

2006 ACCESSORIES & EQUIPMENT

Horns - Impala

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Horn Bracket Bolt	10 N.m	7 lb ft

SCHEMATIC AND ROUTING DIAGRAMS

HORNS SCHEMATIC ICONS

Horns Schematic Icons

Icon	Icon Definition
	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 ZONES</u> . Failure to observe the correct procedure could cause deployment of the SIR components, personal injury, or unnecessary SIR system repairs.

HORNS SCHEMATICS

2006 Chevrolet Impala LS

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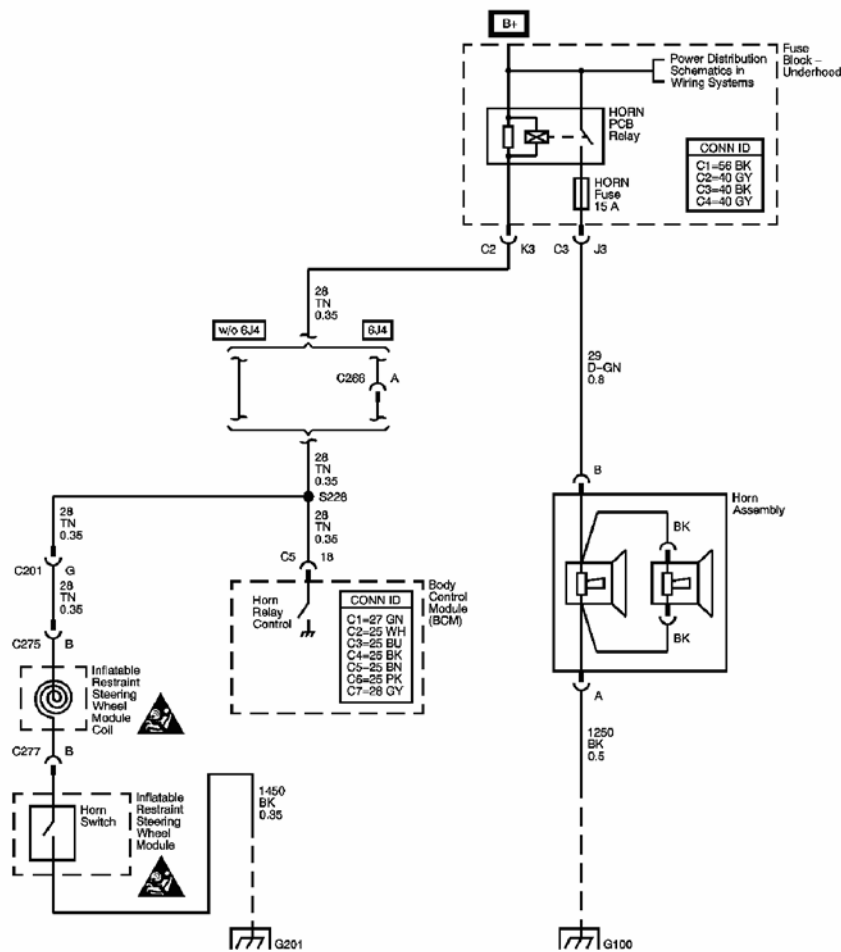


Fig. 1: Horns Schematics - Wiring Diagram
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

HORNS COMPONENT VIEWS

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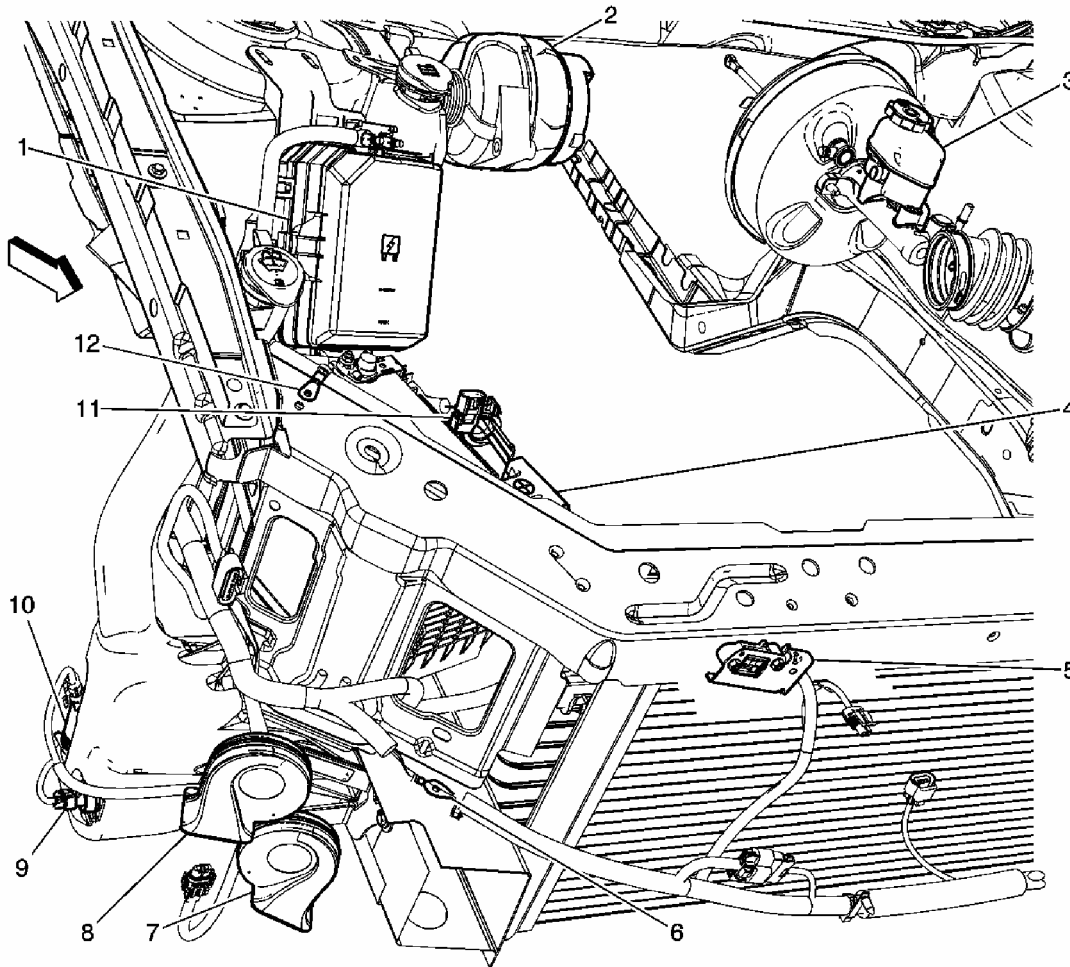


Fig. 2: RF of the Engine Compartment
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Fuse Block - Underhood
2	Generator
3	Brake Fluid Level Switch
4	Battery
5	Inflatable Restraint Front end Sensor - Right
6	G100
7	Horn Assembly
8	Windshield Washer Fluid Container
9	Windshield Washer Fluid Level Switch
10	Windshield Washer Fluid Pump
11	Battery Current Sensor

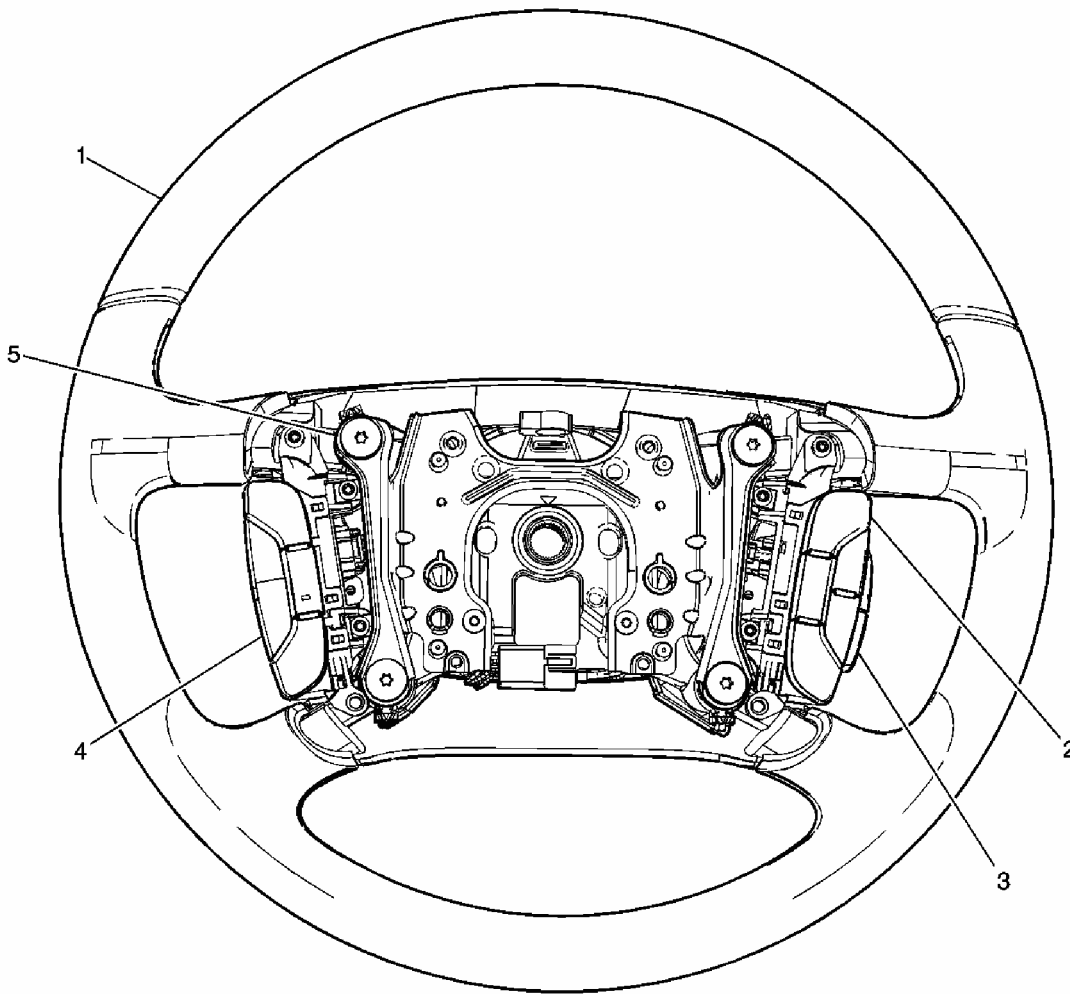


Fig. 3: Steering Wheel Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	Steering Wheel
2	Steering Wheel Controls-Right
3	Radio Controls
4	Steering Wheel Control-Right
5	Horn Contact Plate

HORNS CONNECTOR END VIEWS

Horn Assembly

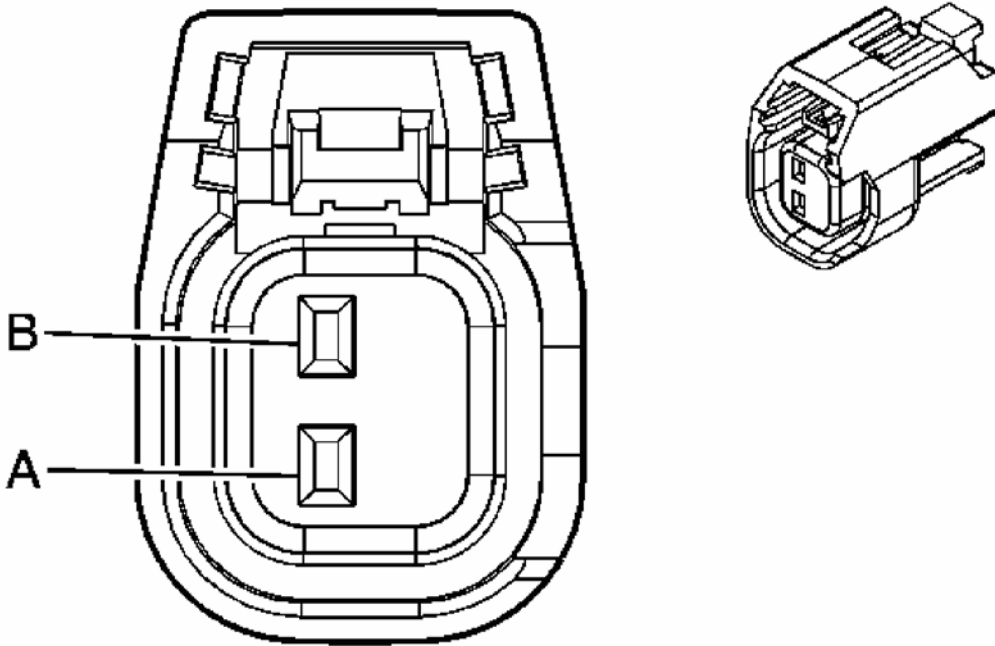


Fig. 4: Horns Connector End View
 Courtesy of GENERAL MOTORS CORP.

Horns Connector End Views

Connector Part Information

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

Terminal Part Information

- Pins: A, B
- 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 Assembly

Pin	Wire Color	Circuit No.	Function
A	BK	1250	Ground

B

D-GN

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Horn Control

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - HORNS

Begin the system diagnosis with the **Diagnostic System Check - Vehicle** in Vehicle DTC Information. 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

Scan Tool Output Controls

Scan Tool Output Control	Additional Menu Selection(s)	Description
Horn	Output Control	Energizes the horn relay for 5 seconds

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. Begin all of the diagnostic procedures with **Diagnostic System Check - Vehicle** in Vehicle DTC Information.

Use the Scan Tool Data List only after the following is determined:

- There is no published DTC procedure nor published symptom procedure for the customer concern.
- The DTC or symptom diagnostic procedure indicated by the diagnostic system check does not resolve the customer concern.

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.

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Scan Tool Data List

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Ignition ON/Engine OFF			
Battery Voltage	Data	Volts	Varies
Horn Output	Outputs	On/Off	Off

SCAN TOOL DATA DEFINITIONS

Battery Voltage

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

Horn Output

The horn output indicates the state that the control module has commanded for the relay.

DTC B2750

Circuit Description

The body control module (BCM) controls the horn relay by grounding the control circuit of the horn relay coil. When the horn relay coil is grounded, the horn relay contacts close applying voltage to the horn through the horn supply voltage circuit.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC B2750

Horn Relay Coil Circuit

This vehicle has DTCs which include DTC Symptoms. For more information on DTC Symptoms, refer to [DTC Symptom Description](#).

DTC B2750

DTC Symptom	DTC Symptom Descriptor
00	Short to battery

Conditions for Running the DTC

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

Conditions for Setting the DTC

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The following condition exists for more than 125 milliseconds:

The DTC will set if the output driver device detects current in excess of its capacity.

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 current DTC clears when the fault is no longer present.
- 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.

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: This step verifies the operation of the horn relay. Listen for an audible click when commanding the horn relay ON and the OFF.

3: This step verifies that voltage is supplied to the coil side of the horn relay. The horn fuse supplies power to the coil side of the horn relay.

4: This step verifies that the BCM is providing ground to the horn relay.

DTC B2750

Step	Action	Yes	No
Schematic Reference: Horns Schematics			
Connector End View Reference: Horns Connector End Views			
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u>
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With a scan tool, command the horn relay ON and OFF. Does the horn relay turn ON and OFF with each command?	Go to <u>Testing for Intermittent Conditions and Poor Connections</u>	Go to Step 3
	1. Turn OFF the ignition. 2. Disconnect the horn relay.		

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3	3. Turn ON the ignition, with the engine OFF. 4. Probe the battery positive voltage circuit of the horn relay with a test lamp connected to a good ground. Does the test lamp illuminate?	Go to Step 4	Go to Step 10
4	1. Connect a test lamp between control circuit of the horn relay and battery positive voltage circuit of the horn relay. 2. With a scan tool, command the horn relay On and OFF. Does the test lamp turn ON and OFF with each command?	Go to Step 8	Go to Step 5
5	Does the test lamp remain illuminated with each command?	Go to Step 7	Go to Step 6
6	Test the control circuit of the horn relay for a short to voltage. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	Go to Step 13	Go to Step 9
7	Test the control circuit of the horn relay for a short to ground. Refer to Circuit Testing and Wiring Repairs . Did you find and correct the condition?	Go to Step 13	Go to Step 9
8	Inspect for poor connections at the horn relay. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Step 13	Go to Step 11
9	Inspect for poor connections at the harness connector of the body control module (BCM). Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs . Did you find and correct the condition?	Go to Step 13	Go to Step 12
10	Repair the open in the battery positive voltage circuit of the horn relay. Refer to Wiring Repairs . Did you complete the repair?	Go to Step 13	-
	Replace the horn relay.		

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11	Did you complete the replacement?	Go to Step 13	-
12	Replace the BCM. Refer to Control Module References for replacement, setup, and programming. Did you complete the replacement?	Go to Step 13	-
13	1. Use the scan tool in order to clear the DTCs. 2. Operate the vehicle within the Conditions for Running the DTC. Does the DTC reset?	Go to Step 2	System OK

SYMPTOMS - HORNS

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

1. Perform **Diagnostic System Check - Vehicle** in Vehicle DTC Information 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** in Wiring Systems.
- 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** in Wiring Systems.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the

symptom:

- **Horns Always On**
- **Horns Inoperative**
- **Horns - Poor Tone**

HORNS ALWAYS ON

Test Description

The numbers below refer to the step numbers on the diagnostic table.

4: Tests if ground is constantly being applied to the horn relay.

5: The horn relay control circuit includes the horn slip ring and the horn switch. The horn switch is part of the inflatable restraint steering wheel module. The horn slip ring and the horn switch must be tested for a short to ground when testing the relay control circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems and **Inflatable Restraint Steering Wheel Module Replacement** in SIR.

Horns Always On

Step	Action	Yes	No
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u> in Vehicle DTC Information
2	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With a scan tool, command the body control module (BCM) Horn Output ON and OFF. Are the horns on at all times?	Go to Step 3	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems
3	1. Turn OFF the ignition. 2. Disconnect the horn relay. Are the horns on at all times?	Go to Step 8	Go to Step 4
4	Connect a test lamp between the battery positive voltage circuit of the horn relay coil and the horn relay control circuit. Does the test lamp illuminate?	Go to Step 5	Go to Step 6

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5	IMPORTANT: The horn switch is part of the inflatable restraint steering wheel module. Refer to <u>Inflatable Restraint Steering Wheel Module Replacement</u> in SIR. To disable the SIR system, refer to <u>SIR Disabling and Enabling Zone 3</u> in SIR. Test the horn relay control circuit for a short to ground. The horn relay control circuit includes the horn slip ring and the horn switch. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 11	Go to Step 7
6	Inspect for poor connections at the horn relay. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 11	Go to Step 9
7	Inspect for poor connections at the harness connector of the BCM. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 11	Go to Step 10
8	Repair the short to voltage in the horn control circuit. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you complete the repair?	Go to Step 11	-
9	Replace the horn relay. Did you complete the replacement?	Go to Step 11	-
10	IMPORTANT: Perform the BCM programming procedure when replacing the BCM. Refer to <u>Body Control Module (BCM) Programming/RPO Configuration</u> in Computer/Integrating Systems. Replace the BCM. Refer to <u>Body Control Module Replacement</u> in Computer/Integrating Systems. Did you complete the replacement?	Go to Step 11	-
11	Operate the horns. Do the horns operate properly?	System OK	Go to Step 1

HORNS INOPERATIVE

Test Description

The numbers below refer to the step numbers on the diagnostic table.

4: Verifies that the body control module (BCM) is providing ground to the horn relay.

5: Tests for voltage at the battery positive voltage terminal of the horn relay coil.

7: Tests for voltage at the battery positive voltage terminal of the horn relay switch. The HORN fuse supplies power to the battery positive voltage terminal of the horn relay switch.

15: The horns need maximum current flow to operate properly. A high resistance, greater than 0.5 ohms, in the horn control circuit or the horn ground circuit could cause operating problems with the horns. Check the circuits for faults that would restrict current flow.

17: The horn relay control circuit includes the horn slip ring and the horn switch. The horn switch is part of the inflatable restraint steering wheel module. The horn slip ring and the horn switch must be tested for a high resistance, an open or a short to voltage when testing the relay control circuit. Refer to **Circuit Testing** and **Wiring Repairs** in Wiring Systems and **Inflatable Restraint Steering Wheel Module Replacement** in SIR.

Horns Inoperative

Step	Action	Yes	No
1	Did you perform the Diagnostic System Check - Vehicle?	Go to Step 2	Go to Diagnostic System Check - Vehicle in Vehicle DTC Information
2	Depress the horn switch. Do the horns operate?	Go to Step 3	Go to Step 5
3	1. Install a scan tool. 2. Turn ON the ignition, with the engine OFF. 3. With a scan tool, command the body control module (BCM) Horn Output ON and OFF. Do the horns operate?	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 4
4	Test the BCM portion of the horn relay control circuit for a high resistance or an open. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.		

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	Did you find and correct the condition?	Go to Step 24	Go to Step 13
5	1. Turn OFF the ignition. 2. Disconnect the horn relay. 3. Connect a test lamp between the battery positive voltage circuit of the horn relay coil and a good ground. Does the test lamp illuminate?	Go to Step 6	Go to Step 16
6	1. Connect a test lamp between the battery positive voltage circuit of the horn relay coil and the horn relay control circuit. 2. Depress and hold the horn switch. Does the test lamp illuminate?	Go to Step 7	Go to Step 17
7	Connect a test lamp between the battery positive voltage circuit of the horn relay switch and a good ground. Does the test lamp illuminate?	Go to Step 8	Go to Step 18
8	Momentarily connect a 15-amp fused jumper wire between the battery positive voltage circuit of the horn relay switch and the horn control circuit. Do the horns operate?	Go to Step 14	Go to Step 9
9	1. Reconnect the horn relay. 2. Disconnect the horn connector. 3. Connect a test lamp between the horn control circuit and a good ground. 4. Depress and hold the horn switch. Does the test lamp illuminate?	Go to Step 10	Go to Step 19
10	1. Connect a test lamp between the horn control circuit and the horn ground circuit. 2. Depress and hold the horn switch. Does the test lamp illuminate?	Go to Step 11	Go to Step 20
11	Inspect for poor connections at the harness connector of the horn. Refer to Testing for Intermittent Conditions and Poor		

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	<u>Connections and Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 24	Go to Step 12
12	1. Connect a 15-amp fused jumper wire between the positive battery terminal and the control terminal of the horn. 2. Connect another jumper wire between the negative battery terminal and the ground terminal of the horn. Do the horns operate?	Go to Step 15	Go to Step 23
13	Inspect for poor connections at the harness connector of the BCM. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 24	Go to Step 21
14	Inspect for poor connections at the horn relay. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 24	Go to Step 22
15	Repair the high resistance in the horn control circuit or the horn ground circuit. A resistance as low as 0.5 ohms could cause operating problems with the horns. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you complete the repair?	Go to Step 24	-
16	Repair the open or high resistance in the battery positive voltage circuit of the horn relay coil. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you complete the repair?	Go to Step 24	-
17	IMPORTANT: The horn switch is part of the inflatable restraint steering wheel module. Refer to <u>Inflatable Restraint Steering Wheel Module Replacement</u> in SIR. To disable the SIR system refer to <u>SIR Disabling and Enabling Zone 3</u> in SIR. Repair the open or short to voltage in		-

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	the horn relay control circuit. The horn relay control circuit includes the horn slip ring and the horn switch. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 24	
18	Repair the open or high resistance in the battery positive voltage circuit of the horn relay switch. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 24	-
19	Repair the open or high resistance in the horn control circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 24	-
20	Repair the open or high resistance in the horn ground circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 24	-
21	IMPORTANT: Perform the BCM programming procedure when replacing the BCM. Refer to Body Control Module (BCM) Programming/RPO Configuration in Computer/Integrating Systems. Replace the BCM. Refer to Body Control Module Replacement in Computer/Integrating Systems. Did you complete the repair?	Go to Step 24	-
22	Replace the horn relay. Did you complete the replacement?	Go to Step 24	-
23	Replace the horns. Refer to Horn Replacement . Did you complete the replacement?	Go to Step 24	-
24	Operate the horns. Do the horns operate properly?	System OK	Go to Step 1

HORNS - POOR TONE

Horns - Poor Tone

Step	Action	Yes	No
	Did you perform the Diagnostic System		Go to Diagnostic

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1	Check - Vehicle?	Go to Step 2	System Check - Vehicle in Vehicle DTC Information
2	Depress the horn switch. Do the horns have a harsh tone or buzzing?	Go to Step 3	Go to Symptoms - Horns
3	• Test the horn mounting hardware for adequate torque. The hardware should be tightened to 10 N.m (7 lb ft). • Inspect the horns for debris in the joint where the horns attach to the vehicle. Did you find and correct the condition?	Go to Step 7	Go to Step 4
4	1. Disconnect the horn connector. 2. Connect a 15-amp fused jumper wire between the positive battery terminal and the control terminal of the horn. 3. Connect another jumper wire between the negative battery terminal and the ground terminal of the horn. Does the horn have a harsh tone or buzzing?	Go to Step 6	Go to Step 5
5	Repair the high resistance in the horn control circuit or the horn ground circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 7	-
6	Replace the horns. Refer to Horn Replacement . Did you complete the replacement?	Go to Step 7	-
7	Operate the horns. Does the horn operate properly?	System OK	Go to Step 1

REPAIR INSTRUCTIONS

HORN REPLACEMENT

Removal Procedure

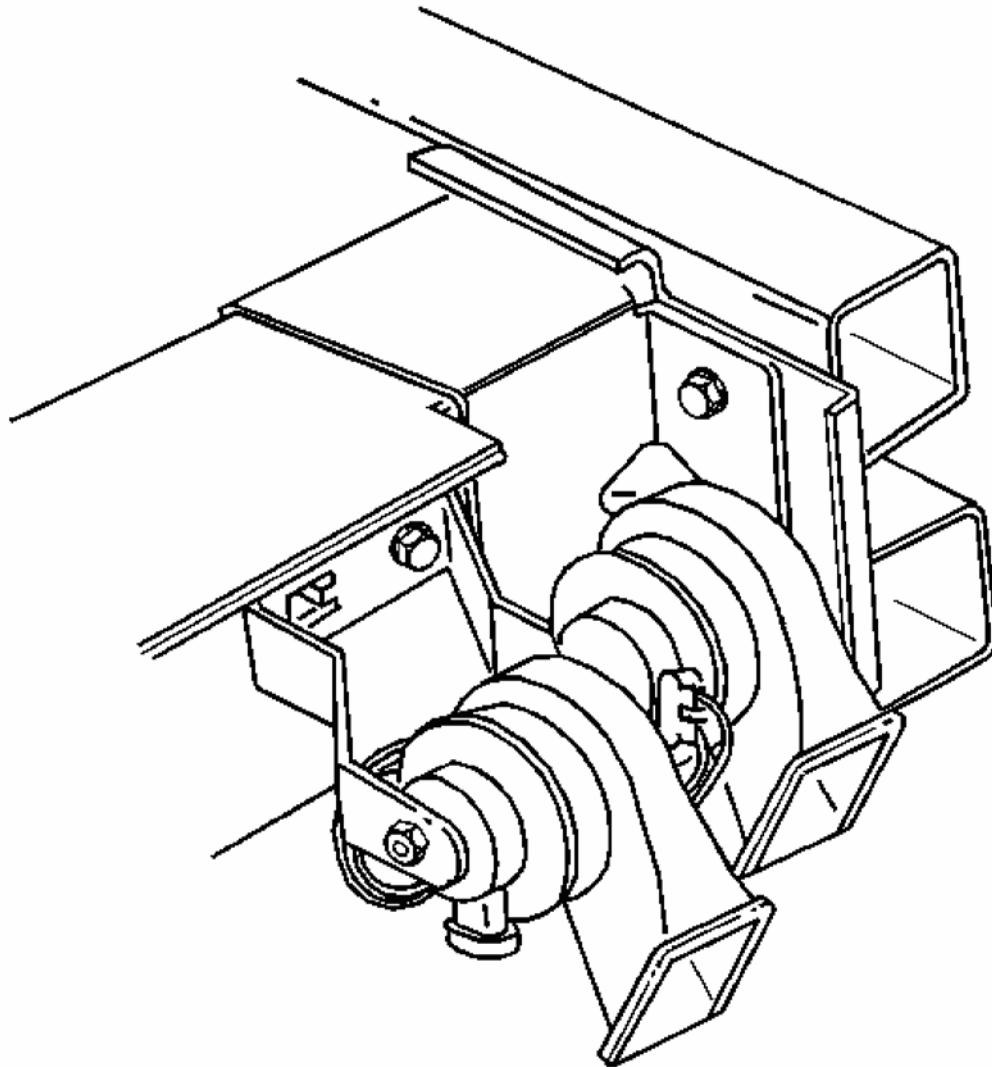


Fig. 5: Vehicle Horn
Courtesy of GENERAL MOTORS CORP.

1. Open the hood.
2. Remove the right headlamp. Refer to **HEADLAMP REPLACEMENT (MONTE CARLO)** in Lighting Systems.
3. Disconnect the horn electrical connector.

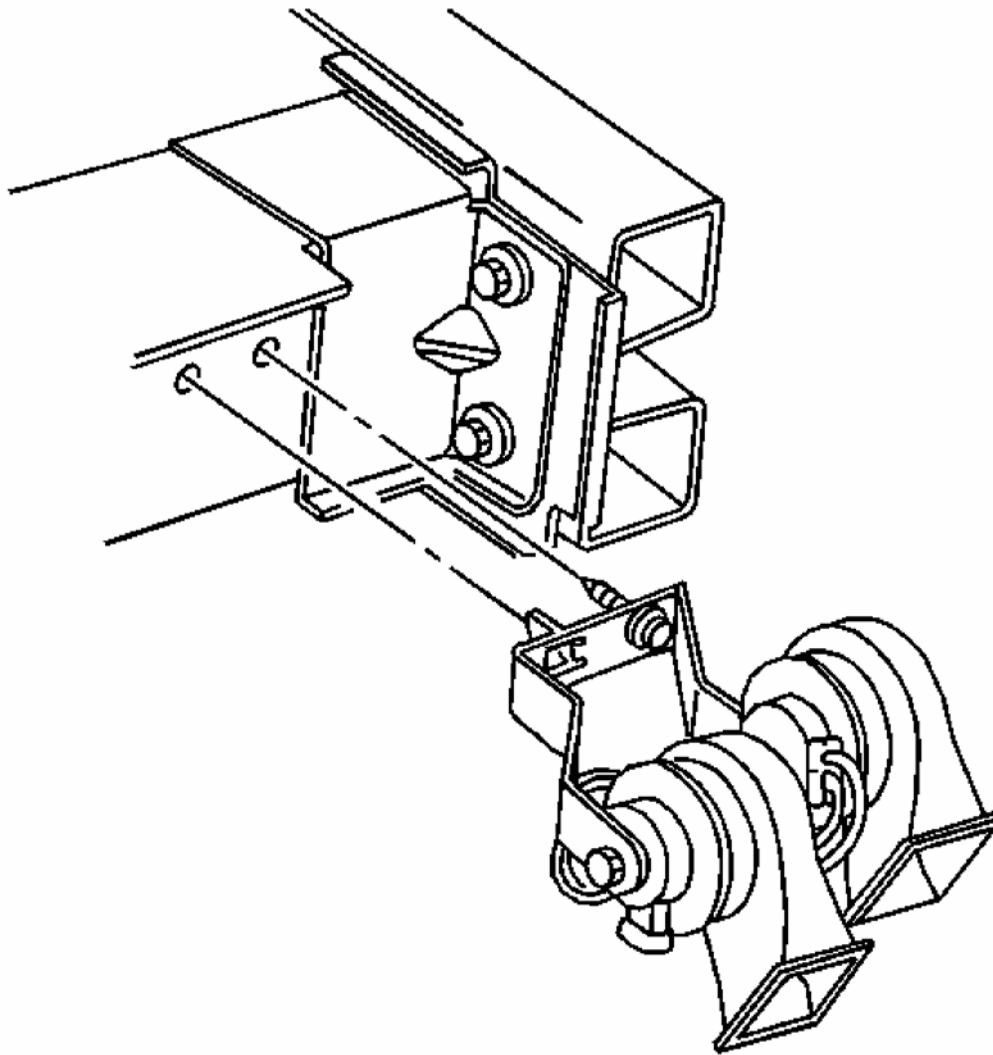


Fig. 6: Horn Bracket & Bolts
Courtesy of GENERAL MOTORS CORP.

4. Remove the horn bracket bolt.
5. Remove the horn from the frame rail extension.

Installation Procedure

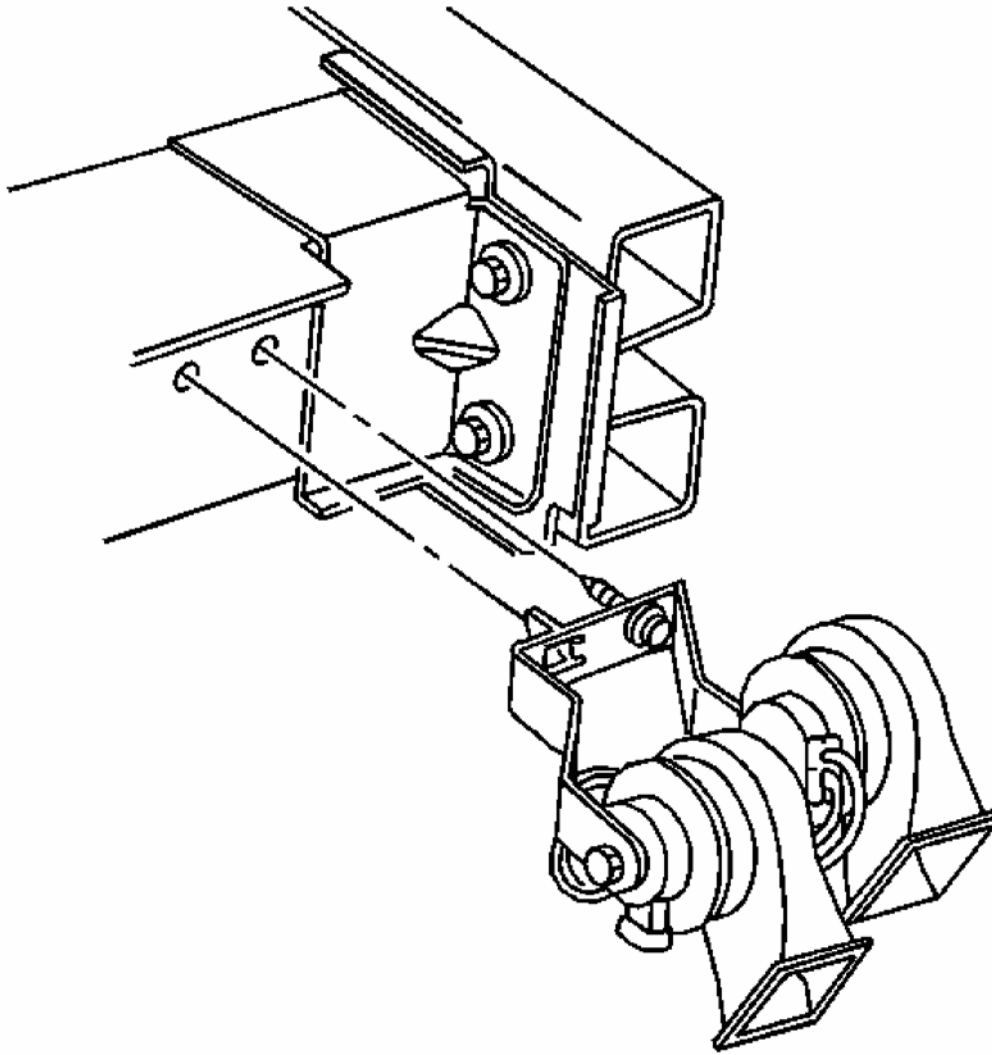


Fig. 7: Horn Bracket & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Position the horn to the frame rail extension; insert the horn anti-rotation tab into the slot on the frame rail.

NOTE: Refer to FASTENER NOTICE in Cautions and Notices.

2. Install the horn bracket bolt.

Tighten: Tighten the bolt to 15 N.m (11 lb ft).

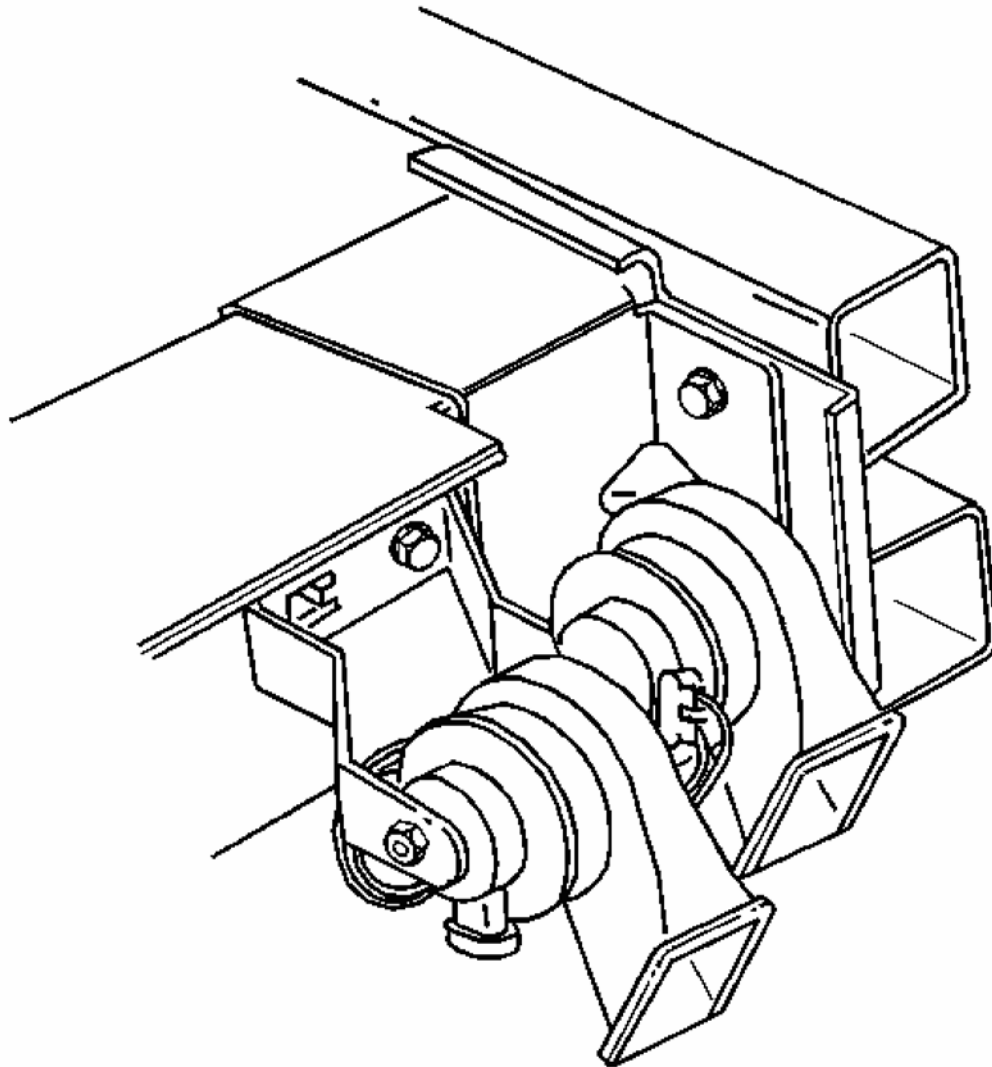


Fig. 8: Vehicle Horn
Courtesy of GENERAL MOTORS CORP.

3. Connect the horn electrical connector.
4. Install the right headlamp. Refer to **HEADLAMP REPLACEMENT (MONTE CARLO)** in Lighting Systems.
5. Close the hood.

DESCRIPTION AND OPERATION

HORNS SYSTEM DESCRIPTION AND OPERATION

System Description

The horn system consists of the following components:

- HORN fuse
- Horn relay
- Horn slip ring
- Horn switch (The horn switch is part of the inflatable restraint steering wheel module.)
- Horn assembly
- Body Control Module (BCM)

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** in Keyless Entry.
 - 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** in Keyless Entry.

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 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.