

2007 ACCESSORIES & EQUIPMENT

Seat Heating and Cooling - H3

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Front Seat Switch Screw	2 N.m	18 lb in

SCHEMATIC AND ROUTING DIAGRAMS

HEATED/COOLED SEAT SCHEMATICS

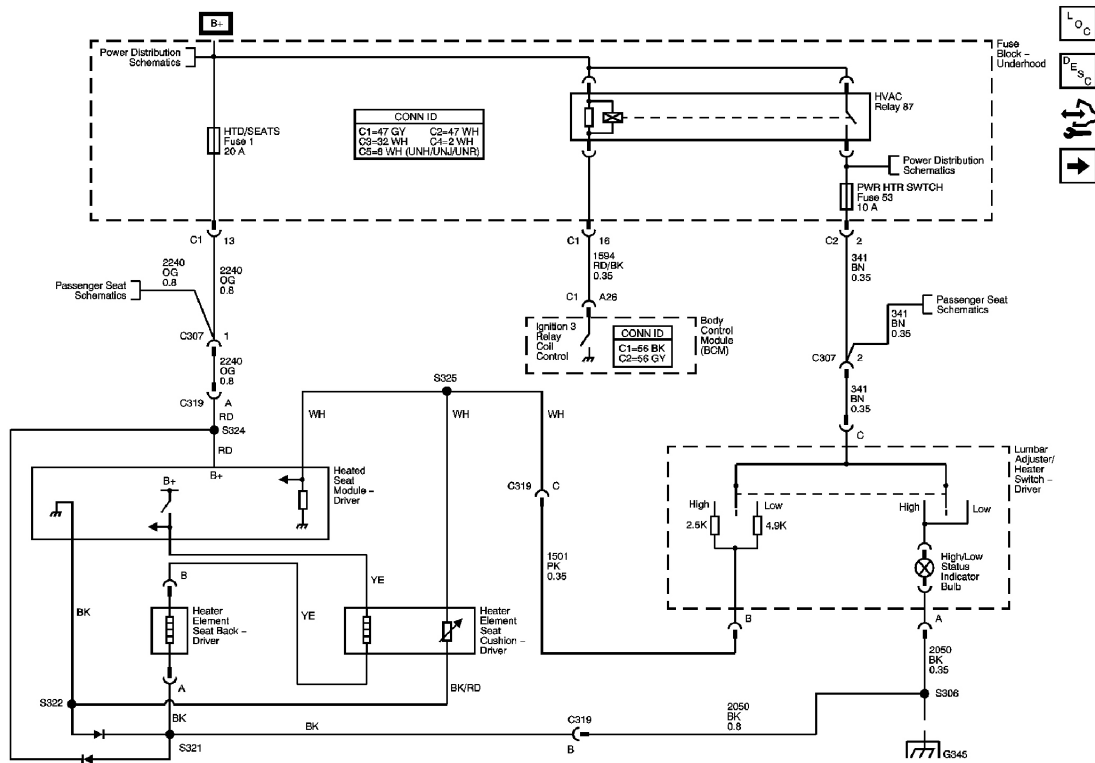


Fig. 1: Driver Side Heated/Cooled Seat Schematic
 Courtesy of GENERAL MOTORS CORP.

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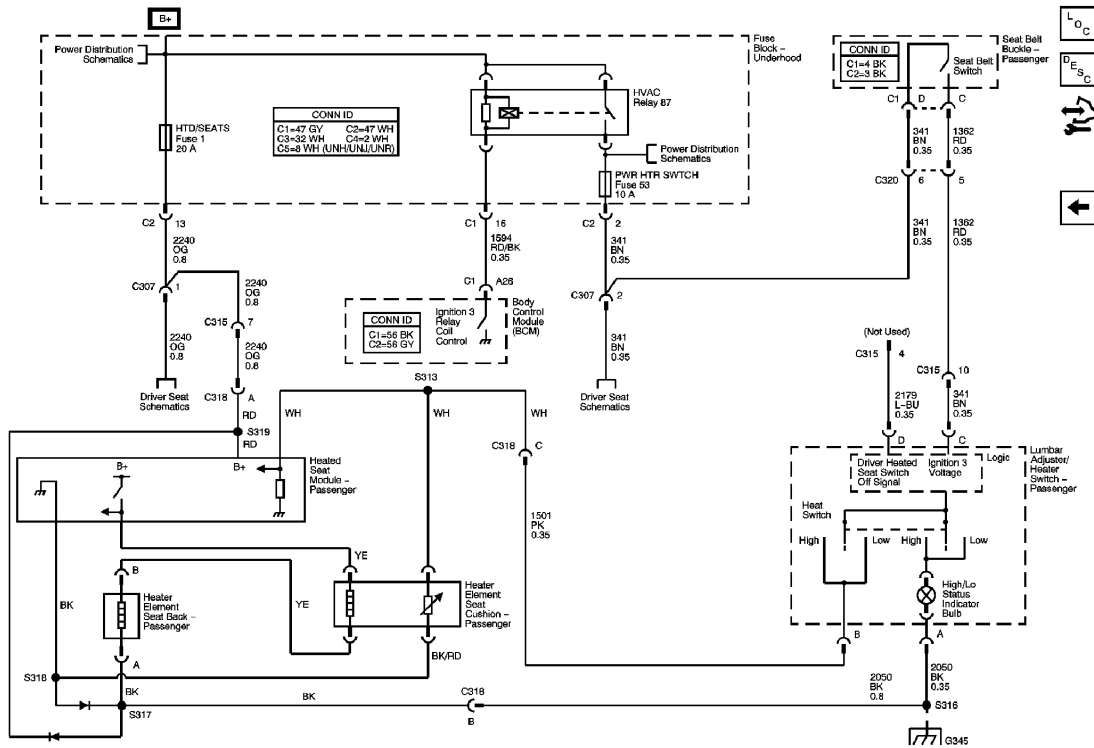


Fig. 2: Passenger Side Heated/Cooled Seat Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

HEATED/COOLED SEAT COMPONENT VIEWS

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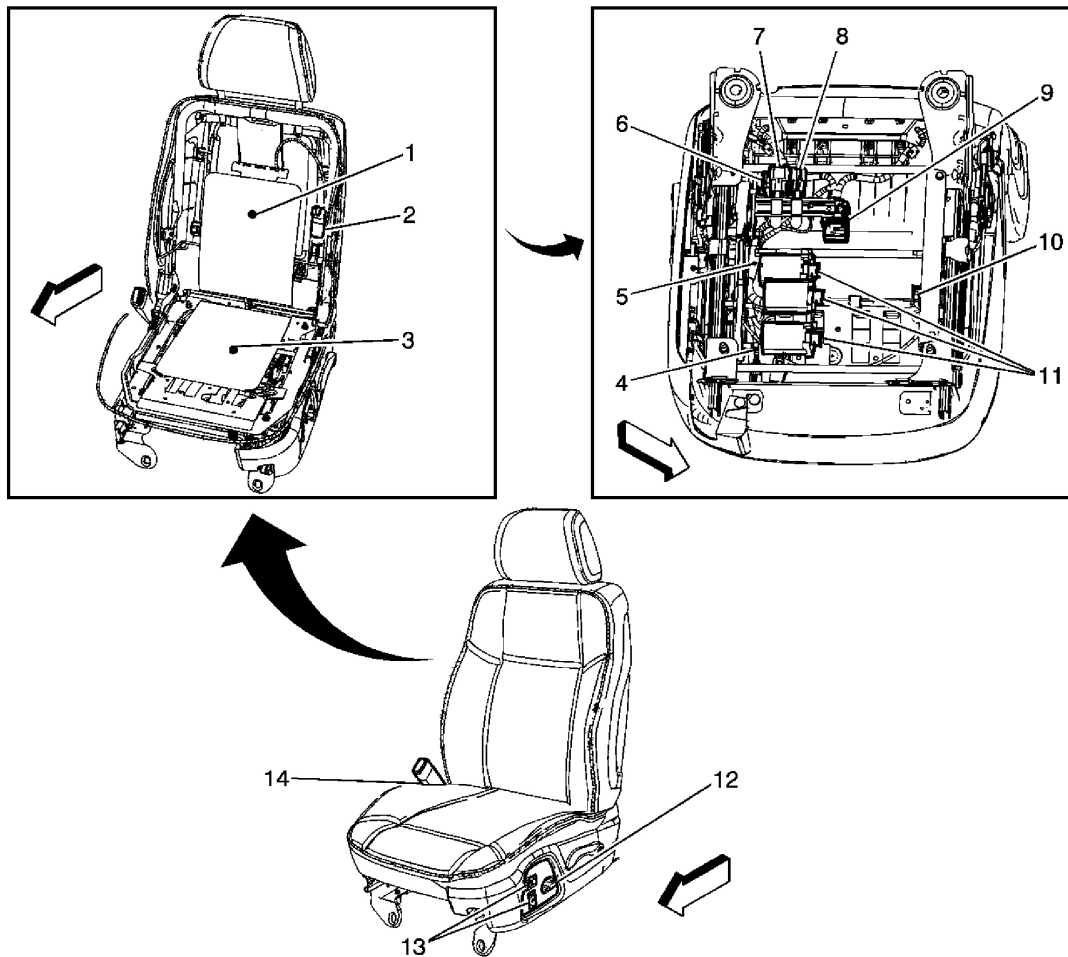


Fig. 3: Identifying Driver Seat Components
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 3

Callout	Component Name
1	Heater Element Seat Back - Driver (KA1)
2	Lumbar Pump Motor - Driver (AG1)
3	Heater Element Seat Cushion - Driver (KA1)
4	S306 (AG1)
5	S312 (AG1)
6	Seat Circuit Breaker (AG1)
7	C307 (AG1)
8	C308
9	Heated Seat Module - Driver (KA1)

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10	Inflatable Restraint Seat Position Sensor (SPS) - Left
11	Seat Motors - Driver (AG1)
12	Seat Adjuster Switch - Driver (AG1)
13	Lumbar Adjuster/Heater Switch - Driver (AG1)
14	Seat Belt Buckle - Driver

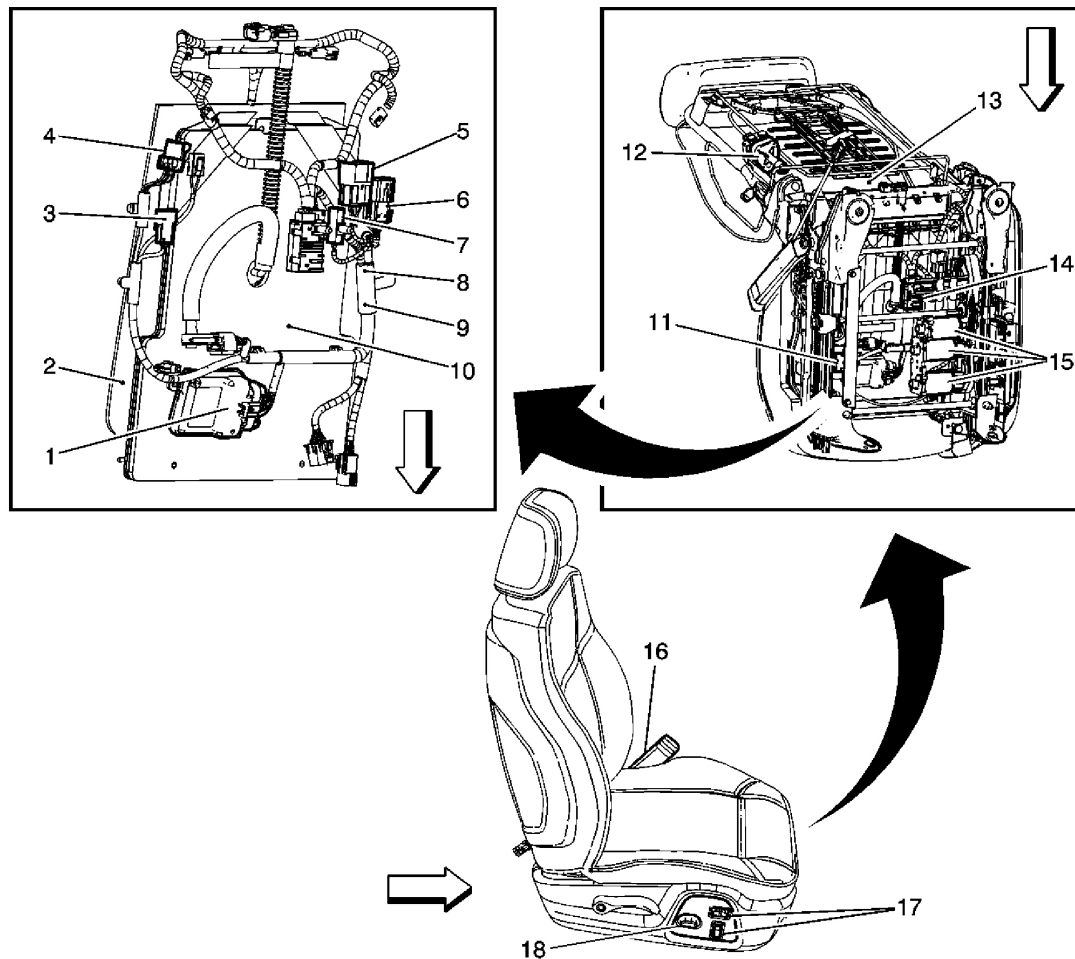


Fig. 4: Identifying Passenger Seat Components
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 4

Callout	Component Name
1	Inflatable Restraint Passenger Presence System (PPS) Module
2	Heater Element Seat Cushion - Passenger (KA1)
3	Seat Belt Buckle - Passenger C1

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4	Seat Belt Buckle - Passenger C2
5	C320
6	C315
7	C318 (AG2)
8	S341 (AG2)
9	S316 (AG2)
10	Inflatable Restraint Passenger Presence System (PPS)
11	Inflatable Restraint Seat Position Sensor (SPS) - Right
12	Lumbar Pump Motor - Passenger (AG2)
13	Heater Element Seat Back - Passenger (KA1)
14	Heated Seat Module - Passenger (KA1)
15	Seat Motors - Passenger (AG2)
16	Seat Belt Buckle - Passenger
17	Lumbar Adjuster/Heater Switch - Passenger (AG2)
18	Seat Adjuster Switch - Passenger (AG2)

HEATED/COOLED SEAT CONNECTOR END VIEWS

Lumbar Adjuster/Heater Switch - Driver (AG1)

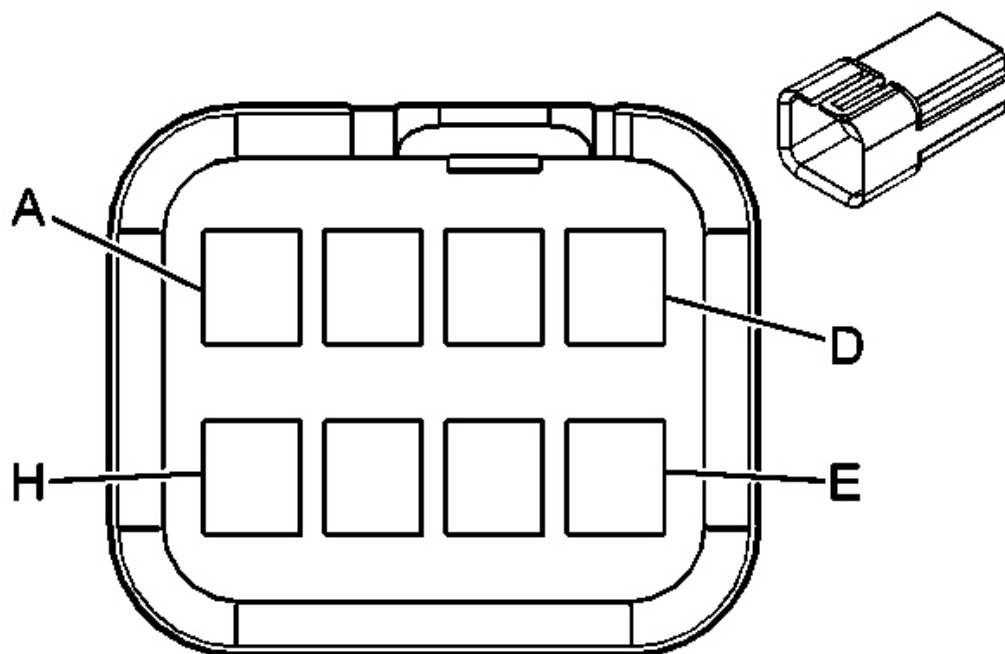


Fig. 5: Lumbar Adjuster/Heater Switch - Driver (AG1) Connector End View
Courtesy of GENERAL MOTORS CORP.

Driver Heated/Cooled Seat Connector Parts Information

Connector Part Information

- OEM: 12045688
- Service: 12101827
- Description: 8-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Pins: A-C
- Terminal/Tray: 12059894/5
- Core/Insulation Crimp: See Terminal Kit
- Release Tool/Test Probe: See Terminal Kit

- Pins: E-H

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- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Driver (AG1) Lumbar Adjuster/Heater Switch Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
A	BK	2050	Ground
B	PK	1501	Driver Heated Seat High/Low Signal
C	BN	141	Ignition 3 Voltage
D	-	-	Not Used
E	BK	2050	Ground
F	D-BU	611	Driver Seat Lumbar Motor Forward Control
G	PK	610	Driver Seat Lumbar Motor Rearward Control
H	OG	1040	Battery Positive Voltage

Lumbar Adjuster/Heater Switch - Passenger (AG2)

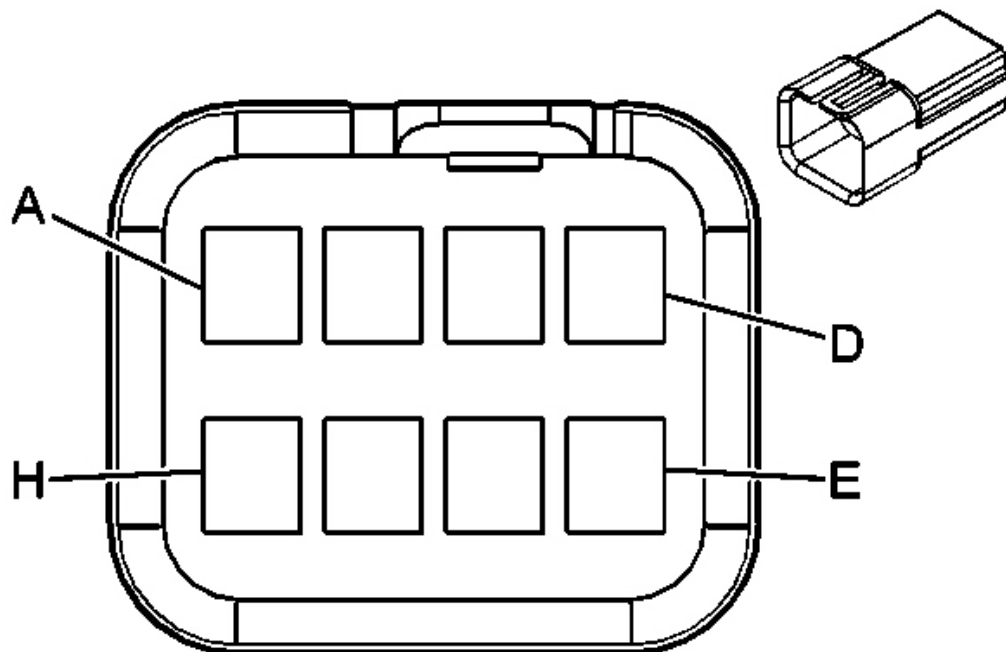


Fig. 6: Lumbar Adjuster/Heater Switch - Passenger (AG2) Connector End View
Courtesy of GENERAL MOTORS CORP.

Passenger Heated/Cooled Seat Connector Parts Information

Connector Part Information

- OEM: 12045688
- Service: 12101827
- Description: 8-Way M Metri-Pack 150 Series (BK)

Terminal Part Information

- Pins: A-D
- Terminal/Tray: 12059894/5
- Core/Insulation Crimp: See Terminal Kit
- Release Tool/Test Probe: See Terminal Kit

- Pins: E-H

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- Terminal/Tray: 12047581/2
- Core/Insulation Crimp: E/A
- Release Tool/Test Probe: 12094429/J-35616-3 (GY)

Passenger (AG2) Lumbar Adjuster/Heater Switch Connector Terminal Identification

Pin	Wire Color	Circuit No.	Function
A	BK	2050	Ground
B	PK	1501	Passenger Heated Seat High/Low Signal
C	BN	341	Ignition 3 Voltage
D	L-BU	2179	Seat Belt Switch - Right Signal
E	BK	2050	Ground
F	D-BU	611	Driver Seat Lumbar Motor Forward Control
G	PK	610	Passenger Seat Lumbar Motor Rearward Control
H	OG	1040	Battery Positive Voltage

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - SEATS

Begin the system diagnosis by reviewing the system Description and Operation. Reviewing the Description and Operation information will help you determine the correct symptom diagnostic procedure when a malfunction exists. Reviewing the Description and Operation information will also help you determine if the condition described by the customer is normal operation. Refer to **Symptoms - Seat Heating and Cooling** in order to identify the correct procedure for diagnosing the system and where the procedure is located.

SYMPTOMS - SEAT HEATING AND COOLING

IMPORTANT: Review the system description in order to familiarize yourself with the system functions. Refer to **Heated Seats Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the heated seat system.

Refer to **Checking Aftermarket Accessories** .

- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

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 **Heated Seat Inoperative (Driver)** or **Heated Seat Inoperative (Passenger)** in order to diagnose the symptom.

HEATED SEAT INOPERATIVE (DRIVER)

Heated Seat Inoperative (Driver)

Step	Action	Values	Yes	No
Schematic Reference: <u>Driver Seat Schematics</u>				
Connector End View Reference: <u>Power Seat Connector End Views</u>				
1	Did you review the Heated Seat System Description and Operation and perform the necessary inspections?	-	Go to Step 2	Go to <u>Symptoms - Seat Heating and Cooling</u>
2	1. Turn ON the ignition. 2. Operate the heated seat switch to the low and high positions. Does the heated seat system operate normal?	-	Go to <u>Testing for Intermittent Conditions and Poor Connections</u>	Go to Step 3
3	Do the low and high switch indicators operate normal?	-	Go to Step 6	Go to Step 4
4	1. Disconnect the heated seat switch connector. 2. Connect a test lamp from the ignition voltage supply circuit terminal in the harness connector to ground.	-		

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	Does the test lamp illuminate?		Go to Step 5	Go to Step 11
5	Connect a test lamp from the ignition voltage supply circuit terminal to the ground circuit terminal in the heated seat switch harness connector. Does the test lamp illuminate?	-	Go to Step 15	Go to Step 12
6	<ol style="list-style-type: none"> 1. Disconnect the seat cushion heater element 4-way connector C319. 2. Connect a test lamp from the battery voltage supply circuit terminal in the seat harness connector to ground. Does the test lamp illuminate?	-	Go to Step 7	Go to Step 13
7	Connect a test lamp from the battery voltage supply circuit terminal to the ground circuit terminal in the C319 seat harness connector. Does the test lamp illuminate?	-	Go to Step 8	Go to Step 14
8	<ol style="list-style-type: none"> 1. Using a DMM measure the resistance through the heated seat switch from the heated seat switch signal circuit terminal to the ground circuit terminal in the C319 seat harness connector. 2. Operate the heated seat switch in the high and low positions. Is the resistance at or near the specified values?	Hi 2.5K ohms Lo 4.9K ohms	Go to Step 10	Go to Step 9
9	<ol style="list-style-type: none"> 1. Disconnect the heated seat switch connector. 2. Test the heated seat switch high/low signal circuit for an open or short to ground. Refer 	-		

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	to <u>Circuit Testing</u> and to <u>Wiring Repairs</u> .			
	Did you find and correct the condition?		Go to Step 21	Go to Step 15
10	1. Disconnect the seat back heater element 2-way connector. 2. Test the resistance through the seat back heater element.	0.5-2 ohms		
	Is the resistance within the specified values?		Go to Step 16	Go to Step 17
11	Repair the open or short to ground in the ignition voltage supply circuit to the heated seat switch. Refer to <u>Circuit Testing</u> and to <u>Wiring Repairs</u> . Is the repair complete?	-	Go to Step 21	-
12	Repair the open or high resistance in heated seat switch ground circuit. Refer to <u>Circuit Testing</u> and to <u>Wiring Repairs</u> . Is the repair complete?	-	Go to Step 21	-
13	Repair the open or short to ground in the battery voltage supply circuit to the heated seat control module. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> . Is the repair complete?	-	Go to Step 21	-
14	Repair the open or high resistance in the heated seat control module ground circuit. Refer to <u>Circuit Testing</u> and to <u>Wiring Repairs</u> . Is the repair complete?	-	Go to Step 21	-
15	Inspect for poor connections at the heated seat switch. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and to	-		

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	<u>Connector Repairs</u> . Did you find and correct the condition?		Go to Step 21	Go to Step 18
16	Inspect for poor connections at the seat cushion heater element. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and to <u>Connector Repairs</u> . Did you find and correct the condition?	-	Go to Step 21	Go to Step 19
17	Inspect for poor connections at the seat back heater element. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> . Did you find and correct the condition?	-	Go to Step 21	Go to Step 20
18	Replace the heated seat switch. Refer to <u>Lumbar Switch Replacement</u> . Is the repair complete?	-	Go to Step 21	-
19	Replace the seat cushion heater element. Refer to <u>Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement</u> . Is the repair complete?	-	Go to Step 21	-
20	Replace the seat back heater element. Refer to <u>Driver Seat Back Cushion Heater and Passenger Seat Back Cushion Heater Replacement</u> . Is the repair complete?	-	Go to Step 21	-
21	Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to Step 3

HEATED SEAT INOPERATIVE (PASSENGER)

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Heated Seat Inoperative (Passenger)

Step	Action	Values	Yes	No
Schematic Reference: <u>Passenger Seat Schematics</u>				
Connector End View Reference: <u>Power Seat Connector End Views</u>				
1	Did you review the Heated Seat System Description and Operation and perform the necessary inspections?	-	Go to Step 2	Go to
2	<ol style="list-style-type: none"> 1. Turn ON the ignition. 2. Buckle the passenger seat belt. 3. Operate the heated seat switch to the low and high positions. Does the heated seat system operate normal?	-	Go to Testing for Intermittent Conditions and Poor Connections	Go to Step 3
3	Do the low and high switch indicators operate normal?	-	Go to Step 7	Go to Step 4
4	<ol style="list-style-type: none"> 1. Disconnect the heated seat switch connector. 2. Connect a test lamp from the ignition voltage supply circuit terminal in the harness connector to ground. Does the test lamp illuminate?	-	Go to Step 5	Go to Step 13
5	Connect a test lamp from the ignition voltage supply circuit terminal to the ground circuit terminal in the heated seat switch harness connector. Does the test lamp illuminate?	-	Go to Step 6	Go to Step 14
6	<ol style="list-style-type: none"> 1. Unbuckle the passenger seat belt. 2. Connect a test lamp from the ignition voltage supply circuit terminal to the seat belt switch signal circuit terminal in the heated seat switch harness 	-		

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	<p>connector.</p> <p>3. Buckle the passenger seat belt.</p> <p>Does the test lamp go OFF when the seat belt is buckled?</p>		Go to Step 18	Go to Step 15
7	<p>1. Disconnect the seat cushion heater element 4-way connector C318.</p> <p>2. Connect a test lamp from the battery voltage supply circuit terminal in the seat harness connector to ground.</p> <p>Does the test lamp illuminate?</p>	-	Go to Step 8	Go to Step 16
8	<p>Connect a test lamp from the battery voltage supply circuit terminal to the ground circuit terminal in the C318 seat harness connector.</p> <p>Does the test lamp illuminate?</p>	-	Go to Step 9	Go to Step 17
9	<p>1. Connect the seat cushion heater element connector C318.</p> <p>2. Using a DMM measure the voltage of the heated seat switch signal circuit by back probing terminal C.</p> <p>3. Operate the heated seat switch in the Hi and Lo positions.</p> <p>Is the signal circuit voltage greater than the specified value in the Hi and Lo switch positions?</p>	7.5 V	Go to Step 12	Go to Step 10
10	<p>1. Disconnect the seat cushion heater element connector C318.</p> <p>2. Using a DMM measure the resistance to ground of heated seat switch signal circuit from the heater element connector</p>	7K ohms		

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	half terminal C. Is the resistance greater than the specified value?		Go to Step 11	Go to Step 19
11	<ol style="list-style-type: none"> 1. Disconnect the heated seat switch connector. 2. Test the heated seat switch high/low signal circuit for an open or short to ground. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> . <p>Did you find and correct the condition?</p>	-	Go to Step 25	Go to Step 18
12	<ol style="list-style-type: none"> 1. Disconnect the seat back heater element 2-way connector. 2. Test the resistance through the seat back heater element. <p>Is the resistance within the specified values?</p>	0.5-2 ohms	Go to Step 19	Go to Step 20
13	<p>Repair the open or short to ground in the ignition voltage supply circuit to the heated seat switch. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> .</p> <p>Is the repair complete?</p>	-	Go to Step 25	-
14	<p>Repair the open or high resistance in heated seat switch ground circuit. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> .</p> <p>Is the repair complete?</p>	-	Go to Step 25	-
15	<p>Test the seat belt switch signal circuit for a short to ground. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> .</p> <p>Did you find and correct the condition?</p>	-	Go to Step 25	Go to Step 24

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16	<p>Repair the open or short to ground in the battery voltage supply circuit to the heated seat control module. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> .</p> <p>Is the repair complete?</p>	-	Go to Step 25	-
17	<p>Repair the open or high resistance in the heated seat control module ground circuit. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> .</p> <p>Is the repair complete?</p>	-	Go to Step 25	-
18	<p>Inspect for poor connections at the heated seat switch. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> .</p> <p>Did you find and correct the condition?</p>	-	Go to Step 25	Go to Step 21
19	<p>Inspect for poor connections at the seat cushion heater element. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> .</p> <p>Did you find and correct the condition?</p>	-	Go to Step 25	Go to Step 22
20	<p>Inspect for poor connections at the seat back heater element. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> .</p> <p>Did you find and correct the condition?</p>	-	Go to Step 25	Go to Step 23
21	<p>Replace the heated seat switch. Refer to <u>Lumbar Switch Replacement</u> .</p> <p>Is the repair complete?</p>	-	Go to Step 25	-
	<p>Replace the seat cushion heater element. Refer to <u>Driver Seat</u></p>			

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22	<u>Cushion Heater and Passenger Seat Cushion Heater Replacement.</u> Is the repair complete?	-	Go to Step 25	-
23	Replace the seat back heater element. Refer to <u>Driver Seat Back Cushion Heater and Passenger Seat Back Cushion Heater Replacement.</u> Is the repair complete?	-	Go to Step 25	-
24	Replace the seat belt buckle. Refer to <u>Front Seat Belt Buckle Replacement .</u> Is the repair complete?	-	Go to Step 25	-
25	Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to Step 3

REPAIR INSTRUCTIONS**FRONT SEAT HEATER SWITCH REPLACEMENT**

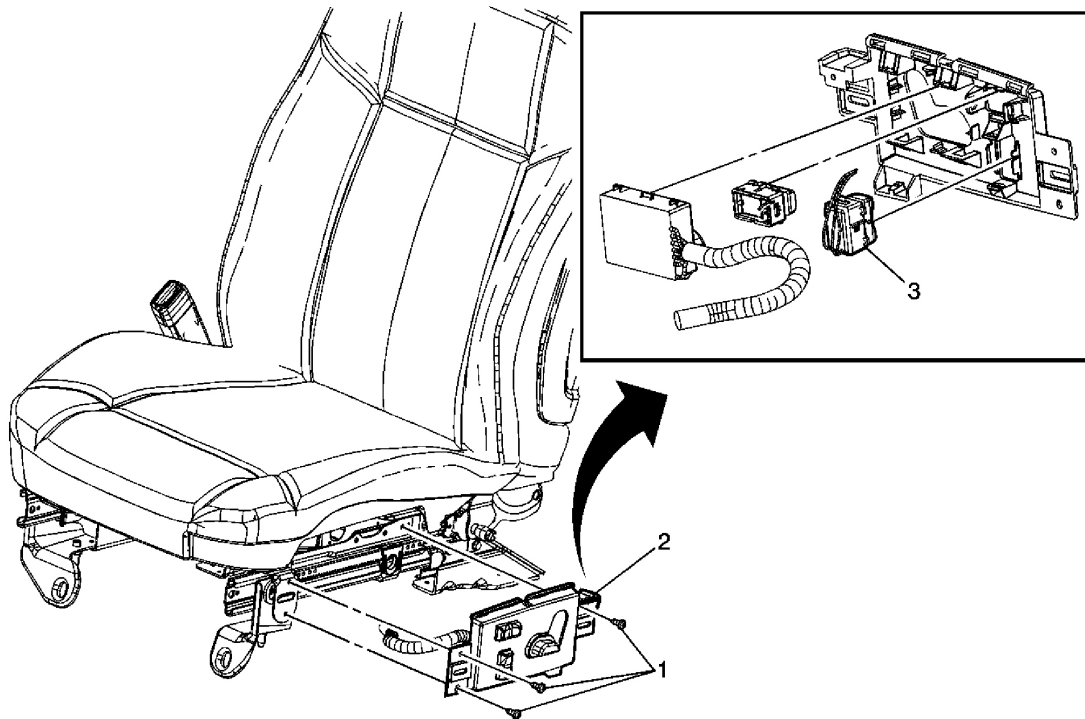


Fig. 7: Replacing Front Heated Seat Switch
 Courtesy of GENERAL MOTORS CORP.

Front Seat Heater Switch Replacement

Callout	Component Name
Preliminary Procedures	
1. Remove the front bucket seat. Refer to <u>Front Seat Replacement - Bucket</u> . 2. Remove the front seat trim panels. Refer to <u>Front Seat Trim Panel Replacement (Manual Lumbar)</u> or <u>Front Seat Trim Panel Replacement (Power Lumbar)</u> .	
1	Seat Switch Assembly Screw (Qty: 3) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 2 N.m (18 lb in)
2	Seat Switch Bezel Assembly
3	Seat Heater Switch Tip: Disconnect the electrical connector.

DRIVER SEAT BACK CUSHION HEATER AND PASSENGER SEAT BACK CUSHION HEATER REPLACEMENT

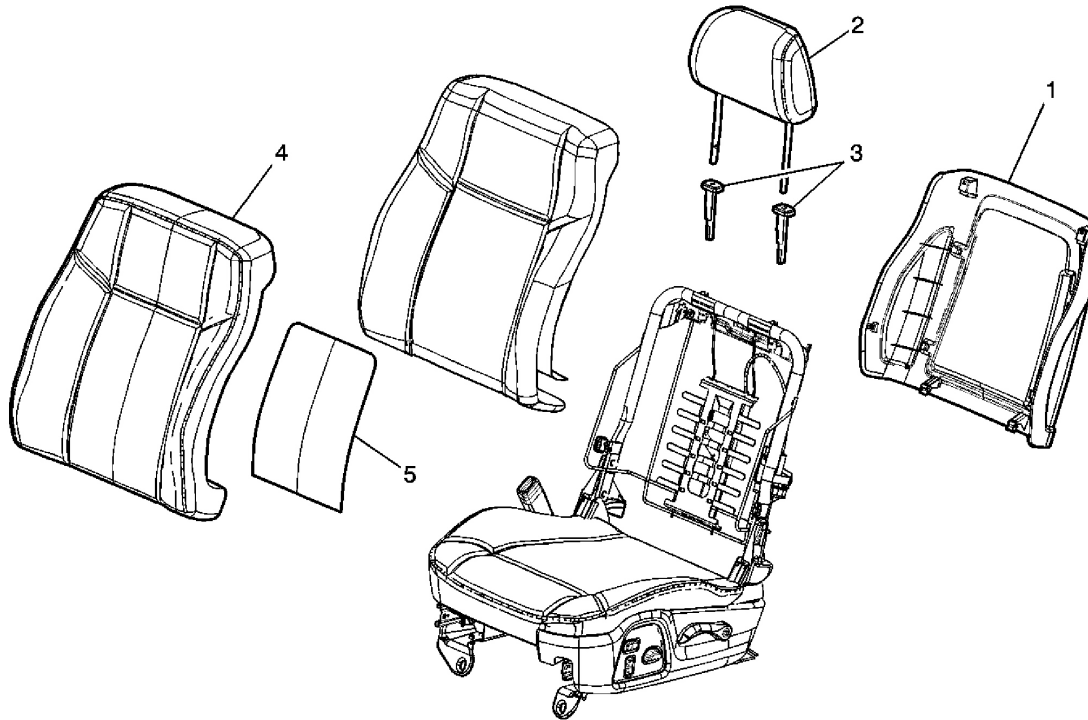


Fig. 8: Replacing Front Seat Back Heater Element
 Courtesy of GENERAL MOTORS CORP.

Driver Seat Back Cushion Heater and Passenger Seat Back Cushion Heater Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedure:	
Remove the front bucket seat. Refer to <u>Front Seat Replacement - Bucket</u> .	
1	Panel, Seat Back Refer to <u>Front Seat Back Panel Replacement</u> .
2	Restraint, Seat Head Refer to <u>Head Restraint Replacement</u> .
3	Guides, Seat Head Restraint (Qty: 2) Refer to <u>Front Seat Head Restraint Guide Replacement</u> .
4	Cover, Seat Back Cushion Refer to <u>Front Seat Back Cushion Cover and Cushion Pad Replacement</u> .

Heater, Seat Back Cushion

Tip:

5

1. Disconnect the electrical connector.
2. The heater assembly has an adhesive backing and should be peeled away from the seat cushion.

DRIVER SEAT CUSHION HEATER AND PASSENGER SEAT CUSHION HEATER REPLACEMENT

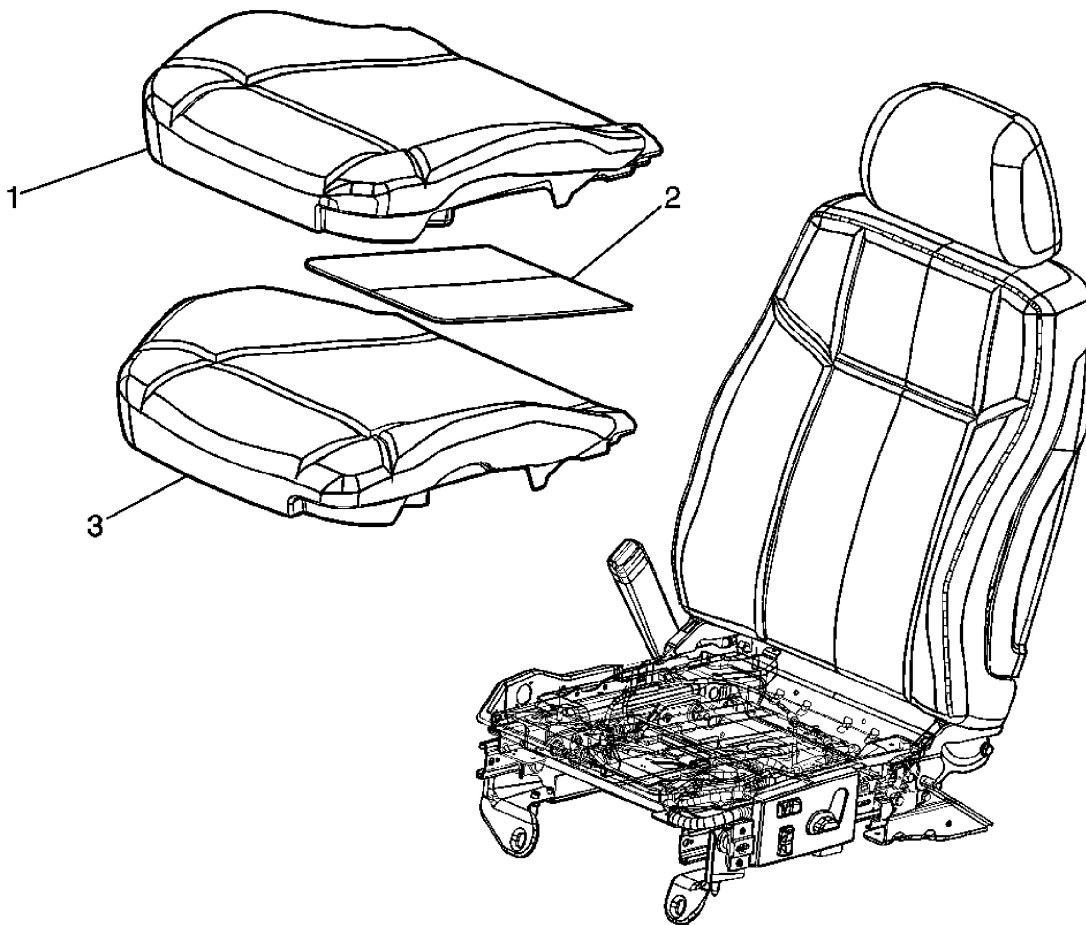


Fig. 9: Replacing Front Seat Cushion Heater Element
 Courtesy of GENERAL MOTORS CORP.

Driver Seat Cushion Heater and Passenger Seat Cushion Heater Replacement

Callout	Component Name
Preliminary Procedures	

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1. Remove the front bucket seat. Refer to **Front Seat Replacement - Bucket** .
2. Remove the seat back recliner handle. Refer to **Driver Seat Recliner Handle and Passenger Seat Recliner Handle Replacement** .
3. Remove the front seat trim panels. Refer to **Front Seat Trim Panel Replacement (Manual Lumbar)** or **Front Seat Trim Panel Replacement (Power Lumbar)** .

1	<p>Seat Cushion Cover</p> <p>Procedure</p> <ol style="list-style-type: none">1. Disconnect the seat cover J-channel from the seat cushion frame.2. Remove the hog rings that secure the pad to the cushion cover.
2	<p>Seat Cushion Heater</p> <p>Tip:</p> <ul style="list-style-type: none">• On the driver seat peel the heater from the seat cushion and disconnect the electrical connector.• On the passenger seat the heater must be replaced as a kit with the passenger presence system.
3	<p>Seat Cushion Pad</p> <p>Tip: Re-zero the inflatable restraint passenger presence system whenever the seat cushion or any component of the passenger presence system is removed. Refer to <u>Control Module References</u> .</p>

DESCRIPTION AND OPERATION

HEATED SEATS DESCRIPTION AND OPERATION

Heated Seats System Operation

The driver and front passenger seats are heated using electric heater elements located in the seat cushions and seat backs. The heated seat control module is part of the seat cushion element and harness assembly and controls the battery positive voltage used to supply the seat heater elements. The heated seat switch and a thermistor located in the seat cushion are connected in series and provide a single input to the heated seat control module. Ignition voltage is supplied to the heated seat switch from the HVAC 20A fuse in the underhood BEC. When the heated seat switch is in the high or low positions voltage is supplied through one of the internal resistors to the switch signal circuit. The heated seat switch signal circuit is grounded through the seat cushion thermistor which is a temperature sensitive variable resistor. The heated seat switch signal circuit input to the heated seat control module is spliced from the circuit between the switch and the

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thermistor, where the voltage level is determined by the resistance of both components. Once the seat cushion has reached the desired temperature the heated seat control module will maintain the heated seat switch signal circuit voltage level of 6 to 7.5 volts by switching the heater element supply circuit on or off as necessary. The passenger heated seat switch must be enabled through the seat belt switch in order for heated seat operation to occur.