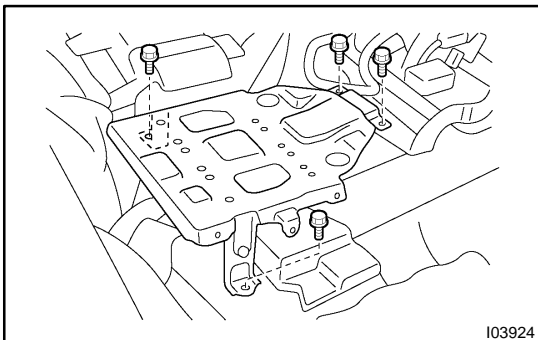
- (a) Using pliers, grip the claws of the clip and slide the clip along the hose
- (b) Disconnect the water hoses



HINT:

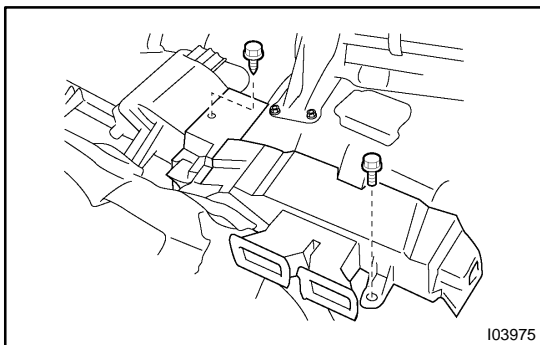
At the time of installation, push the water hose on to the heater radiator pipe to the second ridge on the pipe.

3. REMOVE FRONT SEATS
4. REMOVE REAR CONSOLE BOX
5. REMOVE FRONT CONSOLE BOX COVER
6. REMOVE LOWER CENTER CLUSTER FINISH PANEL
7. REMOVE FRONT DOOR SCUFF PLATE
8. REMOVE COWL SIDE TRIMS
9. REMOVE REAR DOOR SCUFF PLATES
10. REMOVE CENTER PILLAR GARNISHES
11. SLIDE FLOOR CARPET BACKWARD

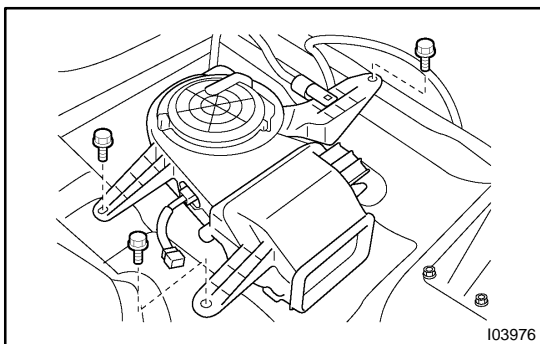


### 12. REMOVE COOLER BRACKET

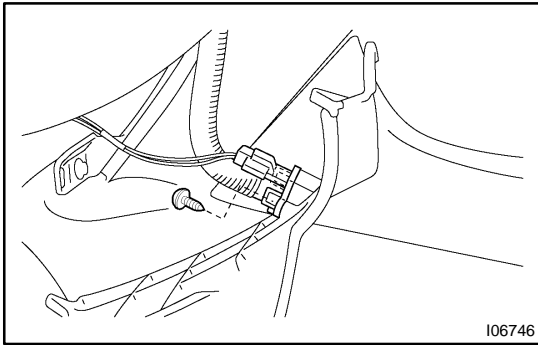
Remove the 4 bolts and the cooler bracket.

**13. REMOVE REAR HEATER DUCT**

Remove the bolt, the screw and the rear heater duct.

**14. REMOVE REAR HEATER UNIT**

- (a) Disconnect the connector.
- (b) Remove the 3 bolts and the rear heater unit.



## ROOM TEMPERATURE SENSOR (for Front A/C) INSPECTION

AC1LN-04

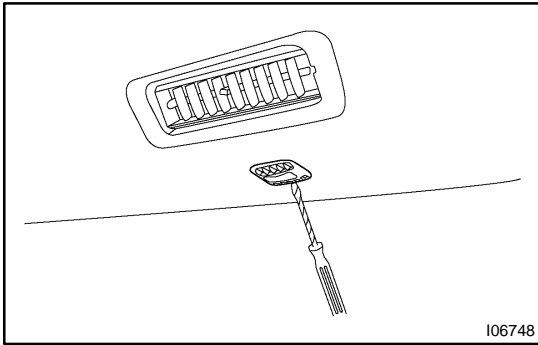
### 1. REMOVE ROOM TEMPERATURE SENSOR

- (a) Remove the lower No. 1 panel set screw.
- (b) Release the lower No. 1 panel set claws.
- (c) Disconnect the connector and the aspirator hose.
- (d) Remove the screw and the room temperature sensor.

### 2. INSPECT ROOM TEMPERATURE SENSOR CIRCUIT (See page [DI-1316](#) )

### 3. INSTALL ROOM TEMPERATURE SENSOR

- (a) Install the room temperature sensor to the lower No. 1 panel with the screw.
- (b) Connect the aspirator hose and the connector.
- (c) Install the lower No. 1 panel with the screw.



## ROOM TEMPERATURE SENSOR (for Rear A/C) INSPECTION

AC1LO-05

### 1. REMOVE ROOM TEMPERATURE SENSOR

Using a screwdriver, pull out the room temperature sensor, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

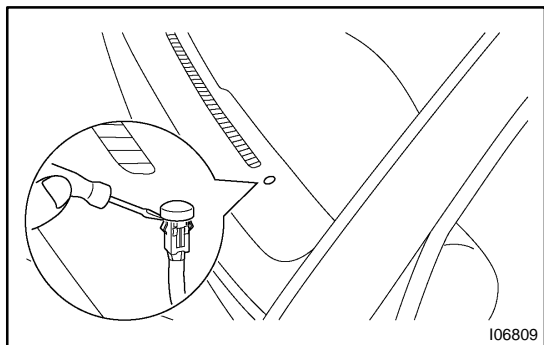
### 2. INSPECT ROOM TEMPERATURE SENSOR

(See page [DI-1330](#) )

### 3. INSTALL ROOM TEMPERATURE SENSOR

- (a) Connect the connector.
- (b) Insert the room temperature sensor to the roof headlining.





## SOLAR SENSOR INSPECTION

AC1LM-05

### 1. REMOVE SOLAR SENSOR

Using a screwdriver, pull out the solar sensor, then disconnect the connector.

HINT:

Tape up the screwdriver tip before use.

### 2. INSPECT SOLAR SENSOR CIRCUIT

(See page [DI-1333](#))

### 3. INSTALL SOLAR SENSOR

- (a) Connect the connector.
- (b) Insert the solar sensor to the instrument panel.

## FOREWORD

This wiring diagram manual has been prepared to provide information on the electrical system of the 2004 LAND CRUISER.

Applicable models: UZJ100 Series

For service specifications and repair procedures of the above models other than those listed in this manual, refer to the following manuals;

Manual Name	Pub. No.
▶ 2004 LAND CRUISER Repair Manual Volume 1 Volume 2	RM1071U1 RM1071U2
▶ 2004 TOYOTA New Car Features	NCF257U

All information in this manual is based on the latest product information at the time of publication. However, specifications and procedures are subject to change without notice.

**TOYOTA MOTOR CORPORATION**

### NOTICE

**When handling supplemental restraint system components (removal, installation or inspection, etc.), always follow the direction given in the repair manuals listed above to prevent accidents and supplemental restraint system malfunction.**

# 2004 LAND CRUISER ELECTRICAL WIRING DIAGRAM

	Section Code	Page
INTRODUCTION .....	A .....	2
HOW TO USE THIS MANUAL .....	B .....	3
TROUBLESHOOTING .....	C .....	12
ABBREVIATIONS .....	D .....	17
GLOSSARY OF TERMS AND SYMBOLS .....	E .....	18
RELAY LOCATIONS .....	F .....	20
ELECTRICAL WIRING ROUTING .....	G .....	68
SYSTEM CIRCUITS .....	H .....	93
GROUND POINT .....	I .....	376
POWER SOURCE (Current Flow Chart) .....	J .....	384
CONNECTOR LIST .....	K .....	394
PART NUMBER OF CONNECTORS .....	L .....	406
OVERALL ELECTRICAL WIRING DIAGRAM .	M .....	410

► **2003 TOYOTA MOTOR CORPORATION**

All rights reserved. This book may not be reproduced or copied, in whole or in part, without the written permission of Toyota Motor Corporation.

# A INTRODUCTION

This manual consists of the following 13 sections:

No.	Section	Description
A	INDEX	Index of the contents of this manual.
	INTRODUCTION	Brief explanation of each section.
B	HOW TO USE THIS MANUAL	Instructions on how to use this manual.
C	TROUBLE-SHOOTING	Describes the basic inspection procedures for electrical circuits.
D	ABBREVIATIONS	Defines the abbreviations used in this manual.
E	GLOSSARY OF TERMS AND SYMBOLS	Defines the symbols and functions of major parts.
F	RELAY LOCATIONS	Shows position of the Electronic Control Unit, Relays, Relay Block, etc. This section is closely related to the system circuit.
G	ELECTRICAL WIRING ROUTING	Describes position of Parts Connectors, Splice points, Ground points, etc. This section is closely related to the system circuit.
H	INDEX	Index of the system circuits.
	SYSTEM CIRCUITS	Electrical circuits of each system are shown from the power supply through ground points. Wiring connections and their positions are shown and classified by code according to the connection method. (Refer to the section, "How to use this manual"). The "System Outline" and "Service Hints" useful for troubleshooting are also contained in this section.
I	GROUND POINT	Shows ground positions of all parts described in this manual.
J	POWER SOURCE (Current Flow Chart)	Describes power distribution from the power supply to various electrical loads.
K	CONNECTOR LIST	Describes the form of the connectors for the parts appeared in this book. This section is closely related to the system circuit.
L	PART NUMBER OF CONNECTORS	Indicates the part number of the connectors used in this manual.
M	OVERALL ELECTRICAL WIRING DIAGRAM	Provides circuit diagrams showing the circuit connections.

This manual provides information on the electrical circuits installed on vehicles by dividing them into a circuit for each system.

The actual wiring of each system circuit is shown from the point where the power source is received from the battery as far as each ground point. (All circuit diagrams are shown with the switches in the OFF position.)

When troubleshooting any problem, first understand the operation of the circuit where the problem was detected (see System Circuit section), the power source supplying power to that circuit (see Power Source section), and the ground points (see Ground Point section). See the System Outline to understand the circuit operation.

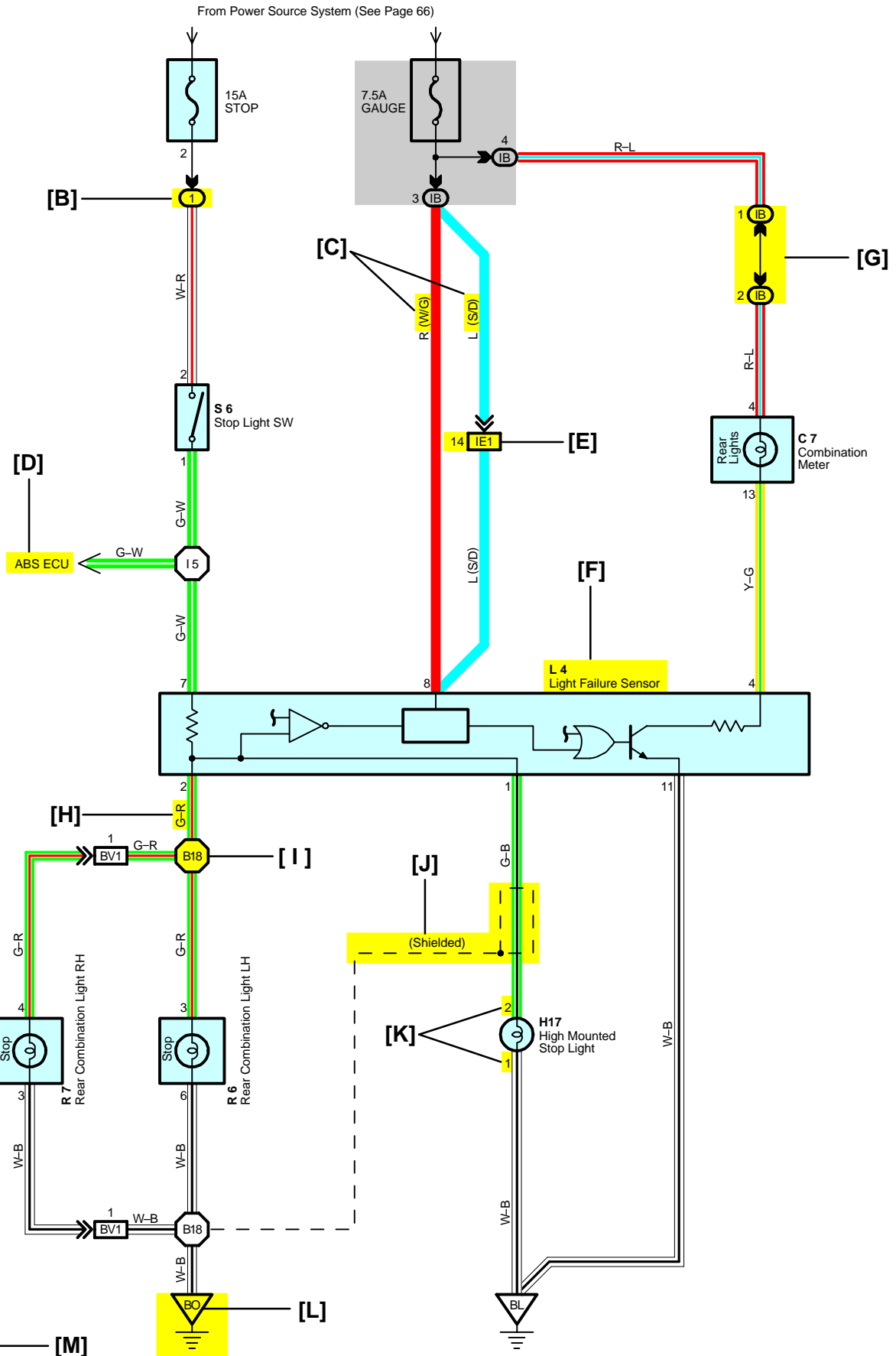
When the circuit operation is understood, begin troubleshooting of the problem circuit to isolate the cause. Use Relay Location and Electrical Wiring Routing sections to find each part, junction block and wiring harness connectors, wiring harness and wiring harness connectors, splice points, and ground points of each system circuit. Internal wiring for each junction block is also provided for better understanding of connection within a junction block.

Wiring related to each system is indicated in each system circuit by arrows (from\_\_, to\_\_). When overall connections are required, see the Overall Electrical Wiring Diagram at the end of this manual.

# B HOW TO USE THIS MANUAL

\* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

## [A] Stop Light



**[A]** : System Title

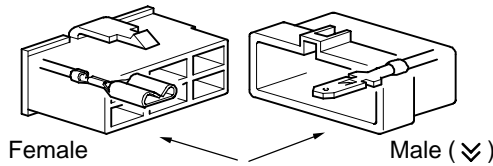
**[B]** : Indicates a Relay Block. No shading is used and only the Relay Block No. is shown to distinguish it from the J/B

Example: ① Indicates Relay Block No.1

**[C]** : ( ) is used to indicate different wiring and connector, etc. when the vehicle model, engine type, or specification is different.

**[D]** : Indicates related system.

**[E]** : Indicates the wiring harness and wiring harness connector. The wiring harness with male terminal is shown with arrows (↗). Outside numerals are pin numbers.



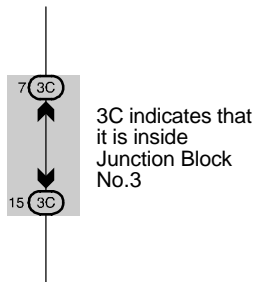
The first letter of the code for each wiring harness and wiring harness connector(s) indicates the component's location, e.g, "E" for the Engine Compartment, "I" for the Instrument Panel and Surrounding area, and "B" for the Body and Surrounding area.

When more than one code has the first and second letters in common, followed by numbers (e.g, IH1, IH2), this indicates the same type of wiring harness and wiring harness connector.

**[F]** : Represents a part (all parts are shown in sky blue). The code is the same as the code used in parts position.

**[G]** : Junction Block (The number in the circle is the J/B No. and the connector code is shown beside it). Junction Blocks are shaded to clearly separate them from other parts.

Example:



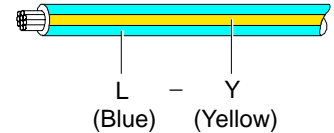
**[H]** : Indicates the wiring color.

Wire colors are indicated by an alphabetical code.

- B = Black    W = White    BR = Brown
- L = Blue    V = Violet    SB = Sky Blue
- R = Red    G = Green    LG = Light Green
- P = Pink    Y = Yellow    GR = Gray
- O = Orange

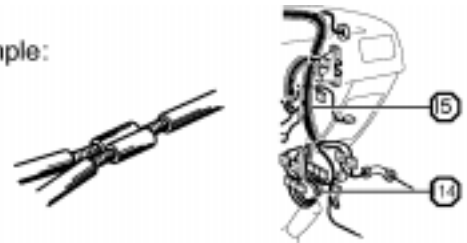
The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

Example: L - Y



**[I]** : Indicates a wiring Splice Point (Codes are "E" for the Engine Room, "I" for the Instrument Panel, and "B" for the Body).

Example:



The Location of splice Point I 5 is indicated by the shaded section.

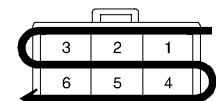
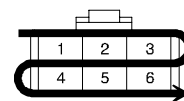
**[J]** : Indicates a shielded cable.



**[K]** : Indicates the pin number of the connector. The numbering system is different for female and male connectors.

Example: Numbered in order from upper left to lower right

Numbered in order from upper right to lower left



Female

Male

**[L]** : Indicates a ground point.

The first letter of the code for each ground point(s) indicates the component's location, e.g, "E" for the Engine Compartment, "I" for the Instrument Panel and Surrounding area, and "B" for the Body and Surrounding area.

**[M]** : Page No.

## B HOW TO USE THIS MANUAL

### [N] System Outline

Current is applied at all times through the STOP fuse to TERMINAL 2 of the stop light SW.  
When the ignition SW is turned on, current flows from the GAUGE fuse to TERMINAL 8 of the light failure sensor, and also flows through the rear lights warning light to TERMINAL 4 of the light failure sensor.

#### Stop Light Disconnection Warning

When the ignition SW is turned on and the brake pedal is pressed (Stop light SW on), if the stop light circuit is open, the current flowing from TERMINAL 7 of the light failure sensor to TERMINALS 1, 2 changes, so the light failure sensor detects the disconnection and the warning circuit of the light failure sensor is activated.

As a result, the current flows from TERMINAL 4 of the light failure sensor to TERMINAL 11 to GROUND and turns the rear lights warning light on. By pressing the brake pedal, the current flowing to TERMINAL 8 of the light failure sensor keeps the warning circuit on and holds the warning light on until the ignition SW is turned off.

### [O] Service Hints

#### S6 Stop Light SW

2-1 : Closed with the brake pedal depressed

#### L4 Light Failure Sensor

1, 2, 7-Ground : Approx. 12 volts with the stop light SW on

4, 8-Ground : Approx. 12 volts with the ignition SW at ON position

11-Ground : Always continuity

### [P] ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
C7	34	L4	36	R7	37
H17	36	R6	37	S6	35

### [Q] ○ : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
1	18	R/B No.1 (Instrument Panel Brace LH)

### [R] ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
IB	20	Instrument Panel Wire and Instrument Panel J/B (Lower Finish Panel)
3C	22	Instrument Panel Wire and J/B No.3 (Instrument Panel Brace LH)

### [S] □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	42	Floor Wire and Instrument Panel Wire (Left Kick Panel)
BV1	50	Luggage Room Wire and Floor Wire (Luggage Room Left)

### [T] ▽ : Ground Points

Code	See Page	Ground Points Location
BL	50	Under the Left Center Pillar
BO	50	Back Panel Center

### [U] ○ : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I5	44	Cowl Wire	B18	50	Luggage Room Wire



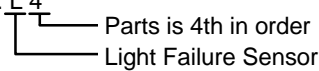
**[N]** : Explains the system outline.

**[O]** : Indicates values or explains the function for reference during troubleshooting.

**[P]** : Indicates the reference page showing the position on the vehicle of the parts in the system circuit.

Example : Part "L4" (Light Failure Sensor) is on page 36 of the manual.

\* The letter in the code is from the first letter of the part, and the number indicates its order in parts starting with that letter.

Example : L 4  


**[Q]** : Indicates the reference page showing the position on the vehicle of Relay Block Connectors in the system circuit.

Example : Connector "1" is described on page 18 of this manual and is installed on the left side of the instrument panel.

**[R]** : Indicates the reference page showing the position on the vehicle of J/B and Wire Harness in the system circuit.

Example : Connector "3C" connects the Instrument Panel Wire and J/B No.3. It is described on page 22 of this manual, and is installed on the instrument panel left side.

**[S]** : Indicates the reference page describing the wiring harness and wiring harness connector (the female wiring harness is shown first, followed by the male wiring harness).

Example : Connector "IE1" connects the floor wire (female) and Instrument panel wire (male). It is described on page 42 of this manual, and is installed on the left side kick panel.

**[T]** : Indicates the reference page showing the position of the ground points on the vehicle.

Example : Ground point "BO" is described on page 50 of this manual and is installed on the back panel center.

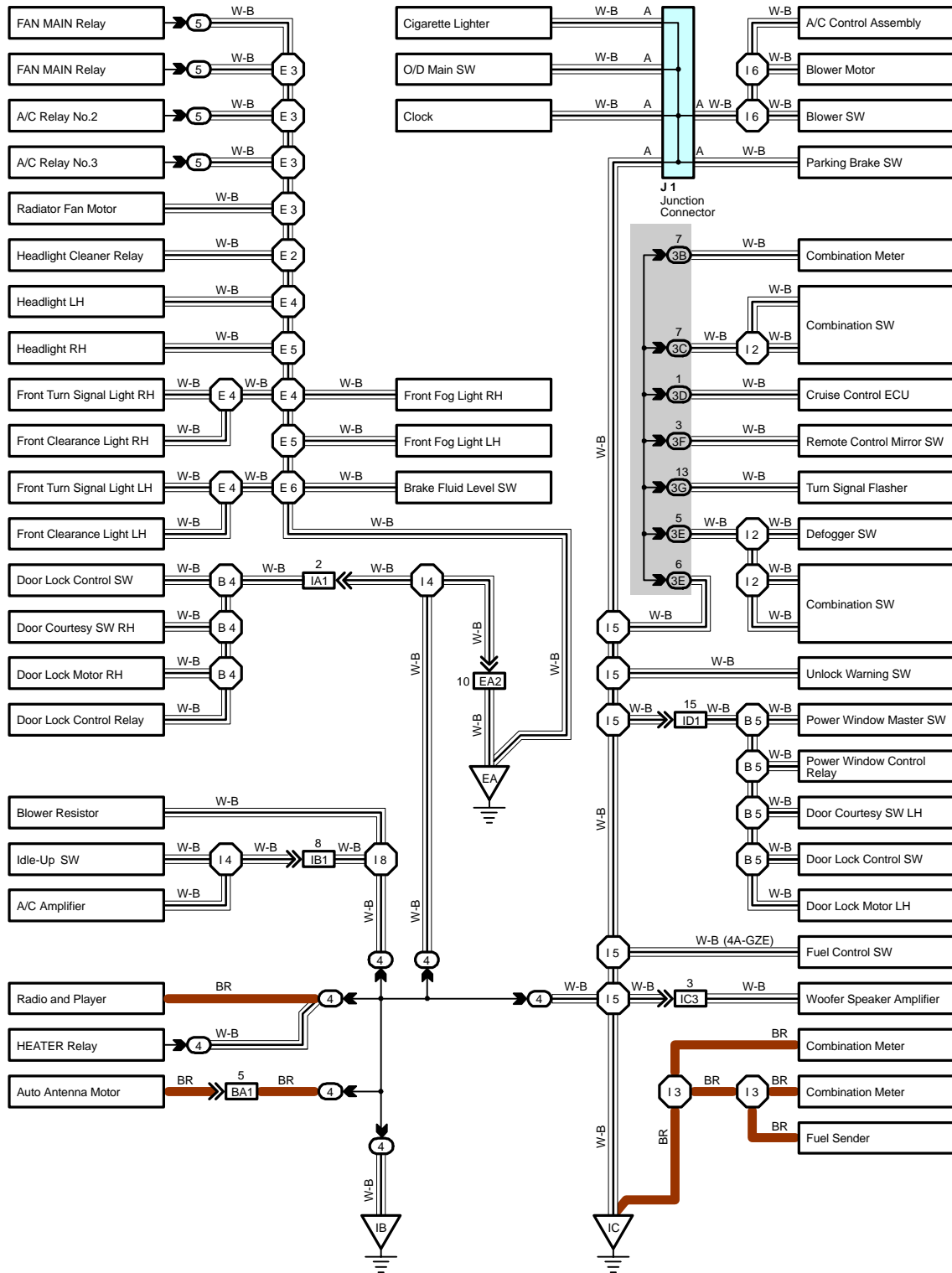
**[U]** : Indicates the reference page showing the position of the splice points on the vehicle.

Example : Splice point "I5" is on the Cowl Wire Harness and is described on page 44 of this manual.

# B HOW TO USE THIS MANUAL

The ground points circuit diagram shows the connections from all major parts to the respective ground points. When troubleshooting a faulty ground point, checking the system circuits which use a common ground may help you identify the problem ground quickly. The relationship between ground points (  $\nabla_{EA}$ ,  $\nabla_{IB}$  and  $\nabla_{IC}$  shown below) can also be checked this way.

## I GROUND POINT

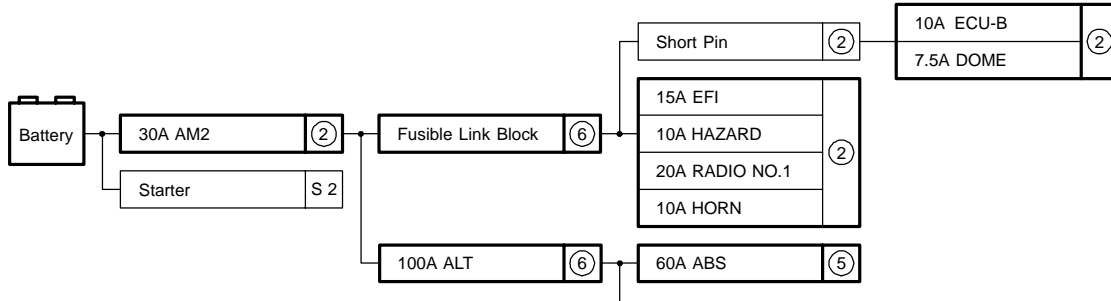


\* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

The "Current Flow Chart" section, describes which parts each power source (fuses, fusible links, and circuit breakers) transmits current to. In the Power Source circuit diagram, the conditions when battery power is supplied to each system are explained. Since all System Circuit diagrams start from the power source, the power source system must be fully understood.

### J POWER SOURCE (Current Flow Chart)

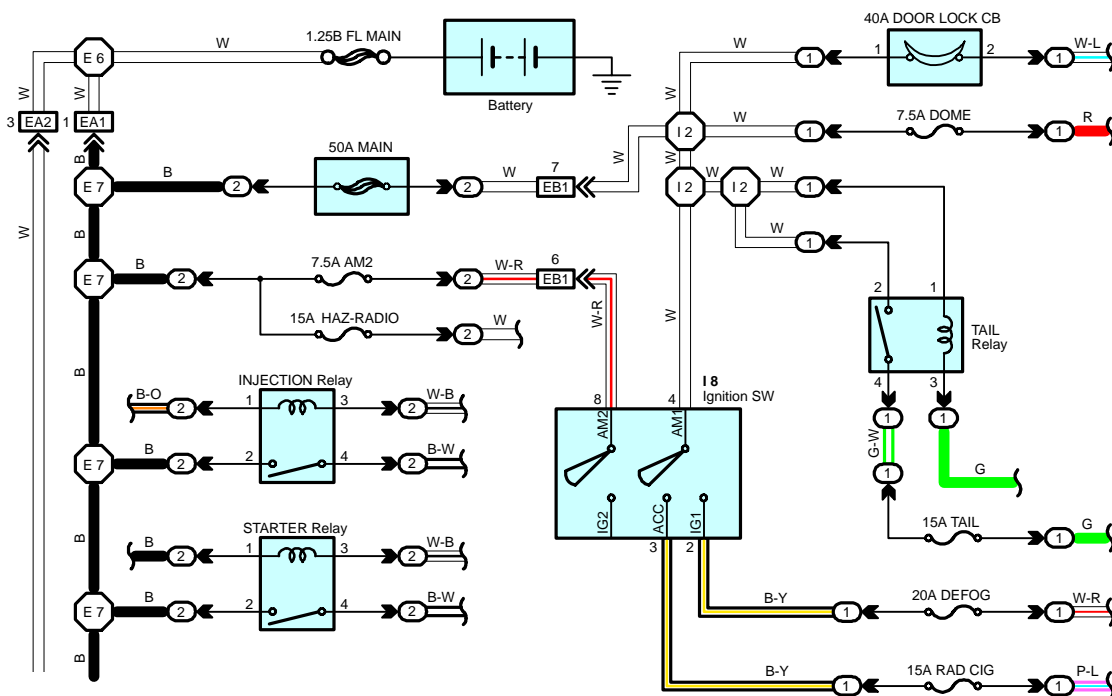
The chart below shows the route by which current flows from the battery to each electrical source (Fusible Link, Circuit Breaker, Fuse, etc.) and other parts.



### Engine Room R/B (See Page 20)

Fuse	System	Page
20A STOP	ABS	194
	ABS and Traction Control	187
	Cruise Control	180
	Electronically Controlled Transmission	166
	Multiplex Communication System	210
10A DOME	Cigarette Lighter	214
	Combination Meter	230
	Headlight	112
	Interior Light	122
	Key Reminder and Seat Belt Warning	
	Light Auto Turn Off	

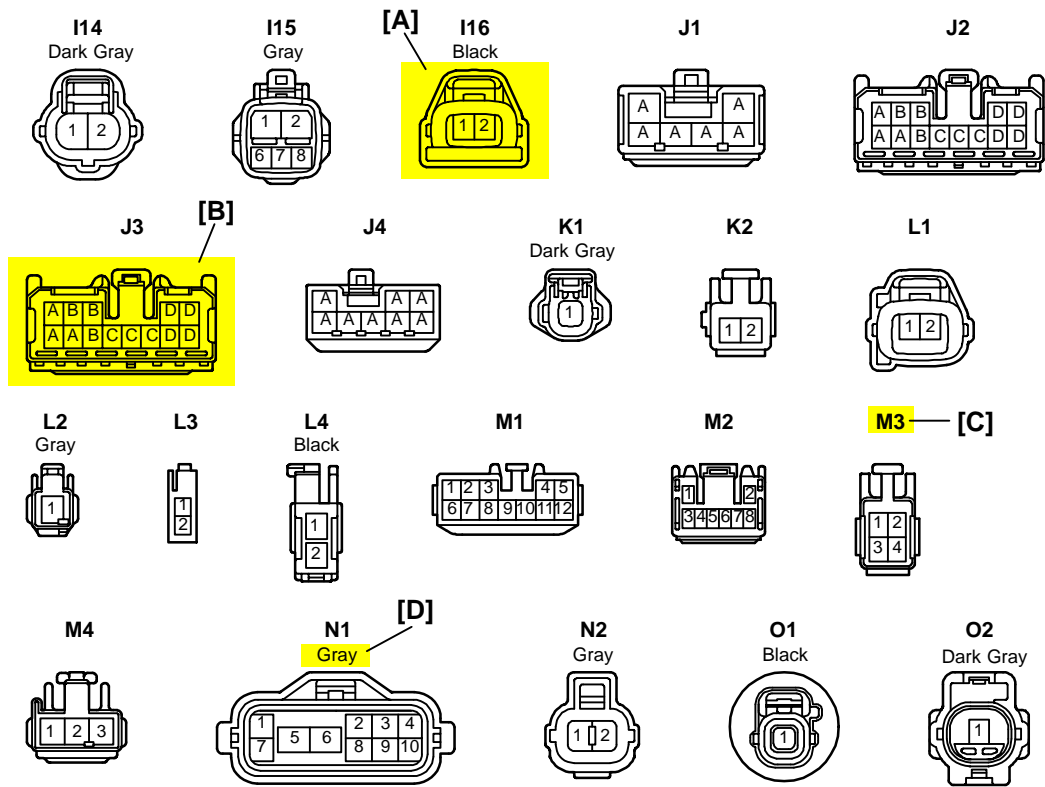
### Power Source



\* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

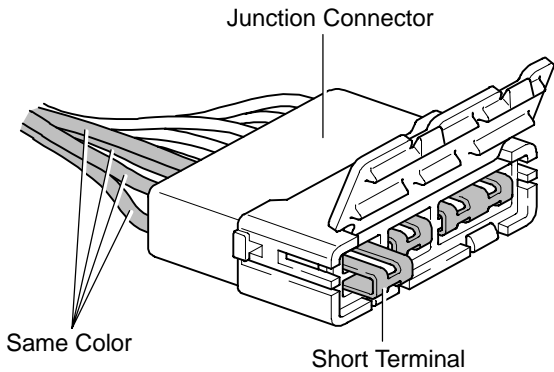
# B HOW TO USE THIS MANUAL

## K CONNECTOR LIST



**[A]** : Indicates connector to be connected to a part. (The numeral indicates the pin No.)

**[B]** : Junction Connector  
Indicates a connector which is connected to a short terminal.



Junction connector in this manual include a short terminal which is connected to a number of wire harnesses. Always perform inspection with the short terminal installed. (When installing the wire harnesses, the harnesses can be connected to any position within the short terminal grouping. Accordingly, in other vehicles, the same position in the short terminal may be connected to a wire harness from a different part.)  
Wire harness sharing the same short terminal grouping have the same color.

**[C]** : Parts Code  
The first letter of the code is taken from the first letter of part, and the numbers indicates its order in parts which start with the same letter.

**[D]** : Connector Color  
Connectors not indicated are milky white in color.

## L PART NUMBER OF CONNECTORS

Code	Part Name	Part Number	Code	Part Name	Part Number
A 1	A/C Ambient Temp. Sensor	90980-1 1070	D 4	Diode (Courtesy)	90980-1 1608
A 2	A/C Condenser Fan Motor	90980-1 1237	D 5	Diode (Interior Light)	90980-10962
A 3	A/C Condenser Fan Relay	90980-10940	D 6	Diode (Moon Roof)	90980-1 1608
A 4	A/C Condenser Fan Resistor	90980-10928	D 7	Door Lock Control Relay	90980-10848
A 5	A/C Magnetic Clutch	90980-1 1271	D 8	Door Lock Control SW LH	90980-1 1148
A 6	A/T Oil Temp. Sensor	90980-1 1413	D 9	Door Lock Control SW RH	
[A]	ABS Actuator [B]	909-1 151	D10	Door Courtesy SW LH	90980-1 1097
A 8	ABS Actuator	90980-1 1009	D11	Door Courtesy SW RH	
A 9	ABS Speed Sensor Front LH	90980-10941	D12	Door Courtesy SW Front LH	90980-1 1156
A10	ABS Speed Sensor Front RH	90980-1 1002	D13	Door Courtesy SW Front RH	
A11	Airbag Sensor Front LH	90980-1 1856	D14	Door Courtesy SW Rear LH	
A12	Airbag Sensor Front RH		D15	Door Courtesy SW Rear RH	
A13	Airbag Sensor Front LH	90980-1 1194	D16	Door Courtesy SW Front LH	90980-1 1170
		90980-1 1194			

**[A]** : Part Code

**[B]** : Part Name

**[C]** : Part Number

Toyota Part Number are indicated.

Not all of the above part numbers of the connector are established for the supply.

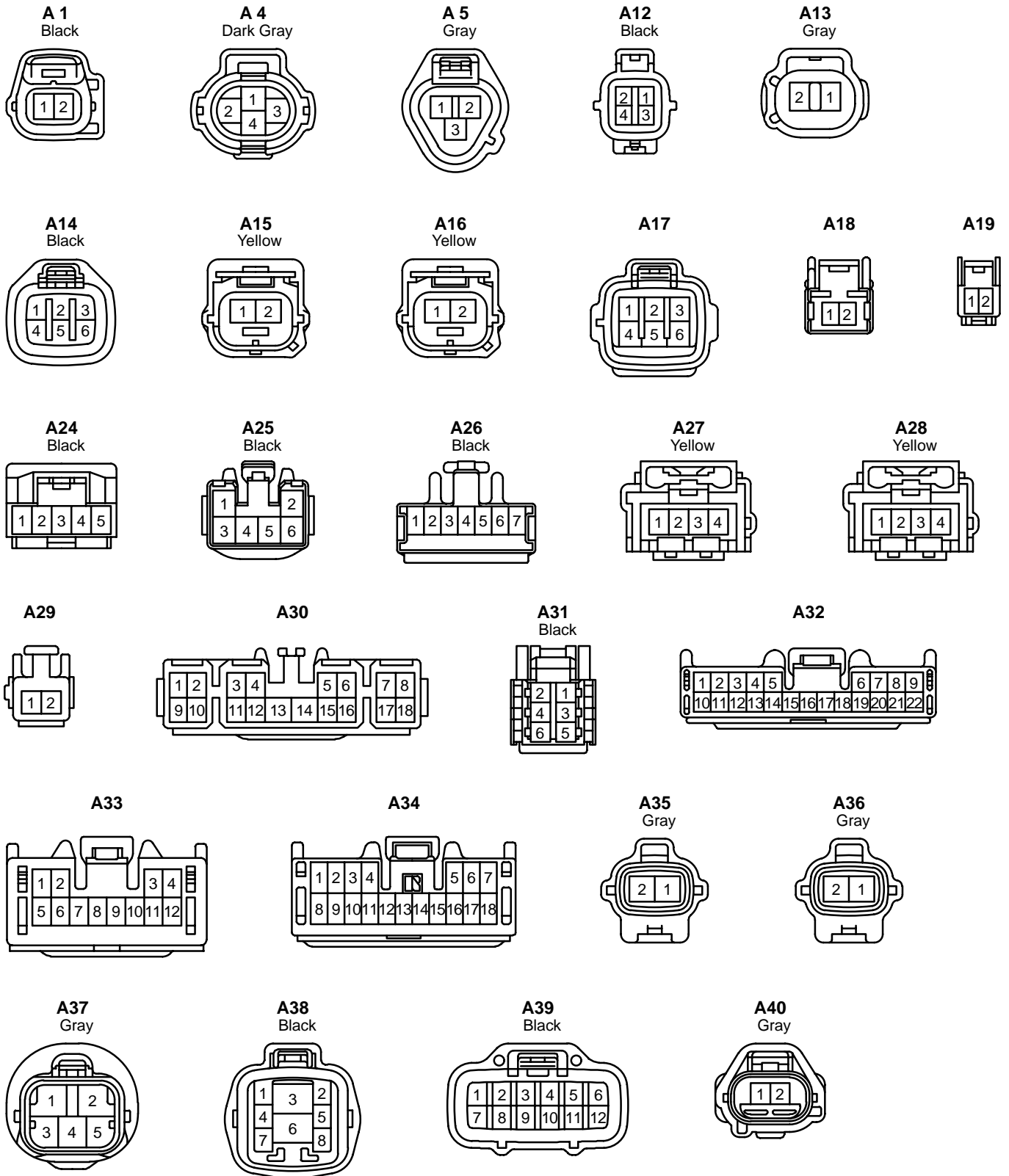
**ABBREVIATIONS**

The following abbreviations are used in this manual.

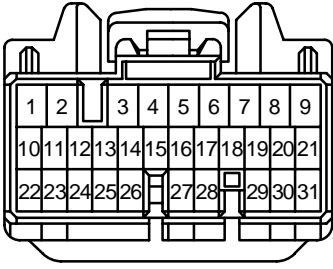
A/C	=	Air Conditioning
A/T	=	Automatic Transmission
ABS	=	Anti-Lock Brake System
ACIS	=	Acoustic Control Induction System
BA	=	Brake Assist
DIFF.	=	Differential
DVD	=	Digital Versatile Disc
EC	=	Electrochromic
ECU	=	Electronic Control Unit
ESA	=	Electronic Spark Advance
ETCS-i	=	Electronic Throttle Control System-intelligent
EVAP	=	Evaporative Emission
IC	=	Integrated Circuit
J/B	=	Junction Block
LH	=	Left-Hand
R/B	=	Relay Block
RH	=	Right-Hand
SFI	=	Sequential Multiport Fuel Injection
SRS	=	Supplemental Restraint System
SW	=	Switch
TEMP.	=	Temperature
TRAC	=	Traction Control
VSC	=	Vehicle Stability Control
VSV	=	Vacuum Switching Valve
w/	=	With
w/o	=	Without

\* The titles given inside the components are the names of the terminals (terminal codes) and are not treated as being abbreviations.

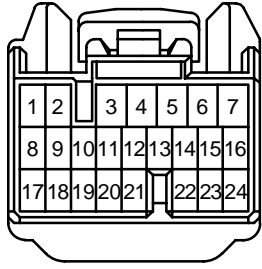
# K CONNECTOR LIST



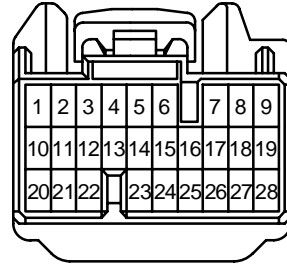
A41



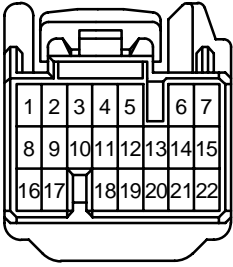
A42



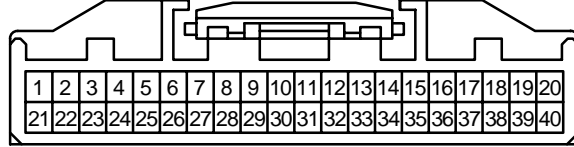
A43



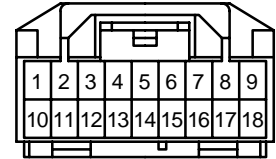
A44



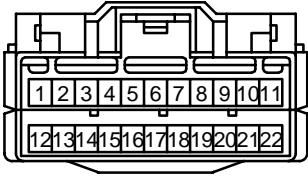
A45



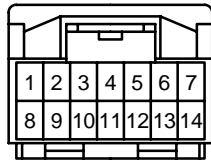
A46



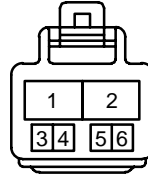
A47



A48



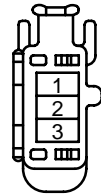
B 1  
Black



B 2



B 3



B 4  
Black



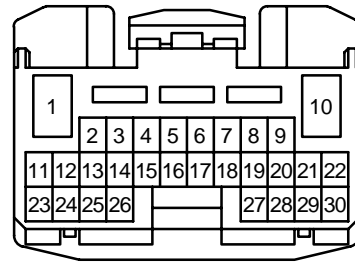
B 5



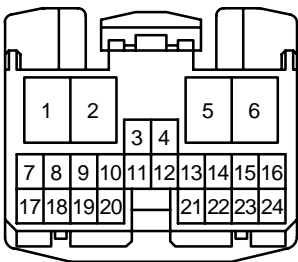
B 6  
Gray



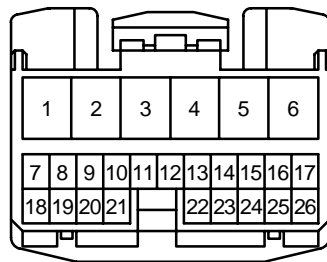
B 7



B 8



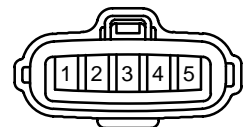
B 9



C 1  
Dark Gray



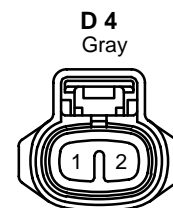
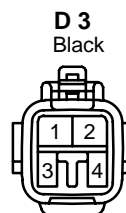
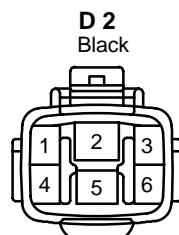
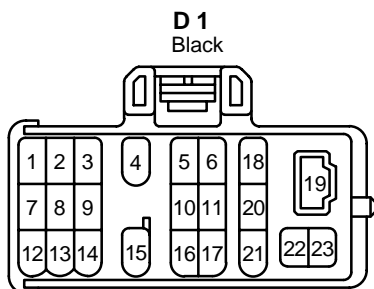
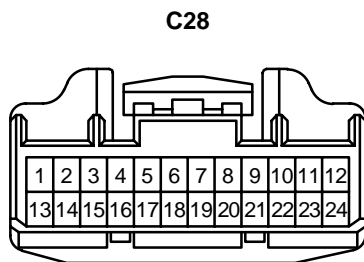
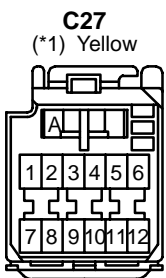
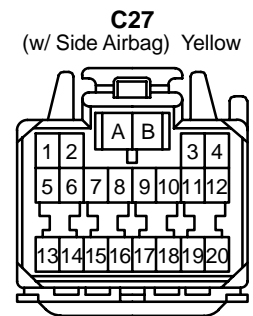
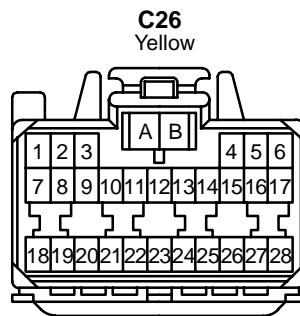
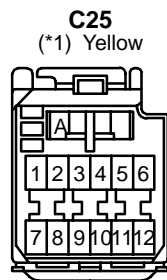
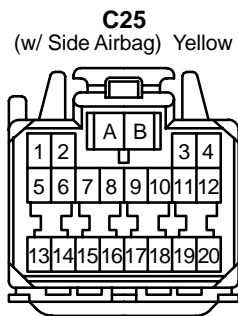
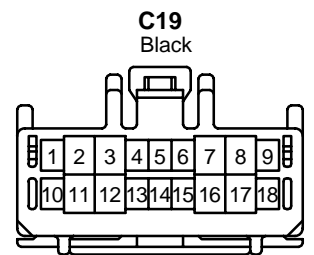
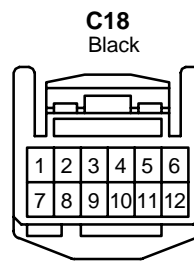
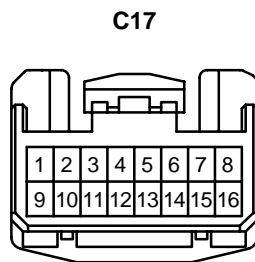
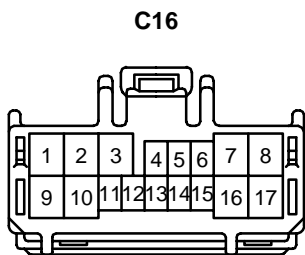
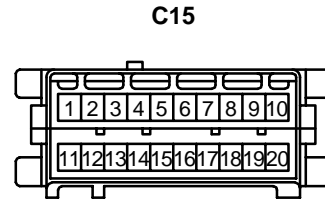
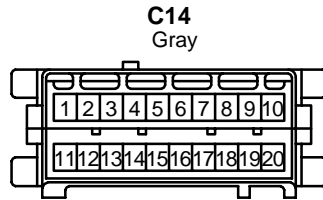
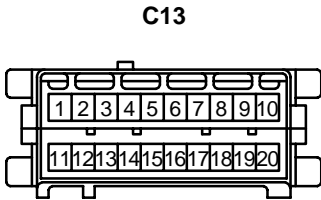
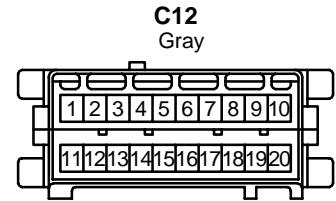
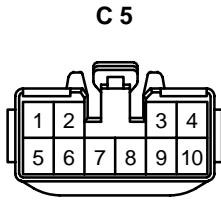
C 2  
Black

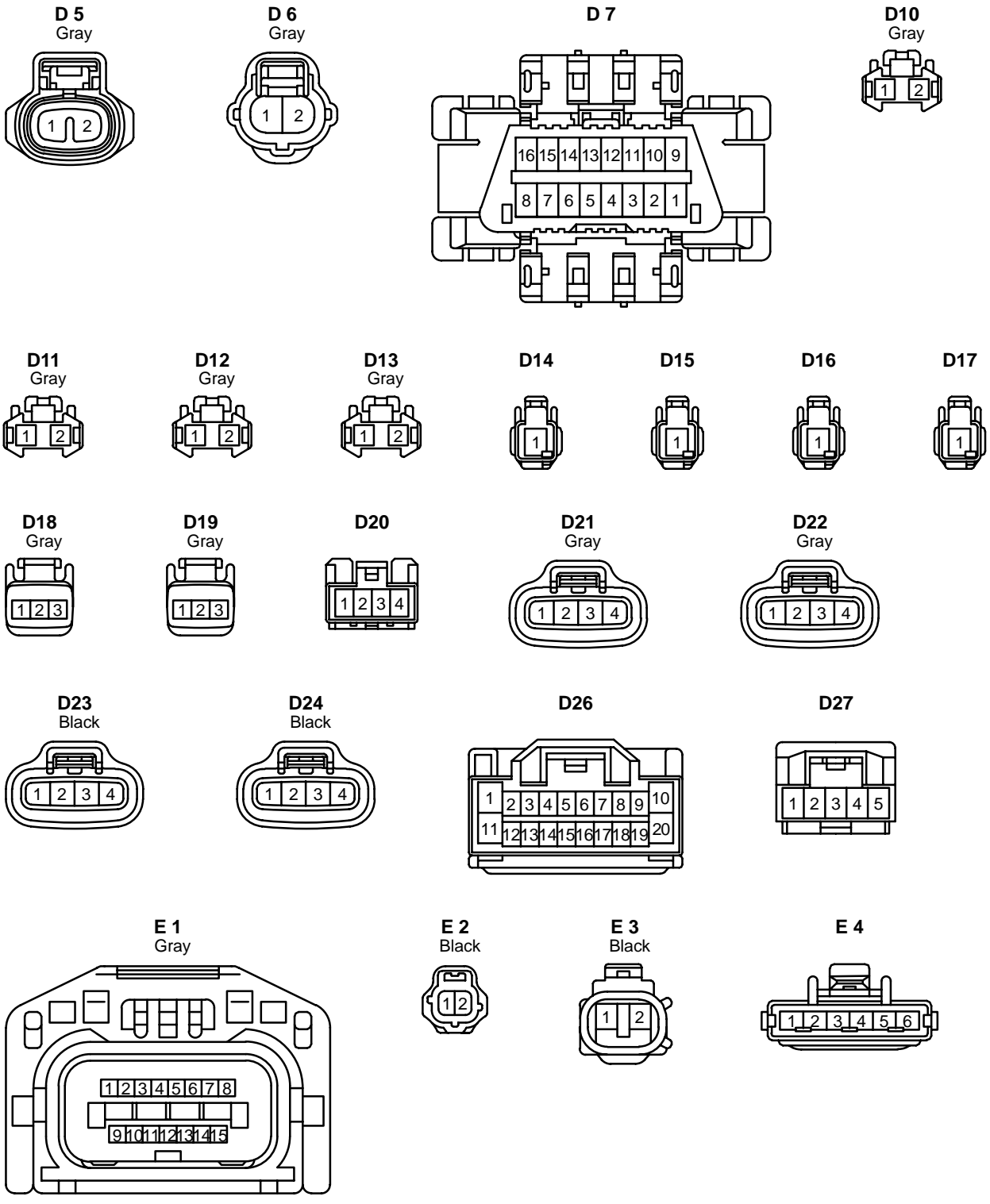




# K CONNECTOR LIST

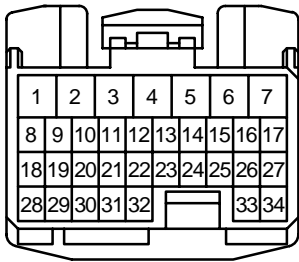
\*1 : w/o Side Airbag



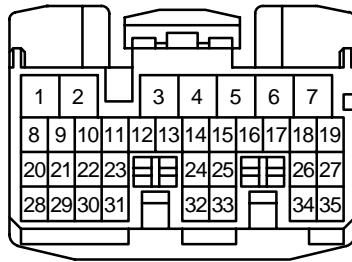


# K CONNECTOR LIST

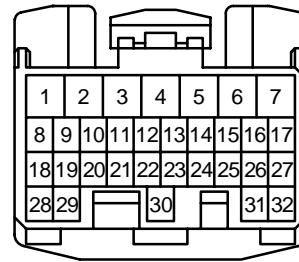
**E 5**



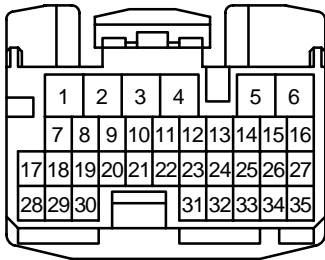
**E 6**



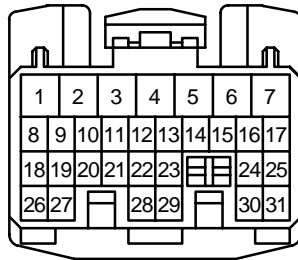
**E 7**



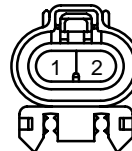
**E 8**



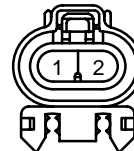
**E 9**



**F 1**  
Brown



**F 2**  
Brown



**F 3**  
Gray



**F 4**  
Gray



**F 5**  
Black



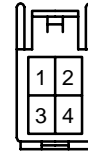
**F 8**



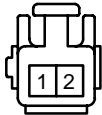
**F 9**



**F 10**



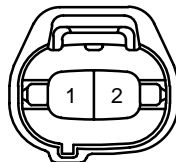
**F 11**



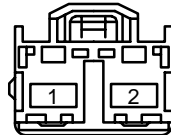
**F 12**  
Dark Gray



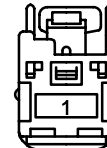
**F 14**  
Dark Gray



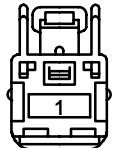
**F 15**  
Black



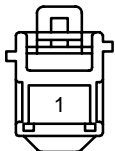
**F 16**  
Black



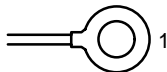
**F 17**  
Black



**F 18**  
Black



**F 19**



**G 1**  
Black



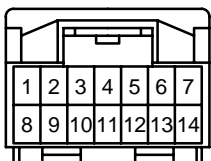
**G 2**



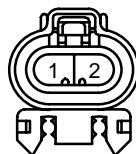
**G 3**



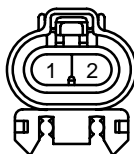
**G 4**  
Gray



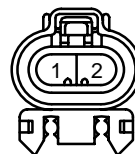
**H 1**  
Black



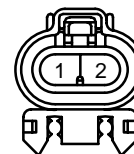
**H 2**  
Brown

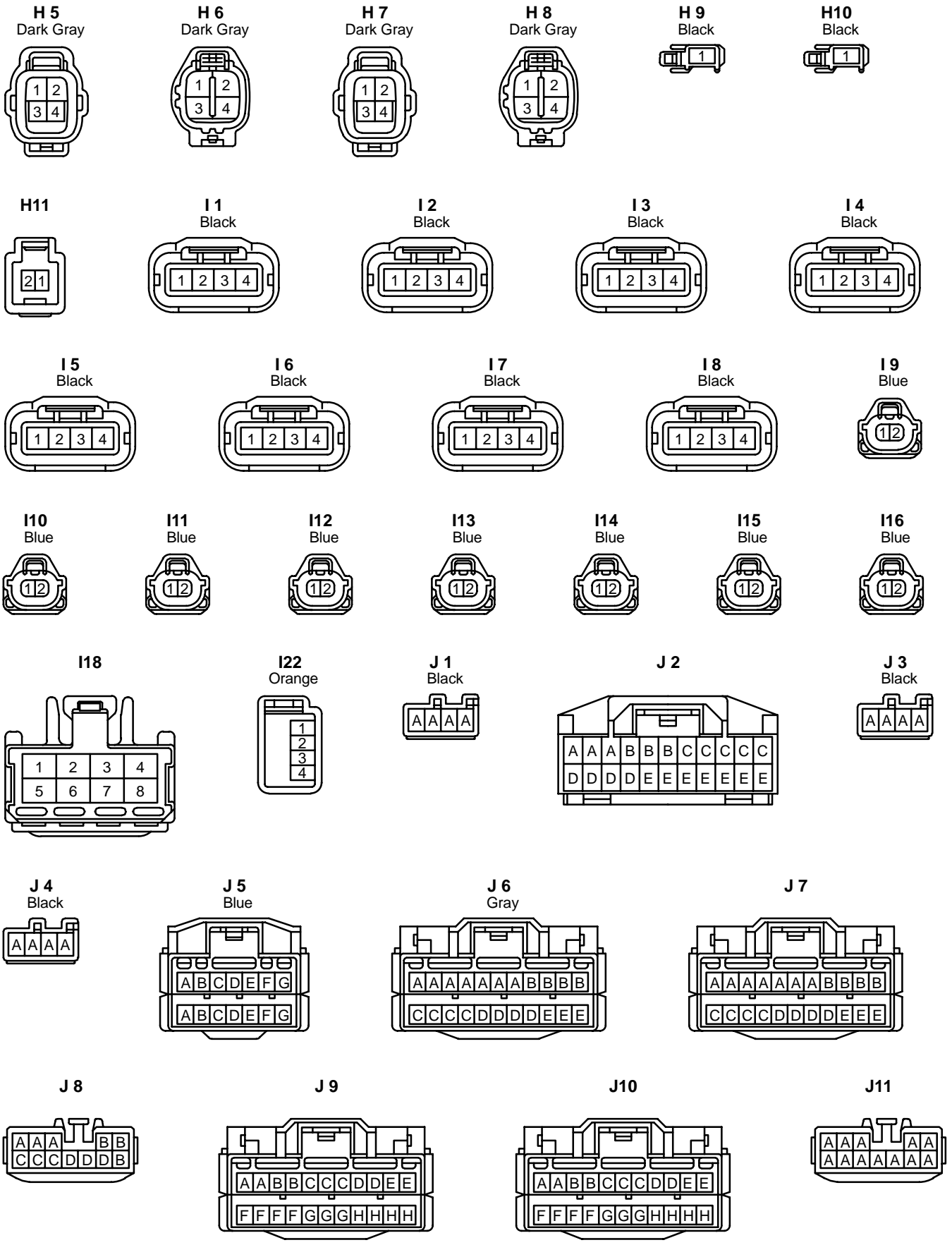


**H 3**  
Black



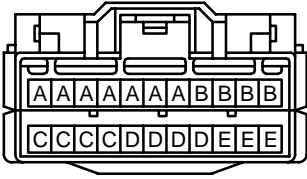
**H 4**  
Brown



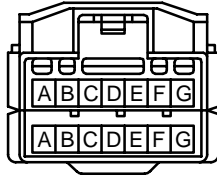


# K CONNECTOR LIST

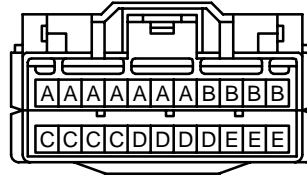
**J12**  
Gray



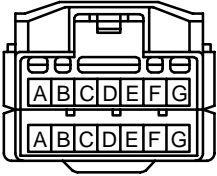
**J13**  
Blue



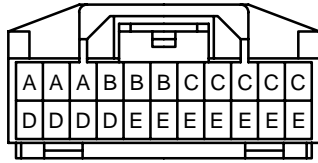
**J14**



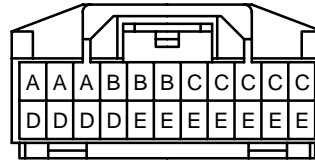
**J15**



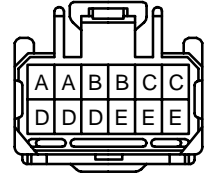
**J16**



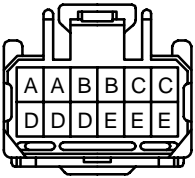
**J17**



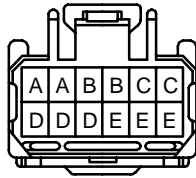
**J18**  
Gray



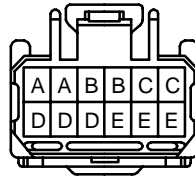
**J19**  
Gray



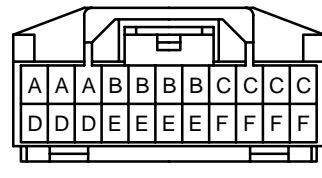
**J20**



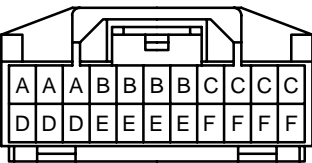
**J21**



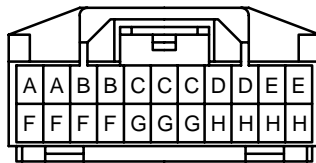
**J22**



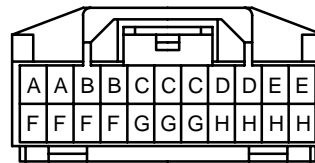
**J23**



**J25**



**J26**



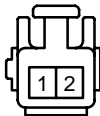
**K 1**  
Dark Gray



**K 2**



**K 3**  
Black



**L 1**



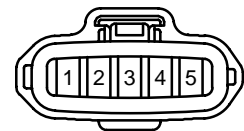
**L 2**



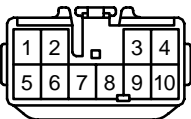
**L 3**



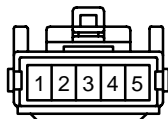
**M 1**  
Black



**M 2**



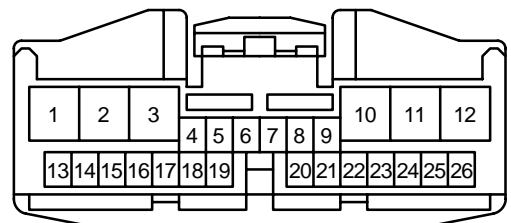
**M 3**

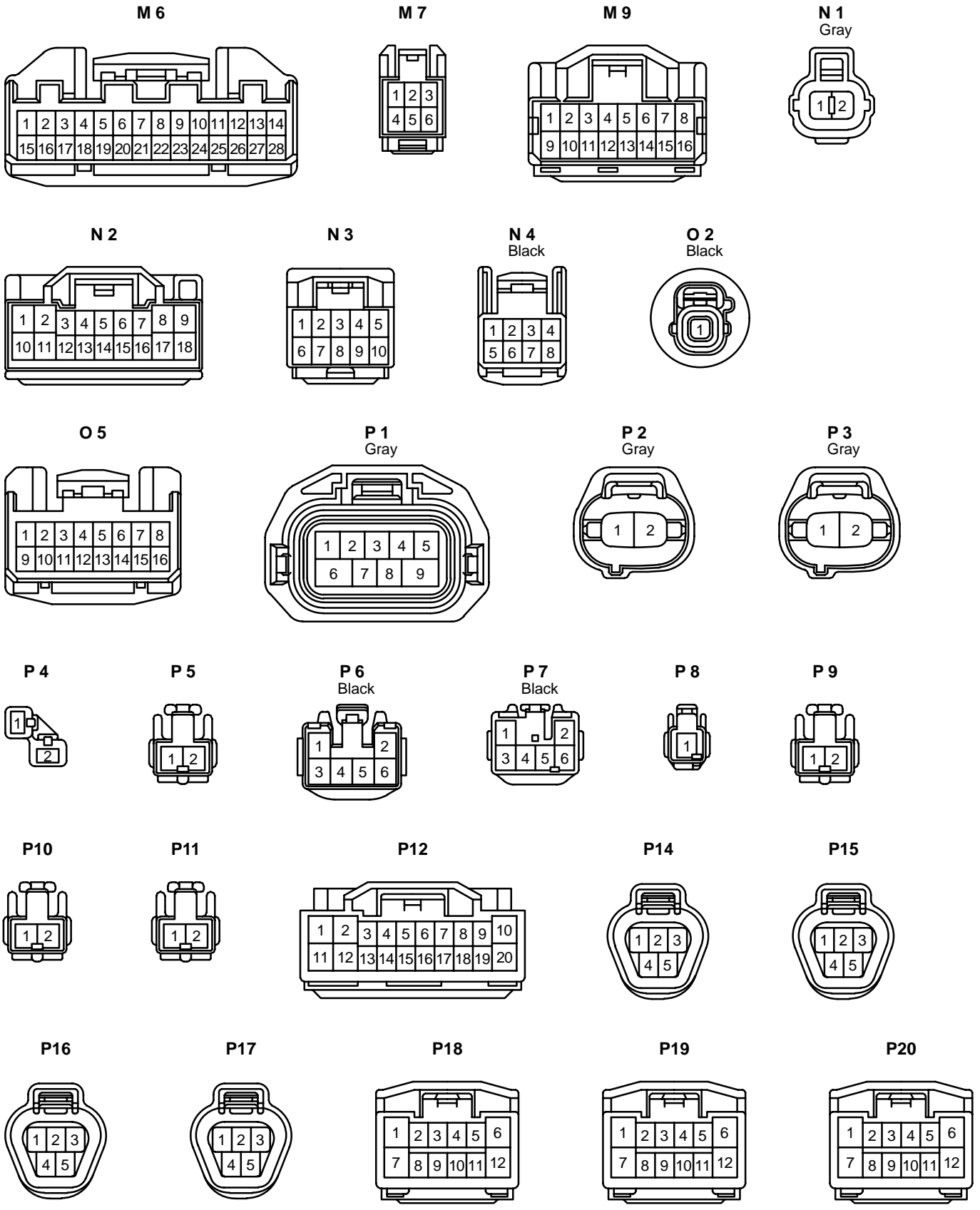


**M 4**  
Gray

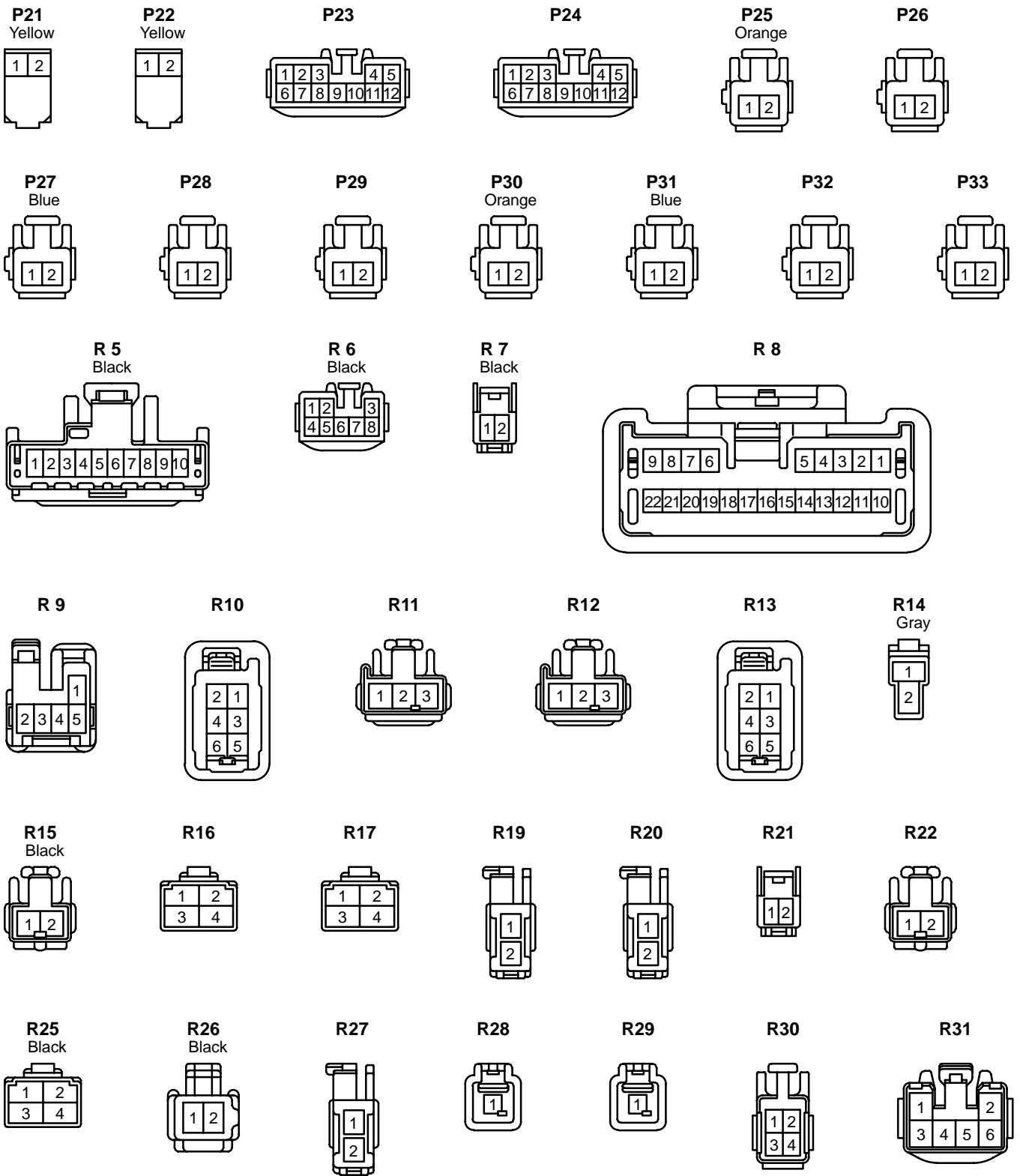


**M 5**

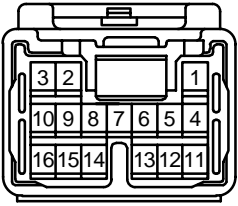




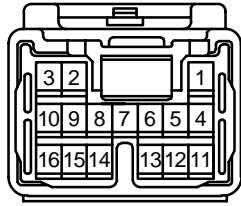
# K CONNECTOR LIST



R32



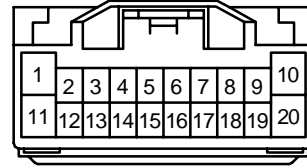
R33



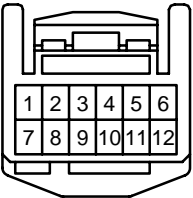
R34  
Black



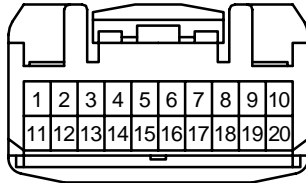
R36



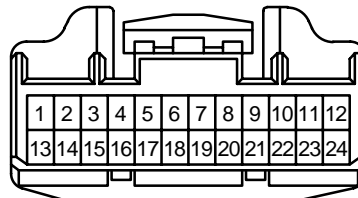
R37



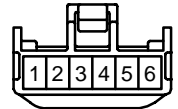
R38



R39



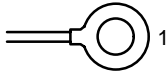
R40  
Black



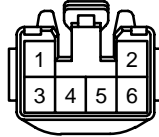
S1  
Black



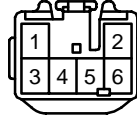
S2



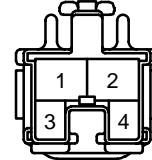
S3  
Black



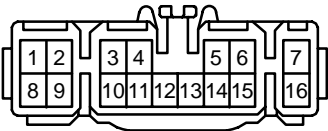
S4  
Brown



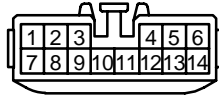
S5  
Blue



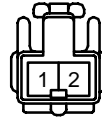
S6  
Gray



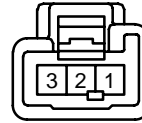
S7  
Gray



S8



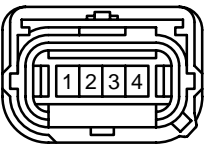
S9



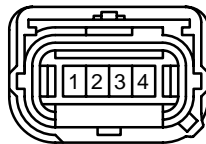
S10



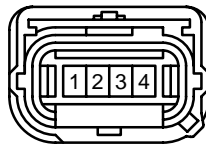
S11  
Yellow



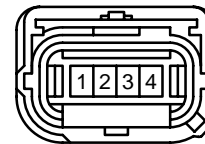
S12  
Yellow



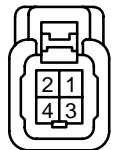
S13  
Yellow



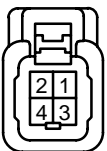
S14  
Yellow



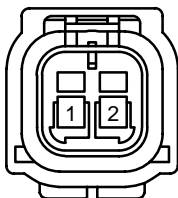
S15



S16



S17  
Black



S18  
Yellow



S19  
Yellow



T1  
Black



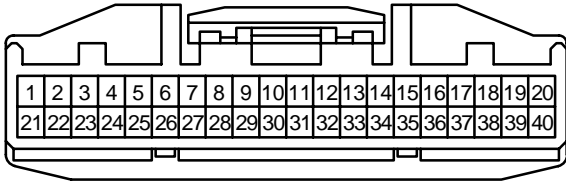
T4





# K CONNECTOR LIST

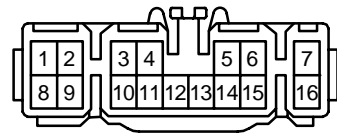
**T 5**



**T 7**



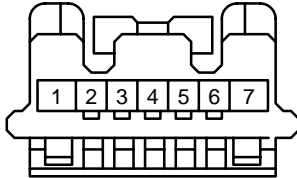
**T 8**



**T 9**  
Black



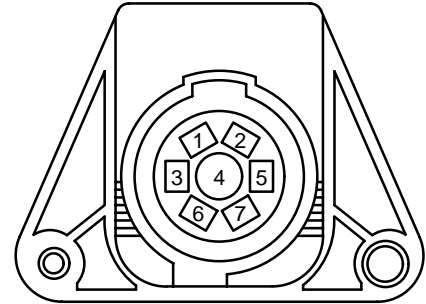
**T10**  
Black



**T11**  
Black



**T12**  
Black



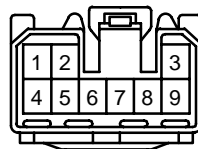
**T13**



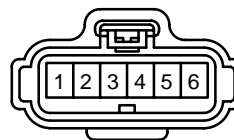
**T14**



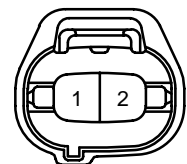
**T15**  
Orange



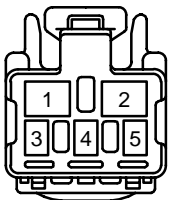
**T16**  
Black



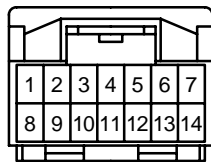
**T17**  
Black



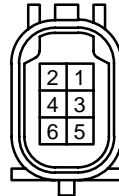
**T18**



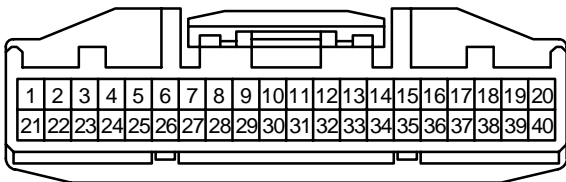
**T19**



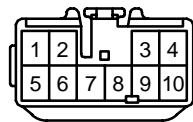
**T20**



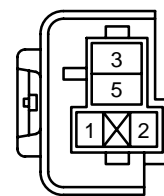
**T21**



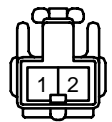
**T22**



**T23**



**U 1**



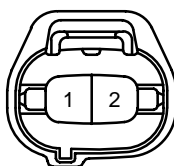
**V 1**  
Black



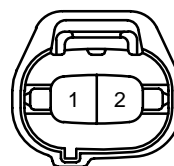
**V 2**  
Black



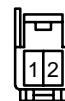
**V 3**  
Black



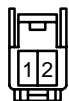
**V 4**  
Black



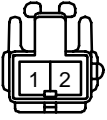
**V 6**



**V 7**



V 8  
Black



V 9  
Gray



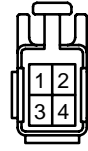
V10  
Blue



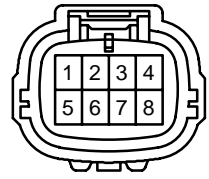
W 1  
Gray



W 4



Y 1  
Black

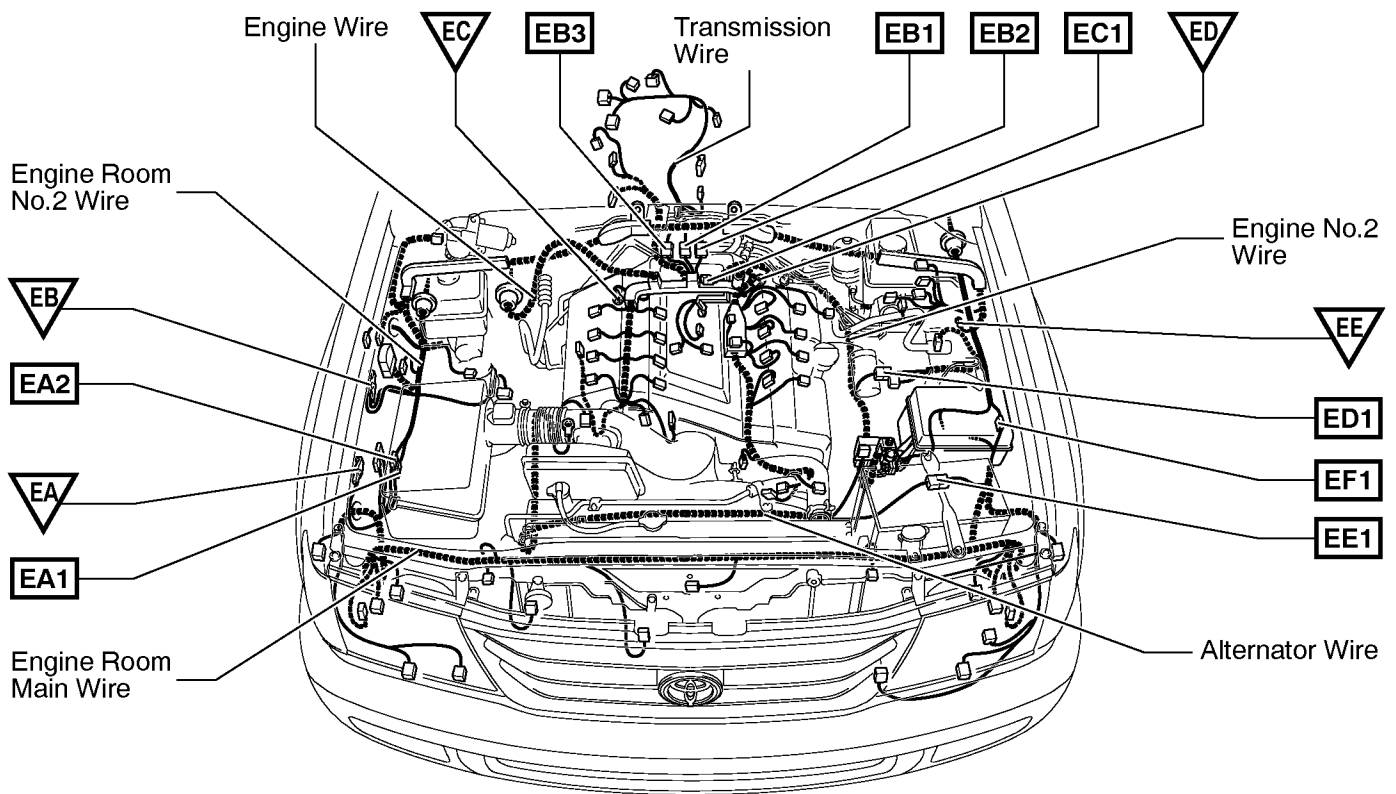


Z 1

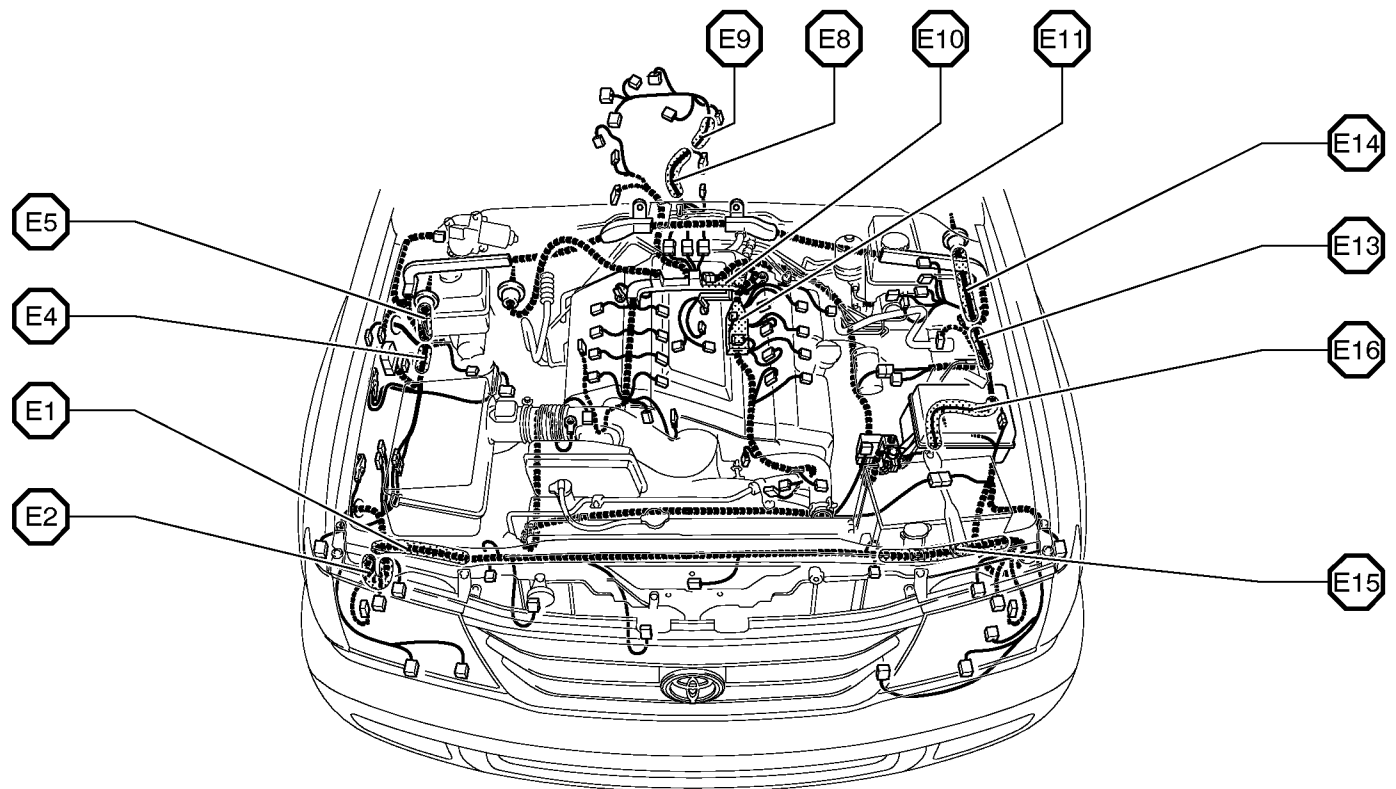


# G ELECTRICAL WIRING ROUTING

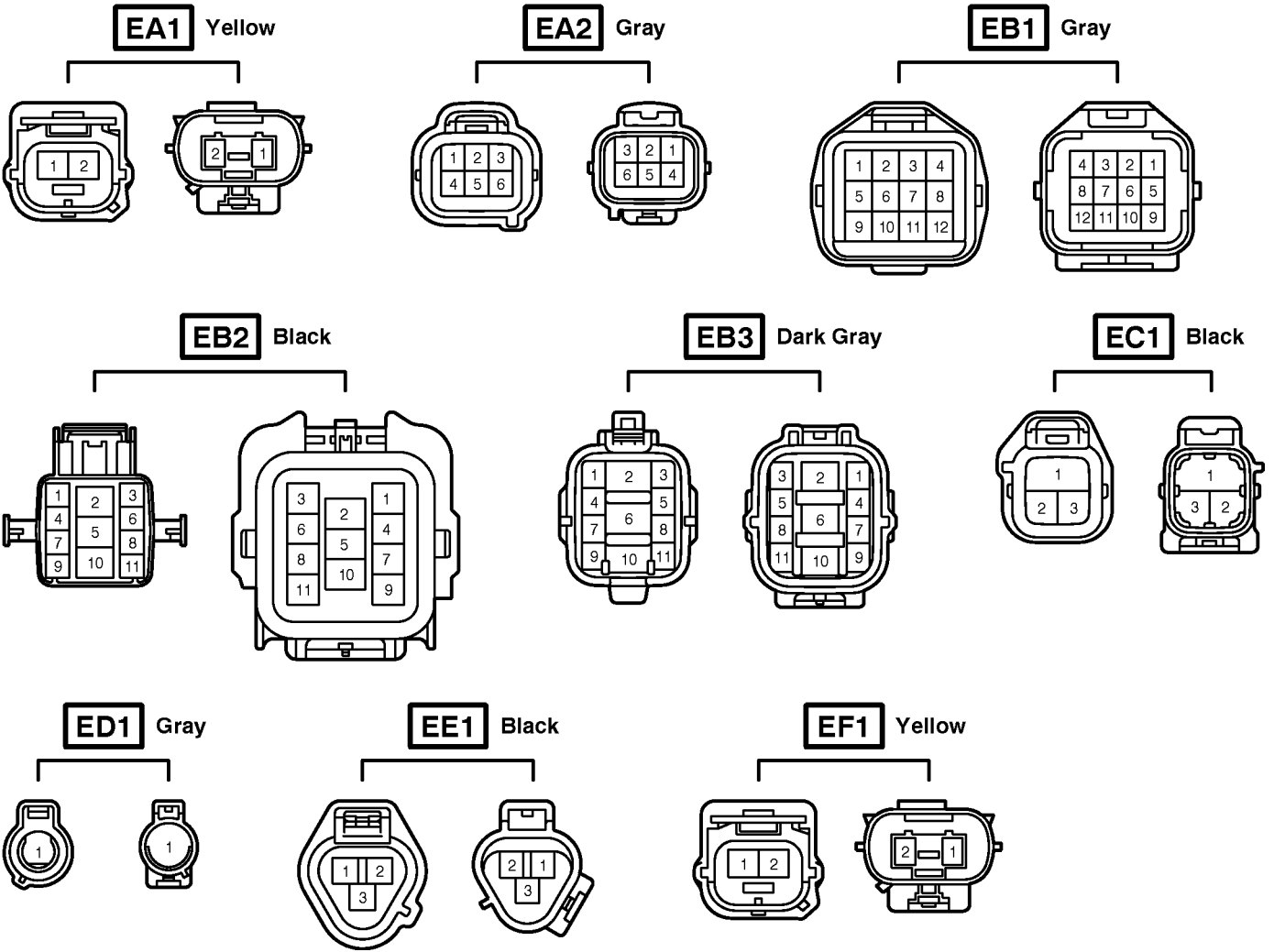
□ : Location of Connector Joining Wire Harness and Wire Harness  
 ▽ : Location of Ground Points



○ : Location of Splice Points



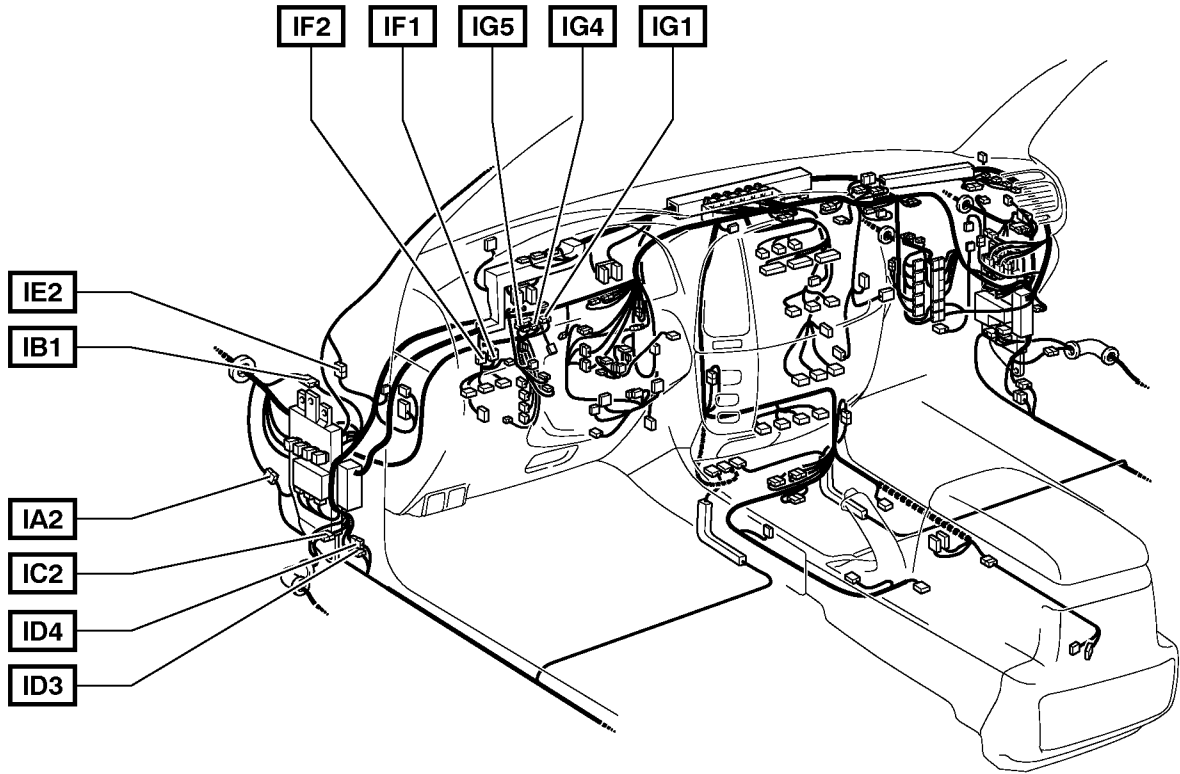
## Connector Joining Wire Harness and Wire Harness



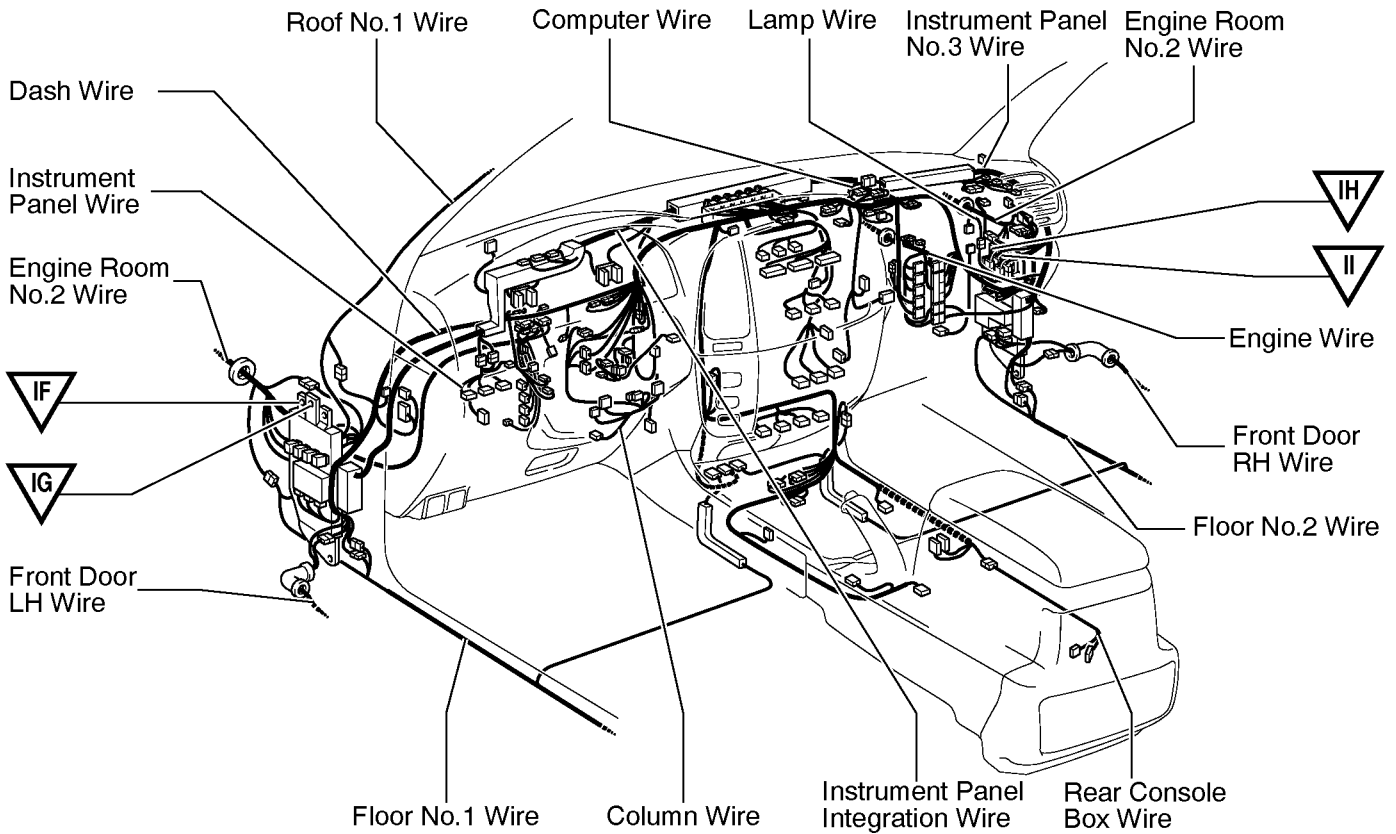
Code	Joining Wire Harness and Wire Harness (Connector Location)
EA1	Engine Room Main Wire and Engine Room No.2 Wire (Engine Compartment Right)
EA2	
EB1	Engine Wire and Transmission Wire (On the Transmission)
EB2	
EB3	
EC1	Engine No.2 Wire and Engine Wire (On the Transmission)
ED1	Engine No.2 Wire and Engine Room No.2 Wire (Near the Engine Room J/B)
EE1	Engine Room Main Wire and Alternator Wire (Near the Battery)
EF1	Engine Room No.2 Wire and Engine Room Main Wire (Under the Engine Room J/B)

# G ELECTRICAL WIRING ROUTING

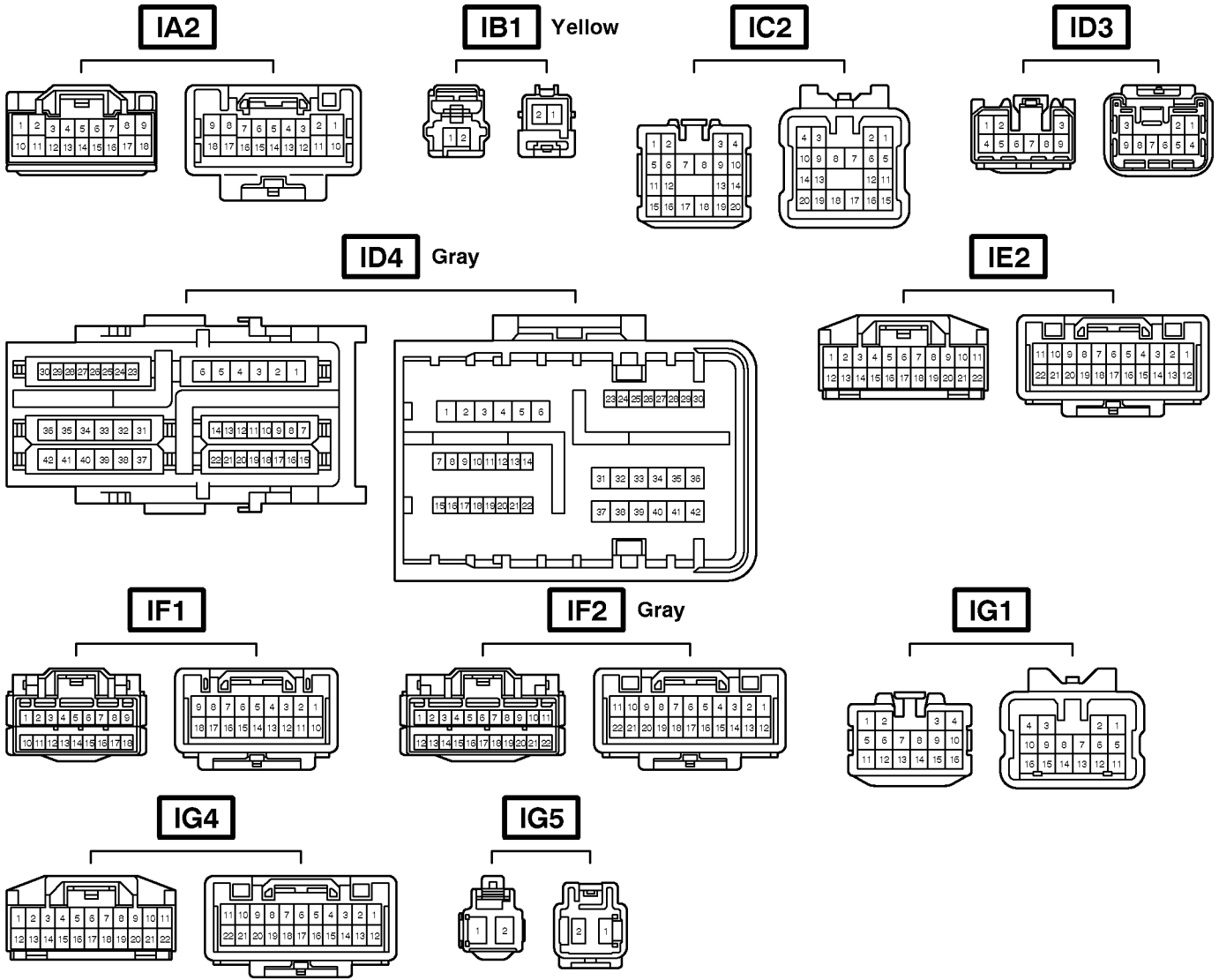
□ : Location of Connector Joining Wire Harness and Wire Harness



▽ : Location of Ground Points



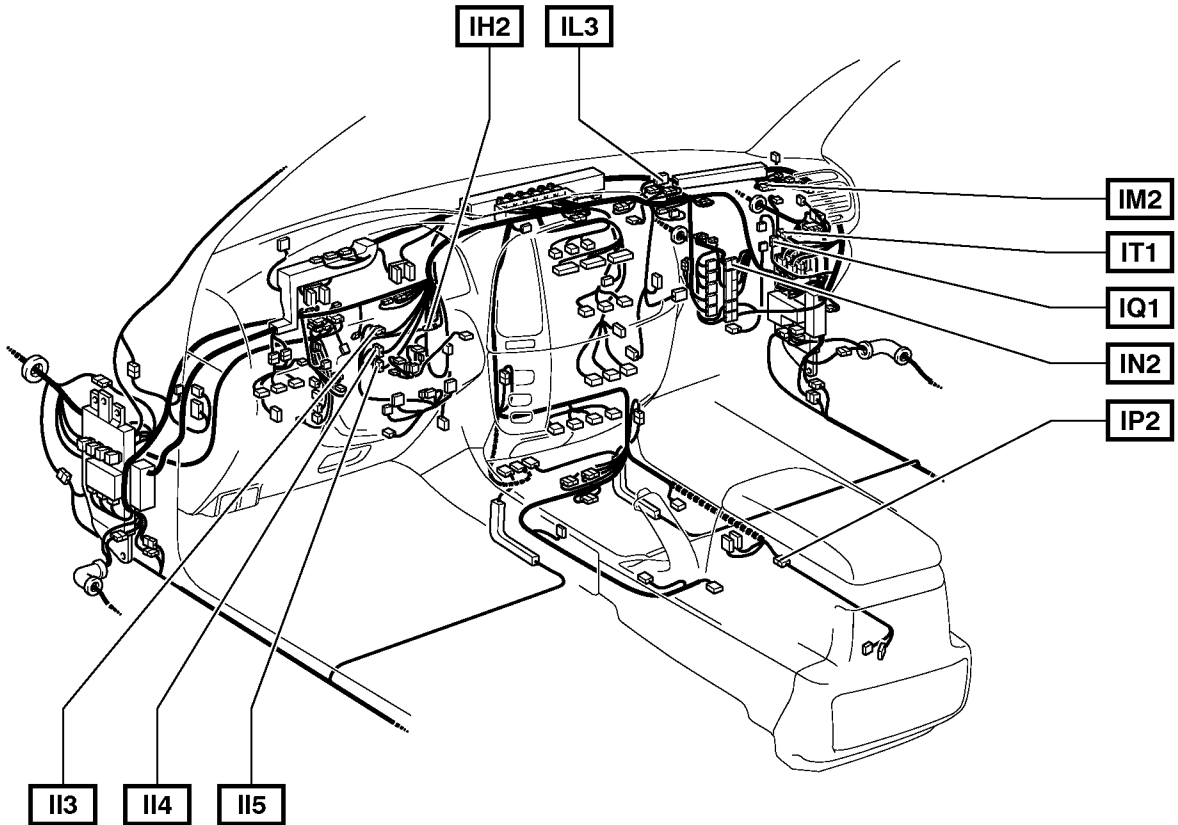
# Connector Joining Wire Harness and Wire Harness



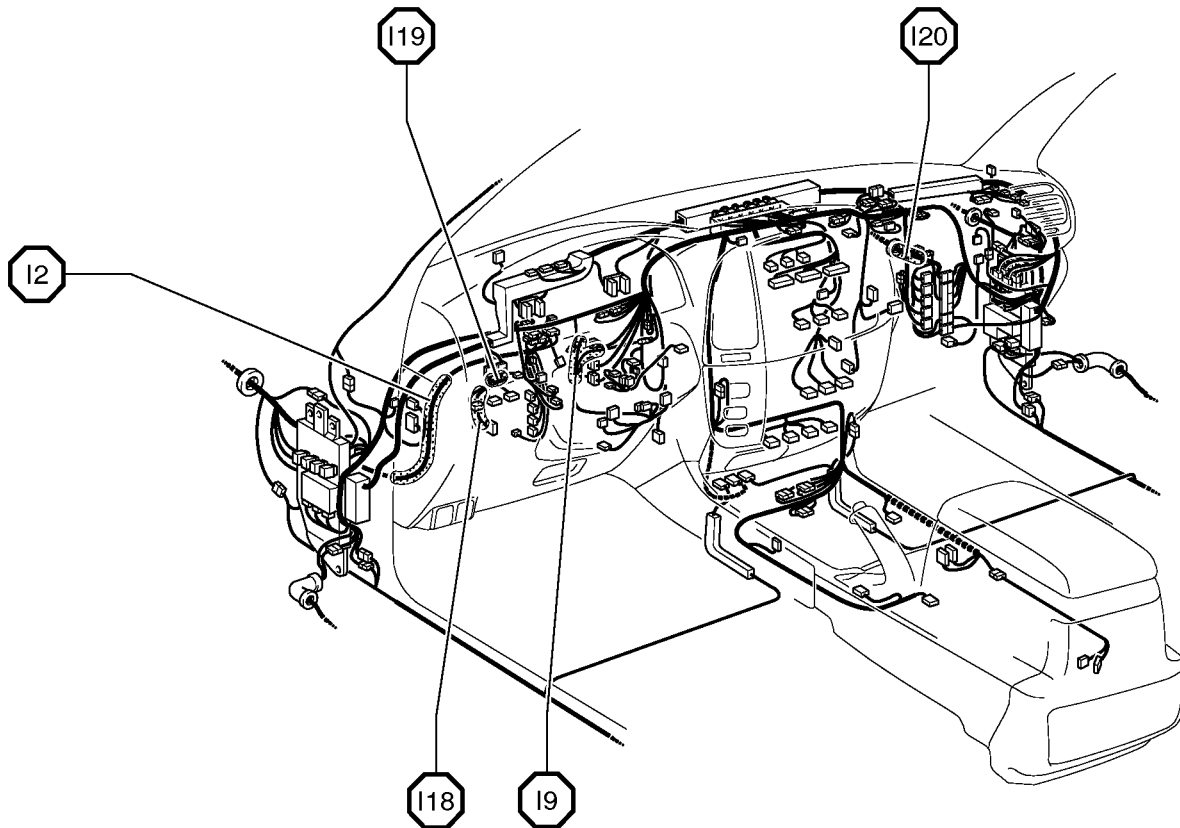
Code	Joining Wire Harness and Wire Harness (Connector Location)
IA2	Engine Room No.2 Wire and Floor No.1 Wire (Left Kick Panel)
IB1	Engine Room No.2 Wire and Dash Wire (Left Kick Panel)
IC2	Front Door LH Wire and Dash Wire (Left Kick Panel)
ID3	Dash Wire and Floor No.1 Wire (Left Kick Panel)
ID4	Dash Wire and Roof No.1 Wire (Left Kick Panel)
IE2	Dash Wire and Roof No.1 Wire (Left Kick Panel)
IF1	Instrument Panel Integration Wire and Instrument Panel Wire (Left Side of Instrument Panel)
IF2	Instrument Panel Integration Wire and Instrument Panel Wire (Left Side of Instrument Panel)
IG1	
IG4	Engine Room No.2 Wire and Dash Wire (Behind the Combination Meter)
IG5	

# G ELECTRICAL WIRING ROUTING

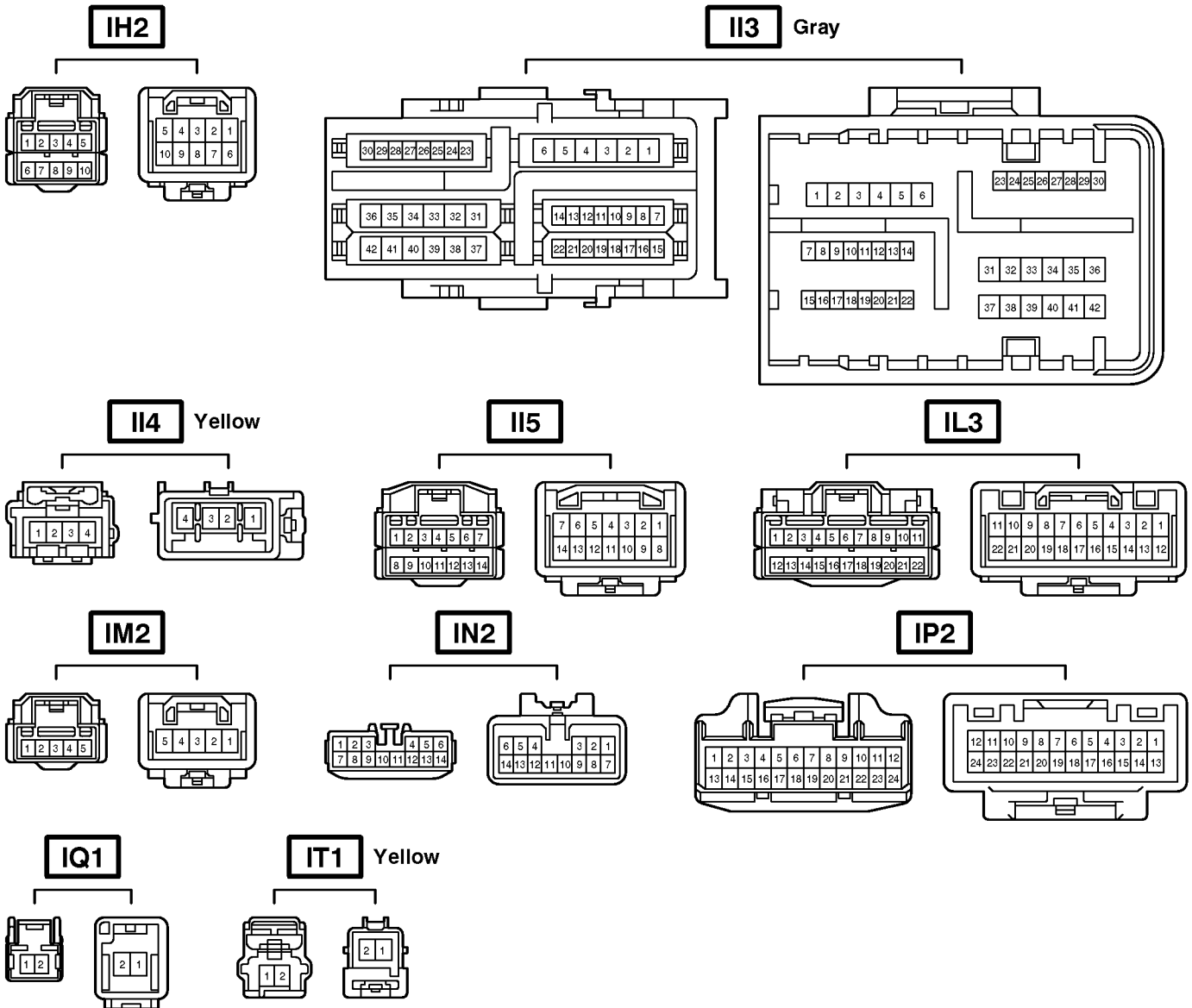
□ : Location of Connector Joining Wire Harness and Wire Harness



○ : Location of Splice Points



# Connector Joining Wire Harness and Wire Harness

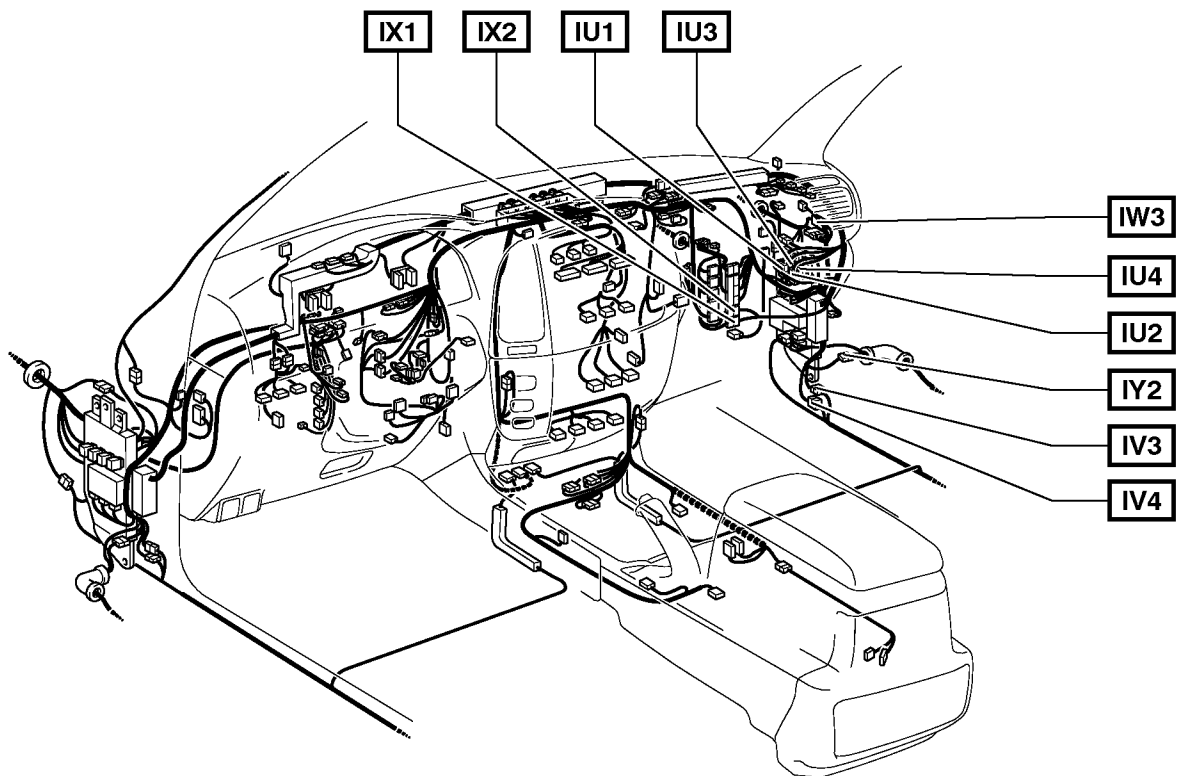


Code	Joining Wire Harness and Wire Harness (Connector Location)
IH2	Instrument Panel Integration Wire and Column Wire (Near the Ignition SW)
II3	
II4	Dash Wire and Column Wire (Near the Ignition SW)
II5	
IL3	Instrument Panel Integration Wire and Computer Wire (Instrument Panel Center)
IM2	Instrument Panel Integration Wire and Instrument Panel No.3 Wire (Right Side of Instrument Panel)
IN2	Engine Wire and Dash Wire (Behind the Glove Box)
IP2	Rear Console Box Wire and Dash Wire (Right Side of Rear Console)
IQ1	Instrument Panel Integration Wire and Lamp Wire (Behind the Glove Box)
IT1	Engine Room No.2 Wire and Dash Wire (Right Kick Panel)

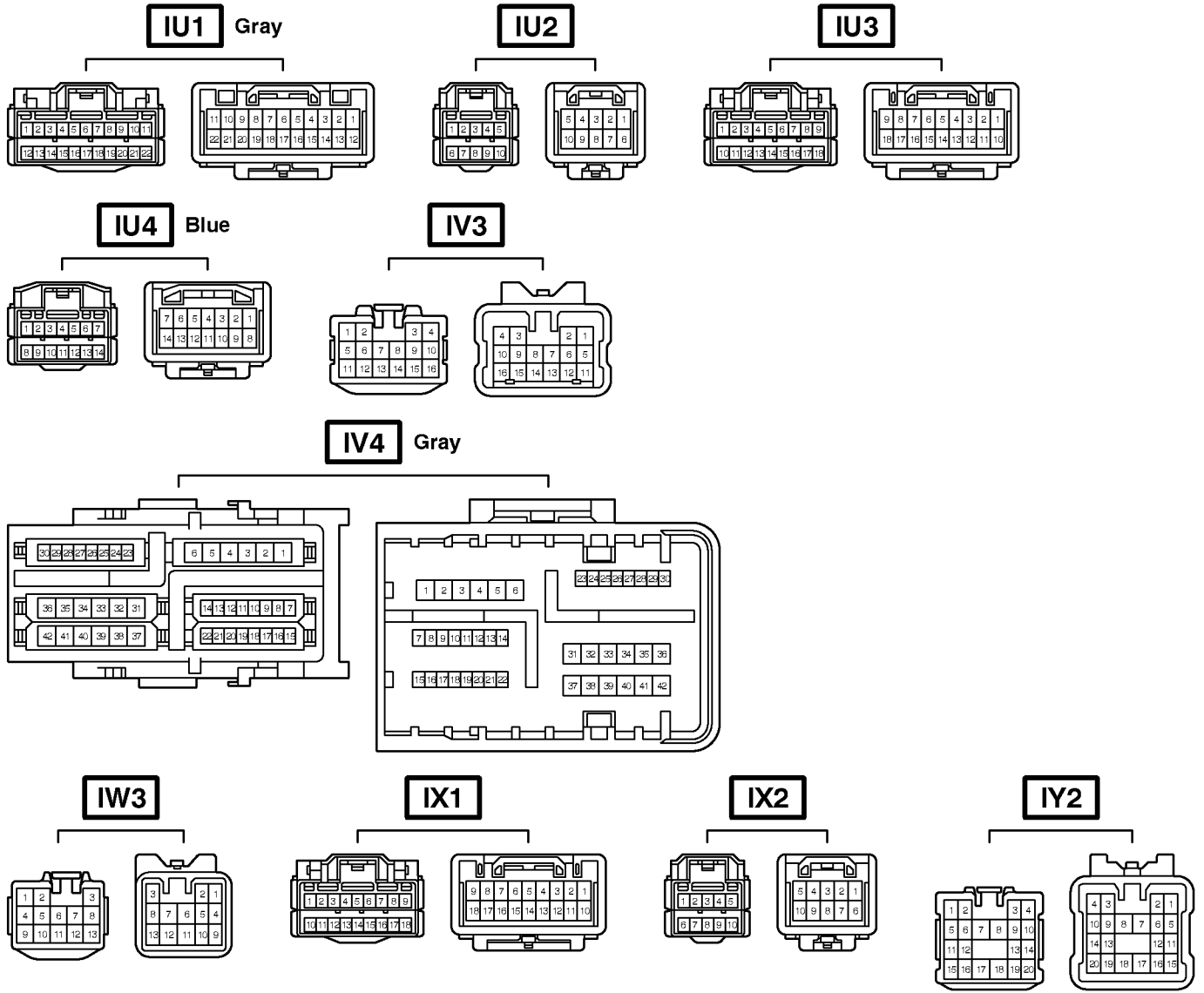


## G ELECTRICAL WIRING ROUTING

□ : Location of Connector Joining Wire Harness and Wire Harness



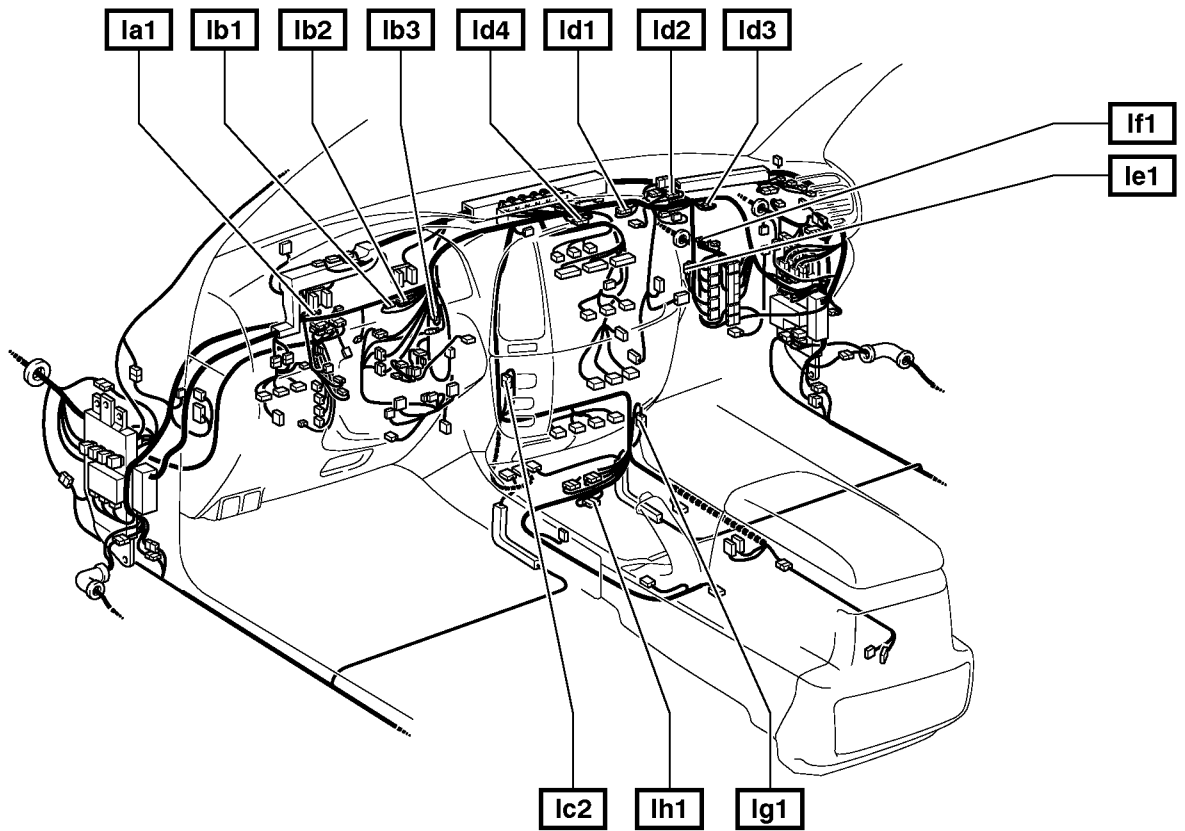
# Connector Joining Wire Harness and Wire Harness



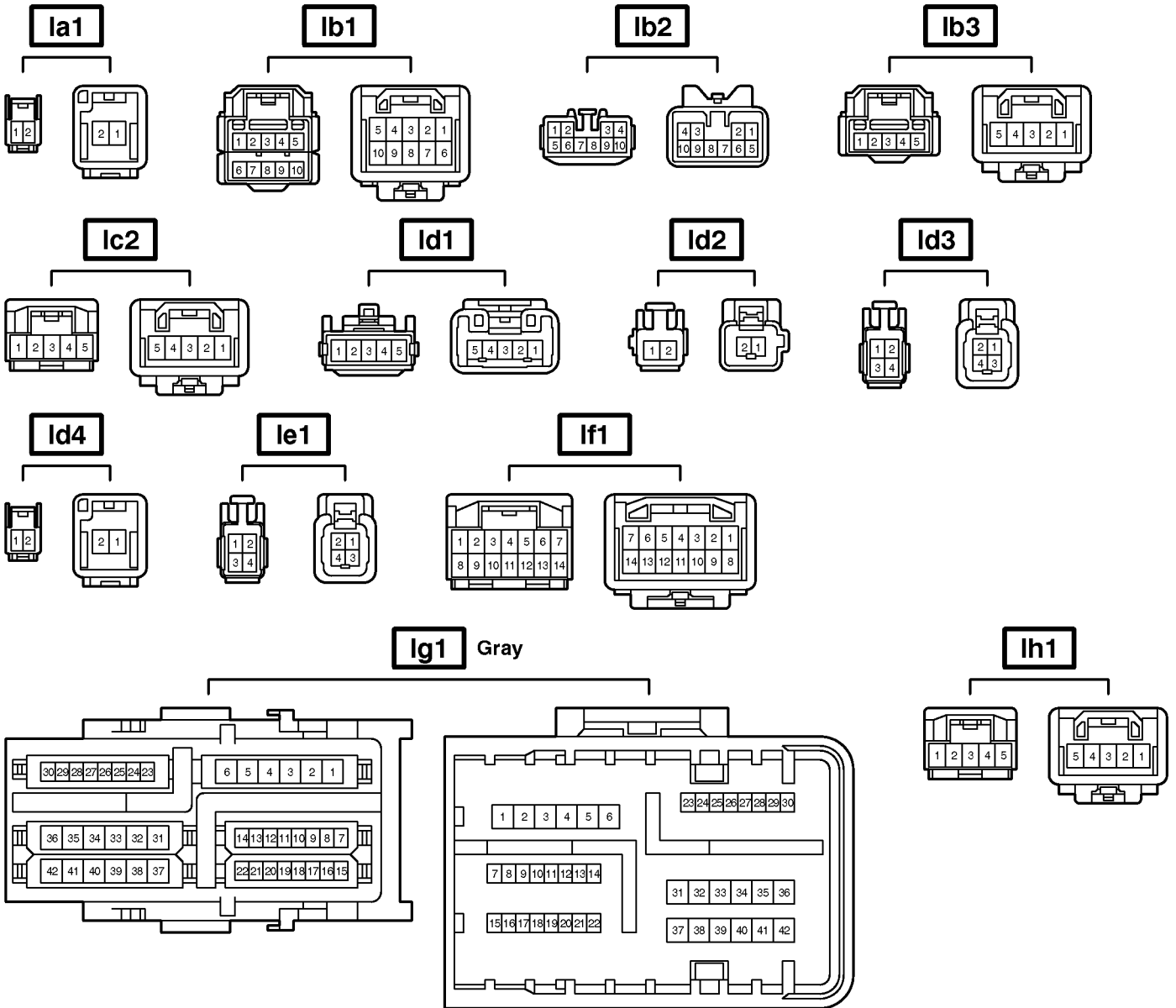
Code	Joining Wire Harness and Wire Harness (Connector Location)
IU1	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IU2	
IU3	
IU4	
IV3	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IV4	
IW3	Engine Room No.2 Wire and Dash Wire (Behind the Glove Box)
IX1	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
IX2	
IY2	Front Door RH Wire and Dash Wire (Right Kick Panel)

## G ELECTRICAL WIRING ROUTING

 : Location of Connector Joining Wire Harness and Wire Harness



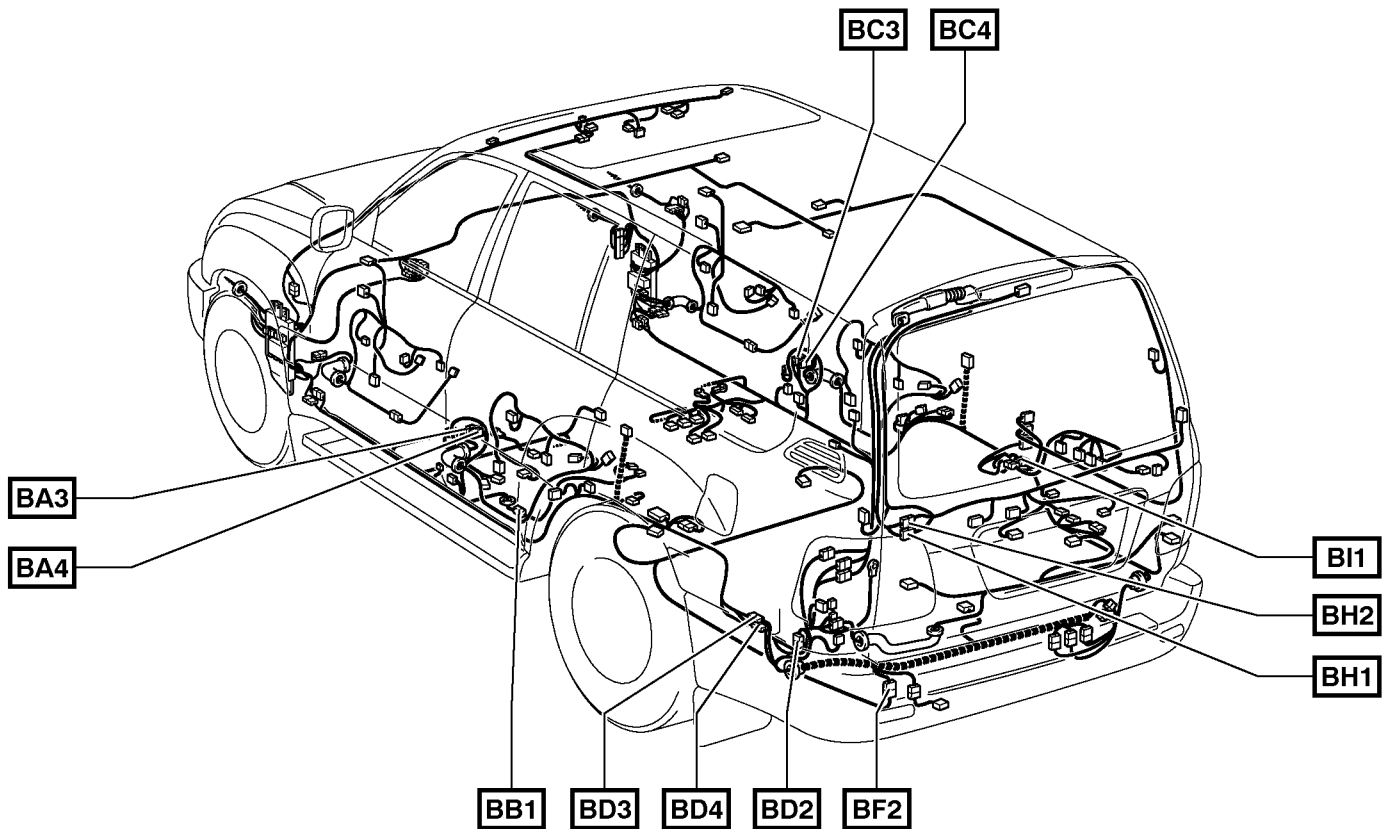
# Connector Joining Wire Harness and Wire Harness



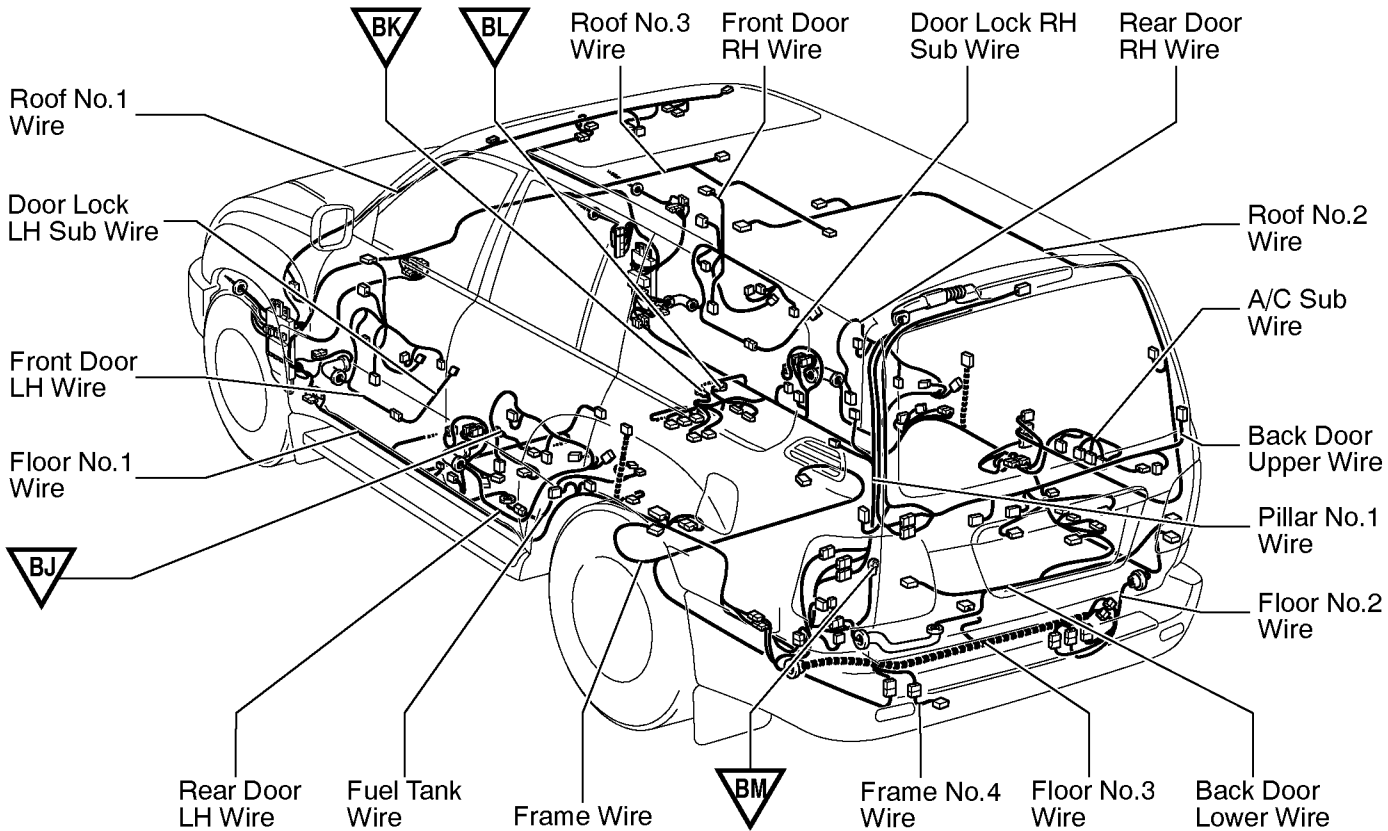
Code	Joining Wire Harness and Wire Harness (Connector Location)
la1	Dash Wire and Dash Wire (Behind the Combination Meter)
lb1	
lb2	Dash Wire and Dash Wire (Behind the Combination Meter)
lb3	
lc2	Dash Wire and Dash Wire (Behind the Center Panel)
ld1	
ld2	
ld3	Dash Wire and Dash Wire (Instrument Panel Center)
ld4	
le1	Dash Wire and Dash Wire (Behind the Glove Box)
lf1	Engine Wire and Engine Wire (Behind the Glove Box)
lg1	Dash Wire and Floor No.2 Wire (Right Side of Front Console)
lh1	Dash Wire and Dash Wire (Center Side of Front Console)

# G ELECTRICAL WIRING ROUTING

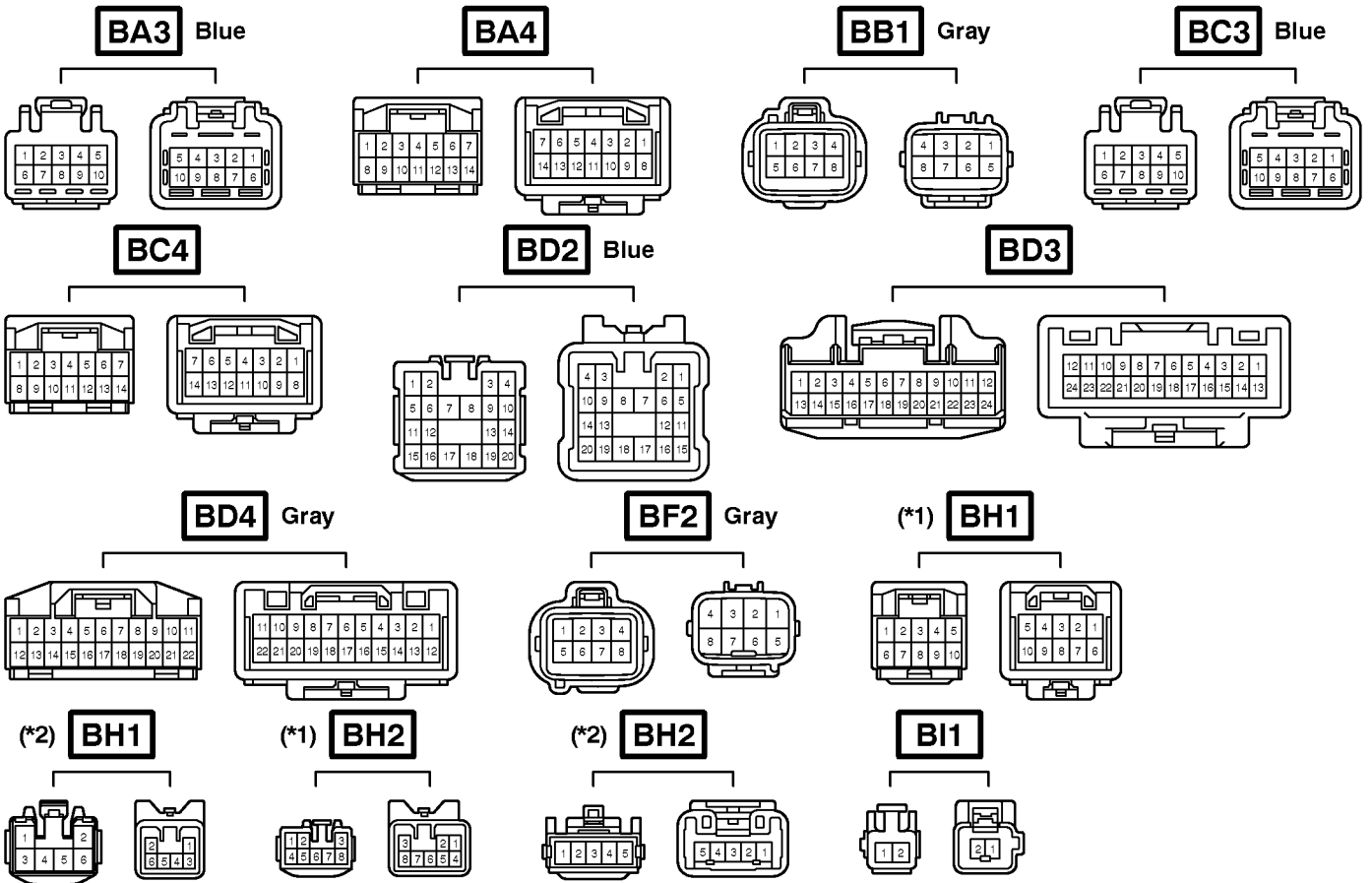
**□ : Location of Connector Joining Wire Harness and Wire Harness**



**▽ : Location of Ground Points**



## Connector Joining Wire Harness and Wire Harness

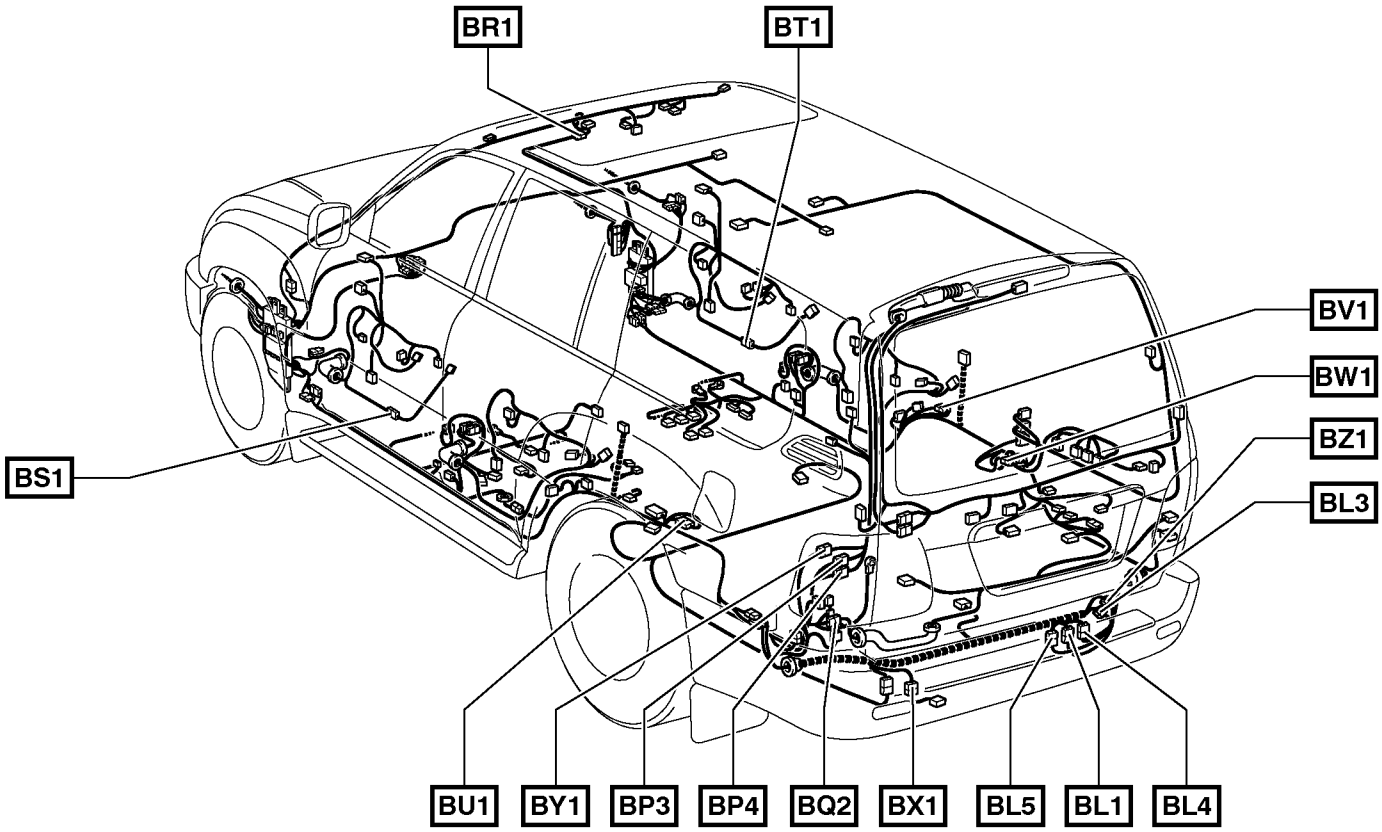


\* 1:w/ Navigation System  
\* 2:w/o Navigation System

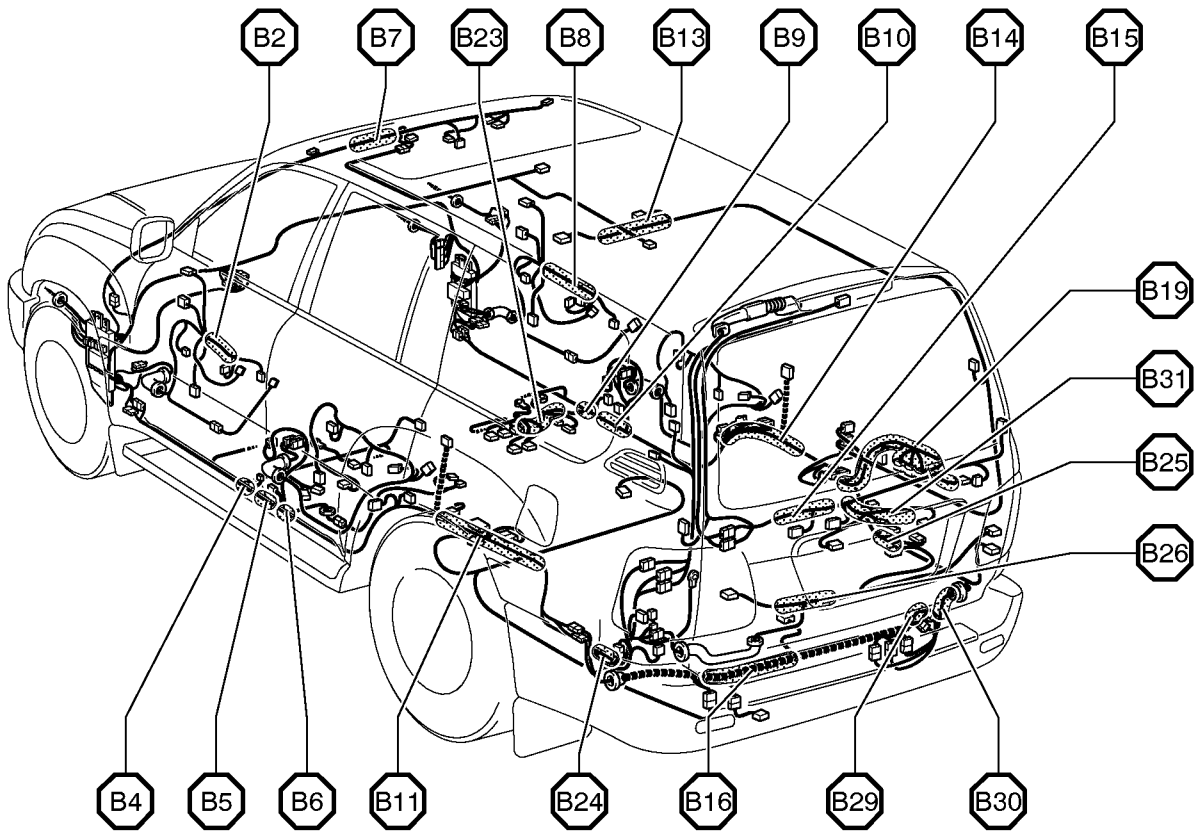
Code	Joining Wire Harness and Wire Harness (Connector Location)
BA3	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BA4	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BB1	Floor No.1 Wire and Fuel Tank Wire (Near the Fuel Tank)
BC3	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)
BC4	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)
BD2	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BD3	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BD4	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BF2	Frame Wire and Floor No.3 Wire (Left Side of Rear Floor Crossmember)
BH1	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BH2	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
B1	Roof No.2 Wire and Floor No.2 Wire (Right Side Rear Quarter Panel)

# G ELECTRICAL WIRING ROUTING

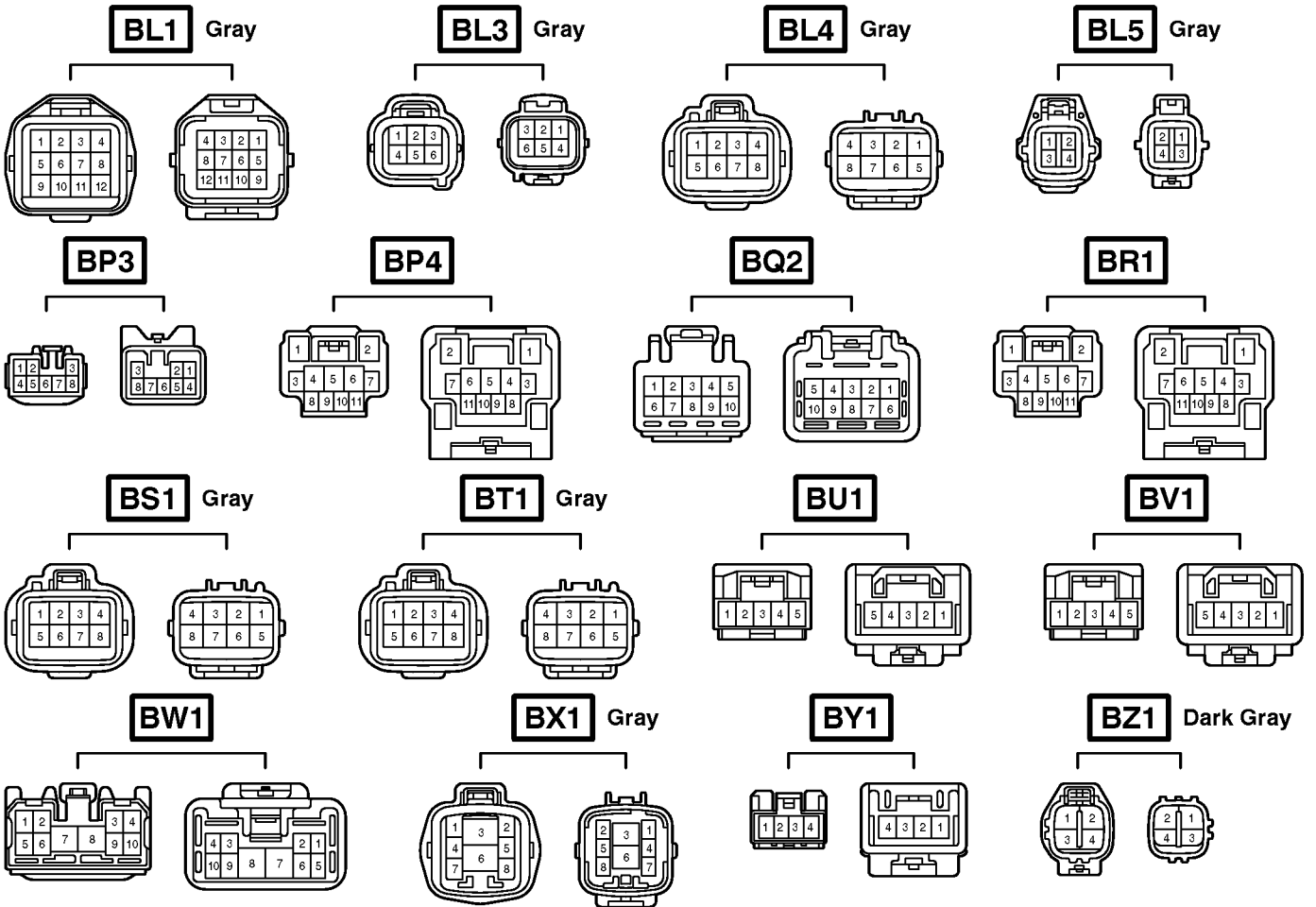
□ : Location of Connector Joining Wire Harness and Wire Harness



○ : Location of Splice Points



## Connector Joining Wire Harness and Wire Harness

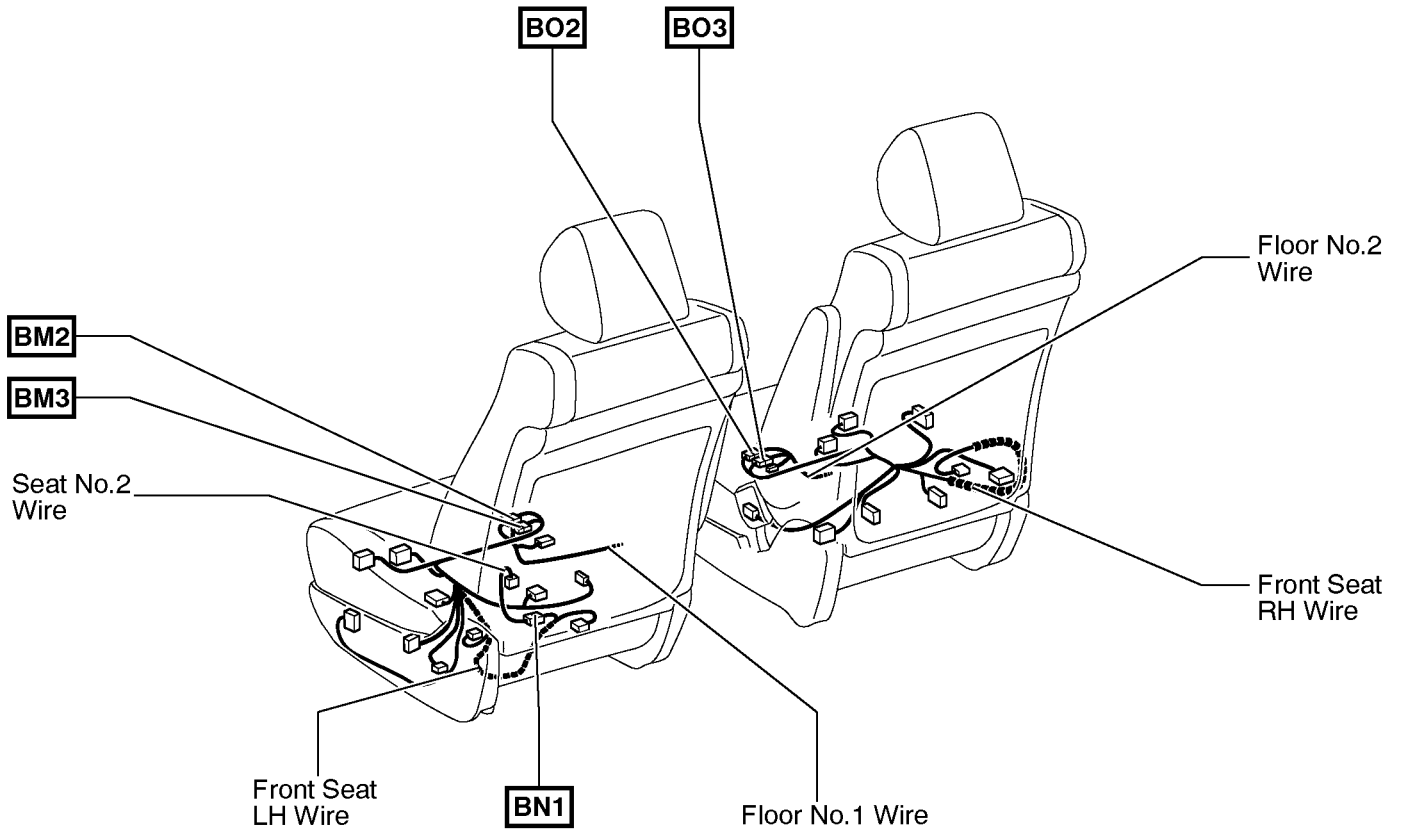


Code	Joining Wire Harness and Wire Harness (Connector Location)
BL1	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BL3	
BL4	
BL5	
BP3	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BP4	
BQ2	Back Door Lower Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BR1	Roof No.3 Wire and Roof No.1 Wire (Front Side of Roof)
BS1	Door Lock LH Sub Wire and Front Door LH Wire (Front Door LH)
BT1	Door Lock RH Sub Wire and Front Door RH Wire (Front Door RH)
BU1	Floor No.1 Wire and Floor No.1 Wire (Near the Left Rear Suspension Support)
BV1	Floor No.2 Wire and Floor No.2 Wire (Near the Right Rear Suspension Support)
BW1	Floor No.2 Wire and A/C Sub Wire (Right Side Rear Quarter Panel)
BX1	Frame No.4 Wire and Floor No.3 Wire (Left Side of Rear Floor Crossmember)
BY1	Pillar No.1 Wire and Floor No.3 Wire (Left Rear Side Quarter Panel)
BZ1	Floor No.3 Wire and Floor No.2 Wire (Right Side of Rear Floor Crossmember)

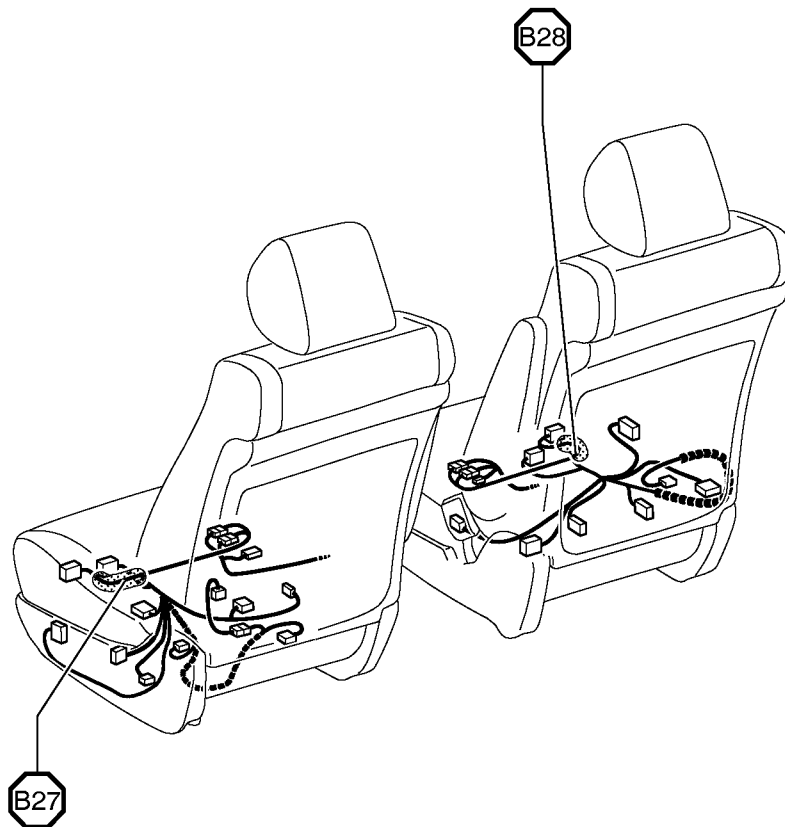


# G ELECTRICAL WIRING ROUTING

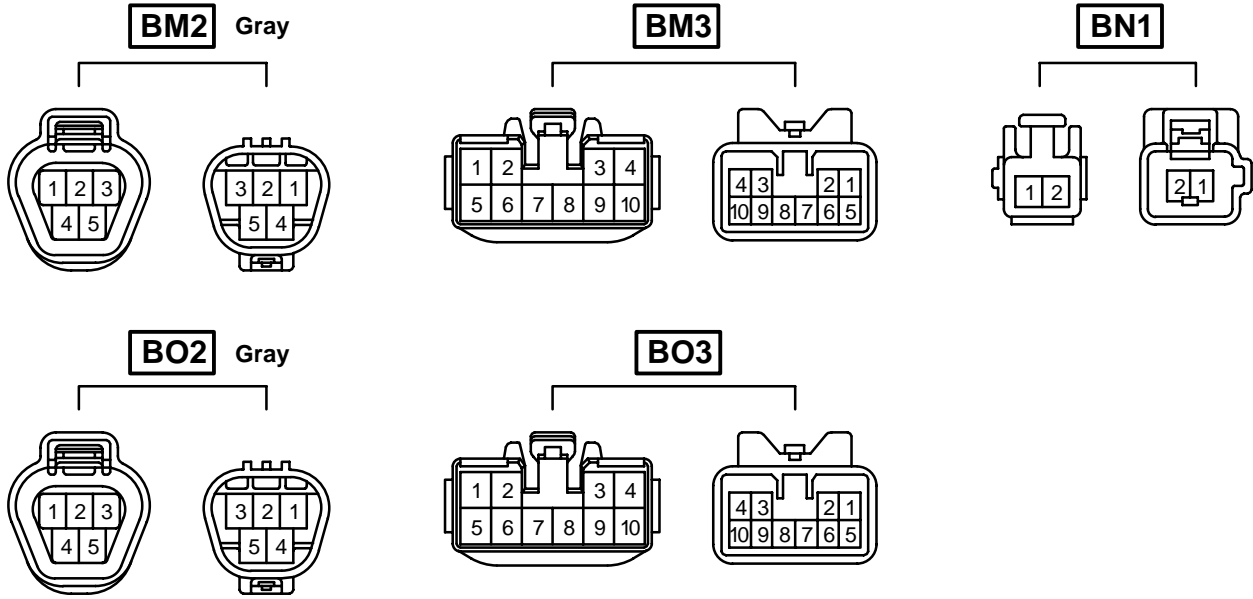
**□** : Location of Connector Joining Wire Harness and Wire Harness



**○** : Location of Splice Points

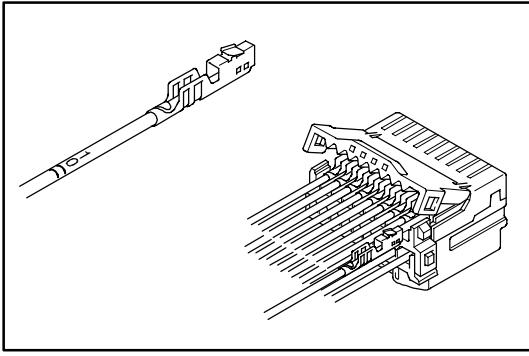


## Connector Joining Wire Harness and Wire Harness



Code	Joining Wire Harness and Wire Harness (Connector Location)
BM2	Floor No.1 Wire and Front Seat LH Wire (Front Side Under the Driver's Seat)
BM3	
BN1	Seat No.2 Wire and Front Seat LH Wire (Rear Side Under the Driver's Seat)
BO2	Floor No.2 Wire and Front Seat RH Wire (Front Side Under the Front Passenger's Seat)
BO3	

## HINT



### WIRE COLOR AND TERMINAL NUMBER

In some parts of the instrumental panel wiring harness, the same wire color (i.e. SB: Sky Blue) is used for all the wiring to a specific connector.

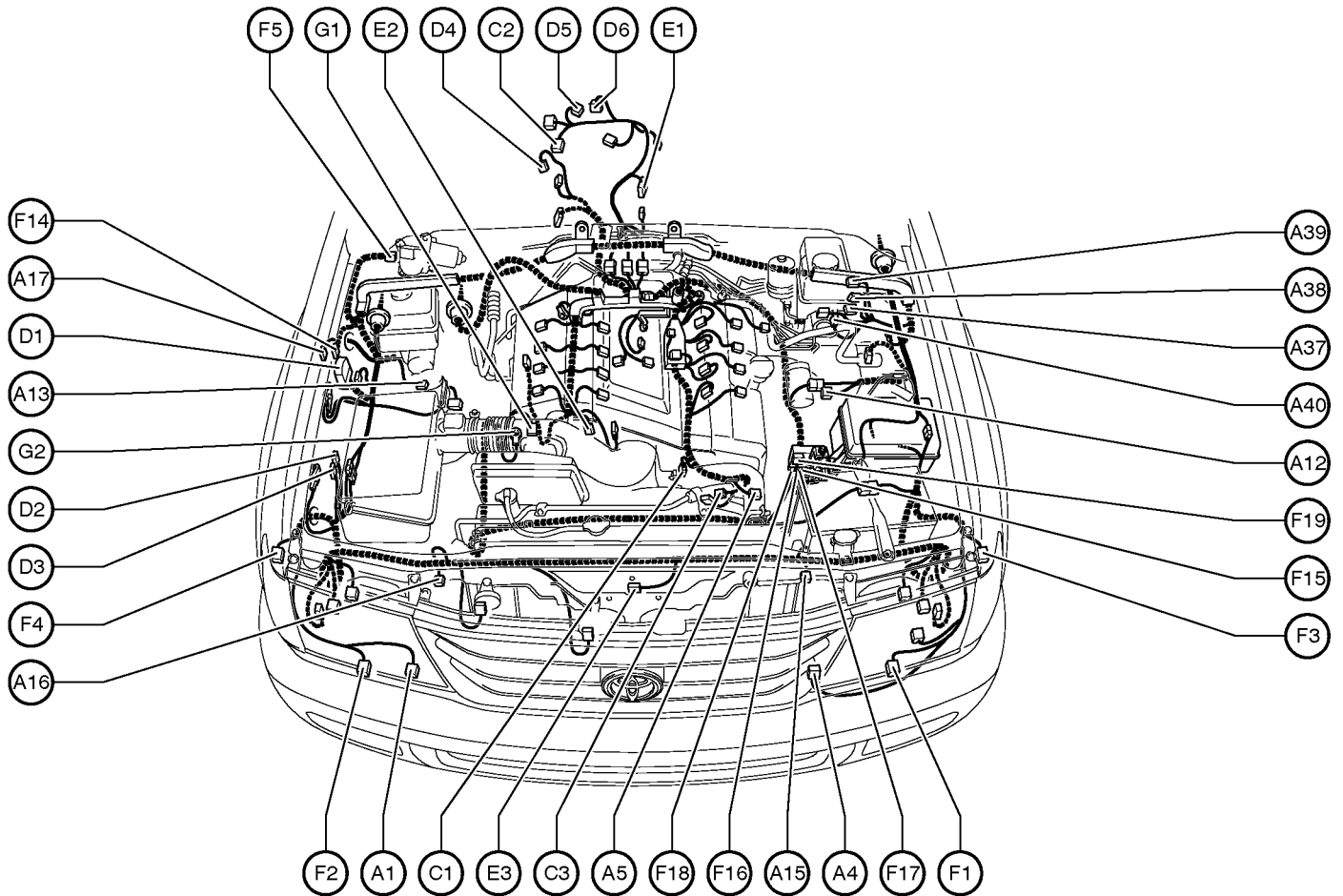
In order to identify the wiring, the terminal number is printed on the wiring.

Install the wiring to the connector position with the same terminal number.

Some early production Vehicles may not have these terminal numbers printed.

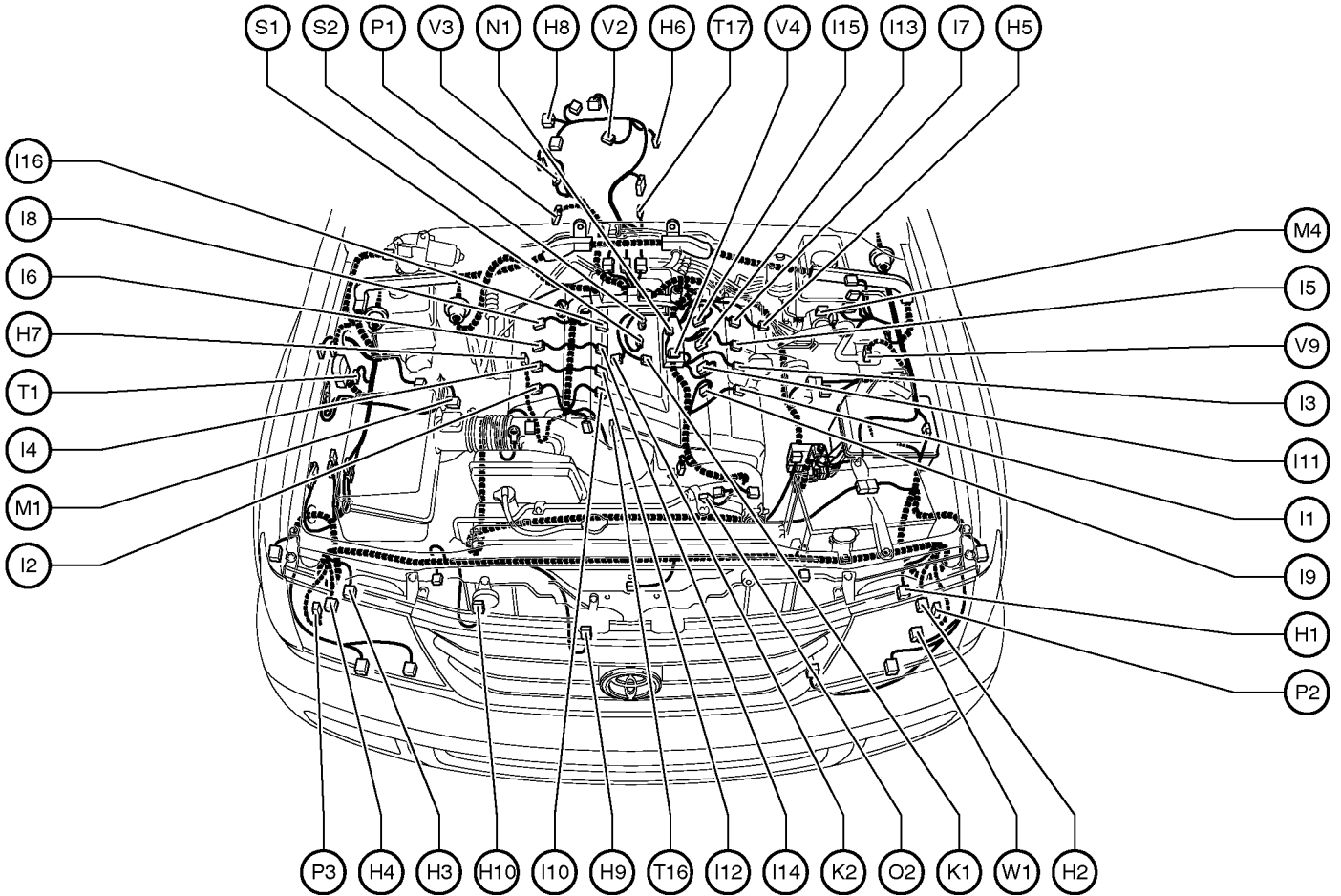
# G ELECTRICAL WIRING ROUTING

## Position of Parts in Engine Compartment



- |  |  |
|--|--|
| A 1 A/C Ambient Temp. Sensor                 | E 1 Electronically Controlled Transmission Solenoid    |
| A 4 Pressure SW                              | E 2 Engine Coolant Temp. Sensor                        |
| A 5 A/C Lock Sensor<br>A/C Magnetic Clutch   | E 3 Engine Hood Courtesy SW                            |
| A12 ABS Speed Sensor Front LH                | F 1 Front Fog Light LH                                 |
| A13 ABS Speed Sensor Front RH                | F 2 Front Fog Light RH                                 |
| A15 Airbag Sensor Front LH                   | F 3 Front Turn Signal Light LH<br>Side Marker Light LH |
| A16 Airbag Sensor Front RH                   | F 4 Front Turn Signal Light RH<br>Side Marker Light RH |
| A17 Auto Antenna Motor                       | F 5 Front Wiper Motor                                  |
| A37 ABS & BA & TRAC & VSC Actuator           | F14 Fuel Pump Resistor                                 |
| A38 ABS & BA & TRAC & VSC Actuator           | F15 Fusible Link Block                                 |
| A39 ABS & BA & TRAC & VSC Actuator           | F16 Fusible Link Block                                 |
| A40 ABS & BA & TRAC & VSC Actuator           | F17 Fusible Link Block                                 |
| C 1 Camshaft Position Sensor                 | F18 Fusible Link Block                                 |
| C 2 Center Diff. Lock Control Motor          | F19 Fusible Link Block                                 |
| C 3 Crankshaft Position Sensor               |  |
| D 1 Data Link Connector 1                    | G 1 Generator  |
| D 2 Daytime Running Light Relay No.3         | G 2 Generator  |
| D 3 Daytime Running Light Relay No.3         |  |
| D 4 Detection SW (Center Diff. Lock)         |  |
| D 5 Detection SW (Transfer L Position)       |  |
| D 6 Detection SW (Transfer Neutral Position) |  |

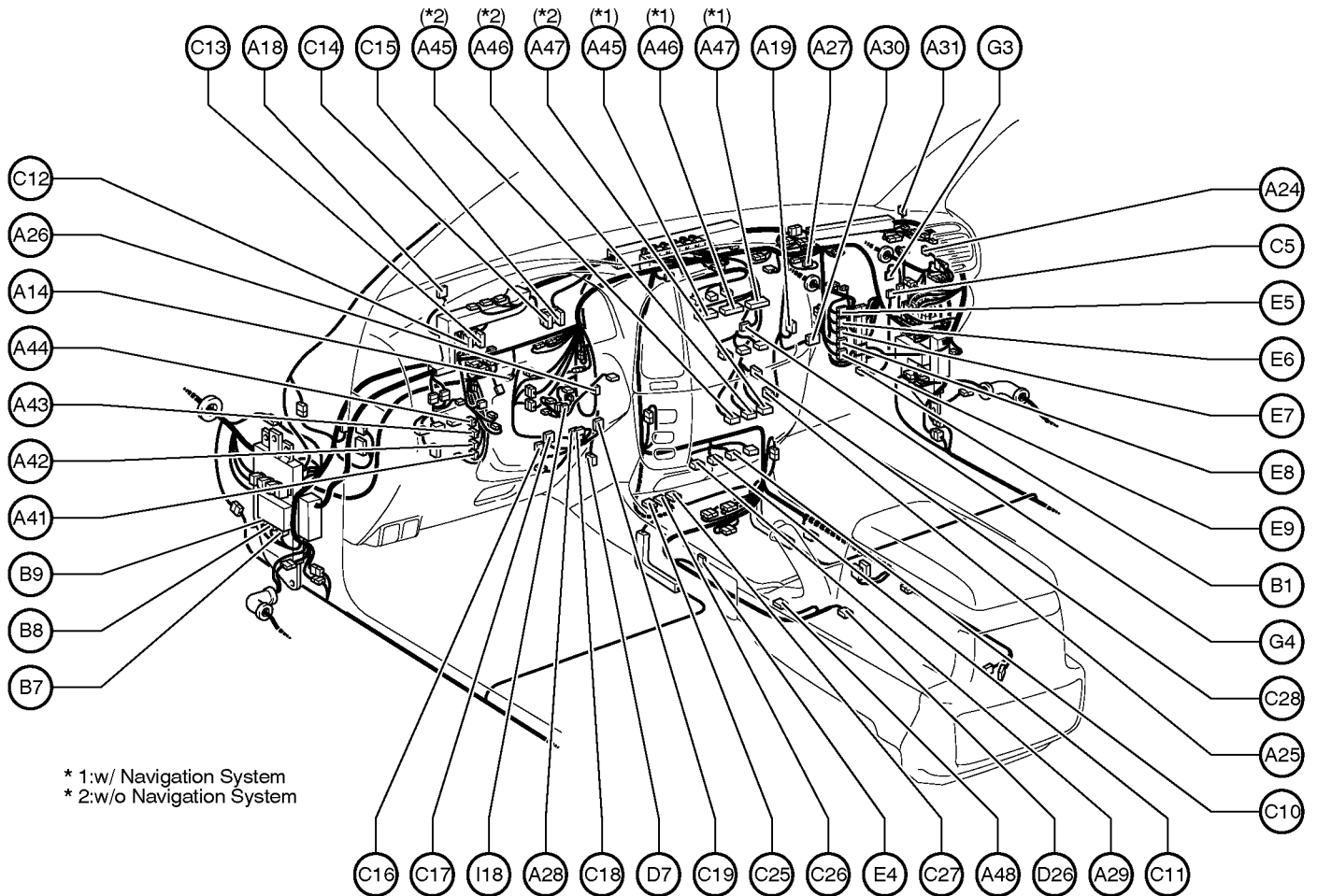
## Position of Parts in Engine Compartment



- |  |  |
|--|--|
| H 1 Headlight LH (High)                    | K 1 Knock Sensor 1   |
| H 2 Headlight LH (Low)                     | K 2 Knock Sensor 2   |
| H 3 Headlight RH (High)                    | M 1 Mass Air Flow Meter  |
| H 4 Headlight RH (Low)                     | M 4 Master Cylinder Pressure Sensor                                  |
| H 5 Heated Oxygen Sensor (Bank 1 Sensor 1) | N 1 Noise Filter (Ignition)  |
| H 6 Heated Oxygen Sensor (Bank 1 Sensor 2) | O 2 Oil Pressure Sender  |
| H 7 Heated Oxygen Sensor (Bank 2 Sensor 1) | P 1 Park/Neutral Position SW   |
| H 8 Heated Oxygen Sensor (Bank 2 Sensor 2) | P 2 Parking Light LH   |
| H 9 Horn LH                                | P 3 Parking Light RH   |
| H10 Horn RH                                | S 1 Starter  |
| I 1 Ignition Coil and Igniter No.1         | S 2 Starter  |
| I 2 Ignition Coil and Igniter No.2         | T 1 Theft Deterrent Horn   |
| I 3 Ignition Coil and Igniter No.3         | T 16 Throttle Control Motor and Sensor                               |
| I 4 Ignition Coil and Igniter No.4         | T 17 Turbine Speed Sensor  |
| I 5 Ignition Coil and Igniter No.5         | V 2 Vehicle Speed Sensor (Combination Meter)                         |
| I 6 Ignition Coil and Igniter No.6         | V 3 Vehicle Speed Sensor<br>(Electronically Controlled Transmission) |
| I 7 Ignition Coil and Igniter No.7         | V 4 VSV (EVAP)   |
| I 8 Ignition Coil and Igniter No.8         | V 9 VSV (Canister Closed Valve)                                      |
| I 9 Injector No.1                          | W 1 Washer Motor   |
| I 10 Injector No.2                         |  |
| I 11 Injector No.3                         |  |
| I 12 Injector No.4                         |  |
| I 13 Injector No.5                         |  |
| I 14 Injector No.6                         |  |
| I 15 Injector No.7                         |  |
| I 16 Injector No.8                         |  |

# G ELECTRICAL WIRING ROUTING

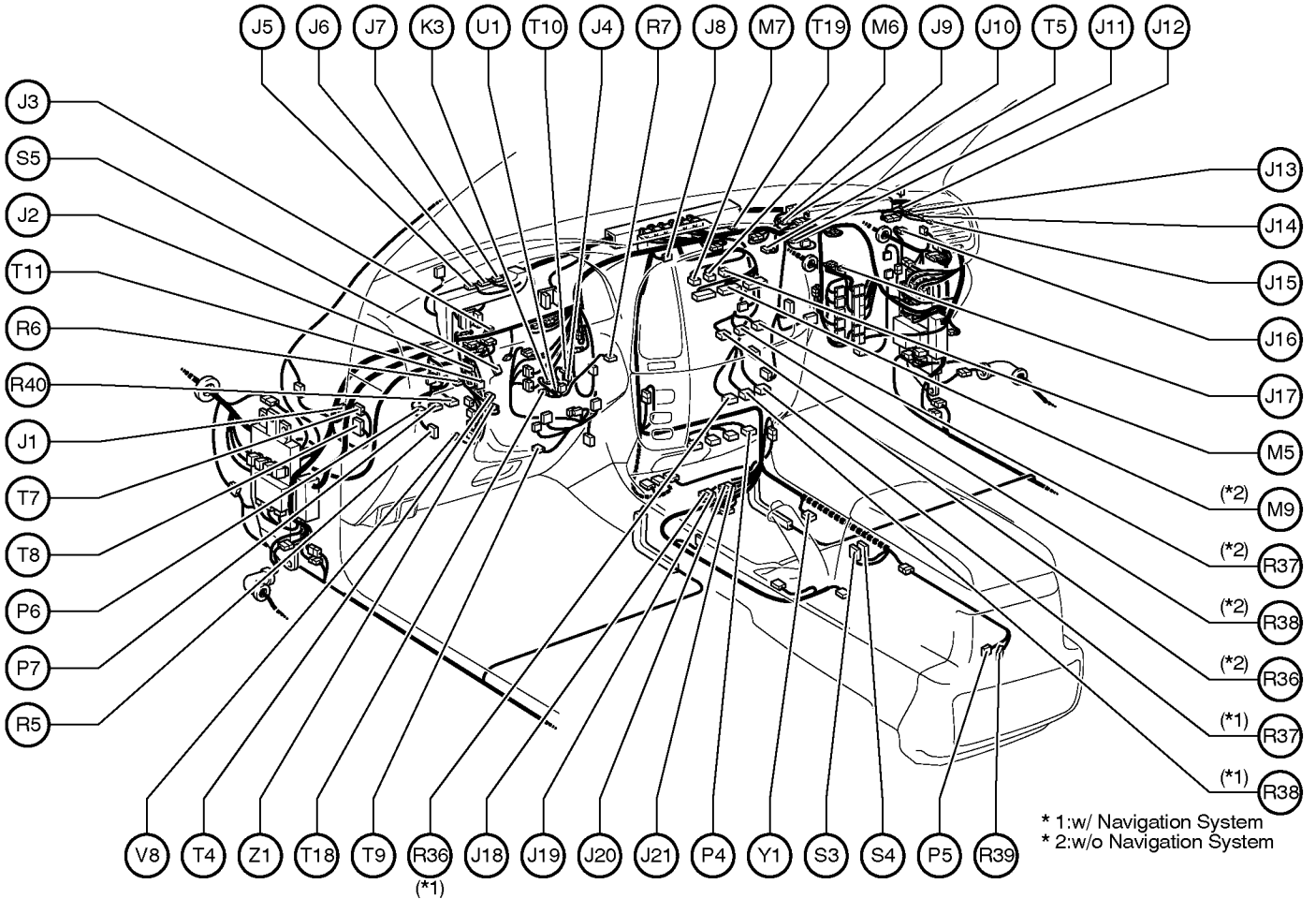
## Position of Parts in Instrument Panel



\* 1:w/ Navigation System  
 \* 2:w/o Navigation System

- |   |  |
|---|--|
| A 14 Accel Position Sensor                          | C 11 Cigarette Lighter Illumination                          |
| A 18 A/C Solar Sensor                               | C 12 Combination Meter                                       |
| A 19 A/C Thermistor                                 | C 13 Combination Meter                                       |
| A 24 Air Inlet Control Servo Motor                  | C 14 Combination Meter                                       |
| A 25 Air Mix Control Servo Motor                    | C 15 Combination Meter                                       |
| A 26 Air Vent Mode Control Servo Motor              | C 16 Combination SW  |
| A 27 Airbag Squib (Front Passenger Airbag Assembly) | C 17 Combination SW  |
| A 28 Airbag Squib (Steering Wheel Pad)              | C 18 Combination SW  |
| A 29 Ashtray Illumination                           | C 19 Combination SW  |
| A 30 Auto Antenna Control Relay                     | C 25 Center Airbag Sensor Assembly                           |
| A 31 Automatic Light Control Sensor                 | C 26 Center Airbag Sensor Assembly                           |
| A 41 ABS & BA & TRAC & VSC ECU                      | C 27 Center Airbag Sensor Assembly                           |
| A 42 ABS & BA & TRAC & VSC ECU                      | C 28 Center Cluster Integration Panel                        |
| A 43 ABS & BA & TRAC & VSC ECU                      |  |
| A 44 ABS & BA & TRAC & VSC ECU                      | D 7 Data Link Connector 3                                    |
| A 45 A/C Control Assembly                           | D 26 DVD Automatic Changer                                   |
| A 46 A/C Control Assembly                           |  |
| A 47 A/C Control Assembly                           | E 4 Electronically Controlled Transmission Pattern Select SW |
| A 48 A/T Shift Lever Illumination                   | E 5 Engine Control Module                                    |
| Shift Lock Control ECU                              | E 6 Engine Control Module                                    |
|   | E 7 Engine Control Module                                    |
| B 1 Blower Motor Controller                         | E 8 Engine Control Module                                    |
| B 7 Body ECU  | E 9 Engine Control Module                                    |
| B 8 Body ECU  |  |
| B 9 Body ECU  | G 3 Glove Box Light  |
|   | G 4 Gateway ECU  |
| C 5 Center Diff. Lock Control Relay                 |  |
| C 10 Cigarette Lighter                              | I 18 Ignition SW   |

**Position of Parts in Instrument Panel**



- J 1 Junction Connector
- J 2 Junction Connector
- J 3 Junction Connector
- J 4 Junction Connector
- J 5 Junction Connector
- J 6 Junction Connector
- J 7 Junction Connector
- J 8 Junction Connector
- J 9 Junction Connector
- J 10 Junction Connector
- J 11 Junction Connector
- J 12 Junction Connector
- J 13 Junction Connector
- J 14 Junction Connector
- J 15 Junction Connector
- J 16 Junction Connector
- J 17 Junction Connector
- J 18 Junction Connector
- J 19 Junction Connector
- J 20 Junction Connector
- J 21 Junction Connector

K 3 Key Interlock Solenoid

- M 5 Multi-Display
- M 6 Multi-Display
- M 7 Multi-Display
- M 9 Multi-Display

- P 4 Power Outlet (Front)
- P 5 Power Outlet (Rear Console Box)
- P 6 Power Quarter Window SW LH
- P 7 Power Quarter Window SW RH

- R 5 Remote Control Mirror SW
- R 6 Rheostat
- R 7 Room Temp. Sensor (Front)
- R 36 Radio and Player
- R 37 Radio and Player
- R 38 Radio and Player
- R 39 Rear Seat Audio Controller
- R 40 Roll Sensing of Curtain Shield Airbags Cutoff SW

- S 3 Seat Heater SW (Driver's Seat)
- S 4 Seat Heater SW (Front Passenger's Seat)
- S 5 Stop Light SW

- T 4 Telescopic Motor
- T 5 Theft Deterrent ECU
- T 7 Tilt and Telescopic ECU
- T 8 Tilt and Telescopic ECU
- T 9 Tilt Motor
- T 10 Ignition Key Cylinder Light  
Transponder Key Amplifier
- T 11 Turn Signal Flasher
- T 18 Towing Brake Controller
- T 19 Transponder Key Computer

U 1 Unlock Warning SW

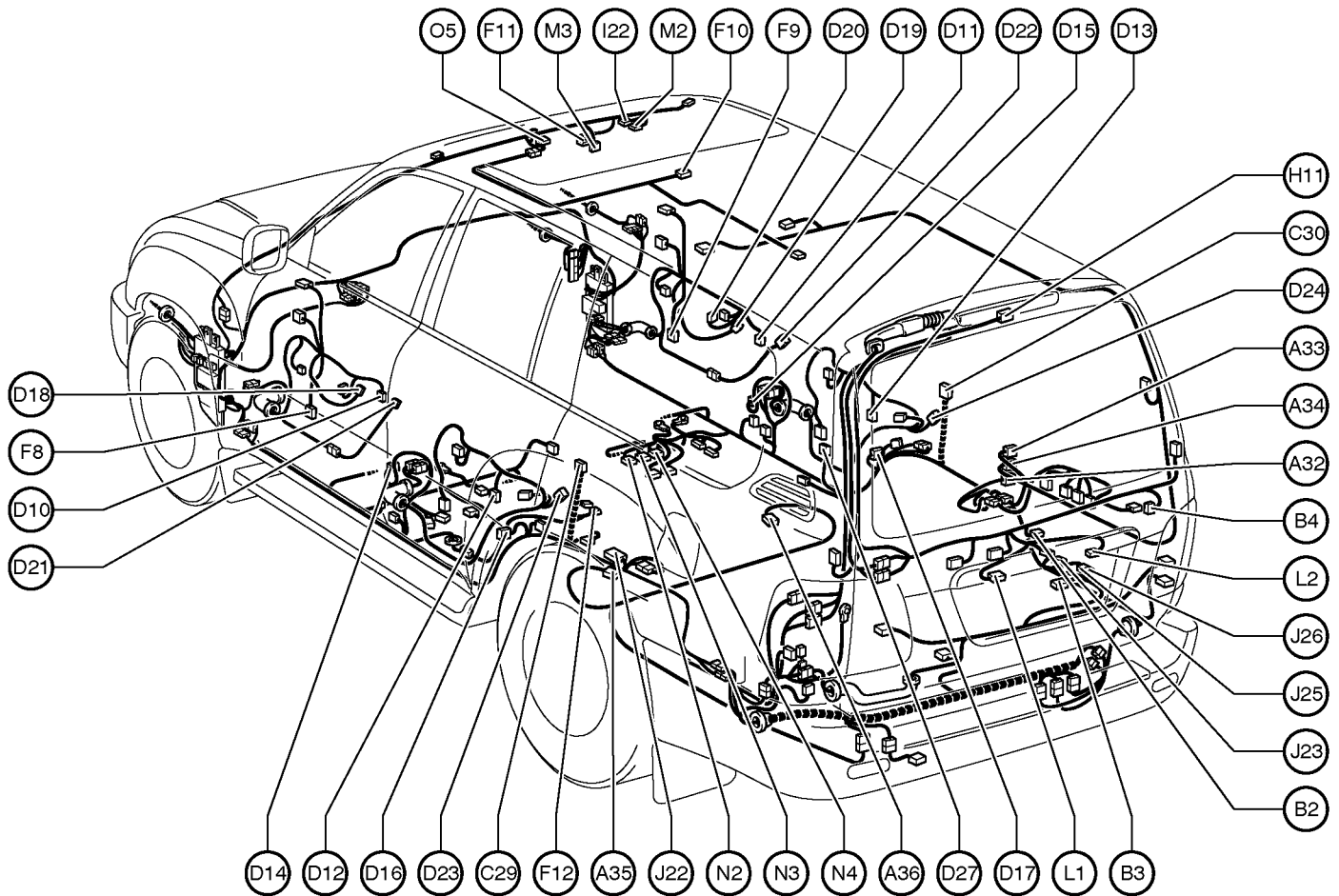
V 8 VSC Warning Buzzer

Y 1 Yaw Rate Sensor

Z 1 Option Connector (Glass Breakage Sensor)

# G ELECTRICAL WIRING ROUTING

## Position of Parts in Body



A32 A/C Amplifier (Rear)  
 A33 A/C Amplifier (Rear)  
 A34 A/C Amplifier (Rear)  
 A35 ABS Speed Sensor Rear LH  
 A36 ABS Speed Sensor Rear RH

B 2 Back Door Courtesy SW  
 B 3 Back Door Key Lock and Unlock SW  
 B 4 Back Door Lock Motor  
 Back Door Unlock Detection SW

C29 Curtain Shield Airbag Squib LH  
 C30 Curtain Shield Airbag Squib RH

D10 Door Courtesy Light Front LH  
 D11 Door Courtesy Light Front RH  
 D12 Door Courtesy Light Rear LH  
 D13 Door Courtesy Light Rear RH  
 D14 Door Courtesy SW Front LH  
 D15 Door Courtesy SW Front RH  
 D16 Door Courtesy SW Rear LH  
 D17 Door Courtesy SW Rear RH  
 D18 Door Key Lock and Unlock SW LH  
 D19 Door Key Lock and Unlock SW RH  
 D20 Door Lock Control SW RH  
 D21 Door Lock Motor Front LH  
 Door Unlock Detection SW Front LH  
 D22 Door Lock Motor Front RH  
 Door Unlock Detection SW Front RH  
 D23 Door Lock Motor Rear LH  
 Door Unlock Detection SW Rear LH  
 D24 Door Lock Motor Rear RH  
 Door Unlock Detection SW Rear RH  
 D27 Door Control Receiver

F 8 Front Door Speaker LH  
 F 9 Front Door Speaker RH  
 F10 Front Interior Light  
 Rear Personal Light  
 F11 Front Personal Light  
 F12 Fuel Pump  
 Fuel Sender

H11 High Mounted Stop Light

I 22 Inner Mirror

J22 Junction Connector  
 J23 Junction Connector  
 J25 Junction Connector  
 J26 Junction Connector

L 1 License Plate Light LH  
 L 2 License Plate Light RH

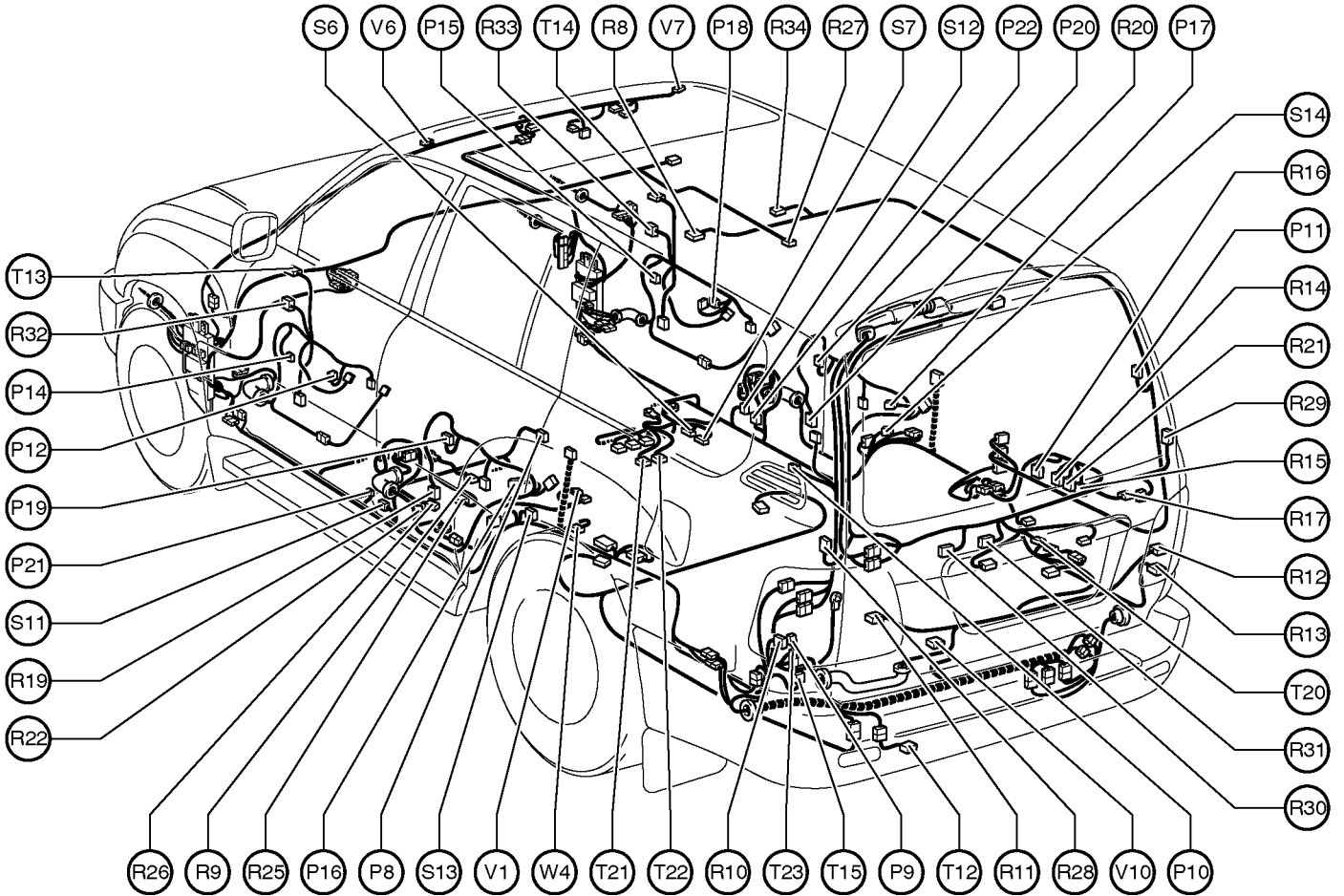
M 2 Moon Roof Control ECU  
 M 3 Moon Roof Control SW

N 2 Navigation ECU  
 N 3 Navigation ECU  
 N 4 Navigation ECU

O 5 Overhead J/B



## Position of Parts in Body



P 8 Parking Brake SW  
 P 9 Power Outlet (Luggage Compartment)  
 P10 Power Vent Window Motor LH  
 P11 Power Vent Window Motor RH  
 P12 Power Window Master SW  
 P14 Power Window Motor Front LH  
 P15 Power Window Motor Front RH  
 P16 Power Window Motor Rear LH  
 P17 Power Window Motor Rear RH  
 P18 Power Window Control SW Front RH  
 P19 Power Window Control SW Rear LH  
 P20 Power Window Control SW Rear RH  
 P21 Pretensioner LH  
 P22 Pretensioner RH

R 8 Rear A/C Control SW  
 R 9 Rear Air Mix Control Servo Motor  
 R10 Rear Combination Light LH  
 R11 Rear Combination Light LH  
 R12 Rear Combination Light RH  
 R13 Rear Combination Light RH  
 R14 Rear Cooler Blower Motor  
 R15 Rear Cooler Magnetic Valve  
 R16 Rear Cooler Power Transistor  
 R17 Rear Cooler Relay  
 R19 Rear Door Speaker LH  
 R20 Rear Door Speaker RH  
 R21 Rear Evaporator Temp. Sensor  
 R22 Rear Heater Blower Motor  
 R25 Rear Heater Power Transistor  
 R26 Rear Inlet Air Temp. Sensor

R27 Rear Interior Light  
 R28 Rear Window Defogger  
 R29 Rear Window Defogger  
 R30 Rear Wiper Motor  
 R31 Rear Wiper Relay  
 R32 Remote Control Mirror LH  
 R33 Remote Control Mirror RH  
 R34 Room Temp. Sensor (Rear)

S 6 Stereo Component Amplifier  
 S 7 Stereo Component Amplifier  
 S11 Side Airbag Sensor Front LH  
 S12 Side Airbag Sensor Front RH  
 S13 Side Airbag Sensor Rear LH  
 S14 Side Airbag Sensor Rear RH

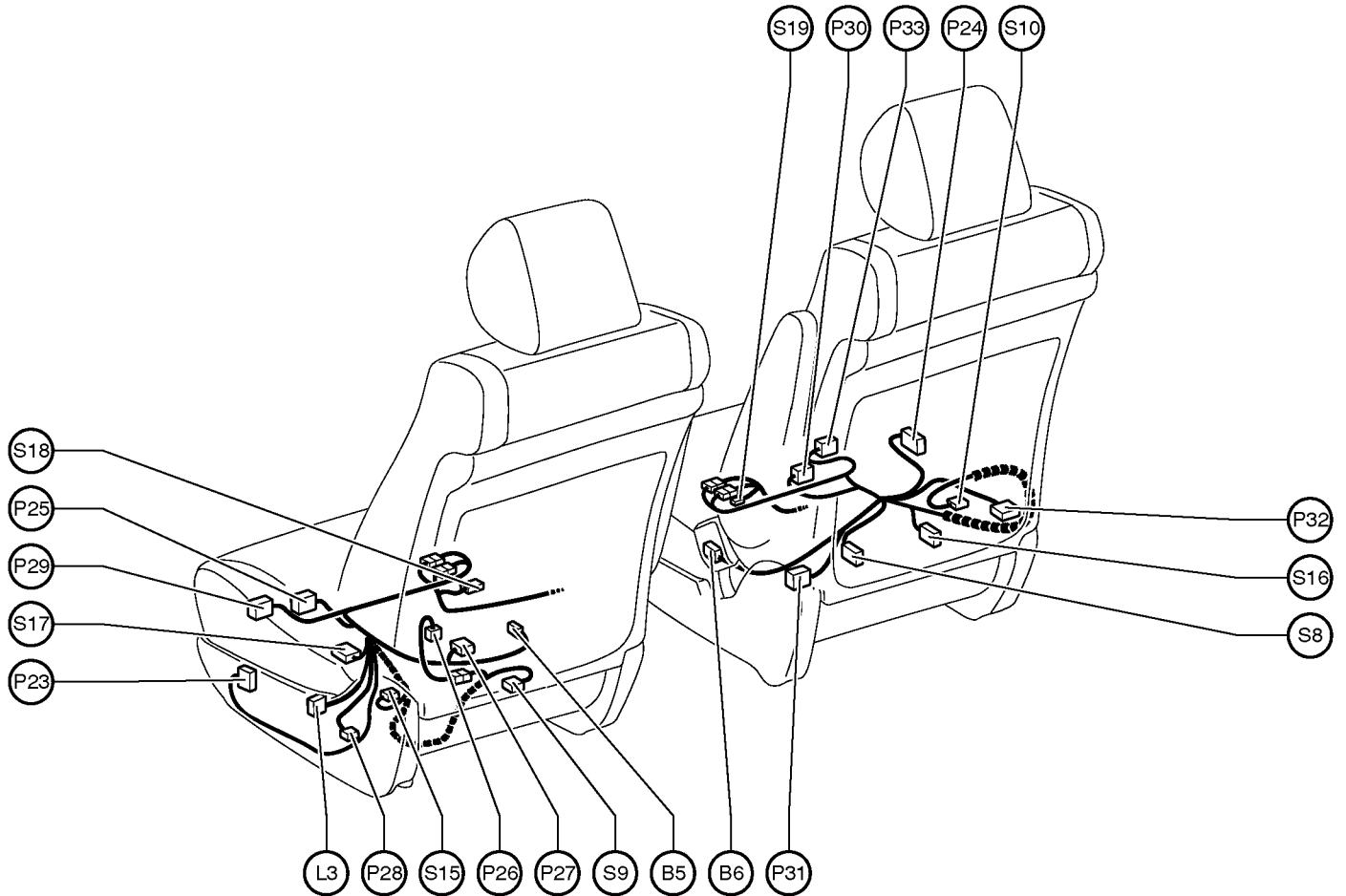
T12 Trailer Socket  
 T13 Tweeter LH  
 T14 Tweeter RH  
 T15 Towing Converter Relay  
 T20 Television Camera  
 T21 Television Camera ECU  
 T22 Television Camera ECU  
 T23 Towing Hitch Relay

V 1 Vapor Pressure Sensor  
 V 6 Vanity Light LH  
 V 7 Vanity Light RH  
 V10 VSV (Pressure Switching Valve)

W 4 Woofer (Speaker)

## G ELECTRICAL WIRING ROUTING

### Position of Parts in Seat



B 5 Buckle SW LH  
B 6 Buckle SW RH

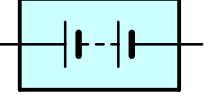

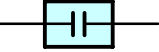
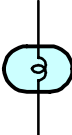

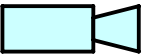
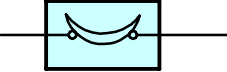


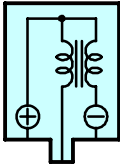




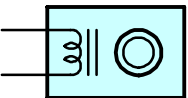

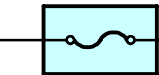
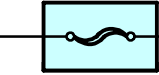
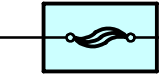
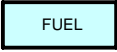

L 3 Lumbar Support Control SW (Driver's Seat)

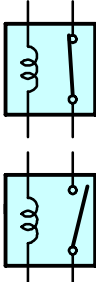

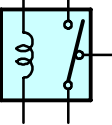
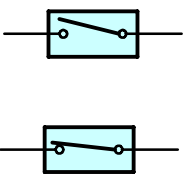
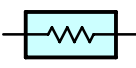
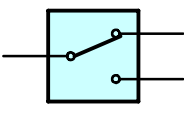
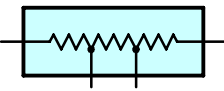
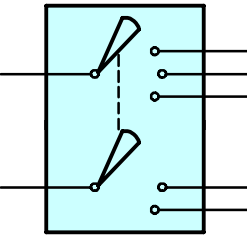
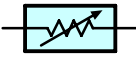
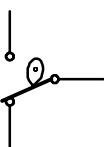

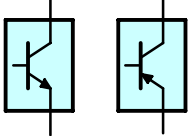
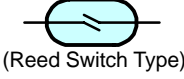
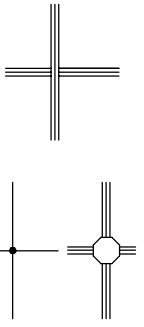
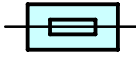
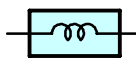
P 23 Power Seat Control SW (Driver's Seat)  
P 24 Power Seat Control SW (Front Passenger's Seat)  
P 25 Power Seat Motor (Driver's Seat Front Vertical Control)  
P 26 Power Seat Motor  
(Driver's Seat Lumbar Support Control)  
P 27 Power Seat Motor (Driver's Seat Rear Vertical Control)  
P 28 Power Seat Motor (Driver's Seat Reclining Control)  
P 29 Power Seat Motor (Driver's Seat Slide Control)  
P 30 Power Seat Motor  
(Front Passenger's Seat Front Vertical Control)  
P 31 Power Seat Motor  
(Front Passenger's Seat Rear Vertical Control)  
P 32 Power Seat Motor  
(Front Passenger's Seat Reclining Control)  
P 33 Power Seat Motor  
(Front Passenger's Seat Slide Control)

S 8 Seat Belt Warning Occupant Detection Sensor  
S 9 Seat Heater (Driver's Seat)  
S 10 Seat Heater (Front Passenger's Seat)  
S 15 Seat Heater (Driver's Seat Cushion)  
S 16 Seat Heater (Front Passenger's Seat Cushion)  
S 17 Seat Position Sensor  
S 18 Side Airbag Squib LH  
S 19 Side Airbag Squib RH

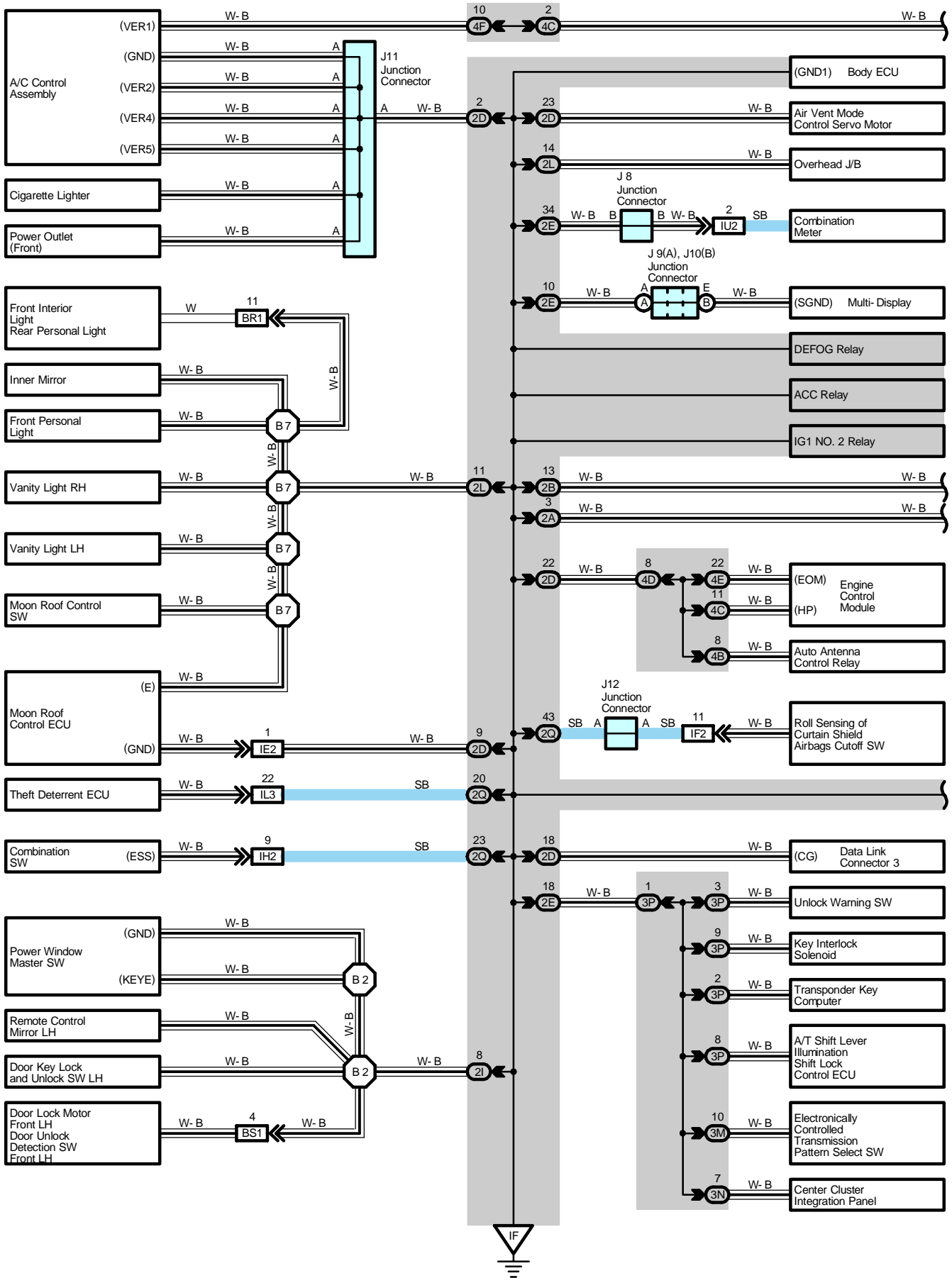


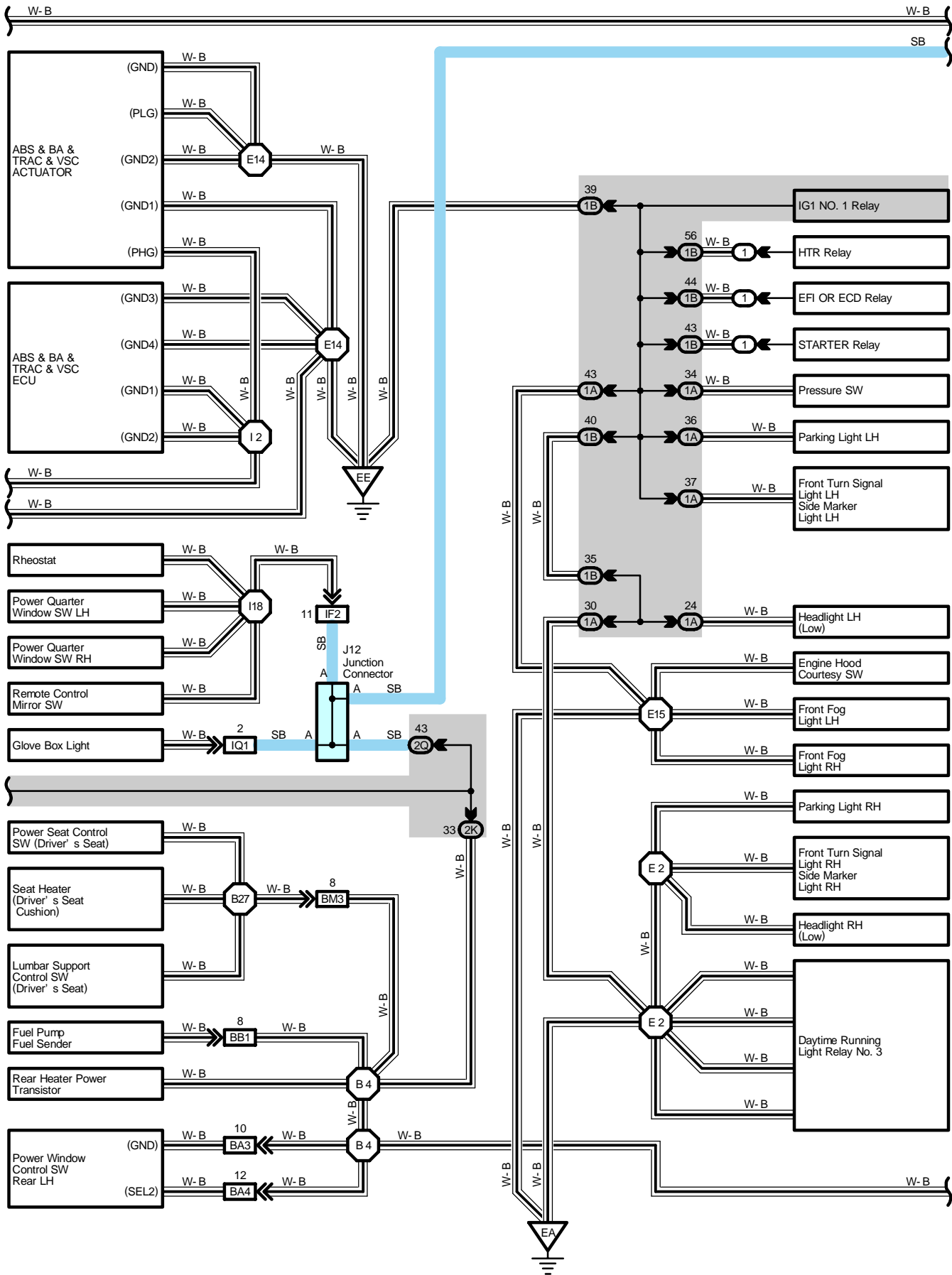
# E GLOSSARY OF TERMS AND SYMBOLS

 <p><b>BATTERY</b> Stores chemical energy and converts it into electrical energy. Provides DC current for the auto's various electrical circuits.</p>	 <p><b>GROUND</b> The point at which wiring attaches to the Body, thereby providing a return path for an electrical circuit; without a ground, current cannot flow.</p>
 <p><b>CAPACITOR (Condenser)</b> A small holding unit for temporary storage of electrical voltage.</p>	<p><b>HEADLIGHTS</b> Current flow causes a headlight filament to heat up and emit light. A headlight may have either a single (1) filament or a double (2) filament</p> <p>1. SINGLE FILAMENT</p>  <p>2. DOUBLE FILAMENT</p> 
 <p><b>CIGARETTE LIGHTER</b> An electric resistance heating element.</p>	
 <p><b>CIRCUIT BREAKER</b> Basically a reusable fuse, a circuit breaker will heat and open if too much current flows through it. Some units automatically reset when cool, others must be manually reset.</p>	 <p><b>HORN</b> An electric device which sounds a loud audible signal.</p>
 <p><b>DIODE</b> A semiconductor which allows current flow in only one direction.</p>	 <p><b>IGNITION COIL</b> Converts low-voltage DC current into high-voltage ignition current for firing the spark plugs.</p>
 <p><b>DIODE, ZENER</b> A diode which allows current flow in one direction but blocks reverse flow only up to a specific voltage. Above that potential, it passes the excess voltage. This acts as a simple voltage regulator.</p>	 <p><b>LIGHT</b> Current flow through a filament causes the filament to heat up and emit light.</p>
 <p><b>PHOTODIODE</b> The photodiode is a semiconductor which controls the current flow according to the amount of light.</p>	 <p><b>LED (LIGHT EMITTING DIODE)</b> Upon current flow, these diodes emit light without producing the heat of a comparable light.</p>
 <p><b>DISTRIBUTOR, IIA</b> Channels high-voltage current from the ignition coil to the individual spark plugs.</p>	 <p><b>METER, ANALOG</b> Current flow activates a magnetic coil which causes a needle to move, thereby providing a relative display against a background calibration.</p>
 <p><b>FUSE</b> A thin metal strip which burns through when too much current flows through it, thereby stopping current flow and protecting a circuit from damage.</p>  <p><b>FUSIBLE LINK</b> A heavy-gauge wire placed in high amperage circuits which burns through on overloads, thereby protecting the circuit. The numbers indicate the cross-section surface area of the wires.</p> <p>(for Medium Current Fuse)</p>  <p>(for High Current Fuse or Fusible Link)</p>	 <p><b>METER, DIGITAL</b> Current flow activates one or many LED's, LCD's, or fluorescent displays, which provide a relative or digital display.</p>
	 <p><b>MOTOR</b> A power unit which converts electrical energy into mechanical energy, especially rotary motion.</p>

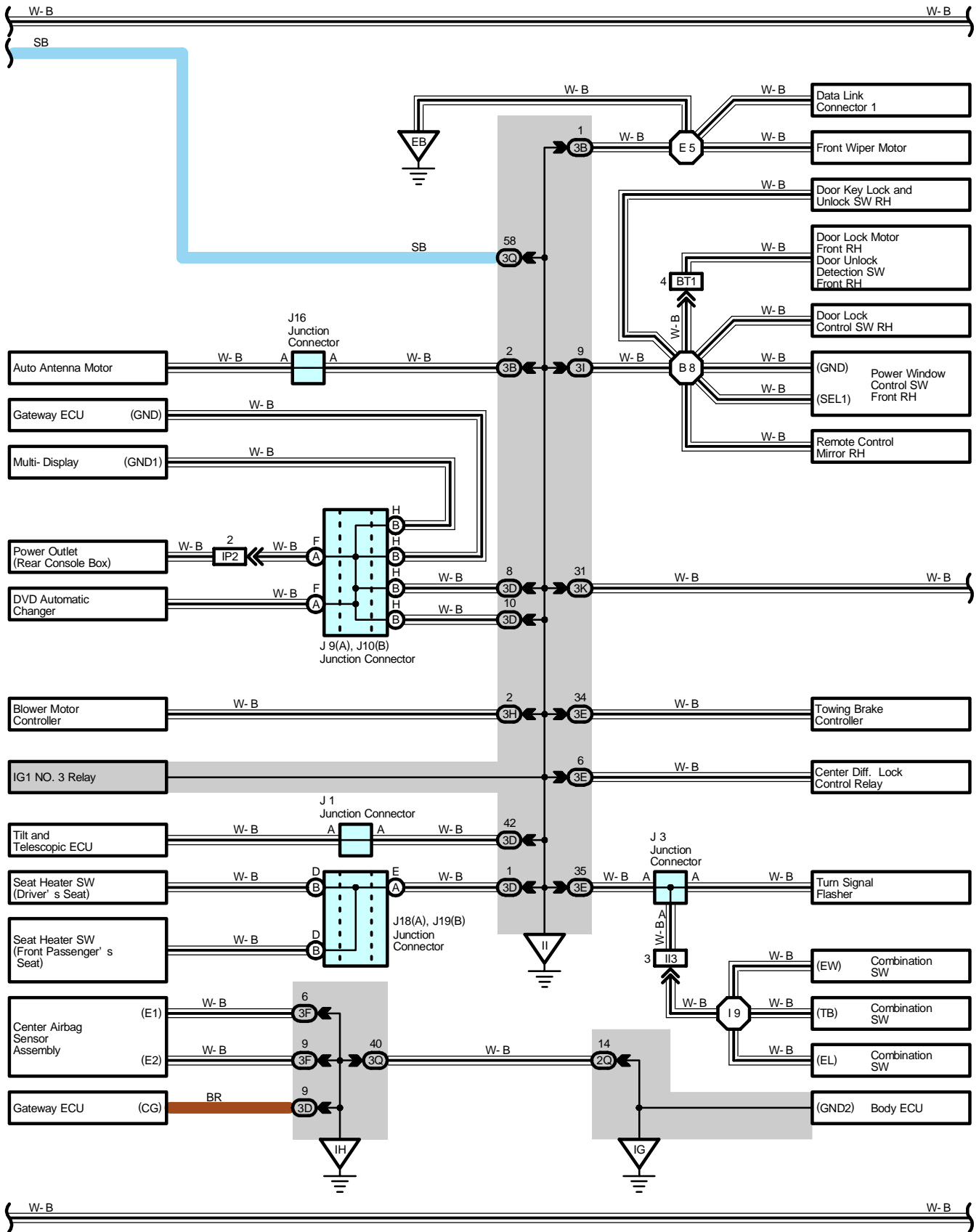
 <p><b>RELAY</b> Basically, an electrically operated switch which may be normally closed (1) or open (2). Current flow through a small coil creates a magnetic field which either opens or closes an attached switch.</p> <p><b>1. NORMALLY CLOSED</b></p> <p><b>2. NORMALLY OPEN</b></p>	 <p><b>SPEAKER</b> An electromechanical device which creates sound waves from current flow.</p>
 <p><b>RELAY, DOUBLE THROW</b> A relay which passes current through one set of contacts or the other.</p>	<p><b>SWITCH, MANUAL</b> Opens and closes circuits, thereby stopping (1) or allowing (2) current flow.</p>  <p><b>1. NORMALLY OPEN</b></p> <p><b>2. NORMALLY CLOSED</b></p>
 <p><b>RESISTOR</b> An electrical component with a fixed resistance, placed in a circuit to reduce voltage to a specific value.</p>	<p><b>SWITCH, DOUBLE THROW</b> A switch which continuously passes current through one set of contacts or the other.</p> 
 <p><b>RESISTOR, TAPPED</b> A resistor which supplies two or more different non adjustable resistance values.</p>	<p><b>SWITCH, IGNITION</b> A key operated switch with several positions which allows various circuits, particularly the primary ignition circuit, to become operational.</p> 
 <p><b>RESISTOR, VARIABLE or RHEOSTAT</b> A controllable resistor with a variable rate of resistance. Also called a potentiometer or rheostat.</p>	<p><b>SWITCH, WIPER PARK</b> Automatically returns wipers to the stop position when the wiper switch is turned off.</p> 
 <p><b>SENSOR (Thermistor)</b> A resistor which varies its resistance with temperature.</p>	<p><b>TRANSISTOR</b> A solidstate device typically used as an electronic relay; stops or passes current depending on the voltage applied at "base".</p> 
 <p><b>SENSOR, SPEED</b> Uses magnetic impulses to open and close a switch to create a signal for activation of other components.</p> <p>(Reed Switch Type)</p>	<p><b>WIRES</b> Wires are always drawn as straight lines on wiring diagrams. Crossed wires (1) without a black dot at the junction are not joined; crossed wires (2) with a black dot or octagonal mark at the junction are spliced (joined) connections.</p>  <p><b>(1) NOT CONNECTED</b></p> <p><b>(2) SPLICED</b></p>
 <p><b>SHORT PIN</b> Used to provide an unbroken connection within a junction block.</p>	
 <p><b>SOLENOID</b> An electromagnetic coil which forms a magnetic field when current flows, to move a plunger, etc.</p>	

# I GROUND POINT

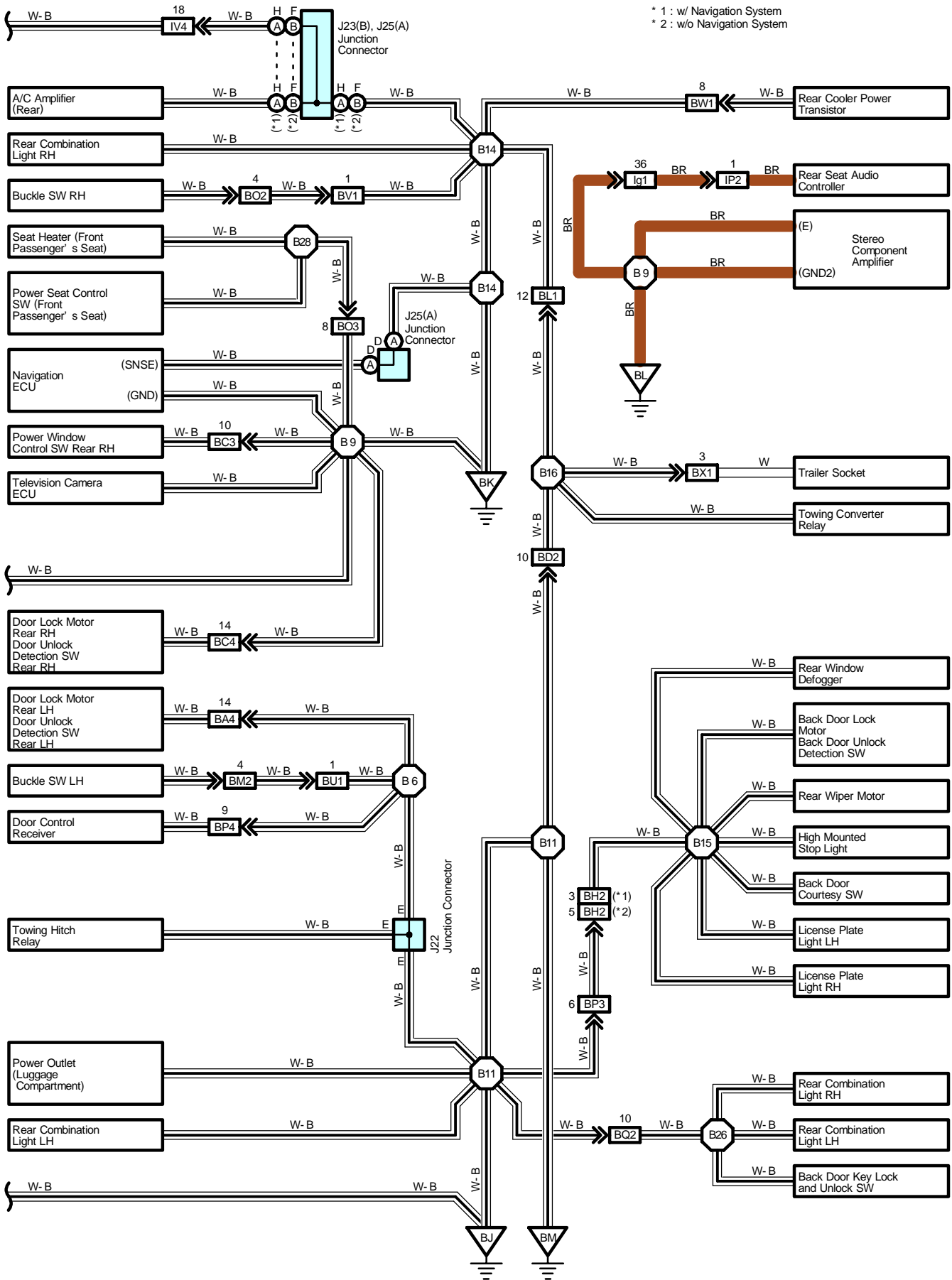




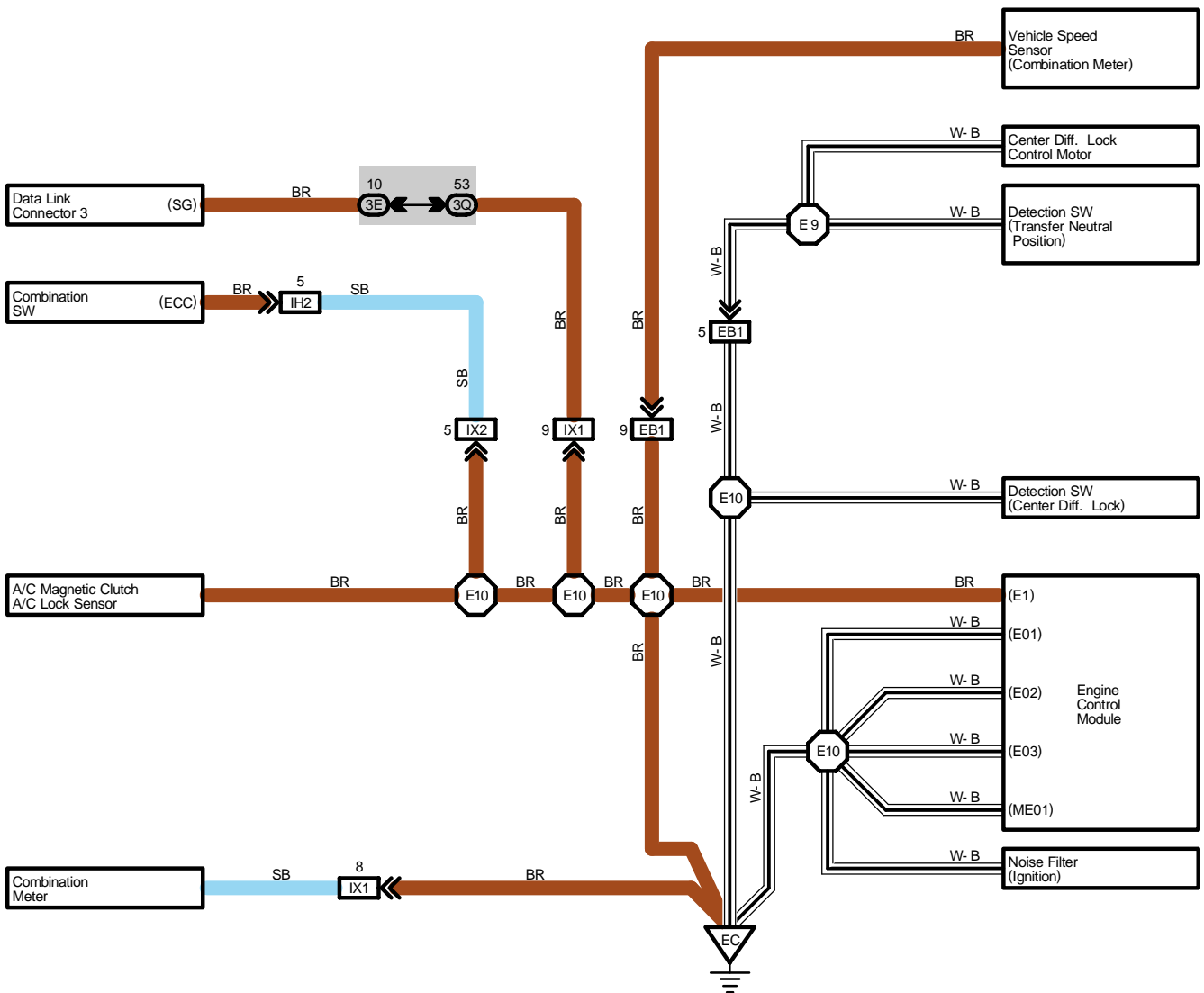
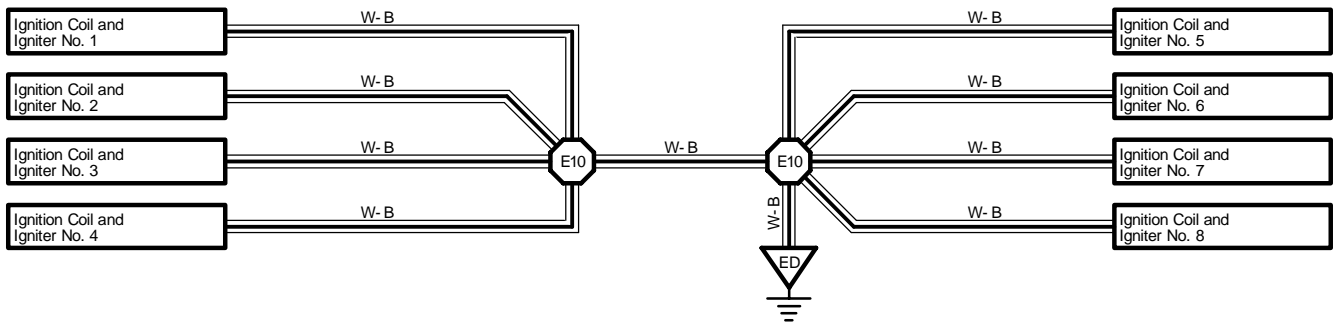
# I GROUND POINT







# I GROUND POINT



**○ : Parts Location**

Code	See Page	Code	See Page	Code	See Page
J1	71	J11	71	J22	72
J3	71	J12	71	J23	B 72
J8	71	J16	71	J25	A 72
J9	A 71	J18	A 71		
J10	B 71	J19	B 71		

**○ : Relay Blocks**

Code	See Page	Relay Blocks (Relay Block Location)
1	22	Engine Room R/B (Engine Compartment Left)

**○ : Junction Block and Wire Harness Connector**

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2B		
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2I	28	Front Door LH Wire and Cowl Side J/B LH (Left Kick Panel)
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2L	28	Roof No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3B	40	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3F		
3H		
3I	40	Front Door RH Wire and Cowl Side J/B RH (Right Kick Panel)
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3M	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3N		
3P		
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4B	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4D		
4E		
4F		

# I GROUND POINT

## ☐ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	76	Engine Wire and Transmission Wire (On the Transmission)
IE2	78	Dash Wire and Roof No.1 Wire (Left Kick Panel)
IF2	78	Instrument Panel Integration Wire and Instrument Panel Wire (Left Side of Instrument Panel)
IH2	80	Instrument Panel Integration Wire and Column Wire (Near the Ignition SW)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
IL3	80	Instrument Panel Integration Wire and Computer Wire (Instrument Panel Center)
IP2	80	Rear Console Box Wire and Dash Wire (Right Side of Rear Console)
IQ1	80	Instrument Panel Integration Wire and Lamp Wire (Behind the Glove Box)
IU2	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IV4	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
IX2		
Ig1	84	Dash Wire and Floor No.2 Wire (Right Side of Front Console)
BA3	86	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BA4		
BB1	86	Floor No.1 Wire and Fuel Tank Wire (Near the Fuel Tank)
BC3	86	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)
BC4		
BD2	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BH2	86	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BL1	88	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BM2	90	Floor No.1 Wire and Front Seat LH Wire (Front Side Under the Driver's Seat)
BM3		
BO2	90	Floor No.2 Wire and Front Seat RH Wire (Front Side Under the Front Passenger's Seat)
BO3		
BP3	88	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BP4		
BQ2	88	Back Door Lower Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BR1	88	Roof No.3 Wire and Roof No.1 Wire (Front Side of Roof)
BS1	88	Door Lock LH Sub Wire and Front Door LH Wire (Front Door LH)
BT1	88	Door Lock RH Sub Wire and Front Door RH Wire (Front Door RH)
BU1	88	Floor No.1 Wire and Floor No.1 Wire (Near the Left Rear Suspension Support)
BV1	88	Floor No.2 Wire and Floor No.2 Wire (Near the Right Rear Suspension Support)
BW1	88	Floor No.2 Wire and A/C Sub Wire (Right Side Rear Quarter Panel)
BX1	88	Frame No.4 Wire and Floor No.3 Wire (Left Side of Rear Floor Crossmember)

## ▽ : Ground Points

Code	See Page	Ground Points Location
EA	76	Front Right Side of Fender Apron
EB		
EC	76	Rear Bank of Right Cylinder Head
ED	76	Rear Bank of Left Cylinder Head
EE	76	Front Left Side of Fender Apron
IF	78	Set Bolt of Cowl Side J/B LH
IG		
IH	78	Set Bolt of Cowl Side J/B RH
II		
BJ	86	Under the Driver's Seat
BK	86	Front Side Under the Front Passenger's Seat
BL	86	Rear Side Under the Front Passenger's Seat
BM	86	Left Rear Side Quarter Panel



## : Splice Points

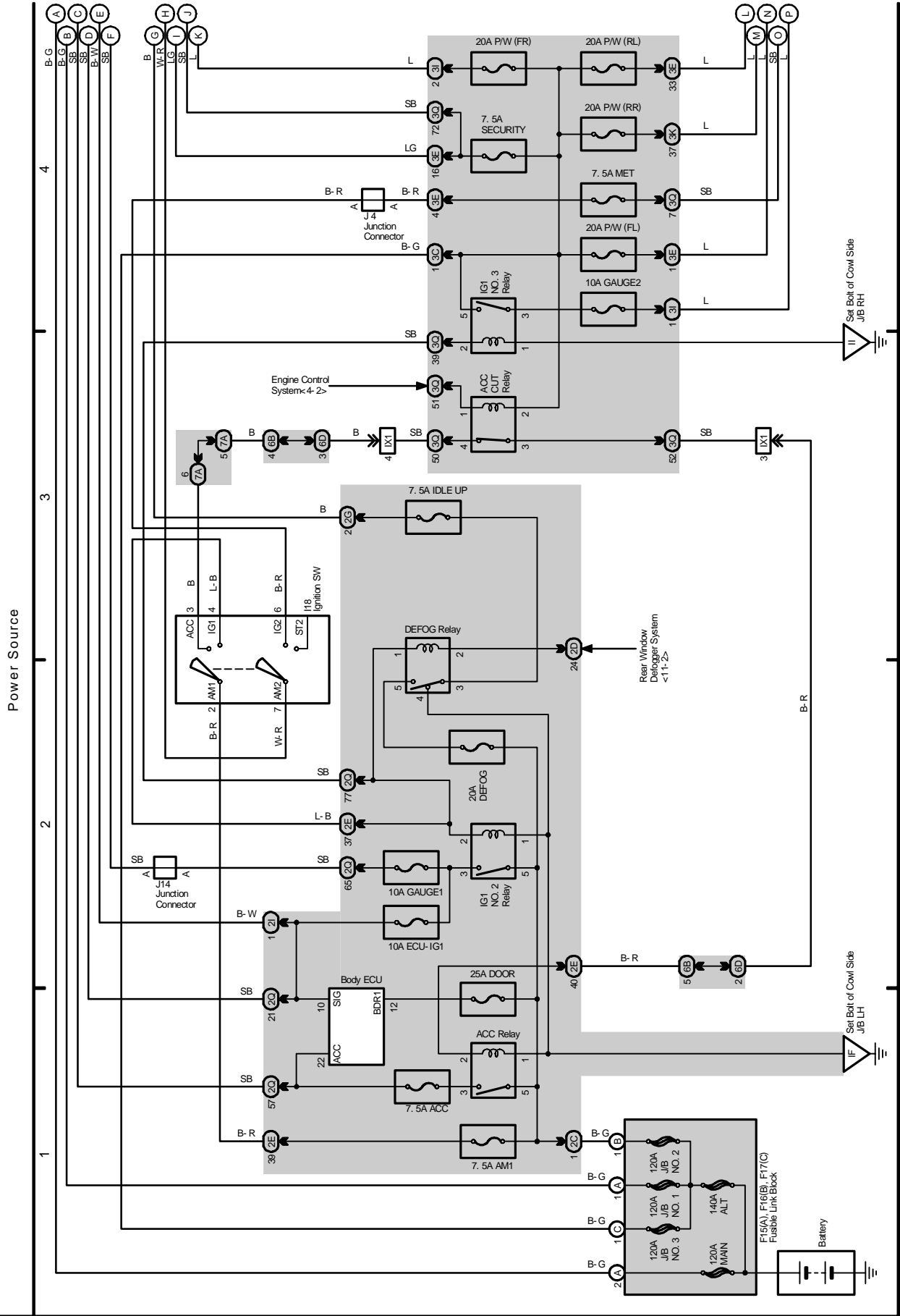
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E2	<a href="#">76</a>	Engine Room Main Wire	B6	<a href="#">88</a>	Floor No.1 Wire
E5	<a href="#">76</a>	Engine Room No.2 Wire	B7	<a href="#">88</a>	Roof No.1 Wire
E9	<a href="#">76</a>	Transmission Wire	B8	<a href="#">88</a>	Front Door RH Wire
E10	<a href="#">76</a>	Engine Wire	B9	<a href="#">88</a>	Floor No.2 Wire
E14	<a href="#">76</a>	Engine Room No.2 Wire	B11	<a href="#">88</a>	Floor No.1 Wire
E15	<a href="#">76</a>	Engine Room Main Wire	B14	<a href="#">88</a>	Floor No.2 Wire
I2	<a href="#">80</a>	Engine Room No.2 Wire	B15	<a href="#">88</a>	Back Door Upper Wire
I9	<a href="#">80</a>	Column Wire	B16	<a href="#">88</a>	Floor No.3 Wire
I18	<a href="#">80</a>	Instrument Panel Wire	B26	<a href="#">88</a>	Back Door Lower Wire
B2	<a href="#">88</a>	Front Door LH Wire	B27	<a href="#">90</a>	Front Seat LH Wire
B4	<a href="#">88</a>	Floor No.1 Wire	B28	<a href="#">90</a>	Front Seat RH Wire



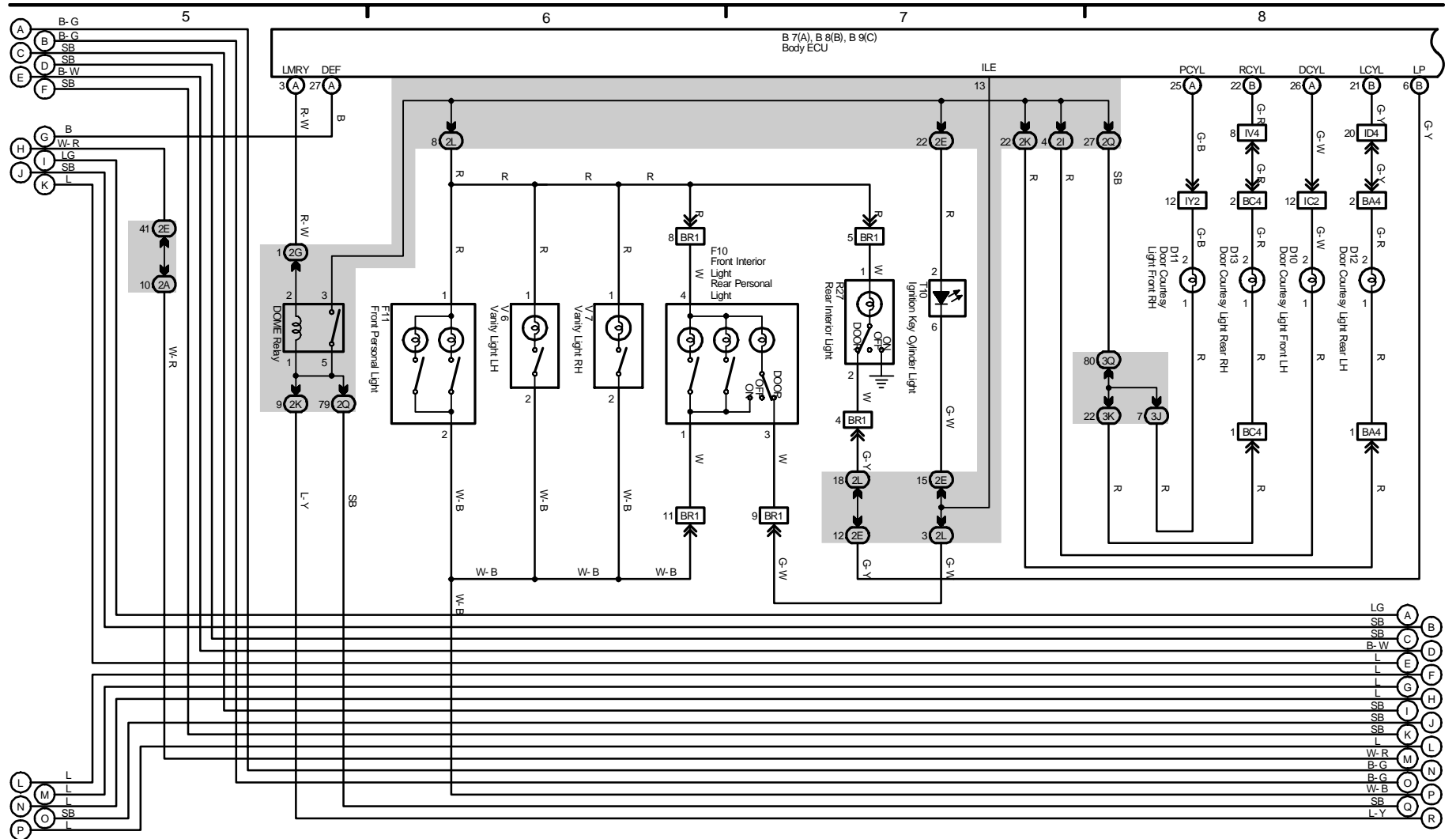
# M OVERALL ELECTRICAL WIRING DIAGRAM

1 LAND CRUISER

(Cont. next page)



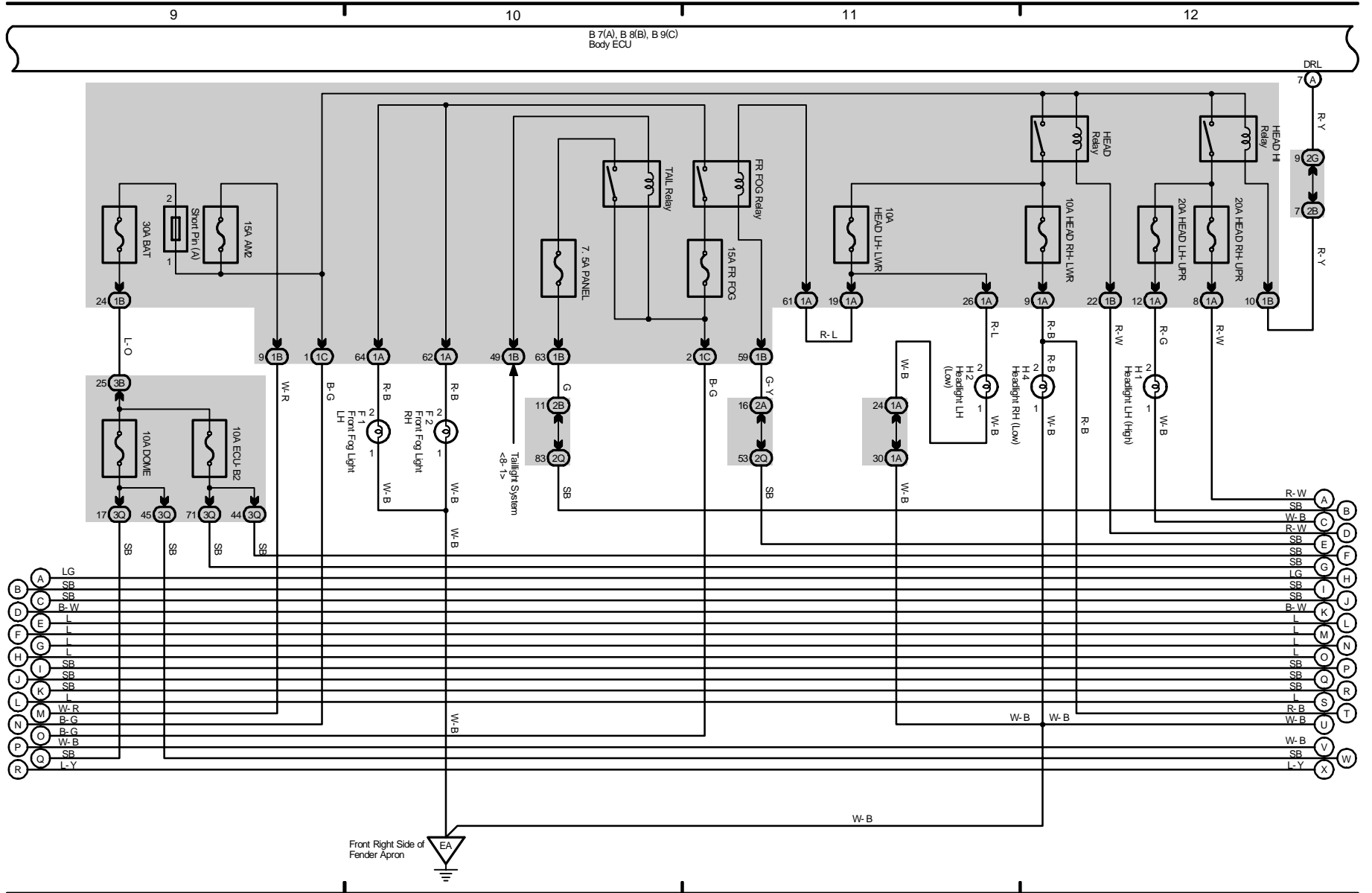
Multiplex Communication System



2004 LAND CRUISER (EWD548U)

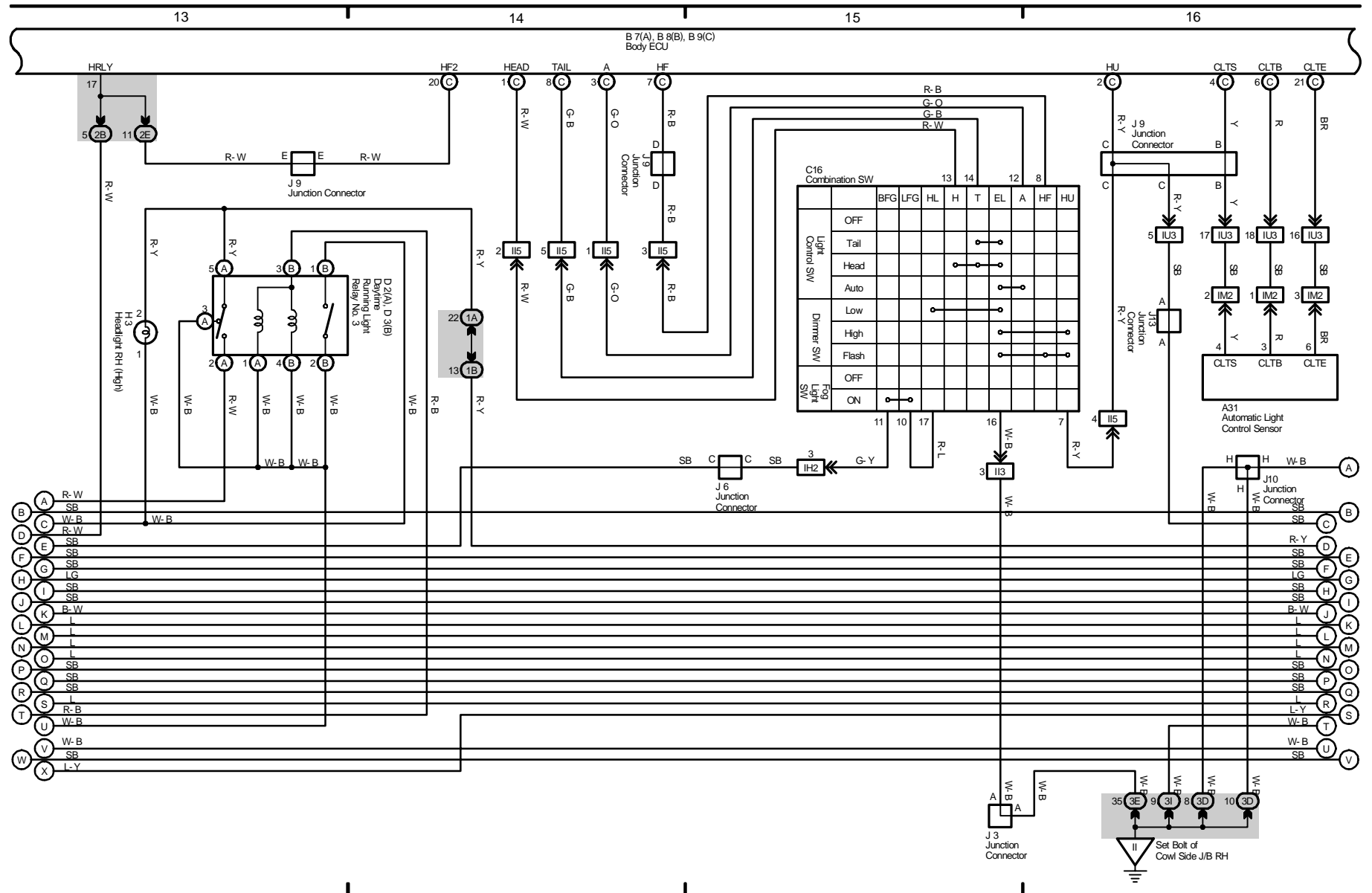


Multiplex Communication System



2004 LAND CRUISER (EWD548U)

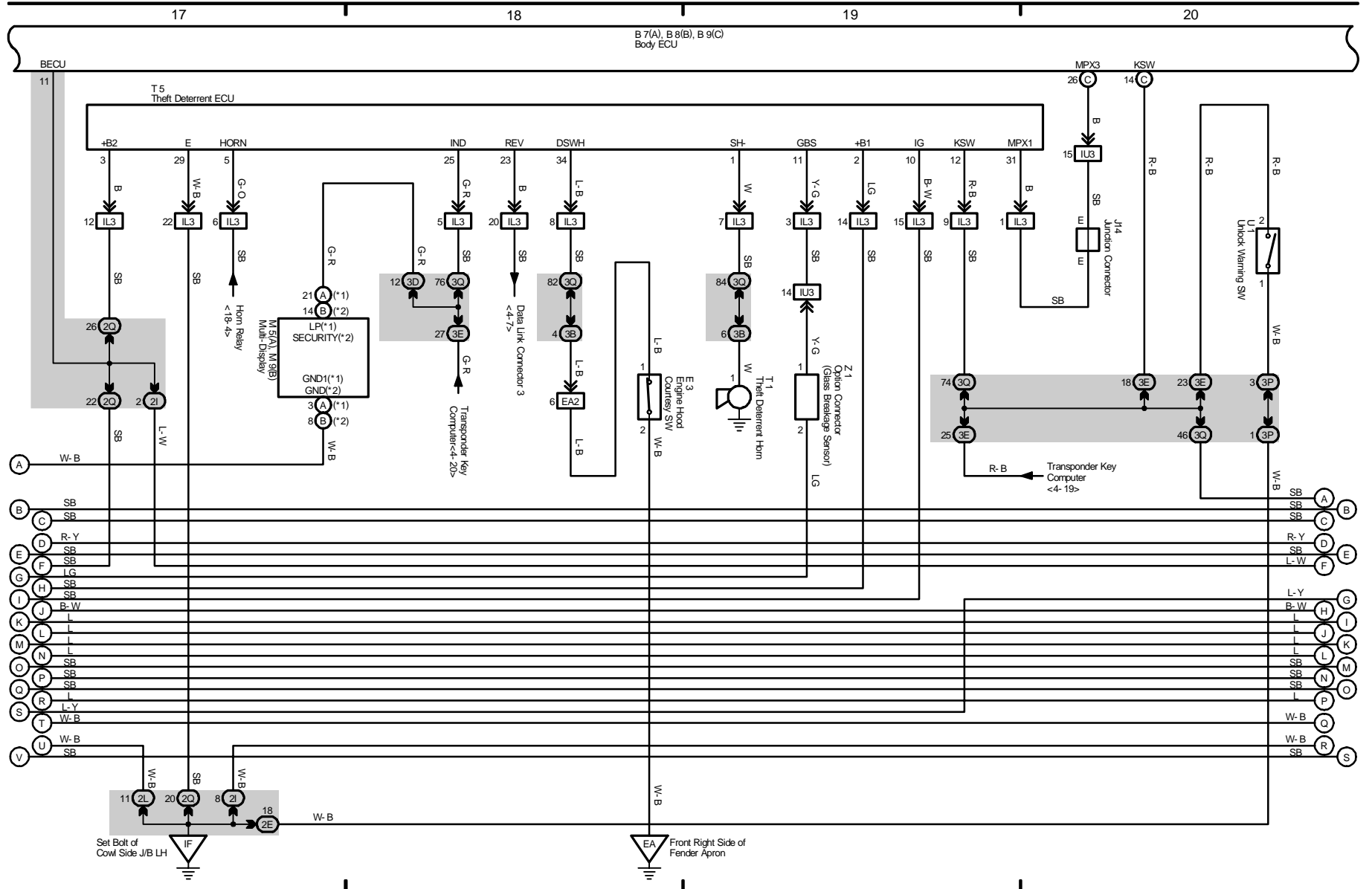
Multiplex Communication System



2004 LAND CRUISER (EWDS48U)

Multiplex Communication System

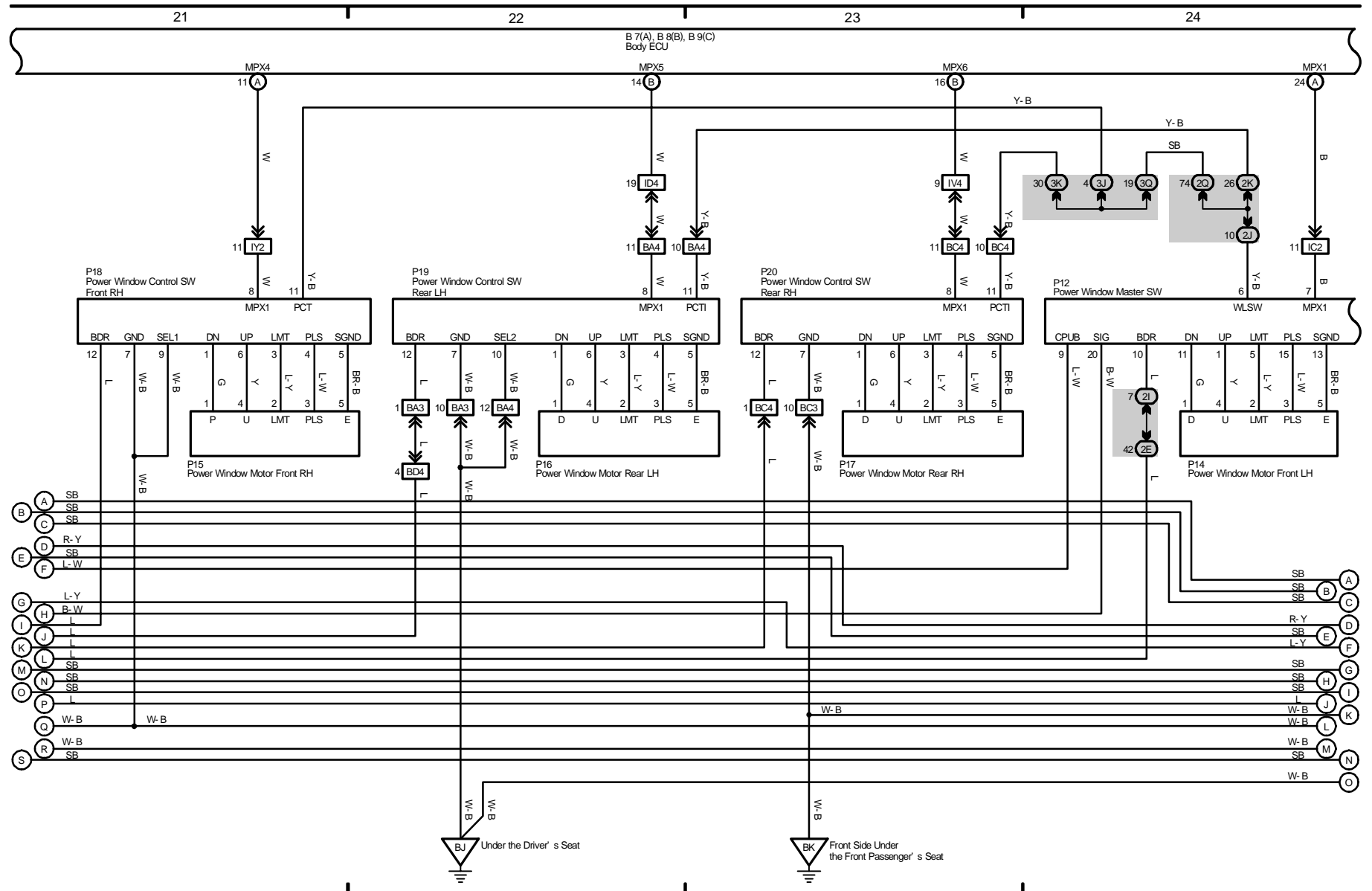
\* 1: w/ Navigation System  
 \* 2: w/o Navigation System



2004 LAND CRUISER (EWDS48U)

M OVERALL ELECTRICAL WIRING DIAGRAM

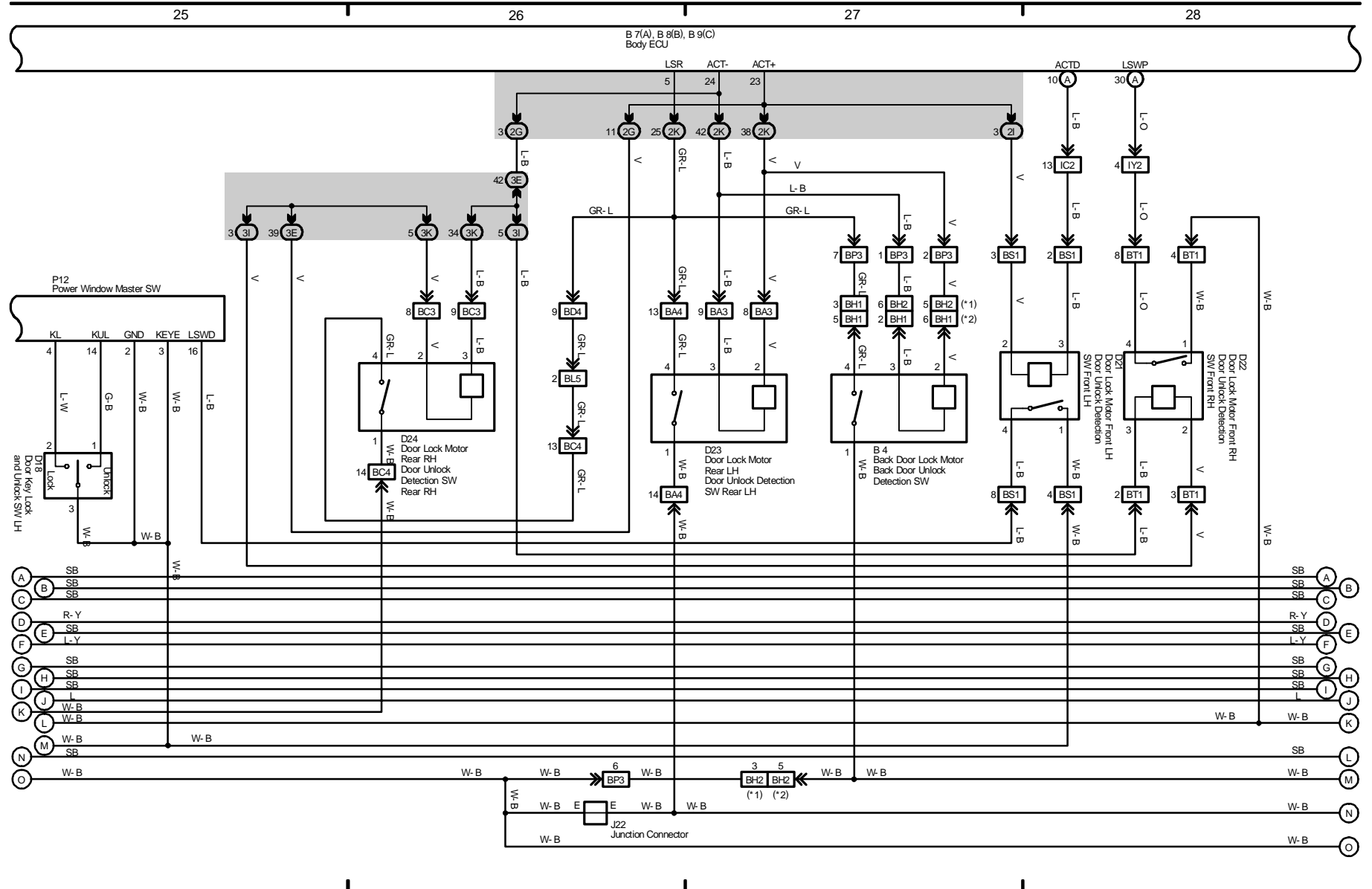
Multiplex Communication System



2004 LAND CRUISER (EWD548U)

Multiplex Communication System

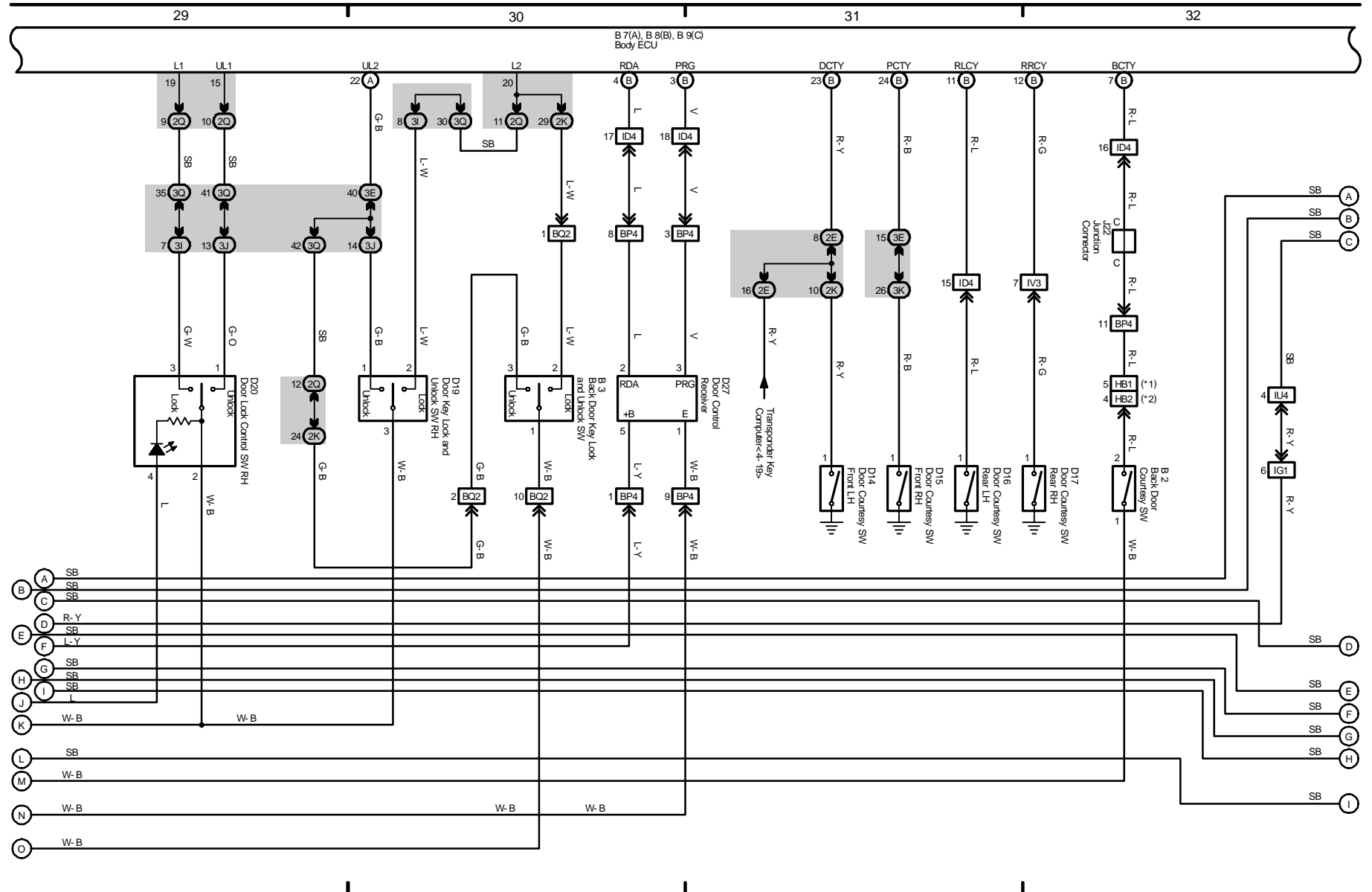
\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System



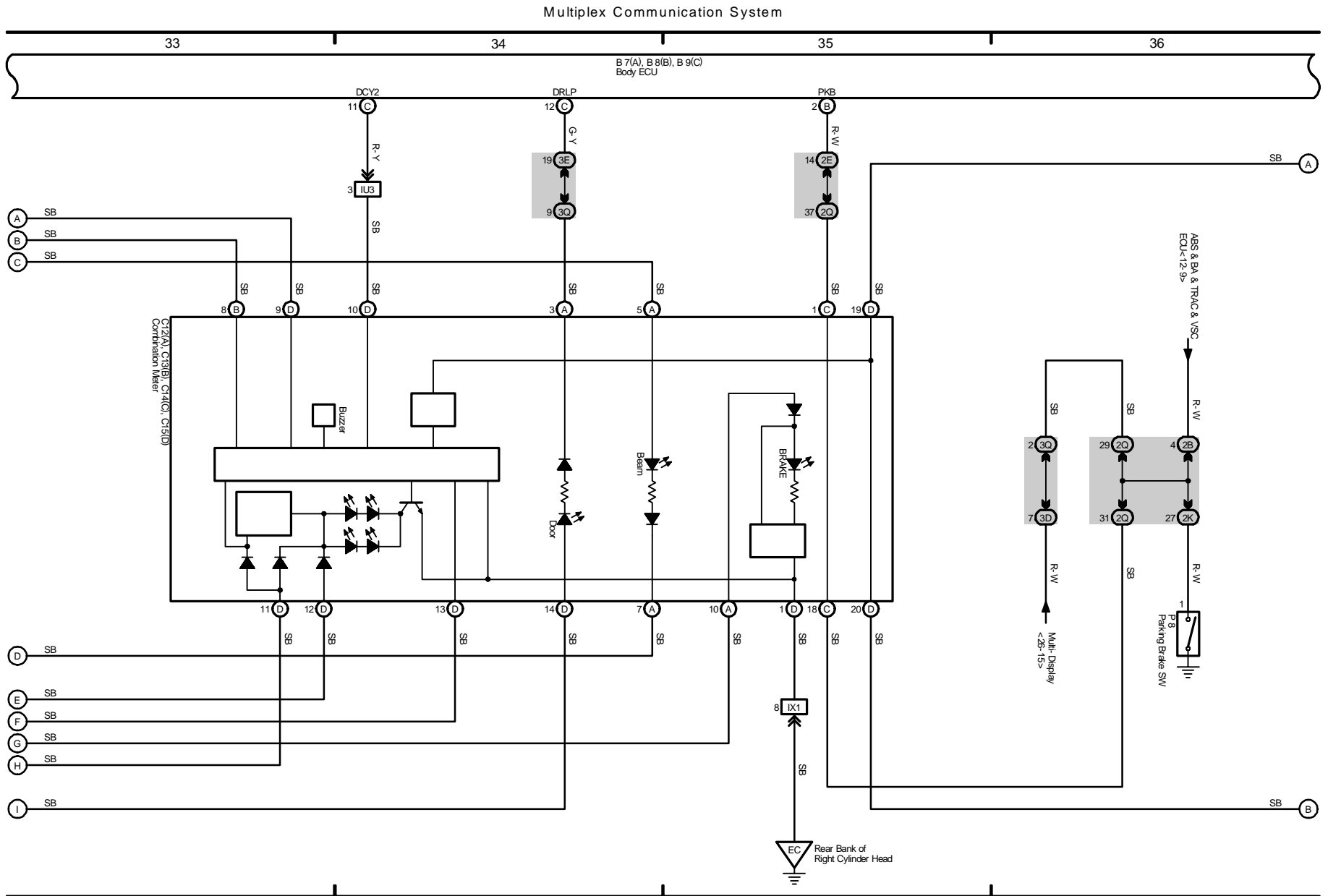
2004 LAND CRUISER (EWD548U)

Multiplex Communication System

\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System



2004 LAND CRUISER (EWD548U)

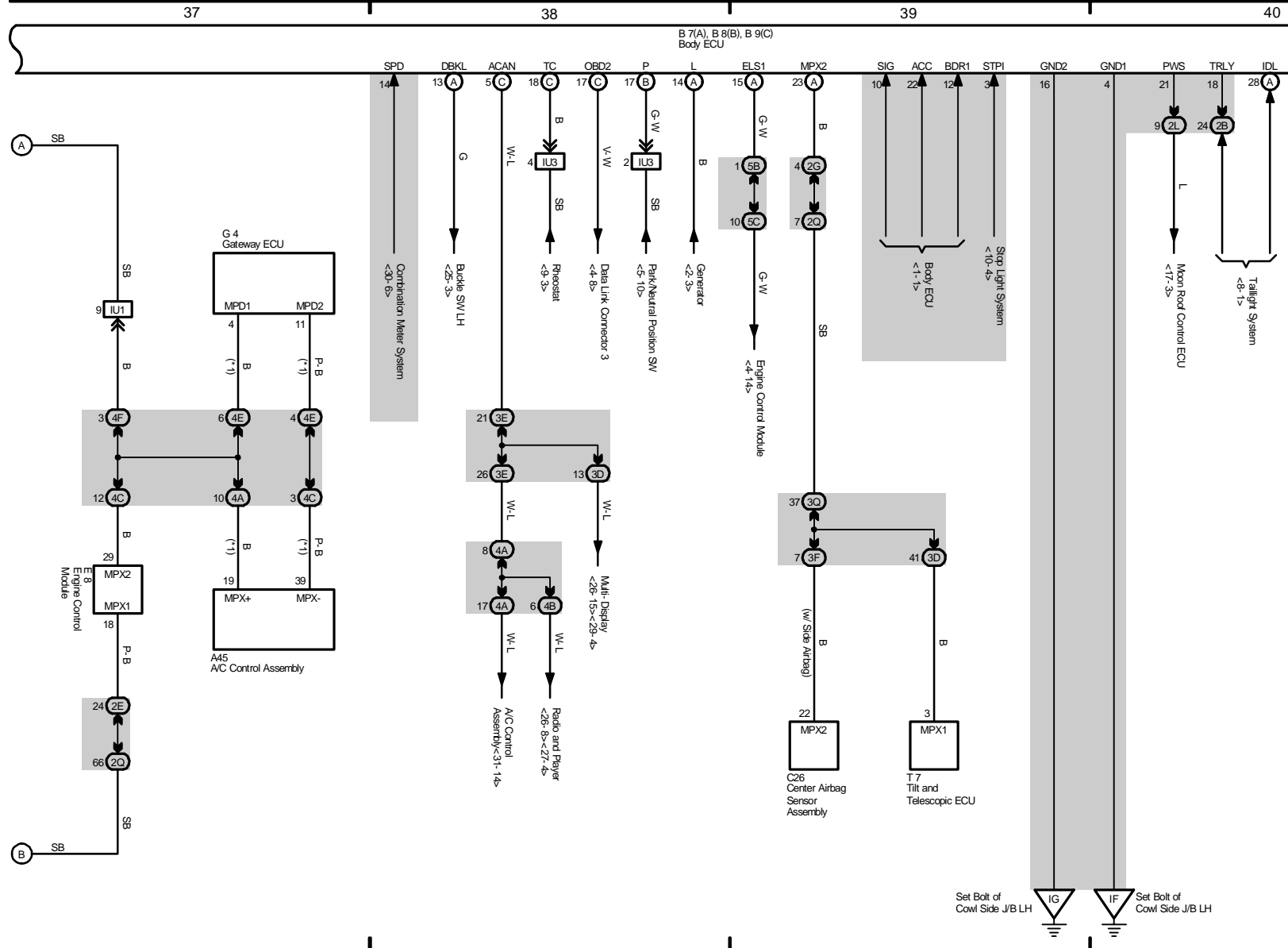


2004 LAND CRUISER (EWD548U)

1 LAND CRUISER (Cont' d)

Multiplex Communication System

\* 1 : w/ Navigation System

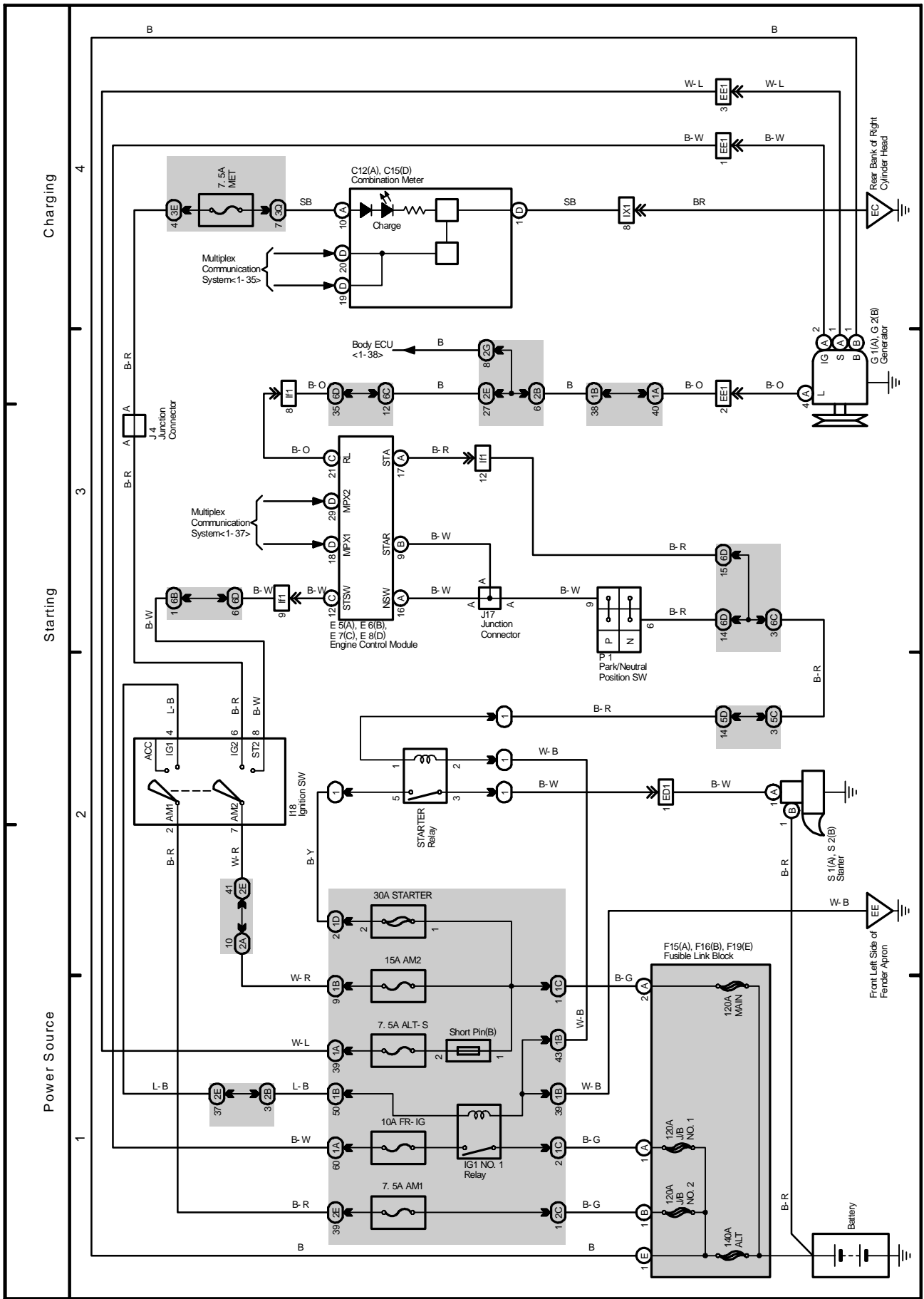


2004 LAND CRUISER (EWD548U)

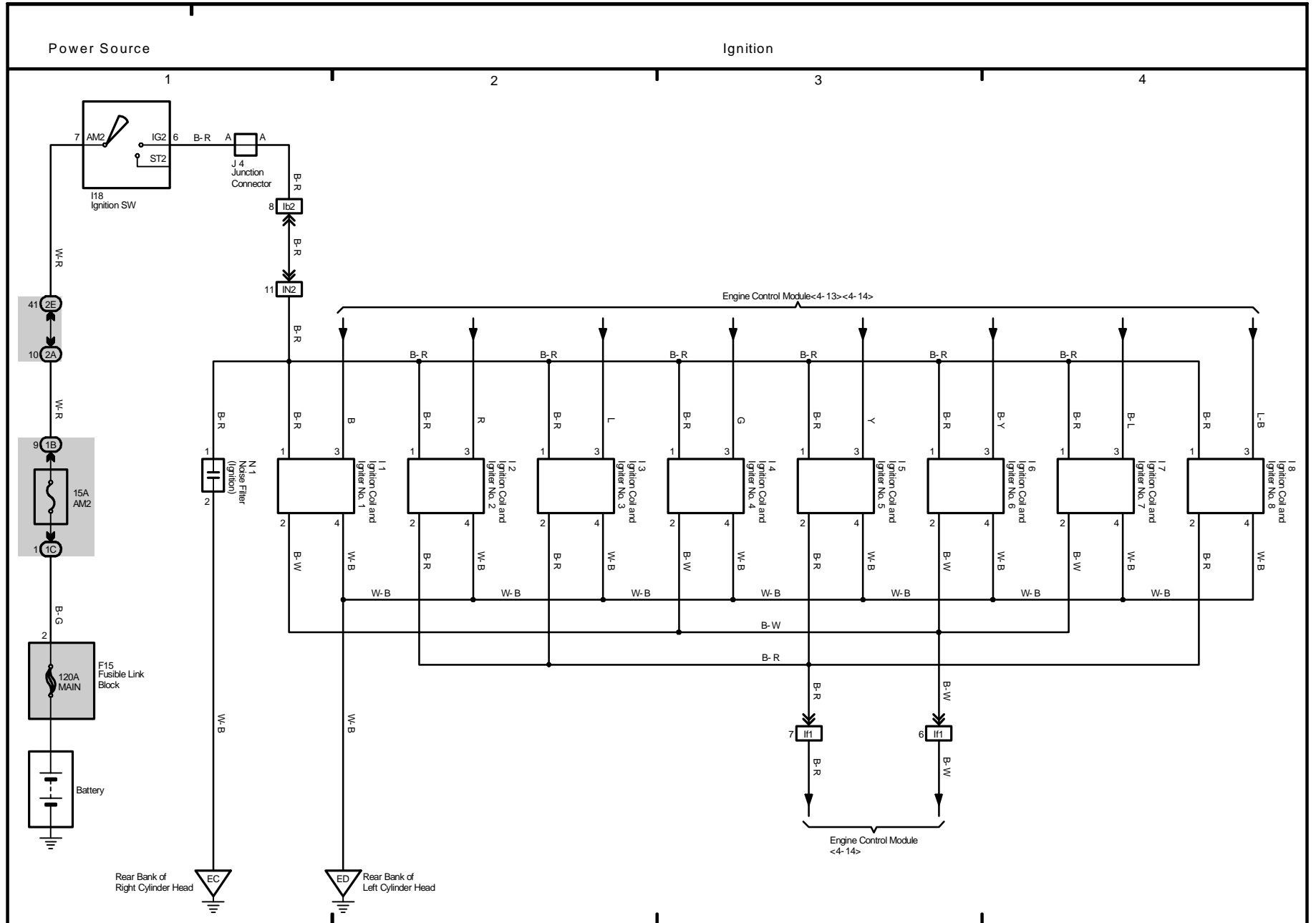


# M OVERALL ELECTRICAL WIRING DIAGRAM

2 LAND CRUISER



### 3 LAND CRUISER

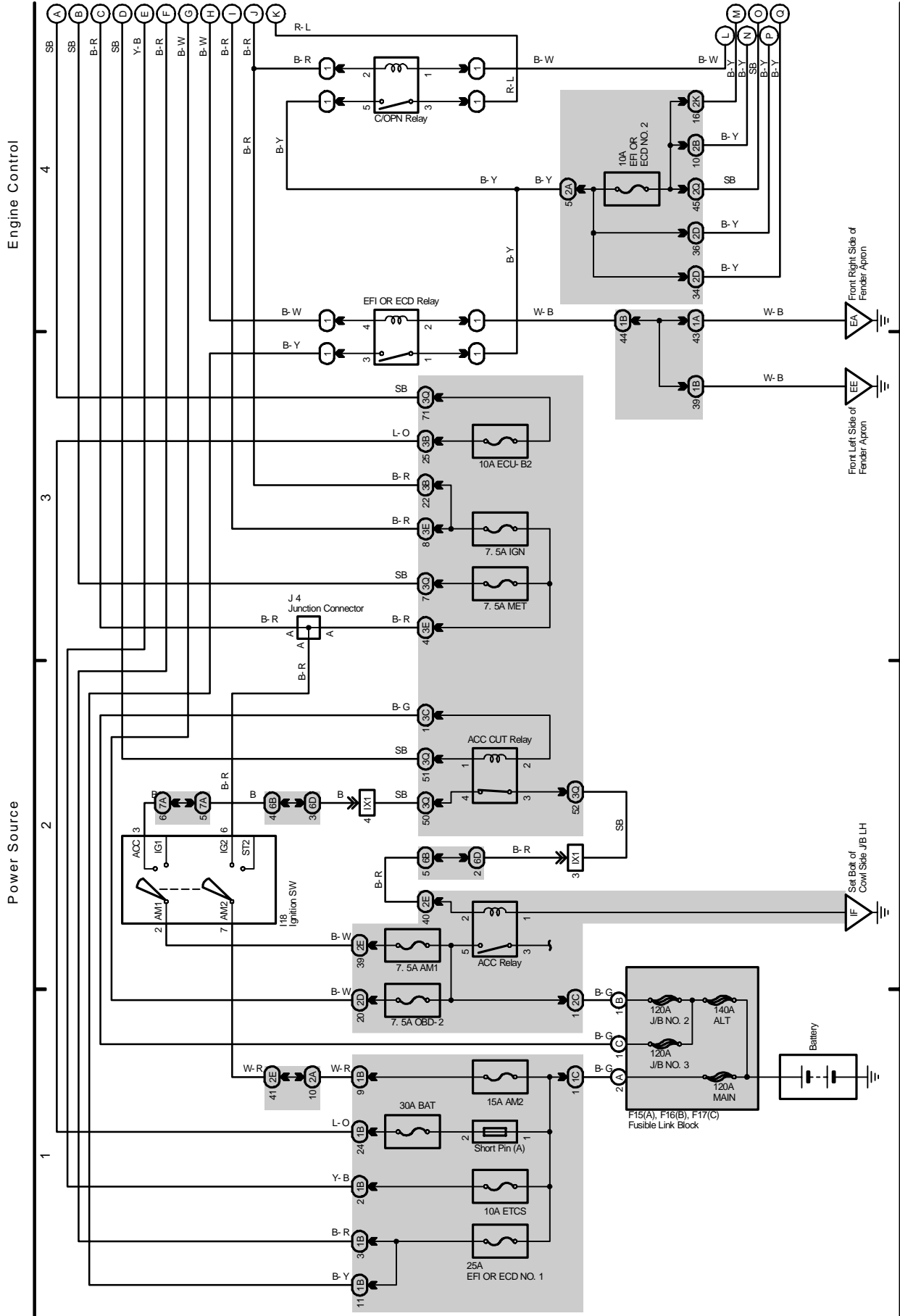


2004 LAND CRUISER (EWD548U)

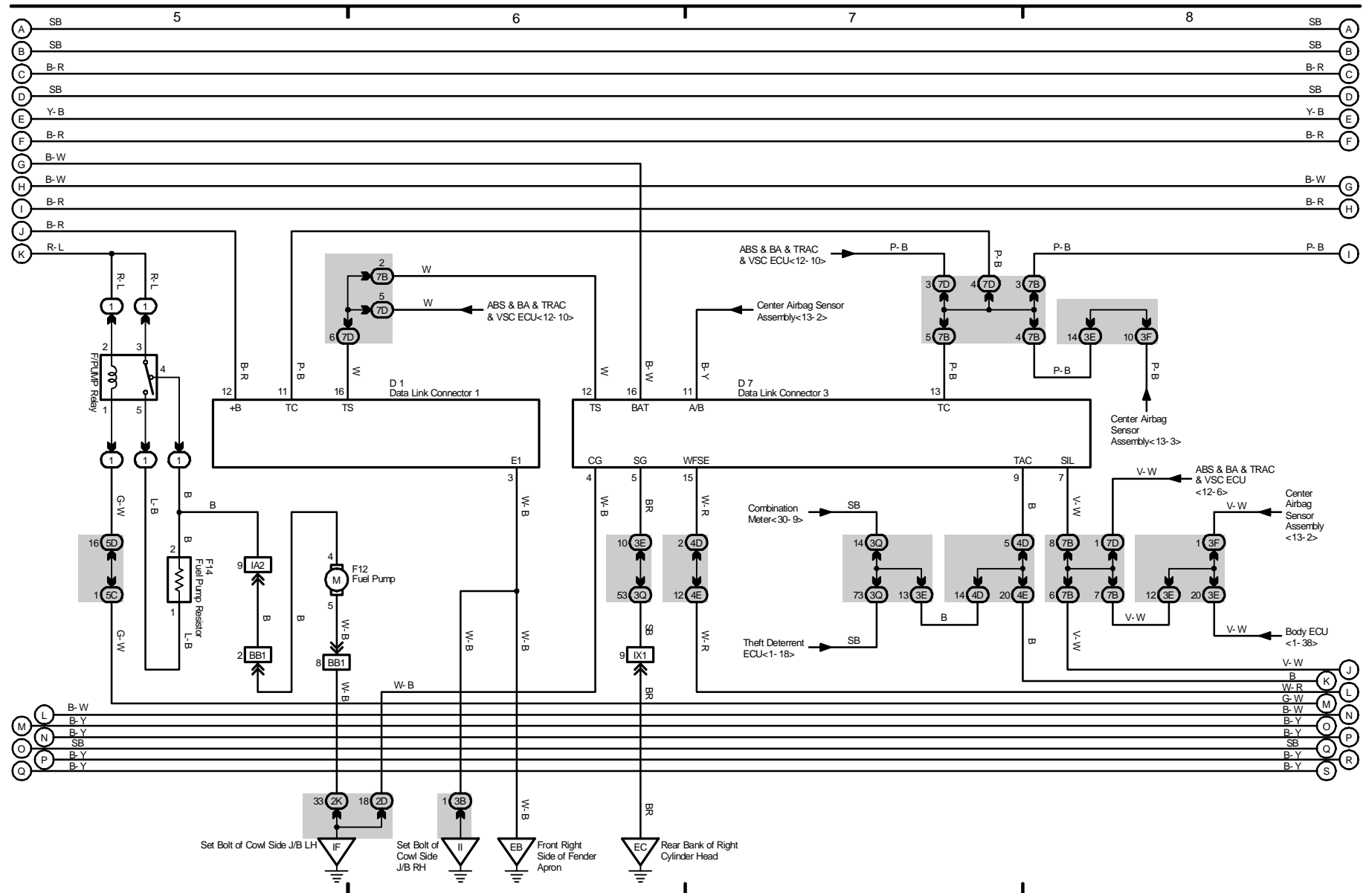
# M OVERALL ELECTRICAL WIRING DIAGRAM

4 LAND CRUISER

(Cont. next page)

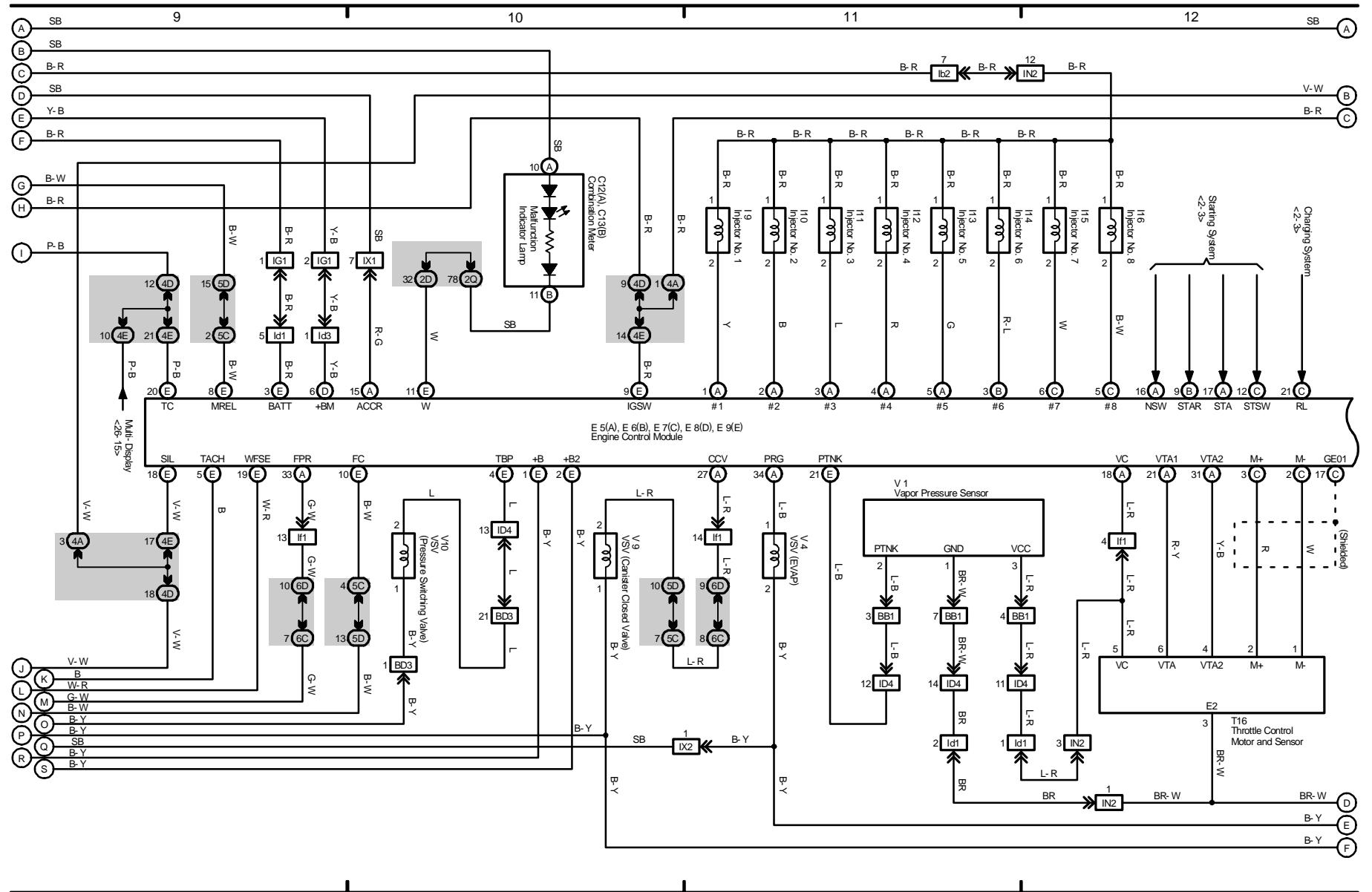


Engine Control



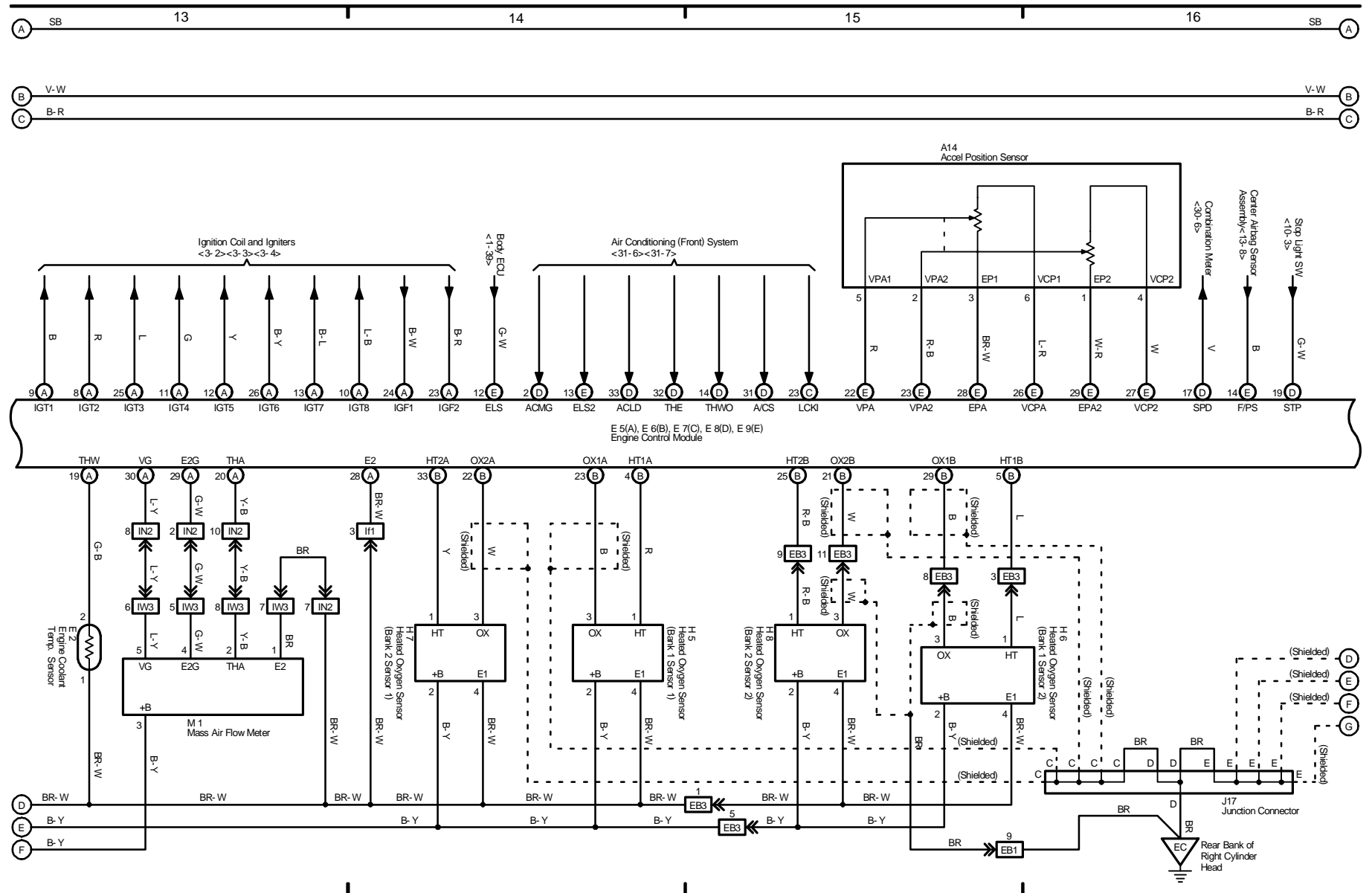
2004 LAND CRUISER (EWD548U)

Engine Control



2004 LAND CRUISER (EWD548U)

Engine Control

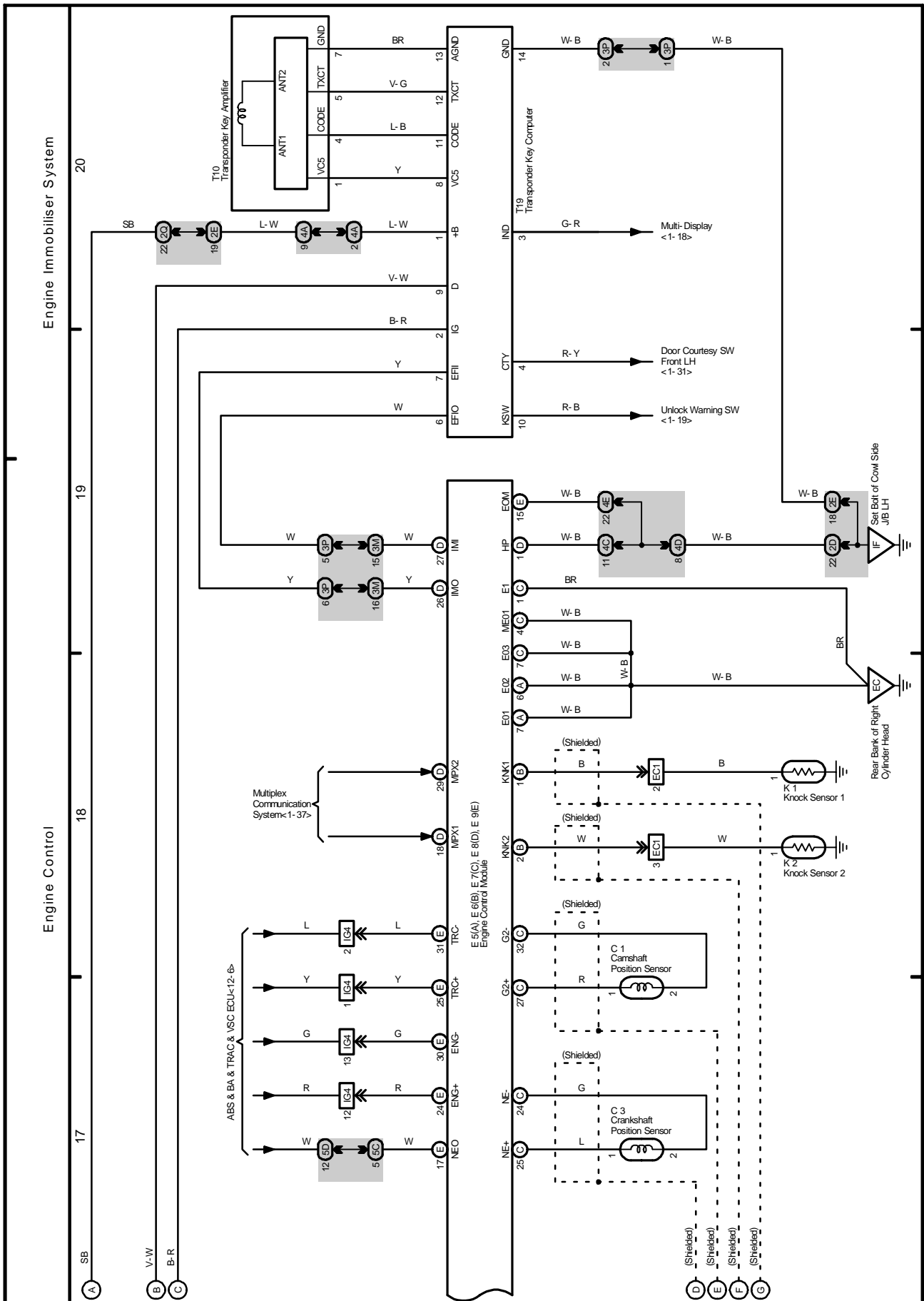


2004 LAND CRUISER (EWD548U)



# M OVERALL ELECTRICAL WIRING DIAGRAM

## 4 LAND CRUISER (Cont' d)



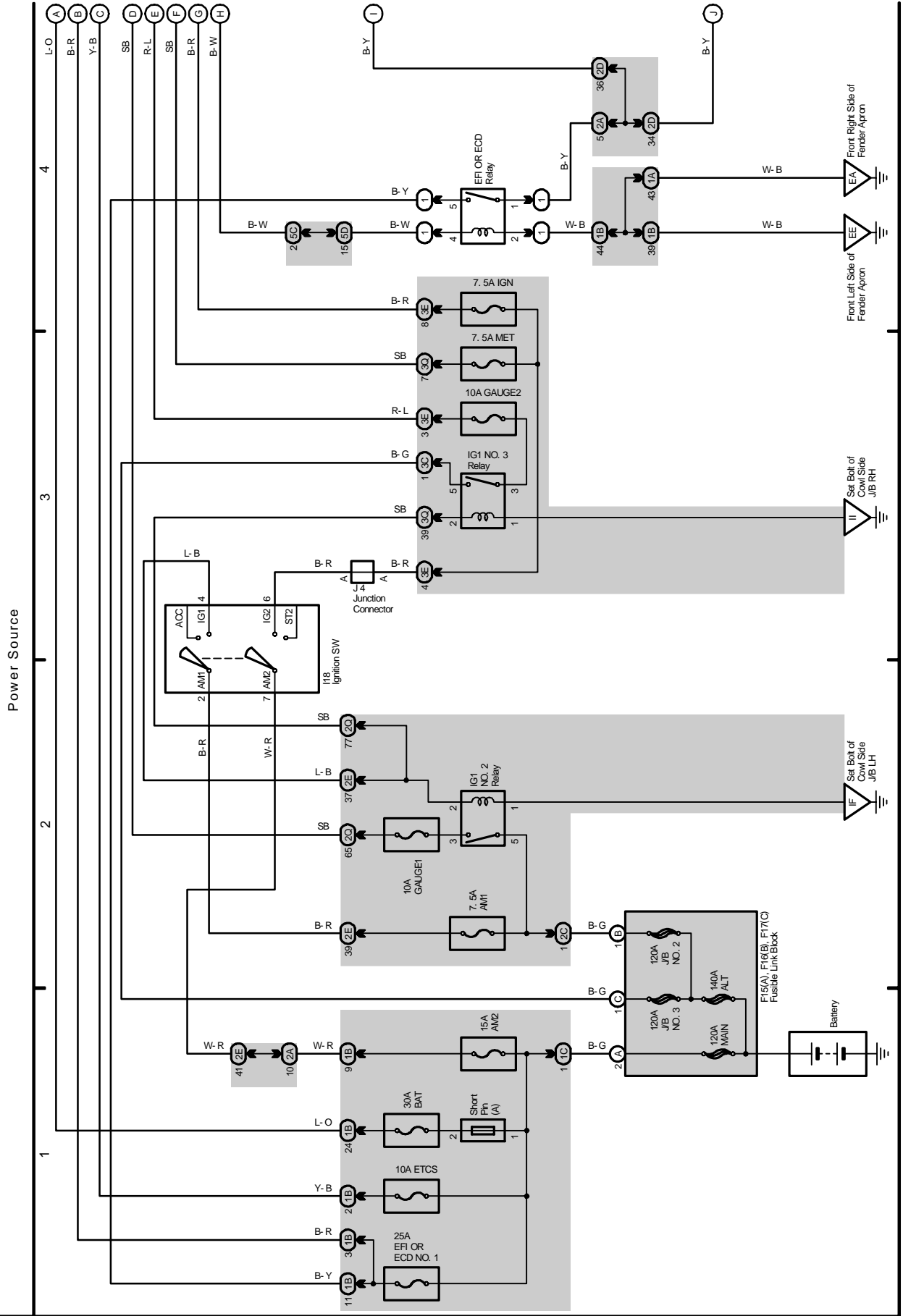




# M OVERALL ELECTRICAL WIRING DIAGRAM

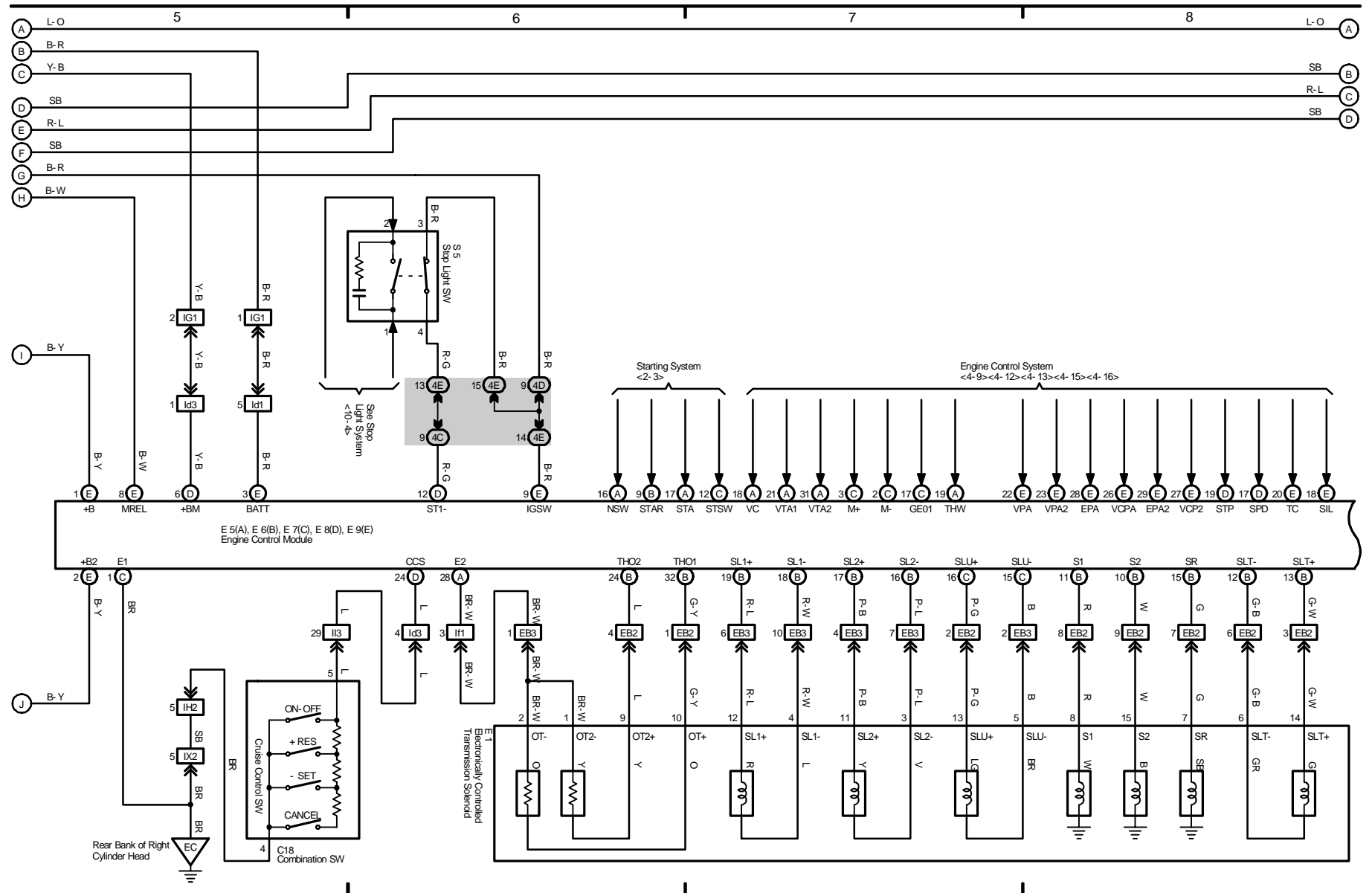
(Cont. next page)

5 LAND CRUISER



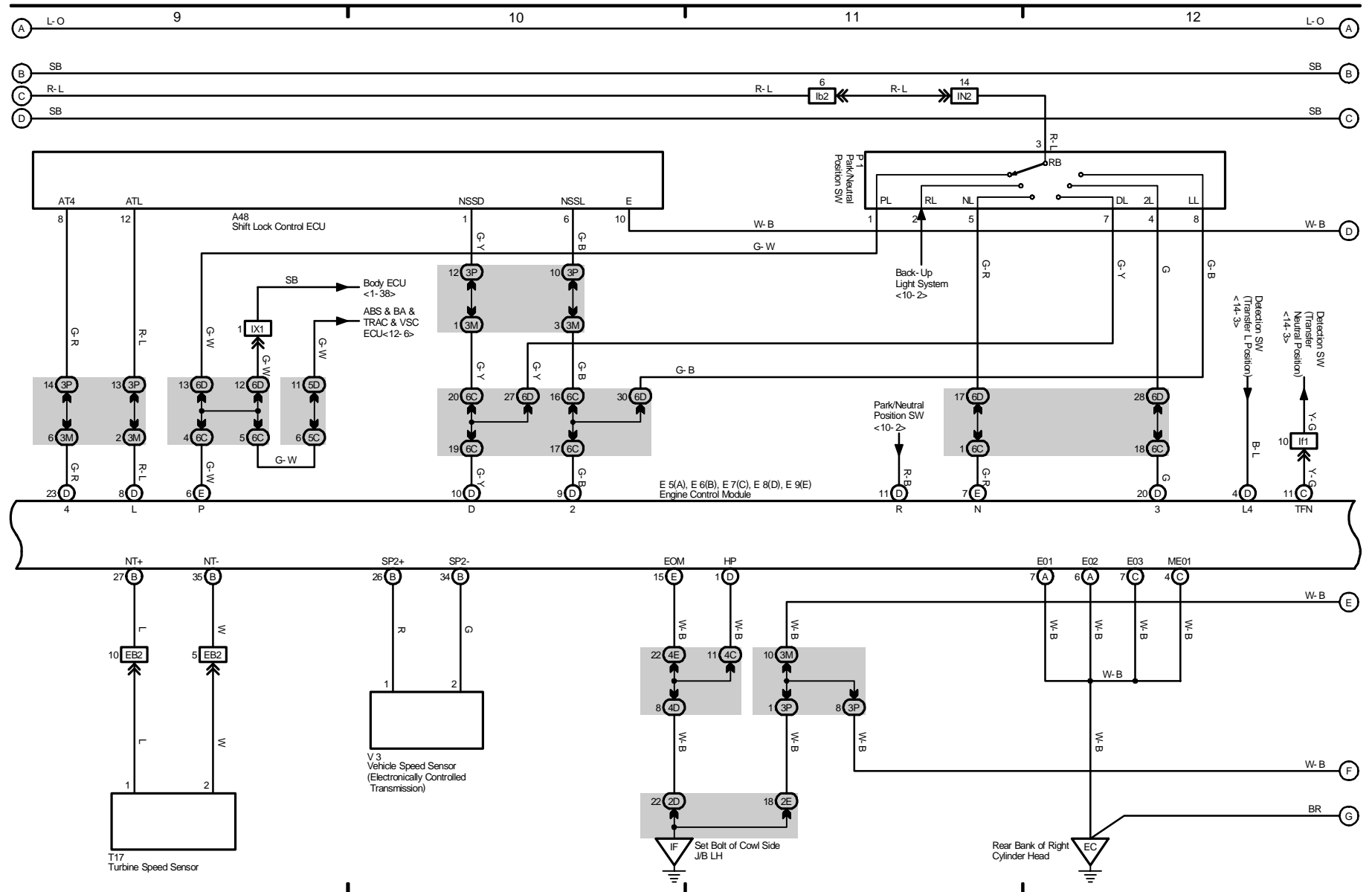
Cruise Control

Electronically Controlled Transmission and A/T Indicator



2004 LAND CRUISER (EWD548U)

Electronically Controlled Transmission and A/T Indicator

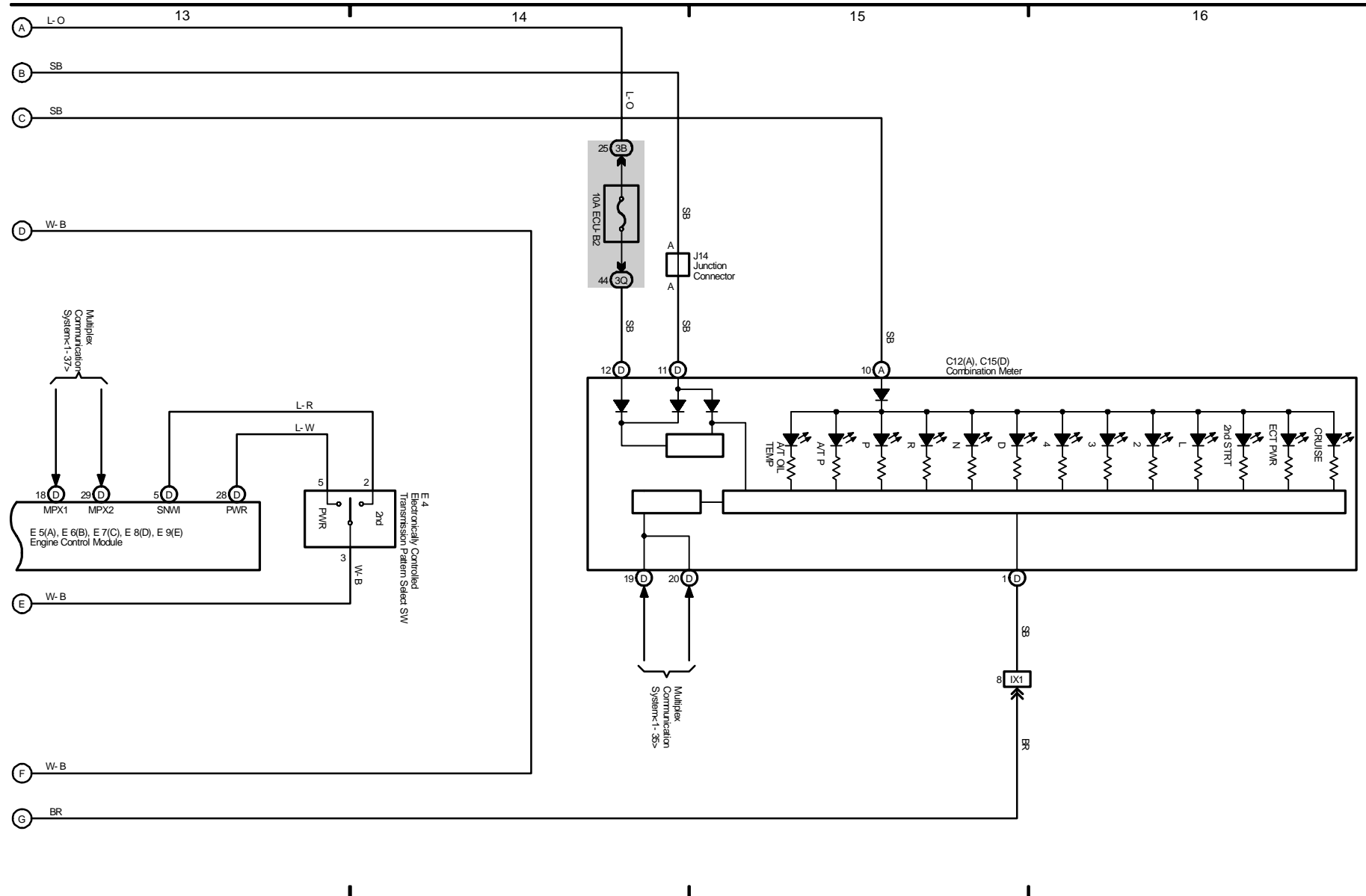


2004 LAND CRUISER (EWD548U)

M OVERALL ELECTRICAL WIRING DIAGRAM

5 LAND CRUISER (Cont' d)

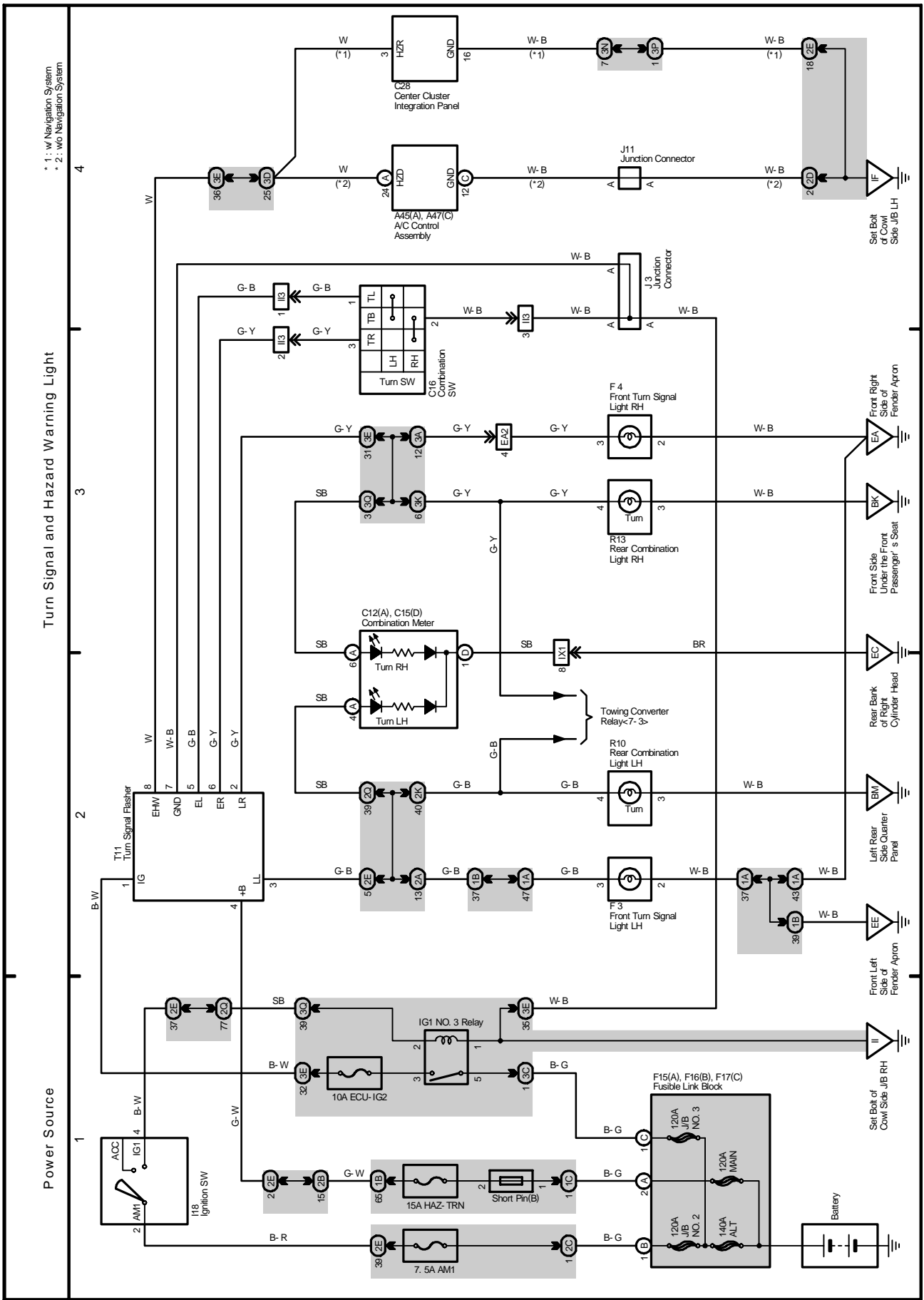
Electronically Controlled Transmission and A/T Indicator



2004 LAND CRUISER (EWD548U)

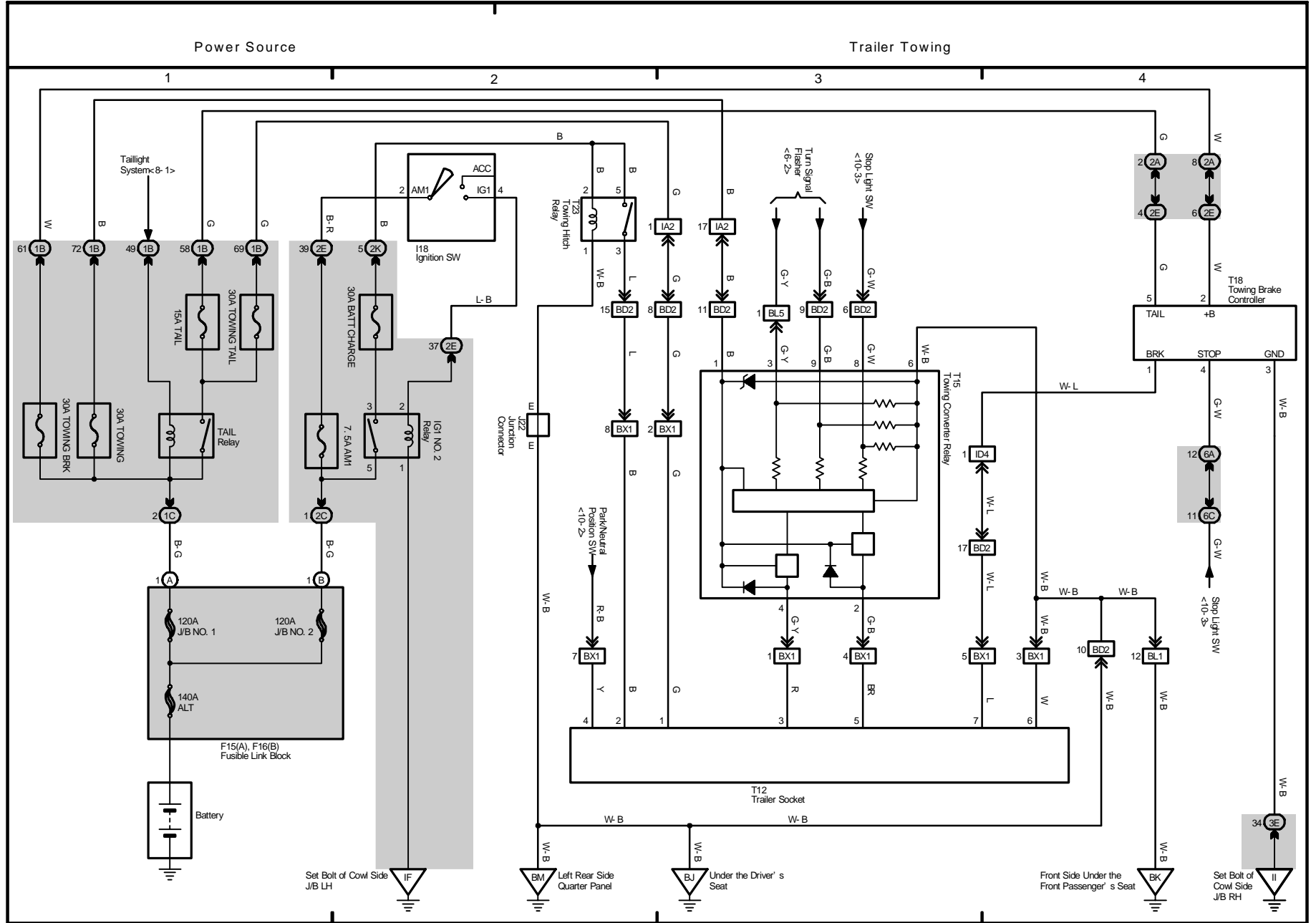
# M OVERALL ELECTRICAL WIRING DIAGRAM

6 LAND CRUISER



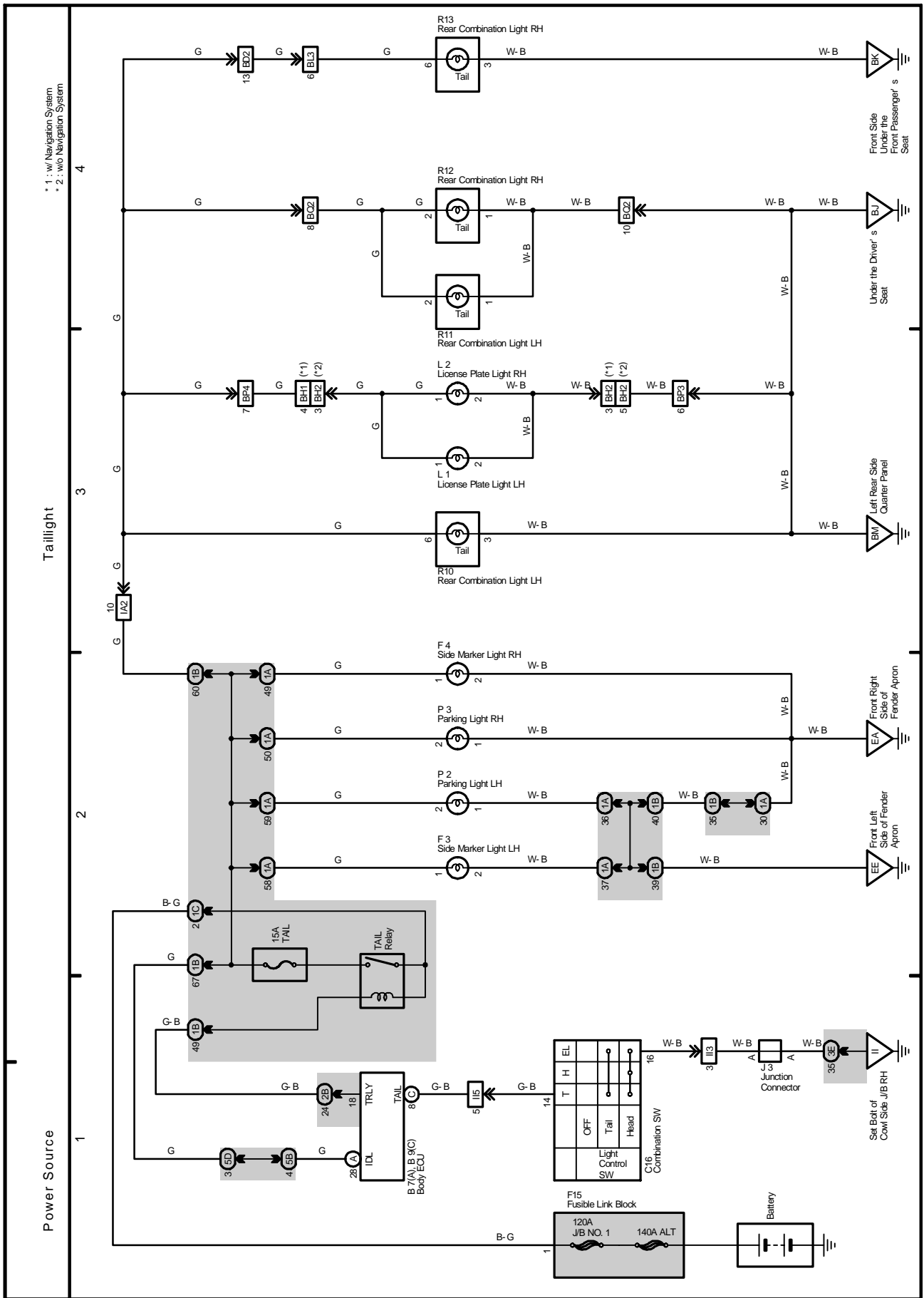
7 LAND CRUISER

2004 LAND CRUISER (EWD548U)



# M OVERALL ELECTRICAL WIRING DIAGRAM

8 LAND CRUISER



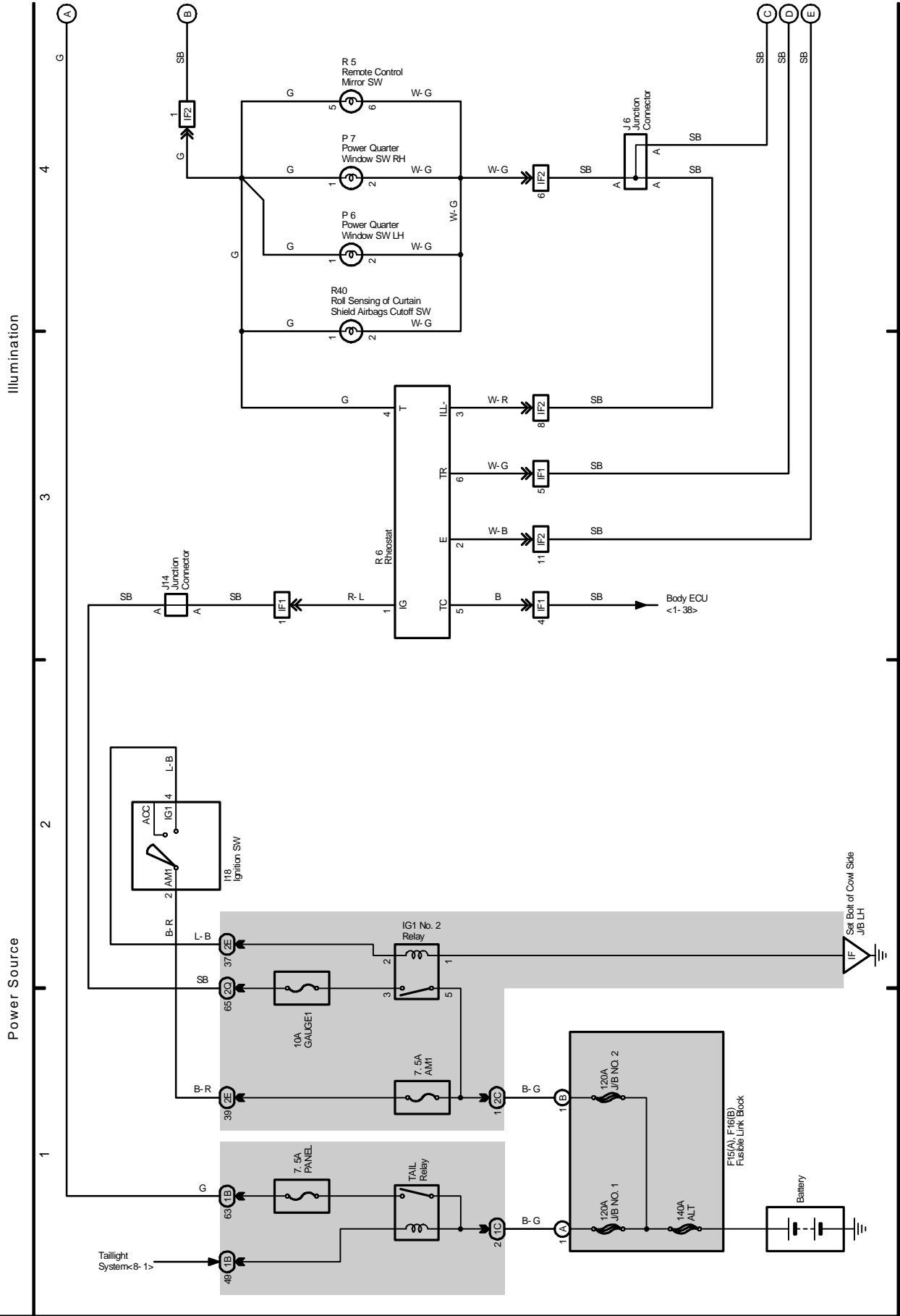




# M OVERALL ELECTRICAL WIRING DIAGRAM

9 LAND CRUISER

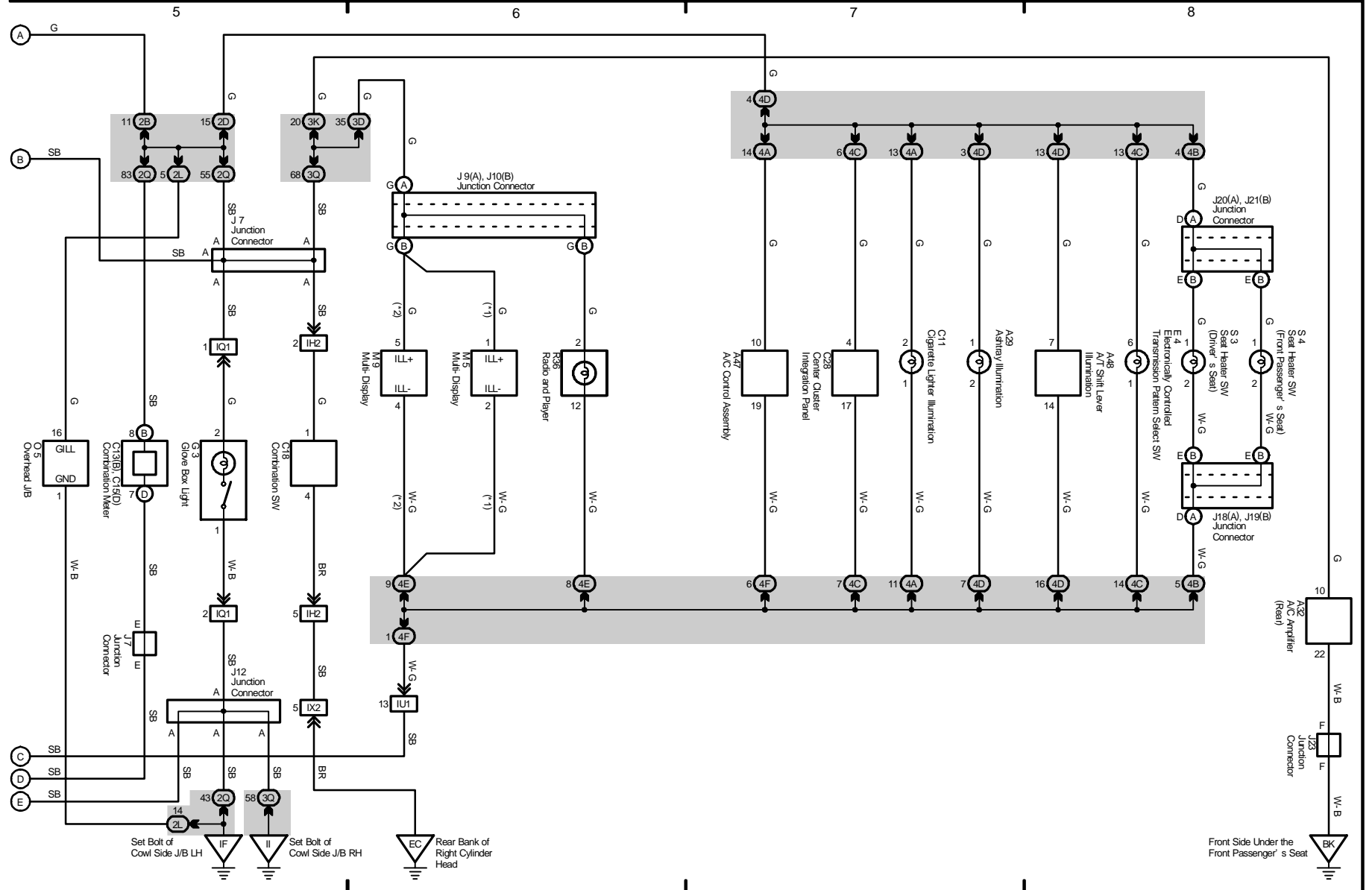
(Cont. next page)



9 LAND CRUISER (Cont' d)

Illumination

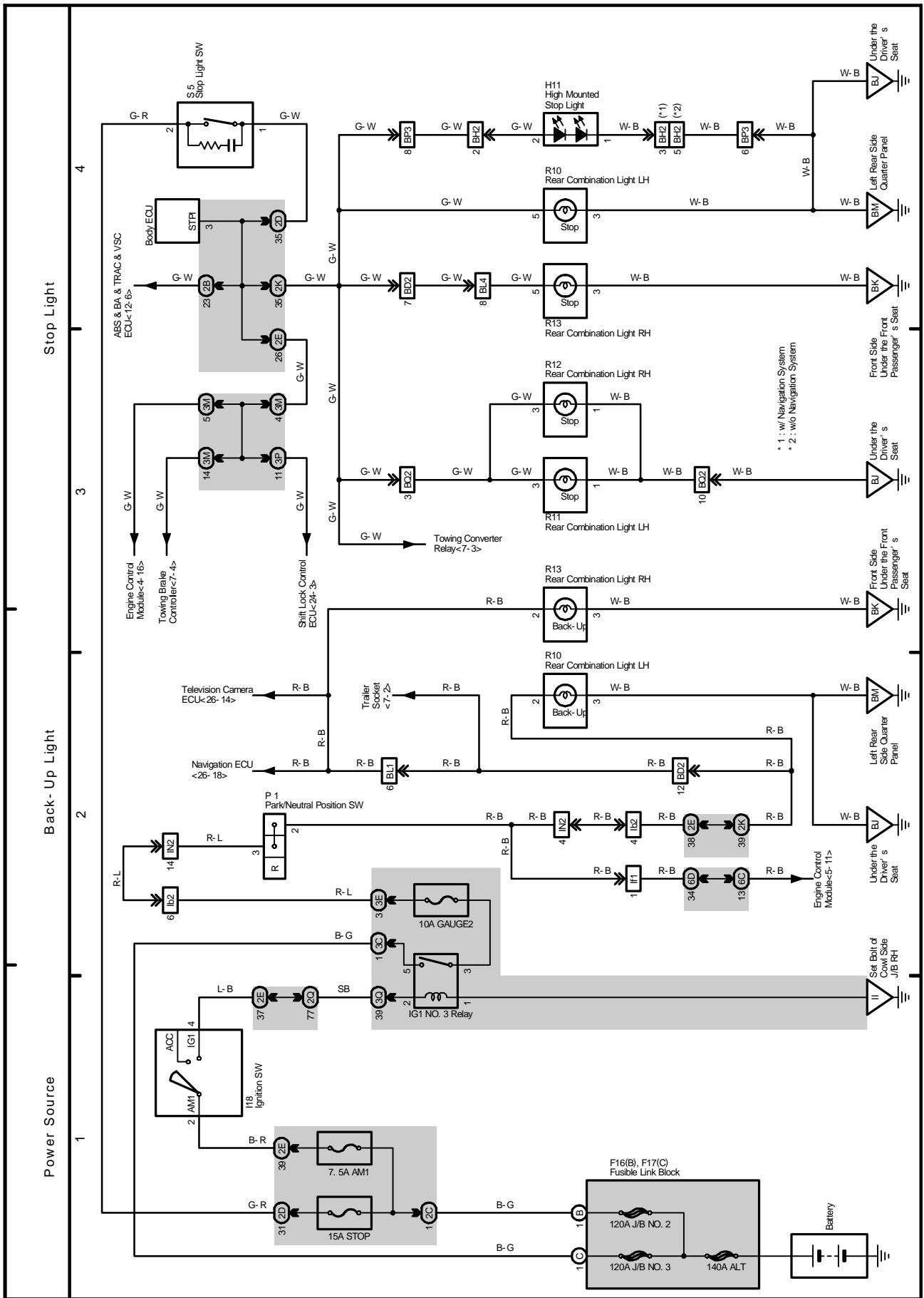
- \* 1 : w/ Navigation System
- \* 2 : w/o Navigation System



2004 LAND CRUISER (EWD548U)

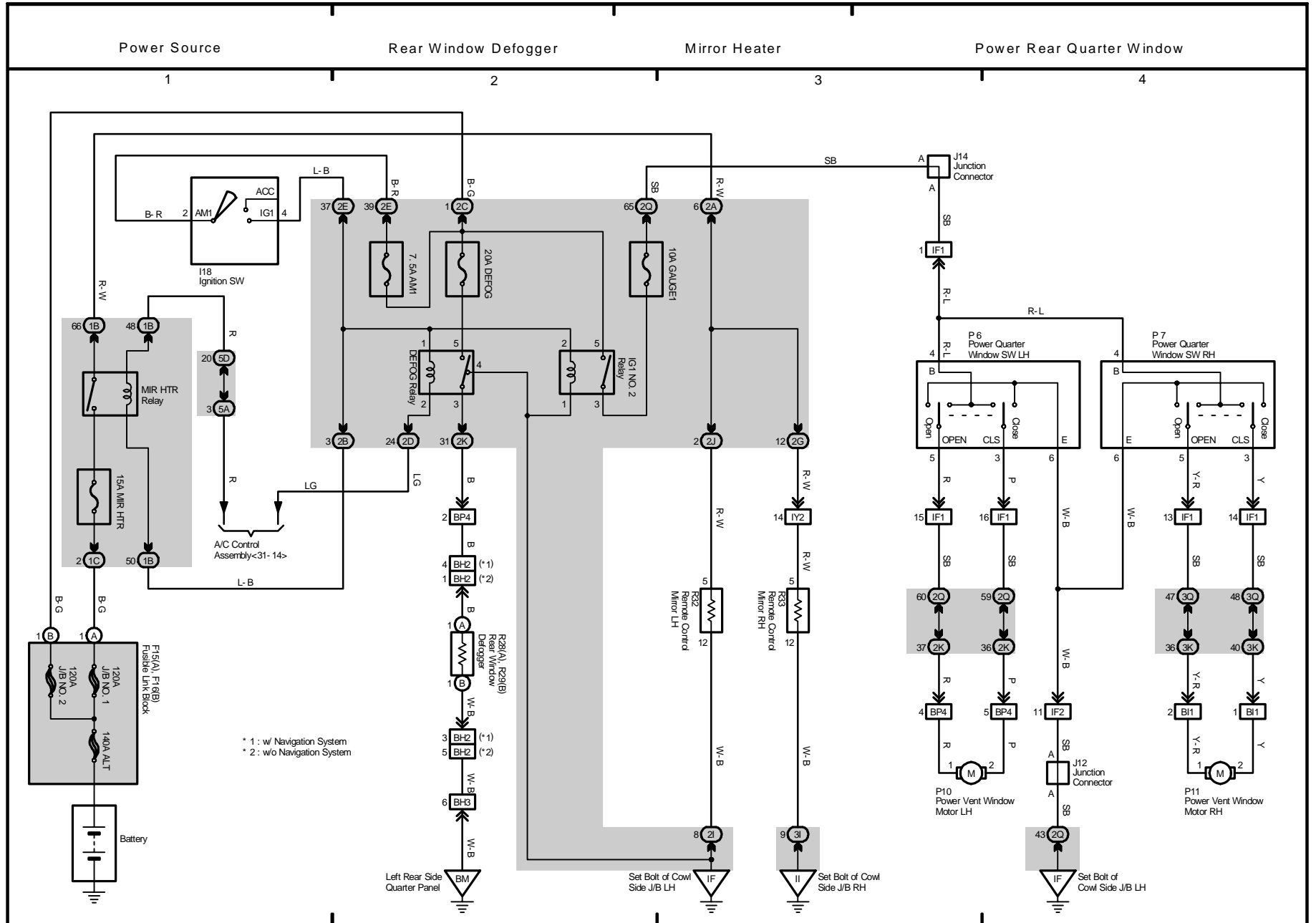
# M OVERALL ELECTRICAL WIRING DIAGRAM

10 LAND CRUISER



11 LAND CRUISER

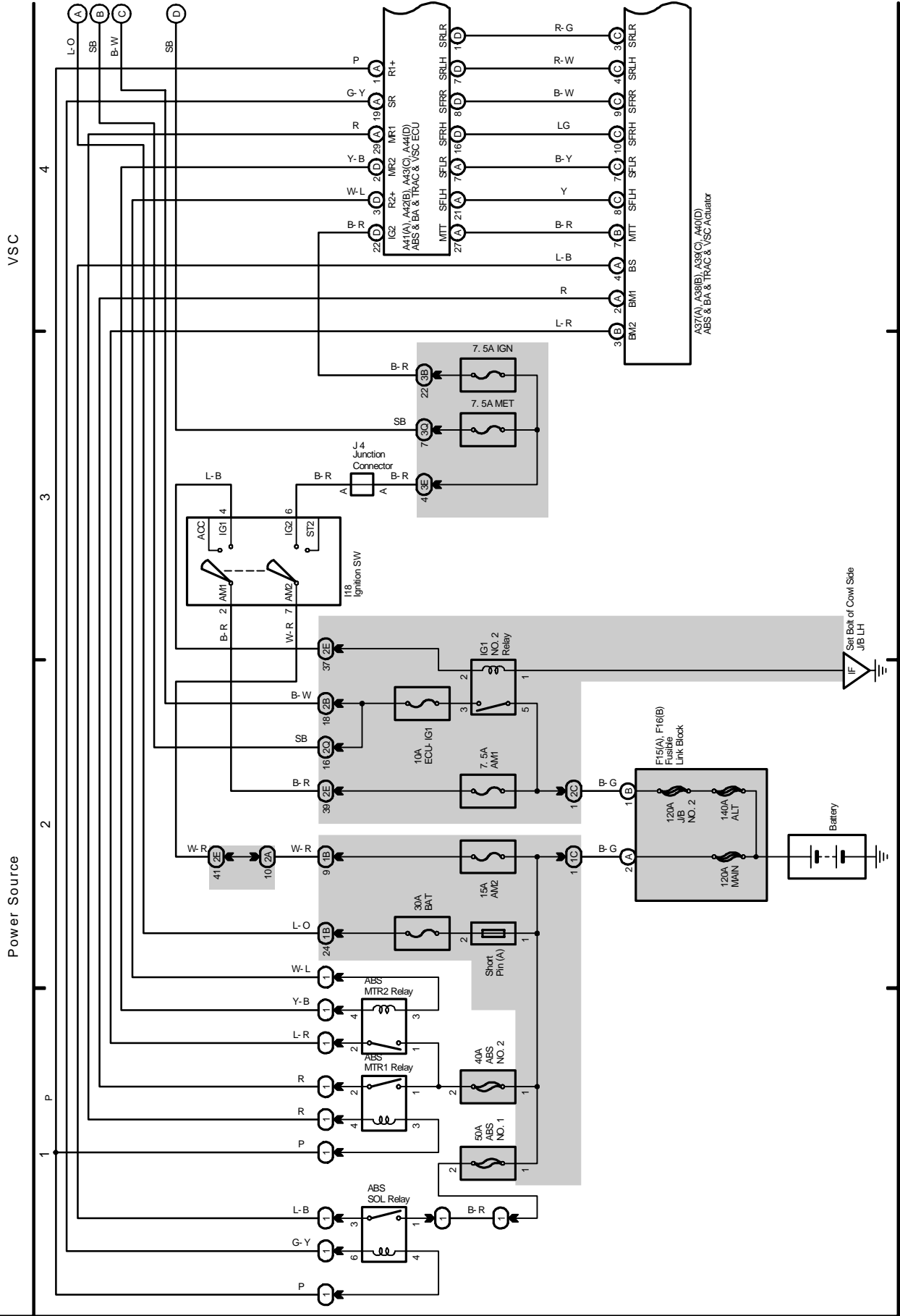
2004 LAND CRUISER (EWD548U)



# M OVERALL ELECTRICAL WIRING DIAGRAM

12 LAND CRUISER

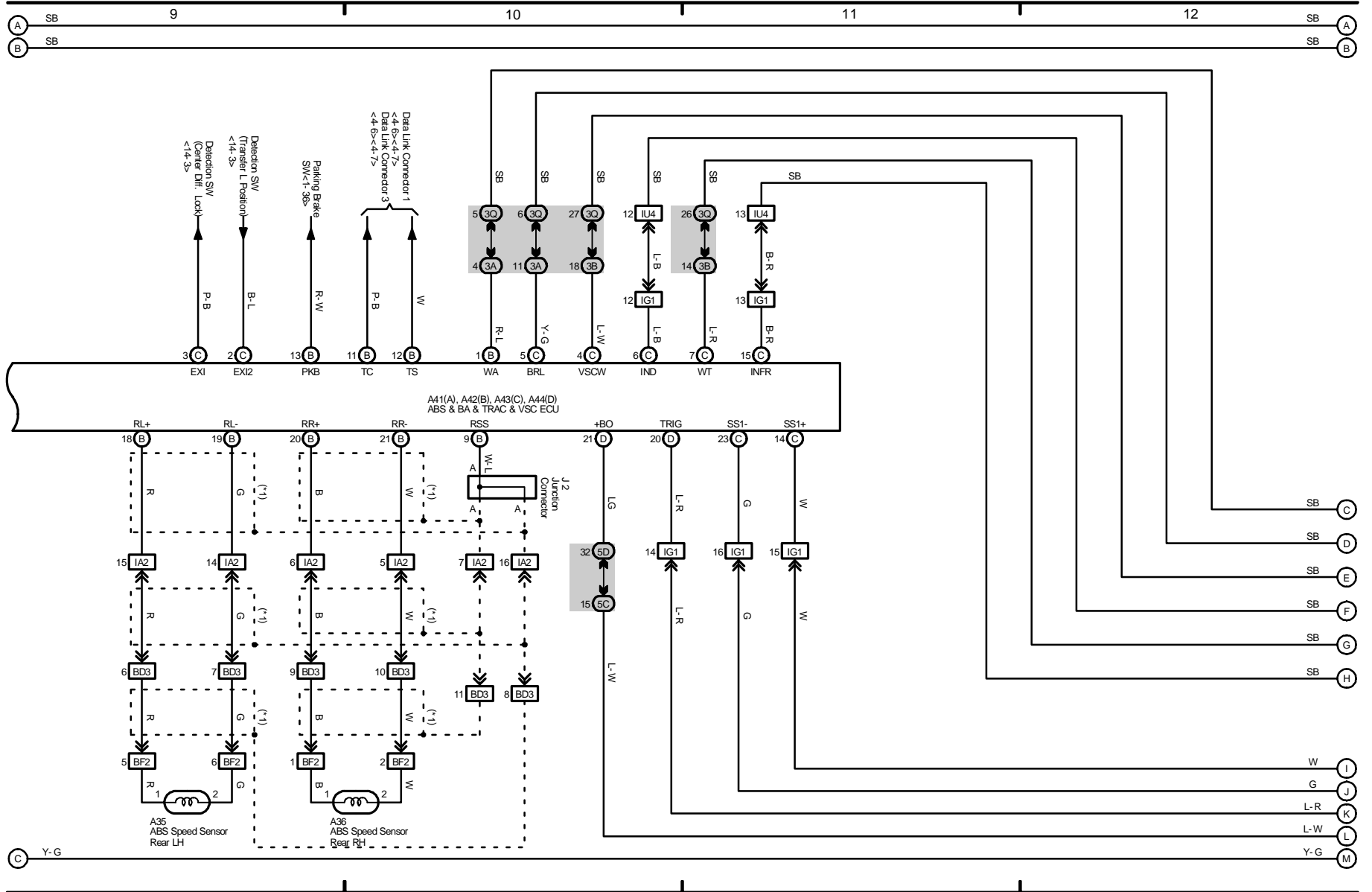
(Cont. next page)





VSC

\* 1 : shielded

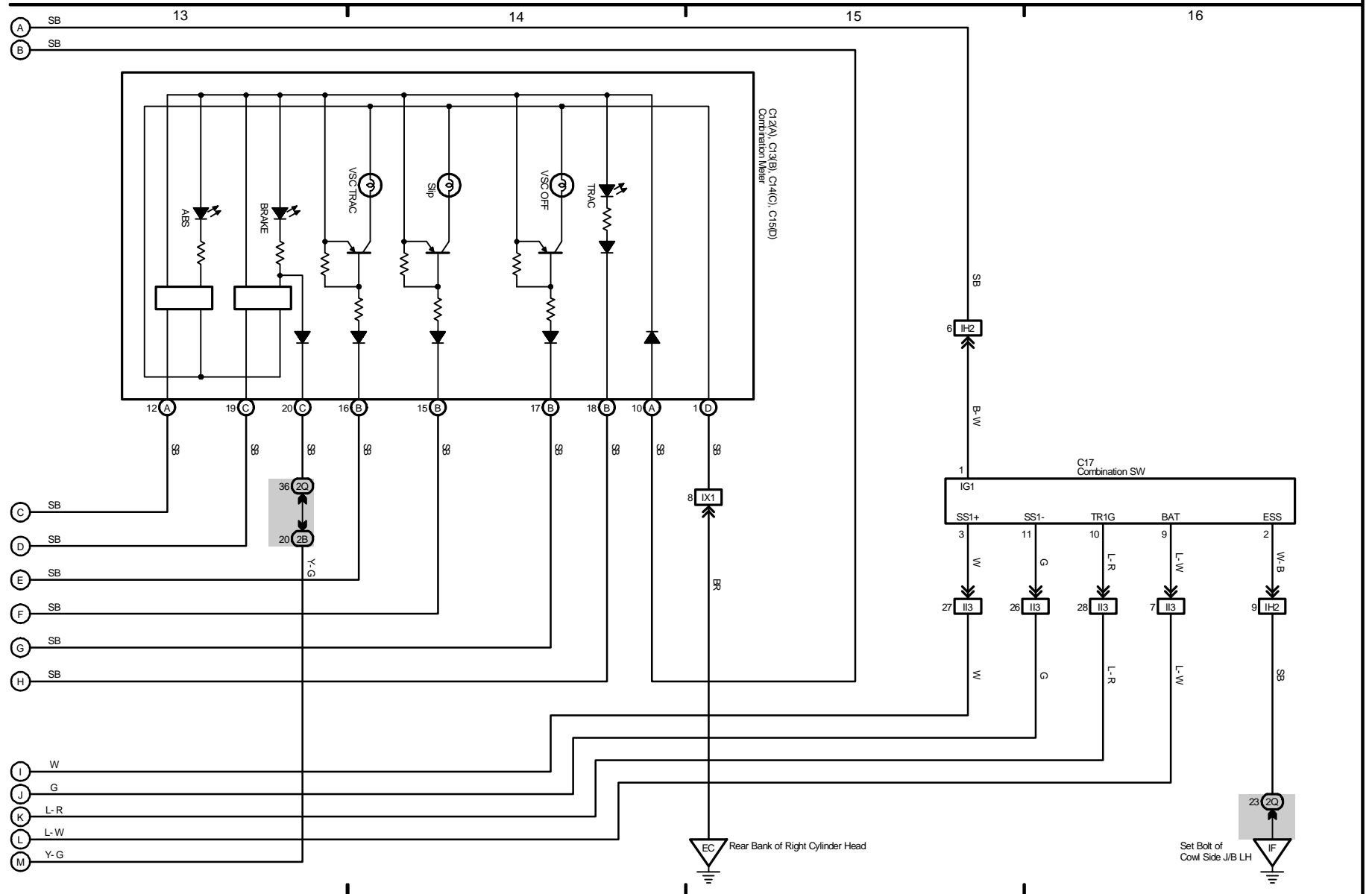


2004 LAND CRUISER (EWD548U)

M OVERALL ELECTRICAL WIRING DIAGRAM

12 LAND CRUISER (Cont' d)

VSC



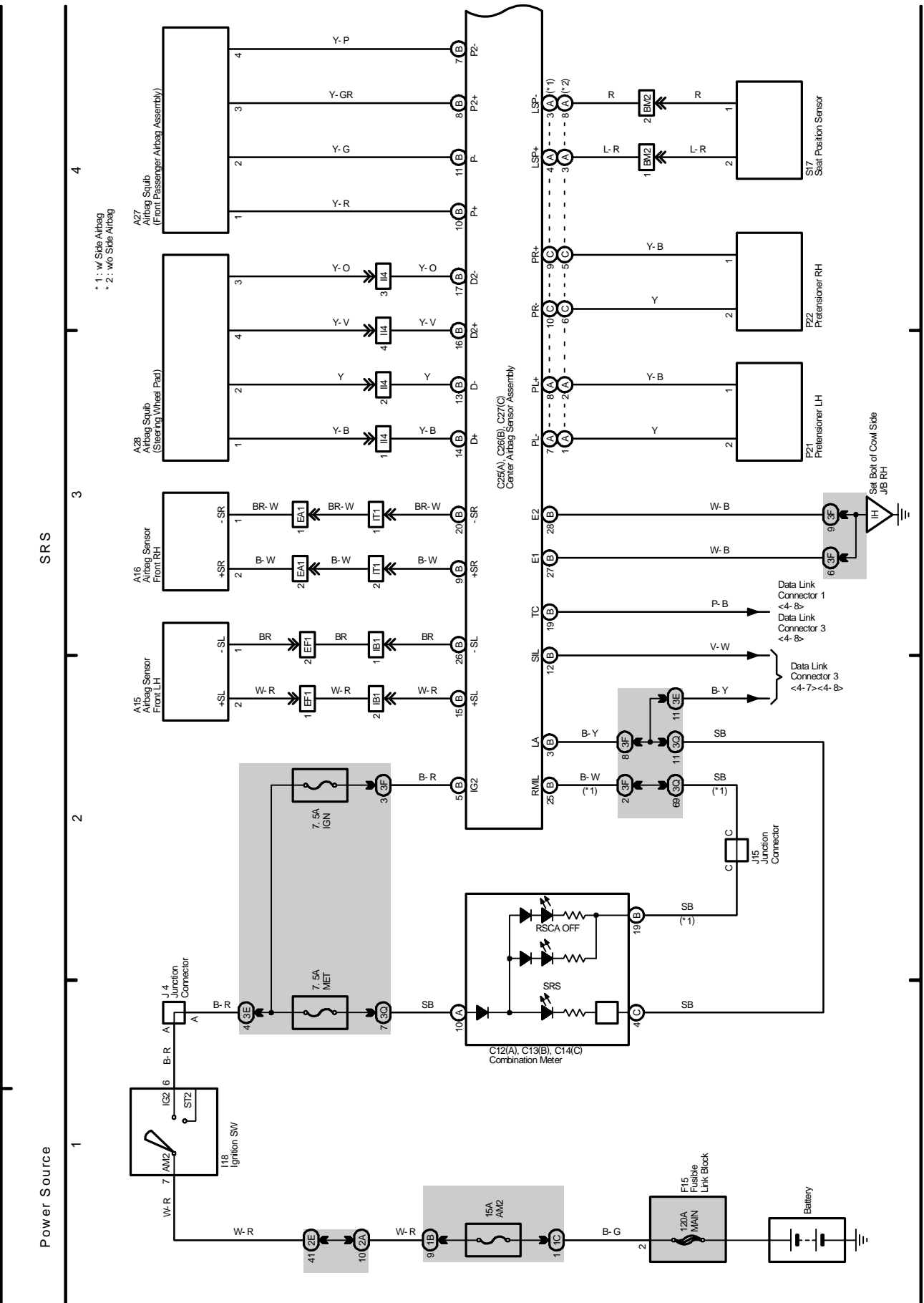
2004 LAND CRUISER (EWD548U)



# M OVERALL ELECTRICAL WIRING DIAGRAM

(Cont. next page)

13 LAND CRUISER



SRS

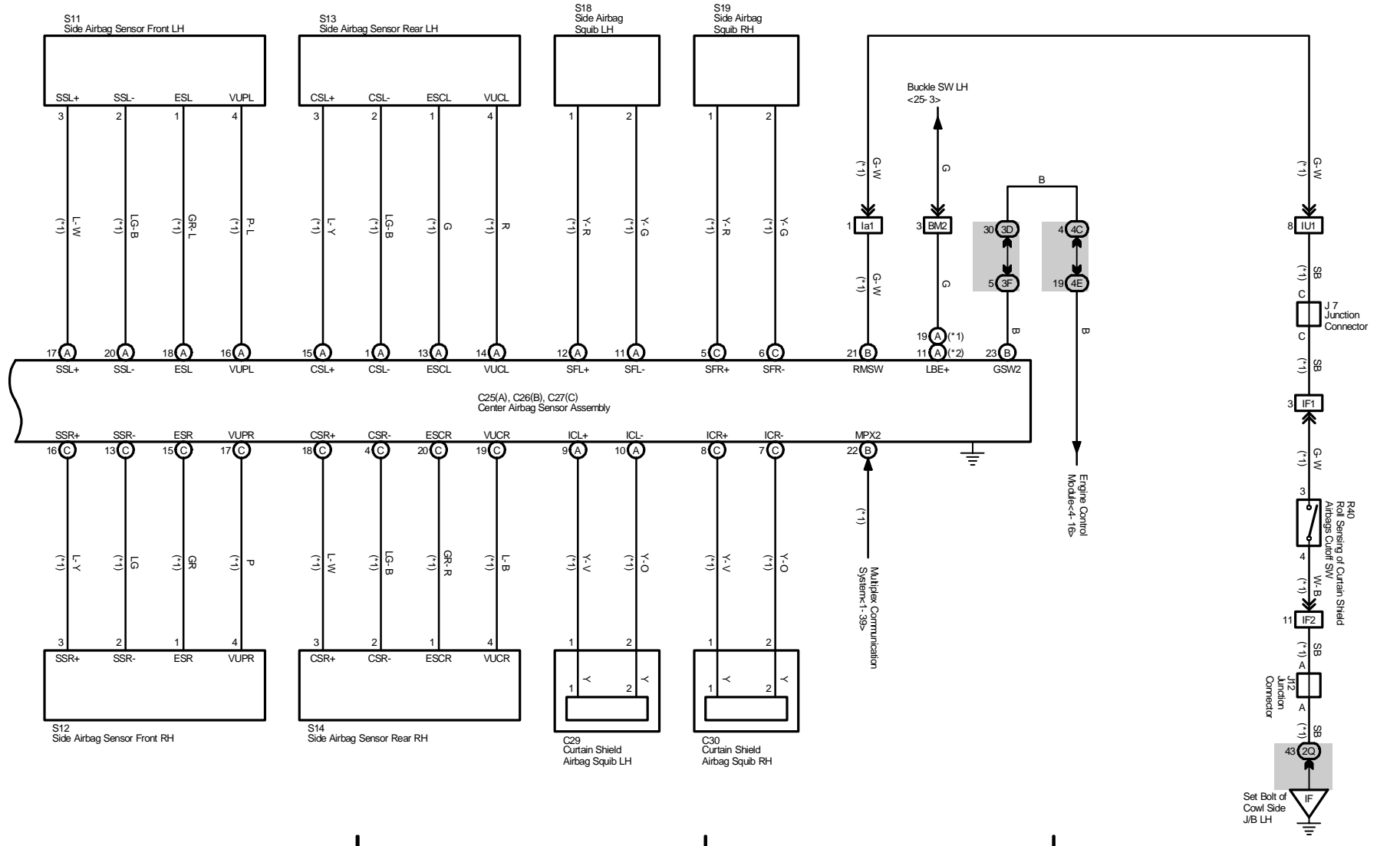
5

6

7

8

\* 1 : w/ Side Airbag  
 \* 2 : w/o Side Airbag

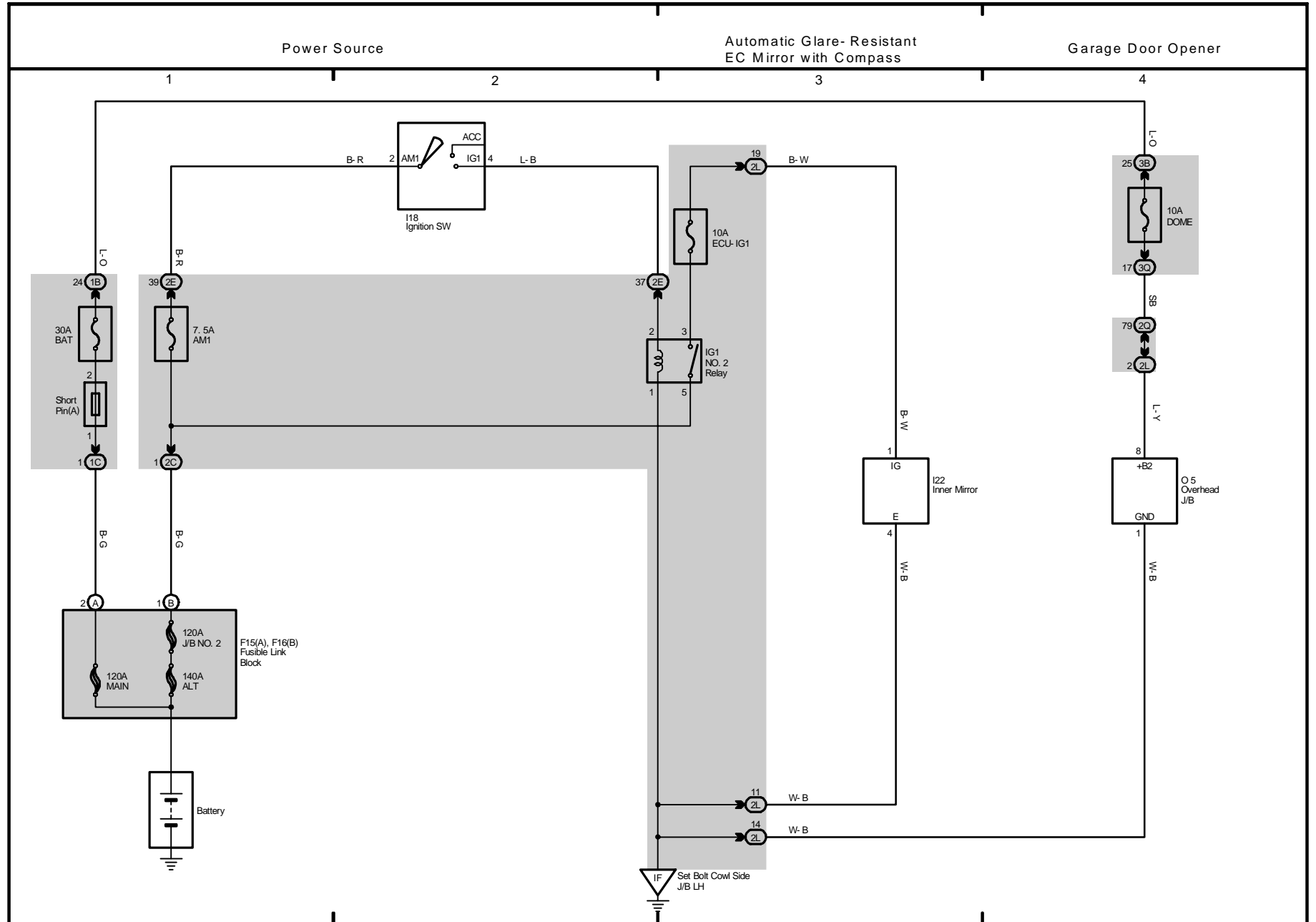


2004 LAND CRUISER (EWD548U)



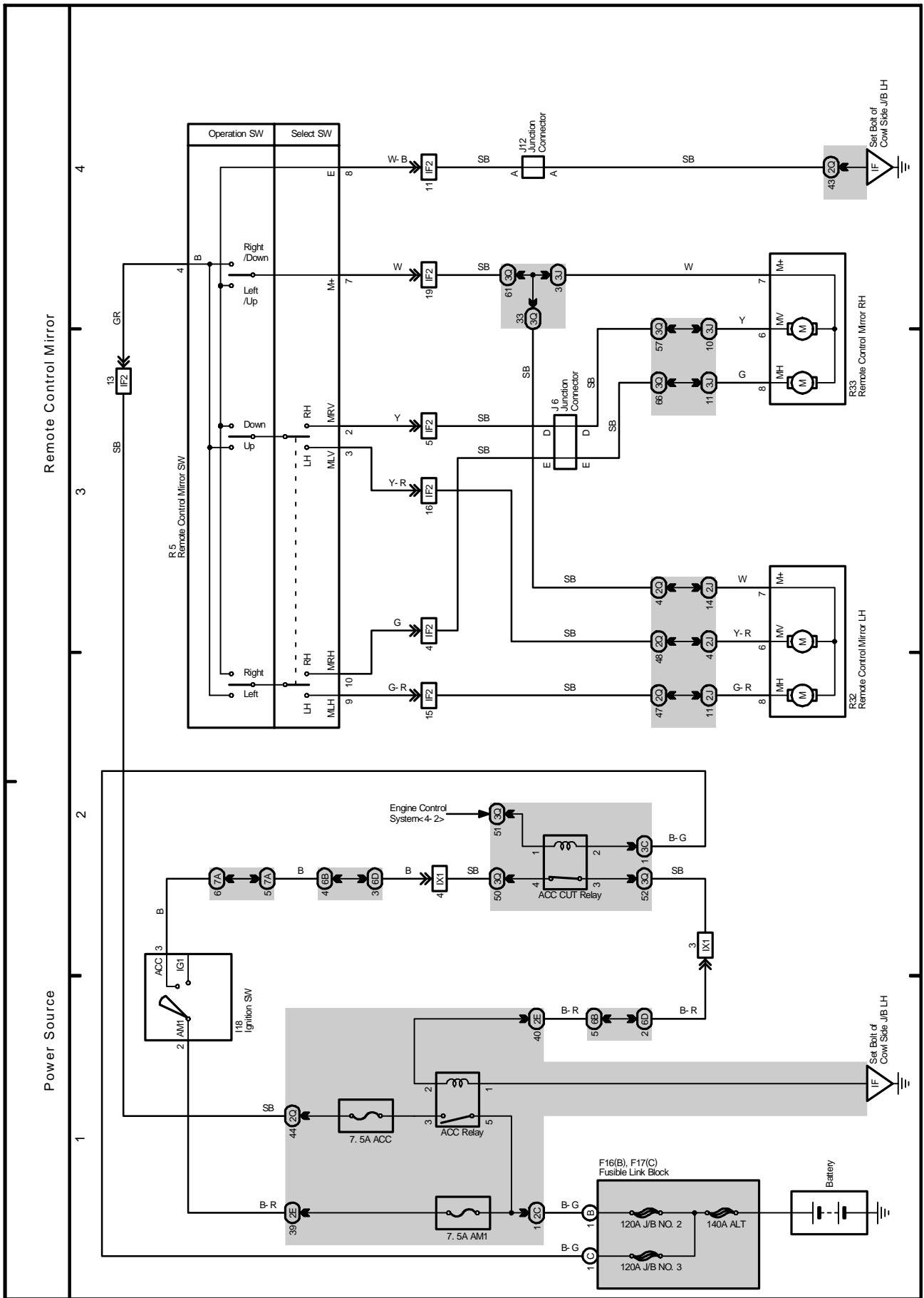
15 LAND CRUISER

2004 LAND CRUISER (EWD548U)



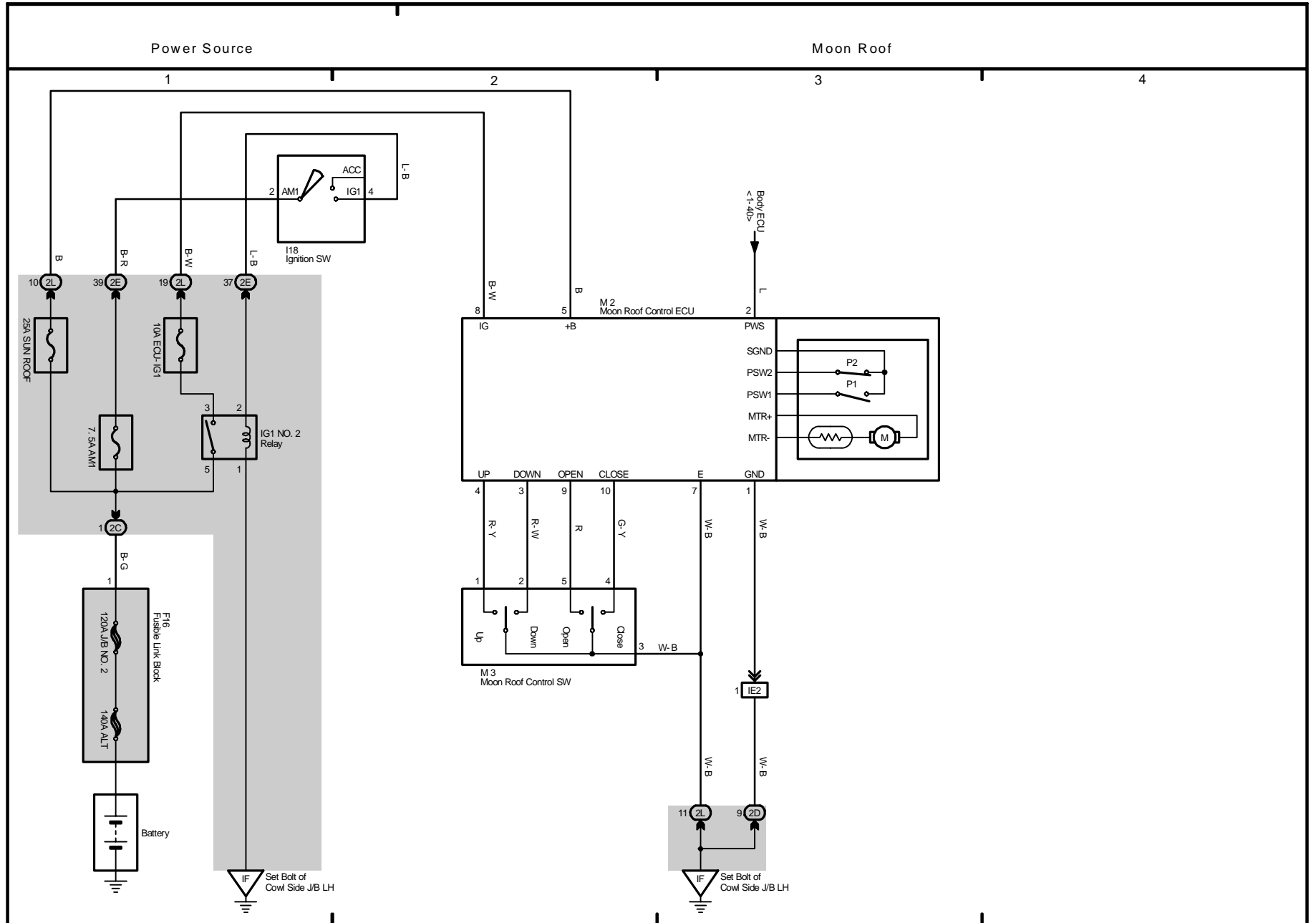
# M OVERALL ELECTRICAL WIRING DIAGRAM

16 LAND CRUISER



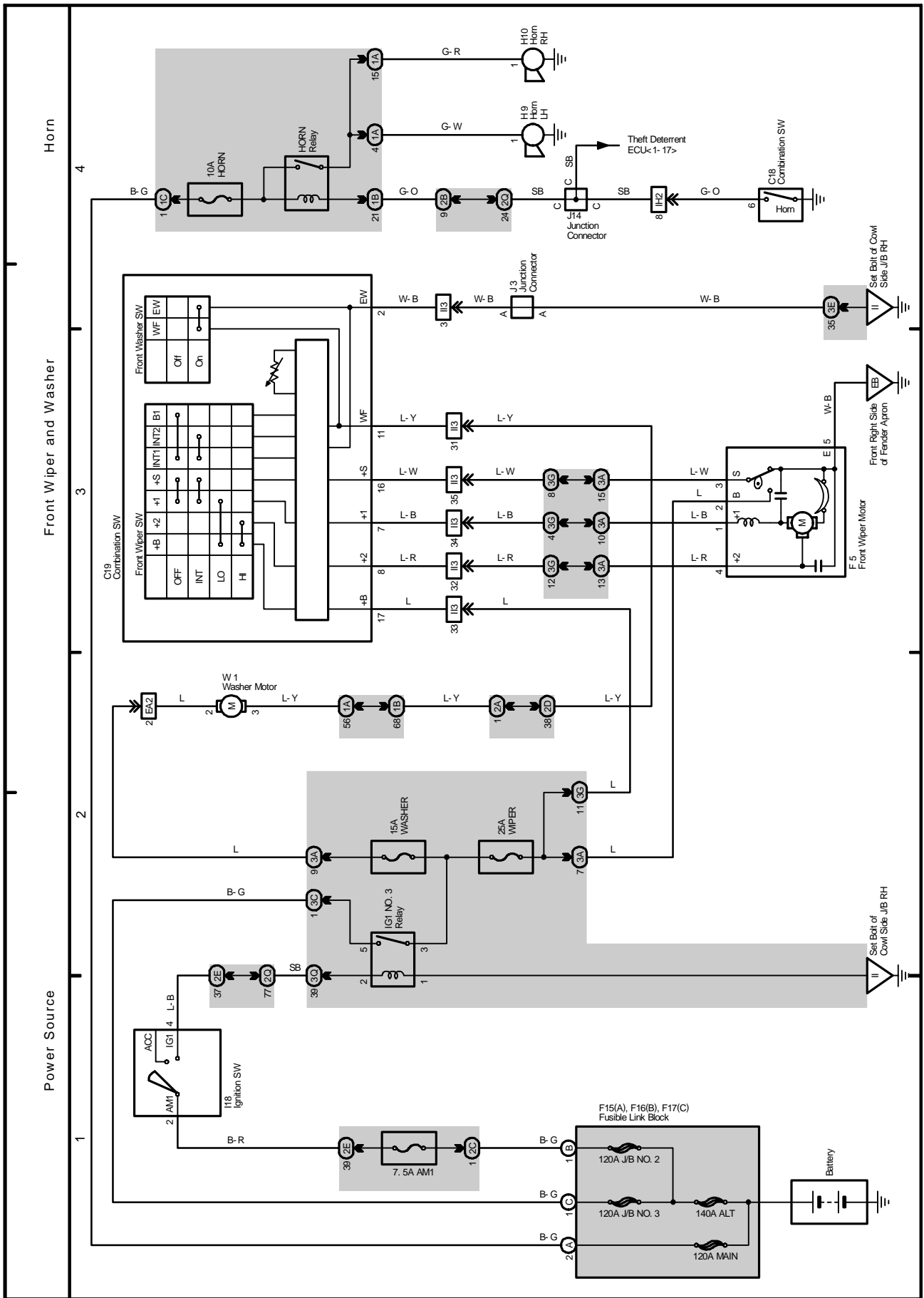
17 LAND CRUISER

2004 LAND CRUISER (EWD548U)



# M OVERALL ELECTRICAL WIRING DIAGRAM

18 LAND CRUISER

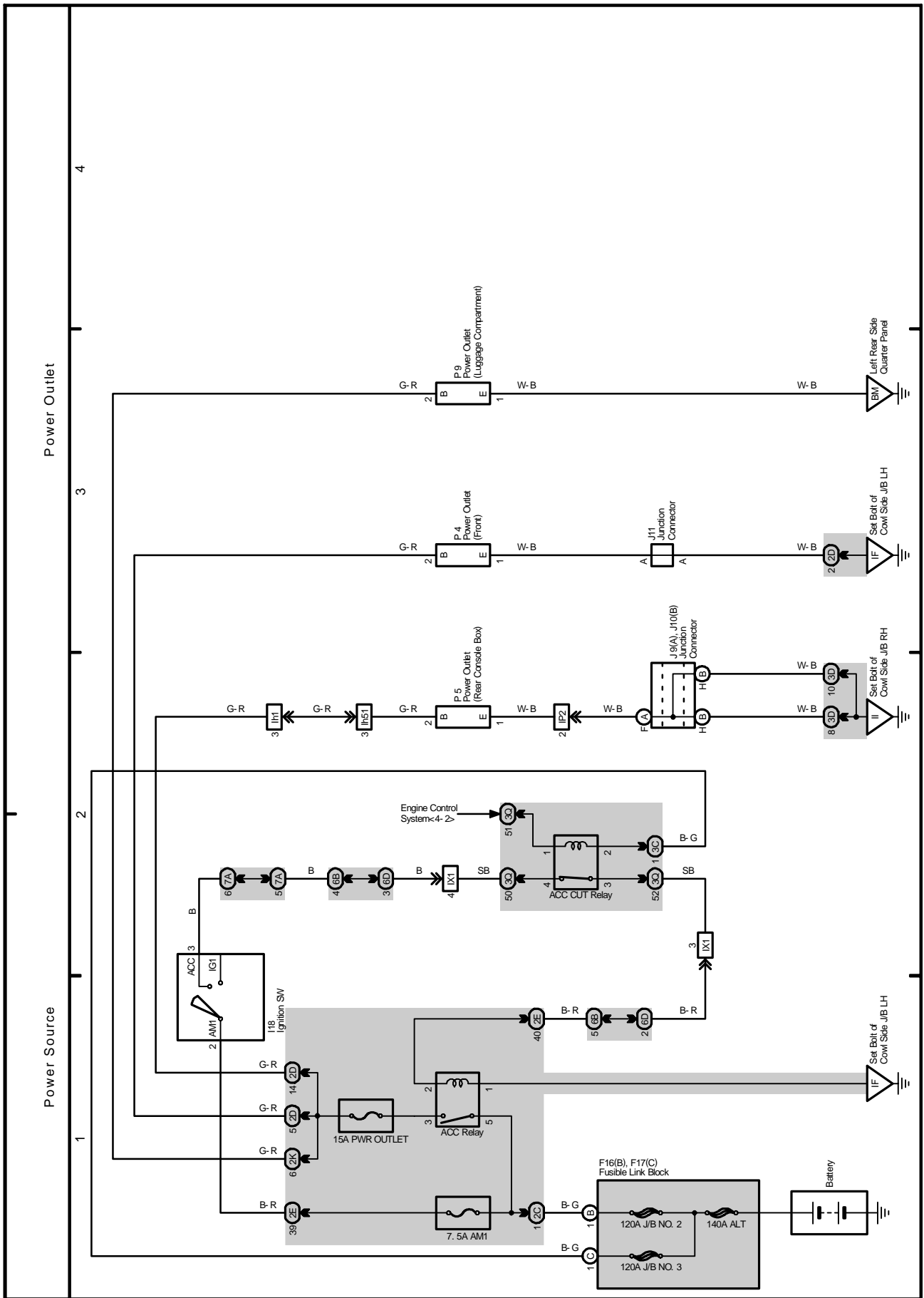


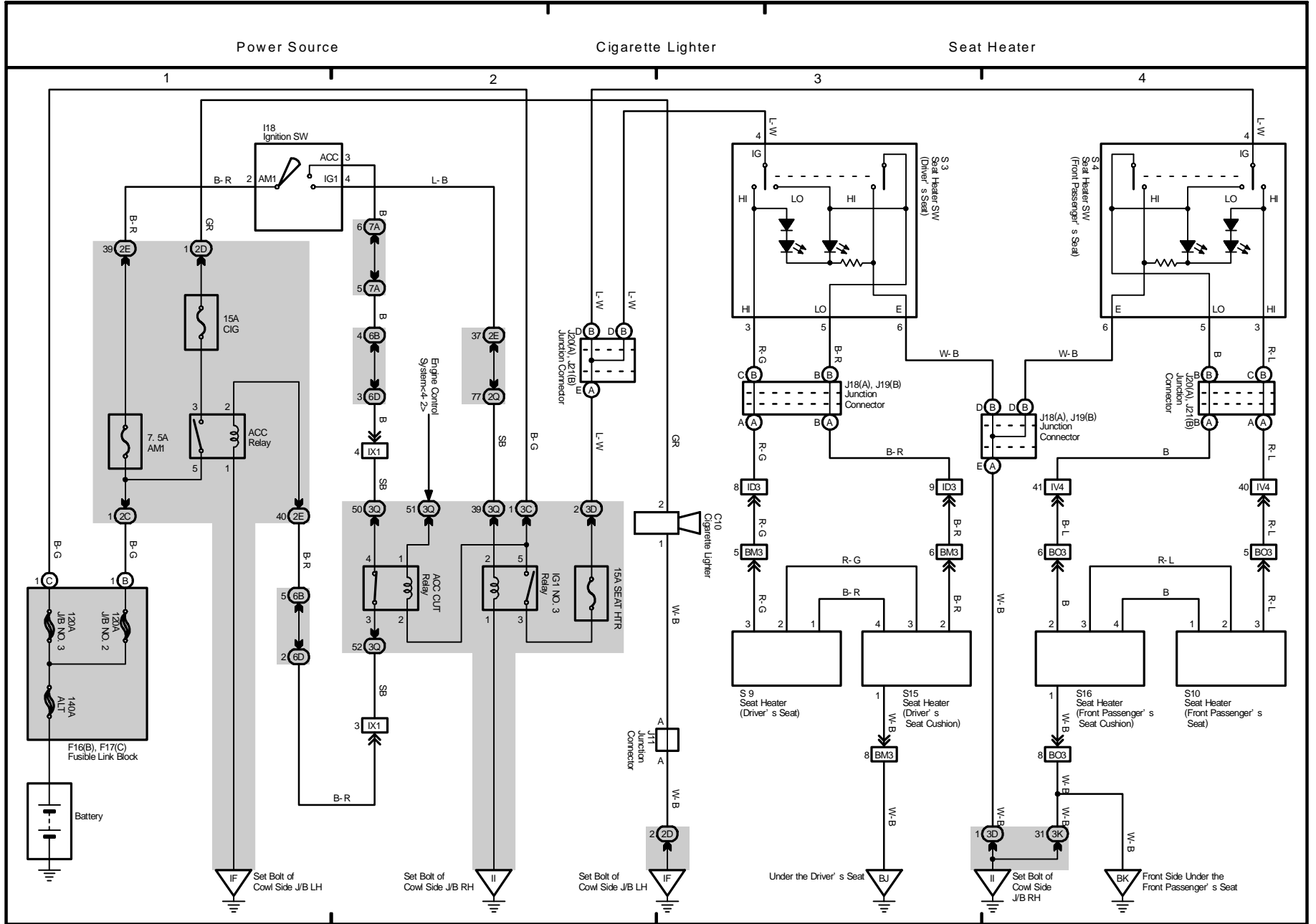




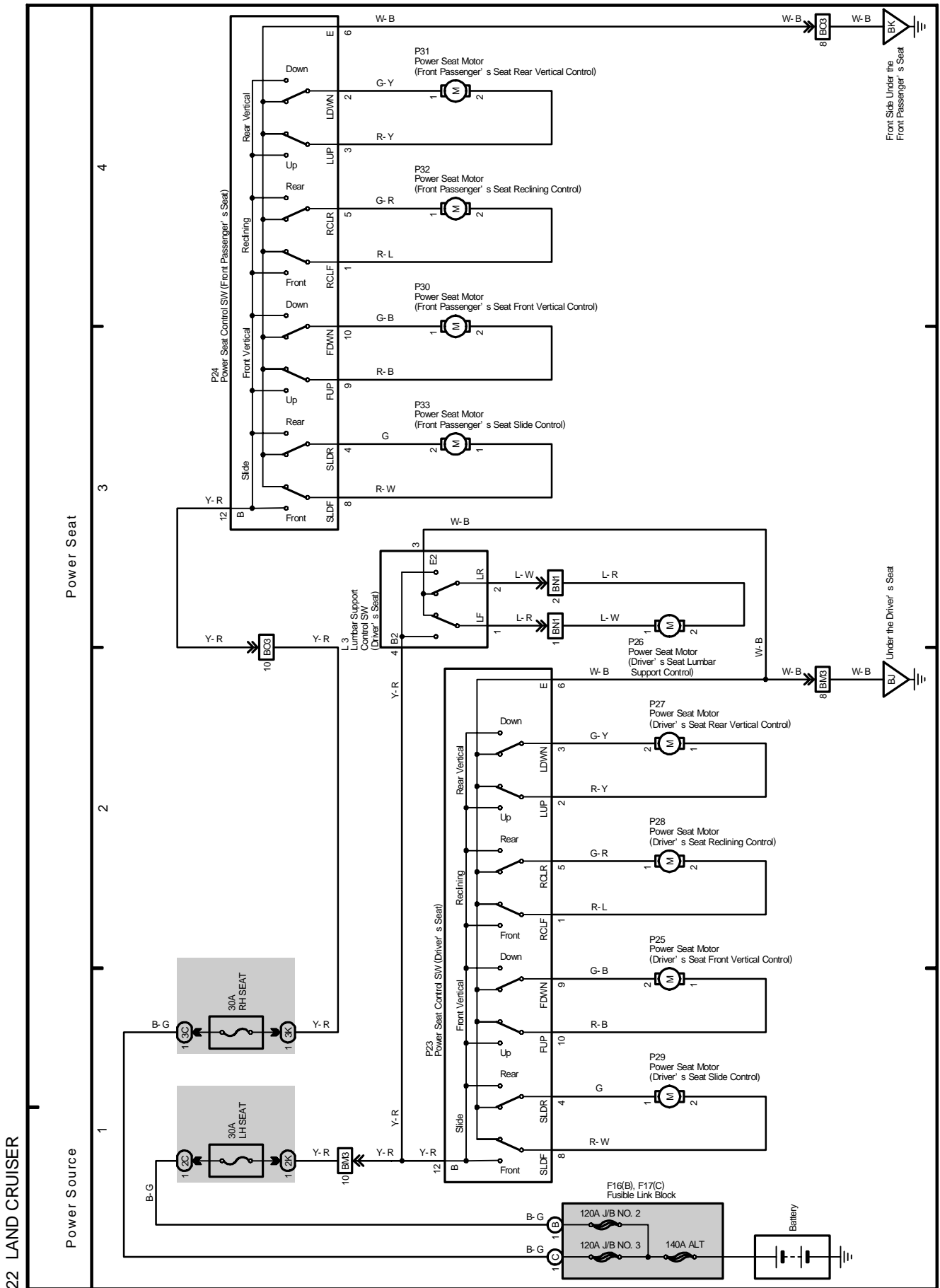
# M OVERALL ELECTRICAL WIRING DIAGRAM

20 LAND CRUISER



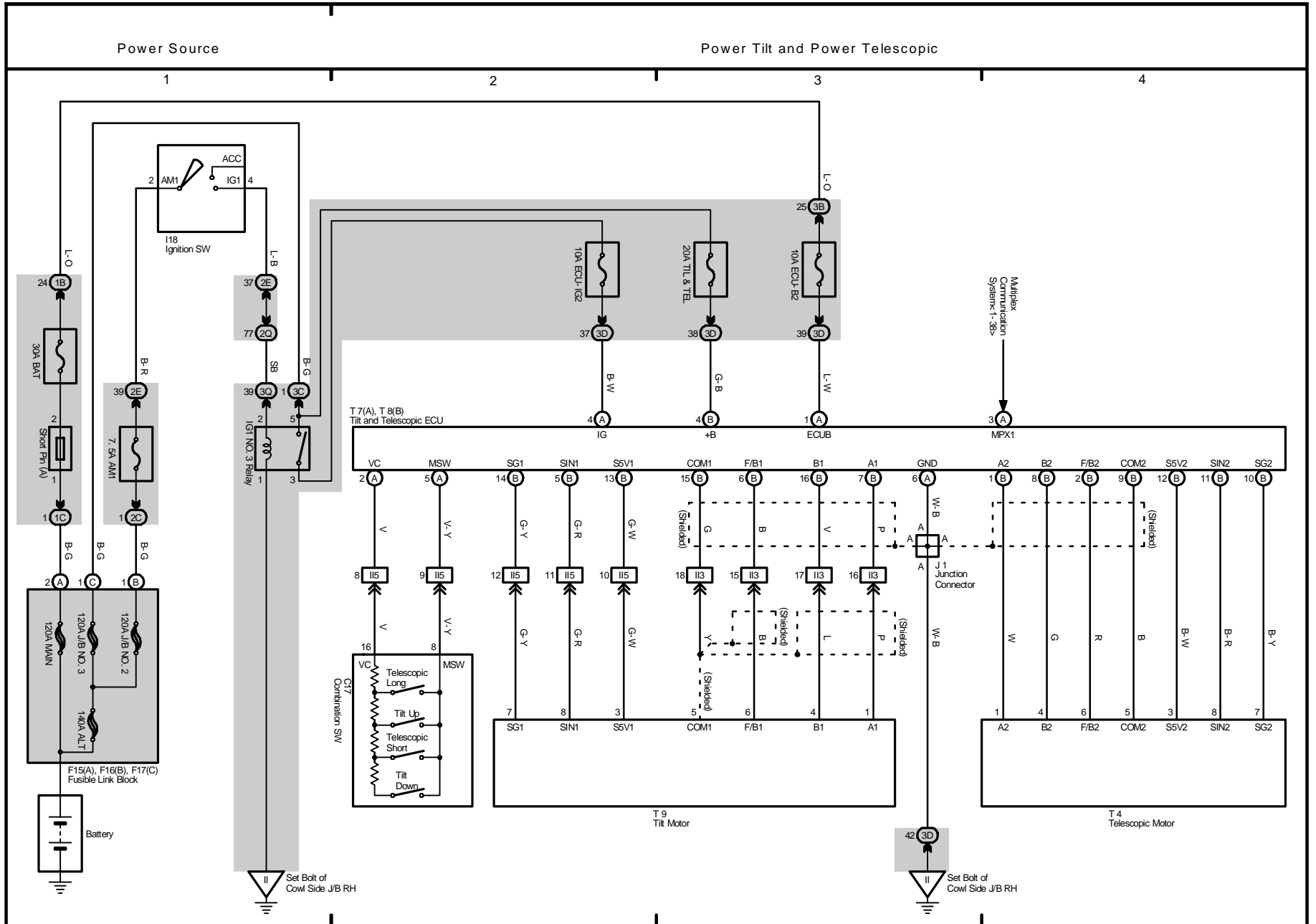


# M OVERALL ELECTRICAL WIRING DIAGRAM



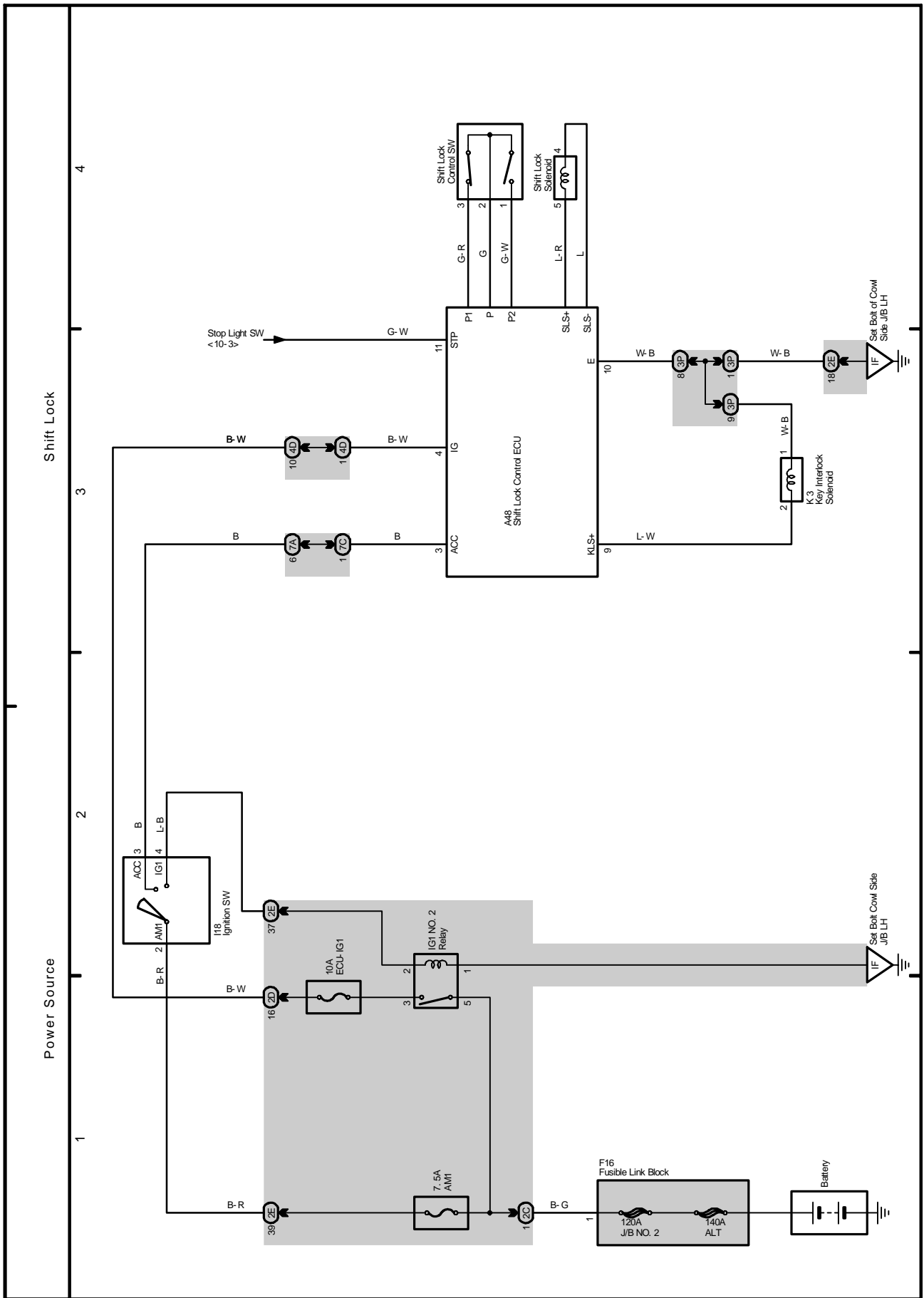
23 LAND CRUISER

2004 LAND CRUISER (EWD548U)



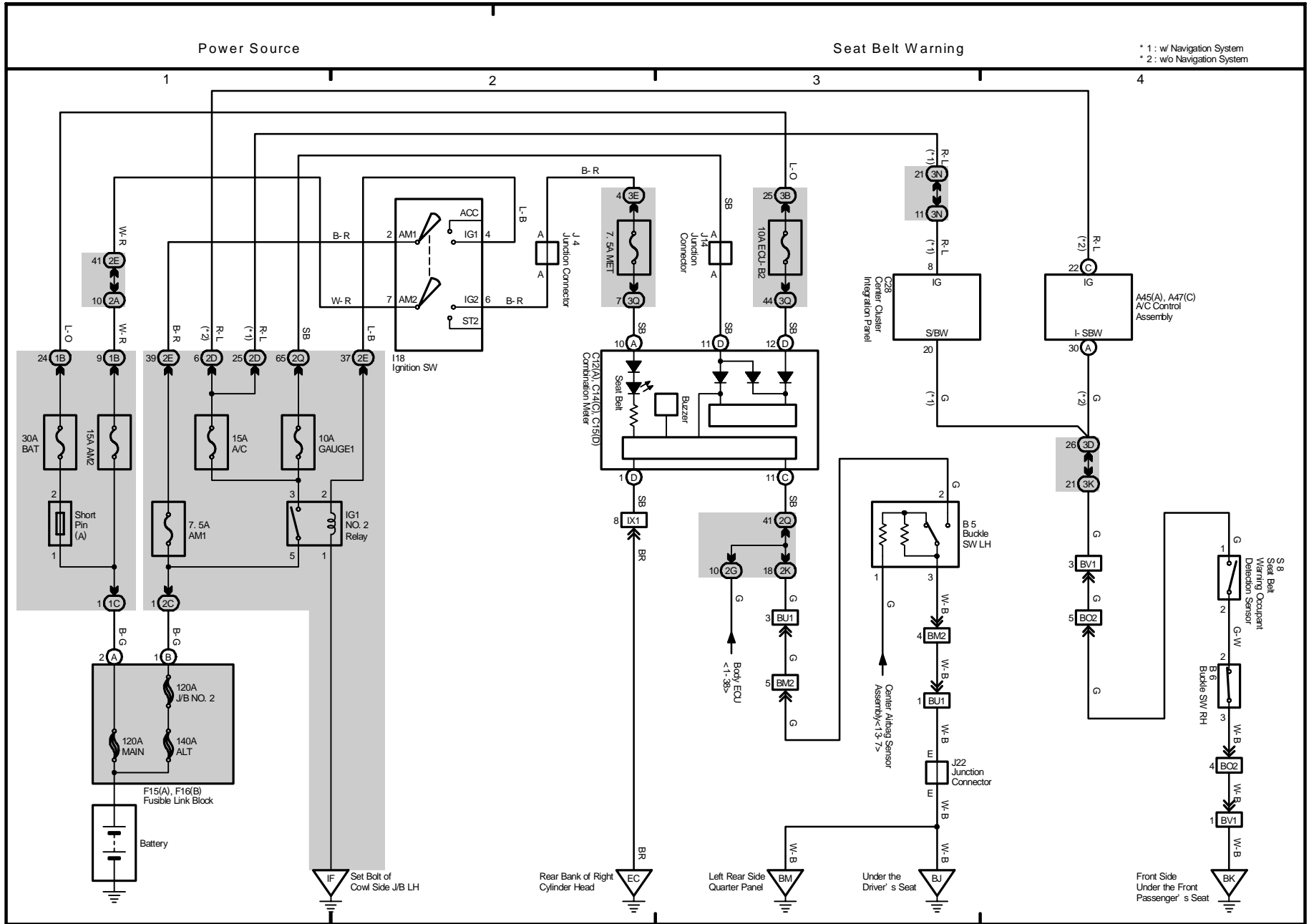
# M OVERALL ELECTRICAL WIRING DIAGRAM

24 LAND CRUISER



25 LAND CRUISER

2004 LAND CRUISER (EWD548U)

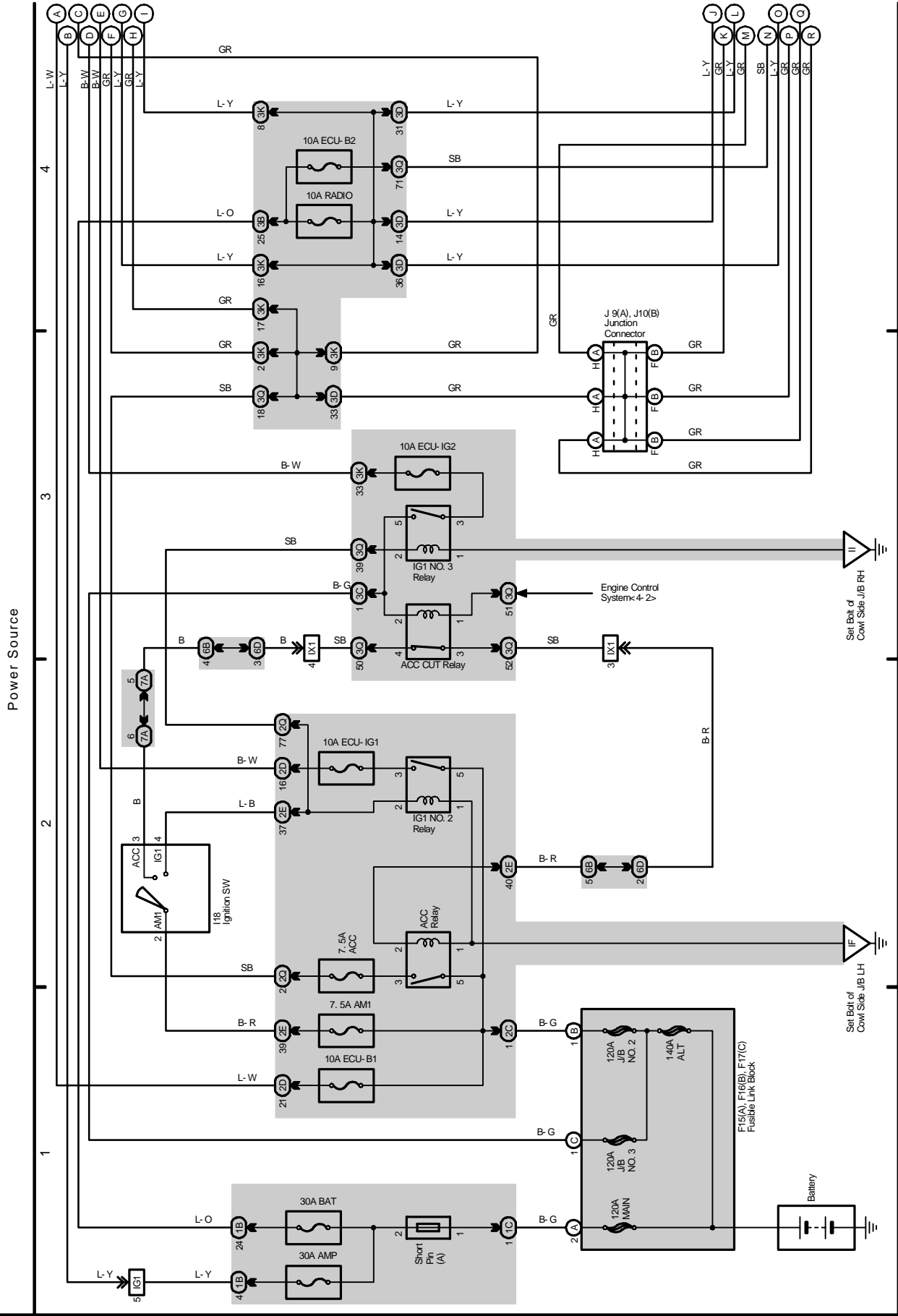


\* 1 : w/ Navigation System  
\* 2 : w/o Navigation System

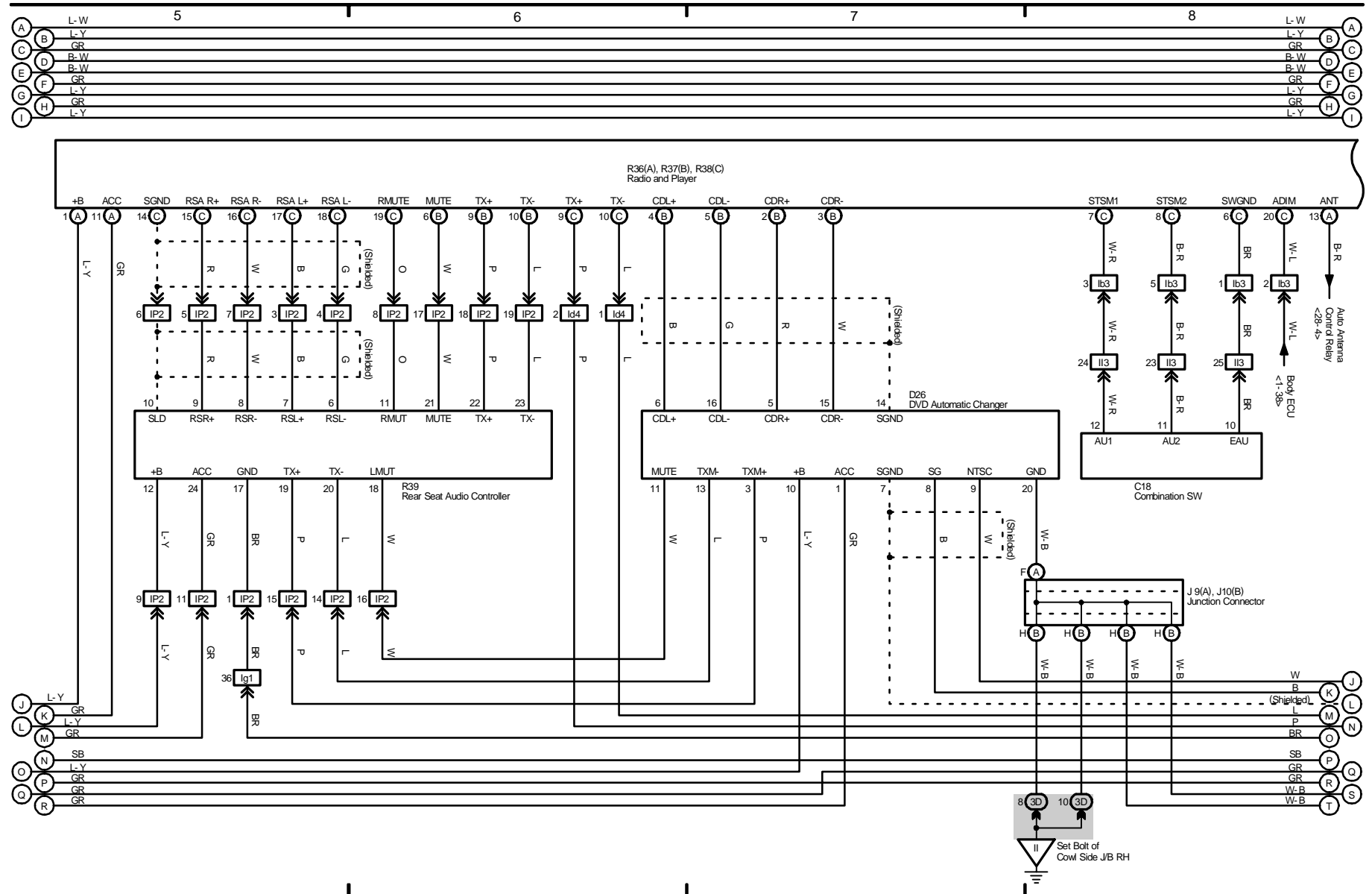
# M OVERALL ELECTRICAL WIRING DIAGRAM

26 LAND CRUISER

(Cont. next page)

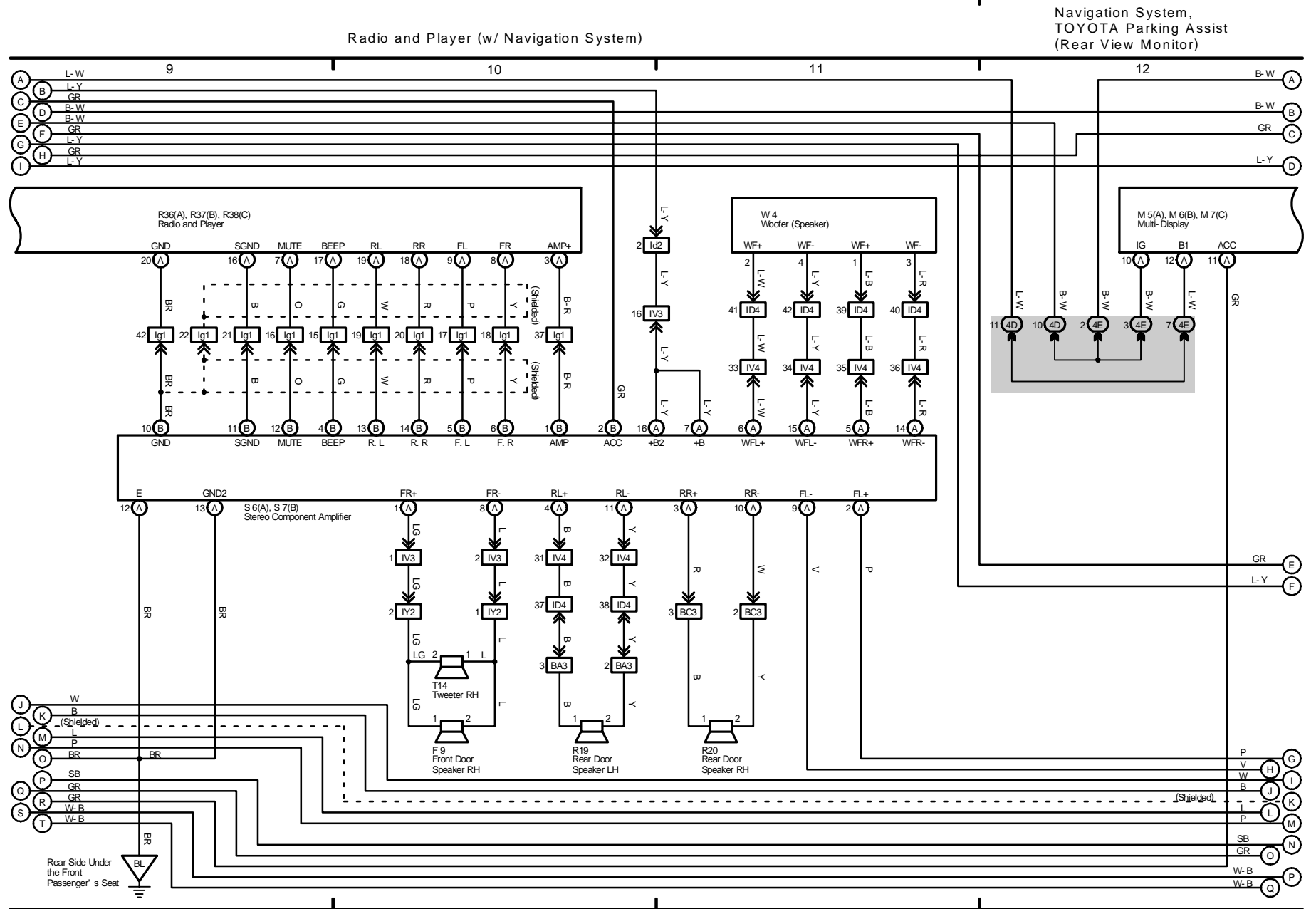


Radio and Player (w/ Navigation System)



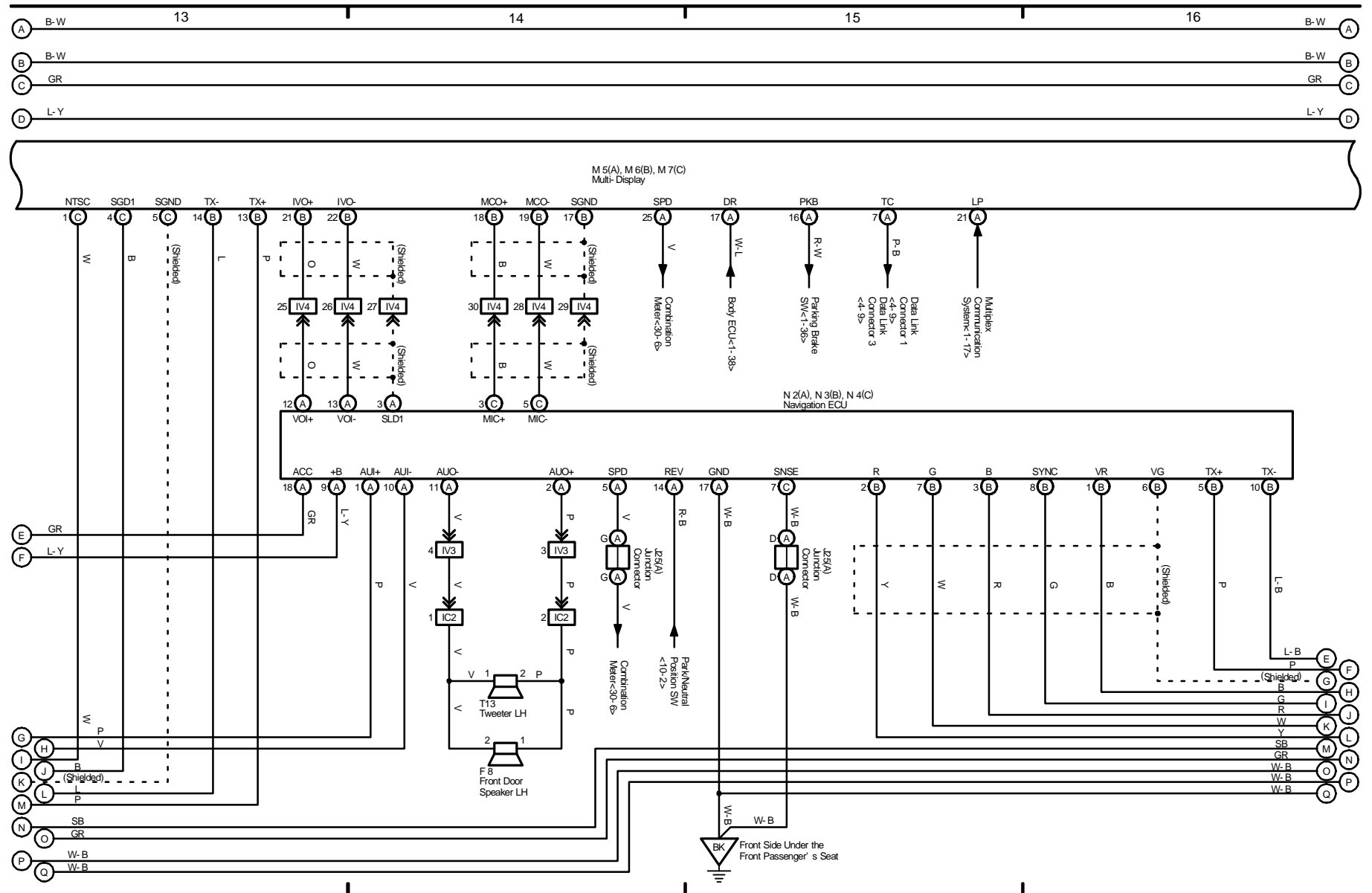
2004 LAND CRUISER (EWD548U)





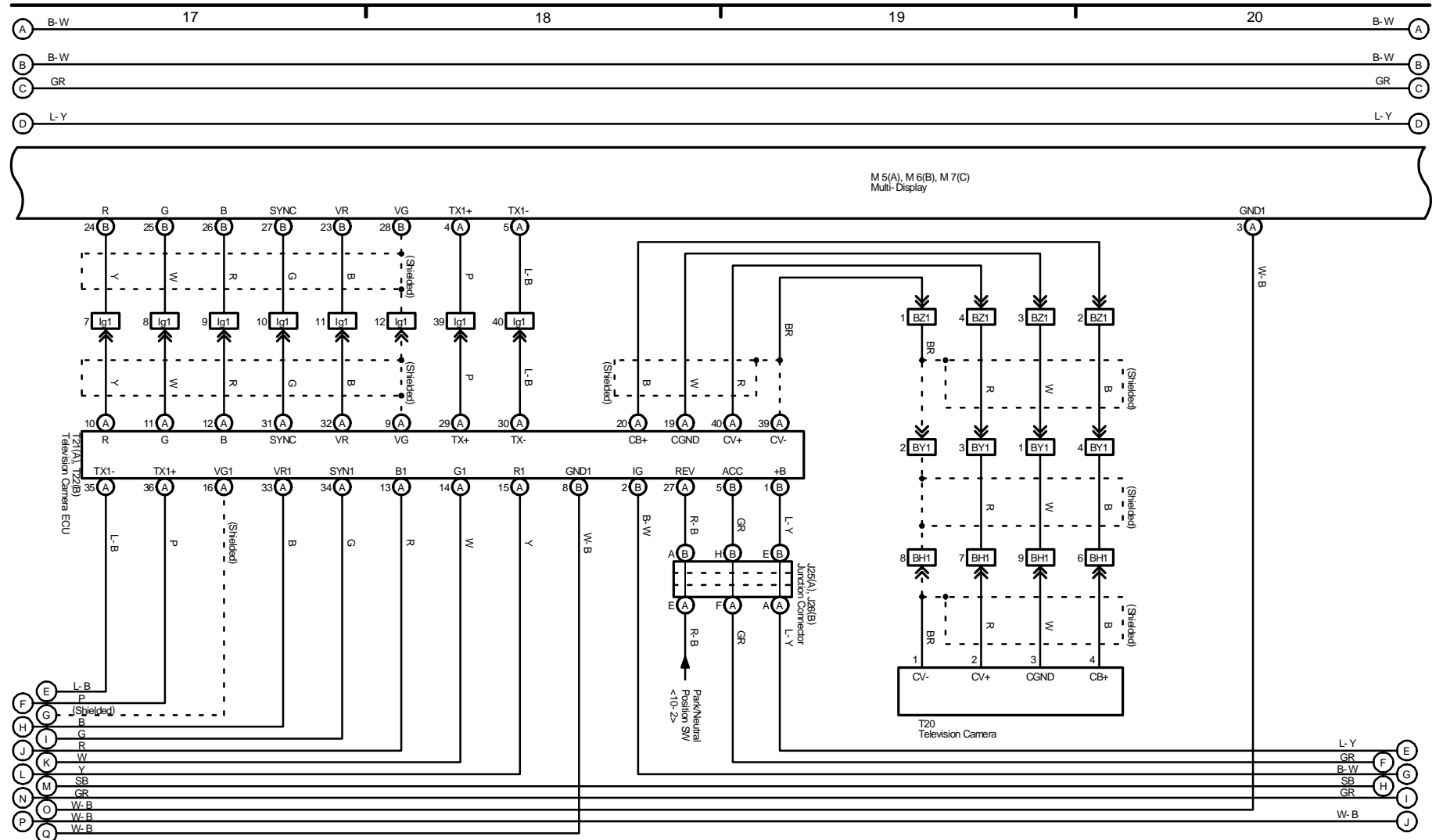
2004 LAND CRUISER (EWD548U)

Navigation System, TOYOTA Parking Assist (Rear View Monitor)



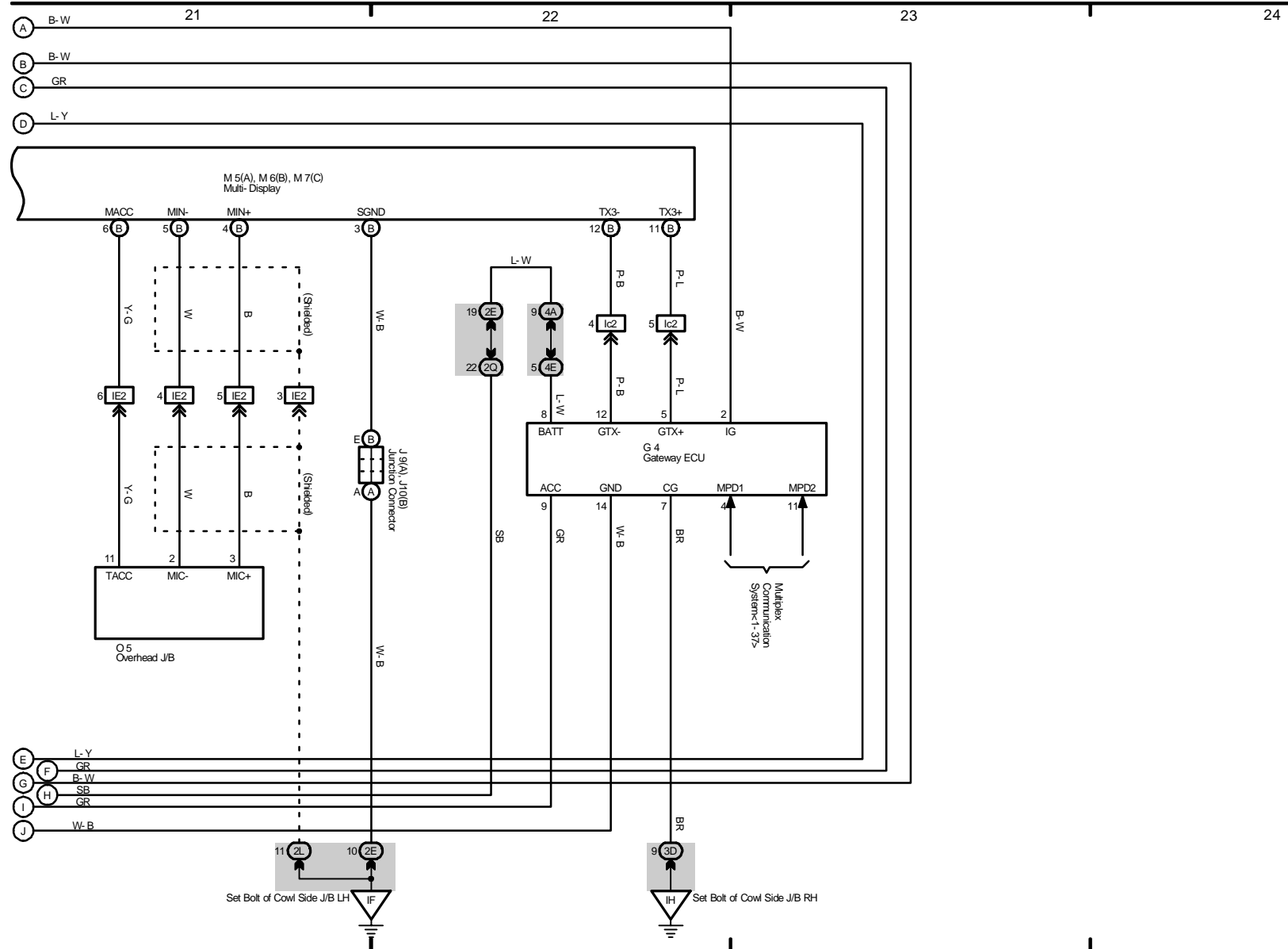
2004 LAND CRUISER (EWD548U)

Navigation System, TOYOTA Parking Assist (Rear View Monitor)



2004 LAND CRUISER (EWDS48U)

Navigation System, TOYOTA Parking Assist (Rear View Monitor)

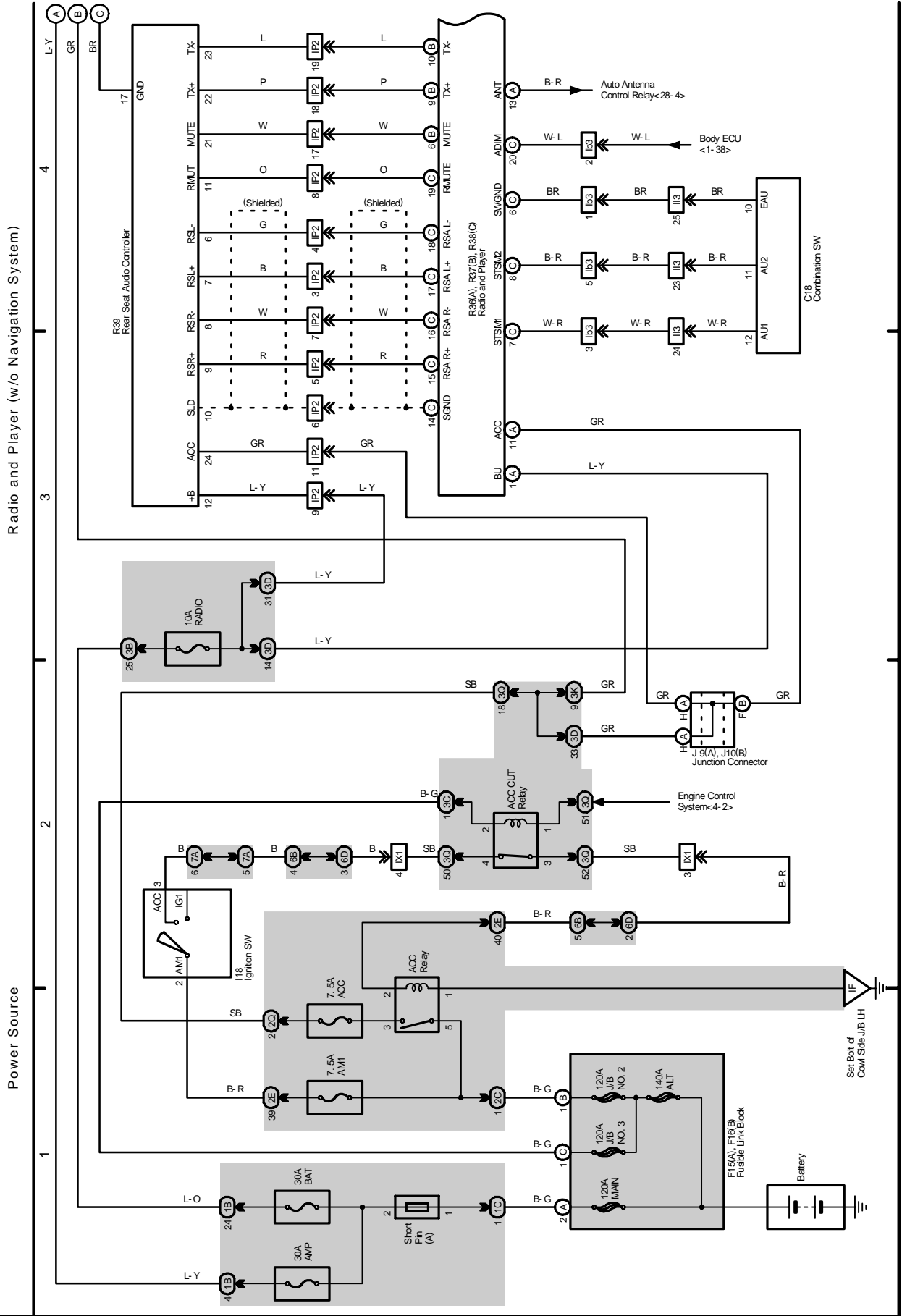


2004 LAND CRUISER (EWD548U)

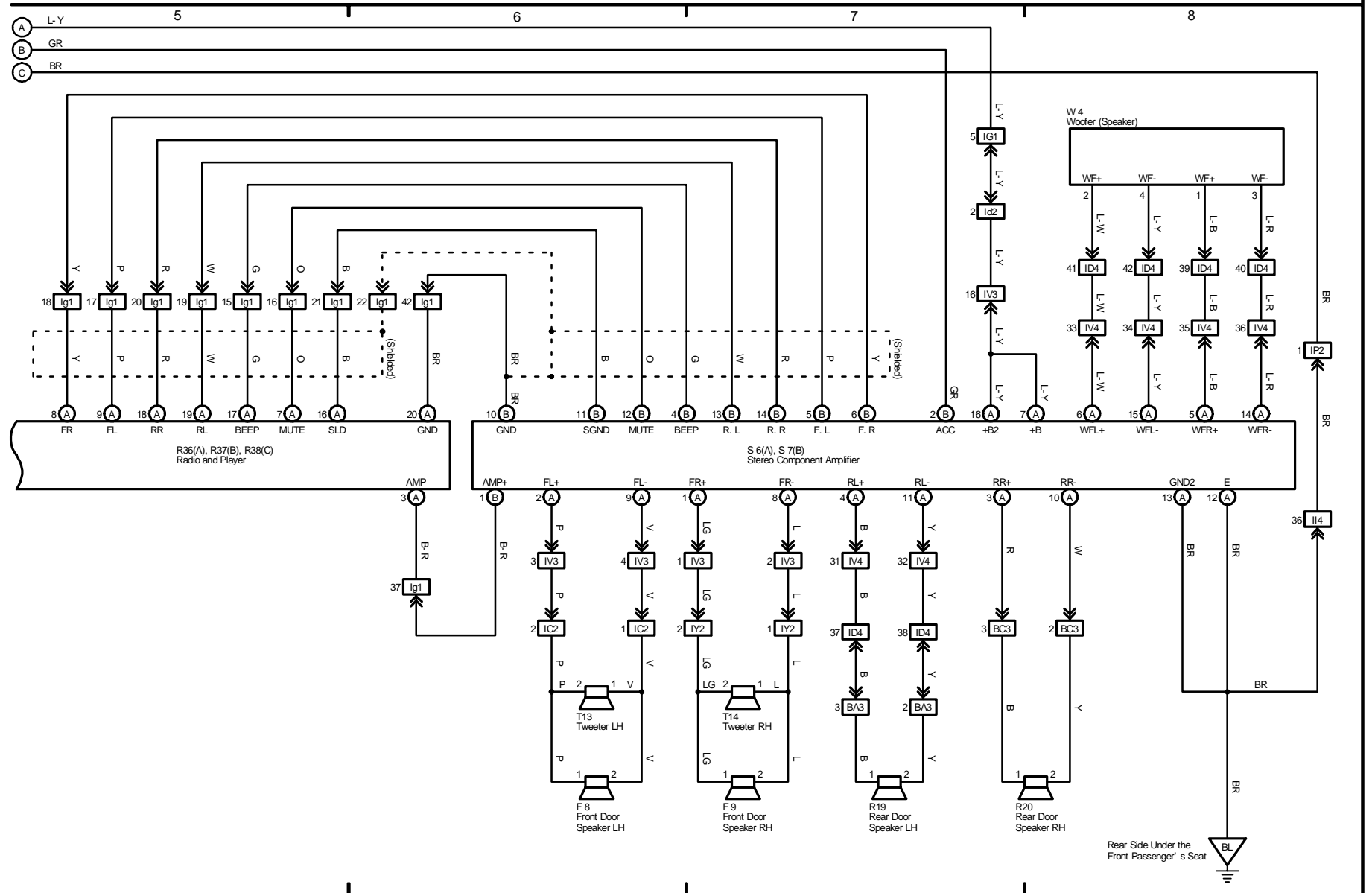
# M OVERALL ELECTRICAL WIRING DIAGRAM

27 LAND CRUISER

(Cont. next page)



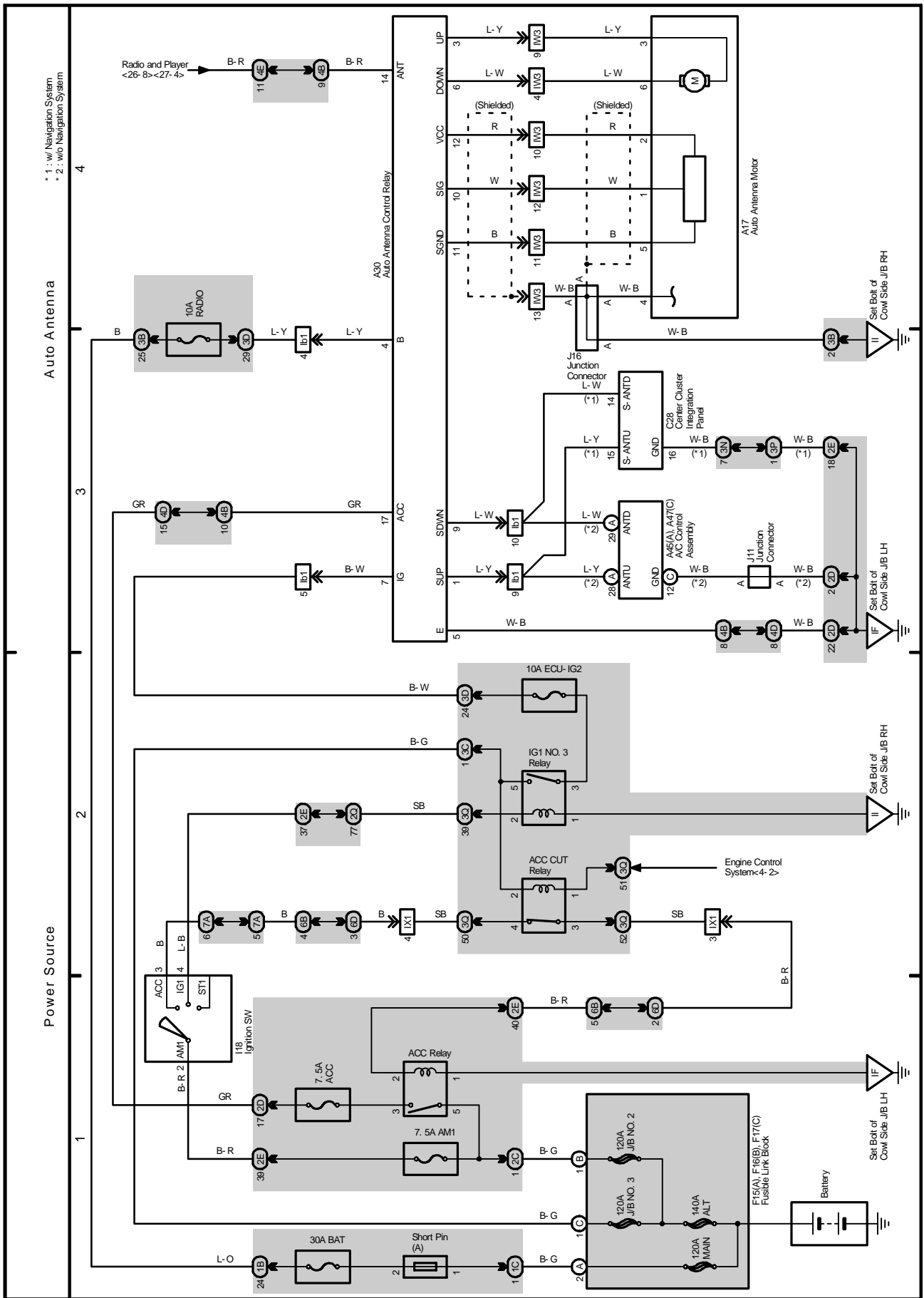
Radio and Player (w/o Navigation System)



2004 LAND CRUISER (EWD548U)

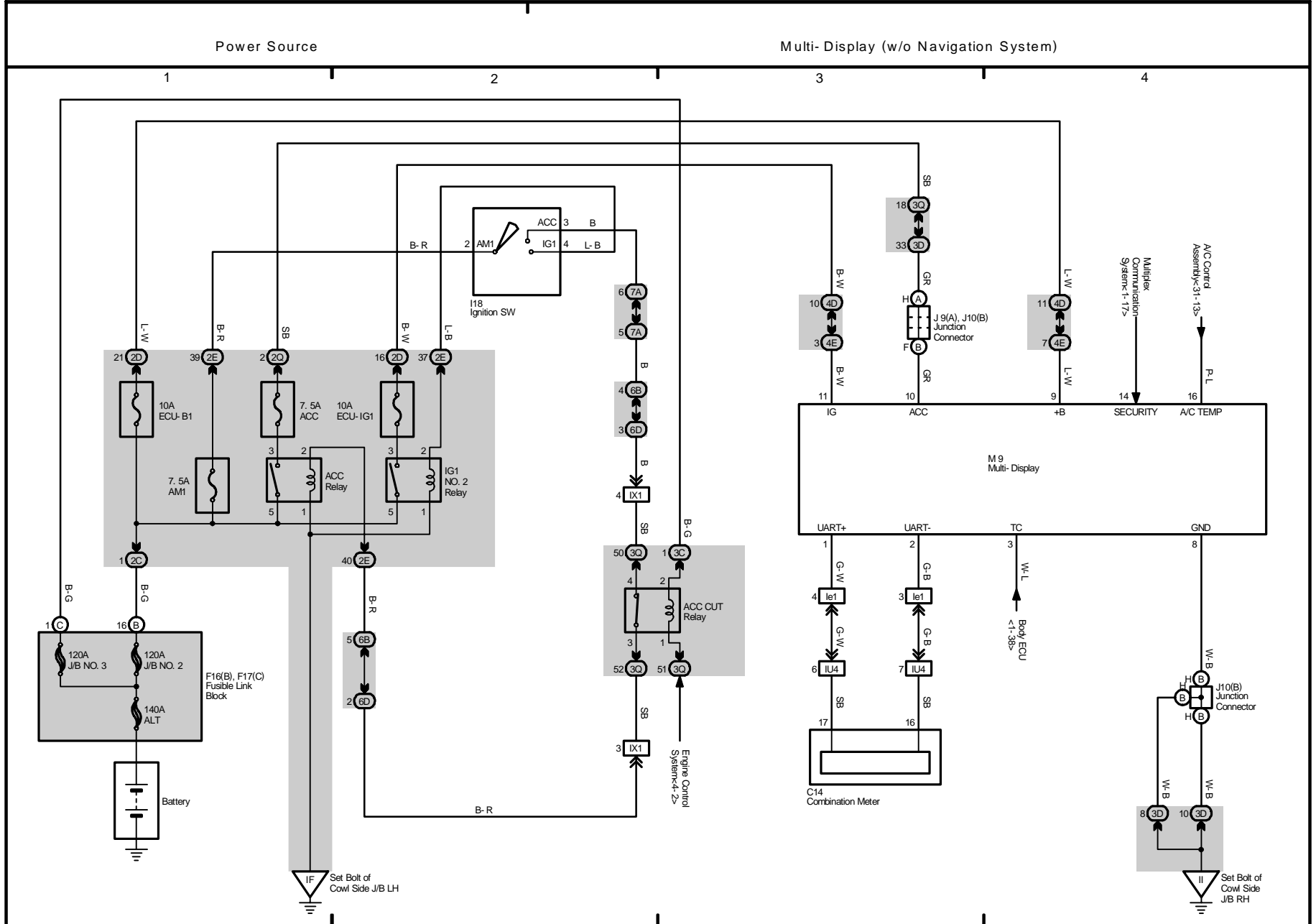
# M OVERALL ELECTRICAL WIRING DIAGRAM

28 LAND CRUISER



29 LAND CRUISER

2004 LAND CRUISER (EWD548U)

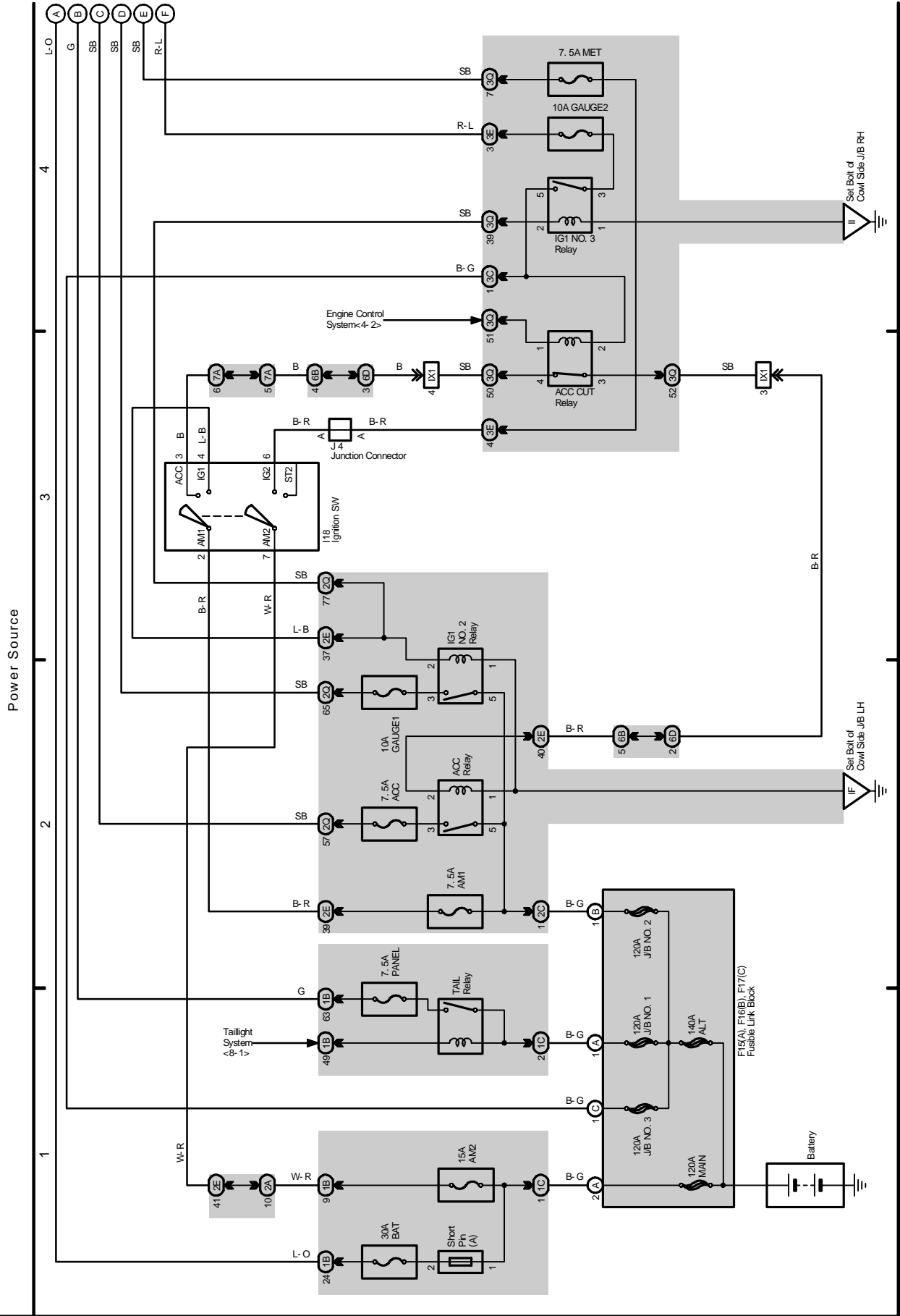




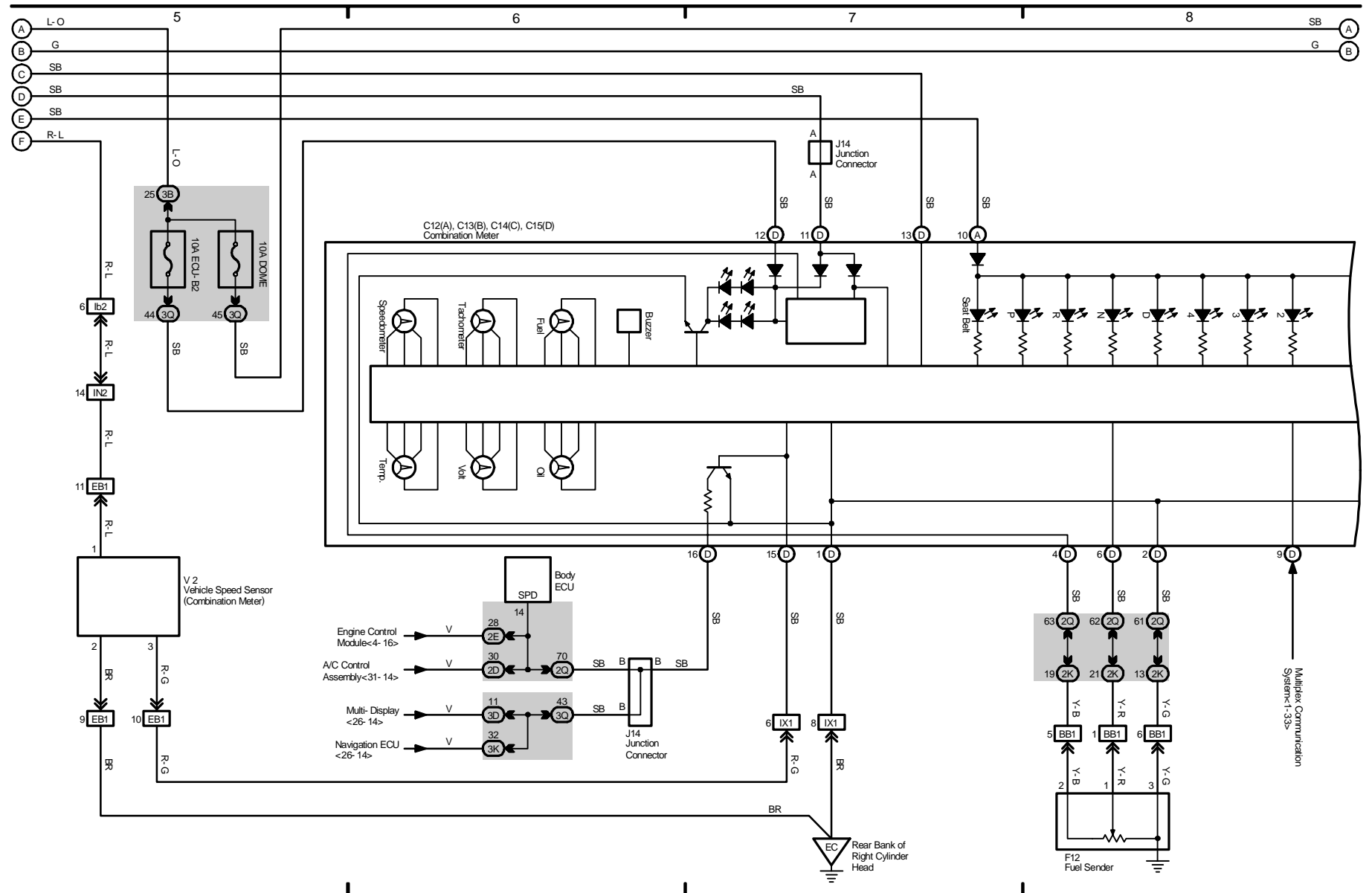
# M OVERALL ELECTRICAL WIRING DIAGRAM

30 LAND CRUISER

(Cont. next page)

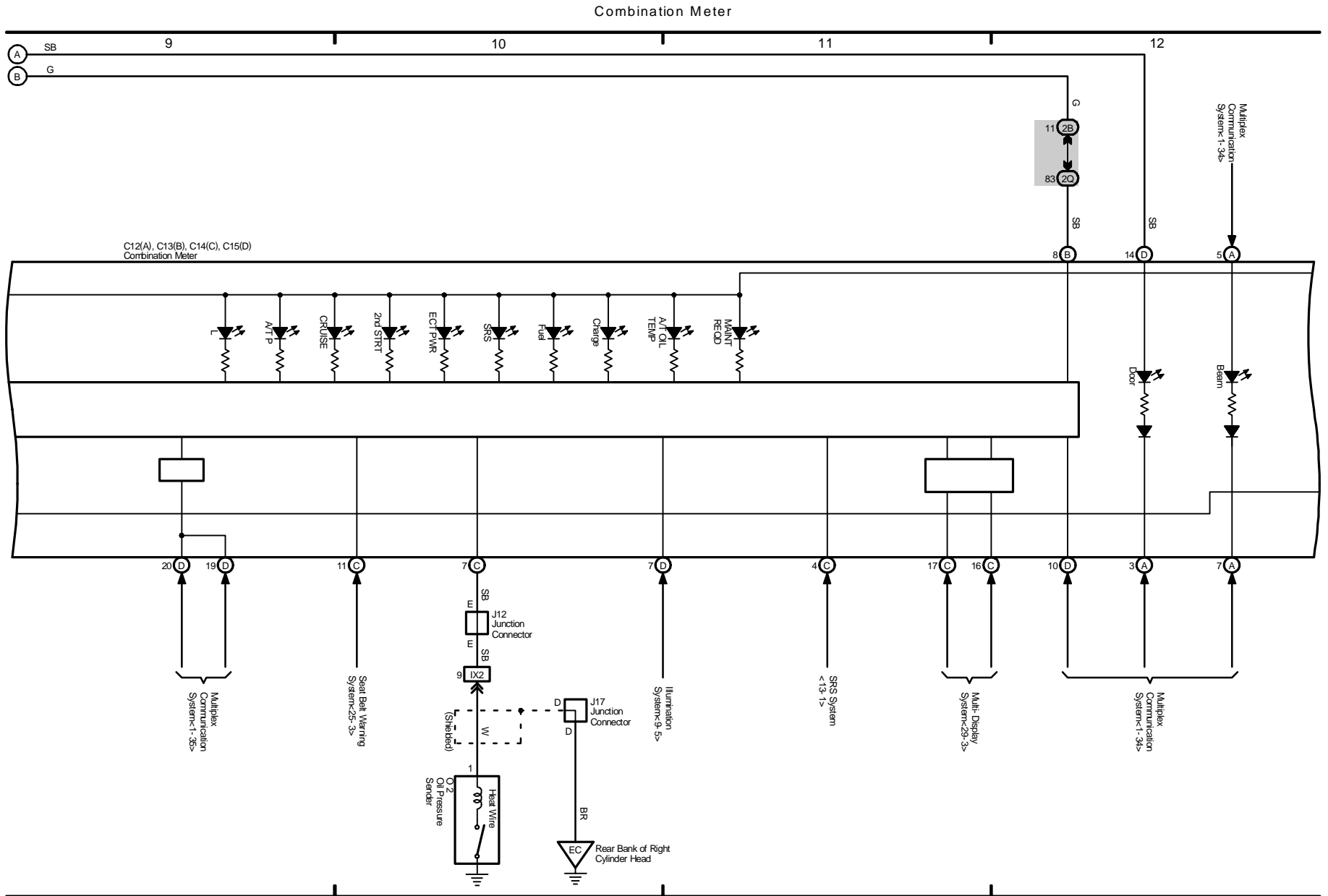


Combination Meter



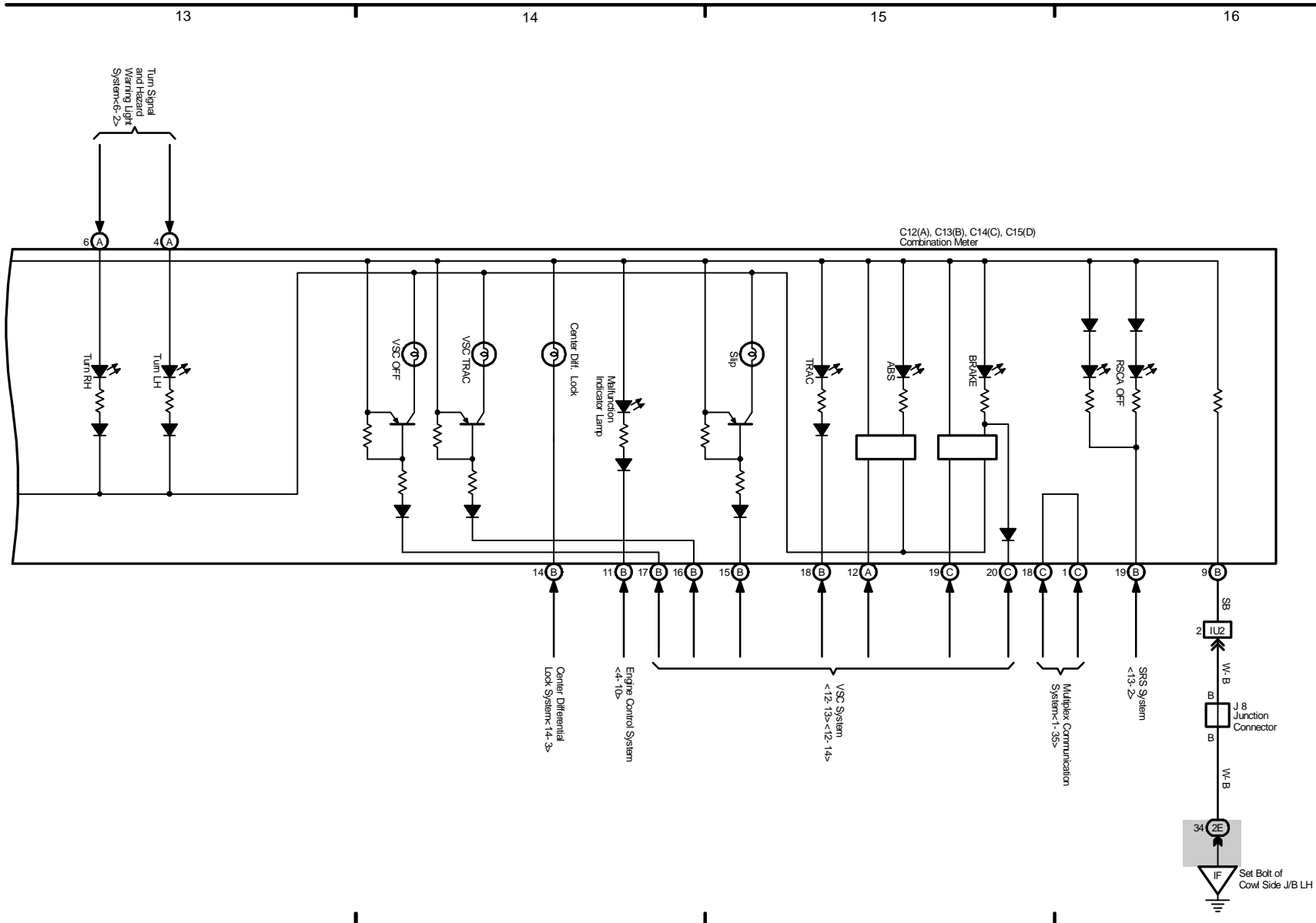
2004 LAND CRUISER (EWD548U)

M OVERALL ELECTRICAL WIRING DIAGRAM



2004 LAND CRUISER (EWD548U)

Combination Meter

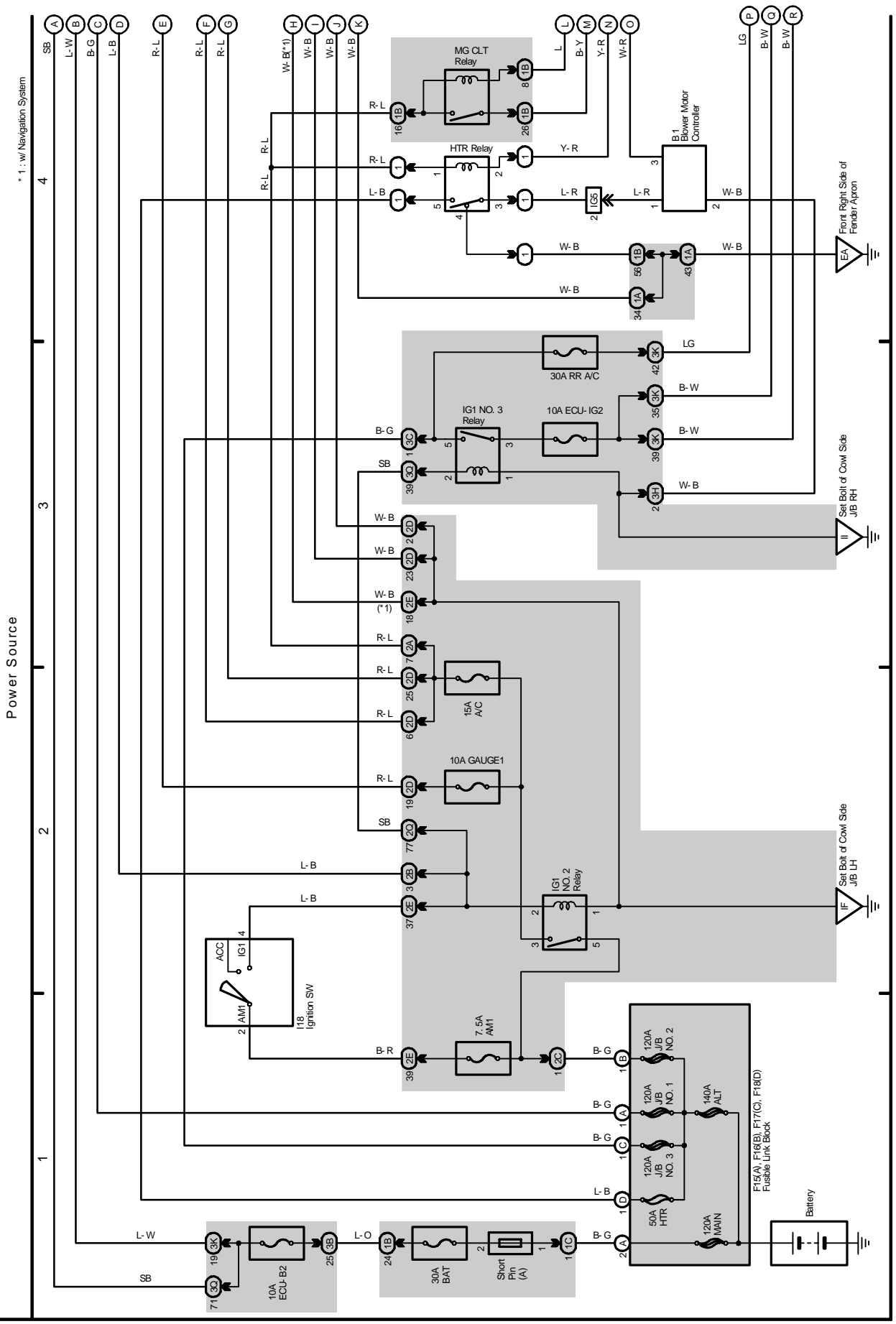


2004 LAND CRUISER (EWD548U)

# M OVERALL ELECTRICAL WIRING DIAGRAM

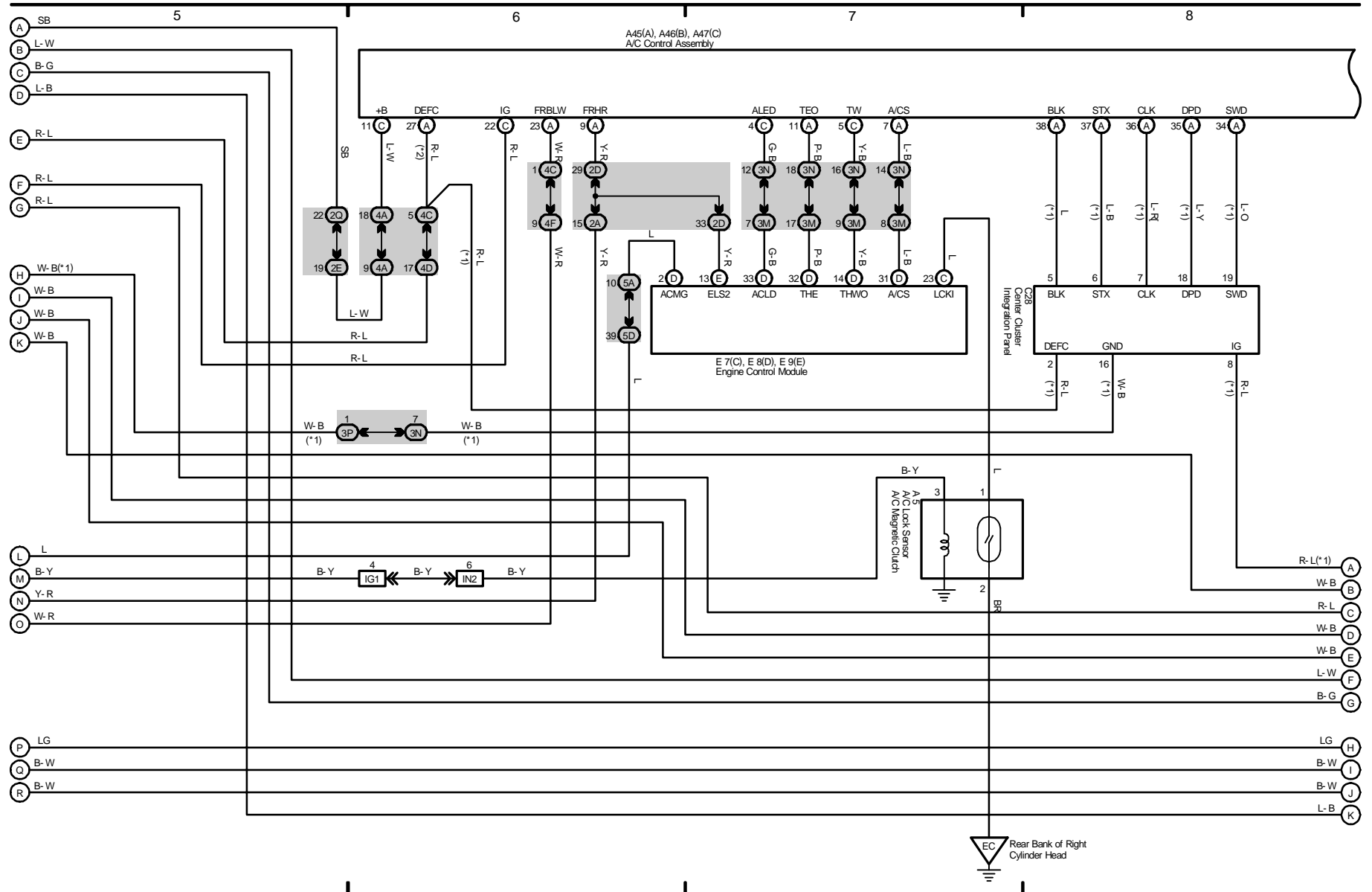
31 LAND CRUISER

(Cont. next page)



Air Conditioning (Front)

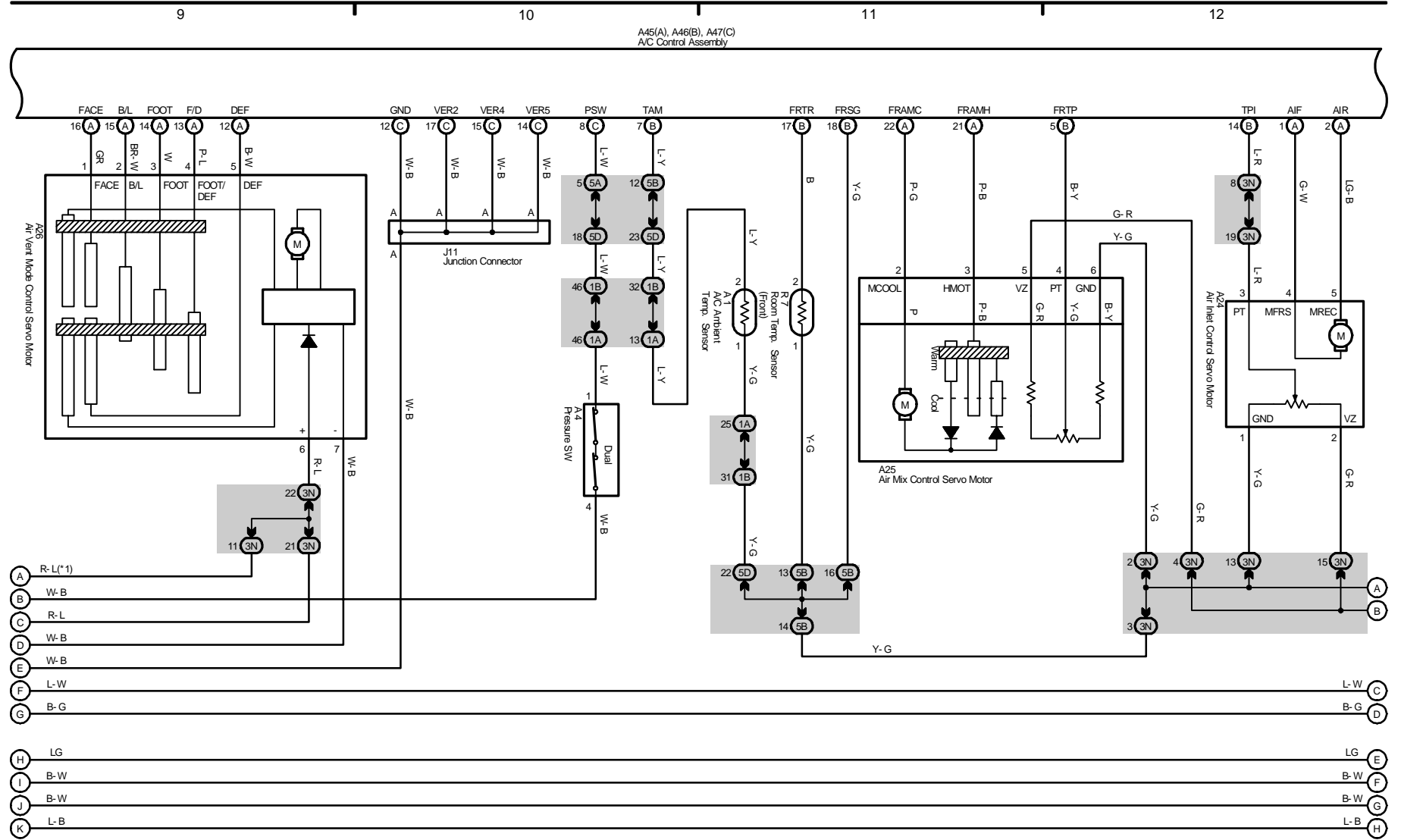
\* 1: w/ Navigation System  
 \* 2: w/o Navigation System



2004 LAND CRUISER (EWD548U)

Air Conditioning (Front)

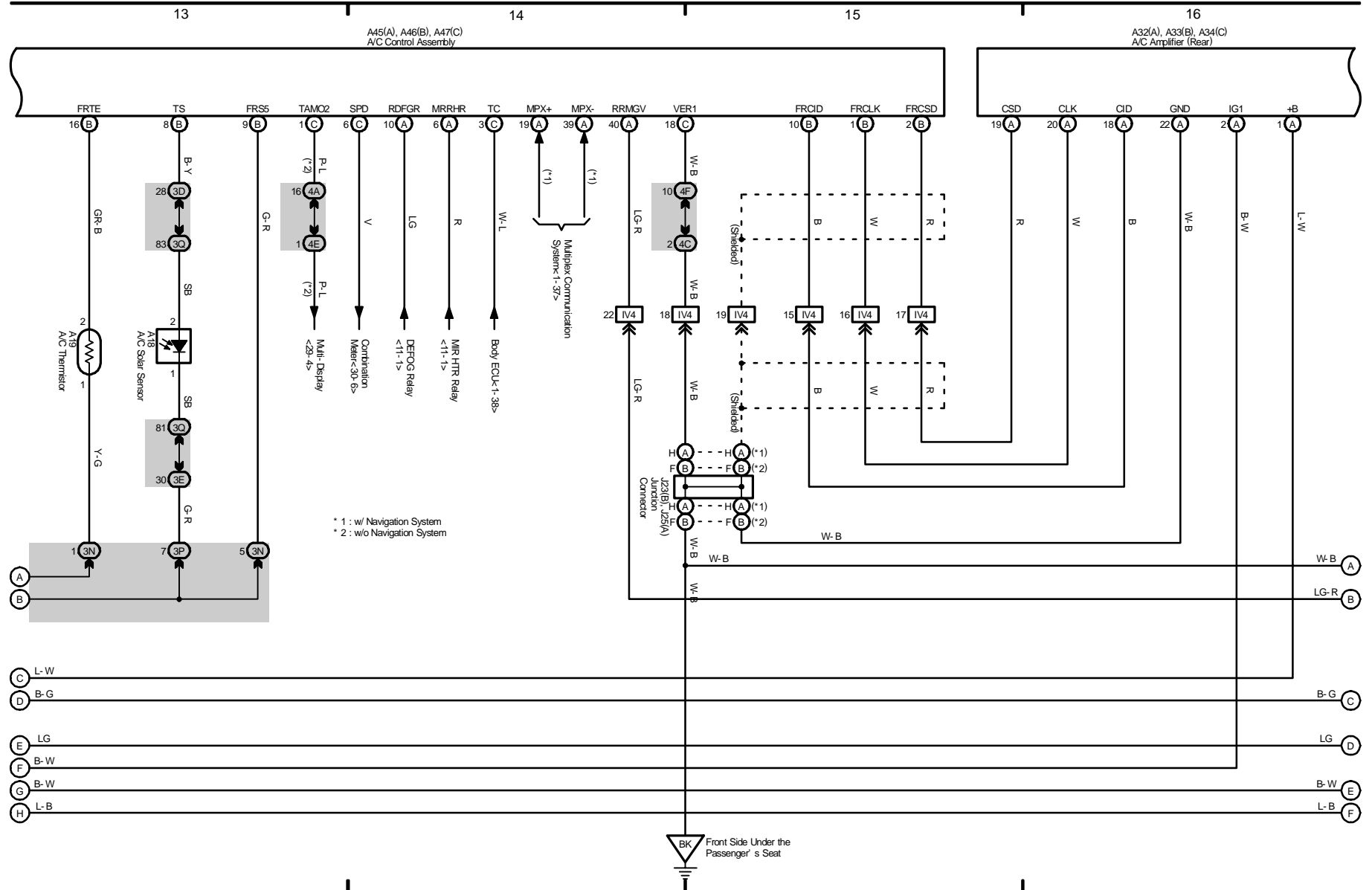
\* 1 : w/ Navigation System



2004 LAND CRUISER (EWD548U)

Air Conditioning (Front)

Air Conditioning (Rear)

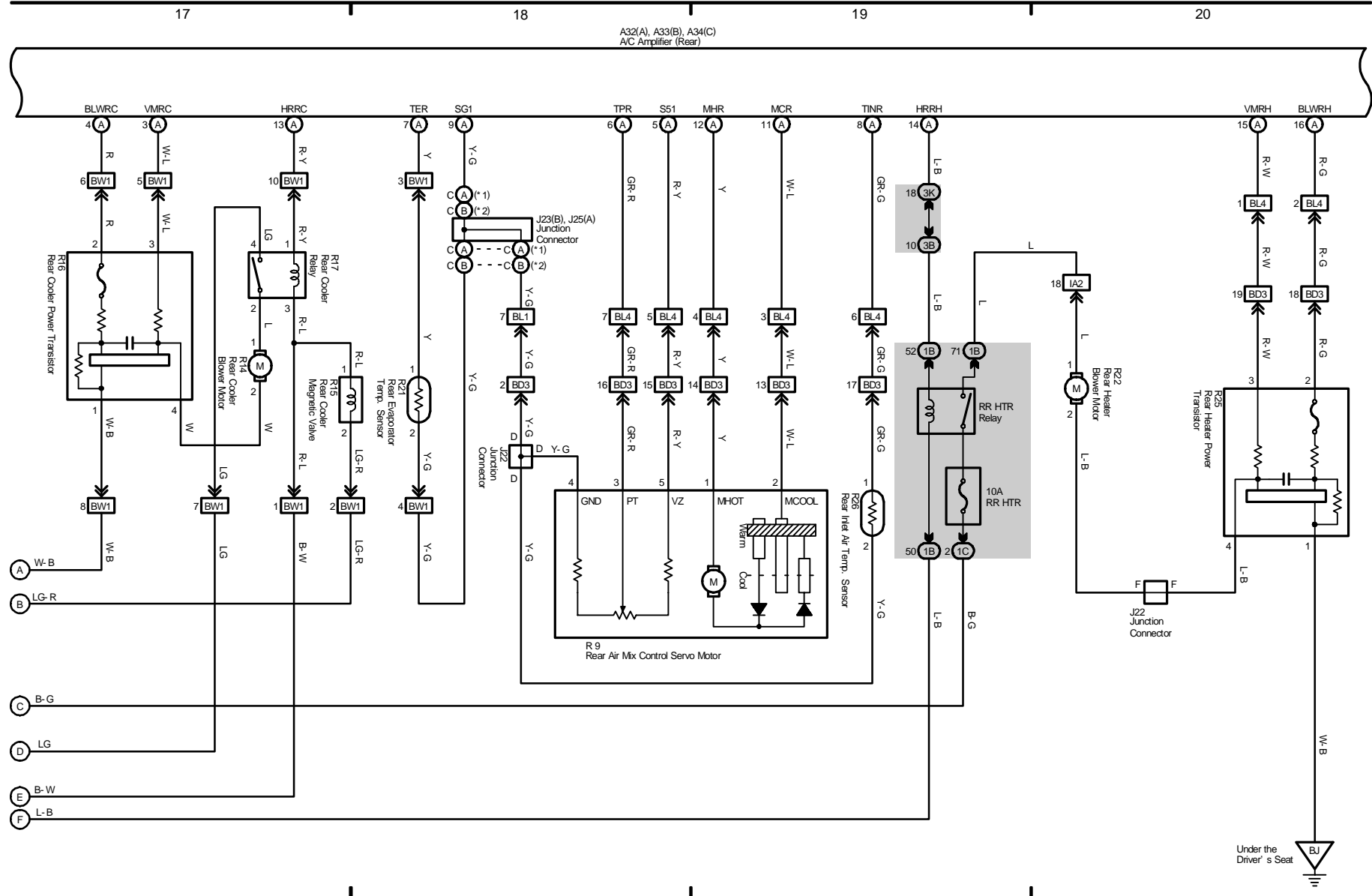


2004 LAND CRUISER (EWD548U)



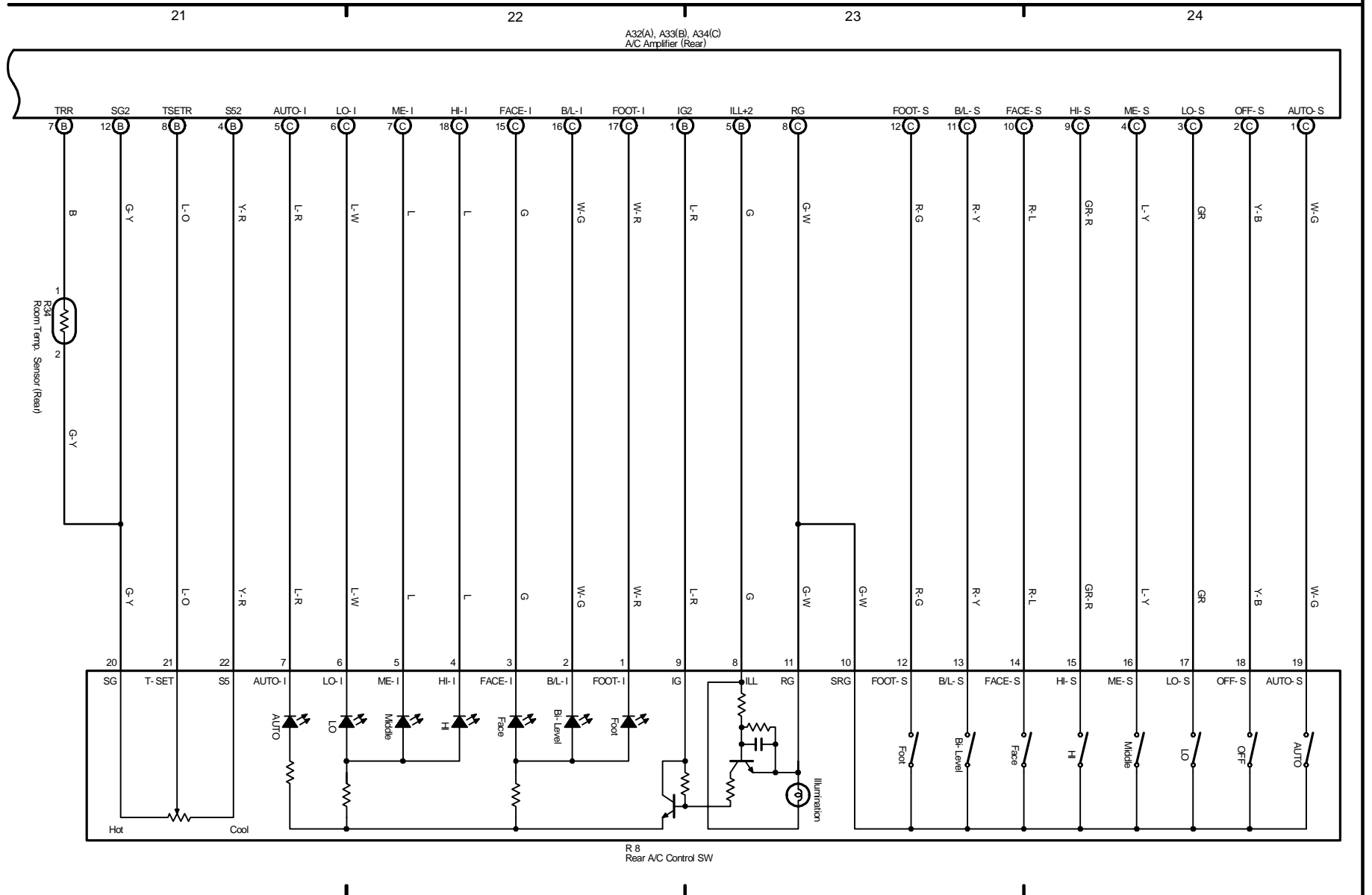
Air Conditioning (Rear)

\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System



2004 LAND CRUISER (EWD548U)

Air Conditioning (Rear)

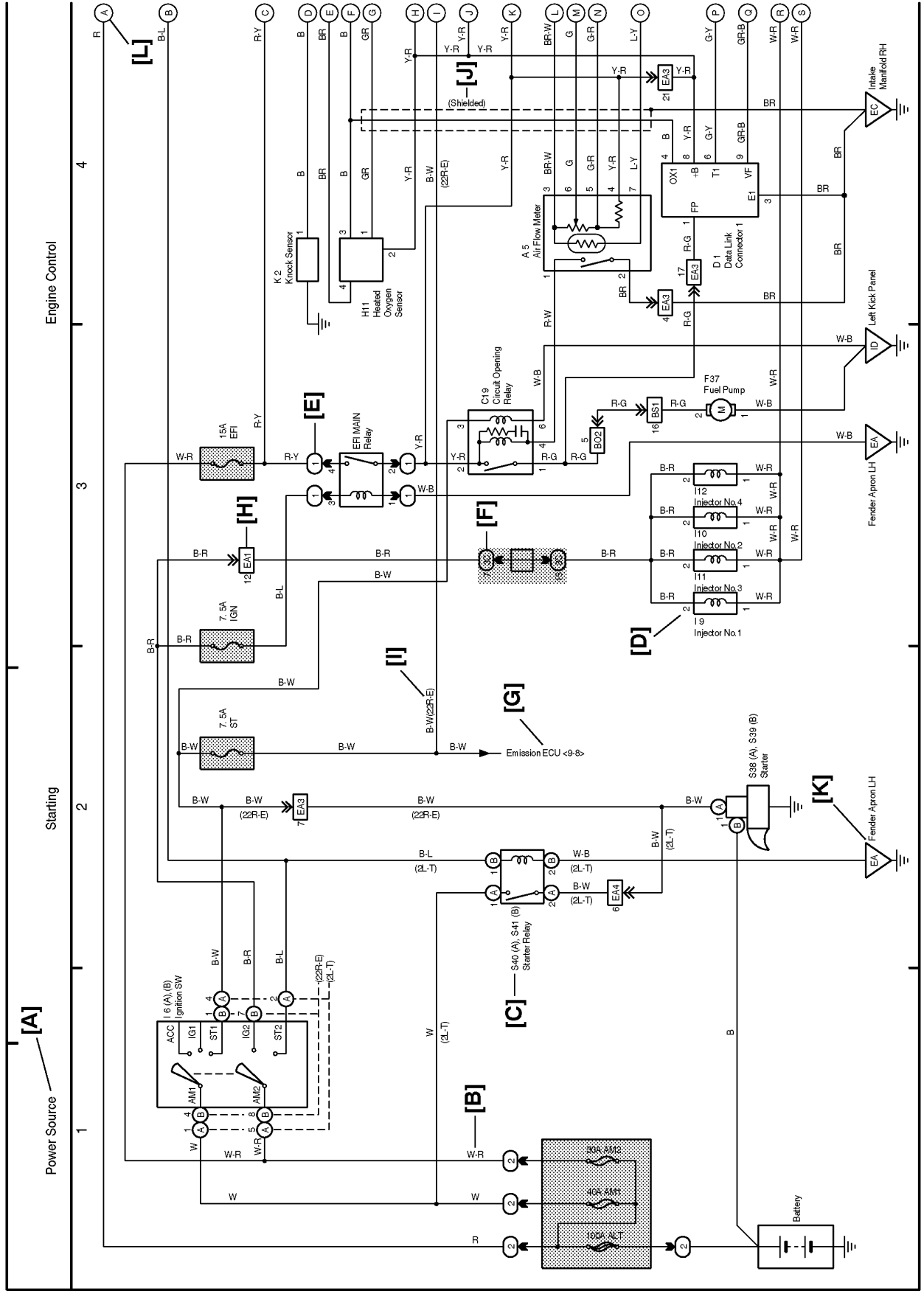


2004 LAND CRUISER (EWD548U)

# M OVERALL ELECTRICAL WIRING DIAGRAM

\* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the wiring diagram section.

**HOW TO READ THIS SECTION**



**[A]** : System Title

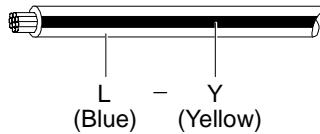
**[B]** : Indicates the wiring color.

Wire colors are indicated by an alphabetical code.

- B = Black    W = White    BR = Brown
- L = Blue    V = Violet    SB = Sky Blue
- R = Red    G = Green    LG = Light Green
- P = Pink    Y = Yellow    GR = Gray
- O = Orange

The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

Example: L - Y

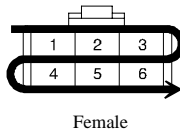


**[C]** : The position of the parts is the same as shown in the wiring diagram and wire routing.

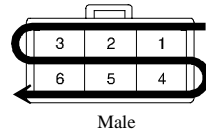
**[D]** : Indicates the pin number of the connector. The numbering system is different for female and male connectors.

Example : Numbered in order from upper left to lower right

Numbered in order from upper right to lower left



Female



Male

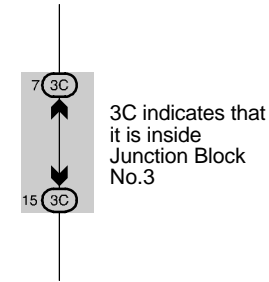
The numbering system for the overall wiring diagram is the same as above

**[E]** : Indicates a Relay Block. No shading is used and only the Relay Block No. is shown to distinguish it from the J/B.

Example : ① Indicates Relay Block No.1

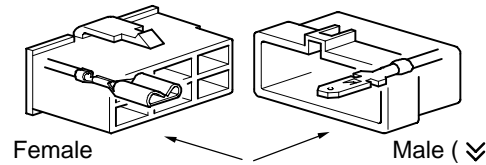
**[F]** : Junction Block (The number in the circle is the J/B No. and the connector code is shown beside it). Junction Blocks are shaded to clearly separate them from other parts.

Example:



**[G]** : Indicates related system.

**[H]** : Indicates the wiring harness and wiring harness connector. The wiring harness with male terminal is shown with arrows (↘). Outside numerals are pin numbers.



**[I]** : ( ) is used to indicate different wiring and connector, etc. when the vehicle model, engine type, or specification is different.

**[J]** : Indicates a shielded cable.



**[K]** : Indicates and located on ground point.

**[L]** : The same code occurring on the next page indicates that the wire harness is continuous.

# SYSTEM INDEX

SYSTEMS	LOCATION	SYSTEMS	LOCATION
Air Conditioning (Front) . . . . .	31-5	* Light Auto Turn Off	
Air Conditioning (Rear) . . . . .	31-15	* Power Window	
Auto Antenna . . . . .	28-3	* Theft Deterrent	
Automatic Glare-Resistant EC Mirror with Compass . . . . .	15-3	* Wireless Door Lock Control	
Back-Up Light . . . . .	10-2	Navigation System . . . . .	26-12
Center Differential Lock . . . . .	14-3	Power Outlet . . . . .	20-2
Charging . . . . .	2-4	Power Rear Quarter Window . . . . .	11-4
Cigarette Lighter . . . . .	21-2	Power Seat . . . . .	22-2
Combination Meter . . . . .	30-5	Power Source . . . . .	1~31-1
Cruise Control . . . . .	5-5	Power Tilt and Power Telescopic . . . . .	23-2
Electronically Controlled Transmission and A/T Indicator . . . . .	5-6	Radio and Player (w/ Navigation System) . . . . .	26-5
Engine Control . . . . .	4-4	Radio and Player (w/o Navigation System) . . . . .	27-3
Engine Immobiliser System . . . . .	4-19	Rear Window Defogger . . . . .	11-2
Front Wiper and Washer . . . . .	18-2	Rear Wiper and Washer . . . . .	19-2
Garage Door Opener . . . . .	15-4	Remote Control Mirror . . . . .	16-2
Horn . . . . .	18-4	Seat Belt Warning . . . . .	25-2
Ignition . . . . .	3-2	Seat Heater . . . . .	21-3
Illumination . . . . .	9-3	Shift Lock . . . . .	24-3
Mirror Heater . . . . .	11-3	SRS . . . . .	13-2
Moon Roof . . . . .	17-2	Starting . . . . .	2-2
Multi-Display (w/o Navigation System) . . . . .	29-3	Stop Light . . . . .	10-3
Multiplex Communication System . . . . .	1-5	Taillight . . . . .	8-2
* Automatic Light Control		TOYOTA Parking Assist (Rear View Monitor) . . . . .	26-12
* Door Lock Control		Trailer Towing . . . . .	7-2
* Front Fog Light		Turn Signal and Hazard Warning Light . . . . .	6-2
* Headlight		VSC . . . . .	12-4
* Interior Light			
* Key Reminder			

# L PART NUMBER OF CONNECTORS

Code	Part Name	Part Number	Code	Part Name	Part Number
A 1	A/C Ambient Temp. Sensor	90980-11070	B 7	Body ECU	90980-12151
A 4	Pressure SW	90980-10943	B 8	Body ECU	90980-12149
A 5	A/C Lock Sensor	90980-11016	B 9	Body ECU	90980-12150
	A/C Magnetic Clutch		C 1	Camshaft Position Sensor	90980-10947
A12	ABS Speed Sensor Front LH	90980-10941	C 2	Center Diff. Lock Control Motor	90980-11024
A13	ABS Speed Sensor Front RH	90980-11002	C 3	Crankshaft Position Sensor	90980-11162
A14	Accel Position Sensor	90980-11144	C 5	Center Diff. Lock Control Relay	90980-10801
A15	Airbag Sensor Front LH	90980-11856	C10	Cigarette Lighter	90980-10760
A16	Airbag Sensor Front RH		C11	Cigarette Lighter Illumination	90980-11148
A17	Auto Antenna Motor	90980-11194	C12	Combination Meter	82824-60060
A18	A/C Solar Sensor	90980-11919	C13	Combination Meter	82824-60050
A19	A/C Thermistor	90980-11918	C14	Combination Meter	82824-60060
A24	Air Inlet Control Servo Motor	90980-11909	C15	Combination Meter	82824-60050
A25	Air Mix Control Servo Motor	90980-10797	C16	Combination SW	90980-11672
A26	Air Vent Mode Control Servo Motor	90980-11165	C17	Combination SW	90980-12155
A27	Airbag Squib (Front Passenger Airbag Assembly)	90980-12160	C18	Combination SW	90980-12183
	Airbag Squib (Steering Wheel Pad)		C19	Combination SW	90980-11594
A28	Airbag Squib (Steering Wheel Pad)		C25	Center Airbag Sensor Assembly (w/ Side Airbag)	82824-50160
A29	Ashtray Illumination	90980-10825		Center Airbag Sensor Assembly (w/o Side Airbag)	90980-11873
A30	Auto Antenna Control Relay	90980-10819	C26	Center Airbag Sensor Assembly	90980-11872
A31	Automatic Light Control Sensor	90980-12056	C27	Center Airbag Sensor Assembly (w/ Side Airbag)	82824-50150
A32	A/C Amplifier (Rear)	90980-11502		Center Airbag Sensor Assembly (w/o Side Airbag)	90980-11871
A33	A/C Amplifier (Rear)	90980-11475	C28	Center Cluster Integration Panel	90980-12200
A34	A/C Amplifier (Rear)	90980-11497	C29	Curtain Shield Airbag Squib LH	90980-11864
A35	ABS Speed Sensor Rear LH	90980-11073	C30	Curtain Shield Airbag Squib RH	
A36	ABS Speed Sensor Rear RH			D 1	Data Link Connector 1
A37	ABS & BA & TRAC & VSC Actuator	90980-11413	D 2	Daytime Running Light Relay No.3	90980-10939
A38	ABS & BA & TRAC & VSC Actuator	90980-10895	D 3	Daytime Running Light Relay No.3	90980-10940
A39	ABS & BA & TRAC & VSC Actuator	90980-11151	D 4	Detection SW (Center Diff. Lock)	90980-11250
A40	ABS & BA & TRAC & VSC Actuator	90980-11009	D 5	Detection SW (Transfer L Position)	
A41	ABS & BA & TRAC & VSC ECU	90980-11935	D 6	Detection SW (Transfer Neutral Position)	90980-11025
A42	ABS & BA & TRAC & VSC ECU	90980-11476	D 7	Data Link Connector 3	90980-11665
A43	ABS & BA & TRAC & VSC ECU	90980-11637	D10	Door Courtesy Light Front LH	90980-11148
A44	ABS & BA & TRAC & VSC ECU	90980-11638	D11	Door Courtesy Light Front RH	
A45	A/C Control Assembly	90980-12170	D12	Door Courtesy Light Rear LH	
A46	A/C Control Assembly	90980-11913	D13	Door Courtesy Light Rear RH	90980-10871
A47	A/C Control Assembly	90980-11927	D14	Door Courtesy SW Front LH	
A48	A/T Shift Lever Illumination	90980-11911	D15	Door Courtesy SW Front RH	
	Shift Lock Control ECU		D16	Door Courtesy SW Rear LH	
B 1	Blower Motor Controller	90980-10910	D17	Door Courtesy SW Rear RH	90980-11170
B 2	Back Door Courtesy SW	90980-10039	D18	Door Key Lock and Unlock SW LH	
B 3	Back Door Key Lock and Unlock SW	90980-11490	D19	Door Key Lock and Unlock SW RH	
B 4	Back Door Lock Motor	90980-11150	D20	Door Lock Control SW RH	90980-11950
	Back Door Unlock Detection SW				
B 5	Buckle SW LH	90980-11169			
B 6	Buckle SW RH				

Note: Not all of the above part numbers of the connector are established for the supply.

Code	Part Name	Part Number	Code	Part Name	Part Number	
D21	Door Lock Motor Front LH	90980-11150	H 1	Headlight LH (High)	90980-11659	
	Door Unlock Detection SW Front LH		H 2	Headlight LH (Low)	90980-11660	
D22	Door Lock Motor Front RH		H 3	Headlight RH (High)	90980-11659	
	Door Unlock Detection SW Front RH		H 4	Headlight RH (Low)	90980-11660	
D23	Door Lock Motor Rear LH		H 5	Heated Oxygen Sensor (Bank 1 Sensor 1)	90980-10869	
	Door Unlock Detection SW Rear LH		H 6	Heated Oxygen Sensor (Bank 1 Sensor 2)	90980-11028	
D24	Door Lock Motor Rear RH		H 7	Heated Oxygen Sensor (Bank 2 Sensor 1)	90980-10869	
	Door Unlock Detection SW Rear RH		H 8	Heated Oxygen Sensor (Bank 2 Sensor 2)	90980-11028	
D26	DVD Automatic Changer		90980-11971	H 9	Horn LH	90980-10619
D27	Door Control Receiver		90980-11909	H10	Horn RH	
E 1	Electronically Controlled Transmission Solenoid		90980-12293	H11	High Mounted Stop Light	90980-11211
E 2	Engine Coolant Temp. Sensor		90980-10736	I 1	Ignition Coil and Igniter No.1	90980-11885
E 3	Engine Hood Courtesy SW	90980-11003	I 2	Ignition Coil and Igniter No.2		
E 4	Electronically Controlled Transmission Pattern Select SW	90980-10933	I 3	Ignition Coil and Igniter No.3		
E 5	Engine Control Module	90980-12144	I 4	Ignition Coil and Igniter No.4		
E 6	Engine Control Module	90980-12145	I 5	Ignition Coil and Igniter No.5		
E 7	Engine Control Module	90980-12143	I 6	Ignition Coil and Igniter No.6		
E 8	Engine Control Module	90980-12146	I 7	Ignition Coil and Igniter No.7		
E 9	Engine Control Module	90980-12142	I 8	Ignition Coil and Igniter No.8		
F 1	Front Fog Light LH	90980-11660	I 9	Injector No.1	90980-11153	
F 2	Front Fog Light RH		I10	Injector No.2		
F 3	Front Turn Signal Light LH	90980-11020	I11	Injector No.3		
	Side Marker Light LH		I12	Injector No.4		
F 4	Front Turn Signal Light RH		I13	Injector No.5		
	Side Marker Light RH		I14	Injector No.6		
F 5	Front Wiper Motor	90980-11599	I15	Injector No.7		
F 8	Front Door Speaker LH	90980-10935	I16	Injector No.8		
F 9	Front Door Speaker RH		I18	Ignition SW	90980-11615	
F10	Front Interior Light	90980-12211	I22	Inner Mirror	90980-11186	
	Rear Personal Light		J 1	Junction Connector	90980-11398	
F11	Front Personal Light	90980-10825	J 2	Junction Connector	90980-11915	
F12	Fuel Pump	90980-11077	J 3	Junction Connector	90980-11398	
	Fuel Sender		J 4	Junction Connector		
F14	Fuel Pump Resistor	90980-11156	J 5	Junction Connector	90980-11925	
F15	Fusible Link Block	90980-11996	J 6	Junction Connector	90980-11927	
F16	Fusible Link Block	90980-11881	J 7	Junction Connector		
F17	Fusible Link Block	90980-11775	J 8	Junction Connector	90980-10803	
F18	Fusible Link Block	90980-10995	J 9	Junction Connector	90980-11927	
F19	Fusible Link Block	82675-60050	J10	Junction Connector		
G 1	Generator	90980-11964	J11	Junction Connector	90980-10803	
G 2	Generator	90980-09212	J12	Junction Connector	90980-11927	
G 3	Glove Box Light	90980-11098	J13	Junction Connector	90980-11925	
G 4	Gateway ECU	90980-11911	J14	Junction Connector	90980-11927	
			J15	Junction Connector	90980-11925	

## L PART NUMBER OF CONNECTORS

Code	Part Name	Part Number	Code	Part Name	Part Number
J16	Junction Connector	90980-11915	P18	Power Window Control SW Front RH	90980-11947
J17	Junction Connector		P19	Power Window Control SW Rear LH	
J18	Junction Connector	90980-11661	P20	Power Window Control SW Rear RH	
J19	Junction Connector		P21	Pretensioner LH	90980-11862
J20	Junction Connector		P22	Pretensioner RH	
J21	Junction Connector		P23	Power Seat Control SW (Driver's Seat)	90980-10803
J22	Junction Connector	90980-11915	P24	Power Seat Control SW (Front Passenger's Seat)	
J23	Junction Connector		P25	Power Seat Motor (Driver's Seat Front Vertical Control)	
J25	Junction Connector		P26	Power Seat Motor (Driver's Seat Lumbar Support Control)	
J26	Junction Connector		P27	Power Seat Motor (Driver's Seat Rear Vertical Control)	
K 1	Knock Sensor 1	90980-11166	P28	Power Seat Motor (Driver's Seat Reclining Control)	
K 2	Knock Sensor 2		P29	Power Seat Motor (Driver's Seat Slide Control)	
K 3	Key Interlock Solenoid	90980-10825	P30	Power Seat Motor (Front Passenger's Seat Front Vertical Control)	
L 1	License Plate Light LH	90980-11148	P31	Power Seat Motor (Front Passenger's Seat Rear Vertical Control)	
L 2	License Plate Light RH		P32	Power Seat Motor (Front Passenger's Seat Reclining Control)	
L 3	Lumbar Support Control SW (Driver's Seat)	90980-10601	P33	Power Seat Motor (Front Passenger's Seat Slide Control)	
M 1	Mass Air Flow Meter	90980-11317	R 5	Remote Control Mirror SW	90980-11657
M 2	Moon Roof Control ECU	90980-10997	R 6	Rheostat	90980-10799
M 3	Moon Roof Control SW	90980-10789	R 7	Room Temp. Sensor (Front)	90980-11918
M 4	Master Cylinder Pressure Sensor	90980-11451	R 8	Rear A/C Control SW	90980-11503
M 5	Multi-Display	90980-12203	R 9	Rear Air Mix Control Servo Motor	90980-11319
M 6	Multi-Display	90980-12410	R10	Rear Combination Light LH	90980-11587
M 7	Multi-Display	90980-12012	R11	Rear Combination Light LH	
M 9	Multi-Display	90980-12094	R12	Rear Combination Light RH	90980-10908
N 1	Noise Filter (Ignition)	90980-10843	R13	Rear Combination Light RH	
N 2	Navigation ECU	90980-11973	R14	Rear Cooler Blower Motor	90980-10214
N 3	Navigation ECU	90980-11923	R15	Rear Cooler Magnetic Valve	90980-10860
N 4	Navigation ECU	90980-12221	R16	Rear Cooler Power Transistor	90980-10171
O 2	Oil Pressure Sender	90980-11363	R17	Rear Cooler Relay	
O 5	Overhead J/B	90980-12155	R19	Rear Door Speaker LH	90980-10935
P 1	Park/Neutral Position SW	90980-11784	R20	Rear Door Speaker RH	
P 2	Parking Light LH	90980-11156	R21	Rear Evaporator Temp. Sensor	90980-11918
P 3	Parking Light RH		R22	Rear Heater Blower Motor	90980-10860
P 4	Power Outlet (Front)	90980-10760	R25	Rear Heater Power Transistor	90980-10171
P 5	Power Outlet (Rear Console Box)	90980-10860	R26	Rear Inlet Air Temp. Sensor	90980-11369
P 6	Power Quarter Window SW LH	90980-10797	R27	Rear Interior Light	90980-10935
P 7	Power Quarter Window SW RH	90980-10996	R28	Rear Window Defogger	90980-11097
P 8	Parking Brake SW	90980-10871	R29	Rear Window Defogger	
P 9	Power Outlet (Luggage Compartment)	90980-10860	R30	Rear Wiper Motor	90980-10795
P10	Power Vent Window Motor LH				
P11	Power Vent Window Motor RH				
P12	Power Window Master SW	90980-12166			
P14	Power Window Motor Front LH	90980-11599			
P15	Power Window Motor Front RH				
P16	Power Window Motor Rear LH				
P17	Power Window Motor Rear RH				

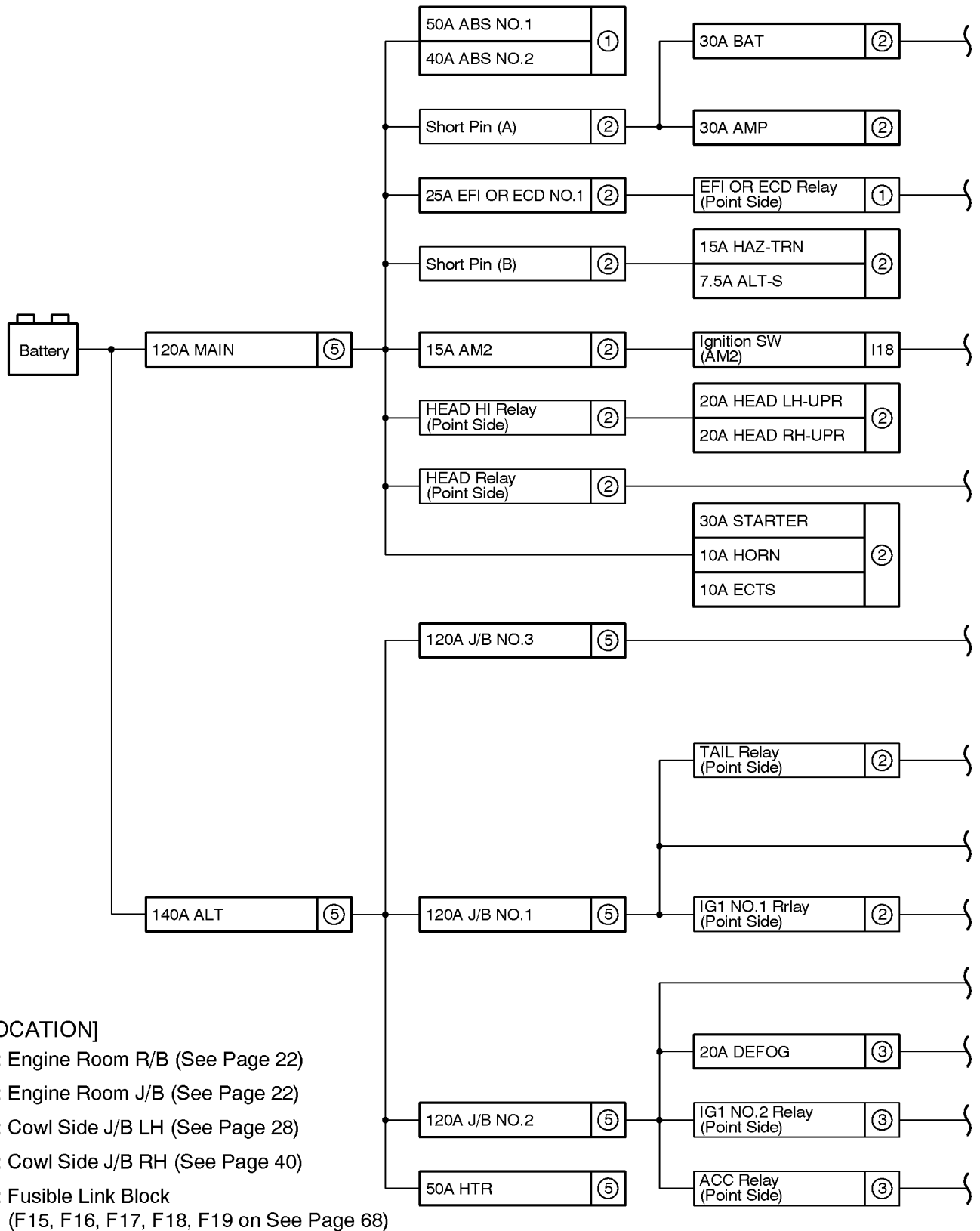
Note: Not all of the above part numbers of the connector are established for the supply.



Code	Part Name	Part Number	Code	Part Name	Part Number
R31	Rear Wiper Relay	90980-10797	T 7	Tilt and Telescopic ECU	90980-10799
R32	Remote Control Mirror LH	90980-11573	T 8	Tilt and Telescopic ECU	90980-10848
R33	Remote Control Mirror RH		T 9	Tilt Motor	90980-10799
R34	Room Temp. Sensor (Rear)	90980-11918	T10	Ignition Key Cylinder Light	90980-12092
R36	Radio and Player	90980-12038		Transponder Key Amplifier	
R37	Radio and Player	90980-12183	T11	Turn Signal Flasher	90980-10799
R38	Radio and Player	90980-12259	T12	Trailer Socket	82824-34030
R39	Rear Seat Audio Controller	90980-12200	T13	Tweeter LH	90980-11300
R40	Roll Sensing of Curtain Shield Airbags Cutoff SW	90980-10957	T14	Tweeter RH	
			T15	Towing Converter Relay	90980-11535
S 1	Starter	90980-11400	T16	Throttle Control Motor and Sensor	90980-11858
S 2	Starter	90980-09585	T17	Turbine Speed Sensor	90980-11156
S 3	Seat Heater SW (Driver's Seat)	90980-10797	T18	Towing Brake Controller	90980-11603
S 4	Seat Heater SW (Front Passenger's Seat)	90980-10996	T19	Transponder Key Computer	90980-11911
S 5	Stop Light SW	90980-11118	T20	Television Camera	90980-12381
S 6	Stereo Component Amplifier	90980-10848	T21	Television Camera ECU	90980-12169
S 7	Stereo Component Amplifier	90980-10807	T22	Television Camera ECU	90980-10997
S 8	Seat Belt Warning Occupant Detection Sensor	90980-10860	T23	Towing Hitch Relay	82660-20340
			U 1	Unlock Warning SW	90980-10860
S 9	Seat Heater (Driver's Seat)	90980-10907	V 1	Vapor Pressure Sensor	90980-11143
S10	Seat Heater (Front Passenger's Seat)		V 2	Vehicle Speed Sensor (Combination Meter)	
S11	Side Airbag Sensor Front LH	90980-12225	V 3	Vehicle Speed Sensor (Electronically Controlled Transmission)	90980-11156
S12	Side Airbag Sensor Front RH				
S13	Side Airbag Sensor Rear LH				
S14	Side Airbag Sensor Rear RH				
S15	Seat Heater (Driver's Seat Cushion)	90980-10794	V 4	VSV (EVAP)	90980-11918
S16	Seat Heater (Front Passenger's Seat Cushion)		V 6	Vanity Light LH	
S17	Seat Position Sensor	90980-12195	V 7	Vanity Light RH	90980-10906
S18	Side Airbag Squib LH	90980-11864	V 8	VSC Warning Buzzer	90980-11162
S19	Side Airbag Squib RH		V 9	VSV (Canister Closed Valve)	90980-11859
T 1	Theft Deterrent Horn	90980-10619	V10	VSV (Pressure Switching Valve)	90980-11294
T 4	Telescopic Motor	90980-10799	W 1	Washer Motor	90980-10795
T 5	Theft Deterrent ECU	90980-12169	W 4	Woofer (Speaker)	90980-12080
			Y 1	Yaw Rate Sensor	90980-10825
			Z 1	Option Connector (Glass Breakage Sensor)	

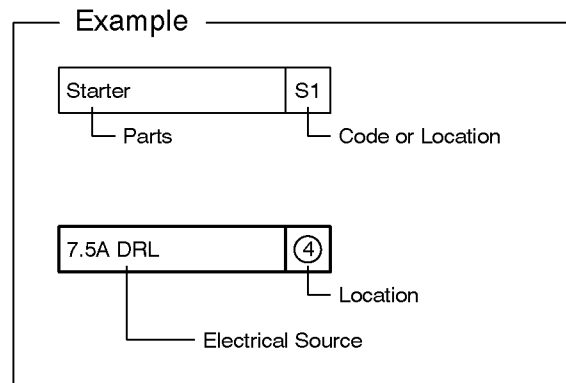
# J POWER SOURCE (Current Flow Chart)

The chart below shows the route by which current flows from the battery to each electrical source (Fusible Link, Circuit Breaker, Fuse, etc.) and other Parts.



10A RADIO	④
10A ECU-B2	
10A DOME	

10A EFI OR ECD NO.2	③
---------------------	---



7.5A IGN	④
7.5A MET	

10A HEAD LH-LWR	②
10A HEAD RH-LWR	

7.5A SECURITY	④
20A TIL & TEL	
30A RH SEAT	
30A RR A/C	
20A P/W (RR)	
20A P/W (RL)	
20A P/W (FR)	
20A P/W (FL)	

IG1 NO.3 Relay (Point Side)	④
-----------------------------	---

20A DIFF	④
10A ECU-IG2	
15A WASHER	
25A WIPER	
10A GAUGE2	
15A SEAT HTR	

15A TAIL	②
7.5A PANEL	
30A TOWING TAIL	

15A MIR HTR	②
10A RR HTR	
30A TOWING BRK	
30A TOWING	
15A FR FOG	

10A FR-IG	②
-----------	---

7.5A AM1	③
30A LH SEAT	
15A STOP	
10A ECU-B1	
25A SUN ROOF	
7.5A OBD-2	
25A DOOR	

DEFOG Realy (Point Side)	③
--------------------------	---

7.5A IDLE UP	③
--------------	---

15A PWR OUTLET	③
15A CIG	
7.5A ACC	

15A RR WIPER	③
10A ECU-IG1	
10A GAUGE1	
30A BATT CHARGE	
15A A/C	

## J POWER SOURCE (Current Flow Chart)

### Engine Room R/B (See Page 22)

Fuse		System	Page
40A	ABS NO.2	VSC	228
50A	ABS NO.1	VSC	228

### Engine Room J/B (See Page 22)

Fuse		System	Page
7.5A	ALT-S	Charging	104
7.5A	PANEL	Combination Meter	350
		Illumination	142
		Multiplex Communication System	172
10A	ETCS	Cruise Control	222
		Electronically Controlled Transmission and A/T Indicator	212
		Engine Control	108
10A	FR-IG	Charging	104
10A	HEAD LH-LWR	Front Fog Light	132
		Headlight	128
		Multiplex Communication System	172
10A	HEAD RH-LWR	Headlight	128
		Multiplex Communication System	172
10A	HORN	Horn	208
		Multiplex Communication System	172
		Theft Deterrent	282
10A	RR HTR	Air Conditioning (Rear)	366
15A	AM2	Automatic Light Control	164
		Engine Control	108
		Headlight	128
		Ignition	100
		Light Auto Turn Off	166
		Starting	98
		Theft Deterrent	282
15A	FR FOG	Front Fog Light	132
		Multiplex Communication System	172
15A	HAZ-TRN	Turn Signal and Hazard Warning Light	134
15A	MIR HTR	Mirror Heater	314
15A	TAIL	Automatic Light Control	164
		Light Auto Turn Off	166
		Multiplex Communication System	172
		Taillight	138
		Theft Deterrent	282
		Trailer Towing	158
20A	HEAD LH-UPR	Headlight	128
		Multiplex Communication System	172

\* These are the page numbers of the first page on which the related system is shown.

Fuse		System	Page
20A	HEAD RH-UPR	Headlight	128
		Multiplex Communication System	172
25A	EFI OR ECD NO.1	Cruise Control	222
		Electronically Controlled Transmission and A/T Indicator	212
		Engine Control	108
30A	AMP	Radio and Player (w/ Navigation System)	324
		Radio and Player (w/o Navigation System)	330
30A	STARTER	Engine Control	108
		Starting	98
30A	TOWING	Trailer Towing	158
30A	TOWING BRK	Trailer Towing	158
30A	TOWING TAIL	Trailer Towing	158

### Cowl Side J/B LH (See Page 28)

Fuse		System	Page
7.5A	ACC	Auto Antenna	322
		Automatic Light Control	164
		Combination Meter	350
		Door Lock Control	260
		Engine Control	108
		Headlight	128
		Interior Light	148
		Key Reminder	316
		Light Auto Turn Off	166
		Multi-Display (w/o Navigation System)	348
		Multiplex Communication System	172
		Navigation System and TOYOTA Parking Assist (Rear View Monitor)	336
		Power Window	250
		Radio and Player (w/ Navigation System)	324
		Radio and Player (w/o Navigation System)	330
Remote Control Mirror	302		
Theft Deterrent	282		
Wireless Door Lock Control	270		
7.5A	AM1	Air Conditioning (Rear)	366
		Engine Control	108
		Mirror Heater	314
		Rear Window Defogger	312
		Shift Lock	244
7.5A	IDLE UP	Multiplex Communication System	172
		Rear Window Defogger	312
7.5A	OBD-2	Engine Control	108

\* These are the page numbers of the first page on which the related system is shown.

## J POWER SOURCE (Current Flow Chart)

Fuse		System	Page
10A	ECU-B1	Multi-Display (w/o Navigation System)	348
		Navigation System and TOYOTA Parking Assist (Rear View Monitor)	336
10A	ECU-IG1	Automatic Glare-Resistant EC Mirror with Compass	304
		Automatic Light Control	164
		Door Lock Control	260
		Headlight	128
		Interior Light	148
		Key Reminder	316
		Light Auto Turn Off	166
		Moon Roof	256
		Multi-Display (w/o Navigation System)	348
		Multiplex Communication System	172
		Navigation System and TOYOTA Parking Assist (Rear View Monitor)	336
		Power Window	250
		Shift Lock	244
		Theft Deterrent	282
VSC	228		
Wireless Door Lock Control	270		
10A	EFI OR ECD NO.2	Engine Control	108
10A	GAUGE1	Air Conditioning (Front)	356
		Center Differential Lock	246
		Combination Meter	350
		Cruise Control	222
		Electronically Controlled Transmission and A/T Indicator	212
		Engine Control	108
		Illumination	142
		Key Reminder	316
		Multiplex Communication System	172
		Navigation System and TOYOTA Parking Assist (Rear View Monitor)	336
		Power Rear Quarter Window	306
		Seat Belt Warning	320
15A	A/C	Air Conditioning (Front)	356
		Air Conditioning (Rear)	366
		Seat Belt Warning	320
15A	CIG	Cigarette Lighter	204
15A	PWR OUTLET	Power Outlet	206
15A	RR WIPER	Rear Wiper and Washer	200
15A	STOP	Cruise Control	222
		Electronically Controlled Transmission and A/T Indicator	212
		Engine Control	108
		Multiplex Communication System	172

\* These are the page numbers of the first page on which the related system is shown.

Fuse		System	Page
15A	STOP	Shift Lock	244
		Stop Light	156
		Trailer Towing	158
		VSC	228
20A	DEFOG	Rear Window Defogger	312
25A	DOOR	Automatic Light Control	164
		Door Lock Control	260
		Headlight	128
		Interior Light	148
		Key Reminder	316
		Light Auto Turn Off	166
		Moon Roof	256
		Multiplex Communication System	172
		Power Window	250
		Theft Deterrent	282
Wireless Door Lock Control	270		
25A	SUN ROOF	Moon Roof	256
30A	BATT CHARGE	Trailer Towing	158
30A	LH SEAT	Power Seat	294

### Cowl Side J/B RH (See Page 40)

Fuse		System	Page
7.5A	IGN	Cruise Control	222
		Electronically Controlled Transmission and A/T Indicator	212
		Engine Control	108
		Engine Immobiliser System	124
		SRS	237
		VSC	228
7.5A	MET	Center Differential Lock	246
		Charging	104
		Combination Meter	350
		Cruise Control	222
		Electronically Controlled Transmission and A/T Indicator	212
		Engine Control	108
		Multiplex Communication System	172
		Seat Belt Warning	320
		SRS	237
VSC	228		
7.5A	SECURITY	Multiplex Communication System	172
		Theft Deterrent	282
10A	DOME	Combination Meter	350
		Garage Door Opener	210
		Interior Light	148
		Multiplex Communication System	172

\* These are the page numbers of the first page on which the related system is shown.

## J POWER SOURCE (Current Flow Chart)

Fuse		System	Page
10A	DOME	Theft Deterrent	282
		Wireless Door Lock Control	270
10A	ECU-B2	Air Conditioning (Front)	356
		Air Conditioning (Rear)	366
		Automatic Light Control	164
		Center Differential Lock	246
		Combination Meter	350
		Cruise Control	222
		Door Lock Control	260
		Electronically Controlled Transmission and A/T Indicator	212
		Engine Control	108
		Engine Immobiliser System	124
		Headlight	128
		Interior Light	148
		Key Reminder	316
		Light Auto Turn Off	166
		Multiplex Communication System	172
		Navigation System and TOYOTA Parking Assist (Rear View Monitor)	336
		Power Tilt and Power Telescopic	298
		Power Window	250
Seat Belt Warning	320		
Theft Deterrent	282		
VSC	228		
Wireless Door Lock Control	270		
10A	ECU-IG2	Air Conditioning (Front)	356
		Air Conditioning (Rear)	366
		Auto Antenna	322
		Navigation System and TOYOTA Parking Assist (Rear View Monitor)	336
		Power Tilt and Power Telescopic	298
		Turn Signal and Hazard Warning Light	134
10A	GAUGE2	Back-Up Light	162
		Center Differential Lock	246
		Combination Meter	350
		Cruise Control	222
		Door Lock Control	260
		Electronically Controlled Transmission and A/T Indicator	212
		Engine Control	108
		Multiplex Communication System	172
		Navigation System and TOYOTA Parking Assist (Rear View Monitor)	336
		Trailer Towing	158
		VSC	228
		Wireless Door Lock Control	270

\* These are the page numbers of the first page on which the related system is shown.



Fuse		System	Page
10A	RADIO	Auto Antenna	322
		Navigation System and TOYOTA Parking Assist (Rear View Monitor)	336
		Radio and Player (w/ Navigation System)	324
		Radio and Player (w/o Navigation System)	330
15A	SEAT HTR	Seat Heater	308
15A	WASHER	Front Wiper and Washer	196
		Rear Wiper and Washer	200
20A	DIFF	Center Differential Lock	246
20A	P/W (FL)	Door Lock Control	260
		Interior Light	148
		Multiplex Communication System	172
		Power Window	250
		Theft Deterrent	282
		Wireless Door Lock Control	270
20A	P/W (FR)	Multiplex Communication System	172
		Power Window	250
20A	P/W (RL)	Multiplex Communication System	172
		Power Window	250
20A	P/W (RR)	Multiplex Communication System	172
		Power Window	250
20A	TIL & TEL	Power Tilt and Power Telescopic	298
25A	WIPER	Front Wiper and Washer	196
30A	RH SEAT	Power Seat	294
30A	RR A/C	Air Conditioning (Rear)	366

### Fusible Link Block (F15, F16, F17, F18, F19 on See Page 68)

Fuse		System	Page
50A	HTR	Air Conditioning (Front)	356
120A	J/B NO.1	Automatic Light Control	164
		Illumination	142
		Light Auto Turn Off	166
		Multiplex Communication System	172
		Taillight	138
		Theft Deterrent	282
120A	J/B NO.2	Air Conditioning (Rear)	366
		Engine Control	108
		Mirror Heater	314
		Rear Window Defogger	312
		Shift Lock	244
120A	J/B NO.3	Engine Control	108
120A	MAIN	Ignition	100
		Multiplex Communication System	172
		Starting	98

\* These are the page numbers of the first page on which the related system is shown.

## J POWER SOURCE (Current Flow Chart)

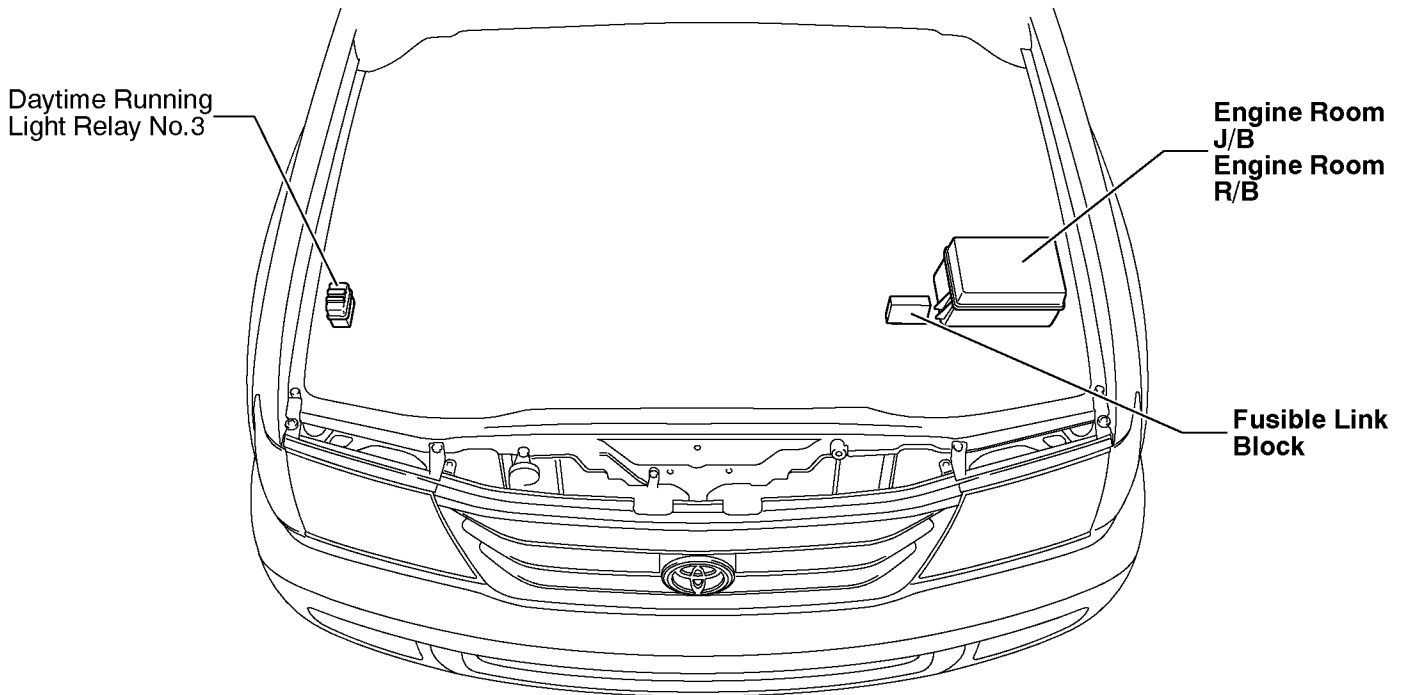
Fuse		System	Page
140A	ALT	Air Conditioning (Front)	<a href="#">356</a>
		Air Conditioning (Rear)	<a href="#">366</a>
		Automatic Light Control	<a href="#">164</a>
		Charging	<a href="#">104</a>
		Engine Control	<a href="#">108</a>
		Illumination	<a href="#">142</a>
		Light Auto Turn Off	<a href="#">166</a>
		Mirror Heater	<a href="#">314</a>
		Multiplex Communication System	<a href="#">172</a>
		Rear Window Defogger	<a href="#">312</a>
		Shift Lock	<a href="#">244</a>
		Taillight	<a href="#">138</a>
		Theft Deterrent	<a href="#">282</a>

\* These are the page numbers of the first page on which the related system is shown.

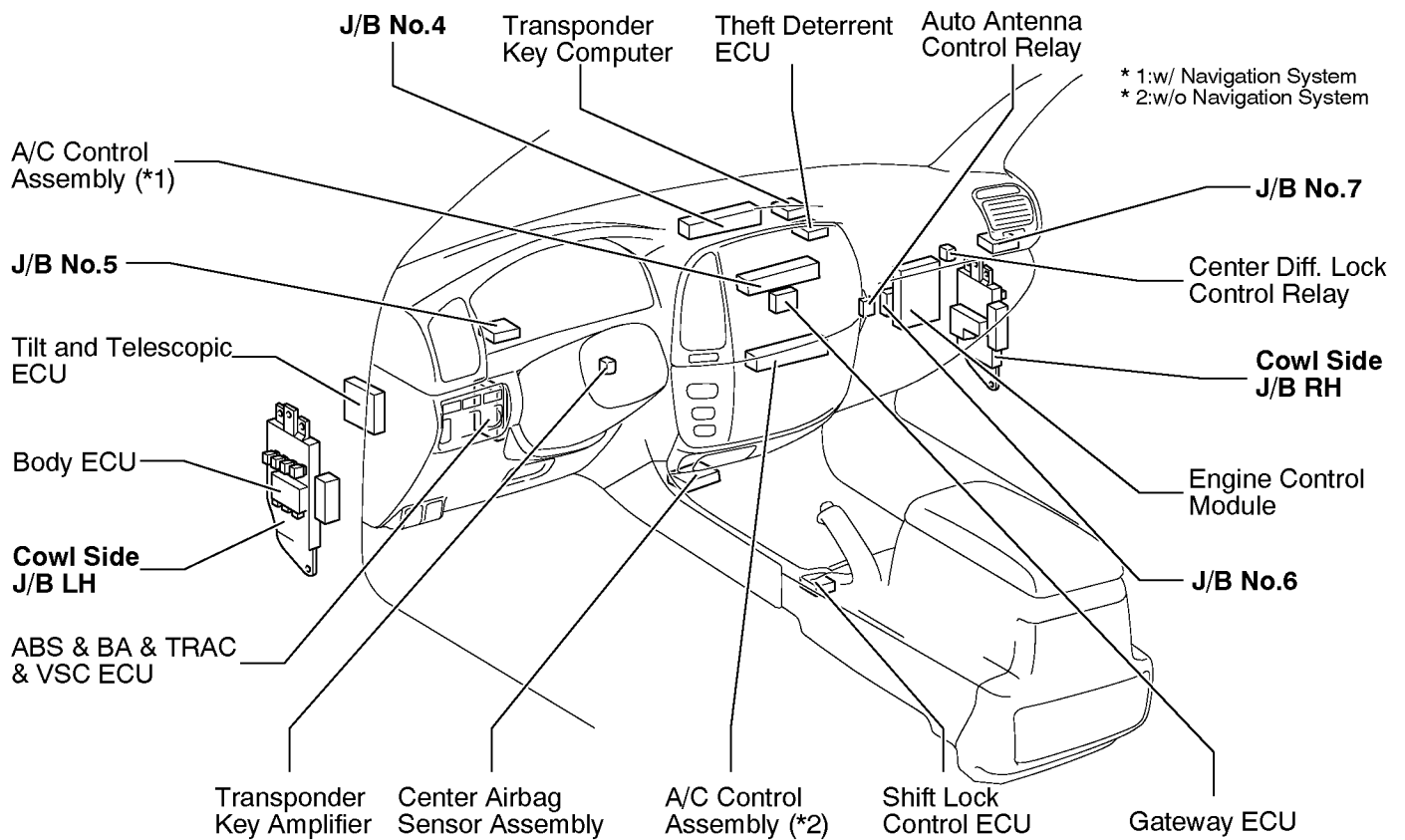


# F RELAY LOCATIONS

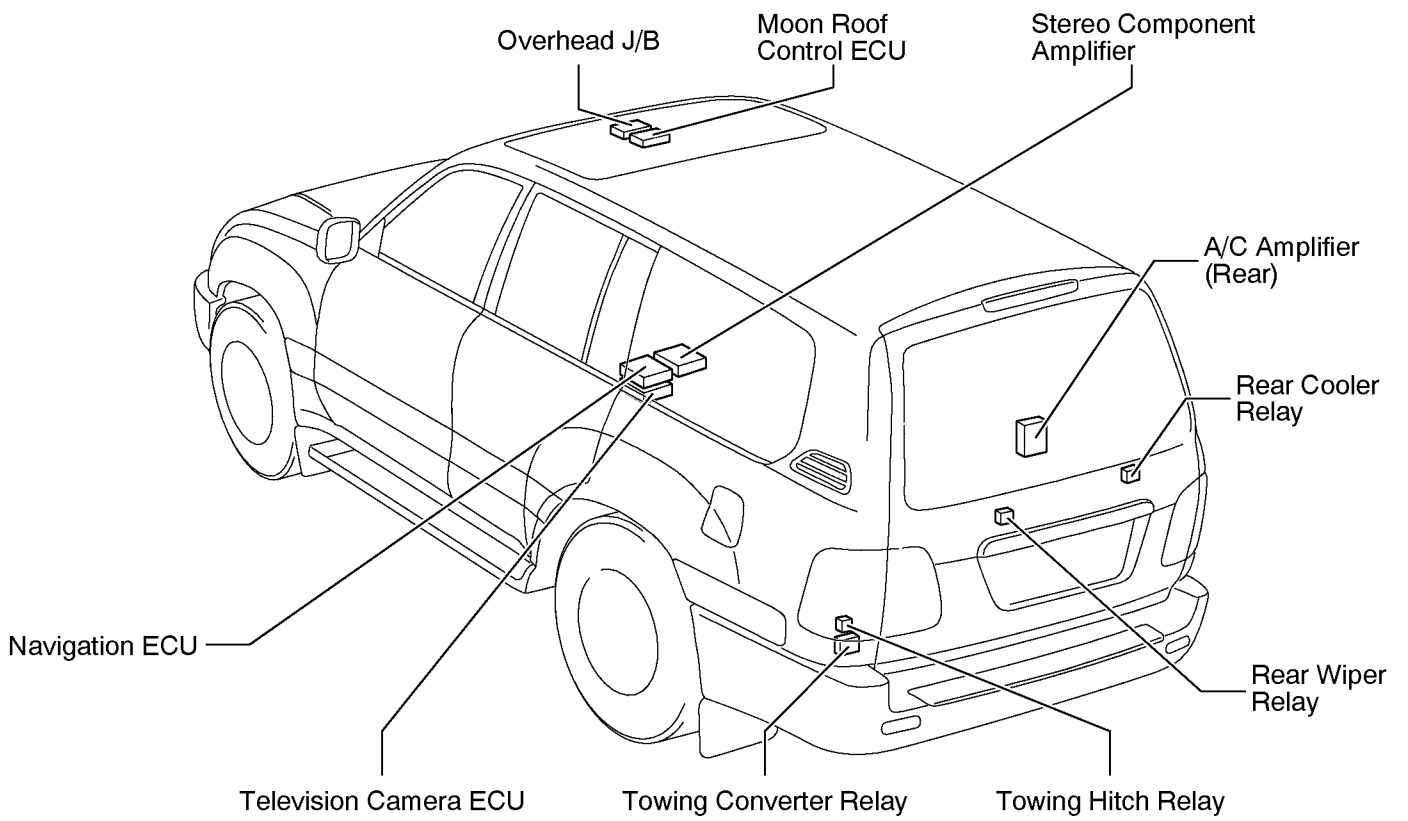
## [Engine Compartment]



## [Instrument Panel]



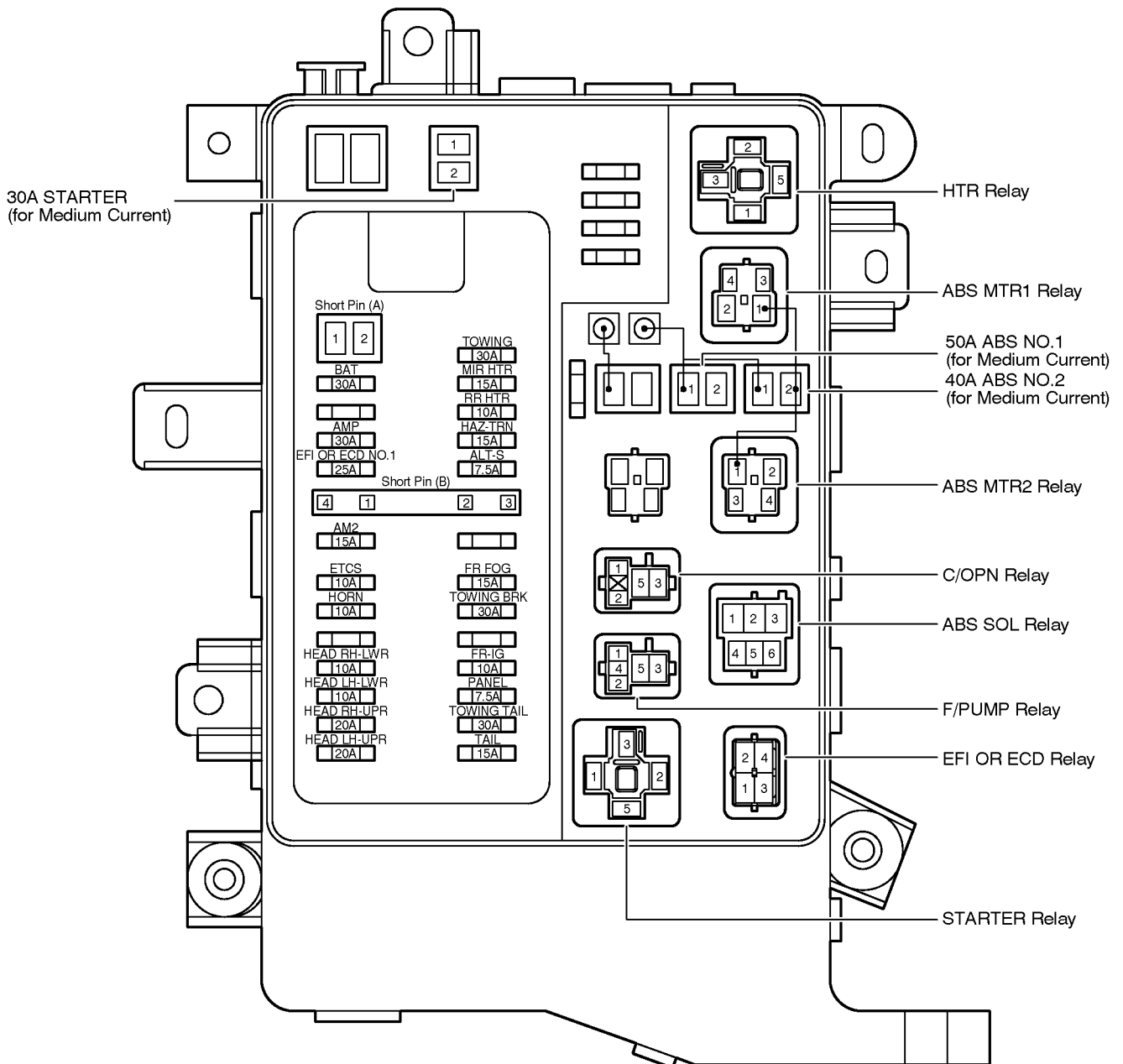
[Body]

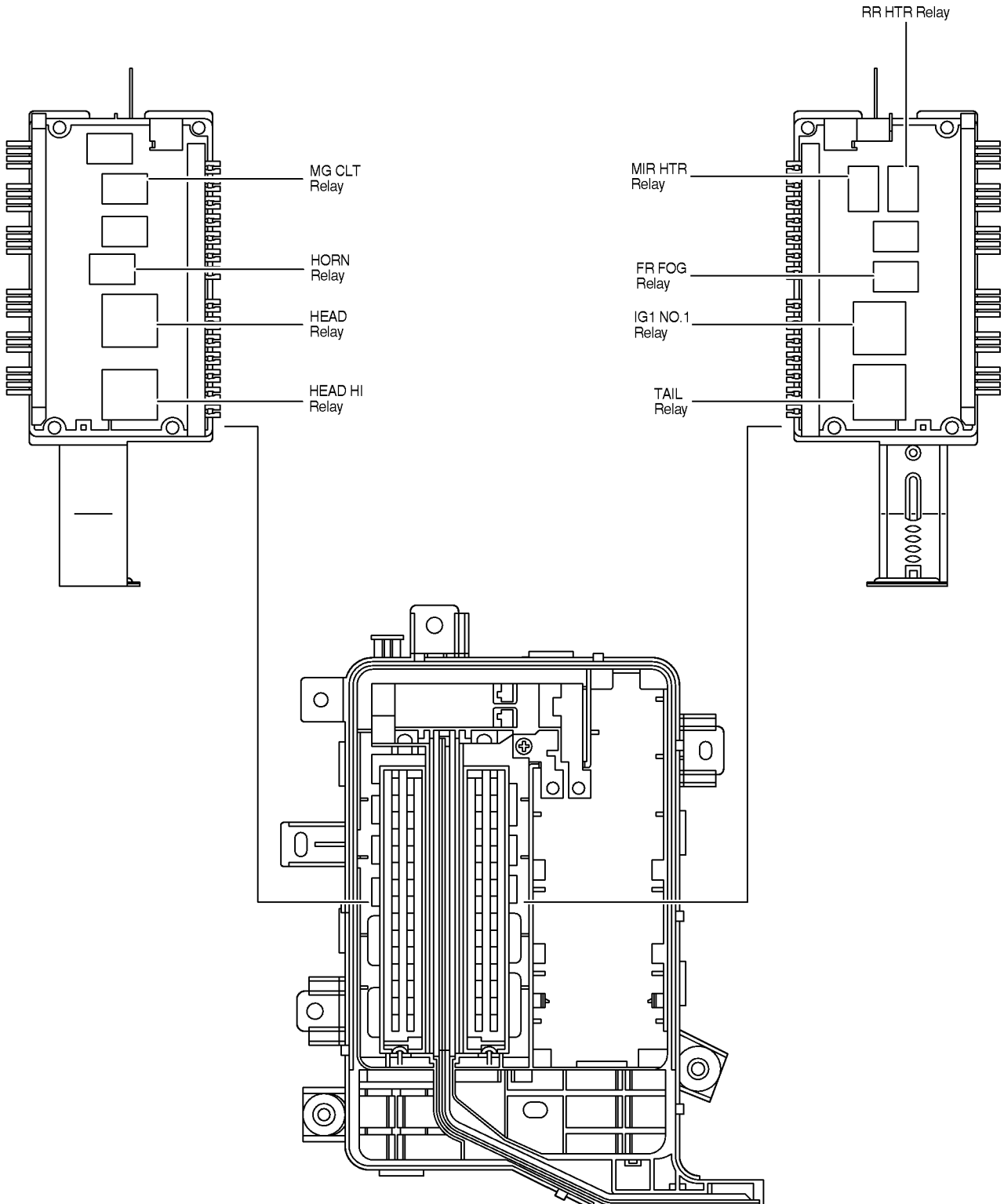


# F RELAY LOCATIONS

○ : Engine Room J/B	<b>Engine Compartment Left (See Page 20)</b>
① : Engine Room R/B	

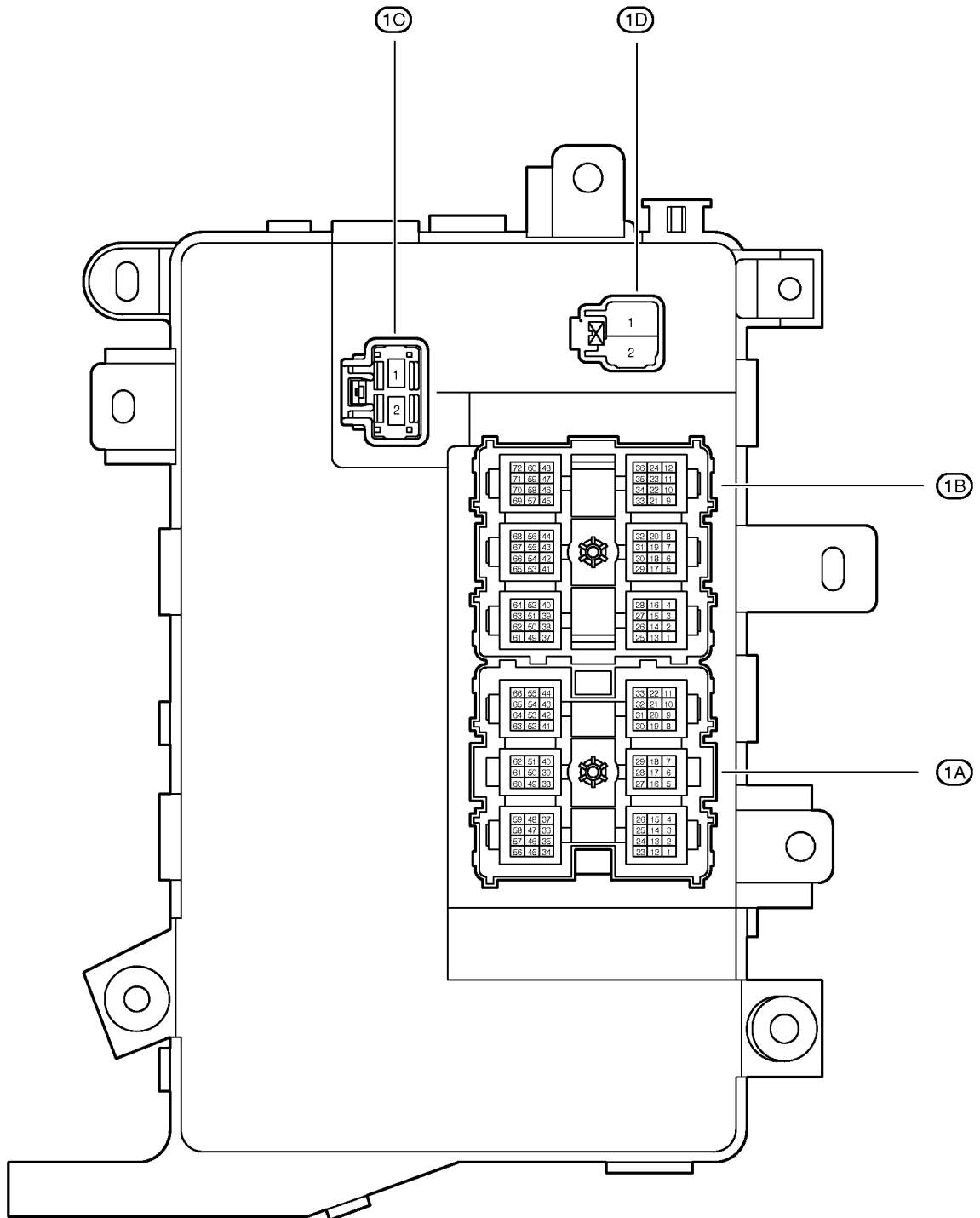
(Inner Circuit : See Page 26)





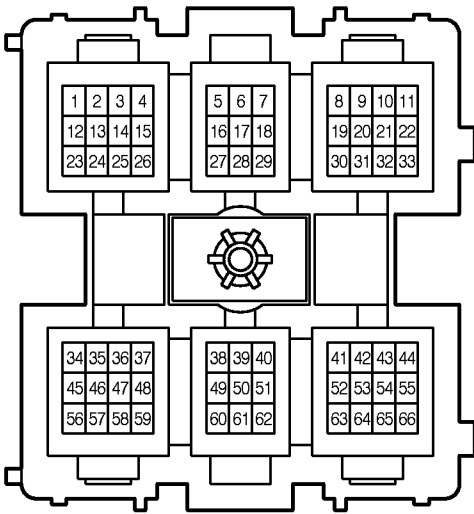
# F RELAY LOCATIONS

○ : Engine Room J/B      Engine Compartment Left (See Page 20)  
 (Inner Circuit : See Page 26)



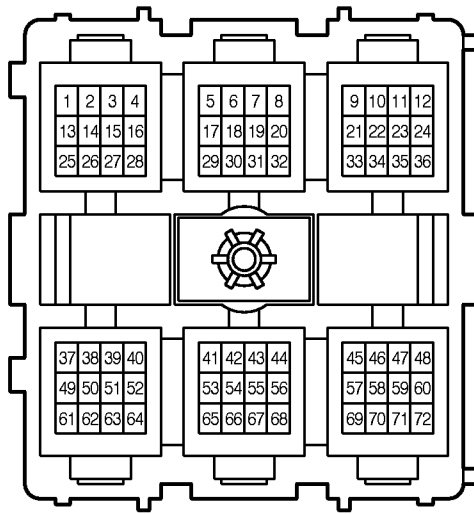


1A



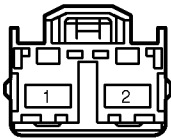
(from Engine Room Main Wire)

1B



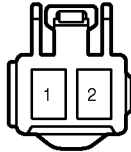
(from Engine Room No.2 Wire)

1C  
Black



(from Engine Room No.2 Wire)

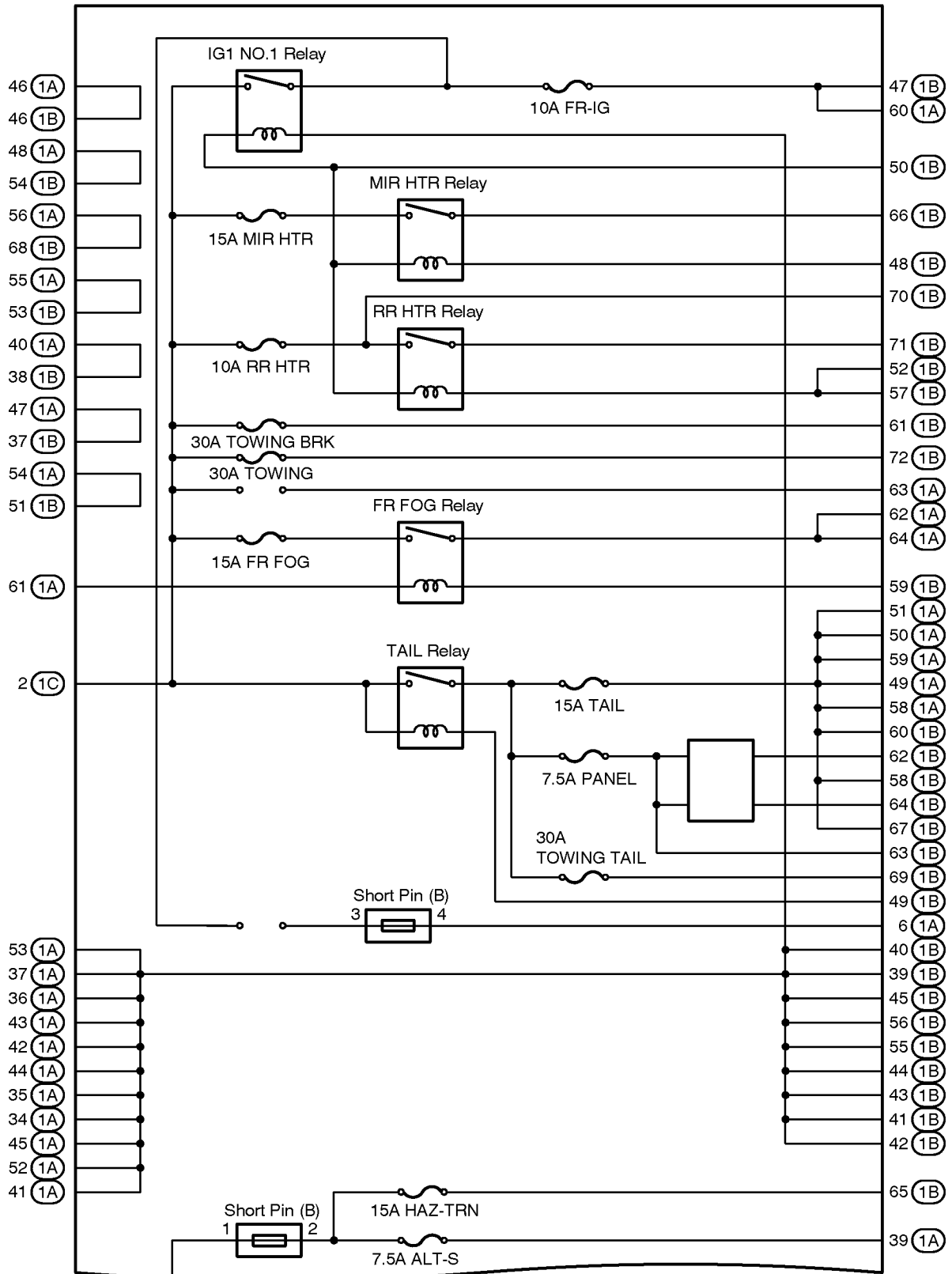
1D



(from Engine Room No.2 Wire)

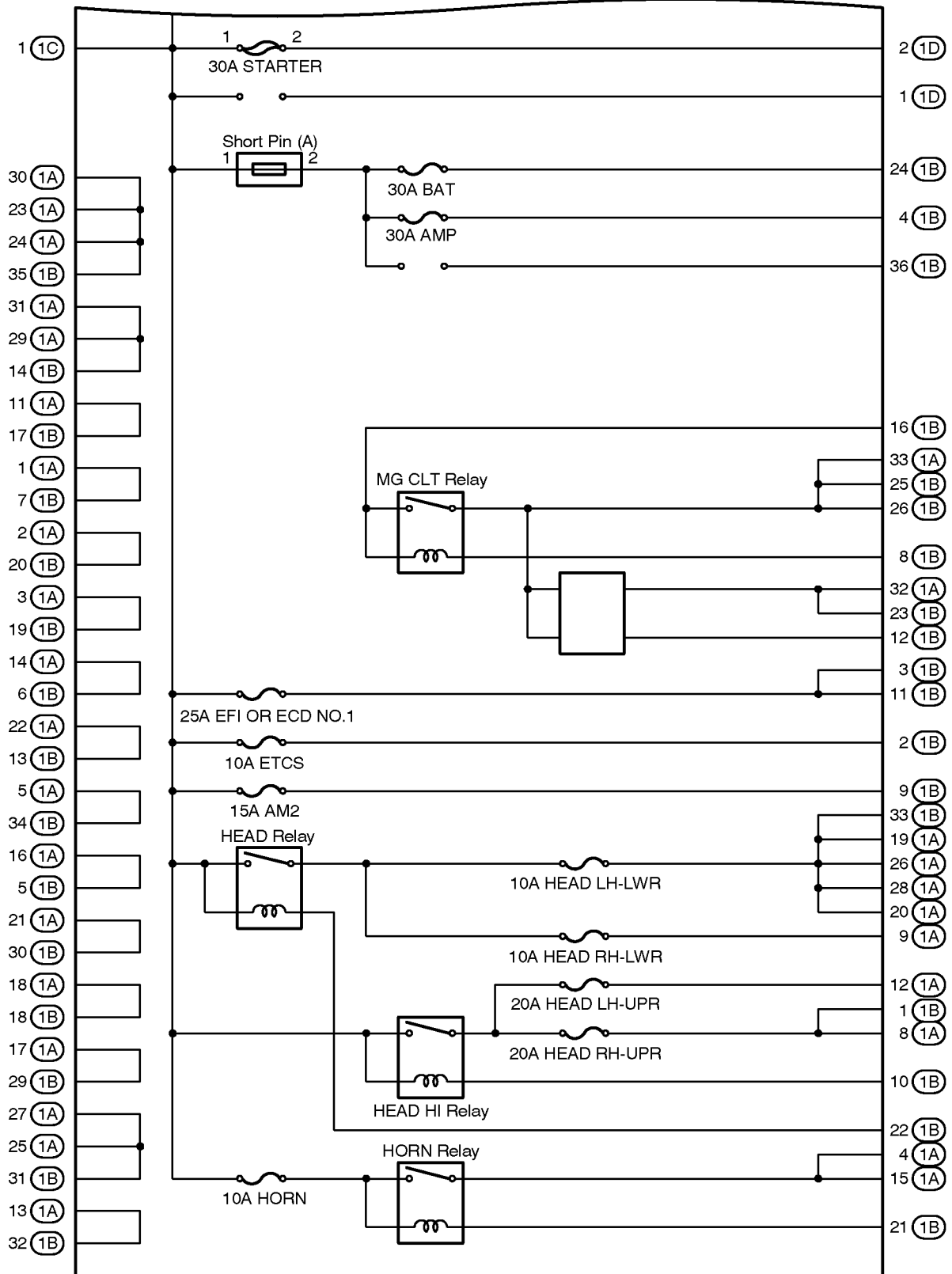
# F RELAY LOCATIONS

## [Engine Room J/B Inner Circuit]



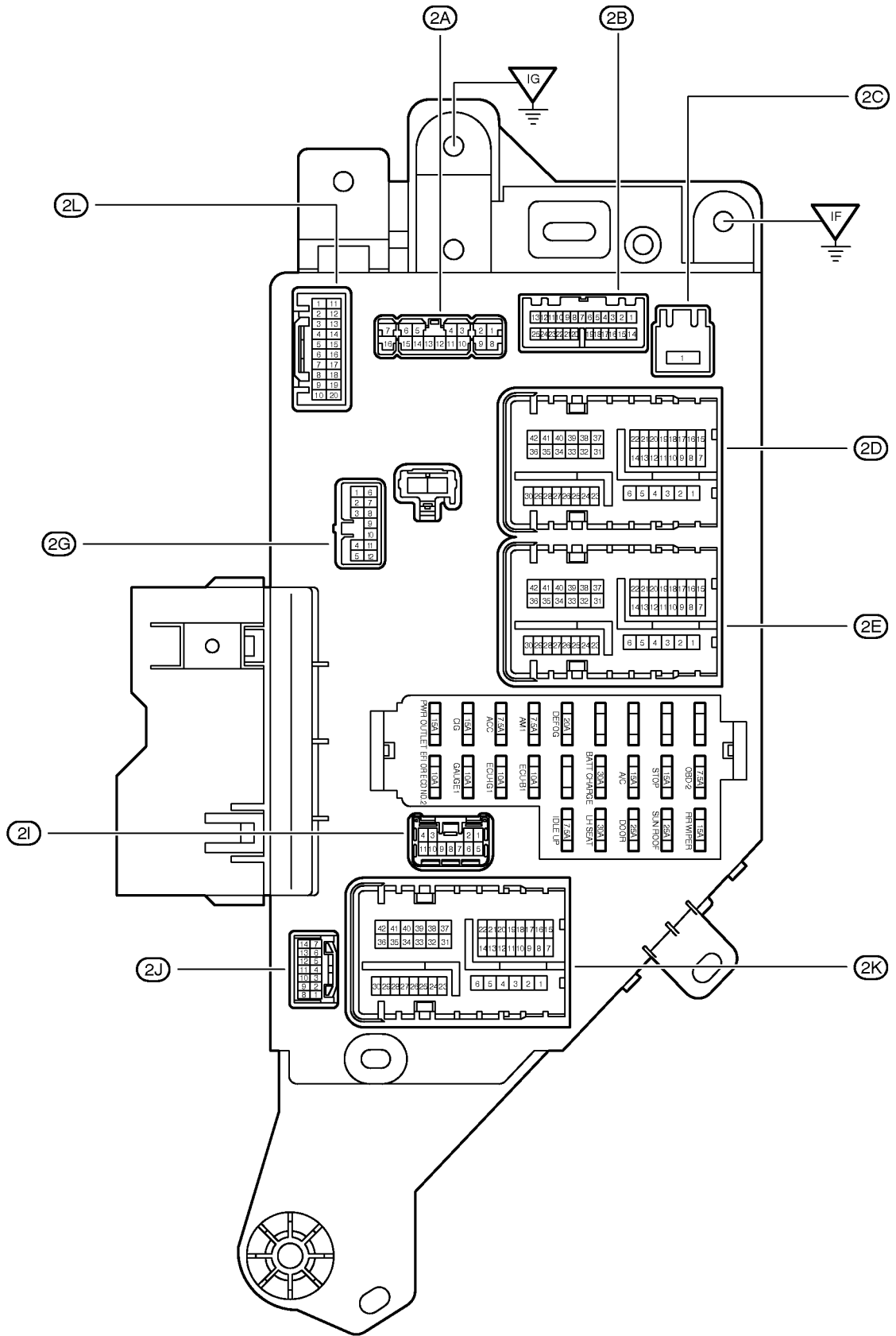
(Cont. next page)

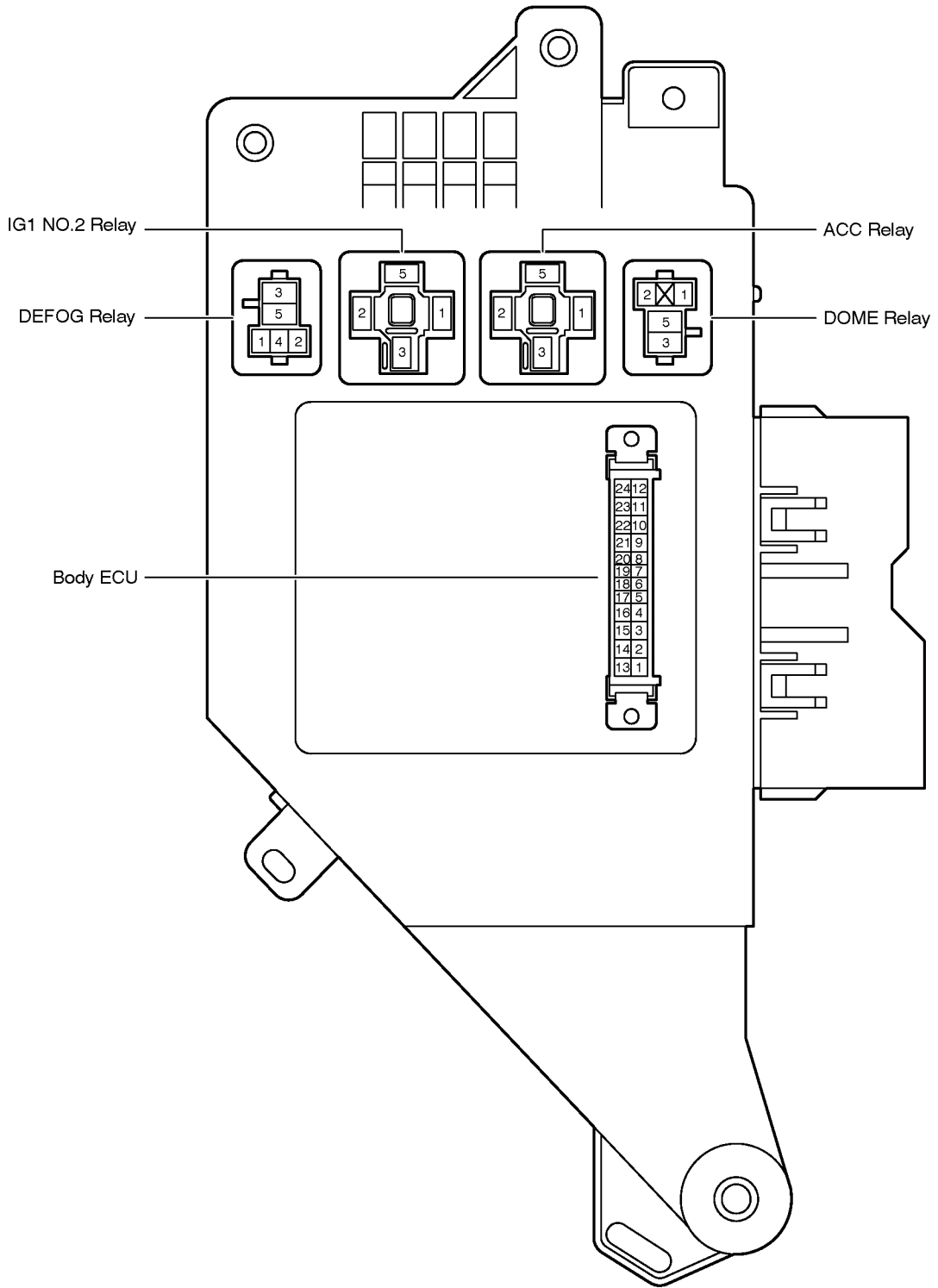
(Cont'd)



# F RELAY LOCATIONS

○ : Cowl Side J/B LH      **Left Kick Panel (See Page 20)**  
(Inner Circuit : See Page 34)

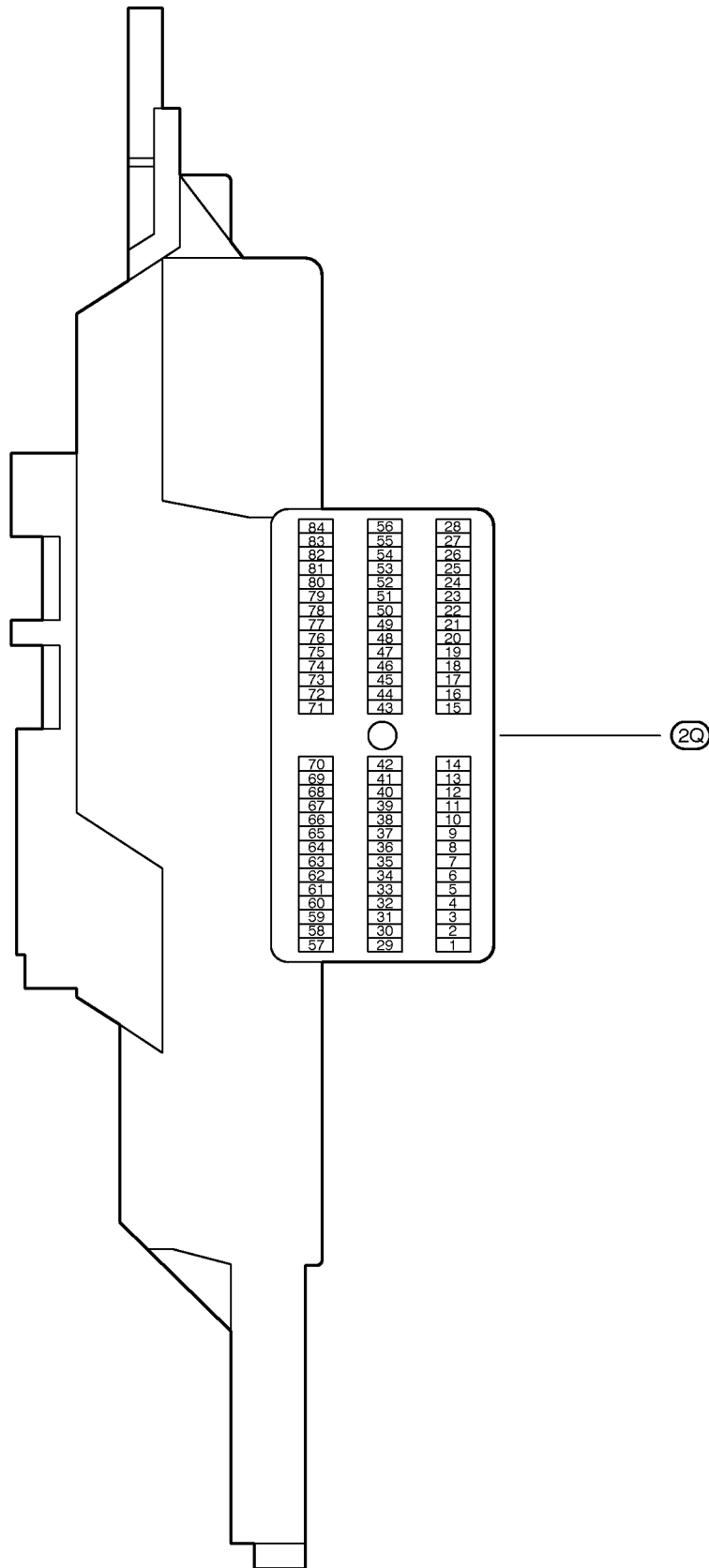




# F RELAY LOCATIONS

○ : Cowl Side J/B LH      **Left Kick Panel (See Page 20)**

**(Inner Circuit : See Page 34)**

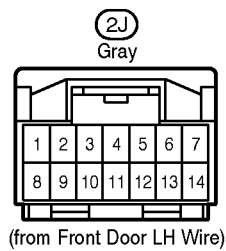
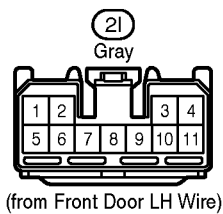
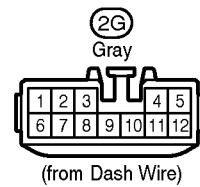
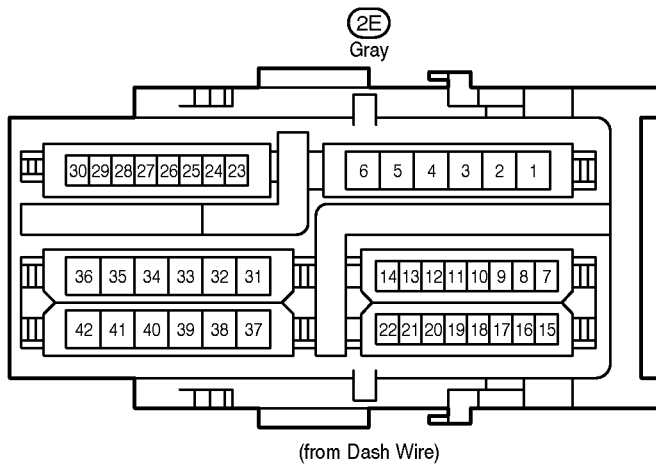
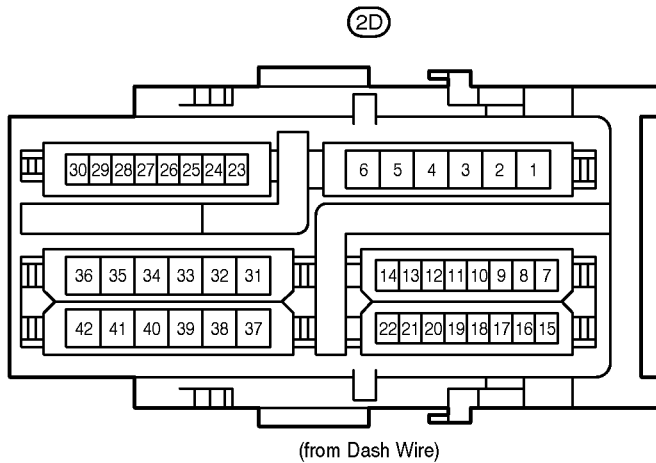
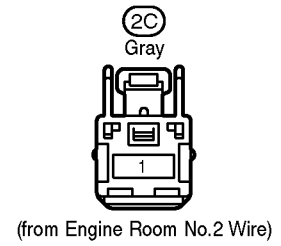
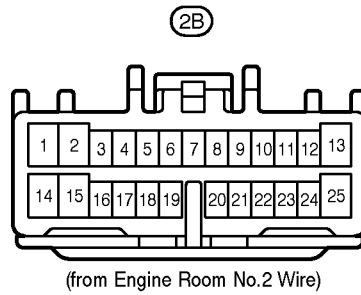
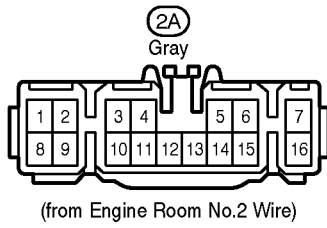




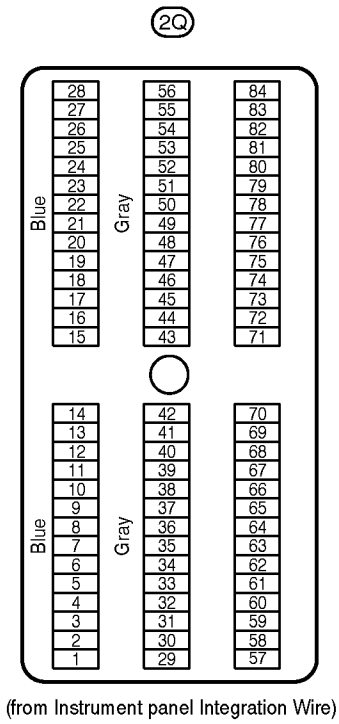
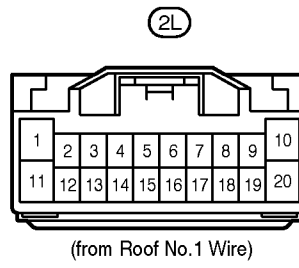
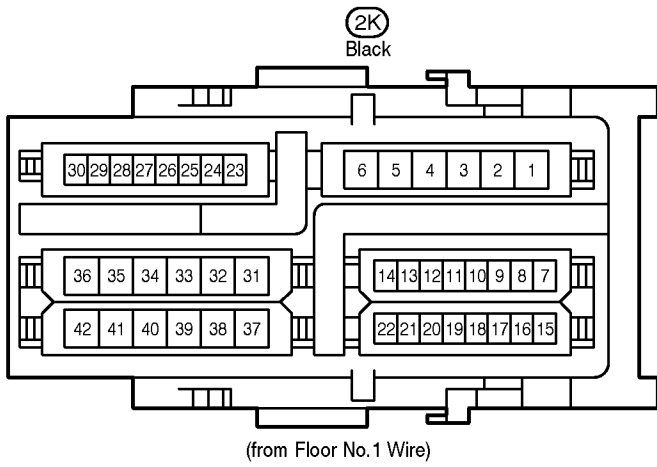
# F RELAY LOCATIONS

○ : Cowl Side J/B LH      **Left Kick Panel (See Page 20)**

**(Inner Circuit : See Page 34)**

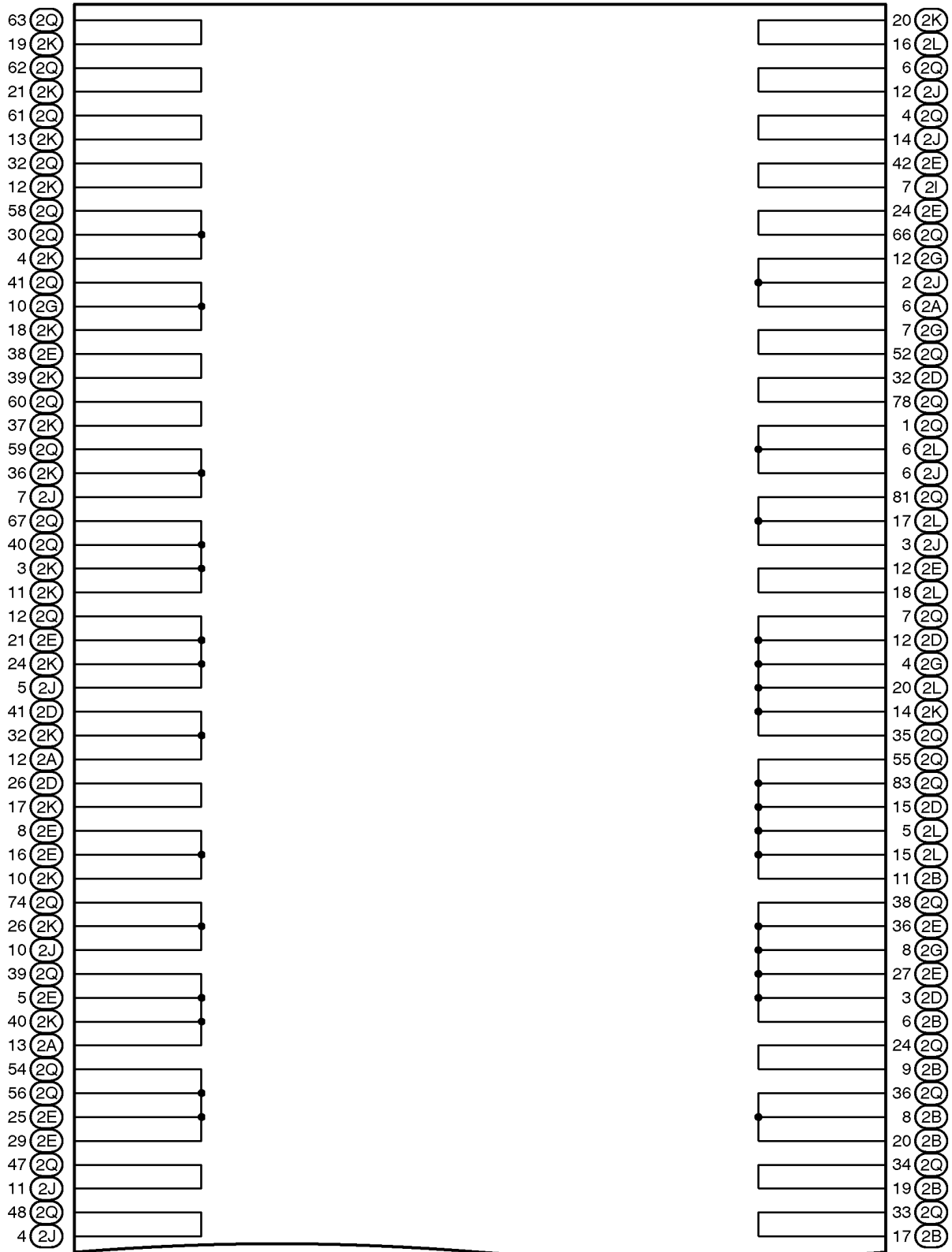






# F RELAY LOCATIONS

## [Cowl Side J/B LH Inner Circuit]



(Cont. next page)

(Cont'd)

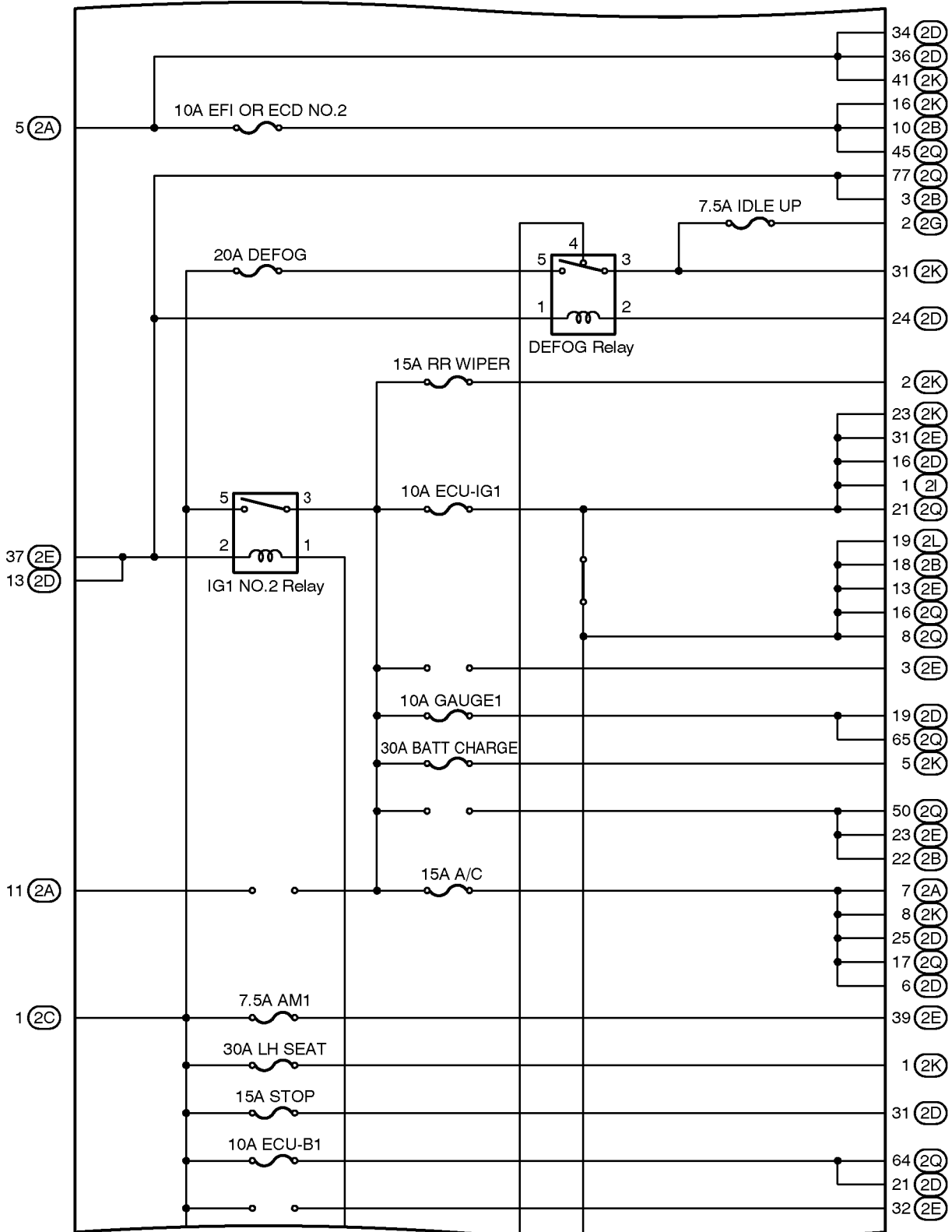
- 53 (2Q)
- 16 (2A)
- 42 (2Q)
- 68 (2Q)
- 2 (2B)
- 42 (2D)
- 25 (2B)
- 40 (2D)
- 14 (2B)
- 38 (2D)
- 1 (2A)
- 33 (2E)
- 1 (2B)
- 8 (2D)
- 10 (2D)
- 9 (2A)
- 6 (2G)
- 16 (2B)
- 41 (2E)
- 10 (2A)
- 9 (2G)
- 4 (2D)
- 7 (2B)
- 39 (2D)
- 14 (2A)
- 34 (2K)
- 49 (2Q)
- 1 (2E)
- 4 (2A)
- 6 (2E)
- 8 (2A)
- 2 (2E)
- 15 (2B)
- 4 (2E)
- 2 (2A)
- 29 (2D)
- 33 (2D)
- 15 (2A)
- 29 (2Q)
- 31 (2Q)
- 4 (2B)
- 27 (2K)
- 14 (2E)
- 37 (2Q)
- 28 (2Q)
- 84 (2Q)
- 30 (2K)
- 1 (2J)
- 72 (2Q)
- 28 (2K)
- 8 (2J)

(Cont. next page)

# F RELAY LOCATIONS

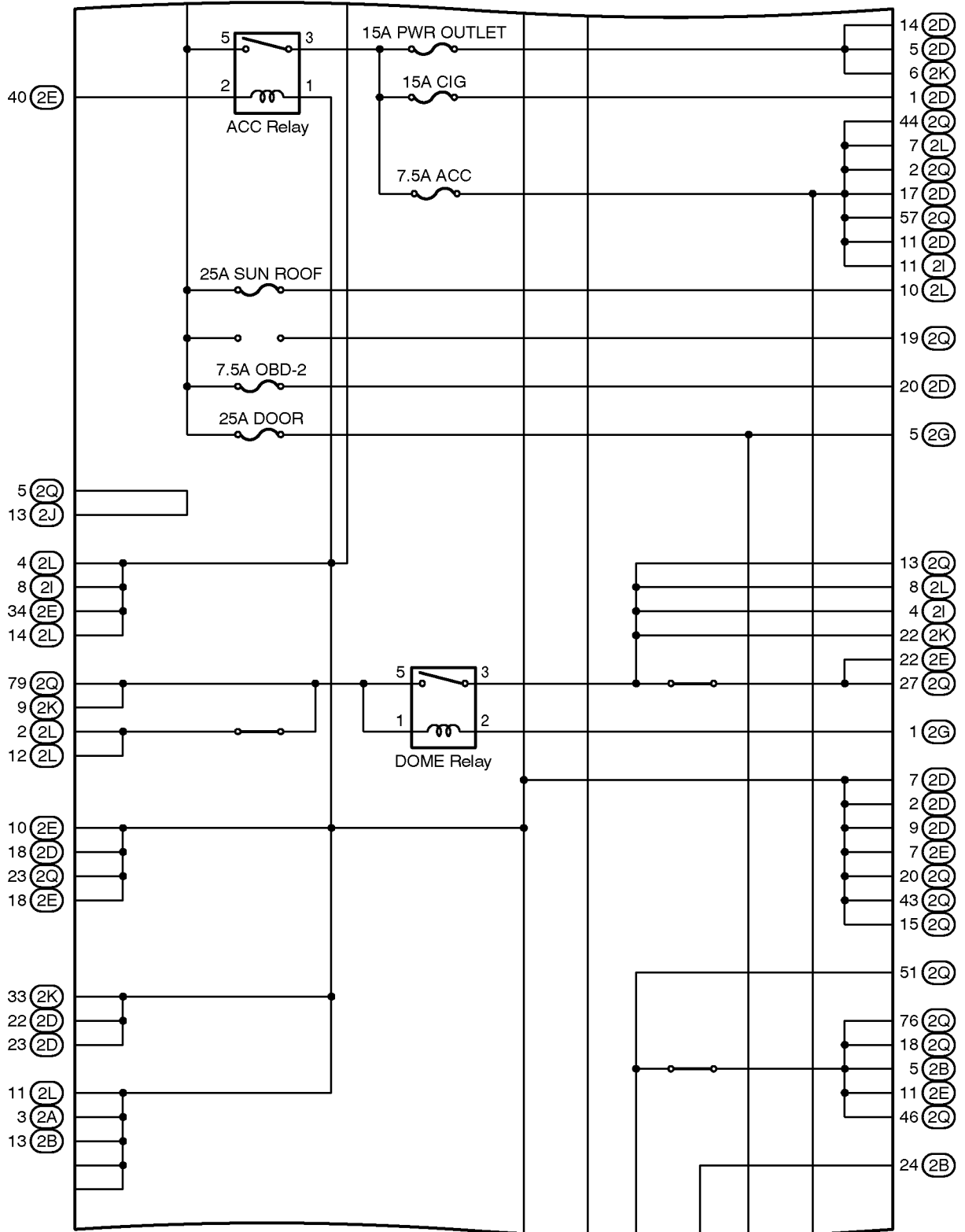
## [Cowl Side J/B LH Inner Circuit]

(Cont'd)



(Cont. next page)

(Cont'd)

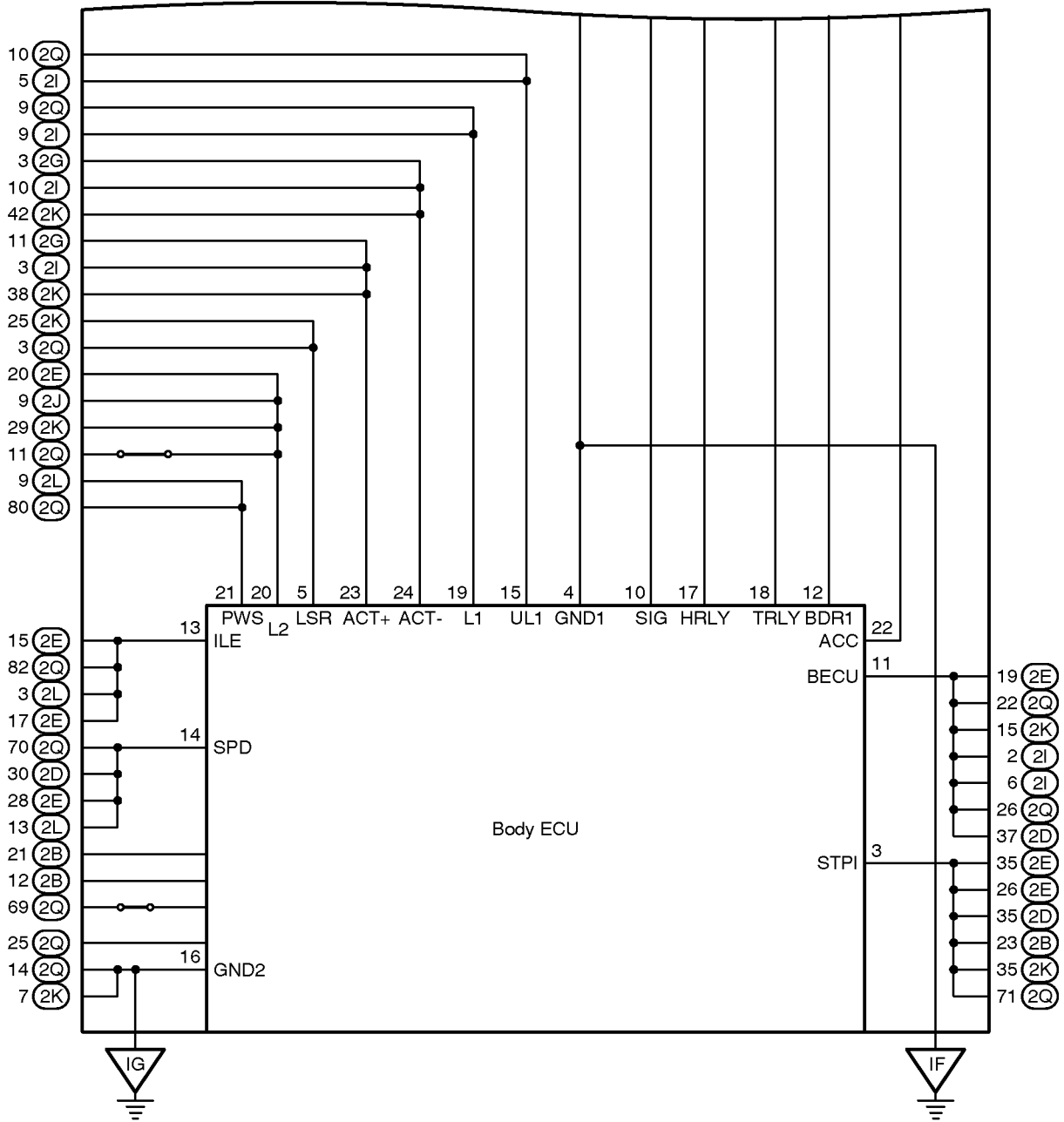


(Cont. next page)

# F RELAY LOCATIONS

## [Cowl Side J/B LH Inner Circuit]

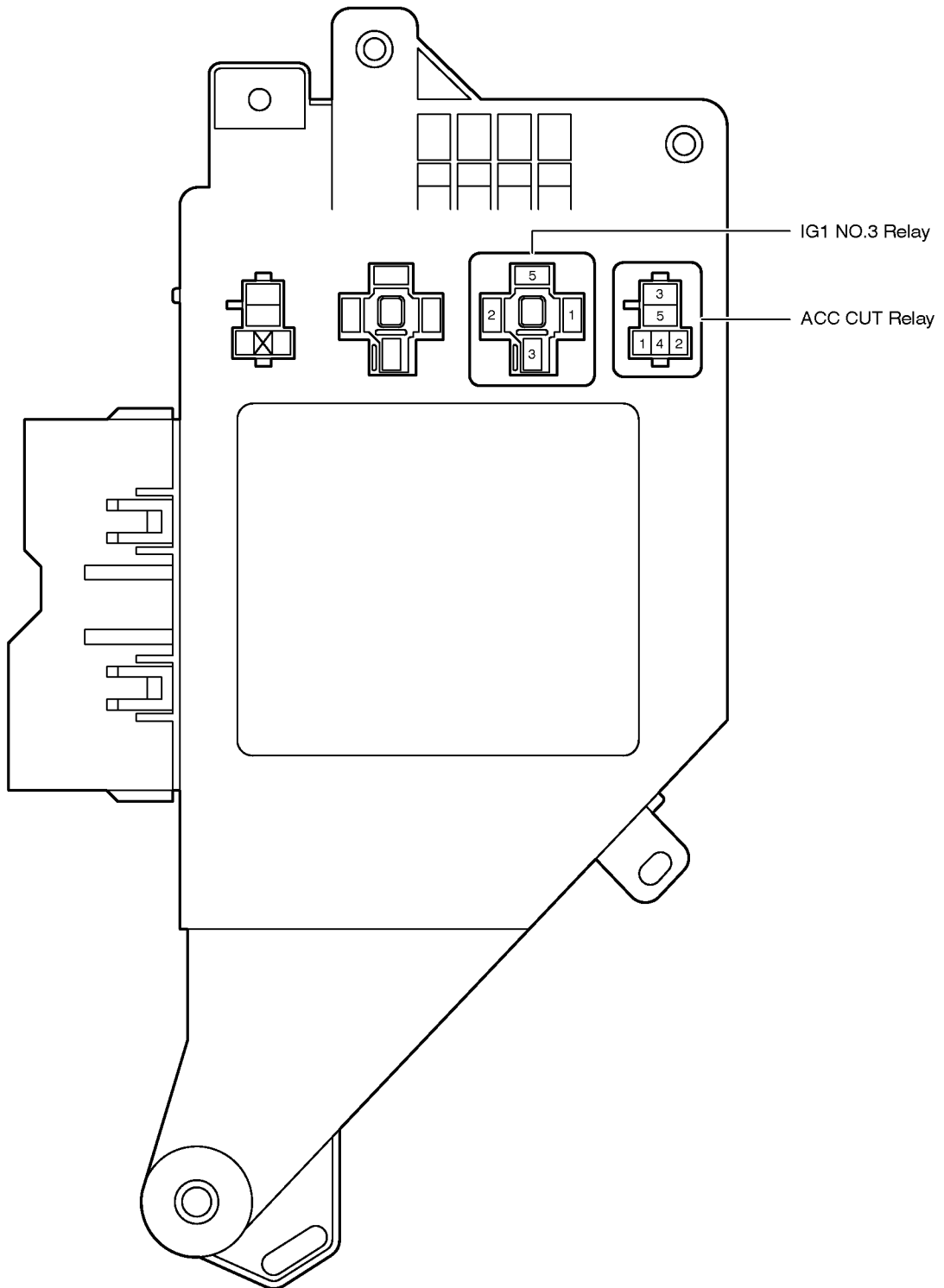
(Cont'd)





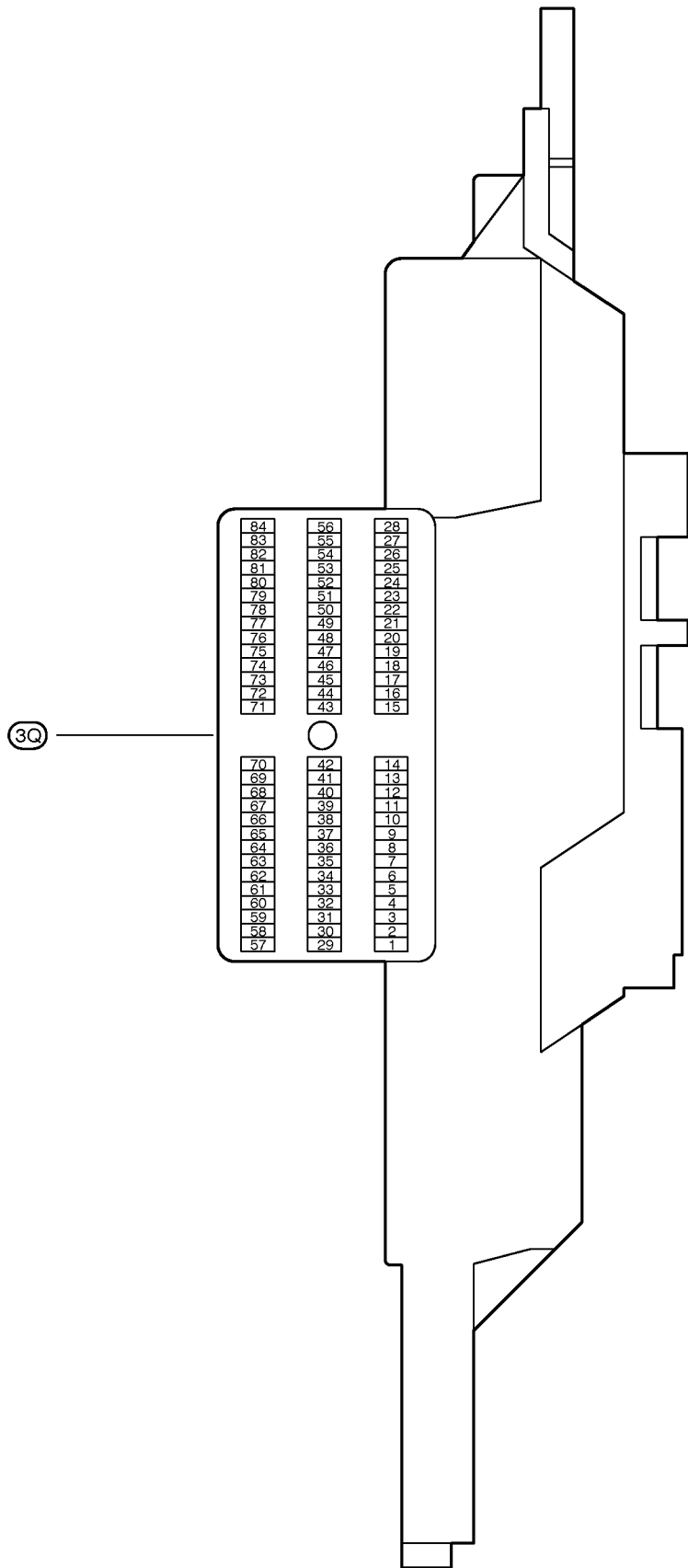


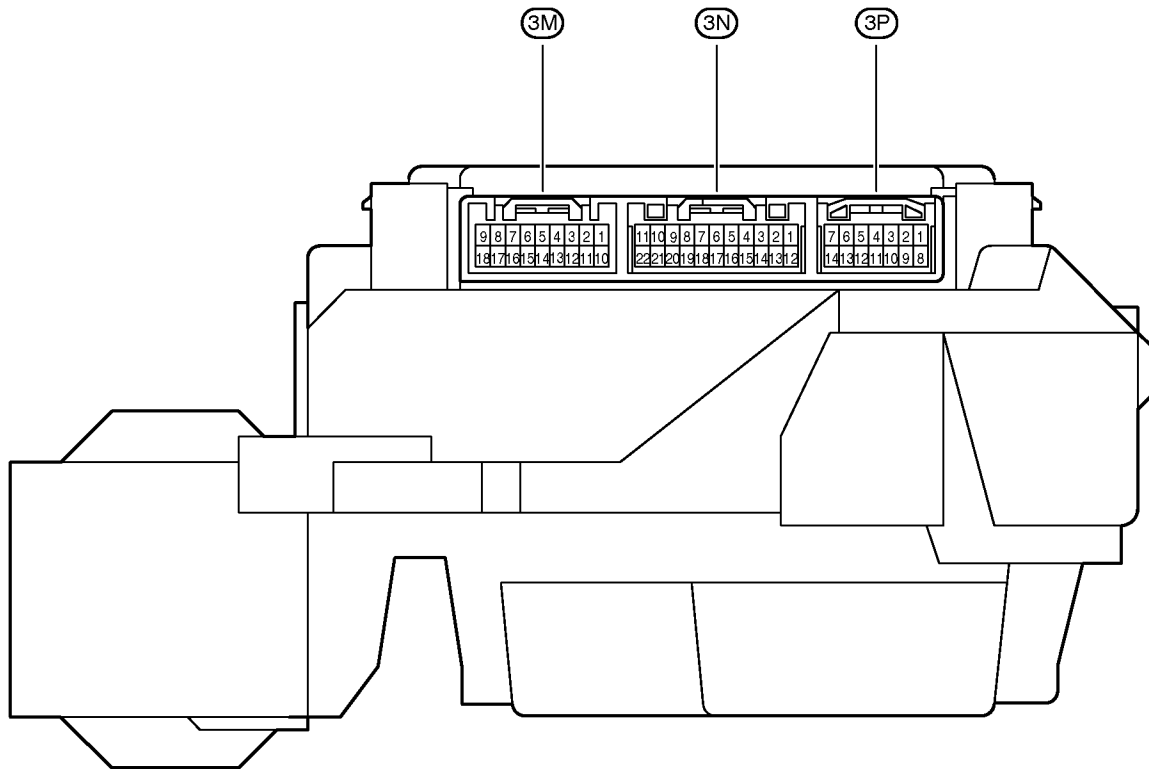




# F RELAY LOCATIONS

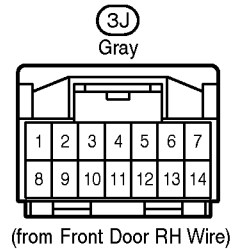
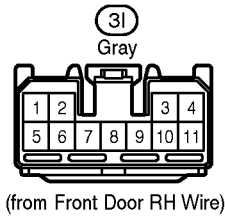
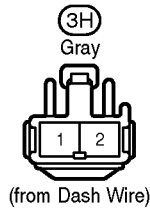
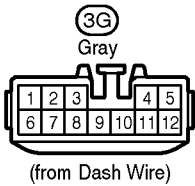
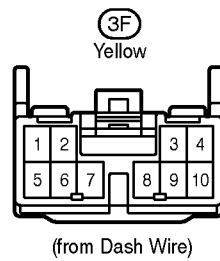
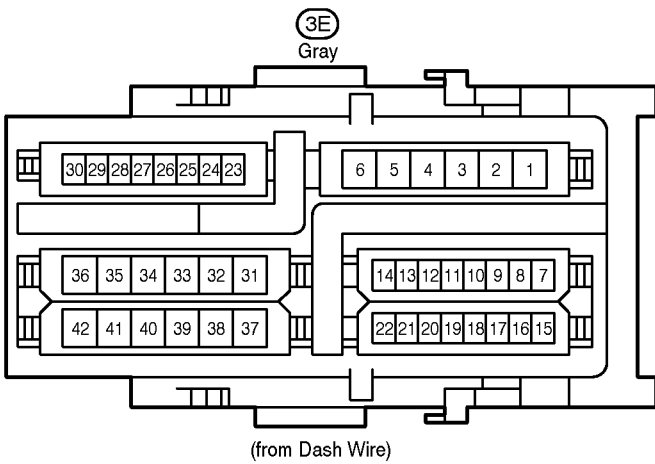
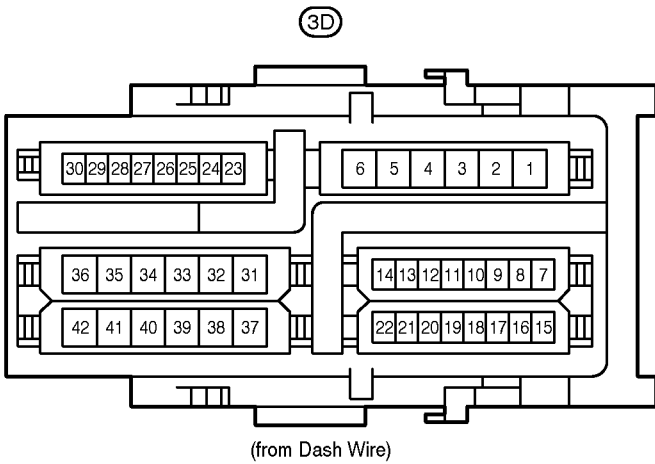
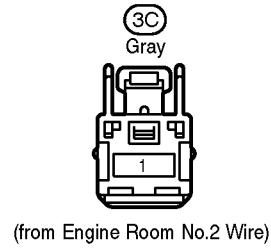
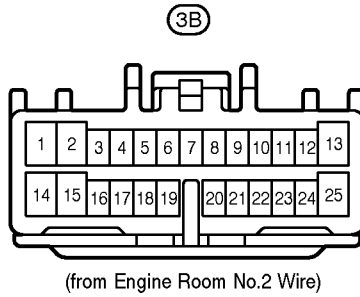
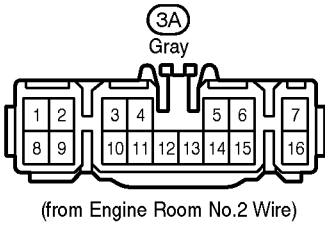
○ : Cowl Side J/B RH      **Right Kick Panel (See Page 20)**  
**(Inner Circuit : See Page 46)**

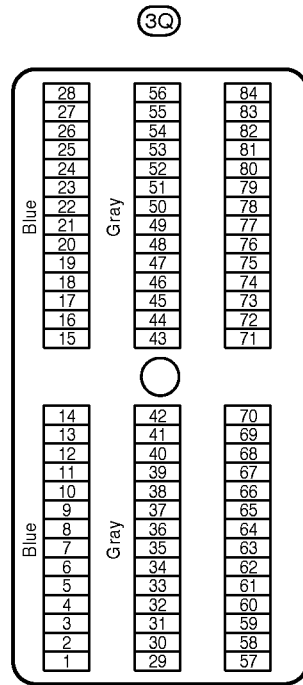
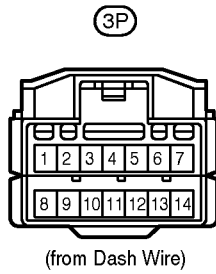
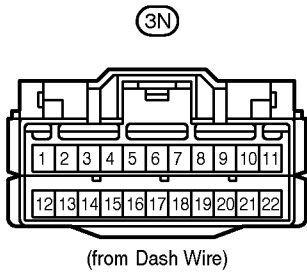
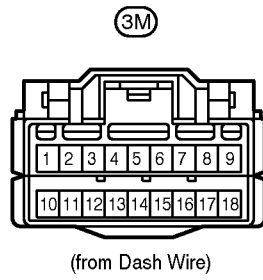
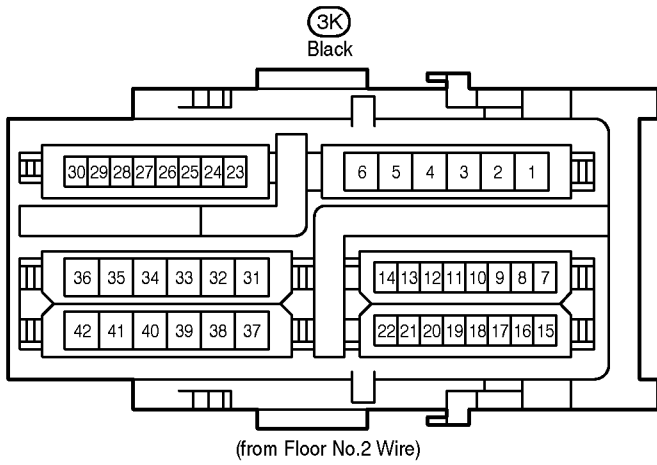




# F RELAY LOCATIONS

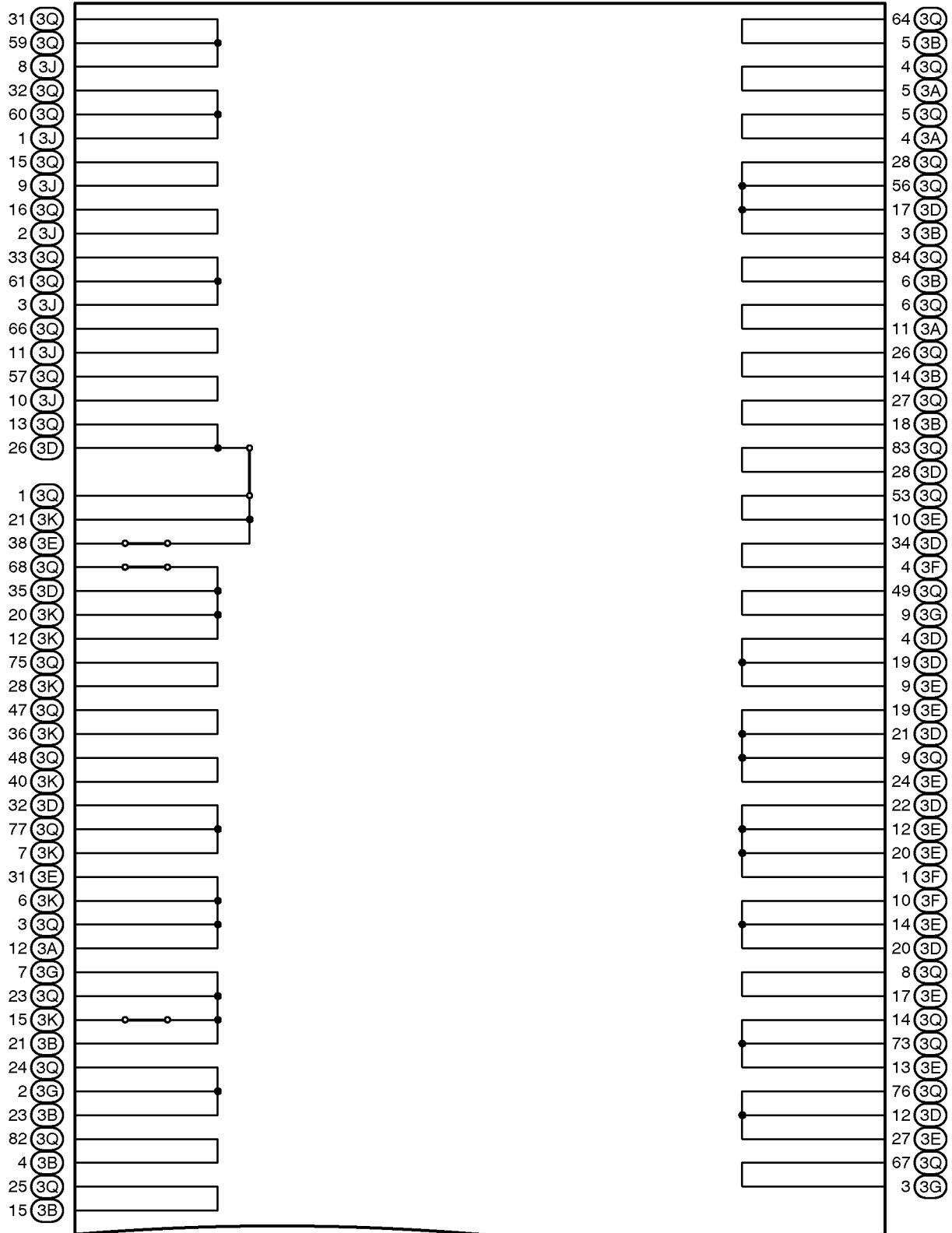
○ : Cowl Side J/B RH      **Right Kick Panel (See Page 20)**  
**(Inner Circuit : See Page 46)**





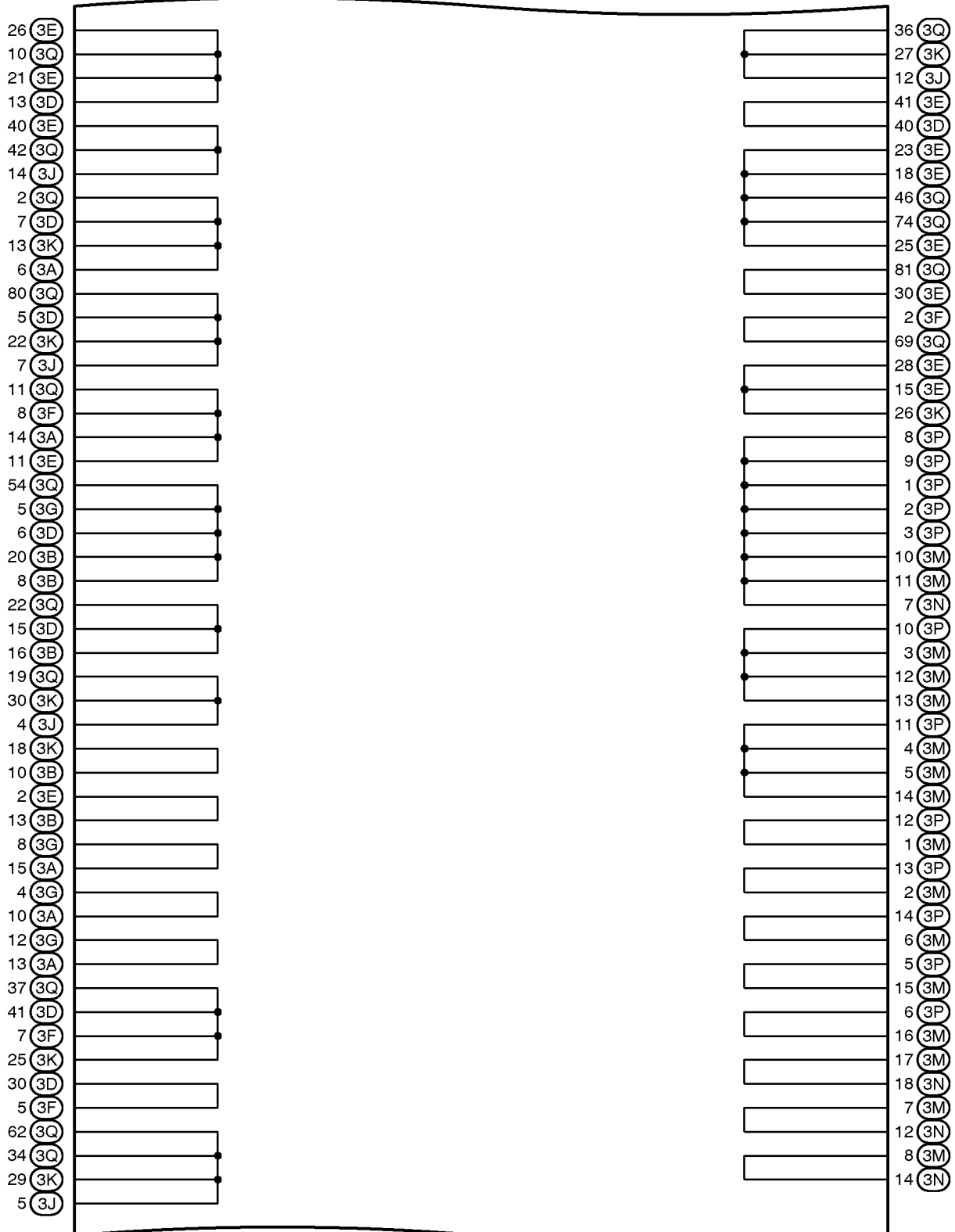
# F RELAY LOCATIONS

## [Cowl Side J/B RH Inner Circuit]



(Cont. next page)

(Cont'd)

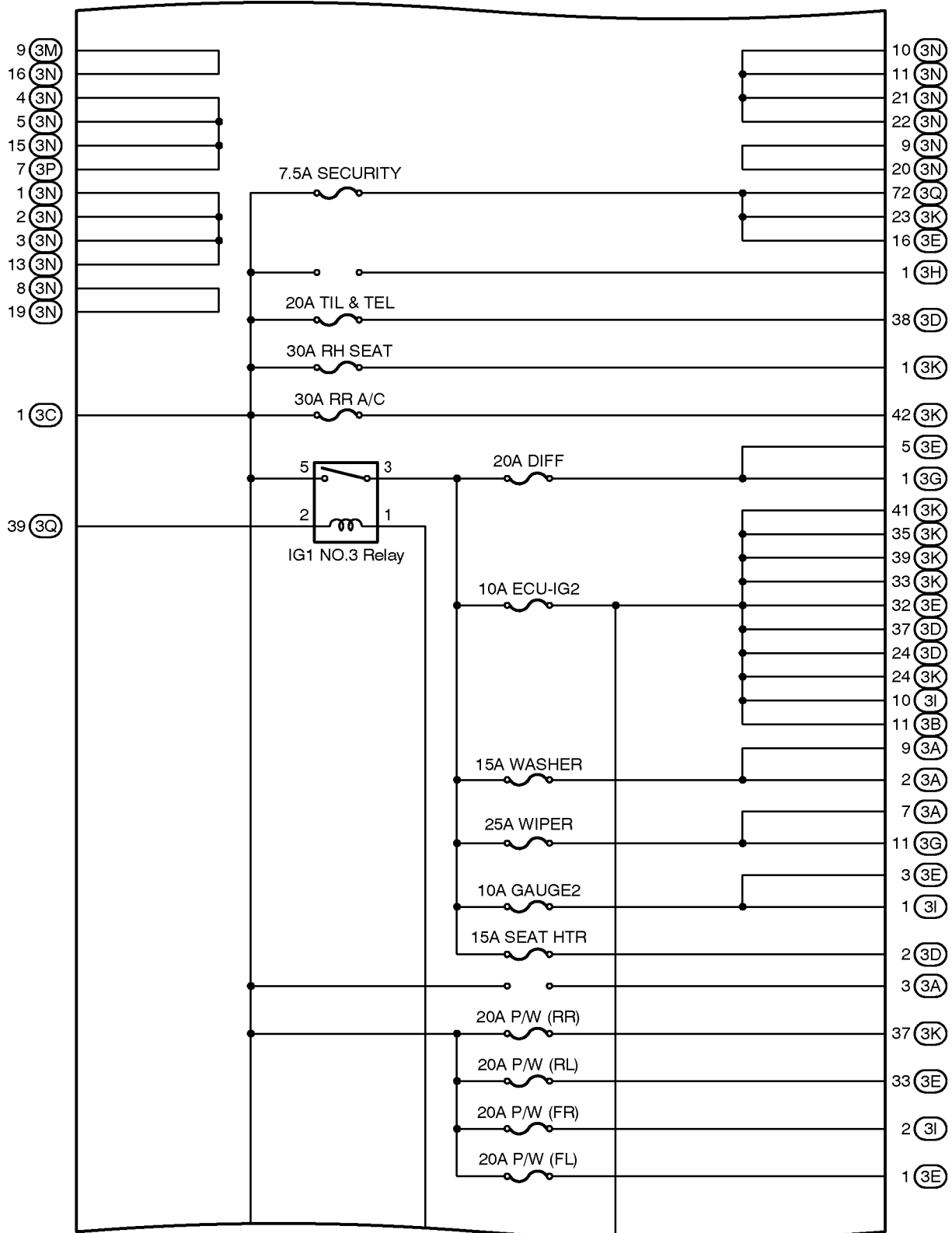


(Cont. next page)

# F RELAY LOCATIONS

## [Cowl Side J/B RH Inner Circuit]

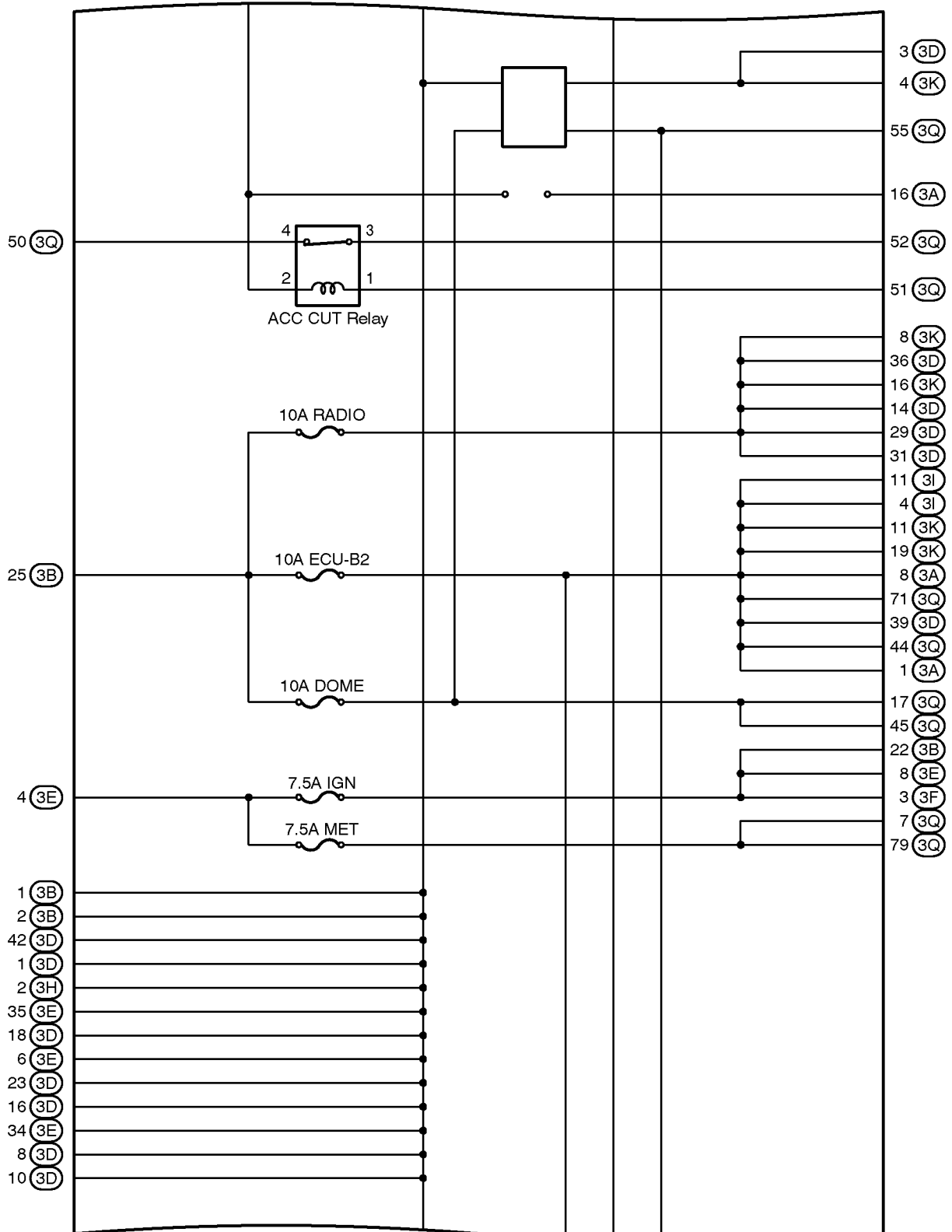
(Cont'd)



(Cont. next page)



(Cont'd)

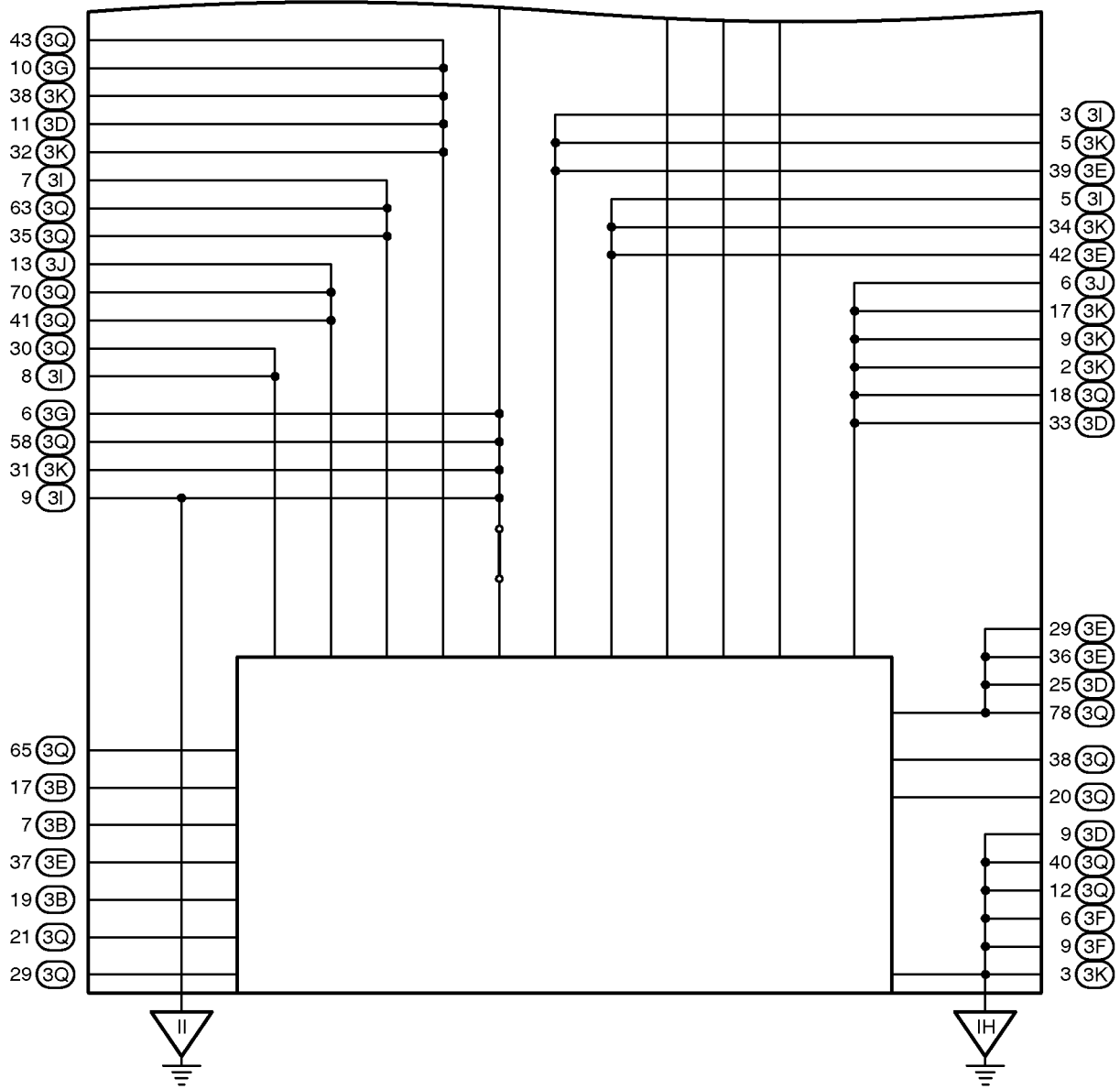


(Cont. next page)

# F RELAY LOCATIONS

## [Cowl Side J/B RH Inner Circuit]

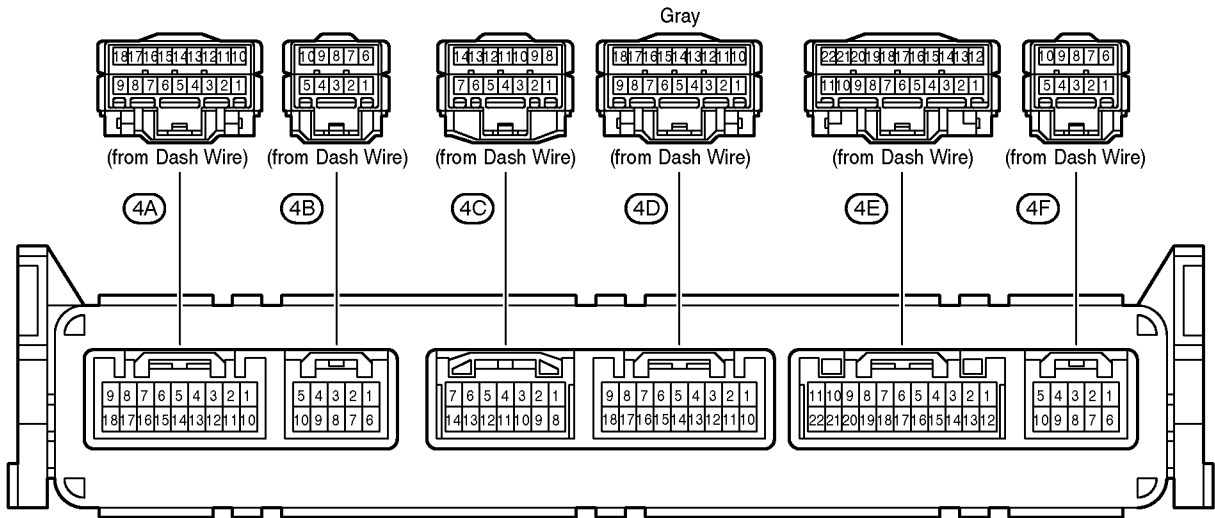
(Cont'd)





# F RELAY LOCATIONS

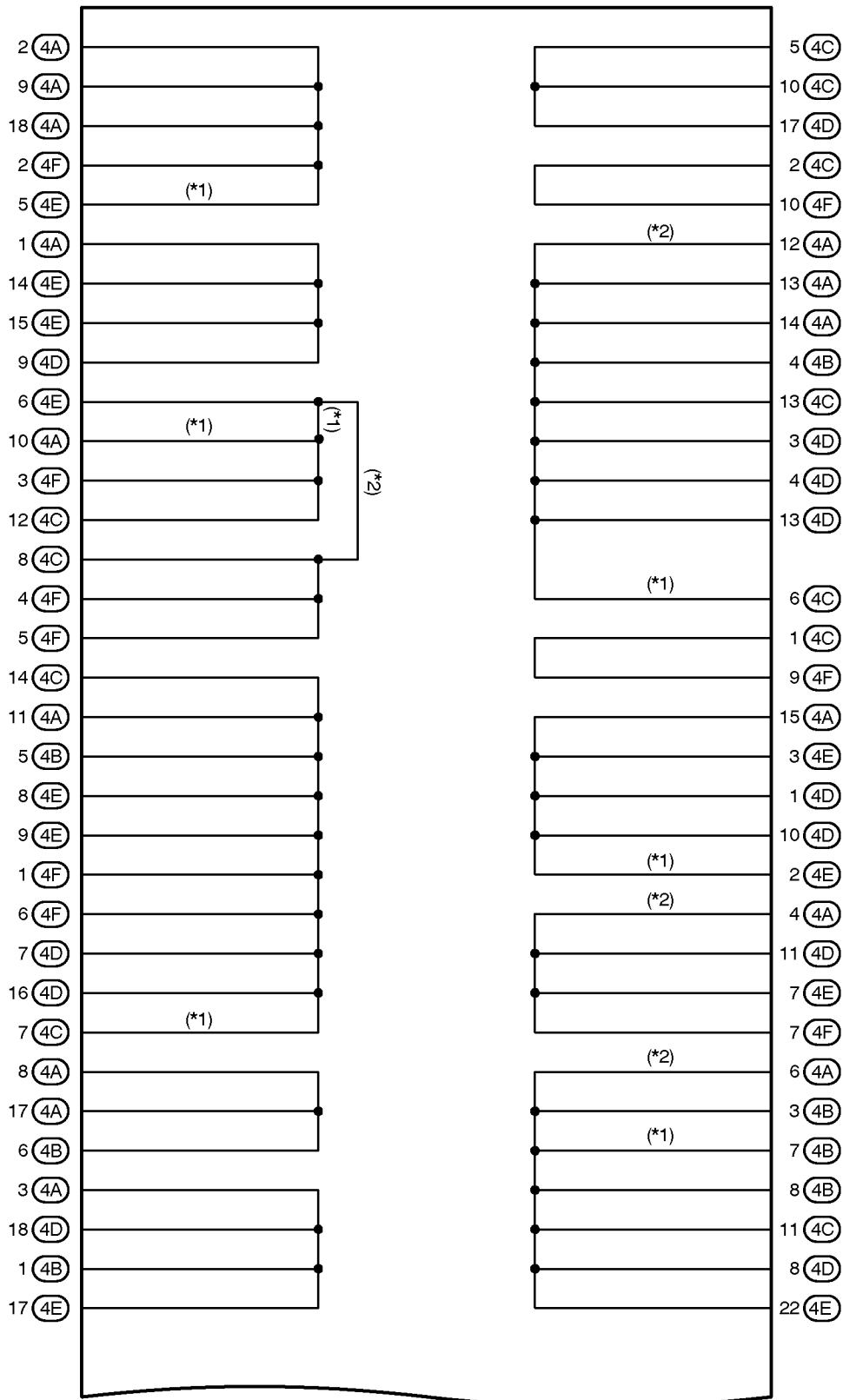
○ : J/B No.4      Instrument Panel Center (See Page 20)





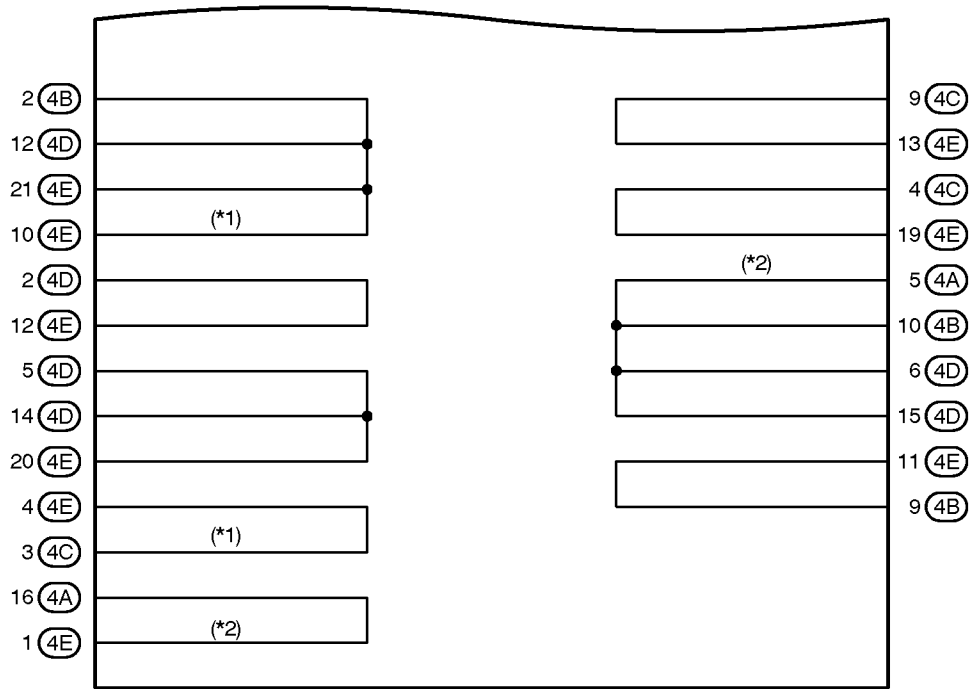
# F RELAY LOCATIONS

## [J/B No.4 Inner Circuit]



(Cont. next page)

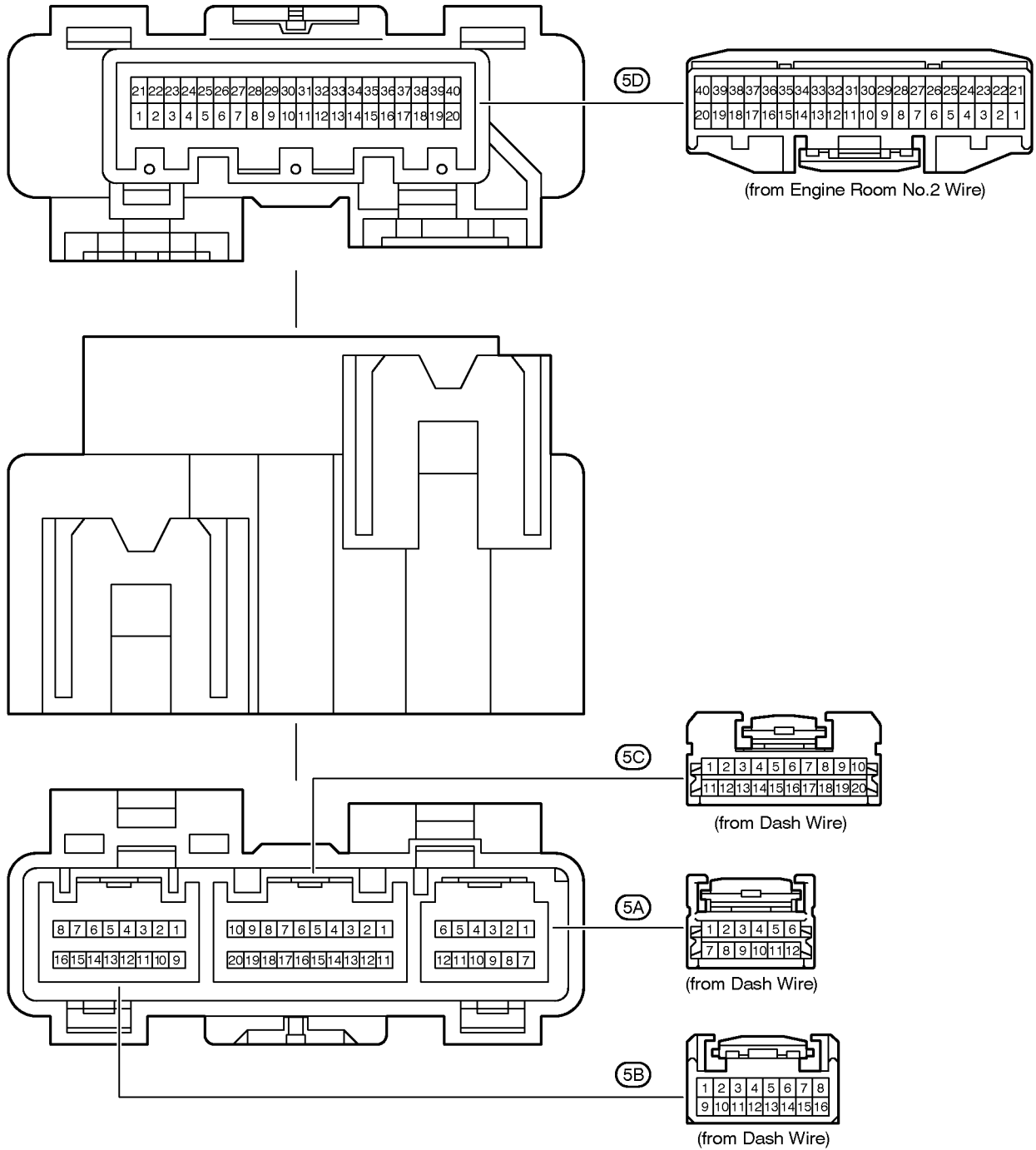
(Cont'd)



\* 1:w/ Navigation System  
\* 2:w/o Navigation System

# F RELAY LOCATIONS

○ : J/B No.5 Behind the Combination Meter (See Page 20)

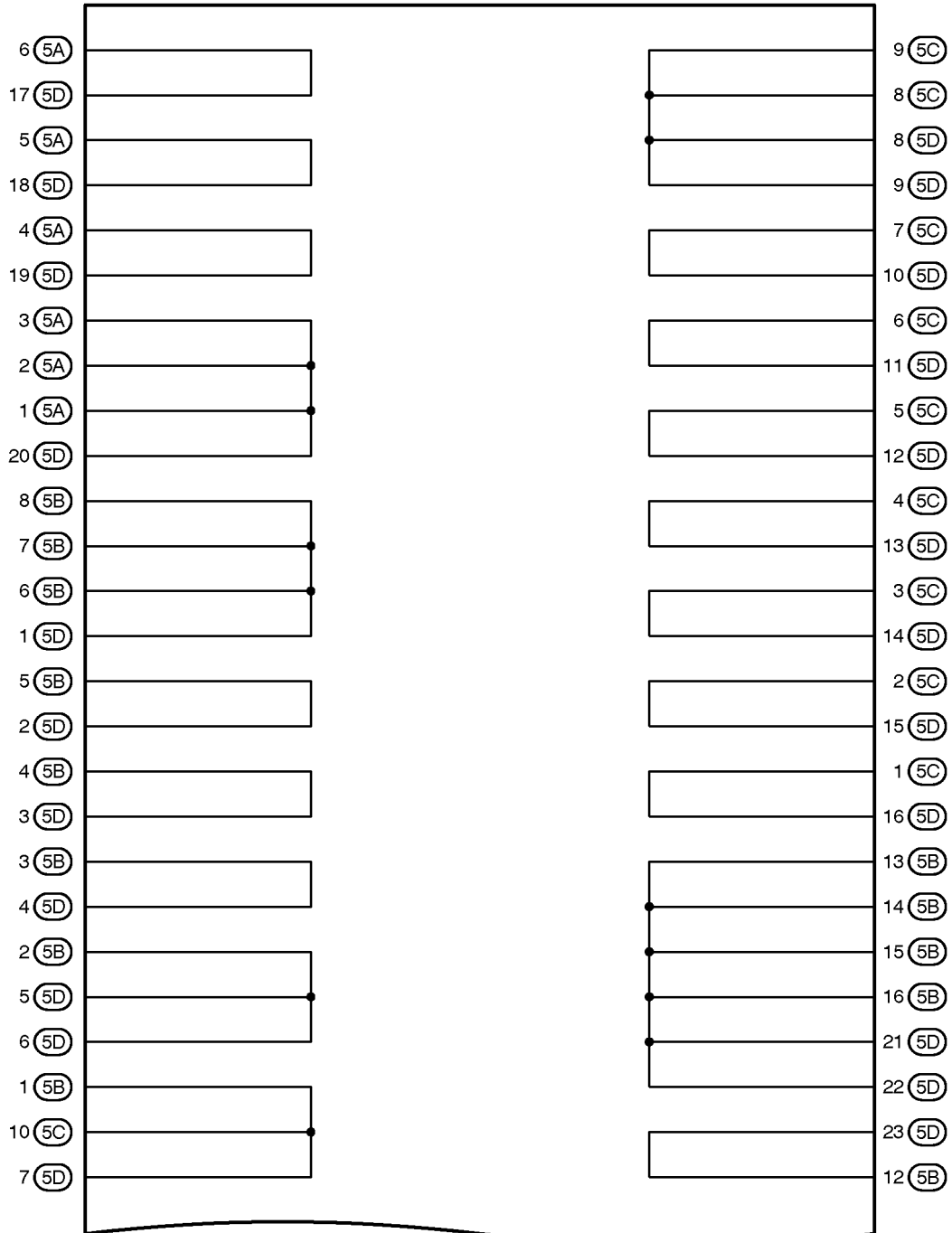






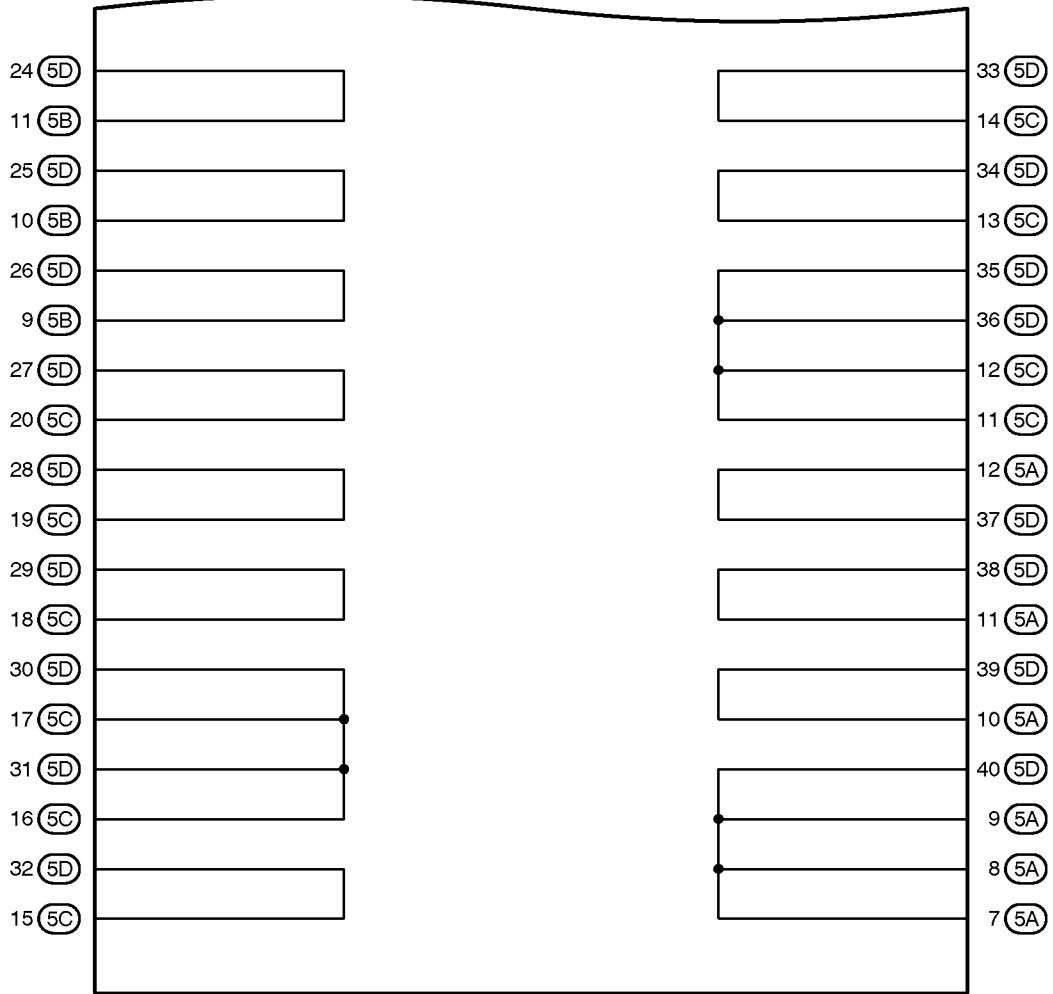
# F RELAY LOCATIONS

## [J/B No.5 Inner Circuit]



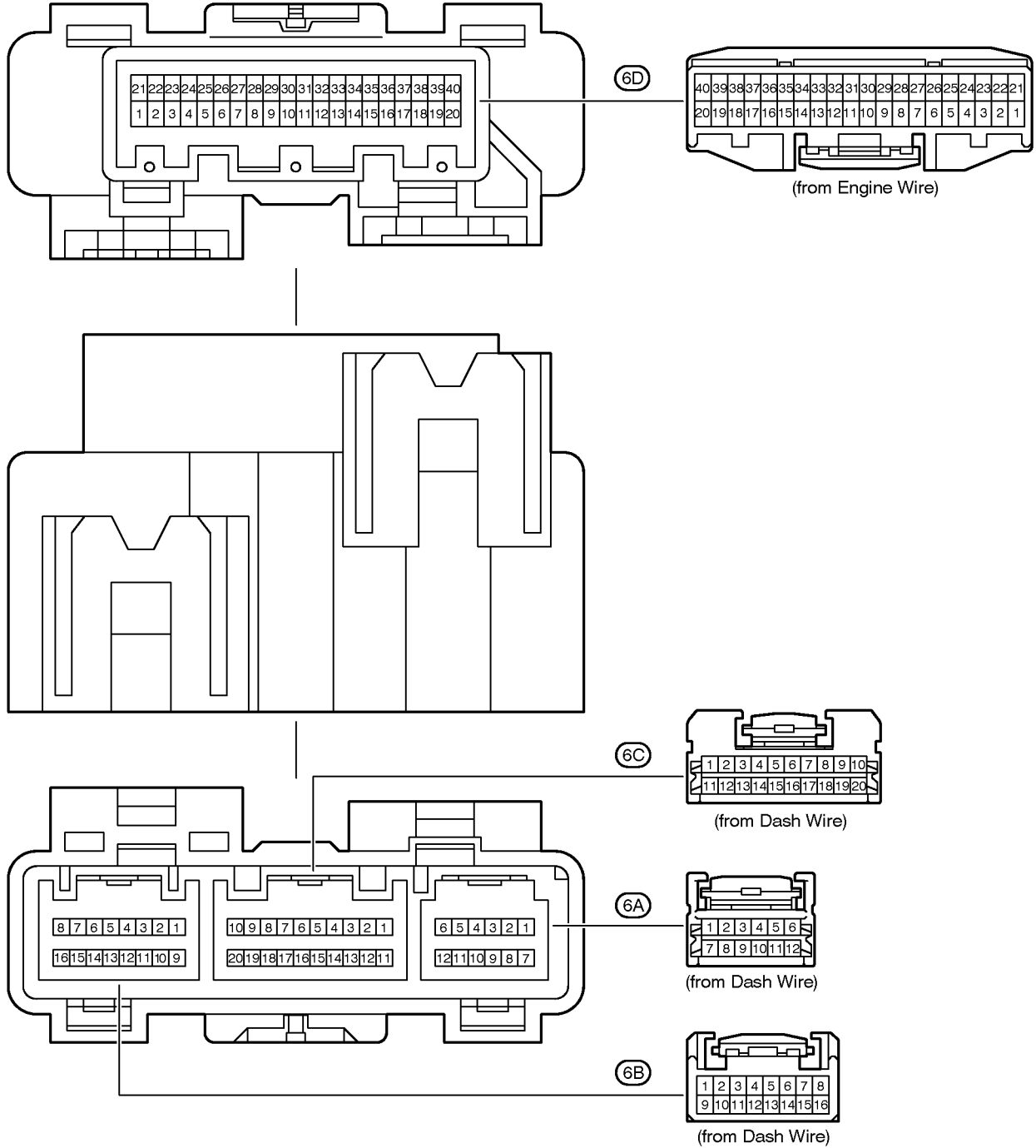
(Cont. next page)

(Cont'd)



# F RELAY LOCATIONS

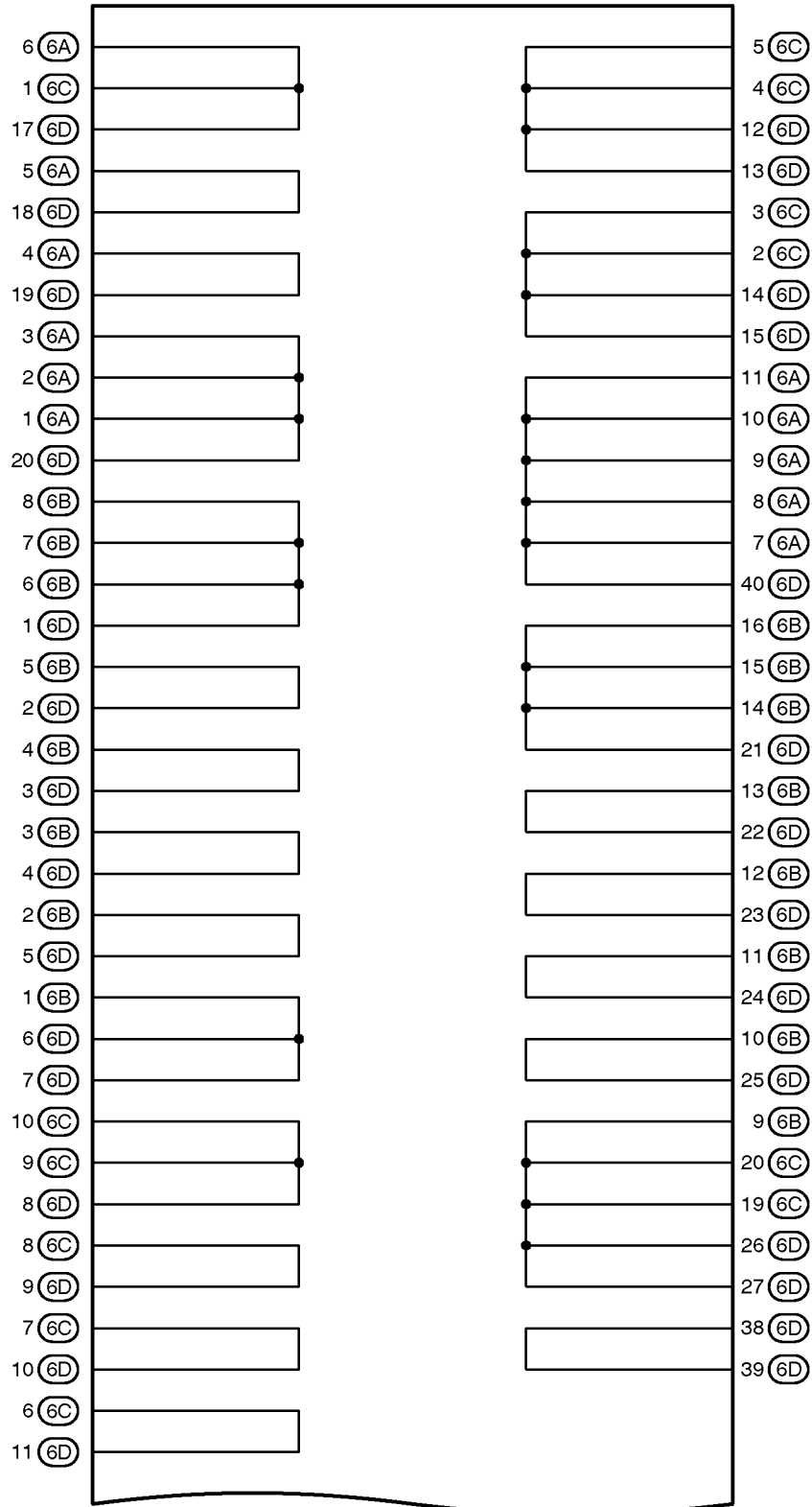
○ : J/B No.6 Behind the Glove Box (See Page 20)





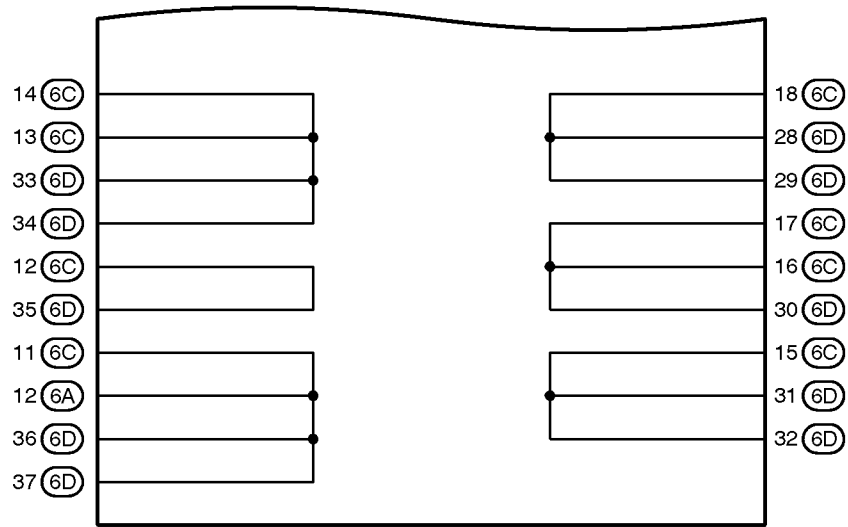
# F RELAY LOCATIONS

## [J/B No.6 Inner Circuit]



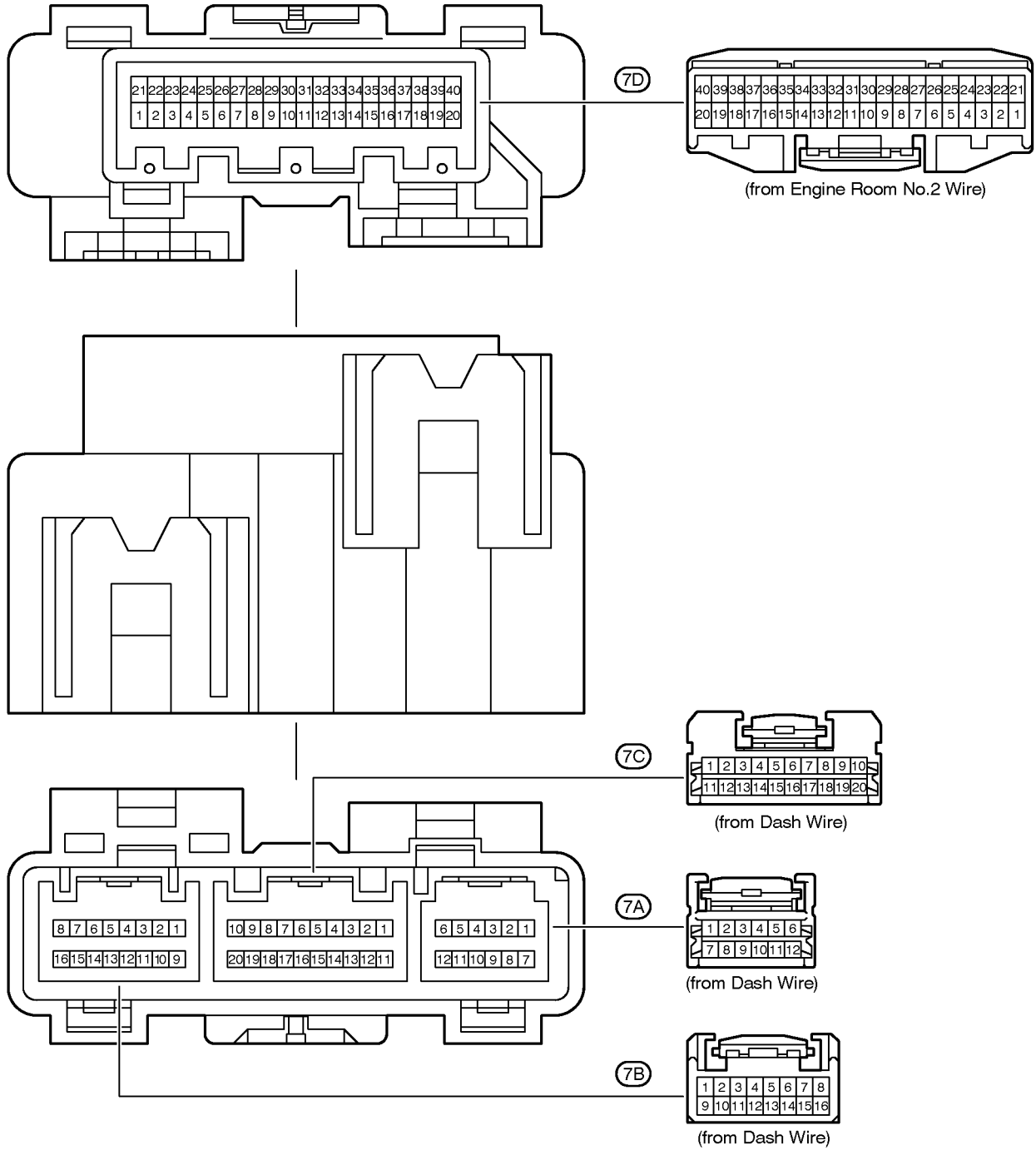
(Cont. next page)

(Cont'd)



# F RELAY LOCATIONS

○ : J/B No.7 Behind the Glove Box (See Page 20)

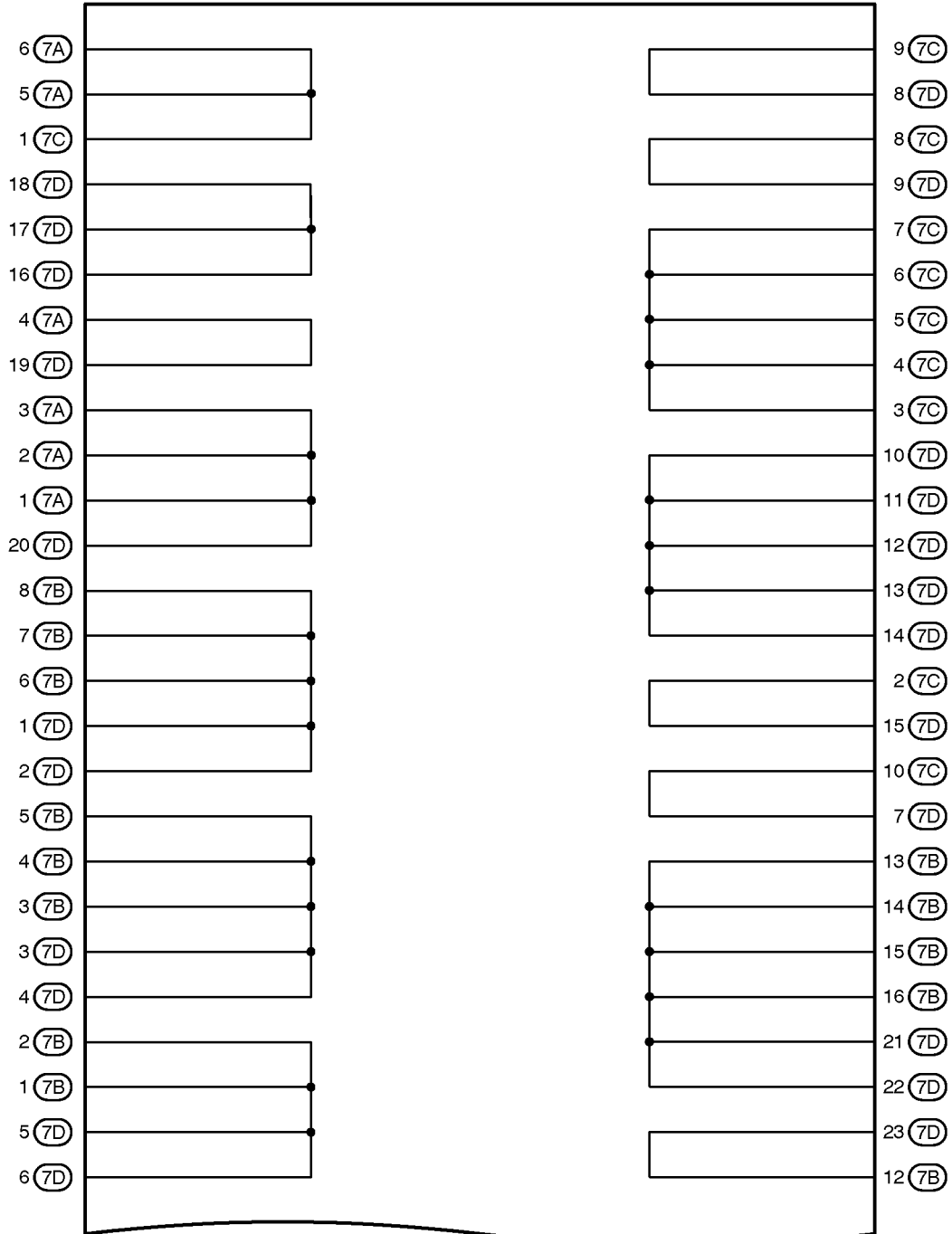






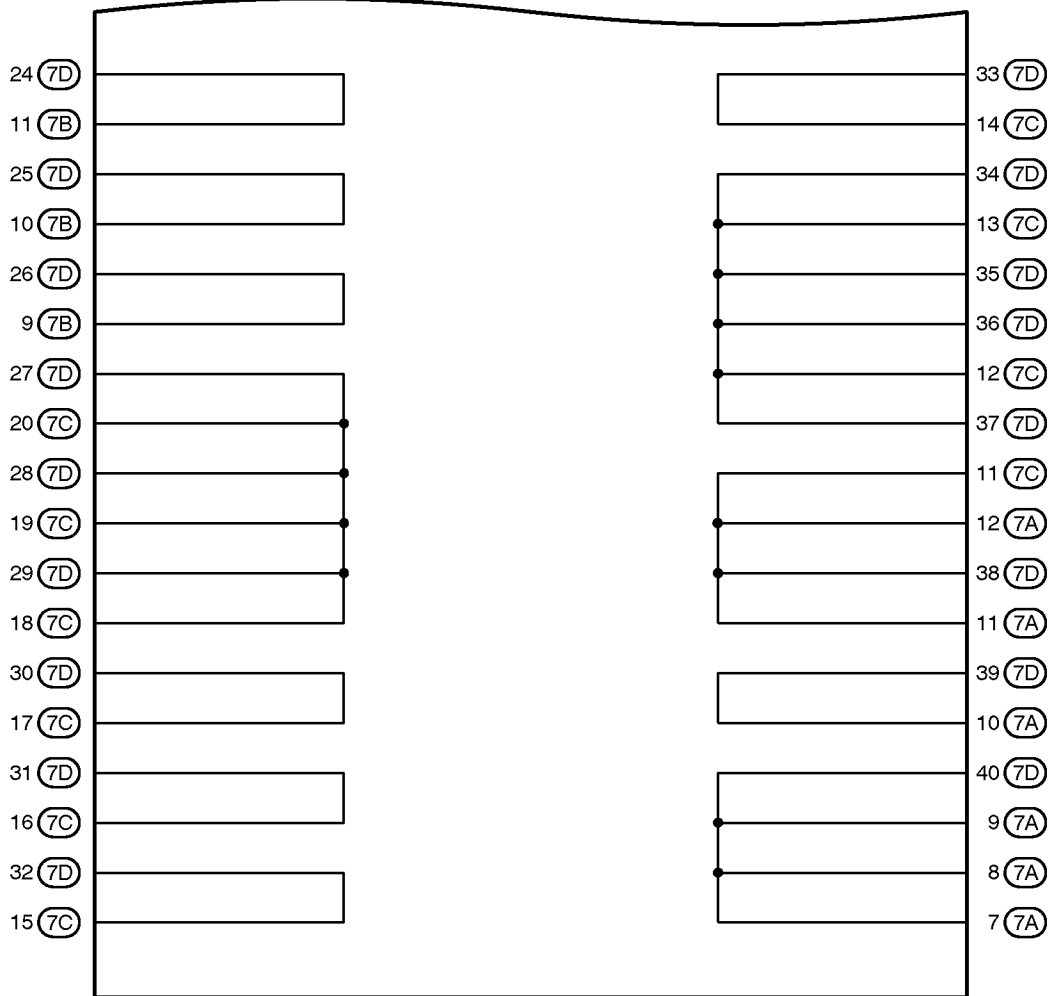
# F RELAY LOCATIONS

## [J/B No.7 Inner Circuit]

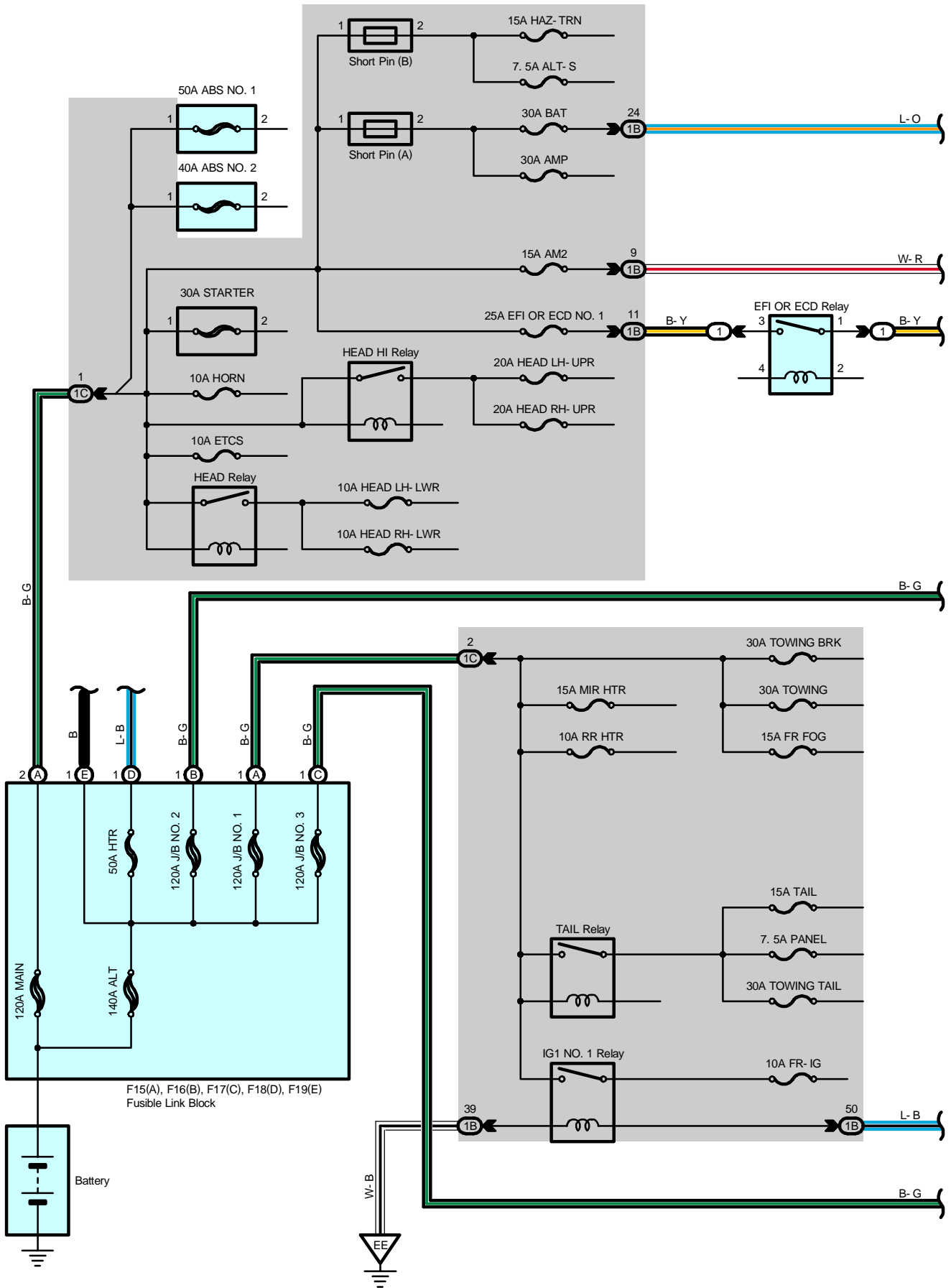


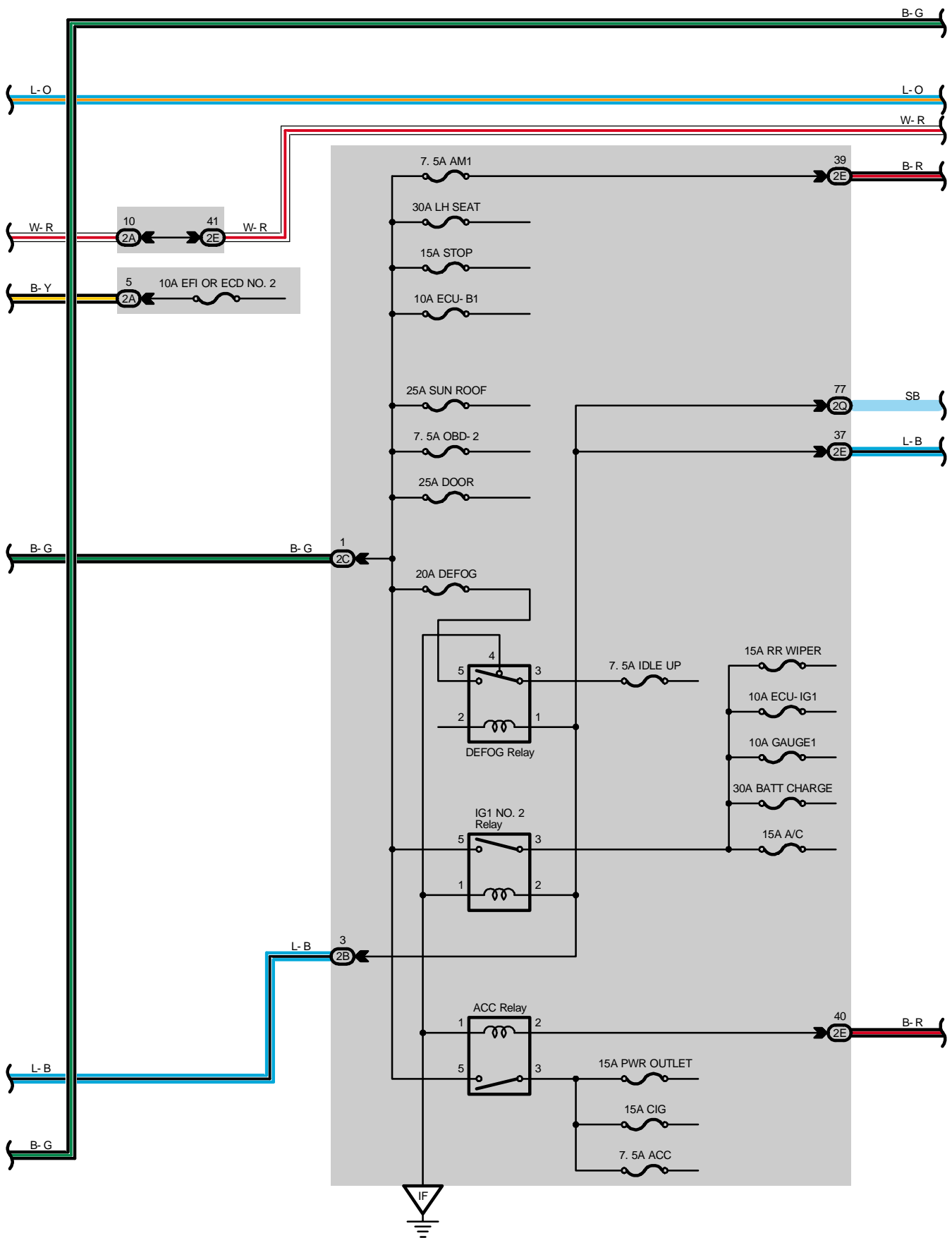
(Cont. next page)

(Cont'd)

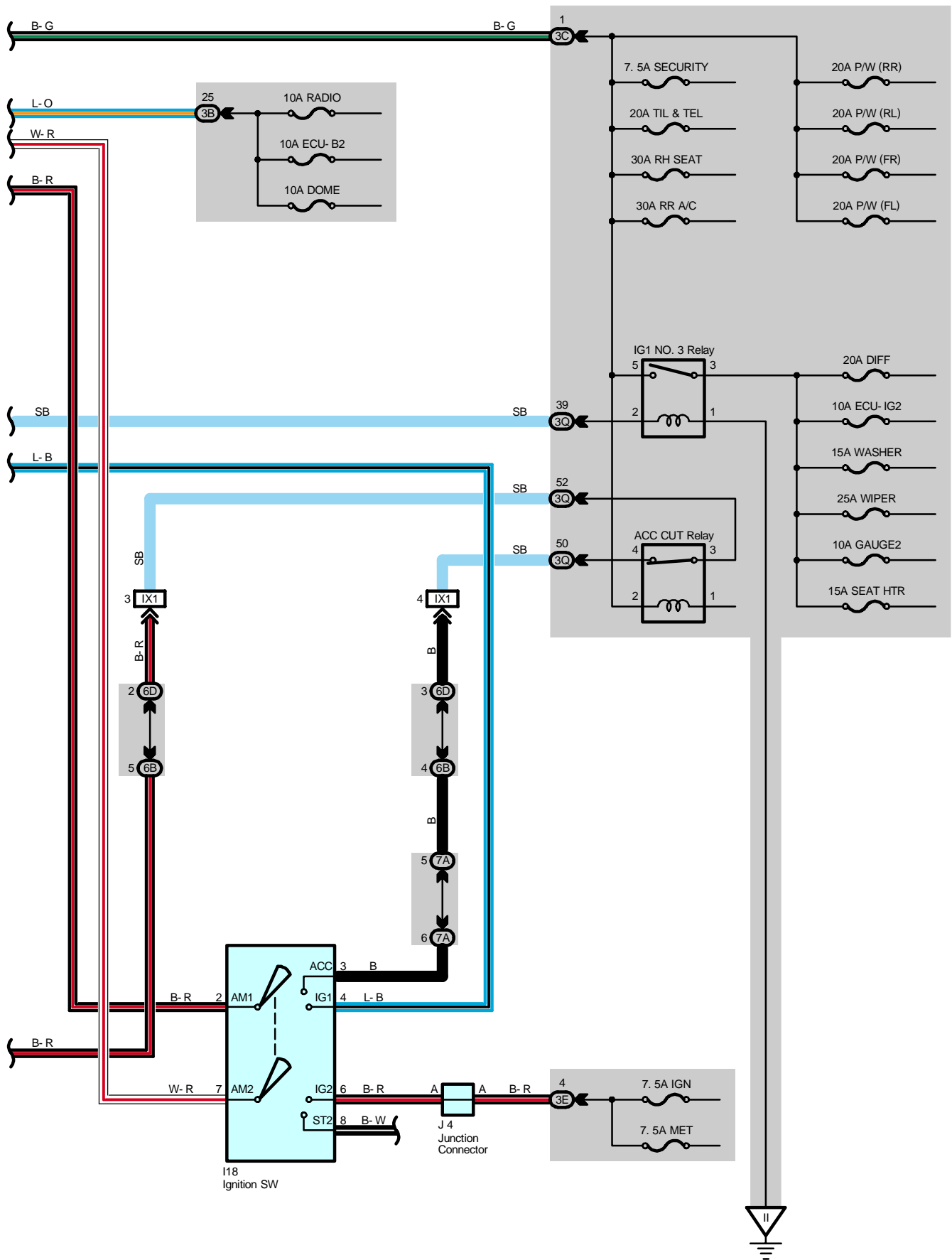


# Power Source





# Power Source



**Service Hints****I18 Ignition SW**

2-3 : Closed with ignition SW at ACC or ON position

2-4 : Closed with ignition SW at ON or ST position

7-6 : Closed with ignition SW at ON or ST position

7-8 : Closed with ignition SW at ST position

 : **Parts Location**

Code		See Page	Code		See Page	Code		See Page
F15	A	68	F18	D	68	J4	71	
F16	B	68	F19	E	68			
F17	C	68	I18		70			

 : **Relay Blocks**

Code	See Page	Relay Blocks (Relay Block Location)
1	22	Engine Room R/B (Engine Compartment Left)

 : **Junction Block and Wire Harness Connector**

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
1C		
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2B		
2C		
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3B	40	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3C		
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
6B	60	Dash Wire and J/B No.6 (Behind the Grove Box)
6D	60	Engine Wire and J/B No.6 (Behind the Grove Box)
7A	64	Dash Wire and J/B No.7 (Behind the Grove Box)

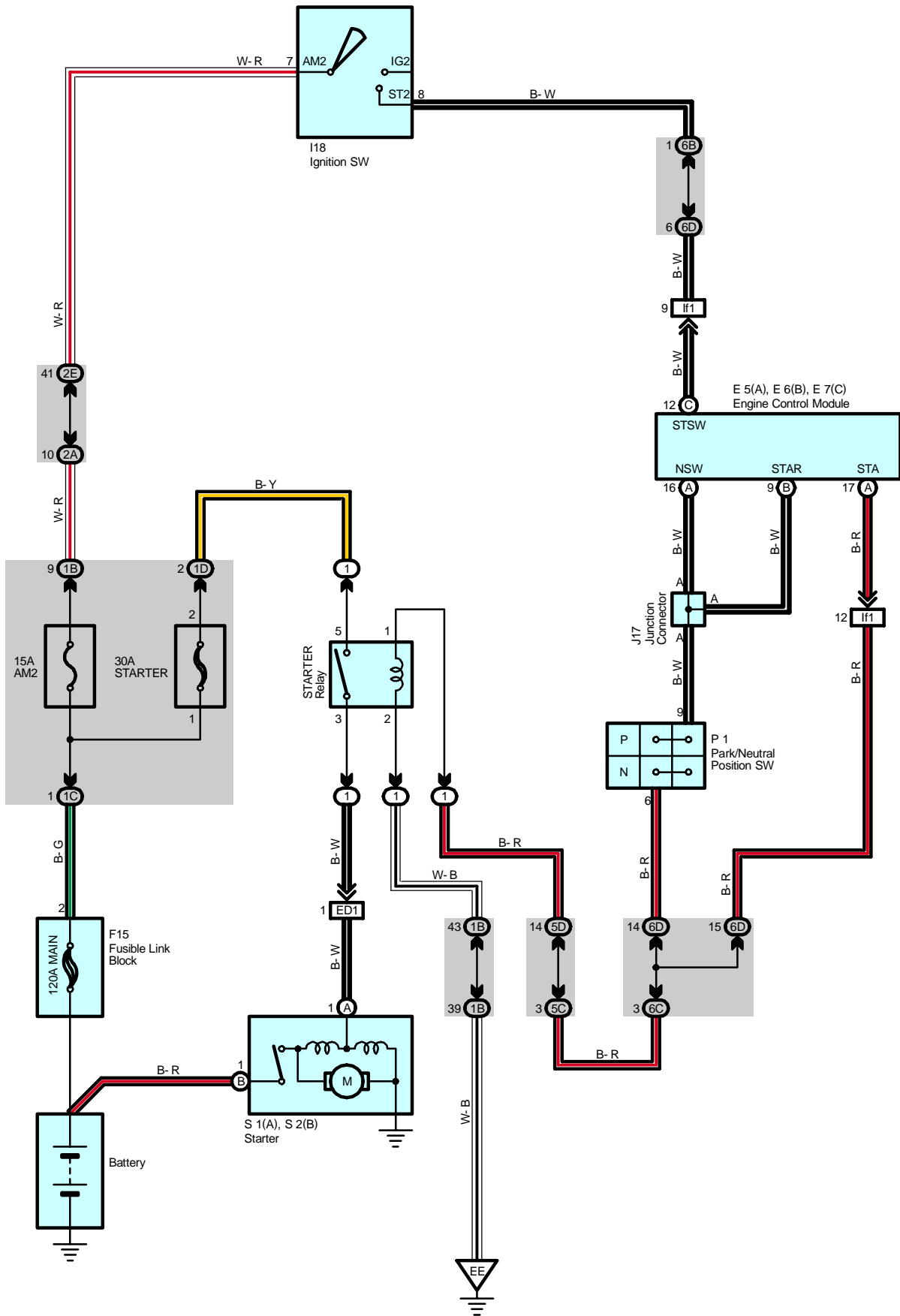
 : **Connector Joining Wire Harness and Wire Harness**

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)

 : **Ground Points**

Code	See Page	Ground Points Location
EE	76	Front Left Side of Fender Apron
IF	78	Set Bolt of Cowl Side J/B LH
II	78	Set Bolt of Cowl Side J/B RH

# Starting





## Service Hints

### I18 Ignition SW

7-8 : Closed with ignition SW at ST position

### P1 Park/Neutral Position SW

6-9 : Closed with A/T shift lever in P or N position

### S1 (A), S2 (B) Starter

Points closed with Park/Neutral position SW at P or N position and ignition SW at ST position

## : Parts Location

Code		See Page	Code		See Page	Code		See Page
E5	A	70	F15	68	P1		69	
E6	B	70	I18	70	S1	A	69	
E7	C	70	J17	71	S2	B	69	

## : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
1	22	Engine Room R/B (Engine Compartment Left)

## : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
1C		
1D		
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
5C	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)
6B	60	Dash Wire and J/B No.6 (Behind the Grove Box)
6C		
6D		

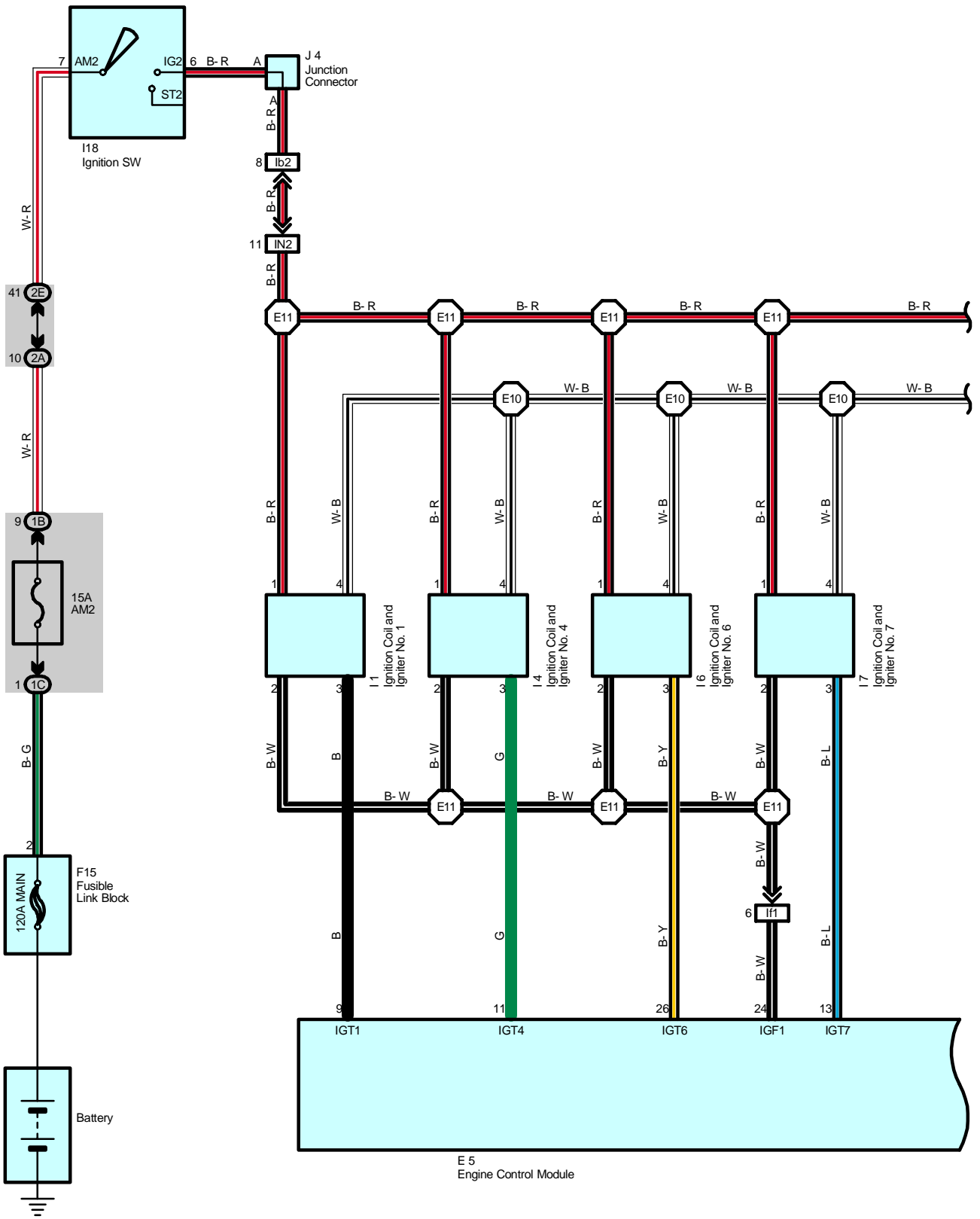
## : Connector Joining Wire Harness and Wire Harness

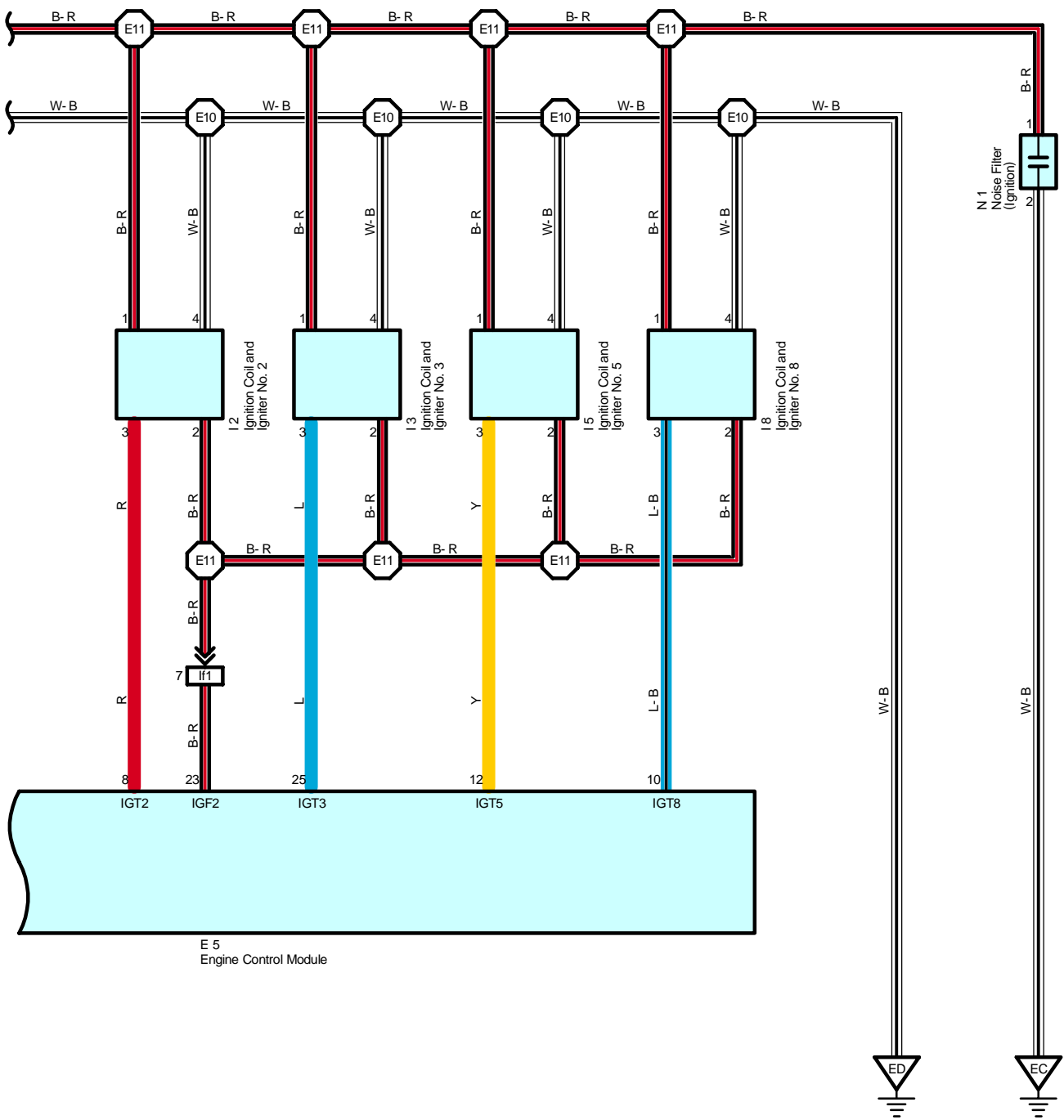
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
ED1	76	Engine No.2 Wire and Engine Room No.2 Wire (Near the Engine Room J/B)
If1	84	Engine Wire and Engine Wire (Behind the Glove Box)

## : Ground Points

Code	See Page	Ground Points Location
EE	76	Front Left Side of Fender Apron

# Ignition





# Ignition

## Service Hints

### I18 Ignition SW

7-6 : Closed with ignition SW at ON or ST position

## : Parts Location

Code	See Page	Code	See Page	Code	See Page
E5	<a href="#">70</a>	I4	<a href="#">69</a>	I18	<a href="#">70</a>
F15	<a href="#">68</a>	I5	<a href="#">69</a>	J4	<a href="#">71</a>
I1	<a href="#">69</a>	I6	<a href="#">69</a>	N1	<a href="#">69</a>
I2	<a href="#">69</a>	I7	<a href="#">69</a>		
I3	<a href="#">69</a>	I8	<a href="#">69</a>		

## : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	<a href="#">24</a>	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
1C		
2A	<a href="#">28</a>	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2E	<a href="#">28</a>	Dash Wire and Cowl Side J/B LH (Left Kick Panel)

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IN2	<a href="#">80</a>	Engine Wire and Dash Wire (Behind the Glove Box)
Ib2	<a href="#">84</a>	Dash Wire and Dash Wire (Behind the Combination Meter)
If1	<a href="#">84</a>	Engine Wire and Engine Wire (Behind the Glove Box)

## : Ground Points

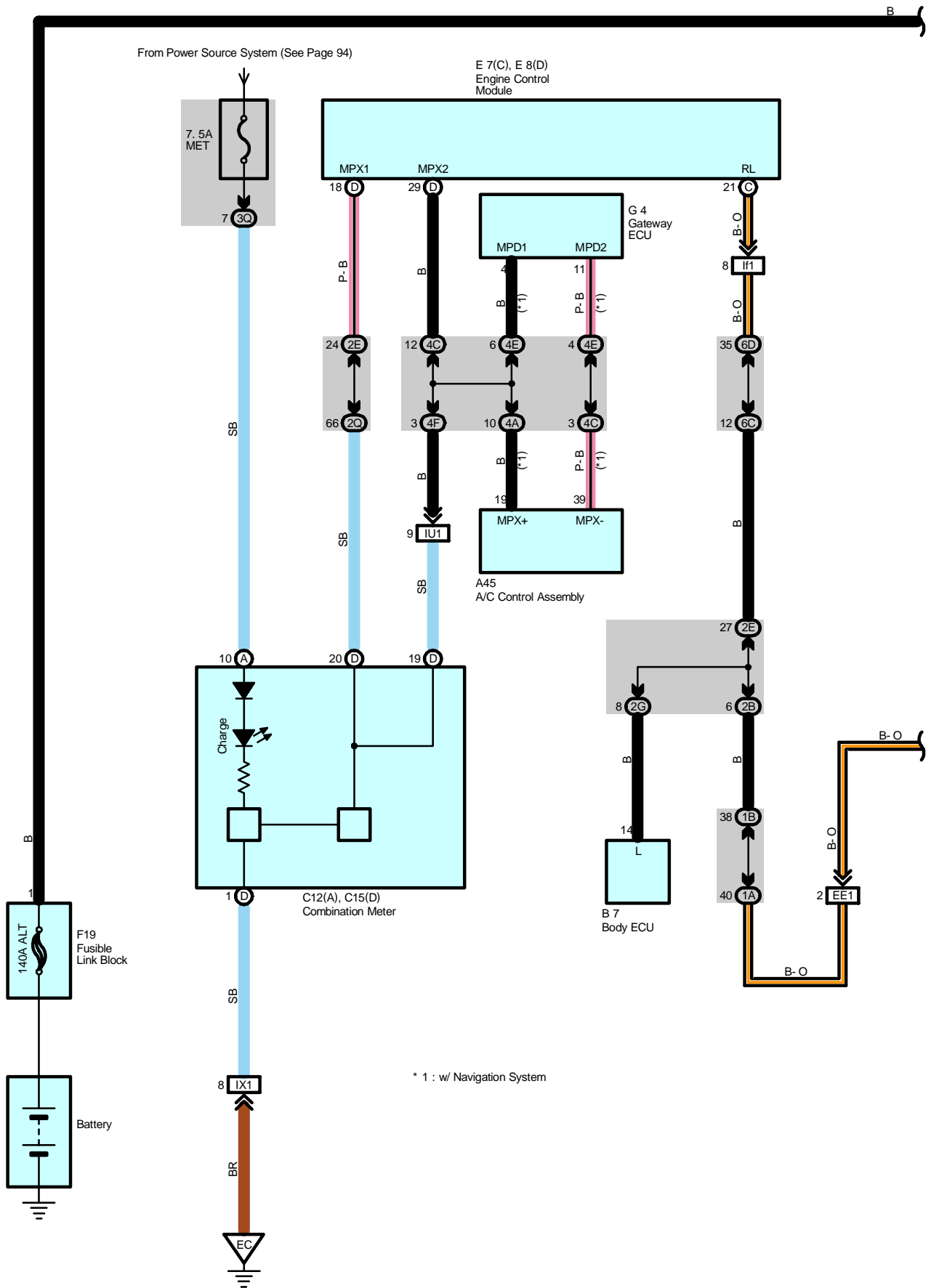
Code	See Page	Ground Points Location
EC	<a href="#">76</a>	Rear Bank of Right Cylinder Head
ED	<a href="#">76</a>	Rear Bank of Left Cylinder Head

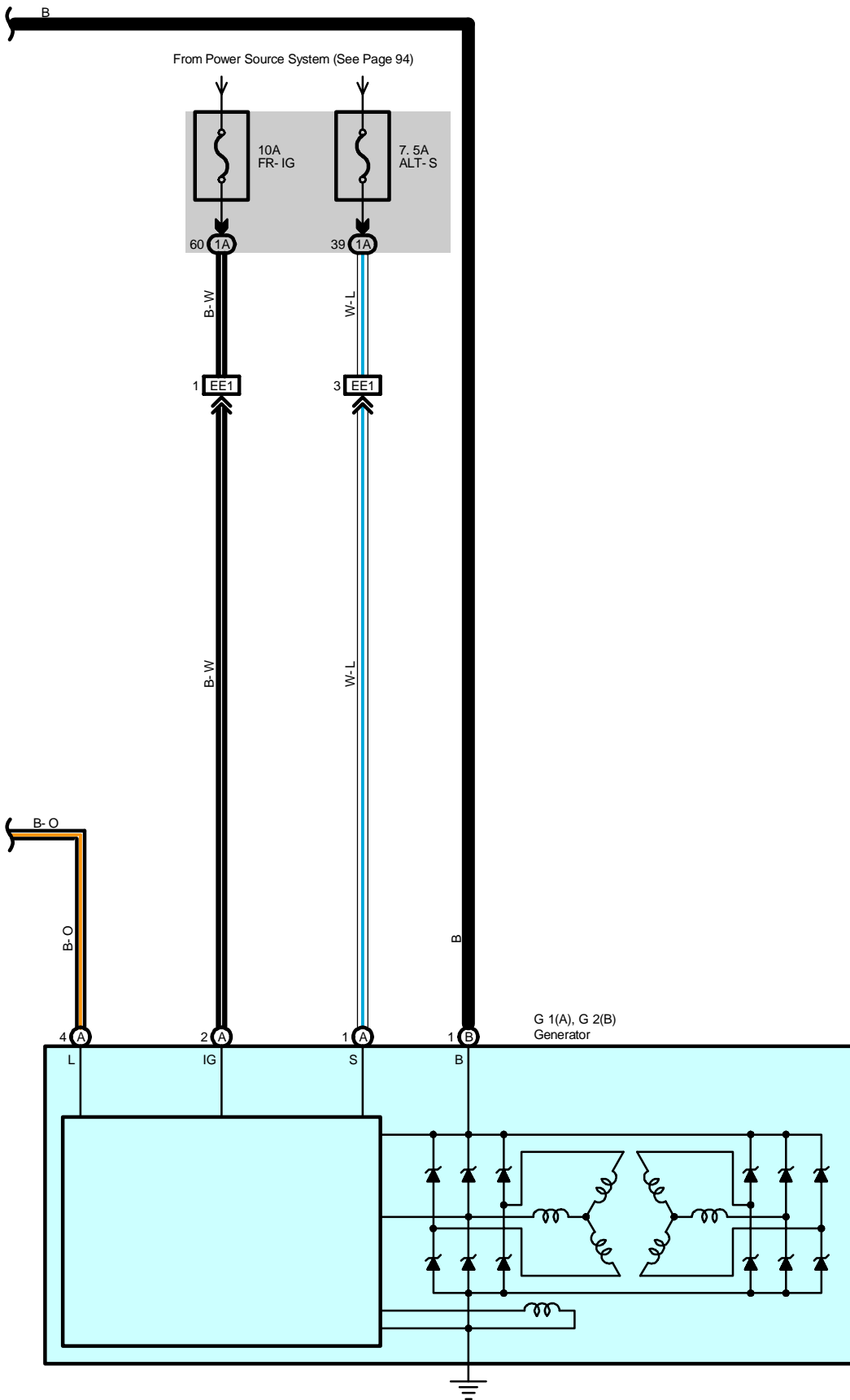
## : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E10	<a href="#">76</a>	Engine Wire	E11	<a href="#">76</a>	Engine Wire



# Charging





# Charging

## Service Hints

### G2 Generator

1-Ground : 13.2-14.0 volts with engine running at 5000 rpm and 115°C (239°F)

### ○ : Parts Location

Code		See Page	Code		See Page	Code		See Page
A45		70	E7	C	70	G2	B	68
B7		70	E8	D	70	G4		70
C12	A	70	F19		68			
C15	D	70	G1	A	68			

### ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2G		
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4E		
4F		
6C	60	Dash Wire and J/B No.6 (Behind the Grove Box)
6D	60	Engine Wire and J/B No.6 (Behind the Grove Box)

### □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EE1	76	Engine Room Main Wire and Alternator Wire (Near the Battery)
IU1	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
If1	84	Engine Wire and Engine Wire (Behind the Glove Box)

### ▽ : Ground Points

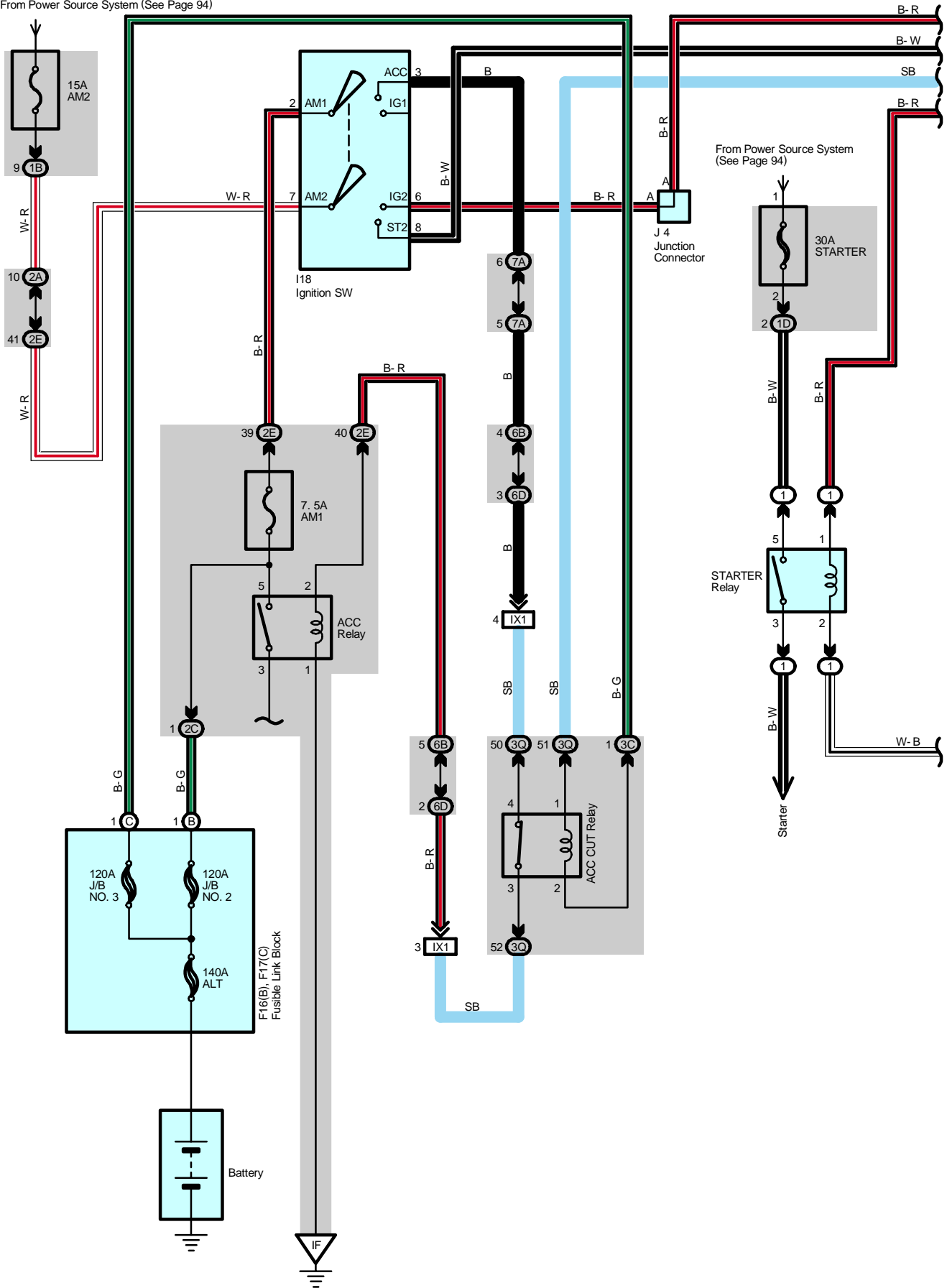
Code	See Page	Ground Points Location
EC	76	Rear Bank of Right Cylinder Head





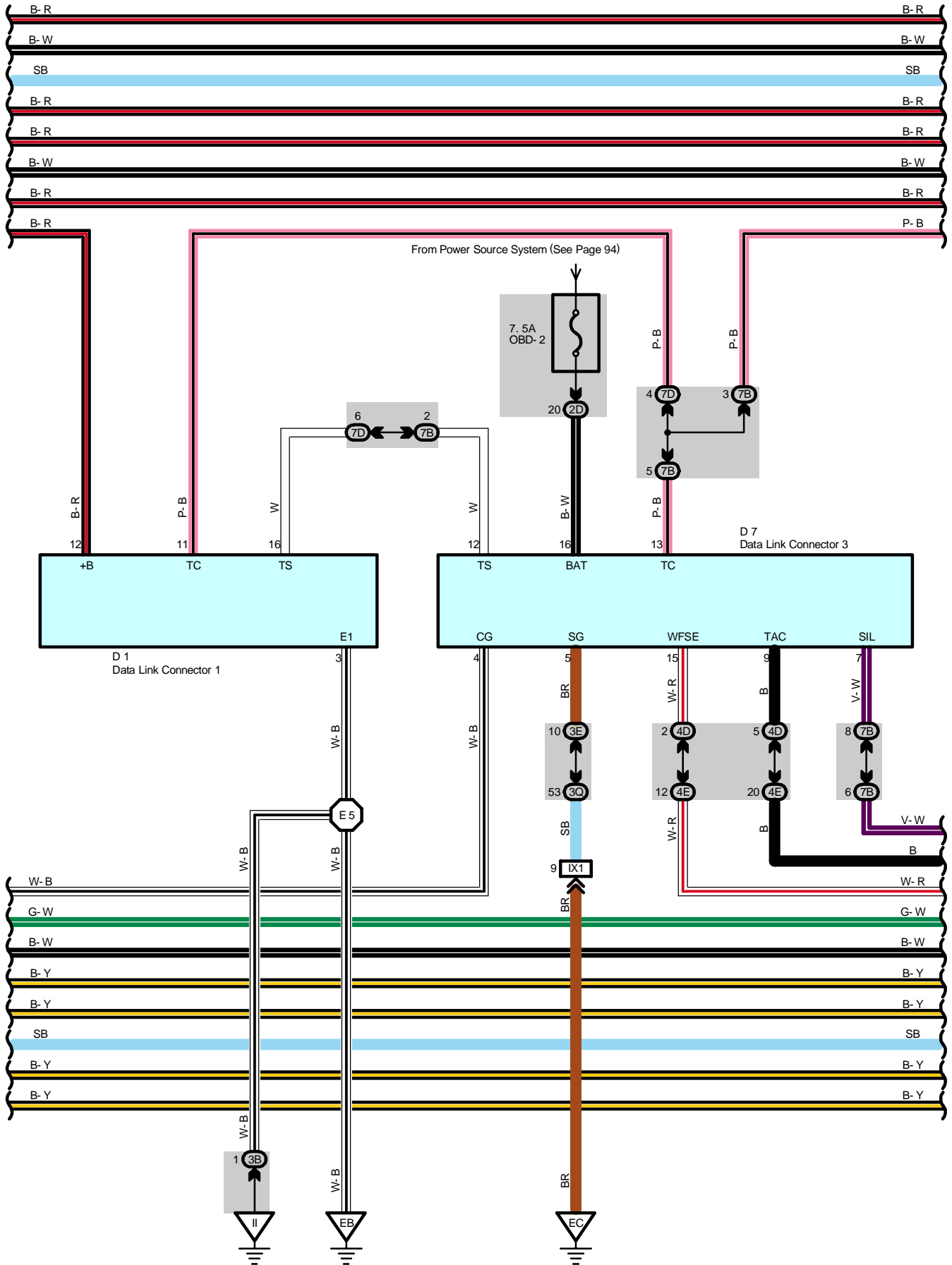
# Engine Control

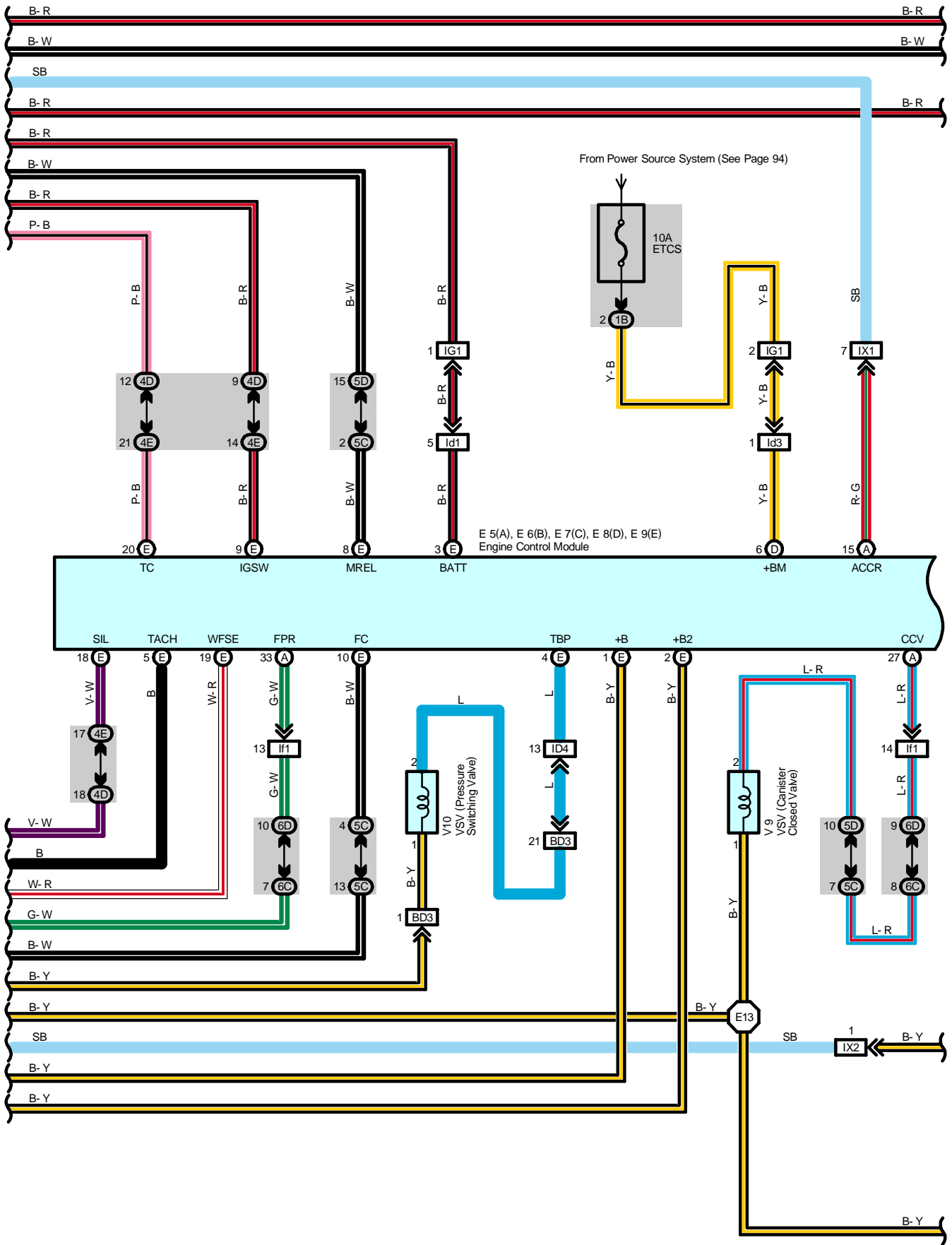
From Power Source System (See Page 94)



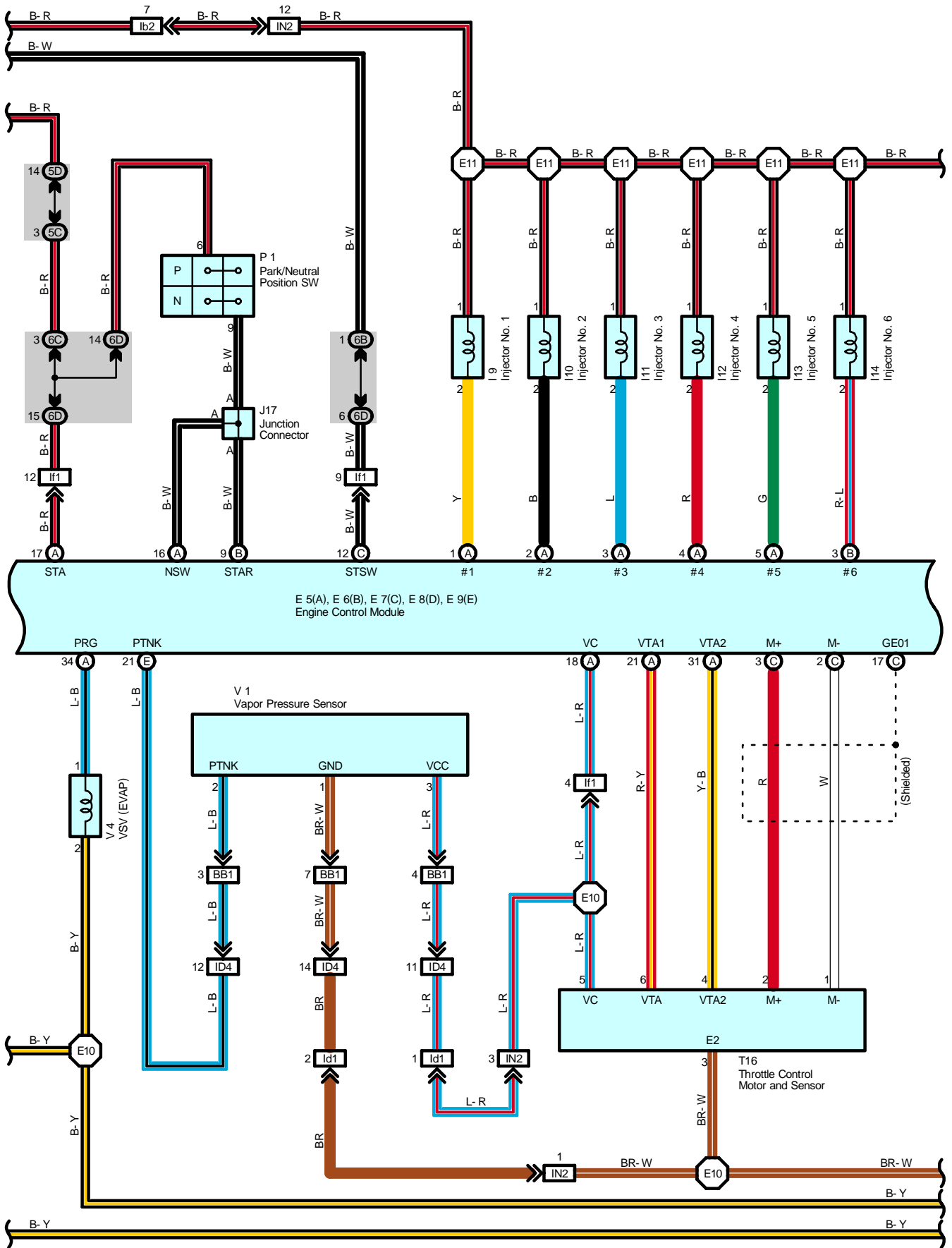


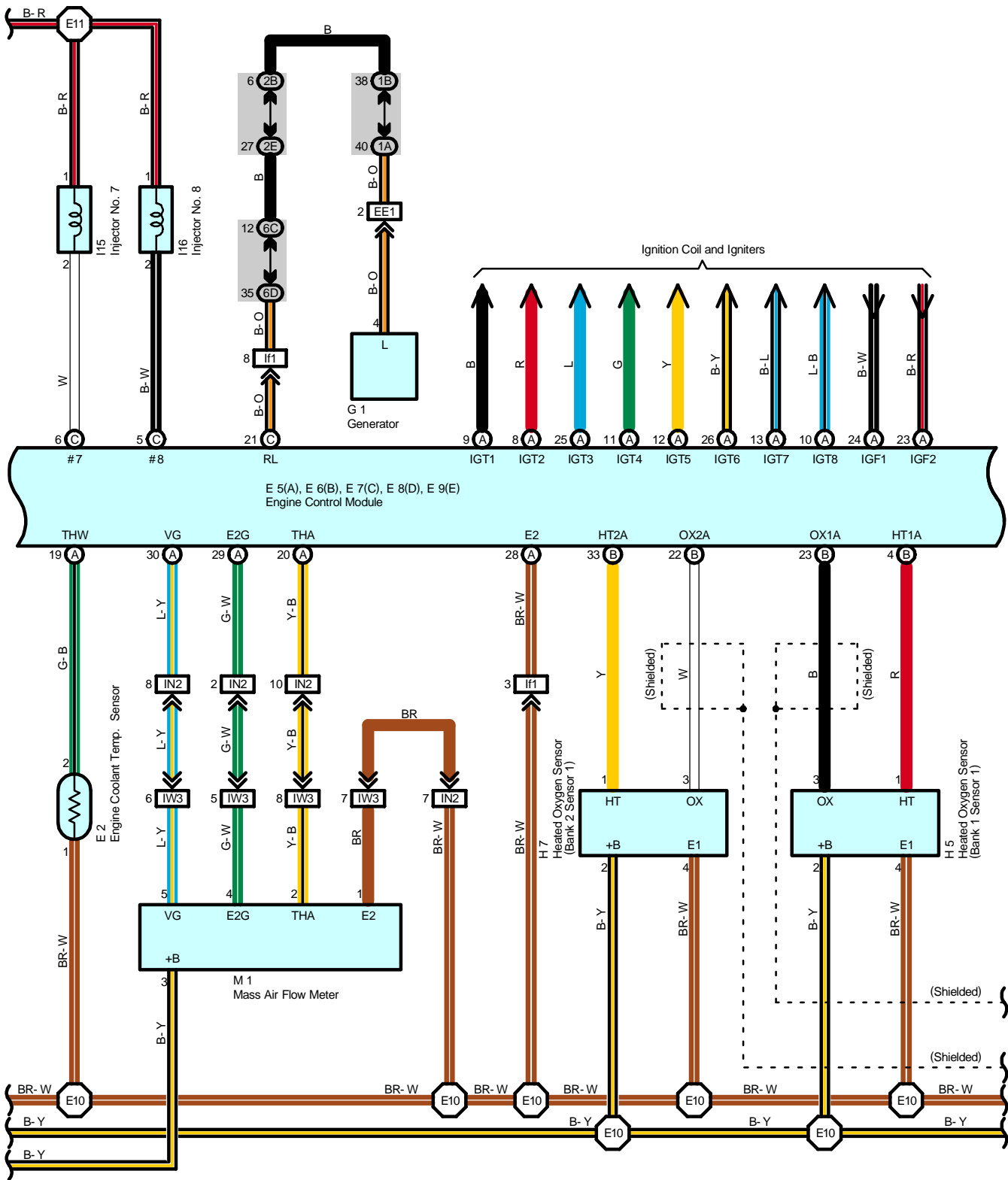
# Engine Control



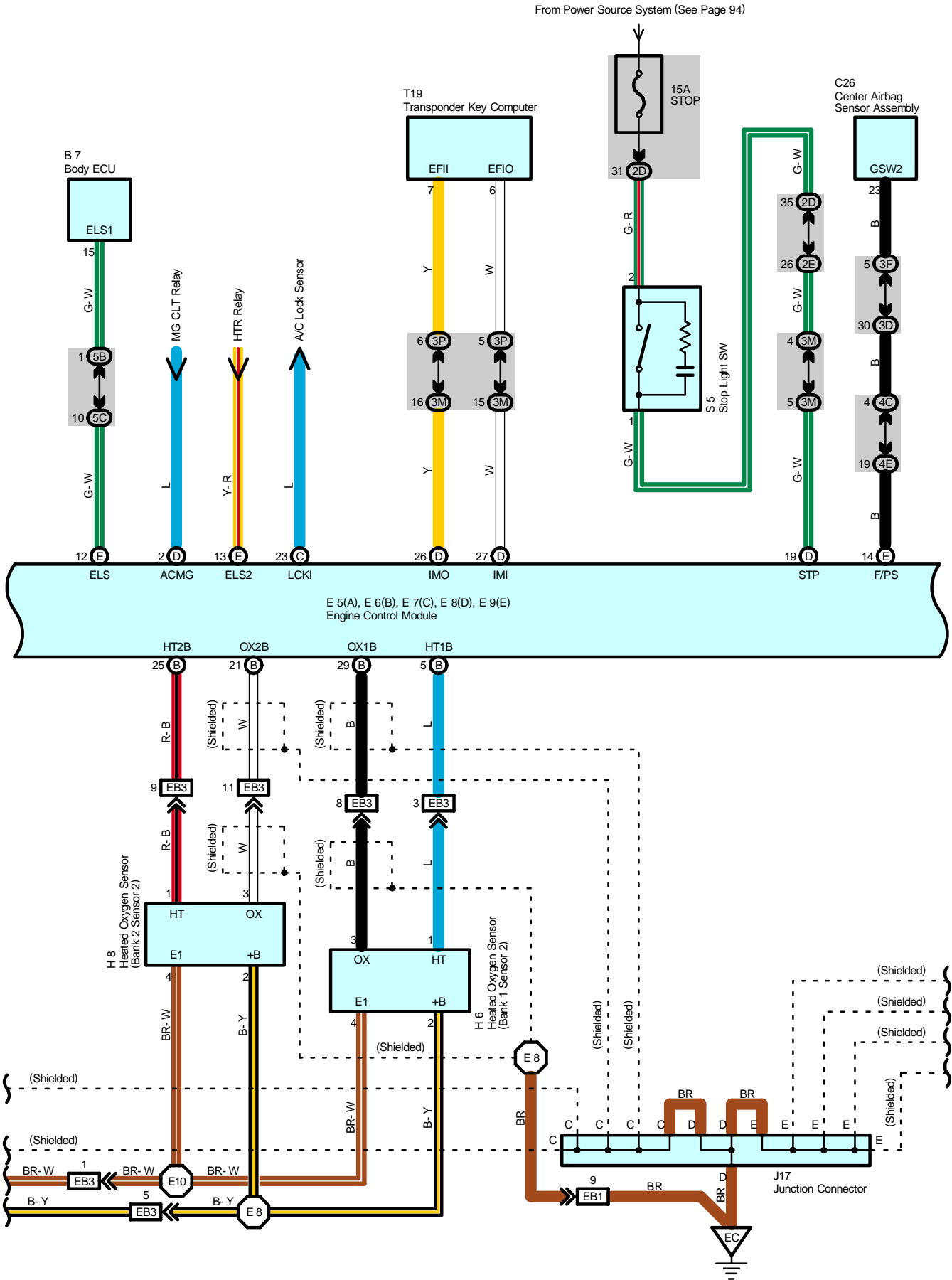


# Engine Control

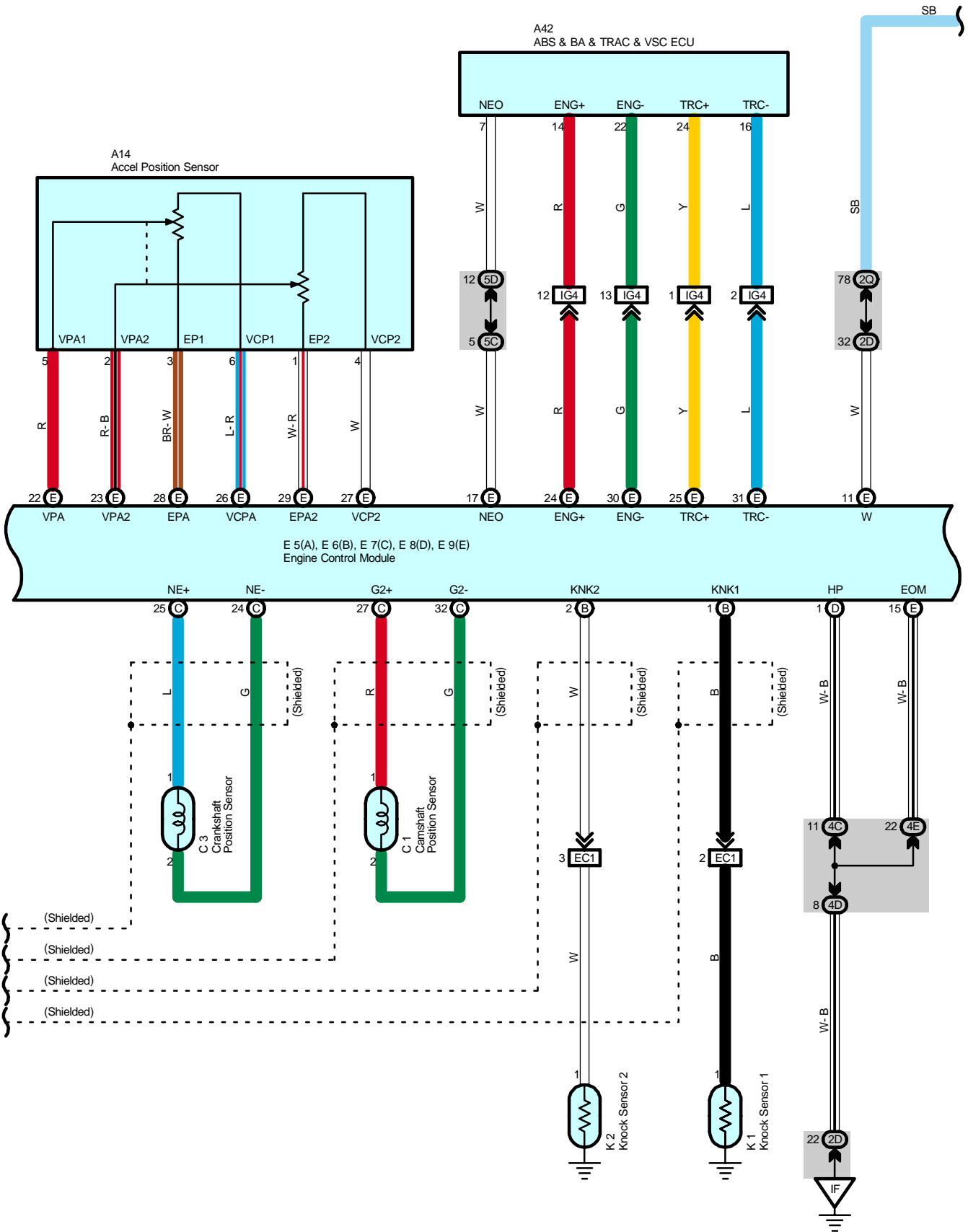




# Engine Control

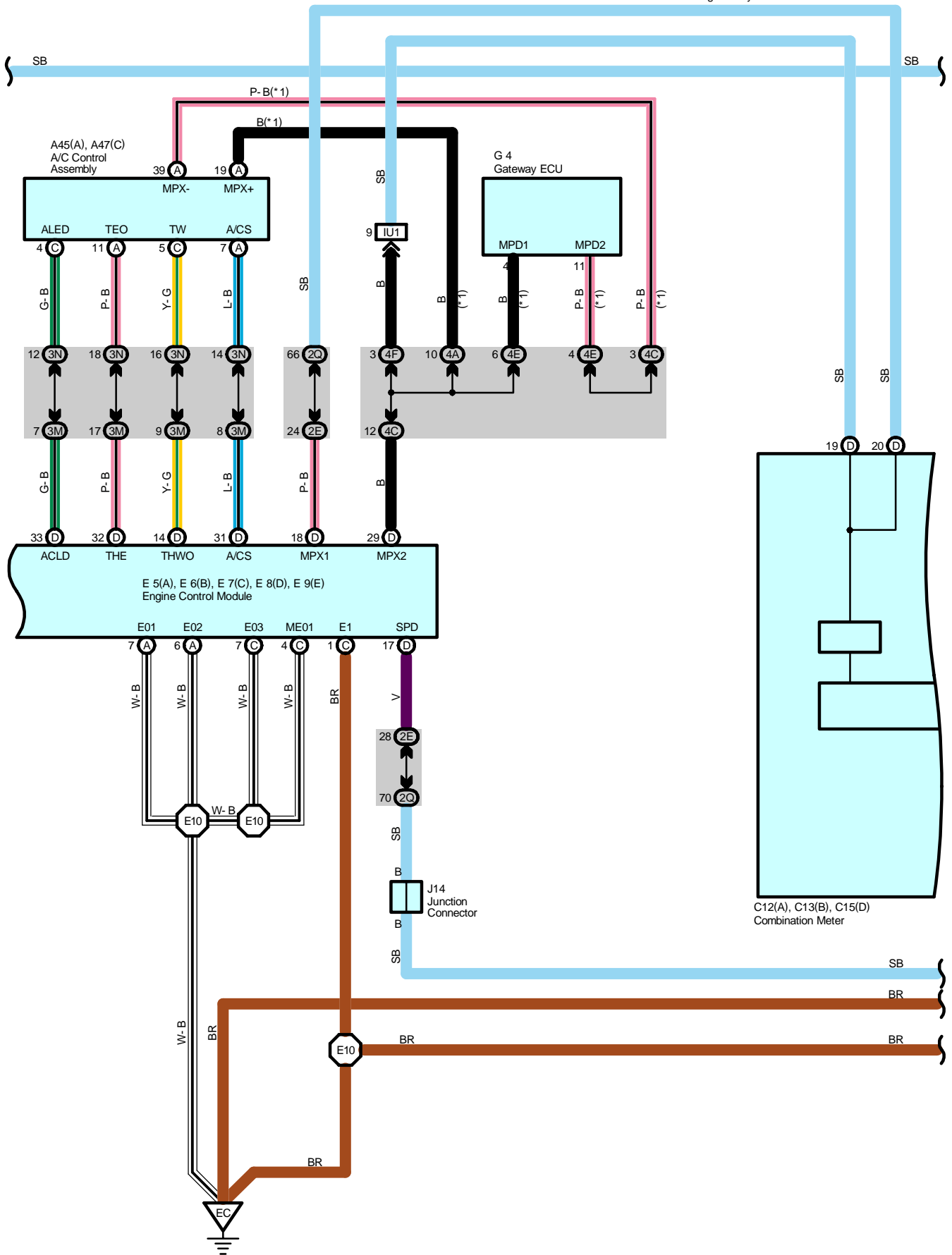






# Engine Control

\* 1 : w/ Navigation System





## System Outline

The engine control system utilizes a microcomputer and maintains overall control of the engine, transmission etc. An outline of the engine control is given here.

### 1. Input Signals

#### (1) Engine coolant temp. signal circuit

The engine coolant temp. sensor detects the engine coolant temp. and has a built-in thermistor with a resistance which varies according to the engine coolant temp. The engine coolant temp. is input into TERMINAL THW of the engine control module as a control signal.

#### (2) Intake air temp. signal circuit

The intake air temp. sensor is installed in the mass air flow meter and detects the intake air temp., which is input as a control signal to TERMINAL THA of the engine control module.

#### (3) Oxygen sensor signal circuit

The oxygen density in the exhaust emission is detected and is input as a control signal from the heated oxygen sensors to TERMINALS OX1A, OX1B, OX2A, OX2B of the engine control module.

#### (4) RPM signal circuit

The camshaft position is detected by the camshaft position sensor and is input into TERMINAL G2+ of the engine control module as a control signal. Also, the engine RPM is detected by the crankshaft position sensor and the signal is input into TERMINAL NE+ of the engine control module.

#### (5) Throttle position sensor signal circuit

The throttle position sensor detects the throttle valve opening angle as a control signal, which is input into TERMINALS VTA1, VTA2 of the engine control module.

#### (6) Vehicle speed circuit

The vehicle speed sensor (Combination meter) detects the vehicle speed, and the signal is input into TERMINAL SPD of the engine control module via the combination meter.

#### (7) Battery signal circuit

Voltage is constantly applied to TERMINAL BATT of the engine control module. When the ignition SW is turned on, the voltage for engine control module start up power supply is applied through the EFI OR ECD relay, to TERMINALS +B, +B2 of the engine control module. The current from the IGN fuse flows to TERMINAL IGSW of the engine control module, and voltage is constantly applied to TERMINAL +BM.

#### (8) Intake air volume signal circuit

The intake air volume is detected by the mass air flow meter, and is input as a control signal to TERMINAL VG of the engine control module.

#### (9) Stop light SW signal circuit

The stop light SW is used to detect whether the vehicle is braking or not, and the signal is input into TERMINAL STP of the engine control module as a control signal.

#### (10) Starter signal circuit

To confirm whether the engine is cranking, the voltage applied to the starter motor when the engine is cranking is detected, and is input into TERMINAL STA of the engine control module as a control signal.

#### (11) Engine knock signal circuit

Engine knocking is detected by the knock sensors, and is input into TERMINALS KNK1, KNK2 of the engine control module as a control signal.

## 2. Control System

### \* SFI system

The SFI system monitors the engine condition through the signals input from each sensors to the engine control module. The control signal is sent to the engine control module TERMINALS #1, #2, #3, #4, #5, #6, #7, #8 to operate the injector (Fuel injection). The SFI system controls the fuel injection by the engine control module in response to the driving conditions.

### \* ESA system

The ESA system monitors the engine condition through the signals input from each sensors to the engine control module. The best ignition timing is decided according to this data and the data memorized in the engine control module. The control signal is output to TERMINALS IGT1, IGT2, IGT3, IGT4, IGT5, IGT6, IGT7, IGT8, and these signals control the igniter to provide the best ignition timing.

### \* Heated oxygen sensor heater control system

The heated oxygen sensor heater control system turns the heater on when the intake air volume is low (Temp. of exhaust emission is low), and warms up the heated oxygen sensors to improve their detection performance. The engine control module evaluates the signals from each sensors, and outputs current to TERMINALS HT1A, HT1B, HT2A, HT2B to control the heater.

### \* Fuel pump control system

The engine control module supplies current to TERMINAL FPR, and controls the operation speed of the fuel pump by the F/PUMP relay.

### \* ACIS

The ACIS includes a valve in the bulkhead separating the surge tank into two parts. This valve is opened and closed in accordance with the driving conditions to control the intake manifold length in two stages, for increased engine output in all ranges from low to high speeds.

### \* ETCS-i

The ETCS-i controls the engine output at its optimal level in accordance with the opening of the accelerator pedal, under all driving conditions.

## 3. Diagnosis System

When there is a malfunction in the engine control module signal system, the malfunctioning system is recorded in the memory. The malfunctioning system can be found by reading the code displayed on the malfunction indicator lamp.

## 4. Fail-Safe System

When a malfunction has occurred in any system, there is a possibility of causing engine trouble due to continued control based on that system. In that case, the fail-safe system either controls the system using the data (Standard values) recorded in the engine control module memory, or else stops the engine.

## Service Hints

### E2 Engine Coolant Temp. Sensor

- 1-2 : Approx. 15.0 k $\Omega$  (-20°C, -4°F)
- : Approx. 2.45 k $\Omega$  (20°C, 68°F)
- : Approx. 0.32 k $\Omega$  (80°C, 176°F)

### E5 (A), E7 (C), E8 (D), E9 (E) Engine Control Module

- BATT-E1 : Always 9.0-14.0 volts
- +BM-E1 : Always 9.0-14.0 volts
- IGSW-E1 : 9.0-14.0 volts with ignition SW at ON or ST position
- +B, +B2-E1 : 9.0-14.0 volts with ignition SW at ON or ST position
- VC-E2 : 4.5-5.5 volts with ignition SW on
- VTA2-E2 : 2.0-2.9 volts with ignition SW on and accelerator pedal released
- : 4.6-5.1 volts with ignition SW on and accelerator pedal depressed
- VTA1-E2 : 0.4-1.0 volts with ignition SW on and accelerator pedal released
- : 3.2-4.8 volts with ignition SW on and accelerator pedal depressed
- THA-E2 : 0.5-3.4 volts with idling, intake air temp. 20°C (68°F)
- THW-E2 : 0.2-1.0 volts with idling, engine coolant temp. 80°C (176°F)
- W-E1 : 9.0-14.0 volts with idling
- : Below 3.0 volts with ignition SW on

# Engine Control

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A14	<a href="#">70</a>	E9   E	<a href="#">70</a>	I16	<a href="#">69</a>
A42	<a href="#">70</a>	F12	<a href="#">72</a>	I18	<a href="#">70</a>
A45   A	<a href="#">70</a>	F14	<a href="#">68</a>	J4	<a href="#">71</a>
A47   C	<a href="#">70</a>	F16   B	<a href="#">68</a>	J14	<a href="#">71</a>
B7	<a href="#">70</a>	F17   C	<a href="#">68</a>	J17	<a href="#">71</a>
C1	<a href="#">68</a>	G1	<a href="#">68</a>	K1	<a href="#">69</a>
C3	<a href="#">68</a>	G4	<a href="#">70</a>	K2	<a href="#">69</a>
C12   A	<a href="#">70</a>	H5	<a href="#">69</a>	M1	<a href="#">69</a>
C13   B	<a href="#">70</a>	H6	<a href="#">69</a>	P1	<a href="#">69</a>
C15   D	<a href="#">70</a>	H7	<a href="#">69</a>	S5	<a href="#">71</a>
C26	<a href="#">70</a>	H8	<a href="#">69</a>	T16	<a href="#">69</a>
D1	<a href="#">68</a>	I9	<a href="#">69</a>	T19	<a href="#">71</a>
D7	<a href="#">70</a>	I10	<a href="#">69</a>	V1	<a href="#">73</a>
E2	<a href="#">68</a>	I11	<a href="#">69</a>	V2	<a href="#">69</a>
E5   A	<a href="#">70</a>	I12	<a href="#">69</a>	V4	<a href="#">69</a>
E6   B	<a href="#">70</a>	I13	<a href="#">69</a>	V9	<a href="#">69</a>
E7   C	<a href="#">70</a>	I14	<a href="#">69</a>	V10	<a href="#">73</a>
E8   D	<a href="#">70</a>	I15	<a href="#">69</a>		

## ○ : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
1	<a href="#">22</a>	Engine Room R/B (Engine Compartment Left)

**: Junction Block and Wire Harness Connector**

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
1D		
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2B		
2C		
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3B	40	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3C		
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3F		
3M		
3N	43	
3P		
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4D		
4E		
4F		
5B	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5C		
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)
6B	60	Dash Wire and J/B No.6 (Behind the Grove Box)
6C		
6D	60	Engine Wire and J/B No.6 (Behind the Grove Box)
7A	64	Dash Wire and J/B No.7 (Behind the Grove Box)
7B		
7D	64	Engine Room No.2 Wire and J/B No.7 (Behind the Grove Box)

# Engine Control

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	76	Engine Wire and Transmission Wire (On the Transmission)
EB3		
EC1	76	Engine No.2 Wire and Engine Wire (On the Transmission)
EE1	76	Engine Room Main Wire and Alternator Wire (Near the Battery)
IA2	78	Engine Room No.2 Wire and Floor No.1 Wire (Left Kick Panel)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IG1	78	Engine Room No.2 Wire and Dash Wire (Behind the Combination Meter)
IG4		
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IU1	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IW3	82	Engine Room No.2 Wire and Dash Wire (Behind the Glove Box)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
IX2		
Ib2	84	Dash Wire and Dash Wire (Behind the Combination Meter)
Id1	84	Dash Wire and Dash Wire (Instrument Panel Center)
Id3		
If1	84	Engine Wire and Engine Wire (Behind the Glove Box)
BB1	86	Floor No.1 Wire and Fuel Tank Wire (Near the Fuel Tank)
BD3	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)

## : Ground Points

Code	See Page	Ground Points Location
EA	76	Front Right Side of Fender Apron
EB		
EC	76	Rear Bank of Right Cylinder Head
EE	76	Front Left Side of Fender Apron
IF	78	Set Bolt of Cowl Side J/B LH
II	78	Set Bolt of Cowl Side J/B RH

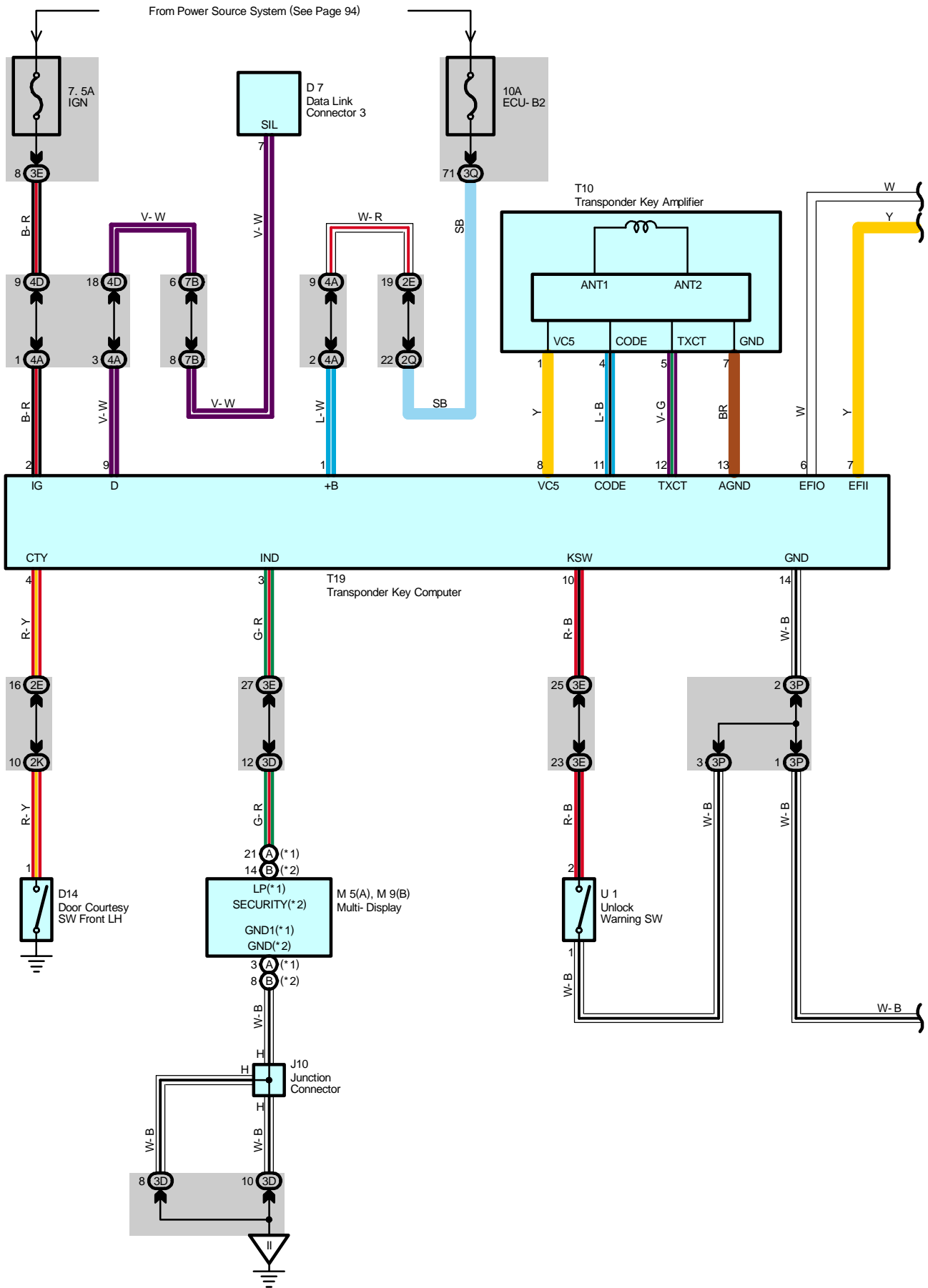
## : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E4	76	Engine Room No.2 Wire	E11	76	Engine Wire
E5			E13		
E8	76	Transmission Wire	E14	76	Engine Room No.2 Wire
E10	76	Engine Wire	E16		

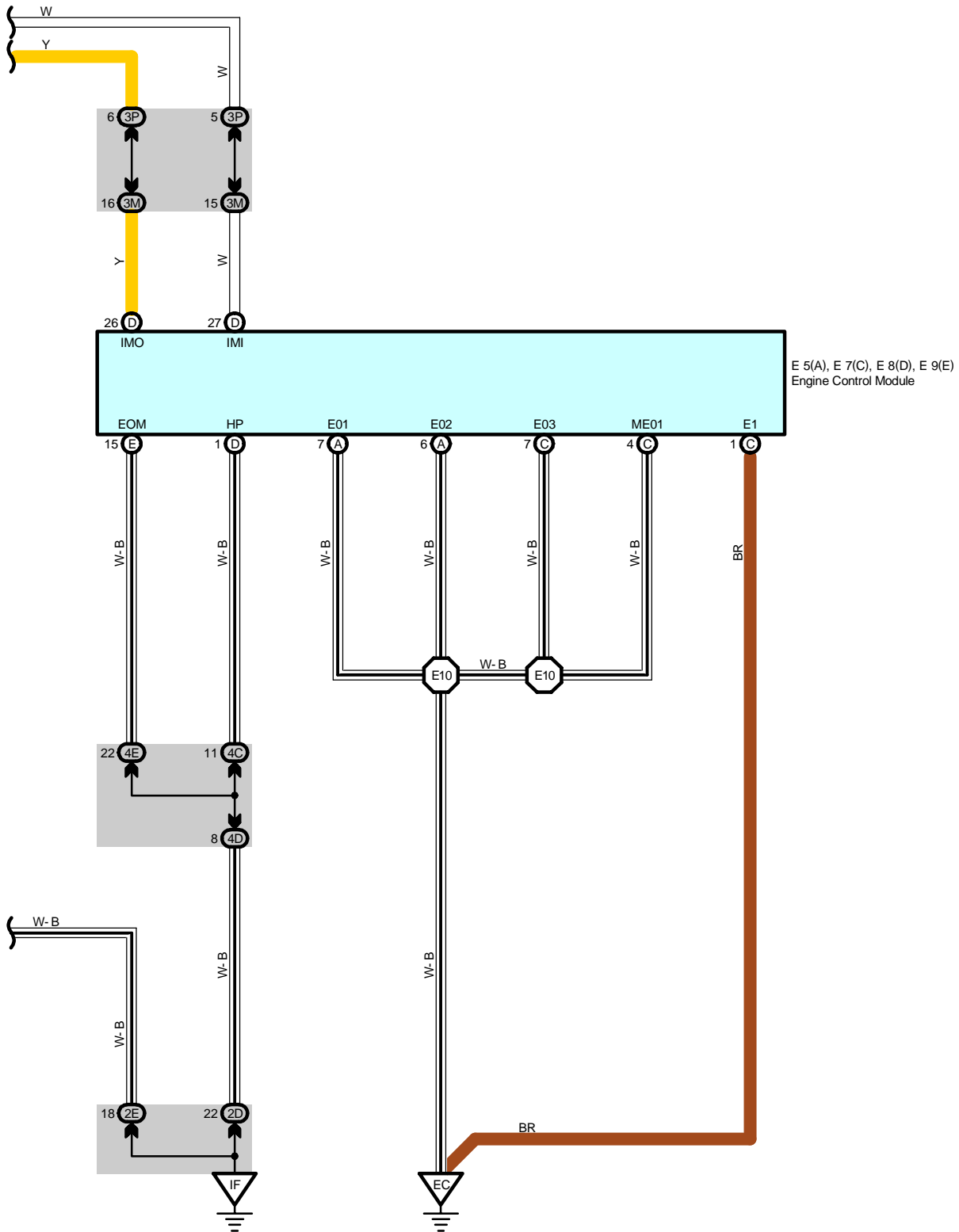




# Engine Immobiliser System



\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System



# Engine Immobiliser System

## Service Hints

### T19 Transponder Key Computer

- 1-Ground : Always approx. 12 volts
- 2-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 14-Ground : Always continuity

## : Parts Location

Code	See Page	Code	See Page	Code	See Page		
D7	70	E8	D	70	M9	B	71
D14	72	E9	E	70	T10		71
E5	A	70	J10	71	T19		71
E7	C	70	M5	A	71	U1	71

## : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3M	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3P		
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4D		
4E		
7B	64	Dash Wire and J/B No.7 (Behind the Grove Box)

## : Ground Points

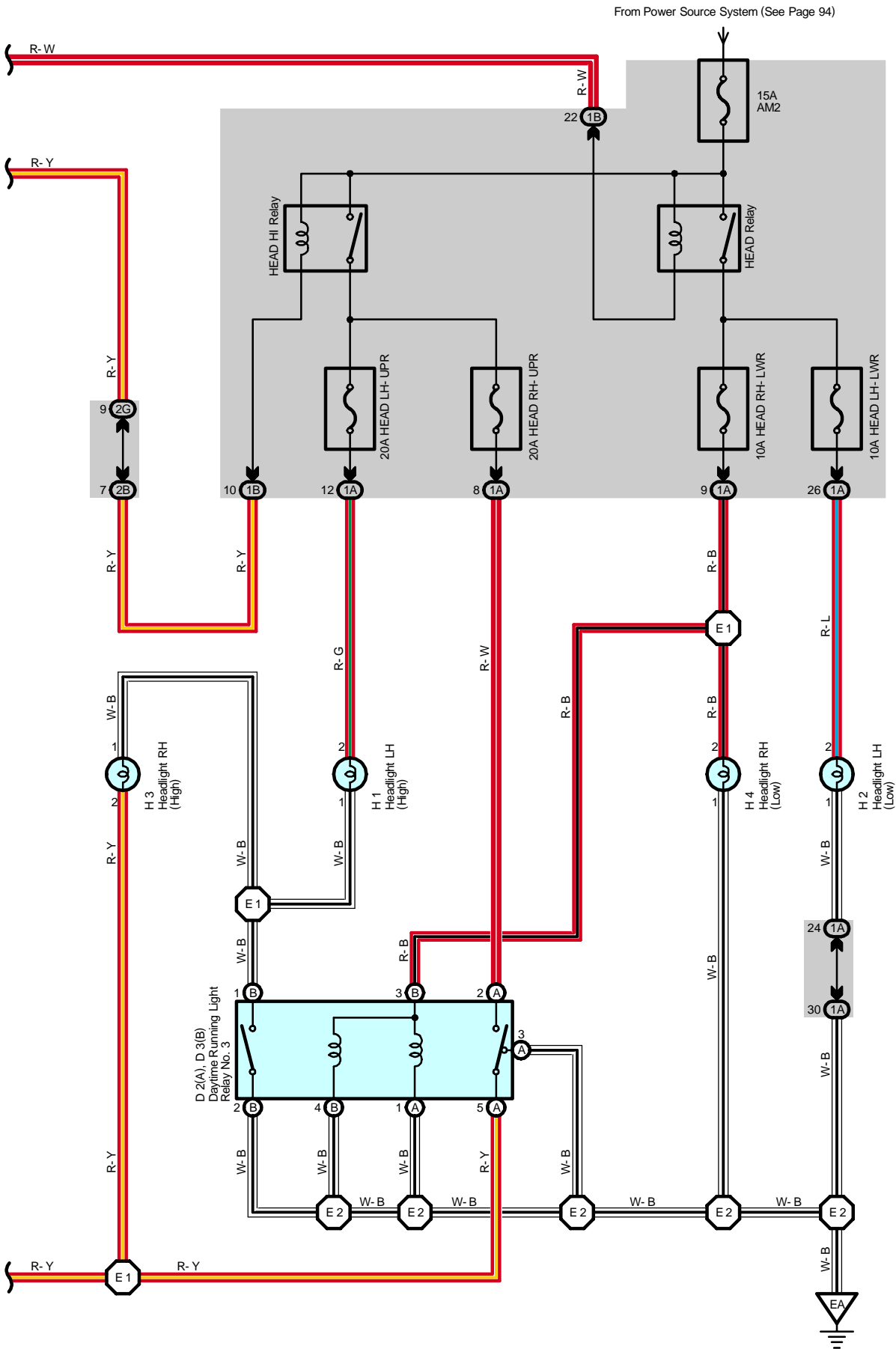
Code	See Page	Ground Points Location
EC	76	Rear Bank of Right Cylinder Head
IF	78	Set Bolt of Cowl Side J/B LH
II	78	Set Bolt of Cowl Side J/B RH

## : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E10	76	Engine Wire			







# Headlight

## System Outline

### Daytime Running Light Operation

When the engine is started, a signal from the generator is input into TERMINAL (A) 14 of the body ECU. At this time, if the parking brake lever is pulled up (Parking brake SW ON), the body ECU is not activated, and the daytime running light system does not operate.

When the parking brake lever is released (Parking brake SW OFF), a signal is input into TERMINAL (B) 2 of the body ECU. This activates the body ECU and the headlight turns on.

## Service Hints

### C16 Combination SW

13-16 : Closed with light control SW at HEAD position

8-16 : Closed with dimmer SW at FLASH position

7-16 : Closed with dimmer SW at HIGH or FLASH position

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
B7	A 70	D2	A 68	H4	69
B8	B 70	D3	B 68	J3	71
B9	C 70	G1	68	J9	71
C12	A 70	H1	69	J13	71
C14	C 70	H2	69	P8	73
C16	70	H3	69		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2G		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EE1	76	Engine Room Main Wire and Alternator Wire (Near the Battery)
IG1	78	Engine Room No.2 Wire and Dash Wire (Behind the Combination Meter)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
II5		
IU3	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IU4		

## ▽ : Ground Points

Code	See Page	Ground Points Location
EA	76	Front Right Side of Fender Apron
IF	78	Set Bolt of Cowl Side J/B LH
IG		
II	78	Set Bolt of Cowl Side J/B RH

## ○ : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E1	76	Engine Room Main Wire	E2	76	Engine Room Main Wire







## Service Hints

### C16 Combination SW

11-Ground : Continuity with light control SW at HEAD position, dimmer SW at LOW position and fog light SW at ON position

### : Parts Location

Code	See Page	Code	See Page	Code	See Page
C16	70	F2	68	J6	71
F1	68	J3	71		

### : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)

### : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IH2	80	Instrument Panel Integration Wire and Column Wire (Near the Ignition SW)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)

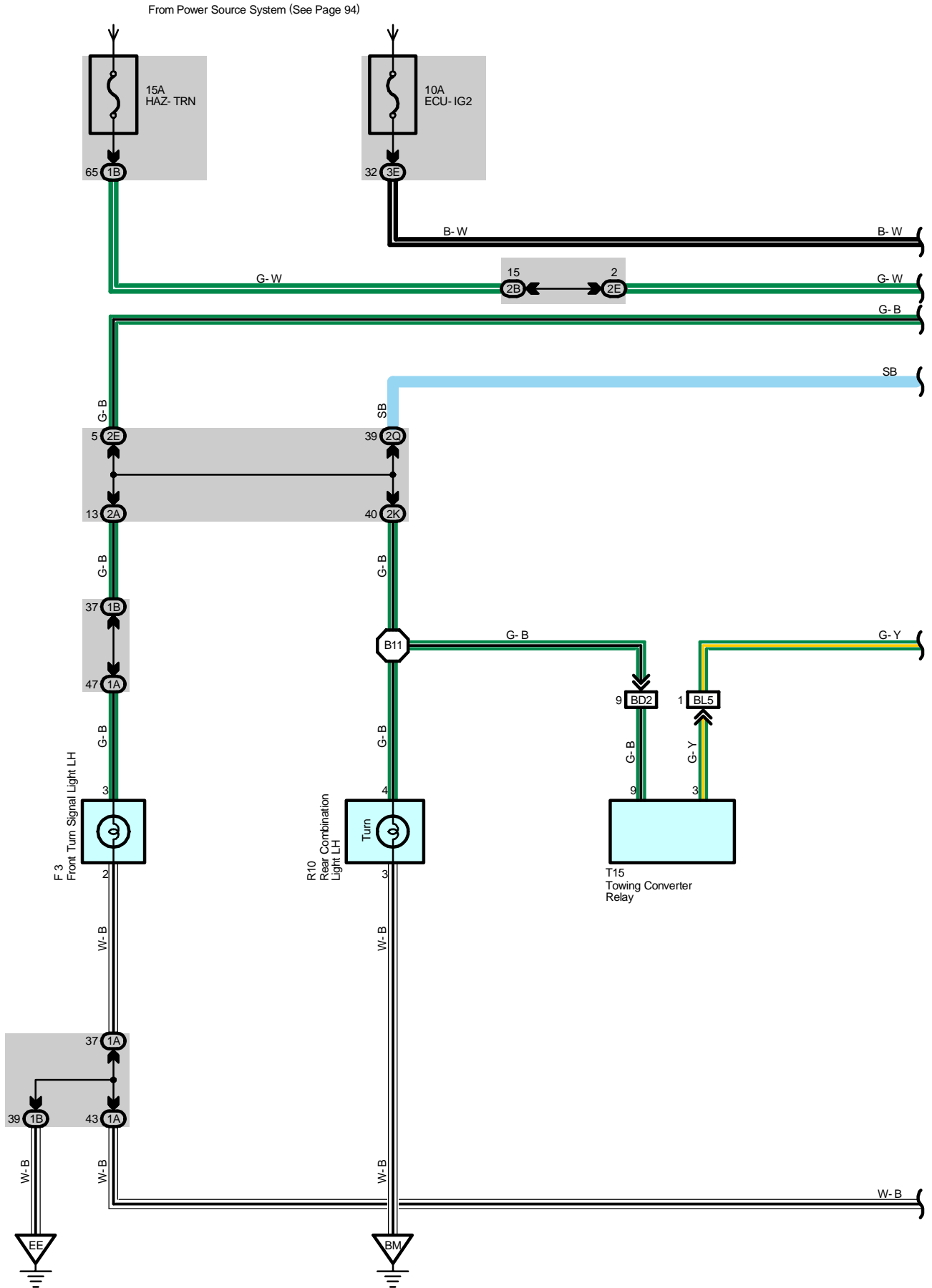
### : Ground Points

Code	See Page	Ground Points Location
EA	76	Front Right Side of Fender Apron
II	78	Set Bolt of Cowl Side J/B RH

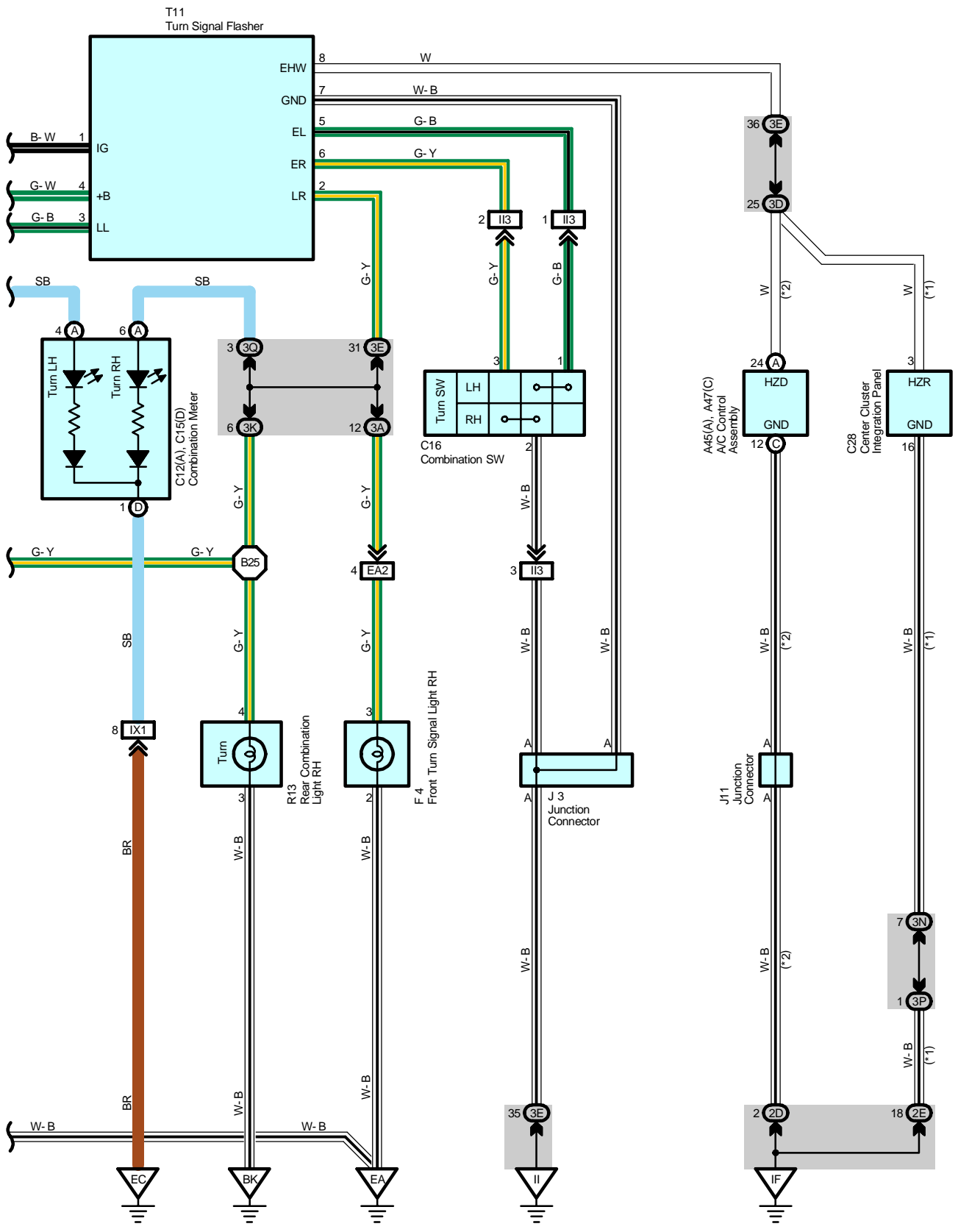
### : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E15	76	Engine Room Main Wire			

# Turn Signal and Hazard Warning Light



\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System



# Turn Signal and Hazard Warning Light

## Service Hints

### T11 Turn Signal Flasher

- 4-Ground : Always approx. 12 volts
- 1-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 7-Ground : Always continuity

## : Parts Location

Code	See Page	Code	See Page	Code	See Page
A45	A 70	C28	70	R10	73
A47	C 70	F3	68	R13	73
C12	A 70	F4	68	T11	71
C15	D 70	J3	71	T15	73
C16	70	J11	71		

## : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2B		
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3A	40	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3N	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3P		
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA2	76	Engine Room Main Wire and Engine Room No.2 Wire (Engine Compartment Right)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
BD2	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BL5	88	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)

## : Ground Points

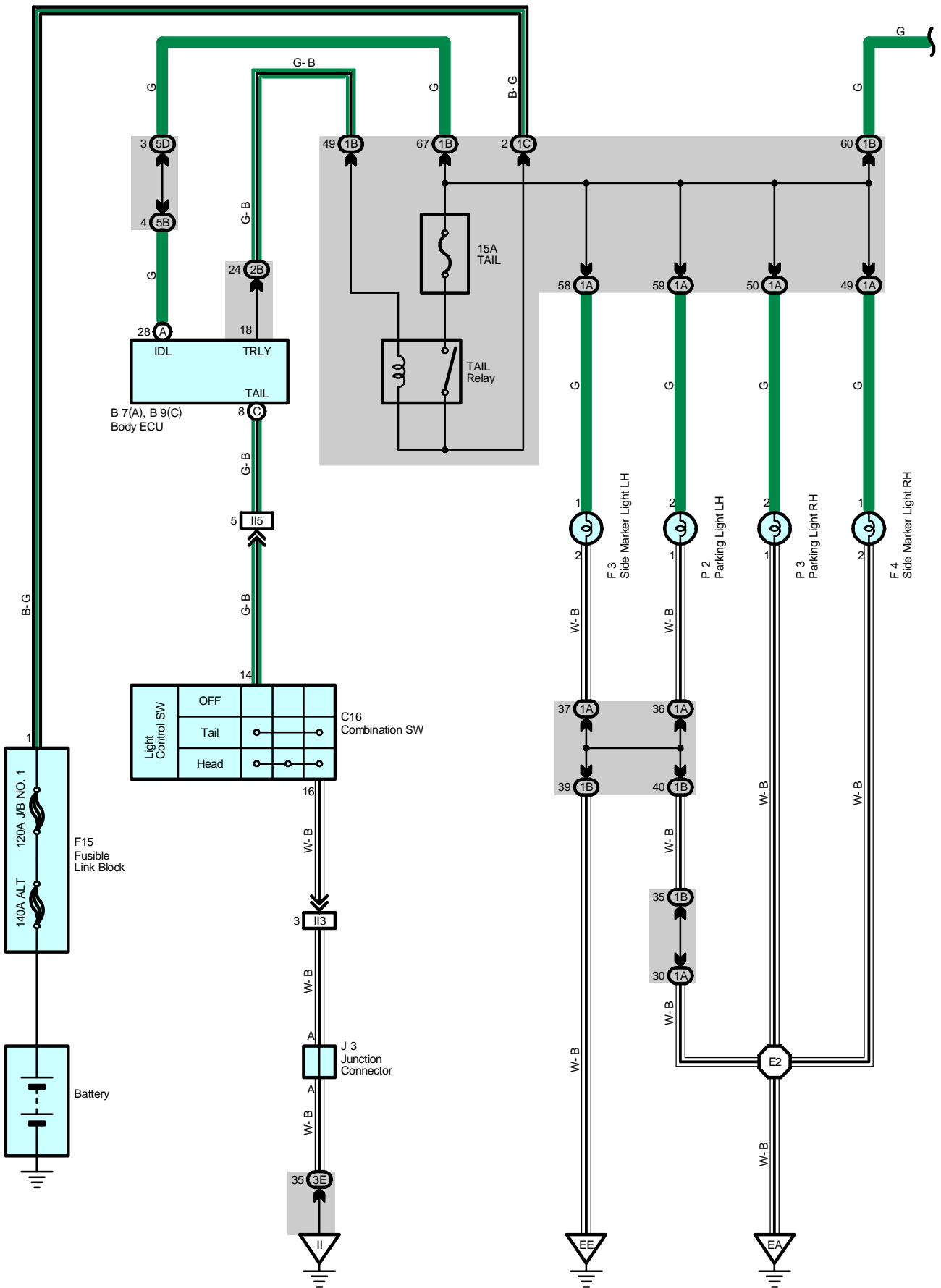
Code	See Page	Ground Points Location
EA	76	Front Right Side of Fender Apron
EC	76	Rear Bank of Right Cylinder Head
EE	76	Front Left Side of Fender Apron
IF	78	Set Bolt of Cowl Side J/B LH
II	78	Set Bolt of Cowl Side J/B RH
BK	86	Front Side Under the Front Passenger's Seat
BM	86	Left Rear Side Quarter Panel

## : Splice Points

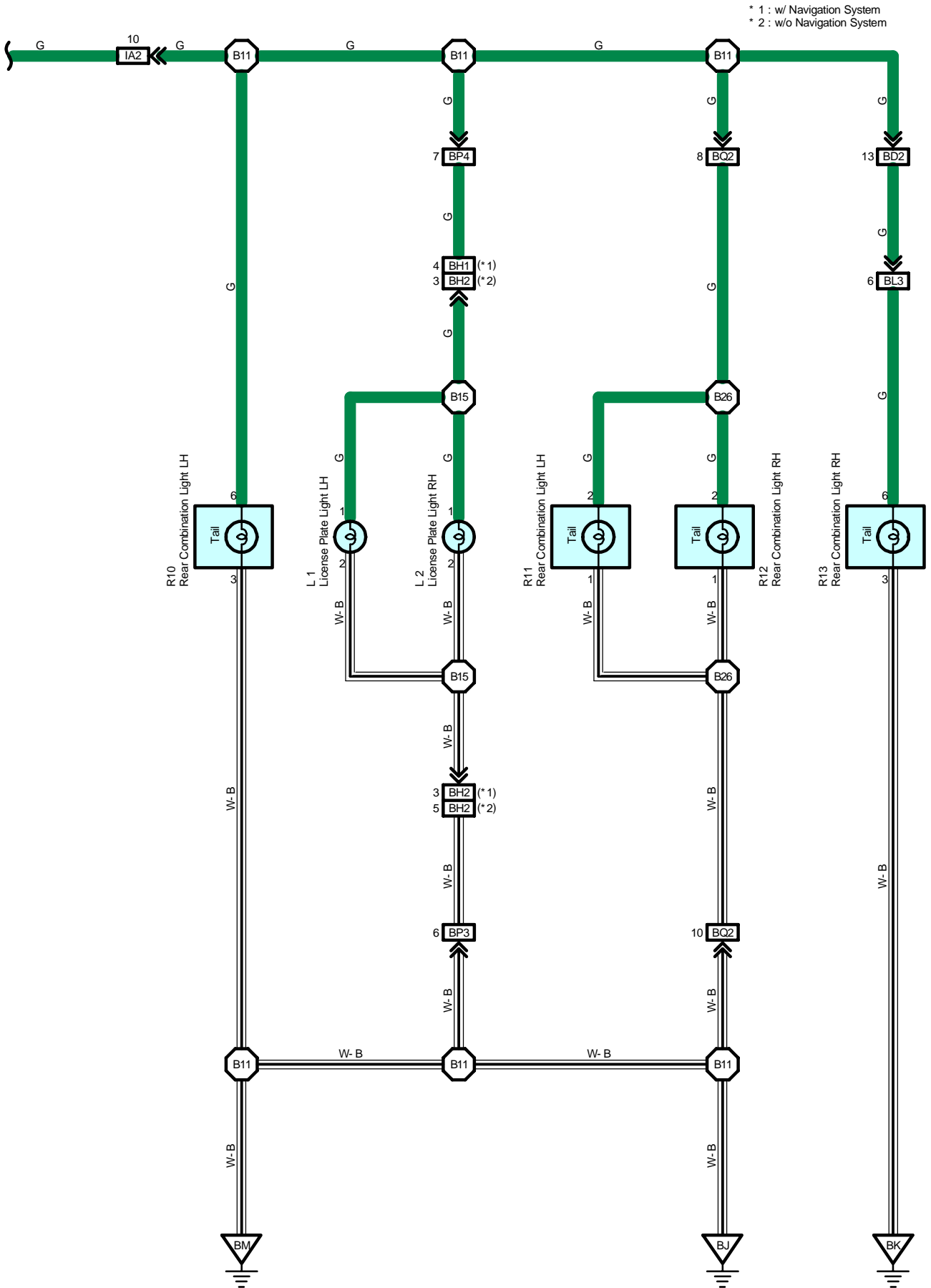
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B11	88	Floor No.1 Wire	B25	88	Floor No.2 Wire



# Taillight







\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System

# Taillight

## Service Hints

### C16 Combination SW

14-16 : Closed with light control SW at TAIL or HEAD position

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page	
B7	A	70	F15	68	P3	69
B9	C	70	J3	71	R10	73
C16	70	L1	72	R11	73	
F3	68	L2	72	R12	73	
F4	68	P2	69	R13	73	

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
1C		
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
5B	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IA2	78	Engine Room No.2 Wire and Floor No.1 Wire (Left Kick Panel)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
II5		
BD2	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BH1	86	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BH2		
BL3	88	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BP3	88	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BP4		
BQ2	88	Back Door Lower Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)

## ▽ : Ground Points

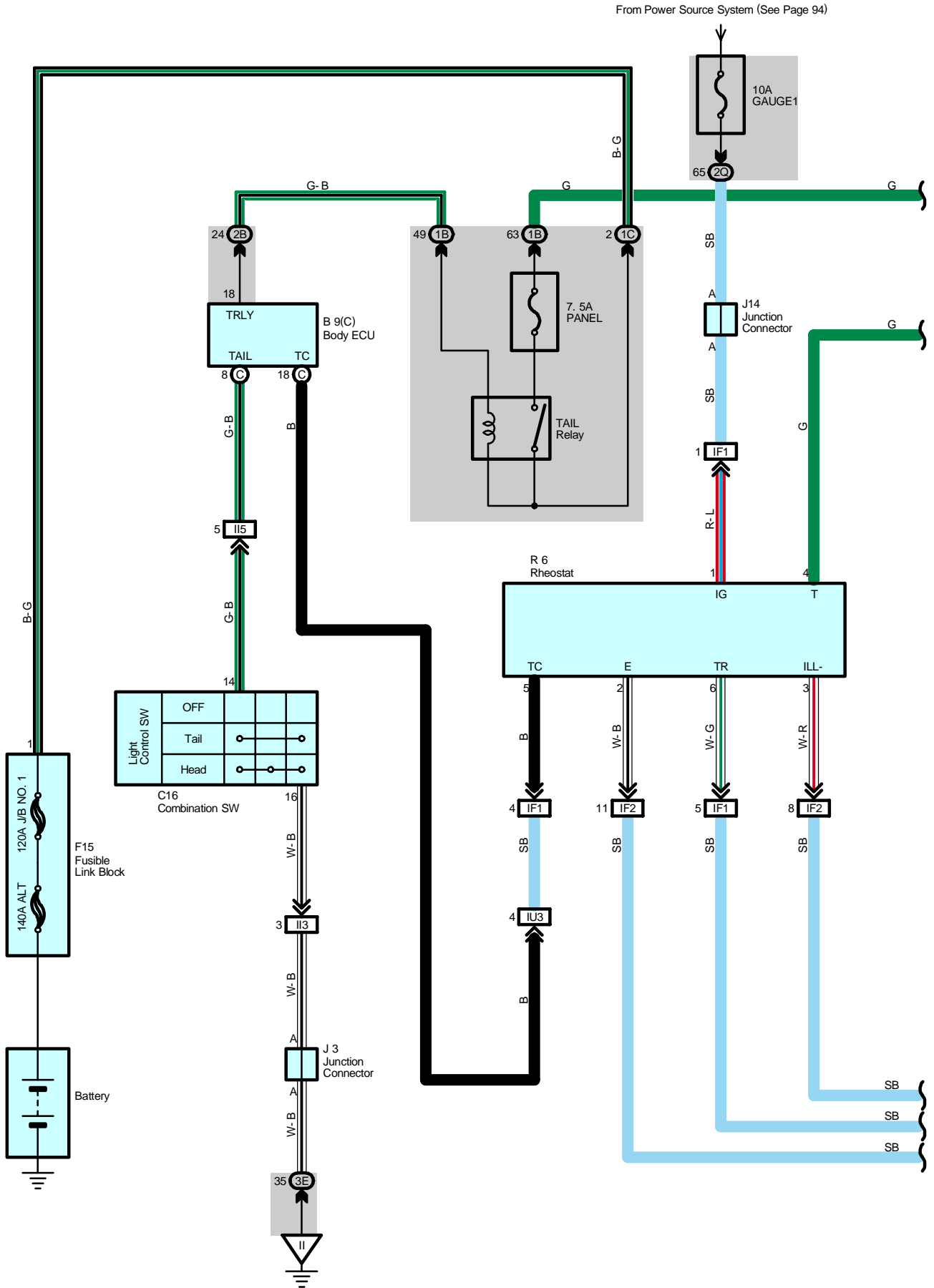
Code	See Page	Ground Points Location
EA	76	Front Right Side of Fender Apron
EE	76	Front Left Side of Fender Apron
II	78	Set Bolt of Cowl Side J/B RH
BJ	86	Under the Driver's Seat
BK	86	Front Side Under the Front Passenger's Seat
BM	86	Left Rear Side Quarter Panel

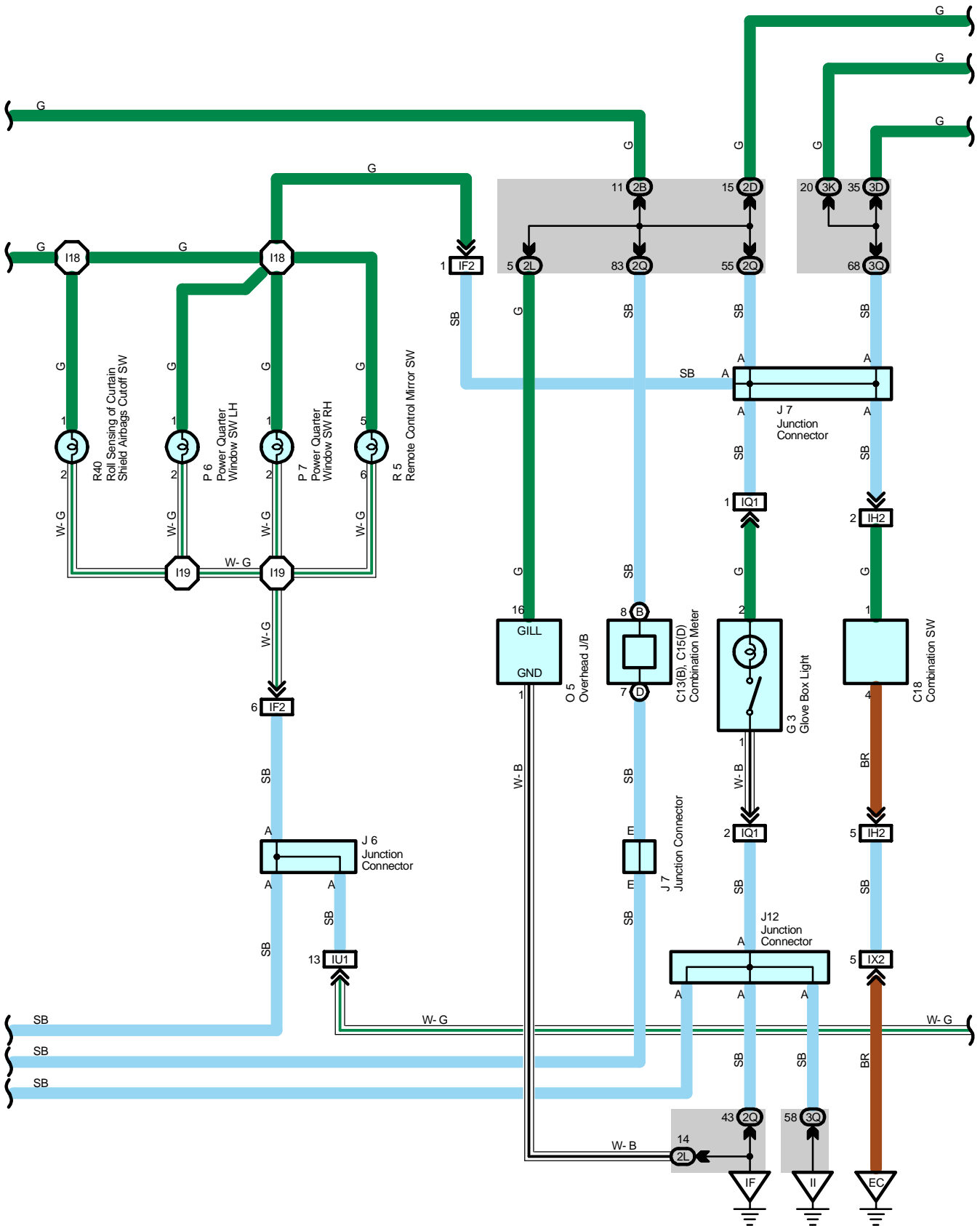
## ○ : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E2	76	Engine Room Main Wire	B15	88	Back Door Upper Wire
B11	88	Floor No.1 Wire	B26	88	Back Door Lower Wire

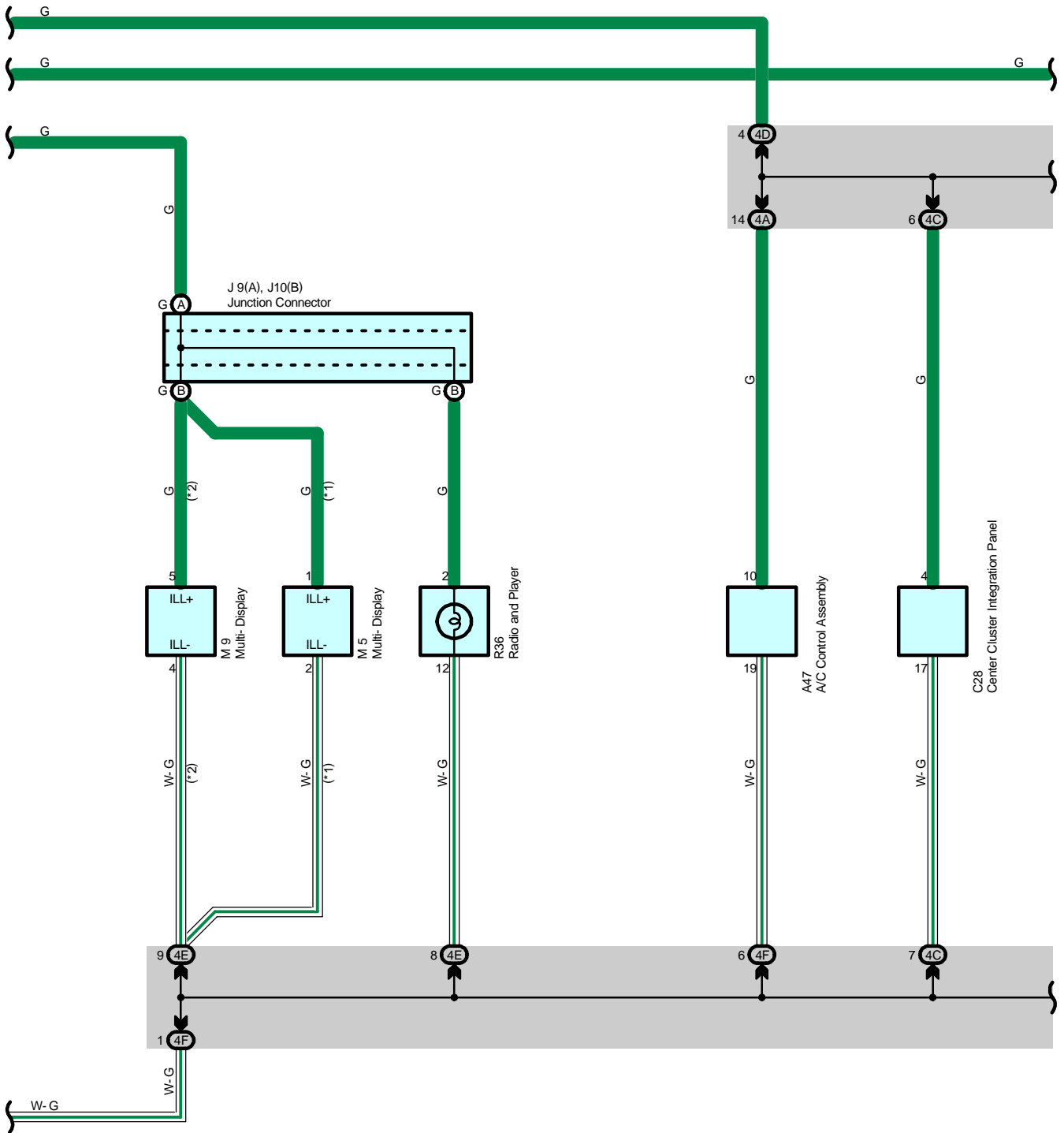


# Illumination

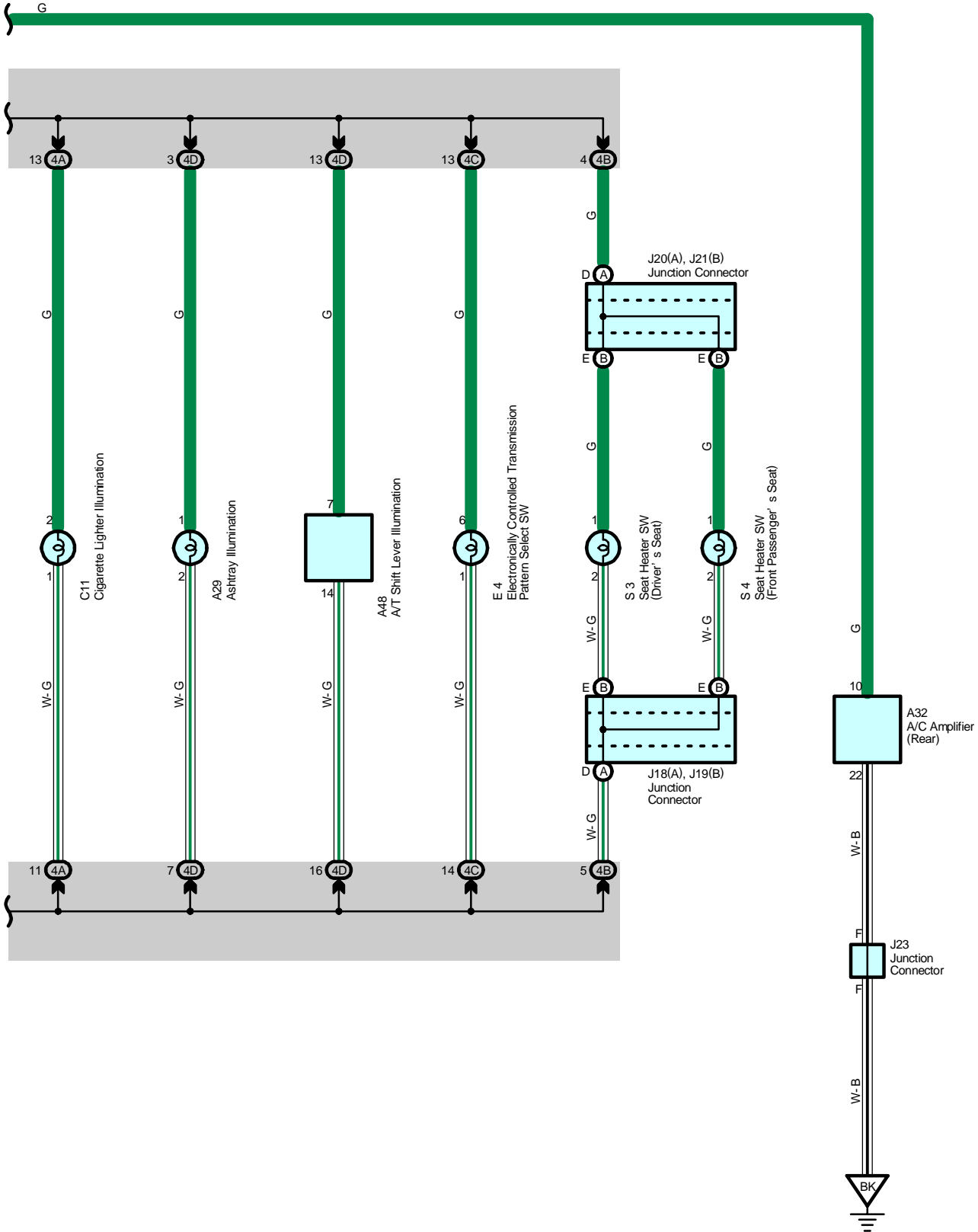




# ILLUMINATION



\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System



# Illumination

## Service Hints

### C16 Combination SW

14-16 : Closed with light control SW at TAIL or HEAD position

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A29	70	G3	70	M5	71
A32	72	J3	71	M9	71
A47	70	J6	71	O5	72
A48	70	J7	71	P6	71
B9	C	J9	A	P7	71
C11	70	J10	B	R5	71
C13	B	J12	71	R6	71
C15	D	J14	71	R36	71
C16	70	J18	A	R40	71
C18	70	J19	B	S3	71
C28	70	J20	A	S4	71
E4	70	J21	B		
F15	68	J23	72		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
1C		
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2L	28	Roof No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4B		
4C		
4D		
4E		
4F		

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IF1	78	Instrument Panel Integration Wire and Instrument Panel Wire (Left Side of Instrument Panel)
IF2		
IH2	80	Instrument Panel Integration Wire and Column Wire (Near the Ignition SW)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
II5		
IQ1	80	Instrument Panel Integration Wire and Lamp Wire (Behind the Glove Box)
IU1	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IU3		
IX2	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)





**: Ground Points**

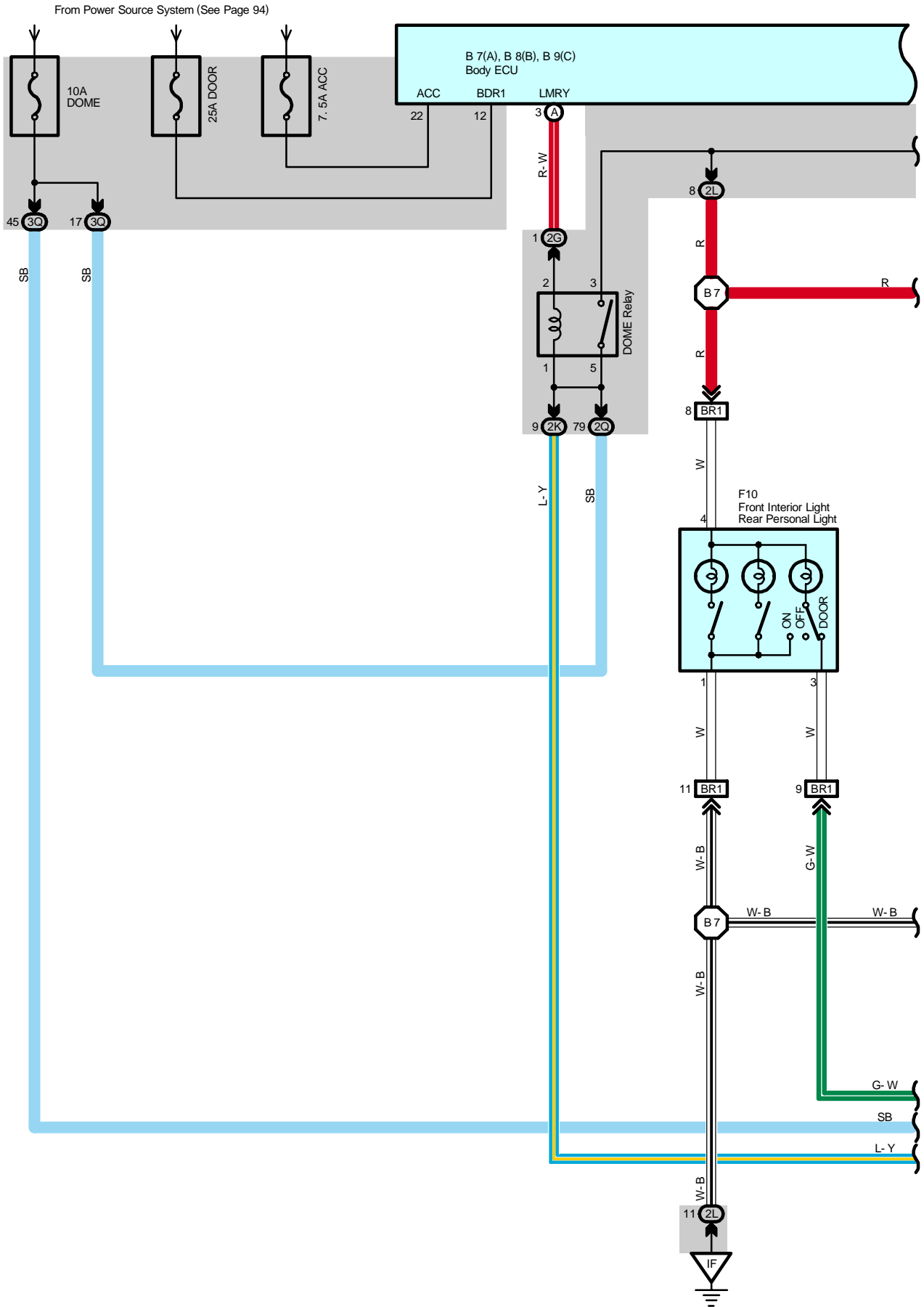
Code	See Page	Ground Points Location
EC	<a href="#">76</a>	Rear Bank of Right Cylinder Head
IF	<a href="#">78</a>	Set Bolt of Cowl Side J/B LH
II	<a href="#">78</a>	Set Bolt of Cowl Side J/B RH
BK	<a href="#">86</a>	Front Side Under the Front Passenger's Seat

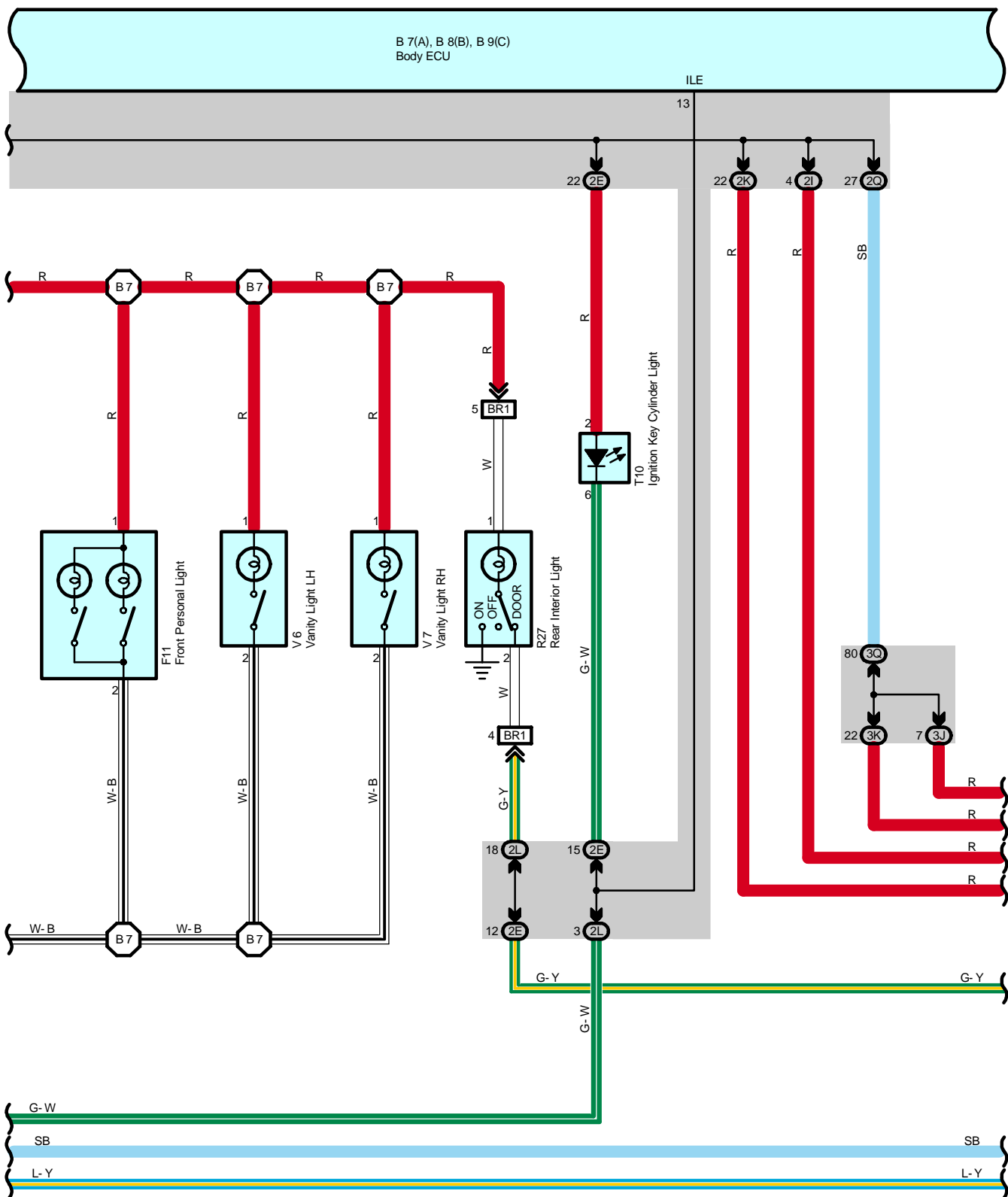


**: Splice Points**

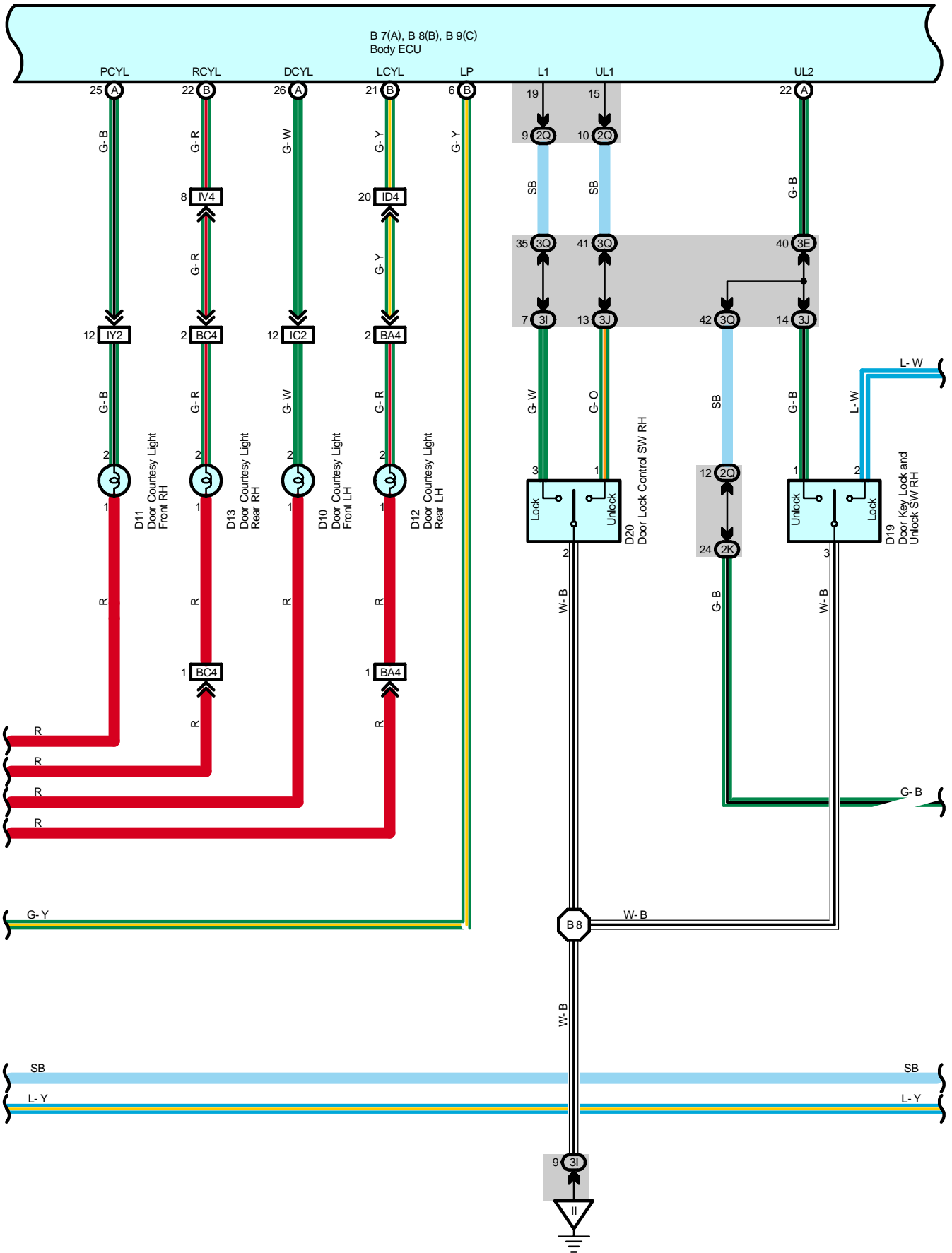
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I18	<a href="#">80</a>	Instrument Panel Wire	I19	<a href="#">80</a>	Instrument Panel Wire

# Interior Light



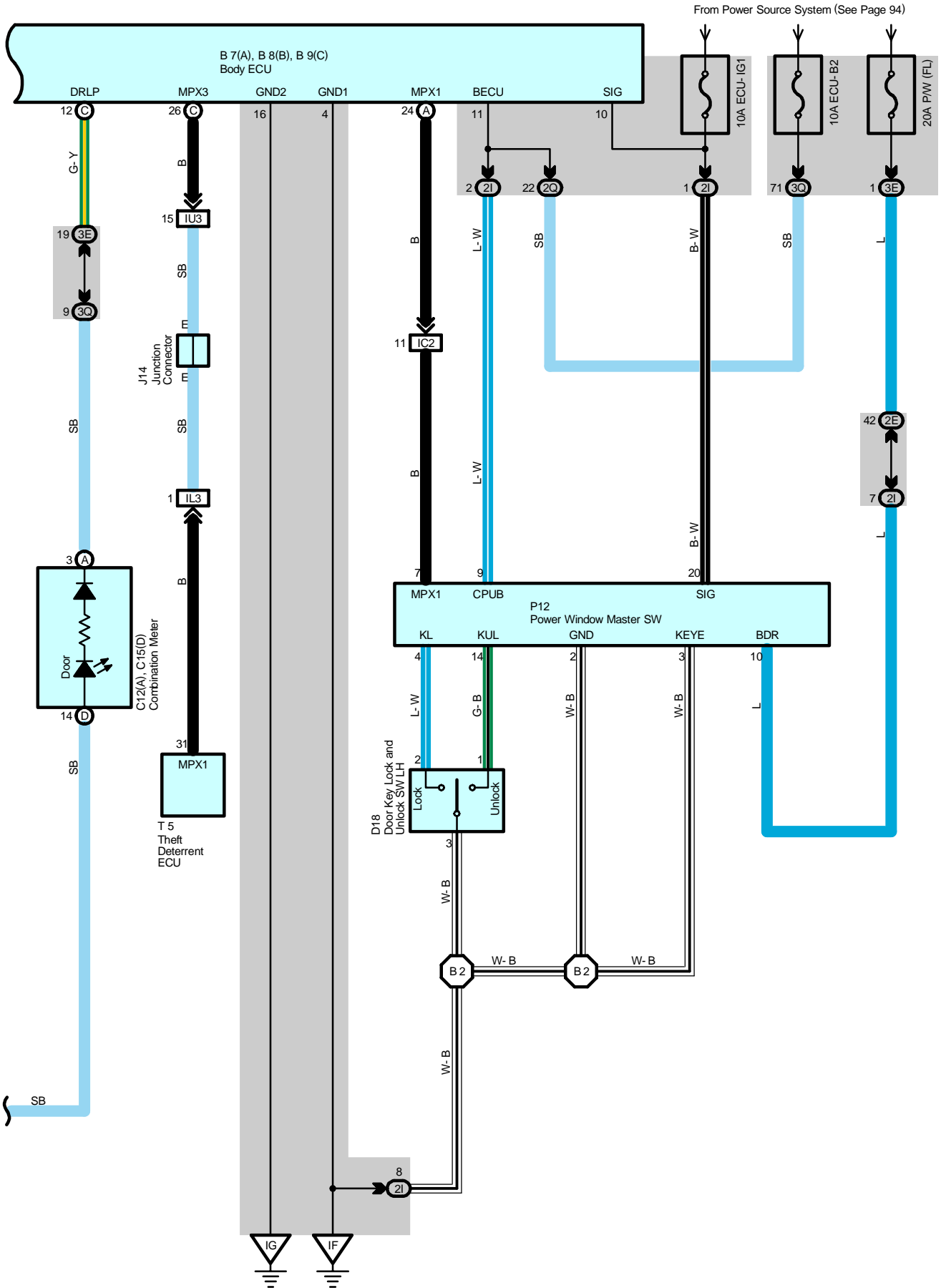


# Interior Light





# Interior Light



## System Outline

### Normal Operation

- \* When the front Door LH or RH is opened, the door courtesy light front LH, RH and open door warning light is turned on. When the front door LH and RH are closed, the door courtesy light front LH, RH is turned off.
- \* When the rear door LH, RH or the back door is opened, door courtesy light rear LH, RH, rear interior light and the open door warning light is turned on. When the rear door LH, RH and back door are closed, the door courtesy light rear LH, RH is turned off.
- \* When all the doors are closed, the open door warning light is turned off.

### Turn Off Function

When the ignition SW turned off and there is no change in the door courtesy SW for approx. 30 minute, the DOME relay is turned off. The DOME relay is turned on again when any of the following conditions are met.

- \* Ignition SW is turned from OFF position to ACC or ON position
- \* Change to any door courtesy SW
- \* Driver or front passenger door is unlocked by the key or transmitter

### Immediate Turn Off Function at Door Lock

When all the doors are closed, and the driver or front passenger door is locked by the key or transmitter, the DOME relay is turned off, after approx. 80 seconds. However, when the illuminated entry system is operating, the DOME relay is turned off after the operation is completed. the DOME relay is turned on again when any of the following conditions are met.

- \* Ignition SW is turned from OFF position to ACC or ON position
- \* Change to any door courtesy SW
- \* Driver or front passenger door is unlocked by the key or transmitter

### Illuminated Entry System

- \* When any door is opened, each light is turned on.
- \* The light remains on for approx. 15 seconds after all doors are closed, and fades out.
- \* With the ignition SW is at ACC or ON position, and any door open, when all the doors are closed, each light fades out immediately.
- \* When the ignition SW is turned to ACC or ON position during timer lighting, each light fades out immediately.
- \* When the doors are locked during timer lighting, each light fades out immediately.
- \* The lights include, the front interior light, ignition key cylinder light, and front door courtesy light LH, RH.

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
B2	72	D13	72	F11	72
B3	72	D14	72	J14	71
B7	A 70	D15	72	J22	72
B8	B 70	D16	72	P12	73
B9	C 70	D17	72	R27	73
C12	A 70	D18	72	T5	71
C15	D 70	D19	72	T10	71
D10	72	D20	72	V6	73
D11	72	D27	72	V7	73
D12	72	F10	72		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2G		
2I	28	Front Door LH Wire and Cowl Side J/B LH (Left Kick Panel)
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2L	28	Roof No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3I	40	Front Door RH Wire and Cowl Side J/B RH (Right Kick Panel)
3J		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)

# Interior Light

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IC2	78	Front Door LH Wire and Dash Wire (Left Kick Panel)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IL3	80	Instrument Panel Integration Wire and Computer Wire (Instrument Panel Center)
IU3	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IV3	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IV4		
IY2	82	Front Door RH Wire and Dash Wire (Right Kick Panel)
BA4	86	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BC4	86	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)
BH1	86	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BH2		
BP3	88	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BP4		
BQ2	88	Back Door Lower Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BR1	88	Roof No.3 Wire and Roof No.1 Wire (Front Side of Roof)

## : Ground Points

Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH
IG		
II	78	Set Bolt of Cowl Side J/B RH
BJ	86	Under the Driver's Seat

## : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B2	88	Front Door LH Wire	B8	88	Front Door RH Wire
B7	88	Roof No.1 Wire	B11	88	Floor No.1 Wire

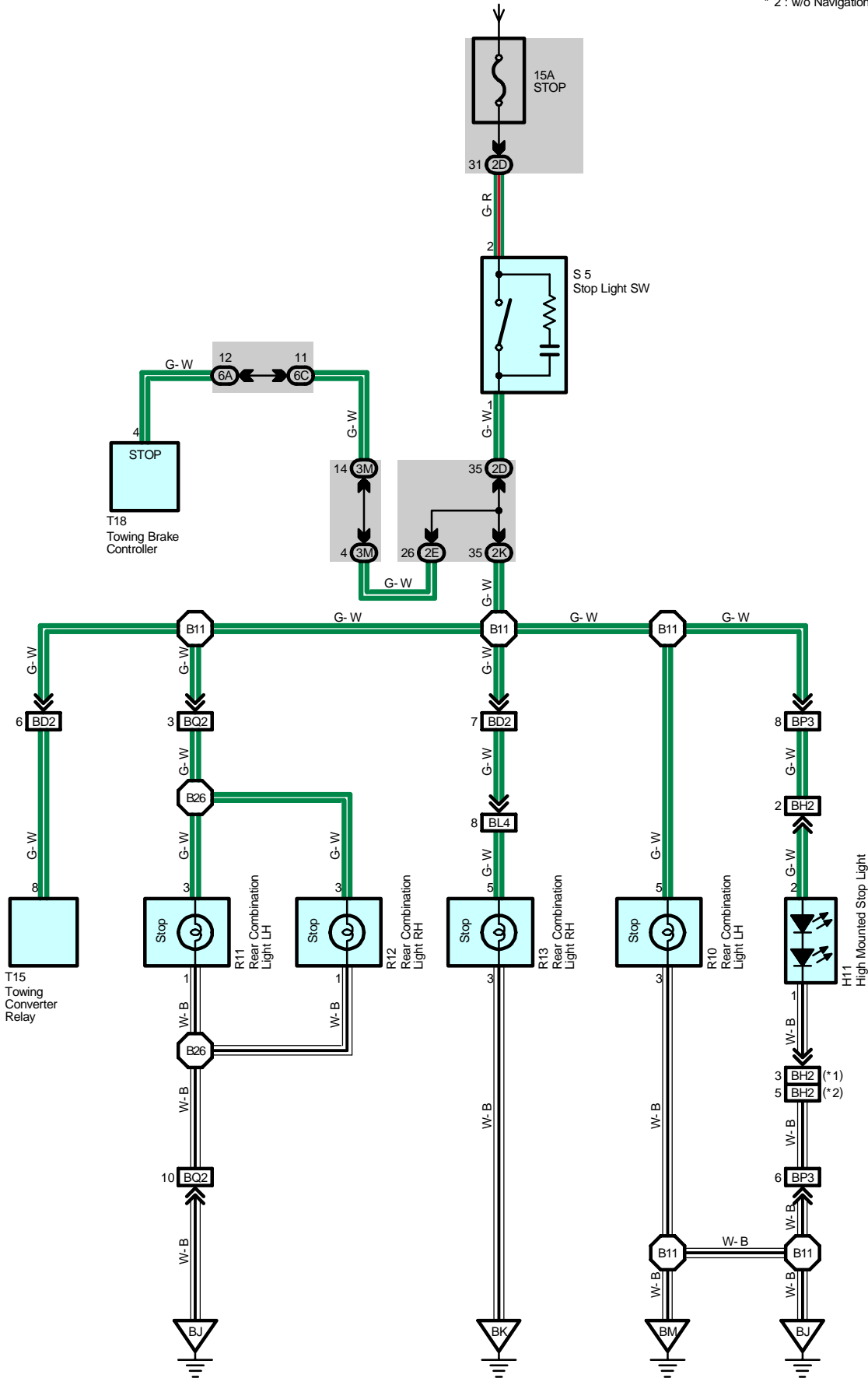




# Stop Light

From Power Source System (See Page 94)

- \* 1 : w/ Navigation System
- \* 2 : w/o Navigation System



**Service Hints****S5 Stop Light SW**

2-1 : Closed with brake pedal depressed

 : **Parts Location**

Code	See Page	Code	See Page	Code	See Page
H11	<a href="#">72</a>	R12	<a href="#">73</a>	T15	<a href="#">73</a>
R10	<a href="#">73</a>	R13	<a href="#">73</a>	T18	<a href="#">71</a>
R11	<a href="#">73</a>	S5	<a href="#">71</a>		

 : **Junction Block and Wire Harness Connector**

Code	See Page	Junction Block and Wire Harness (Connector Location)
2D	<a href="#">28</a>	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2K	<a href="#">28</a>	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
3M	<a href="#">43</a>	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
6A	<a href="#">60</a>	Dash Wire and J/B No.6 (Behind the Grove Box)
6C		

 : **Connector Joining Wire Harness and Wire Harness**

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
BD2	<a href="#">86</a>	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BH2	<a href="#">86</a>	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BL4	<a href="#">88</a>	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BP3	<a href="#">88</a>	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BQ2	<a href="#">88</a>	Back Door Lower Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)

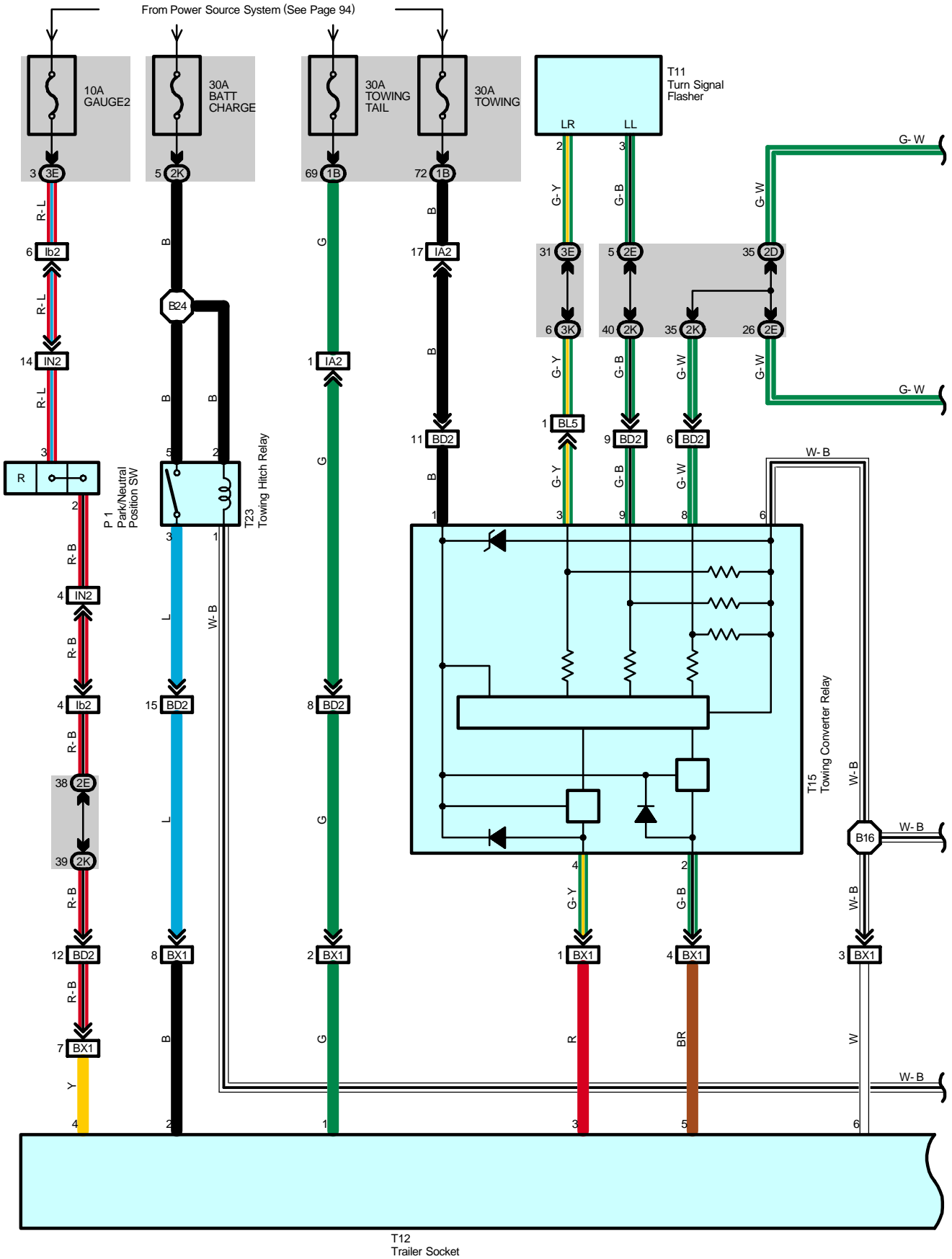
 : **Ground Points**

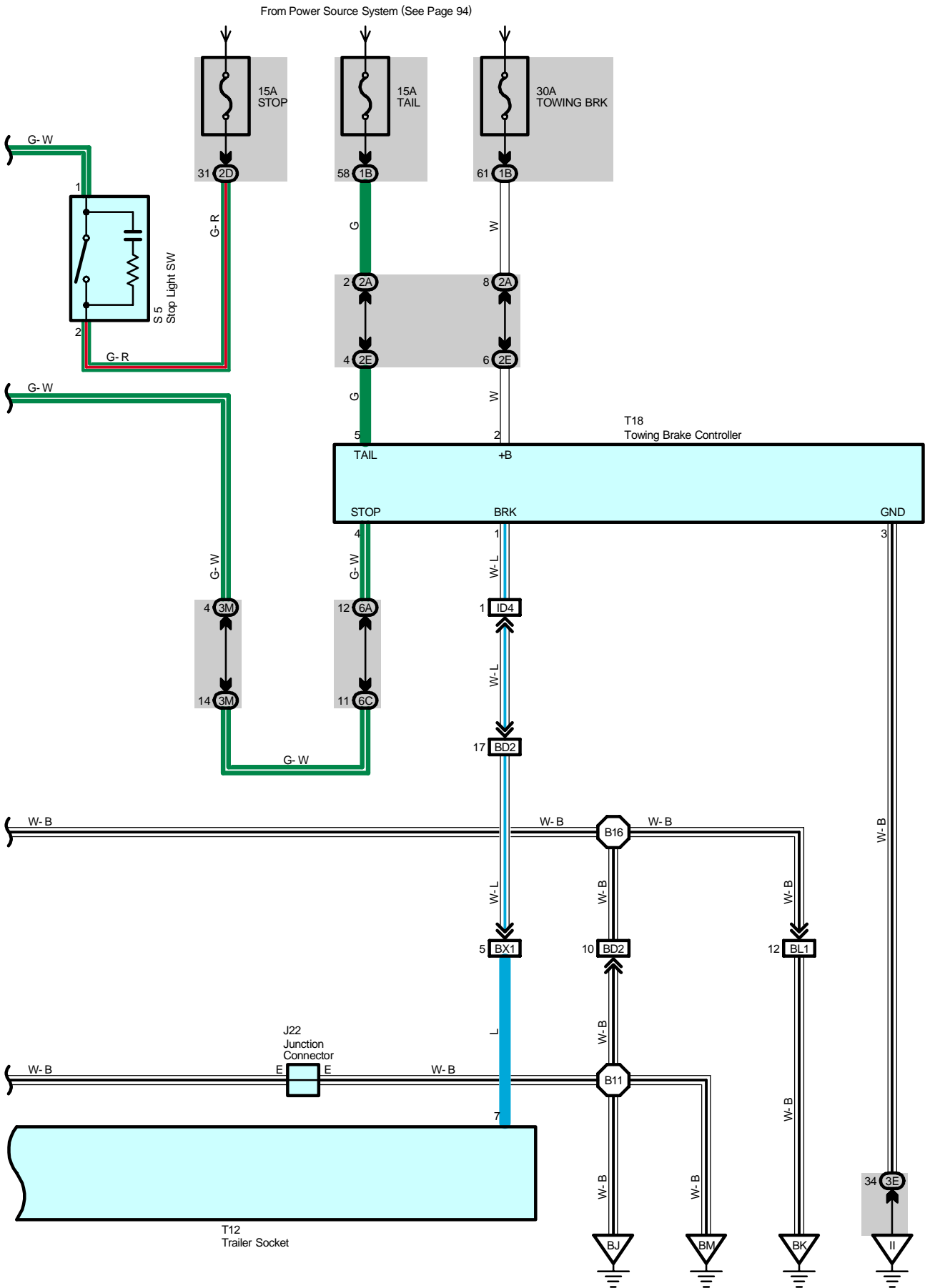
Code	See Page	Ground Points Location
BJ	<a href="#">86</a>	Under the Driver's Seat
BK	<a href="#">86</a>	Front Side Under the Front Passenger's Seat
BM	<a href="#">86</a>	Left Rear Side Quarter Panel

 : **Splice Points**

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B11	<a href="#">88</a>	Floor No.1 Wire	B26	<a href="#">88</a>	Back Door Lower Wire

# Trailer Towing





# Trailer Towing

## Service Hints

### T15 Towing Converter Relay

1-Ground : Always approx. 12 volts

6-Ground : Always continuity

### S5 Stop Light SW

2-1 : Closed with brake pedal depressed

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
J22	72	T11	71	T18	71
P1	69	T12	73	T23	73
S5	71	T15	73		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3M	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
6A	60	Dash Wire and J/B No.6 (Behind the Grove Box)
6C		

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IA2	78	Engine Room No.2 Wire and Floor No.1 Wire (Left Kick Panel)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
lb2	84	Dash Wire and Dash Wire (Behind the Combination Meter)
BD2	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BL1	88	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BL5		
BX1	88	Frame No.4 Wire and Floor No.3 Wire (Left Side of Rear Floor Crossmember)

## ▽ : Ground Points

Code	See Page	Ground Points Location
II	78	Set Bolt of Cowl Side J/B RH
BJ	86	Under the Driver's Seat
BK	86	Front Side Under the Front Passenger's Seat
BM	86	Left Rear Side Quarter Panel

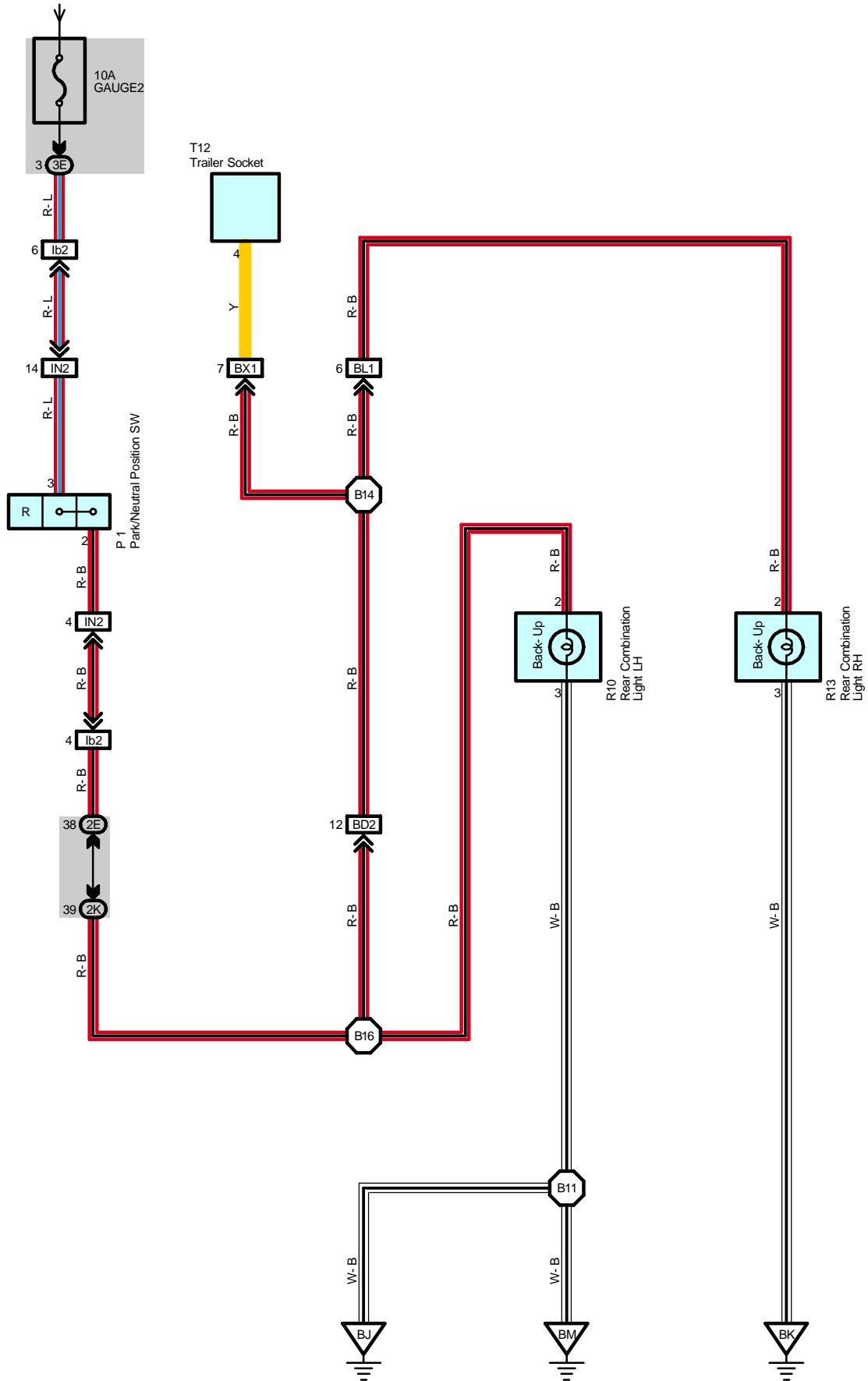
## ○ : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B11	88	Floor No.1 Wire	B24	88	Floor No.1 Wire
B16	88	Floor No.3 Wire			



# Back-Up Light

From Power Source System (See Page 94)





**Service Hints****P1 Park/Neutral Position SW**

3-2 : Closed with shift lever at R position

 : **Parts Location**

Code	See Page	Code	See Page	Code	See Page
P1	<a href="#">69</a>	R13	<a href="#">73</a>		
R10	<a href="#">73</a>	T12	<a href="#">73</a>		

 : **Junction Block and Wire Harness Connector**

Code	See Page	Junction Block and Wire Harness (Connector Location)
2E	<a href="#">28</a>	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2K	<a href="#">28</a>	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
3E	<a href="#">40</a>	Dash Wire and Cowl Side J/B RH (Right Kick Panel)

 : **Connector Joining Wire Harness and Wire Harness**

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IN2	<a href="#">80</a>	Engine Wire and Dash Wire (Behind the Glove Box)
Ib2	<a href="#">84</a>	Dash Wire and Dash Wire (Behind the Combination Meter)
BD2	<a href="#">86</a>	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BL1	<a href="#">88</a>	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BX1	<a href="#">88</a>	Frame No.4 Wire and Floor No.3 Wire (Left Side of Rear Floor Crossmember)

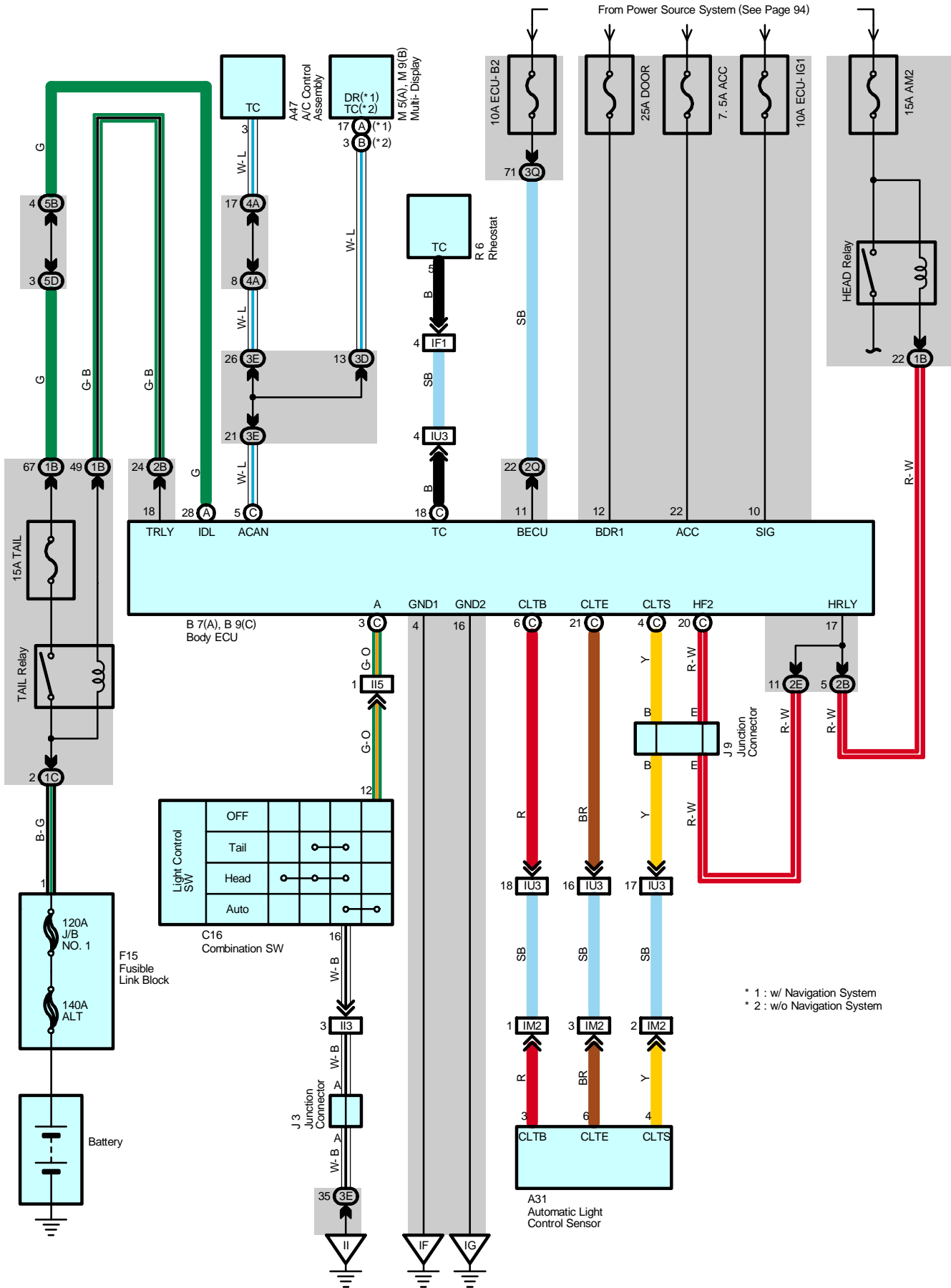
 : **Ground Points**

Code	See Page	Ground Points Location
BJ	<a href="#">86</a>	Under the Driver's Seat
BK	<a href="#">86</a>	Front Side Under the Front Passenger's Seat
BM	<a href="#">86</a>	Left Rear Side Quarter Panel

 : **Splice Points**

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B11	<a href="#">88</a>	Floor No.1 Wire	B16	<a href="#">88</a>	Floor No.3 Wire
B14	<a href="#">88</a>	Floor No.2 Wire			

# Automatic Light Control



## System Outline

The automatic light control system works when the light control SW is turned to AUTO. The automatic light control sensor detects the brightness around the vehicle. By this function, the system automatically turns the taillight and headlight on if the brightness is below the regular level and turns the taillight and headlight off when the surroundings become brighter than the regular level.

## Service Hints

### Body ECU

- 11, 12-Ground : Always approx. 12 volts
- 22-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- 10-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 4, 16-Ground : Always continuity

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A31	70	C16	70	M5 A	71
A47	70	F15	68	M9 B	71
B7 A	70	J3	71	R6	71
B9 C	70	J9	71		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B 1C	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D 3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
5B	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)

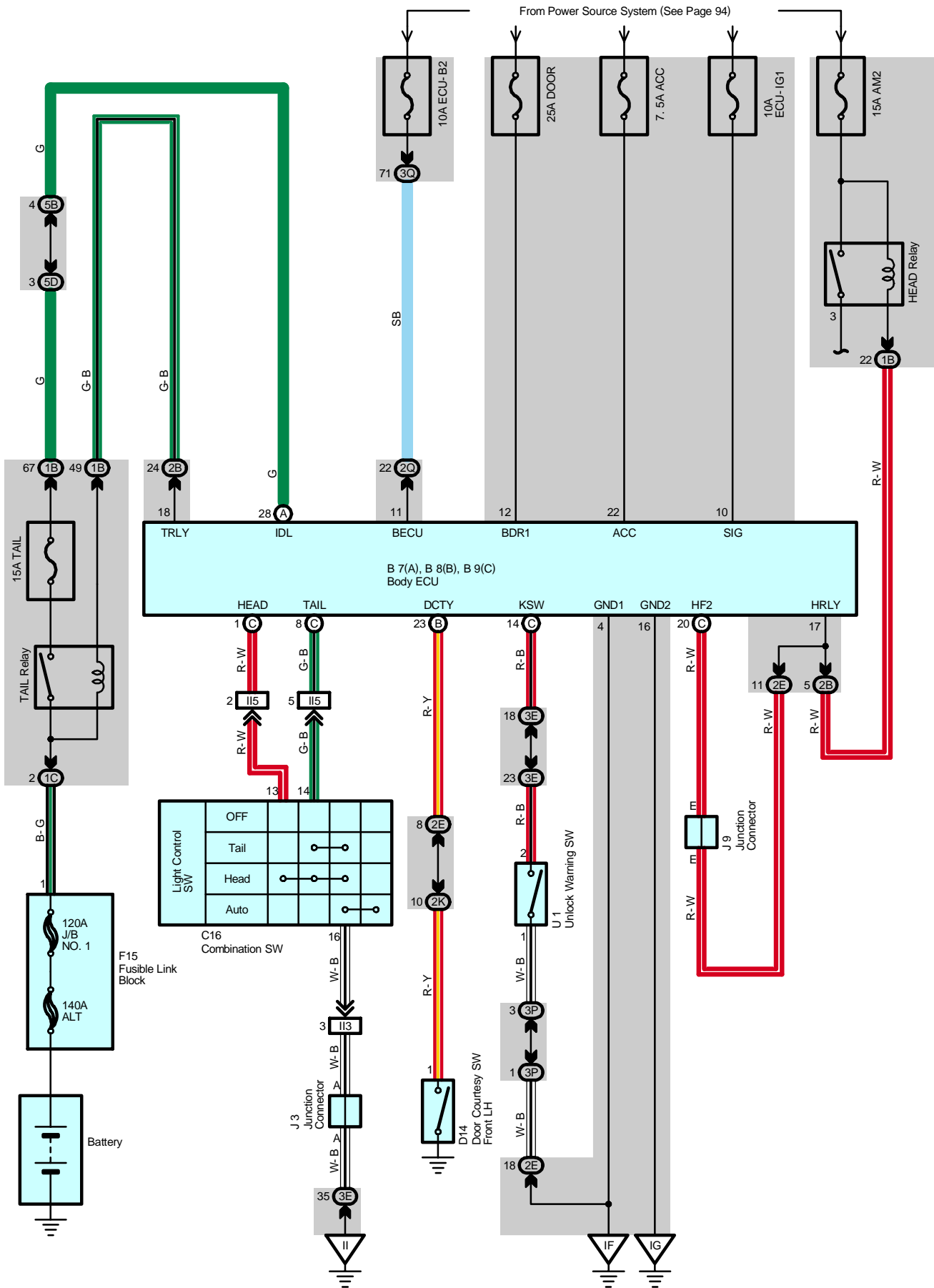
## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IF1	78	Instrument Panel Integration Wire and Instrument Panel Wire (Left Side of Instrument Panel)
II3 II5	80	Dash Wire and Column Wire (Near the Ignition SW)
IM2	80	Instrument Panel Integration Wire and Instrument Panel No.3 Wire (Right Side of Instrument Panel)
IU3	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)

## ▽ : Ground Points

Code	See Page	Ground Points Location
IF IG	78	Set Bolt of Cowl Side J/B LH
II	78	Set Bolt of Cowl Side J/B RH

# Light Auto Turn Off



## System Outline

The light auto turn off system automatically turns the taillight or headlight off according to the door open or close on the driver's side, and prevent failing to turn off the lights.

If the ignition switch is turned to OFF from ON with the headlight or taillight is on, the signal is input in the TERMINAL SIG of the body ECU. If the driver's side door is opened at that time, the signal from the door courtesy SW front LH is sent to the TERMINAL DCTY of the body ECU. The signal turns the headlight or taillight off.

Delayed turn off control

In the case of that some doors are opened, the headlight or taillight is left on for about 30 seconds after the all the doors was closed. However, if the doors are locked using the wireless door lock, the headlight or taillight is immediately turn off.

## Service Hints

### Body ECU

11, 12-Ground : Always approx. 12 volts

10-Ground : Approx. 12 volts with ignition SW at ON or ST position

4, 16-Ground : Always continuity

## ○ : Parts Location

Code		See Page	Code	See Page	Code	See Page
B7	A	70	C16	70	J3	71
B8	B	70	D14	72	J9	71
B9	C	70	F15	68	U1	71

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
1C		
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3P	43	
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
5B	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)

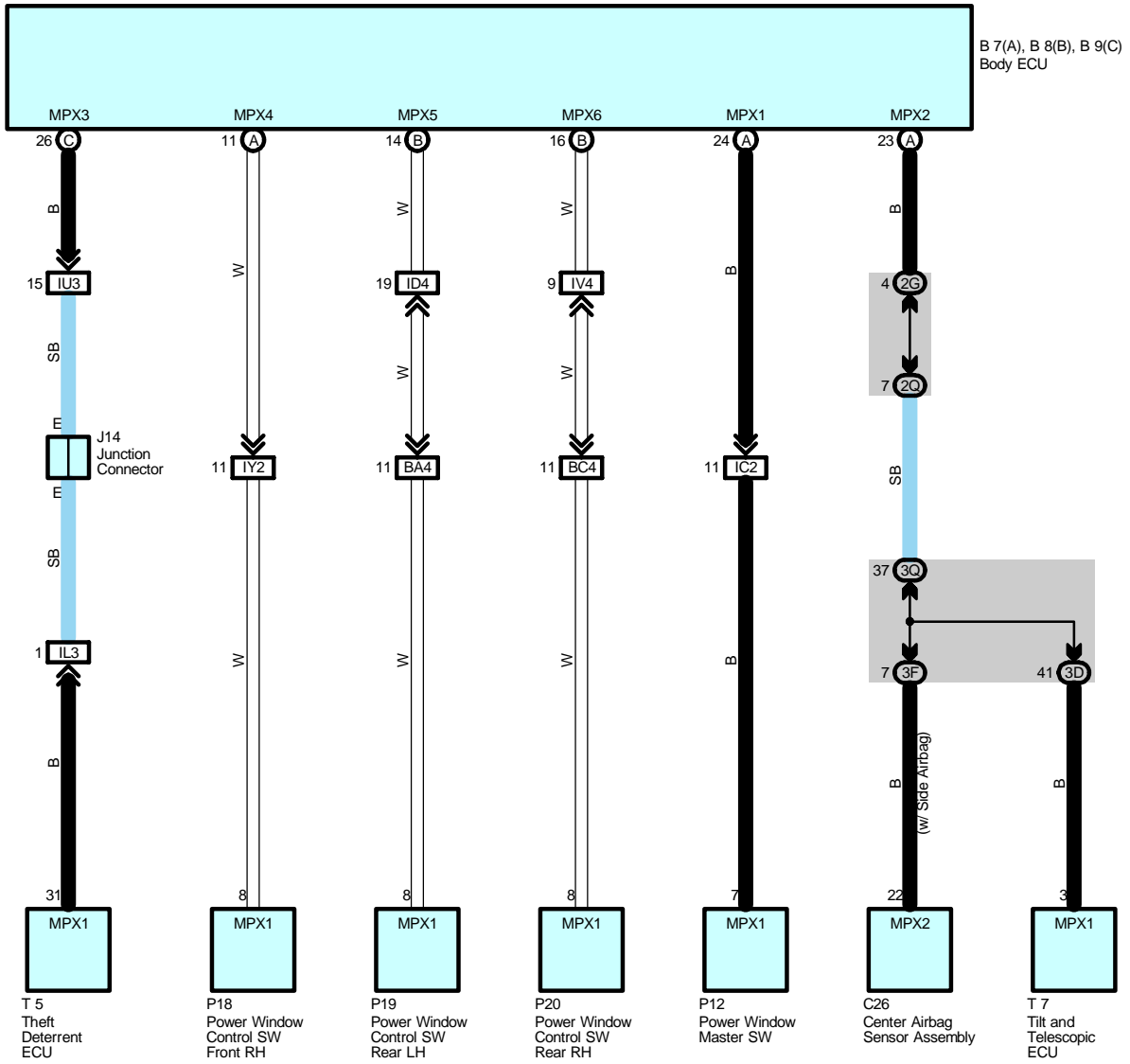
## □ : Connector Joining Wire Harness and Wire Harness

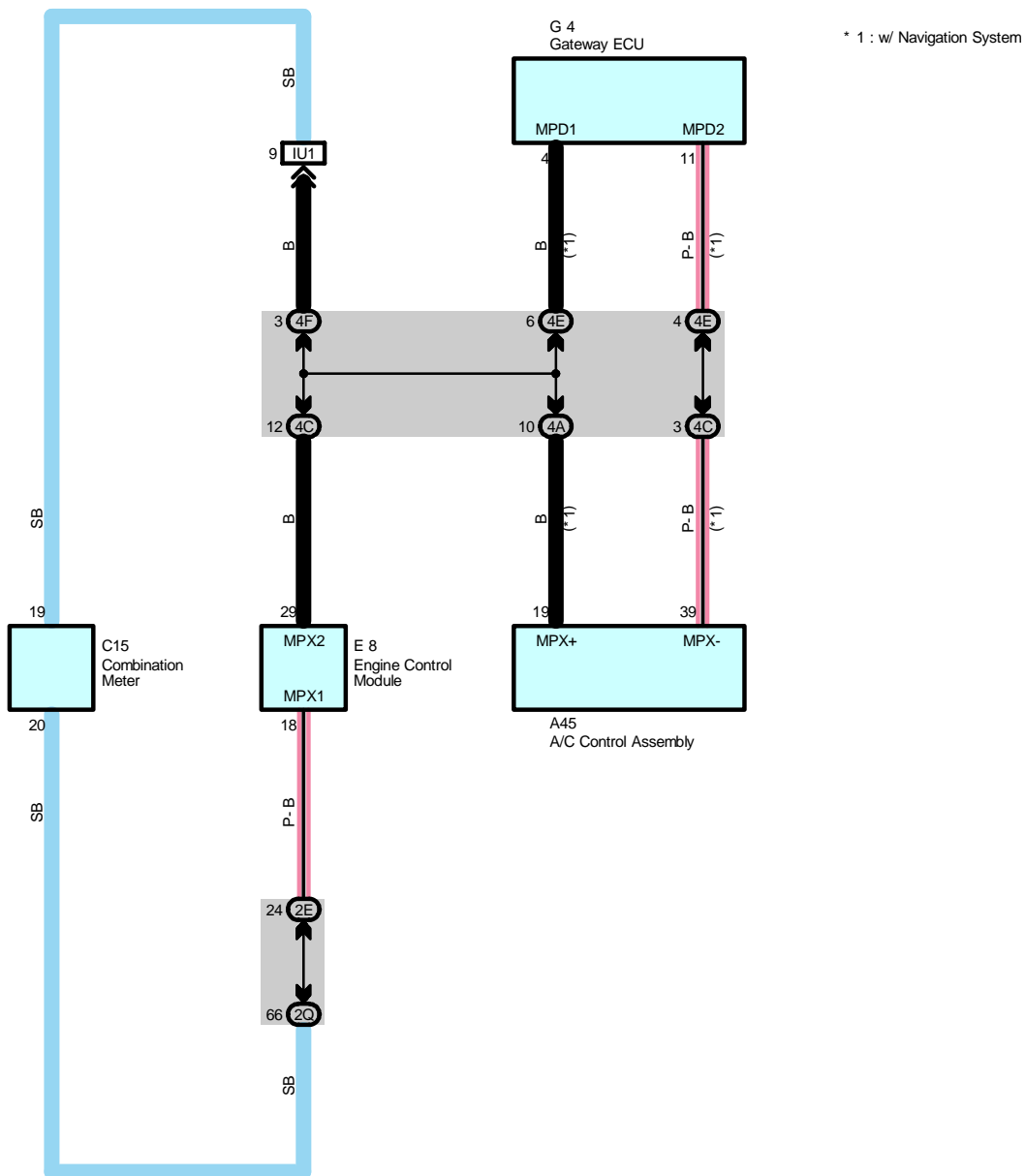
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
II5		

## ▽ : Ground Points

Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH
IG		
II	78	Set Bolt of Cowl Side J/B RH

# Multiplex Communication System (Communication Bus)





\* 1 : w/ Navigation System

# Multiplex Communication System (Communication Bus)

---

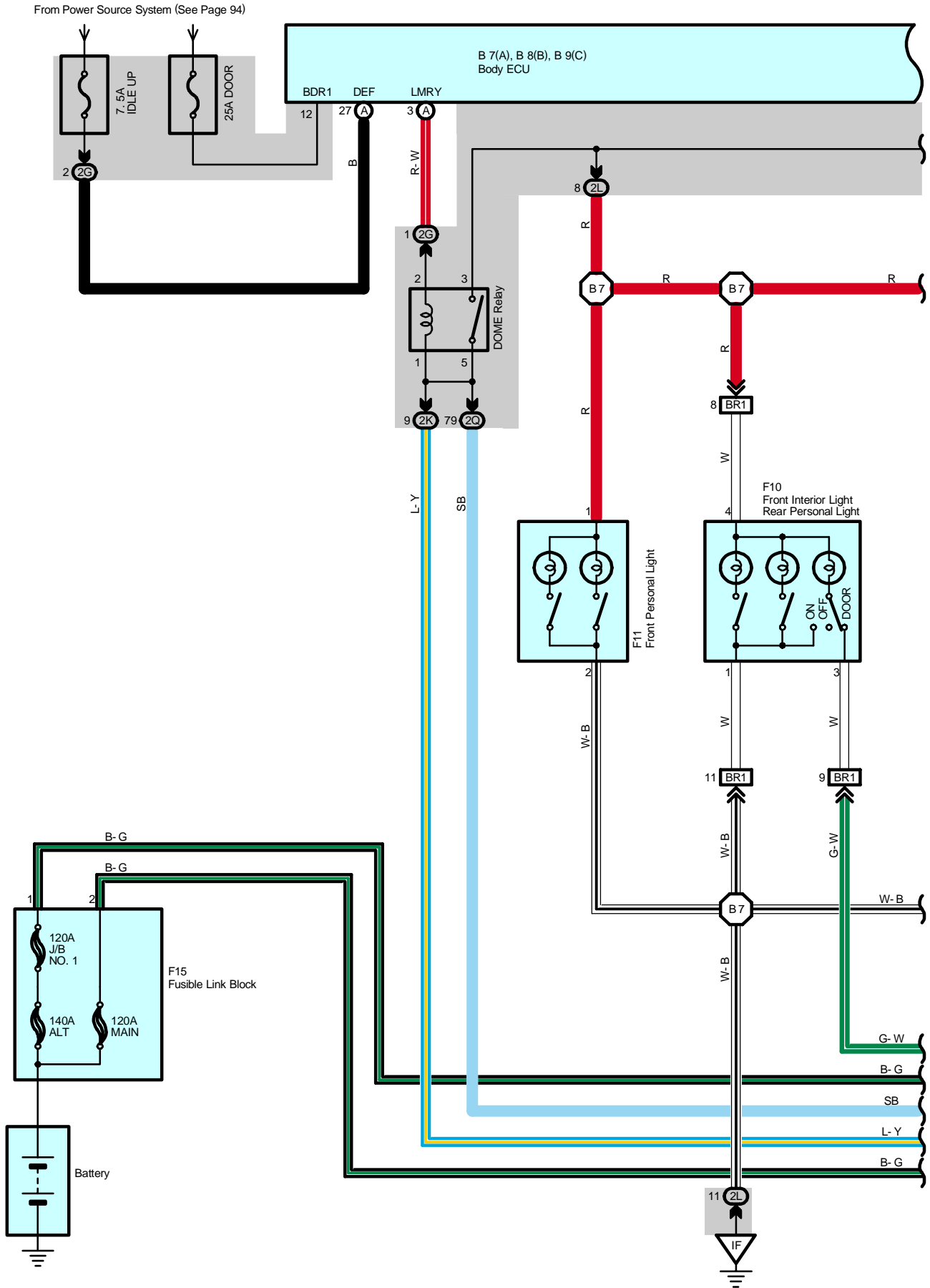
## Multiplex Communication System Includes Following Systems

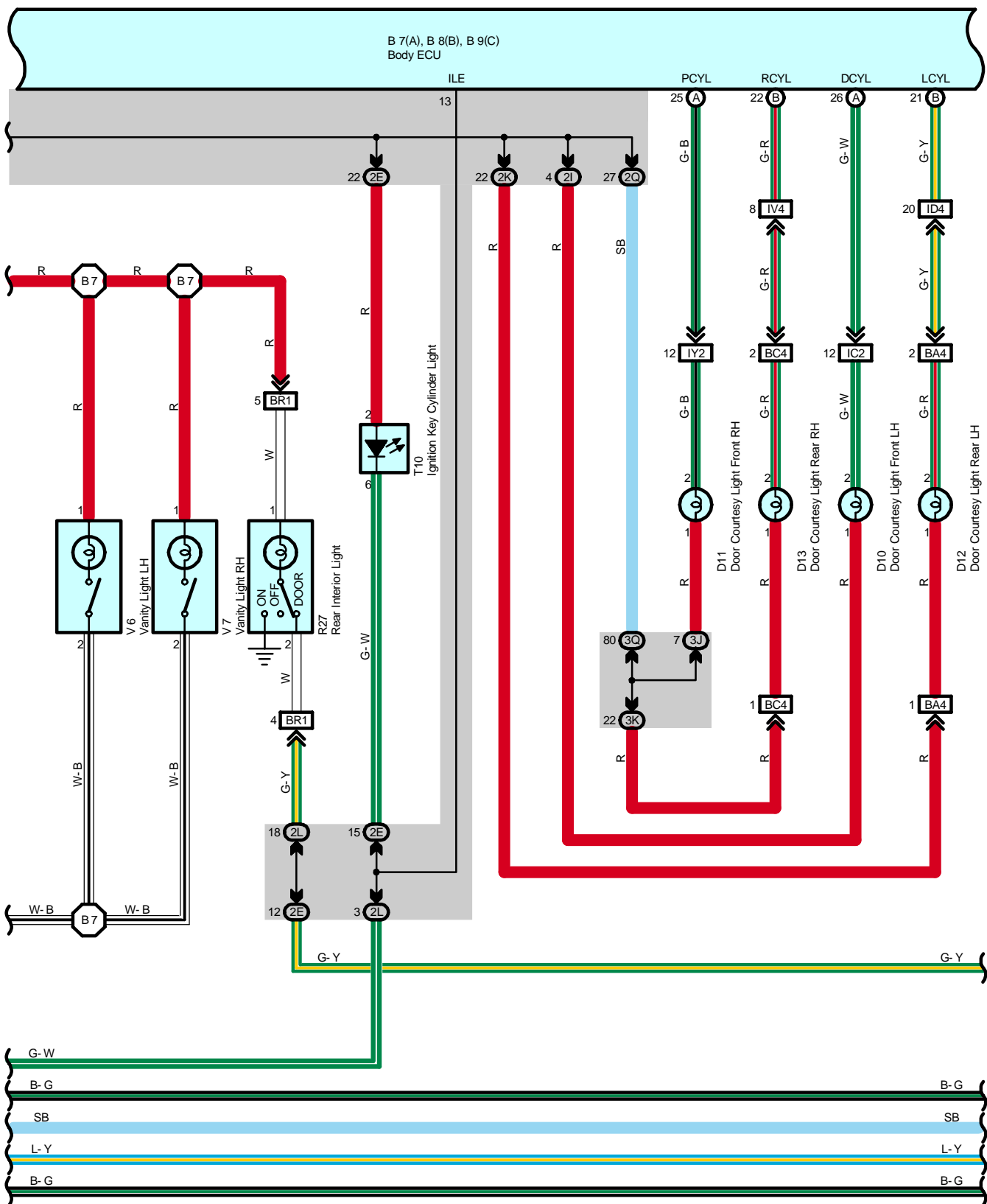
- \* Automatic Light Control
- \* Door Lock Control
- \* Front Fog Light
- \* Headlight
- \* Interior Light
- \* Key Reminder
- \* Light Auto Turn Off
- \* Power Window
- \* Theft Deterrent
- \* Wireless Door Lock Control



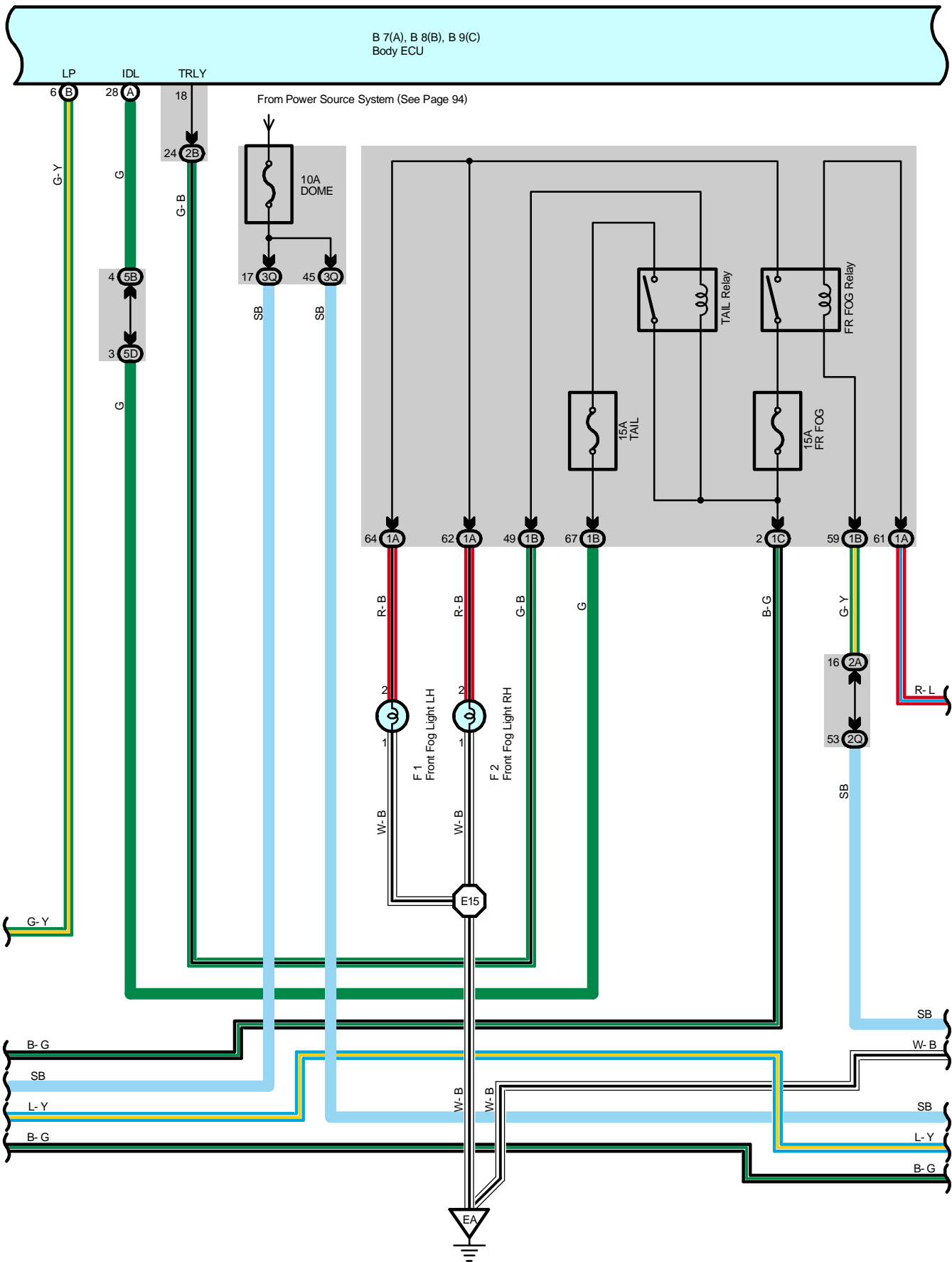


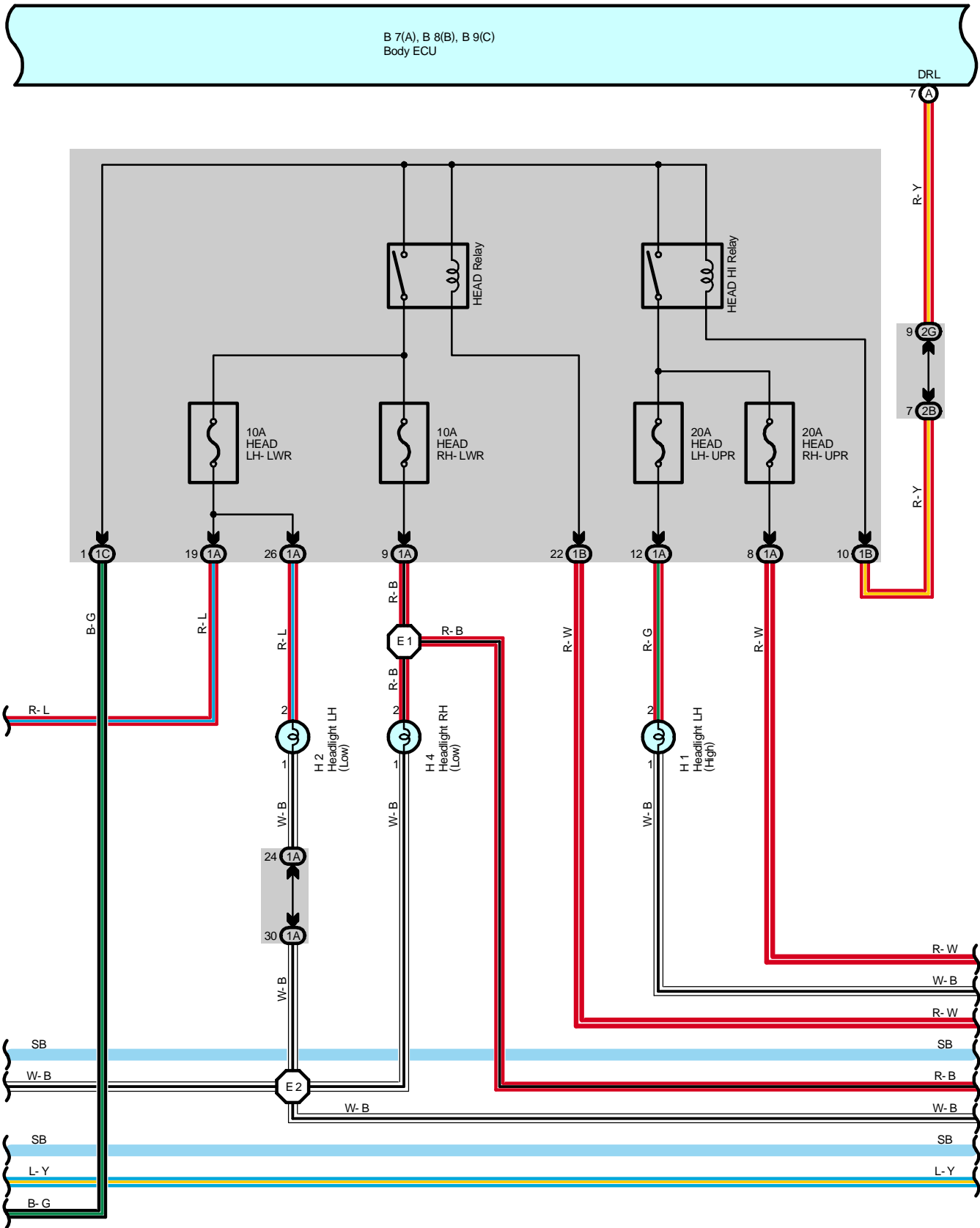
# Multiplex Communication System



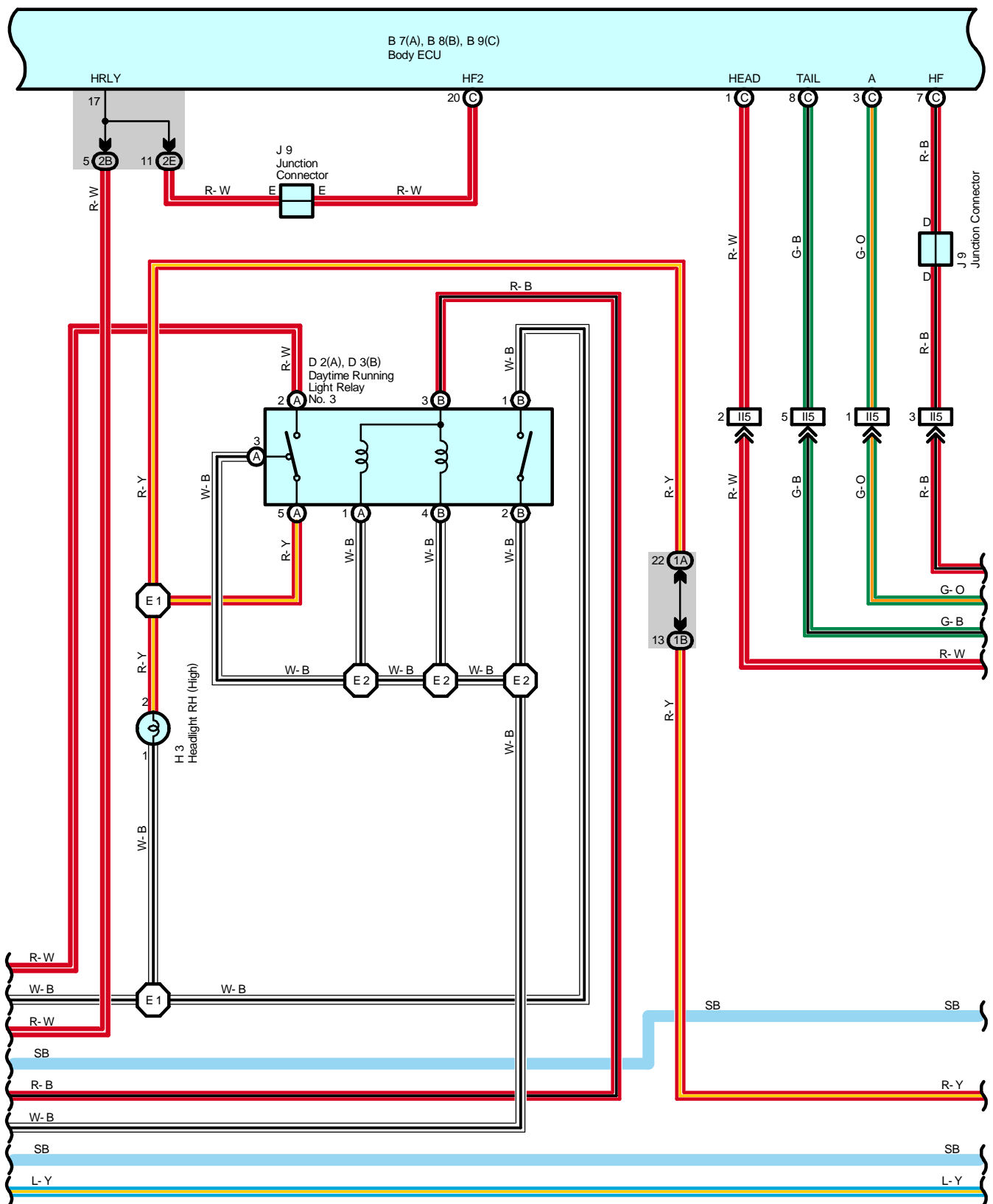


# Multiplex Communication System



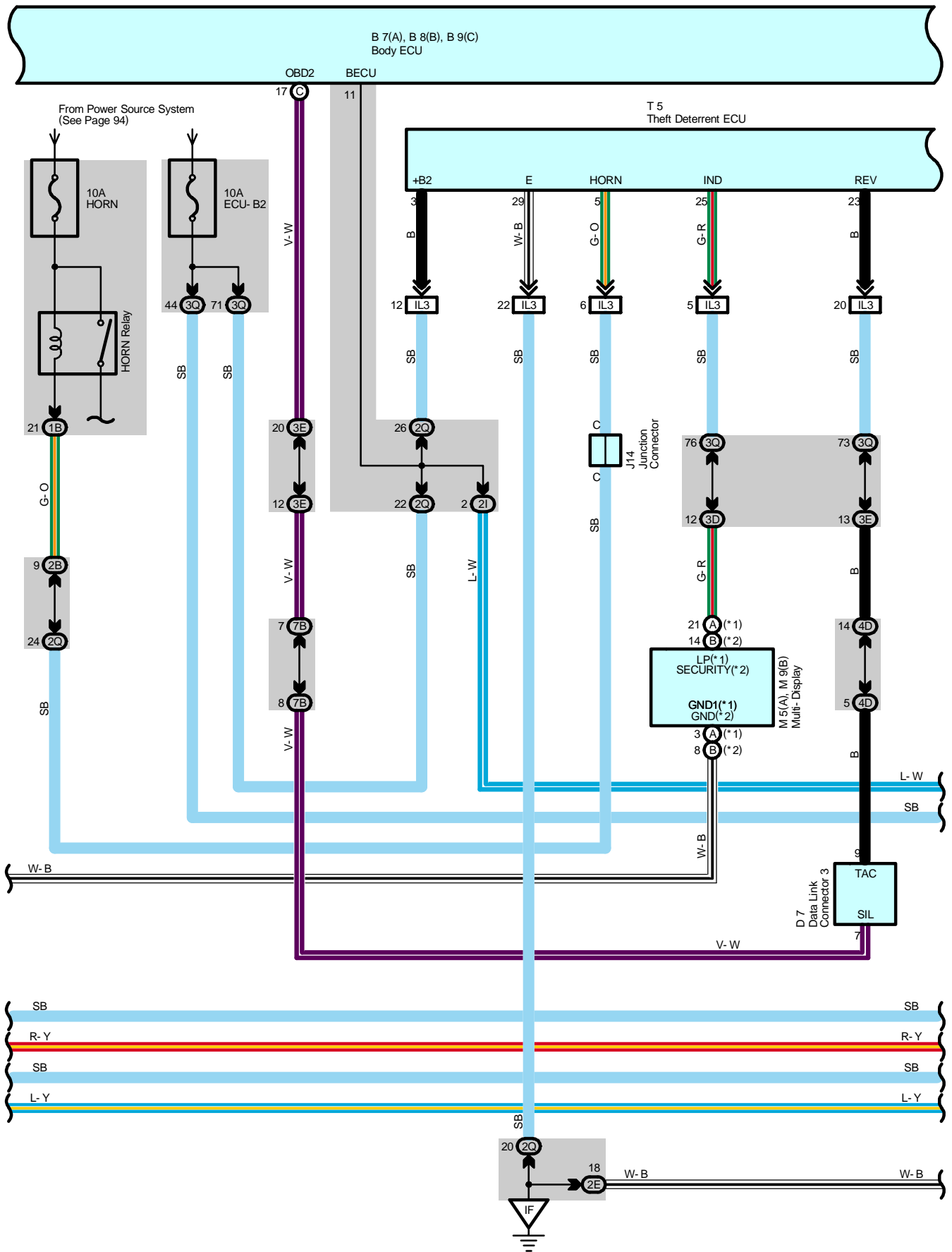


# Multiplex Communication System





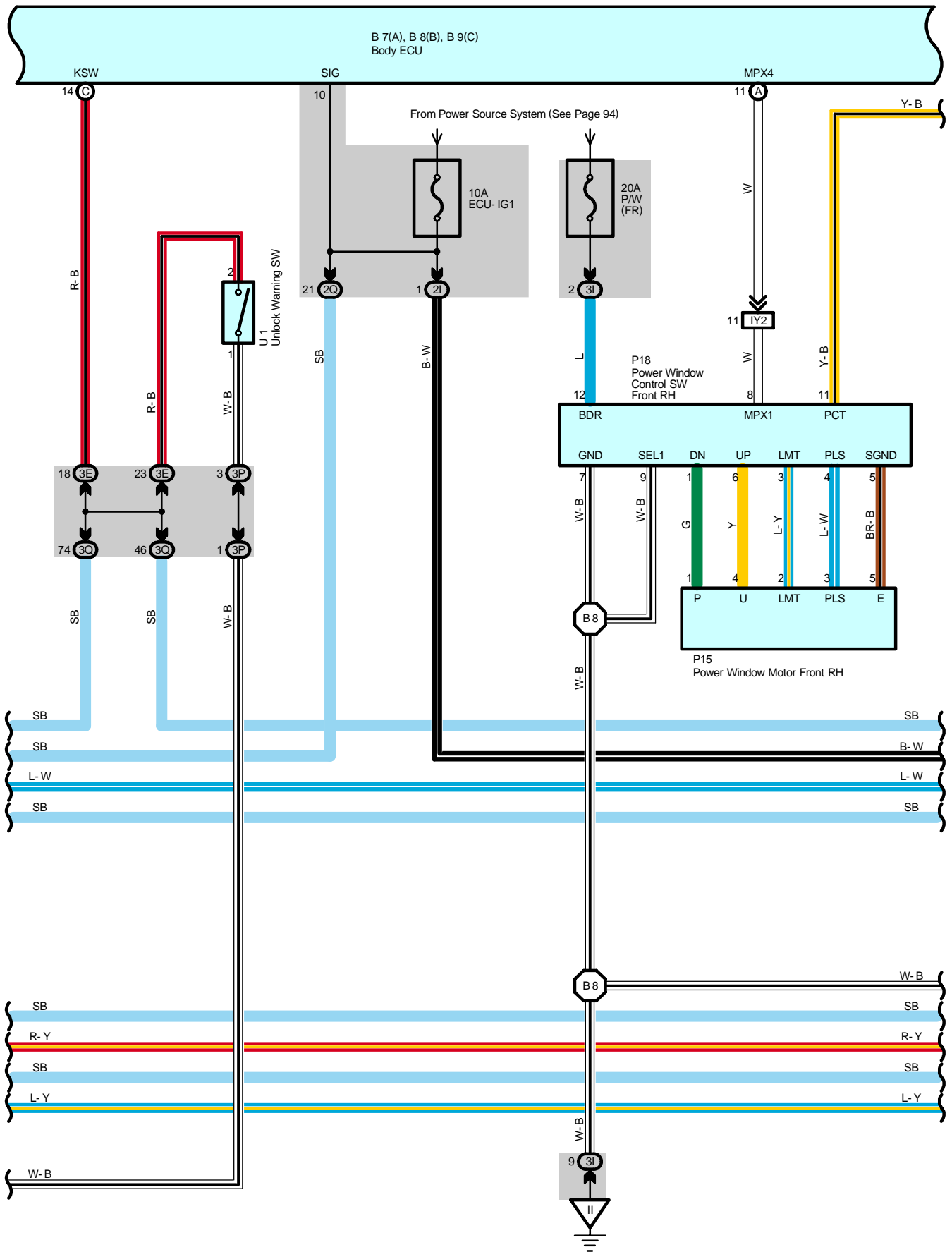
# Multiplex Communication System

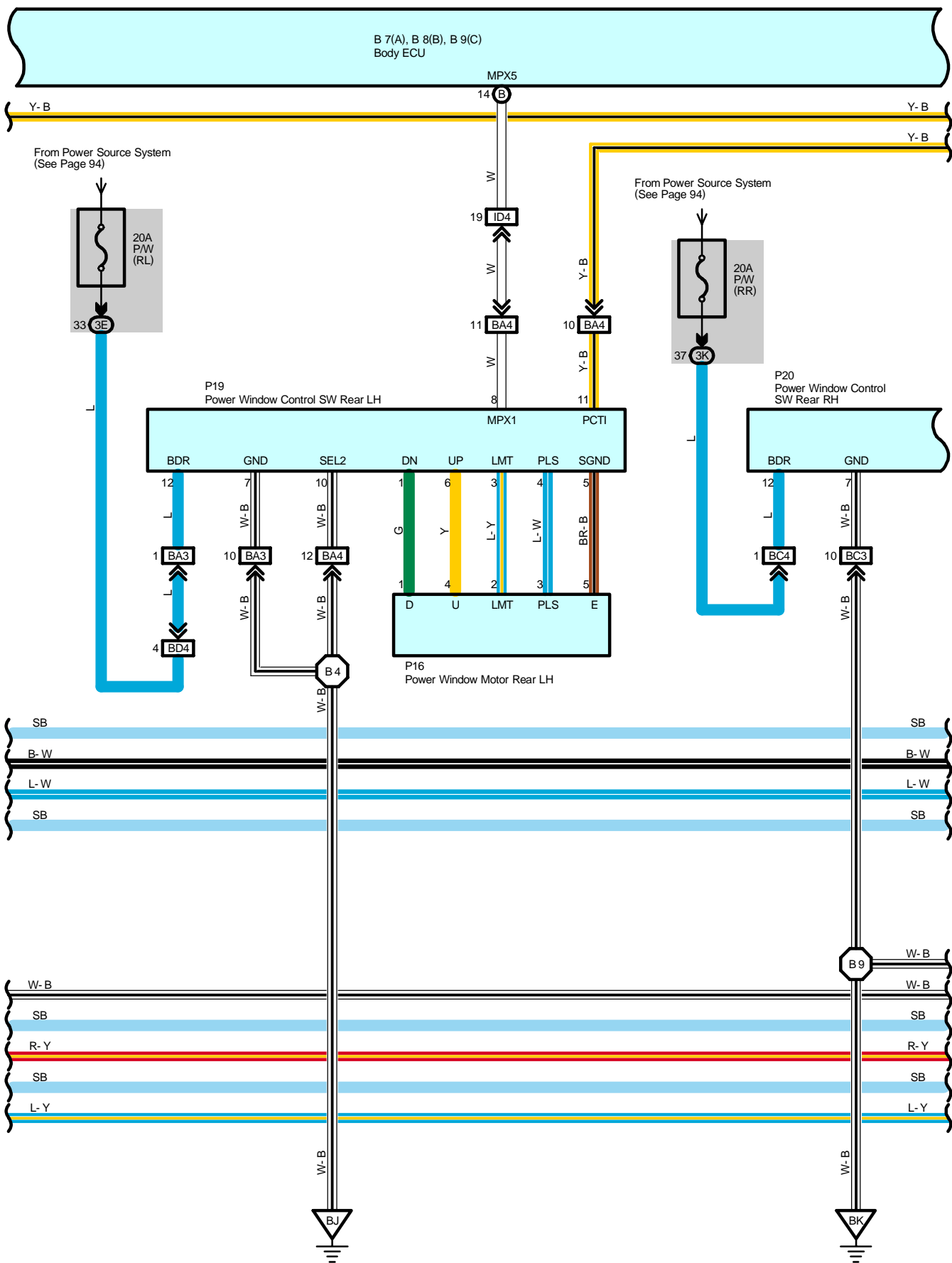




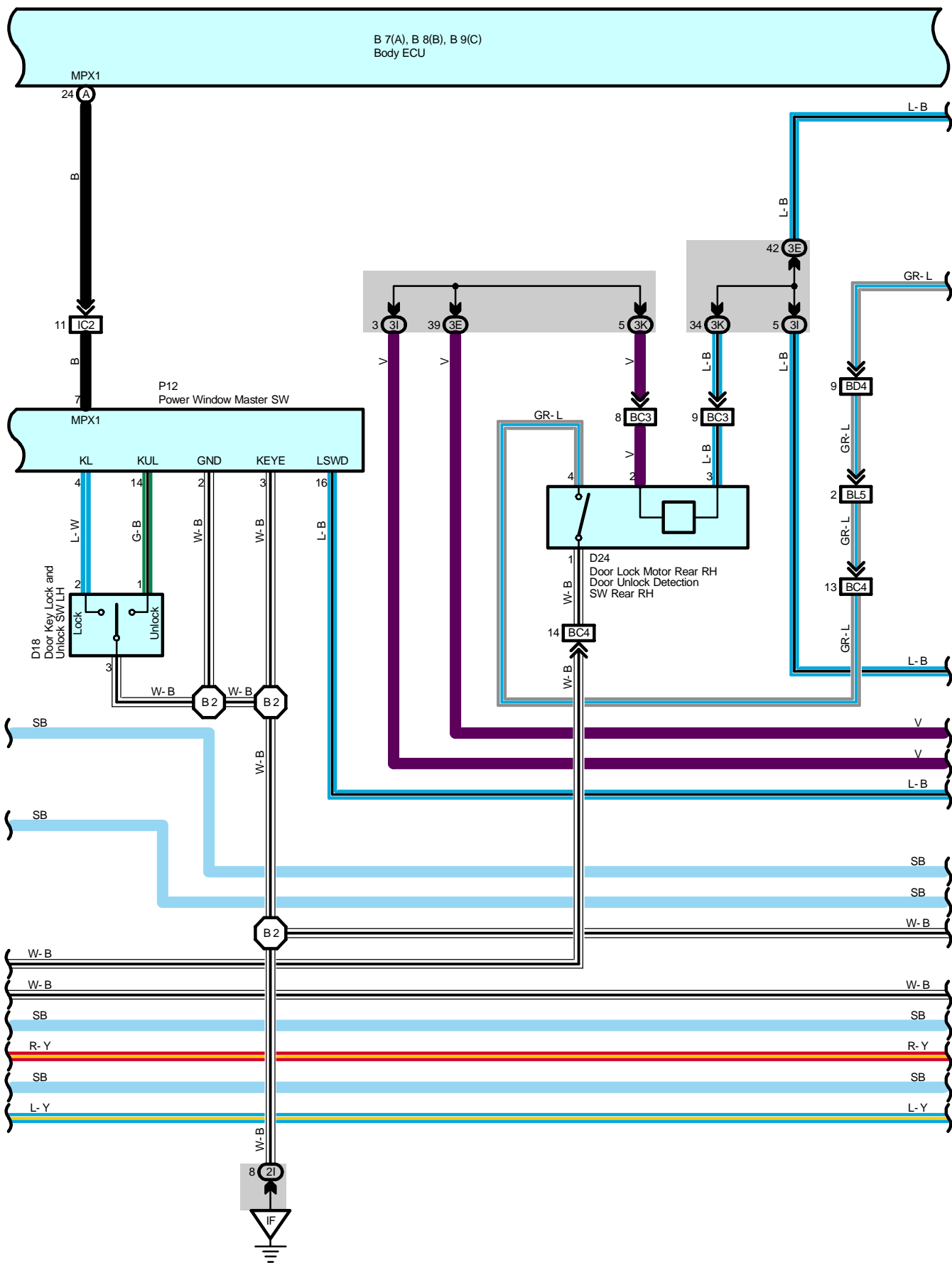


# Multiplex Communication System

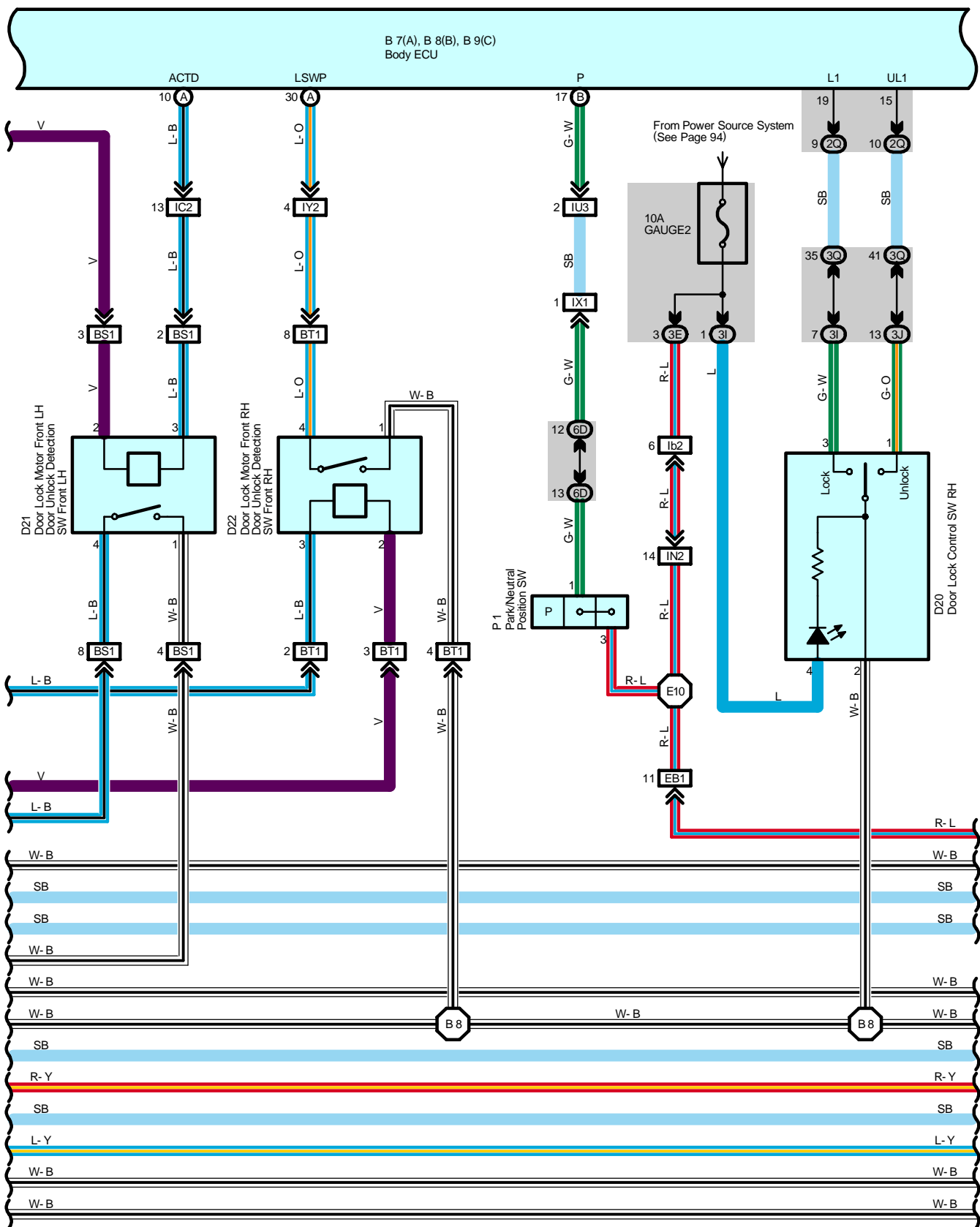




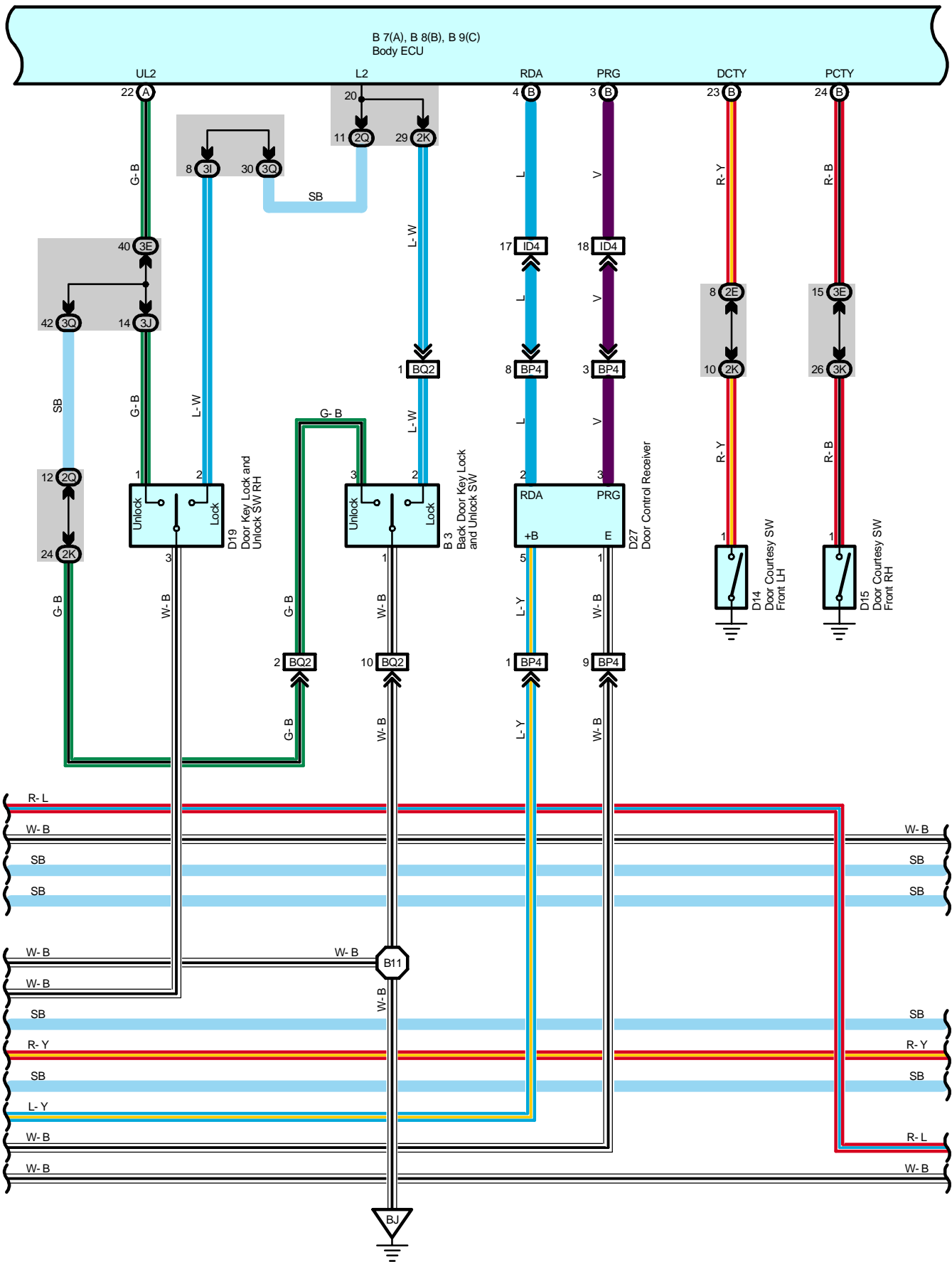




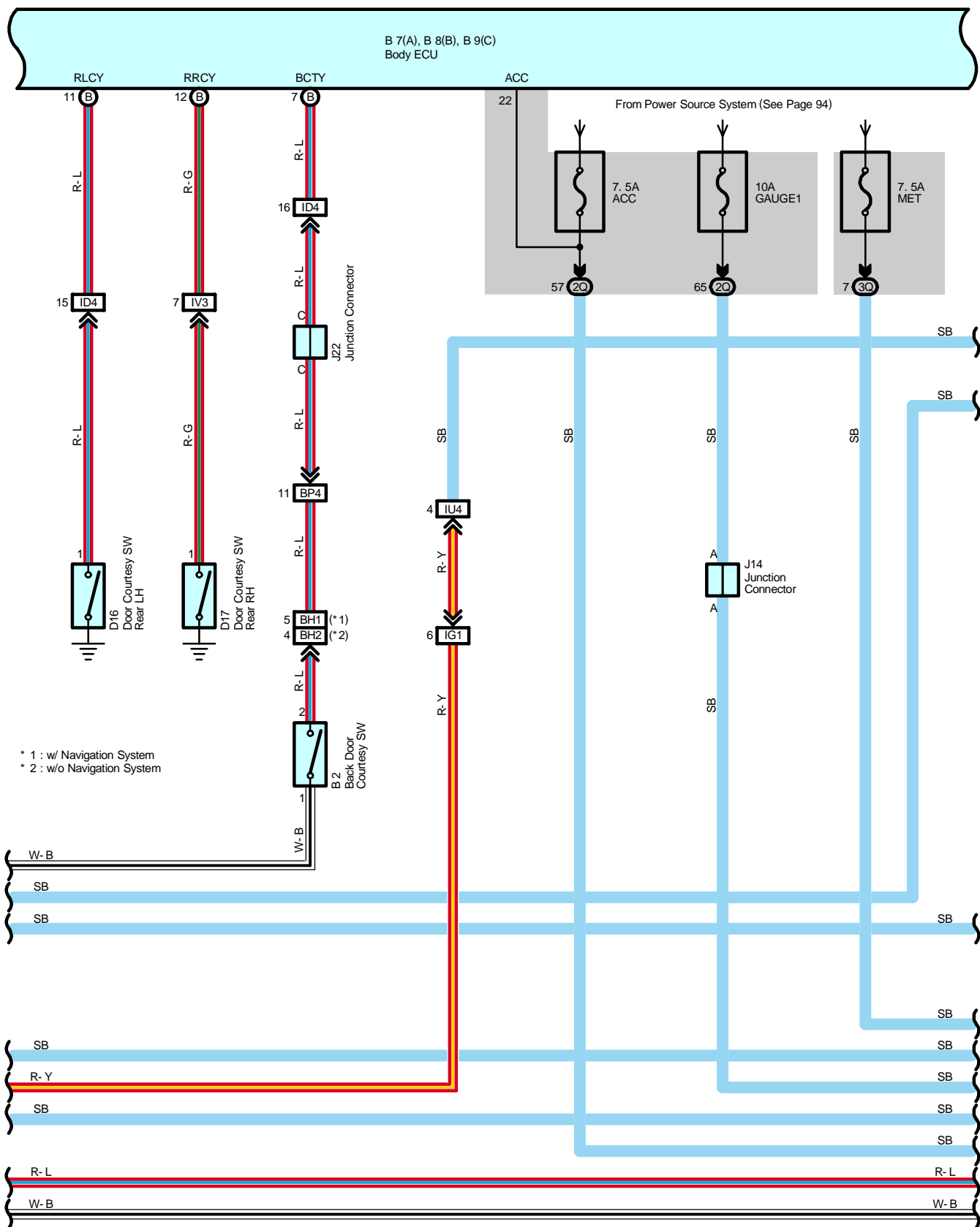




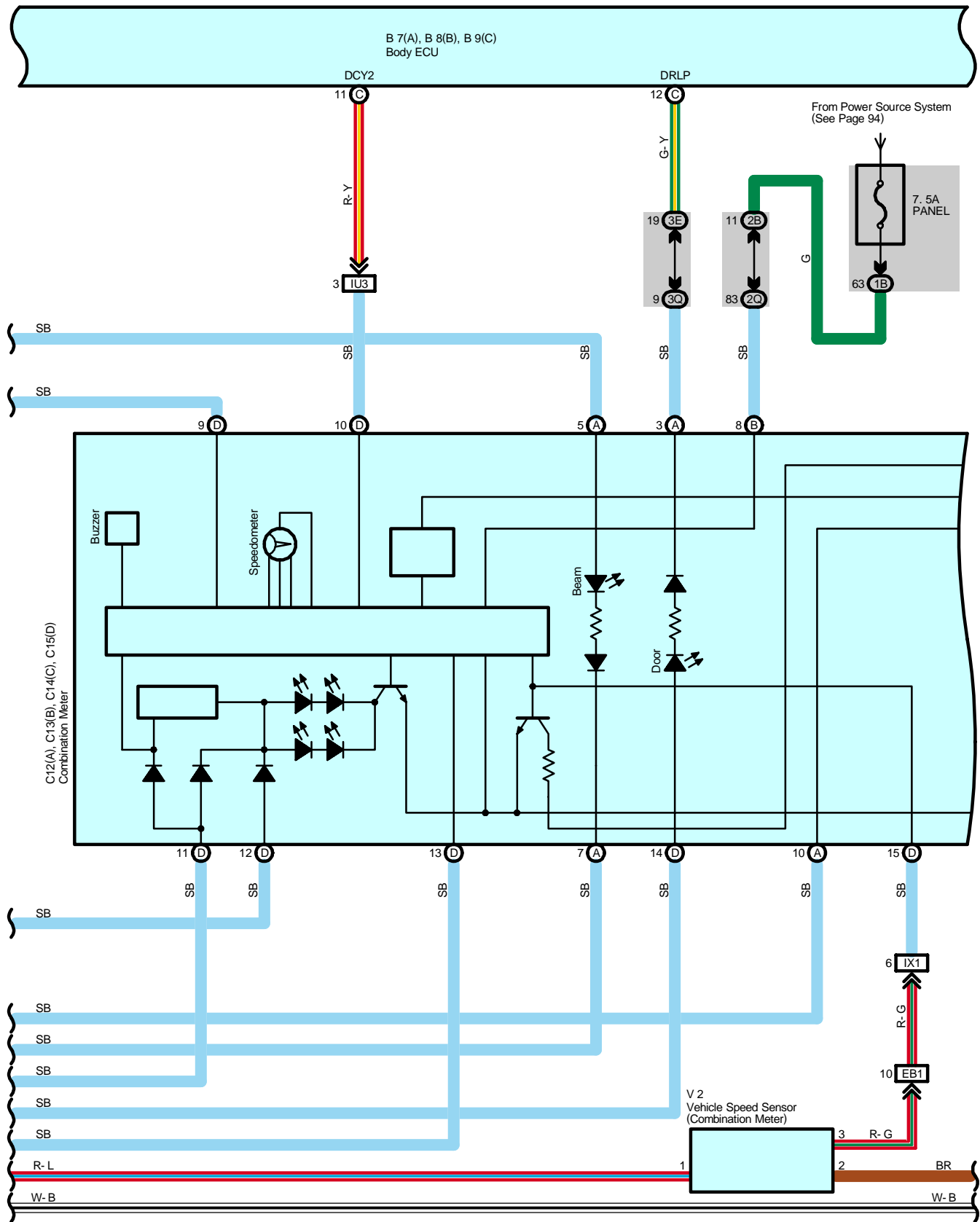
# Multiplex Communication System

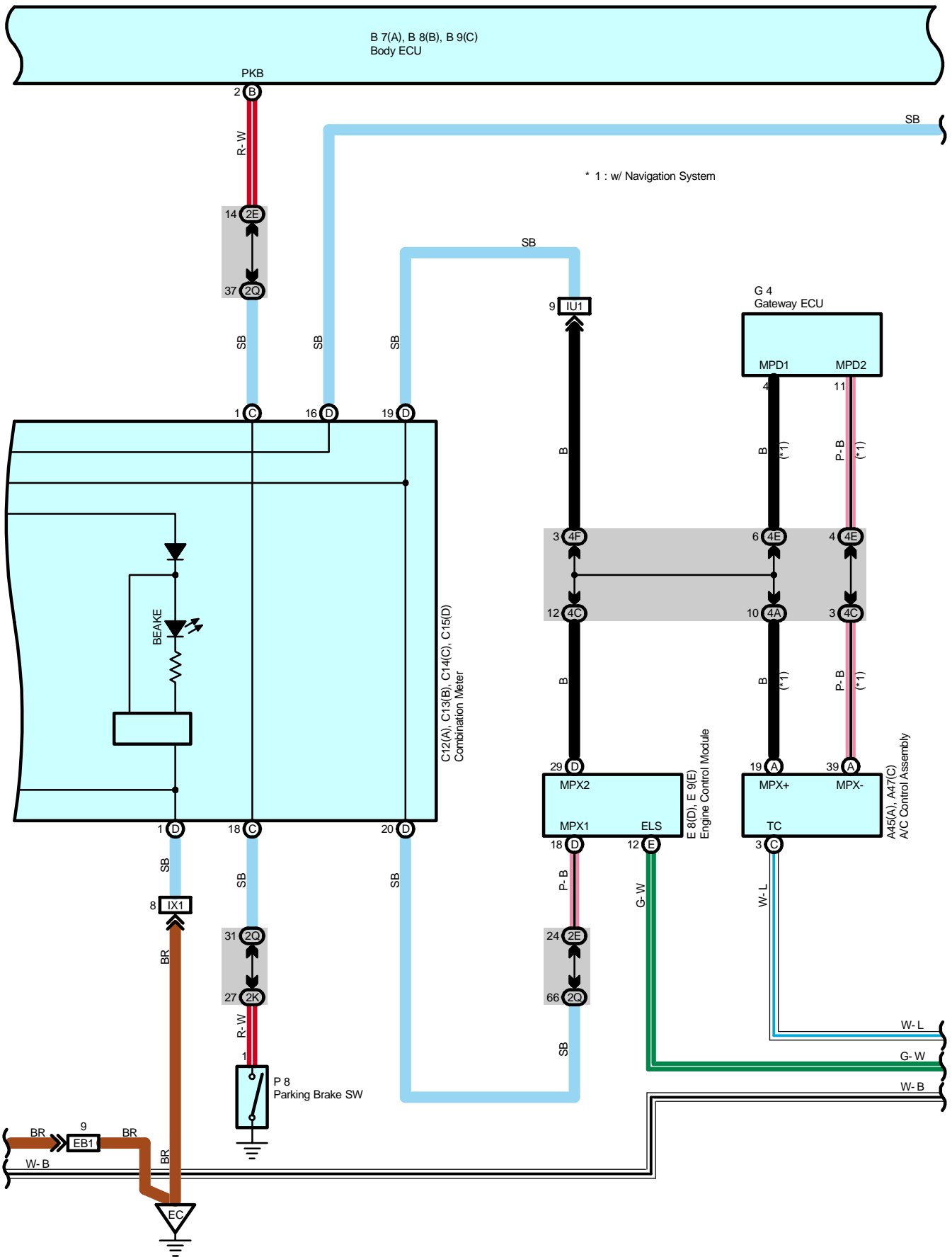




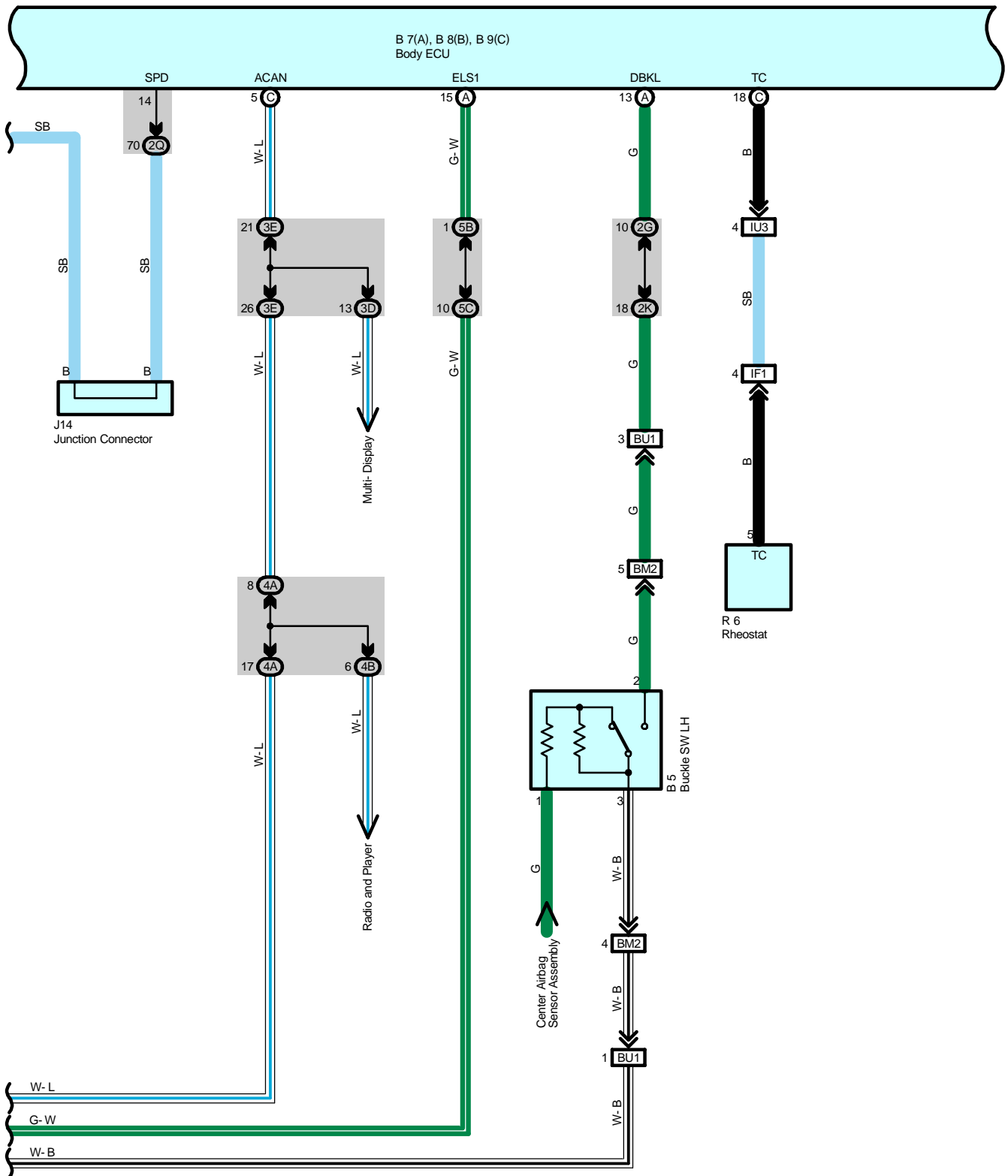


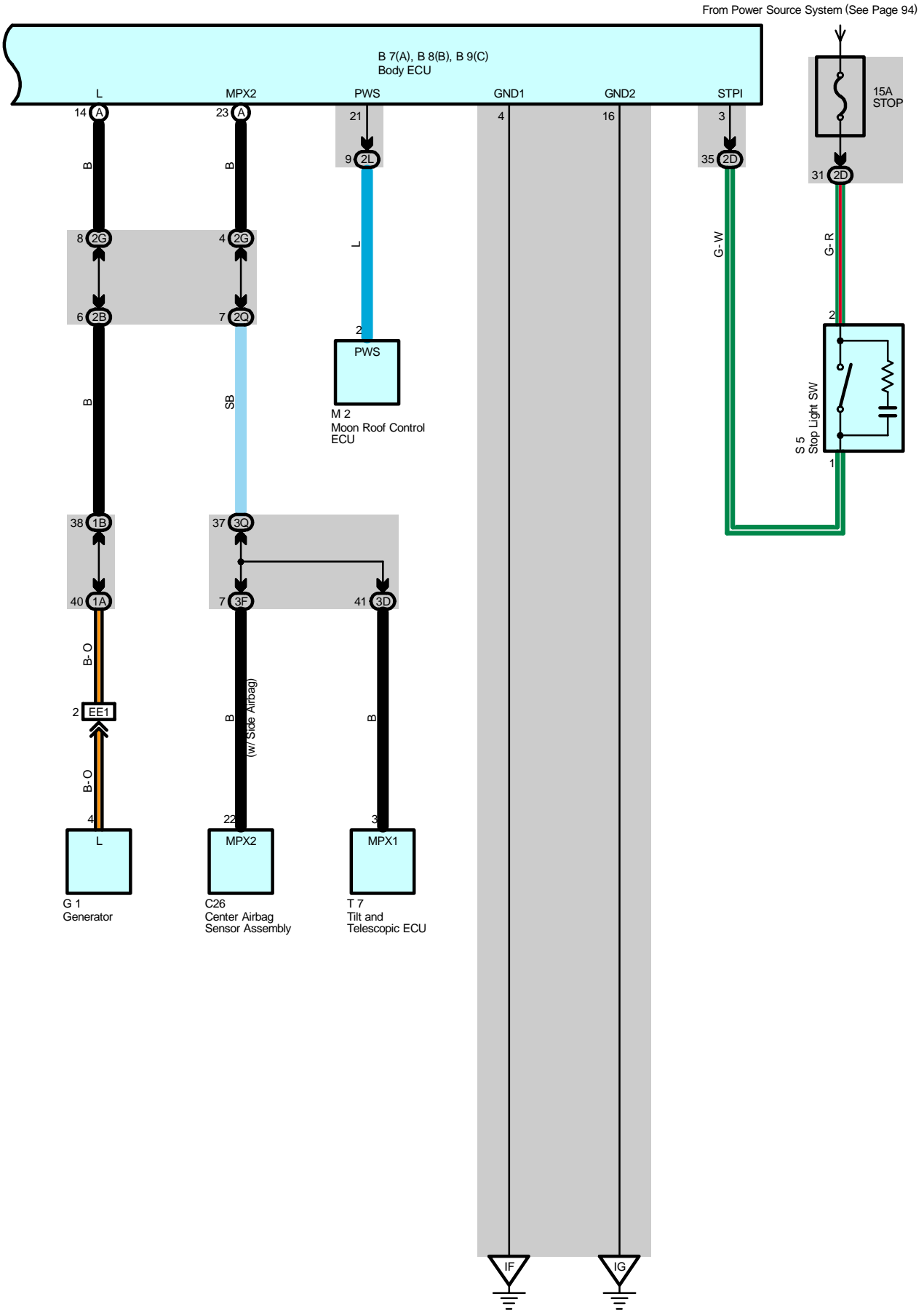
# Multiplex Communication System





# Multiplex Communication System





# Multiplex Communication System

## System Outline

The multiplex communication system communicates among the body ECU, theft deterrent ECU, power window master SW, power window control SW front RH, power window control SW rear LH, power window control SW rear RH, center airbag sensor assembly and tilt and telescopic ECU, among the combination meter, engine control module, A/C control assembly and gateway ECU and controls the following systems according to the signals from respective sensors or switches. For details, please refer to the new car features and/or the repair manual.

## Service Hints

### Body ECU

- 11, 12-Ground : Always approx. 12 volts
- 22-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- 10-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 4, 16-Ground : Always continuity

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A31	70	D18	72	J14	71
A45	A 70	D19	72	J22	72
A47	C 70	D20	72	M2	72
B2	72	D21	72	M5	A 71
B3	72	D22	72	M9	B 71
B4	72	D23	72	P1	69
B5	74	D24	72	P8	73
B7	A 70	D27	72	P12	73
B8	B 70	E3	68	P14	73
B9	C 70	E8	D 70	P15	73
C12	A 70	E9	E 70	P16	73
C13	B 70	F1	68	P17	73
C14	C 70	F2	68	P18	73
C15	D 70	F10	72	P19	73
C16	70	F11	72	P20	73
C26	70	F15	68	R6	71
D2	A 68	G1	68	R27	73
D3	B 68	G4	70	S5	71
D7	70	H1	69	T1	69
D10	72	H2	69	T5	71
D11	72	H3	69	T7	71
D12	72	H4	69	T10	71
D13	72	J3	71	U1	71
D14	72	J6	71	V2	69
D15	72	J9	71	V6	73
D16	72	J10	71	V7	73
D17	72	J13	71	Z1	71

**: Junction Block and Wire Harness Connector**

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
1C		
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2B		
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2G		
2I	28	Front Door LH Wire and Cowl Side J/B LH (Left Kick Panel)
2J		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2L	28	Roof No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3B	40	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3F		
3I	40	Front Door RH Wire and Cowl Side J/B RH (Right Kick Panel)
3J		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3P	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4B		
4C		
4D		
4E		
4F		
5B	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5C		
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)
6D	60	Engine Wire and J/B No.6 (Behind the Grove Box)
7B	64	Dash Wire and J/B No.7 (Behind the Grove Box)

# Multiplex Communication System

## ☐ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA2	76	Engine Room Main Wire and Engine Room No.2 Wire (Engine Compartment Right)
EB1	76	Engine Wire and Transmission Wire (On the Transmission)
EE1	76	Engine Room Main Wire and Alternator Wire (Near the Battery)
IC2	78	Front Door LH Wire and Dash Wire (Left Kick Panel)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IF1	78	Instrument Panel Integration Wire and Instrument Panel Wire (Left Side of Instrument Panel)
IG1	78	Engine Room No.2 Wire and Dash Wire (Behind the Combination Meter)
IH2	80	Instrument Panel Integration Wire and Column Wire (Near the Ignition SW)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
II5		
IL3	80	Instrument Panel Integration Wire and Computer Wire (Instrument Panel Center)
IM2	80	Instrument Panel Integration Wire and Instrument Panel No.3 Wire (Right Side of Instrument Panel)
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IU1	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IU3		
IU4		
IV3	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IV4		
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
IY2	82	Front Door RH Wire and Dash Wire (Right Kick Panel)
Ib2	84	Dash Wire and Dash Wire (Behind the Combination Meter)
BA3	86	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BA4		
BC3	86	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)
BC4		
BD4	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BH1	86	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BH2		
BL5	88	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BM2	90	Floor No.1 Wire and Front Seat LH Wire (Front Side Under the Driver's Seat)
BP3	88	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BP4		
BQ2	88	Back Door Lower Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BR1	88	Roof No.3 Wire and Roof No.1 Wire (Front Side of Roof)
BS1	88	Door Lock LH Sub Wire and Front Door LH Wire (Front Door LH)
BT1	88	Door Lock RH Sub Wire and Front Door RH Wire (Front Door RH)
BU1	88	Floor No.1 Wire and Floor No.1 Wire (Near the Left Rear Suspension Support)

## ▽ : Ground Points

Code	See Page	Ground Points Location
EA	76	Front Right Side of Fender Apron
EC	76	Rear Bank of Right Cylinder Head
IF	78	Set Bolt of Cowl Side J/B LH
IG		
II	78	Set Bolt of Cowl Side J/B RH
BJ	86	Under the Driver's Seat
BK	86	Front Side Under the Front Passenger's Seat

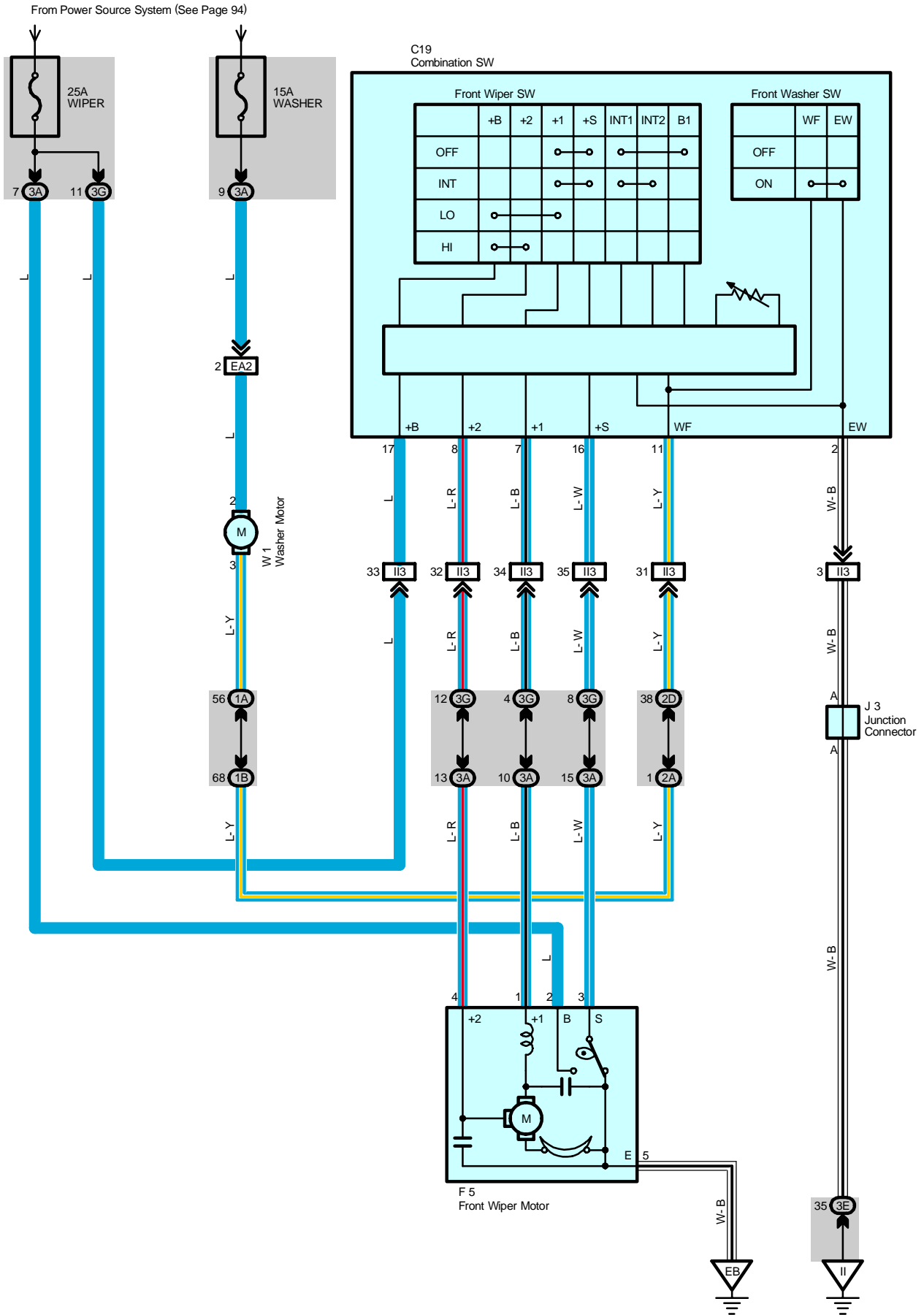




**: Splice Points**

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E1	76	Engine Room Main Wire	B6	88	Floor No.1 Wire
E2			B7	88	Roof No.1 Wire
E10	76	Engine Wire	B8	88	Front Door RH Wire
E15	76	Engine Room Main Wire	B9	88	Floor No.2 Wire
B2	88	Front Door LH Wire	B11	88	Floor No.1 Wire
B4	88	Floor No.1 Wire	B15	88	Back Door Upper Wire
B5					

# Front Wiper and Washer



## System Outline

When the ignition SW turned on, the current from the WIPER fuse flows to the front wiper and washer SW TERMINAL 17, and the front wiper motor TERMINAL 2.

### 1. Low Position

When the front wiper SW is turned to LO position, the current flows from the front wiper and washer SW TERMINAL 17 to TERMINAL 7 to the front wiper motor TERMINAL 1 to TERMINAL 5 to GROUND, and operates the front wiper motor at low speed.

### 2. High Position

When the front wiper SW is turned to HI position, the current flows from the front wiper and washer SW TERMINAL 17 to TERMINAL 8 to the front wiper motor TERMINAL 4 to TERMINAL 5 to GROUND, and operates the front wiper motor at high speed.

### 3. INT Position

When the front wiper SW is turned to INT position, the relay operates and the current which is connected by the relay function flows from the front wiper and washer SW TERMINAL 17 to TERMINAL 2 to GROUND, and operates the wiper.

The intermittent operation is controlled by the charge/discharge function of the condenser installed in the relay, and the intermittent time is controlled by a time control SW to change the charging time of the condenser.

### 4. Washer Interlocking Operation

When the front washer SW is pulled up, the current flows from the washer motor TERMINAL 2 to TERMINAL 3 to the front wiper and washer SW TERMINAL 11 to TERMINAL 2 to GROUND, operates the washer motor and the window washer emits a water spray. This causes the current to flow to the washer continuous operation circuit in the front wiper and washer SW TERMINAL 11 to TERMINAL 7 to front wiper motor TERMINAL 1 to TERMINAL 5 to GROUND, and operates the wiper.

## Service Hints

### C19 Combination SW

17-Ground : Approx. 12 volts with ignition SW at ON or ST position

7-Ground : Approx. 12 volts with front wiper and washer SW at LO position

: Approx. 12 volts 1.6 to 10.7 seconds intermittently with the front wiper and washer SW at INT position

16-Ground : Approx. 12 volts with ignition SW on unless the front wiper motor at STOP position

8-Ground : Approx. 12 volts with front wiper and washer SW at HI position

2-Ground : Always continuity

### F5 Front Wiper Motor

2-Ground : Approx. 12 volts with ignition SW at ON or ST position

5-Ground : Always continuity

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
C19	<a href="#">70</a>	J3	<a href="#">71</a>		
F5	<a href="#">68</a>	W1	<a href="#">69</a>		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	<a href="#">24</a>	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	<a href="#">24</a>	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2A	<a href="#">28</a>	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2D	<a href="#">28</a>	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
3A	<a href="#">40</a>	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3E	<a href="#">40</a>	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3G		

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA2	<a href="#">76</a>	Engine Room Main Wire and Engine Room No.2 Wire (Engine Compartment Right)
II3	<a href="#">80</a>	Dash Wire and Column Wire (Near the Ignition SW)

## Front Wiper and Washer

---



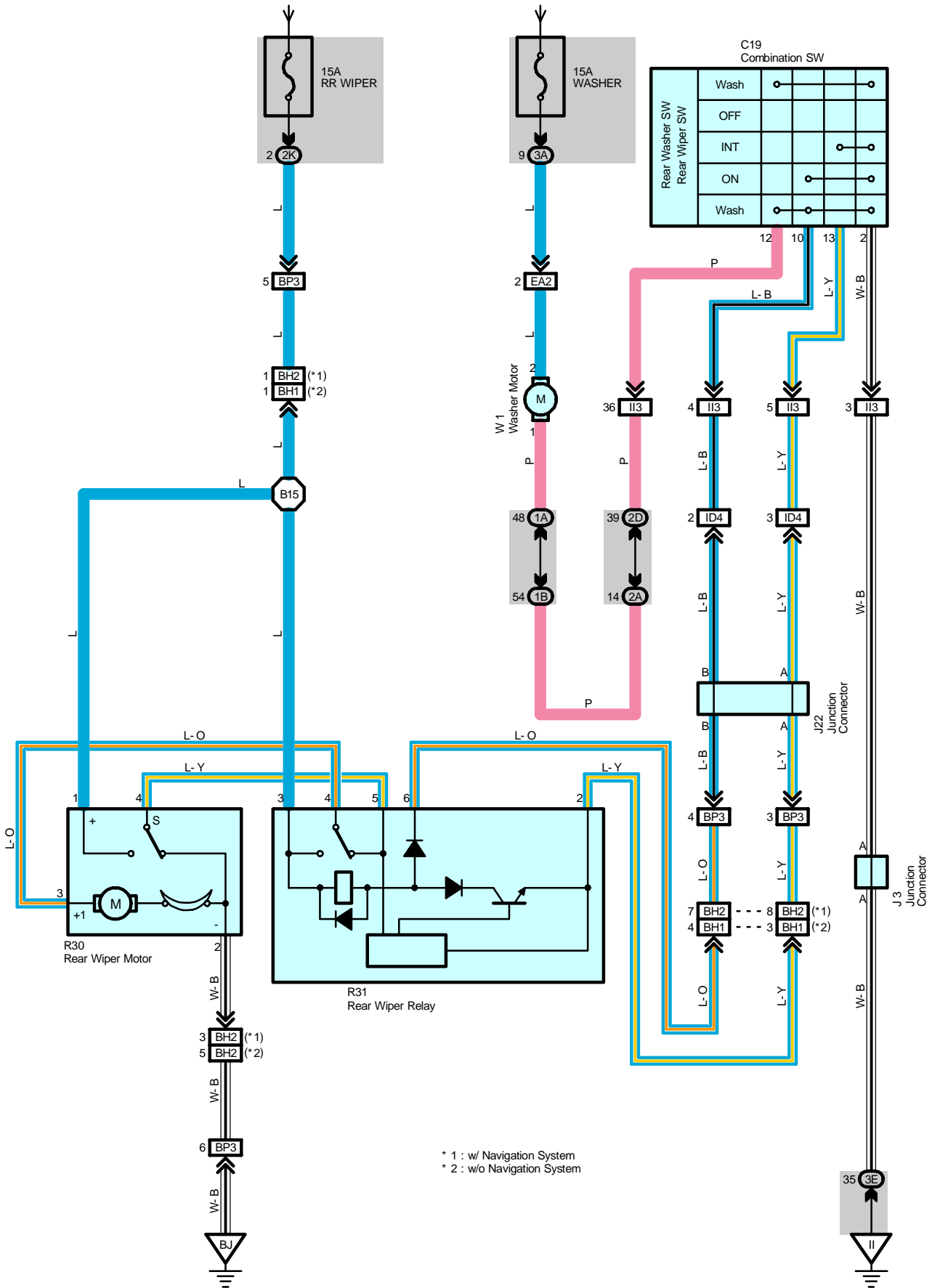
### : Ground Points

Code	See Page	Ground Points Location
EB	<a href="#">76</a>	Front Right Side of Fender Apron
II	<a href="#">78</a>	Set Bolt of Cowl Side J/B RH



# Rear Wiper and Washer

From Power Source System (See Page 94)



## System Outline

When the ignition SW is turned on, the current flows from the WASHER fuse to washer motor TERMINAL 2, and the current flows from the RR WIPER fuse to rear wiper relay TERMINAL 3, and the rear wiper motor TERMINAL 1 respectively.

### 1. Rear Wiper Normal Operation

When the ignition SW is turned on, and the rear wiper and washer SW is turned to ON position, the current flows from the rear wiper relay TERMINAL 3 to TERMINAL 6 to the rear wiper and washer SW TERMINAL 10 to TERMINAL 2 to GROUND, and turns on the rear wiper relay. As a result, the current flows from the rear wiper relay TERMINAL 3 to TERMINAL 4 to the rear wiper motor TERMINAL 3 to TERMINAL 2 to GROUND, and operates the rear wiper.

### 2. Rear Wiper Intermittent Operation

When the ignition SW is turned on, and the rear wiper and washer SW is turned to INT position, the current flows from the rear wiper relay TERMINAL 3 to TERMINAL 2 to the rear wiper and washer SW TERMINAL 13 to TERMINAL 2 to GROUND, and the intermittent circuit in the rear wiper relay is controlled to operate the wiper intermittently.

### 3. Washer Operation

When the ignition SW is turned on, and the rear wiper and washer SW is turned from OFF to WASH position, the current flows from the WASHER fuse to the washer motor TERMINAL 2 to TERMINAL 1 to the rear wiper and washer SW TERMINAL 12 to TERMINAL 2 to GROUND. This activates the washer motor, and the window washer emits a water spray. When the rear wiper and washer SW is turned to ON position, the window washer emits a water spray during rear wiper normal operation.

## Service Hints

### W1 Washer Motor

- 2-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 1-Ground : Continuity with rear wiper and washer SW at WASH position

### R30 Rear Wiper Motor

- 1-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 2-Ground : Always continuity

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
C19	70	J22	72	R31	73
J3	71	R30	73	W1	69

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
3A	40	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA2	76	Engine Room Main Wire and Engine Room No.2 Wire (Engine Compartment Right)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
BH1	86	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BH2		
BP3	88	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)

# Rear Wiper and Washer

---



## : Ground Points

Code	See Page	Ground Points Location
II	<a href="#">78</a>	Set Bolt of Cowl Side J/B RH
BJ	<a href="#">86</a>	Under the Driver's Seat



## : Splice Points

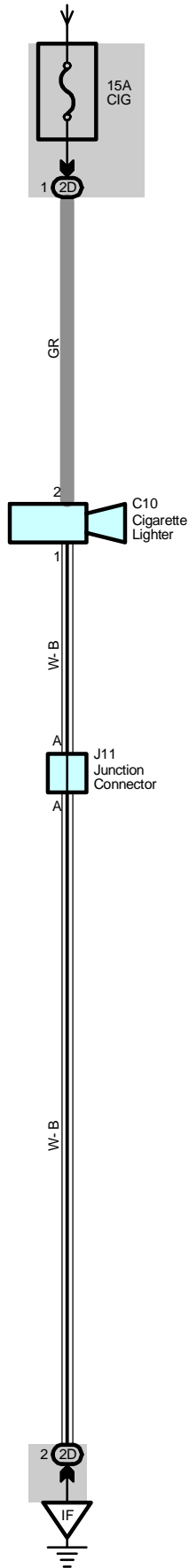
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B15	<a href="#">88</a>	Back Door Upper Wire			





# Cigarette Lighter

From Power Source System (See Page 94)



---

**Service Hints****C10 Cigarette Lighter**

2-Ground : Approx. 12 volts with ignition SW at ACC or ON position

1-Ground : Always continuity

 : **Parts Location**

Code	See Page	Code	See Page	Code	See Page
C10	70	J11	71		

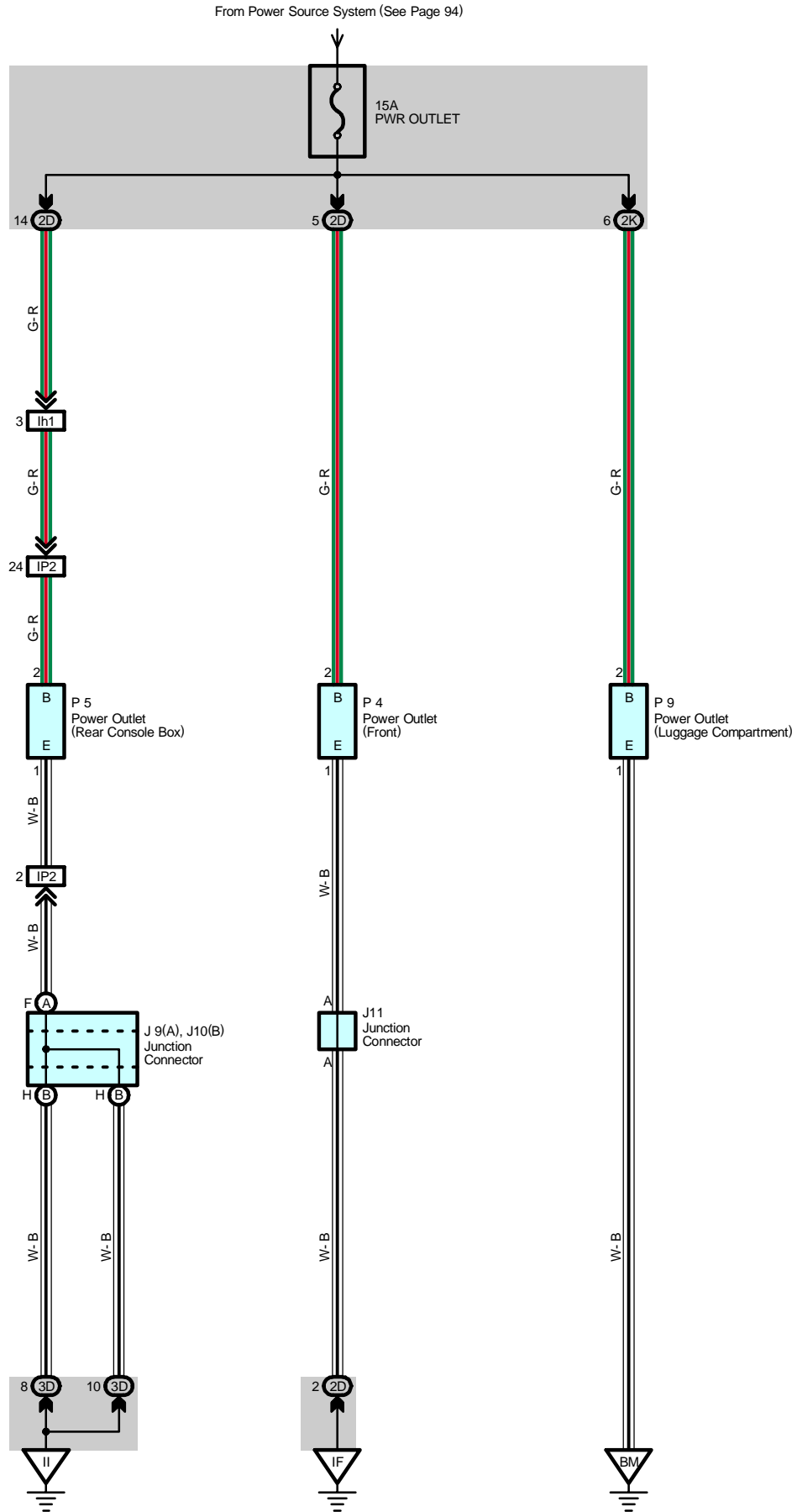
 : **Junction Block and Wire Harness Connector**

Code	See Page	Junction Block and Wire Harness (Connector Location)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)

 : **Ground Points**

Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH

# Power Outlet



## Service Hints

### P4 Power Outlet (Front)

- 2-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- 1-Ground : Always continuity

### P5 Power Outlet (Rear Console Box)

- 2-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- 1-Ground : Always continuity

### P9 Power Outlet (Luggage Compartment)

- 2-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- 1-Ground : Always continuity

## ○ : Parts Location

Code		See Page	Code	See Page	Code	See Page
J9	A	<a href="#">71</a>	J11	<a href="#">71</a>	P5	<a href="#">71</a>
J10	B	<a href="#">71</a>	P4	<a href="#">71</a>	P9	<a href="#">73</a>

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2D	<a href="#">28</a>	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2K	<a href="#">28</a>	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
3D	<a href="#">40</a>	Dash Wire and Cowl Side J/B RH (Right Kick Panel)

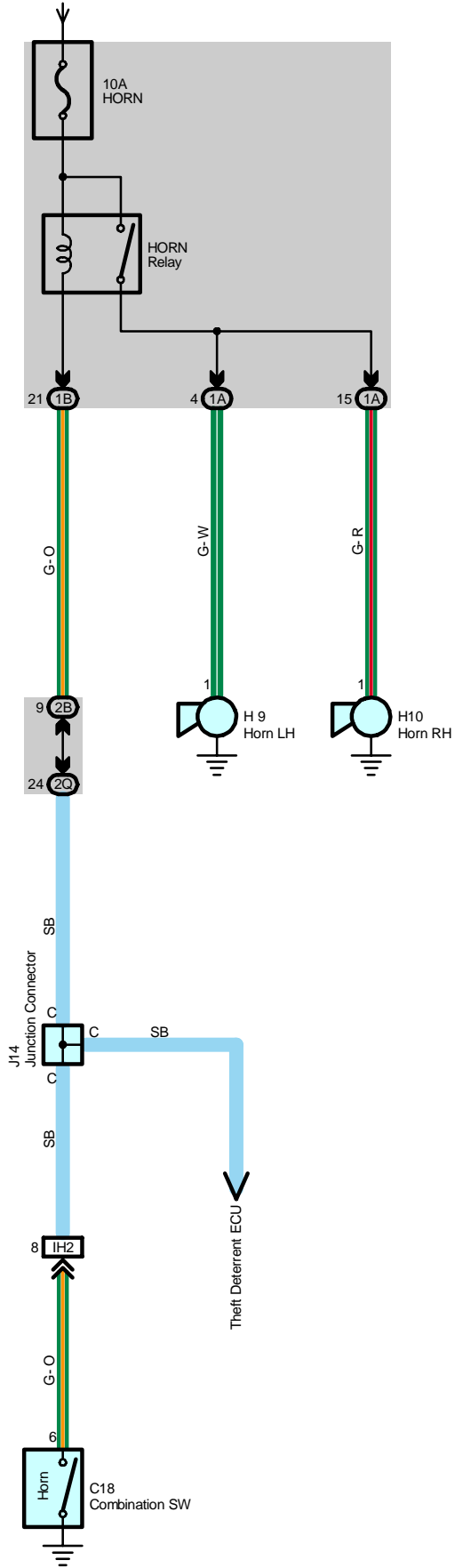
## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IP2	<a href="#">80</a>	Rear Console Box Wire and Dash Wire (Right Side of Rear Console)
Ih1	<a href="#">84</a>	Dash Wire and Dash Wire (Center Side of Front Console)

## ▽ : Ground Points

Code	See Page	Ground Points Location
IF	<a href="#">78</a>	Set Bolt of Cowl Side J/B LH
II	<a href="#">78</a>	Set Bolt of Cowl Side J/B RH
BM	<a href="#">86</a>	Left Rear Side Quarter Panel

From Power Source System (See Page 94)



---

**Service Hints****C18 Combination SW**

6-Ground :Continuity with horn SW on

 : **Parts Location**

Code	See Page	Code	See Page	Code	See Page
C18	<a href="#">70</a>	H10	<a href="#">69</a>		
H9	<a href="#">69</a>	J14	<a href="#">71</a>		

 : **Junction Block and Wire Harness Connector**

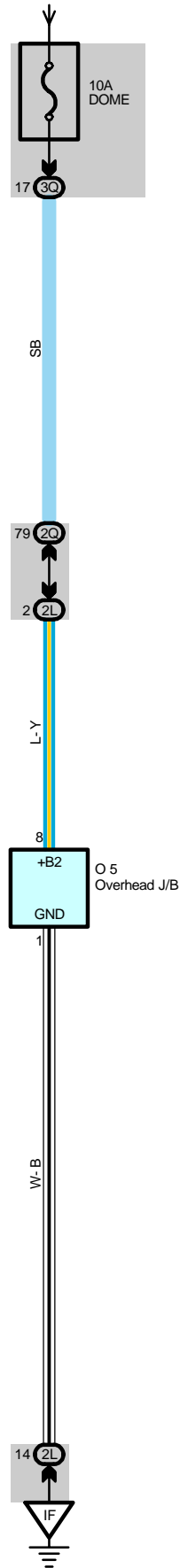
Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	<a href="#">24</a>	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	<a href="#">24</a>	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2B	<a href="#">28</a>	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	<a href="#">30</a>	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)

 : **Connector Joining Wire Harness and Wire Harness**

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IH2	<a href="#">80</a>	Instrument Panel Integration Wire and Column Wire (Near the Ignition SW)

# Garage Door Opener

From Power Source System (See Page 94)





---

**Service Hints****O5 Overhead J/B**

8-Ground : Always approx. 12 volts

1-Ground : Always continuity

 : **Parts Location**

Code	See Page	Code	See Page	Code	See Page
O5	<a href="#">72</a>				

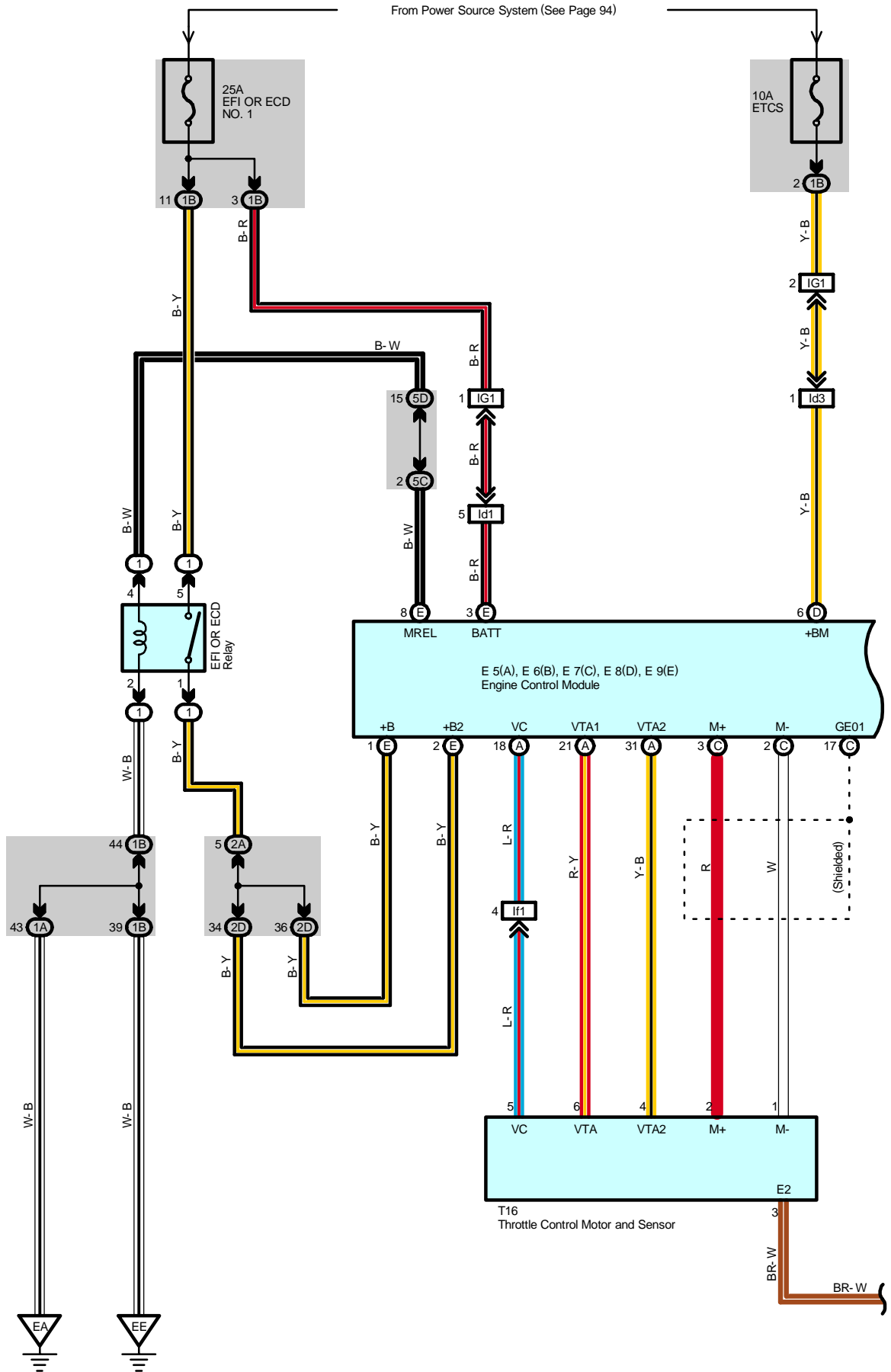
 : **Junction Block and Wire Harness Connector**

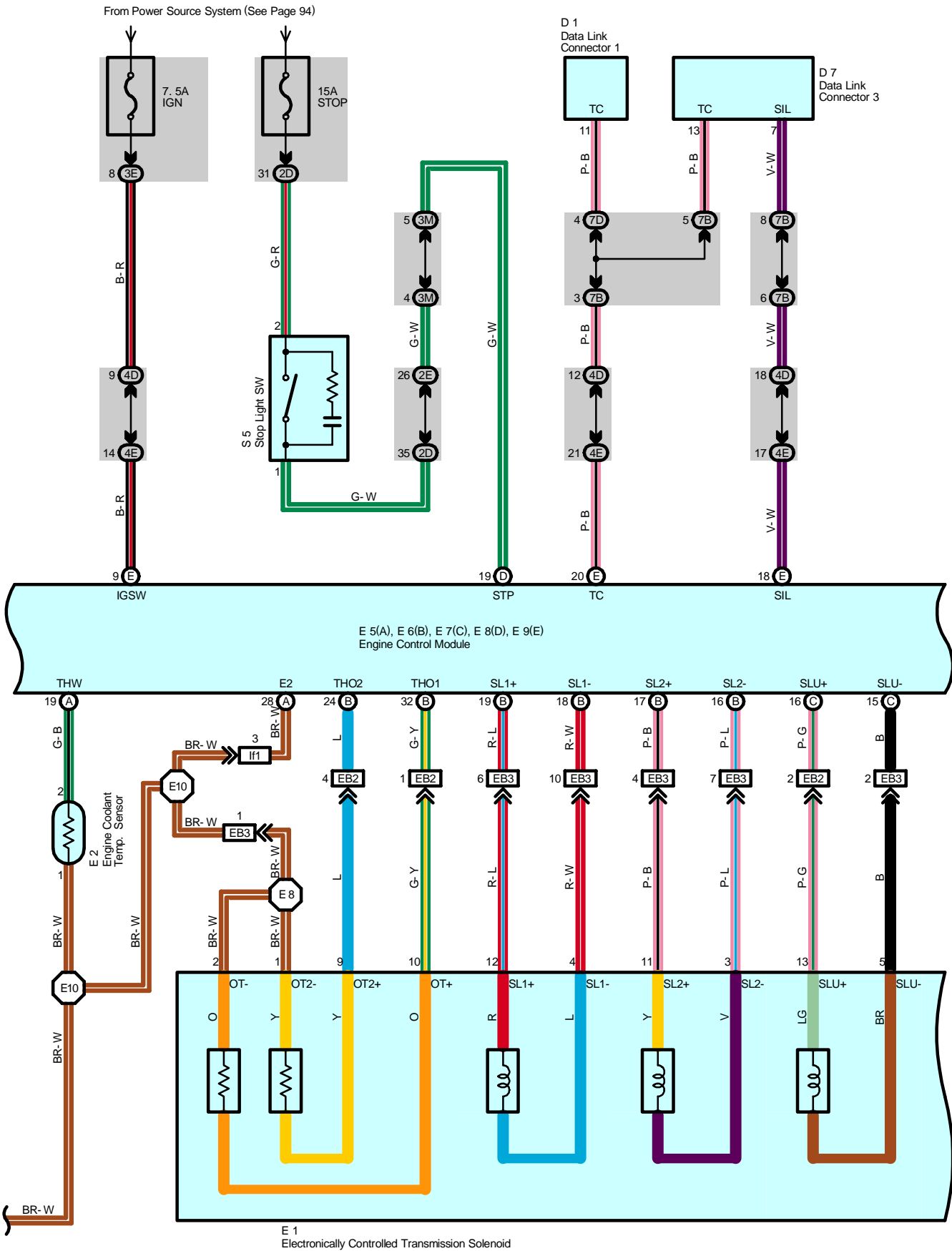
Code	See Page	Junction Block and Wire Harness (Connector Location)
2L	<a href="#">28</a>	Roof No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	<a href="#">30</a>	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3Q	<a href="#">42</a>	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)

 : **Ground Points**

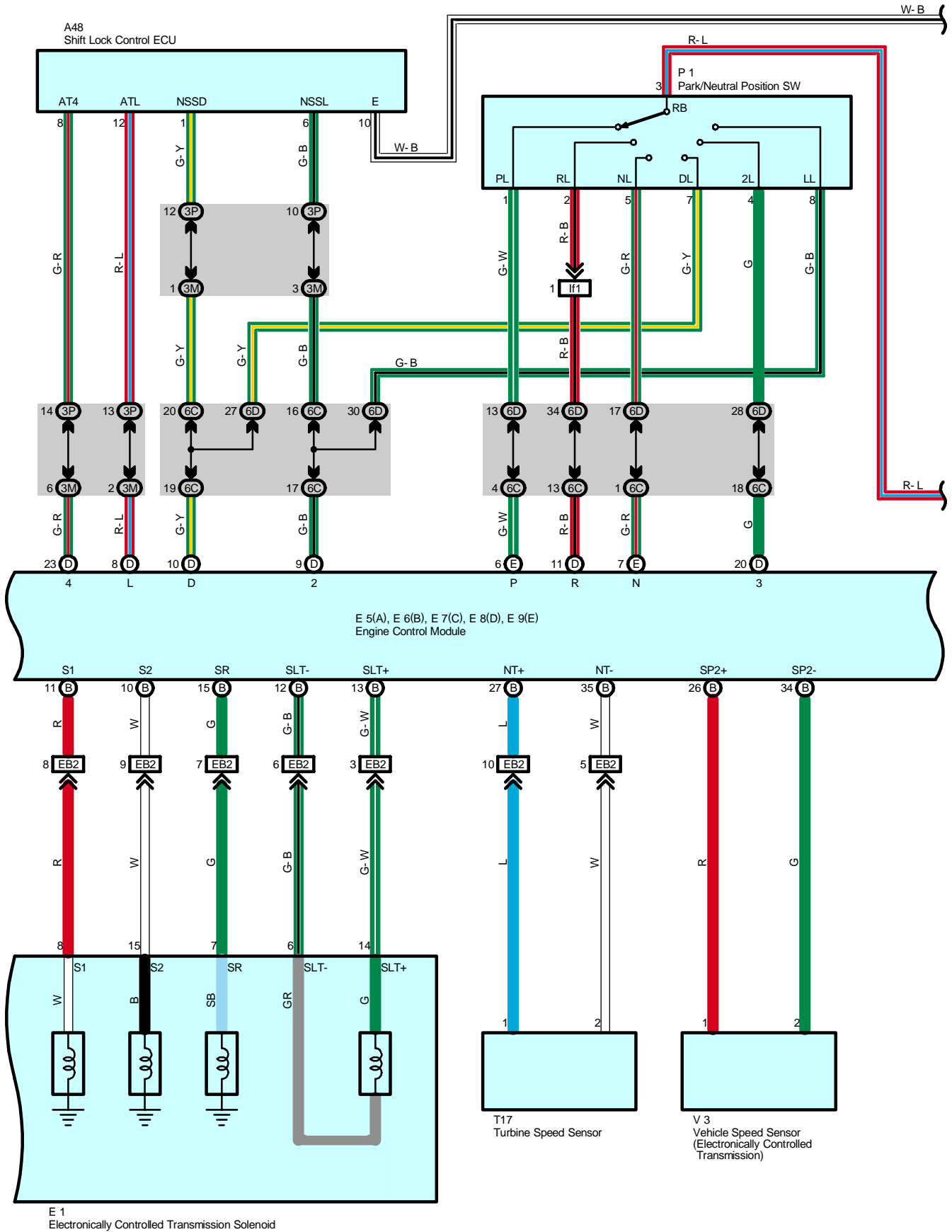
Code	See Page	Ground Points Location
IF	<a href="#">78</a>	Set Bolt of Cowl Side J/B LH

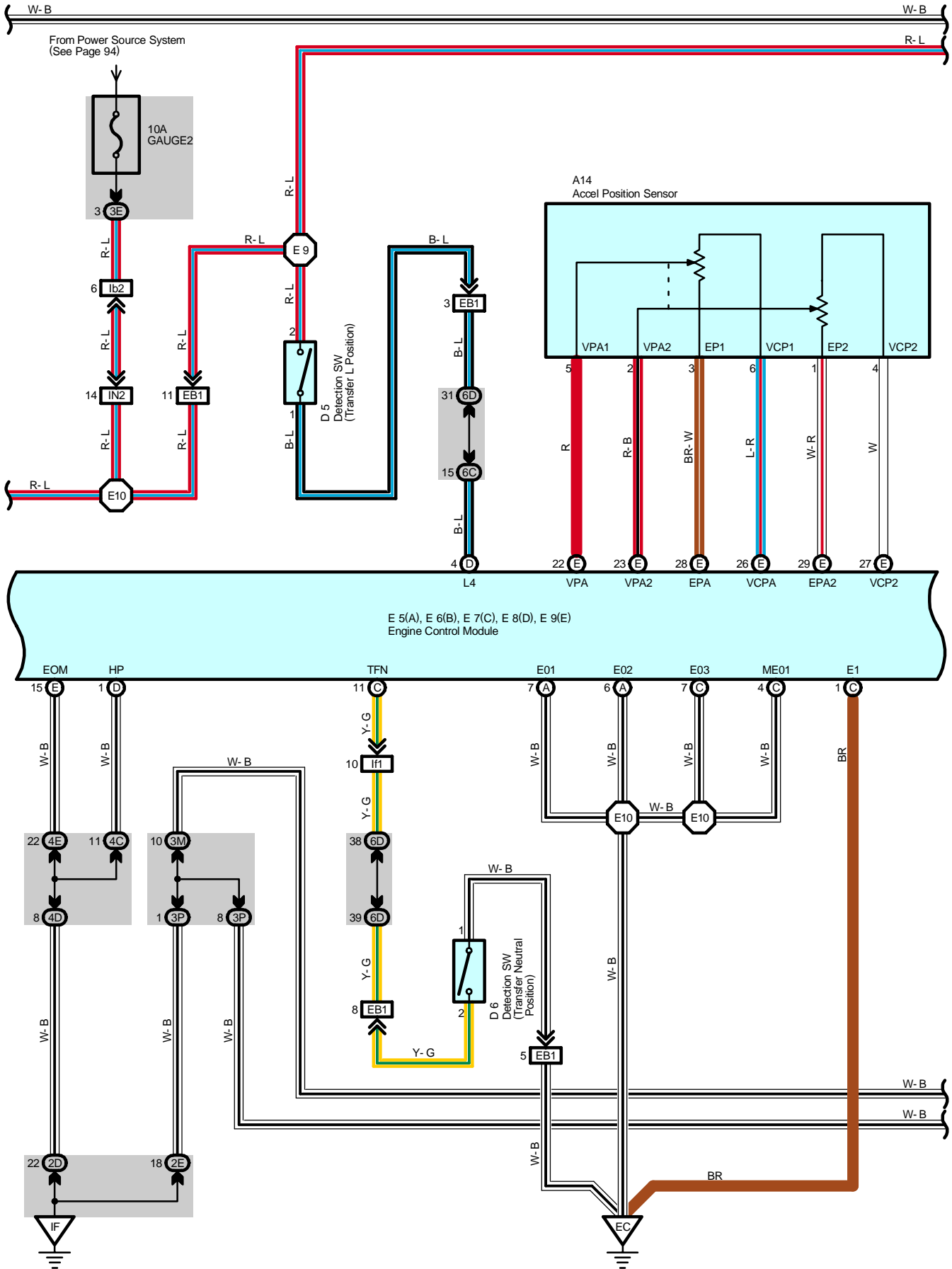
# Electronically Controlled Transmission and A/T Indicator



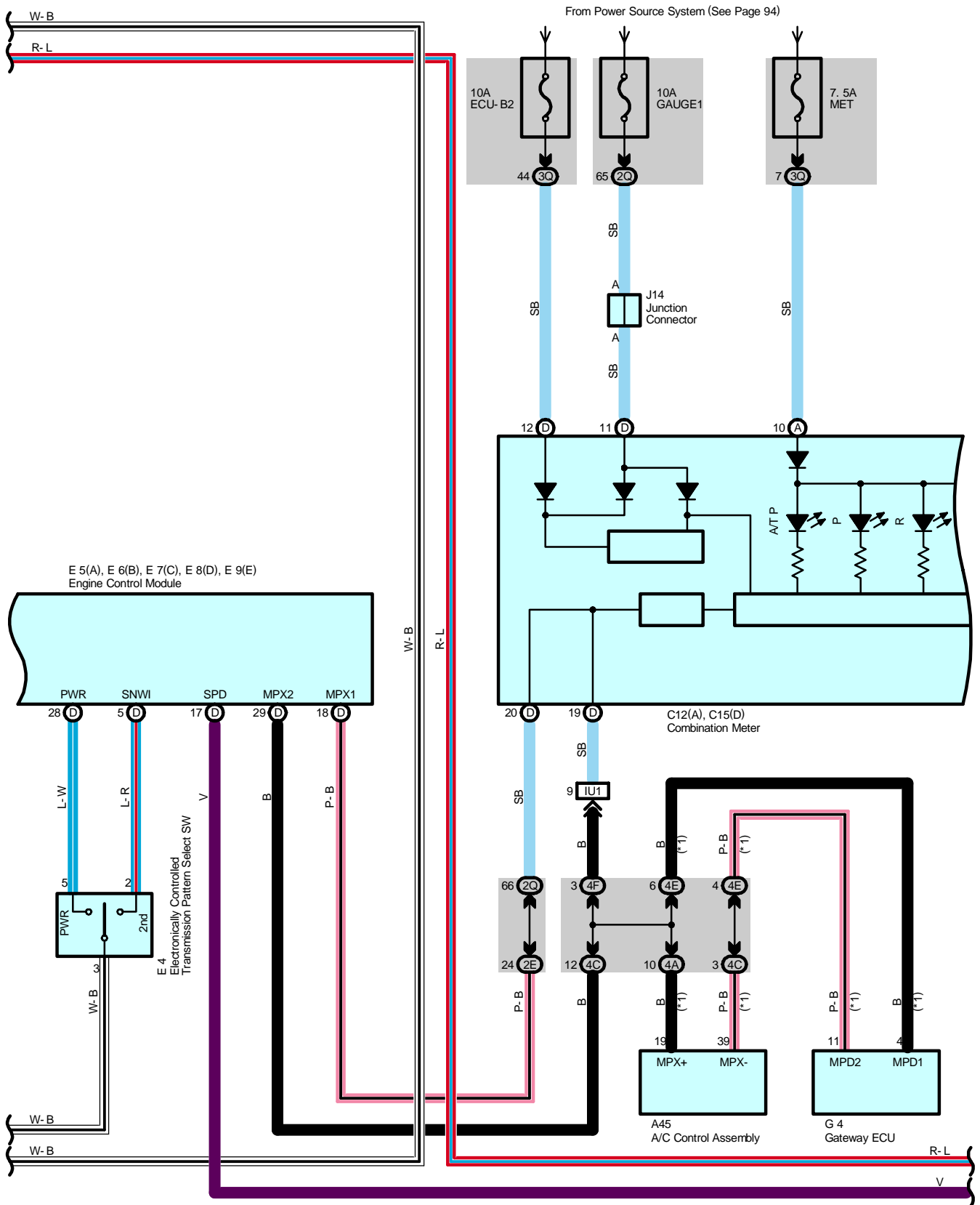


# Electronically Controlled Transmission and A/T Indicator





# Electronically Controlled Transmission and A/T Indicator





# Electronically Controlled Transmission and A/T Indicator

## System Outline

Previous automatic transmissions have selected each gear shift using mechanically controlled throttle hydraulic pressure, governor hydraulic pressure and lock-up hydraulic pressure. The electronically controlled transmission, however, electrically controls the line pressure, throttle pressure, lock-up pressure and accumulator pressure etc. through the solenoid valve. The electronically controlled transmission is a system which precisely controls gear shift timing and lock-up timing in response to the vehicle's driving conditions and the engine condition detected by various sensors. It makes smooth driving possible by shift selection for each gear which is the most appropriate to the driving conditions at that time, and by preventing downing, squat and gear shift shock when starting off.

### 1. Gear Shift Operation

When driving, the engine warm up condition is input as a signal to TERMINAL THW of the engine control module from the engine coolant temp. sensor and the vehicle speed signal from vehicle speed sensor is input to TERMINAL SP2+ of the engine control module. At the same time, the throttle valve opening signal from the throttle position sensor is input to TERMINALS VTA1 and VTA2 of the engine control module as throttle angle signal.

Based on these signals, the engine control module selects the best shift position for the driving conditions and sends current to the electronically controlled transmission solenoid.

### 2. Line Hydraulic Pressure Control

The engine control module adjusts the line hydraulic pressure to the optimal level by controlling TERMINAL SLT+ of the module according to the engine torque data. This realizes the smooth gear shifting.

### 3. High Response Gear Shifting Control

The engine control module performs the high response engine torque up control to control the ignition-timing lag as well as opening the electronic throttle when shifting down. By doing this, the gear shifting is performed in a short period of time. Moreover, the engine control module uses the orifice switching control, which optimizes the speed of applying and reducing the hydraulic pressure. And it realizes the fine shifting condition by applying and reducing hydraulic pressure slowly when the gear shifting shock is important and quickly when the high response is required.

### 4. Clutch Hydraulic Pressure Control

The engine control module controls the clutch operation in the optimal timing and with the best hydraulic pressure according to the engine torque data and the number of the clutch revolution

### 5. Lock-Up and Flexible Lock-Up Control

The engine control module carries out the lock-up control by controlling the TERMINAL SLU+ of the module according to the shift position, vehicle speed, throttle opening degree and running conditions. The engine control module also steadily keeps applying the lock-up clutch a delicate slippage to improve the transmission efficiency (Fuel efficiency) of the torque converter.

### 6. Stop Light SW Circuit

If the brake pedal is depressed (Stop light SW on) when driving in lock-up condition, a signal is input to TERMINAL STP of the engine control module. The engine control module operates and cuts the current to the solenoid to release lock-up.

### 7. Ai-Shift Control

The engine control module judges whether the road is downslope or upslope by detecting the throttle opening degree or the vehicle's speed. Moreover it can expect the winding roads by detecting the turning condition of the vehicle. The engine control module keeps unnecessary shifting up from the fourth gear from operating and carries out the automatic shifting down to the third gear in order to control the vehicle running according to the road conditions. The engine control module also reads the driver's intention during driving from his (her) accelerating operation and the running conditions of the vehicle. As a result of that, ideal shifting patters for each driver are automatically selected without any switching operations.

### 8. Electronically Controlled Transmission Pattern Select SW Circuit

When the electronically controlled transmission pattern select SW is switched to PWR, a signal is input to TERMINAL PWR of the engine control module. This enables shift-up and shift-down at a higher speed range.

### 9. Transfer Shift Operation

When the transfer shift lever is moved to L position, a signal is input into TERMINAL L4 of the engine control module. In addition when the transfer shift lever is moved to N position a signal is input to engine control module TERMINAL TFN. The engine control module detects the transfer condition through this.



## Service Hints

### E4 Electronically Controlled Transmission Pattern Select SW

- 5-3 : Closed with select SW at PWR position
- 2-3 : Closed with select SW at 2nd position

### E7 (C), E9 (E) Engine Control Module

- BATT-E1 : Always 9.0-14.0 volts
- +B-E1 : 9.0-14.0 volts with ignition SW at ON or ST position
- +B2-E1 : 9.0-14.0 volts with ignition SW at ON or ST position
- IGSW-E1 : 9.0-14.0 volts with ignition SW at ON or ST position

### P1 Park/Neutral Position SW

- 3-1 : Closed with shift lever in P position
- 3-2 : Closed with shift lever in R position
- 3-5 : Closed with shift lever in N position
- 3-7 : Closed with shift lever in D position
- 3-4 : Closed with shift lever in 2 position
- 3-8 : Closed with shift lever in L position

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A14	<a href="#">70</a>	E1	<a href="#">68</a>	J14	<a href="#">71</a>
A45	<a href="#">70</a>	E2	<a href="#">68</a>	P1	<a href="#">69</a>
A48	<a href="#">70</a>	E4	<a href="#">70</a>	S5	<a href="#">71</a>
C12	A <a href="#">70</a>	E5	A <a href="#">70</a>	T16	<a href="#">69</a>
C15	D <a href="#">70</a>	E6	B <a href="#">70</a>	T17	<a href="#">69</a>
D1	<a href="#">68</a>	E7	C <a href="#">70</a>	V2	<a href="#">69</a>
D5	<a href="#">68</a>	E8	D <a href="#">70</a>	V3	<a href="#">69</a>
D6	<a href="#">68</a>	E9	E <a href="#">70</a>		
D7	<a href="#">70</a>	G4	<a href="#">70</a>		

## ○ : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
1	<a href="#">22</a>	Engine Room R/B (Engine Compartment Left)

# Electronically Controlled Transmission and A/T Indicator

## : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3M	43	
3P		
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4D		
4E		
4F		
5C	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)
6C	60	Dash Wire and J/B No.6 (Behind the Grove Box)
6D	60	Engine Wire and J/B No.6 (Behind the Grove Box)
7B	64	Dash Wire and J/B No.7 (Behind the Grove Box)
7D	64	Engine Room No.2 Wire and J/B No.7 (Behind the Grove Box)

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	76	Engine Wire and Transmission Wire (On the Transmission)
EB2		
EB3		
IG1	78	Engine Room No.2 Wire and Dash Wire (Behind the Combination Meter)
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IU1	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
Ib2	84	Dash Wire and Dash Wire (Behind the Combination Meter)
Id1	84	Dash Wire and Dash Wire (Instrument Panel Center)
Id3		
If1	84	Engine Wire and Engine Wire (Behind the Glove Box)

## : Ground Points

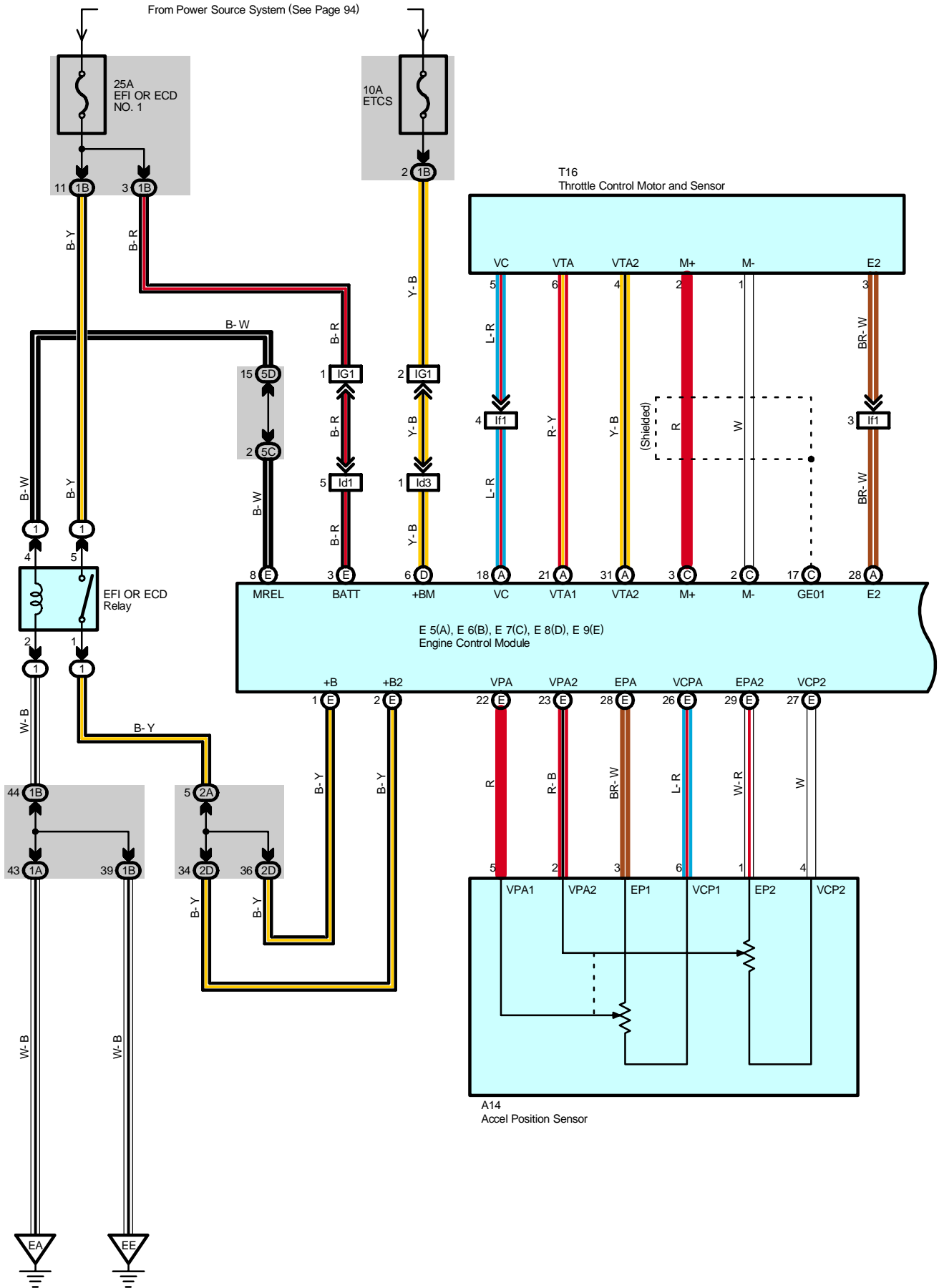
Code	See Page	Ground Points Location
EA	76	Front Right Side of Fender Apron
EC	76	Rear Bank of Right Cylinder Head
EE	76	Front Left Side of Fender Apron
IF	78	Set Bolt of Cowl Side J/B LH

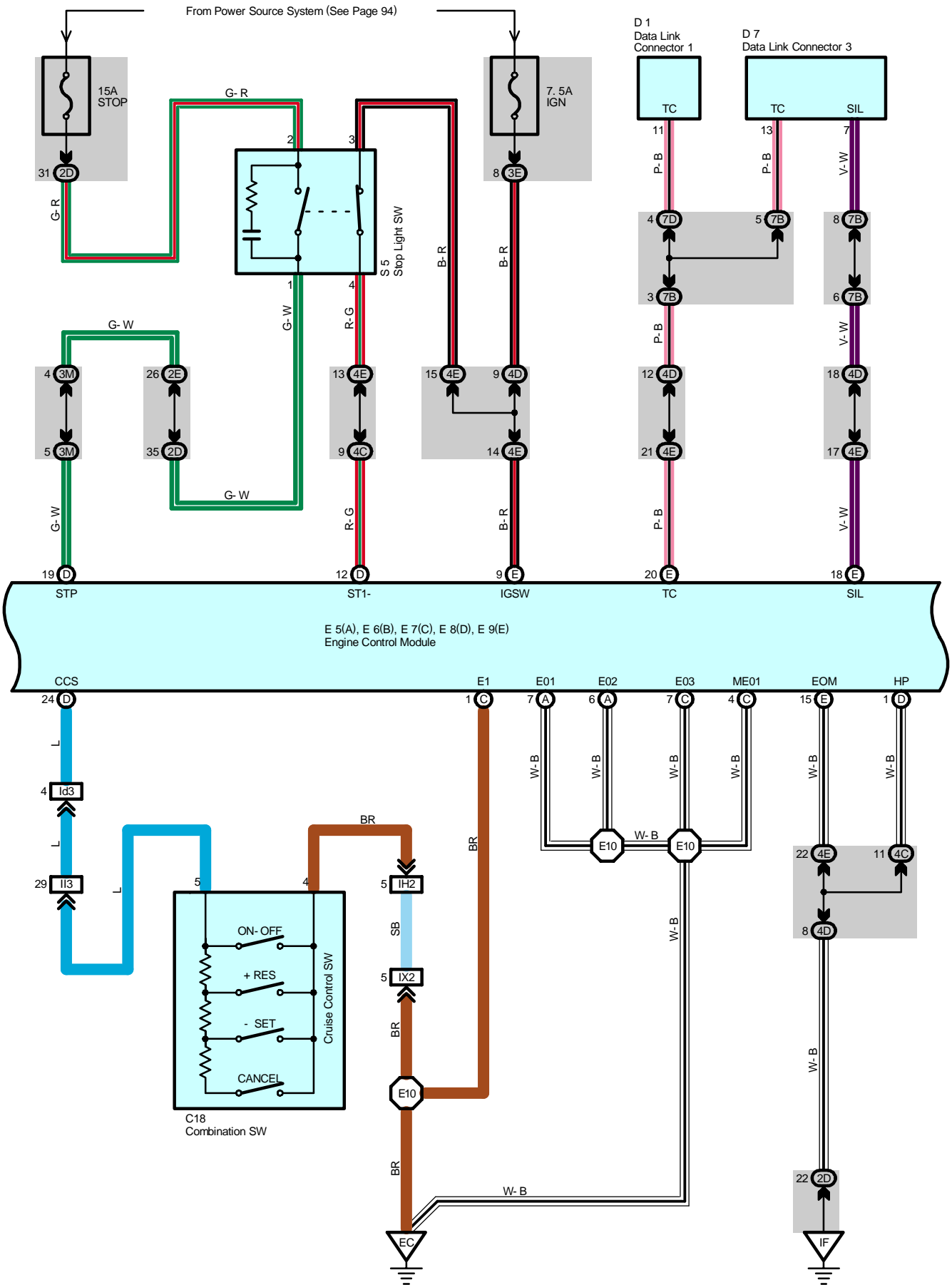
## : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E8	76	Transmission Wire	E10	76	Engine Wire
E9					

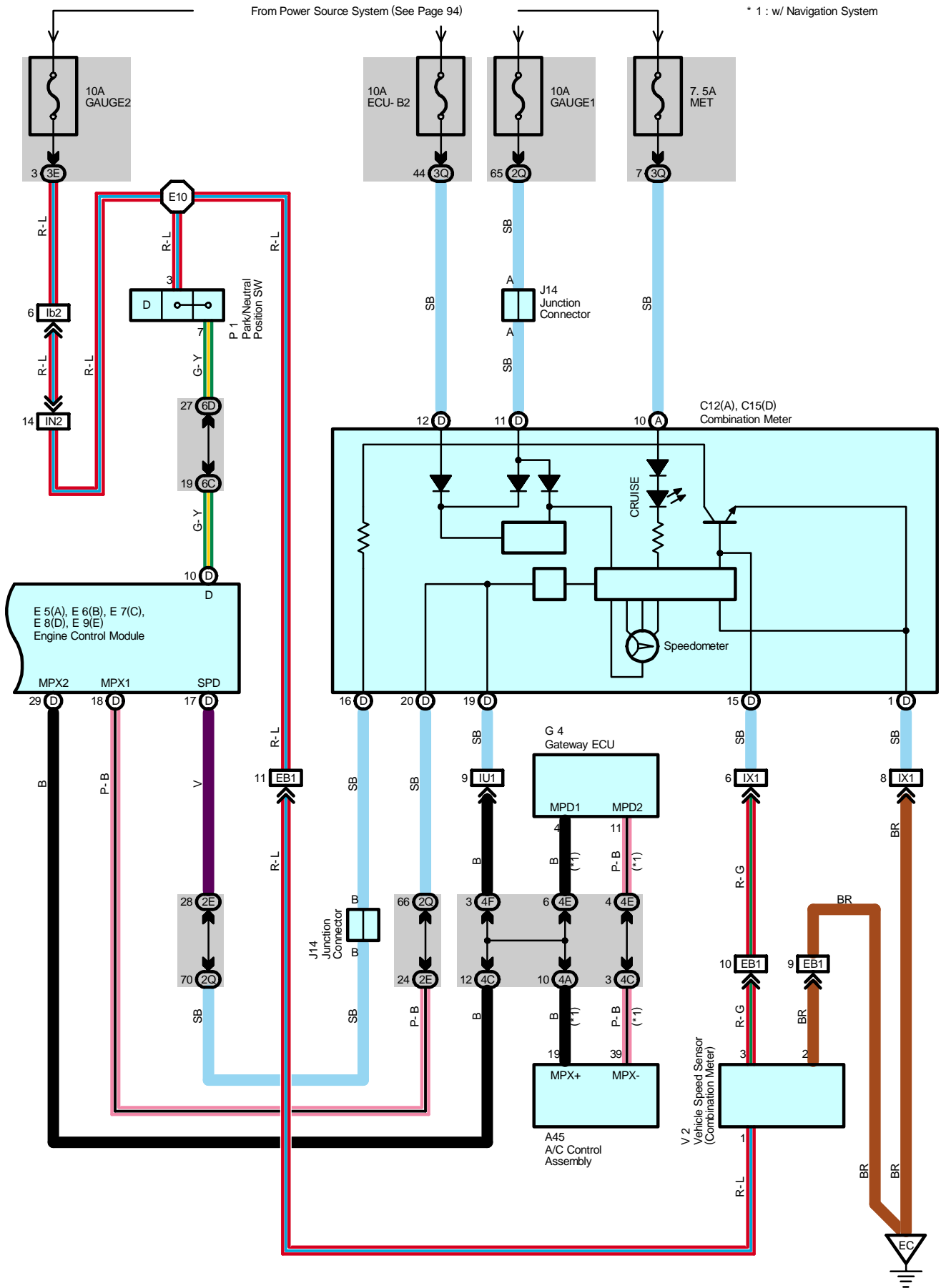


# Cruise Control





# Cruise Control



## System Outline

The cruise control system is a constant vehicle speed controller which controls the opening angle of the engine throttle valve by the SW, and allows driving at a constant speed without depressing the accelerator pedal.

### Set Operation

When the ON-OFF SW is turned on, the systems starts preparations for cruise control and turns on the indicator light in the combination meter.

### Set Speed Control

When the - SET SW is operated with the ON-OFF SW turned on during driving, the speed is controlled at a constant speed.

### Coast Control

When the - SET SW is kept turned on during cruise control driving, the engine control module controls the throttle valve to decelerate the vehicle speed.

Every time the - SET SW is turned on instantaneously, the vehicle speed is decelerated approx. 1.5 km/h.

### Accel Control

When the + RES SW is kept turned on during cruise control driving, the engine control module controls the throttle valve to accelerate the vehicle speed.

Every time the + RES SW is turned on instantaneously, the vehicle speed is accelerated approx. 1.5 km/h.

### Resume Control

If the vehicle speed is within the low speed limit (Approx. 40 km/h, 25 mph) when canceling the cruise control, operation of the + RES SW accelerates the vehicle speed and resumes the level before canceling the cruise control.

### Manual Cancel Mechanism

If any of the following signals are input during cruise control driving, the cruise control is canceled.

- \* The stop light SW is on
- \* The CANCEL SW is turned on
- \* The ON-OFF SW is turned off

### Auto Cancel Function

If any of the following conditions are detected, the cruise control is canceled:

- \* Failure in the stop light SW wiring
- \* Abnormality in the vehicle speed signal
- \* Malfunction in the electronically controlled throttle parts

### Overdrive Function

The overdrive may be canceled if the vehicle travels on a upward slope during cruise control driving. After the overdrive is canceled, if the vehicle speed exceeds the overdrive return speed (Set speed ( 2 km/h, 1.2 mph ) ) and it is determined that the slope has finished, and the vehicle returns to overdrive mode again.

## Service Hints

### E7 (C), E8 (D), E9 (E) Engine Control Module

BATT-E1 : Always 9.0-14.0 volts

IGSW-E1 : 9.0-14.0 volts with ignition SW at ON or ST position

STP-E1 : 7.5-14 volts with brake pedal is depressed  
: Below 1.5 volts with brake pedal is released

### C18 Combination SW

5-4 : Approx. 1540  $\Omega$  with CANCEL SW on

: Approx. 240  $\Omega$  with + RES SW on

: Approx. 630  $\Omega$  with - SET SW on

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A14	70	D7	70	G4	70
A45	70	E5	A 70	J14	71
C12	A 70	E6	B 70	P1	69
C15	D 70	E7	C 70	S5	71
C18	70	E8	D 70	T16	69
D1	68	E9	E 70	V2	69

# Cruise Control

## : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
1	22	Engine Room R/B (Engine Compartment Left)

## : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3M	43	
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4D		
4E		
4F		
5C	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)
6C	60	Dash Wire and J/B No.6 (Behind the Grove Box)
6D	60	Engine Wire and J/B No.6 (Behind the Grove Box)
7B	64	Dash Wire and J/B No.7 (Behind the Grove Box)
7D	64	Engine Room No.2 Wire and J/B No.7 (Behind the Grove Box)

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	76	Engine Wire and Transmission Wire (On the Transmission)
IG1	78	Engine Room No.2 Wire and Dash Wire (Behind the Combination Meter)
IH2	80	Instrument Panel Integration Wire and Column Wire (Near the Ignition SW)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IU1	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
IX2		
Ib2	84	Dash Wire and Dash Wire (Behind the Combination Meter)
Id1	84	Dash Wire and Dash Wire (Instrument Panel Center)
Id3		
If1	84	Engine Wire and Engine Wire (Behind the Glove Box)

## : Ground Points

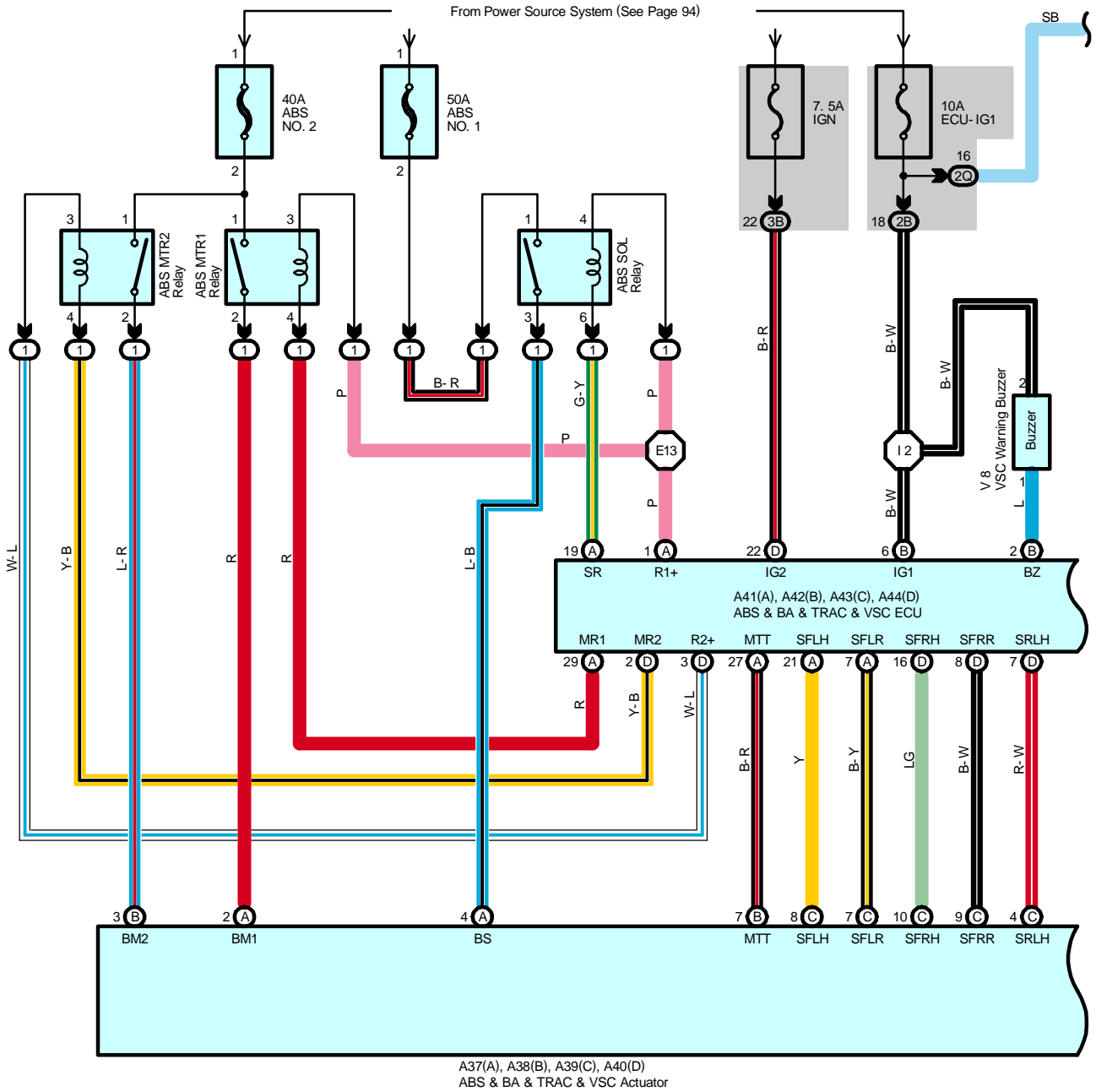
Code	See Page	Ground Points Location
EA	76	Front Right Side of Fender Apron
EC	76	Rear Bank of Right Cylinder Head
EE	76	Front Left Side of Fender Apron
IF	78	Set Bolt of Cowl Side J/B LH

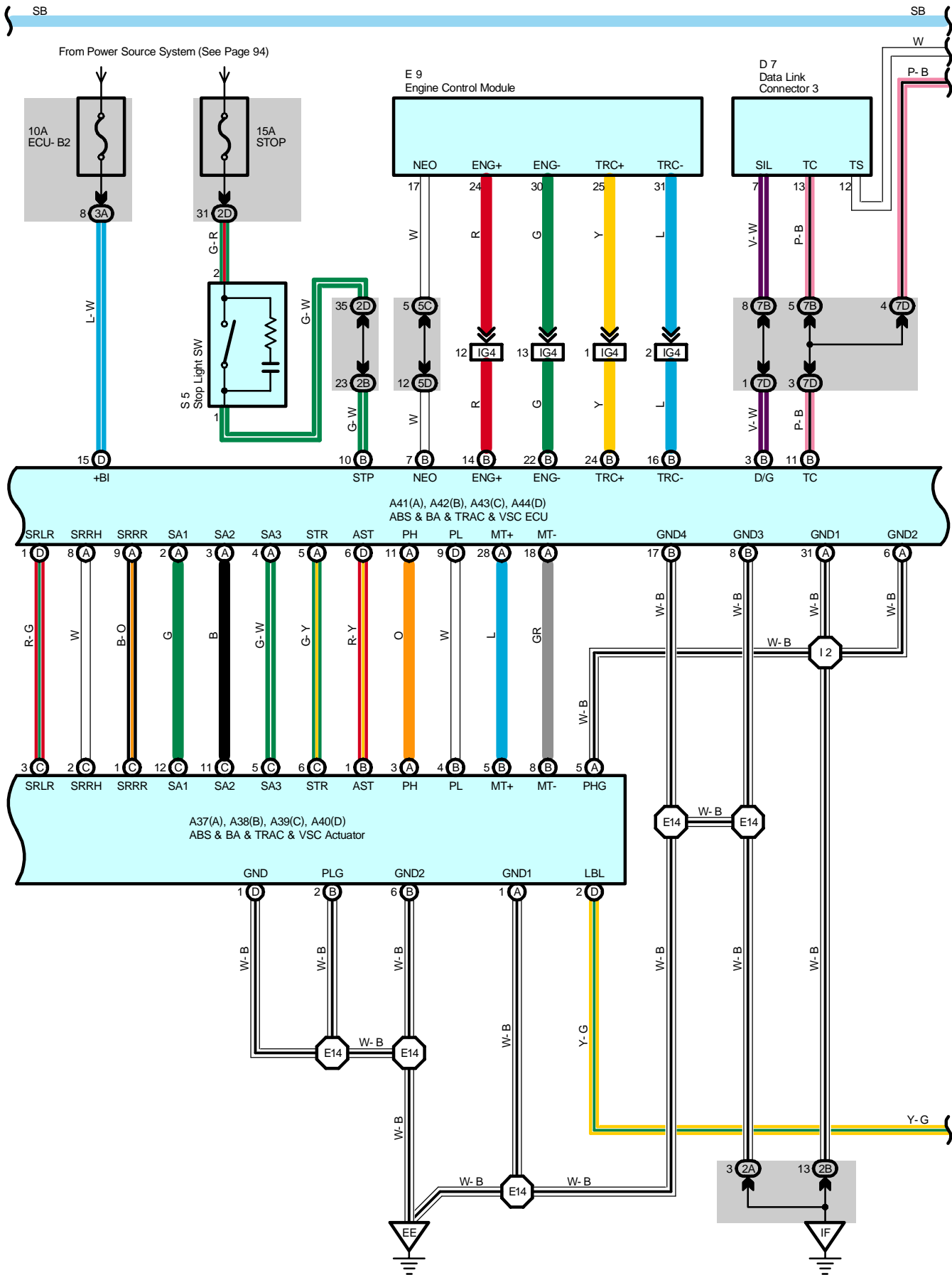
## : Splice Points

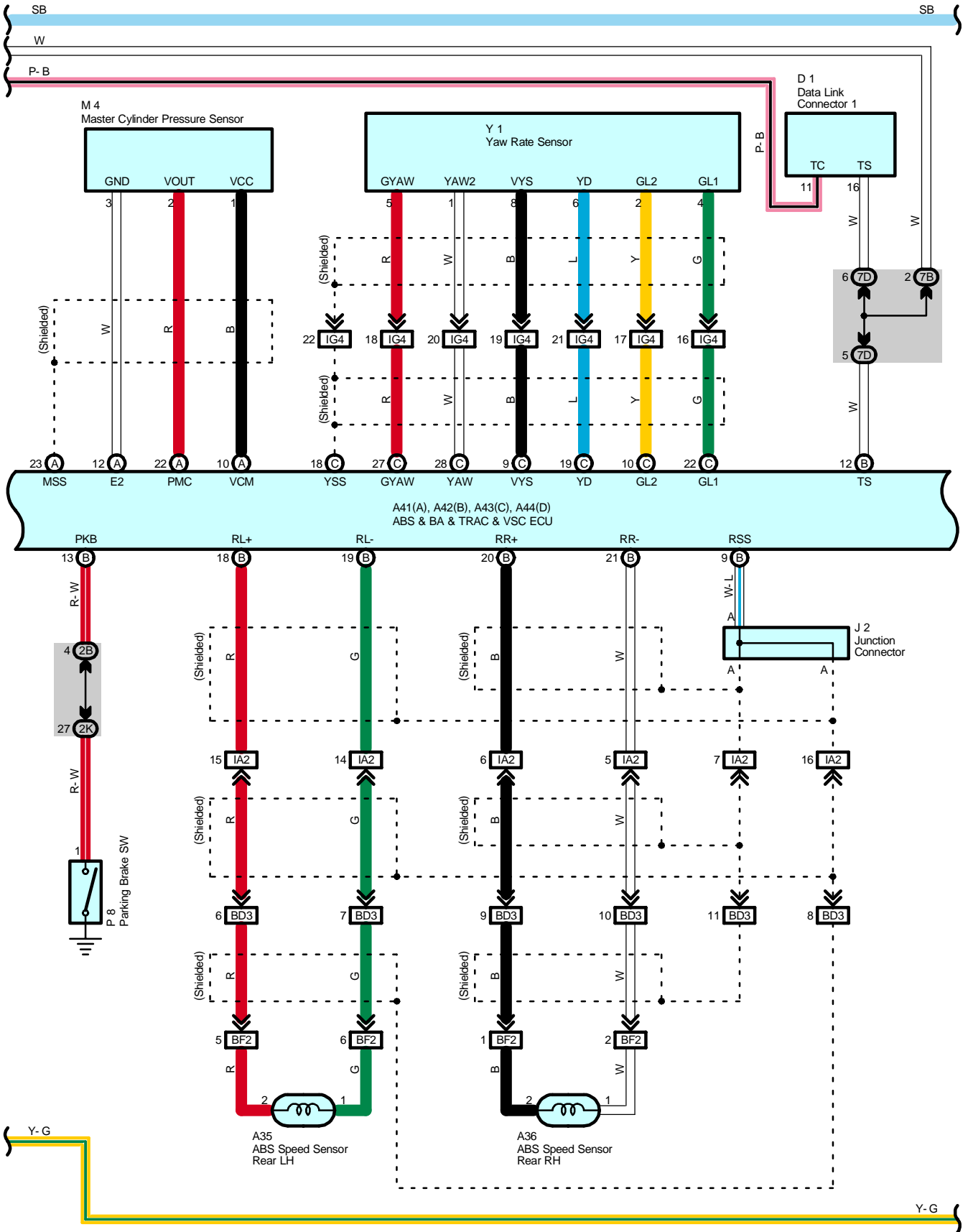
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E10	76	Engine Wire			

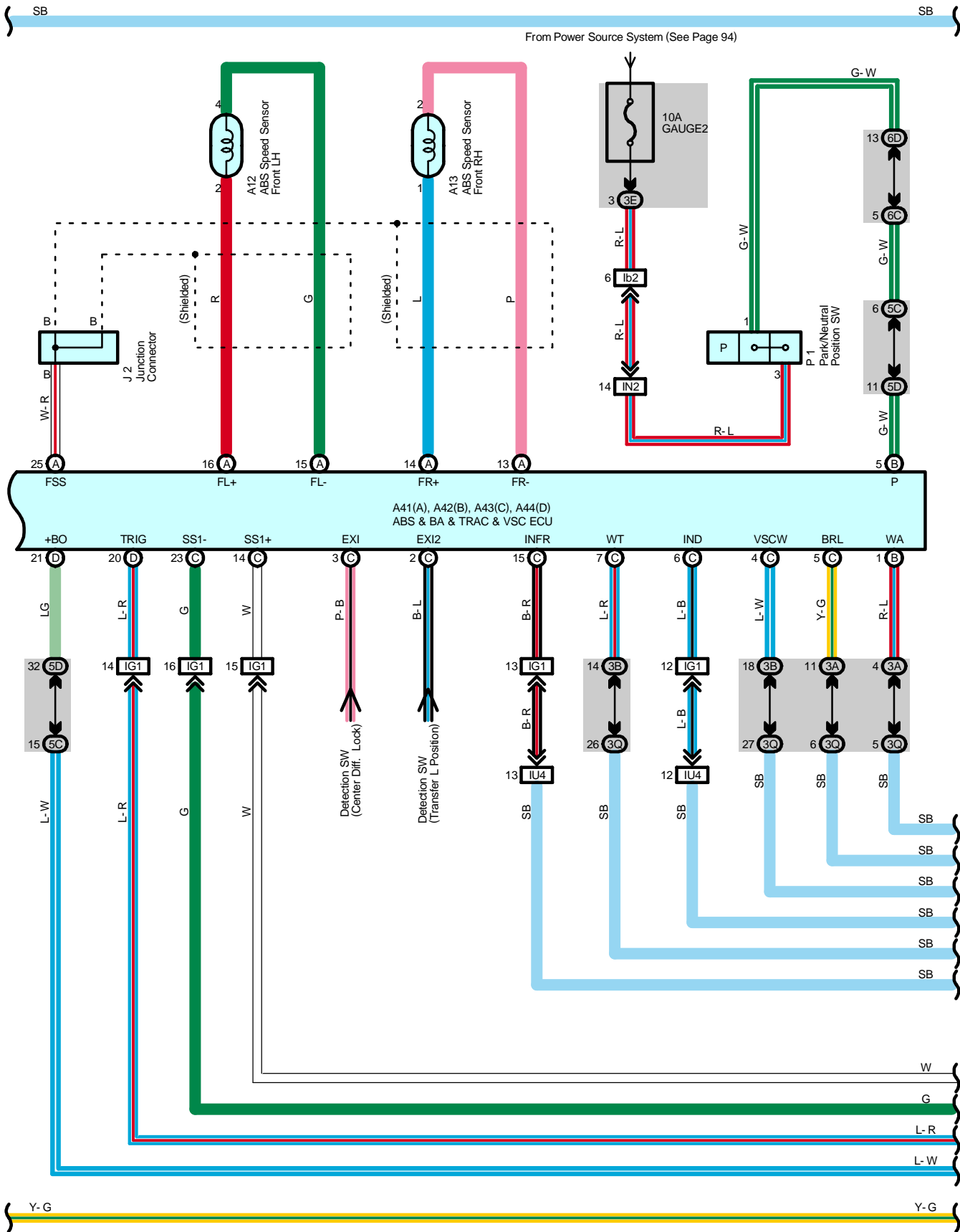


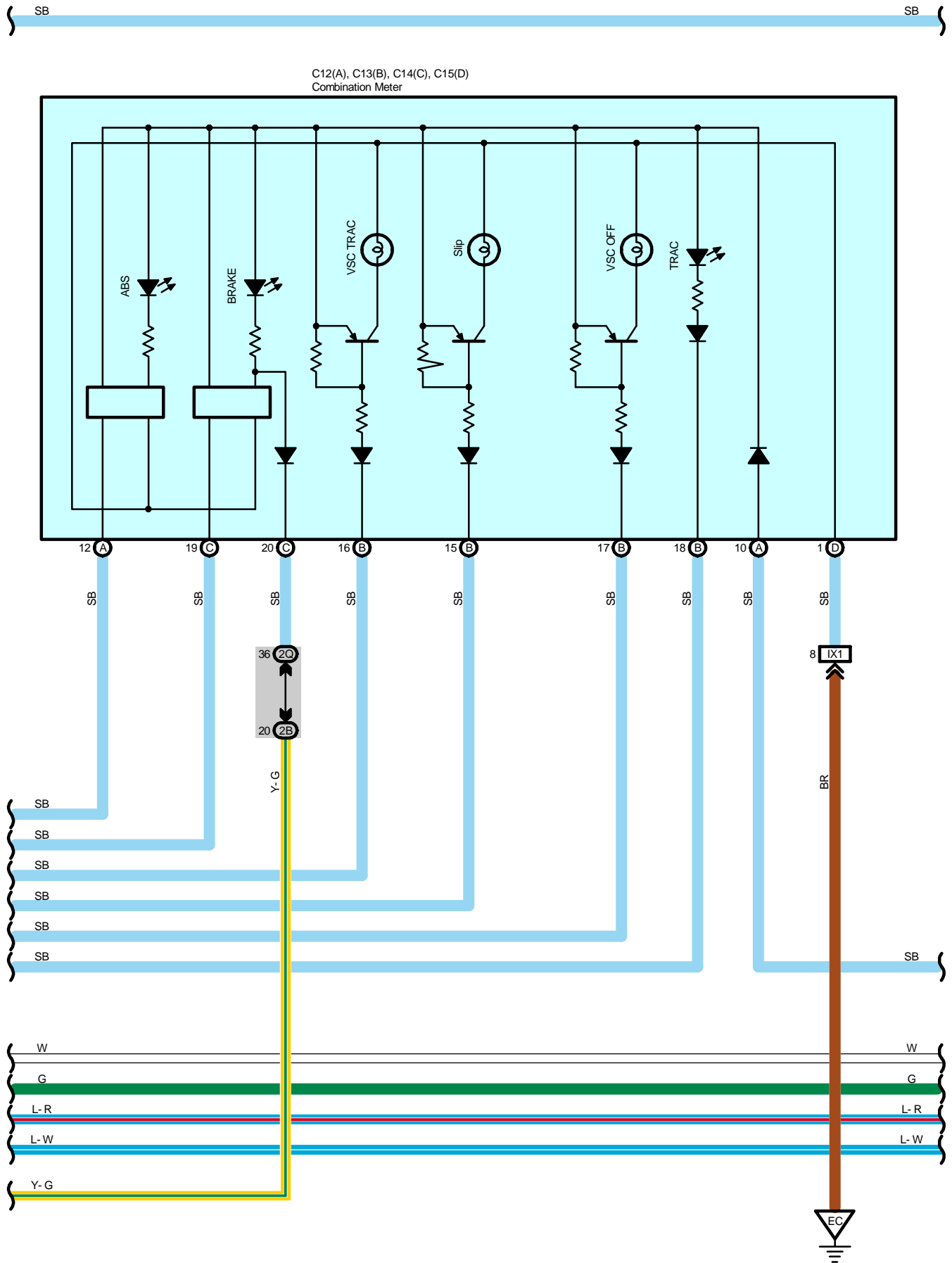














## System Outline

### 1. ABS Operation

If the brake pedal is depressed suddenly, the ABS controls the hydraulic pressure of the wheel cylinders for all the four wheels to automatically avoid wheel locking and ensure the directional and steering stability of the vehicle. If the brake pedal is depressed suddenly, the ABS & BA & TRAC & VSC ECU controls the solenoids in the actuators using the signals from the sensors to move the brake fluid to the reservoir in order to release the braking pressure applied to the wheel cylinder. If the ABS & BA & TRAC & VSC ECU detects that the fluid pressure in the wheel cylinder is insufficient, the ECU controls the solenoids in the actuators to increase the braking pressure.

### 2. Traction Control Operation

The traction control system controls the engine torque, the hydraulic pressure of the driving wheel cylinders, slipping of the wheels which may occur at start or acceleration of the vehicle, to ensure an optimal driving power and vehicle stability corresponding to the road conditions.

### 3. VSC Operation

Unexpected road conditions, vehicle speed, emergency situation, and any other external factors may cause large under- or over-steering of the vehicle. If this occurs, the VSC system automatically controls the engine power and wheel brakes to reduce the under- or over-steering.

To reduce large over-steering :

If the VSC system determines that the over-steering is large, it activates the brakes for the outer turning wheels depending on the degree of the over-steering to produce the moment toward the outside of the vehicle and reduce the over-steering.

To reduce large under-steering :

If the VSC system determines that the under-steering is large, it controls the engine power and activates the rear wheel brakes to reduce the under-steering.

VSC indicator light

If an error occurs in the VSC system, the VSC indicator lights up to warn the driver.

### 4. Traction Mode and VSC Function

When the center differential of the transfer is locked, the VSC function is turned off. At this time, the VSC OFF indicator light in the combination meter will come on, and informs the driver that the VSC function is OFF.

### 5. Mutual System Control

To efficiently operate the VSC system at its optimal level, the VSC system and other control systems are mutually controlled while the VSC system is being operated.

Engine throttle control

The engine power does not interfere with the VSC brake control by controlling the opening of the throttle and reducing the engine output.

Engine control and electronically controlled transmission control

The strong braking force does not interfere with the braking force control of the VSC system by turning off the accel. and reducing changes in the driving torque at shift-down.

VSC system operation indication

The slip indicator light flashes and the buzzer sounds intermittently to warn the driver that the current road is slippery, while the VSC system is being operated.

### 6. Fail Safe Function

If an error occurs in the ABS & BA & TRAC & VSC ECU, sensor signals, and/or actuators, the ABS & BA & TRAC & VSC ECU inhibits the brake actuator control and inputs the error signal to the engine control module. According to the error signal, the brake actuator turns off the solenoid and the engine control module rejects any electronically controlled throttle open request from the VSC system. As a result, the vehicle functions without the ABS, BA, TRAC, and VSC systems.



## Service Hints

### A41 (A), A42 (B), A44 (D) ABS & BA & TRAC & VSC ECU

- (D)15-Ground : Always approx. 12 volts
- (B) 6-Ground : Approx. 12 volts with ignition SW at ON or ST position
- (D)22-Ground : Approx. 12 volts with ignition SW at ON or ST position
- (B)10-Ground : Approx. 12 volts with brake pedal depressed
- (A) 6, (A) 31, (B) 8, (B) 17-Ground : Always continuity

### A12 ABS Speed Sensor Front LH

- 2-4 : Approx. 1.07 kΩ (20 °C, 68 °F)

### A13 ABS Speed Sensor Front RH

- 1-2 : Approx. 1.07 kΩ (20 °C, 68 °F)

### A35, A36 ABS Speed Sensor Rear LH, RH

- 1-2 : Approx. 1.2 kΩ (25 °C, 77 °F)

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A12	68	A42	B 70	D7	70
A13	68	A43	C 70	E9	70
A35	72	A44	D 70	J2	71
A36	72	C12	A 70	M4	69
A37	A 68	C13	B 70	P1	69
A38	B 68	C14	C 70	P8	73
A39	C 68	C15	D 70	S5	71
A40	D 68	C17	70	V8	71
A41	A 70	D1	68	Y1	71

## ○ : Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
1	22	Engine Room R/B (Engine Compartment Left)

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2B		
2D		
2K		
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3A	40	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3B		
3E		
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
5C	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)
6C	60	Dash Wire and J/B No.6 (Behind the Grove Box)
6D	60	Engine Wire and J/B No.6 (Behind the Grove Box)
7B	64	Dash Wire and J/B No.7 (Behind the Grove Box)
7D	64	Engine Room No.2 Wire and J/B No.7 (Behind the Grove Box)

 : **Connector Joining Wire Harness and Wire Harness**

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IA2	78	Engine Room No.2 Wire and Floor No.1 Wire (Left Kick Panel)
IG1	78	Engine Room No.2 Wire and Dash Wire (Behind the Combination Meter)
IG4		
IH2	80	Instrument Panel Integration Wire and Column Wire (Near the Ignition SW)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IU4	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
Ib2	84	Dash Wire and Dash Wire (Behind the Combination Meter)
BD3	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BF2	86	Frame Wire and Floor No.3 Wire (Left Side of Rear Floor Crossmember)

 : **Ground Points**

Code	See Page	Ground Points Location
EC	76	Rear Bank of Right Cylinder Head
EE	76	Front Left Side of Fender Apron
IF	78	Set Bolt of Cowl Side J/B LH

 : **Splice Points**

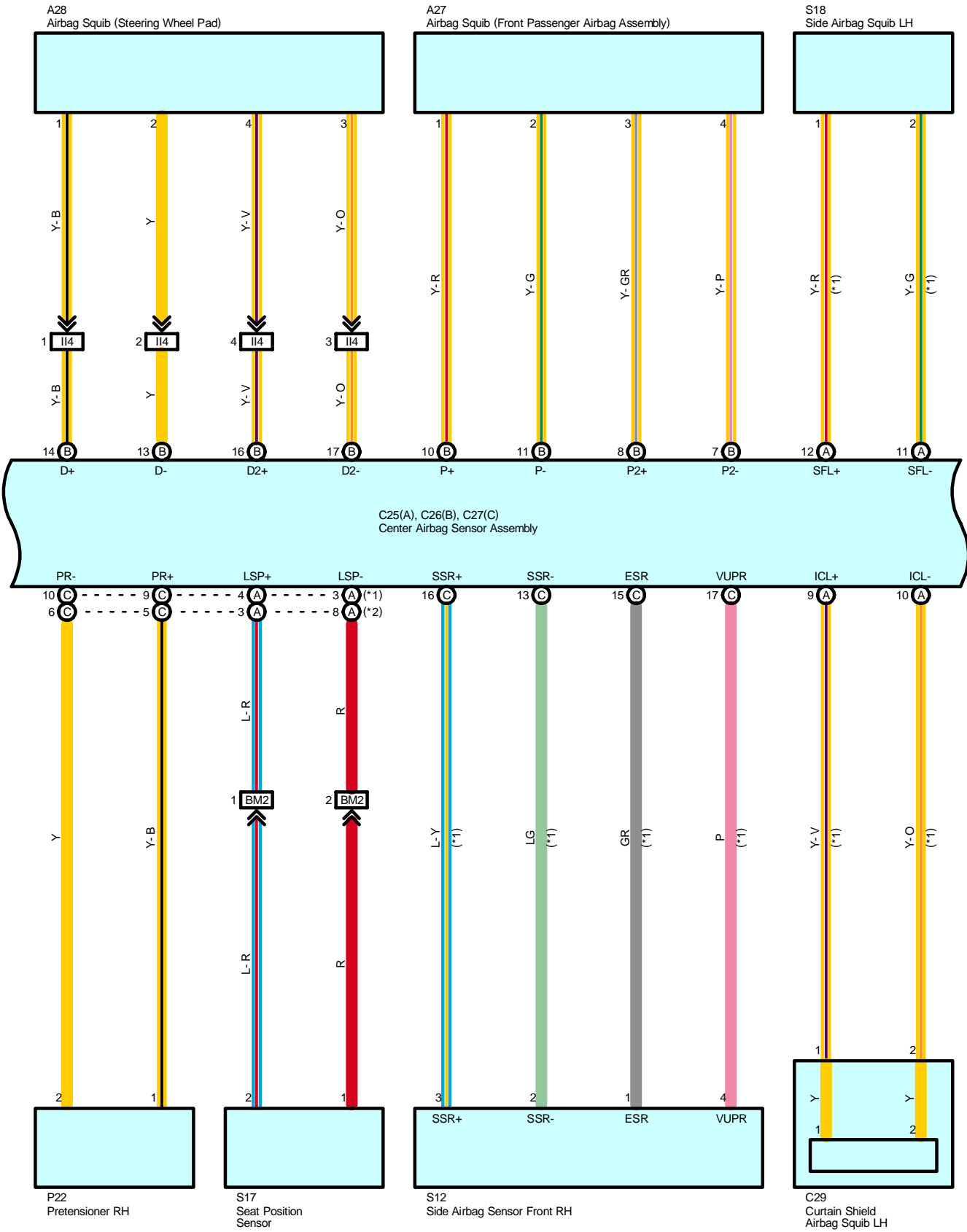
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E13	76	Engine Room No.2 Wire	I2	80	Engine Room No.2 Wire
E14					

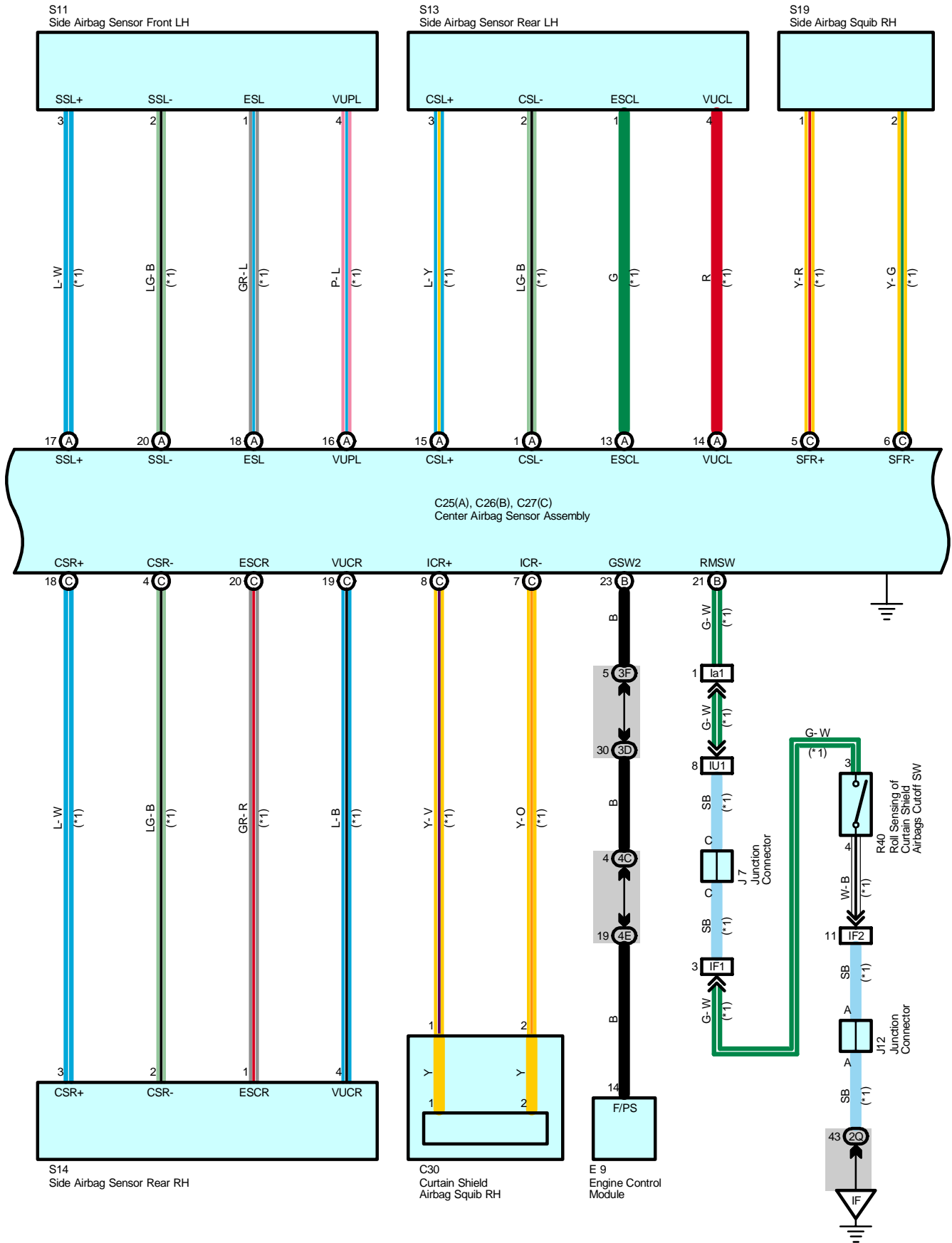
NOTICE: When inspecting or repairing the SRS, perform the operation in accordance with the following precautionary instructions and the procedure and precautions in the Repair Manual for the applicable model year.

- ▶ Malfunction symptoms of the SRS are difficult to confirm, so the DTCs become the most important source of information when troubleshooting. When troubleshooting the SRS, always inspect the DTCs before disconnecting the battery.
- ▶ **Work must be started after 90 seconds from when the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.**  
**(The SRS is equipped with a back-up power source so that if work is started within 90 seconds from disconnecting the negative (-) terminal cable of the battery, the SRS may be deployed.)**
- ▶ When the negative (-) terminal cable is disconnected from the battery, the memory of the clock and audio system will be canceled. So before starting work, make a record of the contents memorized in the audio memory system. When work is finished, reset the audio systems as they were before and adjust the clock. This vehicle has power tilt and power telescopic steering, power seat and power outside rear view mirror which are all equipped with memory function. However, it is not possible to make a record of the memory contents. So when the work is finished, it will be necessary to explain this fact to the customer, and ask the customer to adjust the features and reset the memory. To avoid erasing the memory in each memory system, never use a back-up power supply from outside the vehicle.
- ▶ Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- ▶ Do not expose the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, seat belt pretensioner, center airbag sensor assembly, front airbag sensor assembly or side airbag sensor assembly directly to hot air or flames.
- ▶ Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, seat belt pretensioner, center airbag sensor assembly, front airbag sensor assembly and side airbag sensor assembly should be inspected.
- ▶ Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- ▶ Never disassemble and repair the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, seat belt pretensioner, center airbag sensor assembly, front airbag sensor assembly or side airbag sensor assembly in order to reuse it.
- ▶ If the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, seat belt pretensioner, center airbag sensor assembly, front airbag sensor assembly or side airbag sensor assembly has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- ▶ Use a volt/ohmmeter with high impedance (10 k $\Omega$ /V minimum) for troubleshooting the system's electrical circuits.
- ▶ Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
- ▶ After work on the SRS is completed, perform the SRS warning light check.
- ▶ If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section of the Repair Manual.



\* 1 : w/ Side Airbag  
 \* 2 : w/o Side Airbag







## System Outline

- \* The SRS airbag are provided for the driver and front passenger. The SRS airbags have been designed to help reducing the shocks to the heads and chests of the driver and front passenger in the event of a severe frontal impact collision as supplements to the seat belts.  
This system is a 3-sensor type airbag system to detect the impact during a front collision using the center airbag sensor assembly and airbag sensor front LH, RH, and to make the airbag system and pretensioner operate as well.
- \* In this system, a front side collision is detected by the side airbag sensor front LH, RH in order to simultaneously deploy the side and curtain shield airbags. A rear side collision is detected by the side airbag sensor rear LH, RH in order to deploy only the curtain shield airbag.
- \* Roll sensing of curtain shield airbags control has been adopted in order to deploy the curtain shield airbags and the pretensioners for the driver and front passenger, in the event that the vehicle rolls over.  
A roll sensing of curtain shield airbags cutoff SW is provided on the driver side of the instrument panel to enable the driver to disable this system.
- \* Dual-stage SRS airbags system, that controls the airbag inflating output optimum by judging the extent of impact and seat position (Driver seat), has been used for the driver and front passenger airbags.
- \* In accordance with the adoption of the dual-stage SRS airbag system, a seat position sensor has been established for the driver seat.
- \* This system has adopted a fuel cut control that stops the fuel pump when the airbag is deployed.

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A15	68	C27   C	70	R40	71
A16	68	C29	72	S11	73
A27	70	C30	72	S12	73
A28	70	D7	70	S13	73
B5	74	E9	70	S14	73
B7	70	J7	71	S17	74
C12   A	70	J12	71	S18	74
C13   B	70	J15	71	S19	74
C14   C	70	J22	72	T7	71
C25   A	70	P21	73		
C26   B	70	P22	73		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2G	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3F		
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4C	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4E		
7B	64	Dash Wire and J/B No.7 (Behind the Grove Box)



 : **Connector Joining Wire Harness and Wire Harness**

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA1	76	Engine Room Main Wire and Engine Room No.2 Wire (Engine Compartment Right)
EF1	76	Engine Room No.2 Wire and Engine Room Main Wire (Under the Engine Room J/B)
IB1	78	Engine Room No.2 Wire and Dash Wire (Left Kick Panel)
IF1	78	Instrument Panel Integration Wire and Instrument Panel Wire (Left Side of Instrument Panel)
IF2		
II4	80	Dash Wire and Column Wire (Near the Ignition SW)
IT1	80	Engine Room No.2 Wire and Dash Wire (Right Kick Panel)
IU1	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
Ia1	84	Dash Wire and Dash Wire (Behind the Combination Meter)
BM2	90	Floor No.1 Wire and Front Seat LH Wire (Front Side Under the Driver's Seat)
BU1	88	Floor No.1 Wire and Floor No.1 Wire (Near the Left Rear Suspension Support)

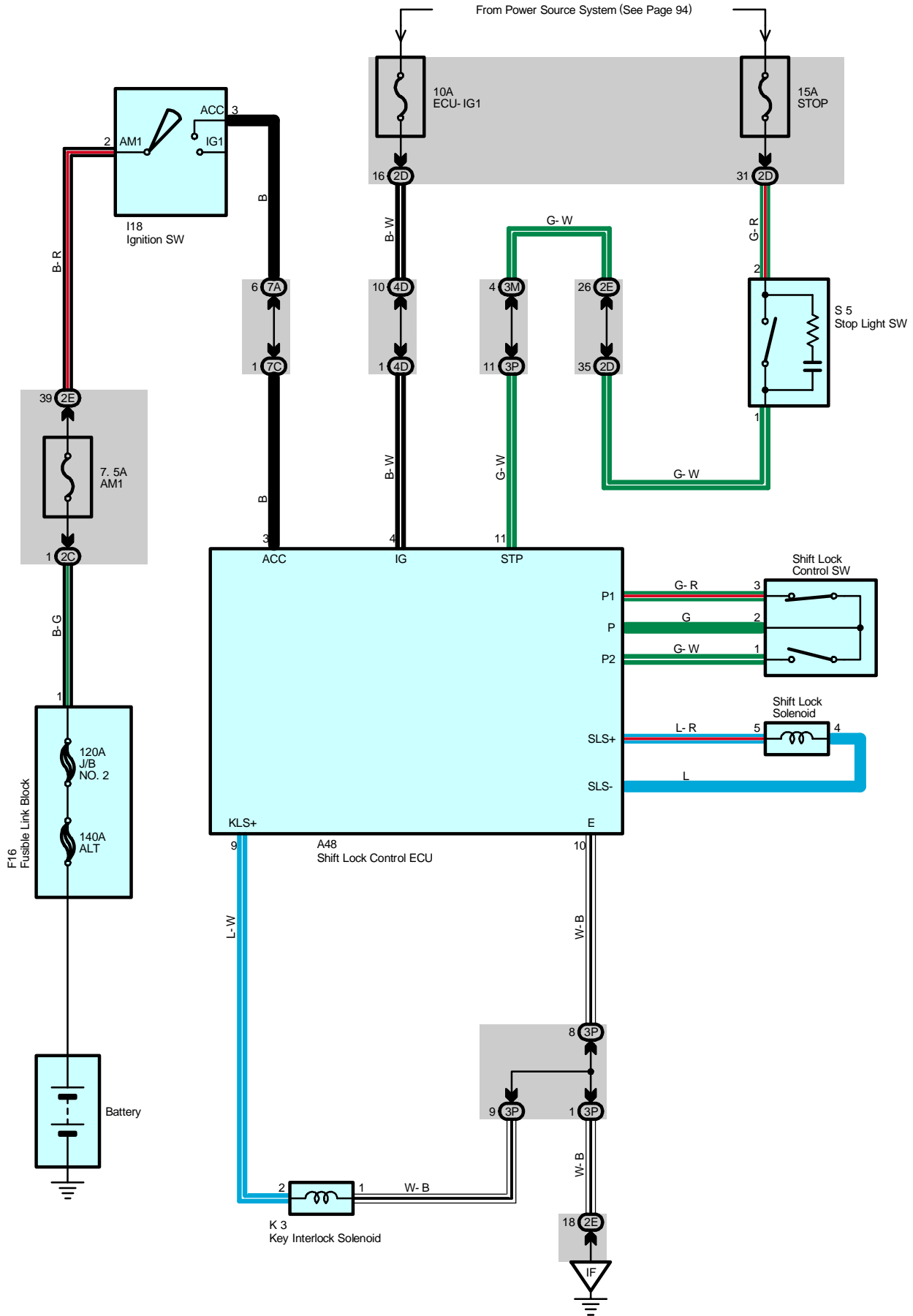
 : **Ground Points**

Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH
IH	78	Set Bolt of Cowl Side J/B RH
BJ	86	Under the Driver's Seat
BM	86	Left Rear Side Quarter Panel

 : **Splice Points**

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B11	88	Floor No.1 Wire			

# Shift Lock



## System Outline

### 1. Shift Lock Mechanism

When the brake pedal is depressed with the ignition SW is turned on (Stop light SW on), the shift lock control ECU is activated and allows the driver to change the shift lever to a position other than P position.

### 2. Key Interlock Mechanism

When the ignition SW is turned on and the shift lever is at a position other than P position, shift lock control ECU is activated to flow current to the key interlock solenoid. This inhibits to turn the ignition SW from on to OFF position.

## Service Hints

### A48 Shift Lock Control ECU

- 3-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- 4-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 11-Ground : Approx. 12 volts with brake pedal depressed
- 10-Ground : Always continuity

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A48	70	I18	70	S5	71
F16	68	K3	71		

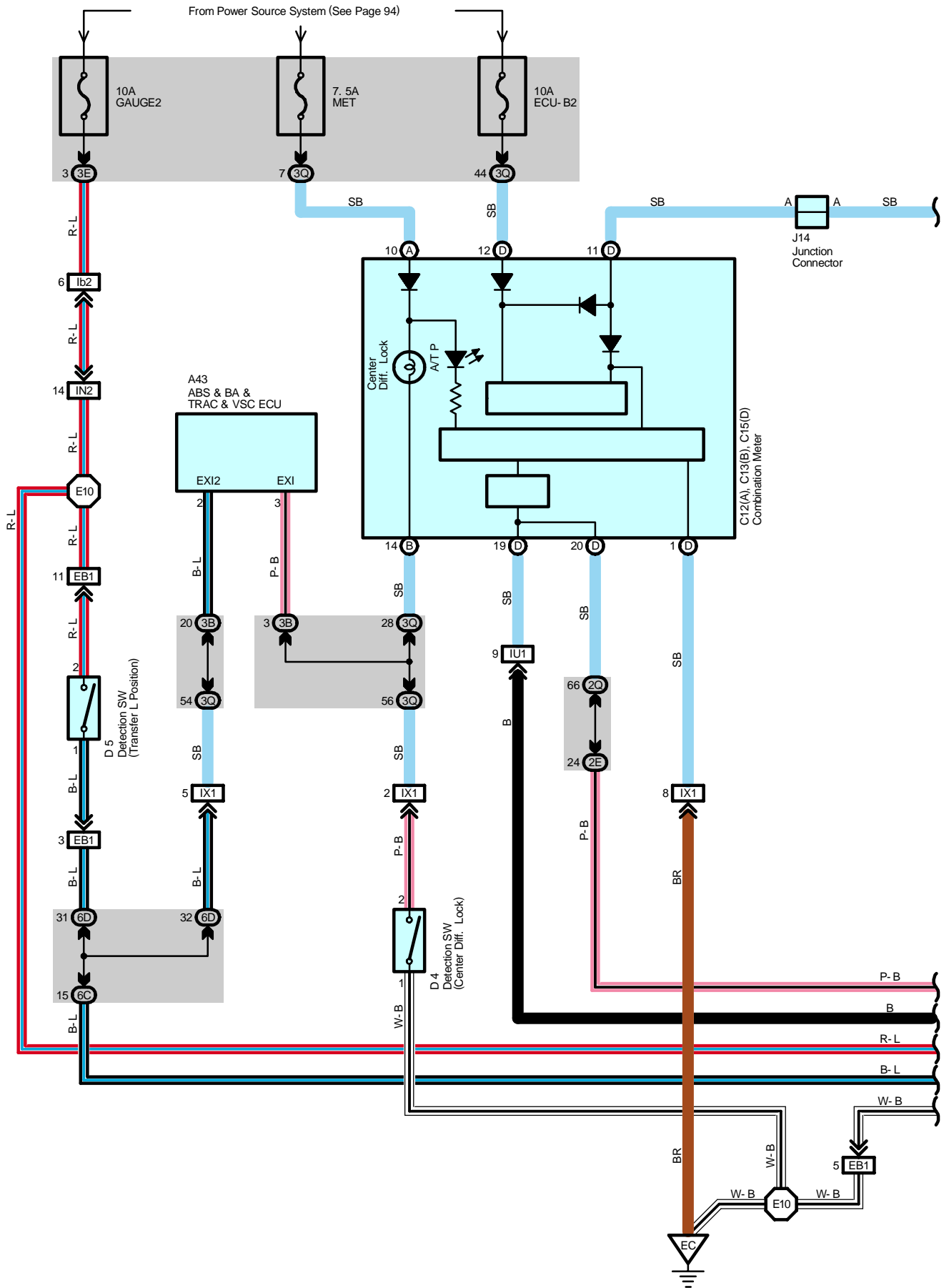
## ○ : Junction Block and Wire Harness Connector

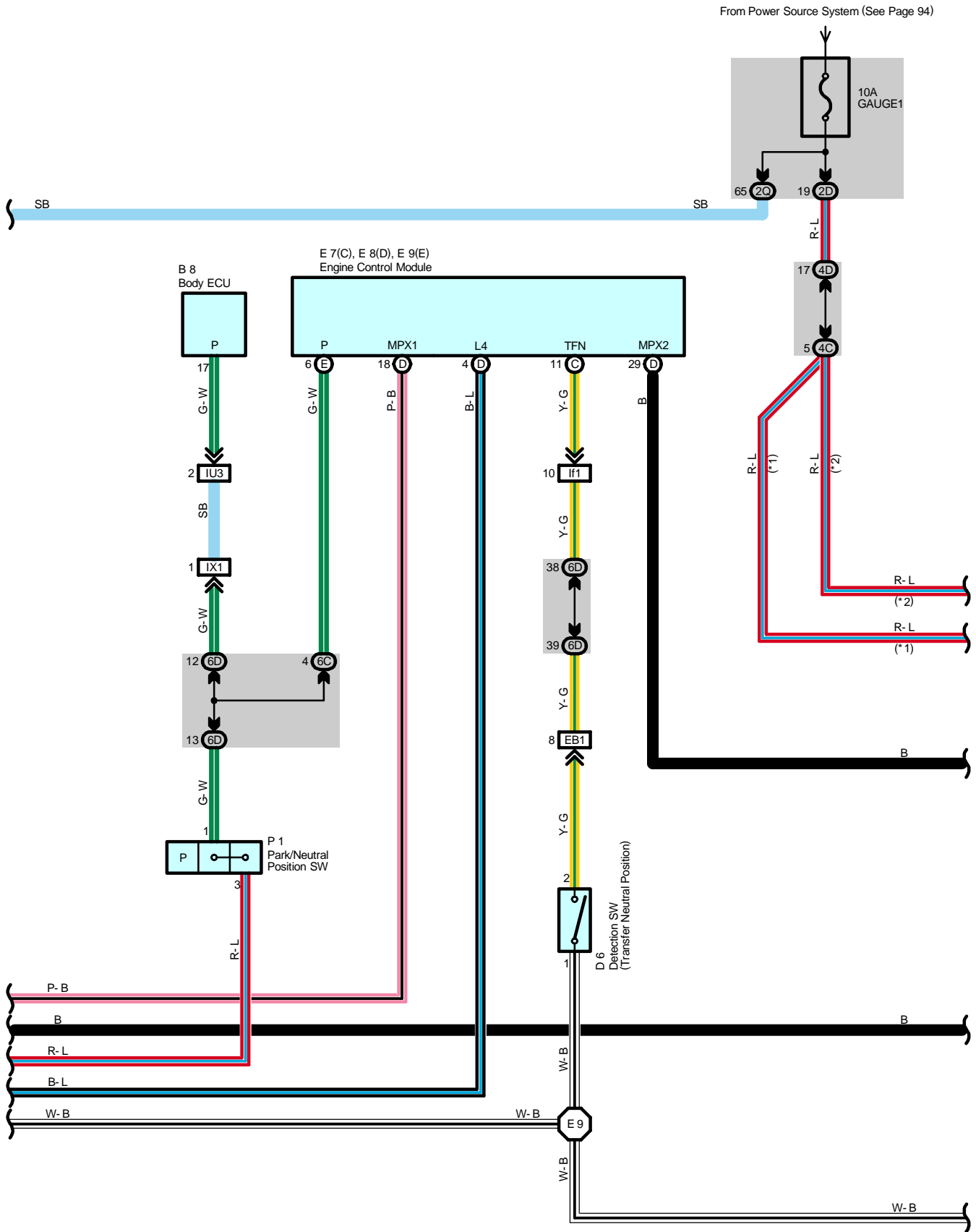
Code	See Page	Junction Block and Wire Harness (Connector Location)
2C	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2D		
2E		
3M	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3P		
4D	52	Dash Wire and J/B No.4 (Instrument Panel Center)
7A	64	Dash Wire and J/B No.7 (Behind the Glove Box)
7C		

## ▽ : Ground Points

Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH

# Center Differential Lock

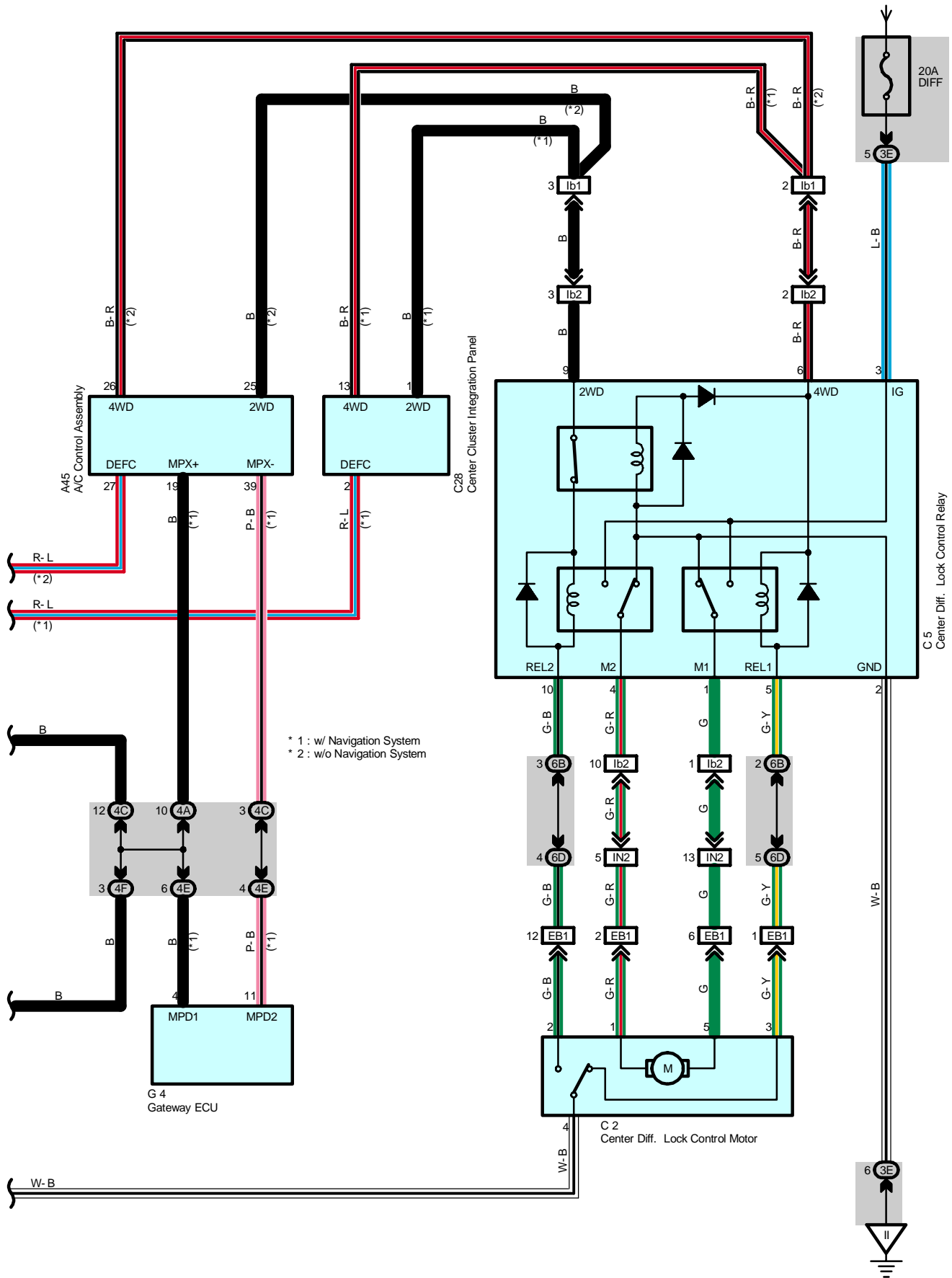




\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System

# Center Differential Lock

From Power Source System (See Page 94)



## Service Hints

### C5 Center Diff. Lock Control Relay

3-Ground : Approx. 12 volts with ignition SW at ON or ST position

2-Ground : Always continuity

### ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page		
A43	70	C13	B	70	E7	C	70
A45	70	C15	D	70	E8	D	70
B8	70	C28		70	E9	E	70
C2	68	D4		68	G4		70
C5	70	D5		68	J14		71
C12	A	D6		68	P1		69

### ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3B	40	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4D		
4E		
4F		
6B	60	Dash Wire and J/B No.6 (Behind the Grove Box)
6C		
6D	60	Engine Wire and J/B No.6 (Behind the Grove Box)

### □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	76	Engine Wire and Transmission Wire (On the Transmission)
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IU1	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IU3		
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
Ib1	84	Dash Wire and Dash Wire (Behind the Combination Meter)
Ib2		
If1	84	Engine Wire and Engine Wire (Behind the Glove Box)

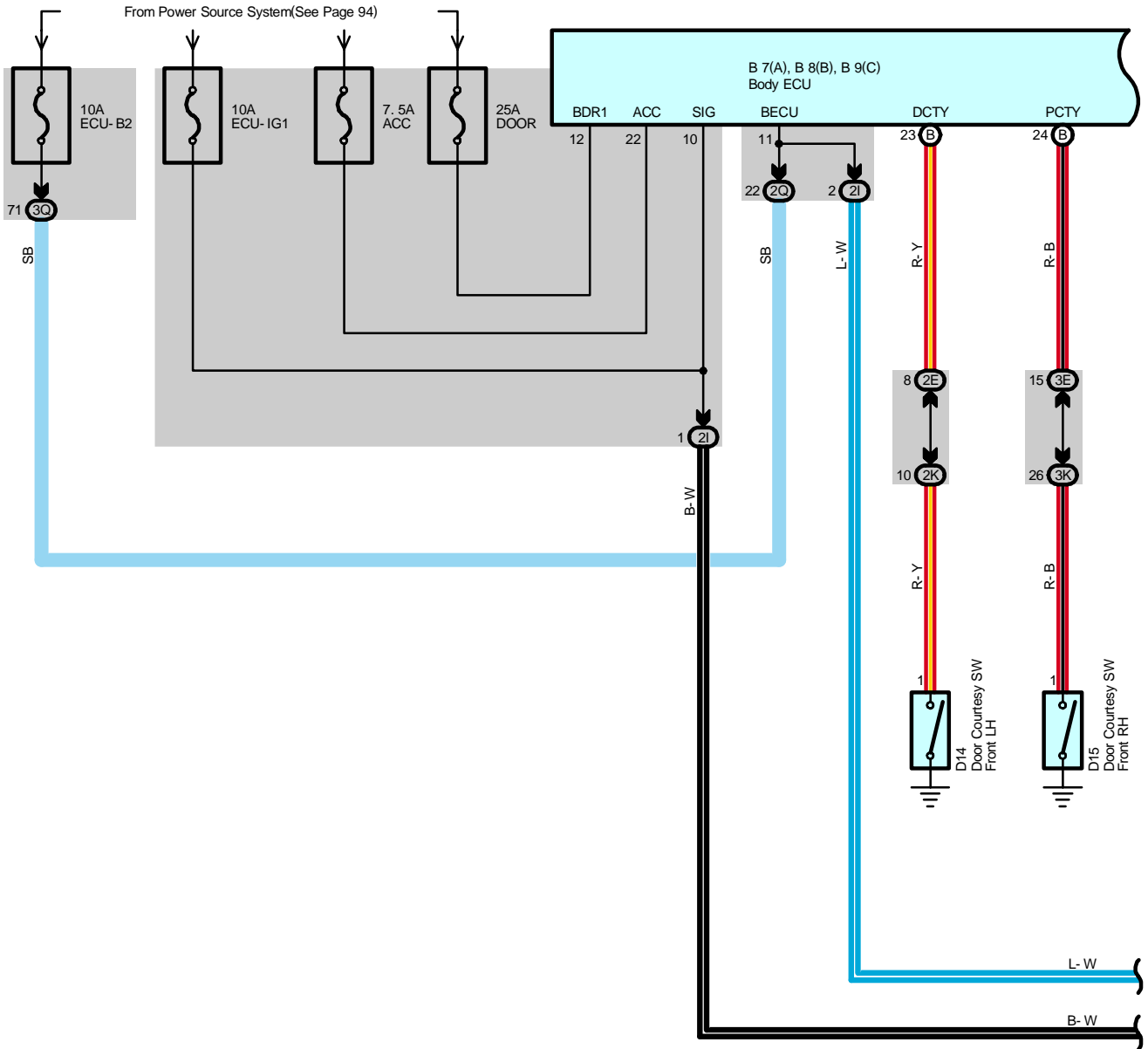
### ▽ : Ground Points

Code	See Page	Ground Points Location
EC	76	Rear Bank of Right Cylinder Head
II	78	Set Bolt of Cowl Side J/B RH

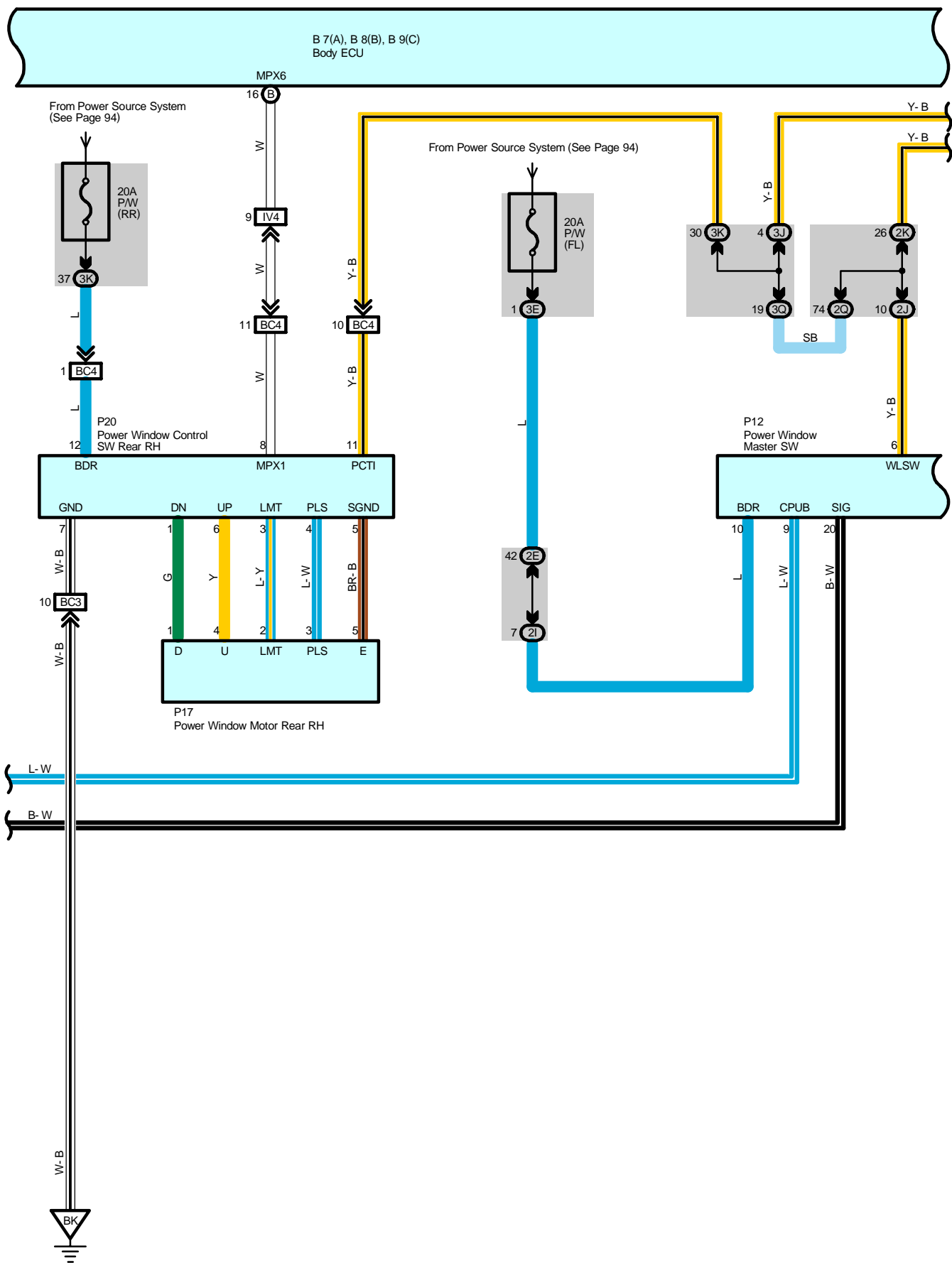
### ○ : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E9	76	Transmission Wire	E10	76	Engine Wire

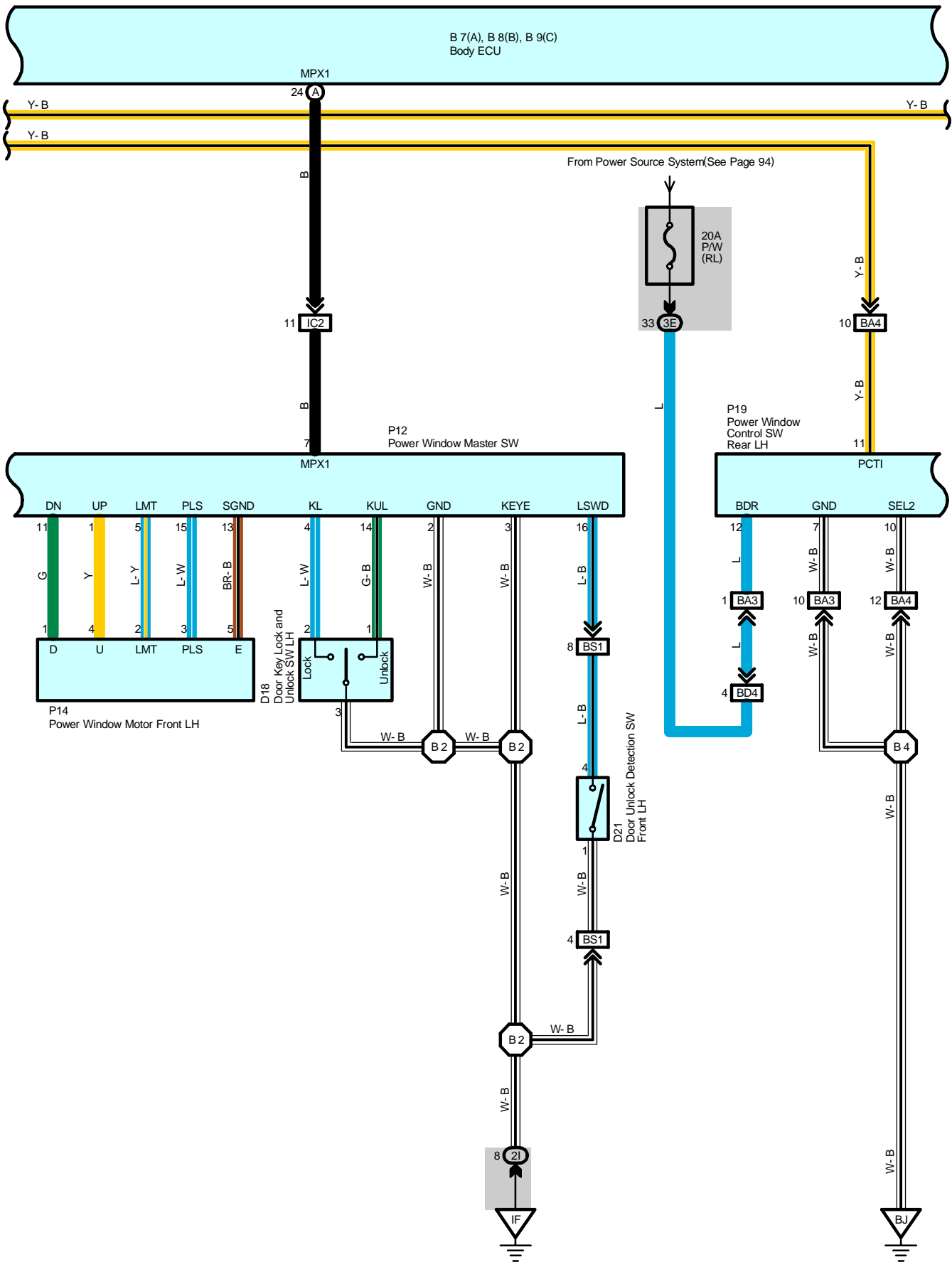
# Power Window

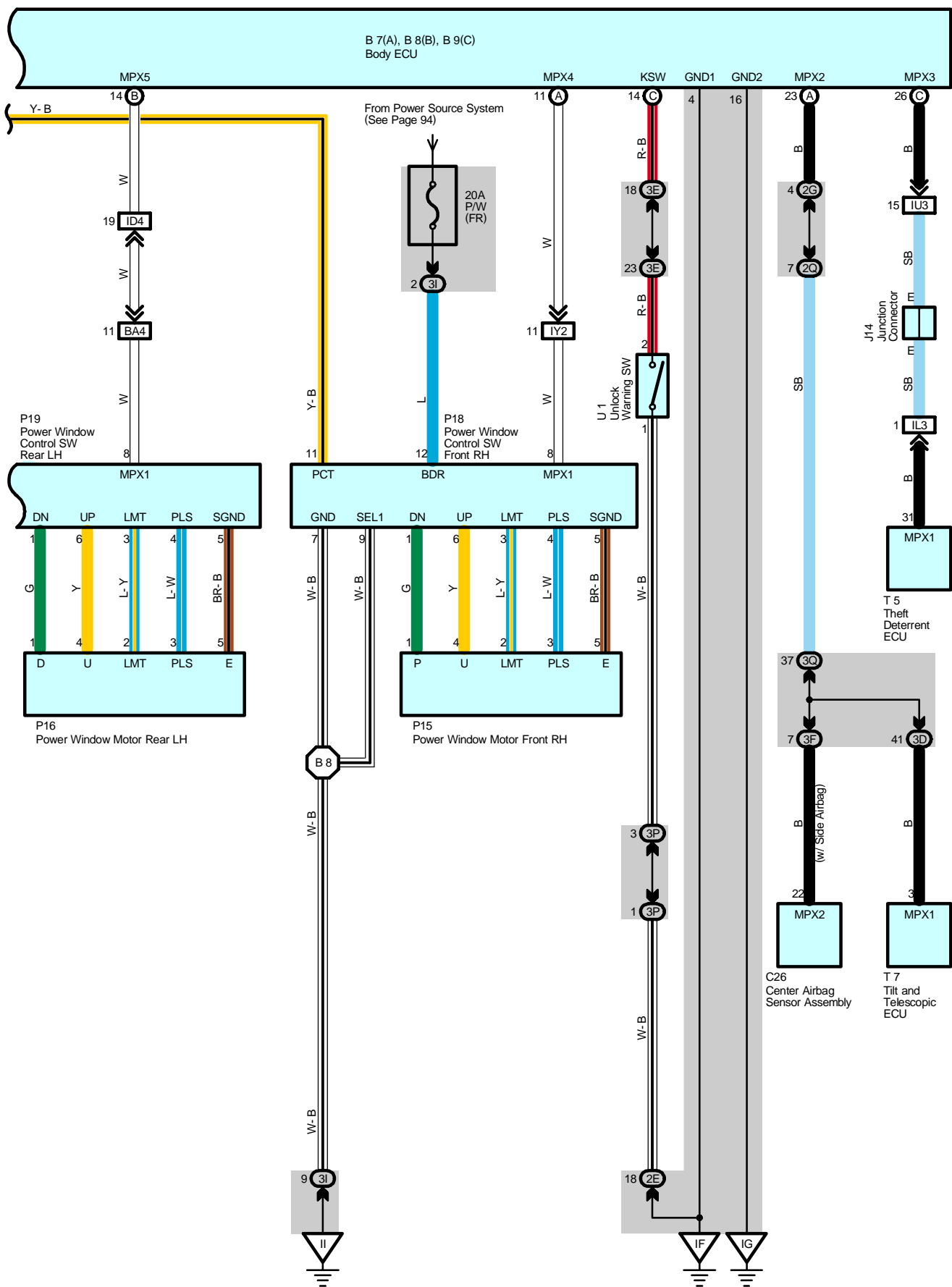






# Power Window





# Power Window

## System Outline

### 1. Manual Down or Up Operation

When the power window master SW is pressed one step, the current flows from the power window master SW TERMINAL DN to the power window motor front LH to the power window master SW TERMINAL UP to GROUND, and rotates the motor to open the window.

When the power window master SW is pulled one step, the current flows from the power window master SW TERMINAL UP to the power window motor front LH to the power window master SW TERMINAL DN to GROUND, and rotates the motor to close the window.

For the other windows, as the power window master SW and the power window SW is operated, the relevant door window is opened or closed.

### 2. Auto Down or Up Operation

When the power window master SW is pushed two steps, the power window master SW determines it is in auto mode and the current flows from the power window master SW TERMINAL DN to the power window motor front LH to the power window master SW TERMINAL UP to GROUND, and rotates the motor to open the window automatically.

When the power window master SW is pulled two steps, the power window master SW determines it is in auto mode and the current flows from the power window master SW TERMINAL UP to the power window motor front LH to the power window master SW TERMINAL DN to GROUND, and rotates the motor to close the window automatically.

Accordingly, when each window switch of the power window control SW is operated, the relevant door window is automatically opened/closed.

### 3. Catching Prevention Function

When any foreign matter is caught in the window during power window up operation, the pulse sensor in the power window motor detects the changes in the number of motor rotations and forcibly opens the door window 50 mm, or when the window opening is less than 200 mm, it opens the window until the opening is 200 mm.

### 4. Key Off Power Window Operation

It is possible to operate the power window for approx. 43 seconds after the ignition SW is turned from on to off. However, when the door is opened while the window is being operated, the power window operation is stopped even though 43 seconds have not elapsed.

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page	
B7	A	70	D21	72	P18	73
B8	B	70	J14	71	P19	73
B9	C	70	P12	73	P20	73
C26	70	P14	73	T5	71	
D14	72	P15	73	T7	71	
D15	72	P16	73	U1	71	
D18	72	P17	73			

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2G		
2I	28	Front Door LH Wire and Cowl Side J/B LH (Left Kick Panel)
2J		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3F		
3I	40	Front Door RH Wire and Cowl Side J/B RH (Right Kick Panel)
3J		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3P	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)

 : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IC2	78	Front Door LH Wire and Dash Wire (Left Kick Panel)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IL3	80	Instrument Panel Integration Wire and Computer Wire (Instrument Panel Center)
IU3	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IV4	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IY2	82	Front Door RH Wire and Dash Wire (Right Kick Panel)
BA3	86	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BA4		
BC3	86	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)
BC4		
BD4	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BS1	88	Door Lock LH Sub Wire and Front Door LH Wire (Front Door LH)

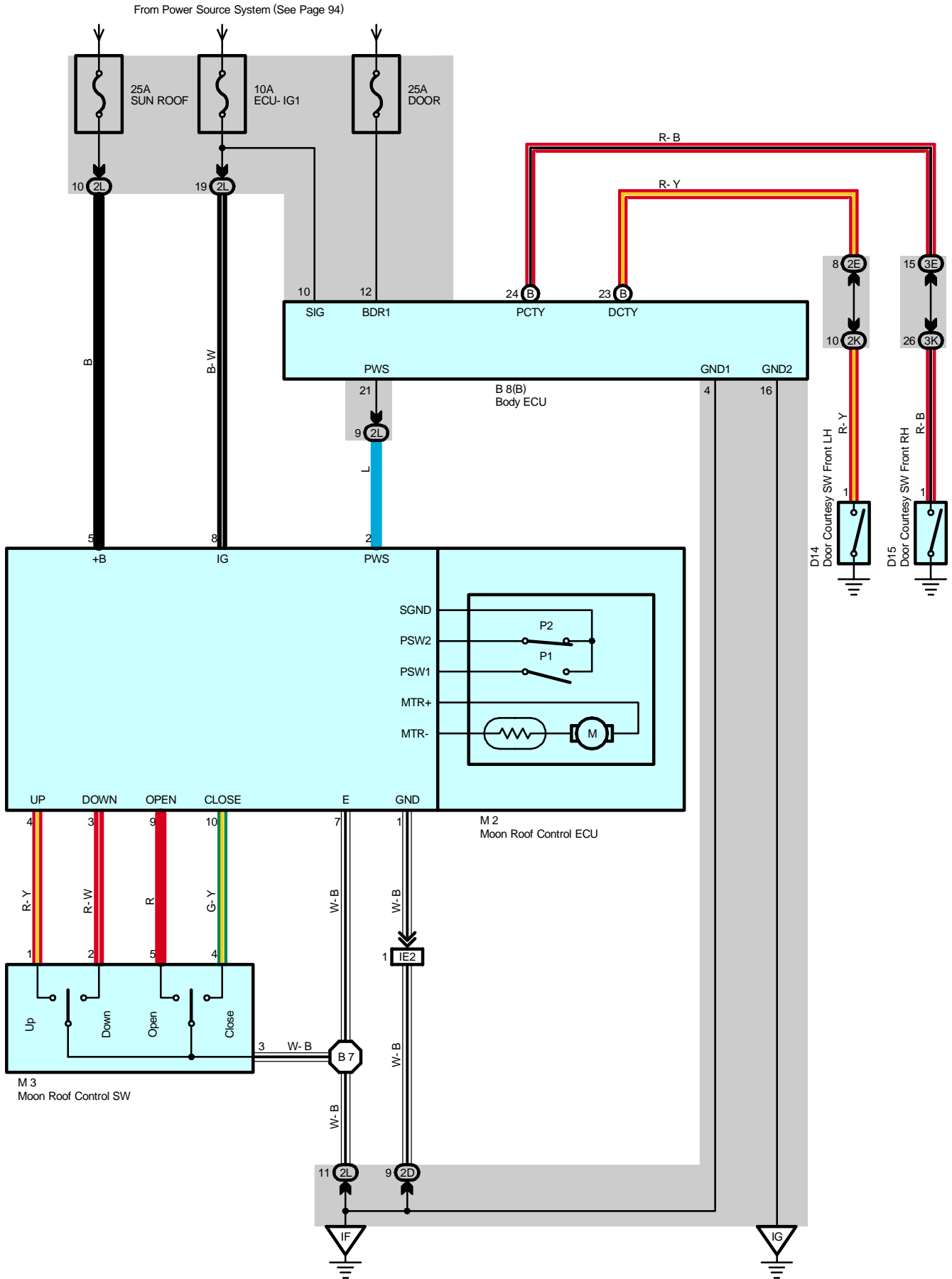
 : Ground Points

Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH
IG		
II	78	Set Bolt of Cowl Side J/B RH
BJ	86	Under the Driver's Seat
BK	86	Front Side Under the Front Passenger's Seat

 : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B2	88	Front Door LH Wire	B8	88	Front Door RH Wire
B4	88	Floor No.1 Wire			

# Moon Roof



## System Outline

In this system, the HALL IC in the moon roof control ECU detects the changes in motor rotation, and allows opening/closing, tilting up/down of the moon roof by one touch operation.

In addition, catching prevention function during moon roof operation is also provided.

Voltage is constantly applied from the SUN ROOF fuse to the moon roof control ECU TERMINAL 5 of the moon roof control ECU.

When the ignition SW is turned on, the current flows from the ECU-IG1 fuse to TERMINAL 8 of the moon roof control ECU.

### 1. Slide Open Operation

When the moon roof control SW is kept pressed to OPEN position for approx. 0.3 seconds or longer (Limit SW No.1 off, limit SW No.2 on), a signal is input from the moon roof control SW TERMINAL 5 to the moon roof control ECU TERMINAL 9. This activates the moon roof control ECU and rotates the motor to open the moon roof automatically. However, in case of pressing the moon roof control SW for 0.3 seconds or less, the moon roof can be operated manually. Then, when the limit SW No.1 is turned on and then turned off again, the pulse signal sent from the HALL IC activates the moon roof control ECU, and determines that the moon roof is fully open, and stops the motor. If other operation SW or the open SW is operated while the moon roof is being opened, the moon roof control ECU is activated to stop the moon roof operation. In addition, when the moon roof is tilted up, the slide open operation does not function.

### 2. Slide Close Operation

When the moon roof control SW is kept pressed to CLOSE position for approx. 0.3 seconds or longer (Limit SW No.1 off, limit SW No.2 off), a signal is input from the moon roof control SW TERMINAL 4 to the moon roof control ECU TERMINAL 10. This activates the moon roof control ECU and rotates the motor to close the moon roof automatically. However, in case of pressing the moon roof control SW for 0.3 seconds or less, the moon roof can be operated manually. Then, when the limit SW No.2 is turned on, the pulse signal sent from the HALL IC activates the moon roof control ECU, and determines that the moon roof is closed fully, and stops the motor. If other operation SW or the close SW is operated while the moon roof is being closed, the moon roof control ECU is activated to stop the moon roof operation.

### 3. Tilt Up Operation

When the moon roof control SW is kept pressed to UP position for approx. 0.3 seconds or longer (Limit SW No.1 off, limit SW No.2 on), a signal is input from the moon roof control SW TERMINAL 1 to the moon roof control ECU TERMINAL 4. This activates the moon roof control ECU and rotates the motor to tilt up the moon roof automatically. If the pulse signal is not input from the HALL IC for 0.5 seconds or longer, it determines that the moon roof is fully tilted up, and stops the motor. If other operation SW or the tilt up SW is operated while the moon roof is being tilted up, the moon roof control ECU is activated to stop the moon roof operation. In addition, when the moon roof is opened, the tilt up operation does not function.

### 4. Tilt Down Operation

When the moon roof control SW is kept pressed to DOWN position for approx. 0.3 seconds or longer (Limit SW No.1 on, limit SW No.2 on), a signal is input from the moon roof control SW TERMINAL 2 to the moon roof control ECU TERMINAL 3. This activates the moon roof control ECU and rotates the motor to tilt down the moon roof automatically.

Then, when the limit SW No.1 is turned off, the pulse signal sent from the HALL IC activated the moon roof control ECU, and determines that the moon roof is closed fully, and stops the motor.

If other operation SW or the tilt down SW is operated while the moon roof is being tilted down, the moon roof control ECU is activated to stop the moon roof operation.

### 5. Catching Prevention Function

During slide close or tilt down operation, if the moon roof control ECU detects a catching load from the changes in the rotation of the motor, the operation is stopped, and the motor is rotated in the reverse direction.

#### \* Slide close operation

The moon roof is moved approx. 200 mm in the reverse direction (Slide open) after a catching load has been detected.

However, if the full open position is detected before moving approx. 200 mm, the reverse movement is stopped.

#### \* Tilt down operation

If a catching load is detected, the moon roof is moved in the reverse direction until fully tilted up.

### 6. Key Off Moon Roof Operation

Within approx. 43 seconds after the ignition SW is turned from on to off, the moon roof can be operated. However, if the driver or front passenger door is opened during this period of time, the moon roof operation is stopped even though 43 seconds have not elapsed.

### 7. Fail-Safe Function

If the moon roof is operated continuously in the same direction, the current flowing to the motor is cut off when the time shown below has elapsed after the motor operation has been started.

\* Slide open/close operation by the moon roof SW approx. 20 seconds

\* Tilt up/down operation by the moon roof SW approx. 2 second

\* Slide open operation for reverse movement in case of catching prevention function approx. 20 seconds

\* Tilt up operation for reverse movement in case of catching prevention function approx. 2 seconds

# Moon Roof

## : Parts Location

Code	See Page	Code	See Page	Code	See Page	
B8	B	70	D15	72	M3	72
D14	72	M2	72			

## : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2L	28	Roof No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE2	78	Dash Wire and Roof No.1 Wire (Left Kick Panel)

## : Ground Points

Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH
IG		

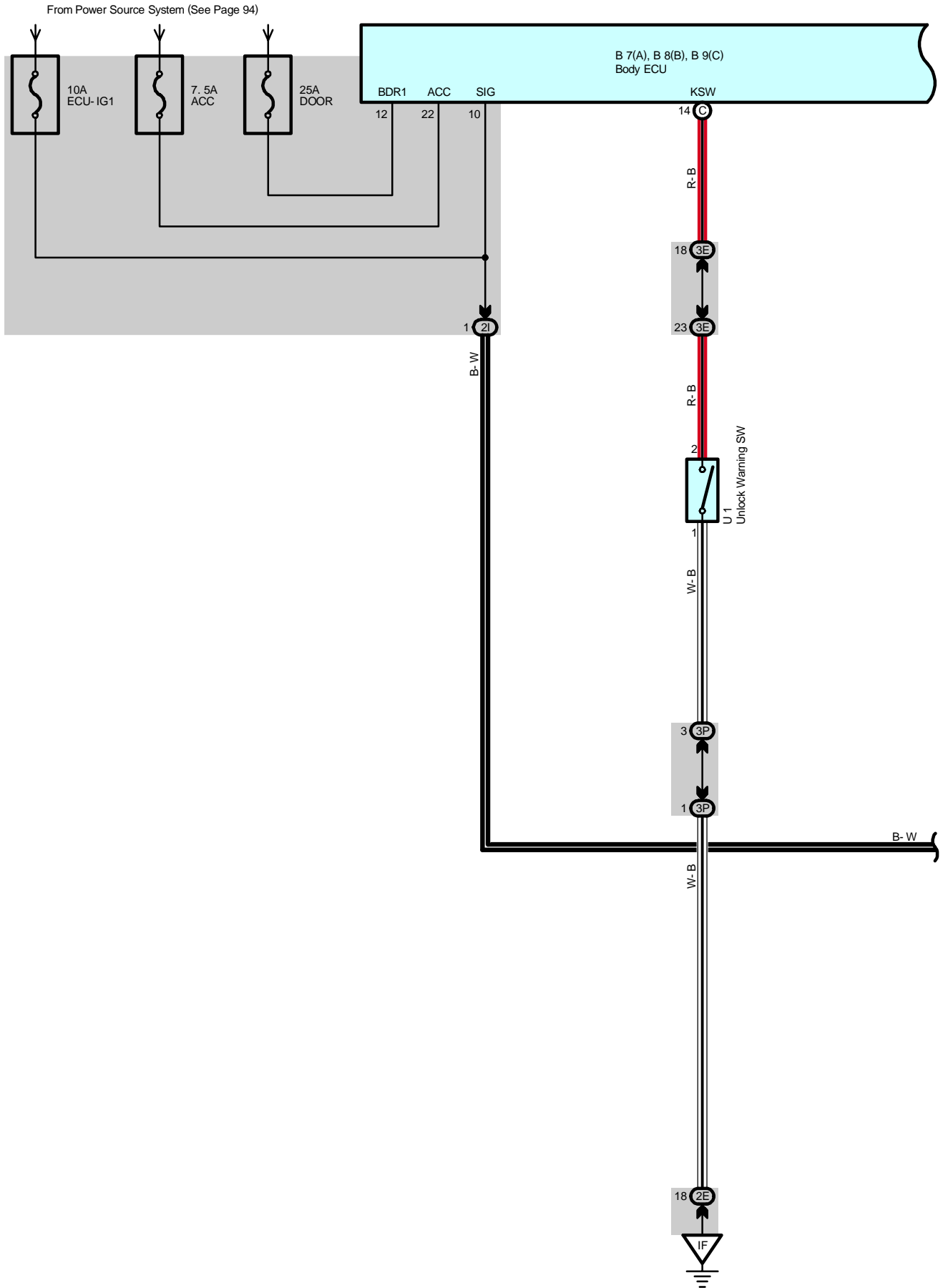
## : Splice Points

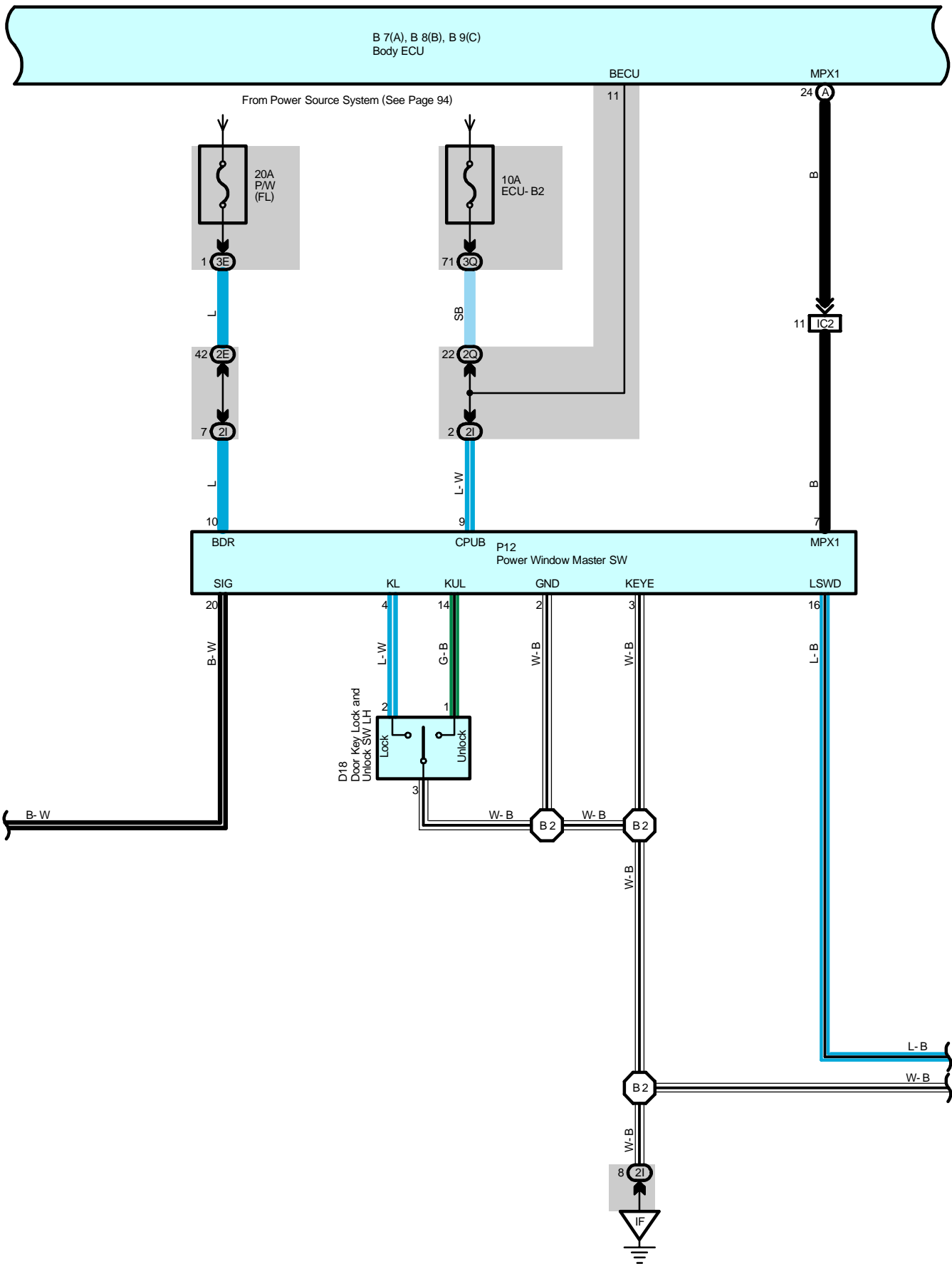
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B7	88	Roof No.1 Wire			



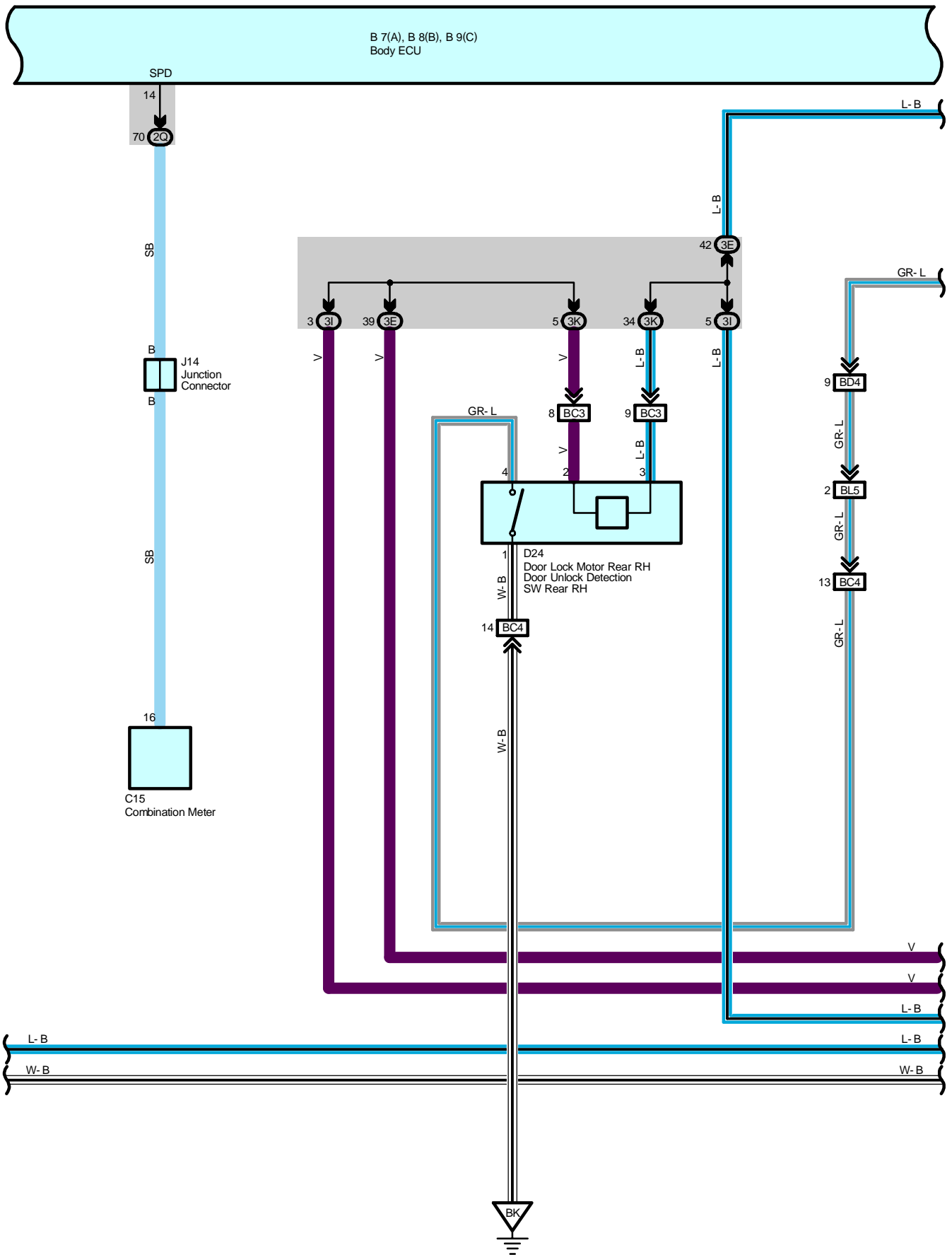


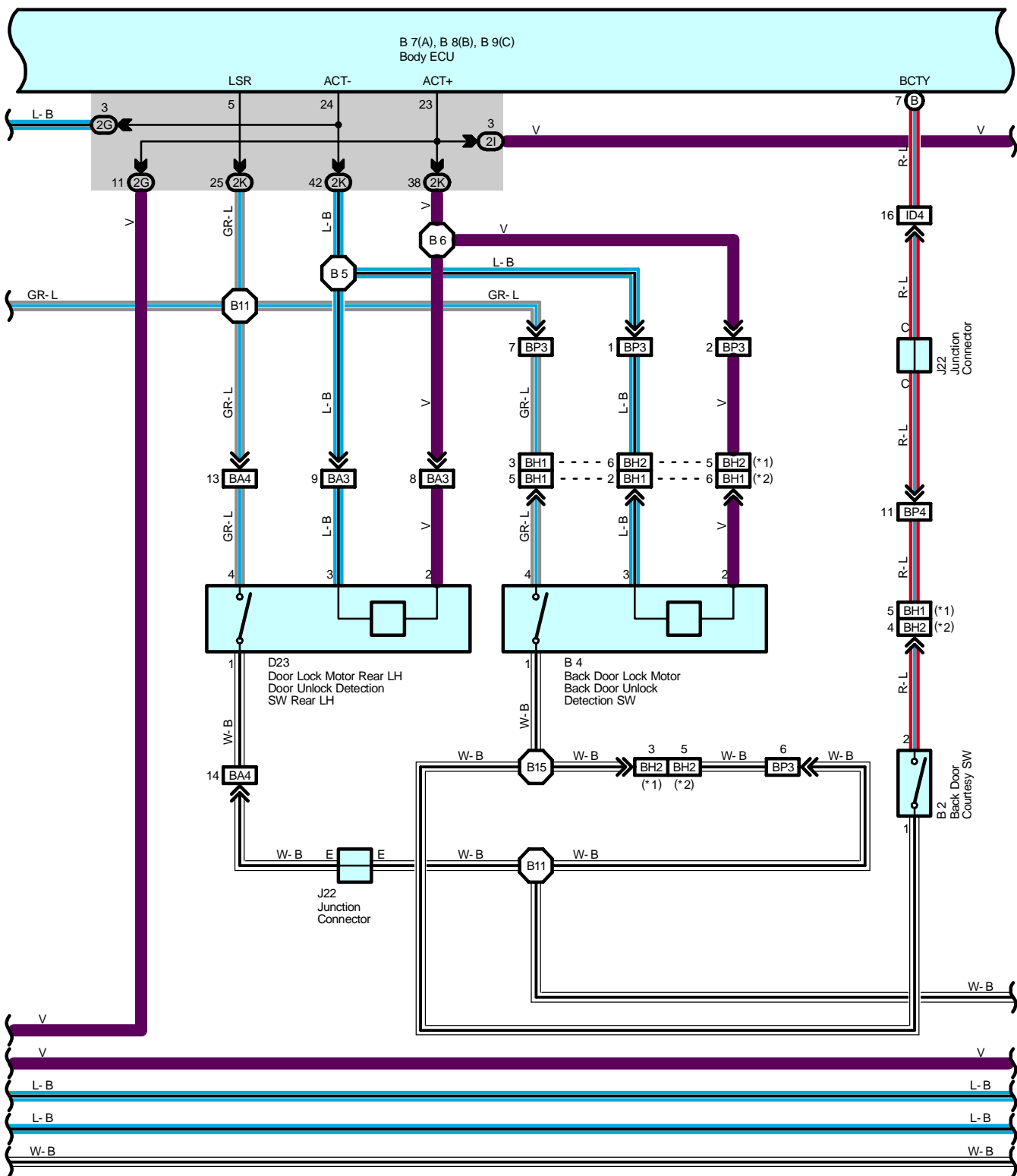
# Door Lock Control





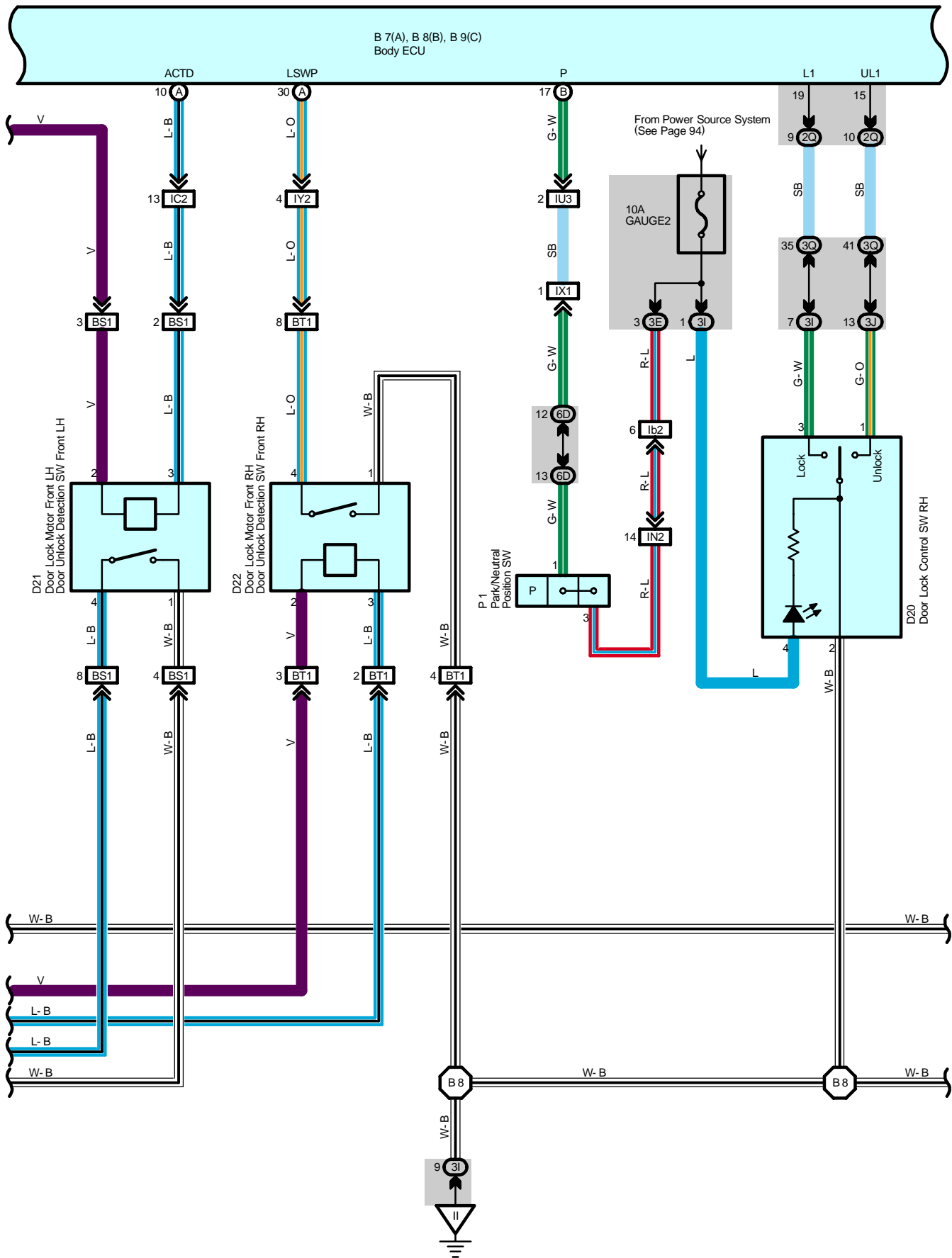
# Door Lock Control

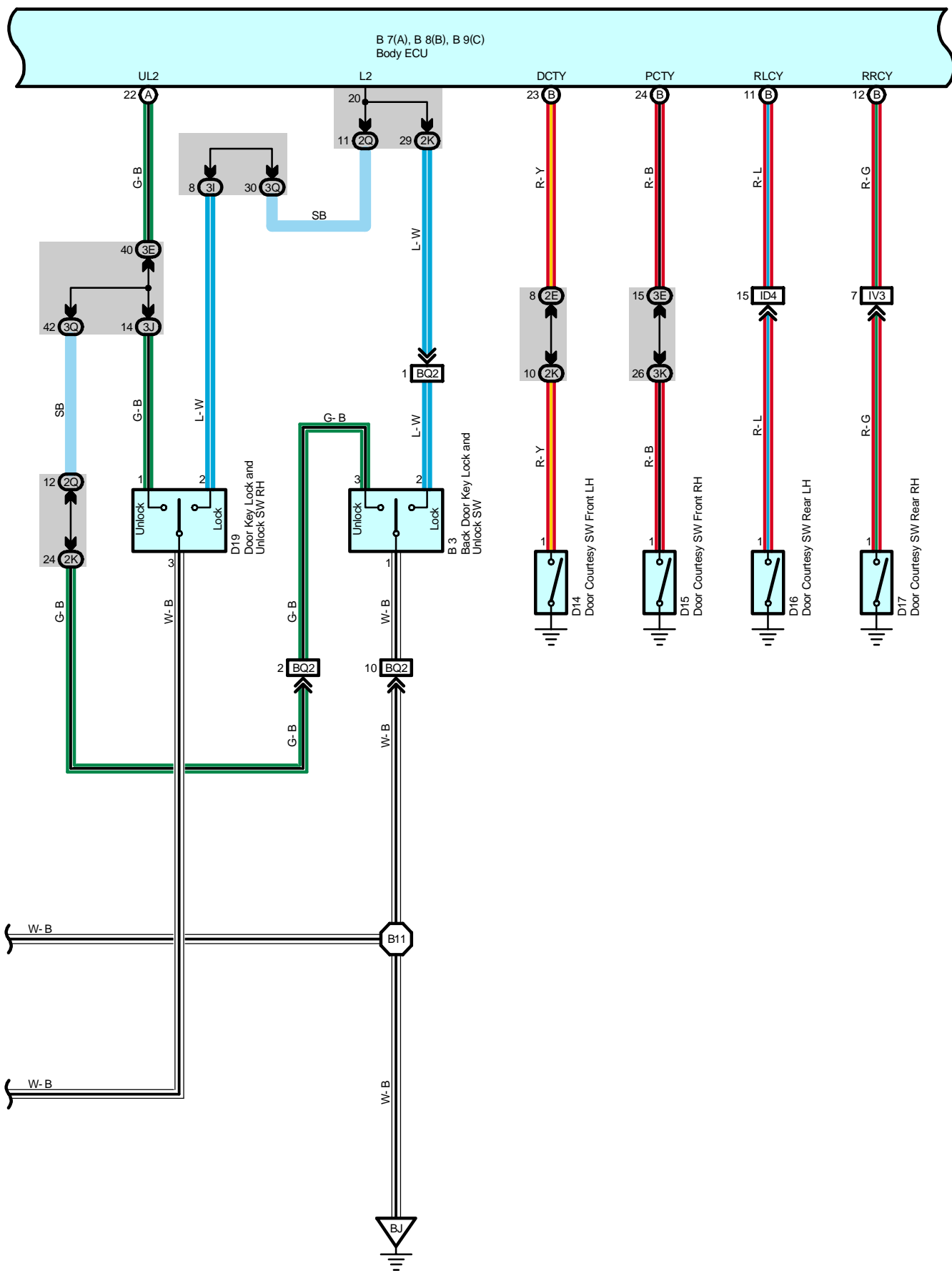




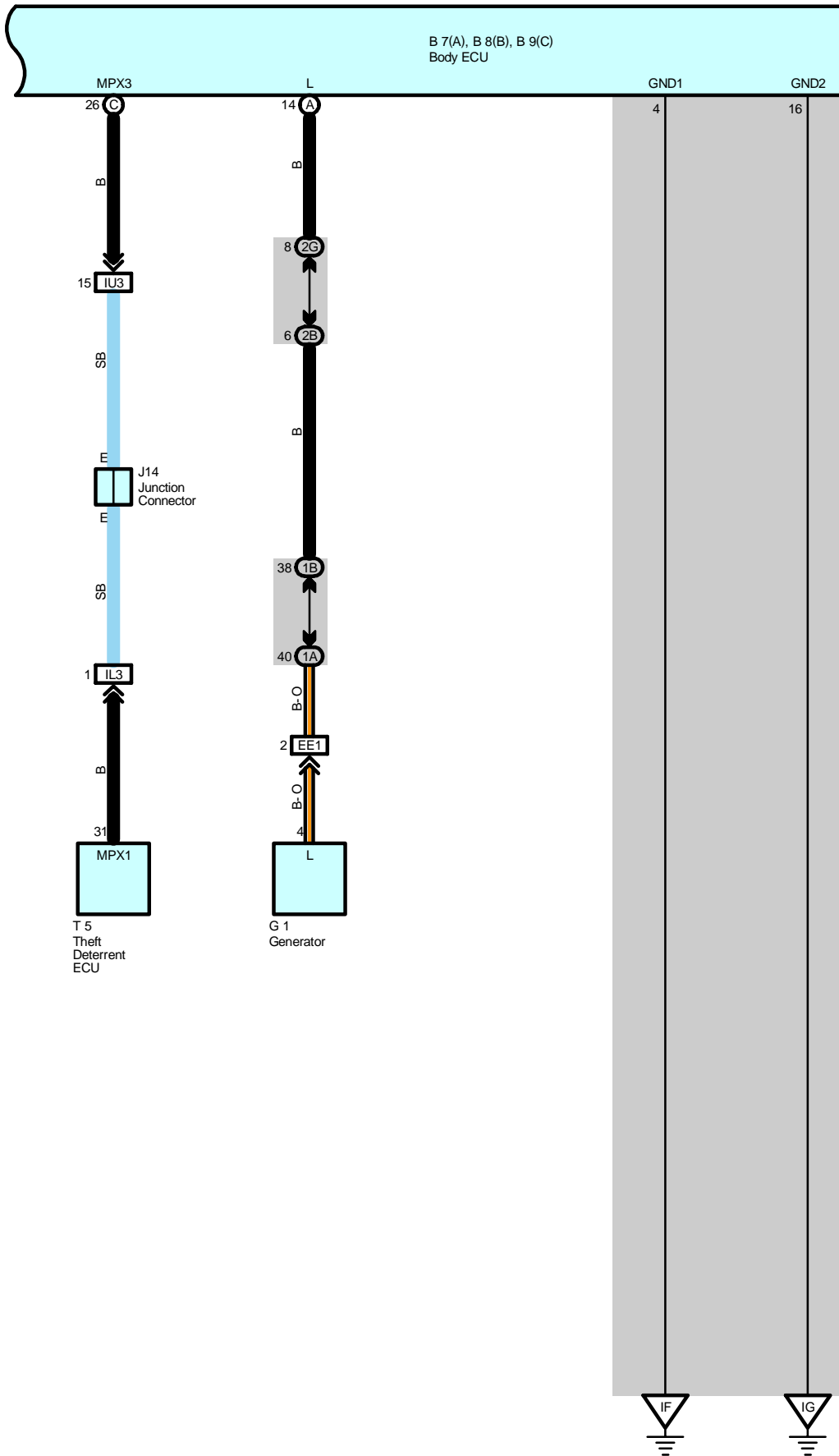
\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System

# Door Lock Control





# Door Lock Control





## System Outline

The door lock control system is controlled by the body ECU.

This system has following features. However, the adopted function differs depending on the establishment.

### 1. Manual Lock and Unlock Operation

Pressing the power door lock switch on the driver or front passenger door to the lock side will lock all the doors and pressing it to the unlock side will unlock all the doors.

### 2. Key-Linked Lock and Unlock Function

This function, which is linked with the key cylinder, can lock or unlock all the doors when a lock or unlock operation is effected.

### 3. Manual Unlock Prohibition Function

Performing the door lock operation with a transmitter or an ignition key will prohibit the unlock operation by the door lock control switch.

### 4. 2-Step Unlock Function

This function is provided to unlock the driver's door by turning the key cylinder first and unlock passenger's door by turning it the second time.

### 5. Key Confine Prevention Function

When the key is inserted in the ignition key cylinder and if you perform the door lock operation, all the doors will be unlocked.

### 6. Shift-Linked Automatic Door Lock

When the conditions listed below are met consecutively, this function causes all the doors to be automatically locked.

- \* The ignition switch is turned from the OFF or ACC position to the ON position.
- \* All doors are closed.
- \* The shift lever is moved out of P position.
- \* Either one of the doors is unlocked.

### 7. Theft Deterrent System-Linked Door Lock Function

When the body ECU receives the door lock signal from the theft deterrent system, "all doors lock" operation will be performed in spite of the current door lock condition.

## ○ : Parts Location

Code		See Page	Code		See Page	Code		See Page
B2		72	D16		72	G1		68
B3		72	D17		72	J14		71
B4		72	D18		72	J22		72
B7	A	70	D19		72	P1		69
B8	B	70	D20		72	P12		73
B9	C	70	D21		72	T5		71
C15		70	D22		72	U1		71
D14		72	D23		72			
D15		72	D24		72			

# Door Lock Control

## : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2G		
2I	28	Front Door LH Wire and Cowl Side J/B LH (Left Kick Panel)
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3I	40	Front Door RH Wire and Cowl Side J/B RH (Right Kick Panel)
3J		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3P	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
6D	60	Engine Wire and J/B No.6 (Behind the Grove Box)

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EE1	76	Engine Room Main Wire and Alternator Wire (Near the Battery)
IC2	78	Front Door LH Wire and Dash Wire (Left Kick Panel)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IL3	80	Instrument Panel Integration Wire and Computer Wire (Instrument Panel Center)
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IU3	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IV3	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
IY2	82	Front Door RH Wire and Dash Wire (Right Kick Panel)
Ib2	84	Dash Wire and Dash Wire (Behind the Combination Meter)
BA3	86	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BA4		
BC3	86	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)
BC4		
BD4	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BH1	86	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BH2		
BL5	88	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BP3	88	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BP4		
BQ2	88	Back Door Lower Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BS1	88	Door Lock LH Sub Wire and Front Door LH Wire (Front Door LH)
BT1	88	Door Lock RH Sub Wire and Front Door RH Wire (Front Door RH)

## : Ground Points

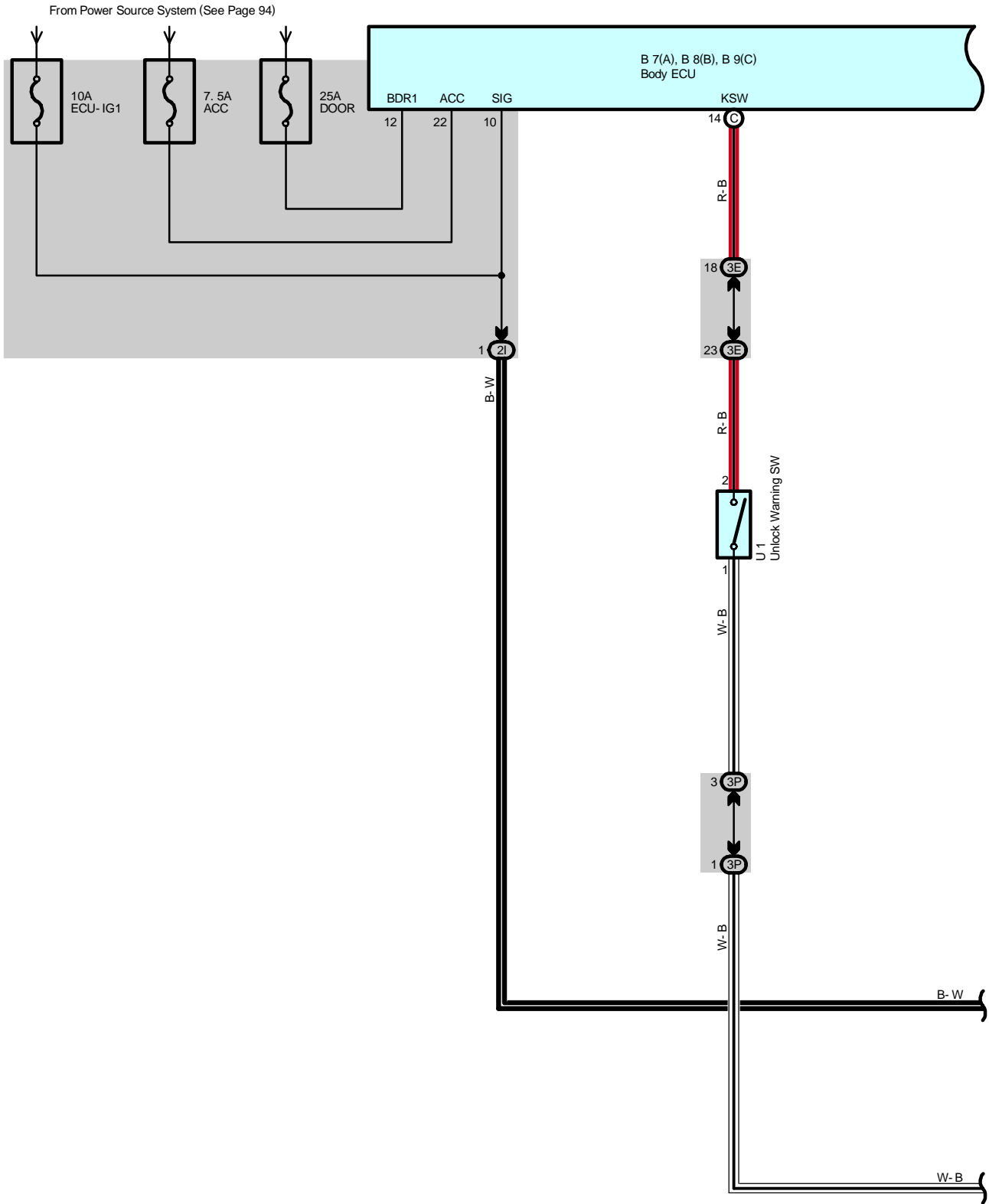
Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH
IG		
II	78	Set Bolt of Cowl Side J/B RH
BJ	86	Under the Driver's Seat
BK	86	Front Side Under the Front Passenger's Seat

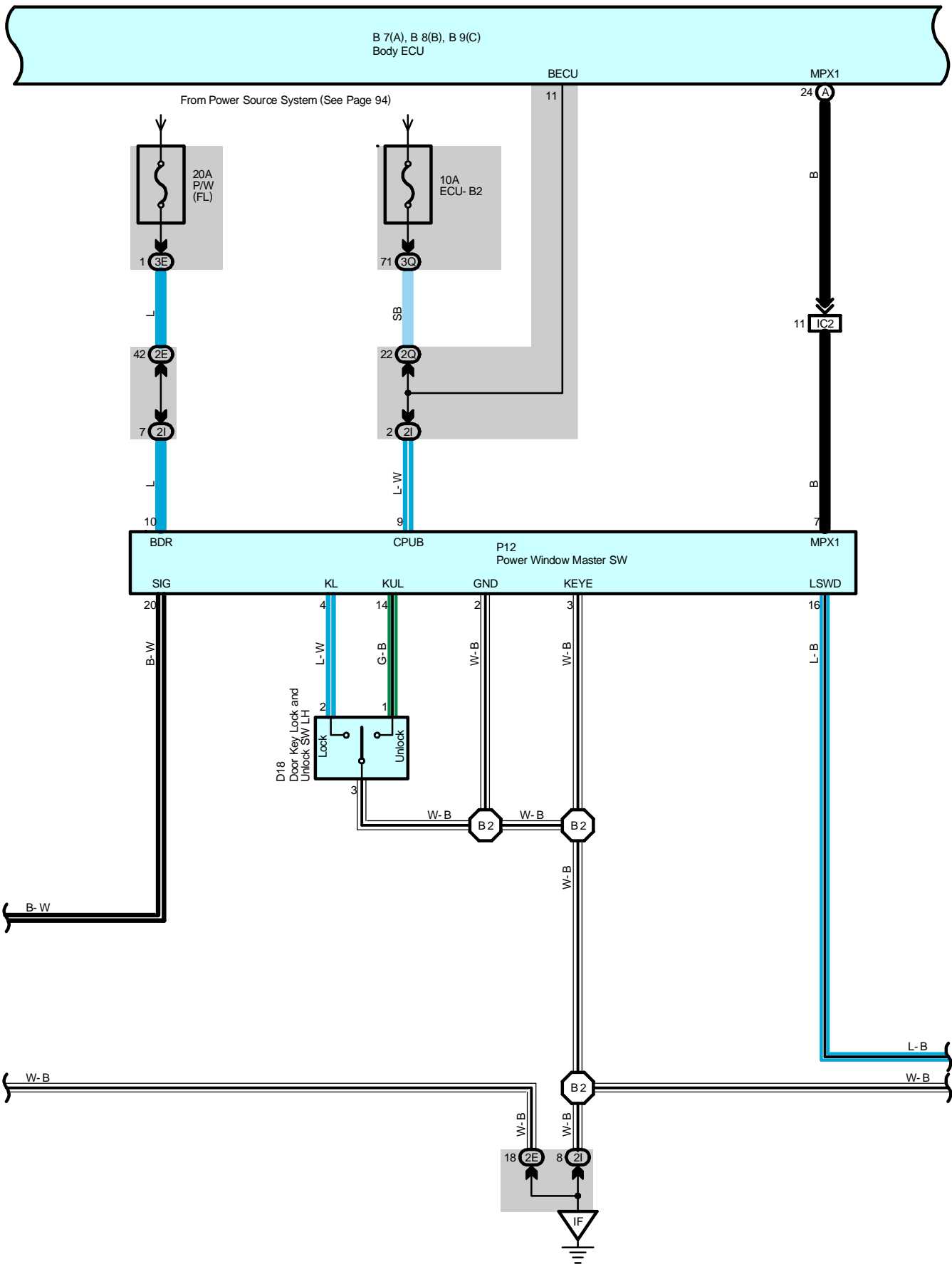


**: Splice Points**

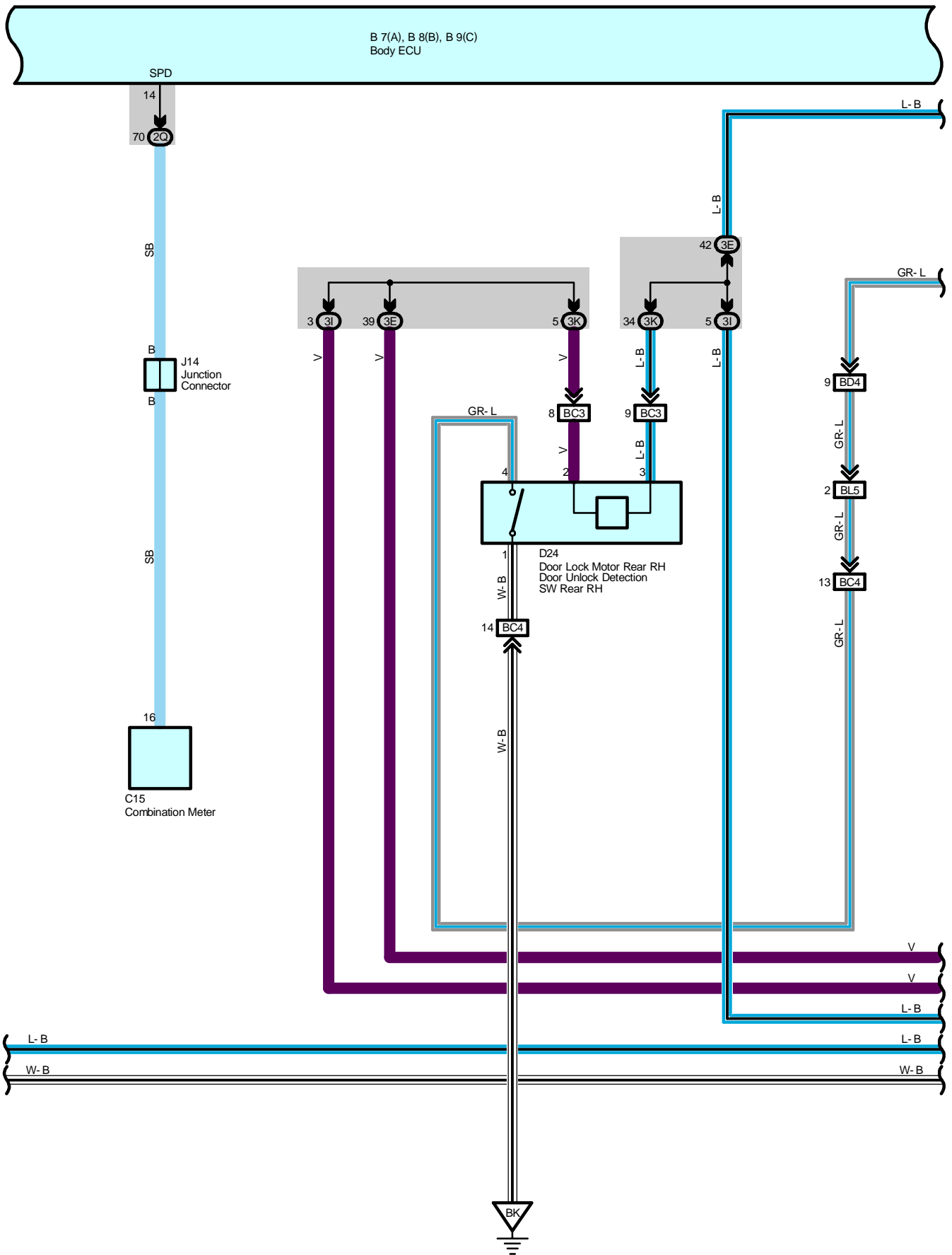
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B2	88	Front Door LH Wire	B8	88	Front Door RH Wire
B5	88	Floor No.1 Wire	B11	88	Floor No.1 Wire
B6			B15	88	Back Door Upper Wire

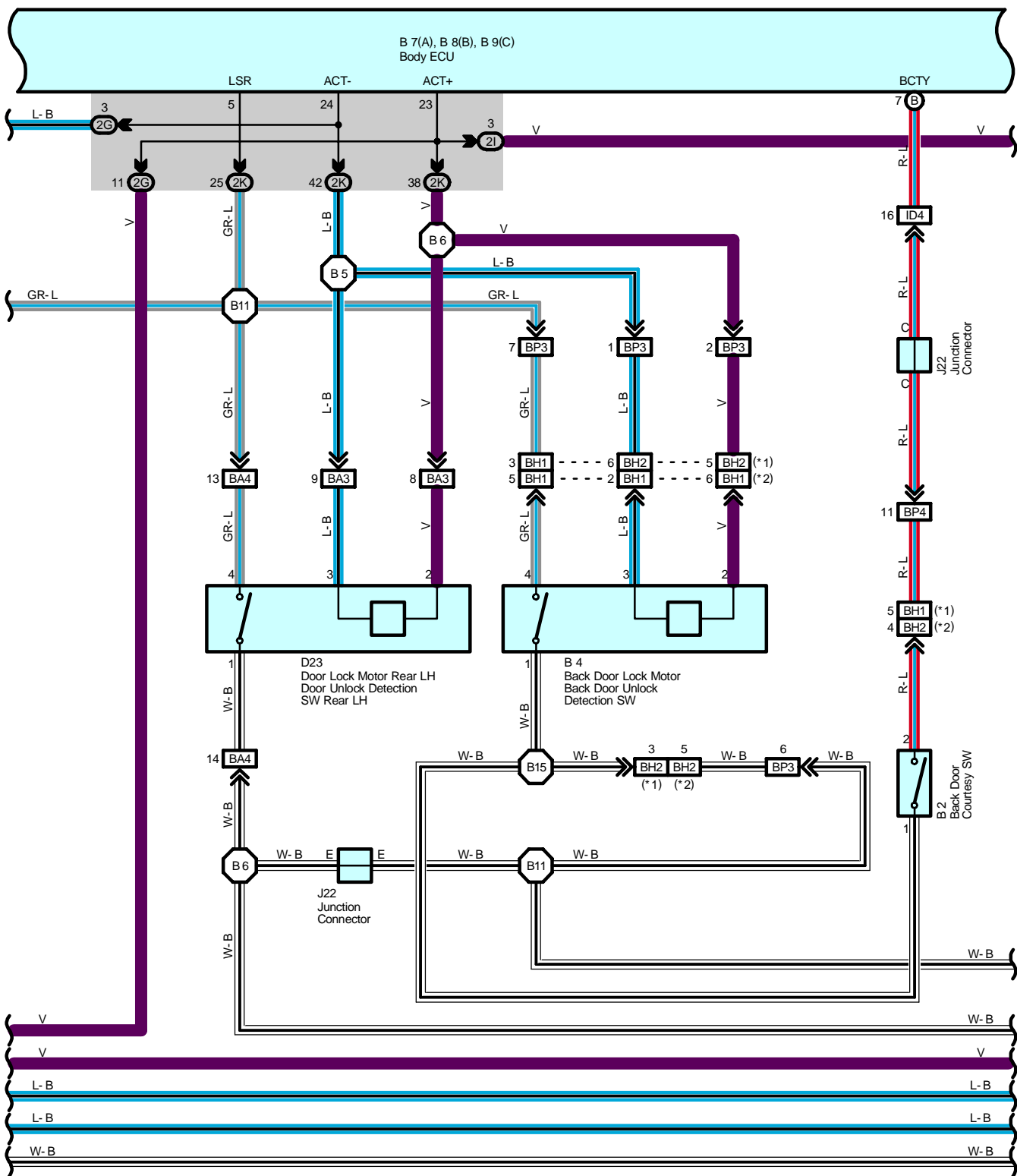
# Wireless Door Lock Control





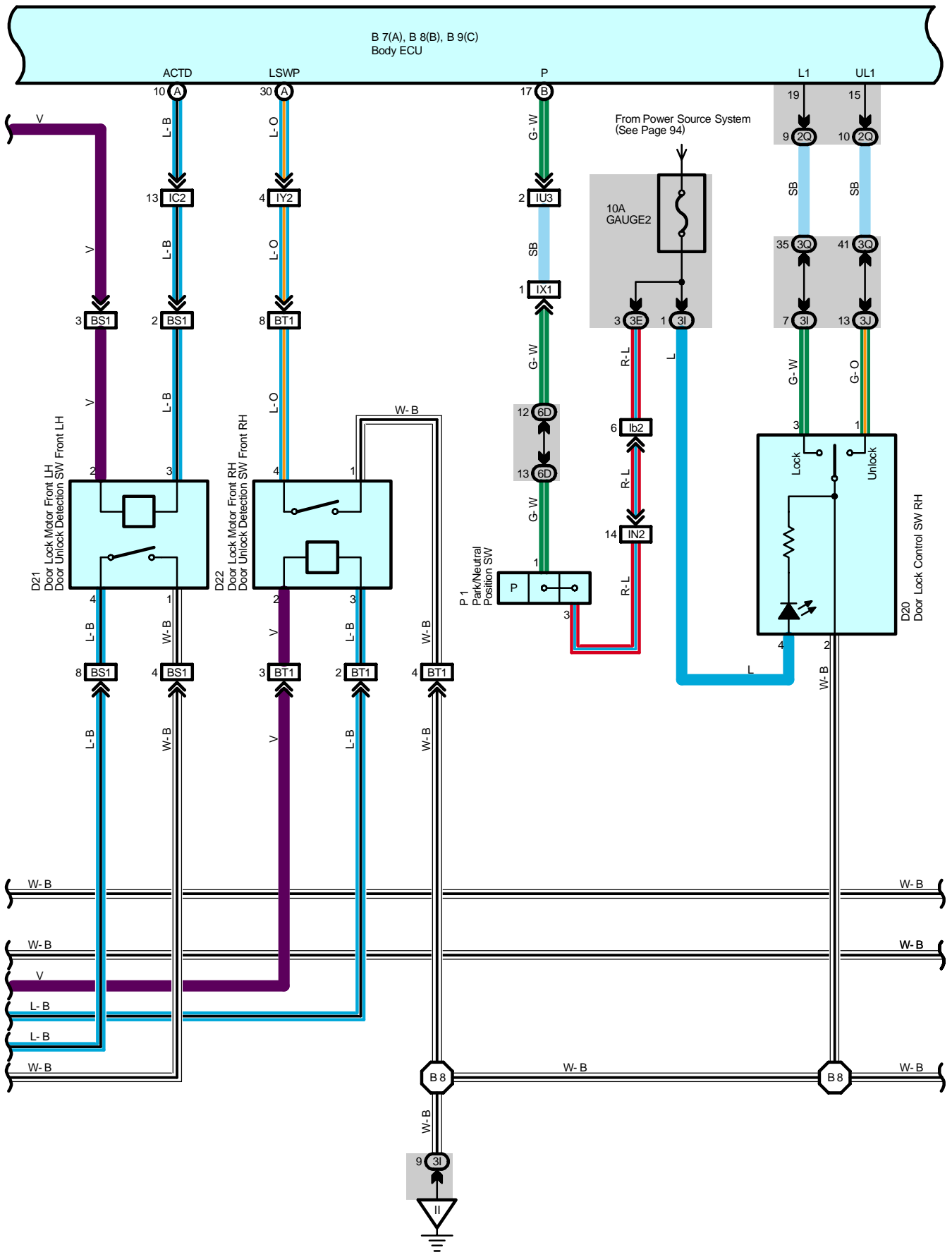
# Wireless Door Lock Control



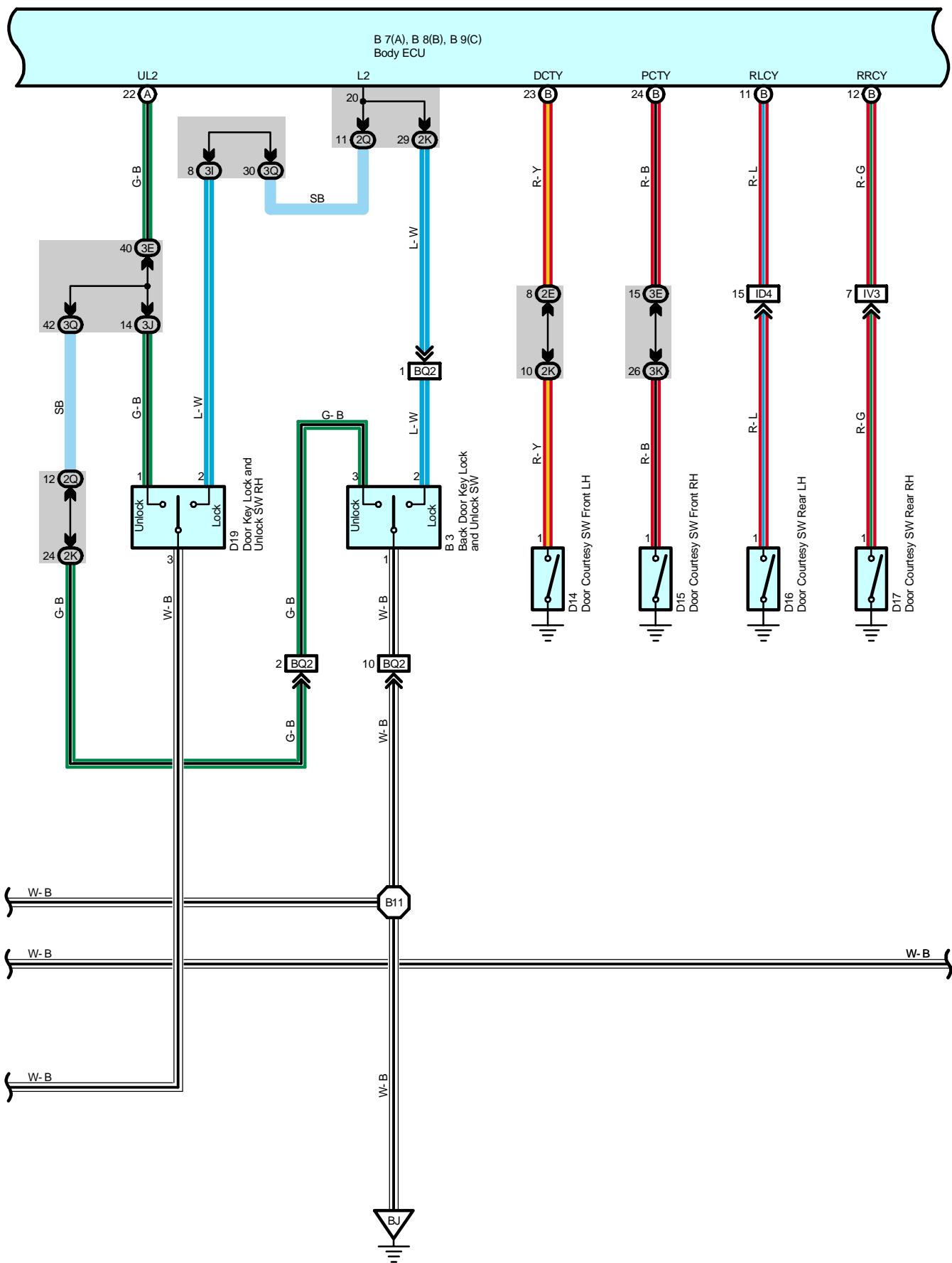


\* 1 : w/ Navigation System  
\* 2 : w/o Navigation System

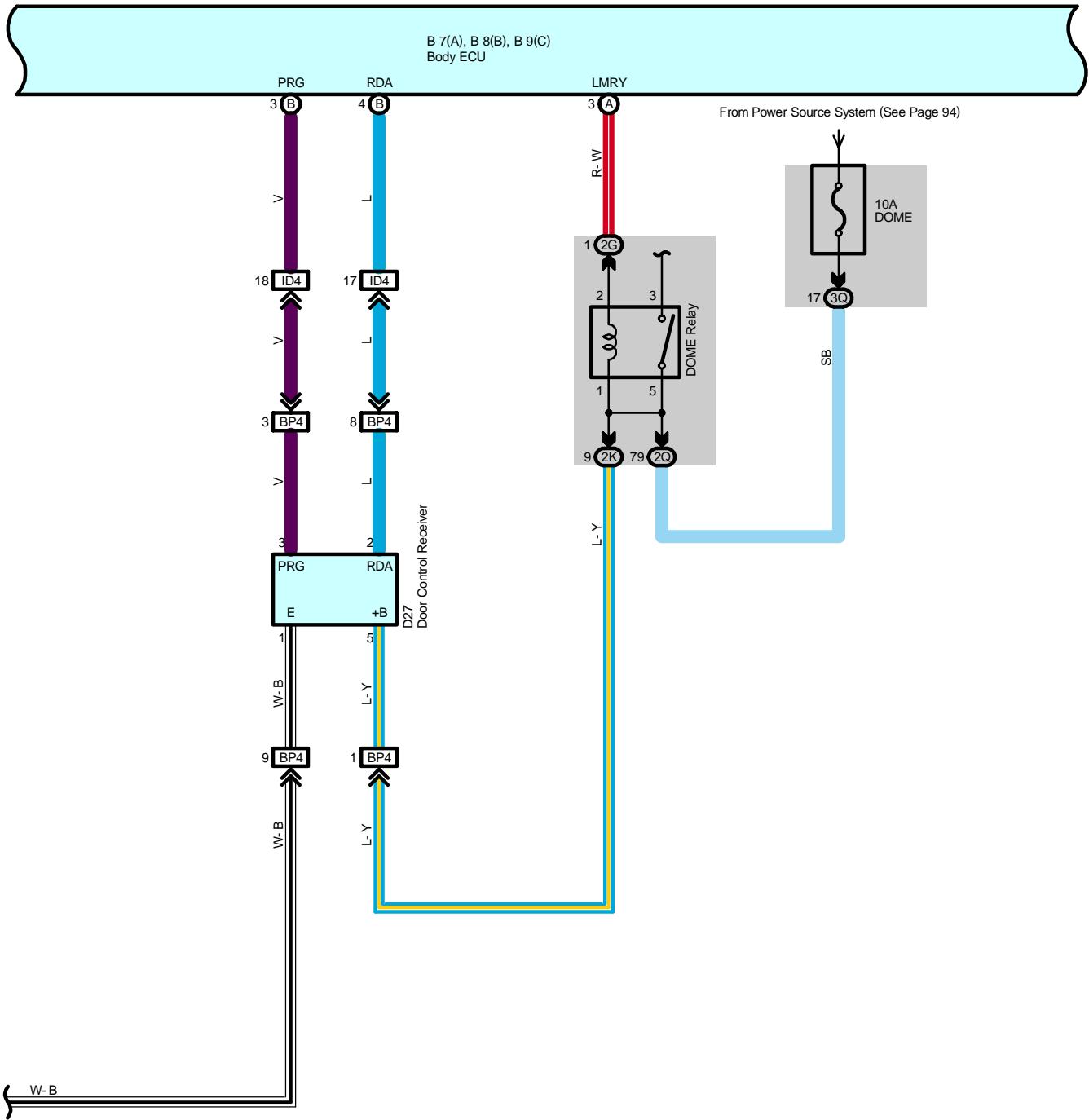
# Wireless Door Lock Control

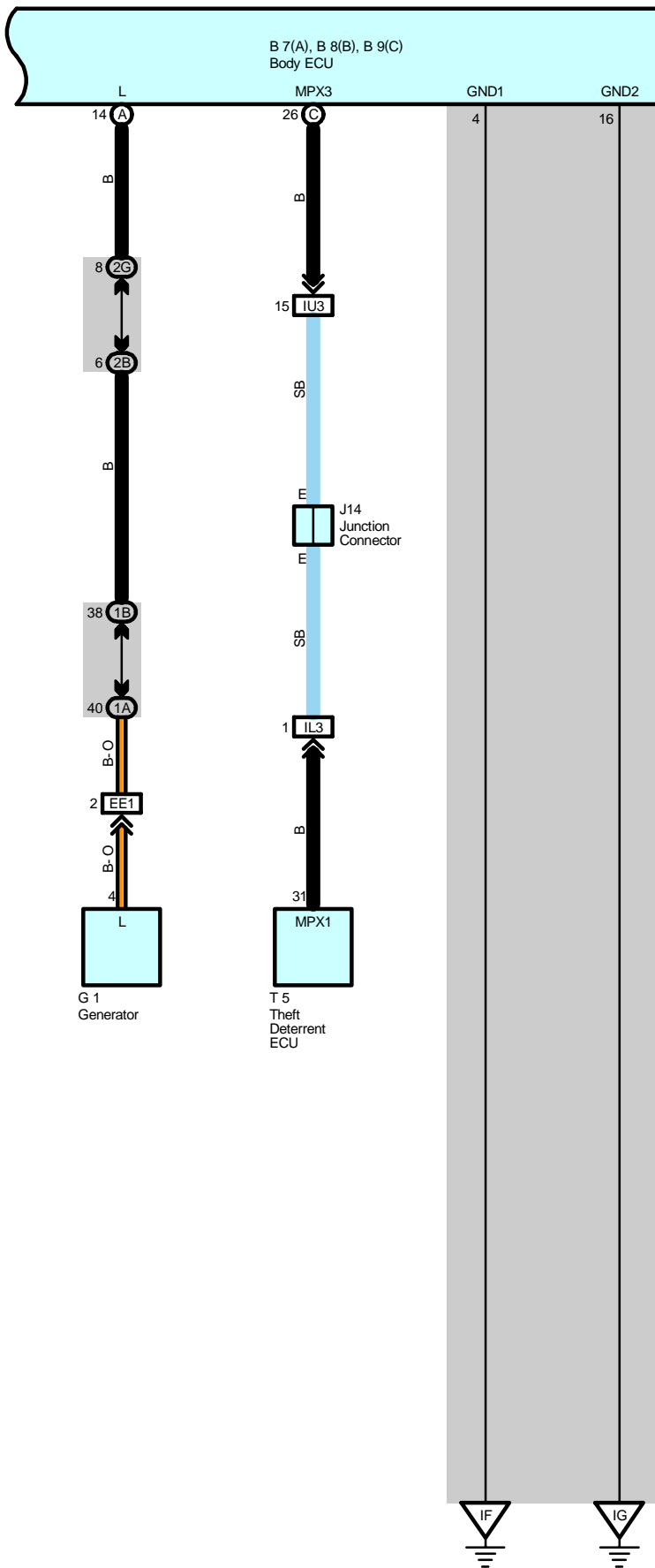






# Wireless Door Lock Control





# Wireless Door Lock Control

## System Outline

In this system, the door control receiver receives weak radio wave transmitted from the transmitter built-into the ignition key, and outputs a signal to the body ECU. Accordingly, all the doors can be locked and unlocked by remote control.

### 1. Normal Operation

\* Lock operation

When the lock SW on the transmitter is pressed, all the doors are locked.

\* Unlock operation

When the unlock SW on the transmitter is pressed once, only the driver door is unlocked. When the unlock SW is pressed again within 3 seconds, all the doors are unlocked.

### 2. Auto Lock Function

When the door is not actually opened within 30 seconds after the door has been unlocked by the unlock SW on the transmitter, all the doors are automatically locked. If any of the following conditions are detected, the wireless door lock does not function.

\* Any door is opened.

\* The ignition key is inserted into the ignition SW.

\* When the unlock detection SW of all the doors are locked.

### 3. Wireless Door Lock Stop Function

If any of the following conditions are detected, the wireless door lock does not function.

Lock operation

\* When any door is open (Door courtesy SW on)

\* The ignition key is inserted into the ignition SW (Unlock warning SW on)

\* Ignition SW is on

Unlock operation

\* Ignition SW is on

### 4. Visual Confirmation of Lock or Unlock

During lock operation, when the door control receiver receives a lock signal from the door unlock detection SW, the turn signal light is flashed once. During unlock operation, when the door control receiver receives an unlock signal from the door unlock detection SW, the turn signal light is flashed twice.

### 5. Panic Mode Function

When the panic SW on the transmitter is pressed, the door control receiver receives a signal and enters the panic mode. The signal input into the theft deterrent ECU from the body ECU turns on the theft deterrent horn, and flashes the taillight and headlight. When the panic SW or the unlock SW of the transmitter is pressed during the panic mode, the panic mode is canceled, and the theft deterrent horn stops, and the taillight and headlight are turned off.

### 6. Repeat Function

If the lock detection signal in response to the output signal is not received after the door control receiver has output the lock signal, the lock signal is output again.

## Service Hints

### D27 Door Control Receiver

5-Ground : Always approx. 12 volts

1-Ground : Always continuity

### D21, D22, D23, D24 Door Unlock Detection SW Front LH, RH, Rear LH, RH

1-Ground : Always continuity

### B4 Back Door Unlock Detection SW

1-Ground : Always continuity

 : Parts Location

Code	See Page	Code	See Page	Code	See Page
B2	72	D16	72	D27	72
B3	72	D17	72	G1	68
B4	72	D18	72	J14	71
B7	A 70	D19	72	J22	72
B8	B 70	D20	72	P1	69
B9	C 70	D21	72	P12	73
C15	70	D22	72	T5	71
D14	72	D23	72	U1	71
D15	72	D24	72		

 : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2G		
2I	28	Front Door LH Wire and Cowl Side J/B LH (Left Kick Panel)
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3I	40	Front Door RH Wire and Cowl Side J/B RH (Right Kick Panel)
3J		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3P	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
6D	60	Engine Wire and J/B No.6 (Behind the Grove Box)

# Wireless Door Lock Control

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EE1	76	Engine Room Main Wire and Alternator Wire (Near the Battery)
IC2	78	Front Door LH Wire and Dash Wire (Left Kick Panel)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IL3	80	Instrument Panel Integration Wire and Computer Wire (Instrument Panel Center)
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IU3	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IV3	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
IY2	82	Front Door RH Wire and Dash Wire (Right Kick Panel)
Ib2	84	Dash Wire and Dash Wire (Behind the Combination Meter)
BA3	86	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BA4		
BC3	86	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)
BC4		
BD4	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BH1	86	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BH2		
BL5	88	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BP3	88	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BP4		
BQ2	88	Back Door Lower Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BS1	88	Door Lock LH Sub Wire and Front Door LH Wire (Front Door LH)
BT1	88	Door Lock RH Sub Wire and Front Door RH Wire (Front Door RH)

## : Ground Points

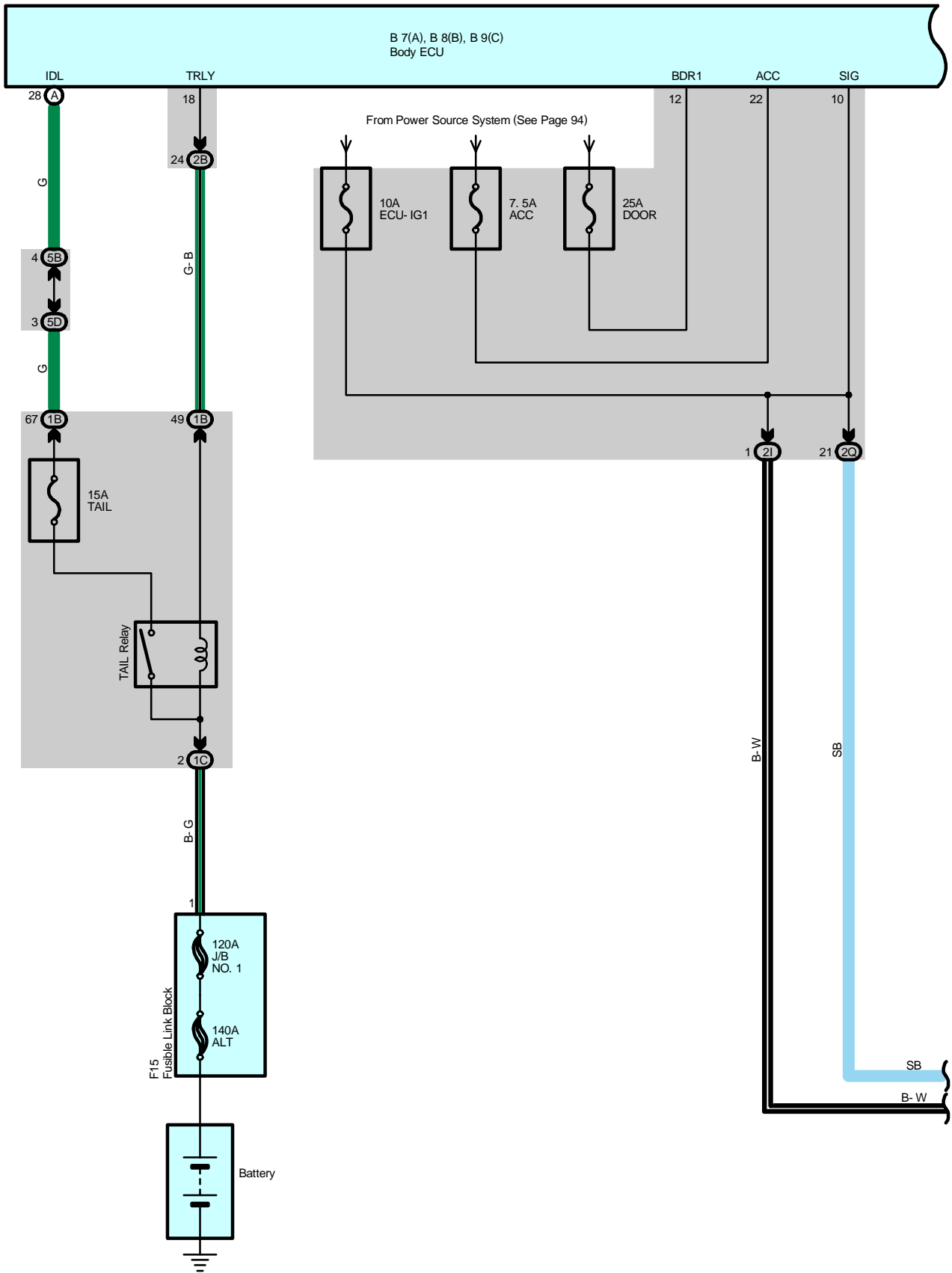
Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH
IG		
II	78	Set Bolt of Cowl Side J/B RH
BJ	86	Under the Driver's Seat
BK	86	Front Side Under the Front Passenger's Seat

## : Splice Points

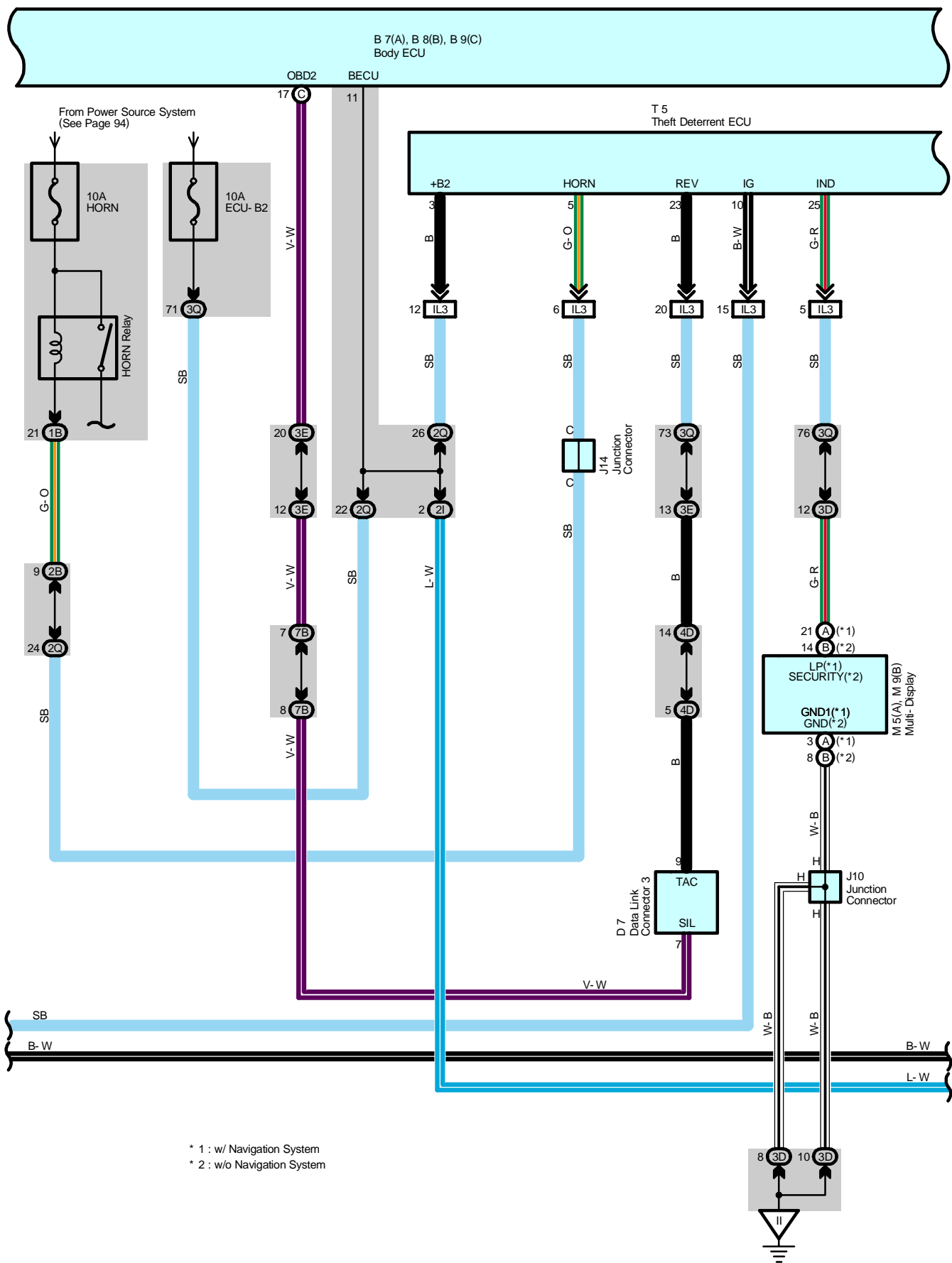
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B2	88	Front Door LH Wire	B8	88	Front Door RH Wire
B5	88	Floor No.1 Wire	B11	88	Floor No.1 Wire
B6			B15	88	Back Door Upper Wire



# Theft Deterrent

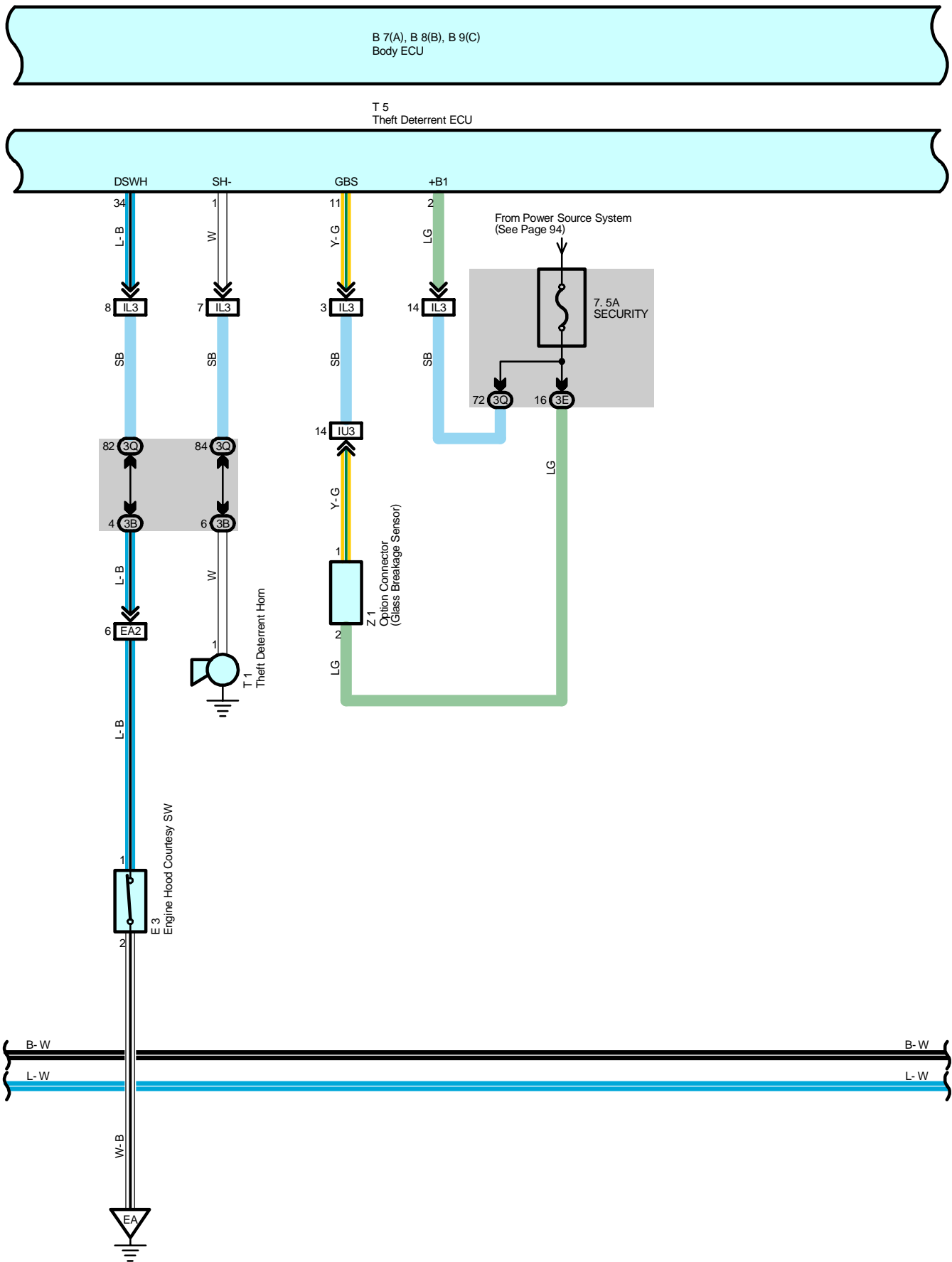


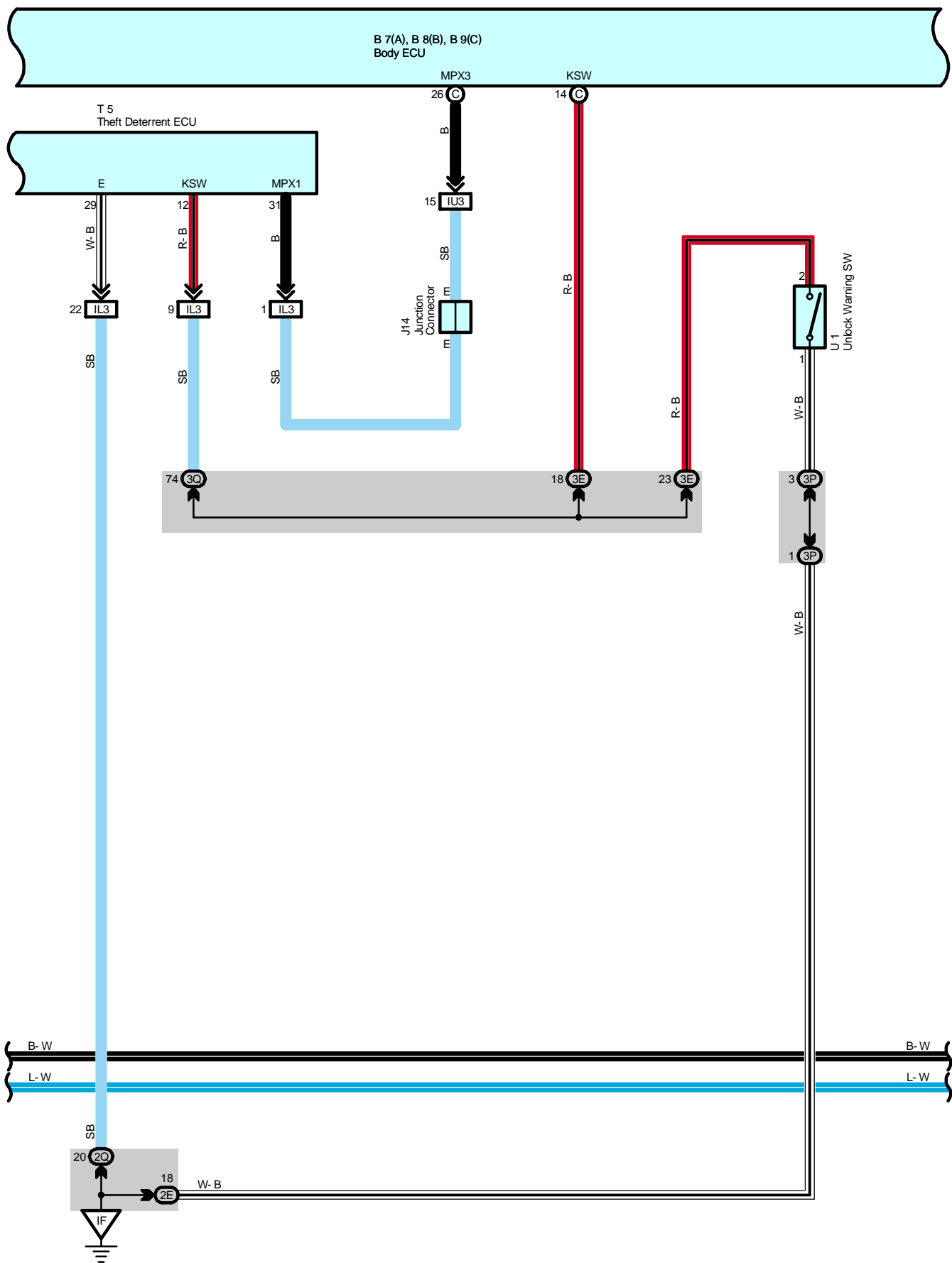




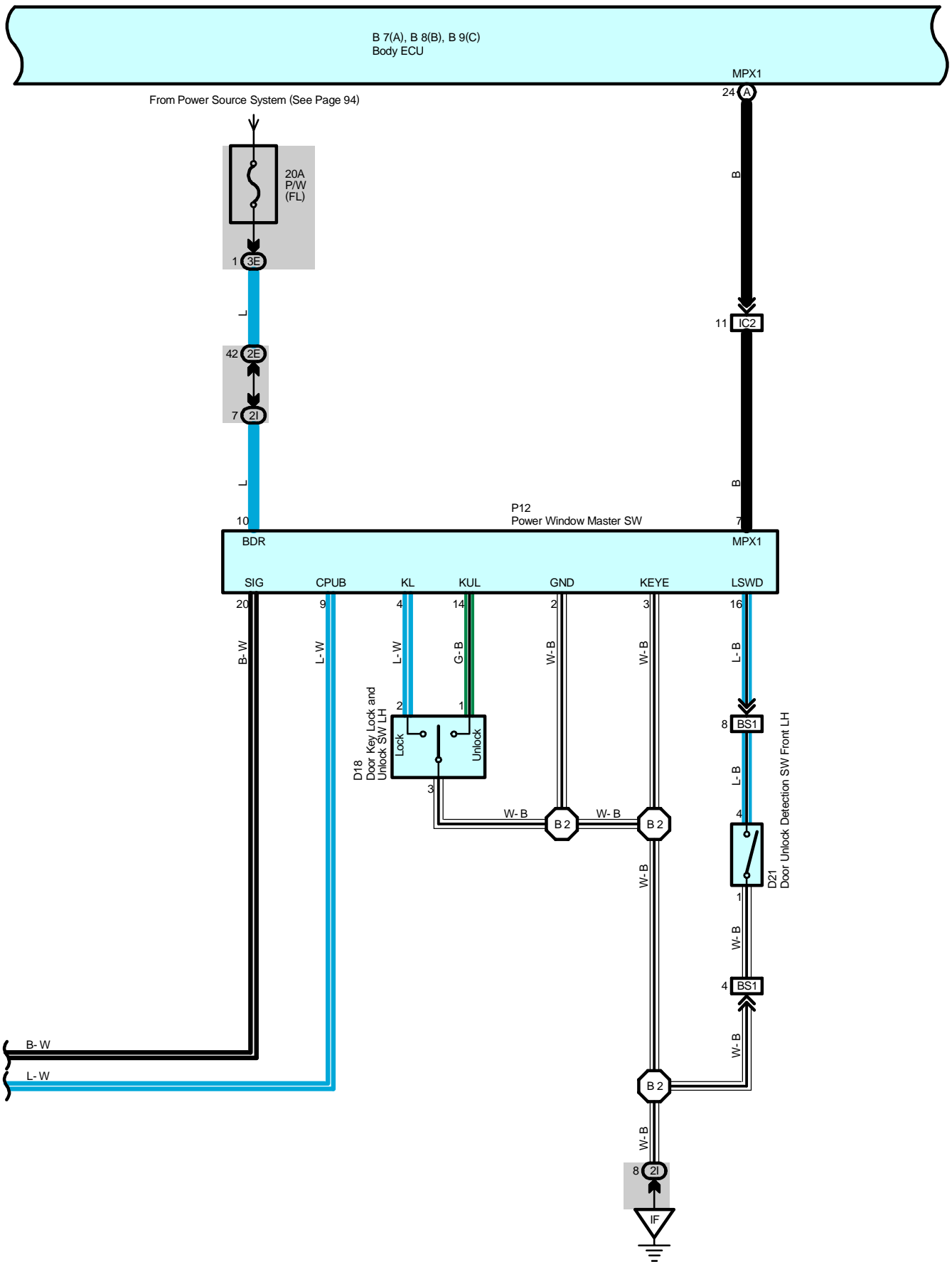
\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System

# Theft Deterrent

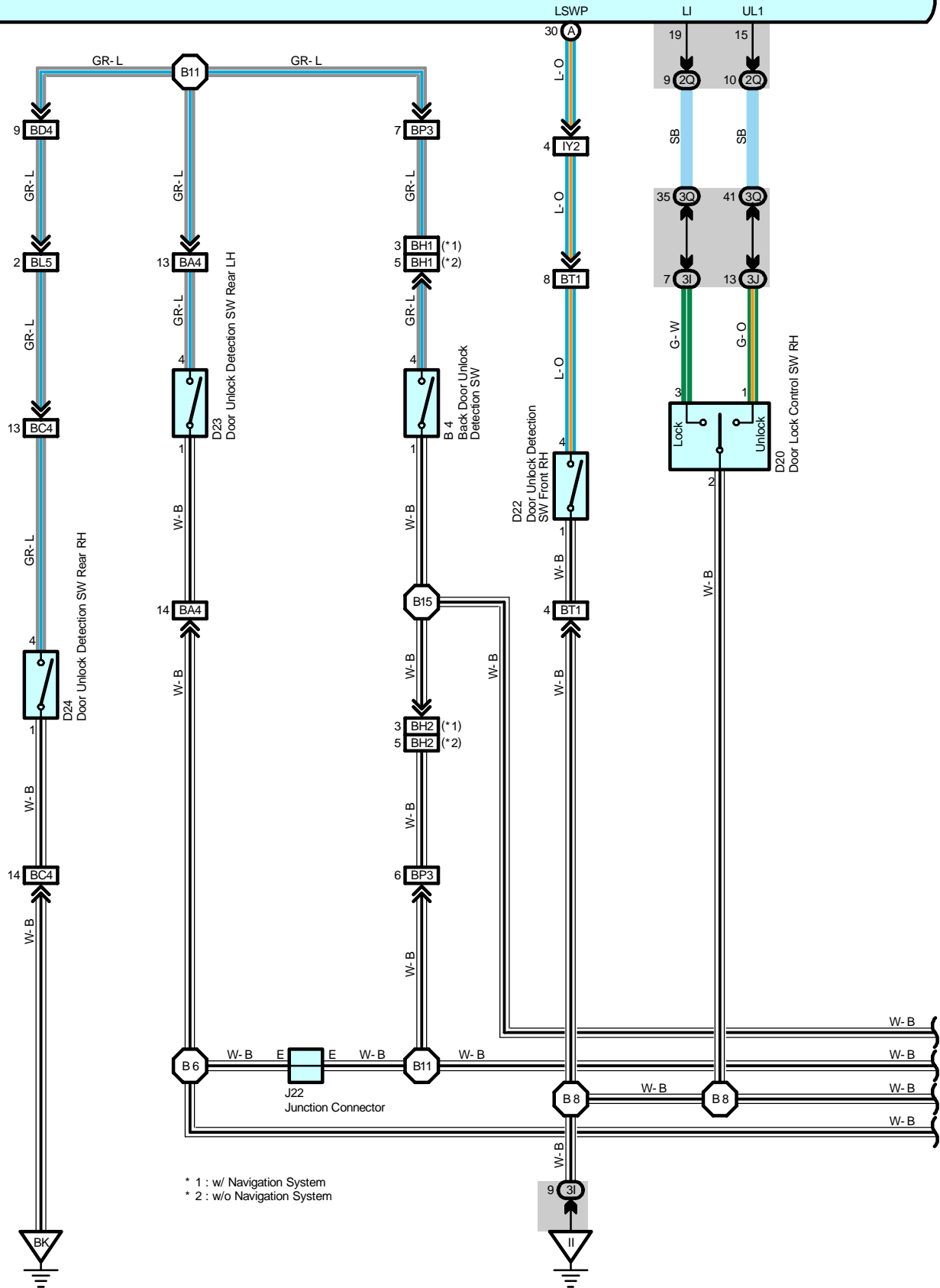




# Theft Deterrent

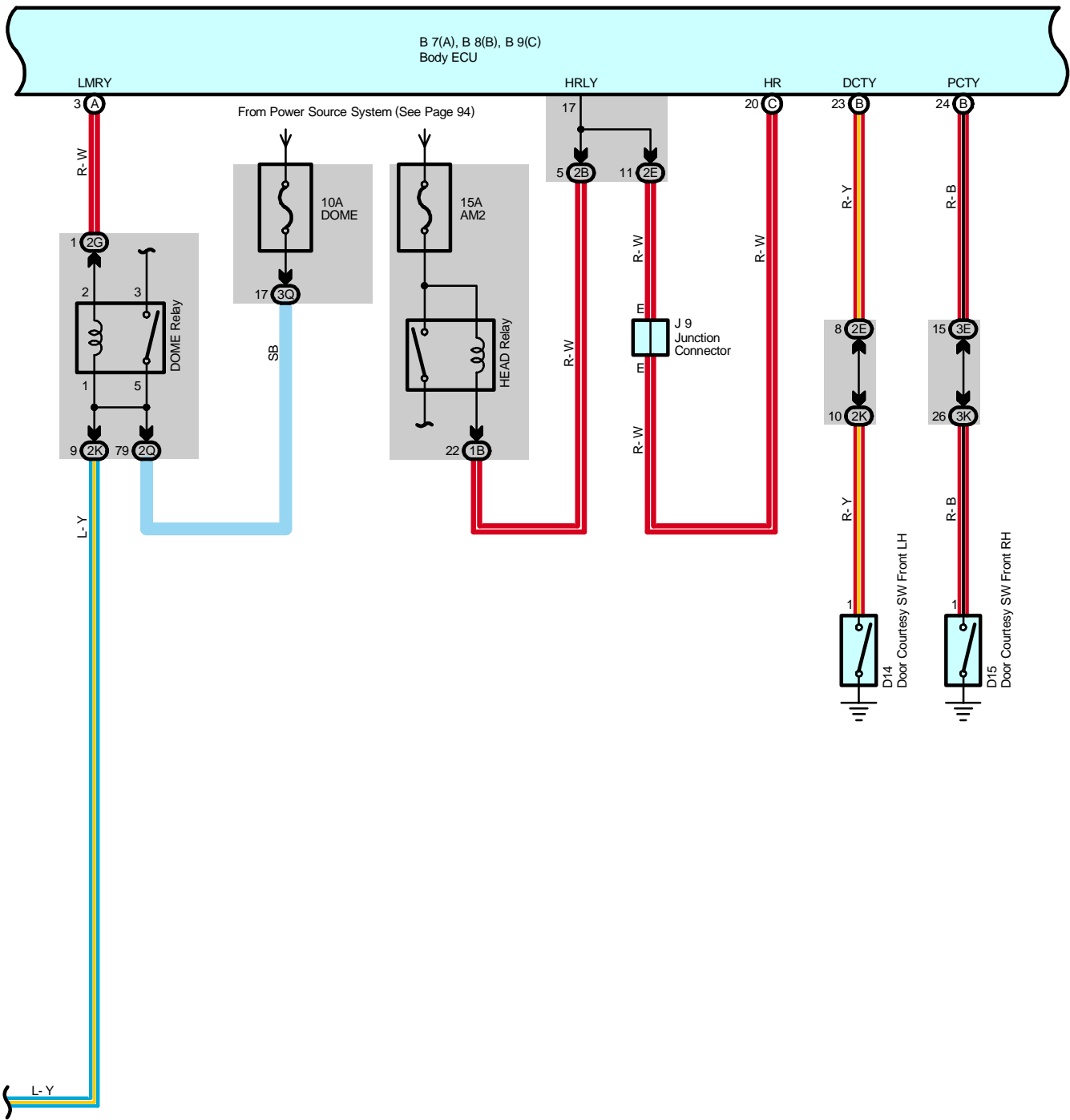


B 7(A), B 8(B), B 9(C)  
Body ECU



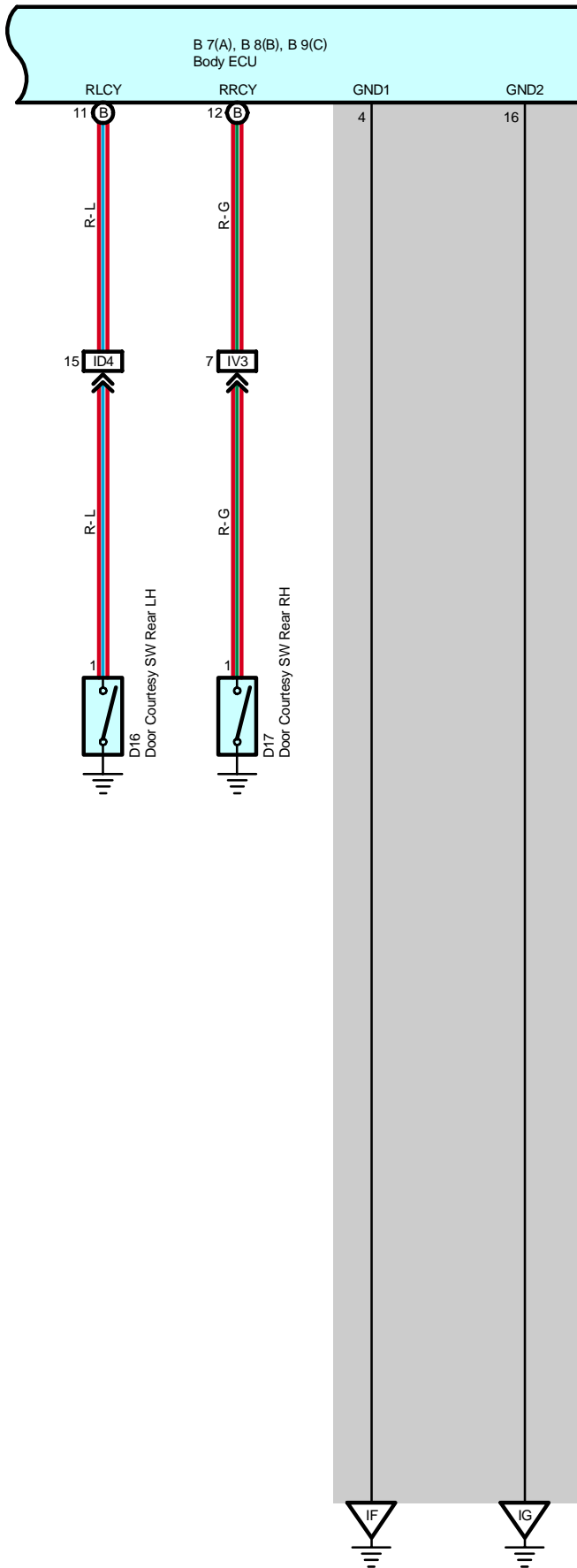
\* 1 : w/ Navigation System  
\* 2 : w/o Navigation System





\* 1 : w/ Navigation System  
 \* 2 : w/o Navigation System

# Theft Deterrent





## Service Hints

### D18, D19 Door Key Lock and Unlock SW LH, RH

- 1-3 : Closed with door lock cylinder unlocked with key
- 2-3 : Closed with door lock cylinder locked with key

### B3 Back Door Key Lock and Unlock SW

- 3-1 : Closed with door lock cylinder unlocked with key
- 2-1 : Closed with door lock cylinder locked with key

### E3 Engine Hood Courtesy SW

- 1-2 : Opened with engine hood open

### U1 Unlock Warning SW

- 2-1 : Closed with ignition key in cylinder

### T5 Theft Deterrent ECU

- 2, 3-Ground : Always approx. 12 volts
- 10-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 29-Ground : Always continuity
- 12-Ground : Continuity with ignition key in cylinder
- 34-Ground : Continuity with engine hood close

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
B2	72	D18	72	J10	71
B3	72	D19	72	J14	71
B4	72	D20	72	J22	72
B7	A	D21	72	M5	A
B8	B	D22	72	M9	B
B9	C	D23	72	P12	73
D7	70	D24	72	T1	69
D14	72	D27	72	T5	71
D15	72	E3	68	U1	71
D16	72	F15	68	Z1	71
D17	72	J9	71		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
1C		
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2G		
2I	28	Front Door LH Wire and Cowl Side J/B LH (Left Kick Panel)
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3B	40	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3I	40	Front Door RH Wire and Cowl Side J/B RH (Right Kick Panel)
3J		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3P	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4D	52	Dash Wire and J/B No.4 (Instrument Panel Center)
5B	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)
7B	64	Dash Wire and J/B No.7 (Behind the Grove Box)

# Theft Deterrent

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA2	76	Engine Room Main Wire and Engine Room No.2 Wire (Engine Compartment Right)
IC2	78	Front Door LH Wire and Dash Wire (Left Kick Panel)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IL3	80	Instrument Panel Integration Wire and Computer Wire (Instrument Panel Center)
IU3	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IV3	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IY2	82	Front Door RH Wire and Dash Wire (Right Kick Panel)
BA4	86	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BC4	86	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)
BD4	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BH1	86	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BH2		
BL5	88	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BP3	88	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BP4		
BQ2	88	Back Door Lower Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BS1	88	Door Lock LH Sub Wire and Front Door LH Wire (Front Door LH)
BT1	88	Door Lock RH Sub Wire and Front Door RH Wire (Front Door RH)

## : Ground Points

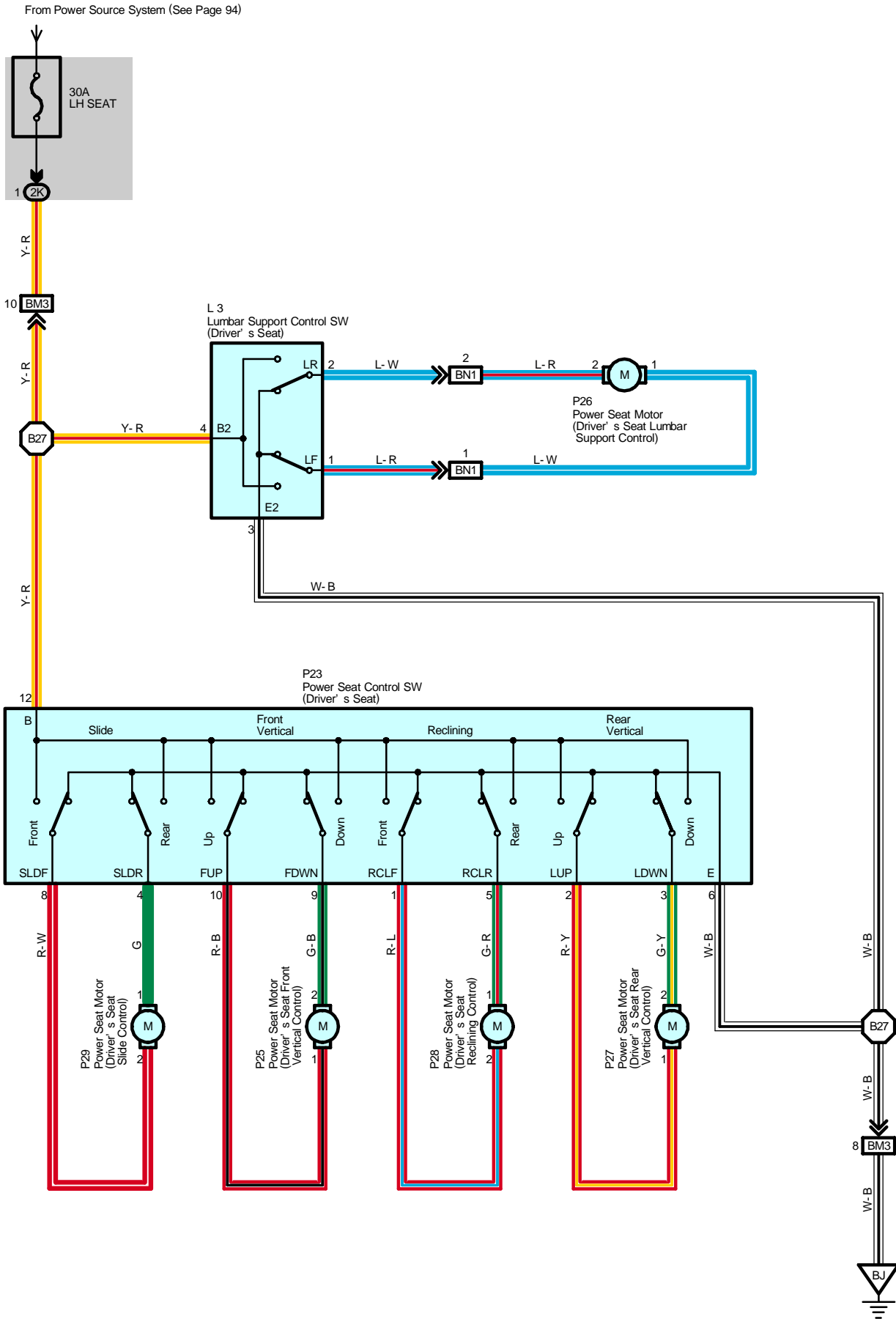
Code	See Page	Ground Points Location
EA	76	Front Right Side of Fender Apron
IF	78	Set Bolt of Cowl Side J/B LH
IG		
II	78	Set Bolt of Cowl Side J/B RH
BJ	86	Under the Driver's Seat
BK	86	Front Side Under the Front Passenger's Seat

## : Splice Points

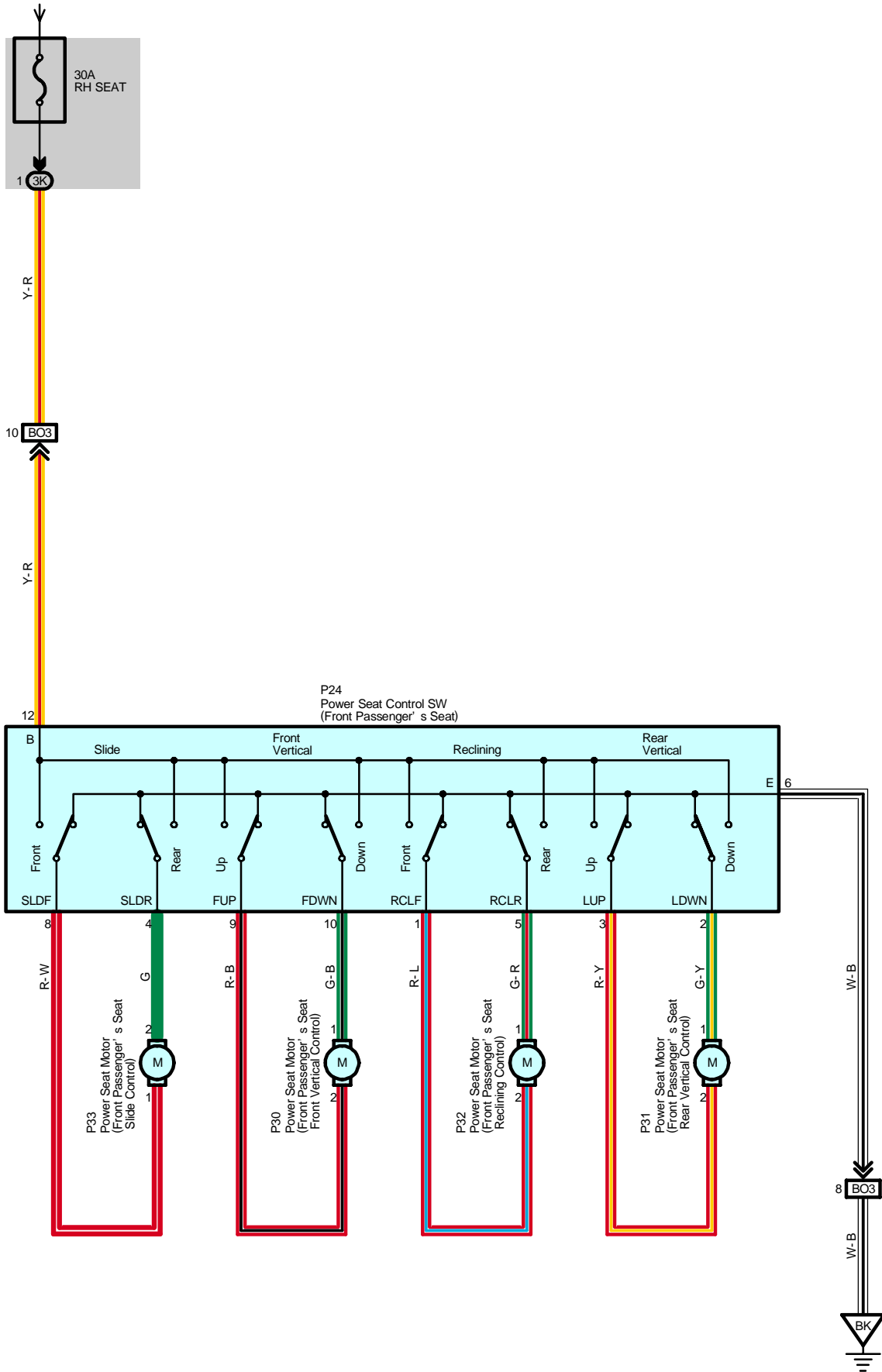
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B2	88	Front Door LH Wire	B11	88	Floor No.1 Wire
B6	88	Floor No.1 Wire	B15	88	Back Door Upper Wire
B8	88	Front Door RH Wire			



# Power Seat



From Power Source System (See Page 94)



# Power Seat

## Service Hints

### P23 Power Seat Control SW (Driver's Seat)

- 12-1 : Closed with driver's seat at front reclining operation
- 12-5 : Closed with driver's seat at rear reclining operation
- 12-10 : Closed with driver's seat at front vertical up operation
- 12-9 : Closed with driver's seat at front vertical down operation
- 12-2 : Closed with driver's seat at rear vertical up operation
- 12-3 : Closed with driver's seat at rear vertical down operation
- 12-8 : Closed with driver's seat at front slide operation
- 12-4 : Closed with driver's seat at rear slide operation
- 6-Ground : Always continuity

### P24 Power Seat Control SW (Front Passenger's Seat)

- 12-1 : Closed with front passenger's seat at front reclining operation
- 12-5 : Closed with front passenger's seat at rear reclining operation
- 12-9 : Closed with front passenger's seat at front vertical up operation
- 12-10 : Closed with front passenger's seat at front vertical down operation
- 12-3 : Closed with front passenger's seat at rear vertical up operation
- 12-2 : Closed with front passenger's seat at rear vertical down operation
- 12-8 : Closed with front passenger's seat at front slide operation
- 12-4 : Closed with front passenger's seat at rear slide operation
- 6-Ground : Always continuity

## : Parts Location

Code	See Page	Code	See Page	Code	See Page
L3	<a href="#">74</a>	P26	<a href="#">74</a>	P30	<a href="#">74</a>
P23	<a href="#">74</a>	P27	<a href="#">74</a>	P31	<a href="#">74</a>
P24	<a href="#">74</a>	P28	<a href="#">74</a>	P32	<a href="#">74</a>
P25	<a href="#">74</a>	P29	<a href="#">74</a>	P33	<a href="#">74</a>

## : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2K	<a href="#">28</a>	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
3K	<a href="#">40</a>	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)

## : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
BM3	<a href="#">90</a>	Floor No.1 Wire and Front Seat LH Wire (Front Side Under the Driver's Seat)
BN1	<a href="#">90</a>	Seat No.2 Wire and Front Seat LH Wire (Rear Side Under the Driver's Seat)
BO3	<a href="#">90</a>	Floor No.2 Wire and Front Seat RH Wire (Front Side Under the Front Passenger's Seat)

## : Ground Points

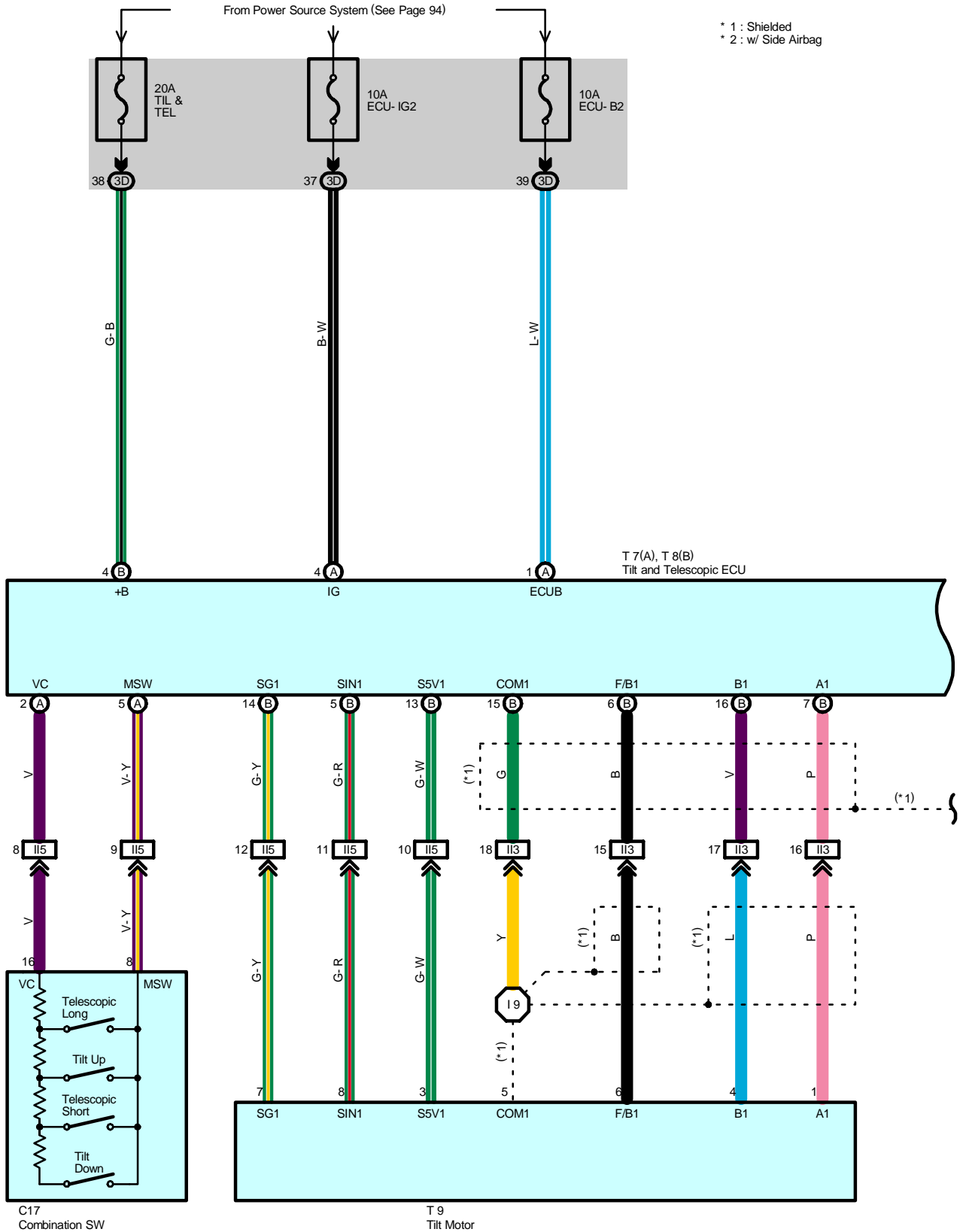
Code	See Page	Ground Points Location
BJ	<a href="#">86</a>	Under the Driver's Seat
BK	<a href="#">86</a>	Front Side Under the Front Passenger's Seat

## : Splice Points

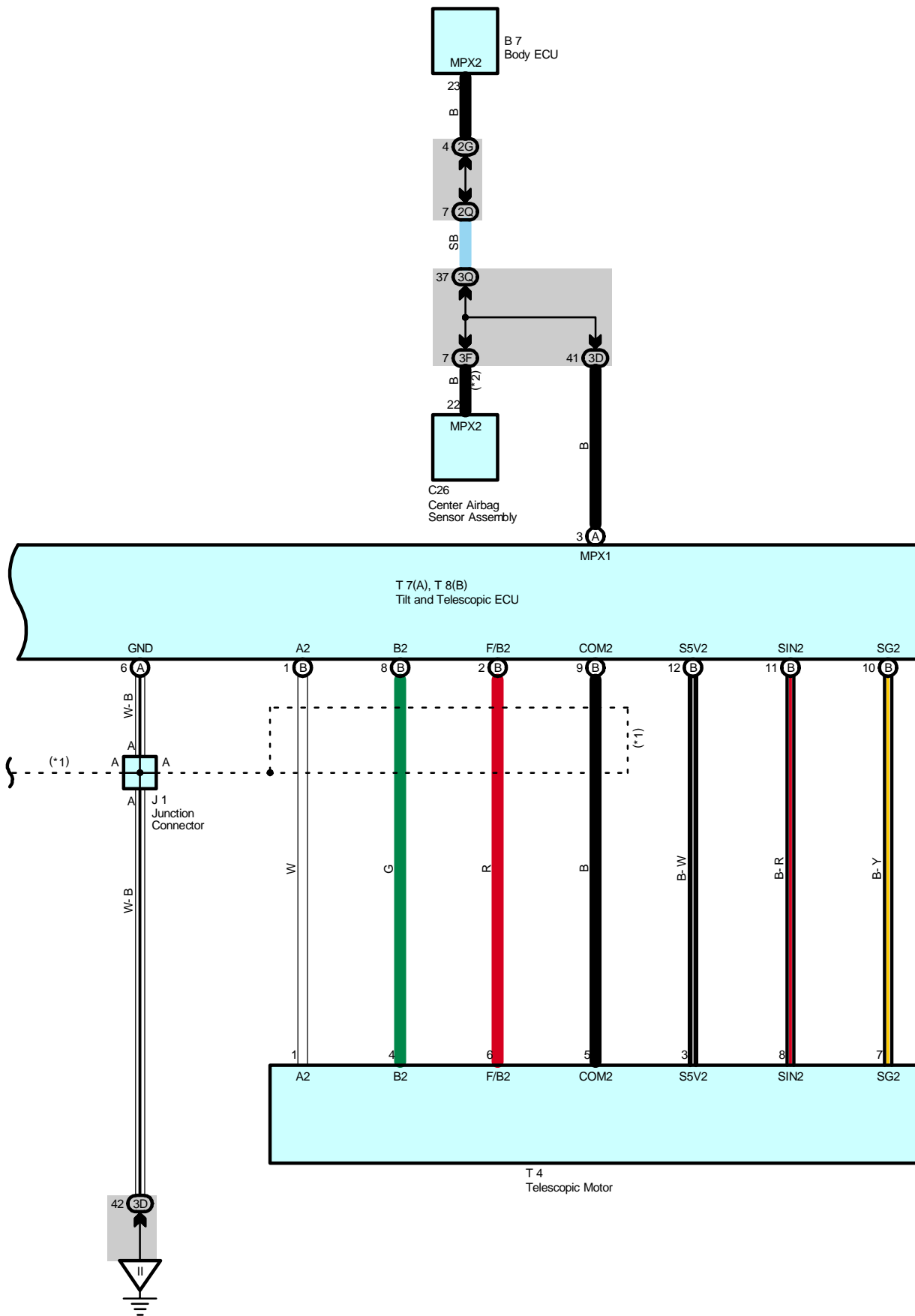
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B27	<a href="#">90</a>	Front Seat LH Wire			



# Power Tilt and Power Telescopic







# Power Tilt and Power Telescopic

## System Outline

This system provides the automatic tilt and telescopic mechanisms using the motor drive, tilt and telescopic ECU control, allowing variable steering movement in the back and forth, and vertical directions. This makes it possible to set the steering to the desired steering position.

## Service Hints

### T7 (A), T8 (B) Tilt and Telescopic ECU

- (A) 1-Ground : Always approx. 12 volts
- (B) 4-Ground : Always approx. 12 volts
- (A) 4-Ground : Approx. 12 volts with ignition SW at ON or ST position
- (A) 6-Ground : Always continuity

### C17 Combination SW

- 16-8 : Approx. 160 Ω with telescopic long operation
- : Approx. 360 Ω with tilt up operation
- : Approx. 790 Ω with telescopic short operation
- : Approx. 1.99 kΩ with tilt down operation

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
B7	70	J1	71	T8   B	71
C17	70	T4	71	T9	71
C26	70	T7   A	71		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2G	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3F		
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
II5		

## ▽ : Ground Points

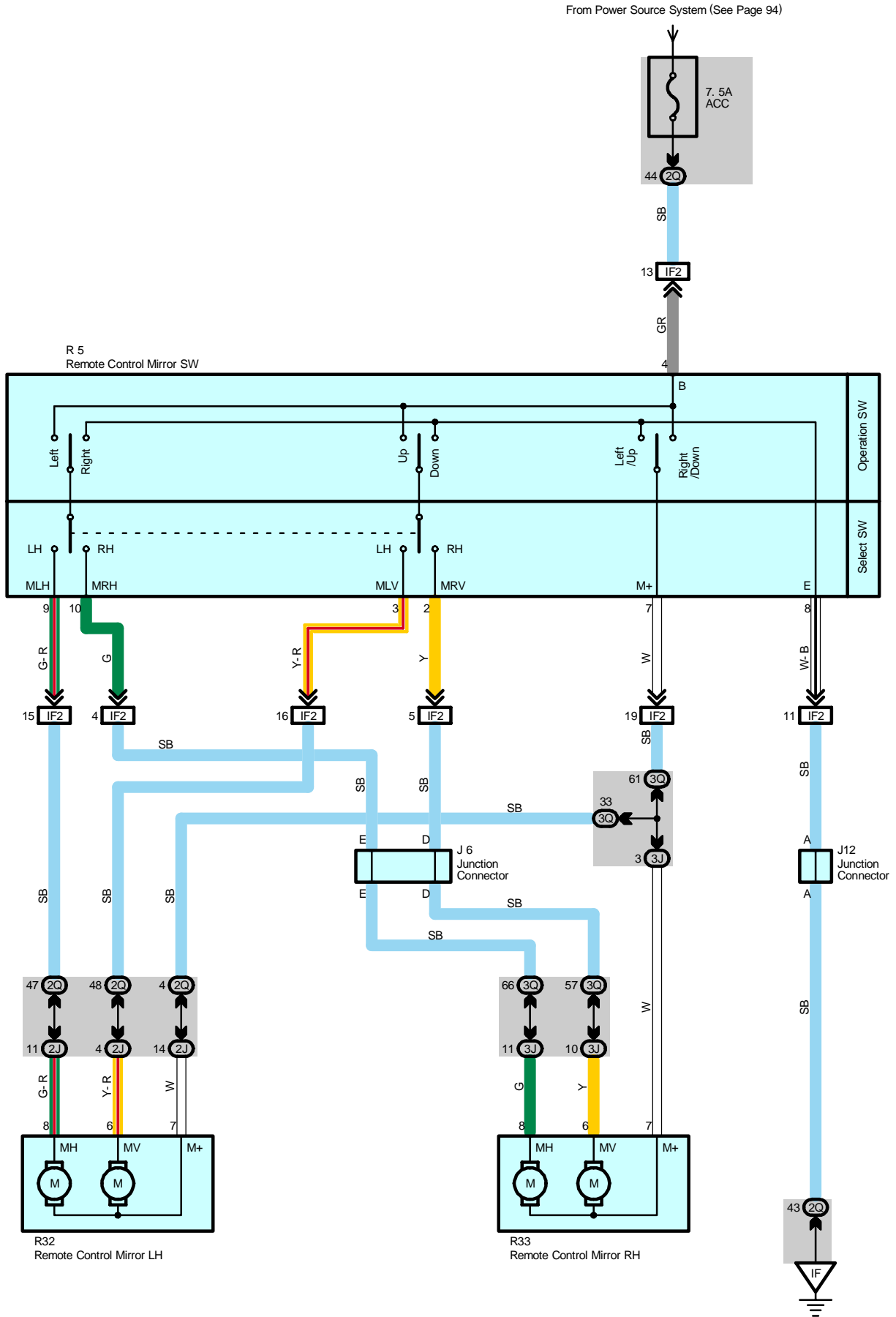
Code	See Page	Ground Points Location
II	78	Set Bolt of Cowl Side J/B RH

## ○ : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I9	80	Column Wire			



# Remote Control Mirror



## Service Hints

### R5 Remote Control Mirror SW

- 7-8 : Continuity with operation SW at LEFT or UP position
- 4-7 : Continuity with operation SW at RIGHT or DOWN position
- 4-9 : Continuity with operation SW at LEFT position and the select SW at LH position
- 4-3 : Continuity with operation SW at UP position and the select SW at LH position
- 8-10 : Continuity with operation SW at RIGHT position and the select SW at RH position
- 2-8 : Continuity with operation SW at DOWN position and the select SW at RH position
- 4-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- 8-Ground : Always continuity

### : Parts Location

Code	See Page	Code	See Page	Code	See Page
J6	<a href="#">71</a>	R5	<a href="#">71</a>	R33	<a href="#">73</a>
J12	<a href="#">71</a>	R32	<a href="#">73</a>		

### : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2J	<a href="#">28</a>	Front Door LH Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	<a href="#">30</a>	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3J	<a href="#">40</a>	Front Door RH Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	<a href="#">42</a>	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)

### : Connector Joining Wire Harness and Wire Harness

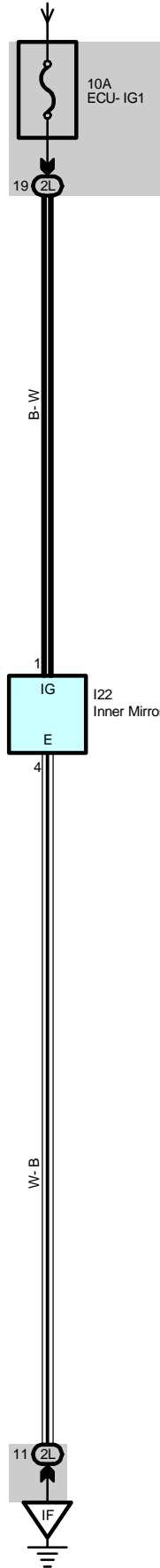
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IF2	<a href="#">78</a>	Instrument Panel Integration Wire and Instrument Panel Wire (Left Side of Instrument Panel)

### : Ground Points

Code	See Page	Ground Points Location
IF	<a href="#">78</a>	Set Bolt of Cowl Side J/B LH

# Automatic Glare-Resistant EC Mirror with Compass

From Power Source System (See Page 94)



---

**Service Hints****I22 Inner Mirror**

1-Ground : Approx. 12 volts with ignition SW at ON or ST position  
4-Ground : Always continuity

 : **Parts Location**

Code	See Page	Code	See Page	Code	See Page
I22	<a href="#">72</a>				

 : **Junction Block and Wire Harness Connector**

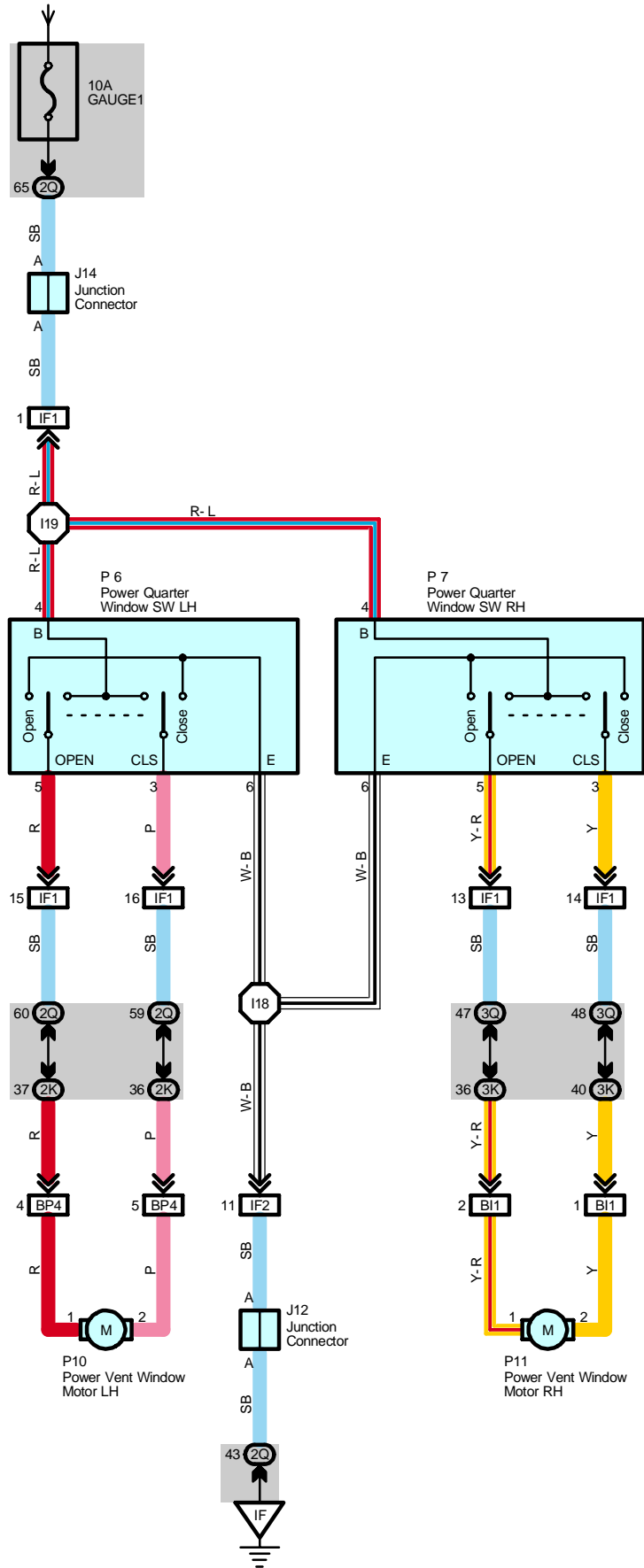
Code	See Page	Junction Block and Wire Harness (Connector Location)
2L	<a href="#">28</a>	Roof No.1 Wire and Cowl Side J/B LH (Left Kick Panel)

 : **Ground Points**

Code	See Page	Ground Points Location
IF	<a href="#">78</a>	Set Bolt of Cowl Side J/B LH

# Power Rear Quarter Window

From Power Source System (See Page 94)





## Service Hints

### P6 Power Quarter Window SW LH

4-Ground : Approx. 12 volts with ignition SW at ON or ST position

6-Ground : Always continuity

### P7 Power Quarter Window SW RH

4-Ground : Approx. 12 volts with ignition SW at ON or ST position

6-Ground : Always continuity

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
J12	<a href="#">71</a>	P6	<a href="#">71</a>	P10	<a href="#">73</a>
J14	<a href="#">71</a>	P7	<a href="#">71</a>	P11	<a href="#">73</a>

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2K	<a href="#">28</a>	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	<a href="#">30</a>	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3K	<a href="#">40</a>	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	<a href="#">42</a>	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IF1	<a href="#">78</a>	Instrument Panel Integration Wire and Instrument Panel Wire (Left Side of Instrument Panel)
IF2		
BI1	<a href="#">86</a>	Roof No.2 Wire and Floor No.2 Wire (Right Side Rear Quarter Panel)
BP4	<a href="#">88</a>	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)

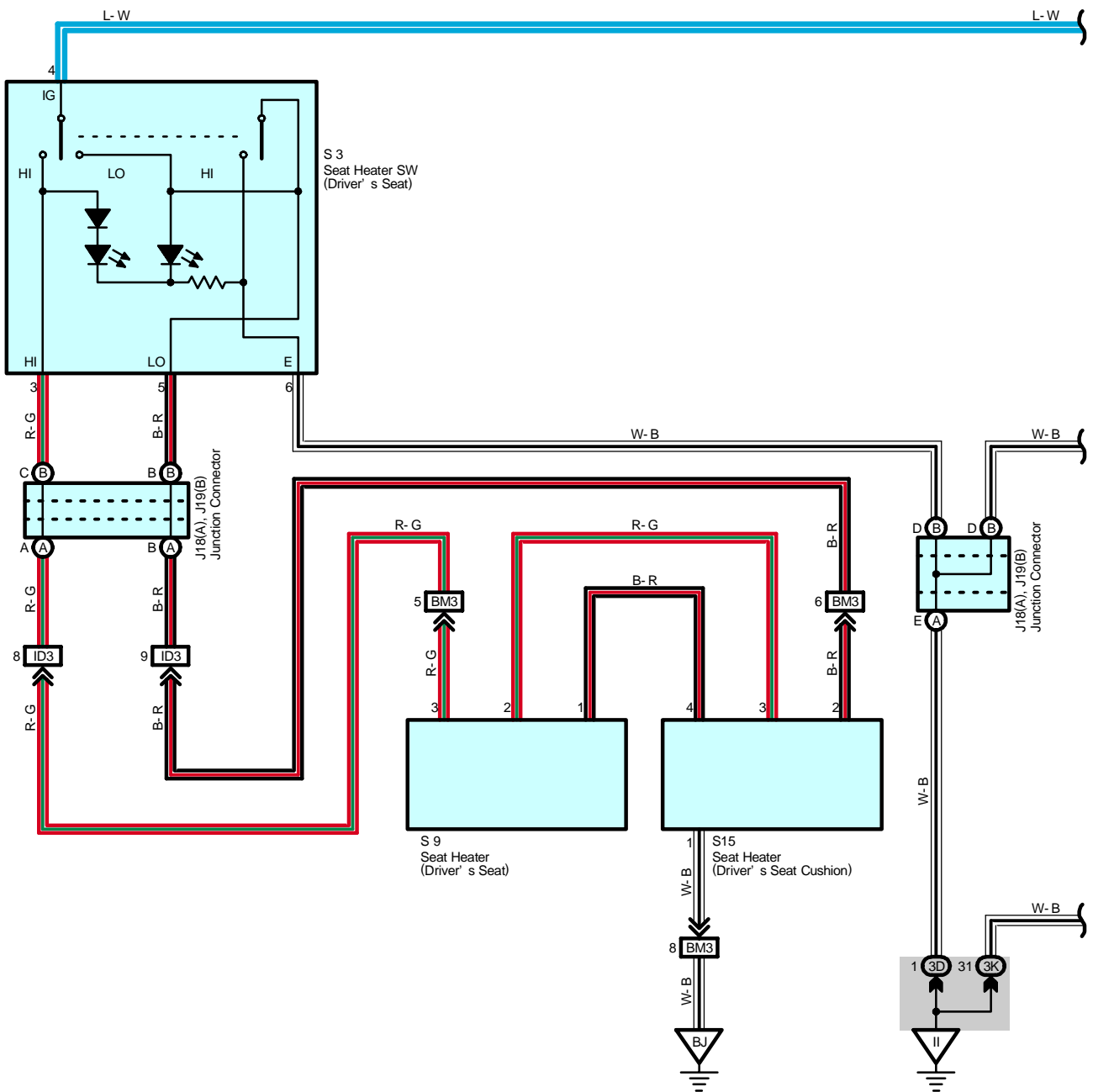
## ▽ : Ground Points

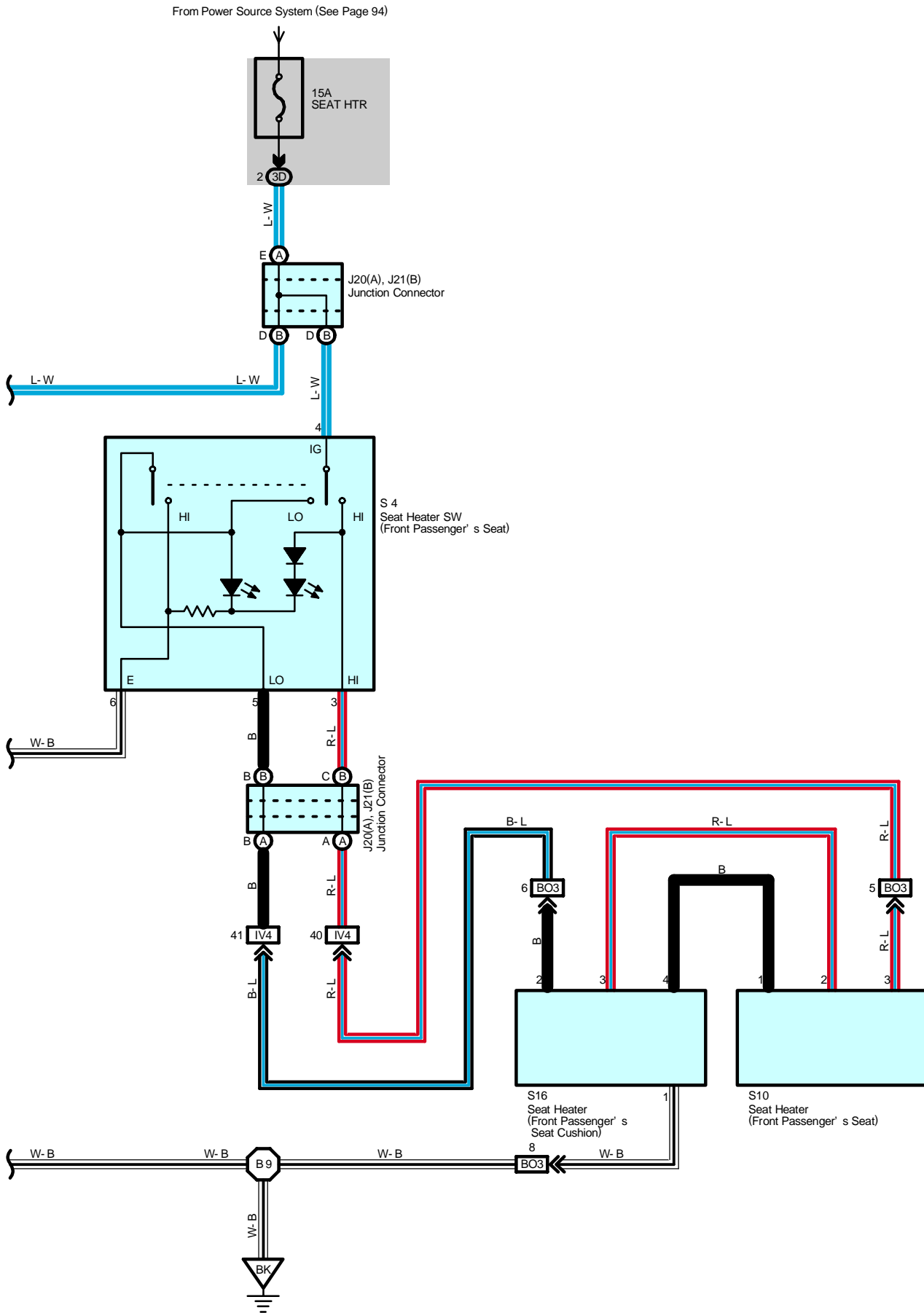
Code	See Page	Ground Points Location
IF	<a href="#">78</a>	Set Bolt of Cowl Side J/B LH

## ○ : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I18	<a href="#">80</a>	Instrument Panel Wire	I19	<a href="#">80</a>	Instrument Panel Wire

# Seat Heater





# Seat Heater

## Service Hints

### S3 Seat Heater SW (Driver's Seat)

4-Ground : Approx. 12 volts with ignition SW at ON or ST position

6-Ground : Always continuity

### S4 Seat Heater SW (Front Passenger's Seat)

4-Ground : Approx. 12 volts with ignition SW at ON or ST position

6-Ground : Always continuity

## ○ : Parts Location

Code		See Page	Code	See Page	Code	See Page
J18	A	<a href="#">71</a>	S3	<a href="#">71</a>	S15	<a href="#">74</a>
J19	B	<a href="#">71</a>	S4	<a href="#">71</a>	S16	<a href="#">74</a>
J20	A	<a href="#">71</a>	S9	<a href="#">74</a>		
J21	B	<a href="#">71</a>	S10	<a href="#">74</a>		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
3D	<a href="#">40</a>	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3K	<a href="#">40</a>	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
ID3	<a href="#">78</a>	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IV4	<a href="#">82</a>	Dash Wire and Floor No.2 Wire (Right Kick Panel)
BM3	<a href="#">90</a>	Floor No.1 Wire and Front Seat LH Wire (Front Side Under the Driver's Seat)
BO3	<a href="#">90</a>	Floor No.2 Wire and Front Seat RH Wire (Front Side Under the Front Passenger's Seat)

## ▽ : Ground Points

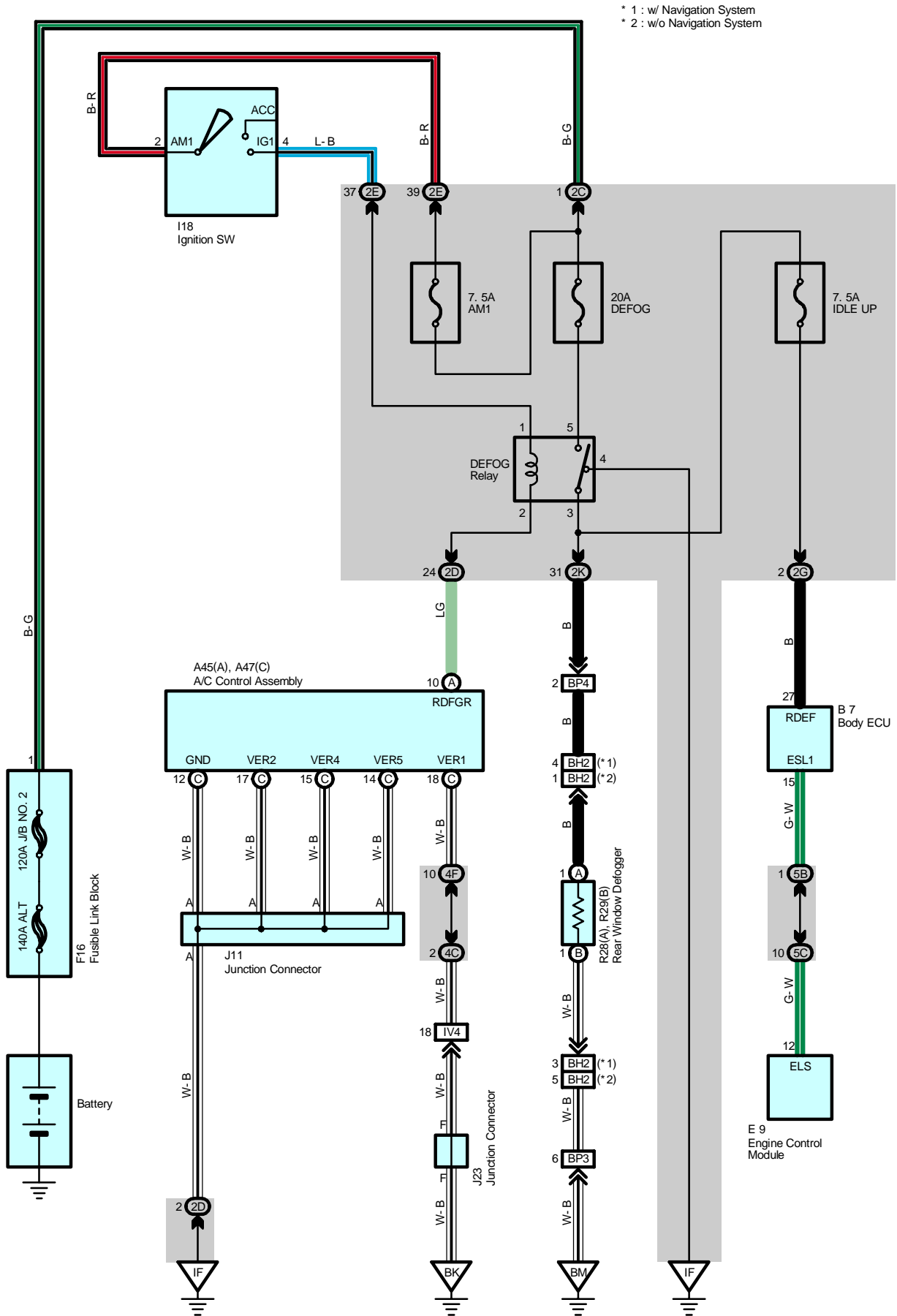
Code	See Page	Ground Points Location
II	<a href="#">78</a>	Set Bolt of Cowl Side J/B RH
BJ	<a href="#">86</a>	Under the Driver's Seat
BK	<a href="#">86</a>	Front Side Under the Front Passenger's Seat

## ○ : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B9	<a href="#">88</a>	Floor No.2 Wire			



# Rear Window Defogger



### Service Hints

#### A45 (A), A47 (C) A/C Control Assembly

(A)10-Ground : Approx. 12 volts with ignition SW at ON or ST position

(C)12, (C) 14, (C) 15, (C) 17, (C) 18-Ground : Always continuity

#### : Parts Location

Code		See Page	Code		See Page	Code		See Page
A45	A	70	F16	68	R28	A	73	
A47	C	70	I18	70	R29	B	73	
B7		70	J11	71				
E9		70	J23	72				

#### : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2C	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2G		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
4C	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4F		
5B	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5C		

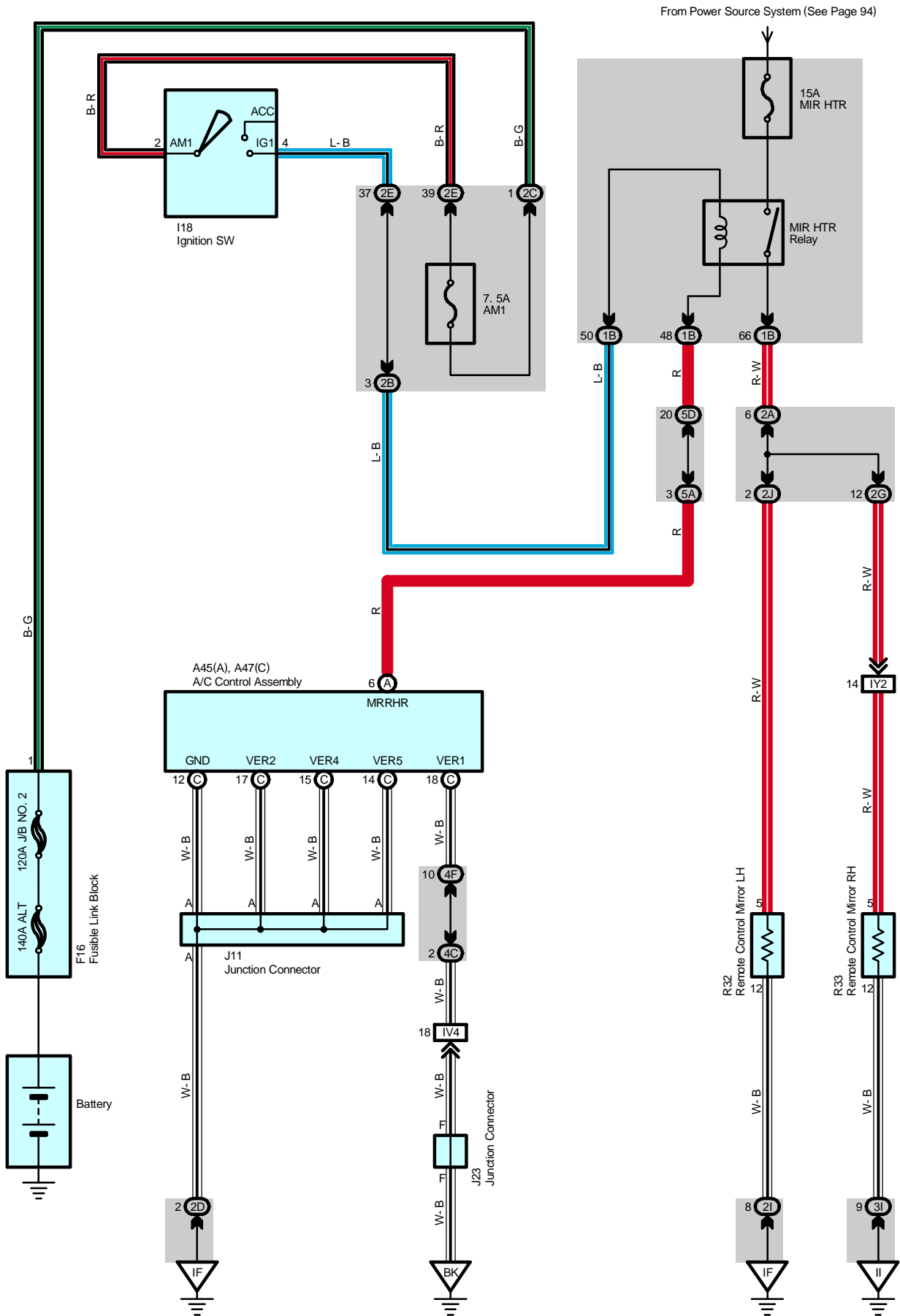
#### : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IV4	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
BH2	86	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BP3	88	Pillar No.1 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BP4		

#### : Ground Points

Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH
BK	86	Front Side Under the Front Passenger's Seat
BM	86	Left Rear Side Quarter Panel

# Mirror Heater





## Service Hints

### A45 (A), A47 (C) A/C Control Assembly

(A) 6-Ground : Approx. 12 volts with ignition SW at ON or ST position

(C)12, (C) 14, (C) 15, (C) 17, (C) 18-Ground : Always continuity

### : Parts Location

Code		See Page	Code	See Page	Code	See Page
A45	A	70	I18	70	R32	73
A47	C	70	J11	71	R33	73
F16		68	J23	72		

### : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2B		
2C		
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2G		
2I	28	Front Door LH Wire and Cowl Side J/B LH (Left Kick Panel)
2J		
3I	40	Front Door RH Wire and Cowl Side J/B RH (Right Kick Panel)
4C	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4F		
5A	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)

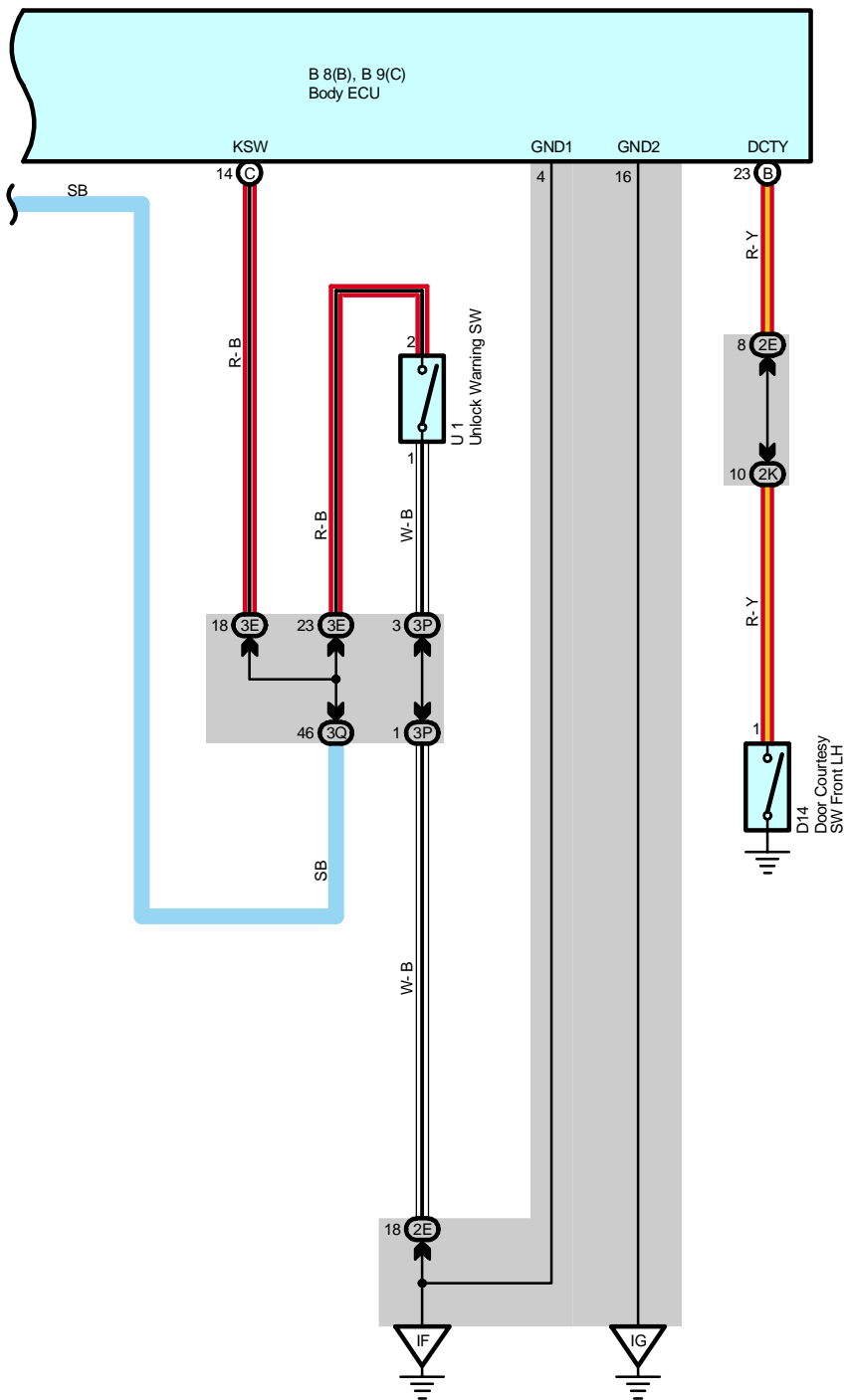
### : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IV4	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IY2	82	Front Door RH Wire and Dash Wire (Right Kick Panel)

### : Ground Points

Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH
II	78	Set Bolt of Cowl Side J/B RH
BK	86	Front Side Under the Front Passenger's Seat





# Key Reminder

## System Outline

When the driver door is opened with the ignition SW off and ignition key remaining in the key cylinder (Unlock warning SW on), a signal is input from the unlock warning SW to the combination meter TERMINAL 9, the body ECU TERMINAL (C) 14, and from the door courtesy SW front LH to the body ECU TERMINAL (B)23. As a result, the buzzer in the combination meter goes on and warns the driver that the key is remaining in the key cylinder.

## Service Hints

### D14 Door Courtesy SW Front LH

1-Ground : Closed with driver's door open

## ○ : Parts Location

Code		See Page	Code	See Page	Code	See Page
B8	B	70	C15	70	J14	71
B9	C	70	D14	72	U1	71

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3E	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3P	43	
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)

## □ : Connector Joining Wire Harness and Wire Harness

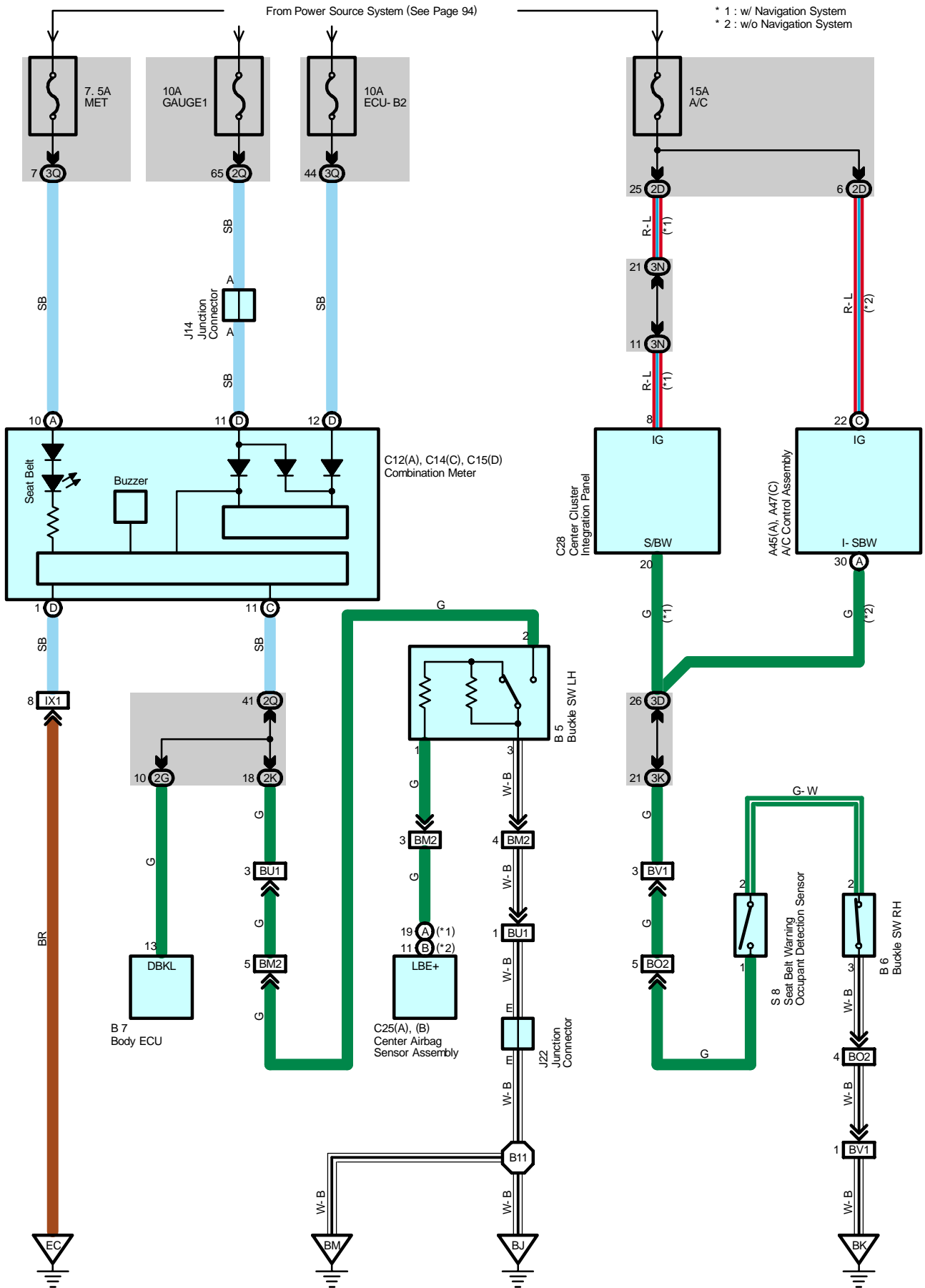
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)

## ▽ : Ground Points

Code	See Page	Ground Points Location
EC	76	Rear Bank of Right Cylinder Head
IF	78	Set Bolt of Cowl Side J/B LH
IG		



# Seat Belt Warning



## System Outline

When the ignition SW turned on, a signal is input to the combination meter and the center cluster integration panel (w/ navigation system) or the A/C control assembly (w/o navigation system). To determine whether the driver has fastened the seat belt, a signal is input from the buckle SW LH to the combination meter. When the seat belt is not fastened, the seat belt warning light in the combination meter blinks, and emits a warning sound.

In addition, the front passenger is recognized by a sensor (Seat belt warning occupant detection sensor) is installed in the front passenger seat, and determines whether the seat belt is fastened. When not fastened, the signals from the seat belt warning occupant detection sensor and the buckle SW RH is input to the center cluster integration panel (w/ navigation system) or the A/C control assembly (w/o navigation system), and the passenger seat belt warning light blinks to warn the passenger.

## Service Hints

### S8 Seat Belt Warning Occupant Detection Sensor

1-2 : Closed with passenger sit on the front passenger seat

## ○ : Parts Location

Code		See Page	Code		See Page	Code	See Page
A45	A	70	C12	A	70	C28	70
A47	C	70	C14	C	70	J14	71
B5		74	C15	D	70	J22	72
B6		74	C25	A	70	S8	74
B7		70		B	70		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2G		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3N	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
BM2	90	Floor No.1 Wire and Front Seat LH Wire (Front Side Under the Driver's Seat)
BO2	90	Floor No.2 Wire and Front Seat RH Wire (Front Side Under the Front Passenger's Seat)
BU1	88	Floor No.1 Wire and Floor No.1 Wire (Near the Left Rear Suspension Support)
BV1	88	Floor No.2 Wire and Floor No.2 Wire (Near the Right Rear Suspension Support)

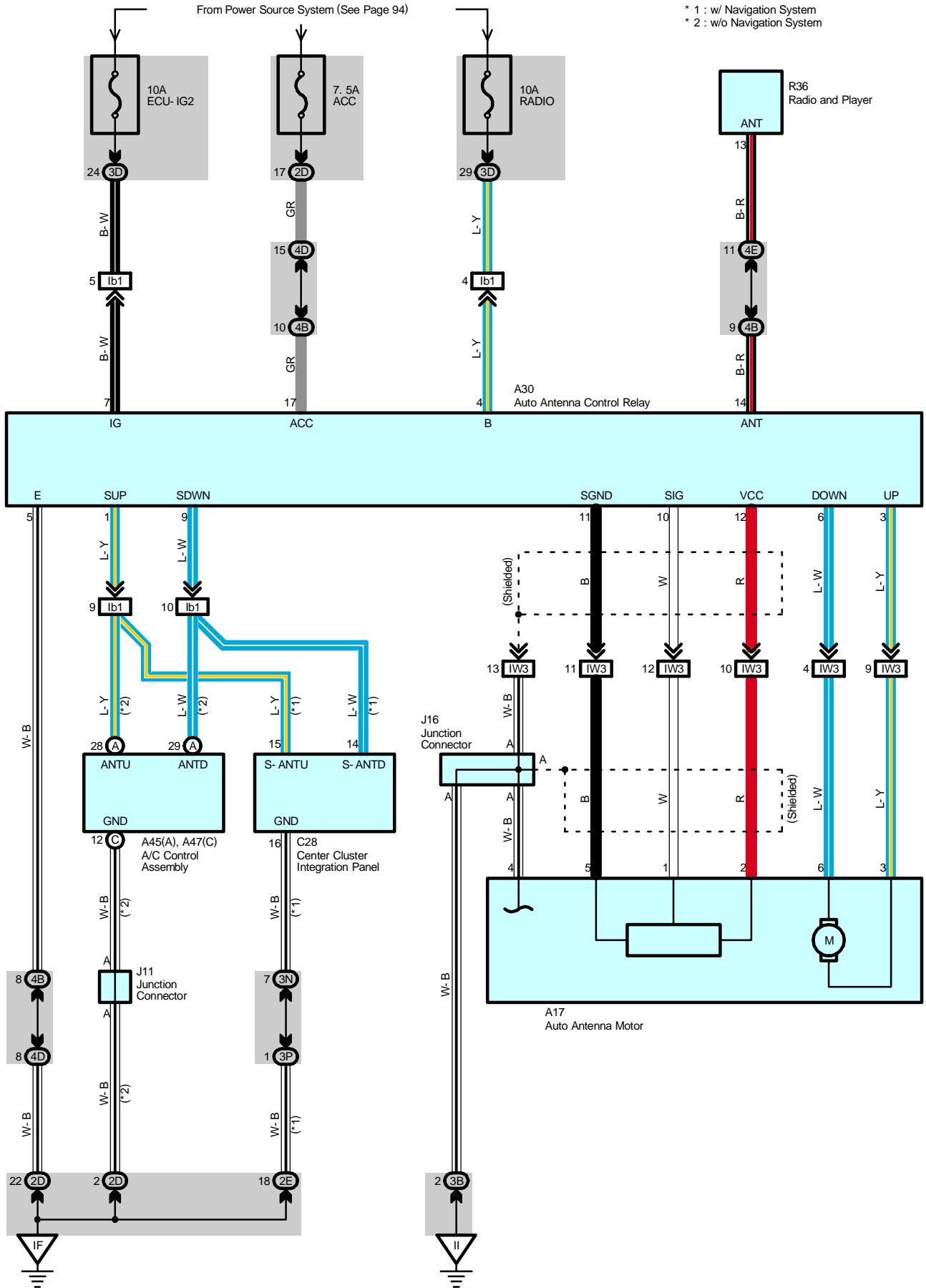
## ▽ : Ground Points

Code	See Page	Ground Points Location
EC	76	Rear Bank of Right Cylinder Head
BJ	86	Under the Driver's Seat
BK	86	Front Side Under the Front Passenger's Seat
BM	86	Left Rear Side Quarter Panel

## ○ : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B11	88	Floor No.1 Wire			

# Auto Antenna





## Service Hints

### A30 Auto Antenna Control Relay

- 4-Ground : Always approx. 12 volts
- 17-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- 7-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 5-Ground : Always continuity

### : Parts Location

Code	See Page	Code	See Page	Code	See Page	
A17	<a href="#">68</a>	A47	C	<a href="#">70</a>	J16	<a href="#">71</a>
A30	<a href="#">70</a>	C28	<a href="#">70</a>	R36	<a href="#">71</a>	
A45	A	<a href="#">70</a>	J11	<a href="#">71</a>		

### : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2D	<a href="#">28</a>	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
3B	<a href="#">40</a>	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3D	<a href="#">40</a>	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3N	<a href="#">43</a>	
3P		
4B	<a href="#">52</a>	Dash Wire and J/B No.4 (Instrument Panel Center)
4D		
4E		

### : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IW3	<a href="#">82</a>	Engine Room No.2 Wire and Dash Wire (Behind the Glove Box)
Ib1	<a href="#">84</a>	Dash Wire and Dash Wire (Behind the Combination Meter)

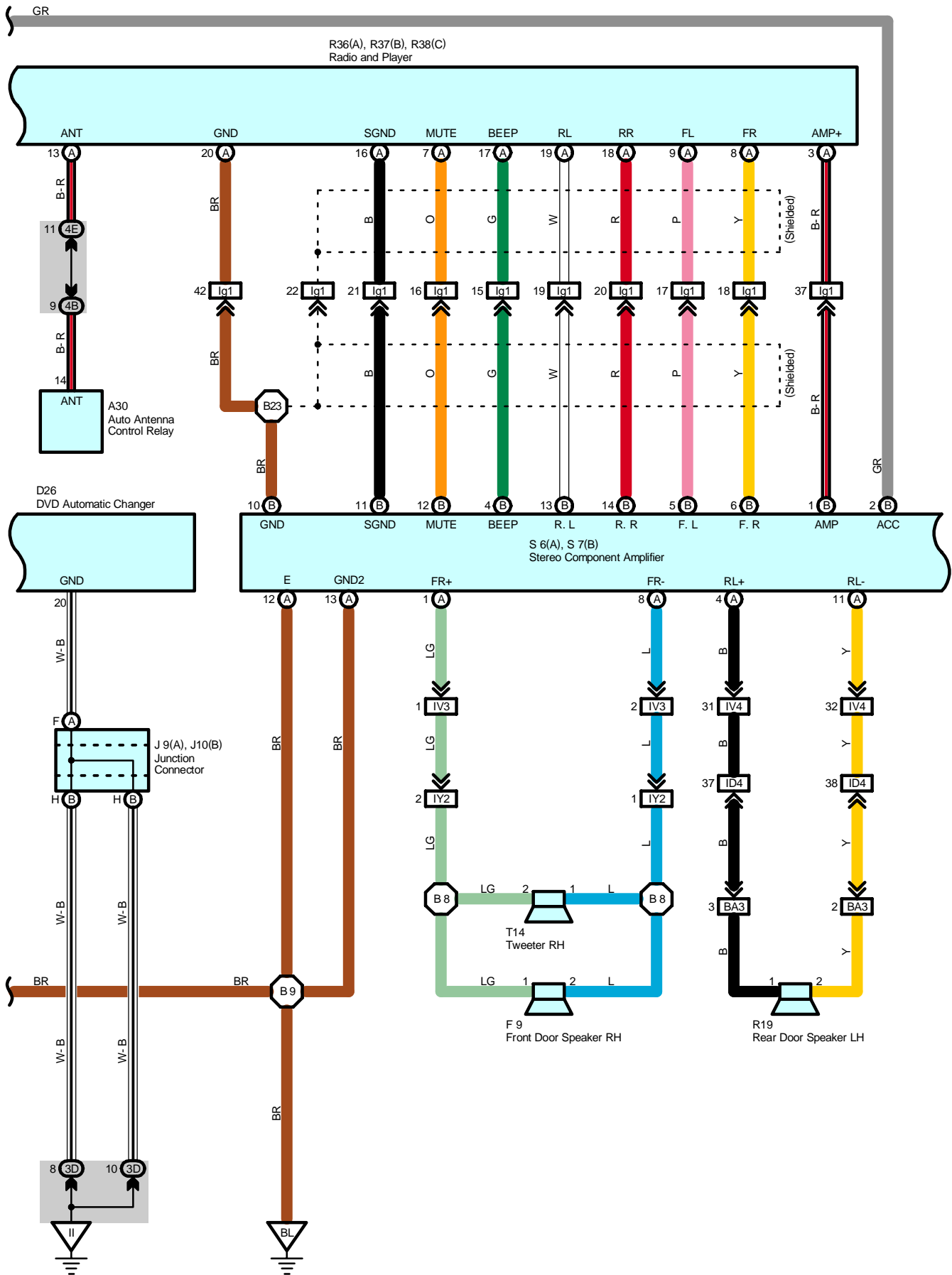
### : Ground Points

Code	See Page	Ground Points Location
IF	<a href="#">78</a>	Set Bolt of Cowl Side J/B LH
II	<a href="#">78</a>	Set Bolt of Cowl Side J/B RH

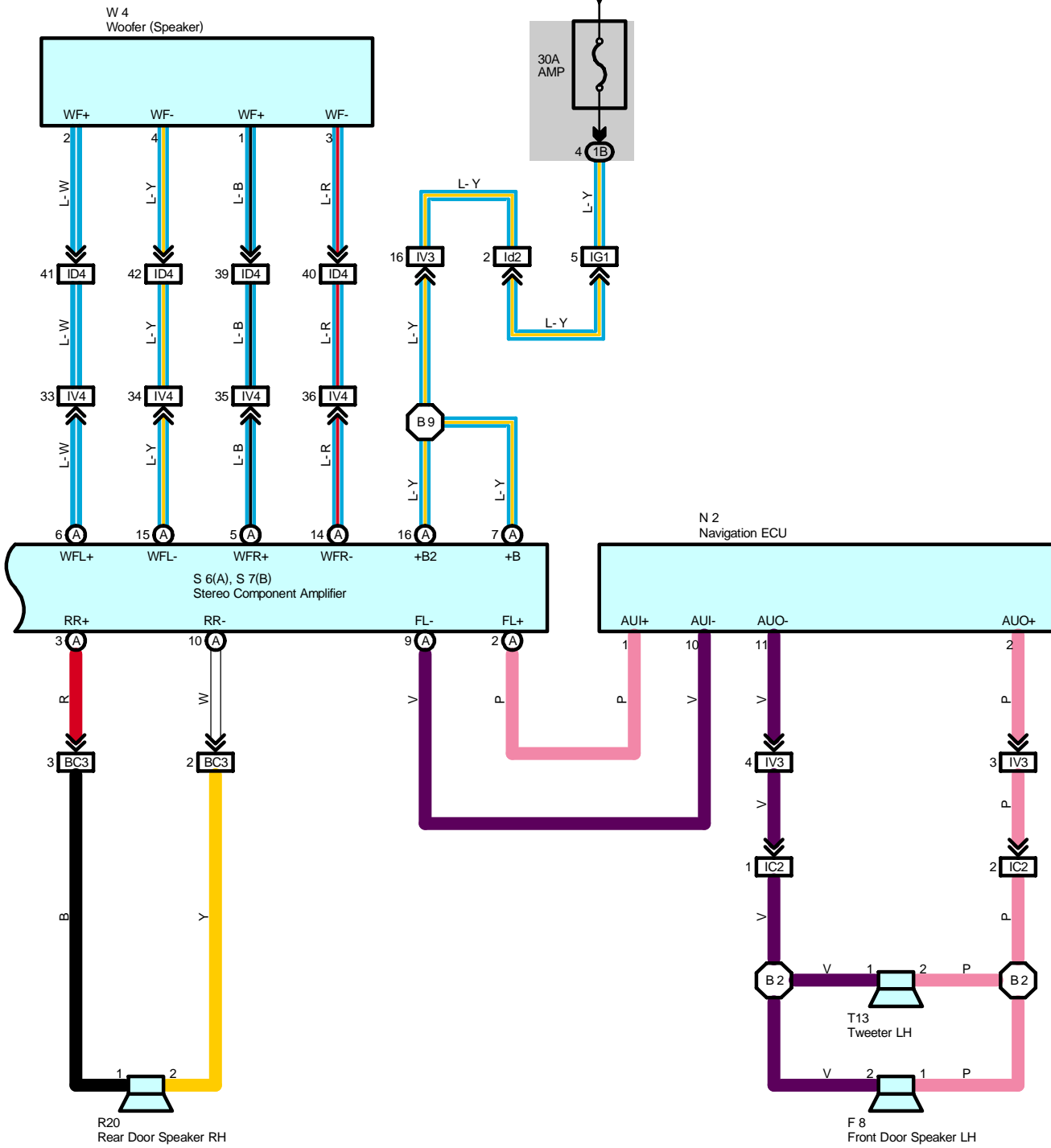




# Radio and Player (w/ Navigation System)



From Power Source System (See Page 94)



# Radio and Player (w/ Navigation System)

## Service Hints

### R36 Radio and Player

1-Ground : Always approx. 12 volts

11-Ground : Approx. 12 volts with ignition SW at ACC or ON position

### S6 (A), S7 (B) Stereo Component Amplifier

(A) 7, (A) 16-Ground : Always approx. 12 volts

(B) 2-Ground : Approx. 12 volts with ignition SW at ACC or ON position

(A) 12, (A) 13-Ground : Always continuity

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A30	70	M6	B 71	R39	71
B9	70	M7	C 71	S6	A 73
C18	70	N2	72	S7	B 73
D26	70	R19	73	T13	73
F8	72	R20	73	T14	73
F9	72	R36	A 71	W4	73
J9	A 71	R37	B 71		
J10	B 71	R38	C 71		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4B		
4E		

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IC2	78	Front Door LH Wire and Dash Wire (Left Kick Panel)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IG1	78	Engine Room No.2 Wire and Dash Wire (Behind the Combination Meter)
Ii3	80	Dash Wire and Column Wire (Near the Ignition SW)
IP2	80	Rear Console Box Wire and Dash Wire (Right Side of Rear Console)
IV3	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IV4		
IY2	82	Front Door RH Wire and Dash Wire (Right Kick Panel)
Ib3	84	Dash Wire and Dash Wire (Behind the Combination Meter)
Id2	84	Dash Wire and Dash Wire (Instrument Panel Center)
Id4		
Ig1	84	Dash Wire and Floor No.2 Wire (Right Side of Front Console)
BA3	86	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BC3	86	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)

## ▽ : Ground Points

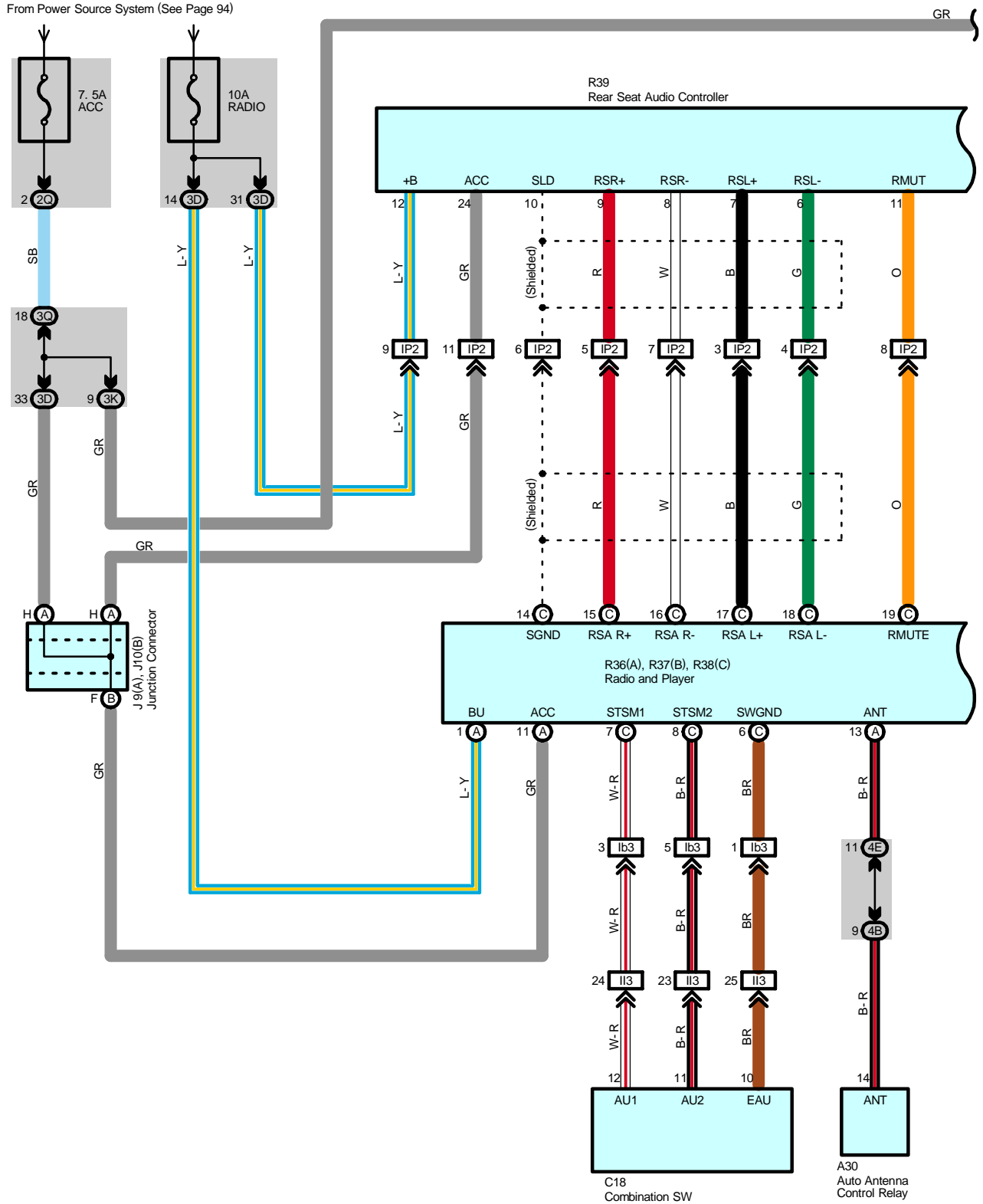
Code	See Page	Ground Points Location
II	78	Set Bolt of Cowl Side J/B RH
BL	86	Rear Side Under the Front Passenger's Seat



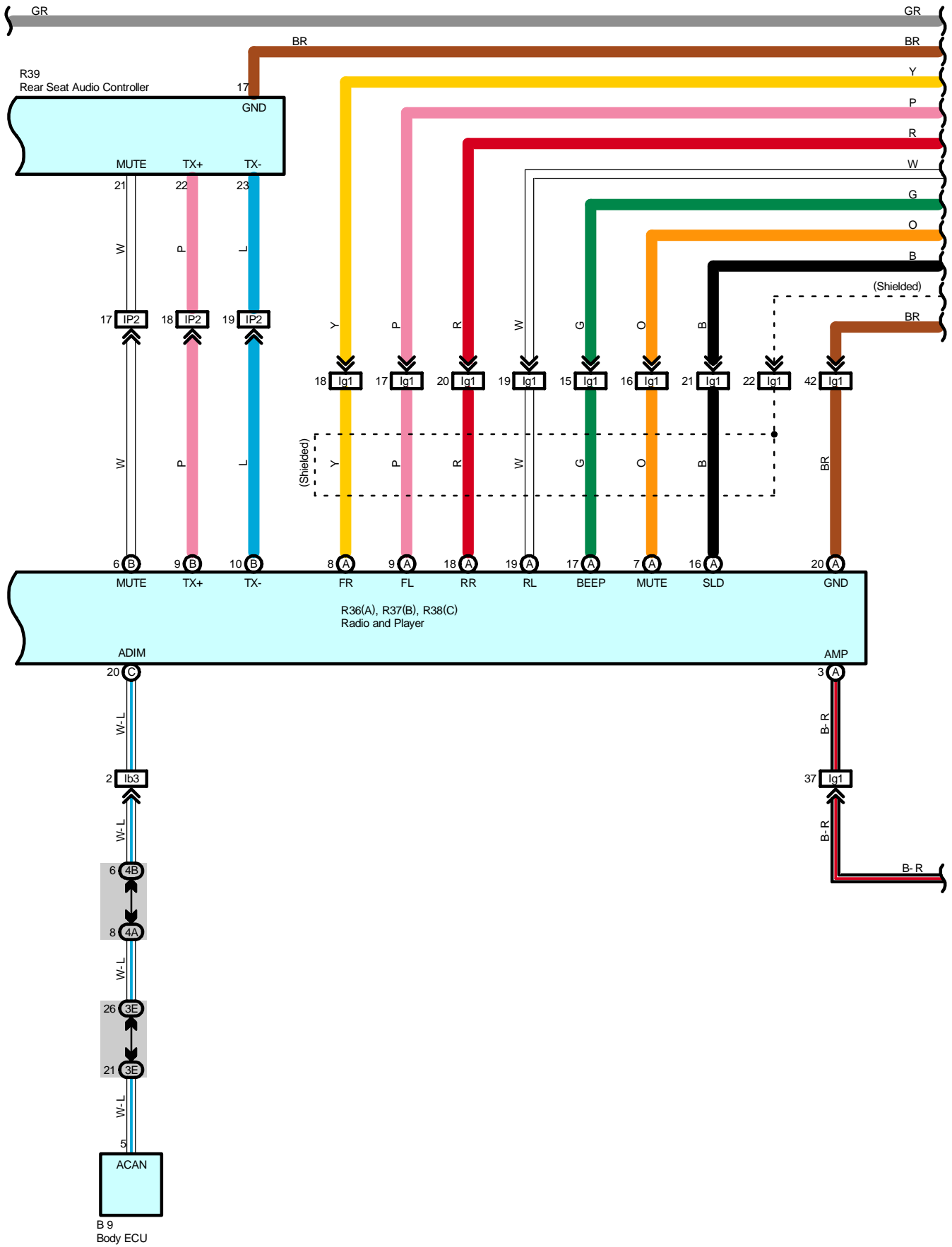
**: Splice Points**

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B2	88	Front Door LH Wire	B9	88	Floor No.2 Wire
B8	88	Front Door RH Wire	B23		

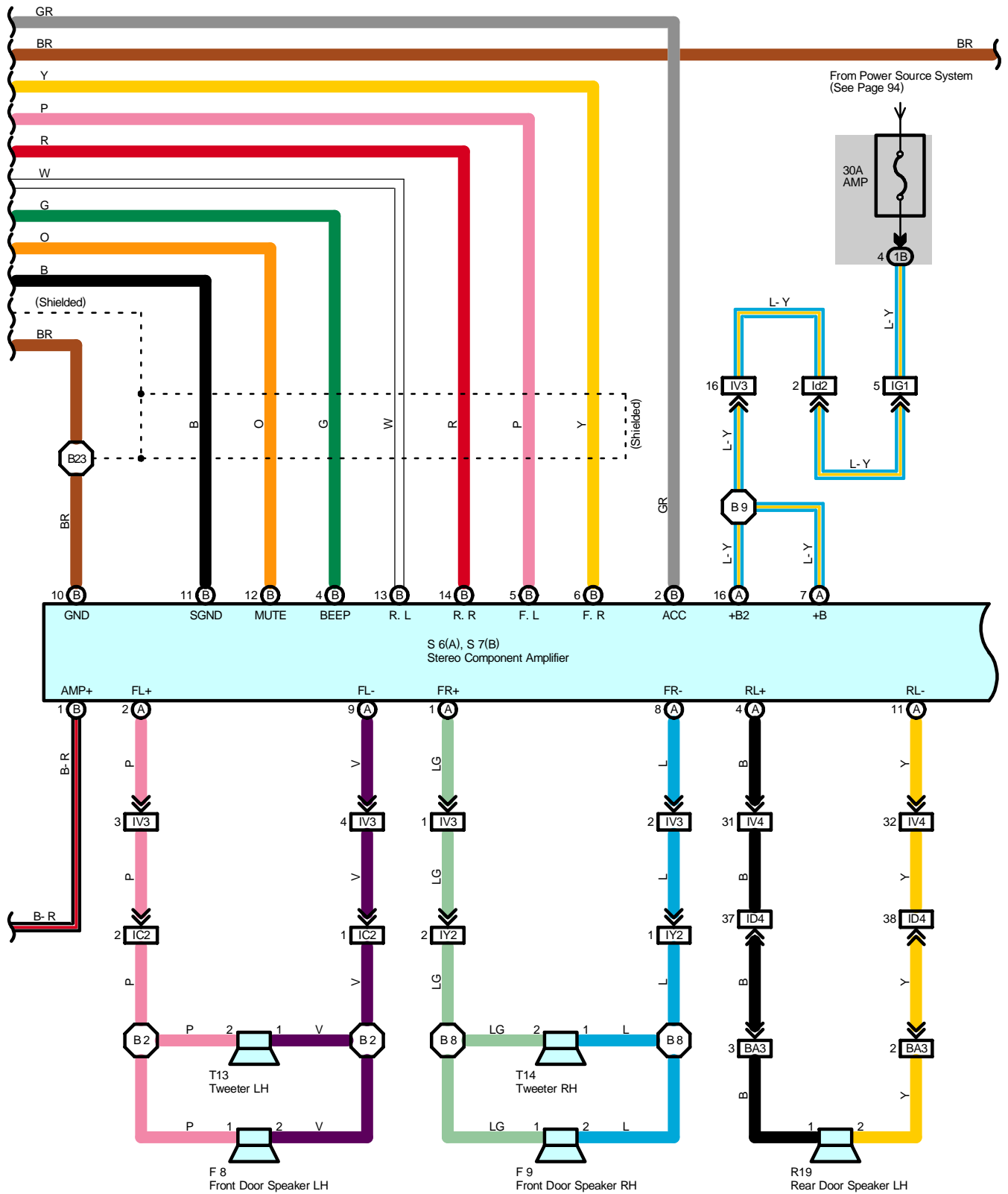
# Radio and Player (w/o Navigation System)

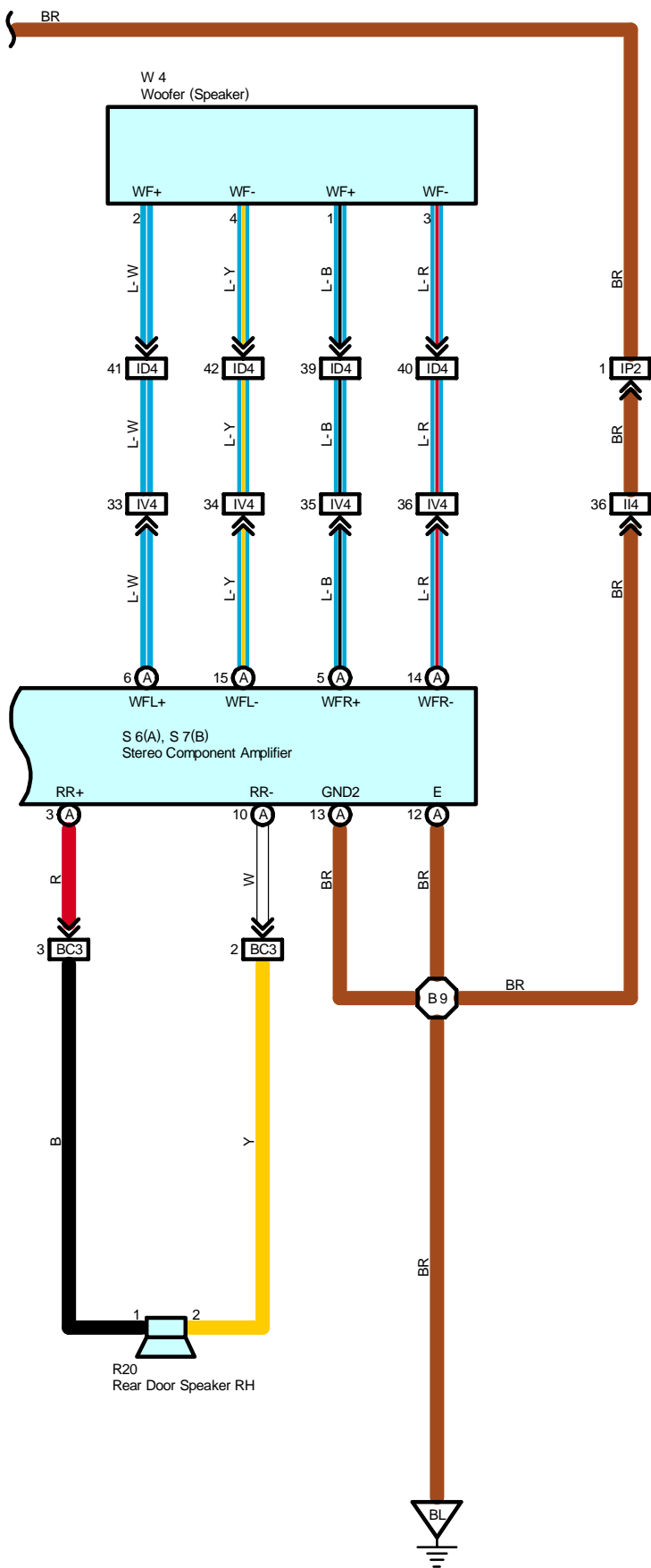






# Radio and Player (w/o Navigation System)





# Radio and Player (w/o Navigation System)

## Service Hints

### R36 Radio and Player

1-Ground : Always approx. 12 volts

11-Ground : Approx. 12 volts with ignition SW at ACC or ON position

### S6 (A), S7 (B) Stereo Component Amplifier

(A) 7, (A) 16-Ground : Always approx. 12 volts

(B) 2-Ground : Approx. 12 volts with ignition SW at ACC or ON position

(A) 12, (A) 13-Ground : Always continuity

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A30	70	J10	B 71	R39	71
B9	70	R19	73	S6	A 73
C18	70	R20	73	S7	B 73
F8	72	R36	A 71	T13	73
F9	72	R37	B 71	T14	73
J9	A 71	R38	C 71	W4	73

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4B		
4E		

## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IC2	78	Front Door LH Wire and Dash Wire (Left Kick Panel)
ID4	78	Dash Wire and Floor No.1 Wire (Left Kick Panel)
IG1	78	Engine Room No.2 Wire and Dash Wire (Behind the Combination Meter)
II3	80	Dash Wire and Column Wire (Near the Ignition SW)
II4		
IP2	80	Rear Console Box Wire and Dash Wire (Right Side of Rear Console)
IV3	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IV4		
IY2	82	Front Door RH Wire and Dash Wire (Right Kick Panel)
Ib3	84	Dash Wire and Dash Wire (Behind the Combination Meter)
Id2	84	Dash Wire and Dash Wire (Instrument Panel Center)
Ig1	84	Dash Wire and Floor No.2 Wire (Right Side of Front Console)
BA3	86	Rear Door LH Wire and Floor No.1 Wire (Left Side of Center Pillar)
BC3	86	Rear Door RH Wire and Floor No.2 Wire (Right Side of Center Pillar)

## ▽ : Ground Points

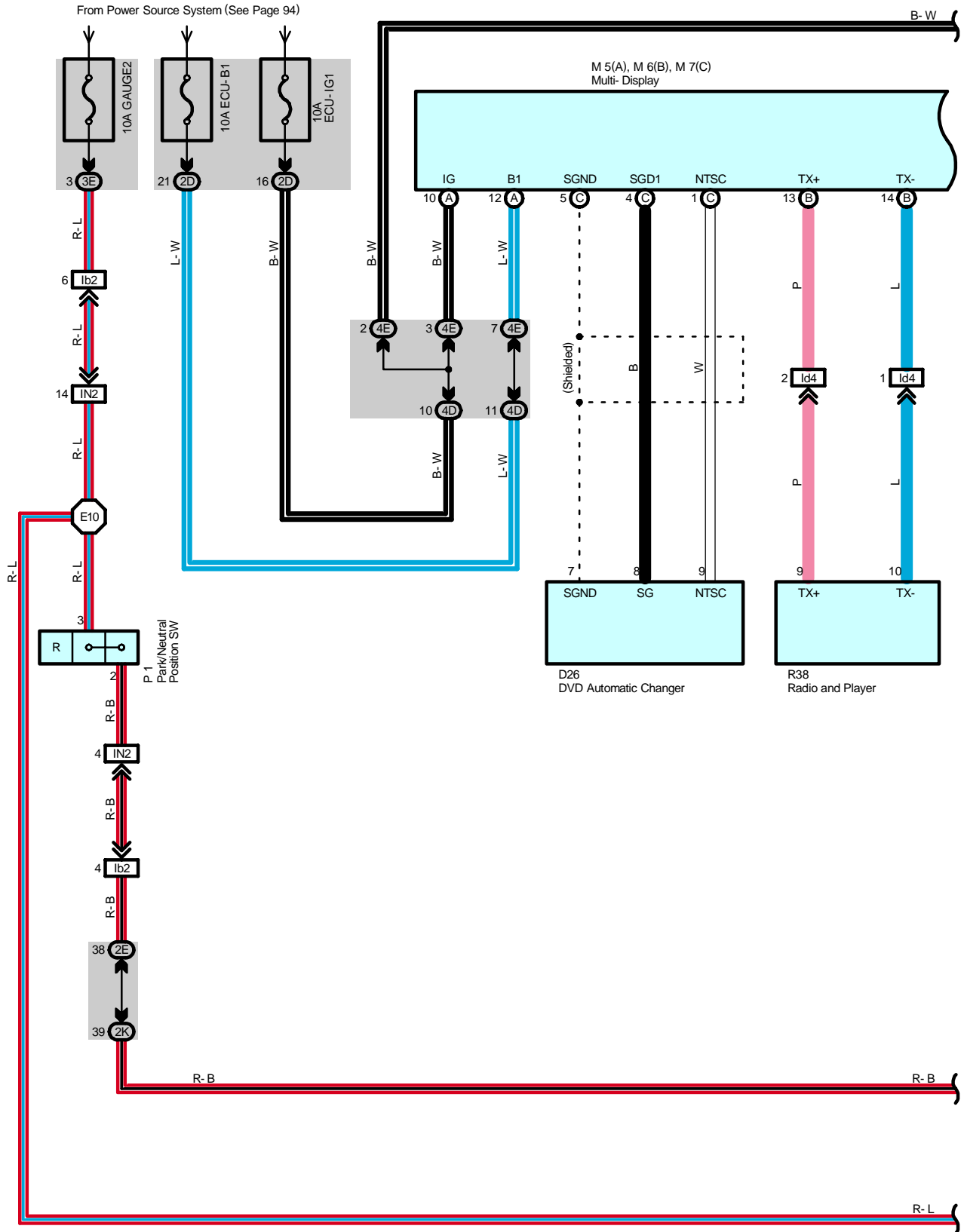
Code	See Page	Ground Points Location
BL	86	Rear Side Under the Front Passenger's Seat



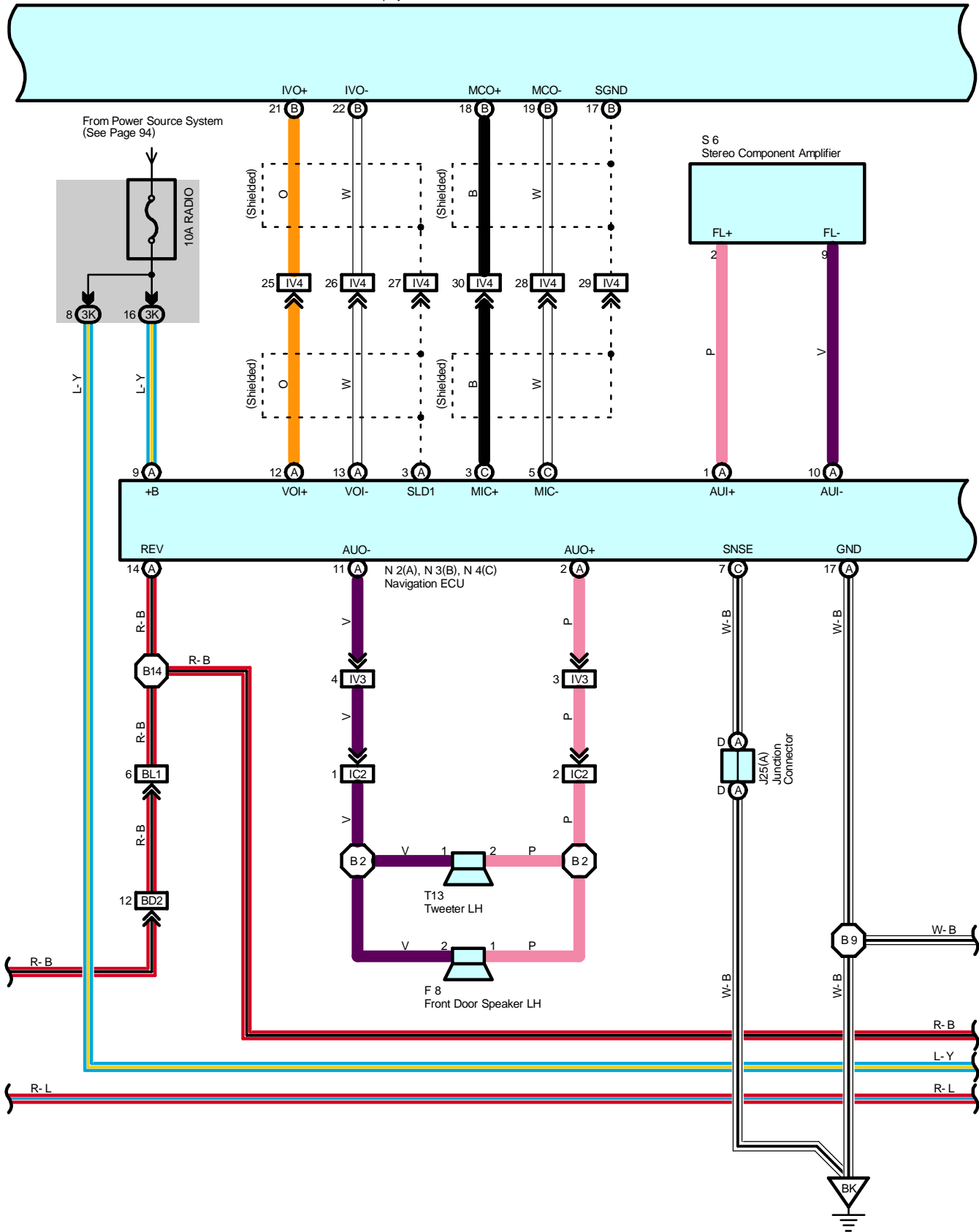
**: Splice Points**

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B2	88	Front Door LH Wire	B9	88	Floor No.2 Wire
B8	88	Front Door RH Wire	B23		

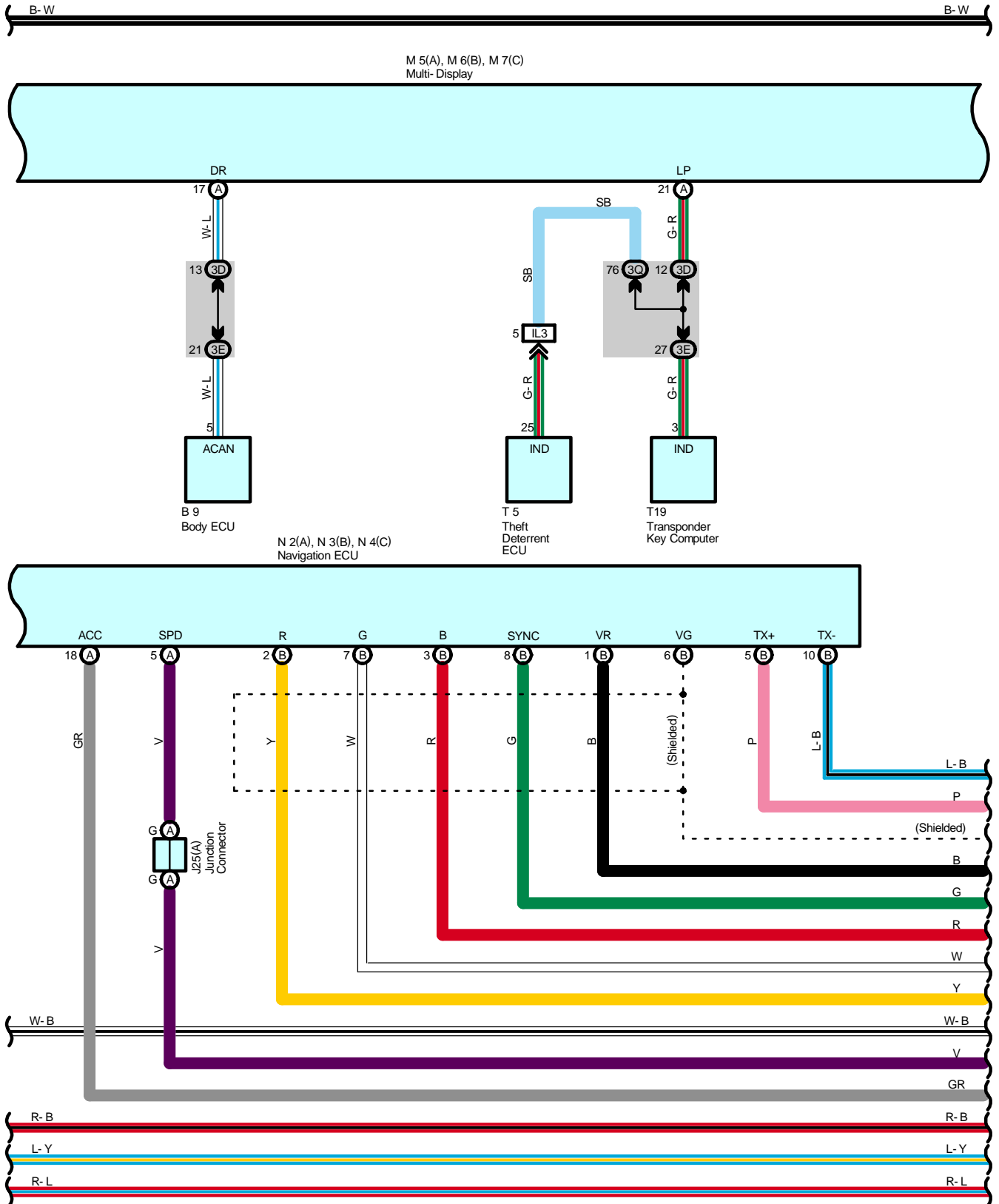
# Navigation System, TOYOTA Parking Assist (Rear View Monitor)



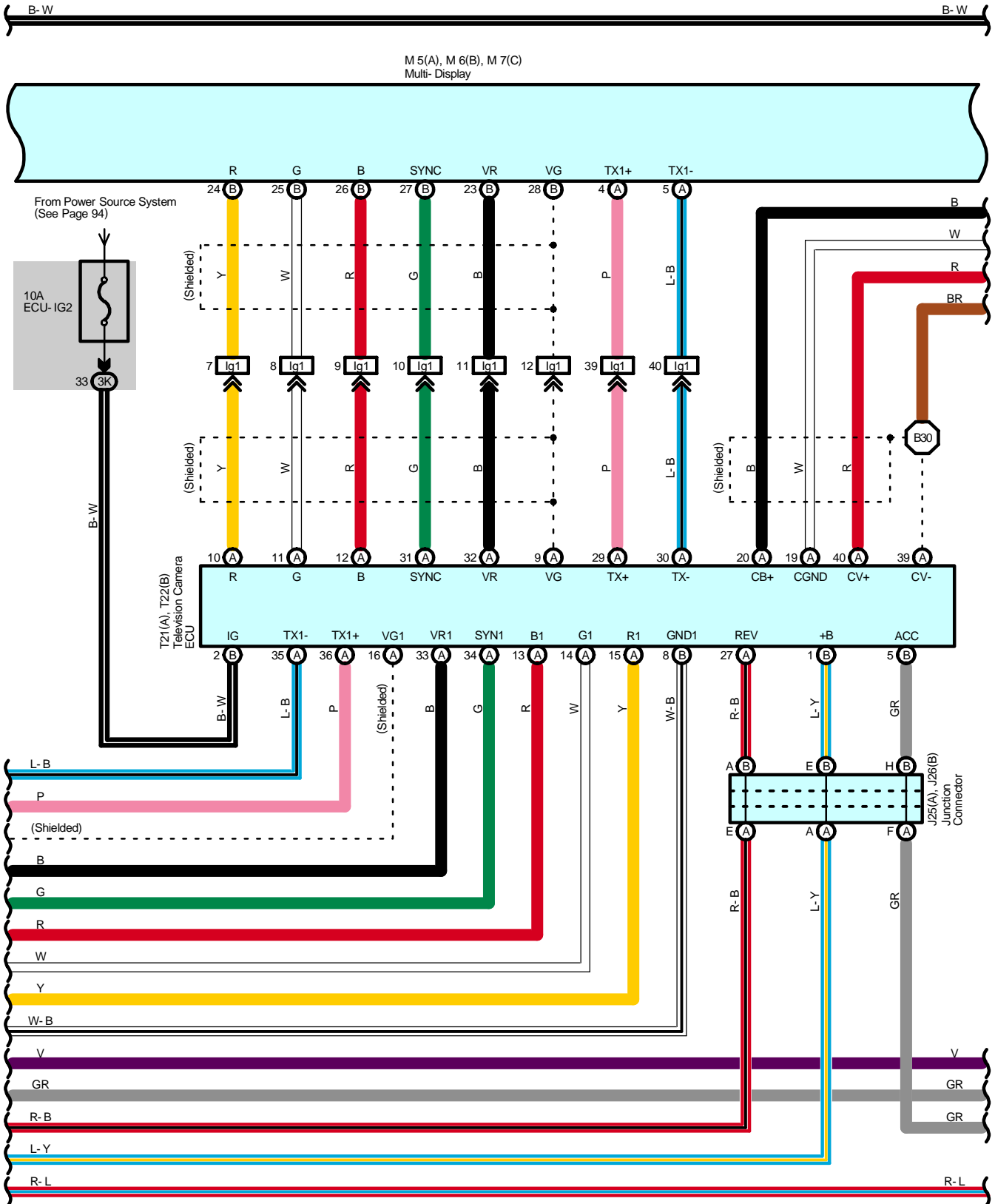
M 5(A), M 6(B), M 7(C)  
Multi-Display



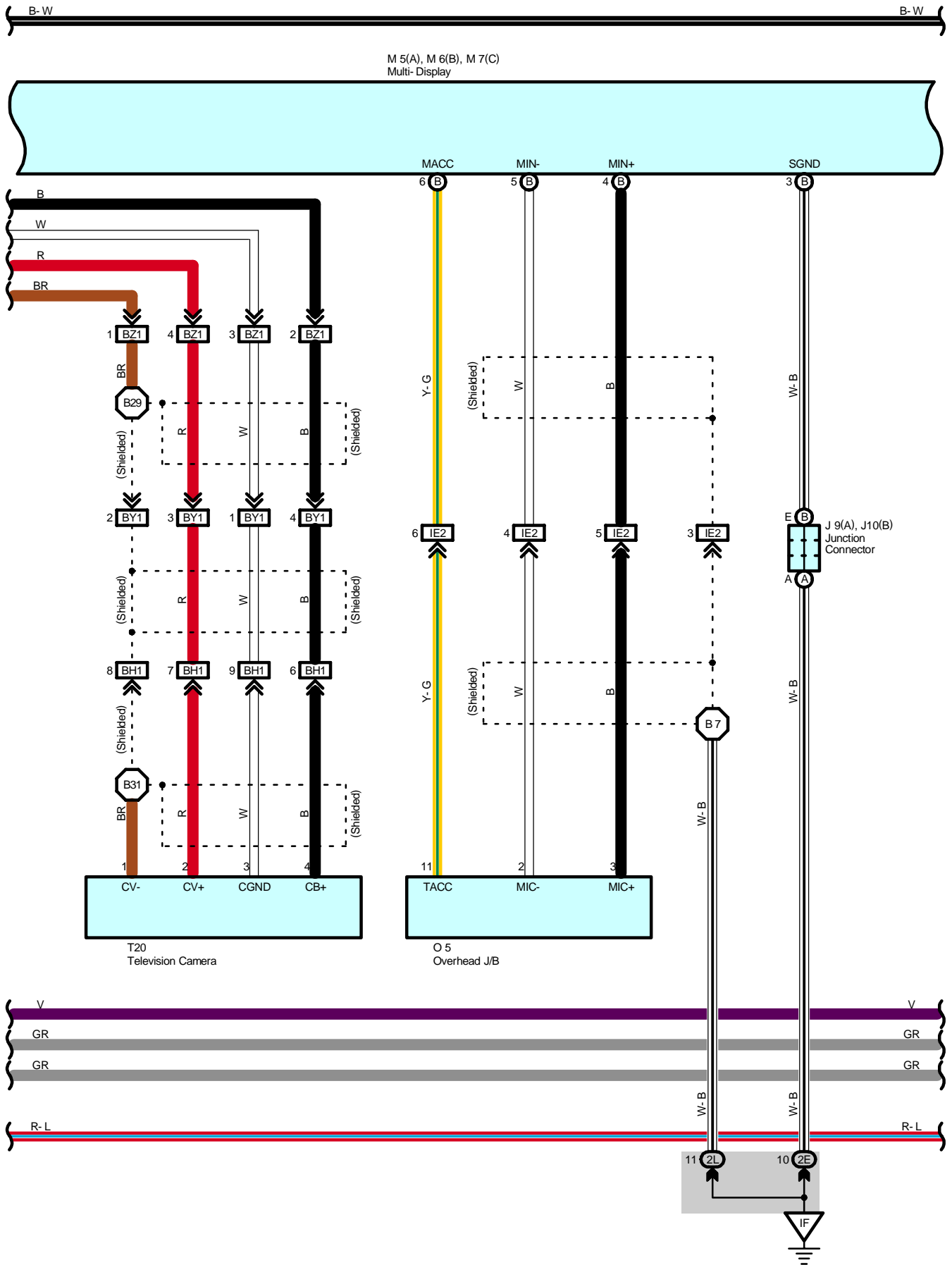
# Navigation System, TOYOTA Parking Assist (Rear View Monitor)

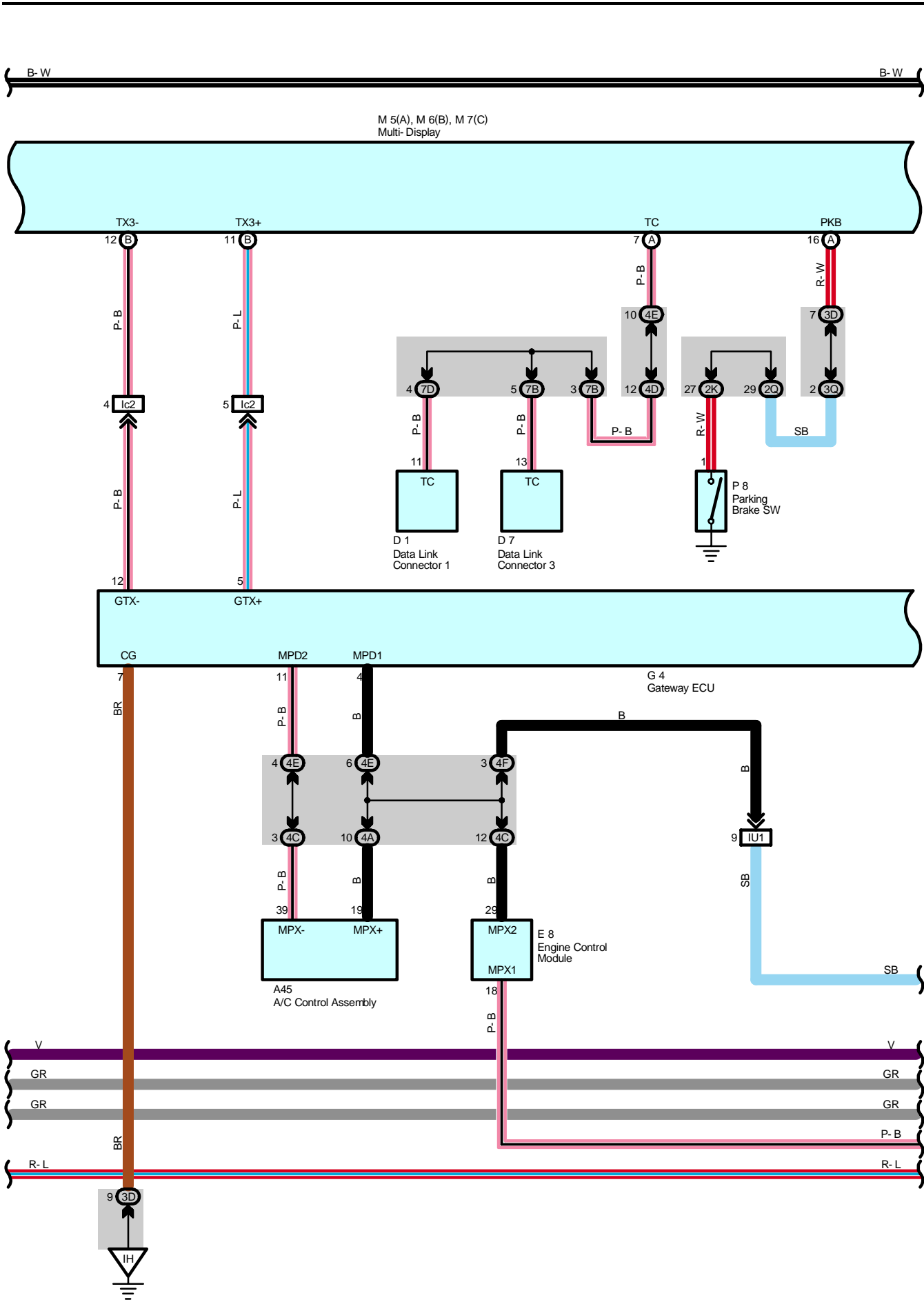




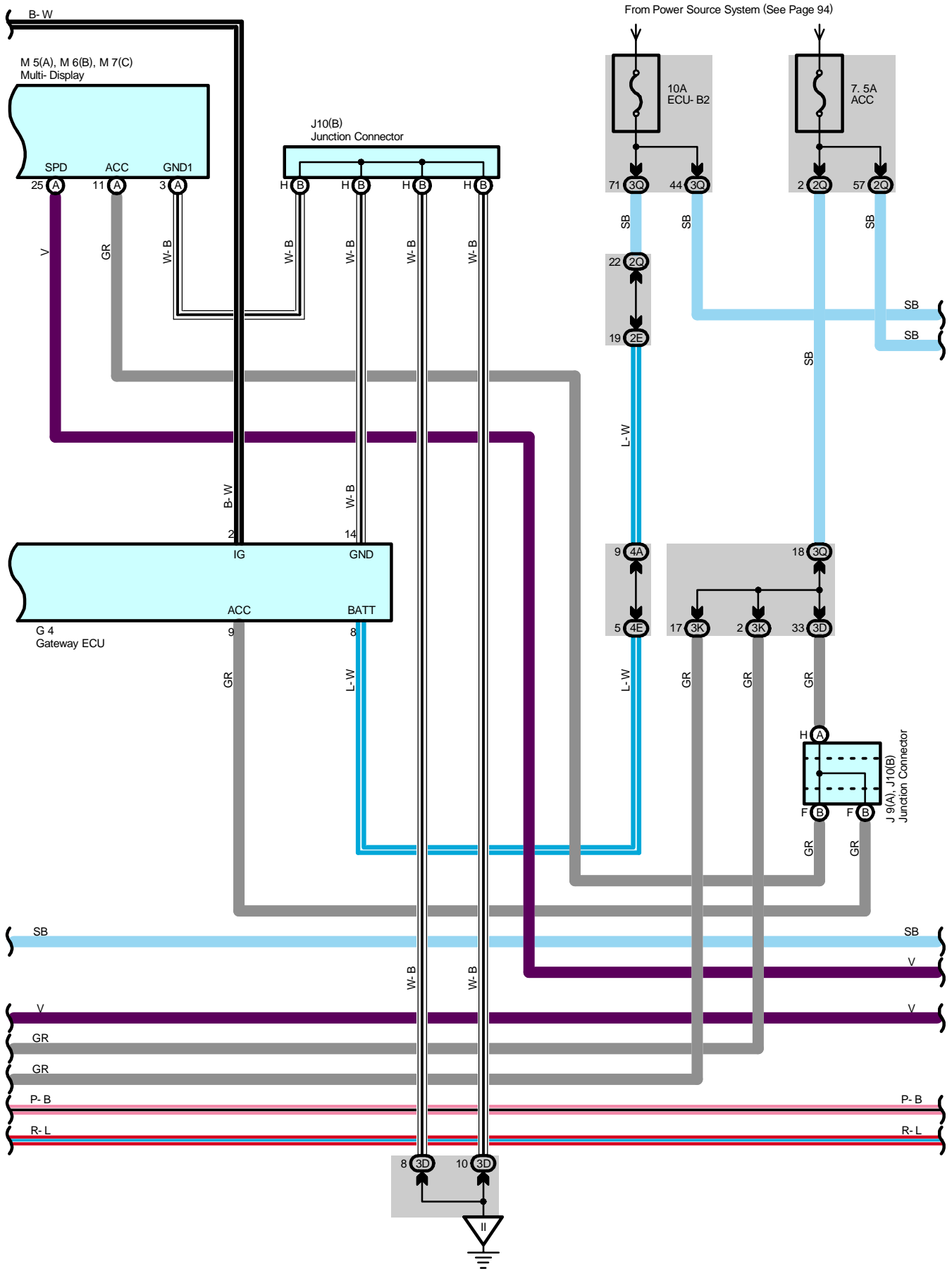


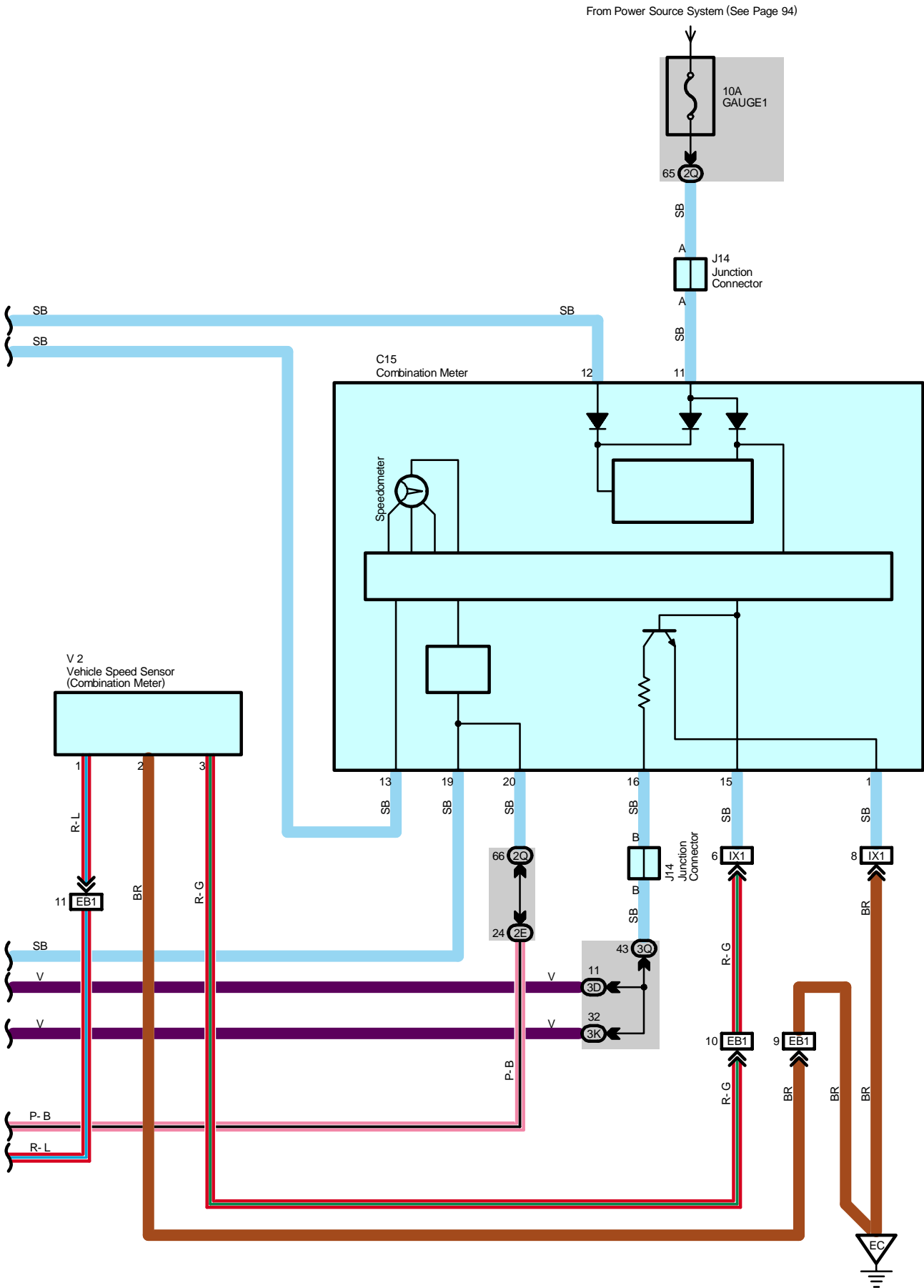
# Navigation System, TOYOTA Parking Assist (Rear View Monitor)





# Navigation System, TOYOTA Parking Assist (Rear View Monitor)





# Navigation System, TOYOTA Parking Assist (Rear View Monitor)

## System Outline

The navigation system displays the operating status and instructions for the automatic air conditioning or radio and player, as well as trip information. Additionally, the navigation system precisely measures the current vehicle position, displays the map obtained from the map database on the screen, and informs the route to the destination shown on the map using voice guidance.

## Service Hints

### N2 (A), N4 (C) Navigation ECU

- (A) 9-Ground : Always approx. 12 volts
- (A)18-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- (A)17-Ground : Always continuity
- (C) 7-Ground : Always continuity

### M5 (A), M6 (B) Multi-Display

- (A)12-Ground : Always approx. 12 volts
- (A)11-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- (A)10-Ground : Approx. 12 volts with ignition SW at ON or ST position
- (A) 3-Ground : Always continuity
- (B) 3-Ground : Always continuity

### T22 Television Camera ECU

- 1-Ground : Always approx. 12 volts
- 5-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- 2-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 8-Ground : Always continuity

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page
A45	<a href="#">70</a>	J14	<a href="#">71</a>	P8	<a href="#">73</a>
B9	<a href="#">70</a>	J25	A <a href="#">72</a>	R38	<a href="#">71</a>
C15	<a href="#">70</a>	J26	B <a href="#">72</a>	S6	<a href="#">73</a>
D1	<a href="#">68</a>	M5	A <a href="#">71</a>	T5	<a href="#">71</a>
D7	<a href="#">70</a>	M6	B <a href="#">71</a>	T13	<a href="#">73</a>
D26	<a href="#">70</a>	M7	C <a href="#">71</a>	T19	<a href="#">71</a>
E8	<a href="#">70</a>	N2	A <a href="#">72</a>	T20	<a href="#">73</a>
F8	<a href="#">72</a>	N3	B <a href="#">72</a>	T21	A <a href="#">73</a>
G4	<a href="#">70</a>	N4	C <a href="#">72</a>	T22	B <a href="#">73</a>
J9	A <a href="#">71</a>	O5	<a href="#">72</a>	V2	<a href="#">69</a>
J10	B <a href="#">71</a>	P1	<a href="#">69</a>		

 : **Junction Block and Wire Harness Connector**

Code	See Page	Junction Block and Wire Harness (Connector Location)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2L	28	Roof No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4D		
4E		
4F		
7B	64	Dash Wire and J/B No.7 (Behind the Grove Box)
7D	64	Engine Room No.2 Wire and J/B No.7 (Behind the Grove Box)

 : **Connector Joining Wire Harness and Wire Harness**

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	76	Engine Wire and Transmission Wire (On the Transmission)
IC2	78	Front Door LH Wire and Dash Wire (Left Kick Panel)
IE2	78	Dash Wire and Roof No.1 Wire (Left Kick Panel)
IL3	80	Instrument Panel Integration Wire and Computer Wire (Instrument Panel Center)
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IU1	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IV3	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
IV4		
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
Ib2	84	Dash Wire and Dash Wire (Behind the Combination Meter)
Ic2	84	Dash Wire and Dash Wire (Behind the Center Panel)
Id4	84	Dash Wire and Dash Wire (Instrument Panel Center)
Ig1	84	Dash Wire and Floor No.2 Wire (Right Side of Front Console)
BD2	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BH1	86	Pillar No.1 Wire and Back Door Upper Wire (Left Side of Back Door)
BL1	88	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BY1	88	Pillar No.1 Wire and Floor No.3 Wire (Left Rear Side Quarter Panel)
BZ1	88	Floor No.3 Wire and Floor No.2 Wire (Right Side of Rear Floor Crossmember)

 : **Ground Points**

Code	See Page	Ground Points Location
EC	76	Rear Bank of Right Cylinder Head
IF	78	Set Bolt of Cowl Side J/B LH
IH	78	Set Bolt of Cowl Side J/B RH
II		
BK	86	Front Side Under the Front Passenger's Seat

# Navigation System, TOYOTA Parking Assist (Rear View Monitor)

---



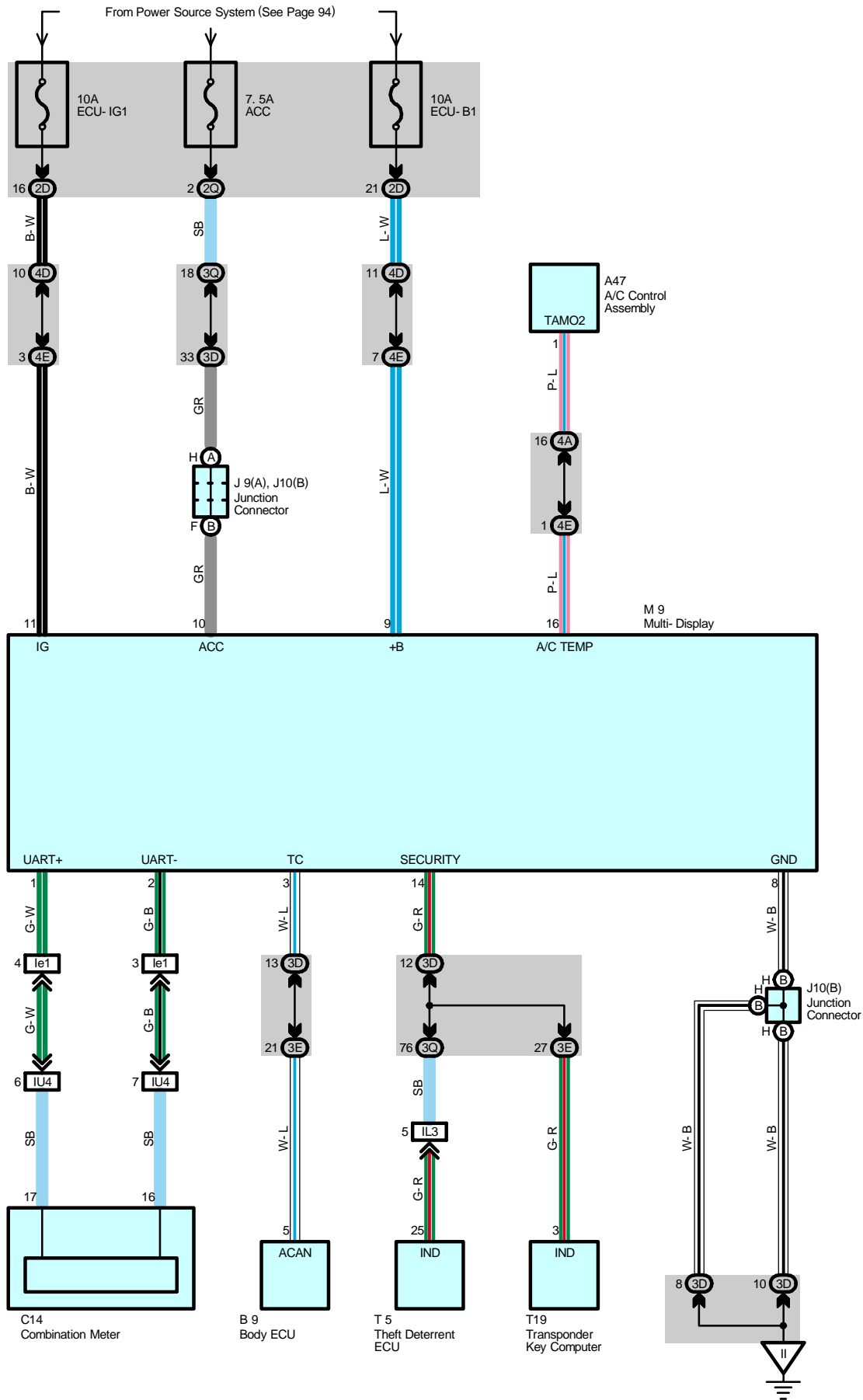
: Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E10	<a href="#">76</a>	Engine Wire	B14	<a href="#">88</a>	Floor No.2 Wire
B2	<a href="#">88</a>	Front Door LH Wire	B29	<a href="#">88</a>	Floor No.3 Wire
B7	<a href="#">88</a>	Roof No.1 Wire	B30	<a href="#">88</a>	Floor No.2 Wire
B9	<a href="#">88</a>	Floor No.2 Wire	B31	<a href="#">88</a>	Back Door Upper Wire





# Multi-Display (w/o Navigation System)



## Service Hints

### M9 Multi-Display

- 9-Ground : Always approx. 12 volts
- 10-Ground : Approx. 12 volts with ignition SW at ACC or ON position
- 11-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 8-Ground : Always continuity

### : Parts Location

Code	See Page	Code	See Page	Code	See Page
A47	<a href="#">70</a>	J9	A	<a href="#">71</a>	T5
B9	<a href="#">70</a>	J10	B	<a href="#">71</a>	T19
C14	<a href="#">70</a>	M9		<a href="#">71</a>	

### : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
2D	<a href="#">28</a>	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	<a href="#">30</a>	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	<a href="#">40</a>	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3Q	<a href="#">42</a>	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	<a href="#">52</a>	Dash Wire and J/B No.4 (Instrument Panel Center)
4D		
4E		

### : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IL3	<a href="#">80</a>	Instrument Panel Integration Wire and Computer Wire (Instrument Panel Center)
IU4	<a href="#">82</a>	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
Ie1	<a href="#">84</a>	Dash Wire and Dash Wire (Behind the Glove Box)

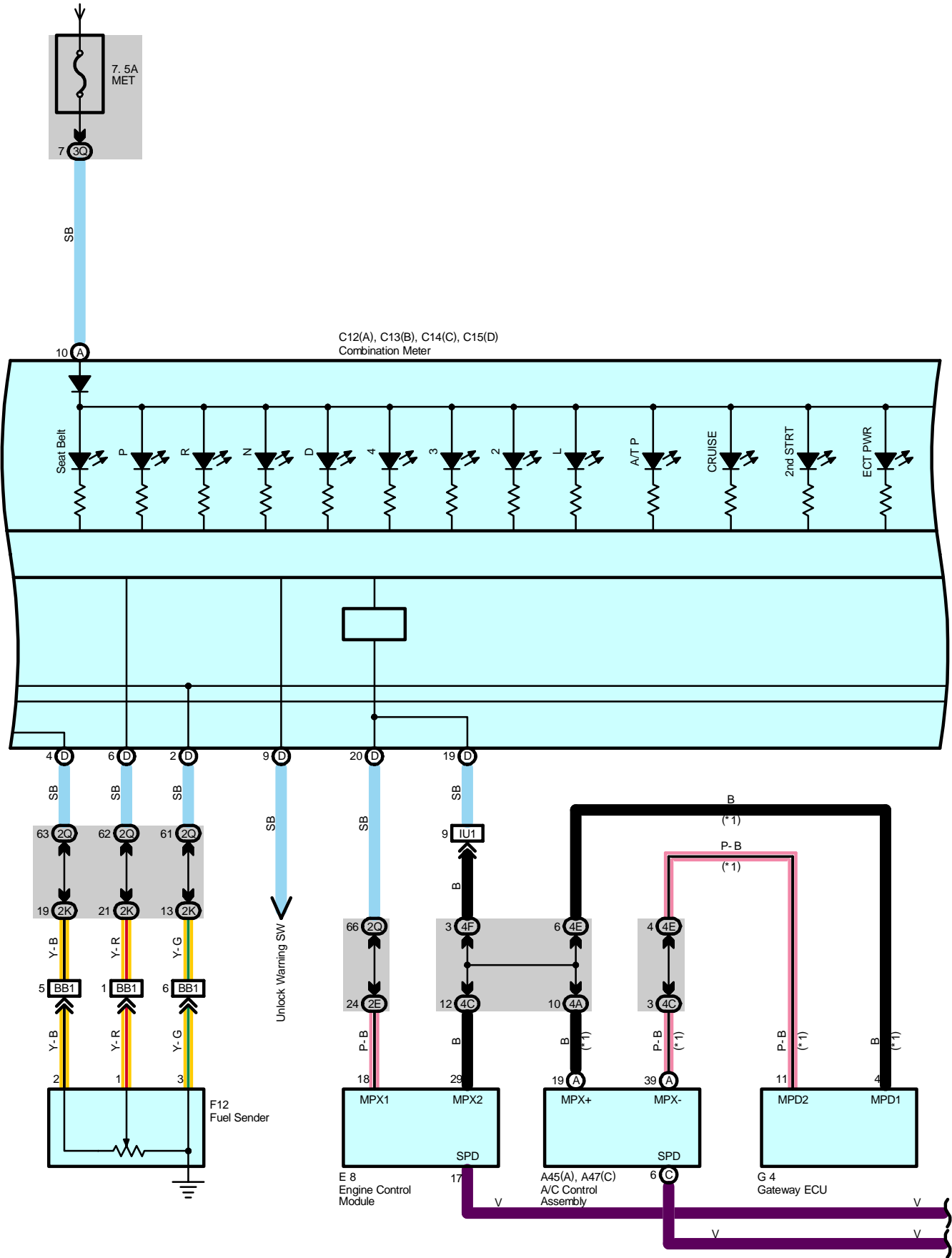
### : Ground Points

Code	See Page	Ground Points Location
II	<a href="#">78</a>	Set Bolt of Cowl Side J/B RH



From Power Source System (See Page 94)

\* 1 : w/ Navigation System

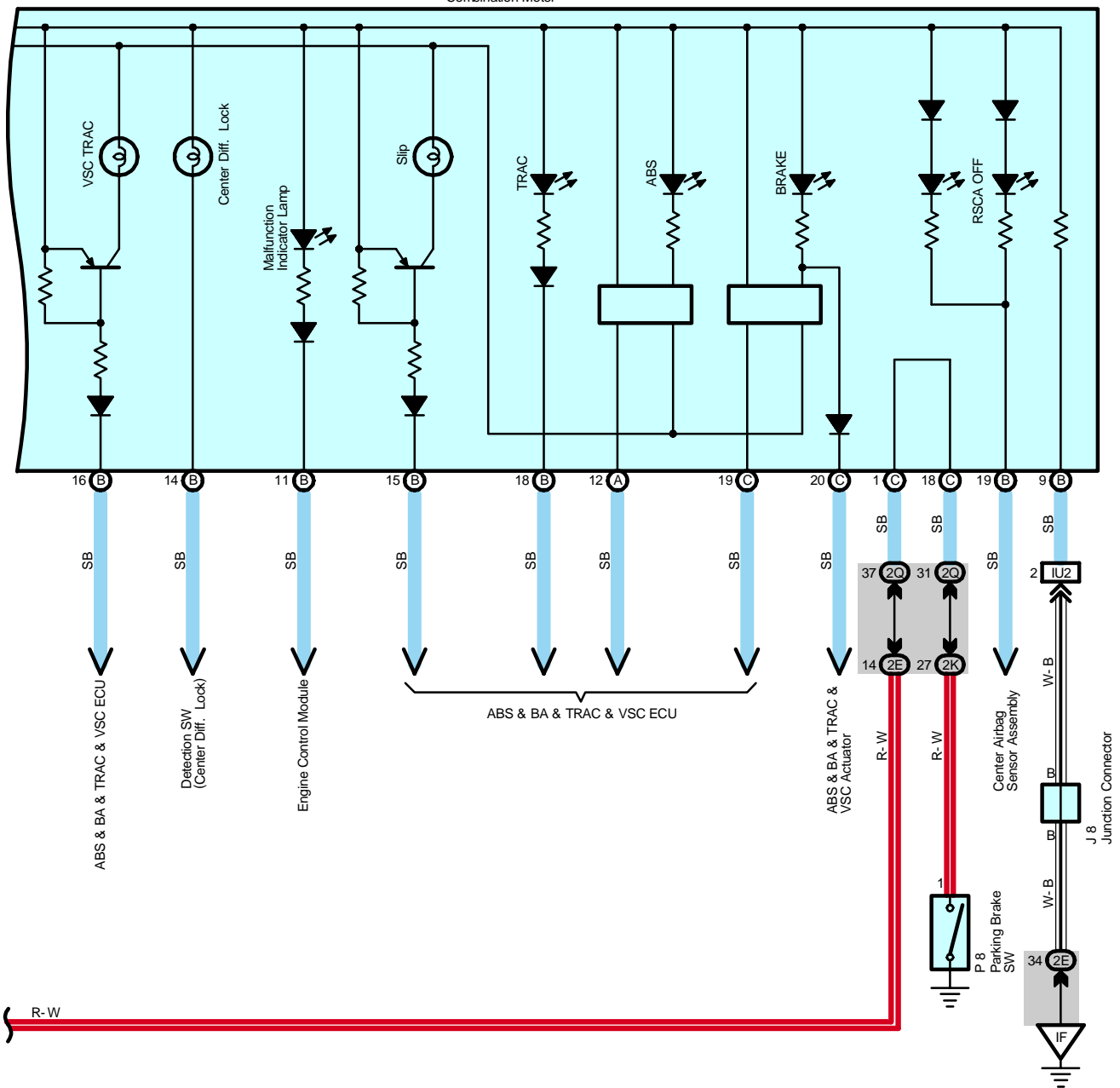






# Combination Meter

C12(A), C13(B), C14(C), C15(D)  
Combination Meter





## Service Hints

### P8 Parking Brake SW

1-Ground : Closed with parking brake lever pulled up

### C12 (A), C13 (B), C15 (D) Combination Meter

(D) 12, (D) 14-Ground : Always approx. 12 volts

(D) 13-Ground : Approx. 12 volts with ignition SW at ACC or ON position

(A) 10, (D) 11-Ground : Approx. 12 volts with ignition SW at ON or ST position

(B) 8-Ground : Approx. 12 volts with light control SW at TAIL or HEAD position

(B) 9, (D) 1-Ground : Always continuity

## ○ : Parts Location

Code		See Page	Code	See Page	Code	See Page
A45	A	70	E8	70	M5	71
A47	C	70	F12	72	M9	71
B8	B	70	G4	70	N2	72
B9	C	70	J8	71	O2	69
C12	A	70	J12	71	P8	73
C13	B	70	J14	71	V2	69
C14	C	70	J17	71		
C15	D	70	J25	72		

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2K	28	Floor No.1 Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4E		
4F		

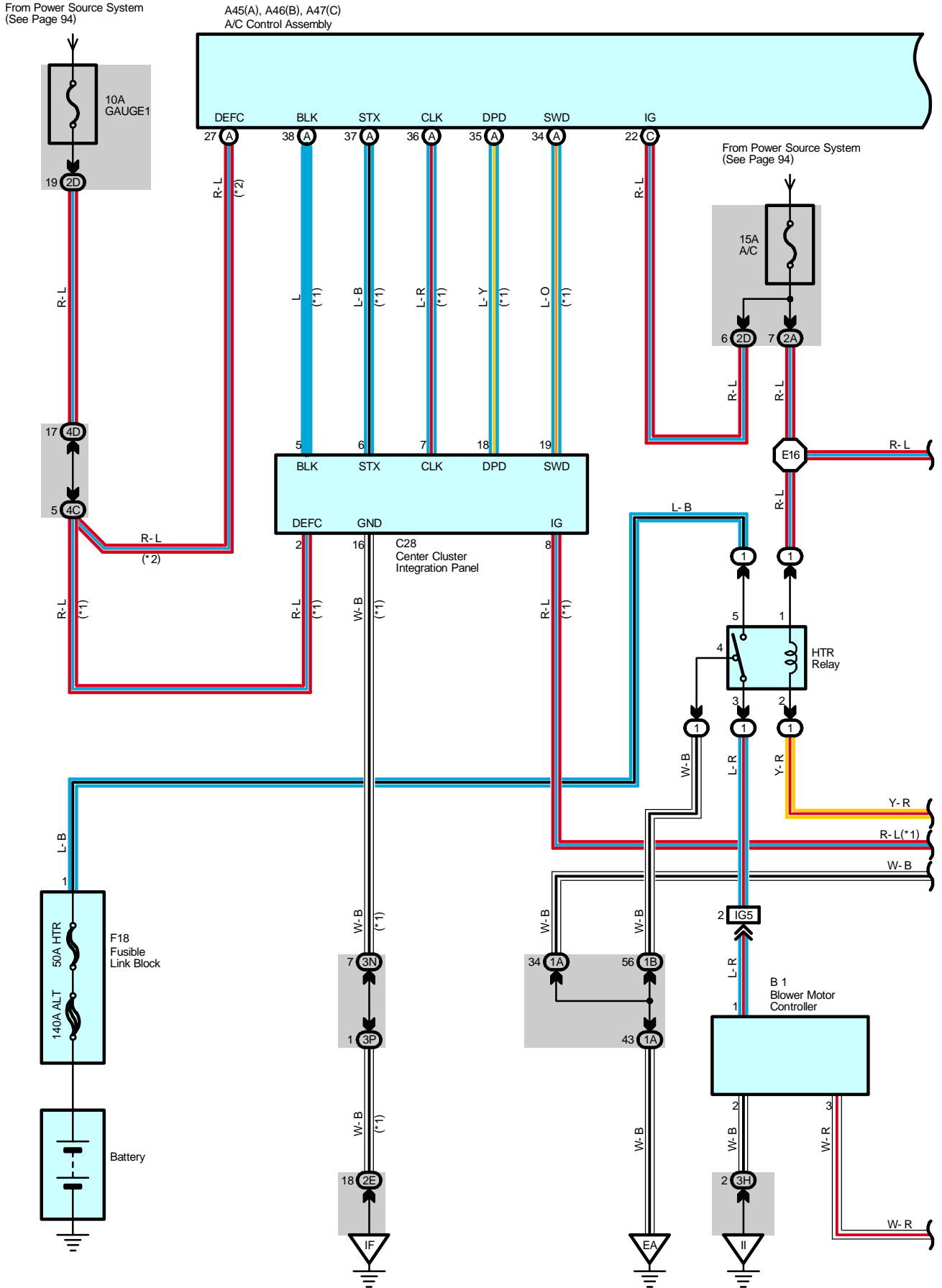
## □ : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	76	Engine Wire and Transmission Wire (On the Transmission)
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IU1	82	Instrument Panel Integration Wire and Dash Wire (Behind the Glove Box)
IU2		
IU3		
IU4		
IX1	82	Instrument Panel Integration Wire and Engine Wire (Behind the Glove Box)
IX2		
Ib2	84	Dash Wire and Dash Wire (Behind the Combination Meter)
Ie1	84	Dash Wire and Dash Wire (Behind the Glove Box)
BB1	86	Floor No.1 Wire and Fuel Tank Wire (Near the Fuel Tank)

## ▽ : Ground Points

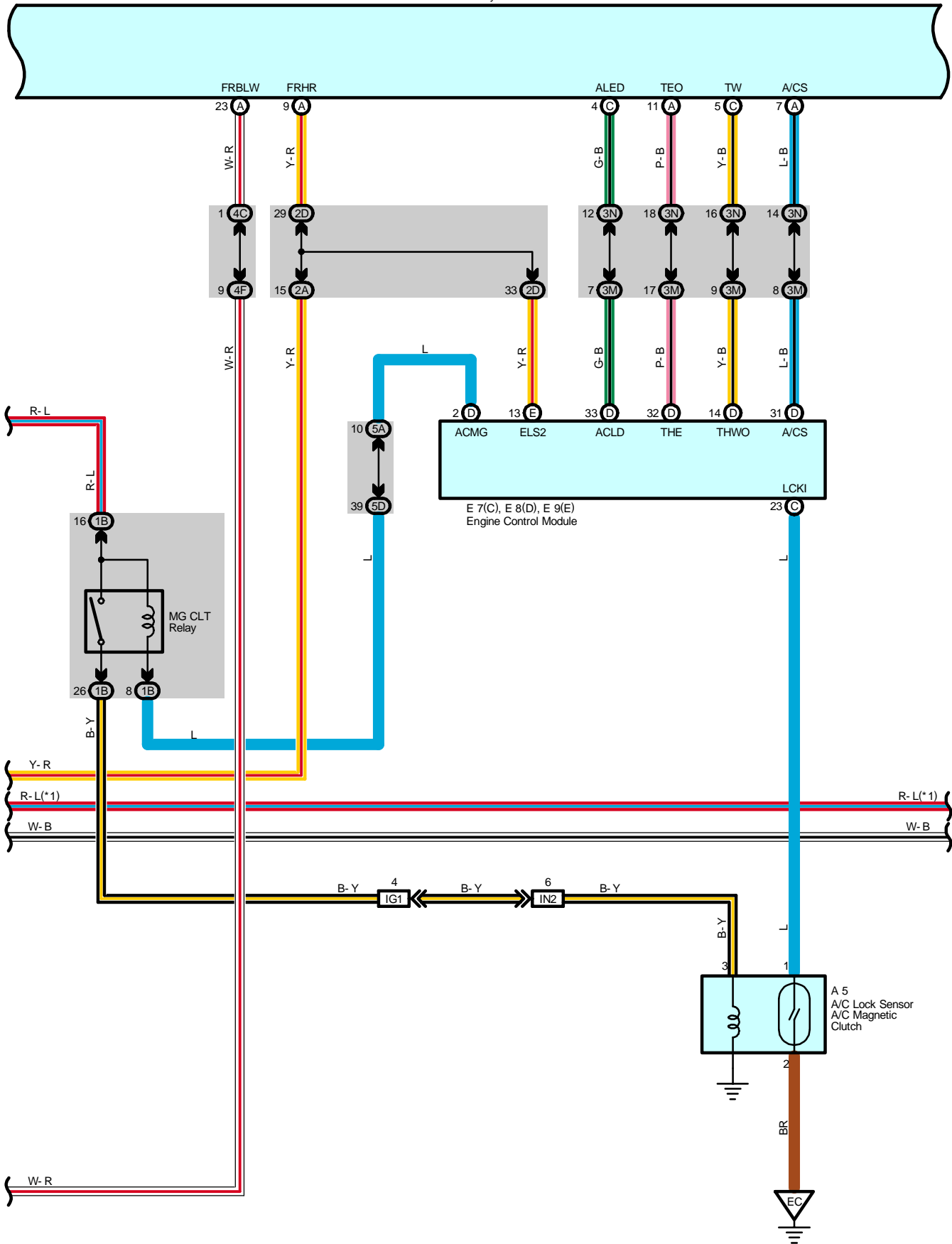
Code	See Page	Ground Points Location
EC	76	Rear Bank of Right Cylinder Head
IF	78	Set Bolt of Cowl Side J/B LH

# Air Conditioning (Front)



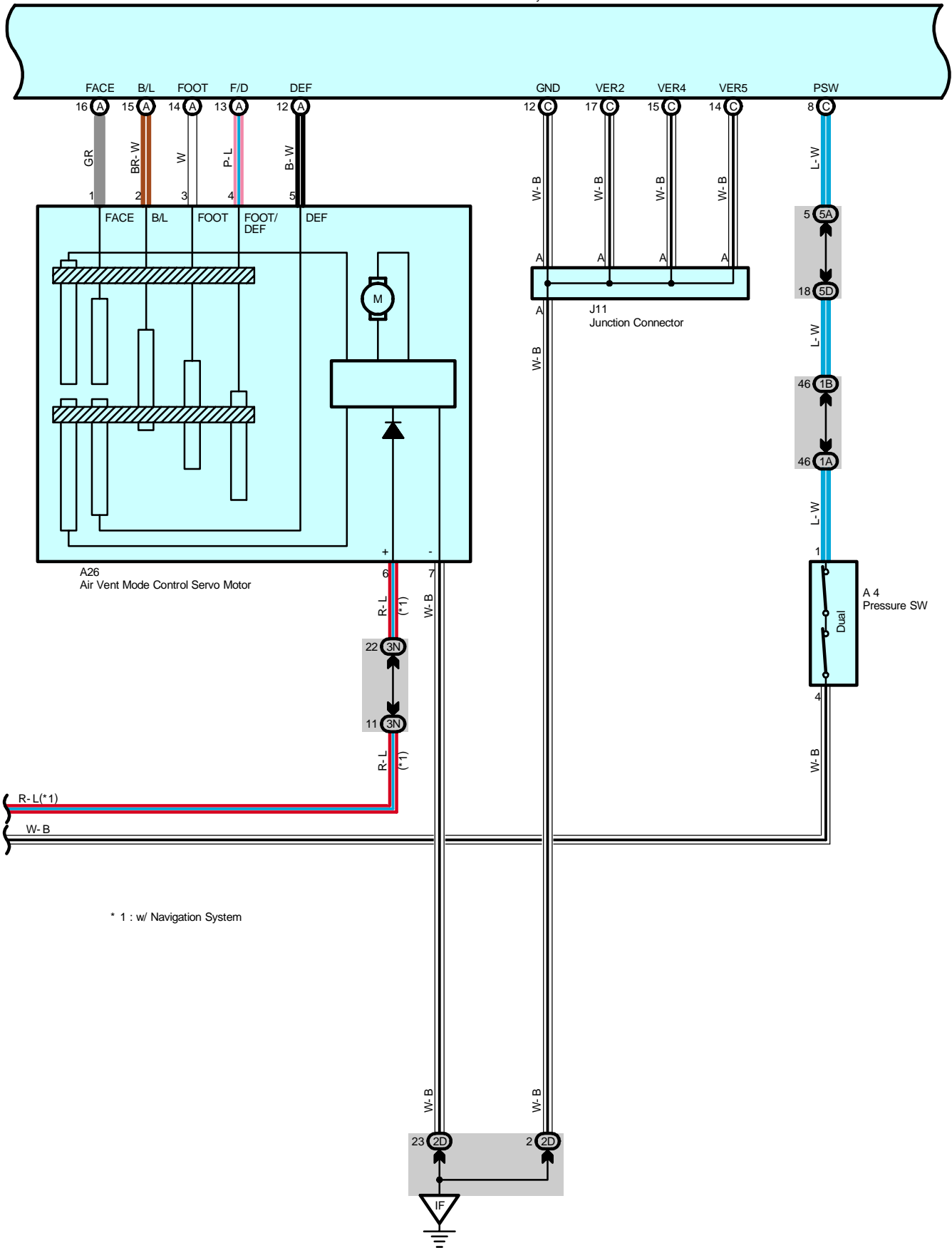
A45(A), A46(B), A47(C)  
A/C Control Assembly

\* 1 : w/ Navigation System  
\* 2 : w/o Navigation System

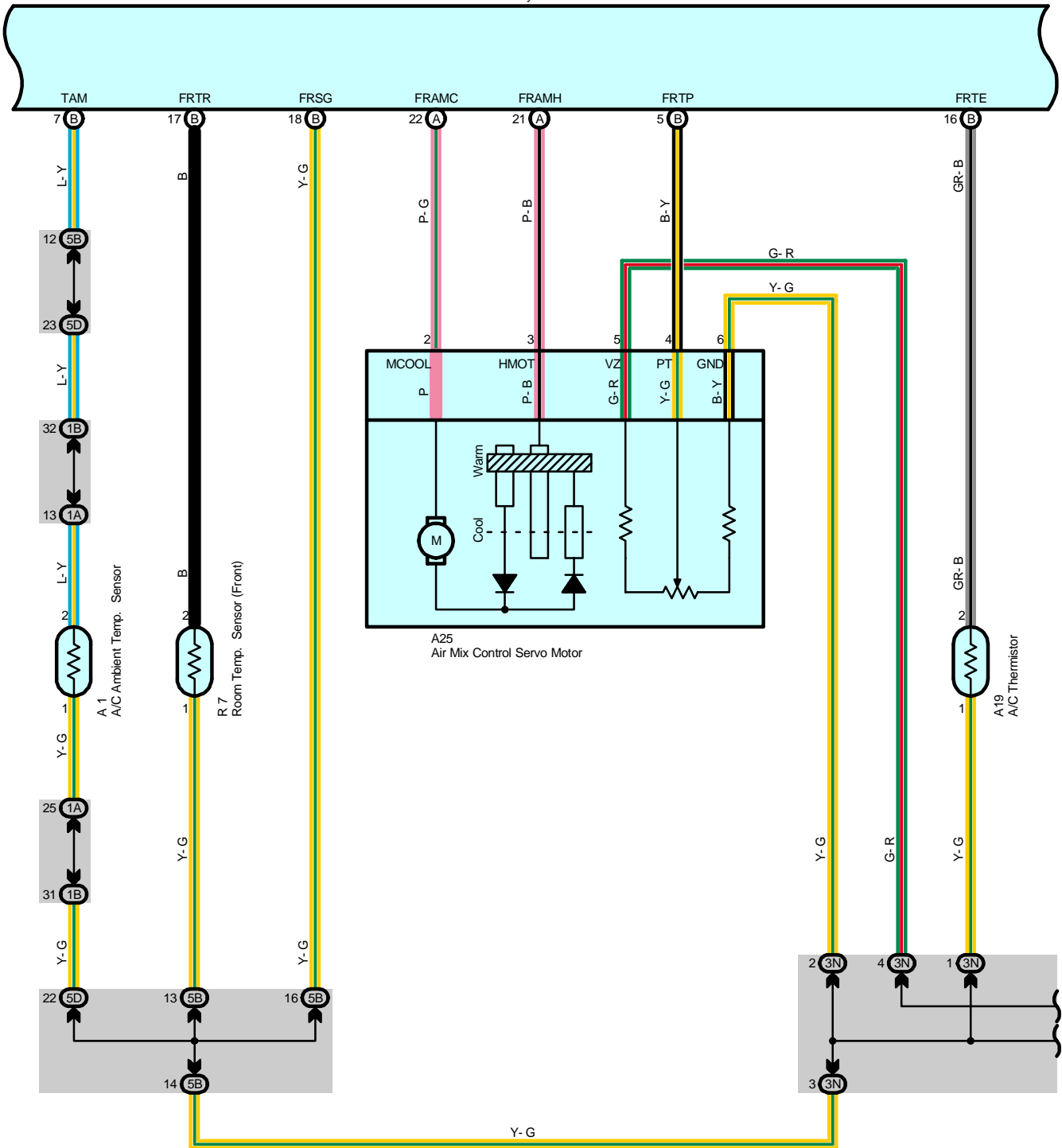


# Air Conditioning (Front)

A45(A), A46(B), A47(C)  
A/C Control Assembly

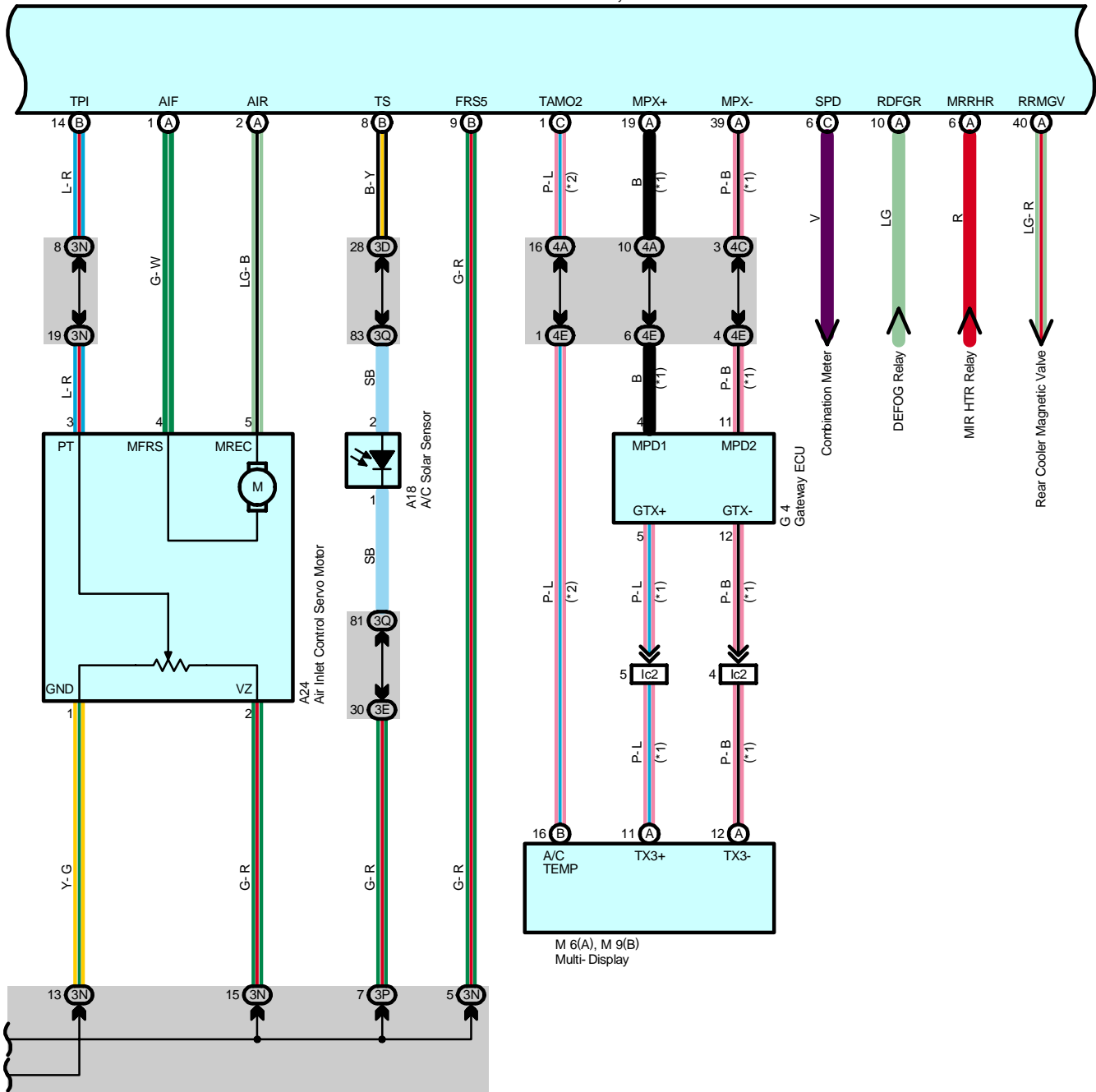


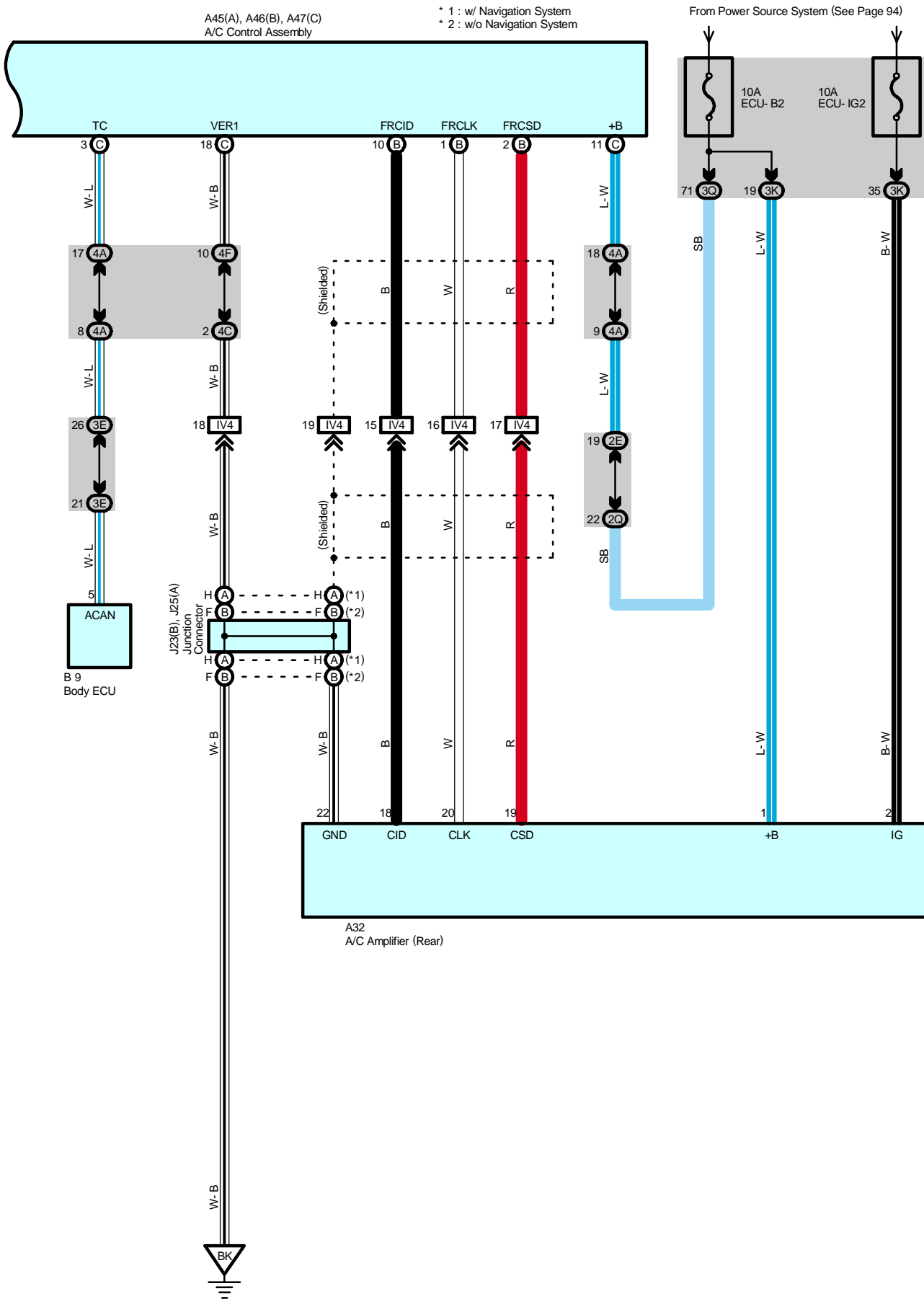
A45(A), A46(B), A47(C)  
A/C Control Assembly



# Air Conditioning (Front)

A45(A), A46(B), A47(C)  
A/C Control Assembly





# Air Conditioning (Front)

## System Outline

### 1. Heater Blower Operation

Manual operation

When the blower speed is set at any speed by the blower control SW, the A/C control assembly sends a signal to the blower motor controller, and controls the blower motor speed.

Auto operation

When the auto SW is operated, the A/C control assembly sends signals to the blower motor controller, according to the signals from respective sensors, commands from the temperature SW etc., and controls the blower motor automatically.

### 2. Air Inlet Control Servo Motor Control

When the FRESH/RECIRC select SW is switched to RECIRC, the motor in the air inlet control servo motor rotates to move the damper to the RECIRC side. The damper position is recognized by the A/C control assembly TERMINAL TPI, and rotates the motor until the damper reaches its position.

When the FRESH/RECIRC select SW is switched to FRESH, the motor in the air inlet control servo motor rotates to move the damper to the FRESH side. The damper position is recognized by the A/C control assembly TERMINAL TPI, and rotates the motor until the damper reaches its position.

When the FRESH/RECIRC select SW is set to auto, the exhaust gas sensor in the engine room detects the ingredient of the exhaust emission, and switches the FRESH/RECIRC mode automatically.

### 3. Air Vent Mode Control Servo Motor

When the mode select SW in the A/C control assembly is pushed, a signal is sent from the A/C control assembly, and activates the air vent mode control servo motor. This causes the servo motor to rotate to the position selected using the mode select SW (FACE, BI-LEVEL, FOOT, FOOT/DEF, DEF), and moves the damper.

### 4. Air Mix Control Servo Motor

When the temperature control SW in the A/C control assembly is pushed, a signal is sent from the A/C control assembly, and activates the air mix control servo motor. The motor and damper is moved until it reaches the temperature set by the temperature control SW.

### 5. Air Conditioning Operation

The A/C control assembly receives various signals, i. e., the engine RPM from the crankshaft position sensor, outlet temperature from the A/C ambient temp. sensor, coolant temperature from the engine coolant temp. sensor, and the lock signal from the A/C compressor, etc. When the engine is started and the A/C SW is turned on, a signal is sent to the A/C control assembly. As a result, the magnetic clutch is turned on and operates the compressor.

In addition, when the engine control module detects that the magnetic clutch is on and the A/C compressor is operating, it controls the engine in the direction to avoid lowering the engine RPM during A/C operation.

When any of the following signals are sent to the A/C control assembly, the A/C is turned off.

- \* Coolant temp. is high.
- \* Outlet air temp. is low.
- \* Large difference between the engine speed and compressor speed.
- \* The refrigerant pressure is abnormally high or low.

## Service Hints

### A45 (A), A47 (C) A/C Control Assembly

(C)11-Ground : Always approx. 12 volts

(C)22-Ground : Approx. 12 volts with ignition SW at ON or ST position

(A)27-Ground : Approx. 12 volts with ignition SW at ON or ST position (w/o navigation system)

(C)12, (C) 14, (C) 15, (C) 17, (C) 18-Ground : Always continuity

### C28 Center Cluster Integration Panel (w/ Navigation System)

2-Ground : Approx. 12 volts with ignition SW at ON or ST position

16-Ground : Always continuity



: Parts Location

Code	See Page	Code	See Page	Code	See Page
A1	68	A45	A 70	F18	68
A4	68	A46	B 70	G4	70
A5	68	A47	C 70	J11	71
A18	70	B1	70	J23	B 72
A19	70	B9	70	J25	A 72
A24	70	C28	70	M6	A 71
A25	70	E7	C 70	M9	B 71
A26	70	E8	D 70	R7	71
A32	72	E9	E 70		

: Relay Blocks

Code	See Page	Relay Blocks (Relay Block Location)
1	22	Engine Room R/B (Engine Compartment Left)

: Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Engine Room Main Wire and Engine Room J/B (Engine Compartment Left)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2A	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2D	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2E		
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3D	40	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3E		
3H		
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3M	43	Dash Wire and Cowl Side J/B RH (Right Kick Panel)
3N		
3P		
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4D		
4E		
4F		
5A	56	Dash Wire and J/B No.5 (Behind the Combination Meter)
5B		
5D	56	Engine Room No.2 Wire and J/B No.5 (Behind the Combination Meter)

: Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	78	Engine Room No.2 Wire and Dash Wire (Behind the Combination Meter)
IG5		
IN2	80	Engine Wire and Dash Wire (Behind the Glove Box)
IV4	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
Ic2	84	Dash Wire and Dash Wire (Behind the Center Panel)

## Air Conditioning (Front)

---



### : Ground Points

Code	See Page	Ground Points Location
EA	<a href="#">76</a>	Front Right Side of Fender Apron
EC	<a href="#">76</a>	Rear Bank of Right Cylinder Head
IF	<a href="#">78</a>	Set Bolt of Cowl Side J/B LH
II	<a href="#">78</a>	Set Bolt of Cowl Side J/B RH
BK	<a href="#">86</a>	Front Side Under the Front Passenger's Seat

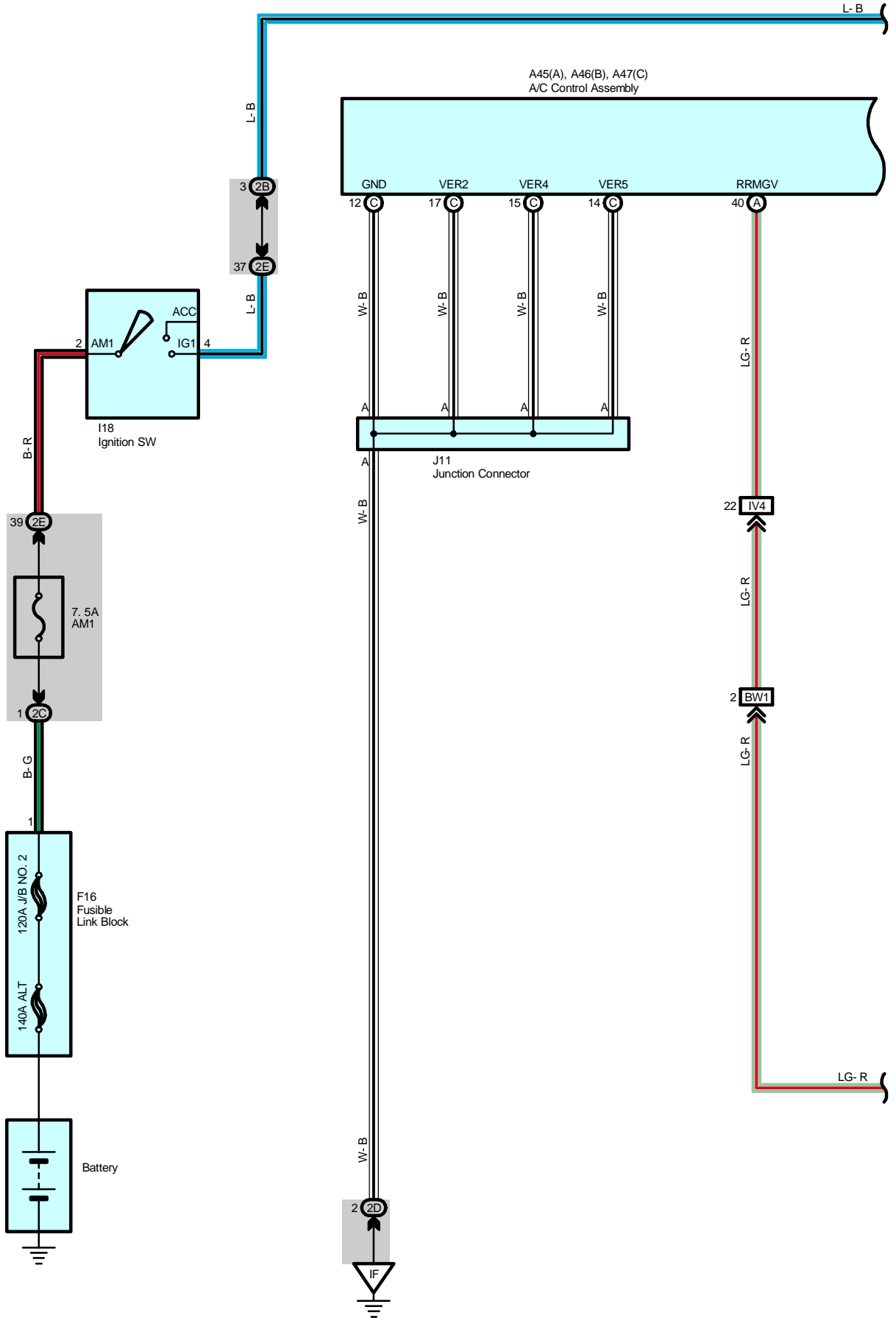


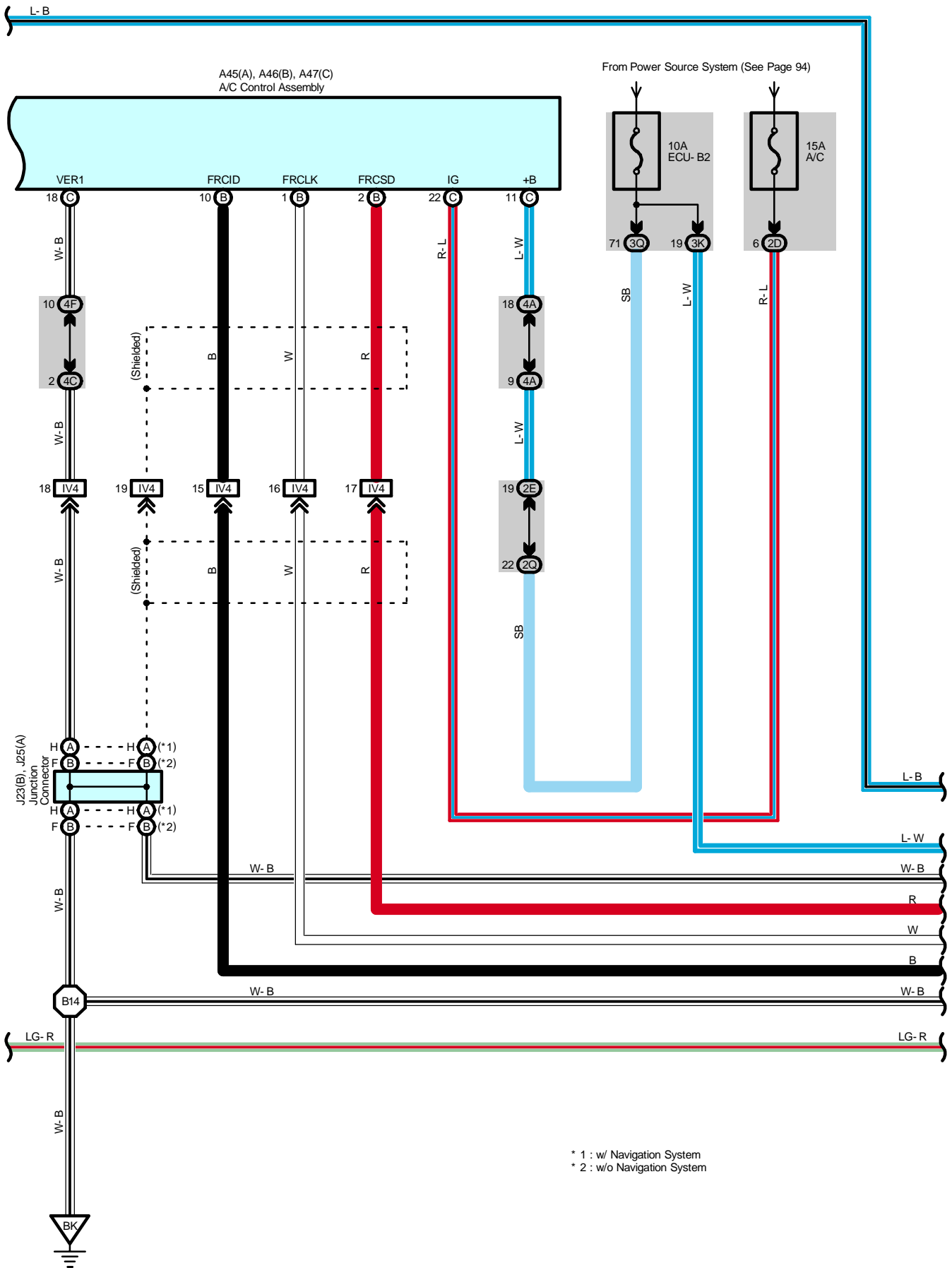
### : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E16	<a href="#">76</a>	Engine Room No.2 Wire			

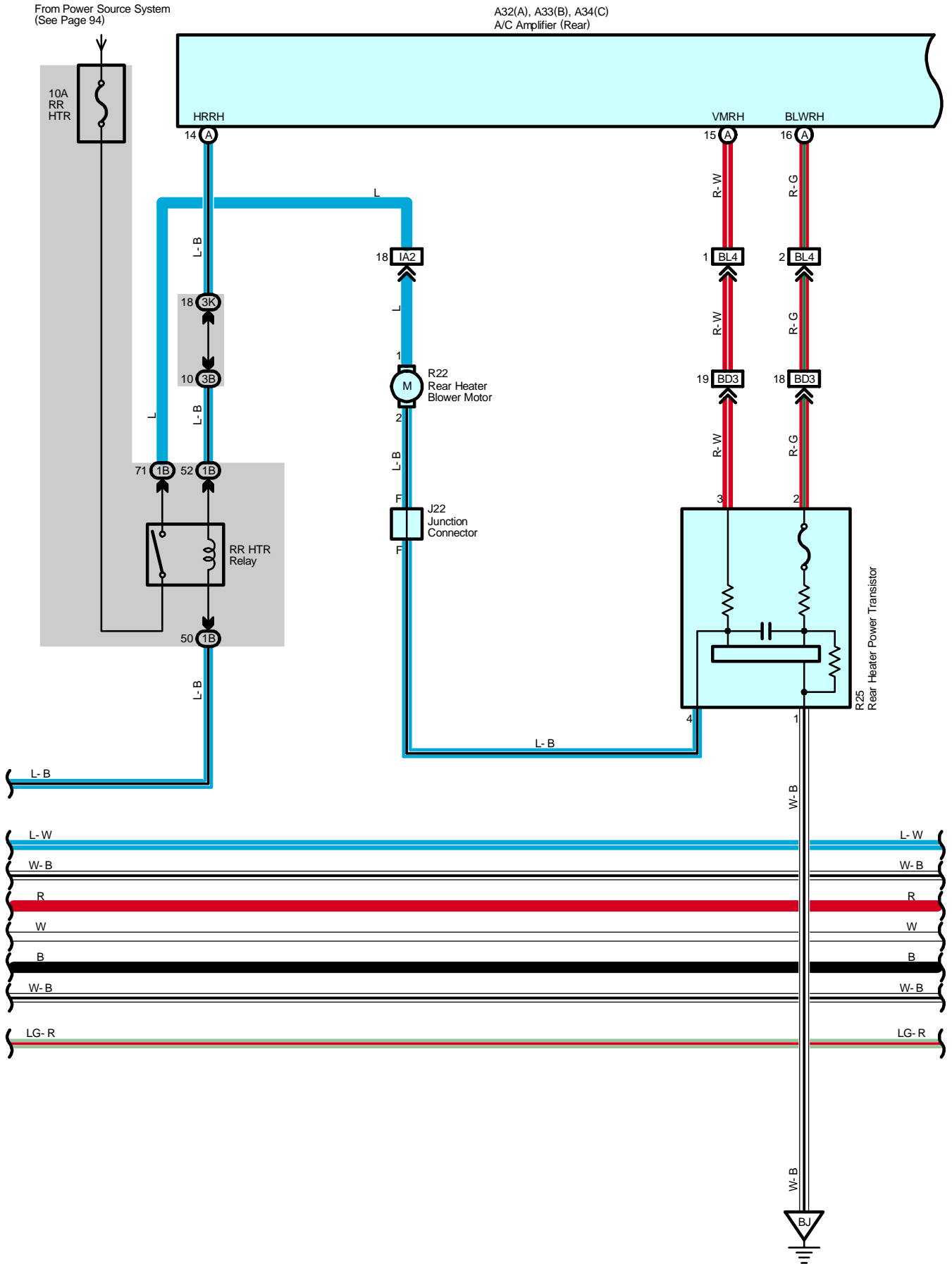


# Air Conditioning (Rear)

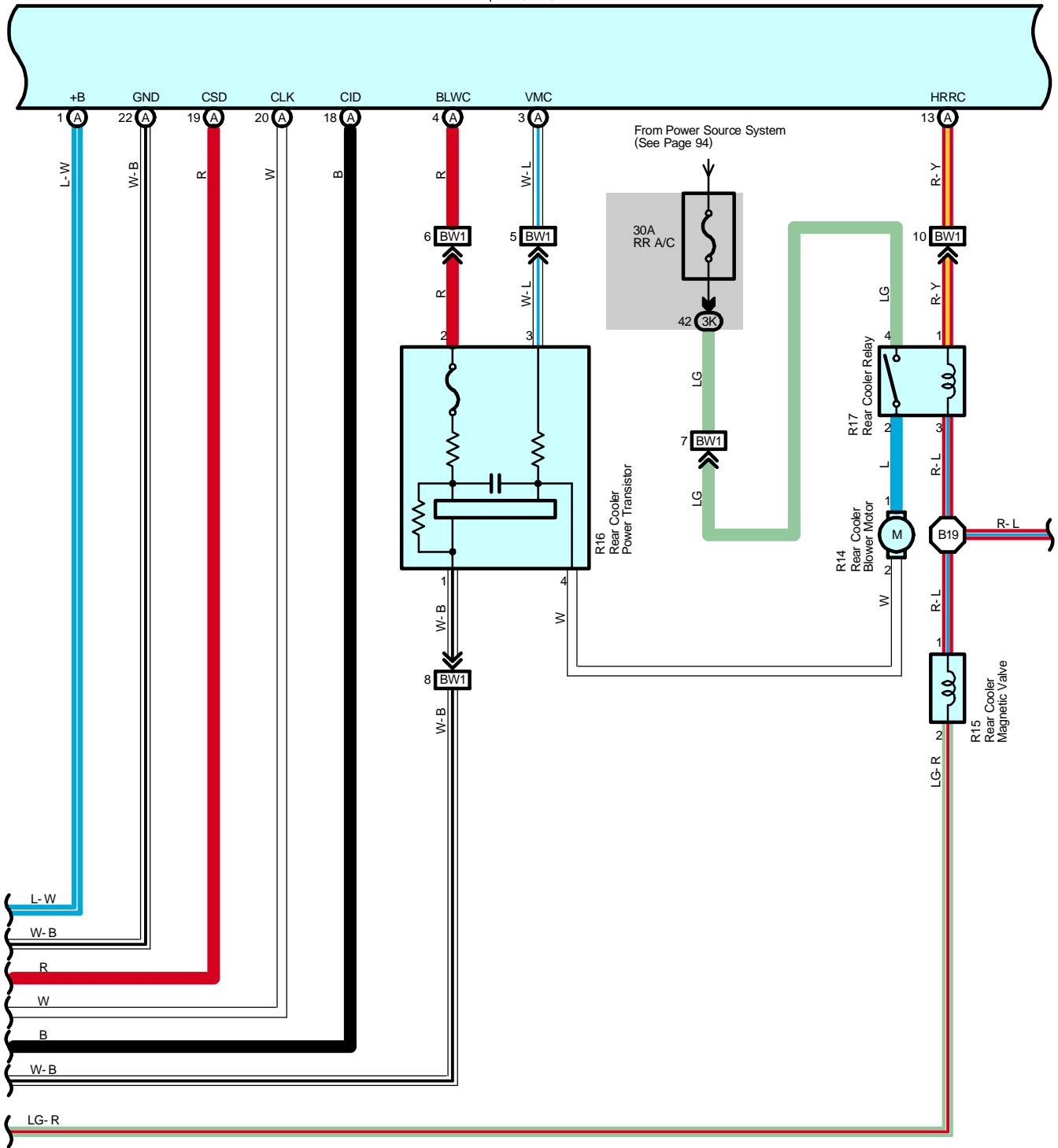




# Air Conditioning (Rear)

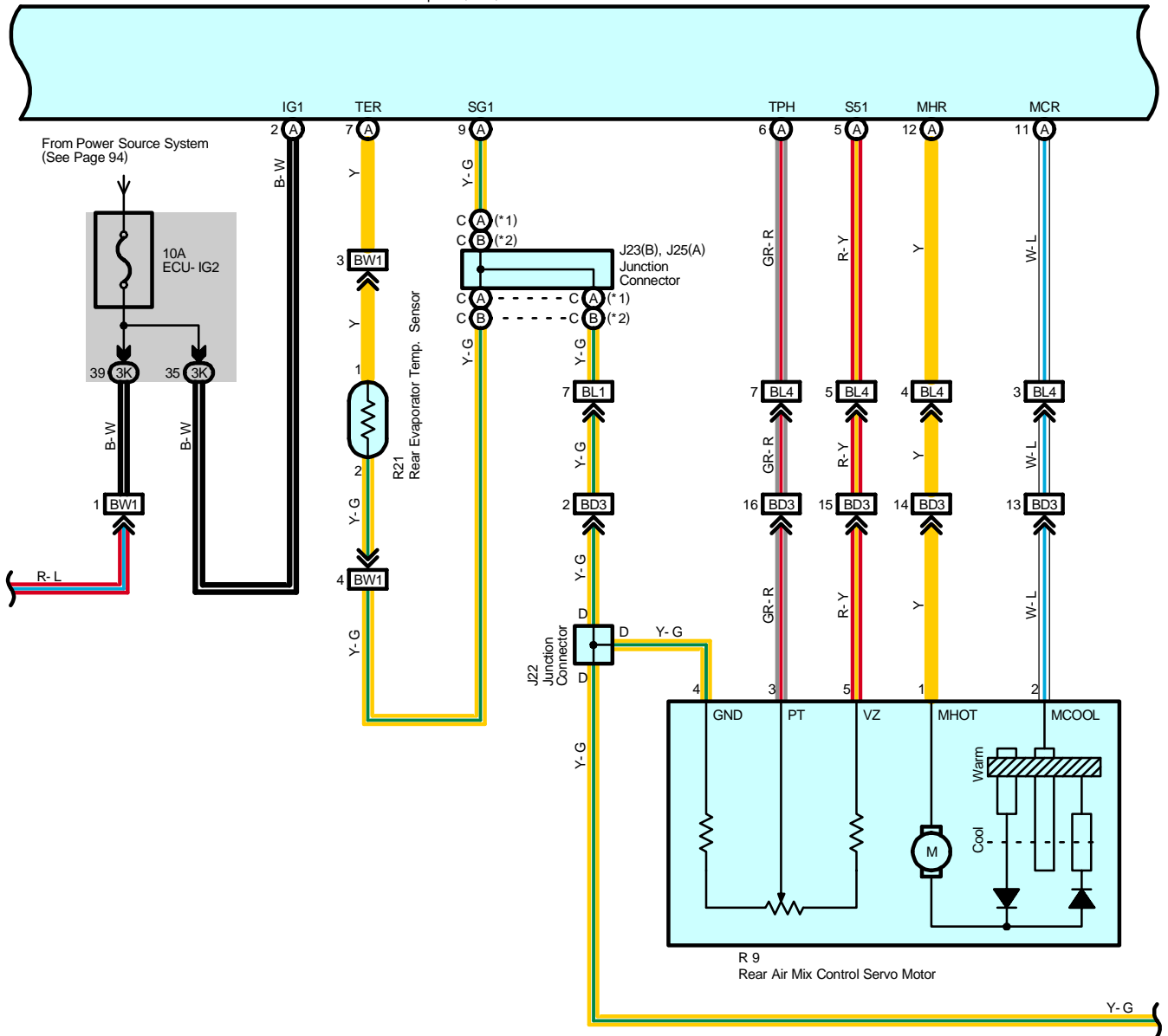


A32(A), A33(B), A34(C)  
A/C Amplifier (Rear)



# Air Conditioning (Rear)

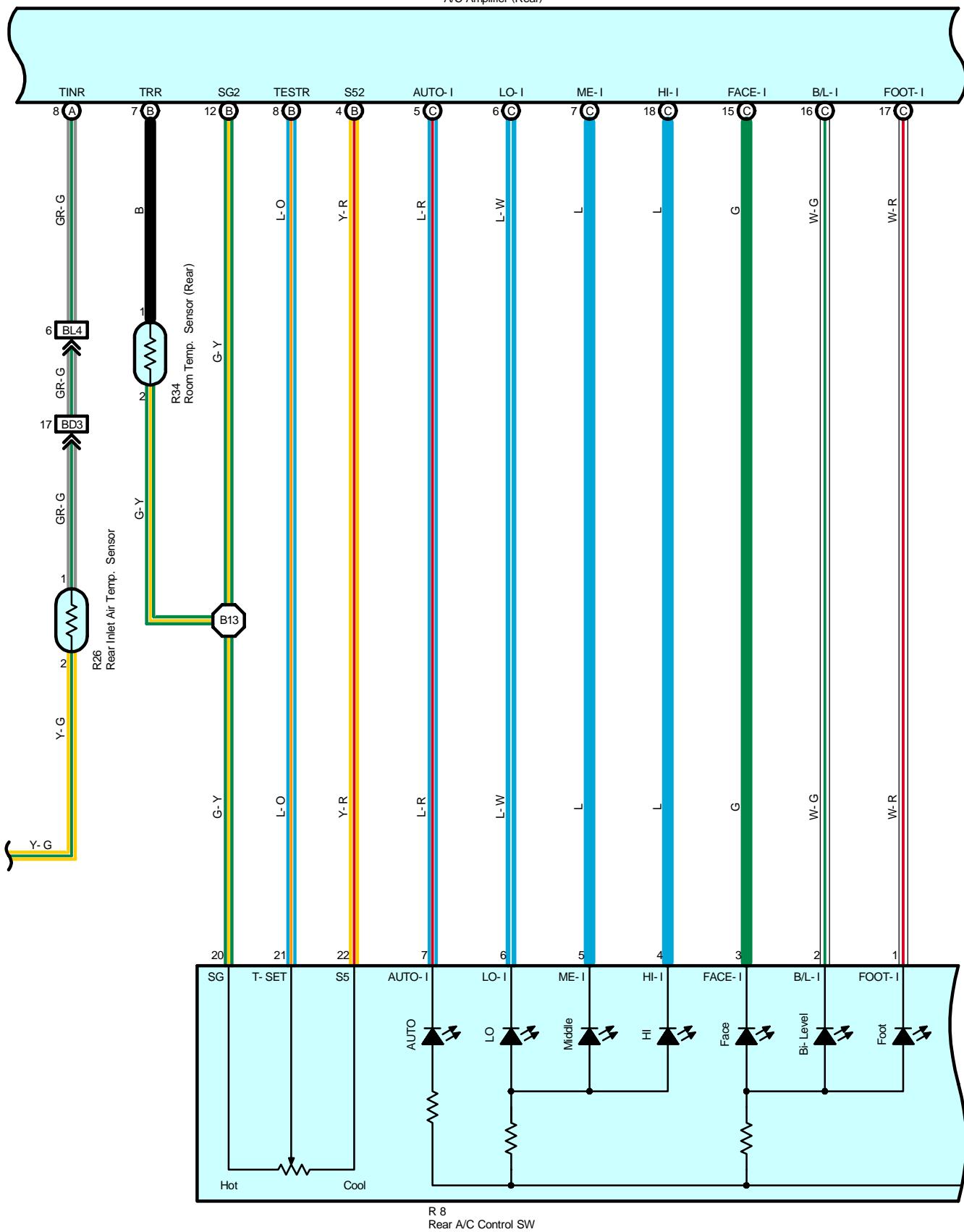
A32(A), A33(B), A34(C)  
A/C Amplifier (Rear)



- \* 1 : w/ Navigation System
- \* 2 : w/o Navigation System

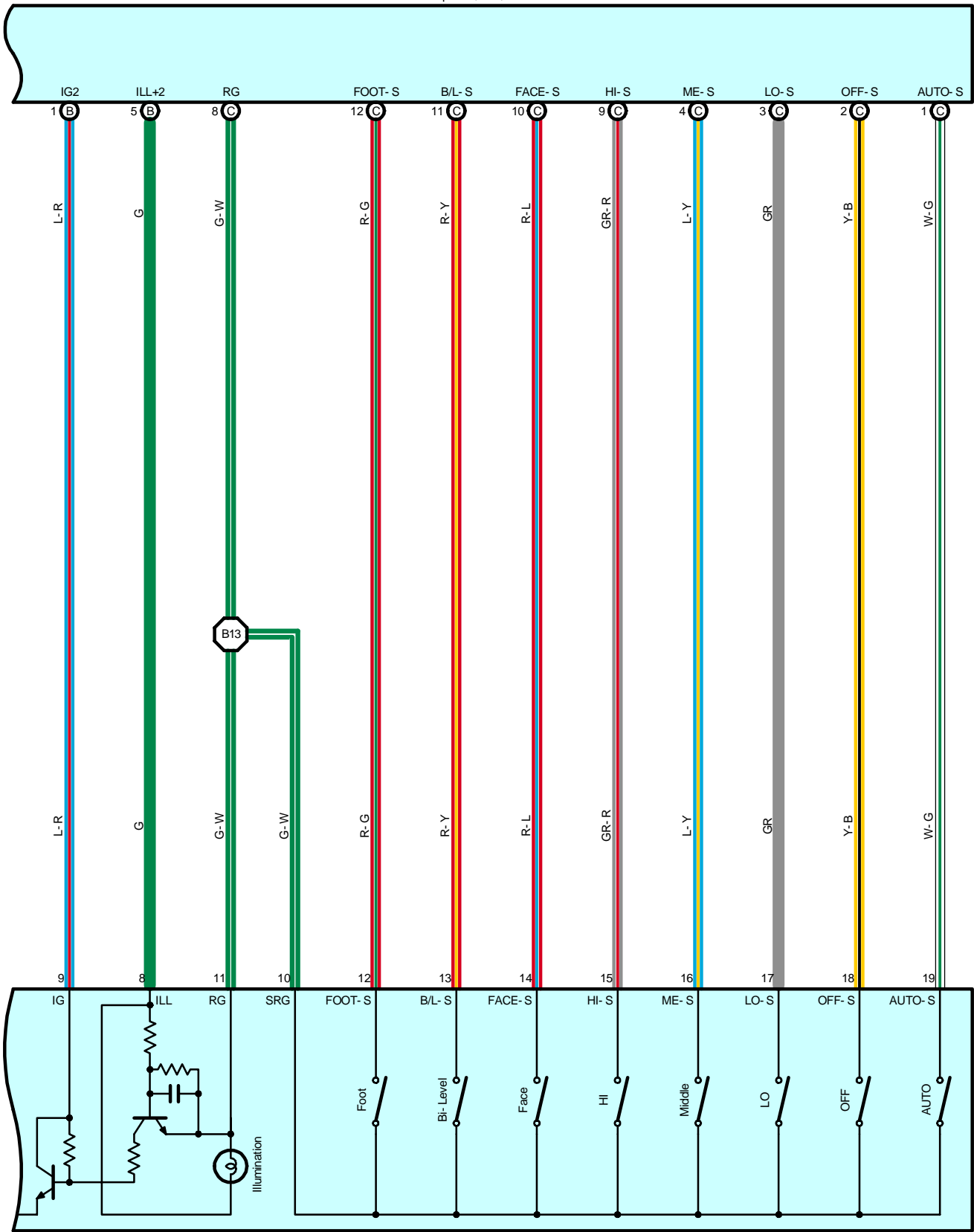


A32(A), A33(B), A34(C)  
A/C Amplifier (Rear)



# Air Conditioning (Rear)

A32(A), A33(B), A34(C)  
A/C Amplifier (Rear)



R 8  
Rear A/C Control SW

## System Outline

### 1. Cooler and Heater Blower Operation

\* Manual operation

When the blower control SW in the rear A/C control SW is set to any blower speed, a signal is sent to the A/C amplifier. The A/C amplifier controls the power transistor and operates the rear cooler blower motor and rear heater blower motor at the set speed.

\* Auto operation

When the auto SW in the rear A/C control SW is operated, a signal is sent to the A/C amplifier. The A/C amplifier controls the power transistor according to the signals from respective sensors, and operates the rear cooler blower motor and rear heater blower motor.

### 2. Air Mix Control Servo Motor Control

When the temperature control lever in the rear A/C control SW is operated, a signal is sent to the A/C amplifier. The A/C amplifier controls the rear air mix control servo motor to operate the damper until it reaches the temperature set by the temperature control lever.

### 3. Air Conditioning Operation

The cooler and heater operation can be switched by the mode select SW in the rear A/C control SW.

## Service Hints

### A32 A/C Amplifier (Rear)

- 1-Ground : Always approx. 12 volts
- 2-Ground : Approx. 12 volts with ignition SW at ON or ST position
- 22-Ground : Always continuity

## ○ : Parts Location

Code	See Page	Code	See Page	Code	See Page		
A32	A	72	J11	71	R16	73	
A33	B	72	J22	72	R17	73	
A34	C	72	J23	B	72	R21	73
A45	A	70	J25	A	72	R22	73
A46	B	70	R8	73	R25	73	
A47	C	70	R9	73	R26	73	
F16	68	R14	73	R34	73		
I18	70	R15	73				

## ○ : Junction Block and Wire Harness Connector

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Engine Room No.2 Wire and Engine Room J/B (Engine Compartment Left)
2B	28	Engine Room No.2 Wire and Cowl Side J/B LH (Left Kick Panel)
2C		
2D		
2E	28	Dash Wire and Cowl Side J/B LH (Left Kick Panel)
2Q	30	Instrument Panel Integration Wire and Cowl Side J/B LH (Left Kick Panel)
3B	40	Engine Room No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3K	40	Floor No.2 Wire and Cowl Side J/B RH (Right Kick Panel)
3Q	42	Instrument Panel Integration Wire and Cowl Side J/B RH (Right Kick Panel)
4A	52	Dash Wire and J/B No.4 (Instrument Panel Center)
4C		
4F		

## Air Conditioning (Rear)

### : Connector Joining Wire Harness and Wire Harness

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IA2	78	Engine Room No.2 Wire and Floor No.1 Wire (Left Kick Panel)
IV4	82	Dash Wire and Floor No.2 Wire (Right Kick Panel)
BD3	86	Floor No.3 Wire and Floor No.1 Wire (Left Rear Side Quarter Panel)
BL1	88	Floor No.2 Wire and Floor No.3 Wire (Right Side of Rear Floor Crossmember)
BL4		
BW1	88	Floor No.2 Wire and A/C Sub Wire (Right Side Rear Quarter Panel)

### : Ground Points

Code	See Page	Ground Points Location
IF	78	Set Bolt of Cowl Side J/B LH
BJ	86	Under the Driver's Seat
BK	86	Front Side Under the Front Passenger's Seat

### : Splice Points

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B13	88	Roof No.2 Wire	B19	88	A/C Sub Wire
B14	88	Floor No.2 Wire			

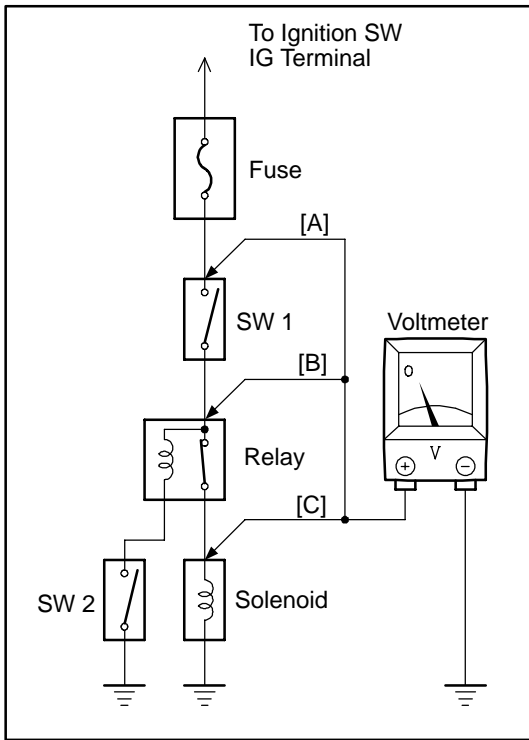


# 2004 LAND CRUISER ELECTRICAL WIRING DIAGRAM SYSTEM CIRCUITS

	Page
Air Conditioning (Front) .....	356
Air Conditioning (Rear) .....	366
Auto Antenna .....	322
Automatic Glare-Resistant EC Mirror with Compass .....	304
Automatic Light Control .....	164
Back-Up Light .....	162
Center Differential Lock .....	246
Charging .....	104
Cigarette Lighter .....	204
Combination Meter .....	350
Cruise Control .....	222
Door Lock Control .....	260
Electronically Controlled Transmission and A/T Indicator .....	212
Engine Control .....	108
Engine Immobiliser System .....	124
Front Fog Light .....	132
Front Wiper and Washer .....	196
Garage Door Opener .....	210
Headlight .....	128
Horn .....	208
Ignition .....	100
Illumination .....	142
Interior Light .....	148
Key Reminder .....	316
Light Auto Turn Off .....	166
Mirror Heater .....	314
Moon Roof .....	256
Multi-Display (w/o Navigation System) .....	348
Multiplex Communication System .....	172
Multiplex Communication System (Communication Bus) .....	168
Navigation System .....	336
Power Outlet .....	206
Power Rear Quarter Window .....	306
Power Seat .....	294
Power Source .....	94
Power Tilt and Power Telescopic .....	298
Power Window .....	250
Radio and Player (w/ Navigation System) .....	324
Radio and Player (w/o Navigation System) .....	330
Rear Window Defogger .....	312
Rear Wiper and Washer .....	200
Remote Control Mirror .....	302
Seat Belt Warning .....	320
Seat Heater .....	308
Shift Lock .....	244
SRS .....	237
Starting .....	98
Stop Light .....	156
Taillight .....	138
Theft Deterrent .....	282
TOYOTA Parking Assist (Rear View Monitor) .....	336
Trailer Towing .....	158
Turn Signal and Hazard Warning Light .....	134
VSC .....	228
Wireless Door Lock Control .....	270

# C TROUBLESHOOTING

## VOLTAGE CHECK



- (a) Establish conditions in which voltage is present at the check point.

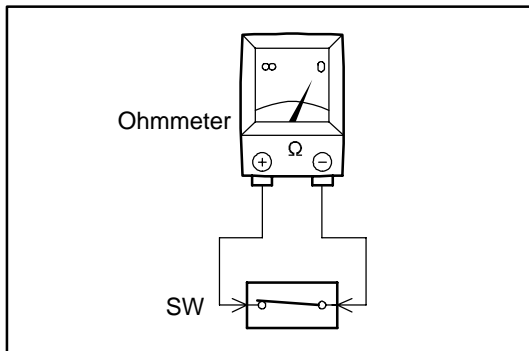
Example:

- [A] - Ignition SW on
- [B] - Ignition SW and SW 1 on
- [C] - Ignition SW, SW 1 and Relay on (SW 2 off)

- (b) Using a voltmeter, connect the negative lead to a good ground point or negative battery terminal, and the positive lead to the connector or component terminal.

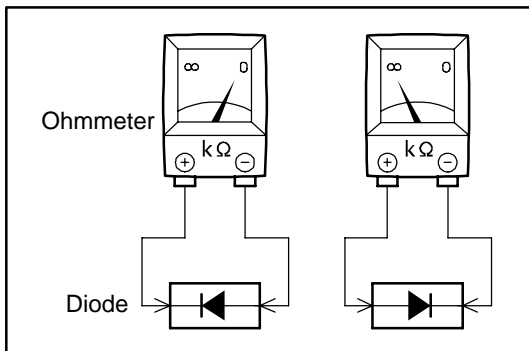
This check can be done with a test light instead of a voltmeter.

## CONTINUITY AND RESISTANCE CHECK



- (a) Disconnect the battery terminal or wire so there is no voltage between the check points.

- (b) Contact the two leads of an ohmmeter to each of the check points.

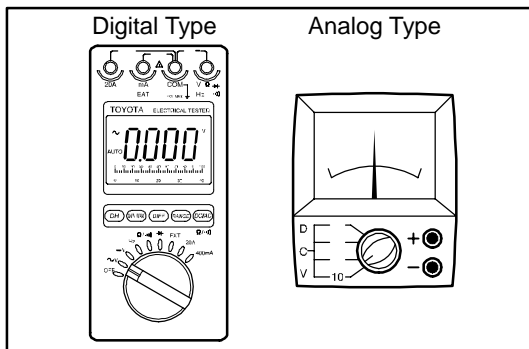


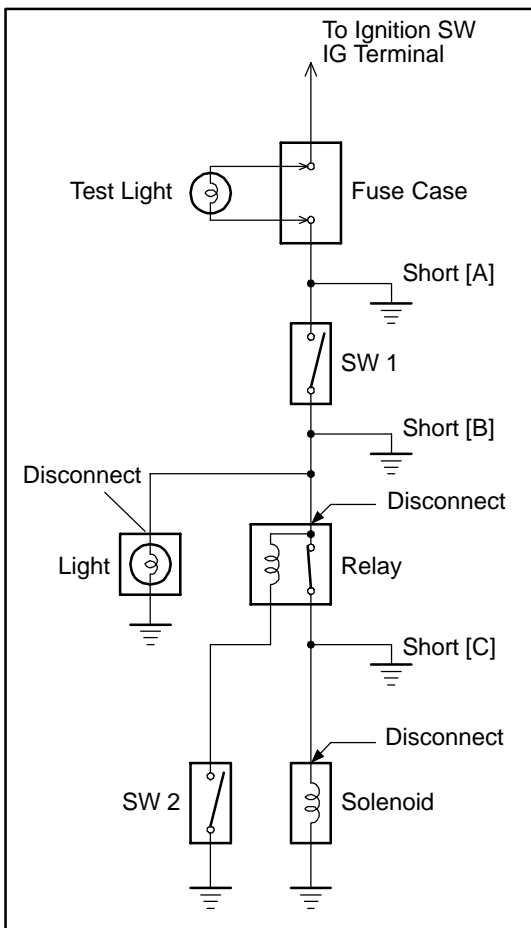
If the circuit has diodes, reverse the two leads and check again.

When contacting the negative lead to the diode positive side and the positive lead to the negative side, there should be continuity.

When contacting the two leads in reverse, there should be no continuity.

- (c) Use a volt/ohmmeter with high impedance (10 k $\Omega$ /V minimum) for troubleshooting of the electrical circuit.





## FINDING A SHORT CIRCUIT

- Remove the blown fuse and disconnect all loads of the fuse.
- Connect a test light in place of the fuse.
- Establish conditions in which the test light comes on.

Example:

- [A] - Ignition SW on
  - [B] - Ignition SW and SW 1 on
  - [C] - Ignition SW, SW 1 and Relay on (Connect the Relay) and SW 2 off (or Disconnect SW 2)
- Disconnect and reconnect the connectors while watching the test light. The short lies between the connector where the test light stays lit and the connector where the light goes out.
  - Find the exact location of the short by lightly shaking the problem wire along the body.

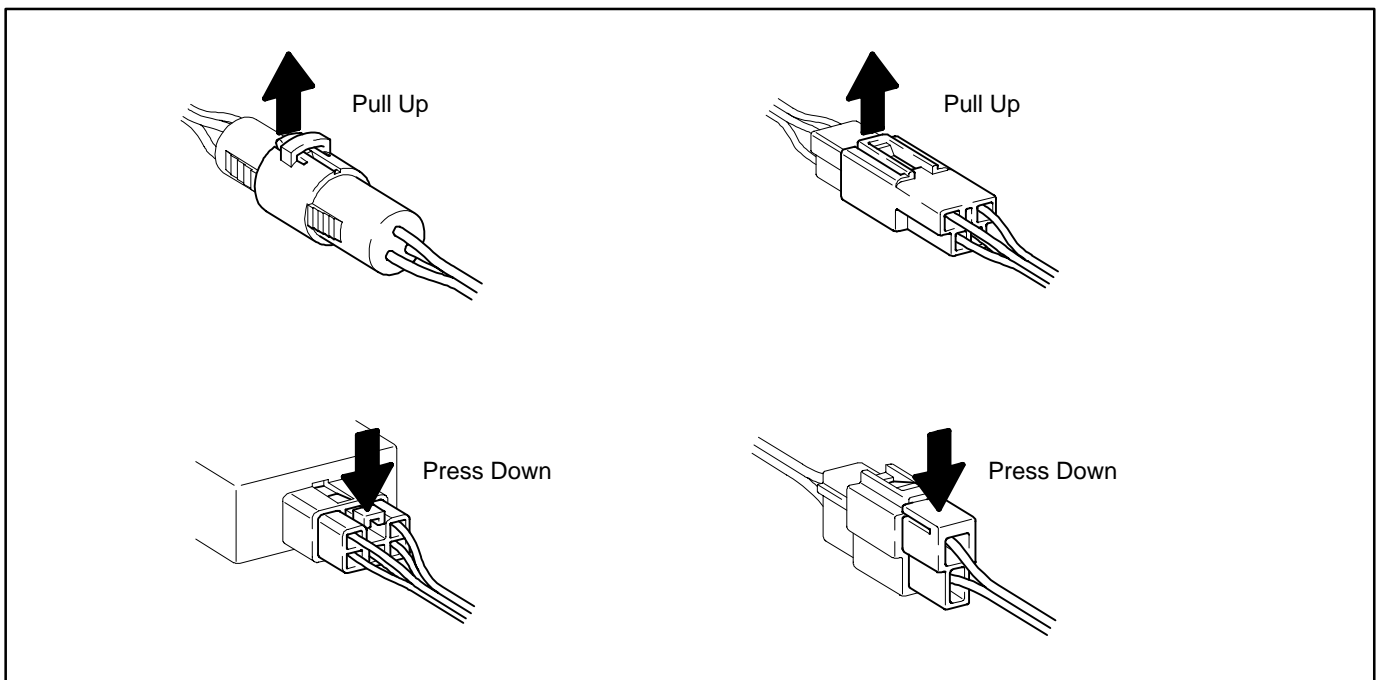
## CAUTION:

- Do not open the cover or the case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)
- When replacing the internal mechanism (ECU part) of the digital meter, be careful that no part of your body or clothing comes in contact with the terminals of leads from the IC, etc. of the replacement part (spare part).

## DISCONNECTION OF MALE AND FEMALE CONNECTORS

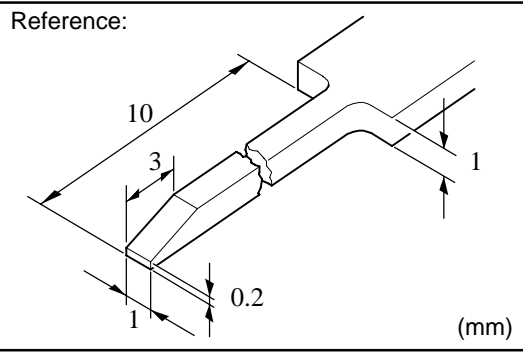
To pull apart the connectors, pull on the connector itself, not the wire harness.

HINT: Check to see what kind of connector you are disconnecting before pulling apart.





# C TROUBLESHOOTING



## HOW TO REPLACE TERMINAL (with terminal retainer or secondary locking device)

### 1. PREPARE THE SPECIAL TOOL

HINT : To remove the terminal from the connector, please construct and use the special tool or like object shown on the left.

### 2. DISCONNECT CONNECTOR

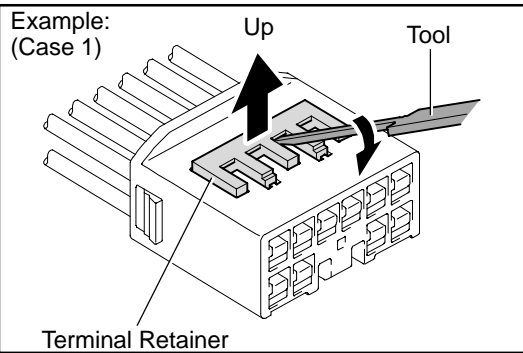
### 3. DISENGAGE THE SECONDARY LOCKING DEVICE OR TERMINAL RETAINER.

(a) Locking device must be disengaged before the terminal locking clip can be released and the terminal removed from the connector.

(b) Use a special tool or the terminal pick to unlock the secondary locking device or terminal retainer.

**NOTICE:**

**Do not remove the terminal retainer from connector body.**

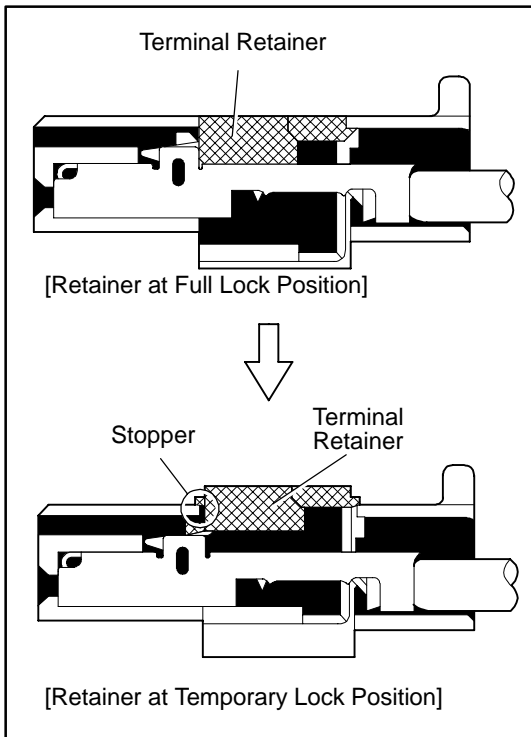


[A] For Non-Waterproof Type Connector

HINT : The needle insertion position varies according to the connector's shape (number of terminals etc.), so check the position before inserting it.

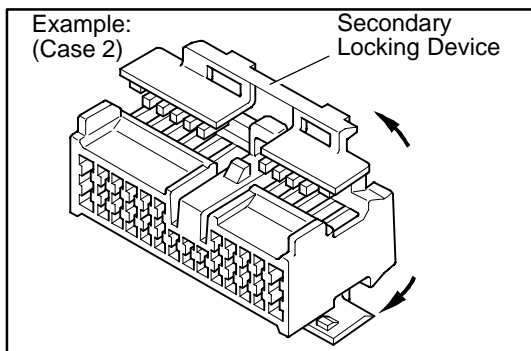
"Case 1"

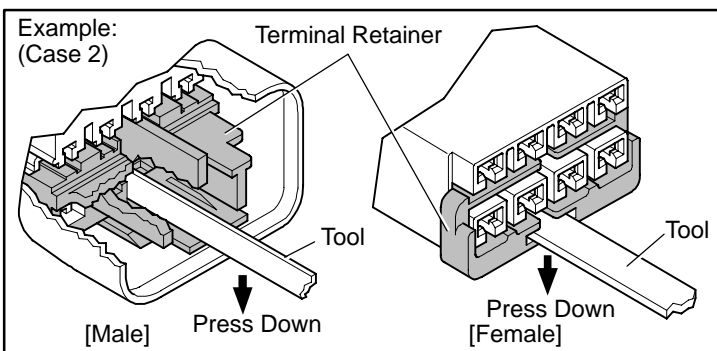
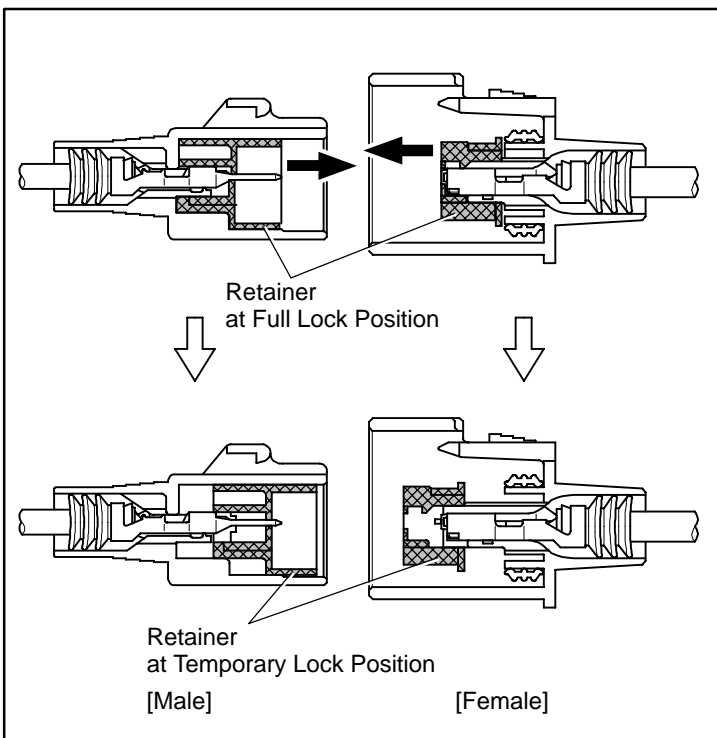
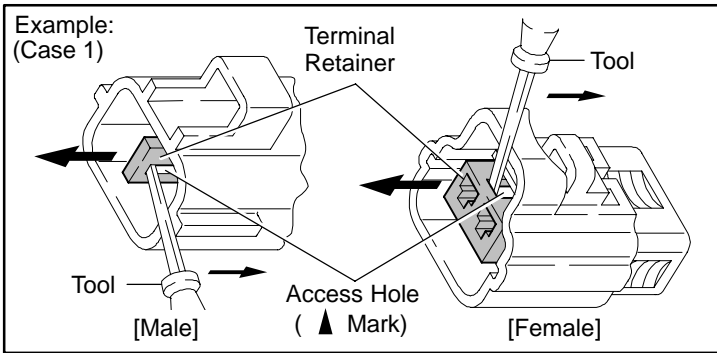
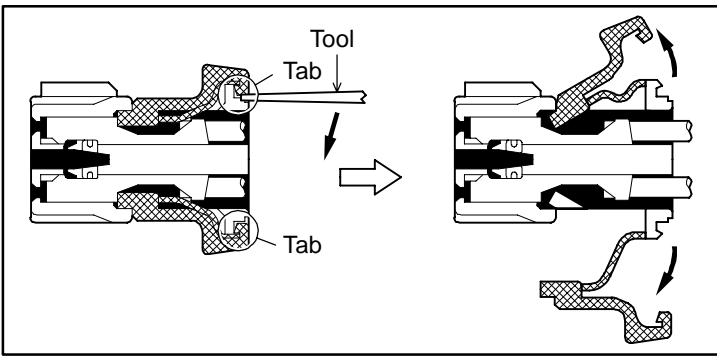
Raise the terminal retainer up to the temporary lock position.



"Case 2"

Open the secondary locking device.





[B] For Waterproof Type Connector

HINT : Terminal retainer color is different according to connector body.

Example:

Terminal Retainer : Connector Body

Black or White : Gray

Black or White : Dark Gray

Gray or White : Black

"Case 1"

Type where terminal retainer is pulled up to the temporary lock position (Pull Type).

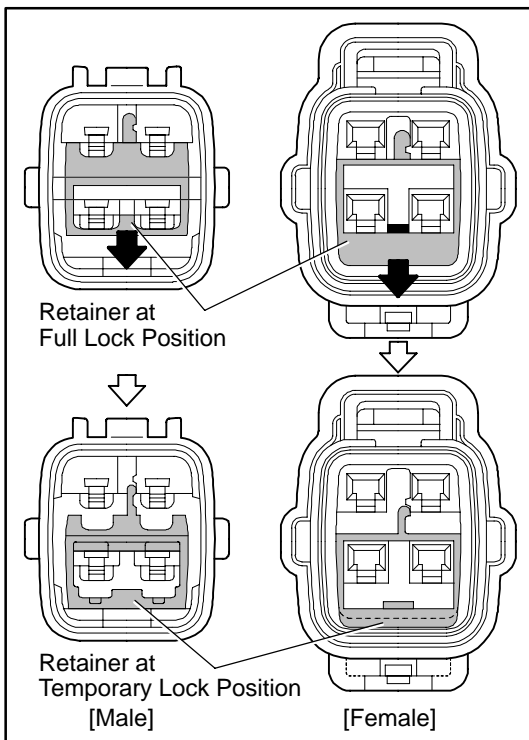
Insert the special tool into the terminal retainer access hole (▲Mark) and pull the terminal retainer up to the temporary lock position.

HINT : The needle insertion position varies according to the connector's shape (Number of terminals etc.), so check the position before inserting it.

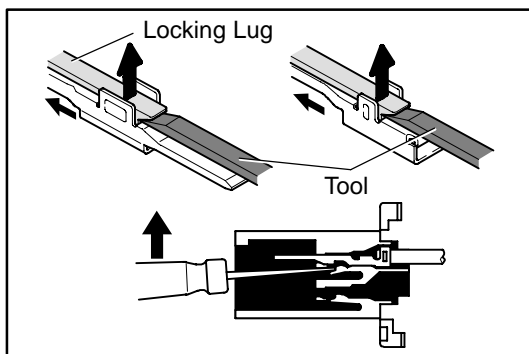
"Case 2"

Type which cannot be pulled as far as Power Lock insert the tool straight into the access hole of terminal retainer as shown.

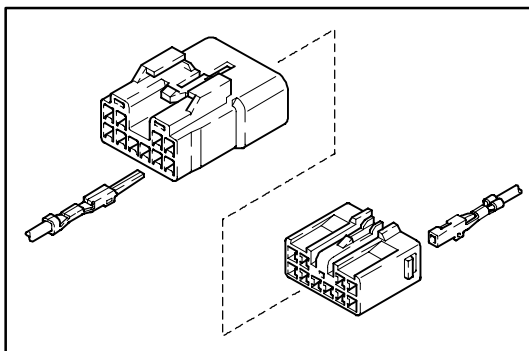
## C TROUBLESHOOTING



Push the terminal retainer down to the temporary lock position.



(c) Release the locking lug from terminal and pull the terminal out from rear.

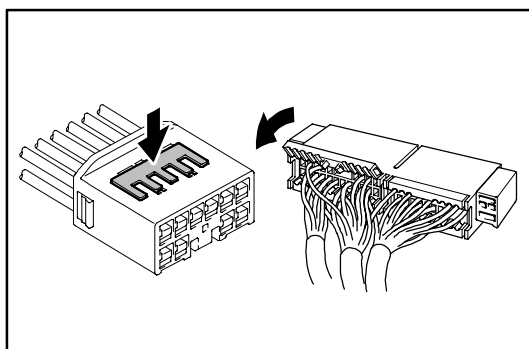


### 4. INSTALL TERMINAL TO CONNECTOR

(a) Insert the terminal.

HINT:

1. Make sure the terminal is positioned correctly.
2. Insert the terminal until the locking lug locks firmly.
3. Insert the terminal with terminal retainer in the temporary lock position.



(b) Push the secondary locking device or terminal retainer in to the full lock position.

### 5. CONNECT CONNECTOR

## 5. ECU (ELECTRONIC CONTROL UNIT)

Many ECUs are mounted in this vehicle.

Take the following precautions during body repair to prevent damage to the ECUs.

- ▶ Before starting electric welding operations, disconnect the negative (-) terminal cable from the battery. When the negative (-) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by each memory system. Then when work is finished, reset the clock and audio systems as before. When the vehicle has tilt and telescopic steering, power seat and outside rear view mirror, which are all equipped with memory function, it is not possible to make a record of the memory contents. So when the operation is finished, it will be necessary to explain this fact to the customer, and request the customer to adjust the features and reset the memory.
- ▶ Do not expose the ECUs to ambient temperatures above 80°C (176°F).  
*NOTICE: If it is possible the ambient temperature may reach 80° (176° F) or more, remove the ECUs from the vehicle before starting work.*
- ▶ Be careful not to drop the ECUs and not to apply physical shocks to them.

## ABBREVIATIONS USED IN THIS MANUAL

For convenience, the following abbreviations are used in this manual.

ABS	Antilock Brake System
A/C	Air Conditioner
assy	assembly
ECT	Electronic Controlled Transmission
ECU	Electronic Control Unit
e.g.	Exempli Gratia (for Example)
Ex.	Except
4WD	Four Wheel Drive Vehicles
in.	inch
LH	Left-hand
LHD	Left-hand Drive
MIG	Metal Inert Gas
M/Y	Model Year
PPS	Progressive Power Steering
RH	Right-hand
RHD	Right-hand Drive
SRS	Supplemental Restraint System
SSM	Special Service Materials
w/	with
w/o	without

## FOREWORD

This repair manual has been prepared to provide essential information on body panel repair methods (including cutting and welding operations, but excluding painting) for the TOYOTA LAND CRUISER.

Applicable models: UZJ100, FZJ10\_ series  
HDJ10\_, HZJ105 series

This manual consists of body repair methods, exploded diagrams and illustrations of the body components and other information relating to body panel replacement such as handling precautions, etc. However, it should be noted that the front fenders of the TOYOTA model is bolted on and require no welding.

When repairing, don't cut and join areas that are not shown in this manual. Only work on the specified contents to maintain body strength.

Body construction will sometimes differ depending on specifications and country of destination. Therefore, please keep in mind that the information contained herein is based on vehicles for general destinations.

For the repair procedures and specifications other than collision-damaged body components of the TOYOTA LAND CRUISER refer to the repair manuals.

If you require the above manuals, please contact your TOYOTA Dealer.

All information contained in this manual is the most up-to-date at the time of publication. However, specifications and procedures are subject to change without prior notice.

**TOYOTA MOTOR CORPORATION**

# GENERAL REPAIR INSTRUCTIONS

## Work Precautions

### SAFETY

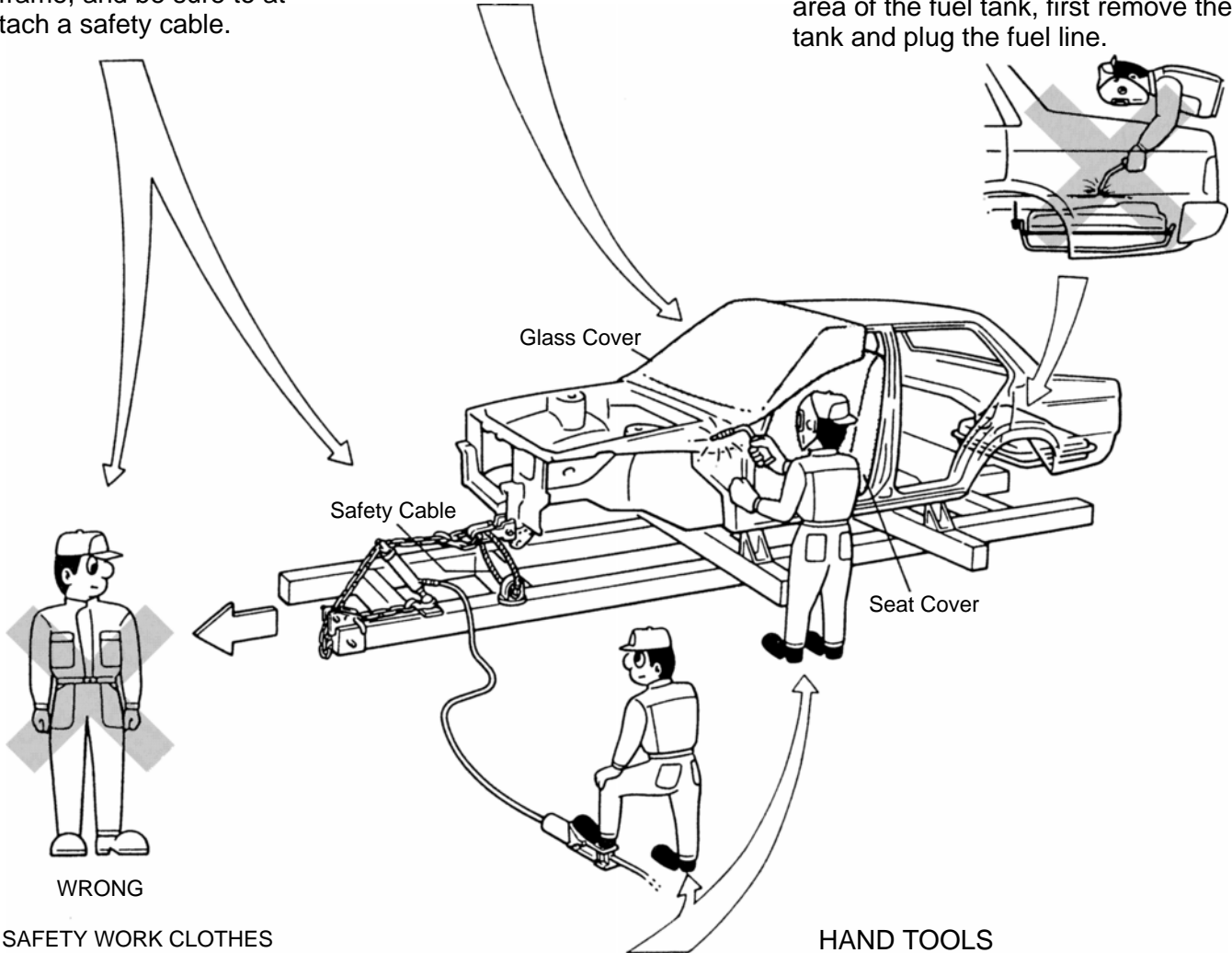
Never stand in direct line with the chain when using a puller on the body or frame, and be sure to attach a safety cable.

### VEHICLE PROTECTION

When welding, protect the painted surfaces, windows, seats and carpet with heat-resistant, fire-proof covers.

### SAFETY

1. Before performing repair work, check for fuel leaks. If a leak is found, be sure to close the opening totally.
2. If it is necessary to use a frame in the area of the fuel tank, first remove the tank and plug the fuel line.



### SAFETY WORK CLOTHES

In addition to the usual mechanic's wear, cap and safety shoes, the appropriate gloves, head protector, glasses, ear plugs, face protector, dust-prevention mask, etc. should be worn as the situation demands.

### HAND TOOLS

Keeping your hand tools in neat order improve your work efficiency.

Dust-Prevention Mask



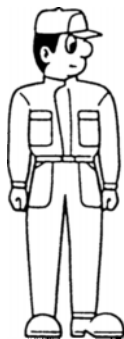
Face Protector



Eye Protector



Safety Shoes



Welder's Glasses



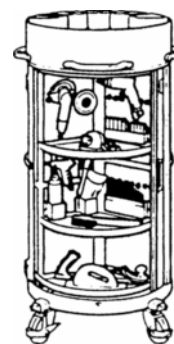
Ear Plugs



Head Protector



Welder's Gloves



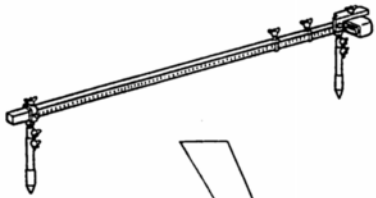
Body Tools Stand

## Proper and Efficient Work Procedures

### REMOVAL

#### PRE-REMOVAL MEASURING

Before removal or cutting operations, take measurements in accordance with the dimension diagram. Always use a puller to straighten a damaged body or frame.



#### NUMBER OF SPOT WELDS AND PANEL POSITIONS

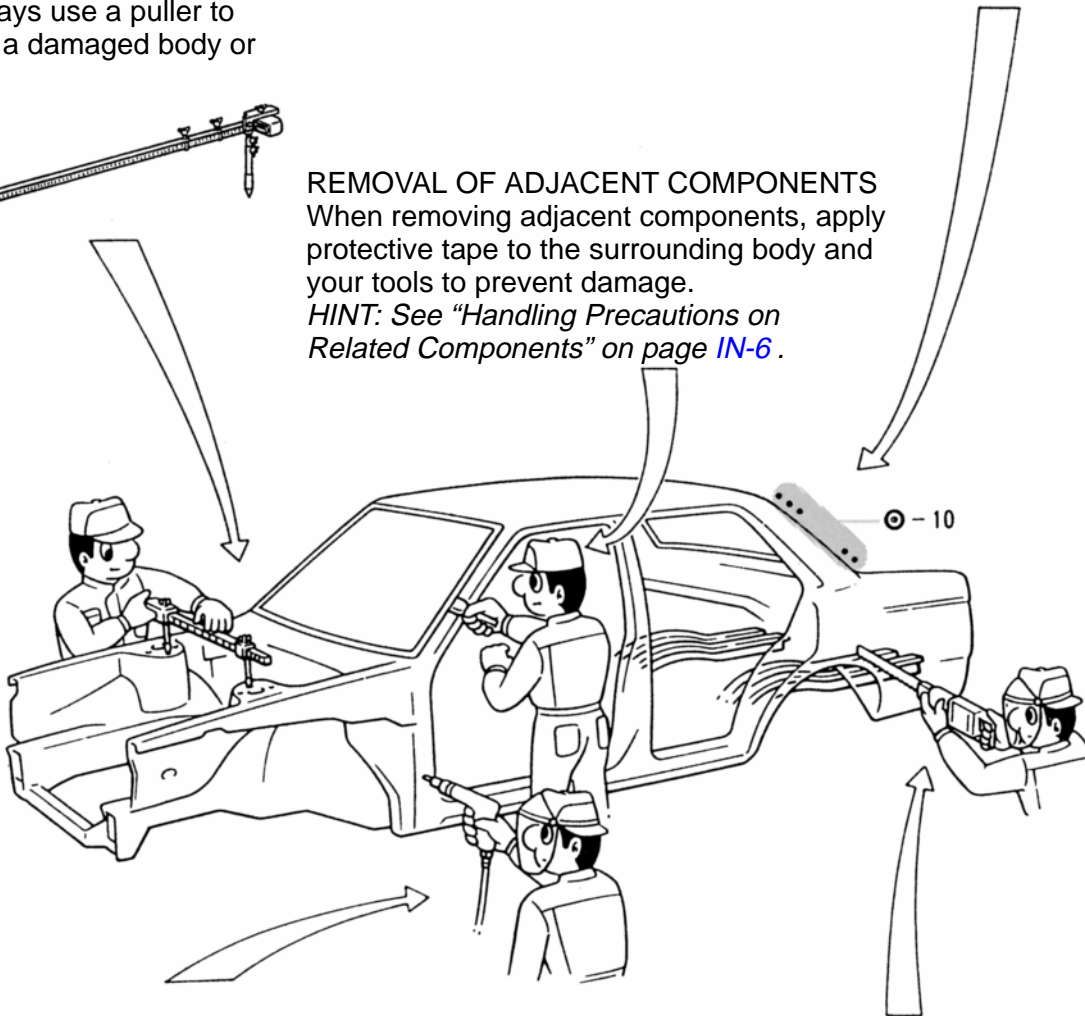
The number of spot welds and the panel positions to be removed are shown for your reference.

*HINT: See "Symbols" on page IN-4, 5.*

#### REMOVAL OF ADJACENT COMPONENTS

When removing adjacent components, apply protective tape to the surrounding body and your tools to prevent damage.

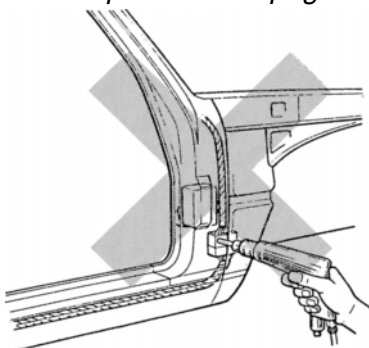
*HINT: See "Handling Precautions on Related Components" on page IN-6.*



#### PRECAUTIONS FOR DRILLING OR CUTTING

Check behind any area to be drilled or cut to insure that there are no hoses, wires, etc., that may be damaged.

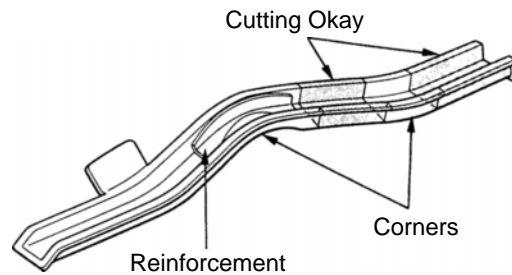
*HINT: See "Handling Precautions on Related Components" on page IN-6.*



WRONG

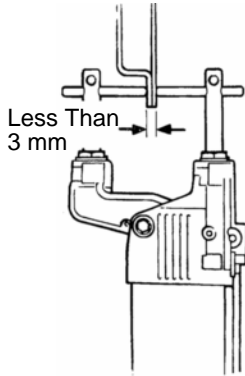
#### CUTTING AREA

Always cut in a straight line and avoid reinforced area.



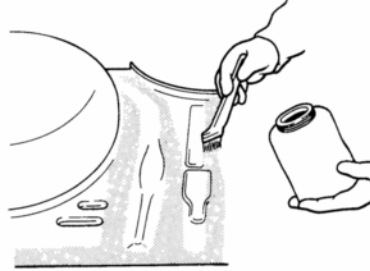
## PREPARATION FOR INSTALLATION

### SPOT WELD POINTS



When welding panels with a combined thickness of over 3 mm (0.12 in.), use a MIG (Metal Inert Gas) welder for plug welding.  
**HINT:** Spot welding will not provide sufficient durability for panels over 3 mm (0.12 in.) thick.

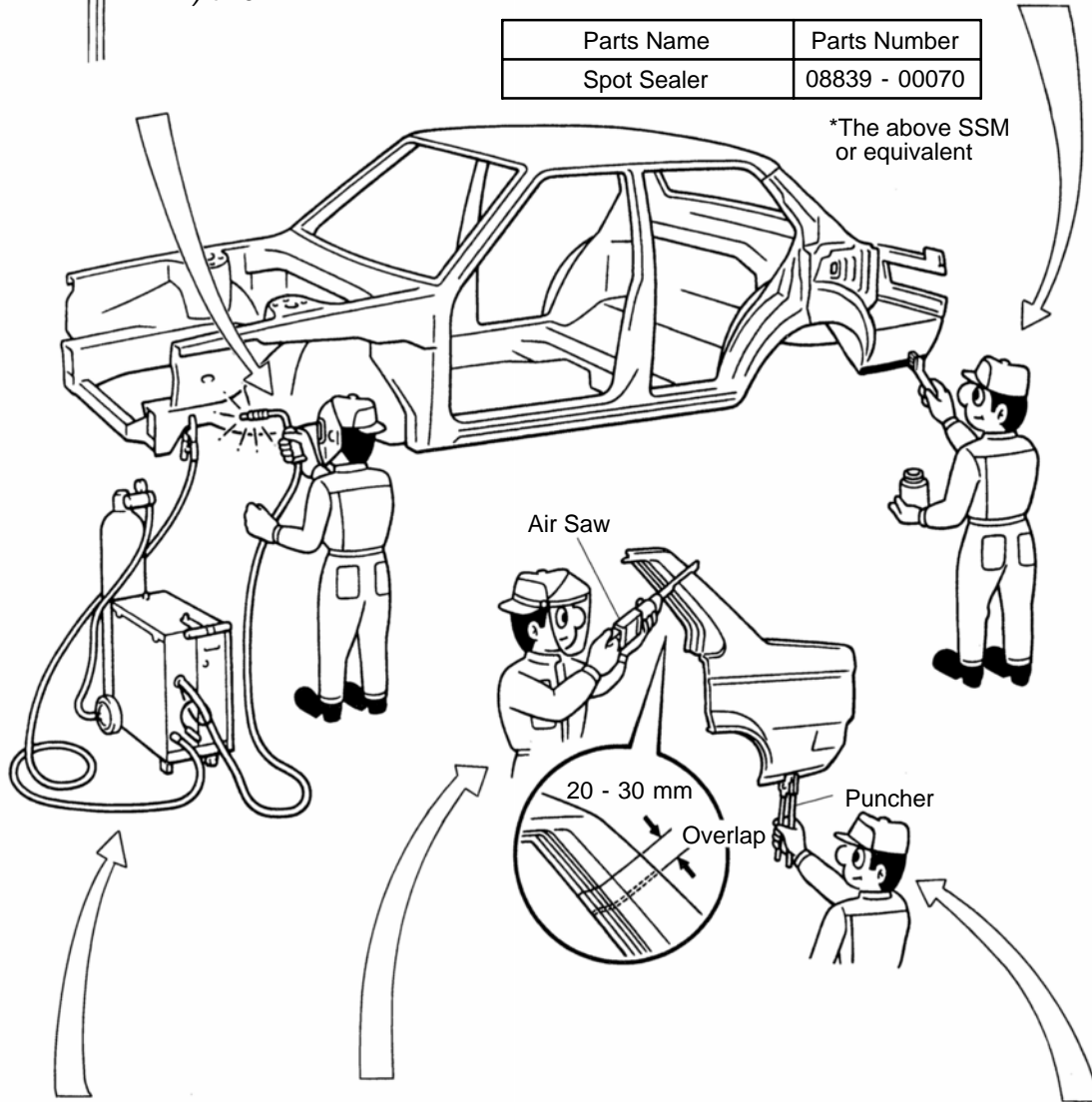
### APPLICATION OF WELD-THROUGH PRIMER (SPOT SEALER)



Remove the paint from the portion of the new parts and body to be welded, and apply weld-through primer.  
**HINT:** See "ANTIRUST TREATMENT" on page AR-2.

Parts Name	Parts Number
Spot Sealer	08839 - 00070

\*The above SSM or equivalent



**SAFETY PRECAUTIONS FOR ELECTRICAL COMPONENTS.**  
 When welding there is a danger that electrical components will be damaged by the electrical current flowing through the body. Before starting work disconnect the negative terminal of the battery and ground the welder near the welding location of the body.

**ROUGH CUTTING OF JOINTS**  
 For joint areas, rough cut the new parts, leaving 20 - 30 mm (0.79 - 1.18 in.) overlap.

**MAKING HOLES FOR PLUG WELDING**  
 For areas where a spot welder cannot be used, use a puncher or drill to make holes for plug welding.

REFERENCE: mm (in.)

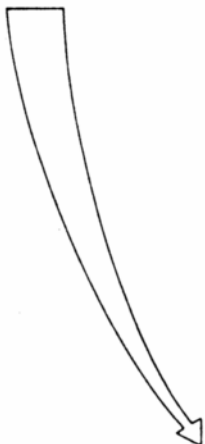
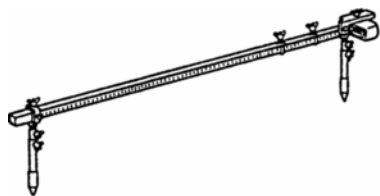
Thickness of welded portion	Size of plug hole
1.0 (0.04) under	5 (0.20) $\phi$ over
1.0 (0.04) - 1.5 (0.06)	6.5 (0.26) $\phi$ over
1.5 (0.06) over	8 (0.31) $\phi$ over



## INSTALLATION

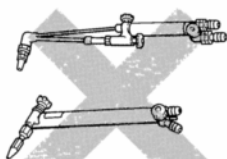
### PRE-WELDING MEASUREMENTS

Always take measurements before installing underbody or engine components to insure correct assembly. After installation, confirm proper fit.



### WELDING PRECAUTIONS

1. The number of welding spots should be as follows.  
Spot weld: 1.3 x No. of manufacturer's spots.  
Plug weld: More than No. of manufacturer's plugs.

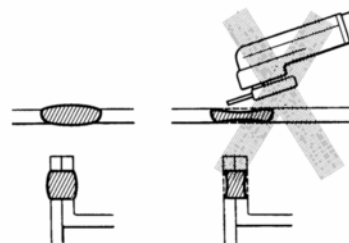


WRONG

2. Plug welding should be done with a MIG (Metal Inert Gas) welder. Do not gas weld or braze panes at areas other than specified.

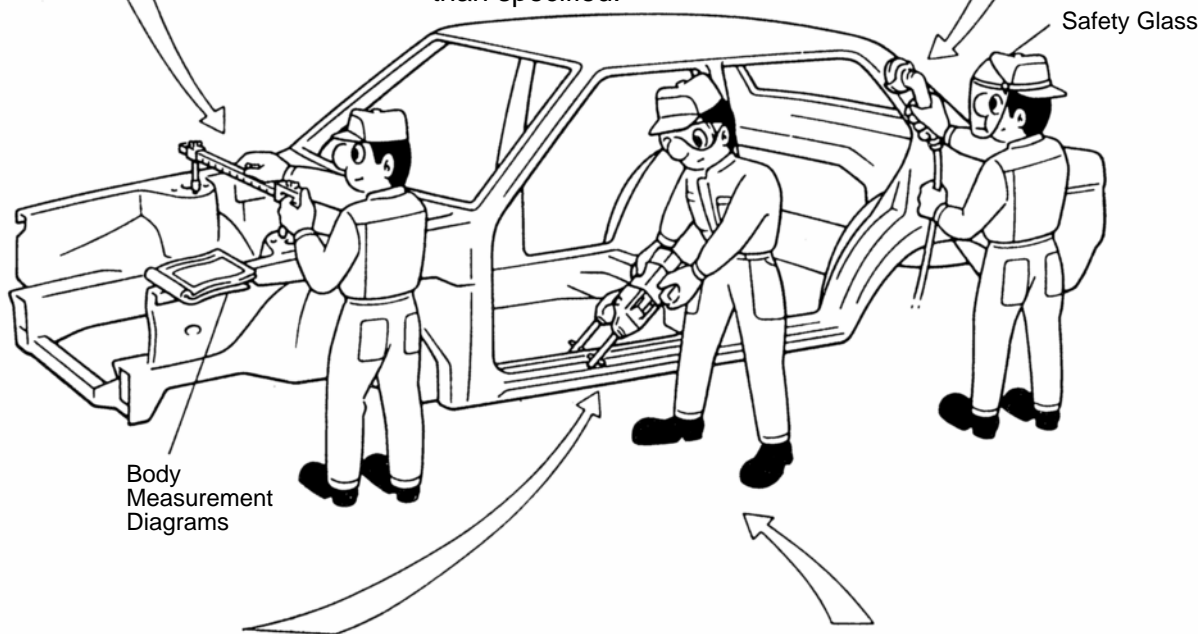
### POST WELDING REFINISHING

1. Always check the welded spots to insure they are secure.
2. When smoothing out the weld spots with a disc grinder, be careful not to grind off too much as this would weaken the weld.



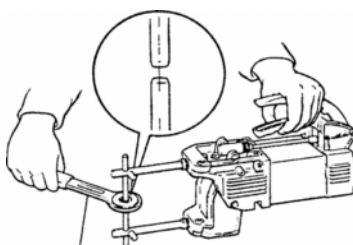
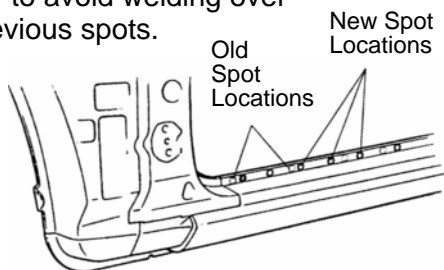
OKAY

WRONG



### SPOT WELD LOCATIONS

Try to avoid welding over previous spots.



Tip Cutter

### SPOT WELDING PRECAUTIONS

1. The shape of the welding tip point has an effect on the strength of the weld.
2. Always insure that the seams and welding tip are free of paint.

### ANTI-RUST TREATMENT

When replacing body panels, always apply body sealer, anti-rust agent or undercoat according to the requirements of your country.

*HINT: For further details, see the description given in Section AR of this manual.*

#### BODY SEALER

Apply body sealer to the required areas.



Cartridge Type      Tube Type

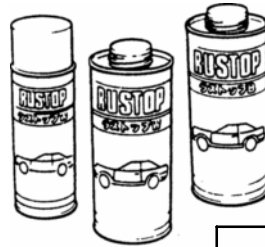
Parts Name	Parts Number
Body Sealer, White (Cartridge Type)	08839-00020
Body Sealer, White (Tube Type)	08839-00030
Body Sealer, Black (Cartridge Type)	08839-00040

\*The above SSM or equivalent

#### ANTI-RUST AGENT (WAX)

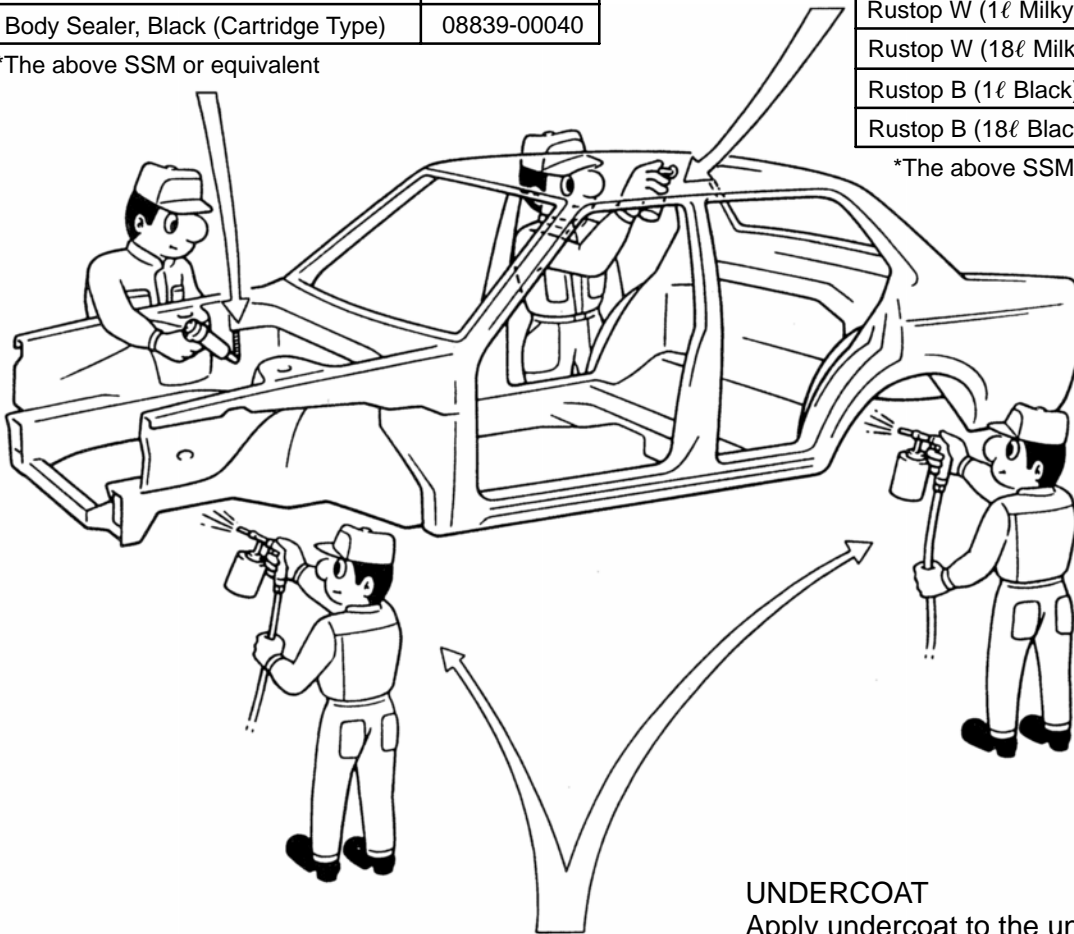
Apply anti-rust agent to following sections.

- ▶ Inside of the hems of the doors and hood.
- ▶ Around the hinges of the doors and hood.
- ▶ Inside of the welded parts with boxed cross-section.



Parts Name	Parts Number
Rustop W (Aerosol)	08860-00200
Rustop W (1l Milky White)	08860-00210
Rustop W (18l Milky White)	08860-00230
Rustop B (1l Black)	08860-00220
Rustop B (18l Black)	08860-00240

\*The above SSM or equivalent



#### UNDERCOAT

Apply undercoat to the underbody and wheel housings.



Undercoating (Oil base)



Undercoating (Water base)



Spray Gun

Parts Name	Parts Number
Pastar UC (Oil Base)	08836-00155
Pastar UW (Water Base)	08836-001 15
Pastar Gun (For thick application)	08836-00091

\*The above SSM or equivalent

## HANDLING PRECAUTIONS

1. The repair procedure for plastic body parts must conform with the type of plastic material.
2. Plastic body parts are identified by the codes in the following chart.
3. When repairing metal body parts adjoining plastic body parts (by brazing, frame cutting, welding, painting etc.), consideration must given to the property of the plastic.

Code	Material name	Heat* resistant temperature limit °C ( °F)	Resistance to alcohol or gasoline	Notes
AAS	Acrylonitrile Acrylic Styrene	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease.)	Avoid gasoline and organic or aromatic solvents.
ABS	Acrylonitrile Butadiene Styrene	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease.)	Avoid gasoline and organic or aromatic solvents.
AES	Acrylonitrile Ethylene Styrene	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease.)	Avoid gasoline and organic or aromatic solvents.
ASA	Acrylonitrile Styrene Acrylate	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease.)	Avoid gasoline and organic or aromatic solvents.
CAB	Cellulose Acetate	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease.)	Avoid gasoline and organic or aromatic solvents.
EPDM	Ethylene Propylene	100 (212)	Alcohol is harmless. Gasoline is harmless if applied only for short time in small amounts.	Most solvents are harmless but avoid dipping in gasoline, solvents, etc.
FRP	Fiber Reinforced Plastics	180 (356)	Alcohol and gasoline are harmless.	Avoid alkali.
EVA	Ethylene Acetate	70 (158)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease.)	Avoid gasoline and organic or aromatic solvents.
PA	Polyamide (Nylon)	80 (176)	Alcohol and gasoline are harmless.	Avoid battery acid.
PBT	Polybutylene Terephthalate	160 (320)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PC	Polycarbonate	120 (248)	Alcohol is harmless.	Avoid gasoline, brake fluid, wax, wax removers and organic solvents. Avoid alkali.

\*Temperatures higher than those listed here may result in material deformation during repair.

Code	Material name	Heat* resistant temperature limit °C (°F)	Resistance to alcohol or gasoline	Notes
PE	Polyethylene	80 (176)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PET	Polyethylene Terephthalate	75 (167)	Alcohol and gasoline are harmless.	Avoid dipping in water.
PMMA	Polymethyl Methacrylate	80 (176)	Alcohol is harmless if applied only for short time in small amounts.	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
POM	Polyoxymethylene (Polyacetal)	100 (212)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PP	Polypropylene	80 (176)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PPO	Modified Polyphenylene Oxide	100 (212)	Alcohol is harmless.	Gasoline is harmless if applied only for quick wiping to remove grease.
PS	Polystyrene	60 (140)	Alcohol and gasoline are harmless if applied only for short time in small amounts.	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
PUR	Polyurethane	80 (176)	Alcohol is harmless if applied only for very short time in small amounts (e.g., quick wiping to remove grease).	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
PVC	Polyvinylchloride (Vinyl)	80 (176)	Alcohol and gasoline are harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
SAN	Styrene Acrylonitrile	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid dipping or immersing in alcohol, gasoline, solvents etc.
TPO	Thermoplastic Olefine	80 (176)	Alcohol is harmless. Gasoline is harmless if applied only for short time in small amounts.	Most solvents are harmless but avoid dipping in gasoline, solvents, etc.
TPU	Thermoplastic Polyurethane	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
TSOP	TOYOTA Super Olefine Polymer	80 (176)	Alcohol and gasoline are harmless.	Most solvents are harmless.
UP	Unsaturated Polyester	110 (233)	Alcohol and gasoline are harmless.	Avoid alkali.

\*Temperatures higher than those listed here may result in material deformation during repair.

## HANDLING PRECAUTIONS ON RELATED COMPONENTS

### 1. FOR VEHICLES EQUIPPED WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

The TOYOTA LAND CRUISER is equipped with an SRS (Supplemental Restraint System), such as the driver airbag and front passenger airbag and seat belt pretensioners. Failure to carry out service operations in the correct sequence could cause the supplemental restraint system to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the supplemental restraint system, it is possible the SRS may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in this manual.

- ▶ Malfunction symptoms of the supplemental restraint system are difficult to confirm, so the diagnostic trouble codes become the most important source of information when troubleshooting.  
When troubleshooting the supplemental restraint system, always inspect the diagnostic trouble codes before disconnecting the battery.
- ▶ Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.  
(The supplemental restraint system is equipped with a back-up power source so that if work is started within 90 seconds of disconnecting the negative (-) terminal cable from the battery, the SRS may deploy.)  
When the negative (-) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by the audio memory system.  
Then when work is finished, reset the clock and audio systems as before.  
To avoid erasing the memory of each memory system, never use a back-up power supply from outside the vehicle.
- ▶ Even in cases of a minor collision where the SRS does not deploy, the passenger's airbag assembly, the steering wheel pad and seat belt pretensioners should be inspected.  
Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- ▶ Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- ▶ Never disassemble and repair the airbag sensor assembly, steering wheel pad in order to reuse it.
- ▶ If the airbag sensor assembly, steering wheel pad have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- ▶ Do not expose the airbag sensor assembly, steering wheel pad directly to hot air or flames.
- ▶ Use a volt/ohmmeter with high impedance (10 k $\Omega$ /V minimum) for troubleshooting of the electrical circuit.
- ▶ Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
- ▶ After work on the supplemental restraint system is completed, check the SRS warning light.
- ▶ Before repairing the body, remove the SRS parts if, during repair, shocks are likely to be applied to the sensors due to vibrations of the body or direct tapping with tools or other parts.
- ▶ Do not expose the SRS parts directly to hot air or flames.

**NOTICE:**

- 1) *The maximum ambient temperature tolerance is 120°C (248°F) for the front airbag sensor, 105°C (221°F) for the center airbag sensor assembly and 93°C (200°F) for the steering wheel pad, and front passenger airbag assembly. If it is possible that the ambient temperature may reach or exceed the temperature limit, remove the sensors and the steering wheel pad from the vehicle or protect them with a hot insulation material before starting work.*
  - 2) *Prior to welding, remove adjacent SRS parts from the vehicle or protect them with fire-proof covers.*
- ▶ If the vehicle is damaged, visually inspect for damage to the steering wheel pad using the inspection procedures described in section RS of the repair manual for the relevant model year.

**STEERING WHEEL PAD (with Airbag)**

- ▶ When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.  
In this case, the twin-lock type connector lock lever should be in the locked state and care should be taken to place it so the connector will not be damaged. In addition do not store a steering wheel pad on top of another one. Storing the pad with its metallic surface up may lead to a serious accident if the airbag inflates for some reason.
- ▶ Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)
- ▶ Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.
- ▶ Store the steering wheel pad where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- ▶ When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the steering column near the combination switch connector before starting work.
- ▶ When disposing of a vehicle or the steering wheel pad alone, the airbag should be deployed using an SST before disposal.  
Carry out the operation in a safe place away from electrical noise.

**FRONT PASSENGER AIRBAG ASSEMBLY**

- ▶ Always store a removed or new front passenger airbag assembly with the airbag deployment direction facing up. Storing the airbag assembly with the airbag deployment direction facing down could cause a serious accident if the airbag inflates.
- ▶ Never measure the resistance of the airbag squib.  
(This may cause the airbag deploy, which is very dangerous.)
- ▶ Grease should not be applied to the front passenger airbag assembly and the airbag door should not be cleaned with detergents of any kind.
- ▶ Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- ▶ When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) installed on the glove compartment finish plate at the left side of the glove compartment before starting work.
- ▶ When disposing of a vehicle or the airbag assembly alone, the airbag should be deployed using an SST before disposal.  
Perform the operation in a safe place away from electrical noise.

**SEAT BELT PRETENSIONER**

- ▶ Before doing any operation which will apply a strong shock to the vehicle, or before removing the seat belt pretensioner, be sure to apply the sensor shock.
- ▶ Never disassemble the seat belt pretensioner.
- ▶ Do not subject the seat belt pretensioner to shocks or bring magnets close to it.
- ▶ Do not expose the seat belt pretensioner to high temperature or fire.
- ▶ Do not drop the seat belt pretensioner. Never use a seat belt pretensioner which has been dropped.
- ▶ Never install the seat belt pretensioner in another vehicle.
- ▶ Store removed seat belt pretensioners on a flat, stable surface.
- ▶ After frontal collision, always check whether the seat belt pretensioners have been activated.
- ▶ When disposing of a vehicle or the pretensioner by itself, always activate the pretensioner before disposal.
- ▶ The seat belt pretensioner is hot when activated, so let it cool down fully before you dispose of it.  
Never apply water to the seat belt pretensioner.

### AIRBAG SENSOR ASSEMBLY

- ▶ Never reuse the airbag sensor assembly involved in a collision when the SRS has deployed.
- ▶ The connectors to the airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not mounted to the floor, it could cause undesired ignition of the supplemental restraint system.
- ▶ Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery, even if only loosening the set bolts of the airbag sensor assembly.

### WIRE HARNESS AND CONNECTOR

- ▶ The SRS wire harness is integrated with the cowl wire harness assembly and floor wire harness assembly. The wires for the SRS wire harness are encased in a yellow corrugated tube. All the connectors for the system are also a standard yellow color. If the SRS wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it as shown on page.

## 2. BRAKE SYSTEM

The brake system is one of the most important safety components. Always follow the directions and notes given in section BR of the repair manual for the relevant model year when handling brake system parts.

*NOTICE: When repairing the brake master cylinder or TRAC system, bleed the air out of the TRAC system.*

## 3. DRIVE TRAIN AND CHASSIS

The drive train and chassis are components that can have great effects on the running performance and vibration resistance of the vehicle. After installing components in the sections listed in the table below, perform alignments to ensure correct mounting angles and dimensions. Particularly accurate repair of the body must also be done to ensure correct alignment.

*HINT: Correct procedures and special tools are required for alignment. Always follow the directions given in the repair manual for the relevant model during alignment and section DI of this manual.*

Component to be aligned	Section of repair manual for relevant model
Front Wheels	Suspension and Axle (SA) section
Rear Wheels	Suspension and Axle (SA) section
Propeller Shaft	Propeller Shaft (PR) section

## 4. COMPONENTS ADJACENT TO THE BODY PANELS

Various types of component parts are mounted directly on or adjacently to the body panels. Strictly observe the following precautions to prevent damaging these components and the body panels during handling.

- ▶ Before repairing the body panels, remove their components or apply protective covers over the components.
- ▶ Before prying components off using a screwdriver or a scraper, etc., attach protective tape to the tool tip or blade to prevent damaging the components and the body paint.
- ▶ Before removing components from the outer surface of the body, attach protective tape to the body to ensure no damage to painted areas.

*HINT: Apply touch-up paint to any damaged paint surfaces.*

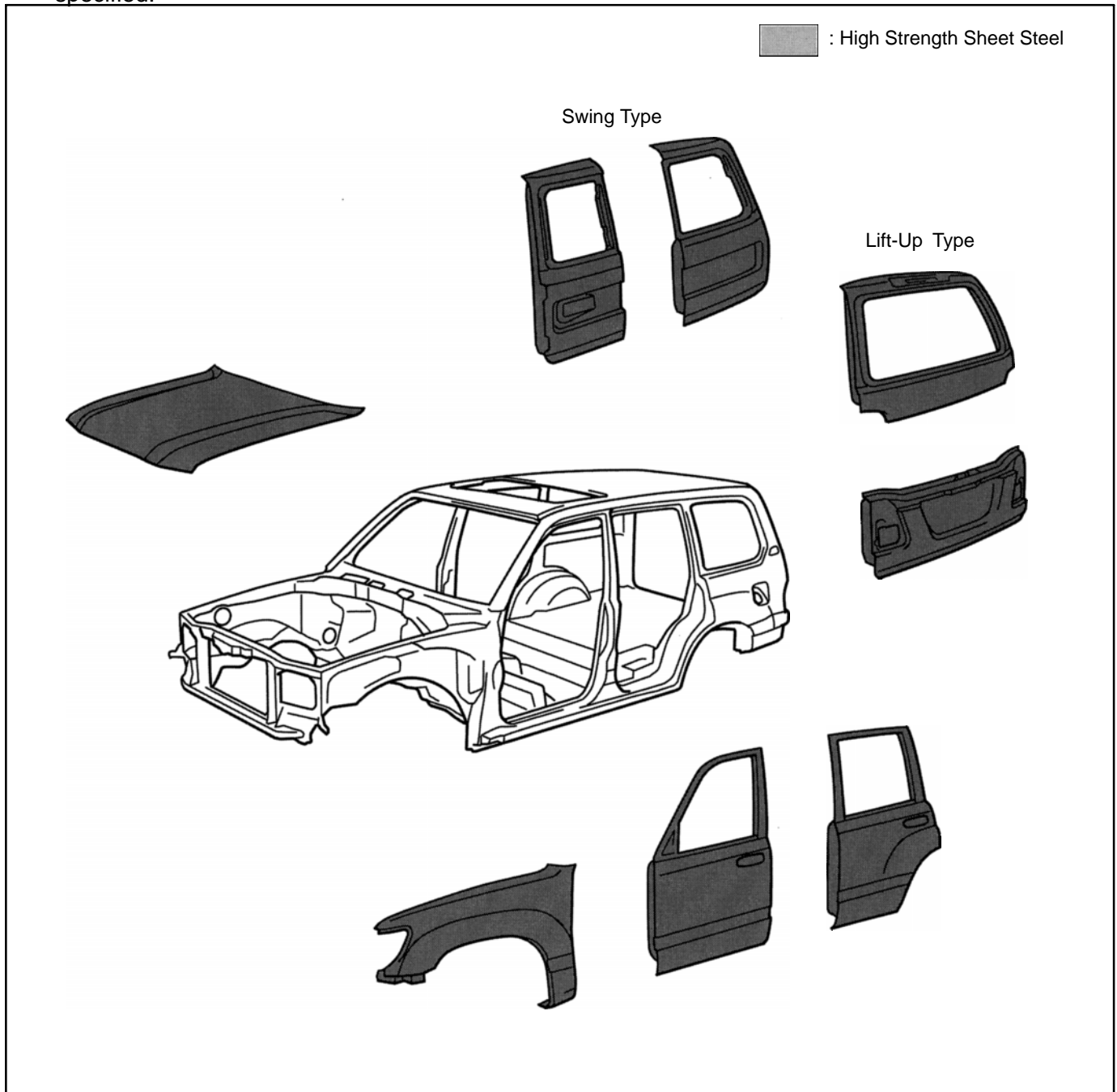
- ▶ Before drilling or cutting sections, make sure that there are no wires, etc. on the reverse side.

## HIGH-STRENGTH STEEL (HSS) PARTS

Generally, High-Strength Steel (HSS) is that which has an intensity value of at 35 kgf/mm<sup>2</sup> (343 MPa), and distinguished from mild steel.

The handling of HSS is the same as for mild steel, but the following should be observed.

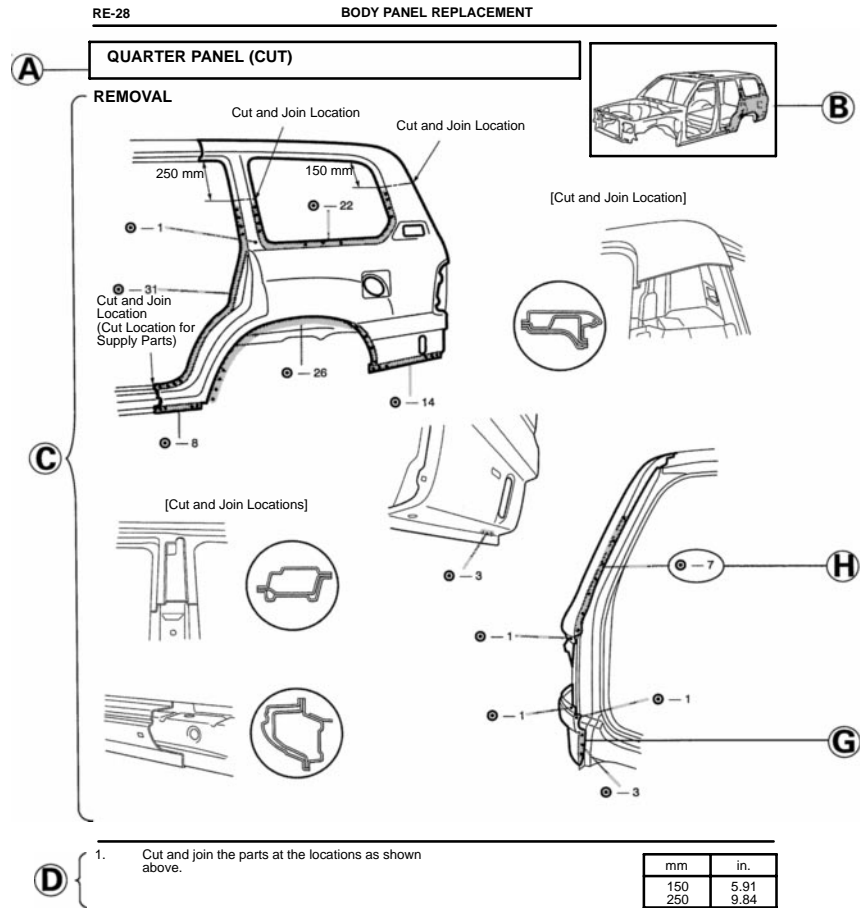
1. Panel Hammering: Because HSS is thinner than mild steel, care should be taken to avoid warping during hammering operations.
2. Removing Spot Welds: Because HSS is tougher than mild steel, damage will occur more easily to a regular drill. Therefore, an HSS Spot Cutter is recommended. Also, use a high-torque drill at low speed, and supply grinding oil to the drill use.
3. Panel welding: Panel welding procedures for HSS are exactly the same as for mild steel. Plug welding should be done with MIG (Metal Inert Gas) welder. Do not gas weld or braze panels at areas other than specified.





# HOW TO USE THIS MANUAL

Each repair method description provided in Section RE of this manual comprises two pages, divided into 2 blocks (REMOVAL AND INSTALLATION) and includes illustrations to facilitate body repair.



**A** : **REPLACEMENT PARTS AND METHOD**

**QUARTER PANEL (CUT)**

- Replacement method
  - (ASSY) . . . . . Assembly replacement
  - (CUT) . . . . . Major cutting (less than 1/2 of parts used)
  - (CUT-H) . . . . . Half cutting (about 1/2 of parts used)
  - (CUT-P) . . . . . Partial cutting (most of parts used)
- Replacement Parts

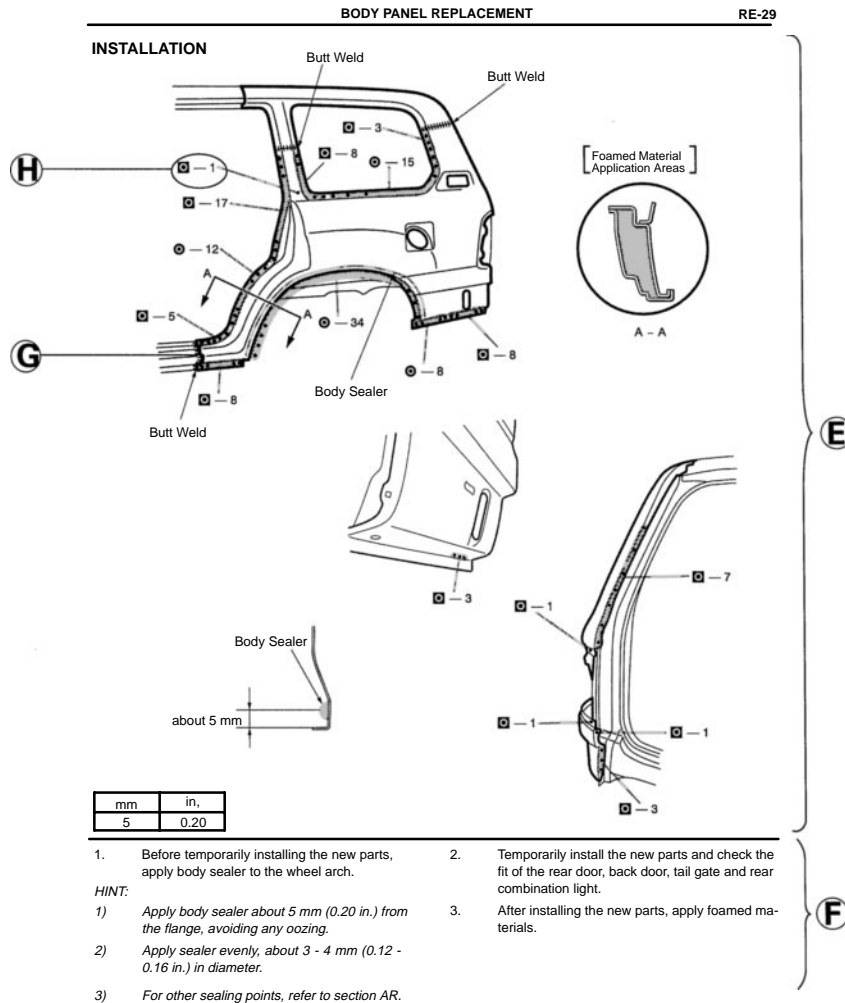
**B** : **PARTS LOCATION**

**C** : **REMOVAL DIAGRAM**

Describes in detail removal of the damaged parts involving repair by cutting.

**D** : **REMOVAL GUIDE**

Provides additional information to more efficiently help you perform the removal.



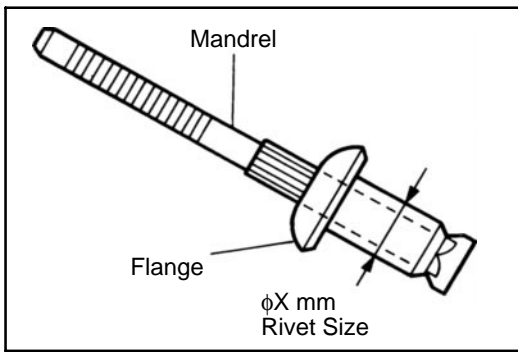
- E** : **INSTALLATION DIAGRAM**  
Describes in detail installation of the new parts involving repair by welding and/or cutting, but excluding painting.
- F** : **INSTALLATION GUIDE**  
Provides additional information to more efficiently help you perform the installation.
- G** : **SYMBOLS**  
See page [IN-4](#).
- H** : **ILLUSTRATION of WELD POINTS**  
Weld method and panel position symbols.  
See page [IN-5](#).

## LOCATION OF PLASTIC BODY PARTS

Parts Name	Code
Radiator Grille	ABS
Front Bumper Cover	TSOP
Fog Light	PC/PP
Front Turn Signal Light	PMMA/PC/AAS
Side Turn Signal Light	SAN/AAS
Cowl Top Ventilator Louver	TSOP
Outer Rear View Mirror	ABS
Outside Moulding (Fender, Front & Rear Door, Quarter)	TSOP
Outside Handle (Front & Rear Door)	PC
Rocker Panel Moulding	TSOP
Side Door Step Plate Cover (Front, Rear)	PP
Quarter Ventilator Louver	PPO/PA
Rear Combination Light	PMMA/PP/AAS
Rear Light	PMMA/PP
Back Door Outside Moulding	TSOP
License Plate Light	PC
License Plate Light Cover	AAS
Back Door Outside Handle	POM
Rear Bumper Cover	TSOP
Reflex Reflector	PMMA/ABS
Rear Fog Light	PC/PP
Outer Under Rear View Mirror	PC/PBT
Roof Moulding	PVC

**HINT:**

- Resin material differs with model.
- / Made up of 2 or more kinds of materials.



# RIVET REMOVAL AND INSTALLATION

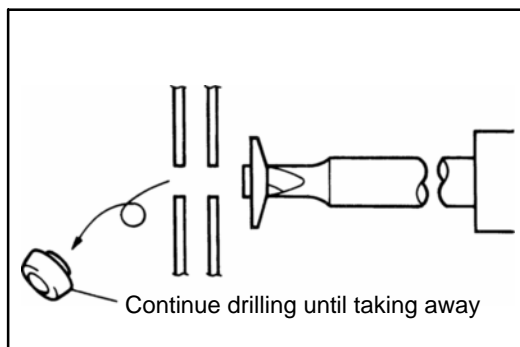
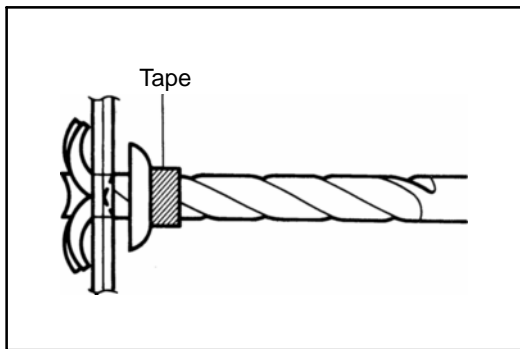
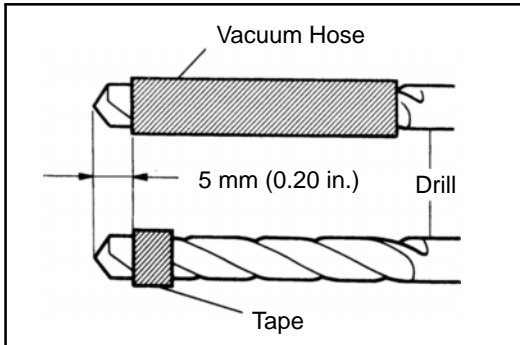
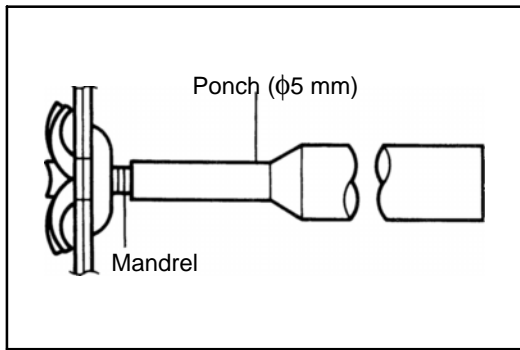
## PARTS NAME AND VARIETY OF RIVET

	Aluminum-Rivet	Steel-Rivet	Waterproof-Rivet	T-Rivet
External Appearance	Before installation 	Before installation 	Before installation 	Before installation 
	After installation  Outer Inner	After installation  Outer Inner	After installation  Outer Inner Waterproof Seal	After installation  Outer Inner Mandrel
Characteristics	<ul style="list-style-type: none"> <li>▶ Small nonwaterproof rivet</li> <li>▶ No magnetic adherence</li> </ul>	<ul style="list-style-type: none"> <li>▶ Small nonwaterproof rivet</li> <li>▶ Magnetic adherence</li> </ul>	<ul style="list-style-type: none"> <li>▶ Small waterproof rivet</li> <li>▶ Waterproof seal</li> </ul>	<ul style="list-style-type: none"> <li>▶ Large waterproof rivet</li> <li>▶ Mandrel sticks out after installation</li> </ul>

## RIVET REMOVAL

### 1. SELECTION OF CUTTING TOOL

	Cutting tool	Note								
Aluminum-Rivet Steel-Rivet T-Rivet with $\phi 6.4$ mm	<p>Drill blade</p> <table border="1"> <thead> <tr> <th>Rivet size</th> <th>Blade size</th> </tr> </thead> <tbody> <tr> <td><math>\phi 4</math> mm</td> <td><math>\phi 4</math> mm</td> </tr> <tr> <td><math>\phi 4.8</math> mm</td> <td><math>\phi 5</math> mm</td> </tr> <tr> <td><math>\phi 6.4</math> mm</td> <td><math>\phi 6.5</math> mm</td> </tr> </tbody> </table>	Rivet size	Blade size	$\phi 4$ mm	$\phi 4$ mm	$\phi 4.8$ mm	$\phi 5$ mm	$\phi 6.4$ mm	$\phi 6.5$ mm	<ul style="list-style-type: none"> <li>▶ Cutting can be done with drill blade or rivet cutter for an aluminum-rivet with <math>\phi 4.8</math> mm.</li> <li>▶ When a rivet cutter is used for an aluminum-rivet (except <math>\phi 4.8</math> mm), a steel-rivet, or a T-rivet with <math>\phi 6.4</math> mm, it is possible that the drill will spin abnormally damaging the rivet hole and breaking the rivet cutter.</li> </ul>
Rivet size	Blade size									
$\phi 4$ mm	$\phi 4$ mm									
$\phi 4.8$ mm	$\phi 5$ mm									
$\phi 6.4$ mm	$\phi 6.5$ mm									
Waterproof special-Rivet with $\phi 4.0$ mm	Drill blade with $\phi 4.0$ mm									
Aluminum-Rivet with $\phi 4.8$ mm Waterproof-Rivet with $\phi 4.8$ mm or $\phi 6.0$ mm	<p>Rivet Cutter (P/N 09060-60350)</p>	<ul style="list-style-type: none"> <li>▶ When an ordinary cutter is used for a waterproof-rivet with <math>\phi 4.8</math> mm or <math>\phi 6.0</math> mm, the rivet can not be cut as it spins with the cutter.</li> </ul>								



## 2. RIVET REMOVAL

- (1) T-Rivet with  $\phi 6.4$  mm:  
Using a punch with  $\phi 5$  mm, stamp out the mandrel.

- (2) Put tape around the drill blade 5 mm (0.20 in.) from the tip or insert a vacuum hose.

**NOTE: Use of tape or a vacuum hose prevents damage to the rivet hole.**

- (3) Attach the drill blade or a rivet cutter to the drill.

- (4) Gently and vertically put the drill to the rivet, and cut the rivets flange.

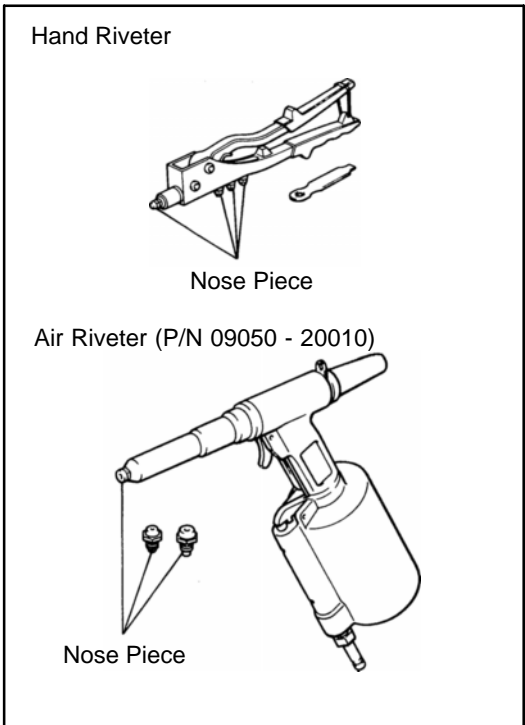
**NOTE:**

- While upward drilling, wear a protective glasses.
- If a drill is strongly pushed deeply in to a rivet, the rivet can't be cut as it spins together with the drill.
- Prizing the hole with a drill can lead to damage to the rivet hole or the breaking of the rivet cutter.
- Take care as the cut rivet is hot.

- (5) Aluminum-Rivet and Waterproof-Rivet with  $\phi 4.8$  mm or  $\phi 6.0$  mm:  
Even if flange is taken off, continue drilling and push out remaining fragments with the drill.

- (6) Steel-Rivet:  
If the flange is taken off, stop drilling and pull out the remaining fragments with a pliers.

- (7) T-Rivet with  $\phi 6.4$  mm:  
If the flange is taken off, stop drilling and push out the remaining fragments with a punch with  $\phi 5$  mm or pull out the remaining fragments with pliers.

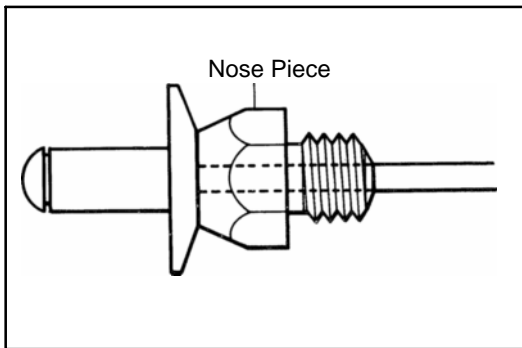


## RIVET INSTALLATION

### 1. RIVET INSTALLATION

- (1) Apply touch-up paint at the area.
- (2) Select an installation tool.

Item	Installation tool
Aluminum-Rivet Waterproof-Rivet with $\phi 4.8$ mm	Hand Riveter or Air Riveter
Steel-Rivet Waterproof-Rivet T-Rivet with $\phi 6.0$ mm with $\phi 6.4$ mm	Air Riveter

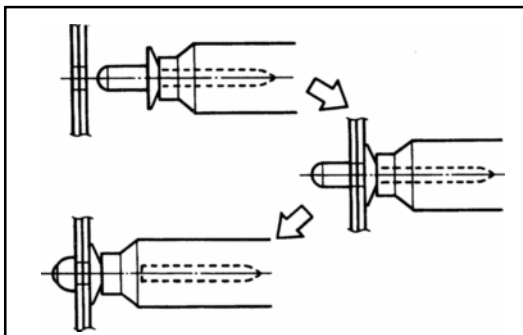


- (3) Select the smallest a nosepiece possible for a rivets mandrel.

**NOTE: Wrong selection of a nose piece may cause the riveter to be damaged or bad tightening.**

<Reference> Nose piece of Air Riveter

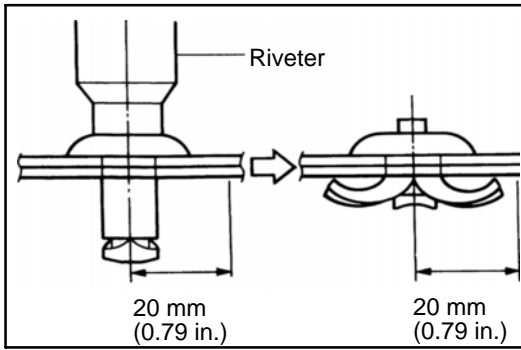
Parts Name	Parts Number	Color	Rivet type
Nose piece No. 1	09050-02020	Silver	$\phi 4.0$ mm Aluminum $\phi 4.0$ mm Steel $\phi 4.8$ mm Waterproof
Nose piece No. 2	09050-02030	Copper	$\phi 4.8$ mm Aluminum $\phi 4.8$ mm Steel
Nose piece No. 3	09050-02040	Black	$\phi 6.4$ mm T-Rivet
Nose piece No. 4	09050-02050	Black	$\phi 4.0$ mm Waterproof Special



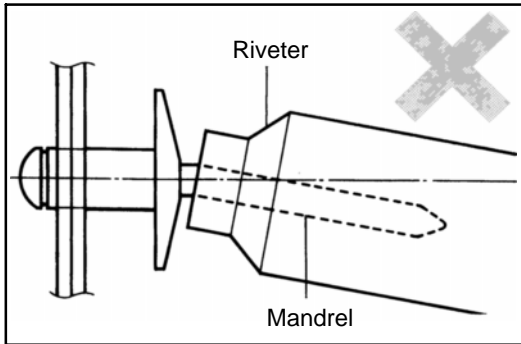
- (4) Insert the nosepiece to the riveter and then the mandrel of the new rivet into the nose piece
- (5) Vertically insert the rivet into a hole and keep place it strongly.

**NOTE:**

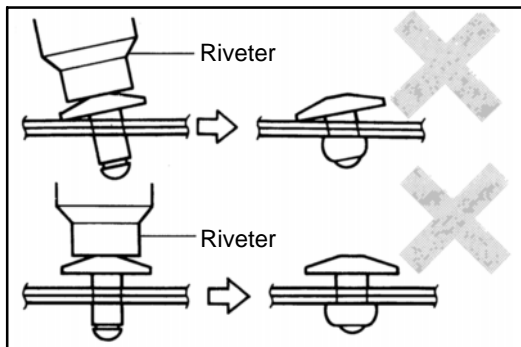
- If the tip of the rivet is not deformed or the mandrel is not cut, repeat process (5) again.



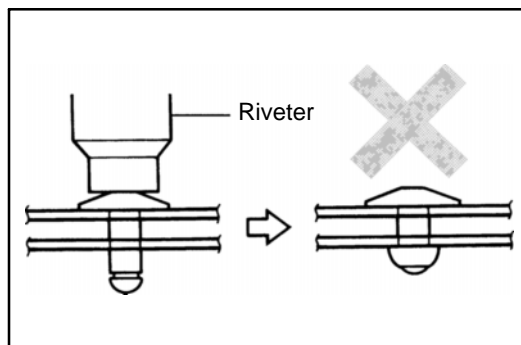
- T-Rivet with of  $\phi 6.4$  mm:  
Do not place your hands or the wire harness within a radius of 20 mm (0.70 in.) from the rivet, as the rivet is cut and opened in this area.



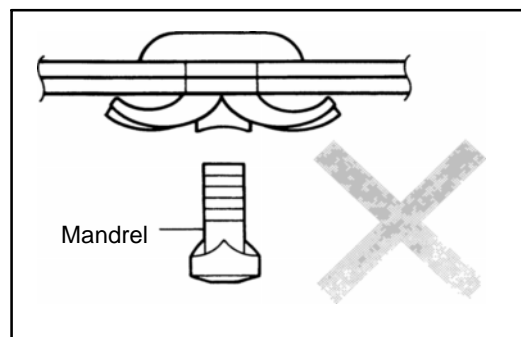
- ▶ Prizing a riveter damages the riveter showing that it is not tightened correctly and bends the mandrel.



- ▶ Loose tightening may result from either tilting the riveter while handling or the riveter not connecting to the material.



- ▶ Loose tightening also occurs when a rivet is applied between materials without touching.

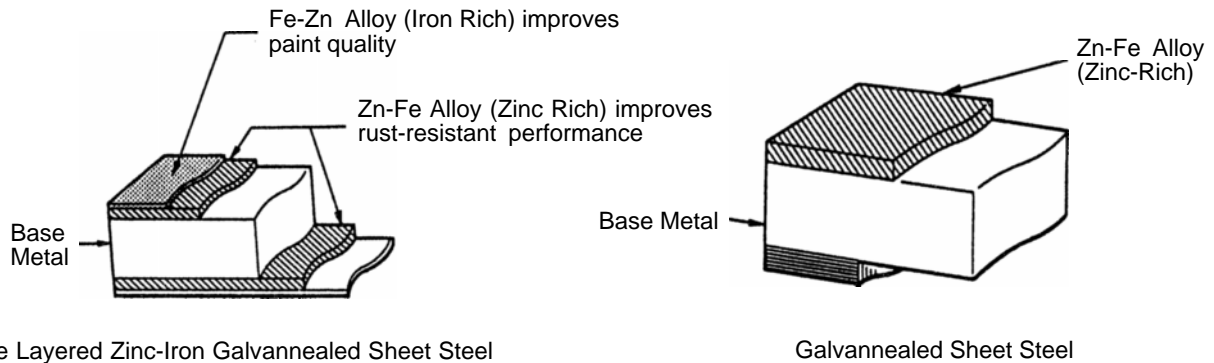


- T-Rivet with  $\phi 6.4$  mm:  
When a mandrel of a rivet is lost, the rivet should be replaced to prevent loose tightening.

## RUST-RESISTANT SHEET STEEL PARTS

Rust-Resistant Sheet Steel have zinc, tin or aluminum etc, plating over the base metal surface in order to improve the corrosion resistance of the sheet metal. This sheeting is used on areas that require anticorrosive abilities but there is no need to distinguish the differences between rust resistant sheet steel and ordinary sheet steel in body repair.

Body panels on TOYOTA models are made of two different melted galvanized sheet steel. The ordinary melted galvanized sheet has a zinc plating over the base metal surface and when heated a zinc-iron alloy plating. The zinc-iron double layered galvanized sheet has a iron rich and another zinc-rich layer above the sheet steel. These 2 layers improve paint adhesion. These two melted galvanized sheet steels are used selectively according to need.



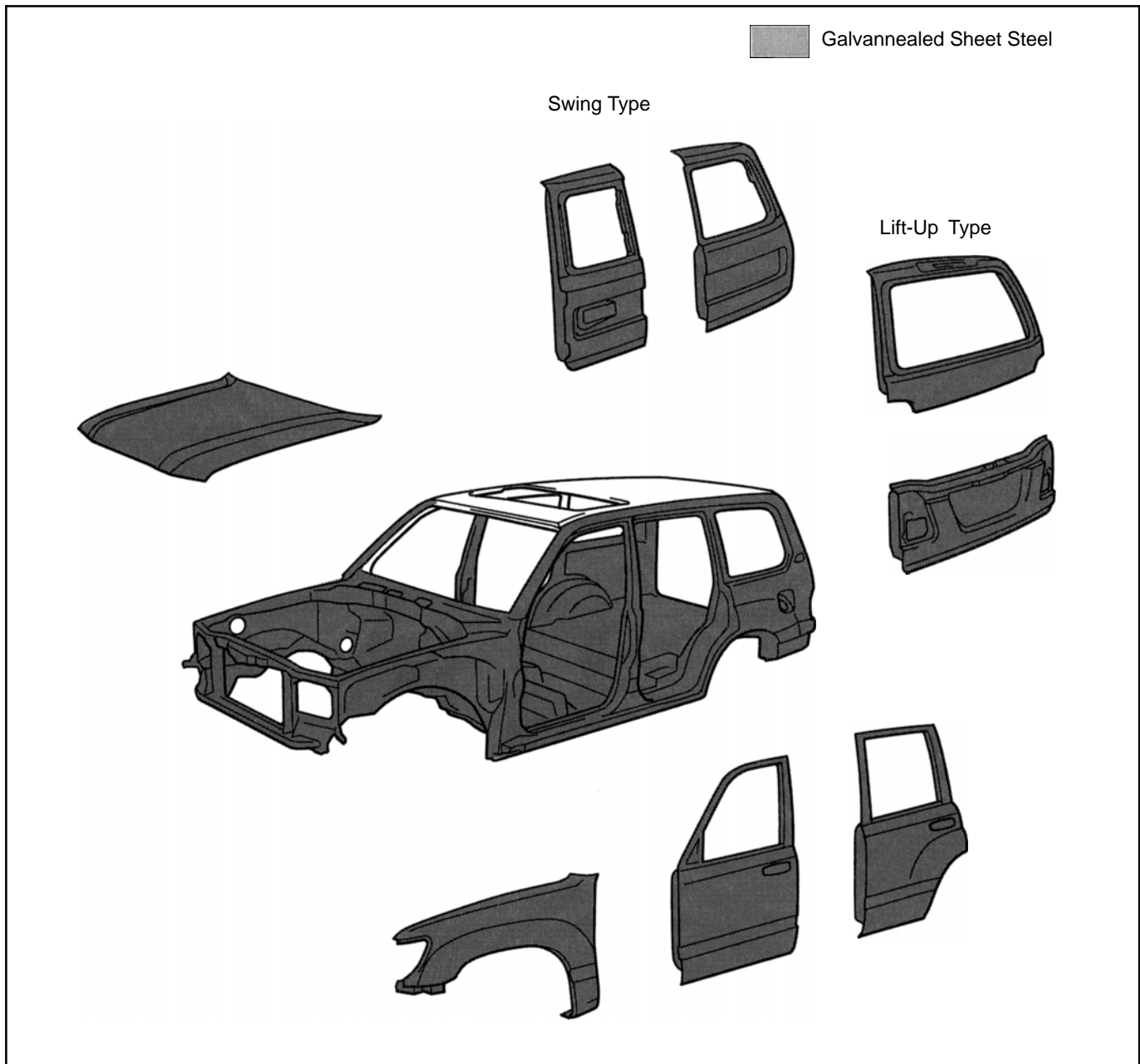
Double Layered Zinc-Iron Galvanized Sheet Steel

Galvanized Sheet Steel

The handling of Rust-Resistant Sheet Steel is the same as for ordinary sheet steel, but the following should be observed.


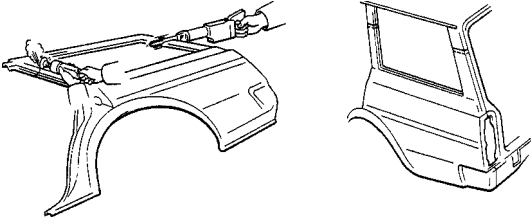

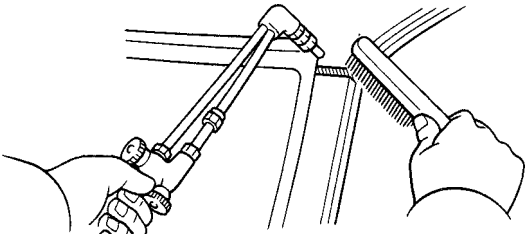


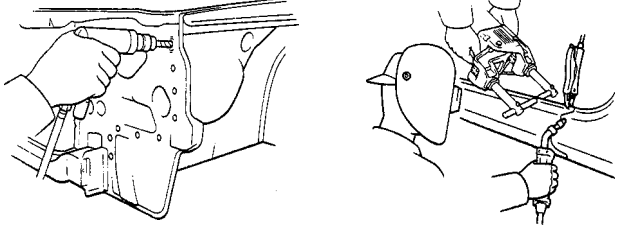

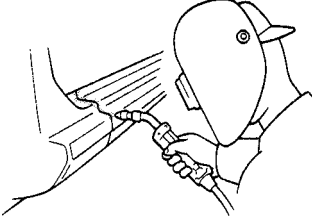

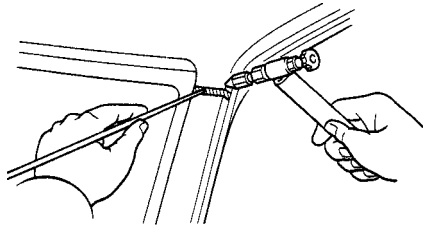

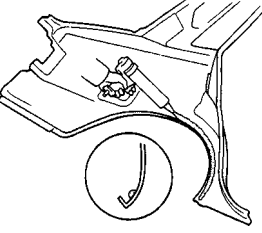
1. Panel Welding: The paint as well as the zinc portion must be removed completely from the welding area to guarantee good welding integrity.
2. Anti-Rust Treatment: Since the zinc plating is lost after welding, anti-rust treatment of the welded area must be thoroughly performed (refer to section AR).





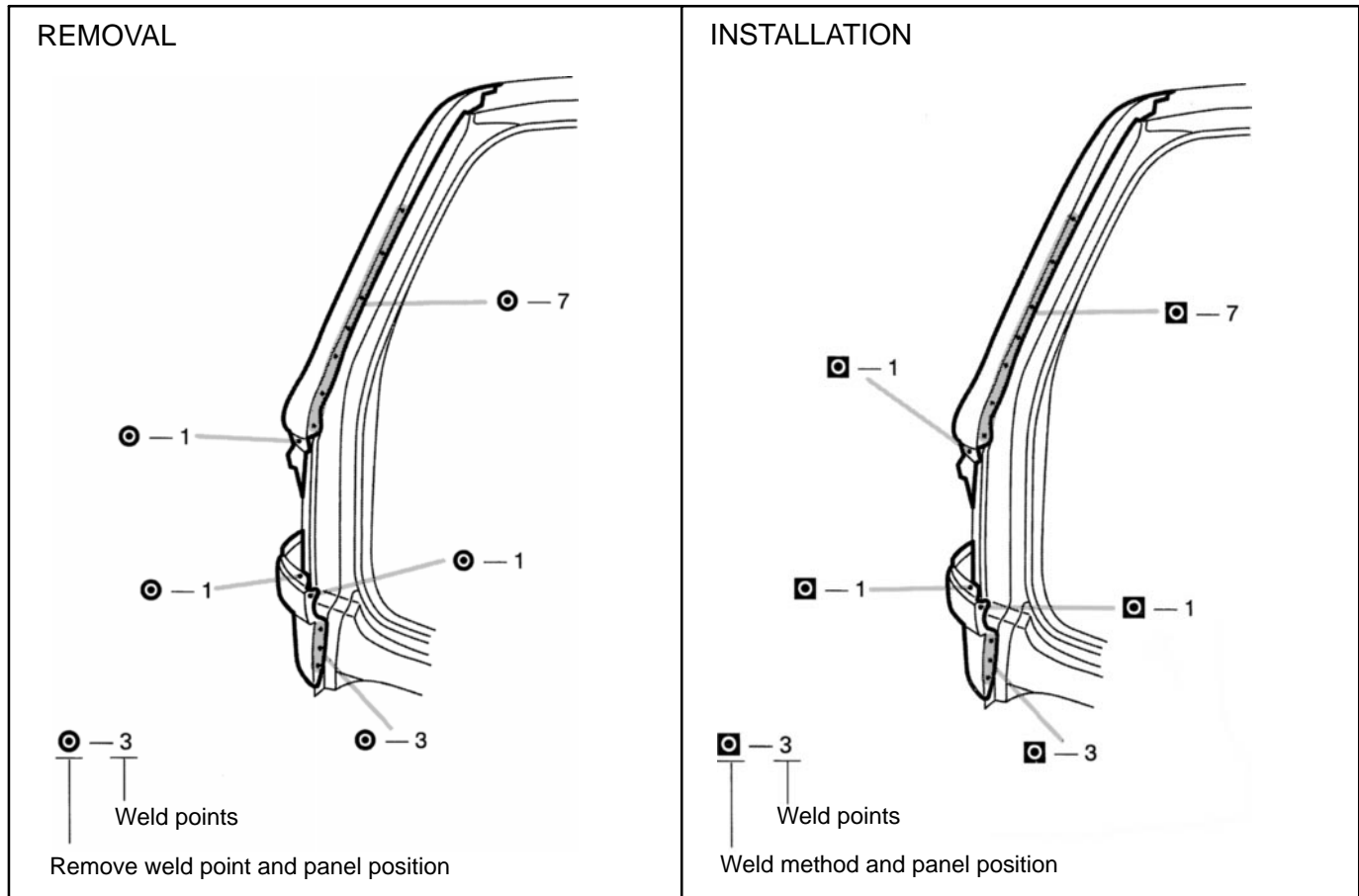
# SYMBOLS

The following symbols are used in the welding Diagrams in Section RE of this manual to indicate cutting areas and the types of weld required.

SYMBOLS	MEANING	ILLUSTRATION
	<p>SAW CUT OR ROUGH CUT</p>	
	<p>REMOVE BRAZE</p>	
 	<p>WELD POINTS  SPOT WELD OR MIG PLUG WELD  (See page <a href="#">IN-5</a>)</p>	
	<p>CONTINUOUS MIG WELD (BUTT WELD OR TACK WELD)</p>	
	<p>BRAZE</p>	
	<p>BODY SEALER</p>	

### Illustration of Weld Point Symbols

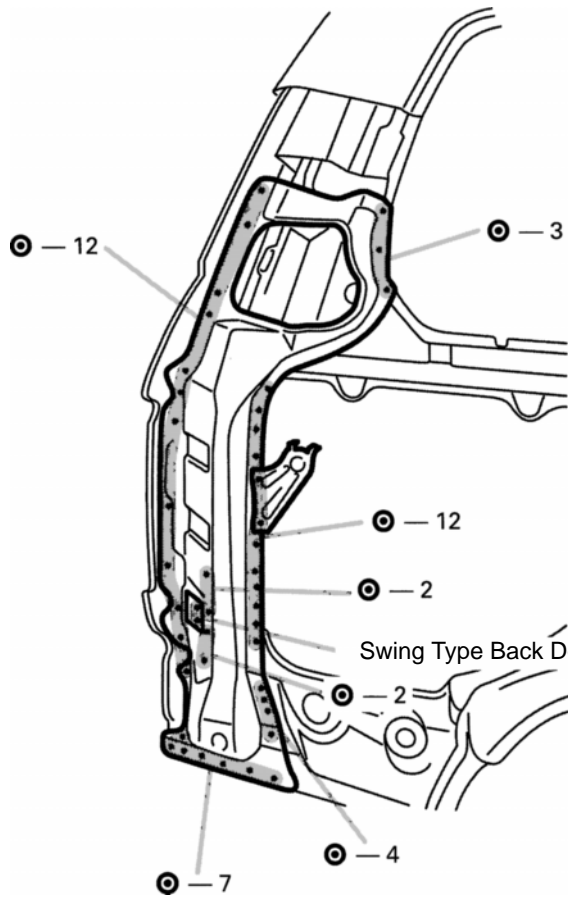
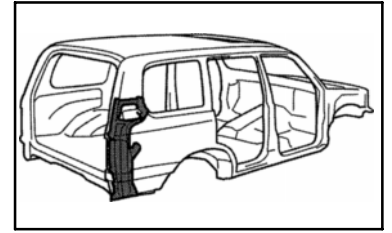
**EXAMPLE:**



SYMBOL	MEANING	ILLUSTRATION	SYMBOL	MEANING	ILLUSTRATION
<p>○ M I</p>	<p>Remove Weld Points</p>		<p>○ M I</p>	<p>Spot Weld</p>	
<p>○</p>	<p>(Outside)</p>		<p>○ M I</p>	<p>Mig Plug Weld</p>	
<p>M</p>	<p>(Middle)</p>		<p>+</p>	<p>Spot MIG Weld</p>	
<p>I</p>	<p>(Inside)</p>		<p><i>HINT: Panel position symbols are as seen from the working posture.</i></p>		

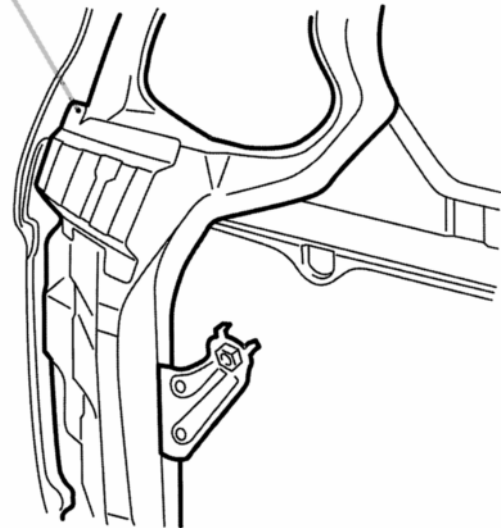
## BACK DOOR OPENING REINFORCEMENT (ASSY)

REMOVAL (With the quarter panel removed.)

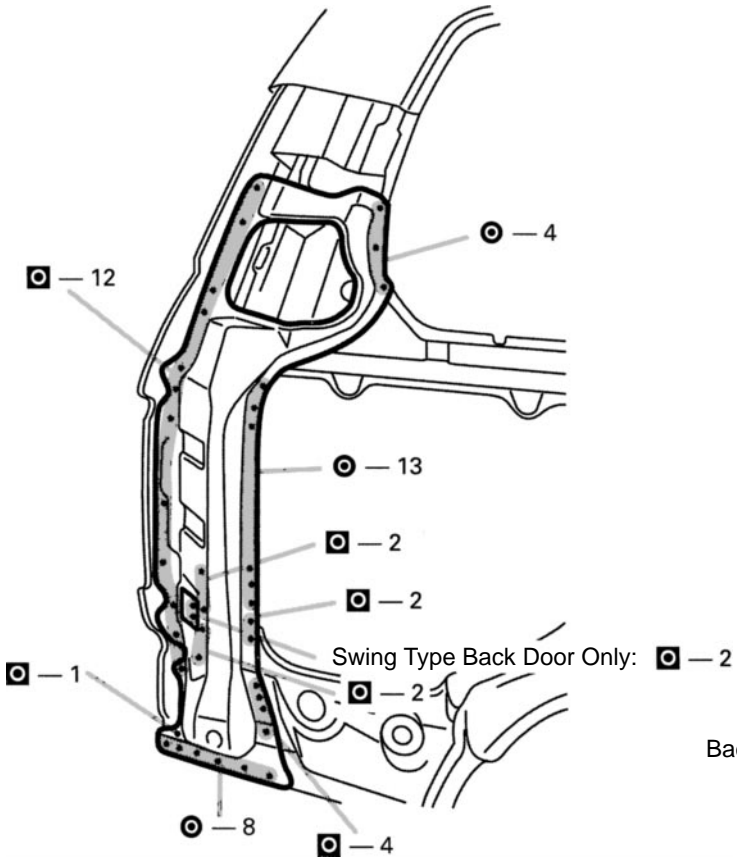


Swing Type Back Door Only: ● — 2

Back Door Type Spare Wheel Carrier (RH) Only: ● — 1

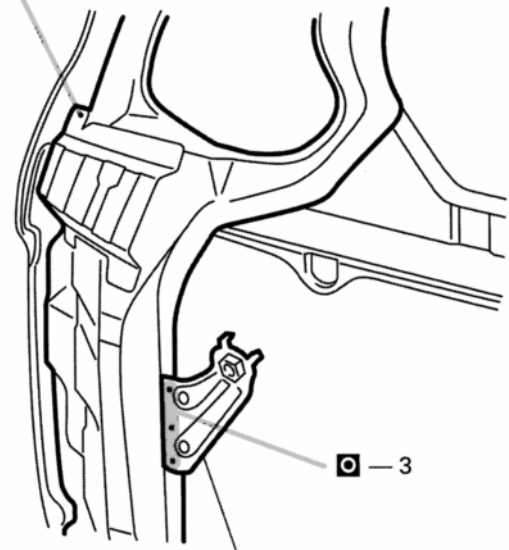


INSTALLATION



Swing Type Back Door Only: 2

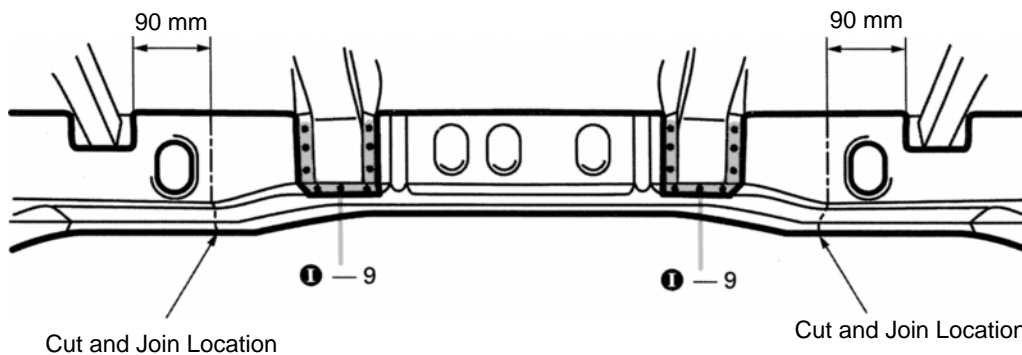
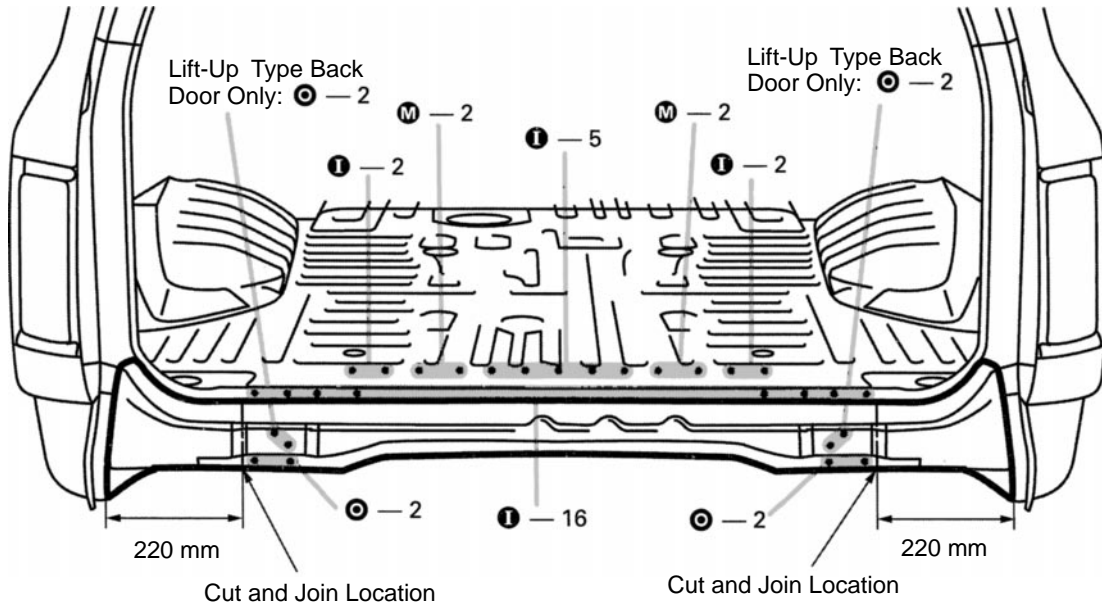
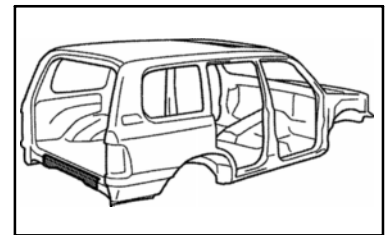
Back Door Type Spare Wheel Carrier (RH) Only: 1



Seat Belt Anchor Reinforcement (3rd Seat Belt Only)

# BODY LOWER BACK PANEL (CUT)

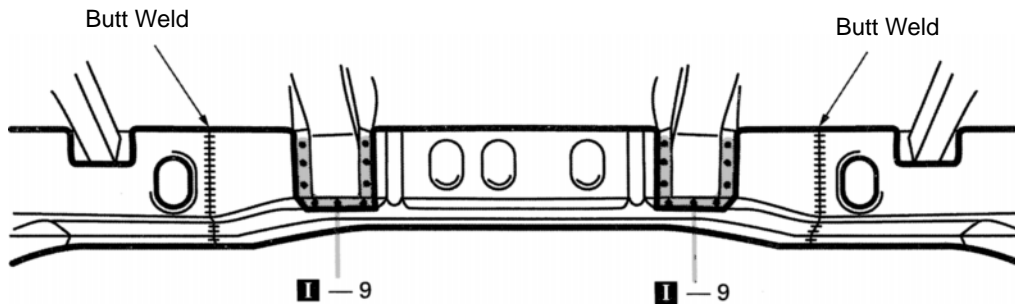
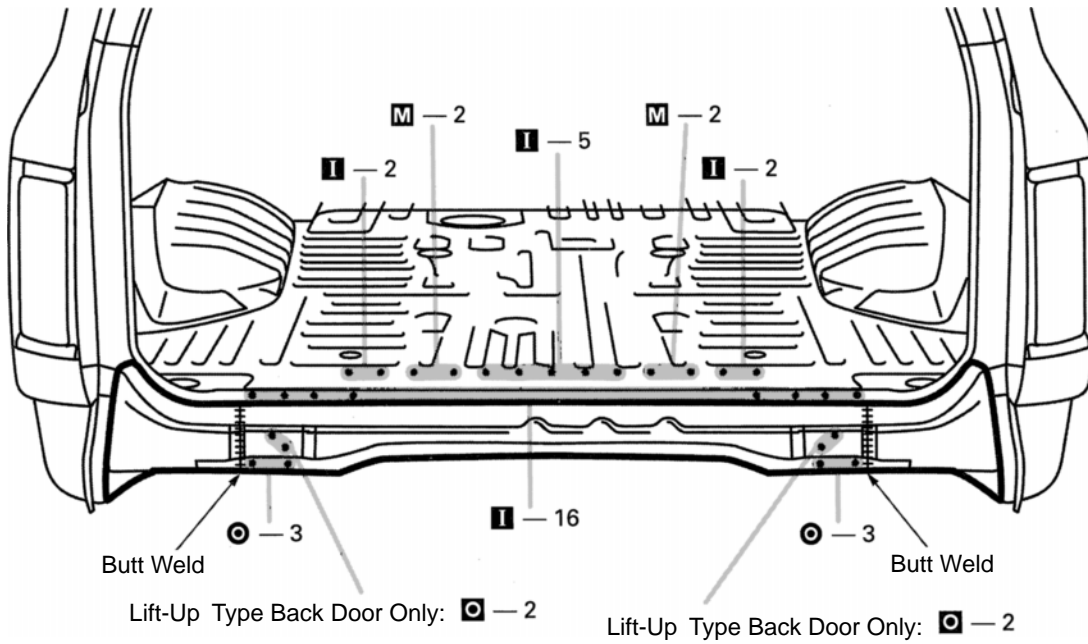
## REMOVAL



1. Cut and join the parts at the locations as shown above.

mm	in.
220	8.66
90	3.54

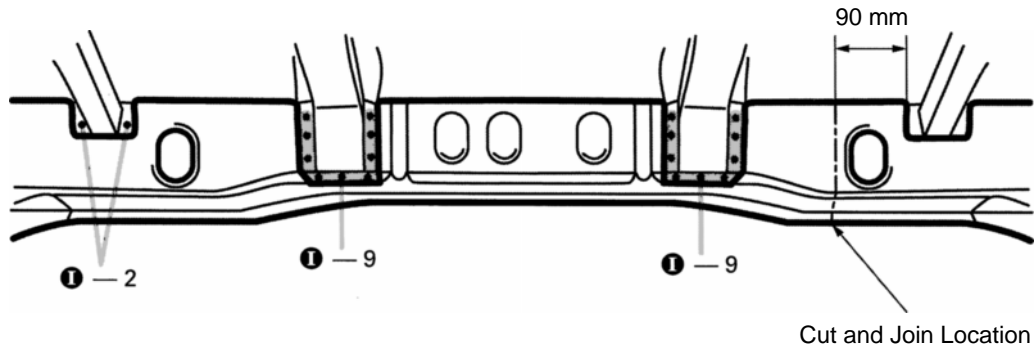
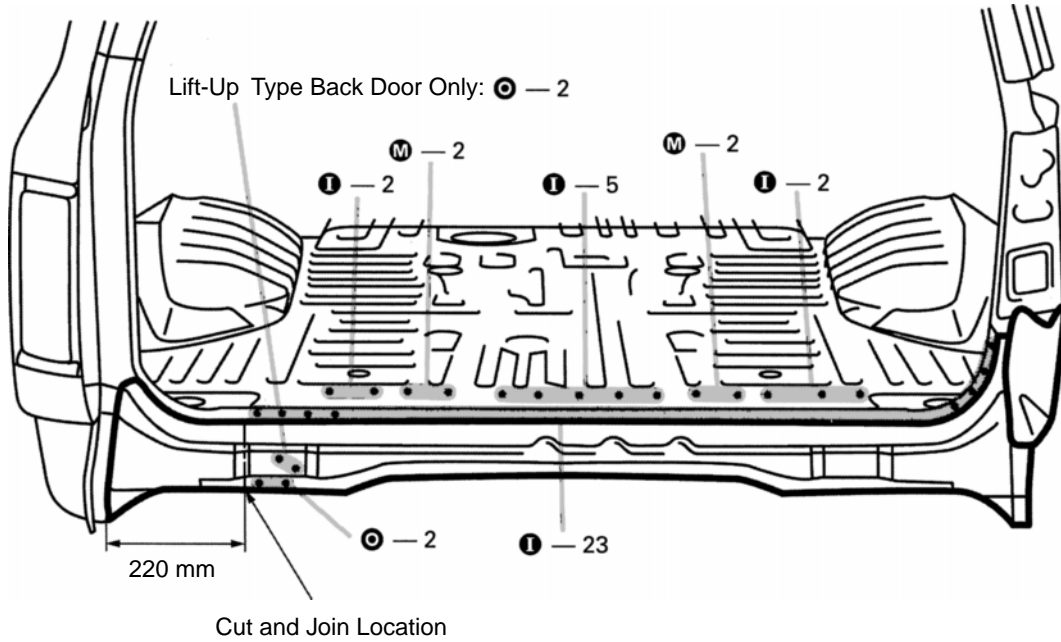
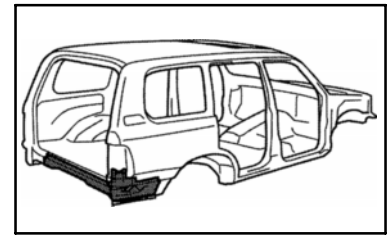
INSTALLATION



1. Temporarily install the new parts and check the fit of the tail gate or back door.

# BODY LOWER BACK PANEL (CUT)

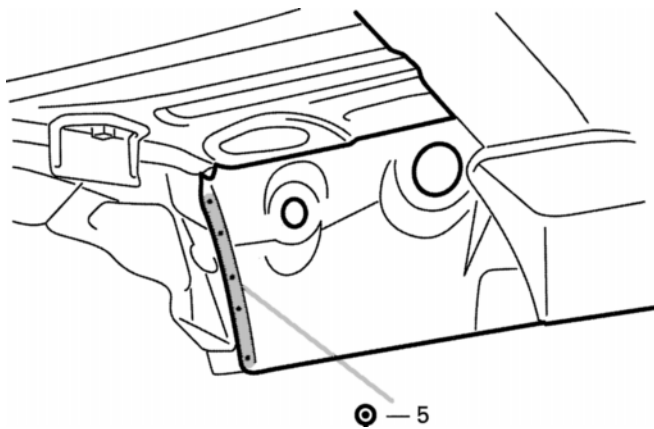
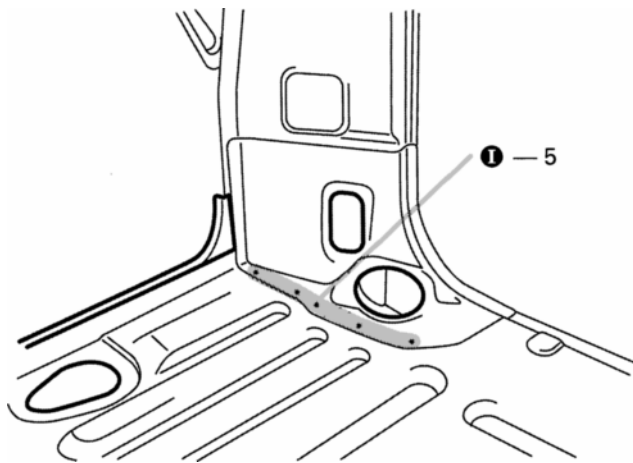
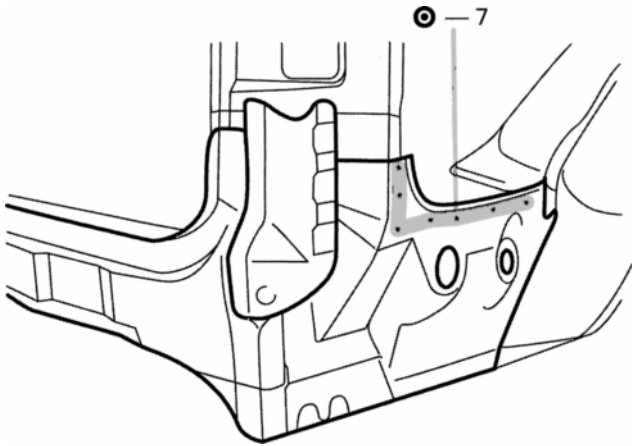
REMOVAL (With the quarter panel rear extension removed.)



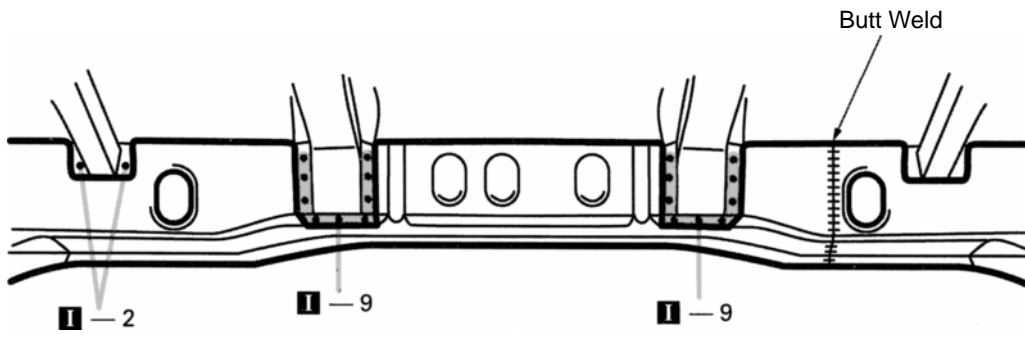
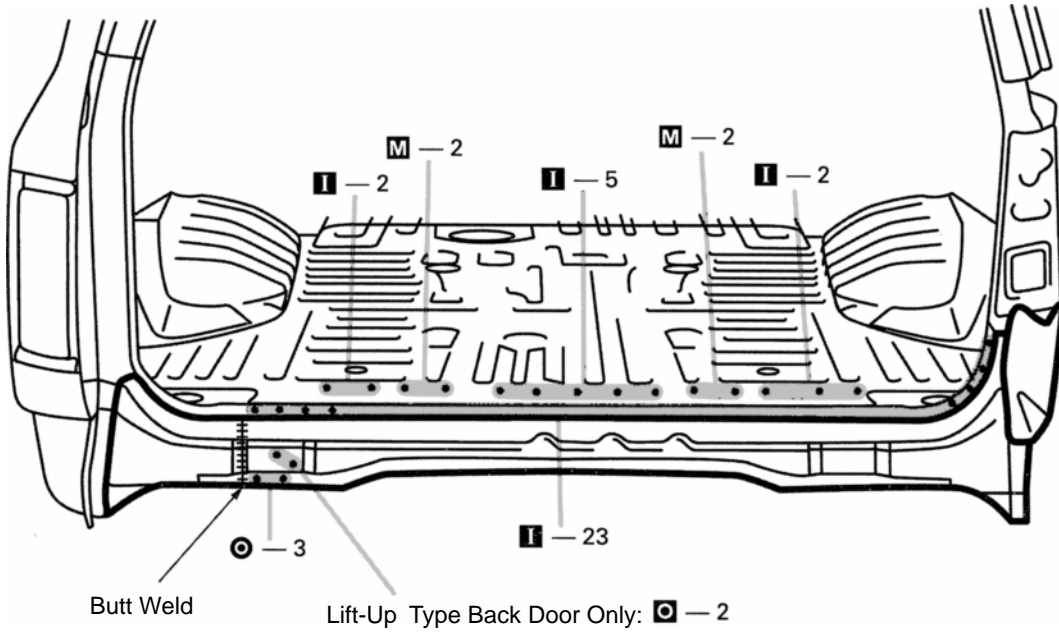
1. Cut and join the parts at the locations as shown above.

mm	in.
220	8.66
90	3.54

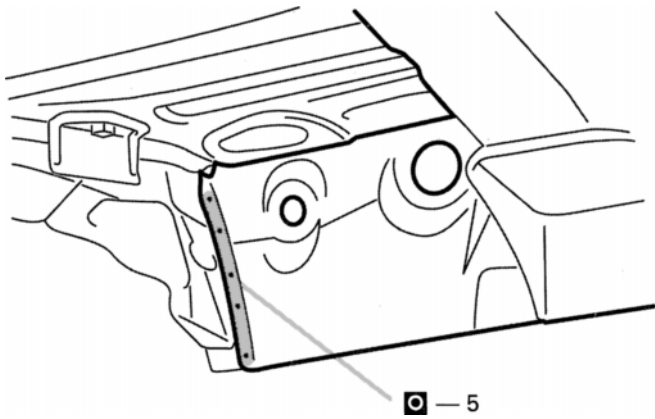
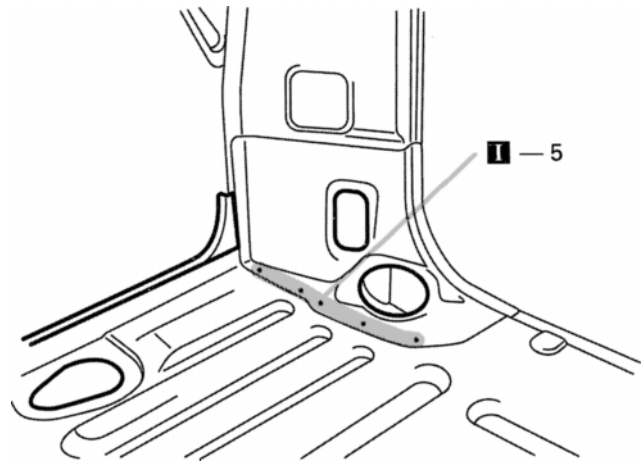
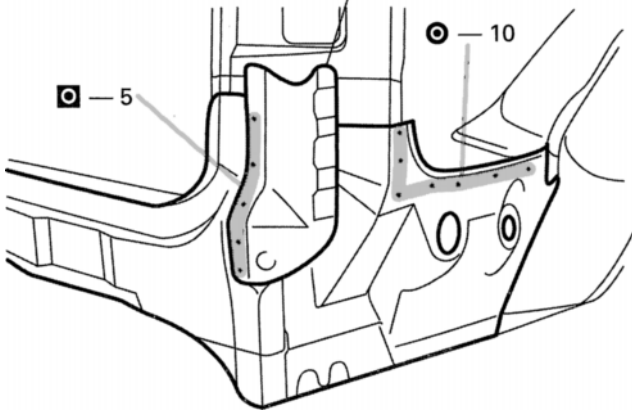




INSTALLATION

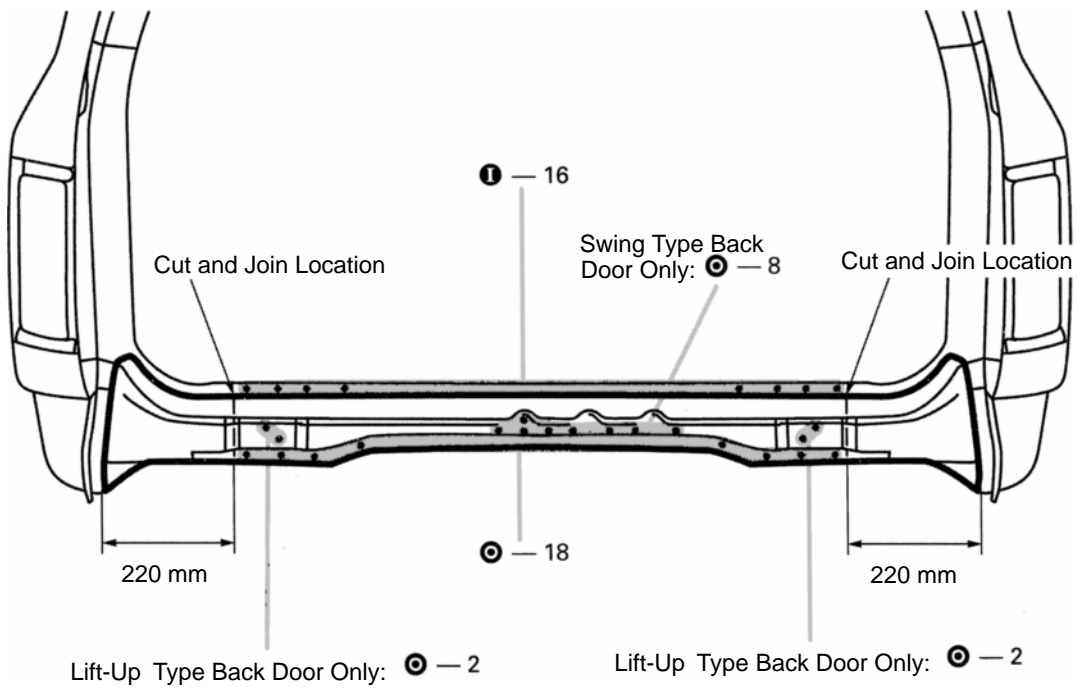
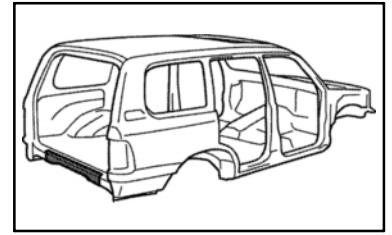


Back Door Opening  
Lower Reinforcement



## BODY LOWER BACK OUTER PANEL (CUT)

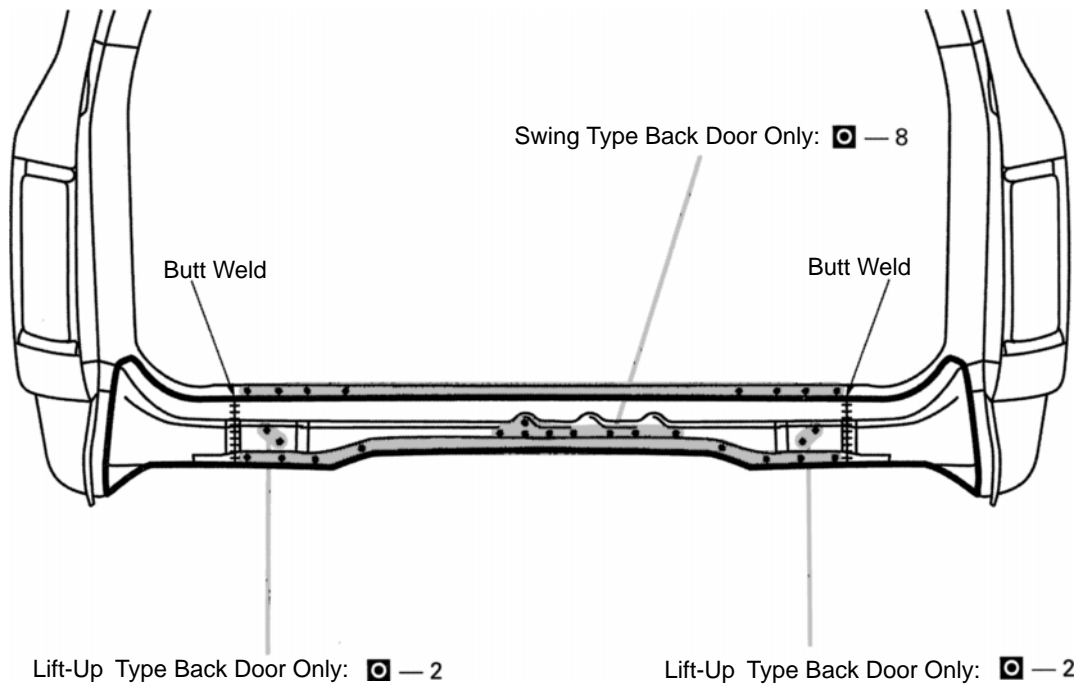
### REMOVAL



mm	in.
220	8.66

1. Cut and join the parts at the locations as shown above.
2. Leave the body lower back inner panel to the vehicle side.

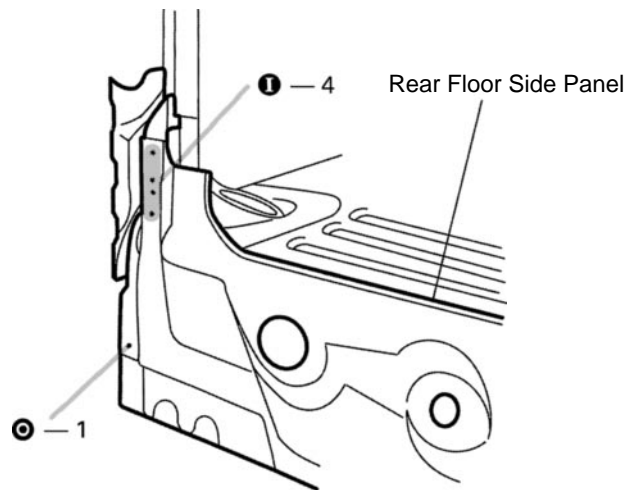
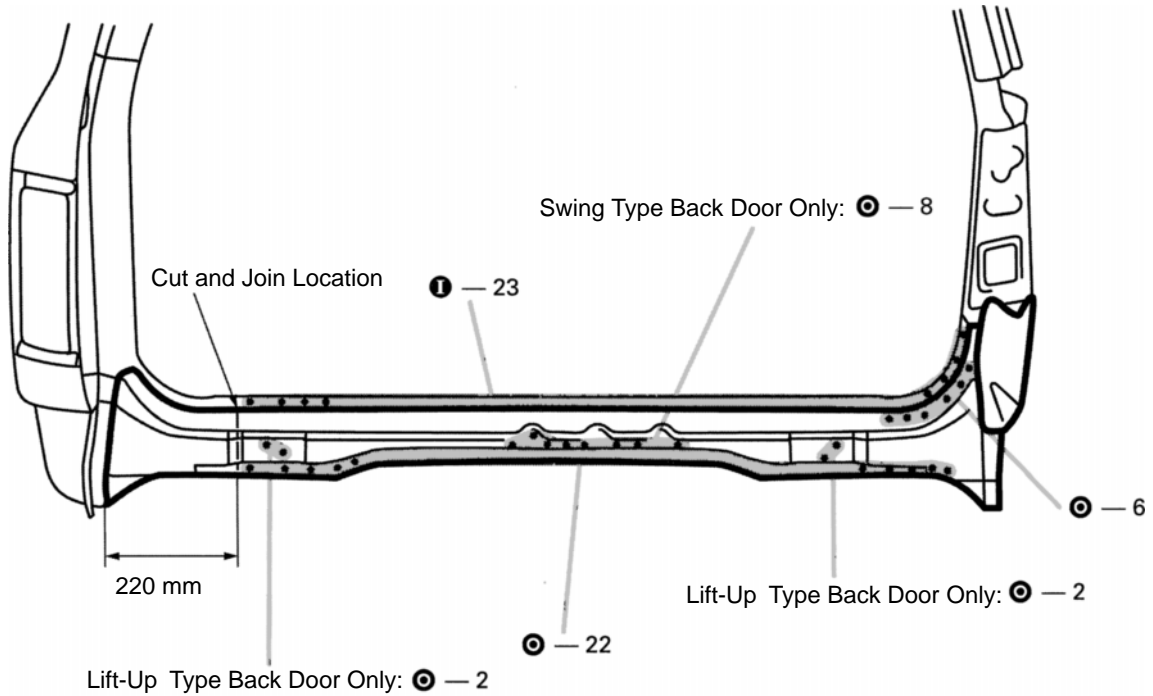
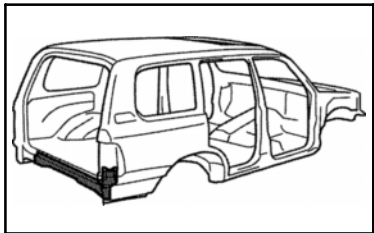
## INSTALLATION



1. Temporarily install the new parts and check the fit of the tail gate or back door.

# BODY LOWER BACK OUTER PANEL (CUT)

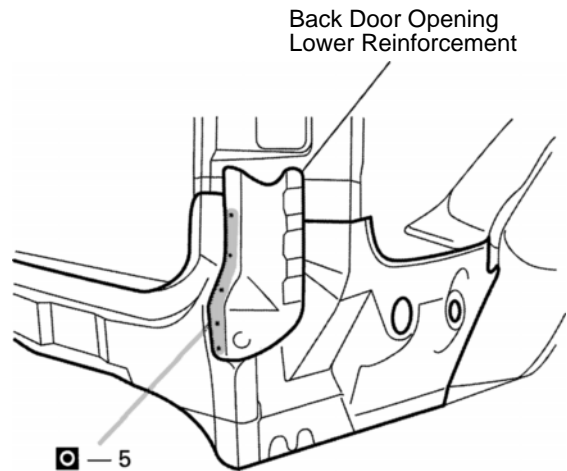
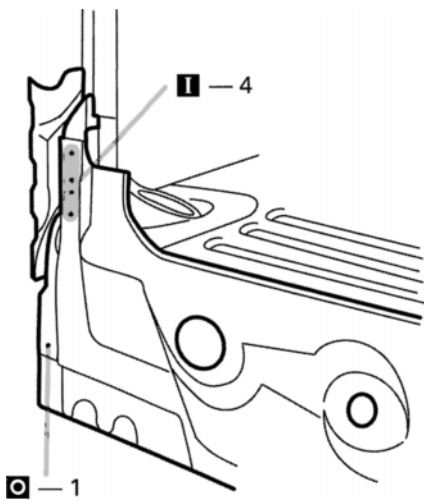
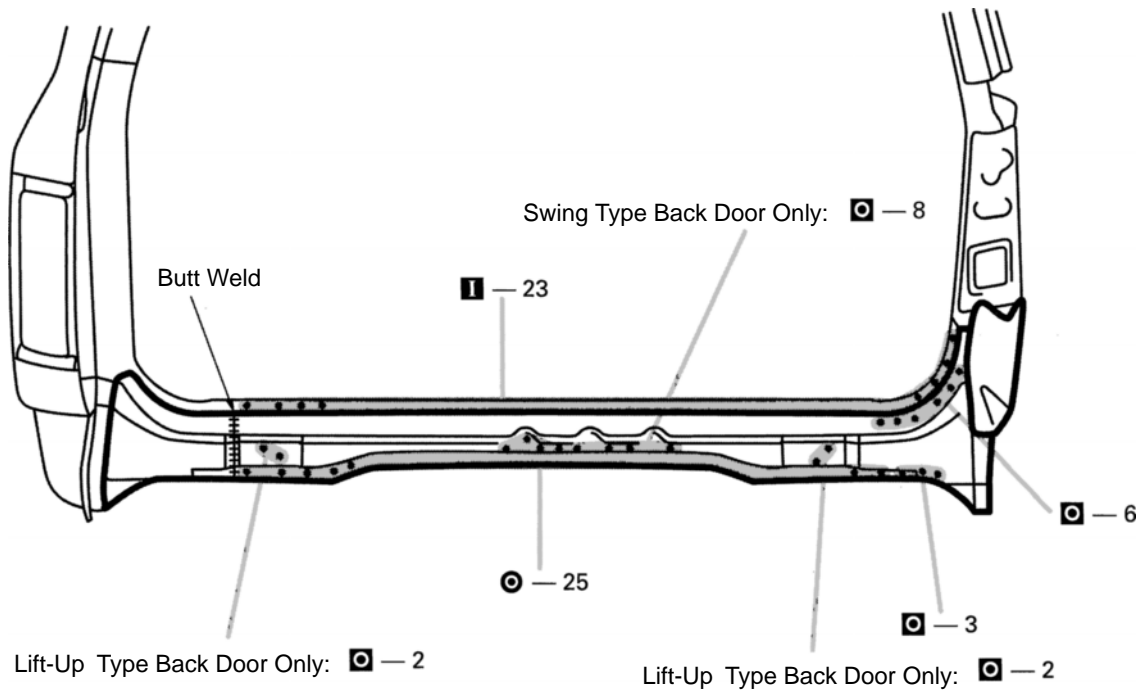
REMOVAL (With the quarter panel rear extension removed.)



mm	in.
220	8.66

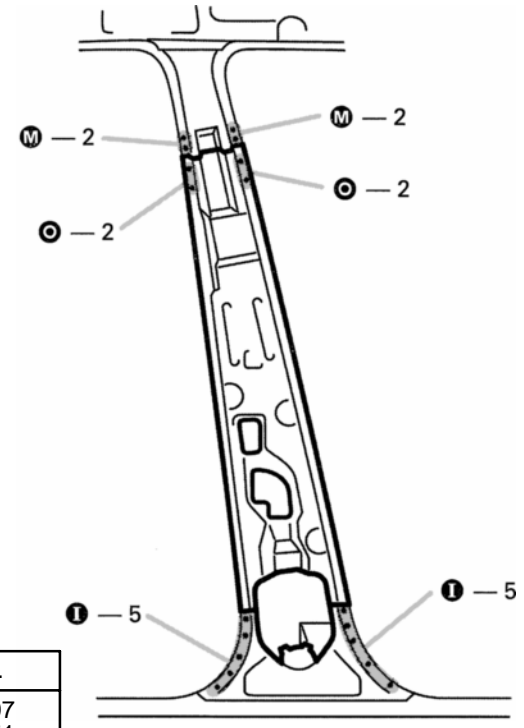
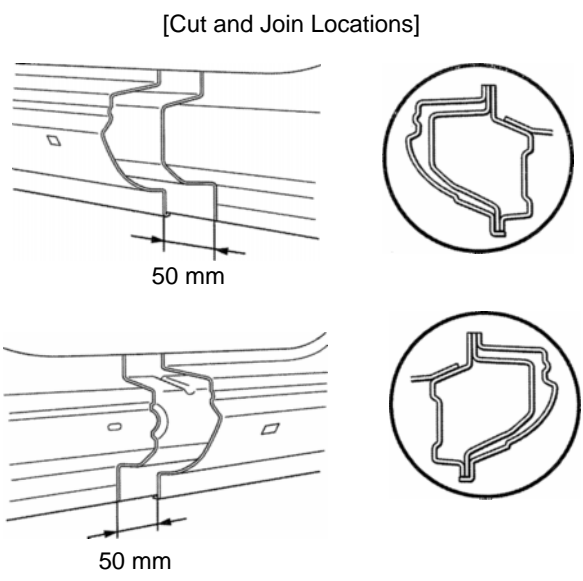
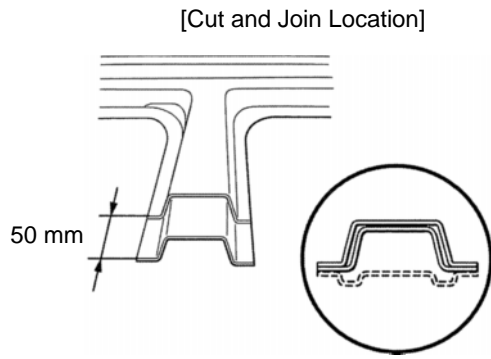
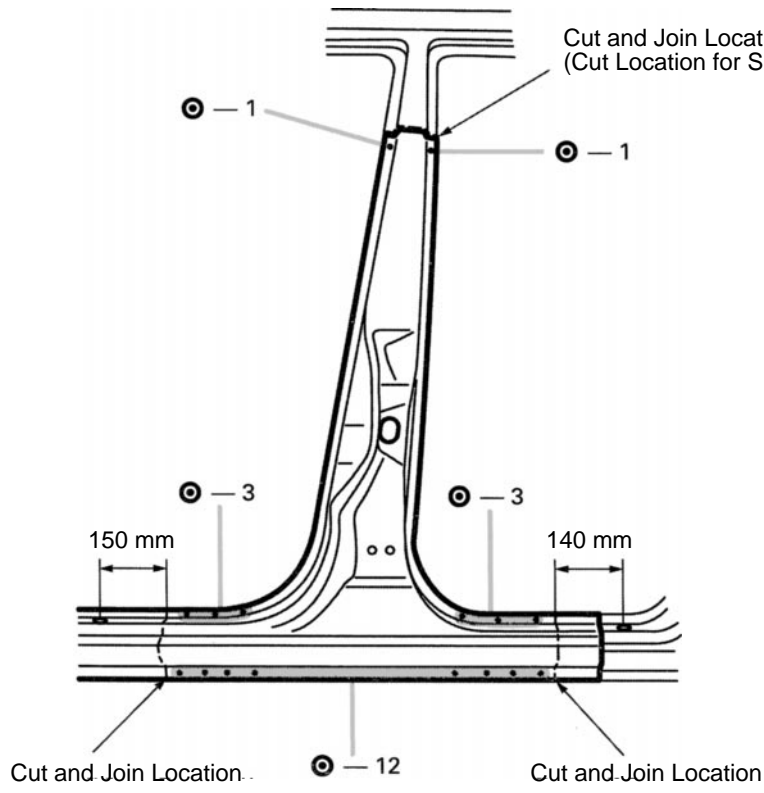
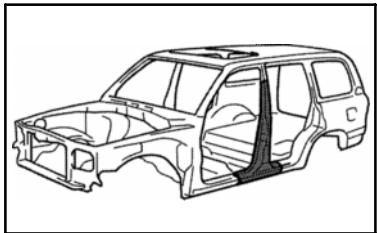
1. Cut and join the parts at the location as shown above.
2. Leave the body lower back inner panel and rear floor side panel to the vehicle side and remove the body lower back outer panel.

INSTALLATION



# CENTER BODY PILLAR (CUT)

## REMOVAL

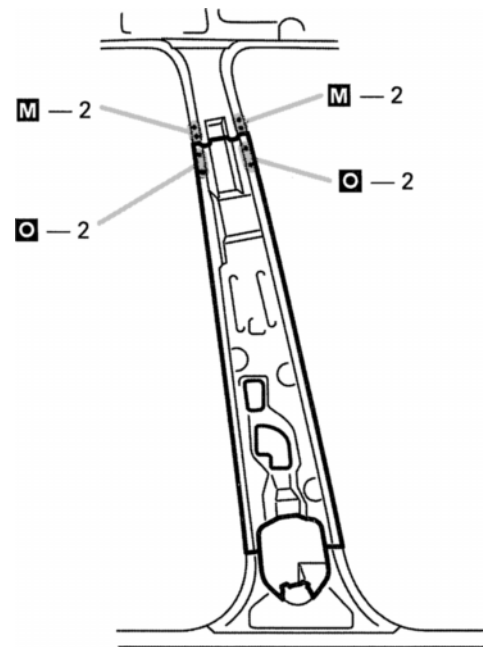
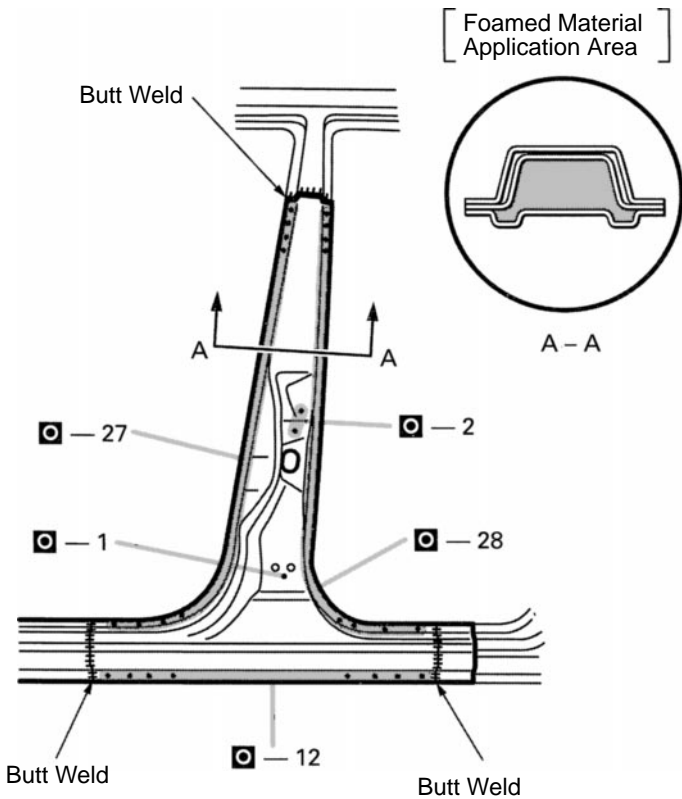
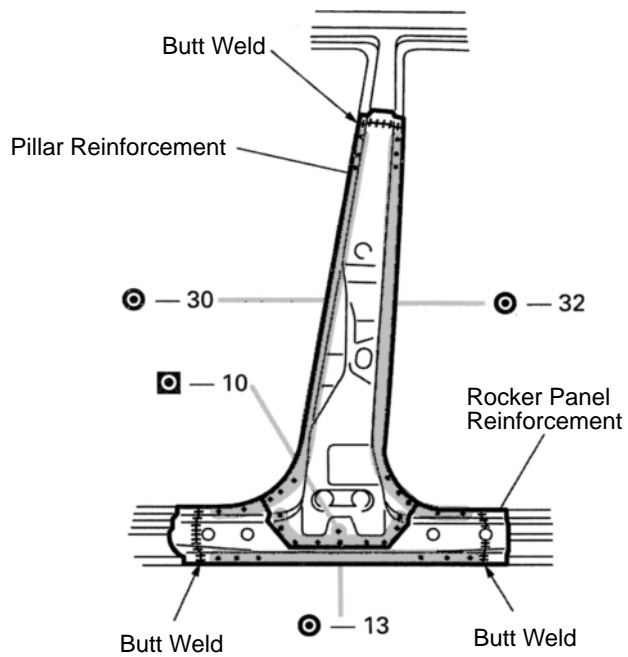
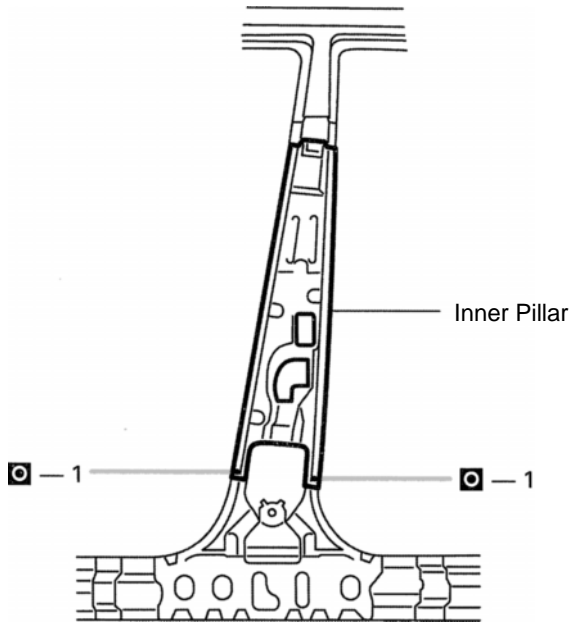


mm	in.
50	1.97
140	5.51
150	5.91

1. Cut and join the parts at the locations as shown above.
2. Cut and join the outer pillar and pillar reinforcement at position shifted about 50 mm (1.97 in.)
3. Cut and join the rocker outer panel and rocker panel reinforcement at position shifted about 50 mm (1.97 in.)



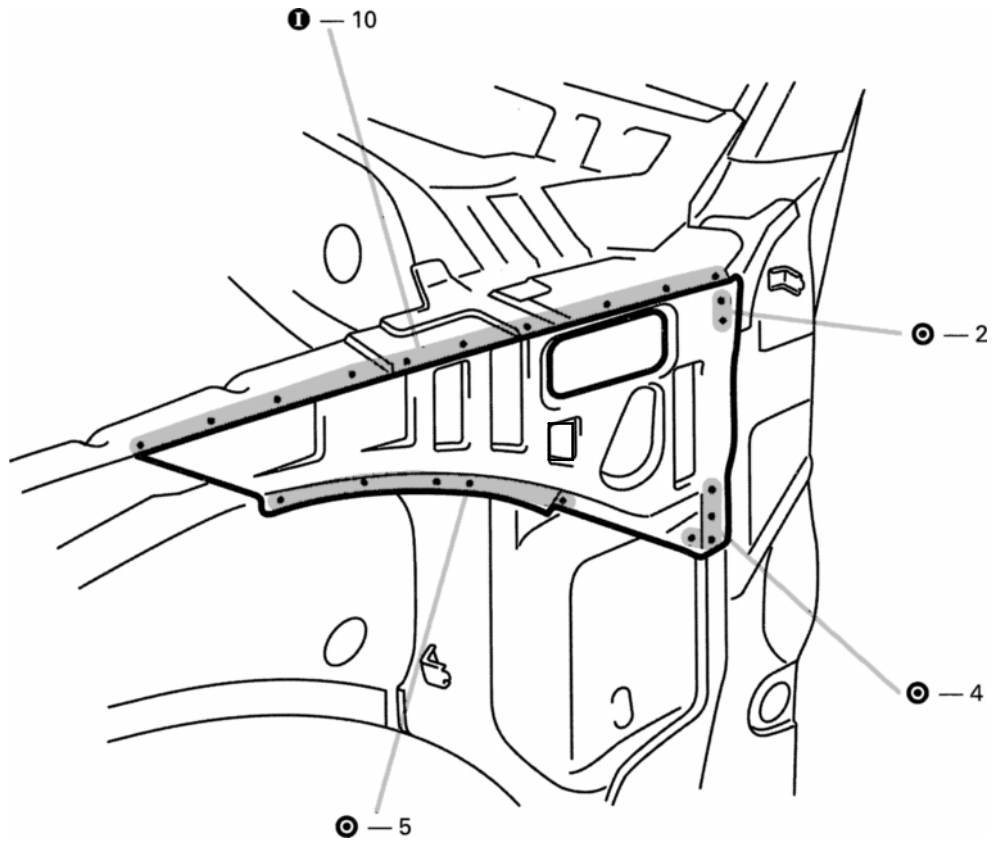
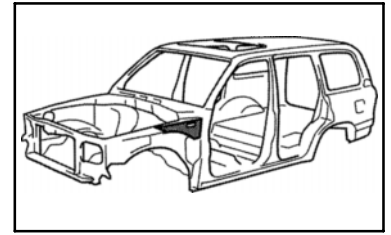
INSTALLATION



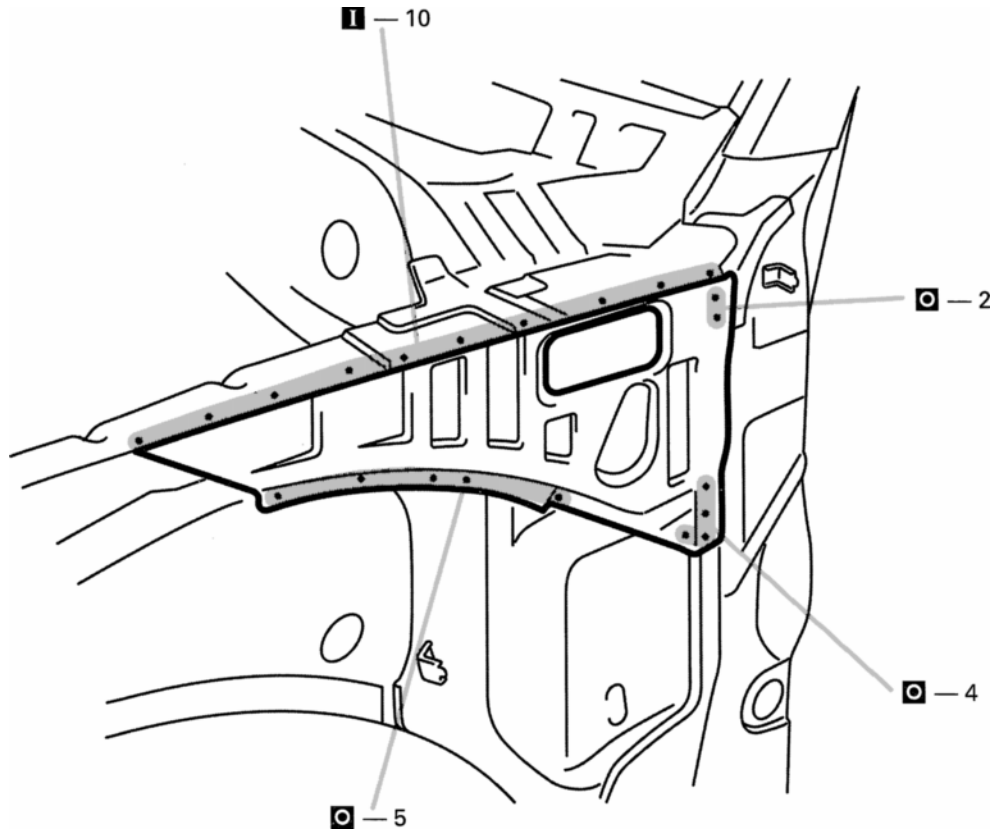
1. Temporarily install the new parts and measure each part in accordance with the body dimension diagram.
2. Temporarily install the new parts and check the fit of the front door and rear door.
3. After welding inner pillar and rocker panel reinforcement and pillar reinforcement to the vehicle install the outer pillar.
4. After installing the new parts, apply foamed materials.

**COWL TOP SIDE PANEL (ASSY)**

**REMOVAL**

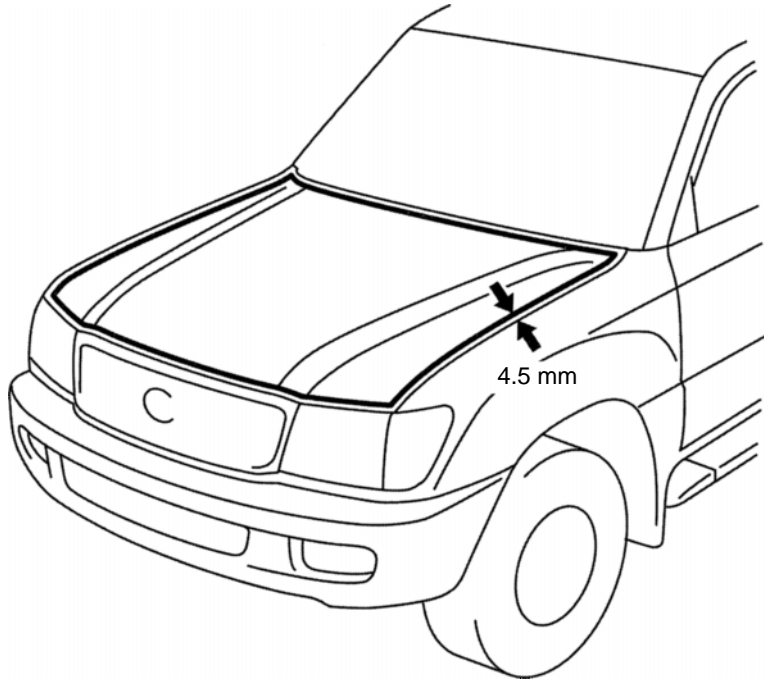


INSTALLATION

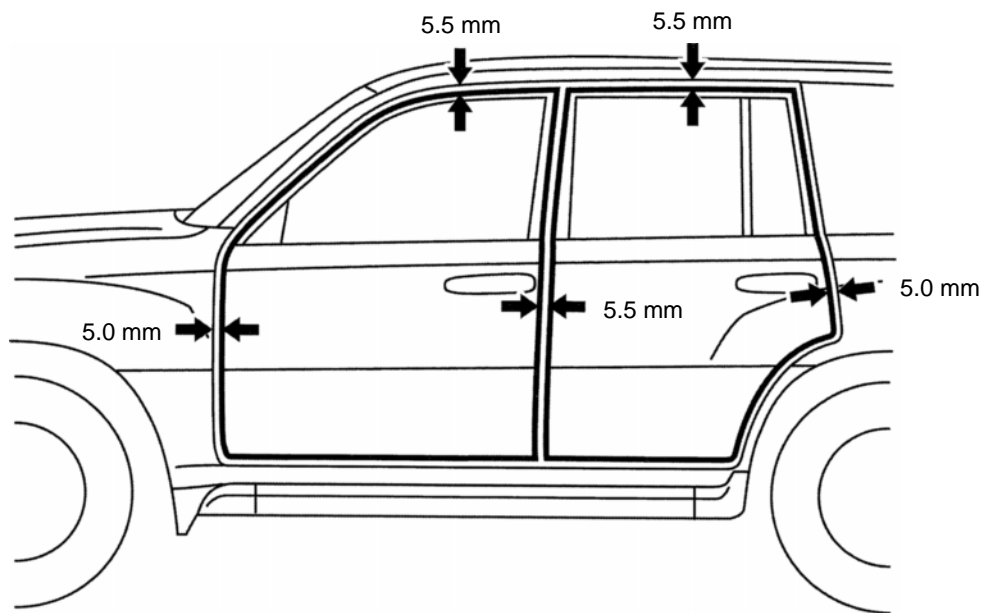


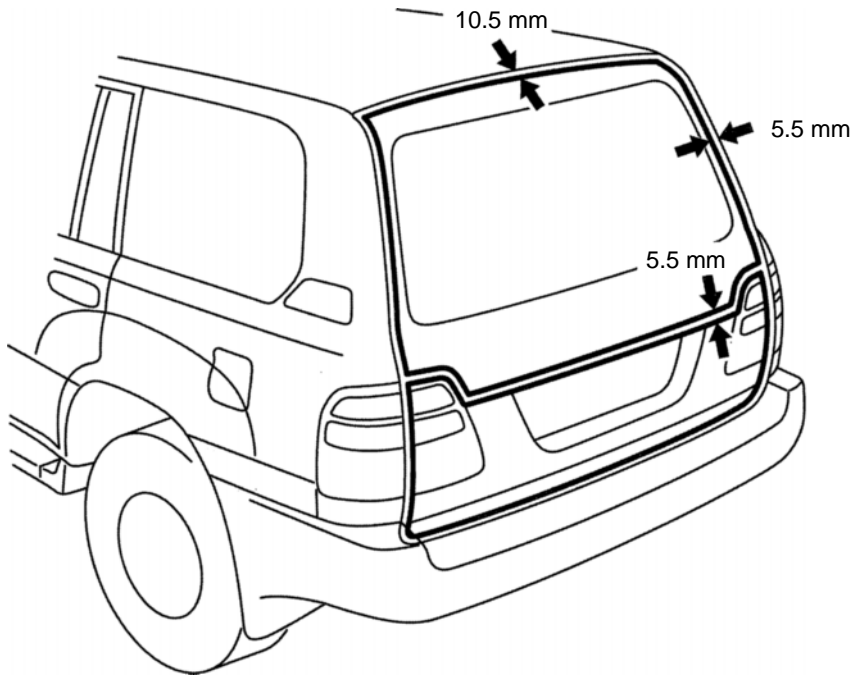
# FIT STANDARDS

After doors and the engine hood are installed, be sure to perform fit adjustment to prevent abnormal wind noise and ensure a good appearance.

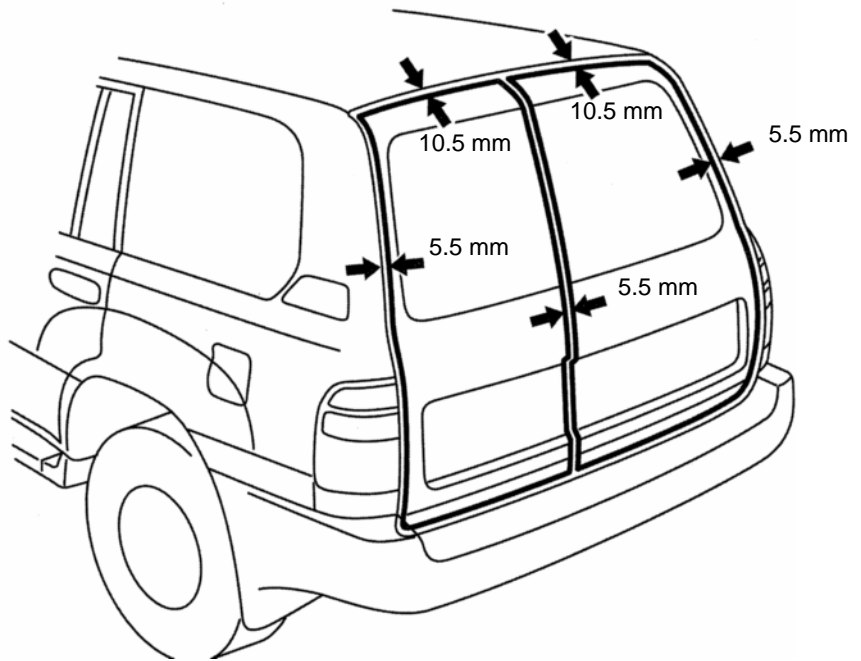


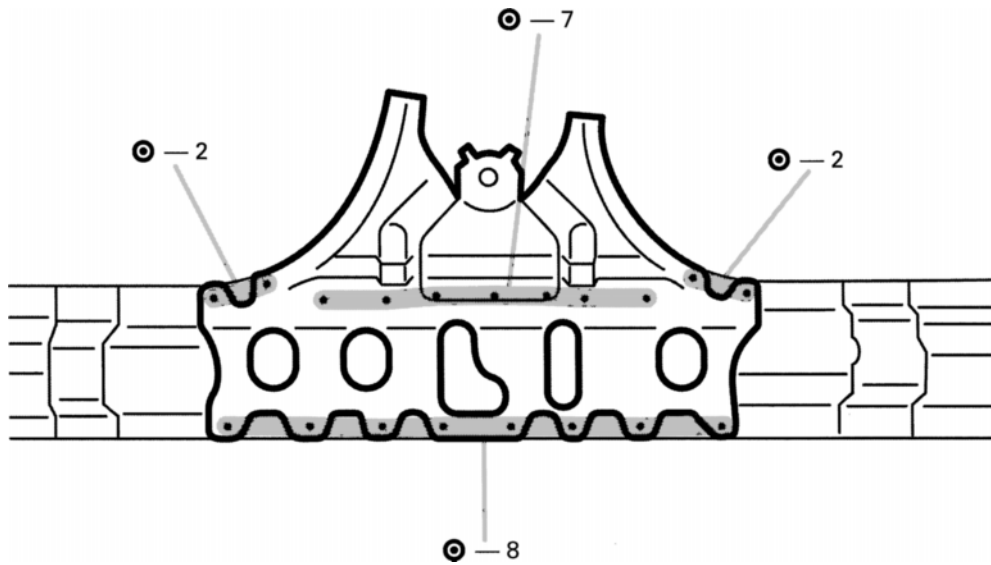
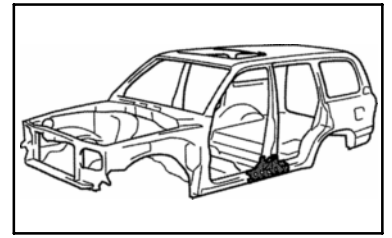
mm	in.
4.5	0.177
5.0	0.197
5.5	0.217



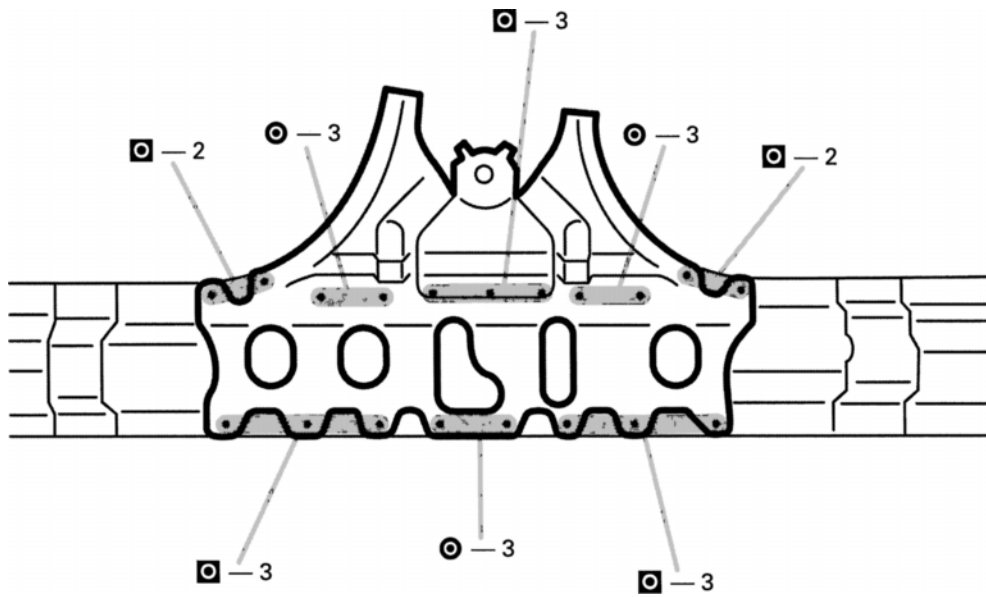


mm	in.
5.5	0.217
10.5	0.413

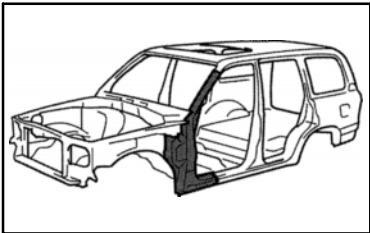


**FLOOR SIDE INNER REAR MEMBER (ASSY)****REMOVAL (With the center body pillar removed.)**

INSTALLATION

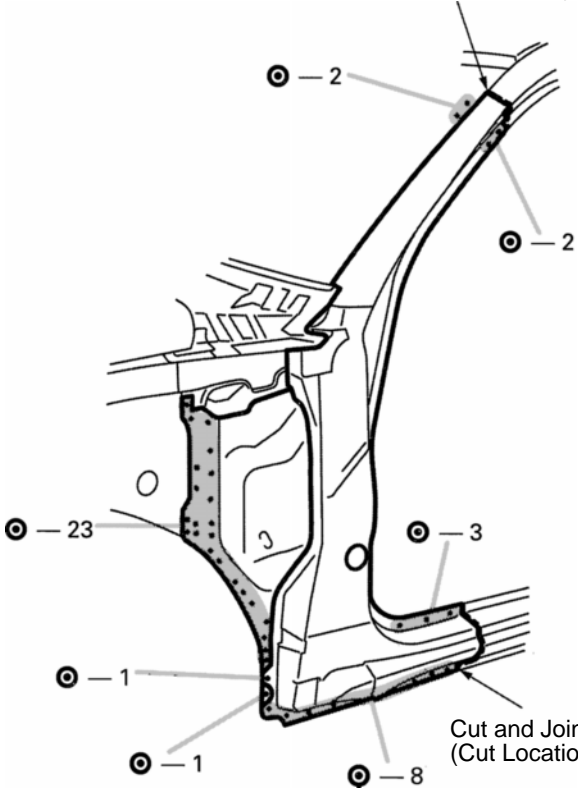


**FRONT BODY PILLAR (CUT)**

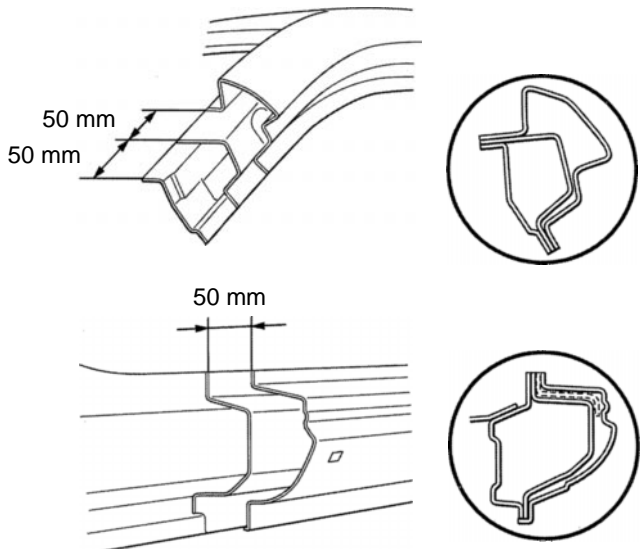


**REMOVAL (With the cowl top side panel removed.)**

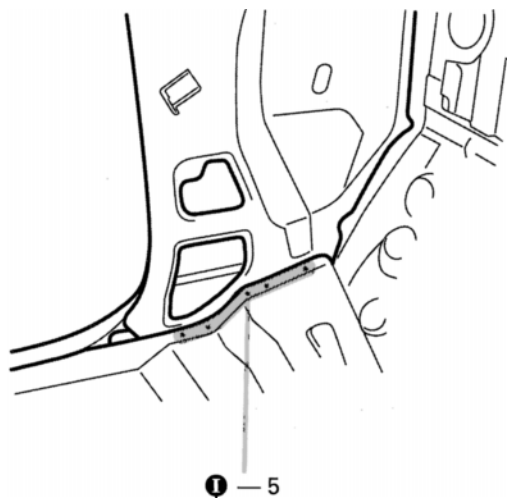
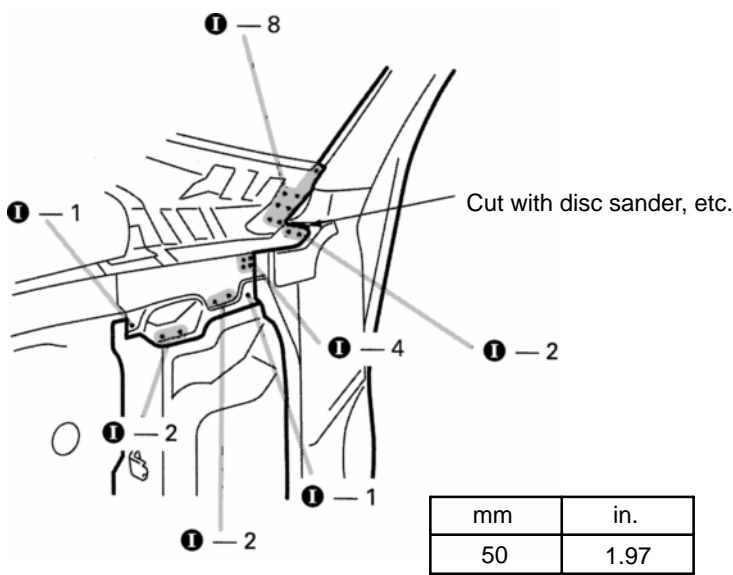
Cut and Join Location  
(Cut Location for Supply Parts)



[Cut and Join Locations]



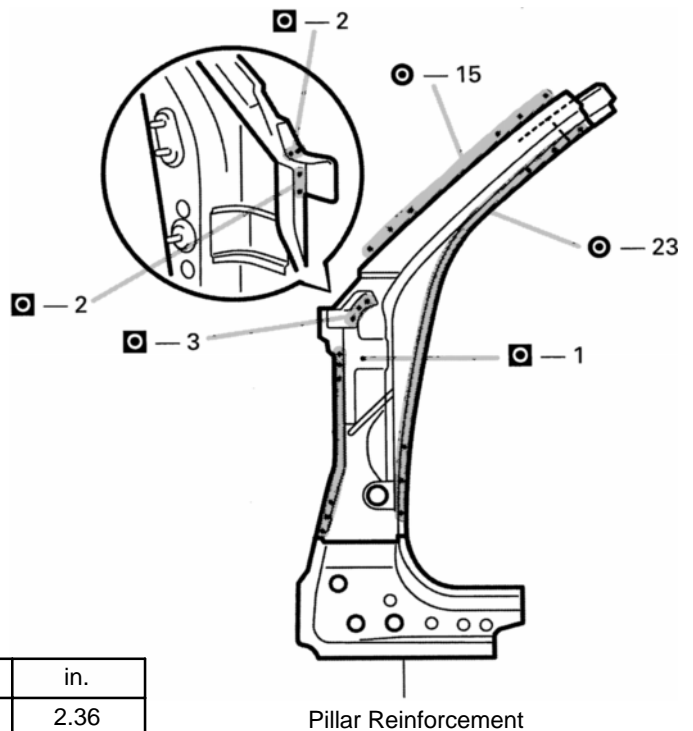
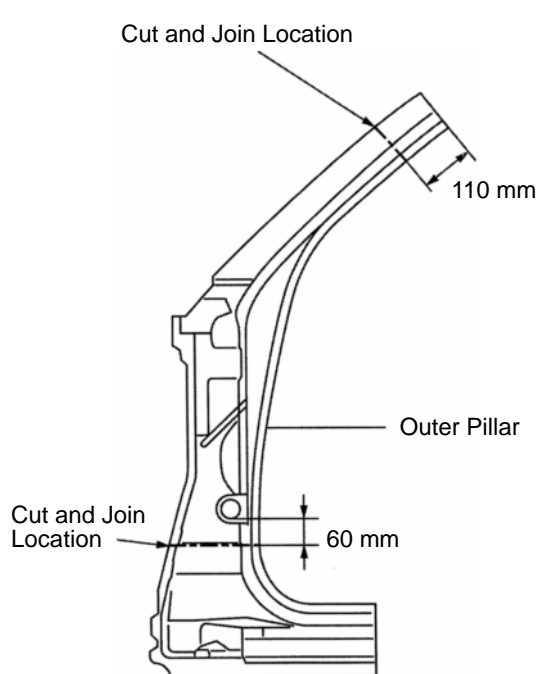
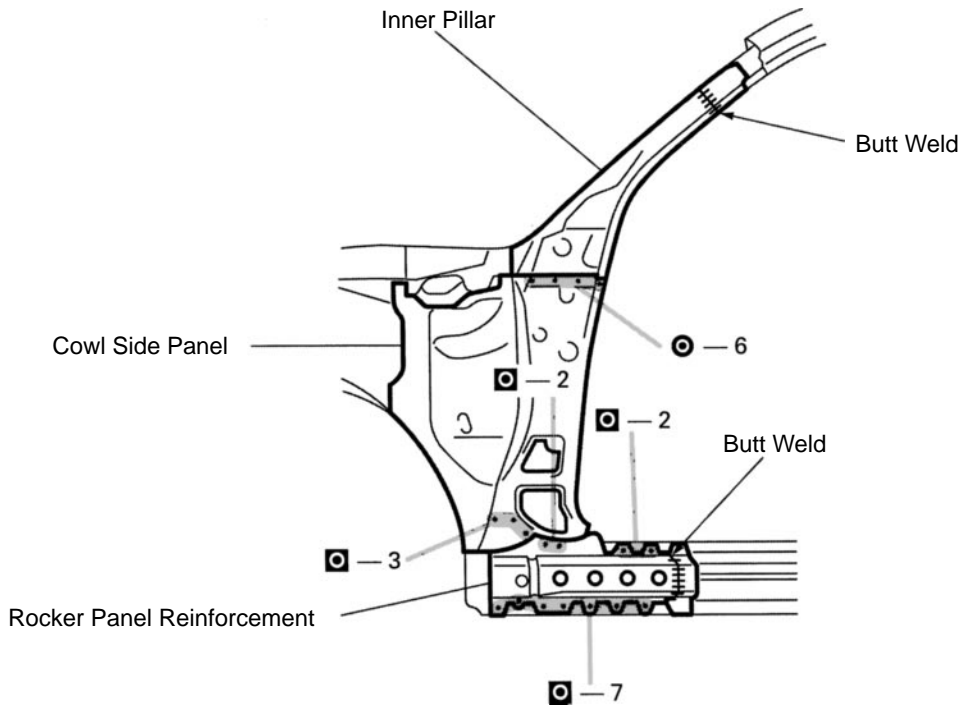
Cut and Join Location  
(Cut Location for Supply Parts)



1. Cut and join the parts at the locations as shown above.
2. Cut and join the outer pillar and reinforcement and inner pillar at position shifted about 50 mm (1.97 in.)
3. Cut and join the rocker outer panel and rocker panel reinforcement at position shifted about 50 mm (1.97 in.)



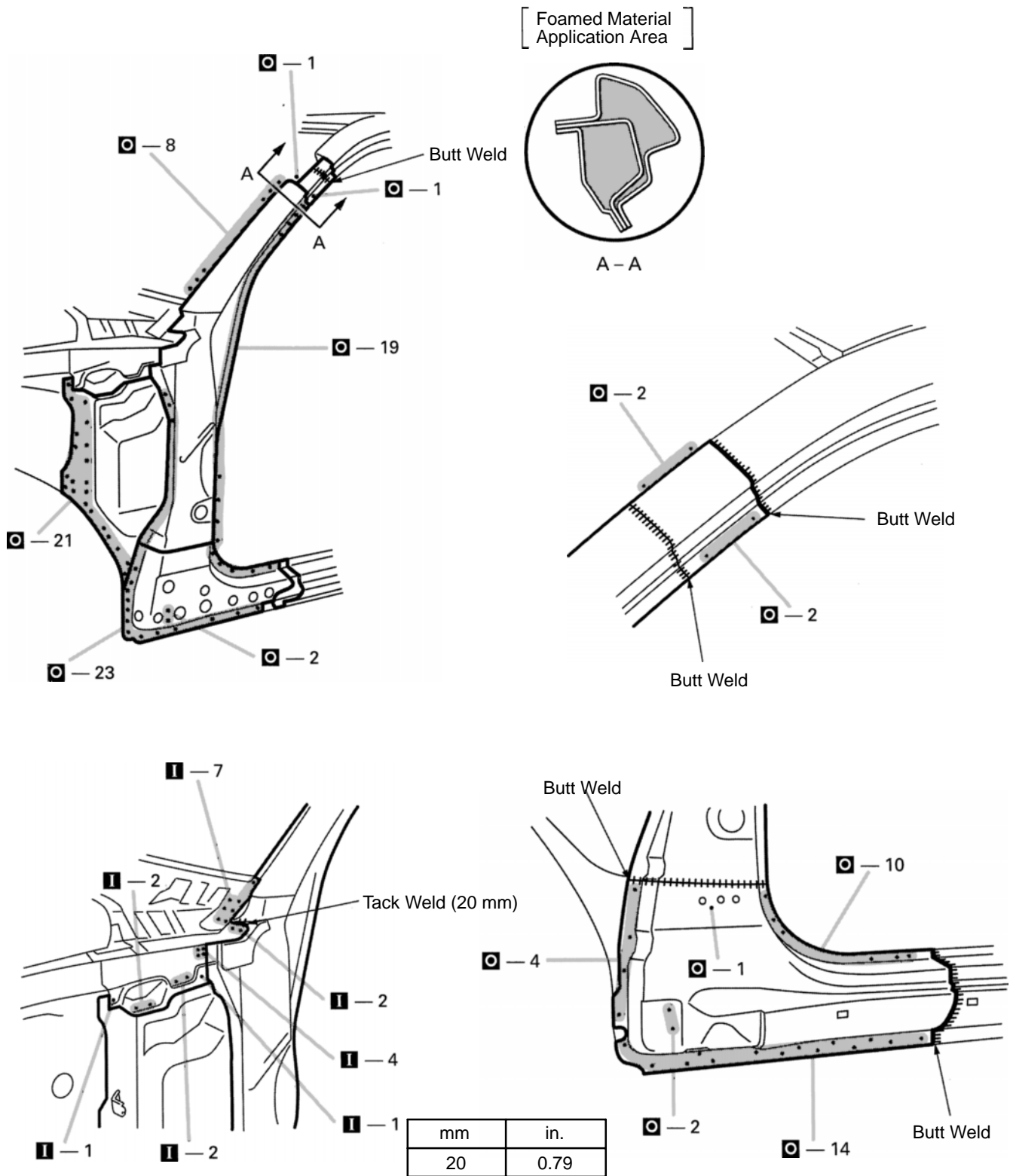
## INSTALLATION



mm	in.
60	2.36
110	4.33

1. Install the inner pillar and rocker panel reinforcement to the vehicle side.
2. Cut the new parts for the outer pillar at the locations as shown above.
3. Before temporarily installing the new parts. Weld the pillar reinforcement and outer pillar with standard points.

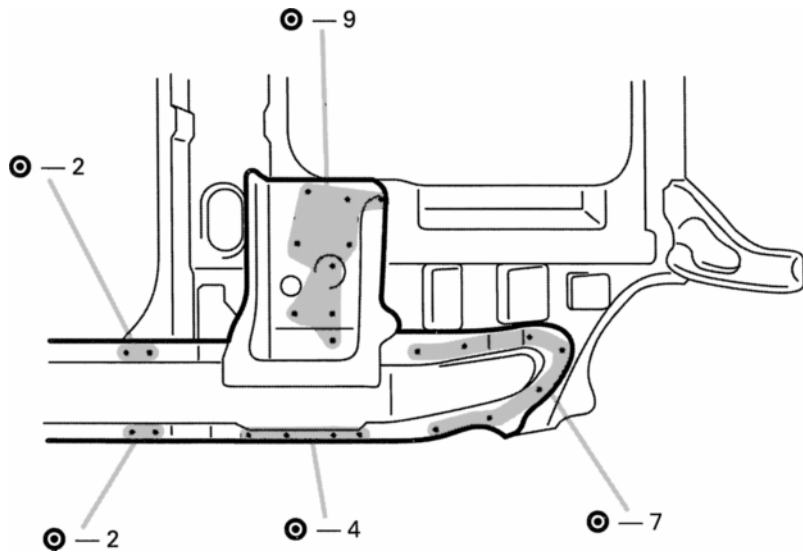
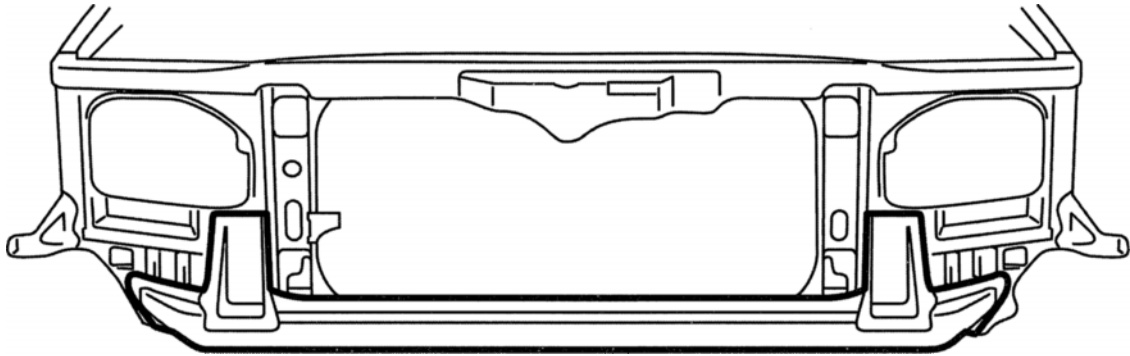
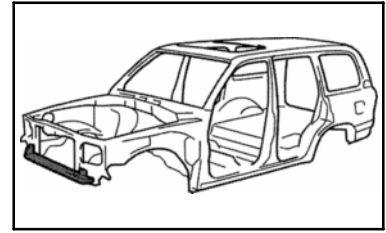
*HINT: After welding the pillar reinforcement finally attach it to the cut and join location tips.*



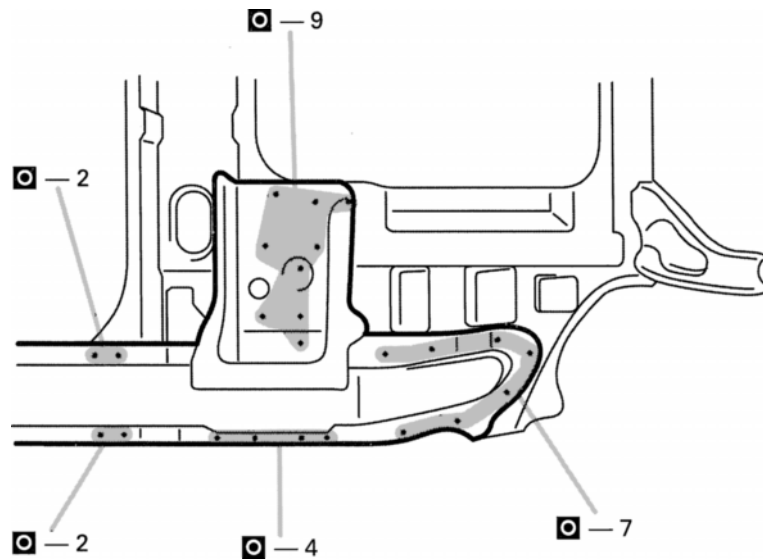
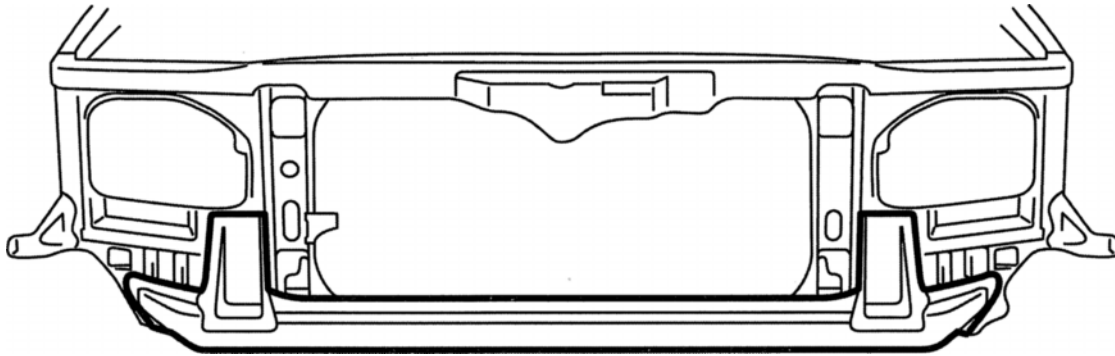
4. Temporarily install the new parts and measure each part in accordance with the body dimension diagram.
5. Before welding the new parts, check the fit of the front door, front fender and windshield glass.
6. Apply foamed material to the pillar section.

**FRONT CROSSMEMBER (ASSY)**

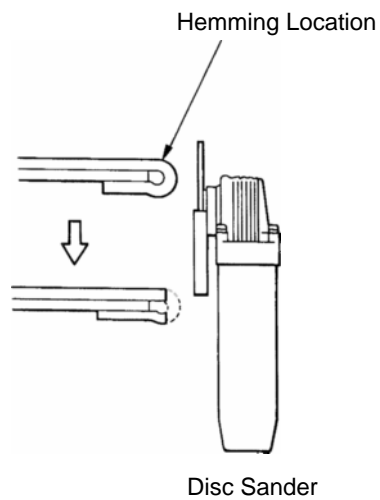
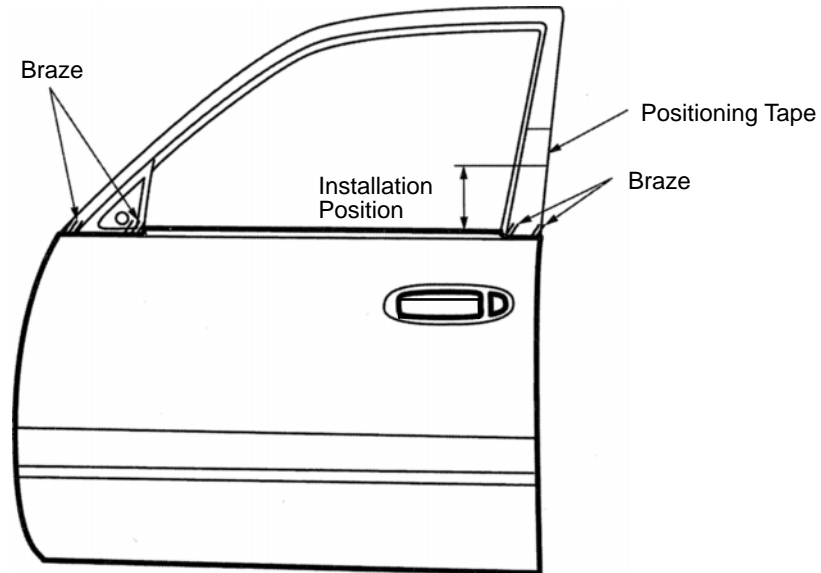
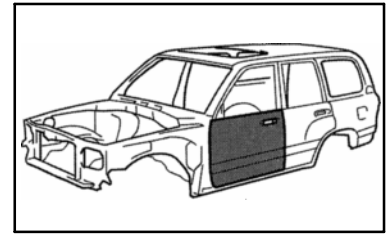
**REMOVAL**



## INSTALLATION

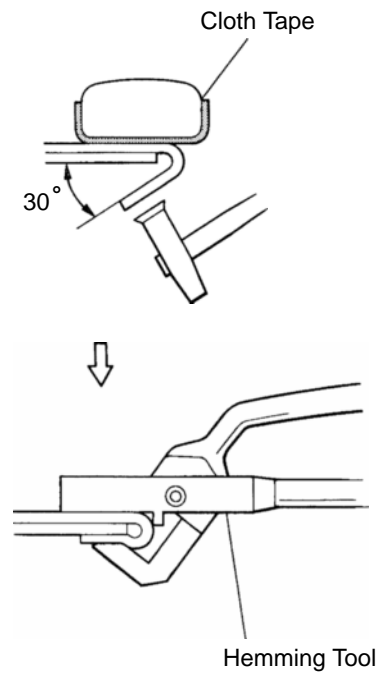
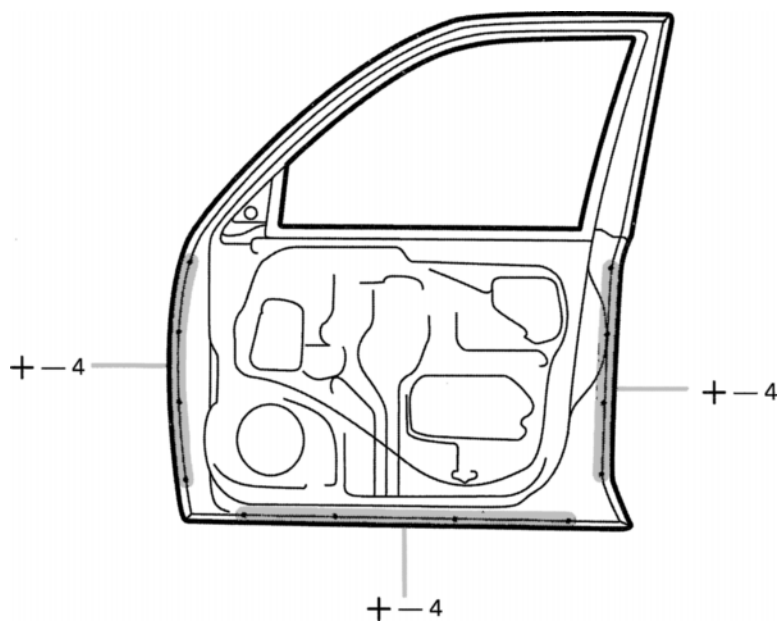
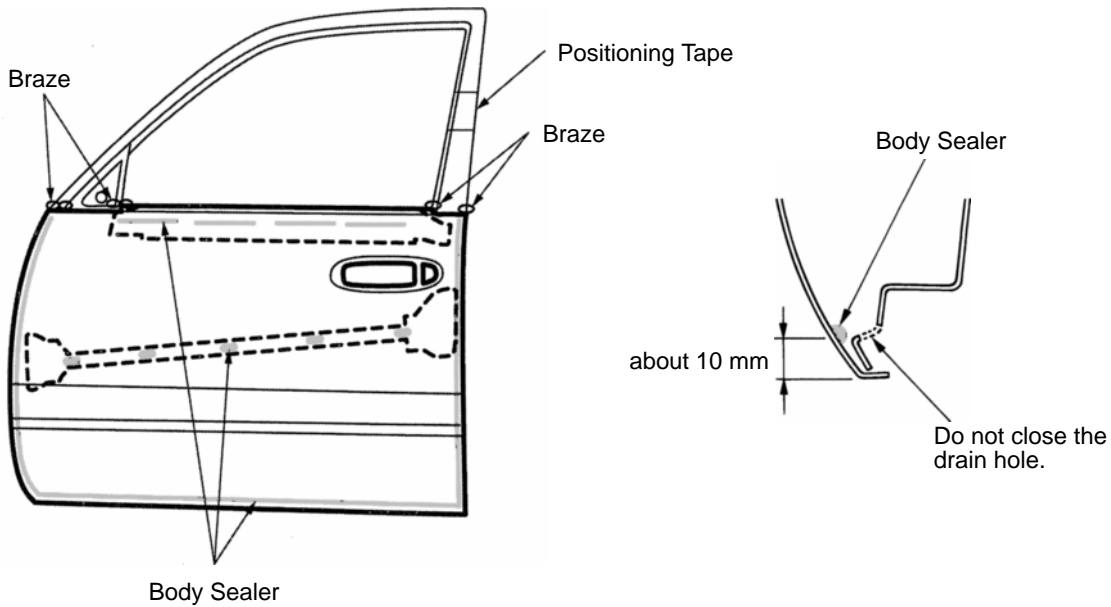


1. Temporarily install the new parts and measure each part in accordance with the body dimension diagram.

**FRONT DOOR OUTER PANEL (ASSY)****REMOVAL**

1. Before removing the outer panel, make the installation position with a tape.
2. After grinding off the hemming location, remove the outer panel.

INSTALLATION



mm	in.
10	0.39

1. Before temporarily installing the new parts, apply body sealer to the reinforcement, side impact protection beam and back side of the new parts.

**HINT:**

- 1) Apply sealer evenly about 10 mm (0.39 in.) from the flange and 3 mm (0.12 in.) in diameter to the outer panel and apply just enough sealer for the reinforcement and side impact protection beam to make contact.
- 2) For other sealing points, refer to section AR.

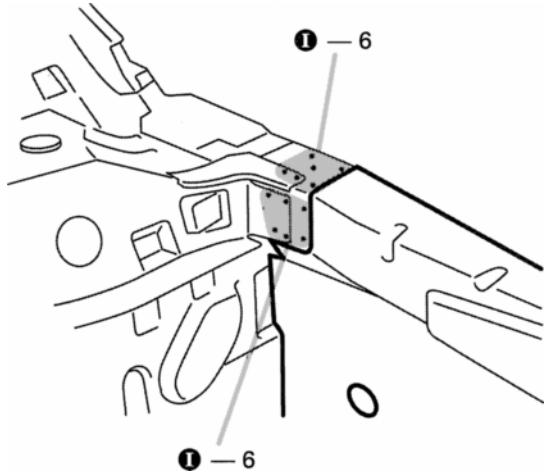
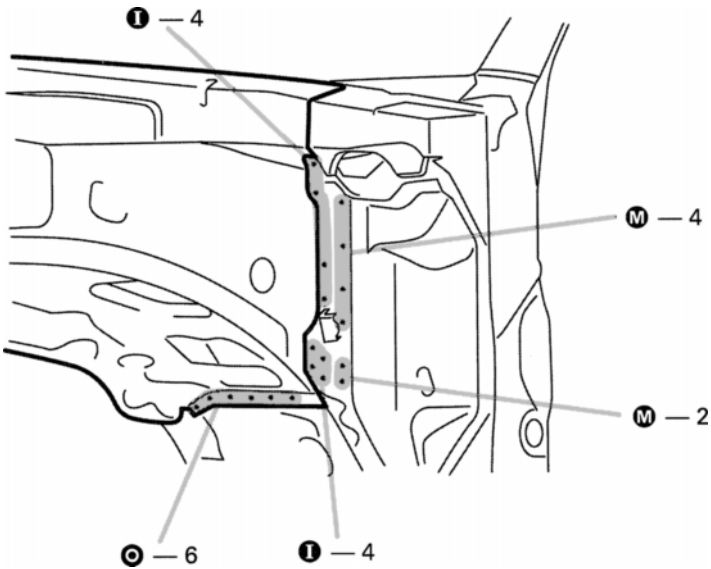
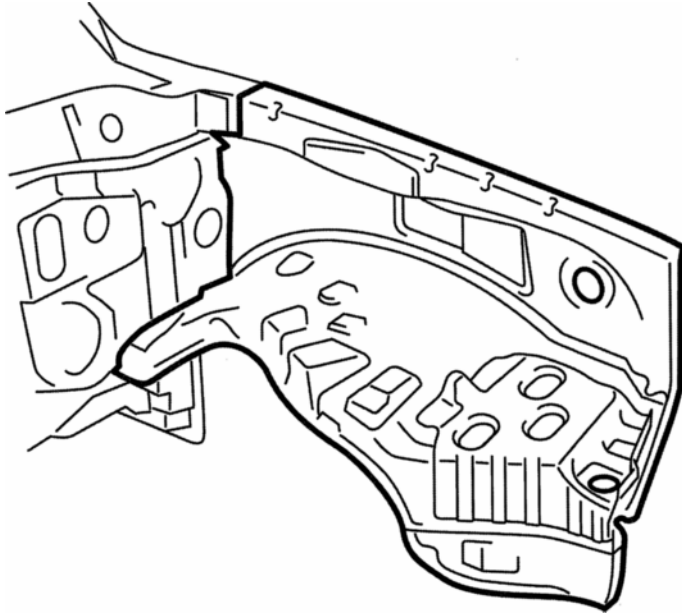
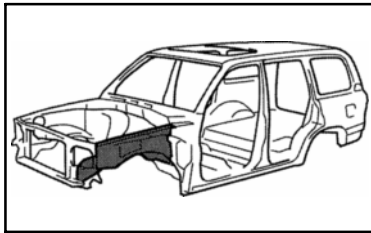
2. Bend the flange hem about 30° with a hammer and dolly, then fasten tightly with a hemming tool.

**HINT:**

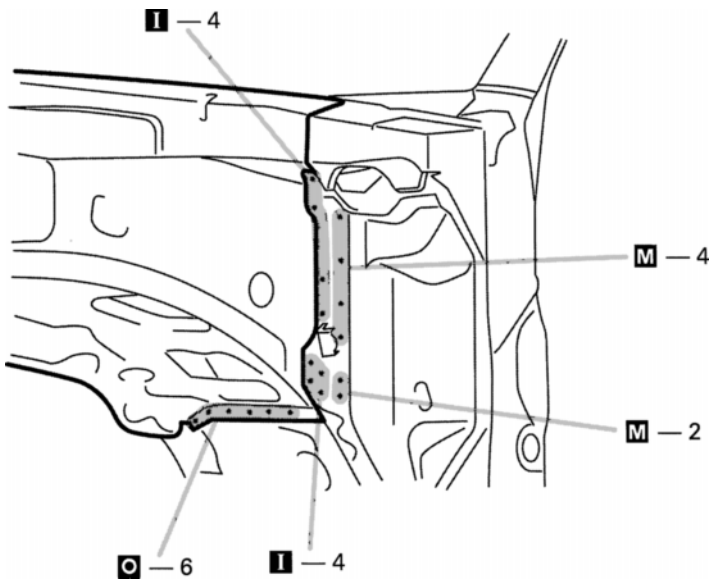
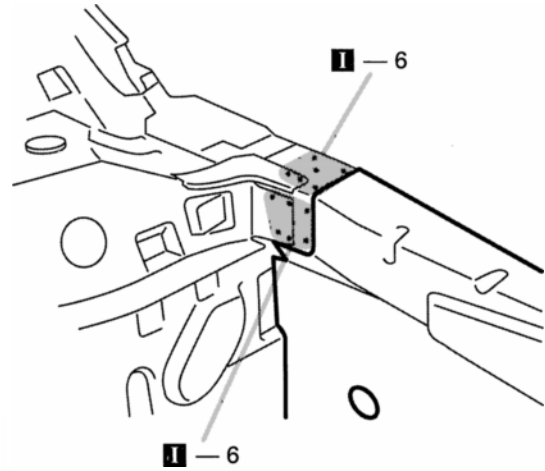
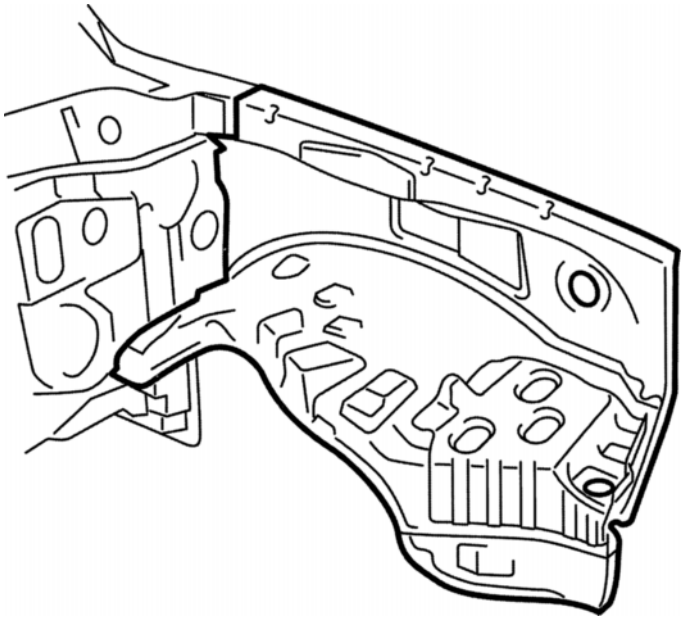
- 1) Perform hemming in three steps, being careful not to warp the panel.
- 2) If a hemming tool cannot be used, hem with a hammer and dolly.

# FRONT FENDER APRON (ASSY)

REMOVAL (With the radiator support, cowl top side panel removed.)



INSTALLATION



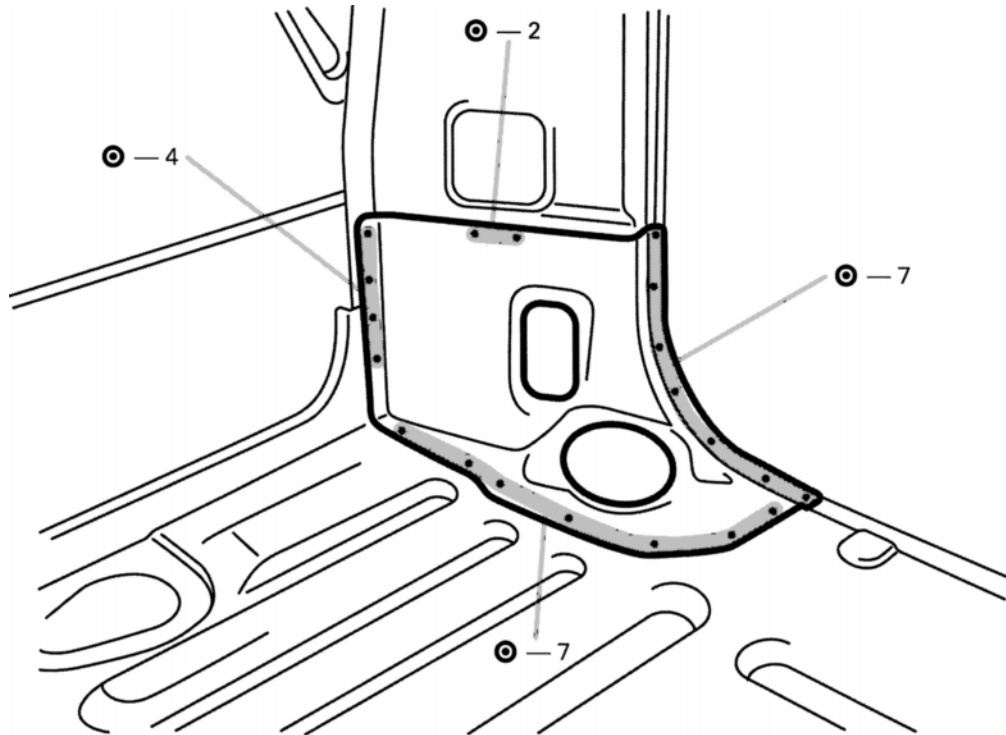
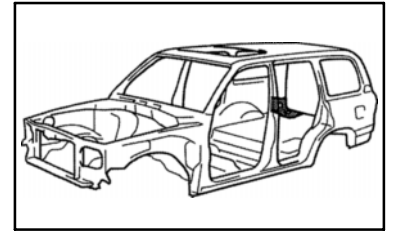
1. Temporarily install the new parts and measure each part in accordance with the body dimension diagram.
2. Temporarily install the front fender and hood, and check the fit.



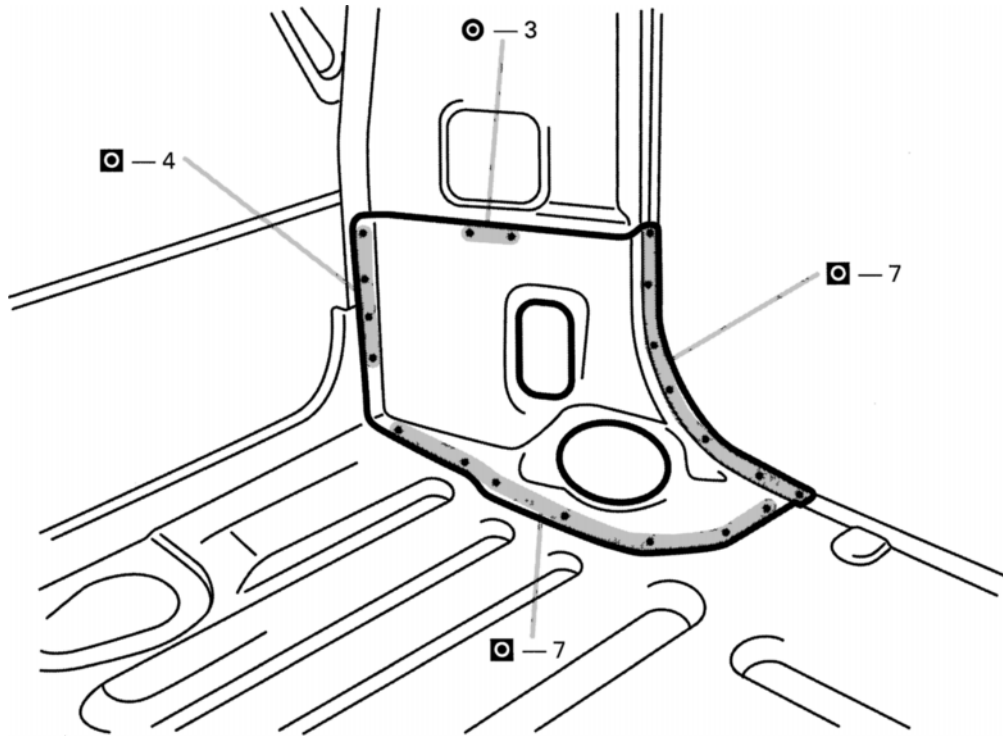
-MEMO-

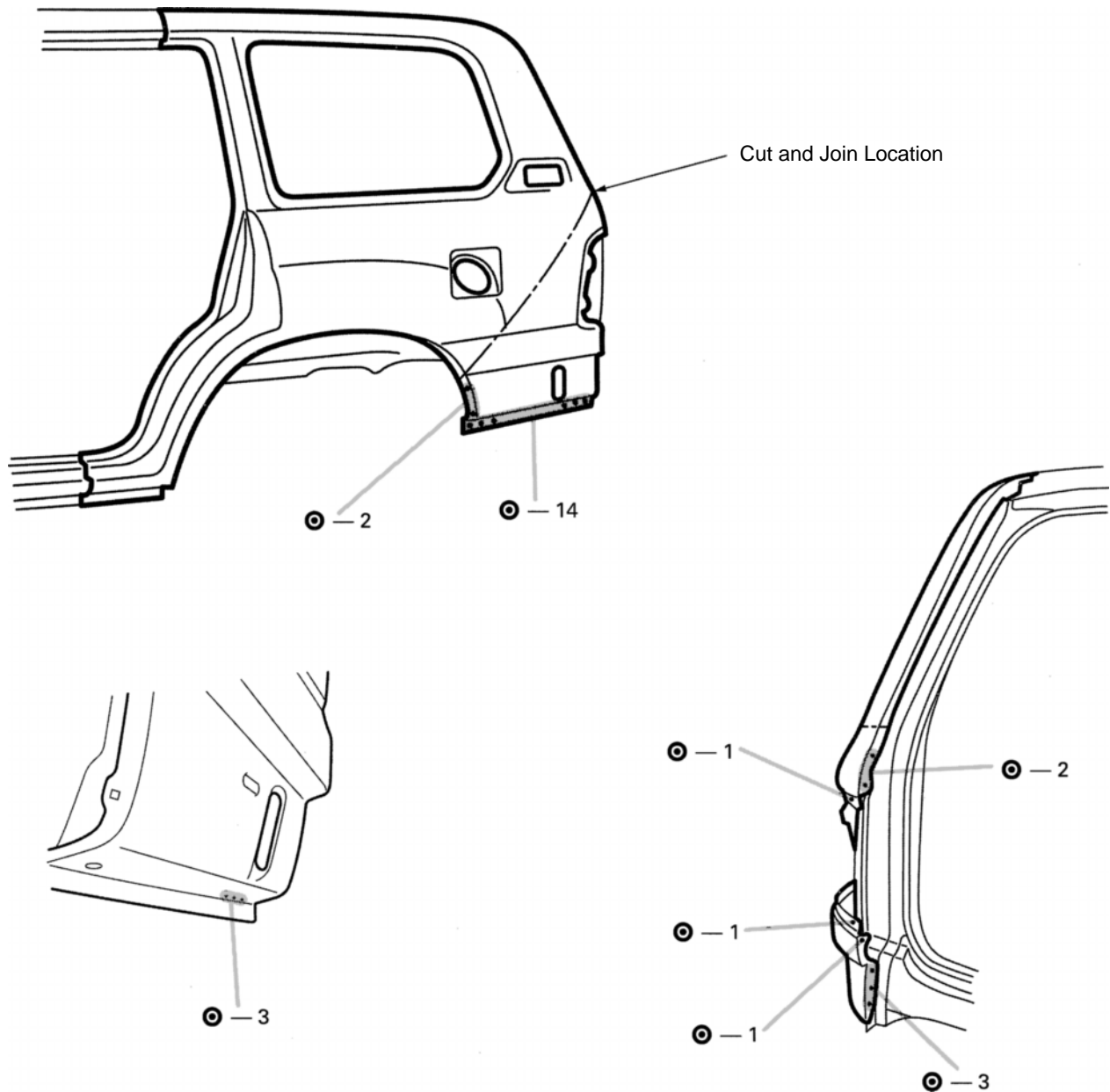
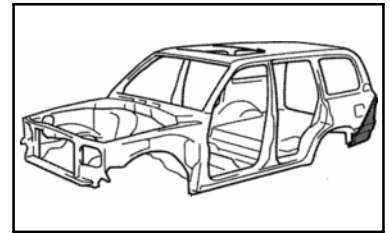
**LOWER BACK UPPER GUSSET (ASSY)**

**REMOVAL**



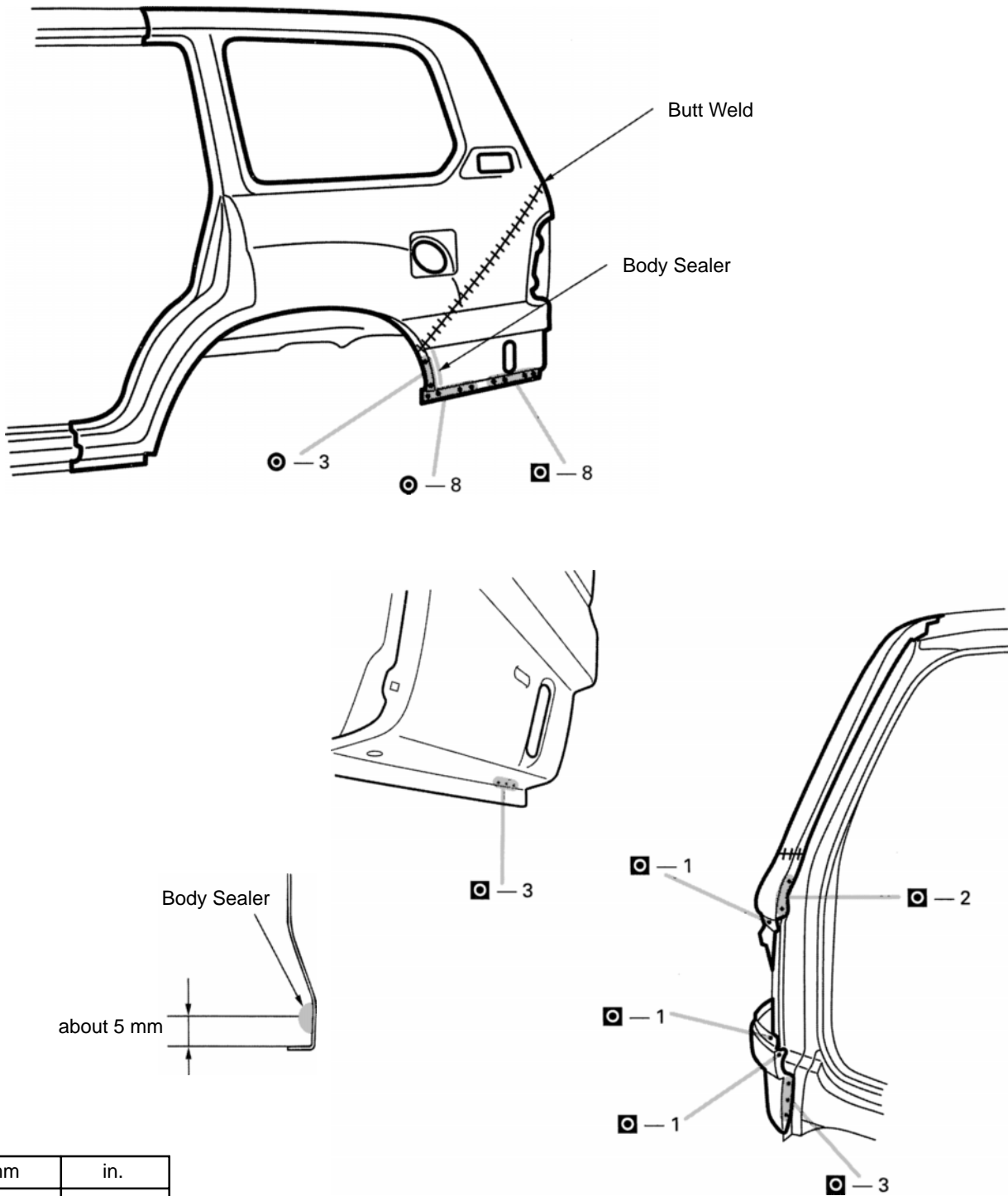
INSTALLATION



**QUARTER PANEL (CUT-P)****REMOVAL**

1. Cut and join the parts at the location as shown above.

INSTALLATION



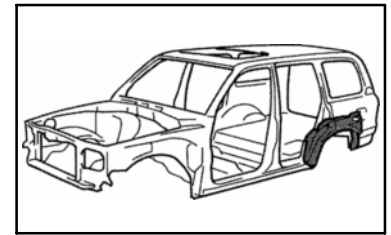
1. Before temporarily installing the new parts, apply body sealer to the wheel arch.

**HINT:**

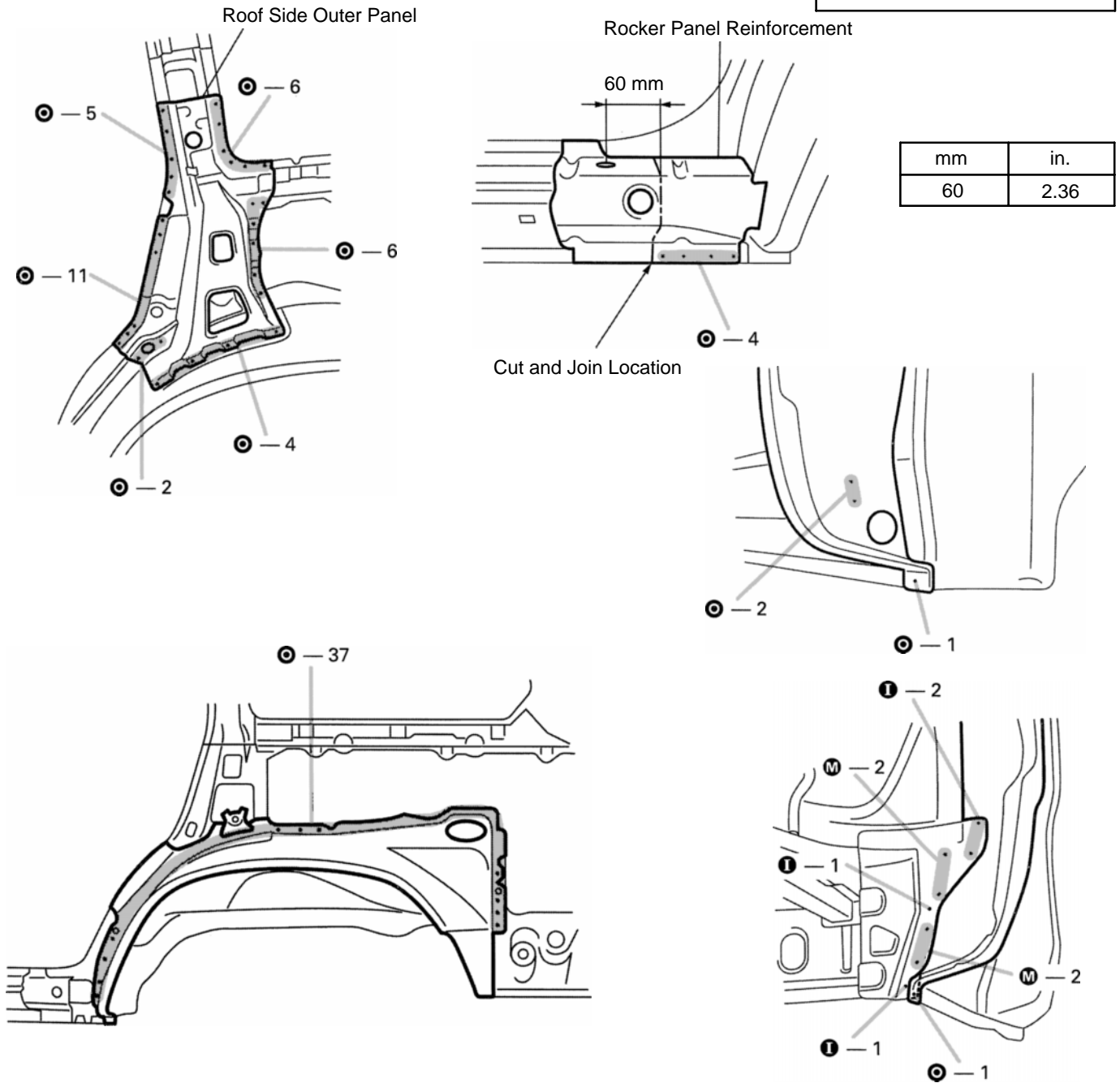
- 1) Apply body sealer about 5 mm (0.20 in.) from the flange, avoiding any oozing.
- 2) Apply sealer evenly, about 3 - 4 mm (0.12 - 0.16 in.) in diameter.
- 3) For other sealing points, refer to section AR.

2. Temporarily install the new parts and check the fit of the tail gate or back door and rear combination light.

# QUARTER WHEEL HOUSING OUTER PANEL (ASSY): Left Side

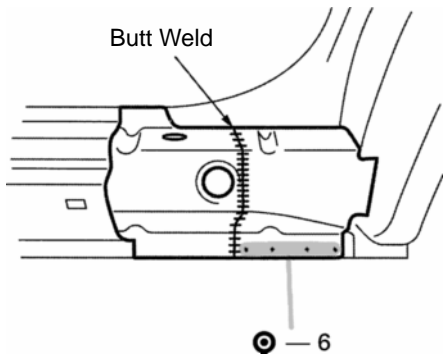
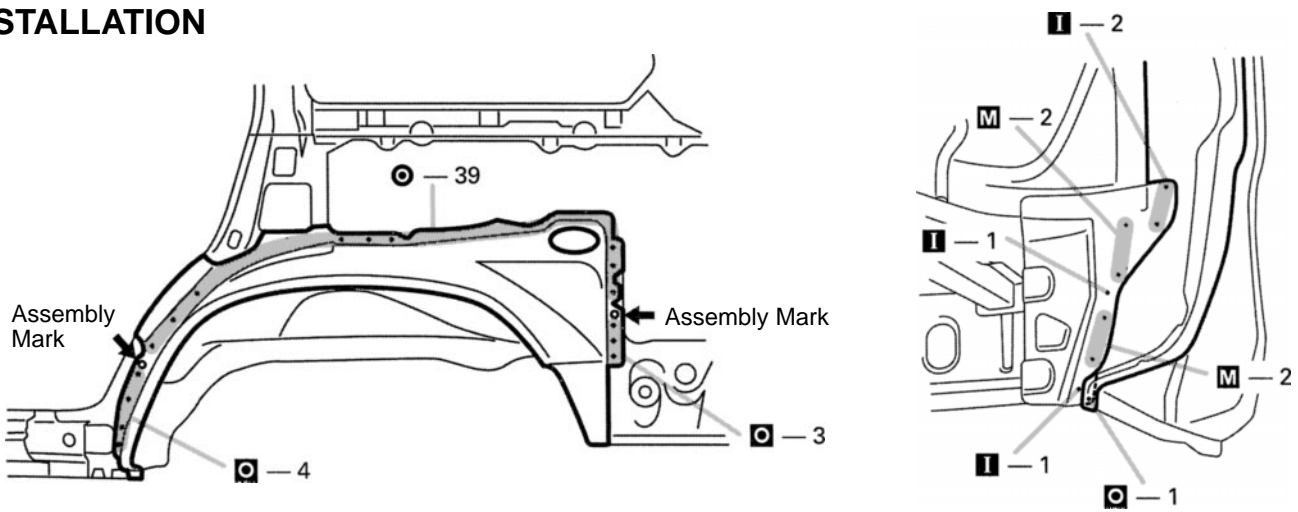


## REMOVAL (With the quarter panel removed.)

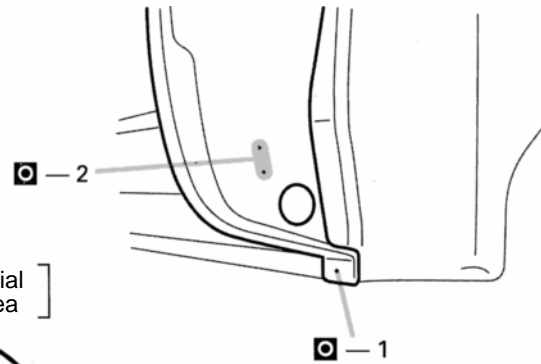
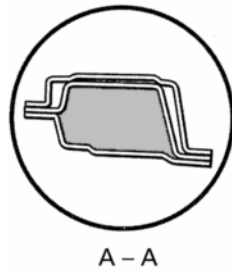


1. Cut and join the rocker panel reinforcement at the location as shown above.
2. After removing the roof side outer panel, remove the quarter wheel housing outer panel.

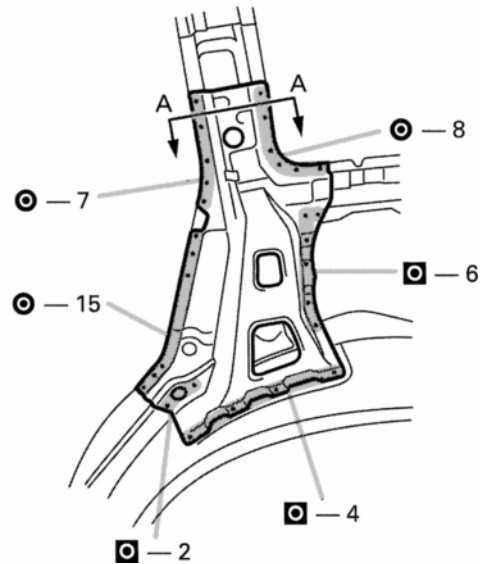
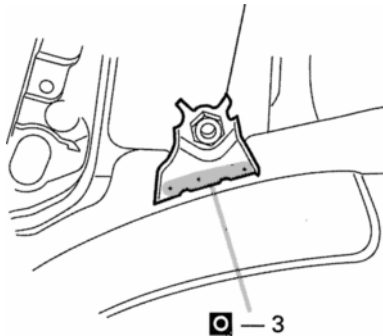
INSTALLATION



[ Foamed Material Application Area ]



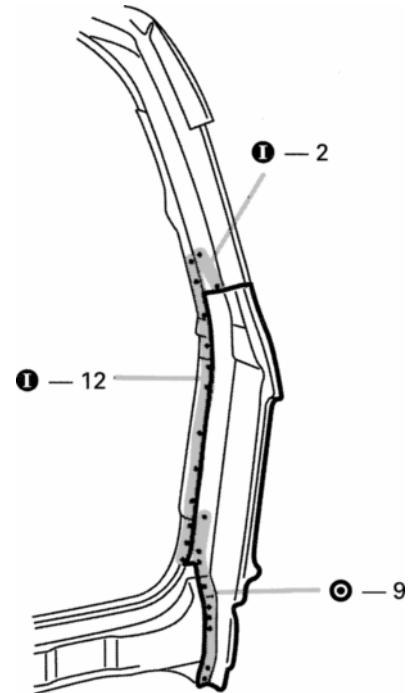
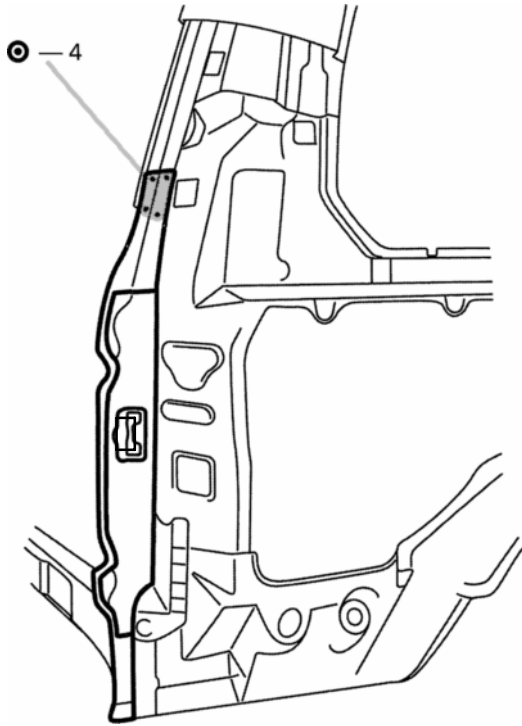
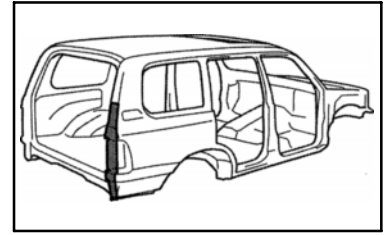
Seat Belt Anchor Reinforcement



1. Determine the position of the new parts by the assembly marks of the inner and outer panels.
2. Before welding the new parts, temporarily install the quarter panel and check the fit.
3. After installing the new parts, apply foamed materials.

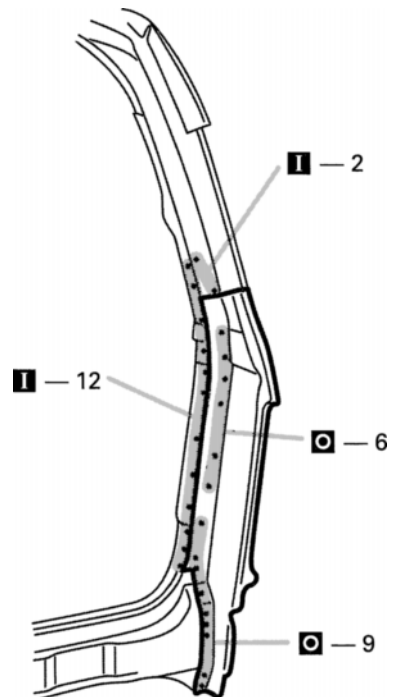
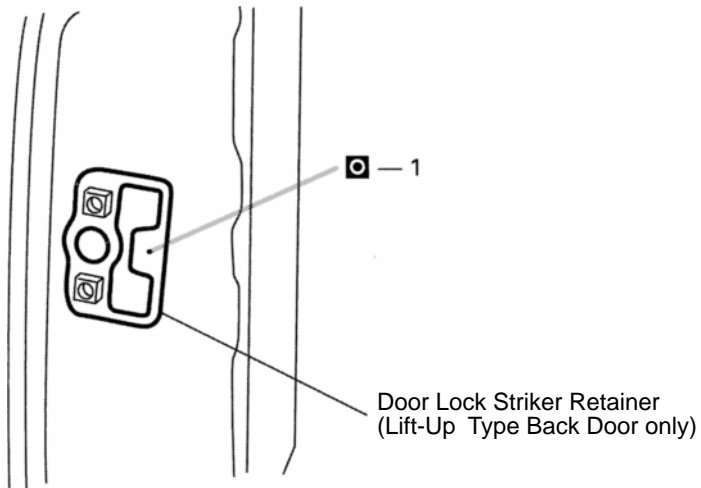
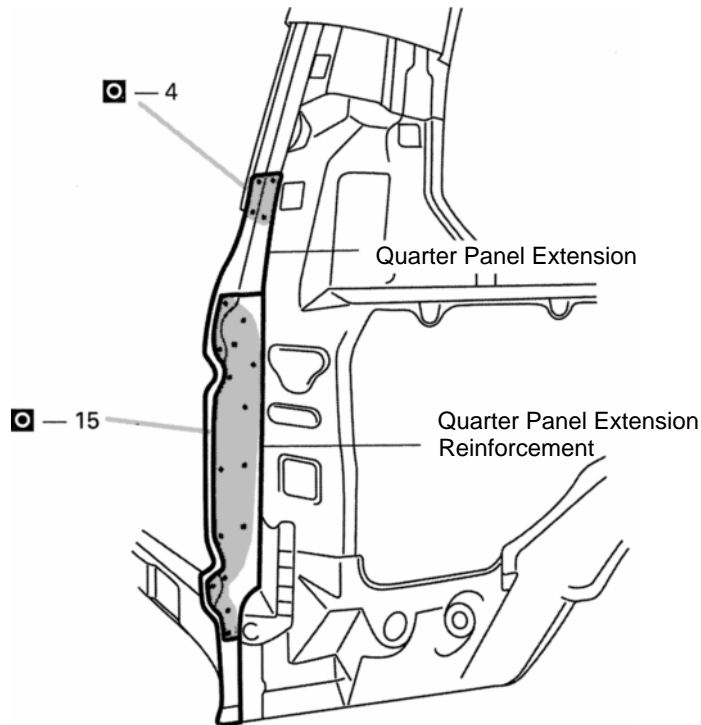
**QUARTER PANEL REAR EXTENSION (ASSY)**

**REMOVAL (With the back door opening reinforcement removed.)**





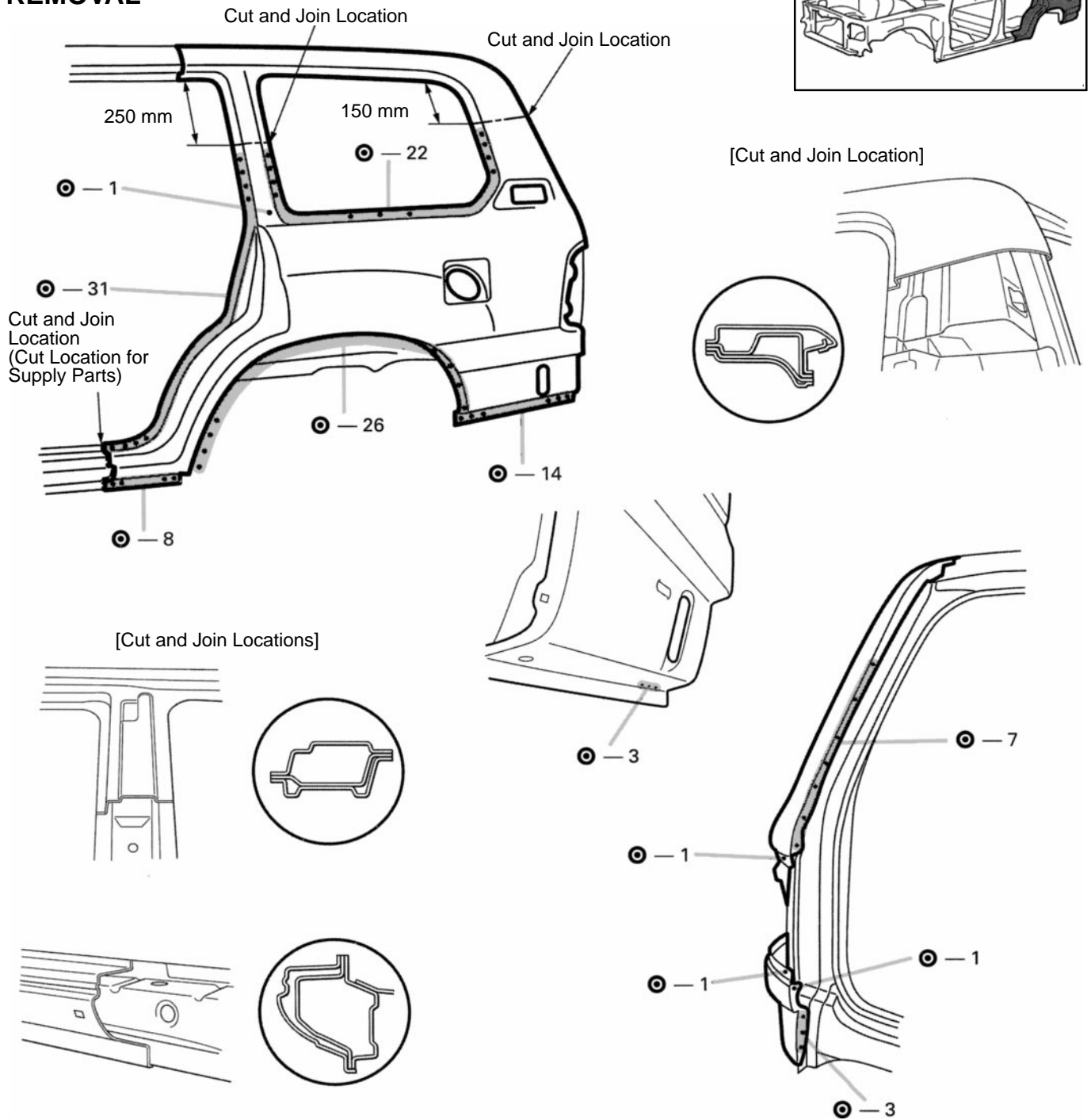
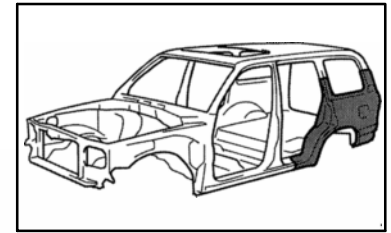
INSTALLATION



1. Before welding the new parts, temporarily install the back door opening reinforcement and check the fit.

# QUARTER PANEL (CUT)

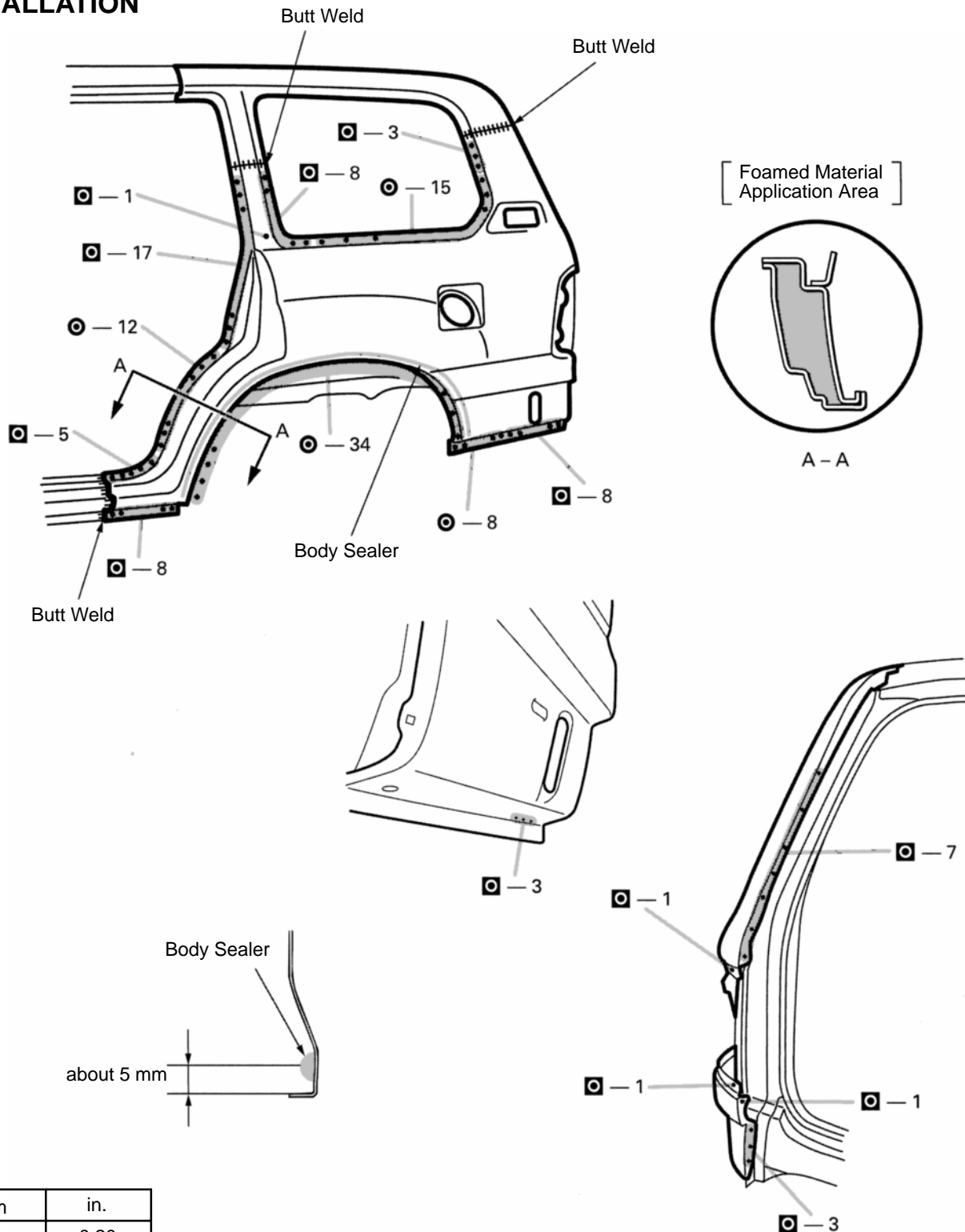
## REMOVAL



1. Cut and join the parts at the locations as shown above.

mm	in.
150	5.91
260	9.84

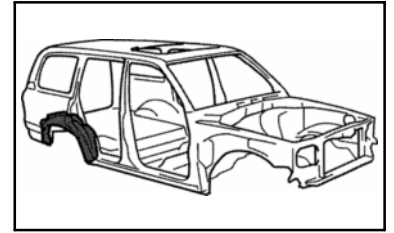
INSTALLATION



mm	in.
5	0.20

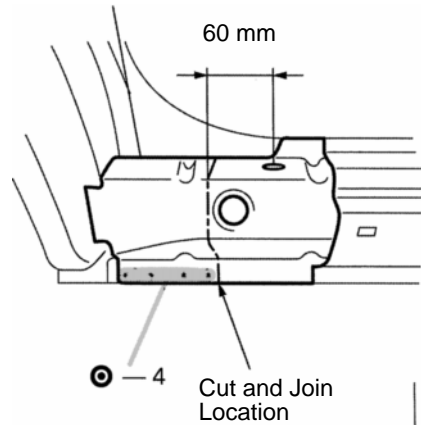
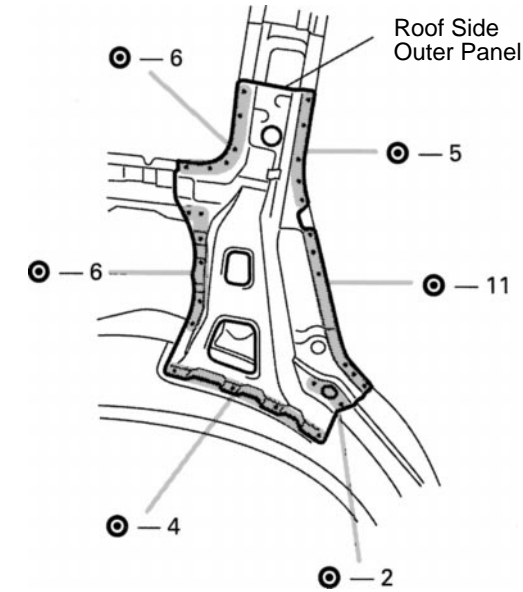
1. Before temporarily installing the new parts, apply body sealer to the wheel arch.
  2. Temporarily install the new parts and check the fit of the rear door, back door, tail gate or back door and rear combination light.
  3. After installing the new parts, apply foamed materials.
- HINT:**
- 1) Apply body sealer about 5 mm (0.20 in.) from the flange, avoiding any oozing.
  - 2) Apply sealer evenly, about 3 - 4 mm (0.12 - 0.16 in.) in diameter.
  - 3) For other sealing points, refer to section AR.

## QUARTER WHEEL HOUSING OUTER PANEL (ASSY): Right Side

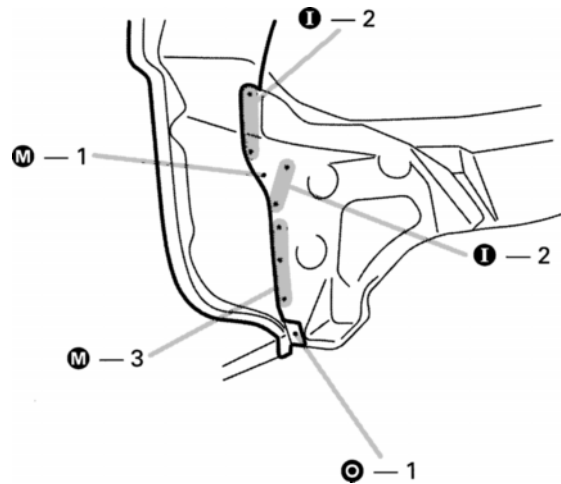
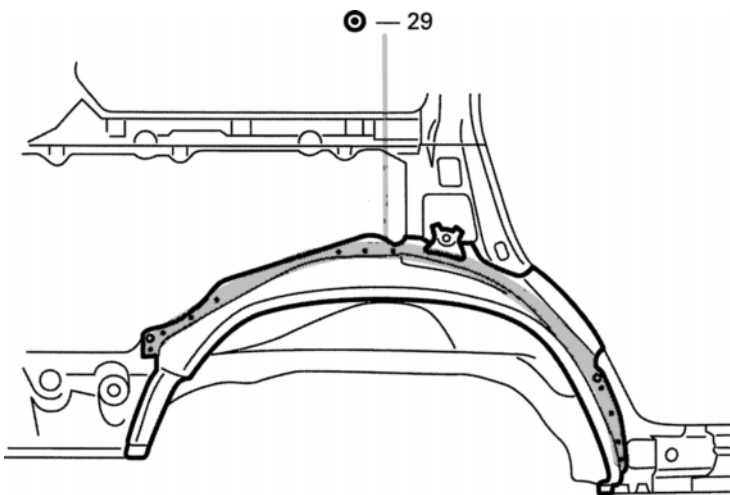
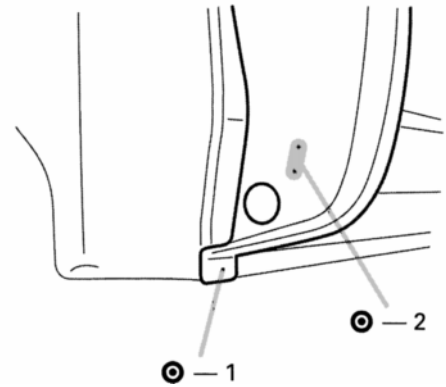


### REMOVAL (With the quarter panel removed.)

Rocker Panel Reinforcement

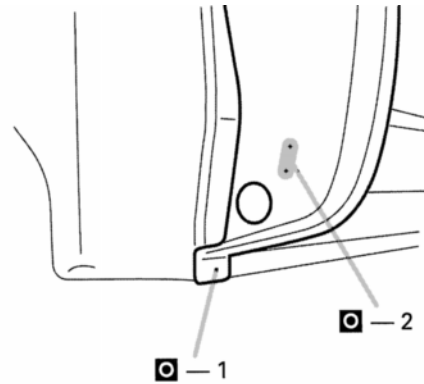
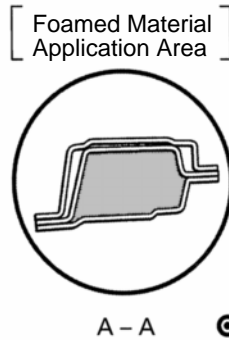
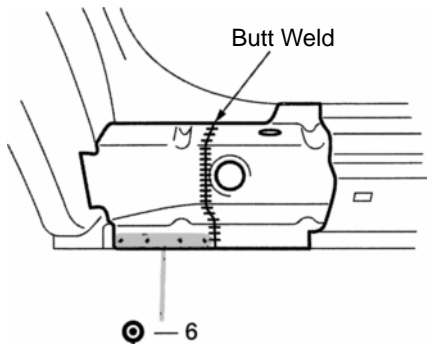
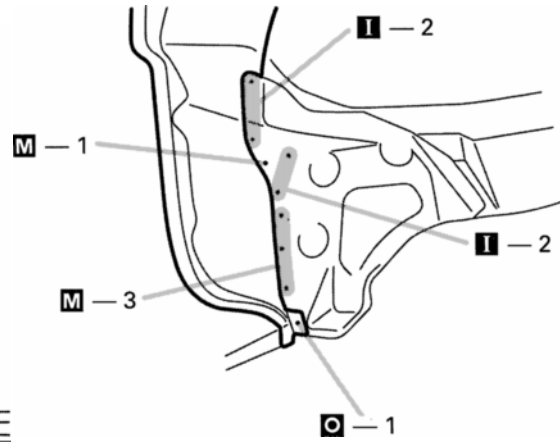
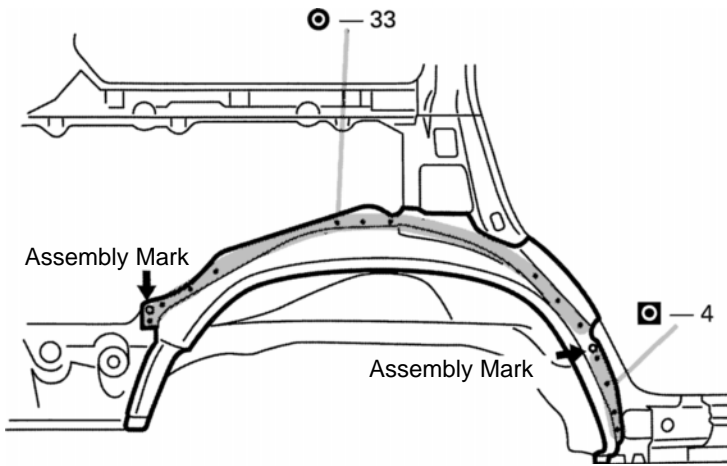


mm	in.
60	2.36

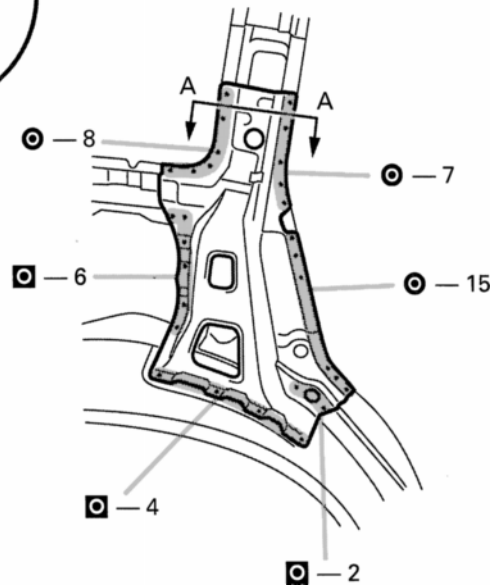
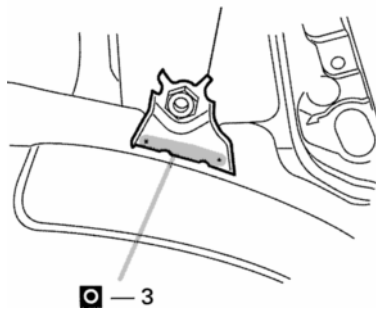


1. Cut and join the rocker panel reinforcement at the location as shown above.
2. After removing the roof side outer panel, remove the quarter wheel housing outer panel.

INSTALLATION



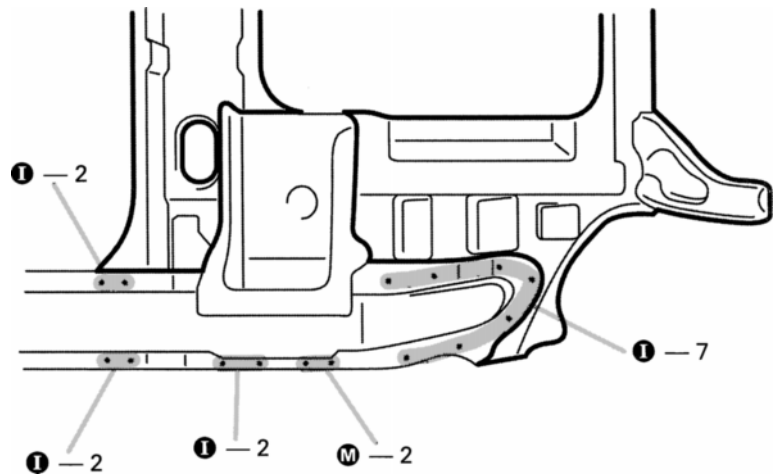
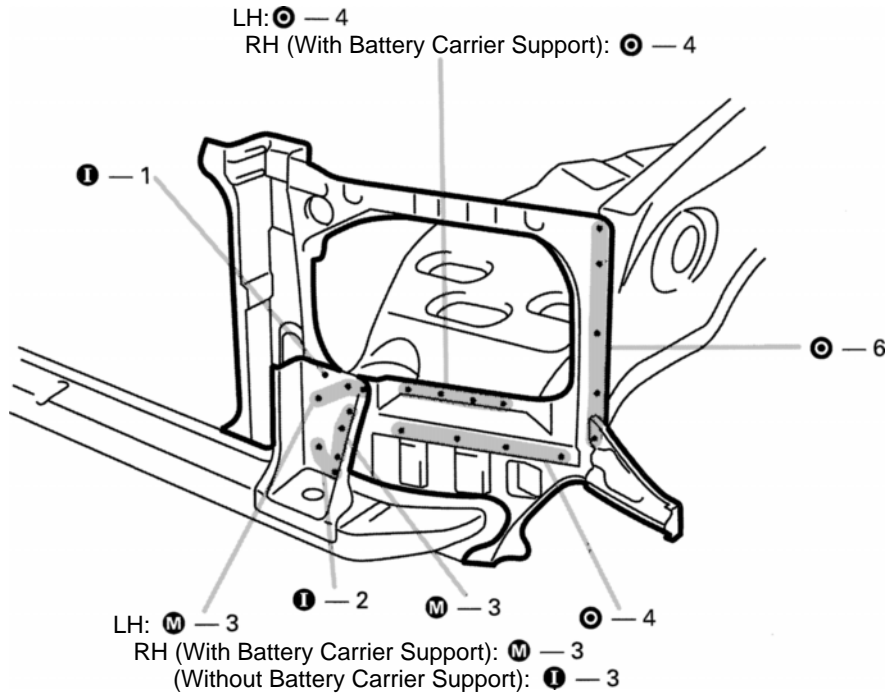
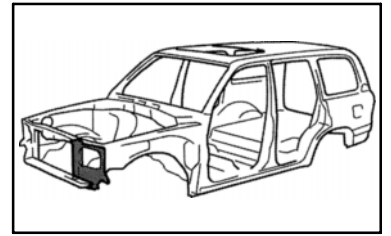
Seat Belt Anchor Reinforcement



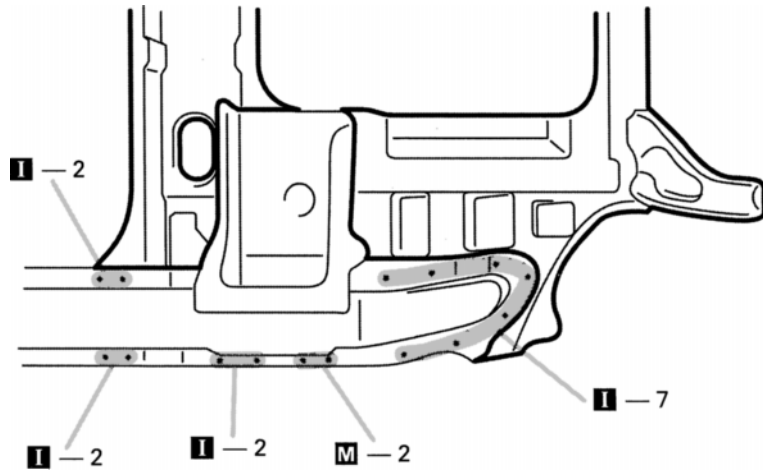
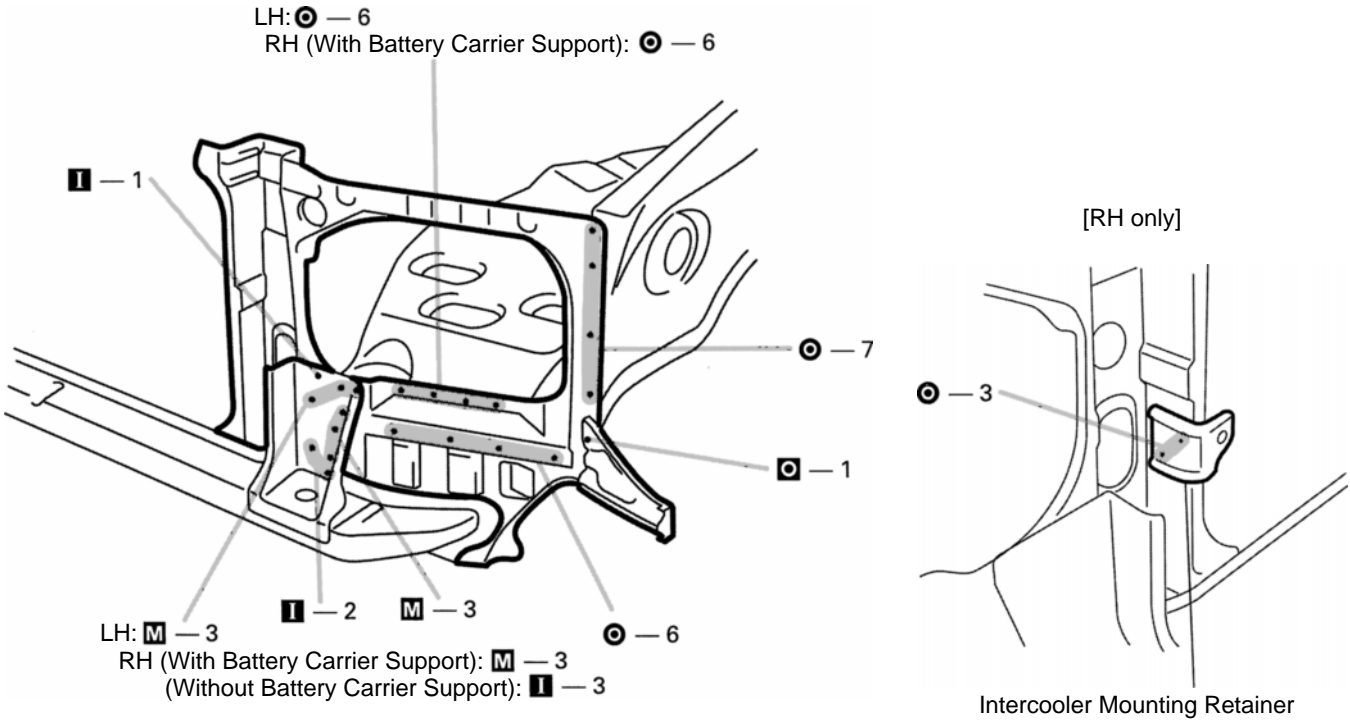
1. Determine the position of the new parts by the assembly marks of the inner and outer panels.
2. Before welding the new parts, temporarily install the quarter panel and check the fit.
3. After installing the new parts, apply foamed materials.

## RADIATOR SIDE SUPPORT (ASSY)

REMOVAL (With the radiator upper support removed.)



INSTALLATION

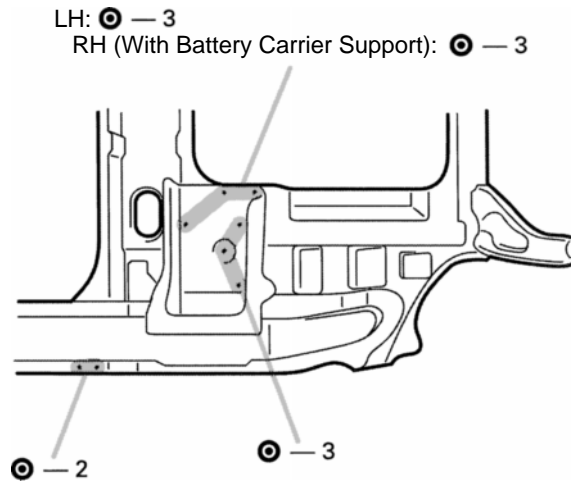
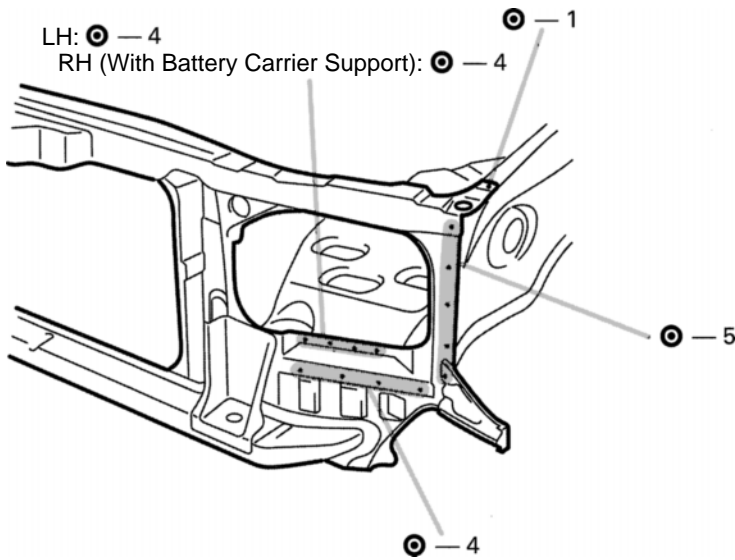
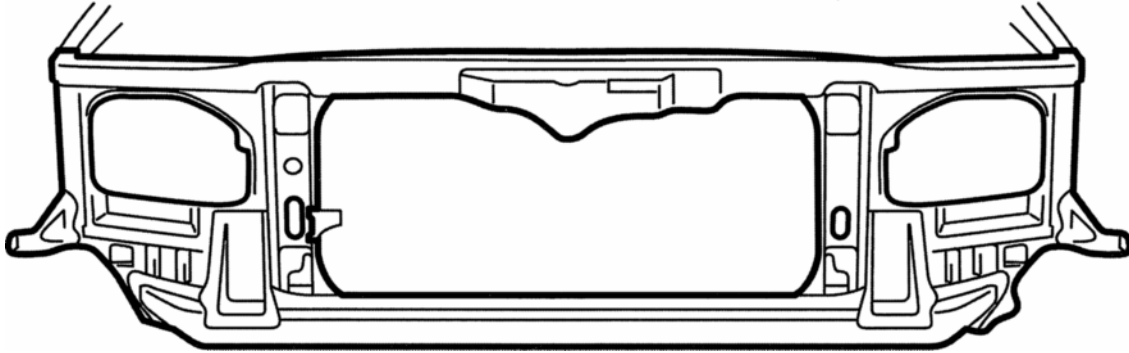
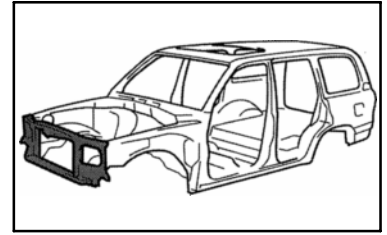


1. Temporarily install the new parts and measure each part in accordance with the body dimension diagram.

*HINT: First install the radiator upper support.*

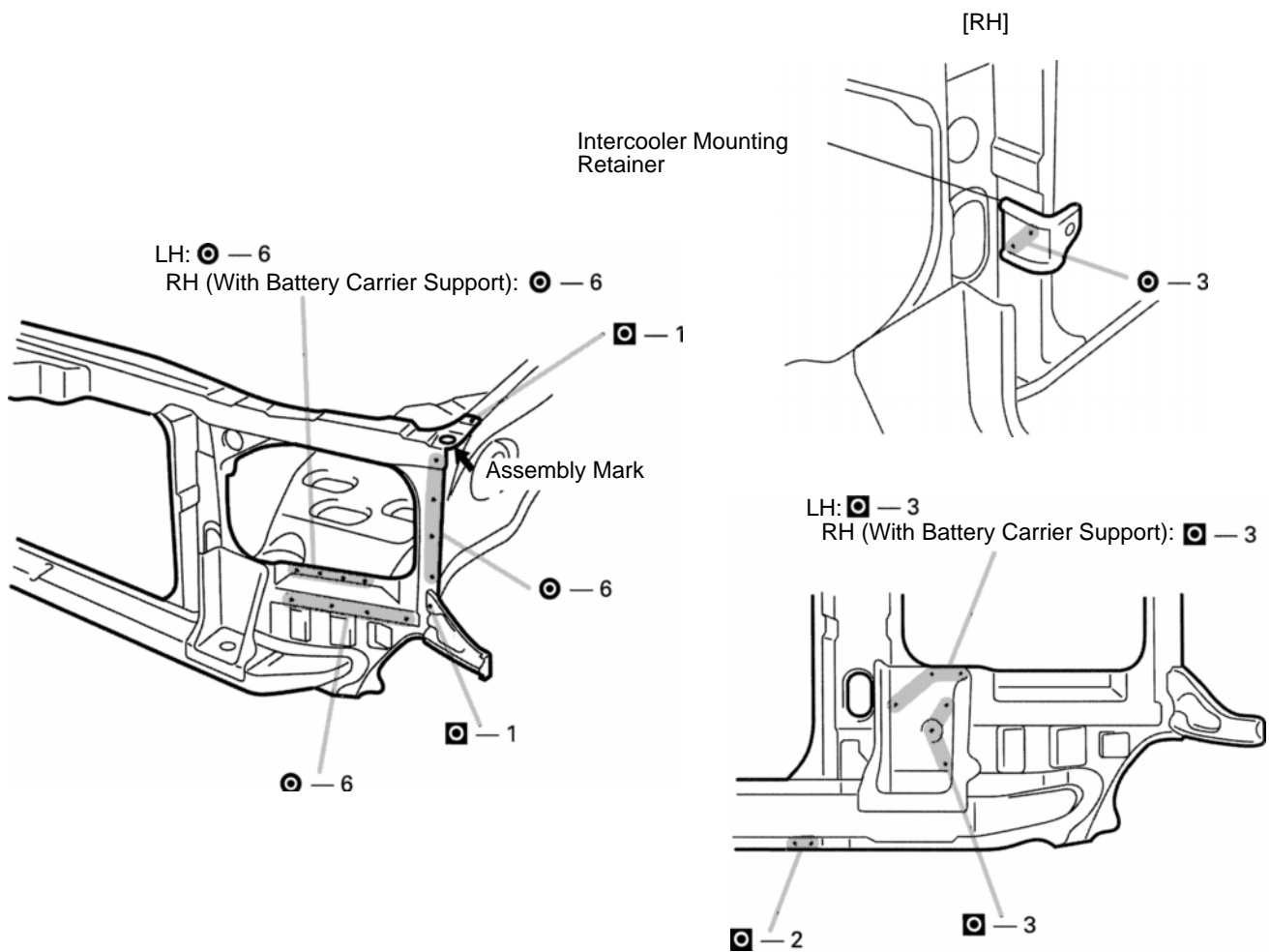
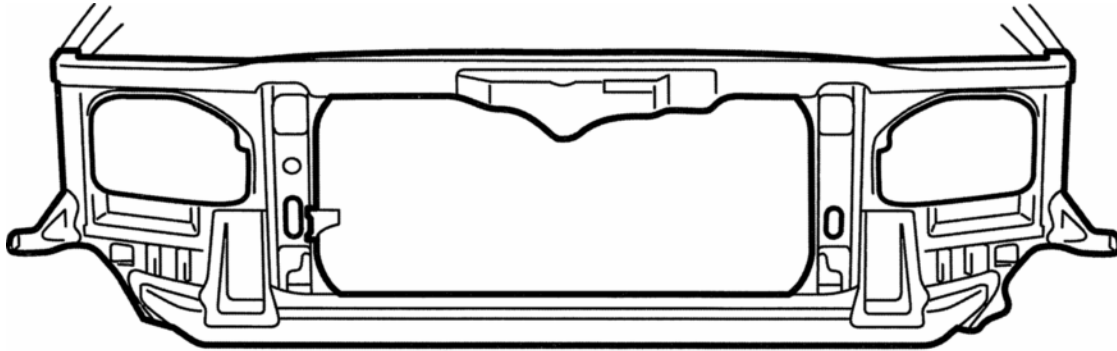
# RADIATOR SUPPORT (ASSY)

## REMOVAL





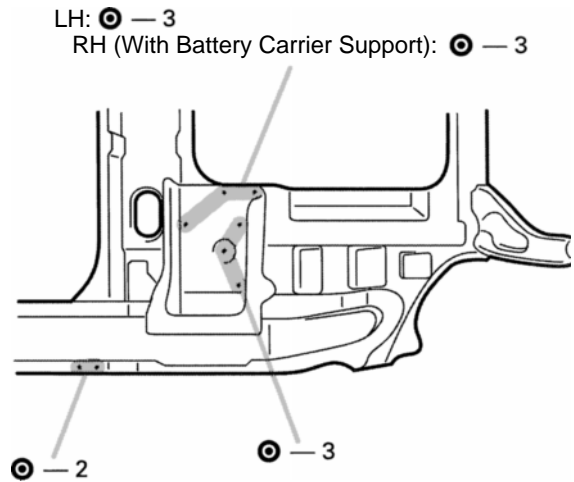
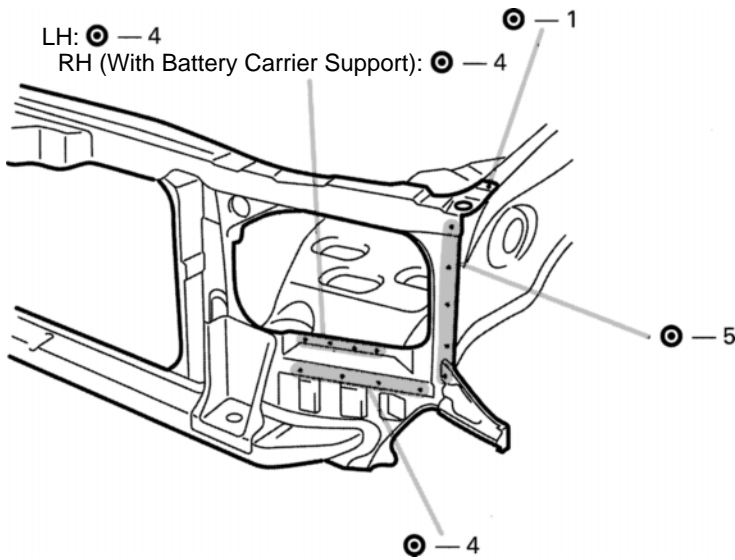
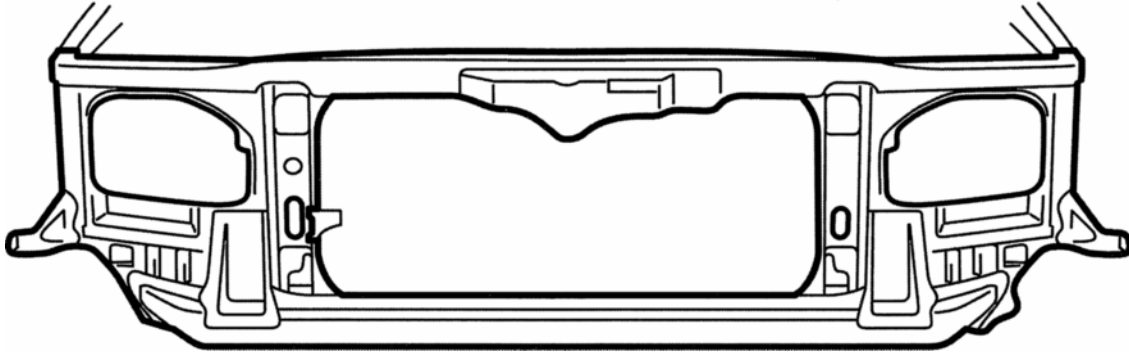
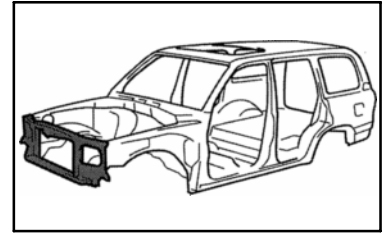
INSTALLATION



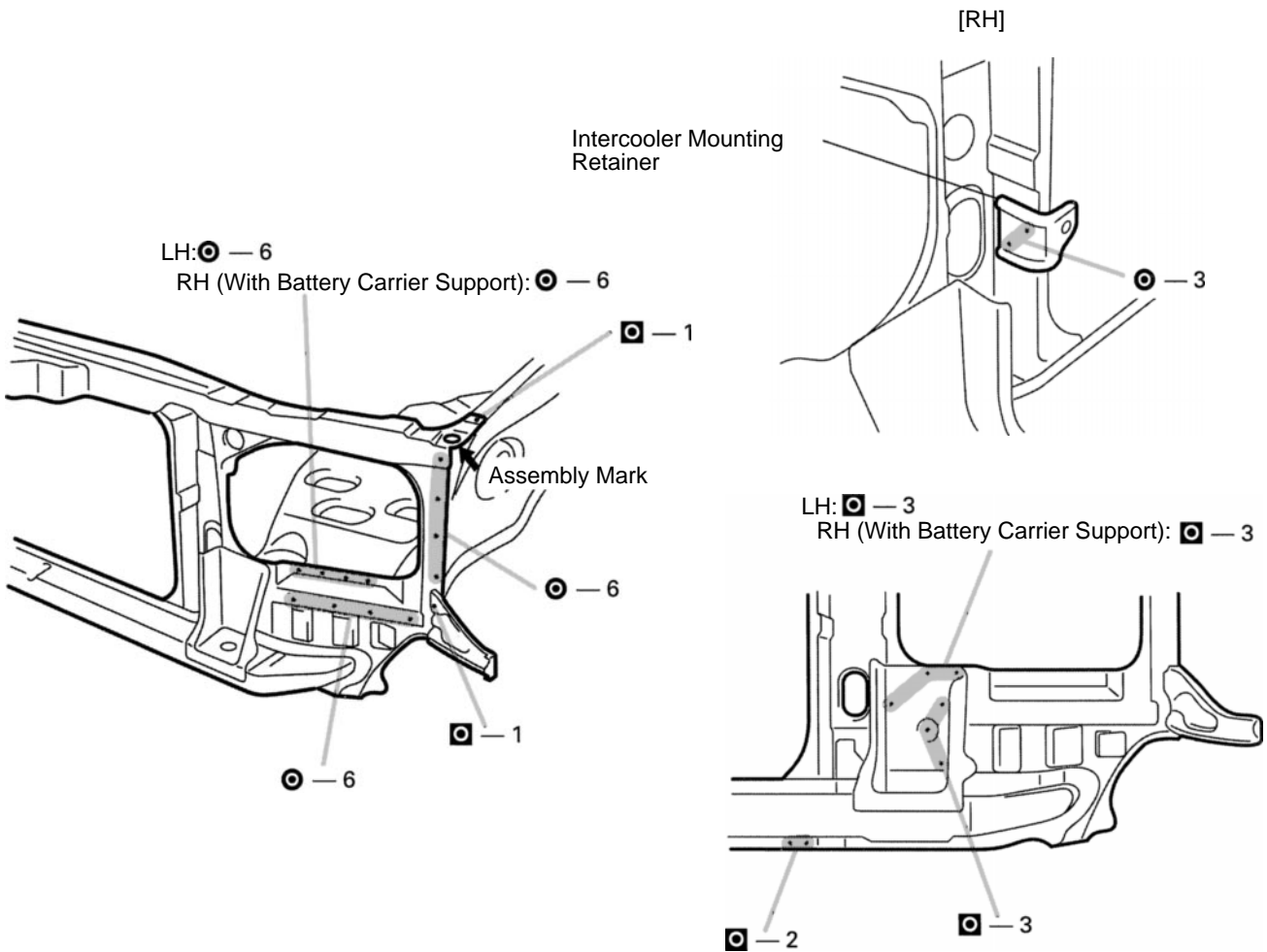
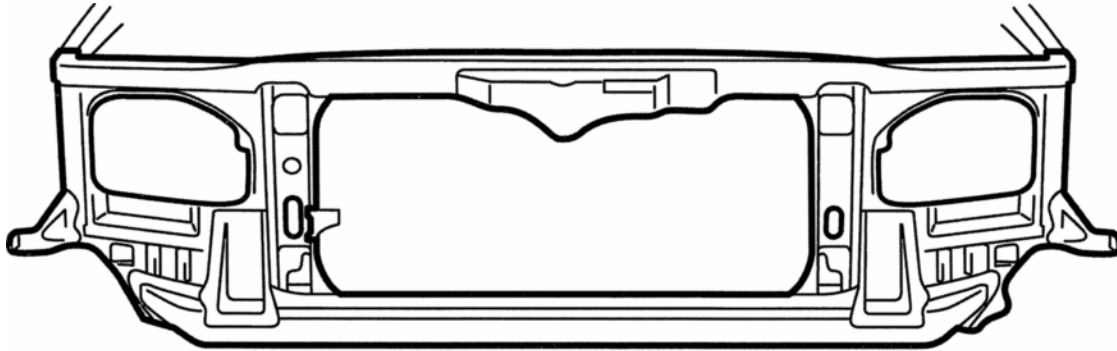
1. When temporarily installing the new parts, determine the installation position by the assembly mark. Then, measure each part in accordance with the body dimension diagram.

# RADIATOR SUPPORT (ASSY)

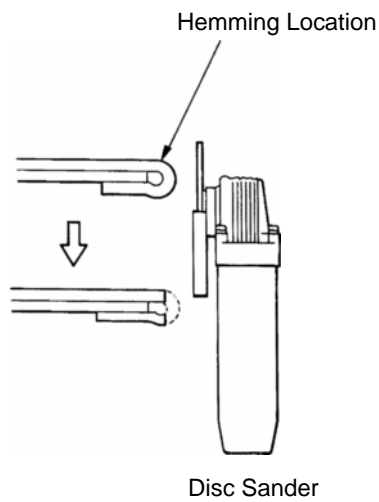
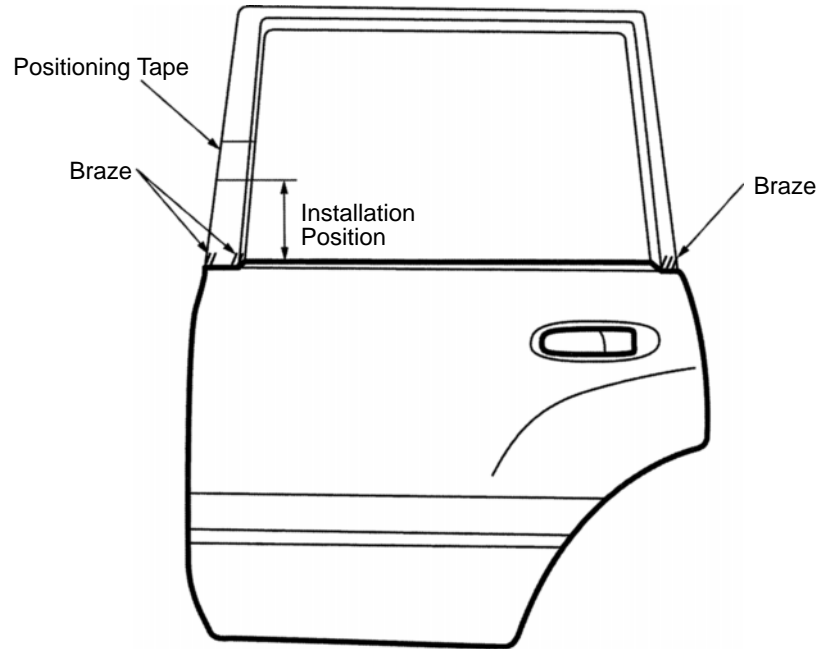
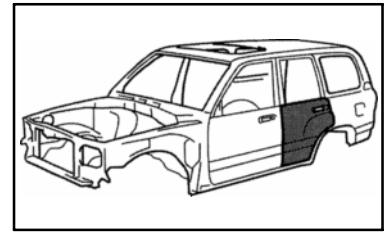
## REMOVAL



INSTALLATION

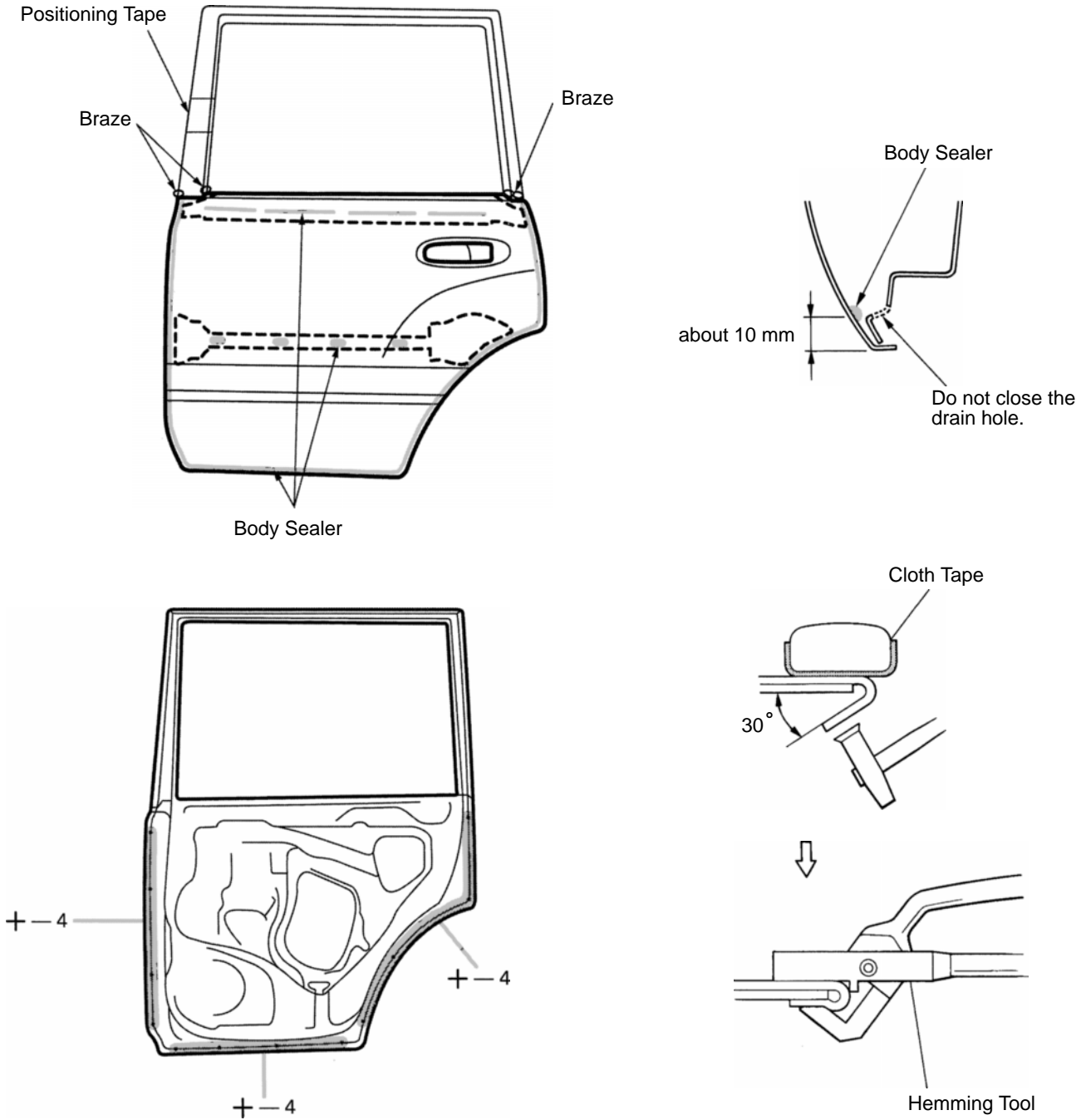


1. When temporarily installing the new parts, determine the installation position by the assembly mark. Then, measure each part in accordance with the body dimension diagram.

**REAR DOOR OUTER PANEL (ASSY)****REMOVAL**

1. Before removing the outer panel, make the installation position with a tape.
2. After grinding off the hemming location, remove the outer panel.

INSTALLATION



mm	in.
10	0.39

1. Before temporarily installing the new parts, apply body sealer to the reinforcement, side impact protection beam and back side of the new parts.

**HINT:**

1) Apply sealer evenly about 70 mm (0.39 in.) from the flange and 3 mm (0.12 in.) in diameter to the outer panel and apply just enough sealer for the reinforcement and side impact protection beam to make contact.

2. Bend the flange hem about 30° with a hammer and dolly, then fasten tightly with a hemming tool.

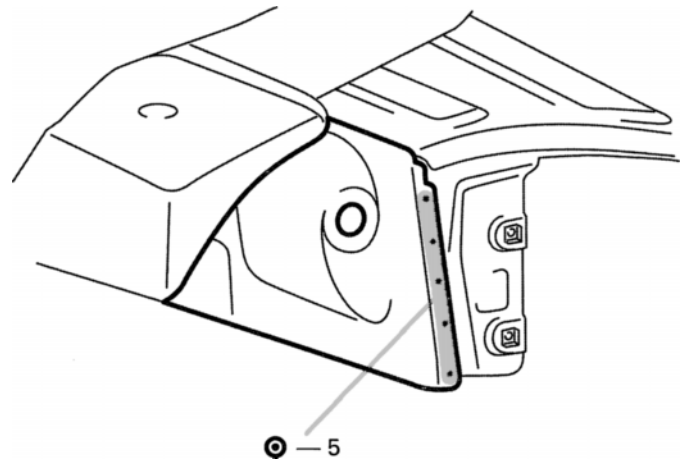
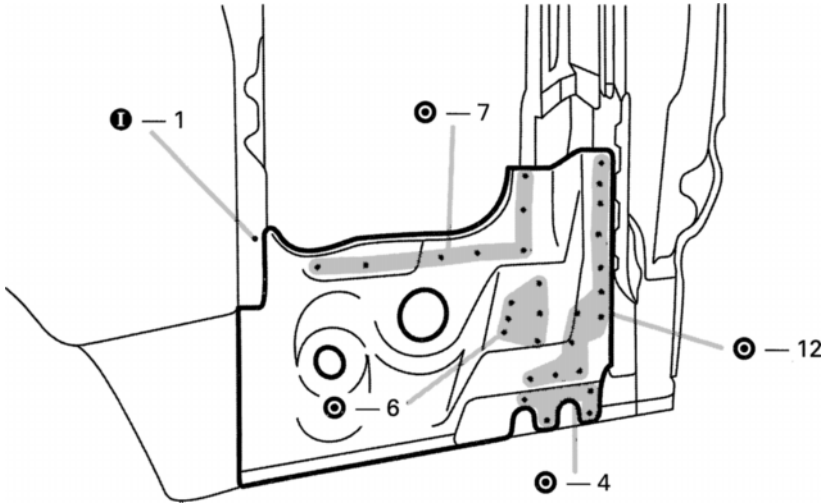
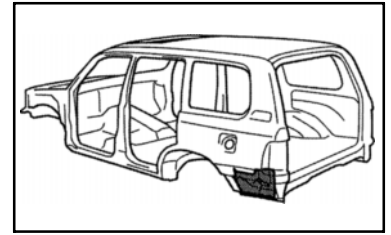
2) For other sealing points, refer to section AR.

**HINT:**

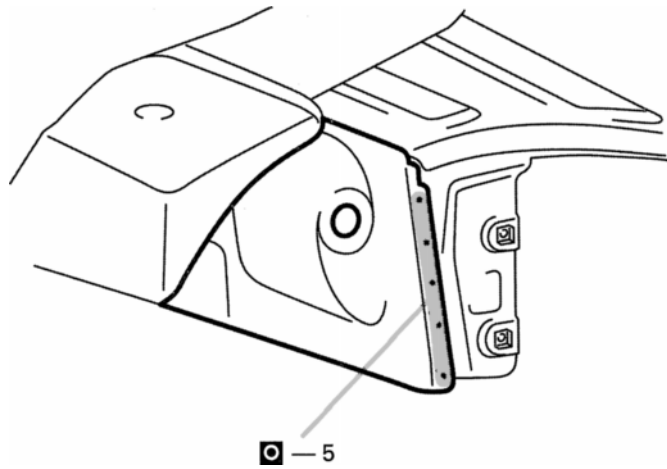
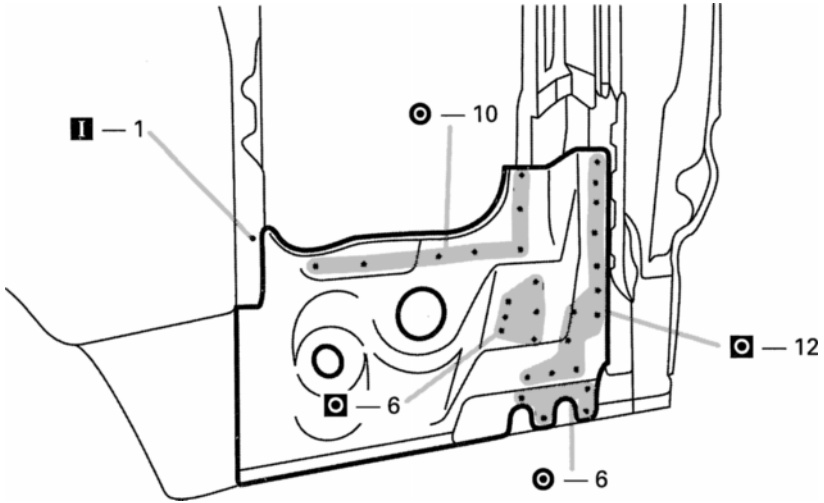
1) Perform hemming in three steps, being careful not to warp the panel.  
 2) If a hemming tool cannot be used, hem with a hammer and dolly.

**REAR FLOOR SIDE PANEL (ASSY): Left Side**

**REMOVAL (With the back door opening reinforcement removed.)**

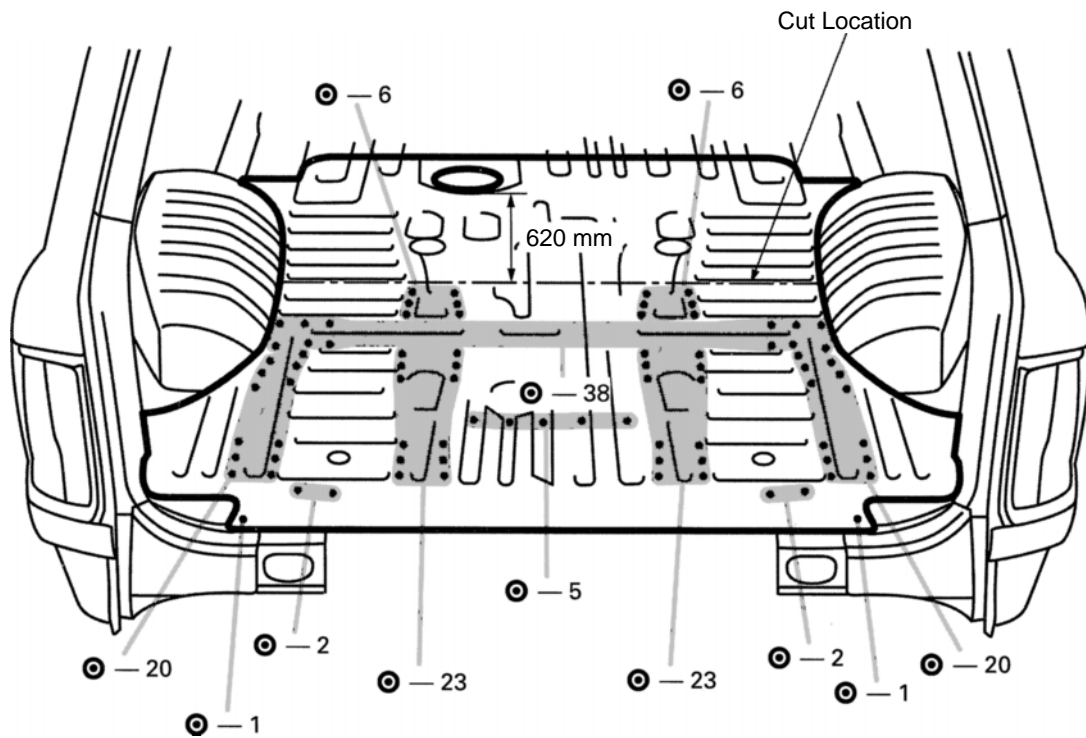
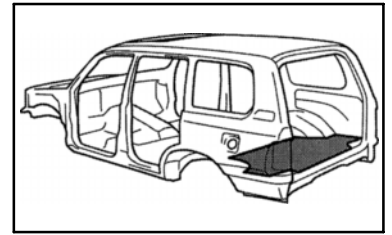


INSTALLATION



## REAR FLOOR PAN (CUT)

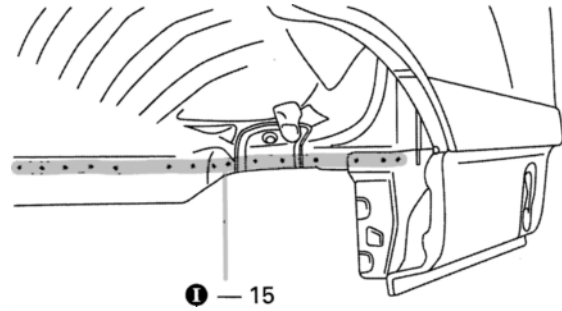
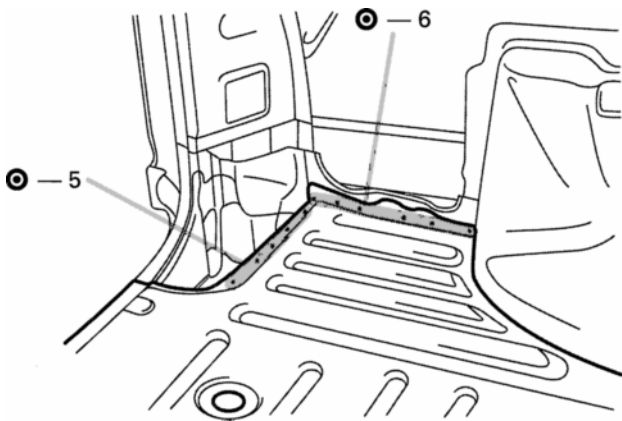
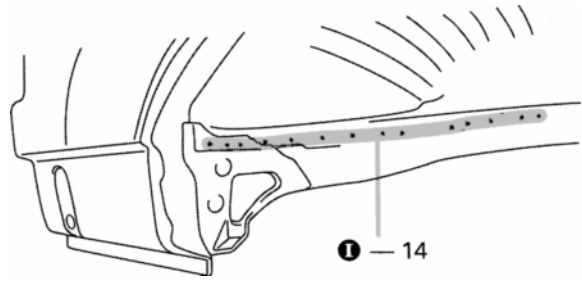
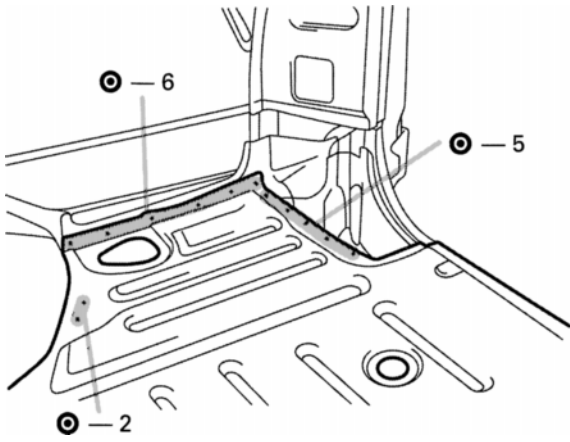
REMOVAL (With the body lower back panel, lower back upper gusset removed.)



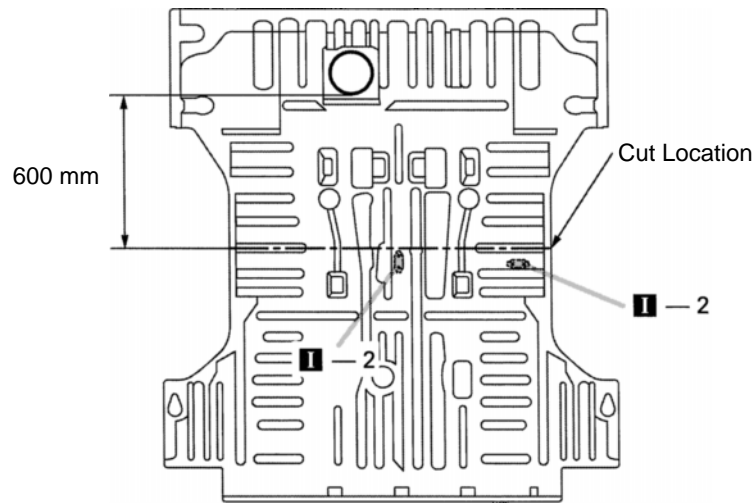
mm	in.
620	24.41

1. Cut the parts at the location as shown above.

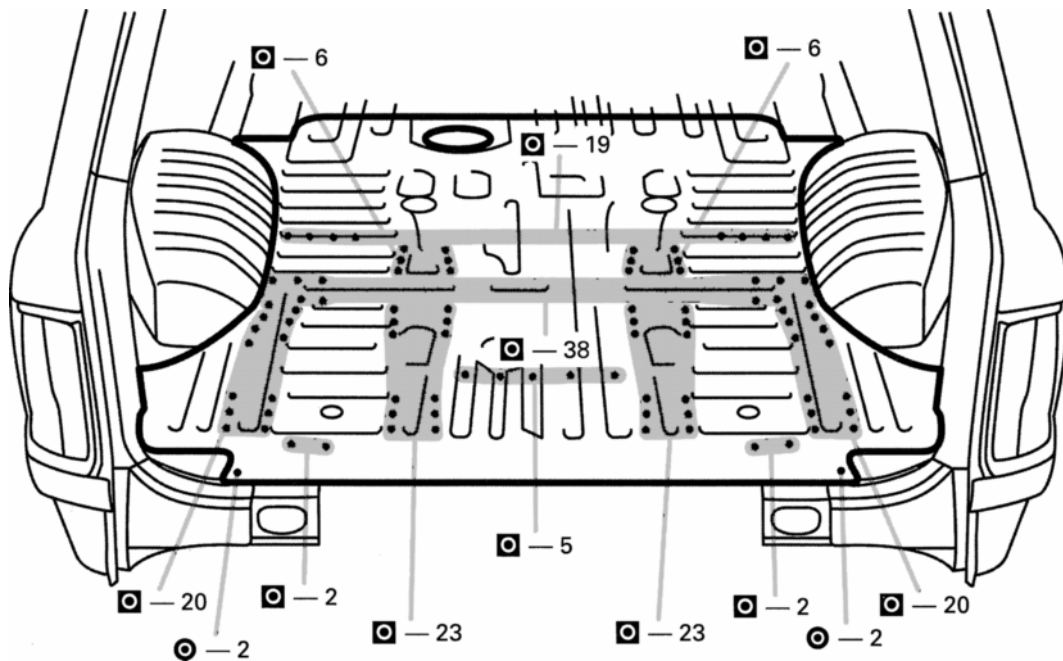




## INSTALLATION

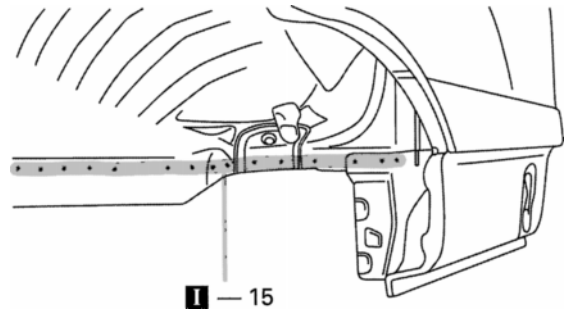
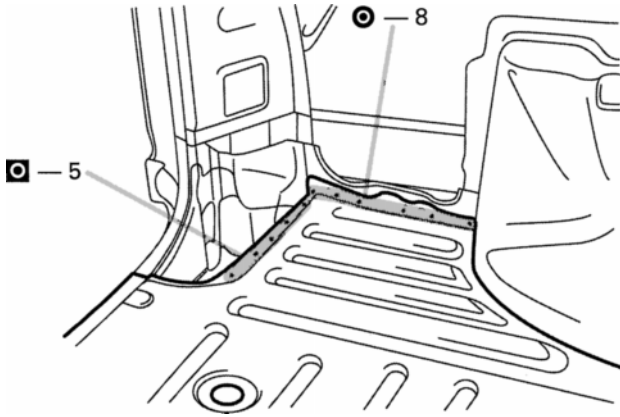
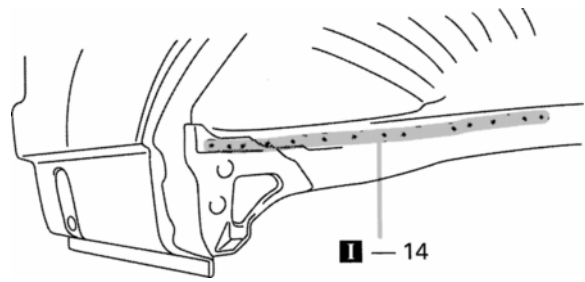
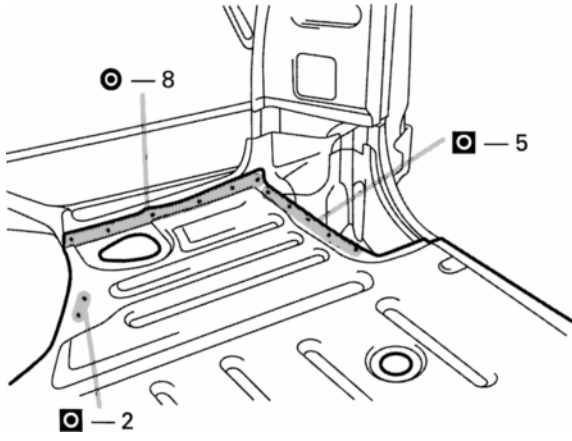


mm	in.
600	23.62



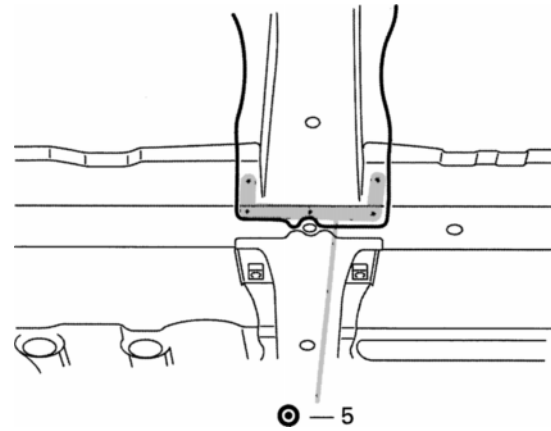
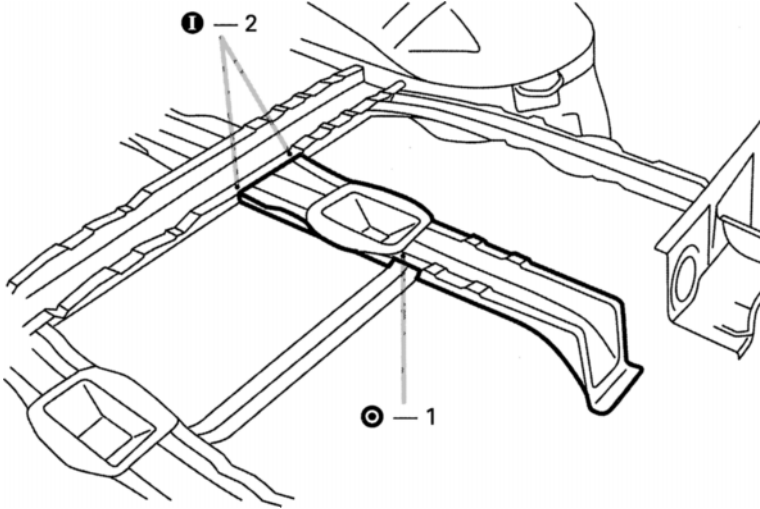
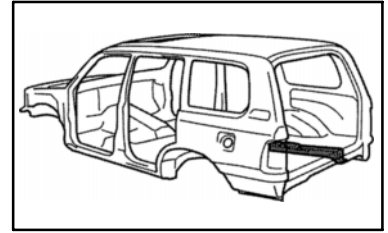
1. Cut the new parts at the location as shown above.
2. Plug weld the overlapping portion of the new parts.
3. Coat the overlapping opening portion from the both sides with body sealer.

*HINT: Be sure the portion to be welded are align and not loose.*

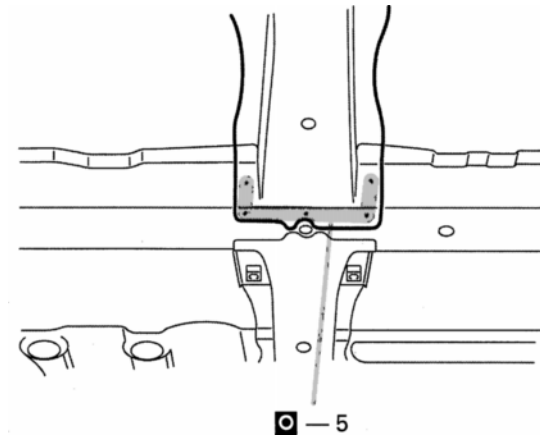
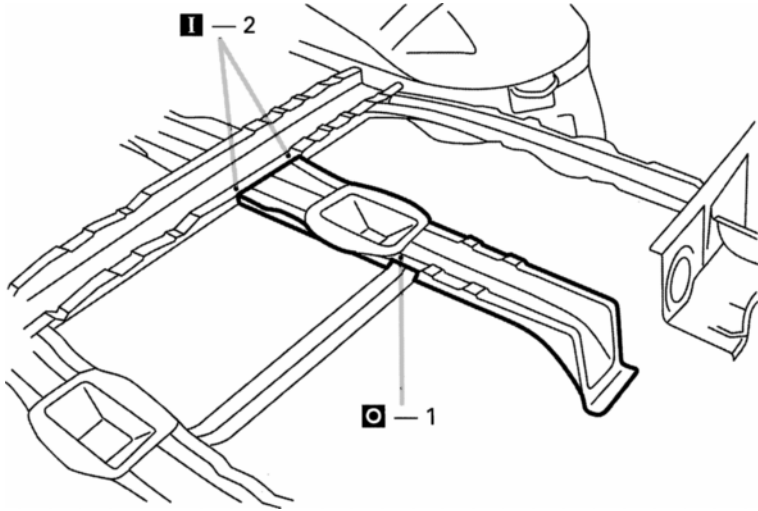


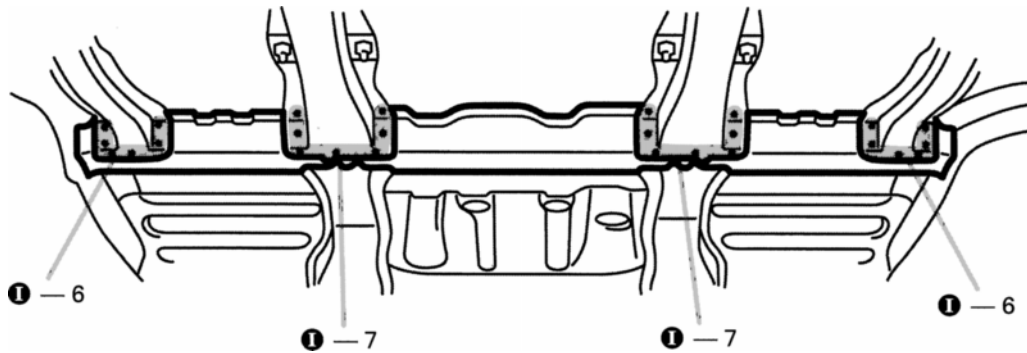
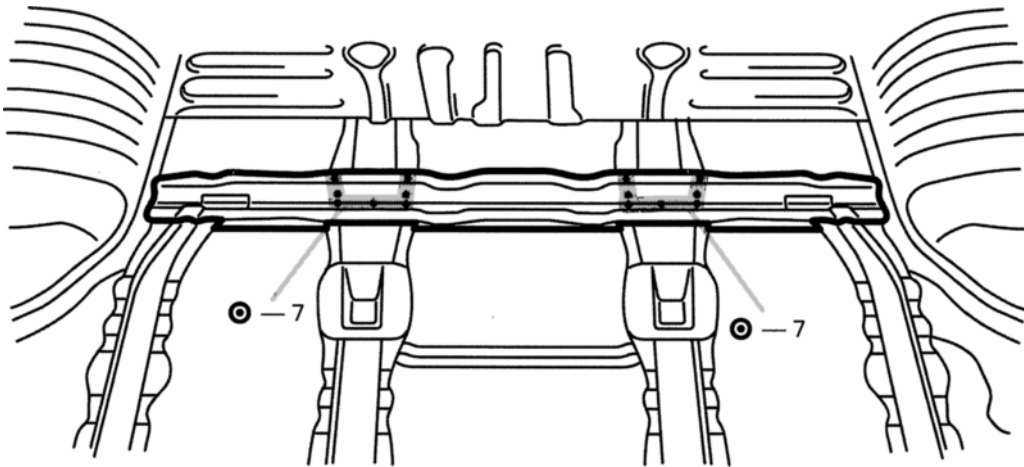
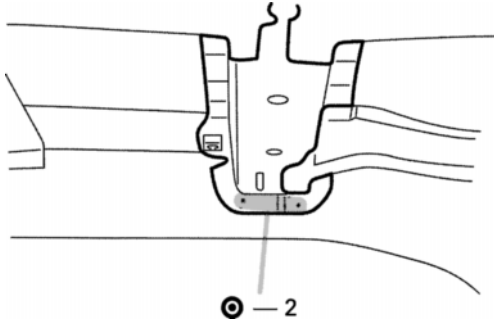
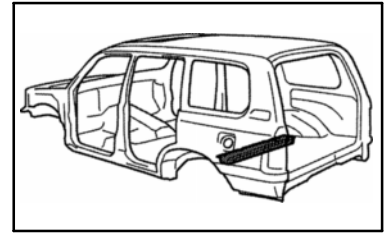
**REAR FLOOR SIDE REAR CENTER MEMBER (ASSY)**

**REMOVAL (With the body lower back panel, rear floor pan removed.)**

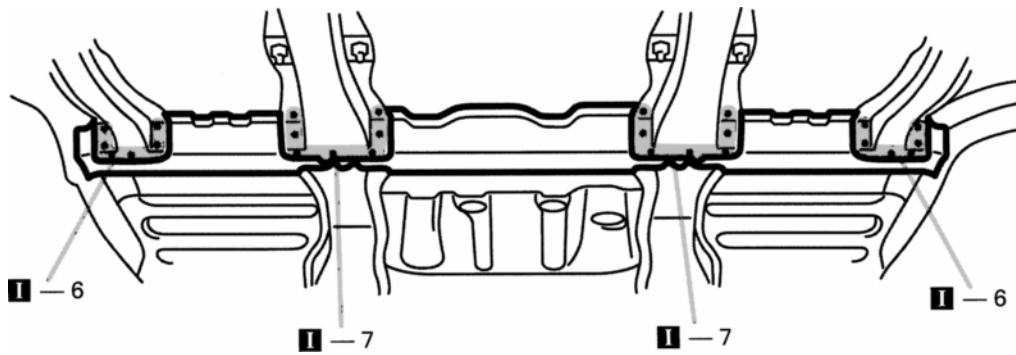
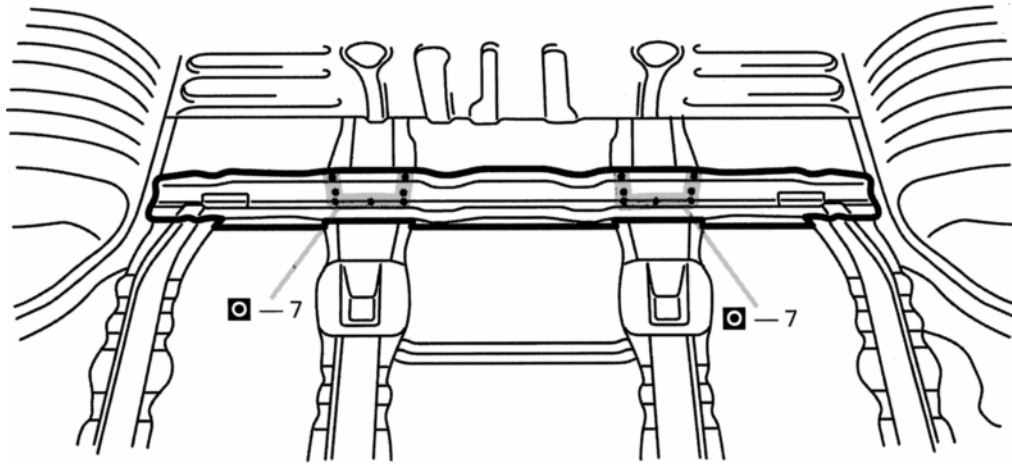
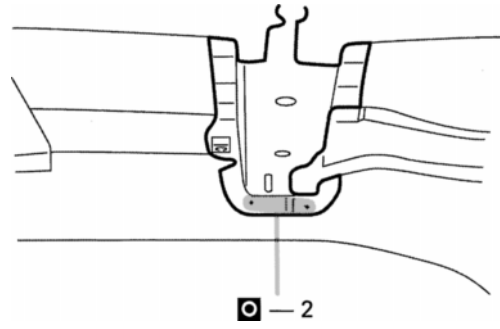


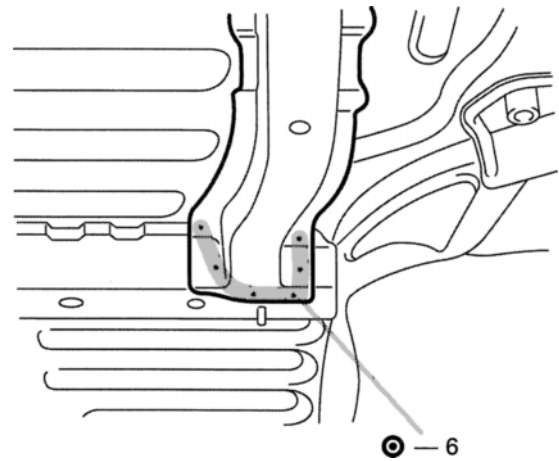
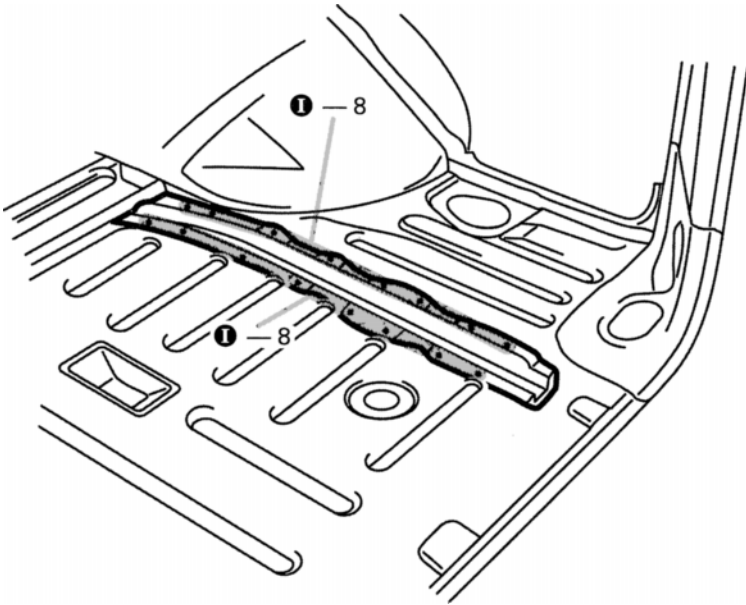
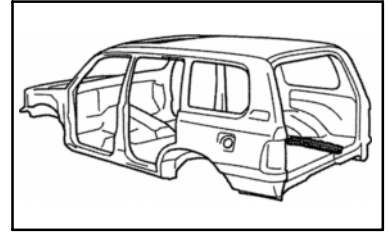
INSTALLATION



**REAR FLOOR No. 3 CROSSMEMBER (ASSY)****REMOVAL (With the rear floor pan removed.)**

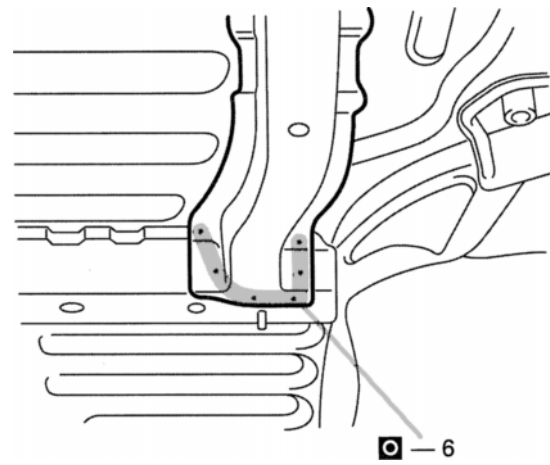
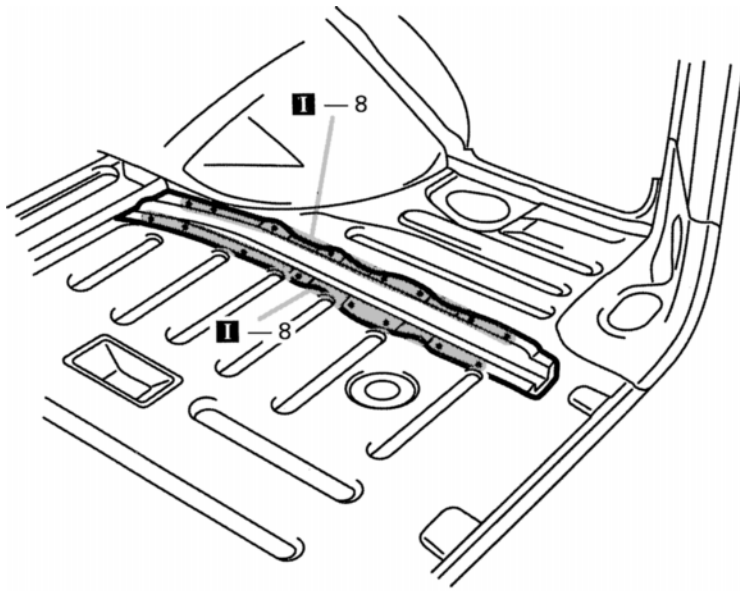
INSTALLATION



**REAR FLOOR SIDE MEMBER REAR No. 2  
REINFORCEMENT (ASSY)****REMOVAL (With the body lower back panel removed.)**

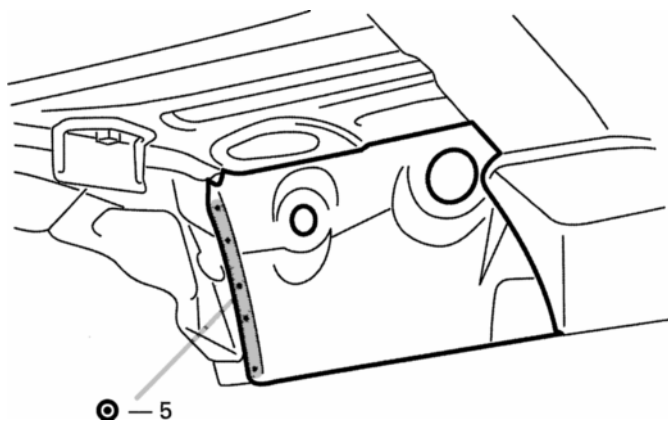
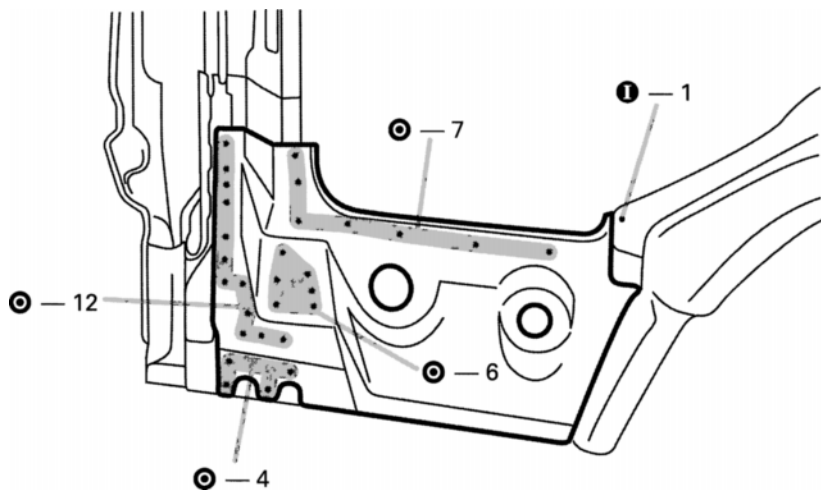
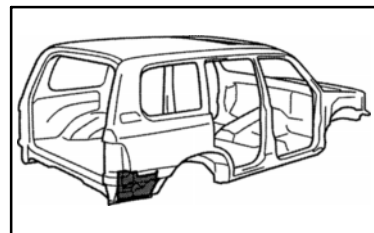


INSTALLATION

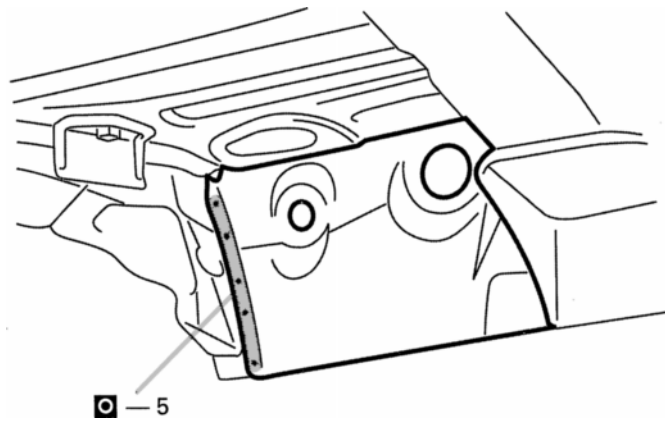
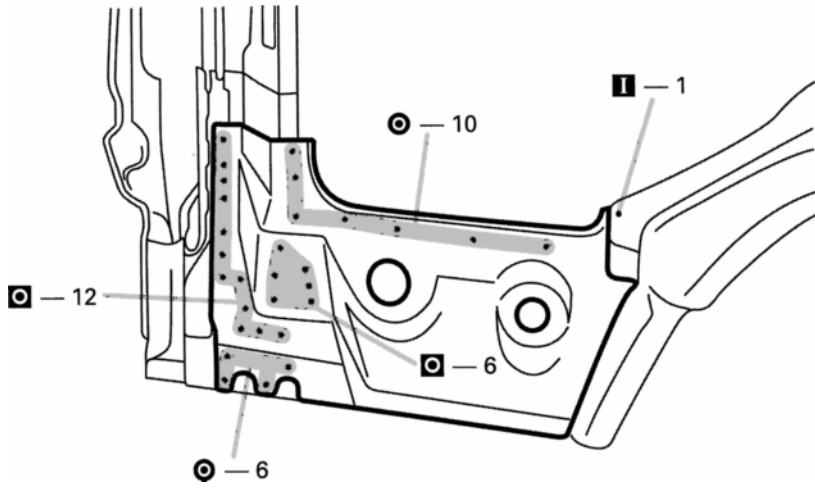


**REAR FLOOR SIDE PANEL (ASSY): Right Side**

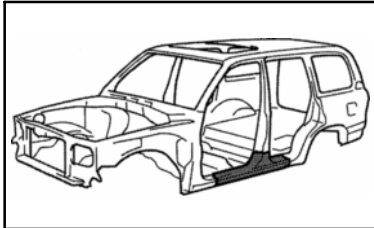
**REMOVAL (With the back door opening reinforcement removed.)**



INSTALLATION

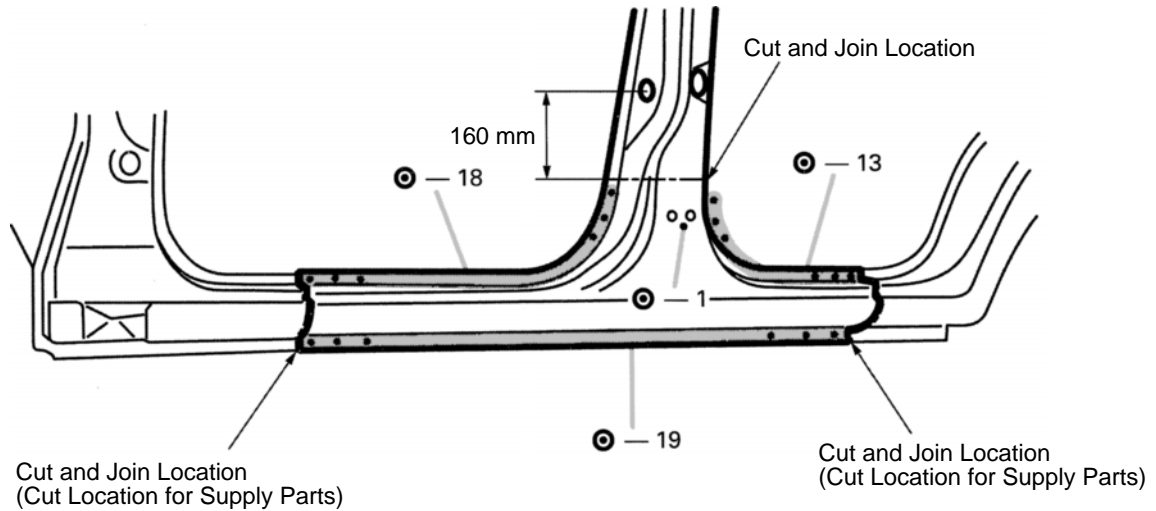
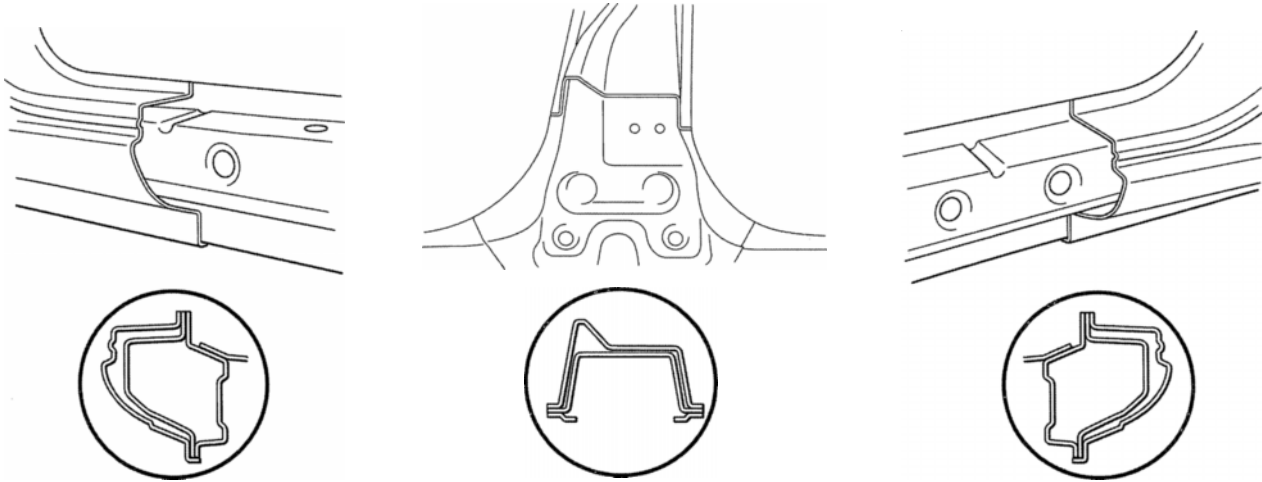


# ROCKER OUTER PANEL (CUT)



## REMOVAL

[Cut and Join Locations]

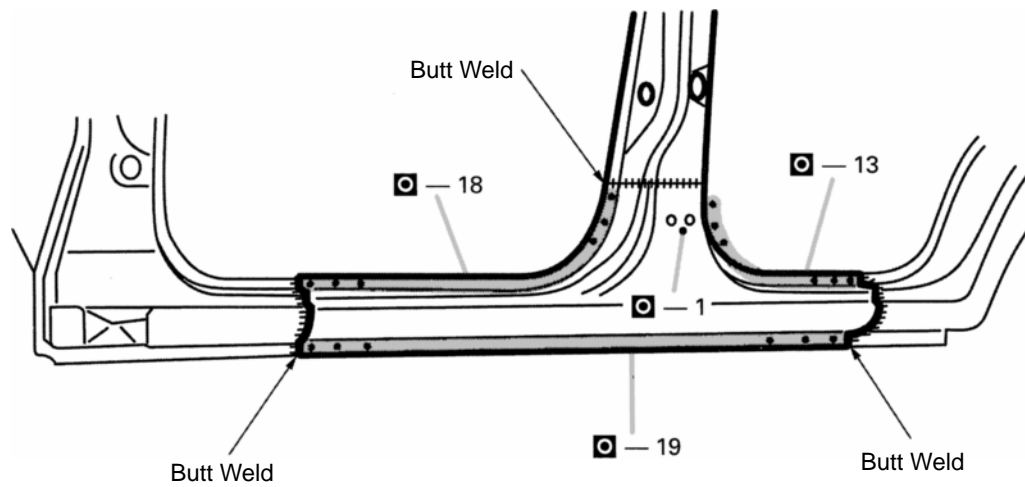


1. Cut and join the parts at the locations as shown above.

*HINT: Take care not to damage the internal reinforcement.*

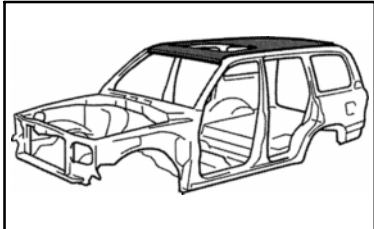
mm	in.
160	6.30

## INSTALLATION

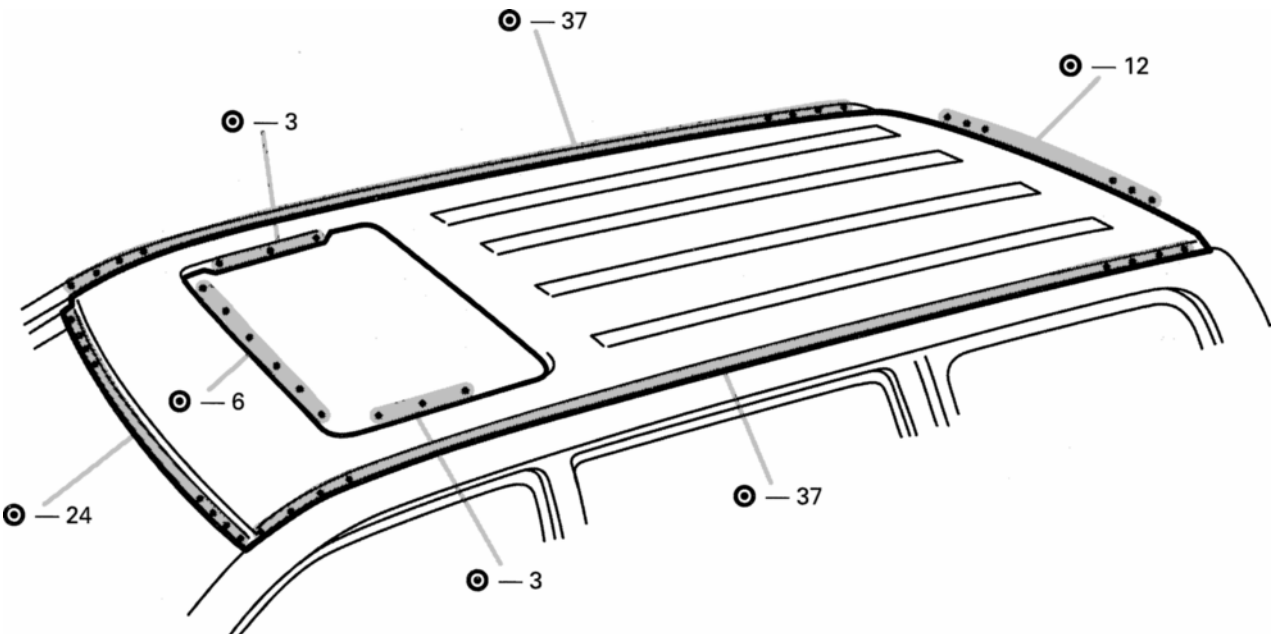


1. Before welding the new parts, check the fit of the front door and rear door.

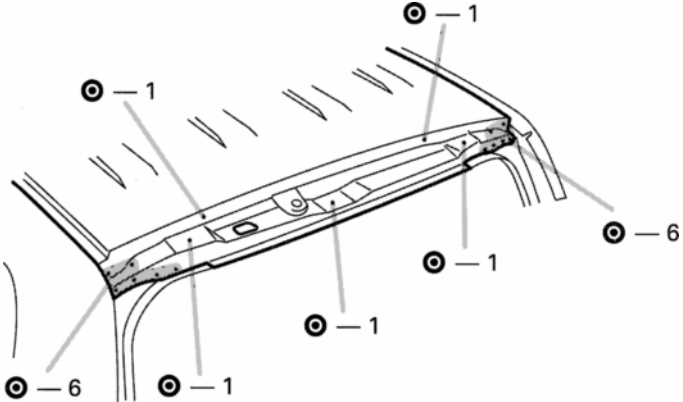
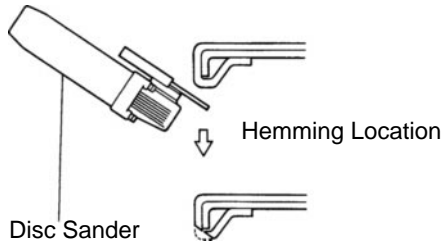
# ROOF PANEL (ASSY): Moon Roof



## REMOVAL



[If reusing the roof panel reinforcement]

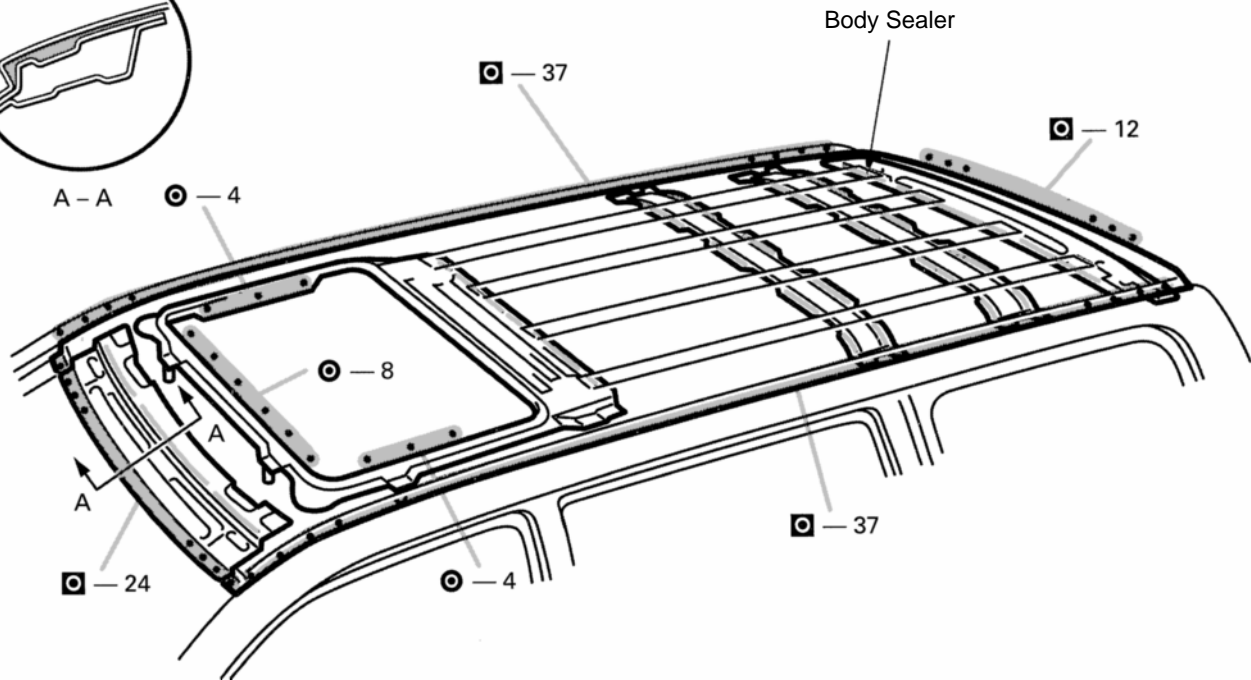


INSTALLATION

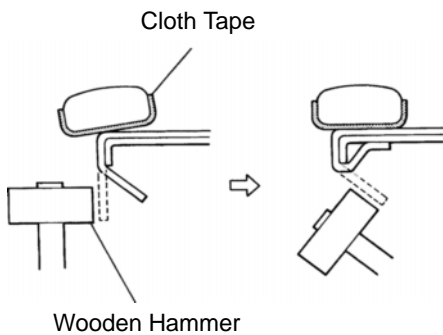
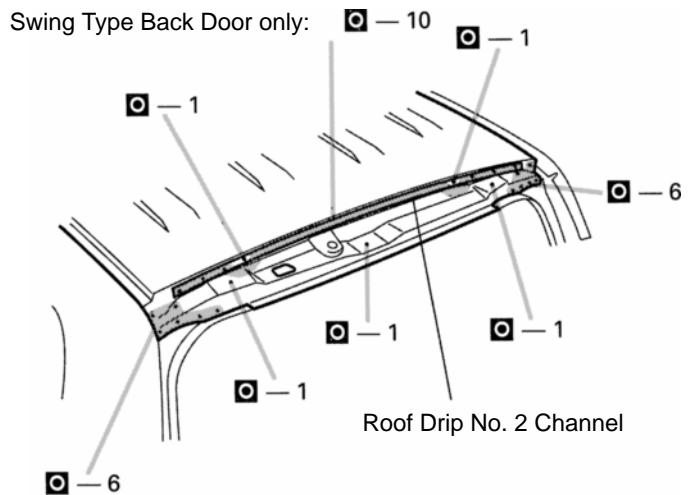
[ Foamed Material Application Area ]



A - A



Swing Type Back Door only:



Before temporarily installing the new parts, apply body sealer to the windshield header panel, roof panel reinforcement and back window frame.

**HINT:**

- 1) Apply just enough sealer for the new parts to make contact.
- 2) For other sealing points, refer to Section AR.

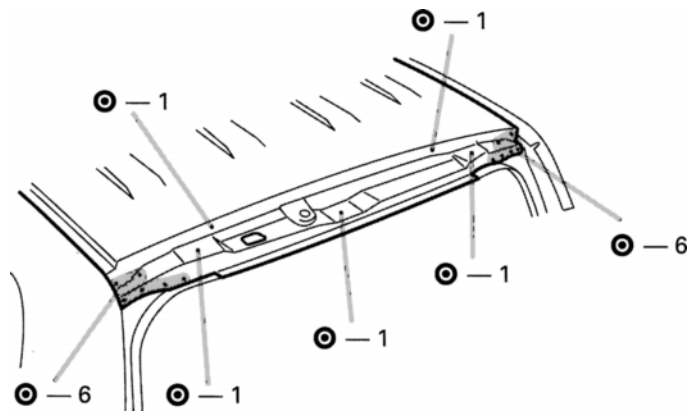
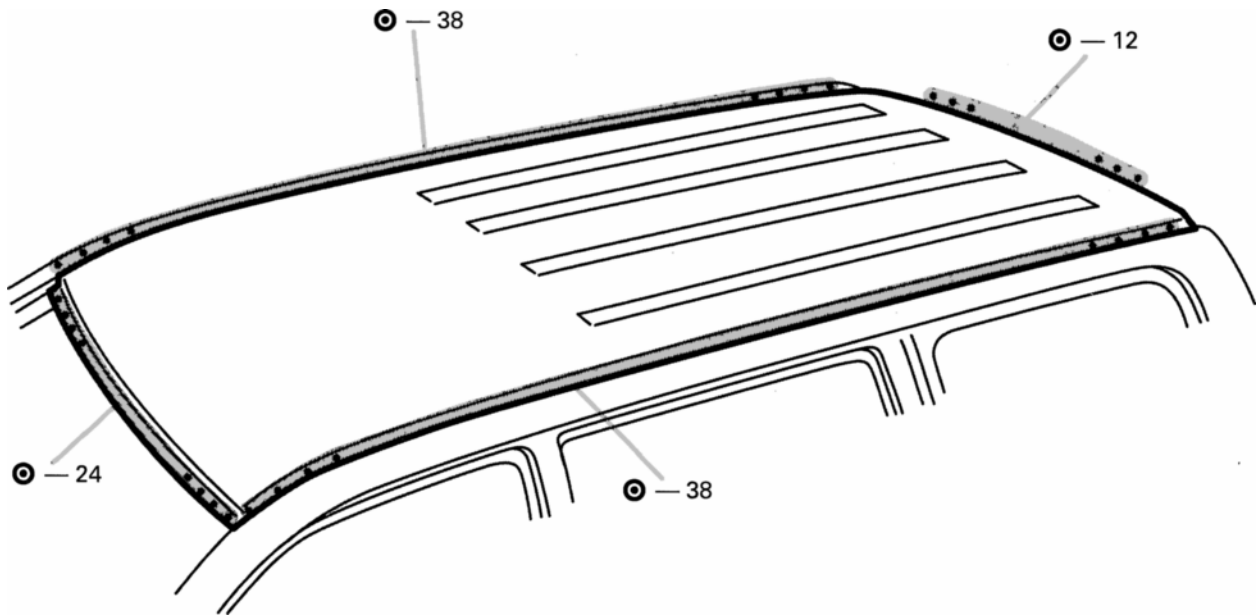
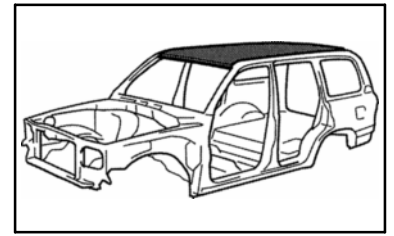
2. Bend the flange hem with a wooden hammer and dolly.

**HINT:** Perform hemming three steps, being careful not to warp the panel.

3. After installing the new parts, apply foamed materials.

**ROOF PANEL (ASSY): Normal Roof**

**REMOVAL**



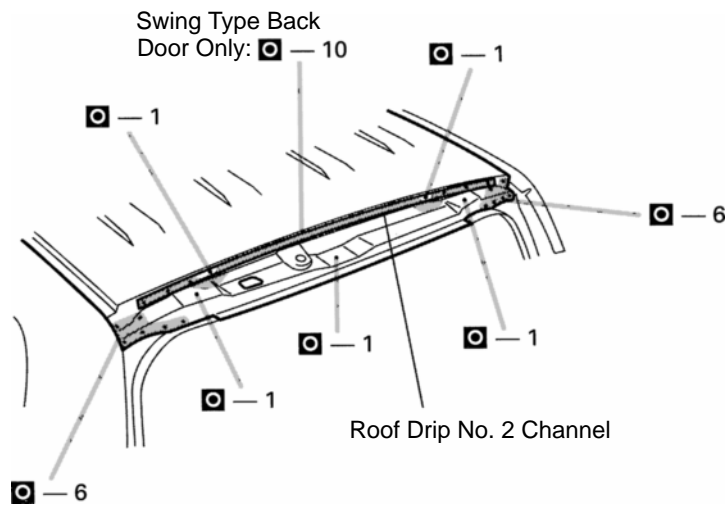
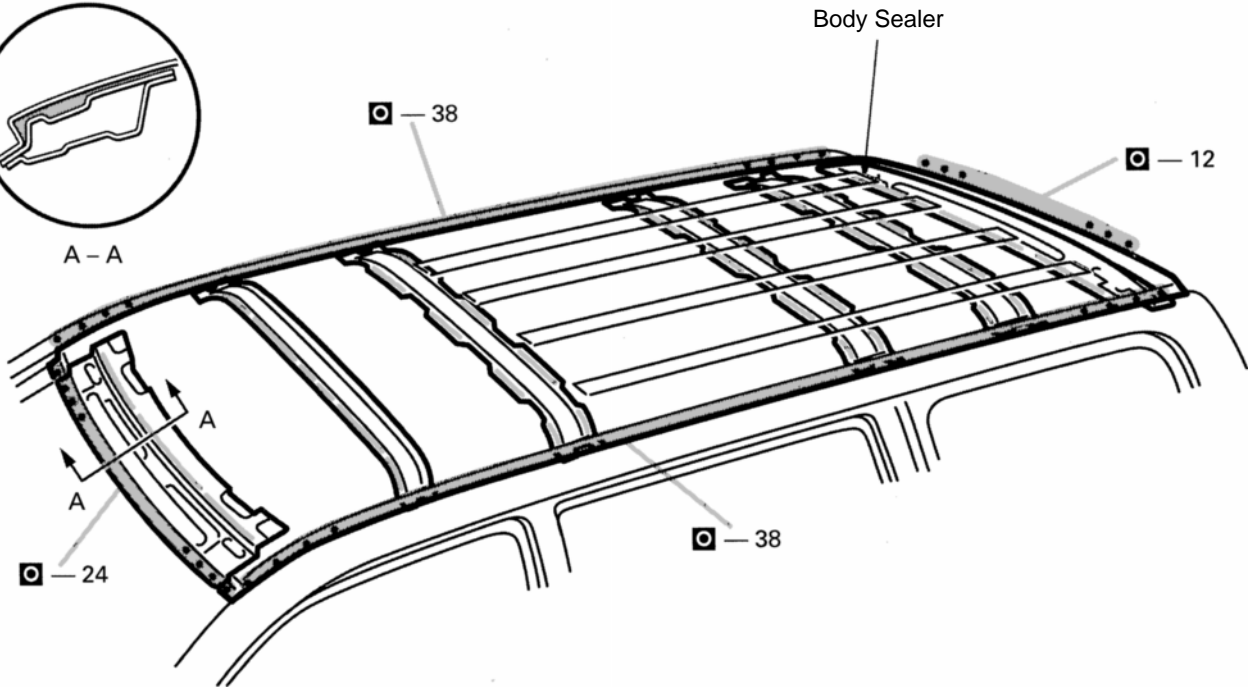


INSTALLATION

[ Foamed Material Application Area ]



A - A



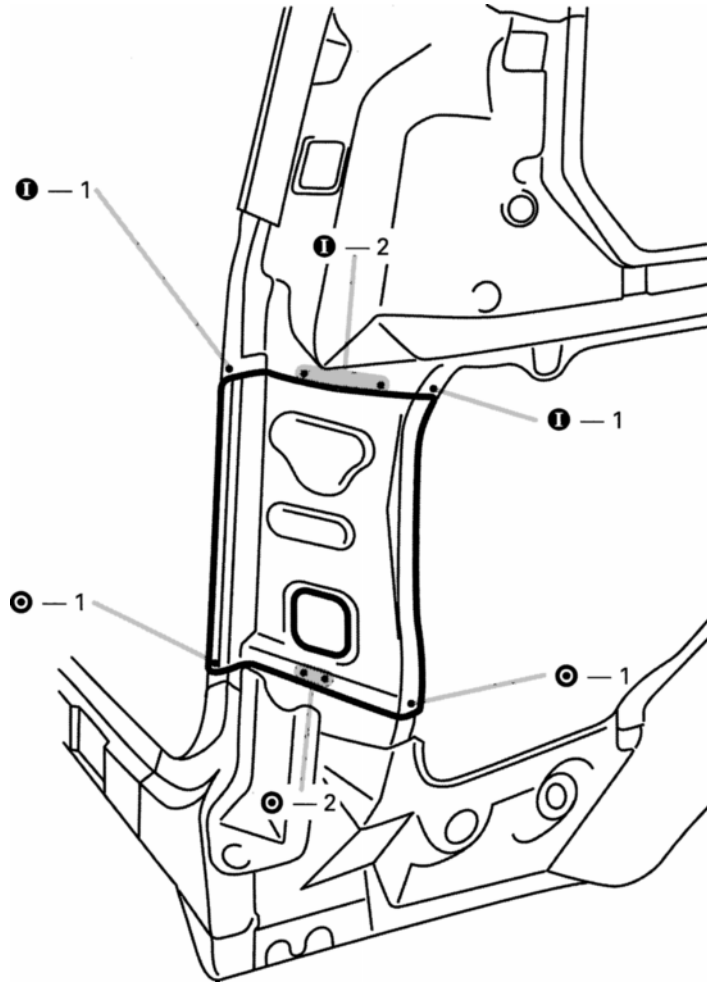
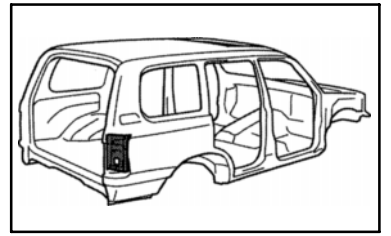
1. Before temporarily installing the new parts, apply body sealer to the windshield header panel, roof panel reinforcement and back door opening upper frame.
2. After installing the new parts, apply foamed materials.

**HINT:**

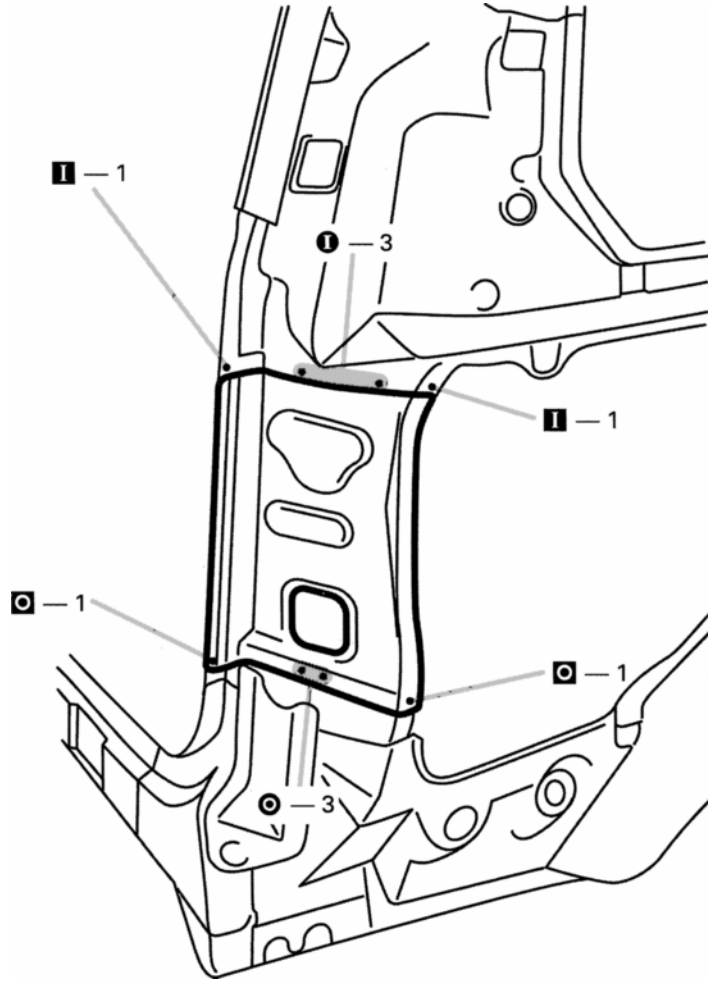
- 1) Apply just enough sealer for the new parts to make contact.
- 2) For other sealing points, refer to Section AR.

# ROOF SIDE INNER REAR PANEL (ASSY)

REMOVAL (With the quarter panel rear extension removed.)

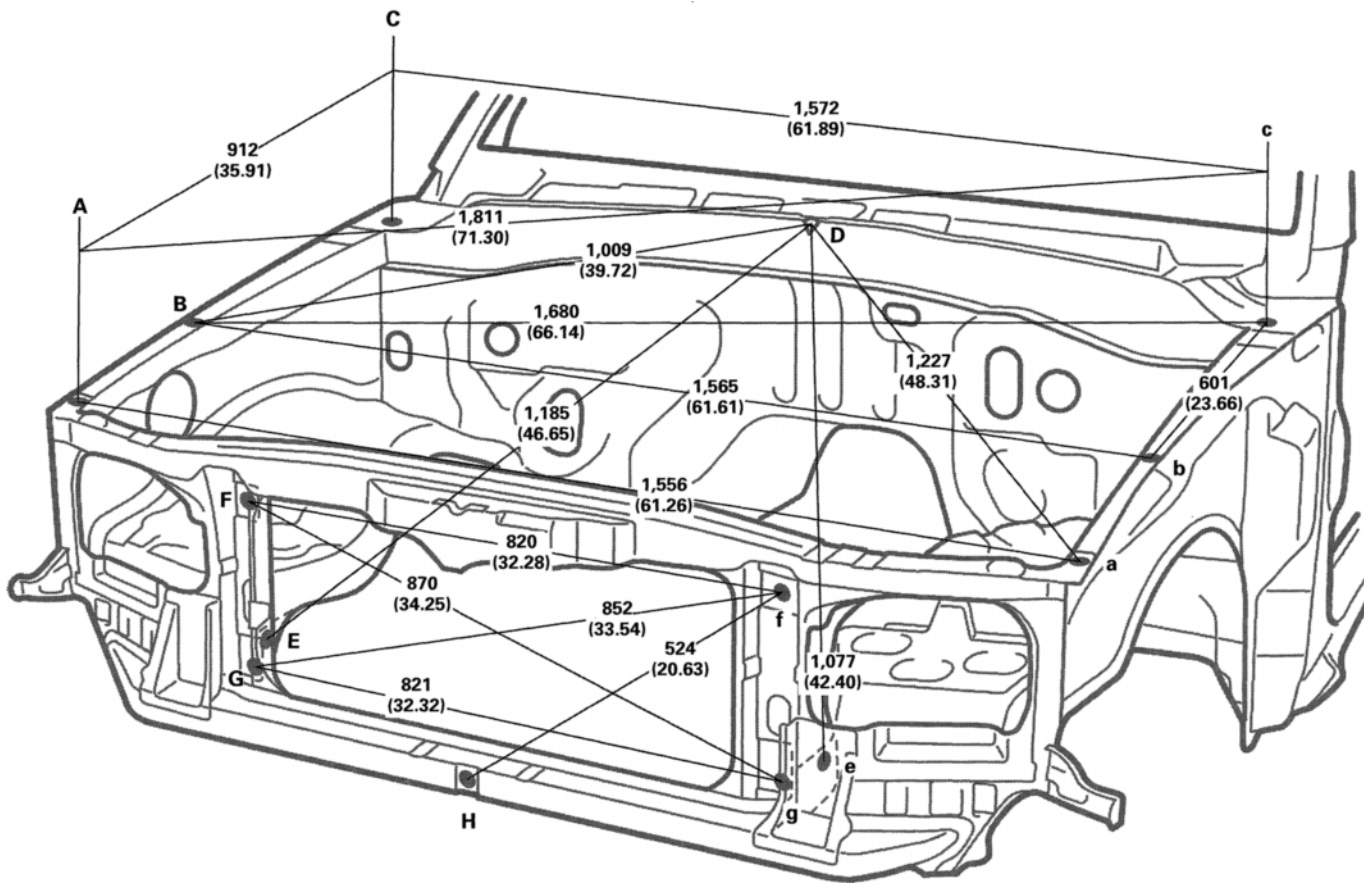


INSTALLATION



**BODY DIMENSION DRAWINGS**  
**ENGINE COMPARTMENT**

(Three-Dimensional Distance)



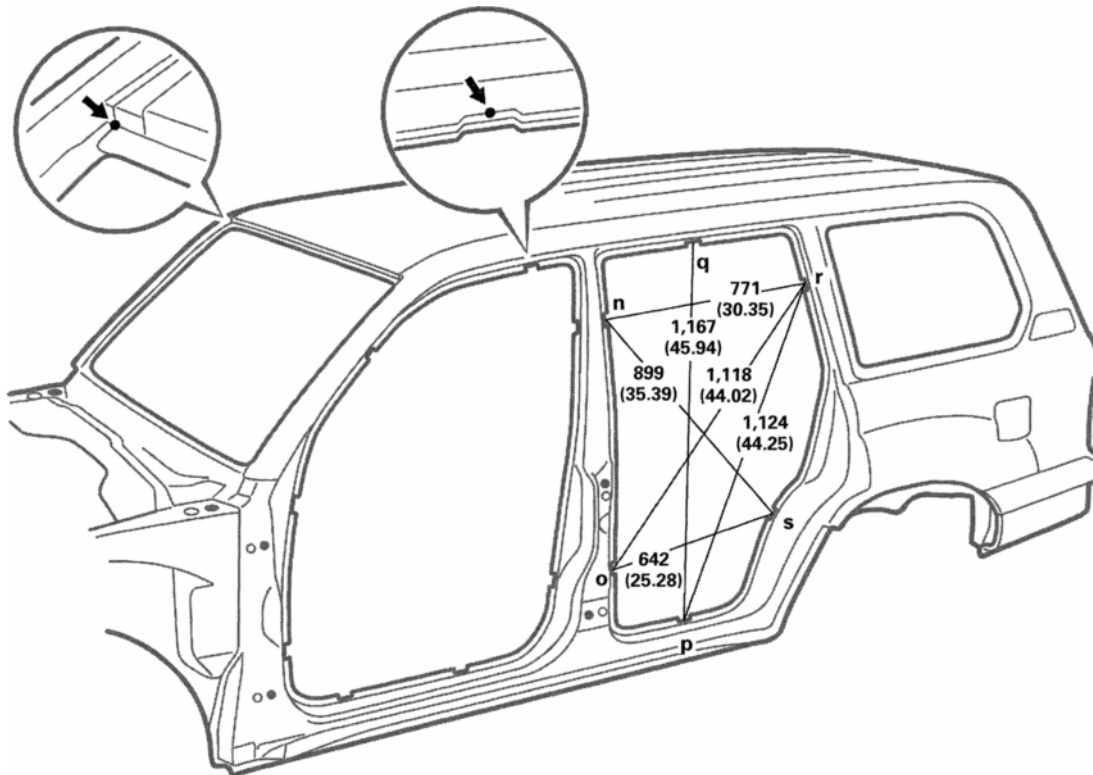
*HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).*

mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Front fender installation nut	6 (0.24) nut	F, f	Radiator installation hole	12 (0.47)
B, b	Front fender installation nut	6 (0.24) nut	G	Radiator installation hole	9 (0.35)
C, c	Front fender installation nut	6 (0.24) nut	g	Radiator installation hole	11X9 (0.43X0.35)
D	Cowl top panel vehicle center mark	—	H	Hood lock support installation nut	6 (0.24) nut
E, e	Front fender apron standard hole	10 (0.39)	—	—	—

**BODY OPENING AREAS  
(Side View-Rear)**

(Three-Dimensional Distance)



*HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).*

Vehicle Dimensions Left ↔ Right

N-n	O-o	P-p	Q-q	R-r	S-s
1,472 (57.95)	1,613 (63.50)	1,619 (63.74)	1,330 (52.36)	1,442 (56.77)	1,607 (63.27)

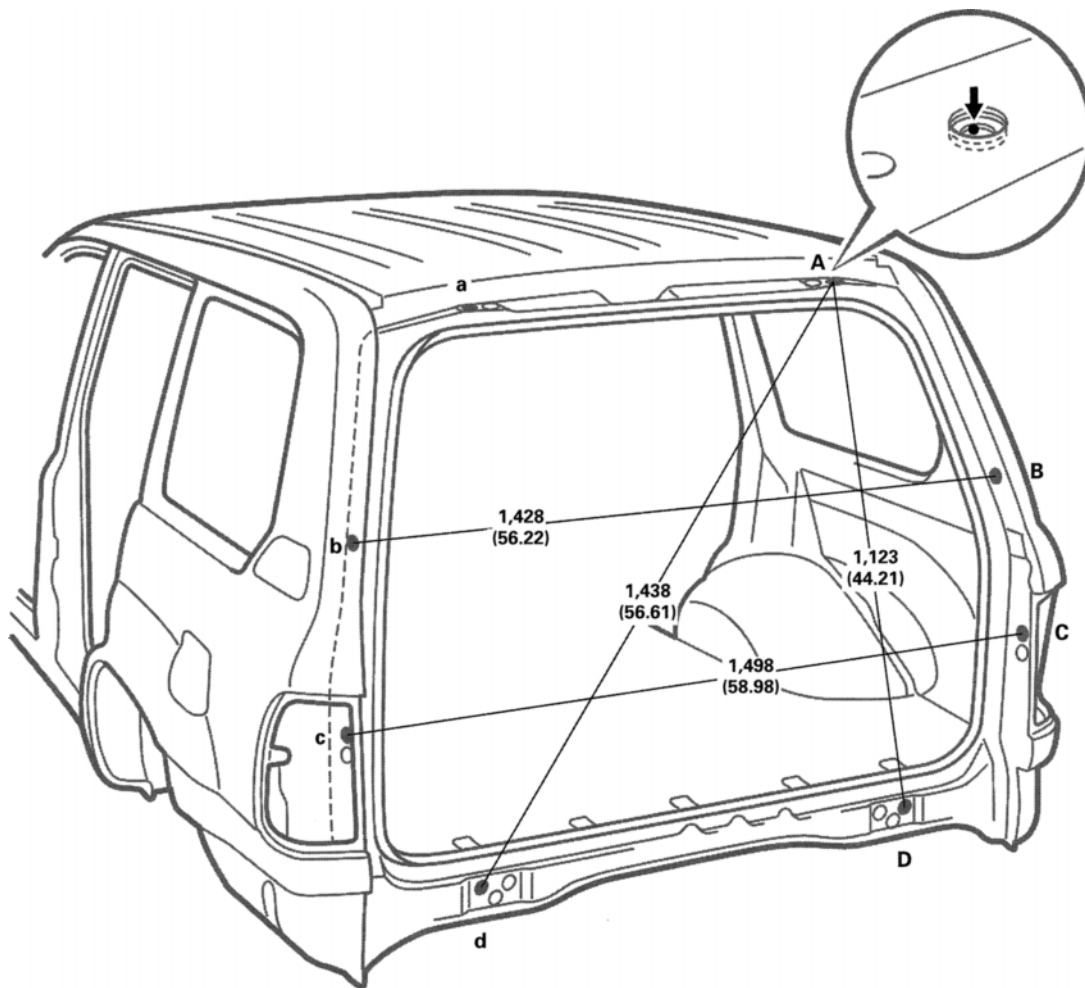
N-r or n-R	N-s or n-S	O-s or o-S	P-q or p-Q	R-s or r-S
1,649 (64.92)	1,782 (70.16)	1,734 (68.27)	1,875 (73.82)	1,692 (66.61)

mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
N, n	Center body pillar assembly mark	—	Q, q	Roof side rail assembly mark	—
O, o	Center body pillar assembly mark	—	R, r	Quarter panel assembly mark	—
P, p	Rocker panel assembly mark	—	S, s	Quarter panel assembly mark	—

**BODY OPENING AREAS**  
**(Rear View: Lift-Up Type)**

(Three-Dimensional Distance)



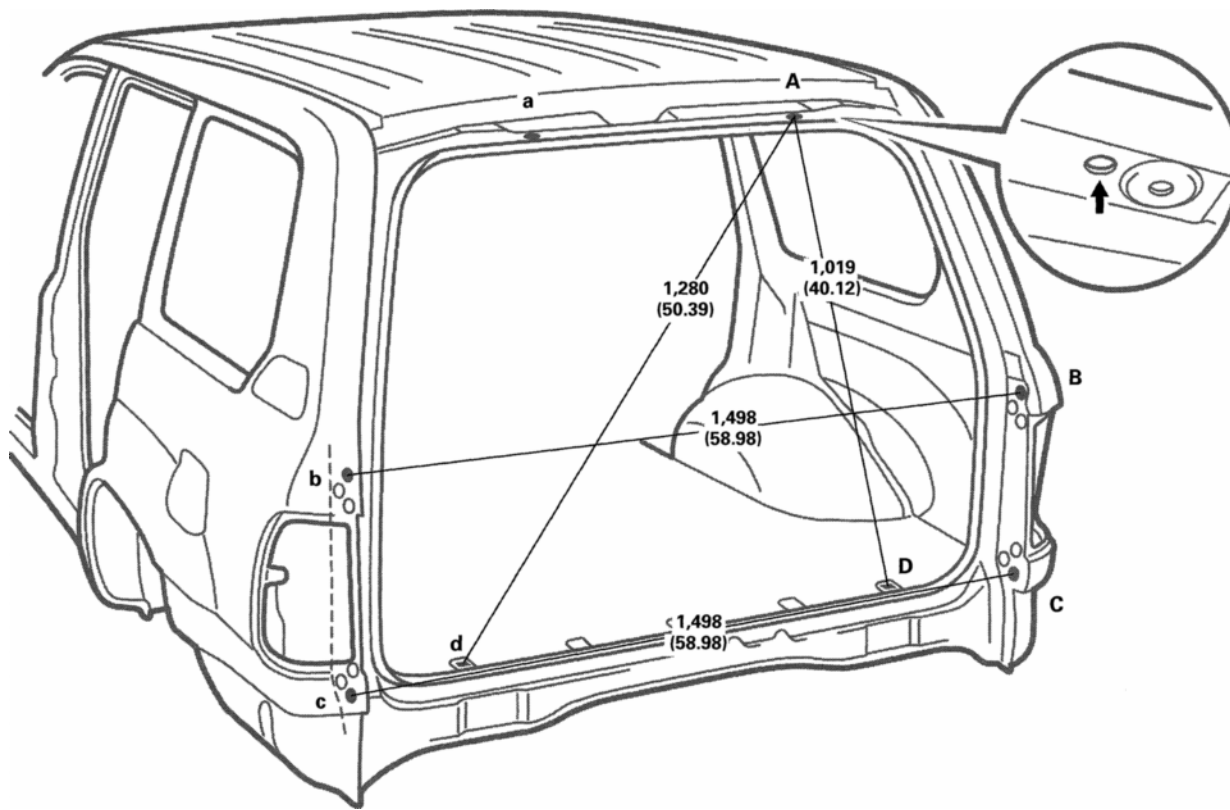
*HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).*

mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A	Back door hinge installation hole-outer = front tip: RH	8.2 (0.323)	C, c	Tail gate lock striker installation nut	8 (0.31) nut
a	Back door hinge installation hole-outer = front tip: LH	11×8.2 (0.43×0.323)	D, d	Tail gate hinge installation nut-outer	8 (0.31) nut
B, b	Back door damper stay installation nut	8 (0.31) nut	—		—

**BODY OPENING AREAS  
(Rear View: Swing Type)**

(Three-Dimensional Distance)



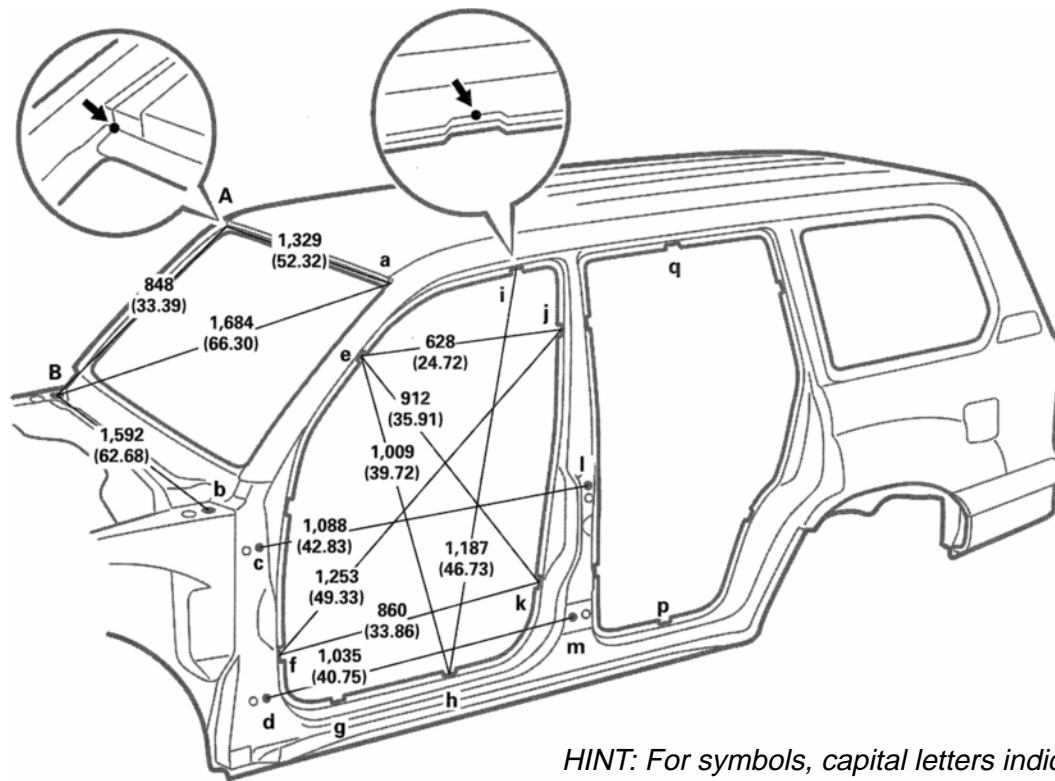
*HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).*

mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Back door opening frame standard hole	10 (0.39)	C, c	Back door hinge installation nut-lower	8 (0.31) nut
B, b	Back door hinge installation nut-upper	8 (0.31) nut	D, d	Rear floor finish plate installation hole	12.5×8.5 (0.492×0.335)

**BODY OPENING AREAS  
(Side View-Front)**

(Three-Dimensional Distance)



*HINT: For symbols, capital letters indicate right side of vehicle, small letters indicate left side of vehicle (Seen from rear).*

Vehicle Dimensions Left ↔ Right

E-e	F-f	G-g	H-h	I-i	J-j	K-k
1,438 (56.61)	1,599 (62.95)	1,608 (63.31)	1,614 (63.54)	1,340 (52.76)	1,472 (57.95)	1,610 (63.39)

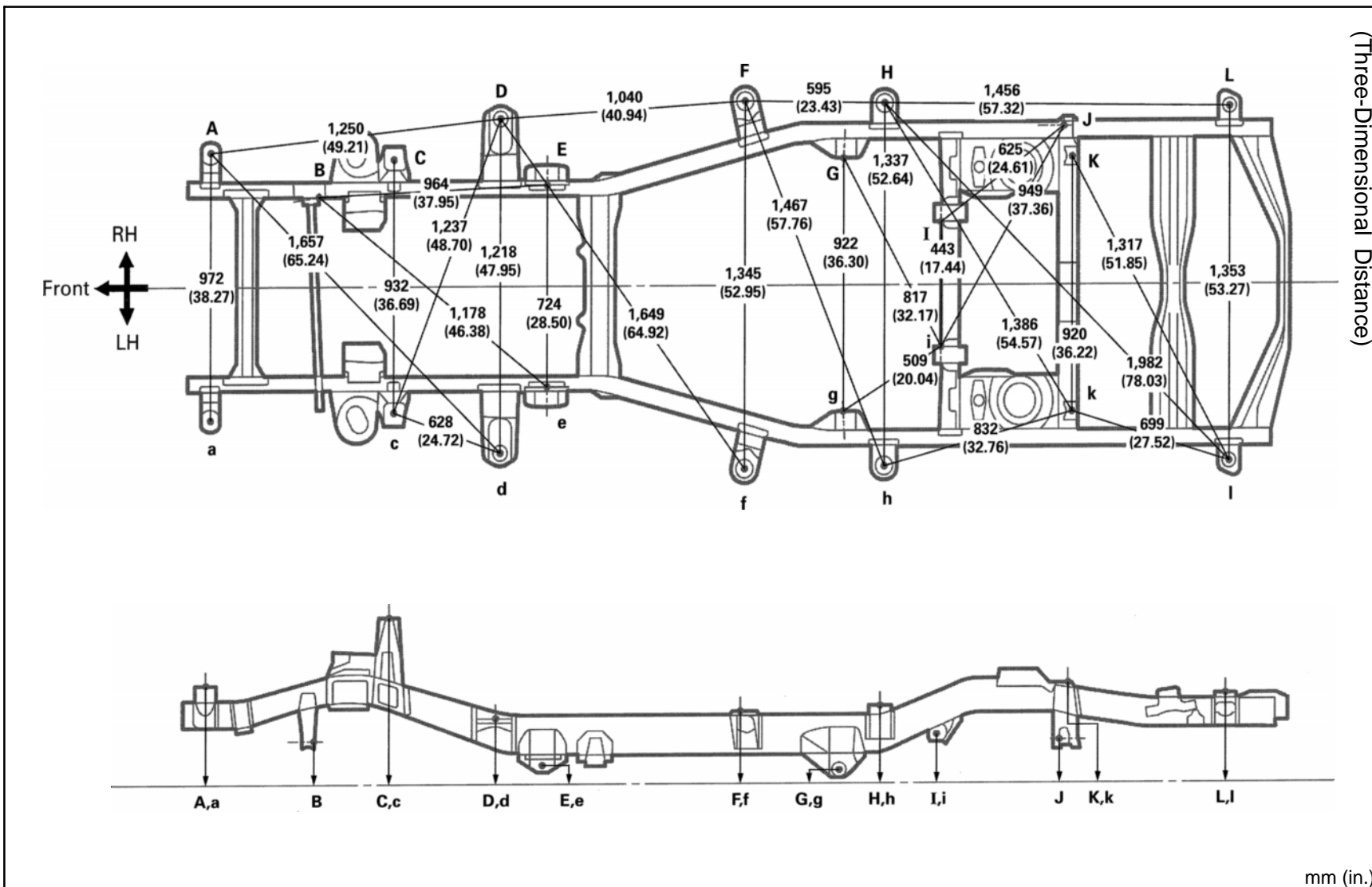
E-f or e-F	E-h or e-H	E-j or e-J	F-j or f-J	F-k or f-K	G-p or g-P	H-i or h-I	I-q or i-Q	J-k or j-K
1,757 (69.17)	1,827 (71.93)	1,585 (62.40)	1,980 (77.95)	1,821 (71.69)	1,979 (77.91)	1,890 (74.41)	1,459 (57.44)	1,706 (67.17)

mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Roof panel/Front body pillar adjoining portion	—	I, i	Roof side rail assembly mark	—
B, b	Hood hinge installation nut-rear	8 (0.31) nut	J, j	Center body pillar assembly mark	—
C, c	Front door hinge installation nut	8 (0.31) nut	K, k	Center body pillar assembly mark	—
D, d	Front door hinge installation nut	8 (0.31) nut	L, l	Rear door hinge installation hole	13 (0.51)
E, e	Front body pillar assembly mark	—	M, m	Rear door hinge installation nut	8 (0.31) nut
F, f	Front body pillar assembly mark	—	P, p	Rocker panel assembly mark	—
G, g	Rocker panel assembly mark	—	Q, q	Roof side rail assembly mark	—
H, h	Rocker panel assembly mark	—	—		—



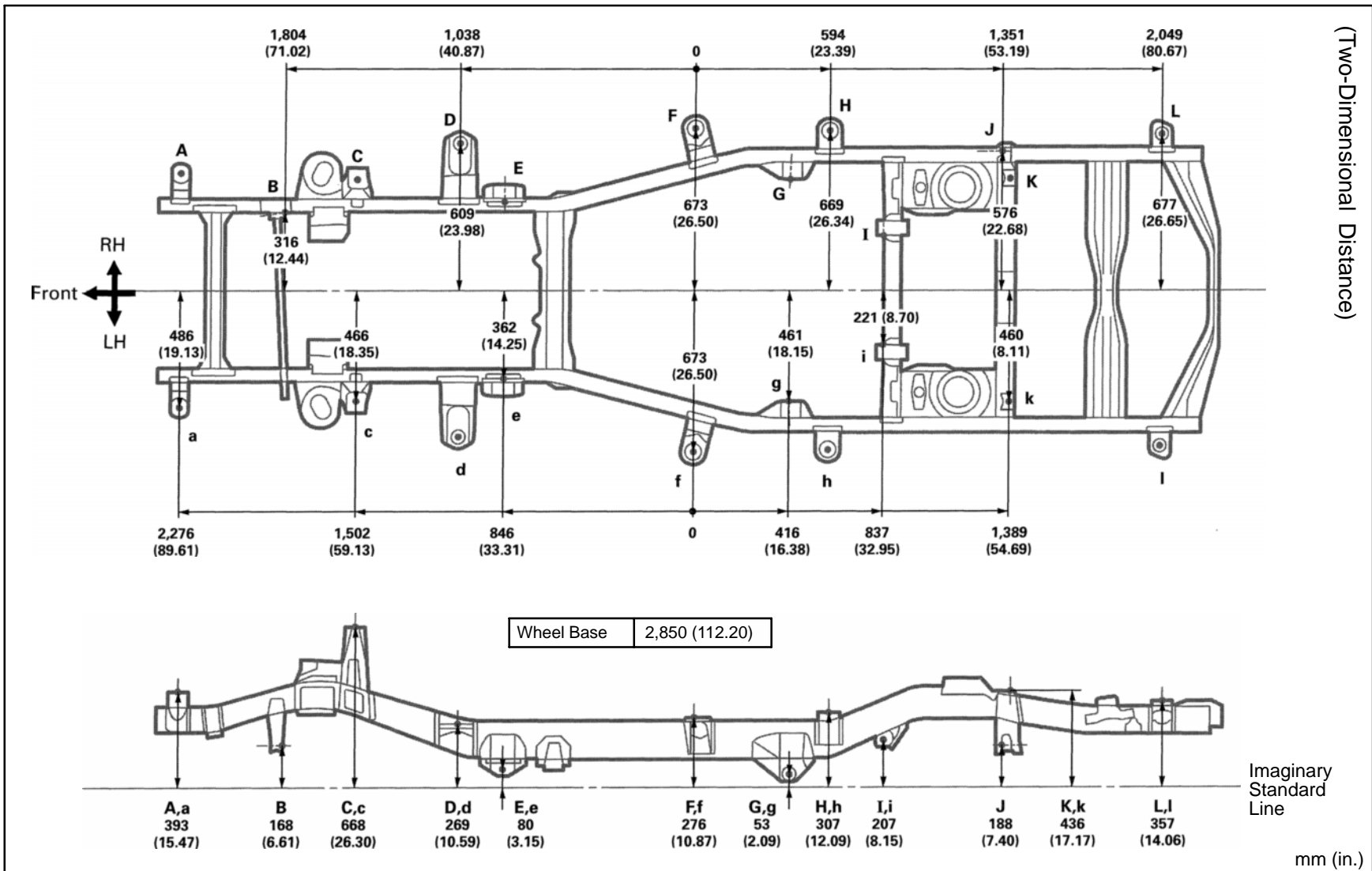
**FRAME DIMENSION  
FZJ105 series (RHD) • HZJ105 series (RHD)**



Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Body mounting bole	24 (0.94)	G, g	Lower control arm installation hole-inner	18.5 (0.728)
B	Lateral control rod installation hole-rear	16.5 (0.650)	H, h	Body mounting hole	30 (1.18)
C, c	Shock absorber installation hole	24 (0.94)	I, i	Upper control arm installation hole-inner	18.5 (0.728)
D, d	Body mounting hole	60 (2.36)	J	Lateral control rod installation hole-front	18.5 (0.728)
E, e	Leading arm installation hole-inner	18.5 (0.728)	K, k	Body mounting hole	16 (0.63)
F, f	Body mounting hole	30 (1.18)	L, l	Body mounting hole	70 (2.76)

mm (in.)

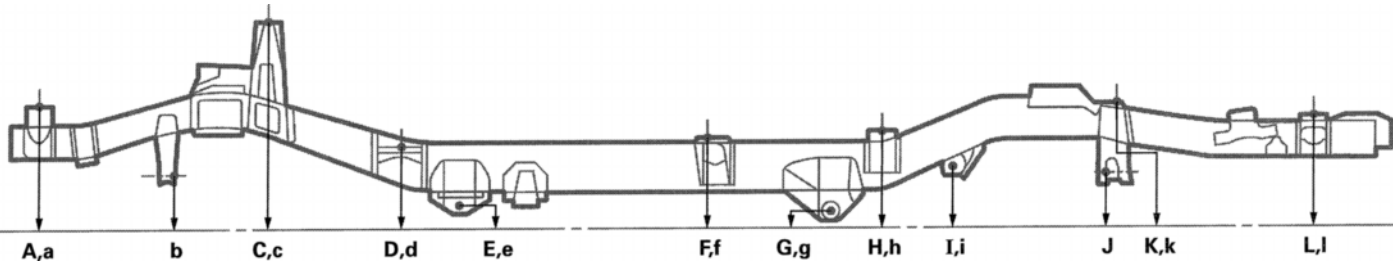
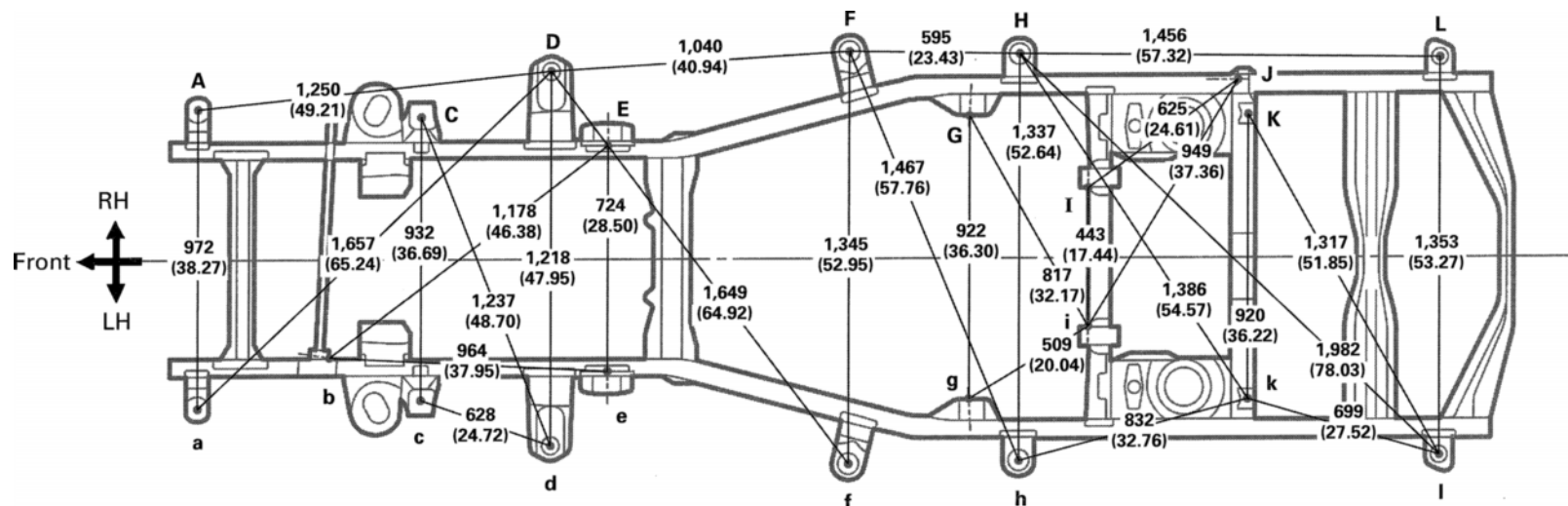
**FRAME DIMENSION**  
**FZJ105 series (RHD) • HZJ105 series (RHD) (Cont'd)**



Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Body mounting hole	25 (0.94)	G, g	Lower control arm installation hole-inner	18.5 (0.728)
B	Lateral control rod installation hole-rear	16.5 (0.650)	H, h	Body mounting hole	30 (1.18)
C, c	Shock absorber installation hole	24 (0.94)	I, i	Upper control arm installation hole-inner	18.5 (0.728)
D, d	Body mounting hole	60 (2.36)	J	Lateral control rod installation hole-front	18.5 (0.728)
E, e	Leading arm installation hole-inner	18.5 (0.728)	K, k	Body mounting hole	16 (0.63)
F, f	Body mounting hole	30 (1.18)	L, l	Body mounting hole	70 (2.76)

**FRAME DIMENSION  
FZJ105 series (LHD) • HZJ105 series (LHD)**

(Three-Dimensional Distance)



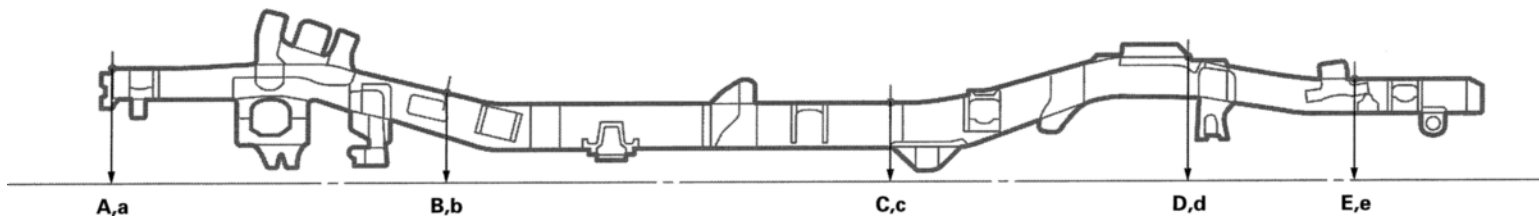
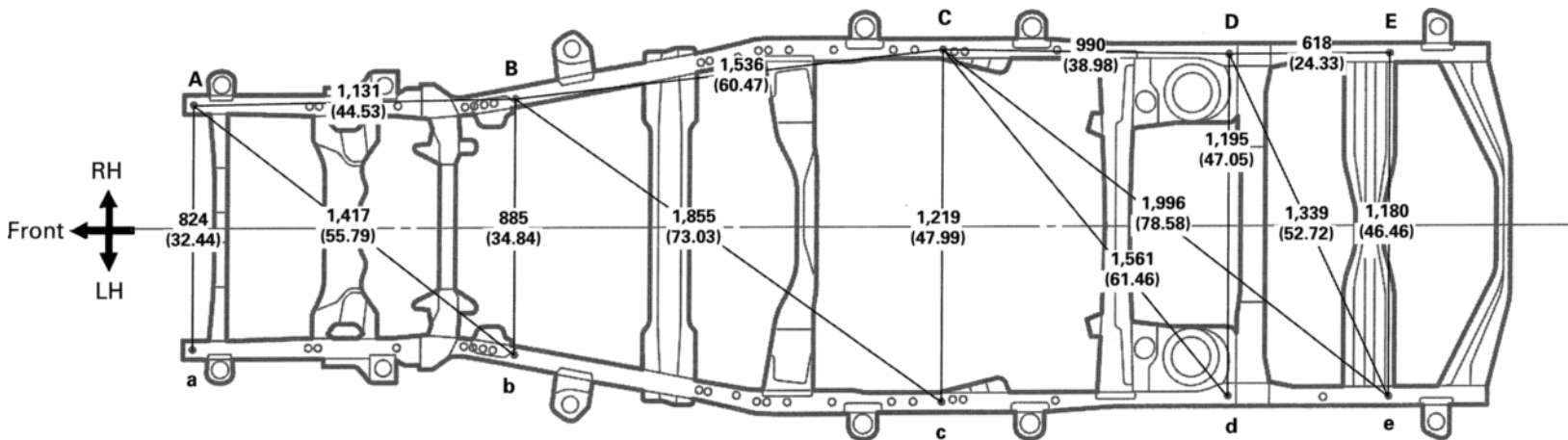
mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Body mounting hole	24 (0.94)	G, g	Lower control arm installation hole-inner	18.5 (0.728)
b	Lateral control rod installation hole-rear	16.5 (0.650)	H, h	Body mounting hole	30 (1.18)
C, c	Shock absorber installation hole	24 (0.94)	I, i	Upper control arm installation hole-inner	18.5 (0.728)
D, d	Body mounting hole	60 (2.36)	J	Lateral control rod installation hole-front	18.5 (0.728)
E, e	Leading arm installation hole-inner	18.5 (0.728)	K, k	Body mounting hole	16 (0.63)
F, f	Body mounting hole	30 (1.18)	L, l	Body mounting hole	70 (2.76)



**FRAME DIMENSION-Upper Face**  
**UZJ100 series • HDJ100, 101 series • FZJ100 series**

(Three-Dimensional Distance)

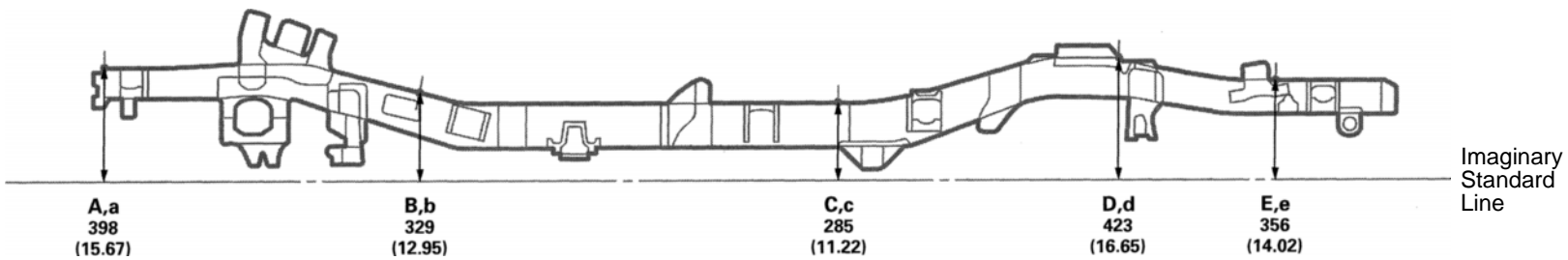
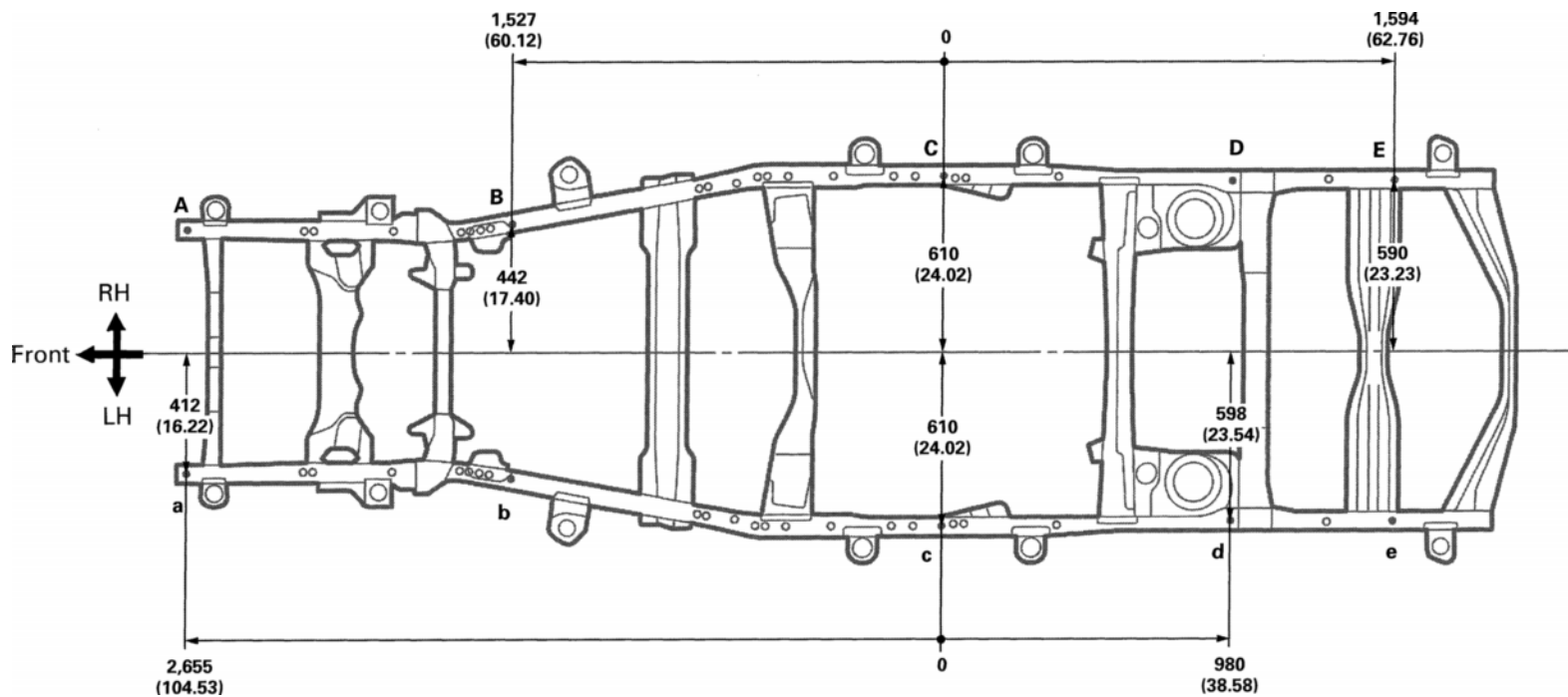


mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Winch installation nut	12 (0.47) nut	D, d	Frame side rail working hole	7 (0.28)
B, b	Accumulator installation nut	8 (0.31) nut	E, e	Wire harness installation hole	12×7 (0.47×0.28)
C, c	Frame side rail standard hole	16×16 (0.63×0.63)	—	—	—

**FRAME DIMENSION-Upper Face**  
**UZJ100 series • HDJ100,101 series • FZJ100**  
**series (Cont'd)**

(Two-Dimensional Distance)

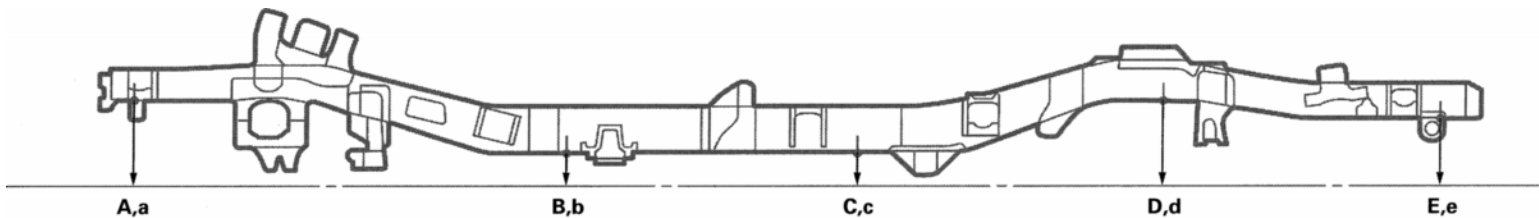
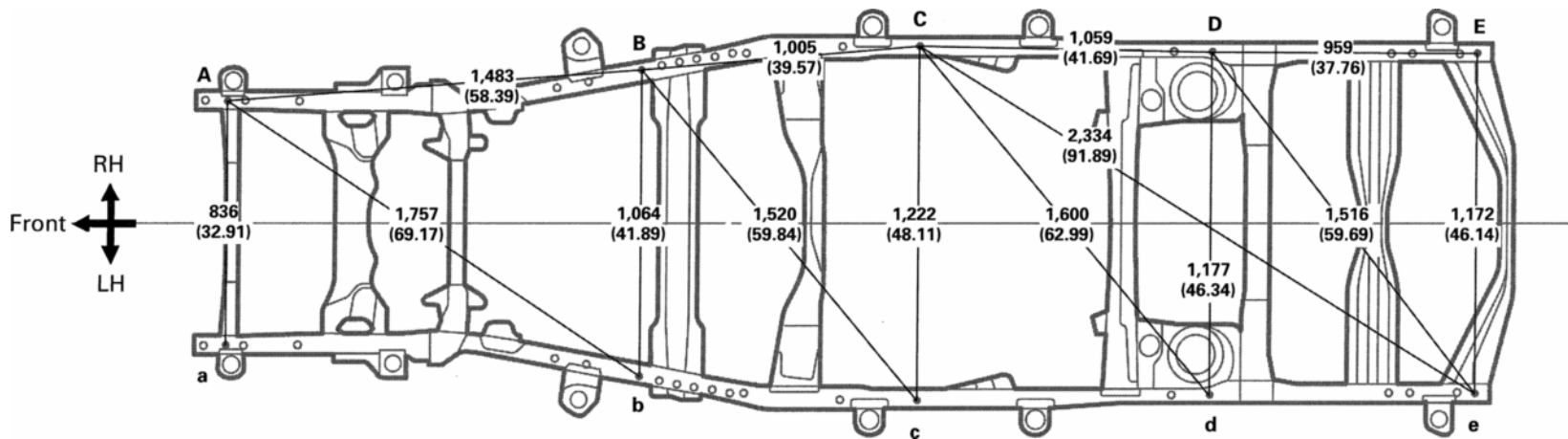


mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Winch installation nut	12 (0.47) nut	D, d	Frame side rail working hole	7 (0.28)
B, b	Accumulator installation nut	8 (0.31) nut	E, e	Wire harness installation hole	12×7 (0.47×0.28)
C, c	Frame side rail standard hole	16×16 (0.63×0.63)	—	—	—

**FRAME DIMENSION-Lower Face**  
**UZJ100 series • HDJ100,101 series • FZJ100 series**

(Three-Dimensional Distance)

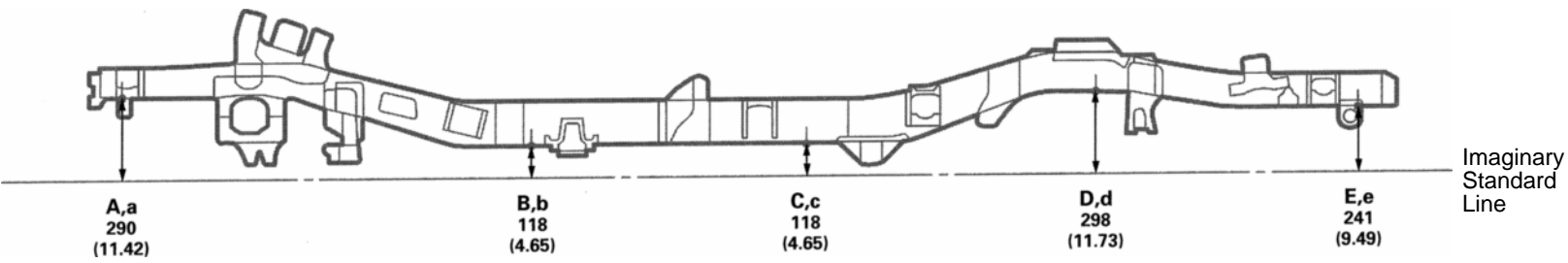
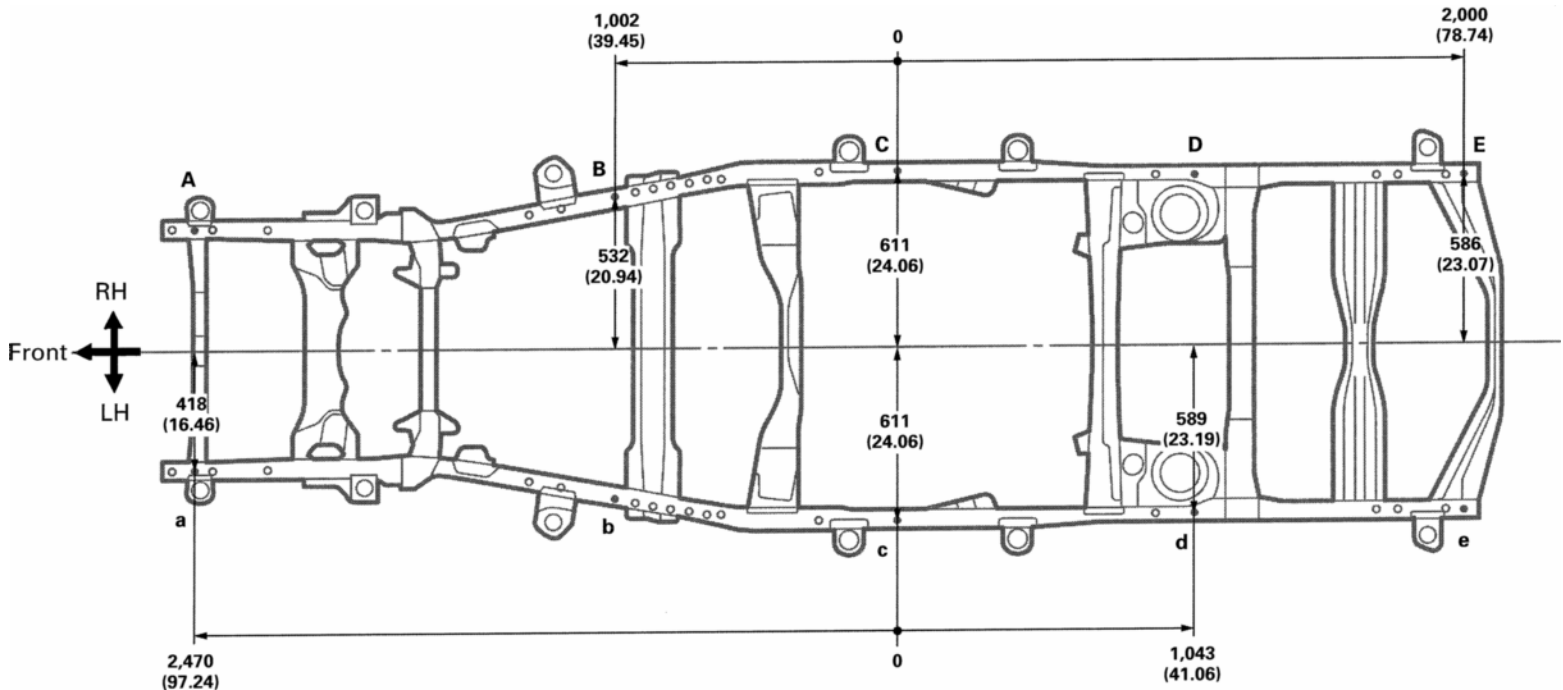


mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Hook installation nut	14 (0.55) nut	D, d	Stopper lubber installation nut	8 (0.31) nut
B, b	Under cover installation nut	8 (0.31) nut	E, e	Hook installation nut	14 (0.55) nut
C, c	Frame side rail standard hole	16X16 (0.63X0.63)	—	—	—

**FRAME DIMENSION-Lower Face**  
**UZJ100 series • HDJ100, 101 series • FZJ100**  
**series (Cont'd)**

(Two-Dimensional Distance)



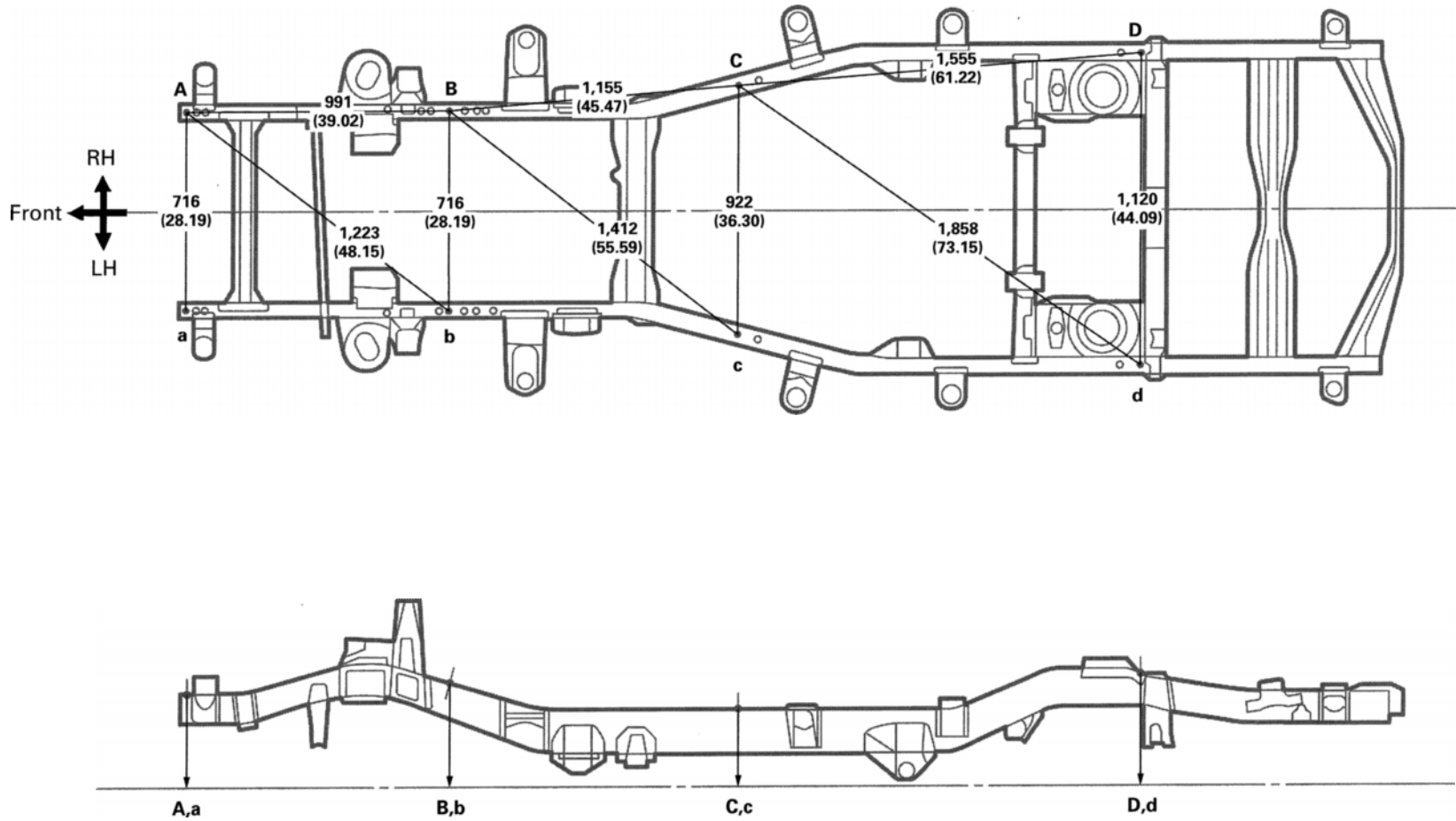
mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Hook installation nut	14 (0.55) nut	D, d	Stopper lubber installation nut	8 (0.31) nut
B, b	Undercover installation nut	8 (0.31) nut	E, e	Hook installation nut	14 (0.55) nut
C, c	Frame side rail standard hole	16X16 (0.63X0.63)	—	—	—



**FRAME DIMENSION-Upper Face**  
**FZJ105 series • HZJ105 series**

(Three-Dimensional Distance)

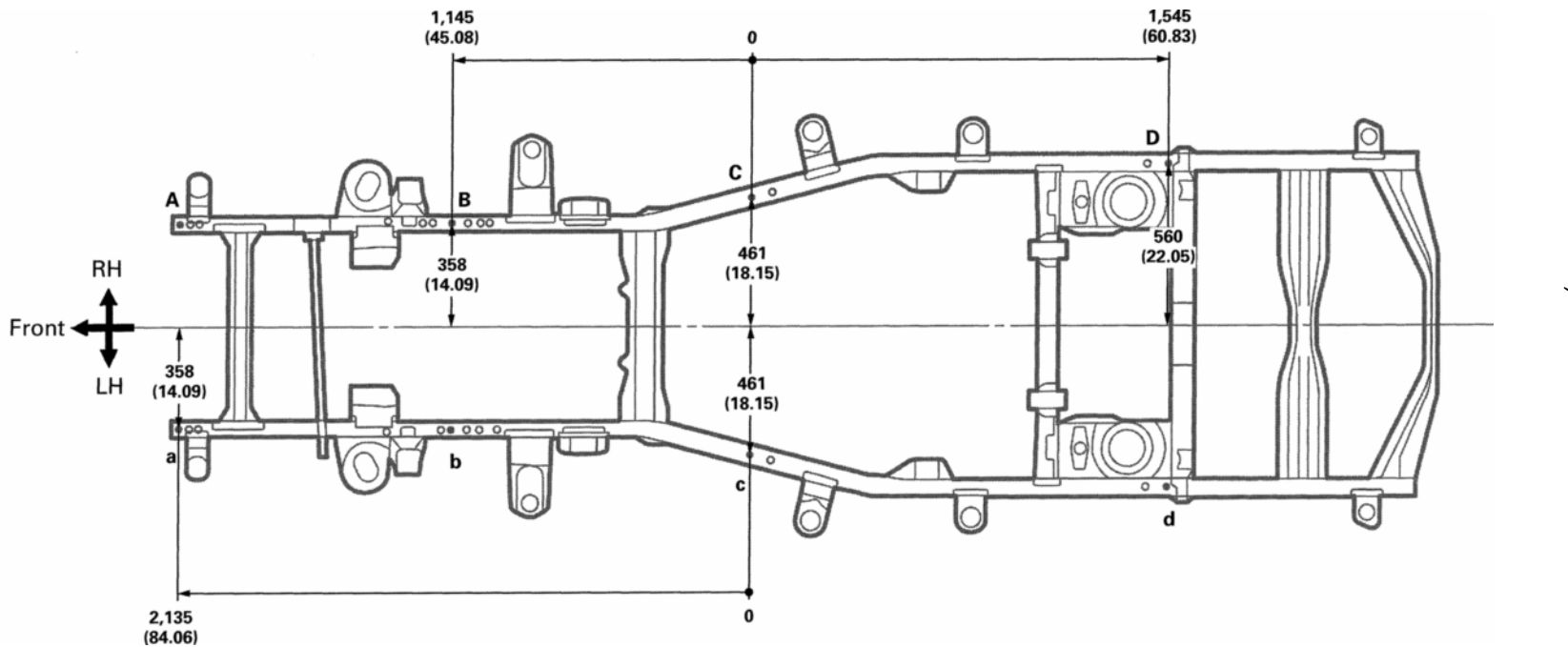


mm (in.)

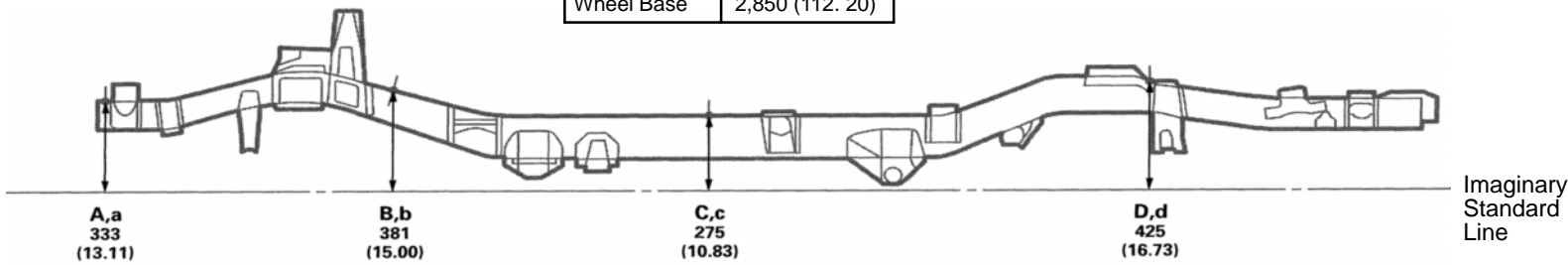
Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Winch installation nut	12 (0.47) nut	C, c	Frame side rail standard hole	14 (0.55)
B, b	Insulator installation hole	10 (0.39)	D, d	Frame side rail working hole	9 (0.35)

**FRAME DIMENSION-Upper Face**  
**FZJ105 series • HZJ105 series**  
 (Cont'd)

(Two-Dimensional Distance)



Wheel Base	2,850 (112.20)
------------	----------------

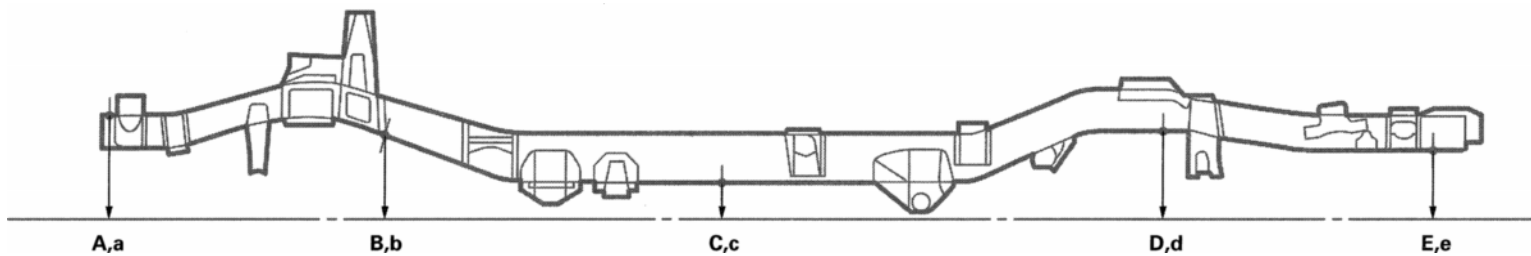
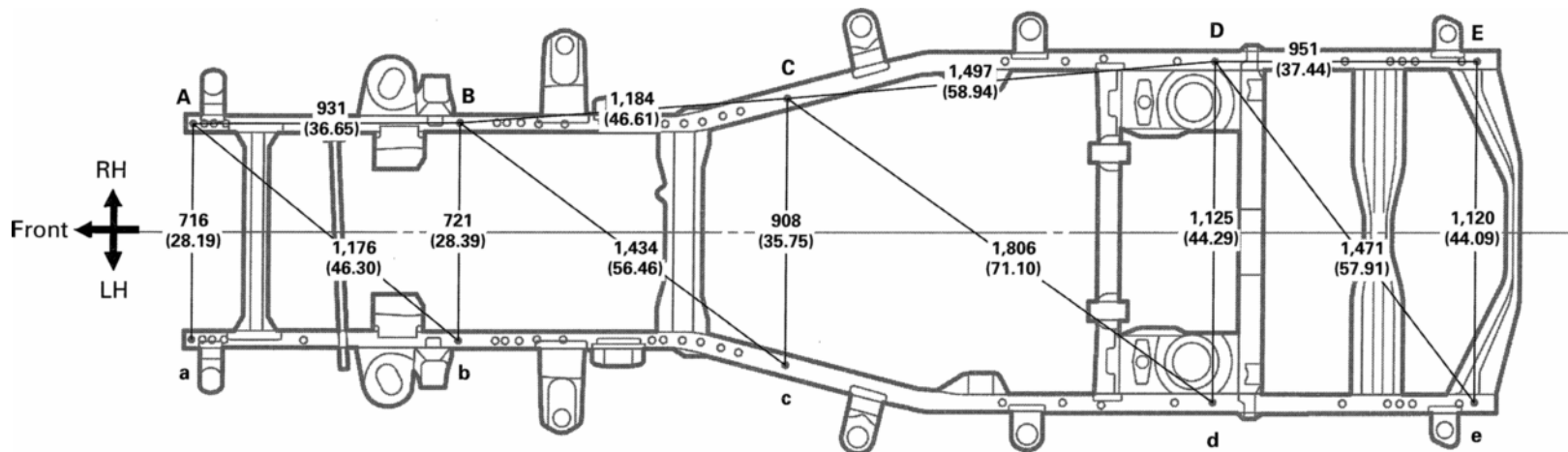


mm (in.)

Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Winch installation nut	12 (0.47) nut	C, c	Frame side rail standard hole	14 (0.55)
B, b	Insulator installation hole	10 (0.39)	D, d	Frame side rail working hole	9 (0.35)

**FRAME DIMENSION-Lower Face**  
**FZJ105 series • HZJ105 series**

(Three-Dimensional Distance)

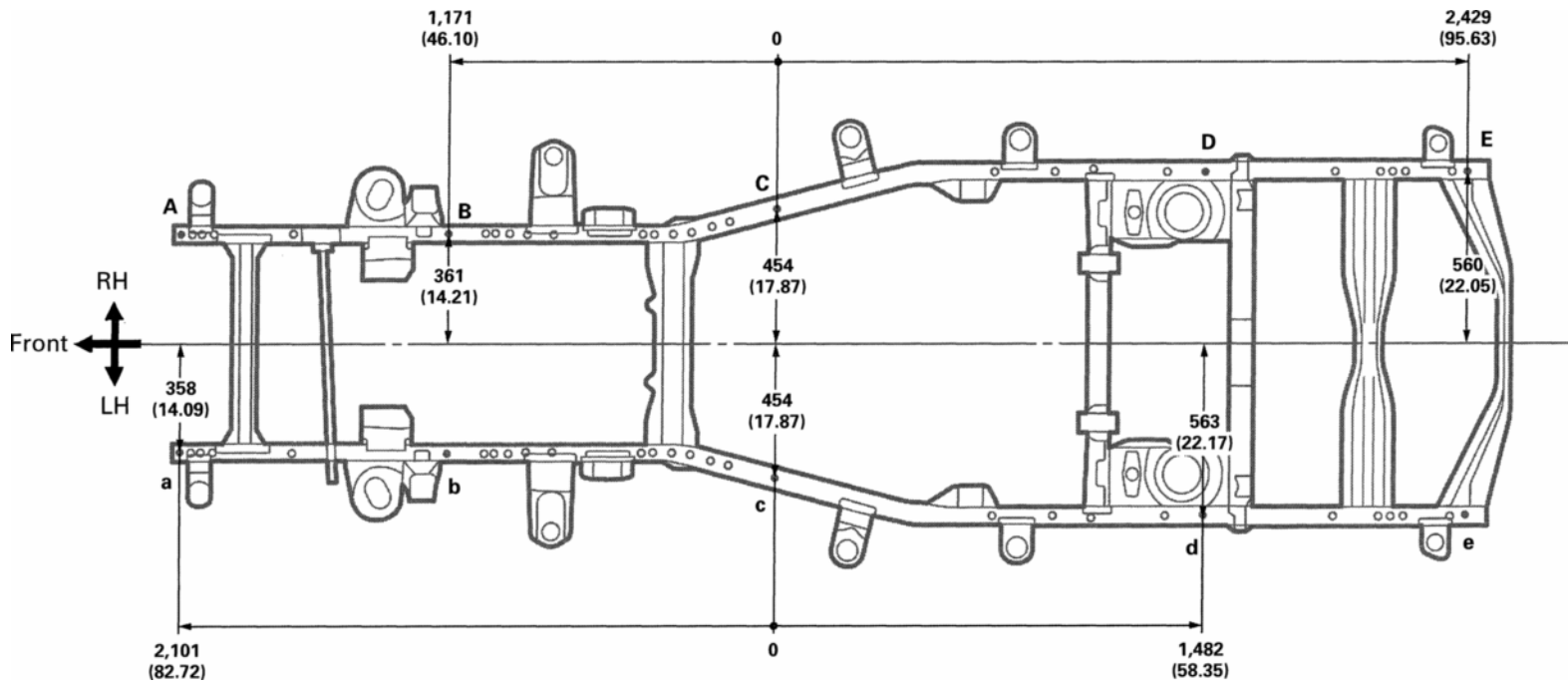


mm (in.)

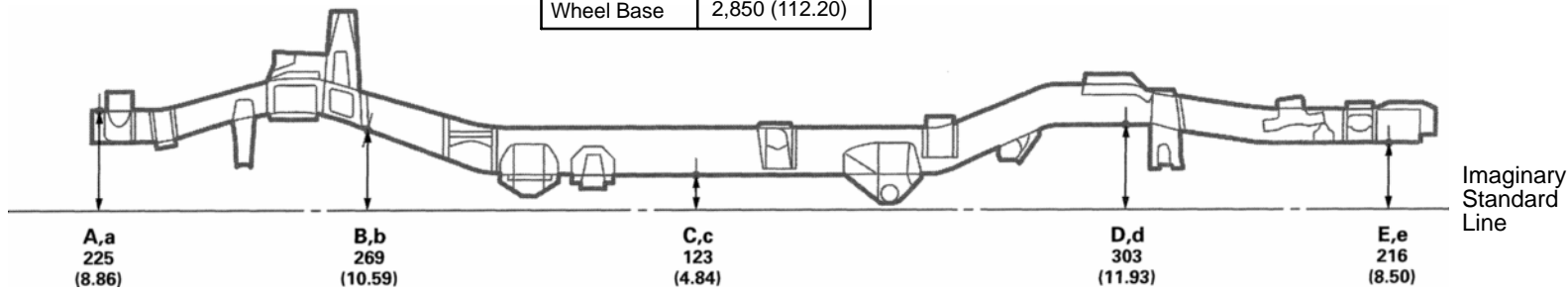
Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Hook installation nut	12 (0.47) nut	D, d	Stopper lubber installation nut	8 (0.31) nut
B, b	Frame side rail working hole	9 (0.35)	E, e	Hook installation nut	12 (0.47) nut
C, c	Undercover installation nut	8 (0.31) nut	—	—	—

**FRAME DIMENSION-LOWER Face**  
**FZJ105 series • HZJ105 series**  
 (Cont'd)

(Two-Dimensional Distance)



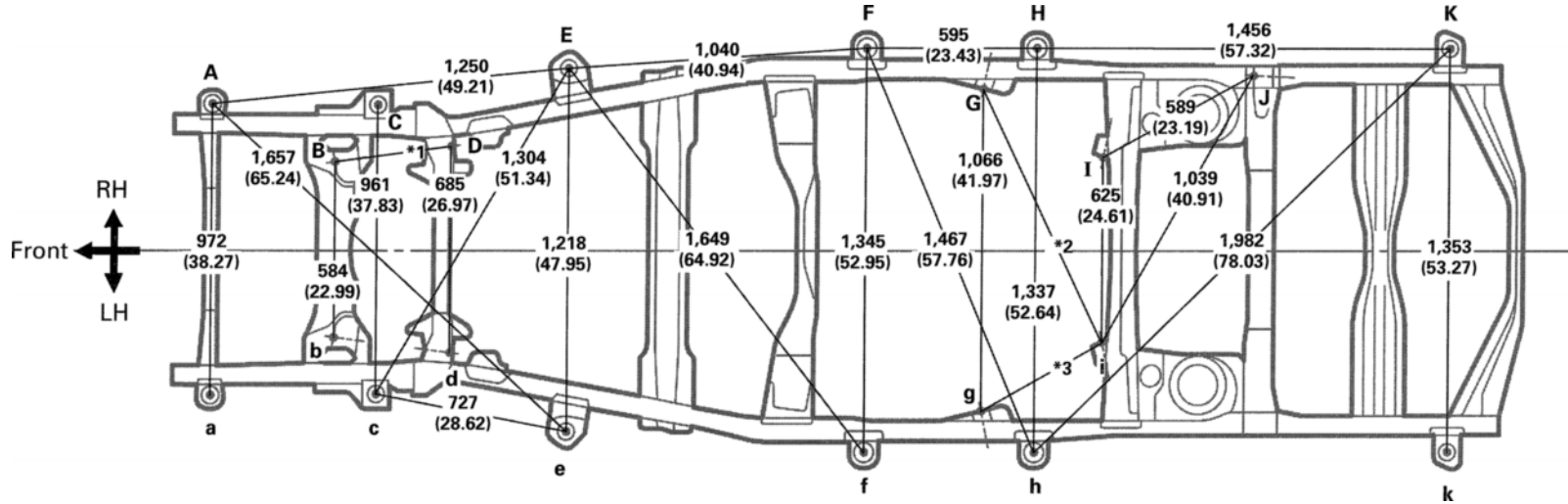
Wheel Base 2,850 (112.20)



mm (in.)

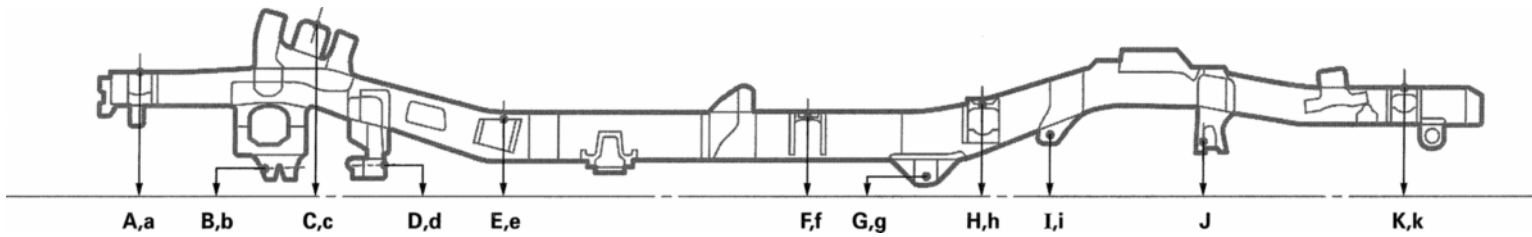
Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Hook installation nut	12 (0.47) nut	D, d	Stopper lubber installation nut	8 (0.31) nut
B, b	Frame side rail working hole	9 (0.35)	E, e	Hook installation nut	12 (0.47) nut
C, c	Undercover installation nut	8 (0.31) nut	—	—	—

(Three-Dimensional Distance)



*1	401(15.79)
----	------------

*2	959 (37.76)
*3	503 (19.80)

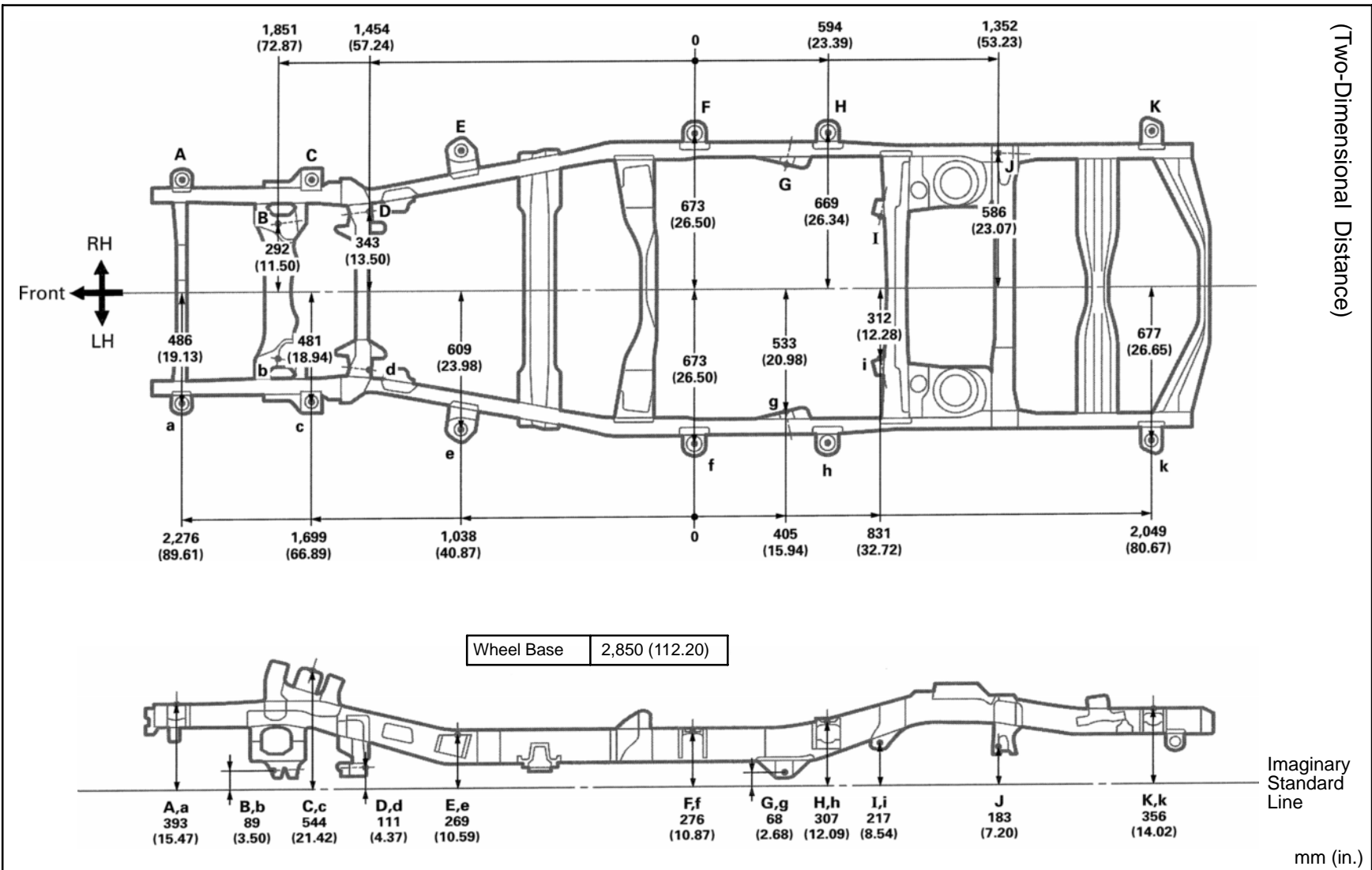


mm (in.)

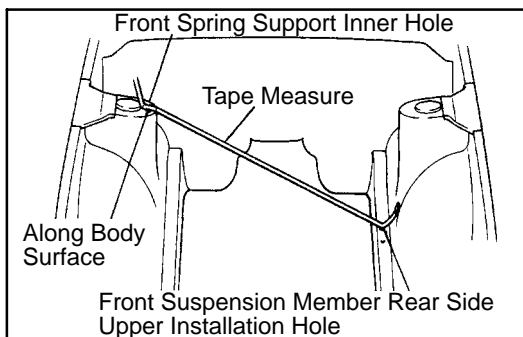
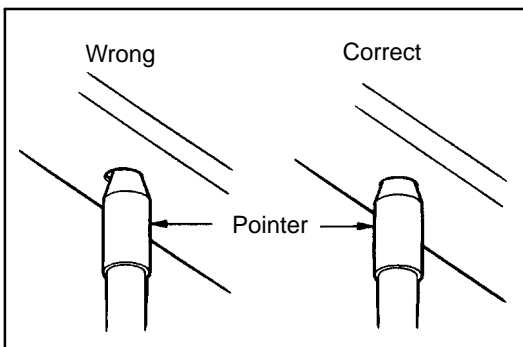
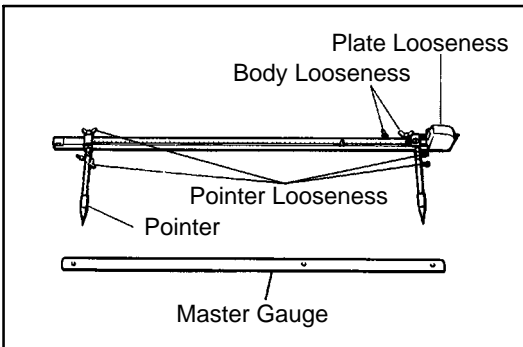
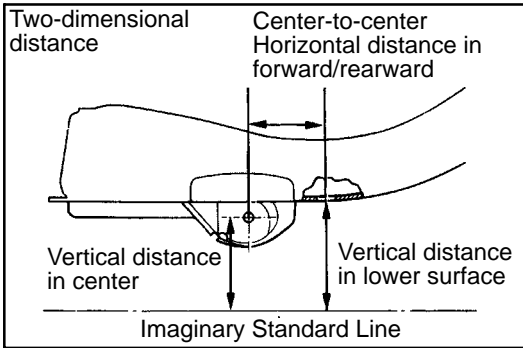
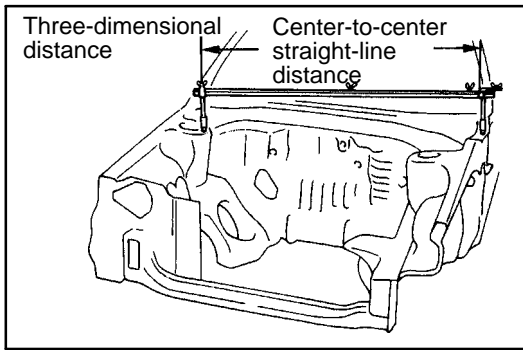
Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Body mounting hole	24 (0.94)	G, g	Lower control link installation hole	14.5 (0.571)
B, b	Suspension lower arm installation hole	20 (0.79)	H, h	Body mounting hole	30 (1.18)
C, c	Shock absorber installation hole	29.5 (1.161)	I, i	Upper control link installation hole	14.5 (0.571)
D, d	Suspension lower arm installation hole	48 (1.89)	—	Lateral control rod installation hole	14.5 (0.571)
E, e	Body mounting hole	60 (2.36)	K, k	Body mounting hole	70 (2.76)
F, f	Body mounting hole	30 (1.18)	—	—	—

**FRAME DIMENSION**  
**UZJ100 series • HDJ100, 101 series • FZJ100 series**

**FRAME DIMENSION**  
**UZJ100 series • HDJ100,101 series • FZJ100**  
**series (Cont'd)**



Symbol	Name	Hole dia.	Symbol	Name	Hole dia.
A, a	Body mounting hole	24 (0.94)	G, g	Lower control link installation hole	14.5 (0.571)
B, b	Suspension lower arm installation hole	20 (0.79)	H, h	Body mounting hole	30 (1.18)
C, c	Shock absorber installation hole	29.5 (1.161)	I, i	Upper control link installation hole	14.5 (0.571)
D, d	Suspension lower arm installation hole	48 (1.89)	J	Lateral control rod installation hole	14.5 (0.571)
E, e	Body mounting hole	60 (2.36)	K, k	Body mounting hole	70 (2.76)
F, f	Body mounting hole	30 (1.18)	—	—	—



## GENERAL INFORMATION

### 1. BASIC DIMENSIONS

- (a) There are two types of dimensions in the diagram. (Three-dimensional distance)

► Straight-line distance between the centers of two measuring points.

(Two-dimensional distance)

► Horizontal distance in forward/rearward between the centers of two measuring points.

► The height from an imaginary standard line.

- (b) In cases in which only one dimension is given, left and right are symmetrical.

- (c) The dimensions in the following drawing indicate actual distance. Therefore, please use the dimensions as a reference.

### 2. MEASURING

- (a) Basically, all measurements are to be done with a tracking gauge. For portions where it is not possible to use a tracking gauge, a tape measure should be used.

- (b) Use only a tracking gauge that has no looseness in the body, measuring plate, or pointers.

#### HINT:

1. The height of the left and right pointers must be equal.
2. Always calibrate the tracking gauge before measuring or after adjusting the pointer height.
3. Take care not to drop the tracking gauge or otherwise shock it.
4. Confirm that the pointers are securely in the holes.

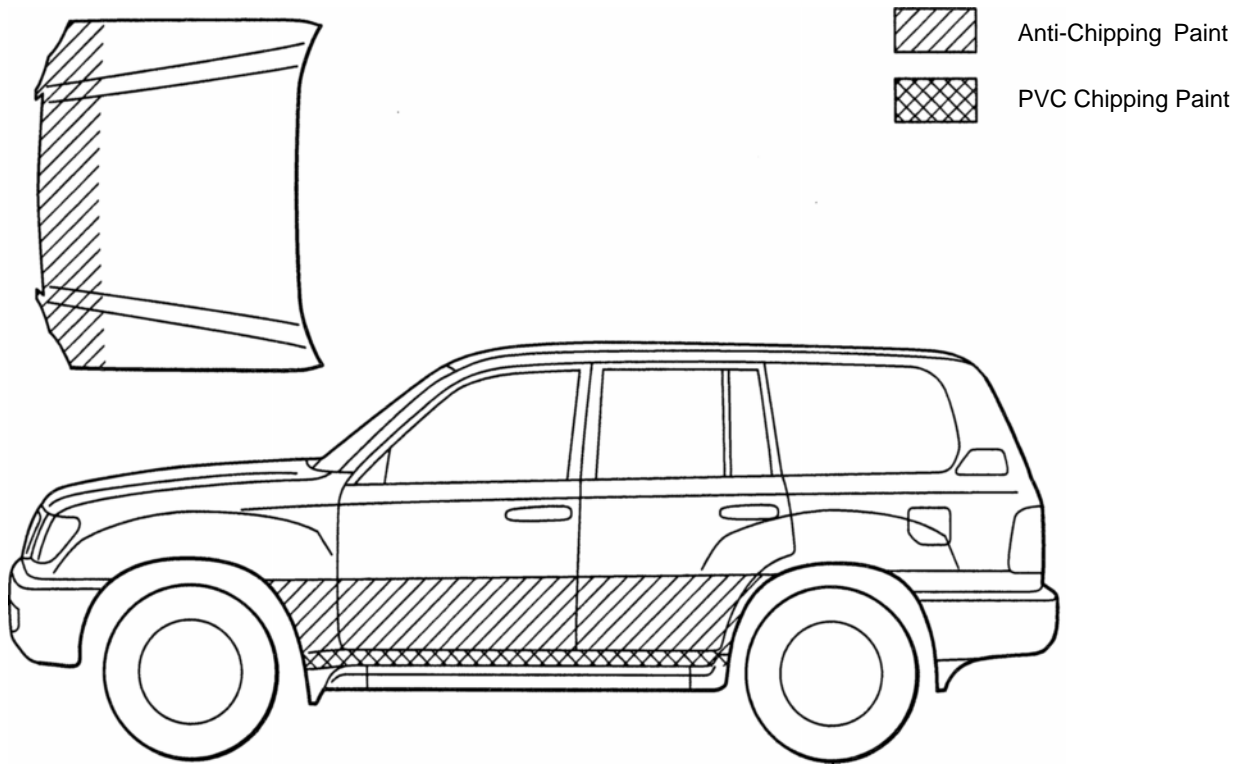
- (c) When using a tape measure, avoid twists and bends in the tape.

- (d) When tracking a diagonal measurement from the front spring support inner hole to the suspension member upper rear installation hole, measure along the front spring support panel surface.

## BODY PANEL ANTI-CHIPPING PAINT APPLICATION AREAS

### HINT:

1. *Anti-chipping paint should be applied to some areas before the second coat and to others after the top coat.*
2. *If other areas are accidentally coated, wipe off the paint immediately with a rag soaked in grease, wax and silicone remover.*

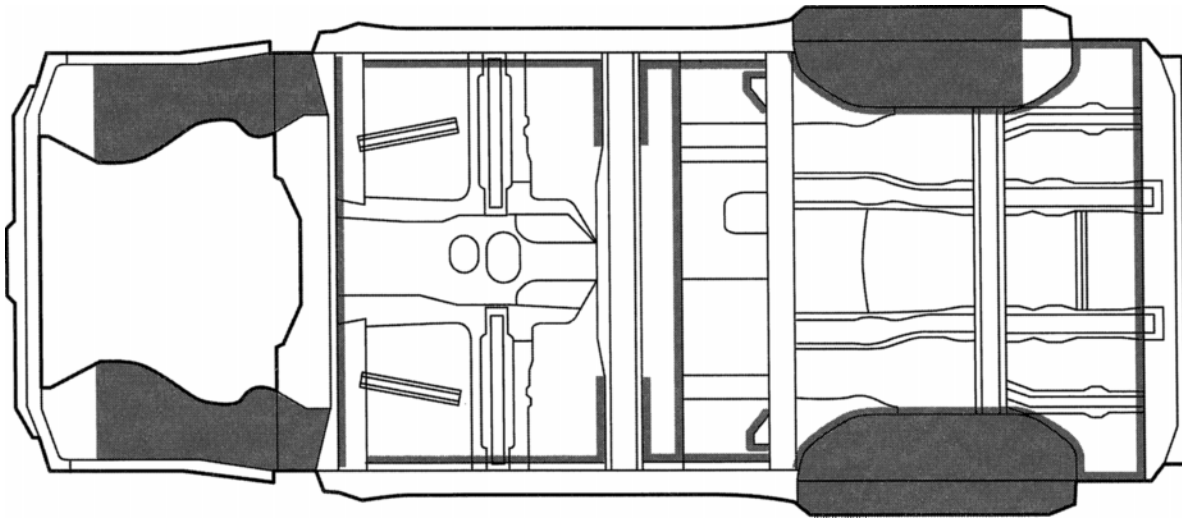




## BODY PANEL UNDERCOATING AREAS

### HINT:

1. First wipe off any dirt, grease or oil with a rag soaked in a grease, wax and silicone remover.
2. Cover the surrounding areas with masking paper to avoid coating unnecessary areas. If other areas are accidentally coated, wipe off the coating immediately.
3. Apply the first coating of undercoat to all welded areas and panel joints, then apply a second coat over the entire area.
4. Do not coat parts which become hot, such as the tailpipe, or moving parts, such as the propeller shaft.
5. Besides the locations described below, apply undercoating to all weld points under the body to insure corrosion prevention.
6. Be sure to seal the edge of the flange of the member and bracket with undercoating.
7. If undercoat is damaged by peeling, cracks, etc., be sure to repair as necessary.
8. Before the undercoat apply sealer allowing rust prevention to be attained.



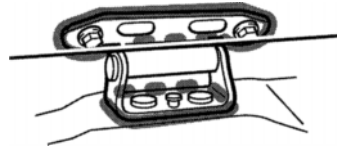
REFERENCE: Referring to the notes above, undercoating should be applied according to the specifications for your country.

## BODY PANEL ANTI-RUST AGENT (WAX) APPLICATION AREAS

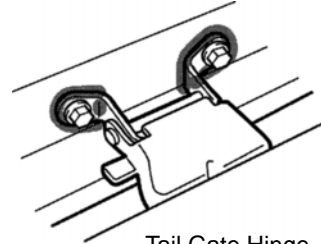
### HINT:

1. Whenever adjusting the doors and hoods, apply anti-rust agent (wax) around the hinges.
2. Even if partially repairing a part, apply anti-rust agent (wax) over the entire application area of the part.
3. Wipe off the anti-rust agent immediately with a rag soaked in a grease, wax and silicone remover, if accidentally applied to other areas.

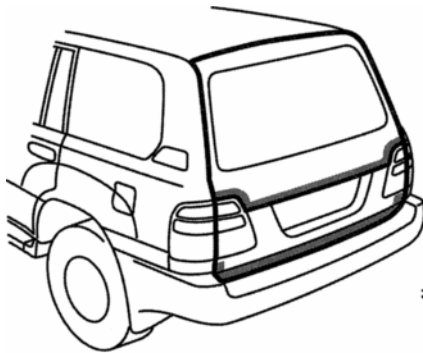
### LIFT-UP TYPE BACK DOOR



Back Door Hinge

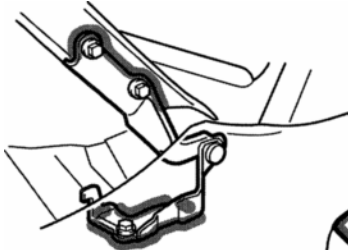


Tail Gate Hinge

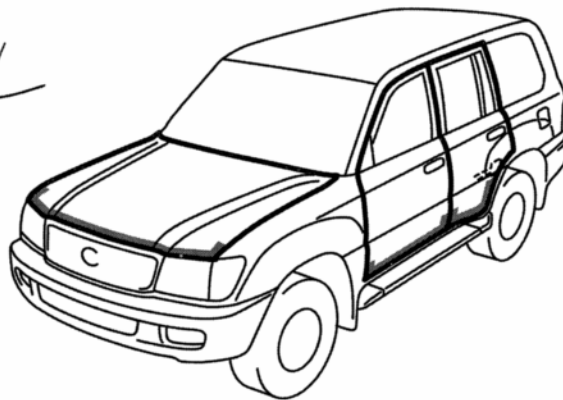


Tail Gate Hinge

Back Door, Tail Gate



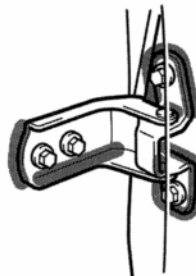
Hood Hinge



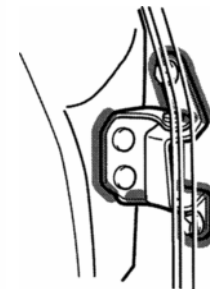
Door



Hood

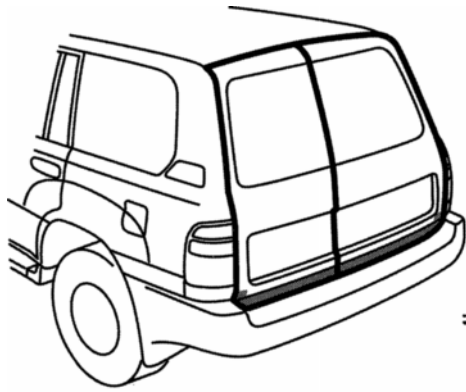


Door Hinge

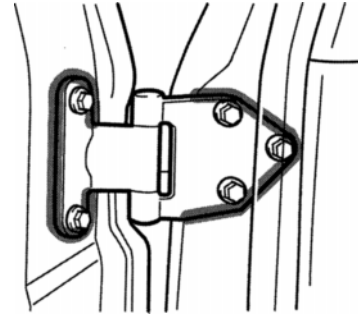


Door Hinge

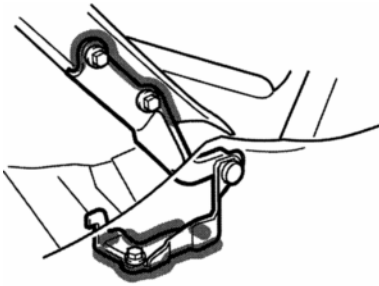
SWING TYPE BACK DOOR



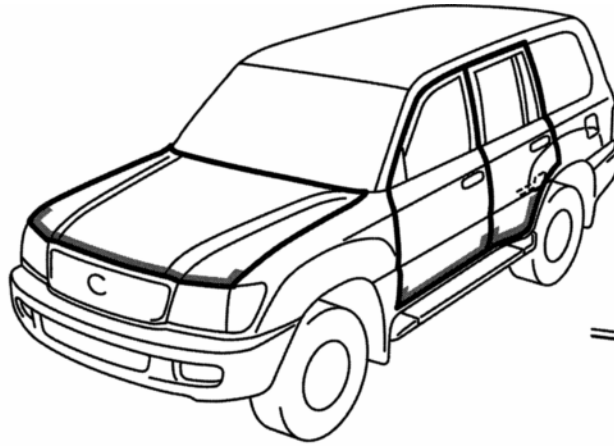
Back Door



Back Door Hinge



Hood Hinge



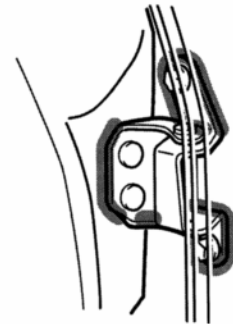
Door



Hood



Door Hinge

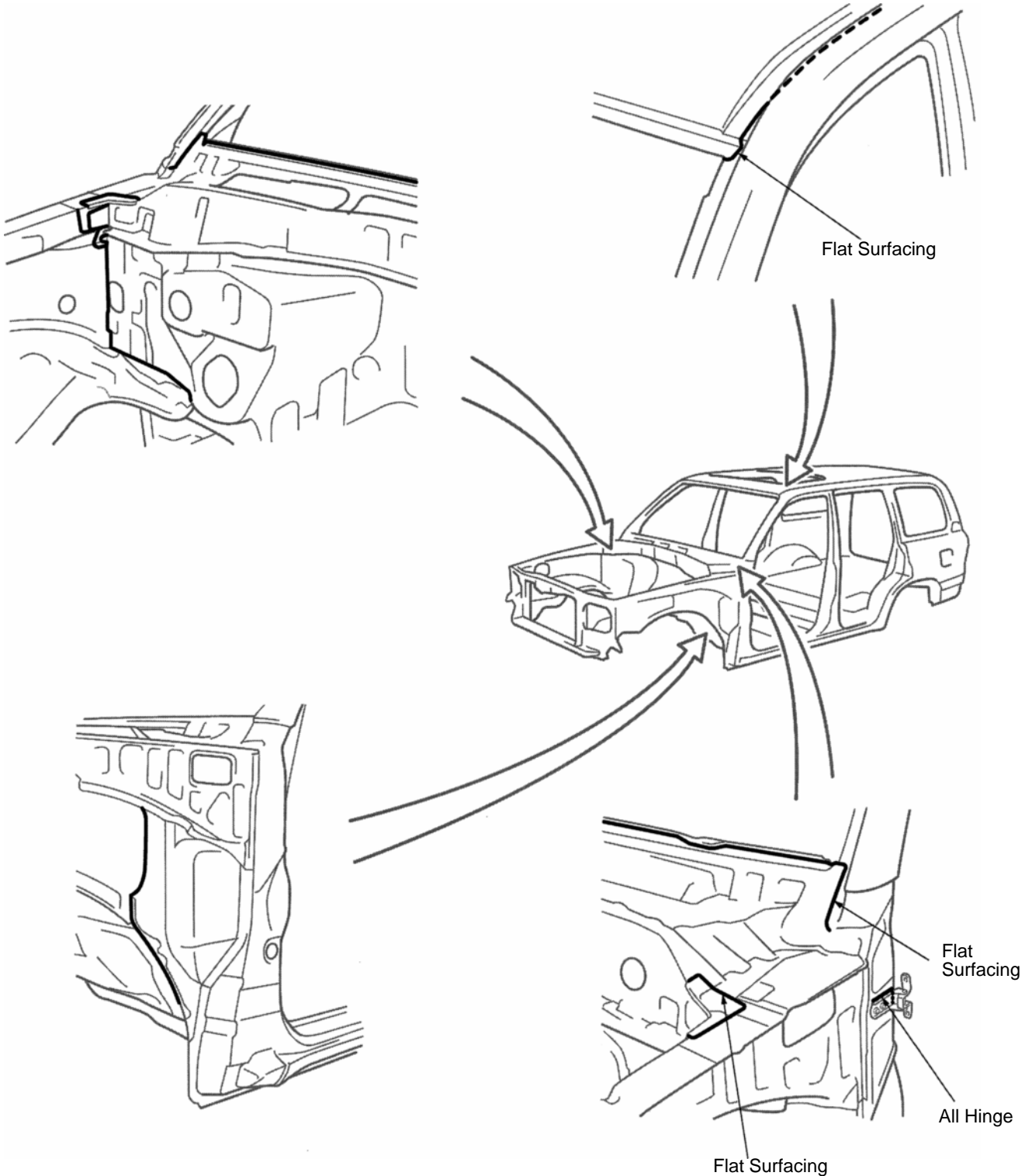


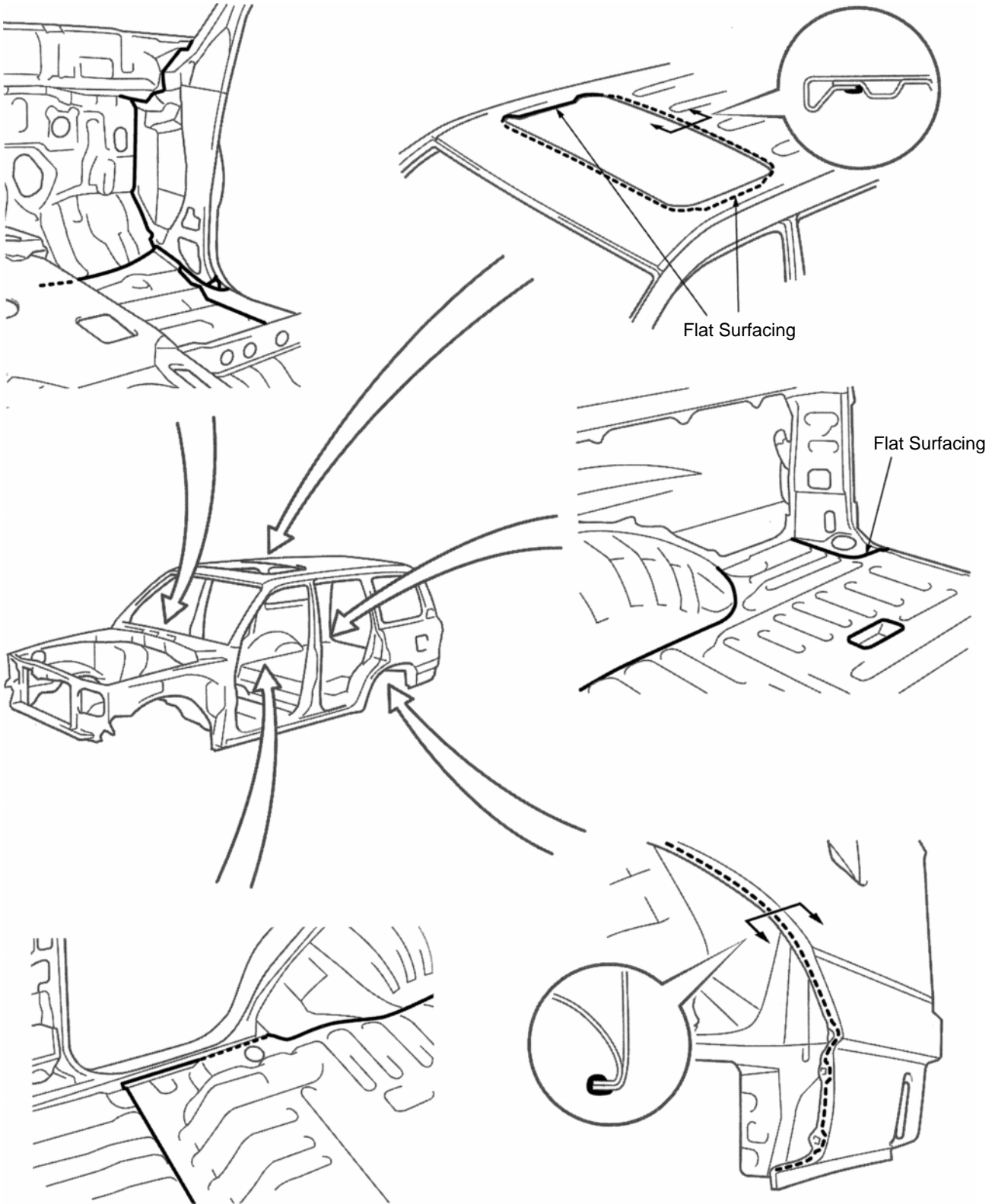
Door Hinge

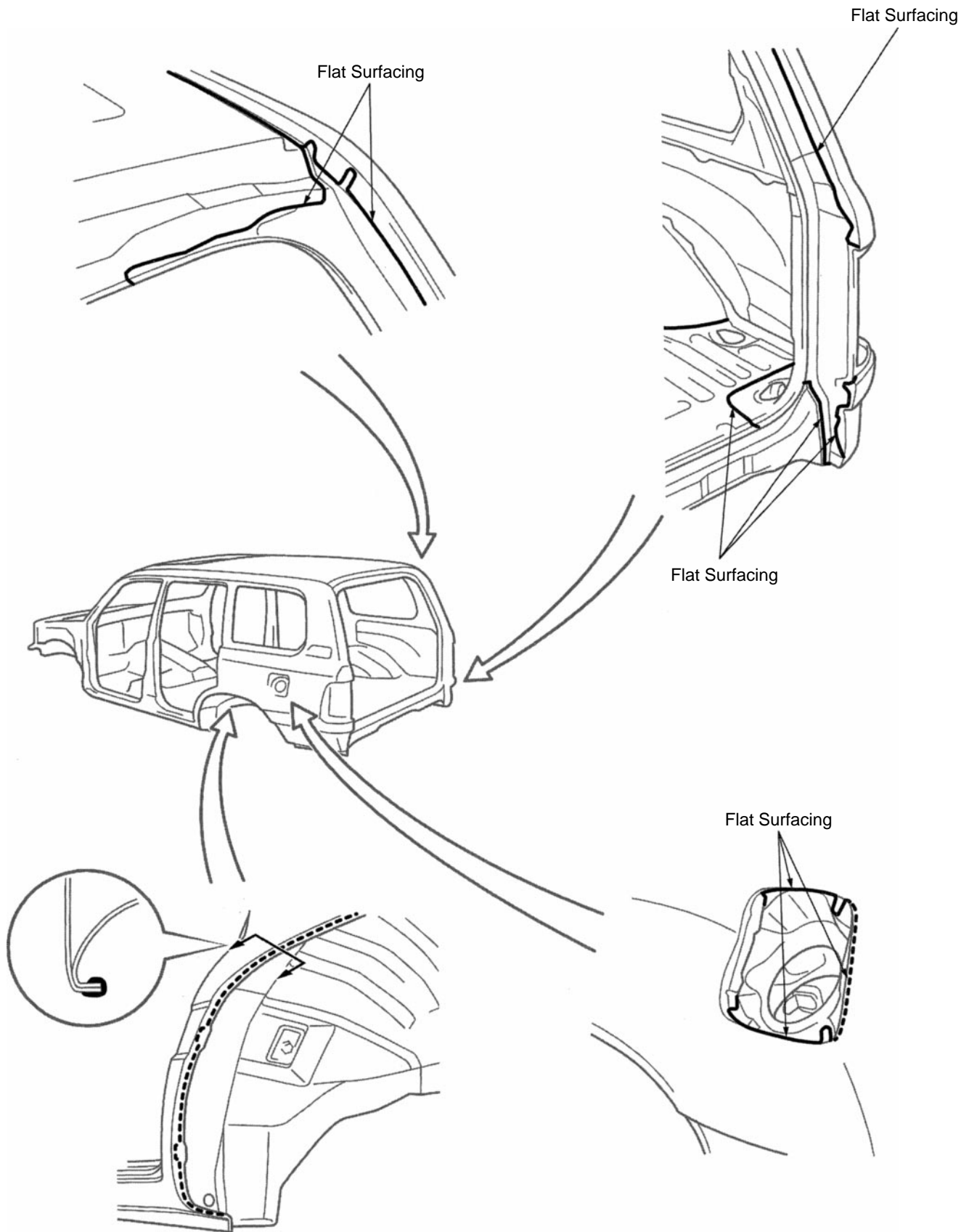
## BODY PANEL SEALING AREAS

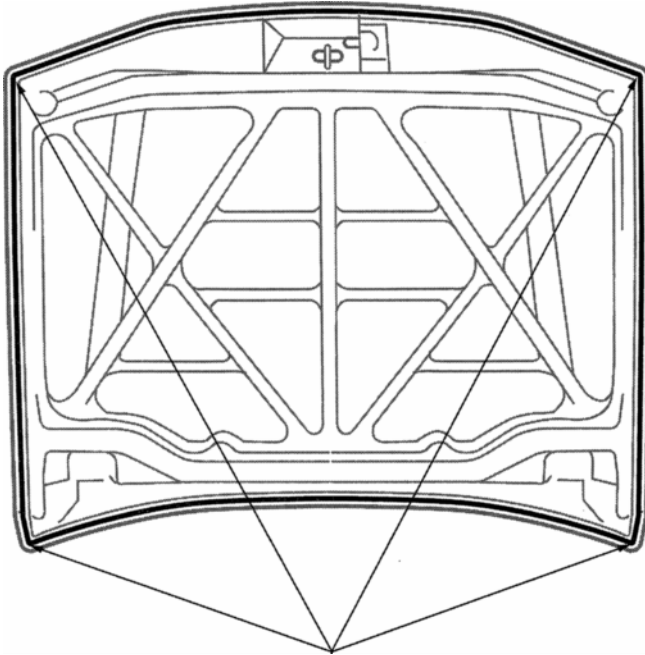
### HINT:

1. Prior to applying body sealer, clean the area with a rag soaked in a grease, wax and silicone remover.
2. If weld-through primer was used, first wipe off any excess and coat with anti-corrosion primer before applying body sealer.
3. Wipe off excess body sealer with a rag soaked in a grease, wax and silicone remover.
4. If body sealer is damaged by peeling, cracks, etc., be sure to repair as necessary.

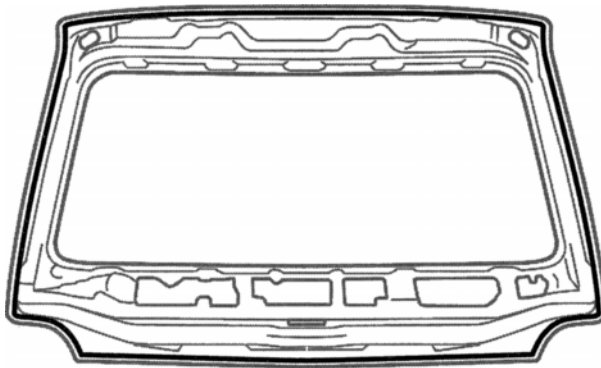




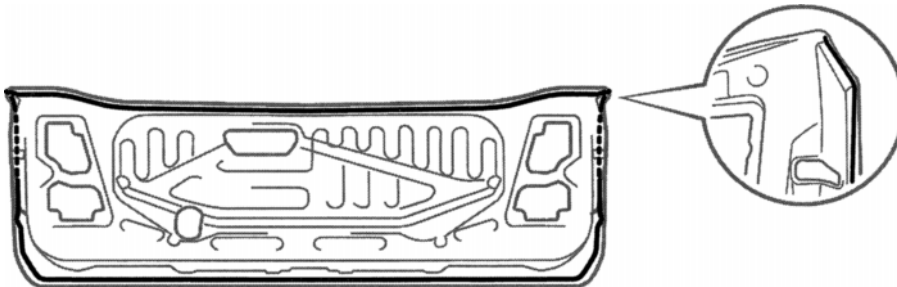




Flat Surfacing

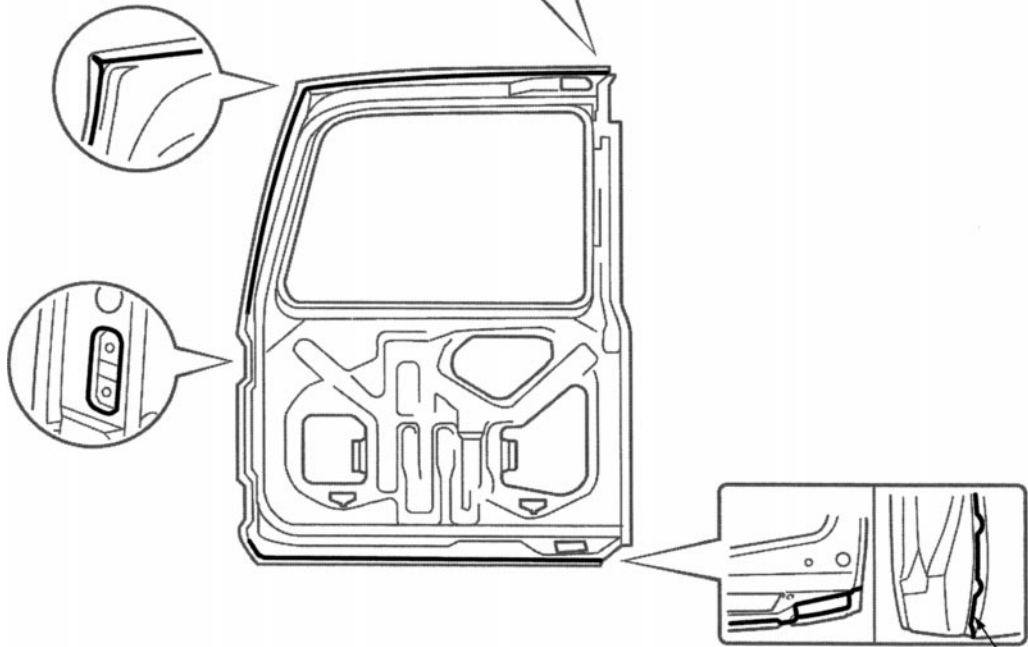
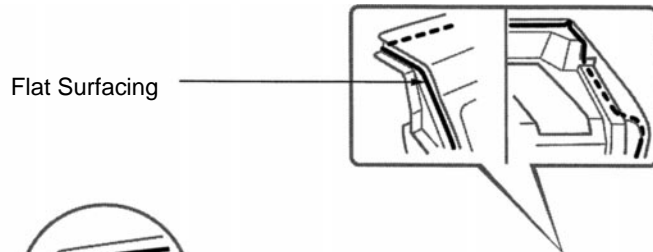
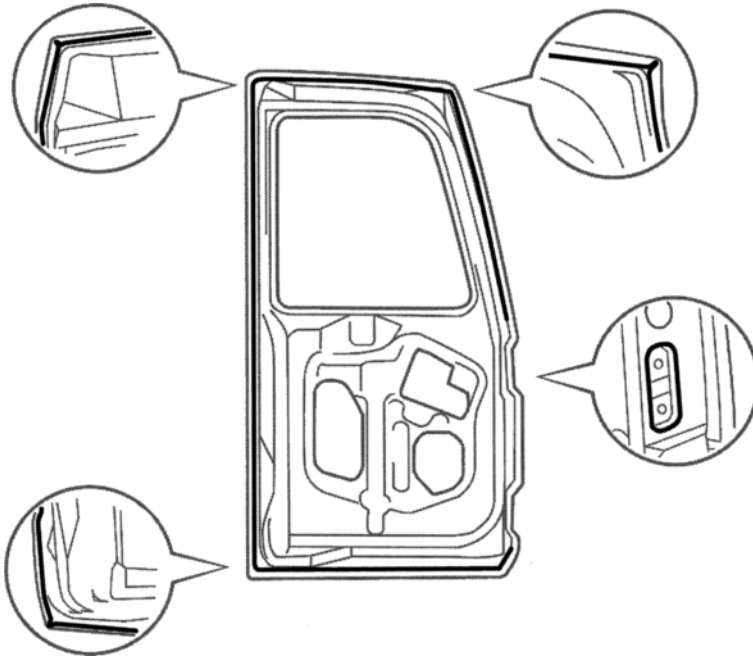


Lift-Up Type Back Door



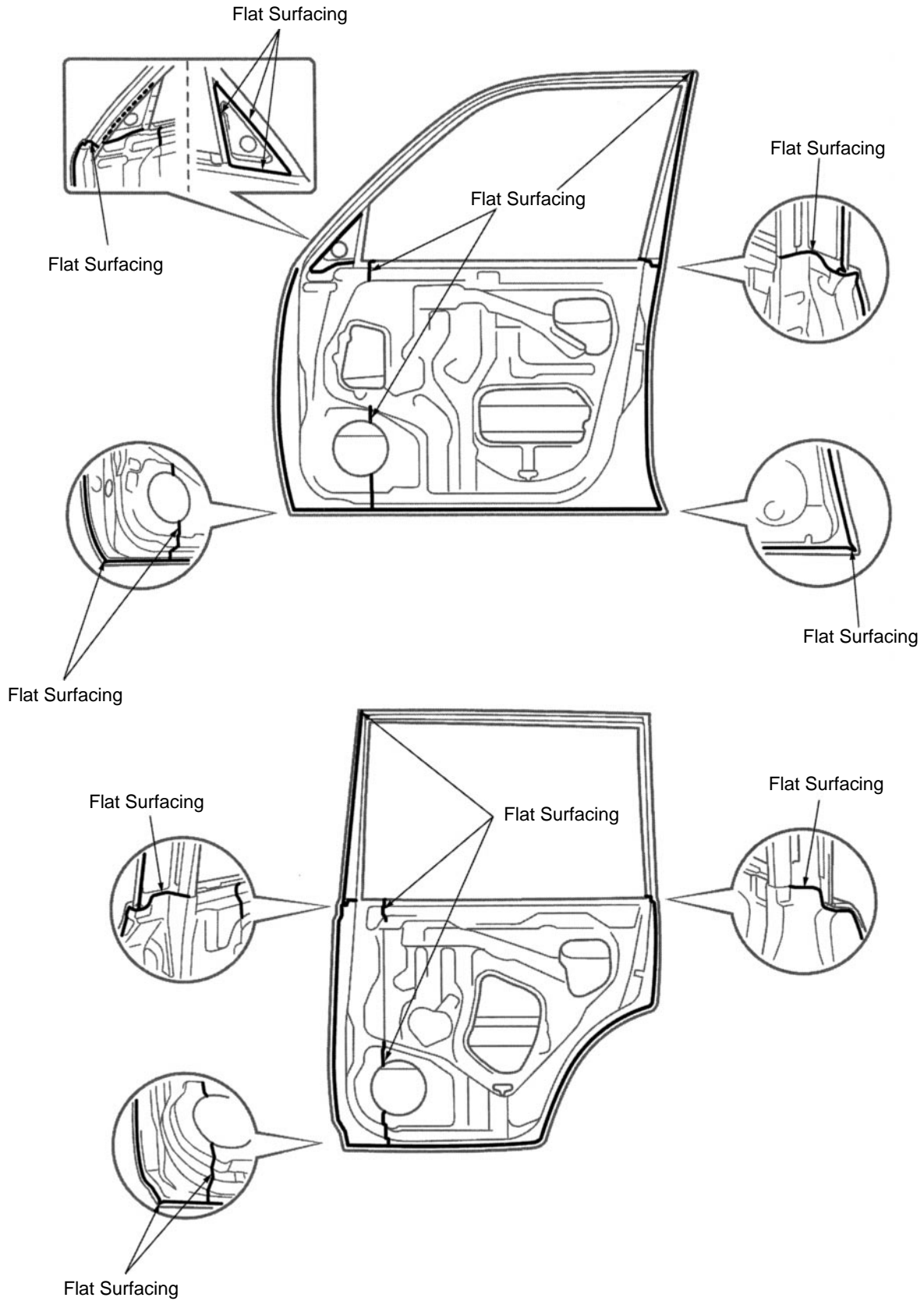
Lift-Up Type Back Door

Swing Type Back Door



Flat Surfacing





## GENERAL INFORMATION

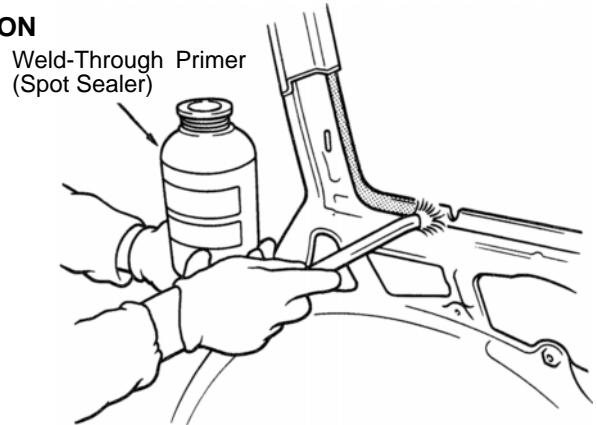
Anti-rust treatment is necessary before welding and before and after the painting process.

### ANTI-RUST TREATMENT BEFORE WELDING

#### 1. WELD-THROUGH PRIMER (SPOT SEALER) APPLICATION

For anti-corrosion measures, always apply the weld-through primer (spot sealer) to welding surfaces where the paint film has been removed.

*HINT: Apply the weld-through primer (spot sealer) so that it does not ooze out from the joining surfaces.*

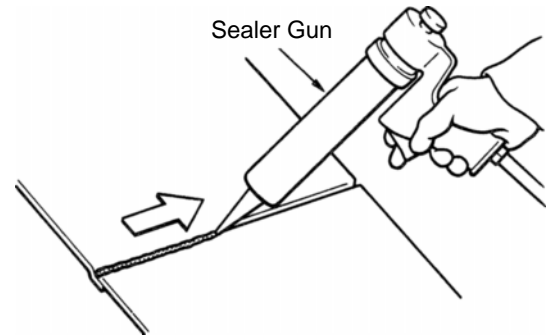


**WELD-THROUGH PRIMER (SPOT SEALER) APPLICATION**

### ANTI-RUST TREATMENT BEFORE PAINTING PROCESS

#### 1. BODY SEALER APPLICATION

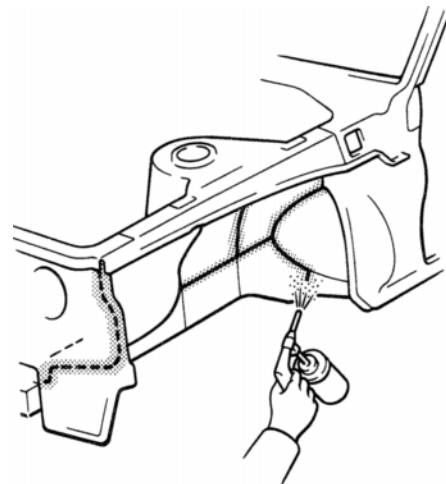
For water-proofing and anti-corrosion measures, always apply the body sealer to the body panel seams and hems of the doors, hoods, etc.



**BODY SEALER APPLICATION**

#### 2. UNDERCOAT APPLICATION

To prevent corrosion and protect the body from damage by flying stones, always apply sufficient undercoat to the bottom surface of the under body and inside of the wheel housings.

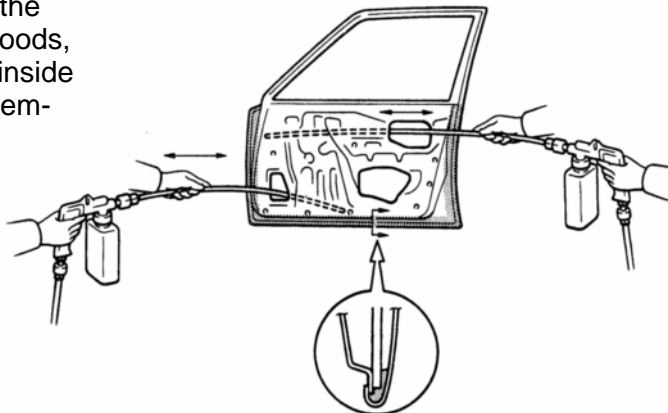


**UNDERCOAT APPLICATION**

**ANTI-RUST TREATMENT AFTER PAINTING PROCESS**

**1. ANTI-RUST AGENT (WAX) APPLICATION**

To preserve impossible to paint areas from corrosion, always apply sufficient anti-rust agent (wax) to the inside of the hemming areas of the doors and hoods, and around the hinges, or the welded surfaces inside the boxed cross-section structure of the side member, body pillar, etc.



**ANTI-RUST AGENT (WAX) APPLICATION**

**REFERENCE: ANTI-RUST TREATMENT BY PAINTING**

Painting prevents corrosion and protects the sheet metal from damage. In this section, anti-chipping paint only for anti-corrosion purpose is described.

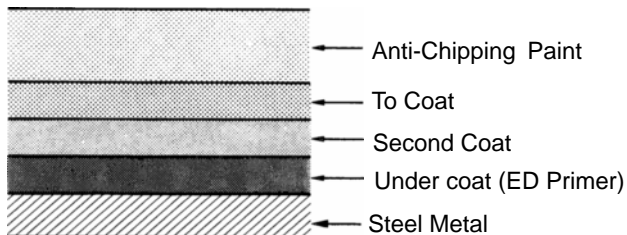
**1. ANTI-CHIPPING PAINT**

To prevent corrosion and protect the body from damage by flying stones, etc., apply anti-chipping paint to the rocker panel, wheel arch areas, valance panel, etc.

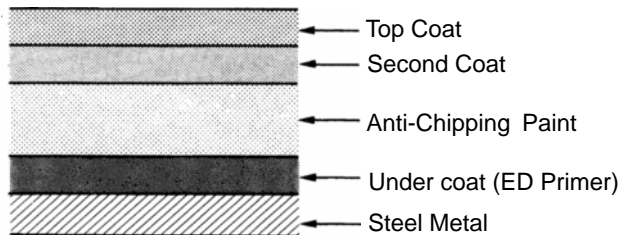
*HINT:*

*Depending on the model or the application area, there are cases where the application of anti-chipping paint is necessary before the second coat or after the top coat.*

▶ Apply the anti-chipping paint after the top coat.











▶ Apply the anti-chipping paint before the second coat.

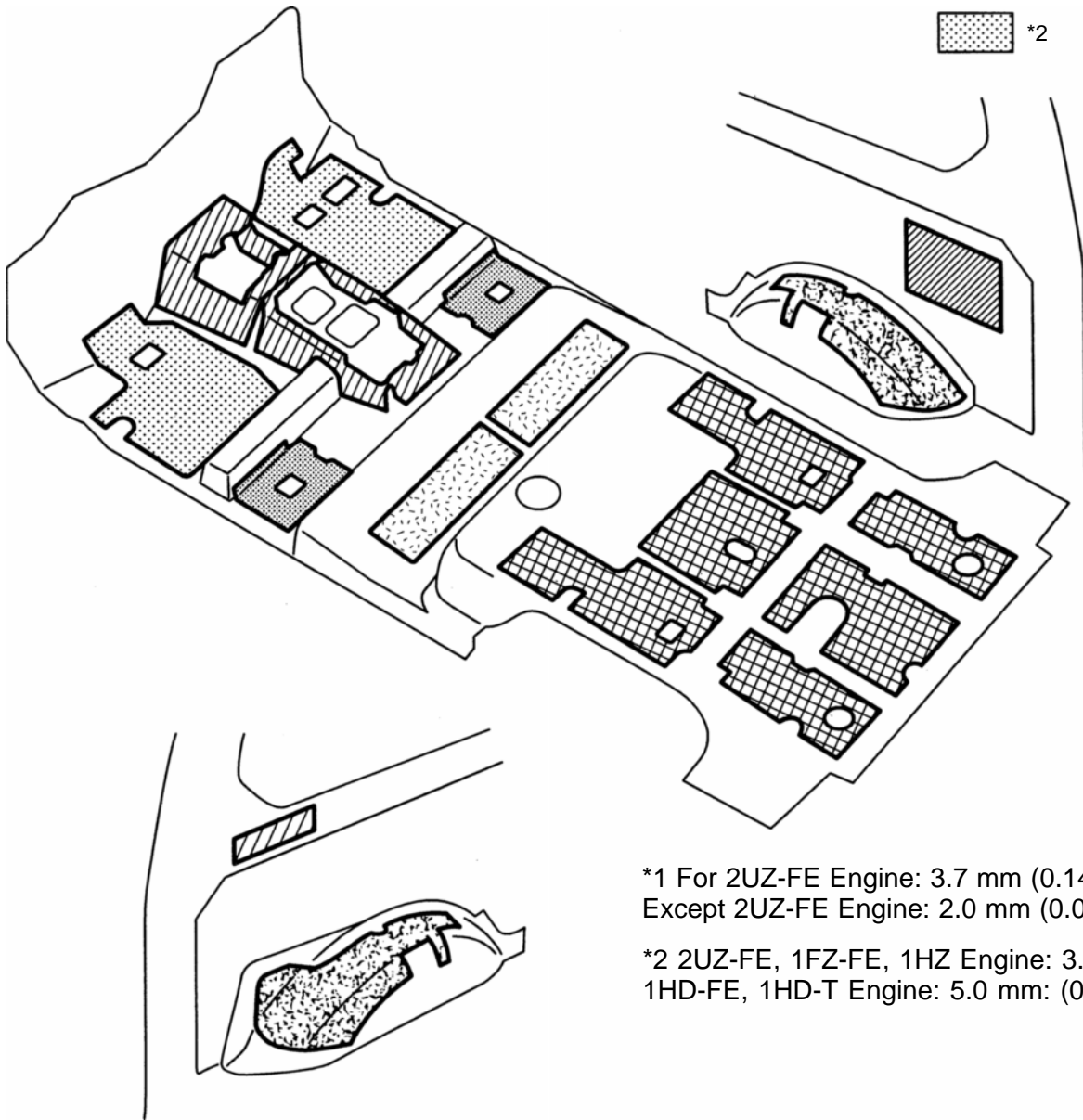


# SILENCER SHEET INSTALLATION AREAS

1 + 1 SEATER MODELS

Thickness of Asphalt Sheet

-  0.8 mm (0.031 in.)
-  1.5 mm (0.059 in.)
-  2.0 mm (0.079 in.)
-  3.0 mm (0.118 in.)
-  3.5 mm (0.138 in.)
-  3.7 mm (0.146 in.)
-  \*1
-  \*2











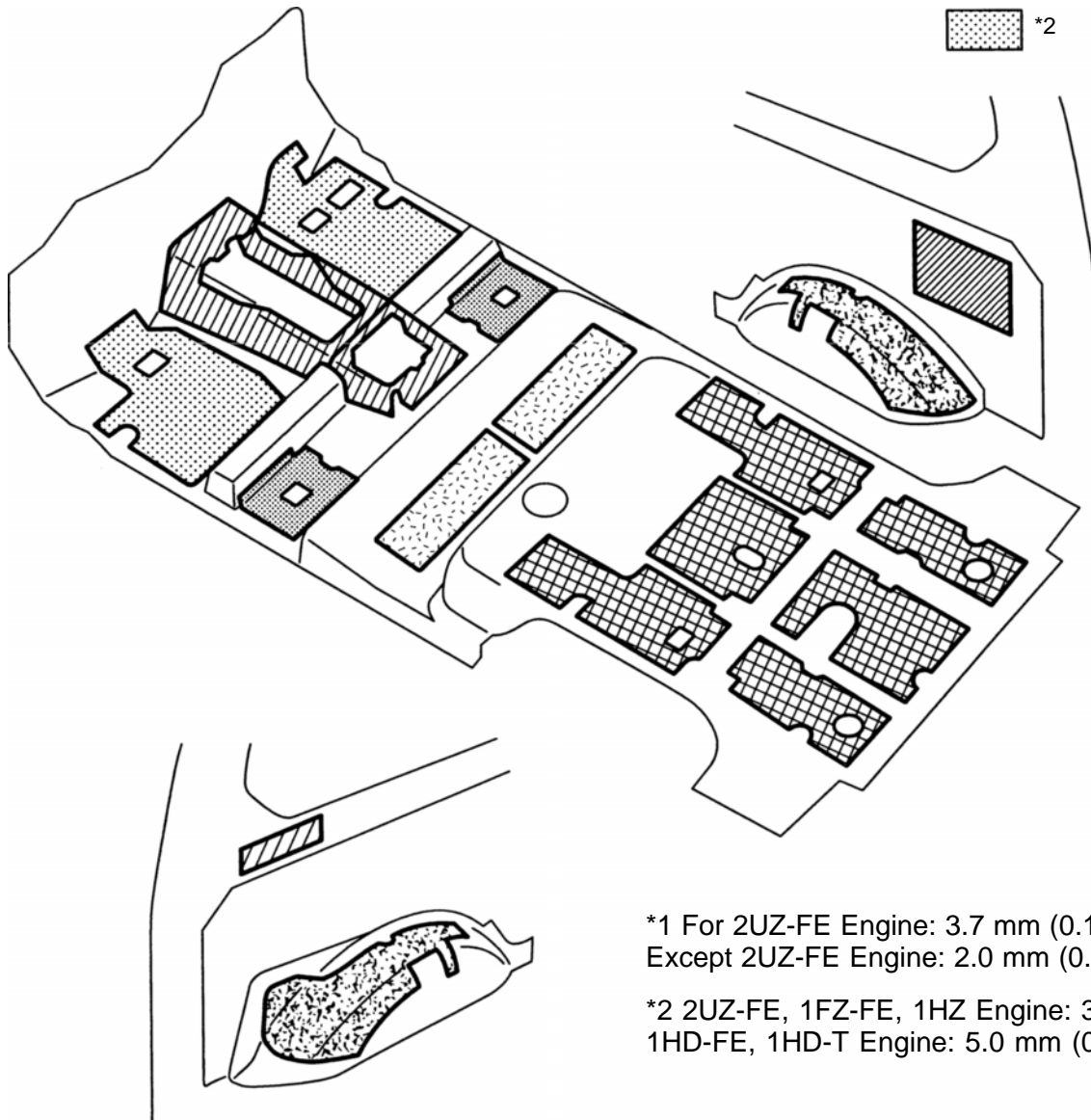
\*1 For 2UZ-FE Engine: 3.7 mm (0.146 in.)  
 Except 2UZ-FE Engine: 2.0 mm (0.079 in.)

\*2 2UZ-FE, 1FZ-FE, 1HZ Engine: 3.0 mm (0.118 in.)  
 1HD-FE, 1HD-T Engine: 5.0 mm (0.197 in.)

1 + 2 SEATER MODELS

Thickness of Asphalt Sheet

-  0.8 mm (0.031 in.)
-  1.5 mm (0.059 in.)
-  2.0 mm (0.079 in.)
-  3.0 mm (0.118 in.)
-  3.5 mm (0.138 in.)
-  3.7 mm (0.146 in.)
-  \*1
-  \*2



\*1 For 2UZ-FE Engine: 3.7 mm (0.146 in.)  
 Except 2UZ-FE Engine: 2.0 mm (0.079 in.)

\*2 2UZ-FE, 1FZ-FE, 1HZ Engine: 3.0 mm (0.118 in.)  
 1HD-FE, 1HD-T Engine: 5.0 mm (0.197 in.)