

## SECTION 7A

# HEATING AND VENTILATION SYSTEM

**CAUTION:** Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.

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## SPECIFICATIONS

### HEATER TEMPERATURE SPECIFICATIONS

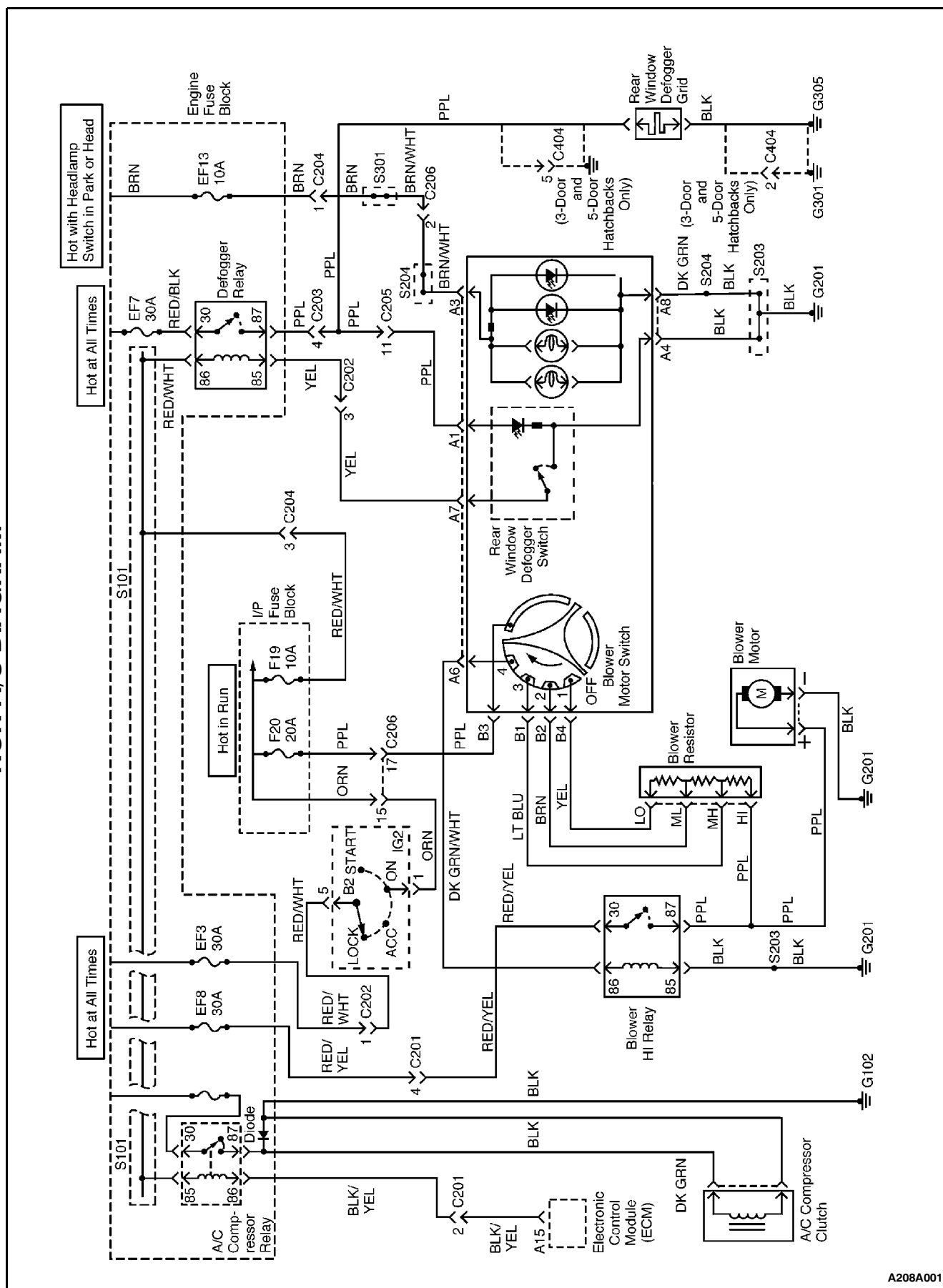
Ambient Air Temperature	Heater Outlet Air Temperature
* 18° C (0° F)	54° C (130° F)
* 4° C (25° F)	59° C (139° F)
10° C (50° F)	64° C (147° F)

### FASTENER TIGHTENING SPECIFICATIONS

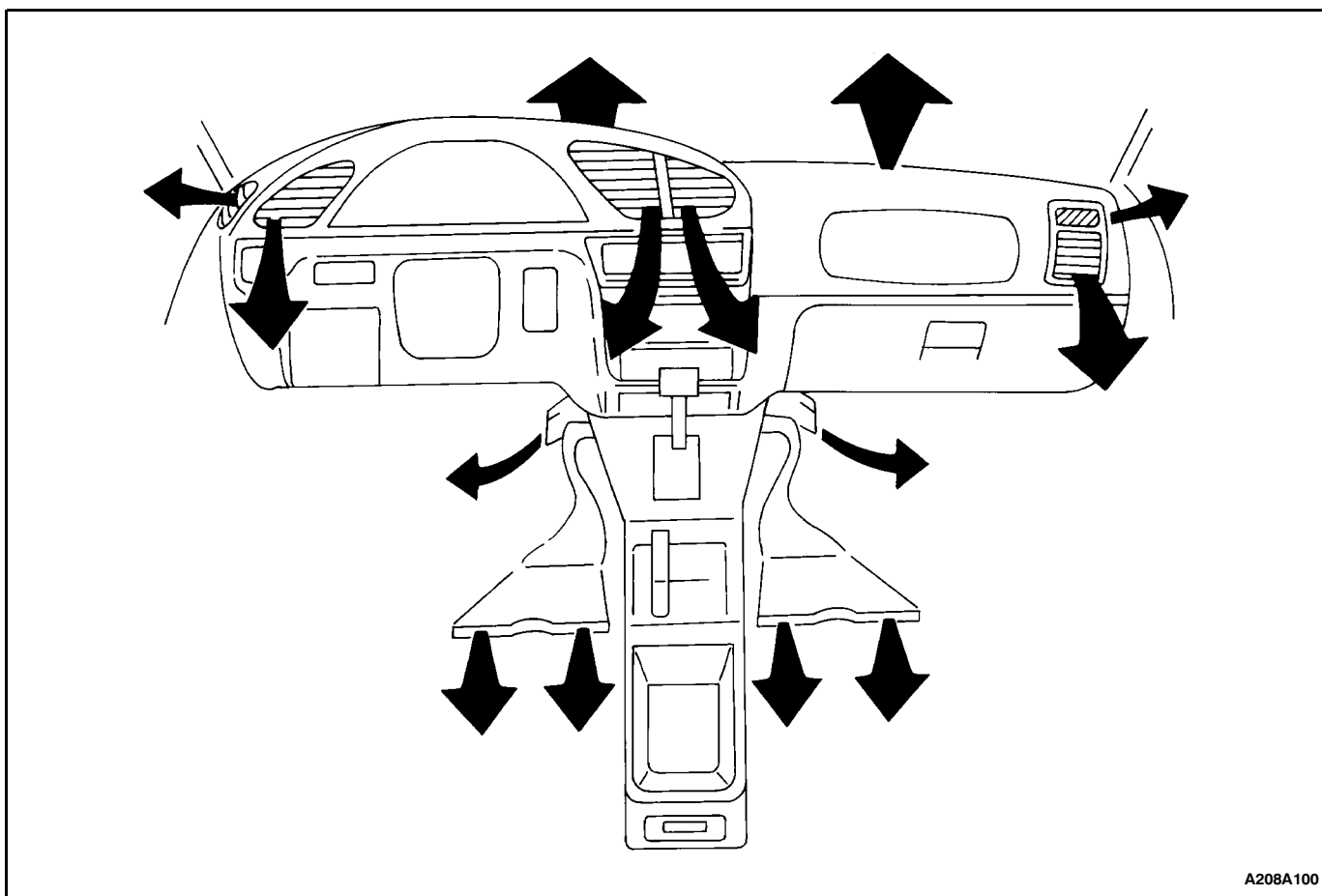
Application	N•m	Lb-Ft	Lb-In
Blower Motor Retaining Screws	6	-	53
Blower Resistor Retaining Screws	6	-	53
HVAC Controller Retaining Screws	2	-	18

## SCHEMATIC AND ROUTING DIAGRAMS

## NON-A/C DIAGRAM



A208A001

**AIRFLOW THROUGH VENTS WITH REAR HEATING DUCT\*****(Left-Hand Drive Shown, Right-Hand Drive Similar)**

A208A100

**\*Rear heating duct available on vehicles in cold climate countries.**

## DIAGNOSIS

### HEATER SYSTEM

#### INSUFFICIENT HEATING OR DEFROSTING

**Caution:** The cooling system is pressurized when hot. Injury can result from removing the surge tank cap before the engine is sufficiently cool.

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Check the coolant level. Is the coolant level correct?	-	Go to Step 4	Go to Step 3
3	Add coolant as needed. Is the repair complete?	-	System OK	Go to Step 4
4	Check the timing belt for tension or damage. Is the timing belt OK?	-	Go to Step 6	Go to Step 5
5	Correct any problem with the drive belts. Is the repair complete?	-	System OK	Go to Step 6
6	Check the coolant hoses for leaks or kinks. Are the coolant hoses OK?	-	Go to Step 8	Go to Step 7
7	Repair any problem with the coolant hoses. Is the repair complete?	-	System OK	Go to Step 8
8	Check the surge tank cap. Refer to Section 2D, Engine Cooling. Is the surge tank cap OK?	-	Go to Step 10	Go to Step 9
9	Repair or replace the surge tank cap as needed. Is the repair complete?	-	System OK	Go to Step 10
10	1. Set the A/C switch OFF on vehicles equipped with air conditioning (A/C). 2. Set the blower motor switch on 4. 3. Set the heater control to full hot. 4. Turn the ignition ON. 5. Check for airflow from the heater outlet. Is there heavy airflow from the heater outlet?	-	Go to Step 11	Go to Step 26
11	Check for a change in the airflow at various blower speeds. Does the blower speed increase as the switch is turned from 1 to 4?	-	Go to Step 12	Go to "Blower Electrical"
12	1. Set the A/C switch to OFF, on vehicles equipped with A/C. 2. Set the temperature lever to full hot. 3. Set the blower motor switch on 4. 4. With the engine sufficiently cool, remove the surge tank cap. 5. Start the vehicle and idle the engine. 6. Watch for the flow of the coolant. Is the coolant flow visible?	-	Go to Step 14	Go to Step 13

## Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
13	1. Check for the following conditions: <ul style="list-style-type: none"> <li>• Restriction in the cooling system.</li> <li>• Failed water pump impeller.</li> <li>• Faulty thermostat.</li> </ul> 2. Make repairs to the cooling system, as needed. Are the repairs complete?	-	System OK	Go to Step 14
14	1. Install the surge tank cap. 2. With the ignition ON, allow the engine to warm up for about 20 minutes. Drive the vehicle at 48 km/h (30 mph). 3. Use a thermometer to measure the ambient air temperature and the discharge air temperature at the heater outlet. Does the heater output meet the minimum values given?	Refer to "Temperature Specifications"	Go to Step 15	Go to Step 16
15	1. Check the vehicle for cold air leaks at the following locations: <ul style="list-style-type: none"> <li>• Dash.</li> <li>• Heater cases.</li> <li>• Vents.</li> </ul> 2. Check under the seat for obstructions. 3. Repair any leaks or obstructions. Are the repairs complete?	-	System OK	-
16	1. Turn the ignition OFF. 2. Turn the temperature control knob to full cold, then rapidly to full hot. 3. Listen for the sound of the temperature door slam just before reaching the end of the travel range of the control knob. Does the door slam?	-	Go to Step 18	Go to Step 17
17	1. Check the following aspects of the temperature door: <ul style="list-style-type: none"> <li>• Travel.</li> <li>• Cables.</li> <li>• Linkage.</li> </ul> 2. Verify the accuracy of the temperature controls at full hot. 3. Verify the accuracy of the temperature controls at full cold. Is the repair complete?	-	System OK	-
18	1. Set the temperature door to full hot. 2. Start the vehicle. 3. Check the temperature of the heater inlet hose and the heater outlet hose by feel. The air temperature around the hoses should be at least 29°C (84°F). Is the heater inlet hose hot and the heater outlet hose warm?	-	Go to Step 19	Go to Step 22
19	Check the thermostat. Refer to Section 2D, Engine Cooling. Is the thermostat installed and seated properly?	-	Go to Step 20	Go to Step 21

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### Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
20	Replace the thermostat. Refer to Section 2D, Engine Cooling. Is the repair complete?	-	System OK	-
21	Reinstall the thermostat. Is the repair complete?	-	System OK	-
22	Inspect the heater hoses for proper installation. Are the heater hoses reversed?	-	Go to Step 23	Go to Step 24
23	Reinstall the heater hoses properly. Is the repair complete?	-	System OK	-
24	1. Back flush the heater core. 2. Drain the cooling system. 3. Replace the coolant. 4. Warm the engine to an average operating temperature. 5. Feel the heater inlet hose and the heater outlet hose. Is the heater inlet hose hot and the heater outlet hose warm?	-	System OK	Go to Step 25
25	Replace the heater core. Is the repair complete?	-	System OK	-
26	Recheck the system using the "Control Settings/Correct Results" tests. Refer to "Improper Air Delivery or No Mode Shift" in this section. Is the repair complete?	-	System OK	Go to Step 27
27	Check for airflow from the defroster or the vent outlets. Is there high airflow from the defroster or the vent outlets?	-	Go to Step 28	Go to Step 29
28	Adjust the heater door at the floor and the vent door to get the proper airflow. Is the repair complete?	-	System OK	-
29	Switch the mode knob to defrost. Is the defroster airflow OK?	-	Go to Step 30	Go to Step 31
30	1. Remove the heater outlet and check for obstructions. 2. Remove any obstructions in the heater outlet. Is the repair complete?	-	System OK	-
31	Check for airflow change at various blower speeds. Does the blower speed increase as the control is turned from 1 to 4?	-	Go to Step 32	Go to "Blower Electrical"
32	Check for obstructions in the system at the blower inlet. Are there any obstructions?	-	Go to Step 33	Go to Step 34
33	Remove the obstructions in the system at the blower inlet. Is the repair complete?	-	System OK	-
34	1. Set the blower on 4. 2. Rotate the temperature control from full hot to full cold. 3. Listen for an airflow change. Does the airflow change?	-	Go to Step 35	Go to Step 36

## Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
35	1. Check the following aspects of the temperature door: <ul style="list-style-type: none"> <li>• Travel.</li> <li>• Cables.</li> <li>• Linkage.</li> <li>• Control.</li> </ul> 2. Verify the accuracy of the temperature controls at full hot. Is the repair complete?	-	System OK	-
36	1. Check the system for any obstruction between the blower and the system outlets. 2. Remove any obstruction. Is the repair complete?	-	System OK	-

## BLOWER ELECTRICAL

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Check the blower. Does the blower run at any speed?	-	Go to Step 14	Go to Step 3
3	1. Disconnect the power connector from the blower motor under the dashboard on the passenger side of the vehicle. 2. Turn the ignition ON. 3. Turn the blower ON. 4. Test for voltage on the connector. The terminal connected to the violet wire is positive and the terminal connected to the black wire is negative. Is the appropriate voltage present?	11-14 v	Go to Step 4	Go to Step 5
4	Replace the blower motor. Is the repair complete?	-	System OK	-
5	Check fuse 20 in the passenger compartment fuse box. Is the fuse blown?	-	Go to Step 6	Go to Step 7
6	1. Turn the ignition ON. 2. Use a short detector to locate a possible short in the following connections: <ul style="list-style-type: none"> <li>• From the fuse panel to the blower speed switch.</li> <li>• From the blower speed switch to the heater resistor block.</li> <li>• From the heater resistor block to the blower motor.</li> <li>• From the blower speed switch to the blower HI relay.</li> </ul> 3. Repair any short. 4. Replace any blown fuse. Is the repair complete?	-	System OK	-

## 7A - 8 HEATING AND VENTILATION SYSTEM

### Blower Electrical (Cont'd)

Step	Action	Value(s)	Yes	No
7	1. Turn the ignition ON. 2. Set the blower switch on 4. 3. Check the blower motor ground. Is the ground OK?	-	Go to Step 9	Go to Step 8
8	Repair the blower motor ground. Is the repair complete?	-	System OK	-
9	Check the motor connector with a 12-volt test light. Does the test light come on?	-	Go to Step 10	Go to Step 11
10	Repair the open in the feed wire from the resistor block to the blower motor. Is the repair complete?	-	System OK	-
11	Use the 12-volt test light to check the power feed terminal on the blower speed switch. Does the light come on?	-	Go to Step 12	Go to Step 13
12	Replace the blower speed switch. Is the repair complete?	-	System OK	-
13	Repair the open in the power wire from the blower speed switch to the fuse panel. Is the repair complete?	-	System OK	-
14	Check the blower operation at speed 4. Does the blower fail to operate at speed 4?	-	Go to Step 15	Go to Step 21
15	Check fuse EF8 in the engine fuse compartment. Is this fuse blown?	-	Go to Step 16	Go to Step 17
16	1. Turn the ignition ON. 2. Set the blower motor switch on 4. 3. Use a short detector to locate a possible short in the following locations: • From the engine fuse panel to the blower HI relay. • From the blower HI relay to the blower motor. 4. Repair any short. 5. Replace the fuse EF8. Is the repair complete?	-	System OK	-
17	1. Turn the ignition switch ON. 2. Set the blower switch on 4. 3. Test for voltage on the blower HI relay coil terminal from the blower speed switch terminal B3. Is the appropriate voltage present?	11-14 v	Go to Step 18	Go to Step 19
18	Replace the blower speed switch. Is the repair complete?	-	System OK	-
19	1. Turn the ignition OFF. 2. Check for opens in the following connections: • EF8-to-the blower HI relay. • Blower speed switch-to-the blower HI relay. • Blower HI relay-to-ground. • Blower HI relay-to-the blower motor. 3. Repair any opens. Is the repair complete?	-	System OK	Go to Step 20



## Blower Electrical (Cont'd)

Step	Action	Value(s)	Yes	No
20	Replace the blower HI relay. Is the repair complete?	-	System OK	-
21	1. Disconnect the resistor block connector. 2. Connect one lead of a self-powered test light to any single lead on the resistor block. Use the other lead to probe each of the other two terminals. Does the test light illuminate on all terminals?	-	Go to Step 23	Go to Step 22
22	Replace the resistor block. Is the repair complete?	-	System OK	-
23	1. Turn the ignition to LOCK. 2. Disconnect the connector from the resistor block. 3. Connect a jumper lead from the positive terminal on the battery to any wire terminal in the connector. 4. Test for voltage from the corresponding wire on the blower speed switch. 5. Repeat the same test on the other wires. Does the lamp light on all three wires?	-	Go to Step 25	Go to Step 24
24	Replace the blower speed switch. Is the repair complete?	-	System OK	-
25	Repair the open in the affected wire. Is the repair complete?	-	System OK	-

## IMPROPER AIR DELIVERY OR NO MODE SHIFT

This procedure provides a test of all functions of the heater/defroster unit.

1. Warm up the vehicle.
2. Keep the engine running.
3. Perform the tests outlined in the table below and look for the results indicated.

CONTROL SETTINGS			CORRECT RESULTS				
MODE KNOB	TEMP. CONTROL	BLOWER MOTOR SWITCH	BLOWER SPEED	POWER VENT OUTLET	FLOOR OUTLET	DEFROST OUTLET	SIDE WINDOW OUTLET
Vent	Cold	Off	Off	No Airflow	No Airflow	No Airflow	No Airflow
Vent	Cold	4	High	Ambient Airflow	No Airflow	No Airflow	No Airflow
Floor	Cold to Hot	4	High	No Airflow	Cold to Hot Airflow	Minimum Cold to Hot Airflow	Minimum Cold to Hot Airflow
Defroster	Cold to Hot	4	High	No Airflow	Minimum Cold to Hot Airflow	Cold to Hot Airflow	Minimum Cold to Hot Airflow

If any of these settings does not produce the correct results, perform the following diagnostic procedure.

**Improper Air Delivery or No Mode Shift (Cont'd)**

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Examine the affected door in the unit for proper cable attachment. <ul style="list-style-type: none"> <li>• Check the cable connection to the door.</li> <li>• Check that the cable sheath is properly retained.</li> </ul> Is the cable connected properly?	-	Go to Step 4	Go to Step 3
3	Repair as necessary. Is the repair complete?	-	System OK	-
4	1. Disconnect the cable at the door. 2. Check the range of the door travel and the effort required to move it. Does the door move freely through its entire range of travel so that it can close at both ends of the range?	-	Go to Step 5	Go to Step 3
5	Check the travel of the Bowden cable by turning the control knob. Is the cable travel OK?	-	Go to Step 6	Go to Step 7
6	1. Reinstall the cable. 2. Recheck the system using the "Control Settings/Correct Results" tests in this procedure. Does the system perform properly?	-	System OK	Go to Step 9
7	1. Check the cable attachment at the control. 2. Check for a broken control. Is there a problem with the cable attachment or the control?	-	Go to Step 8	Go to Step 9
8	Repair the cable attachment or control as necessary. Is the repair complete?	-	System OK	Go to Step 9
9	Recheck the system using the "Control Settings/Correct Results" tests in this procedure. Is the repair complete?	-	System OK	Go to Step 10
10	Check for airflow from the defroster or the vent outlets. Is there high airflow from the defroster or the vent outlets?	-	Go to Step 11	Go to Step 12
11	Adjust the heater door at the floor and the vent door to get the proper airflow. Is the repair complete?	-	System OK	-
12	Switch the mode knob to defrost. Is the defroster airflow OK?	-	Go to Step 13	Go to Step 14
13	1. Remove the heater outlet. 2. Check the heater outlet for obstructions. 3. Remove any obstructions in the heater outlet. Is the repair complete?	-	System OK	-
14	Check the blower speeds for change in the airflow. Does the blower speed increase as the control is turned from 1 to 4?	-	Go to Step 15	Go to "Blower Electrical"

**Improper Air Delivery or No Mode Shift (Cont'd)**

Step	Action	Value(s)	Yes	No
15	1. Check for obstructions in the system at the blower inlet. 2. Remove any obstructions at the blower inlet. Is the repair complete?	-	System OK	Go to Step 16
16	1. Set the blower on 4. 2. Rotate the temperature control from full hot to full cold. 3. Listen for an airflow change. Does the airflow change?	-	Go to Step 17	Go to Step 18
17	1. Check the temperature door adjustment, the cables, the linkage, and the control. 2. Adjust the temperature control to full hot. Is the repair complete?	-	System OK	-
18	1. Check the system for any obstruction between the blower and the system outlets. 2. Remove any obstruction between the blower and the system outlets. Is the repair complete?	-	System OK	-

**TOO MUCH HEAT**

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Set the mode switch to the floor position. Is there too much heat when the mode switch is in the floor position?	-	Go to Step 3	Go to Step 9
3	Check for defroster bleed. Is there objectionable defroster bleed?	-	Go to Step 4	Go to Step 5
4	1. Check the door travel, the cables, the controls, and the linkage for the heater and the defroster. 2. Adjust or repair, as required. Is the repair complete?	-	System OK	-
5	1. In vehicles equipped with air conditioning (A/C), set the A/C switch OFF. 2. In all vehicles, set the blower speed to 4. 3. Set the temperature to full hot. 4. Turn the ignition switch to ON. 5. Check for airflow from the floor outlets. 6. Check the floor outlet attachment. Is the airflow high?	-	Go to Step 7	Go to Step 8
6	Check for a change in the airflow at different blower speeds. Does the airflow change as the setting for the blower-speed switch is changed?	-	System OK	Go to "Blower Electrical"
7	1. Check the temperature door travel, the cables, and the linkage. 2. Adjust to full cold. 3. Check for full hot. Is the repair complete?	-	System OK	-

## 7A - 12 HEATING AND VENTILATION SYSTEM

### Too Much Heat (Cont'd)

Step	Action	Value(s)	Yes	No
8	Adjust or repair the floor/defroster and/or the vent/floor mode. Is the repair complete?	-	System OK	-
9	Set the mode switch to the vent position. In the vent position, is the problem objectionable bleed?	-	Go to Step 10	Go to Step 15
10	1. Check the system case for leaks. 2. Check the floor outlet attachment. Are any problems found?	-	Go to Step 11	Go to Step 12
11	Repair the system case or the floor outlet attachment as required. Is the repair complete?	-	System OK	Go to Step 12
12	1. Turn the ignition switch OFF. 2. Turn the temperature control knob to full hot, then rapidly to full cold. Do you hear the door slam just before you reach the end of the control travel?	-	Go to Step 13	Go to Step 14
13	Adjust the vent door to vent more. Is the repair complete?	-	System OK	-
14	1. Check the temperature door travel, the cables, and the linkage. 2. Verify that the temperature door goes to full cold. 3. Check the temperature door for full hot. Is the temperature door travel correct?	-	System OK	-
15	1. Set the fresh air/recirculating air control to fresh air. 2. Set the temperature control to full cold. 3. Start the vehicle and allow the engine to warm up. 4. Measure the air temperature at the blower inlet, or cowl, and at the vent air outlet inside the vehicle. Is the outlet air more than 5°C (41°F) warmer than the inlet air?	-	Go to Step 16	System OK
16	1. Check for hot air leaks from the engine compartment to the blower inlet. 2. Repair as needed. Is the repair complete?	-	System OK	-

**CONTROLS**

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Is excessive effort required to move a control?	-	Go to Step 5	Go to Step 3
3	Does a door move too easily on a high-blower setting?	-	Go to Step 4	System OK
4	1. Replace the Bowden cable with a longer cable. 2. Add a loop to the cable routing to increase the effort required to move a control. 3. Check for instrument panel interference with the new cable routing. Does the control operate properly?	-	System OK	Go to Step 5
5	Check the cables for improper routing, kinks, wiring interference, or other instrument panel interference. Is any cable problem found?	-	Go to Step 6	Go to Step 7
6	Repair as needed. Is the repair complete?	-	System OK	-
7	1. Remove the cable from any door that binds on the cable. 2. Cycle the door manually. 3. Check for door binding. Is there any door binding?	-	Go to Step 8	Go to Step 11
8	Check the door seal for proper installation. Is the door seal OK?	-	Go to Step 9	Go to Step 10
9	1. Check a binding door for shaft alignment, a bent shaft or a bent door, or a warped case. 2. Repair, as needed. Is the repair complete?	-	System OK	-
10	Repair the door seal, as needed. Is the repair complete?	-	System OK	-
11	Check for control binding. Does the control bind?	-	Go to Step 13	Go to Step 12
12	1. Reinstall the cable to the door. 2. Check the cable-to-dash components clearances. 3. Repair any interference. Is the repair complete?	-	System OK	-
13	1. Remove the cable from the control. 2. Check the control for binding. Does the control bind?	-	Go to Step 14	Go to Step 15
14	Replace the control. Is the repair complete?	-	System OK	-
15	Replace the cable. Is the repair complete?	-	System OK	-

## BLOWER NOISE

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	1. Sit inside the vehicle. 2. Close the doors and the windows. 3. Turn the ignition ON. 4. Set the blower speed to 4. 5. Set the temperature to full cold. 6. Cycle through the blower speeds, the modes, and the temperature settings in order to find the noise. Is the blower noise constant at high blower speeds or certain modes, but absent at lower speeds or in other modes?	-	Go to Step 11	Go to Step 3
3	Check for vibrations from the blower motor and fan assembly at each blower speed by feeling the blower motor housing. Do you find excessive vibration?	-	Go to Step 6	Go to Step 4
4	1. Remove the blower motor and fan assembly. Refer to "Blower Motor" in this section. 2. Check for foreign material at the opening of the blower inlet. Do you find any foreign material at the blower inlet?	-	Go to Step 5	Go to Step 6
5	Remove all foreign material. Is the repair complete?	-	System OK	Go to Step 6
6	1. Examine the blower fan for wear spots, cracked blades, a cracked hub, a loose fan retaining nut, or bad alignment. 2. Examine the blower case for wear spots. Do you find any problem?	-	Go to Step 7	Go to Step 9
7	Lubricate the motor. Is the repair complete?	-	System OK	Go to Step 8
8	Replace the motor and fan assembly. Is the repair complete?	-	System OK	Go to Step 9
9	If the noise is a click/tick or whine, replace the motor. Is the repair complete?	-	System OK	Go to Step 10
10	Reinstall the original motor. Is the problem still present?	-	Go to Step 11	System OK
11	1. Set the blower speed on 4. 2. Check full-hot to full-cold temperature positions in the defrost, floor, and vent modes. Is the noise present in the defrost mode only?	-	Go to Step 12	Go to Step 13
12	1. Check the ducts for obstructions or foreign materials. 2. Remove any obstructions or foreign materials. 3. Check the floor/defroster door seals. 4. Repair or replace the ducts and door seals, as needed. Is the repair complete?	-	System OK	-
13	Is the noise present in the floor mode only?	-	Go to Step 12	Go to Step 14

## Blower Noise (Cont'd)

Step	Action	Value(s)	Yes	No
14	Is the noise present in the vent mode only?	-	Go to Step 15	Go to Step 16
15	1. Check the ducts for obstructions or foreign materials. 2. Remove any obstructions or foreign materials. 3. Check the vent door seals. 4. Repair or replace the vent door seals, as needed. Is the repair complete?	-	System OK	-
16	Is the noise present in all modes, but not all temperature positions?	-	Go to Step 17	Go to Step 18
17	1. Check the temperature door seals. 2. Repair or replace the temperature door seals, as needed. Is the repair complete?	-	System OK	-
18	1. Check the system for obstructions or foreign materials between the fan and the temperature door. 2. Repair or replace any parts, as needed. Is the repair complete?	-	System OK	Go to Step 2

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

#### TEMPERATURE CABLE ADJUSTMENT

Because the cable and the cable housings have fixed lengths, it is impossible to make a temperature cable adjustment.

The heater/air distribution case linkage also cannot be adjusted.

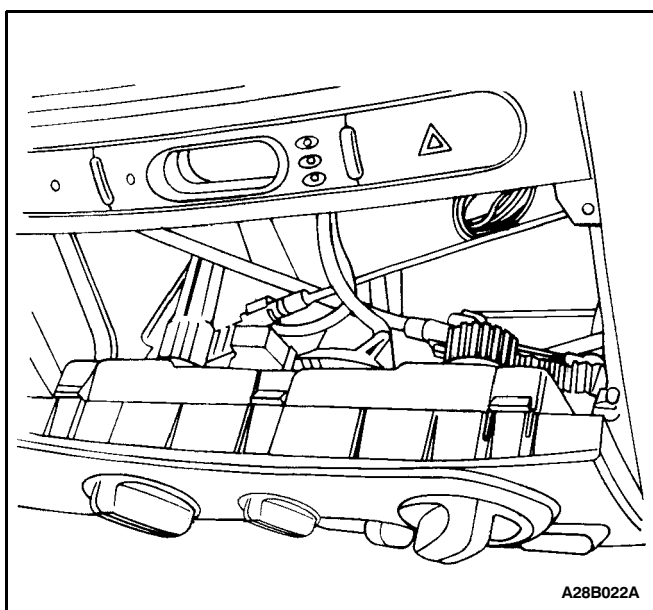
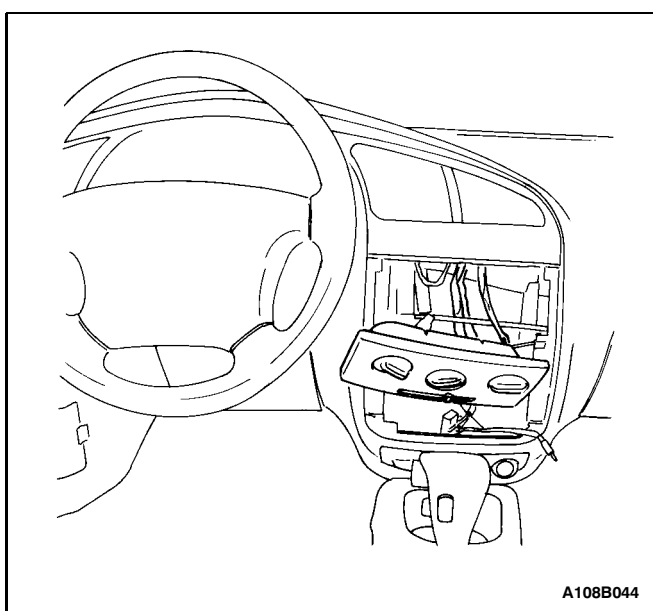
If a malfunction is suspected, verify the proper operation of the controller and the mechanical doors for the heater/air distributor case assembly.

#### CONTROL ASSEMBLY

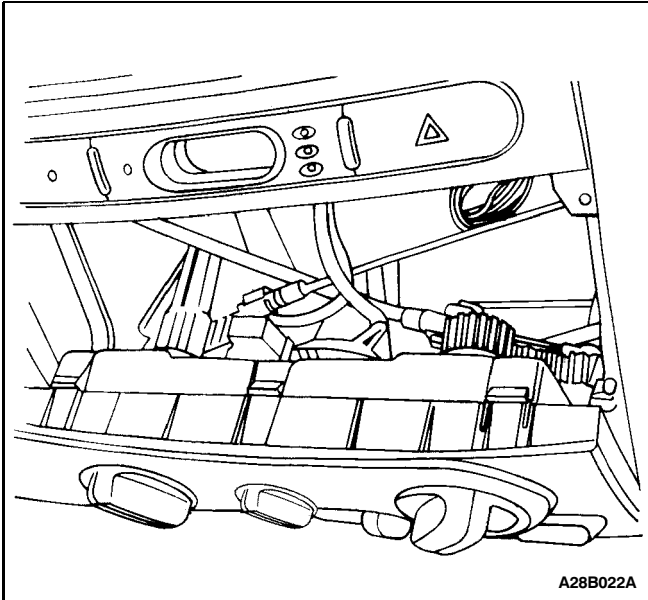
(Left-Hand Drive Shown, Right-Hand Drive Similar)

##### Removal Procedure

1. Disconnect the negative battery cable.
  2. Remove the audio system. Refer to Section 9F, Audio Systems.
  3. Remove the lower left and the lower right heating, ventilation, and air conditioning (HVAC) controller retaining screws.
  4. Remove the controller by pulling it out to provide clearance for the removal of the cable.
  5. Disconnect the mechanical control cables by gently prying off the cable eyelet and unsnapping the cable housing from the mechanical slide.
- Important: Note the location of the cables and the housings to facilitate their reinstallation.
6. Disconnect the electrical connectors.

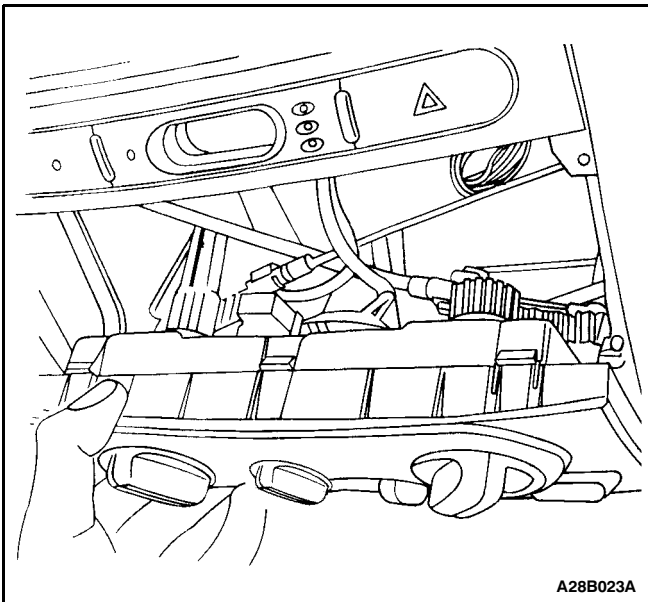






### Installation Procedure

1. Connect the electrical connectors to the proper sockets on the back of the controller.
2. Install the mechanical cable housings to the proper control positions.
3. Install the eyelets on the end of each cable, pressing each onto the proper post.
4. Install the controller by gently inserting the controller into the proper position on the center console.

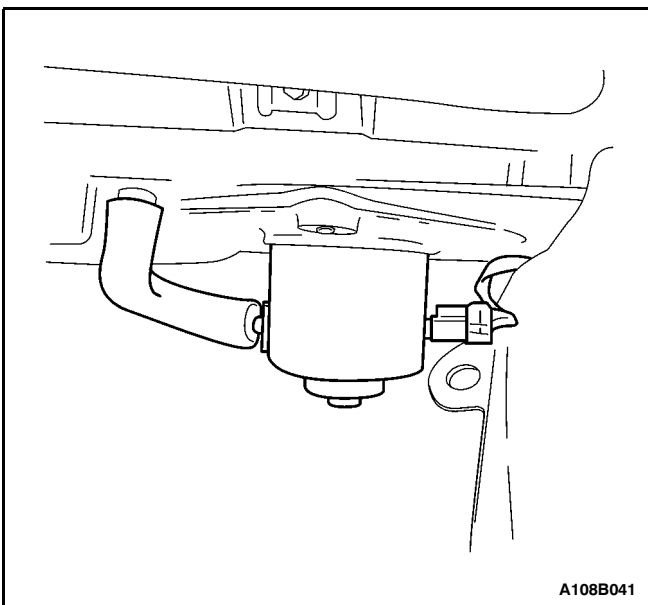


5. Install the lower left and the lower right controller retaining screws.

### Tighten

Tighten the HVAC controller retaining screws to 2 N•m (18 lb-in).

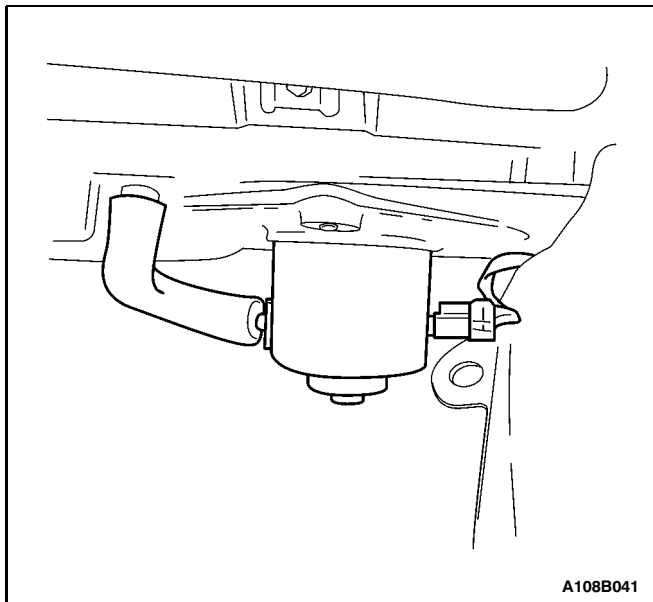
6. Install the audio system. Refer to Section 9F, Audio Systems.
7. Connect the negative battery cable.
8. Confirm the proper operation of the controller by moving it through all of the controller's possible functioning positions.



## BLOWER MOTOR

### Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the blower motor electrical connector.
3. Remove the blower cooling hose.
4. Remove the screws that secure the motor to the heater/ air distribution case.
5. Remove the motor and the seal from the heater/air distribution case by gently pulling the motor straight down and out.



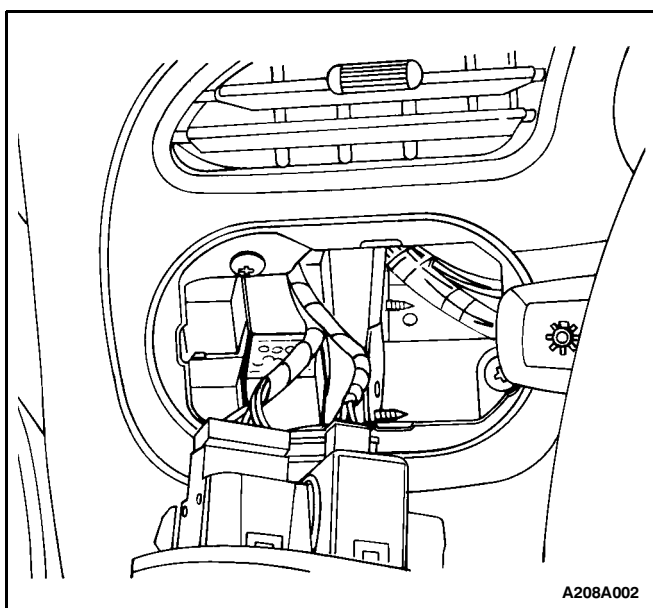
### Installation Procedure

1. Install the blower motor and seal, with the shock mount pads, in the heater/air distribution case. Hold the blower motor in position.
2. Install the screws to secure the blower motor to the heater/air distributor case.

### Tighten

Tighten the blower motor retaining screws to 6 N•m (53 lb-in).

3. Install the blower motor cooling hose.
4. Connect the electrical connector.
5. Connect the negative battery cable.
6. Confirm that the blower motor operates properly.

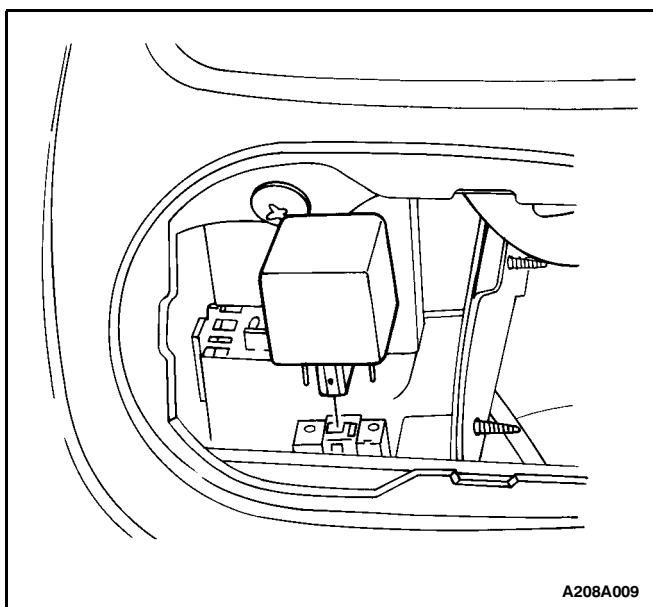


### HIGH-BLOWER RELAY

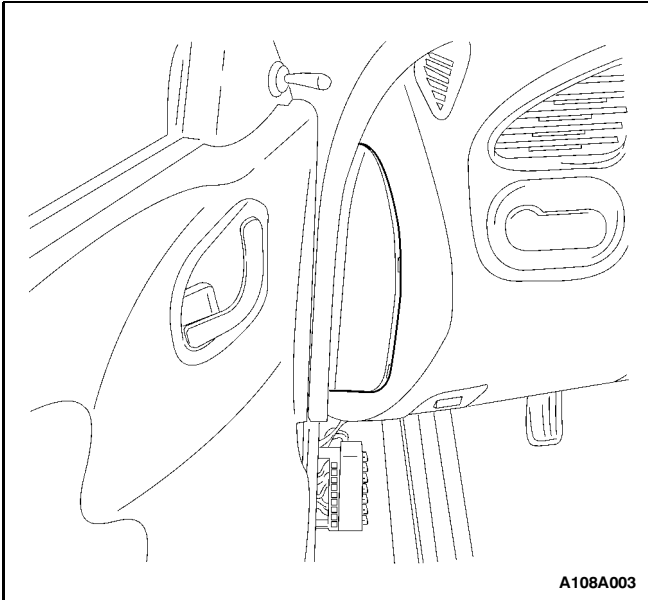
(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the access panel at the instrument cluster end of the instrument panel.

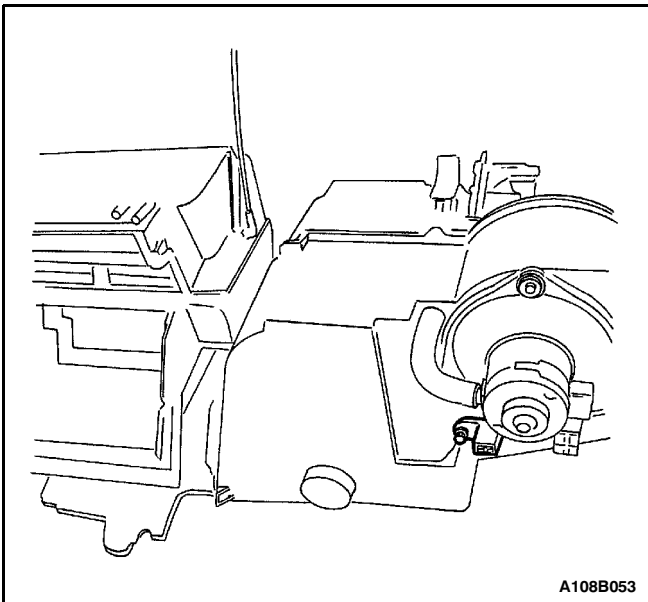


3. Reach through this opening and push back a latch that holds the control panel that contains the remote mirror control and the headlamp leveling control.
4. Remove the panel from the dashboard.
5. Pull out the relay at the front of the relay box.



### Installation Procedure

1. Align the relay contacts with the relay terminal slots.
2. Push the relay firmly into the base. The relay must be seated and flush with the base edge.
3. Replace the instrument panel access panel.
4. Replace the remote mirror/lighting control panel.
5. Connect the negative battery cable.

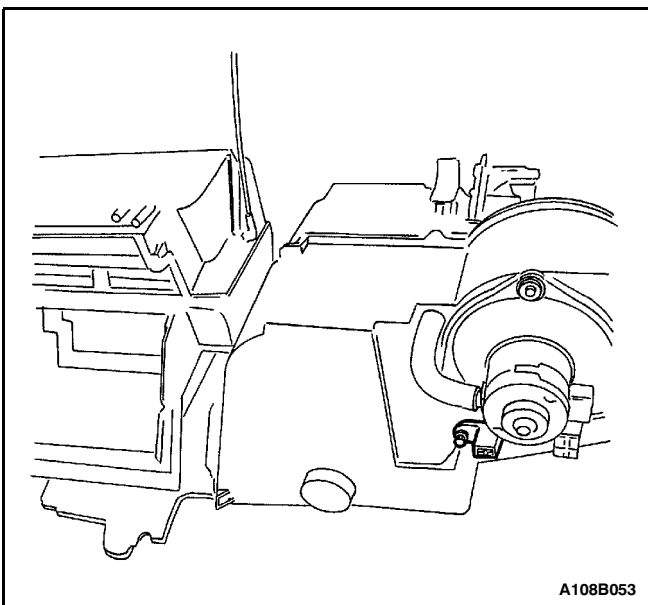


### BLOWER RESISTOR

(Left-Hand Drive Shown, Right-Hand Drive Similar)

#### Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the electrical connector at the resistor.
3. Remove the retaining screws from the resistor.
4. Remove the resistor by gently pulling downward.



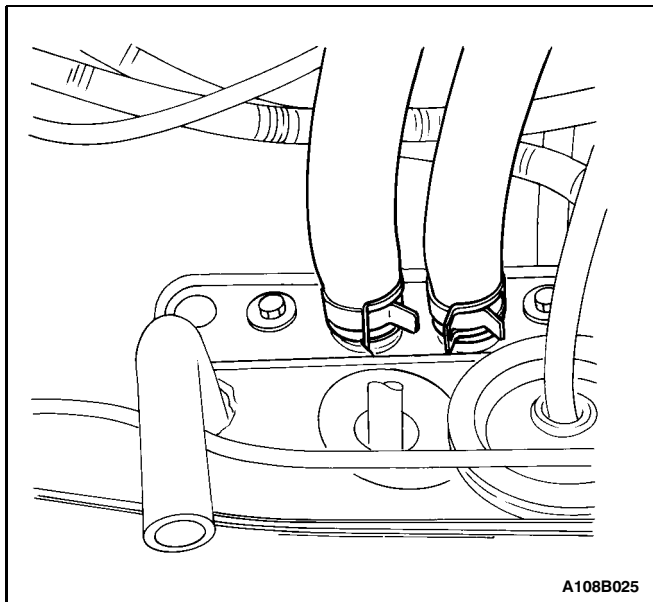
#### Installation Procedure

1. Install the new resistor into the heater/air distribution case with the screws.

#### Tighten

Tighten the blower resistor retaining screws to 6 N•m (53 lb-ft).

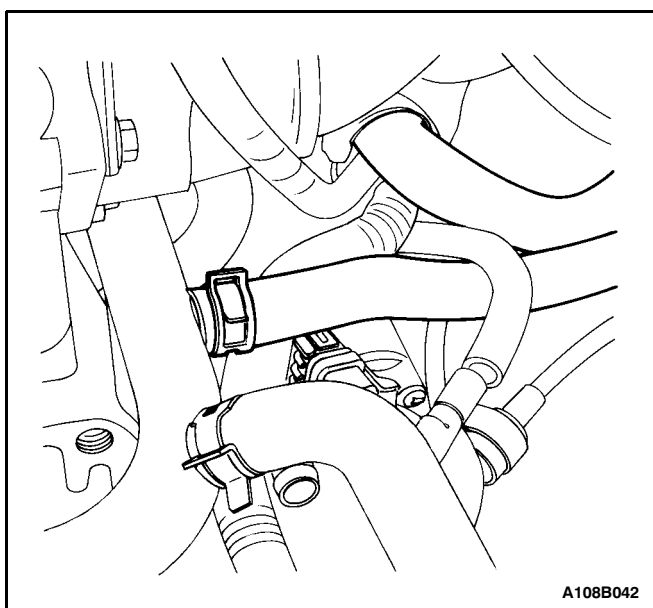
2. Connect the electrical connector at the resistor.
3. Connect the negative battery cable.
4. Confirm the proper performance of the blower.



### HEATER HOSES

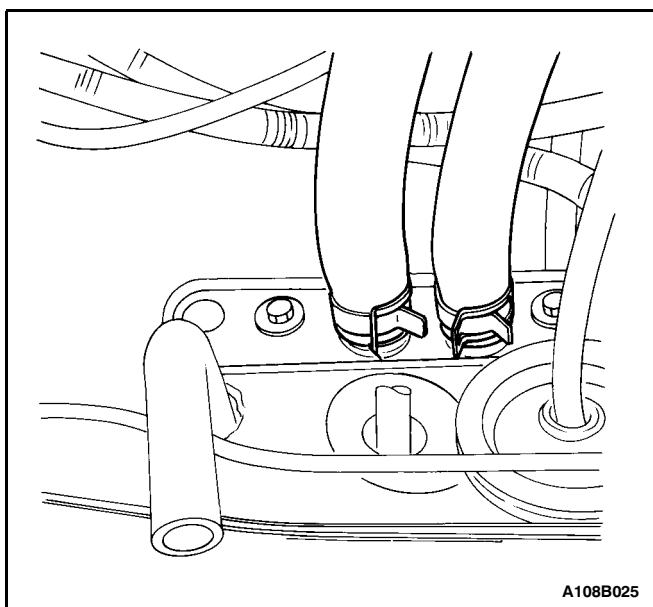
#### Removal Procedure

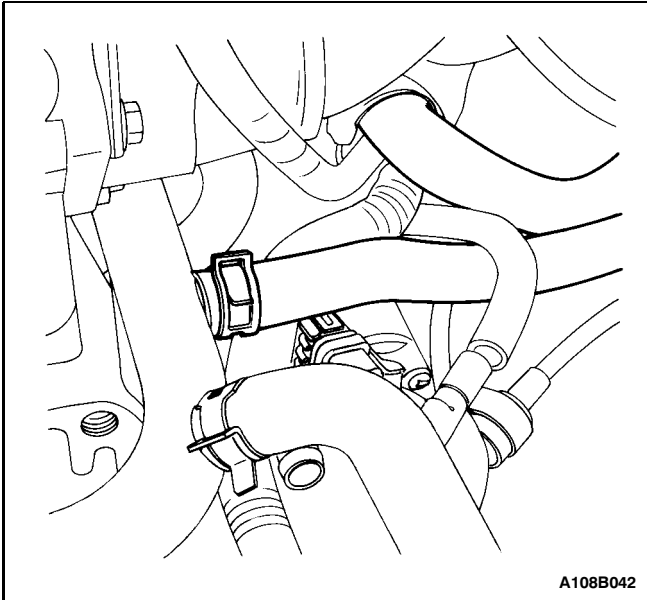
1. Partially drain the cooling system.
2. Compress and slide rearward the two heater hose spring clamps at the fire wall.
3. Gently twist the hose from the left to the right and back again to loosen the bond between the hose and the tube.
4. Remove the end of the hose from the tube.
5. Repeat steps 3 and 4 with the other hose.
6. Compress the heater hose spring clamp on the inlet coolant line and slide the clamp rearward.
7. Remove the hose from the vehicle.
8. Compress the heater hose spring clamp at the connection below the intake manifold and slide the clamp rearward.
9. Remove hose from the vehicle.



#### Installation Procedure

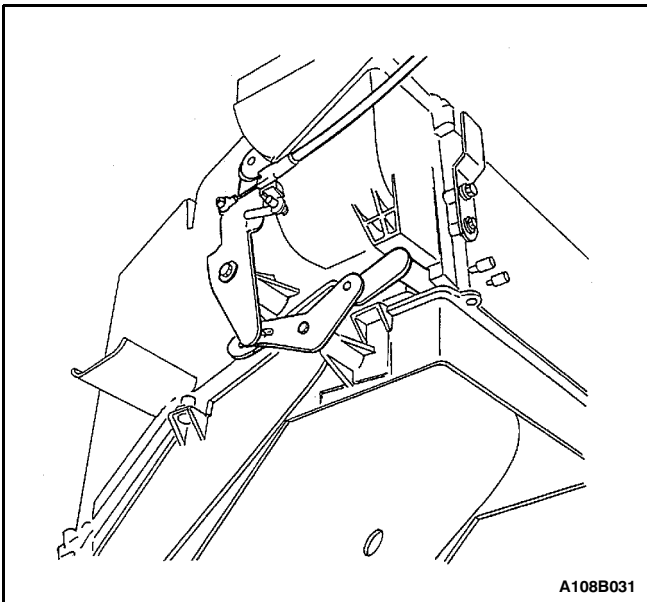
1. Install the left heater hose to the coolant inlet line fitting. Slide the end of the heater hose over the coolant fitting until the hose is seated.
2. Install the right heater hose to the fitting below the intake manifold. Slide the end of the heater hose over the fitting until it is seated.
3. Install and seat the other end of each heater hose.
4. Compress and slide the spring clamps into position on the heater hoses and release the tension on the spring clamps.





A108B042

5. Fill the cooling system.
6. Check the hoses for leaks.



A108B031

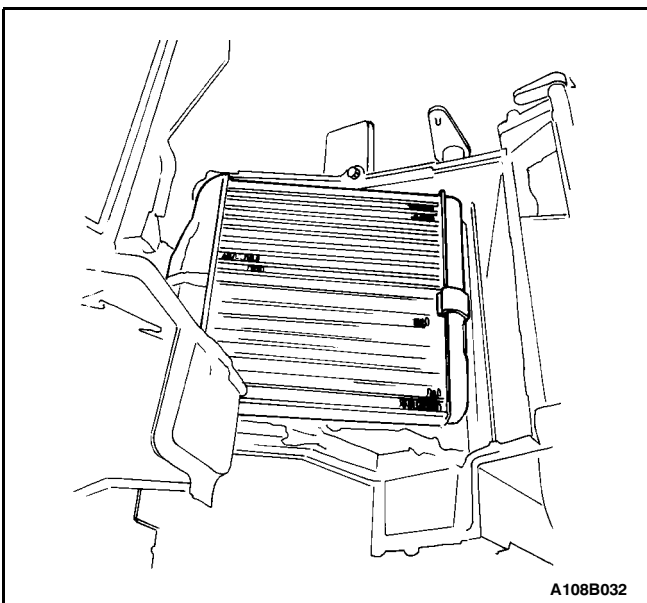
## HEATER CORE

(Left-Hand Drive Shown, Right-Hand Drive Similar)

### Removal Procedure

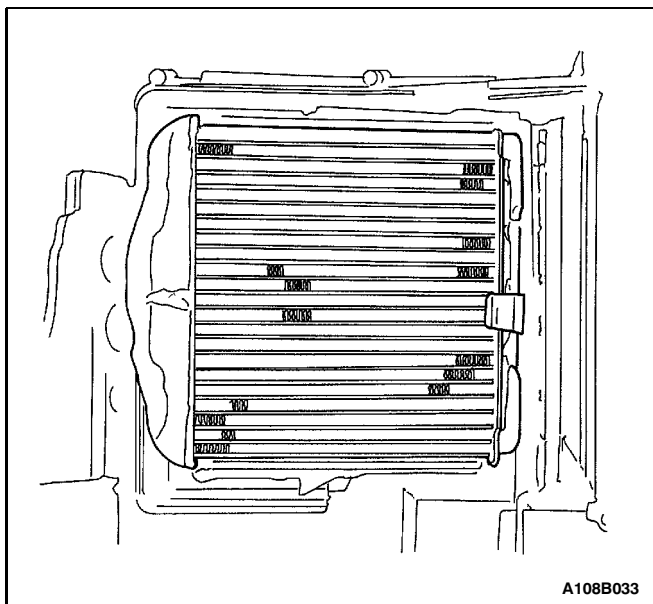
1. Raise the hood.
2. Disconnect the negative battery cable.
3. Remove the instrument panel carrier assembly from the vehicle. Refer to Section 9E, Instrumentation/Driver Information.
4. Remove the heater/air distribution case from the vehicle. Refer to Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System.
5. Remove the linkage screw from the lower heater core cover post.
6. Remove the linkage lever. Note the position of all the levers to facilitate reassembly.

**Notice:** Handle the case carefully to avoid damaging the linkage levers.



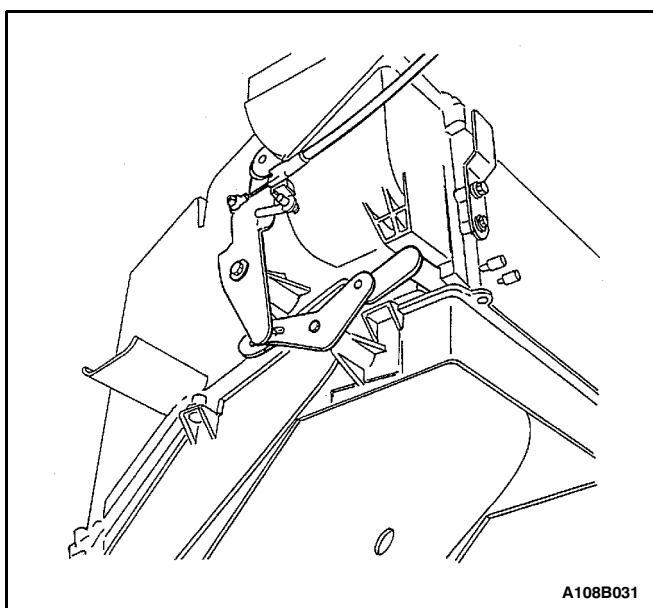
A108B032

7. Remove the screws that secure the heater core cover.
8. Slowly separate the lower heater core cover from the rest of the assembly. Retain the sealant.
9. Remove the screw and the bracket clamp that secure the heater core lines to the case.
10. Remove the spring clamp that secures the heater core body to the case.
11. Remove the heater core from the case.

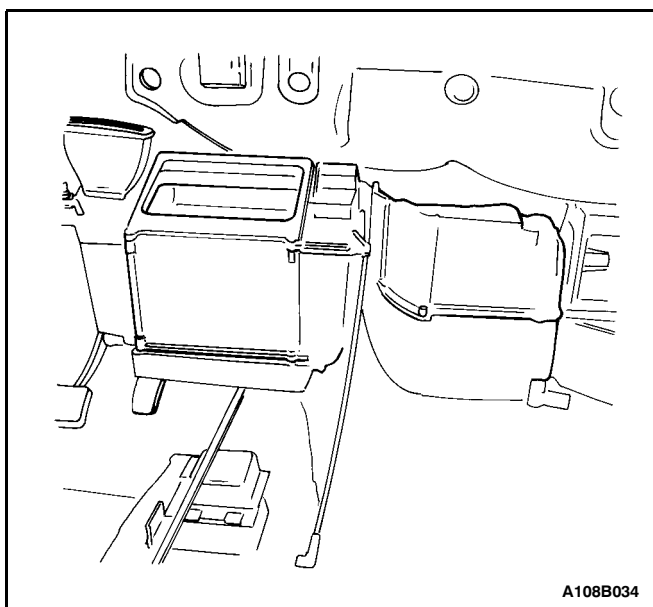


### Installation Procedure

1. Install the heater core into the case.
2. Secure the heater core lines to the case with the retaining bracket clamp and the screw.
3. Install the heater core body with the retaining spring clamp.
4. Reapply the sealant to the heater core cover mounting channel flange as removed.
5. Install the heater core cover.



6. Install the retaining screws.
7. Install the linkage lever onto the cover post with the screw.
8. Confirm proper operation of the actuating levers for the heater/air distribution case doors.



9. Install the heater/air distribution case. Refer to Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System.
10. Install the instrument panel carrier assembly. Refer to Section 9E, Instrumentation/Driver Information.
11. Fill the cooling system.
12. Connect the negative battery cable.

### REAR HEATER

Some vehicles are equipped with rear seat heater ducts. Should there be no airflow to the rear, look for any obstructions, such as items on the floor under the front seats. Also check for air leaks between the heater/air distributor assembly and the rear ducts.

## GENERAL DESCRIPTION AND SYSTEM OPERATION

### HEATING AND VENTILATION SYSTEMS

The base heater system is designed to provide heating, ventilation, windshield defrosting, side window defogging, and in some vehicles, deliver heat to the rear seat area.

The heater and fan assembly blower regulates the air flow from the air inlet for further processing and distribution.

The heater core transfers the heat from the engine coolant to the inlet air.

The temperature door regulates the amount of the air that passes through the heater core. The temperature door also controls the temperature of the air by controlling the mix of the heated air and the ambient air.

The mode door regulates the flow and the distribution of the processed air to the heater ducts and to the defroster ducts.

This console-mounted heating and ventilation panel contains the following:

#### Three Rotary Control Knobs

##### 1. The Rotary Temperature Control Knob

- Actuates by cable.
- Raises the temperature of the air entering the vehicle by rotation toward the right, or the red portion of the knob.

##### 2. The Rotary Blower Control Knob

- Turns on to operate the blower motor at four speeds.
- Turns OFF to stop the blower.

- Operates completely independently both from the mode control that regulates the defroster door and from the temperature control knob.
- Changes the fan speed in any mode and at any temperature setting.

##### 3. The Rotary Mode Control Knob

- Actuates by cable.
- Regulates the air distribution between the windshield, the instrument panel, and the floor vents.

#### Push Knobs

##### 1. The Rear Window Defogger Push Knob

- Controls the rear window defogger.
- Turns ON the rear window defogger when the push knob is pressed and the indicator lamp is illuminated.

##### 2. The A/C Push Knob (if the vehicle is equipped with air conditioning)

- Controls the A/C.
- Turns the A/C ON when the push knob is down. However, if the blower control knob is OFF, the A/C system is OFF, regardless of the position of the A/C knob.

#### One Lever

##### 1. The Fresh Air Control Lever

- Operates by cable.
- Switches between recirculating passenger compartment air and bringing outside air into the passenger compartment.
- Draws in outside air when the lever is moved to the left.
- Recirculates inside air when the lever is moved to the right.