

2001 ACCESSORIES & EQUIPMENT**Power Seats - Catera****DESCRIPTION & OPERATION**

WARNING: Vehicles are equipped with air bag supplemental restraint system. Before attempting any repairs involving steering column, instrument panel or related components, see SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM in appropriate AIR BAG RESTRAINT SYSTEMS article.

NOTE: There are 2 power seat systems available: Memory Seats, and Power Seats. Power Seats have 6-way function and may also be referred to as 6-Way Power Seats. Both systems are available with Heated Seats function.

HEATED SEATS

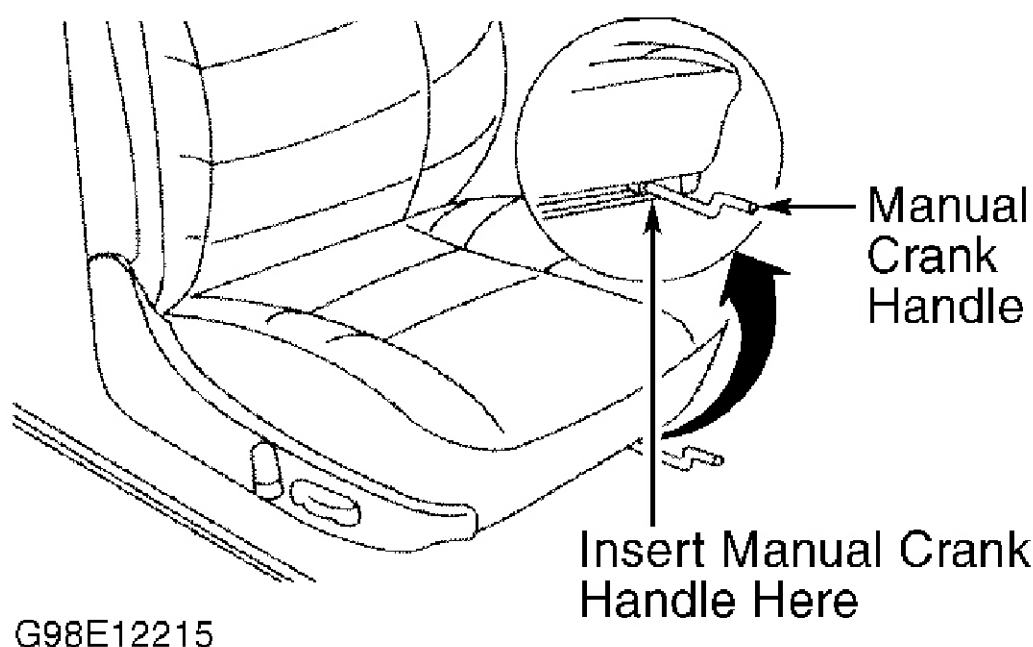
Front heated seat system consists of these components: driver's and passenger's heated seat switch, driver's and passenger's seat back heater element, HTD SEAT FRONT 30-amp, CLAMP 15 10-amp, and RH HEATED SEAT 15-amp fuses, located in fuse block. Rear heated seat system consists of these components: rear heated seat relays, left and right heated seat switch, left and right seat back heater, left and right seat cushion heater, CLAMP 15 CRUISE 15-amp and HTD SEAT REAR 30-amp fuses, located in fuse block.

Heated seat relay and thermistor are part of front seat cushion heater. Heated seat control relay controls battery voltage used to supply seat heater elements. Ignition voltage is supplied to heated seat switch. When heated seat switch is in positions 1 through 5, ignition voltage is supplied through ON switch signal circuit to heated seat relay. Voltage to heater level selector switch signal circuit is reduced by resistors within heated seat switch, level 1-5 seat heater operation is determined by signal circuit voltage to heated seat relay. Heated seat relay uses resistance through heated seat thermistor to regulate seat temperature. When heated seat reaches maximum temperature for selected operating mode battery voltage supply to seat heater elements is removed. When seat cools resistance value through heated seat thermistor returns to limits set for selected operating mode and heated seat relay provides battery voltage supply to heated seat element supply circuit.

Rear heated seat relays control battery voltage supply to seat cushion heater elements and seat back heater elements. Ignition voltage is supplied to rear heated seat switches. When a heated seat switch is turned ON, ignition voltage is supplied to heated seat relay through heated seat switch signal circuit. When voltage is supplied to seat heater relay ignition terminal and switch signal terminal relay energizes and battery supply circuit is closed to heater element supply circuit. Seat heater elements regulate temperature independently by opening or closing ground circuit within element/pad assembly.

MANUAL OPERATION

If electrical failure prevents front seats from being moved forward or backward, both front seats can be moved manually. Included in spare tire jack kit is a crank that inserts into front of seat. See **Fig. 1** . Rotate crank clockwise until proper seat position is achieved.



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Fig. 1: Adjusting Front Seats Manually
 Courtesy of GENERAL MOTORS CORP.

MEMORY SEATS

Memory seat system consists of these components: driver's seat adjuster switch, Memory Seat Module (MSM), driver's seat front horizontal and vertical adjuster motors, driver's seat rear vertical adjuster motor, driver's seat recliner adjuster motor, PWR SEAT 30-amp and CLAMP 15 CRUISE 15-amp fuses, both located in fuse block. Memory seat system is controlled by driver's seat adjuster switch and MSM.

MSM controls all of memory seat functions through use of inputs and outputs which are hard-wired to MSM. Keyword 82 serial data circuit provides a communication line between MSM and a scan tool and is used for diagnostic purposes and module programming only. MSM controls seat adjuster motors by providing voltage and ground through adjuster motor supply circuits. Seat adjuster motors are reversible and direction travel is determined by polarity of supply circuits. MSM uses position sensors for storing and recalling memory seat position settings. Position sensors are internal parts of adjuster motors. MSM provides a 5-volt reference circuit and a low reference circuit to each position sensors, and monitors position sensor signal voltages which vary from zero to 5 volts depending on seat position. MSM monitors resistance through driver's seat adjuster switch. Switch inputs to MSM are determined by continuity through a combination of driver's seat adjuster switch circuits. Driver's seat adjuster switch circuits are shared among individual switches, this limits ability of MSM to interpret simultaneous switch inputs.

POWER SEATS

Power seat system consists of these components: driver's and passenger's seat adjuster switch, driver's and passenger's seat submarine switch, driver's and passenger's seat horizontal adjuster motor, driver's and passenger's seat front vertical adjuster motor, driver's and passenger's seat rear vertical adjuster motor, driver's and passenger's seat recliner adjuster motor, and PWR SEAT 35-amp fuse located in fuse block. Seat adjuster motors are controlled by seat adjuster switch. Battery voltage and ground is supplied to seat adjuster motors through seat adjuster switch. All seat adjuster switch circuits are closed to ground (grounded) when in an inactive state. When a seat adjuster switch is pressed, one of the adjuster motor supply circuits is supplied battery voltage, and the other remains grounded. Adjuster motors are reversible and direction of motor rotation is determined by which circuit is supplied battery voltage by the switch.

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A submarine switch is mounted under power seat and prevents seat from being tilted to far forward. Battery voltage supply to front vertical motor down switch and rear vertical motor up switch is supplied through submarine switch. When seat reaches a point where no more forward tilt is allowed seat frame contacts submarine switch and opens battery voltage supply to front vertical motor down switch and rear vertical motor up switch.

COMPONENT LOCATIONS

COMPONENT LOCATIONS

Component	Location
Data Link Connector	Below Instrument Panel, To Right Of Steering Column
Front & Rear Vertical Adjuster Actuator Motor	Below Driver's & Passenger's Front Seat
Front Seat Heater Relays	Below Left Side Of Instrument Panel
Front Seat Heater Switches	On Center Of Instrument Panel, To Right Of A/C-Heater Control
Fuse Block	Lower Left Side Of Steering Column, On Instrument Panel
Heated Seat Harness Connector C315	Below Left Side Of Driver's Seat
Heated Seat Harness Connector C316	Below Front Passenger's Seat
Horizontal Adjuster Actuator Motor	Below Driver's & Passenger's Front Seat
Memory Seat Module	Below Driver's Seat
Rear Seat Cushion Heater Relay	Below Left Side Of Rear Seat
Rear Seat Heater Switch	On Rear Of Center Console
Seat Adjuster Switch	Outboard Side Of Seat Lower Trim
Seatback Heater	Driver's & Passenger's Seatback Cushion
Seat Cushion Heater	Driver's & Passenger's Seat Cushion
Seat Recliner Motor	On Side Of Driver's & Passenger's Seatback
Submarine Switch	Below Front Vertical Motor

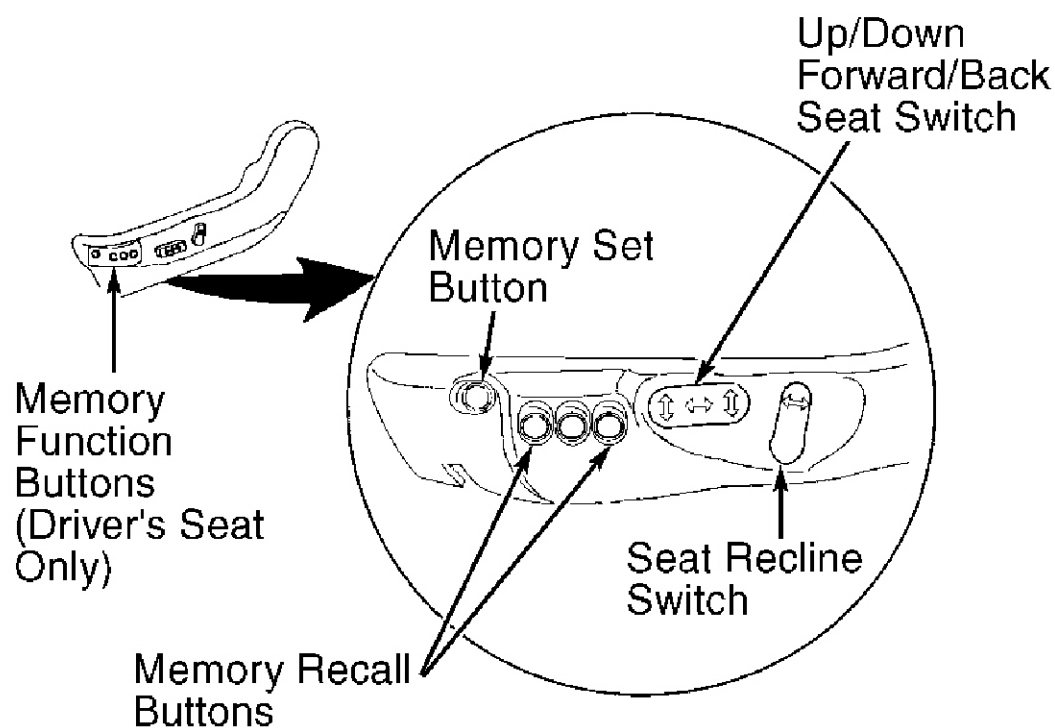
PROGRAMMING

MEMORY SEAT MODULE

1. Open driver's door. Connect scan tool to Data Link Connector (DLC). DLC is located below instrument panel, to right of steering column. Turn ignition switch to RUN position. Retrieve system related DTCs. If any system related DTCs exist, diagnose and repair system as necessary.
2. If any system related DTCs do not exist, ensure there are no objects in front, behind or under driver's seat which may prevent full seat movement. Initialize system programming by following instructions on scan tool display. DO NOT press any seat adjuster, memory or mirror switch buttons.
3. When scan tool displays PRESS MEMORY KEY & HOLD, press and hold memory button until scan tool displays RELEASE ALL KEY. If memory button is released before scan tool displays RELEASE ALL KEY, programming will resume when memory button is pressed.

MEMORY SEAT & MIRRORS

To program memory seat functions, move driver's seat, inside rearview mirror and outside rearview mirrors to desired positions. Depress "M" (memory set button) and No. 1 memory recall buttons on seat adjuster switch at same time and hold for 5 seconds. See **Fig. 2** . Seat position will now be saved. Seat positions may be programmed for 2 additional drivers by repeating procedure and pressing No. 2 and No. 3 memory recall buttons.



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Fig. 2: Identifying Power Seat Controls
 Courtesy of GENERAL MOTORS CORP.

ADJUSTMENTS

SEAT ADJUSTER PHASING

When installing power seat adjusters (except at back recliner), ensure each pair of adjusters is in phase. When adjusters are out of phase, one adjuster will reach its maximum travel limit before another, resulting in improper seat travel.

1. Operate horizontal, vertical and tilt switches until seat is in full forward, full up and full rear tilt position. Disconnect drive shafts from seat adjusters. See **ADJUSTER HORIZONTAL & VERTICAL DRIVE SHAFTS** under REMOVAL & INSTALLATION.
2. Operate adjusters to full forward, full up and full tilt position by hand, using drive shaft, or by inserting drive shaft into actuator motor. Reconnect drive shafts to seat adjusters.

TROUBLE SHOOTING

PRELIMINARY CHECKS

Verify customer complaint by operating system. Visually inspect for obvious signs of mechanical and electrical damage. Inspect for blown fuses. Inspect for loose or corroded connections, damaged wiring harnesses and/or switches. Check for a broken or partially broken wire inside insulation, which could cause system malfunction but prove good in a continuity/voltage check with system disconnected. Ensure any aftermarket electronic equipment is properly installed. Inspect window track for any binding or sticking. If fault is found, repair as necessary. If no fault is found, perform self-diagnostics. See **SELF-DIAGNOSTIC SYSTEM**.

SELF-DIAGNOSTIC SYSTEM

NOTE: Following DTCs are for Memory Seat system. DTC tests are written specifically

for use with GM Tech I or Tech II scan tools. Generic scan tool can be used, but may have limited functions. If Memory Seat feature is inoperative, see **TEST C: MEMORY SEAT FEATURE INOPERATIVE** in **SYSTEM TESTS**. 6-Way Power Seats are diagnosed using symptom based **SYSTEM TESTS**. See **SYSTEM TESTS** .

MEMORY SEAT SYSTEMS DIAGNOSTIC SYSTEM CHECK

1. Connect scan tool to Data Link Connector (DLC). DLC is located below instrument panel, to right of steering column. If scan tool does not power up, perform appropriate diagnostic test. See **BODY CONTROL MODULES - CATERA** article. If scan tool powers up, go to next step.
2. Turn ignition switch to RUN position. Attempt to establish communication with Memory Seat Module (MSM). If scan tool communicates with MSM, go to next step. If scan tool does not communicate with MSM, perform appropriate diagnostic test. See **BODY CONTROL MODULES - CATERA** article.
3. Using scan tool, select MSM display DTCs function. If scan tool displays any DTCs, perform appropriate test in accordance with DTC retrieved. See **DIAGNOSTIC TROUBLE CODE DEFINITIONS** . If scan tool does not display any DTCs, repair power seats by symptom. See **SYMPTOM INDEX** table under **SYSTEM TESTS**.

CLEARING DIAGNOSTIC TROUBLE CODES

Connect scan tool to Data Link Connector (DLC). Follow instructions on scan tool display to clear DTCs.

DIAGNOSTIC TROUBLE CODE DEFINITIONS

DIAGNOSTIC TROUBLE CODE DEFINITIONS

DTC	Description	Perform Test
011, 012, 016 Or 017	Driver's Seat Forward/Backward, Recliner, Front Height Or Rear Height Motor Inoperative	<u>DTC 011, 012, 016 Or 017</u>
021	Seat Adjuster Switch Inoperative	<u>DTC 21</u>
050 Or 055	Memory Seat Module Malfunction	<u>DTC 050 Or 055</u>

DIAGNOSTIC TESTS

DTC 011, 012, 016 OR 017: DRIVER'S SEAT FORWARD/BACKWARD, RECLINER, FRONT HEIGHT OR REAR HEIGHT MOTOR INOPERATIVE

Description

Seat adjuster motors are controlled by Memory Seat Module (MSM) through adjuster motor supply circuits. Adjuster motor operation occurs when MSM switches on of adjuster motor supply circuits to battery voltage and another to ground. Adjuster motors are reversible and direction of adjuster motor rotation is determined by which adjuster motor supply circuits is switched to battery voltage and which is grounded. Seat adjuster motors are equipped with positions sensors. Position sensors are supplied with a 5-volt reference and low reference circuits from MSM. Position sensor signal circuit voltage is pulled low by position sensor and varies from zero to 5 volts, depending on seat position. MSM uses position sensor signal voltages to determine seat position when storing or recalling seat position settings. Memory seat recall functions and seat adjuster motor will be disabled.

Code Enable Criteria

The following conditions must occur for DTC to be stored:

- Position sensor signal voltage to Memory Seat Module (MSM) is not .1-4.7 volts.
- MSM attempts to operate a seat adjuster motor and no change is observed through position sensor.

- Seat adjuster switch input to MSM is always active.

Testing

1. If power seat systems diagnostic system check has been performed, go to next step. If power seat systems diagnostic system check has not been performed, go to **POWER SEAT SYSTEMS DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Connect scan tool to Data Link Connector (DLC). DLC is located below instrument panel, to right of steering column. Attempt to operate seat adjuster motor which stored DTC. If scan tool displays DTC status as current, go to next step. If scan tool does not display DTC status as current, go to step 7 .
3. Using scan tool, display Memory Seat Module (MSM) data list. Observe position sensor voltage parameter. Position sensor voltage parameter should be .1-4.7 volts. If voltage is not as specified, go to next step. If voltage is as specified, inspect for intermittents. See **TROUBLE SHOOTING** .
4. Disconnect suspect position sensor harness connector. Using scan tool, observe suspect position sensor voltage parameter. Position sensor voltage parameter should be 4.7-5.0 volts. If voltage is as specified, go to next step. If voltage is not as specified, go to step 13 .
5. Connect a 3-amp fused jumper wire between MSM signal circuit and low reference circuit terminals. See **WIRING DIAGRAMS** . Using scan tool, observe suspect position sensor voltage. Position sensor voltage should be zero. If voltage is as specified, go to next step. If voltage is not as specified, go to step 12 .
6. Inspect suspect position sensor harness connector for any damage. If problem does not exist, go to step 11 . If problem exists, repair suspect position sensor harness connector as necessary. After repair, go to step 16 .
7. Using scan tool, display MSM data list, and observe both driver's and passenger's seat adjuster switch parameters. If either seat adjuster switch is displayed as active, go to next step. If either seat adjuster switch is not displayed as active, go to step 9 .
8. Disconnect driver's seat adjuster switch 18-pin harness connector C7 from MSM. See **Fig. 3** . Using scan tool, observe seat adjuster switch parameters. If either seat adjuster switch is displayed as active, go to step 13 . If either seat adjuster switch is not displayed as active, go to step 14 .
9. Disconnect all seat adjuster motor/position sensor harness connectors from MSM. Separate terminals, and connect position sensor harness connectors to MSM. Connect a test light between seat adjuster motor harness connector terminals. Using seat adjuster switch, press in all positions. If test light does not illuminate in all positions, go to next step. If test light illuminates in all positions, go to step 11 .
10. Inspect Gray/Brown wire for an open or high resistance between suspect seat adjuster motor and MSM harness connector. See **WIRING DIAGRAMS** . If problem does not exist, go to step 13 . If problem exists, repair Gray/Brown wire as necessary. After repair, go to step 16 .
11. Inspect suspect seat adjuster motor harness connector for any damage. If problem does not exist, go to next step. If problem exists, repair suspect seat adjuster motor harness connector as necessary. After repair, go to step 16 .
12. Replace suspect seat adjuster motor, then go to step 16 .
13. Replace MSM. Program MSM. See **MEMORY SEAT MODULE** under PROGRAMMING. After repair, go to step 16 .
14. Inspect suspect seat adjuster switch harness connector for any damage. If problem does not exist, go to next step. If problem exists, repair suspect seat adjuster switch harness connector as necessary. After repair, go to step 16 .
15. Replace suspect seat adjuster switch, then go to next step.
16. Using scan tool, clear DTCs. Operate system to verify repair. If DTC resets, repeat test beginning at step 2 .

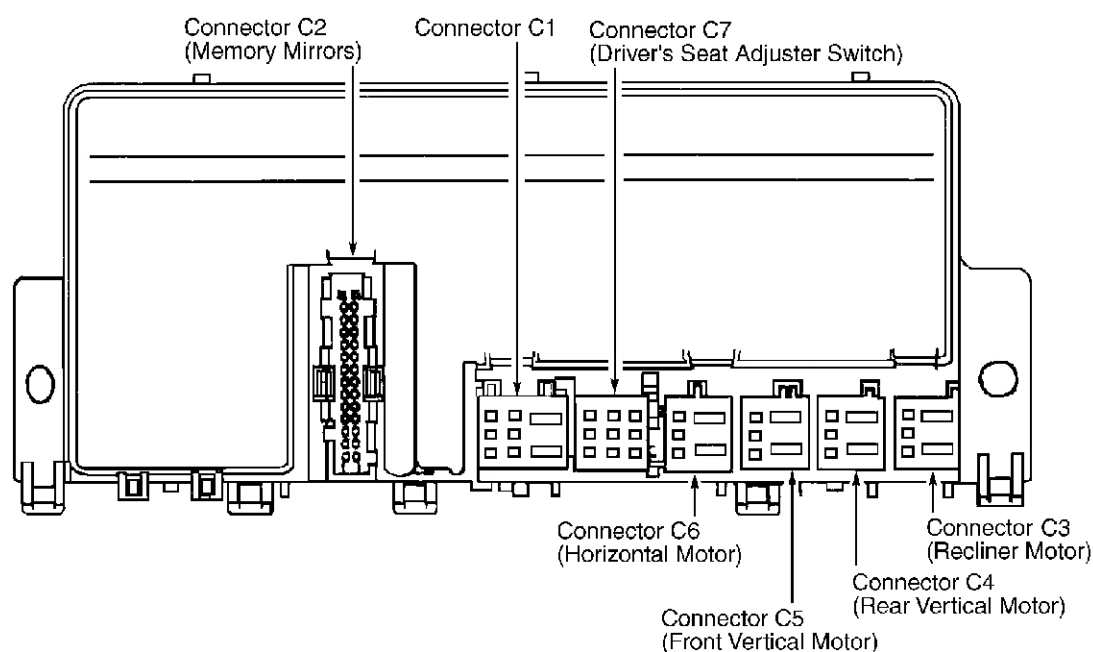


Fig. 3: Identifying Memory Seat Module Harness Connectors
 Courtesy of GENERAL MOTORS CORP.

Diagnostic Aids

Check for mechanical conditions which may prevent adjuster motor from operating properly. Inspect Memory Seat Module (MSM) harness connector terminals for damage or poor connections.

DTC 021: SEAT ADJUSTER SWITCH INOPERATIVE

Description

Memory Seat Module (MSM) monitors resistance through seat adjuster switch. Switch inputs to MSM are determined by continuity through a combination of seat adjuster switch circuits. Seat adjuster switch circuits are shared among individual switches, which limits ability of MSM to interpret simultaneous switch inputs. DTC 21 will set if one or more seat adjuster switches are shorted, stuck or has faulty circuits, or if MSM is faulty. When DTC is set, all power seat functions are disabled. DTC 21 will clear when fault no longer exists.

Code Enable Criteria

The following condition must occur for DTC to be stored:

- Memory Seat Module (MSM) is unable to determine which seat switch is active, because of continuity through multiple switch circuits.

Testing

1. If power seat systems diagnostic system check has been performed, go to next step. If power seat systems diagnostic system check has not been performed, go to **POWER SEAT SYSTEMS DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Disconnect seat adjuster switch harness connector C7 from Memory Seat Module (MSM). See **Fig. 3** . Check for DTCs. If DTC no longer exists, go to next step. If DTC still exists, go to step 5 .
3. Inspect seat adjuster switch harness connectors for damage. If problem does not exist, go to next step. If problem exists, repair seat adjuster harness connector as necessary. After repair, go to step 6 .
4. Replace seat adjuster switch. After repair, go to step 6 .
5. Replace MSM. Program MSM. See **MEMORY SEAT MODULE** under PROGRAMMING. After repair,

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go to next step.

- Using scan tool, clear DTCs. Operate system to verify repair. If DTC resets, repeat test beginning at step 2 .

Diagnostic Aids

Inspect seat adjuster switch for physical damage. Check for damaged switch harness connector at Memory Seat Module (MSM).

DTC 050 OR 055: MEMORY SEAT MODULE MALFUNCTION

Description

An internal failure in Memory Seat Module (MSM) will set DTC 50 or 55. When DTC is stored, MSM is disabled.

Code Enable Criteria

The following conditions must occur for DTC to be stored:

- High battery voltage supply circuit to Memory Seat Module (MSM) is open or unable to provide sufficient current flow to operate output devices.
- MSM EEPROM, RAM or ROM is defective.

Testing

- If power seat systems diagnostic system check has been performed, go to next step. If power seat systems diagnostic system check has not been performed, go to **POWER SEAT SYSTEMS DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
- Inspect Red wire for an open or high resistance between fuse block and Memory Seat Module (MSM) harness connector C1 terminal No. 1. If problem does not exist, go to next step. If problem exists, repair Red wire as necessary. After repair, go to step 5 .
- Inspect MSM harness connector for poor connections. If problem does not exist, go to next step. If problem exists, repair MSM harness connector as necessary. After repair, go to step 5 .
- Replace MSM. Program MSM. See **MEMORY SEAT MODULE** under PROGRAMMING. After repair, go to next step.
- Using scan tool, clear DTCs. Operate system to verify repair. If DTC resets, repeat test beginning at step 2 .

Diagnostic Aids

Replace Memory Seat Module (MSM).

SYSTEM TESTS

NOTE: System Tests are primarily used to diagnose 6-Way Power Seats based on symptoms. Memory Seat system use Test C, if system is inoperative. See **SYMPTOM INDEX** table to identify which test procedure to use for applicable symptom.

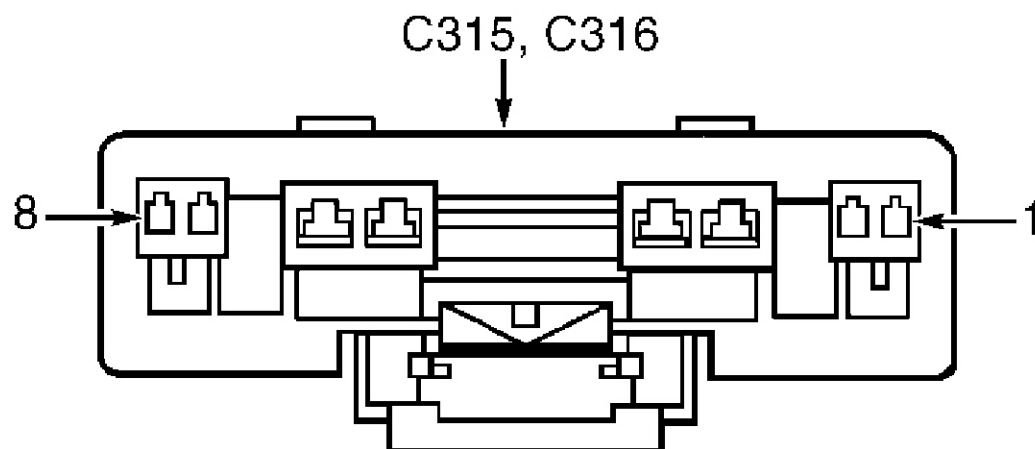
SYMPTOM INDEX

Symptom	Perform Test
Power Seat Inoperative	<u>A</u>
Power Seat Does Not Tilt Forward	<u>B</u>
Memory Seat Feature Inoperative	<u>C</u>

Heated Seat Always On - Front	<u>D</u>
Heated Seat Inoperative - Front	<u>E</u>
Heated Seat Always On - Rear	<u>F</u>
Heated Seat Inoperative - Rear	<u>G</u>

TEST A: POWER SEAT INOPERATIVE

1. Review power seat operation. See **POWER SEATS** under DESCRIPTION & OPERATION. After review, go to next step.
2. If all seat adjuster motors are inoperative, go to next step. If any seat adjuster motors are inoperative, go to step 5 .
3. Disconnect suspect seat adjuster switch harness connector. Connect a test light between ground and suspect seat adjuster switch harness connector terminal No. 3 (Red wire). See **Fig. 4** . If test light illuminates, go to next step. If test light does not illuminate, go to step 8 .
4. Connect a test light between suspect seat adjuster switch harness connector terminals No. 3 (Red wire) and 4 (Black wire). If test light illuminates, go to next step. If test light does not illuminate, go to step 9 .
5. Disconnect suspect seat adjuster motor harness connector. Connect a test light between suspect seat adjuster motor supply circuit terminals. See **WIRING DIAGRAMS** . Using suspect seat adjuster switch, operate power seat through all positions. If test light does not illuminate in all positions, go to next step. If test light illuminates in all positions, go to step 7 .
6. Inspect suspect seat adjuster switch pigtail harness and/or connector for any damage. If problem does not exist, go to step 10 . If problem exists, repair suspect seat adjuster switch pigtail harness and/or connector as necessary. After repair, go to step 12 .
7. Inspect suspect seat adjuster motor pigtail harness and/or connector for any damage. If problem does not exist, go to step 11 . If problem exists, repair suspect seat adjuster motor pigtail harness and/or connector as necessary. After repair, go to step 12 .
8. Repair open or high resistance in Red wire between suspect seat adjuster switch and fuse block. After repair, go to step 12 .
9. Repair open or high resistance in Black wire between ground and suspect seat adjuster switch. Ground point is located on left front of engine compartment. After repair, go to step 12 .
10. Replace suspect seat adjuster switch, then go to step 12 .
11. Replace suspect seat adjuster motor, then go to next step.
12. Operate system to verify repair. If system is not operating correctly, repeat test beginning at step 2 .



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Fig. 4: Identifying Seat Adjuster Switch Harness Connectors C315 & C316 Terminals
Courtesy of GENERAL MOTORS CORP.

TEST B: POWER SEAT DOES NOT TILT FORWARD

1. Review power seat operation. See **POWER SEATS** under DESCRIPTION & OPERATION. After review, go to next step.
2. Disconnect suspect seat adjuster motor harness connector. Connect a test light between suspect seat adjuster motor supply circuit terminals. See **WIRING DIAGRAMS** . Using suspect seat adjuster switch, operate power seat through all positions. If test light does not illuminate in all positions, go to next step. If test light illuminates in all positions, go to step 5 .
3. Disconnect submarine switch harness connector. Connect a fused jumper wire between submarine Gray/Brown wire and Gray/Pink wire terminals. See **WIRING DIAGRAMS** . Ensure test light is still connected between suspect seat adjuster motor supply circuit terminals. Using suspect seat adjuster switch, operate power seat to UP and DOWN positions. If test light illuminates in both positions, go to next step. If test light does not illuminate in both positions, go to step 6 .
4. Inspect submarine switch for any mechanical damage or conditions which may prevent proper operation. If problem does not exist, go to step 7 . If problem exists, repair submarine switch as necessary. After repair, go to step 10 .
5. Inspect suspect seat adjuster motor pigtail harness and/or connector for any damage. If problem does not exist, go to step 8 . If problem exists, repair suspect seat adjuster motor pigtail harness and/or connector as necessary. After repair, go to step 10 .
6. Inspect suspect seat adjuster switch pigtail harness and/or connector for any damage. If problem does not exist, go to step 9 . If problem exists, repair suspect seat adjuster switch pigtail harness and/or connector as necessary. After repair, go to step 10 .
7. Replace submarine switch, then go to step 10 .
8. Replace suspect seat adjuster motor, then go to step 10 .
9. Replace suspect seat adjuster switch, then go to next step.
10. Operate system to verify repair. If system is not operating correctly, repeat test beginning at step 2 .

TEST C: MEMORY SEAT FEATURE INOPERATIVE

1. If power seat systems diagnostic system check has been performed, go to next step. If power seat systems diagnostic system check has not been performed, perform **POWER SEAT SYSTEMS DIAGNOSTIC SYSTEM CHECK** under SELF-DIAGNOSTIC SYSTEM.
2. Connect scan tool to Data Link Connector (DLC). DLC is located below instrument panel, to right of steering column. Using scan tool, display Memory Seat Module (MSM) data list. If any seat adjuster or memory switch displays as always active, go to next step. If any seat adjuster or memory switch does not display as always active, go to step 4 .
3. Disconnect seat adjuster switch harness connector C7 from MSM. See **Fig. 3** . If any seat adjuster or memory switch does not display as always active, go to step 5 . If any seat adjuster or memory switch displays as always active, go to step 7 .
4. Disconnect seat adjuster switch harness connector C7 from MSM. See **Fig. 3** . Using a DVOM, test continuity of seat adjuster and memory recall switches, while pressing all buttons on switches. If all seat adjuster and memory switches do not have continuity when pressed, go to next step. If all seat adjuster and memory switches have continuity when pressed, go to step 7 .
5. Inspect seat adjuster switch circuits or harness connector terminals for any damage. If problem does not exist, go to next step. If problem exists, repair seat adjuster circuits or harness connector terminals as necessary. After repair, go to step 8 .
6. Replace seat adjuster switch, then go to step 8 .

7. Replace MSM. Program MSM. See **MEMORY SEAT MODULE** under PROGRAMMING. After repair, go to next step.
8. Operate system to verify repair. If system is not operating correctly, repeat test beginning at step 2 .

TEST D: HEATED SEAT ALWAYS ON

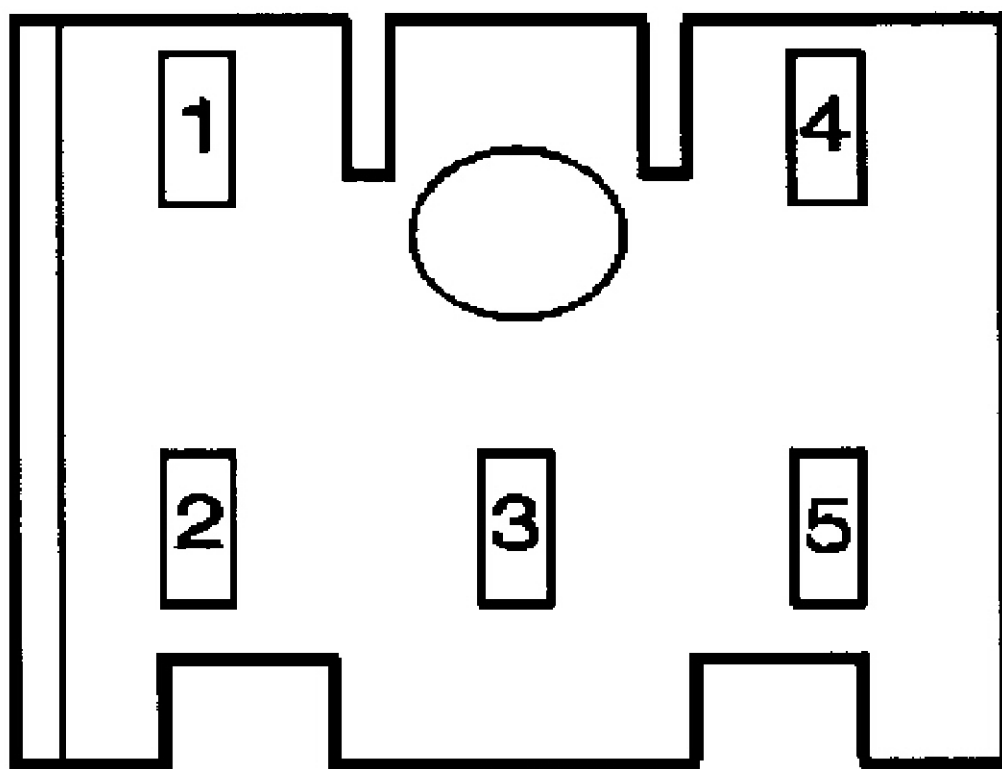
1. Review heated seat operation. See **HEATED SEATS** under DESCRIPTION & OPERATION. After review, go to next step.
2. Turn ignition switch to RUN position. Turn front heated seat heater switches off. If heated seats turn do not turn off, go to next step. If heated seats turn off, inspect for intermittents. See **TROUBLE SHOOTING** .
3. Disconnect suspect heated seat switch harness connector. If heated seats do not remain on, go to next step. If heated seats remain on, go to step 5 .
4. Replace suspect heated seat switch, then go to step 6 .
5. Replace suspect heated seat cushion, then go to next step.
6. Operate system to verify repair. If system is not operating correctly, repeat test beginning at step 3 .

TEST E: HEATED SEAT INOPERATIVE - FRONT

1. Review heated seat operation. See **HEATED SEATS** under DESCRIPTION & OPERATION. After review, go to next step.
2. Turn ignition switch to RUN position. Turn driver's and passenger's seat heater switches through 1-5 positions. If heated seats are inoperative, go to next step. If heated seat operate, inspect for intermittents. See **TROUBLE SHOOTING** .
3. Disconnect suspect seat heater switch harness connector. Connect a test light between ground and suspect seat heater switch harness connector terminal No. 3 (Brown wire). Turn ignition switch to RUN position. If test light illuminates, go to next step. If test light does not illuminate, go to step 10 .
4. Using a DVOM, measure resistance between suspect seat heater switch harness connector terminals No. 2 (Black/Green wire on drivers switch, Black/Yellow wire on passengers switch) and 3 (Brown wire). See **Fig. 5** . Turn suspect seat heater switch through all positions (1-5). Resistance should measure 0-.5 ohms. If resistance is as specified, go to next step. If resistance is not as specified, go to step 13 .
5. Using DVOM, measure resistance between suspect seat heater switch harness connector terminals No. 3 (Brown wire) and 5 (Black/Red wire on drivers switch, Black/Blue wire on passengers switch). Turn suspect seat heater switch through all positions (1-5). Resistance should measure 0.5-9.5 k/ohms. If resistance is as specified, go to next step. If resistance is not as specified, go to step 13 .
6. Disconnect suspect heated seat harness connector C315 or C316. Inspect Black/Green wire for an open or high resistance between seat heater switch harness connector terminal No. 2 and heated seat harness connector C315 terminal No. 2 (on passenger's heated seat harness connector C316, Black/Yellow wire). See **Fig. 4** and **Fig. 5** . Inspect Black/Red wire for an open or high resistance between seat heater switch harness connector terminal No. 5 and heated seat harness connector C315 terminal No. 1 (on passenger's heated seat harness connector C316, Black/Blue wire). If problem does not exist, go to next step. If problem exists, repair Black/Green wire, Black/Red wire, Black/Yellow wire and/or Black/Blue wire are necessary. See **WIRING DIAGRAMS** . After repair, go to step 16 .
7. Connect a test light between ground and suspect heated seat harness connector terminal No. 6 (Red wire). If test light illuminates, go to next step. If test light does not illuminate, go to step 11 .
8. Connect a test light between suspect heated seat harness connector terminals No. 5 (Black wire) and 6 (Red wire). See **Fig. 4** . If test light illuminates, go to next step. If test light does not illuminate, go to step 12 .
9. Disconnect suspect harness connector between seat cushion and seat back. Measure resistance of heater element between seat harness connector terminals. Resistance should be .5-2.0 ohms. If resistance is not as specified, go to step 14 . If resistance is as specified, go to step 15 .
10. Repair open or high resistance in Brown wire between suspect seat heater switch and fuse block. After repair,

go to step 16 .

11. Repair open or high resistance in Red wire. After repair, go to step 16 .
12. Repair open in Black wire between ground and suspect heated seat harness connector. Ground point is located on left front of engine compartment. After repair, go to step 16 .
13. Replace suspect seat heater switch, then go to step 16 .
14. Replace suspect seat back, then go to step 16 .
15. Replace suspect seat cushion, then go to next step.
16. Operate system to verify repair. If system is not operating correctly, repeat test beginning at step 3 .



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Fig. 5: Identifying Seat Heater Switch Harness Connector Terminals
Courtesy of GENERAL MOTORS CORP.

TEST F: HEATED SEAT ALWAYS ON - REAR

1. Review heated seat operation. See **HEATED SEATS** under DESCRIPTION & OPERATION. After review, go to next step.
2. Turn ignition switch to RUN position. Turn both left and right seat heater switches off. If rear heated seats do not remain off, go to next step. If rear heated seats remain off, inspect for intermittents. See **TROUBLE SHOOTING** .
3. Disconnect suspect rear seat heater switch harness connector. If rear heated seats do not turn off, go to next step. If rear heated seats turn off, go to step 6 .
4. Disconnect suspect rear seat cushion heater relay. Rear seat cushion heater relay is located below left side of rear seat. If rear heated seats turn off, go to next step. If rear heated seats do not turn off, go to step 7 .
5. Inspect Black/White wire for a short to voltage between suspect seat heater switch harness connector terminal No. 2 and suspect rear seat cushion heater relay harness connector terminal No. 5. See **Fig. 5** and **Fig. 6** . If

problem does not exist, go to step 8 . If problem exists, repair Black/White wire as necessary. After repair, go to step 9 .

6. Replace suspect rear seat heater switch. After repair, go to step 9 .
7. Repair short to voltage in suspect rear seat heater element supply circuit. See **WIRING DIAGRAMS** . After repair, go to step 9 .
8. Replace suspect rear seat cushion heater relay. After repair, go to next step.
9. Operate system to verify repair. If system is not operating correctly, repeat test beginning at step 3 .

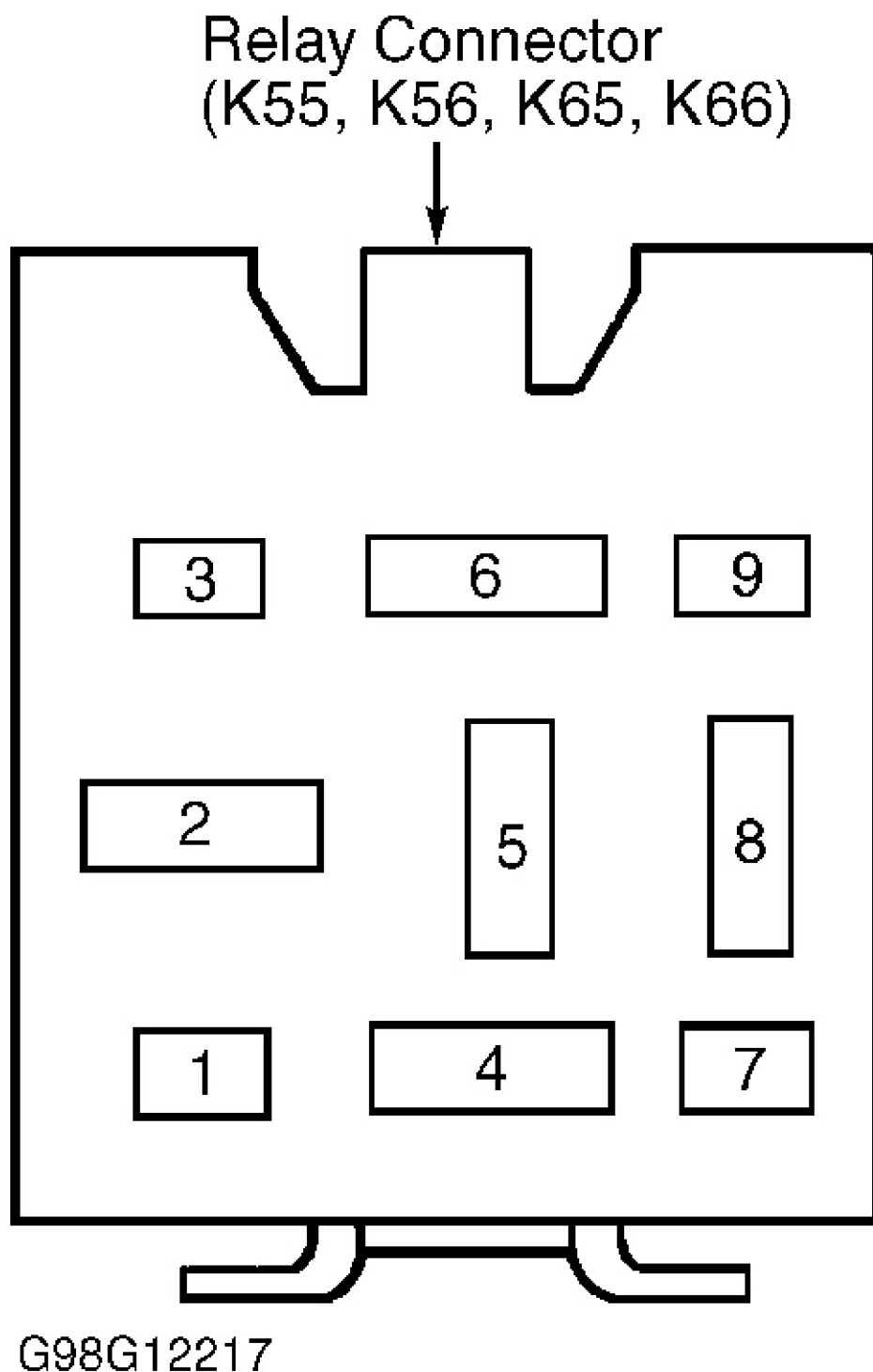


Fig. 6: Identifying Rear Seat Cushion Heater Relay Connector Terminals
Courtesy of GENERAL MOTORS CORP.

TEST G: HEATED SEAT INOPERATIVE - REAR

1. Review heated seat operation. See **HEATED SEATS** under DESCRIPTION & OPERATION. After review, go to next step.
2. Turn ignition switch to RUN position. Turn left and right rear seat heater switches on. If rear heated seats are inoperative, go to next step. If rear heated seats operate, inspect for intermittents. See **TROUBLE SHOOTING**.
3. If rear heated seat switch indicator does not operate correctly, go to next step. If rear heated seat switch indicator operates correctly, go to step 11.
4. Disconnect suspect rear seat cushion heater relay. Rear seat cushion heater relay is located below left side of rear seat. Connect a test light between ground and suspect rear seat cushion heater relay harness connector terminal No. 2 (Red wire). See **Fig. 6**. If test light illuminates, go to next step. If test light does not illuminate, go to step 13.
5. Connect a test light between ground and suspect rear seat cushion heater relay harness connector terminal No. 6 (Brown wire). Turn ignition switch to RUN position. If test light illuminates, go to next step. If test light does not illuminate, go to step 14.
6. Turn ignition switch to OFF position. Connect a test light between ground and suspect rear seat cushion heater relay harness connector terminal No. 5 (Black/White wire). Turn ignition switch to RUN position. Turn suspect rear seat heater switch on. If test light illuminates, go to next step. If test light does not illuminate, go to step 9.
7. Connect a test light between battery voltage and suspect rear seat cushion heater relay harness connector terminal No. 4 (Black wire). If test light illuminates, go to next step. If test light does not illuminate, go to step 15.
8. Inspect suspect rear heated seat element supply circuit for an open or high resistance between suspect rear seat cushion heater relay harness connector terminal No. 8 and suspect rear seat cushion heater. See **WIRING DIAGRAMS**. If problem does not exist, go to step 16. If problem exists, repair rear heated seat element supply circuit as necessary. After repair, go to step 19.
9. Turn ignition switch to OFF position. Disconnect suspect rear seat heater switch harness connector. Connect a test light between ground and suspect rear heated seat switch harness connector terminal No. 3 (Brown wire). Turn ignition switch to RUN position. If test light illuminates, go to next step. If test light does not illuminate, go to step 14.
10. Inspect Black/White wire for an open or high resistance between suspect rear seat heater switch harness connector terminal No. 2 and suspect rear seat cushion heater relay harness connector terminal No. 5. If problem does not exist, go to step 17. If problem exists, repair Black/White wire as necessary. After repair, go to step 19.
11. Disconnect suspect rear seat back or seat cushion heater harness connector. Connect a test light between suspect rear seat back or seat cushion heater harness connector terminals. See **WIRING DIAGRAMS**. Turn ignition switch to RUN position. Turn suspect seat heater switch on. If test light does not illuminate, go to next step. If test light illuminates, go to step 18.
12. Inspect suspect rear seat heater element supply circuit for an open or high resistance. See **WIRING DIAGRAMS**. If problem does not exist, go to step 15. If problem exists, repair suspect rear seat heater element supply circuit as necessary. After repair, go to step 19.
13. Repair open or high resistance in Red wire between suspect rear seat cushion heater relay and fuse block. After repair, go to step 19.
14. Repair open or high resistance in Brown wire between suspect rear seat cushion heater relay and fuse block. After repair, go to step 19.
15. Repair open or high resistance in Black wire between ground and suspect rear seat cushion heater relay. Ground point is located at base of left "A" pillar. After repair, go to step 19.
16. Replace suspect rear seat cushion heater relay. After repair, go to step 19.

17. Replace suspect seat heater switch. After repair, go to step 19 .
18. Replace suspect rear seat heater element, then go to next step.
19. Operate system to verify repair. If system is not operating correctly, repeat test beginning at step 3 .

REMOVAL & INSTALLATION

WARNING: Vehicles are equipped with air bag supplemental restraint system. Before attempting any repairs involving steering column, instrument panel or related components, see **SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM** in appropriate **AIR BAG RESTRAINT SYSTEMS** article.

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See **COMPUTER RELEARN PROCEDURES** article in **GENERAL INFORMATION** before disconnecting battery.

ADJUSTER HORIZONTAL & VERTICAL DRIVE SHAFTS

Removal & Installation

Remove front seat. See **POWER SEAT** . Remove power seat adjuster. See **POWER SEAT ADJUSTER** . Remove seat adjuster actuator motor. See **POWER ACTUATOR MOTORS** . Remove drive shaft. See **Fig. 9** . To install, reverse removal procedure.

FRONT SEAT HEATER SWITCH

Removal & Installation

Using a small, flat-bladed tool, gently pry on right side of seat heater switch button to remove from instrument panel. To install, reverse removal procedure.

HEATING ELEMENTS

Removal & Installation

1. Remove seatback cushion cover. See **SEAT & SEATBACK CUSHION COVERS** .
2. Cut along seams on inside of seat cover. DO NOT cut through front side of seat cover. Cut heating element wires. Remove heating element and wiring from seat cover.
3. To install, position heating element to seat cover. Place heating element wiring in same location as old wiring. Fold over ends of new heating element and tape to seat cushion cover. To complete installation, reverse removal procedure.

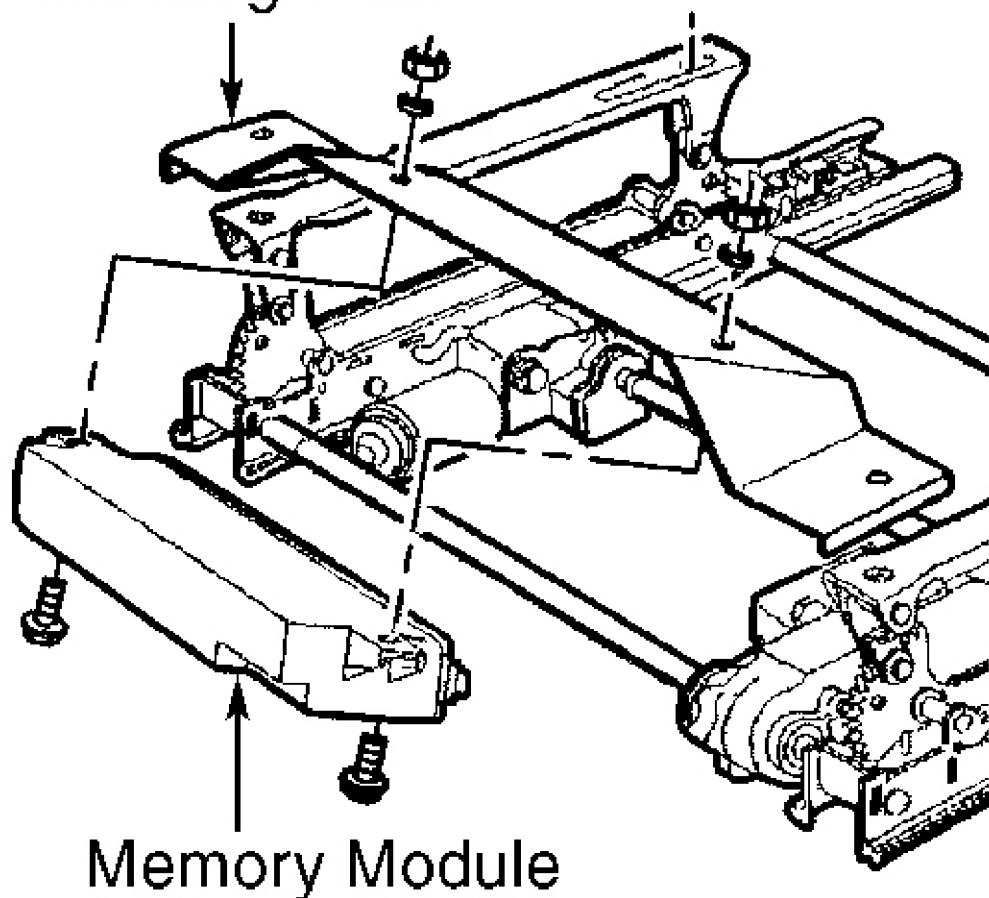
MEMORY SEAT MODULE

Removal & Installation

1. Remove driver's seat. See **POWER SEAT** . Using thin-blade screwdriver, gently pry off seat adjuster switch buttons. Remove cushion outer finish panel screw, located in front of seat frame. Remove seat adjuster switch screws. Remove cushion outer finish panel.
2. Disconnect Memory Seat Module (MSM) harness connectors (wiring harness is routed under seat cushion frame and secured with tie-straps). Remove MSM. See **Fig. 7** .
3. To install, reverse removal procedure. If MSM is replaced, reprogram new MSM. See **MEMORY SEAT MODULE** under **PROGRAMMING**. When routing MSM wiring harness, install tie straps to prevent

damage.

Mounting Plate



Memory Module

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Fig. 7: Removing Memory Seat Module
Courtesy of GENERAL MOTORS CORP.

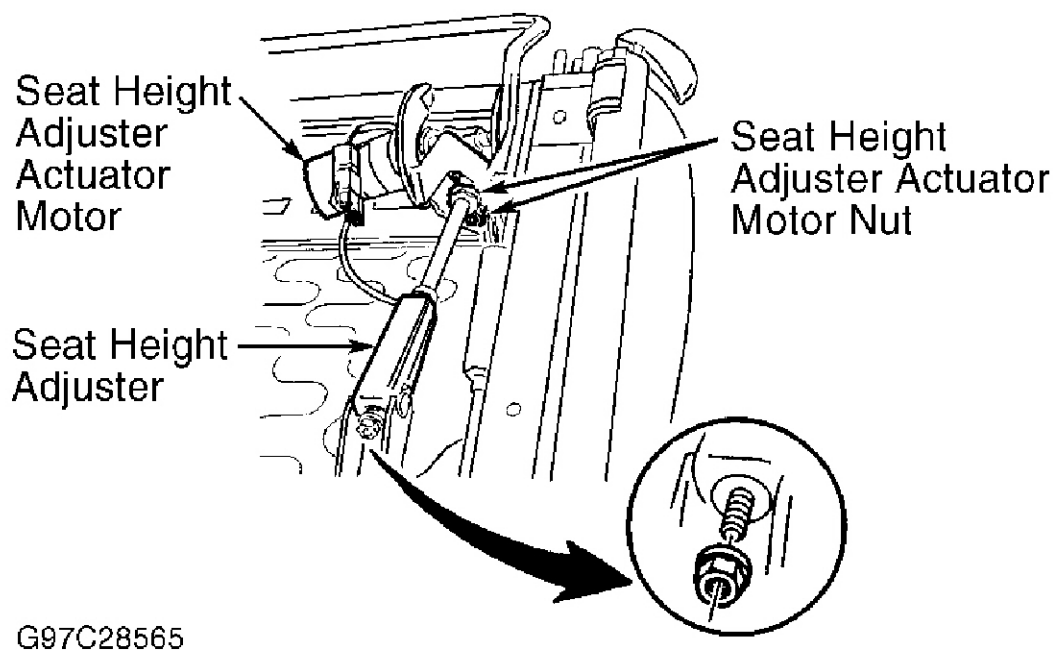
POWER ACTUATOR MOTORS

NOTE: When any power actuator motor with potentiometer is replaced, Memory Seat Module (MSM) needs to be programmed. See MEMORY SEAT MODULE under PROGRAMMING.

Removal & Installation (Height Adjuster/Actuator Motor)

1. Remove front seat. See POWER SEAT . Using thin-blade screwdriver, gently pry off seat adjuster switch buttons. Remove cushion outer finish panel screw, located in front of seat frame. Remove seat adjuster switch screws. Remove cushion outer finish panel.
2. Remove seat height adjuster harness connector. Remove bolts and seat adjuster. Remove height adjuster actuator motor nuts. Remove adjuster nut. See Fig. 8 . Remove bolts and height adjuster actuator motor. Remove seat height adjuster.
3. To install, reverse removal procedure. Ensure actuator motor is aligned with height adjuster shaft. Tighten adjuster bolts to 19 ft. lbs. (25 N.m). Ensure adjusters are in phase. See SEAT ADJUSTER PHASING

under ADJUSTMENTS.



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Fig. 8: Removing Seat Height Adjuster Actuator Motor
Courtesy of GENERAL MOTORS CORP.

Removal & Installation (Power Recliner)

1. Remove front seat. See **POWER SEAT** . Remove seatback cushion foam. See **SEAT & SEATBACK CUSHION COVERS** .
2. Disconnect power recliner actuator motor harness connectors. Remove retaining clip and seatback recliner actuator shaft from seatback. Remove screws and power recliner actuator motor. To install, reverse removal procedure.

Removal & Installation (Seat Adjuster Motor)

Remove power seat adjuster. See **POWER SEAT ADJUSTER** . Slide adjuster actuator motor off of drive shaft. To install, reverse removal procedure. Ensure adjusters are in phase. See **SEAT ADJUSTER PHASING** under ADJUSTMENTS.

POWER SEAT

Removal & Installation (Driver's Seat)

1. Disable air bag system, if equipped with seat-mounted side air bags. Disconnect air bag seatback module harness connector, if equipped. See appropriate AIR BAG RESTRAINT SYSTEMS article. Move seat to full forward position. Remove front seat track rear trim cover screw.
2. Slide front seat track trim cover off. Remove seat rear anchor bolts. Move seat to full rearward position. Remove seat front anchor bolts. To access seat track-to-seat frame bolts, move seat to center and upright position. Disconnect seat harness connectors. Remove seat.
3. To install, reverse removal procedure. Tighten front and rear seat anchor bolts to 19 ft lbs. (25 N.m). Activate air bag system. See appropriate AIR BAG RESTRAINT SYSTEMS article.

Removal & Installation (Passenger's Seat)

1. Disable air bag system, if equipped with seat-mounted side air bags. Disconnect air bag seatback module

harness connector, if equipped. See appropriate AIR BAG RESTRAINT SYSTEMS article. Move seat to full forward and up position.

2. If any vertical motor is seized, it may be necessary to cut rear driveshaft and remove motor to raise seat. Remove seat track trim cover screw and seat track trim cover. Remove rear seat anchor bolts. Move seat to full rearward and tilt back position.
3. Remove front seat anchor bolts. Move seat to center and upright position (this will allow seat track bolts to be removed when seat is out of vehicle). Disconnect seat harness connectors. Remove seat from vehicle.
4. To install, reverse removal procedure. Tighten front and rear seat anchor bolts to 19 ft lbs. (25 N.m). Activate air bag system. See appropriate AIR BAG RESTRAINT SYSTEMS article.

POWER SEAT ADJUSTER

Removal & Installation

1. Remove front seat. See **POWER SEAT** . Using thin-blade screwdriver, gently pry off seat adjuster switch buttons. Remove cushion outer finish panel screw, located in front of seat frame. Remove adjuster control switch screws. Remove cushion outer finish panel.
2. Disconnect Memory Seat Module (MSM) harness connectors. Remove seat adjuster bolts. Remove seat adjuster (leaving actuator motors attached). Disconnect 3 drive shafts from seat adjuster and actuator motors. See **Fig. 9** .
3. If removing inner seat adjuster, remove seat belt buckle pretensioner. Remove actuator motor nuts. Remove actuator motors from seat adjuster.
4. To install, reverse removal procedure. Tighten actuator motor nuts to 89 INCH lbs. (10 N.m). Tighten seat adjuster bolts to 19 ft. lbs. (25 N.m). Adjust seat adjuster phase. See **SEAT ADJUSTER PHASING** under ADJUSTMENTS.

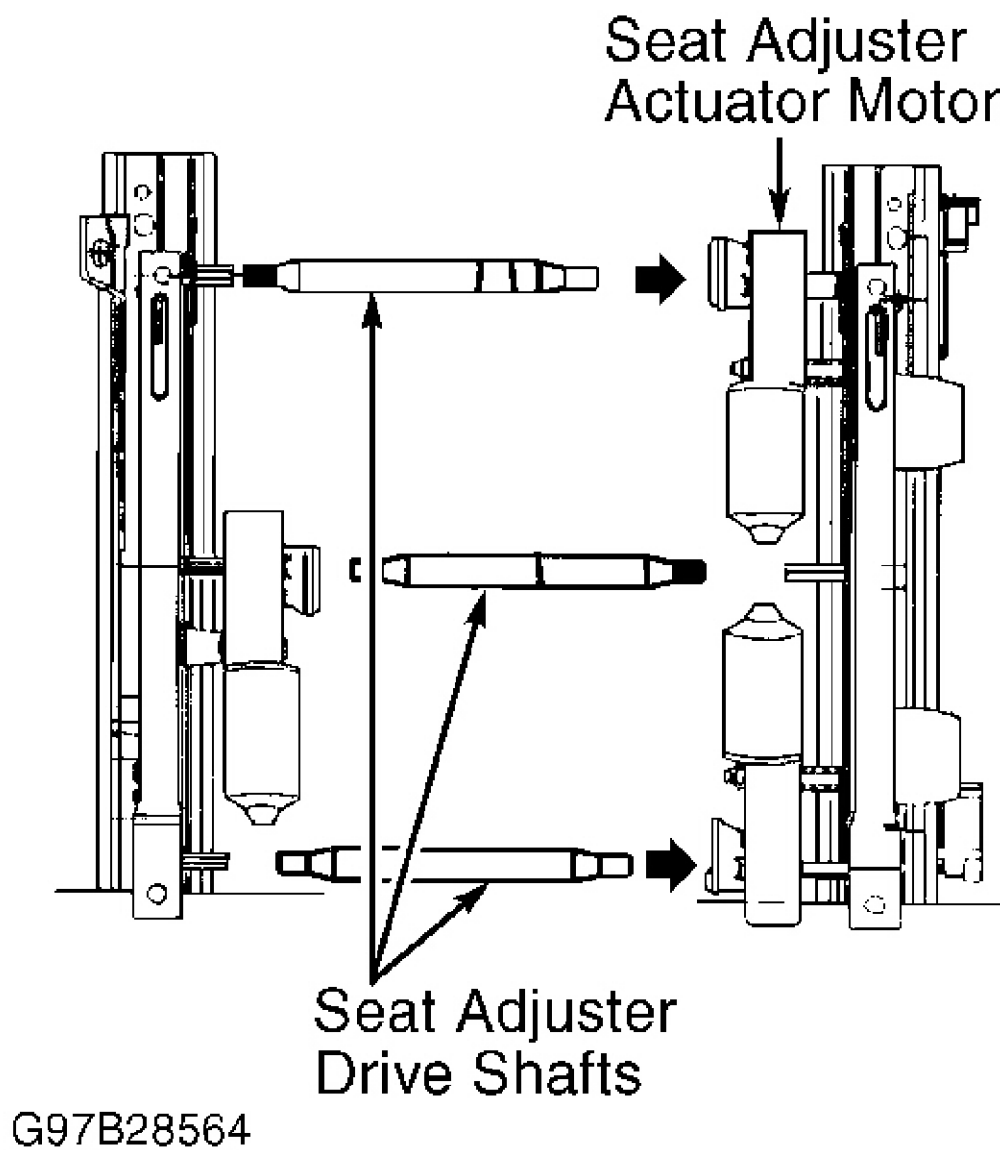


Fig. 9: Removing Power Seat Adjuster Components
Courtesy of GENERAL MOTORS CORP.

REAR SEAT HEATER SWITCH

Removal & Installation

Using a flat-bladed screwdriver, gently pry rear seat heater switch panel from center console. Disconnect seat heater switch harness connector. Remove seat heater switch from panel. To install, reverse removal procedure.

REAR SEAT CUSHION HEATER RELAY

Removal & Installation

1. Pull release handles located at base of seat cushion, and pull out seat cushion. Disconnect heating element harness connectors. Remove seat belt from cushion, and remove seat cushion.
2. Pull back carpet on left side to expose relays. Using small screwdriver, release relay from clip. Remove rear seat cushion relay. To install, reverse removal procedure.

SEAT ADJUSTER SWITCH

Removal & Installation

2001 Cadillac Catera

2001 ACCESSORIES & EQUIPMENT Power Seats - Catera

1. Remove front seat. See **POWER SEAT** . Using thin-blade screwdriver, gently pry off seat adjuster switch buttons. Remove cushion outer finish panel screw, located in front of seat frame.
2. Remove seat adjuster switch screws. Remove cushion outer finish panel. Disconnect seat adjuster switch harness connectors. Remove seat adjuster switch.
3. To install, reverse removal procedure. Ensure wiring harness is secured to seat frame with tie-straps to prevent damage.

SEAT & SEATBACK CUSHION COVERS

Removal & Installation (Front Seat Cushion)

Remove front seat. See **POWER SEAT** . Remove seatback. See **SEATBACK** . Remove cushion cover retaining rings. Remove seat cushion cover. To install, reverse removal procedure.

Removal & Installation (Rear Seat Cushion)

1. Pull release handles located at base of seat cushion, and pull out seat cushion. Disconnect heating element harness connectors. Remove seat belt from cushion, and seat cushion.
2. Put down protective cover to prevent damage to cushion cover, and remove cushion cover retaining rings. Remove seat cushion cover. To install, reverse removal procedure.

Removal & Installation (Front Seatback Cushion)

1. Remove front seat. See **POWER SEAT** . Remove seatback. See **SEATBACK** . Raise headrest restraint to full upright position. Push in on tabs, and remove headrest restraint. Remove lateral release knob and bezel, if equipped.
2. Using small screwdriver, gently pry off lumbar support actuator knobs. Remove seatback panel screws located at bottom of seatback panel. Remove seatback panel. Remove inflatable restraint front seat module (if equipped). See appropriate AIR BAG RESTRAINT SYSTEMS article.
3. Unhook seatback inner liner (use small thin-blade screwdriver to release lower hooks). Push in on release tabs, and remove headrest restraint release tab retainers. Remove retaining rings. Remove seatback cushion cover. Remove seat heater wiring through seat cushion pad. To install, reverse removal procedure.

Removal & Installation (Rear Seatback Cushion)

1. Pull release handles located at base of seat cushion, and pull out seat cushion. Disconnect heating element harness connectors. Remove seat belt from cushion, and seat cushion.
2. Fold down rear seatback cushion. Remove retaining clips and hinge bolts. Remove rear seatback from vehicle. Disconnect seatback heating element harness connector. Drill out rivets, and remove seatback release latch.
3. Unhook seatback cushion cover from around frame. Remove retainer rings from center of seatback cushion cover. DO NOT damage heating element while removing retaining rings.
4. To install, reverse removal procedure. Tighten rear seatback hinge bolts to 15 INCH lbs. (20 N.m).

SEATBACK

Removal (Front Seat)

1. Remove front seat. See **POWER SEAT** . Using thin-blade screwdriver, gently pry off seat adjuster control buttons. Remove cushion outer finish panel screw, located in front of seat frame. Remove adjuster control switch screws. Remove cushion outer finish panel.
2. Disconnect Memory Seat Module (MSM) harness connectors (wiring harness is routed under seat cushion frame and secured with tie-straps). Unsnap seat cushion inner finish panel.

2001 Cadillac Catera

2001 ACCESSORIES & EQUIPMENT Power Seats - Catera

3. If equipped with seatback air bag module, remove front seatback panel. Disconnect air bag harness connector. Detach air bag module wiring harness from seat.
4. Disconnect heating and recliner harness connectors. Remove seatback inner and outer clip. Remove seatback inner and outer bolts. Remove seatback from seat cushion.

Installation

To install, reverse removal procedure. Tighten seatback inner and outer bolts to 35 ft. lbs. (45 N.m). When routing MSM harness wiring harness, install tie straps to prevent damage.

SUBMARINE SWITCH

Removal & Installation

1. Remove front seat. See **POWER SEAT** . Using thin-blade screwdriver, gently pry off seat adjuster switch buttons. Remove cushion outer finish panel screw, located in front of seat frame.
2. Disconnect Memory Seat Module (MSM) harness connectors. Disconnect submarine switch harness connector. Remove seat adjuster. See **POWER SEAT ADJUSTER** . Unhook and remove submarine switch from inner seat adjuster.
3. To install, ensure submarine switch is attached at all 3 places on inner seat adjuster. To complete installation, reverse removal procedure. When seat is installed in vehicle, ensure submarine switch arms move up and down with seat adjuster.

WIRING DIAGRAMS

2001 Cadillac Catera

2001 ACCESSORIES & EQUIPMENT Power Seats - Catera

Fig. 10: Power Memory Seats Wiring Diagram (Catera)

2001 Cadillac Catera

2001 ACCESSORIES & EQUIPMENT Power Seats - Catera

Fig. 11: Power 6-Way & Reclining Seats Wiring Diagram (Catera)

2001 Cadillac Catera

2001 ACCESSORIES & EQUIPMENT Power Seats - Catera

Fig. 12: Power Heated Seats Wiring Diagram (Catera - Front)

2001 Cadillac Catera

2001 ACCESSORIES & EQUIPMENT Power Seats - Catera

Fig. 13: Power Heated Seats Wiring Diagram (Catera - Rear)

2001 Cadillac Catera

2001 ACCESSORIES & EQUIPMENT Power Seats - Catera

2001 Cadillac Catera

2001 ACCESSORIES & EQUIPMENT Power Seats - Catera

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