HEATED SEAT SYSTEM

TABLE OF CONTENTS

GENERAL INFORMATION

INTRODUCTION

Individually controlled electrically heated front seats are available factory-installed optional equipment on this model. The seat heaters will only operate when the ignition switch is in the ON position, and the surface temperature at the front seat heating element sensors is below the designed temperature set points of the system. The heated seat system will not operate in ambient temperatures greater than about 32° C (90° F).

There are separate momentary, tactile, two-directional rocker switches located in the center console with center NEUTRAL, HI and LO positions for each front seat. Depressing the rocker switch to its momentary HI or LO position signals the Seat Heat Interface Module (SHIM) to power the selected heated seat and maintain the requested temperature setting (HI or LO). Each switch has a HI and LO Light-Emitting Diode (LED) which, via the SHIM, illuminates to give a visual indication that the system is in the HI or LO mode. The LO heat set point is about 32° C (90° F), and the HI heat set point is about 38° C (100° F). The system shall be deactivated whenever the same set position is depressed a second time and shall change states directly when switching from HI to LO or vice versa. The system shall be deactivated whenever the ignition switch is placed in the off position. When the ignition switch is placed back in the run position, the heated seat system shall remain deactivated until a momentary switch is depressed. When a seat heater is turned on, a sensor located near the seat cushion electric heater element provides the SHIM with input indicating the surface temperature of the seat cushion. If the surface temperature input is below the temperature set point of the SHIM for the selected temperature setting, an N-FET Transistor within the SHIM energizes the heating elements in the seat cushion and back. When the sensor input indicates the correct temperature set point has been achieved, the SHIM de-energizes the N-FET. The SHIM will continue to cycle the N-FET as needed to maintain the temperature set point.

The SHIM will automatically turn off the heating elements if it detects a short or an open in the heating element or a sensor out of range. These conditions will also cause the SHIM to notify the occupant of the failure via flashing the heated seat switch LED's as discussed later.

Switched battery power to the SHIM is supplied by the heated seat relay mounted to the seat cushion frame with the SHIM under the right front seat. The battery feed is protected by a circuit breaker located in the junction block.

Following are general descriptions of the major components in the heated seat system. Refer to 8W-63 - Power Seat With Heated Seats in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

DESCRIPTION AND OPERATION

HEATED SEAT SWITCH

The heated seat switch assembly is located on the center console where the ashtray is normally located (Fig. 1). The two momentary, two-directional rocker switches, one switch for each front seat, provide a resistor-multiplexed signal to the Seat Heat Interface Module (SHIM). Each switch has center NEUTRAL, and momentary LO and HI positions so that both the driver and the front seat passenger can select a preferred seat heating mode.

Each switch has two telltales (LED's) which indicate the mode of the heater of the respective seat.

DESCRIPTION AND OPERATION (Continued)

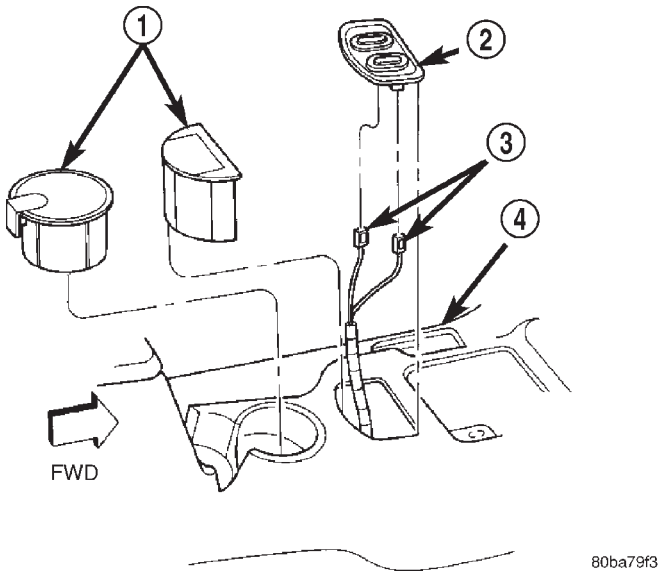

Fig. 1 Heated Seat Switch Location

1 – ASH RECEIVER
2 – HEATED SEAT SWITCHES & BEZEL
3 – WIRE HARNESS CONNECTORS
4 – FLOOR CONSOLE

The switches also have LED's which provide backlighting when the ignition switch is in the ON position. The LED's cannot be repaired. If the LED is faulty, the individual switch must be replaced.

SEAT HEAT INTERFACE MODULE

The Seat Heat Interface Module (SHIM) is an electronic microprocessor controlled device designed to operate the electric seat heater elements. The SHIM is located under the right front seat cushion. Inputs to the module include the console mounted resistor multiplexed switch signals, seat cushion temperature sensors, a relay-switched battery feed, and a ground. The SHIM outputs are the feed for the seat heating elements and sensors, and the switch telltale circuits. The SHIM cannot be repaired and, if faulty or damaged, it must be replaced.

HEATED SEAT RELAY

The heated seat relay is located under the right front seat cushion near the SHIM. Ignition and battery power is fed to the relay, which then provides a switched battery feed to the SHIM. The heated seat relay cannot be repaired and, if faulty or damaged, it must be replaced.

HEATED SEAT ELEMENT and SENSOR

Two heated seat heating elements are used in each front seat, one for the seat cushion and the other for the seat back. The two elements for each seat are connected in series with the SHIM.

The temperature sensor is a Negative Temperature Coefficient (NTC) thermistor. One temperature sensor is used for each seat, and it is integral to the seat cushion heating element.

The heating elements are sewn into the seat cushion cover and seat back cover assemblies, which are serviced individually. The heating elements and temperature sensor cannot be repaired and, if faulty or damaged, the affected seat cover assembly must be replaced. Refer to Group 23 - Body for the seat cushion cover and seat back cover Removal and Installation.

DIAGNOSIS AND TESTING

HEATED SEAT SYSTEM

For circuit descriptions and diagrams, refer to 8W - 63 - Power Seat With Heated Seats in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

The heated seat system is capable of performing some self-diagnostics. The following table depicts the various failure modes which will be reported to the occupant via flashing the momentary switch telltales. The switch telltales will flash on the driver's switch if the failure exists in the driver's seat portion of the system, similarly with the passenger's switch. The telltale will illuminate for approximately a ½second on, ½second off pulse for a duration of one minute. This process will repeat every time the system is initiated via the switches until the problem has been corrected.

DIAGNOSIS AND TESTING (Continued)

SEAT HEAT INTERFACE MODULE DIAGNOSTIC ROUTINES

FAILURE MODE	SWITCH "HI" TELLTALE	SWITCH "LO" TELLTALE
Shorted Heating Element	Flashing	Flashing
Open Heating Element	Flashing	Off
NTC Value Out of Range	Off	Flashing

Before testing the individual components in the heated seat system, check the following:

- If the heated seat switch backlighting does not illuminate with the ignition switch in the ON position, check the fuse in the junction block. If the fuse is OK, see Heated Seat Switch Backlighting in the Diagnosis and Testing section of this group. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.
- If the heated seat switch telltales do not illuminate with the ignition switch in the ON position, but the heating elements do heat, see Heated Seat Switch Telltales in the Diagnosis and Testing section of this group.
- If the heated seat switch backlighting illuminates with the ignition switch in the ON position, but the heating elements do not heat and the telltales do not illuminate, check the circuit breaker in the junction block. If the circuit breaker is OK, see Heated Seat Switch Multiplexed Resistances in the Diagnosis and Testing section of this group. If not OK, replace the faulty circuit breaker.
- If the heated seat switch backlighting illuminates and the telltales illuminate, but the heating elements do not heat; see Heated Seat Element in the Diagnosis and Testing section of this group.

HEATED SEAT SWITCH

For circuit descriptions and diagrams, refer to 8W - 63 - Power Seat With Heated Seats in Group 8W - Wiring Diagrams.

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

BACKLIGHTING

(1) Disconnect and isolate the battery negative cable

(2) Remove the heated seat switch assembly from the center console. Remove the connector from the suspect switch. Check for continuity between the ground circuit cavity of the 6-way heated seat switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open circuit as required.

(3) Connect the battery negative cable. Turn the ignition switch to the ON position. Check for battery voltage at the fused ignition switch output circuit cavity of the 6-way heated seat switch wire harness connector. If OK, turn the ignition switch to the OFF position, disconnect and isolate the battery negative cable, and replace the heated seat switch. If not OK, repair the open circuit as required.

TELLTALES

(1) Replace the heated seat switch with a known good unit and test the operation of the switch telltales. If OK, discard the faulty heated seat switch. If not OK, see Seat Heat Interface Module in the Diagnosis and Testing section of this group.

MULTIPLEXED RESISTANCES

(1) Disconnect and isolate the battery negative cable.

(2) Remove the heated seat switch assembly from the center console. Remove the connector from the suspect switch.

(3) With the suspect heated seat switch in the NEUTRAL position, using an ohmmeter, measure the resistance between the fused ignition switch output circuit terminal and the heated seat switch output circuit terminal in the 6-way connector receptacle on the back of the switch. The resistance reading should be about 2.2. Kohms. If OK, go to Step 4. If not OK, replace the faulty switch.

(4) Hold the suspect heated seat switch in the LO position. Using an ohmmeter, check the resistance between the fused ignition switch output circuit terminal and the heated seat switch output circuit terminal in the 6-way connector receptacle on the back of the switch. The resistance reading should be about 414 Ohms. If OK, go to Step 5. If not OK, replace the faulty switch.

(5) Hold the suspect heated seat switch in the HI position. Using an ohmmeter, check the resistance between the fused ignition switch output circuit terminal and the heated seat switch output circuit terminal in the 6-way connector receptacle on the back

DIAGNOSIS AND TESTING (Continued)

of the switch. The resistance reading should be about 32.5 Ohms. If OK, see Heated Seat Relay in the Diagnosis and Testing section of this group. If not OK, replace the faulty switch.

HEATED SEAT ELEMENT and SENSOR

The wire harness connectors for the seat cushion and seat back heating elements are located under the seat, near the rear edge of the seat cushion frame. For circuit descriptions and diagrams, refer to 8W - 63 - Power Seat With Heated Seats in Group 8W - Wiring Diagrams.

SEAT CUSHION

(1) Disconnect and isolate the battery negative cable. Unplug the 4-way heated seat cushion wire harness connector.

(2) Check for continuity between the two heated seat element circuit cavities of the seat cushion cover half of the heated seat cushion wire harness connector. There should be continuity. If OK, go to Step 3. If not OK, replace the faulty seat cushion cover.

(3) Check for continuity between one of the heated seat element circuit cavities of the seat cushion cover half of the heated seat cushion wire harness connector and the seat cushion frame. There should be no continuity. If OK, see Seat Back in the Diagnosis and Testing section of this group. If not OK, replace the faulty seat cushion cover.

SEAT BACK

(1) Disconnect and isolate the battery negative cable. Unplug the 2-way heated seat back wire harness connector.

(2) Check for continuity between the heated seat element circuit cavity and the ground circuit cavity of the seat back cover half of the heated seat back wire harness connector. There should be continuity. If OK, go to Step 3. If not OK, replace the faulty seat back cover.

(3) Check for continuity between the heated seat element circuit cavity of the seat back cover half of the heated seat back wire harness connector and the seat back frame. There should be no continuity. If OK, see Heated Seat Sensor in the Diagnosis and Testing section of this group. If not OK, replace the faulty seat back cover.

HEATED SEAT SENSOR

The wire harness connector for the seat cushion heating element and sensor are located under the seat, near the rear edge of the seat cushion frame. For circuit descriptions and diagrams, refer to 8W - 63 - Power Seat With Heated Seats in Group 8W - Wiring Diagrams.

(1) Disconnect and isolate the battery negative cable. Unplug the 4-way heated seat cushion wire harness connector.

(2) Using an ohmmeter, check the resistance between the heated seat sensor input circuit cavity and the heated seat sensor feed circuit cavity of the seat cushion cover half of the heated seat cushion wire harness connector. The sensor resistance should be between 1 Kohm and 200 Kohms. If OK, see Heated Seat Relay in the Diagnosis and Testing section of this group. If not OK, replace the faulty seat cushion cover.

HEATED SEAT RELAY

For circuit descriptions and diagrams, refer to 8W - 63 - Power Seat With Heated Seats in Group 8W - Wiring Diagrams.

(1) Disconnect and isolate the battery negative cable. Unplug the 8-way heated seat relay connector.

(2) Check for continuity between the ground circuit cavity of the 8-way heated seat relay wire harness connector and a good ground. There should be continuity. If OK, go to Step 3. If not OK, repair the open circuit as required.

(3) Connect the battery negative cable. Check for battery voltage at the battery feed circuit cavity (pin 8) of the 8-way heated seat relay wire harness connector. If OK, go to Step 4. If not OK, repair the open circuit as required.

(4) Turn the ignition switch to the ON position. Check for battery voltage at the fused ignition switch output circuit cavity of the 8-way heated seat relay wire harness connector. If OK, turn the ignition switch to the OFF position, disconnect and isolate the battery negative cable, and go to Step 5. If not OK, repair the open circuit as required.

(5) Unplug the 14-way seat heat interface module (SHIM) connector. Check for continuity between the two switched battery feed cavities of the 14-way SHIM wire harness connector and the switched battery feed cavity of the 8-way heated seat relay wire harness connector. If OK, reconnect the heated seat relay wire harness connector, and go to Step 6. If not OK, repair the open circuit as required.

(6) Connect the battery negative cable. Turn the ignition switch to the ON position. Check for battery voltage at the switched battery feed cavities of the 14-way SHIM wire harness connector. If OK, turn the ignition switch to the OFF position, disconnect and isolate the battery negative cable, and see Seat Heat Interface Module in the diagnosis and testing section of this group. If not OK, replace the heated seat relay.

DIAGNOSIS AND TESTING (Continued)

SEAT HEAT INTERFACE MODULE

Before testing the seat heat interface module, test the heated seat switch, the heated seat elements, and the heated seat sensor as described in the Diagnosis and Testing section of this group. If testing of the heated seat switch, elements, and sensor reveals no problems, proceed as follows. For circuit descriptions and diagrams, refer to 8W - 63 - Power Seat With Heated Seats in Group 8W - Wiring Diagrams.

(1) Replace the seat heat interface module with a known good unit and test the operation of the heated seats. If OK, discard the faulty seat heat interface module. If not OK, go to Step 2.

(2) Test each of the circuits from the heated seat switch, heated seat relay, heated seat elements, and heated seat sensor to the seat heat interface module. Repair any short or open circuits as required.

REMOVAL AND INSTALLATION

HEATED SEAT SWITCH

WARNING: ON VEHICLES EQUIPPED WITH AIRBAGS, REFER TO GROUP 8M - PASSIVE RESTRAINT SYSTEMS BEFORE ATTEMPTING ANY STEERING WHEEL, STEERING COLUMN, OR INSTRUMENT PANEL COMPONENT DIAGNOSIS OR SERVICE. FAILURE TO TAKE THE PROPER PRECAUTIONS COULD RESULT IN ACCIDENTAL AIRBAG DEPLOYMENT AND POSSIBLE PERSONAL INJURY.

(1) Disconnect and isolate the battery negative cable.

(2) Using a trim stick or another suitable wide flat-bladed tool, gently pry around the perimeter edges of the heated switch assembly bezel to release the assembly from the console. Remove the assembly from the console.

(3) Pull the switch assembly out from the console far enough to access and unplug the wire harness connectors.

(4) Remove the heated seat switch assembly from the console.

(5) Remove the heated seat switch(es) from the heated seat switch assembly.

(6) Reverse the removal procedures to install.

SEAT HEAT INTERFACE MODULE

(1) Move the right power seat adjuster to its full up and full rear stop positions.

(2) Disconnect and isolate the battery negative cable.

(3) Unhook the seat cushion cover retainer from the seat cushion frame and pull back the seat cushion cover.

(4) Pull back the seat cushion to allow access to the Seat Heat Interface Module (SHIM).

(5) Pull the SHIM upward to release the two mounting fasteners from either the module or the mounting bracket. Unplug the wire harness connector from the module (Fig. 2).

WARNING: THERE ARE MANY SHARP METAL EDGES ON THE SEAT CUSHION FRAME AND SEAT ADJUSTER RAILS UNDER THE SEAT. WHEN PERFORMING THIS SERVICE, A LONG-SLEEVED SHIRT AND GLOVES SHOULD BE WORN IN ORDER TO AVOID UNNECESSARY CUTS AND ABRASIONS TO EXPOSED SKIN.

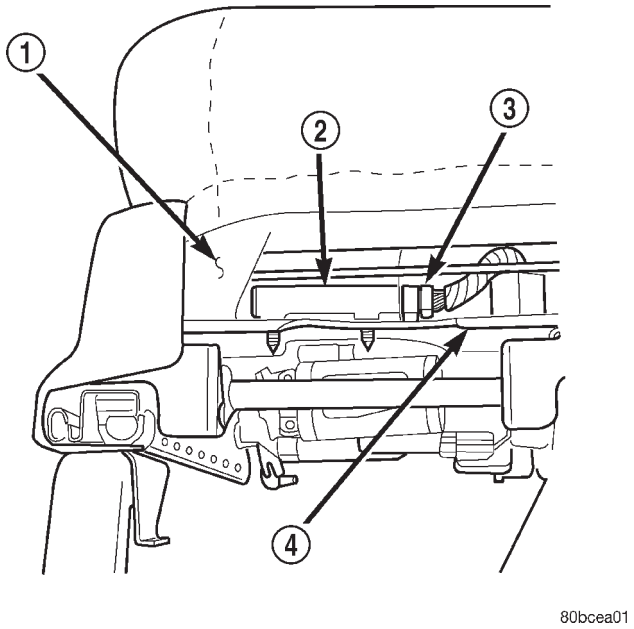

Fig. 2 Seat Heat Interface Module Remove/Install

1 – SEAT CUSHION FRAME
2 – SEAT HEAT INTERFACE MODULE
3 – WIRE HARNESS CONNECTOR
4 – POWER SEAT TRACK FRONT BRACKET

(6) Reverse the removal procedures to install. Be certain that the SHIM terminals are aligned with the cavities in the wire harness connector before pushing the module firmly into place.

HEATED SEAT RELAY

(1) Move the right power seat adjuster to its full up and full rear stop positions.

(2) Disconnect and isolate the battery negative cable.

(3) Unhook the seat cushion cover retainer from the seat cushion frame and pull back the seat cushion cover.

(4) Pull back the seat cushion to allow access to the Heated Seat Relay.

REMOVAL AND INSTALLATION (Continued)

(5) Cut the Christmas tree fastener to remove the Heated Seat Relay fastener from the mounting bracket. Unplug the wire harness connector from the relay (Fig. 3).

(6) Reverse the removal procedures to install. A new Christmas tree fastener must be used to mount the relay. Be certain that the relay terminals are aligned with the cavities in the wire harness connector before pushing the relay firmly into place.

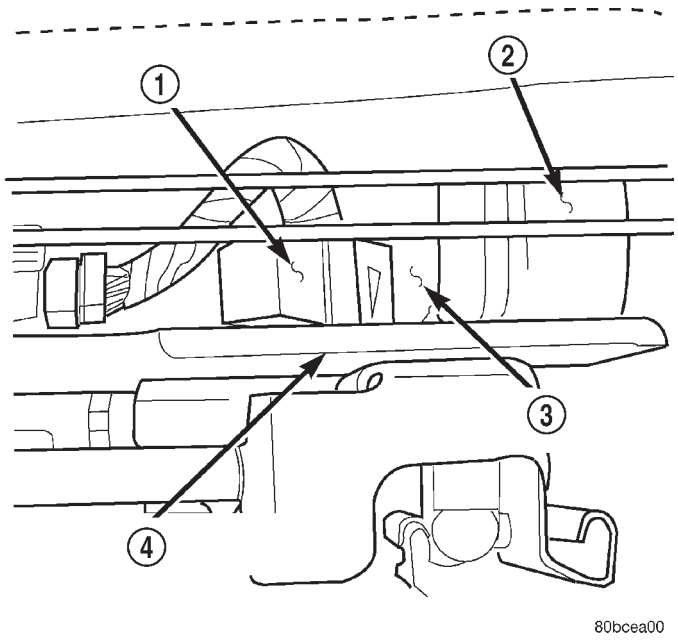

Fig. 3 Heated Seat Relay Remove/Install

1 – HEATED SEAT RELAY
2 – SEAT CUSHION FRAME
3 – WIRE HARNESS CONNECTOR
4 – POWER SEAT TRACK FRONT BRACKET