

ACCESSORIES & EQUIPMENT

Horns - CTS Sedan

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Horn Bolt	9 N.m	80 lb in
Steering Wheel Horn Contact Spring Retainer Bolt	8 N.m	71 lb in

SCHEMATIC WIRING DIAGRAMS

HORN WIRING SCHEMATICS

Horn System

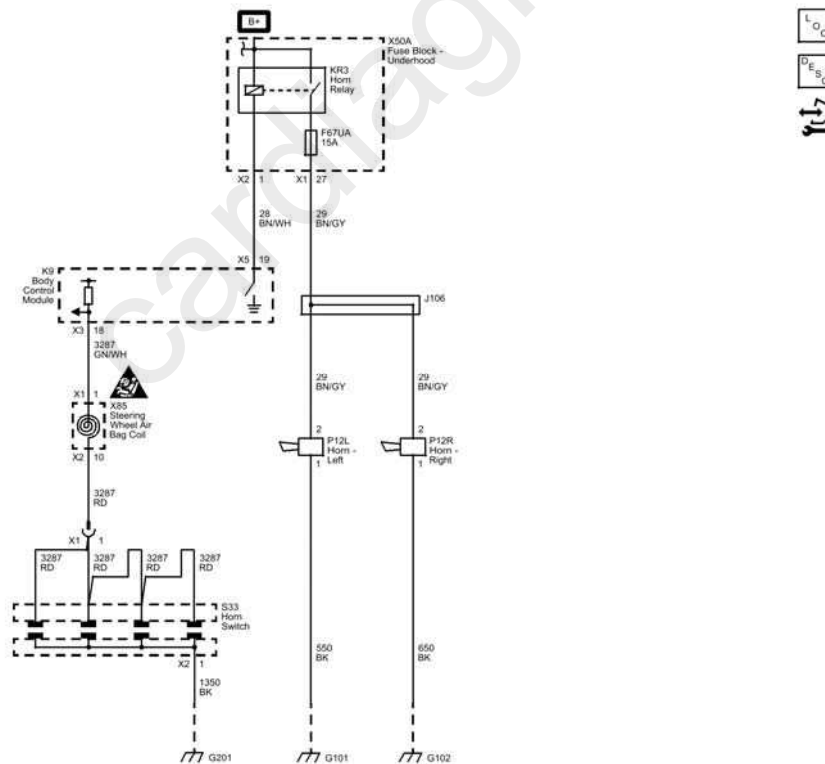


Fig. 1: Horn System
Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B2750	DTC B2750 Horn Relay Secondary Circuit

DTC B2750: HORN RELAY SECONDARY CIRCUIT

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptors

DTC B2750

Horn Relay Secondary Circuit

For symptom byte information refer to: **Symptom Byte List**

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control	B2750 02	B2750 04	B2750 01	-

Circuit/System Description

The body control module provides a ground for the horn printed circuit board relay within the underhood fuse block. The underhood fuse block will then provide B+ voltage to the horn control circuit, sounding the horn.

Conditions for Running the DTC

When the horn output is actively being requested by the body control module.

Conditions for Setting the DTC

B2750 01

The body control module detects a short to voltage in the horn relay control circuit.

B2750 02

The body control module detects a short to ground in the horn relay control circuit.

B2750 04

The body control module detects an open/high resistance in the horn relay control circuit.

Action Taken When the DTC Sets

The body control module will command the horn when requested but the horn will be inoperative.

Conditions for Clearing the DTC

- The DTC clears when the fault is no longer detected.
- The current DTC will become history when the request for the output is removed.
- The history DTC will clear after 50 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Horn Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

Description and Operation

Horns System Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the P12L Horn-Left and the P12R Horn-Right turn ON and OFF when commanding the Horn Relay On and Off with a scan tool.

- **If the P12L Horn-Left and the P12R Horn-Right are always ON or always OFF**

Refer to Circuit/System Testing.

- **If the P12L Horn-Left and the P12R Horn-Right turns ON and OFF**

3. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.
2. Verify the P12L Horn-Left and the P12R Horn-Right are not activated.
 - **If the P12L Horn-Left and the P12R Horn-Right are activated**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block-Underhood.
 2. Test for infinite resistance between the control circuit terminal 19 X5 at the K9 Body Control Module and ground.
 - If less than Infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the X50A Fuse Block-Underhood.
 - **If the P12L Horn-Left and the P12R Horn-Right are not activated**
3. Connect a 3 A fused jumper wire between the control circuit terminal 19 and ground.
4. Verify the P12L Horn-Left and the P12R Horn-Right activates.
 - **If the P12L Horn-Left and the P12R Horn-Right do not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the X2 harness connector at the X50A Fuse Block-Underhood, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 19 X5 at the K9 Body Control Module and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, test or replace the X50A Fuse Block-Underhood.
 - **If the P12L Horn-Left and the P12R Horn-Right activates**
5. Replace the K9 Body Control Module.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Front Compartment Fuse Block Housing Replacement**
- **Control Module References** for body control module replacement, programming and setup

SYMPTOMS - HORNS

IMPORTANT: The following steps must be completed before using the symptom tables:

1. Perform **Diagnostic System Check - Vehicle** , before using the symptom tables in order to verify that all of the following are true:
 - There are no DTCs set
 - The control modules can communicate via the serial data link
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Horns System Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the horn system. Refer to **Checking Aftermarket Accessories** .
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Perform the following if a horn buzzes or has a harsh tone.
 - Inspect for debris in the joint where the horn fastens to the vehicle.
 - Test the torque of the horn mounting hardware. The horn mounting hardware should be tightened to a torque of 10 N.m (7 lb ft).

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure **Horns Malfunction** in order to diagnose the symptom.

HORNS MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Horn Switch Signal	1	3	3	-
Horn Switch Ground	-	3	-	-
Horn Relay Control	B2750 02	B2750 04	B2750 01	-

Left Horn Control	3	2	1	-
Right Horn Ground	-	2	-	-
Left Horn Control	3	2	1	-
Right Horn Ground	-	2	-	-
1. Horn Always On 2. Single Horn Inoperative 3. Both Horns Inoperative				

Circuit/System Description

The body control module (BCM) monitors the Horn Switch signal circuit, when the horn pad is pressed, the BCM detects the drop in the Horn Switch signal circuit and provides a ground for the Horn printed circuit board relay within the underhood fuse block. The underhood fuse block will then provide B+ voltage to the horn control circuit, sounding the horns.

Diagnostic Aids

OnStar® RemoteLink™ applications or "apps" downloads are available to owners of certain mobile devices. Unwanted or inadvertent horn activations have been associated with these applications to which the customer may be unaware. Contact the GM Technical Assistance Center regarding information on a remedy for this situation.

A short to ground in the horn relay control circuit or a short to voltage in the horn control circuit will cause the horns to sound continuously until the horns overheat and become inoperative.

Rotate the steering wheel while pressing the horn pad to identify intermittent and poor connections within the steering column.

If diagnosing a Horn- Poor Tone condition, inspect the following:

- Debris or water in the horn assembly
- Proper horn mounting hardware torque-Refer to **Fastener Tightening Specifications**.
- Debris in the joint where the horns attach to the vehicle
- Debris in direct contact with the horn
- Vehicle components vibrating while the horn is sounding

Reference Information

Schematic Reference

Horn Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - SEDAN

Description and Operation

Horns System Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Horn Switch parameter changes between Active and Inactive when pressing and releasing the horn pad.
 - **If the parameter does not change**

Refer to Circuit/System Testing - Horn Switch Malfunction.
 - **If the parameter changes**
3. Verify the P12L Horn-Left and the P12R Horn-Right turns ON and OFF and emit a clear and even tone when commanding the Horn Relay On and OFF with a scan tool.
 - **If the P12L Horn-Left and the P12R Horn-Right do not turn ON and OFF**

Refer to Circuit/System Testing - Horns or Horn Command Malfunction.
 - **If a single P12 Horn does not turn ON and OFF**

Refer to Circuit/System Testing - Horn - Poor Tone.
 - **If the sound emitted is not clear and even**

Refer to Circuit/System Testing - Horn - Poor Tone.
 - **If the P12L Horn-Left and the P12R Horn-Right turn ON and OFF and emit a even and clear tone**
4. All OK.

Circuit/System Testing

Horn Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the X1 and X2 harness connectors at the S33 Horn Switch. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 ohms between the ground circuit terminal 1 X2 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
3. Ignition ON.
4. Verify the scan tool Horn Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 1 X1 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 1 X1 and the ground circuit terminal 1 X2.
6. Verify the scan tool Horn Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, remove the 3 A fused jumper wire, disconnect the harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K9 Body Control Module.
 - **If Active**
7. Test or replace the S33 Horn Switch.

Horns or Horn Command Malfunction

1. Ignition OFF, disconnect the harness connector at the appropriate P12 Horn. Ignition ON
2. Connect a test lamp between the control circuit terminal 2 and ground, ignition ON.
3. Verify the test lamp does not turn ON and OFF when commanding the Horn Relay On and Off with a scan tool.

- **If the test lamp turns ON and OFF**

Test or replace the P12 Horn.

- **If the test lamp does not turn ON and OFF**

4. Ignition OFF, connect the harness connector at the P12 Horn. Disconnect the X1 harness connector at the X50A Fuse Block-Underhood, ignition ON.
5. Verify the P12L Horn-Left and P12R Horn-Right are not activated.
 - **If the P12L Horn-Left and P12R Horn-Right is activated**
 1. Ignition OFF, disconnect the harness connector at the P12L Horn-Left and P12R Horn-Right, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 2 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the P12L Horn-Left and P12R Horn-Right.
 - **If the P12L Horn-Left and P12R Horn-Right is not activated**
6. Connect a 15 A fused jumper wire between the control circuit terminal 27 and B+.
7. Verify the P12L Horn-Left or P12R Horn-Right activates.
 - **If the P12L Horn-Left and P12R Horn-Right do not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the P12 Horn, ignition ON.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than Infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, test or replace the P12 Horn.
 - **If the P12L Horn-Left and P12R Horn-Right activates**
8. Ignition OFF, connect the X1 harness connector at the X50A Fuse Block-Underhood. Disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
9. Verify the P12L Horn-Left and P12R Horn-Right are not activated.
 - **If the P12L Horn-Left and P12R Horn-Right is activated**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block-Underhood.
 2. Test for infinite resistance between the control circuit terminal 19 X5 at the K9 Body Control Module and ground.
 - If less than Infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the X50A Fuse Block-Underhood.
 - **If the P12L Horn-Left and P12R Horn-Right are not activated**
10. Connect a 3 A fused jumper wire between the control circuit terminal 19 and ground.
11. Verify the P12L Horn-Left and P12R Horn-Right activates.

- **If the P12 Horn does not activate**

1. Ignition OFF, remove the jumper wire, disconnect the X2 harness connector at the X50A Fuse Block-Underhood, ignition ON.
2. Test for less than 1 V between the control circuit terminal 19 X5 at the K9 Body Control Module and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the X50A Fuse Block-Underhood.

- **If the P12L Horn-Left and P12R Horn-Right activates**

12. Replace the K9 Body Control Module.

Horn - Poor Tone

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the appropriate P12 Horn. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 1 ohms between the ground circuit terminal 1 and ground.
 - **If 1 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the high resistance in the circuit.
 - If less than 2 ohms, repair high resistance in the ground connection.
 - **If less than 1 ohms**
3. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block-Underhood.
4. Test for less than 2 ohms between the P12 Horn control circuit terminal 2 and the X50A Fuse Block-Underhood control circuit terminal 27 X1.
 - **If 2 ohms or greater**

Repair the high resistance in the control circuit.

- **If less than 2 ohms**

5. Test or replace the P12 Horn.

Component Testing

Horn Test

1. Ignition OFF, disconnect the harness connector at the appropriate P12 Horn.
2. Install a 15 A fused jumper wire between the control terminal 2 and 12 V. Install a jumper wire between the ground terminal 1 and ground.
3. Verify the P12 horn. turns ON and OFF

- **If the P12 Horn. does not turn ON and OFF**

Replace the P12 Horn.

- **If the P12 Horn. turns ON and OFF**

4. All OK

Horn Switch

1. Ignition OFF, disconnect the X1 and X2 harness connectors at the S33 Horn Switch.
2. Test for infinite resistance between the signal terminal 1 X1 and the ground terminal 1 X2 with the switch in the open position.

- **If less than infinite resistance**

Replace the S33 Horn Switch.

- **If infinite resistance**

3. Test for less than 3 ohms between the signal terminal 1 X1 and the ground terminal 1 X2 with the switch in the closed position.

- **If 3 ohms or greater**

Replace the S33 Horn Switch.

- **If less than 3 ohms**

4. All OK

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Steering Wheel Horn Contact Replacement**
- **Horn Replacement (Left Hand High Note), Horn Replacement (Right Hand Low Note)**
- **Front Compartment Fuse Block Housing Replacement**
- **Control Module References** for body control module replacement, programming and setup

REPAIR INSTRUCTIONS

HORN REPLACEMENT (LEFT HAND HIGH NOTE)

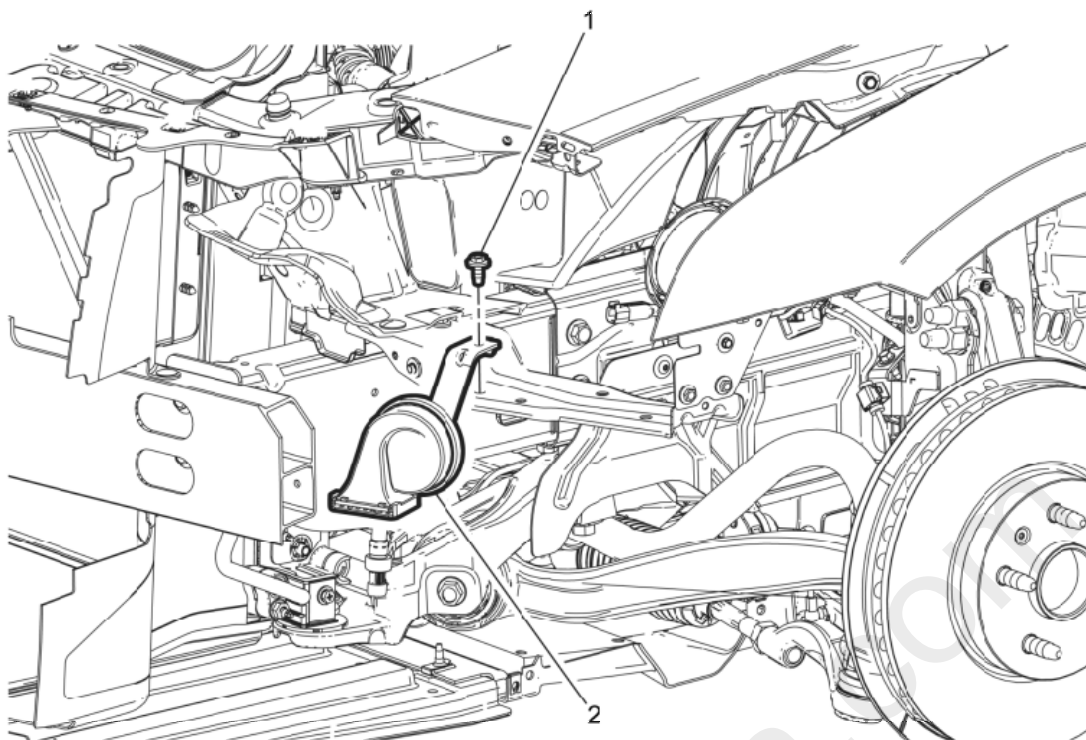


Fig. 2: Horn (Left Hand High Note)
 Courtesy of GENERAL MOTORS COMPANY

Horn Replacement (Left Hand High Note)

Callout	Component Name
Preliminary Procedure Remove the left headlamp. Refer to Headlamp Replacement .	
1	Horn Bolt CAUTION: Refer to Fastener Caution . Tighten 9 (80 lb in)
2	Horn Procedure Disconnect the electrical connector.

HORN REPLACEMENT (RIGHT HAND LOW NOTE)

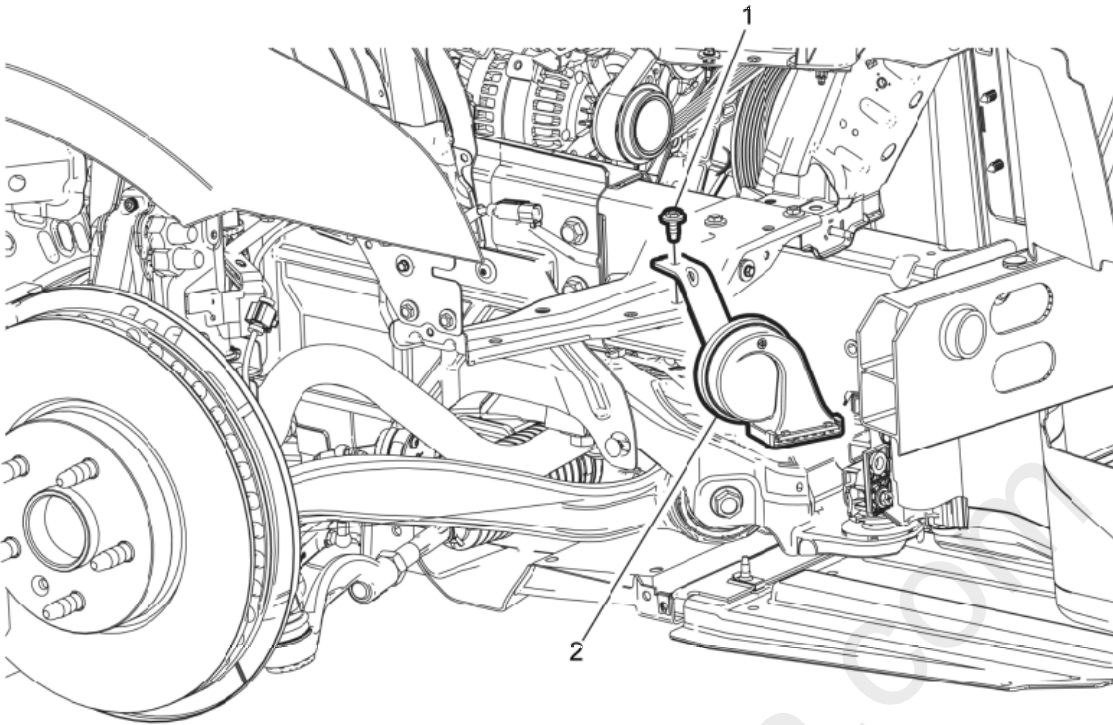


Fig. 3: Horn (Right Hand Low Note)
 Courtesy of GENERAL MOTORS COMPANY

Horn Replacement (Right Hand Low Note)

Callout	Component Name
Preliminary Procedure Remove the right headlamp. Refer to <u>Headlamp Replacement</u>	
1	Horn Bolt CAUTION: Refer to <u>Fastener Caution</u> . Tighten 9 (80 lb in)
2	Horn Procedure Disconnect the electrical connector.

STEERING WHEEL HORN CONTACT REPLACEMENT

Removal Procedure

1. Remove the steering wheel spoke cover. Refer to Steering Wheel Spoke Cover Replacement .

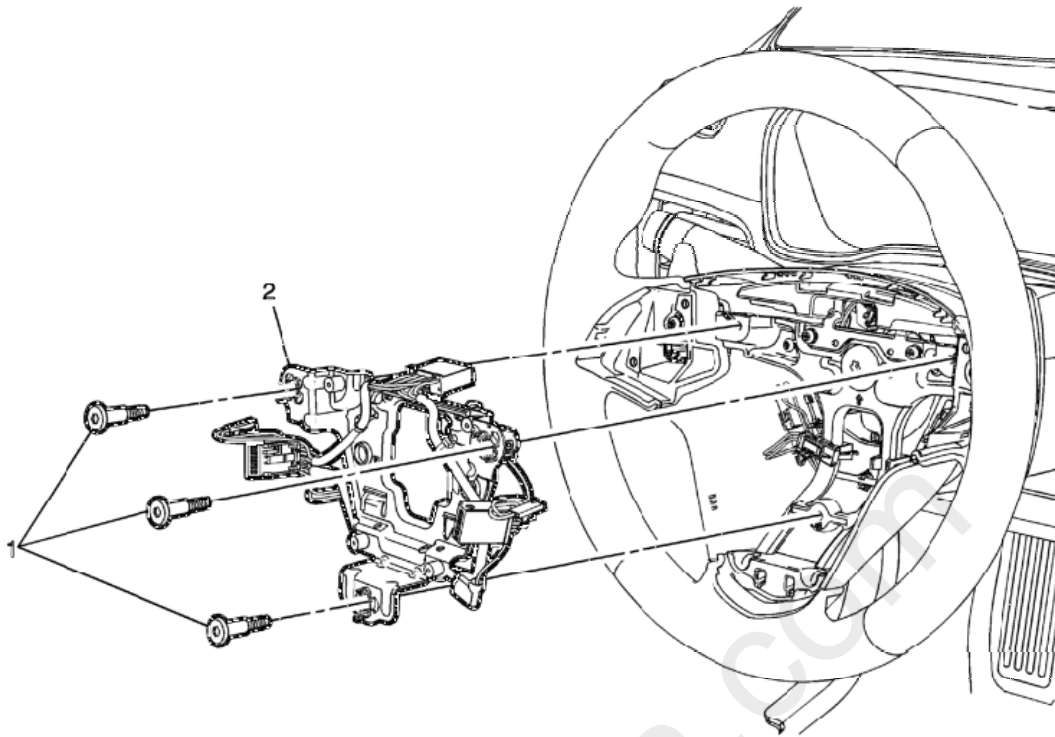


Fig. 4: Steering Wheel Horn Contact
Courtesy of GENERAL MOTORS COMPANY

2. Remove the steering wheel horn contact spring retainer bolts (1).
3. Disconnect the electrical connections.
4. Remove the screw retaining the ring terminal ground.
5. Remove the steering wheel horn contact (2).
6. Transfer the steering wheel harness, if necessary. Refer to **Steering Wheel Pad Accessory Wiring Harness Replacement**.

Installation Procedure

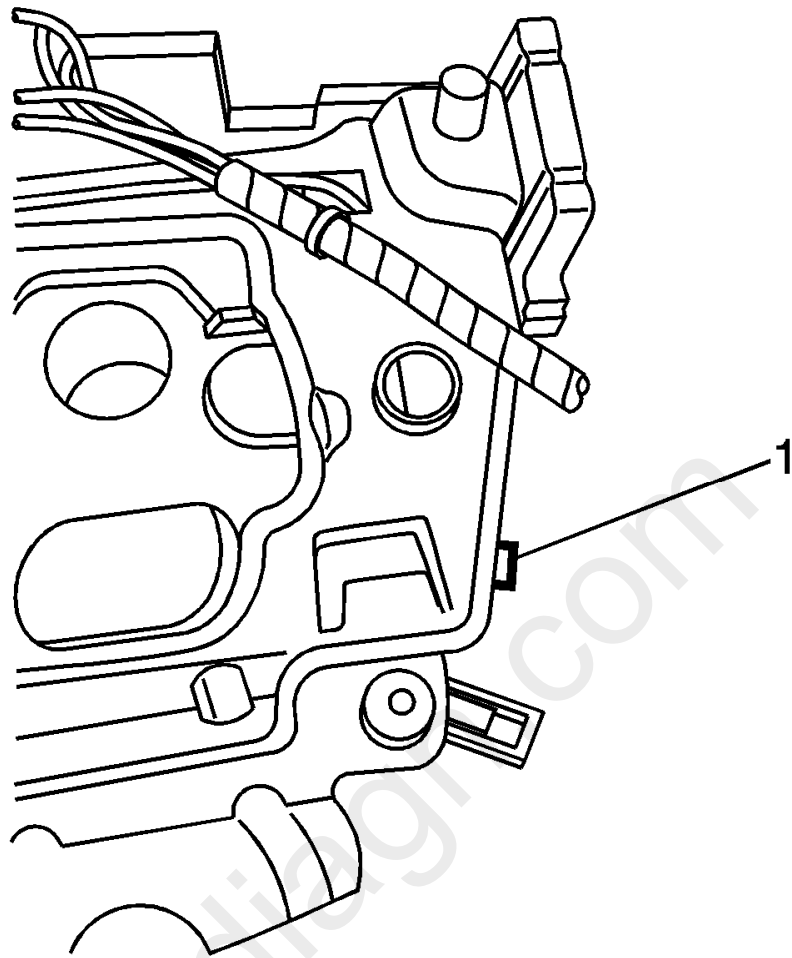


Fig. 5: Horn Plate Spring

Courtesy of GENERAL MOTORS COMPANY

1. Observe the horn plate spring (1). If it has become dislodged from its correct position and is now protruding from the back of the horn plate assembly, perform the following steps.

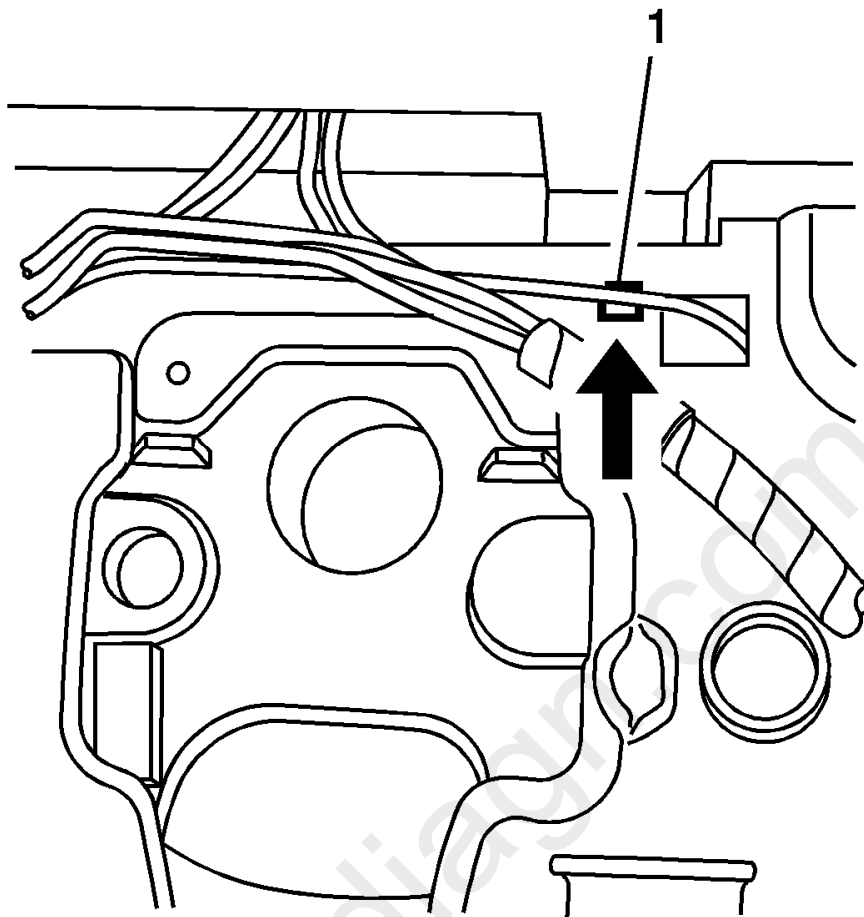


Fig. 6: Horn Plate

Courtesy of GENERAL MOTORS COMPANY

2. Correctly position the top of the horn plate spring on the horn plate (1). Ensure the spring is as close to the top of the horn plate assembly as possible.

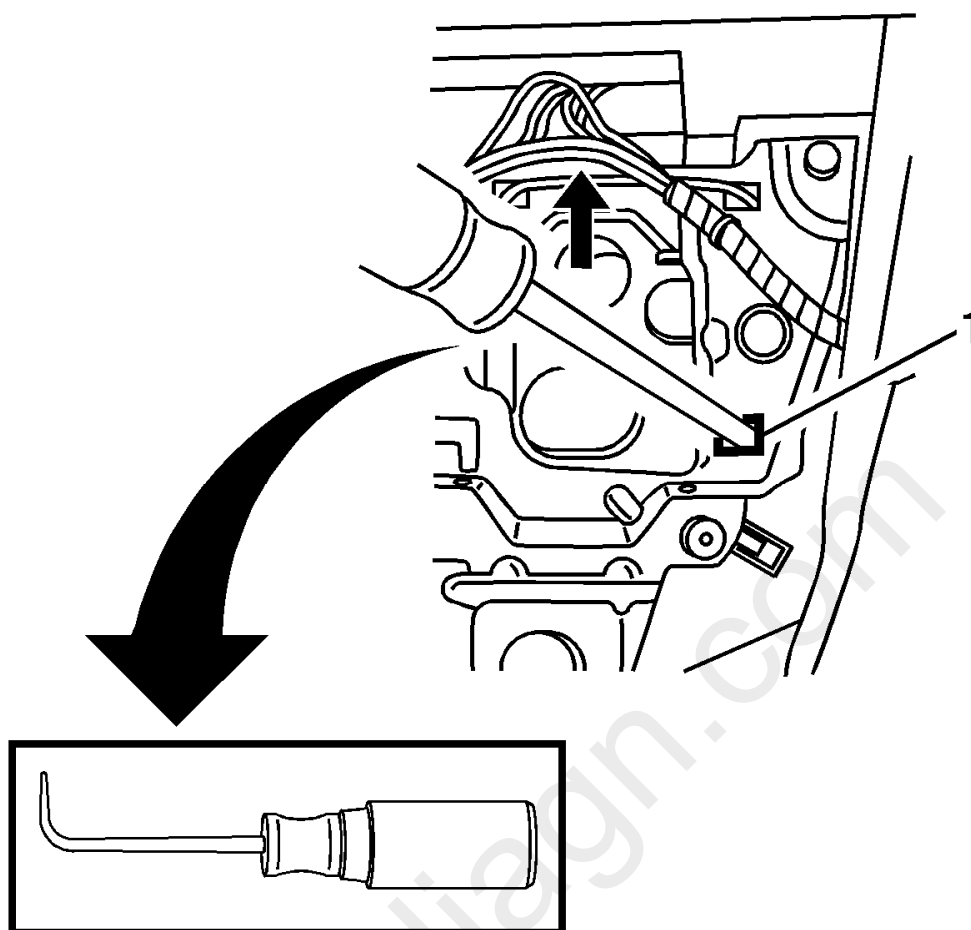


Fig. 7: Curved Pick Inserted Through Horn Plate Spring Orifice
Courtesy of GENERAL MOTORS COMPANY

3. Insert curved pick (1) horn plate spring orifice and hook horn plate spring while keeping the top of the spring in correct position, in upward direction.

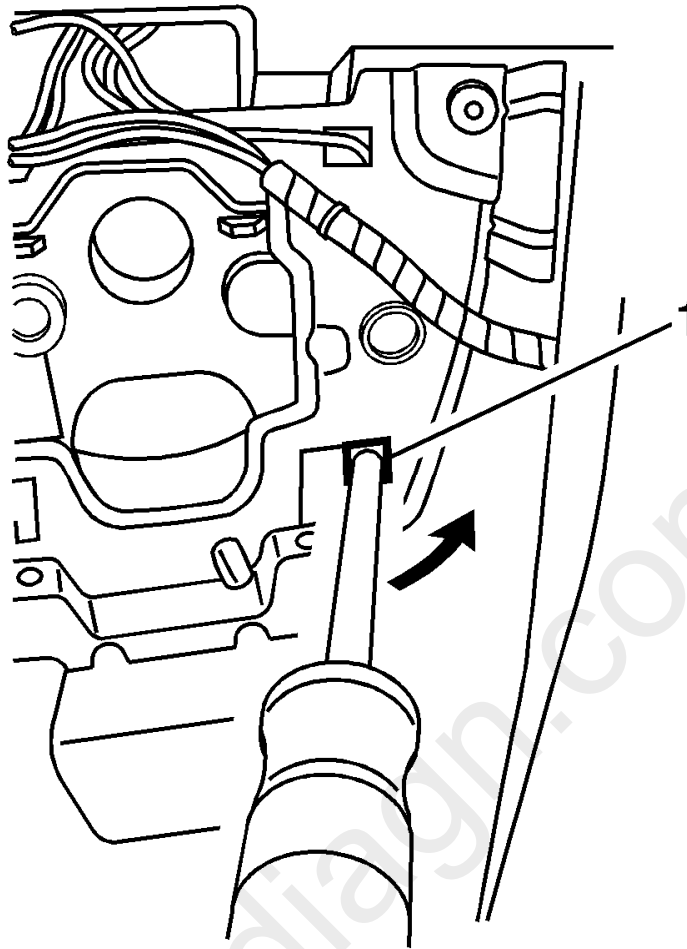


Fig. 8: Rotating Curved Pick Counterclockwise
Courtesy of GENERAL MOTORS COMPANY

4. Rotate the curved pick (1) counterclockwise to avoid interference with the grounding wire from the wire harness.
5. Pull the spring back through the orifice and into the correct position.

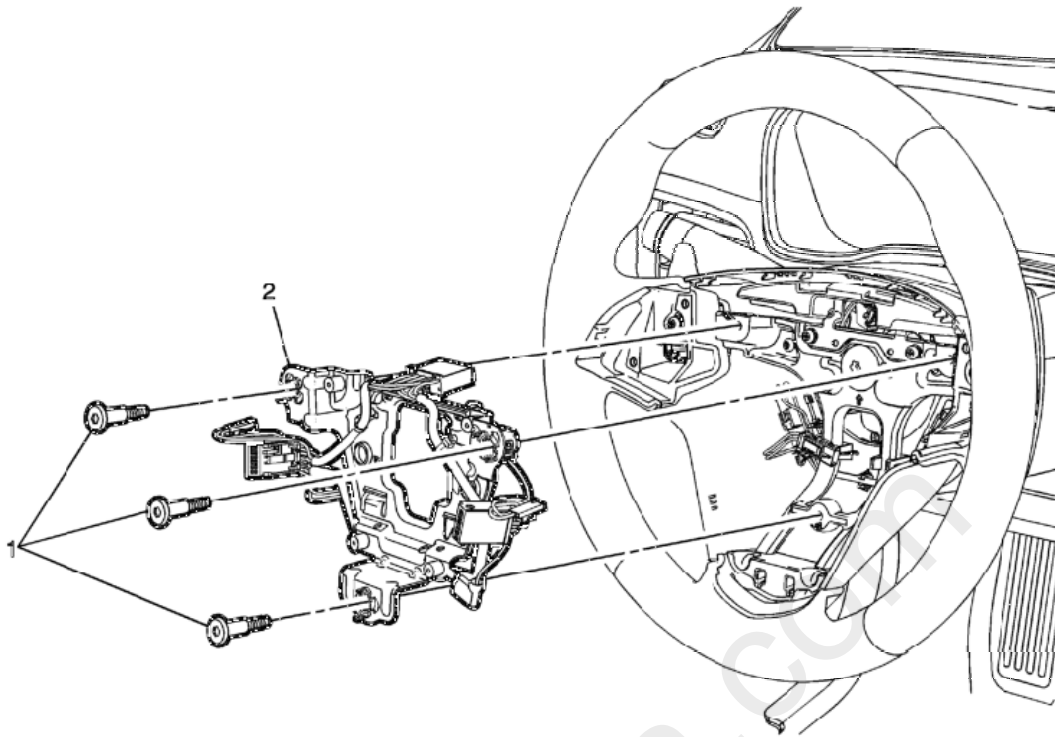


Fig. 9: Steering Wheel Horn Contact
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

6. Install the steering wheel horn contact spring retainer bolts (1) and tighten to 8 (71 lb in).
7. Connect the electrical connections.
8. Install the steering wheel spoke cover. Refer to Steering Wheel Spoke Cover Replacement .

DESCRIPTION AND OPERATION

HORNS SYSTEM DESCRIPTION AND OPERATION

System Description

The horn system consists of the following components:

- HORN fuse
- Underhood fuse block (contains PCB horn relay)
- Horn switch
- Horn-left
- Horn-right

- Body control module (BCM)

System Operation

The vehicle horn system is activated under the following conditions:

- When the horn switch is depressed
- The BCM commands the horns ON under any of the following conditions:
 - When the content theft deterrent system detects a vehicle intrusion-For further information refer to **Theft Systems Description and Operation** .
 - When the panic button is depressed on the remote control door lock transmitter-For further information refer to **Keyless Entry System Description and Operation (With ATH)** , **Keyless Entry System Description and Operation (Without ATH)** .
 - When the keyless entry system is used to lock the vehicle, a horn chirp may sound to notify the driver that the vehicle has been locked. The notification feature may be enabled or disabled through personalization. For further information refer to **Keyless Entry System Description and Operation (With ATH)** , **Keyless Entry System Description and Operation (Without ATH)** .
 - When the OnStar® system is used to sound the horns if equipped-For further information, refer to **OnStar Description and Operation** .

Circuit Operation

Battery positive voltage is applied at all times to the horn relay coil and the horn relay switch. Pressing either of the horn switches applies ground to the horn relay control circuit. The BCM may also apply ground to the horn relay control circuit as described above. When the horn relay control circuit is grounded, the horn relay is energized and battery positive voltage is applied to the horns through the horn control circuit. The horns sound as long as ground is applied to the horn relay control circuit.