

Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RTB0
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 -]
Title: INTRODUCTION: HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS: GENERAL INFORMATION; 2016 - 2020 MY 4Runner [08/2015 -]		

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)

- 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.

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
Air Conditioning System (for Manual Air Conditioning System)	○	-	-	-	○	○	-
Power Window Control System	○	-	-	-	○	○	○
Window Defogger System	-	-	-	-	-	○	-
Sliding Roof System	○	-	-	-	○	○	○
Power Mirror Control System	-	-	-	-	-	-	-
Wiper and Washer System	-	-	-	-	-	○	○
Lighting System (for Exterior)	○	-	-	-	○	○	○
Horn System	-	-	-	-	-	-	-
Automatic Running Board 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.

13. 1.DTC CHECK

PROCEED TO
NEXT

14. 2.MAKE A NOTE OF DTC DISPLAYED AND THEN CLEAR MEMORY

PROCEED TO
NEXT

15. 3.SYMPTOM CONFIRMATION

Result

RESULT	PROCEED TO
No symptoms exist	Go to step 4
Symptoms exist	Go to step 5

16. 4.SIMULATION TEST USING SYMPTOM SIMULATION METHODS

PROCEED TO
NEXT

17. 5.DTC CHECK

Result

RESULT	PROCEED TO
DTC is not output	GO TO STEP 6
DTC is output	TROUBLESHOOTING OF PROBLEM INDICATED BY DTC

18. 6.SYMPTOM CONFIRMATION

Result

Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RUH0
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 - 08/2019]
Title: AUDIO / VIDEO: AUDIO AND VISUAL SYSTEM: OPERATION CHECK; 2016 - 2019 MY 4Runner [08/2015 - 08/2019]		

OPERATION CHECK

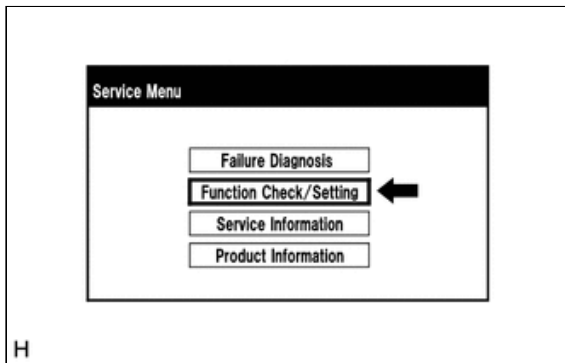
1. CHECK PANEL & STEERING SWITCH

HINT:

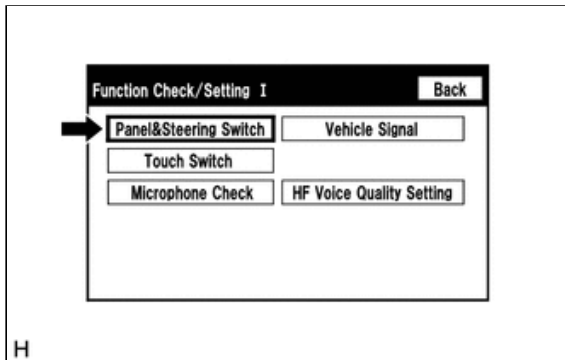
- The radio and display receiver assembly panel switches and steering switches are checked in the following procedure.
- Illustrations may differ from the actual vehicle screen depending on the device settings and options. Therefore, some detailed areas may not be shown exactly the same as on the actual vehicle screen.

(a) Enter diagnostic mode (See page [INFO](#)).

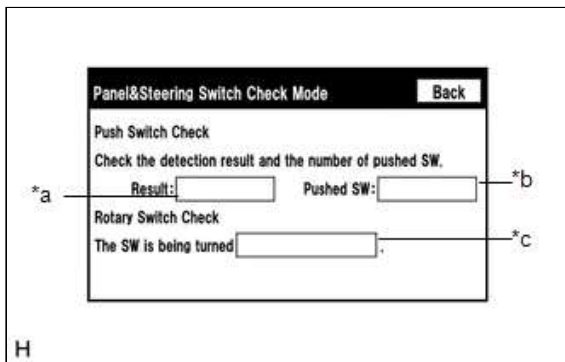
(b) Select "Function Check/Setting" from the "Service Menu" screen.



(c) Select "Panel & Steering Switch" from the "Function Check/Setting I" screen.



(d) Panel & Steering Switch Check Mode



Screen Description

DISPLAY	CONTENT
*a: Switch condition	"Pushed" is displayed when any switch is pushed

Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RULT
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 - 08/2019]
Title: PARK ASSIST / MONITORING: REAR VIEW MONITOR SYSTEM (for Radio and Display Type): SYSTEM DESCRIPTION; 2016 - 2019 MY 4Runner [08/2015 - 08/2019]		

SYSTEM DESCRIPTION

1. GENERAL

- (a) To assist the driver with parking the vehicle by displaying an image of the area behind the vehicle, this system has a rear television camera assembly mounted on the back door. The system displays the image on the radio and display receiver assembly.
- (b) This system consists of the following components:
- (1) Radio and display receiver assembly
 - (2) Rear television camera assembly
 - (3) Park/neutral position switch assembly

2. FUNCTION OF COMPONENTS

- (a) The radio and display receiver assembly controls the system by using information from the rear television camera assembly and park/neutral position switch assembly.

ITEM	FUNCTION
Rear Television Camera Assembly	<ul style="list-style-type: none"> • Mounted on the back door to transmit an image of the area behind the vehicle to the radio and display receiver assembly. • Has a color video camera that uses a CMOS (Complementary Metal Oxide Semiconductor) and wide-angle lens.
Radio and Display Receiver Assembly	<ul style="list-style-type: none"> • Receives video signals, which contain an image of the area behind the vehicle taken with the rear television camera assembly. • Performs control of the system by receiving a shift position signal from the park/neutral position switch assembly. • Displays the rear view monitor image on the display panel.
Park/Neutral Position Switch Assembly	Transmits a reverse signal to the radio and display receiver assembly.

3. OPERATION EXPLANATION

- (a) The radio and display receiver assembly receives the reverse signal from the park/neutral position switch assembly when the shift lever is moved to R. After receiving the reverse signal, the radio and display receiver assembly switches to the rear view monitor system.

4. NOTES FOR REAR VIEW MONITOR

- (a) Notes for the rear view monitor.
- (1) The rear view monitor may not function properly if the camera is subjected to a severe blow by any hard object.
 - (2) Do not "scrub" the camera because it is made of resin. Scrubbing it may scratch the camera and affect the image. Prevent organic solvents, waxes, bond removing solvents, or glass coating from adhering to the camera. If anything adheres to the camera, clean it off immediately and wash it with water.
 - (3) Exposing the camera to a sudden temperature change may affect proper functioning of the camera.
 - (4) A clear image may not appear if the camera is dirty with snow, mud, etc. In that case, wash it with water and wipe off the lens. Use a detergent to remove dirt if necessary.
- (b) Images are difficult to discern even in normal conditions if:
- (1) The camera lens is dirty with snow, mud and etc.
 - (2) The vehicle is tilted at a steep angle.
 - (3) The camera lens is frosted over (the image immediately after turning the ignition switch to ON may be blurred or darker than normal).
 - (4) A strong beam of light, such as a sunbeam or headlight, hits the camera.

Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RTUB
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 - 08/2019]
Title: A750E (AUTOMATIC TRANSMISSION / TRANSAXLE): AUTOMATIC TRANSMISSION SYSTEM: DTC CHECK / CLEAR; 2016 - 2019 MY 4Runner [08/2015 - 08/2019]		

DTC CHECK / CLEAR

NOTICE:

When the diagnosis system is changed from normal mode to check mode or vice versa, all DTCs and freeze frame data recorded in normal mode are cleared. Before changing modes, always check and make a note of DTCs and freeze frame data.

HINT:

- DTCs which are stored in the ECM can be displayed on the Techstream. The Techstream can display the current, pending and permanent DTCs.
- If a malfunction is detected during the current driving cycle, current and permanent DTCs are stored.
- Some DTCs are not stored if the ECM does not detect the same malfunction again during a second consecutive driving cycle. However, such malfunctions, detected on only one occasion, are stored as pending DTCs.
- Current and pending DTCs can be cleared by using the Techstream or by disconnecting the cable from the negative battery terminal. However, permanent DTCs cannot be cleared using either of these two methods.
- After clearing current DTCs using the Techstream (or by disconnecting the cable from the negative battery terminal), permanent DTCs can be cleared when the system is determined to be normal for the relevant DTCs and then the universal trip is performed.

2-trip Detection Examples

Pending DTC	Store condition	Malfunction detected
	Clear condition	System determined to be normal or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Current DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	No malfunctions in 40 driving cycles or DTCs cleared using Techstream or Cable disconnected from negative battery terminal
Permanent DTC	Store condition	Malfunction detected (2nd trip)
	Clear condition	Ignition switch turned to ON after no malfunction detected in 3 consecutive driving cycles or After DTCs cleared using Techstream or cable disconnected from negative battery terminal, malfunction not detected when universal trip driving performed
MIL	ON	Malfunction detected (2nd trip)
	OFF	Ignition switch turned to ON after no malfunction detected in 3 consecutive driving cycles or DTCs cleared using Techstream or Cable disconnected from negative battery terminal

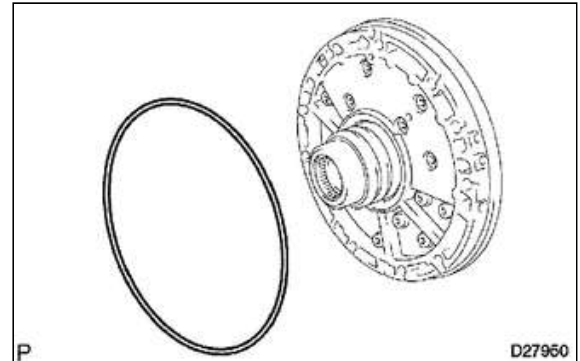
Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RTSG
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 -]
Title: A750E (AUTOMATIC TRANSMISSION / TRANSAXLE): OIL PUMP: DISASSEMBLY; 2016 - 2020 MY 4Runner [08/2015 -]		

DISASSEMBLY

PROCEDURE

1. REMOVE AUTOMATIC TRANSMISSION CASE O-RING

(a) Remove the O-ring from the oil pump assembly.

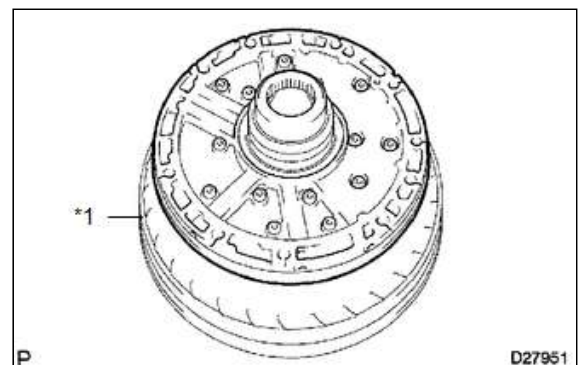


2. FIX OIL PUMP ASSEMBLY

(a) Place the oil pump body on the torque converter clutch.

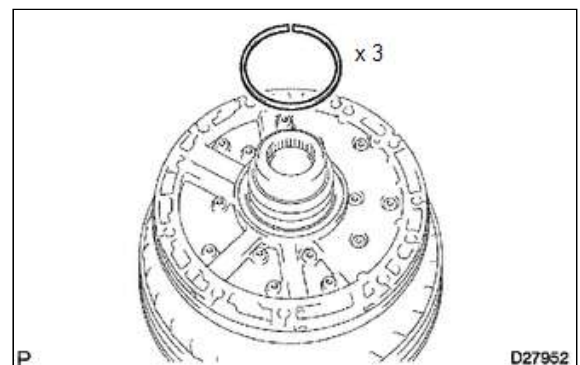
Text in Illustration

*1	Torque Converter Clutch
----	-------------------------



3. REMOVE CLUTCH DRUM OIL SEAL RING

(a) Remove the 3 oil seal rings.



4. REMOVE STATOR SHAFT ASSEMBLY

(c) Press the direct clutch piston into the clutch drum with both hands.

NOTICE:

Be careful not to damage the O-rings.

(d) Place SST on the direct clutch piston and compress the return spring with a press.

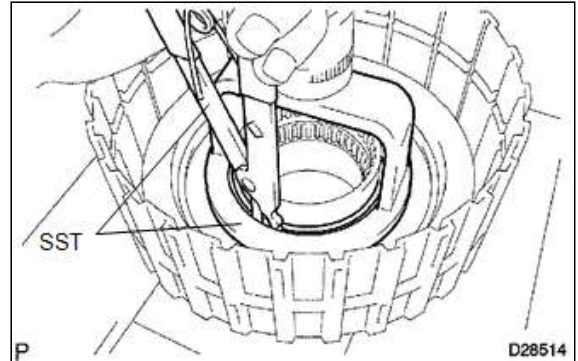
SST: 09320-89010

SST: 09350-30020

09350-07070

NOTICE:

Stop pressing when the spring sheet is lowered to a position 1 to 2 mm (0.039 to 0.078 in.) from the snap ring groove to prevent the spring sheet from being deformed.



(e) Install the snap ring with a snap ring expander.

NOTICE:

Do not expand the snap ring excessively.

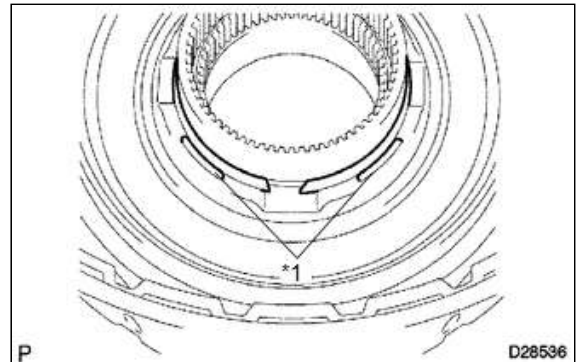
(f) Position the end gap of the snap ring as shown in the illustration

Text in Illustration

*1	Stopper
----	---------

NOTICE:

Make sure the end gap of the snap ring is not aligned with the spring retainer claw.

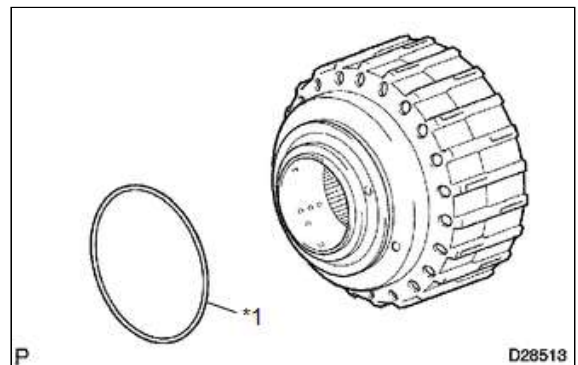


31. INSTALL REVERSE CLUTCH PISTON SUB-ASSEMBLY

(a) Coat a new O-ring with ATF and install it to the clutch drum.

Text in Illustration

*1	New O-Ring
----	------------



(b) Coat a new O-ring with ATF and install it to the reverse clutch piston.

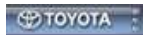
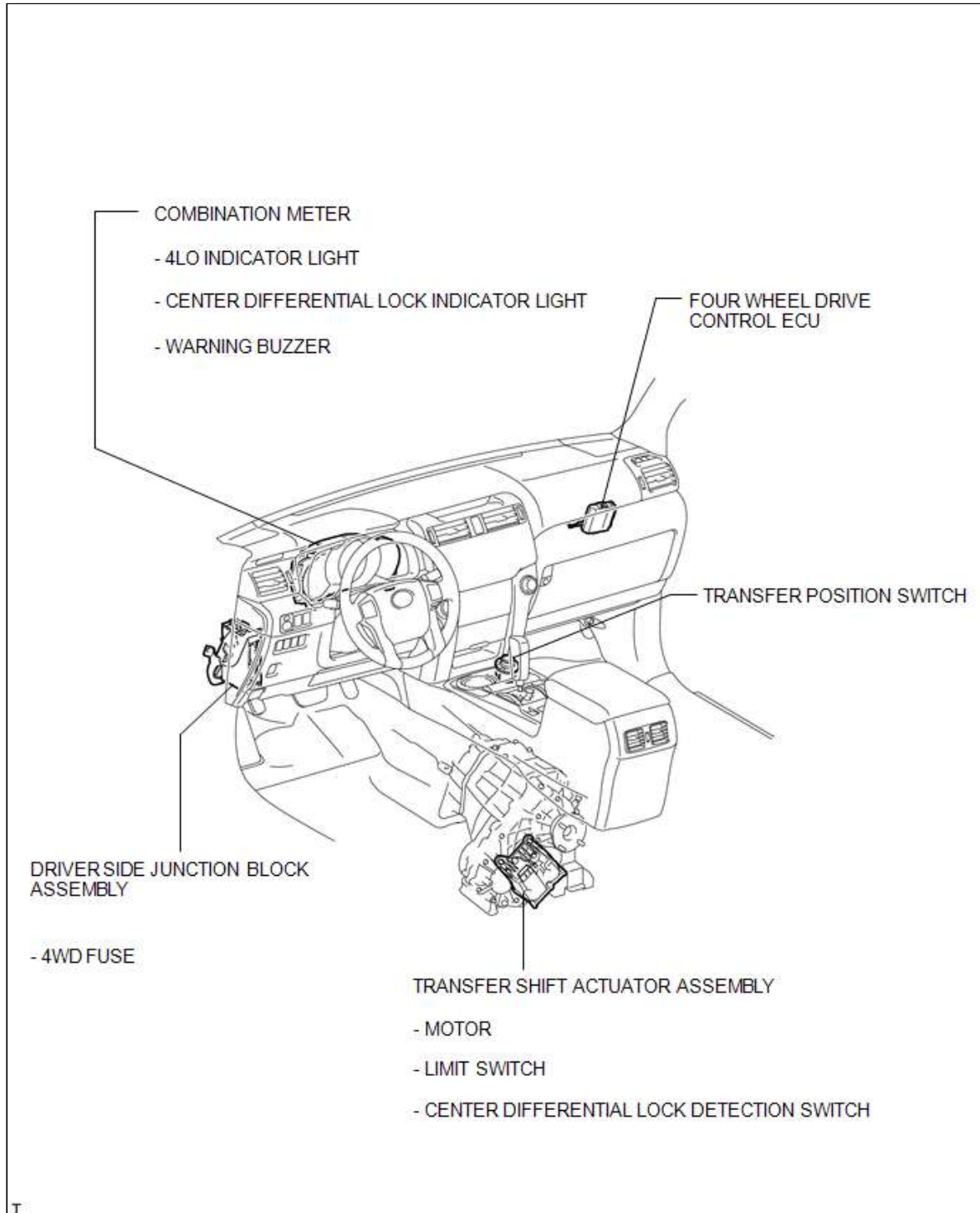
Text in Illustration

*1	New O-Ring
----	------------

Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RTXG
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 - 08/2019]
Title: VF4BM (TRANSFER / 4WD / AWD): TRANSFER SYSTEM: PARTS LOCATION; 2016 - 2019 MY 4Runner [08/2015 - 08/2019]		

PARTS LOCATION

ILLUSTRATION



Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RTIM
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 - 08/2019]
Title: 1GR-FE (ENGINE CONTROL): SFI SYSTEM: PROBLEM SYMPTOMS TABLE; 2016 - 2019 MY 4Runner [08/2015 - 08/2019]		

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

SFI System

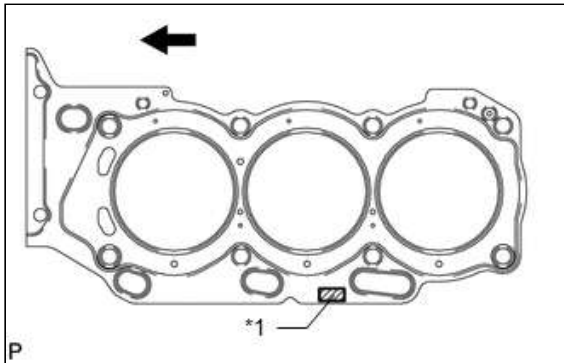
SYMPTOM	SUSPECTED AREA	SEE PAGE
Engine does not crank (Does not start)	Battery	INFO
	Starter relay (ST)	INFO
	Starter assembly	INFO
	Start signal circuit	INFO
	VC output circuit	INFO
	Park/neutral position switch (for 2WD)	INFO
	Park/neutral position switch (for 4WD)	INFO
No initial combustion (Does not start)	Immobiliser system (w/ Smart Key System)	INFO
	Immobiliser system (w/o Smart Key System)	INFO
	ECM power source circuit	INFO
	VC output circuit	INFO
	Ignition system	INFO
	Fuel pump control circuit	INFO
	Fuel injector assembly	INFO
	Crankshaft position sensor	INFO
	Intake system	INFO
	Valve timing	INFO
	No. 1 valve rocker arm sub-assembly*	INFO
Engine cranks normally but difficult to start	ECM power source circuit	INFO
	Engine difficult to start	INFO
	Throttle body with motor assembly	INFO
	Fuel pump	INFO
	Engine coolant temperature sensor	INFO
	Fuel pump control circuit	INFO
	Ignition system	INFO
	Spark plug	INFO
	Compression	INFO
	Fuel injector assembly	INFO
	Crankshaft position sensor	INFO

*1	Seal Packing
*2	Gasket

NOTICE:

- Remove any oil from the contact surface.
- Install the cylinder head gasket within 3 minutes and tighten the bolts within 15 minutes after applying seal packing.
- Do not add engine oil within 2 hours of installation.


(c) Place the cylinder head gasket on the cylinder block surface with the front face of the Lot No. stamp upward.



NOTICE:

Make sure that the gasket is installed facing the proper direction.

Text in Illustration

*1	Lot No.
	Engine Front

6. INSTALL CYLINDER HEAD LH

(a) Place the cylinder head on the cylinder block.

NOTICE:

- Gently place the cylinder head in order not to damage the gasket with the bottom part of the head.
- Make sure that no oil is on the mounting surface of the cylinder head.

HINT:

The cylinder head bolts are tightened in 3 progressive steps.

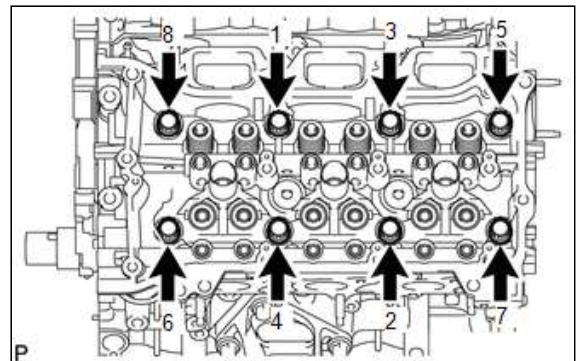
(b) Apply a light coat of engine oil to the threads and under the heads of the cylinder head bolts.

(c) Step 1:

(1) Using a 10 mm bi-hexagon wrench, install and uniformly tighten the 8 cylinder head bolts with the plate washers in several steps in the sequence shown in the illustration.

Torque:

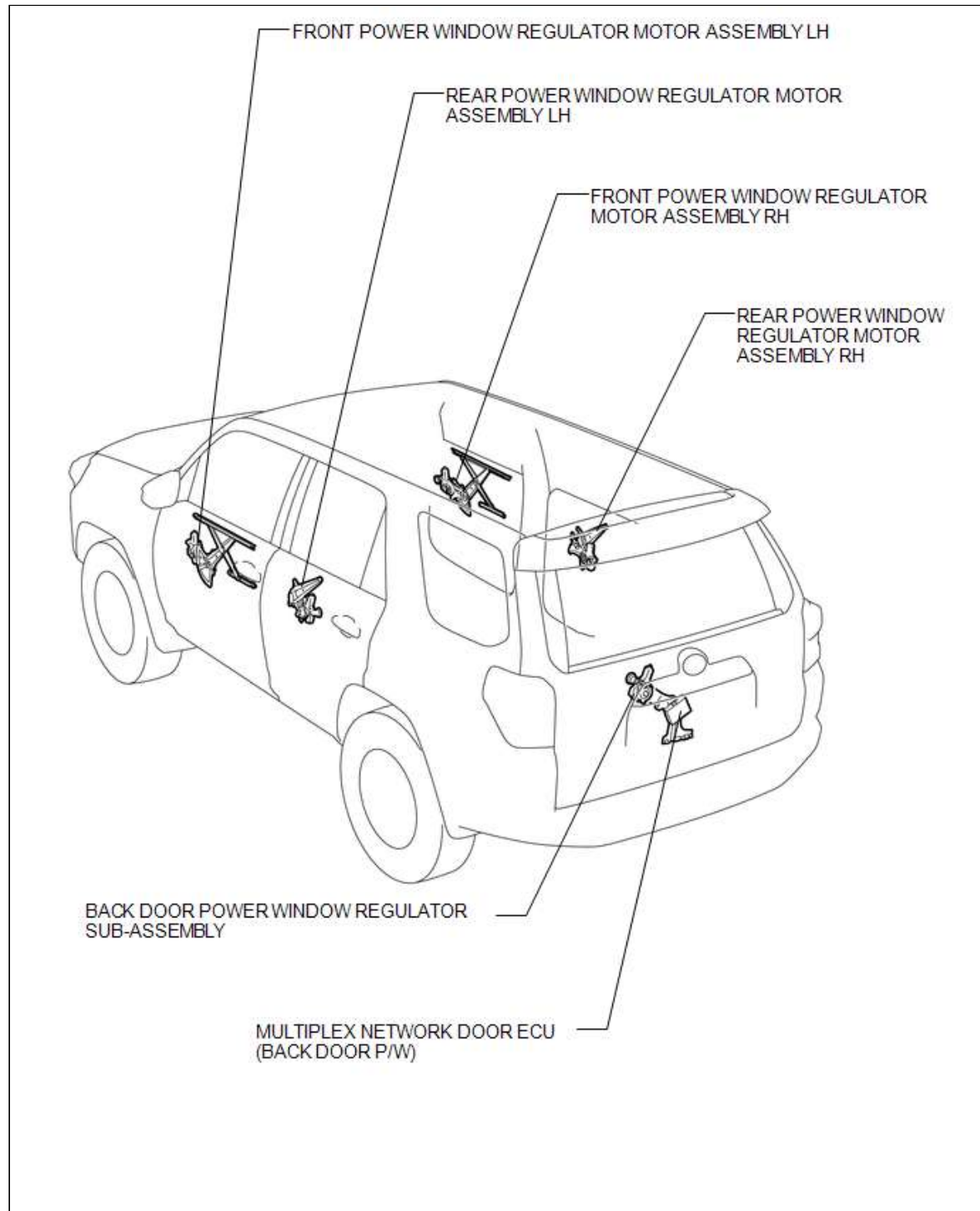
36 N·m {367 kgf·cm, 27 ft·lbf}



Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RUP1
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 - 08/2019]
Title: NETWORKING: LIN COMMUNICATION SYSTEM: PARTS LOCATION; 2016 - 2019 MY 4Runner [08/2015 - 08/2019]		

PARTS LOCATION

ILLUSTRATION

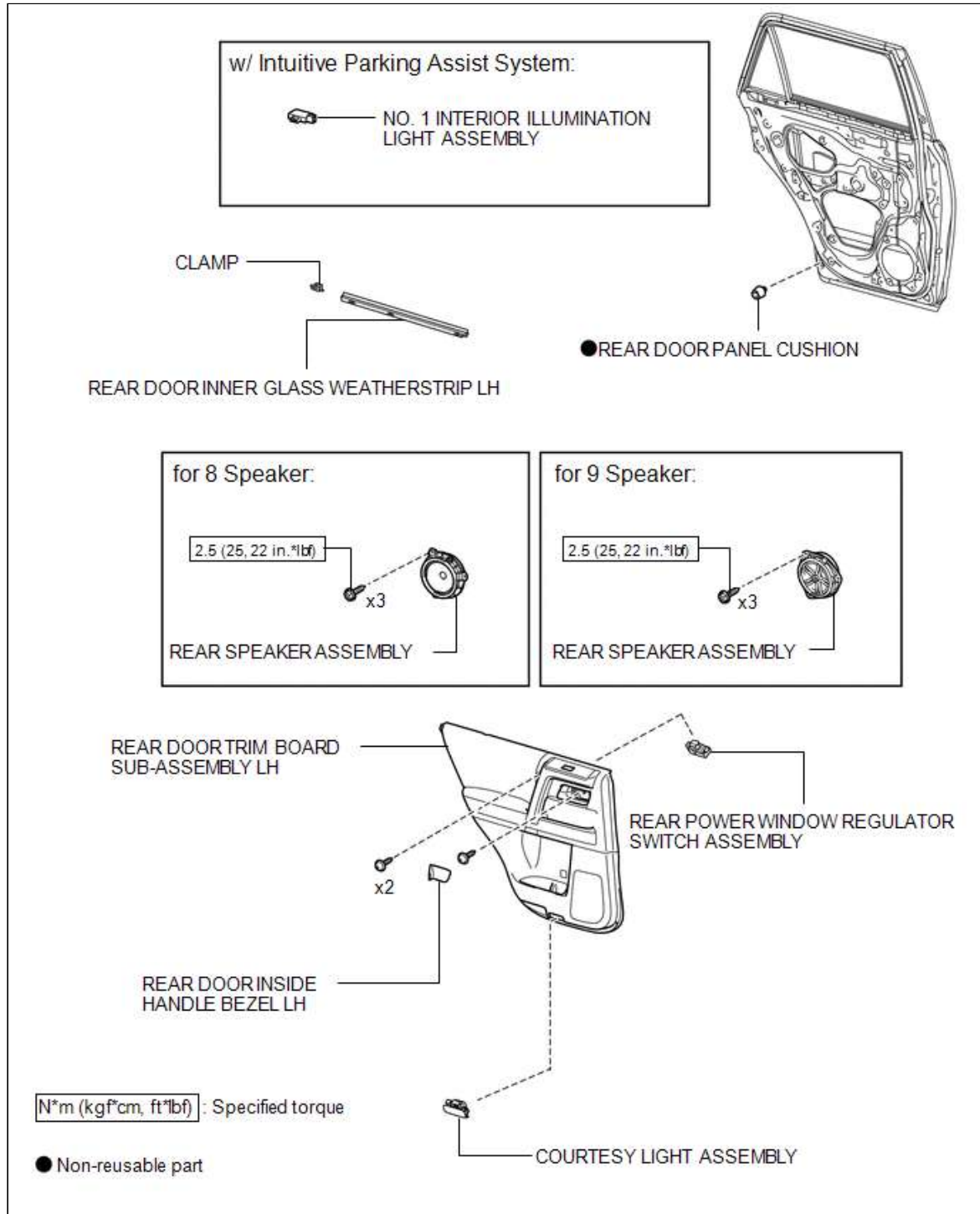


ILLUSTRATION

Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RVEY
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 -]
Title: DOOR / HATCH: REAR DOOR: COMPONENTS; 2016 - 2020 MY 4Runner [08/2015 -]		

COMPONENTS

ILLUSTRATION



ILLUSTRATION

Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RUY6
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 - 08/2019]
Title: METER / GAUGE / DISPLAY: METER / GAUGE SYSTEM: DATA LIST / ACTIVE TEST; 2016 - 2019 MY 4Runner [08/2015 - 08/2019]		

DATA LIST / ACTIVE TEST

1. DATA LIST

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- (a) Warm up the engine.
- (b) Turn the ignition switch off.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the Techstream on.
- (f) Enter the following menus:
 - (1) for Combination Meter: Body Electrical / Combination Meter / Data List
 - (2) for ABS/VSC/TRAC: Chassis / ABS/VSC/TRAC / Data List
 - (3) for Engine and ECT: Powertrain / Engine and ECT / Data List
- (g) Check the values by referring to the table below.

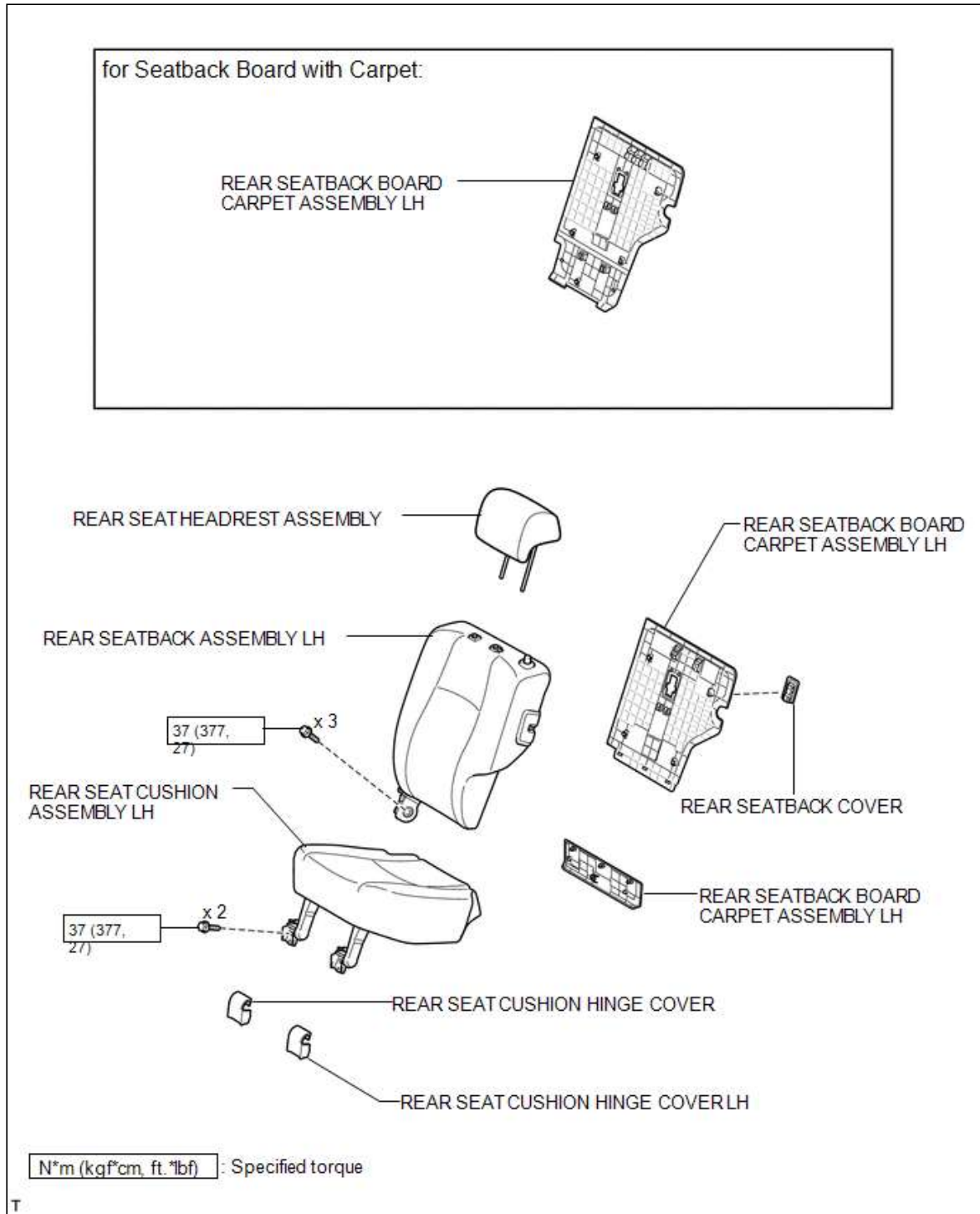
Combination Meter

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Tail Cancel SW	TAIL cancel switch condition / OFF or ON	OFF: TAIL cancel switch off ON: TAIL cancel switch on	-
ODO/TRIP Change SW	ODO/TRIP switch condition / OFF or ON	OFF: ODO/TRIP switch not pushed ON: ODO/TRIP switch pushed	-
P-Seatbelt Buckle SW	Front passenger side seat belt warning light request signal / OFF or ON	OFF: Tongue plate (for front passenger side) not inserted ON: Tongue plate (for front passenger side) inserted	-
Vehicle Speed Meter	Vehicle speed / Min.: 0 km/h (0 mph), Max.: 255 km/h (158 mph)	Almost same as actual vehicle speed (when driving)	-
Engine Rpm	Engine speed / Min.: 0 rpm, Max.: 12800 rpm	600 to 700 rpm (When idling)	-
Coolant Temperature	Engine coolant temperature / 16 to 127°C (60.8 to 260.6°F)	After warming up: 80 to 95°C (176 to 203°F)	-
Washer Switch*1	Washer fluid level warning switch / OFF or ON	OFF: Washer fluid level not low ON: Washer fluid level low	-
Multi Display Select Switch	DISP switch in the steering pad switch assembly / OFF or ON	OFF: DISP switch in the steering pad switch assembly not pressed ON: DISP switch in the steering pad switch assembly pressed	-
+B Voltage Value	Battery voltage / Min.: 0 V, Max.: 25.5 V	11 to 14 V	-

Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RV41
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 -]
Title: SEAT: REAR NO. 1 SEAT ASSEMBLY (for 60/40 Split Double-folding Seat Type LH Side): COMPONENTS; 2016 - 2020 MY 4Runner [08/2015 -]		

COMPONENTS

ILLUSTRATION



ILLUSTRATION

Last Modified: 03-17-2020	6.10:8.0.50	Doc ID: RM100000000RUVO
Model Year Start: 2016	Model: 4Runner	Prod Date Range: [08/2015 - 08/2019]
Title: THEFT DETERRENT / KEYLESS ENTRY: SMART KEY SYSTEM (for Start Function): SYSTEM DESCRIPTION; 2016 - 2019 MY 4Runner [08/2015 - 08/2019]		

SYSTEM DESCRIPTION

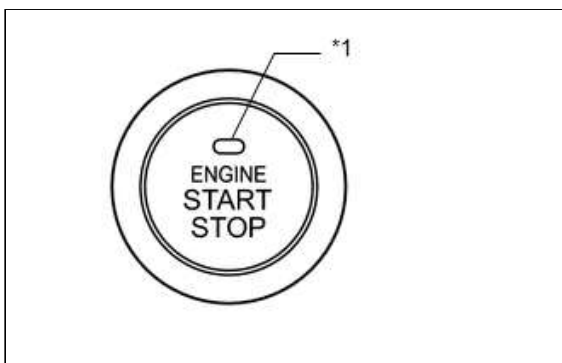
1. PUSH-BUTTON START DESCRIPTION

(a) The push-button start function uses a push-type engine switch, which the driver can operate by merely carrying the key. This system consists primarily of the power management control ECU, engine switch, ID code box, steering lock ECU, key, ACC relay, IG1 relay, IG2 relay and certification ECU. The power management control ECU controls the system. This function operates in cooperation with the smart key system.

2. FUNCTION OF COMPONENT

COMPONENT	FUNCTION
Engine switch - Transponder key amplifier	Informs the driver of a power source mode or system abnormality with the illumination state of the indicator light.
Power management control ECU	<ul style="list-style-type: none"> Changes the power source mode in 4 stages (off, on (ACC), on (IG), start). Controls the indicator light of the engine switch. Activates the starter relay.
Certification ECU	<ul style="list-style-type: none"> Performs key verification (checks whether the correct key is present). Controls the security indicator and the illumination of the lettering on the engine switch. Records ECU verification codes.
Stop light switch	Outputs the state of the brake pedal to the power management control ECU.
Park/neutral position switch	Outputs the state of the shift lever to the power management control ECU.
Shift lock control ECU	Outputs a shift lock control ECU signal to the power management control ECU.
ID code box	<ul style="list-style-type: none"> Transmits a command to set or cancel the immobiliser to the ECM based on permission signals from the certification ECU. Records ECU verification codes.
ECM	<ul style="list-style-type: none"> Receives an engine start request signal from the power management control ECU, turns on the starter relay, and starts the engine. Receives a signal from the ID code box and performs engine ignition and injection.

3. CONSTRUCTION AND OPERATION



Text in Illustration

*1	Indicator Light
----	-----------------