
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 B unless otherwise noted.

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DESCRIPTION AND SYSTEM OPERATION

HEATING AND VENTILATION SYSTEMS

The base heater system is designed to provide heating, ventilation, windshield defrosting, and side window defogging.

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 ∞ 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

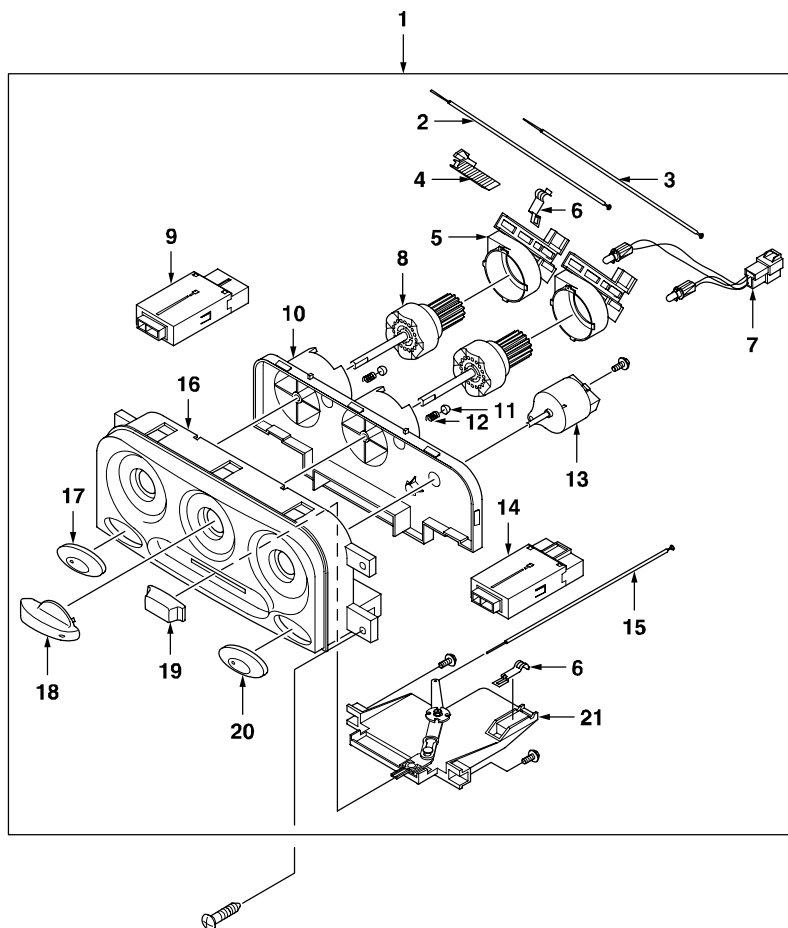
1. The Fresh Air Control Lever

- 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.

COMPONENT LOCATOR

CONTROL ASSEMBLY

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

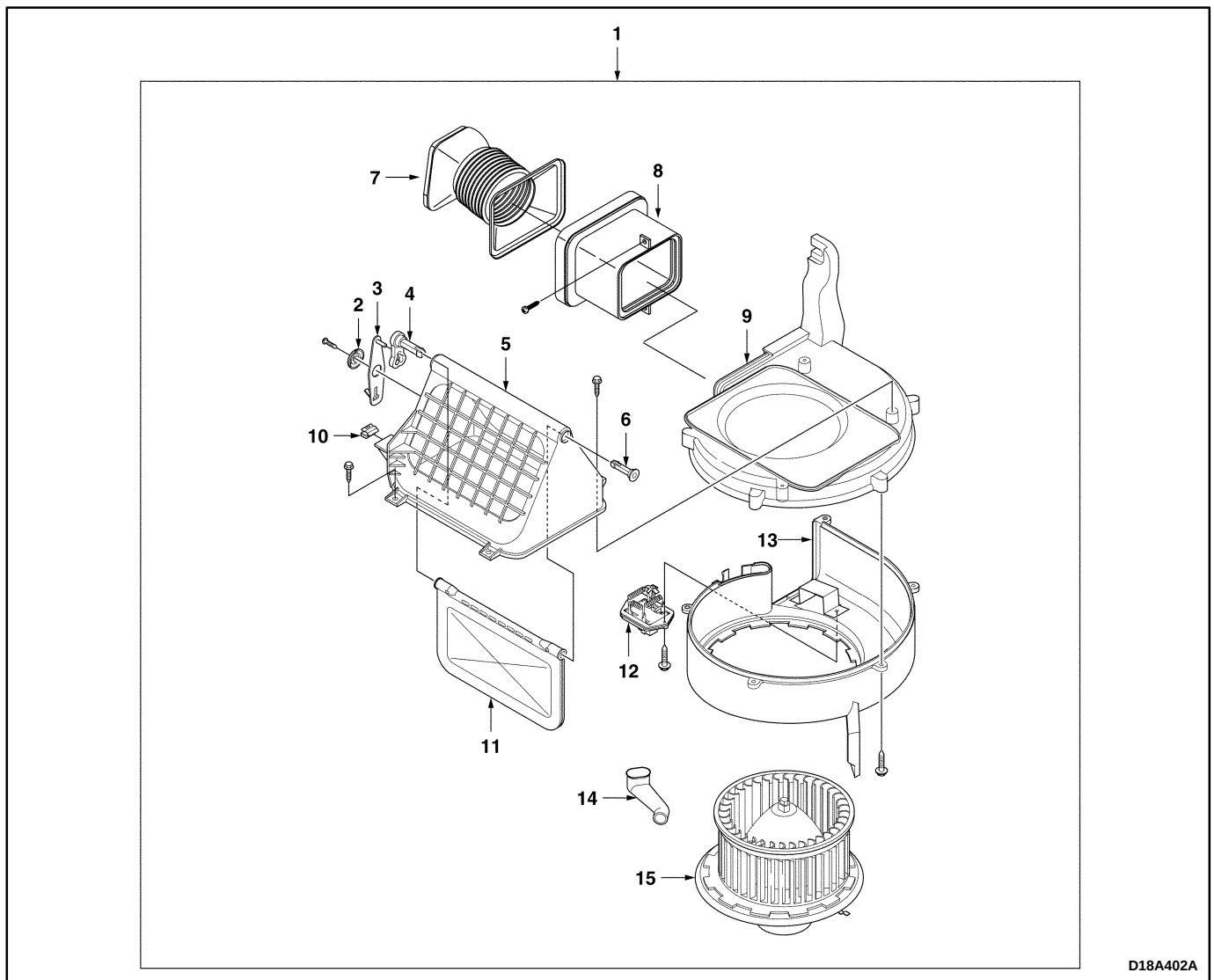


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| 1. HVAC Control Assembly | 12. Detent Spring |
| 2. Temperature Control Cable | 13. Blower Switch |
| 3. Mode Select Cable | 14. Rear Defogger Switch |
| 4. Rack | 15. Recirculating/Fresh Air Door Cable |
| 5. Bracket | 16. Panel |
| 6. Cable Clamp | 17. A/C Push Knob |
| 7. Bulb Socket Assembly | 18. Rotary Knob |
| 8. Pinion Assembly | 19. Recirculating Knob |
| 9. A/C Switch | 20. Rear Defogger Push Knob |
| 10. Housing | 21. Recirculation |
| 11. Detent Cap | |

BLOWER MODULE ASSEMBLY

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



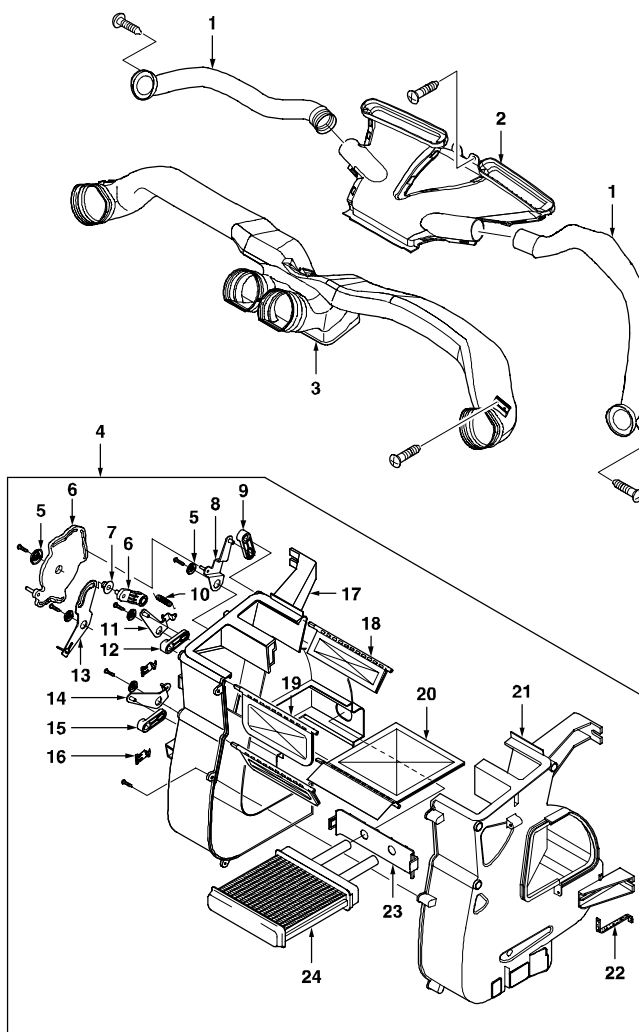
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1. Blower Module Assembly
2. Plastic Washer
3. Blower Link
4. Blower Lever
5. Air Intake Case
6. Valve Retainer
7. Heater Duct Assembly
8. Blower Connector Duct

9. Orifice Case
10. Cable Clamp
11. Blower Valve
12. Blower Resistor
13. Lower Case
14. Cooling Hose
15. Blower Motor

AIR DISTRIBUTOR AND HEATER MODULE ASSEMBLY

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



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- | | |
|--------------------------------------|-------------------------------|
| 1. Defroster Duct Hose | 13. Temperature Control Link |
| 2. Defroster Duct | 14. Heater Link |
| 3. Ventilation Duct | 15. Heater Lever |
| 4. Heater Module Assembly | 16. Cable Link |
| 5. Plastic Washer | 17. Left Heater Case |
| 6. Temperature Control Lever | 18. Defroster Valve |
| 7. Temperature Control Lever Bearing | 19. Ventilation Valve |
| 8. Defroster Link | 20. Temperature Control Valve |
| 9. Defroster Lever | 21. Right Heater Case |
| 10. Spring | 22. Case Seal |
| 11. Ventilation Link | 23. Heater Core Cover |
| 12. Ventilation Lever | 24. Heater Core |

DIAGNOSTIC INFORMATION AND PROCEDURES

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 <i>Section 1D, Engine Cooling</i> . 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. 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 25
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 air conditioning. 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 a ● Restriction in the cooling system. ● Failed water pump impeller. ● Faulty thermostat. 2. Make repairs to the cooling system, as needed. Are the repairs complete?	–	System OK	–
14	1. Check the vehicle for cold air leaks at the ● Dash. ● Heater cases. ● Vents. 2. Check under the seat for obstructions. 3. Repair any leaks or obstructions. Are the repairs complete?	–	System OK	–
15	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. Did the door slam?	–	Go to Step 17	Go to Step 16
16	1. Check the temperature door ● Travel. ● Cables. ● Linkage. 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	–
17	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. Is the heater inlet hose hot and the heater outlet hose warm?	–	Go to Step 18	Go to Step 21
18	Check the thermostat. Refer to <i>Section 1D, Engine Cooling</i> . Is the thermostat installed and seated properly?	–	Go to Step 19	Go to Step 20
19	Replace the thermostat. Refer to <i>Section 1D, Engine Cooling</i> . Is the repair complete?	–	System OK	–
20	Reinstall the thermostat. Is the repair complete?	–	System OK	–
21	Inspect the heater hoses for proper installation. Are heater hoses reversed?	–	Go to Step 22	Go to Step 23
22	Reinstall the heater hoses properly. Is the repair complete?	–	System OK	–

Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
23	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 <i>Step 24</i>
24	Replace the heater core. Is the repair complete?	—	System OK	—
25	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 <i>Step 26</i>
26	Check for airflow from the defroster or the vent outlets. Is there high airflow from the defroster or the vent outlets?	—	Go to <i>Step 27</i>	Go to <i>Step 28</i>
27	Adjust the heater door at the floor and the vent door to get the proper airflow. Is the repair complete?	—	System OK	—
28	Switch the mode knob to defrost. Is the defroster airflow OK?	—	Go to <i>Step 29</i>	Go to <i>Step 30</i>
29	1. Remove the heater outlet and check for obstructions. 2. Remove any obstructions in the heater outlet. Is the repair complete?	—	System OK	—
30	Check for airflow change at various blower speeds. Does the blower speed increase as the control is turned from 1 to 4?	—	Go to <i>Step 31</i>	Go to “Blower Electrical”
31	Check for obstructions in the system at the blower inlet. Are there any obstructions?	—	Go to <i>Step 32</i>	Go to <i>Step 33</i>
32	Remove the obstructions in the system at the blower inlet. Is the repair complete?	—	System OK	—
33	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 <i>Step 34</i>	Go to <i>Step 35</i>

Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
34	1. Check the temperature door • Travel. • Cables. • Linkage. • Control. 2. Verify the accuracy of the temperature controls at full hot. Is the repair complete?	–	System OK	–
35	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 <i>Step 2</i>	System OK
2	Check the blower. Does the blower run at any speed?	–	System OK	Go to <i>Step 3</i>
3	1. Disconnect the power connector from the blower motor under the dashboard on the passenger side of the vehicle. 2. Use an ohmmeter check the resistance between the 1 terminal of the blower motor connector and each step with the blower switch place each position. Does the ohmmeter show the specified value of the each position?	Refer to "Specifications" in this section.	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	Replace the blower motor. Is the repair complete?	–	System OK	Go to <i>Step 7</i>
5	Check the fuse Ef6. Is the fuse blown?	–	Go to <i>Step 6</i>	Go to <i>Step 7</i>
6	1. Turn the ignition ON. 2. Use a short detector to locate a possible short. • From the fuse Ef6 to the blower switch. • From the blower switch to the blower resistor. • From the blower resistor to the blower motor. 3. Repair any short. 4. Replace any blown fuse. Is the repair complete?	–	System OK	–
7	1. Turn the ignition ON. 2. Disconnect the power connector from the blower motor. 3. Use a test lamp to locate a possible short. • From the terminal 2 of the motor connector to the terminal 3 of the motor switch connector. • From the terminal 2 of the motor connector to the terminal 4 of the motor switch connector. • From the terminal 2 of the motor connector to the terminal 5 of the motor switch connector. • From the terminal 2 of the motor connector to the terminal 6 of the motor switch connector. Does the test lamp light ON?	–	Go to <i>Step 9</i>	Go to <i>Step 8</i>
8	Replace the blower resistor. Is the repair complete?	–	System OK	Go to <i>Step 10</i>
9	Replace the blower motor switch. Is the repair complete?	–	System OK	–
10	1. Check the ground of the blower motor. 2. Repair the ground of the blower motor. 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.

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. • Check the cable connection to the door. • Check that the cable sheath is properly retained. 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

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

Step	Action	Value(s)	Yes	No
8	Repair the cable attachment or control as necessary. Is the repair complete?	–	System OK	Go to <i>Step 9</i>
9	Recheck the system using the “Control Settings/Correct Results” tests in this procedure. Is the repair complete?	–	System OK	Go to <i>Step 10</i>
10	Check for airflow from the defroster or the vent outlets. Is there high airflow from the defroster or the vent outlets?	–	Go to <i>Step 11</i>	Go to <i>Step 12</i>
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 <i>Step 13</i>	Go to <i>Step 14</i>
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 <i>Step 15</i>	Go to “Blower Electrical”
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 <i>Step 16</i>
16	1. Set the blower on 4. 2. Rotate the temperature control from full hot to full cold. 3. Listen for an airflow change. Did the airflow change?	–	Go to <i>Step 17</i>	Go to <i>Step 18</i>
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 <i>Step 2</i>	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 <i>Step 3</i>	Go to <i>Step 9</i>
3	Check for defroster bleed. Is there objectionable defroster bleed?	–	Go to <i>Step 4</i>	Go to <i>Step 5</i>
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 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 <i>Step 7</i>	Go to <i>Step 8</i>
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	–
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 <i>Step 10</i>	Go to <i>Step 15</i>
10	1. Check the system case for leaks. 2. Check the floor outlet attachment. Are any problems found?	–	Go to <i>Step 11</i>	Go to <i>Step 12</i>
11	Repair the system case or the floor outlet attachment as required. Is the repair complete?	–	System OK	Go to <i>Step 12</i>
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 reached the end of the control travel?	–	Go to <i>Step 13</i>	Go to <i>Step 14</i>
13	Adjust the vent door to vent more. Is the repair complete?	–	System OK	–

Too Much Heat (Cont'd)

Step	Action	Value(s)	Yes	No
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. 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 <i>Step 2</i>	System OK
2	Is excessive effort required to move a control?	–	Go to <i>Step 5</i>	Go to <i>Step 3</i>
3	Does a door move too easily on a high-blower setting?	–	Go to <i>Step 4</i>	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 <i>Step 5</i>
5	Check the cables for improper routing, kinks, wiring interference, or other instrument panel interference. Is any cable problem found?	–	Go to <i>Step 6</i>	Go to <i>Step 7</i>
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 <i>Step 8</i>	Go to <i>Step 11</i>
8	Check the door seal for proper installation. Is the door seal OK?	–	Go to <i>Step 9</i>	Go to <i>Step 10</i>
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 <i>Step 13</i>	Go to <i>Step 12</i>
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 <i>Step 14</i>	Go to <i>Step 15</i>
14	Replace the control. Is the repair complete?	–	System OK	–
15	Replace the cable. Is the repair complete?	–	System OK	–

BLOWER NOISE

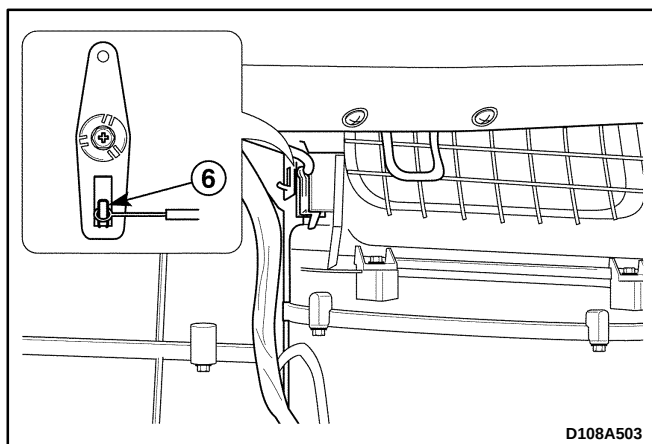
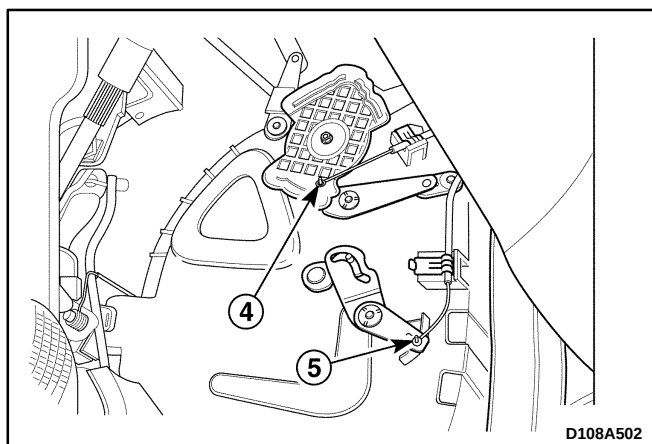
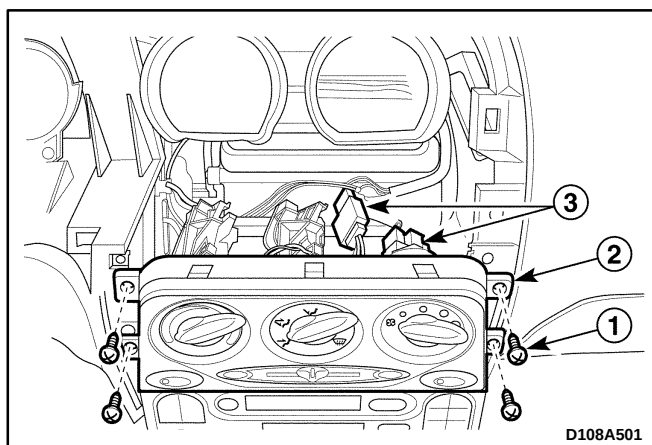
Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	—	Go to <i>Step 2</i>	System OK
2	1. Sit inside the vehicle. 2. Close the doors and windows. 3. Turn the ignition ON. 4. Set the blower speed to 4. 5. Set the temperature to full cold. 6. Cycle through 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 <i>Step 11</i>	Go to <i>Step 3</i>
3	Check for vibrations from the blower motor and fan assembly at each blower speed by feeling the blower motor housing. Did you find excessive vibration?	—	Go to <i>Step 6</i>	Go to <i>Step 4</i>
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. Did you find any foreign material at the blower inlet?	—	Go to <i>Step 5</i>	Go to <i>Step 6</i>
5	Remove all foreign material. Is the repair complete?	—	System OK	Go to <i>Step 6</i>
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. Did you find any problem?	—	Go to <i>Step 7</i>	Go to <i>Step 9</i>
7	Lubricate the motor. Is the repair complete?	—	System OK	Go to <i>Step 8</i>
8	Replace the motor and fan assembly. Is the repair complete?	—	System OK	Go to <i>Step 9</i>
9	If the noise is a click/tick or whine, replace the motor. Is the repair complete?	—	System OK	Go to <i>Step 10</i>
10	Reinstall the original motor. Is the problem still present?	—	Go to <i>Step 11</i>	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 <i>Step 12</i>	Go to <i>Step 13</i>
12	1. Check the ducts for obstructions or foreign materials. 2. Remove any obstructions or foreign materials. 3. Check floor/defroster door seals. 4. Repair or replace, as needed. Is the repair complete?	—	System OK	—
13	Is the noise present in the floor mode only?	—	Go to <i>Step 12</i>	Go to <i>Step 14</i>

Blower Noise (Cont'd)

Step	Action	Value(s)	Yes	No
14	Is the noise present in the vent mode only?	–	Go to <i>Step 15</i>	Go to <i>Step 16</i>
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 as needed. Is the repair complete?	–	System OK	–
16	Is the noise present in all modes, but not all temperature positions?	–	Go to <i>Step 17</i>	Go to <i>Step 18</i>
17	1. Check the temperature door seals. 2. Repair or replace, 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, as needed. Is the repair complete?	–	System OK	Go to <i>Step 2</i>

REPAIR INSTRUCTIONS

ON-VEHICLE SERVICE

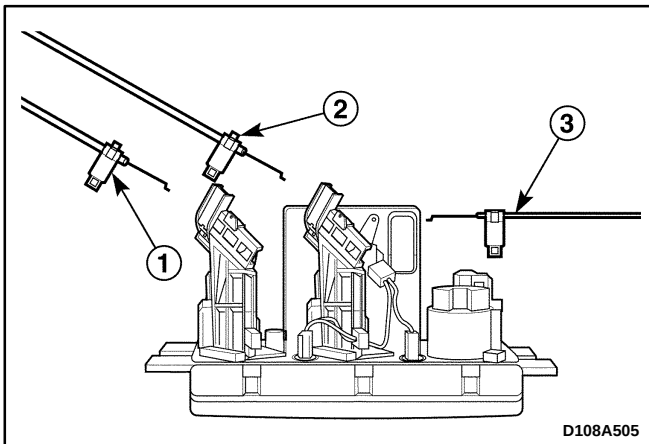
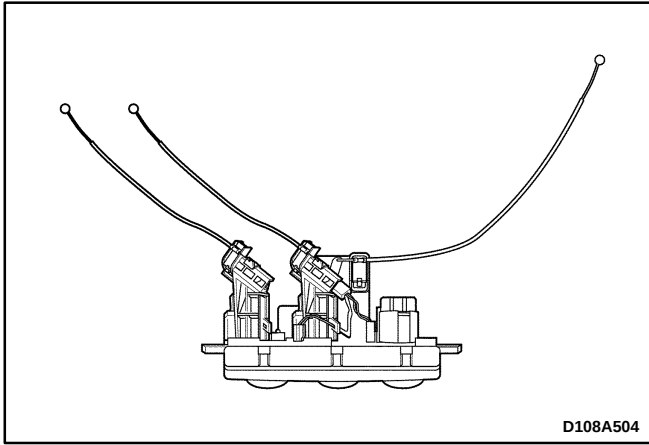


CONTROL ASSEMBLY AND CONTROL CABLES

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

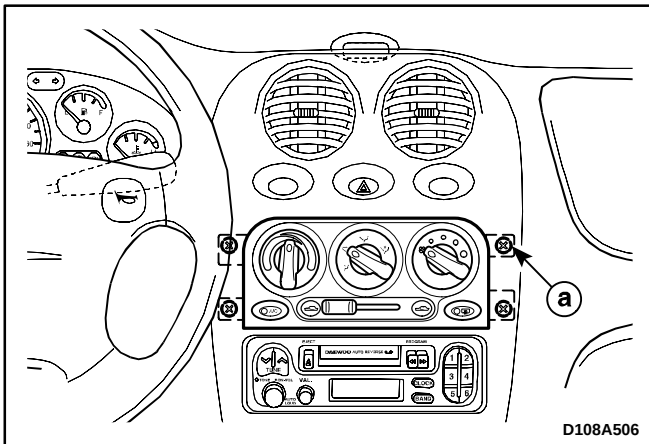
Removal Procedure

1. Disconnect the negative battery cable.
2. Remove the instrument cluster housing trim panel. Refer to *Section 9E, Instrumentation/Driver information*.
3. Remove the control assembly.
 - Remove the control assembly retaining screws (1).
 - Separate the control assembly from the instrument panel (2).
 - Disconnect the electrical connectors (3).
 - Disconnect the mode control cable from the heater module (4).
 - Disconnect the temperature control cable from the heater module (5).
- Remove the glove box from the instrument panel. Refer to *Section 9E, Instrumentation/Driver Information*.
- Disconnect the recirculating/fresh air door cable from the blower module (6).



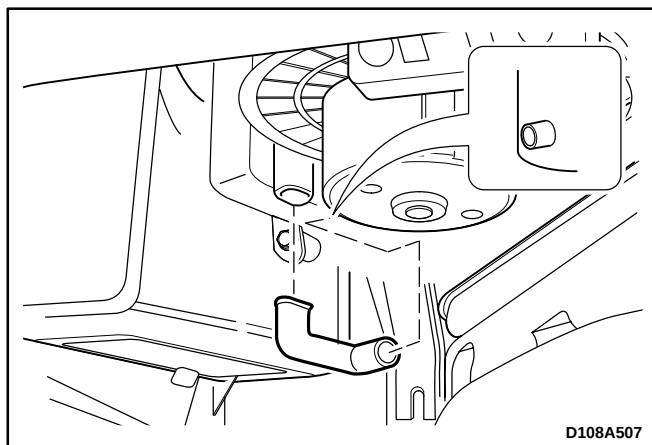
4. Disconnect the control cables from the control assembly.

- Disconnect the temperature control cable (1).
- Disconnect the mode control cable (2).
- Disconnect the recirculating/fresh air door cable (3).



Installation Procedure

1. Connect the control cables to the control assembly.
2. Connect the recirculating/fresh air door cable to the blower module.
3. Install the glove box to the instrument panel. Refer to *Section 9E, Instrumentation/Driver Information*.
4. Connect the temperature control cable and the mode control cable to the heater module.
5. Connect the electrical connectors.
6. Install the control assembly with the screws.
7. Install the instrument cluster housing trim panel. Refer to *Section 9E, Instrumentation/Driver Information*.
8. Connect the negative battery cable.

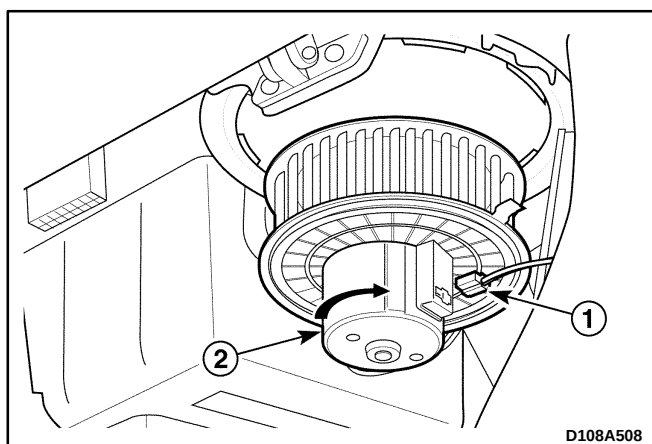


BLOWER MOTOR AND COOLING HOSE

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

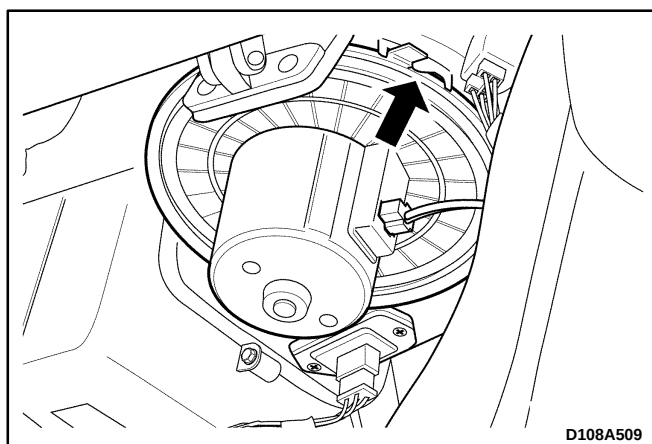
Removal Procedure

1. Remove the blower motor cooling hose.



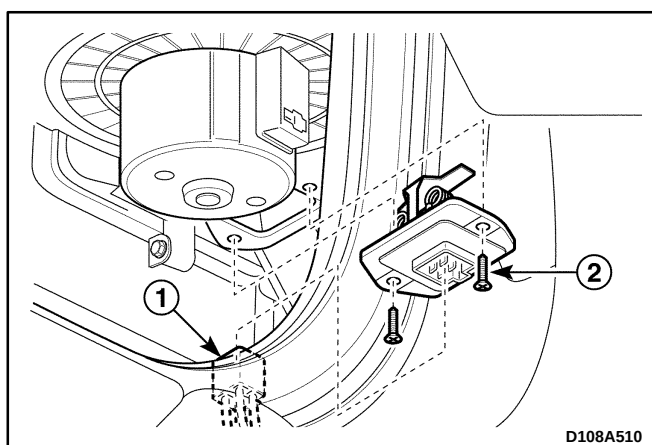
2. Remove the blower motor.

- Disconnect the motor electrical connector (1).
- Turn the blower motor (2).



Installation Procedure

1. Install the blower motor by turning the motor clockwise.
2. Connect the motor electrical connector.
3. Install the blower motor cooling hose.

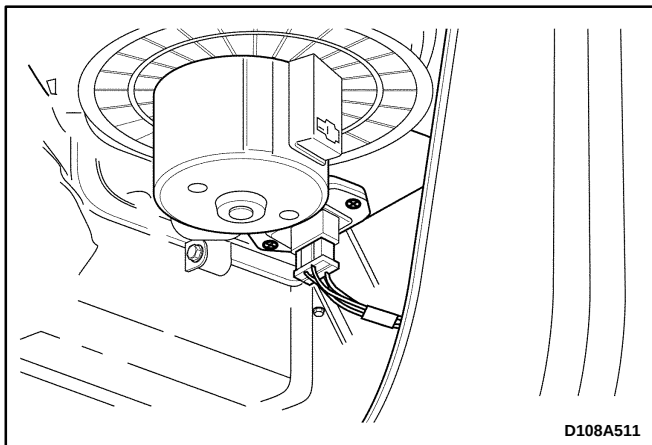


BLOWER RESISTOR

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

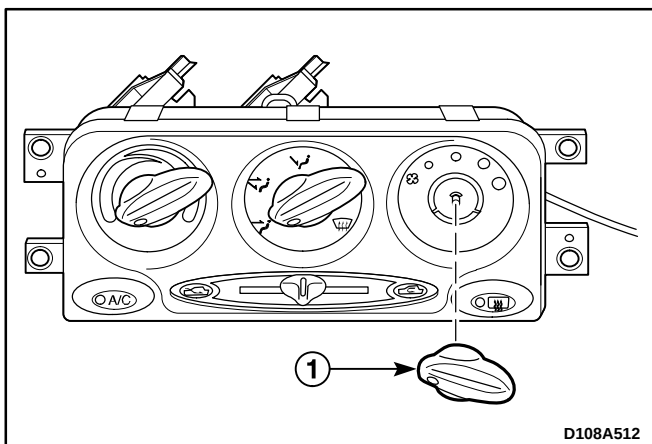
Removal Procedure

1. Remove the blower resistor.
 - Disconnect the blower resistor connector (1).
 - Remove the screws (2).



Installation Procedure

1. Install the blower resistor with the retaining screws.
2. Connect the blower resistor connector.

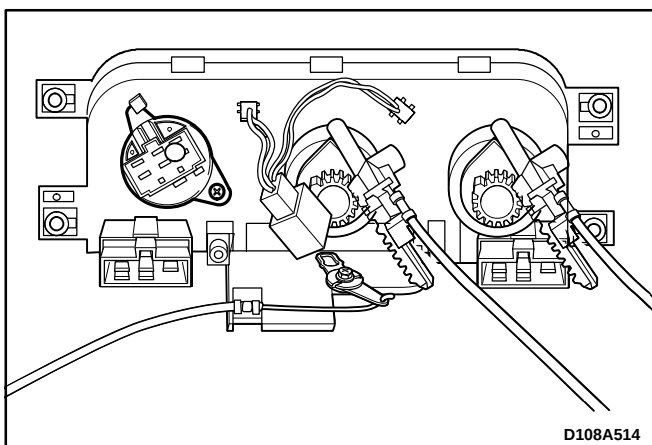
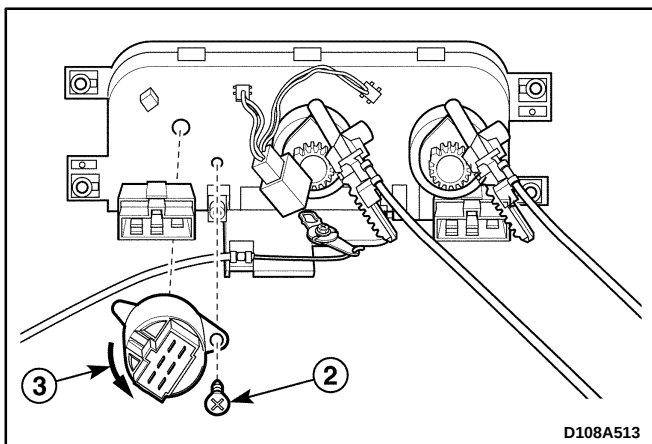


BLOWER MOTOR SWITCH

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

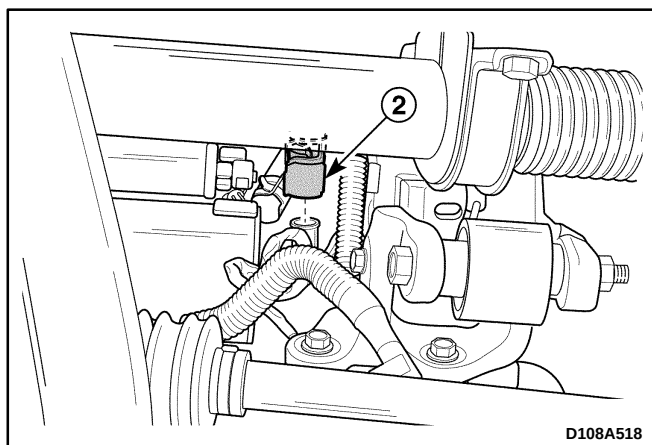
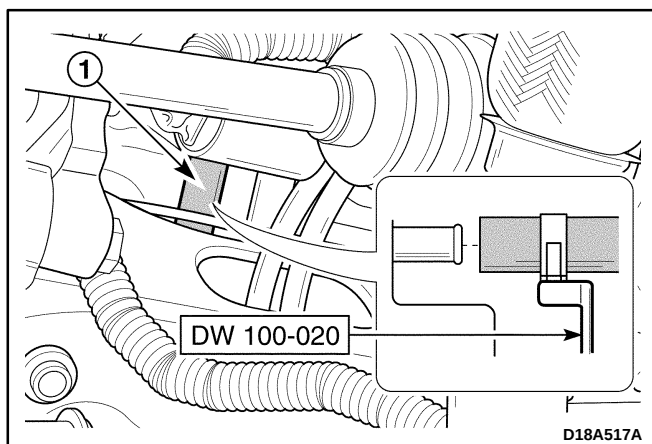
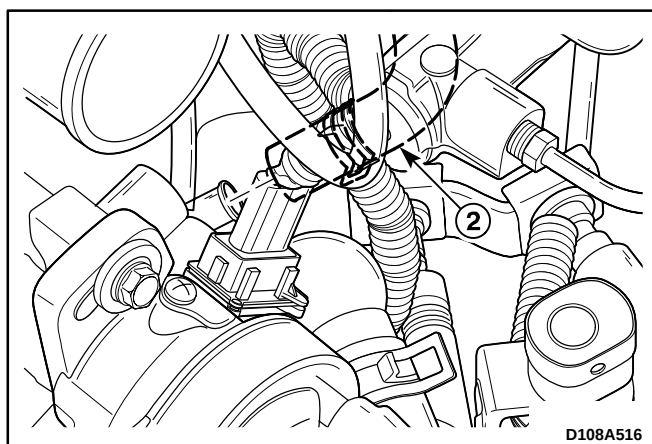
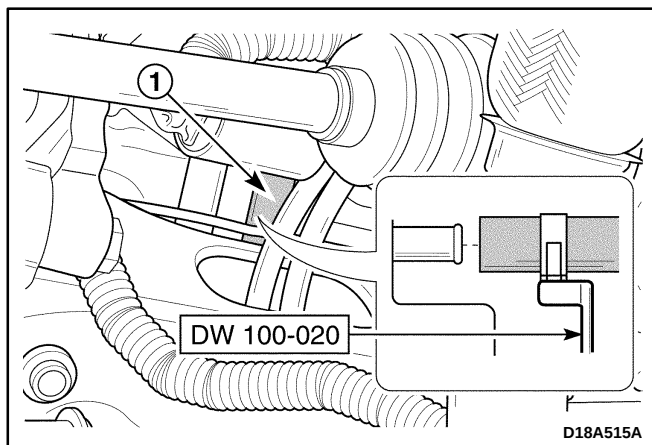
Removal Procedure

1. Remove the control assembly. Refer to "Control Assembly and Control Cables" in this section.
2. Remove the blower motor switch.
 - Remove the switch knob (1).
 - Remove the blower motor switch retaining screw (2).
 - Turn the blower motor switch anticlockwise (3).



Installation Procedure

1. Install the blower motor switch with the screw.
2. Install the switch knob.
3. Install the control assembly. Refer to "Control Assembly and Control Cables" in this section.



HEATER HOSES

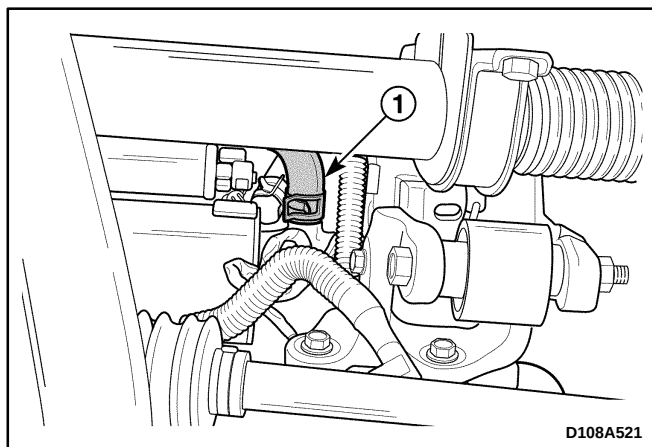
(Left-Hand Drive Shown, Right-Hand Drive Similar)

Tool Required

DW100-020 Hose Remover/Installer.

Removal Procedure

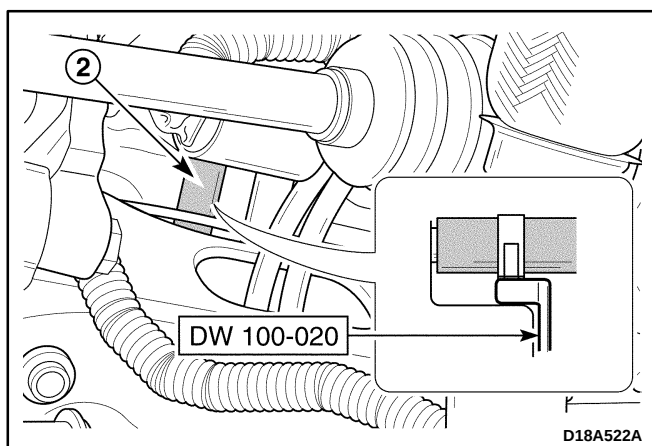
1. Disconnect the negative battery cable.
2. Drain the coolant.
3. Remove the heater inlet hoses.
 - Remove the air cleaner housing.
 - Raise and suitably support the vehicle.
 - Disconnect the hose from the heater module using a hose remover DW100-020 (1).
 - Lower the vehicle.
 - Disconnect the hose from the thermostat (2).
4. Remove the heater outlet hoses.
 - Raise and suitably support the vehicle.
 - Disconnect the hose from the heater module using a hose remover DW100-020 (1).
 - Disconnect the B⁺ terminal from the starter. Refer to *Section 1E, Engine Electrical*.
 - Disconnect the heater hose from the engine (2).



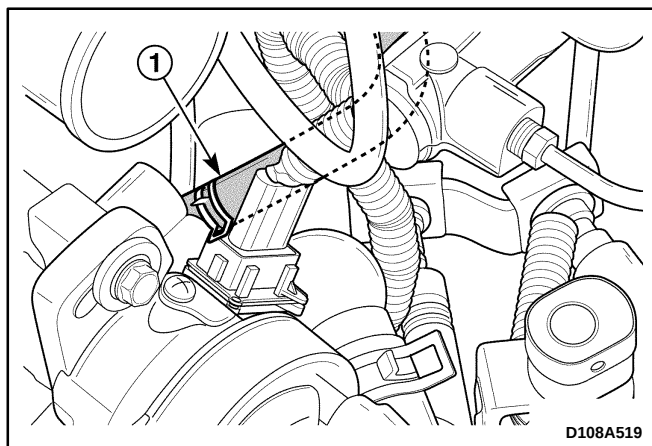
Installation Procedure

1. Install the heater outlet hoses.

- Connect the heater hose to the engine (1).
- Connect the B⁺ terminal to the starter. Refer to *Section 1E, Engine Electrical*.

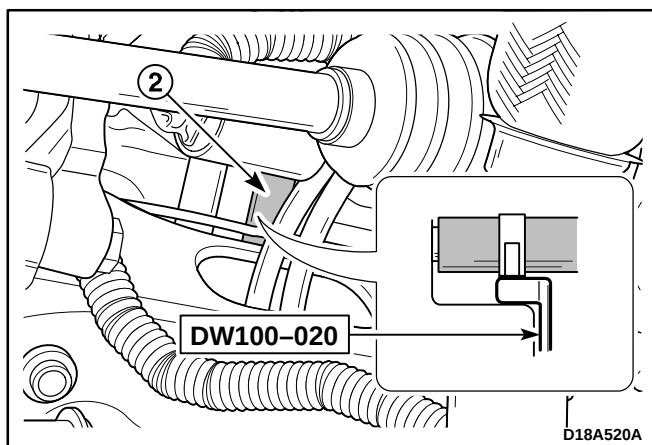


- Connect the hose to the heater module using a hose installer DW100-020 (2).
- Lower the vehicle.



2. Install the heater inlet hoses.

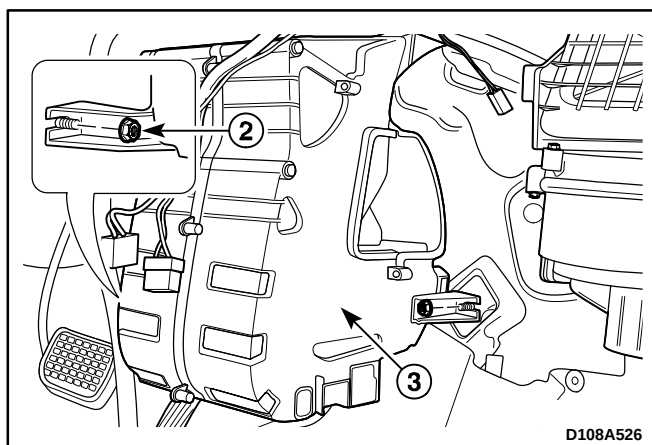
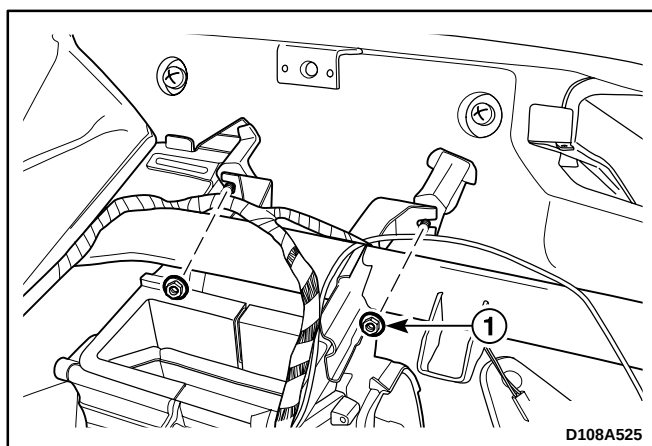
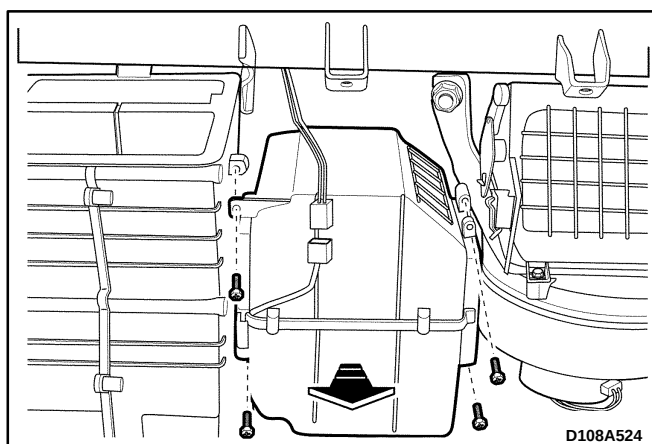
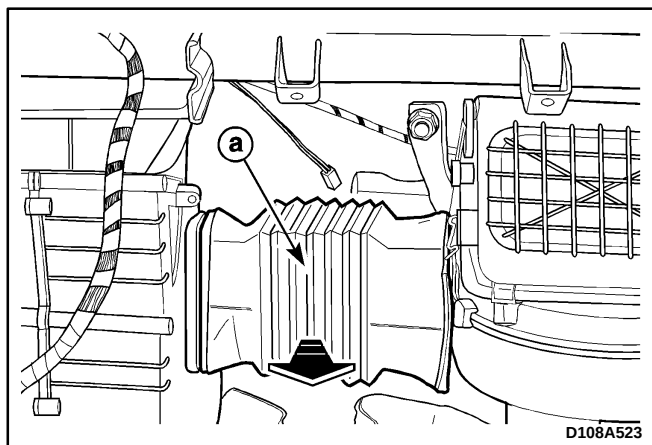
- Connect the hose to the thermostat (1).
- Raise and suitably support the vehicle.



- Connect the hose to the heater module using a hose installer DW100-020 (2).
- Lower the vehicle.
- Install the air cleaner housing.

3. Refill the coolant. Refer to *Section 1D, Engine Cooling*.

4. Connect the negative battery cable.

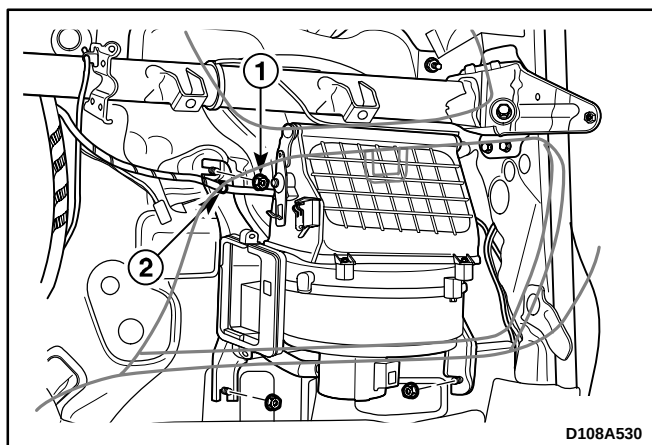
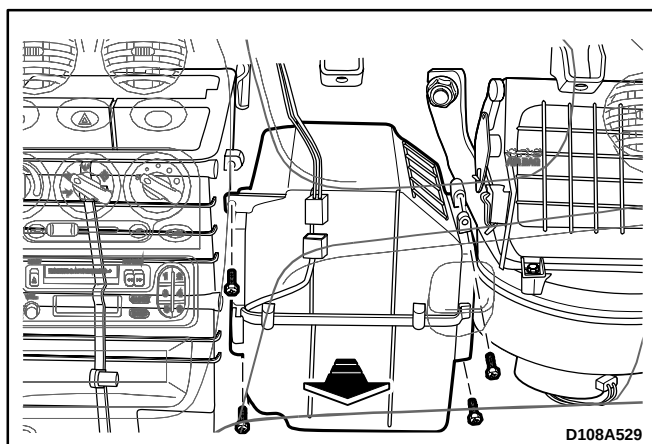
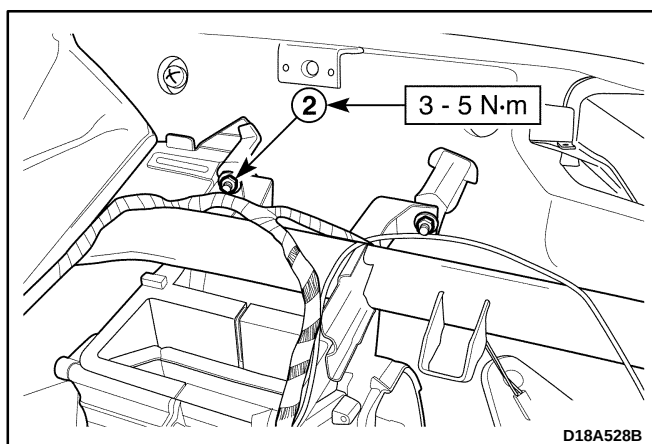
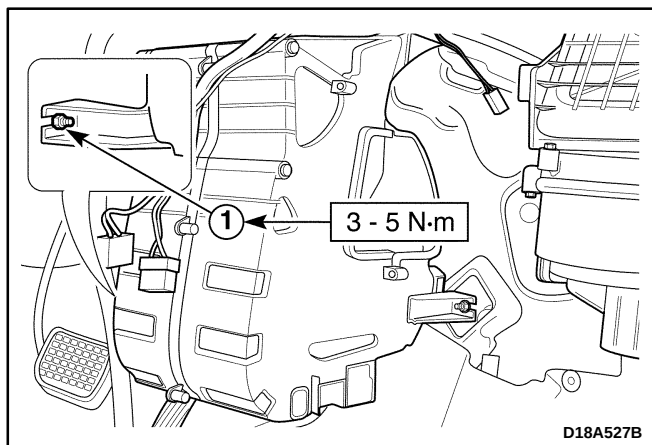


HEATER MODULE

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

Removal Procedure

1. Disconnect the heater hoses from the heater module. Refer to "Heater Hoses" in this section.
2. Remove the instrument panel and the lower tie bar center. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Remove the heater module-to-blower module connection tube on the vehicle not equipped with A/C.
 - a. Heater module-to-blower module connection tube.
4. Remove the evaporator on the vehicle equipped with A/C. Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*.
5. Remove the heater module.
 - Remove the upper nuts (1).
 - Remove the lower nuts (2).
 - Remove the heater module (3).



Installation Procedure

1. Install the heater module with the nuts.

Tighten

Tighten the heater module lower nuts to 3–5 N·m (27–44 lb-in) (1).

Tighten the heater module upper nuts to 3–5 N·m (27–44 lb-in) (2).

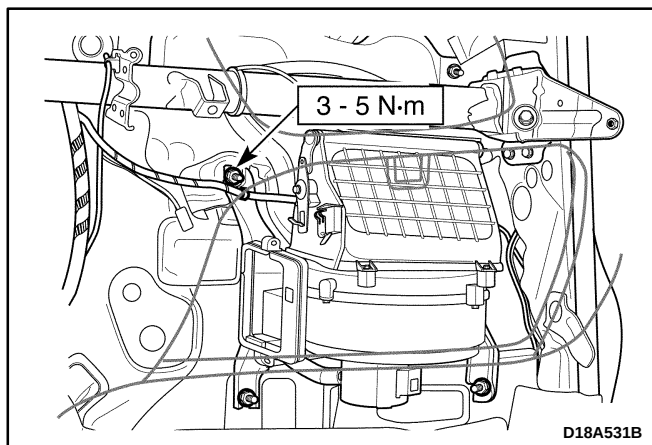
2. Install the evaporator on the vehicle equipped with A/C. Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*.
3. Install the heater module-to-blower module connection tube on the vehicle not equipped with A/C with the screw.
4. Install the instrument panel and the lower tie bar. Refer to *Section 9E, Instrumentation/Driver Information*.
5. Connect the heater hoses to the heater module. Refer to "Heater Hoses" in this section.

BLOWER MODULE

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

Removal Procedure

1. Remove the glove box from the instrument panel. Refer to *Section 9E, Instrumentation/Driver Information*.
2. Remove the heater module-to-blower module connection tube on the vehicle not equipped with A/C. Refer to "Heater Module" in this section.
3. Remove the evaporator on the vehicle equipped with A/C. Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*.
4. Remove the blower resistor. Refer to "Blower Resistor" in this section.
5. Disconnect the blower motor connector. Refer to "Blower Motor and Cooling Hose" in this section.
6. Remove the blower module.
 - Remove the nuts (1).
 - Disconnect the wiring harness (2).



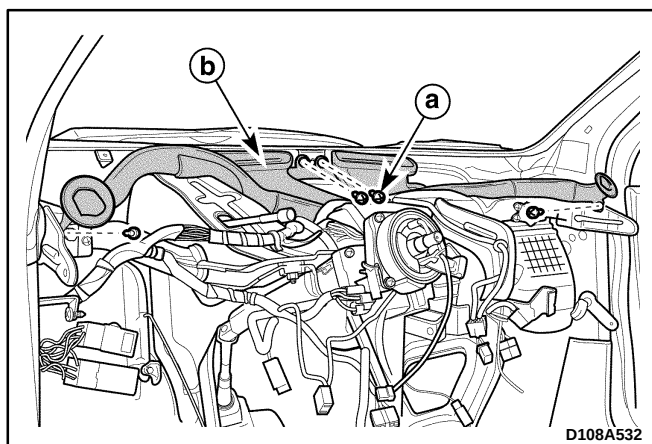
Installation Procedure

1. Install the blower module with the nuts.

Tighten

Tighten the blower module retaining nuts to 3–5 N•m (27–44 lb-in).

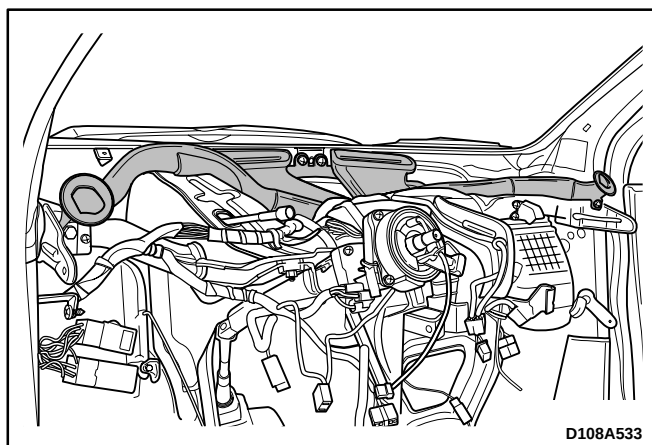
2. Connect the wiring harness.
3. Connect the blower motor connector. Refer to "Blower Motor and Cooling Hose" in this section.
4. Install the blower resistor. Refer to "Blower Resistor" in this section.
5. Install the evaporator on the vehicle equipped with A/C. Refer to *Section 7B, Manual Control Heating, Ventilation, and Air Conditioning System*.
6. Install the heater module-to-blower module connection tube on the vehicle not equipped with A/C. Refer to "Heater Module" in this section.
7. Install the glove box to the instrument panel. Refer to *Section 9E, Instrumentation/Driver Information*.



DEFROSTER DUCT AND HOSES (Left-Hand Drive Shown, Right-Hand Drive Similar)

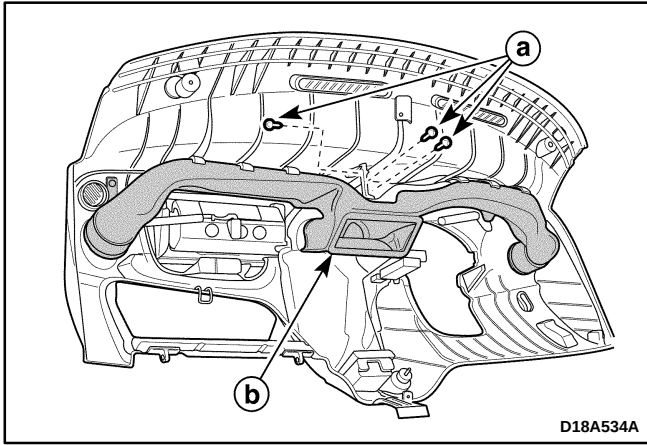
Removal Procedure

1. Remove the instrument panel. Refer to *Section 9E, Instrumentation/Driver Information*.
2. Remove the defroster duct and hoses retaining screws.
 - a. Retaining screw.
3. Remove the defroster duct and hoses.
 - b. Defroster duct and hoses.



Installation Procedure

1. Install the defroster duct and hoses with the screws.
2. Install the instrument panel. Refer to *Section 9E, Instrumentation/Driver Information*.

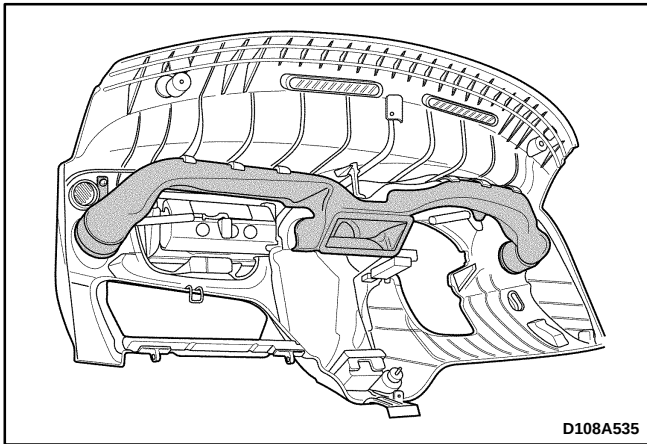


VENTILATION DUCT

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

Removal Procedure

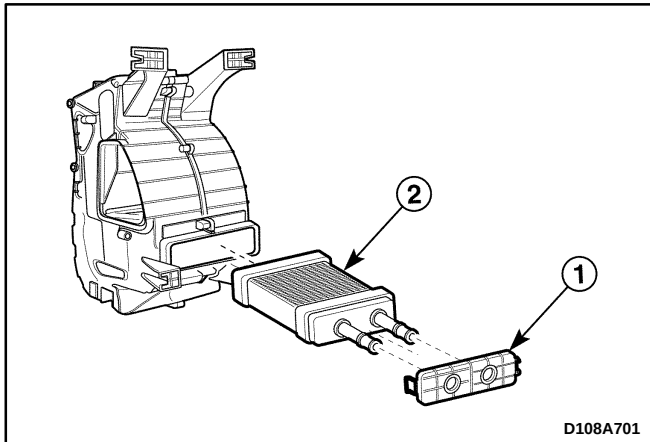
1. Remove the instrument panel. Refer to *Section 9E, Instrumentation/Driver Information*.
2. Remove the ventilation duct retaining screws.
 - a. Retaining screw.
3. Remove the ventilation duct.
 - b. Ventilation duct.



Installation Procedure

1. Install the ventilation duct with the screws.
2. Install the instrument panel. Refer to *Section 9E, Instrumentation/Driver Information*.

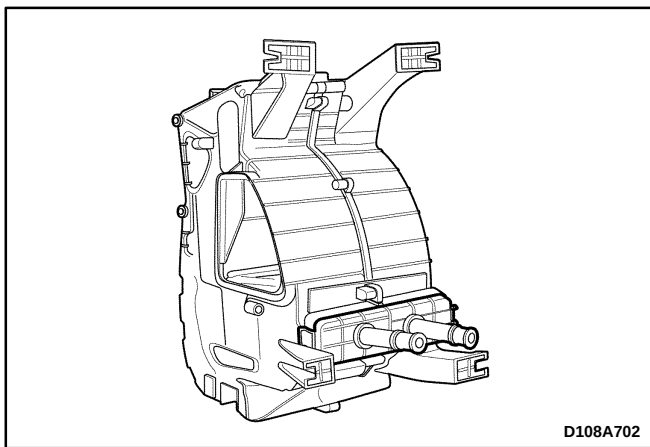
UNIT REPAIR



HEATER CORE

Disassembly Procedure

1. Remove the heater module. Refer to "Heater Module" in this section.
2. Remove the heater core.
 - Remove the heater core cover (1).
 - Remove the heater core (2).



Assembly Procedure

1. Install the heater core to the heater module.
2. Install the heater core cover.
3. Install the heater module. Refer to "Heater Module" in this section.

SPECIFICATIONS

GENERAL SPECIFICATIONS

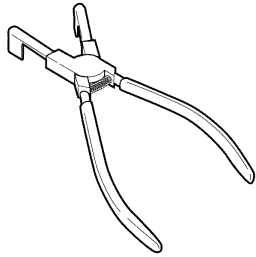
Application		Unit	Description
Maximum Heating Capacity		cal/h	7,300
Blower Motor Resistance	1 st	Ω	2.25 – 2.75
	2 nd	Ω	1.08 – 1.32
	3 rd	Ω	0.36 – 0.44
	4 th	Ω	–

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Heater Module Nuts	3 – 5	–	27 – 44
Blower Module Nuts	3 – 5	–	27 – 44

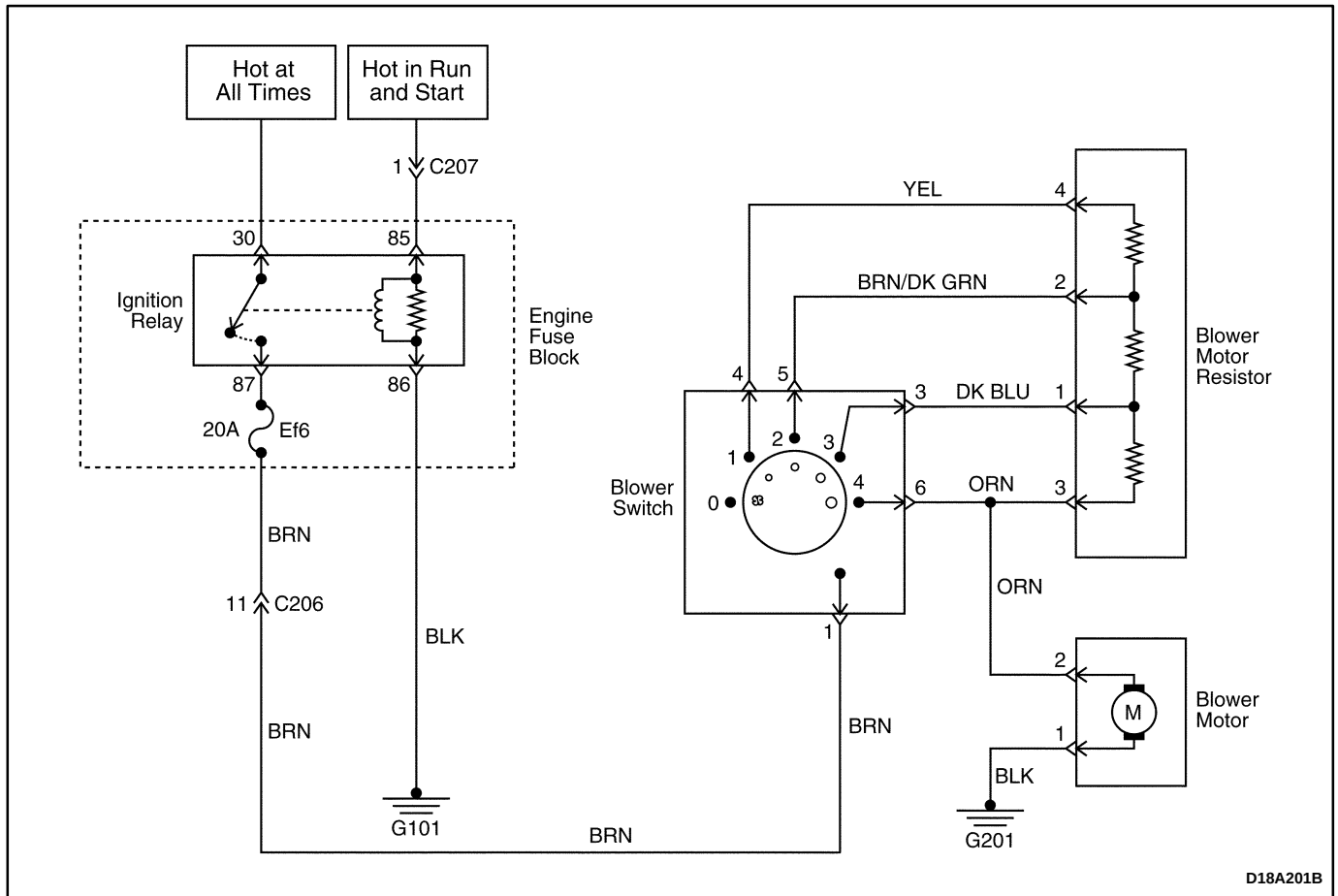
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS TABLE

 D102B119	DW 100-020 Spring Clamp Remover/Installer
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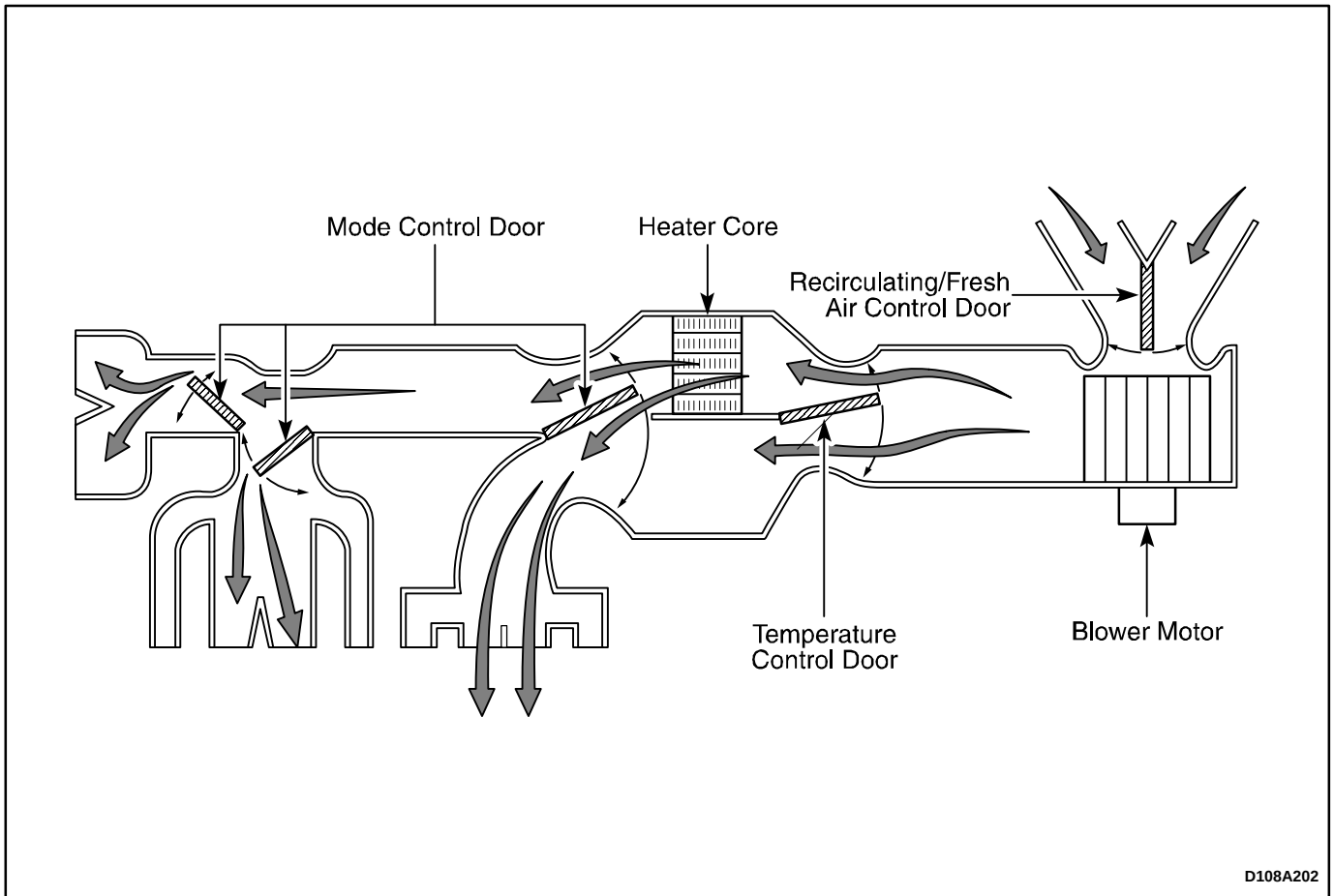
SCHEMATIC AND ROUTING DIAGRAMS

NON-A/C DIAGRAMS



AIR FLOW THROUGH DUCTS (NON-A/C)

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



SECTION 7B

MANUAL CONTROL HEATING, VENTILATION, AND AIR CONDITIONING 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 B unless otherwise noted.

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DESCRIPTION AND OPERATION

SYSTEM COMPONENTS -FUNCTIONAL

Compressor

All compressors are belt-driven from the engine crankshaft through the compressor clutch pulley. The compressor pulley rotates without driving the compressor shaft until on electromagnetic clutch coils energized. When voltage is applied to energize the clutch coil, the clutch plate and hub assembly are drawn toward the pulley. The magnetic force locks the clutch plate and pulley together as one unit to drive the compressor shaft.

Condenser Core

The condenser assembly in front of the radiator consists of coils which carry the refrigerant and cooling fins that provide the rapid transfer of heat. The air passing through the condenser cools the high-pressure refrigerant vapor and cause it to condense into a liquid.

Expansion Valve

The expansion valve is located on the passenger compartment side of the dash panel. The expansion valve can fail in three different positions: open, closed, or restricted. An expansion valve that fails in the open position will result in a noisy A/C compressor or no cooling. The cause can be a broken spring, a broken ball, or excessive moisture in the A/C system. If the spring or the ball is found to be defective, replace the expansion valve. If excessive moisture is found in the A/C system, recycle the refrigerant. An expansion valve that fails in the closed position will result in low suction pressure and no cooling. This may be caused by a failed power dome or excessive moisture in the A/C system. If the power dome on the expansion valve is found to be defective, replace the expansion valve. If excessive moisture is found in the A/C system, recycle the refrigerant.

A restricted expansion valve will result in low suction pressure and no cooling. This may be caused by debris

in the refrigerant system. If debris is believed to be cause, recycle the refrigerant, replace the expansion valve, and replace the receiver/dryer.

Evaporator Core

The evaporator is device which cools and dehumidifies the air before it enters the vehicle. High-pressure liquid refrigerant flows through the expansion tube (orifice) and becomes a low-pressure gas in the evaporator. The heat in the air passing through the evaporator core is transferred to the cooler surface of the core, which cools the air. As the process of heat transfer from the air to the evaporator core surface is taking place, any moisture (humidity) in the air condenses on the outside surface of the evaporator core and is drained off as water.

Receiver-Dryer

The sealed receiver-dryer assembly is connected to the evaporator outlet pipe. It acts as a refrigerant storing container, receiving liquid and some vapor and refrigerant oil from the evaporator.

At the bottom the receiver-dryer is the desiccant, which acts as a drying agent for the moisture that may have entered the system. The receiver-dryer is serviceable only as an assembly.

Dual Cut Switch

The dual cut switch controls compressor operation when the cycling refrigerant pressure is dropped or surged.

Evaporator Thermistor

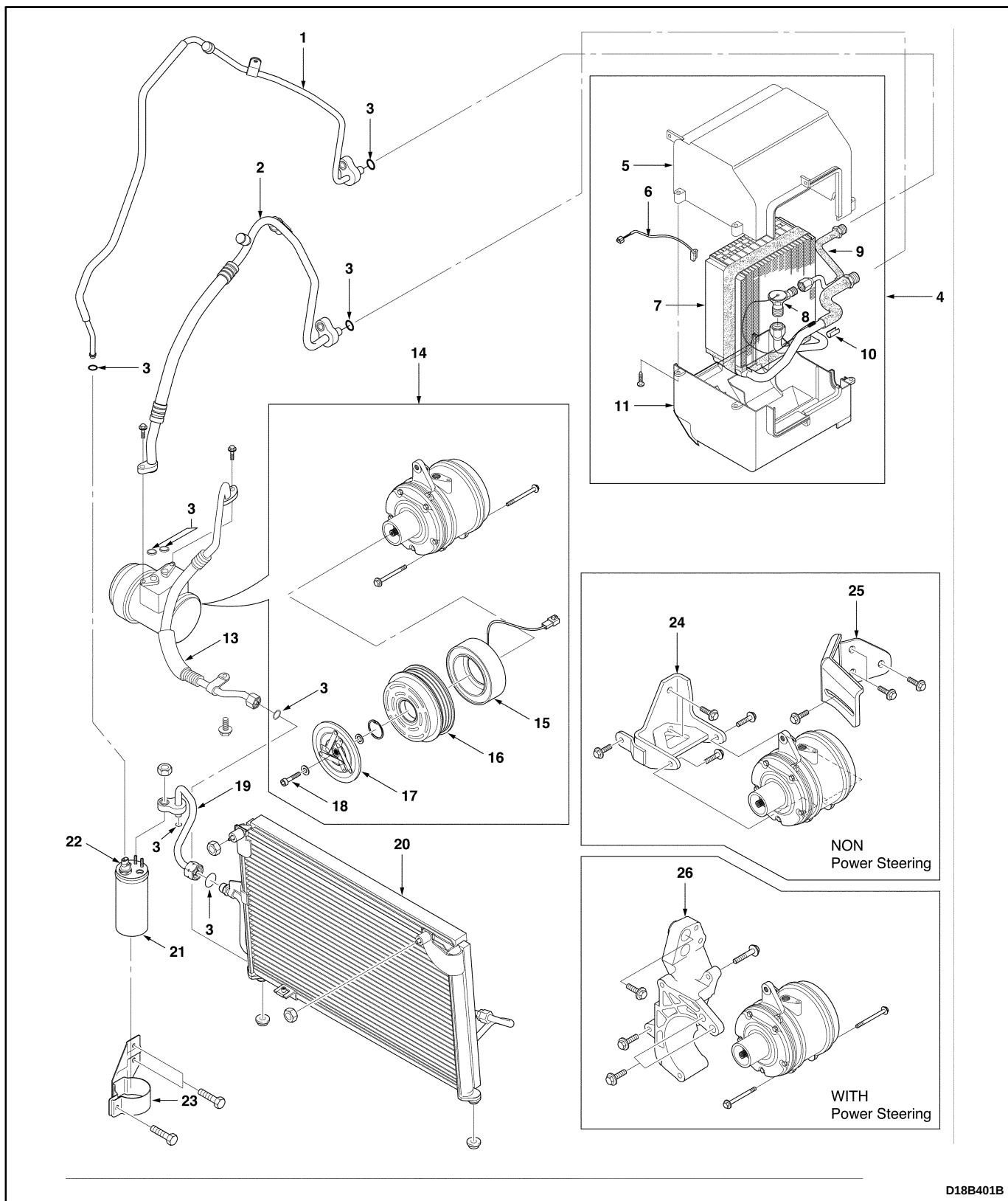
A semiconductor which resistance is noticeably changed as the change of temperature. When the refrigerant temperature of the evaporator drops to 0°C (32°F) and below, the evaporator cores get stuck with frost or ice, reducing the airflow, lowering the cooling capacity. The thermistor is a sensor which is used to prevent from frosting or icing.

The thermistor is installed on the evaporator.

COMPONENT LOCATOR

A/C SYSTEM

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



D18B401B

- | | |
|--|--|
| 1. High Pressure Pipe
(Receiver Dryer → Evaporator) | 14. Compressor |
| 2. Low Pressure Hose
(Evaporator → Compressor) | 15. Compressor Magnetic Clutch |
| 3. O-ring | 16. Compressor Pulley |
| 4. Evaporator Module | 17. Compressor Clutch Drive |
| 5. Evaporator Upper Case | 18. Shaft Bolt |
| 6. thermistor | 19. High Pressure Pipe
(Condenser → Receiver-Dryer) |
| 7. Evaporator Core | 20. Condenser |
| 8. Expansion Valve | 21. Receiver-Dryer |
| 9. Evaporator Inlet Pipe | 22. Dual Cut Switch |
| 10. Plate | 23. Receiver-Dryer Bracket |
| 11. Evaporator Lower Case | 24. Compressor Bracket |
| 12. O-ring | 25. Compressor Stay |
| 13. High Pressure Pipe
(Compressor → Condenser) | 26. A/C & Power Steering Bracket |
-

DIAGNOSTIC INFORMATION AND PROCEDURES

GENERAL DIAGNOSIS

TESTING THE REFRIGERANT SYSTEM

If you suspect a problem in the refrigerant system, check for the following conditions:

1. Check the outer surfaces of the radiator and the condenser cores to be sure that the airflow is not blocked by dirt, leaves, or other foreign material. Check between the condenser and the radiator, as well as all outer surfaces.
2. Check for restrictions or kinks in the condenser core, the hoses, and the tubes.
3. Check the operation of the blower fan.
4. Check all the air ducts for leaks or restrictions. A low airflow rate may indicate a restricted evaporator core.
5. Check for slippage of the compressor clutch.
6. Check the drive belt tension.

INSUFFICIENT COOLING “QUICK CHECK” PROCEDURE

Perform the following “hand-feel” procedure to get a quick idea of whether the air conditioning (A/C) system has the proper charge of Refrigerant-134a.

1. Warm up the engine. Run the engine at idle.
2. Open the hood and all the doors.
3. Turn the A/C switch ON.
4. Set the temperature control to the full cold position.
5. Set the blower speed switch on 4.
6. “Hand-feel” the temperature of the evaporator outlet pipe. The pipe should be cold.
7. Check for other problems. Refer to “Testing the Refrigerant System” in this section.
8. Leak check the system. Refer to “Leak Testing the Refrigerant System” in this section. If you find a leak, discharge the system and repair the leak as required. After completing the repair, evacuate and charge the system.
9. If there is no leak, refer to “Insufficient Cooling Diagnosis” in this section.

PRESSURE-TEMPERATURE RELATIONSHIP OF R-134A

TEMPERATURE °C (°F)*	PRESSURE kPa (psig)*	TEMPERATURE °C (°F)*	PRESSURE kPa (psig)*
-8.89 (16)	105.70 (15.33)	37.78 (100)	856.84 (124.27)
-7.78 (18)	114.87 (16.66)	38.89 (102)	886.56 (128.58)
-6.67 (20)	124.32 (18.03)	40.00 (104)	916.35 (132.98)
-5.56 (22)	134.11 (19.45)	41.11 (106)	947.92 (137.48)
-4.44 (24)	144.24 (20.92)	42.22 (108)	979.64 (142.08)
-3.33 (26)	154.65 (22.43)	43.33 (110)	1012.11 (146.79)
-2.22 (28)	165.48 (24.00)	44.44 (112)	1045.21 (151.59)
-1.11 (30)	176.65 (25.62)	45.56 (114)	1079.14 (156.51)
0.00 (32)	188.16 (27.29)	46.67 (116)	1113.75 (161.53)
1.11 (34)	200.02 (29.01)	47.78 (118)	1149.12 (166.66)
2.22 (36)	212.30 (30.79)	48.89 (120)	1185.18 (171.89)
3.33 (38)	224.98 (32.63)	50.00 (122)	1222.07 (177.24)
4.44 (40)	238.08 (34.53)	51.11 (124)	1259.72 (182.70)
7.22 (45)	272.49 (39.52)	52.22 (126)	1298.12 (188.27)
10.00 (50)	309.58 (44.90)	53.33 (128)	1337.35 (193.96)
12.77 (55)	349.51 (50.69)	54.44 (130)	1377.35 (199.76)
15.56 (60)	392.33 (56.90)	57.22 (135)	1480.91 (214.78)
18.33 (65)	438.18 (63.55)	60.00 (140)	1589.57 (230.54)
21.11 (70)	487.27 (70.67)	62.78 (145)	1703.62 (247.08)
23.89 (75)	539.67 (78.27)	65.56 (150)	1823.04 (264.40)
26.67 (80)	609.38 (88.38)	68.33 (155)	1948.04 (282.53)
29.44 (85)	655.09 (95.01)	71.11 (160)	2078.77 (301.49)
32.22 (90)	718.39 (104.19)	73.89 (165)	2215.29 (321.29)
35.00 (95)	785.61 (113.94)	76.67 (170)	2357.81 (341.96)

* All values rounded to two decimal places.

EVAPORATOR RANGE: From -6.67 to 7.22°C (20 to 45°F), the temperatures represent the gas temperatures inside the coil and not on the coil surfaces. Add 1.67 to 5.56°C (3 to 10°F) the temperature for coil and air-off temperatures.

CONDENSER RANGE: From 110 to 160°F, temperatures are not ambient. Add 19.4 to 22.2°C (35 to 40°F) for proper heat transfer, then refer to the pressure chart.

Example: 32°C (90°F) ambient temperature

+ 22°C (40°F)

54°C (130°F)

Condenser temperature = 1379 kPa (200 psig)

Based on 48.3 km/h (30 mph) air flow.

LEAK TESTING THE REFRIGERANT SYSTEM

Test for leaks whenever you suspect a refrigerant leak in the system. You should also test for leaks whenever you perform a service operation which results in disturbing the lines or the connections. Leaks are commonly found at the refrigerant fittings or at the connections. Leaks are commonly caused by the following problems:

- Improper torque.
- Damaged O-ring seals.
- Dirt or lint on the O-ring seals.

Liquid Leak Detectors

Use a liquid leak detector solution on locations such as fittings. Apply the solution to the area in question with the swab that is supplied with the solution. Look for bubbles to appear. This will indicate the existence and location of any leak.

For areas where this is not practical, such as sections of the evaporator and the condenser, an electronic leak detector is more useful.

Electronic Leak Detectors

Follow the manufacturer's instructions for calibration, operation, and maintenance of an electronic leak detector. Battery condition is especially important to the accuracy of a portable model. Set the detector to R-134a before beginning the test.

Important: Electronic leak detectors are sensitive to windshield washing solutions, solvents and cleaners, and certain vehicle adhesives.

Surfaces must be clean to prevent false readings. Make sure that all surfaces are dry to prevent damage to the detector.

General Testing Instructions

- Follow the entire path of the refrigerant system.
- Completely circle each joint at 25 to 50 mm (1 to 2 inches) per second.
- Hold the probe tip within 6 mm (1/4 inch) of the surface.
- Do not block the air intake.

The audible tone changes from 1 to 2 clicks per second into a solid alarm if there is a leak. Adjust the balance control to maintain 1 to 2 clicks per second.

Test all of the following areas, even after one leak has been confirmed:

- Evaporator inlet and outlet.
- Receiver-drier inlet and outlet.
- Condenser inlet and outlet.
- Brazed and welded areas.
- Damaged areas.
- Hose couplings.
- Compressor rear head.
- All fittings and joints.

Testing Service Ports/Access Valves

The sealing cap is the primary seal for the service ports. This cap contains a special leak-free O-ring. Make sure that this cap is not missing or loose. Always use the correct cap.

Testing the Evaporator Core

Leaks in the evaporator core are difficult to find. Test the evaporator core using the following procedure:

1. Run the blower fan at speed setting 4 for at least 15 minutes.
2. Turn the blower to the OFF position.
3. Wait for 10 minutes.
4. Remove the blower motor resistor. Refer to "Blower Motor Resistor" in this section.
5. Insert the leak detector probe as close as possible to the evaporator core. The detector will indicate a leak with a solid alarm.
6. Use a flashlight to search for refrigerant oil in the core surface.

Testing the Compressor Shaft Seal

1. Blow shop air behind and in front of the compressor clutch/pulley for at least 15 seconds.
2. Wait 1 to 2 minutes.
3. Probe the area in front of the pulley. If the detector emits a solid alarm, there is a leak.

AIR CONDITIONING SYSTEM DIAGNOSIS

INSUFFICIENT COOLING DIAGNOSIS

Step	Action	Value(s)	Yes	No
1	Can you verify the customer complaint?	–	Go to Step 2	System OK
2	1. Check the fuses Ef14, Ef19, and Ef12. 2. Check the blower fan operation. 3. Check the engine cooling fan operation. 4. Check the A/C compressor belt. 5. Check the A/C condenser for restricted air flow. 6. Check the slippage of the compressor clutch. 7. Repair or replace any components as needed. 8. Check the A/C system operation. Is the A/C system operation normal?	–	System OK	Go to Step 3
3	1. Turn the ignition switch OFF. 2. Connect the high and the low pressure gauges. Are both pressures within the value specified?	Low Side Pressure: 200 kPa (29 Psi)	Go to Step 8	Go to Step 6
4	Are both pressures above the specified value?		Go to Step 5	–
5	Are both pressures within the specified value?		Go to Step 8	–
6	Are both pressure below the specified value?		Go to Step 7	Go to Step 4
7	1. Add the refrigerant R–134a. 2. Check the A/C system for leaks. 3. Repair any refrigerant leaks as needed. 4. Recover, evacuate, and recharge the A/C system. Are both pressure within the specified value?	High Side Pressure: 1,500 kPa (217.5 Psi)	Go to Step 8	–
8	1. Start the engine and allow it to run at idle. 2. Set the A/C controls to following positions. • The A/C switch to the ON position. • The fresh air control switch to fresh air. • The blower motor to 4. • The temperature to full cold. Does the A/C compressor clutch engage?	–	Go to Step 9	Go to Step 11
9	1. Check for a knocking noise from the A/C compressor. 2. Cycle the A/C compressor ON and OFF in order to verify the source of the noise. Do you hear a loud knocking noise?	–	Go to Step 10	Go to Step 14
10	1. Recover the A/C system refrigerant. 2. Replace the A/C compressor. 3. Evacuate and recharge the A/C system. 4. Check the A/C system for leaks. Is the repair complete?	–	Go to Step 14	–
11	1. Turn the ignition switch OFF. 2. Disconnect the A/C compressor clutch coil connector. 3. Connect a jumper wire from ground to one A/C compressor clutch coil terminal. 4. Connect a fused jumper wire from the positive battery terminal to the other A/C compressor clutch coil terminal. Does the A/C clutch engage?	–	Go to Step 12	Go to Step 13

Insufficient Cooling Diagnosis (Cont'd)

Step	Action	Value(s)	Yes	No
12	Repair the electrical circuit to the A/C compressor clutch coil. Does the A/C clutch engage?	–	Go to Step 20	Go to Step 13
13	Replace the A/C compressor clutch coil. Does the A/C clutch engage?	–	Go to Step 9	Go to Step 10
14	Important: Perform this test under garage conditions; 21-32°C (70-90°F) and no sun load. Follow this test carefully for accurate results. 1. Close all of the windows and the doors of the vehicle. 2. Set the A/C controls to the following positions: • The A/C switch to the ON position. • The fresh air control switch to fresh air. • The blower motor to 4. • The temperature to full cold. 3. Start the engine and follow it to run at idle for 5 minutes. 4. Feel the evaporator inlet and outlet pipes. Is there a noticeable difference in the temperature of the evaporator inlet and outlet pipes?	–	Go to Step 16	Go to Step 15
15	1. Recover the A/C system refrigerant. 2. Replace the expansion valve as needed. 3. Evacuate and recharge the A/C system. 4. Check the A/C system for leaks. 5. Note the discharge air temperature with the A/C ON. Is the discharge temperature normal?	–	Go to Step 16	Go to Step 18
16	Feel the liquid pipe between the condenser and the expansion valve. Is the pipe cold?	–	Go to Step 19	Go to Step 17
17	1. Remove the restriction of the high pressure side. 2. Check the A/C system for leaks. Is the repair complete?	–	System OK	–
18	1. Recover the A/C system refrigerant. 2. Evacuate and recharge the A/C system. 3. Check the A/C system for leaks. Is the repair complete?	–	System OK	–
19	1. Run the engine at 3,000 rpm. 2. Close all of the windows and doors of the vehicle. 3. Set the A/C controls to the following positions: • The A/C switch to the ON position. • The fresh air control switch to fresh air. • The blower motor to 4. • The temperature to full cold. 4. Turn the A/C switch ON and OFF every 20 seconds for 3 minutes. Are the A/C compressor high and the low side pressures within the specified value of each other?	Low Side Pressure: 200 kPa (29 psi) High Side Pressure: 1,500 kPa (217.5 psi)	System OK	Go to Step 22

Insufficient Cooling Diagnosis (Cont'd)

Step	Action	Value(s)	Yes	No
20	1. Turn the ignition switch OFF. 2. Turn the A/C switch to the OFF position. 3. Attempt to turn the clutch driver (not the pulley). Can you turn the clutch driver freely by hand?	–	Go to <i>Step 23</i>	Go to <i>Step 21</i>
21	1. Recover the A/C system refrigerant. 2. Replace the A/C compressor. 3. Evacuate and recharge the A/C system. Is the repair complete?	–	System OK	–
22	1. Add the refrigerant R–134a. Does the cooling performance improve?	–	System OK	Go to <i>Step 23</i>
23	1. Recover the A/C system refrigerant. 2. Replace the compressor. 3. Evacuate and recharge the A/C system. 4. Check the A/C system for leaks. Is the repair complete?	–	System OK	–

SYMPTOM DIAGNOSIS

PRESSURE TEST CHART (R-134A SYSTEM)

Condition	Related Symptoms	Probable Cause	Correction
Discharge (high) Pressure Abnormally High	After stopping the compressor, the pressure drops quickly, then falls gradually.	There is air in the system.	Recover, evacuate and recharge the system with the specified amount of refrigerant.
	The condenser is excessively hot.	There is excessive refrigerant in the system.	Recover, evacuate and recharge the system with the specified amount of refrigerant.
	Reduced or no air flow through the condenser.	The condenser or the radiator fins are clogged.	Clean the condenser or the radiator fins.
		The condenser or the radiator fan is not working properly.	- Check the voltage and the fan rpm. - Check the fan direction.
	Line to the condenser is excessively hot.	Restricted flow of refrigerant in the system	Locate and repair the restriction.
Discharge Pressure Abnormally Low	The condenser is not hot.	Insufficient refrigerant in the system.	- Check the system for a leak. - Charge the system.
	High and low pressures are balanced soon after stopping the compressor. Low side pressure is higher than normal.	Faulty compressor.	Repair or replace the compressor.
	The outlet of the expansion valve is not frosted, low pressure gauge indicates vacuum.	Faulty expansion valve.	Replace the expansion valve.
		Moisture in the system.	Recover, evacuate, and recharge the system.
Suction (low) Pressure Abnormally Low	Condenser is not hot.	Insufficient refrigerant in the system.	Repair the leaks. Recover, evacuate, and recharge the system.
	The expansion valve is not frosted and the low pressure line is not cold. Low pressure gauge indicates a vacuum.	Frozen expansion valve.	Replace the expansion valve.
		Faulty expansion valve.	
	Discharge temperature is low and the air flow from the vents is restricted.	The evaporator is frozen.	Clear the restricted evaporator case drain.
	The expansion valve is frosted.	The expansion valve is clogged.	Clean or replace the expansion valve.
	The receiver/dryer outlet is cool and the inlet is warm.	The receiver/dryer is clogged.	Replace the receiver/dryer.

Pressure Test Chart (R-134a System) (Cont'd)

Condition	Related Symptoms	Probable Cause	Correction
Suction Pressure Abnormally High	Low pressure hose and check joint are cooler than the temperature around the evaporator.	The expansion valve is opened for too long.	Replace the expansion valve.
	Suction pressure is lowered when the condenser is cooled by water.	There is excessive refrigerant in the system.	Recover, evacuate, and recharge the system.
Suction and Discharge Pressure Abnormally High	Reduced airflow through the condenser.	The condenser or the radiator fins are clogged.	Clean the condenser and the radiator.
		The radiator cooling fans are not working properly.	- Check the voltage and the radiator cooling fan rpm. - Check the fan direction.
	Condenser is excessively hot.	There is excessive refrigerant in the system.	Recover, evacuate, and recharge the system.
Suction and Discharge Pressure Abnormally Low	Low pressure hose and metal end areas are cooler than the evaporator.	Clogged or kinked low pressure hose.	Repair or replace the low pressure hose.
	Temperature around the expansion valve is low compared to that around the receiver/drier.	The high pressure line is clogged.	Repair or replace the high pressure line.
Refrigerant Leaks	The compressor clutch is dirty.	The compressor shaft seal is leaking.	Repair or replace the compressor.
	The compressor bolts are dirty.	Leaking around a compressor housing bolt.	Tighten the bolt(s) or replace the compressor.
	The compressor gasket is wet with oil.	The compressor gasket is leaking.	Repair or replace the compressor.
	—	Poor tightening in the system.	Retighten the connection (coupling, bolt etc.)
	—	O-ring is faulty.	Replace the O-ring.

REPAIR INSTRUCTIONS ON-VEHICLE SERVICE

GENERAL A/C SYSTEM SERVICE PROCEDURES

O-RING REPLACEMENT

Important: Even though O-rings may look identical, it is extremely important that only recommended service replacement air conditioning O-rings be used, or excessive leakage of refrigerant may occur.

Important: Always slip the O-ring onto the flange tube to ensure proper locating and sealing.

Install new DAEWOO-approved service replacement air conditioning O-rings whenever a joint or a fitting is disassembled, except when the O-rings are provided on new components.

When replacing O-rings on an air conditioning component or a joint connection, the fitting design should be identified to ensure installation of the correct air conditioning service replacement O-ring.

Before installation, verify that both O-rings and fittings have not been nicked or deformed. Deformed or nicked parts must be replaced. Failure to use the proper service replacement parts and procedures may result in excessive refrigerant leakage.

HANDLING REFRIGERANT

Caution: Always work in a well-ventilated area and avoid breathing any refrigerant fumes. If you have difficulty breathing, seek medical attention immediately. If refrigerant comes in contact with any part of your body, flush the exposed area with water. If a rash or pain develops, seek medical attention.

Air conditioning systems contain refrigerant. This is a chemical mixture which requires special handling procedures to avoid personal injury.

Always wear goggles and wrap a clean cloth around the fittings, the valves and the connections when performing work that involves opening the refrigerant system. Do not weld or steam clean on or near any vehicle-installed air conditioning lines or components.

All refrigerant drums are shipped with a heavy metal screw cap. The purpose of the cap is to protect the valve and the safety plug from damage. It is good practice to replace the cap after each use of the drum.

If it is necessary to transport or carry any container of refrigerant in a vehicle, do not carry it in the passenger compartment.

HANDLING OF REFRIGERANT LINES AND FITTINGS

Notice: Using too low or too high torque when tightening a fitting can result in loose joints or deformed joint parts. Both conditions can result in refrigerant leakage.

- Keep all metal tubing lines free of dents or kinks. Any line restrictions will cause the loss of system capacity.
- Never bend a flexible hose line to a radius of less than four times the diameter of the hose.
- Never allow a flexible hose line to come near the exhaust manifold.
- Inspect flexible hose lines regularly for leaks or brittleness.
- Replace flexible hose lines with new lines if you find signs of deterioration or leaking.
- Discharge the refrigeration system of all refrigerant before disconnecting any fitting in the refrigeration system.
- Proceed very cautiously regardless of the gauge readings.
- Open the fittings very slowly.
- Keep your face and your hands away from the fitting so that you will not be injured if there happens to be liquid refrigerant in the line.
- If you notice pressure when you loosen a fitting, allow the pressure to bleed off as described under "Discharging, Adding Oil, Evacuating and Charging Procedures for A/C System" in this section.
- Cap or tape any refrigerant line immediately after it is opened. This will prevent the entrance of moisture and dirt, which can cause internal compressor wear or plugged lines in the condenser, the evaporator core, the expansion valve or the compressor inlet screens.

Important: Use two proper wrenches to connect the O-ring fittings.

- Back up the opposing fitting to prevent distortion of the connecting lines or the components.
- Back up both the swaged fitting on the flexible hose connections and the coupling to which it is attached with two wrenches to prevent turning the fitting and damaging the ground seat.
- Keep the O-rings and the seats in perfect condition. A burr or a piece of dirt may cause a refrigerant leak.
- Dip new O-rings in clean PAG refrigerant oil before installation.

MAINTAINING CHEMICAL STABILITY IN THE REFRIGERATION SYSTEM

The efficient operation and life of the air conditioning system is dependent upon the chemical stability of the refrigeration system. When foreign materials, such as dirt, air, or moisture, contaminate the refrigeration system, they will change the stability of the refrigerant and the PAG compressor oil. They will also affect the pressure-temperature relationship, reduce efficient operation, and can possibly cause interior corrosion and abnormal wear of moving parts.

Observe the following practices to ensure chemical stability in the system:

- Wipe away dirt or oil at and near any connection before opening that connection. This will reduce the chance of dirt entering the system.
- Cap, plug, or tape both sides of a connection as soon as possible after opening the connection. This will prevent the entry of dirt, foreign material, and moisture.
- Keep all tools clean and dry, including the manifold gauge set and all replacement parts.
- Use a clean and dry transfer device and container to add PAG refrigerant oil. This will ensure that the oil remains as moisture-free as possible. Refer to “Discharging, Adding Oil, Evacuating and Charging Procedures for A/C System” in this section.
- Have everything you need ready to allow you to perform all operations quickly when opening an A/C system. Do not leave the A/C system open any longer than necessary.
- Evacuate and recharge any A/C system that has been opened. Refer to “Discharging, Adding Oil, Evacuating and Charging Procedures for A/C System” in this section for the instructions to perform this procedure properly.

All service parts are dehydrated and sealed before shipping. They should remain sealed until just before making connections. All the parts should be at room temperature before uncapping. This prevents condensation of moisture from the air from entering the system. Reseal all parts as soon as possible if the caps have been removed but the connections cannot be made promptly.

DISCHARGING, ADDING OIL, EVACUATING, AND CHARGING PROCEDURES FOR A/C SYSTEMS

Caution: Use only refillable refrigerant tanks that are authorized for the charging station being used. The use of other tanks may cause personal injury or void the warranty. Refer to the manufacturer's instructions for the charging station.

Caution: To avoid personal injury, always wear goggles and gloves when performing work that involves opening the refrigeration system.

A charging station discharges, evacuates, and recharges an air conditioning system with one hook-up. Filtering during the recovery cycle together with filtering during the evacuation cycle ensures a supply of clean, dry refrigerant for A/C system charging.

Notice:

- Never use the R-134a charging station on a system charged with R-12. The refrigerants and the oils are not compatible and must never be mixed in even the smallest amount. Mixing refrigerant residue will damage the equipment.
- Never use adapters which convert from one size fitting to another. This will allow contamination which may cause system failure.

Charging Station Setup and Maintenance

Refer to the manufacturer's instructions for all initial setup procedures and all maintenance procedures. There are many charging stations available. All perform the various tasks required to discharge the system and recover refrigerant, evacuate the system, add a measured amount of oil, and recharge an air conditioning system with a measured amount of refrigerant.

Control Panel Functions

A charging station will have controls and indicators to allow the operator to control and monitor the operation in progress. Refer to the manufacturer's instructions for details. These can be expected to include:

1. Main Power Switch: The main power switch supplies electrical power to the control panel.
2. Display: The display shows the time programmed for vacuum and the weight of the refrigerant programmed for recharging. Refer to the manufacturer's instructions for detailed programming information.
3. Low Side Manifold Gauge: This gauge shows the system's low side pressure.
4. High Side Manifold Gauge: This gauge shows the system's high side pressure.
5. Controls: This will contain the controls that control various operating functions.
6. Low Side Valve: This valve connects the low side of the A/C system to the unit.
7. Moisture Indicator: This indicator shows if the refrigerant is wet or dry.
8. High Side Valve: This valve connects the high side of the A/C system to the unit.

Refrigerant Recovery

Important: Use only a refrigerant tank that is designed for the charging station in use. The unit's overfill limitation mechanism is calibrated specifically for use with this tank. The tank's valves are also specifically for this unit.

1. Attach the high side hose with the quick disconnect coupler to the high side fitting of the vehicle's A/C system.
2. Open the coupler valve after attachment.
3. Attach the low side hose with the quick disconnect coupler to the low side fitting of the vehicle's A/C system.
4. Open the coupler valve after attachment.
5. Check the high side and the low side gauges on the unit's control panel in order to ensure that the A/C system has pressure. If there is no pressure, there is no refrigerant in the system to recover.

Important: If there is no refrigerant in the system, do not continue with the recovery operation. This will draw air into the recovery tank.

6. Open both the high side and the low side valves.
7. Open the gas and the liquid valves on the tank.
8. Drain any oil that may be in the oil separator.
9. Close the oil drain valve.
10. Plug the unit into the proper voltage outlet.
11. Turn on the main power switch.

Notice: Never reuse refrigerant oil. Damage to the A/C system may result. Dispose of the refrigerant oil properly.

12. Begin the recovery process. Refer to the manufacturer's instructions for the charging station in use.

Important: Some A/C system PAG lubricating oil may be removed with the refrigerant during recovery. The amount of oil removed varies. A charging station separates the oil from the refrigerant and allows a means of determining how much oil was removed. Replace the same amount of oil when you recharge the system. Refer to the manufacturer's instructions for the charging station in use.

13. Wait 5 minutes. Check the control panel low side gauge. If the A/C has maintained vacuum, the recovery is complete.
14. There is more refrigerant in the system if the low side gauge pressure rises above zero. Recover the additional refrigerant. Repeat this step until the system maintains vacuum for two minutes.

Important: If the control indicator shows that the refrigerant tank is full during the recovery process and the unit shuts off, install an empty unit tank to store the refrigerant needed for steps later in the procedure. Do not use any other type of tank.

Evacuation

The unit tank must contain a sufficient amount of R-134a refrigerant for charging. Check the amount of refrigerant in the tank. If there is less than 3.6 kg (8 pounds) of refrigerant, add new refrigerant to the tank. Refer to the manufacturer's instructions for adding refrigerant.

1. Verify that the high side and the low side hoses are connected to the A/C system. Open both the high side and the low side valves on the unit's control panel.
2. Open both the gas and the liquid valves on the tank.

Important: Refer to the manufacturer's instructions for the charging station in use. It is necessary to evacuate the system before recharging it with new or recycled refrigerant.

3. Start the vacuum pump and begin the evacuation process. Non-condensable gases (mostly air) are automatically vented from the tank during the recycling process. You may hear the pressure being released.
4. Check for leaks in the system. Refer to the manufacturer's instructions for the charging station in use.

Important:

- Change the vacuum pump oil frequently. Refer to the manufacturer's instructions for the charging station in use.

A/C System Oil Charge Replenishing

Any oil removed from the A/C system during the recovery process must be replenished at this time.

1. Use the correct graduated bottle of polyalkaline glycol (PAG) oil for the R-134a system.

Important:

- Keep the oil bottles tightly capped at all times to protect the oil from moisture and contamination.
 - Never open the oil injection valve while there is positive pressure in the A/C system. This will result in oil blow-back through the bottle vent. You must have A/C system vacuum for this operation.
 - Never let the oil level drop below the pick-up tube while charging or replenishing the system. This will allow air into the A/C system.
2. Refer to the manufacturer's instructions for the charging station in use. Add the proper amount of PAG oil to the system.
 3. Close the valve when the required oil charge has been pulled into the system.

Charging

Important: Evacuate the air conditioning system before charging.

1. Close the low side valve on the control panel.
2. Open the high side valve on the control panel.

3. Refer to the manufacturer's instructions for the charging station in use.
 - Enter the amount of refrigerant needed to charge the A/C. Be sure that you are using the correct system of measurement (kg, lb).
 - Begin the charging process.

Successful Transfer Complete

1. Close the high side valve on the unit's control panel. Both valves should be closed.
2. Start the vehicle and the A/C system.
3. Let the engine run until the readings on the high side and low side gauges stabilize.
4. Compare the readings to the system specifications.
5. Check the evaporator outlet temperature to ensure that the A/C system is operating within the system specifications.
6. Keep the A/C running.
7. Close the high side coupler valve.
8. Disconnect the high side hose from the vehicle.

9. Open the high side and low side valves on the control panel.
10. The system will quickly draw in refrigerant from both hoses through the low side hose.
11. Close the low side coupler valve.
12. Disconnect the low side hose from the vehicle.

Unsuccessful Transfer

Sometimes the total charge does not transfer into the A/C system. There are two reasons why this may occur.

1. The pressure in the unit's tank and the pressure in the A/C system are roughly equal. This will cause the transfer to proceed too slowly. Refer to the manufacturer's instructions for the charging station in use.
2. There was not enough refrigerant in the unit's tank to transfer the full charge. It is necessary to recover the partial charge of refrigerant from the vehicle and evacuate and charge the A/C system again. Refer to the manufacturer's instructions for the charging station in use.

SERVICEABLE COMPONENTS

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

CONTROL ASSEMBLY AND CONTROL CABLES

To remove the control assembly and control cables, refer to *Section 7A, Heating and Ventilation System (Without Air Conditioning)*.

BLOWER MOTOR AND COOLING HOSE

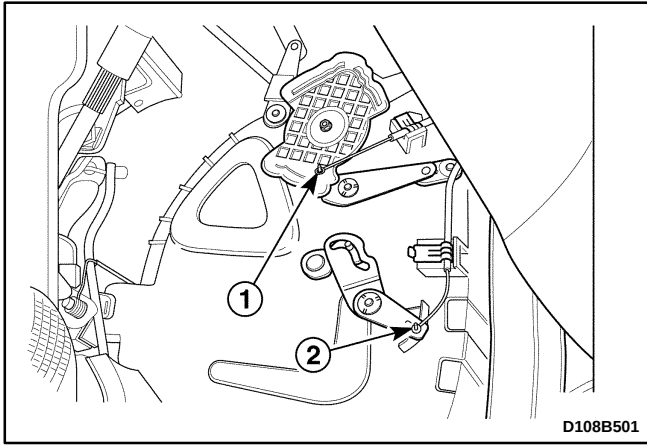
To remove the blower motor and cooling hose, refer to *Section 7A, Heating and Ventilation System (Without Air Conditioning)*.

BLOWER RESISTOR

To remove the blower resistor, refer to *Section 7A, Heating and Ventilation System (Without Air Conditioning)*.

BLOWER MOTOR SWITCH

To remove the blower motor switch, refer to *Section 7A, Heating and Ventilation System (Without Air Conditioning)*.

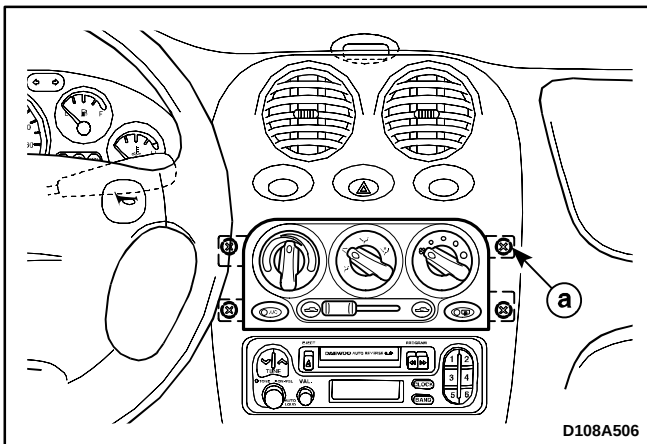
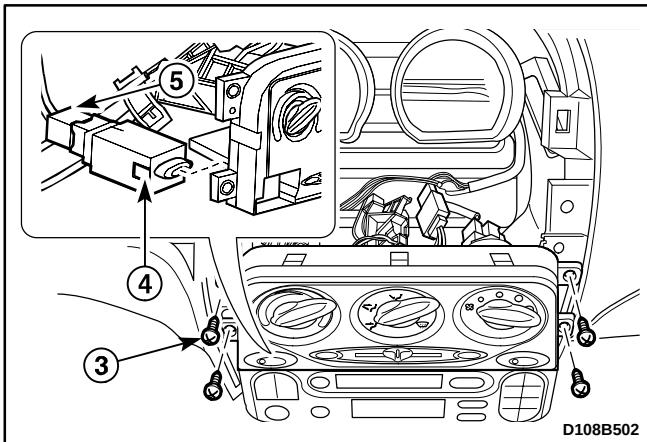


A/C PUSH KNOB

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

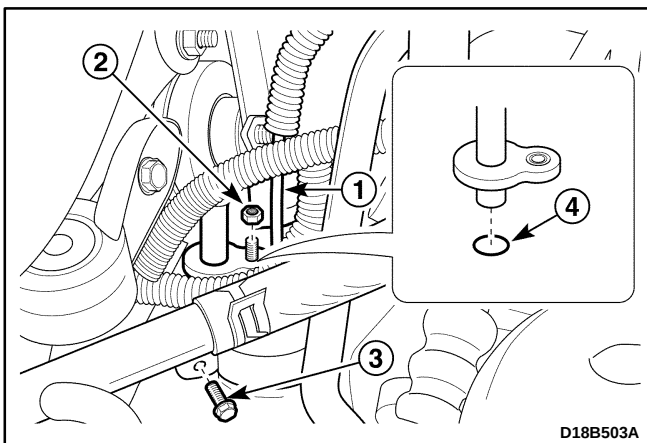
Removal Procedure

1. Remove the instrument cluster housing trim panel. Refer to *Section 9E, Instrumentation/Driver Information*.
2. Remove the A/C push knob.
 - Disconnect the temperature control cable from the heater module (1).
 - Disconnect the mode control cable from the heater module (2).
- Remove the control assembly retaining screws (3).
- Pull out the control assembly.
- Remove the A/C push knob by pushing the knob lock (4).
- Disconnect the A/C push knob electrical connector (5).



Installation Procedure

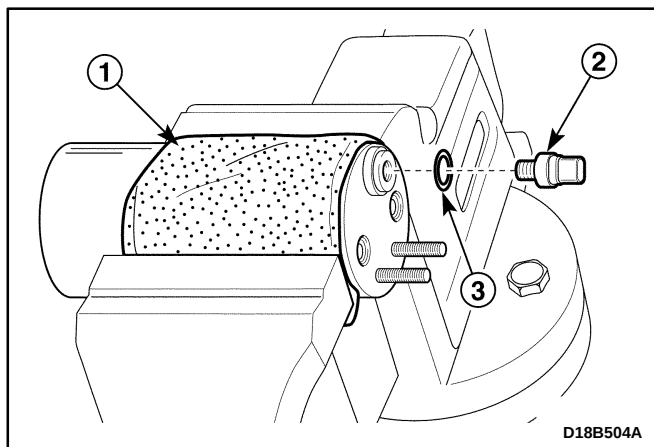
1. Install the A/C push knob to the control assembly.
2. Connect the A/C push knob electrical connector.
3. Install the control assembly with the screws.
4. Connect the mode control cable to the heater module.
5. Connect the temperature control cable to the heater module.
6. Install the instrument cluster housing trim panel. Refer to *Section 9E, Instrumentation / Driver Information*.



RECEIVER DRYER AND DUAL CUT SWITCH

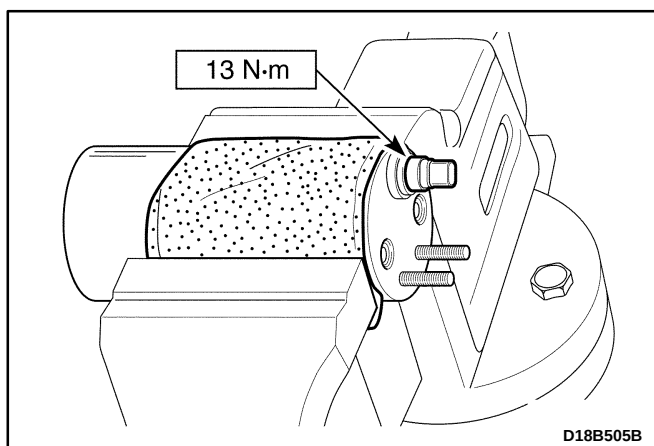
Removal Procedure

1. Recover the refrigerant. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System" in this section.
2. Remove the front bumper fascia. Refer to *Section 9O, Bumpers and Fascias*.
3. Remove the receiver dryer.
 - Disconnect the dual cut switch connector (1).
 - Remove the receiver dryer flange nuts (2).
 - Remove the bracket bolt (3).
 - Discard the O-ring (4).



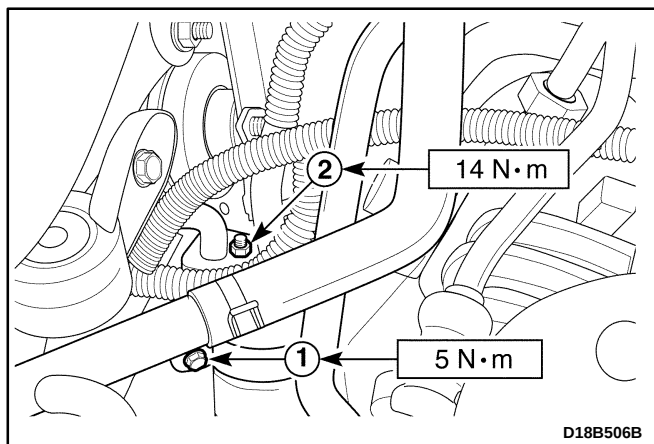
4. Remove the dual cut switch.

- With the receiver dryer clothed, vise the receiver dryer (1).
- Remove the dual cut switch (2).
- Discard the O-ring (3).



Installation Procedure

1. Install the new O-ring.
2. Install the dual cut switch.
Tighten the dual cut switch to 13 N•m (115 lb-in).



3. Install the receiver dryer.

- Install the new O-rings.
- Install the bracket bolt (1).

Tighten

Tighten the bracket bolt to 5 N•m (44 lb-in).

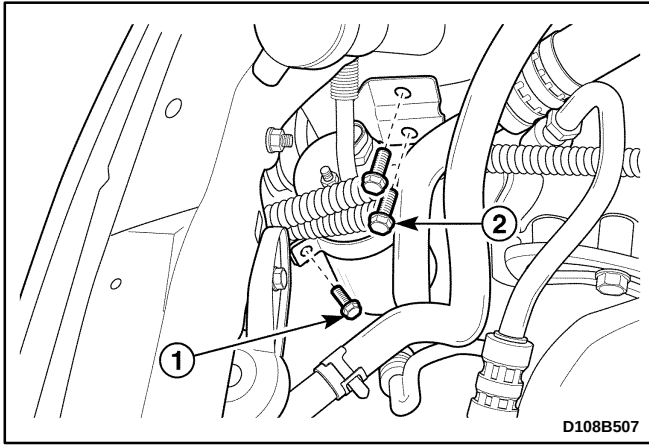
- Install the receiver dryer flange nuts (2).

Tighten

Tighten the receiver dryer flange nut to 14 N•m (10.5 lb-ft).

- Connect the dual cut switch connector.

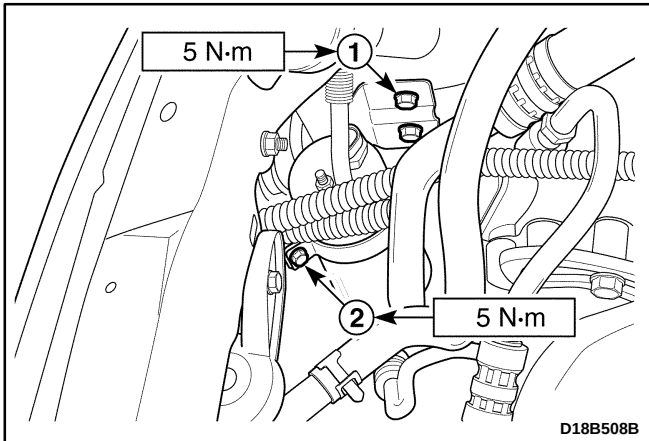
4. Install the front bumper fascia. Refer to *Section 90, Bumpers and Fascias*.
5. Evacuate and recharge the system. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System" in this section.



RECEIVER DRYER BRACKET

Removal Procedure

1. Remove the front bumper fascia. Refer to *Section 9O, Bumpers and Fascias*.
2. Remove the receiver dryer bracket.
 - Remove the receiver dryer bracket bolt (1).
 - Remove the receiver dryer bracket-to-body bolts (2).

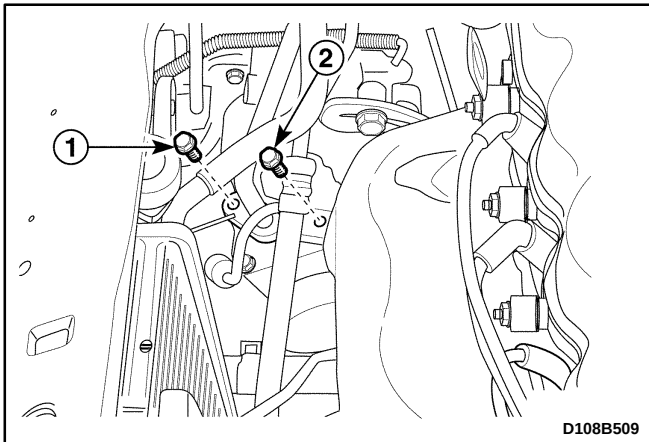


Installation Procedure

1. Install the receiver dry bracket with the bolts.

Tighten

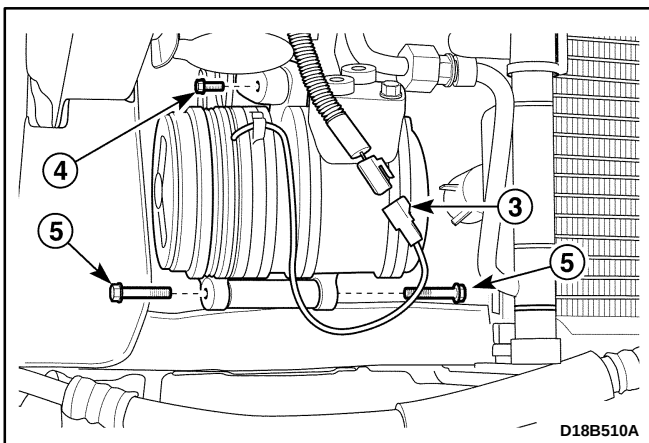
- Tighten the receiver dryer bracket-to-body bolts to 5 N·m (44 lb-in) (1).
 - Tighten the receiver dryer bracket bolt to 5 N·m (44 lb-in) (2).
2. Install the front bumper fascia. Refer to *Section 9O, Bumpers and Fascias*.

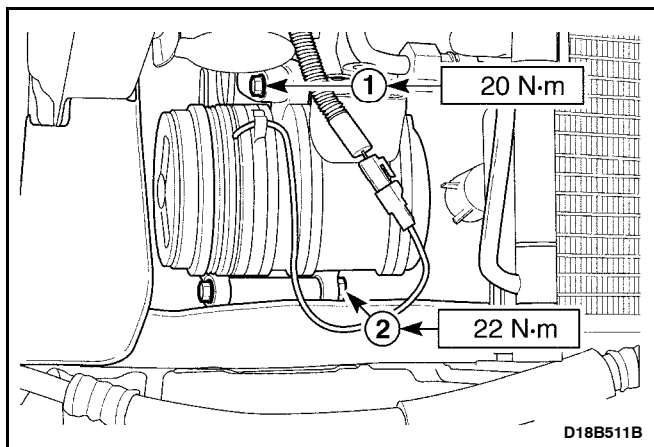


COMPRESSOR

Removal Procedure

1. Remove the receiver dryer. Refer to "Receiver Dryer and Dual Cut Switch" in this section.
2. Remove the A/C belt. Refer to *Section 6B, Power Steering Pump*.
3. Remove the compressor.
 - Discharge and recover the refrigerant. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System" in this section.
 - Remove the bolt securing the low pressure pipe line to the compressor (1).
 - Remove the bolt securing the high pressure pipe line to the compressor (2).
 - Disconnect the electrical connector (3).
 - Remove the upper bolt mounting the compressor-to-bracket (4).
 - Remove the lower bolts mounting the compressor-to-bracket (5).





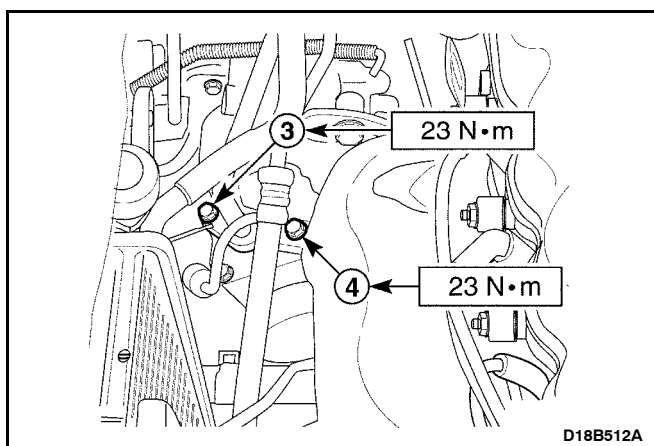
Installation Procedure

1. Install the compressor with the mounting bolts.

Tighten

- Tighten the compressor-to-bracket upper bolt to 20 N·m (15 lb-ft) (1).
- Tighten the compressor-to-bracket lower bolts to 22 N·m (16 lb-ft) (2).

2. Connect the electrical connector.



3. Install the A/C high pressure pipe line to the compressor with the bolt.

Tighten

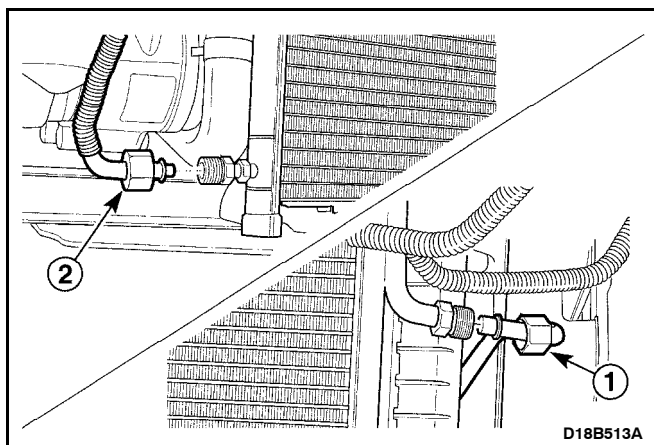
Tighten the A/C high pressure pipe line bolt to 23 N·m (17 lb-ft) (3).

4. Install the A/C low pressure pipe line to the compressor with the bolt.

Tighten

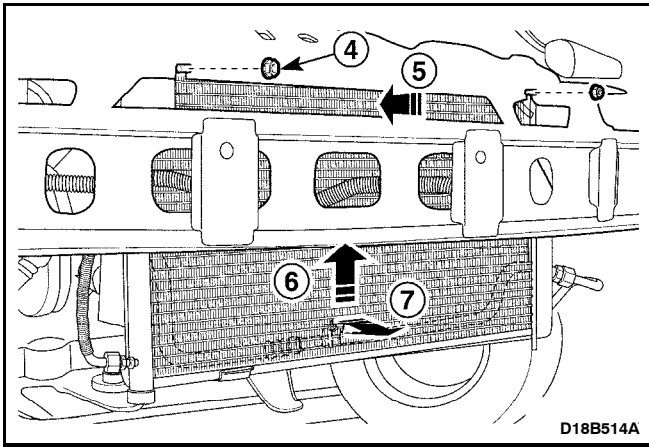
Tighten the A/C low pressure pipe line bolt to 23 N·m (17 lb-ft) (4).

5. Evacuate and charge the system. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedure for A/C System" in this section.
6. Install the A/C belt. Refer to *Section 6B, Power Steering Pump*.
7. Install the receiver dryer. Refer to "Receiver Dryer and Dual Cut Switch" in this section.

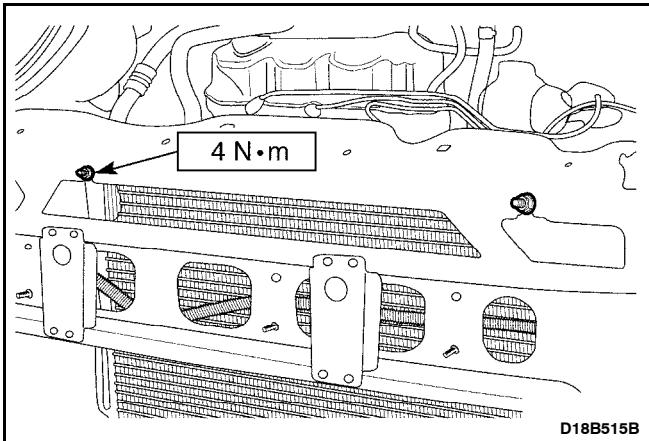


CONDENSER

1. Disconnect the negative battery cable.
2. Remove the front bumper fascia. Refer to *Section 90, Bumpers and Fascias*.
3. Discharge and recover the refrigerant. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C system" in this section.
4. Remove the condenser.
 - Loosen the condenser pipe-to-compressor pipe fitting (1).
 - Loosen the condenser pipe-to-receiver dryer pipe fitting (2).



- Remove the condenser mounting nuts (3).
- Push the top of the condenser (4).
- Take off the condenser from the lower bracket by lifting the condenser (5).
- Remove the condenser (6).



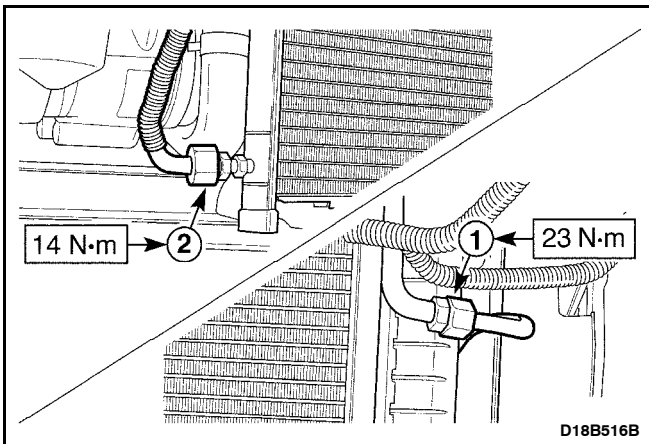
Installation Procedure

Important: Discard the removed O-rings.

1. Install the condenser with the nuts.

Tighten

Tighten the condenser mounting nuts to 4 N·m (36 lb-in).

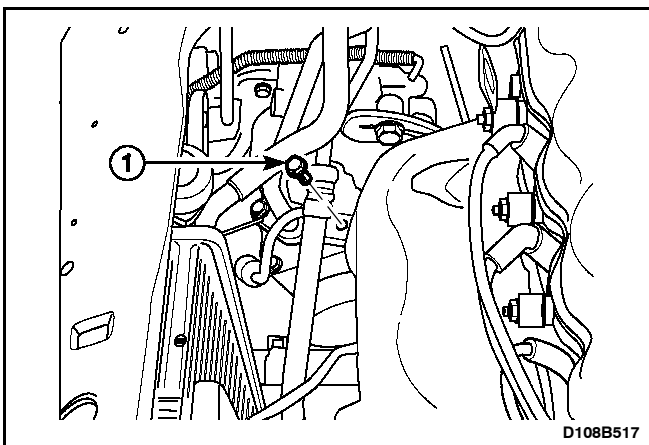


2. Tighten the fittings and the bolt.

Tighten

- Tighten the condenser pipe-to-compressor pipe fitting to 23 N·m (17 lb-ft) (1).
- Tighten the condenser pipe-to-receiver dryer pipe fitting to 14 N·m (10.5 lb-ft) (2).

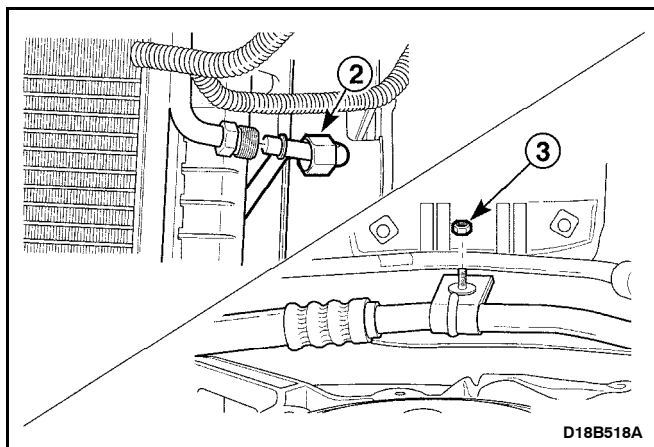
3. Evacuate and recharge the system. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System" in this section.
4. Install the front bumper fascia. Refer to *Section 90, Bumpers and Fascias*.
5. Connect the negative battery cable.



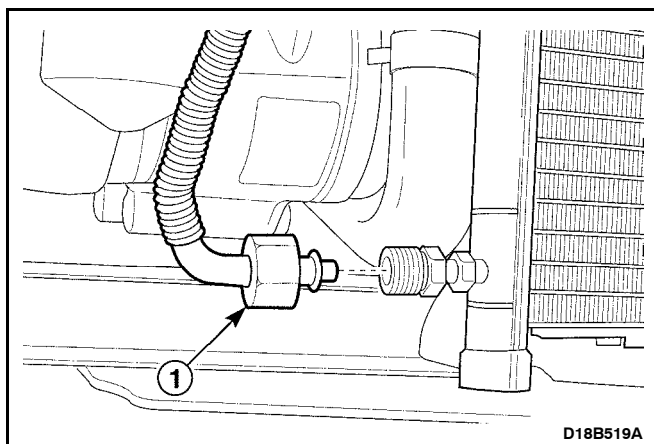
A/C HIGH PRESSURE PIPE LINE (Left-Hand Drive Shown, Right-Hand Drive Similar)

Removal Procedure

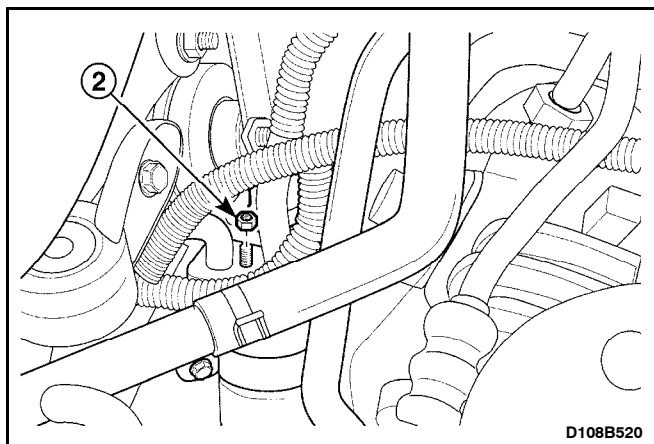
1. Disconnect the negative battery cable.
2. Remove the front bumper fascia. Refer to *Section 90, Bumpers and Fascias*.
3. Discharge and recover the refrigerant. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System" in this section.
4. Remove the A/C high pressure pipe line between the compressor and the condenser.
 - Remove the bolt securing the high pressure pipe line to the compressor (1).



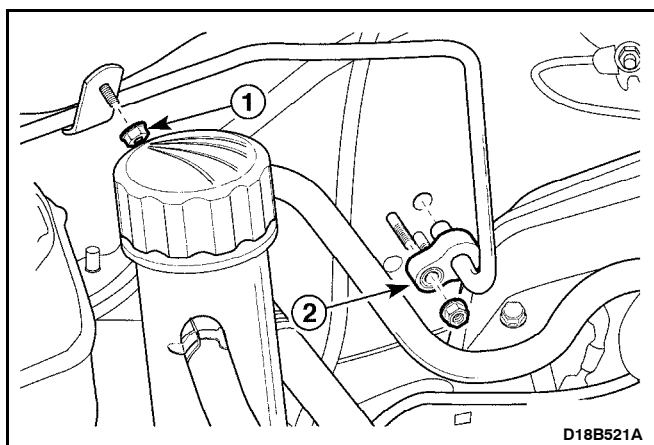
- Loosen the fitting securing the high pressure pipe line to the condenser pipe line (2).
- Remove the clamp nut (3).



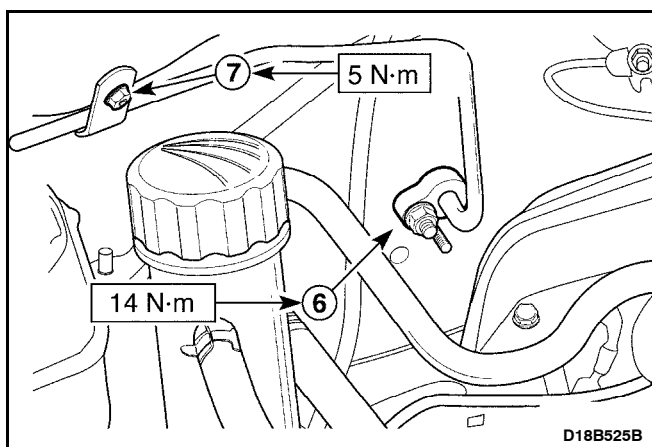
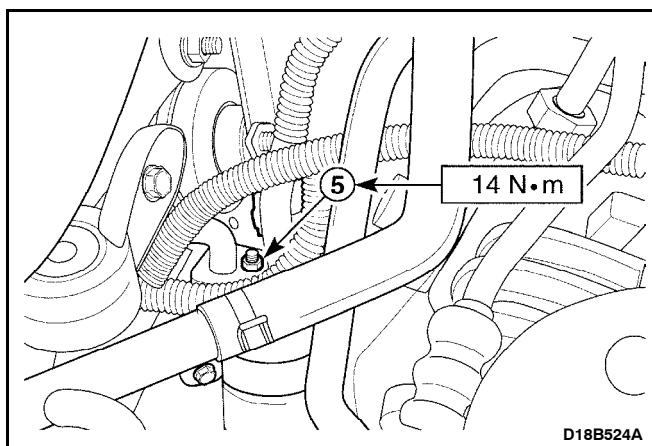
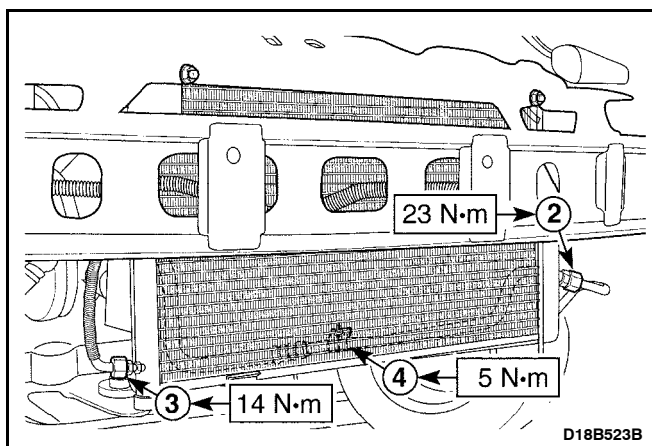
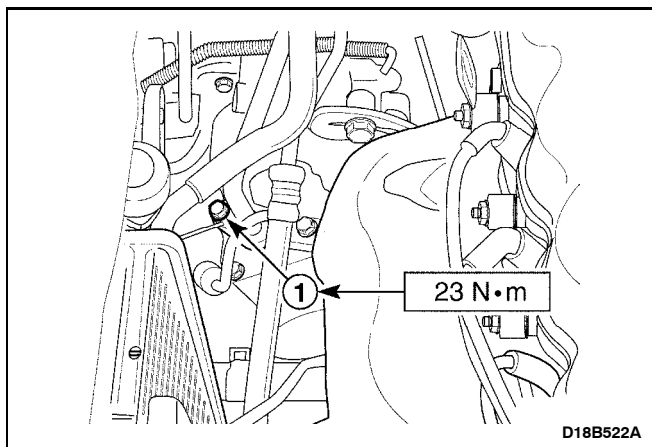
5. Remove the A/C high pressure pipe line between the condenser and the receiver dryer.
 - Loosen the fitting securing the receiver dryer to the condenser (1).



- Remove the receiver dryer flange nuts (2).



6. Remove the A/C high pressure pipe line between the receiver dryer and the evaporator.
 - Remove the purge control valve. Refer to *Section 1F, Engine Controls*.
 - Remove the bracket nut (1).
 - Loosen the fitting (2).



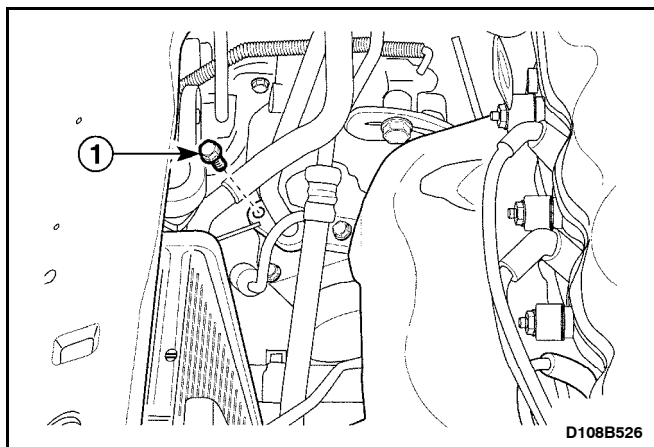
Installation Procedure

Important: Discard the removed O-rings.

1. Install the high pressure pipe lines with the bolts, the nuts, and the fittings.

Tighten

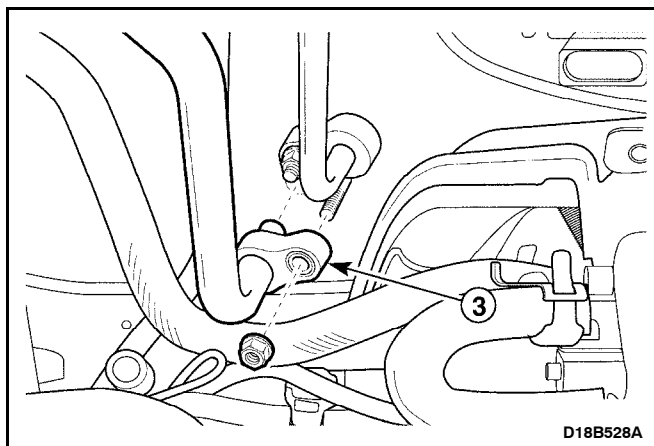
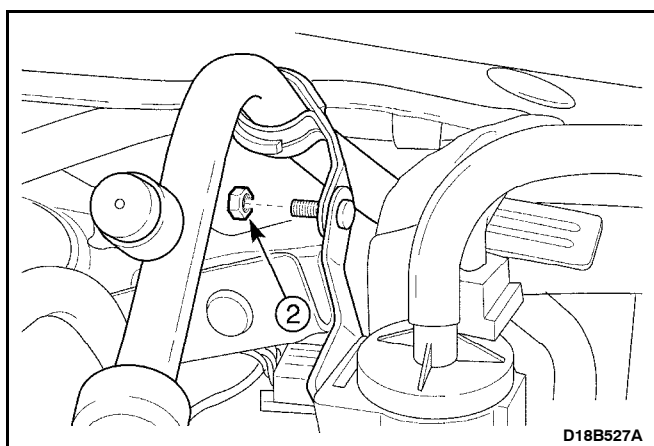
- Tighten the bolt securing the high pressure pipe line to the compressor to 23 N·m (17 lb-ft) (1).
 - Tighten the fitting securing the high pressure pipe line to the condenser pipe line to 23 N·m (17 lb-ft) (2).
 - Tighten the fitting securing the high pressure pipe line to the receiver dryer to 14 N·m (10.5 lb-ft) (3).
 - Tighten the bracket nut to 5 N·m (44 lb-in) (4).
 - Tighten the receiver dryer flange nuts to 14 N·m (10.5 lb-ft) (5).
 - Tighten the nut securing the high pressure pipe line to the evaporator to 14 N·m (10.5 lb-ft) (6).
 - Tighten the bracket nut to 5 N·m (44 lb-in) (7).
2. Install the purge control valve. Refer to *Section 1F, Engine controls*.
 3. Evacuate and recharge the system. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System" in this section.
 4. Install the front bumper fascia. Refer to *Section 90, Bumpers and Fascias*.
 5. Connect the negative battery cable.



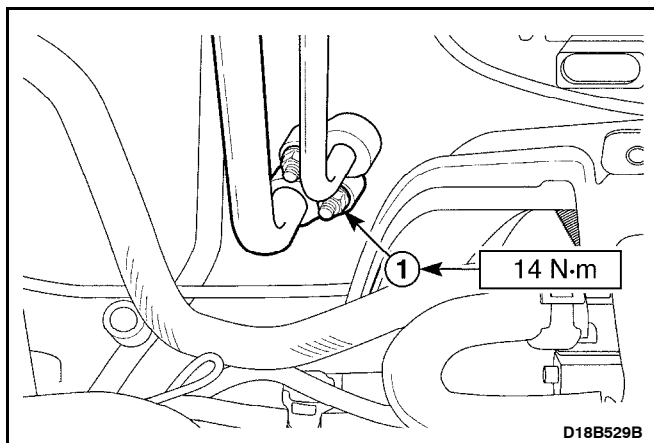
A/C LOW PRESSURE PIPE LINE (Left-Hand Drive Shown, Right-Hand Drive Similar)

Removal Procedure

1. Disconnect the negative battery cable.
2. Discharge and recover the refrigerant. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System" in this section.
3. Remove the A/C low pressure pipe line.
 - Remove the bolt securing the A/C low pressure pipe line at the compressor (1).
 - Remove the bracket nut from shut bar (2).



- Remove the purge control valve. Refer to *Section 1F, Engine Controls*.
- Loosen the nut securing the A/C low pressure pipe line at the evaporator (3).



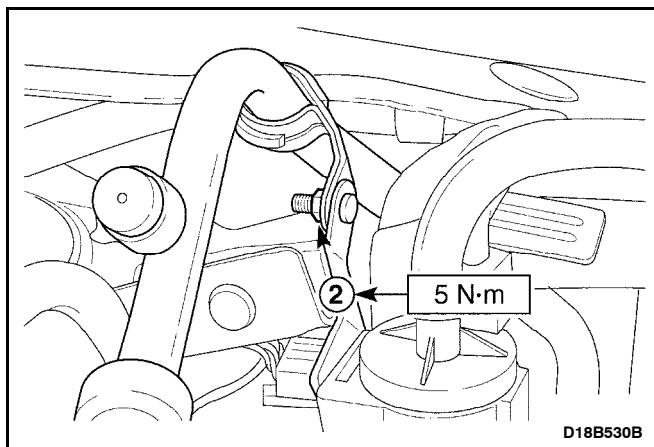
Installation Procedure

Important: Discard the removed O-rings.

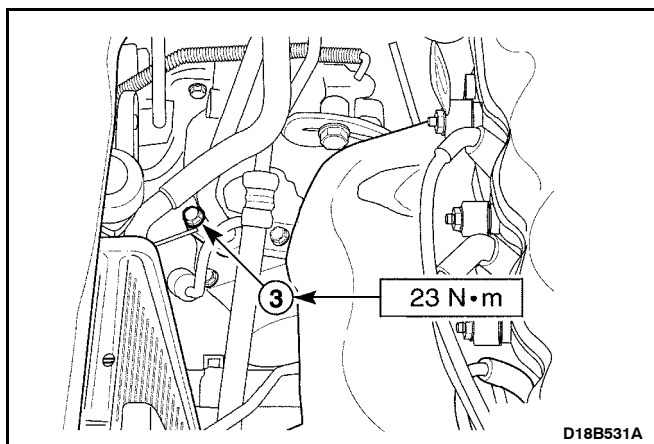
1. Install the A/C low pressure pipe line.

Tighten

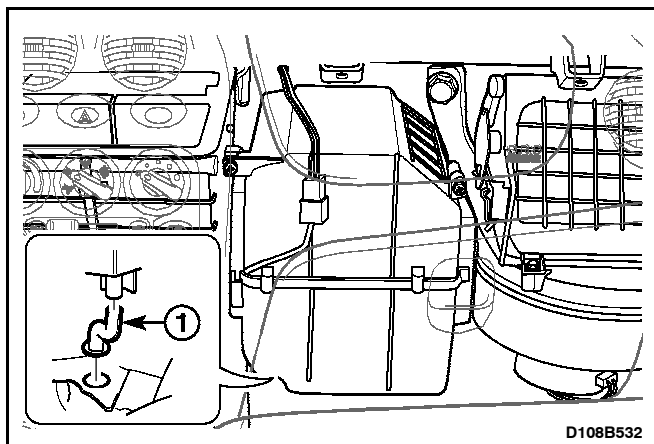
- Tighten the nut securing the A/C low pressure pipe line at the evaporator to 14 N·m (10.5 lb-ft) (1).



- Tighten the bracket nut to 5 N·m (44 lb-in) (2).



- Tighten the bolt securing the A/C low pressure pipe line at the compressor to 23 N·m (17 lb-ft) (3).
2. Evacuate and recharge the system. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedure for A/C System" in this section.
 3. Connect the negative battery cable.

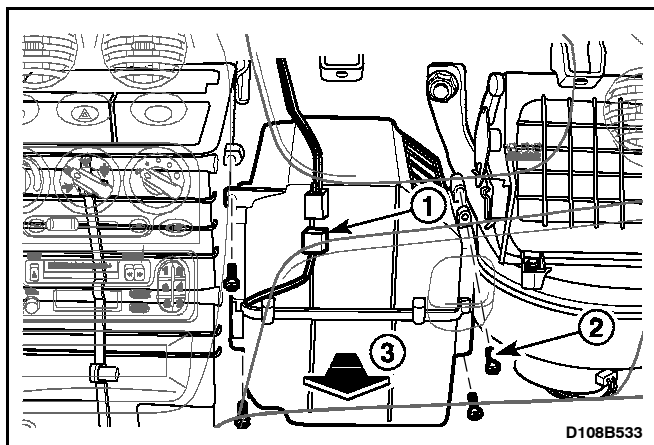


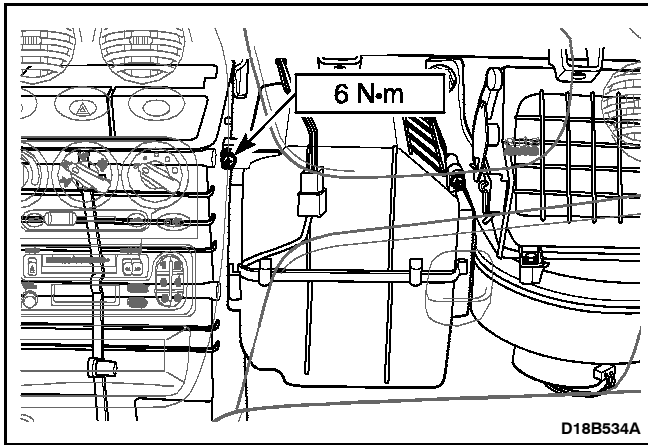
EVAPORATOR UNIT AND DRAIN HOSE

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

Removal Procedure

1. Disconnect the negative battery cable.
2. Discharge and recover the refrigerant. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System" in this section.
3. Loosen the high pressure pipe line (receiver dryer → evaporator) nut and the low pressure pipe line (evaporator → compressor) nut.
4. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver information*.
5. Remove the evaporator unit.
 - Remove the drain hose (1).
 - Disconnect the thermistor connector (2).
 - Remove the screws (3).
 - Remove the evaporator backward slowly (4).

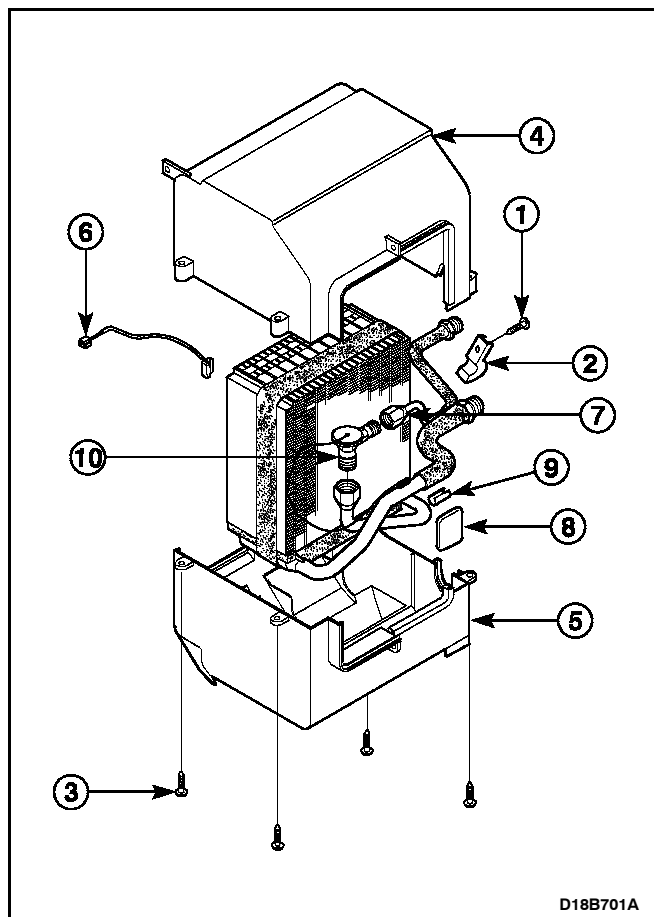




Installation Procedure

1. Install the evaporator with the screws.
2. Connect the thermistor connector.
3. Install the drain hose.
4. Install the glove box. Refer to *Section 9E, Instrumentation / Driver Information*.
5. Tighten the high pressure pipe line (receiver dryer → evaporator) nut and the low pressure pipe line (evaporator → compressor) nut to 14 N·m (10.5 lb-ft).
6. Evacuate and recharge the system. Refer to "Discharging, Adding Oil, Evacuating, and Charging Procedures for A/C System" in this section.
7. Connect the negative battery cable.

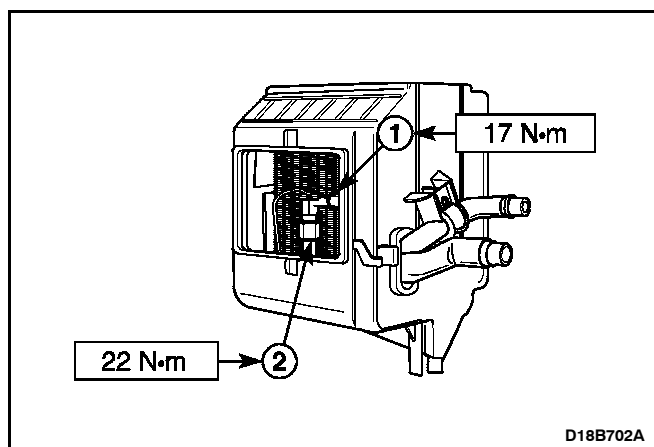
UNIT REPAIR



EVAPORATOR CORE AND EXPANSION VALVE

Disassembly Procedure

1. Remove the evaporator unit. Refer to "Evaporator Unit and Drain Hose" in this section.
2. Remove the evaporator core and expansion valve.
 - Remove the screw (1).
 - Remove the clamp (2).
 - Remove the screws securing the evaporator case cover (3).
 - Remove the upper evaporator case cover (4).
 - Remove the lower evaporator case cover (5).
 - Remove the thermistor (6).
 - Loosen the fitting and remove the high pressure pipe line (7).
 - Remove the tape (8).
 - Remove the evaporator plate seal (9).
 - Loosen the fitting and remove the expansion valve (10).



Assembly Procedure

1. Install the expansion valve with the fitting.

Tighten

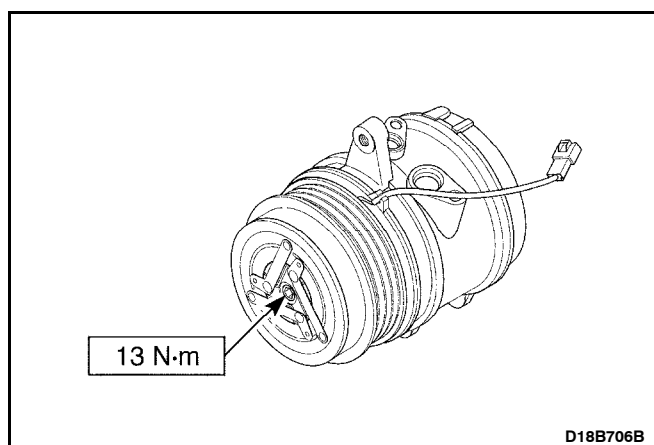
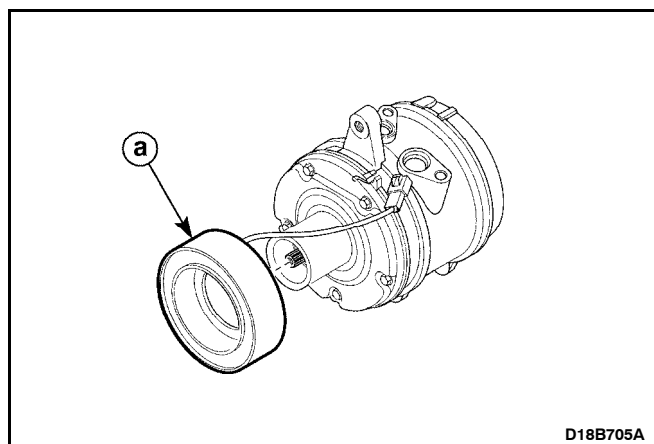
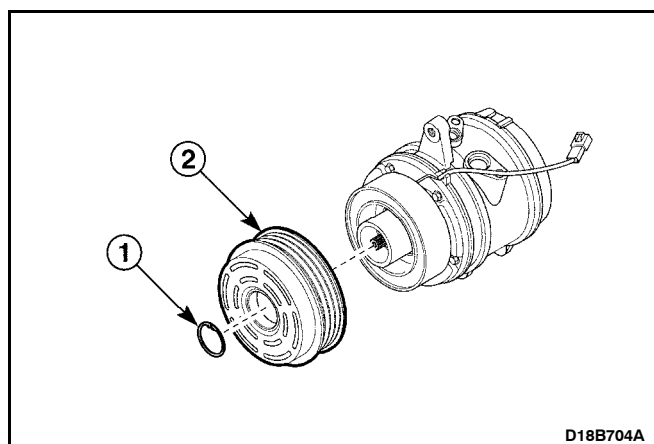
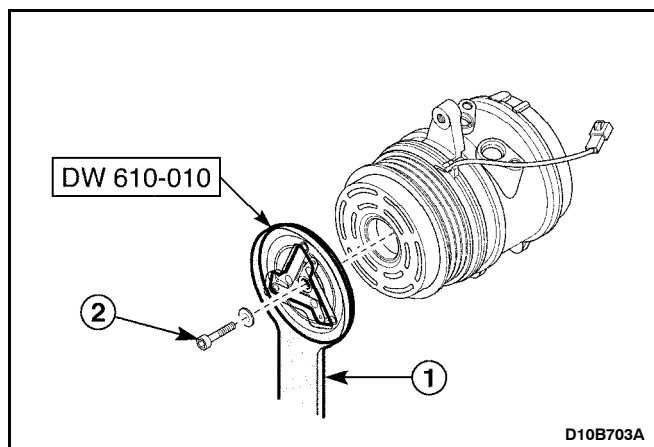
Tighten the high pressure pipe line coupling to 17 N•m (13 lb-ft) (1).

2. Install the evaporator plate seal.
3. Install the tape.
4. Install the high pressure pipe line with the fitting.

Tighten

Tighten the expansion valve coupling to 22 N•m (16 lb-ft) (2).

5. Install the thermistor.
6. Install the screws securing the evaporator case cover.
7. Install the clamp and the screw.
8. Install the evaporator unit. Refer to "Evaporator Unit and Drain Hose" in this section.



COMPRESSOR OVERHAUL

Tools Required

DW-610-010 Clutch Hub Holding Tool

Disassembly Procedure

1. Remove the compressor. Refer to "Compressor" in this section.
2. Remove the clutch drive plate.
 - Use the clutch hub holding tool DW-610-010 to keep the clutch drive plate (1).
 - Remove the shaft bolt (2).
3. Remove the compressor pulley.
 - Remove the snap ring using a ring pryer (1).
 - Remove the pulley (2).
4. Disconnect the wiring harness holder and remove the electromagnetic clutch.
 - a. Electromagnetic clutch

Assembly Procedure

1. Connect the wiring harness holder and install the clutch coil.
2. Install the snap ring and compressor pulley.
3. Use the clutch hub holding tool DW-610-010, install the clutch drive plate with the shaft bolt.

Tighten

Tighten the shaft bolt to 13 N·m (115 lb-in).

4. Install the compressor. Refer to "Compressor" in this section.

SPECIFICATIONS

GENERAL SPECIFICATIONS

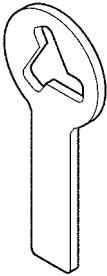
Application		Unit	Description
Compressor		-	SP-10.4PK
Receiver-Dryer		-	AL R/DRIER
Refrigerant	Type	-	R-134a System
	Capacity	g	500 (RHD : 530)
Refrigerant Oil in A/C System	Type	-	RL 244 PAG OIL
	Capacity	cc	150
A/C Cooling Capacity (Airflow rate 8.7 kg/min)		Kcal/h	5,500
Refrigerant Pressure in A/C System (Engine Idle, Fresh Air 30°C (86°F), Ambient Temperature 25°C-35°C (77°F-95°F), Temperature to Full Cold)	Low Pressure Side	kPa (psi)	200 (2.9)
	High Pressure Side	kPa (psi)	1,500 (217.5)
A/C Compressor ON/OFF Condition (Refer to Section 1F, Engine Controls About the A/C Compressor ON/OFF Condition According to Engine Operating Status)	Evaporator Thermistor Temperature	°C (°F)	ON - - - - - 2.45(36.81) OFF - - - - - 1.0 (34.2)
	Dual Cut Switch Pressure	kPa	ON - - - - - 205-245 300-400 OFF - - - - - 180-220 240-280

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Compressor Upper Bracket Bolts	20	15	-
Compressor Front Head-to-Rear Head Through-Bolt	22	16	-
High Pressure Pipe Line (Compressor → Condenser) Bolt	23	17	-
High Pressure Pipe Line (Compressor → Condenser) Fitting	23	17	-
High Pressure Pipe Line (Compressor → Condenser) Clamp Nut	5	-	44
Receiver-Dryer Flange Nut	14	10.5	-
High Pressure Pipe Line (Condenser → Receiver-Dryer) Fitting Nut	14	10.5	-
High Pressure Pipe Line (Receiver-Dryer → Evaporator) Fitting Nut	14	10.5	-
High Pressure Pipe Line (Receiver-Dryer → Evaporator) Clamp Nut	5	-	44
Low Pressure Pipe Line (Evaporator → Compressor) Fitting Nut	14	10.5	-
Low Pressure Pipe Line (Evaporator → Compressor) Clamp Nut	5	-	44
Low Pressure Pipe Line (Evaporator → Compressor) Compressor Bolt	23	17	-
Dual Cut Switch	13	-	115
Receiver-Dryer Bracket-to-Body Bolts	5	-	44
Receiver-Dryer Bracket Bolt	5	-	44
Expansion Valve Coupling (Receiver-Dryer → Expansion Valve)	17	13	-
Expansion Valve Coupling (Expansion Valve → Evaporator)	22	16	-
Compressor Shaft Bolt	13	-	115
Condenser Mounting Nuts	4	-	36

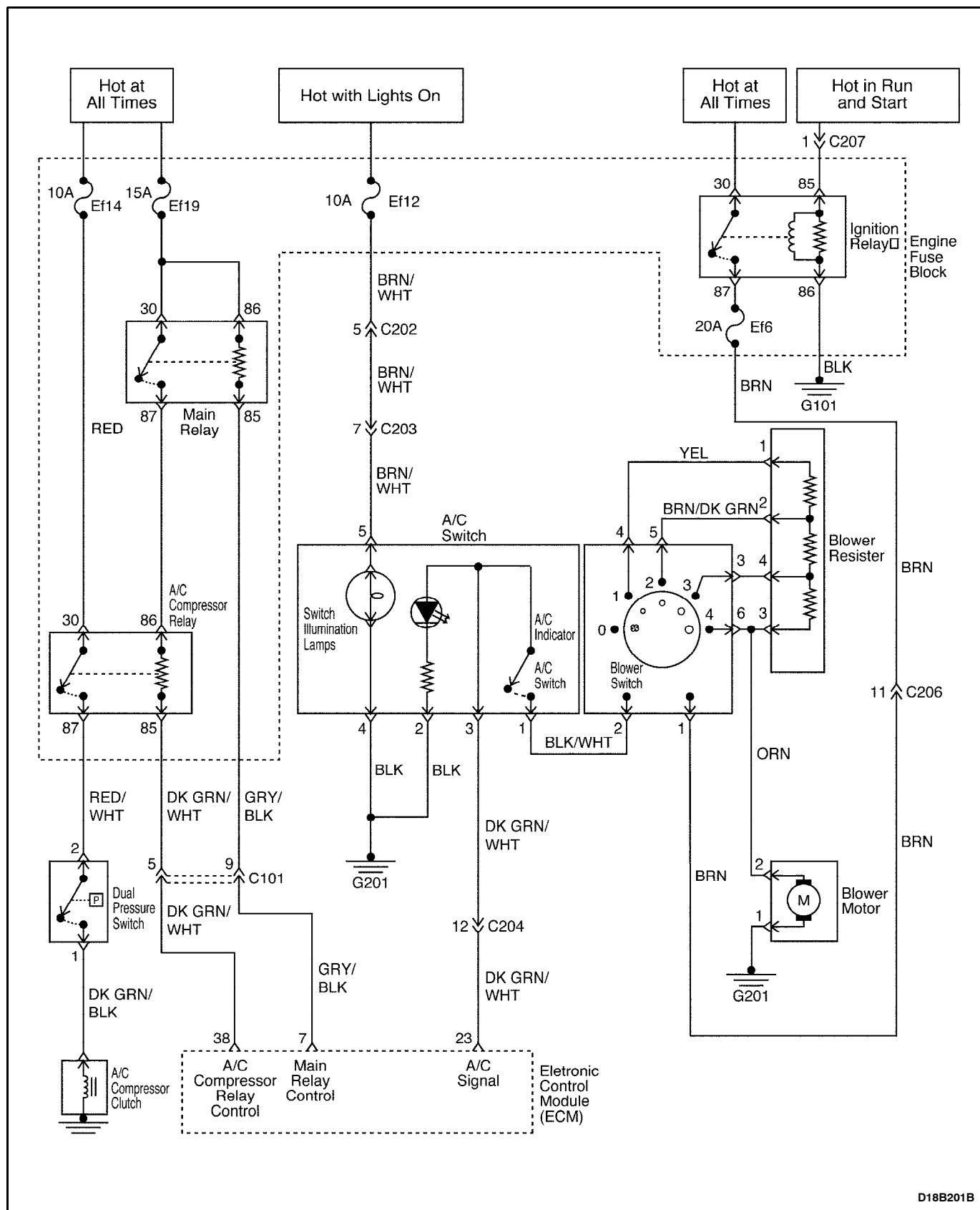
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS TABLE

 D108B101	DW-610-010 Clutch Hub Holding Tool
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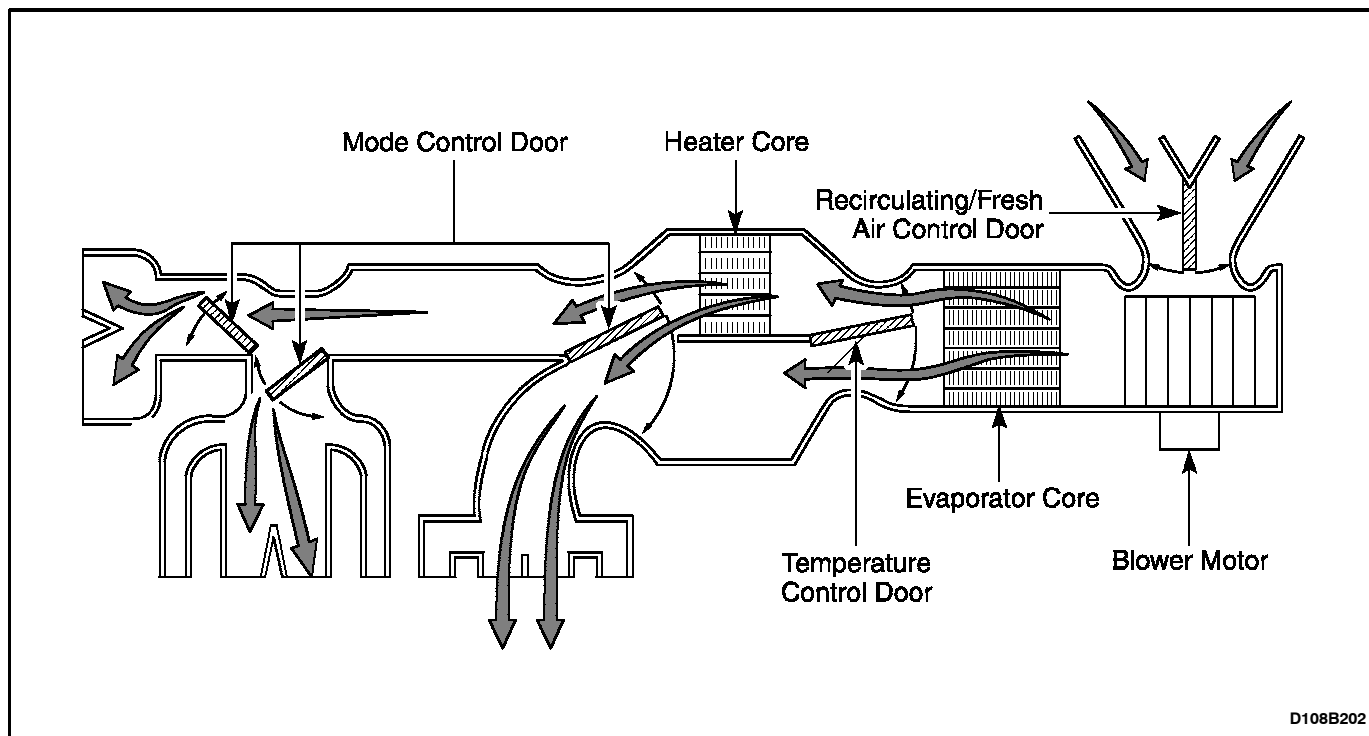
SCHEMATIC AND ROUTING DIAGRAMS

A/C DIAGRAMS



A/C AIRFLOW

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



A/C SYSTEM

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

