

2007 ACCESSORIES & EQUIPMENT

Horns - Outlook

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Horn Bracket Bolt	10 N.m	89 lb in

SCHEMATIC AND ROUTING DIAGRAMS

HORN SCHEMATIC ICONS

Horn Schematic Icons

Icon	Icon Definition
	<p>CAUTION: When performing service on or near the SIR components or the SIR wiring, the SIR system must be disabled. Refer to <u>SIR DISABLING AND ENABLING</u> . Failure to observe the correct procedure could cause deployment of the SIR components, personal injury or unnecessary SIR system repairs.</p>

HORN SCHEMATICS

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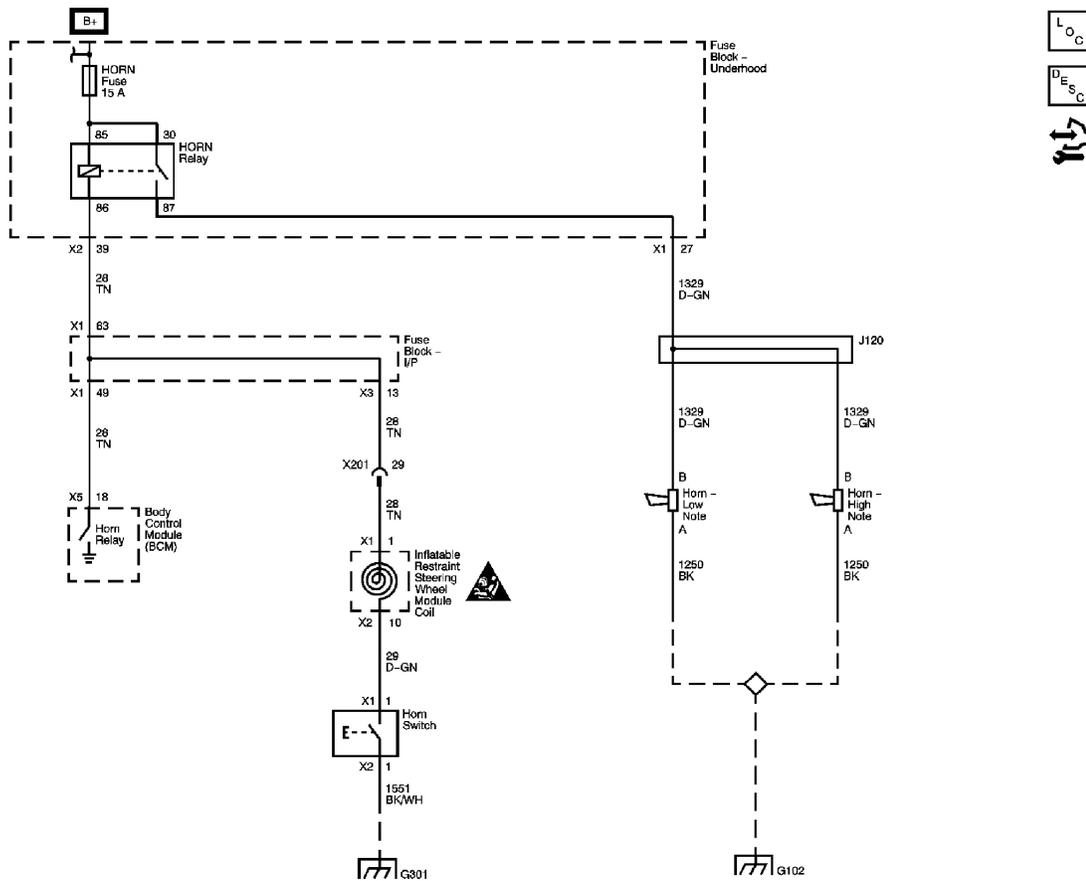


Fig. 1: Horn System - Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

HORN COMPONENT VIEWS

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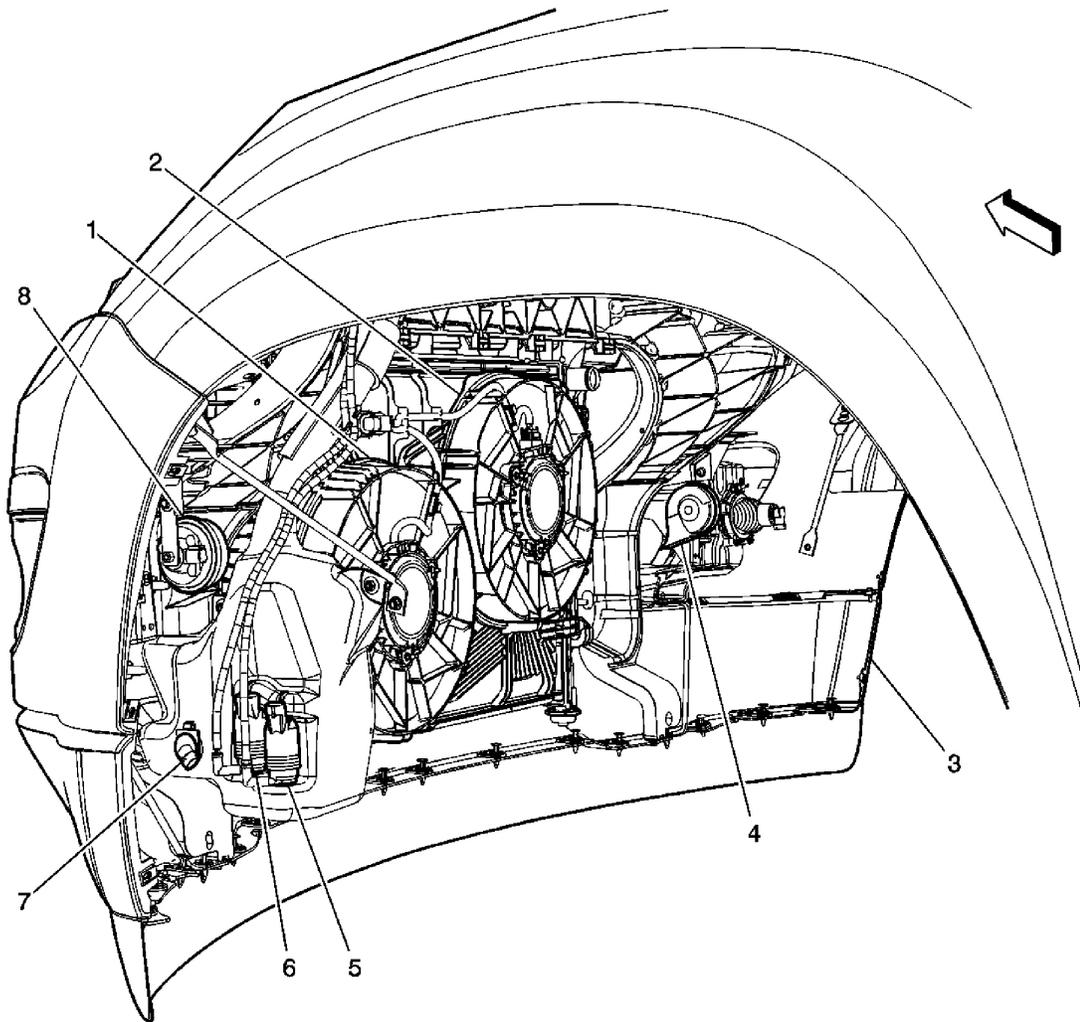


Fig. 2: Identifying Components Behind Front Fascia
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Cooling Fan - Left
2	Cooling Fan - Right
3	LF Fender
4	Horn - High Note
5	Windshield Washer Fluid Pump
6	Rear Window Washer Fluid Pump
7	Washer Fluid level Sensor
8	Horn - Low Note

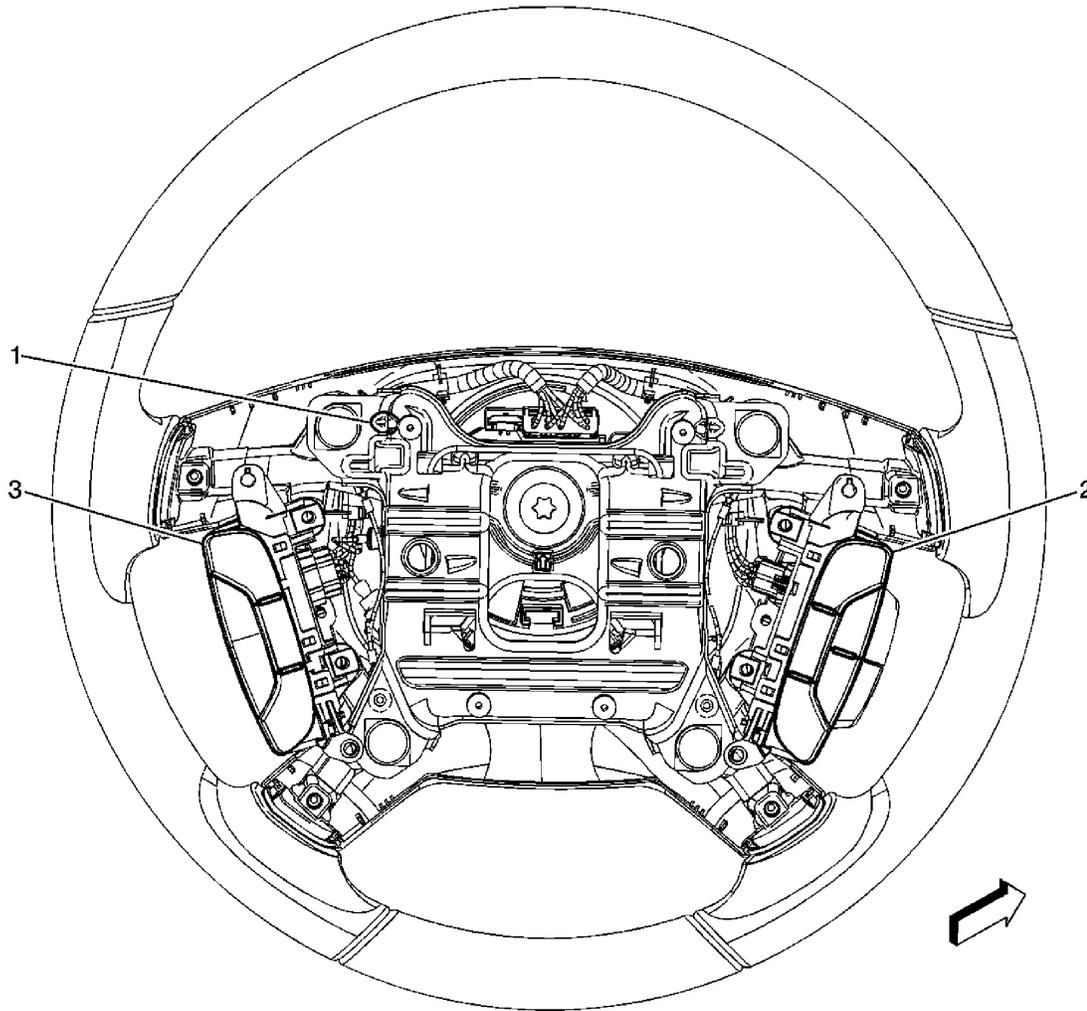


Fig. 3: Identifying Steering Wheel Components
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	Horn Switch
2	Steering Wheel control Switch Assembly - Right (UK3)
3	Steering Wheel Control Switch Assembly - Left

HORN CONNECTOR END VIEWS

Horn - High Note

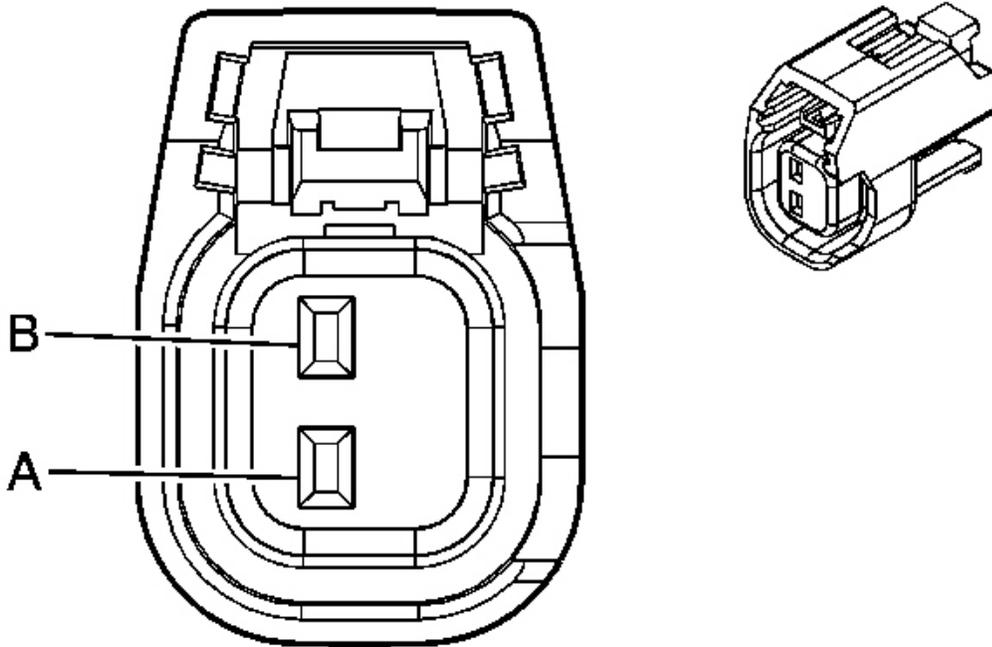


Fig. 4: Horn - High Note Connector End View
 Courtesy of GENERAL MOTORS CORP.

Horn - High Note Connector Parts Information

Connector Part Information

- OEM: 15419715
- Service: 88988313
- Description: 2-Way F GT 150 Series Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12191819/8
- Core/Insulation Crimp: Pins A - E/A
- Core/Insulation Crimp: Pins B - 2/A
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

Horn - High Note Connector Terminal Identification

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Pin	Wire	Circuit No.	Function
A	0.5 BK	1250	Ground
B	0.8 D-GN	1329	Horn Fuse Supply Voltage

Horn - Low Note

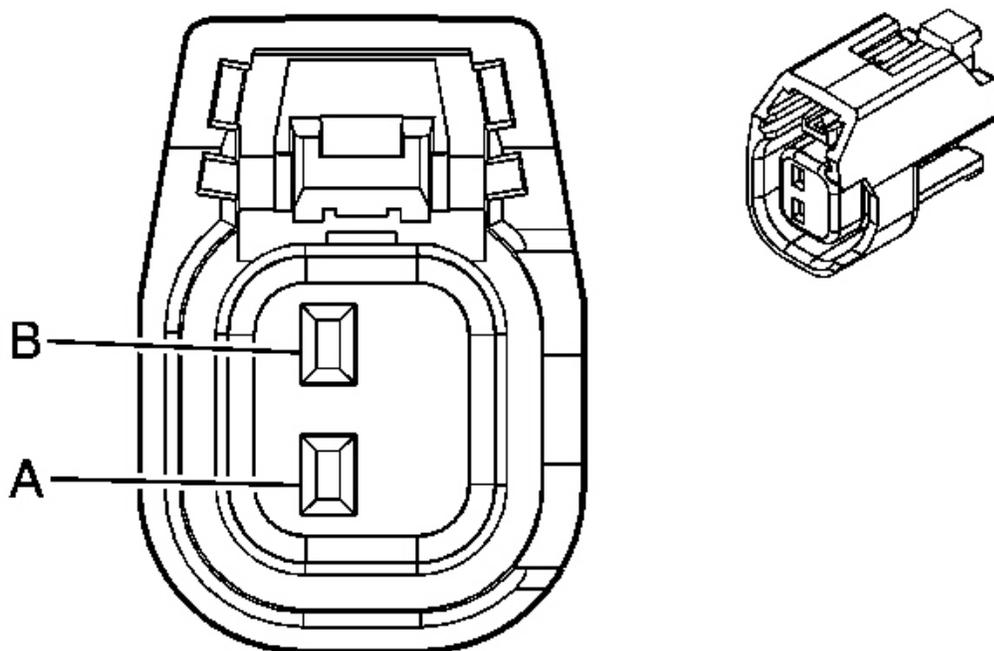


Fig. 5: Horn - Low Note Connector End View
Courtesy of GENERAL MOTORS CORP.

Horn - Low Note Connector Parts Information

Connector Part Information

- OEM: 15419715
- Service: 88988313
- Description: 2-Way F GT 150 Series Sealed (GY)

Terminal Part Information

- Terminal/Tray: 12191819/8

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- Core/Insulation Crimp: Pins A - E/A
- Core/Insulation Crimp: Pins B - 2/A
- Release Tool/Test Probe: 15315247/J-35616-2A (GY)

Horn - Low Note Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.5 BK	1250	Ground
B	0.8 D-GN	1329	Horn Fuse Supply Voltage

Horn Switch X1

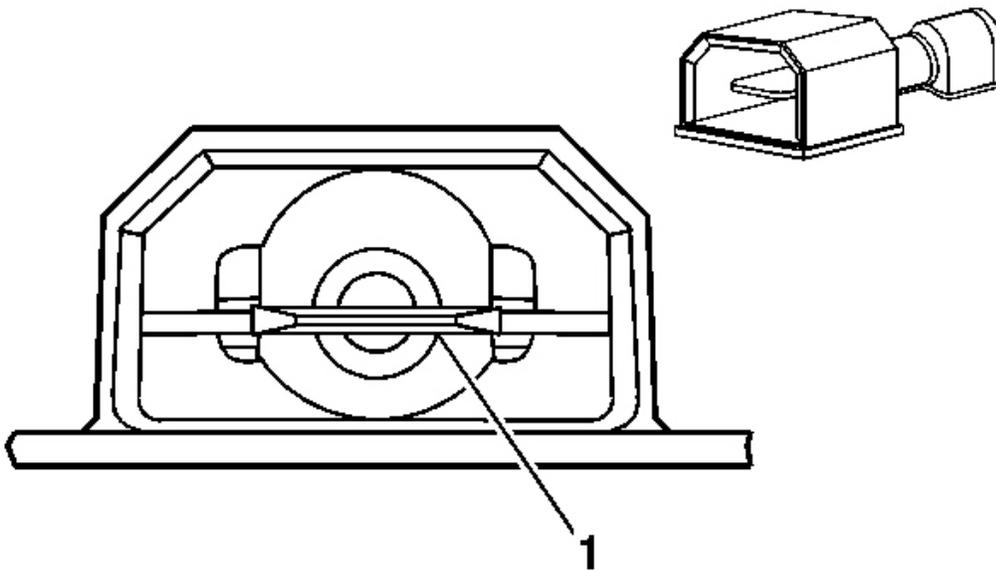


Fig. 6: Horn Switch X1 Connector End View
Courtesy of GENERAL MOTORS CORP.

Horn Switch X1 Connector Parts Information

Connector Part Information

- OEM: 2-521102-2
- Service: See Catalog

- Description: 1-Way F 4.75 Series (RD)

Terminal Part Information

- Terminal/Tray: See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool/Test Probe: See Terminal Repair Kit

Horn Switch X1 Connector Terminal Identification

Pin	Wire	Circuit No.	Function
A	0.35 D-GN	29	Horn Control

Horn Switch X2

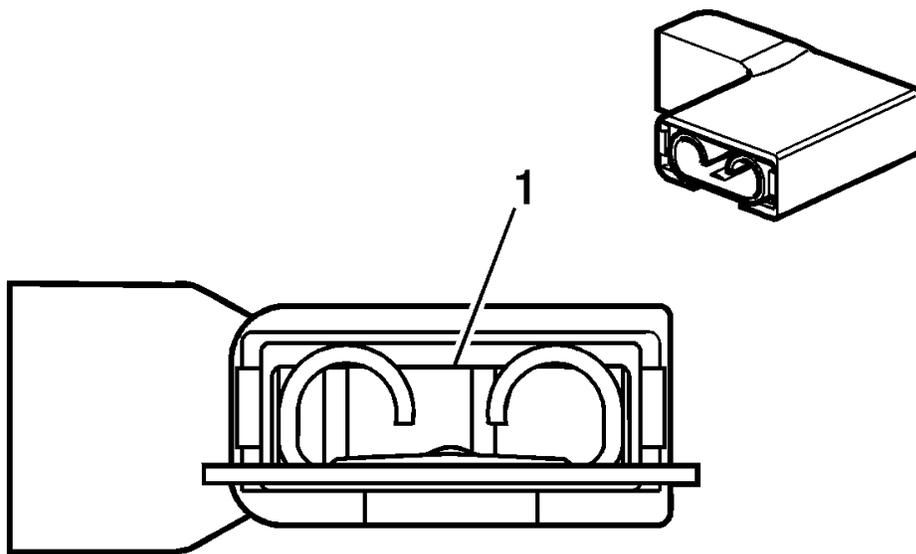


Fig. 7: Horn Switch X2 Connector End View
 Courtesy of GENERAL MOTORS CORP.

Horn Switch X2 Connector Parts Information

Connector Part Information

- OEM: 2-520128-2
- Service: See Catalog
- Description: 1-Way F 6.35 Series (RD)

Terminal Part Information

- Terminal/Tray: See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool/Test Probe: See Terminal Repair Kit

Horn Switch X2 Connector Terminal Identification

Pin	Wire	Circuit No.	Function
1	0.35 BK/WH	1550	Ground

DIAGNOSTIC INFORMATION AND PROCEDURES**DIAGNOSTIC STARTING POINT - HORNS**

Begin the system diagnosis with the **Diagnostic System Check - Vehicle** . The Diagnostic System Check will provide the following information:

- The identification of the control modules which command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification of any stored diagnostic trouble codes (DTCs) and their status

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

SCAN TOOL OUTPUT CONTROLS**Body Control Module (BCM)**

Scan Tool Output Control	Additional Menu Selection(s)	Description
Horn	Miscellaneous Test	The BCM Energizes the horn relay for 5 seconds when you select On or until you select Off.

SCAN TOOL DATA LIST

The Horns Scan Tool Data List contains all of the horn related parameters that are available on the scan tool. The parameters in the list are arranged in alphabetical order. The column, Data List, indicates the location of the parameter within the scan tool menu selections. Use the Horns Scan Tool Data List as directed by a diagnostic table or in order to supplement the diagnostic procedures.

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The Typical Data Values are obtained from a properly operating vehicle under the conditions specified in the first row of the Scan Tool Data List table. Comparison of the parameter values from the suspect vehicle with the Typical Data Values may reveal the source of the customer concern.

Body Control Module (BCM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF			
Horn Relay Command	Outputs	Off/On	Off

SCAN TOOL DATA DEFINITIONS

Battery Voltage

The scan tool displays the current state of the battery in volts.

Horn Relay Command

The scan tool displays Off/On. The horn output indicates the state that the control module has commanded for the relay.

DTC B2750

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 Descriptor

DTC B2750 00

Horn Relay Coil Circuit

Diagnostic Fault Information

DTC B2750

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance

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Horn Relay Control	B2750 00	B2750 00	B2750 00	-
Horn Control	2	2	1	-
Horn Ground	-	2	-	-
Horn Switch Ground	-	2	-	-
1. Horns Always ON 2. Horns Inoperative				

Circuit/System Description

The body control module (BCM) controls the horn relay by grounding the control circuit of the horn relay coil energizing the relay. When the horn relay is energized, the horn relay contacts close applying voltage through the horn fuse and the horn control circuit to the horns.

Conditions for Running the DTC

The DTC can only set only when the output is actively being requested by the BCM.

Conditions for Setting the DTC

The BCM detects a short to ground, open or short to voltage in the horn relay control circuit for approximately 125 milliseconds.

Action Taken When the DTC Sets

The BCM disables the output to the horn relay until the next ignition cycle.

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

Horn Connector End Views

Electrical Information Reference

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

Scan Tool Reference

- **Scan Tool Output Controls**
- **Scan Tool Data List**
- **Scan Tool Data Definitions**

Circuit/System Verification

Ignition ON, use scan tool Horn output control to command the horn relay On. The Horn Relay Command output data parameter should display On and the horn should sound.

Circuit/System Testing

1. Ignition OFF, disconnect the C4 harness connector at the underhood fuse block.
2. Connect a test lamp between the harness connector terminal G1 and battery voltage.
3. Command the horn ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always OFF, test the horn relay control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the BCM.
 - If the test lamp is always ON, test the horn relay control circuit for a short to ground. If the circuit tests normal, replace the BCM.
4. If all circuits/connectors test normal, replace the underhood fuse block.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, setup and programming

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 **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**Horns Malfunction**

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Horn Relay Control	1	2	2	-
Horn Control	2	2	1	-
Horn Switch Ground	-	2	2	-
Horn Ground	-	2	2	-
1. Horn Always On 2. Horn Inoperative				

Circuit/System Description

Battery positive voltage is applied at all times to the horn relay coil and the horn relay switch. Pressing the horn switch applies ground through the switch contacts and the horn relay control circuit to the coil side of the relay, energizing the relay. Battery voltage is then applied through the switch side of the relay, the horn fuse and the horn control circuit to the horns. The body control module (BCM) may also apply ground to the horn relay control circuit as described above. The horns sound as long as ground is applied to the horn relay control circuit.

Diagnostic Aids

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.

Reference Information

Schematic Reference

Horn Schematics

Connector End View Reference

Horn Connector End Views

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

- **Scan Tool Data List**
- **Scan Tool Data Definitions**
- **Scan Tool Output Controls**

Circuit/System Testing

1. Ignition OFF, connect a test lamp between the HORN fuse test point and ground.
2. Press and release the horn pad. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp does not illuminate or remains illuminated at all times, refer to **Horn Switch Circuit Test**.
3. Ignition ON, command the horn ON and OFF with a scan tool. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp does not illuminate, test the control circuit terminal 18 at the BCM harness connector C5 for a short to voltage or an open/high resistance. If the circuit tests normal, replace the BCM.
4. Connect a 15A fused jumper wire between the HORN fuse test point and B+. The horn should sound and emit a clear and even tone.
 - If the horn does not sound, refer to **Horn Circuit Test**.
 - If the sound emitted is not clear and even, refer to **Horn - Poor Tone**.

Horn Switch Circuit Test

1. Ignition OFF, disconnect the harness connector at the horn switch.
2. Ignition OFF, test for less than 1.0 ohm of resistance between the ground circuit terminal B and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect the harness connector at the horn switch.
4. Disconnect the harness connector C4 at the underhood fuse block.
5. Connect a test lamp between the control circuit terminal G1 and B+.

6. Press and release the horn pad. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to ground or a sticking horn pad/switch. If the circuit tests normal, replace the BCM.
 - If the test lamp is always OFF, test the control circuit for a short to voltage, an open high resistance or a horn switch which is not closing.
7. Ignition OFF, connect the harness connector at the underhood fuse block. Disconnect the harness connector at the horn.
8. Verify that a test lamp does not illuminate between the control circuit terminal B and ground.
 - If the test lamp illuminates, test the control circuit for a short to voltage. If the circuit tests normal, replace the underhood fuse block.
9. If all circuits test normal, test or replace the underhood fuse block.

Horn Circuit Test

1. Ignition OFF, disconnect the harness connector at the horn.
2. Ignition OFF, test for less than 1.0 ohm of resistance between the ground circuit terminal A and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Connect a test lamp between the control circuit terminal B and ground.
4. Press and release the horn pad. The test lamp should turn ON and OFF when changing between the commanded states.
 - If the test lamp is always ON, test the control circuit for a short to voltage. If the circuit tests normal, replace the underhood fuse block.
 - If the test lamp is always OFF and the circuit fuse is good, test the control circuit for an open/high resistance. If the circuit tests normal, test or replace the underhood fuse block.
 - If the test lamp is always OFF and the circuit fuse is open, test the control circuit for a short to ground. If the circuit tests normal, test or replace the horn.
5. If all circuit test normal, test or replace the horn.

Horn - Poor Tone

1. Ignition OFF, disconnect the harness connector at the horn.
2. Test for less than 1.0 ohm of resistance between the ground circuit terminal A and ground.
 - If greater than the specified range, test the ground circuit for a high resistance.

3. Disconnect the harness connector C1 at the underhood fuse block.
4. Test for less than 1.0 ohm of resistance between the control circuit terminal E5 at the underhood fuse block and the control circuit terminal B at the horn.
 - If greater than the specified range, test the control circuit for a high resistance.
5. If all circuits test normal, test or replace the horn.

Component Testing

Horn

1. Ignition OFF, disconnect the harness connector at the horn.
2. Install a 15A fused jumper wire between the control circuit terminal B and 12 volts. Install a jumper wire between the ground circuit terminal A and ground. Verify the horn emits a clear and even tone.
 - If the sound emitted is not clear and even, test or replace the horn.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- Horn Switch
- **Horn Replacement**
- **Underhood Electrical Center or Junction Block Replacement**
- **Control Module References** for BCM replacement, setup and programming

REPAIR INSTRUCTIONS

HORN REPLACEMENT

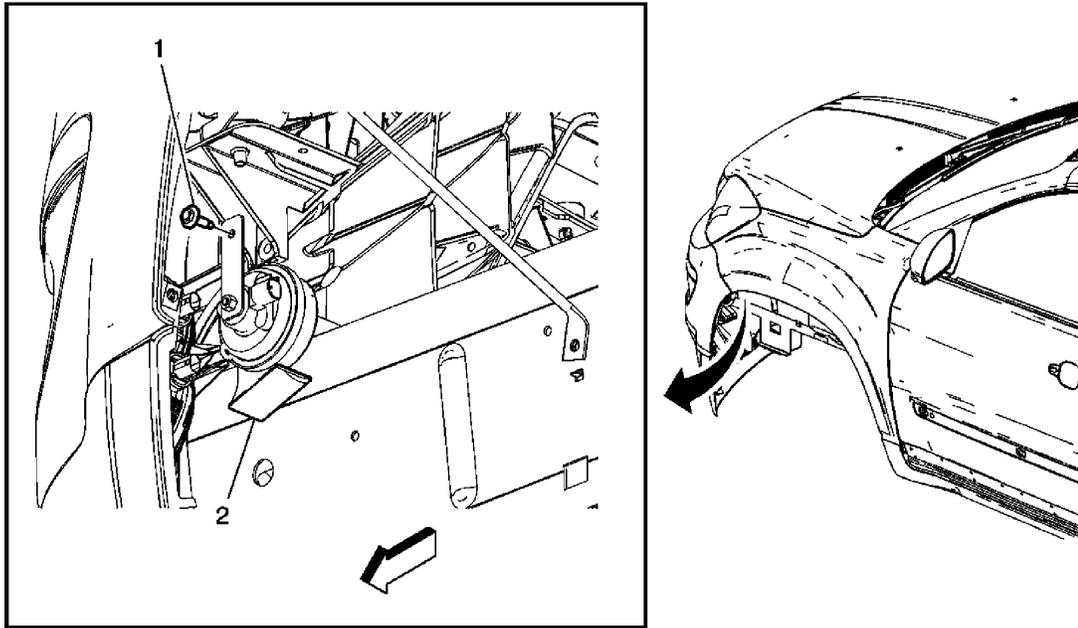


Fig. 8: Identifying Horn
 Courtesy of GENERAL MOTORS CORP.

Horn Replacement

Callout	Component Name
Preliminary Procedure: Remove the front wheelhouse liner (front). Refer to Front Wheelhouse Liner Replacement (Front) or Front Wheelhouse Liner Replacement (Rear) .	
1	Horn Bolt NOTE: Refer to Fastener Notice . Tighten: 9 N.m (80 lb in)
2	Horn Procedure: Disconnect the electrical connector.

DESCRIPTION AND OPERATION

HORNS SYSTEM DESCRIPTION AND OPERATION

System Description

The horn system consists of the following components:

- Horn switch
- Horn PCB relay
- Horn assembly
- Body control module (BCM)
- HORN fuse 15 A

System Operation

The vehicle horn system is activated under the following conditions:

- The horn switch is depressed.
- The body control module (BCM) commands the horns on. The BCM commands the horns on under any of the following conditions:
 - When the panic button is depressed on the remote control door lock transmitter. For further information refer to **Keyless Entry System Description and Operation** .
 - 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** .

Circuit Operation

Battery positive voltage is applied at all times to the horn relay coil and the horn relay switch. Pressing the horn switch applies ground through the switch contacts and the horn relay control circuit to the coil side of the relay, energizing the relay. Battery voltage is then applied through the switch side of the relay, the horn fuse and the horn control circuit to the horns. The body control module (BCM) may also apply ground to the horn relay control circuit as described above. The horns sound as long as ground is applied to the horn relay control circuit.