

**2009 Toyota Highlander Limited**

2009 ACCESSORIES &amp; EQUIPMENT Horn - Highlander

**2009 ACCESSORIES & EQUIPMENT****Horn - Highlander****HORN SYSTEM****PRECAUTION**

**NOTE:** When disconnecting the cable from the negative (-) battery terminal, initialize the following system after the cable is reconnected.

**SYSTEM NAME REFERENCE**

| System Name            | See procedure         |
|------------------------|-----------------------|
| Power Back Door System | <u>INITIALIZATION</u> |

**PARTS LOCATION**

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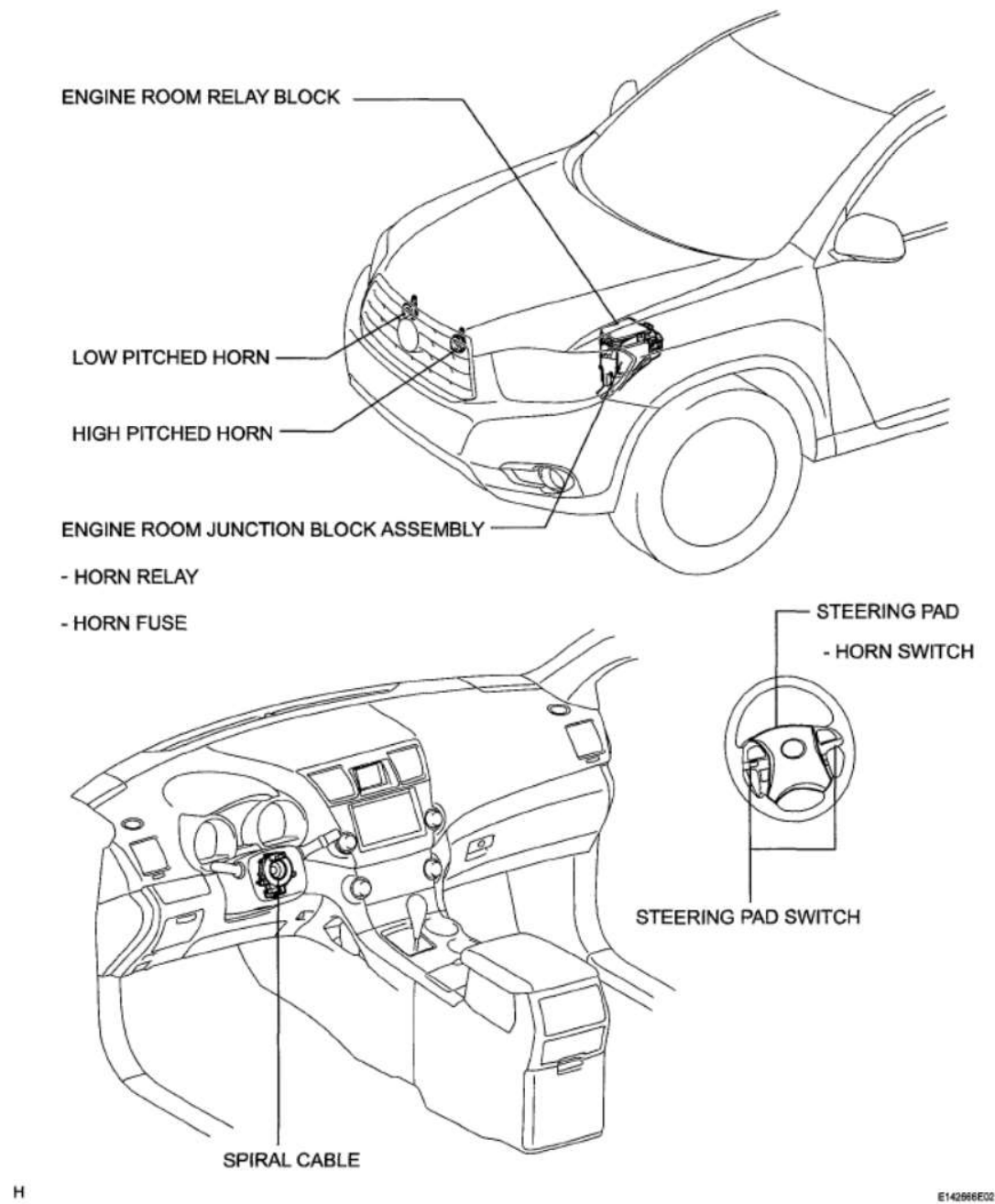
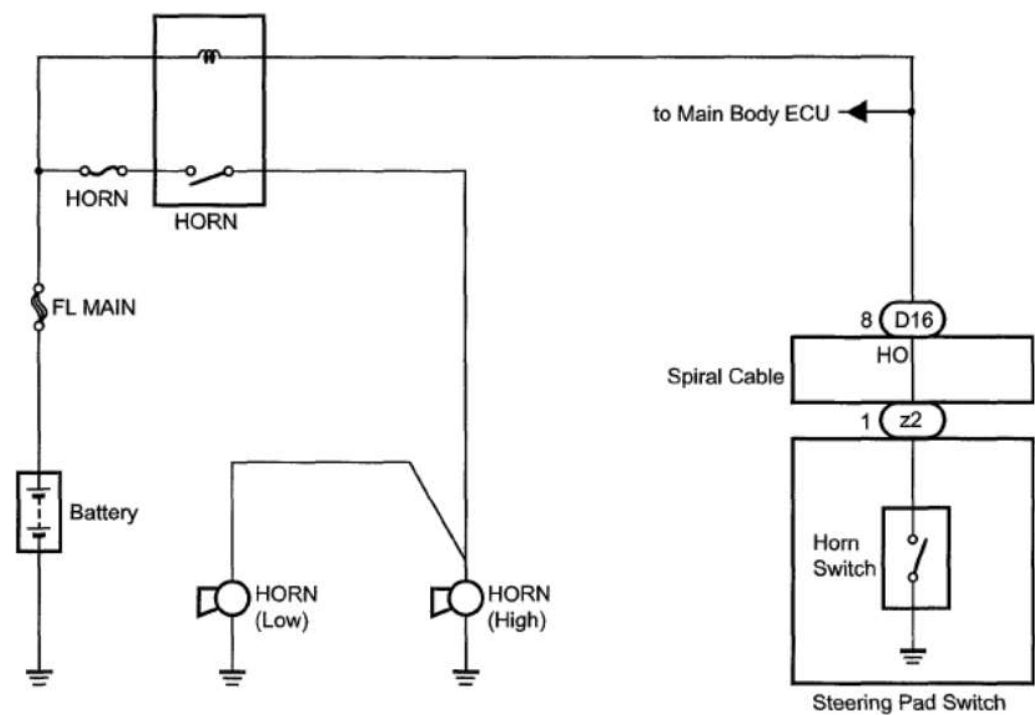


**Fig. 1: Identifying Horn System Parts Location**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**SYSTEM DIAGRAM**

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E142665E04

**Fig. 2: Horn System Diagram**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of the problem symptom. 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.

HORN SYSTEM

SYMPTOM CHART

| Symptom             | Suspected Area             | Reference                  |
|---------------------|----------------------------|----------------------------|
| Horn does not sound | HORN fuse                  | -                          |
|                     | Horn relay                 | <u>HORN RELAY</u>          |
|                     | Horn switch (Steering pad) | <u>STEERING PAD</u>        |
|                     | Steering pad switch        | <u>STEERING PAD SWITCH</u> |
|                     | Spiral cable               | <u>SPIRAL CABLE</u>        |

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|                                                                  |                            |                                   |
|------------------------------------------------------------------|----------------------------|-----------------------------------|
| Horn sounds constantly                                           | Wire harness               | -                                 |
|                                                                  | Horn relay                 | <b><u>HORN RELAY</u></b>          |
|                                                                  | Horn switch (Steering pad) | <b><u>STEERING PAD</u></b>        |
|                                                                  | Steering pad switch        | <b><u>STEERING PAD SWITCH</u></b> |
|                                                                  | Wire harness               | -                                 |
| Low pitched horn operates but high pitched horn does not operate | High pitched horn          | <b><u>HIGH PITCHED HORN</u></b>   |
|                                                                  | Wire harness               | -                                 |
| High pitched horn operates but low pitched horn does not operate | Low pitched horn           | <b><u>LOW PITCHED HORN</u></b>    |
|                                                                  | Wire harness               | -                                 |

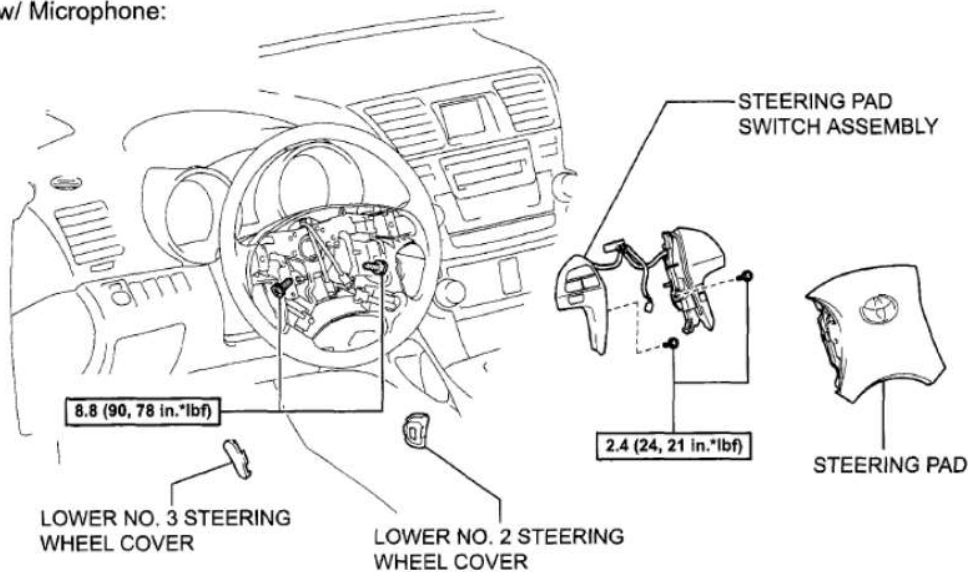
## STEERING PAD SWITCH

### COMPONENTS

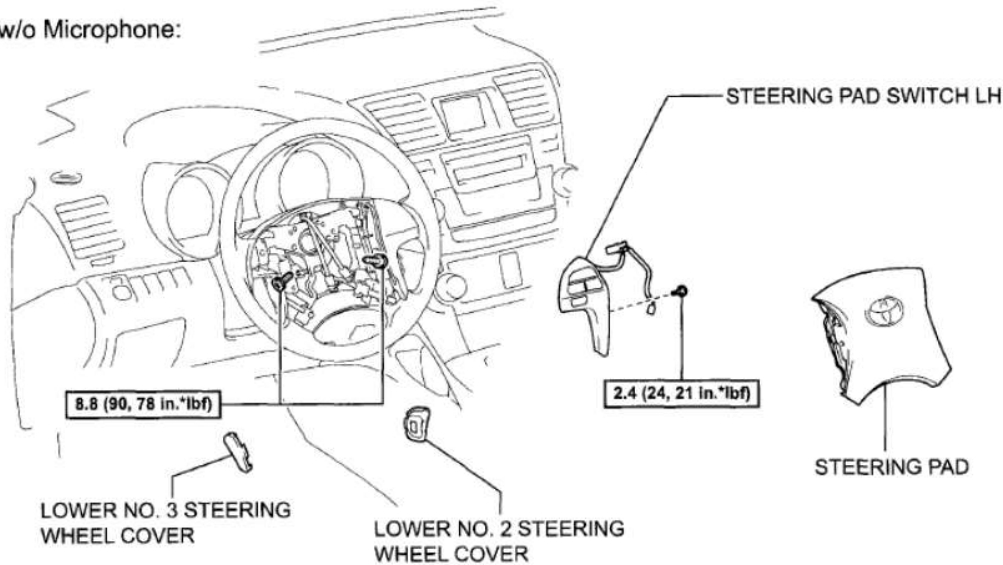
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w/ Microphone:



w/o Microphone:



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

P

E173897E03

**Fig. 3: Identifying Steering Pad Switch Components With Torque Specification**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## REMOVAL

### 1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

**CAUTION:** Wait for 90 seconds after disconnecting the cable to prevent airbag deployment (See [AIRBAG SYSTEM](#) ).

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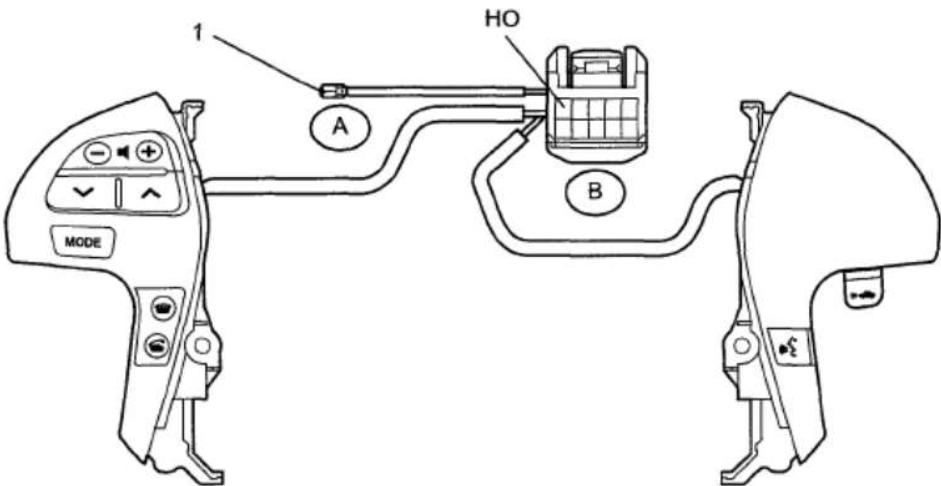
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**NOTE:** When disconnecting the cable, some systems need to be initialized after the cable is reconnected (See INITIALIZATION ).

- 2. REMOVE LOWER NO. 3 STEERING WHEEL COVER (See REMOVAL )
- 3. REMOVE LOWER NO. 2 STEERING WHEEL COVER (See REMOVAL )
- 4. REMOVE STEERING PAD (See REMOVAL )
- 5. REMOVE STEERING PAD SWITCH ASSEMBLY (w/ Microphone) (See REMOVAL )
- 6. REMOVE STEERING PAD SWITCH LH (w/o Microphone) (See REMOVAL )

INSPECTION

- 1. INSPECT STEERING PAD SWITCH ASSEMBLY (w/ Microphone)
  - a. Disconnect steering pad switch assembly connector A from the steering pad.
  - b. Disconnect steering pad switch assembly connector B from the spiral cable.



E151678E01

**Fig. 4: Identifying Steering Pad Switch Assembly Connector**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

**Standard resistance**

**RESISTANCE REFERENCE**

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

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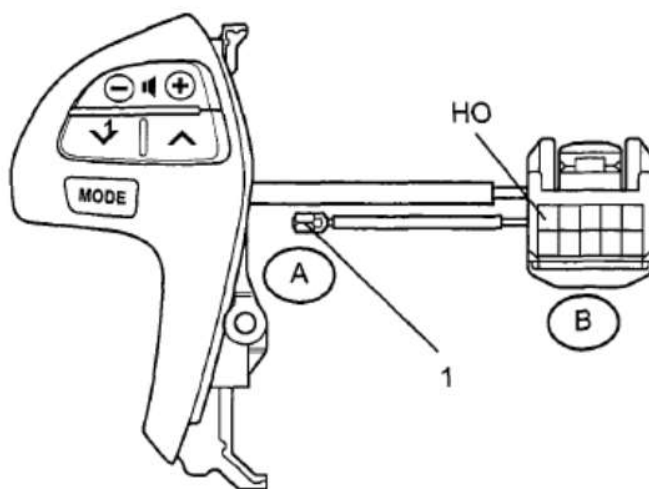
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| Tester connection | Condition | Specified condition |
|-------------------|-----------|---------------------|
| A-1 - B-1 (HO)    | Always    | Below 1 ohms        |

If the result is not as specified, replace the steering pad switch assembly.

#### 2. INSPECT STEERING PAD SWITCH LH (w/o Microphone)

- a. Disconnect steering pad switch LH connector A from the steering pad.
- b. Disconnect steering pad switch LH connector B from the spiral cable.



E160935E03

**Fig. 5: Identifying Steering Pad Switch LH Connector B And Spiral Cable**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

#### Standard Resistance

#### RESISTANCE REFERENCE

| Tester connection | Condition | Specified condition |
|-------------------|-----------|---------------------|
| A-1 - B-1 (HO)    | Always    | Below 1 ohms        |

If the result is not as specified, replace the steering pad switch LH.

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#### INSTALLATION

1. **INSTALL STEERING PAD SWITCH ASSEMBLY (w/ Microphone)** (See INSTALLATION )
2. **INSTALL STEERING PAD SWITCH LH (w/o Microphone)** (See INSTALLATION )
3. **INSTALL STEERING PAD** (See INSTALLATION )
4. **INSTALL LOWER NO. 3 STEERING WHEEL COVER** (See INSTALLATION )
5. **INSTALL LOWER NO. 2 STEERING WHEEL COVER** (See INSTALLATION )
6. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

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

7. **INSPECT STEERING PAD** (See INSTALLATION )
8. **INSPECT SRS WARNING LIGHT**
  - a. Inspect the SRS warning light (See DIAGNOSIS SYSTEM ).

#### HORN RELAY

##### ON-VEHICLE INSPECTION

1. **INSPECT FUSE (HORN)**
  - a. Remove the HORN fuse from the engine room junction block assembly.
  - b. Measure the resistance of the fuse.

**Standard resistance:**

**Below 1 ohms**

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

2. **INSPECT ENGINE ROOM JUNCTION BLOCK ASSEMBLY (HORN RELAY)**
  - a. Install the HORN fuse to the engine room junction block assembly.
  - b. Remove the engine room junction block assembly from the engine room relay block.
  - c. Connect the positive (+) lead from the battery to terminal 2G-1.
  - d. Connect the negative (-) lead from the battery to terminal 2D-10.
  - e. Measure the voltage according to the value(s) in the table below.

**Standard voltage**

##### VOLTAGE SPECIFICATION

| Tester Connection       | Condition | Specified Condition |
|-------------------------|-----------|---------------------|
| 2B-6 - Battery negative | Always    | 11 to 14 V          |

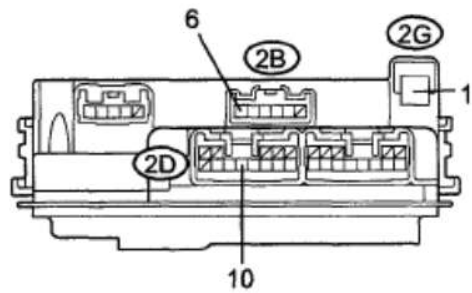
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|  |        |            |
|--|--------|------------|
|  | Always | 11 to 14 V |
|--|--------|------------|

If the result is not as specified, replace the engine room junction block assembly.

Component without harness connected:  
(Engine Room Junction Block Assembly)



A137364E21

**Fig. 6: Identifying Engine Room Junction Block Assembly**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

LOW PITCHED HORN

COMPONENTS

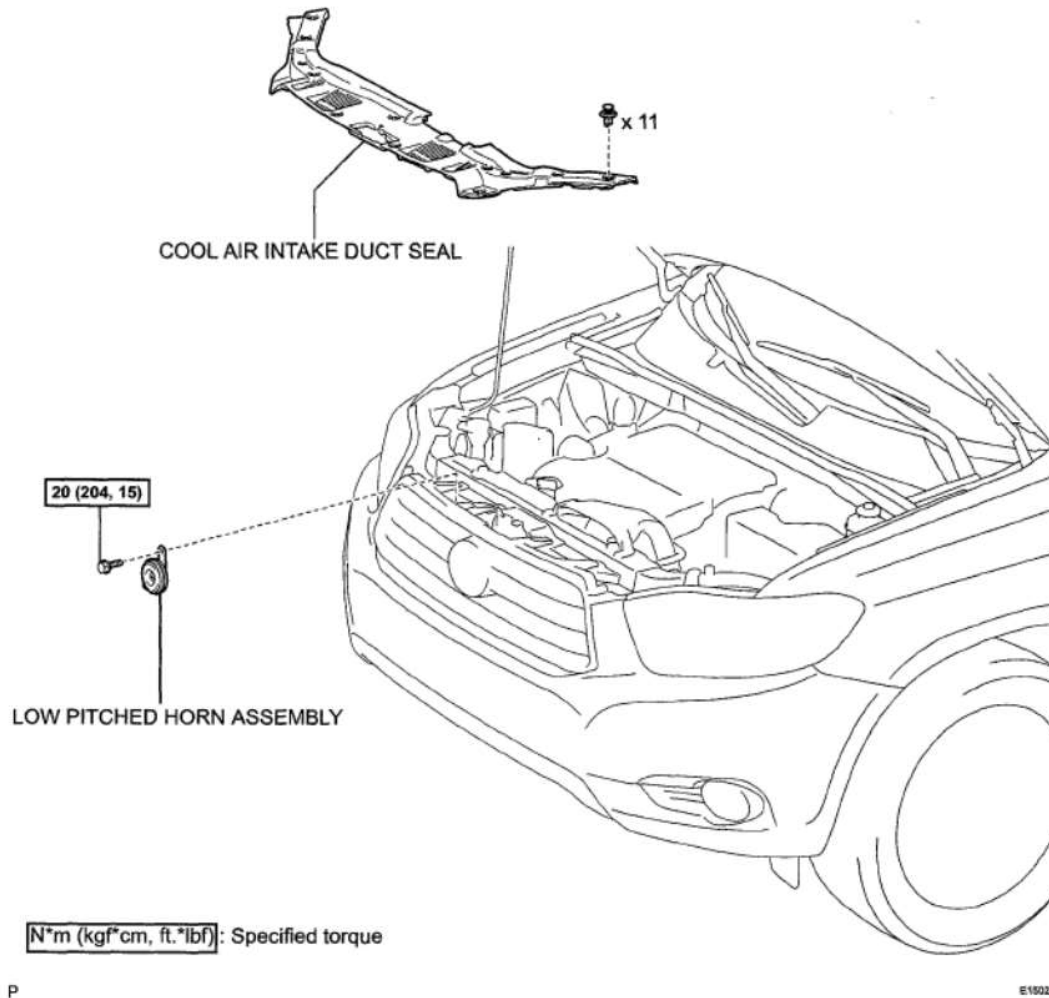
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**Fig. 7: Identifying Low Pitched Horn Components With Torque Specification**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**REMOVAL**

1. **REMOVE COOL AIR INTAKE DUCT SEAL** (See **REMOVAL** )
2. **REMOVE LOW PITCHED HORN ASSEMBLY**
  - a. Disconnect the connector.
  - b. Remove the bolt and the low pitched horn assembly.

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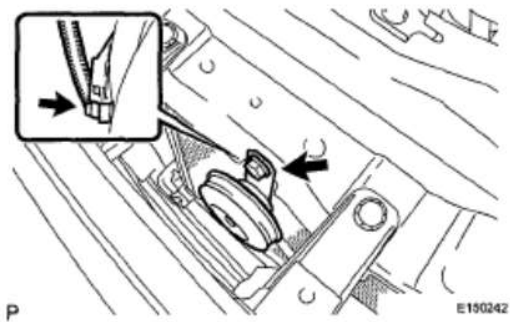


**Fig. 8: Identifying Low Pitched Horn Assembly And Bolt**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION

1. INSPECT LOW PITCHED HORN

- a. Apply battery voltage and check operation of the horn, as shown in the table below.

OK

SPECIFIED CONDITION CHART

| Measurement Condition               | Specified Condition |
|-------------------------------------|---------------------|
| Battery positive (+) --> Terminal 1 | Horn sounds         |
| Battery negative (-) --> Horn body  |                     |

If the result is not as specified, replace the low pitched horn.

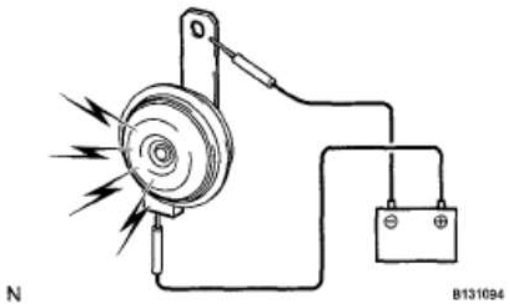


**Fig. 9: Inspecting Low Pitched Horn**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSTALLATION

1. INSTALL LOW PITCHED HORN ASSEMBLY

- a. Install the low pitched horn assembly with the bolt.

**Torque: 20 N\*m (204 kgf\*cm, 15 ft.\*lbf)**

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b. Connect the connector.

2. **INSTALL COOL AIR INTAKE DUCT SEAL** (See INSTALLATION )

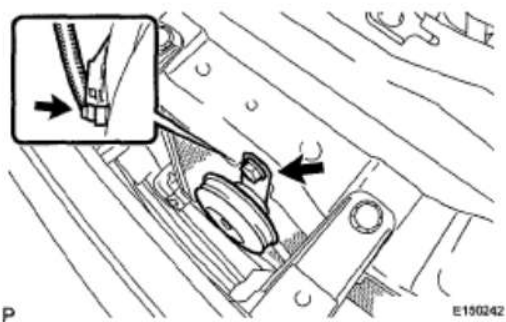
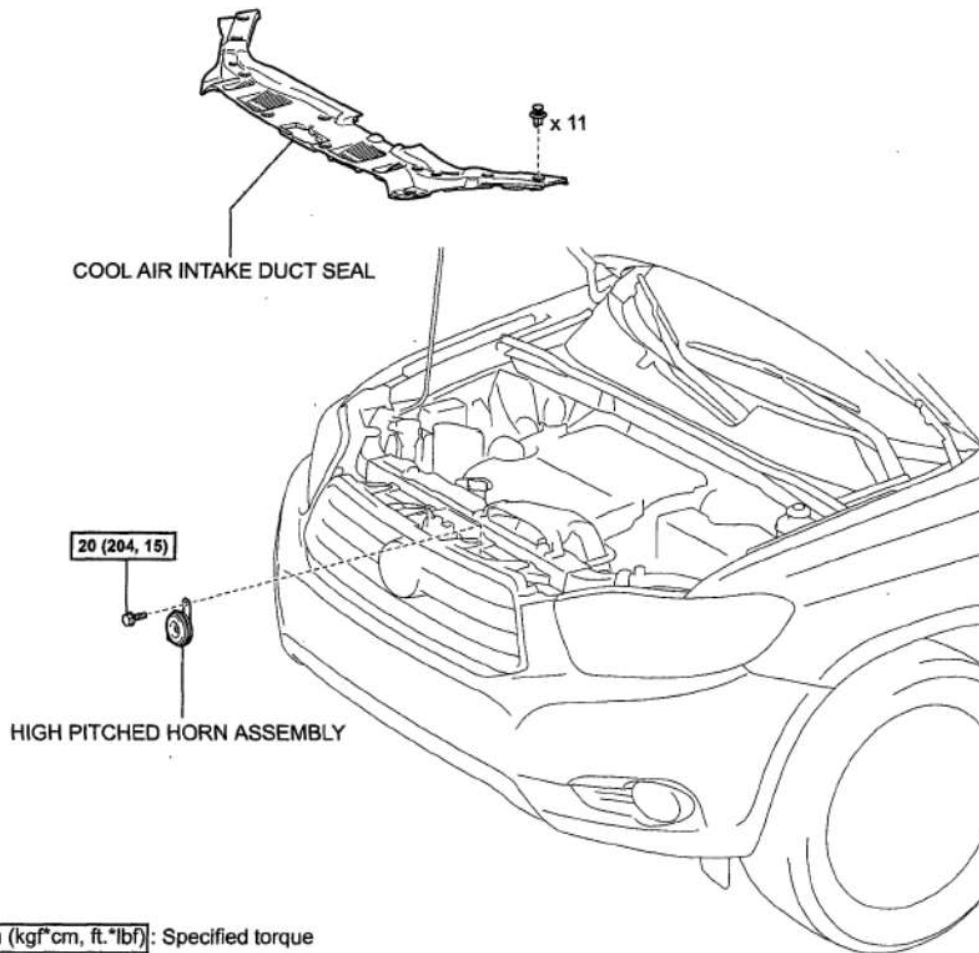


**Fig. 10: Locating Low Pitched Horn Assembly And Bolt**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## HIGH PITCHED HORN

### COMPONENTS

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

P

E110253E01

**Fig. 11: Identifying High Pitched Horn Components**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**REMOVAL**

1. **REMOVE COOL AIR INTAKE DUCT SEAL** (See **REMOVAL** )
2. **REMOVE HIGH PITCHED HORN ASSEMBLY**
  - a. Disconnect the connector.
  - b. Remove the bolt and the high pitched horn assembly.

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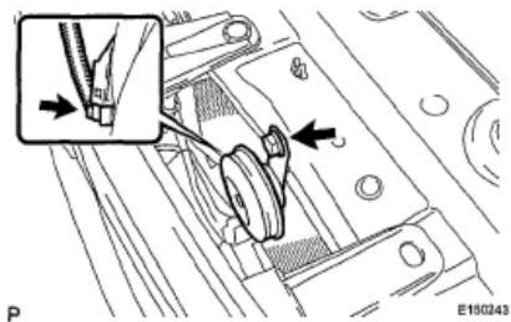


**Fig. 12: Locating High Pitched Horn Assembly And Connector**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**INSPECTION**

**1. INSPECT HIGH PITCHED HORN**

- a. Apply battery voltage and check operation of the horn, as shown in the table below.

**Standard**

**SPECIFIED CONDITION CHART**

| Measurement Condition               | Specified Condition |
|-------------------------------------|---------------------|
| Battery positive (+) --> Terminal 1 | Horn sounds         |
| Battery negative (-) --> Horn body  |                     |

If the result is not as specified, replace the high pitched horn.

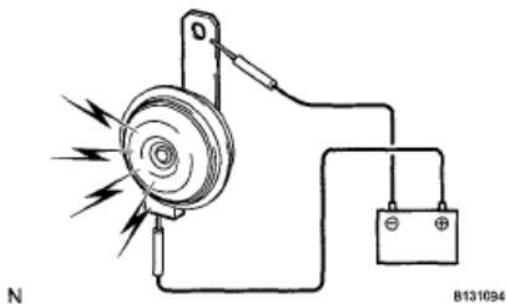


**Fig. 13: Inspecting Low Pitched Horn**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**INSTALLATION**

**1. INSTALL HIGH PITCHED HORN ASSEMBLY**

- a. Install the high pitched horn assembly with the bolt.

**Torque: 20 N\*m (204 kgf\*cm, 15 ft.\*lbf)**

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b. Connect the connector.

2. **INSTALL COOL AIR INTAKE DUCT SEAL** (See INSTALLATION )

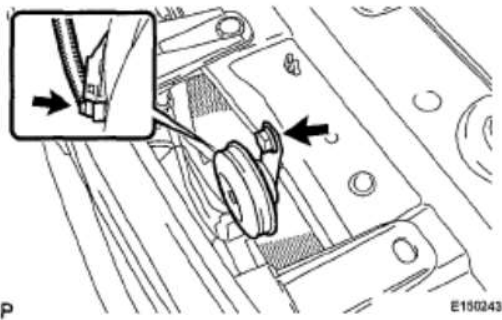


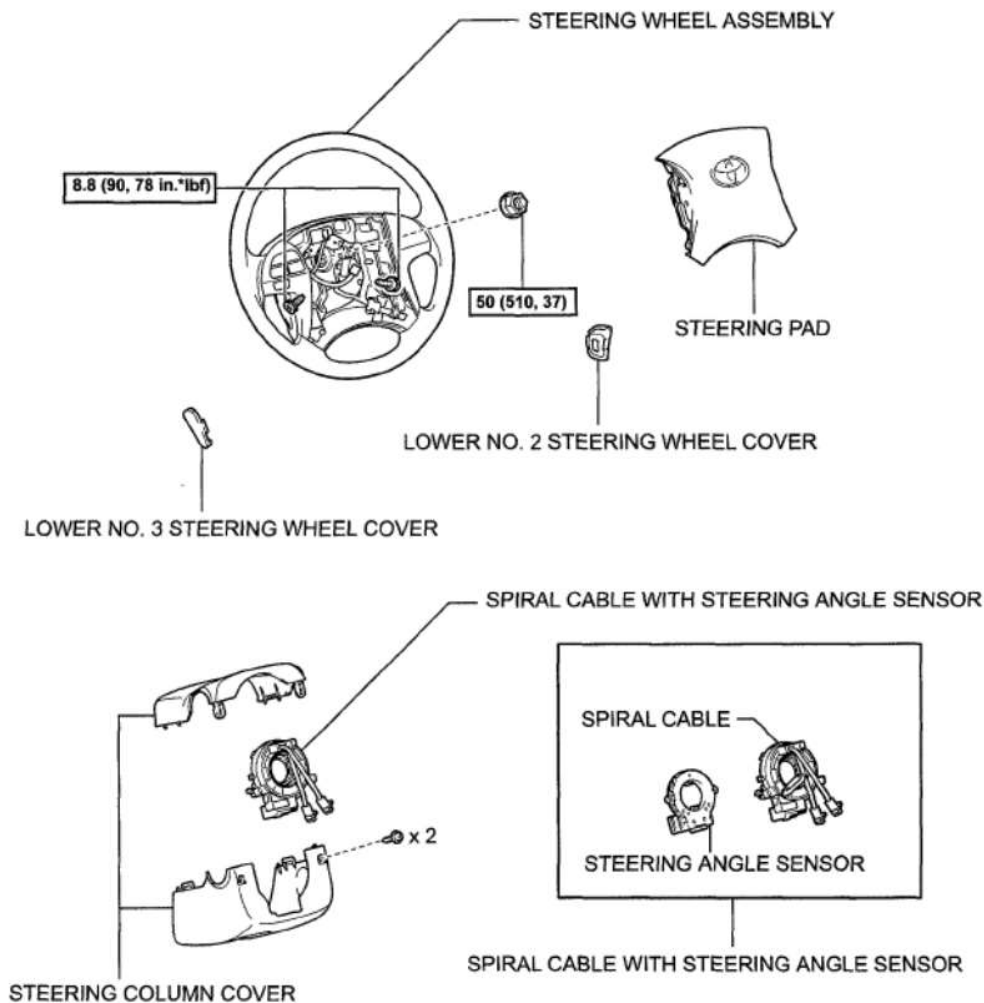
**Fig. 14: Locating High Pitched Horn Assembly And Connector**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## **SPIRAL CABLE**

### **COMPONENTS**

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

C167002E01

**Fig. 15: Identifying Spiral Cable Components With Torque Specification**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## REMOVAL

### 1. PRECAUTION

**CAUTION:** Be sure to read "PRECAUTION" thoroughly before servicing (See AIRBAG SYSTEM ).

### 2. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

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#### 3. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

**CAUTION:** Wait for at least 90 seconds after disconnecting the cable to prevent airbag deployment.

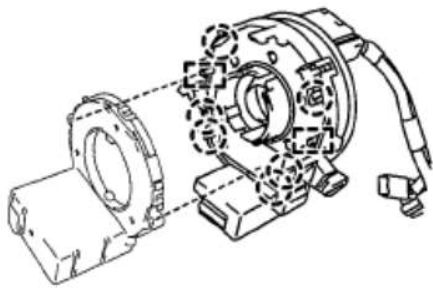
**NOTE:** When disconnecting the cable, some systems need to be initialized after the cable is reconnected (See INITIALIZATION ).

4. REMOVE LOWER NO. 3 STEERING WHEEL COVER (See REMOVAL )
5. REMOVE LOWER NO. 2 STEERING WHEEL COVER (See REMOVAL )
6. REMOVE STEERING PAD (See REMOVAL )
7. REMOVE STEERING WHEEL ASSEMBLY (See DISASSEMBLY )
8. REMOVE STEERING COLUMN COVER (See REMOVAL )
9. REMOVE SPIRAL CABLE WITH STEERING ANGLE SENSOR (See REMOVAL )
10. REMOVE SPIRAL CABLE
  - a. Disengage the 6 claws and 2 pins, and remove the spiral cable from the steering angle sensor.

#### INSPECTION

##### 1. INSPECT SPIRAL CABLE

- a. If there are any defects as mentioned below, replace the spiral cable with a new one: Scratches, cracks, dents or chips on the connector or the spiral cable.



C147678E02

**Fig. 16: Identifying Spiral Cable, Claw And Clips**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Inspect the spiral cable.
  1. Measure the resistance according to the value(s) in the table below.

**NOTE:** To avoid breaking of the spiral cable, do not turn the spiral cable more than necessary.

If the value is not within the specified range, replace the spiral cable.

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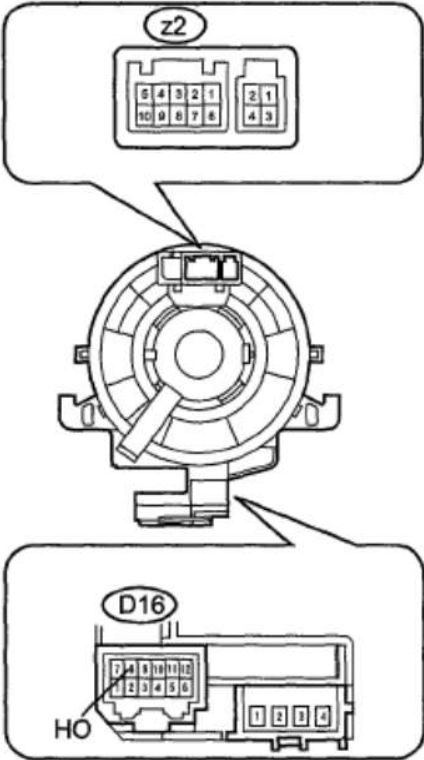
Standard resistance

RESISTANCE REFERENCE

| Tester connection | Condition                  | Specified condition |
|-------------------|----------------------------|---------------------|
| z2-1 - D16-8 (HO) | Center                     | Below 1 ohms        |
|                   | 2.5 rotations to the left  |                     |
|                   | 2.5 rotations to the right |                     |

If the result is not as specified, replace the spiral cable.

Component without harness connected:  
(Spiral Cable)



E144333E11

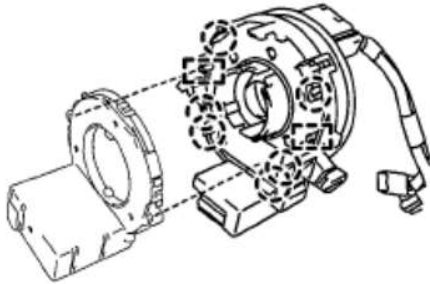
**Fig. 17: Identifying D16 Spiral Cable Connector Terminal**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSTALLATION

1. INSTALL SPIRAL CABLE

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- a. Engage the 6 claws and 2 pins, and install the spiral cable to the steering angle sensor.
2. **INSTALL SPIRAL CABLE WITH STEERING ANGLE SENSOR** (See **INSTALLATION** )
3. **INSTALL STEERING COLUMN COVER** (See **INSTALLATION** )



C147575E02

**Fig. 18: Identifying Steering Angle Sensor Claws And Pins**

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

4. **ADJUST SPIRAL CABLE** (See **INSTALLATION** )
5. **INSTALL STEERING WHEEL ASSEMBLY** (See **INSTALLATION** )
6. **INSTALL STEERING PAD** (See **INSTALLATION** )
7. **INSTALL LOWER NO. 3 STEERING WHEEL COVER** (See **INSTALLATION** )
8. **INSTALL LOWER NO. 2 STEERING WHEEL COVER** (See **INSTALLATION** )
9. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

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

10. **INSPECT STEERING PAD** (See **INSTALLATION** )
11. **INSPECT STEERING WHEEL CENTER POINT**
12. **INSPECT SRS WARNING LIGHT**
  - a. Inspect the SRS warning light (See **DIAGNOSIS SYSTEM** ).