

# HOW TO USE THIS MANUAL

## GENERAL INFORMATION

### 1. GENERAL DESCRIPTION

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

### 2. INDEX

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

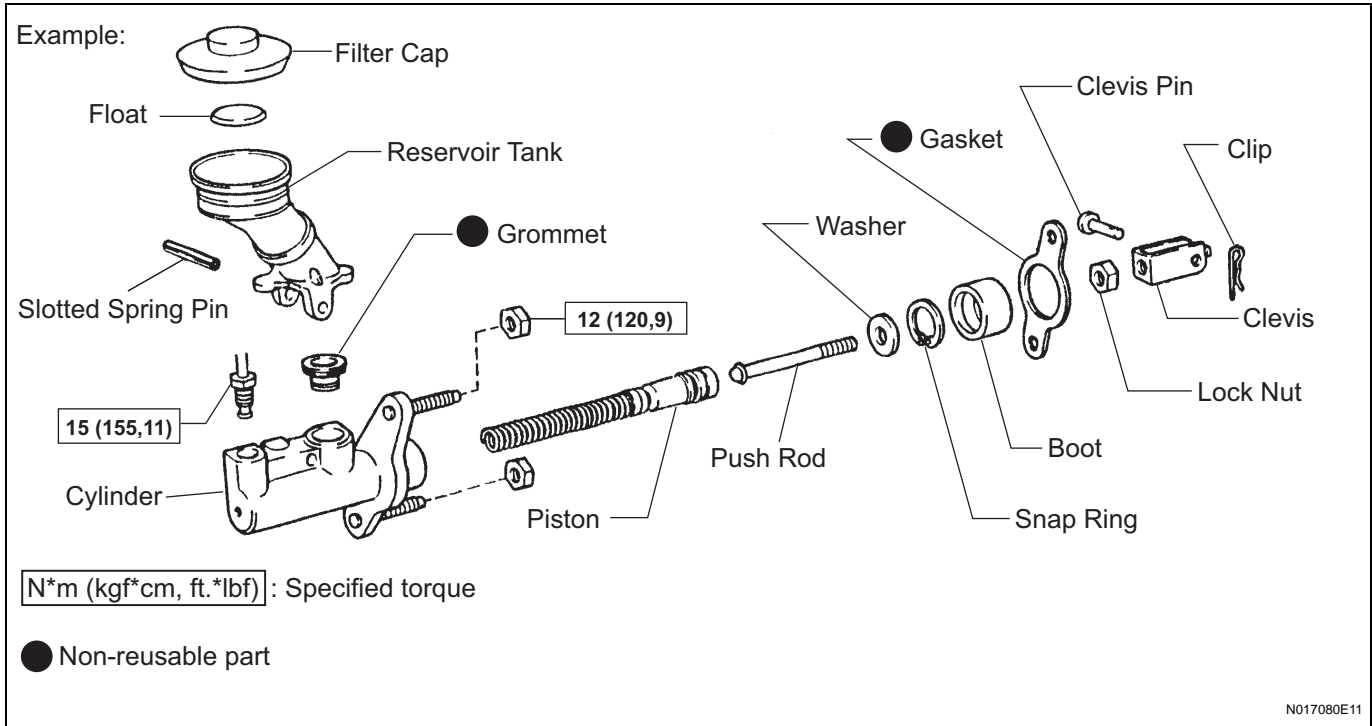
### 3. PREPARATION

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

### 4. REPAIR PROCEDURES

- (a) A component illustration is placed under the title where necessary.

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



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

HINT:

There are cases where such information can only be explained by using an illustration. In these cases, torque, oil and other information are described in the illustration.

- (d) Only items with key points are described in the text. What to do and other details are explained using illustrations next to the text. Both the text and illustrations are accompanied by standard values and notices.

Illustration	What to do and where to do it
Task heading	What work will be performed
Explanation text	<ul style="list-style-type: none"> <li>How to perform the task</li> <li>Information such as specifications and warnings, which are written in boldface text</li> </ul>

- (e) Illustrations of similar vehicle models are sometimes used. In these cases, minor details may be different from the actual vehicle.

- (f) Procedures are presented in a step-by-step format.

**5. SERVICE SPECIFICATIONS**

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

## 6. TERM DEFINITIONS

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

## 7. INTERNATIONAL SYSTEM OF UNITS

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

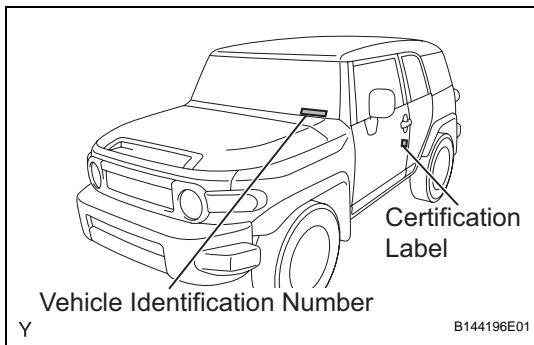
Example:

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

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# IDENTIFICATION INFORMATION

## VEHICLE IDENTIFICATION AND SERIAL NUMBERS

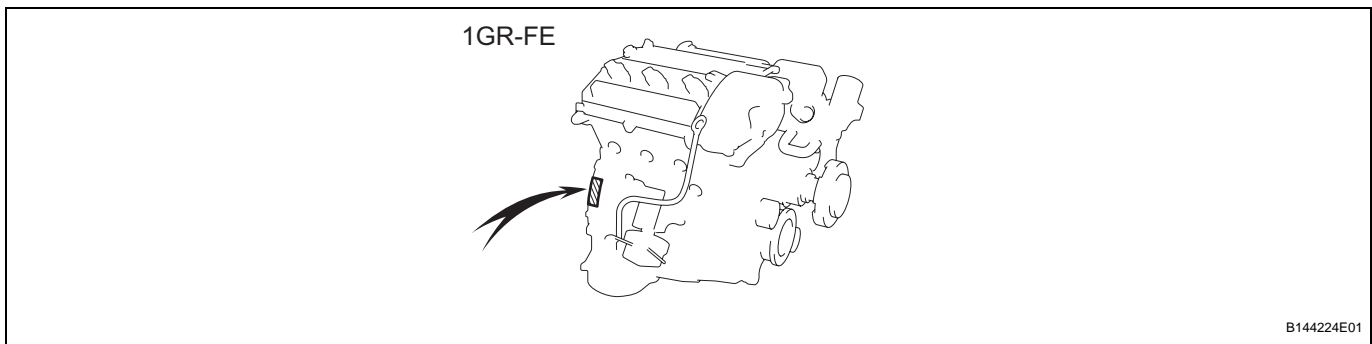


### 1. VEHICLE IDENTIFICATION NUMBER

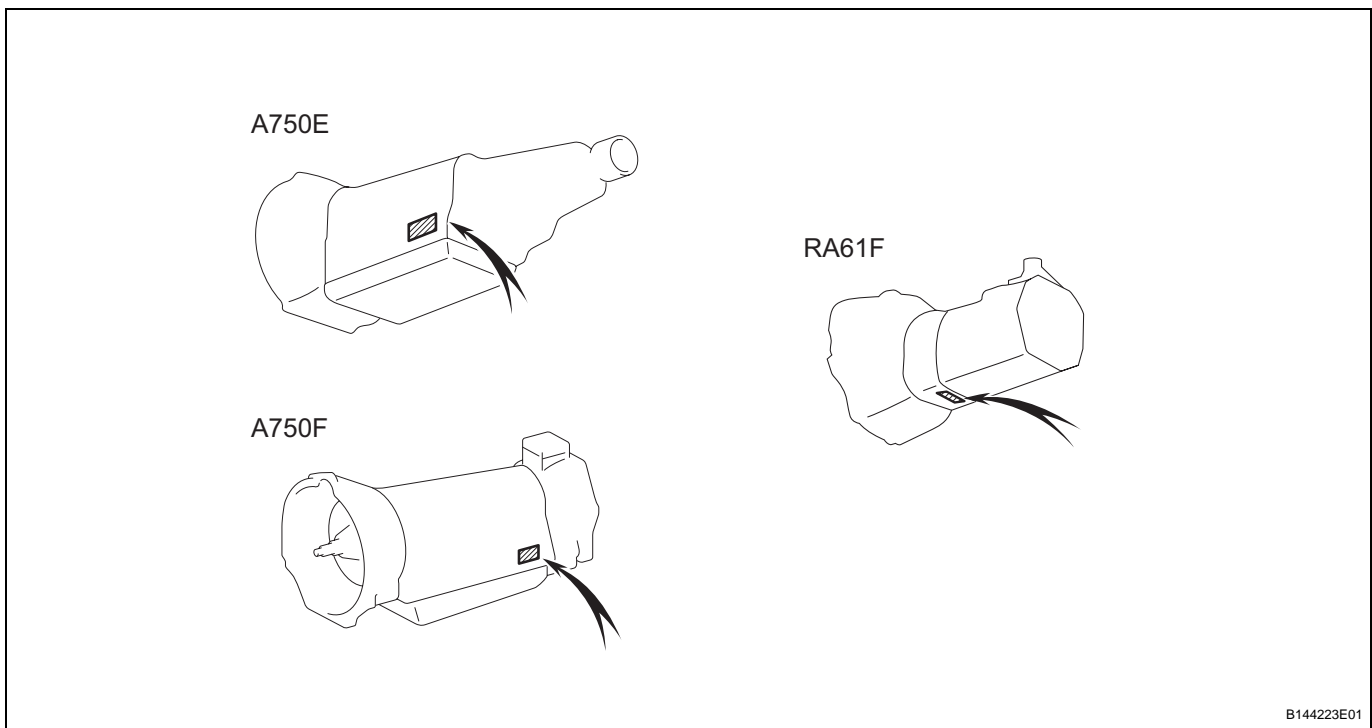
- (a) The vehicle identification number is stamped on the vehicle body and on the certification label, as shown in the illustration.
- (1) Vehicle Identification Number
  - (2) Certification Label

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

- (a) The engine serial number is stamped on the cylinder block of the engine and the transmission serial number is stamped on the housing as shown in the illustration.
- (1) Engine Serial Number



### (2) Transmission Serial Number



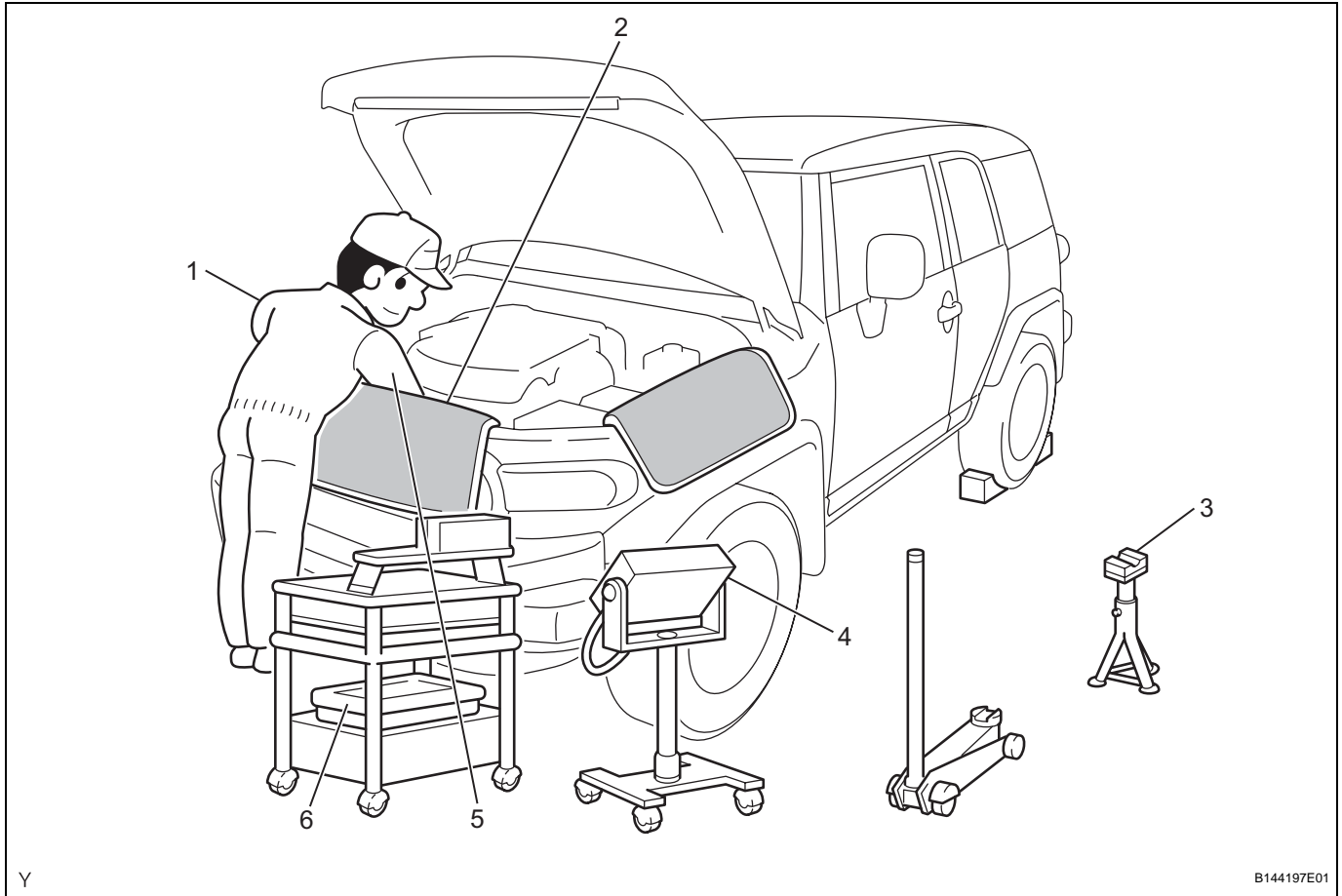
# REPAIR INSTRUCTION

## PRECAUTION

### 1. BASIC REPAIR HINT

#### (a) HINTS ON OPERATIONS

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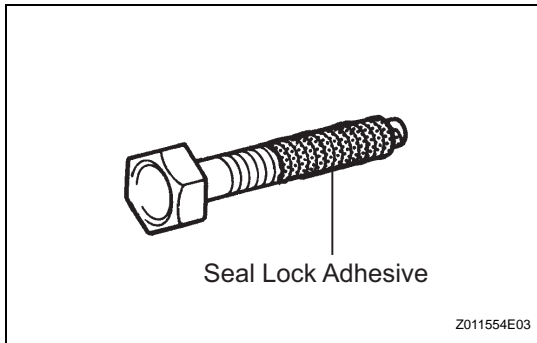
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1	Attire	<ul style="list-style-type: none"> <li>Always wear a clean uniform.</li> <li>A hat and safety shoes must be worn.</li> </ul>
2	Vehicle protection	Prepare a grille cover, fender cover, seat cover and floor mat before starting the operation.
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 the 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 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 ensure reassembly of components to their original positions. Temporarily mark hoses and their fittings if needed.</li> <li>Clean and wash the removed parts if necessary and assemble them after a thorough check.</li> </ul>

6	Removed parts	<ul style="list-style-type: none"> <li>Place removed parts in a separate box to avoid mixing them up with new parts or contaminating 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.

(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.

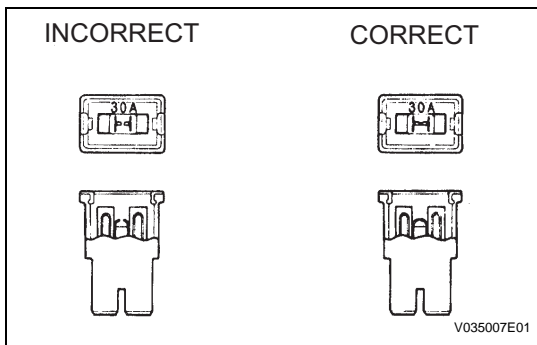
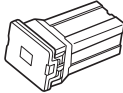

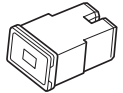

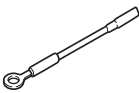

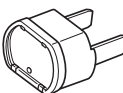



Illustration	Symbol	Part Name	Abbreviation
<p style="text-align: center;">N</p>	<p style="text-align: center;">N</p>	FUSE	FUSE

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

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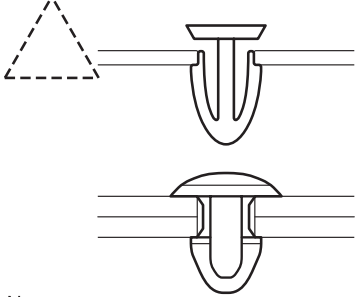
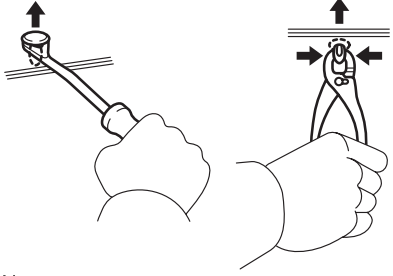
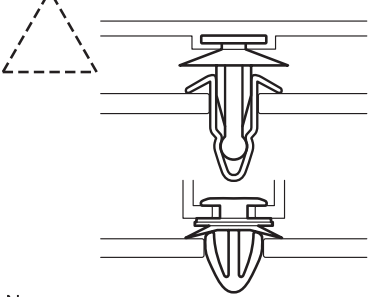
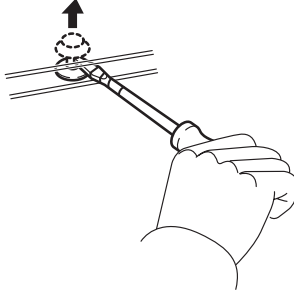
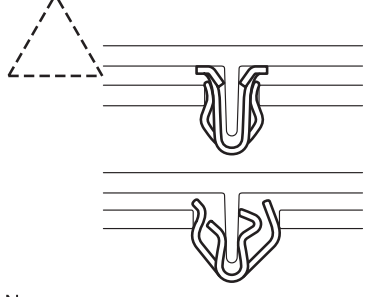
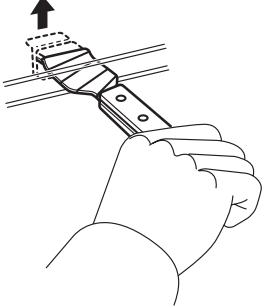
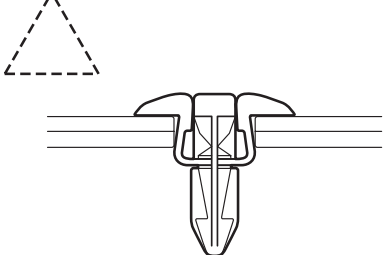
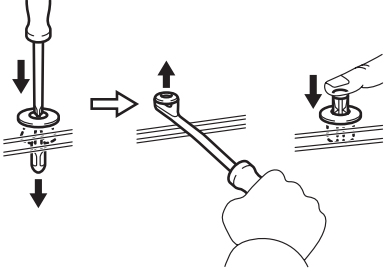
(g) CLIPS

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

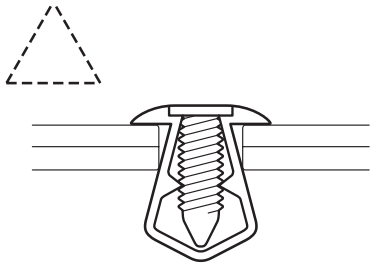
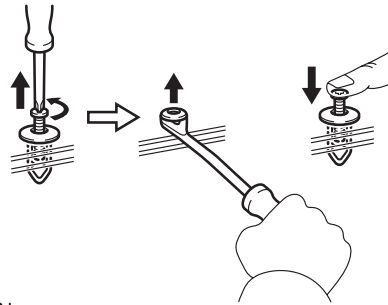
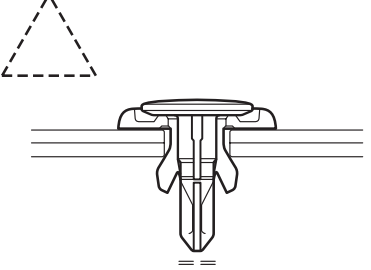
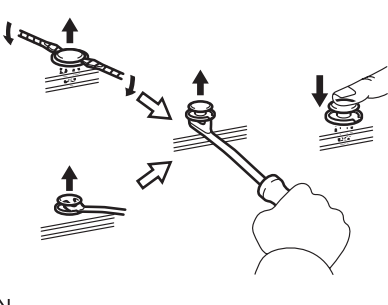
HINT:

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

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Shape (Example)	Illustration	Procedures
 <p>N</p>	 <p>N</p>	<p>1. Remove the clips with a clip remover or pliers.</p>
 <p>N</p>	 <p>N</p>	<p>1. Remove the clips with a clip remover or screwdriver.</p>
 <p>N</p>	 <p>N</p>	<p>1. Remove the clips with a wide scraper to prevent panel damage.</p>
 <p>N</p>	 <p>N</p>	<p>1. Remove the clips by pushing the center pin through and prying out the shell.</p>



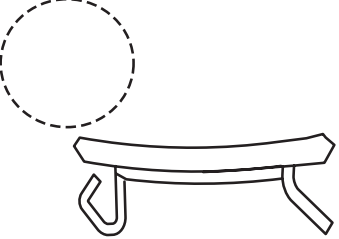
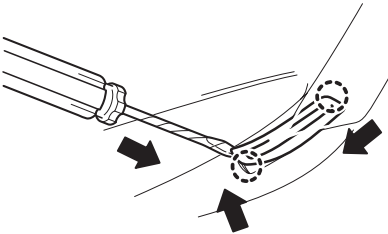
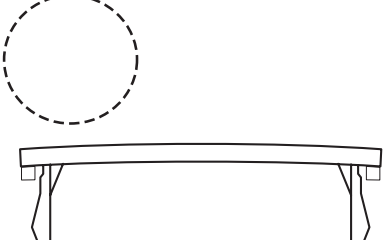
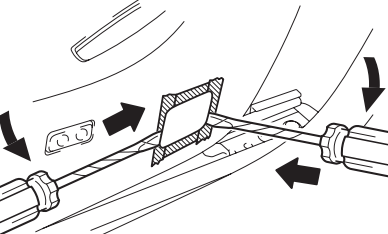
Shape (Example)	Illustration	Procedures
 <p>N</p>	 <p>N</p>	<p>1. Remove the clips by unscrewing the center pin and prying out the shell.</p>
 <p>N</p>	 <p>N</p>	<p>1. Remove the clips by prying out the pin and then prying out the shell.</p>

(h) CLAWS

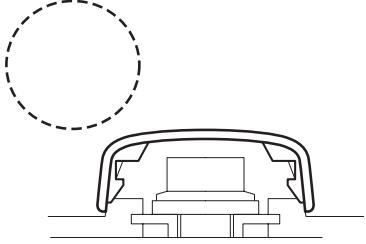
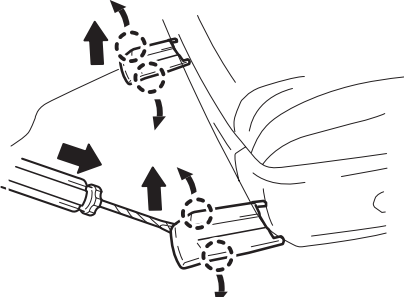
(1) The removal and installation methods of typical claws used for vehicle body parts are shown in the table below.

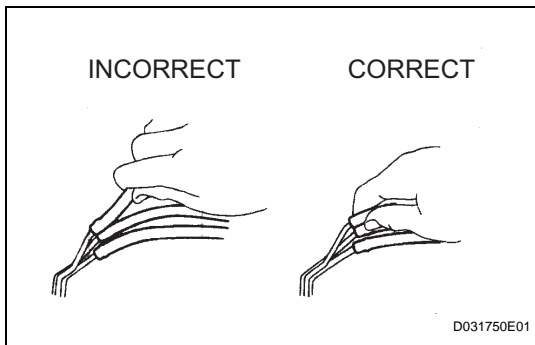
HINT:

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

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

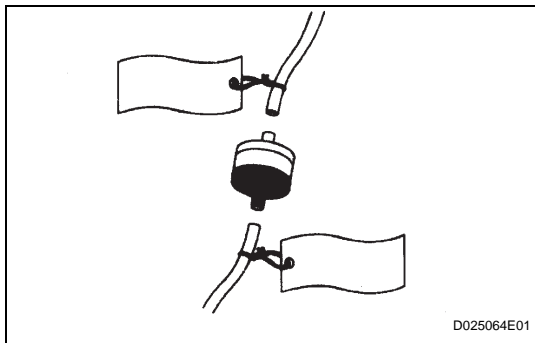
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Shape (Example)	Illustration	Procedures
		<p>1. Using a screwdriver, detach the claws and remove the cap or covers.</p>



(i) REMOVAL AND INSTALLATION OF VACUUM HOSES

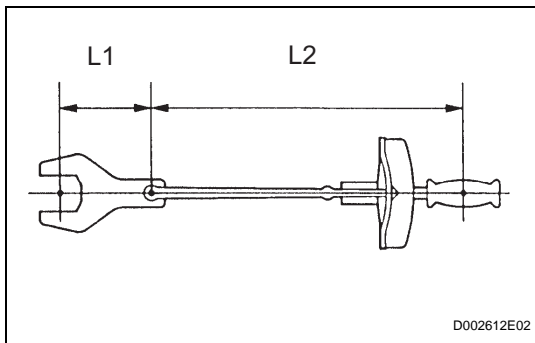
(1) To disconnect a vacuum hose, pull and twist from the end of the hose. Do not pull from the middle of the hose as this may cause damage.



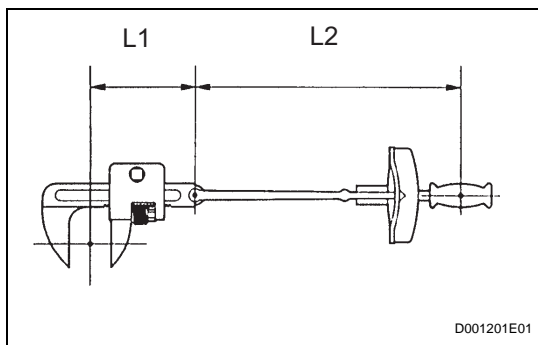
(2) When disconnecting vacuum hoses, use tags to identify where they should be reconnected.

(3) After completing any hose related repairs, double check that the vacuum hoses are properly connected. The label under the hood shows the proper layout.

(4) When using a vacuum gauge, never force the hose onto a connector that is too large. If a hose has been stretched, it may leak air. 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 a 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.)}

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**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 FRONT SEAT OUTER BELT ASSEMBLY WITH PRETENSIONER**

The FJ CRUISER 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 the 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.

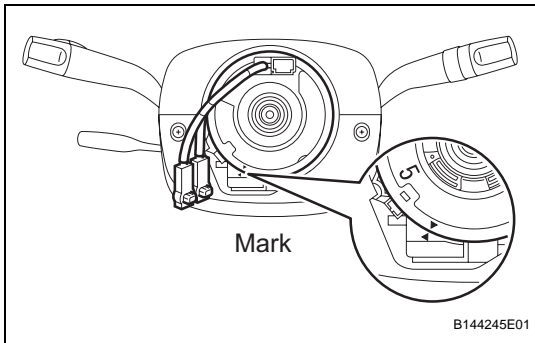
(a) GENERAL NOTICE

- (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 backup 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 backup power source (battery or other) to avoid erasing system memory. The backup power source may inadvertently power the SRS and cause it to deploy.**
- (3) Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, front seat side airbag assembly, curtain shield airbag assembly and seat belt pretensioner should be inspected
- (4) In minor collisions where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, front seat side airbag assembly, curtain shield airbag assembly and seat belt pretensioner should be inspected before further use of the vehicle.
- (5) Never use SRS parts from another vehicle.  
When replacing parts, use new parts.
- (6) Before repairs, remove the airbag sensor assemblies if impacts are likely to be applied to the sensor during repairs.
- (7) Never disassemble and attempt to repair the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly and seat belt pretensioner.
- (8) Replace the steering wheel pad, front passenger airbag assembly, front seat side airbag assembly, curtain shield airbag assembly and seat belt pretensioner if: 1) damage has occurred from being dropped, or 2) cracks, dents or other defects in the case, bracket or connector are present.
- (9) Do not directly expose the airbag sensor assemblies or airbag assemblies to hot air or flames.
- (10) Use an ohmmeter / voltmeter with high impedance (10 k $\Omega$ /V minimum) for troubleshooting electrical circuits.

(11) Information labels are attached to the SRS components. Follow the instructions on the labels.

(12) After work on the SRS is completed, check the SRS warning light.

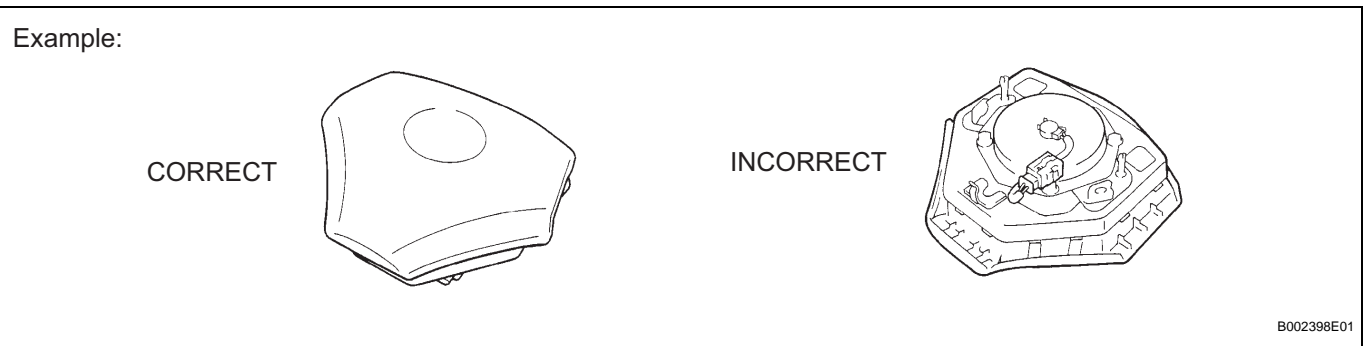


(b) SPIRAL CABLE

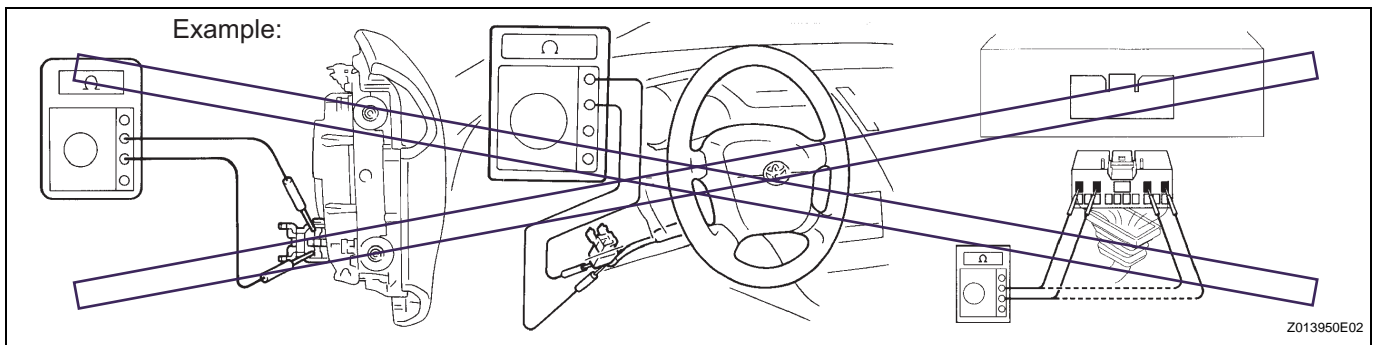
(1) The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, as cable disconnection and other problems may occur. Refer to the information about correct installation of the steering wheel.

(c) STEERING PAD

(1) Always place a removed or new steering pad surface upward as shown in the illustration. Placing the horn button with the pad surface facing down could cause a serious accident if the airbag inflates. Also, do not place anything on top of the horn button.



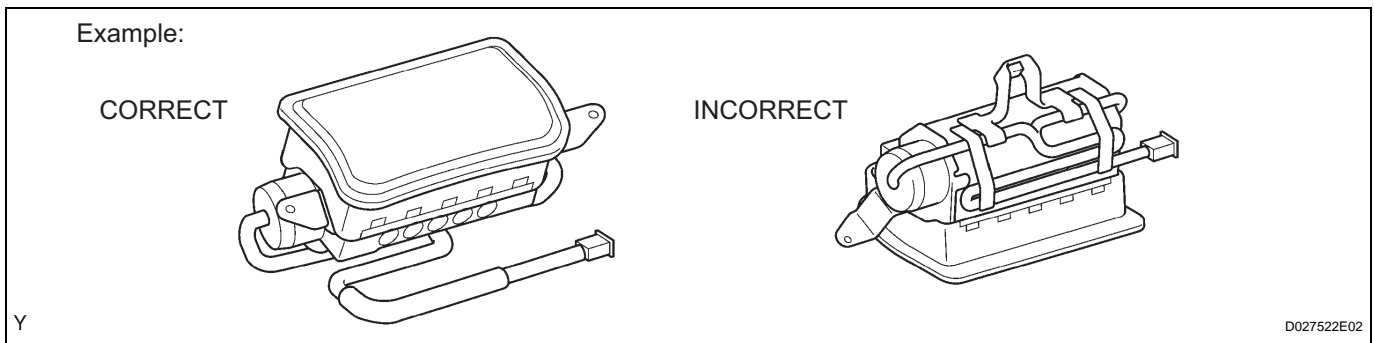
(2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.



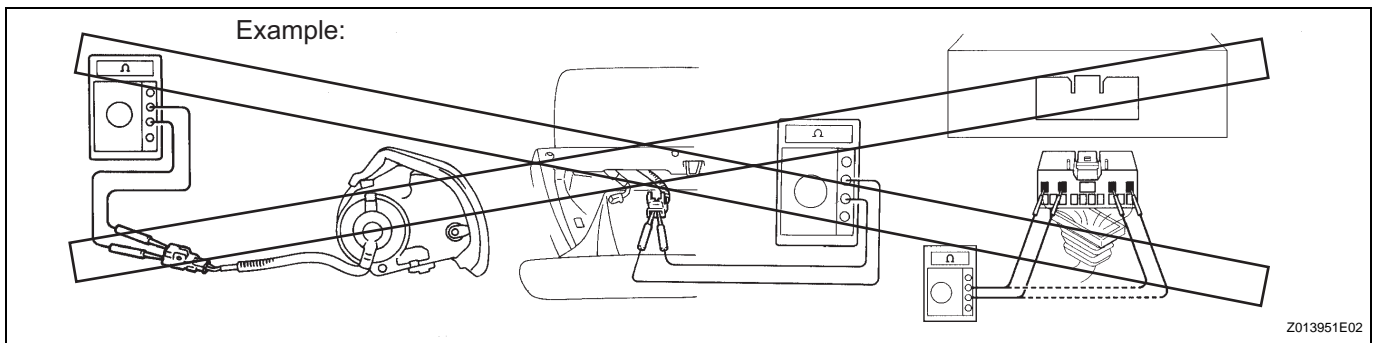
(3) Grease or detergents of any kind should not be applied to the horn button.

(4) Store the horn button assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.
- (6) When disposing of the vehicle or the horn button assembly by itself, the airbag should be deployed using SST before disposal. Activate the airbag in a safe place away from electrical noise.
- (d) FRONT PASSENGER AIRBAG ASSEMBLY
- (1) Always place a removed or new front passenger airbag assembly with the pad surface facing upward as shown in the illustration. Placing the airbag assembly with the airbag inflation direction facing down could cause a serious accident if the airbag inflates.

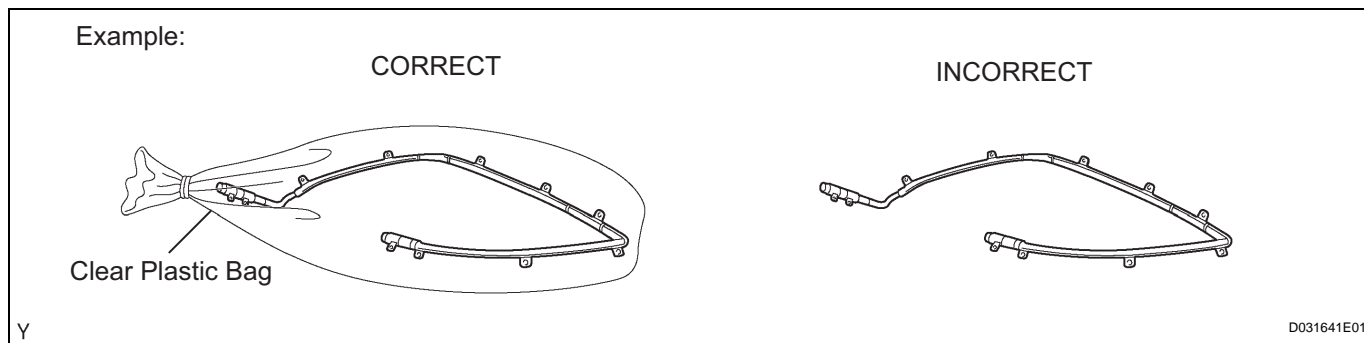


- (2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.



- (3) Grease or detergents of any kind should not be applied to the front passenger airbag assembly.
- (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.
- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

- (6) When disposing of the vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal. Activate the airbag in a safe place away from electrical noise.
- (e) CURTAIN SHIELD AIRBAG ASSEMBLY
- (1) Always place a removed or new curtain shield airbag assembly in a clear plastic bag, and keep it in a safe place.

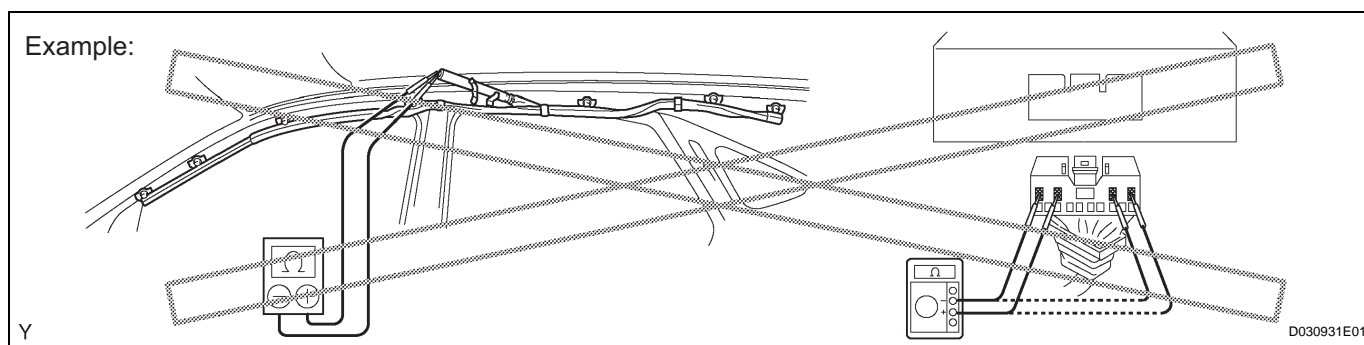
**CAUTION:**

The plastic bag is not reusable.

**NOTICE:**

Never disassemble the curtain shield airbag assembly.

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

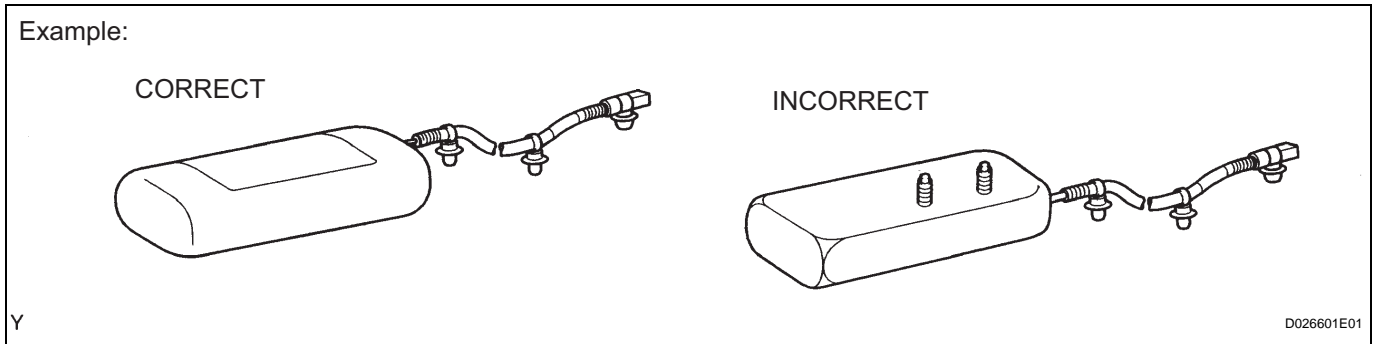


- (3) Grease or detergents of any kind should not be applied to the curtain shield airbag assembly.
- (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.
- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

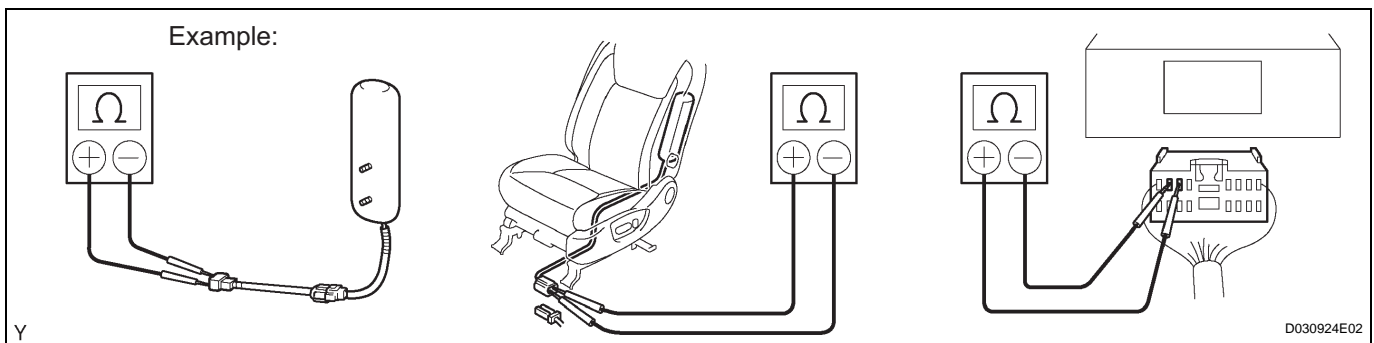
- (6) When disposing of a vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal. Activate the airbag in a safe place away from electrical noise.

(f) FRONT SEAT SIDE AIRBAG ASSEMBLY

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



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

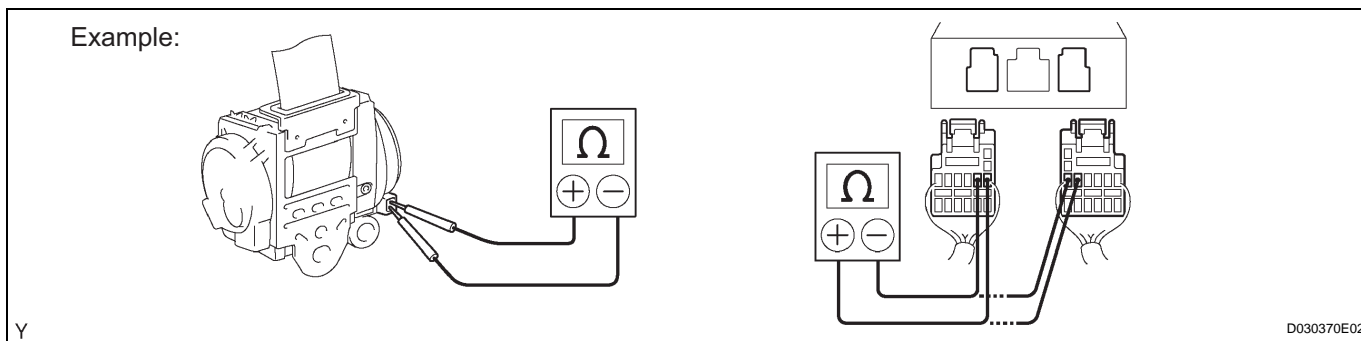


- (3) Grease or detergents of any kind should not be applied to the front seat airbag assembly.
- (4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.
- (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to 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. Activate the airbag in a safe place away from electrical noise.

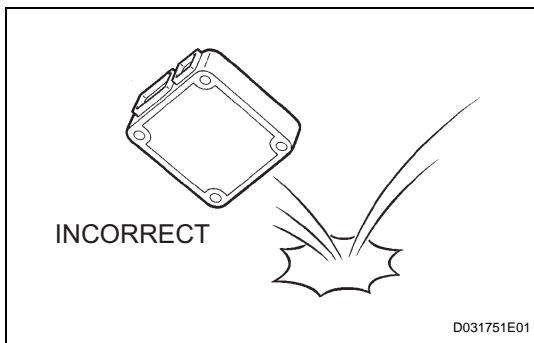
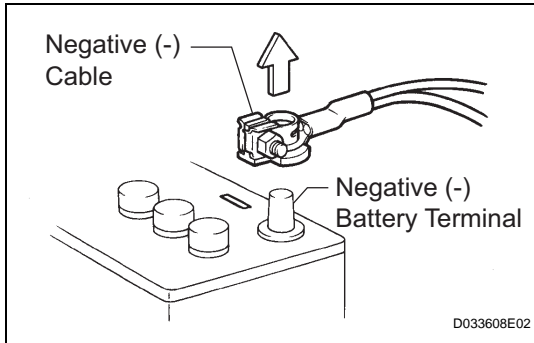


## (g) FRONT SEAT OUTER BELT ASSEMBLY WITH PRETENSIONER

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



- (2) Never disassemble the seat outer belt.
  - (3) Never install the seat outer belt on another vehicle.
  - (4) Store the seat outer belt in an area where the ambient temperature is below 80°C (176°F), the humidity is not high and there is no electrical noise.
  - (5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the pretensioner deploying due to currents entering the squib wiring.
  - (6) When disposing of a vehicle or the seat outer belt assembly by itself, the seat outer belt should be activated before disposal. Activate it in a safe place away from electrical noise.
  - (7) As the seat outer belt is hot after the pretensioner is activated, allow some time for it to cool down sufficiently before disposal. Never apply water to try to cool down the seat outer belt.
  - (8) Grease, detergents, oil or water should not be applied to the front seat outer belt.
- (h) AIRBAG SENSOR ASSEMBLY
- (1) Never reuse an airbag sensor assembly that has been involved in a collision where the SRS has deployed.
  - (2) The connectors to the airbag sensor assembly should be connected or disconnected with the sensor placed on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not placed on the floor, the SRS may activate.
  - (3) Work must be started at least 90 seconds after the ignition switch is turned OFF and the cable is disconnected from the negative (-) battery terminal, even if only loosening the set bolts of the airbag sensor assembly.



## (i) WIRE HARNESS AND CONNECTOR

- (1) The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are a standard yellow color. If the SRS wire harness becomes disconnected or the connector becomes broken, repair or replace it.

## 3. ELECTRONIC CONTROL

## (a) REMOVAL AND INSTALLATION OF BATTERY TERMINAL

**NOTICE:**

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

- (1) Before performing electronic work, disconnect the cable from the negative (-) battery terminal to prevent component and wire damage caused by accidental short circuits.
- (2) When disconnecting the cable, turn the ignition switch off and the headlight dimmer switch OFF and loosen the cable nut completely. Perform these operations without twisting or prying the cable. Then disconnect the cable.
- (3) Clock settings, radio settings, audio system memory, DTCs and other data are erased when the cable is disconnected from the negative (-) battery terminal. Write down any necessary data before disconnecting the cable.

## (b) HANDLING OF ELECTRONIC PARTS

- (1) Do not open the cover or case of the ECU unless absolutely necessary. If the IC terminals are touched, the IC may be rendered inoperative by static electricity.
- (2) Do not pull the wires when disconnecting electronic connectors. Pull the connector.
- (3) Be careful not to 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 of a wire connector, insert the tester probe carefully to prevent terminals from bending.

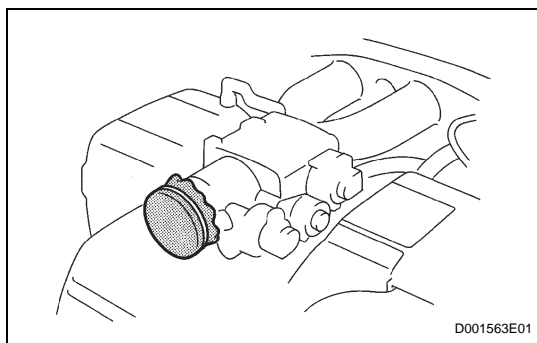
## 4. REMOVAL AND INSTALLATION OF FUEL CONTROL PARTS

## (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.

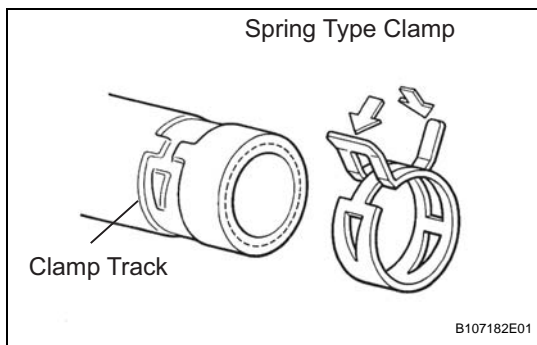
- (2) Never work in a pit or near a pit as vaporized fuel will collect in those places.
- (b) REMOVING AND INSTALLING FUEL SYSTEM PARTS
- (1) Prepare a fire extinguisher before starting the operation.
  - (2) To prevent static electricity, install a ground wire to the fuel changer, vehicle and fuel tank, and 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 equipment 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.

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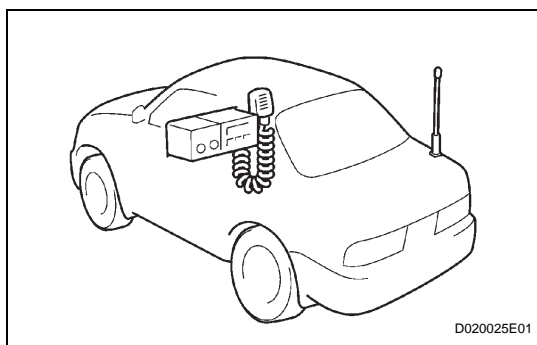
#### 5. REMOVAL AND INSTALLATION OF ENGINE INTAKE PARTS

- (a) If any metal particles enter inlet system parts, they 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

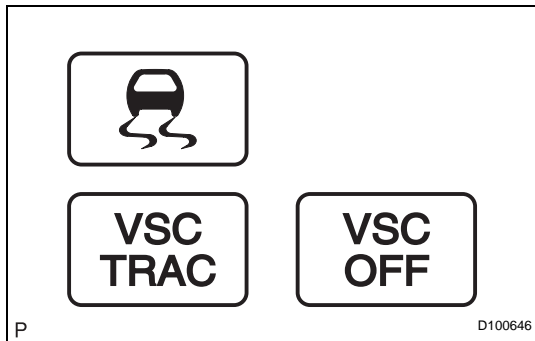
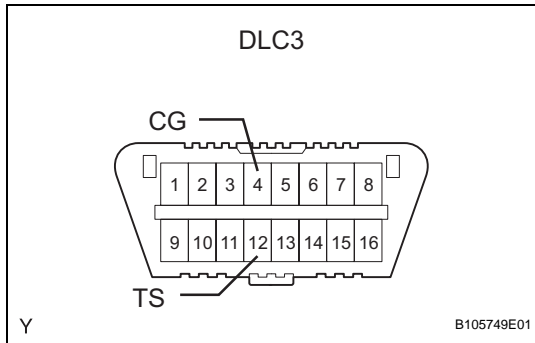
- (a) Before removing the hose, check the clamp position so that it can be reinstalled in the same position.
- (b) Replace any deformed or dented clamps with new ones.
- (c) When reusing a hose, attach the clamp on the clamp track portion of the hose.
- (d) For a spring type clamp, you may want to spread 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 as 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 sensor locations, refer to the section of the applicable components.

IN



- (c) Keep the antenna and feeder separate from other wiring as much as possible. This will prevent signals 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 a high-powered mobile communication system.

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

When testing with a 2-wheel drum tester such as a speedometer tester, a combination tester of the speedometer and brake, a chassis dynamometer, or when jacking up the front wheels and driving the wheels, always turn the TRAC system OFF.

- (a) Confirm that the TRAC system is OFF.
  - (1) Ignition switch to OFF.
  - (2) Connect SST to terminals TS and CG of DLC3.

### NOTICE:

**Confirm that the VSC/TRAC warning light blinks.**

- (b) Begin testing.
  - (c) Disconnect SST from DLC3.
  - (d) Check that the VSC/TRAC warning light turns OFF.
- HINT:  
The SLIP indicator light blinks when the TRAC system is operating.

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

### (a) NOTICES WHEN USING DRUM TESTER

- (1) Before beginning testing, to disable the VSC, turn the ignition switch OFF and connect SST to terminals TS and CG of the DLC3.

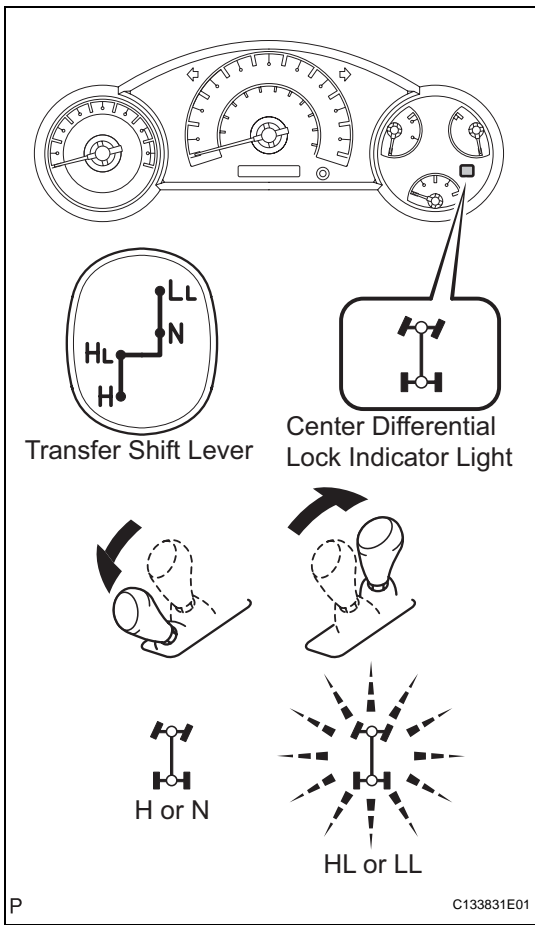
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### NOTICE:

- **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

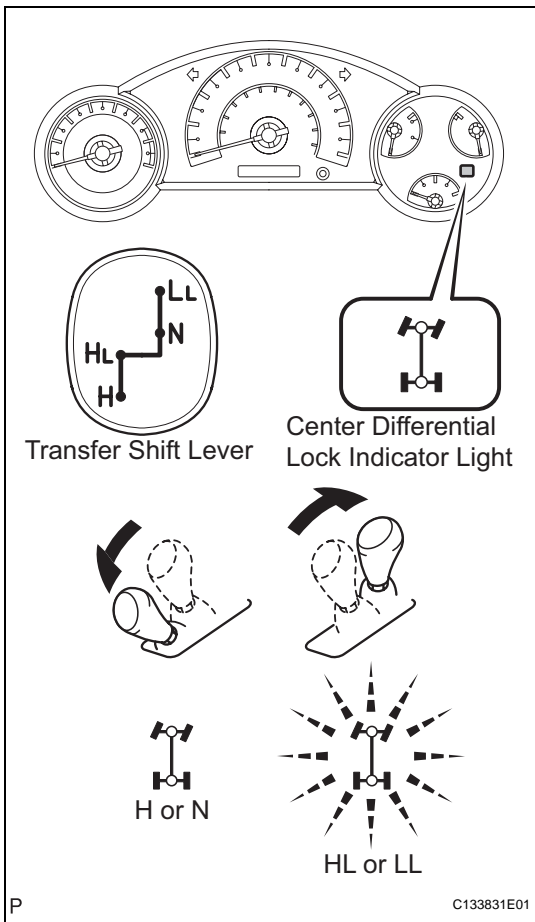
- (1) Do not carry out unnecessary installation and removal as it might affect the adjustment of VSC related parts.
- (2) Be sure to follow the instructions for work preparation and final confirmation of proper operation of the VSC system.



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

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

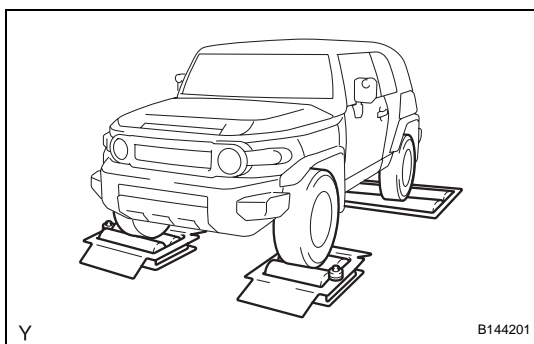
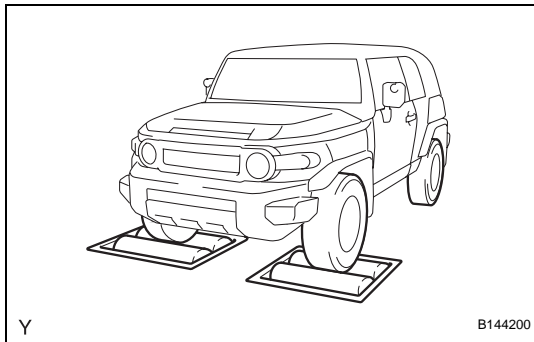
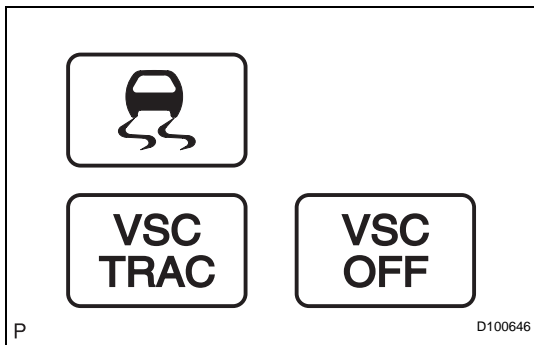
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**11. WHEN TESTING BRAKES, SPEEDOMETER, ETC.**

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

- Center differential mode position (FREE or LOCK)



- Vehicle Stability Control (VSC) system:  
If the vehicle is equipped with the system, the slip indicator light, the VSC / TRAC indicator light and the VSC OFF indicator light come on with the ignition switch turned to ON. They will go off after about a few seconds.
- Whether wheels should be touching ground or jacked up
- Transmission gear position (N position)
- Transfer gear position (H or L position)
- Maximum testing vehicle speed
- Maximum testing time

(b) Using Braking Tester:

Measure by low-speed type (Vehicle Speed: Below 0.5 km/h or 0.3 mph) brake tester and observe the following instructions before performing the test.

- (1) Position the wheels to be tested (front or rear) on the tester.
- (2) Put the center differential in the FREE position.
- (3) If the vehicle is equipped with a Vehicle Stability Control (VSC) system, prohibit the system from activating (see previous step).
- (4) Shift the transmission shift lever to the "N" position.

HINT:

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

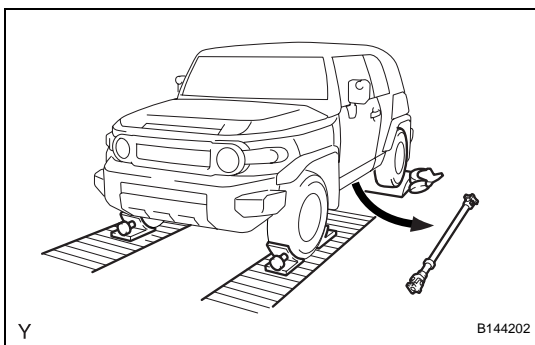
(c) Using Speedometer Tester:

Observe the following instructions and then test with the rear wheels.

- (1) Position the rear wheels on the tester roller.
- (2) Position the front wheels on the free roller or jack them up.
- (3) Put the center differential in the FREE position.
- (4) Deactivate the Vehicle Stability Control (VSC) & Traction Control (TRAC) system.
- (5) Ensure that the vehicle does not move using chains.

HINT:

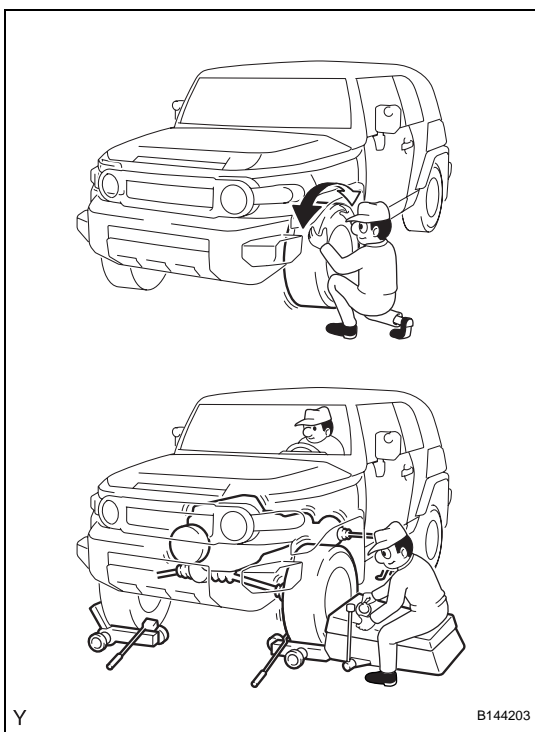
- Sudden shifting, braking, acceleration or deceleration is not allowed.
- Do not forget to change the Vehicle Stability Control (VSC) & Traction Control (TRAC) system to an operational condition after the test. Check that the VSC warning indicator light goes off when restarting the engine.



- (d) Using Chassis Dynamometer:  
Observe the following instructions and then measure with the rear wheels.
- (1) Remove the front propeller shaft.
  - (2) Put the center differential in the LOCK position.
  - (3) Deactivate the Vehicle Stability Control (VSC) & Traction Control (TRAC) system.
  - (4) Ensure that the vehicle is securely fixed in place.

## HINT:

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



- (e) On-Vehicle Wheel Balancing:  
When doing on-vehicle wheel balancing on a full-time 4WD vehicle, to prevent each wheel from being rotated at a different speed and in different directions (which could damage the center differential), always be sure to observe the following precautions.

- (1) All 4 wheels should be jacked up, lifted off of the ground completely.
- (2) Put the center differential in the LOCK position.
- (3) Deactivate the Vehicle Stability Control (VSC) & Traction Control (TRAC) system.
- (4) The parking brake lever should be fully released.
- (5) None of the brakes should be applied.
- (6) The wheels should be driven on the wheel balancer with the engine running.
- (7) Carry out the wheel balancing with the transmission in the D position.

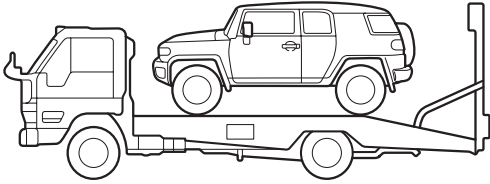
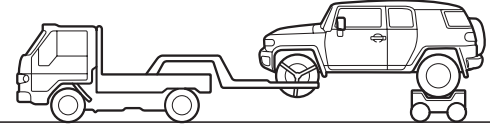
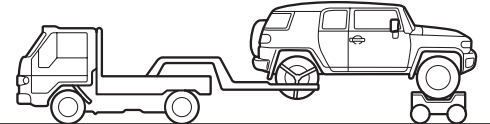
## HINT:

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

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

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

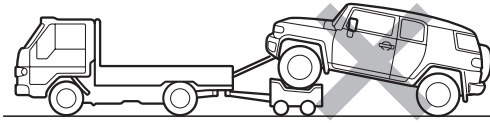
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Towing Method	Parking Brake Condition	Transmission Shift Lever Position
<p>1. Flat Bed Truck</p>  <p>Y</p>	<p>Applied</p>	<p>Any Position</p>
<p>2. Wheel Lift Type Truck</p> <p>From Front</p>  <p>Y</p> <p>From Rear</p>  <p>Y</p>	<p>Applied</p>	

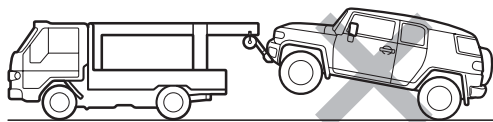
**NOTICE:**

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

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

 <p>Y</p>	<ul style="list-style-type: none"> <li>• Never tow the vehicle using a method where the lifted-up wheel cannot rotate.</li> <li>• If this towing method is used, either from the front or rear:                     <ol style="list-style-type: none"> <li>(a) There is a danger of the drive train heating up and causing breakdown, or of the wheels flying off the dolly.</li> <li>(b) In addition, if the vehicle is equipped with a Vehicle Stability Control (VSC) &amp; Traction Control (TRAC) system, the system will apply the rotating wheels brake unless the engine isn't shut off.</li> </ol> </li> </ul>
--	---





Y

Do not use the sling type method, either from the front or rear, as this method causes damage to the body.

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### 13. FOR VEHICLES EQUIPPED WITH CATALYTIC CONVERTER

#### CAUTION:

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

- (a) Use only unleaded gasoline.
- (b) Avoid idling the engine for more than 20 minutes.
- (c) Avoid performing unnecessary spark jump tests.
  - (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

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

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

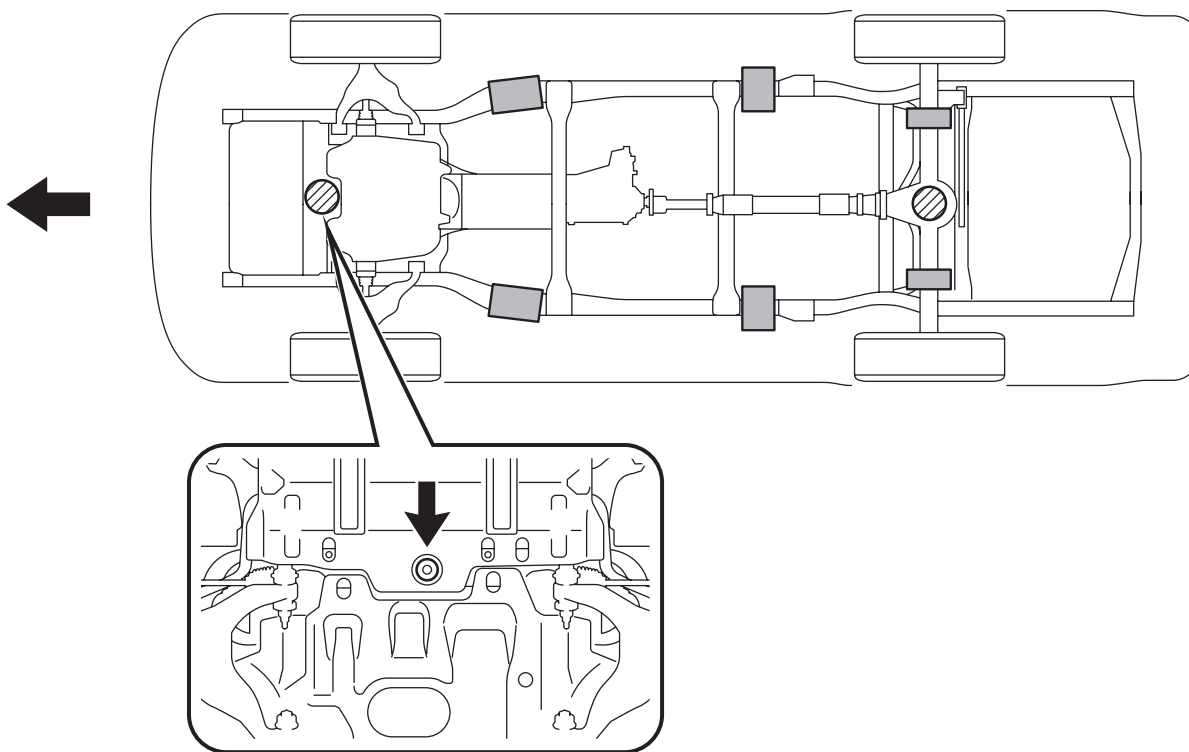
### 2. NOTICE FOR USING 4 POST LIFT

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

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

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

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



 JACK POSITION

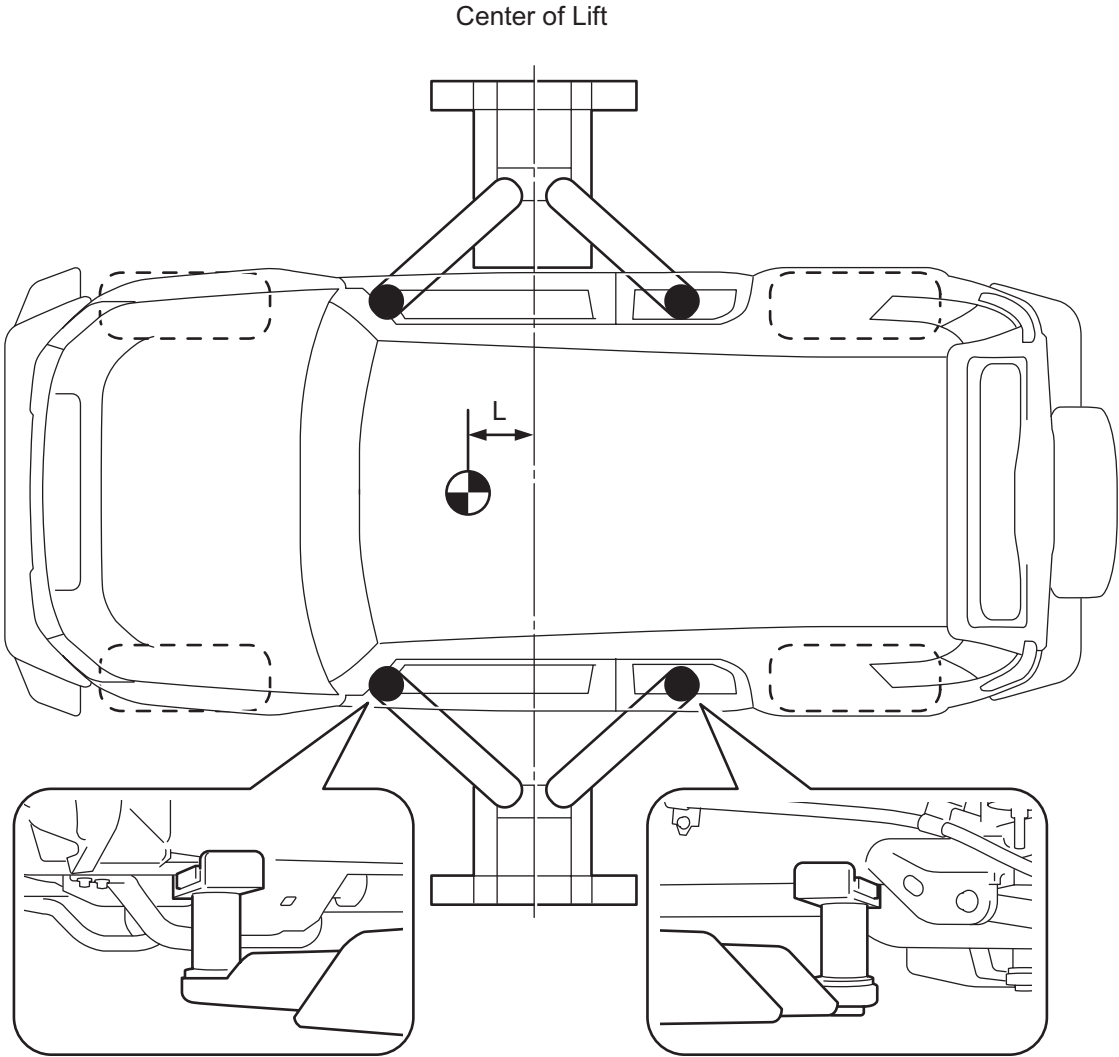
 SUPPORT POSITION

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**4. NOTICE FOR USING SWING ARM TYPE LIFT**

- (a) Follow safety procedures outlined in its instruction manual.
- (b) Use a swing arm equipped with a rubber attachment.
- (c) Set in the vehicle so as to make its center of gravity as close as possible to the center of the lift. (L becomes short.)
- (d) Place the vehicle horizontally by adjusting the height of the cradle, and match the groove of the cradle and the safety stand support location accurately.
- (e) Be sure to lock the swing arms before lifting and during work (if equipped with arm locks).
- (f) Lift the vehicle up off the ground. Stand at a safe distance and shake the vehicle to check its stability.

Swing Arm Type Lift:



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## CUSTOMIZE PARAMETERS

### HINT:

The following can be customized.

### NOTICE:

- When the customer requests a change in a function, first make sure that the function can be customized.
- Be sure to make a note of the current settings before customizing.
- When troubleshooting a function, first make sure that the function is set to the default setting.

### 1. LIGHTING SYSTEM

#### Illuminated Entry

Display (Item)	Default	Contents	Setting
LIGHTING TIME (Lighting Time)	15 (second)	Changes illumination duration after door closure. (It will quickly fade out in case of turning the ignition switch ON)	7.5/ 15/ 30 (second)
/L ON / UNLOCK (Room light illuminates when door key unlocked.)	ON	Function to light up the room light, when unlocking with the door key cylinder. (Room light illuminated when interior light switch in DOOR position)	ON / OFF
I/L ON/ACC OFF (Room light illuminates when ignition switch turned off)	ON	Illuminates light when ignition switch turned on (ACC). (Room light illuminated when interior light switch in DOOR position)	ON / OFF

### HINT:

Sensitivity adjustments are difficult to confirm. Check by driving the customer's vehicle.

### 2. POWER DOOR LOCK CONTROL SYSTEM

#### Power Door Lock Control System

Display (Item)	Default	Contents	Setting
UNLK/KEY TWICE	ON	Unlocks only driver side door when driver side door key cylinder turned to unlock once, and unlocks all doors when turned to unlock twice. For OFF setting, turning it once unlocks all doors.	ON / OFF

### 3. WIRELESS DOOR LOCK CONTROL SYSTEM

#### Wireless Door Lock Control System

Display (Item)	Default	Contents	Setting
HAZARD ANS BACK	ON	When wireless lock switch on transmitter pressed, illuminates all hazard warning lights once. When unlock switch pressed, all hazard warning lights illuminate twice	ON / OFF
WIRELESS OPER	ON	ON /OFF of wireless door lock function	ON / OFF
ALARM FUNCTION	ON	Operates security alarm when panic switch on transmitter continuously pressed for 1 second	ON / OFF

Display (Item)	Default	Contents	Setting
UNLOCK/2 OPER	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	30 seconds	Time until relocking after unlocking with wireless door lock function	60 seconds / 30 seconds
OPEN DOOR WARN	ON	If a door is not completely closed and LOCK is pressed, this function sounds a buzzer for 10 seconds	ON / OFF
WIRELS BUZZ VOL	MID2	To adjust the volume of the wireless buzzer	OFF / MIN / MID1/ MID2 /MID3 / MAX

## INITIALIZATION

The initialization procedures are below the table.

System Name
Meter / Gauge System

### 1. DESCRIPTION

#### NOTICE:

**Do not place magnetic or metal objects on or near the accessory meter.**

#### HINT:

The procedures described below are for vehicles equipped with an accessory meter.

- (a) The location of magnetic north differs depending on the vehicle location. Adjustment of the compass' magnetism is required to correct possible compass deviations from true north.
- (b) Compass function calibration is necessary when: 1) purchasing a vehicle; 2) disconnecting and reconnecting the cable of the negative (-) battery terminal; 3) replacing the vehicle battery; 4) driving the vehicle outside the set zone (see the zone map below); or 5) placing magnetic or metal objects near the accessory meter (the direction indication on the display blinks).

### 2. PERFORM CALIBRATION

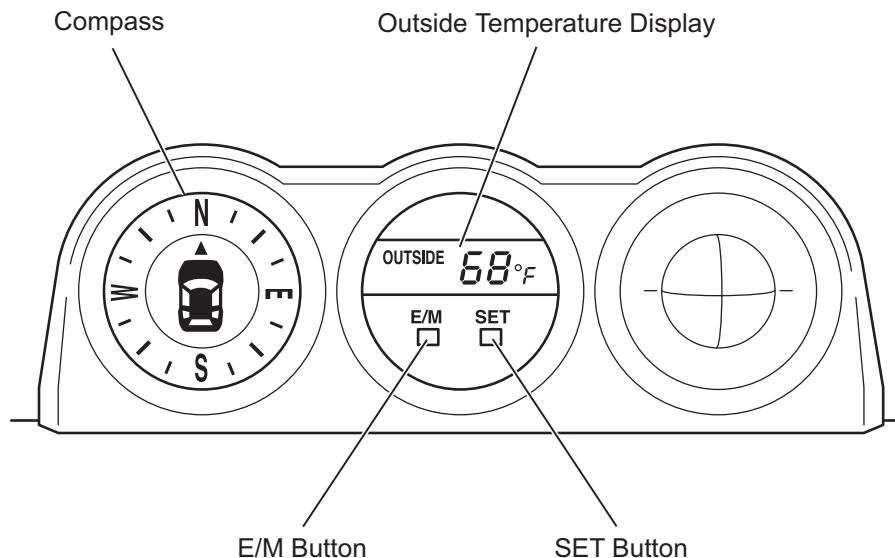
#### CAUTION:

- **Strictly observe posted speed limits, traffic laws and road conditions.**
- **Make sure no people are near the vehicle.**

#### NOTICE:

- **Perform the circling calibration in a spacious area that does not have artificial magnetic influence. Calibration cannot be performed in underground parking lots, areas under steel towers and areas between tall buildings.**
- **When performing the calibration, do not operate the air conditioner, power windows, or any other electrical system.**
- **The compass may become magnetized during shipping by vessels or freight cars. Be sure to calibrate the compass by correctly performing the procedure described below. If the calibration cannot be completed despite the vehicle being driven in a circle several times, the vehicle's magnetic field may be interfering with the calibration. Demagnetize the vehicle using a demagnetizer and perform calibration again.**



**Accessory Meter:**

B133412E01

**(a) DEVIATION CALIBRATION PROCEDURE:**

- (1) Turn the ignition switch ON.

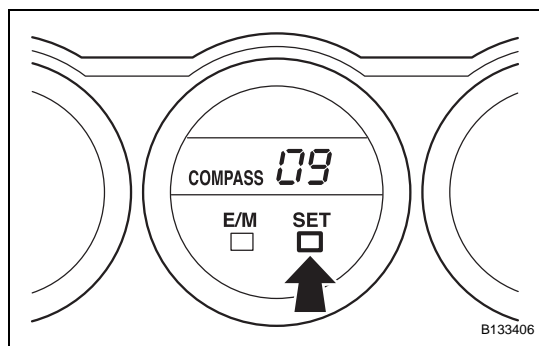
**HINT:**

When the initial circling calibration has not yet been performed, the COMPASS indicator in the outside temperature display blinks.

- (2) Switch the mode to compass correction mode by pushing the SET button for about 2 seconds, until the zone number appears in the outside temperature display.

**HINT:**

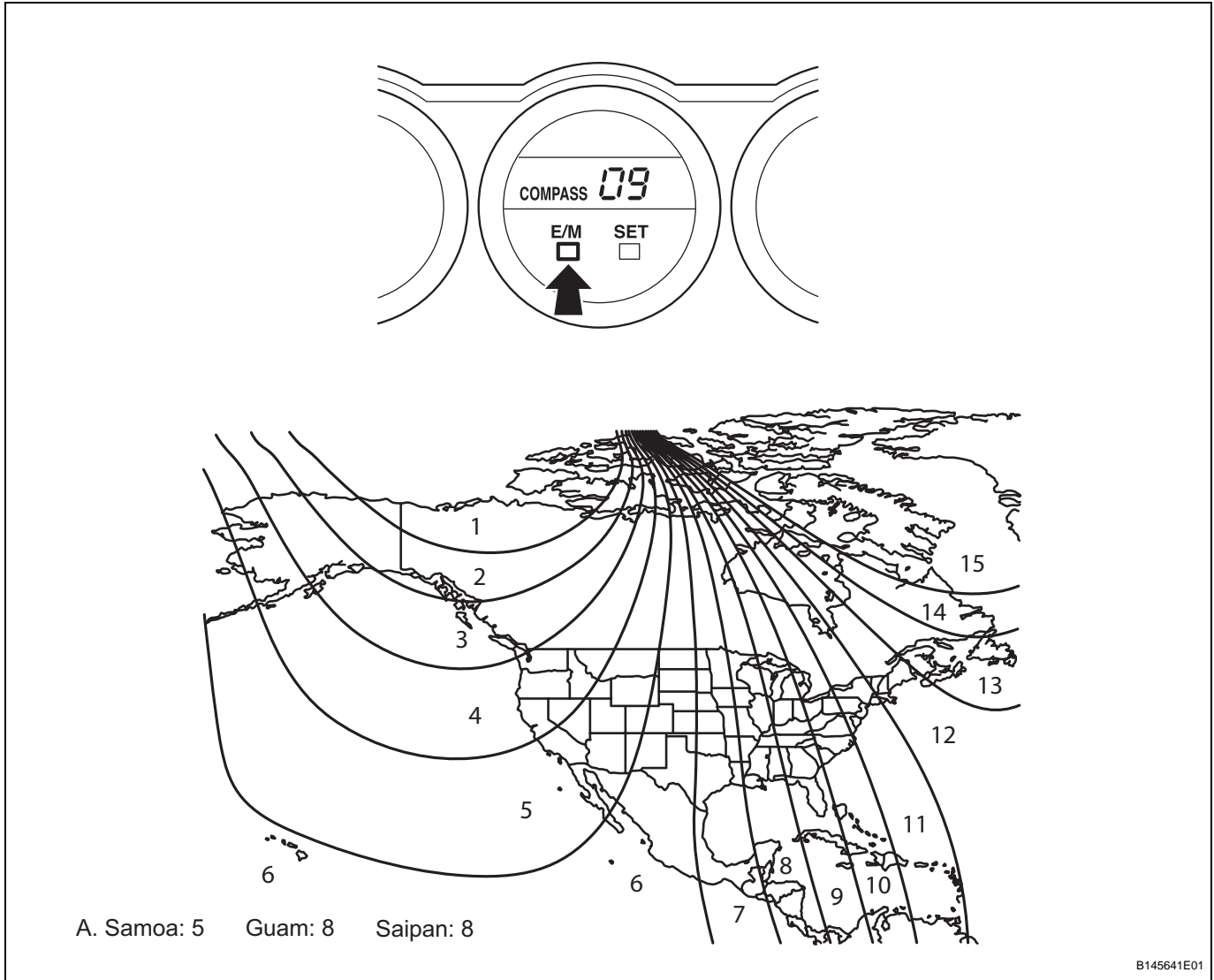
If no button operations occur for more than 6 seconds while in compass correction mode, the calibration is cancelled and the display returns to the outside temperature indication. To restart, perform the procedure from the first step again.



B133406

(3) Refer to the following map to determine the vehicle location and select the relevant zone number by pushing the E/M button.

IN



**HINT:**

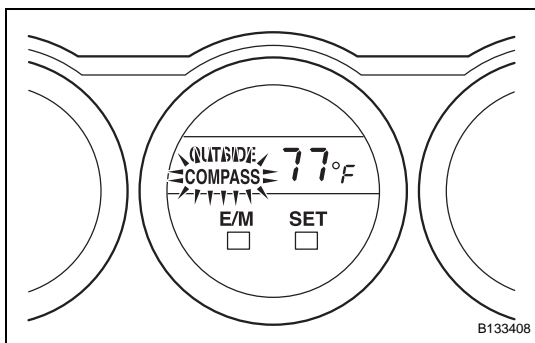
After DEVIATION CALIBRATION, leave the system for 6 seconds or push and hold the SET button for about 2 seconds. The display returns to the outside temperature display.

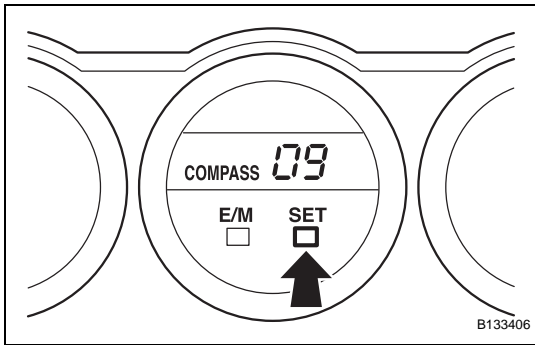
**(b) CIRCLING CALIBRATION PROCEDURE:**

(1) Start the engine.

**HINT:**

When the initial circling calibration has not yet been performed, the COMPASS indicator in the outside temperature display blinks.

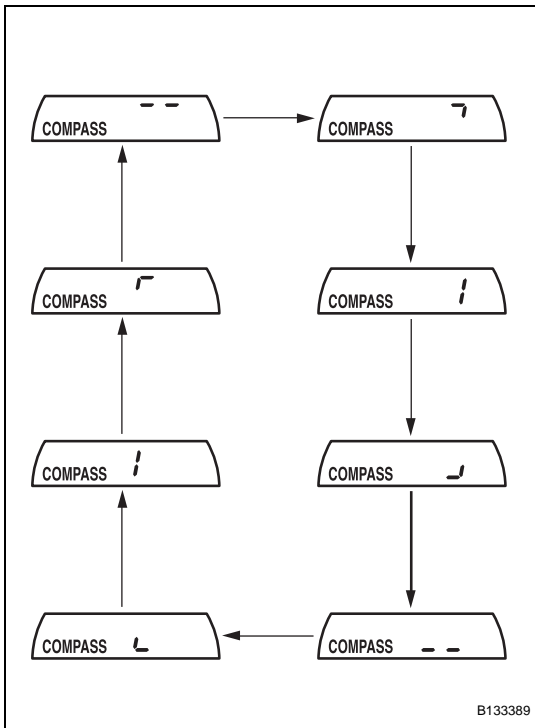




- (2) Switch the mode to compass correction mode by pushing the SET button for about 2 seconds, until the zone number appears in the outside temperature display.

HINT:

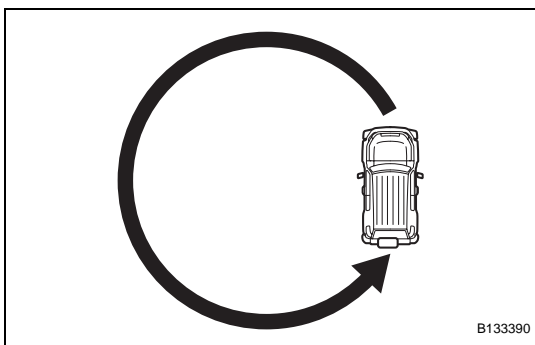
If no button operations occur for more than 6 seconds while in compass correction mode, calibration is cancelled and the display returns to the outside temperature indication. To restart, perform the procedure from the first step again.



- (3) Push the SET button again to change the mode to turn correction mode.

HINT:

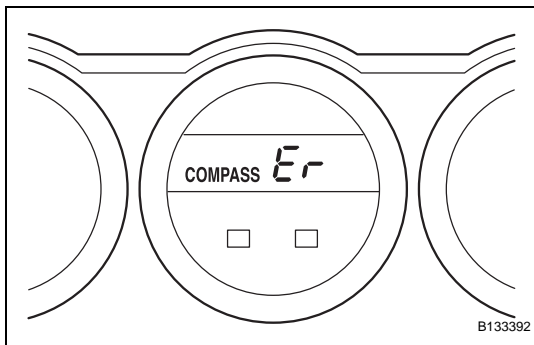
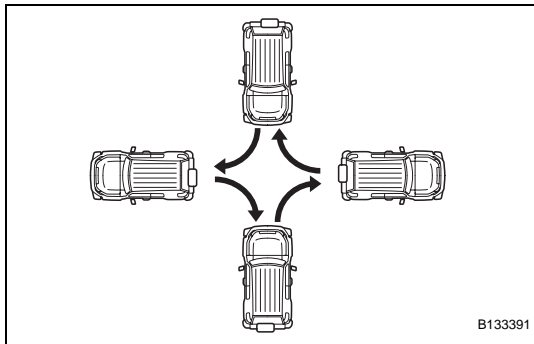
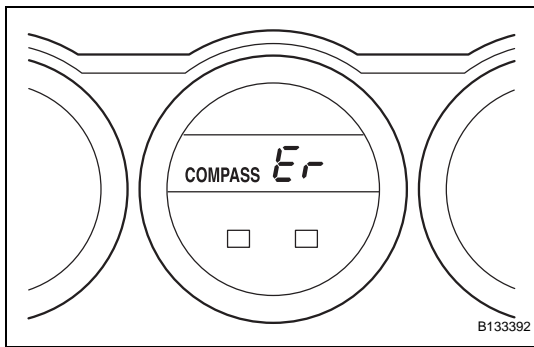
While in correction mode, the indication bars move as shown in the illustration.



- (4) If there is sufficient space to drive the vehicle in a circle, perform the following procedure:
1. Drive the vehicle in a full circle within 2 minutes, at a vehicle speed of 5 mph (8 km/h) or lower, as shown in the illustration.

**NOTICE:**

- Do not perform the circling calibration of the compass in a place where the earth's magnetic field is subject to interference by artificial magnetic fields (underground parking, under a steel tower, between buildings, roof parking, near a crossing, near a large vehicle, etc.).
- During the calibration, do not operate any electric systems (power window, etc.) as they may interfere with the calibration.



## HINT:

- When the compass display returns to the outside temperature display, the calibration is complete.
- When the circling calibration fails, "Er" is displayed for about 2 seconds and then the COMPASS indicator flashes.
- If the correct direction is not displayed after driving the vehicle as specified, change the vehicle location.
- To cancel the calibration before completion, push the SET button for about 2 seconds.

(5) If enough space is not available to drive in a circle, perform the following:

1. Perform a four-point turn within 2 minutes, as shown in the illustration.

## NOTICE:

- **Do not perform the circling calibration of the compass in a place where the earth's magnetic field is subject to interference by artificial magnetic fields (underground parking, under a steel tower, between buildings, roof parking, near a crossing, near a large vehicle, etc.).**
- **During the calibration, do not operate any electric systems (power window, etc.) as they may interfere with the calibration.**

## HINT:

- When the compass display returns to the outside temperature display, the calibration is complete.
- When the circling calibration fails, "Er" is displayed for about 2 seconds and then the COMPASS indicator flashes.
- If the correct direction is not displayed after driving the vehicle as specified, change the vehicle location.
- To cancel the calibration before completion, push the SET button for about 2 seconds.

(6) Check that the COMPASS indicator is not blinking and that the compass is displayed normally.

# HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

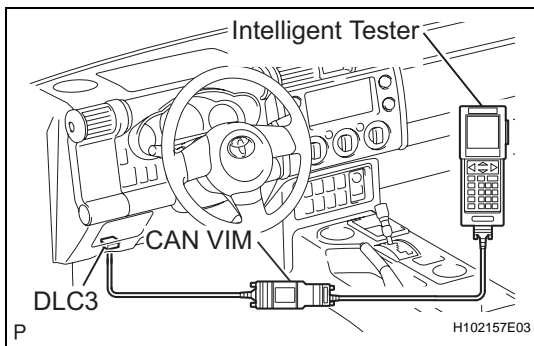
## GENERAL INFORMATION

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

Connect the cable of the intelligent tester (with CAN VIM) to the DLC3, turn the ignition switch ON and attempt to use the tester. If the display indicates that a communication error has occurred, there is a problem either with the vehicle or with the tester.

- \* If communication is normal when the tester is connected to another vehicle, inspect the DLC3 of the original vehicle.
- \* If communication is still not possible when the tester is connected to another vehicle, the problem may be in the tester itself. Consult the Service Department listed in the tester's instruction manual.



# 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 "SYMPTOM CONFIRMATION AND DTC (AND FREEZE FRAME DATA) CHECK". 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 "SYMPTOM CONFIRMATION AND DTC (AND FREEZE FRAME DATA) CHECK". 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) Confirm 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 FJ CRUISER 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 FJ CRUISER.

System	DTC Check (Normal Mode)	DTC Check (Check Mode)	Freeze-frame Data	Sensor Check / Test Mode (Input Signal Check)	Data List	Active Test	Customize Parameter
1GR-FE SFI SYSTEM	○	○	○	-	○	○	-
A750E AUTOMATIC TRANSAXLE SYSTEM	○	○	-	-	○	○	-
A750F AUTOMATIC TRANSAXLE SYSTEM	○	○	-	-	○	○	-
VEHICLE STABILITY CONTROL SYSTEM	○	-	○	○	○	○	-
AIRBAG SYSTEM	○	○	-	-	○	-	-



System	DTC Check (Normal Mode)	DTC Check (Check Mode)	Freeze-frame Data	Sensor Check / Test Mode (Input Signal Check)	Data List	Active Test	Customize Parameter
OCCUPANT CLASSIFICATION SYSTEM	○	-	-	-	○	-	-
CRUISE CONTROL SYSTEM	○	-	-	-	○	-	-
MULTIPLEX COMMUNICATION	○	-	-	-	-	-	-
CAN COMMUNICATION SYSTEM	○	-	-	-	-	-	-

- In the DTC check, it is very important to determine whether the problem indicated by the DTC is either: 1) still occurring, or 2) occurred in the past but has since 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.

<b>1</b>	<b>DTC CHECK</b>
----------	------------------

<b>NEXT</b>
-------------

<b>2</b>	<b>MAKE A NOTE OF DTCS DISPLAYED AND THEN CLEAR MEMORY</b>
----------	--

<b>NEXT</b>
-------------

<b>3</b>	<b>SYMPTOM CONFIRMATION</b>
----------	-----------------------------

**Result**

Result	Proceed to
No symptoms exist	A
Symptoms exist	B

**B** → **Go to step 5**

**A**

**4 | SIMULATION TEST USING SYMPTOM SIMULATION METHODS**

**IN**

**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
Symptoms exist	A
No 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 is still occurring 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**

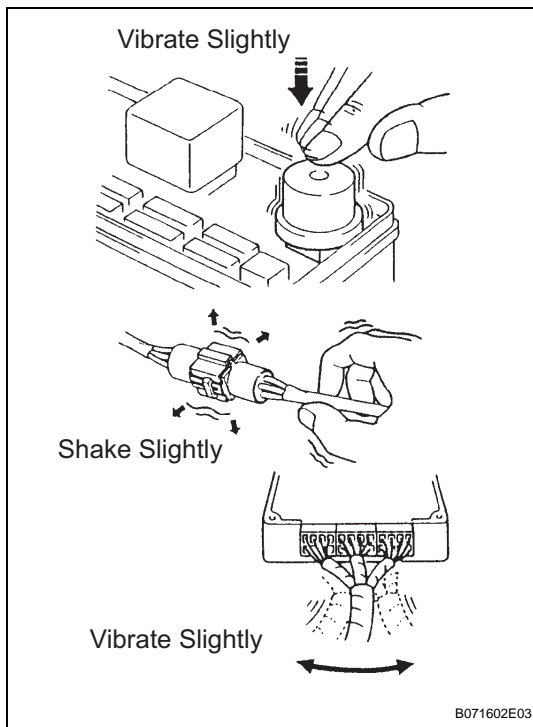
**HINT:**

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 on 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 them.**

**(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.

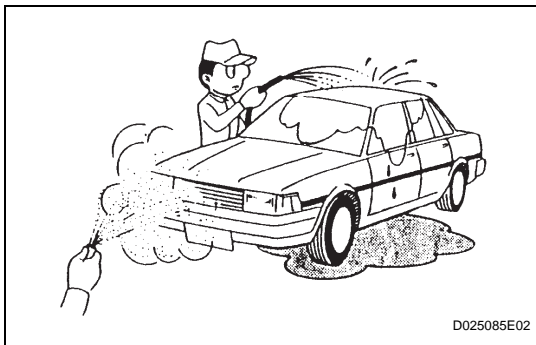
**(b) HEAT METHOD:**

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 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.

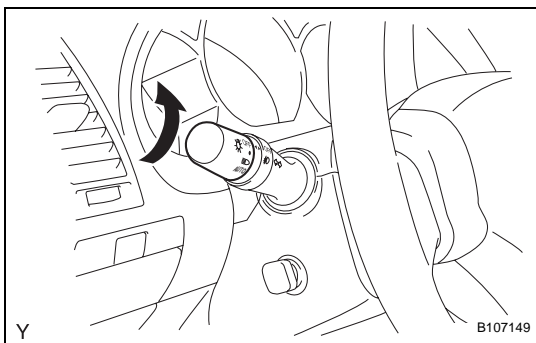
- (1) Sprinkle water onto the vehicle and check if the malfunction occurs.

**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 are 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 is still occurring, use the Problem Symptoms Table. The suspected areas (circuits or parts) for each problem symptom are in the table. The suspected areas are listed in order of probability. A description of each of the chart's columns are below.

**HINT:**

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

IN

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

IN

## 7. CIRCUIT INSPECTION

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

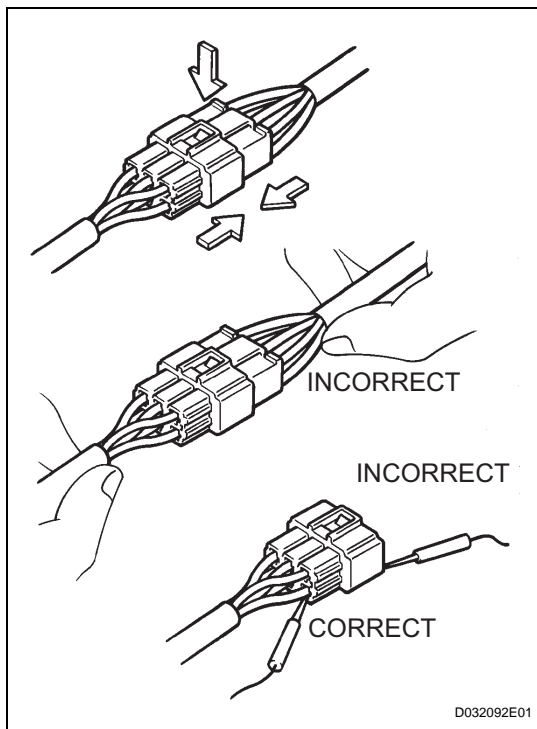
Item	Description
Circuit Description	The major role, operation of the circuit and its component parts are explained.
Diagnostic Trouble Code No. and Detection Item	Indicates the diagnostic trouble codes, diagnostic trouble code settings and suspected areas for a problem
Wiring Diagram	<p>This shows a wiring diagram of the circuit. Use this diagram together with ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit.</p> <p>Wire colors are indicated by an alphabetical code:</p> <ul style="list-style-type: none"> <li>• B = Black</li> <li>• L = Blue</li> <li>• R = Red</li> <li>• BR = Brown</li> <li>• LG = Light Green</li> <li>• V = Violet</li> <li>• G = Green</li> <li>• O = Orange</li> <li>• W = White</li> <li>• GR = Gray</li> <li>• P = Pink</li> <li>• Y = Yellow</li> <li>• SB = Sky Blue</li> </ul> <p>The first letter indicates the basic wire color and the second letter indicates the color of the stripe.</p>
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	<p>Connector being checked is connected. Connections of tester are indicated by (+) or (-) after the terminal name.</p> <p>Connector being checked is disconnected. For illustrations of inspections between a connector and body ground, information about the body ground is not shown in the illustration.</p>

## 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.

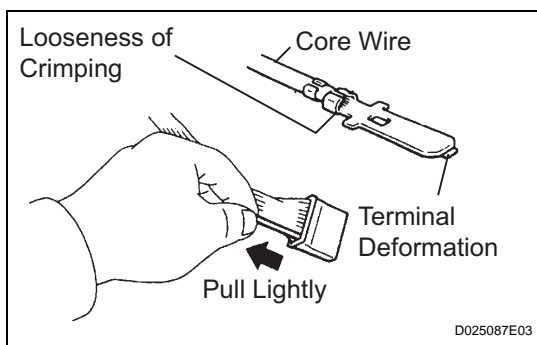


#### (b) HANDLING CONNECTORS

- (1) When disconnecting a connector, first squeeze the mating 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 deformed, damaged, loose 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.

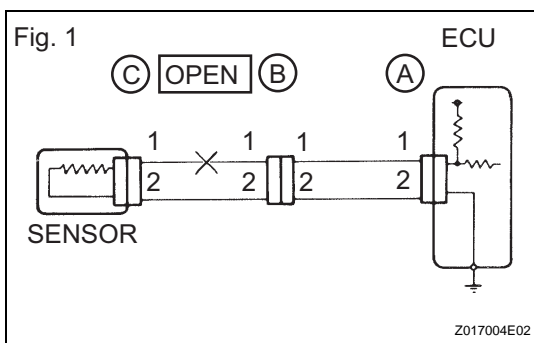
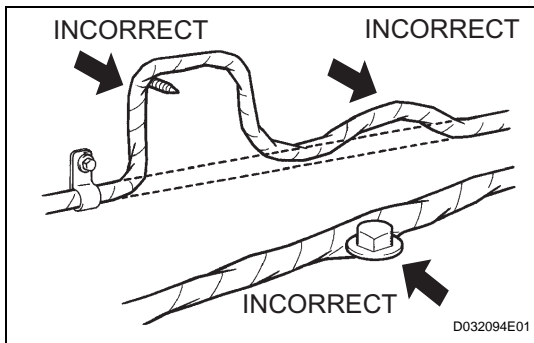
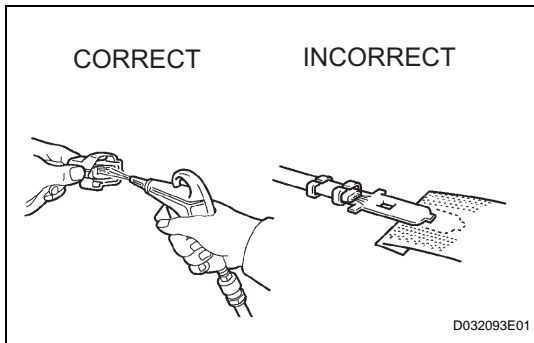
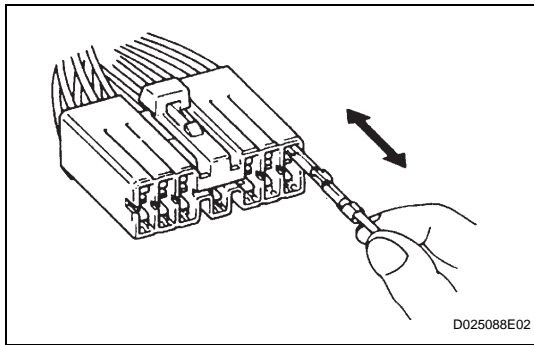
#### NOTICE:

- **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

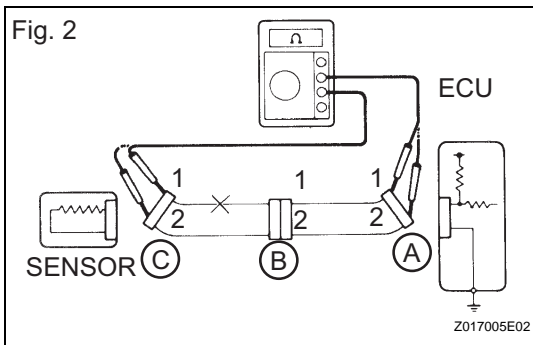
- (1) If there is any foreign matter on the terminal, clean the contact point using an air gun or cloth. Never rub the contact point using sandpaper as the plating may come off.
- (2) If there is abnormal contact pressure, replace the female terminal. If the male terminal is gold-plated (gold color), 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, check the resistance or voltage, as described below.



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

**Standard resistance (Fig. 2)**

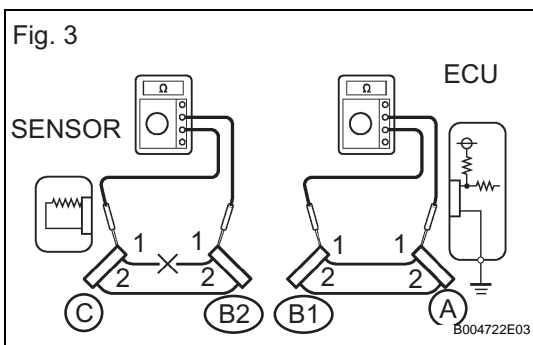
Tester Connection	Specified Condition
Connector A terminal 1 - Connector C terminal 1	10 kΩ or higher
Connector A terminal 2 - Connector C terminal 2	Below 1Ω

**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.

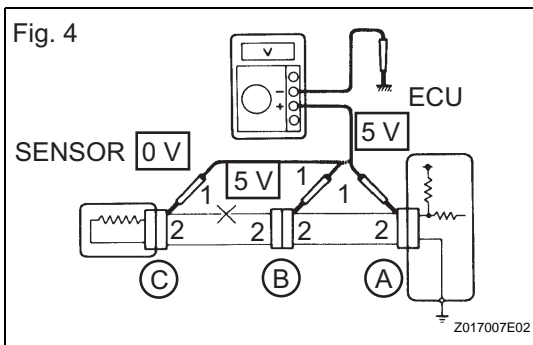
- (2) Disconnect connector B and measure the resistance between the connectors.

**Standard resistance (Fig. 3)**



Tester Connection	Specified Condition
Connector A terminal 1 - Connector B1 terminal 1	Below 1 Ω
Connector B2 terminal 1 - Connector C terminal 1	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.

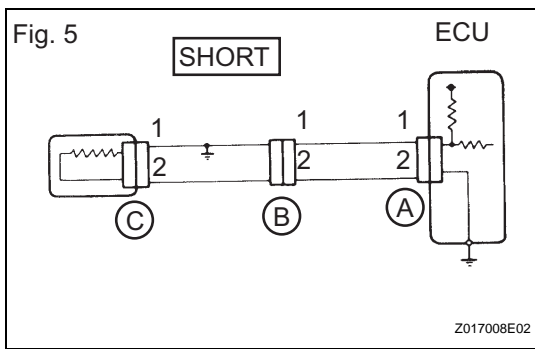
- (1) In a circuit in which voltage is applied to the ECU connector terminal, an open circuit can be checked by conducting a voltage check. With each connector still connected, measure the voltage between the body ground and these terminals (in this order): 1) terminal 1 of connector A, 2) terminal 1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

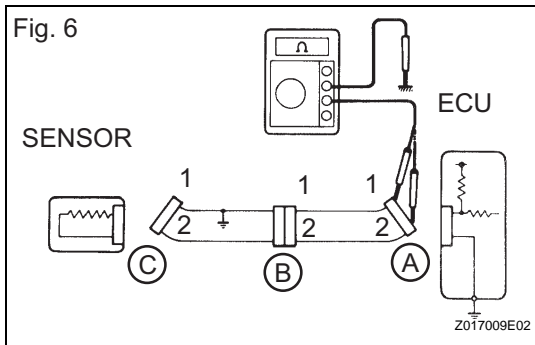
If the results match the examples above, an open circuit exists in the wire harness between terminal 1 of connector B and terminal 1 of connector C.





**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)**

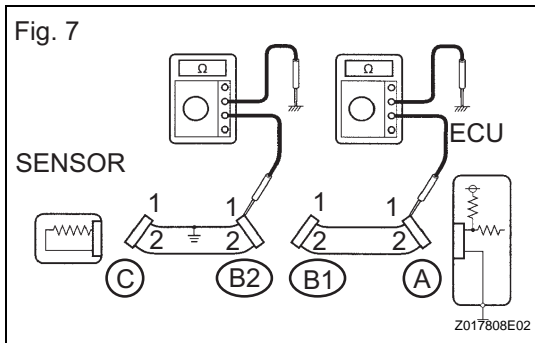
Tester Connection	Specified Condition
Connector A terminal 1 - Body ground	Below 1 Ω
Connector A terminal 2 - Body ground	10 kΩ or higher

**HINT:**

Measure the resistance while lightly shaking the wire harness vertically and horizontally. If your results match the examples above, a short 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 1 - Body ground	Below 1 Ω

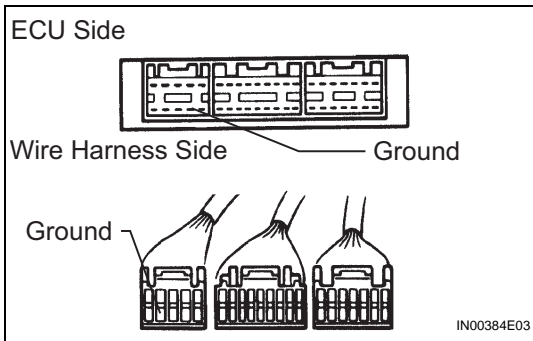
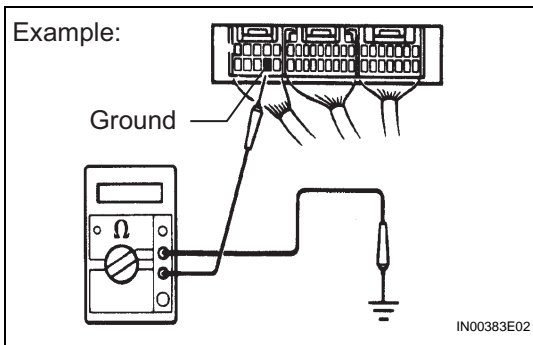
If the results match the examples above, a short circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

**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 Ω**

(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.

**TERMS****ABBREVIATIONS USED IN MANUAL**

ABBREVIATIONS	MEANING
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
A.D.D.	Automatic Disconnecting Differential
A/C	Air Conditioner
A/F	Air-Fuel Ratio
A/T, ATM	Automatic Transmission (Transaxle)
ABS	Anti-Lock Brake System
AC	Alternating Current
ACC	Accessory
ACIS	Acoustic Control Induction System
ACM	Active Control Engine Mount
ACSD	Automatic Cold Start Device
AFS	Adaptive Front-Lighting System
AHC	Active Height Control Suspension
AID	Air Injection Control Driver
ALR	Automatic Locking Retractor
ALT	Alternator
AMP	Amplifier
ANT	Antenna
APPROX.	Approximately
ASSB	Assembly Services Sdn. Bhd.
ASSY	Assembly
ATF	Automatic Transmission Fluid
AUTO	Automatic
AUX	Auxiliary
AVG	Average
AVS	Adaptive Variable Suspension
B/L	Bi-Level
B/S	Bore-Stroke Ratio
B+	Battery Voltage
BA	Brake Assist
BACS	Boost Altitude Compensation System
BAT	Battery
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
BVSV	Bimetallic Vacuum Switching Valve
C/V	Check Valve
Calif.	California
CAN	Controller Area Network
CB	Circuit Breaker

ABBREVIATIONS	MEANING
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
CV	Control Valve
CW	Curb Weight
D/INJ	Direct Injection
DC	Direct Current
DEF	Defogger
DFL	Deflector
DIFF.	Differential
DIFF. LOCK	Differential Lock
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
E/G	Engine
EBD	Electronic Brake Force Distribution
EC	Electrochromic
ECAM	Engine Control And Measurement System
ECD	Electronically Controlled Diesel
ECDY	Eddy Current Dynamometer
ECT	Electronic Controlled Automatic Transmission/Transaxle
ECU	Electronic Control Unit
ED	Electro-Deposited Coating
EDIC	Electronic Diesel Injection Control
EDU	Electronic Driving Unit
EFI	Electronic Fuel Injection
EGR	Electronic Gas Recirculation
EGR	Exhaust Gas Recirculation
EGR-VM	EGR-Vacuum Modulator
ELR	Emergency Locking Retractor
EMPS	Electric Motor Power Steering
ENG	Engine
ES	Easy & Smooth
ESA	Electronic Spark Advance

ABBREVIATIONS	MEANING
ETCS-i	Electronic Throttle Control System-intelligent
EVAP	Evaporative Emission Control
EVP	Evaporator
E-VRV	Electric Vacuum Regulating Valve
EX	Exhaust
F/G	Fuel Gauge
F/P	Fuel Pump
F/W	Flywheel
FE	Fuel Economy
FF	Front-Engine Front-Wheel-Drive
FIPG	Formed In Place Gasket
FL	Fusible Link
FPU	Fuel Pressure Up
FR / Fr	Front
FW/D	Flywheel Damper
FWD	Front-Wheel-Drive
GAS	Gasoline
GND	Ground
GPS	Global Positioning System
GSA	Gear Shift Actuator
H/B	Hatchback
HAC	High Altitude Compensator
H-FUSE	High Current Fuse
HI	High
HID	High Intensity Discharge (Headlamp)
HPU	Hydraulic Power Unit
HSG	Housing
HT	Hard Top
HV	Hybrid Vehicle
HWS	Heated Windshield System
I/P	Instrument Panel
IC	Integrated Circuit
IDI	Indirect Diesel Injection
IFS	Independent Front Suspension
IG	Ignition
I/A	Integrated Ignition Assembly
IN	Intake (Manifold, Valve)
INT	Intermittent
IRS	Independent Rear Suspension
ISC	Idle Speed Control
J/B	Junction Block
J/C	Junction Connector
KD	Kick-Down
L/H/W	Length, Height, Width
LAN	Local Area Network
LB	Liftback
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LH	Left-Hand

ABBREVIATIONS	MEANING
LHD	Left-Hand Drive
LLC	Long-Life Coolant
LNG	Liquefied Natural Gas
LO	Low
LPG	Liquefied Petroleum Gas
LSD	Limited Slip Differential
LSP & PV	Load Sensing Proportioning and Bypass Valve
LSPV	Load Sensing Proportioning Valve
M/T, MTM	Manual Transmission (Transaxle)
MAP	Manifold Absolute Pressure
MAX.	Maximum
MG1	Motor Generator No.1
MG2	Motor Generator No.2
MIC	Microphone
MIL	Malfunction Indicator Lamp
MIN.	Minimum
MMT	Multi-mode Manual Transmission
MP	Multipurpose
MPI	Multipoint Electronic Injection
MPX	Multiplex Communication System
MT	Mount
MTG	Mounting
N	Neutral
NA	Natural Aspiration
NO. / No.	Number
O/D	Overdrive
O/S	Oversize
O2S	Oxygen Sensor
OC	Oxidation Catalyst
OCV	Oil Control Valve
OEM	Original Equipment Manufacturing
OHC	Overhead Camshaft
OHV	Overhead Valve
OPT	Option
ORVR	On-board Refilling Vapor Recovery
P & BV	Proportioning And Bypass Valve
P/W	Power Window
PBD	Power Back Door
PCS	Power Control System
PCV	Positive Crankcase Ventilation
PKB	Parking Brake
PPS	Progressive Power Steering
PROM	Programmable Read Only Memory
PS	Power Steering
PSD	Power Slide Door
PTC	Positive Temperature Coefficient
PTO	Power Take-Off
PZEV	Partial Zero Emission Vehicle
R & P	Rack and Pinion

ABBREVIATIONS	MEANING
R/B	Relay Block
R/F	Reinforcement
RAM	Random Access Memory
RBS	Recirculating Ball Type Steering
RFS	Rigid Front Suspension
RH	Right-Hand
RHD	Right-Hand Drive
RLY	Relay
ROM	Read Only Memory
RR / Rr	Rear
RRS	Rigid Rear Suspension
RSE	Rear Seat Entertainment
RWD	Rear-Wheel Drive
SC	Supercharger
SCV	Swirl Control Valve
SDN	Sedan
SEN	Sensor
SICS	Starting Injection Control System
SOC	State Of Charge
SOHC	Single Overhead Camshaft
SPEC	Specification
SPI	Single Point Injection
SRS	Supplemental Restraint System
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
STJ	Cold-Start Fuel Injection
SW	Switch
SYS	System
T/A	Transaxle
T/M	Transmission
TACH	Tachometer
TAM	P.T. TOYOTA-Astra Motor
TASA	TOYOTA Argentina S.A.
TAT	TOYOTA Motor Thailand Co. Ltd.
TAW	TOYOTA Auto Works Co. Ltd.
TBI	Throttle Body Electronic Fuel Injection
TC	Turbocharger
TCCS	TOYOTA Computer-Controlled System
TCV	Timing Control Valve
TDC	Top Dead Center
TDV	TOYOTA de Venezuela C.A.
TEMP.	Temperature
TEMS	TOYOTA Electronic Modulated Suspension
TFT	TOYOTA Free-Tronic
TIS	Total Information System For Vehicle Development
TKM	TOYOTA Kirloskar Motor Ltd.
TMC	TOYOTA Motor Corporation
TMMIN	PT. TOYOTA Motor Manufacturing Indonesia

ABBREVIATIONS	MEANING
TMMK	TOYOTA Motor Manufacturing Kentucky, Inc.
TMP	TOYOTA Motor Philippines Corp.
TMT	TOYOTA Motor Thailand Co. Ltd.
TRAC	Traction Control System
TRC	Traction Control System
TSAM	TOYOTA South Africa Motors (Pty) Ltd.
TURBO	Turbocharge
TWC	Three-Way Catalyst
U/D	Underdrive
U/S	Undersize
VCV	Vacuum Control Valve
VENT	Ventilator
VGRS	Variable Gear Ratio Steering
VIM	Vehicle Interface Module
VIN	Vehicle Identification Number
VPS	Variable Power Steering
VSC	Vehicle Skid Control
VSC	Vehicle Stability Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
VVT-i	Variable Valve Timing-intelligent
W/ / w/	With
W/H	Wire Harness
W/O / w/o	Without
WGN	Wagon



## 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
3GR	Third Gear	-
4GR	Fourth Gear	-
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)
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 (HO2S)
IAC	Idle Air Control	Idle Speed Control (ISC)

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )-ABBREVIATIONS
IAT	Intake Air Temperature	Intake or Inlet Air temperature
ICM	Ignition Control Module	-
IFI	Indirect Fuel Injection	Indirect Injection (IDL)
IFS	Inertia Fuel-Shutoff	-
ISC	Idle Speed Control	-
KS	Knock Sensor	Knock Sensor
MAF	Mass Air Flow	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 Lamp	Check Engine Lamp
MST	Manifold Surface Temperature	-
MVZ	Manifold Vacuum Zone	-
NVRAM	Non-Volatile Random Access Memory	-
O2S	Oxygen Sensor	Oxygen Sensor, O2 Sensor (O2S)
OBD	On-Board Diagnostic	On-Board Diagnostic System (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Converter (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)

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )-ABBREVIATIONS
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) Manifold Converter CCRO
TWC+OC	Three-Way + Oxidation Catalytic Converter	CCR + CCo
VAF	Volume Air Flow	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	-