

# HOW TO USE THIS MANUAL

## GENERAL INFORMATION

### 1. GENERAL DESCRIPTION

- (a) This manual is written in accordance with SAE J2008.
  - (1) Diagnosis
  - (2) Removing / Installing, Replacing, Disassembling / Reassembling, Checking and Adjusting
  - (3) Final Inspection
- (b) The following procedures are omitted from this manual. However, these procedures must be performed.
  - (1) Use a jack or lift to perform operations
  - (2) Clean all removed parts
  - (3) Perform a visual check

### 2. INDEX

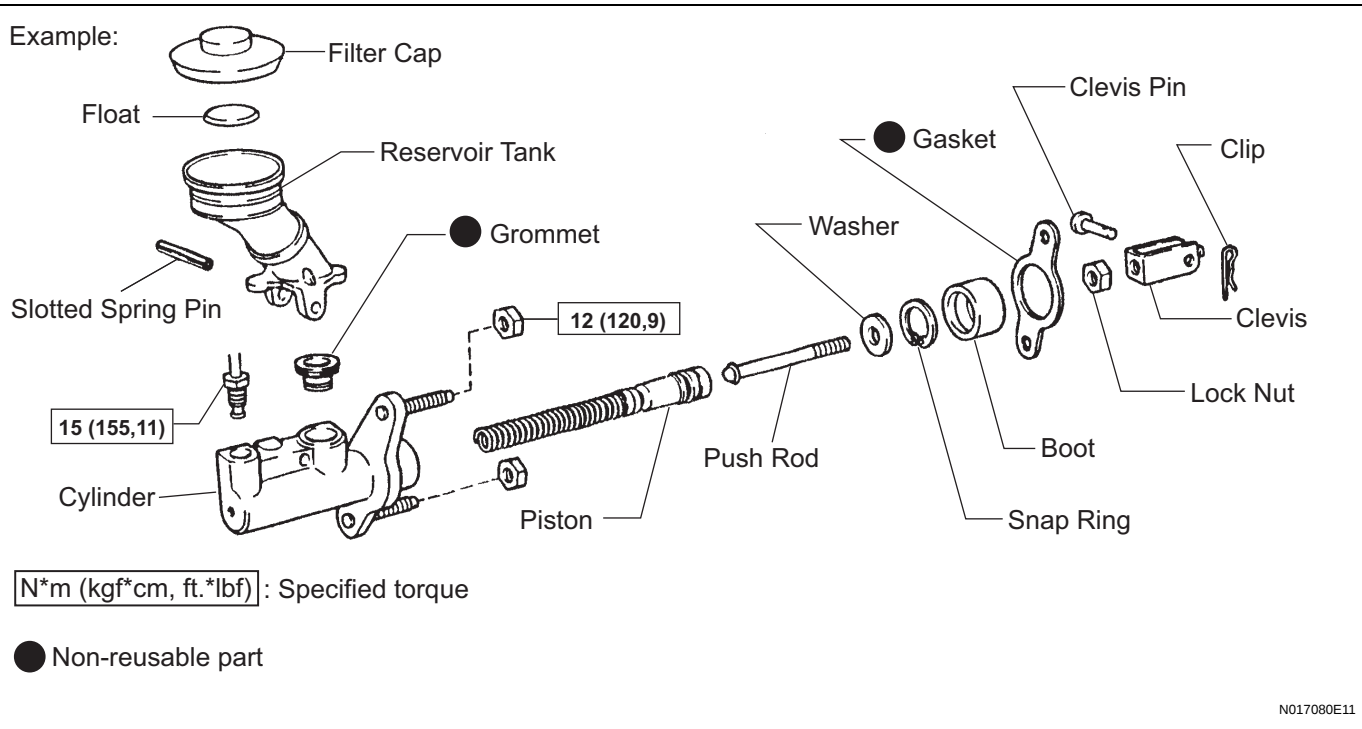
- (a) An alphabetical INDEX section is provided at the end of the manual as a reference to help you find the item to be repaired.

### 3. PREPARATION

- (a) Use of Special Service Tools (SST) and Special Service Materials (SSM) may be required, depending on the repair procedure. Be sure to use SST and SSM when they are required and follow the working procedure properly. A list of SST and SSM is in the "Preparation" section of this manual.

### 4. REPAIR PROCEDURES

- (a) A component illustration is placed under the title where necessary.
- (b) Non-reusable parts, grease application areas, precoated parts and torque specifications are noted in the component illustrations.  
The following illustration is an example.



- (c) Torque specifications, grease application areas and non-reusable parts are emphasized in the procedures.
- HINT:
- There are cases where such information can only be explained by using an illustration. In these cases, torque, oil and other information are described in the illustration.
- (d) Only items with key points are described in the text. What to do and other details are explained using illustrations next to the text. Both the text and illustrations are accompanied by standard values and notices.

|                  |                                                                                                                         |
|------------------|-------------------------------------------------------------------------------------------------------------------------|
| Illustration     | What to do and where to do it                                                                                           |
| Task heading     | What work will be performed                                                                                             |
| Explanation text | How to perform the task<br>Also has information such as specifications and warnings, which are written in boldface text |

- (e) Illustrations of similar vehicle models are sometimes used. In these cases, minor details may be different from the actual vehicle.
- (f) Procedures are presented in a step-by-step format.

5. SERVICE SPECIFICATIONS

- (a) SPECIFICATIONS are presented in boldface text throughout the manual. The specifications are also found in the "Service Specifications" section for reference.

6. TERM DEFINITIONS

|         |                                                              |
|---------|--------------------------------------------------------------|
| CAUTION | Possibility of injury to you or other people.                |
| NOTICE  | Possibility of damage to components being repaired.          |
| HINT    | Provides additional information to help you perform repairs. |

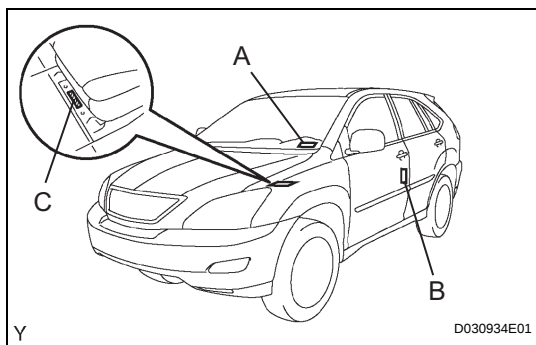
**7. INTERNATIONAL SYSTEM OF UNITS**

- (a) The units used in this manual comply with the International System of Units (SI UNIT) standard. Units from the metric system and the English systems are also provided.

Example:

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

**IN**



## IDENTIFICATION INFORMATION

### VEHICLE IDENTIFICATION AND SERIAL NUMBERS

#### 1. VEHICLE IDENTIFICATION NUMBER

- (a) The vehicle identification number is stamped on the vehicle body and on the certification label, as shown in the illustration.

A:

Vehicle Identification Number

B:

Certification Label

C:

Frame Number

#### 2. ENGINE SERIAL NUMBER AND TRANSMISSION SERIAL NUMBER

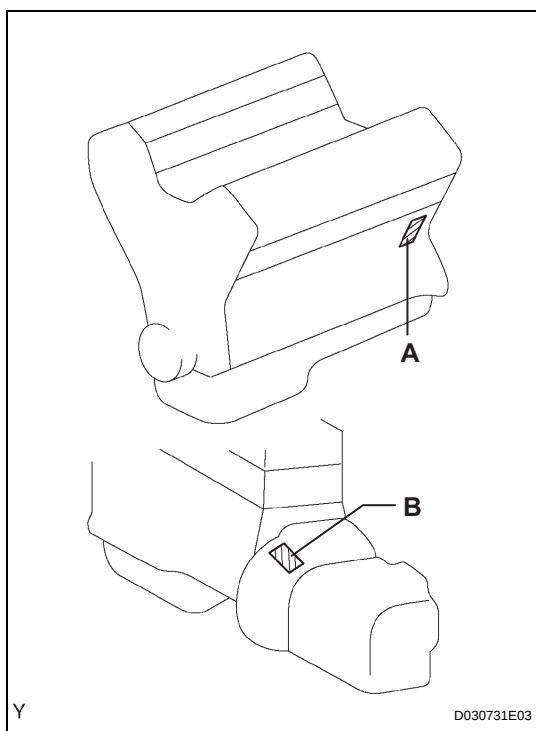
- (a) The engine serial number is stamped on the cylinder block of the engine and the transaxle serial number is stamped on the housing as shown in the illustration.

A:

Engine Serial Number

B:

Transaxle Serial Number

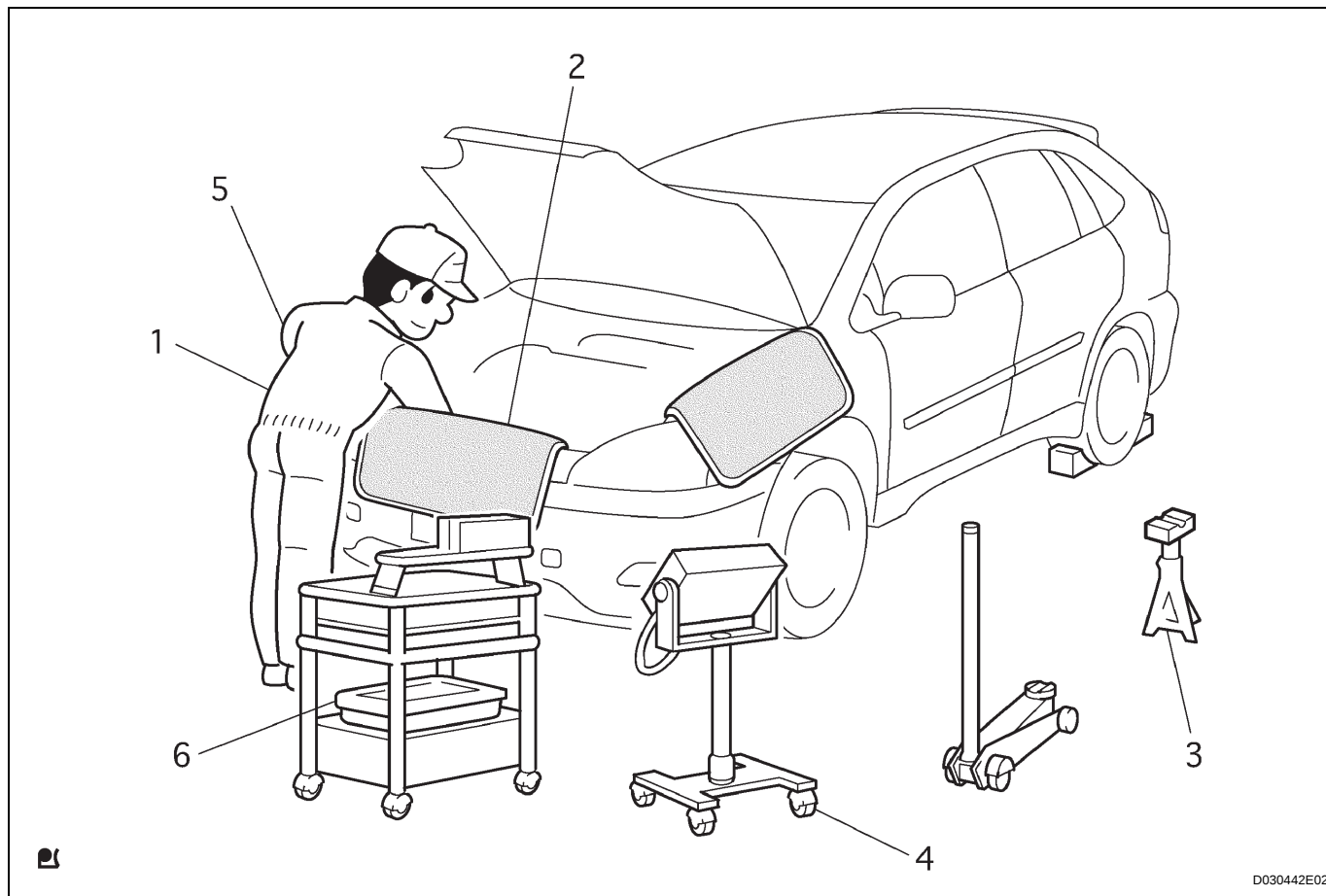


# REPAIR INSTRUCTION

## PRECAUTION

### 1. BASIC REPAIR HINT

#### (a) HINTS ON OPERATIONS

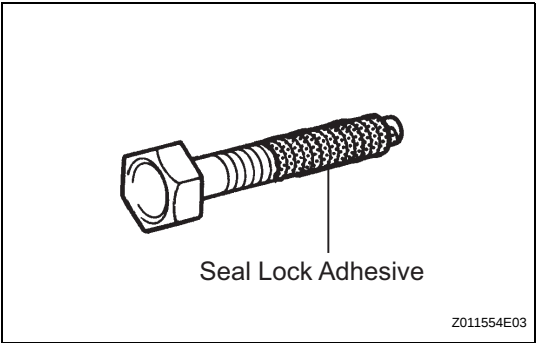


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|   |                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Attire                                                        | <ul style="list-style-type: none"> <li>Always wear a clean uniform.</li> <li>Hat and safety shoes must be worn.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2 | Vehicle protection                                            | Prepare a grille cover, fender cover, seat cover and floor mat before starting the operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3 | Safety operation                                              | <ul style="list-style-type: none"> <li>When working with 2 or more persons, be sure to check safety for one another.</li> <li>When working with the engine running, make sure to provide ventilation for exhaust fumes in the workshop.</li> <li>If working on high temperature, high pressure, rotating, moving, or vibrating parts, wear appropriate safety equipment and take extra care not to injure yourself or others.</li> <li>When jacking up the vehicle, be sure to support the specified location with a safety stand.</li> <li>When lifting up the vehicle, use appropriate safety equipment.</li> </ul>                       |
| 4 | Preparation of tools and measuring gauge                      | Before starting operation, prepare a tool stand, SST, gauge, oil and parts for replacement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 5 | Removal and installation, disassembly and assembly operations | <ul style="list-style-type: none"> <li>Diagnose with a thorough understanding of proper procedures and of the reported problem.</li> <li>Before removing the parts, check the general condition of the assembly and for deformation and damage.</li> <li>When the assembly is complicated, take notes. For example, note the total number of electrical connections, bolts, or hoses removed. Add matchmarks to insure reassembly of components in the original positions. Temporarily mark hoses and their fittings if needed.</li> <li>Clean and wash the removed parts if necessary and assemble them after a thorough check.</li> </ul> |

|   |               |                                                                                                                                                                                                                                                                                                                                                                                       |
|---|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 | Removed parts | <ul style="list-style-type: none"><li>Place the removed parts in a separate box to avoid mixing them up with the new parts or contaminating the new parts.</li><li>For non-reusable parts such as gaskets, O-rings, and self-locking nuts, replace them with new ones as instructed in this manual.</li><li>Retain the removed parts for customer inspection, if requested.</li></ul> |
|---|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

IN



(b) JACKING UP AND SUPPORTING VEHICLE

- (1) Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations.

(c) PRECOATED PARTS

- (1) Precoated parts are bolts and nuts that are coated with a seal lock adhesive at the factory.
- (2) If a precoated part is retightened, loosened or moved in any way, it must be recoated with the specified adhesive.
- (3) When reusing a precoated part, clean off the old adhesive and dry the part with compressed air. Then apply new seal lock adhesive appropriate to that part.
- (4) Some seal lock agents harden slowly. You may have to wait for the seal lock adhesive to harden.

(d) GASKETS

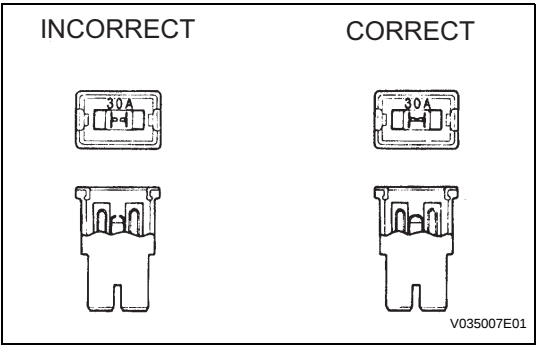
- (1) When necessary, use a sealer on gaskets to prevent leaks.

(e) BOLTS, NUTS AND SCREWS

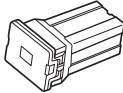
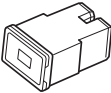
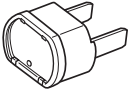
- (1) Carefully follow all the specifications for tightening torques. Always use a torque wrench.

(f) FUSES

- (1) When inspecting a fuse, check that the wire of the fuse is not broken.
- (2) When replacing fuses, be sure that 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>N</p>     | <p>N</p> | FUSE      | FUSE         |

| Illustration                                                                             | Symbol                                                                                   | Part Name           | Abbreviation |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------|--------------|
| <br>N   | <br>N   | MEDIUM CURRENT FUSE | M-FUSE       |
| <br>N   | <br>N   | HIGH CURRENT FUSE   | H-FUSE       |
| <br>N  | <br>N  | FUSIBLE LINK        | FL           |
| <br>N | <br>N | CIRCUIT BREAKER     | CB           |

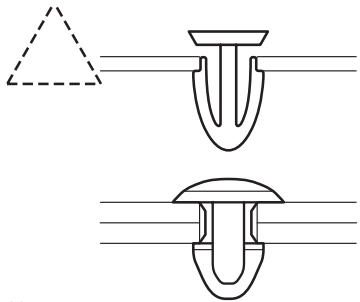
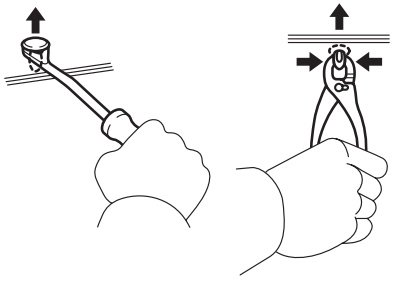
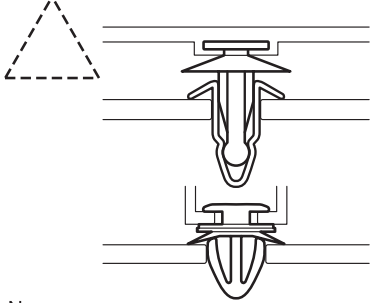
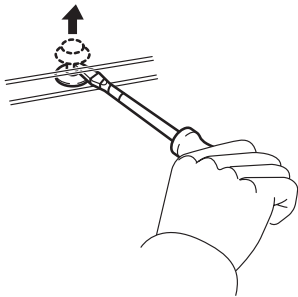
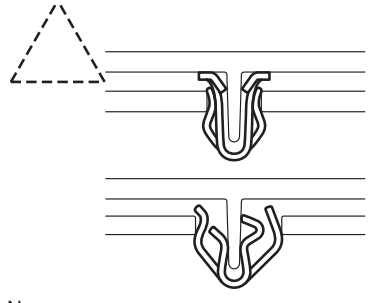
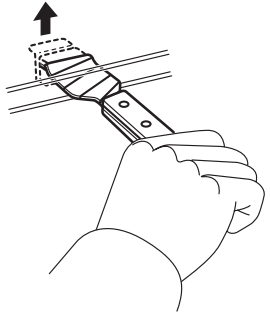
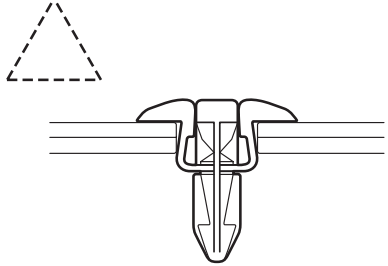
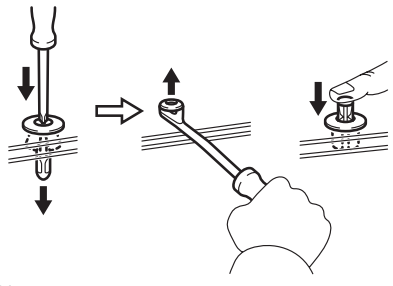
(g) CLIPS

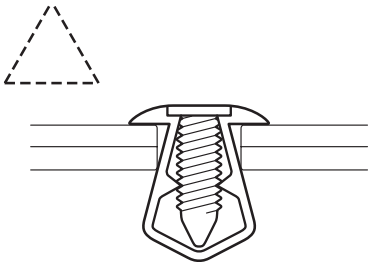
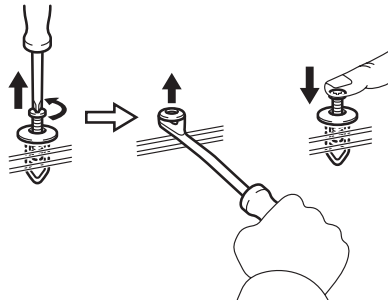
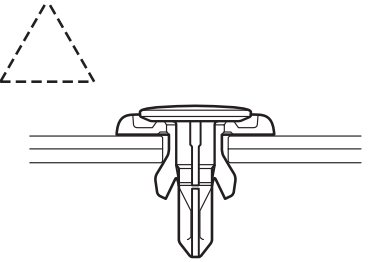
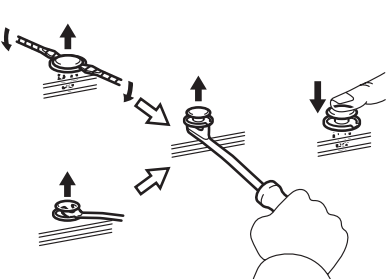
(1) The removal and installation methods of typical clips used for vehicle body parts are shown in the table below.

HINT:

If clips are damaged during work, always replace the damaged clip with a new one.

IN

| Shape (Example)                                                                              | Removal/Installation                                                                                                                                                  |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>N</p>   | <p>Remove clips with clip remover or pliers.</p>  <p>N</p>                          |
|  <p>N</p>   | <p>Remove fasteners with clip remover or screwdriver.</p>  <p>N</p>                 |
|  <p>N</p>  | <p>Remove clips with wide scraper to prevent panel damage.</p>  <p>N</p>          |
|  <p>N</p> | <p>Remove clips by pushing center pin through and prying out shell.</p>  <p>N</p> |

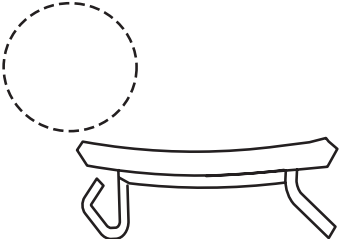
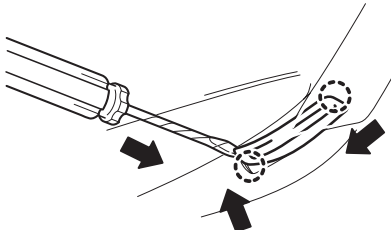
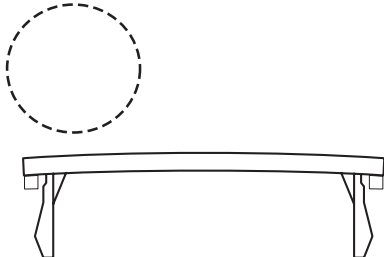
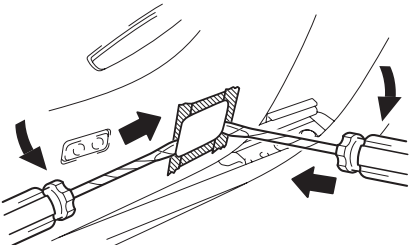
| Shape (Example)                                                                        | Removal/Installation                                                                                                                                   |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>N | Remove clips by unscrewing center pin and prying out shell.<br><br>N |
| <br>N | Remove clips by prying out pin and then prying out shell.<br><br>N   |

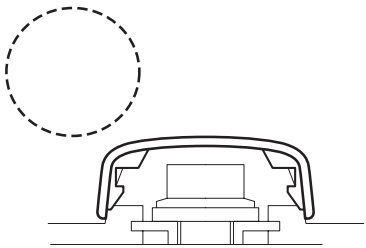
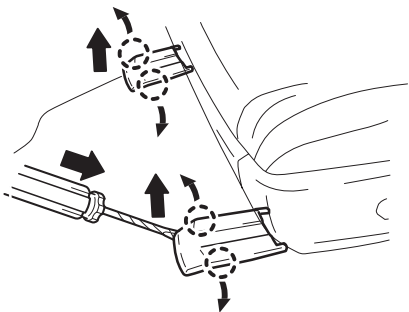
(h) CLAWS

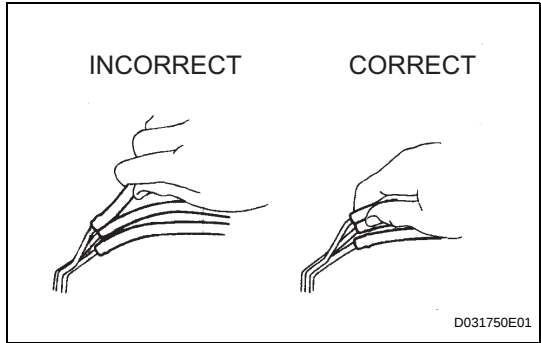
(1) The removal and installation methods of typical claws used for vehicle body parts are shown in the table below.

HINT:

If claws are damaged during a procedure, always replace the damaged claws with a new caps or covers.

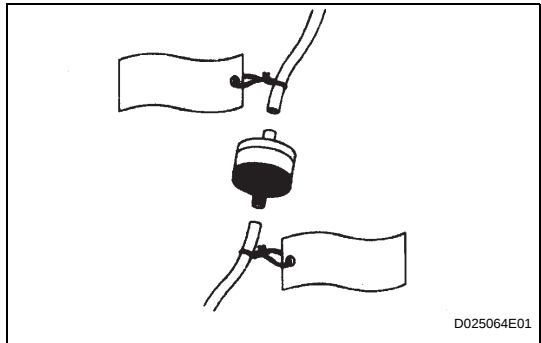
| Shape (Example)                                                                          | Illustration                                                                              | Procedures                                                             |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <br>N | <br>N | 1. Using a screwdriver, detach the claws and remove the cap or covers. |
| <br>N | <br>N | 1. Using a screwdriver, detach the claws and remove the cap or covers. |

| Shape (Example)                                                                   | Illustration                                                                      | Procedures                                                             |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------|
|  |  | 1. Using a screwdriver, detach the claws and remove the cap or covers. |

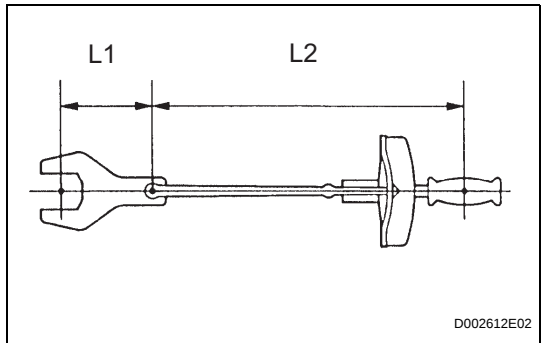


(i) REMOVAL AND INSTALLATION OF VACUUM HOSES

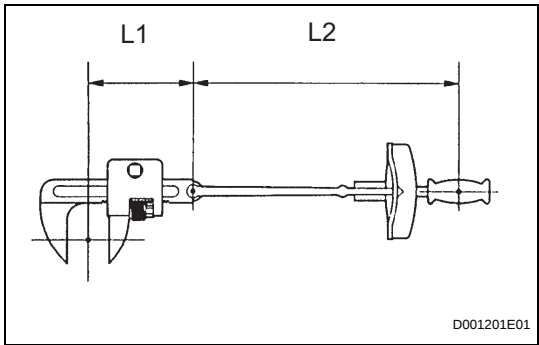
(1) To disconnect a vacuum hose, pull and twist from the end of the hose. Do not pull from the middle of the hose as this may damage the hose.



- (2) When disconnecting vacuum hoses, use tags to identify where they should be reconnected.
- (3) After completing any hose related repairs, double check that the vacuum hoses are properly connected. The label under the hood shows the proper layout.
- (4) When using a vacuum gauge, never force the hose onto a connector that is too large. If a hose has been stretched, air may leak. Use a step-down adapter if necessary.



(j) TORQUE WHEN USING TORQUE WRENCH WITH EXTENSION TOOL



- (1) Use the formula below to calculate special torque values for situations where SST or an extension tool is combined with the torque wrench.

**Formula:**

$$T' = L2 / (L1 + L2) * T$$

|    |                                                  |
|----|--------------------------------------------------|
| T' | Reading of torque wrench {N*m (kgf*cm, ft.*lbf)} |
| T  | Torque {N*m (kgf*cm, ft.*lbf)}                   |
| L1 | Length of SST or extension tool {cm (in.)}       |
| L2 | Length of torque wrench {cm (in.)}               |

**NOTICE:**

If an extension tool or SST is combined with a torque wrench and the wrench is used to tighten to a torque specification in this manual, the actual torque will be excessive and parts will be damaged.

**2. FOR VEHICLES EQUIPPED WITH SRS AIRBAG AND SEAT BELT PRETENSIONER**

The LEXUS RX330 is equipped with a Supplemental Restraint System (SRS).

**CAUTION:**

Failure to carry out the service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing and lead to serious injury. Furthermore, if a mistake is made when servicing SRS, it is possible that the SRS may fail to operate properly. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following section carefully.

**(a) GENERAL NOTICE**

- (1) As malfunctions of the SRS are difficult to confirm, the Diagnostic Trouble Codes (DTCs) become the most important source of information when troubleshooting. When troubleshooting the SRS, always check the DTCs before disconnecting the battery.

- (2) Work must be started at least 90 seconds after the ignition switch is turned off and after the cable is disconnected from the negative (-) battery terminal.

The SRS is equipped with a back-up power source. If work is started within 90 seconds after turning the ignition switch off and disconnecting the cable from the negative (-) battery terminal, the SRS may deploy.

When the cable is disconnected from the negative (-) battery terminal, clock and audio system memory is erased. Before starting work, make a note of the settings of each memory system. When work is finished, reset the clock and audio system as before.

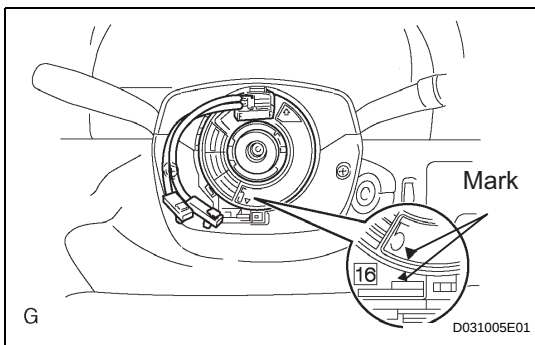
**CAUTION:**

**Never use a back-up power source (battery or other) to avoid erasing system memory. The back-up power source may inadvertently power the SRS and cause it to deploy.**

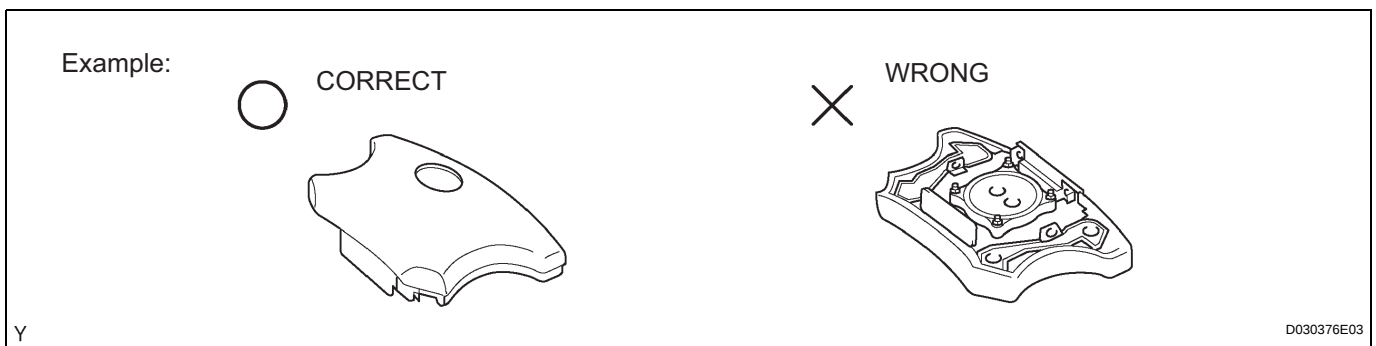
- (3) In minor collisions where the SRS does not deploy, the steering pad, front passenger airbag assembly, driver side knee airbag assembly, front seat side airbag assembly, curtain shield airbag assembly and front seat outer belt assembly should be inspected before further use of the vehicle.
- (See page [RS-389](#) for steering pad)  
 (See page [RS-413](#) for front passenger airbag assembly)  
 (See page [RS-428](#) for front seat side airbag assembly)  
 (See page [RS-404](#) for driver side knee airbag assembly)  
 (See page [RS-422](#) for curtain shield airbag assembly)  
 (See page [SB-20](#) for front seat outer belt assembly)
- (4) Never use SRS parts from another vehicle. When replacing parts, use new parts.
- (5) Before repairs, remove the airbag sensor assemblies if impacts are likely to be applied to the sensor during repairs.
- (6) Never disassemble and attempt to repair all airbag sensor assemblies and all airbag assemblies.
1. Steering pad
  2. Front passenger airbag assembly
  3. Driver side knee airbag assembly
  4. Front seat side airbag assembly
  5. Curtain shield airbag assembly
  6. Front seat outer belt assembly

- (7) Replace the airbag sensor assemblies and the airbag assemblies if: 1) damage has occurred from being dropped, or 2) cracks, dents or other defects in the case, bracket or connector are present.
- (8) Do not directly expose the airbag sensor assembly or airbag assembly to hot air or flames.
- (9) Use a voltmeter / ohmmeter with high impedance (minimum=10 k $\Omega$ ) for troubleshooting electrical circuits.
- (10) Information labels are attached to the SRS components. Follow the instructions on the labels.
- (11) After work on the SRS is completed, check the SRS warning light.

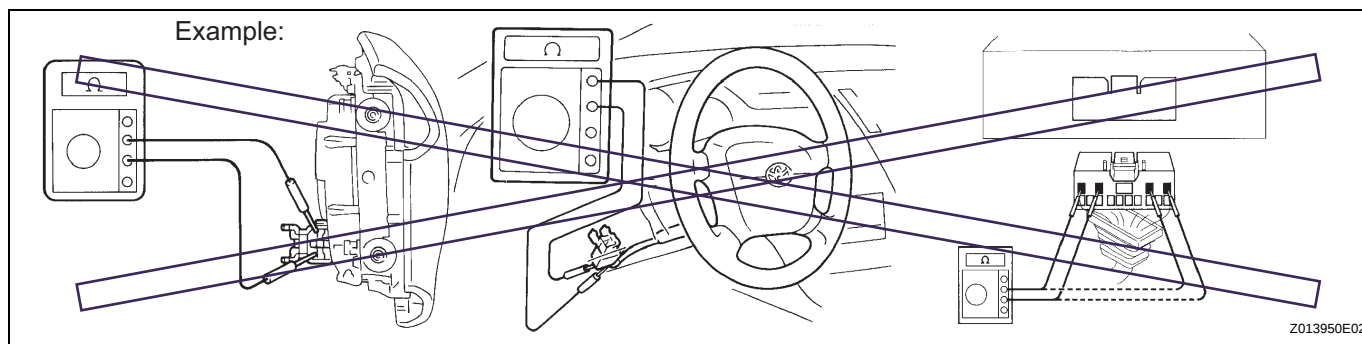
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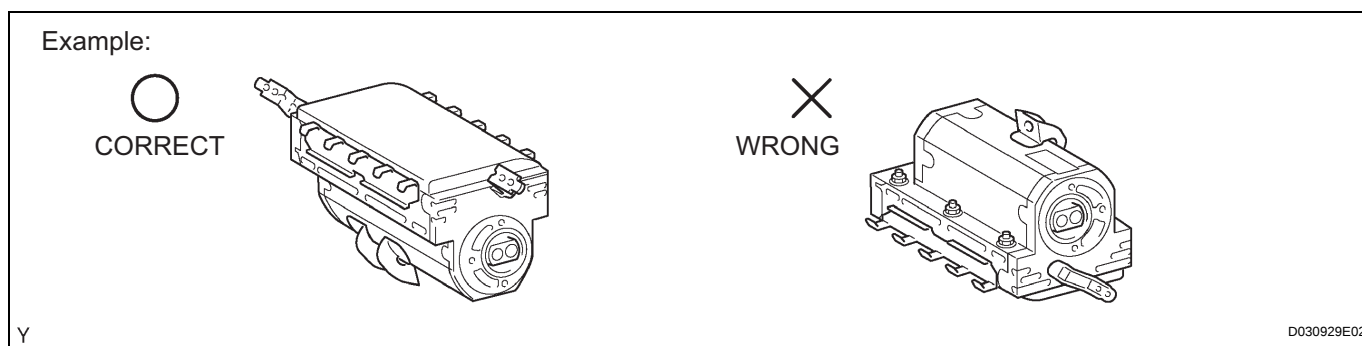
- (b) SPIRAL CABLE
  - (1) The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, as cable disconnection and other problems may occur. Refer to the information about correct installation of the steering wheel (See page [RS-399](#)).
- (c) STEERING PAD
  - (1) Always place a removed or new steering pad surface upward as shown in the illustration. Placing the horn button with the pad surface facing down could cause a serious accident if the airbag inflates. Also, do not place anything on top of the horn button.



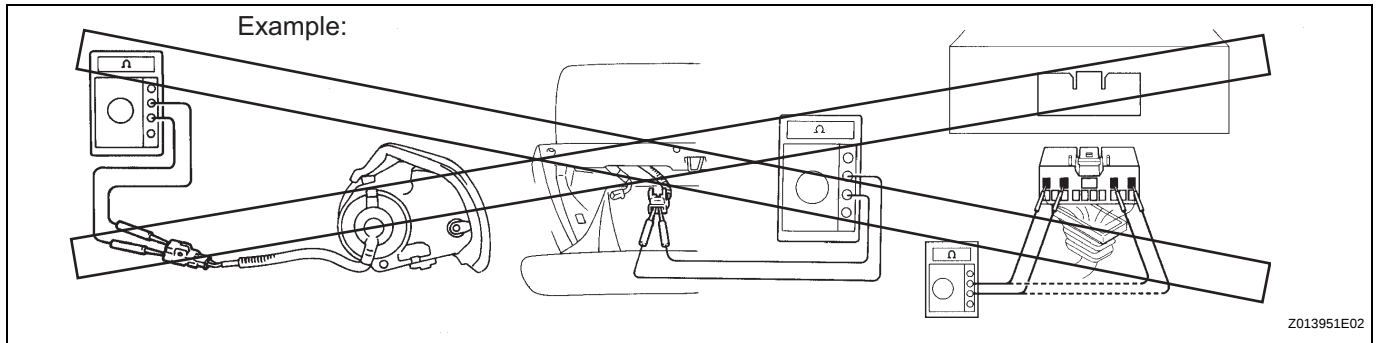
- (2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.



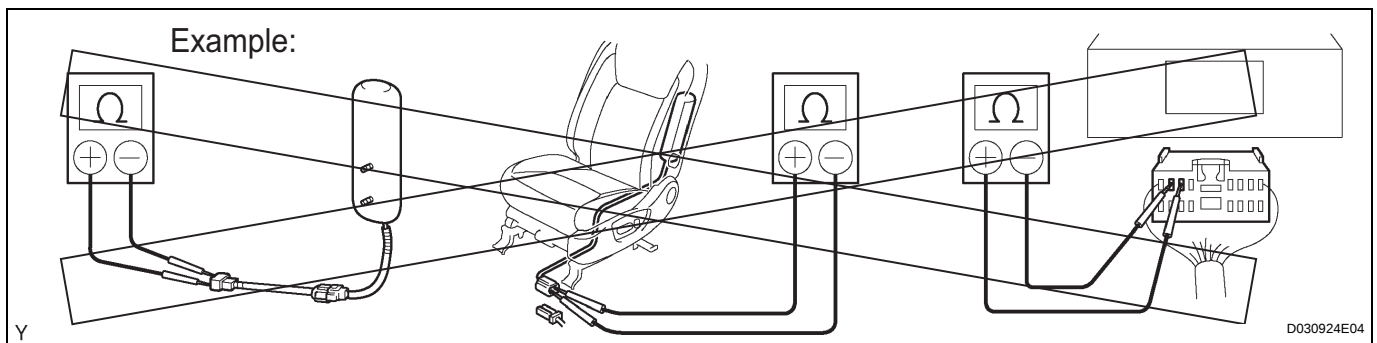
- (3) Grease or detergents of any kind should not be applied to the horn button.
- (4) Store the horn button assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.
- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.
- (6) When disposing of the vehicle or the horn button assembly by itself, the airbag should be deployed using SST before disposal (See page [RS-389](#)). Activate the airbag in a safe place away from electrical noise.
- (d) FRONT PASSENGER AIRBAG ASSEMBLY
- (1) Always place a removed or new front passenger airbag assembly with the pad surface facing upward as shown in the illustration. Placing the airbag assembly with the airbag inflation 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 inflate, which could cause serious injury.



- (3) Grease or detergents of any kind should not be applied to the front passenger airbag assembly.
  - (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.
  - (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.
  - (6) When disposing of the vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal (See page [RS-413](#)). Activate in a safe place, away from electrical noise.
- (e) FRONT SEAT SIDE AIRBAG ASSEMBLY
- (1) Always place a removed or new front seat side airbag assembly with the airbag inflation direction facing up.
  - (2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.

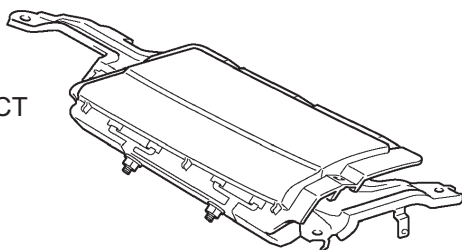


- (3) Grease or detergents of any kind should not be applied to the front seat side airbag assembly.
- (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

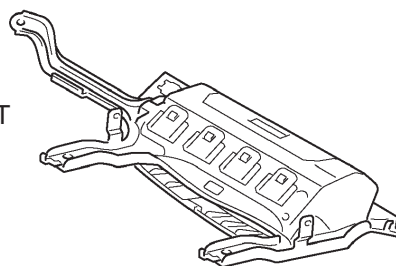
- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.
- (6) When disposing of a vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal (See page [RS-428](#)). Activate in a safe place away from electrical noise.
- (f) DRIVER SIDE KNEE AIRBAG ASSEMBLY AND FRONT PASSENGER SIDE KNEE AIRBAG ASSEMBLY
  - (1) Always place a removed or new knee airbag assembly with the airbag inflation direction facing upward. Placing the airbag assembly with the airbag inflation direction facing downward could cause a serious accident if the airbag inflates.

Example:

CORRECT



INCORRECT

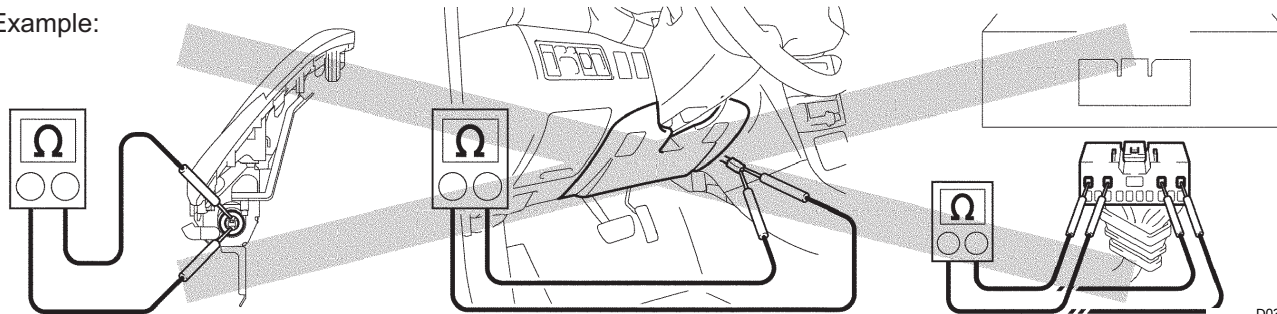


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- (2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.

Example:

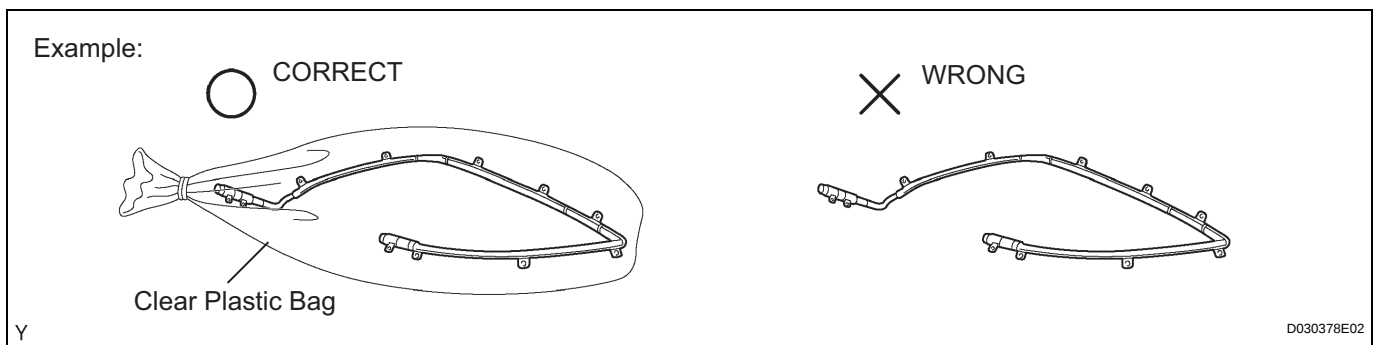


P

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- (3) Grease or detergents of any kind should not be applied to the knee airbag assembly.
- (4) Store the knee airbag assembly where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.
- (6) When disposing of a vehicle or knee airbag assembly unit by itself, the airbag should be inflated using SST before disposal (See page [RS-404](#)). Activate in a safe place, away from electrical noise.
- (g) CURTAIN SHIELD AIRBAG ASSEMBLY
  - (1) Always place a removed or new curtain shield airbag assembly in a clear plastic bag, and keep it in a safe place.

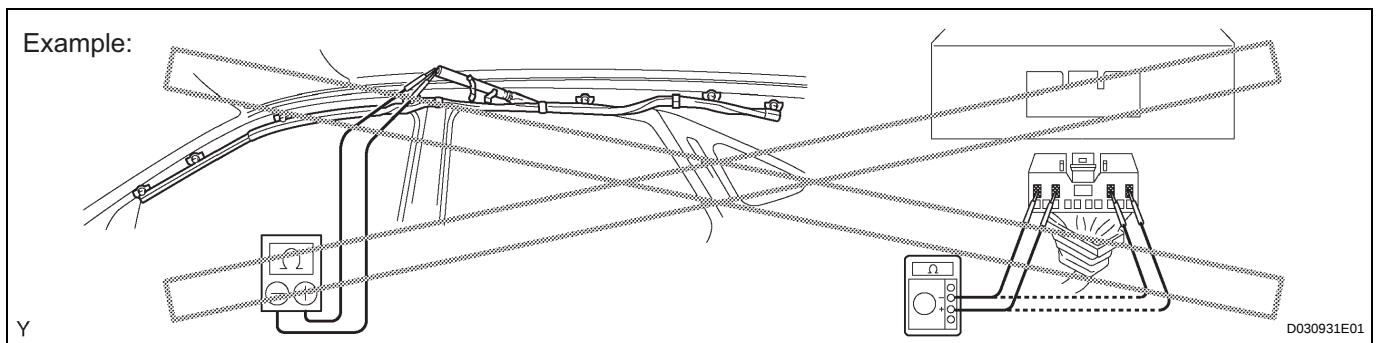
**CAUTION:**

The plastic bag is not reusable.

**NOTICE:**

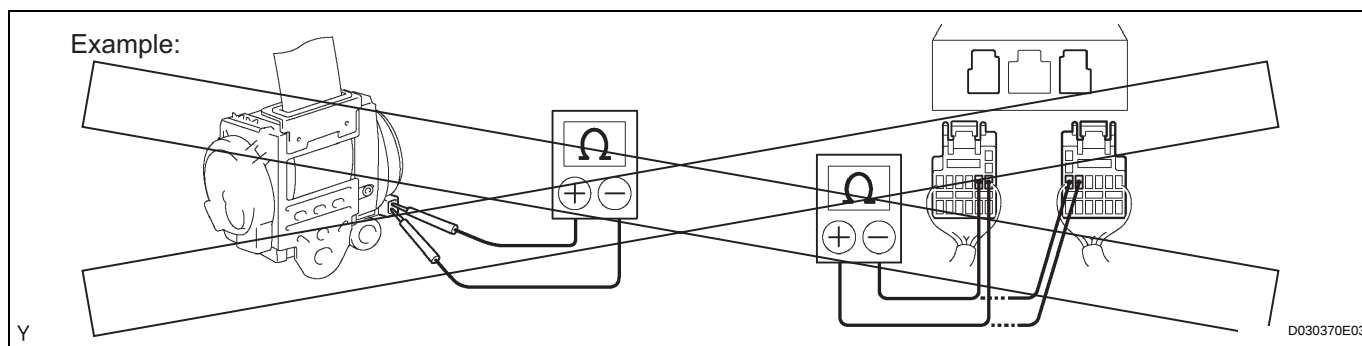
Never disassemble the curtain shield airbag assembly.

- (2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.



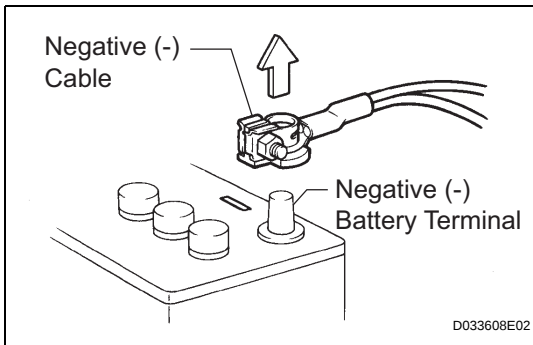
- (3) Grease or detergents of any kind should not be applied to the curtain shield airbag assembly.
- (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.
- (6) When disposing of a vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal (See page [RS-422](#)). Activate in a safe place away from electrical noise.
- (h) FRONT SEAT OUTER BELT ASSEMBLY AND REAR SEAT OUTER BELT ASSEMBLY (SEAT BELT PRETENSIONER)
  - (1) Never measure the resistance of the seat outer belt. This may cause the pretensioner of the seat belt to activate, which could cause serious injury.



- (2) Never disassemble the seat outer belt.
- (3) Never install the seat outer belt on another vehicle.
- (4) Store the seat outer belt in an area where the ambient temperature is below 80°C (176°F), the humidity is not high and there is no electrical noise.
- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to current entering the squib wiring.
- (6) When disposing of a vehicle or the seat outer belt unit by itself, the seat outer belt should be activated before disposal (See page [SB-20](#)). Activate in a safe place away from electrical noise.
- (7) As the seat outer belt is hot after being activated, allow some time for it to cool down sufficiently before disposal. Never apply water to cool down the seat outer belt.
- (8) Grease, detergents, oil or water should not be applied to the front seat outer belt.

- (i) **AIRBAG SENSOR ASSEMBLY**
- (1) Never reuse an airbag sensor assembly that has been involved in a collision where the SRS has deployed.
  - (2) The connectors to the airbag sensor assembly should be connected or disconnected with the sensor placed on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not placed on the floor, the SRS may activate.
  - (3) Work must be started at least 90 seconds after the ignition switch is turned off and the cable is disconnected from the negative (-) battery terminal, even if only loosening the set bolts of the airbag sensor assembly.
- (j) **WIRE HARNESS AND CONNECTOR**
- (1) The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are a standard yellow color. If the SRS wire harness becomes disconnected or the connector becomes broken, repair or replace it.



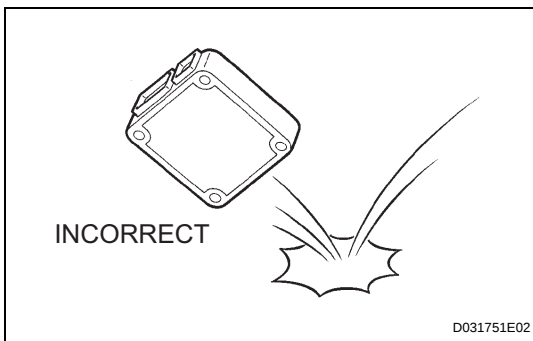
### 3. ELECTRONIC CONTROL

- (a) **REMOVAL AND INSTALLATION OF BATTERY TERMINAL**

**NOTICE:**

**Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.**

- (1) Before performing electronic work, disconnect the cable from the negative (-) battery terminal to prevent component and wire damage caused by accidental short circuits.
  - (2) When disconnecting the cable, turn the ignition switch and headlight dimmer switch off and loosen the cable nut completely. Perform these operations without twisting or prying the cable. Then disconnect the cable.
  - (3) Clock settings, radio settings, audio system memory, DTCs and other data are erased when the cable is disconnected from the negative (-) battery terminal. Write down any necessary data before disconnecting the cable.
- (b) **HANDLING OF ELECTRONIC 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 rendered inoperative by static electricity.
  - (2) Do not pull the wires when disconnecting electronic connectors. Pull the connector itself.
  - (3) Do not drop electronic components, such as sensors or relays. If they are dropped on a hard surface, they should be replaced.



- (4) When cleaning the engine with steam, protect the electronic components, air filter and emission-related components from water.
- (5) Never use an impact wrench to remove or install temperature switches or temperature sensors.
- (6) When measuring the resistance between terminals of a wire connector, insert the tester probe carefully to prevent terminals from bending.

#### 4. REMOVAL AND INSTALLATION OF FUEL CONTROL PARTS

##### (a) PLACE FOR REMOVING AND INSTALLING FUEL SYSTEM PARTS

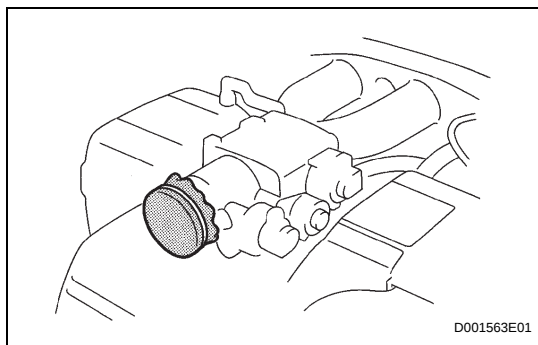
- (1) Work in a location with good air ventilation that does not have welders, grinders, drills, electric motors, stoves, or any other ignition sources.
- (2) Never work in a pit or near a pit as vaporized fuel will collect in those places.

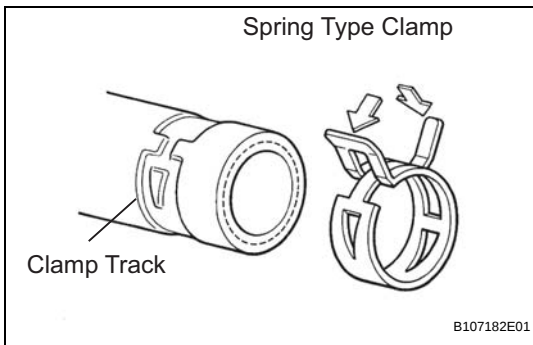
##### (b) REMOVING AND INSTALLING FUEL SYSTEM PARTS

- (1) Prepare a fire extinguisher before starting the operation.
- (2) To prevent static electricity, install a ground wire to the fuel changer, vehicle and fuel tank, do not spray the surrounding area with water. Be careful when performing work in this area, as the work surface will become slippery. Do not clean up gasoline spills with water, as this may cause the gasoline to spread, and possibly create a fire hazard.
- (3) Avoid using electric motors, working lights and other electric equipments that can cause sparks or high temperatures.
- (4) Avoid using iron hammers as they may create sparks.
- (5) Dispose of fuel-contaminated cloth separately using a fire resistant container.

#### 5. REMOVAL AND INSTALLATION OF ENGINE INTAKE PARTS

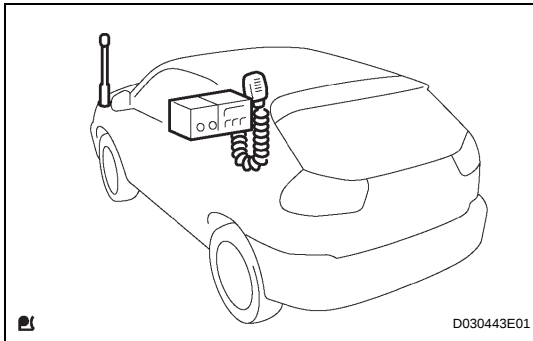
- (a) If any metal particles enter inlet system parts, this may damage the engine.
- (b) When removing and installing inlet system parts, cover the openings of the removed parts and engine openings. Use gummed tape or other suitable materials.
- (c) When installing inlet system parts, check that no metal particles have entered the engine or the installed parts.





## 6. HANDLING OF HOSE CLAMPS

- Before removing the hose, check the clamp position so that it can be reinstalled in the same position.
- Replace any deformed or dented clamps with new ones.
- When reusing a hose, attach the clamp on the clamp track portion of the hose.
- For a spring type clamp, you may want to spread the tabs slightly after installation by pushing in the direction of the arrows as shown in the illustration.

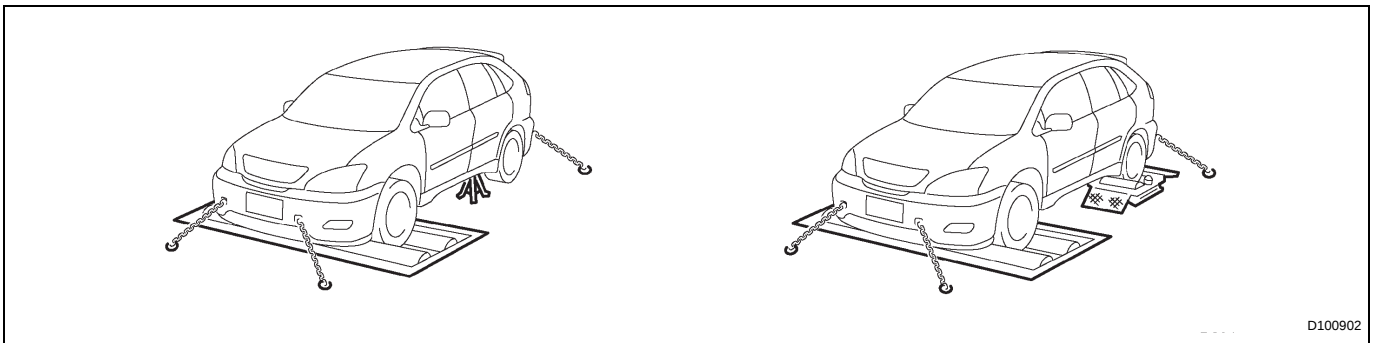


## 7. FOR VEHICLES EQUIPPED WITH MOBILE COMMUNICATION SYSTEMS

- Install the antenna far away from the ECU and sensors of the vehicle electronic systems as possible.
- Install an antenna feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle electronic systems. For details about ECU and sensors locations, refer to the section on the applicable components.
- Keep the antenna and feeder separate from other wirings as much as possible. This will prevent signals sent from the communication equipment from affecting vehicle equipment and vice-versa.
- Check that the antenna and feeder are correctly adjusted.
- Do not install any high-powered mobile communication system.

## 8. WHEN SERVICING FULL-TIME 4WD VEHICLES

The full-time 4WD LEXUS RX330 is equipped with the open center differential system.



If incorrect preparations or test procedures are used, the test will not only be unsuccessful, but may be dangerous as well.

Therefore, before beginning any such servicing or test, be sure to check the following items:

- Whether wheels should be touching ground or jacked up
- Transaxle gear position
- Maximum testing vehicle speed
- Maximum testing time

**CAUTION:**

- **Never accelerate or decelerate the vehicle suddenly**
- **Observe the other cautions given for each individual test**

## (a) Before Beginning Test

This vehicle does not have a Center Diff. Lock Mode or 4WD (Normal) Mode to allow only the front or rear wheel to be rotated.

The test method for this vehicle is different from that for vehicles equipped with the Center Diff. Lock Mode or 4WD (Normal) Mode, so make sure to use the correct test method.

## (b) Braking Force Test

(Vehicle Speed: Below 0.5 km/h or 0.3 mph)

When performing low-speed type brake tester measurements, observe the following instructions.

- (1) Position the wheels to be tested (front or rear) on the tester.
- (2) Shift the transaxle shift lever to "N" position.
- (3) Idle the engine, operate the brake booster and perform the test.

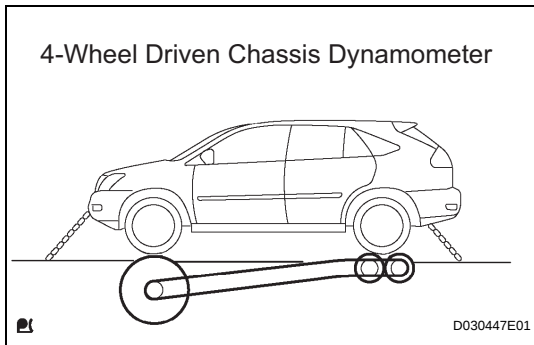
## (c) Speedometer Test or Other Tests

**NOTICE:**

**If you do not observe the following conditions for the test, there will be the cases where the 4WD functions will deteriorate; the parts in the drive-train system will have a malfunction; the vehicle will jump out. Therefore, do not conduct a test unless observing the following conditions.**

**HINT:**

When conducting a test with the vehicle highly loaded are driven with high speeds, observe the following conditions.

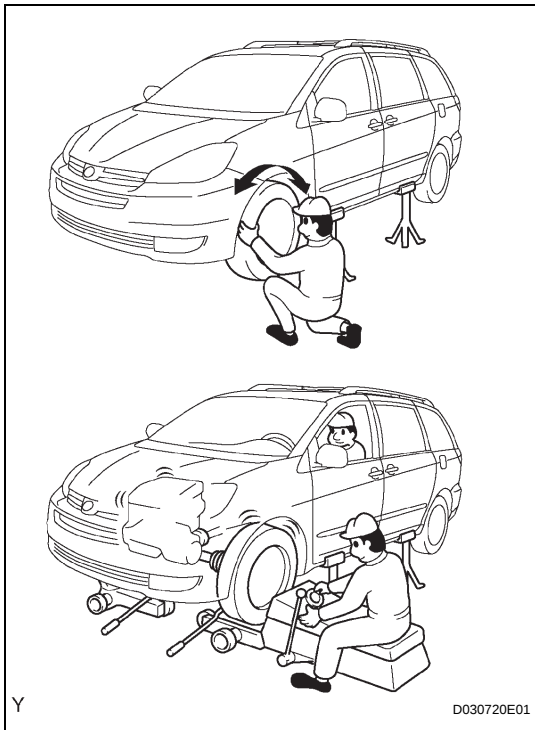


| No. | Chassis Dynamometer Type           | Vehicle Speed and Test Time | Propeller shaft           |
|-----|------------------------------------|-----------------------------|---------------------------|
| 1   | 4-Wheel Driven Chassis Dynamometer | No restriction              | Normal<br>(Do not remove) |

\*: This is to avoid damaging the center differential.

**NOTICE:**

- **Do not suddenly accelerate and do not suddenly apply brake.**
- **Confirm that the vehicle is securely immobilized.**
- **Never operate the brakes to drive the wheels or stop them suddenly.**



## (d) On-Vehicle Wheel Balancing

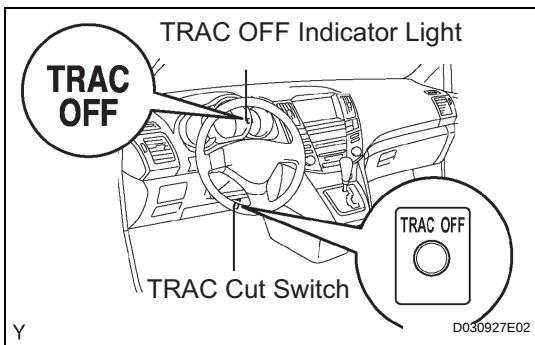
When doing on-vehicle wheel balancing on a full-time 4WD vehicle, to prevent the wheels from rotating at different speeds in different directions from each other (which could damage the center differential), always be sure to observe the following precautions:

- (1) All 4 wheels should be jacked up, clearing the ground completely.
- (2) The parking brake lever should be fully released.
- (3) None of the brakes should be allowed to drag.
- (4) The wheels should be driven on the wheel balancer with the engine running.

## HINT:

When doing this, be careful of the other wheels, which will rotate at the same time.

- (5) Avoid sudden acceleration, deceleration and braking.
- (6) Carry out wheel balancing with the transaxle in D position.



## 9. FOR VEHICLES EQUIPPED WITH TRACTION CONTROL (TRAC) SYSTEM

When using a 2-wheel drum tester such as a speedometer tester or chassis dynamometer, etc., or jacking up the front wheels and driving the wheels, always push in the TRAC cut ("TRAC OFF") switch and turn the TRAC system OFF.

## (a) Confirm TRAC system is OFF

- (1) Press the TRAC cut ("TRAC OFF") switch.
- (2) Check that the TRAC OFF indicator light comes on when the TRAC system is turned OFF by the TRAC cut switch.

## HINT:

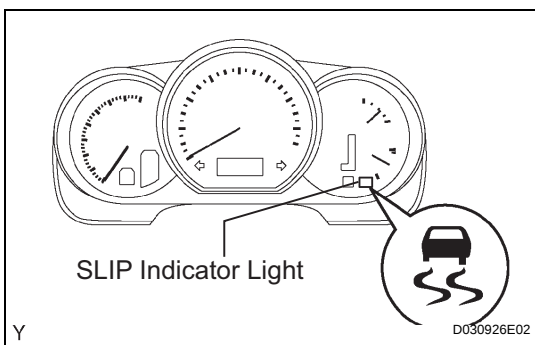
The SLIP indicator light should always operate right after the engine is restarted.

## (3) Begin measurements.

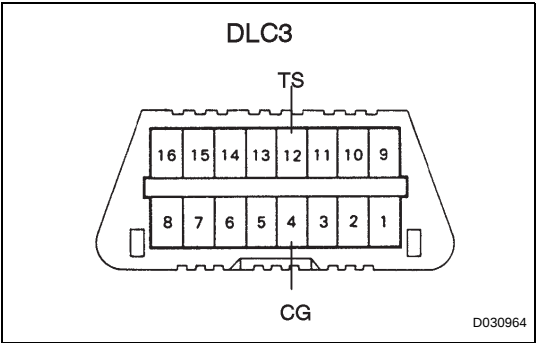
- (4) Press the TRAC cut switch to turn the TRAC to the operative mode and check that the TRAC OFF indicator light goes off.

## HINT:

The SLIP indicator light blinks when the TRAC system is operating.



IN

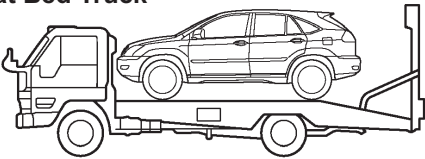
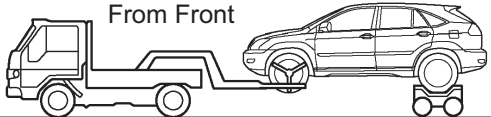
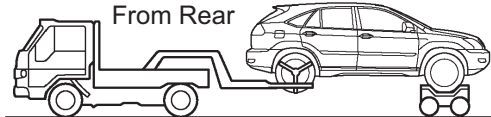
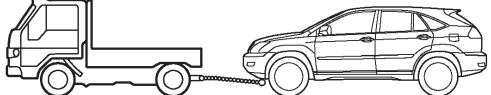


**10. FOR VEHICLES EQUIPPED WITH VEHICLE STABILITY CONTROL (VSC) SYSTEM**

- (a) Notices when using dram tester
- (1) When using a drum tester, be sure to start the engine with the ignition switch OFF, and connect SST to the terminals TS and CG of the DLC3 before the measurement in order to cancel the VSC operation.
- SST 09843-18040**
- NOTICE:**
- **Confirm that the VSC warning light blinks.**
  - **The VSC system is reset when the engine is restarted.**
  - **Fasten the vehicle with lock chains.**
- (b) Notice of related operations to VSC
- (1) Do not carry out unnecessary installation and removal as it might disorder the adjustment of the parts related to the VSC.
- (2) Be sure to carry out the preparation for operation and the confirmation of operation completion in accordance with the instructions of the text and when the operations related to the VSC are performed.

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

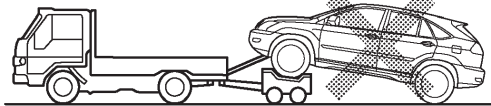
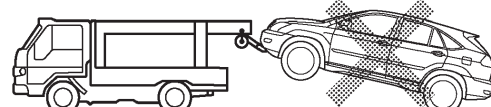
- Use one of methods shown below to tow the vehicle.
- If the vehicle has trouble with the chassis or drive train, use method 1 (flat bed truck).

| Towing Method                                                                                                                                                                                                 | Conditions | Parking Brake | Transaxle Shift Lever Position |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|--------------------------------|
| <b>1. Flat Bed Truck</b><br>                                                                                               |            | Applied       | Any Position                   |
| <b>2. Wheel Lift Type Truck</b><br><br> |            | Applied       | Any Position                   |
| <b>3. Towing with Rope</b><br>                                                                                             |            | Released      | Neutral Position               |

**NOTICE:**

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

The towing methods shown below are dangerous and can damage the vehicle, so do not use them.

|                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>NO</b></p>  | <ul style="list-style-type: none"> <li>• Never tow the vehicle using a method in which the wheels that are lifted up cannot rotate.</li> <li>• Do not use the sling type towing method either from the front or rear.</li> <li>• If this towing method is used, either from the front or rear:               <ol style="list-style-type: none"> <li>(a) The drive train may heat up and be damaged and the wheels may fly off the dolly.</li> <li>(b) In addition, if the vehicle is equipped with the VSC &amp; TRAC system, the system will apply an internal brake to the rotating wheels when the engine is not shut off.</li> </ol> </li> </ul> |
| <p style="text-align: center;"><b>NO</b></p>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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## 12. FOR VEHICLES EQUIPPED WITH CATALYTIC CONVERTER

**CAUTION:**

**If a large amount of unburned gasoline flows into the converter, it may cause overheating and is a fire hazard. To prevent this, observe the following precautions.**

- (a) Use only unleaded gasoline.
- (b) Avoid prolonged idling.  
Avoid idling the engine for more than 20 minutes.
- (c) Avoid a spark jump test.
  - (1) Perform a spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
  - (2) While testing, never race the engine.
- (d) Avoid a prolonged engine compression measurement.  
Engine compression measurements must be performed as rapidly as possible.
- (e) Do not run the engine when the fuel tank is nearly empty. This may cause the engine to misfire and create an extra load on the converter.

## 13. FOR VEHICLES EQUIPPED WITH AIR SUSPENSION SYSTEM (See page [SC-1](#))

## VEHICLE LIFT AND SUPPORT LOCATIONS

### 1. NOTICE ABOUT VEHICLE CONDITION WHEN JACKING UP VEHICLE

- (a) The vehicle must be unloaded before jacking up/lifting up the vehicle. Never jack up/lift up a heavily loaded vehicle.
- (b) When removing heavy parts such as the engine and transmission, the center of gravity of the vehicle may shift. To stabilize the vehicle, place a balance weight in a location where it will not roll or shift, or use a transmission jack to hold the jacking support.

### 2. NOTICE FOR USING 4 POST LIFT

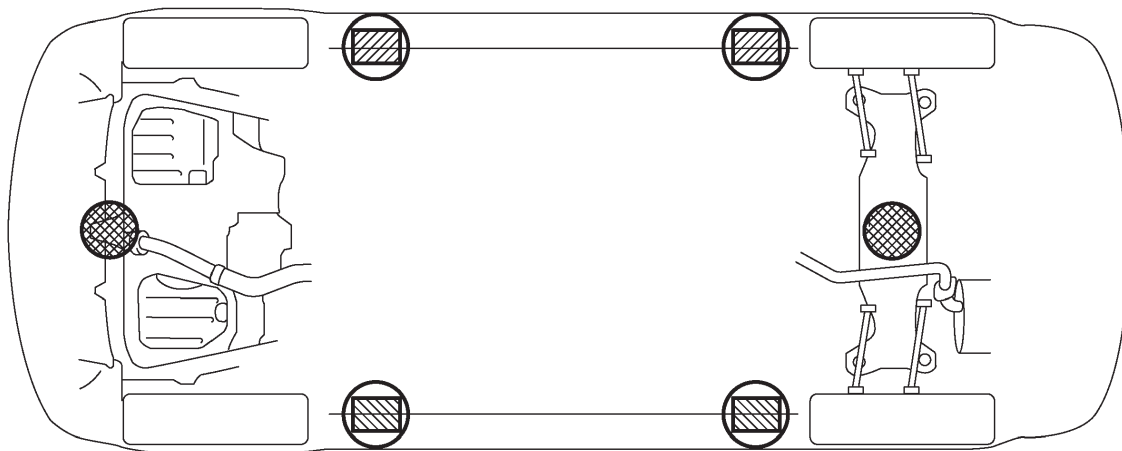
- (a) Follow the safety procedures outlined in the lift instruction manual.
- (b) Use precautionary measures to prevent the free wheel beam from damaging tires or wheels.
- (c) Use wheel chocks to secure the vehicle.

### 3. NOTICE FOR USING JACK AND SAFETY STAND

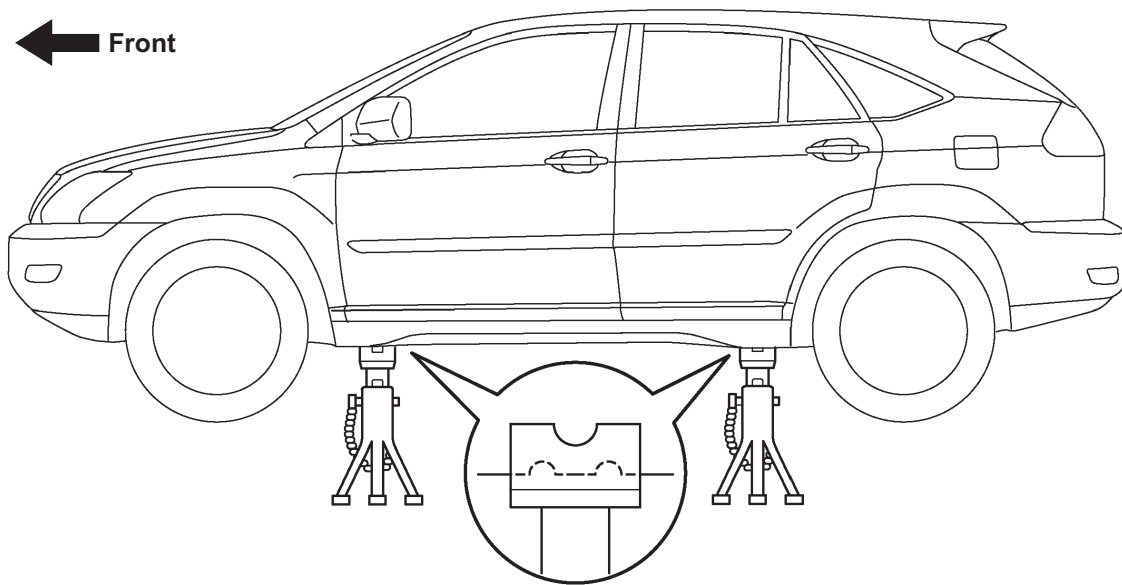
- (a) Work on a level surface. Use wheel chocks at all times.
- (b) Set the jack and rigid racks to the specified locations of the vehicle accurately.
- (c) When jacking up the vehicle, first release the parking brake and move the shift lever to N.
- (d) When jacking up the entire vehicle:
  - (1) When jacking up the front wheels first, make sure wheel chocks are behind the rear wheels.
  - (2) When jacking up the rear wheels first, make sure wheel chocks are in front of the front wheels.
- (e) When jacking up only the front or rear wheels of the vehicle:
  - (1) Before jacking up the front wheels, place wheel chocks on both sides of the rear wheels.
  - (2) Before jacking up the rear wheels, place wheel chocks on both sides of the front wheels.
- (f) When lowering a vehicle that only has its front or rear wheels jacked up:
  - (1) Before lowering the front wheels, make sure wheel chocks are in front of the rear wheels.
  - (2) Before lowering the rear wheels, make sure wheel chocks are behind the front wheels.

- (g) It is extremely dangerous to perform any work on a vehicle raised on a jack alone, even for work that can be finished quickly.

2WD



← Front



JACK POSITION

Front - - - - - Front frame

Rear - - - - - Rear suspension member

CAUTION :

When jacking up the front and rear, make sure the vehicle is not carrying any extra weight.

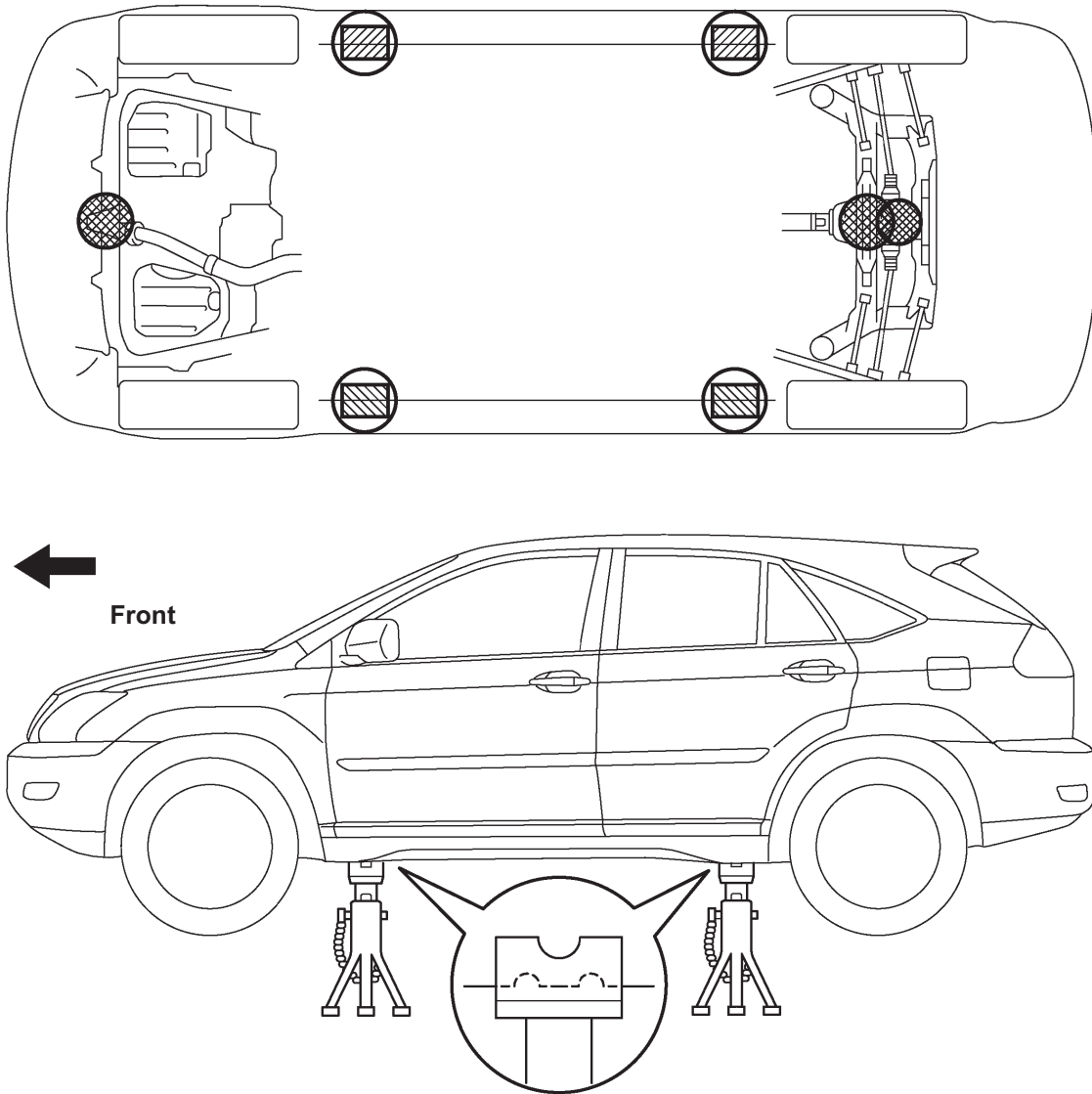
PANTOGRAPH JACK POSITION

SUPPORT POSITION

Safety stand and swing arm type lift - - - - -

4WD

IN



## JACK POSITION

Front - - - - - Front frame

Rear - - - - - Rear differential support or rear suspension member

## CAUTION :

When jacking up the front and rear, make sure the vehicle is not carrying any extra weight.

## NOTICE :

Do not apply a jack onto the aluminum cover of the carrier of the differential support.

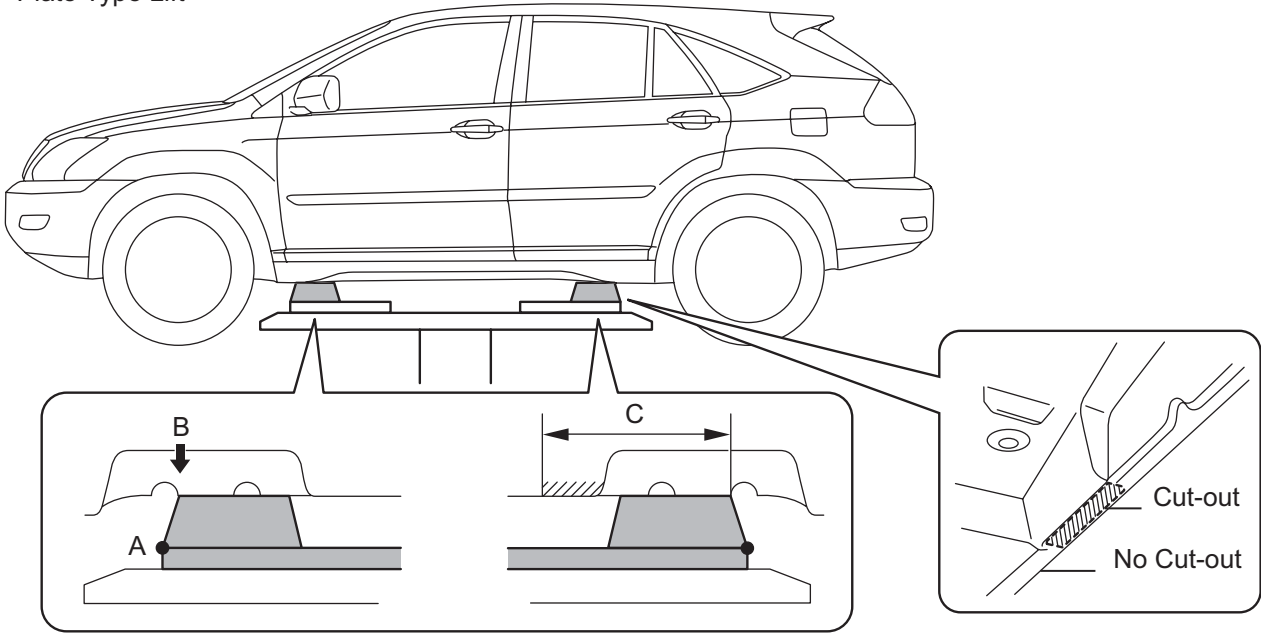
## PANTOGRAPH JACK POSITION

## SUPPORT POSITION

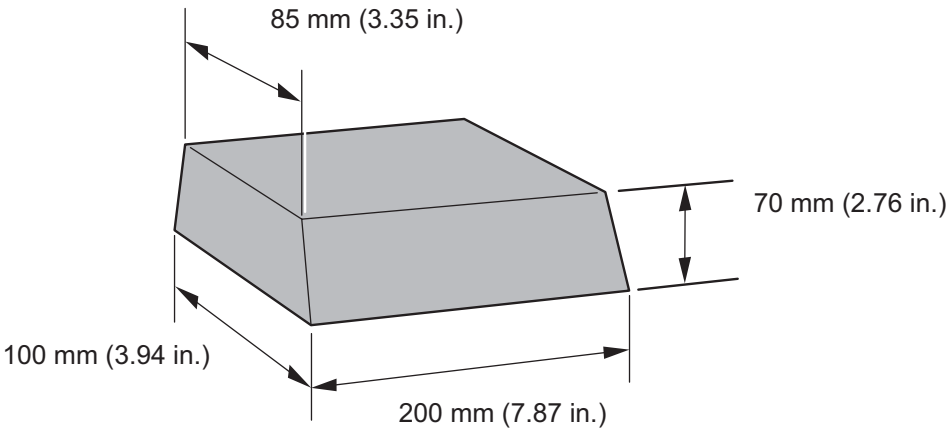
Safety stand and swing arm type lift - - - - -



Plate Type Lift



Attachment dimensions



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HINT:

|                             |                                                |
|-----------------------------|------------------------------------------------|
| Left and right set position | Place the vehicle over the center of the lift. |
|-----------------------------|------------------------------------------------|

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Front and rear set position | <ul style="list-style-type: none"><li>• When using attachments: 1) place the vehicle front attachments with the 70 x 200 mm (2.76 x 7.87 in.) side facing the front/rear of the vehicle; and 2) place the vehicle rear attachments with the 70 x 100 mm (2.76 x 3.94 in.) side facing the front/rear of the vehicle.</li><li>• Align the cushion gum ends of the plate with the attachment lower ends (A).</li><li>• Align the attachment upper end (B) with the front cut-out at the pantograph jack position.</li></ul> |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**NOTICE:**  
**Do not set an attachment onto any areas other than area (C) of the body rocker panel moulding indicated in the illustration.**

# HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

## GENERAL INFORMATION

A large number of ECU controlled systems are used in the LEXUS RX330. In general, ECU controlled systems are considered to be very intricate, requiring a high level of technical knowledge to troubleshoot. However, most problem checking procedures only involve inspecting the ECU controlled system's circuits one by one. An adequate understanding of the system and a basic knowledge of electricity is enough to perform effective troubleshooting, accurate diagnoses and necessary repairs.

### FOR USING INTELLIGENT TESTER

- Before using the intelligent tester, read the tester operator's manual thoroughly.
- If the tester cannot communicate with the ECU controlled systems when the tester is connected to the DLC3 with the ignition switch on and the tester turned on, there is a problem on the vehicle side or tester side.
  - (1) If communication is normal when the tester is connected to another vehicle, inspect the diagnosis data link line (Bus (+) line) or ECU power circuit of the vehicle.
  - (2) If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself. Perform the Self Test procedures outlined in the tester operator's manual.

# ELECTRONIC CIRCUIT INSPECTION PROCEDURE

## 1. BASIC INSPECTION

### (a) WHEN MEASURING RESISTANCE OF ELECTRONIC PARTS

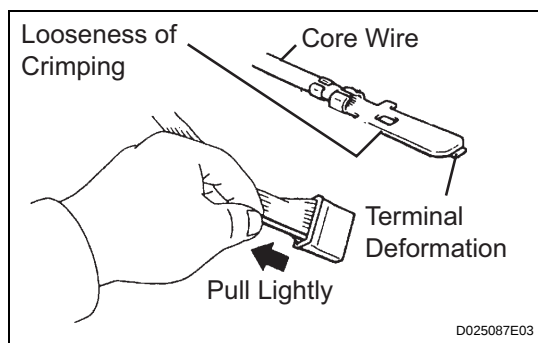
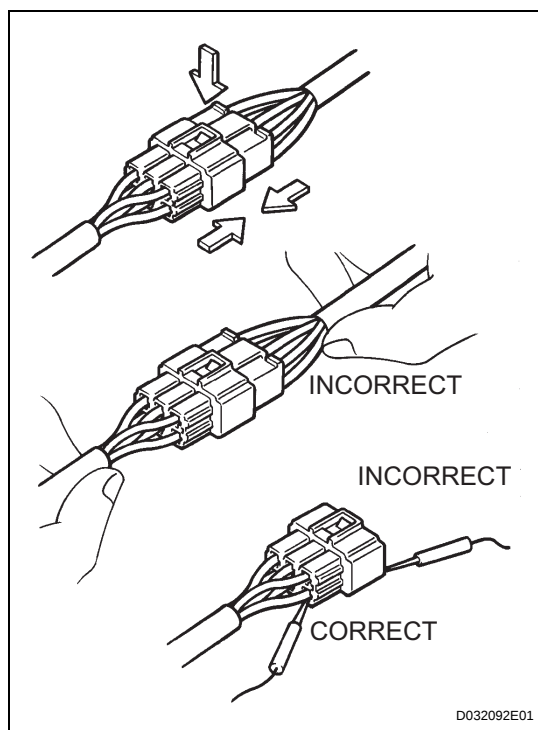
- (1) Unless otherwise stated, all resistance measurements should be made at an ambient temperature of 20°C (68°F). Resistance measurements may be inaccurate if measured at high temperatures, i.e. immediately after the vehicle has been running. Measurements should be made after the engine has cooled down.

### (b) HANDLING CONNECTORS

- (1) When disconnecting a connector, first squeeze the mating connector housing halves tightly together to release the lock, and then press the lock claw and separate the connector.
- (2) When disconnecting a connector, do not pull on the harnesses. Grasp the connector directly and separate it.
- (3) Before connecting a connector, check that there are no deformations, damage, looseness or missing terminals.
- (4) When connecting a connector, press firmly until it locks with a "click" sound.
- (5) If checking a connector with a TOYOTA electrical tester, check the connector from the backside (harness side) using a mini test lead.

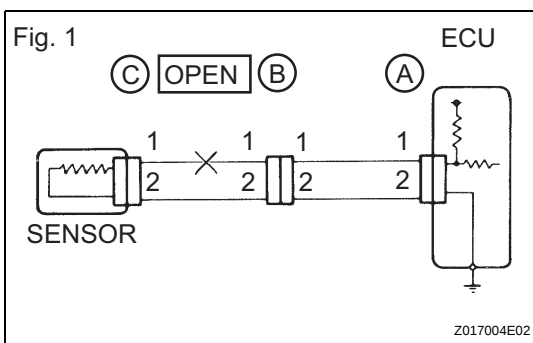
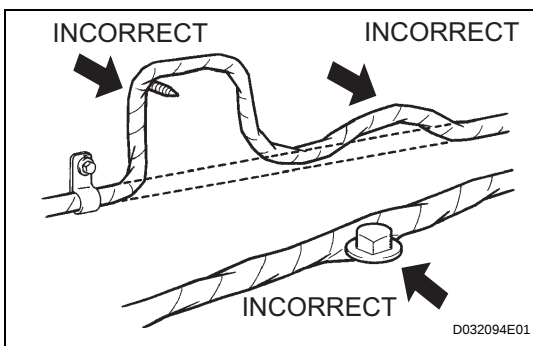
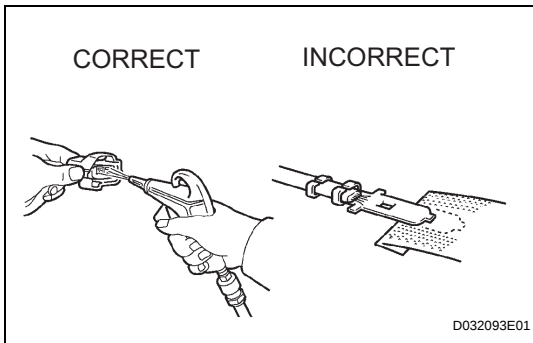
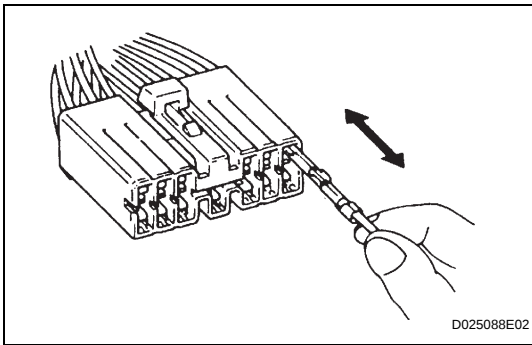
#### NOTICE:

- **As a waterproof connector cannot be checked from the backside, check it by connecting a sub-harness.**
- **Do not damage the terminals by moving the inserted tester needle.**



### (c) CHECKING CONNECTORS

- (1) Checking when a connectors is disconnected: Squeeze the connector together to confirm that they are fully connected and locked.
- (2) Checking when a connector is disconnected: Check by pulling the wire harness lightly from the backside of the connector. Look for unlatched terminals, missing terminals, loose crimps or broken conductor wires. Check visually for corrosion, metallic or foreign matter and water, and bent, rusted, overheated, contaminated, or deformed terminals.



- (3) Checking the contact pressure of the terminal: Prepare a spare male terminal. Insert it into a female terminal, and check for ample tension when inserting and after full engagement.

**NOTICE:**

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

IN

(d) REPAIR METHOD OF CONNECTOR TERMINAL

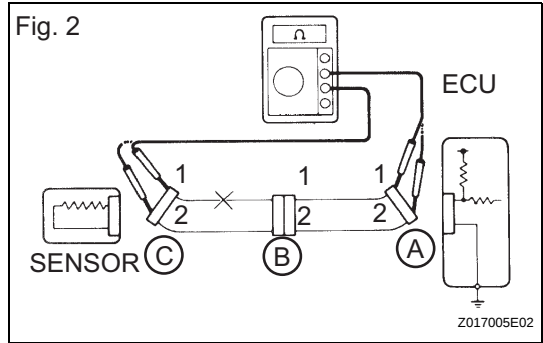
- (1) If there is any foreign matter on the terminal, clean the contact point with compressed air or a cloth. Never rub the contact point using sandpaper as the plating may come off.
- (2) If there is abnormal contact pressure, replace the female terminal. If the male terminal is gold-plated (gold color), use a gold-plated female terminal; if it is silver-plated (silver color), use a silver-plated female terminal.
- (3) Damaged, deformed, or corroded terminals should be replaced. If the terminal does not lock into the housing, the housing may have to be replaced.

(e) HANDLING OF WIRE HARNESS

- (1) If removing a wire harness, check the wiring and clamping before proceeding so that it can be restored in the same way.
- (2) Never twist, pull or slacken the wire harness more than necessary.
- (3) The wire harness should never come into contact with a high temperature part, or rotating, moving, vibrating or sharp-edged parts. Avoid contact with panel edges, screw tips and other sharp items.
- (4) When installing parts, never pinch the wire harness.
- (5) Never cut or break the cover of the wire harness. If it is cut or broken, replace it or repair it with vinyl tape.

2. CHECK FOR OPEN CIRCUIT

- (a) For an open circuit in the wire harness in Fig. 1, the resistance or voltage, as described below.



- (b) Check the resistance.
- (1) Disconnect connectors A and C and measure the resistance between the terminals of the connectors.

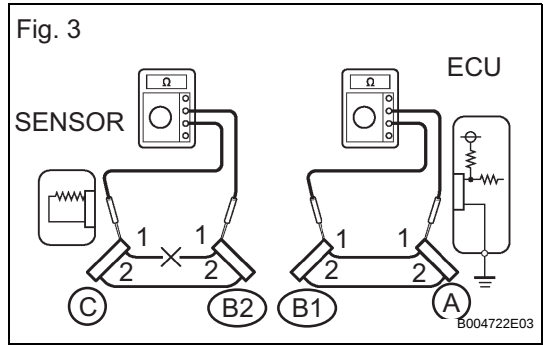
**Standard resistance (Fig. 2)**

| Tester Connection                               | Specified Condition     |
|-------------------------------------------------|-------------------------|
| Connector A terminal 1 - Connector C terminal 1 | 10 k $\Omega$ or higher |
| Connector A terminal 2 - Connector C terminal 2 | Below 1 $\Omega$        |

**HINT:**  
Measure the resistance while lightly shaking the wire harness vertically and horizontally. If the results match the examples above, an open circuit exists between terminal 1 of connector A and terminal 1 of connector C.

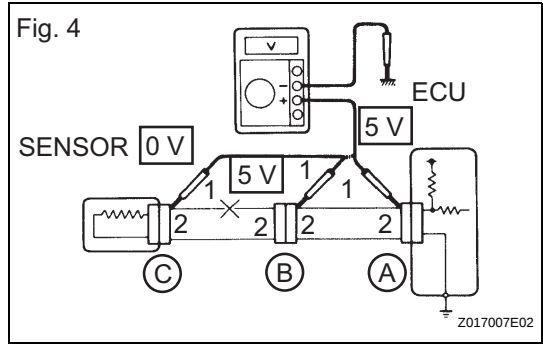
- (2) Disconnect connector B and measure the resistance between the terminals of the connectors.

**Standard resistance (Fig. 3)**



| Tester connection                                | Specified Condition     |
|--------------------------------------------------|-------------------------|
| Connector A terminal 1 - Connector B1 terminal 1 | Below 1 $\Omega$        |
| Connector B2 terminal 2 - Connector C terminal 2 | 10 k $\Omega$ or higher |

If the results match the examples above, an open circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

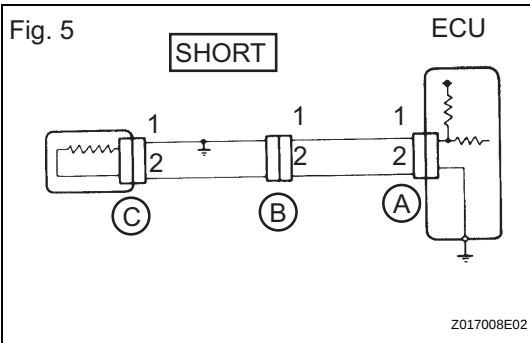


- (c) Check the voltage.
- (1) In a circuit in which voltage is applied to the ECU connector terminal, an open circuit can be checked by conducting a voltage check. With each connector still connected, measure the voltage between the body ground and these terminals (in this order): 1) terminal 1 of connector A, 2) terminal 1 of connector B, and 3) terminal 1 of connector C.

**Standard voltage (Fig. 4)**

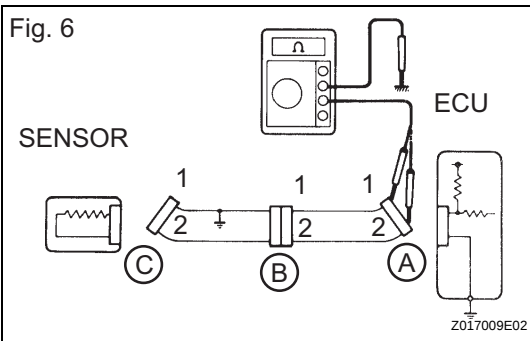
| Tester Connection                    | Specified Condition |
|--------------------------------------|---------------------|
| Connector A terminal 1 - Body ground | 5 V                 |
| Connector B terminal 1 - Body ground | 5 V                 |
| Connector C terminal 1 - Body ground | Below 1 V           |

If the results match the examples above, an open circuit exists in the wire harness between terminal 1 of connector B and terminal 1 of connector C.



### 3. CHECK FOR SHORT CIRCUIT

- (a) If the wire harness is ground shorted (Fig. 5), locate the section by conducting a resistance check with the body ground (below).



- (b) Check the resistance with the body ground.  
(1) Disconnect connectors A and C and measure the resistance.

#### Standard resistance (Fig. 6)

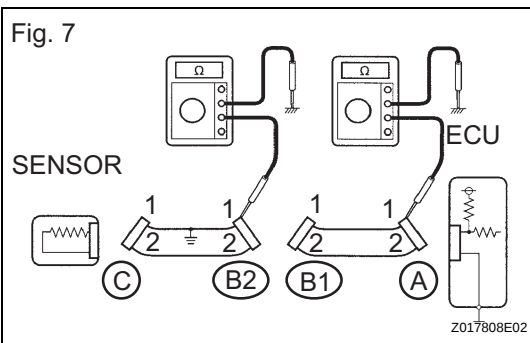
| Tester Connection                    | Specified Condition     |
|--------------------------------------|-------------------------|
| Connector A terminal 1 - Body ground | Below 1 $\Omega$        |
| Connector A terminal 2 - Body ground | 10 k $\Omega$ or higher |

#### HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally. If your results match the examples above, an open circuit exists between terminal 1 of connector A and terminal 1 of connector C.

- (2) Disconnect connector B and measure the resistance.

#### Standard resistance (Fig. 7)



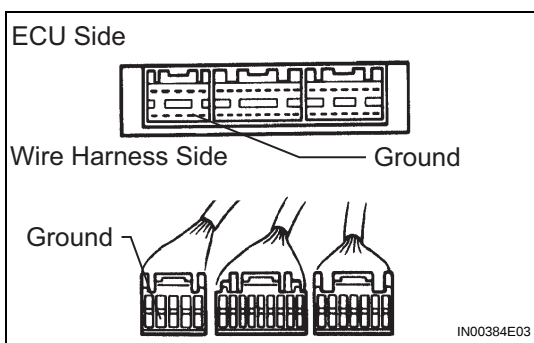
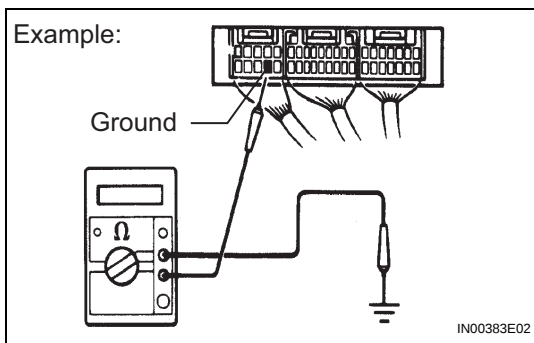
| Tester Connection                     | Specified Condition     |
|---------------------------------------|-------------------------|
| Connector A terminal 1 - Body ground  | 10 k $\Omega$ or higher |
| Connector B2 terminal 2 - Body ground | Below 1 $\Omega$        |

If the results match the examples above, a short circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

### 4. CHECK AND REPLACE ECU

#### NOTICE:

- The connector should not be disconnected from the ECU. Perform the inspection from the backside of the connector on the wire harness side.
- When no measuring condition is specified, perform the inspection with the engine stopped and the ignition switch on.
- Check that the connectors are fully seated. Check for loose, corroded or broken wires.



(a) First, check the ECU ground circuit. If it is faulty, repair it. If it is normal, the ECU could be faulty. Temporarily replace the ECU with a normally functioning one and check if the symptoms occur. If the trouble symptoms disappear, replace the original ECU.

(1) Measure the resistance between the ECU ground terminal and body ground.

**Standard resistance:**

**Below 1  $\Omega$**

(2) Disconnect the ECU connector. Check the ground terminal on the ECU side and wire harness side for bending, corrosion or foreign matter. Lastly, check the contact pressure of the female terminals.

## HOW TO PROCEED WITH TROUBLESHOOTING

### 1. OPERATION FLOW

#### HINT:

Perform troubleshooting in accordance with the procedures below. The following is an outline of basic troubleshooting procedures. Confirm the troubleshooting procedures for the circuit you are working on before beginning troubleshooting.

IN

#### 1 VEHICLE BROUGHT TO WORKSHOP

NEXT

#### 2 CUSTOMER PROBLEM ANALYSIS

- (a) Ask the customer about the conditions and environment when the problem occurred.

NEXT

#### 3 INSPECT BATTERY VOLTAGE

##### Standard voltage:

11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

#### 4 SYMPTOM CONFIRMATION AND DTC (AND FREEZE FRAME DATA) CHECK

- (a) Visually check the wire harnesses, connectors and fuses for open and short circuits.  
(b) Warm up the engine to the normal operating temperature.  
(c) Confirm the problem symptoms and conditions, and check for DTCs

##### Result

| Result            | Proceed to |
|-------------------|------------|
| DTC is output     | A          |
| DTC is not output | B          |

B

Go to step 6

A

5

DTC CHART

- (a) Check the results obtained in step 4. Then find the output DTC in the DTC chart. Look at the "Trouble Area" column for a list of potentially malfunctioning circuits and / or parts.

NEXT

Go to step 7

6

PROBLEM SYMPTOMS CHART

- (a) Check the results obtained in step 4. Then find the problem symptoms in the problem symptoms table. Look at the "Suspected Area" column for a list of potentially malfunctioning circuits and / or parts.

NEXT

7

CIRCUIT INSPECTION OR PARTS INSPECTION

- (a) Identify the malfunctioning circuit or part.

NEXT

8

ADJUST, REPAIR OR REPLACE

- (a) Adjust, repair or replace the malfunctioning circuit or parts.

NEXT

9

CONFIRMATION TEST

- (a) After the adjustment, repairs or replacement, confirm that the malfunction no longer exists. If the malfunction does not reoccur, perform a confirmation test under the same conditions and in the same environment as when the malfunction occurred the first time.

NEXT

END

2. CUSTOMER PROBLEM ANALYSIS

## HINT:

- In troubleshooting, confirm that the problem symptoms have been accurately identified. Preconceptions should be discarded in order to make an accurate judgment. To clearly understand what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time the malfunction occurred.
- Gather as much information as possible for reference. Past problems that seem unrelated may also help in some cases.
- The following 5 items are important points in the 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                                           |

### 3. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE

## HINT:

The diagnostic system in the LEXUS RX330 has various functions.

- The first function is the Diagnostic Trouble Code (DTC) check. A DTC is a code stored in the ECU memory whenever a malfunction in the signal circuits to the ECU occurs. In a DTC check, a previous malfunction's DTC can be checked by a 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 functions, the problem areas can be narrowed down and troubleshooting is more effective. Diagnostic functions are incorporated in the following system in the LEXUS RX330.

| System                                              | Diagnostic Trouble Code Check | Input Signal Check (Sensor Check) | Diagnostic Test Mode (Active Test) |
|-----------------------------------------------------|-------------------------------|-----------------------------------|------------------------------------|
| SFI System                                          | ○<br>(with Check Mode)        | ○                                 | ○                                  |
| Air Suspension System                               | ○                             | ○                                 | ○                                  |
| Tire Pressure Warning System                        | ○                             |                                   | ○                                  |
| ABS with EBD & BA & TRAC & VSC System               | ○                             | ○                                 | ○                                  |
| Electronically Controlled Automatic Transaxle [ECT] | ○<br>(with Check Mode)        | ○                                 | ○                                  |
| Power Tilt and Power Telescopic Steering Column     | ○                             |                                   | ○                                  |
| Air Conditioning System                             | ○                             |                                   | ○                                  |
| Supplemental Restraint System                       | ○                             |                                   |                                    |
| Lighting System                                     | ○                             |                                   | ○                                  |
| Wiper and Washer System                             |                               |                                   | ○                                  |
| Combination Meter                                   |                               |                                   | ○                                  |
| Power Window Control System                         |                               |                                   | ○                                  |

| System                                      | Diagnostic Trouble Code Check | Input Signal Check (Sensor Check) | Diagnostic Test Mode (Active Test) |
|---------------------------------------------|-------------------------------|-----------------------------------|------------------------------------|
| Power Mirror Control System (w/ memory)     |                               |                                   | ○                                  |
| Front Power Seat Control System (w/ memory) |                               |                                   | ○                                  |
| Power Door Lock Control System              |                               |                                   | ○                                  |
| Back Door Closer System                     | ○                             |                                   | ○                                  |
| Power Back Door System                      | ○                             |                                   | ○                                  |
| Wireless Door Lock Control System           | ○                             |                                   | ○                                  |
| Sliding Roof System                         |                               |                                   | ○                                  |
| Engine Immobiliser System                   | ○                             |                                   | ○                                  |
| Multiplex Communication System              | ○                             |                                   |                                    |
| CAN Communication System                    | ○                             |                                   |                                    |
| Cruise Control System                       | ○                             | ○                                 |                                    |
| Dynamic Laser Cruise Control System         | ○                             | ○                                 | ○                                  |

- In the DTC check, it is very important to determine whether the problem indicated by the DTC either: 1) still occurs, or 2) occurred in the past but has returned to normal. In addition, the DTC should be compared to the problem symptom to see if they are related. For this reason, DTCs should be checked before and after confirmation of symptoms (i.e., whether or not problem symptoms exist) to determine current system conditions, as shown in the flowchart below.
- Never skip the DTC check. Failing to check DTCs may, depending on the case, result in unnecessary troubleshooting for systems operating normally or lead to repairs not related to the problem. Follow the procedures listed in the flowchart in the correct order.
- The following flowchart shows how to proceed with troubleshooting using the DTC check. Directions from the flowchart will indicate how to proceed either to DTC troubleshooting or to the troubleshooting of each problem symptom.

## 1 DTC CHECK

NEXT

## 2 MAKE A NOTE OF DTCS DISPLAYED AND THEN CLEAR MEMORY

NEXT

## 3 SYMPTOM CONFIRMATION

### Result

| Result            | Proceed to |
|-------------------|------------|
| No symptoms exist | A          |
| Symptoms exist    | B          |

B

Go to step 5

A

4

SIMULATION TEST USING SYMPTOM SIMULATION METHODS

NEXT

5

DTC CHECK

**Result**

| Result            | Proceed to |
|-------------------|------------|
| DTC is not output | A          |
| DTC is output     | B          |

B

TROUBLESHOOTING OF PROBLEM  
INDICATED BY DTC

A

6

SYMPTOM CONFIRMATION

**Result**

| Result            | Proceed to |
|-------------------|------------|
| No symptoms exist | A          |
| Symptoms exist    | B          |

If a DTC was displayed in the initial DTC check, the problem may have occurred in a wire harness or connector in that circuit in the past. Check the wire harness and connectors.

B

SYSTEM NORMAL

A

**TROUBLESHOOTING OF EACH PROBLEM SYMPTOM**

The problem still occurs in a place other than the diagnostic circuit (the DTC displayed first is either for a past problem or a secondary problem).

IN

#### 4. SYMPTOM SIMULATION

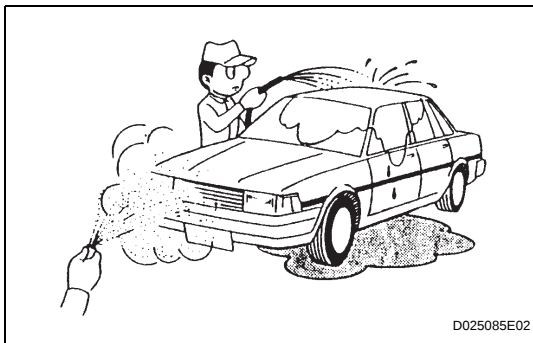
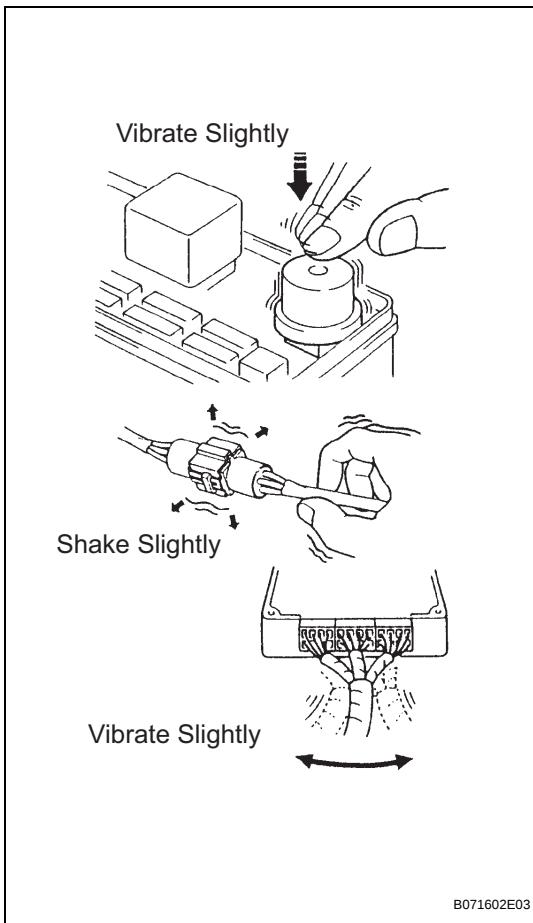
##### HINT:

The most difficult case in troubleshooting is when no problem symptoms occur. In such a case, a thorough problem analysis must be carried out. A simulation of the same or similar conditions and environment in which the problem occurred in the customer's vehicle should be carried out. No matter how much skill or experience a technician has, troubleshooting without confirming the problem symptoms will lead to important repairs being overlooked and mistakes or delays.

##### For example:

**With a problem that only occurs when the engine is cold or as a result of vibration caused by the road during driving, the problem can never be determined if the symptoms are being checked on a stationary vehicle or a vehicle with a warmed-up engine. Vibration, heat or water penetration (moisture) is difficult to reproduce. The symptom simulation tests below are effective substitutes for the conditions and can be applied on a stationary vehicle. Important points in the symptom simulation test:**

**In the symptom simulation test, the problem symptoms as well as the problem area or parts must be confirmed. First, narrow down the possible problem circuits according to the symptoms. Then, connect the tester and carry out the symptom simulation test, judging whether the circuit being tested is defective or normal. Also, confirm the problem symptoms at the same time. Refer to the problem symptoms table for each system to narrow down the possible causes.**



- (a) **VIBRATION METHOD:** When a malfunction seems to occur as a result of vibration.

(1) **PART AND SENSOR**

Apply slight vibration with a finger to the part of the sensor suspected to be the cause of the problem, and check whether or not the malfunction occurs.

**NOTICE:**

**Applying strong vibration to relays may open relays.**

(2) **CONNECTORS**

Slightly shake the connector vertically and horizontally.

(3) **WIRE HARNESS**

Slightly shake the wire harness vertically and horizontally.

**HINT:**

The connector joint and fulcrum of the vibration are the major areas that should be checked thoroughly.

- (b) **HEAT METHOD:** When a malfunction seems to occur when the area in question is heated.

- (1) Heat the component that is the possible cause of the malfunction with a hair dryer or similar device. Check if the malfunction occurs.

**NOTICE:**

- **Do not heat to more than 60°C (140°F). Exceeding this temperature may damage the components.**
- **Do not apply heat directly to the parts in the ECU.**

- (c) **WATER SPRINKLING METHOD:** When a malfunction seems to occur on a rainy day or in high-humidity.

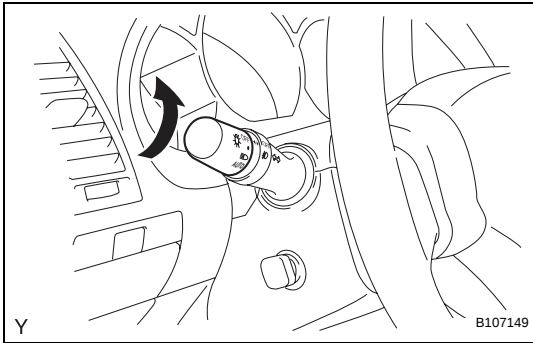
- (1) Sprinkle water onto the vehicle and check if the malfunction occurs.

**NOTICE:**

- **Never sprinkle water directly into the engine compartment. Indirectly change the temperature and humidity by spraying water onto the front of the radiator.**
- **Never apply water directly onto the electronic components.**

**HINT:**

If the vehicle has or had a water leakage problem, the leakage may have damaged the ECU or connections. Look for evidence of corrosion or short circuits. Proceed with caution during water tests.



(d) **HIGH ELECTRICAL LOAD METHOD:** When a malfunction seems to occur when electrical load is excessive.

- (1) Turn on the heater blower, headlight, rear window defogger and all other electrical loads. Check if the malfunction reoccurs.

## 5. DIAGNOSTIC TROUBLE CODE CHART

Look for output Diagnostic Trouble Codes (DTCs) (from the DTC checks) in the appropriate section's Diagnostic Trouble Code Chart. Use the chart to determine the trouble area and the proper inspection procedure. A description of each of the chart's columns is shown in the table below.

| Item           | Description                                                                                                                        |
|----------------|------------------------------------------------------------------------------------------------------------------------------------|
| DTC No.        | Indicates the diagnostic trouble code                                                                                              |
| Detection Item | Indicates the system or details of the problem                                                                                     |
| Trouble Area   | Indicates the suspect areas of the problem                                                                                         |
| See Page       | Indicates the page where the inspection procedures for each circuit is to be found, or gives instruction for checking and repairs. |

## 6. PROBLEM SYMPTOMS TABLE

When a "Normal" code is output during a DTC check but the problem still occurs, use the Problem Symptoms Table. The suspected areas (circuits or parts) for each problem symptoms are in the table. The suspected areas are listed in order of probability. A description of each of the chart's columns is shown in the table below.

HINT:

In some cases, the problem is not detected by the diagnostic system even though a problem symptom occurs. It is possible that the problem is occurring outside the detection range of the diagnostic system, or that the problem occurs in a completely different system.

| Item                                 | Description                                                        |
|--------------------------------------|--------------------------------------------------------------------|
| Problem Symptom                      | -                                                                  |
| Circuit Inspection, Inspection Order | Indicates the order in which the circuits need to be checked       |
| Circuit or Part Name                 | Indicates the circuit or part which needs to be checked            |
| See Page                             | Indicates the page where the flowchart for each circuit is located |

## 7. CIRCUIT INSPECTION

A description of the main areas of each circuit inspection is shown in the table below.

| Item                                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Circuit Description                            | The major role, operation of the circuit and its component parts are explained.                                                                                                                                                                                                                                                                                                                                                                                          |
| Diagnostic Trouble Code No. and Detection item | Indicates the diagnostic trouble codes, diagnostic trouble code settings and suspected areas for a problem                                                                                                                                                                                                                                                                                                                                                               |
| Wiring diagram                                 | This shows a wiring diagram of the circuit.<br>Use this diagram together with ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit.<br>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<br>The first letter indicates the basic wire color and the second letter indicates the color of the stripe. |

| Item                                                                 | Description                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inspection Procedures                                                | Use the inspection procedures to determine if the circuit is normal or abnormal. If abnormal, use the inspection procedures to determine whether the problem is located in the sensors, actuators, wire harnesses or ECU.                                                                   |
| Indicates the condition of the connector of the ECU during the check | Connector being checked is connected.<br>Connections of tester are indicated by (+) or (-) after the terminal name.<br>Connector being checked is disconnected.<br>The inspections between a connector and body ground, information about the body ground is not shown in the illustration. |

# TERMS

## ABBREVIATIONS USED IN MANUAL

| Abbreviations | Meaning                              |
|---------------|--------------------------------------|
| ABS           | Anti-Lock Brake System               |
| A/C           | Air Conditioner                      |
| AC            | Alternating Current                  |
| ACC           | Accessory                            |
| ACIS          | Acoustic Control Induction System    |
| ACM           | Active Control Engine Mount          |
| ACSD          | Automatic Cold Start Device          |
| A.D.D         | Automatic Disconnecting Differential |
| A/F           | Air-Fuel Ratio                       |
| AHC           | Active Height Control Suspension     |
| ALR           | Automatic Locking Retractor          |
| ALT           | Alternator                           |
| AMP           | Amplifier                            |
| ANT           | Antenna                              |
| APPROX.       | Approximately                        |
| ASSY          | Assembly                             |
| A/T, ATM      | Automatic Transmission (Transaxle)   |
| ATF           | Automatic Transmission Fluid         |
| AUTO          | Automatic                            |
| AUX           | Auxiliary                            |
| AVG           | Average                              |
| AVS           | Adaptive Variable Suspension         |
| B+            | Battery Voltage                      |
| BA            | Brake Assist                         |
| BACS          | Boost Altitude Compensation System   |
| BAT           | Battery                              |
| BDC           | Bottom Dead Center                   |
| B/L           | Bi-Level                             |
| B/S           | Bore-Stroke Ratio                    |
| BTDC          | Before Top Dead Center               |
| BVSV          | Bimetallic Vacuum Switching Valve    |
| CAN           | Controller Area Network              |
| CB            | Circuit Breaker                      |
| CCo           | Catalytic Converter For Oxidation    |
| CCV           | Canister Closed Valve                |
| CD            | Compact Disc                         |
| CF            | Cornering Force                      |
| CG            | Center Of Gravity                    |
| CH            | Channel                              |
| CKD           | Complete Knock Down                  |
| COMB.         | Combination                          |
| CPE           | Coupe                                |
| CPS           | Combustion Pressure Sensor           |
| CPU           | Central Processing Unit              |
| CRS           | Child Restraint System               |
| CTR           | Center                               |

| Abbreviations | Meaning                                        |
|---------------|------------------------------------------------|
| C/V           | Check Valve                                    |
| CV            | Control Valve                                  |
| CW            | Curb Weight                                    |
| DC            | Direct Current                                 |
| DEF           | Defogger                                       |
| DFL           | Deflector                                      |
| DIFF.         | Differential                                   |
| DIFF. LOCK    | Differential Lock                              |
| D/INJ         | Direct Injection                               |
| DLC           | Data Link Connector                            |
| DLI           | Distributorless Ignition                       |
| DOHC          | Double Overhead Camshaft                       |
| DP            | Dash Pot                                       |
| DS            | Dead Soak                                      |
| DSP           | Digital Signal Processor                       |
| DTC           | Diagnostic Trouble Code                        |
| DVD           | Digital Versatile Disc                         |
| EBD           | Electric Brake Force Distribution              |
| EC            | Electrochromic                                 |
| ECAM          | Engine Control And Measurement System          |
| ECD           | Electronically Controlled Diesel               |
| ECDY          | Eddy Current Dynamometer                       |
| ECT           | Electronic Controlled Automatic Transmission   |
| ECU           | Electronic Control Unit                        |
| ED            | Electro-Deposited Coating                      |
| EDU           | Electronic Driving Unit                        |
| EDIC          | Electric Diesel Injection Control              |
| EFI           | Electronic Fuel Injection                      |
| E/G           | Engine                                         |
| EGR           | Exhaust Gas Recirculation                      |
| EGR-VM        | EGR-Vacuum Modulator                           |
| ELR           | Emergency Locking Retractor                    |
| EPS           | Electric Power Steering                        |
| ENG           | Engine                                         |
| ES            | Easy & Smooth                                  |
| ESA           | Electronic Spark Advance                       |
| ETCS-i        | Electronic Throttle Control System-intelligent |
| EVAP          | Evaporative Emission Control                   |
| EVP           | Evaporator                                     |
| E-VRV         | Electric Vacuum Regulating Valve               |
| EX            | Exhaust                                        |
| FE            | Fuel Economy                                   |
| FF            | Front-Engine-Front-Wheel-Drive                 |
| F/G           | Fuel Gauge                                     |
| FIPG          | Formed In Place Gasket                         |
| FL            | Fusible Link                                   |
| F/P           | Fuel Pump                                      |
| FPU           | Fuel Pressure Up                               |
| FR            | Front                                          |

| Abbreviations | Meaning                                     |
|---------------|---------------------------------------------|
| F/W           | Flywheel                                    |
| FW/D          | Flywheel Damper                             |
| FWD           | Front-Wheel-Drive                           |
| GAS           | Gasoline                                    |
| GND           | Ground                                      |
| GPS           | Global Positioning System                   |
| GSA           | Gear Shift Actuator                         |
| HAC           | High Altitude Compensator                   |
| H/B           | Hatchback                                   |
| H-FUSE        | High Current Fuse                           |
| HI            | High                                        |
| HID           | High Intensity Discharge (Headlight)        |
| HPU           | Hydraulic Power Unit                        |
| HSG           | Housing                                     |
| HT            | Hard Top                                    |
| HV            | Hybrid Vehicle                              |
| HWS           | Heated Windshield System                    |
| IC            | Integrated Circuit                          |
| IDI           | Indirect Diesel Injection                   |
| IFS           | Independent Front Suspension                |
| IG            | Ignition                                    |
| IIA           | Integrated Ignition Assembly                |
| IN            | Intake (Manifold, Valve)                    |
| INT           | Intermittent                                |
| I/P           | Instrument Panel                            |
| IRS           | Independent Rear Suspension                 |
| ISC           | Idle Speed Control                          |
| J/B           | Junction Block                              |
| J/C           | Junction Connector                          |
| KD            | Kick-Down                                   |
| LAN           | Local Area Network                          |
| LB            | Liftback                                    |
| LCD           | Liquid Crystal Display                      |
| LED           | Light Emitting Diode                        |
| LH            | Left-Hand                                   |
| LHD           | Left-Hand Drive                             |
| L/H/W         | Length, Height, Width                       |
| LLC           | Long-Life Coolant                           |
| LNG           | Liquefied Natural Gas                       |
| LO            | Low                                         |
| LPG           | Liquefied Petroleum Gas                     |
| LSD           | Limited Slip Differential                   |
| LSP & BV      | Load Sensing Proportioning and Bypass Valve |
| LSPV          | Load Sensing Proportioning Valve            |
| MAP           | Manifold Absolute Pressure                  |
| MAX.          | Maximum                                     |
| MIC           | Microphone                                  |
| MIL           | Malfunction Indicator Light                 |
| MIN.          | Minimum                                     |

| Abbreviations | Meaning                           |
|---------------|-----------------------------------|
| MG1           | Motor Generator No. 1             |
| MG2           | Motor Generator No. 2             |
| MMT           | Multi-mode Manual Transmission    |
| MP            | Multipurpose                      |
| MPI           | Multipoint Electronic Injection   |
| MPX           | Multiplex Communication System    |
| M/T, MTM      | Manual Transmission (Transaxle)   |
| MT            | Mount                             |
| MTG           | Mounting                          |
| N             | Neutral                           |
| NA            | Natural Aspiration                |
| NO.           | Number                            |
| O2S           | Oxygen Sensor                     |
| OC            | Oxidation Catalyst                |
| OCV           | Oil Control Valve                 |
| O/D           | Overdrive                         |
| OEM           | Original Equipment Manufacturing  |
| OHC           | Overhead Camshaft                 |
| OHV           | Overhead Valve                    |
| OPT           | Option                            |
| ORVR          | On-board Refueling Vapor Recovery |
| O/S           | Oversize                          |
| P & BV        | Proportioning and Bypass Valve    |
| PBD           | Power Back Door                   |
| PCS           | Power Control System              |
| PCV           | Positive Crankcase Ventilation    |
| PKB           | Parking Brake                     |
| PPS           | Progressive Power Steering        |
| PROM          | Programmable Read Only Memory     |
| PS            | Power Steering                    |
| PSD           | Power Slide Door                  |
| PTC           | Positive Temperature Coefficient  |
| PTO           | Power Take-Off                    |
| PZEV          | Partial Zero Emission Vehicle     |
| P/W           | Power Window                      |
| R & P         | Rack and Pinion                   |
| RAM           | Random Access Memory              |
| R/B           | Relay Block                       |
| RBS           | Recirculating Ball Type Steering  |
| R/F           | Reinforcement                     |
| RFS           | Rigid Front Suspension            |
| RH            | Right-Hand                        |
| RHD           | Right-Hand Drive                  |
| RLY           | Relay                             |
| ROM           | Read Only Memory                  |
| RR            | Rear                              |
| RRS           | Rigid Rear Suspension             |
| RSE           | Rear Seat Entertainment           |
| RWD           | Rear-Wheel Drive                  |

| Abbreviations | Meaning                                          |
|---------------|--------------------------------------------------|
| SC            | Supercharger                                     |
| SCV           | Swirl Control Valve                              |
| SDN           | Sedan                                            |
| SEN           | Sensor                                           |
| SICS          | Starting Injection Control System                |
| SOC           | State Of Charge                                  |
| SOHC          | Single Overhead Camshaft                         |
| SPEC          | Specification                                    |
| SPI           | Single Point Injection                           |
| SRS           | Supplemental Restraint System                    |
| SSM           | Special Service Materials                        |
| SST           | Special Service Tools                            |
| STD           | Standard                                         |
| STJ           | Cold-Start Fuel Injection                        |
| SW            | Switch                                           |
| SYS           | System                                           |
| T/A           | Transaxle                                        |
| TACH          | Tachometer                                       |
| TBI           | Throttle Body Electronic Fuel Injection          |
| TC            | Turbocharger                                     |
| TCCS          | TOYOTA Computer-Controlled System                |
| TCV           | Timing Control Valve                             |
| TDC           | Top Dead Center                                  |
| TEMP.         | Temperature                                      |
| TFT           | TOYOTA Free-Tronic                               |
| TIS           | Total Information System For Vehicle Development |
| T/M           | Transmission                                     |
| TMC           | TOYOTA Motor Corporation                         |
| TMMIN         | PT. TOYOTA Motor Manufacturing Indonesia         |
| TMMK          | TOYOTA Motor Manufacturing Kentucky, Inc.        |
| TMT           | TOYOTA Motor Thailand Co. Ltd.                   |
| TRAC/TRC      | Traction Control System                          |
| TURBO         | Turbocharge                                      |
| TWC           | Three-Way Catalyst                               |
| U/D           | Underdrive                                       |
| U/S           | Undersize                                        |
| VCV           | Vacuum Control Valve                             |
| VDIM          | Vehicle Dynamics Integrated Management           |
| VENT          | Ventilator                                       |
| VIM           | Vehicle Interface Module                         |
| VGRS          | Variable Gear Ratio Steering                     |
| VIN           | Vehicle Identification Number                    |
| VPS           | Variable Power Steering                          |
| VSC           | Vehicle Skid Control                             |
| VSV           | Vacuum Switching Valve                           |
| VTV           | Vacuum Transmitting Valve                        |
| VVT-i         | Variable Valve Timing-intelligent                |
| W/            | With                                             |
| WGN           | Wagon                                            |

| Abbreviations | Meaning                          |
|---------------|----------------------------------|
| W/H           | Wire Harness                     |
| W/O           | Without                          |
| 1ST           | First                            |
| 2ND           | Second                           |
| 2WD           | Two Wheel Drive Vehicle (4 x 2)  |
| 3RD           | Third                            |
| 4TH           | Fourth                           |
| 4WD           | Four Wheel Drive Vehicle (4 x 4) |
| 4WS           | Four Wheel Steering System       |
| 5TH           | Fifth                            |

IN

## GLOSSARY OF SAE AND LEXUS TERMS

This glossary lists all SAE-J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their LEXUS equivalents.

| SAE ABBREVIATIONS | SAE TERMS                                                 | LEXUS TERMS<br>( )-ABBREVIATIONS                                                                             |
|-------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| A/C               | Air Conditioning                                          | Air Conditioner                                                                                              |
| ACL               | Air Cleaner                                               | Air Cleaner, A/CL                                                                                            |
| AIR               | Secondary Air Injection                                   | Air Injection (AI)                                                                                           |
| AP                | Accelerator Pedal                                         | -                                                                                                            |
| B+                | Battery Positive Voltage                                  | +B, Battery Voltage                                                                                          |
| BARO              | Barometric Pressure                                       | HAC                                                                                                          |
| CAC               | Charge Air Cooler                                         | Intercooler                                                                                                  |
| CARB              | Carburetor                                                | Carburetor                                                                                                   |
| CFI               | Continuous Fuel Injection                                 | -                                                                                                            |
| CKP               | Crankshaft Position                                       | Crank Angle                                                                                                  |
| CL                | Closed Loop                                               | Closed Loop                                                                                                  |
| CMP               | Camshaft Position                                         | Cam Angle                                                                                                    |
| CPP               | Clutch Pedal Position                                     | -                                                                                                            |
| CTOX              | Continuous Trap Oxidizer                                  | -                                                                                                            |
| CTP               | Closed Throttle Position                                  | LL ON, Idle ON                                                                                               |
| DFI               | Direct Fuel Injection                                     | Direct Injection (DI./INJ)                                                                                   |
| DI                | Distributor Ignition                                      | -                                                                                                            |
| DLC3              | Data Link Connector 3                                     | OBD II Diagnostic Connector                                                                                  |
| DTC               | Diagnostic Trouble Code                                   | Diagnostic Trouble Code                                                                                      |
| DTM               | Diagnostic Test Mode                                      | -                                                                                                            |
| ECL               | Engine Coolant Level                                      | -                                                                                                            |
| ECM               | Engine Control Module                                     | Engine Electronic Control Unit (ECU)                                                                         |
| ECT               | Engine Coolant Temperature                                | Coolant Temperature, Water Temperature (THW)                                                                 |
| EEPROM            | Electrically Erasable Programmable Read Only Memory       | Electrically Erasable Programmable Read Only Memory (EEPROM), Erasable Programmable Read Only Memory (EPROM) |
| EFE               | Early Fuel Evaporation                                    | Cold Mixture Heater (CMH), Heat Control Valve (HCV)                                                          |
| EGR               | Exhaust Gas Recirculation                                 | Exhaust Gas Recirculation (EGR)                                                                              |
| EI                | Electronic Ignition                                       | Distributorless Ignition (DLI)                                                                               |
| EM                | Engine Modification                                       | Engine Modification (EM)                                                                                     |
| EPROM             | Erasable Programmable Read Only Memory                    | Programmable Read Only Memory (PROM)                                                                         |
| EVAP              | Evaporative Emission                                      | Evaporative Emission Control (EVAP)                                                                          |
| FC                | Fan Control                                               | -                                                                                                            |
| FEEPROM           | Flash Electrically Erasable Programmable Read Only Memory | -                                                                                                            |
| FEPROM            | Flash Erasable Programmable Read Only Memory              | -                                                                                                            |
| FF                | Flexible Fuel                                             | -                                                                                                            |
| FP                | Fuel Pump                                                 | Fuel Pump                                                                                                    |
| GEN               | Generator                                                 | Alternator                                                                                                   |
| GND               | Ground                                                    | Ground (GND)                                                                                                 |
| HO2S              | Heated Oxygen Sensor                                      | Heated Oxygen Sensor (HO <sub>2</sub> S)                                                                     |
| IAC               | Idle Air Control                                          | Idle Speed Control (ISC)                                                                                     |
| IAT               | Intake Air Temperature                                    | Intake or Inlet Air Temperature                                                                              |
| ICM               | Ignition Control Module                                   | -                                                                                                            |

| SAE<br>ABBREVIATIONS | SAE TERMS                           | LEXUS TERMS<br>( )-ABBREVIATIONS                                                                            |
|----------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------|
| IFI                  | Indirect Fuel Injection             | Indirect Injection (IDL)                                                                                    |
| IFS                  | Inertia Fuel-Shutoff                | -                                                                                                           |
| ISC                  | Idle Speed Control                  | -                                                                                                           |
| KS                   | Knock Sensor                        | Knock Sensor                                                                                                |
| MAF                  | Mass Airflow                        | Air Flow Meter                                                                                              |
| MAP                  | Manifold Absolute Pressure          | Manifold Pressure Intake Vacuum                                                                             |
| MC                   | Mixture Control                     | Electric Bleed Air Control Valve (EBCV)<br>Mixture Control Valve (MCV)<br>Electric Air Control Valve (EACV) |
| MDP                  | Manifold Differential Pressure      | -                                                                                                           |
| MFI                  | Multiport Fuel Injection            | Electronic Fuel Injection (EFI)                                                                             |
| MIL                  | Malfunction Indicator Light         | Check Engine Light                                                                                          |
| MST                  | Manifold Surface Temperature        | -                                                                                                           |
| MVZ                  | Manifold Vacuum Zone                | -                                                                                                           |
| NVRAM                | Non-Volatile Random Access Memory   | -                                                                                                           |
| O2S                  | Oxygen Sensor                       | Oxygen Sensor, O <sub>2</sub> Sensor (O <sub>2</sub> S)                                                     |
| OBD                  | On-Board Diagnostic                 | On-Board Diagnostic System (OBD)                                                                            |
| OC                   | Oxidation Catalytic Converter       | Oxidation Catalytic Convert (OC), CCo                                                                       |
| OL                   | Open Loop                           | Open Loop                                                                                                   |
| PAIR                 | Pulsed Secondary Air Injection      | Air Suction (AS)                                                                                            |
| PCM                  | Powertrain Control Module           | -                                                                                                           |
| PNP                  | Park/Neutral Position               | -                                                                                                           |
| PROM                 | Programmable Read Only Memory       | -                                                                                                           |
| PSP                  | Power Steering Pressure             | -                                                                                                           |
| PTOX                 | Periodic Trap Oxidizer              | Diesel Particulate Filter (DPF)<br>Diesel Particulate Trap (DPT)                                            |
| RAM                  | Random Access Memory                | Random Access Memory (RAM)                                                                                  |
| RM                   | Relay Module                        | -                                                                                                           |
| ROM                  | Read Only Memory                    | Read Only Memory (ROM)                                                                                      |
| RPM                  | Engine Speed                        | Engine Speed                                                                                                |
| SC                   | Supercharger                        | Supercharger                                                                                                |
| SCB                  | Supercharger Bypass                 | E-ABV                                                                                                       |
| SFI                  | Sequential Multiport Fuel Injection | Electronic Fuel Injection (EFI), Sequential Injection                                                       |
| SPL                  | Smoke Puff Limiter                  | -                                                                                                           |
| SRI                  | Service Reminder Indicator          | -                                                                                                           |
| SRT                  | System Readiness Test               | -                                                                                                           |
| ST                   | Scan Tool                           | -                                                                                                           |
| TB                   | Throttle Body                       | Throttle Body                                                                                               |
| TBI                  | Throttle Body Fuel Injection        | Single Point Injection<br>Central Fuel Injection (Ci)                                                       |
| TC                   | Turbocharger                        | Turbocharger                                                                                                |
| TCC                  | Torque Converter Clutch             | Torque Converter                                                                                            |
| TCM                  | Transmission Control Module         | Transmission ECU, ECT ECU                                                                                   |
| TP                   | Throttle Position                   | Throttle Position                                                                                           |
| TR                   | Transmission Range                  | -                                                                                                           |
| TVV                  | Thermal Vacuum Valve                | Bimetallic Vacuum Switching Valve (BVSV)<br>Thermostatic Vacuum Switching Valve (TVSV)                      |
| TWC                  | Three-Way Catalytic Converter       | Three-Way Catalytic (TWC)<br>Manifold Converter<br>CC <sub>RO</sub>                                         |

| SAE<br>ABBREVIATIONS | SAE TERMS                                 | LEXUS TERMS<br>( )-ABBREVIATIONS |
|----------------------|-------------------------------------------|----------------------------------|
| TWC+OC               | Three-Way + Oxidation Catalytic Converter | CC <sub>R</sub> + CCo            |
| VAF                  | Volume Airflow                            | Air Flow Meter                   |
| VR                   | Voltage Regulator                         | Voltage Regulator                |
| VSS                  | Vehicle Speed Sensor                      | Vehicle Speed Sensor             |
| WOT                  | Wide Open Throttle                        | Full Throttle                    |
| WU-OC                | Warm Up Oxidation Catalytic Converter     | -                                |
| WU-TWC               | Warm Up Three-Way Catalytic Converter     | -                                |
| 3GR                  | Third Gear                                | -                                |
| 4GR                  | Fourth Gear                               | -                                |