

2008 Isuzu Ascender LS

2008 Seats Power Seats - Ascender, Envoy & Trailblazer

2008 Seats

Power Seats - Ascender, Envoy & Trailblazer

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Memory Seat Module Screw	3 N.m	26 lb in
Seat Cushion Frame Nut	25 N.m	18 lb ft
Seat Belt Buckle Bolt	55 N.m	41 lb ft

SCHEMATIC & ROUTING DIAGRAMS

DRIVER SEAT SCHEMATICS

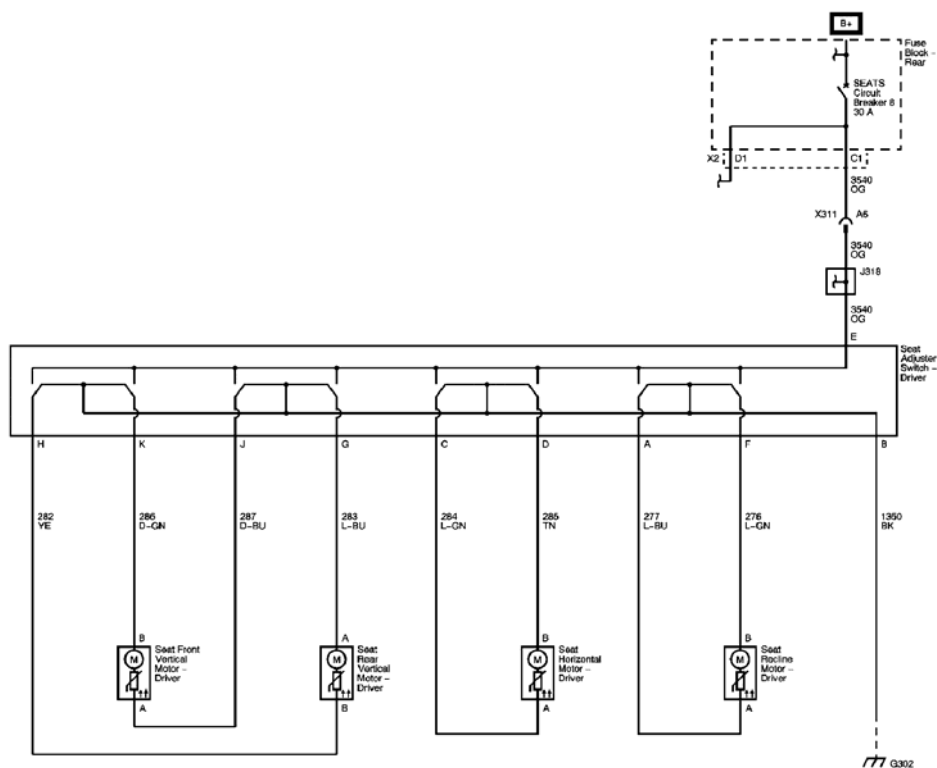


Fig. 1: Power Seat Controls Schematic w/o Memory
Courtesy of GENERAL MOTORS CORP.

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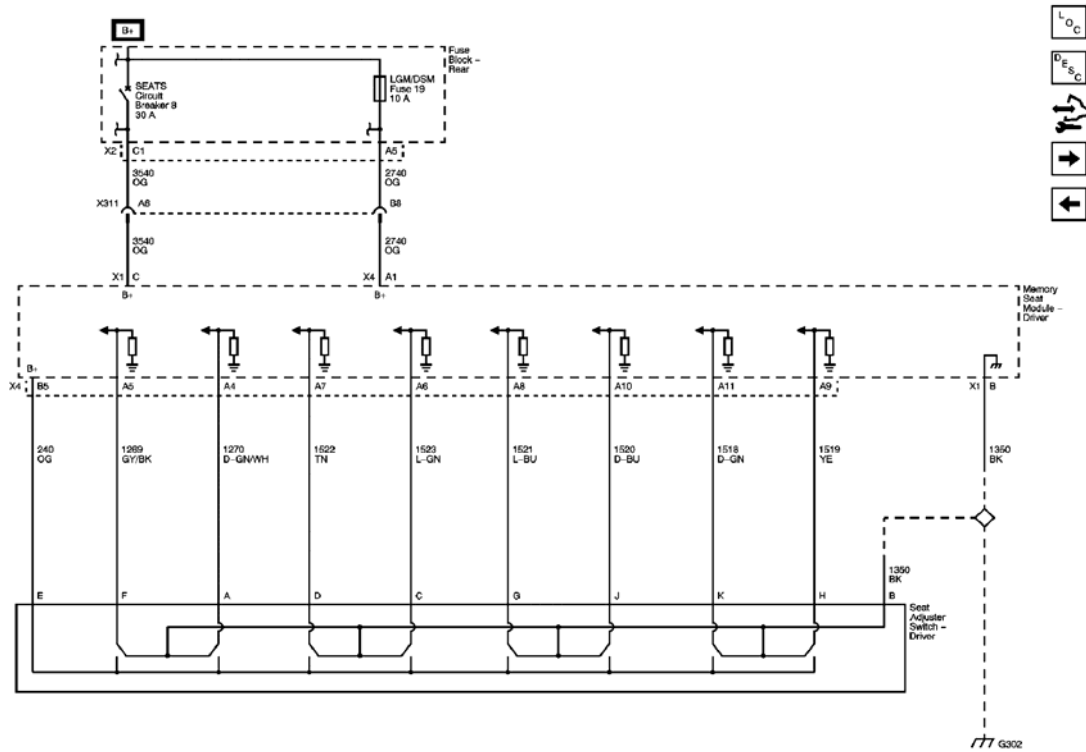


Fig. 2: Power Seat Controls w/Memory Schematic - Power, Ground, and Switch Controls
Courtesy of GENERAL MOTORS CORP.

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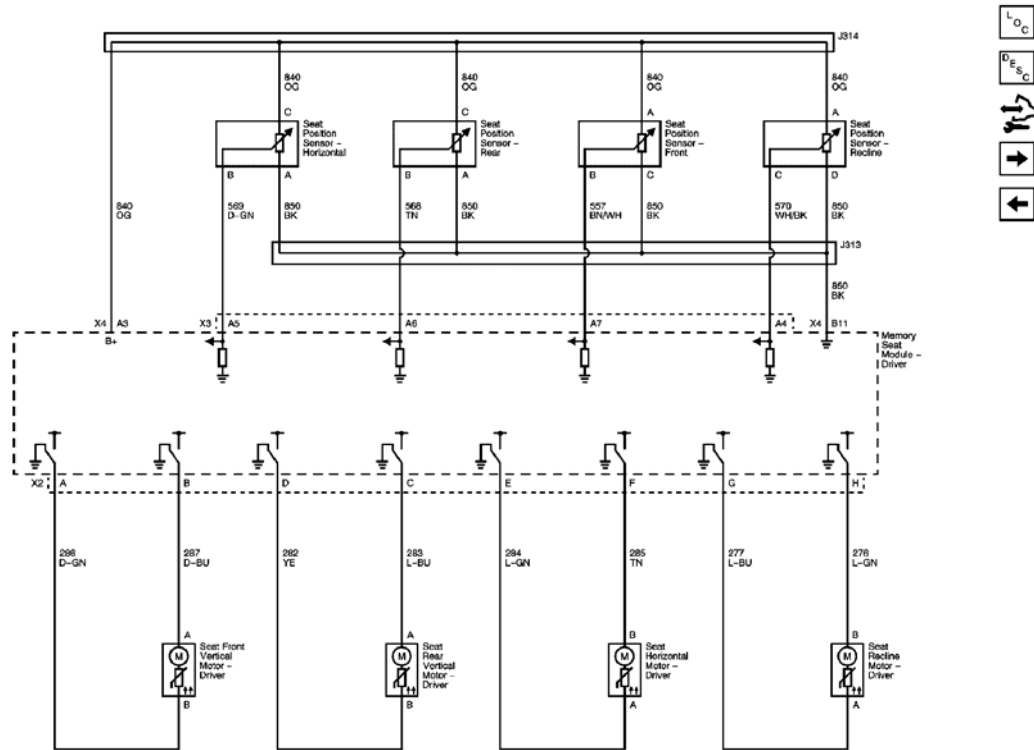


Fig. 3: Power Seat Controls w/Memory Schematic - Motors and Position Sensors
Courtesy of GENERAL MOTORS CORP.

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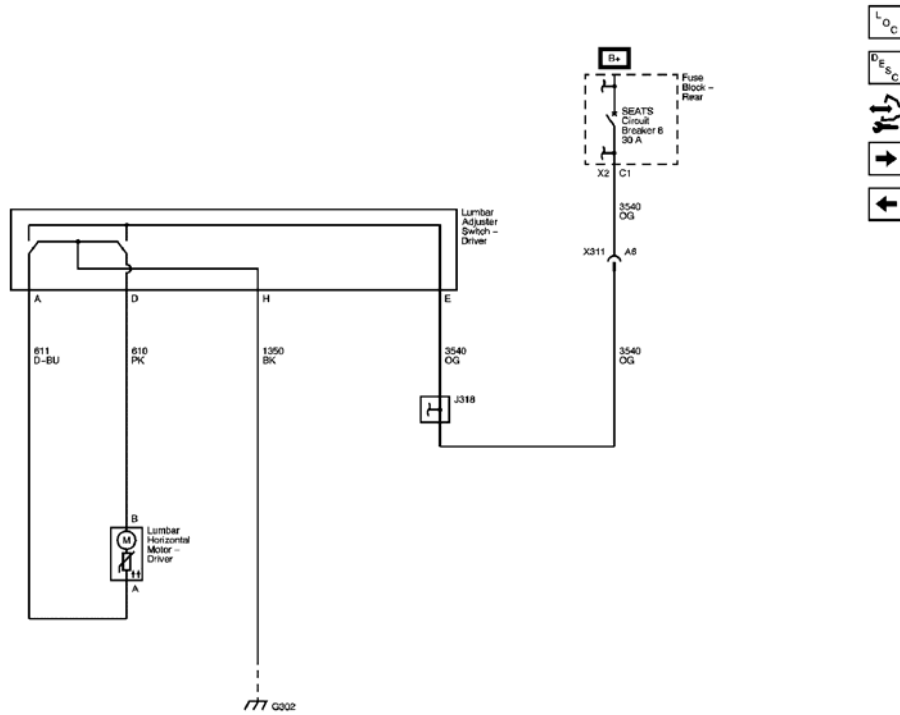


Fig. 4: Lumbar Controls Schematic - w/o Memory
Courtesy of GENERAL MOTORS CORP.

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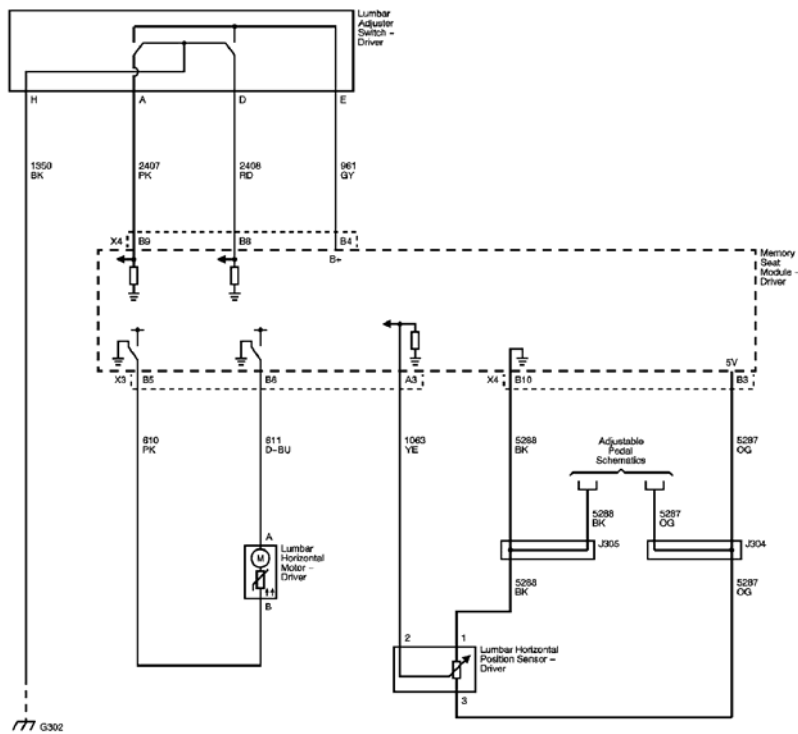


Fig. 5: Lumbar Controls Schematic - w/Memory
Courtesy of GENERAL MOTORS CORP.

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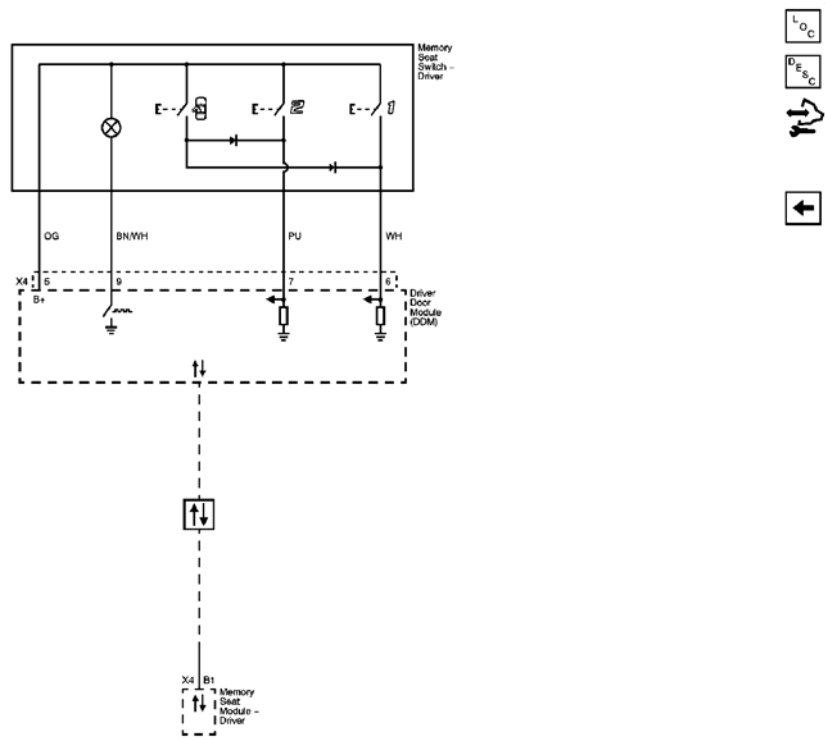


Fig. 6: Memory Controls Schematic
Courtesy of GENERAL MOTORS CORP.

PASSENGER SEAT SCHEMATICS

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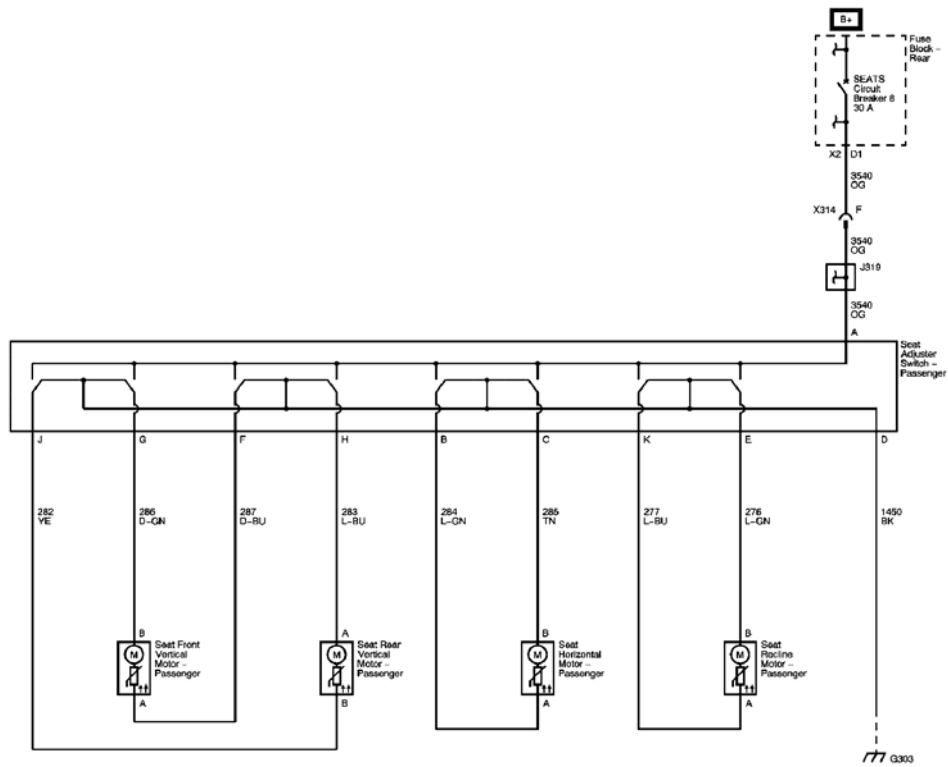
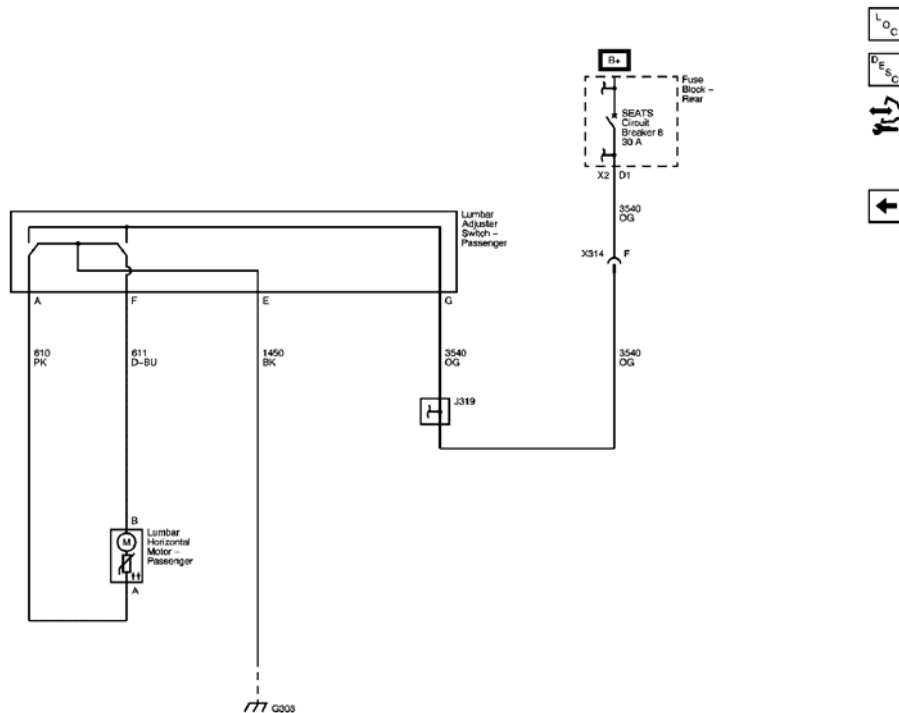


Fig. 7: Power Seat Controls Schematic
Courtesy of GENERAL MOTORS CORP.

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L_OC

D_ES_C



Fig. 8: Lumbar Controls Schematic
 Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION & PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
<u>DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, or B1820</u>	B1735: Driver Seat Front Up Switch Circuit B1740: Driver Seat Front Down Switch Circuit B1745: Driver Seat Rear Up Switch Circuit B1750: Driver Seat Rear Down Switch Circuit B1755: Driver Seat Assembly Forward Switch Circuit B1760: Driver Seat Assembly Rearward Switch Circuit B1815: Driver Seat Recline Forward Switch Circuit B1820: Driver Seat Recline Rearward Switch Circuit
<u>DTC B1825, B1850, B1860, B2355, B2365, or B2375</u>	B1825: Driver Seat Recline Position Sensor Circuit B1850: Driver Seat Lumbar Horizontal Position Sensor Circuit B2355: Driver Seat Front Vertical Position Sensor Circuit B2365: Driver Seat Rear Vertical Position Sensor Circuit B2375: Driver Seat Horizontal Position Sensor Circuit

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DTC B1830, B1835, B1840 or B1845	B1830: Driver Seat Lumbar Forward Switch Circuit B1835: Driver Seat Lumbar Rearward Switch Circuit
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DIAGNOSTIC STARTING POINT - SEATS

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.

DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, OR B1820

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 B1735

Driver Seat Front Up Switch Circuit

DTC B1740

Driver Seat Front Down Switch Circuit

DTC B1745

Driver Seat Rear Up Switch Circuit

DTC B1750

Driver Seat Rear Down Switch Circuit

DTC B1755

Driver Seat Assembly Forward Switch Circuit

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DTC B1760

Driver Seat Assembly Rearward Switch Circuit

DTC B1815

Driver Seat Recline Forward Switch Circuit

DTC B1820

Driver Seat Recline Rearward Switch Circuit

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Switch Supply Voltage	1	1	-	-
Recline Forward Switch Signal	2	2	B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820	-
Recline Rearward Switch Signal	2	2	B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820	-
Horizontal Forward Switch Signal	2	2	B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820	-
Horizontal Rearward Switch Signal	2	2	B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820	-
Rear Vertical Down Switch Signal	2	2	B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820	-
Rear Vertical Up Switch Signal	2	2	B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820	-
Front Vertical Down Switch Signal	2	2	B1735, B1740, B1745, B1750, B1755, B1760, B1815, B1820	-
			B1735, B1740,	

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Front Vertical Up Switch Signal	2	2	B1745, B1750, B1755, B1760, B1815, B1820	-
Switch Ground	-	3	-	-
1. All power seat switches inoperative 2. One seat switch inoperative 3. No effect				

Circuit/System Description

The seat adjuster switches are inputs to the memory seat module (MSM). The seat module supplies the adjuster switch assembly with a battery positive switch supply circuit and monitors the switch signal circuits. In an inactive state the switch signal circuits are floating and when a switch is pressed the signal circuit is closed to the switch power circuit within the adjuster switch assembly. When battery voltage is present on the switch signal circuit the seat module determines the switch status to be active.

Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

Conditions for Setting the DTC

A switch signal circuit to the seat module is active for more than 60 seconds.

Action Taken When the DTC Sets

The seat module will disable the seat adjuster function for which the DTC has set.

Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

Reference Information

Schematic Reference

Driver Seat Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Memory Seats 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

Ignition ON, observe the scan tool seat adjuster switch parameters while operating each adjuster switch in both directions. The reading should change between Inactive and the desired direction.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the seat adjuster switch.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal E and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Verify the scan tool switch parameter is Inactive.
 - If not the specified value, test the affected signal circuit terminal listed for a short to voltage. If the circuit tests normal, replace the memory seat module.
 - Recline forward terminal F
 - Recline rearward terminal A
 - Horizontal forward terminal D
 - Horizontal rearward terminal C
 - Rear down terminal G
 - Rear up terminal J
 - Front up terminal K
 - Front down terminal H
4. Install a 3A fused jumper wire between the affected signal circuit terminal listed and the B+ circuit terminal E. Verify the scan tool switch parameter is the desired direction.
 - Recline forward terminal F
 - Recline rearward terminal A
 - Horizontal forward terminal D
 - Horizontal rearward terminal C
 - Rear down terminal G
 - Rear up terminal J

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- Front up terminal K
 - Front down terminal H
 - If not the specified value, test the signal circuit for an open/high resistance. If the circuit tests normal, replace the memory seat module.
5. If all circuits test normal, test or replace the seat adjuster switch.

Repair Procedures

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

- **Power Seat Switch Replacement**
- **Control Module References** for MSM replacement, programming, and setup.

DTC B1825, B1850, B1860, B2355, B2365, OR B2375

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 B1825

Driver Seat Recline Position Sensor Circuit

DTC B1850

Driver Seat Lumbar Horizontal Position Sensor Circuit

DTC B2355

Driver Seat Front Vertical Position Sensor Circuit

DTC B2365

Driver Seat Rear Vertical Position Sensor Circuit

DTC B2375

Driver Seat Horizontal Position Sensor Circuit

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
5-volt Reference Voltage	B1825, B1850, B2355, B2365, B2375	B1825, B1850, B2355, B2365, B2375	B1825, B1850, B2355, B2365, B2375	-
Recline Position Sensor Signal	B1825	B1825	B1825	-
Horizontal Position Sensor Signal	B2375	B2375	B2375	-
Rear Vertical Position Sensor Signal	B2365	B2365	B2365	-
Front Vertical Position Sensor Signal	B2355	B2355	B2355	-
Horizontal Lumbar Position Sensor Signal	B1850	B1850	B1850	-
Low Reference	-	B1825, B1850, B2355, B2365, B2375	-	-

Circuit/System Description

The driver seat adjuster motors are equipped with potentiometer type position sensors used by the memory seat module (MSM) to determine the seat position. The position sensors are supplied with 5-volt reference and ground circuits from the MSM. The position sensor signal circuits are referenced from ground within the MSM. The signal circuit voltage levels monitored by the MSM range from 0.39-4.58 volts and are determined by the wiper locations on the resistors within the motor position sensors. The position sensor circuit voltage levels are used by the MSM to determine the seat position when storing or recalling memory position settings.

Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

Conditions for Setting the DTC

The position sensor signal circuit voltage level to the MSM is not within the 0.39-4.58 volt range.

Action Taken When the DTC Sets

The memory recall functions for the seat motor with a current status DTC will be disabled.

Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

Reference Information

Schematic Reference

Driver Seat Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Memory Seats 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

Ignition ON, observe the scan tool position sensor parameters. The readings should be between 0.39-4.58 volts and change when the seat position is changed.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the affected position sensor.
2. Ignition OFF, test for less than 20 ohms of resistance between the listed low reference circuit terminal and ground.
 - Horizontal or rear vertical position sensor terminal A
 - Front vertical position sensor terminal C
 - Recline position sensor terminal D
 - Horizontal lumbar position sensor terminal 1
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the MSM.
3. Ignition ON, test for 4.8 - 5.2 volts between the listed 5-volt reference circuit terminal and ground.
 - Horizontal or rear vertical position sensor terminal C
 - Front vertical or recline position sensor terminal A
 - Horizontal lumbar position sensor terminal 3
 - If less than the specified range, test the 5-volt reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the MSM.
 - If greater than the specified range, test the 5-volt reference circuit for a short to voltage. If the circuit tests normal, replace the MSM.

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4. Verify the scan tool position sensor parameter is less than 0.39 volts.
 - If greater than the specified range, test the affected signal circuit terminal listed for a short to voltage. If the circuit tests normal, replace the MSM.
 - Horizontal or front and rear vertical position sensors terminal B
 - Recline position sensor terminal C
 - Horizontal lumbar position sensor terminal 2
5. Install a 3A fused jumper wire between the listed signal circuit terminal and 5-volt reference circuit terminal. Verify the scan tool position sensor parameter is greater than 4.58 volts.
 - Horizontal or rear vertical position sensor terminal B to terminal C
 - Front vertical position sensor terminal B to terminal A
 - Recline position sensor terminal C to terminal A
 - Horizontal lumbar position sensor terminal 2 to terminal 3
 - If less than the specified range, test the signal circuit for short to ground or an open/high resistance. If the circuit tests normal, replace the MSM.
6. If all circuits test normal, test or replace the affected position sensor.

Repair Procedures

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

- **Power Seat Adjuster Mechanism Replacement**
- **Front Seat Lumbar Support Replacement**
- **Control Module References** for MSM replacement, programming, and setup.

DTC B1830, B1835, B1840 OR B1845

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 B1830

Driver Seat Lumbar Forward Switch Circuit

DTC B1835

Driver Seat Lumbar Rearward Switch Circuit

Diagnostic Fault Information

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Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Switch Supply Voltage	1	1	-	-
Lumbar Forward Switch Signal	1	1	B1830, B1835	-
Lumbar Rearward Switch Signal	1	1	B1830, B1835	-
Switch Ground	-	2	-	
1. Lumbar switches inoperative 2. No effect				

Circuit/System Description

The power lumbar switches are inputs to the memory seat module (MSM). The seat module supplies the switch assembly with a battery positive switch supply circuit and monitor the switch signal circuits. In an inactive state the switch signal circuits are floating and when a switch is pressed the signal circuit is closed to the switch power circuit within the lumbar switch assembly. When battery voltage is present on the switch signal circuit the seat module determines the switch status to be active.

Conditions for Running the DTC

The battery voltage must be between 9-16 volts.

Conditions for Setting the DTC

A switch signal circuit to the MSM is active for more than 60 seconds.

Action Taken When the DTC Sets

The MSMe will disable the power lumbar function.

Conditions for Clearing the DTC

- This DTC will clear on current status after the condition for setting the fault is corrected.
- A history DTC will clear after 100 consecutive ignition cycles without a fault present.

Reference Information

Schematic Reference

Driver Seat Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Memory Seats 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

Ignition ON, observe the scan tool lumbar switch parameters while operating the lumbar switch in both directions. The reading should change between Inactive, Forward and Rearward.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the lumbar switch.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal E and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Verify the scan tool switch parameter is Inactive.
 - If not the specified value, test the affected signal circuit terminal listed for a short to voltage. If the circuit tests normal, replace the memory seat module.
 - Lumbar forward terminal A
 - Lumbar rearward terminal D
4. Install a 3A fused jumper wire between the affected signal circuit terminal listed and the B+ circuit terminal E. Verify the scan tool switch parameter is the desired direction.
 - Lumbar forward terminal A
 - Lumbar rearward terminal D
 - If not the specified value, test the signal circuit for an open/high resistance. If the circuit tests normal, replace the memory seat module.
5. If all circuits test normal, test or replace the lumbar switch.

Repair Procedures

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

- **Power Seat Switch Replacement**
- **Control Module References** for MSM replacement, programming, and setup.

SYMPTOMS - POWER SEATS

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

1. Perform the **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 the following system descriptions:
 - **Memory Seats Description and Operation**
 - **Power Seats System Description and Operation**
 - **Lumbar Support Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the 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 a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Memory Seat Feature Inoperative**
- **Power Seat Inoperative (w/o Memory)** or **Power Seat Inoperative (w/Memory)**

MEMORY SEAT FEATURE INOPERATIVE

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

	Short to	Open/High	Short to	Signal
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Circuit	Ground	Resistance	Voltage	Performance
Switch Supply Voltage	1	1	-	-
Memory 1 Switch Signal	2	2	1	-
Memory 2 Switch Signal	3	3	1	-

1. All memory switch functions inoperative
2. Memory 1 and Exit functions inoperative
3. Memory 2 and Exit functions inoperative

Circuit/System Description

The memory recall switch assembly on the driver's door provides inputs to the driver door module (DDM). Battery voltage is supplied to the memory recall switch assembly from the DDM. When a memory recall 1, 2, or EXIT switch is pressed, the switch contacts close the appropriate switch signal circuit to the battery voltage supply circuit within the memory recall switch assembly. When the DDM receives active switch signals from the memory recall switch assembly, the appropriate commands are sent to the memory seat module (MSM).

Reference Information

Schematic Reference

Driver Seat Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Memory Seats 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. Verify the power seat operates in all directions from the seat adjuster switch.
 - If the power seat does not operate normal, refer to Power Seat Switch Replacement.

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2. Ignition ON, observe the scan tool Memory Switch parameter while activating the memory 1, memory 2, and exit switch functions. The reading should change between Idle and the active switch function.
 - If not the specified value, refer to **Memory Seat Switch Component Test**.
3. If the memory switch inputs to the DDM function normal, replace the MSM.

Component Testing

Memory Seat Switch Component Test

1. Ignition OFF, disconnect the X4 harness connector at the DDM.
2. Test for infinite resistance between each of the signal terminals 7 and 8 and the B+ terminal 5 with the switch in the open position.
 - If not the specified value, replace the memory seat switch.
3. Test for less than 1.0 ohm of resistance between the signal terminal 8 and the B+ terminal 5 with the Memory 1 button pressed and the Exit button pressed.
 - If greater than the specified range, replace the memory seat switch.
4. Test for less than 1.0 ohm of resistance between the signal terminal 7 and the B+ terminal 5 with the Memory 2 button pressed and the Exit button pressed.
 - If greater than the specified range, replace the memory seat switch.
5. If the memory seat switch tests normal, replace the DDM.

Repair Procedures

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

- **Driver Seat Adjuster Memory Switch Replacement**
- **Control Module References** for DDM or MSM replacement, programming, and setup.

POWER SEAT INOPERATIVE (W/O MEMORY)

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.

Circuit/System Description

Battery voltage is supplied to the power seat switch through the power seat circuit breaker. While the seat adjuster switches are in an inactive state the switch contacts are closed to the power seat switch ground circuit. When a power seat switch is pressed to an active state the switch contact is closed to the battery voltage supply circuit. Each seat adjuster motor is controlled by the power seat switch through 2 motor control circuits. The seat adjuster motors are bidirectional and the direction of adjuster motor rotation is determined by which of the adjuster motor control circuits is switched to battery voltage while the other remains grounded.

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Reference Information

Schematic Reference

- **Driver Seat Schematics**
- **Passenger Seat Schematics**

Connector End View Reference

Component Connector End Views

Description and Operation

Power Seats 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. Verify operation of all power seat functions from the seat adjuster switch.
 - If any of the seat adjuster switch functions are inoperative, refer to **Adjuster Motor Control Circuit Test**.
2. Verify operation of the horizontal lumbar function.
 - If the horizontal lumbar function is inoperative, refer to **Lumbar Motor Control Circuit Test**.

Circuit/System Testing

Adjuster Motor Control Circuit Test

1. Ignition OFF, disconnect the harness connector at the seat adjuster switch.
2. 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. Verify that a test lamp illuminates between the B+ circuit terminal E and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.

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4. Connect the harness connector at the seat adjuster switch.
5. Ignition OFF, disconnect the harness connector at the affected seat motor.
6. Ignition OFF, test for less than 1.0 ohm of resistance between the control circuit terminal A and ground.
 - If greater than the specified range, test the control circuit for an open/high resistance. If circuits test normal, replace the seat adjuster switch.
7. Ignition OFF, test for less than 1.0 ohm of resistance between the control circuit terminal B and ground.
 - If greater than the specified range, test the control circuit for an open/high resistance. If circuits test normal, replace the seat adjuster switch.
8. Connect a test lamp between control circuit terminal A and control circuit terminal B.
9. Operate the affected seat switch in both directions. The test lamp should turn ON when commanding the motor in both directions.
 - If the test lamp remains OFF during either of the commands, test for a short to ground on either control circuit. If the circuits test normal, replace the seat adjuster switch.
10. If all circuits test normal, test or replace the affected motor assembly.

Lumbar Motor Control Circuit Test

1. Ignition OFF, disconnect the harness connector at the lumbar switch.
2. Test for less than 1.0 ohm of resistance between the ground circuit terminal H and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal E and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Connect the harness connector at the lumbar switch.
5. Ignition OFF, disconnect the harness connector at the lumbar motor.
6. Ignition OFF, test for less than 1.0 ohm of resistance between the control circuit terminal A and ground.
 - If greater than the specified range, test the control circuit for an open/high resistance. If circuits test normal, replace the lumbar switch.
7. Ignition OFF, test for less than 1.0 ohm of resistance between the control circuit terminal B and ground.
 - If greater than the specified range, test the control circuit for an open/high resistance. If circuits test normal, replace the lumbar switch.
8. Connect a test lamp between control circuit terminal A and control circuit terminal B.
9. Operate the lumbar switch in both directions. The test lamp should turn ON when commanding the motor in both directions.
 - If the test lamp remains OFF during either of the commands, test for a short to ground on either control circuit. If the circuits test normal, replace the lumbar switch.
10. If all circuits test normal, test or replace the lumbar motor assembly.

Repair Procedures

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

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- **Power Seat Switch Replacement**
- **Front Seat Lumbar Control Switch Replacement**
- **Power Seat Adjuster Mechanism Replacement**
- **Front Seat Lumbar Support Replacement**

POWER SEAT INOPERATIVE (W/MEMORY)

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.

Circuit/System Description

Battery voltage is supplied to the memory seat module (MSM) through the power seat circuit breaker. The MSM supplies the seat adjuster switch assembly with a battery positive reference voltage. While the seat adjuster switches are in an inactive state the switch contacts are closed to the adjuster switch ground circuit. When a seat adjuster switch is pressed to an active state the switch contact is closed to the reference voltage circuit. Battery voltage on a switch signal circuit indicates to the MSM the switch status is active. Each seat adjuster motor is controlled by the MSM through 2 motor control circuits. While the seat adjuster motors are in an inactive state the motor control circuits are closed to ground circuit contacts within the MSM. The MSM operates the seat adjuster motors by switching one of a motor's control circuits to battery voltage. The seat adjuster motors are bidirectional and the direction of adjuster motor rotation is determined by which of the adjuster motor control circuits is switched to battery voltage while the other remains grounded.

Reference Information

Schematic Reference

Driver Seat Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Memory Seats 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, observe the scan tool seat adjuster switch parameters while operating each adjuster switch in both directions. The reading should change between Inactive and the desired direction.
 - If any of the switch input parameters are Inactive or Invalid while the switch is pressed, refer to the affected Switch Circuit Test
2. If the switch inputs to the MSM function normal, refer to **Motor Control Circuit Test**.

Circuit/System Testing**Seat Adjuster Switch Circuit Test**

1. Ignition OFF, disconnect the harness connector at the seat adjuster switch.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal E and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Verify the scan tool switch parameter is Inactive.
 - If not the specified value, test the affected signal circuit terminal listed for a short to voltage. If the circuit tests normal, replace the memory seat module.
 - Recline forward terminal F
 - Recline rearward terminal A
 - Horizontal forward terminal D
 - Horizontal rearward terminal C
 - Rear down terminal G
 - Rear up terminal J
 - Front up terminal K
 - Front down terminal H
4. Install a 3A fused jumper wire between the affected signal circuit terminal listed and the B+ circuit terminal E. Verify the scan tool switch parameter is the desired direction.
 - Recline forward terminal F
 - Recline rearward terminal A
 - Horizontal forward terminal D
 - Horizontal rearward terminal C
 - Rear down terminal G
 - Rear up terminal J

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- Front up terminal K
 - Front down terminal H
 - If not the specified value, test the signal circuit for an open/high resistance. If the circuit tests normal, replace the memory seat module.
5. If all circuits test normal, test or replace the seat adjuster switch.

Lumbar Switch Circuit Test

1. Ignition OFF, disconnect the harness connector at the lumbar switch.
2. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal E and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Verify the scan tool switch parameter is Inactive.
 - If not the specified value, test the affected signal circuit terminal listed for a short to voltage. If the circuit tests normal, replace the memory seat module.
 - Lumbar forward terminal A
 - Lumbar rearward terminal D
4. Install a 3A fused jumper wire between the affected signal circuit terminal listed and the B+ circuit terminal E. Verify the scan tool switch parameter is the desired direction.
 - Lumbar forward terminal A
 - Lumbar rearward terminal D
 - If not the specified value, test the signal circuit for an open/high resistance. If the circuit tests normal, replace the memory seat module.
5. If all circuits test normal, test or replace the lumbar switch.

Motor Control Circuit Test

1. Ignition OFF, disconnect the X1 harness connector at the MSM.
2. Verify that a test lamp illuminates between the B+ circuit terminal C and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
3. Connect the X1 harness connector at the MSM.
4. Ignition OFF, disconnect the harness connector at the affected seat motor.
5. Ignition OFF, test for less than 1.0 ohm of resistance between the control circuit terminal A and ground.
 - If greater than the specified range, test the control circuit for an open/high resistance. If circuits test normal, replace the MSM.
6. Ignition OFF, test for less than 1.0 ohm of resistance between the control circuit terminal B and ground.
 - If greater than the specified range, test the control circuit for an open/high resistance. If circuits test normal, replace the MSM.
7. Connect a test lamp between control circuit terminal A and control circuit terminal B.

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8. Command the affected seat motor in both directions with a scan tool. The test lamp should turn ON when commanding the motor in both directions.
 - If the test lamp remains OFF during either of the commands, test for a short to ground on either control circuit. If the circuits test normal, replace the MSM.
9. If all circuits test normal, test or replace the affected motor assembly.

Repair Procedures

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

- **Power Seat Switch Replacement**
- **Front Seat Lumbar Control Switch Replacement**
- **Power Seat Adjuster Mechanism Replacement**
- **Front Seat Lumbar Support Replacement**
- **Control Module References** for MSM replacement, programming, and setup.

REPAIR INSTRUCTIONS

POWER SEAT SWITCH REPLACEMENT

Removal Procedure

1. Remove the switch bezel assembly from the seat assembly. Refer to **Driver Seat and Passenger Seat Adjuster Switch Bezel Replacement** .
2. Remove the buttons from the switch.
3. Release the tabs that retain the seat switch to the seat bezel assembly.

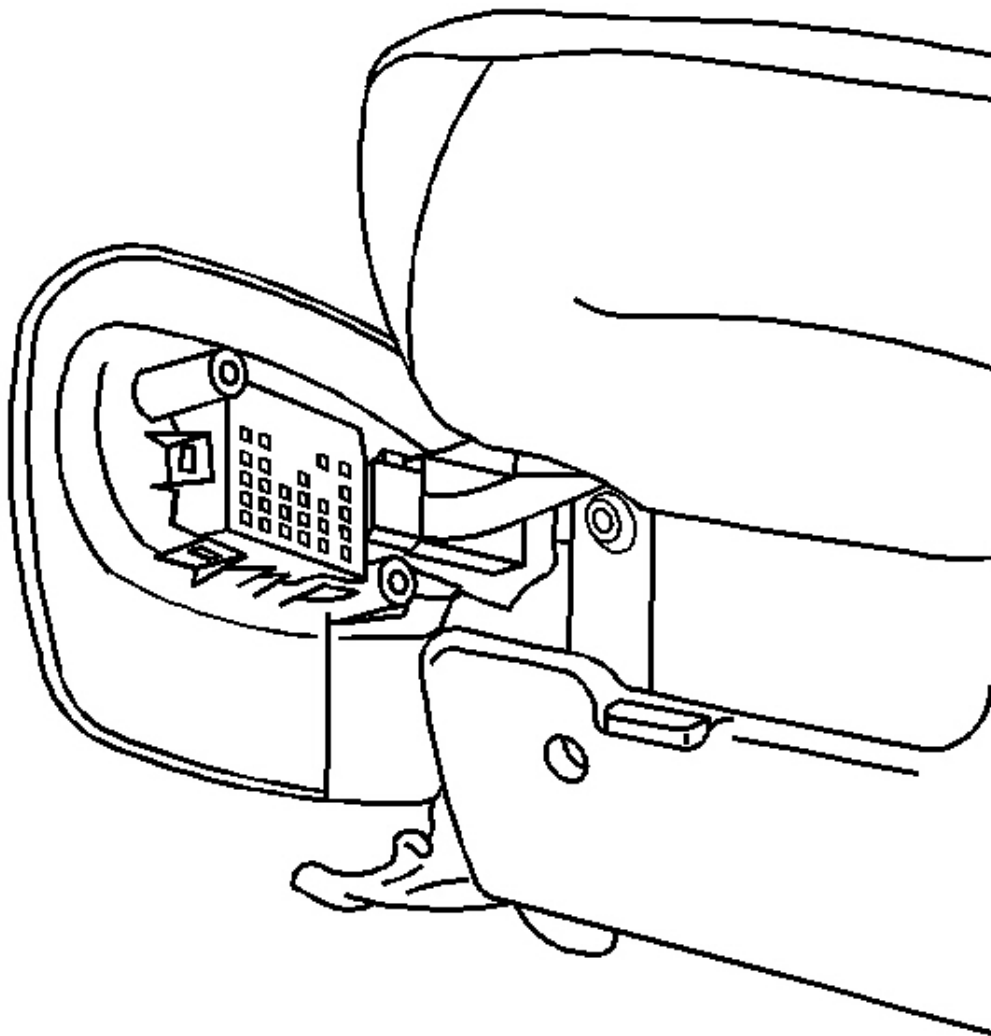


Fig. 9: View Of Bulkhead Connector
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the electrical connector from the switch.
5. Remove the seat switch from the seat bezel assembly.

Installation Procedure

1. Connect the electrical connector to the switch.

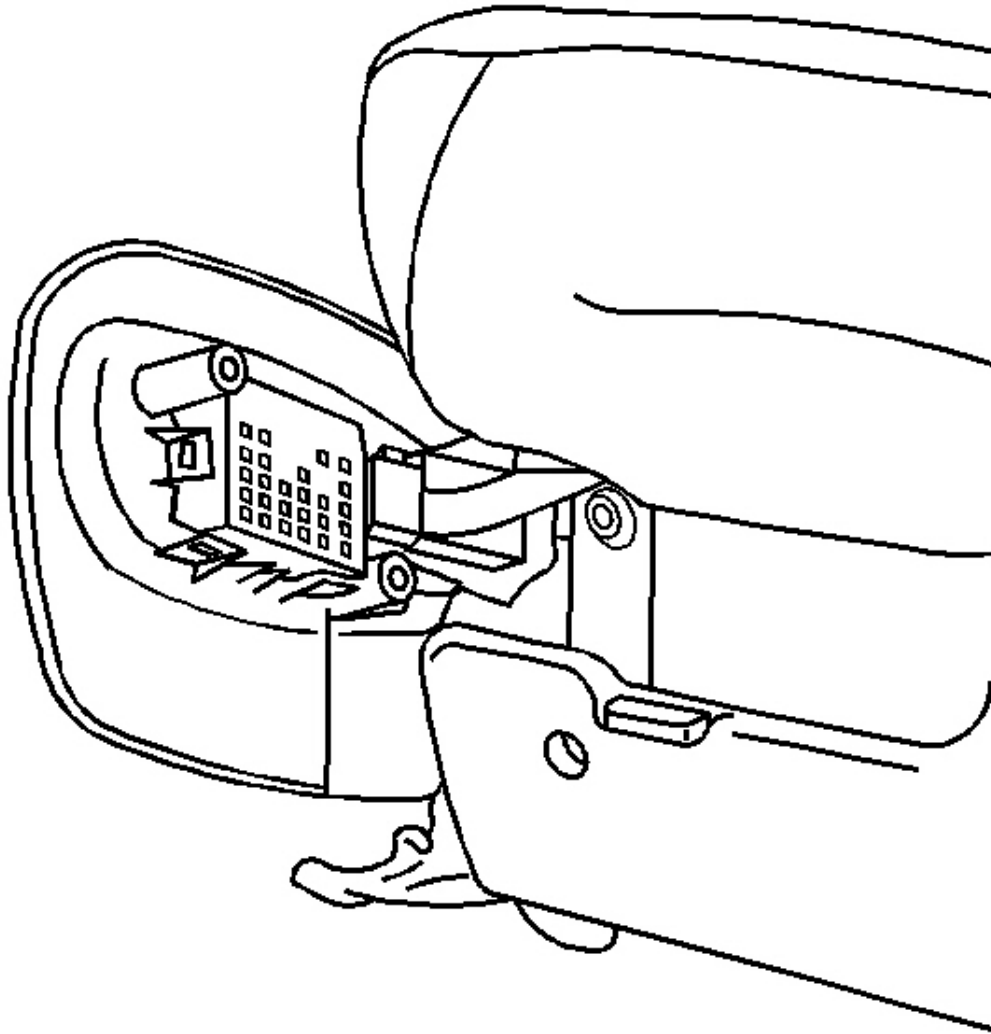


Fig. 10: View Of Bulkhead Connector
Courtesy of GENERAL MOTORS CORP.

2. Install the seat switch to the seat bezel assembly. Verify that the retaining tabs are fully seated.
3. Install the buttons on the switch.
4. Install the switch bezel assembly to the seat assembly. Refer to **Driver Seat and Passenger Seat Adjuster Switch Bezel Replacement** .

Removal Procedure

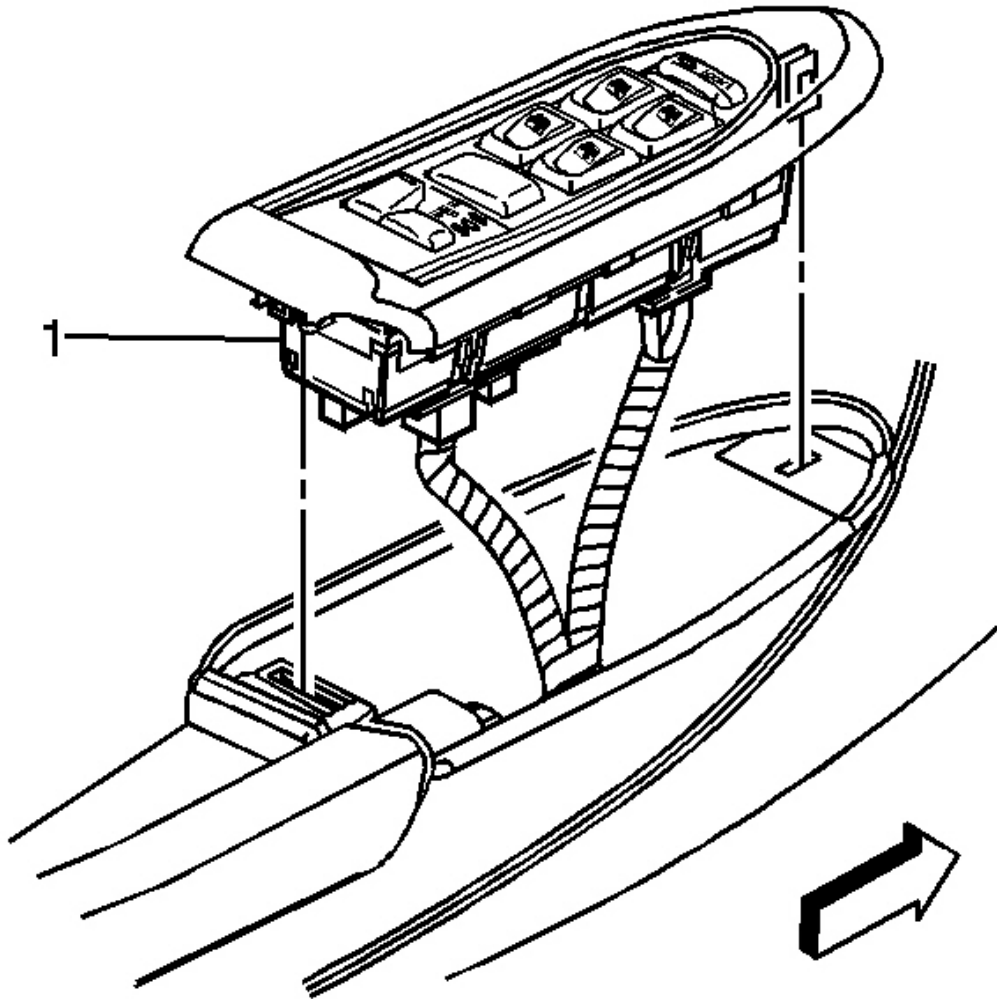


Fig. 11: Identifying Door Lock & Side Window Switch - Driver
Courtesy of GENERAL MOTORS CORP.

1. Lift up on the front edge of the door lock and side window switch (1) in order to release the front retaining clip.
2. Lift up on the rear edge of the switch panel in order to release the 2 rear retaining clips.

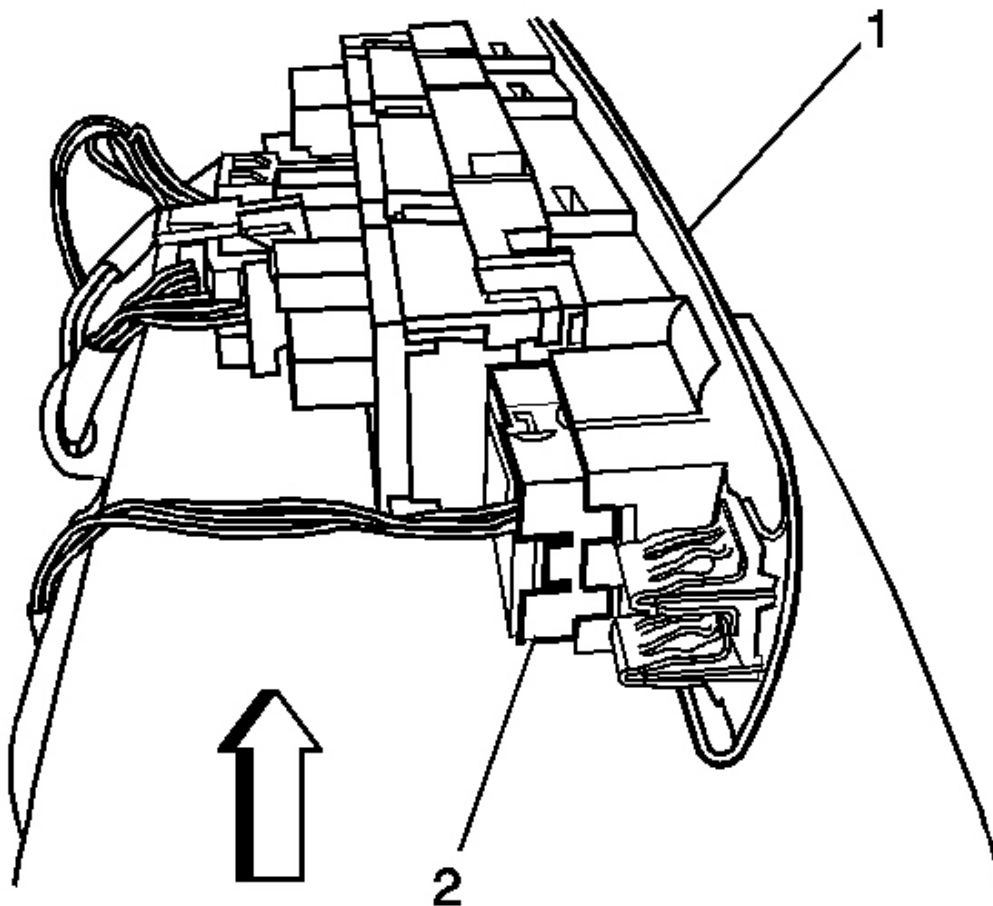


Fig. 12: Identifying Switch Panel Electrical Connector
Courtesy of GENERAL MOTORS CORP.

3. Remove the electrical connector (2) from the memory seat switch.
4. Remove the memory seat switch from the lock and door lock and side window switch (1).

Installation Procedure

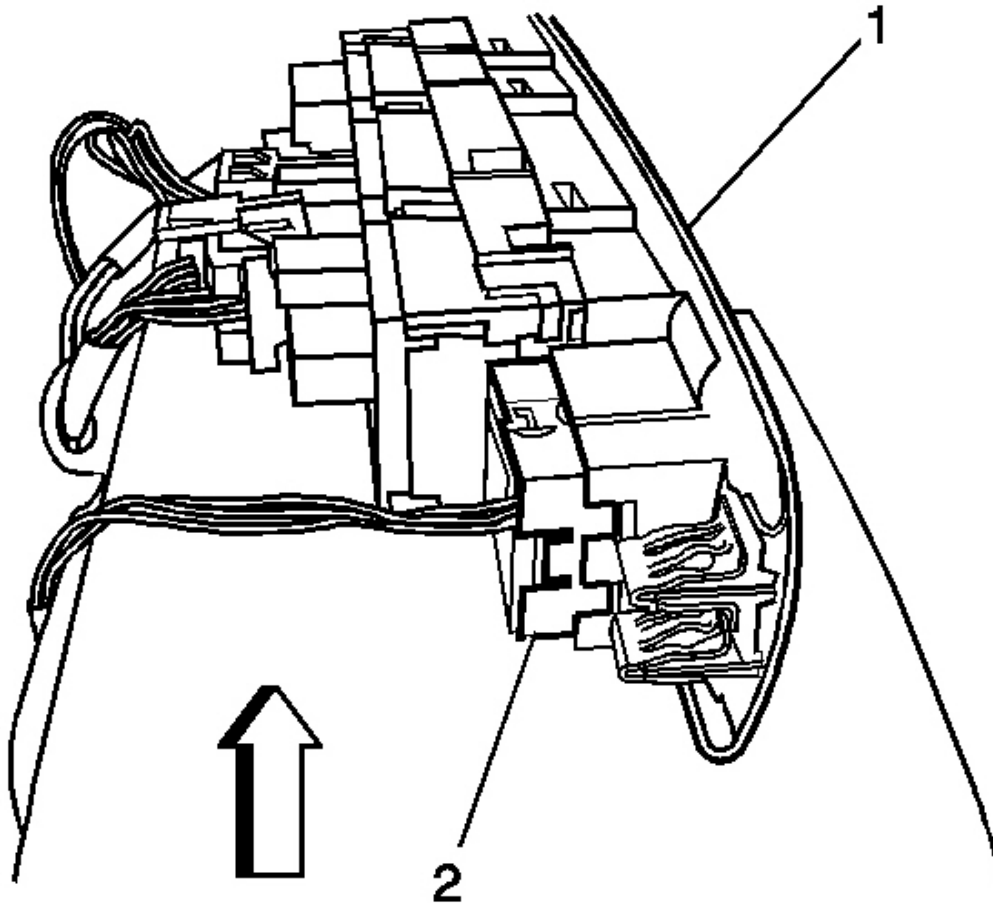


Fig. 13: Identifying Switch Panel Electrical Connector
Courtesy of GENERAL MOTORS CORP.

1. Position the memory seat switch to the lock and door lock and side window switch (1).
2. Connect the electrical connector (2) to the memory seat switch.

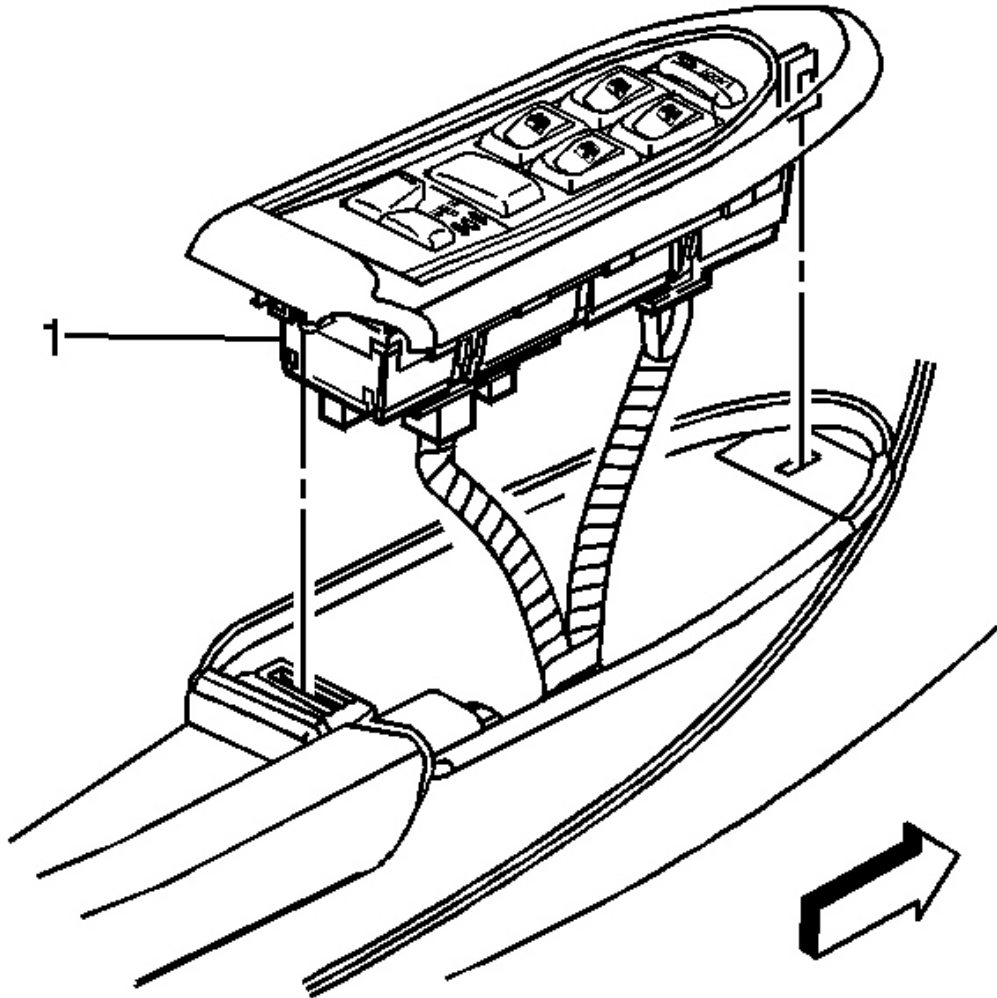


Fig. 14: Identifying Door Lock & Side Window Switch - Driver
Courtesy of GENERAL MOTORS CORP.

3. Install the door lock and side window switch (1). Verify that the front retaining clips and the rear retaining clips are fully seated.

MEMORY SEAT CONTROL MODULE REPLACEMENT

Removal Procedure

1. Remove the 3 seat switch bezel screws. Refer to Driver Seat and Passenger Seat Adjuster Switch Bezel Replacement .

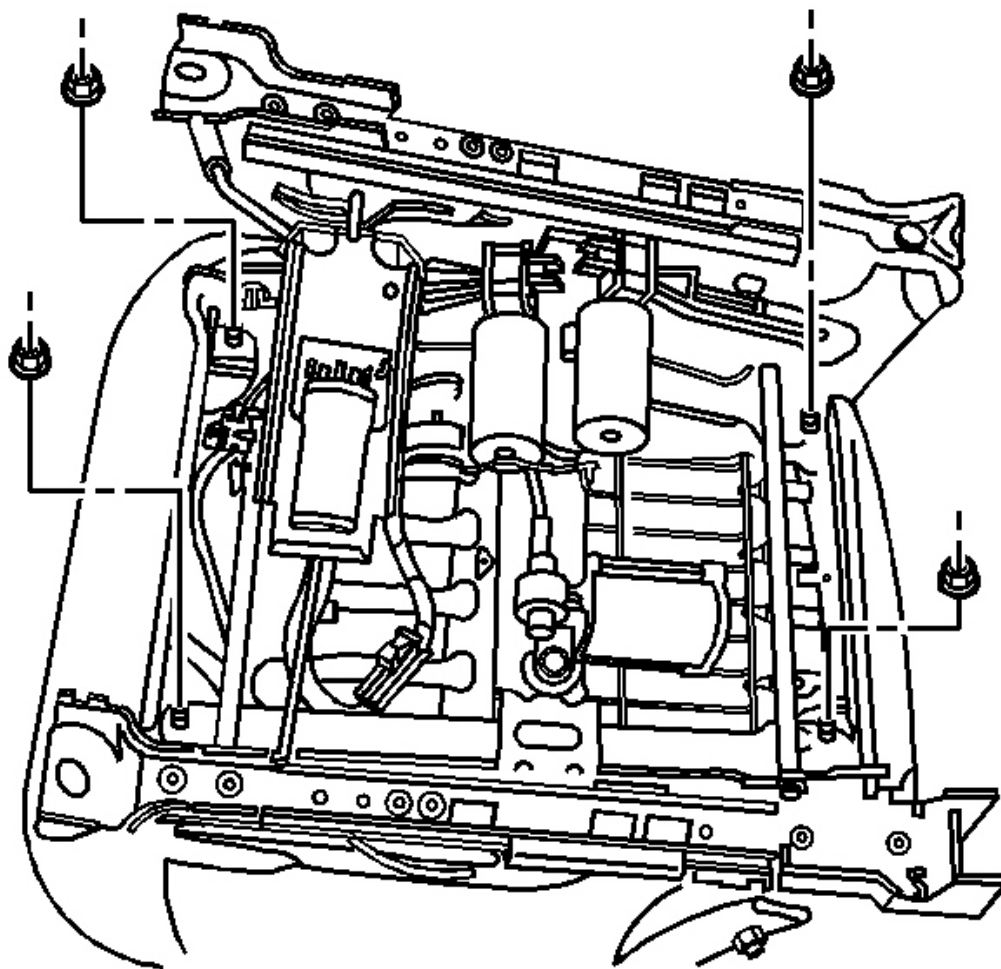


Fig. 15: View Of Underside Of Seat Adjuster Frame & Mounting Nuts
Courtesy of GENERAL MOTORS CORP.

2. Remove 4 nuts that attach the seat pan to the seat assembly.
3. Remove the clip from the front outboard seat pan stud. Discard the clip.
4. Lift the seat pan up in order to allow access to the seat control module retaining screw.

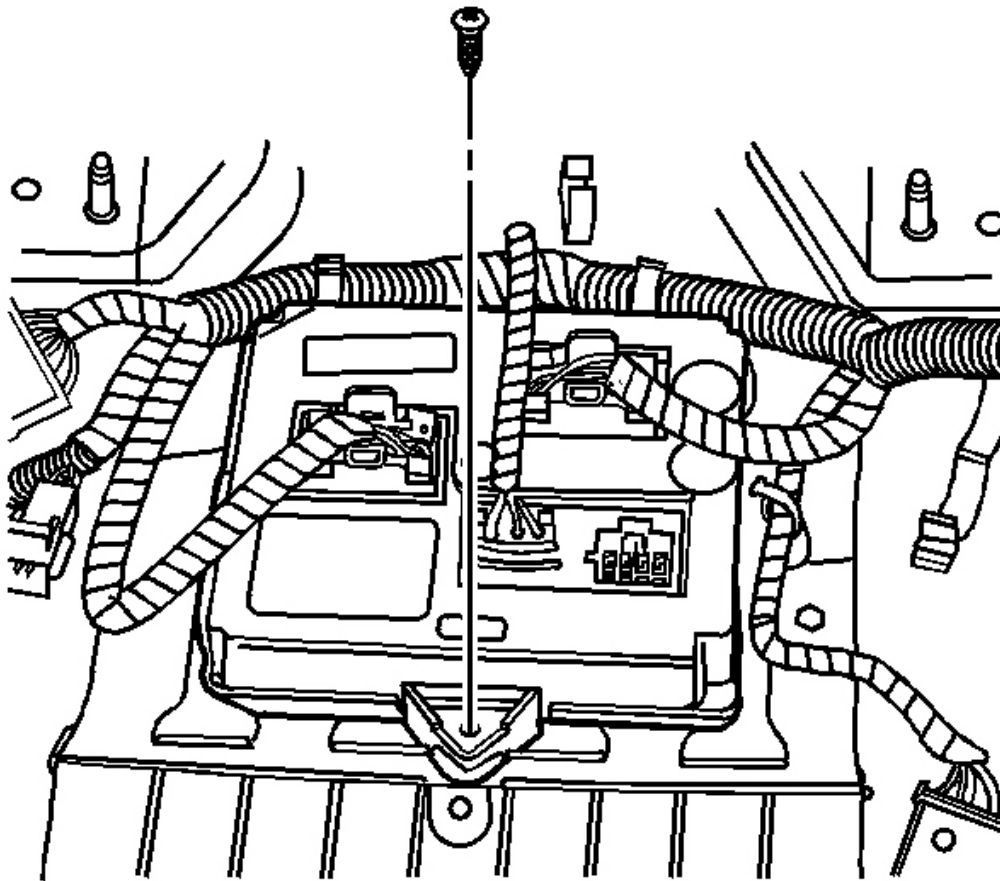


Fig. 16: Locating Seat Module Retaining Screw
Courtesy of GENERAL MOTORS CORP.

5. Remove the seat control module retaining screw.
6. Disconnect the electrical connectors from the seat control module as necessary.
7. Remove the seat control module from the seat assembly.

Installation Procedure

1. Align and install the locating tabs on the seat control module with the seat pan.
2. Connect the electrical connectors to the seat control module as necessary.

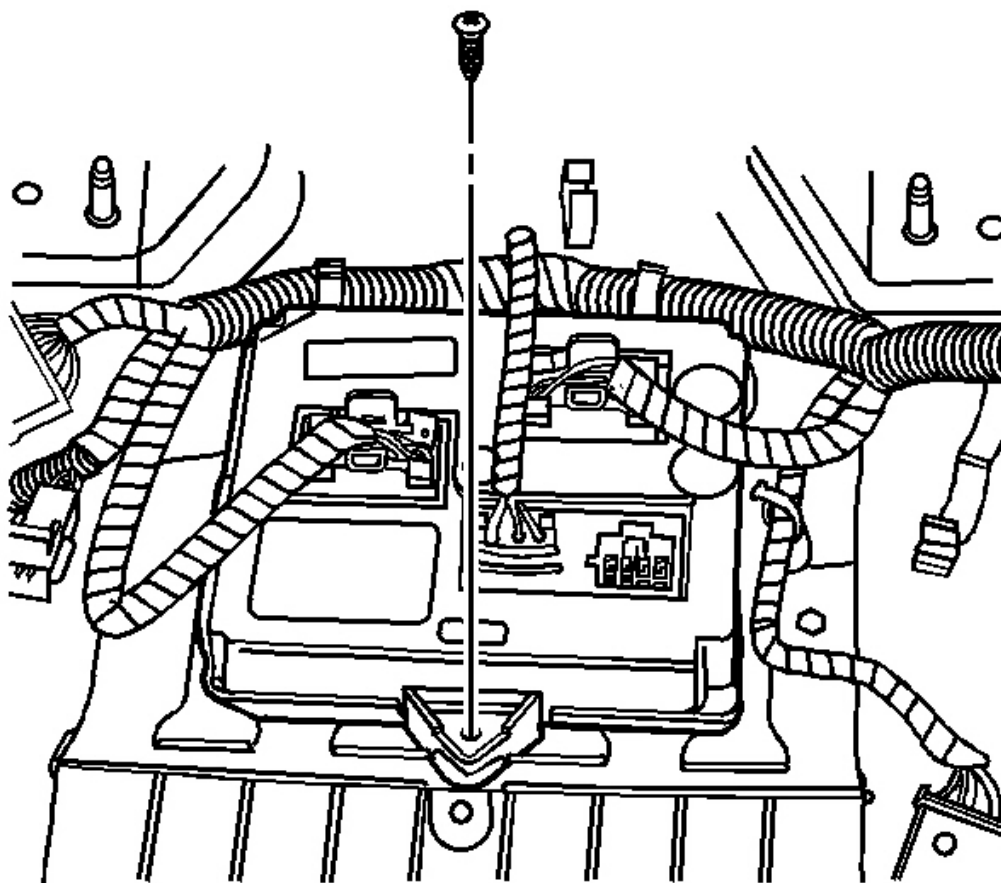


Fig. 17: Locating Seat Module Retaining Screw
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

3. Install the screw that retains the seat control module to the seat pan.

Tighten: Tighten the screw to 3 N.m (26 lb in).

4. Install the seat pan to the seat assembly.

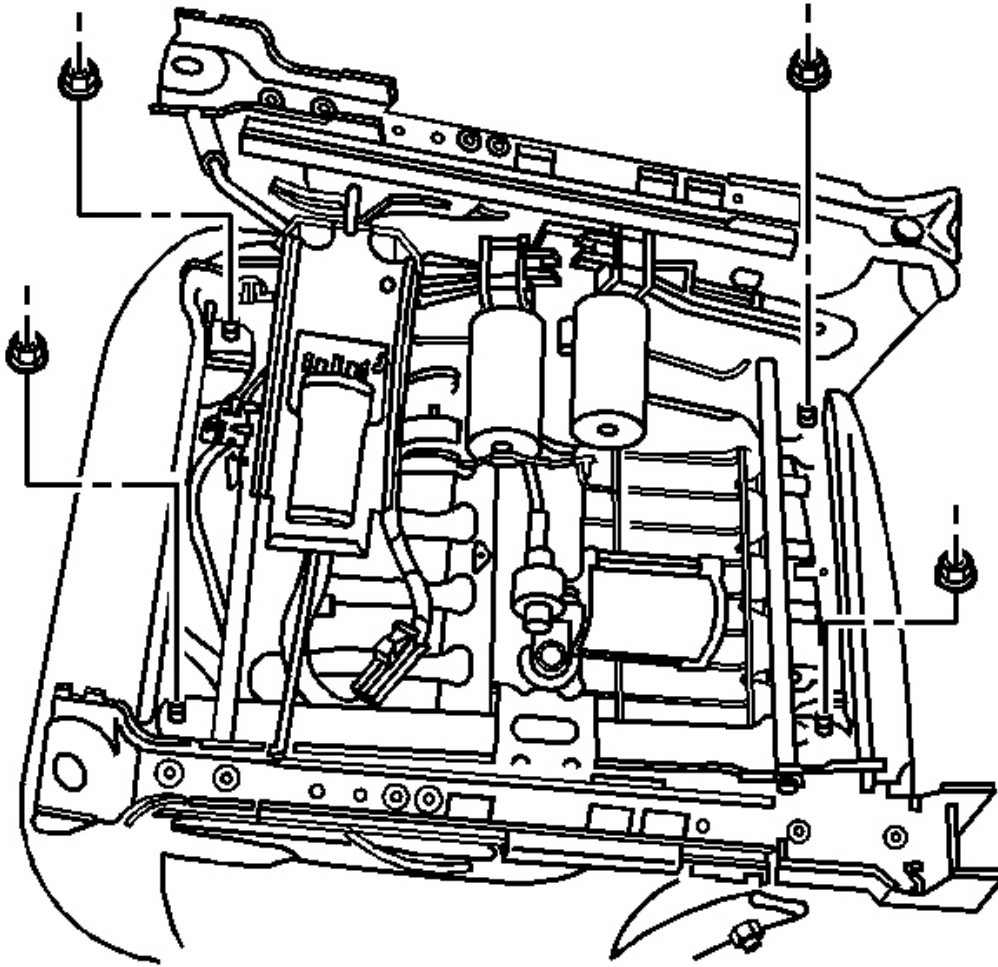


Fig. 18: View Of Underside Of Seat Adjuster Frame & Mounting Nuts
Courtesy of GENERAL MOTORS CORP.

5. Install the nuts which retain the seat pan to the seat assembly.

Tighten: Tighten the nuts to 25 N.m (18 lb ft).

6. Install the 3 seat switch bezel screws. Refer to [Driver Seat and Passenger Seat Adjuster Switch Bezel Replacement](#) .
7. Calibrate the seat. Refer to [Memory Seat Calibration](#).

MEMORY SEAT CALIBRATION

The memory seat module uses position sensor inputs to establish soft stop locations for the adjuster motors several millimeters ahead of the physical limits of the adjuster assembly. After replacing a memory seat module or adjuster components, it may be necessary to reset the adjuster motor soft stop locations. When the repair procedure has been completed, operate the seat adjuster switch in every direction until the seat adjuster reaches its mechanical hard stop by repeatedly pressing and releasing the switch as necessary.

POWER SEAT ADJUSTER MECHANISM REPLACEMENT

Removal Procedure

1. Remove the front bucket seat assembly from the vehicle. Refer to **Front Seat Replacement - Bucket** .
2. Remove the seat cushion trim panel. Refer to **Seat Cushion Outer Trim Panel Replacement** .

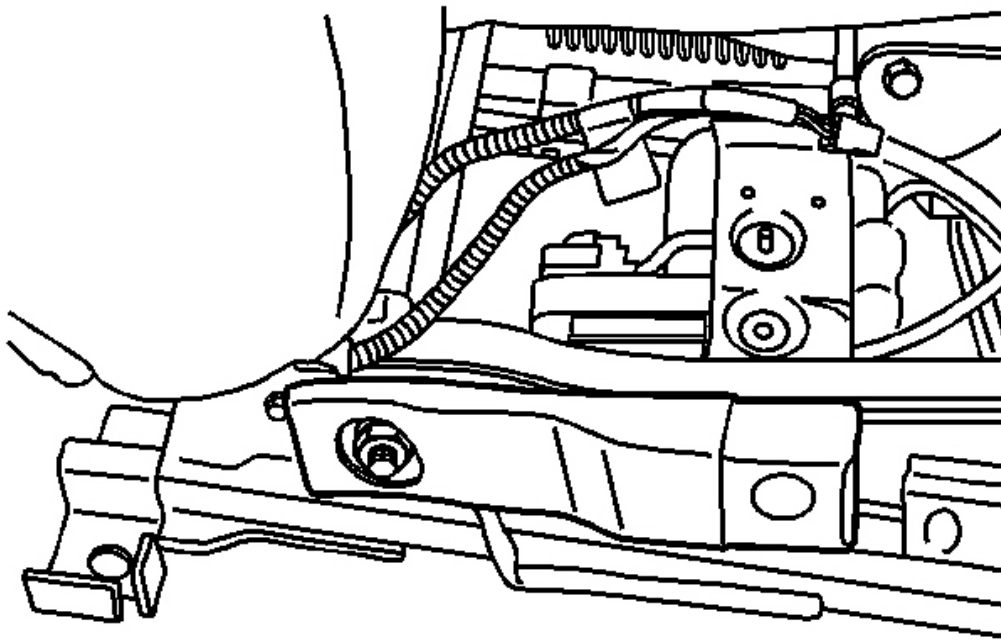


Fig. 19: Locating Seat Belt Buckle Nut
Courtesy of GENERAL MOTORS CORP.

3. Remove the seat belt buckle nut.

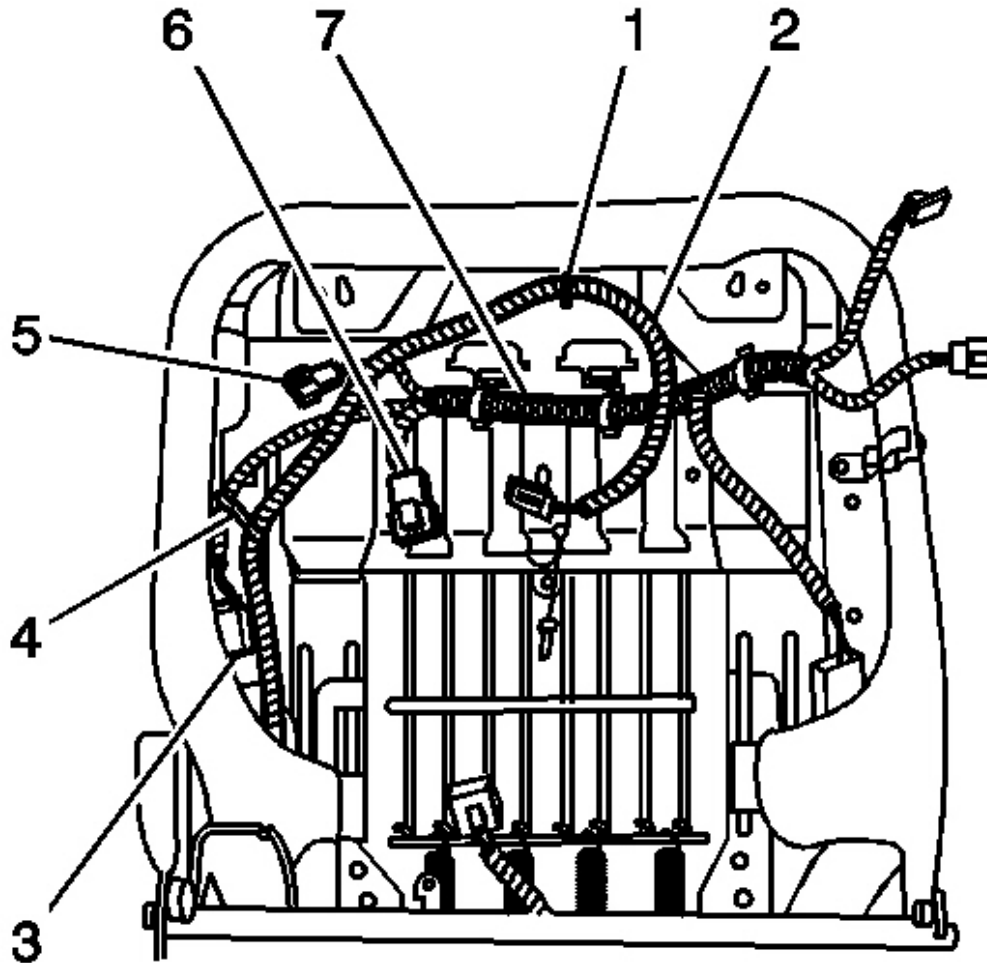


Fig. 20: Identifying Connectors & Harness
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the black electrical connector (6) from the seat back harness.
5. Disconnect the black electrical connector (3) from the seat belt buckle.
6. Disconnect the gray lumbar electrical connector (5), if equipped.
7. Remove the SIR harness (2) from the harness clips (1, 4), and remove the SIR harness from the seat.

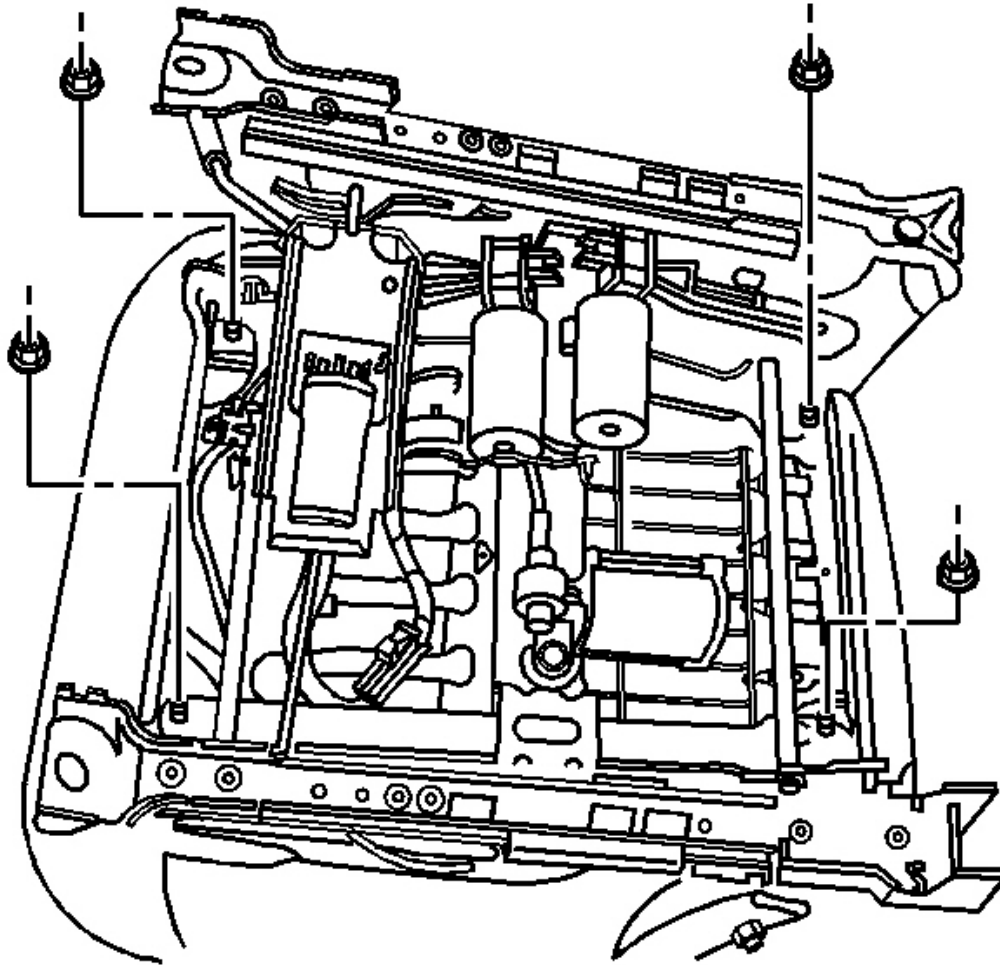


Fig. 21: View Of Underside Of Seat Adjuster Frame & Mounting Nuts
Courtesy of GENERAL MOTORS CORP.

8. Remove the 4 nuts that secure the seat pan to the power seat adjuster frame.
9. Remove the seat back. Refer to **Front Seat Back Replacement** .
10. If replacing the seat adjuster mechanism, remove the seat position sensor and retain to use on the new adjuster. Refer to **Inflatable Restraint Seat Position Sensor Replacement** .

Installation Procedure

1. If installing a new seat adjuster assembly, install the seat position sensor that was removed from the original adjuster, to the new seat adjuster. Refer to **Inflatable Restraint Seat Position Sensor**

Replacement .

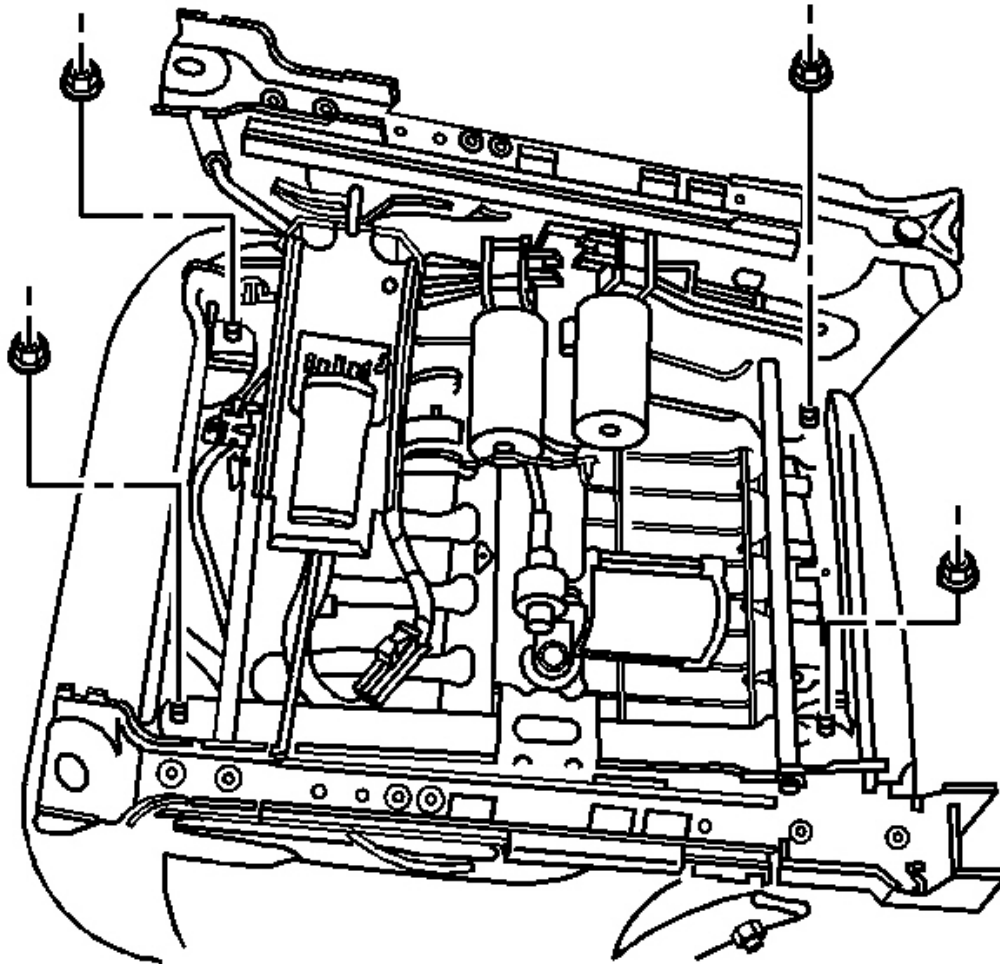


Fig. 22: View Of Underside Of Seat Adjuster Frame & Mounting Nuts
Courtesy of GENERAL MOTORS CORP.

2. Install the seat back. Refer to **Front Seat Back Replacement .**

NOTE: Refer to **Fastener Notice .**

3. Install the 4 nuts that secure the seat pan to the power seat adjuster frame.

Tighten: Tighten the nuts to 25 N.m (18 lb ft).

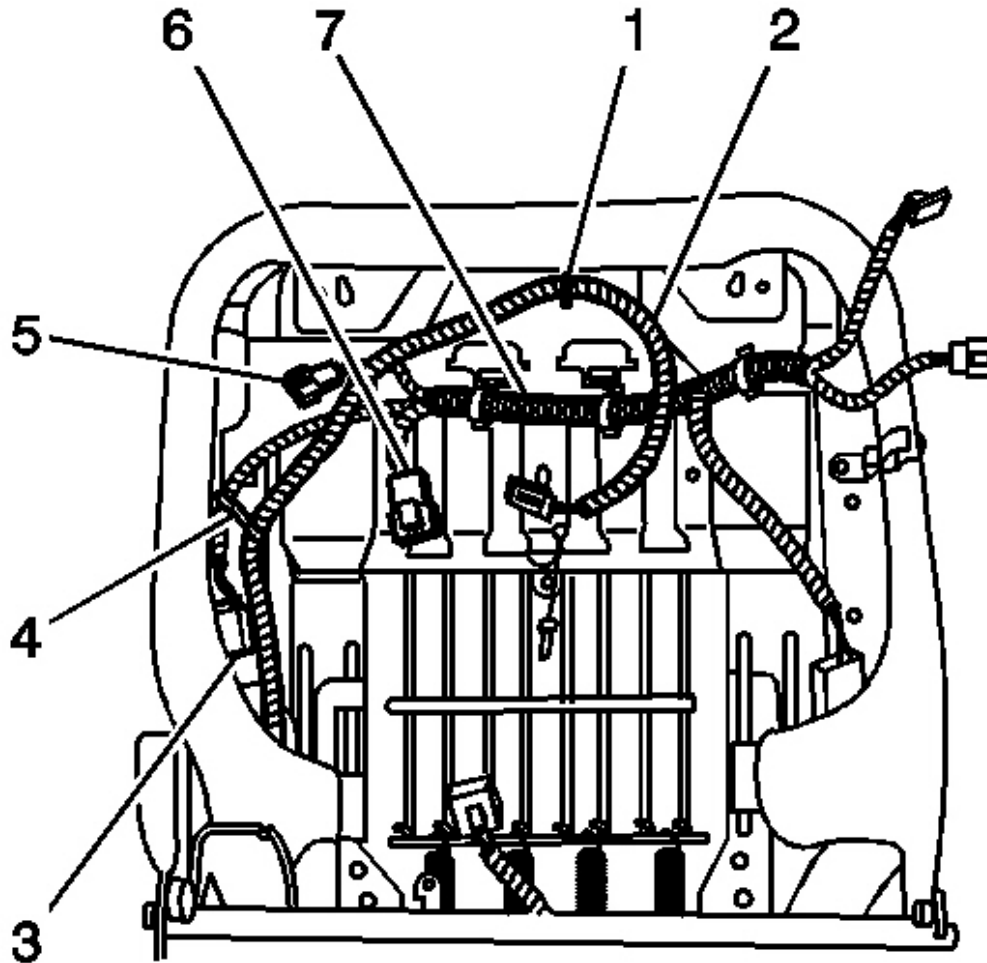


Fig. 23: Identifying Connectors & Harness
Courtesy of GENERAL MOTORS CORP.

4. Install the SIR harness (2) to the seat clips (1, 4).
5. Connect the gray lumbar electrical connector (5), if equipped.
6. Connect the black electrical connector (3) to the seat belt buckle.
7. Connect the black electrical connector (6) to the seat back harness.

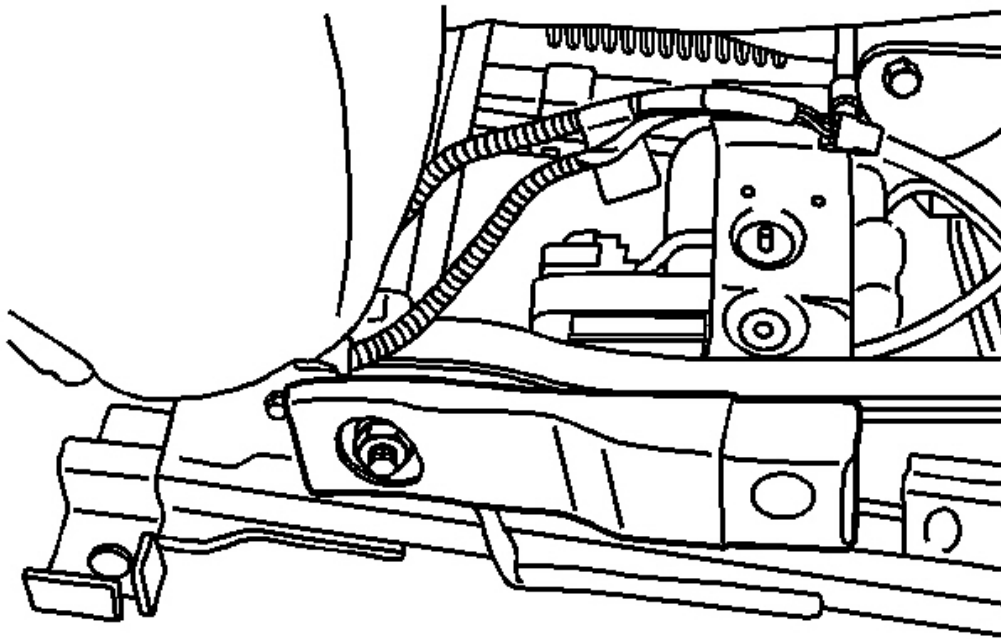


Fig. 24: Locating Seat Belt Buckle Nut
Courtesy of GENERAL MOTORS CORP.

8. Install the seat belt buckle to the seat with the nut.

Tighten: Tighten the nut to 55 N.m (41 lb ft).

9. Install the seat cushion trim panel. Refer to **Seat Cushion Outer Trim Panel Replacement** .
10. Install the front bucket seat assembly to the vehicle. Refer to **Front Seat Replacement - Bucket** .
11. If the vehicle is equipped with memory seats, calibrate the seat. Refer to **Memory Seat Calibration**.

FRONT SEAT LUMBAR CONTROL SWITCH REPLACEMENT

Removal Procedure

1. Remove the switch bezel assembly from the seat. Refer to **Driver Seat and Passenger Seat Adjuster Switch Bezel Replacement** .
2. Remove the power seat switch. Refer to **Power Seat Switch Replacement**.

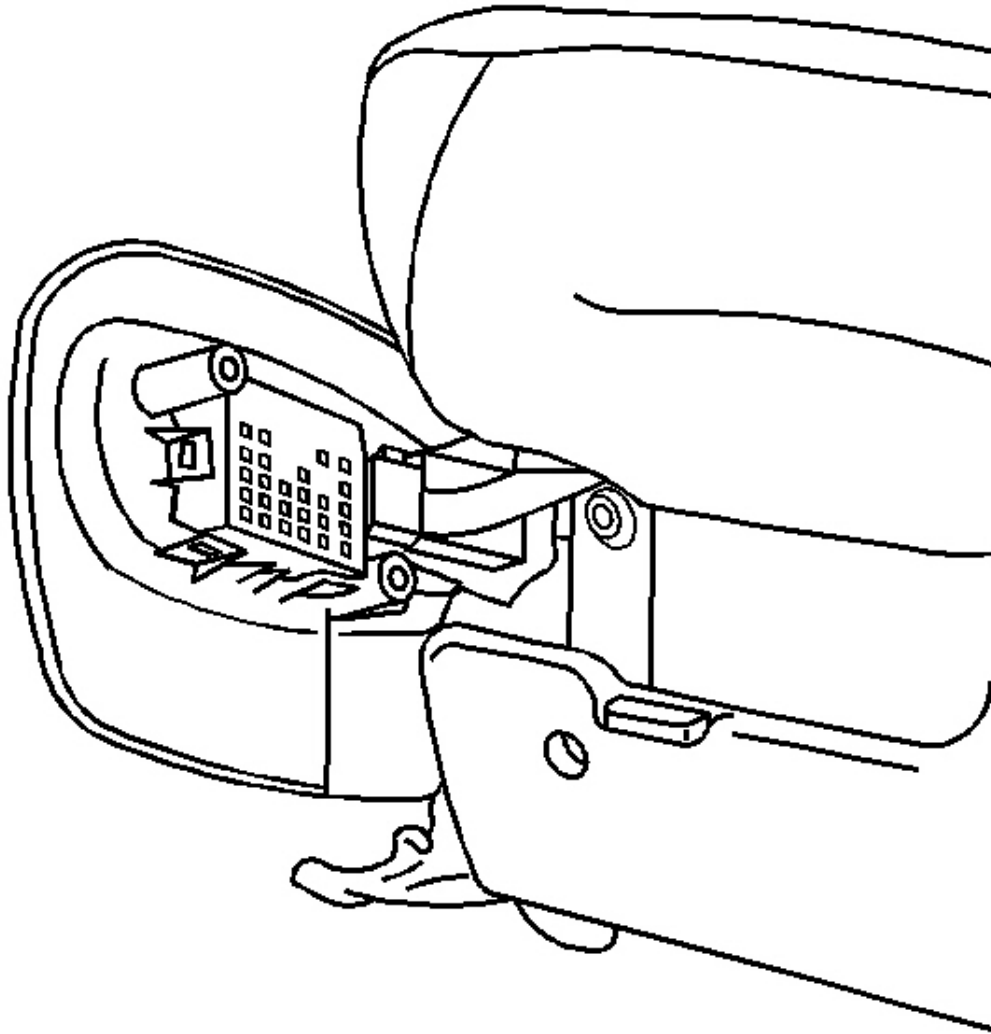


Fig. 25: View Of Bulkhead Connector
Courtesy of GENERAL MOTORS CORP.

3. Release the tabs that retain the lumbar switch to the switch bezel assembly.
4. Disconnect the electrical connector from the lumbar switch.
5. Remove the lumbar switch from the switch bezel assembly.

Installation Procedure

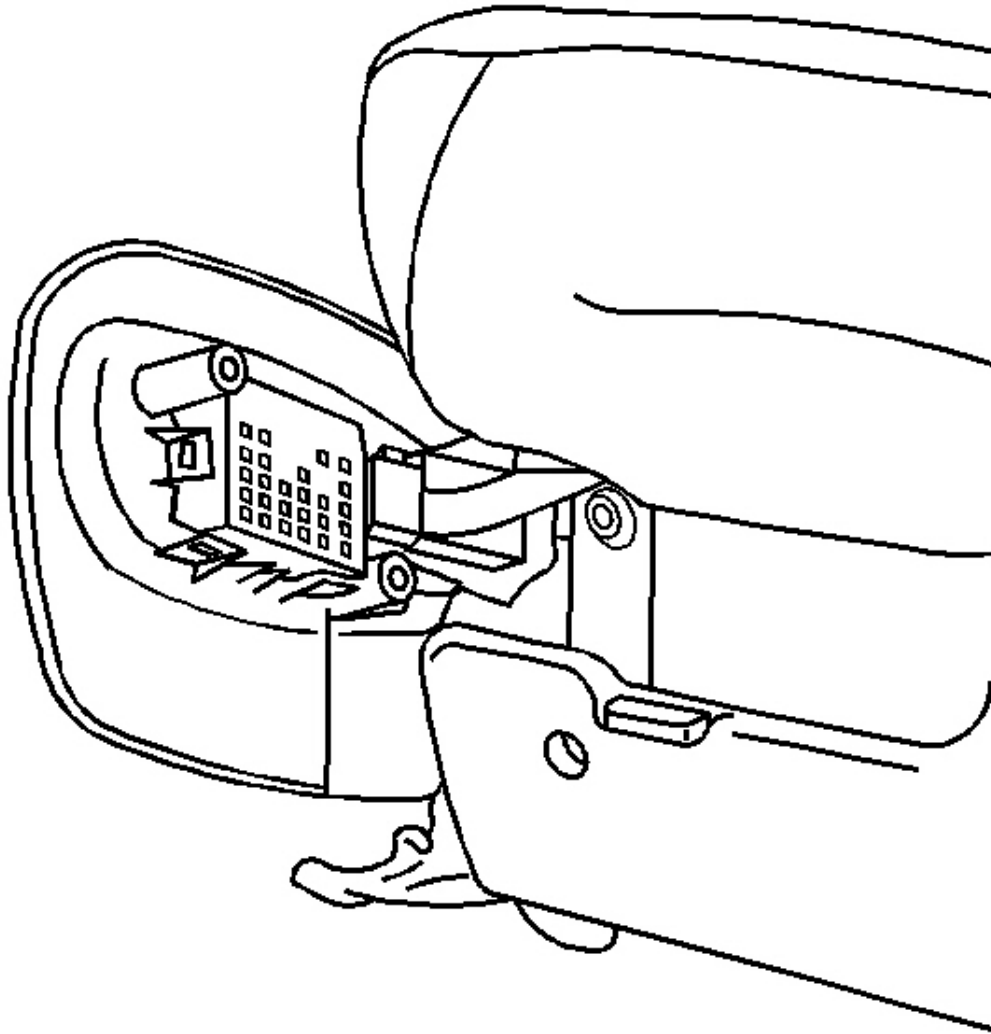


Fig. 26: View Of Bulkhead Connector
Courtesy of GENERAL MOTORS CORP.

1. Connect the electrical connector to the lumbar switch.
2. Install the lumbar switch to the switch bezel assembly, verifying that the retaining tabs are fully seated.
3. Install the power seat switch. Refer to **Power Seat Switch Replacement**.
4. Install the switch bezel assembly to the seat. Refer to **Driver Seat and Passenger Seat Adjuster Switch Bezel Replacement** .

Removal Procedure

1. Remove the front seat from the vehicle. Refer to **Front Seat Replacement - Bucket** .
2. Remove the seat back cover and pad. Refer to **Front Seat Back Cushion Cover and Cushion Pad Replacement** .
3. Remove the seat back panel. Refer to **Driver Seat and Passenger Seat Back Cushion Finish Panel Replacement** .
4. Disconnect the electrical connector from the lumbar motor.
5. Detach the lumbar clip from the top of the seat back frame.

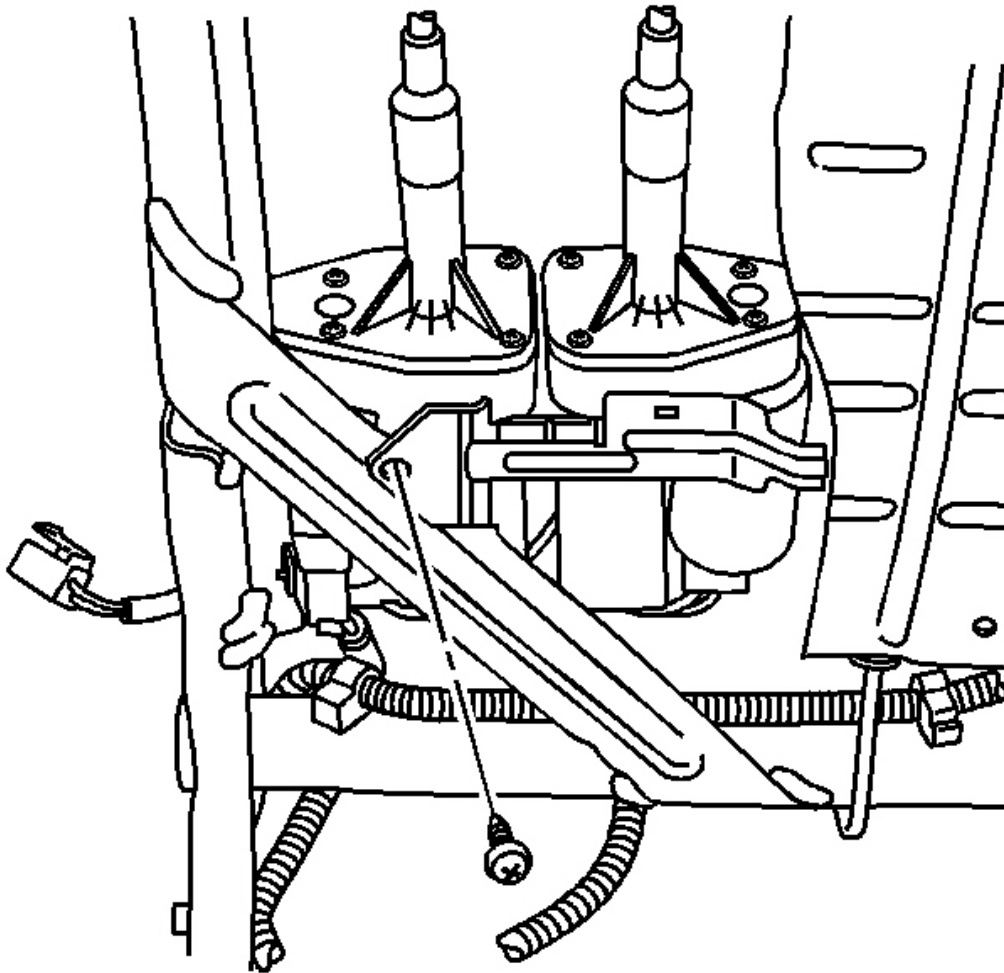


Fig. 27: Locating Lumbar Motor Mounting Screw
Courtesy of GENERAL MOTORS CORP.

6. Remove the lumbar motor mounting screw.
7. Remove the lumbar assembly from the seat.

Installation Procedure

1. Position the lumbar assembly onto the seat.

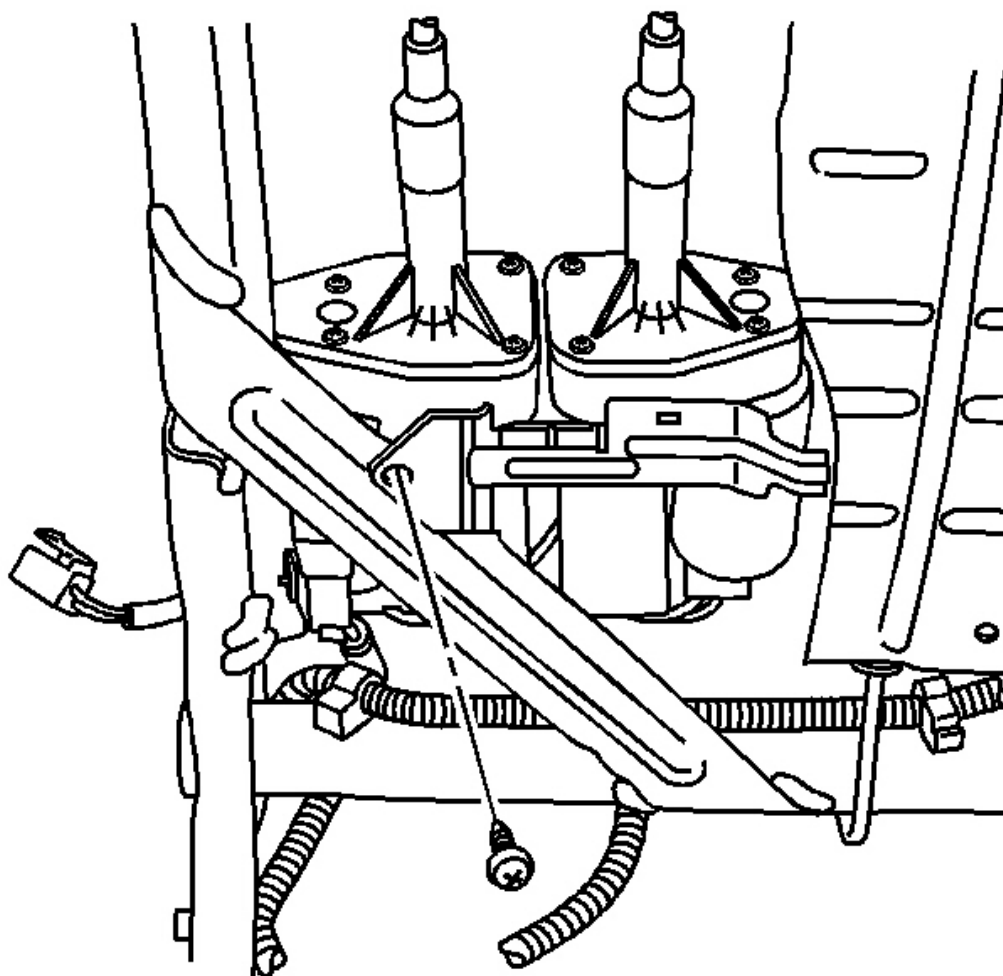


Fig. 28: Locating Lumbar Motor Mounting Screw
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

2. Install the lumbar motor mounting screw.

Tighten: Tighten the lumbar motor mounting screw to 8 N.m (71 lb in).

3. Attach the lumbar clips onto the top and bottom of the seat back frame.
4. Connect the electrical connector to the lumbar motor.
5. Install the seat back panel. Refer to **Driver Seat and Passenger Seat Back Cushion Finish Panel Replacement** .
6. Install the seat back pad and cover. Refer to **Front Seat Back Cushion Cover and Cushion Pad Replacement** .
7. Install the seat in the vehicle. Refer to **Front Seat Replacement - Bucket** .

DESCRIPTION & OPERATION

LUMBAR SUPPORT DESCRIPTION & OPERATION

Lumbar Support System Components

The lumbar support system for the driver and passenger seat consists of the following components:

- Lumbar switch
- Seat lumbar motor assembly
- Driver seat module
- Seat circuit breaker

A51 Lumbar Support System Operation

Battery voltage is supplied to the lumbar switch through the power seat circuit breaker. While the switches are in an inactive state the switch contacts are closed to the switch ground circuit. When a switch is pressed to an active state the switch contact is closed to the battery voltage supply circuit. Each motor is controlled by the lumbar switch through 2 motor control circuits. The motors are bidirectional and the direction of motor rotation is determined by which of the motor control circuits is switched to battery voltage while the other remains grounded.

AR9 Lumbar Support System Operation

The driver seat module supplies the lumbar adjuster switch assembly with a battery positive reference voltage. While the switches are in an inactive state the switch contacts are closed to the switch ground circuit. When a switch is pressed to an active state the switch contact is closed to the reference voltage circuit. Battery voltage on a switch signal circuit indicates to the driver seat module the switch status is active. Each seat adjuster motor is controlled by the seat module through 2 motor control circuits. While the seat adjuster motors are in an inactive state the motor control circuits are closed to ground circuit contacts within the driver seat module. The seat module operates the seat adjuster motors by switching one of a motor's control circuits to battery voltage. The seat adjuster motors are bidirectional and the direction of adjuster motor rotation is determined by which of the adjuster motor control circuits is switched to battery voltage while the other remains grounded.

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The driver seat lumbar adjuster motors are equipped with internal position sensors. The adjuster motor position sensors are monitored by the driver seat module and are used to determine the lumbar positions when storing or recalling memory settings. The lumbar adjuster motors use potentiometer type position sensors. The position sensors are supplied with 5-volt reference and ground circuits from the driver seat module. The position sensor signal circuits are supplied 5 volts through a resistor then monitored within the driver seat module. The signal voltage monitored by the driver seat module ranges from 0.39-4.58 volts and is determined by the wiper location on the resistor within the position sensor. The signal circuit voltage levels are used by the driver seat module to determine the lumbar motor positions when storing or recalling memory seat position settings.

MEMORY SEATS DESCRIPTION & OPERATION

Memory Seat System Components

The memory seat system consists of the following components:

- Power Seat Switch
- Seat Horizontal Motor
- Seat Front Vertical Motor
- Seat Rear Vertical Motor
- Seat Recliner Motor
- Driver Seat Module
- Memory Seat Switch

Memory Seat System Description

Battery voltage is supplied to the driver seat module through the power seat circuit breaker. The driver seat module supplies the seat adjuster switch assembly with a battery positive reference voltage. While the seat adjuster switches are in an inactive state the switch contacts are closed to the adjuster switch ground circuit. When a seat adjuster switch is pressed to an active state the switch contact is closed to the reference voltage circuit. Battery voltage on a switch signal circuit indicates to the driver seat module the switch status is active. Each seat adjuster motor is controlled by the driver seat module through 2 motor control circuits. While the seat adjuster motors are in an inactive state the motor control circuits are closed to ground circuit contacts within the driver seat module. The driver seat module operates the seat adjuster motors by switching one of a motor's control circuits to battery voltage. The seat adjuster motors are bidirectional and the direction of adjuster motor rotation is determined by which of the adjuster motor control circuits is switched to battery voltage while the other remains grounded.

Memory Set/Recall Operation

The driver seat adjuster motors are equipped with potentiometer type position sensors used by the driver seat module to determine the seat position. The position sensors are supplied with 5-volt reference and ground circuits from the driver seat module. The position sensor signal circuits are referenced from ground within the driver seat module. The signal circuit voltage levels monitored by the driver seat module range from 0.39 - 4.58 volts and are determined by the wiper locations on the resistors within the motor position sensors. The position sensor circuit voltage levels are used by the driver seat module to determine the seat position when storing or recalling memory position settings.

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The memory recall switch assembly on the driver's door provides inputs to the driver door module. Battery voltage is supplied to the memory recall switch assembly from the driver door module. When a memory recall 1, 2, or EXIT switch is pressed, the switch contacts close the appropriate switch signal circuit to the battery voltage supply circuit within the memory recall switch assembly. When the driver door module receives active switch signals from the memory recall switch assembly, the appropriate commands are sent to the driver seat module using the Class 2 Serial Data circuit.

Memory seat recall operation is allowed only with the transmission selector lever in the PARK position while the ignition is on. The transmission selector lever position data is provided to the driver seat module by a message through the Class 2 Serial Data circuit.

POWER SEATS SYSTEM DESCRIPTION & OPERATION

Power Seat System Components

The power seat system for the driver and passenger consists of the following components:

- Power Seat Switch
- Seat Horizontal Motor
- Seat Front Vertical Motor
- Seat Rear Vertical Motor
- Seat Recliner Motor

Power Seat System Operation

For the driver memory seat operation refer to **Memory Seats Description and Operation**. The passenger seat and A51 driver seat are 6 or 8 way power adjustable bucket seats with power lumbar, and all of the adjuster motors are directly controlled through the switch assemblies. Battery voltage is supplied to the power seat switch through the power seat circuit breaker. While the seat adjuster switches are in an inactive state the switch contacts are closed to the power seat switch ground circuit. When a power seat switch is pressed to an active state the switch contact is closed to the battery voltage supply circuit. Each seat adjuster motor is controlled by the power seat switch through 2 motor control circuits. The seat adjuster motors are bidirectional and the direction of adjuster motor rotation is determined by which of the adjuster motor control circuits is switched to battery voltage while the other remains grounded.