ELECTRICALLY HEATED SYSTEMS

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DESCRIPTION AND OPERATION

INTRODUCTION

For proper operation of the Rear Window Defogger system refer to the Owner's Manual.

The system consists of a rear glass with two vertical bus bars and a series of electrically connected grid lines on the inside surface (Fig. 1). The control switch is located in the HVAC Control Module. The relay is located in the junction block. The timer is located in the Body Control Module (BCM).

Circuit protection for heated grid is provided by:

- Fuse 12 (EBL) located in the power distribution center
- Rear window defogger relay (EBL) located in the Junction Block

When the button is depress to the ON position, current is directed to the rear defogger grid lines. A yellow indicator within the center of the button will illuminate while the defogger is ON. The heated grid lines will heat the rear glass and clear the window surface of fog or frost.

CAUTION: Grid lines can be damaged or scraped off with sharp instruments, care should be taken in cleaning glass or removing foreign materials, decals or stickers. Normal glass cleaning solvents or hot water used with rags or toweling is recommended.

HVAC CONTROL MODULE

The rear window control switch and circuit are integrated into the HVAC control module (Fig. 2). When actuating the switch it sends a ground signal to the Body Control Module (BCM). The BCM actuates the relay allowing current to flow through the grid lines for ten minutes upon initial actuation. Then 5 minutes with each subsequent actuation or until either the switch or ignition is turned off. An indicating lamp illuminates the rear window defogger switch.

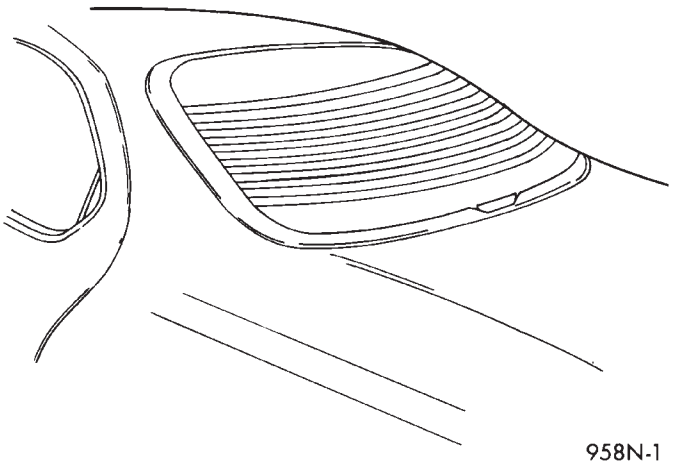

Fig. 1 Rear Window Defogger

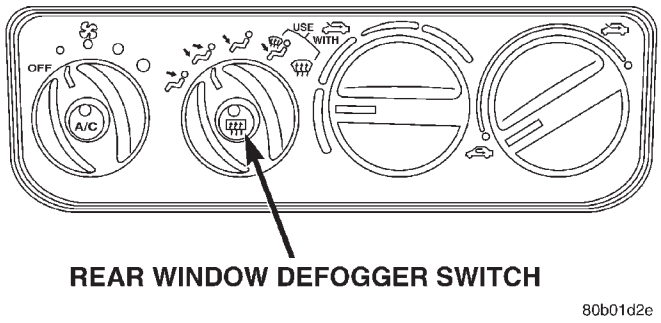

Fig. 2 HVAC Control Module

DIAGNOSIS AND TESTING

SYSTEM TEST

Electrically heated rear window defogger operation can be checked in vehicle in the following manner:

(1) Turn ignition switch to the ON position.

(2) Make sure defogger switch is OFF.

(3) Remove the battery negative remote cable from the terminal. Using a ammeter (capable of a 30 AMP range), connect the ammeter is series between the battery cable and the remote terminal. Turn the Defogger control switch ON, a distinct increase in amperage draw should be noted.

(4) The rear window defogger operation can be checked by feeling the glass. A distinct difference in temperature between the grid lines and adjacent clear glass can be detected in 3 to 4 minutes of operation.

(5) Using a DC voltmeter (Fig. 3) contact terminal B with the negative lead, and terminal A with the positive lead. The voltmeter should read 10-14 volts.

(6) Step 3, Step 4, and Step 5 above will confirm system operation. Indicator light illumination means that there is power available at the output of the relay only, and does not necessarily verify system operation.

(7) If the indicator light is not on, then check fuse #6 in the junction block.

(8) If turning the switch ON produced no distinct current draw on the ammeter the problem should be isolated in the following manner:

(a) Confirm the ignition switch is ON.

(b) Ensure that the heated rear glass feed wire is connected to the terminal or pigtail and that the ground wire is in fact grounded.

(c) Ensure that fuse 12 (EBL) in the Power Distribution Center is OK.

(9) When the above steps have been completed and the system is still inoperative, one or more of the following is defective:

(a) Control switch in the HVAC control module

(b) Rear window defogger relay (EBL) in the Junction Block

(c) Timer circuit in the Body Control Module

(d) Rear window grid lines, all grid lines would have to be broken or one of the feed wires are not connected for the system to be inoperative.

(10) If depressing the switch button ON produces severe voltmeter deflection, the circuit should be closely checked for a shorting condition.

(11) If the system operation has been verified but indicator bulb does not light, check fuse 6 in the junction block. If not OK, replace as necessary. If OK, test the HVAC control module.

(12) For detailed wiring information, refer to group 8W, Wiring Diagrams.

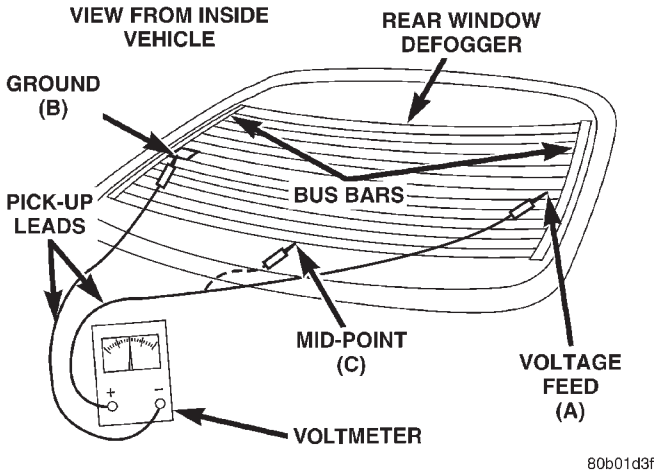

Fig. 3 Grid Line Test

GRID LINES

The horizontal grid lines and vertical bus bar lines printed and fired on inside surface of rear window glass (Fig. 3) comprise an electrical parallel circuit. The electrically conductive lines are composed of a silver-ceramic material which when fired on glass becomes bonded to the glass and is highly resistant to abrasion. It is possible, however, that a break may occur in an individual grid line resulting in no current flow through the line. To detect breaks in grid lines the following procedure is required:

(1) Turn ignition switch to the ON position. Depress the control switch button to ON position. The indicator light should come on.

(2) Using a DC voltmeter with 0-15 volt range, contact the ground terminal with negative lead of voltmeter. With positive lead of voltmeter, contact feed terminal (Fig. 3). The voltmeter should read 10-14 volts. A lower voltage reading indicates a poor ground connection.

(3) Connect the negative lead of voltmeter to a good body ground point. The voltage reading should not be more than two tenth of a volt difference. If more than two tenth of a volt repair the ground circuit.

(4) Connect negative lead of voltmeter to ground terminal and touch each grid line at Mid-Point with Positive lead. A reading of approximately 6 volts indicates a line is good. A reading of 0 volts indicates a break in line between Mid-Point and feed terminal. A reading of 10-14 volts indicates a break between Mid-Point and ground terminal. Move toward break and voltage will change as soon as break is crossed (Fig. 3). Refer to Group 8W, Wiring Diagrams for circuit information.

HVAC CONTROL MODULE

The control switch and timer circuit may be tested in the vehicle with or without scan tool (DRB).

DIAGNOSIS AND TESTING (Continued)

TESTING WITH SCAN TOOL

If using the scan tool, refer to the proper Body Diagnostic Procedures Manual.

TESTING WITHOUT SCAN TOOL

(1) Remove the control switch from console and do not disconnect control switch (Fig. 4).

(2) Using a ohmmeter, check leads between Pins 5 and 8 of the 8-way connector. Depress the rear window defogger button and the resistance reading should be 500 to 520 ohms. If not OK, replace HVAC. If OK, check:

- Rear window relay (EBL)
- Blown fuse
- Cut wire
- Poor ground
- Poor connection
- Defective BCM
- Bulkhead connector inoperative

Refer to Group 8W, Wiring Diagrams.

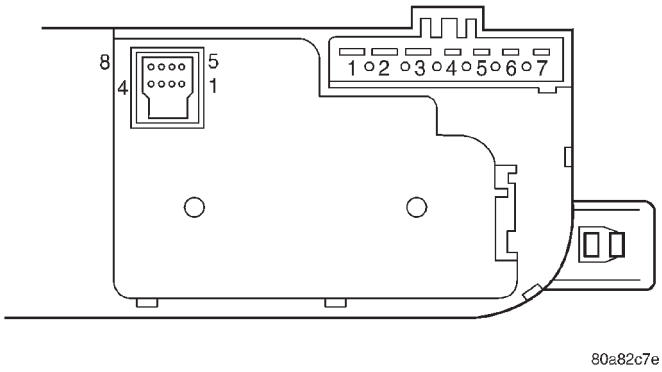

Fig. 4 HVAC Control Module Connectors

REAR WINDOW DEFOGGER RELAY

(1) Check fuses.

(a) Fuse 15 in the Junction Block

(b) Fuse 8 and 12 in the Power Distribution Center.

(2) Remove the rear window defogger relay (EBL) from the Junction Block (Fig. 5).

(3) Using voltmeter, test battery voltage:

(a) Test rear window defogger relay terminals 13 for battery voltage. If voltage is OK, go to Step b. If voltage is not OK, repair A4 circuit.

(b) Test the rear window defogger relay terminal for battery voltage with the key in the run position. If voltage is OK, go to Step c. If voltage is not OK, repair A31circuit.

(c) Use a known good relay. If not OK, repair circuits as necessary. Refer to Group 8W, Wiring Diagrams. If OK, replace relay.

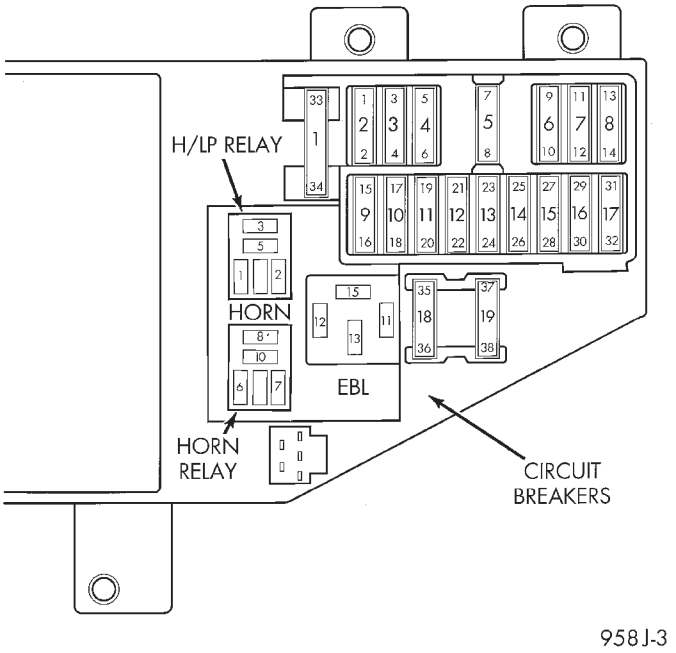

Fig. 5 Rear Window Defogger Relay (EBL)

SERVICE PROCEDURES

REPAIR GRID LINES, TERMINALS AND PIGTAILS

WARNING: REPAIR KIT MAY CAUSE SKIN OR EYE IRRITATION.

THE KIT CONTAINS EPOXY RESIN AND AMINE TYPE HARDENER AND HARMFUL:

- **DO NOT TAKE INTERNALLY, IF SWALLOWED INDUCE VOMITING AND CALL A PHYSICIAN IMMEDIATELY.**
- **IF CONTACTED WITH SKIN, WASH AFFECTED AREAS WITH SOAP AND WATER.**
- **IF CONTACTED WITH EYES, FLUSH WITH PLENTY OF WATER.**

USE WITH ADEQUATE VENTILATION.

DO NOT USE NEAR FIRE OR OPEN FLAME THE CONTENTS CONTAIN FLAMMABLE SOLVENTS.

KEEP OUT OF REACH OF CHILDREN.

The repair of the grid lines or the terminal is possible using the Mopar® Repair Package or equivalent.

(1) Mask repair area so conductive epoxy can be extended onto the line or the bus bar (Fig. 6).

(2) Follow instructions in repair kit for preparing damaged area.

(3) Remove package separator clamp and mix plastic conductive epoxy thoroughly. Fold in half and cut center corner to dispense epoxy.

SERVICE PROCEDURES (Continued)

(4) Apply conductive epoxy through slit in masking tape. Overlap both ends of the break by 19 mm (3/4 inch).

(5) For a terminal or pigtail replacement, mask adjacent areas so epoxy can be extended onto line as well as bus bar. Apply a thin layer of epoxy to area where terminal was fastened and to adjacent line.

(6) Apply a thin layer of conductive epoxy on terminal and place terminal on desired location. To prevent terminal from moving while the epoxy is curing, it must be wedged or clamped.

(7) Carefully remove masking tape from grid line.

CAUTION: Do not allow the glass surface to exceed 204°C (400°F), glass may fracture.

(8) Allow epoxy to cure 24 hours at room temperature or use heat gun with a 260° to 371°C (500° to 700°F) range for 15 minutes. Hold gun approximately 254 mm (10 inches) from repaired area.

(9) After conductive epoxy is properly cured remove wedge from terminal and check out operation of rear window defogger. Do not attach connectors until curing is complete.

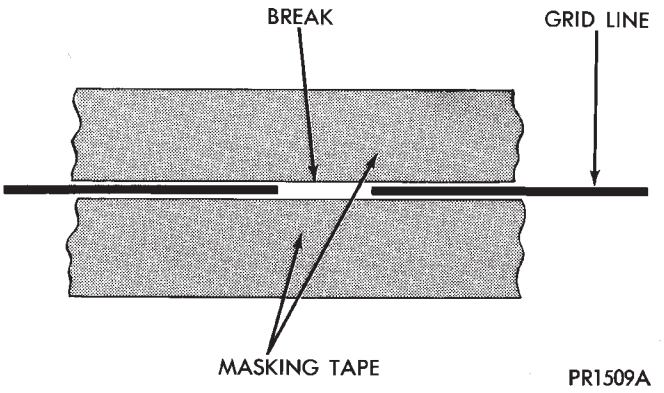

Fig. 6 Grid Line Repair

REMOVAL AND INSTALLATION

HVAC CONTROL

Refer to Group 8E, Instrument Panel and Systems for proper Removal and Installation procedures.

REAR WINDOW DEFOGGER RELAY

(1) Open the driver's door and remove instrument panel end cover.

(2) Remove rear window defogger relay from the Junction Block (Fig. 5).