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<b>Title:</b> FOREWORD / CAUTION / SECTION: FOREWORD: CAUTION (2010 4Runner)		

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## **FOREWORD**

This is Volume 1 of the 2010 4RUNNER manual. There are five volumes to this manual. The sections included in each volume are indicated by black type in the Section Index. Use the Section Index of each volume to find the volume with the section you need.

This manual applies to the models listed below. It covers all information in the previously issued Pub. No. RM1430U, and includes all production changes effective November 2009 or later.

Applicable models	GRN280, 285 series
	TRN280 series

Please note that the publications below have also been prepared as relevant service manuals for the components and system in these vehicles.

MANUAL NAME	PUB. NO.
2010 4RUNNER Electrical Wiring Diagram	EM1431U
2010 4RUNNER New Car Features	NM1431U

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<b>Title:</b> TOC2: TOC2: CAUTION (2010 4Runner)		

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## **FOREWORD**

This is Volume 2 of the 2010 4RUNNER manual. There are five volumes to this manual. The sections included in each volume are indicated by black type in the Section Index. Use the Section Index of each volume to find the volume with the section you need.

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<b>Title:</b> TOC3: TOC3: CAUTION (2010 4Runner)		

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## **FOREWORD**

This is Volume 3 of the 2010 4RUNNER manual. There are five volumes to this manual. The sections included in each volume are indicated by black type in the Section Index. Use the Section Index of each volume to find the volume with the section you need.

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## **FOREWORD**

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<b>Title:</b> INTRODUCTION: HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS: ELECTRONIC CIRCUIT INSPECTION PROCEDURE (2010 4Runner)		

## **ELECTRONIC CIRCUIT INSPECTION PROCEDURE**

### **1. BASIC INSPECTION**

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

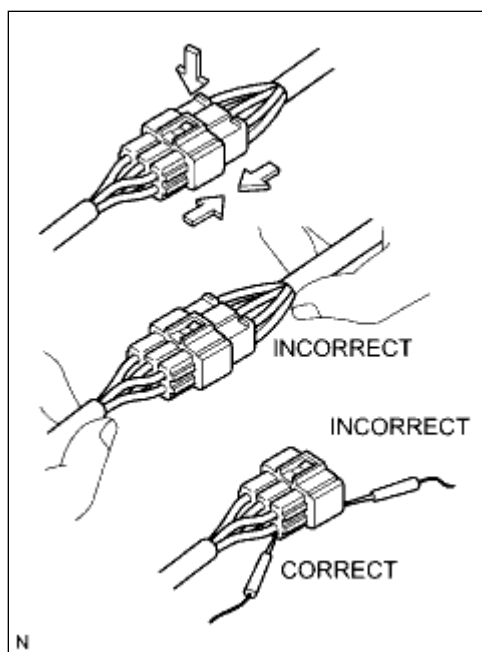
- (1) Unless otherwise stated, all resistance measurements should be made at an ambient temperature of 20°C (68°F). Resistance measurements may be inaccurate if measured at high temperatures, i.e. immediately after the vehicle has been running. Measurements should be made after the engine has cooled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

#### **(b) HANDLING CONNECTORS**

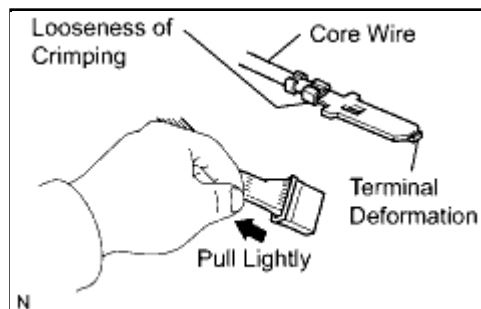
- (1) When disconnecting a connector, first squeeze the mating halves tightly together to release the lock, and then press the lock claw and separate the connector.
- (2) When disconnecting a connector, do not pull on the harnesses. Grasp the connector directly and separate it.
- (3) Before connecting 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**

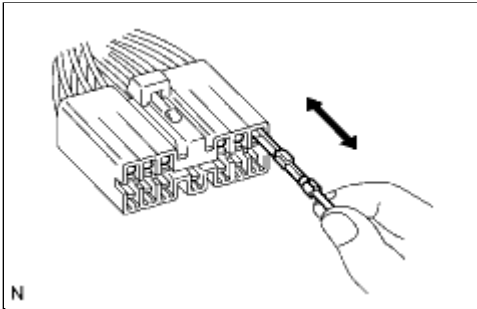


- (1) Checking when a connector is connected: Squeeze the connectors together to confirm that



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.



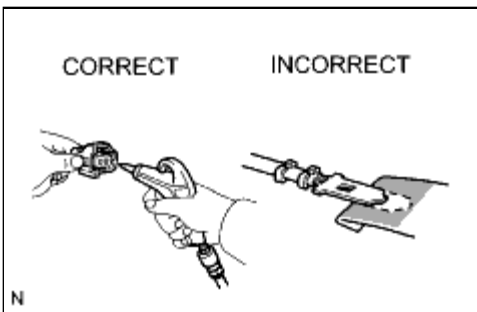
- (3) Checking the contact pressure of the terminal: Prepare a spare male terminal. Insert it into a female terminal, and check for ample tension when inserting and after full engagement.

**NOTICE:**

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

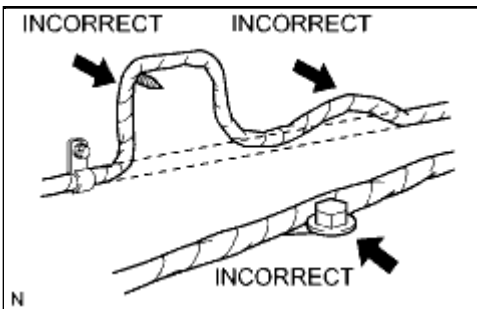
**(d) REPAIR METHOD OF CONNECTOR TERMINAL**

- (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.

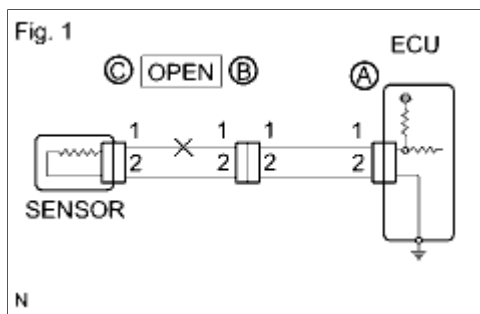


**(e) HANDLING OF WIRE HARNESS**

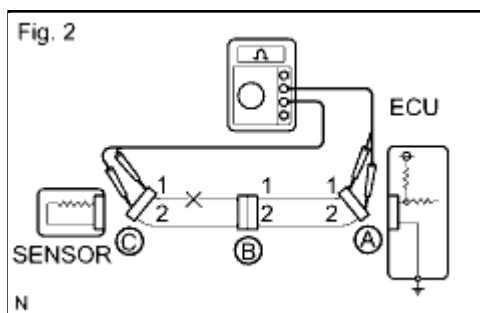
- (1) If removing a wire harness, check the wiring and clamping before proceeding so that it can be restored in the same way.
- (2) Never twist, pull or slacken the wire harness more than necessary.
- (3) The wire harness should never come into contact with a high temperature part, or rotating, moving, 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 k $\Omega$ or higher
Connector A terminal 2 - Connector C terminal 2	Below 1 $\Omega$

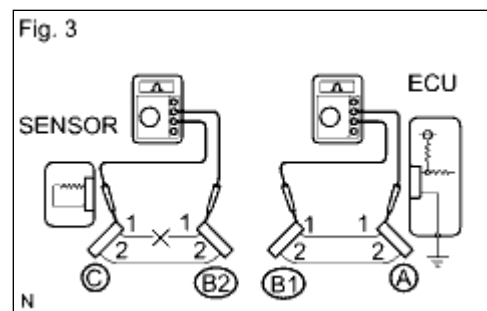
### HINT:

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

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

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

Standard Resistance (Fig. 3):



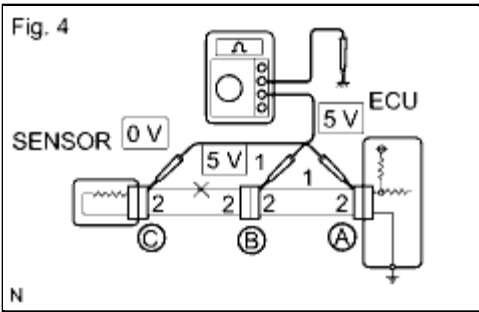
TESTER CONNECTION	SPECIFIED CONDITION
Connector A terminal 1 - Connector B1 terminal 1	Below 1 $\Omega$
Connector B2 terminal 1 - Connector C terminal 1	10 k $\Omega$ or higher

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

(c) Check the voltage.

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

With each connector still connected, measure the voltage between the body ground and these terminals (in this order): 1) terminal 1 of connector A; 2) terminal 1 of connector B; and 3) terminal 1 of connector C.

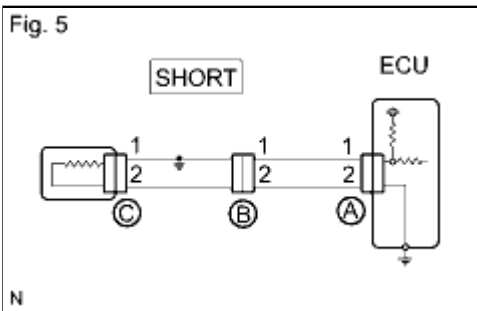


Standard Voltage (Fig. 4):

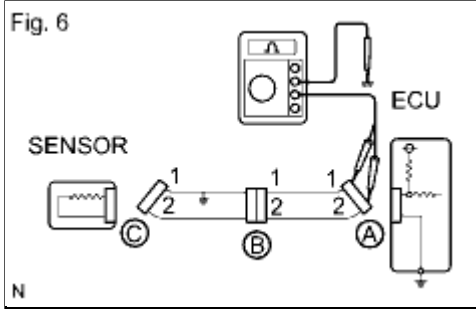
TESTER CONNECTION	SPECIFIED CONDITION
Connector A terminal 1 - Body ground	5 V
Connector B terminal 1 - Body ground	5 V
Connector C terminal 1 - Body ground	Below 1 V

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

### 3. CHECK FOR SHORT CIRCUIT



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



(1) Disconnect connectors A and C and measure the resistance.

Standard Resistance (Fig. 6):

TESTER CONNECTION	SPECIFIED CONDITION
Connector A terminal 1 - Body ground	Below 1 $\Omega$
Connector A terminal 2 - Body ground	10 k $\Omega$ or higher

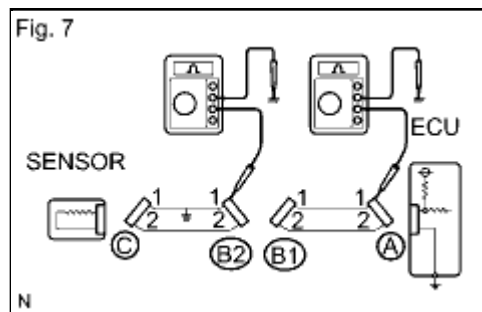
#### **HINT:**

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

If your results match the examples above, 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 k $\Omega$ or higher
Connector B2 terminal 1 - Body ground	Below 1 $\Omega$

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

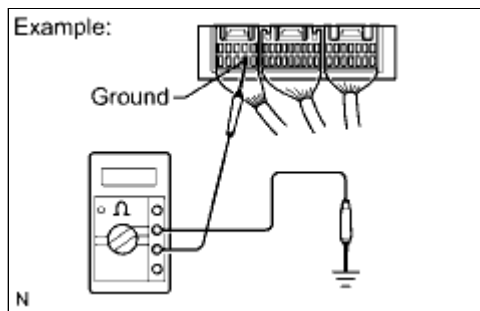
## **4. CHECK AND REPLACE ECU**

#### **NOTICE:**

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

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

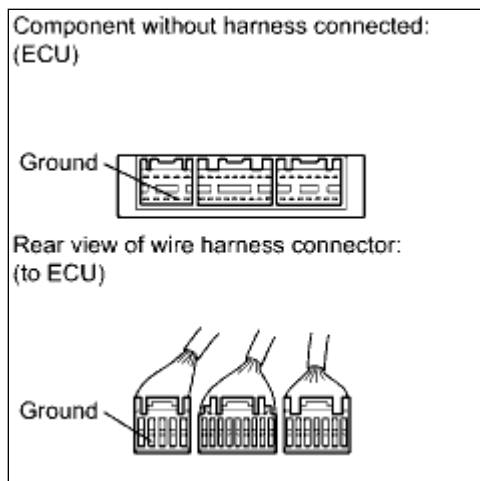
occur. If the trouble symptoms disappear, replace the original ECU.



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

Standard Resistance:

Below 1  $\Omega$



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

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<b>Title:</b> INTRODUCTION: HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS: GENERAL INFORMATION (2010 4Runner)		

## GENERAL INFORMATION

A large number of ECU controlled systems are used in the 4RUNNER. 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.

### 1. TROUBLESHOOTING PROCEDURES

- The troubleshooting procedures consist of diagnosis procedures for when a DTC is stored and diagnosis procedures for when no DTC is stored. The basic idea is explained in the following table.

PROCEDURE TYPE	DETAILS	TROUBLESHOOTING METHOD
DTC Based Diagnosis	The diagnosis procedure is based on the DTC that is stored.	The malfunctioning part is identified based on the DTC detection conditions using a process of elimination. The possible trouble areas are eliminated one-by-one by use of the Techstream and inspection of related parts.
Symptom Based Diagnosis (No DTCs stored)	The diagnosis procedure is based on problem symptoms.	The malfunctioning part is identified based on the problem symptoms using a process of elimination. The possible trouble areas are eliminated one-by-one by use of the Techstream and inspection of related parts.

- Vehicle systems are complex and use many ECUs that are difficult to inspect independently. Therefore, a process of elimination is used, where components that can be inspected individually are inspected, and if no problems are found in these components, the related ECU is identified as the problem and replaced.
- It is extremely important to ask the customer about the environment and the conditions present when the problem occurred (Customer Problem Analysis). This makes it possible to simulate the conditions and confirm the symptom. If the symptom cannot be confirmed or the DTC does not recur, the malfunctioning part may not be identified using the troubleshooting procedure, and the ECU for the related system may be replaced even though it is not defective. If this happens, the original problem will not be solved.
- In order to prevent endless expansion of troubleshooting procedures, the troubleshooting procedures are written with the assumption that multiple malfunctions do not occur simultaneously for a single problem symptom.
- To identify the malfunctioning part, troubleshooting procedures narrow down the target by separating components, ECUs and wire harnesses during the inspection. If the wire harness is identified as the cause of the problem, it is necessary to inspect not only the connections

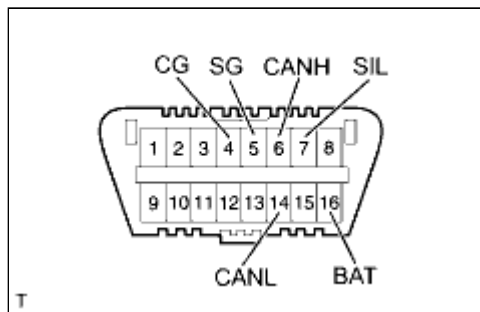
to components and ECUs but also all of the wire harness connectors between the component and the ECU.

## 2. DESCRIPTION

System data and the Diagnostic Trouble Codes (DTCs) can be read from the Data Link Connector 3 (DLC3) of the vehicle. When the system seems to be malfunctioning, use the Techstream to check for a malfunction and perform repairs.

## 3. DATA LINK CONNECTOR 3 (DLC3)

(a) The vehicle ECU uses the ISO 15765-4 communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.



TERMINAL NO. (SYMBOL)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
7 (SIL) - 5 (SG)	Bus "+" line	During transmission	Pulse generation
4 (CG) - Body ground	Chassis ground	Always	Below 1 $\Omega$
5 (SG) - Body ground	Signal ground	Always	Below 1 $\Omega$
16 (BAT) - Body ground	Battery positive	Always	11 to 14 V
6 (CANH) - 14 (CANL)	CAN bus line	Ignition switch off*	54 to 69 $\Omega$
6 (CANH) - 4 (CG)	HIGH-level CAN bus line	Ignition switch off*	200 $\Omega$ or higher
14 (CANL) - 4 (CG)	LOW-level CAN bus line	Ignition switch off*	200 $\Omega$ or higher
6 (CANH) - 16 (BAT)	HIGH-level CAN bus line	Ignition switch off*	6 k $\Omega$ or higher
14 (CANL) - 16 (BAT)	LOW-level CAN bus line	Ignition switch off*	6 k $\Omega$ or higher

### NOTICE:

**\*: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches, or the doors.**

If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

(b) Connect the cable of the Techstream 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.

### **HINT:**

- 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.

## **FOR USING TECHSTREAM**

- Before using the Techstream, read the tester operator's manual thoroughly.
- If the tester cannot communicate with the ECU controlled systems when connected to the DLC3 with the ignition switch in the on position and the tester turned on, there is a problem on the vehicle side or tester side.
  - a. If communication is possible when the tester is connected to another vehicle, inspect the diagnosis data link line (bus (+) line), CANH and CANL lines, and the power circuits for the vehicle ECUs.
  - b. If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself. Perform the Self Test procedure outlined in the tester operator's manual.





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<b>Title:</b> INTRODUCTION: HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS: HOW TO PROCEED WITH TROUBLESHOOTING (2010 4Runner)		

## **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.

<b>1.</b>	<b>VEHICLE BROUGHT TO WORKSHOP</b>
-----------	------------------------------------

**NEXT**



<b>2.</b>	<b>CUSTOMER PROBLEM ANALYSIS</b>
-----------	----------------------------------

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

**NEXT**



<b>3.</b>	<b>INSPECT BATTERY VOLTAGE</b>
-----------	--------------------------------

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 (INCLUDING 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 the DTC 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 TABLE

- (a) Check the results obtained in the symptom confirmation. 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 questions 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 4RUNNER 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 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 systems in the 4RUNNER.

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	○	○	○	-	○	○	-
2TR-FE SFI System	○	○	○	-	○	○	-
Cruise Control System	○	-	-	-	○	○	-
A343E Automatic Transmission System	○	○	-	-	○	○	-
A750E Automatic Transmission System	○	○	○	-	○	○	-
A750F Automatic Transmission 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
Kinetic Dynamic Suspension System	○	-	-	-	○	○	-
Tire Pressure Warning System	○	-	-	-	○	○	-
Vehicle Stability Control System	○	-	○	○	○	○	-
Power Steering System	○	-	-	-	○	-	-
Steering Lock System	○	-	-	-	○	○	-
Audio and Visual System	○	-	-	-	-	-	-
Navigation System	○	-	-	-	-	-	-
Intuitive Parking Assist System	-	-	-	-	-	-	-
Rear View Monitor System (w/ Navigation System)	-	-	-	-	-	-	-
Rear View Monitor System (w/o Navigation System)	-	-	-	-	-	-	-
Garage Door Opener System	-	-	-	-	-	-	-
Safety Connect System	○	-	-	-	○	○	○
LIN Communication 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
CAN Communication System	○	-	-	-	-	-	-
Power Door Lock Control System	-	-	-	-	○	○	○
Wireless Door Lock Control System (w/ Smart Key System)	○	-	-	-	○	○	○
Wireless Door Lock Control System (w/o Smart Key System)	○	-	-	-	○	○	○
Key Reminder Warning System	-	-	-	-	○	-	-
Smart Key System (for Start Function)	○	-	-	-	○	○	-
Smart Key System (for Entry Function)	○	-	-	-	○	○	○
Engine Immobiliser System (w/ Smart Key System)	○	-	-	-	○	○	-
Engine Immobiliser System (w/o Smart Key System)	○	-	-	-	○	○	-
Theft Deterrent 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
Lighting System (for Interior)	-	-	-	-	○	○	○
Meter / Gauge System	○	-	-	-	○	○	○
Clock System	-	-	-	-	-	-	-
Airbag System	○	○	-	-	○	-	-
Occupant Classification System	○	-	-	-	○	-	-
Front Power Seat Control System	-	-	-	-	-	-	-
Seat Heater System	-	-	-	-	-	-	-
Seat Belt Warning System	-	-	-	-	○	○	○
Air Conditioning System (for Automatic Air Conditioning System)	○	-	-	-	○	○	○
Air Conditioning System (for Manual Air Conditioning System)	○	-	-	-	○	○	-
Power Window Control System	○	-	-	-	○	○	○
Window Defogger 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
Sliding Roof System	○	-	-	-	○	○	○
Power Mirror Control System	-	-	-	-	-	-	-
Wiper and Washer System	-	-	-	-	-	○	○
Lighting System (for Exterior)	○	-	-	-	○	○	○
Horn 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>
-----------	------------------

**NEXT**  
▼

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

**NEXT**





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

**Result**

RESULT	PROCEED TO
No symptoms exist	A
Symptoms exist	B

**B** ► Go to step 5

**A**



<b>4.</b>	<b>SIMULATION TEST USING SYMPTOM SIMULATION METHODS</b>
-----------	---

**NEXT**



<b>5.</b>	<b>DTC CHECK</b>
-----------	------------------

**Result**

RESULT	PROCEED TO
DTC is not output	A
DTC is output	B

**B** ► TROUBLESHOOTING OF PROBLEM INDICATED BY DTC



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**

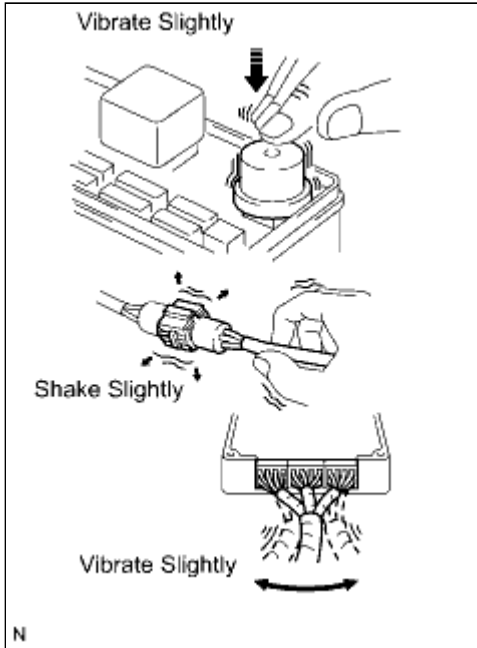
The problem is still occurring in a place other than the diagnostic circuit (the DTC displayed first is either for a past problem or a secondary problem).

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 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.  
To reproduce DTCs, it is necessary to satisfy the respective DTC detection conditions.



#### (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.

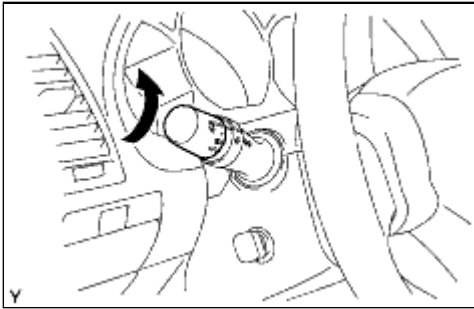
#### **NOTICE:**

- 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 the electrical load is excessive.

- (1) Turn on the heater blower, headlights, 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 Diagnostic Trouble Code Chart of the appropriate section. Use the chart to determine the trouble area and the proper inspection procedure. A description of each column of the chart is below.

ITEM	DESCRIPTION
DTC Code	Indicates the diagnostic trouble code.
Detection Item	Indicates the system or details of the problem.
Trouble Area	Indicates the suspected areas of the problem.
See Page	Indicates the page where the inspection procedures for each circuit can be found, or where there are instructions for checks 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 column of the chart is 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.**

ITEM	DESCRIPTION
Symptom	-
Suspected Area	Indicates the circuit or part which needs to be checked.
See Page	Indicates the page where the flowchart for each circuit is located.

## 7. CIRCUIT INSPECTION

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

ITEM	DESCRIPTION
Circuit Description	The major role and operation of the circuit and its component parts are explained.
DTC Code, DTC Detection Condition, Trouble Area	Indicates the diagnostic trouble codes, diagnostic trouble code detection conditions, and trouble areas of a problem.
Wiring Diagram	This shows a wiring diagram of the circuit. Use this diagram together with an ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit.
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.
Inspection Procedure Connector Illustrations	<ul style="list-style-type: none"> <li>• Connector being checked is connected: Connections of tester are indicated by (+) or (-) after the terminal name.</li> <li>• 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.</li> </ul>



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<b>Title:</b> INTRODUCTION: HOW TO USE THIS MANUAL: GENERAL INFORMATION (2010 4Runner)		

## **GENERAL INFORMATION**

### **1. GENERAL DESCRIPTION**

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

### **2. INDEX**

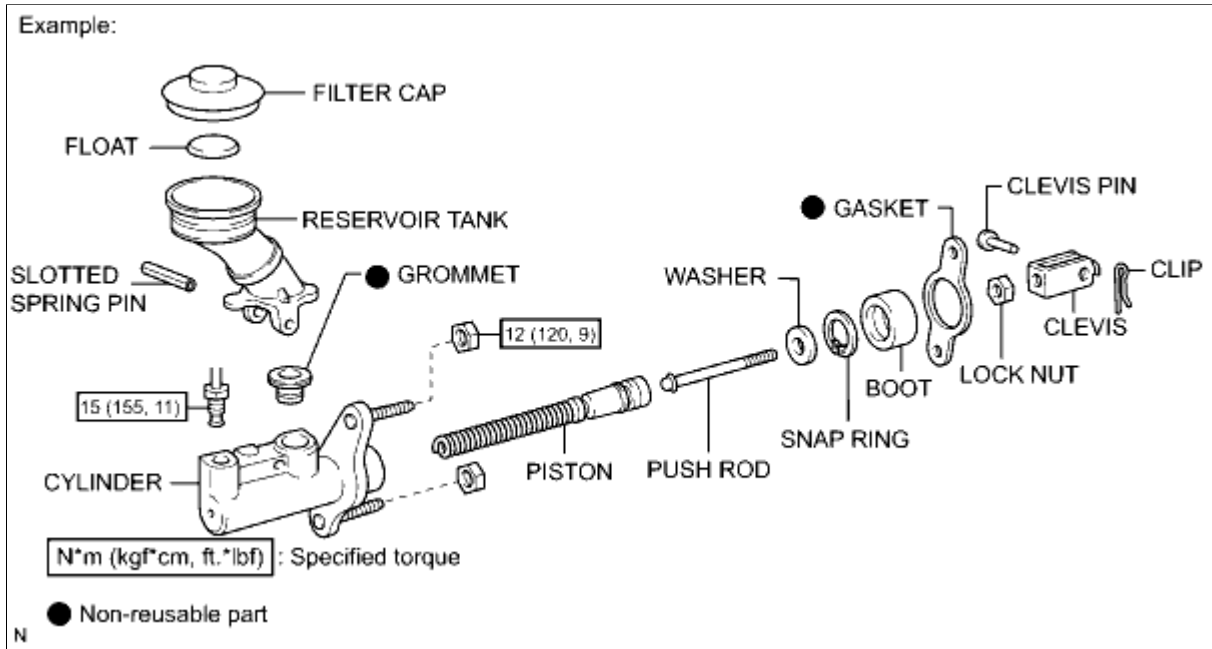
- (a) An alphabetical INDEX section is provided at the end of the manual as a reference to help you find the item to be repaired.

### **3. PREPARATION**

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

### **4. REPAIR PROCEDURES**

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



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

#### HINT:

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

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

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

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

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

## 5. SERVICE SPECIFICATIONS

(a) SPECIFICATIONS are presented in boldface text throughout the manual. The specifications are also found in the "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) standard. Units from the metric system and the English systems are also provided.

- Below is an example.

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





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<b>Title:</b> INTRODUCTION: REPAIR INSTRUCTION: CUSTOMIZE PARAMETERS (2010 4Runner)		

## CUSTOMIZE PARAMETERS

### 1. CUSTOMIZING FUNCTION WITH THE TECHSTREAM

#### HINT:

The following items 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.

#### (a) POWER DOOR LOCK CONTROL SYSTEM

##### **Door Lock**

DISPLAY	DEFAULT	CONTENT	SETTING
Auto Lock	OFF	Function that locks all doors when the vehicle speed reaches a certain level.	ON or OFF
Auto Lock/Shift	ON	Function that locks all doors when the shift lever is moved from P to any position other than P while the engine is running and all doors are closed.	ON or OFF
Auto Unlock/Shift	ON	Function that unlocks all doors when the shift lever is moved to P from any position other than P while the ignition switch is on.	ON or OFF
All Unlock/Open-Close	OFF	Function that unlocks the other doors when the driver door is opened within 10 seconds after the ignition switch is turned off.	ON or OFF

#### (b) WIRELESS DOOR LOCK CONTROL SYSTEM (w/ Smart Key System)

##### **Wireless Door Lock**

DISPLAY (ITEM)	DEFAULT	FUNCTION	SETTING
Wireless Control	ON	Function that turns wireless door lock / on or off	ON or OFF
Hazard Answer Back	ON	When the lock switch on the transmitter is pressed, this function illuminates the hazard warning lights and side turn signal lights once. When the unlock switch is pressed, the hazard warning lights and side turn signal lights illuminate twice.	ON or OFF

DISPLAY (ITEM)	DEFAULT	FUNCTION	SETTING
Open Door Warning	ON	If a door is not completely closed and the transmitter lock switch is pressed, this function makes the buzzer sound for 10 seconds.	ON or OFF
Panic Function	ON	Function to operate theft deterrent system by continuously pressing panic switch on transmitter for 0.8 seconds	ON or OFF
Auto Lock Time	60 s	Function that changes the time until relocking after unlocking the doors with the wireless door lock function.	30 s/60 s or 120 s
Wireless Auto Lock	ON	This function turns the wireless auto lock function on or off.	ON or OFF
Wireless Buzzer Resp	ON	Wireless door lock buzzer response / on or off	ON or OFF
P/W Ope buzzer	ON	Wireless power window buzzer response / on or off	ON or OFF
Wireless Buzzer Vol	Level7	Wireless door lock buzzer Volume	Level7/Level6/Level5 /Level4/Level3/Level2 /Level1 or Level0

(c) WIRELESS DOOR LOCK CONTROL SYSTEM (w/o Smart Key System)

**Wireless Door Lock**

DISPLAY (ITEM)	DEFAULT	FUNCTION	SETTING
Wireless Control	ON	Function that turns wireless door lock / on or off	ON or OFF
Hazard Answer Back	ON	When the lock switch on the transmitter is pressed, this function illuminates the hazard warning lights and side turn signal lights once. When the unlock switch is pressed, the hazard warning lights and side turn signal lights illuminate twice.	ON or OFF
Open Door Warning	ON	If a door is not completely closed and the transmitter lock switch is pressed, this function makes the buzzer sound for 10 seconds.	ON or OFF
Panic Function	ON	Function to operate theft deterrent system by continuously pressing panic switch on transmitter for 0.8 seconds	ON or OFF
Auto Lock Time	60 s	Function that changes the time until relocking after unlocking the doors with the wireless door lock function.	30 s/60 s or 120 s

DISPLAY (ITEM)	DEFAULT	FUNCTION	SETTING
Wireless Auto Lock	ON	This function turns the wireless auto lock function on or off.	ON or OFF
Wireless Buzzer Resp	ON	Wireless door lock buzzer response / on or off	ON or OFF
P/W Ope buzzer	ON	Wireless power window buzzer response / on or off	ON or OFF
Wireless Buzzer Vol	Level7	Wireless door lock buzzer Volume	Level7/Level6/Level5 /Level4/Level3/Level2 /Level1 or Level0

(d) SMART KEY SYSTEM (for Entry Function)

**Smart Key**

DISPLAY	DEFAULT	CONTENTS	SETTING
Park Wait Time (Waiting time to permit unlocking door after locking)	2.5s	Function that sets the waiting time to permit unlocking the door after the door is locked with the entry lock function.	0.5s/1.5s/2.5s or 5s
Ignition Available Area (Entry ignition available area)	All	Function to choose the available area for the key to start the engine and cancel the steering lock.	Front or All
Back Door Opening Operation (Back door open mode when vehicle is locked)	Long	Function to choose the back door open operation mode when the vehicle is locked.	Long/Twice or OFF
Door Unlock Mode	Driver	Function that chooses the doors to be operated by entry unlock operation	All or Driver
Touch activation Over Threshold	Active	The function that limits the consecutive entry lock operation to only 2 times can be changed between Active and Not Active. When in Not Active mode, there is no limit for the number of times that the consecutive entry lock operation can be performed.	Active or Not Active

**Warning**

DISPLAY	DEFAULT	CONTENTS	SETTING
Key Low Battery Warning (Warn when key battery becomes weak)	ON	Function that warns the driver that the key battery power is low.	ON or OFF

## (1) ENTRY UNLOCK MODE SWITCHING FUNCTION

1. To use the entry unlock mode switching function, make sure the engine switch is off and simultaneously press and hold the lock switch on the key and another key switch for 5 seconds.

When the switches are pressed and held for 5 seconds, the entry door unlock mode changes in the following order: all door unlock mode, driver door unlock mode.

### NOTICE:

**After pressing and holding the switches for 5 seconds, wait 5 seconds before performing the same procedure again.**

- o All door unlock mode (default):

When a touch sensor is touched, all the doors unlock.

- o Driver door unlock mode:

When the driver door touch sensor is touched, only the driver door unlocks. When another touch sensor is touched, all doors unlock.

2. The certification ECU receives this signal from the key and changes the smart key system to the appropriate entry unlock mode.
3. The certification ECU sounds the wireless door lock buzzer and combination meter buzzer to inform the user that the mode has been switched.

MODE	WIRELESS DOOR LOCK BUZZER	COMBINATION METER ASSEMBLY (BUZZER)
All Doors (Default)	Sounds 2 times	Sounds once
Driver Door (Customized)	Sounds 3 times	Sounds once

### HINT:

**The function only changes the entry unlock mode of the smart key system. It does not switch the unlocking of the wireless door lock control.**

## (2) KEY CANCEL

The key cancel operation disables the following functions:

- Entry Unlock/Lock
- Key Lock-in Prevention
- Entry Back Door Open
- Warning
- Entry Ignition

- a. The operation procedures are as follows:

Precondition:

Engine switch off, driver side door closed and unlocked.

- i. Unlock the driver side door once with the unlock switch of the key.
- ii. Open the driver door within 5 seconds.

iii. Unlock the driver side door twice with the unlock switch of the key within 5 seconds.

iv. Close and open the driver door twice within 30 seconds.

((Driver door: Open condition → Close → Open → Close → Open)

v. Unlock the driver side door twice with the unlock switch of the key within 5 seconds.

vi. Close and open the driver door once within 30 seconds.

(Driver door: Open condition → Close → Open)

vii. Close the driver door within 5 seconds.

When key cancel is activated, the wireless door lock buzzer sounds twice.

To return to the original condition, perform the procedure again. When the original condition is restored, the wireless door lock buzzer sounds once.

#### (e) LIGHTING SYSTEM (for Interior)

##### Illuminated Entry

DISPLAY	DEFAULT	CONTENT	SETTING
Lighting Time	15s	Changes the lighting time after closing all of the doors. (It will fade out immediately in case of turning the ignition switch from off to ACC or ON.	7.5s/15s or 30s
I/L when ACC OFF	ON	A function that turns on the lights when the ignition switch is turned from ON or ACC to off (the room light turns on when the interior light switch is set to DOOR).	ON or OFF
I/L ON W/Door Key Unlock*2	ON	A function that turns on the room light when the door is unlocked with the door key cylinder (the room light turns on when the map light switch is set to DOOR).	ON or OFF
Room Light when Aprchd*1	ON	A function that turns on the room light when the key is brought within the vehicle exterior detection area (the room light turns on when the map light switch is set to DOOR).	ON or OFF
Inside Foot Light*3	ON	Changes the interior foot lights control.	ON or OFF
Center Console Spot Light	ON	Lights up the center console spot light when ignition switch is turned ACC or ON.	ON or OFF
Mirr-Foot-Lgt Approached*4	ON	Door mirror foot light (when approaching vehicle)	ON or OFF
Mirr-Foot-Lgt Unlocked*4	ON	Door mirror foot light (when unlocking doors)	ON or OFF
Mirror Foot Light Time*4	15s	Door mirror foot light illumination duration	0s/7.5s/15s or 30s

DISPLAY	DEFAULT	CONTENT	SETTING
Light Control*5	ON	Change the inside handle illumination control.	ON or OFF
Interior Light Control	ON	Change the engine switch illumination*1 or ignition key cylinder light*2 control.	ON or OFF
Exterior Light Control*4	ON	Change the door mirror foot light control.	ON or OFF

- \*1: w/ Smart Key System
- \*2: w/o Smart Key System
- \*3: w/ Interior Foot Light
- \*4: w/ Door Mirror Foot Light
- \*5: w/ Inside Handle Illumination

(f) METER / GAUGE SYSTEM

### Warning

TESTER DISPLAY	DEFAULT	CONTENT	SETTING
Driver Side Seatbelt Warning Buzzer*1	ON	Function to turn on/off the seat belt warning buzzer	ON or OFF
Front Passenger Side Seatbelt Warning Buzzer*1	ON	Function to turn on/off the seat belt warning buzzer	ON or OFF

- \*1: This setting is only valid for the buzzer which sounds at 20 km/h (12 mph) or more.

### Display

TESTER DISPLAY	DEFAULT	CONTENT	SETTING
Units By Region	MI/g	Function to change the unit of the display	km/l, MI or g
Language	English	Function to change language of display	English/French
ECO Driving Indicator	ON	Function to turn on or off the ECO driving indicator zone display in the multi-information display	ON or OFF

(g) SEAT BELT WARNING SYSTEM

### Seat Belt Warning

DISPLAY	DEFAULT	CONTENTS	SETTING
Driver Side Seatbelt Warning Buzzer	ON	If the driver side seat belt is unfastened and the vehicle is driven at approximately 20 km/h (12.5 mph) or more, the system sounds the seat belt warning buzzer.	ON or OFF
Front Passenger Side Seatbelt Warning Buzzer	ON	If the front passenger side seat belt is unfastened with the front passenger seat occupied and the vehicle is driven at approximately 20 km/h (12.5 mph) or more, the system	ON or OFF

DISPLAY	DEFAULT	CONTENTS	SETTING
		sounds the seat belt warning buzzer.	

(h) AIR CONDITIONING SYSTEM (for Automatic Air Conditioning System)

**Air Conditioner**

DISPLAY	DEFAULT	CONTENTS	SETTING
Set Temperature Shift	Normal	Function to set the temperature shift.	+2 C/+1 C/Normal/-1 C or -2 C
Compressor Mode	Automatic	Function to turn the A/C on automatically by pressing the AUTO button when the blower is on and the A/C is off.	Automatic or Manual
Air Inlet Mode	Automatic	Function to automatically change to recirculation mode when the A/C is turned on.	Automatic or Manual
Foot/DEF Auto Mode	ON	Function to turn on the airflow from the front and rear footwell register ducts and front defroster automatically when auto mode is on.	ON or OFF
Foot/DEF Automatic Blow Up Function	ON	Function to change the blower level automatically when the front defroster is on.	ON or OFF
Add Foot Air in FACE Mode	ON	When the FACE mode is selected, an additional amount of air is blown to the foot area.	ON or OFF

(i) POWER WINDOW CONTROL SYSTEM

**Power Window**

TESTER DISPLAY	DEFAULT	CONTENT	SETTING
Door Key P/W Up	OFF	This function is used to close the windows by operating the mechanical key.	ON or OFF
Door Key P/W Down	OFF	This function is used to open the windows by operating the mechanical key.	ON or OFF
P/W Up W/ Transmitter	OFF	This function is used to close the windows using the wireless key transmitter.	ON or OFF
P/W Down W/ Transmitter	OFF	This function is used to open the windows using the wireless key transmitter..	ON/OFF
P Window Auto Up	Avail	This function is used to enable or disable the auto up function for the front passenger door window using the power window regulator switch assembly (for front passenger side).	Avail or Not Avl

TESTER DISPLAY	DEFAULT	CONTENT	SETTING
P Window Auto Up From Driver	Avail	This function is used to enable or disable the remote auto up function for the front passenger door window using the master switch.	Avail or Not Avl
RR Window Auto Up	Avail	This function is used to enable or disable the auto up function using the rear power window regulator switch assembly RH.	Avail or Not Avl
RR Window Auto Up From Driver	Avail	This function is used to enable or disable the remote auto up function for the rear RH door window using the master switch.	Avail or Not Avl
RL Window Auto Up	Avail	This function is used to enable or disable the auto up function using the rear power window regulator switch assembly LH.	Avail or Not Avl
RL Window Auto Up From Driver	Avail	This function is used to enable or disable the remote auto up function for the rear LH door window using the master switch.	Avail or Not Avl
Door Key Linked Back P/W UP	AVAIL	This function is used to close the back door windows by operating the mechanical key.	NOT AVL or AVAIL
Door Key Linked Back P/W DOWN	AVAIL	This function is used to open the back door windows by operating the mechanical key.	NOT AVL or AVAIL

#### PSD & PBD operation (w/ Smart Key System)

TESTER DISPLAY	DEFAULT	CONTENT	SETTING
Smart Back Door P/W Up SW	AVAIL	This function is used to permit or disable back door power window up operation via the luggage electrical key switch.	NOT AVL or AVAIL
Smart Back Door P/W Down	AVAIL	This function is used to permit or disable back door power window down operation via the luggage electrical key switch.	NOT AVL or AVAIL
Smart Back Door P/W Press ON	0.8 sec.	This function is used to change the time that the luggage electrical key switch must be pressed to operate the back door power window.	0.8 sec./1 sec./1.2 sec. or 1.4 sec.
Back Door P/W UP when half-shut	NOT AVL	This function is used to permit or disable back door power window up operation when the back door is ajar.	NOT AVL or AVAIL

#### (j) SLIDING ROOF SYSTEM

##### Slide Roof

DISPLAY	DEFAULT	CONTENTS	SETTING
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DISPLAY	DEFAULT	CONTENTS	SETTING
Door Key Related Open*1	ON	The function to manually open the sliding roof linked with the power windows by holding the driver side door key for 1.5 seconds or more to the unlock position when the ignition switch is off.	ON or OFF
Door Key Related Close*1	ON	The function to manually close the sliding roof linked with the power windows by holding the driver side door key for 1.5 seconds or more to the lock position when the ignition switch is off.	ON or OFF
Wireless Key Related Open*2	ON	The function to manually open the sliding roof linked with the power windows by pressing the transmitter UNLOCK switch for 1.5 seconds or more when the ignition switch is off.	ON or OFF
Door Key Related Operation	Slide	The function to select tilt up or slide open of the manual sliding roof operation linked with the power windows by holding the driver side door key for 1.5 seconds or more to the unlock position when the ignition switch is off.	Slide or Tilt
Wireless Key Related Operation	Slide	The function to select tilt up or slide open of the manual sliding roof operation linked with the power windows by pressing on the transmitter UNLOCK switch for 1.5 seconds or more when the ignition switch is off.	Slide or Tilt

#### **HINT:**

- 1: This function is linked with the power window key-linked function. If the power window key-linked function is set to OFF, the sliding roof key-linked function will not operate even when it is set to ON.
- \*2: This function is linked with the power window wireless transmitter-linked function. If the power window wireless transmitter-linked function is set to OFF, the sliding roof wireless transmitter-linked function will not operate even when it is set to ON.

#### **(k) WIPER AND WASHER SYSTEM**

##### **Wiper**

DISPLAY	DEFAULT	CONTENT	SETTING
Linked Rear Wiper Washer	AVAIL	Function to make the rear wiper run automatically after the washer function is used.	NOT AVAIL or AVAIL
Rewipe Function	AVAIL	Function to make the rear wiper run once automatically a certain amount of time after the washer function is completed, to prevent the dripping of washing fluid.	NOT AVAIL or AVAIL
Rear Wiper Interval Speed	3 sec.	Function used to change the time from when the rear wiper stops moving until it starts moving again in intermittent mode.	3 sec./2 sec./4 sec. or 5 sec.
Rear Wiper Retract Time	3 sec.	Function used to change the time from when the rear wiper stops moving after the rear wiper switch is turned off until the rear wiper is stored in the spoiler.	3 sec./4 sec./5 sec. or 6 sec.

(I) LIGHTING SYSTEM (for Exterior)

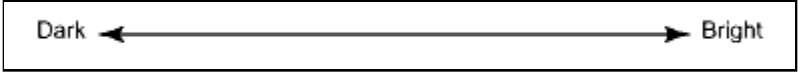
**Light Control**

DISPLAY	DEFAULT	CONTENT	SETTING
Disp Ex OFF Sen	NORMAL	Changes brightness when lowering lights such as the combination meter indicator light, A/C indicator light, and clock light.* 1	LIGHT2/LIGHT1 /NORMAL/DARK1 or DARK2
Disp Ex ON Sen	NORMAL	canceling lowering lights such as the combination meter indicator light, A/C indicator light, and clock light.* 2	LIGHT2/LIGHT1 /NORMAL/DARK1 or DARK2
Light Auto OFF Delay	30s	Function to continue illuminating the headlights for a certain period of time after closing all the doors with the ignition switch turned from ON to off under the condition that the headlight dimmer switch is at head or AUTO with the headlight on.	OFF/30s/60s or 90s
Sensitivity	Normal	A function to adjust the ambient light sensitivity of the automatic light control system.* 3	Light2/Light1/Normal /Dark1 or Dark2
DRL Function	ON	A function that enables or disables the DRL.	ON or OFF

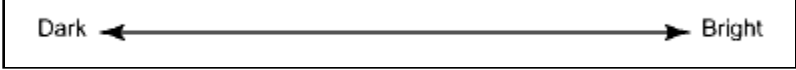
**HINT:**

The sensitivity adjustment may be difficult to confirm. Check by driving the customer's vehicle.


**\*1**

Brightness of lowering the lights					
Setting	DARK2	DARK1	NORMAL	LIGHT1	LIGHT2

**\*2**

Brightness when canceling the lowering of the lights					
Setting	DARK2	DARK1	NORMAL	LIGHT1	LIGHT2

**\*3**

Lighting brightness					
Setting	Dark2	Dark1	Normal	Light1	Light2




TOYOTA

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<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000003YMF002X
<b>Title:</b> INTRODUCTION: REPAIR INSTRUCTION: INITIALIZATION (2010 4Runner)		

## INITIALIZATION

### 1. PROCEDURES NECESSARY WHEN CABLE IS DISCONNECTED/RECONNECTED TO BATTERY TERMINAL

#### Procedures Necessary when Cable is Disconnected/Reconnected to Battery Terminal






NECESSARY PROCEDURE	EFFECT OR INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE IS NOT PERFORMED	SEE PAGE
Reset back door unlock position	Back door unlock function	








#### NOTICE:

- After the battery is reconnected, be sure to wait 10 seconds or more before attempting to start the engine. The engine may not start immediately after the battery is reconnected.

### 2. PROCEDURES NECESSARY WHEN ECU OR OTHER PARTS ARE REPLACED

#### Procedures Necessary when ECU or Other Parts are Replaced

REPLACEMENT PART	NECESSARY PROCEDURE	EFFECT OR INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE IS NOT PERFORMED	SEE PAGE
ECM (for 1GR-FE)	Register VIN.	DTC P0630 is output	
ECM (fro 2TR-FE)	Register VIN.	DTC P0630 is output	
<ul style="list-style-type: none"> <li>ECM (for 1GR-FE)</li> <li>Throttle body with motor assembly</li> </ul>	<ul style="list-style-type: none"> <li>Learning values save</li> <li>Learning values write</li> </ul>	Engine starting	
<ul style="list-style-type: none"> <li>ECM (for 2TR-FE)</li> <li>Throttle body with motor assembly</li> </ul>	<ul style="list-style-type: none"> <li>Learning values save</li> <li>Learning values write</li> </ul>	Engine starting	
<ul style="list-style-type: none"> <li>Automatic transmission assembly (for A750F)</li> </ul>	Reset memory	Large shift shock	

REPLACEMENT PART	NECESSARY PROCEDURE	EFFECT OR INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE IS NOT PERFORMED	SEE PAGE
<ul style="list-style-type: none"> <li>Valve body assembly (for A750F)</li> <li>Any of the shift solenoid valve (for A750F)</li> </ul>			
<ul style="list-style-type: none"> <li>Automatic transmission assembly (for A750E)</li> <li>Valve body assembly (for A750E)</li> <li>Any of the shift solenoid valve (for A750E)</li> </ul>	Reset memory	Large shift shock	
<ul style="list-style-type: none"> <li>Tire pressure warning ECU</li> <li>Tire pressure warning valve and transmitter</li> </ul>	Code registration	Tire pressure warning system	
<ul style="list-style-type: none"> <li>Master cylinder solenoid</li> <li>Yaw rate and acceleration sensor</li> <li>Spiral cable sub-assembly (steering angle sensor)</li> </ul>	Calibration	Vehicle stability control system	
Garage door opener transmitter	Registration	Garage door opener system	
DCM (Telematics Transceiver)	DCM Activation	Safety connect system does not operative	
<ul style="list-style-type: none"> <li>Steering lock actuator assembly</li> <li>Certification ECU</li> <li>ID code box</li> <li>Key</li> </ul>	Code registration	<ul style="list-style-type: none"> <li>Engine immobiliser system (w/ Smart Key System)</li> <li>Engine start</li> <li>Steering lock and unlock</li> </ul>	
<ul style="list-style-type: none"> <li>Transponder key ECU</li> <li>ECM</li> <li>Key</li> </ul>	Code registration	<ul style="list-style-type: none"> <li>Engine immobiliser system (w/o Smart Key System)</li> <li>Engine start</li> </ul>	

REPLACEMENT PART	NECESSARY PROCEDURE	EFFECT OR INOPERATIVE FUNCTION WHEN NECESSARY PROCEDURE IS NOT PERFORMED	SEE PAGE
<ul style="list-style-type: none"> <li>• Door control receiver assembly</li> <li>• Key</li> </ul>	Code registration	Wireless door lock control system (w/o Smart Key System)	<a href="#">INFO</a>
<ul style="list-style-type: none"> <li>• Front power window regulator motor LH</li> <li>• Front power window regulator motor RH</li> <li>• Rear power window regulator motor LH</li> <li>• Rear power window regulator motor RH</li> <li>• Back door power window regulator motor</li> </ul>	Motor initialization	Power window control system	<a href="#">INFO</a>
<ul style="list-style-type: none"> <li>• Sliding roof ECU (sliding roof drive gear sub-assembly)</li> <li>• Sliding roof glass</li> <li>• Sliding roof housing</li> </ul>	Sliding roof system initialization	Auto operation	<a href="#">INFO</a>

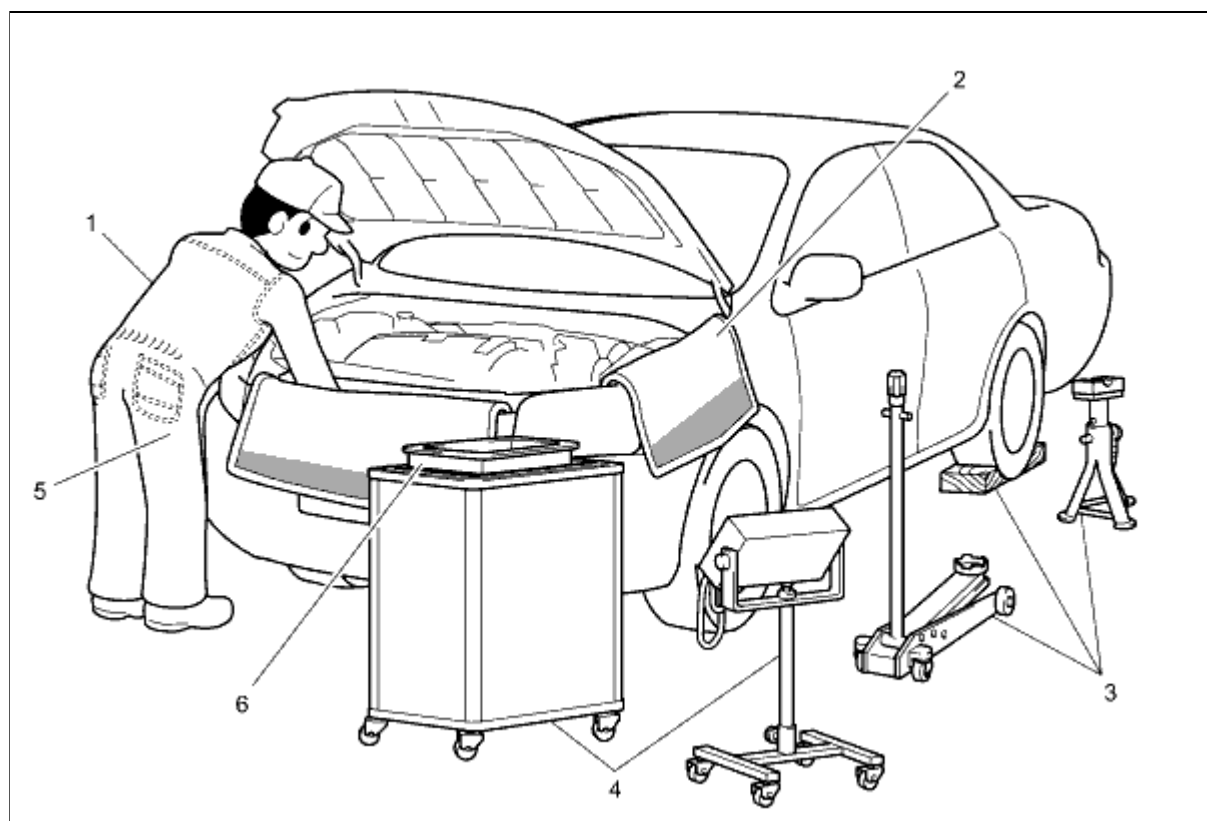


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<b>Title:</b> INTRODUCTION: REPAIR INSTRUCTION: PRECAUTION (2010 4Runner)		

## **PRECAUTION**

### **1. BASIC REPAIR HINT**

#### **(a) HINTS ON OPERATIONS**



1	Attire	<ul style="list-style-type: none"> <li>• Always wear a clean uniform.</li> <li>• Hat and safety shoes must be worn.</li> </ul>
2	Vehicle protection	Prepare a grille cover, fender cover, seat cover and floor mat before starting the operation.
3	Safe operation	<ul style="list-style-type: none"> <li>• When working with 2 or more persons, be sure to check safety for one another.</li> <li>• When working with the engine running, make sure to provide ventilation for exhaust fumes in the workshop.</li> <li>• If working on high temperature, high pressure, rotating, moving, or vibrating parts, wear appropriate safety equipment and take extra care not to injure yourself or others.</li> </ul>

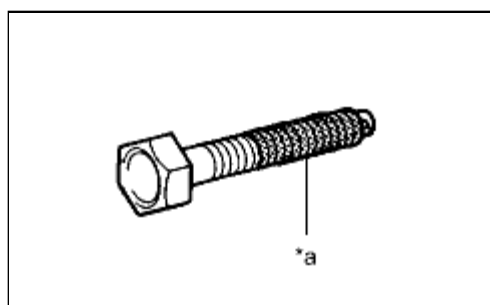
		<ul style="list-style-type: none"> <li>• When jacking up the vehicle, be sure to support the specified location with a safety stand.</li> <li>• When lifting up the vehicle, use appropriate safety equipment.</li> </ul>
4	Preparation of tools and measuring gauge	Before starting operation, prepare a tool stand, SST, a gauge, oil and the parts for replacement.
5	Removal and installation, disassembly and assembly operations	<ul style="list-style-type: none"> <li>• Diagnose with a thorough understanding of proper procedures and of the reported problem.</li> <li>• Before removing the parts, check the general condition of the assembly and for deformation and damage.</li> <li>• When the assembly is complicated, take notes. For example, note the total number of electrical connections, bolts, or hoses removed. Add matchmarks to ensure reassembly of components in the original positions. Temporarily mark hoses and their fittings if needed.</li> <li>• Clean and wash the removed parts if necessary and assemble them after a thorough check.</li> </ul>
6	Removed parts	<ul style="list-style-type: none"> <li>• Place the removed parts in a separate box to avoid mixing them up with the new parts or contaminating the new parts.</li> <li>• For non-reusable parts such as gaskets, O-rings, and self-locking nuts, replace them with new ones as instructed in this manual.</li> <li>• Retain the removed parts for customer inspection, if requested.</li> </ul>

#### (b) JACKING UP AND SUPPORTING VEHICLE

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

#### (c) PRECOATED PARTS

### Text in Illustration



*a	Seal Lock Adhesive
----	--------------------

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



- apply new seal lock adhesive appropriate to that part.
- (4) Some seal lock agents harden slowly. You may have to wait for the seal lock adhesive to harden.

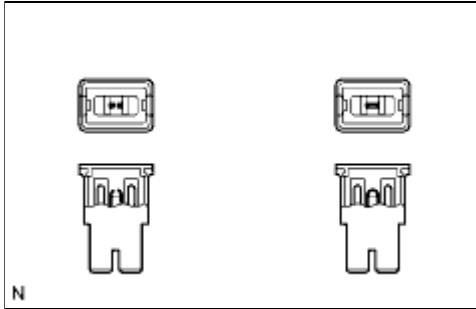
(d) GASKETS

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

(e) BOLTS, NUTS AND SCREWS

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

(f) FUSES



- (1) When inspecting a fuse, check that the wire of the fuse is not broken.
- (2) If the wire of a fuse is broken, confirm that there are no shorts in its circuit.
- (3) When a fuse is replaced, a fuse with the same amperage rating must be used.

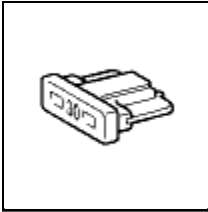
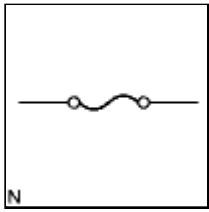
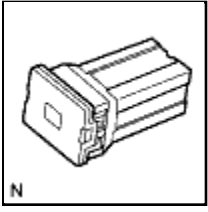
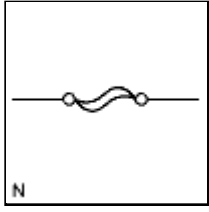
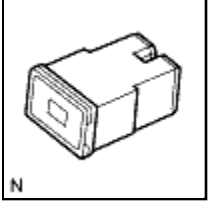
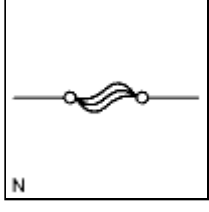
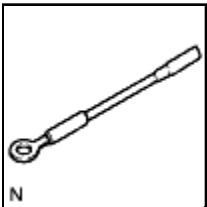
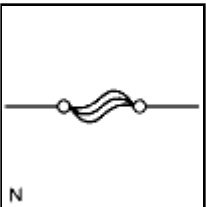
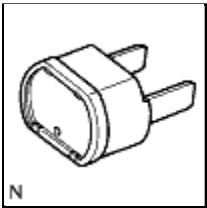
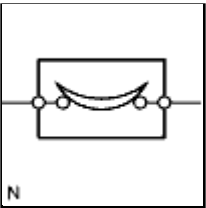
ILLUSTRATION	SYMBOL	PART NAME	ABBREVIATION
		FUSE	FUSE
		MEDIUM CURRENT FUSE	M-FUSE
		HIGH CURRENT FUSE	H-FUSE

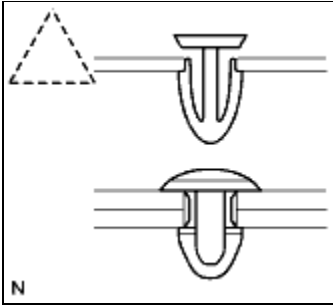
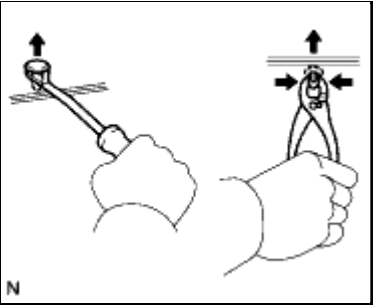
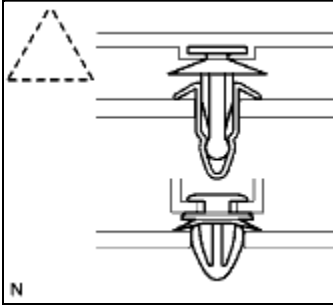
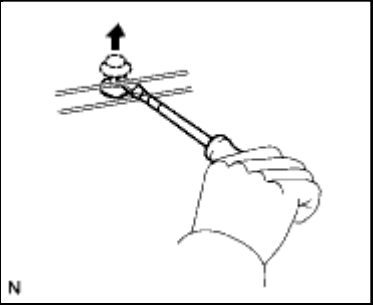
ILLUSTRATION	SYMBOL	PART NAME	ABBREVIATION
		FUSIBLE LINK	FL
		CIRCUIT BREAKER	CB

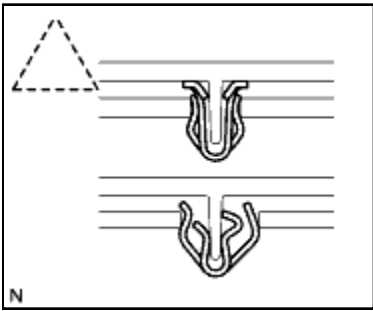
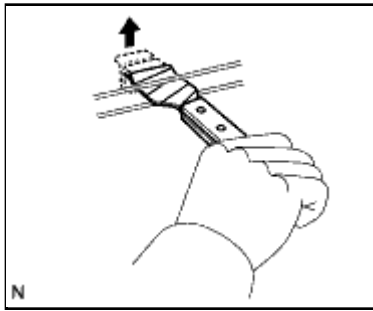
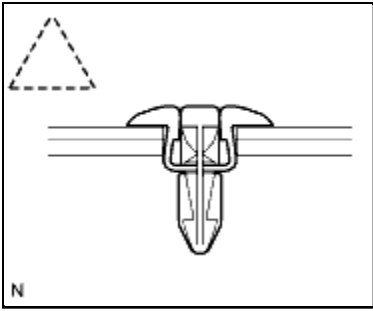
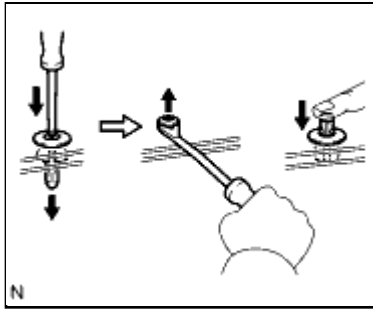
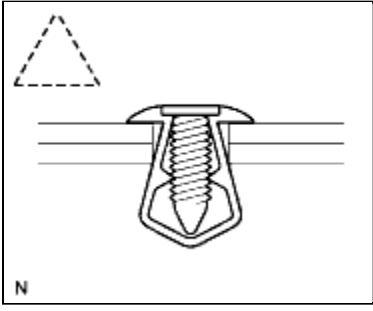
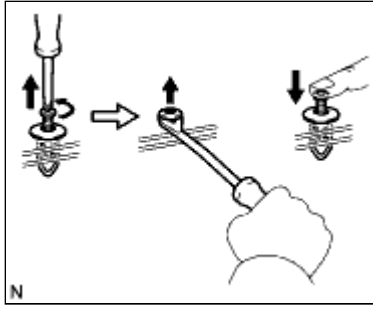
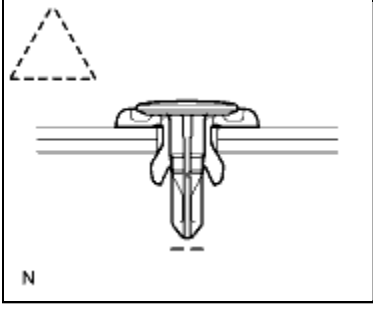
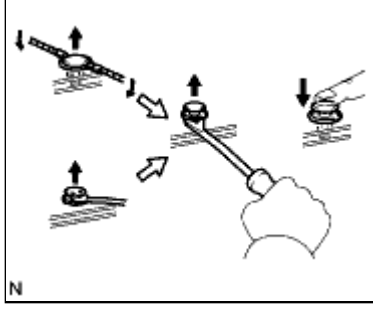
### (g) CLIPS

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

#### **HINT:**

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

SHAPE (EXAMPLE)	ILLUSTRATION	PROCEDURES
		Remove clips with a clip remover or pliers.
		Remove clips with a clip remover or screwdriver.

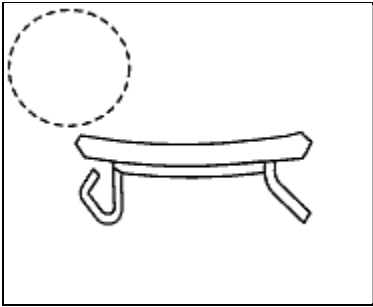
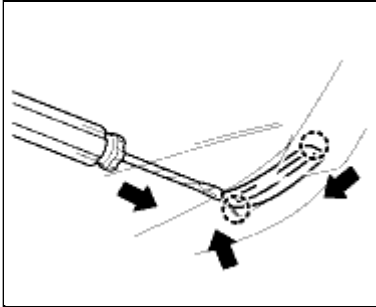
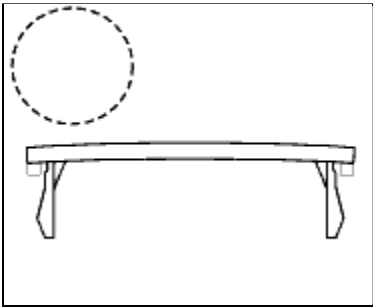
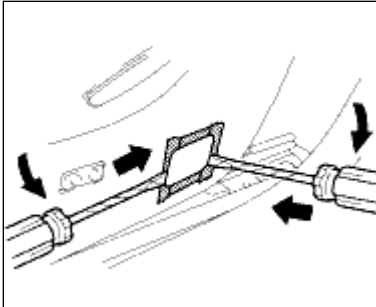
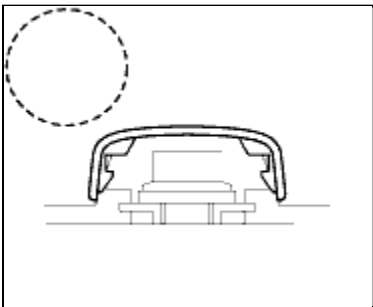
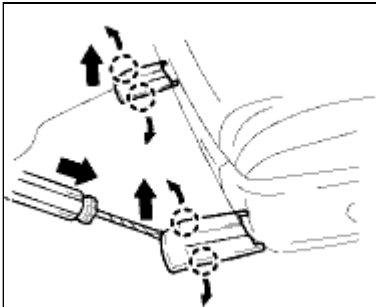
SHAPE (EXAMPLE)	ILLUSTRATION	PROCEDURES
		Remove clips with a wide scraper to prevent panel damage.
		Remove clips by pushing the center pin through and prying out the shell.
		Remove clips by unscrewing the center pin and prying out the shell.
		Remove clips by prying out the pin and then prying out the shell.

#### (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 of caps or covers are damaged during a procedure, always replace the caps or covers with new ones.**

SHAPE (EXAMPLE)	ILLUSTRATION	PROCEDURES
		Using a screwdriver, detach the claws and remove the caps or covers.
		Using a screwdriver, detach the claws and remove the caps or covers.
		Using a screwdriver, detach the claws and remove the caps or covers.

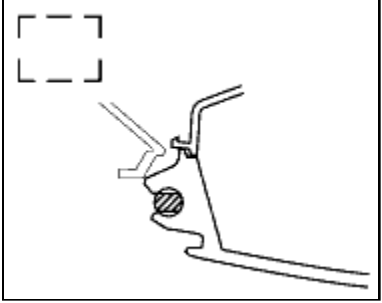
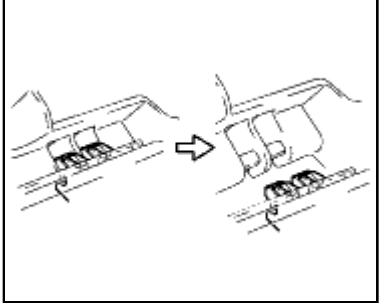
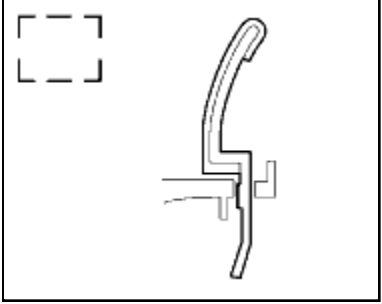
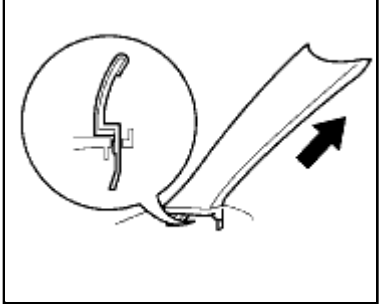
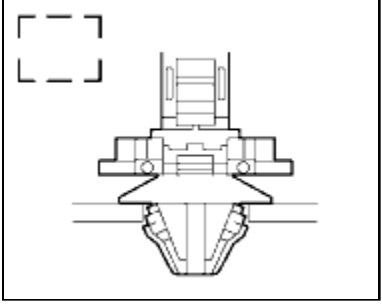
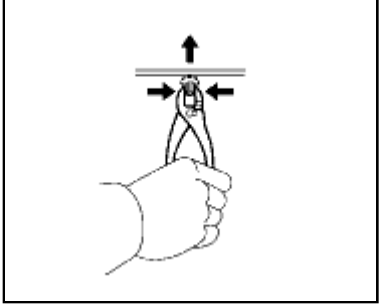
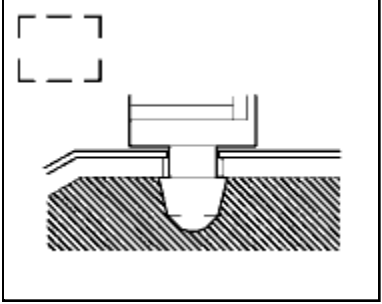
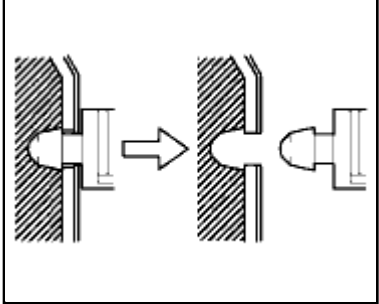
(i) HINGE, GUIDE, CLAMP, PIN ETC.

(1) The removal and installation methods of typical hinges, guides, clamps and pins used for vehicle body parts are shown in the table below.

**HINT:**

If clamps are damaged during a procedure, always replace the cap or cover that has damaged clamps with a new one.

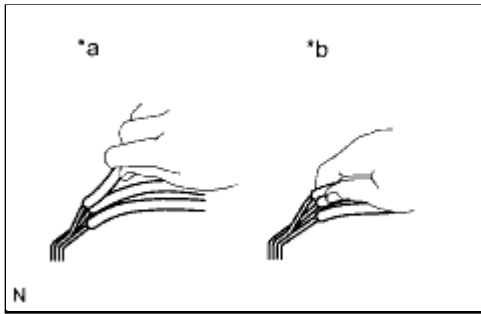
SHAPE (EXAMPLE)	ILLUSTRATION	PROCEDURES
		Disengage the pins by pulling.

SHAPE (EXAMPLE)	ILLUSTRATION	PROCEDURES
		
		Disengage the pins by pulling.
		Remove the clamps with pliers.
		Disengage the pins by pulling.

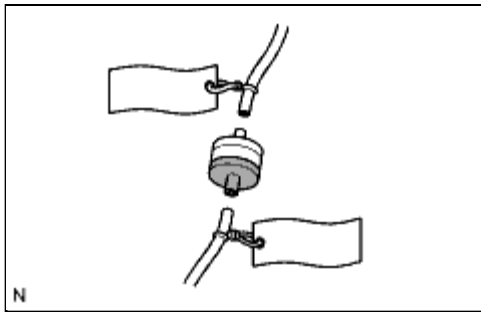
#### (j) REMOVAL AND INSTALLATION OF VACUUM HOSES

- (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.

#### Text in Illustration



*a	INCORRECT
*b	CORRECT

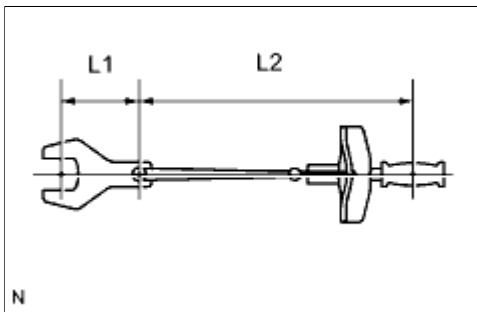


(2) When disconnecting vacuum hoses, use tags to identify where they should be reconnected.

(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.

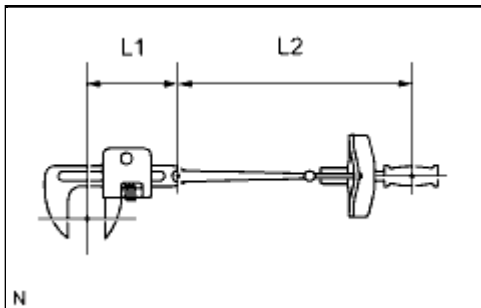
#### (k) TORQUE WHEN USING TORQUE WRENCH WITH EXTENSION TOOL



(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.)}

**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 WITH SUPPLEMENTAL RESTRAINT SYSTEM**

The 4RUNNER is equipped with a Supplemental Restraint System (SRS). The SRS of this vehicle consists of the following:

1. Steering pad
2. Knee airbag assembly (for Driver side)
3. Knee airbag assembly (for Front passenger side)
4. Front passenger airbag assembly
5. Curtain shield airbag assembly
6. Front seat side airbag assembly
7. Center airbag sensor assembly
8. Front airbag sensor
9. Side airbag sensor
10. Rear airbag sensor
11. Rear floor airbag sensor

**CAUTION:**

- Failure to carry out service procedures in the correct sequence could cause SRS parts to unexpectedly deploy and possibly lead to serious injuries. Furthermore, if a mistake is made when servicing SRS parts, they may fail to operate when required. Before performing servicing (including installation/removal, inspection and replacement of parts), be sure to read the following precautions.
- Before starting work, wait at least 90 seconds after the ignition switch is turned off and after the cable is disconnected from the negative (-) battery terminal. (SRS parts are equipped with a backup power source. If work is started within 90 seconds of turning the ignition switch off and disconnecting the cable from the negative (-) battery terminal, SRS parts may deploy).
- Do not expose SRS parts directly to hot air or flames.

**NOTICE:**

- Malfunction symptoms of SRS parts are difficult to confirm. DTCs are the most important source of information when troubleshooting. During troubleshooting, always confirm DTCs before disconnecting the cable from the negative (-) battery terminal.
- For minor collisions where SRS parts do not deploy, always inspect the SRS parts.
- Before performing repairs, remove airbag sensors as necessary if any kind of impact is likely to occur to an airbag sensor during repairs.
- Never use SRS parts from another vehicle. When replacing SRS parts, replace them with new ones.
- Never disassemble or attempt to repair SRS parts.
- If an SRS part has been dropped, or if there are any cracks, dents or other defects in the case, bracket or connector, replace the SRS part with a new one.
- Use an ohmmeter/voltmeter with high impedance (10 k $\Omega$ /V minimum) for troubleshooting the electrical circuits.
- Information labels are attached to the periphery of SRS parts. Follow the cautions and

instructions on the labels.

- After work on SRS parts is completed, perform the SRS warning light check.
- When the cable is disconnected from the negative (-) battery terminal, the memory settings of each system will be cleared. Because of this, be sure to write down the settings of each system before starting work. When work is finished, reset the settings of each system as before. Never use a backup power supply from outside the vehicle to avoid erasing the memory in a system.
- An airbag or pretensioner may be activated by static electricity. To prevent this, be sure to touch a metal surface with bare hands to discharge static electricity before performing this procedure.

#### (a) 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.

#### (b) AIRBAG ASSEMBLY

- (1) Airbag assembly with pad:

Always place a removed or new airbag assembly with the pad surface facing upward. Placing the airbag assembly with the airbag inflation direction facing downward could cause a serious accident if the airbag inflates. Also, do not place anything on top of the airbag assembly.

- (2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause a serious injury.
- (3) Grease or detergents of any kind should not be applied to the 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 center airbag sensor connectors. 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 by itself, the airbag should be deployed using SST before disposal. Activate the airbag in a safe place away from electrical noise.

#### (c) SEAT OUTER BELT ASSEMBLY WITH PRETENSIONER

- (1) Never measure the resistance of the seat outer belt. This may cause the pretensioner of the seat outer belt to activate, which could cause a serious injury.
- (2) Never install the seat outer belt on another vehicle.
- (3) 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.
- (4) When using electric welding anywhere on the vehicle, disconnect the center airbag sensor connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the pretensioner deploying due to currents entering the squib wiring.
- (5) When disposing of a vehicle or the seat outer belt by itself, the pretensioner should be activated before disposal. Activate the pretensioner in a safe place away from electrical noise.
- (6) 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.
- (7) Grease, detergents, oil or water should not be applied to the seat outer belt.

#### (d) 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.

(e) WIRE HARNESS AND CONNECTOR

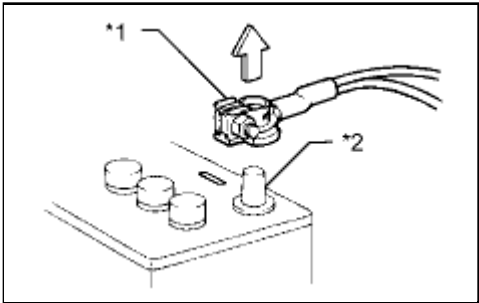
- (1) The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are yellow. If the SRS wire harness becomes disconnected or the connector becomes broken, repair or replace it.

3. ELECTRONIC CONTROL

(a) REMOVAL AND INSTALLATION OF BATTERY CABLE

Text in Illustration

*1	Cable
*2	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 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 cleared when the cable is disconnected from the negative (-) battery terminal. Write down any necessary data before disconnecting the cable.

HINT:

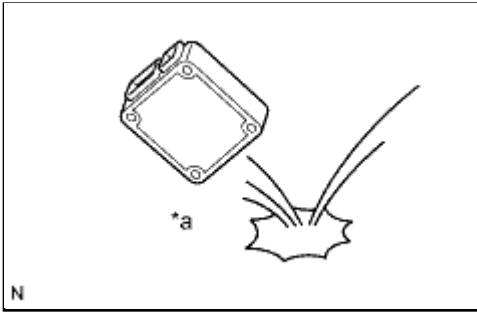
\*: w/o Navigation System

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

(b) HANDLING OF ELECTRONIC PARTS

- (1) Do not open the cover or case of an ECU unless absolutely necessary. If the IC terminals are touched, the IC may be rendered inoperative by static electricity.

Text in Illustration



*a	INCORRECT
----	-----------

- (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 emissions-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 the terminals from bending.

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

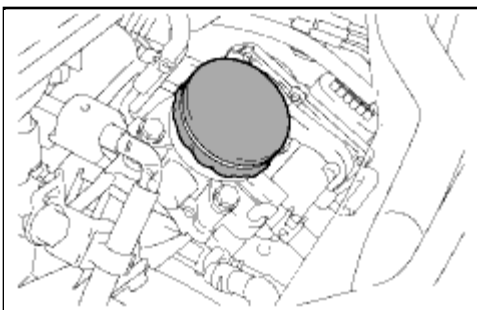
##### (a) PLACE FOR REMOVING AND INSTALLING FUEL SYSTEM PARTS

- (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.
- (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 cloths separately using a fire resistant container.

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

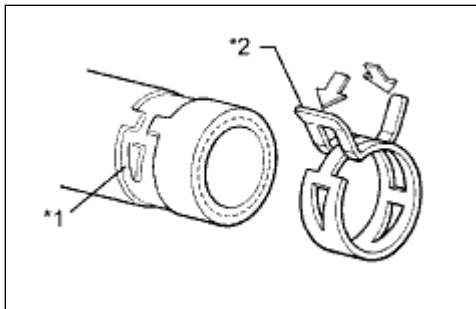


- (a) If any metal particles enter inlet system parts, they may damage the engine.

- (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

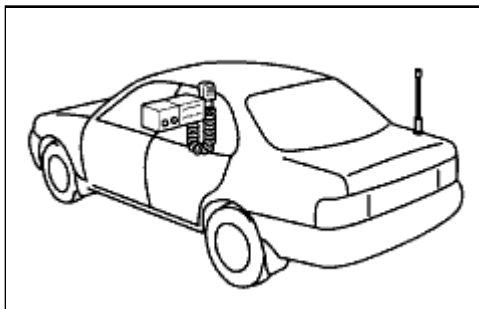
### Text in Illustration



*1	Clamp Track
*2	Spring Type Clamp

- (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

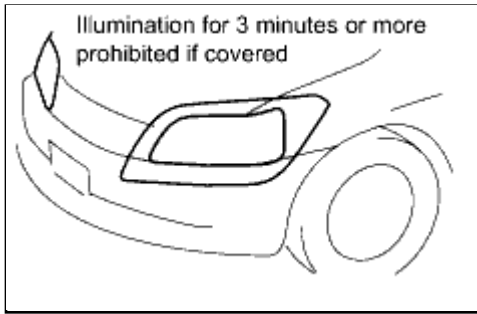


- (a) Install the antenna as far away from the ECU and sensors of the vehicle electronic systems as possible.

- (b) Install the 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.
- (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. WHEN INSPECTING HEADLIGHT


- (a) When the headlights are illuminated, do not cover the headlights for 3 minutes or more.



**NOTICE:**

- When the headlight dimmer switch assembly is set to HEAD, do not touch the high-voltage socket area of the discharge headlight.
- As the outer lens of the headlight is made of resin, the resulting heat created when covering the headlight for an extended period of time may deform the headlight.

## 9. FOR VEHICLES EQUIPPED WITH TRACTION CONTROL (TRC) AND VEHICLE STABILITY CONTROL (VSC) SYSTEMS

When testing with a 2-wheel drum tester such as a speedometer tester, a combination speedometer and brake tester, or a chassis dynamometer, or when jacking up the front wheels and turning the wheels, perform the following procedure to enter inspection mode and disable the TRC and VSC systems .

**HINT:**

- The vehicle may slip unexpectedly out of the dynamometer because of TRC and VSC operation.
- Pressing the VSC OFF switch (for vehicles with a VSC OFF switch) does not disable TRC and VSC operation completely.

**NOTICE:**

- Make sure that the VSC warning light is blinking.
- Secure the vehicle with chains for safety.

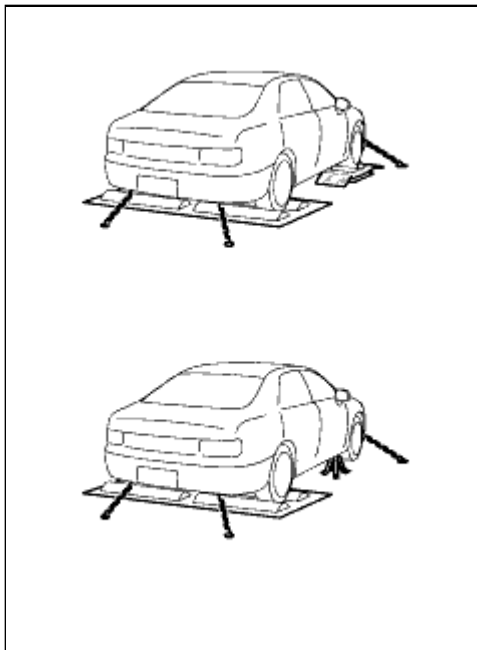
## 10. WHEN SERVICING ACTIVE TORQUE CONTROL 4WD VEHICLES

### (a) WHEN USING A SPEEDOMETER TESTER

**NOTICE:**

- Inspection should be done using the front wheels.
- Do not brake or accelerate suddenly.
- Maximum vehicle speed must be less than 60 km/h (37 mph) (when using free rollers to support the rear wheels, vehicle speed must be less than 50 km/h (31 mph)).
- Driving time should be less than 1 minute.
- Follow all usage and safety procedures in the operator's manual for the speedometer tester.

- (1) Place the front wheels onto the rollers.
- (2) Enter inspection mode to disable TRC and VSC control.
- (3) Place the rear wheels on free rollers or use safety stands to allow the rear wheels to rotate freely.
- (4) Secure the vehicle with suitable chains or straps.
- (5) Start the engine, and then measure the vehicle speed while increasing the speed gradually with the shift lever in D.
- (6) After the test is finished, decrease the speed gradually, and then stop the vehicle.



(b) WHEN USING A BRAKE TESTER

**NOTICE:**

- A high-speed type brake tester cannot be used.
- Vehicle speed should be less than 0.5 km/h (0.3 mph).
- Follow all usage and safety procedures in the operator's manual for the brake tester.

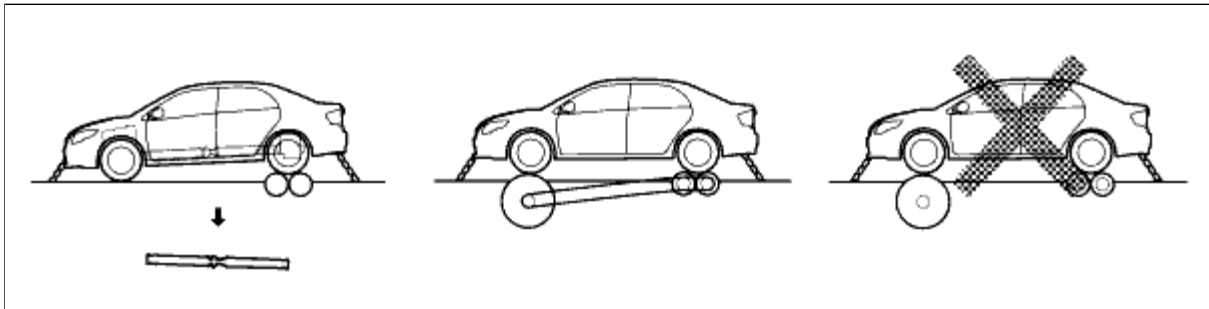
- (1) Place the wheels to be tested (front or rear) onto the rollers.
- (2) Move the shift lever to N.
- (3) Start the engine to allow normal brake booster operation.
- (4) Operate the brakes to perform the test.

(c) WHEN USING A CHASSIS DYNAMOMETER

- (1) Enter inspection mode to disable TRC and VSC control.
- (2) Follow the instructions shown in the illustration.

**NOTICE:**

- Do not brake or accelerate suddenly.
- Confirm that the vehicle is securely immobilized.
- Follow all usage and safety procedures in the operator's manual for the chassis dynamometer.
- Be sure to follow the instructions specified in the illustration. Failure to do so may cause deterioration of 4WD system function, malfunction of drivetrain components and risk of the vehicle jumping off the dynamometer.



(d) WHEN USING AN ON-VEHICLE BALANCER

- (1) Raise the vehicle until all 4 wheels are off the ground.
- (2) Support the vehicle with safety stands at an appropriate height. Make sure that vehicle does not lean in any direction, and that the tires are completely clear of the floor.
- (3) Place the vibration pick-up unit into position for the wheel to be measured\*1.
- (4) Release the parking brake.
- (5) Check that no dragging force exists when turning each wheel by hand.
- (6) Put the wheel balancer in position.
- (7) Wheel balance measurement should be done by using both the engine and the wheel balancer drive roller to spin the wheels.

**HINT:**

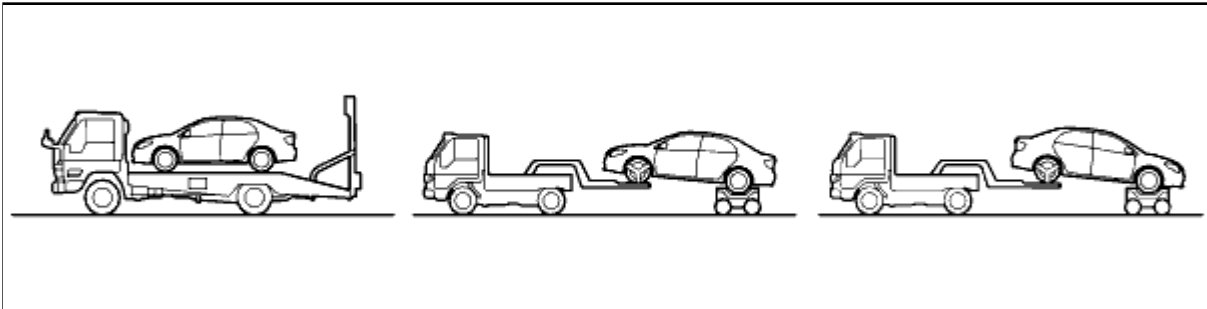
**\*1: Different on-vehicle wheel balancers have different requirements for mounting the vibration pick-up unit(s). Refer to the operator's manual for the wheel balancer to confirm requirements for use.**

**NOTICE:**

- Start the engine and then increase the vehicle speed gradually with the shift lever in D.
- Do not accelerate or decelerate suddenly.
- Deceleration should be done by braking gradually.
- Make sure that no one is standing in-line with the spinning wheels.
- Measurement should be done quickly.
- Confirm that the vehicle is securely immobilized.
- Follow all usage and safety procedures in the operator's manual for the wheel balancer.

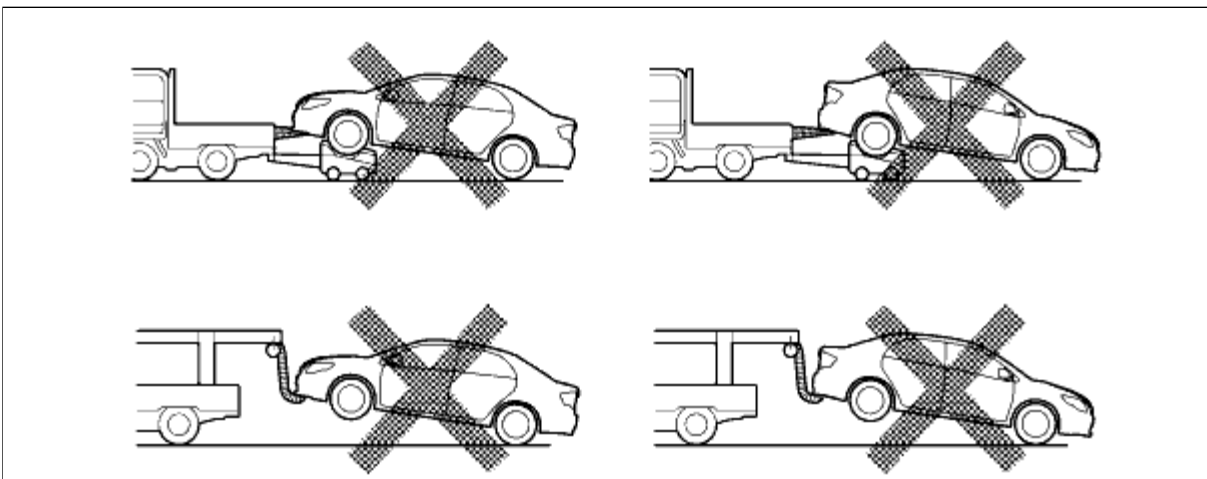
**11. WHEN TOWING ACTIVE TORQUE CONTROL 4WD VEHICLES**

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

**NOTICE:**

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

- (c) The following towing methods shown below are dangerous and can damage the vehicle, so do not use them.



- (1) Do not tow the vehicle with only two wheels on the ground.
- (2) Do not use a sling-type towing method either from the front or rear.

**NOTICE:**

**If these towing methods are used either from the front or rear, the following may occur.**

- The drive train may overheat and be damaged and the wheels may off the dolly.
- In addition, if the vehicle is equipped with the VSC system, the system will apply the brakes to the rotating wheels.

## 12. FOR VEHICLES EQUIPPED WITH CATALYTIC CONVERTER

### **CAUTION:**

**If a large amount of unburned gasoline or gasoline vapors flow into the converter, it may cause converter 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 tests.
  - (1) Perform a spark test only when absolutely necessary. Perform this test as rapidly as possible.
  - (2) While testing, never race the engine unless instructed.
- (d) Avoid a prolonged engine compression measurement. Engine compression measurements must be performed as rapidly as possible.
- (e) Do not run the engine when the fuel tank is nearly empty. This may cause the engine to misfire and create an extra load on the converter.

## 13. IGNITION SWITCH EXPRESSION

### **HINT:**

**The type of ignition switch used on this model differs according to the specifications of the vehicle. The expressions listed in the table below are used in this section.**

EXPRESSION	IGNITION SWITCH (POSITION)	ENGINE SWITCH (CONDITION)
Ignition Switch off	Off	Off
Ignition Switch ON	ON	On (IG)
Ignition Switch ACC	ACC	On (ACC)
Engine Start	START	Start



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## **VEHICLE LIFT AND SUPPORT LOCATIONS**

### **1. NOTICE ABOUT VEHICLE CONDITION WHEN RAISING VEHICLE**

- (a) The vehicle must be unloaded before jacking up or raising the vehicle. Never jack up or raise a heavily loaded vehicle.
- (b) When removing any heavy components like the engine or transaxle, the vehicle center of gravity will shift. To stabilize the vehicle, place a balance weight in a location that will prevent the vehicle from rolling or shifting, or place a transmission jack under the appropriate jack position at the opposite end of the vehicle.

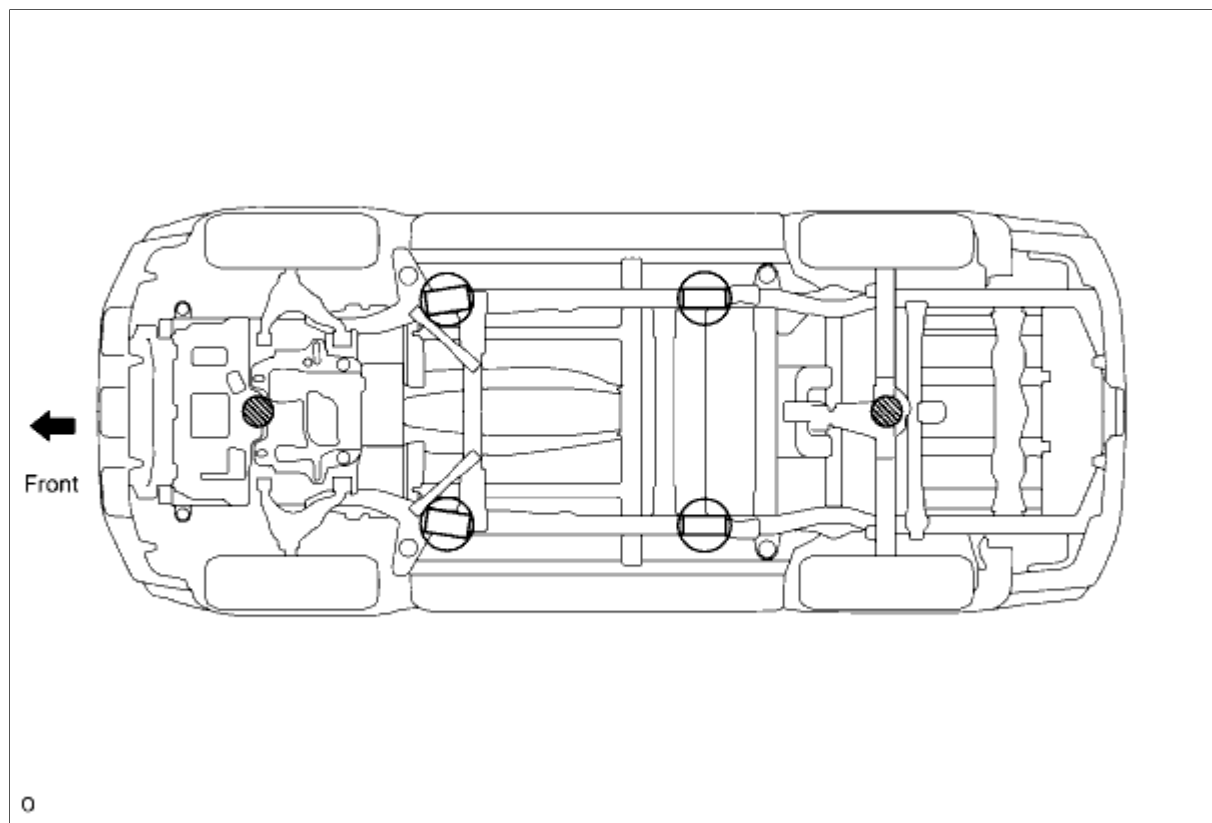
### **2. NOTICE FOR USING 4 POST LIFT**

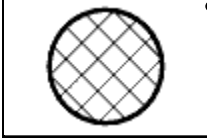
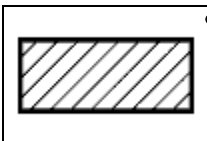
- (a) Follow the safety procedures outlined in the lift's instruction manual.
- (b) Do not damage the tires or wheels while driving onto the lift.
- (c) Use wheel chocks to secure the vehicle.

### **3. NOTICE FOR USING JACK AND SAFETY STANDS**

- (a) Work on a level surface. Use wheel chocks at all times.
- (b) Use safety stands with rubber attachments as shown in the illustration.
- (c) Set the jack and safety stands exactly under the specified locations on the vehicle.
- (d) Do not work on or leave the vehicle supported only by a jack. Be sure to support the vehicle with safety stands.
- (e) When jacking up the vehicle, first release the parking brake and move the shift lever to N.
- (f) 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.
- (g) 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.
- (h) When lowering a vehicle that only has its front or rear wheels jacked up.





	<p><b>JACK POSITION</b></p> <p>Front: Center of crossmember</p>	<p><b>CAUTION:</b></p> <p>When jacking up the vehicle, make sure the vehicle is not carrying any extra weight.</p>
	<p><b>SUPPORT POSITION</b></p> <ul style="list-style-type: none"> <li>• Swing arm type lift</li> </ul>	

- (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.



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## **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)
A-TRAC	Active Traction Control
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

ABBREVIATIONS	MEANING
ASL	Automatic sound levelizer
ASSB	Assembly Services Sdn. Bhd.
ASSY	Assembly
ATDC	After Top Dead Center
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
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

ABBREVIATIONS	MEANING
CPU	Central Processing Unit
CRAWL	Crawl Control
CRS	Child Restraint System
CTR	Center
CV	Control Valve
CVT	Continuously Variable Transmission (Transaxle)
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

ABBREVIATIONS	MEANING
EFI	Electronic Fuel Injection
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
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
H-FUSE	High Current Fuse
HI	High
HID	High Intensity Discharge (Headlight)

ABBREVIATIONS	MEANING
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
IIA	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
KDSS	Kinetic Dynamic Suspension System
L/H/W	Length, Height, Width
LAN	Local Area Network
LB	Liftback
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LH	Left-Hand
LHD	Left-Hand Drive
LIN	Local Interconnect Network
LLC	Long-Life Coolant
LNG	Liquefied Natural Gas
LO	Low
LPG	Liquefied Petroleum Gas
LSD	Limited Slip Differential

ABBREVIATIONS	MEANING
LSP & BV	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 Refueling Vapor Recovery
P & BV	Proportioning And Bypass Valve
P/W	Power Window
PBD	Power Back Door

ABBREVIATIONS	MEANING
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
R/B	Relay Block
R/F	Reinforcement
RAM	Random Access Memory
RBS	Recirculating Ball Type Steering
REAS	Relative Absorber System
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 (for gasoline engine)
SCV	Suction Control Valve (for diesel engine)
SDN	Sedan
SEN	Sensor
SICS	Starting Injection Control System
SOC	State Of Charge



ABBREVIATIONS	MEANING
SOHC	Single Overhead Camshaft
SPEC	Specification
SPI	Single Point Injection
SPV	Spill Control Valve
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 (for diesel engine)
TCV	Tumble Control Valve (for gasoline engine)
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	P.T. 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
TVIP	TOYOTA Vehicle Intrusion Protection
TWC	Three-Way Catalyst
U/D	Underdrive
U/S	Undersize
VCV	Vacuum Control Valve
VDIM	Vehicle Dynamics Integrated Management
VENT	Ventilator
VGRS	Variable Gear Ratio Steering
VIM	Vehicle Interface Module
VIN	Vehicle Identification Number
VPS	Variable Power Steering
VSC	Vehicle Stability Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
VVT-i	Variable Valve Timing-intelligent
W/ / w/	With
W/H	Wire Harness
W/O / w/o	Without
WGN	Wagon



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## **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	-
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)

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )-ABBREVIATIONS
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)
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 Airflow	Air Flow Meter
MAP	Manifold Absolute Pressure	Manifold Pressure Intake Vacuum
MC	Mixture Control	Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV)

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )-ABBREVIATIONS
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)

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )-ABBREVIATIONS
TC	Turbocharger	Turbocharger
TCC	Torque Converter Clutch	Torque Converter
TCM	Transmission Control Module	Transmission ECU, ECT ECU
TP	Throttle Position	Throttle Position
TR	Transmission Range	-
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) Manifold Converter CCRO
TWC+OC	Three-Way + Oxidation Catalytic Converter	CCR + CCo
VAF	Volume Airflow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor
WOT	Wide Open Throttle	Full Throttle
WU-OC	Warm Up Oxidation Catalytic Converter	-
WU-TWC	Warm Up Three-Way Catalytic Converter	-