

# 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) This manual explains (1) (see "Diagnostics" section) and (2). (3) is omitted.
- (c) The following procedures are omitted from this manual. However, these procedures are essential and must be performed when applicable.
  - (1) Use a jack or lift to perform operations
  - (2) Cleaning removed parts
  - (3) Performing a visual check

### 2. INDEX

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

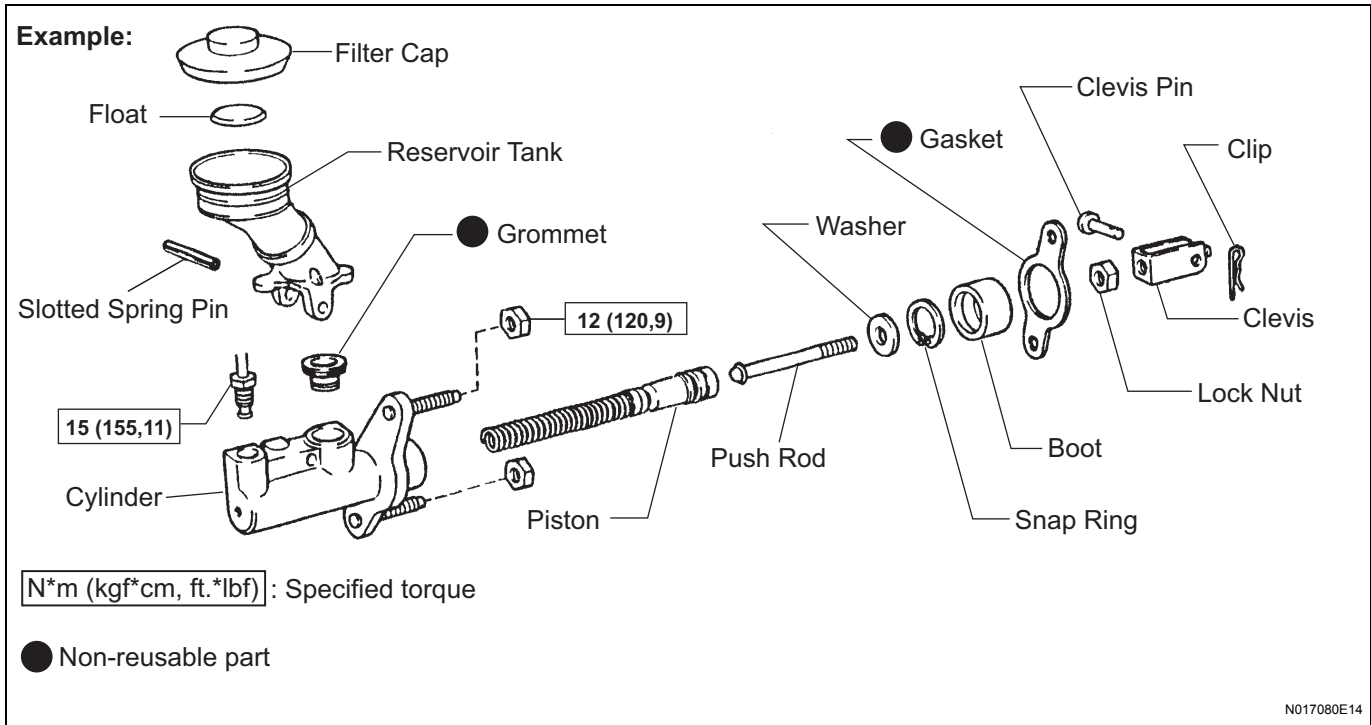
### 3. PREPARATION

- (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.



- (c) Torque specifications, grease application areas and non-reusable parts are emphasized in the procedures.

**NOTICE:**

**There are cases where such information can only be explained by using an illustration. In these cases, all the information such as torque, oil, etc. are described in the illustration.**

- (d) Only items with key points are described in the text. What to do and other details are placed in illustrations next to the text. Both the text and illustrations are accompanied by standard values and notices.
- (e) Illustrations of similar vehicle models are sometimes used. In those cases, specific details may be different from the actual vehicle.
- (f) Procedures are presented in a step-by-step format:
- (1) The illustration shows what to do and where to do it.
  - (2) The task heading tells what to do.

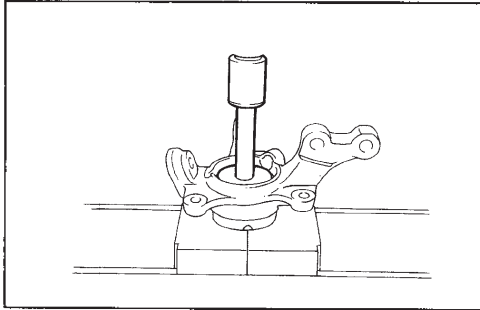
- (3) The explanation text tells how to perform the task. It also has information such as specifications and warning.

**Example:**

*Illustration:*

*what to do and where*

*Task heading: what you will be doing*



**14. INSTALL FRONT AXLE HUB BEARING**

- (a) Using SST and a press, install a new bearing to the steering knuckle.

SST **09950-60020** (09951-00720), **09950-70010** (09951-07100)

*Set part No.*

*Component part No.*

D032545E03

**HINT:**

This format provides an experienced technician with a FAST TRACK to the necessary information. The task headings are easy to read and the text below the task heading provides detailed information. Important specifications and warnings are always written in bold type.

**5. SERVICE SPECIFICATIONS**

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

**6. TERMS DEFINITION**

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.

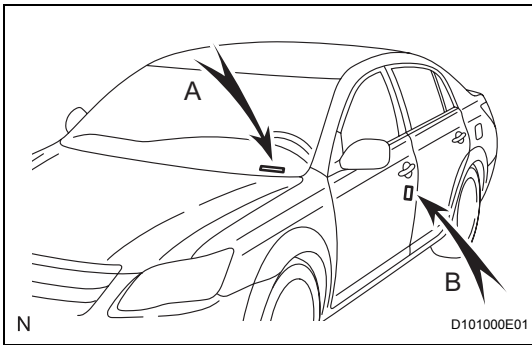
**7. SI UNIT**

- (a) The units used in this manual comply with the SI UNIT (International System of Units) 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 identification number plate and certification label, as shown in the illustration.

**A:**

**Vehicle Identification Number Plate**

**B:**

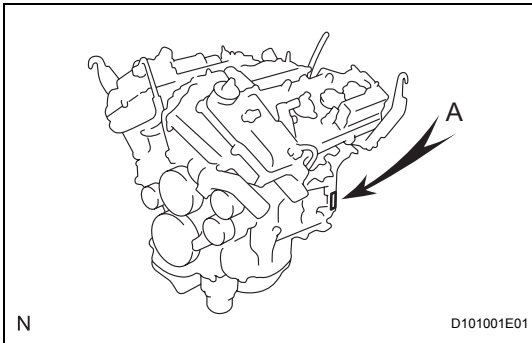
**Certification Label**

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

- (a) The engine serial number is stamped on the cylinder block of the engine.

**A:**

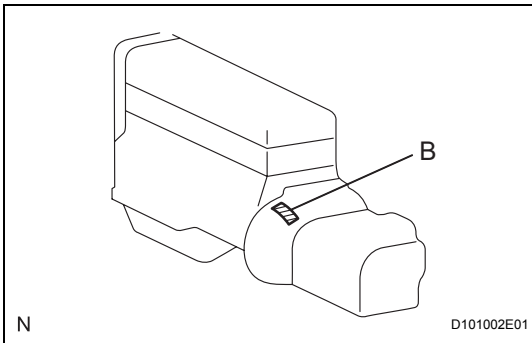
**Engine Serial Number**



- (b) The transmission serial number is stamped on the housing as shown in the illustration.

**B:**

**Transmission Serial Number**

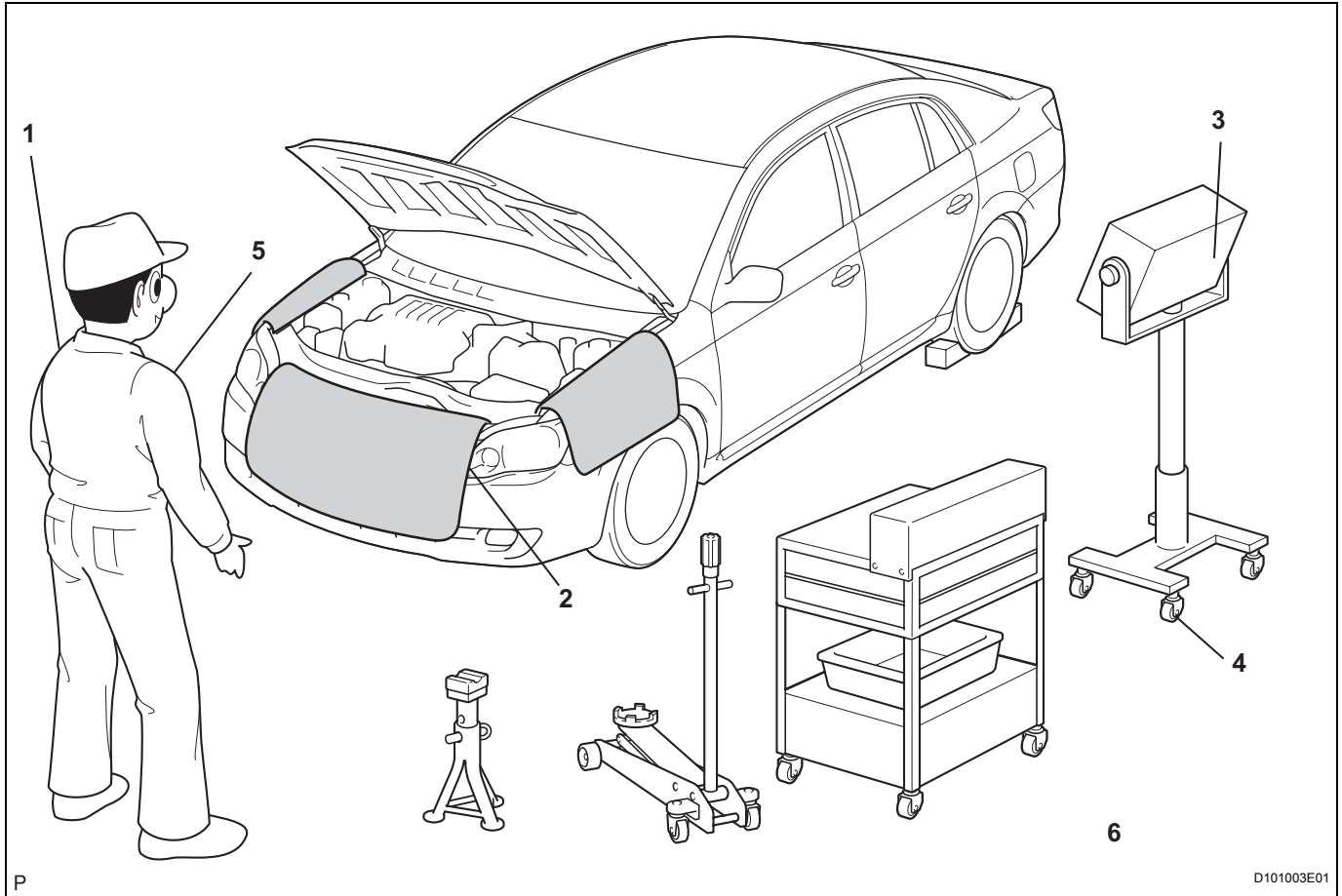


# REPAIR INSTRUCTION

## PRECAUTION

### 1. BASIC REPAIR HINT

#### (a) HINTS ON OPERATIONS



P

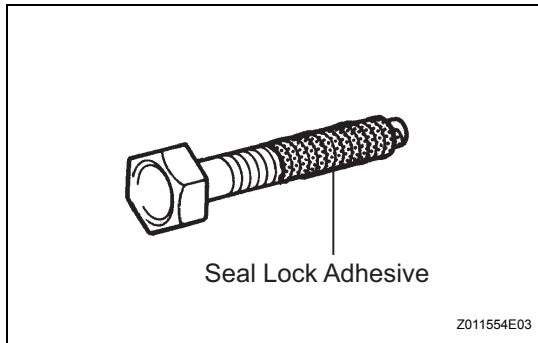
D101003E01

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	Safe 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>

IN

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>
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(b) JACKING UP AND SUPPORTING VEHICLE

- 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

- Precoated parts are bolts and nuts that are coated with a seal lock adhesive at the factory.
- If a precoated part is retightened, loosened or moved in any way, it must be recoated with the specified adhesive.
- 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.
- Some seal lock agents harden slowly. You may have to wait for the seal lock adhesive to harden.

(d) GASKETS

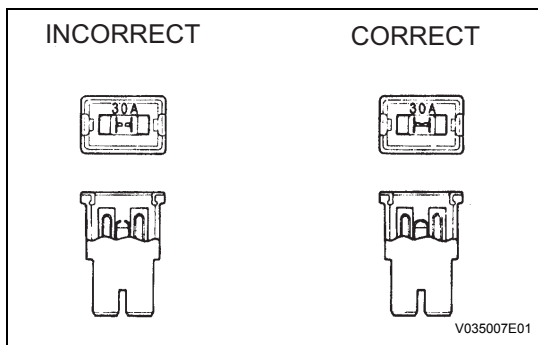
- When necessary, use a sealer on gaskets to prevent leaks.

(e) BOLTS, NUTS AND SCREWS

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

**NOTICE:**

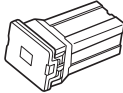

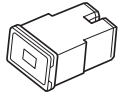

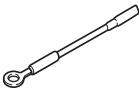

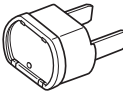

**Perform the torque with the lower limit value of the torque tolerance.**



(f) FUSES

- When inspecting a fuse, check that the wire of the fuse is not broken.
- 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 style="text-align: center;">N</p>	<p style="text-align: center;">N</p>	FUSE	FUSE

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

IN

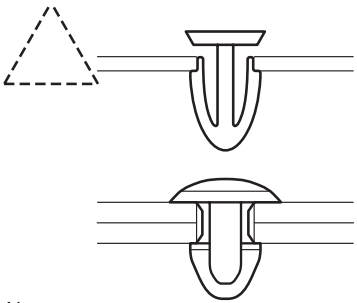
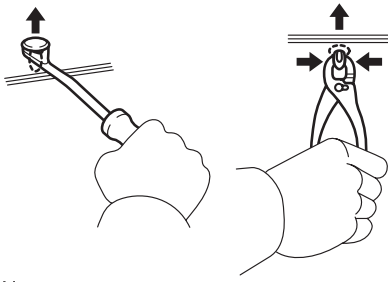
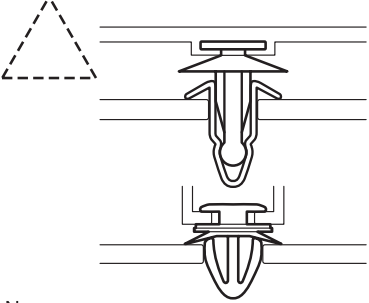
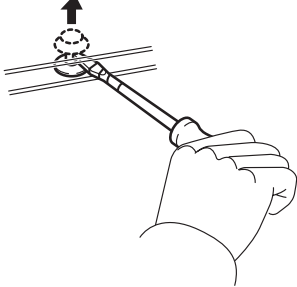
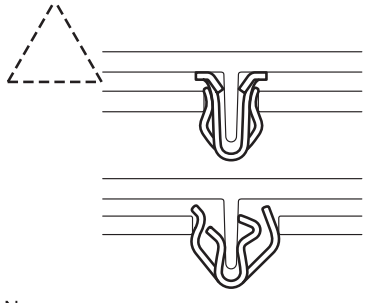
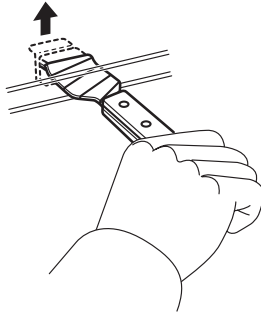
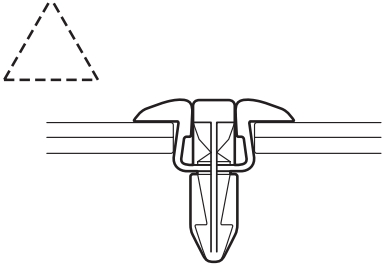
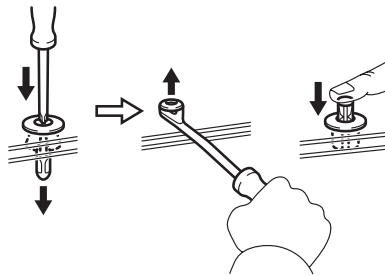
(g) CLIPS

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

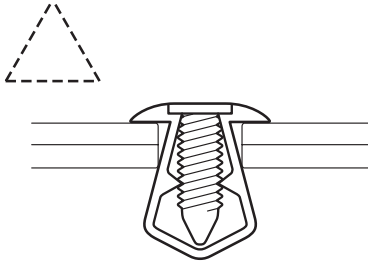
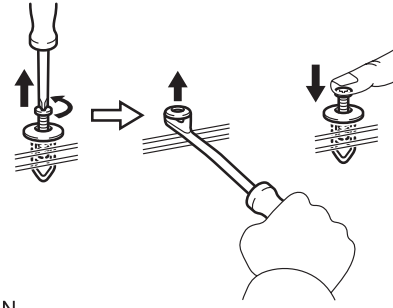
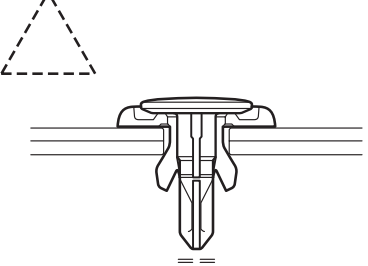
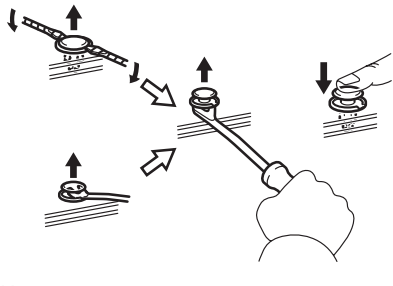
HINT:

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

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>



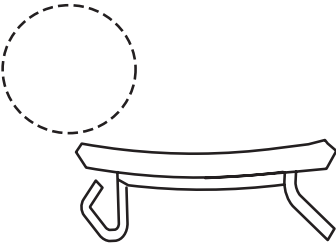
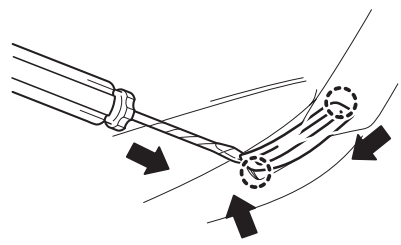
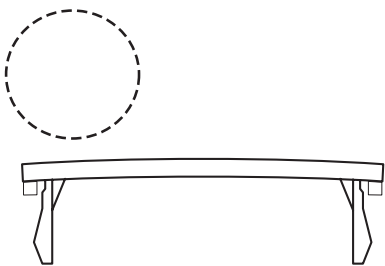
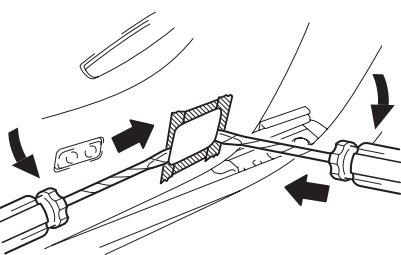
Shape (Example)	Removal/Installation
 <p>N</p>	<p>Remove clips by unscrewing center pin and prying out shell.</p>  <p>N</p>
 <p>N</p>	<p>Remove clips by prying out pin and then prying out shell.</p>  <p>N</p>

(h) CLAWS

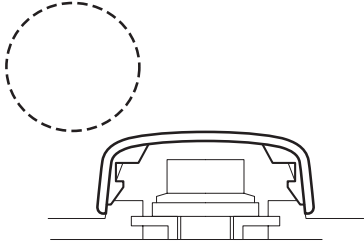
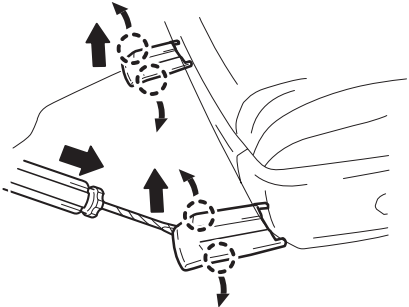
(1) The removal and installation methods of typical claws used for vehicle body parts are shown in the table below.

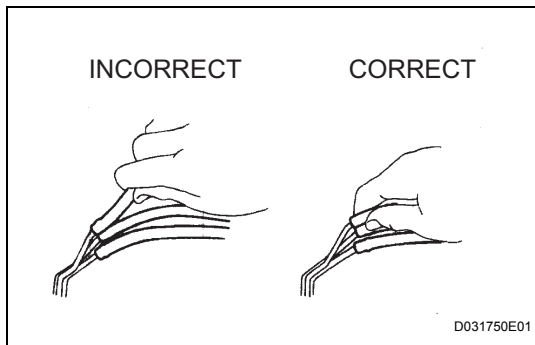
HINT:

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

Shape (Example)	Illustration	Procedures
		<ol style="list-style-type: none"> <li>Using a screwdriver, detach the claws and remove the cap or covers.</li> </ol>
		<ol style="list-style-type: none"> <li>Using a screwdriver, detach the claws and remove the cap or covers.</li> </ol>

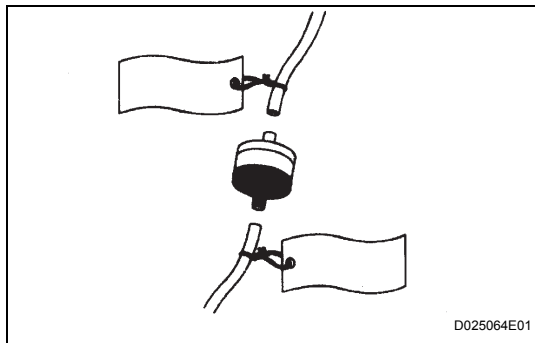
IN

Shape (Example)	Illustration	Procedures
		<p>1. Using a screwdriver, detach the claws and remove the cap or covers.</p>

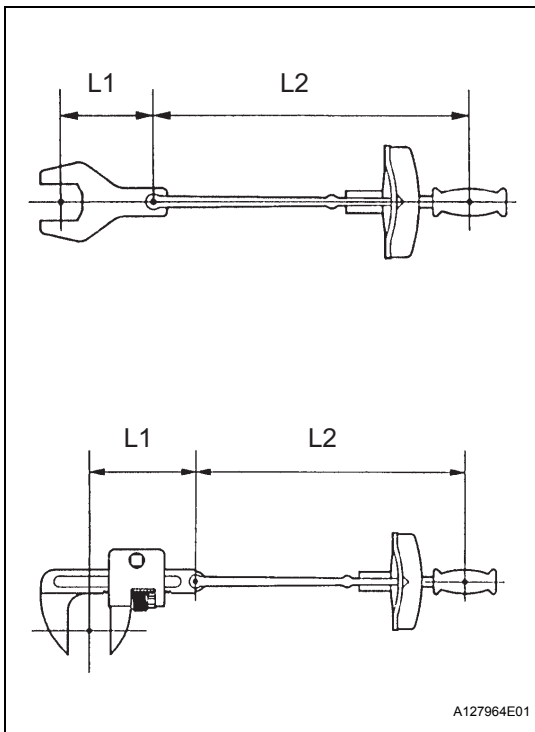


(i) REMOVAL AND INSTALLATION OF VACUUM HOSES

(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 cause damage.



- (2) When disconnecting vacuum hoses, use tags to identify where they should be reconnected.
- (3) After completing the job, 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 AVALON is equipped with a Supplemental Restraint System (SRS).

**CAUTION:**

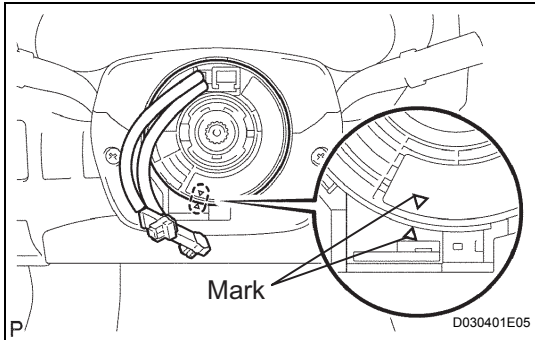
Failure to carry out the service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing and lead to serious injury. Furthermore, if a mistake is made when servicing SRS, it is possible that the SRS may fail to operate properly. Before servicing (including removal 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-306](#) for steering pad)  
(See page [RS-330](#) for front passenger airbag assembly)  
(See page [RS-320](#) for front driver side knee airbags assembly)  
(See page [RS-346](#) for front seat side airbag assembly)  
(See page [RS-340](#) for curtain shield airbag assembly)  
(See page [SB-15](#) 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 repair the airbag sensor assembly, horn button assembly, instrument panel passenger airbag assembly, curtain shield airbag assembly, front seat airbag assembly, instrument panel lower airbag assembly or seat belt pretensioner.
- (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 kΩ) 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.

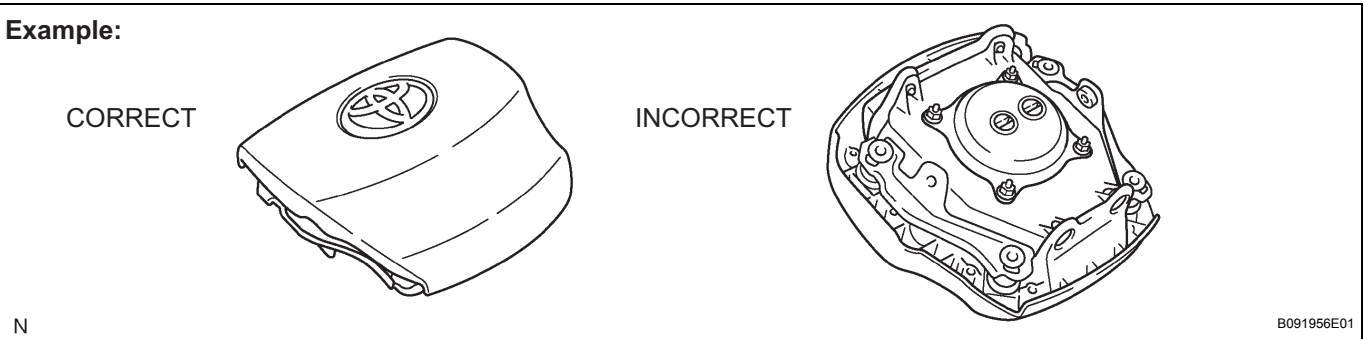


(b) SPIRAL CABLE

- (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-315).

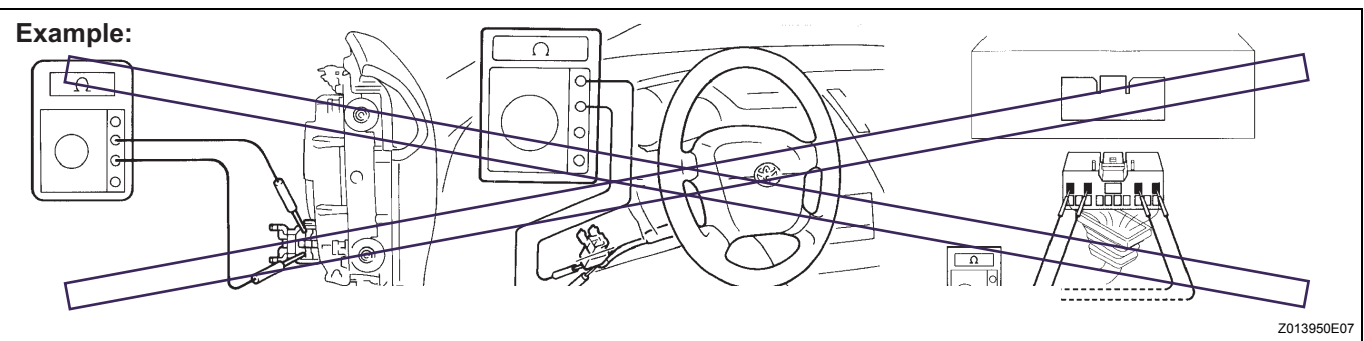
(c) STEERING PAD

- (1) When removing the horn button assembly or handling a new horn button, it should be placed with the pad surface facing up. See illustration below.



placing the horn button with the pad surface facing down may lead to a serious accident if the airbag accidentally 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.

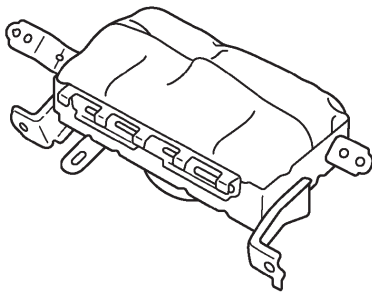


- (3) Grease or detergents of any kind should not be applied to the steering wheel pad.

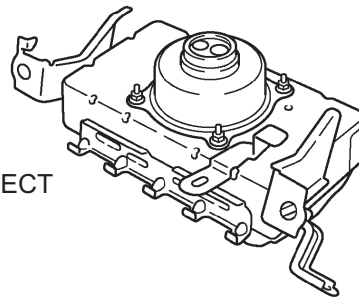
- (4) Store the horn button assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and electrical noise is not nearby.
  - (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag or seat belt pretensioner deploying due to currents entering the squib wiring.
  - (6) When disposing of the vehicle or the horn button assembly by itself, the airbag should be inflated using an SST before disposal (See page [RS-306](#)). Activate in a safe away from electrical noise.
- (d) FRONT PASSENGER AIRBAG ASSEMBLY
- (1) Always place a removed or new instrument panel passenger airbag assembly with the airbag inflation direction facing up. 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.

**Example:**

CORRECT

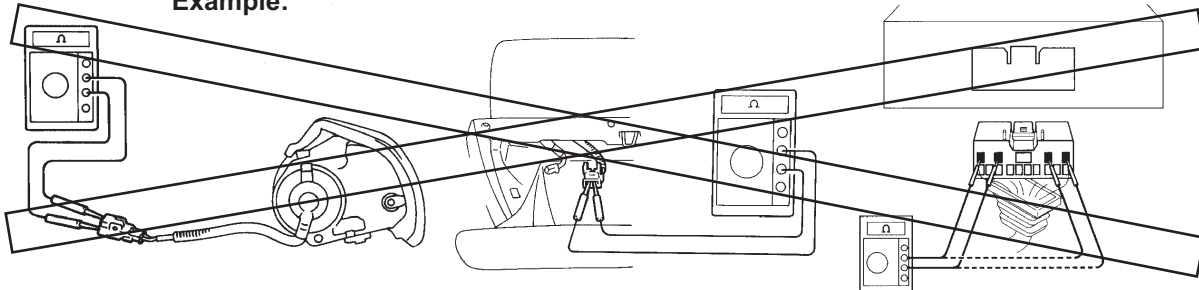


INCORRECT



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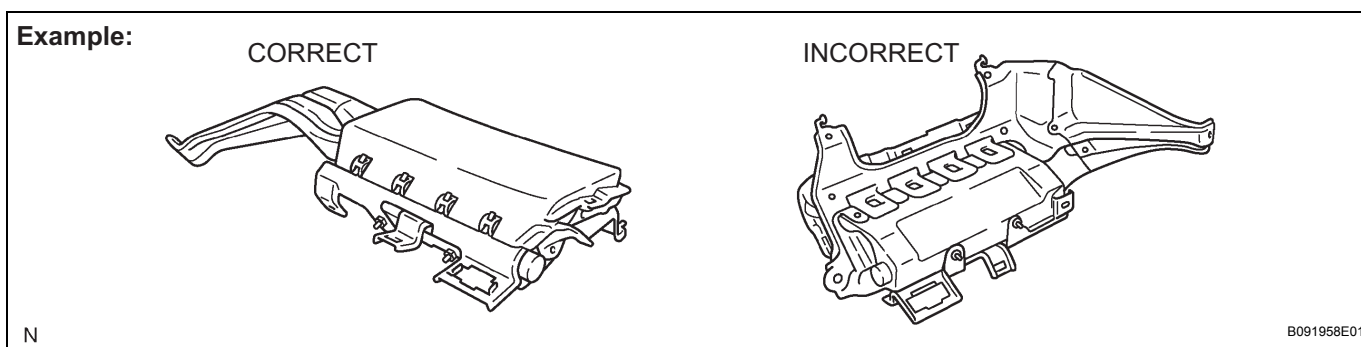
- (3) Grease or detergents of any kind should not be applied to the instrument panel passenger airbag assembly.

**Example:**

Z013951E06

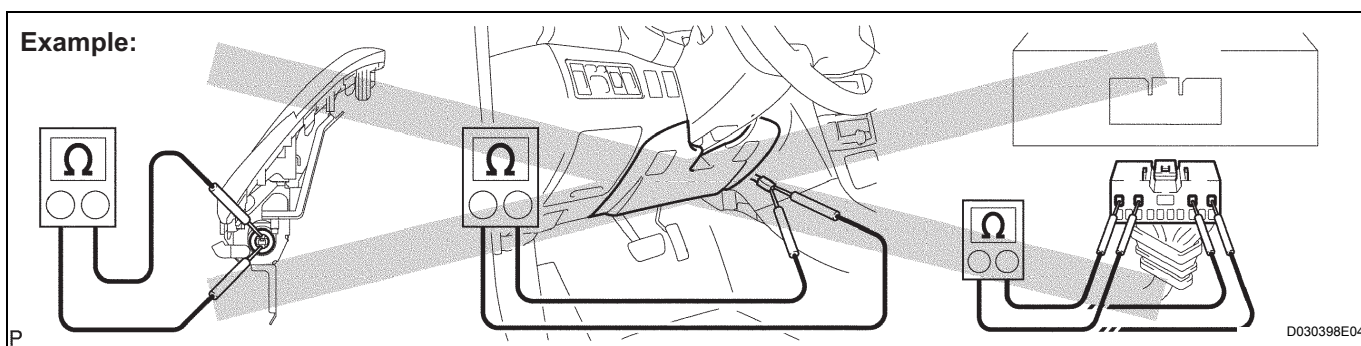
- (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and electrical noise is not nearby.

- (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 currents 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-330](#)).  
Activate in a safe place away from electrical noise.
- (e) FRONT DRIVER SIDE KNEE AIRBAG ASSEMBLY
- (1) Always store a removed or new instrument panel lower airbag assembly with the airbag inflating direction facing upward.



Placing the airbag assembly with the airbag inflation direction facing downward 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 seat airbag assembly.
- (4) Store the instrument panel lower airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
- (5) When using electric welding, first disconnect the airbag connector (2 pins) installed on the instrument panel lower airbag assembly before starting work.

- (6) When disposing of a vehicle or the instrument panel lower airbag assembly unit by itself, the airbag should be inflated using an SST before disposal (See page [RS-320](#)).

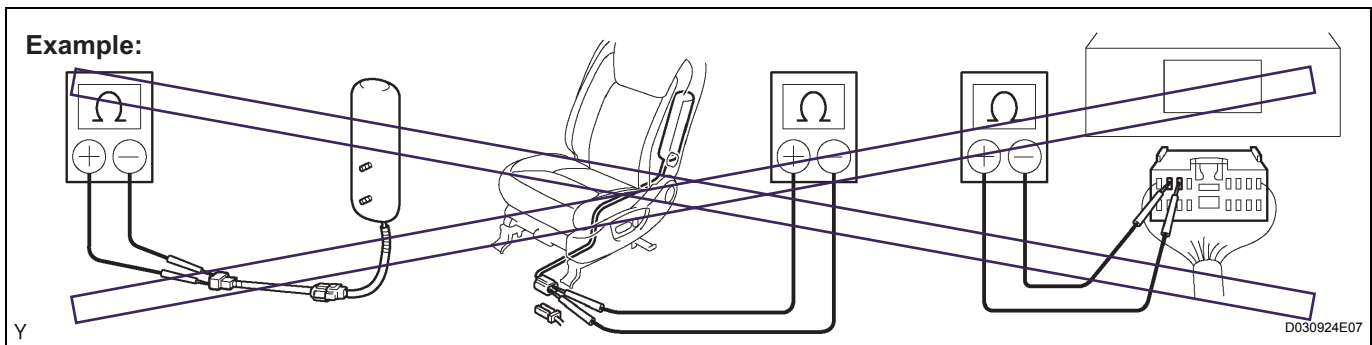
Activate in a safe place away from electrical noise.

(f) FRONT SEAT AIRBAG ASSEMBLY

- (1) Always place a removed or new front seat airbag assembly with the airbag inflation direction facing up.

Placing the airbag assembly with the airbag inflation direction facing down could cause a serious accident if the airbag deploys.

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



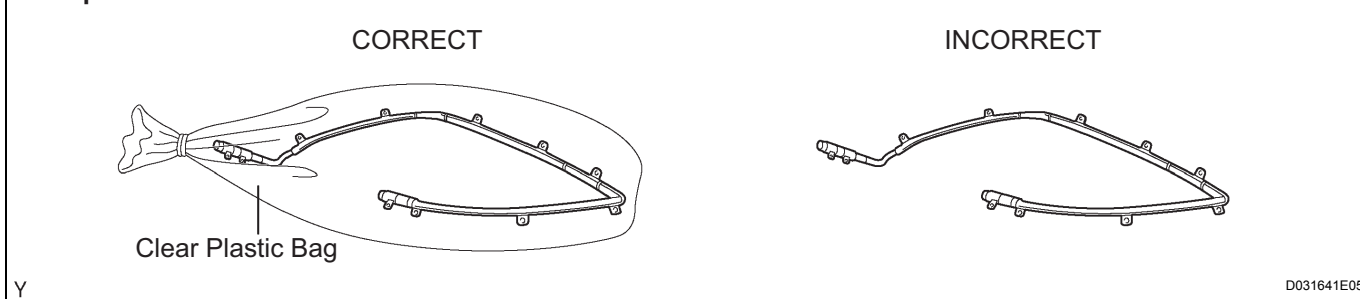
- (3) Grease or detergents of any kind should not be applied to the front airbag assembly.
- (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and electrical noise is not nearby.
- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents 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-346](#)).
- Activate in a safe place away from electrical noise.



## (g) CURTAIN SHIELD AIRBAG ASSEMBLY

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

## Example:

**NOTICE:**

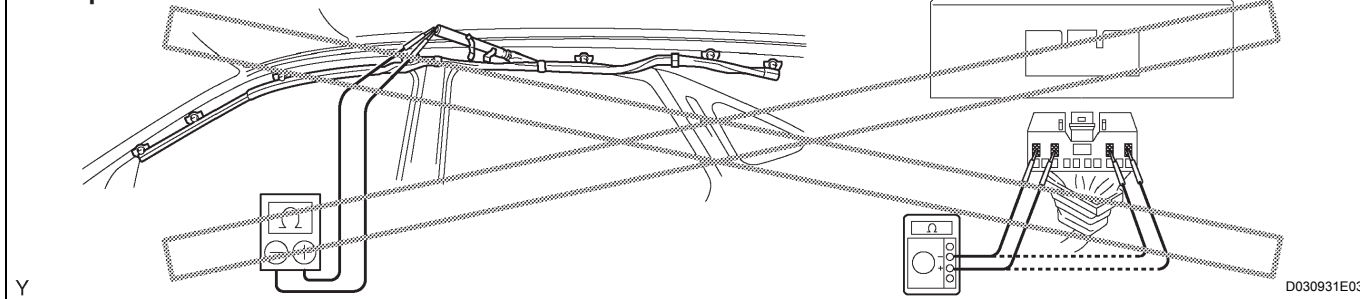
**Plastic bag is re-useable.**

**CAUTION:**

**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.

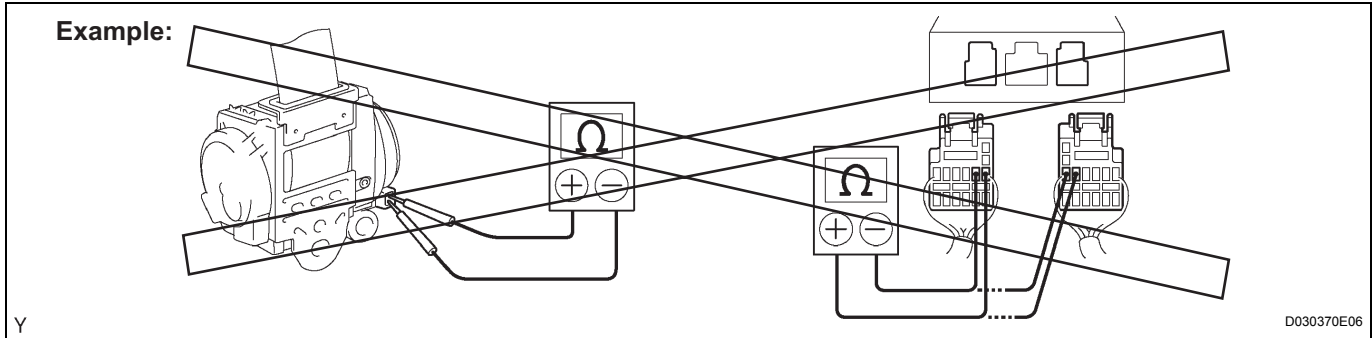
## Example:



- (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 electrical noise is not nearby.
- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.
- (6) When disposing of a vehicle or the curtain shield airbag assembly unit, the airbag should be deployed using SST before disposal (See page [RS-340](#)).  
Activate in a safe place away from electrical noise.

## (h) FRONT SEAT OUTER BELT ASSEMBLY (SEAT BELT PRETENSIONER)

- (1) Never measure the resistance of the seat belt pretensioner. This may cause the seat belt pretensioner to activate, which could cause serious injury.

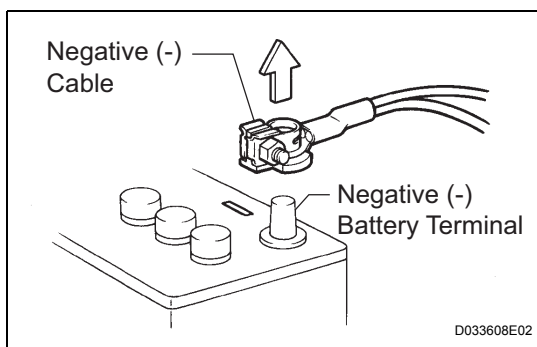


- (2) Never disassemble the seat belt pretensioner.
  - (3) Never install the seat belt pretensioner on another vehicle.
  - (4) Store the seat belt pretensioner in an area where the ambient temperature is below 80°C (176°F), the humidity is not high and electrical noise is not nearby.
  - (5) When using 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 currents entering the squib wiring.
  - (6) When disposing of a vehicle or the seat belt pretensioner unit by itself, the seat belt pretensioner should be activated before disposal (See page [SB-15](#)). Activate in a safe place away from electrical noise.
  - (7) As the seat belt pretensioner is hot after being activated, allow some time for it to cool down sufficiently before disposal. Never apply water to try to cool down the seat belt pretensioner.
  - (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 mounted on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not mounted to the floor, the SRS may activate.

- (3) Work must be started at least 90 seconds after the ignition switch is turned to the LOCK position and the negative (-) terminal cable is disconnected from the battery, even if only loosening the set bolts of the airbag sensor assembly.

(j) WIRE HARNESS AND CONNECTOR

- (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:**

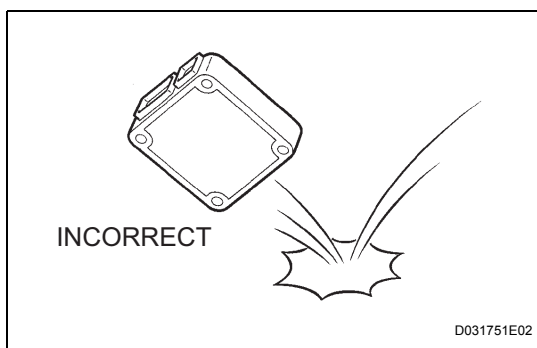
**After disconnecting the negative (-) terminal, it is necessary to perform the initialization of certain systems.**

(b) REMOVAL AND INSTALLATION OF BATTERY CABLE

- (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.

(c) HANDLING OF ELECTRONIC PARTS

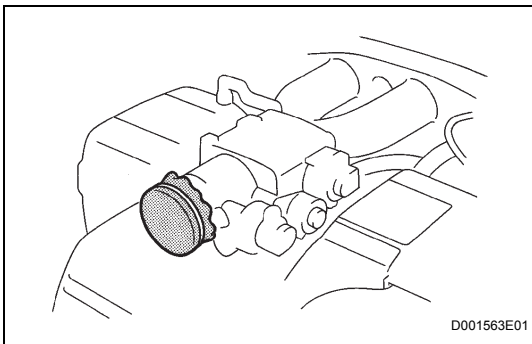
- (1) Do not open the cover or case of the ECU unless absolutely necessary. If the IC terminals are touched, the IC may be rendered inoperative by static electricity.
- (2) Do not pull the wires when disconnecting electronic connectors. Pull the connector itself.
- (3) Do not drop electronic components, 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.

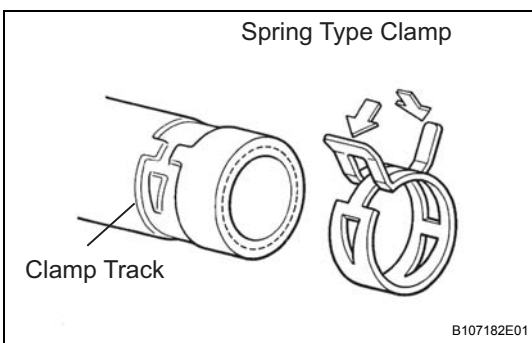
#### 4. REMOVAL AND INSTALLATION OF FUEL CONTROL PARTS

- (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.



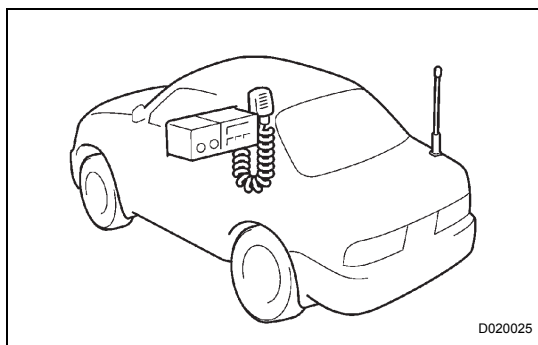
#### 5. REMOVAL AND INSTALLATION OF ENGINE INTAKE PARTS

- (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.



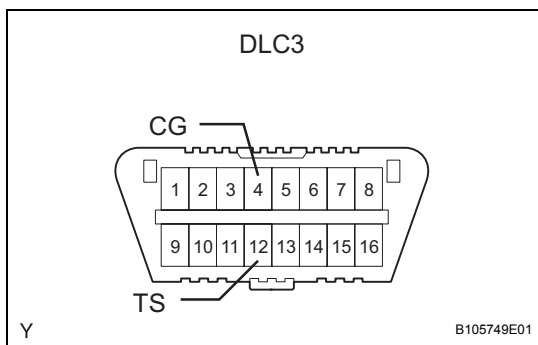
#### 6. HANDLING OF HOSE CLAMPS

- (a) Before removing the hose, check the clamp position so that it can be reinstalled in the same position.
- (b) Replace any deformed or dented clamps with new ones.
- (c) When reusing a hose, attach the clamp on the clamp track portion of the hose.
- (d) 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

- (a) Install the antenna far away from the ECU and sensors of the vehicle electronic systems as possible.
- (b) 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.
- (c) 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.
- (d) Check that the antenna and feeder are correctly adjusted.
- (e) Do not install any high-powered mobile communication system.



## 8. FOR VEHICLES EQUIPPED WITH VEHICLE STABILITY CONTROL (VSC) SYSTEM

- (a) NOTICES WHEN USING DRUM TESTER
  - (1) Before beginning testing, disable the VSC. To disable the VSC, turn the ignition switch off and connect SST to terminals TS and CG of the DLC3.  
**SST 09843-18040**  
**NOTICE:**
    - **Confirm that the VSC warning light blinks.**
    - **VSC system will be reset when the engine is restarted.**
    - **For safety, secure the vehicle with restraint chains while using a wheel dynamometer.**
- (b) NOTICES OF RELATED OPERATIONS TO VSC
  - (1) Do not carry out unnecessary installation and removal as it might affect the adjustment of VSC related parts.
  - (2) Be sure to follow the instructions for work preparation and final confirmation of proper operation of the VSC system.

## 9. FOR VEHICLES EQUIPPED WITH CATALYTIC CONVERTER

### CAUTION:

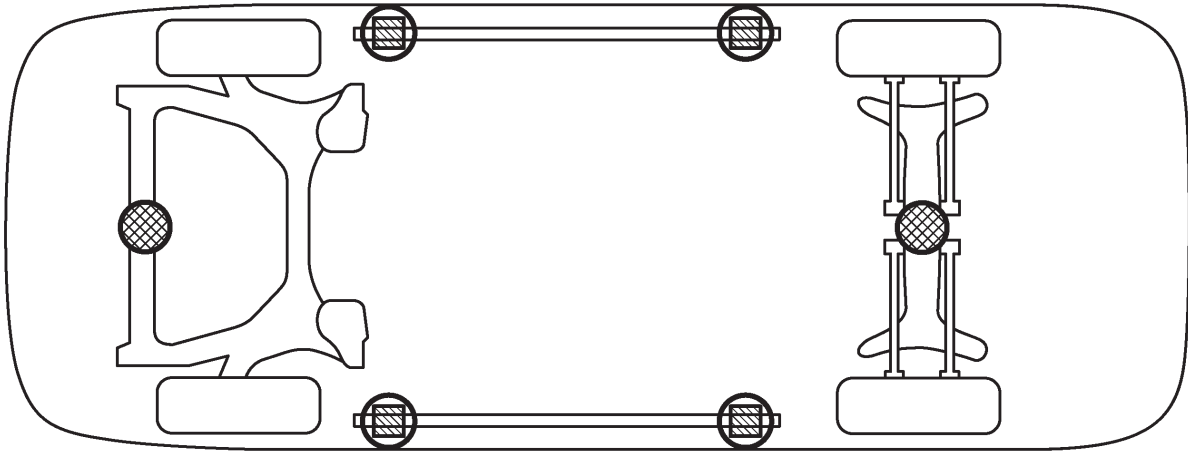
**If a large amount of unburned gasoline or gasoline vapors flow into the converter, it may cause over heating and create a fire hazard. To prevent this, observe the following precautions.**

- (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.

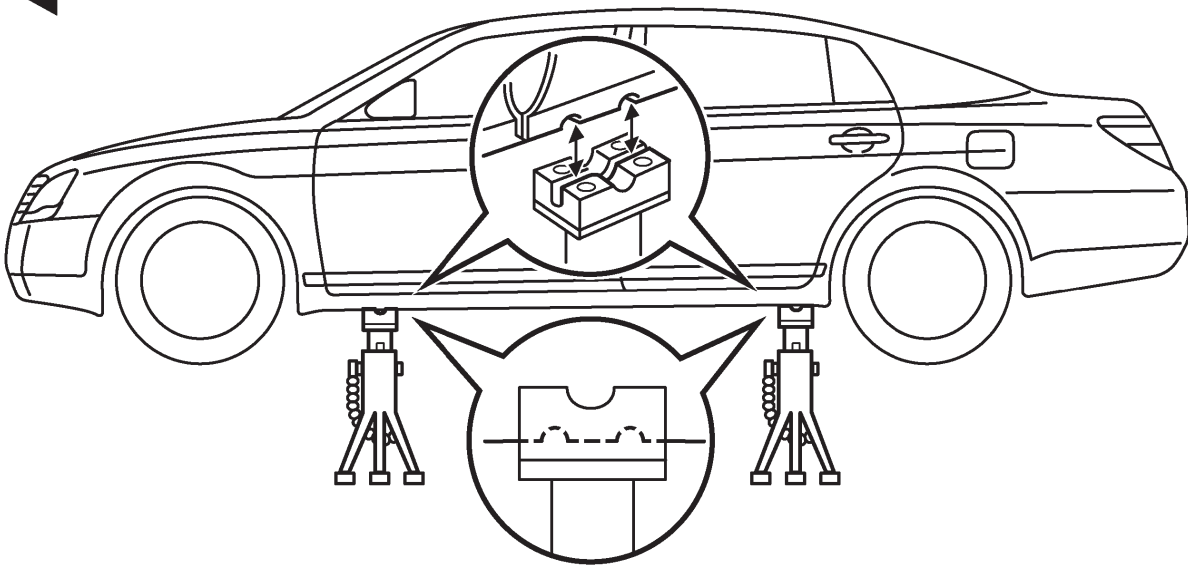
- (2) While testing, never race the engine.
- (d) Avoid a prolonged engine compression measurement.  
Engine compression measurements must be performed as rapidly as possible.
- (e) Do not run the engine when the fuel tank is nearly empty. This may cause the engine to misfire and create an extra load on the converter.

# VEHICLE LIFT AND SUPPORT LOCATIONS

IN



← Front



**JACK POSITION** \_\_\_\_\_ ●

Front ----- Front frame  
Rear ----- Rear suspension member

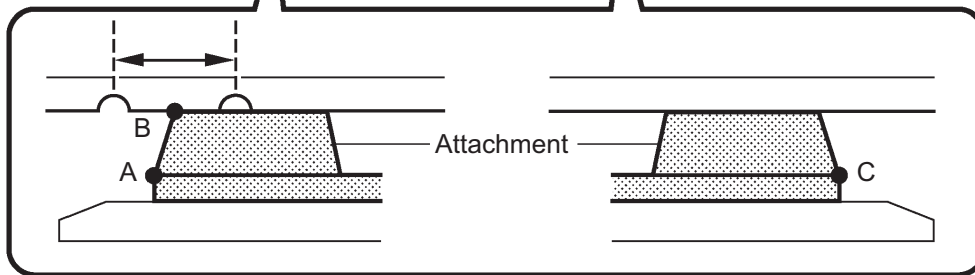
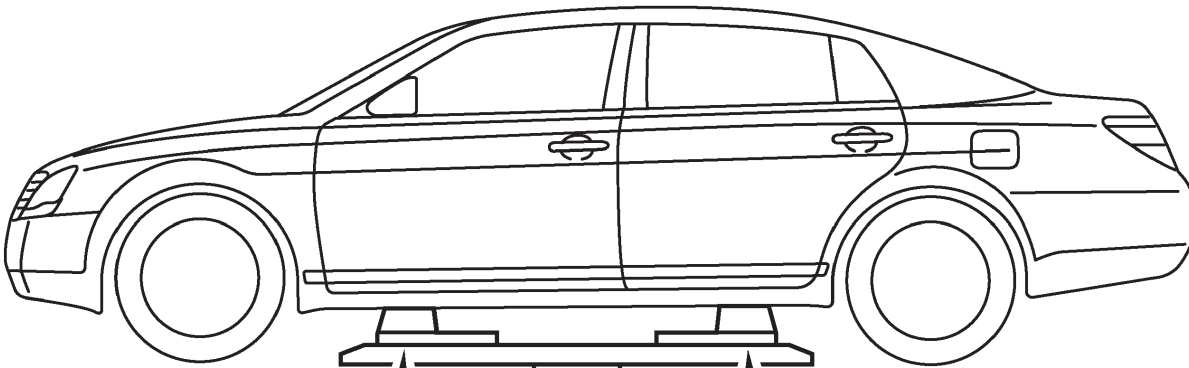
**CAUTION :**

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 ..... ▣

Plate Type Lift



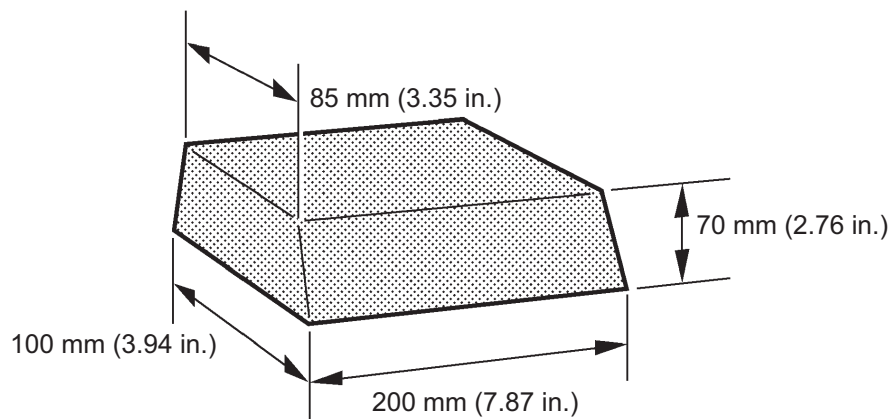
**NOTICE :**

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

**HINT:**

- Left and right set position      place the vehicle over the center of the lift.
- Front and rear set position      ● Place the attachments at the ends of the rubber plate surface, under the vehicle lift pad (A and C in the illustration).
- Raise the plate slightly and reposition the car so the top of the attachment (B in the illustration) is aligned with the front side notch in the vehicle rocker flange.

Attachment Dimensions





## CUSTOMIZE PARAMETERS

### HINT:

The following can be customized.

### NOTICE:

- After confirming whether the items of the customer's request are applicable or not for the customized items, perform the customize operation.
- Be sure to record the current value before customizing.
- In case of performing the troubleshooting, pay attention as there is a possibility that the function is OFF by customizing. (Example: In case of the symptom in which "The wireless operation does not function" is displayed, check that the wireless operation is not OFF by customizing, then perform the troubleshooting.)

### 1. AIR CONDITIONING SYSTEM

#### AIR CONDITIONER

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
SET TEMP SHIFT (Set Temperature Shift)	NORMAL	To control with the shifted temperature against the display temperature.	+2C / +1C / NORMAL / -1C / -2C
AIR INLET MODE (Air Inlet Mode)	AUTO	In case of turning the A/C ON when you desire to make the compartment cool down quickly, this is the function to change the mode automatically to RECIRCULATED mode.	MANUAL / AUTO
COMPRESSOR MODE (Compressor Mode)	AUTO	Function to turn the A/C ON automatically by pressing the AUTO button when the blower is ON and the A/C is OFF.	MANUAL / AUTO
COMPRS/DEF OPER (Compressor/Air Inlet DEF Operation)	LINK	Function to turn the A/C ON automatically linking with the FRONT DEF button when A/C OFF.	NORMAL / LINK
EVAP CTRL (Evaporator Control)	AUTO	Function to set the evaporator control to the AUTOMATIC position (AUTO) to save power or to the coldest position (MANUAL) to dehumidify the air and to prevent the windows fogging up.	MANUAL / AUTO
BUTTON PRS BUZ (Button Press Buzzer)	ON	Function to sound a buzzer when a button is pressed.	OFF / ON
FOOT/DEF MODE (Foot/DEF auto mode)	ON	Function to turn the air flow from FOOT/DEF ON automatically when AUTO MODE is ON.	OFF / ON
AUTO BLOW UP (Foot/DEF automatic blow up function)	ON	Function to switch the blower level automatically when the defroster is ON.	OFF / ON
AMBIENT TMP SFT (Ambient Temperature Shift)	NORMAL	To control with the shifted ambient temperature against the display ambient temperature.	+3C / +2C / +1C / NORMAL / -1C / -2C / -3C
FOOT AIR LEAK (Foot Air Leak)	ON	Function to cut off the airstream felt underfoot while the vehicle is moving.	OFF / ON

### 2. LIGHTING SYSTEM

#### ILLUMINATED ENTRY

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
LIGHTING TIME (Lighting Time)	15 s	To change the lighting time after closing the door. (It will quickly fade out in case of turning the ignition on (IG).)	7.5 s / 15 s / 30 s
ILLUMI SYSTEM (Operation of illumination)	ON	Function to turn on the step light, center console light and door inside handle light when one of the following occurs; the ignition turned on (IG), door unlock or door open.	ON / OFF

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
LIGHT CONTROL (Light control)	ON	Function to turn on the step light and door inside handle light when the ignition switch is turned on (IG) and the shift lever is not in the P position.	ON / OFF
I/L ON / UNLOCK (Interior light ON w/ door key unlock)	ON	Function to turn on the interior light*, ignition light and step light when unlocking with the door key cylinder. *: Interior light comes on when the interior light switch is in the DOOR position.	ON / OFF
I/L ON/ACC OFF (Illumination system ON with ACC OFF)	ON	Function to turn on the interior light* and door courtesy light when the ignition switch is turned from on (ACC) to off. *: interior light comes on when the interior light switch is in the DOOR position.	ON / OFF

**LIGHT CONTROL**

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
LIGHT OFF DELAY (Light Auto OFF Delay)	30 s	Function to keep the headlight on for a certain period of time after closing all the doors when turning the ignition switch on (IG) under the condition that the light control switch is in the HEAD or AUTO position with the headlight ON.	OFF / 30 s / 60 s / 90 s
LIGHT CTRL TYPE (Control Type)	CURRENT	To change the control logic when the light control switch is in the AUTO position. Refer to the *table 1.	CURRENT / OLD
SENSITIVITY (Turn ON luminous intensity)	NORMAL	To adjust the sensitivity of the lighting illumination. Refer to the *illumination 1.	DARK2 / DARK1 / NORMAL / LIGHT1 / LIGHT2
DISP EX ON SEN (Display Extinction Luminous Intensity)	NORMAL	To dim the lights such as the indicator light of the combination meter, A/C indicator light, and clock. Refer to *illumination 2.	DARK2 / DARK1 / NORMAL / LIGHT1 / LIGHT2
DISP EX OFF SEN (Display Extinction Release Luminous Intensity)	NORMAL	To cancel to dim the lights such as the indicator light of the combination meter, A/C indicator light, and clock. Refer to *illumination 3.	DARK2 / DARK1 / NORMAL / LIGHT1 / LIGHT2

**Table 1**

	Brightness of the surrounding when lighting	Lighting delay	Delay of turning light off	**2
OLD	Old logic	6 sec.	6 sec.	3 sec.
CURRENT	New logic **1 ('97/8-)	15 sec.	15 sec.	15 sec.

\*\*1: The new system has the ability to light up two times brighter than the old system.

\*\*2: Delay time until the headlight is turned on when the outside suddenly gets dark.

**Illumination 1**

Lighting brightness	
Setting	

**Illumination 2**

Brightness when dimming the lights	
Setting	

**Illumination 3**

Brightness when canceling to dim the lights	
Setting	

**3. WIPER AND WASHER SYSTEM****WIPER**

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
AUTO WIPE (Auto wipe)	AVAIL	Function to operate the wiper automatically when it is raining.	NOT AVAIL / AVAIL
REWIPE CONTROL (Rewipe Control)	SPD MOD	Function to change the time between end of the washer motor operation and start of wiper operation, to prevent streaking from washer fluid.	OFF / 3s / SPD MOD
SPEED MODE (Speed Mode)	AVAIL	Function to change to the intermittent operation mode when the vehicle comes to a stop (0 vehicle speed) from a driving condition where the wiper switch is in the LO position.	NOT AVAIL / AVAIL

**4. COMBINATION METER****WARNING BUZZER:**

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
KEY REMND VOLUM	LARGE	Function to change volume of key remind warning buzzer.	Big / Middle / Small
KEY REMND SOUND	900 ms	Function to change cycle of key remind warning buzzer.	600 ms / 900 ms / 1,200 ms

**5. POWER DOOR LOCK CONTROL SYSTEM**

Display (Item)	Default	Contents	Setting
Auto Lock	OFF	Function that locks the doors once when the vehicle speed reaches a certain level.	ON/OFF
Unlk/Key Twice	ON	Function that unlocks only driver side door when driver side door key cylinder is turned to unlock once and unlocks all the doors when it is turned to unlock twice.	ON/OFF
All Unlk/Opn-CI	ON		ON/OFF
Unlock/Park	OFF	Function that unlocks doors when lever is shifted to P position from any position other than P while the ignition switch is ON.	ON/OFF

**6. WIRELESS DOOR LOCK CONTROL SYSTEM**

Display (Item)	Default	Function	Setting
OPEN DOOR WARN (Open door warning)	ON	If any door is not completely closed and transmitter lock switch is pressed, this function sounds buzzer for 10 seconds.	ON/OFF
WIRELESS OPER (Wireless door lock control function)	ON	Function that turns wireless door lock function ON/OFF.	ON/OFF
ALARM FUNCTION (*1) (Panic function)	ON	Function that operates theft deterrent system when transmitter panic switch on transmitter is pressed and held for 2.5 seconds.	ON/OFF
UNLOCK/2OPER (Wireless unlock operated twice)	ON	Function that unlocks driver side door when unlock switch on transmitter is pressed once, and unlocks all doors when pressed twice. If setting is OFF, pressing unlock switch once makes all doors unlock.	ON/OFF
AUTO LOCK DELAY (Auto lock time)	30 s	This function regulates the interval between unlocking and automatic relocking of doors.	30 s/60 s

Display (Item)	Default	Function	Setting
WIRLS BUZZ RESP (Buzzer answer-back for wireless door lock control)	ON	Function that sounds wireless door lock buzzer for answer-back when lock/unlock switch on transmitter is pressed.	ON/OFF
HAZARD ANS BACK (Hazard answer-back for wireless door lock control)	ON	When lock switch on transmitter is pressed, this function blinks all hazard warning lights once. When unlock switch is pressed, all hazard warning lights blink twice.	ON/OFF
TRUNK LID OPER (Wireless trunk opener function setting)	0.8 s PR	Changes operation method of transmitter to open trunk.	1 TIME/2 TIMES/0.8 s PR/OFF

(\*1): This function cannot be turned on or off if the security system is turned off.

## 7. SMART KEY SYSTEM

### WIRELESS DOOR LOCK

Display (Item)	Default	Contents	Setting
OPEN DOOR WARN (Open door warning)	ON	Function to make the buzzer sound for 10 seconds if the door is open when locking with the wireless door lock function.	ON/OFF
WIRELESS OPER (Wireless door lock control function)	ON	ON/OFF of the wireless door lock function.	ON/OFF
ALARM FUNCTION (*1) (Panic function)	ON	Function to operate the theft deterrent system by keeping pressing the lock button of the transmitter for 2.5 seconds. If there is a panic button, press the panic button instead of the lock button.	ON/OFF
UNLOCK2 OPER (2 times operation wireless unlock)	ON	Function to unlock the driver's door by pressing the unlock button of the transmitter once and to unlock all the doors by pressing it twice. In the OFF setting, pressing one time makes all the doors unlocked.	ON/OFF
LUGGAGE COMPARTMENT LID OPER (Trunk lid open function type)	0.8 s PR	To change the operation method of opening the luggage compartment by the transmitter.	1 TIME/ 2 TIMES 0.8 s PR/OFF
AUTO LOCK DELAY (Auto lock time)	30 s	To change the time until re-locking after unlocking with the wireless door lock function.	60 s/30 s
HAZARD AND BACK (Hazard answer back of the wireless)	ON	Function to light up the all turn signal lights once when pressing the transmitter lock button and twice when pressing the unlock button.	ON/OFF
WIRLS BUZZ RESP (Wireless buzzer response)	ON	ON/OFF of the wireless buzzer response function.	ON/OFF

\*1: w/ Theft deterrent system

### WARNING (COMBINATION METER)

Display (Item)	Default	Contents	Setting
SMART WARN3 (Warn a key is taken out by fellow passengers)	ON	Function to warn that a key is taken out by fellow passengers (it means the key is taken out from except the driver's door) when ignition is not OFF.	ON/OFF
KEY LOW-BATT WRN (Warn when the key battery becomes weak)	ON	Setting a warning function for the first time when a key battery becomes weak.	ON/OFF
KEY REMND VOLUM (Key reminder buzzer volume)	LARGE	To change the volume of the key reminder buzzer.	LARGE/MEDIUM/SMALL

Display (Item)	Default	Contents	Setting
KEY REMND SOUND (Key reminder buzzer sound)	NORMAL	To change the frequency of the key reminder buzzer.	NORMAL/FAST/SLOW/0 s

**SMART**

Display (Item)	Default	Contents	Setting
SMART IGNITION (SMART ignition available area)	ALL	Function to choose the available area for smart key to start E/G and cancel the Steering Lock.	FRONT/ALL
PARK WAIT TIME (Wait time to permit opening door after locking)	2.5 s	Setting a wait time to permit opening a door after it being locked with SMART entry.	0.5 s/1.5 s/2.5 s/5 s
SMART TRUNK (Luggage compartment opening operation when vehicle is locked)	ON	Function to open a luggage compartment when the driver has the key and press the luggage open button.	ON/OFF
KEY LOW-BATT WRN	ON	Function to set a warning function for the time when a key battery becomes weak.	ON/OFF

**8. THEFT DETERRENT SYSTEM****THEFT DETERRENT SYSTEM**

DISPLAY (ITEM)	DEFAULT	CONTENTS	SETTING
PASSIVE MODE	OFF	For vehicles with the smart key system, PASSIVE MODE is the function that sets the theft deterrent system 30 seconds after the driver's door is closed from the open condition with the key removed from the ignition key cylinder. For vehicles without the smart key system, PASSIVE MODE is the function that sets the theft deterrent system 30 seconds after the driver's door is closed from the open condition with the ignition switch turned from on (IG) to off	ON/OFF
WARN BY GLS SEN	ON	Function that turns the glass break sensor on/off. This function is only effective for vehicles with glass break sensors.	ON/OFF
ENTRY DELAY	14s	Function that changes the entry delay time (period before starting the warning) for the passive mode.	0s/14s/30s
WARNING BY HORN	ON	Function to make the horn warning available.	ON/OFF

## INITIALIZATION

### NOTICE:

When disconnecting the negative (-) battery terminal, initialize the following system(s) after the terminal is reconnected.

System Name	See Step No.
Power Window Control System	1
Sliding Rood System	1

### 1. INITIALIZE FRONT POWER SEAT CONTROL SYSTEM

- (a) The power seat ECU must be initialized under any of the following conditions.
  - The battery is disconnected.
  - The D/C CUT fuse is replaced.
  - The power seat switch (power seat ECU) is replaced.
  - The power seat assembly is removed from the vehicle.
- (b) Initialize the power seat ECU as follows.
  - (1) Using the seat switches, fully slide the seat forward, fully recline the seatback forward, and fully raise the seat cushion and headrest.
  - (2) Using the seat switches, fully slide the seat rearward, fully recline the seatback rearward, and fully lower the seat cushion and headrest.

# HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

## GENERAL INFORMATION

A large number of ECU controlled systems are used in the AVALON. 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

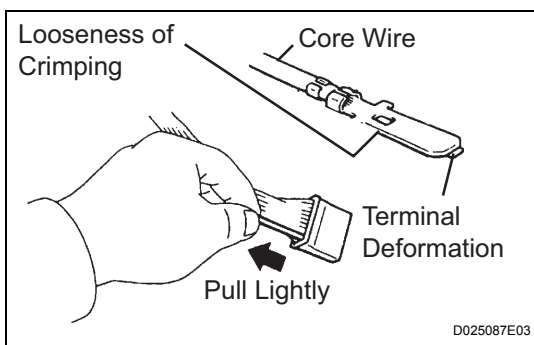
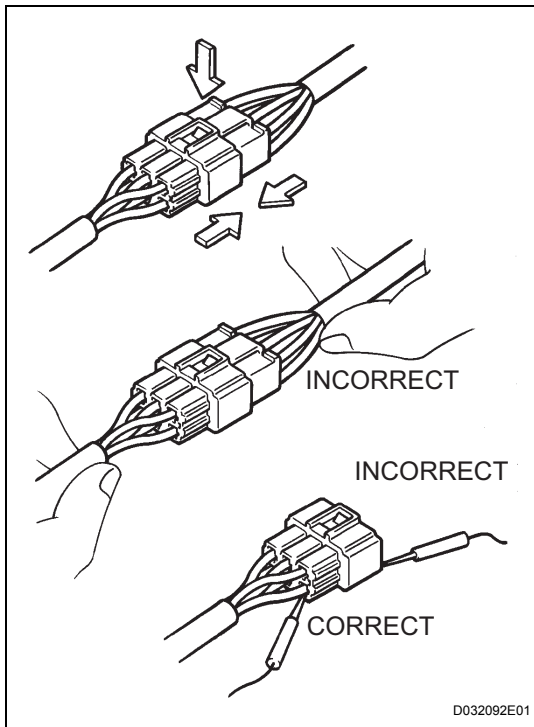
- (1) Unless otherwise stated, all resistance measurements should be made at an ambient temperature of 20°C (68°F). Resistance measurements may be inaccurate if measured at high temperatures, i.e. immediately after the vehicle has been running. Measurements should be made after the engine has cooled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

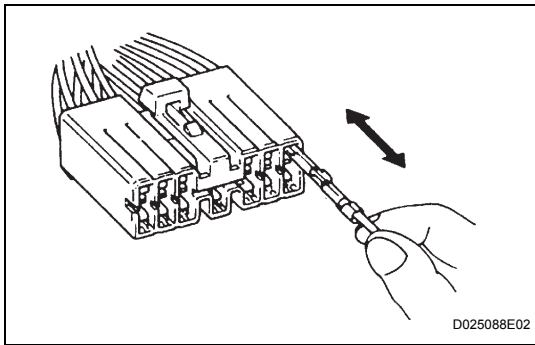
- **As a waterproof connector cannot be checked from the backside, check it by connecting a sub-harness.**
- **Do not damage the terminals by moving the inserted tester needle.**



#### (c) CHECKING CONNECTORS

- (1) Checking when a connector 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.

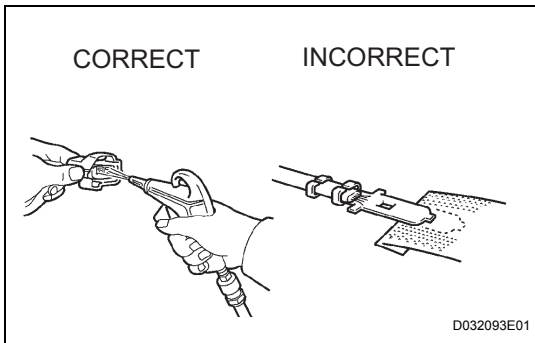




- (3) Checking the contact pressure of the terminal:  
Prepare a spare male terminal. Insert it into a female terminal, and check for ample tension when inserting and after full engagement.

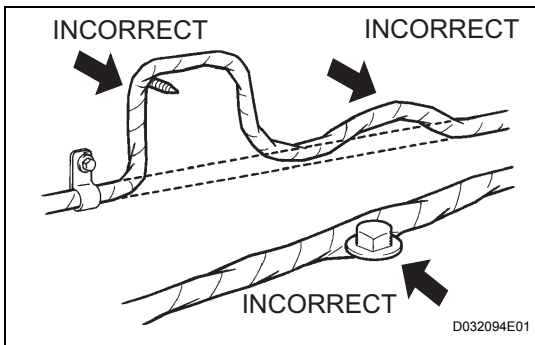
**NOTICE:**

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



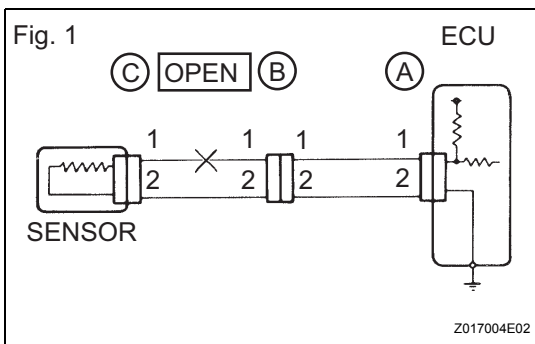
(d) REPAIR METHOD OF CONNECTOR TERMINAL

- (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.



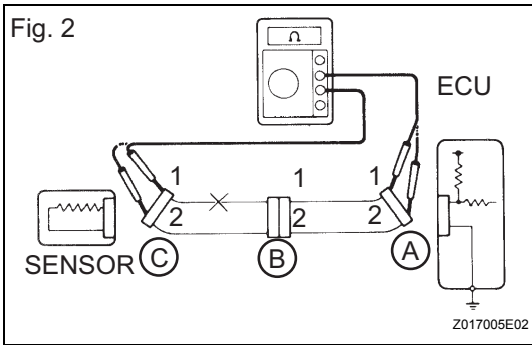
(e) HANDLING OF WIRE HARNESS

- (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)**

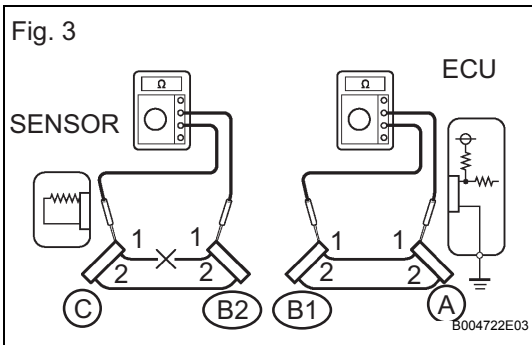
Tester Connection	Specified Condition
Connector A terminal 1 - Connector C terminal 1	10 kΩ or higher
Connector A terminal 2 - Connector C terminal 2	Below 1Ω

**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.

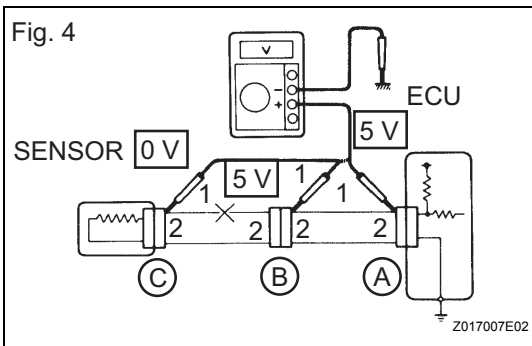
- (2) Disconnect connector B and measure the resistance between the terminals of the connectors.

**Standard resistance (Fig. 3)**



Tester connection	Specified Condition
Connector A terminal 1 - Connector B1 terminal 1	Below 1 Ω
Connector B2 terminal 2 - Connector C terminal 2	10 kΩ 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.

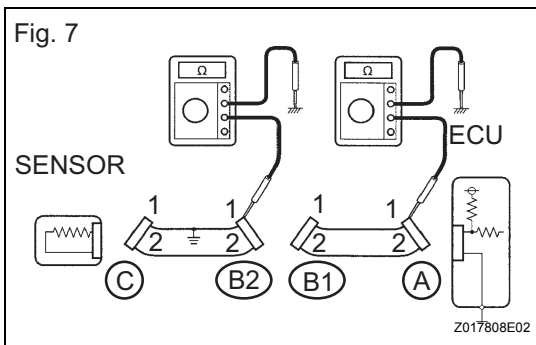
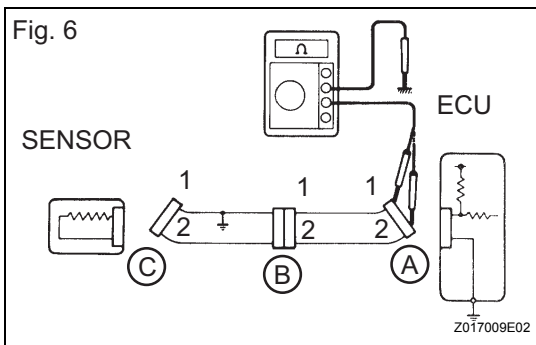
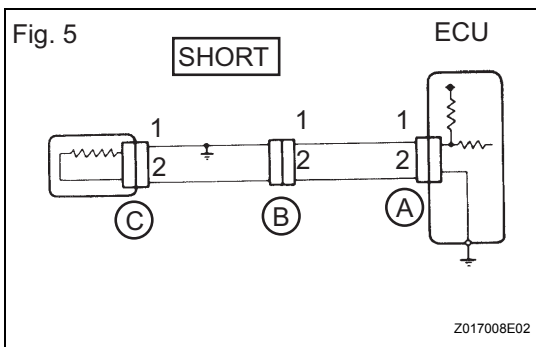


- (c) Check the voltage.  
 (1) In a circuit in which voltage is applied to the ECU connector terminal, an open circuit can be checked by conducting a voltage check. With each connector still connected, measure the voltage between the body ground and these terminals (in this order): 1) terminal 1 of 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 Ω
Connector A terminal 2 - Body ground	10 kΩ 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 kΩ or higher
Connector B2 terminal 2 - Body ground	Below 1 Ω

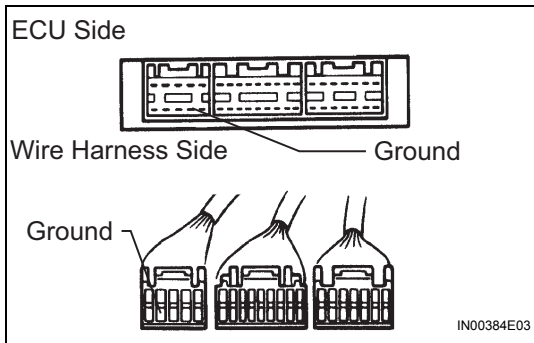
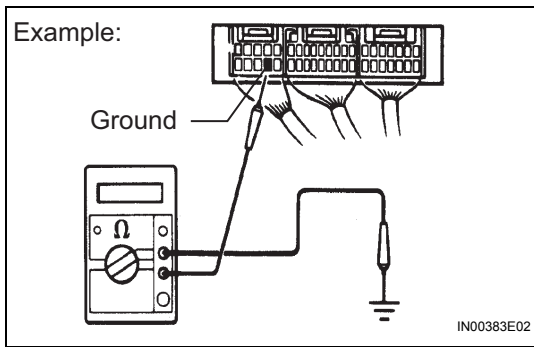
If the results match the examples above, a short circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

**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.

IN



(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 AVALON 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 AVALON.

System	DTC Check	Check Mode	Sensor Check/Test Mode (Input Signal Check)	DATA LIST	ACTIVE TEST
SFI System	○	○		○	○
ABS with EBD System	○		○	○	○
ABS with EBD & BA & TRAC & VSC System	○		○	○	○
Electronic Controlled Automatic Transmission [ECT]	○	○		○	○
Electric Steering Lock	○			○	○
Air Conditioning System	○			○	○
Supplemental Restraint System	○	○		○	
Lighting System	○			○	○
Wiper & Washer System				○	○
Audio System	○				
Navigation System	○				

System	DTC Check	Check Mode	Sensor Check/Test Mode (Input Signal Check)	DATA LIST	ACTIVE TEST
Combination Meter				○	○
Power Mirror Control System (w/ Memory)				○	○
Front Power Seat Control System (w/ Memory)				○	○
Power Door Lock Control System				○	
Wireless Door Lock Control System	○			○	○
Smart Key System	○			○	○
Engine Immobilizer System (w/o Smart Key System)	○			○	○
Push Button Start	○			○	○
Theft Deterrent 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).

#### 4. SYMPTOM SIMULATION

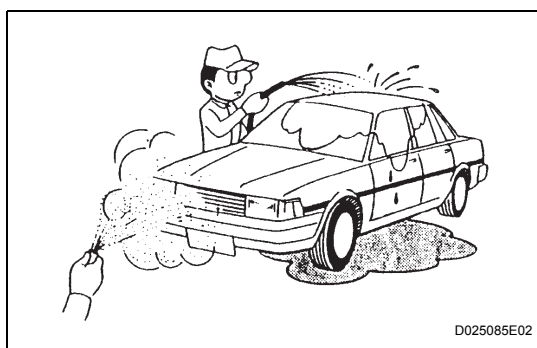
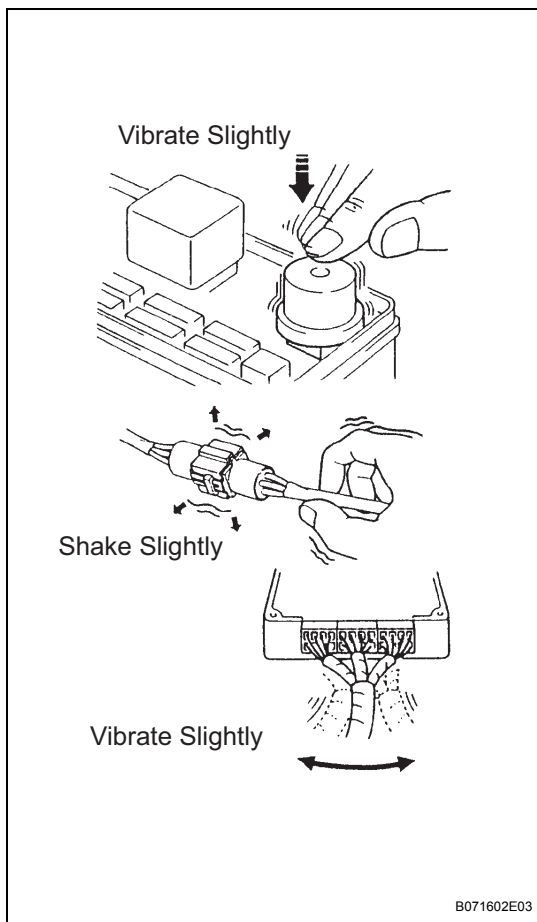
##### HINT:

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.

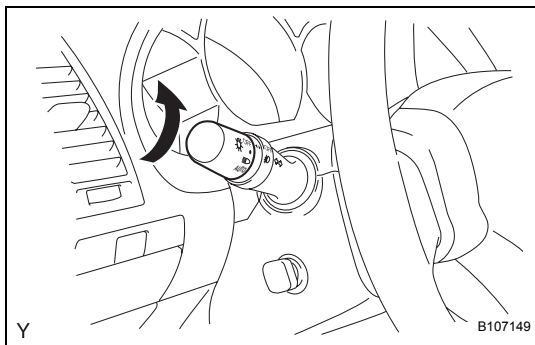
(1) Sprinkle water onto the vehicle and check if the malfunction occurs.

**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. Use this diagram together with ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit. Wire colors are indicated by an alphabetical code. B = Black, L = Blue, R = Red, BR = Brown, LG = Light Green, V = Violet, G = Green, O = Orange, W = White, GR = Gray, P = Pink, Y = Yellow, SB = Sky Blue The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

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. Connections of tester are indicated by (+) or (-) after the terminal name. Connector being checked is disconnected. 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
EMPS	Electric Motor Power Steering
ENG	Engine
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
FVCV	Fuel Tank Pressure Switching valve

Abbreviations	Meaning
F/W	Flywheel
FW/D	Flywheel Damper
FWD	Front-Wheel-Drive
GAS	Gasoline
GND	Ground
GPS	Global Positioning System
HAC	High Altitude Compensator
H/B	Hatchback
H-FUSE	High Current Fuse
HI	High
HID	High Intensity Discharge (Headlight)
HSG	Housing
HT	Hard Top
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
MG1	Motor Generator No. 1
MG2	Motor Generator No. 2
MP	Multipurpose



Abbreviations	Meaning
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
O/D	Overdrive
OEM	Original Equipment Manufacturing
OHC	Overhead Camshaft
OHV	Overhead Valve
OPT	Option
ORVR	On-board Refilling 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
PS	Power Steering
PTC	Positive Temperature Coefficient
PTO	Power Take-Off
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
RWD	Rear-Wheel Drive
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

Abbreviations	Meaning
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
TEMS	TOYOTA Electronic Modulated Suspension
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.
TRC	Traction Control System
TURBO	Turbocharge
TWC	Three-Way Catalyst
U/D	Underdrive
U/S	Undersize
VCV	Vacuum Control Valve
VENT	Ventilator
VIM	Vehicle Interface Module
VIN	Vehicle Identification Number
VPS	Variable Power Steering
VSC	Vehicle Stability Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
VVT-i	Variable Valve Timing-intelligent
W/	With
WGN	Wagon
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

## GLOSSARY OF SAE AND TOYOTA TERMS

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

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )-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 ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )-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) Mixture Control Valve (MCV) 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) 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 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) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) Manifold Converter CC <sub>RO</sub>

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )-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	-