

SUSPENSION

Tires / Wheel System (Inspection) - Sienna

TIRE AND WHEEL SYSTEM

PRECAUTION

PRECAUTION

1. IN CASE OF REMOVAL AND INSTALLATION OF TIRE PRESSURE WARNING VALVE AND TRANSMITTER

- a. When installing a tire, make sure that the tire pressure warning valve and transmitter does not interfere with the tire bead in order to prevent damage to the tire pressure warning valve and transmitter.
- b. After completing the operation, remove the valve core to rapidly release the air in the tire and check that the warning light comes on. If the warning light does not come on, the system may be defective.
- c. If there is air leakage, tighten the nut to a torque of 4.0 N*m (41 kgf*cm, 35 in.*lbf) and push the valve core 2 or 3 times to remove any dirt attached to the valve core. If the air continues to leak, replace the grommet, washer, and nut.
- d. When installing the tire pressure warning valve and transmitter, check whether the rim, grommet, washer, and nut are clean. Use a manufacturer-specified cap.
- e. When putting air into the tire, first install the tire pressure valve straight onto the stem of the tire pressure warning valve and transmitter.

2. IN CASE OF TIRE AND WHEEL REPLACEMENT OR TIRE ROTATION

- a. If replacing a tire, be sure to check the grommet of the tire valve for damage. If the grommet is damaged, replace the grommet, washer, and nut.
- b. If replacing the tire pressure warning valve and transmitter, make sure that a new grommet and washer are used.
- c. If tires and wheels are replaced, register the transmitter ID. Refer to **REGISTRATION** .

HOW TO PROCEED WITH TROUBLESHOOTING

HOW TO PROCEED WITH TROUBLESHOOTING

1. DIAGNOSIS OF TIRE VIBRATION

- a. **TIGHTEN WHEEL NUTS**

NEXT: Go to next step

- b. **INSPECT TIRES See step 1**

NG --> Go to step 3

OK --> Go to step 4

- c. REPAIR OR REPLACE TIRE(S)**

NEXT: Go to next step

- d. INSPECT AND/OR ADJUST WHEEL BALANCE See step 3**

NEXT: Go to next step

- e. INSPECT FRONT AXLE HUB BEARING LOOSENESS AND AXLE HUB RUNOUT. Refer to ON-VEHICLE INSPECTION**

NG --> Go to step 6

OK --> Go to step 7

- f. REPAIR FRONT AXLE HUB BEARING LOOSENESS AND AXLE HUB RUNOUT. Refer to REMOVAL**

NEXT: Go to next step

- g. INSPECT REAR AXLE HUB BEARING LOOSENESS AND AXLE HUB RUNOUT. Refer to ON-VEHICLE INSPECTION**

NG --> Go to step 8

OK --> Go to step 9

- h. REPAIR REAR AXLE HUB BEARING LOOSENESS AND AXLE HUB RUNOUT. Refer to ON-VEHICLE INSPECTION**

NEXT: Go to next step

- i. PERFORM ROAD TEST**

NEXT: Go to next step

- j. RETURN VEHICLE TO CUSTOMER**

2. DIAGNOSIS OF IRREGULAR TIRE WEAR

- a. INSPECT TIRES See step 1**

NEXT: Go to next step

- b. REPAIR OR REPLACE TIRE(S)**

NEXT: Go to next step

- c. **INSPECT AND/OR ADJUST FRONT WHEEL ALIGNMENT. Refer to ADJUSTMENT**

NEXT: Go to next step

- d. **INSPECT REAR WHEEL ALIGNMENT. Refer to INSPECTION**

NEXT: Go to next step

- e. **PERFORM ROAD TEST**

NEXT: Go to next step

- f. **RETURN VEHICLE TO CUSTOMER**

INSPECTION

INSPECTION

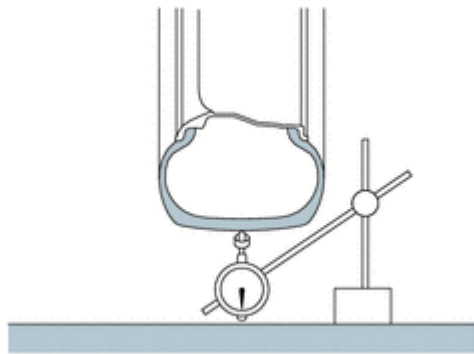
1. INSPECT TIRES

- a. Check the tires for wear and proper inflation pressure.

Cold Tire Inflation Pressure

Tire Size	Front kPa (kgf/cm², psi)	Rear kPa (kgf/cm², psi)
P235/60R17 100T		
P235/55R18 99V	240 (2.4, 35)	240 (2.4, 35)
P235/55RF18 99T		
P235/50R19 99V	250 (2.5, 36)	250 (2.5, 36)

- b. Using a dial indicator, check the runout of the tires.



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Fig. 1: Checking Runout Of Tires

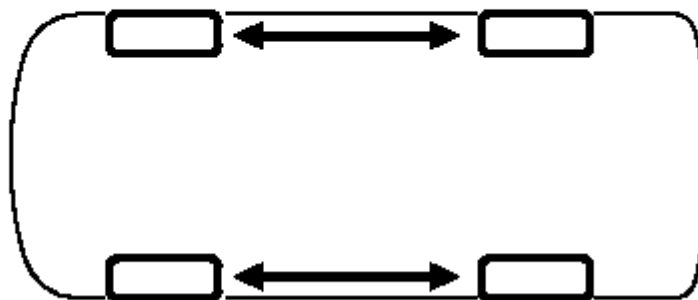
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Maximum tire runout

1.4 mm (0.0551 in.)

2. ROTATE TIRES

- a. Rotate the tires as shown in the illustration.



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Fig. 2: Identifying Tire Rotation

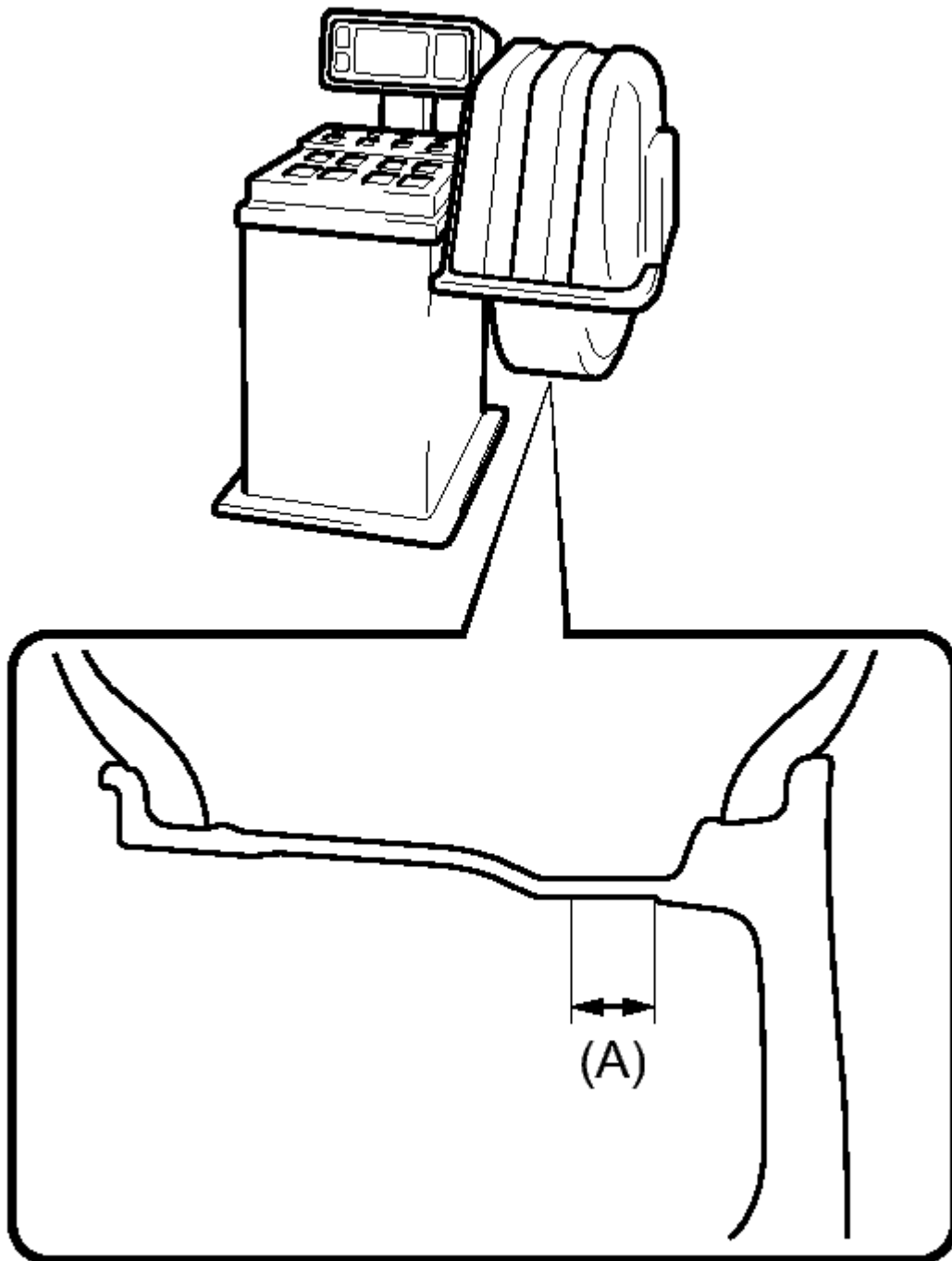
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a Front

3. INSPECT WHEEL BALANCE

- a. Check and adjust the off-the-car balance.



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Fig. 3: Inspecting Wheel Balance

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Maximum wheel imbalance after adjustment

8.0 g (0.0176 lb)

NOTE:

- Use a cleaning detergent to remove dirt, oil and water from the surface where the balance weight is to be adhered.
- Do not touch the sticking surface of the tape.
- Adhere a sticking type balance weight to the flat surface (A) shown in the illustration.

Width (A)

25 mm (0.984 in.)

- Push the balance weight securely with your finger to adhere it to the position.
- Do not reuse the balance weight.
- Use the TOYOTA genuine sticking type balance weights.

HINT:

The inner side balance weight should be installed by clipping it to the rim.

4. INSPECT FRONT AXLE HUB

Refer to **ON-VEHICLE INSPECTION**

5. INSPECT REAR AXLE HUB

Refer to **ON-VEHICLE INSPECTION**

REPAIR

REPAIR

1. INTRODUCTION

- a. This information introduces ways to determine whether the run-flat tire is repairable or not. Repair must be performed by following the appropriate procedures. If a flat tire occurs, it is possible to drive a maximum of 160 km (100 miles) at a speed below 90 km/h (55 mph) due to the reinforced sidewalls. However, if the customer continues to drive with low tire pressure (less than about 100 kPa (1.0 kgf/cm², 14.5 psi) and tire pressure warning light is on), the inside of the sidewall will gradually deteriorate and the run-flat performance may be reduced. Therefore, the tires may require replacement. However, there are some cases where it is possible to repair a run-flat tire using the same repair method as for normal tires. Use the following flowchart to determine if a run-flat tire is repairable.

NOTE: When performing repairs, follow the Rubber Manufacturers Association (RMA) repair procedures.

2. REPAIR PROCEDURE (CUSTOMER INTERVIEW)

- a. The tire pressure warning system can help determine the history of the tire's use. The driving conditions the tire was subjected to while the tire pressure warning light was on should be obtained from the customer. Also, make sure to ask the following questions.
 1. Was the vehicle driven at a speed over 90 km/h (55 mph) with the tire pressure warning light on?
 2. Was the vehicle driven over 160 km (100 miles) with the tire pressure warning light on?

A "Yes" response to either of the above will greatly reduce the chance of tire repairability.

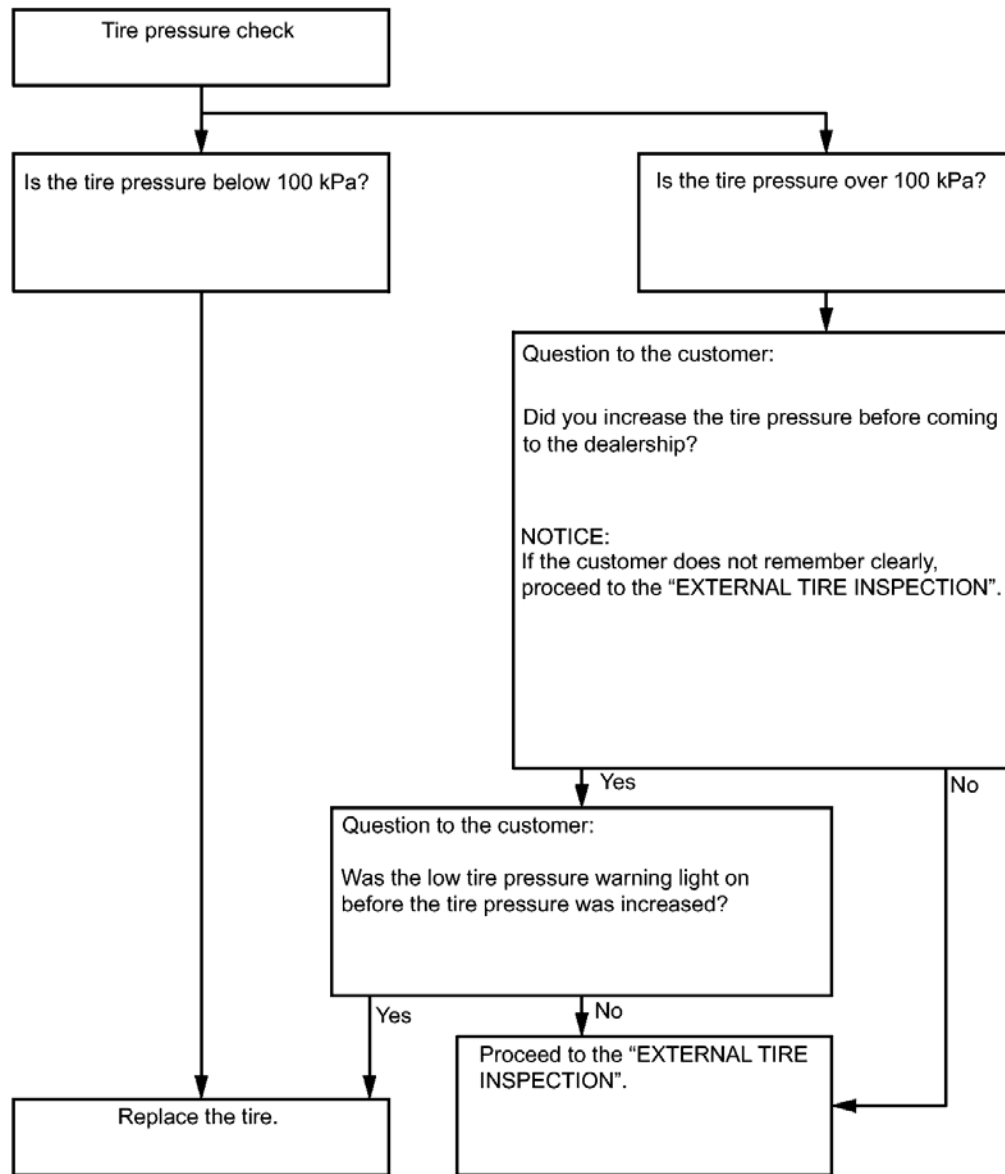
3. TECHNICIAN TIRE INSPECTION

- a. After the customer interview, it is necessary to conduct a thorough inspection of the tire after it has been removed from the wheel. As it is difficult to identify a tire with low pressure visually, check the pressure of each tire to determine the tire(s) causing the low-pressure warning. If the tire is found to be repairable, follow the RMA repair procedures.

WARNING: The deflated tire may be extremely hot, which may cause injury, so allow the tire to cool prior to handling.

4. TIRE PRESSURE INSPECTION

- a. Inspection procedure



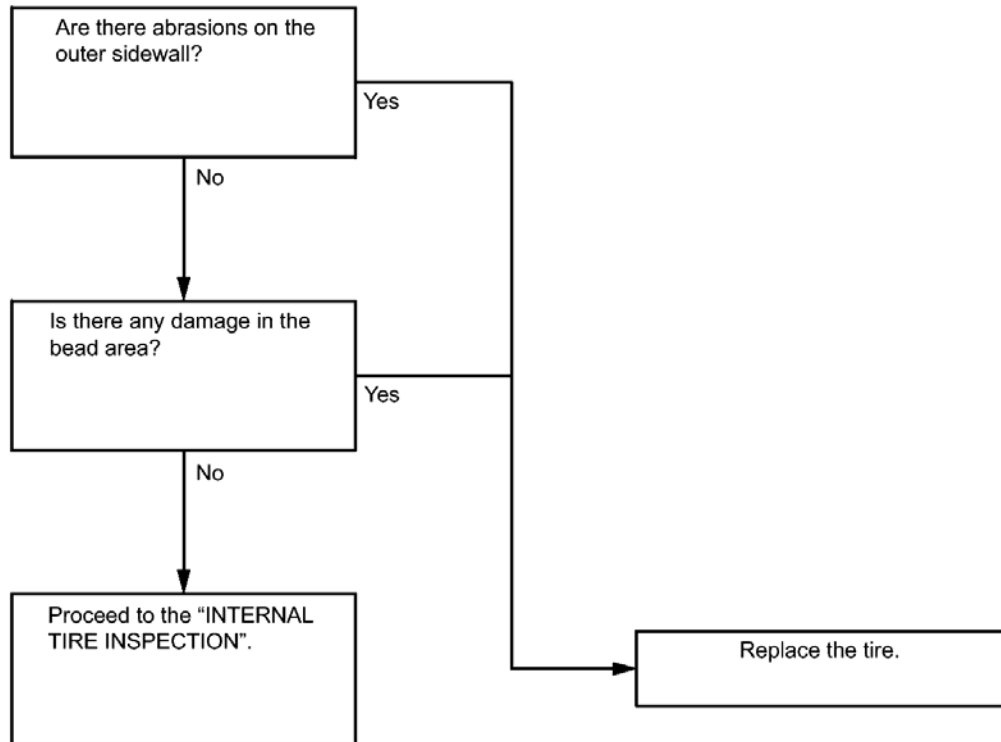
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Fig. 4: Tire Pressure Flow Chart

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

5. EXTERNAL TIRE INSPECTION

a. Inspection procedure

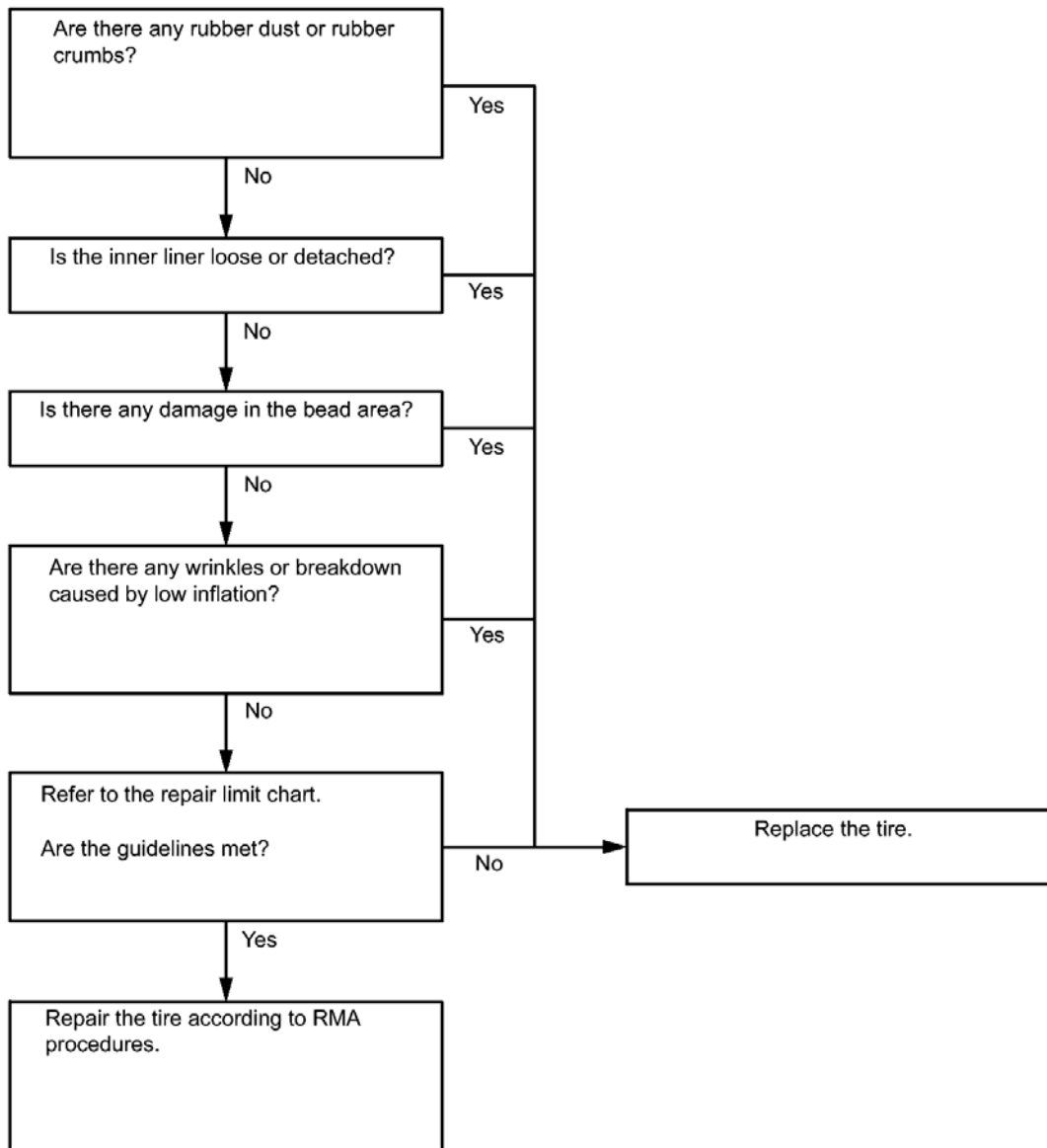


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Fig. 5: External Tire Pressure Inspection Flow Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

6. INTERNAL TIRE INSPECTION

- a. Inspection procedure

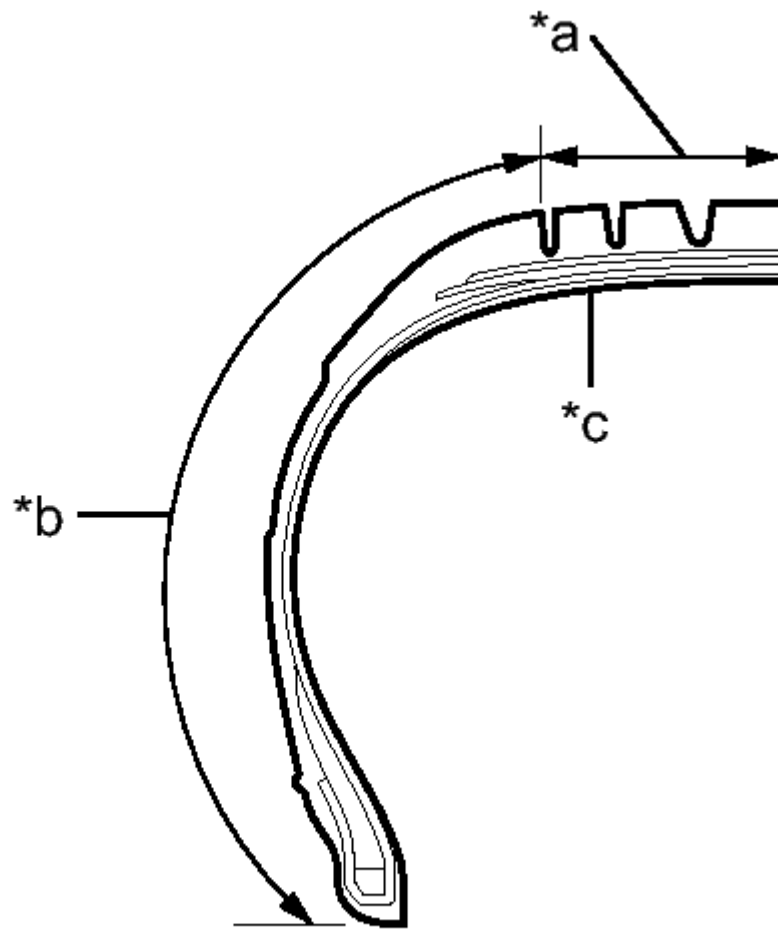


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Fig. 6: Internal Tire Pressure Inspection Flow Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

7. RUN-FLAT TIRE REPAIR LIMIT CHART

- a. Tires that have a penetration in the tread area but meet the above inspection criteria may be repaired if the guidelines listed below are also met.



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Fig. 7: Identifying Run-Flat Tire Repair Limit
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	Tread Area (Repairable)
*b	Sidewall Area (Not Repairable)
*c	Tire Contour

Puncture Condition (Tread Area Only)

		Distance
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Diameter (Maximum)	Number (Maximum)	between holes (Minimum)
6.4 mm (0.25 in.)	2	406 mm (16 in.)

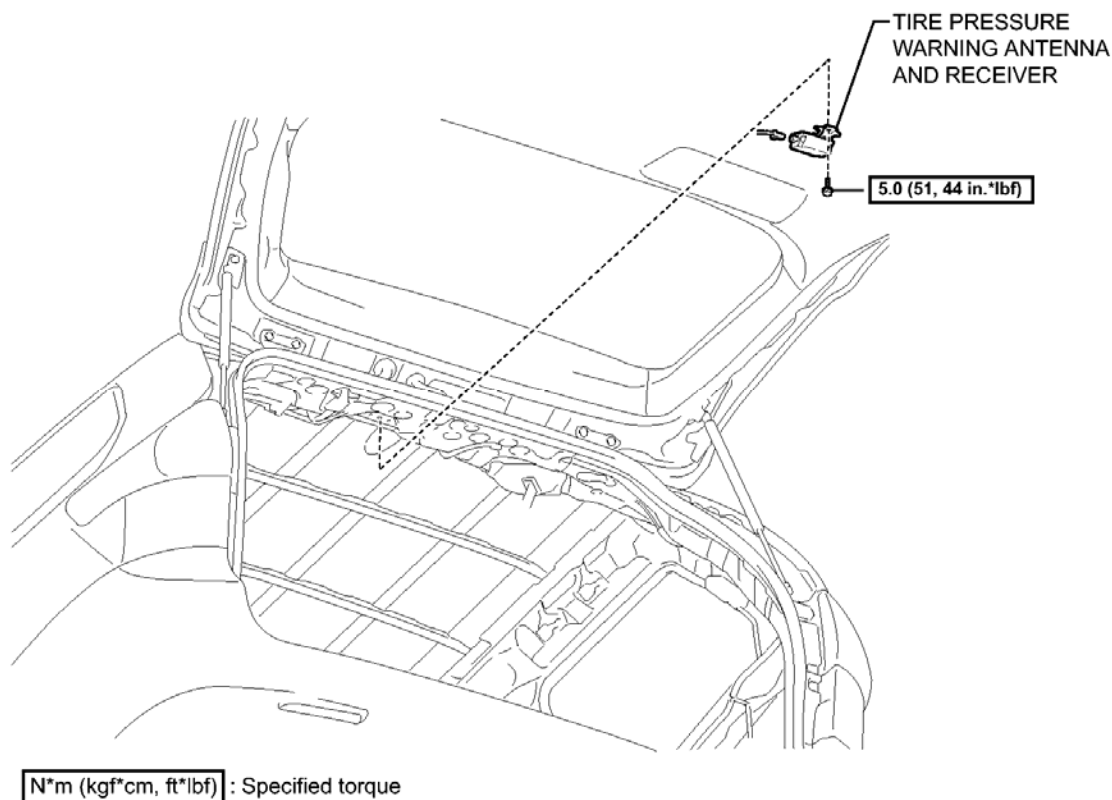
SUSPENSION

Tires / Wheel System (Service Information) - Sienna

TIRE PRESSURE WARNING RECEIVER

COMPONENTS

ILLUSTRATION



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Fig. 1: Tire Pressure Warning Receiver Replacement Components Location With Torque Specifications
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

REMOVAL

1. REMOVE ROOF HEADLINING ASSEMBLY

Refer to **REMOVAL**

2. REMOVE TIRE PRESSURE WARNING ANTENNA AND RECEIVER

- a. Disconnect the tire pressure warning antenna and receiver connector.

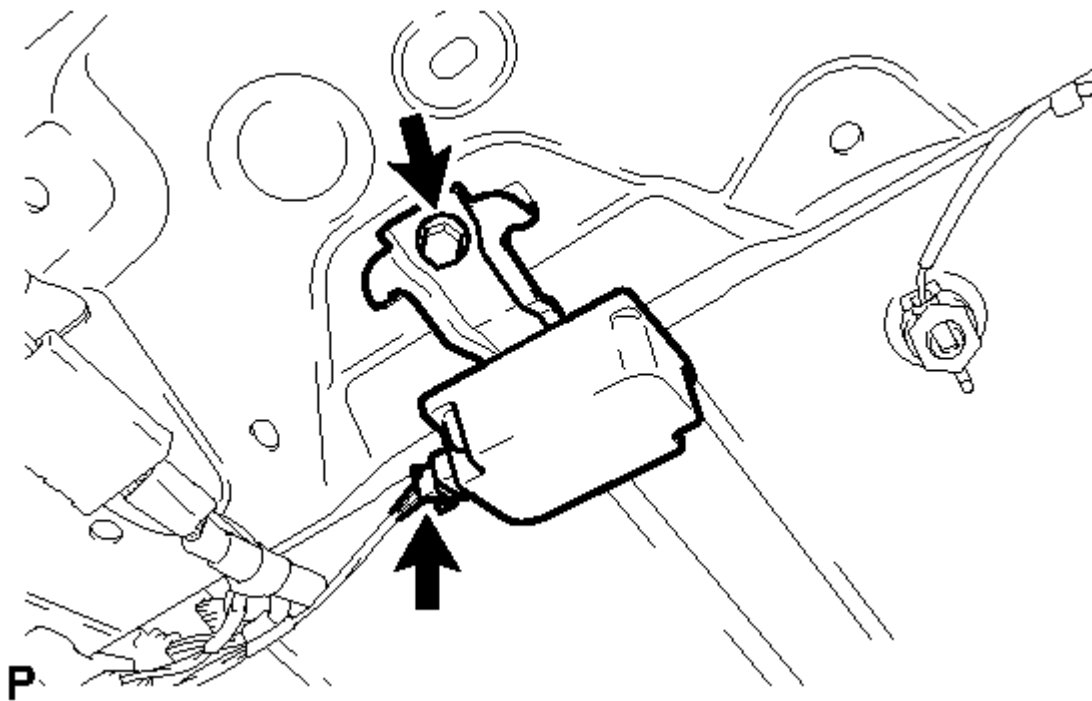


Fig. 2: Identifying Tire Pressure Warning Antenna Bolt & Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the bolt and tire pressure warning antenna and receiver.

INSTALLATION

INSTALLATION

1. INSTALL TIRE PRESSURE WARNING ANTENNA AND RECEIVER

- a. Engage the 2 tabs into the holes as shown in the illustration and install the tire pressure warning antenna and receiver.

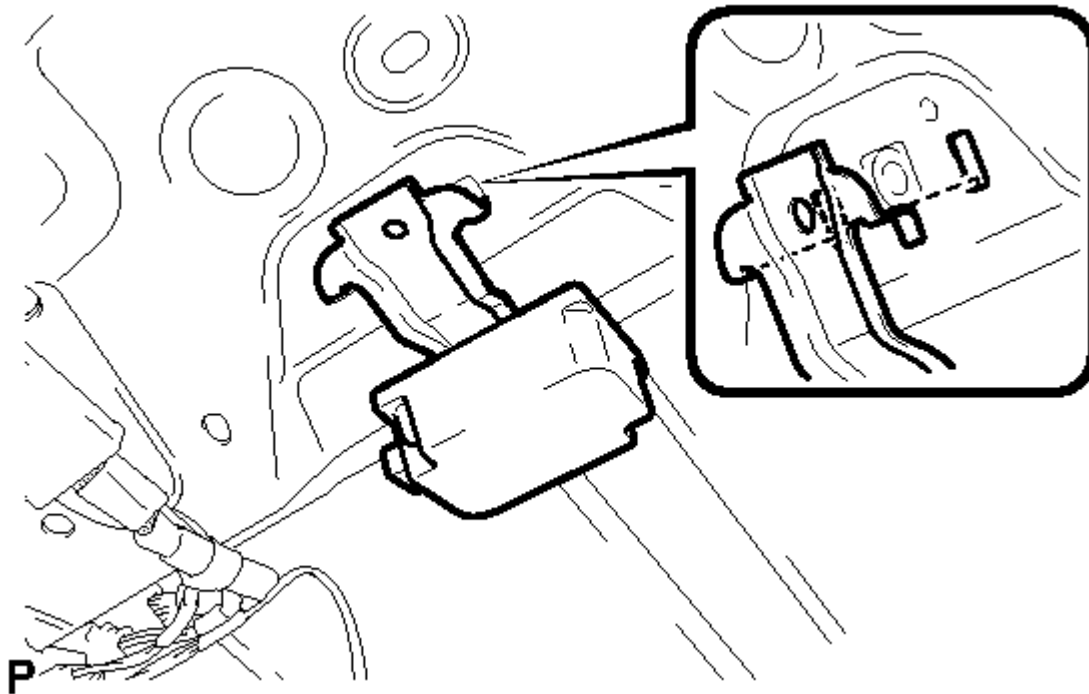


Fig. 3: Identifying Tire Pressure Warning Antenna Tabs
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Install the bolt.

Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)

- c. Connect the connector to the tire pressure warning antenna and receiver.

2. INSTALL ROOF HEADLINING ASSEMBLY

Refer to **INSTALLATION**

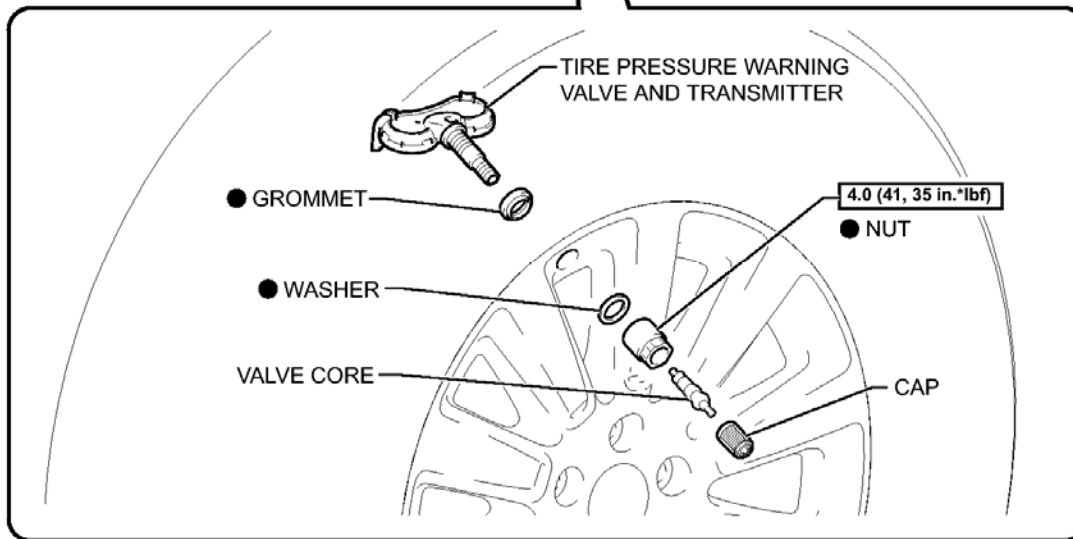
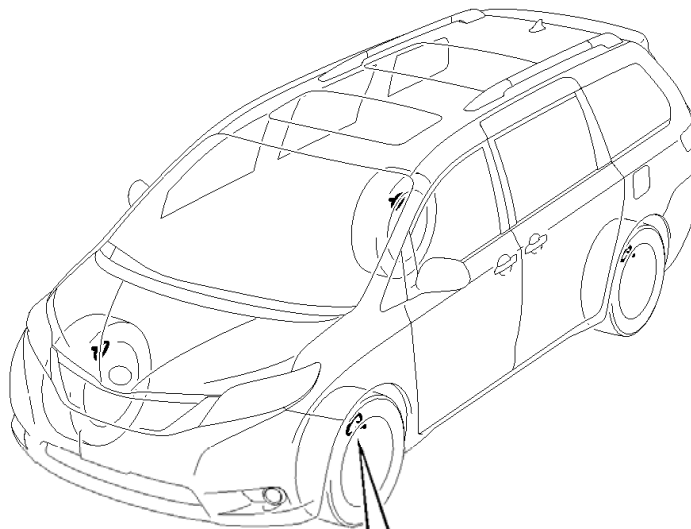
3. INSPECT TIRE PRESSURE WARNING SYSTEM

Refer to **TEST MODE PROCEDURE**

TIRE PRESSURE WARNING VALVE

COMPONENTS

ILLUSTRATION



N*m (kgf*cm, ft*lbf) : Specified torque

● Non-reusable part

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Fig. 4: Tire Pressure Warning Valve Replacement Components With Torque Specifications
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

REMOVAL

1. REMOVE FRONT WHEEL

2. REMOVE REAR WHEEL

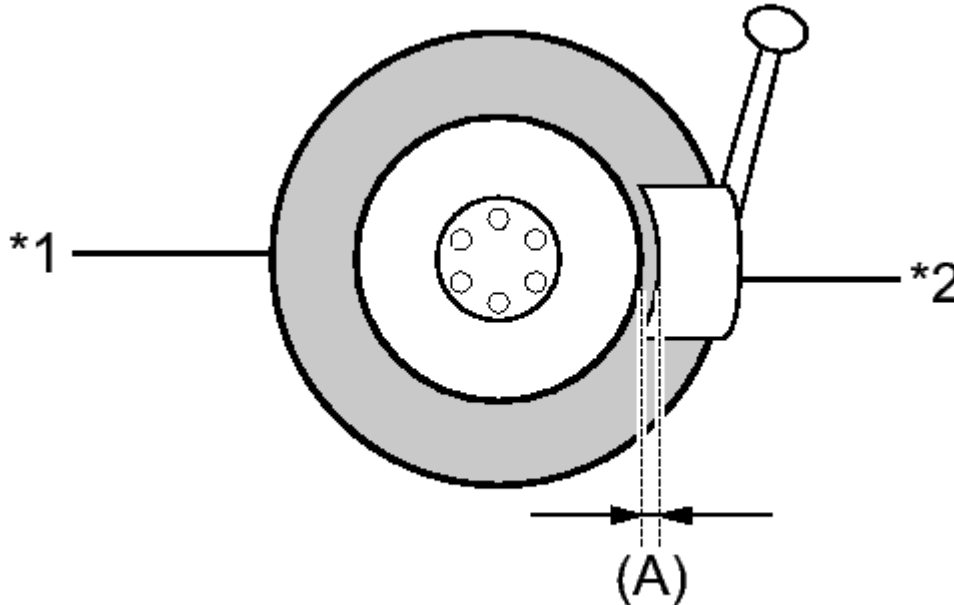
3. REMOVE TIRE PRESSURE WARNING VALVE AND TRANSMITTER

- Remove the cap and valve core, and release the air from the tire.
- After ensuring that a sufficient amount of air has been released, remove the nut and washer that are used to secure the tire pressure warning valve and transmitter. Drop the tire pressure warning valve and transmitter inside the tire.

HINT:

Keep the removed cap, valve core, nut, and washer.

- After dropping the tire pressure warning valve and transmitter into the tire, disengage the bead using the shoe of the tire remover.



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Fig. 5: Identifying Clearance Between Tire And Shoe
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*1	Tire
*2	Shoe

NOTE:

- Be careful not to damage the tire pressure warning valve and transmitter due to interference between the valve and the tire bead.
- Set the tire remover shoe as shown in the illustration.

Width (A)

10 to 20 mm (0.394 to 0.787 in.)

- d. Remove the bead on the upper side in the usual way.
- e. Take out the tire pressure warning valve and transmitter from the tire and remove the bead on the lower side in the usual way.

NOTE: **If replacing the tire pressure warning valve and transmitter, make sure that a new grommet, washer, and nut are used.**

INSTALLATION

INSTALLATION

1. INSTALL TIRE PRESSURE WARNING VALVE AND TRANSMITTER

- NOTE:**
- **Use only a specified cap. If an unspecified cap is used, it may seize to the tire pressure warning valve and transmitter.**
 - **If replacing the tire pressure warning valve and transmitter, make sure that the new grommet, washer, and nut are used.**

- a. Insert the tire pressure warning valve and transmitter into the valve installation hole. Insert it from the inside of the rim so that the printed surface can be seen.

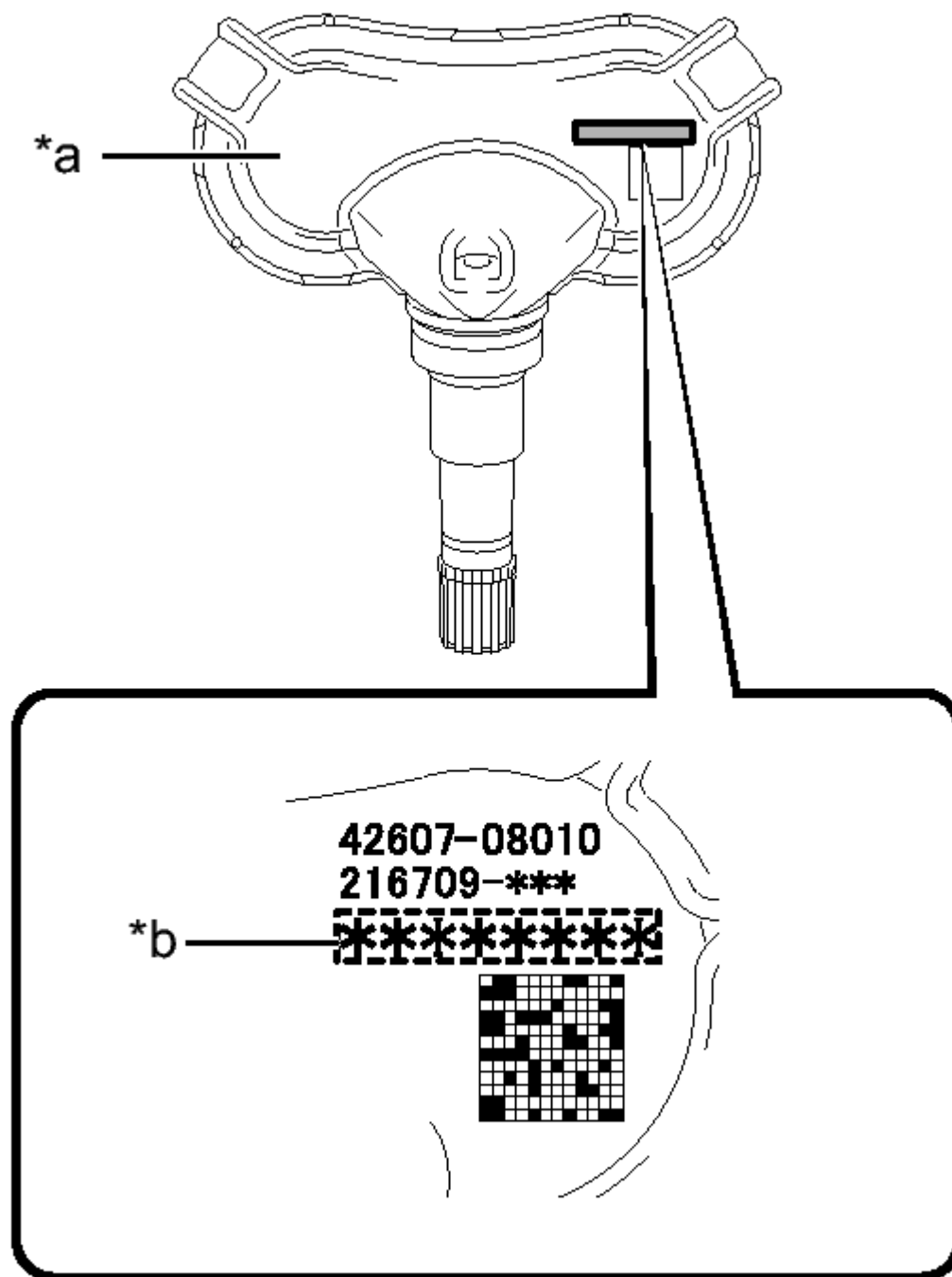


Fig. 6: Identifying Tire Pressure Warning Valve, Transmitter & Transmitter ID
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

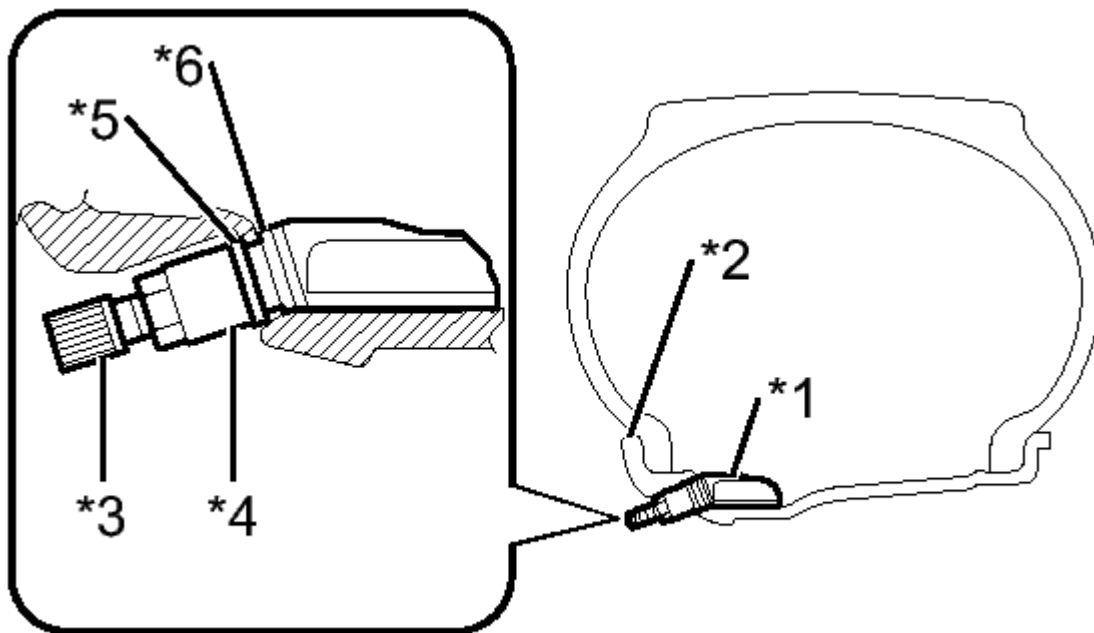
Printed

*a	Surface
*b	8-digit Number Transmitter ID

NOTE:

- Check that there is no oil, water, or lubricant around the rim hole, tire pressure warning valve and transmitter, washer, and nut. Failing to do so may result in improper installation.
- Check that there is no visible deformation, damage, or other abnormalities on the tire pressure warning valve and transmitter.
- Check that there is no foreign matter on the inner grommet and around the rim hole.
- If the tire pressure warning valve and transmitter is installed upside down, it may be damaged or fail to transmit signals when running at high speeds.
- If installing a new tire pressure warning valve and transmitter, write down the ID number before installation.
- It is necessary to register the ID in the ECU after installation. Refer to REGISTRATION .

- b. Install a new washer on the tire pressure warning valve and transmitter from the rim side and tighten a new nut.



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Fig. 7: Identifying Tire Pressure Warning Valve & Transmitter Position
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

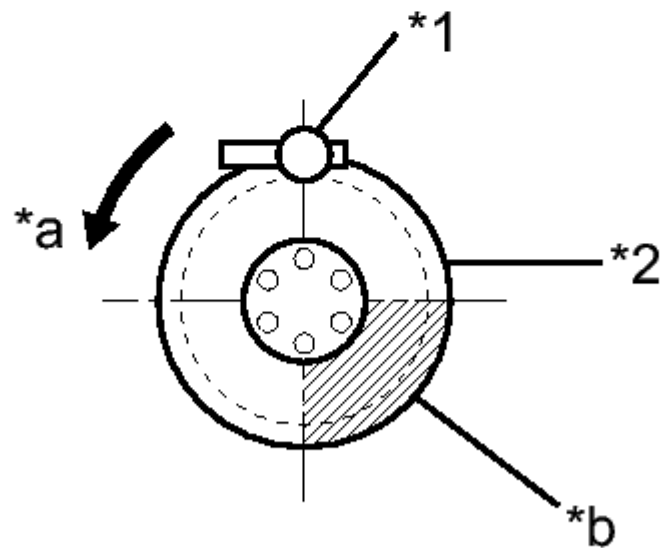
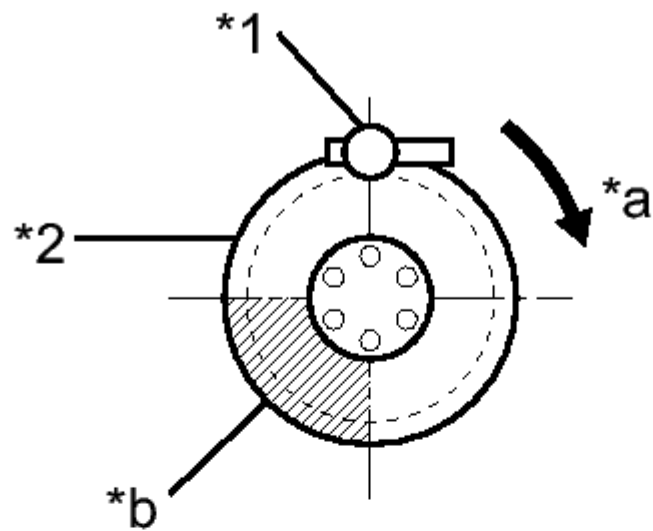
TEXT IN ILLUSTRATION

	Tire Pressure
*1	Warning Valve and Transmitter
*2	Rim
*3	Cap
*4	Nut
*5	Washer
*6	Grommet

Torque: 4.0 N*m (41 kgf*cm, 35 in.*lbf)

NOTE:

- No further tightening is required once the nut is tightened to the specified torque.
 - Check that there is no foreign matter on the washer and nut.
- c. Set the wheel disc to the mounting machine and install the lower tire bead. Position the main body of the tire pressure warning valve and transmitter in the shaded area shown in the illustration.



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Fig. 8: Setting Wheel Disc To Mounting Machine
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

Mount

*1	Tool of the Mounting Machine
*2	Rim
*a	Rim Rotating Direction
*b	Area for the Tire Pressure Warning Valve and Transmitter

NOTE:

- If the tire pressure warning valve and transmitter is positioned outside this area, it will interfere with the tire bead, and may cause damage to the tire pressure warning valve and transmitter.
- If the use of lubricant is required when installing the bead, do not apply the lubricant directly to the tire pressure warning valve and transmitter.

d. Install the upper bead.

NOTE:

Make sure that the tire bead and tool do not interfere with the main body of the tire pressure warning valve and transmitter and that it is not clamped by the bead.

e. After the tire is inflated, the valve nut may be loose. Retighten the nut to the specified torque.

Torque: 4.0 N*m (41 kgf*cm, 35 in.*lbf)

NOTE:

No further tightening is required once the nut is tightened to the specified torque.

f. Check for air leaks with soapy water.

2. INSTALL FRONT WHEEL

Torque: 103 N*m (1050 kgf*cm, 76 ft.*lbf)

3. INSTALL REAR WHEEL

Torque: 103 N*m (1050 kgf*cm, 76 ft.*lbf)

4. INSPECT TIRES . Refer to INSPECTION - Step 1

5. REGISTER TRANSMITTER ID

Refer to **REGISTRATION**

6. INSPECT TIRE PRESSURE WARNING SYSTEM

Refer to **TEST MODE PROCEDURE**

DISPOSAL

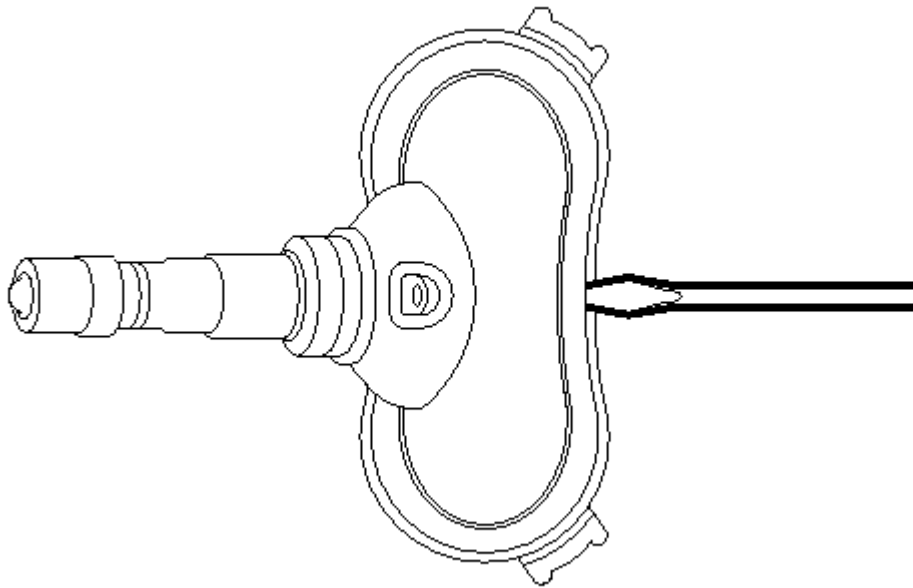
DISPOSAL

HINT:

The tire pressure warning valve and transmitter is powered by a lithium battery. When disposing of the tire pressure warning valve and transmitter, remove the battery and dispose of it correctly.

1. DISPOSE OF TIRE PRESSURE WARNING VALVE AND TRANSMITTER

- a. Use the tip of a screwdriver to pry off the back cover.

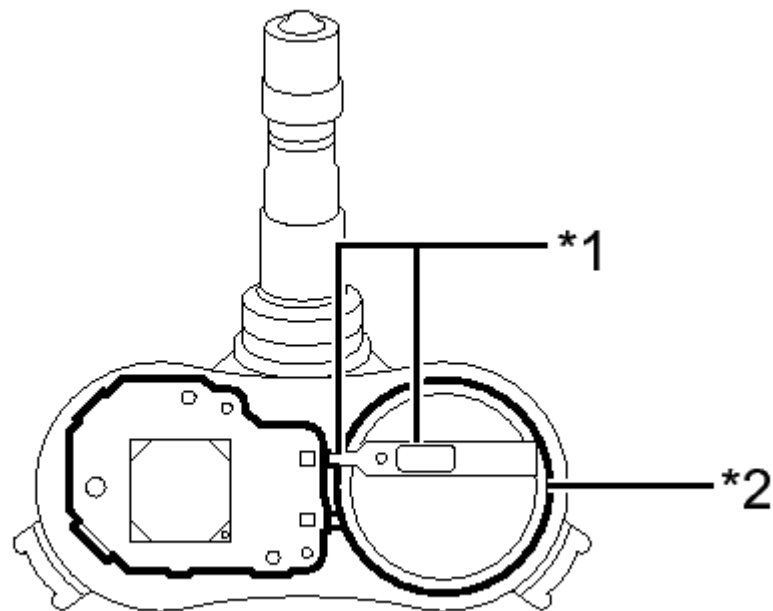


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Fig. 9: Identifying Back Cover

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. The battery and base board are exposed. While taking out the battery, cut the 2 terminals that connect the battery to the base board.



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Fig. 10: Identifying Base Board, Battery & Terminals
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

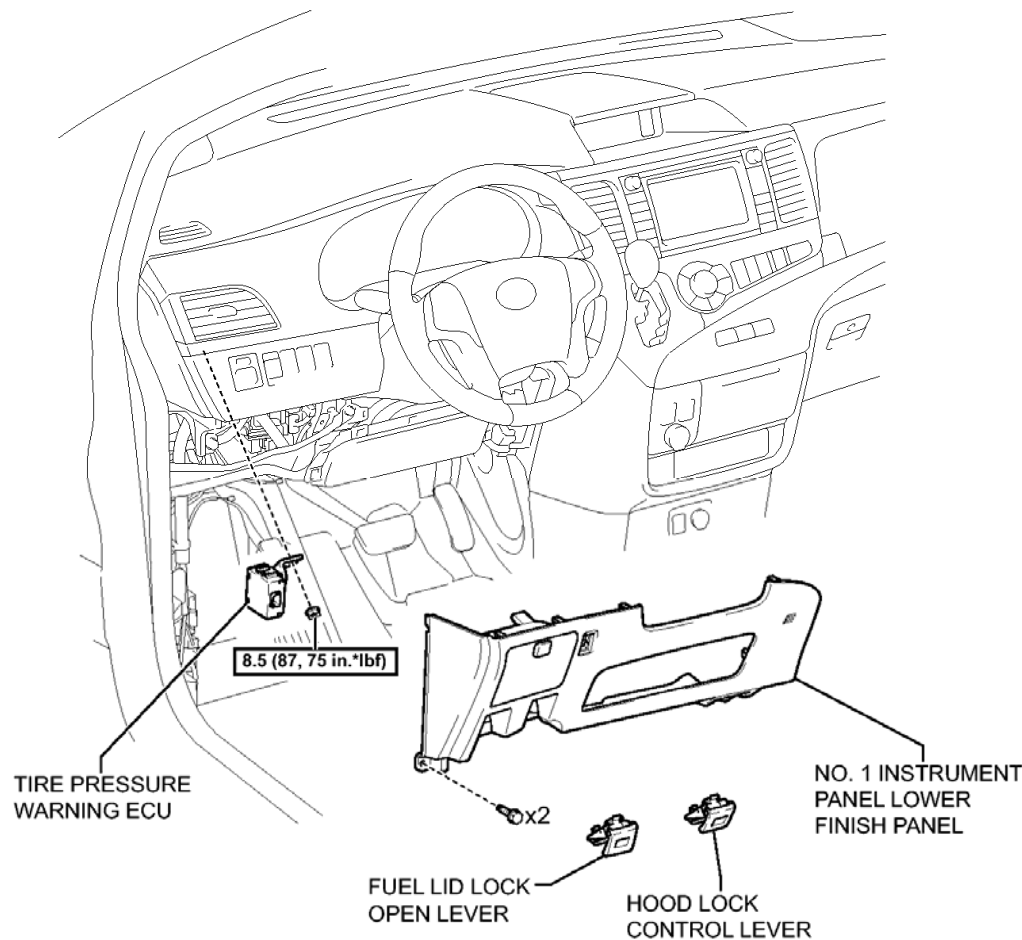
TEXT IN ILLUSTRATION

*1	Terminal
*2	Lithium Battery

TIRE PRESSURE WARNING ECU

COMPONENTS

ILLUSTRATION



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Fig. 11: Tire Pressure Warning ECU Replacement Components With Torque Specifications
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

REMOVAL

NOTE: Before removing the tire pressure warning ECU, read the registered transmitter IDs of all wheels and write them down to use for re-registration of transmitter IDs. Refer to REGISTRATION .

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTE: When disconnecting the cable, some systems need to be initialized after the cable is reconnected. Refer to INITIALIZATION .

2. REMOVE NO. 1 INSTRUMENT PANEL LOWER FINISH PANEL . Refer to REMOVAL - Step

3. REMOVE TIRE PRESSURE WARNING ECU

- a. Disconnect the tire pressure warning ECU connector.

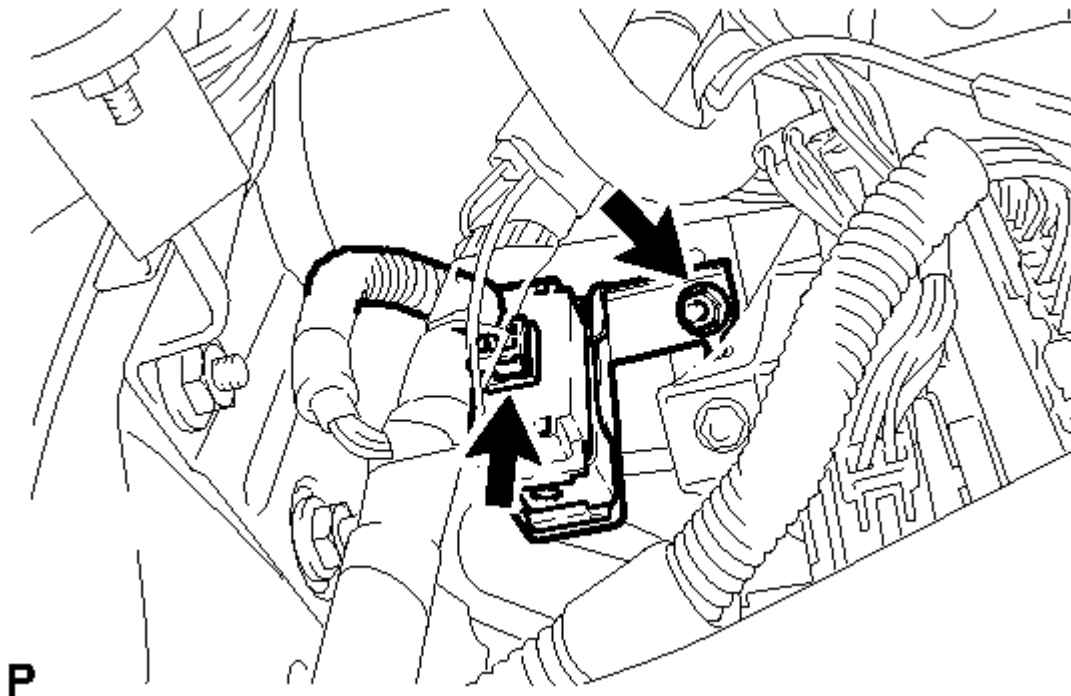


Fig. 12: Identifying Tire Pressure Warning ECU Connector & Nut
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

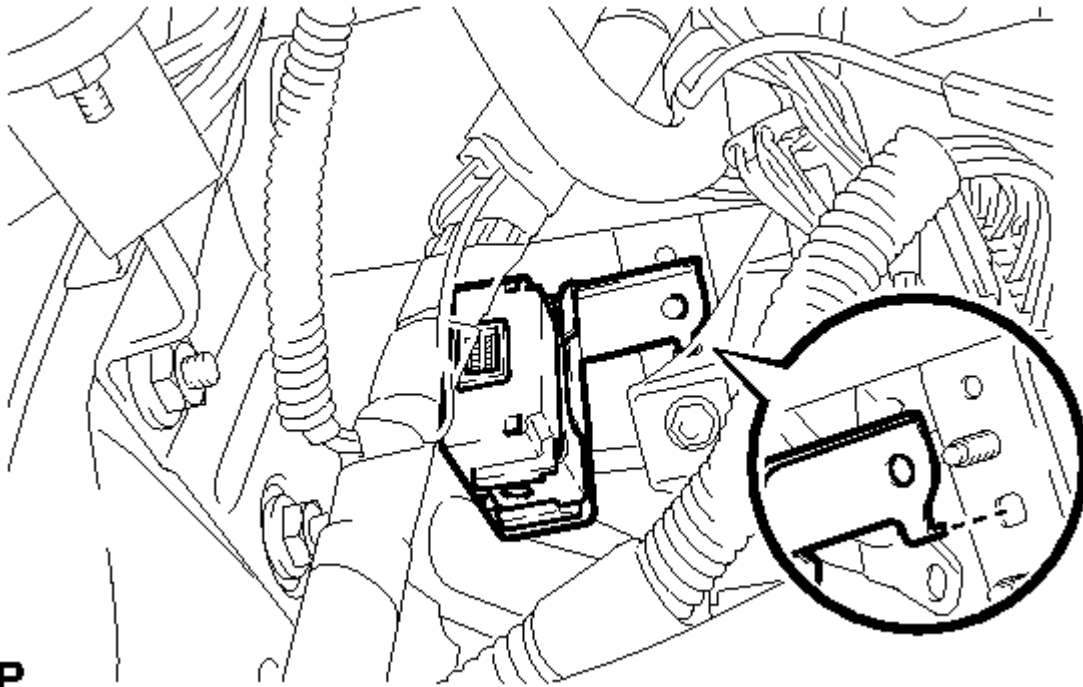
- b. Remove the nut and tire pressure warning ECU.

INSTALLATION

INSTALLATION

1. INSTALL TIRE PRESSURE WARNING ECU

- a. Engage the tab into the hole as shown in the illustration and install the tire pressure warning ECU.



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Fig. 13: Identifying Tire Pressure Warning ECU Tab
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Install the nut.

Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)

- c. Connect the connector to the tire pressure warning ECU.

2. **INSTALL NO. 1 INSTRUMENT PANEL LOWER FINISH PANEL** . Refer to **INSTALLATION - Step 39**
3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

NOTE: When disconnecting the cable, some systems need to be initialized after the cable is reconnected. Refer to **INITIALIZATION** .

4. **REGISTER TRANSMITTER ID**

Refer to **REGISTRATION**

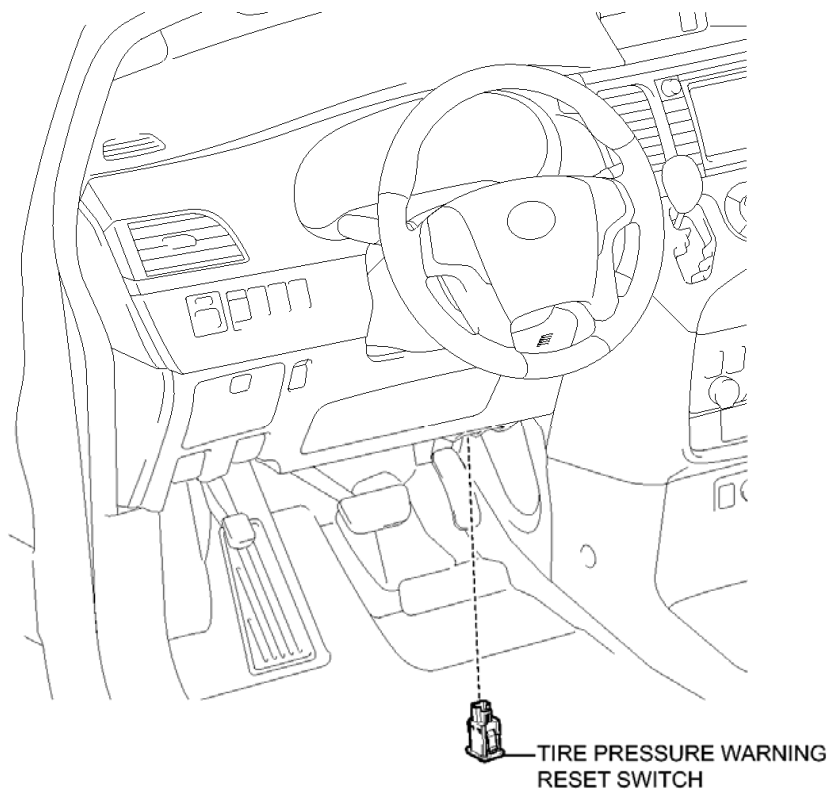
5. **INSPECT TIRE PRESSURE WARNING SYSTEM**

Refer to **TEST MODE PROCEDURE**

TIRE PRESSURE WARNING RESET SWITCH

COMPONENTS

ILLUSTRATION



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Fig. 14: Tire Pressure Warning Reset Switch Replacement Components
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

REMOVAL

1. REMOVE TIRE PRESSURE WARNING RESET SWITCH

- a. Disengage the 2 claws and remove the tire pressure warning reset switch from the instrument panel finish panel lower.

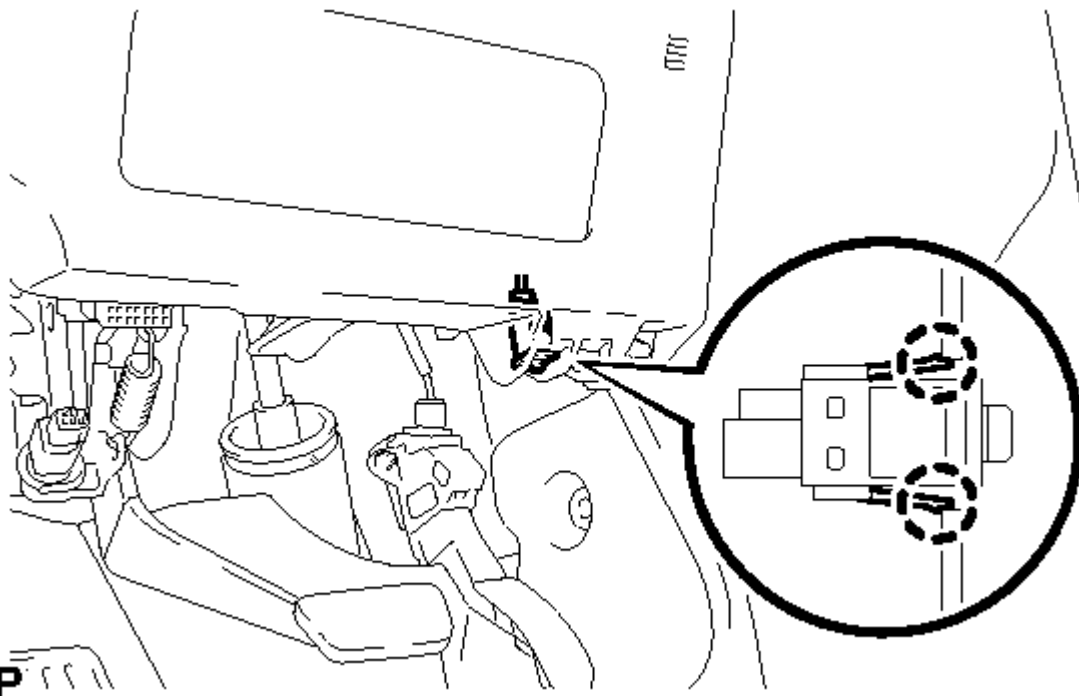


Fig. 15: Identifying Tire Pressure Warning Reset Switch Claws
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Disconnect the tire pressure warning reset switch connector.

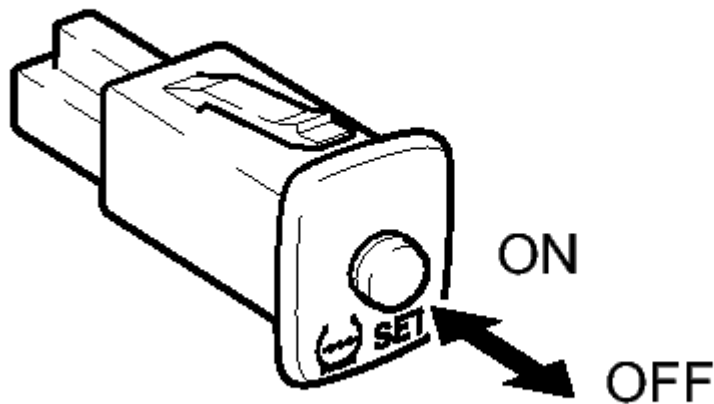
INSPECTION

INSPECTION

1. INSPECT TIRE PRESSURE WARNING RESET SWITCH

- a. Check the resistance.

*a



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Fig. 16: Inspecting Tire Pressure Warning Reset Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

	Component without harness connected
*a	(Tire Pressure Warning Reset Switch)

1. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	ON	Below 1 ohms
	OFF	10 kohms or higher

If the result is not as specified, replace the tire pressure warning reset switch.

INSTALLATION

INSTALLATION

1. INSTALL TIRE PRESSURE WARNING RESET SWITCH

- a. Connect the connector to the tire pressure warning reset switch.
- b. Engage the 2 claws to install the tire pressure warning reset switch to the instrument panel finish panel lower.

2. INSPECT TIRE PRESSURE WARNING SYSTEM

Refer to **TEST MODE PROCEDURE**