

BRAKES

Brake Control System (Preparation) - Sienna

BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS

SST

SST

	09843-18040	Diagnosis Check Wire No. 2	
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RECOMMENDED TOOLS

RECOMMENDED TOOLS

	09017-1C100	Union Nut Wrench 10mm	
	09017-1C110	Union Nut Wrench 12mm	
	09080-1C110	Toyota Electrical Tester Set	
	09080-2C100	Test Lead Set	

EQUIPMENT

EQUIPMENT

Torque wrench	-
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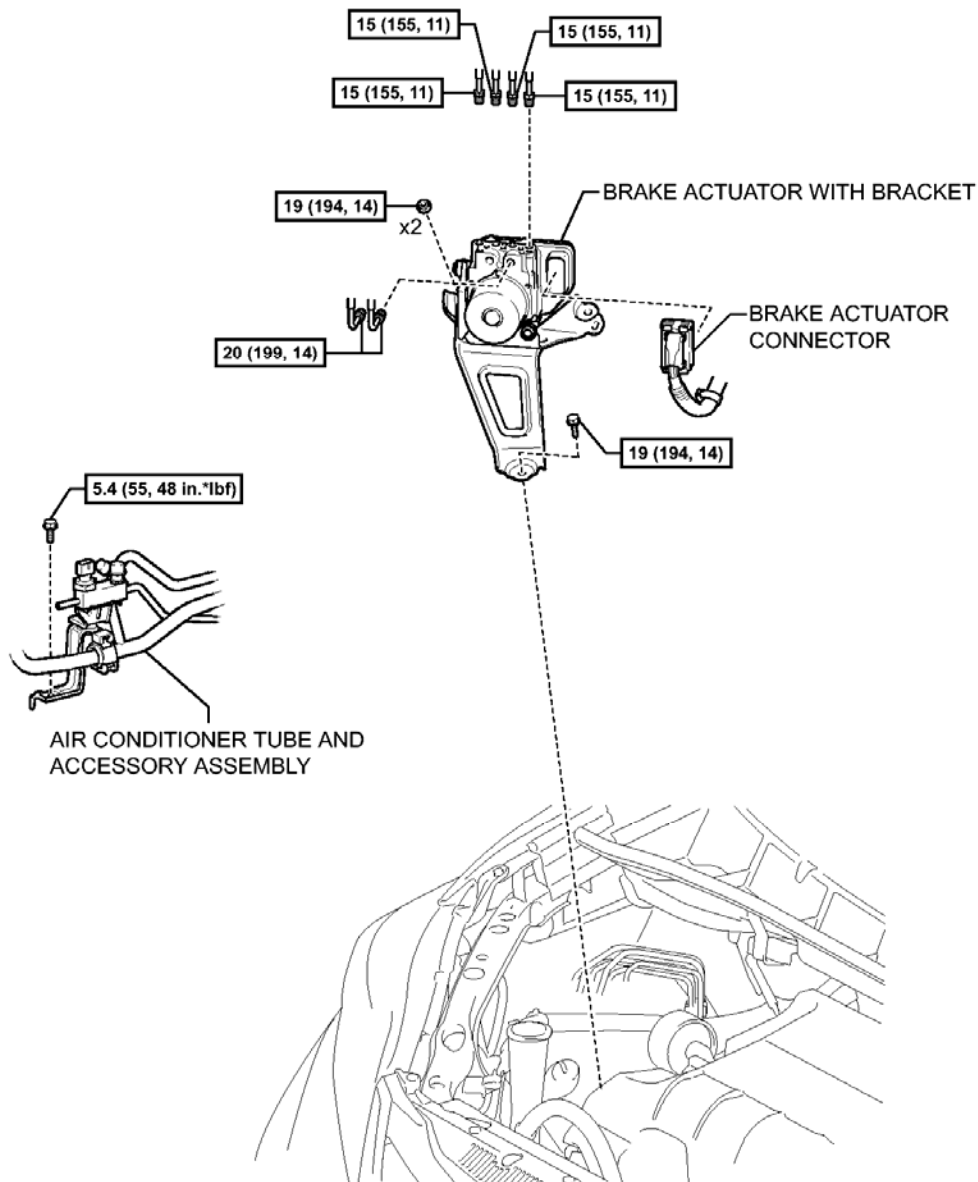
BRAKES

Brake Control System (Service Information) - Sienna

BRAKE ACTUATOR

COMPONENTS

ILLUSTRATION

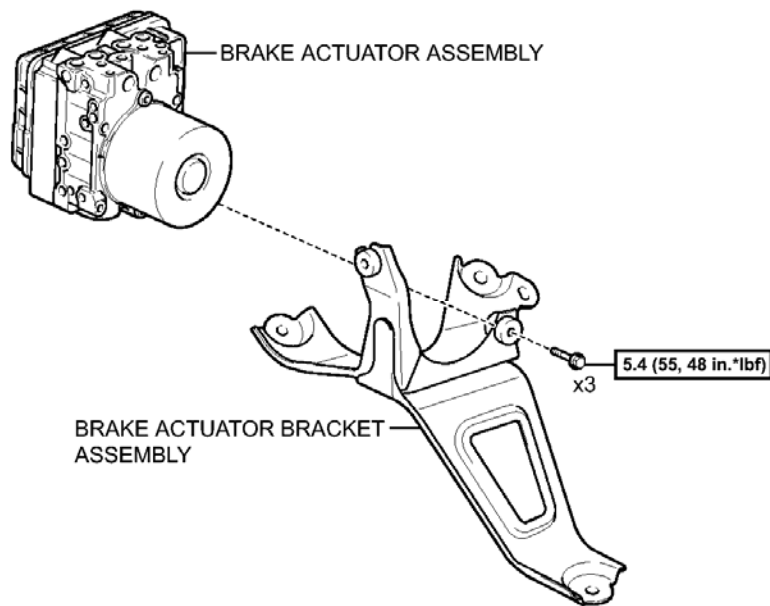


[N*m (kgf*cm, ft.*lbf)]: Specified torque

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Fig. 1: Brake Actuator Replacement Components With Torque Specifications (1 of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ILLUSTRATION



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

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Fig. 2: Brake Actuator Replacement Components With Torque Specifications (2 of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ON-VEHICLE INSPECTION

ON-VEHICLE INSPECTION

1. CONNECT TECHSTREAM

- Connect the Techstream to the DLC3.
- Start the engine and run it at idle.
- Turn the Techstream on.
- Enter the following menus: Chassis / ABS/VSC/TRAC / Active Test.

HINT:

Refer to the Techstream operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

- a. Enter the following menus: Active Test / Motor Relay.
- b. Turn the motor relay on, and check for actuator motor operation sounds.

NOTE: Do not keep the motor relay on continuously for more than 5 seconds. If it needs to be operated repeatedly, set an interval of more than 20 seconds between operations.

- c. Turn the motor relay off.
- d. Fully depress the brake pedal and hold it for approximately 15 seconds. Check that the pedal's initial depth is maintained for the entire 15 seconds.
- e. Turn the motor relay on, check that the pedal does not pulsate.
- f. Turn the motor relay off and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

- a. Enter the following menus: Active Test / SFRH or SFRR.
- b. Depress the brake pedal and hold it.

NOTE: Do not turn on a solenoid in a manner different from that shown in the following steps.

- c. Turn the SFRH and SFRR solenoids on simultaneously, and check that the pedal cannot be depressed further.

NOTE: Each solenoid operates for 2 seconds and turns off automatically. If it needs to be operated repeatedly, set an interval of more than 20 seconds between operations.

- d. Turn the SFRH and SFRR solenoids off simultaneously, and check that the pedal can be depressed.
- e. With the pedal still depressed, turn the motor relay on and check that the pedal returns.

NOTE: Do not keep the motor relay on continuously for more than 5 seconds. If it needs to be operated repeatedly, set an interval of more than 20 seconds between operations.

- f. Turn the motor relay off and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

- a. Using the same procedure, check the solenoids of the other wheels.

HINT:

- Left front wheel: SFLH, SFLR
- Right rear wheel: SRRH, SRRR

- Left rear wheel: SRLH, SRLR

REMOVAL

REMOVAL

1. DRAIN BRAKE FLUID

NOTE: If brake fluid leaks onto any painted surface, immediately wash it off.

2. 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 .

3. REMOVE BRAKE ACTUATOR WITH BRACKET

- Disconnect the air conditioner pressure sensor connector and separate the harness clamp.

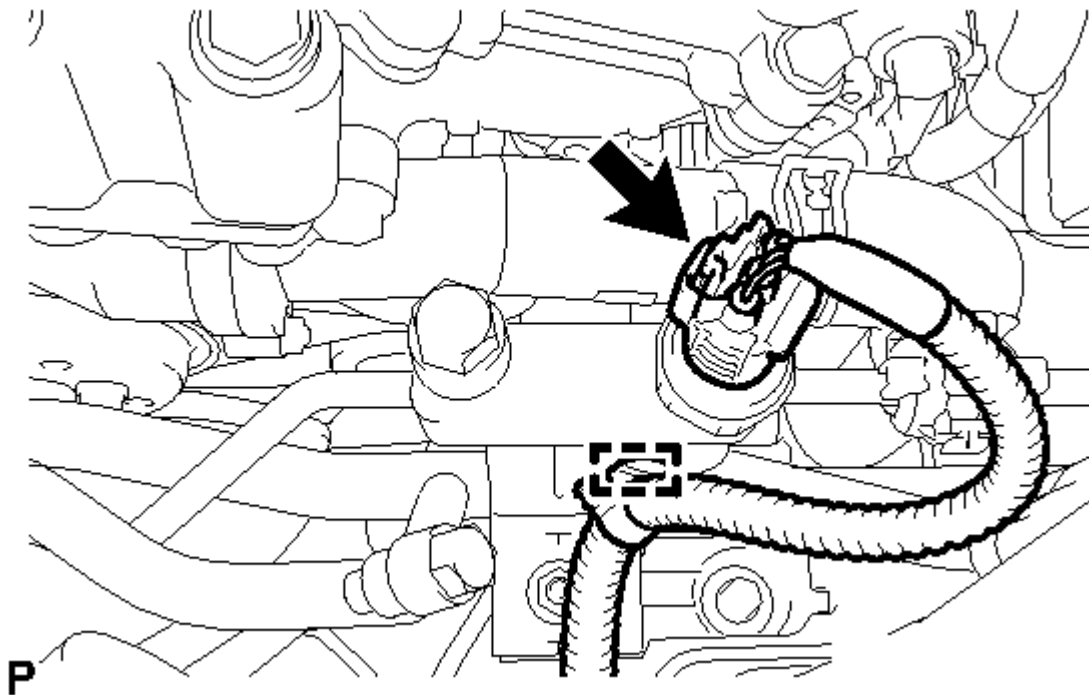
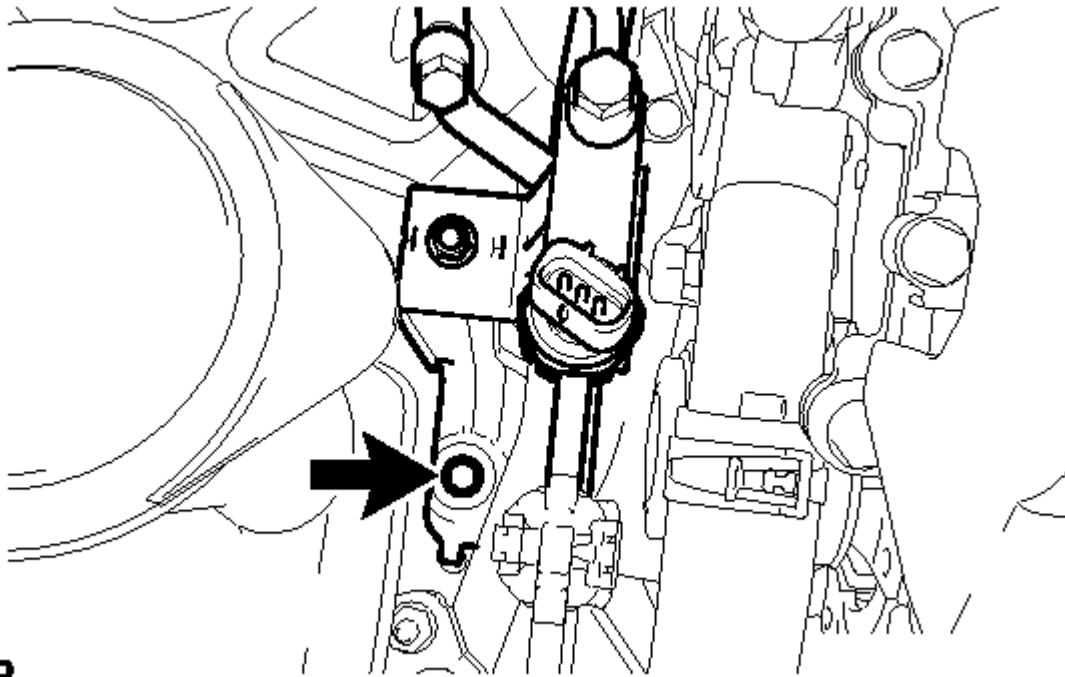


Fig. 3: Identifying Air Conditioner Pressure Sensor Connector & Harness Clip
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- Remove the bolt and separate the air conditioner tube and accessory assembly from the body.

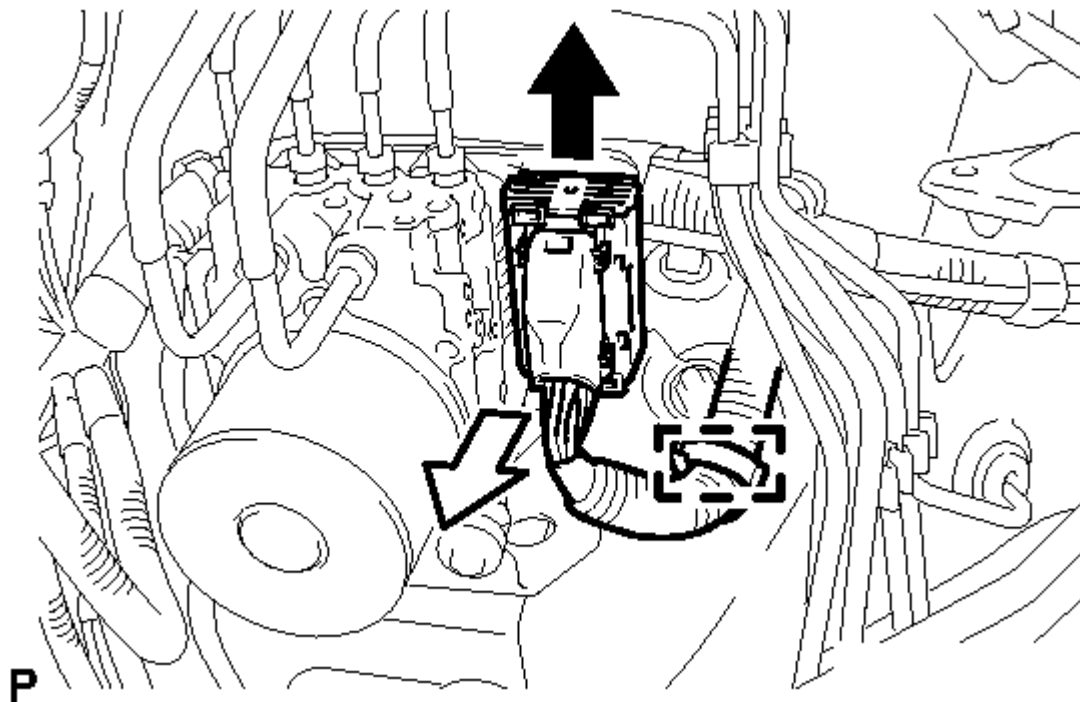


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Fig. 4: Identifying Air Conditioner Tube, Accessory Assembly & Fasteners
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: Do not damage the air conditioner tube and accessory assembly.

- c. Release the lock lever and disconnect the brake actuator connector.

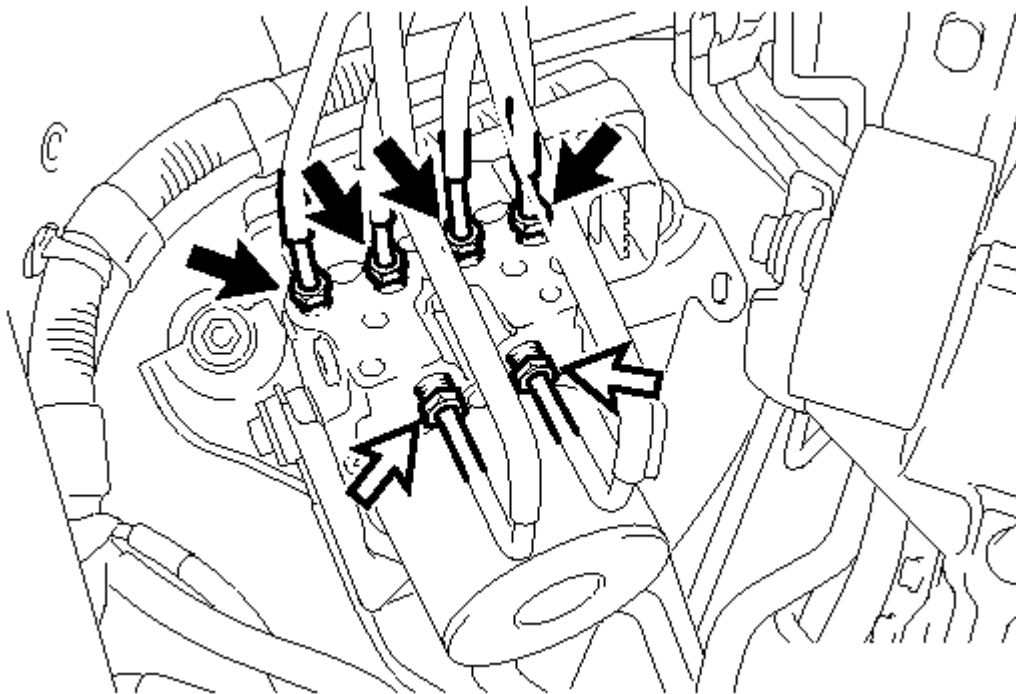


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Fig. 5: Removing Lock Lever & Brake Actuator Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: Be careful not to allow brake fluid to enter the removed connector.

- d. Separate the harness clamp from the brake actuator bracket assembly.
- e. Using union nut wrenches (10 mm and 12 mm), disconnect the 6 brake lines from the brake actuator with bracket.



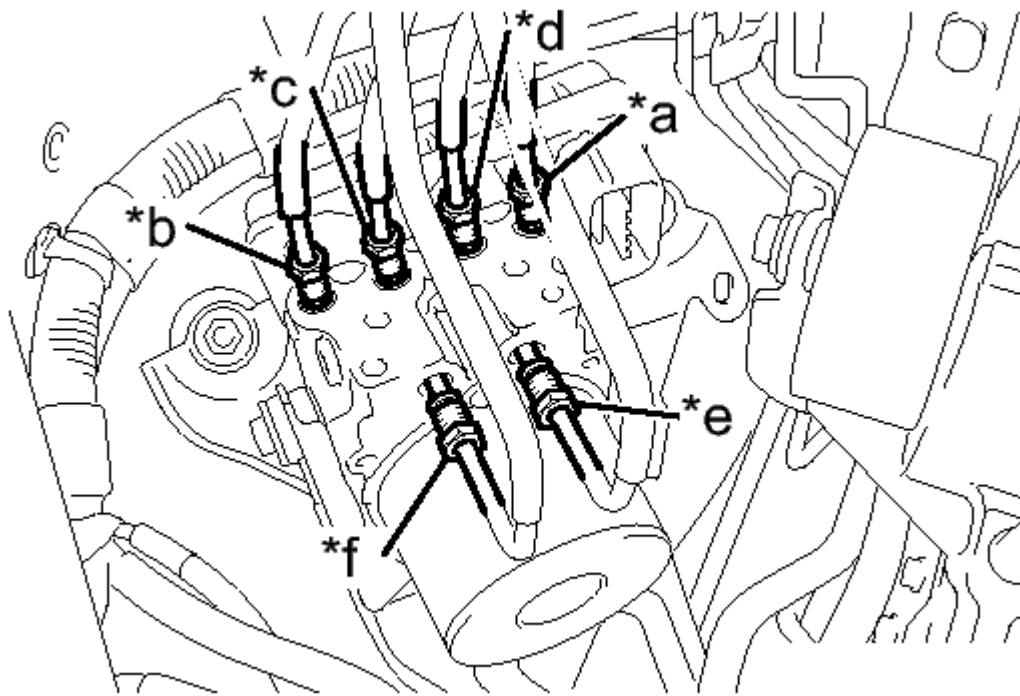
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Fig. 6: Remove/Install Brake Actuator Brake Line Union Fasteners
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

Flare
Nut
A
(10
mm)
Flare
Nut
B
(12
mm)

- f. Use tags or make a memo to identify the places to reconnect.



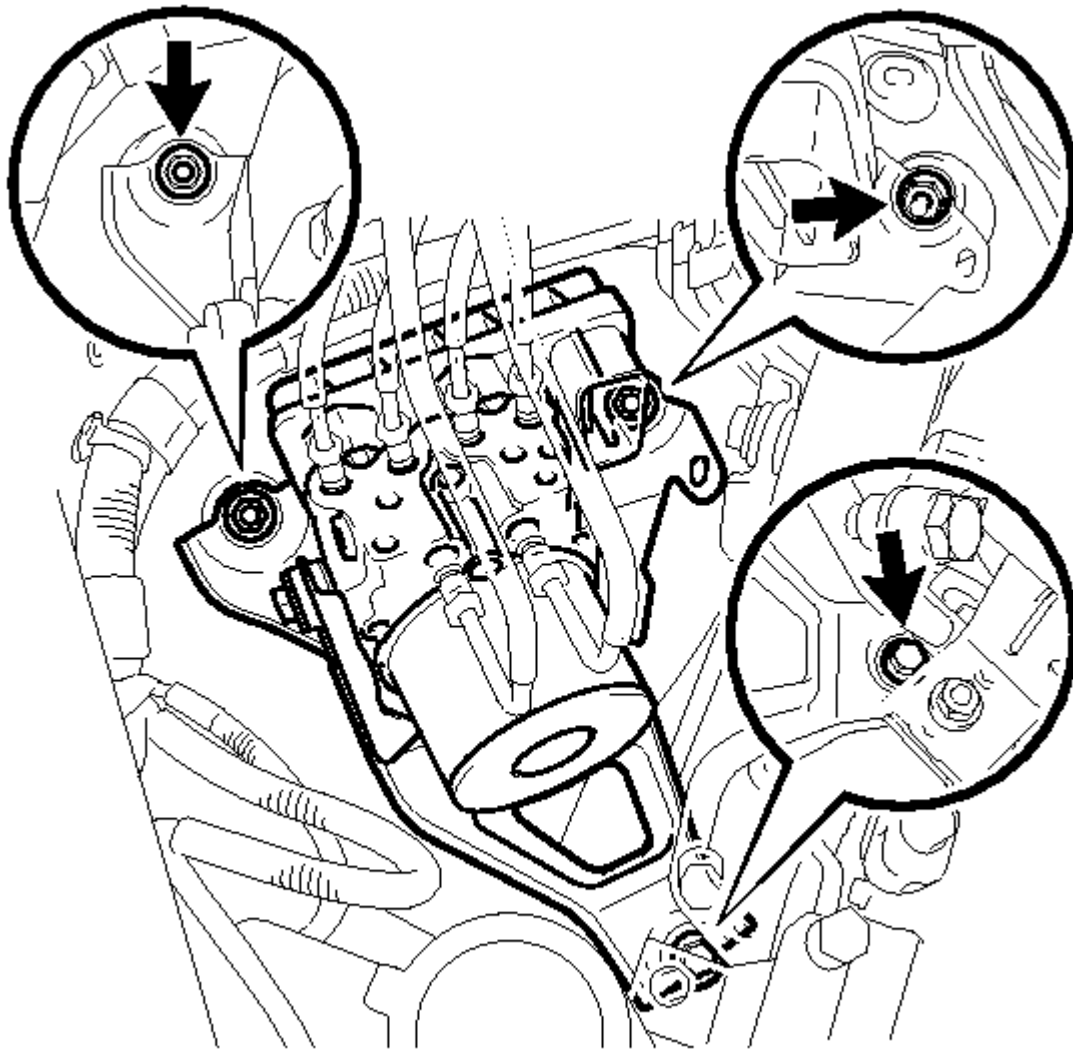
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Fig. 7: Remove/Install Marked Brake Actuator Lines
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	To front wheel cylinder RH
*b	To front wheel cylinder LH
*c	To rear wheel cylinder RH
*d	To rear wheel cylinder LH
*e	From 1st of master cylinder
	From

- g. Remove the bolt, 2 nuts and brake actuator with bracket from the body.



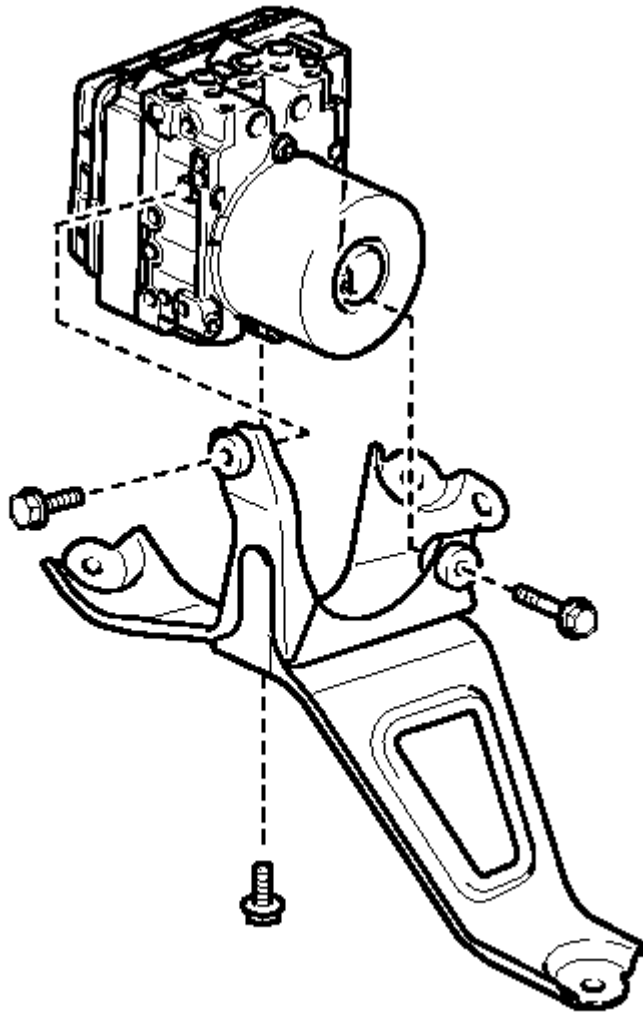
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Fig. 8: Identifying Brake Actuator With Bracket & Fasteners
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: Do not damage the brake lines or wire harness.

4. REMOVE BRAKE ACTUATOR ASSEMBLY

- a. Remove the 3 bolts and brake actuator assembly from the brake actuator bracket assembly.



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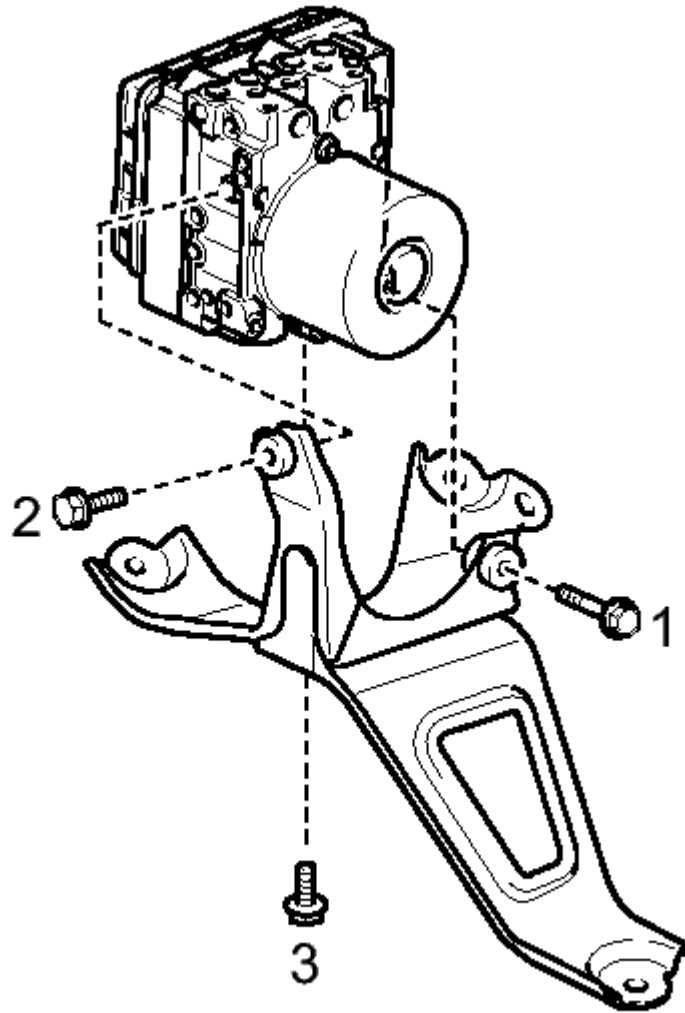
Fig. 9: Identifying Brake Actuator Assembly, Bracket And Fasteners
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSTALLATION

INSTALLATION

1. INSTALL BRAKE ACTUATOR ASSEMBLY

- a. Install the brake actuator to the brake actuator bracket assembly with the 3 bolts.



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Fig. 10: Installing Brake Actuator Assembly & Fasteners To Brake Actuator Bracket Assembly

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

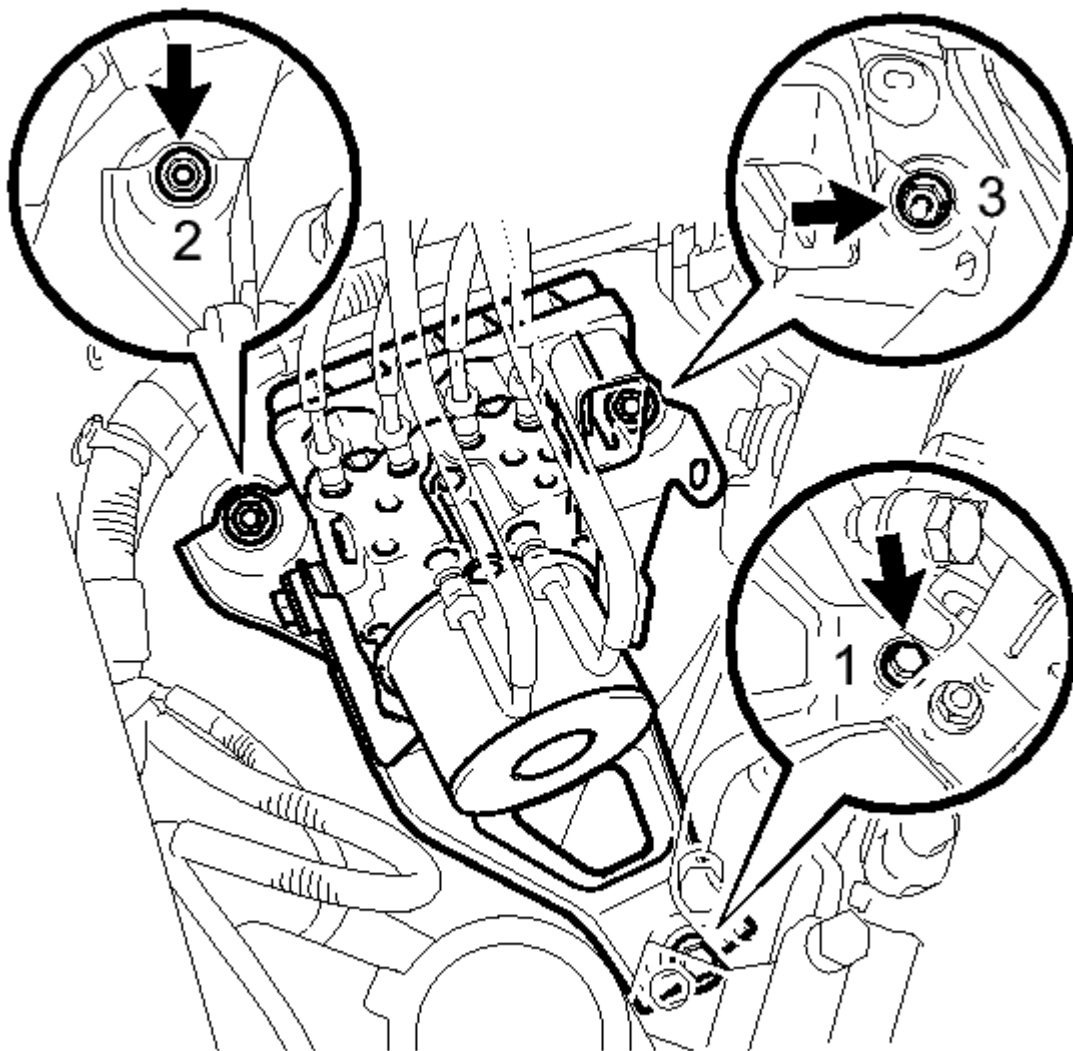
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

NOTE:

- Do not remove the hole plugs of a new brake actuator before connecting the 6 brake lines because the brake actuator is filled with brake fluid.
- Do not hold the actuator by the connector.
- Tighten the 3 bolts in the order shown in the illustration.

2. INSTALL BRAKE ACTUATOR WITH BRACKET

- a. Install the brake actuator with bracket to the body with the bolt and 2 nuts.



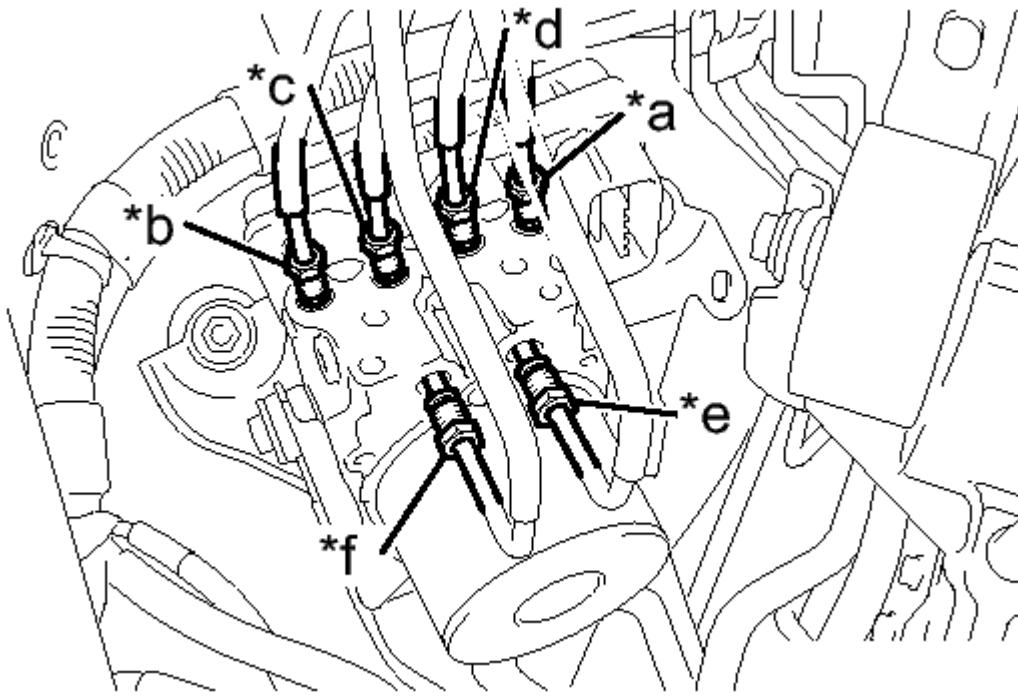
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Fig. 11: Installing Brake Actuator/Bracket & Fasteners To Body
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)

NOTE:

- Do not damage the brake lines or wire harness.
 - Tighten the bolt and 2 nuts in the order shown in the illustration.
- b. Temporarily tighten each brake line to the correct positions of the brake actuator with bracket as shown in the illustration.



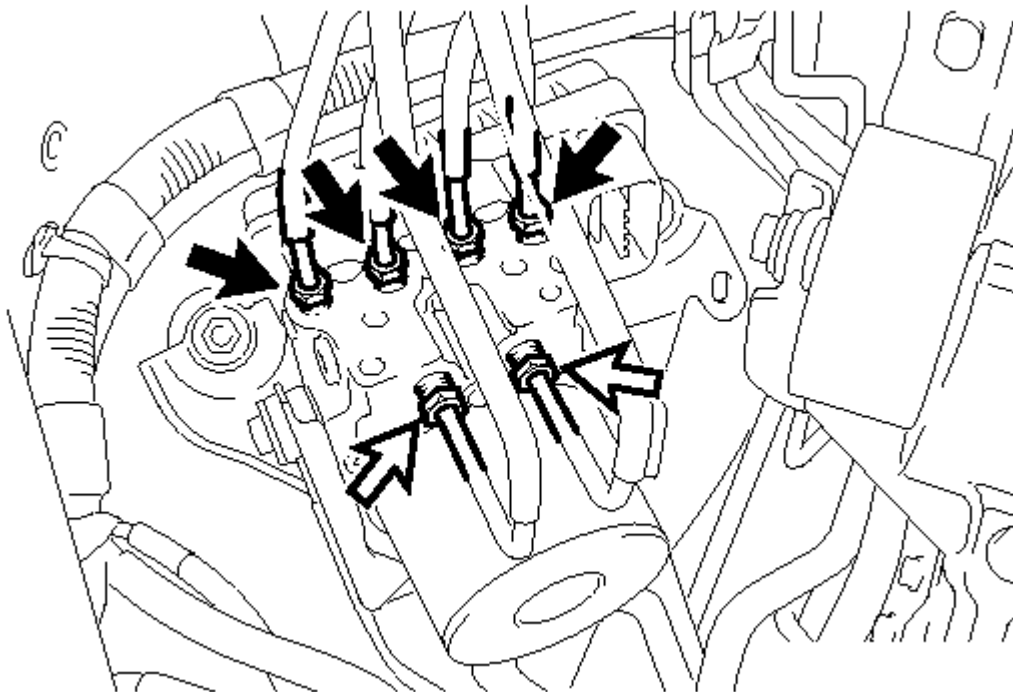
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Fig. 12: Remove/Install Marked Brake Actuator Lines
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	To front wheel cylinder RH
*b	To front wheel cylinder LH
*c	To rear wheel cylinder RH
*d	To rear wheel cylinder LH
*e	From 1st of master cylinder
	From

- c. Using union nut wrenches (10 mm and 12 mm), fully tighten each brake line.



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Fig. 13: Remove/Install Brake Actuator Brake Line Union Fasteners
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

Flare
Nut
A
(10
mm)
Flare
Nut
B
(12
mm)

Flare nut A (10 mm)

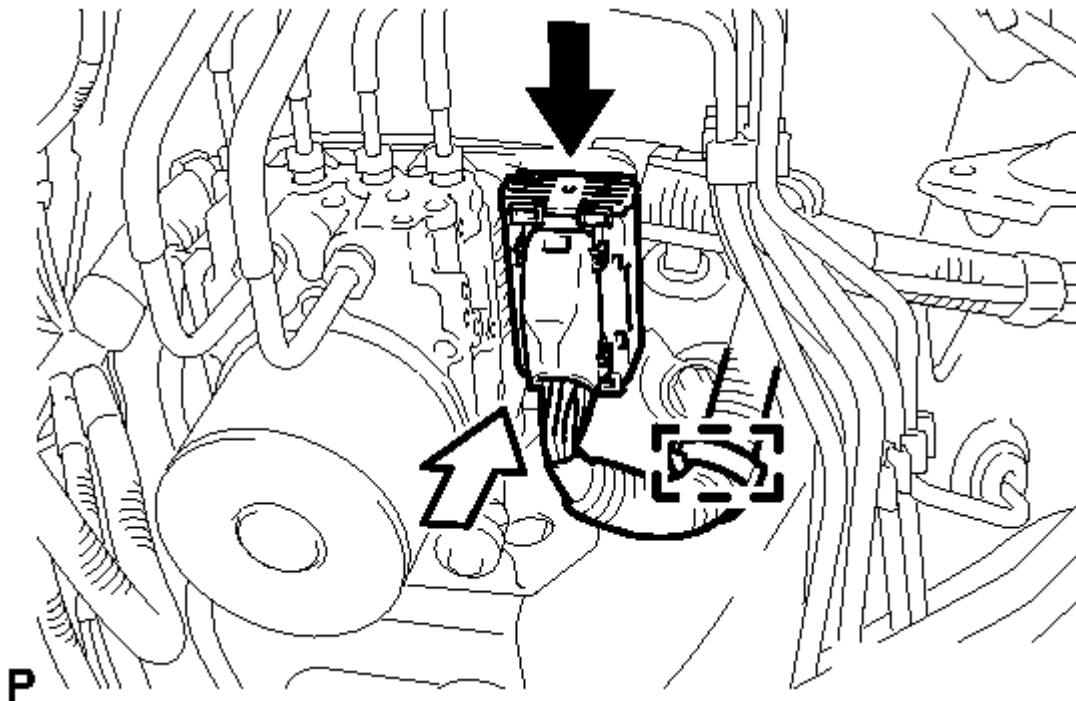
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf)

Flare nut B (12 mm)

Torque: 20 N*m (199 kgf*cm, 14 ft.*lbf)

NOTE: Use the formula to calculate special torque values for situations where the union nut wrench is combined with a torque wrench. Refer to PRECAUTION .

- d. Install the harness clamp.



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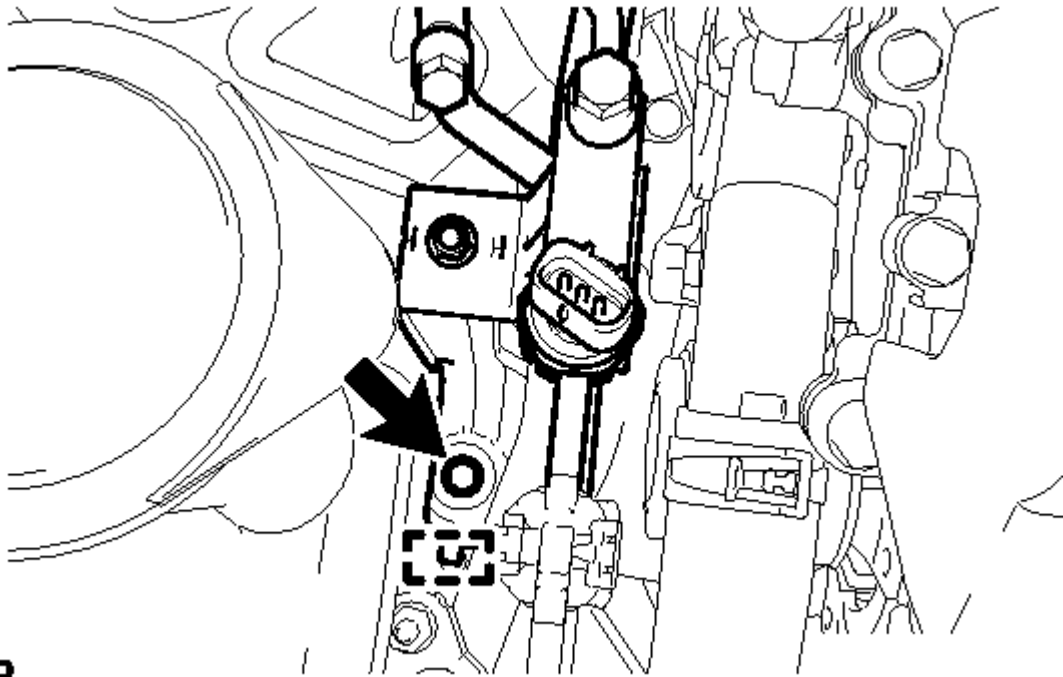
Fig. 14: Installing Brake Actuator Connector & Clamp
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- e. Connect the brake actuator connector.

NOTE:

- Make sure that the connector is locked securely.
- Make sure that the actuator connector can be connected smoothly. Do not allow water, oil or dirt to enter.

- f. Install the air conditioner tube and accessory assembly to the body with the bolt.



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Fig. 15: Installing Air Conditioner Tube & Accessory Assembly Fastener To Body
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

NOTE:

- Be sure to insert the air conditioner tube and accessory assembly into the stopper hole while installing the air conditioner tube and accessory assembly.
- Do not damage the air conditioner tube and accessory assembly.

g. Install the harness clamp and connect the air conditioner pressure sensor connector.

3. **FILL RESERVOIR WITH BRAKE FLUID** . Refer to **REPLACEMENT - Step 2**
4. **BLEED BRAKE MASTER CYLINDER** . Refer to **BLEEDING - Step 3**
5. **BLEED BRAKE LINE** . Refer to **BLEEDING - Step 4**
6. **BLEED BRAKE ACTUATOR** . Refer to **BLEEDING - Step 5**
7. **INSPECT FOR BRAKE FLUID LEAK**
8. **INSPECT FLUID LEVEL IN RESERVOIR** . Refer to **ON-VEHICLE INSPECTION - Step 1**
9. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

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

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

10. INSPECT BRAKE ACTUATOR USING TECHSTREAM

Refer to **ON-VEHICLE INSPECTION**

11. PERFORM YAW RATE AND ACCELERATION SENSOR ZERO POINT CALIBRATION

Refer to **TEST MODE PROCEDURE**

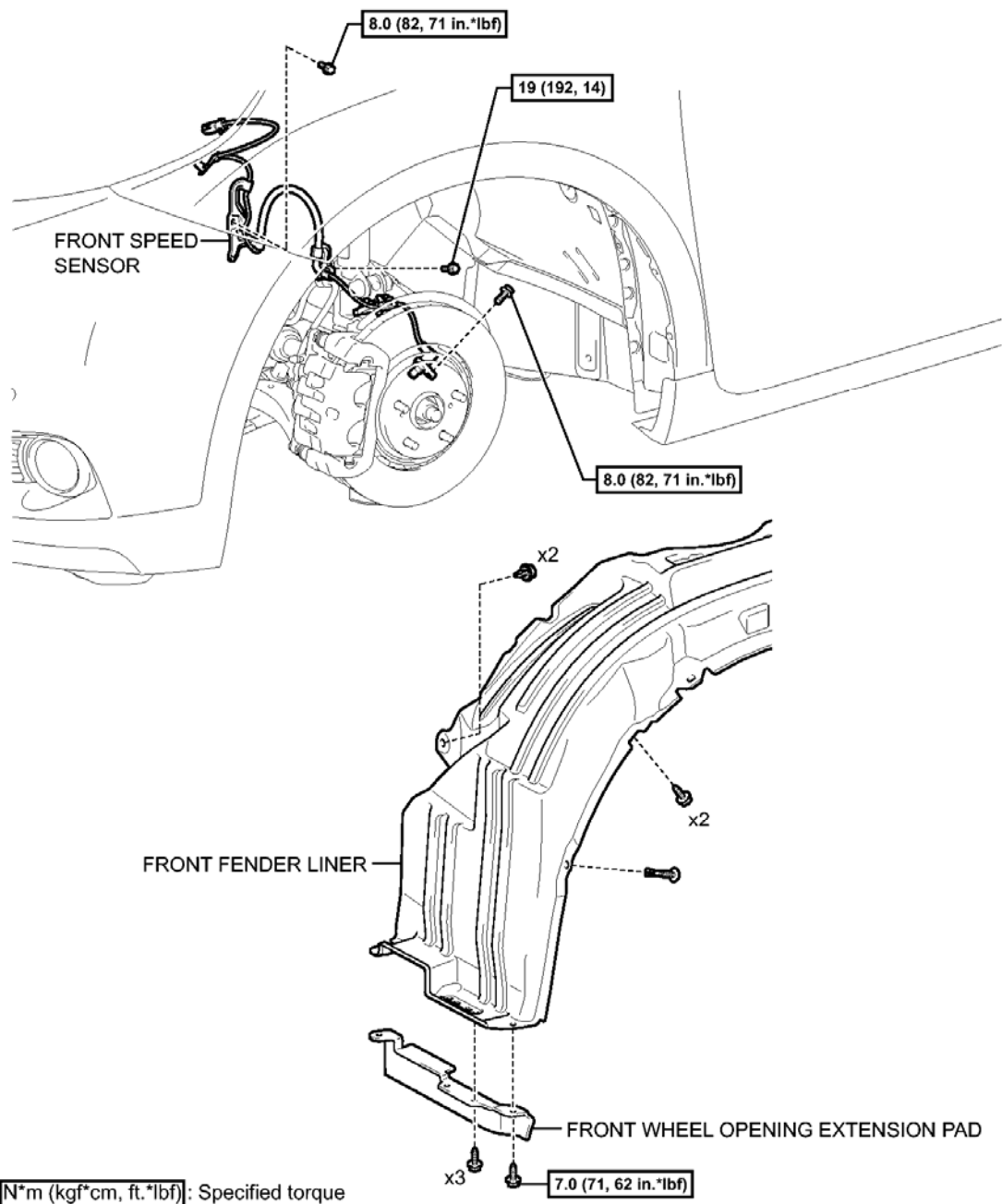
12. CHECK AND CLEAR DTCS

Refer to **DTC CHECK / CLEAR**

FRONT SPEED SENSOR

COMPONENTS

ILLUSTRATION



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Fig. 16: Front Speed Sensor Replacement Components With Torque Specifications
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

REMOVAL

HINT:

- Use the same procedure for the LH side and RH side.
- The following procedure is for the LH side.
- If the sensor rotor needs to be replaced, replace it together with the front drive shaft assembly.

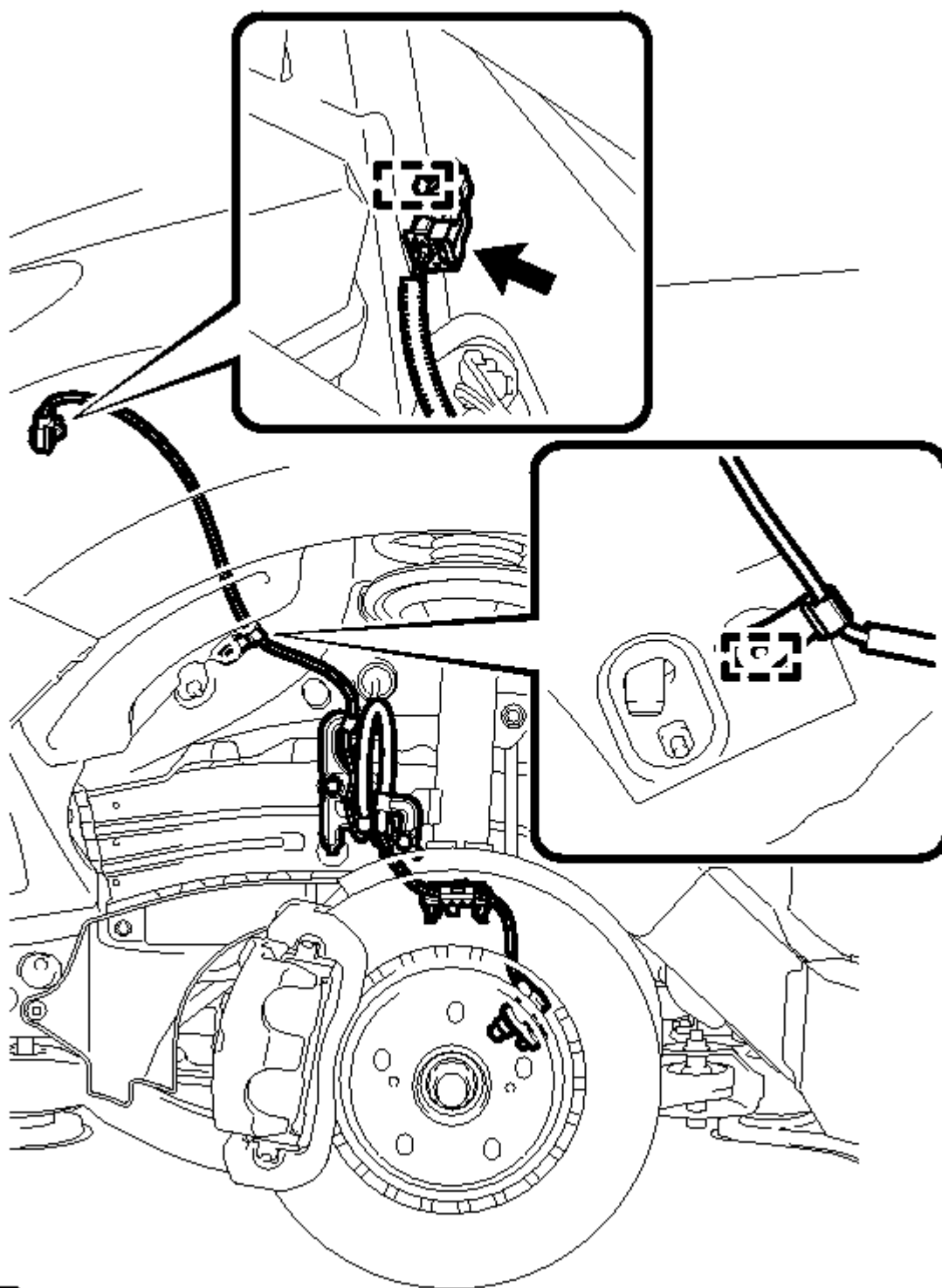
1. **REMOVE FRONT WHEEL**

2. **REMOVE FRONT WHEEL OPENING EXTENSION PAD** . Refer to **REMOVAL - Step 1**

3. **SEPARATE FRONT FENDER LINER** . Refer to **REMOVAL - Step 2**

4. **REMOVE FRONT SPEED SENSOR**

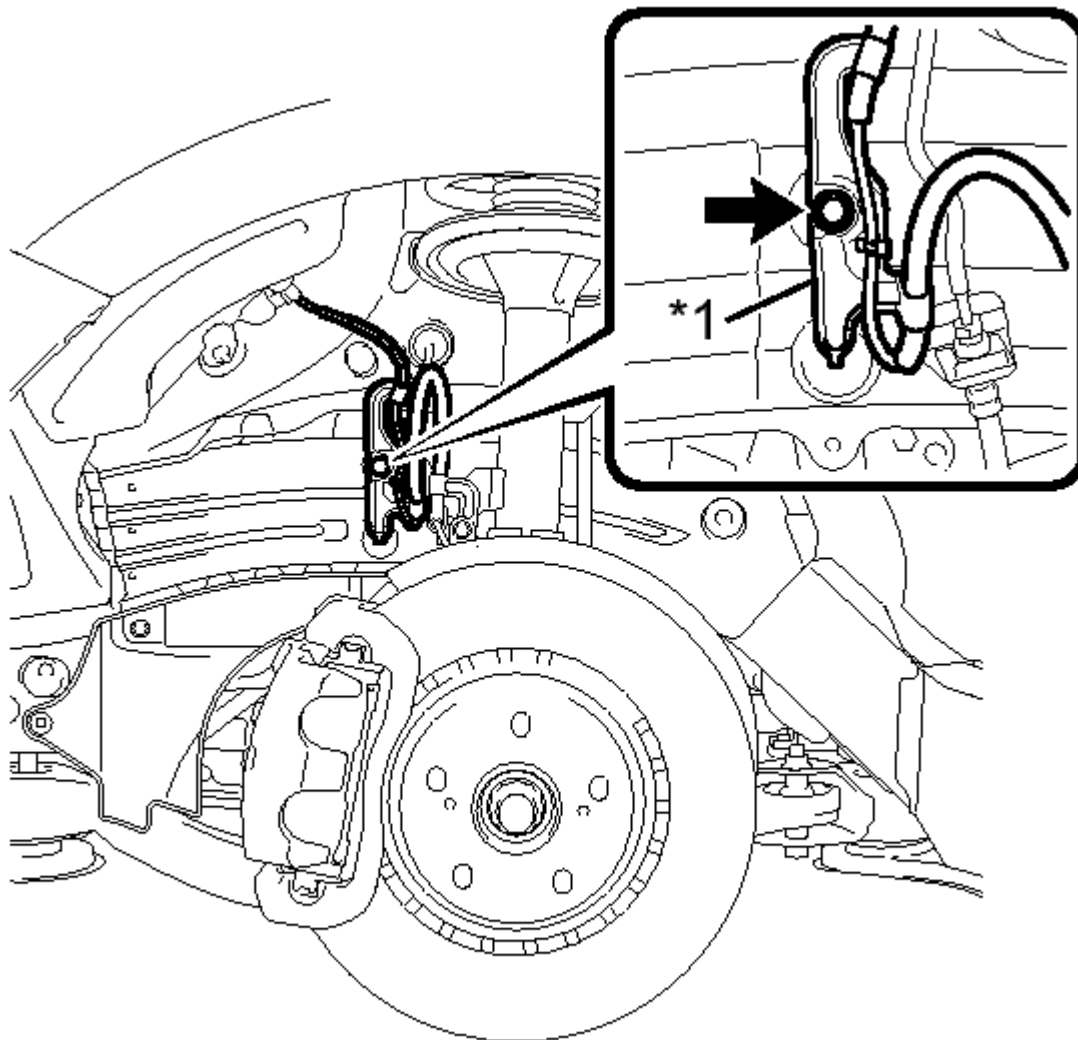
- a. Disconnect the front speed sensor connector and remove the 2 clamps.



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Fig. 17: Identifying Front Speed Sensor Connector & Fasteners
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the bolt and No. 3 sensor clamp from the body.



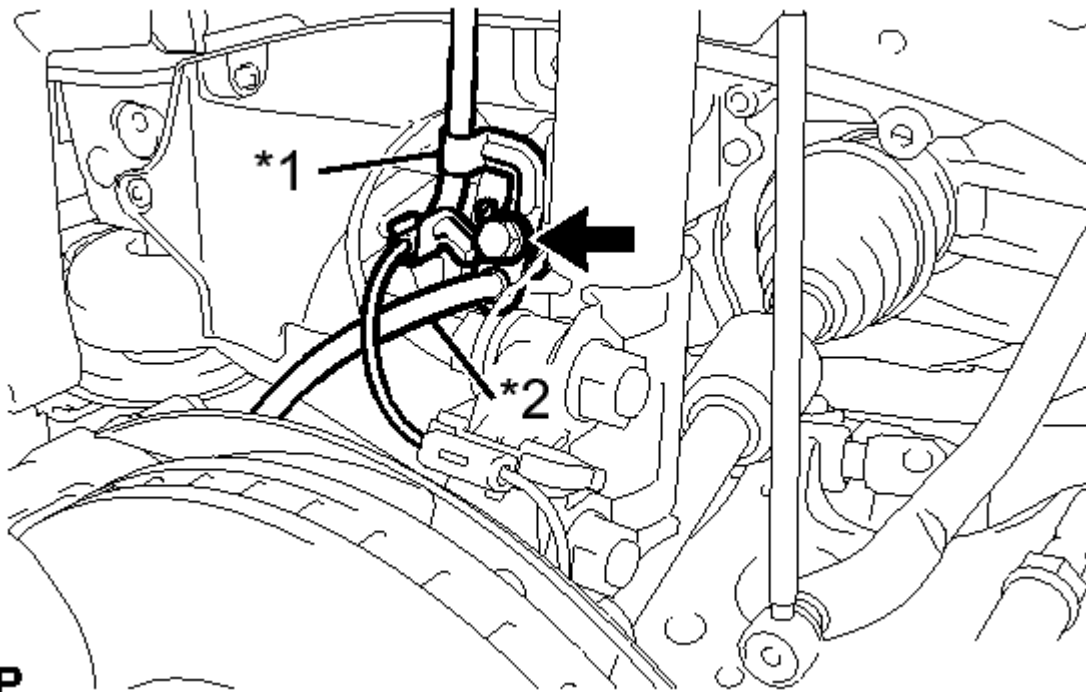
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Fig. 18: Identifying No. 3 Sensor Clamp Fastener
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

	No. 3
*1	Sensor Clamp

- c. Remove the bolt, No. 2 sensor clamp and front brake flexible hose together from the shock absorber assembly.



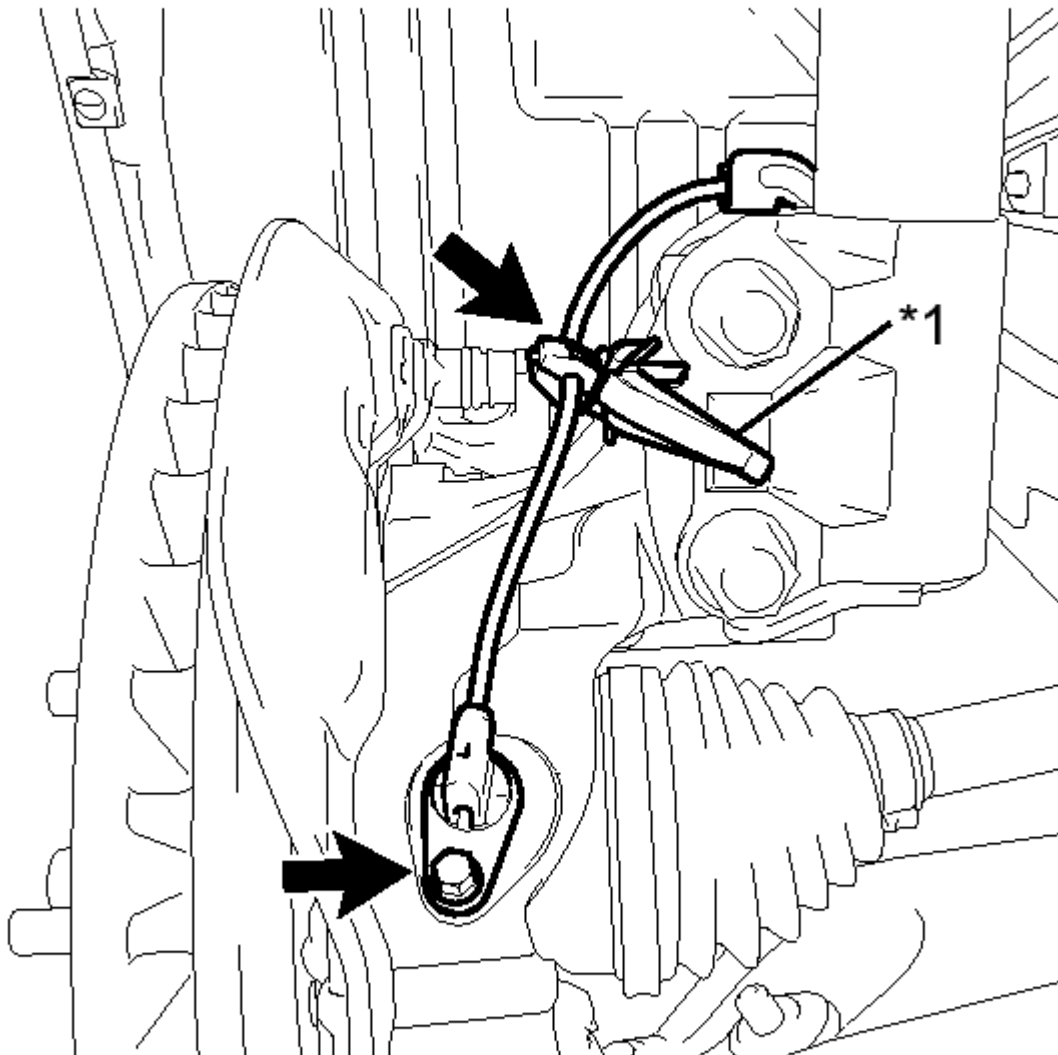
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Fig. 19: Identifying No. 2 Sensor Fasteners & Front Brake Flexible Hose
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

	No. 2
*1	Sensor Clamp
*2	Front Brake Flexible Hose

- d. Remove the bolt, No. 1 sensor clamp and front speed sensor.

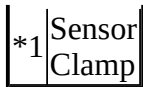


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Fig. 20: Identifying No. 1 Sensor Fasteners
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

No. 1



NOTE:

- Prevent foreign matter from attaching to the front speed sensor tip.
- Clean the speed sensor installation hole and the contact surfaces every time the front speed sensor is removed.

INSTALLATION

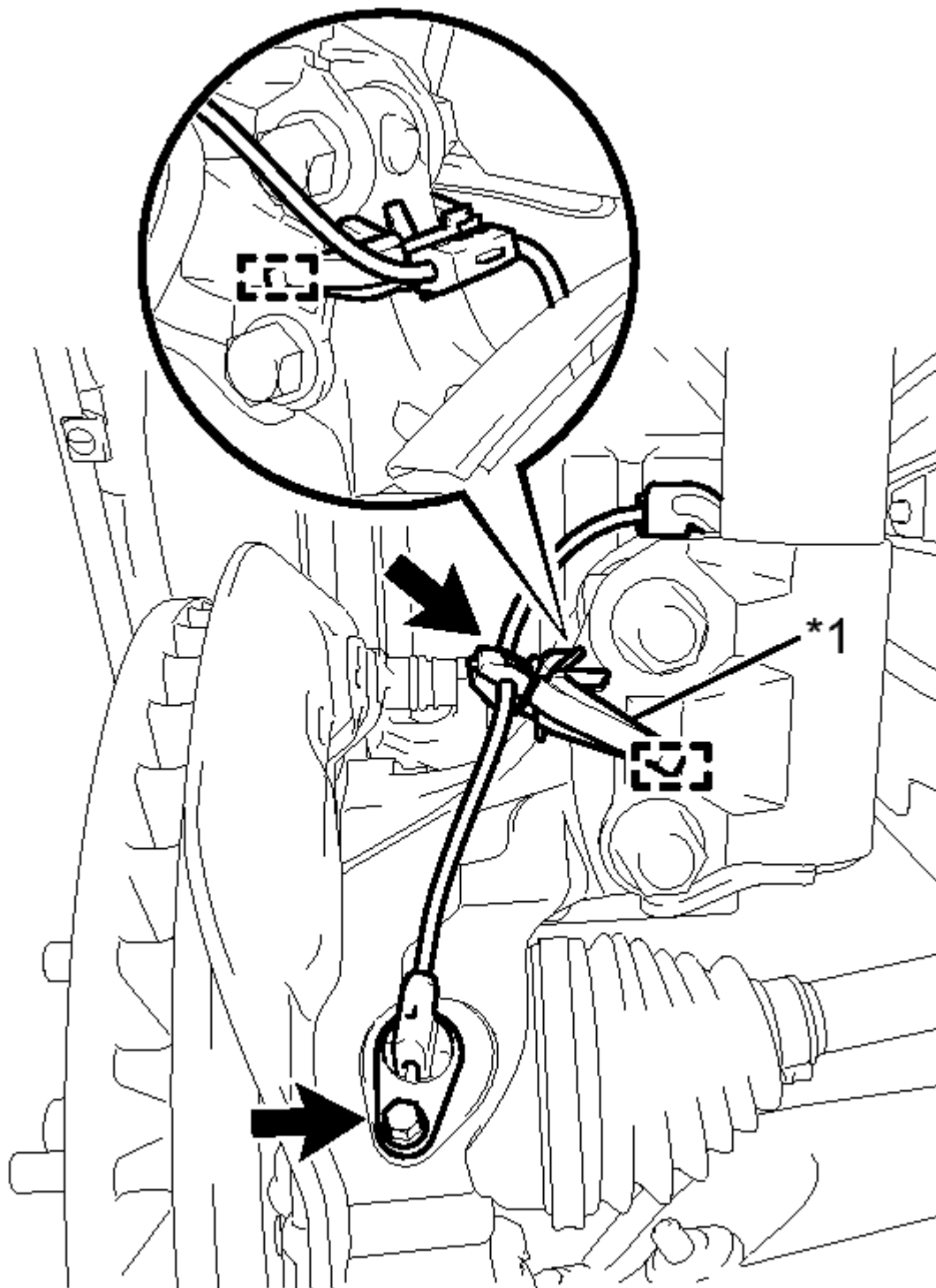
INSTALLATION

HINT:

- Use the same procedure for the LH side and RH side.
- The following procedure is for the LH side.
- If the sensor rotor needs to be replaced, replace it together with the front drive shaft assembly.

1. INSTALL FRONT SPEED SENSOR

- a. Install the No. 1 sensor clamp and front speed sensor with the bolt.

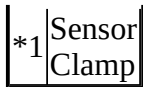


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Fig. 21: Installing No. 1 Sensor & Front Speed Sensor Fasteners
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

No. 1

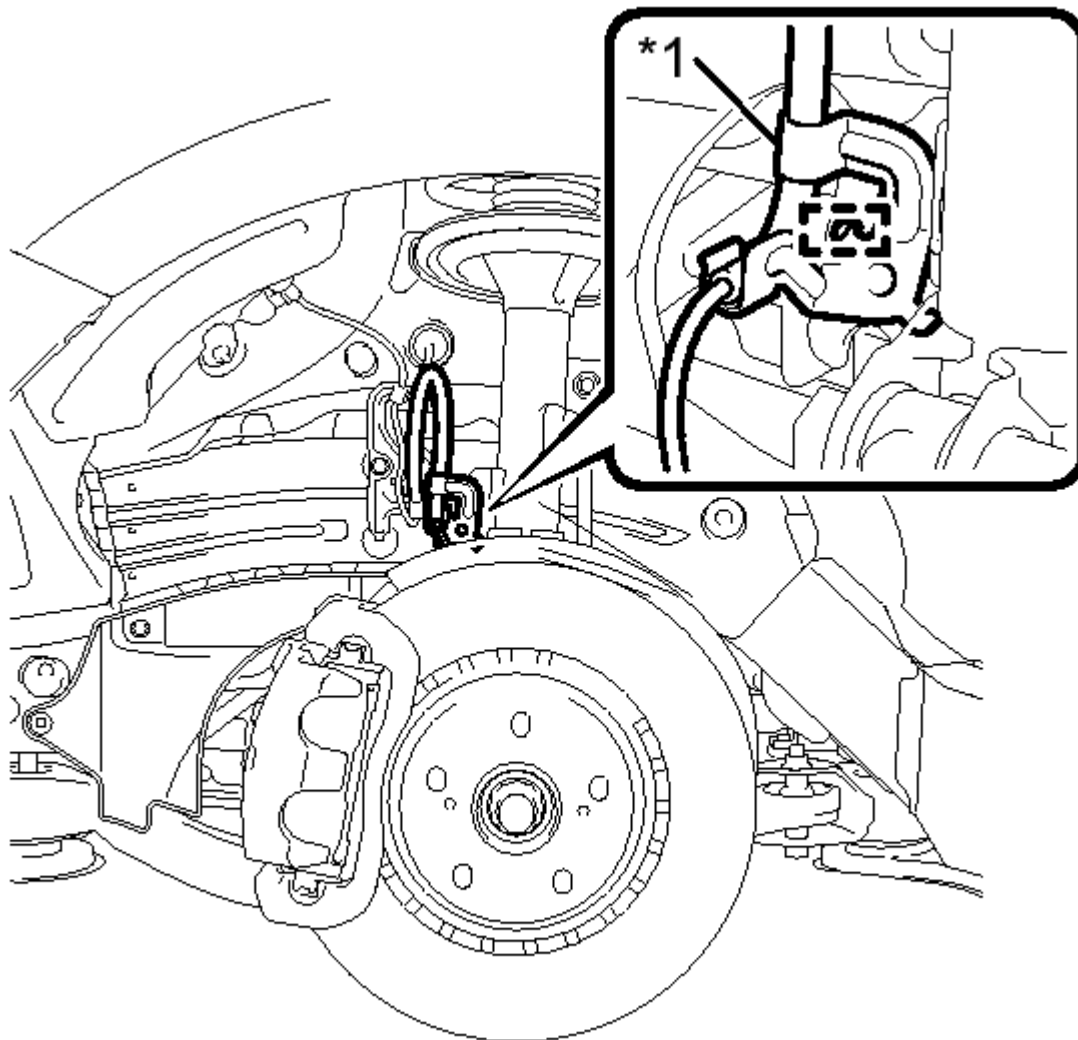


Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

NOTE:

- Prevent foreign matter from attaching to the front speed sensor tip.
- Firmly insert the front speed sensor body into the knuckle before tightening the bolt.
- After installing the front speed sensor to the knuckle, make sure that there is no clearance between the front speed sensor stay and knuckle. Also make sure that no foreign matter is stuck between the parts.
- Before installing the clamp, firmly insert the points of the clamp into the installation holes.

b. Temporarily install the No. 2 sensor clamp.



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Fig. 22: Installing No. 2 Sensor Fastener

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

TEXT IN ILLUSTRATION

	No. 2
*1	Sensor Clamp

NOTE: Be sure to insert the No. 2 sensor clamp into the stopper hole while installing the No. 2 sensor clamp.

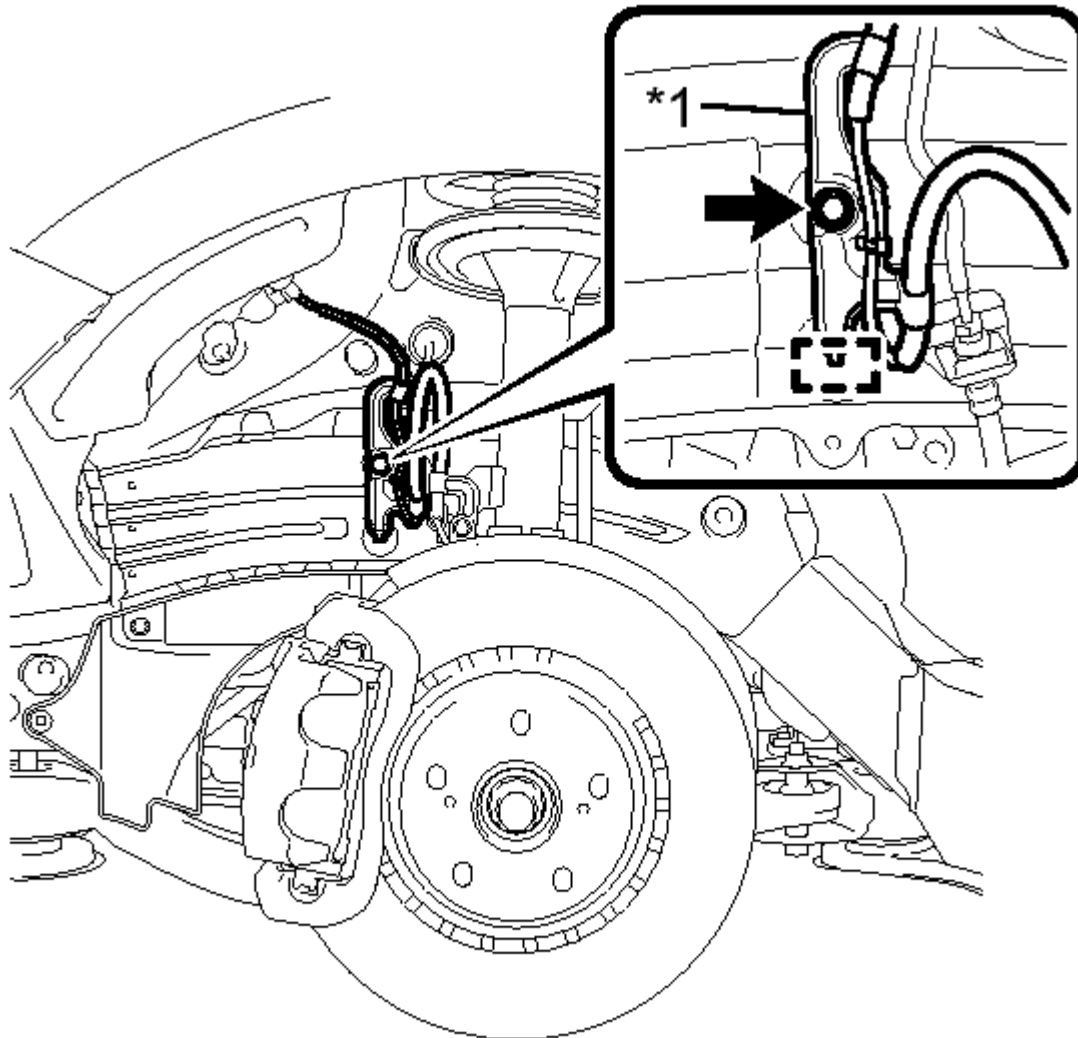
- c. Install the front brake flexible hose and No. 2 sensor clamp together to the shock absorber with the bolt.

Torque: 19 N*m (192 kgf*cm, 14 ft.*lbf)

NOTE:

- Do not twist the wire harness for the front speed sensor when installing it.
- A bolt tightens the brake flexible hose and front speed sensor together. Make sure that the flexible hose is positioned over the front speed sensor.

d. Install the No. 3 sensor clamp to the body with the bolt.



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Fig. 23: Installing No. 3 Sensor Fasteners To Body
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

No. 3
*1 Sensor Clamp

Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

NOTE: Be sure to insert the No. 3 sensor clamp into the stopper hole while installing the No. 3 sensor clamp.

- e. Install the 2 clamps and connect the front speed sensor connector.
- 2. **INSTALL FRONT FENDER LINER** . Refer to **INSTALLATION - Step 13**
- 3. **INSTALL FRONT WHEEL OPENING EXTENSION PAD** . Refer to **INSTALLATION - Step 14**
- 4. **INSTALL FRONT WHEEL**

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

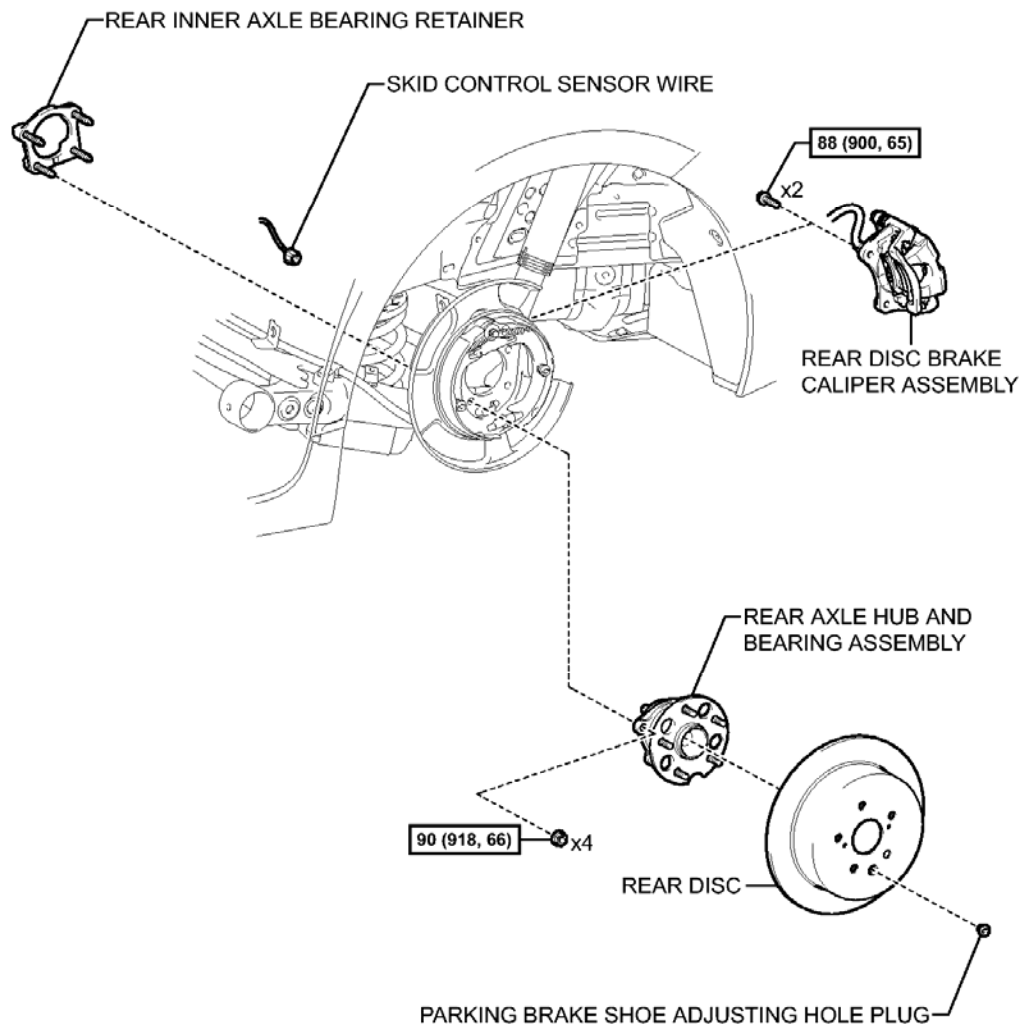
- 5. **CHECK FOR SPEED SENSOR SIGNAL**

Refer to **TEST MODE PROCEDURE**

REAR SPEED SENSOR (FOR 2WD)

COMPONENTS

ILLUSTRATION



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

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Fig. 24: Rear Speed Sensor Replacement Components With Torque Specifications (2WD)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

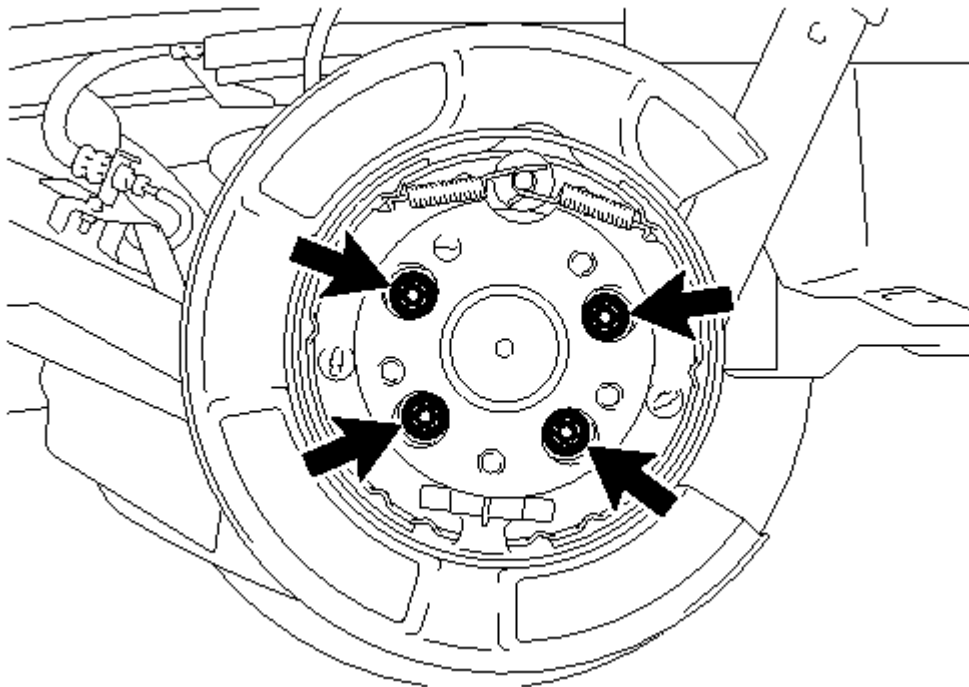
REMOVAL

REMOVAL

HINT:

- Use the same procedure for the RH side and LH side.
- The following procedure is for the LH side.
- The rear speed sensor is a component of the rear axle hub and bearing assembly. If the sensor malfunctions, replace the rear axle hub and bearing assembly
- If the sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

1. **REMOVE REAR WHEEL**
2. **SEPARATE REAR DISC BRAKE CALIPER ASSEMBLY** . Refer to **DISASSEMBLY - Step 2**
3. **REMOVE PARKING BRAKE SHOE ADJUSTING HOLE PLUG** . Refer to **REMOVAL - Step 14**
4. **REMOVE REAR DISC** . Refer to **REMOVAL - Step 15**
5. **DISCONNECT SKID CONTROL SENSOR WIRE** . Refer to **REMOVAL - Step 6**
6. **REMOVE REAR AXLE HUB AND BEARING ASSEMBLY**
 - a. Remove the 4 nuts and hub and bearing assembly.



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Fig. 25: Identifying Rear Axle Hub/Bearing Assembly & Nuts
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

- The rear speed sensor is a component of the rear axle hub and bearing assembly. If the sensor malfunctions, replace the rear axle hub and bearing assembly.
- If the sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

7. **REMOVE REAR INNER AXLE BEARING RETAINER** . Refer to **REMOVAL - Step 10**

INSTALLATION

INSTALLATION

HINT:

- Use the same procedure for the RH side and LH side.
- The following procedure is for the LH side.
- The rear speed sensor is a component of the rear axle hub and bearing assembly. If the sensor malfunctions, replace the rear axle hub and bearing assembly.
- If the sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

1. **INSTALL REAR INNER AXLE BEARING RETAINER** . Refer to **INSTALLATION - Step 1**
2. **INSTALL REAR AXLE HUB AND BEARING ASSEMBLY**
 - a. Install the hub and bearing assembly with the 4 nuts.

Torque: 90 N*m (918 kgf*cm, 66 ft.*lbf)

HINT:

- The rear speed sensor is a component of the rear axle hub and bearing assembly. If the sensor malfunctions, replace the rear axle hub and bearing assembly.
 - If the sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.
3. **INSPECT REAR AXLE HUB BEARING LOOSENESS** . Refer to **ON-VEHICLE INSPECTION - Step 1**
 4. **INSPECT REAR AXLE HUB RUNOUT** . Refer to **ON-VEHICLE INSPECTION - Step 2**
 5. **CONNECT SKID CONTROL SENSOR WIRE** . Refer to **INSTALLATION - Step 5**
 6. **INSTALL REAR DISC** . Refer to **INSTALLATION - Step 1**
 7. **INSTALL PARKING BRAKE SHOE ADJUSTING HOLE PLUG** . Refer to **INSTALLATION - Step 2**
 8. **INSTALL REAR DISC BRAKE CALIPER ASSEMBLY** . Refer to **REASSEMBLY - Step 17**
 9. **ADJUST PARKING BRAKE SHOE CLEARANCE AND PARKING BRAKE PEDAL TRAVEL** . Refer to **ADJUSTMENT - Step 2**
 10. **INSTALL REAR WHEEL**

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

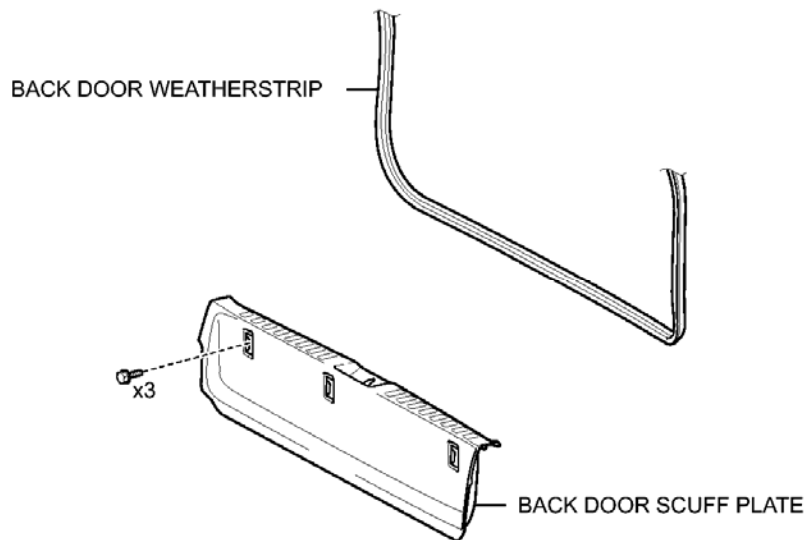
11. **CHECK FOR SPEED SENSOR SIGNAL**

Refer to **TEST MODE PROCEDURE**

REAR SPEED SENSOR (FOR AWD)

COMPONENTS

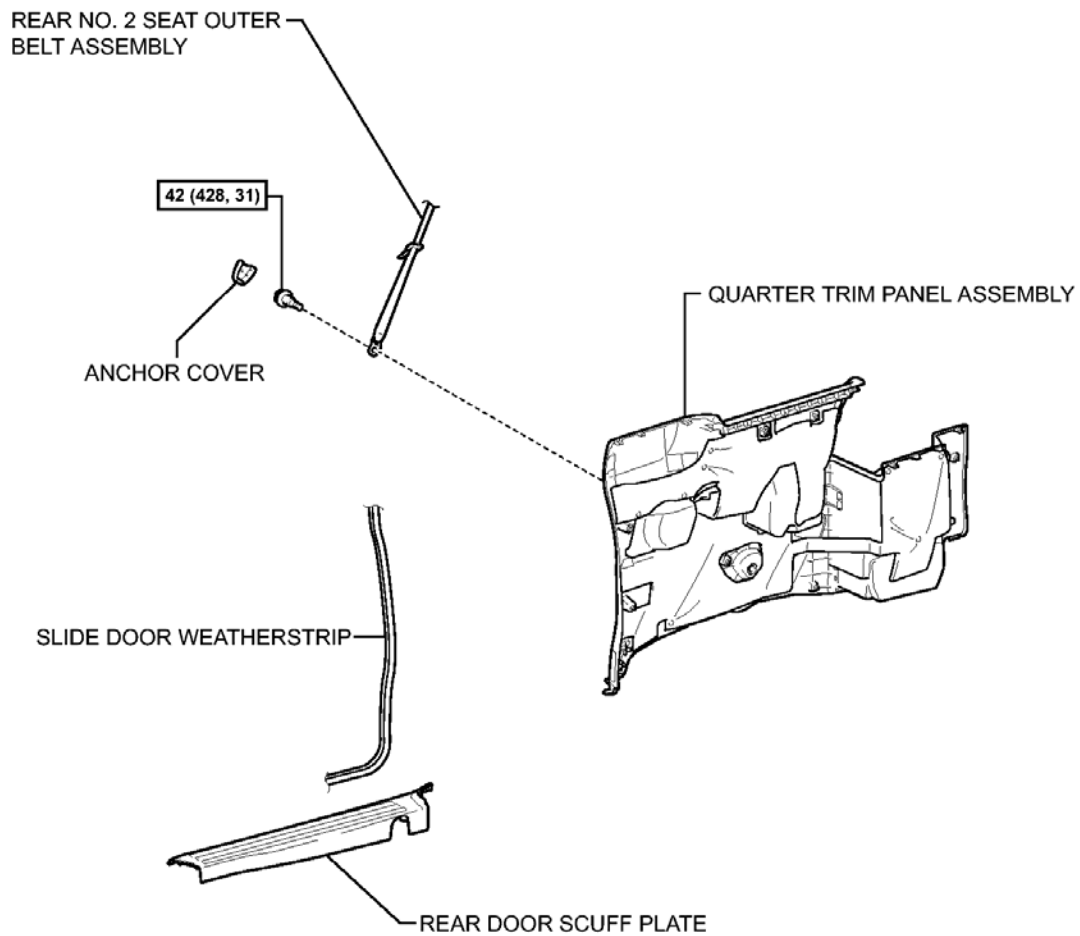
ILLUSTRATION



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Fig. 26: Rear Speed Sensor Replacement Components (1 of 3)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

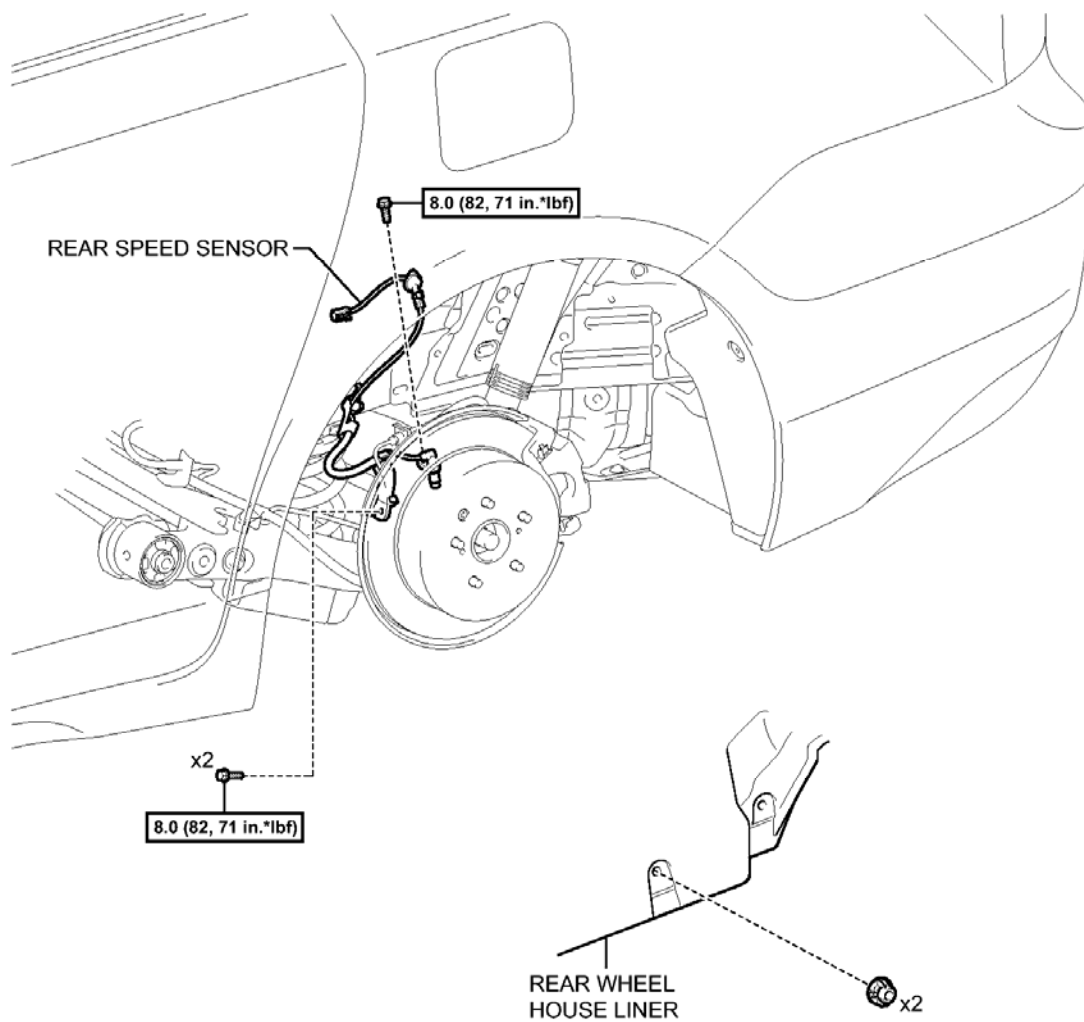
ILLUSTRATION



$\boxed{\text{N}\cdot\text{m (kgf}\cdot\text{cm, ft}\cdot\text{lb)}} : \text{Specified torque}$

Fig. 27: Rear Speed Sensor Replacement Components With Torque Specifications (2 of 3)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ILLUSTRATION



$\boxed{\text{N}^*\text{m (kgf}^*\text{cm, ft.}^*\text{lbf)}}$: Specified torque

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Fig. 28: Rear Speed Sensor Replacement Components With Torque Specifications (3 of 3)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

REMOVAL

HINT:

- Use the same procedure for the LH side and RH side.
- The following procedure is for the LH side.
- If the sensor rotor needs to be replaced, replace it together with the rear drive shaft assembly.

1. **SEPARATE BACK DOOR WEATHERSTRIP**
2. **REMOVE BACK DOOR SCUFF PLATE** . Refer to **REMOVAL - Step 17**
3. **REMOVE REAR DOOR SCUFF PLATE** . Refer to **REMOVAL - Step 14**
4. **SEPARATE SLIDE DOOR WEATHERSTRIP**
5. **SEPARATE REAR NO. 2 SEAT OUTER BELT ASSEMBLY** . Refer to **REMOVAL - Step 5**
6. **REMOVE QUARTER TRIM PANEL ASSEMBLY** . Refer to **REMOVAL - Step 27**
7. **REMOVE REAR WHEEL**
8. **REMOVE REAR SPEED SENSOR**
 - a. Disconnect the rear speed sensor connector.

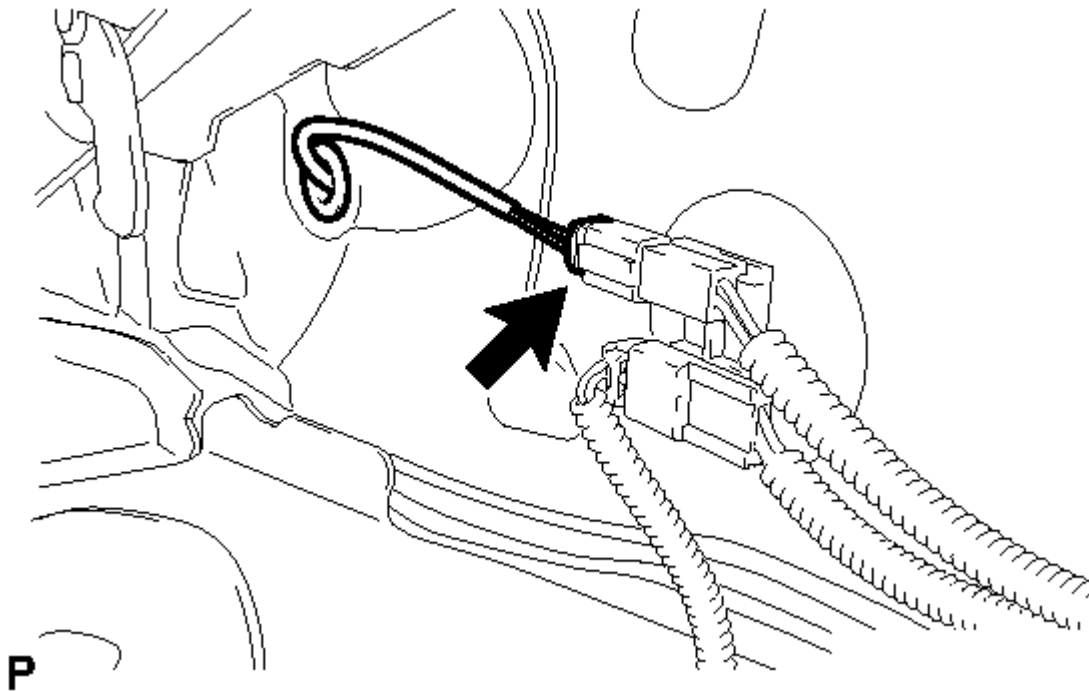
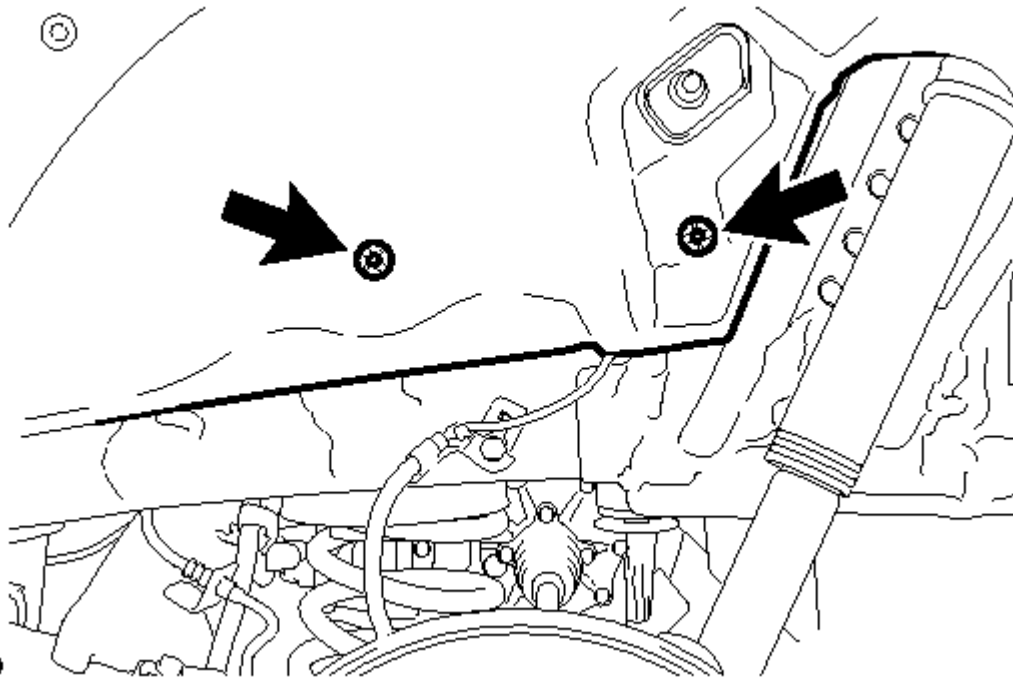


Fig. 29: Identifying Rear Speed Sensor Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the 2 clips and peel back the rear wheel house liner.



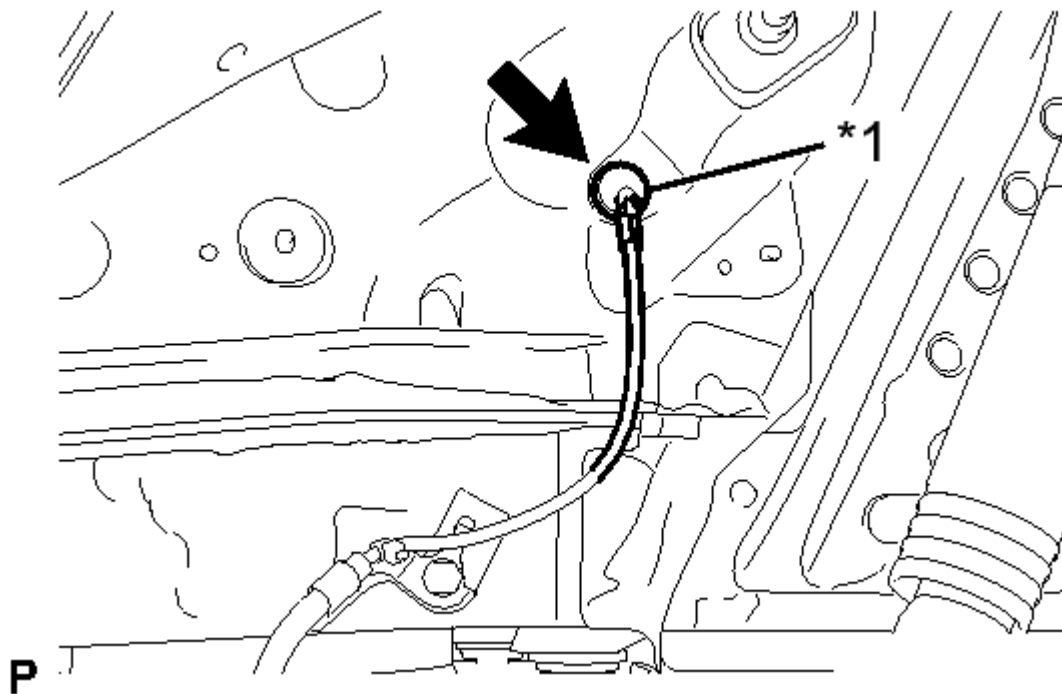
P

Fig. 30: Identifying Rear Wheel House Liner Fasteners
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Peel back the rear wheel house liner enough to allow removal and installation of the rear speed sensor.

- c. Disconnect the grommet of the rear speed sensor wire from the hole of the wheel house.

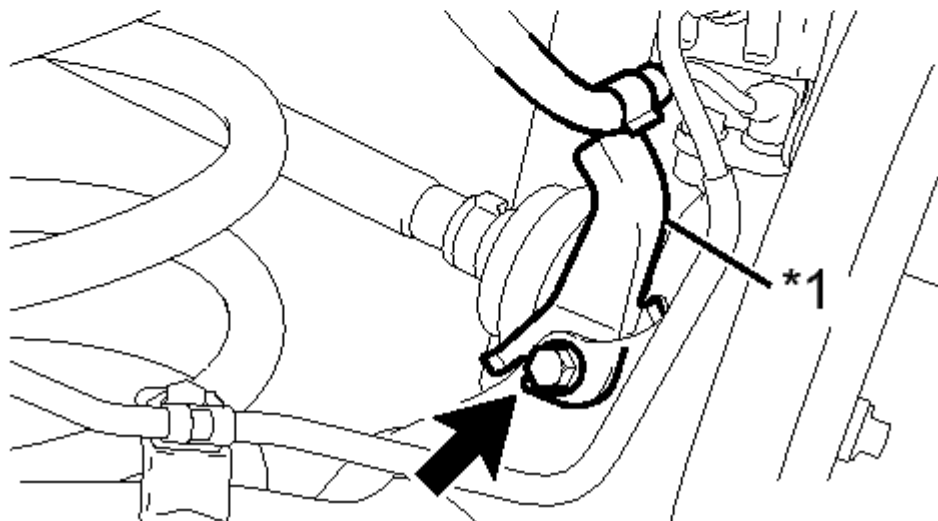
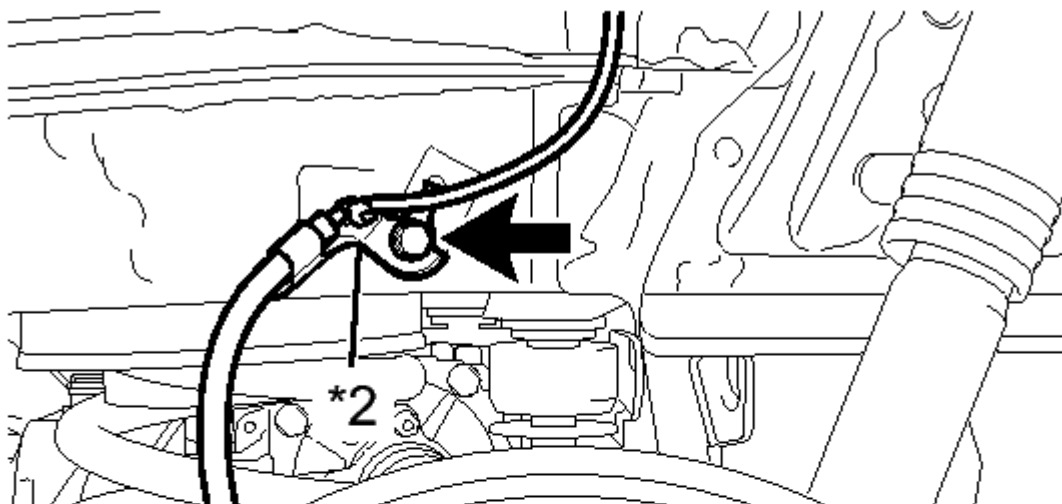


P
Fig. 31: Identifying Rear Speed Sensor Wire & Grommet
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*1	Grommet
----	---------

- d. Remove the 2 bolts, No. 1 bracket and No. 2 bracket from the body and rear axle beam.



P

Fig. 32: Identifying No. 1 & No. 2 Bracket Fasteners
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*1	No. 1 Bracket
*2	No. 2 Bracket

- e. Remove the bolt and rear speed sensor from the retainer.

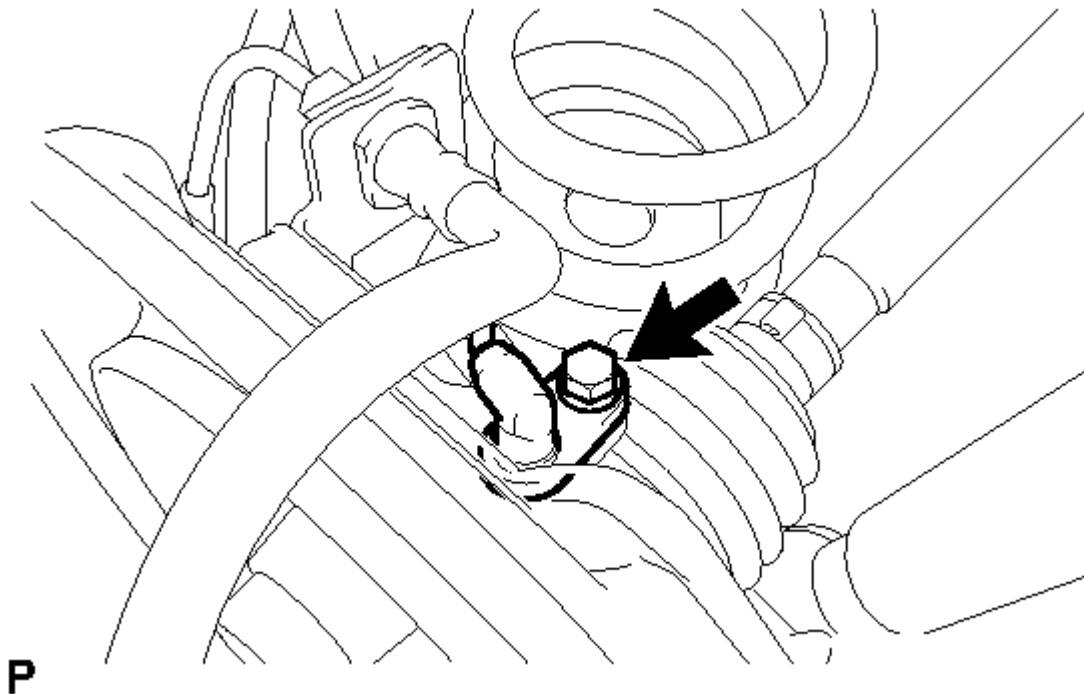


Fig. 33: Identifying Rear Speed Sensor & Fastener
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: Keep the sensor tip and rear speed sensor installation hole free from foreign matter.

INSTALLATION

INSTALLATION

HINT:

- Use the same procedure for the LH side and RH side.
- The following procedure is for the LH side.
- If the sensor rotor needs to be replaced, replace it together with the rear drive shaft assembly.

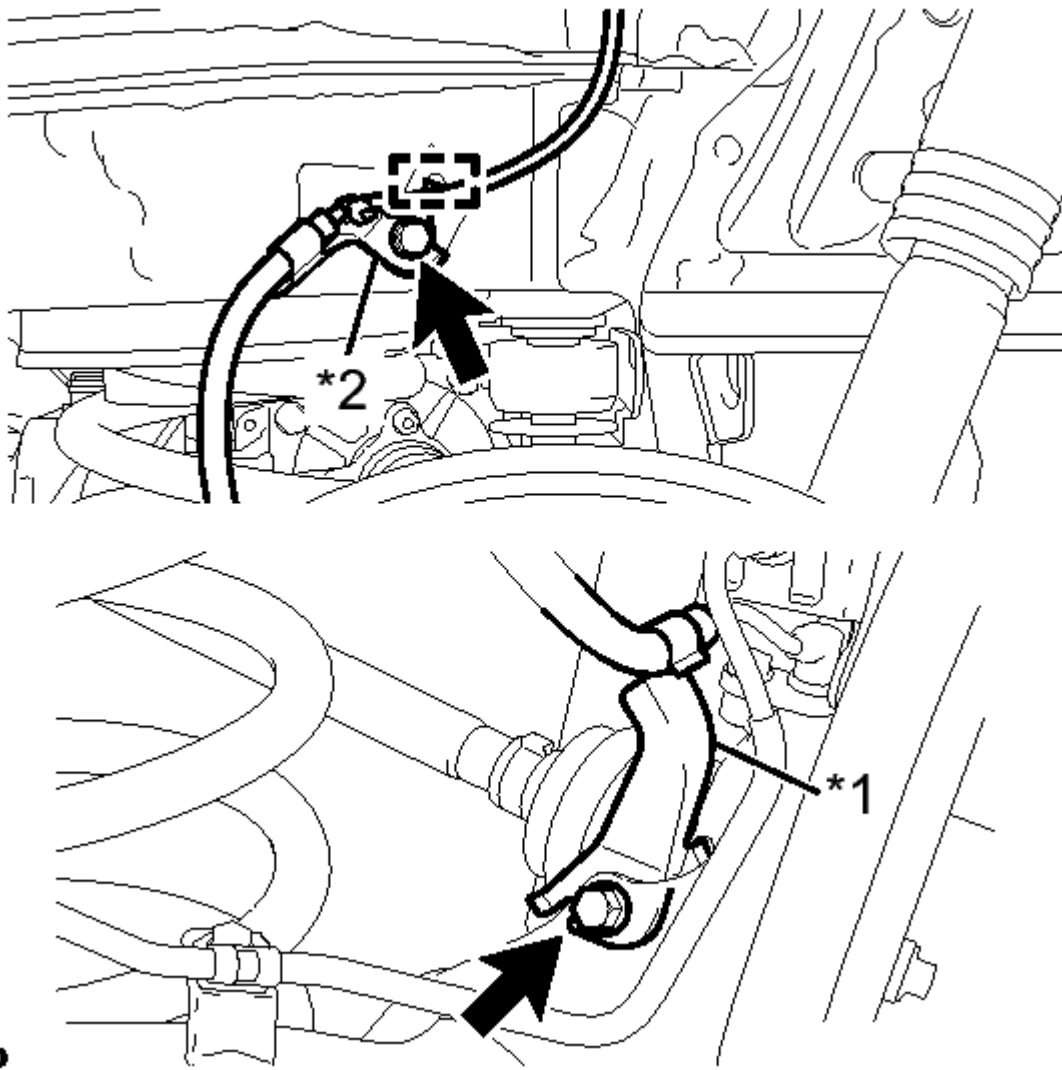
1. INSTALL REAR SPEED SENSOR

- a. Install the rear speed sensor with the bolt.

Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

NOTE: Keep the rear speed sensor tip and sensor installation hole free from foreign matter.

- b. Install the No. 1 bracket and No. 2 bracket with the 2 bolts.



P

Fig. 34: Installing No. 1 & No. 2 Bracket Fasteners
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

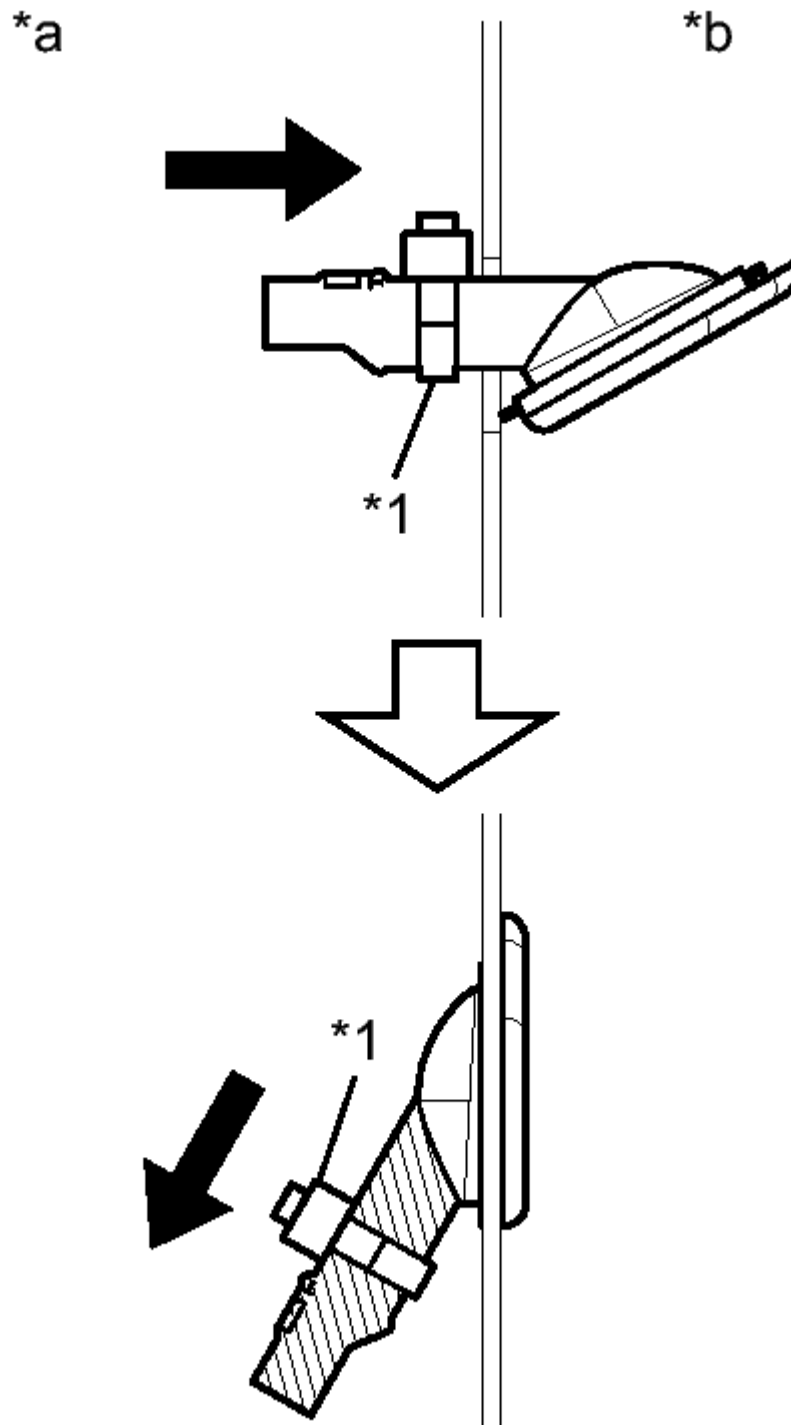
*1	No. 1 Bracket
*2	No. 2 Bracket

Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

NOTE:

- Be sure to insert the No. 2 bracket into the stopper hole while installing the No. 2 bracket.
- Do not twist the rear speed sensor wire when installing the brackets.

- c. Insert the connector and grommet to the inside of the vehicle through the passage hole in the wheel well.



P

Fig. 35: Identifying Grommet Band Clamp Position
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*1	Band Clamp
*a	Outside
*b	Inside
	Gripping Point

NOTE: Make sure that the grommet's band clamp remains on the outside of the vehicle.

- d. Hold the grommet and pull it from the inside to the outside of the vehicle. Then secure it in place so that it is not tilted.

NOTE: When pulling out the grommet, do not grip the sensor wire.

- e. The direction of the grommet is indicated in the illustration.

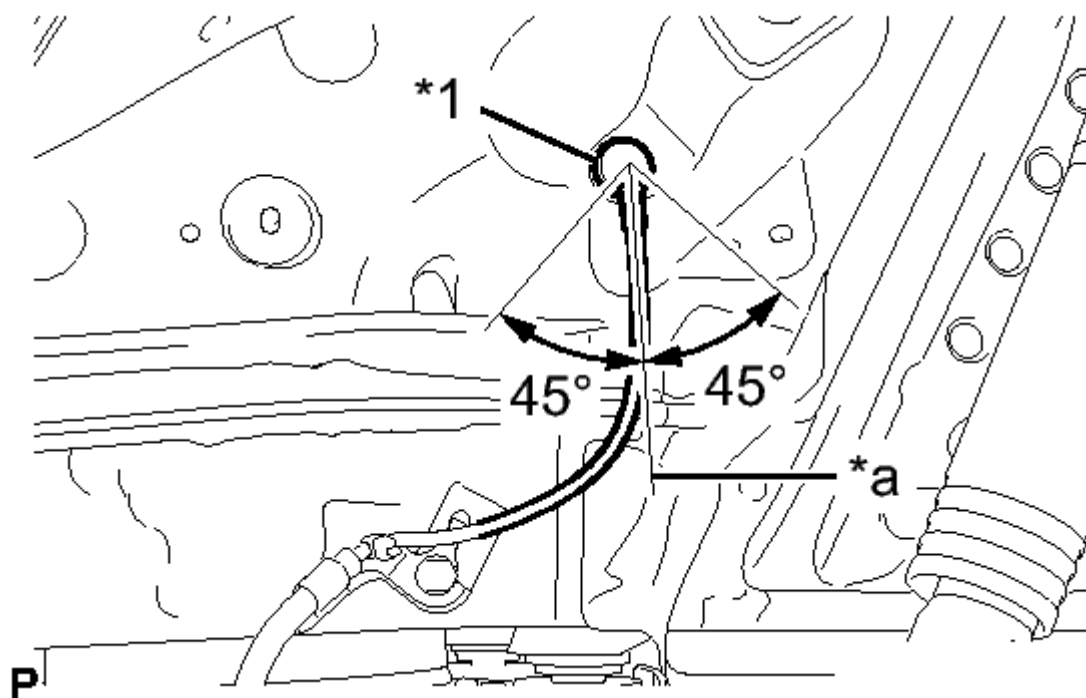


Fig. 36: Identifying Direction Of Grommet & Vertical Line
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*1	Grommet
*a	Vertical line

- f. Return the rear wheel house liner and engage the 2 clips.
- g. Connect the rear speed sensor connector.
- 2. **INSTALL QUARTER TRIM PANEL ASSEMBLY** . Refer to **INSTALLATION - Step 15**
- 3. **INSTALL REAR NO. 2 SEAT OUTER BELT ASSEMBLY** . Refer to **INSTALLATION - Step 3**
- 4. **INSTALL SLIDE DOOR WEATHERSTRIP**
- 5. **INSTALL REAR DOOR SCUFF PLATE** . Refer to **INSTALLATION - Step 28**
- 6. **INSTALL BACK DOOR SCUFF PLATE** . Refer to **INSTALLATION - Step 24**
- 7. **INSTALL BACK DOOR WEATHERSTRIP**
- 8. **INSTALL REAR WHEEL**

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

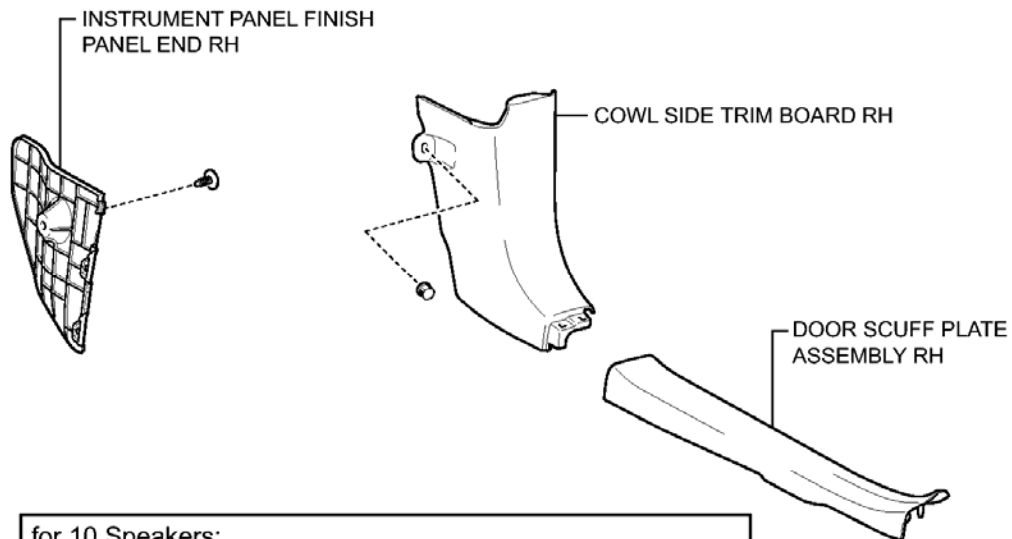
- 9. **CHECK FOR SPEED SENSOR SIGNAL**

Refer to **TEST MODE PROCEDURE**

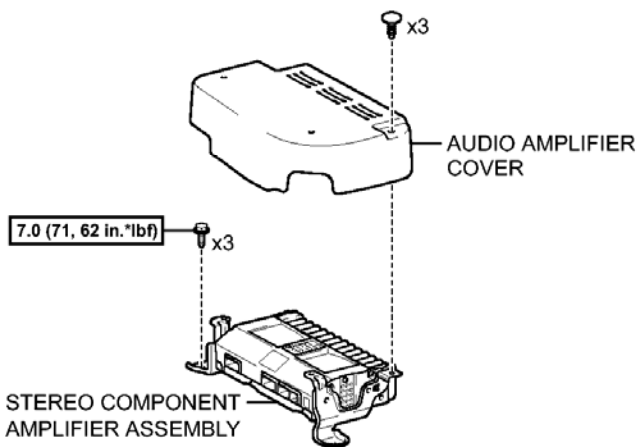
YAW RATE AND ACCELERATION SENSOR

COMPONENTS

ILLUSTRATION



for 10 Speakers:

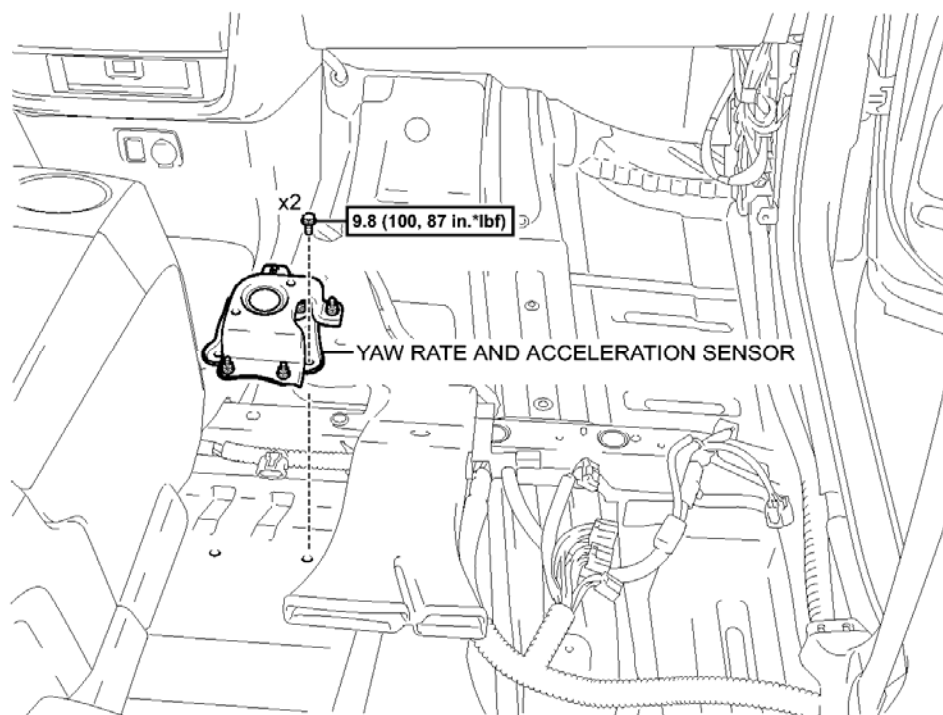


[N*m (kgf*cm, ft.*lbf)]: Specified torque

P

Fig. 37: Yaw Rate & Acceleration Sensor Replacement Components With Torque Specifications (1 of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ILLUSTRATION



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

P

Fig. 38: Yaw Rate & Acceleration Sensor Replacement Components With Torque Specifications (2 of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

REMOVAL

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 FRONT SEAT ASSEMBLY RH (for Manual Seat)**

Refer to **REMOVAL**

3. **REMOVE FRONT SEAT ASSEMBLY RH (for Power Seat)**

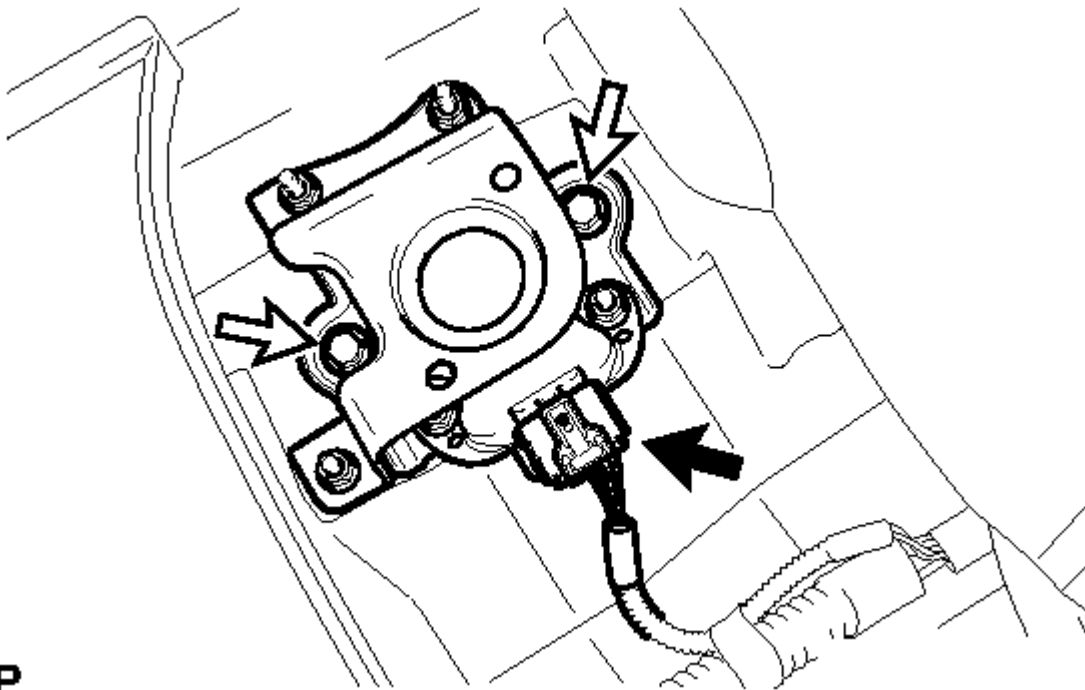
Refer to **REMOVAL**

4. **REMOVE DOOR SCUFF PLATE ASSEMBLY RH** . Refer to **REMOVAL - Step 3**
5. **REMOVE COWL SIDE TRIM BOARD RH** . Refer to **REMOVAL - Step 5**
6. **REMOVE AUDIO AMPLIFIER COVER (for 10 Speakers)** . Refer to **REMOVAL - Step 3**
7. **REMOVE STEREO COMPONENT AMPLIFIER ASSEMBLY (for 10 Speakers)** . Refer to **REMOVAL - Step 4**
8. **REMOVE INSTRUMENT PANEL FINISH PANEL END RH** . Refer to **REMOVAL - Step 39**
9. **REMOVE YAW RATE AND ACCELERATION SENSOR**
 - a. Disengage the clips and peel back the floor carpet.

HINT:

Peel back the floor carpet enough to allow removal and installation of the yaw rate and acceleration sensor.

- b. Disconnect the connector from the yaw rate and acceleration sensor.



P

Fig. 39: Identifying Yaw Rate/Acceleration Sensor, Connector & Fasteners
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Remove the 2 bolts and yaw rate and acceleration sensor.

INSTALLATION

INSTALLATION

1. INSTALL YAW RATE AND ACCELERATION SENSOR

- a. Connect the connector to the yaw rate and acceleration sensor.

NOTE: Make sure that the yaw rate and acceleration sensor connector is connected securely.

- b. Install the yaw rate and acceleration sensor with the 2 bolts.

Torque: 9.8 N*m (100 kgf*cm, 87 in.*lbf)

NOTE:

- Do not damage the yaw rate and acceleration sensor.
- Make sure that the yaw rate and acceleration sensor is installed securely.
- Do not use dropped or damaged parts.
- Keep the contact surfaces of the yaw rate and acceleration sensor and the body free of foreign matter.
- Make sure that the sensor is facing the correct direction.

- c. Return the floor carpet and engage the clips.

2. **INSTALL INSTRUMENT PANEL FINISH PANEL END RH** . Refer to **INSTALLATION - Step 18**
3. **INSTALL STEREO COMPONENT AMPLIFIER ASSEMBLY (for 10 Speakers)** . Refer to **INSTALLATION - Step 1**
4. **INSTALL AUDIO AMPLIFIER COVER (for 10 Speakers)** . Refer to **INSTALLATION - Step 2**
5. **INSTALL COWL SIDE TRIM BOARD RH** . Refer to **INSTALLATION - Step 35**
6. **INSTALL DOOR SCUFF PLATE ASSEMBLY RH** . Refer to **INSTALLATION - Step 37**
7. **INSTALL FRONT SEAT ASSEMBLY RH (for Manual Seat)**

Refer to **INSTALLATION**

8. **INSTALL FRONT SEAT ASSEMBLY RH (for Power Seat)**

Refer to **INSTALLATION**

9. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

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

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

10. **PERFORM YAW RATE AND ACCELERATION SENSOR ZERO POINT CALIBRATION**

Refer to **CALIBRATION**

11. CHECK FOR YAW RATE SENSOR SIGNAL

Refer to **TEST MODE PROCEDURE**

STEERING ANGLE SENSOR

COMPONENTS

ILLUSTRATION

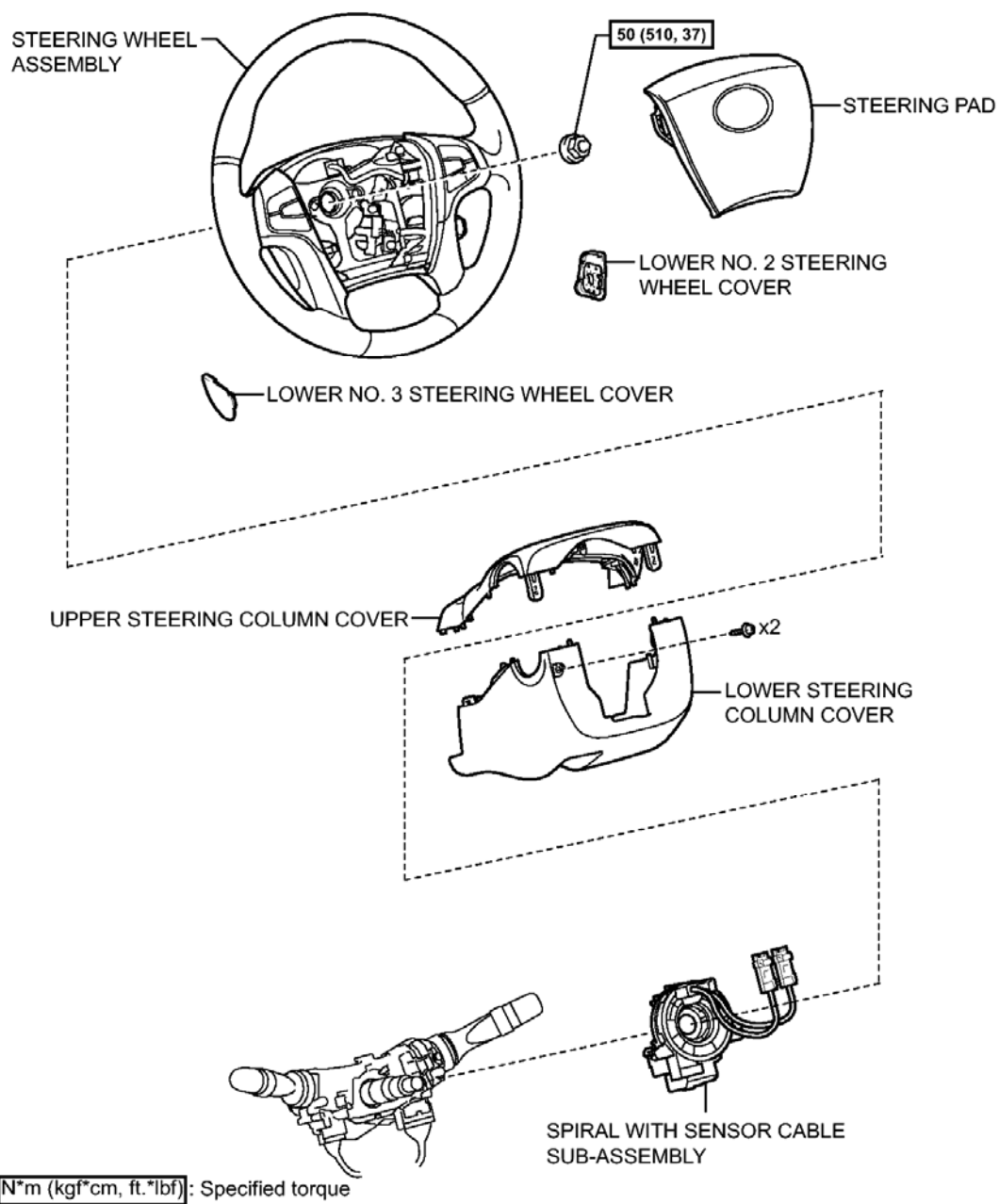


Fig. 40: Steering Angle Sensor Replacement Components With Torque Specifications
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

REMOVAL

WARNING: Some of these service operations affect the SRS airbag system. Read the

precautionary notices concerning the SRS airbag system before servicing. Refer to PRECAUTION .

NOTE: Do not remove the steering angle sensor from the spiral cable.

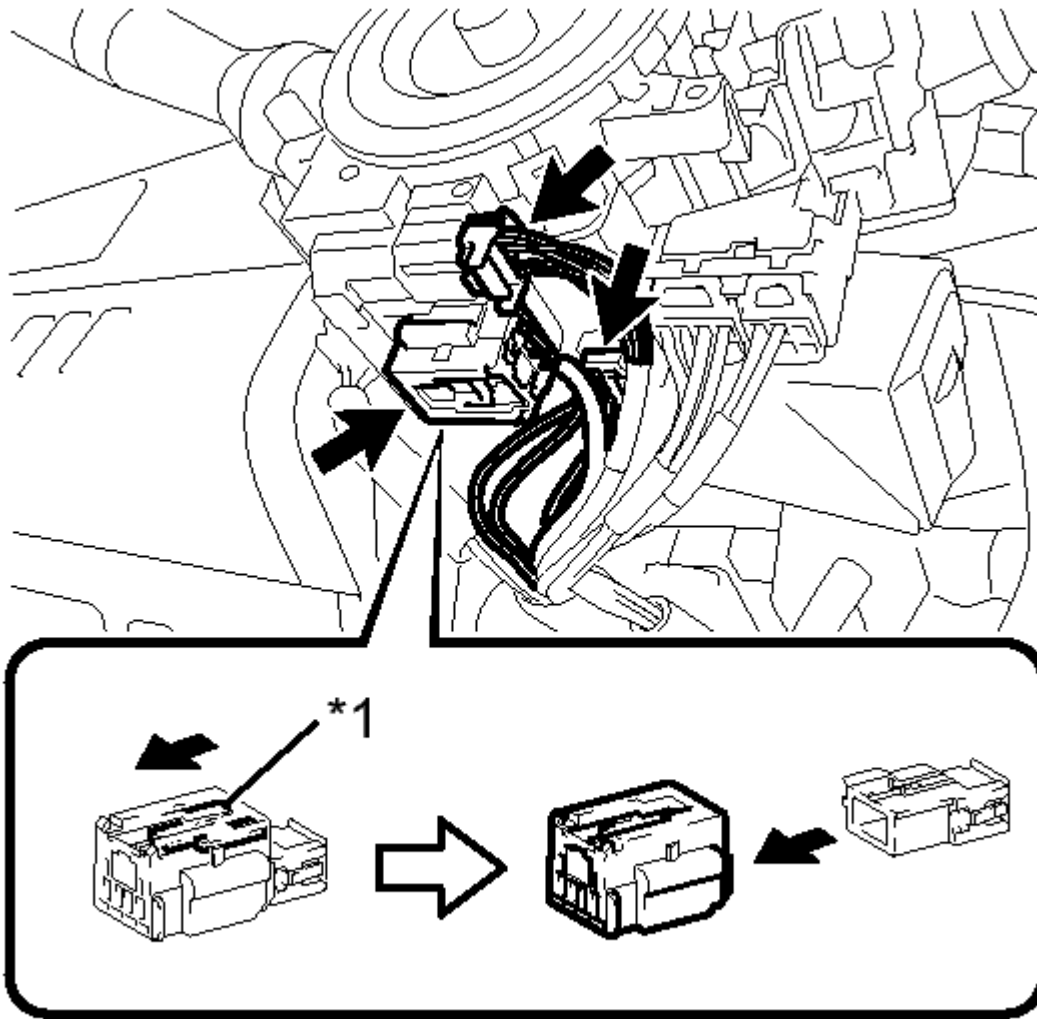
REMOVAL

1. **POSITION FRONT WHEELS FACING STRAIGHT AHEAD**
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**

WARNING: Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

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

3. **REMOVE LOWER NO. 3 STEERING WHEEL COVER** . Refer to REMOVAL - Step 2
4. **REMOVE LOWER NO. 2 STEERING WHEEL COVER** . Refer to REMOVAL - Step 3
5. **REMOVE STEERING PAD** . Refer to REMOVAL - Step 4
6. **REMOVE STEERING WHEEL ASSEMBLY** . Refer to REMOVAL - Step 6
7. **REMOVE LOWER STEERING COLUMN COVER** . Refer to REMOVAL - Step 10
8. **REMOVE UPPER STEERING COLUMN COVER** . Refer to REMOVAL - Step 11
9. **REMOVE SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY**
 - a. Disconnect the horn connector.



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Fig. 41: Removing Horn Connector From Spiral With Sensor Cable Sub-Assembly
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*1 Slider

- b. Slide the slider and disengage the airbag connector.
- c. Disconnect the steering angle sensor connector.
- d. Disengage the 3 claws and remove the spiral with sensor cable sub-assembly.

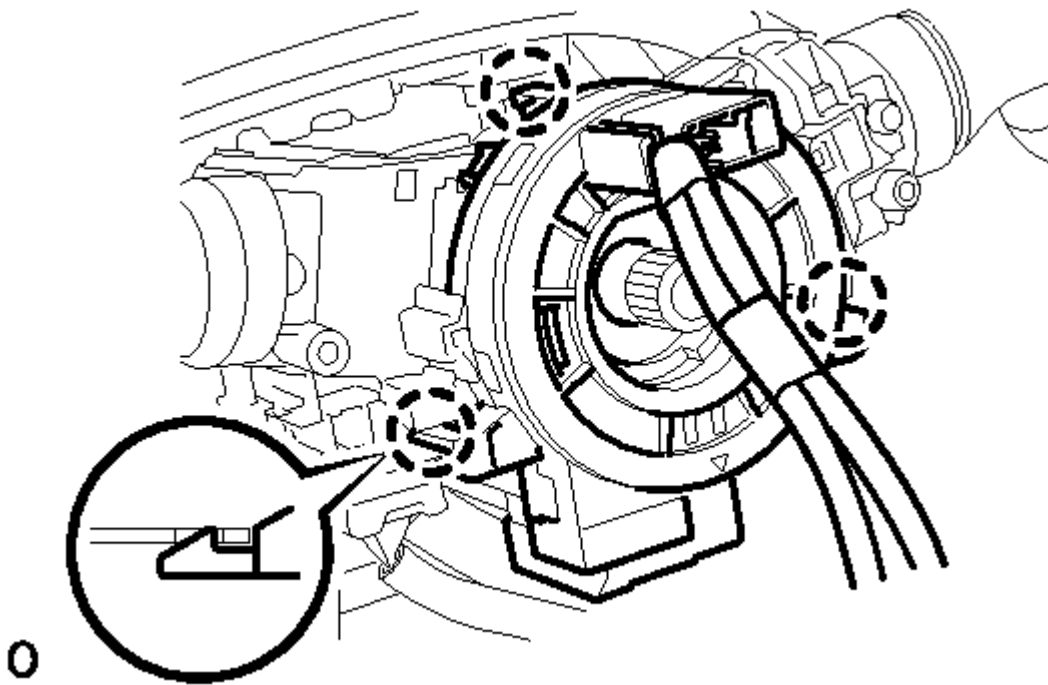


Fig. 42: Identifying Spiral With Sensor Cable Sub-Assembly Claws
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

WARNING:

- Do not replace the spiral with sensor cable sub-assembly when the ignition switch is ON and the battery cable is connected.
- Do not rotate the spiral with sensor cable sub-assembly when the ignition switch is ON and the battery cable is connected.
- Make sure the steering wheel is installed and centered before rotating the steering angle sensor when performing steering angle sensor operation inspections (inspecting for abnormal noise, diagnosis inspections, etc.).
- Do not remove the steering angle sensor from the spiral cable.
- If there is a malfunction in the steering angle sensor, replace the spiral with sensor cable sub-assembly.

INSTALLATION

INSTALLATION

WARNING: Some of these service operations affect the SRS airbag system. Read the precautionary notices concerning the SRS airbag system before servicing. Refer to PRECAUTION .

1. INSTALL SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY

- a. Check that the ignition switch is off.
- b. Check that the cable is disconnected from the negative (-) battery terminal.

WARNING: Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

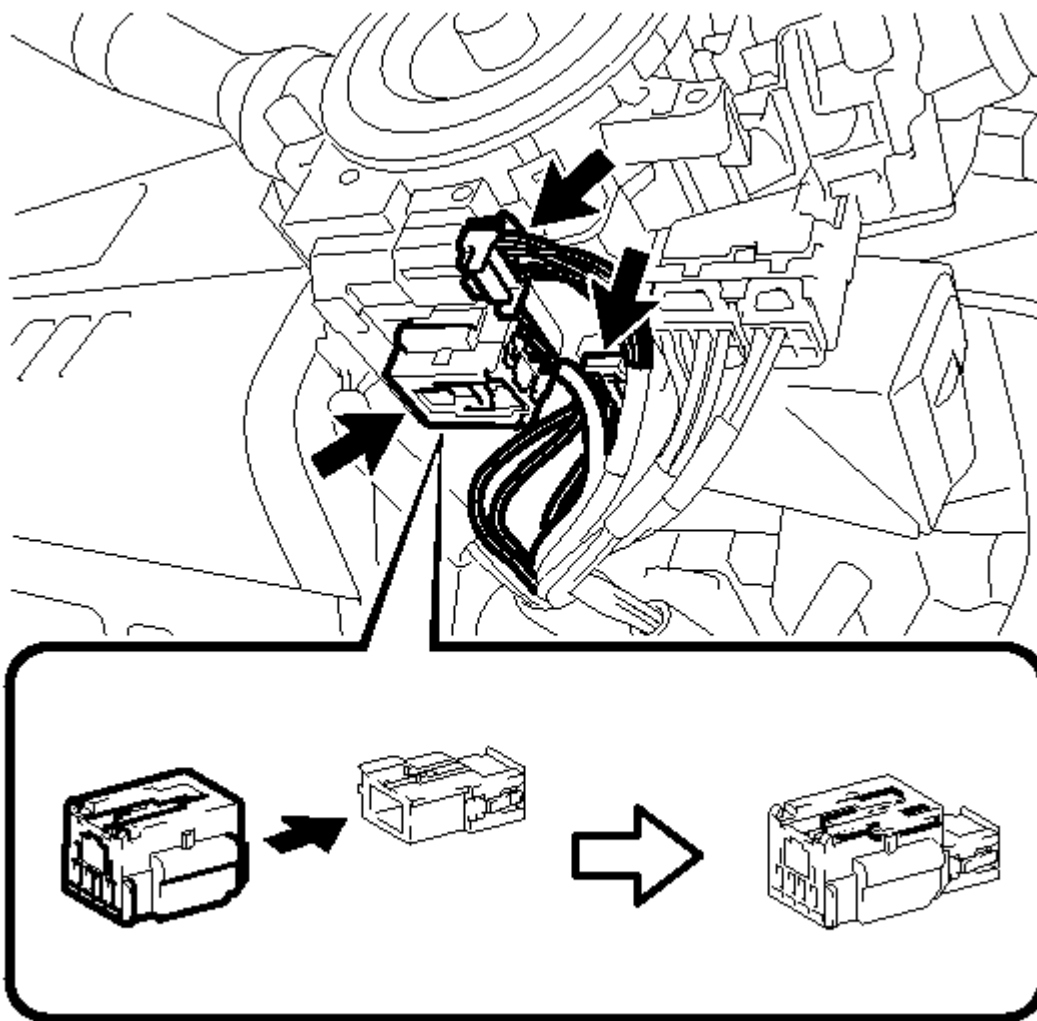
- c. Confirm that the front tires face straight forward.
- d. Confirm that the turn signal switch is in the neutral position.

NOTE: Perform the operation when the turn signal switch is in the neutral position. Otherwise, the turn signal pin will break.

- e. Engage the 3 claws and install the spiral with sensor cable sub-assembly.

NOTE: Pull the lock pin out before installing the steering wheel when replacing the spiral with sensor cable sub-assembly with a new one.

- f. Connect the airbag connector.



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Fig. 43: Identifying Spiral Cable Horn, Airbag & Steering Angle Sensor Connectors
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- g. Connect the horn connector.
- h. Connect the steering angle sensor connector.

WARNING:

- Do not replace the spiral with sensor cable sub-assembly when the ignition switch is ON and the battery cable is connected.
- Do not rotate the spiral with sensor cable sub-assembly when the ignition switch is ON and the battery cable is connected.
- Make sure the steering wheel is installed and centered before rotating the steering angle sensor when performing steering angle sensor operation inspections

(inspecting for abnormal noise, diagnosis inspections, etc.).

- Do not remove the steering angle sensor from the spiral cable.
- If there is a malfunction in the steering angle sensor, replace the spiral with sensor cable sub-assembly.

2. **INSTALL UPPER STEERING COLUMN COVER** . Refer to INSTALLATION - Step 6
3. **INSTALL LOWER STEERING COLUMN COVER** . Refer to INSTALLATION - Step 7
4. **ADJUST SPIRAL CABLE** . Refer to INSTALLATION - Step 4
5. **INSTALL STEERING WHEEL ASSEMBLY** . Refer to INSTALLATION - Step 12
6. **INSPECT STEERING WHEEL CENTER POINT**
7. **INSTALL STEERING PAD** . Refer to INSTALLATION - Step 1
8. **INSTALL LOWER NO. 2 STEERING WHEEL COVER** . Refer to INSTALLATION - Step 3
9. **INSTALL LOWER NO. 3 STEERING WHEEL COVER** . Refer to INSTALLATION - Step 2
10. **POSITION FRONT WHEELS FACING STRAIGHT AHEAD**
11. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

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

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

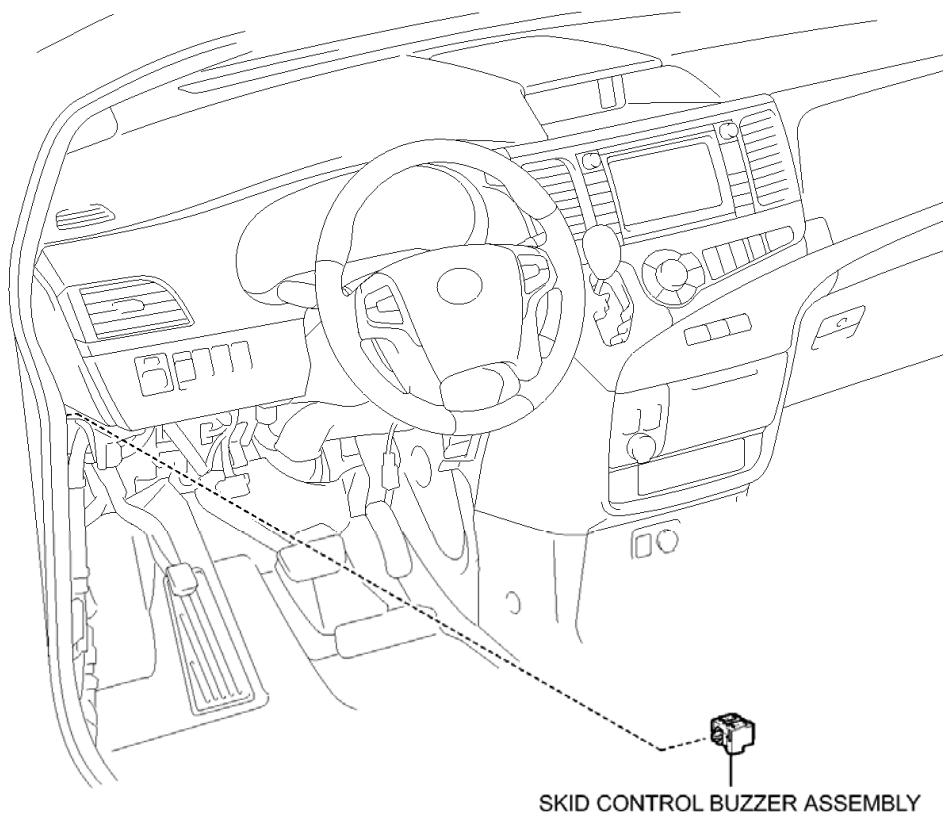
12. **INSPECT STEERING PAD** . Refer to INSTALLATION - Step 5
13. **INSPECT SRS WARNING LIGHT**

Refer to DIAGNOSIS SYSTEM

SKID CONTROL BUZZER

COMPONENTS

ILLUSTRATION



P

Fig. 44: Skid Control Buzzer Replacement Components
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

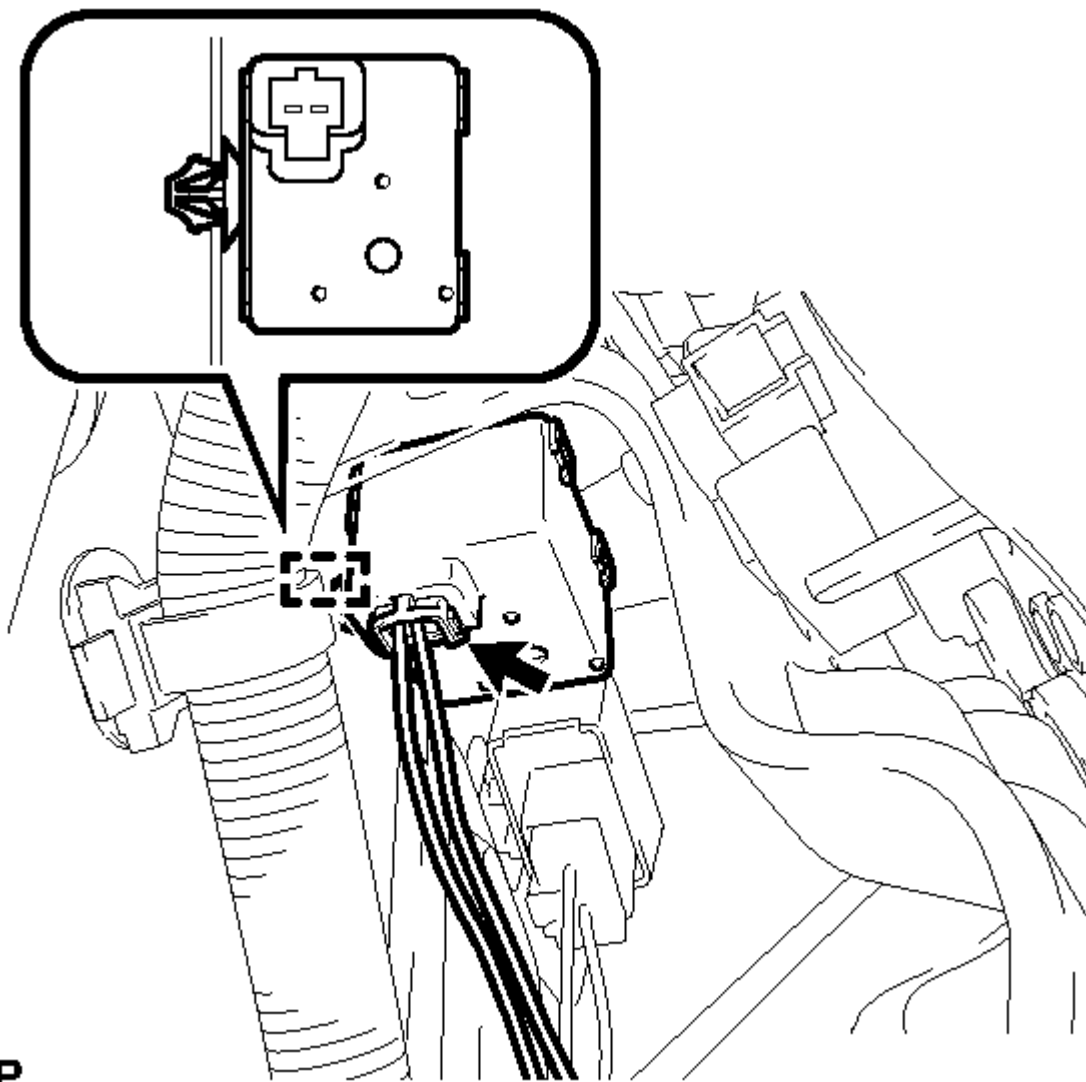
REMOVAL

1. REMOVE KNEE AIRBAG ASSEMBLY

Refer to **REMOVAL**

2. REMOVE SKID CONTROL BUZZER ASSEMBLY

- a. Remove the skid control buzzer clamp.



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Fig. 45: Identifying Skid Control Buzzer Assembly Connector & Fastener
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Disconnect the skid control buzzer connector.

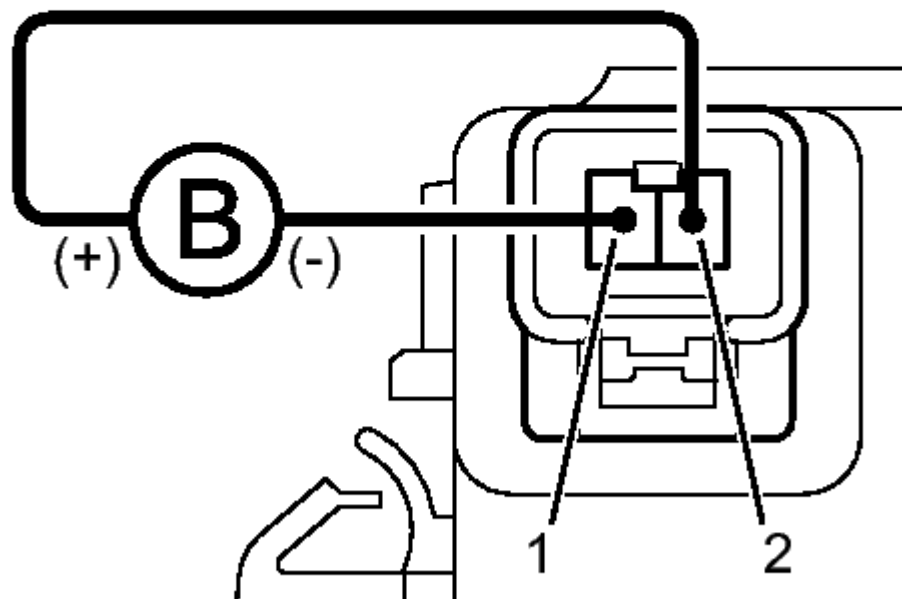
INSPECTION

INSPECTION

1. INSPECT SKID CONTROL BUZZER ASSEMBLY

- a. Connect a negative (-) lead from the battery to terminal 1 of the skid control buzzer and a positive (+) lead to terminal 2, and then check that the buzzer sounds.

*a



N

Fig. 46: Inspecting Skid Control Buzzer Assembly Operation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

	Component without harness
*a	connected (Skid Control Buzzer)

OK

The skid control buzzer sounds.

If the result is not as specified, replace the switch.

INSTALLATION

INSTALLATION

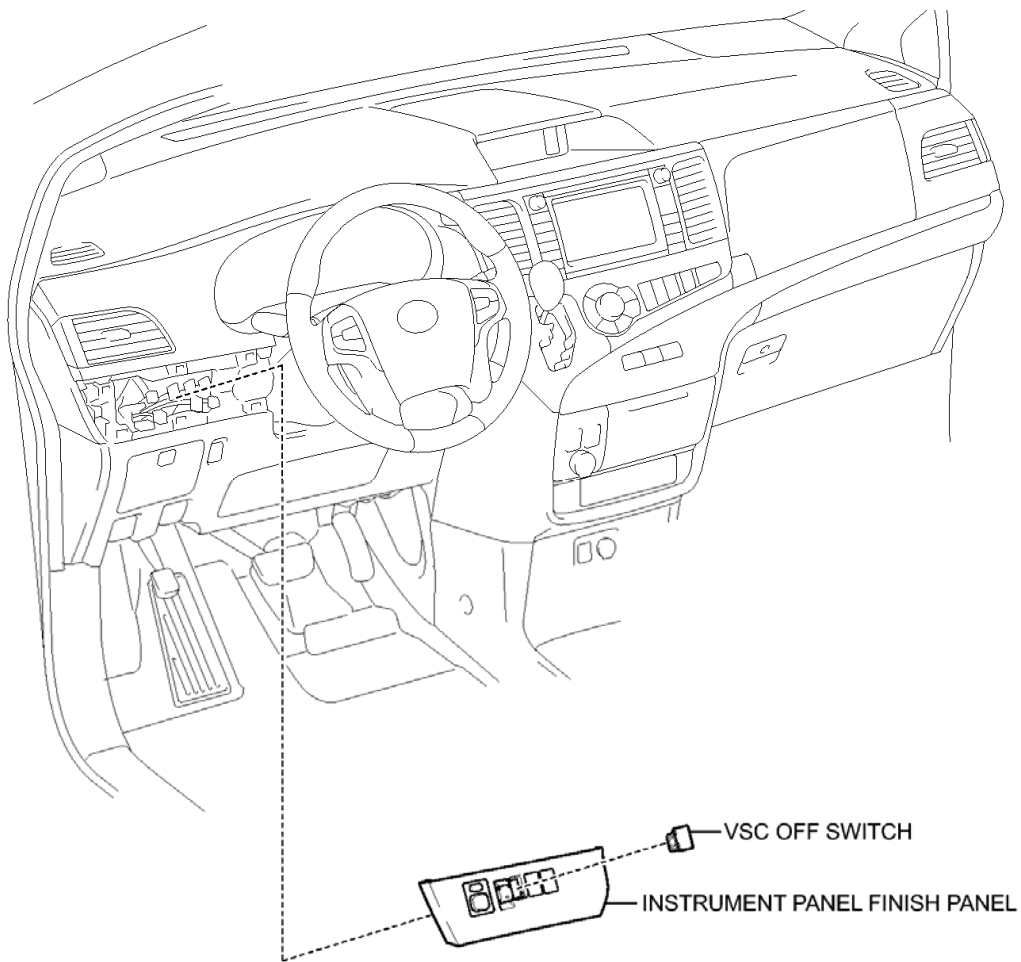
- 1. INSTALL SKID CONTROL BUZZER ASSEMBLY**
 - a. Connect the skid control buzzer connector.
 - b. Install the skid control buzzer clamp.
- 2. INSTALL KNEE AIRBAG ASSEMBLY**

Refer to **INSTALLATION**

VSC OFF SWITCH

COMPONENTS

ILLUSTRATION



P

Fig. 47: VSC OFF Switch Replacement Components
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

REMOVAL

1. **REMOVE INSTRUMENT PANEL FINISH PANEL** . Refer to **REMOVAL - Step 22**
2. **REMOVE VSC OFF SWITCH**
 - a. Disengage the 2 claws and remove the VSC OFF switch.

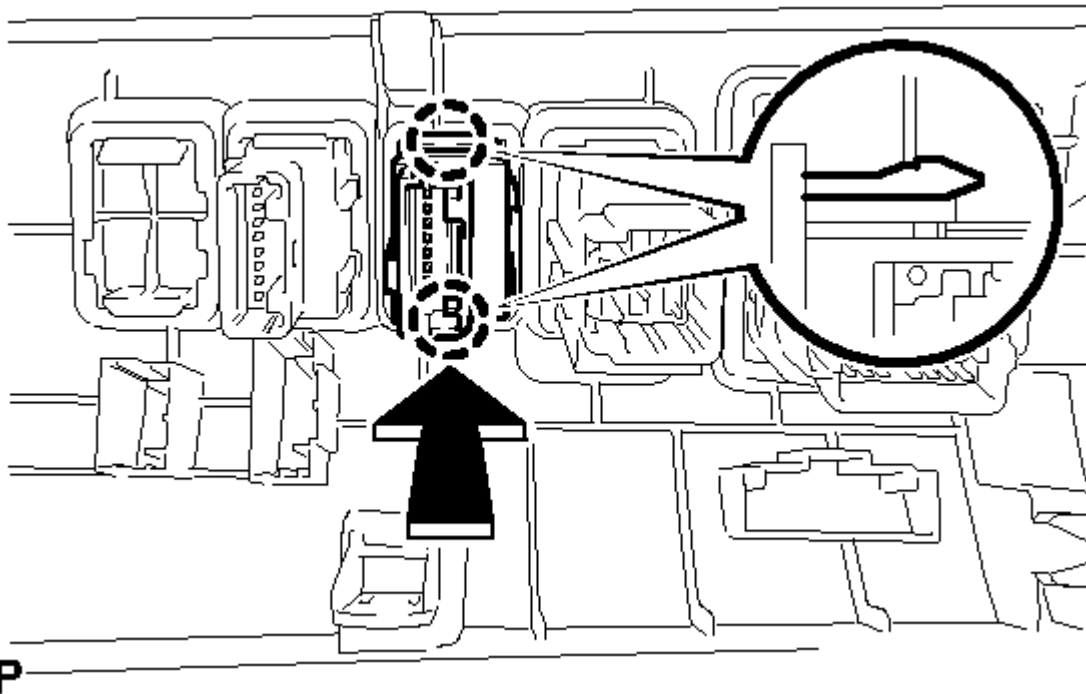


Fig. 48: Identifying VSC OFF Switch Claws
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

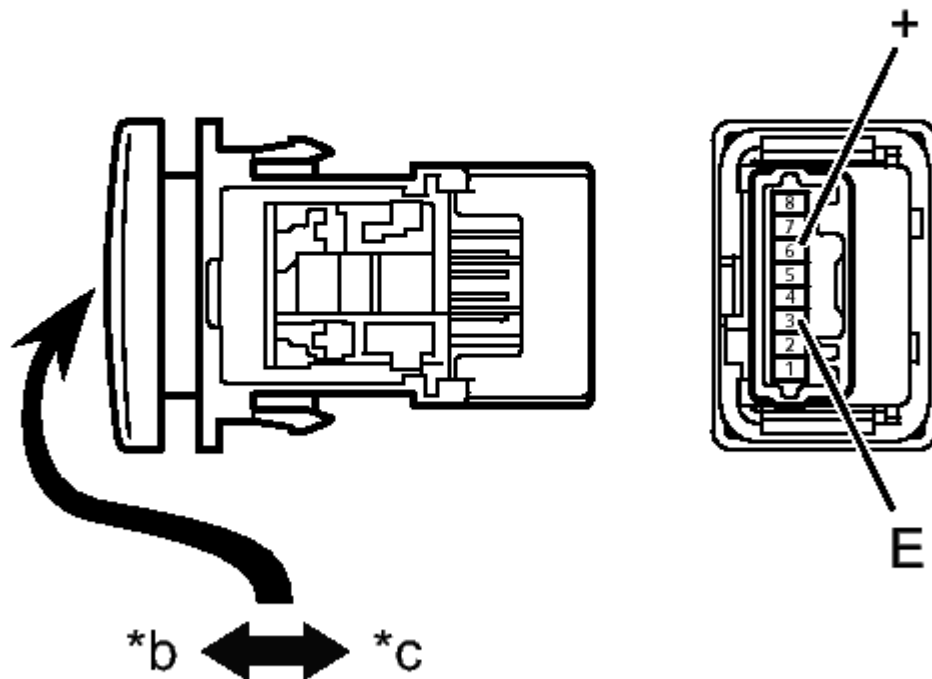
INSPECTION

INSPECTION

1. INSPECT VSC OFF SWITCH

- a. Disconnect the VSC OFF switch connector.
- b. Measure the resistance according to the value(s) in the table below.

*a



N

Fig. 49: Measuring VSC OFF Switch Resistance
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	Component without harness connected (VSC OFF Switch)
*b	Not pushed in
*c	Pushed in

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
6 (+) - 3 (E)	Switch is pushed in	Below 1 ohms
6 (+) - 3 (E)	Switch is not pushed in	10 kohms or higher

If the value is not as specified, replace the VSC OFF switch.

INSTALLATION

INSTALLATION

1. INSTALL VSC OFF SWITCH

- Engage the 2 claws and install the VSC OFF switch.

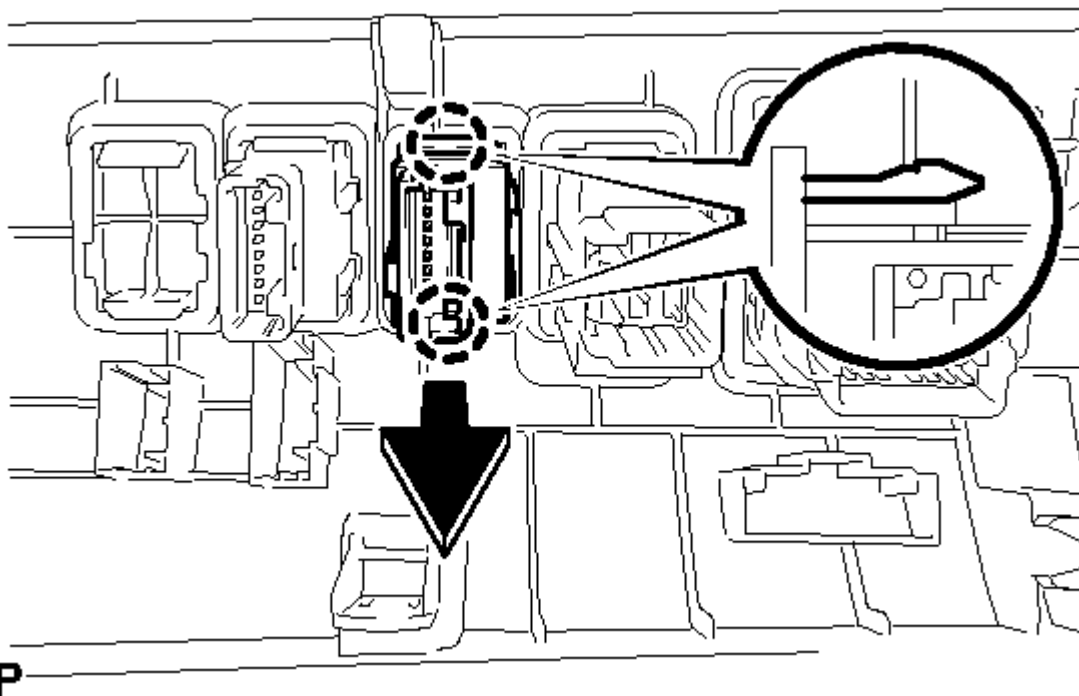


Fig. 50: Installing VSC OFF Switch Claws
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- INSTALL INSTRUMENT PANEL FINISH PANEL . Refer to INSTALLATION - Step 36
- CHECK FOR WARNING LIGHT AND INDICATOR LIGHT

Refer to TEST MODE PROCEDURE

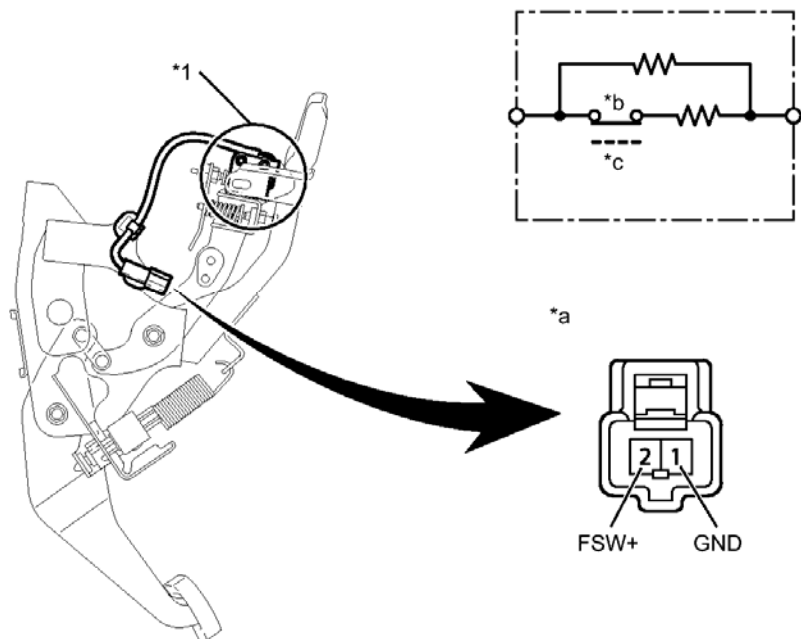
BRAKE PEDAL LOAD SENSING SWITCH

ON-VEHICLE INSPECTION

ON-VEHICLE INSPECTION

1. INSPECT BRAKE PEDAL LOAD SENSING SWITCH

- NOTE:
- Do not remove the brake pedal load sensing switch from the brake pedal support assembly.
 - When there is a malfunction in the brake pedal load sensing switch, replace the brake pedal support assembly.
- a. Disconnect the brake pedal load sensing switch connector.



P
Fig. 51: Brake Pedal Load Sensing Switch Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*1	Brake Pedal Load Sensing Switch	-	-
	Component without harness connected		Brake pedal

*a	(Brake Pedal Load Sensing Switch)	*b	release (ON)
*c	Brake pedal depressed (OFF)	-	-

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

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
2 (FSW+) - 1 (GND)	Brake pedal load sensing switch OFF (Brake pedal depressed)	950 to 1050 ohms
2 (FSW+) - 1 (GND)	Brake pedal load sensing switch ON (Brake pedal released)	203 to 223 ohms

If the value is not as specified, replace the brake pedal support assembly. Refer to **REMOVAL** .

BRAKES

Brake Control System (Service Specifications) - Sienna

BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS

SERVICE DATA

SERVICE DATA

SKID CONTROL BUZZER

Measurement Condition	Specified Condition
Battery positive (+) voltage --> Terminal 1	Skid control buzzer sounds
Battery negative (-) --> Terminal 2	

VSC OFF SWITCH

Tester Connection	Switch Condition	Specified Condition
6 (+) - 3 (E)	Switch is pushed in	Below 1 ohms
6 (+) - 3 (E)	Switch is not pushed in	10 kohms or higher

BRAKE PEDAL LOAD SENSING SWITCH

Tester Connection	Switch Condition	Specified Condition
2 (FSW+) - 1(GND)	Brake pedal load sensing switch OFF (Brake pedal depressed)	950 to 1050 ohms
2 (FSW+) - 1(GND)	Brake pedal load sensing switch ON (Brake pedal released)	203 to 223 ohms

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Part Tightened		N*m	kgf*cm	ft.*lbf
Brake actuator assembly x Brake actuator bracket assembly		5.4	55	48 in.*lbf
Brake actuator with bracket x Body		19	194	14
Air conditioner tube and accessory assembly x Body		5.4	55	48 in.*lbf
Brake actuator x Brake line	Flare Nut A (10 mm)	15	155	11
	Flare Nut B (12 mm)	20	199	14
Front speed sensor x Steering knuckle		8.0	82	71 in.*lbf
Front speed sensor x Body		8.0	82	71

				in.*lbf
Front speed sensor x Shock absorber		19	192	14
Rear axle hub and bearing assembly x Rear axle beam assembly	for 2WD	90	918	66 in.*lbf
Rear speed sensor x Rear axle beam assembly	for AWD	8.0	82	71 in.*lbf
Rear speed sensor x Body		8.0	82	71 in.*lbf
Rear speed sensor x Retainer		8.0	82	71 in.*lbf
Yaw rate and acceleration sensor x Body		9.8	100	87 in.*lbf