

2010 ACCESSORIES & EQUIPMENT

Power Seats - Equinox & Terrain

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Driver or Passenger Seat Adjuster Memory Module Fastener	4 N.m	35 lb in
Front Seat Adjuster Vertical Actuator Retainer	20 N.m	15 lb ft
Front Seat Recliner Actuator Motor Fastener	6 N.m	53 lb in

SCHEMATIC AND ROUTING DIAGRAMS

DRIVER SEAT SCHEMATICS

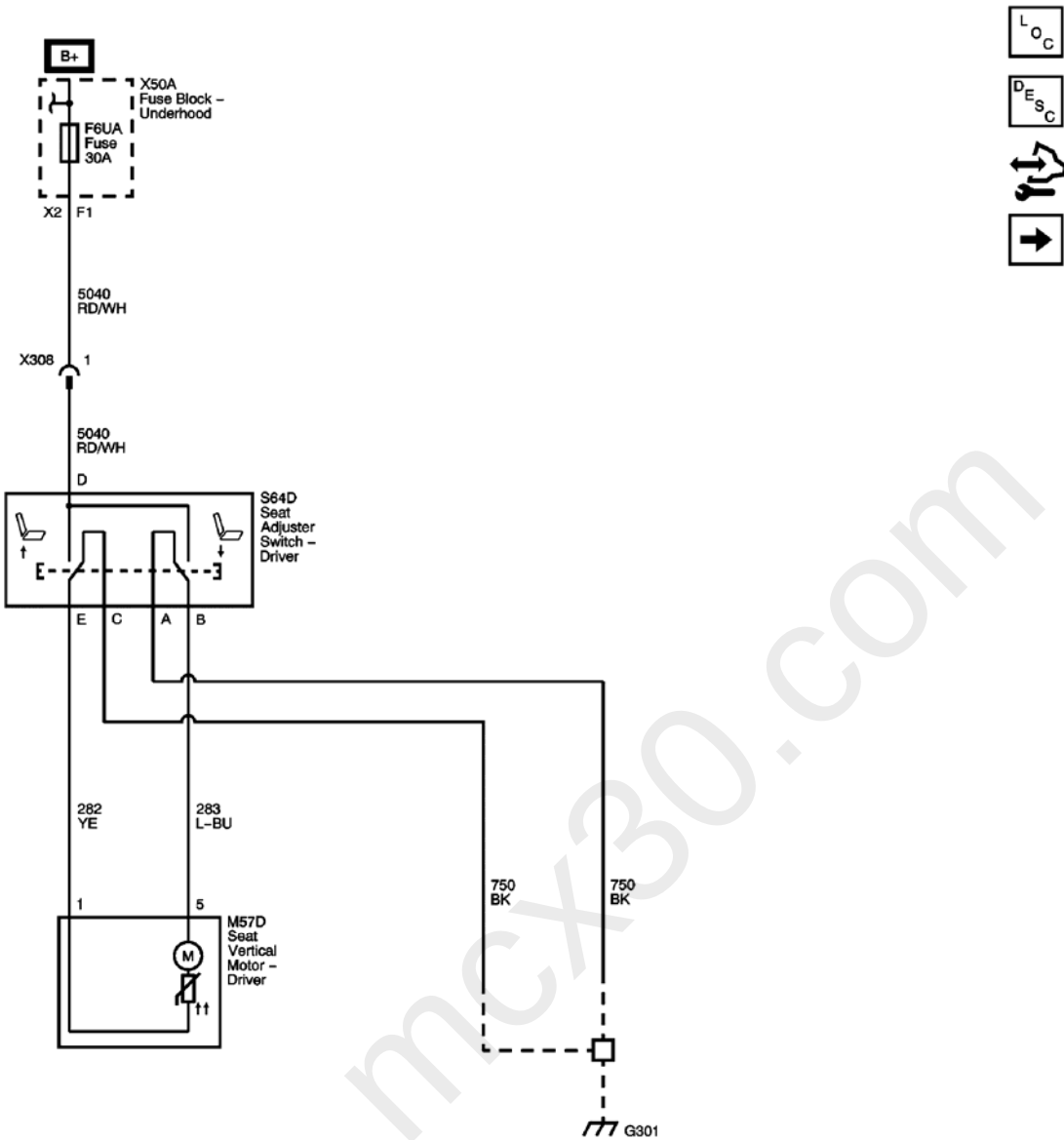


Fig. 1: Power Seat (without AE8 or LTZ or SLT)
 Courtesy of GENERAL MOTORS CORP.

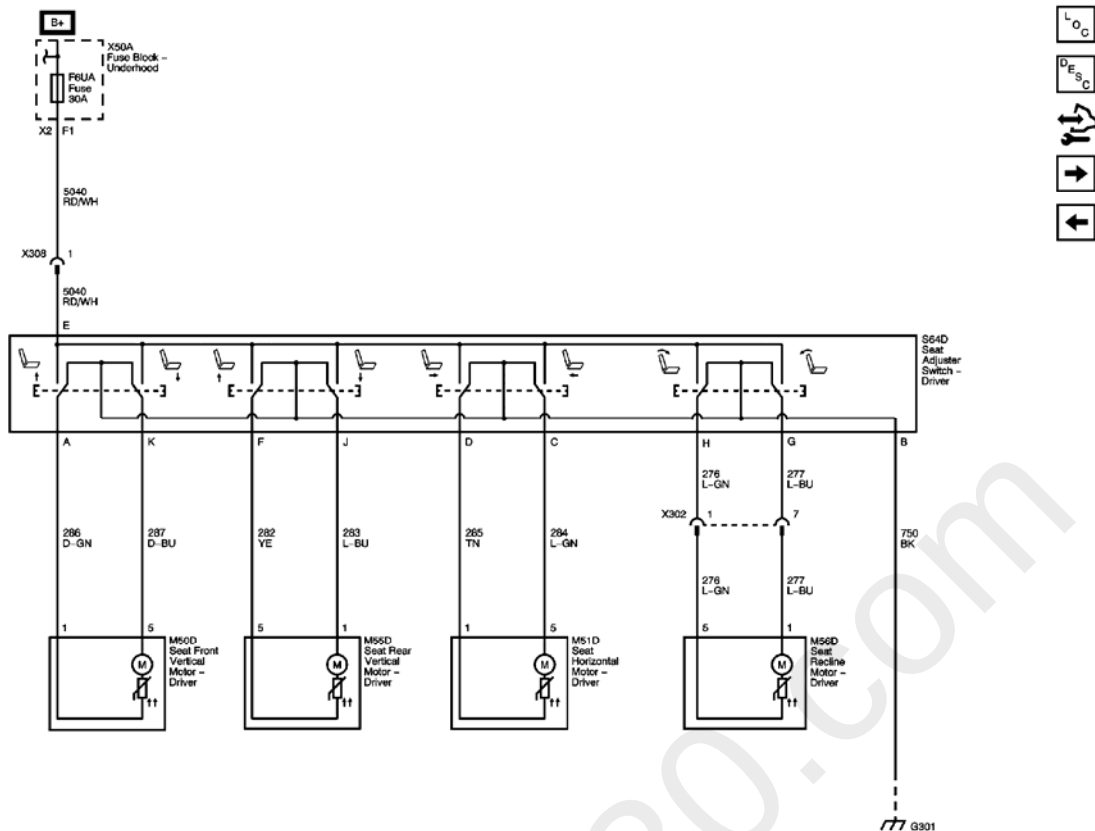


Fig. 2: Power Seat (AE8 without LTZ or SLT)
Courtesy of GENERAL MOTORS CORP.

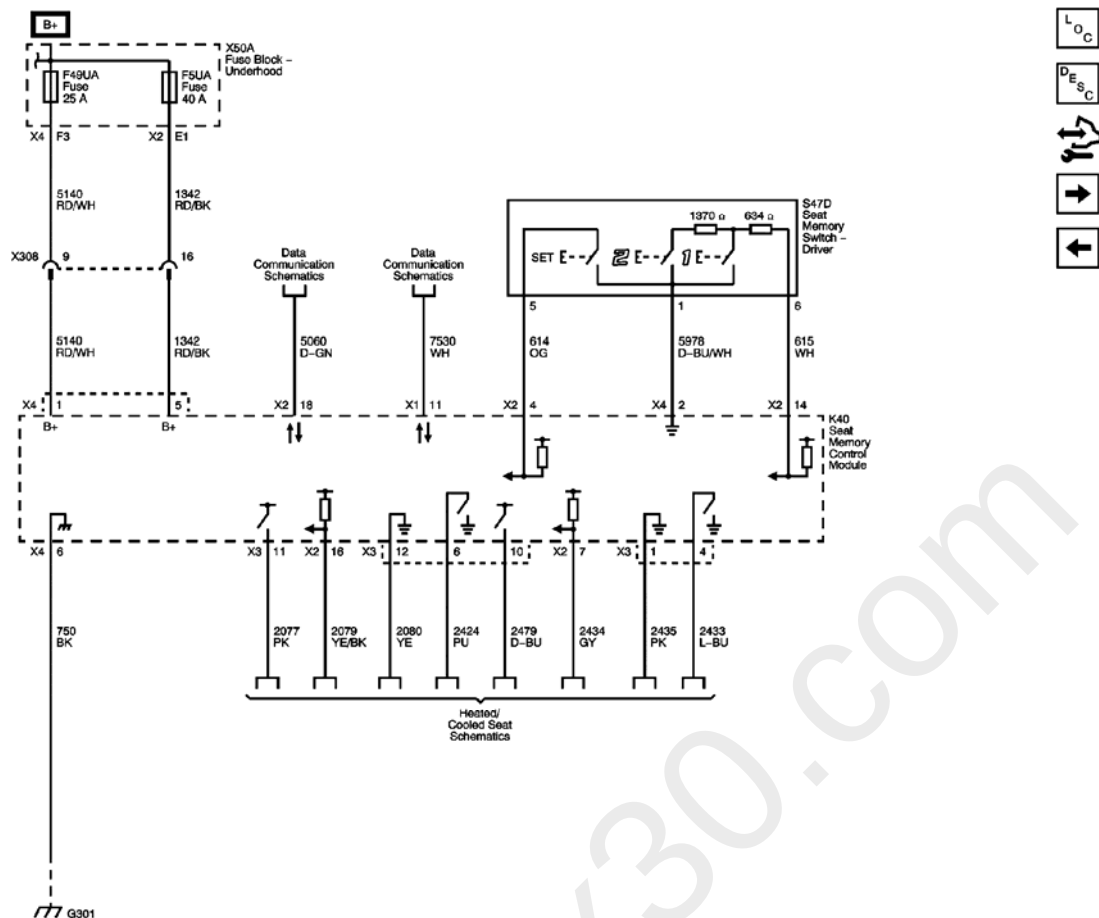


Fig. 3: Module Power, Ground, Serial Data, and Memory/Heated Seat Switch (LTZ or SLT)
 Courtesy of GENERAL MOTORS CORP.

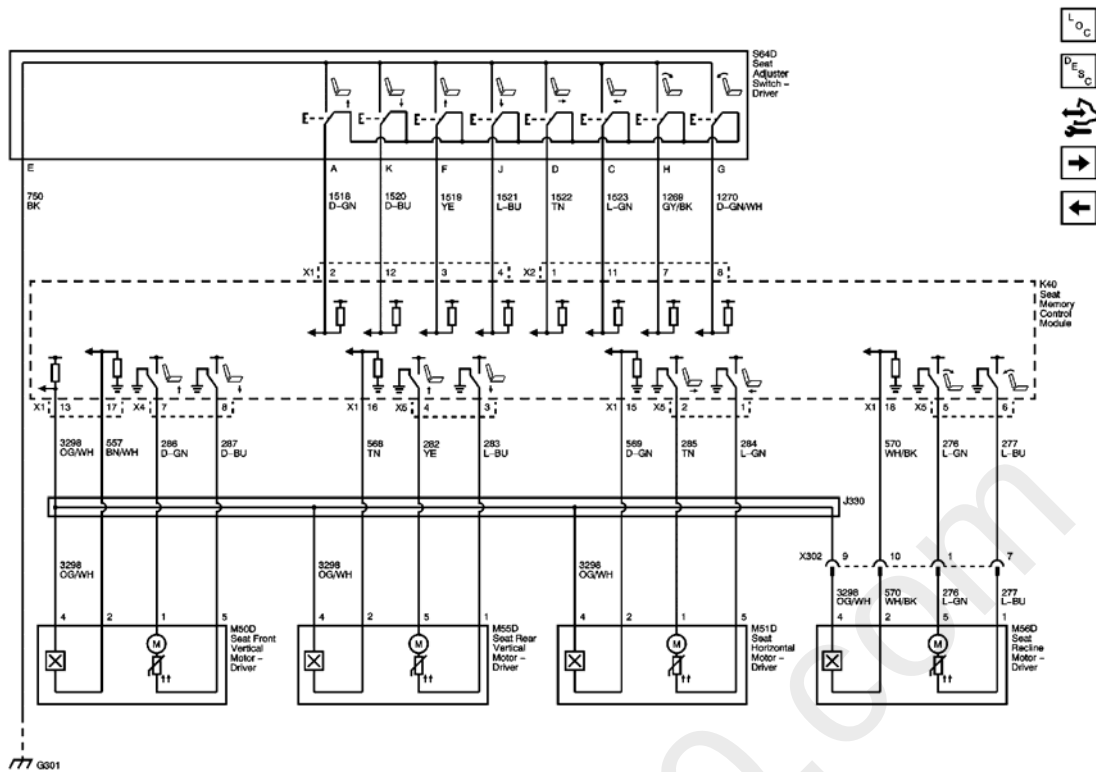


Fig. 4: Seat Adjuster Switch and Position Motors (LTZ or SLT)
 Courtesy of GENERAL MOTORS CORP.

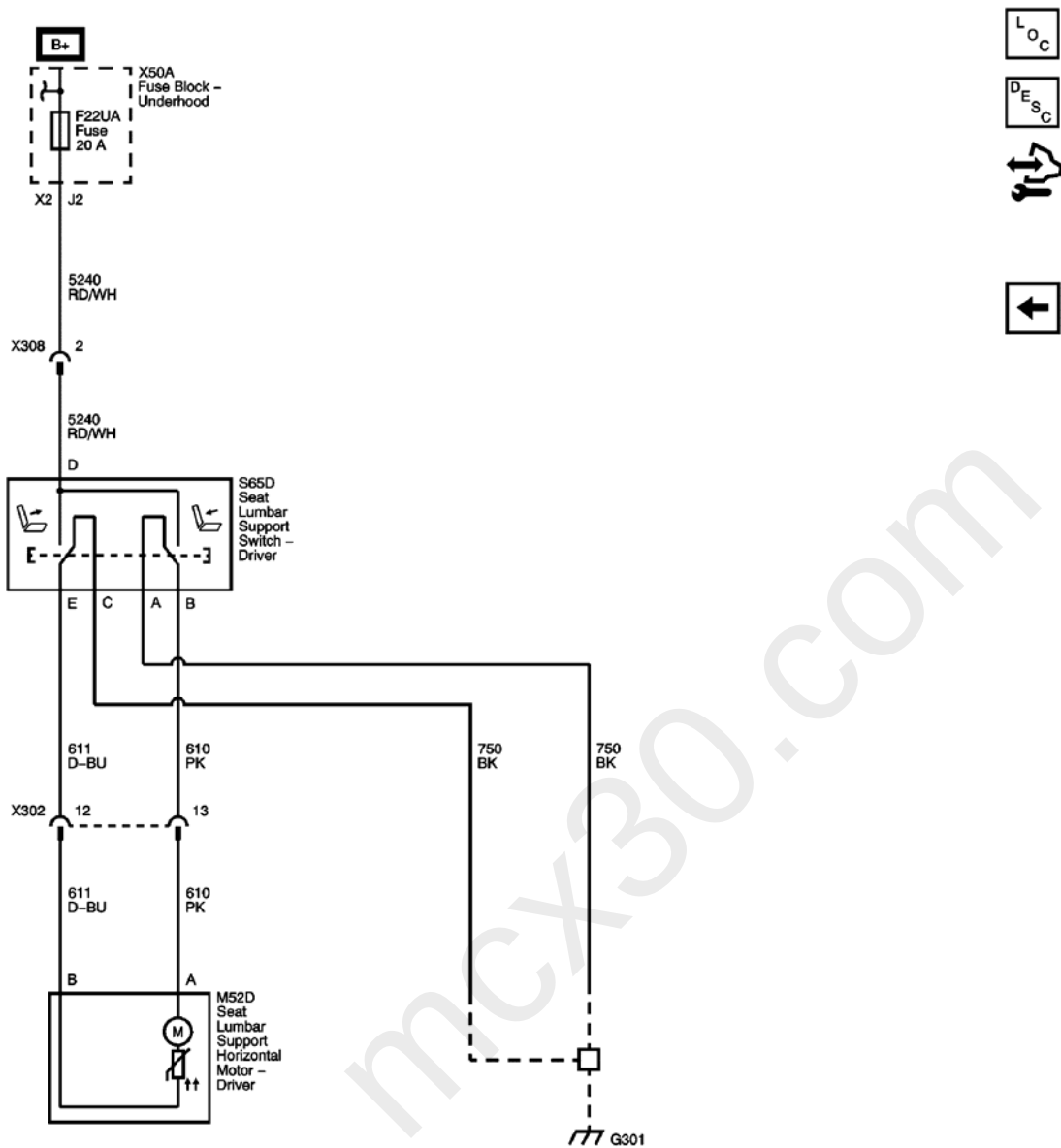


Fig. 5: Power Lumbar
 Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B1735, B1740, B1745, B1750, B1755, B1760, B1815, or B1820	B1735 02: Driver Seat Front Up Switch Circuit Short to Ground B1740 02: Driver Seat Front Down Switch Circuit Short to Ground B1745 02: Driver Seat Rear Up Switch Circuit Short to Ground

	B1750 02: Driver Seat Rear Down Switch Circuit Short to Ground B1755 02: Driver Seat Assembly Forward Switch Circuit Short to Ground B1760 02: Driver Seat Assembly Rearward Switch Circuit Short to Ground B1815 02: Driver Seat Recline Forward Switch Circuit Short to Ground B1820 02: Driver Seat Recline Rearward Switch Circuit Short to Ground
<u>DTC B1825, B2355, B2365, or B2375</u>	B1825 01: Driver Seat Recline Position Sensor Circuit Short to Battery B1825 06: Driver Seat Recline Position Sensor Circuit Low Voltage/Open B2355 01: Driver Seat Front Vertical Position Sensor Circuit Short to Battery B2355 06: Driver Seat Front Vertical Position Sensor Circuit Low Voltage/Open B2365 01: Driver Seat Rear Vertical Position Sensor Circuit Short to Battery B2365 06: Driver Seat Rear Vertical Position Sensor Circuit Low Voltage/Open B2375 01: Driver Seat Assembly Horizontal Position Sensor Circuit Short to Battery B2375 06: Driver Seat Assembly Horizontal Position Sensor Circuit Low Voltage/Open
<u>DTC B3920</u>	B3920 01: Driver Seat Motors Group 1 Common Circuit Short to Battery B3920 02: Driver Seat Motors Group 1 Common Circuit Short to Ground B3920 42: Driver Seat Motors Group 1 Common Circuit Calibration Not Programmed 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	-	-
Rear Vertical Up Switch Signal	B1735 02, B1740 02, 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,	1	-	-

	B1815 02, B1820 02			
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 code 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 codes will set.
- If a switch is stuck in one direction and the switch is pressed in the opposite direction, a single code will set.

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 Memory Control Module seat switch parameters listed below while pressing and releasing the appropriate seat directional switch. The readings should change between Inactive and Forward/Rearward or UP/Down.

- Driver Seat Cushion Front Vertical Switch
- Driver Seat Cushion Rear Vertical Switch
- Driver Seat Horizontal Switch
- Driver Seat Back Switch

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S64D driver seat adjuster switch.
2. Ignition ON, 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 the specified value, test the appropriate signal circuit listed below for a short to ground. If the circuit tests normal, replace the K40 seat memory control module.
 - 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 all circuits test normal, test or replace the S64D driver seat adjuster switch.

Component Testing

1. Ignition OFF, disconnect the harness connector at the S64D driver seat adjuster switch.
2. Test for infinite resistance between the ground terminal E and each seat direction signal terminal with the switch in the open position.
 - If not the specified value, replace the S64D driver seat adjuster switch.
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 greater than the specified value, replace the S64D driver seat adjuster switch.

Repair Procedures

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

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

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	B1825 01, B2355 01, B2365 01, B2375 01	-
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	-
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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 short to battery 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

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 positioning 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

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, test for B+ between the 12 V reference circuit terminal 4 and ground.
 - If less than the specified value, test the 12 V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K40 seat memory control module.
3. Test for 0.3 - 2 V between the signal circuit terminal 2 and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K40 seat memory control module.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the K40 seat memory control module.
4. If all circuits test normal, replace the seat motor.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Front Seat Tilt Adjuster Actuator Replacement
- Driver or Passenger Seat Adjuster Vertical Actuator Replacement
- Front Seat Adjuster Actuator Replacement

- **Driver or Passenger Seat Recliner Actuator Replacement**
- **Control Module References** for seat memory control module replacement, setup, and programming

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 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	Open/High Resistance	Short to Voltage	Signal Performance
Driver Seat Front Vertical Motor Down Control	B3920 02	1	B3920 01	B3920 42
Driver Seat Front Vertical Motor Up Control	B3920 02	1	B3920 01	B3920 42
Driver Seat Rear Vertical Motor Down Control	B3920 02	1	B3920 01	B3920 42
Driver Seat Rear Vertical Motor Up Control	B3920 02	1	B3920 01	B3920 42
Driver Seat Horizontal Motor Forward Control	B3920 02	1	B3920 01	B3920 42
Driver Seat Horizontal Motor Rearward Control	B3920 02	1	B3920 01	B3920 42

Driver Seat Recline Motor Forward Control	B3920 02	1	B3920 01	B3920 42
Driver Seat Recline Motor Rearward Control	B3920 02	1	B3920 01	B3920 42
1. Power seat motor is 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 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

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, 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 not the specified value, test the control circuit for a short to ground.
- 3. Ignition ON, verify that a test lamp does not illuminate 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 the test lamp illuminates, test the control circuit for a short to voltage.
- 4. If all circuits test normal, replace the K40 seat memory control module.

B3920 0B

1. Ignition ON, use a scan tool to clear the current and history DTC.
2. 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
3. Clear the diagnostic trouble code.
4. Ignition OFF, disconnect the harness connector at the appropriate seat motor for which the DTC set.
5. Ignition ON, operate the appropriate motor adjuster switch in both directions. DTC B3920 00 or B3920 0B should not set.
 - If the DTC sets, test for a short between control circuits terminal 1 and terminal 5. If the circuits test normal, replace the K40 seat memory control module.
6. Test control circuits terminal 1 and terminal 5 for a high resistance. If the circuits test normal, test or replace the seat motor.

B3920 42

If this DTC is set, replace the K40 seat memory control module.

Repair Procedures

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

- **Front Seat Tilt Adjuster Actuator Replacement**

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

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)** or **Power Seat Malfunction (With Memory)**

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, 2	2	-	-
Lumbar Motor Rearward Control	2	2	-	-
Lumbar Motor Forward Control	2	2	-	-
Seat Lumbar Support Switch Ground	-	2	-	-
1. Power seats are inoperative 2. Lumbar support is inoperative				

Circuit/System Description

Power seat lumbar support is completely controlled through the seat lumbar support switch. Battery voltage is supplied at all times to the lumbar switch through a 20 A fuse located in the underhood fuse block. When the lumbar switches are in an inactive state, the switch contacts are closed to the switch ground circuit.

The lumbar motor is reversible. For example, when the lumbar forward switch is pressed to move the lumbar support forward, battery voltage is applied through the switch contacts and the lumbar motor forward control circuit to the motor. The motor is grounded through the lumbar motor rearward switch contacts and the lumbar motor rearward control circuit to the motor. The motor runs in order to drive the lumbar support forward toward the occupants back until the switch is released. Moving the lumbar support rearward works similarly to moving the lumbar support forward, except that battery positive voltage and ground are applied on 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

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 Testing

1. Ignition OFF, disconnect the harness connector at the S65D driver seat lumbar support switch.
2. Test for less than 10 ohms between the ground circuit terminals listed below and ground.
 - Terminal A
 - Terminal C
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal D and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. Ignition OFF, connect the harness connector at the S65D driver seat lumbar support switch and disconnect the harness connector at the M52D driver seat lumbar support horizontal motor.
5. Connect a test lamp between control circuit terminal A and control circuit terminal B.
6. Ignition ON, command the lumbar motor Forward and Rearward using the lumbar switch. The test lamp should turn ON when commanding the forward and rearward states.
 - If the test lamp remains OFF for either of the commands, test the control circuits for a short to ground or an open/high resistance. If the circuits test normal, test or replace the S65D driver seat lumbar support switch.
7. If the circuits test normal replace the M52D driver seat lumbar support horizontal motor.

Component Testing

Lumbar Support Motor

1. Ignition OFF, disconnect the harness connector at the M52D driver seat lumbar support horizontal motor.

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

2. Install a 30 A fused jumper wire between the control terminal A and 12 V. Momentarily install a jumper wire between the control terminal B and ground. The M52D driver seat lumbar support horizontal motor should momentarily perform the FORWARD function.
 - If the function does not perform as specified, replace the M52D driver seat lumbar support horizontal motor.
3. Reverse the polarity of jumper wires; the a lumbar motor should perform REARWARD function.
 - If the function does not perform as specified, replace the M52D driver seat lumbar support horizontal motor.

Repair Procedures

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

- **Driver Seat Lumbar Control Switch Replacement**
- **Driver or Passenger Seat Lumbar Support Actuator 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	1	1	-	-
Memory Switch Signal	1	1	1	-
Driver Seat Memory Switch Low Reference	-	1	-	-
1. Memory seat feature 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 miss-diagnosing the circuit.

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 that all manual driver power seat functions operate when being controlled by the power seat adjuster switches.
 - If any seat function does not operate, refer to **Power Seat Malfunction (Without Memory)** or **Power Seat Malfunction (With Memory)**.
2. Verify that the memory recall personalization option is ON. Refer to the owners manual.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S47D driver seat memory switch.
2. Test for less than 15 ohms between the low reference circuit terminal 1 and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K40 seat memory control module.
3. Ignition ON, press a power seat switch in order to wake up the K40 seat memory control module. Test for greater than 9 V between the signal circuit terminal 6 and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K40 seat memory control module.
4. Test for greater than 9 V between the signal circuit terminal 5 and ground.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K40 seat memory control module.
5. If all circuits test normal, test or replace the S47D driver seat memory switch.

Component Testing

Driver Seat Memory Switch

1. Disconnect the harness connector at the S47D driver seat memory switch.
2. Test for infinite resistance between the low reference terminal 1 and the signal terminals listed below with

the switch in the open position.

- Terminal 5
 - Terminal 6
 - If not the specified value, replace the S47D driver seat memory switch.
3. Test the resistance between terminal 1 and terminal 6 while pressing the memory 1 and memory 2 buttons. Compare the resistance readings to the values in the Memory Switch Values table below.
 - If the resistance is not within the specified range, replace the S47D driver seat memory switch.
 4. Test for less than 1 ohms between terminal 1 and terminal 5 while pressing the memory set switch.
 - If greater than the specified range, replace the S47D driver seat memory switch.

Memory Switch Values

Switch Position	Resistance
Memory 1	570 - 698 ohms
Memory 2	1800 - 2209 ohms

Repair Procedures

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

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

POWER SEAT MALFUNCTION (WITHOUT 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.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Seat Adjuster Switch 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	-	-

Seat Adjuster Switch 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 switch. Battery voltage is supplied at all times to the seat switch through a 30 A fuse located in the underhood fuse block. When the seat switches are in an inactive state, the switch contacts are closed to the ground circuit.

All seat motors are reversible. For example, when the seat horizontal forward switch is pressed to move the entire seat forward, ground 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 B+ 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

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

Circuit/System Testing

2 Way Power Seat

1. Ignition OFF, disconnect the harness connector at the S64D driver seat adjuster switch.
2. Test for less than 5 ohms between the ground circuit terminals listed below and ground:
 - Terminal A
 - Terminal C

- If greater than the specified range, test the ground circuit for an open/high resistance.
- 3. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminal D and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
- 4. Ignition OFF, connect the harness connector at the S64D driver seat adjuster switch and disconnect the harness connector at the M57D driver seat vertical motor.
- 5. Connect a test lamp between control circuit terminal 1 and control circuit terminal 5.
- 6. Ignition ON, command the seat motor Up and Down using the seat adjuster switch. The test lamp should turn ON when commanding the up and down states.
 - If the test lamp remains OFF for either of the commands, test the control circuits for a short to ground or an open/high resistance. If the circuits test normal, test or replace the S64D driver seat adjuster switch.
- 7. If all circuits test normal, test or replace the M57D driver seat vertical motor.

8 Way Power Seat

- 1. Ignition OFF, disconnect the harness connector at the S64D driver seat adjuster switch.
- 2. Test for less than 5 ohms between the ground circuit terminal B and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
- 3. 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.
- 4. Ignition OFF, connector the harness connector at the S64D driver seat adjuster switch and disconnect the harness connector at the appropriate seat motor listed below:
 - M51D seat horizontal motor
 - M50D seat front vertical motor
 - M55D seat rear vertical motor
 - M56D seat recline motor
- 5. Connect a test lamp between control circuit terminal 1 and control circuit terminal 5.
- 6. Ignition ON, command the seat motor Up and Down or Forward and Rearward using the seat adjuster switch. The test lamp should turn ON when commanding the up and down or forward and rearward states.
 - If the test lamp remains OFF for either of the commands, test the control circuits for a short to ground or an open/high resistance. If the circuits test normal, test or replace the S64D driver seat adjuster switch.
- 7. If all circuits test normal, test or replace the seat motor.

Component Testing

Seat Motor

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

- M51D seat horizontal motor
- M50D seat front vertical motor
- M55D seat rear vertical motor
- M56D 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 12 V. 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 function does not perform as specified, replace the seat motor.
3. Reverse the polarity of jumper wires. The a seat motor should perform in the opposite direction.
 - If the function does not perform as specified, replace the seat motor.

Repair Procedures

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

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

POWER SEAT MALFUNCTION (WITH 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.

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	-	-
	B1735 02, B1740 02,			

Front Vertical Up Switch Signal	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	-	-
Rear Vertical Up Switch Signal	B1735 02, B1740 02, 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 are 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 25 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 40 A fuse. 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

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 Memory Control Module seat switch parameters listed below while pressing the appropriate seat switch. The reading should change between Inactive and Forward/Rearward or Up/Down.
 - Driver Seat Horizontal Switch
 - Driver Seat Cushion Front Vertical Switch
 - Driver Seat Cushion Rear Vertical Switch
 - Driver Seat Back Switch
 - If the reading does not change between the specified values, refer to the Driver Seat Adjuster Switch Circuit Test.
2. If all seat switch inputs to the K40 seat memory control module function normal, refer to the Seat Motor Control Circuit Test.

Circuit/System Testing

Driver Seat Adjuster Switch Circuit Test

1. Ignition OFF, disconnect the harness connector at the S64D driver seat adjuster switch.
2. Test for less than 10 ohms between the ground circuit terminal E and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify that the scan tool seat switch parameters listed below are Inactive.
 - Driver Seat Horizontal Switch
 - Driver Seat Cushion Front Vertical Switch
 - Driver Seat Cushion Rear Vertical Switch
 - Driver Seat Back Switch
 - If not the specified value, test the appropriate signal circuit listed below for a short to ground. If the circuit tests normal, replace the K40 seat memory control module.
 - 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
- Install a 3 A fused jumper wire between the ground circuit terminal E and the appropriate signal circuit terminal listed below. Verify the appropriate scan tool seat switch parameter is Forward/Rearward or Up/Down.
 - 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 not the specified value, test the signal circuit for a short to voltage an open/high resistance. If the circuit tests normal, replace the K40 seat memory control module.
- If all circuits test normal, test or replace the S64D driver seat adjuster switch.

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 the ground circuit terminal 6 and ground.
 - If less than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, verify that a test lamp illuminates between the B+ circuit terminals listed below and ground:
 - Terminal 1
 - terminal 5
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance.
4. 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:
 - M50 seat front vertical motor
 - M55 seat rear vertical motor
 - M51 seat horizontal motor
 - M56 seat back recline motor
5. Connect a test lamp between control circuit terminal 1 and control circuit terminal 5.

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

6. Ignition ON, command the seat motor in the Up/Down or Forward/Rearward directions with a scan tool. The test lamp should turn ON when commanding the up and down or forward and rearward states.
 - If the test lamp remains OFF during either of the commands, test the control circuits for an open/high resistance. If the circuits test normal, replace the K40 seat memory control module.
7. If all circuits test normal, test or replace the seat motor.

Component Testing

Driver Seat Adjuster Switch

1. Ignition OFF, disconnect the harness connector at the S64D driver seat adjuster switch.
2. Test for infinite resistance between the ground terminal E and each signal terminal listed below with the switch in the open position.
 - 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 not the specified value, replace the S64D driver seat adjuster switch.
3. Test for less than 1 ohms between the ground terminal E and each signal terminal listed below with the appropriate switch in the closed position.
 - 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 greater than the specified range, replace the S64D driver seat adjuster switch.

Seat Motor

1. Ignition OFF, disconnect the harness connector at the appropriate seat motor listed below:
 - M50 front vertical motor
 - M55 rear vertical motor
 - M51 horizontal motor
 - M56 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 12 V. 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 function does not perform as specified, replace the seat motor.
3. Reverse the polarity of jumper wires. The a seat motor should perform in the opposite direction.
 - If the function does not perform as specified, replace the seat motor.

Repair Procedures

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

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

REPAIR INSTRUCTIONS

DRIVER SEAT ADJUSTER SWITCH REPLACEMENT

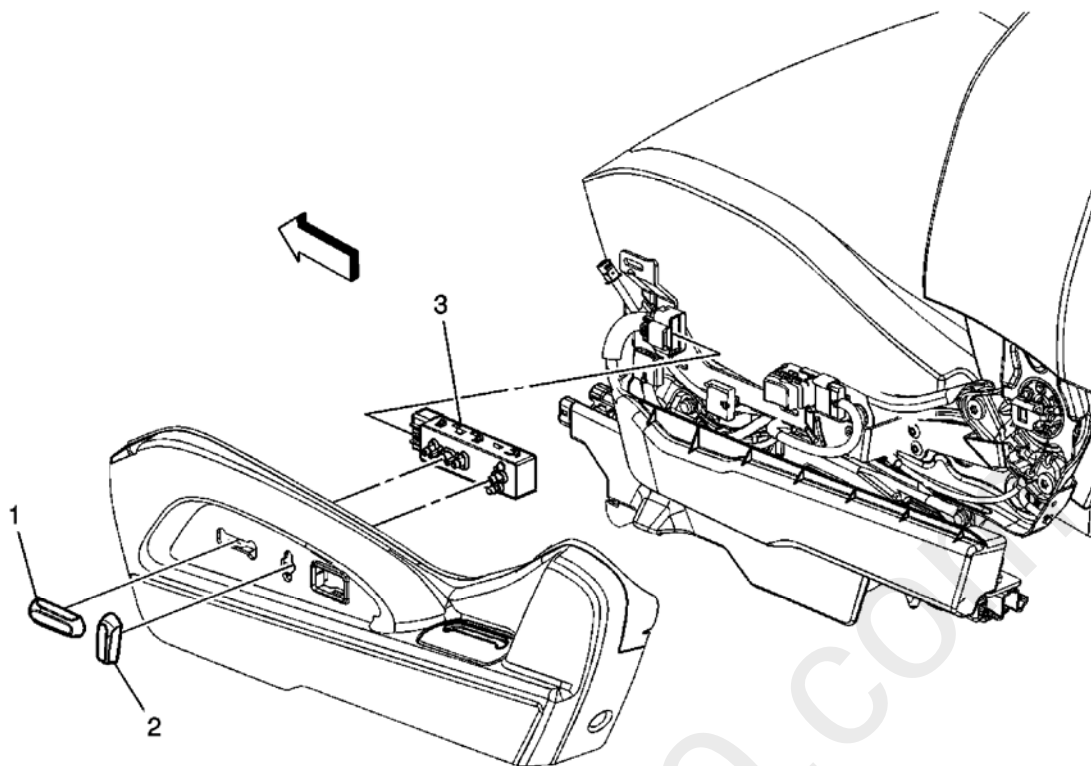


Fig. 6: Driver Seat Adjuster Switch
Courtesy of GENERAL MOTORS CORP.

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

DRIVER SEAT ADJUSTER MEMORY SWITCH REPLACEMENT

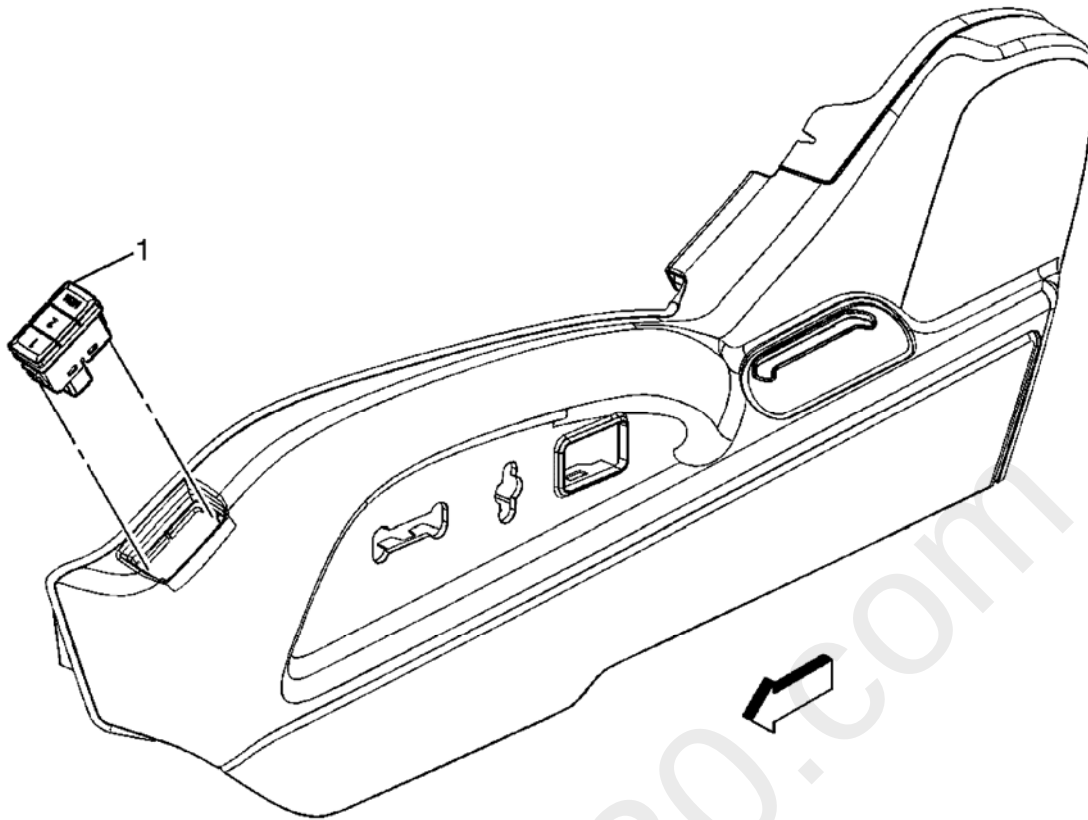


Fig. 7: Driver Seat Adjuster Memory Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the driver or passenger seat outer adjuster finish cover. Refer to <u>Driver or Passenger Seat Outer Adjuster Finish Cover Replacement</u> .	
1	Driver Seat Adjuster Memory Switch Procedure: Pull up gently on the memory switch to disengage it from the outer recliner cover.

DRIVER OR PASSENGER SEAT ADJUSTER MEMORY MODULE REPLACEMENT

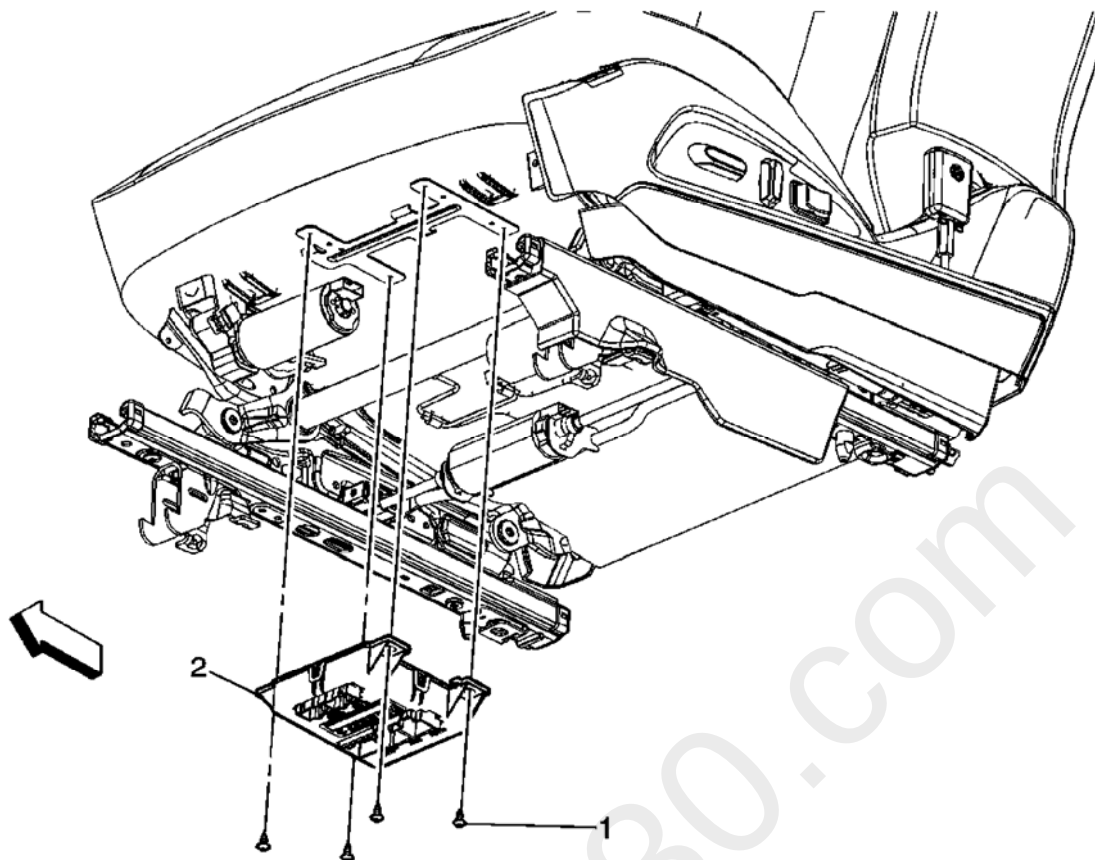


Fig. 8: Driver or Passenger Seat Adjuster Memory Module
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the driver seat. Refer to <u>Driver or Passenger Seat Replacement</u> .	
1	Driver or Passenger Seat Adjuster Memory Module Fastener (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 4 N.m (35 lb in)
2	Driver or Passenger Seat Adjuster Memory Module Procedure 1. Disconnect the electrical connectors. 2. Remove the module from the adjuster memory bracket. 3. Refer to <u>Control Module References</u> for programing and setup information.

FRONT SEAT TILT ADJUSTER ACTUATOR REPLACEMENT

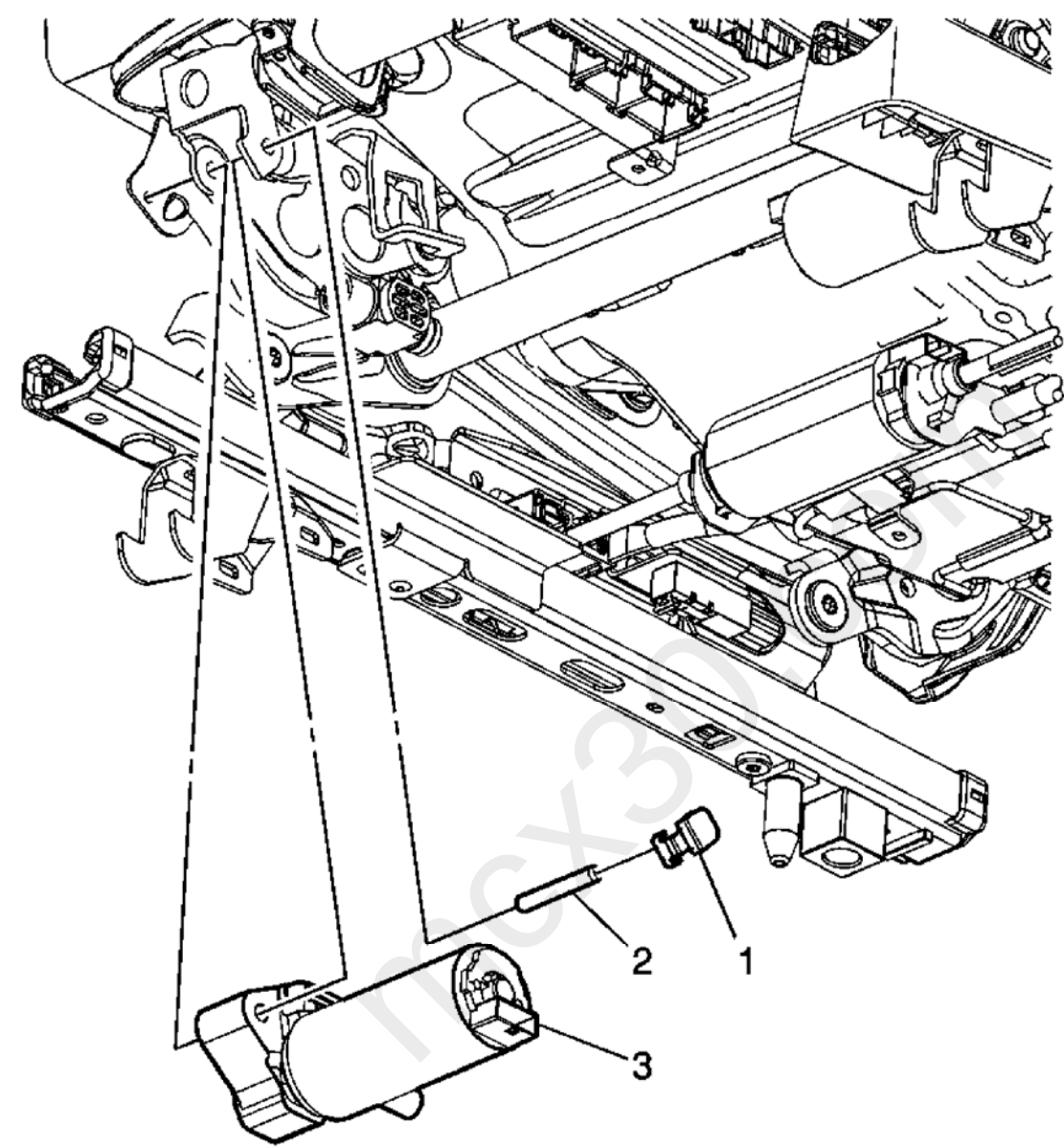


Fig. 9: Front Seat Tilt Adjuster Actuator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the driver or passenger seat. Refer to <u>Driver or Passenger Seat Replacement</u> .	
1	Front Seat Tilt Adjuster Actuator Securing Clip Procedure: Remove the securing clip from the actuator and roll pin.
	Front Seat Tilt Adjuster Actuator Roll Pin

2	Procedure: Use a hammer and small round tool to tap the roll pin out from the actuator.
3	Front Seat Tilt Adjuster Actuator Procedure 1. Disconnect the electrical connector. 2. Remove the adjuster vertical actuator by pulling downward from the cushion frame tilt actuator bracket.

DRIVER OR PASSENGER SEAT ADJUSTER VERTICAL ACTUATOR REPLACEMENT

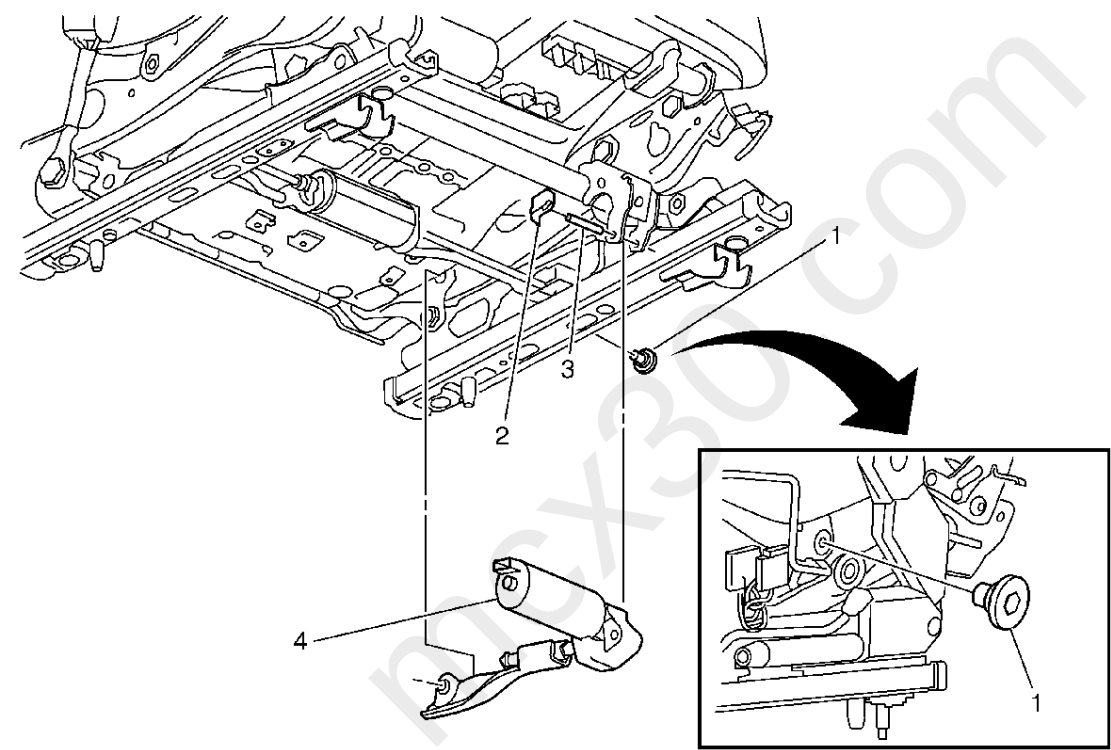


Fig. 10: Driver or Passenger Seat Adjuster Vertical Actuator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Remove the driver or passenger seat. Refer to <u>Driver or Passenger Seat Replacement</u> .	
2. Remove the driver or passenger seat inner adjuster front finish cover. Refer to <u>Driver or Passenger Seat Outer Adjuster Finish Cover Replacement</u> .	
3. Remove the driver or passenger seat belt tensioner cover. Refer to <u>Driver or Passenger Seat Belt Tensioner Cover Replacement</u> .	
	Driver or Passenger Seat Adjuster Vertical Actuator Retainer

1	CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 20 N.m (15 lb ft)
2	Driver or Passenger Seat Adjuster Vertical Actuator Securing Clip Procedure: Remove the securing clip from the actuator and roll pin.
3	Driver or Passenger Seat Adjuster Vertical Actuator Roll Pin Procedure: Use a hammer and small round tool to tap the roll pin out from the actuator.
4	Driver or Passenger Seat Adjuster Vertical Actuator Procedure 1. Disconnect the electrical connector. 2. Remove the adjuster vertical actuator by pulling downward from the cushion frame.

FRONT SEAT ADJUSTER ACTUATOR REPLACEMENT

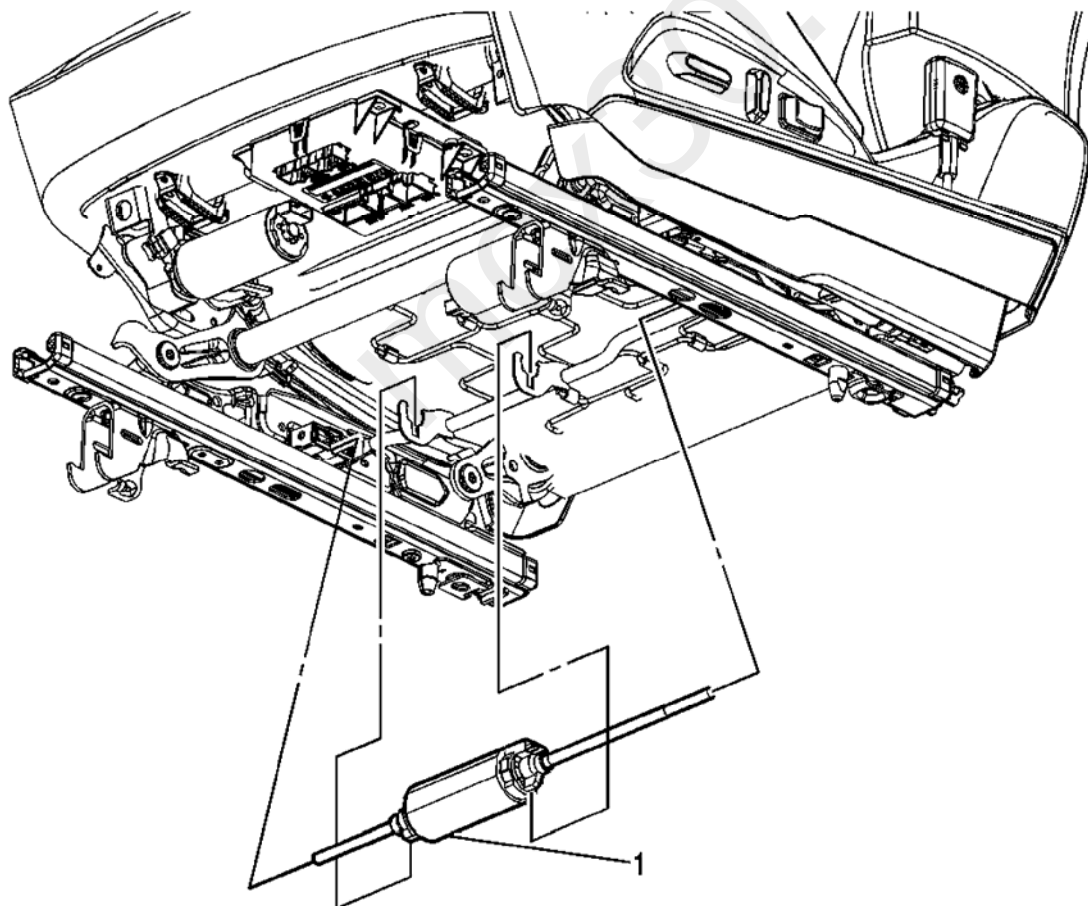


Fig. 11: Front Seat Adjuster Actuator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the driver or passenger seat. Refer to <u>Driver or Passenger Seat Replacement</u>	
1	Front Seat Adjuster Actuator Replacement Procedure 1. Disconnect the electric connector. 2. Remove the seat adjuster motor out of both seat frame brackets. 3. Remove the seat adjuster motor cables by pulling the cables out of adjuster tracks.

DRIVER SEAT LUMBAR CONTROL SWITCH REPLACEMENT

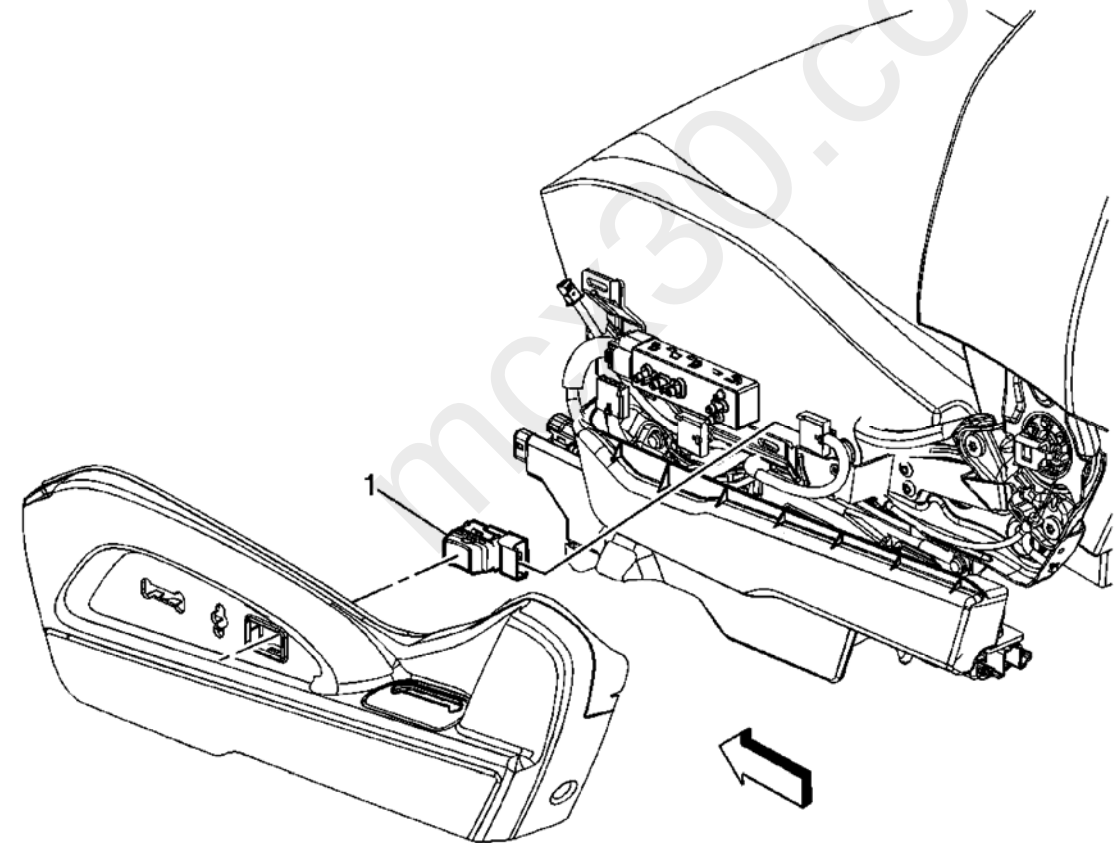


Fig. 12: Driver Seat Lumbar Control Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

Preliminary Procedure:
Remove the driver seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement** .

1	Driver Seat Lumbar Control Switch Tip: Use a flat-bladed tool to release the switch from the finish cover.
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DRIVER OR PASSENGER SEAT LUMBAR SUPPORT ACTUATOR REPLACEMENT

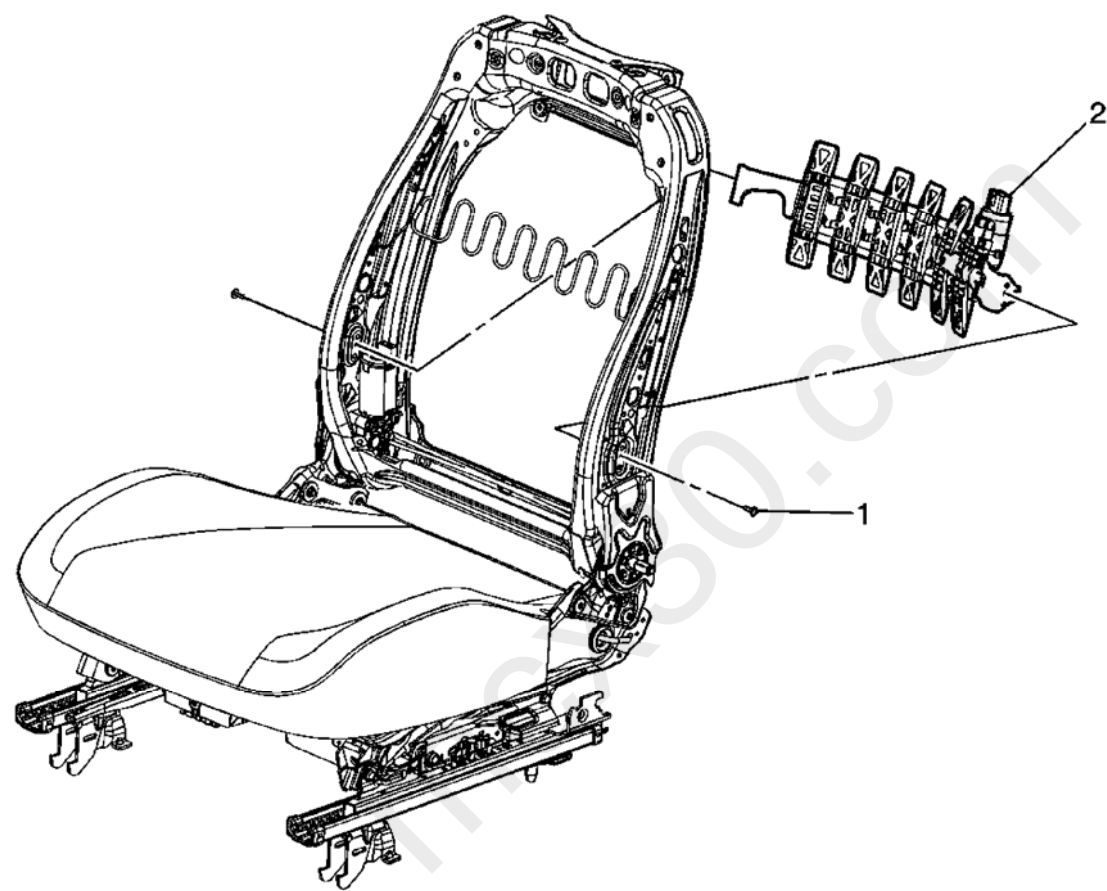


Fig. 13: Driver or Passenger Seat Lumbar Support Actuator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	
1. Disable the SIR system. Refer to <u>SIR Disabling and Enabling</u> .	
2. Remove the driver or passenger seat back cushion cover and pad. Refer to <u>Driver or Passenger Seat Back Cushion Cover and Pad Replacement</u> .	
3. Remove the seat side inflatable restraint module. Refer to <u>Driver or Passenger Seat Side Inflatable Restraint Module Replacement</u> .	

1	Front Seat Lumbar Support Actuator fastener (Qty: 2)
2	Front Seat Lumbar Support Actuator Procedure 1. Disconnect the electrical connectors. 2. Pull the lumbar support rearward and up until the lumbar support disengages from the seat back frame.

DRIVER OR PASSENGER SEAT RECLINER ACTUATOR REPLACEMENT

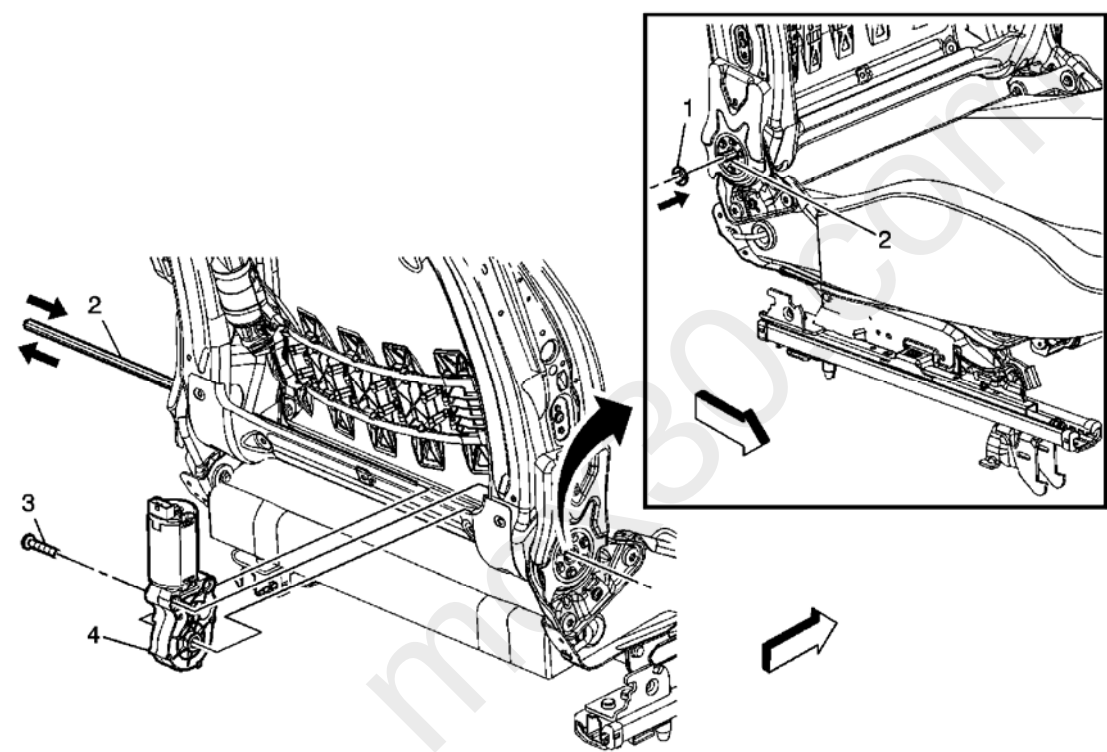


Fig. 14: Driver or Passenger Seat Recliner Actuator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: Refer to <u>SIR Warning</u> .	
Preliminary Procedure	
1. Remove the driver or passenger seat. Refer to <u>Driver or Passenger Seat Replacement</u> .	
2. Remove seat inner recliner finish cover. Refer to <u>Driver or Passenger Seat Inner Recliner Finish Cover Replacement</u> .	

3.	Remove seat outer adjuster finish cover. Refer to <u>Driver or Passenger Seat Outer Adjuster Finish Cover Replacement</u> .
4.	Remove seat back cushion finish panel. Refer to <u>Driver or Passenger Seat Back Cushion Finish Panel Replacement</u> .
1	Front Seat Recliner Rod Jam Nut Tip: Replace with new rod jam nut.
2	Recliner Rod Procedure: Gently tap the recliner rod outward until the rod is free of the recliner motor.
3	Front Seat Recliner Actuator Motor Fastener CAUTION: Refer to <u>Fastener Caution</u> . Procedure: Disconnect the electric connector. Tighten: 6 N.m (53 lb in)
4	Front Seat Recliner Actuator Motor

DESCRIPTION AND OPERATION

LUMBAR SUPPORT DESCRIPTION AND OPERATION

Lumbar Support Components

The power seat lumbar support systems consist of the following components:

- Lumbar switch
- Lumbar horizontal motor
- Circuit Breaker 25 A

Lumbar Switch

The lumbar switch provides both power and ground to the lumbar motor. Battery positive voltage is supplied at all times to the lumbar adjuster switch through a circuit breaker located in the rear fuse block. Ground for the lumbar adjuster switch is supplied from the G300 ground stake.

Lumbar Horizontal Motor

The lumbar support motor contains an electronic circuit breaker (PTC) that will reset only after voltage has been removed from the motor. The lumbar horizontal motor moves the lumbar support forward and rearward.

When the lumbar switch is operated to move the lumbar support rearward, battery positive voltage is applied

through the lumbar rearward switch contacts and the lumbar motor rearward control circuit to the lumbar horizontal motor. The motor is grounded through the lumbar forward switch contacts and the lumbar motor forward control circuit to the horizontal motor. The motor runs to drive the lumbar support rearward away from the occupant's back until the switch is released. Moving the lumbar support forward works similarly to moving the lumbar support rearward, except that battery positive voltage and ground are applied on opposite circuits causing the motor to run in the opposite direction.

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 adjuster 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 G301. 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 power seat system consists of the following components:

- Seat adjuster switch
- Seat horizontal motor
- Seat front vertical motor
- Seat rear vertical motor
- Seat back recline motor
- 30 A fuse

Seat Adjuster Switch

The seat adjuster switch provides both power and ground to the selected seat motors. Battery positive voltage is supplied at all times to the driver seat switch through a 30 A fuse located in the underhood fuse block. Ground

for the driver seat adjuster switch is provided at G301.

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. 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.