

Power Seats - Malibu

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Driver or Passenger Seat Recliner Actuator Bolt	6 N.m	53 lb in

DRIVER SEAT WIRING SCHEMATICS

Seat Position (without A45) Wiring Schematics

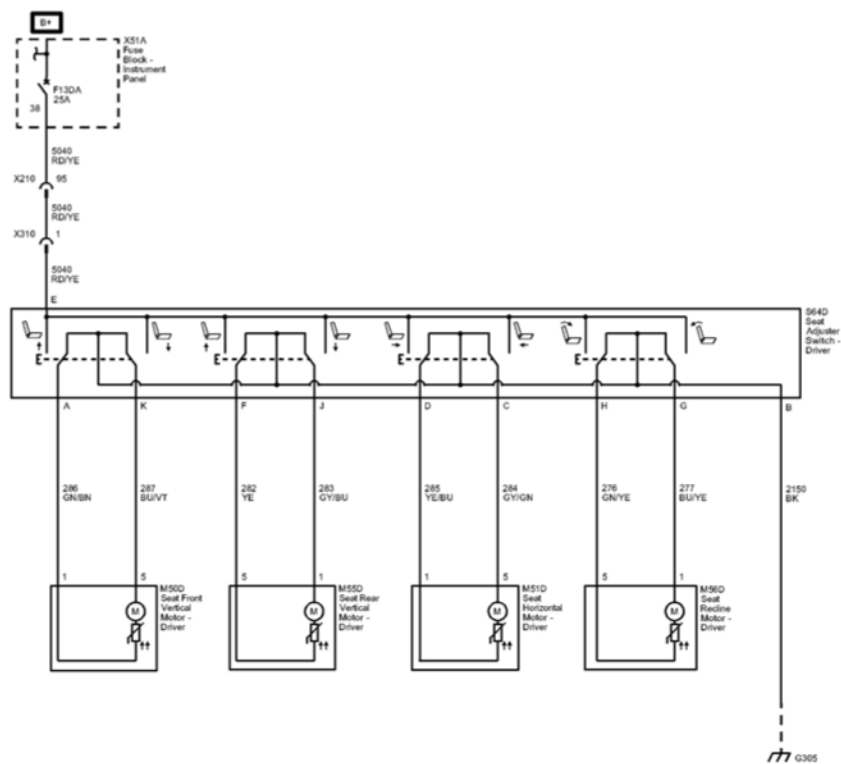


Fig. 2: Seat Position (without A45) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Power, Ground, Serial Data, and Seat Memory Switch (A45) Wiring Schematics



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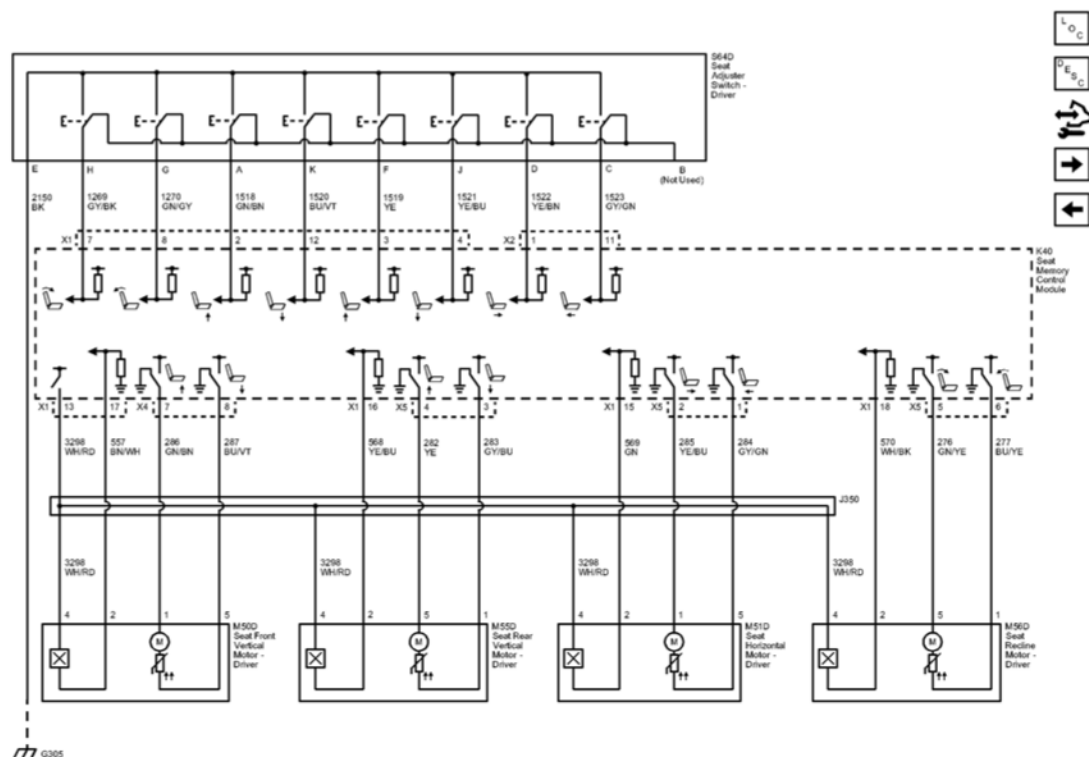


Fig. 4: Position Motors and Seat Adjuster Switch (A45) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Lumbar (APG) Wiring Schematics

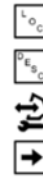
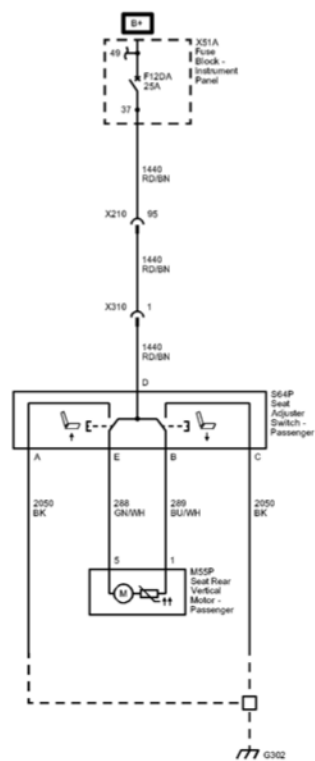


Fig. 6: Seat Position (A6C) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Seat Position (AG2) Wiring Schematics

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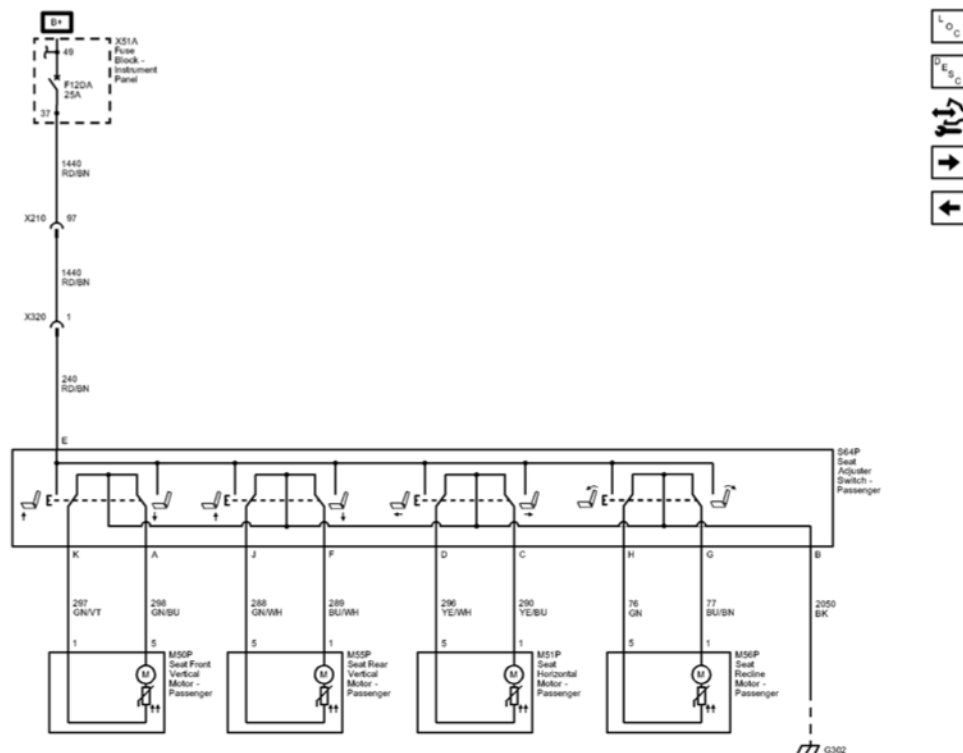


Fig. 7: Seat Position (AG2) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

Lumbar (APH) Wiring Schematics

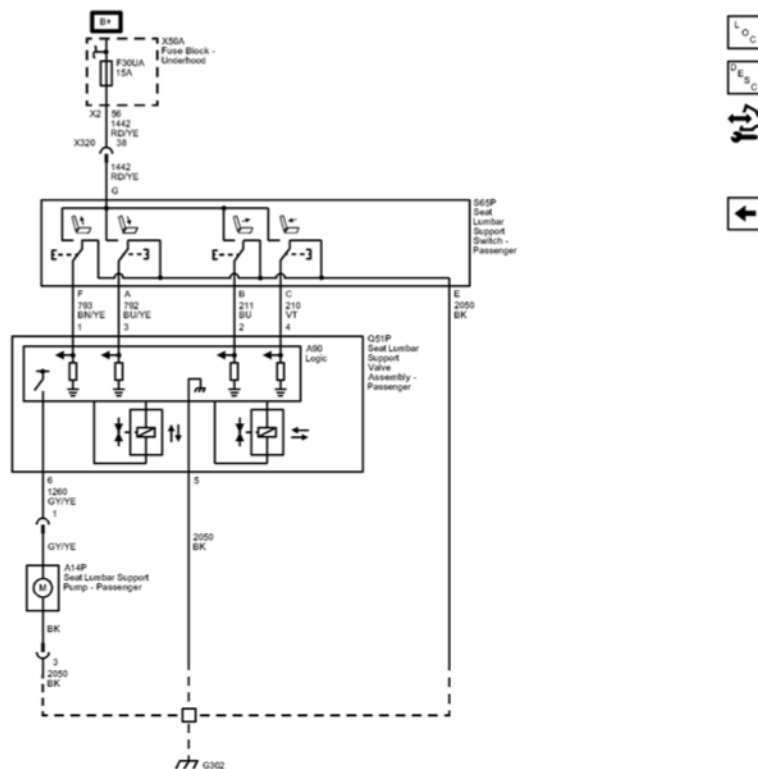


Fig. 8: Lumbar (APH) Wiring Schematics
 Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
<u>DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, or B1820</u>	DTC B1735 02 Driver Seat Front Up Switch Circuit Short to Ground
	DTC B1740 02 Driver Seat Front Down Switch Circuit Short to Ground
	DTC B1745 02 Driver Seat Rear Up Switch Circuit Short to Ground
	DTC B1750 02 Driver Seat Rear Down Switch Circuit Short to Ground
	DTC B1755 02 Driver Seat Assembly Forward Switch Circuit Short to Ground
	DTC B1760 02 Driver Seat Assembly Rearward Switch Circuit Short to Ground
	DTC B1815 02 Driver Seat Recline Forward Switch Circuit Short to Ground
	DTC B1820 02 Driver Seat Recline Rearward Switch Circuit Short to Ground
	DTC B1825 02 Driver Seat Recline Rearward Switch Circuit Short to Ground

	DTC B1820 02 Driver Seat Recline Rearward Switch Circuit Short to Ground
<u>DTC B1825, B2355, B2365, or B2375</u>	DTC B1825 01 Driver Seat Recline Position Sensor Circuit Short to Battery DTC B1825 06 Driver Seat Recline Position Sensor Circuit Low Voltage/Open DTC B2355 01 Driver Seat Front Vertical Position Sensor Circuit Short to Battery DTC B2355 06 Driver Seat Front Vertical Position Sensor Circuit Low Voltage/Open DTC B2365 01 Driver Seat Rear Vertical Position Sensor Circuit Short to Battery DTC B2365 06 Driver Seat Rear Vertical Position Sensor Circuit Low Voltage/Open DTC B2375 01 Driver Seat Assembly Horizontal Position Sensor Circuit Short to Battery DTC B2375 06 Driver Seat Assembly Horizontal Position Sensor Circuit Low Voltage/Open
<u>DTC B3920</u>	DTC B3920 00 Driver Seat Motors Group 1 Common Circuit Malfunction DTC B3920 01 Driver Seat Motors Group 1 Common Circuit Short to Battery DTC B3920 02 Driver Seat Motors Group 1 Common Circuit Short to Ground DTC B3920 42 Driver Seat Motors Group 1 Common Circuit Calibration Not Programmed DTC B3920 0B Driver Seat Motors Group 1 Common Circuit High Current

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 Descriptors

DTC B1735 02

Driver Seat Front Up Switch Circuit Short to Ground

DTC B1740 02

Driver Seat Front Down Switch Circuit Short to Ground

DTC B1745 02

Driver Seat Rear Up Switch Circuit Short to Ground

DTC B1750 02

Driver Seat Rear Down Switch Circuit Short to Ground

DTC B1755 02

Driver Seat Assembly Forward Switch Circuit Short to Ground

DTC B1760 02

Driver Seat Assembly Rearward Switch Circuit Short to Ground

DTC B1815 02

Driver Seat Recline Forward Switch Circuit Short to Ground

DTC B1820 02

Driver Seat Recline Rearward Switch Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Front Vertical Up Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Front Vertical Down Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
	B1735 02, B1740 02, B1745 02,			

Rear Vertical Up Switch Signal	B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Rear Vertical Down Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Horizontal Forward Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Horizontal Rearward Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Recline Forward Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Recline Rearward Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
1. Power seat inoperative				

Circuit/System Description

The seat memory control module supplies a reference voltage to each signal circuit of the driver seat adjuster switch. When the power seat switches are pressed, the appropriate signal circuit from the seat memory control module is pulled low through the switch contacts indicating the power seat command. The seat memory control module then commands the driver seat to move in response to the switch signals.

Conditions for Running the DTC

- DTC B1325 must not be present.
- Module battery voltage must be between 9-16 V.

Conditions for Setting the DTC

- If a seat switch circuit is active in one direction and the switch for the opposite direction is pressed, this DTC will set.
- A short to ground on a switch signal circuit.

Action Taken When the DTC Sets

- A motor output driven in response to a switch considered failed, is deactivated for both directions.
- All memory recall commands are ignored.
- The seat memory control module will respond to any other switch signal that has not set a DTC.

Conditions for Clearing the DTC

- The current DTC will clear and set the DTC to history, when the fault is no longer present and the ignition is cycled OFF then back to ACC or RUN.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Diagnostic Aids

- If one of the switch signal circuits is shorted to ground, multiple DTCs will set.
- If a switch is stuck in one direction and the switch is pressed in the opposite direction, a single DTC will set.

Reference Information

Schematic Reference

Driver Seat Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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.
2. Verify the scan tool seat switch parameters listed below change between Inactive and Forward/Rearward or UP/Down when pressing the appropriate seat directional switch.
 - Driver Seat Cushion Front Vertical Switch
 - Driver Seat Cushion Rear Vertical Switch
 - Driver Seat Horizontal Switch
 - Driver Seat Back Switch
 - **If the parameter does not change**

Refer to Circuit/System Testing below.
 - **If the parameter changes**
3. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S64D Seat Adjuster Switch - Driver.
2. Verify that all scan tool driver seat switch parameters listed below are Inactive:
 - Driver Seat Cushion Front Vertical Switch
 - Driver Seat Cushion Rear Vertical Switch
 - Driver Seat Horizontal Switch
 - Driver Seat Back Switch
 - **If not Inactive**
 1. Ignition OFF, disconnect the harness connector at the K40 Seat Memory Control Module, ignition ON.
 2. Test for infinite resistance between the appropriate signal circuit terminal listed below and ground:
 - Front vertical up switch terminal A

- Front vertical down switch terminal K
- Rear vertical up switch terminal F
- Rear vertical down switch terminal J
- Horizontal forward switch terminal D
- Horizontal rearward switch terminal C
- Recline forward switch terminal H
- Recline rearward switch terminal G
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K40 Seat Memory Control Module.

○ **If Inactive**

3. Install a 3 A fused jumper wire between the appropriate signal circuit terminal listed below and the ground circuit terminal E.
 - Front vertical up switch terminal A
 - Front vertical down switch terminal K
 - Rear vertical up switch terminal F
 - Rear vertical down switch terminal J
 - Horizontal forward switch terminal D
 - Horizontal rearward switch terminal C
 - Recline forward switch terminal H
 - Recline rearward switch terminal G
4. Verify the scan tool seat switch parameter is Forward/Rearward or UP/Down.
 - **If not Forward/Rearward or UP/Down**
 1. Ignition OFF, disconnect the harness connector at the K40 Seat Memory Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Ignition OFF.
 4. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K40 Seat Memory Control Module.
 - **If Forward/Rearward or UP/Down**
5. Test or replace the S64D Seat Adjuster Switch - Driver.

Component Testing

Seat Adjuster Switch Test

1. Ignition OFF, disconnect the harness connector at the S64D Seat Adjuster Switch - Driver.

2. Test for infinite resistance between the ground terminal E and each signal terminal with the switch in the open position.

- **If less than infinite resistance**

Replace the S64D Seat Adjuster Switch - Driver.

- **If infinite resistance**

3. Test for less than 2 ohms between the ground terminal E and each signal terminal with the appropriate switch in the closed position.

- **If 2 ohms or greater**

Replace the S64D Seat Adjuster Switch - Driver.

- **If less than 2 ohms**

4. All OK.

Repair Instructions

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

- **Driver Seat Adjuster and Recliner Switch Replacement**
- **Control Module References** for K40 Seat Memory Control Module replacement, programming and setup

DTC B1825, 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 Descriptors

DTC B1825 01

Driver Seat Recline Position Sensor Circuit Short to Battery

DTC B1825 06

Driver Seat Recline Position Sensor Circuit Low Voltage/Open

DTC B2355 01

Driver Seat Front Vertical Position Sensor Circuit Short to Battery

DTC B2355 06

Driver Seat Front Vertical Position Sensor Circuit Low Voltage/Open

DTC B2365 01

Driver Seat Rear Vertical Position Sensor Circuit Short to Battery

DTC B2365 06

Driver Seat Rear Vertical Position Sensor Circuit Low Voltage/Open

DTC B2375 01

Driver Seat Assembly Horizontal Position Sensor Circuit Short to Battery

DTC B2375 06

Driver Seat Assembly Horizontal Position Sensor Circuit Low Voltage/Open

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
12 V Reference	B1825 06, B2355 06, B2365 06, B2375 06	B1825 06, B2355 06, B2365 06, B2375 06	-	-
Driver Seat Front Vertical Position Sensor Signal	B2355 06	B2355 06	B2355 01	-
Driver Seat Rear Vertical Position Sensor Signal	B2365 06	B2365 06	B2365 01	-
Driver Seat Horizontal Position Sensor Signal	B2375 06	B2375 06	B2375 01	-
Driver Seat Recline Position Sensor Signal	B1825 06	B1825 06	B1825 01	-

Circuit Description

The seat memory control module monitors the position of the seat motors by using hall effect position sensors which are an internal part of each motor. The module supplies each sensor with a 12 V reference circuit and a low side signal circuit. During seat motor operation, the hall effect position sensor provides a determined number of pulse signals for every revolution of the motor shaft. The scan tool displays these pulse signals as counts that range from 0-65, 535. The module counts the feedback pulses from each sensor to determine seat position and end of travel limits for each of the seat motors. High scan tool count values indicate forward or upward seat positions while low count values indicate rearward or downward seat positions.

Conditions for Running the DTC

- DTC B1325 must not be present.
- Module battery voltage must be between 9-16 V.

Conditions for Setting the DTC

The seat memory control module does not detect position sensor movement or pulse signals while the adjuster motor is active. The following conditions will set this DTC:

B1825 01, B2355 01, B2365 01, or B2375 01

The seat memory control module detects a voltage greater than 5 V on the sensor signal circuit.

B1825 06, B2355 06, B2365 06, or B2375 06

The seat memory control module detects a short to ground or an open on the sensor signal circuit.

Action Taken When the DTC Sets

- With a short to ground or an open circuit, the seat memory control module disables the memory recall and easy exit/entry action commands of the motor monitored by the sensor. The motor will respond to manual position commands.
- With a short to battery voltage, the seat memory control module disables the memory recall and easy exit/entry action commands for all four seat motors. The motors will respond to manual position commands.

Conditions for Clearing the DTC

- The current DTC clears when the fault is no longer present and the power mode changes to OFF then back to ACC or RUN.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Driver Seat Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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 Testing

1. Ignition OFF, disconnect the harness connector at the appropriate driver seat motor listed below for which the DTC set:
 - M50 seat front vertical motor
 - M55 seat rear vertical motor
 - M51 seat horizontal motor
 - M56 seat back recline motor
2. Ignition ON.
3. Test for greater than 10.8 V between the 12 V reference circuit terminal 4 and ground.
 - **If 10.8 V or less**
 1. Ignition OFF, disconnect the X1 harness connector at the K40 seat memory control module.
 2. Test for infinite resistance between the 12 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the 12 V reference circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K40 seat memory control module.
 - **If greater than 10.8 V**
4. Test for 0.3-2 V between the signal circuit terminal 2 and ground.
 - **If 0.3 V or less**
 1. Ignition OFF, disconnect the X1 harness connector at the K40 seat memory control module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K40 seat memory control module.
 - **If greater than 2 V**

1. Ignition OFF, disconnect the X1 harness connector at the K40 seat memory control module, ignition ON.
2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K40 seat memory control module.
 - **If between 0.3-2 V**
5. Test or replace the seat motor.

Repair Instructions

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

- **Front Seat Tilt Adjuster Actuator Replacement**
- **Front Seat Adjuster Actuator Replacement**
- **Driver Seat Outer Adjuster Rear Vertical Actuator Replacement**
- **Driver or Passenger Seat Recliner Actuator Replacement**
- **Control Module References** for seat memory control module replacement, programming and setup

DTC B3920

Diagnostic Instructions

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

DTC Descriptors

DTC B3920 00

Driver Seat Motors Group 1 Common Circuit Malfunction

DTC B3920 01

Driver Seat Motors Group 1 Common Circuit Short to Battery

DTC B3920 02

Driver Seat Motors Group 1 Common Circuit Short to Ground

DTC B3920 42

Driver Seat Motors Group 1 Common Circuit Calibration Not Programmed

DTC B3920 0B

Driver Seat Motors Group 1 Common Circuit High Current

Diagnostic Fault Information

Circuit	Short to Ground	High Resistance	Open	Short to Voltage	Signal Performance
Driver Seat Front Vertical Motor Down Control	B3920 02	B3920 0B	1	B3920 01	B3920 42
Driver Seat Front Vertical Motor Up Control	B3920 02	B3920 0B	1	B3920 01	B3920 42
Driver Seat Rear Vertical Motor Down Control	B3920 02	B3920 0B	1	B3920 01	B3920 42
Driver Seat Rear Vertical Motor Up Control	B3920 02	B3920 0B	1	B3920 01	B3920 42
Driver Seat Horizontal Motor Forward Control	B3920 02	B3920 0B	1	B3920 01	B3920 42
Driver Seat Horizontal Motor Rearward Control	B3920 02	B3920 0B	1	B3920 01	B3920 42
Driver Seat Recline Motor Forward Control	B3920 02	B3920 0B	1	B3920 01	B3920 42
Driver Seat Recline Motor Rearward Control	B3920 02	B3920 0B	1	B3920 01	B3920 42
1. Power seat motor inoperative					

Circuit/System Description

The seat memory control module controls the seat motors via half bridges that are connected to power rails internal to the module. The seat memory control module connects all of the motor control circuits on each power rail to a common reference point whenever they are not in operation. This reference point is biased to approximately 2.5 V. The seat memory control module checks to see if this reference voltage is shorted to ground or battery before enabling any seat motor.

When a power seat switch is pressed or when a memory recall is requested, each seat motor receives battery voltage and ground from the seat memory control module via the motor control circuits. All motors are reversible, so the direction the motor rotates depends on which control circuit voltage is applied and which control circuit ground is applied. When the switch is operated in the opposite direction, the module reverses the polarity and applies voltage and ground to the opposite circuits to move the seat in the opposite direction.

Conditions for Running the DTC

- DTC B1325 must not be present.
- Module battery voltage must be between 9-16 V.

Conditions for Setting the DTC

B3920 00

Current out of the module does not match the current returning to the module from 1.5-5 A.

B3920 01

The voltage on any power rail 1 motor control circuit exceeds 2.78 V for 100 ms.

B3920 02

The voltage on any power rail 1 motor control circuit is below 1.47 V for 100 ms.

B3920 42

This DTC will set if the module calibration is not programmed.

B3920 0B

The differential current measured through the high and low side of the power rail is within tolerance of each other, but the absolute current or an over-current has exceeded the maximum value.

Action Taken When the DTC Sets

The seat memory control module will not allow operation of any motor on the power rail for which the DTC was set.

Conditions for Clearing the DTC

- The current DTC clears when the fault is no longer present and the power mode changes to OFF then back to ACC or RUN.
- The history DTC will clear after 40 consecutive fault-free ignition cycles have occurred.

Reference Information

Schematic Reference

Driver Seat Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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 Testing

B3920 01 or B3920 02

1. Ignition OFF, disconnect the X4 and X5 harness connectors at the K40 seat memory control module.
2. Test for infinite resistance between the control circuit terminals listed below and ground:
 - M50D front vertical motor up control terminal 7 X4
 - M50D front vertical motor down control terminal 8 X4
 - M55D rear vertical motor up control terminal 4 X5
 - M55D rear vertical motor down control terminal 3 X5
 - M51D horizontal motor forward control terminal 2 X5
 - M51D horizontal motor rearward control terminal 1 X5
 - M56D recline motor forward control terminal 5 X5
 - M56D recline motor rearward control terminal 6 X5
 - **If less than infinite resistance**

Repair the short to ground on the circuit.

- **If infinite resistance**
3. Ignition ON.
 4. Test for less than 1 V between the control circuit terminals listed below and ground:
 - M50D front vertical motor up control terminal 7 X4
 - M50D front vertical motor down control terminal 8 X4
 - M55D rear vertical motor up control terminal 4 X5
 - M55D rear vertical motor down control terminal 3 X5
 - M51D horizontal motor forward control terminal 2 X5
 - M51D horizontal motor rearward control terminal 1 X5
 - M56D recline motor forward control terminal 5 X5
 - M56D recline motor rearward control terminal 6 X5
 - **If 1 V or greater**

Repair the short to voltage on the circuit.

- **If less than 1 V**

5. Replace the K40 seat memory control module.

B3920 00 or B3920 0B

1. Ignition ON.
2. Clear the current and history DTC.
3. Determine which motor set this DTC by operating the driver seat motors listed below one at a time in both directions. Check for the DTC to set between each motor test.
 - M50D seat front vertical motor
 - M55D seat rear vertical motor
 - M51D seat horizontal motor
 - M56D seat back recline motor
4. Ignition OFF, disconnect the harness connector at the seat motor for which the DTC set, ignition ON.
5. Clear the DTC.
6. Verify that DTC B3920 00 or B3920 0B does not set while operating the seat motor adjuster switch in both directions.

- **If DTC B3920 00 or B3920 0B sets**

1. Test for infinite resistance between control circuit terminal 1 and control circuit terminal 5.
 - If less than infinite resistance, repair the short between the circuits.
 - If infinite resistance
2. Test for less than 2 ohms between the control circuit terminals listed below end to end:
 - Terminal 1
 - Terminal 5
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the seat motor.

- **If DTC B3920 00 or B3920 0B does not set**

7. Replace the seat motor.

B3920 42

1. Ignition ON.
2. Verify the DTC is not set.
 - **If the DTC is set**

Replace the K40 seat memory control module.

- **If the DTC is not set**

3. All OK.

Repair Instructions

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

- **Front Seat Tilt Adjuster Actuator Replacement**
- **Front Seat Adjuster Actuator Replacement**
- **Driver Seat Outer Adjuster Rear Vertical Actuator Replacement**
- **Driver or Passenger Seat Recliner Actuator Replacement**
- **Control Module References** for seat memory control module replacement, programming and setup

SYMPTOMS - POWER SEATS

NOTE: 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:
 - **Lumbar Support Description and Operation**
 - **Memory Seats Description and Operation**
 - **Power Seats System 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:

- **Lumbar Support Malfunction**
- **Memory Seat Feature Malfunction**
- **Power Seat Malfunction (Without Memory A45), Power Seat Malfunction (With Memory A45)**

LUMBAR SUPPORT MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Seat Lumbar Support Switch B+	1	1	-	-
Seat Horizontal Lumbar Rearward Signal Terminal 2	1	2, 3	5	-
Seat Horizontal Lumbar Forward Signal Terminal 4	1	3	4	-
Seat Vertical Lumbar Down Signal Terminal 3	1	2, 3	5	-
Seat Vertical Lumbar Up Signal Terminal 1	1	2	4	-
Seat Lumbar Support Switch Ground	-	1	-	-
Seat Lumbar Support Pump Control	1	1	4	-
Seat Lumbar Support Pump Ground	-	1	-	-
Seat Lumbar Support Valve Assembly Ground	-	1	-	-
1. The seat lumbar support is inoperative 2. The upper lumbar support is inoperative 3. The lower lumbar support is inoperative 4. The lumbar support pump is always ON 5. The lumbar support will not inflate				

Circuit/System Description

Battery voltage is supplied at all times to the driver and passenger seat lumbar support switches through a 15 A fuse located in the underhood fuse block. When a lumbar switch is pressed to inflate the lumbar support, battery voltage is applied through the switch contacts and the inflate control circuit to the seat lumbar support valve assembly. In response to this signal, the lumbar support valve assembly energizes its internal inflate solenoid and applies battery voltage through the seat lumbar support pump control circuit to the pump. The pump runs to inflate the appropriate lumbar bladder until the switch is released. When the switch is pressed to deflate the lumbar support, battery voltage is applied through the switch contacts and the deflate signal circuit to the

lumbar support valve assembly. The lumbar support valve assembly energizes its internal deflate solenoid and air is released from the bladder until the switch is released.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Lumbar Support Description and Operation

Electrical Information Reference

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

Circuit/System Verification

1. Ignition ON.
2. Verify the lumbar support pump turns ON when the lumbar support switch is pressed in the FORWARD direction. The upper and lower lumbar support bladders should inflate until the bladders are 100% inflated or the switch is released.
 - **If the bladders do not inflate**

Refer to Circuit/System Testing below
 - **If the bladders inflate**
3. Verify the upper and lower lumbar support bladders deflate when the lumbar REARWARD switch is pressed. The bladders should deflate until the bladders are 100% deflated or the switch is released.
 - **If the bladders do not deflate**

Refer to Circuit/System Testing below
 - **If the bladders deflate**
4. Verify the lumbar support pump turns ON and the upper lumbar support bladder starts to inflate when the lumbar switch is pressed in the UP direction. If the lower bladder is inflated it will deflate while the upper

bladder inflates until the upper bladder is 100% inflated or switch is released.

- **If the pump does not turn ON or the upper bladder does not inflate**

Refer to Circuit/System Testing below

- **If the pump turns ON and the upper bladder inflates**

5. Verify the upper lumbar bladder starts to deflate while the lower lumbar bladder starts to inflate while the lumbar switch is pressed in the DOWN direction. The upper bladder should deflate until it is 100% deflated and the lower bladder should inflate until it is 100% inflated or the switch is released.

- **If the upper bladder does not deflate or the lower bladder does not inflate**

Refer to Circuit/System Testing below

- **If the upper bladder deflates and the lower bladder inflates**

6. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the appropriate S65 seat lumbar support switch, ignition ON.
2. Verify a test lamp illuminates between the B+ circuit terminal G and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for greater than 10 ohms between each signal circuit listed below and ground:
 - Lumbar signal circuit terminal A
 - Lumbar signal circuit terminal B
 - Lumbar signal circuit terminal C
 - Lumbar signal circuit terminal F
 - If 10 ohms or less, disconnect the harness connector at the Q51 seat lumbar support valve assembly and retest to verify if the short is in the circuit or the component.
 - If greater than 10 ohms, test or replace the S65 seat lumbar support switch.
- **If the test lamp illuminates**
3. Ignition OFF, connect the harness connector at the S65 seat lumbar support switch and disconnect the

harness connector at the Q51 seat lumbar support valve assembly.

4. Test for less than 10 ohms between the ground circuit terminal 5 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 10 ohms**
5. Ignition ON.
6. Verify a test lamp turns ON and OFF between each signal circuit listed below and ground when pressing and releasing the S65 seat lumbar support switch in the appropriate direction.
 - Lumbar up switch signal terminal 1
 - Lumbar rearward switch signal terminal 2
 - Lumbar down switch signal terminal 3
 - Lumbar forward switch signal terminal 4
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the harness connector at the S65 seat lumbar support switch.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than Infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the S65 seat lumbar support switch.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the harness connector at the S65 seat lumbar support switch, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the S65 seat lumbar support switch.
 - **If the test lamp turns ON and OFF**
7. Ignition OFF, connect the harness connector at the Q51 seat lumbar support valve assembly and disconnect the harness connector at the A14 seat lumbar support pump.
8. Test for less than 10 ohms between the ground circuit terminal 3 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance the ground connection.
 - **If less than 10 ohms**

9. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
10. Verify the test lamp turns ON and OFF when commanding the A14 seat lumbar support pump ON and OFF by pressing and releasing the lumbar support switch in either the UP or FORWARD direction.
 - **If the test lamp is always OFF**
 1. Ignition OFF, disconnect the harness connector at the Q51 seat lumbar support valve assembly.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the Q51 seat lumbar support valve assembly.
 - **If the test lamp is always ON**
 1. Ignition OFF, disconnect the harness connector at the Q51 seat lumbar support valve assembly, ignition ON.
 2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the Q51 seat lumbar support valve assembly,
 - **If the test lamp turns ON and OFF**
11. Test or replace the A14 seat lumbar support pump.

Component Testing

Lumbar Support Switch

1. Ignition OFF, disconnect the harness connector at the appropriate S65 seat lumbar support switch.
2. Test for infinite resistance between the B+ terminal G and each signal terminal with the switch in the open position.
 - **If less than infinite resistance**

Replace the S65 seat lumbar support switch.
 - **If infinite resistance**
3. Test for less than 2 ohms between the B+ terminal G and each signal terminal with the appropriate switch in the closed position.
 - **If 2 ohms or greater**

Replace the S65 seat lumbar support switch.
 - **If less than 2 ohms**
4. All OK.

Repair Instructions

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

- **Driver or Passenger Seat Lumbar Control Switch Replacement**
- **Driver or Passenger Seat Cushion Air Pump Replacement**
- **Seat Lumbar Sub System Replacement**

MEMORY SEAT FEATURE MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Memory Set Switch Signal Terminal 5	1	1	-	-
Memory Switch Signal Terminal 1	1	1	1	-
Driver Seat Memory Switch Low Reference	-	1	-	-
1. Memory seat feature is inoperative				

Circuit/System Description

Low reference is supplied to the driver seat memory switch from the seat memory control module. When a memory switch is pressed, the signal circuit from the seat memory control module is pulled low through the switch contacts and series of resistors indicating the memory recall request. In response to this signal, the seat memory control module commands the appropriate seat motors to move to the pre-recorded seat positions stored in memory.

Diagnostic Aids

The seat memory control module must be awake when measuring voltage from either one of the memory seat switch signal circuits. Voltage readings of 0.0 V or 5 V are possible if the module is not fully awake and result in misdiagnosing the circuit.

Reference Information

Schematic Reference

Driver Seat Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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.
2. Verify that all manual driver power seat functions operate when being controlled by the S64D Seat Adjuster Switch - Driver.
 - **If any seat function does not operate**

Refer to **Power Seat Malfunction (Without Memory A45)**, **Power Seat Malfunction (With Memory A45)**.

- **If all seat functions operate**
3. Verify that the memory recall personalization option is ON. Refer to the owners manual.
 - **If the memory recall personalization option is not ON**

Turn ON the option, refer to the Owners Manual.

- **If the memory recall personalization option is ON**
4. Refer to Circuit/System Testing below.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S47D Seat Memory Switch - Driver.
2. Test for less than 10 ohms between the low reference circuit terminal 1 and ground.
 - **If 10 ohms or greater**
 1. Ignition OFF, disconnect the X3 harness connector at the K40 Seat Memory Control Module.

2. Test for less than 2 ohms in the low reference circuit end to end
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K40 Seat Memory Control Module.
 - **If less than 10 ohms**
3. Ignition ON, press a power seat switch in order to wake up the K40 Seat Memory Control Module.
4. Test for 9 V or greater between each signal circuit terminal listed below and ground:
 - Memory set switch signal terminal 5
 - Memory switch signal terminal 6
 - **If less than 9 V**
 1. Ignition OFF, disconnect the X2 harness connector at the K40 Seat Memory Control Module.
 2. Test for infinite resistance between the signal circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K40 Seat Memory Control Module.
 - **If 9 V or greater**
5. Ignition OFF, disconnect the X2 harness connector at the K40 Seat Memory Control Module, ignition ON.
6. Test for less than 1 V between each signal circuit terminal listed below and ground:
 - Memory set switch signal terminal 5
 - Memory switch signal terminal 6
 - **If 1 V or greater**

Repair the short to voltage on the circuit.

- **If less than 1 V**
7. Test or replace the S47D Seat Memory Switch - Driver.

Component Testing

Driver Seat Memory Switch

1. Ignition OFF, disconnect the harness connector at the S47D Seat Memory Switch - Driver.
2. Test for infinite resistance between each signal terminal listed below and the low reference terminal 1 with the switch in the open position.
 - Terminal 5
 - Terminal 6
 - **If less than infinite resistance**

Replace the S47D Seat Memory Switch - Driver.

- **If infinite resistance**

3. Test for less than 2 ohms between the signal terminal 5 and the low reference terminal 1 while pressing the memory MEM button.

- **If 2 ohms or greater**

Replace the S47D Seat Memory Switch - Driver.

- **If less than 2 ohms**

4. Test for 570-698 ohms between the signal terminal 6 and the low reference terminal 1 while pressing the memory 1 button.

- **If not between 570-698 ohms**

Replace the S47D Seat Memory Switch - Driver.

- **If between 570-698 ohms**

5. Test for 1800-2209 ohms between the signal terminal 6 and the low reference terminal 1 while pressing the memory 2 button.

- **If not between 1800-2209 ohms**

Replace the S47D Seat Memory Switch - Driver.

- **If between 1800-2209 ohms**

6. All OK.

Repair Instructions

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

- **Driver Seat Adjuster Memory Switch Replacement**
- **Control Module References** for seat memory control module replacement, programming and setup

POWER SEAT MALFUNCTION (WITHOUT MEMORY A45)

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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B+	1	1	-	-
Front Vertical Motor Down Control	1	1	-	-
Front Vertical Motor Up Control	1	1	-	-
Horizontal Motor Forward Control	1	1	-	-
Horizontal Motor Rearward Control	1	1	-	-
Rear Vertical Motor Down Control	1	1	-	-
Rear Vertical Motor Up Control	1	1	-	-
Recline Motor Forward Control	1	1	-	-
Recline Motor Rearward Control	1	1	-	-
Ground	-	1	-	-
1. Power seat inoperative				

Circuit/System Description

The driver seat without memory and the passenger seat are completely controlled through their respective seat adjuster switches. Battery voltage is supplied at all times to the seat adjuster switch through a circuit breaker located in the instrument panel fuse block. When the seat switches are in an inactive state, the switch contacts are closed to the switch ground circuit.

All seat motors are reversible. For example, when the seat horizontal forward switch is pressed to move the entire seat forward, battery voltage is applied through the switch contacts and the seat horizontal motor forward control circuit to the motor. With the horizontal motor rearward switch contacts closed to the switch ground circuit, the motor runs in order to drive the entire seat forward until the switch is released. Moving the entire seat rearward works similarly to moving the entire seat forward, except that battery voltage and ground are applied on opposite circuits causing the motor to run in the opposite direction. All seat motors are powered this way.

Reference Information

Schematic Reference

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

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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

Circuit/System Verification

1. Verify the M57D Seat Vertical Motor - Driver operates when pressing the seat switch in both directions.
 - **If the seat vertical motor does not operate**

Refer to Circuit/System Testing below : 2-Way Power Seat Circuit Test.

- **If the seat vertical motor operates**

2. Verify the passenger seat directional motors listed below operate while operating the seat switches in both directions.

- M51 Seat Horizontal Motor
- M50 Seat Front Vertical Motor
- M55 Seat Rear Vertical Motor
- M56 Seat Recline Motor

- **If all seat motors do not operate**

Refer to the Circuit/System Testing below: 8-Way Seat Adjuster Switch Circuit Test.

- **If 1 or more seat motors operate**

Refer to the Circuit/System Testing below: 8-Way Power Seat Motor Circuit Test.

- **If all seat motors operate**

3. All OK.

Circuit/System Testing

2-Way Power Seat Circuit Test

1. Ignition OFF, disconnect the harness connector at the S64D Seat Adjuster Switch - Driver.
2. Test for less than 5 ohms between each ground circuit terminal listed below and ground:
 - Terminal A
 - Terminal C

- **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
- **If less than 5 ohms**
- 3. Ignition ON.
- 4. Verify a test lamp illuminates between the B+ circuit terminal D and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the circuit breaker is not open and there is voltage at the circuit breaker.
 - **If the test lamp illuminates**
- 5. Ignition OFF, connect the harness connector at the S64D Seat Adjuster Switch - Driver and disconnect the harness connector at the M57D Seat Vertical Motor - Driver.
- 6. Connect a test lamp between control circuit terminal 1 and control circuit terminal 5, ignition ON.
- 7. Verify the test lamp turns ON when commanding the M57D Seat Vertical Motor - Driver Up and Down using the seat adjuster switch.
 - **If the test lamp does not turn ON during either of the commands**
 1. Ignition OFF, disconnect the harness connector at the M57D Seat Vertical Motor - Driver.
 2. Test for less than 2 ohms in each control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, test or replace the M57D Seat Vertical Motor - Driver.
 - **If the test lamp turns ON during each of the commands**
- 8. Test or replace the M57D Seat Vertical Motor - Driver.

8-Way Seat Adjuster Switch Circuit Test

1. Ignition OFF, disconnect the harness connector at the appropriate S64 Seat Adjuster Switch.
2. Test for less than 5 ohms between the ground circuit terminal B and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Ignition ON.

4. Verify a test lamp illuminates between the B+ circuit terminal E and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF
 2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the circuit breaker is not open and there is voltage at the circuit breaker.
 - **If the test lamp illuminates**
5. Test or replace the S64 Seat Adjuster Switch.

8-Way Power Seat Motor Circuit Test

1. Ignition OFF, disconnect the harness connector at the appropriate seat motor listed below:
 - M51 Seat Horizontal Motor
 - M50 Seat Front Vertical Motor
 - M55 Seat Rear Vertical Motor
 - M56 Seat Recline Motor
2. Connect a test lamp between control circuit terminal 1 and control circuit terminal 5, ignition ON.
3. Verify the test lamp turns ON when commanding the seat motor Up and Down or Forward and Rearward using the S64 Seat Adjuster Switch.
 - **If the test lamp does not turn ON during either of the commands**
 1. Ignition OFF, disconnect the harness connector at the S64 Seat Adjuster Switch.
 2. Test for less than 2 ohms in each control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, test or replace the S64 Seat Adjuster Switch.
 - **If the test lamp turns ON during each of the commands**
4. Test or replace the seat motor.

Component Testing

Seat Adjuster Switch Test

1. Ignition OFF, disconnect the harness connector at the appropriate S64 Seat Adjuster Switch.
2. Test for infinite resistance between the B+ terminal and each control terminal with the switch in the open position.
 - **If less than infinite resistance**

Replace the S64 Seat Adjuster Switch.
 - **If infinite resistance**
3. Test for less than 2 ohms between the B+ terminal and each control terminal with the appropriate switch

in the closed position.

- **If 2 ohms or greater**

Replace the S64 Seat Adjuster Switch.

- **If less than 2 ohms**

4. Test for less than 2 ohms between the ground terminal and each control terminal with the switch in the open position.

- **If 2 ohms or greater**

Replace the S64 Seat Adjuster Switch.

- **If less than 2 ohms**

5. All OK.

Seat Motor

1. Ignition OFF, disconnect the harness connector at the appropriate seat motor listed below:

- M51 Seat Horizontal Motor
- M50 Seat Front Vertical Motor
- M55 Seat Rear Vertical Motor
- M56 Seat Recline Motor

NOTE: When performing the following tests, make sure that the seat is not already in the position the test is attempting to produce.

2. Install a 30 A fused jumper wire between control terminal 1 and B+.
3. Momentarily install a jumper wire between control terminal 5 and ground. The seat motor should momentarily perform the appropriate FORWARD/ REARWARD/ UP/ DOWN function.

- **If the motor does not perform the FORWARD/ REARWARD/ UP/ DOWN function**

Replace the motor.

- **If the motor performs the FORWARD/ REARWARD/ UP/ DOWN function**

4. Reverse the jumper wires; the motor should perform FORWARD/ REARWARD/ UP/ DOWN function.

- **If the motor does not perform the FORWARD/ REARWARD/ UP/ DOWN function**

Replace the motor.

- **If the motor performs the FORWARD/ REARWARD/ UP/ DOWN function**

5. All OK.

Repair Instructions

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

- **Driver Seat Adjuster and Recliner Switch Replacement**
- **Passenger Seat Adjuster Switch Replacement**
- **Front Seat Tilt Adjuster Actuator Replacement**
- **Front Seat Adjuster Actuator Replacement**
- **Driver Seat Outer Adjuster Rear Vertical Actuator Replacement**
- **Driver or Passenger Seat Recliner Actuator Replacement**

POWER SEAT MALFUNCTION (WITH MEMORY A45)

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Seat Memory Control Module B+ Terminal 1 X4	2	2	-	-
Seat Memory Control Module B+ Terminal 5 X4	B242A 02, B2425 0D, B2430 0D, 1, 3	B242A 02, B2425 0D, B2430 0D, 1, 3	-	-
Front Vertical Up Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Front Vertical Down Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
	B1735 02, B1740 02,			

Rear Vertical Up Switch Signal	B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Rear Vertical Down Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Horizontal Forward Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Horizontal Rearward Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Recline Forward Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Recline Rearward Switch Signal	B1735 02, B1740 02, B1745 02, B1750 02, B1755 02, B1760 02, B1815 02, B1820 02	1	-	-
Driver Seat Front Vertical				

Motor Down Control	B3920 02	1	B3920 01	B3920 00
Driver Seat Front Vertical Motor Up Control	B3920 02	1	B3920 01	B3920 00
Driver Seat Horizontal Motor Forward Control	B3920 02	1	B3920 01	B3920 00
Driver Seat Horizontal Motor Rearward Control	B3920 02	1	B3920 01	B3920 00
Driver Seat Rear Vertical Motor Down Control	B3920 02	1	B3920 01	B3920 00
Driver Seat Rear Vertical Motor Up Control	B3920 02	1	B3920 01	B3920 00
Driver Seat Recline Motor Forward Control	B3920 02	1	B3920 01	B3920 00
Driver Seat Recline Motor Rearward Control	B3920 02	1	B3920 01	B3920 00
Seat Memory Control Module Ground Terminal 3 X4	-	1, 2	-	-
Seat Memory Control Module Ground Terminal 6 X4	-	1, 2	-	-
1. Power seat and memory functions inoperative 2. Scan Tool Does Not Communicate with Low Speed GMLAN Device 3. Heated seats are inoperative				

Circuit/System Description

Battery voltage is supplied at all times to the seat memory control module through a fuse located in the underhood fuse block. This voltage is used by the module for logic power. Battery positive voltage is also supplied at all times to the seat memory control module through a circuit breaker located in the instrument panel fuse block. This voltage is connected to a power rail internal to the seat memory control module and is used to drive the power seat motors and the seat heater elements on vehicles equipped with heated seats. Each seat motor is controlled by the seat memory control module through 2 motor control circuits. The seat memory control module connects all motor control circuits on the power rail to a common reference point whenever they are not in operation. This reference point is biased to approximately 2.5 V. The seat memory control module checks to see if the reference voltage is shorted to ground or battery before enabling any of the seat motors.

All motors are reversible. For example, when the seat switch is operated to move the entire seat forward, the switch signal circuit from the seat memory control module is pulled low indicating the entire seat forward command. In response to this signal, the seat memory control module applies battery voltage through the driver seat horizontal motor forward control circuit and ground through the driver seat horizontal motor rearward control circuit to the motor. The motor runs to drive the entire seat forward until the switch is released. Moving the entire seat rearward works similarly to moving the entire seat forward, except that battery positive voltage and ground are applied on the opposite circuits causing the motor to run in the opposite direction.

Reference Information

Schematic Reference

Driver Seat Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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.
2. Verify the scan tool seat switch parameters listed below change between Inactive and Forward/Rearward or Up/Down when pressing the appropriate switch.
 - Driver Seat Horizontal Switch
 - Driver Seat Cushion Front Vertical Switch
 - Driver Seat Cushion Rear Vertical Switch
 - Driver Seat Back Switch
 - **If the parameter does not change**

Refer to Circuit/System Testing below- Driver Seat Adjuster Switch Circuit Test.
 - **If the parameter changes**
3. Verify the seat directional motors listed below operate while operating the appropriate driver seat switches in both directions.
 - M51D Horizontal Motor
 - M50D Front Vertical Motor
 - M55D Rear Vertical Motor
 - M56D Recline Motor

- **If any seat motor does not operate**

Refer to Circuit/System Testing below- Seat Motor Control Circuit Test.

- **If all seat motors operate**

4. All OK.

Circuit/System Testing

Driver Seat Adjuster Switch Circuit Test

1. Ignition OFF, disconnect the harness connector at the S64D Seat Adjuster Switch - Driver.
2. Test for less than 5 ohms between the ground circuit terminal E and ground.
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Verify that all scan tool driver seat switch parameters listed below are Inactive:
 - Driver Seat Cushion Front Vertical Switch
 - Driver Seat Cushion Rear Vertical Switch
 - Driver Seat Horizontal Switch
 - Driver Seat Back Switch
 - **If not Inactive**
 1. Ignition OFF, disconnect the appropriate X1 or X2 harness connector at the K40 Seat Memory Control Module.
 2. Test for infinite resistance between the appropriate signal circuit terminal listed below and ground:
 - Front vertical upward switch terminal A
 - Front vertical downward switch terminal K
 - Rear vertical upward switch terminal F
 - Rear vertical downward switch terminal J
 - Horizontal forward switch terminal D
 - Horizontal rearward switch terminal C
 - Recline forward switch terminal H
 - Recline rearward switch terminal G
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K40 Seat Memory Control Module.
 - **If Inactive**
4. Install a 3 A fused jumper wire between the appropriate signal circuit terminal listed below and the

ground circuit terminal E.

- Front vertical upward switch terminal A
- Front vertical downward switch terminal K
- Rear vertical upward switch terminal F
- Rear vertical downward switch terminal J
- Horizontal forward switch terminal D
- Horizontal rearward switch terminal C
- Recline forward switch terminal H
- Recline rearward switch terminal G

5. Verify the scan tool seat switch parameter is Forward/Rearward or UP/Down.

○ **If not Forward/Rearward or UP/Down**

1. Ignition OFF, disconnect the appropriate X1 or X2 harness connector at the K40 Seat Memory Control Module, ignition ON.
2. Test for less than 1 V between the signal circuit terminal and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Ignition OFF.
4. Test for less than 2 ohms in the signal circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K40 Seat Memory Control Module.

○ **If Forward/Rearward or UP/Down**

6. Test or replace the S64D Seat Adjuster Switch - Driver.

Seat Motor Control Circuit Test

1. Ignition OFF, disconnect the X4 harness connector at the K40 Seat Memory Control Module.
2. Test for less than 5 ohms between each ground circuit terminal listed below and ground:
 - Terminal 3
 - Terminal 6
 - **If 5 ohms or greater**
 1. Ignition OFF.
 2. Test for less than 2 ohms in the ground circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, repair the open/high resistance in the ground connection.
 - **If less than 5 ohms**
3. Ignition ON.
4. Verify that a test lamp illuminates between the B+ circuit terminal 5 and ground.
 - **If the test lamp does not illuminate.**
 1. Ignition OFF.

2. Test for less than 2 ohms in the B+ circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, verify the circuit breaker is OK and there is voltage at the circuit breaker.
 - **If the test lamp illuminates.**
5. Ignition OFF, connect the X4 harness connector at the K40 Seat Memory Control Module and disconnect the harness connector at the appropriate seat motor listed below:
 - M50D Seat Front Vertical Motor - Driver
 - M55D Seat Rear Vertical Motor - Driver
 - M51D Seat Horizontal Motor - Driver
 - M56D Seat Recline Motor - Driver
6. Connect a test lamp between control circuit terminal 1 and control circuit terminal 5, ignition ON.

NOTE: **Once a seat motor is commanded On using the scan tool, the seat function may not work using the seat adjuster switch until you back out of the scan tool Control Functions menu.**

7. Verify the test lamp illuminates when commanding the seat motor in the Up/Down or Forward/Rearward states with a scan tool.
 - **If the test lamp does not illuminate during either of the commands**
 1. Ignition OFF, disconnect the X4 harness connector at the K40 Seat Memory Control Module.
 2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 ohms in each control circuit end to end.
 - If 2 ohms or greater, repair the open/high resistance in the circuit.
 - If less than 2 ohms, replace the K40 Seat Memory Control Module.
 - **If the test lamp illuminates during each of the commands**
8. Test or replace the seat motor.

Component Testing

Seat Adjuster Switch Test

1. Ignition OFF, disconnect the harness connector at the S64D Seat Adjuster Switch - Driver.
2. Test for infinite resistance between the ground terminal E and each signal terminal with the switch in the open position.
 - **If less than infinite resistance**

Replace the S64D Seat Adjuster Switch - Driver.

- **If infinite resistance**

3. Test for less than 2 ohms between the ground terminal E and each signal terminal with the appropriate switch in the closed position.

- **If 2 ohms or greater**

Replace the S64D Seat Adjuster Switch - Driver.

- **If less than 2 ohms**

4. All OK.

Seat Motor

1. Ignition OFF, disconnect the harness connector at the appropriate seat motor listed below:

- M50D Seat Front Vertical Motor - Driver
- M55D Seat Rear Vertical Motor - Driver
- M51D Seat Horizontal Motor - Driver
- M56D Seat Recline Motor - Driver

NOTE: When performing the following tests, make sure that the seat is not already in the position the test is attempting to produce.

2. Install a 30 A fused jumper wire between control terminal 1 and 12 V.
3. Momentarily install a jumper wire between control terminal 5 and ground. The seat motor should momentarily perform the appropriate FORWARD/ REARWARD/ UP/ DOWN function.

- **If the motor does not perform the FORWARD/ REARWARD/ UP/ DOWN function**

Replace the motor.

- **If the motor performs the FORWARD/ REARWARD/ UP/ DOWN function**

4. Reverse the jumper wires; the motor should perform FORWARD/ REARWARD/ UP/ DOWN function.

- **If the motor does not perform the FORWARD/ REARWARD/ UP/ DOWN function**

Replace the motor.

- **If the motor performs the FORWARD/ REARWARD/ UP/ DOWN function**

5. All OK.

Repair Instructions

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

- **Driver Seat Adjuster and Recliner Switch Replacement**
- **Front Seat Tilt Adjuster Actuator Replacement**
- **Front Seat Adjuster Actuator Replacement**

- [Driver Seat Outer Adjuster Rear Vertical Actuator Replacement](#)
- [Driver or Passenger Seat Recliner Actuator Replacement](#)
- [Control Module References](#) for K40 Seat Memory Control Module replacement, programming and setup

REPAIR INSTRUCTIONS

DRIVER OR PASSENGER SEAT ADJUSTER SWITCH KNOB REPLACEMENT

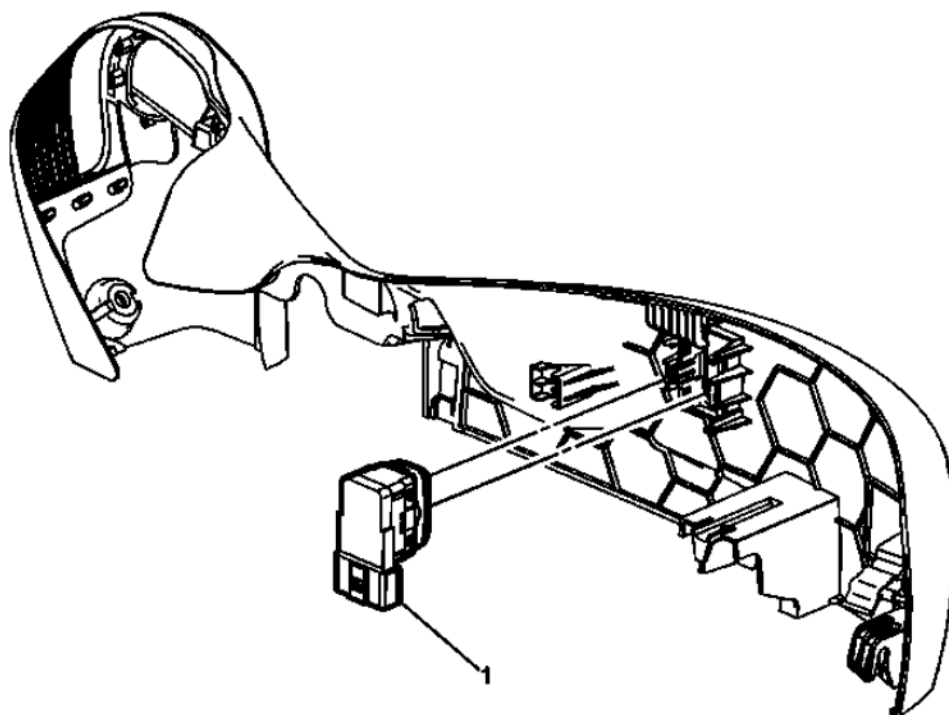


Fig. 9: Driver or Passenger Seat Adjuster Switch Knob
Courtesy of GENERAL MOTORS COMPANY

Driver or Passenger Seat Adjuster Switch Knob Replacement

Callout	Component Name
Preliminary Procedure Remove the driver or passenger seat outer recliner finish cover. Refer to <u>Driver or Passenger Seat Outer Recliner Finish Cover Replacement (Power)</u> , <u>Driver or Passenger Seat Outer Recliner Finish Cover Replacement (Manual)</u> .	
1	Driver or Passenger seat Adjuster Switch knob NOTE: Use a flat-bladed tool to release the switch from the finish cover.

DRIVER SEAT ADJUSTER AND RECLINER SWITCH REPLACEMENT

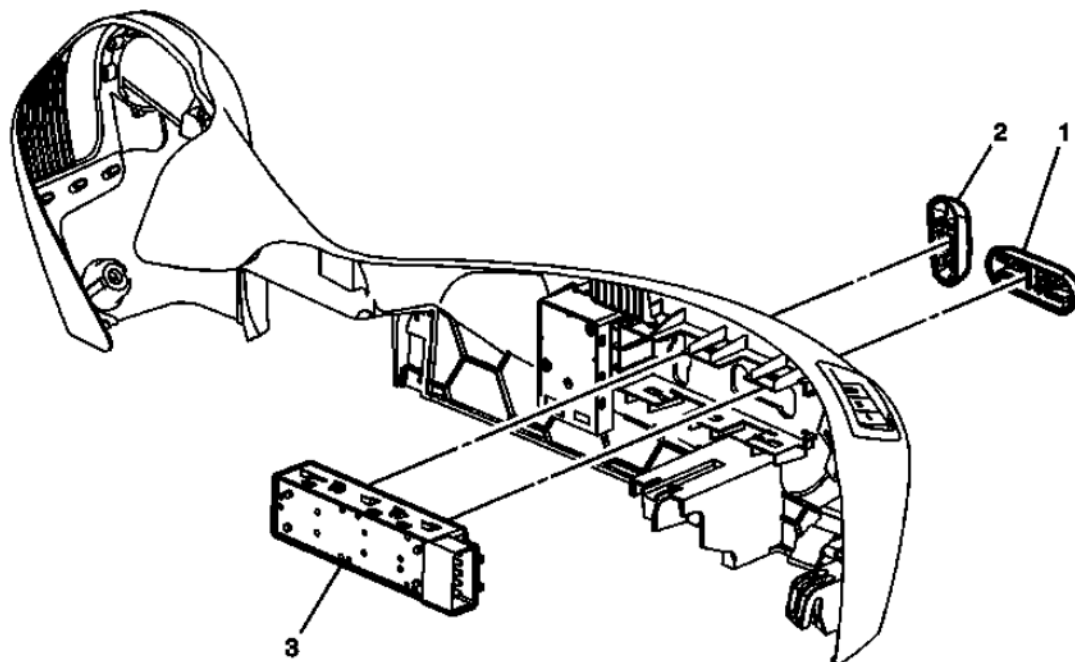


Fig. 10: Driver Seat Adjuster and Recliner Switch
 Courtesy of GENERAL MOTORS COMPANY

Driver Seat Adjuster and Recliner Switch Replacement

Callout	Component Name
Preliminary Procedure Remove the driver or passenger seat outer recliner finish cover. Refer to <u>Driver or Passenger Seat Outer Recliner Finish Cover Replacement (Power)</u> , <u>Driver or Passenger Seat Outer Recliner Finish Cover Replacement (Manual)</u> .	
1	Front Seat Adjuster Knob
2	Front Seat Recliner Knob
3	Driver Seat Adjuster and Recliner Switch Procedure 1. Use a flat-bladed tool to release the switch from the adjuster finish cover. 2. Disconnect the electrical connector.

PASSENGER SEAT ADJUSTER SWITCH REPLACEMENT

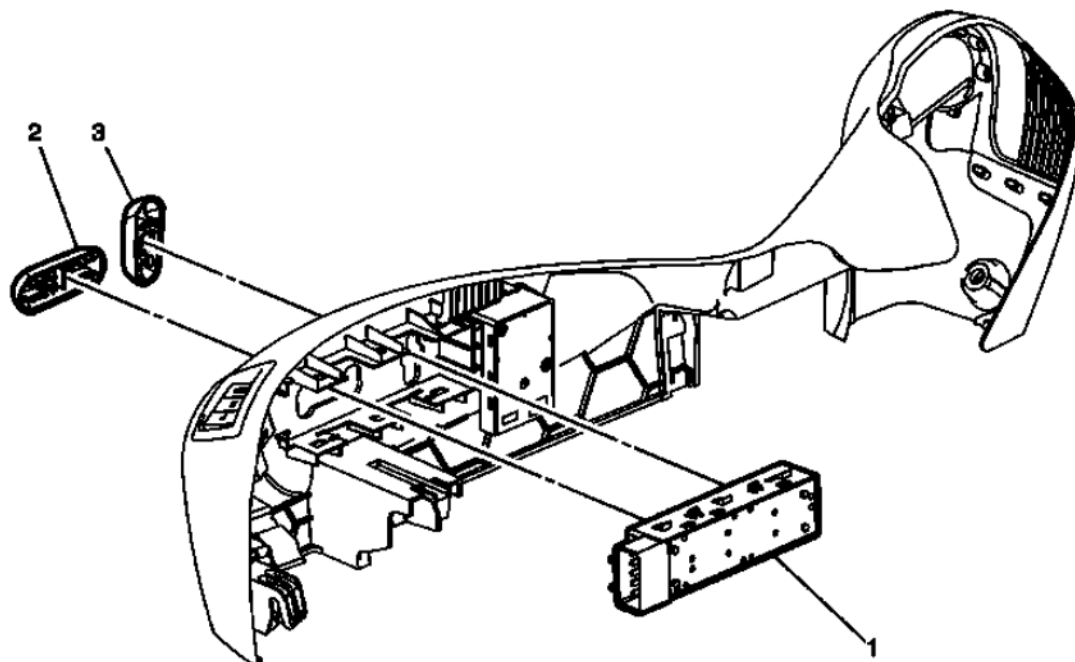


Fig. 11: Passenger Seat Adjuster Switch
 Courtesy of GENERAL MOTORS COMPANY

Passenger Seat Adjuster Switch Replacement

Callout	Component Name
Preliminary Procedure Remove the driver or passenger seat outer recliner finish cover. Refer to <u>Driver or Passenger Seat Outer Recliner Finish Cover Replacement (Power)</u> , <u>Driver or Passenger Seat Outer Recliner Finish Cover Replacement (Manual)</u> .	
1	Passenger Seat Adjuster Switch Procedure Use a flat-bladed tool to release the switch from the adjuster finish cover.
2	Front Seat Adjuster Knob
3	Front Seat Recliner Knob

DRIVER SEAT ADJUSTER MEMORY SWITCH REPLACEMENT

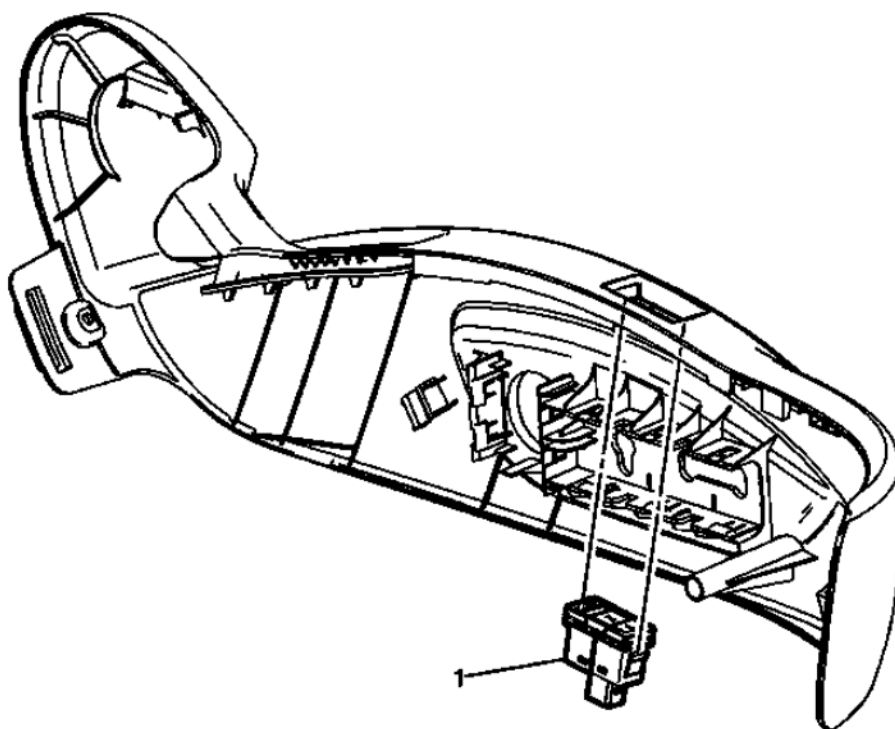


Fig. 12: Driver Seat Adjuster Memory Switch
 Courtesy of GENERAL MOTORS COMPANY

Driver Seat Adjuster Memory Switch Replacement

Callout	Component Name
Preliminary Procedure Remove the driver or passenger seat outer recliner finish cover. Refer to <u>Driver or Passenger Seat Outer Recliner Finish Cover Replacement (Power)</u> , <u>Driver or Passenger Seat Outer Recliner Finish Cover Replacement (Manual)</u> .	
1	Driver Seat Adjuster Memory Switch Procedure Use a flat-bladed tool to release the switch from the outer recliner cover.

DRIVER OR PASSENGER SEAT ADJUSTER MEMORY MODULE REPLACEMENT

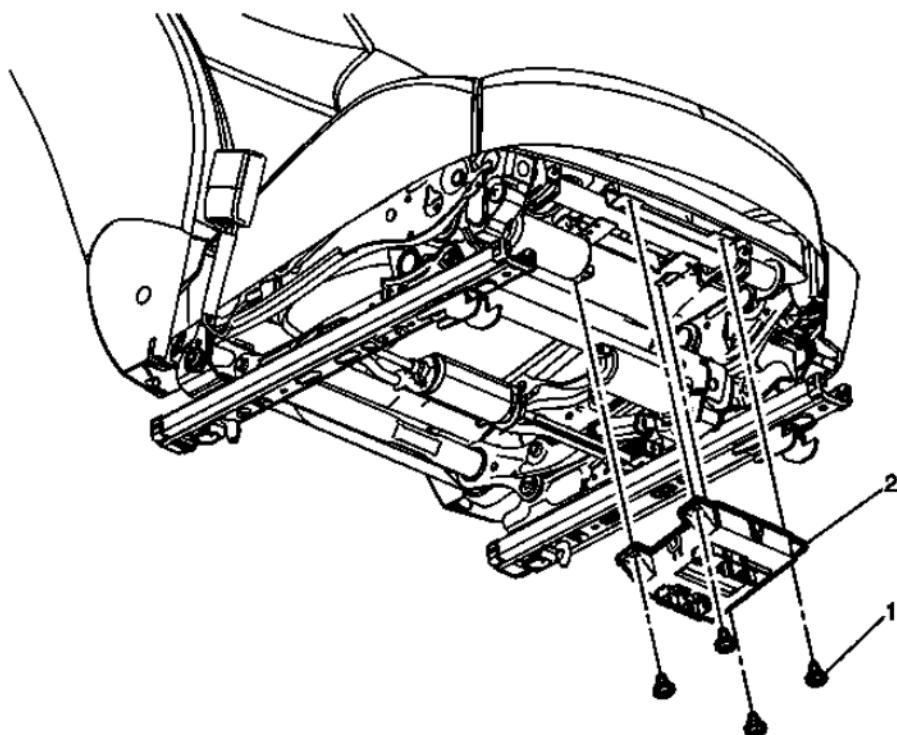


Fig. 13: Driver or Passenger Seat Adjuster Memory Module
 Courtesy of GENERAL MOTORS COMPANY

Driver or Passenger Seat Adjuster Memory Module Replacement

Callout	Component Name
1	Driver or Passenger Seat Adjuster Memory Module Fastener (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> .
2	Driver or Passenger Seat Adjuster Memory Module Procedure 1. Disconnect the electrical connector. 2. Disconnect the module from the bracket, then pull downward away from the bottom of the seat. 3. Refer to <u>Control Module References</u> for programming and setup information.

FRONT SEAT TILT ADJUSTER ACTUATOR REPLACEMENT

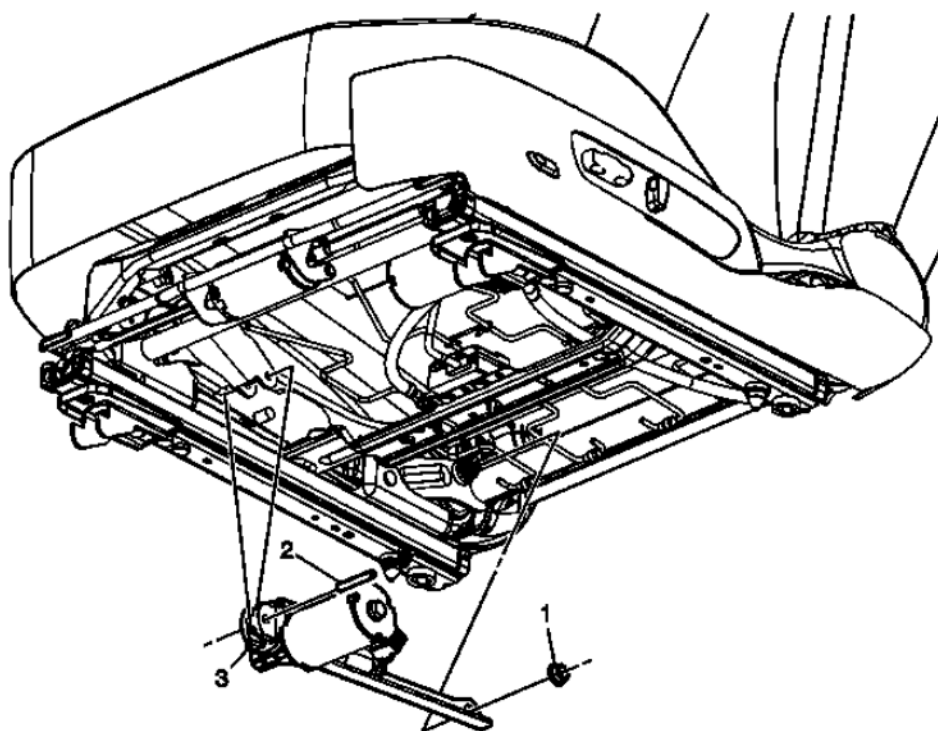


Fig. 14: Front Seat Tilt Adjuster Actuator
 Courtesy of GENERAL MOTORS COMPANY

Front Seat Tilt Adjuster Actuator Replacement

Callout	Component Name
Preliminary Procedure Remove the driver or passenger seat. Refer to Driver or Passenger Seat Removal and Installation .	
1	Front Seat Tilt Actuator Nut CAUTION: Refer to Fastener Caution . Tighten 7 N.m (62 lb in)
2	Roll Pin Procedure Use a set of pliers to pull the pin outboard to release it from the seat frame. NOTE: Replace pin with new, if necessary.
3	Front Seat Tilt Actuator Procedure Disconnect the electrical connector.

FRONT SEAT ADJUSTER ACTUATOR REPLACEMENT

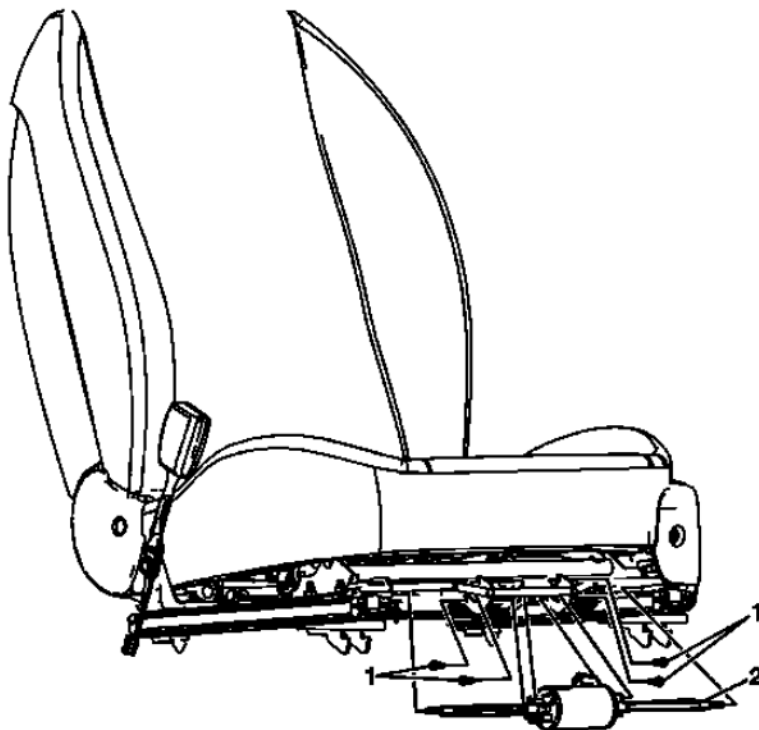


Fig. 15: View Of Front Seat Adjuster Actuator
Courtesy of GENERAL MOTORS COMPANY

Front Seat Adjuster Actuator Replacement

Callout	Component Name
Preliminary Procedure Remove the driver or passenger seat. Refer to <u>Driver or Passenger Seat Removal and Installation</u> .	
1	Front Seat Adjuster Actuator Screw (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 3 N.m (27 lb in)
2	Front Seat Adjuster Actuator Procedure 1. Remove the seat adjuster motor cables by pulling the cables out of the adjuster. 2. Disconnect the electrical connector.

DRIVER SEAT OUTER ADJUSTER REAR VERTICAL ACTUATOR REPLACEMENT

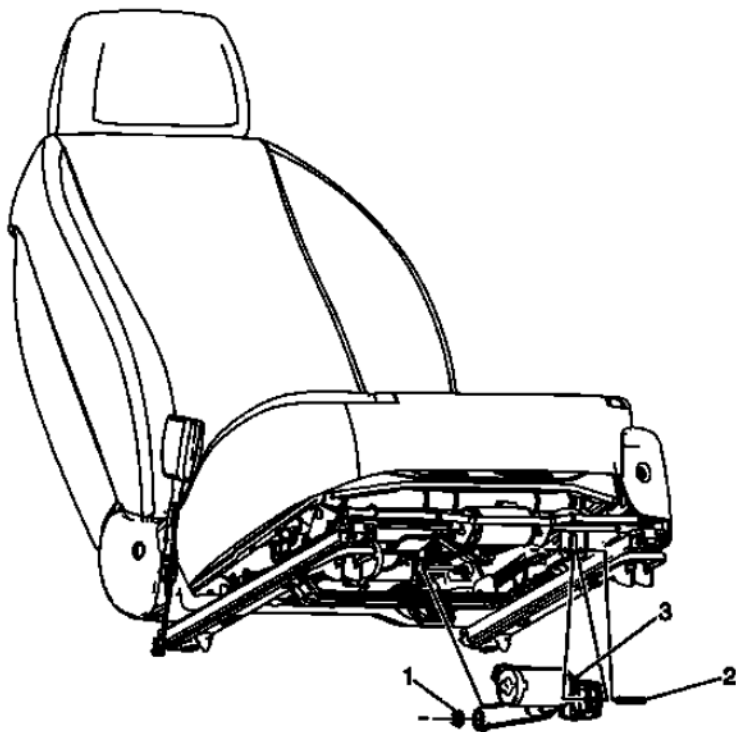


Fig. 16: Identifying Driver Seat Outer Adjuster Rear Vertical Actuator
Courtesy of GENERAL MOTORS COMPANY

Driver Seat Outer Adjuster Rear Vertical Actuator Replacement

Callout	Component Name
Preliminary Procedure Remove the driver or passenger seat. Refer to Driver or Passenger Seat Removal and Installation .	
1	Front Seat Outer Adjuster Rear Vertical Actuator Nut CAUTION: Refer to Fastener Caution . Tighten 7 N.m (62 lb in)
2	Roll Pin TIP: Use a hammer and small round tool to tap the roll pin out.
3	Front Seat Outer Adjuster Rear Vertical Actuator Procedure Disconnect the electrical connector.

DRIVER OR PASSENGER SEAT LUMBAR CONTROL SWITCH REPLACEMENT

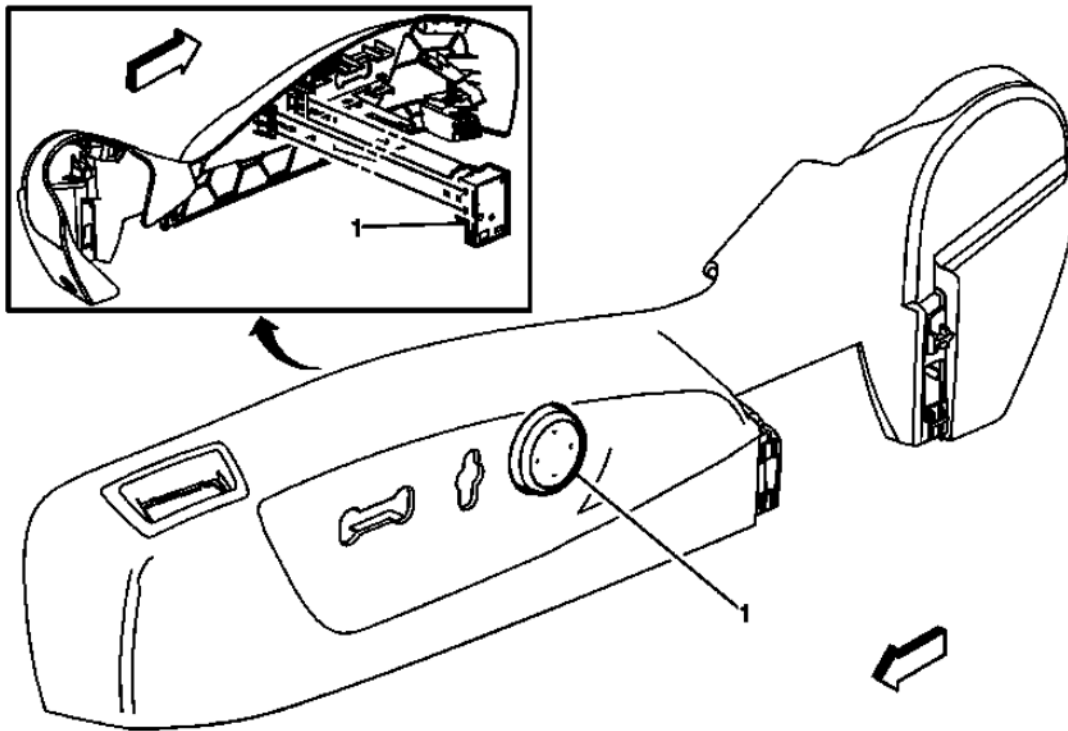


Fig. 17: Driver or Passenger Seat Lumbar Control Switch
 Courtesy of GENERAL MOTORS COMPANY

Driver or Passenger Seat Lumbar Control Switch Replacement

Callout	Component Name
Preliminary Procedure Remove the driver or passenger seat outer recliner finish cover. Refer to. <u>Driver or Passenger Seat Outer Recliner Finish Cover Replacement (Power)</u> , <u>Driver or Passenger Seat Outer Recliner Finish Cover Replacement (Manual)</u>	
1	Driver or Passenger Seat Lumbar Control Switch Procedure Use a flat-bladed tool to release the lumbar control switch from the adjuster finish cover.

DRIVER OR PASSENGER SEAT CUSHION AIR PUMP REPLACEMENT

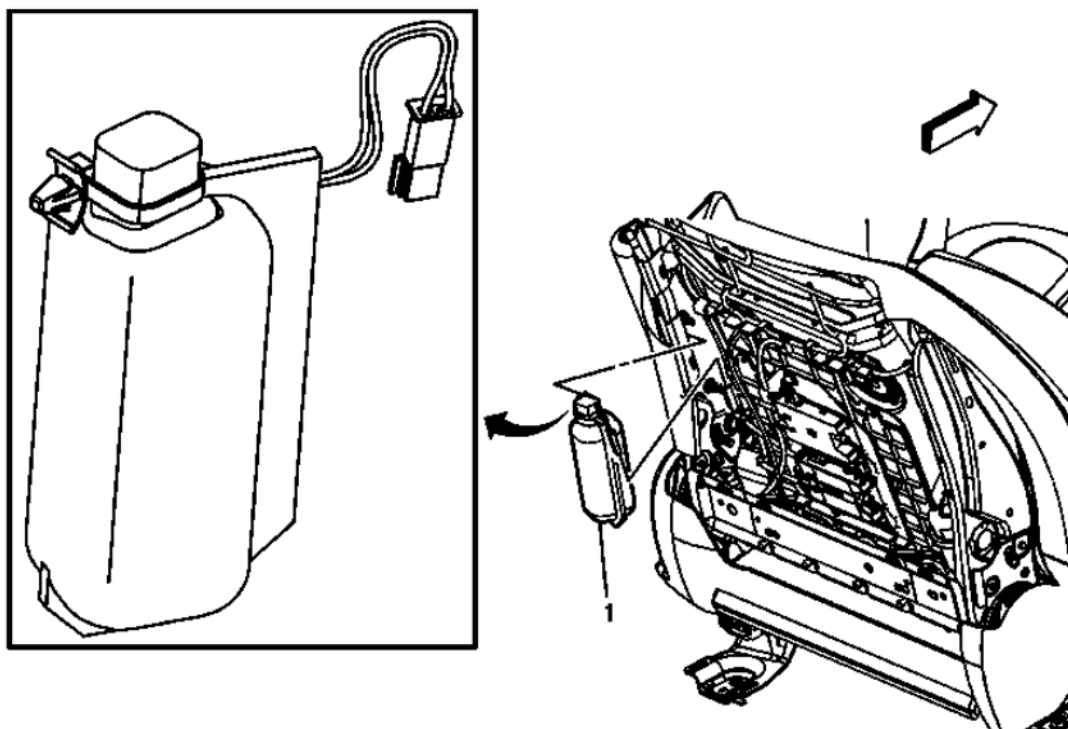


Fig. 18: Identifying Driver Or Passenger Seat Cushion Air Pump (W2E)
 Courtesy of GENERAL MOTORS COMPANY

Driver or Passenger Seat Cushion Air Pump Replacement

Callout	Component Name
Preliminary Procedure Remove the driver or passenger seat back cushion cover 1. Refer to <u>Driver or Passenger Seat Back Cushion Cover Replacement</u> .	
1	Driver or Passenger Seat Cushion Air Pump Procedure 1. Disconnect electrical connectors as needed. 2. Disconnect air pump hose from lumbar support bladder control valve. 3. Remove the seat cushion air pump.

SEAT LUMBAR SUB SYSTEM REPLACEMENT

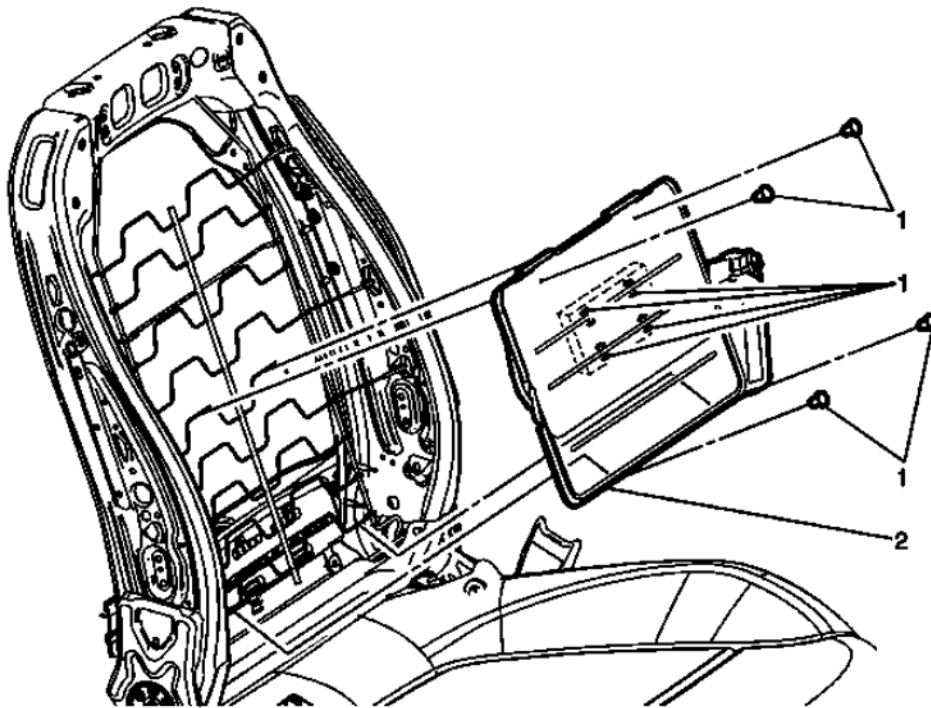


Fig. 19: Seat Lumbar Sub System
 Courtesy of GENERAL MOTORS COMPANY

Seat Lumbar Sub System Replacement

Callout	Component Name
WARNING: Refer to <u>SIR Warning</u> .	
Preliminary Procedure 1. Disable the SIR system. Refer to <u>SIR Disabling and Enabling</u> Rear Seat Back Cushion Replacement 2. Remove the driver or passenger seat. Refer to <u>Driver or Passenger Seat Removal and Installation</u> 3. Remove the front seat back cushion pad. Refer to <u>Front Seat Back Pad Replacement</u>	
1	Driver or Passenger Seat Lumbar Support Retainer (Qty: 4) Procedure 1. Remove the eight retainers. 2. Unfold the two top areas that fold over the seat back cushion wire.
	Driver or Passenger Seat Lumbar Support Assembly

2

Procedure

1. Release the lumbar pump by removing three support retainers.
2. Remove cover from pump by removing one support retainer.
3. Disconnect the electrical connection to the lumbar pump and lumbar distributor.
4. Pull downward to remove the lumbar support assembly from the seat back cushion wire.

DRIVER OR PASSENGER SEAT RECLINER ACTUATOR REPLACEMENT

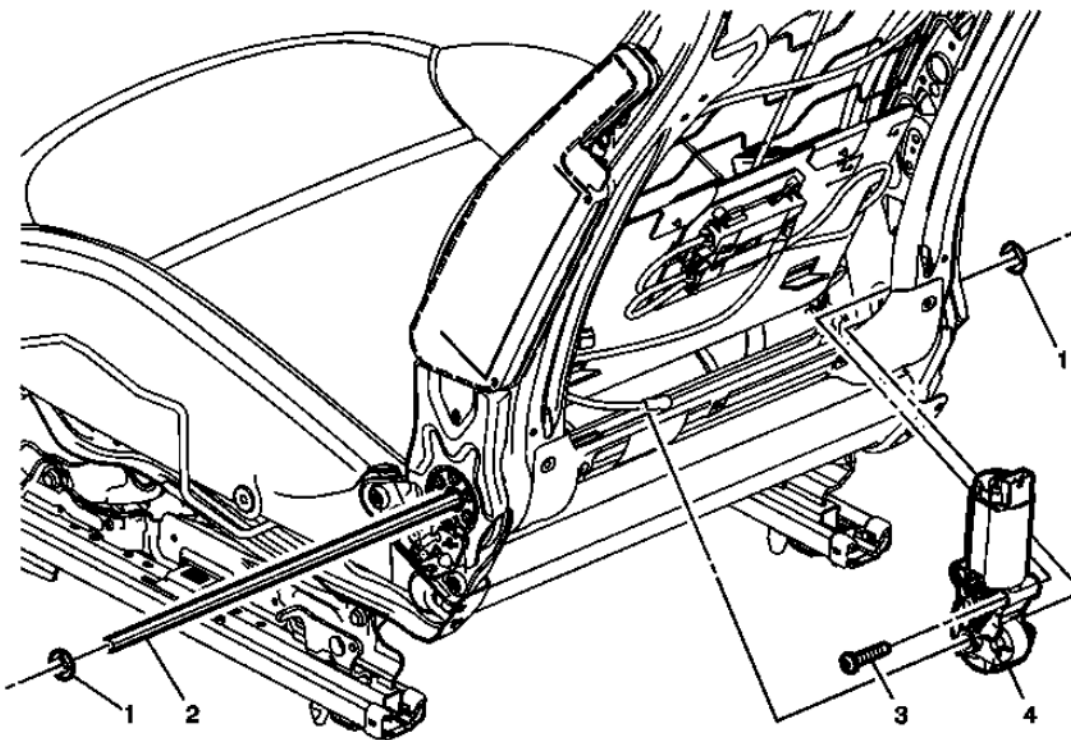


Fig. 20: Driver or Passenger Seat Recliner Actuator
Courtesy of GENERAL MOTORS COMPANY

Driver or Passenger Seat Recliner Actuator Replacement

Callout	Component Name
Preliminary Procedures	
1. Remove the driver or passenger seat. Refer to <u>Driver or Passenger Seat Removal and Installation</u> . 2. Remove the front seat back cushion pad. Refer to <u>Front Seat Back Pad Replacement</u> . 3. Remove the front seat head restraint actuator. Refer to <u>Driver or Passenger Seat Head Restraint Actuator Replacement</u> .	
	Push on Nut

1	NOTE: Cut off to remove and replace with new nut.
2	Driver or Passenger Seat Back Cushion Frame Cross Bar Procedure 1. Clamp the lower seat back frame so that the seat back does not move while replacing the recliner actuator. 2. Using a hammer and brass punch tap the bar out far enough to release from the recliner actuator motor.
3	Driver or Passenger Seat Recliner Actuator Bolt CAUTION: Refer to <u>Fastener Caution</u> Tighten 6 N.m (53 lb in)
4	Driver or Passenger Seat Recliner Actuator Procedure Disconnect the electrical connector.

DESCRIPTION AND OPERATION

LUMBAR SUPPORT DESCRIPTION AND OPERATION

Lumbar Support Components

The driver and front passenger pneumatic lumbar support system consists of the following components:

- Seat Lumbar support switch
- Seat lumbar adjuster valve assembly
- Seat lumbar support pump

Circuit Description

Battery voltage is supplied at all times to the driver and passenger seat lumbar support switches through 15 A fuses located in the underhood fuse block. When a lumbar switch is pressed to inflate the lumbar support, battery voltage is applied through the switch contacts and the inflate control circuit to the seat lumbar adjuster valve assembly. In response to this signal, the lumbar adjuster valve assembly energizes its internal inflate solenoid and applies battery voltage through the seat lumbar support pump control circuit to the pump. The pump runs to inflate the appropriate lumbar bladder until the switch is released. When the switch is pressed to deflate the lumbar support, battery voltage is applied through the switch contacts and the deflate signal circuit to the lumbar adjuster valve assembly. The lumbar adjuster valve assembly energizes its internal deflate solenoid and air is released from the bladder until the switch is released.

Description of Operation

The following describes the lumbar support operation and how the lumbar adjuster valve assembly responds to each of the lumbar support switch inputs:

- When the lumbar support switch pressed in the FORWARD direction, the lumbar adjuster valve assembly will command the lumbar support pump ON and the upper and lower lumbar support bladders should inflate until the bladders are 100% inflated or the switch is released.
- When pressing the lumbar support switch in the REARWARD direction, the lumbar adjuster valve assembly will slowly deflate the upper and lower lumbar support bladders until the switch is released or both bladders are 100% deflated.
- When the lumbar support switch is pressed in the UP direction, the lumbar adjuster valve assembly will slowly inflate the upper lumbar support bladder until the switch is released or the bladder is 100% inflated.
- When the lumbar support switch is pressed in the DOWN direction, the lumbar adjuster valve assembly will slowly deflate the upper lumbar bladder while it inflates the lower lumbar bladder. The lumbar adjuster valve assembly will continue this operation until the switch is released or the upper lumbar bladder is 100% deflated and the lower lumbar bladder is 100% inflated.

MEMORY SEATS DESCRIPTION AND OPERATION

Memory Seat System Components

The memory seat system consists of the following components:

- Seat memory control module
- Driver seat memory switch
- Driver seat switch
- Seat horizontal motor/sensor
- Seat front vertical motor/sensor
- Seat rear vertical motor/sensor
- Seat back recline motor/sensor

Driver Seat Personalization Option

The seat memory control module will not perform remote memory recall and driver seat easy exit functions unless these personalization options are activated in the audio system, refer to Vehicle Personalization in the Owners Manual. The audio system reports the vehicle personalization option settings to the seat memory control module as well as other receiving modules via GMLAN message each time the ignition switch is cycled to the ON position. The seat memory control module will then store the seat personalization option settings and examine them before making a memory seat adjustment. The seat personalization option settings stored within the seat memory control module will not change until the memory recall option setting in the audio system is changed and the ignition switch is cycled to the ON position.

Driver Seat Adjuster Switch

Ground is supplied at all times to the driver seat adjuster switch through the switch ground circuit and G305. The seat memory control module supplies a low current voltage to each signal circuit of the seat adjuster switch. When the seat switches are pressed, the appropriate signal circuit from the seat memory control module is pulled low through the switch contacts indicating the power seat command. The seat memory control module then commands the driver seat to move in response to the switch signals.

Seat Motors

There are 4 motors that move the position of the seat. These are the seat horizontal motor, front vertical motor, rear vertical motor and the seat back recline motor. The horizontal motor moves the entire seat forward and rearward. Both vertical motors run simultaneously when the seat switch is operated in order to move the entire seat up and down. Or they can be selected independently to vertically tilt the front or rear of the seat up and down. The recline motor moves the angle of the seat back forward or rearward.

The seat memory control module controls all seat motors via half bridges that are connected to a single power rail internal to the module. The module connects all motor outputs on the power rail to a common reference point whenever they are not in operation. This reference point is biased to approximately 2.5 V. The seat memory control module checks to see if this reference voltage is shorted to ground or battery before enabling any seat motor. All seat motors operate independently of each other. Each motor contains a electronic circuit breaker (PTC), which will reset only after voltage has been removed from the motor.

All seat motors are reversible. For example, when the seat switch is pressed to move the entire seat forward, ground is applied through the switch contacts and seat horizontal forward switch signal circuit to the seat memory control module. In response to this signal, the seat memory control module applies battery voltage through the driver seat horizontal motor forward control circuit and ground through the driver seat horizontal motor rearward control circuit to the motor. The motor runs in order to drive the entire seat forward. Moving the entire seat rearward works similarly to moving the entire seat forward, except that battery voltage and ground are applied on the opposite circuits causing the motor to run in the opposite direction. All of the seat motors are powered this way.

Seat Position Sensors

The seat motors are equipped with 2 wire hall effect type position sensors internal to the motor. The sensors are monitored by the seat memory control module and are used to determine seat positions when storing or recalling memory settings. The seat memory control module supplies the sensors with a common 12 V reference circuit and separate signal circuits. During seat motor operation, the hall effect position sensor provides a determined number of pulse signals for every revolution of the motor shaft. These pulse signals (Counts) range from 0 - 65, 535. High scan tool count values indicate forward or upward seat positions while low count values indicate rearward or downward seat positions.

Memory Functions

Memory recalls via the memory switch require the driver to press and hold the memory button until the seat reaches it's memory position.

Ground from the seat memory control module is supplied at all times through the low reference circuit to the driver seat memory switch. The module also supplies memory set and memory recall signal circuits to the seat memory switch. When a memory recall switch is pressed, the signal circuit from the seat memory control

module is pulled low through the switch contacts and a series of resistors indicating the memory recall request. In response to this signal, the seat memory control module commands the appropriate seat motors to move to the pre-recorded seat positions stored in memory.

There are two methods to save and recall memory positions for the driver seat and outside rearview mirrors (also adjustable pedals and power tilt/telescoping steering column if equipped). The first method to save and recall memory positions is by using the memory set buttons, the second method is by using the key fob.

Unique memory positions may be saved for up to 5 drivers. Two unique memory positions can be saved via memory recall switches 1 and 2. To save memory positions for driver 1:

- Adjust the driver seat and the exterior mirrors (also adjustable pedals and power column if equipped) to the desired position.
- Simultaneously press and hold the memory recall switch MEM button and button 1 until a signal chime sounds indicating the memory position is saved for driver 1.

A second seating position for driver 2 may be programmed by repeating the above steps and pressing memory button 2. There is no correlation between fob 1 and memory button 1 or fob 2 and memory button 2. The positions stored for each of the memory recall buttons can be recalled by pressing and holding the memory recall button until the memory controlled devices reach their saved position.

In addition to the two memory recall switch positions, three remote memory recall positions for Drivers 1, 2, and 3 may be saved. Drivers 1 and 2 will each have a unique set of remote memory recall positions saved for key fob ID's 1 and 2. A third unique set of positions for Driver 3 may also be saved for all additional key fobs 3 through 8. Key fob ID's 3 through 8 will be recognized by the Seat Memory Control Module as key fob ID 3. Key fob ID 3 will share the same set of saved positions but will be unique from key fob IDs 1 and 2.

NOTE: The key fob memory recall positions are not tied to the positions stored to the memory seat recall switches.

Key fobs 1, 2 and 3 (up to 3 unique sets of positions) can be saved by:

- Press Unlock on the desired key fob
- Place the ignition in the ON position
- Adjust seat and mirrors to desired positions
- Turn the ignition OFF

Keyless Entry and Memory Recall Personalization

When a keyless entry transmitter is used in order to unlock the vehicle's doors, the body control module communicates the unlock command and which driver performed the command to the seat memory control module via a serial data message. Vehicle lock/unlock functions and memory recall settings may be personalized. For functional descriptions and personalization instructions, refer to the vehicle owners manual.

POWER SEATS SYSTEM DESCRIPTION AND OPERATION

The driver and passenger power seat systems each consist of the following components:

- Seat adjuster switch
- Seat horizontal motor
- Seat front vertical motor
- Seat rear vertical motor
- Seat back recline motor
- 25 A circuit breaker

Seat Switch

The seat switches provide both power and ground to the selected seat motors. Battery positive voltage is supplied at all times to the driver and passenger seat switches through a 25 A circuit breaker located in the instrument panel fuse block. Ground for the driver seat switch is provided at G305 while ground for the passenger seat switch is provided at G302.

Seat Motors

All of the seat motors operate independently of each other. Each motor contains an electronic circuit breaker (PTC) that opens in the event of a circuit overload and will reset only after voltage has been removed from the circuit. There are four seat position motors and one lumbar motor. These are the horizontal motor, front vertical motor, rear vertical motor, and the seat back recline motor. The seat horizontal motor moves the entire seat forward and rearward. The seat vertical motors may operate independently to tilt the front or rear of the seat cushion up or down. Both motors can also run simultaneously to move the entire seat up or down. The recline motor moves the angle of the seat back forward or rearward.

Seat Operation

All seat motors are reversible. For example, when the seat horizontal forward switch is pressed to move the entire seat forward, battery voltage is applied through the switch contacts and the seat horizontal motor forward control circuit to the motor. With the horizontal motor rearward switch contacts closed to the switch ground circuit, the motor runs in order to drive the entire seat forward until the switch is released. Moving the entire seat rearward works similarly to moving the entire seat forward, except that battery voltage and ground are applied on opposite circuits causing the motor to run in the opposite direction. All seat motors are powered this way.