SERVICE MANUAL SECTION

AIR CONDITIONING - HEATER SYSTEM: 5000*i*, 9100*i*, 9200*i*, 9400*i*, 9900*i* MODELS

Model: 5000i
Start Date: 03/01/1999

Model: 9100i
Start Date: 03/01/1999

Model: 9200i
Start Date: 03/01/1999

Model: 9400i
Start Date: 03/01/1999

Model: 9900i
Start Date: 03/01/1999

S16023

01/09/2006

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1. AIR CONDITIONING SYSTEM SERVICE

This manual covers the air conditioning - heating system for the 5000i Series models and 9000i Series models (daycabs and sleepers). These models use the lowered heater box system. This system uses a single blower and can be identified by the side access cover for the system filter.

Use s16015 (CTS-5070), AIR CONDITIONING - HEATER SYSTEM, for 5000 Series and 9000 Series Models WITHOUT the Lowered Heater Box HVAC System (Day Cabs, Add-On Sleeper Boxes, and pre-5/1/1997 Pro-Sleepers)

Use s16020 (CTS-5255), AIR CONDITIONING - HEATER SYSTEM, for 9000 Series Pro-Sleeper Models After 5/1/1997 (WITH the Lowered Heater Box HVAC System)

1.1. SERVICE WARNINGS

Refrigerant R-134a is a nonflammable, nonexplosive, and noncorrosive hydrofluorocarbon refrigerant. R-134a is heavier than air and has a slight ether-type odor. Although R-134a is classified as a safe refrigerant, the following precautions must be observed to protect the A/C system components and the person working on the system.

WARNING – Carbon monoxide is a colorless, odorless, and dangerous gas that is present in vehicle exhaust. When it is necessary to operate the engine during vehicle service in a confined area, always use the proper equipment to vent the exhaust gasses outside of the work area.

WARNING – Safety goggles or other adequate eye protection must be worn when working with refrigerant. The temperature of liquid refrigerant is -20 degrees F (-29 degrees C). Serious injury or blindness will result from refrigerant contacting the eyes.

WARNING – If the refrigerant should contact the eyes, DO NOT rub them. Splash the eyes with cold water for at least 15 minutes to gradually get the temperature above the freezing point. See a doctor immediately.

WARNING – Wear nonporous gloves. Should liquid refrigerant come into contact with the skin, remove any contaminated clothing, including shoes; then treat the injury as though the skin had been frostbitten or frozen. See a doctor immediately.

WARNING – Be certain that pressurized refrigerant containers are not exposed to open flame or temperatures above 125 degrees F (51 degrees C). Do not discard empty refrigerant containers where they are likely to be subjected to the heat of trash burners, etc.; they may explode, resulting in personal injury or possible death. Containers must be stored, installed, and disposed of in accordance with all state and local ordinances.

WARNING – Never weld, solder, steam clean or use excessive heat on any of the air conditioning lines or equipment while the system is charged. Heat applied to any part will cause the pressure within the system to become excessive, which may result in an explosion and possible personal injury.

WARNING – Do not smoke or allow any type of fire or flame in the immediate area while servicing the air conditioning system. Refrigerant is not combustible; however, in the presence of heat it changes to a poisonous gas. Inhalation can cause death or serious injury.

WARNING – R-134a must not be mixed with air and then pressurized. When mixed with large quantities of air and pressurized, R-134a becomes combustible.

WARNING – Refrigerant must be recovered from the air conditioning system before any components of the system are removed or replaced. Removing components while pressure is in the system will cause personal injury or death.

WARNING – Do not remove the compressor oil fill plug to check the oil level in the refrigerant compressor while the A/C system is charged with refrigerant. The crankcase side of the compressor is under pressure and personal injury may result. It is not possible to check the oil level in the compressor on an A/C system that is under system pressure.

WARNING – Do not install or remove A/C testing or charging equipment while the engine is running. Serious injury may result from doing so.

WARNING – Always use approved refrigerant recycling equipment when working with R-134a to prevent accidental discharge. If released into the atmosphere, the refrigerant evaporates very quickly and may displace the oxygen surrounding the work area, especially in small or enclosed areas. This situation creates the hazard of suffocation or brain damage for anyone in the work area. If a leak should occur, avoid breathing the refrigerant and lubricant vapor. Thoroughly ventilate the area before continuing with service. Federal and state laws require that refrigerant be recovered and recycled to help protect the environment.

WARNING – When using a manual manifold gauge set connected to both the air conditioning system and refrigerant supply cylinder, never open the high side hand valve of the manifold gauge set while the A/C system is operating. If hot, high pressure refrigerant is forced through the gauge to the refrigerant supply cylinder; it could cause the cylinder to rupture and cause personal injury.

WARNING – When using a recovery station to service the air conditioning system, carefully follow the equipment manufacturer's operating instructions (including all cautions and warnings).

WARNING – Always use correct replacement refrigerant hoses. Do not use hoses other than those specified for the system being serviced. The use of improper hoses may cause a hose rupture, which may result in personal injury.

2. DESCRIPTION

The air handling unit of the Blend-Air heating and air conditioning system is a combination unit (Figure 1). Both the heater core and air conditioner evaporator are housed in one unit, and use common air ducts and blowers. The term "Blend-Air" refers to the mixing or blending together of air from the air conditioner, heater and outside air. This provides for heating, cooling, defrosting, dehumidifying and ventilation in whatever combination the driver chooses to select. The specific system covered in this manual is known as the 'lowered heater box' system; and, it can be identified by the side access cover that provides easy access to the system's air filter element.

This system has used two methods to recirculate cabin air. In the first method, cabin air was drawn into the blend-air unit through the louvered filter access cover and a louvered panel on the front of the blend-air unit. Outside air was prevented from entering the system by a door in the air inlet duct. In the current method, cabin air is drawn into the blend-air unit through an opening in the air inlet duct, under the dash. This 'recirc' inlet is opened by the same air door that is used to block the outside air. The louvered panel on the front of the blend-air unit has been removed and the louvered filter access cover has been replaced with a solid cover.

The same basic blend-air unit can be used for daycabs or sleepers. In the sleeper version a bunk blend-air door assembly is used to control the air at the bunk output port on the rear of the blend-air unit. Daycab versions use a dummy panel in place of the bunk blend-air door assembly, and a panel is used to cover the bunk output port.

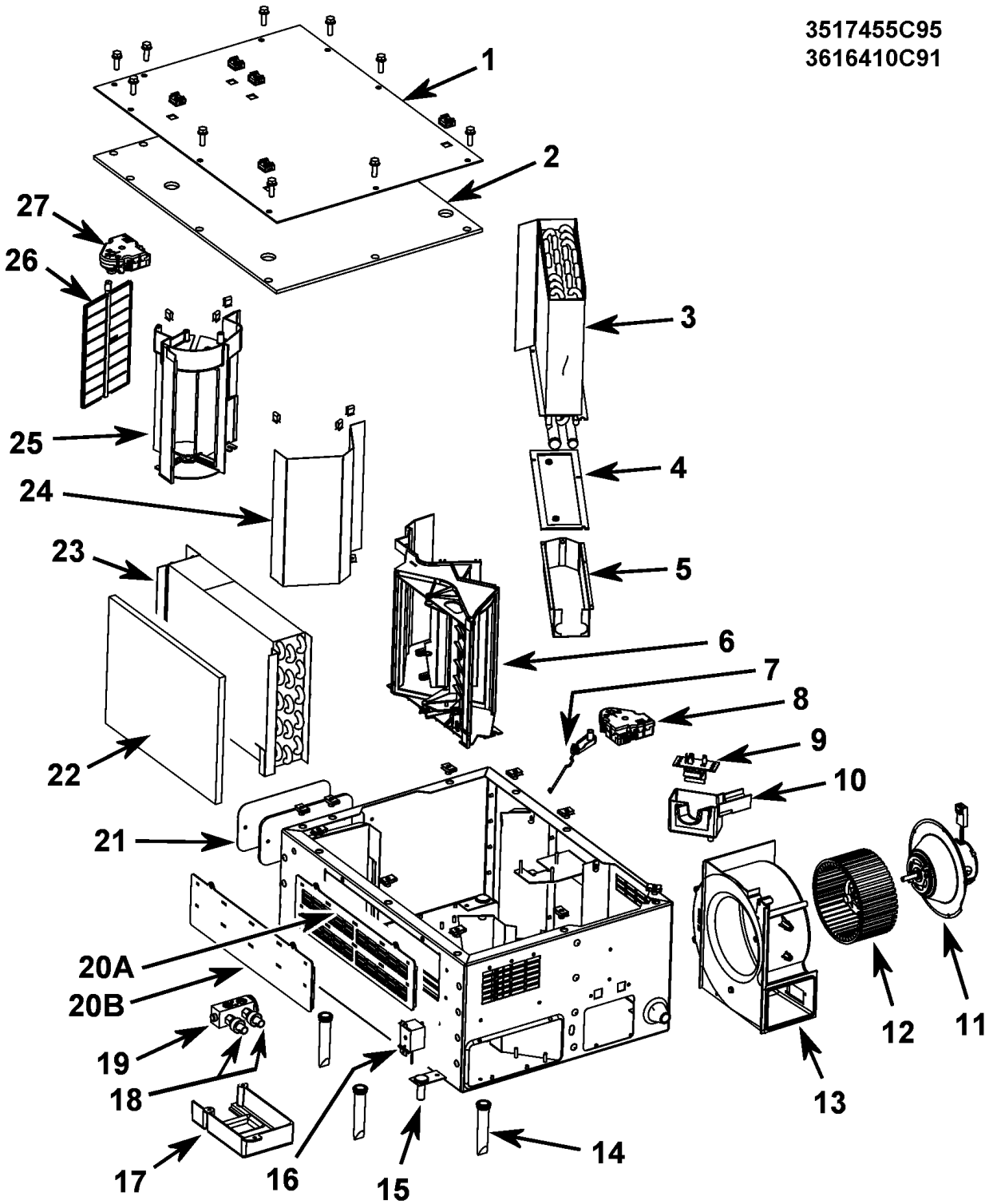

Figure 1 Blend-Air Heating and A/C Unit

1. COVER
2. COVER SEAL
3. HEATER CORE
4. GASKET
5. PAN
6. CAB BLEND-DOOR ASSEMBLY
7. BLEND-DOOR LINKAGE
8. CAB BLEND-DOOR ACTUATOR
9. BLOWER SPEED CONTROL RESISTOR
10. BLOWER SPEED CONTROL RESISTOR HOUSING
11. MOTOR
12. BLOWER WHEEL
13. BLOWER HOUSING
14. MOISTURE DRIP TUBE
15. ASSEMBLY MOUNTING BOLT
16. THERMOSTATIC SWITCH
17. EXPANSION VALVE COVER
18. PRESSURE SWITCHES
19. EXPANSION VALVE

20A. FILTER ACCESS COVER – VENTED
20B. FILTER ACCESS COVER – SOLID

21. COVER PANEL – DAYCABS
22. FILTER
23. EVAPORATOR
24. DUMMY PANEL – DAYCABS
25. BUNK BLEND-DOOR HOUSING – SLEEPERS
26. BUNK BLEND-DOOR – SLEEPERS
27. BUNK BLEND-DOOR ACTUATOR – SLEEPERS

The system's Blend-Air unit is integrated into the cab to provide a built-in appearance. The heater core, evaporator, blower and other parts of the system are located in the Blend-Air unit under the passenger seat. Heating and cooling controls along with a blower speed control are located in the cab and sleeper compartment.

For greater detail in servicing the air conditioning system, refer to the following manuals, as necessary, for the model being serviced. (Manuals are located in the Master Service Manual.)

- s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE (Includes Sanden Compressor Info)
- s16022, AIR CONDITIONING PROTECTION AND DIAGNOSTICS SYSTEM (APAds™)
- s16017, AIR CONDITIONING COMPRESSOR AND CLUTCH (CCI Type)
- GROUP 8 ELECTRICAL CIRCUIT DIAGRAMS
- GROUP 8 ELECTRICAL TROUBLESHOOTING GUIDE

3. OPERATION

The control unit located on the cab's instrument panel provides the means of operating the system (Figure 2). The knobs control the fresh air door, mode doors and the blend air doors. A push button A/C switch and a four speed fan control are also located on the control unit. The PRO SLEEPER control unit includes a BUNK button to activate the bunk control panel settings from the cab.

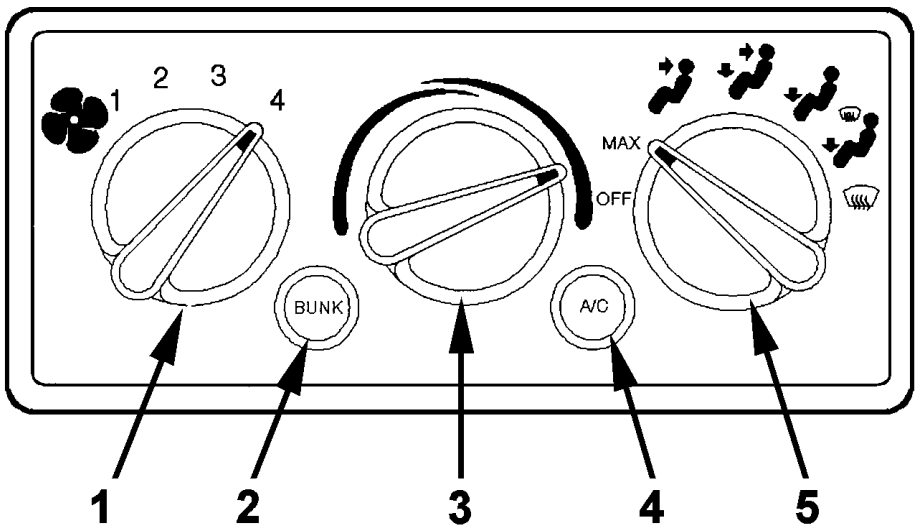

Figure 2 Blend-Air A/C - Heater System Control Unit (Located on Cab Instrument Panel)

1. BLOWER SPEED CONTROL
2. BUNK SWITCH (PRO SLEEPER MODELS)
3. TEMPERATURE CONTROL
4. A/C SWITCH
5. MODE CONTROL

3.1. FRESH AIR VENTILATION

Fresh air enters the cab in all modes on the cab control panel except in the MAX mode. The fan speed may be controlled in all modes to increase or decrease air flow.

3.2. HEATING

Cab

With the A/C switch in the OFF position, heating is controlled with the temperature knob (Figure 2). The full clockwise position provides the maximum heat. Move the mode control knob to obtain the desired air flow distribution between cab heat and defrost requirements. For the maximum air flow, set the fan control to the 4 position.

Sleeper Compartment

With the A/C switch in the OFF position, heating is controlled with the temperature and blower speed knobs. Full clockwise blower position and full clockwise temperature control position provide maximum heat (Figure 3).

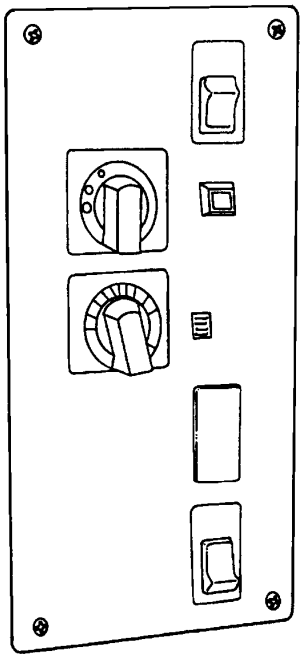

Figure 3 Typical Sleeper Compartment Control Unit

3.3. COOLING

Cab

To quickly cool the cab in warm weather, open all windows. Push the A/C button to start the air conditioning system. Set the mode control to MAX and the temperature knob to COLD (full counter-clockwise). For maximum cooling, set the fan control on the 4 position. Adjust the air outlets to evenly distribute the air around the occupant's head, chest and belt areas. Once the air in the cab is cooled, close the windows and set the mode control to panel or any other desired air flow pattern. Do not use the MAX mode position for extended intervals. To do so will cause high humidity in the cab.

Sleeper Compartment

For maximum cooling, push the A/C switch to the ON position, set the blower switch to the HI speed position and temperature control to full counter-clockwise position (Figure 3).

3.4. DEFROSTING

To obtain maximum defrosting, move the temperature control knob to the HOT position (full clockwise) and set the mode control to DEF. Adjust the fan speed to provide the desired air flow (Figure 2).

To clear the system of humid air, operate blower for 30 seconds in Floor mode before moving the mode control knob to the DEF position. This will help prevent rapid fogging of the windshield, which can happen if humid air is blown onto cool glass.

To improve defroster efficiency, remove ice and/or snow from the glass.

3.5. DEHUMIDIFYING

Moving the mode control knob to the defrost position will automatically engage the air conditioning which will dehumidify the cab and sleeper. If an A/C mode is used to dehumidify the cab, do not set the mode control to MAX.

4. SYSTEM DIAGNOSIS

Refer to s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual.

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5. MAINTENANCE

5.1. PRE-SEASON CHECKS AND OFF-SEASON CARE

Experience has shown that many problems that occur with heating and air conditioning systems result from lack of regular maintenance. Complete pre-season check-outs and off-season care of heating and air conditioning systems will aid in obtaining satisfactory performance during the operating seasons. For more detailed information, refer to s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual.

5.2. AIR FILTER

The Blend-Air system air filter element should be replaced every year at the beginning of the cooling season. More frequent replacement may be required for vehicles operating in dusty areas.

Remove

1. Unsnap the fasteners that hold the filter access cover to the side of the Blend-Air unit (Figure 4).

2. Reach inside the Blend-Air unit and pull old filter from the unit. Note the orientation of the filter (Figure 5).

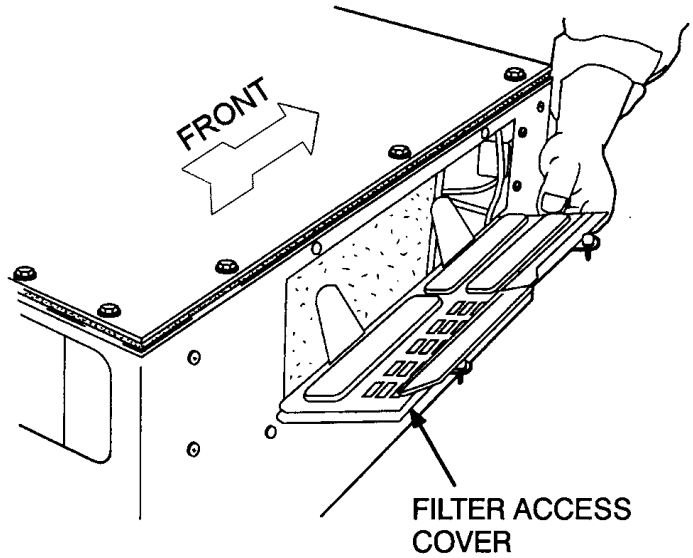

Figure 4 Filter Access Cover

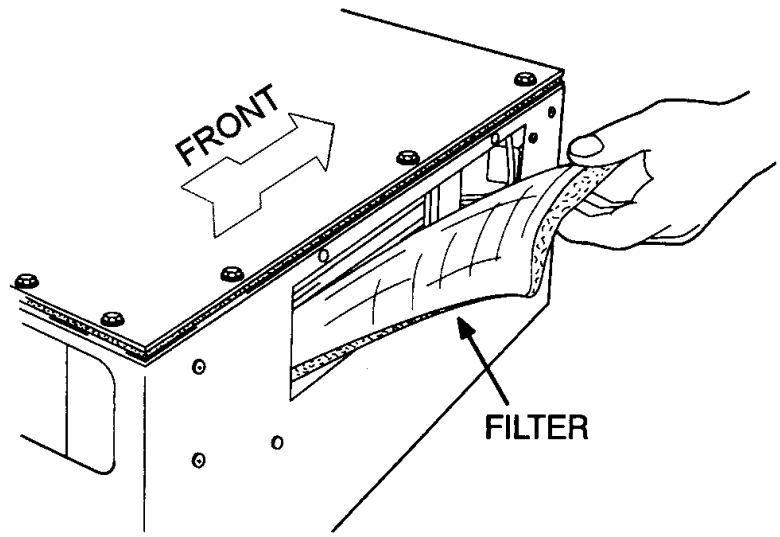

Figure 5 Blend-Air Unit Filter

Install

NOTE – Ensure the filter orientation is the same as noted in Remove, Step 2.

1. Install new filter element in the unit (mesh side toward evaporator). Slide it into the slots next to the evaporator (Figure 5).

2. Install the filter access cover on the outside of the Blend-Air unit. Push in fasteners until they snap into place (Figure 4).

6. SERVICE HINTS

Special attention to the following during component remove and install will aid in avoiding unnecessary and time-consuming problems.

1. Note electrical connections during removal.

2. It is most important that all refrigerant hose, O-rings, and tubing fittings be lubricated with **MINERAL-BASED** refrigerant oil and tightened as specified in the TORQUE CHART. Use only a torque wrench known to be correct.

3. Always use a back-up wrench when loosening or tightening fittings.

4. Replace the receiver-dehydrator unit on any system which is opened for more than a short period (<30 minutes), when the system is flushed, and/or when the compressor is replaced for an internal failure, causing system contamination.

5. All refrigerant hose and tubing support clamps and stay locks must be re-installed in their original position.

6. The air conditioning system must be purged and flushed, as described in s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual, any time the compressor is replaced due to an internal failure, causing system contamination.

7. The compressor oil level must be checked and replaced as specified in s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual.

8. All A/C component and refrigerant line openings should be immediately covered or plugged during removal and remain so until re-installation to prevent the entry of dirt, moisture and other foreign material. Even the slightest particle can cause problems if carried to a vulnerable place within the system.

7. REMOVE AND INSTALL

7.1. EXPANSION VALVE

WARNING – Before performing any of the following procedures, read the SERVICE WARNINGS. Failure to read the service warnings and to be aware of the dangers involved when working with refrigerant could lead to serious personal injury.

Remove

1. Make sure the key switch and the A/C switch are in the OFF position.

2. Recover the refrigerant from the Air Conditioning system. Refer to s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual.

3. Under the cab, remove the three screws that secure the plastic cover over the high and low pressure switches on the expansion valve. Remove the cover.

4. Disconnect the electrical connectors from the low and high pressure switches (Figure 6).

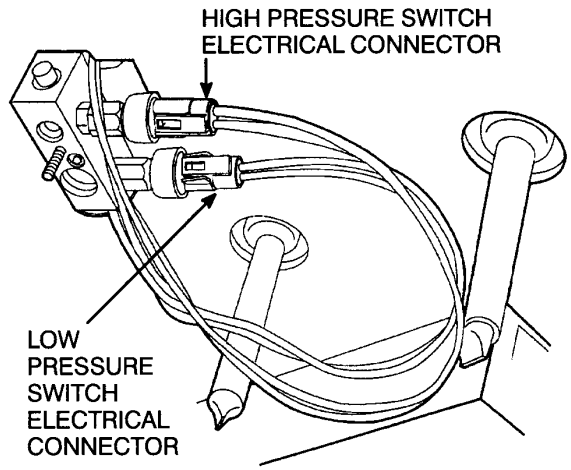

Figure 6 Low and High Pressure Switches (Refrigerant Lines not Shown)

5. Remove the 10 mm hex lock nut that holds the two refrigerant lines in place on the expansion valve. Remove the lines from the expansion valve. Cap or plug the ends of both lines.

6. If the low and high pressure switches are being removed from the expansion valve, use a backup wrench to prevent the Shrader valves from being loosened or removed (Figure 7).

7. Remove two 5/32 inch Allen head capscrews that secure the expansion valve to the evaporator (Figure 8) and remove the expansion valve.

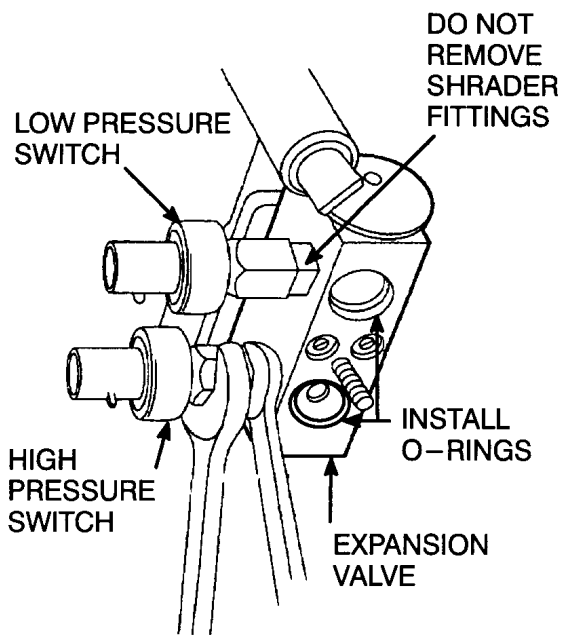

Figure 7 Use Backup Wrench When Removing/Installing Pressure Switches

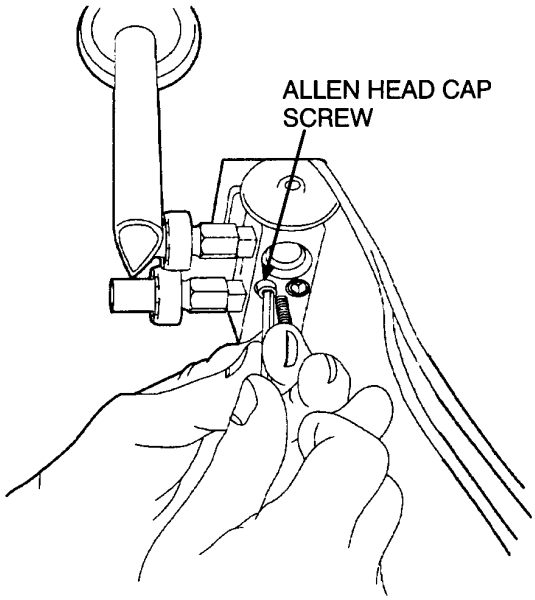

Figure 8 Expansion Valve Mounting

8. Cap or plug the inlet and outlet tubes on the evaporator.

9. Keep the openings on the expansion valve covered to keep them clean if the valve is to be reinstalled.

Install

IMPORTANT – Before installing new O-rings in the following steps, verify that the old O-rings were completely removed.

1. Lubricate new O-rings with MINERAL OIL. Remove caps or plugs, and install new O-rings on the inlet and outlet tubes on the evaporator (Figure 9).

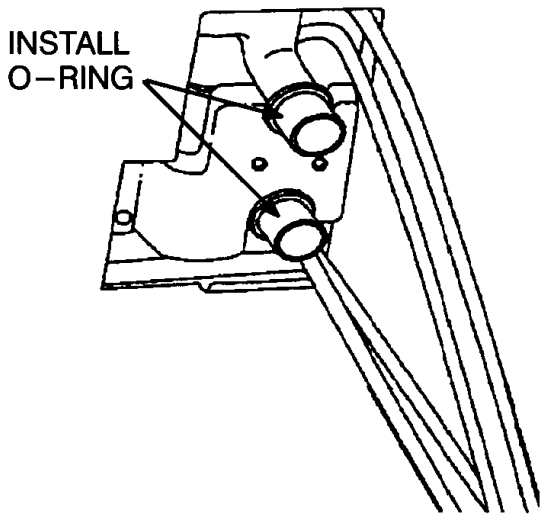

Figure 9 Install O-Rings on Evaporator Tubes

2. Install expansion valve on the evaporator tubes with the stud facing out and secure in place with the two 5/32 inch Allen head capscrews removed previously (Figure 8). Tighten the capscrews to 79 to 89 lbf-in (8.9 to 10 Nm).

> **CAUTION – To prevent damage to the threads in the expansion valve, use two wrenches to tighten both pressure cut-off switches (Figure 7).**

3. Install the high and low pressure cut-off switches (Figure 7) (if removed).

4. Install new O-rings, lubricated with MINERAL OIL, onto the high and low pressure refrigerant line fittings before inserting the fittings into the expansion valve (Figure 7).

> **CAUTION – In the following step, do not over-tighten the 10 mm hex lock nut. Too much torque will strip the threads on the stud, which will require replacing the expansion valve.**

5. Install both refrigerant lines on the expansion valve along with the plate that holds them in place. Secure the plate onto the stud using the 10 mm hex lock nut. Tighten the lock nut to 80 to 90 lbf-in (9 to 10 Nm).

6. Connect electrical connectors to both pressure switches (Figure 6).

7. Install plastic cover over the high and low pressure switches on the expansion valve with the three screws removed in Step 3 of Remove.

8. Evacuate and charge the air conditioning system. Refer to s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual.

9. Test system operation.

7.2. BLEND-AIR UNIT COVER

Some of the service to the heating and air conditioning system is performed inside the Blend-Air unit (Figure 10). Perform the following procedure to remove and install the Blend-Air unit cover:

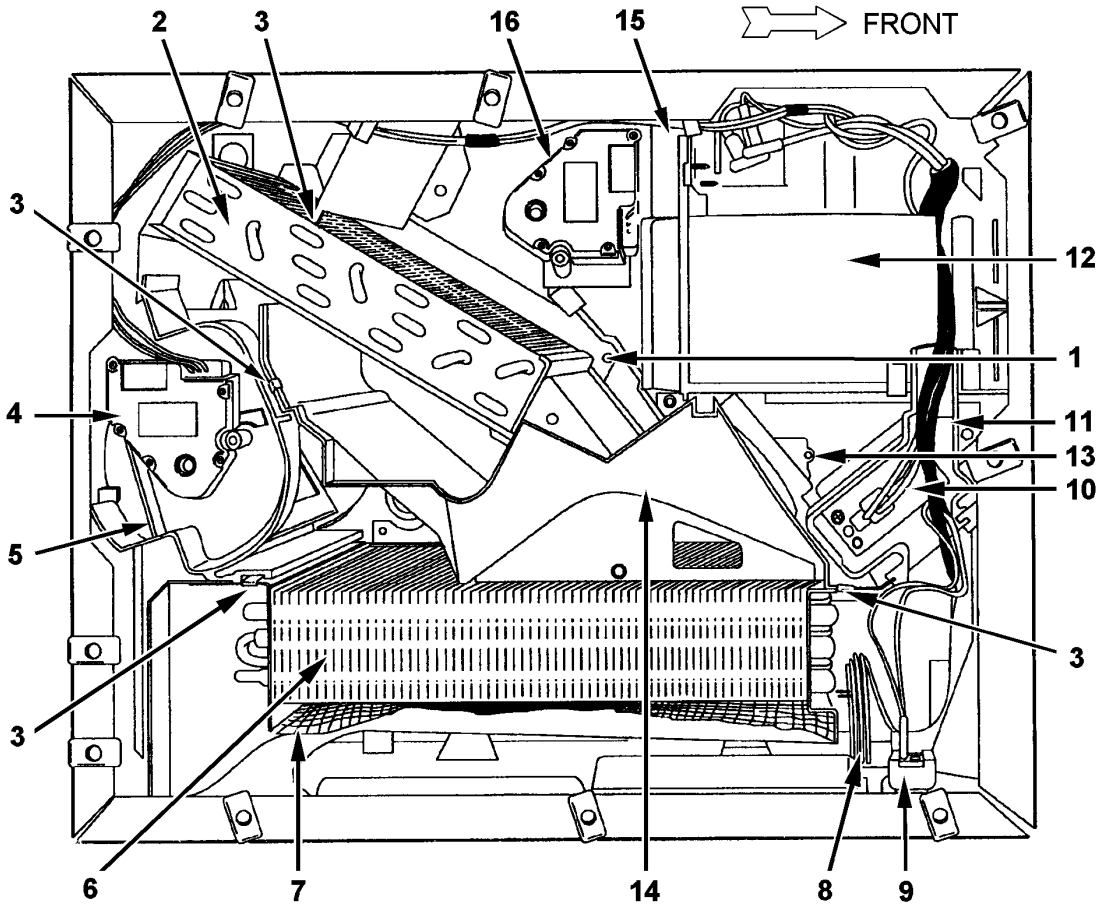

Figure 10 Blend-Air Unit Components (Sleeper Version Shown)

1. HEATER CORE MOUNTING NUT
2. HEATER CORE
3. CLIP
4. BUNK BLEND-DOOR ACTUATOR (Sleepers Only)
5. BUNK BLEND-DOOR ASSEMBLY (Sleepers Only)
6. EVAPORATOR
7. FILTER
8. CAPILLARY TUBE
9. THERMOSTATIC SWITCH
10. BLOWER SPEED RESISTOR
11. BLOWER SPEED RESISTOR HOUSING
12. BLOWER ASSEMBLY
13. CAB BLEND-DOOR ASSEMBLY MOUNTING NUT
14. CAB BLEND-DOOR ASSEMBLY
15. BLOWER ASSEMBLY MOUNTING NUT
16. CAB BLEND-DOOR ACTUATOR

Remove

Refer to Figure 11.

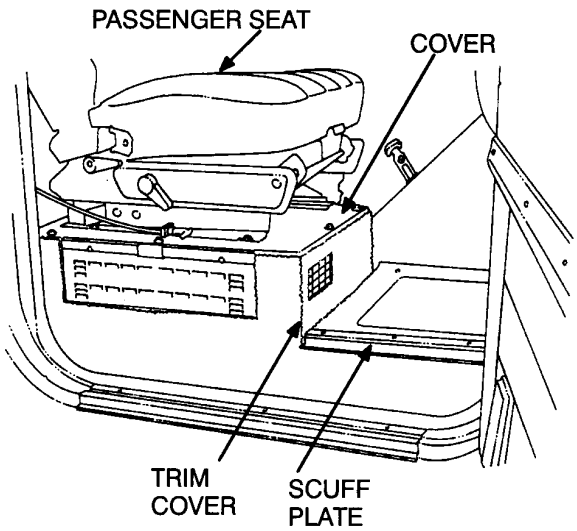

Figure 11 Blend-Air Unit Top Cover

1. Remove the passenger seat.
2. Remove top cover mounting screws.
3. Remove cover from the Blend-Air unit.

Install

Refer to Figure 11.

1. Install top cover on the Blend-Air unit.
2. Install the passenger seat.

7.3. BLEND-AIR UNIT

WARNING – Before performing any of the following procedures, read the SERVICE WARNINGS. Failure to read the service warnings and to be aware of the dangers involved when working with refrigerant could lead to serious personal injury.

Remove

NOTE – Most components can be serviced without removing the Blend-Air unit (see Figure 10). Do not remove the Blend-Air unit unless it is necessary for the service being performed.

1. Make sure the key switch and A/C switch are OFF.

2. Close the heater water valves at the engine.

3. Recover the refrigerant from the Air Conditioning system. Refer to GROUP 16-AIR CONDITIONING THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual.

Remove - Under the Cab

WARNING – To prevent personal injury from hot coolant, do not remove the heater hoses from the heater core inlet and outlet until the cooling system has cooled down.

1. Note how the heater hoses are connected to the heater core, and label the hoses for proper reconnection later. Remove the heater hoses from the heater core inlet and outlet tubes (Figure 12).

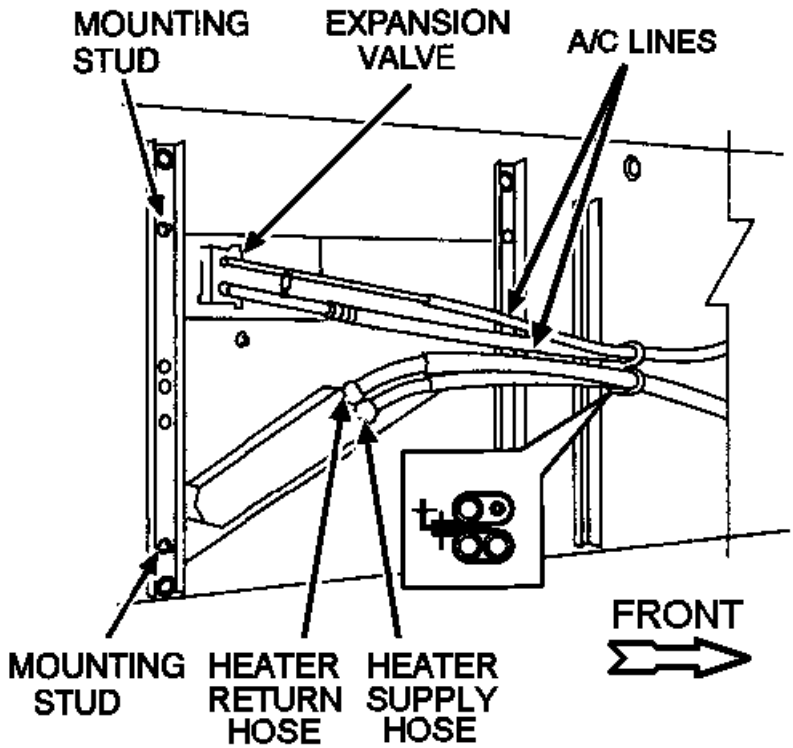

Figure 12 Components Located Under the Cab

NOTE – It is recommended that the heater hose inlet and outlet tubes be plugged or capped to prevent coolant from being released inside the cab during removal of the Blend-Air unit.

2. Remove the plastic cover (three screws) that covers the high and low pressure switches on the expansion valve.

3. Remove the 10 mm nut that secures the refrigerant lines to the expansion valve and remove the refrigerant lines from the expansion valve (Figure 12). Cap or plug all hoses. Place tape over the openings in the expansion valve.

4. If the expansion valve is being removed from the evaporator, refer to EXPANSION VALVE, Remove.

5. Remove the unit mounting stud nuts and washers (Figure 12).

Remove - Inside the Cab

1. Remove the passenger seat.
2. Remove the passenger side floor panel, as follows:
   a. Remove the scuff plate from door sill (Figure 13).

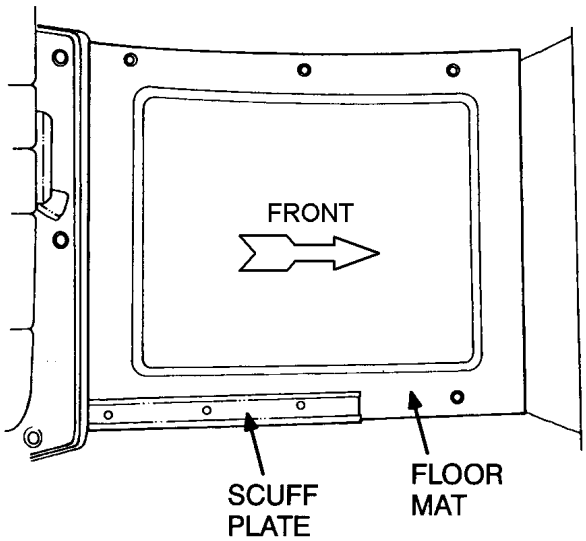

Figure 13 Floor Mat Remove/Install

   b. Remove the floor mat (Figure 13).
   c. Remove the screws securing the floor panel (Figure 14).

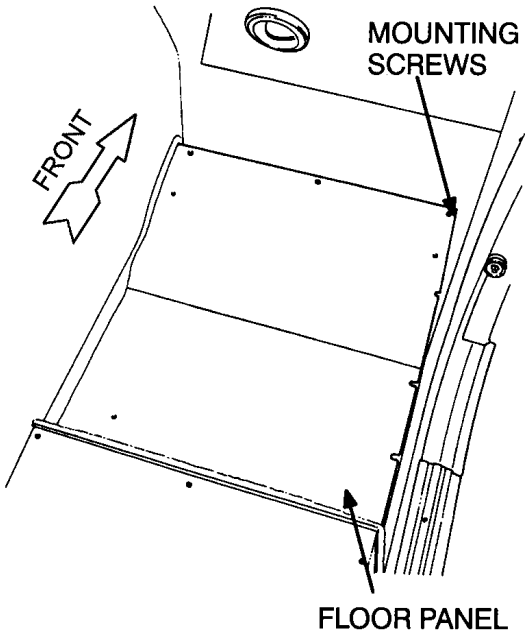

Figure 14 Floor Panel Remove/Install

d. Take out the floor panel, exposing the air ducts (Figure 15).

3. Remove the sheet metal screws securing the air ducts at the Blend-Air unit (Figure 15).

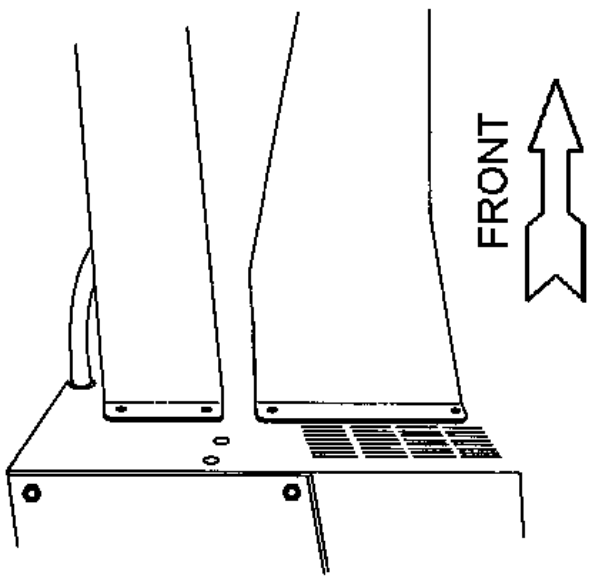

Figure 15 Air Ducts to Blend-Air Unit

4. Remove the passenger side kick panel to gain access to the electrical harness behind it.

5. Disconnect the Blend-Air unit electrical harness from the cab harness located behind the kick panel (Figure 16).

6. Note the placement of the clamps securing the harness between the Blend-Air unit and the electrical connector behind the kick panel; then remove the clamps.

7. Disconnect the Blend-Air unit electrical harness from the rear of the control panel (Figure 17) by removing the control panel. Refer to AIR CONDITIONING AND HEATER CONTROL ASSEMBLY, Remove (See Cab - Remove, page 43).

8. Carefully lift the Blend-Air unit and remove it from the vehicle. The seal between the Blend-Air unit and the cab floor should come up with the Blend-Air unit.

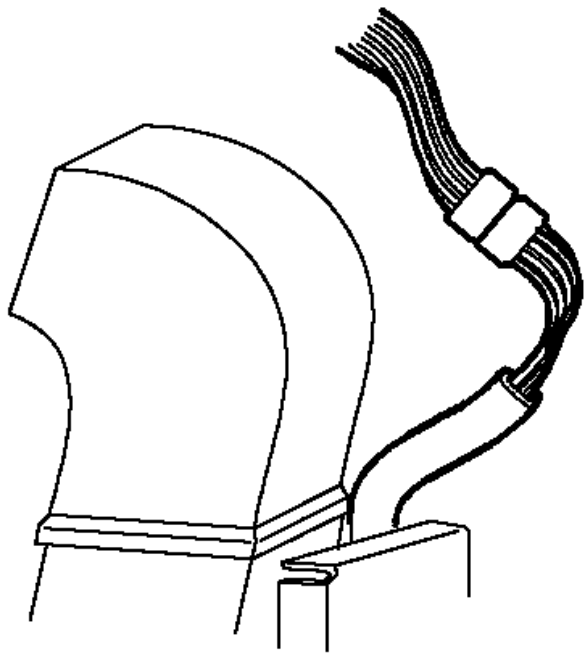

Figure 16 Disconnect Blend-Air Electrical Harness from Cab Harness Behind Kick Panel

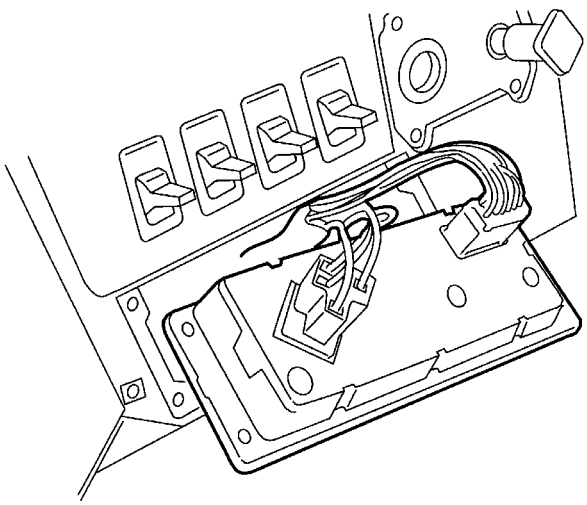

Figure 17 Disconnect Harness Connector from Cab Control Panel

Install

Position the Blend-Air unit housing assembly in the cab with mounting studs, tubes and pipes protruding through the floor.

Install - Under the Cab

1. Install washers and nuts on the mounting studs (Figure 18). Tighten mounting nuts to 22 to 28 lbf-ft (30 to 38 Nm).

2. Install the heater hoses on the heater core tubes making certain that the supply hose is on the inlet tube and the return hose on the outlet tube. The heater core inlet tube is the one nearest the center of the cab. Install the hose clamps (Figure 18).

3. If the expansion valve must be installed, refer to EXPANSION VALVE, Install (See Install, page 12).

> **CAUTION – In the following step, do not over-tighten the 10 mm lock nut. Too much torque will strip the threads on the stud, which will require replacing the expansion valve.**

4. Lubricate new O-rings with **MINERAL-BASED** refrigerant oil and slide them on both refrigerant line fittings that will be installed on the expansion valve. Position both fittings into the expansion valve openings. Slide the plate that holds the fittings in place onto the stud (Figure 18 and Figure 7). Install the 10 mm lock nut and tighten to 80 to 90 lbf-in (9 to 10 Nm).

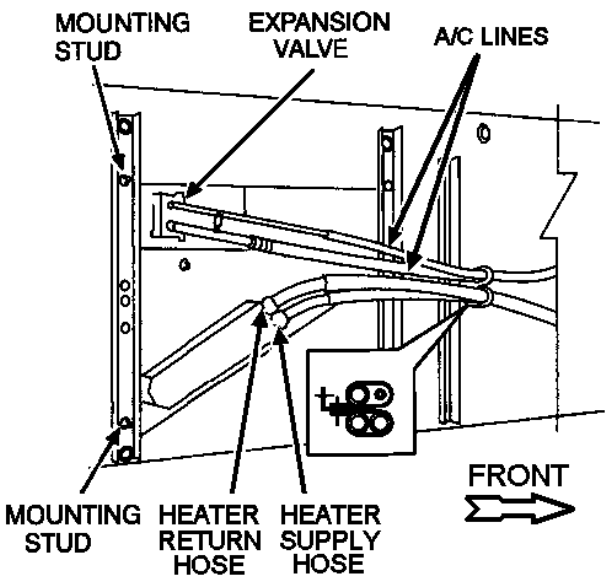

Figure 18 Under Cab Heater-A/C Routing

5. Check to be sure the low and high pressure switch electrical connectors are plugged into each switch.

6. Install the plastic cover (three screws) that covers the high and low pressure switches on the expansion valve.

7. Open the heater water valves at the engine.

Install - Inside the Cab

1. Connect Blend-Air electrical wiring harness to rear of A/C and Heater Control Assembly (Figure 17), and install control assembly. Refer to AIR CONDITIONING AND HEATER CONTROL ASSEMBLY, Install (See Cab - Install, page 45).

2. Connect Blend-Air electrical wiring harness to the cab harness (Figure 16).

3. Install clamps to maintain the original routing of the electrical harness between the kick plate and the Blend-Air unit.

4. Install the kick plate.

5. Secure the air ducts in place with sheet metal screws (Figure 15).

6. Install the floor panel (Figure 14).

7. Install the floor mat (Figure 13).

8. Replace coolant lost during heater hose removal. Refer to the Operator's Manual for the correct type of coolant.

9. Evacuate and charge the air conditioning system as described in s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual.

NOTE – In the following step, to verify correct heater and A/C operation at the air duct outlets, the cover must be in place on the Blend-Air unit.

10. Run the engine and check the system for leaks (coolant and refrigerant) and proper operation.

11. Install Blend-Air unit cover and passenger seat . Refer to BLEND AIR UNIT COVER, Install.

7.4. THERMOSTATIC SWITCH

Remove

1. Make sure the key switch and A/C switch are in the OFF position.

2. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 15).

3. Remove the two electrical connectors from the thermostatic temperature control switch (Figure 19).

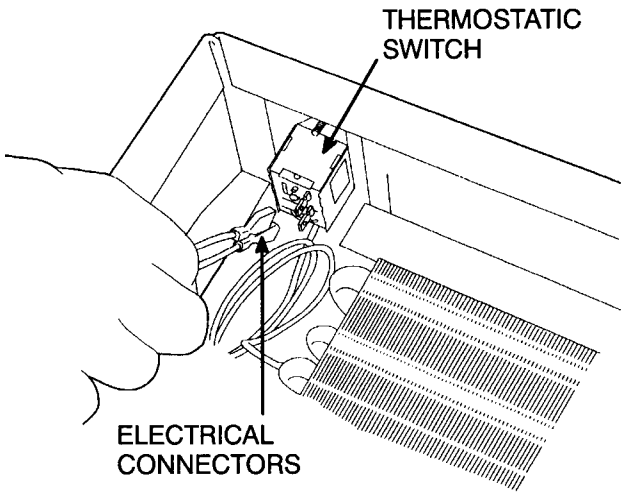

Figure 19 Thermostatic Temperature Control Switch

4. Remove the two screws that secure the switch to the side of the Blend-Air unit (Figure 20).

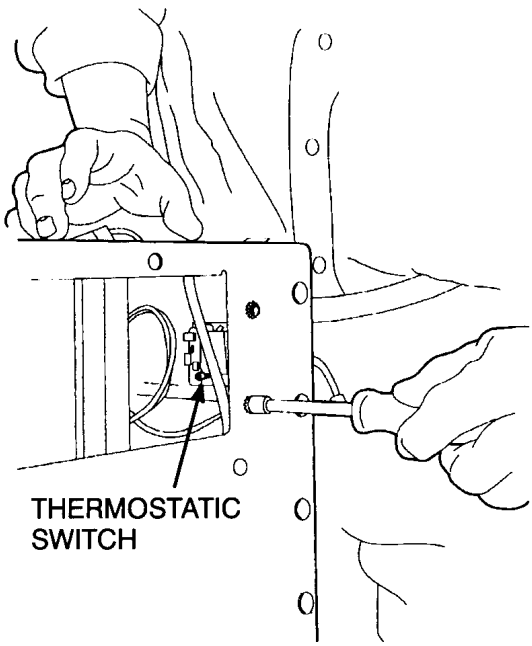

Figure 20 Thermostatic Switch Mounting

CAUTION – Handle the thermostatic switch capillary tube with care while removing it from the end of the evaporator. If the tube is kinked or damaged, the thermostatic switch will require replacing.

NOTE – In the following step, before removing the capillary tube from the evaporator, put a pencil mark on the tube, at the edge of the evaporator. Use this as a gauge to determine how far to insert the tube when installing this or a new switch. If a new switch is to be installed, transfer the mark to the new capillary tube.

5. Carefully remove the switch. As the switch is being removed, slide the capillary tube out of the evaporator (Figure 21).

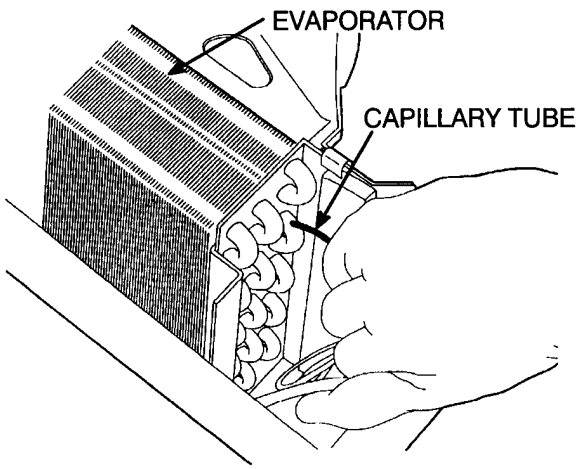

Figure 21 Thermostatic Switch Capillary Tube

Install

CAUTION – Handle the capillary tube with care while installing it into the end of the evaporator. If the tube is kinked or damaged, the thermostatic switch will require replacing.

1. Insert the capillary tube into the same hole in the evaporator that it was removed from (Figure 21), until the pencil mark is at the edge of the evaporator. NOTE: If the capillary tube is being installed into a new evaporator, carefully insert it into the same area that was used on the old evaporator.

2. Position the switch against the side of the Blend-Air unit, and install and tighten the mounting screws (Figure 20).

3. Connect the two electrical connectors to the switch (Figure 19).

NOTE – In the following step, to verify correct A/C operation at the air duct outlets, the cover must be in place on the Blend-Air unit.

4. Test system operation.

5. Install Blend-Air unit cover and passenger seat. Refer to BLEND AIR UNIT COVER, Install (See Install, page 15).

7.5. BUNK BLEND-DOOR ACTUATOR (SLEEPER MODELS)

Remove

1. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 15).

2. Disconnect the electrical connector from the actuator (Figure 22).

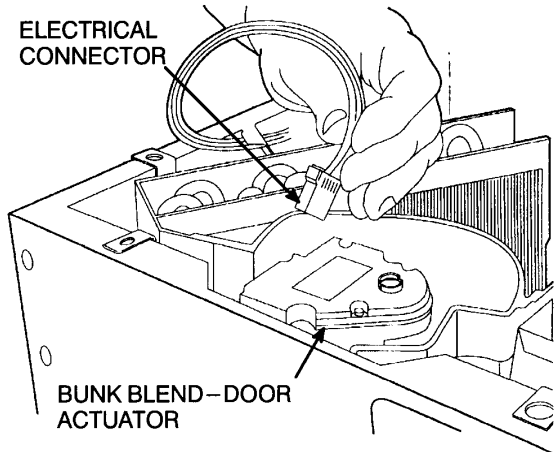

Figure 22 Actuator Connector

3. Remove two screws that secure the actuator to the top of the bunk blend-door assembly (Figure 23) and lift the actuator off the blend-door shaft (Figure 24).

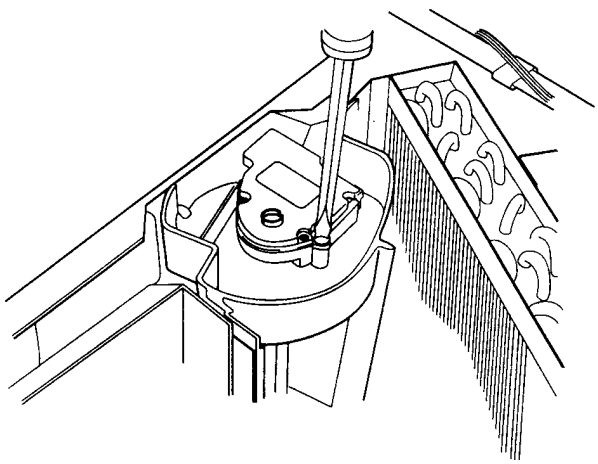

Figure 23 Actuator Mounting Screws

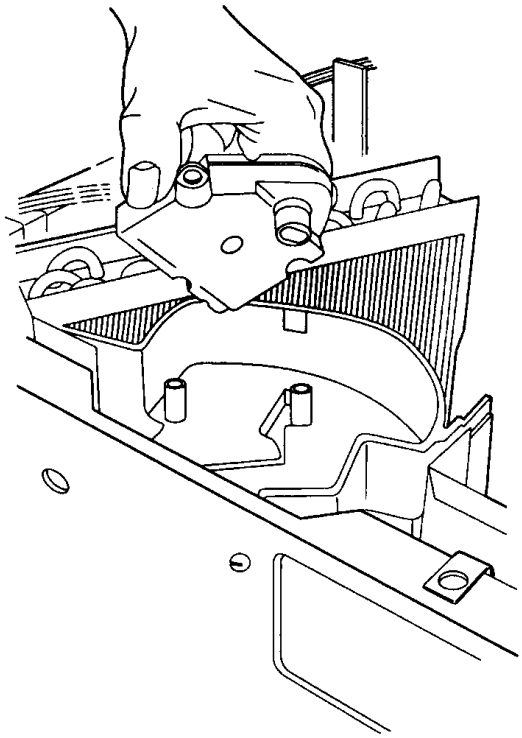

Figure 24 Actuator Remove/Install

Install

1. Install the actuator on the blend-door shaft.
2. Install the two screws that secure the actuator to the top of the bunk blend-door assembly (Figure 23).
3. Connect the electrical connector to the actuator (Figure 22).
4. Install Blend-Air unit cover and passenger seat. Refer to BLEND AIR UNIT COVER, Install (See Install, page 15).

7.6. BUNK BLEND-DOOR ASSEMBLY (SLEEPER MODELS)

NOTE – Daycab models use a dummy housing in place of the Bunk Blend-Door Assembly. The following procedures can be used for removal and installation of the dummy housing.

Remove

1. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 15).
2. Disconnect the electrical connector from the actuator (Figure 22).
3. Remove the clip that secures the bunk blend-door assembly to the cab blend-door assembly (Figure 25).

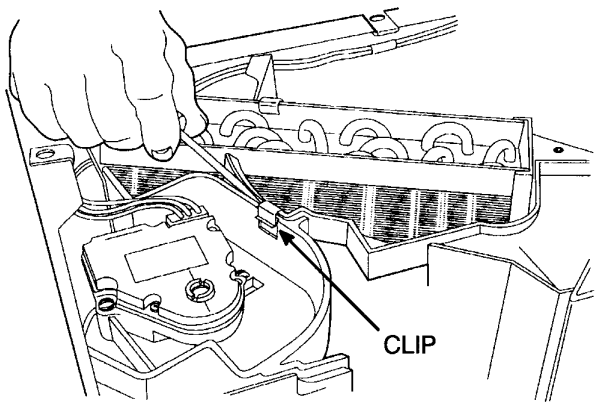

Figure 25 Clip Securing Bunk Blend-Door Assembly to Cab Blend-Door Assembly

4. Remove the two nuts that secure the assembly to the bottom of the Blend-Air unit.
5. Remove one screw that secures the bunk blend-air assembly to the back side of Blend-Air unit (Figure 26).
6. Lift the bunk blend-door assembly straight up and out of the Blend-Air unit (Figure 27).

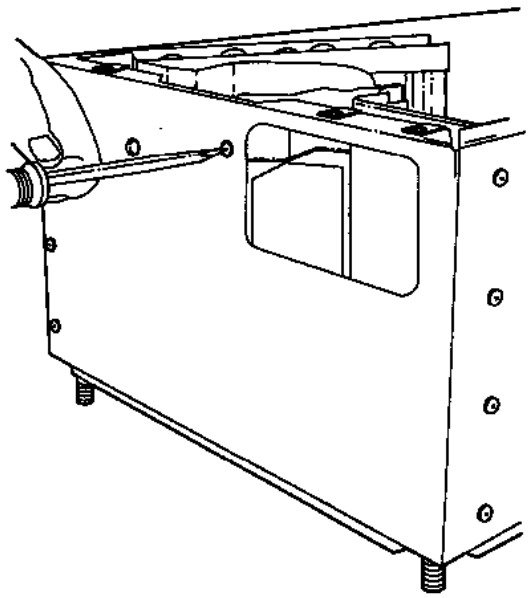

Figure 26 Screw on Back Side of Blend-Air Unit

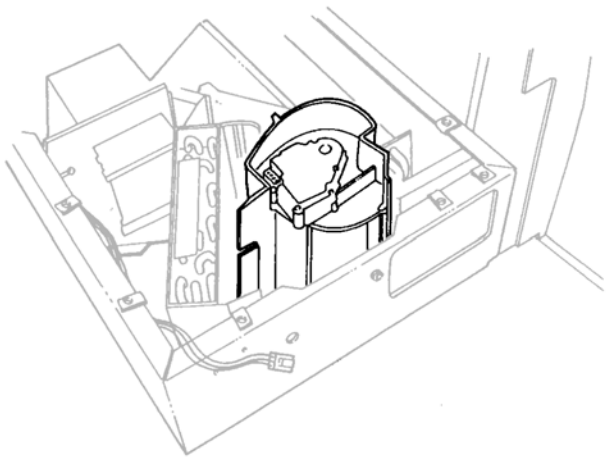

Figure 27 Bunk Blend-Door Assembly

Install

1. Slide bunk blend-door assembly into Blend-Air unit (Figure 27).
2. Secure bunk blend-door assembly to back side of unit with screw removed previously (Figure 26).
3. Install the two nuts that secure the assembly to the bottom of the Blend-Air unit. Tighten to 13 lbf-in (1.46 Nm).
4. Install the clip between the bunk blend-door assembly and the cab blend-door unit (Figure 25).
5. Plug the electrical connector into the actuator (Figure 22).

NOTE – In the following step, to verify correct operation at the air duct outlets, the cover must be in place on the Blend-Air unit.

6. Test operation.
7. Install Blend-Air unit cover and passenger seat. Refer to BLEND AIR UNIT COVER, Install (See Install, page 15).

7.7. CAB BLEND-DOOR ACTUATOR

Remove

1. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 15).
2. Disconnect the electrical connector from the cab blend-door actuator (Figure 10).
3. Remove the screws that secure the cab blend-door actuator to the blend-air unit.

NOTE – While removing the cab blend-door actuator in the following step, the linkage to the cab blend-door assembly must be disconnected.

4. Remove the actuator from the blend-air unit.

Install

NOTE – While installing the cab blend-door actuator in the following step, the linkage to the cab blend-door assembly must be reconnected.

1. Install the actuator into the blend-air unit (Figure 10).
2. Install the screws that secure the actuator.
3. Connect the electrical connector to the actuator.
4. Install Blend-Air unit cover and passenger seat. Refer to BLEND AIR UNIT COVER, Install (See Install, page 15).

7.8. CAB BLEND-DOOR ASSEMBLY

Remove

1. Make sure the key switch and A/C switch are in the OFF position.
2. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 15).
3. Remove two clips: one securing the cab blend-door assembly to the evaporator (Figure 28), and one securing the cab blend-door assembly to the bunk blend-door assembly (Figure 29).

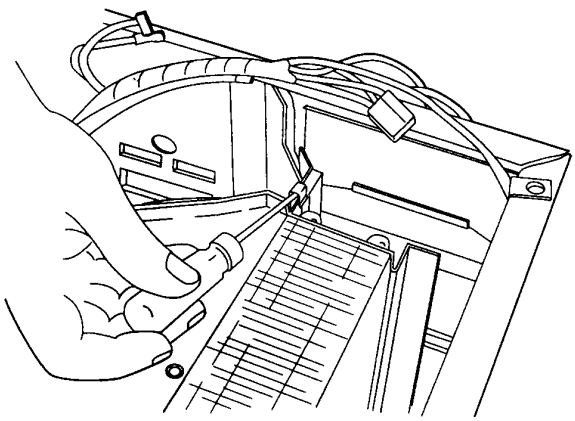

Figure 28 Clip Securing Cab Blend-Door Assembly to Evaporator

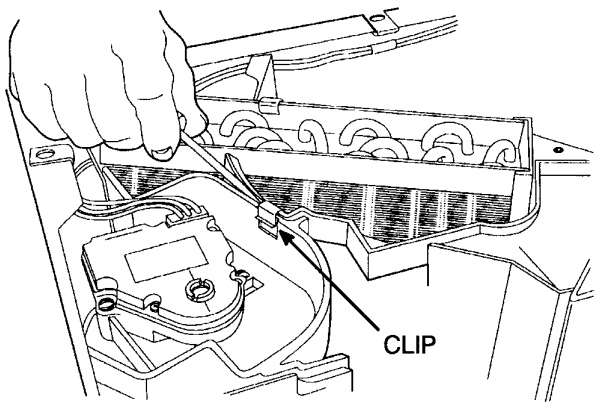

Figure 29 Clip Securing Cab Blend-Door Assembly to Bunk Blend-Door Assembly (Sleepers) or Dummy Housing (Daycabs)

4. Remove the five nuts that secure the cab blend-door assembly to the bottom of the Blend-Air unit.

NOTE – While removing the cab blend-door assembly, in the following step, the linkage to the actuator must be disconnected.

5. Lift the cab blend-door assembly straight up and out of the Blend-Air unit (Figure 30)

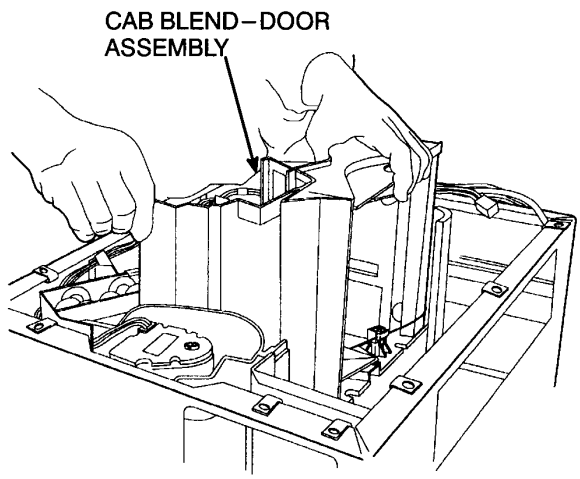

Figure 30 Cab Blend-Door Assembly

Install

NOTE – While installing the cab blend-door assembly, in the following step, the linkage to the actuator must be reconnected.

1. Install the cab blend-door assembly into the Blend-Air unit (Figure 30).

2. Install the five nuts that secure the cab blend-door assembly to the bottom of the case (Figure 10). Tighten to 13 lbf-in (1.46 Nm).

3. Install the two clips securing the cab blend-door assembly to the evaporator (Figure 28) and the bunk blend-door assembly (Figure 29).

NOTE – In the following step, to verify correct operation at the air duct outlets, the cover must be in place on the Blend-Air unit.

4. Test operation.

5. Install Blend-Air unit cover and passenger seat. Refer to BLEND AIR UNIT COVER, Install (See Install, page 15).

7.9. HEATER CORE

WARNING – To prevent personal injury from hot coolant, do not remove the heater hoses from the heater core inlet and outlet fittings until the cooling system has cooled down.

Remove

1. Make sure the key switch and A/C switch are in the OFF position.

2. Close the heater water valves on the engine.

3. Under the cab, note how the heater hoses are connected to the heater core, and label the hoses for proper reconnection later. Remove the heater hoses from the heater core inlet and outlet tubes (Figure 31).

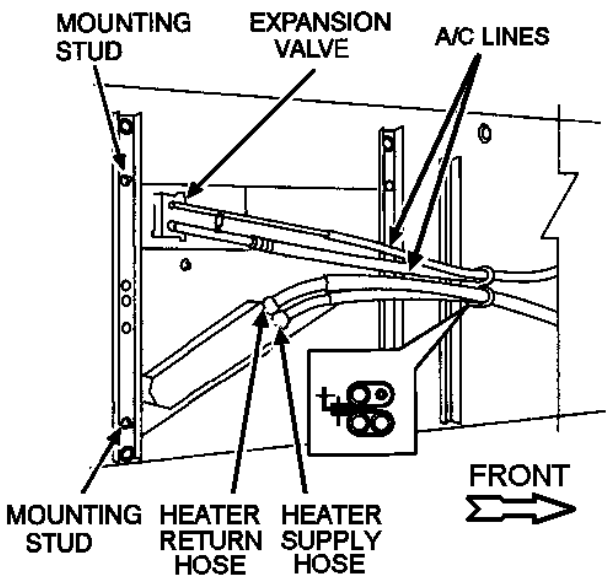

Figure 31 Under Cab Heater Hose Routing

4. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 15).

5. Remove the cab blend-door assembly. Refer to CAB BLEND-DOOR ASSEMBLY, Remove (See Remove, page 28).

6. Remove the bunk blend-door assembly (sleepers) or dummy housing (daycabs). Refer to BUNK BLEND-DOOR ASSEMBLY, Remove (See Remove, page 25).

7. Remove the two nuts that secure the heater core to the bottom of the Blend-Air unit (Figure 10).

8. Remove the clip that secures the heater core to the inside of the Blend-Air unit (Figure 32).

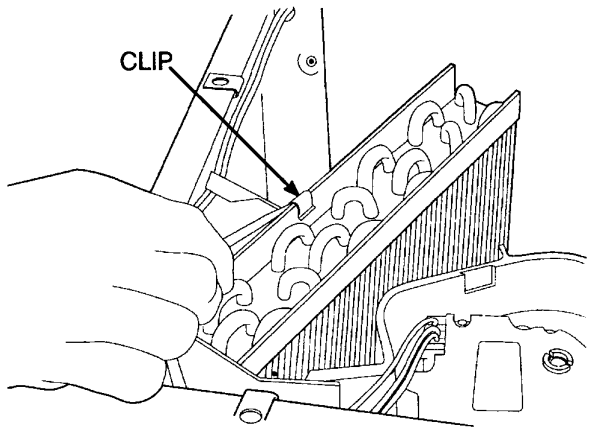

Figure 32 Heater Core Clip

NOTE – In the following step, it will be necessary to cock the heater core to get the inlet and outlet tubes out of the pan that protrudes through the cab floor. The pan should stay in the Blend-Air unit.

9. Lift the heater core out of the Blend-Air unit (Figure 33).

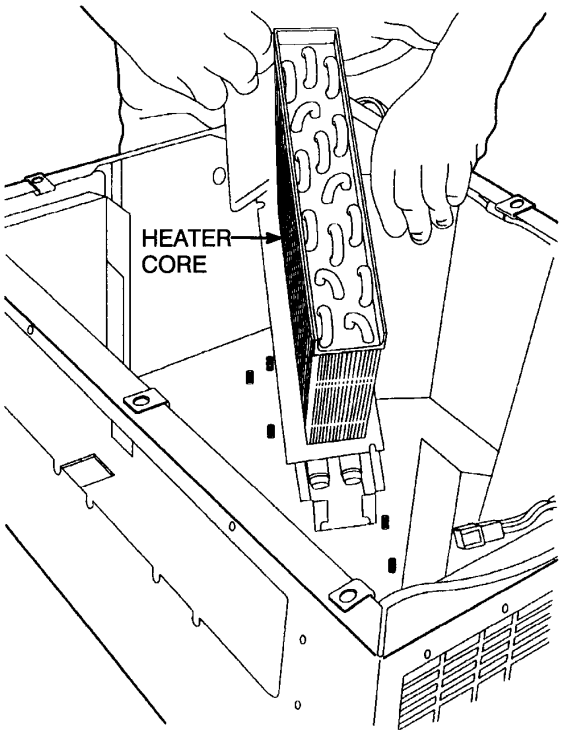

Figure 33 Heater Core Remove/Install

Install

NOTE – In the following step, it will be necessary to cock the heater core to get the inlet and outlet tubes into the pan that protrudes through the cab floor.

1. Install the heater core in the Blend-Air unit (Figure 33).
2. Install the clip that secures the heater core inside the Blend-Air unit (Figure 32).
3. Install the two nuts that secure the heater core to the bottom of the Blend-Air unit (Figure 10). Tighten to 13 lbf-in (1.46 Nm).
4. Install the bunk blend-door assembly (sleepers) or dummy housing (daycabs). Refer to BUNK BLEND-DOOR ASSEMBLY, Install (See Install, page 27).
5. Install the cab blend-door assembly. Refer to CAB BLEND-DOOR ASSEMBLY, Install (See Install, page 29).
6. Under the cab, connect the heater hoses to the inlet and outlet tubes on the heater core (Figure 31). The inlet hose (smaller hose) should be on the tube closest to the center of the vehicle. Install hose clamps.
7. Open the heater water valves on the engine.
8. Check coolant level. If coolant needs to be added, refer to the Operator's Manual for the correct type of coolant to add.

NOTE – In the following step, to verify correct heater and A/C operation at the air duct outlets, the cover must be in place on the Blend-Air unit.

9. Run engine and check operation of heater and A/C. Check for leaks at the heater hose connections.

10. Install Blend-Air unit cover and passenger seat. Refer to BLEND AIR UNIT COVER, Install (See Install, page 15).

7.10. EVAPORATOR

WARNING – Before performing any of the following procedures, read the SERVICE WARNINGS. Failure to read the service warnings and to be aware of the dangers involved when working with refrigerant could lead to serious personal injury.

Remove

1. Make sure the key switch and the A/C switch are in the OFF position.

2. Recover the refrigerant from the Air Conditioning system. Refer to s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual.

3. Under the cab, remove the expansion valve. Refer to EXPANSION VALVE, Remove (See Remove, page 10).

4. From inside the cab, remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 15).

5. Remove Blend-Air unit filter.

CAUTION – In the following step, handle the capillary tube with care while removing it from the end of the evaporator. If the tube is kinked or damaged, the thermostatic switch will require replacing.

6. Remove the thermostatic switch capillary tube from the end of the evaporator. Refer to THERMOSTATIC SWITCH, Remove (See Remove, page 21). NOTE: It is not necessary to remove the switch from the Blend-Air unit during this procedure.

7. Remove the two clips that secure the evaporator to the cab blend-door assembly and the Blend-Air unit frame (Figure 34).

8. Pull the evaporator up and out of the unit (Figure 35).

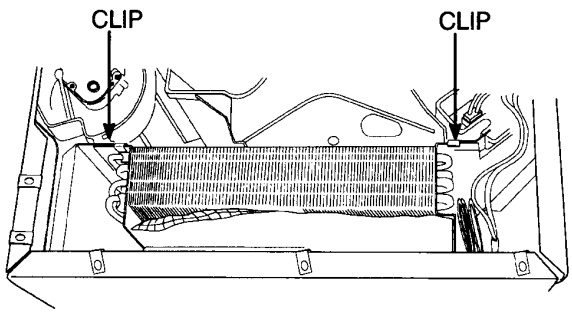

Figure 34 Evaporator Clips

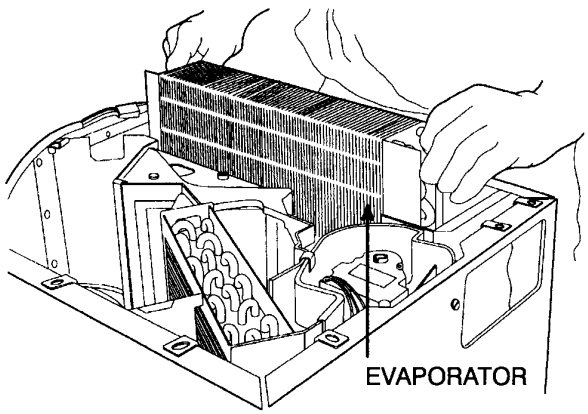

Figure 35 Evaporator Remove/Install

Install

1. Install the evaporator in the Blend-Air unit (Figure 35).

2. Install the two clips that secure the evaporator to the cab blend-door assembly and the Blend-Air unit frame (Figure 34).

> **CAUTION – In the following step, handle the capillary tube with care while installing it into the end of the evaporator. If the tube is kinked or damaged, the thermostatic switch will require replacing.**

3. Install the thermostatic switch capillary tube in the end of the evaporator. Refer to THERMOSTATIC SWITCH, Install (See Install, page 23).

4. Install the Blend-Air unit filter.

5. Under the cab, install the expansion valve. Refer to EXPANSION VALVE, Install.

6. Evacuate and charge the air conditioning system. Refer to s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual.

NOTE – In the following step, to verify correct A/C operation at the air duct outlets, the cover must be in place on the Blend-Air unit.

7. Start the engine and check the air conditioning system for leaks and proper operation.

8. Install Blend-Air unit cover and passenger seat. Refer to BLEND AIR UNIT COVER, Install (See Install, page 15).

7.11. BLOWER RESISTORS – CAB (MOUNTED IN BLEND-AIR UNIT)

Remove

1. Make sure the key switch and blower motor switch are in the OFF position.

2. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 15).

3. Slide the blower speed resistor housing up and out of the Blend-Air unit (Figure 36).

4. Disconnect the electrical connector from the resistor pack (Figure 37).

5. Remove the two screws that secure the resistor pack to the resistor housing.

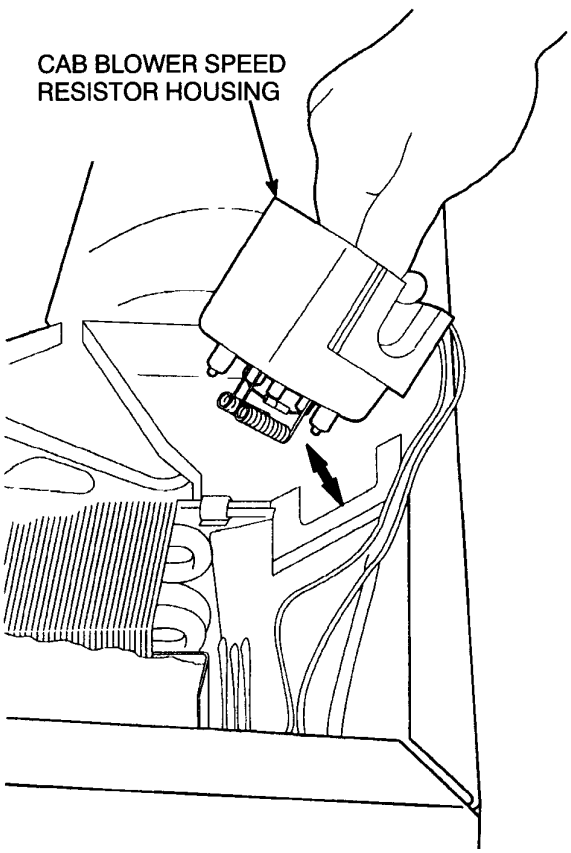

Figure 36 Cab Blower Speed Resistor Housing

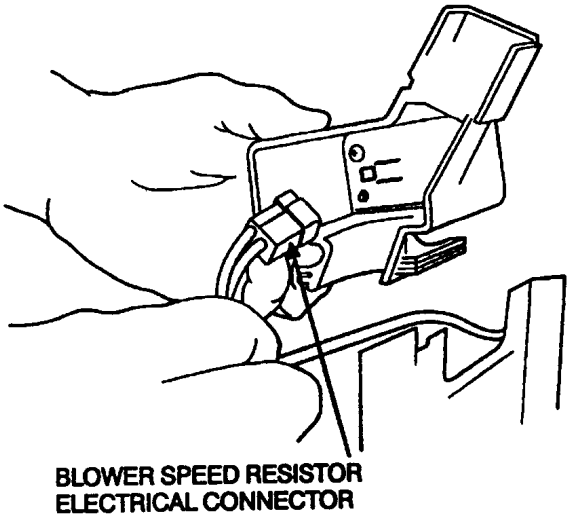

Figure 37 Electrical Connector in Resistor Pack

Install

1. Secure a new resistor pack to the resistor housing with the screws removed previously.
2. Connect the electrical connector to the resistor pack (Figure 37).
3. Slide the resistor housing into its opening in the Blend-Air unit (Figure 36).

NOTE – In the following step, to verify correct blower operation at the air duct outlets, the cover must be in place on the Blend-Air unit.

4. Test for correct blower operation.
5. Install Blend-Air unit cover and passenger seat. Refer to BLEND AIR UNIT COVER, Install (See Install, page 15).

7.12. BLOWER MOTOR ASSEMBLY – CAB (LOCATED IN BLEND-AIR UNIT)

Remove

1. Make sure the key switch and blower motor switch are in the OFF position.
2. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 15).
3. Remove two screws from the front side of the Blend-Air unit (Figure 38).

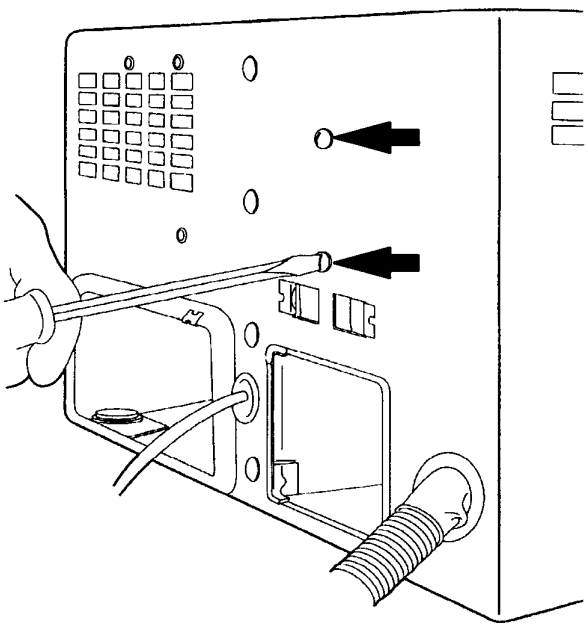

Figure 38 Cab Blower Mounting Screws

4. Remove the cab blend-door actuator. Refer to CAB BLEND-DOOR ACTUATOR, Remove (See Remove, page 27).

5. Remove two screws from the blower motor housing where it is fastened to the inside of the Blend-Air unit (Figure 39).

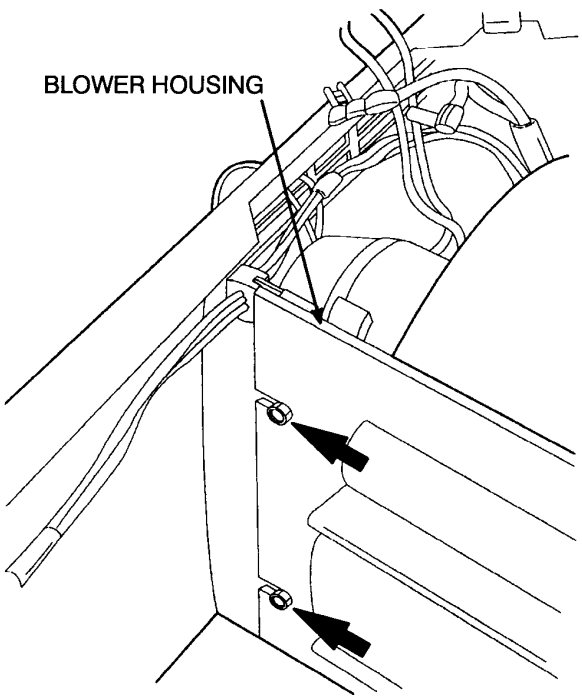

Figure 39 Blower Motor Housing Screws

6. Disconnect the electrical connector from the motor.

> **CAUTION – In the following step, take care not to damage the resistors while handling the blower speed resistor housing.**

7. Slide the blower speed resistor housing up and out of the Blend-Air unit and carefully lay it out of the way (Figure 36).

8. Slide the blower housing back and up to remove (Figure 40).

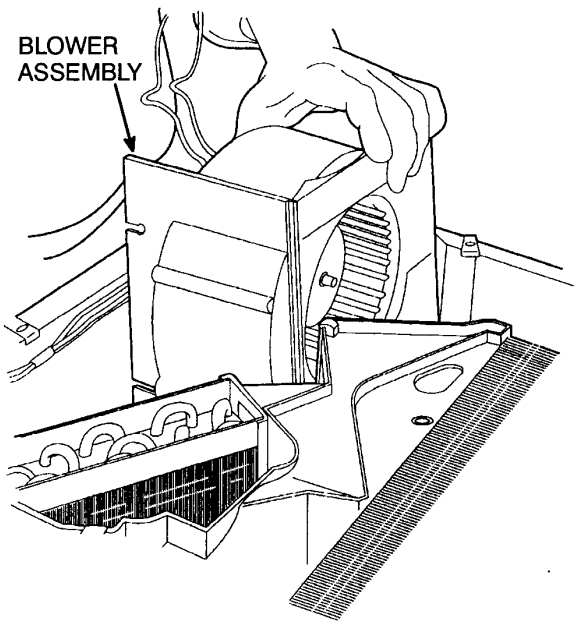

Figure 40 Blower Housing Assembly

9. If the motor is to be replaced, remove the five screws that secure the blower motor assembly to the blower housing and remove the blower motor assembly (Figure 41).

10. If the blower wheel must be separated from motor, to allow replacement of individual parts, remove the clip from the end of the motor shaft and slide the wheel off of the motor shaft.

11. Inspect the blower wheel for damage. Replace if damaged.

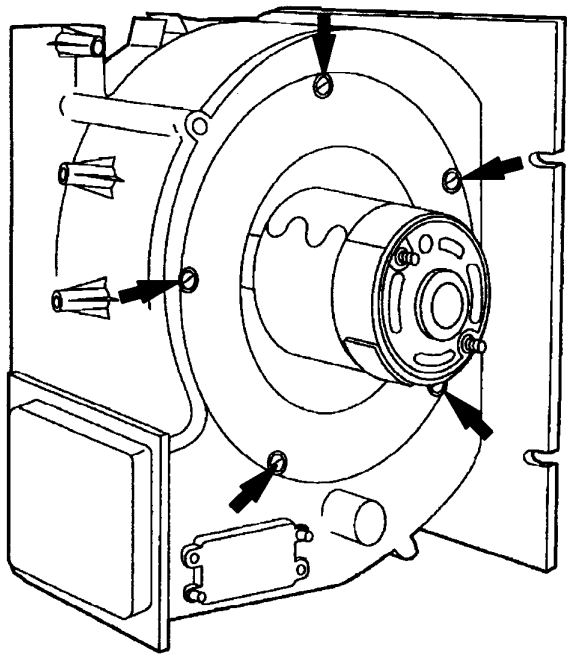

Figure 41 Screws Securing Blower Motor Assembly

Install

1. If the blower wheel was removed, install the wheel onto the motor shaft until it bottoms out; then, install the clip onto the motor shaft to hold the wheel in position.

2. Install the blower motor assembly into the blower housing using the five screws removed previously (Figure 41).

3. Position blower motor housing in Blend-Air unit (Figure 40), and reconnect the electrical connector to the motor.

4. While holding the blower motor housing in place, install and tighten two screws through the front side of the Blend-Air unit into the blower motor housing (Figure 38).

5. Install and tighten the two screws that secure the blower motor housing to the inside of the Blend-Air unit (Figure 39).

6. Slide the blower speed resistor housing back into the Blend-Air unit (Figure 36).

7. Install the cab blend-door actuator into the Blend-Air unit. Refer to CAB BLEND-DOOR ACTUATOR, Install (See Install, page 28).

NOTE – In the following step, to verify correct blower operation at the air duct outlets, the cover must be in place on the Blend-Air unit.

8. Test operation of blower unit.

9. Install Blend-Air unit cover and passenger seat. Refer to BLEND AIR UNIT COVER, Install (See Install, page 15).

7.13. BLOWER MOTOR ASSEMBLY – SLEEPER COMPARTMENT

Remove

Refer to Figure 42.

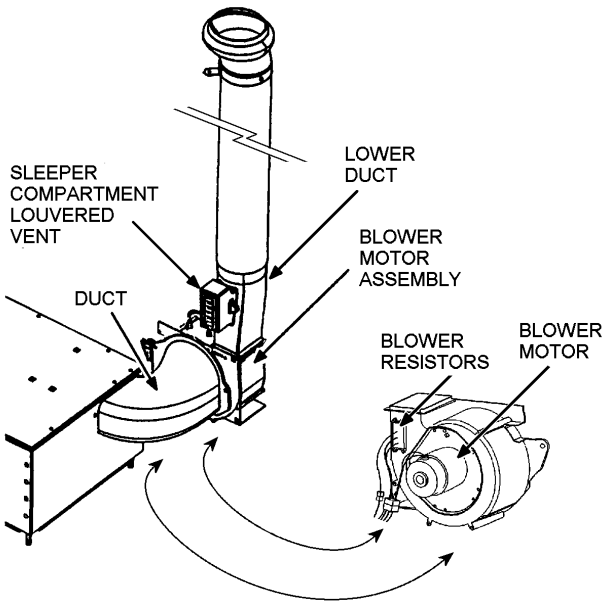

Figure 42 Blower Motor Assembly (Sleeper Compartment)

1. Make sure the key switch and blower motor switches are in the OFF position.
2. Remove seat belt restraining bracket from passenger side trim panel.
3. Remove screws from lower passenger side trim panel to gain access to the sleeper compartment blower.
4. Remove the section of air duct that connects the blend-air unit to the blower motor assembly.
5. Disconnect the electrical connectors from the blower motor assembly.
6. Remove the three bolts from the blower motor assembly mounting flange.
7. Raise the blower motor assembly and tilt it outward to remove.

Install

Refer to Figure 42.

1. If removed, install the duct onto the blower motor assembly.
2. Tilt the blower motor and duct assembly toward the duct enclosure and slide the assembly into position. Make sure the blower motor duct engages the duct in the enclosure.
3. Install and tighten the bolts in the blower motor assembly mounting flange.
4. Connect the electrical connectors to the blower motor assembly.

5. Install and tighten the mounting screws for the duct section between the blower motor assembly and the blend air unit.

6. Carefully position the trim panel around the duct and install the mounting screws.

7. Install the seat belt restraining bracket.

7.14. BLOWER RESISTORS – SLEEPER COMPARTMENT

Remove

1. Make sure the key switch and A/C switch are OFF.

2. Refer to BLOWER MOTOR ASSEMBLY - SLEEPER COMPARTMENT, Remove, to gain access to the bunk blower motor assembly.

3. Disconnect the electrical connectors for the resistor assembly.

4. Remove the two screws that hold the resistor assembly in place and remove the resistor assembly.

Install

1. Install the resistor assembly with two screws.

2. Connect the electrical connectors to the resistor assembly.

3. Check blower motor operation.

4. Install remaining trim panels. Refer to BLOWER MOTOR ASSEMBLY - SLEEPER COMPARTMENT, Install, to complete installation.

7.15. DASH FAN MODE ACTUATORS

Dash Fan Mode Actuator (Driver Side) — Remove

1. Make sure the key switch is OFF.

2. Remove four screws and gauge cluster panel (Figure 43).

3. Remove flexible duct (Figure 44). Note correct orientation.

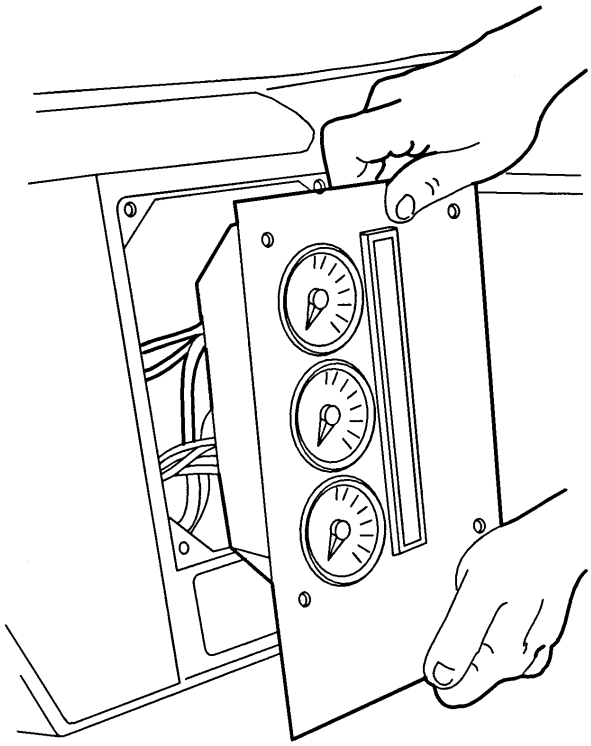

Figure 43 Gauge Cluster Panel Remove/Install

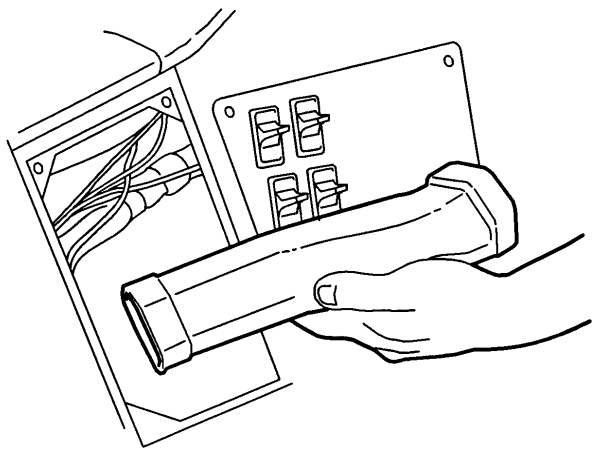

Figure 44 Flexible Duct Remove/Install

4. Actuator will now be visible. Disconnect electrical connector from the actuator.
5. Remove three mounting screws from the actuator.
6. Remove actuator.

Dash Fan Mode Actuator (Driver Side) — Install

1. Install the actuator with three screws. NOTE: A magnetic socket bit is helpful.

2. Connect the electrical connector to the actuator.
3. Install the flexible duct. Make sure both ends of the duct are seated (Figure 44).
4. Install the gauge cluster and screws (Figure 43).

Dash Fan Mode Actuator (Passenger Side) — Remove

1. Remove the passenger side kick panel.
2. Remove the electrical connector and actuator mounting screws (Figure 45).
3. Remove the actuator.

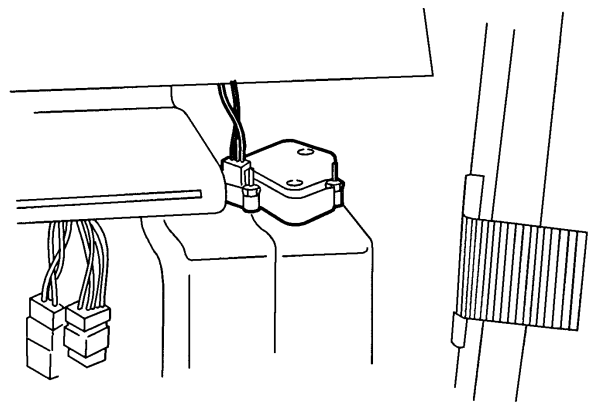

Figure 45 Passenger Side Mode Actuator

Dash Fan Mode Actuator (Passenger Side) — Install

1. Install actuator and mounting screws.
2. Connect the actuator electrical connector (Figure 45).
3. Install kick panel.

7.16. AIR CONDITIONING AND HEATER CONTROL ASSEMBLY

NOTE – Light bulb service procedures can be found in the operators manual.

Cab - Remove

1. Remove screws from dash cover panel surrounding the air conditioning and heater control assembly (Figure 46); then remove the panel.
2. Remove four screws from cab control assembly (Figure 47).

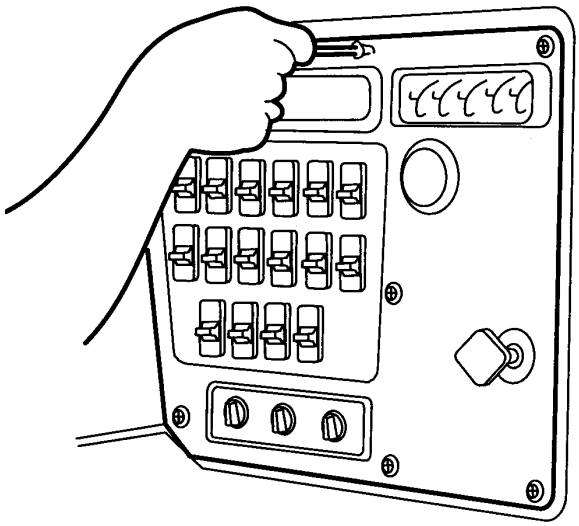

Figure 46 Dash Cover Panel Remove/Install

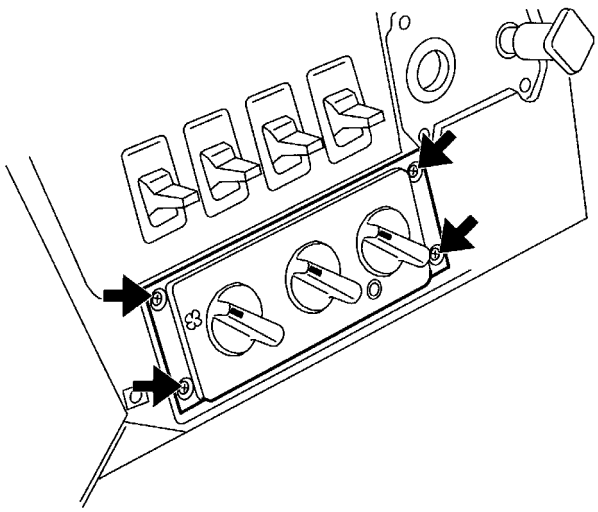

Figure 47 Cab Control Assembly Remove/Install

3. Carefully lift the cab control assembly out of dash, and disconnect electrical connectors from rear of control assembly (Figure 48).

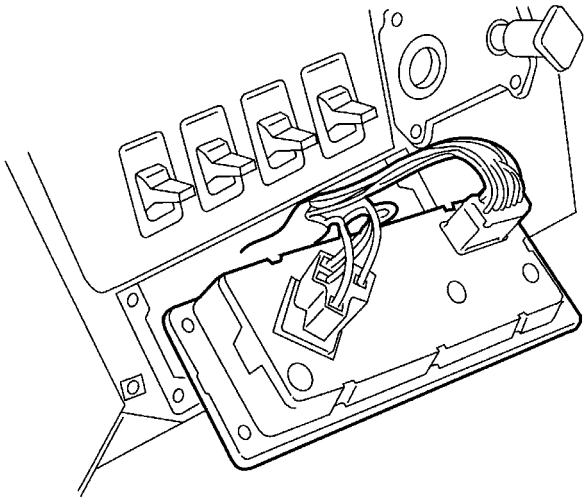

Figure 48 Cab Control Assembly Electrical Connections

Cab - Install

1. Connect electrical connectors to rear of cab control assembly (Figure 48).
2. Place cab control assembly into position in dash and secure with four mounting screws (Figure 47).
3. Install dash cover panel surrounding the air conditioning and heater control assembly (Figure 46).

7.17. SLEEPER COMPARTMENT CONTROL UNIT

Remove

1. Remove four screws from sleeper control panel (Figure 49).
2. Carefully slide sleeper control panel out (Figure 50).
3. Remove and replace individual components as necessary.

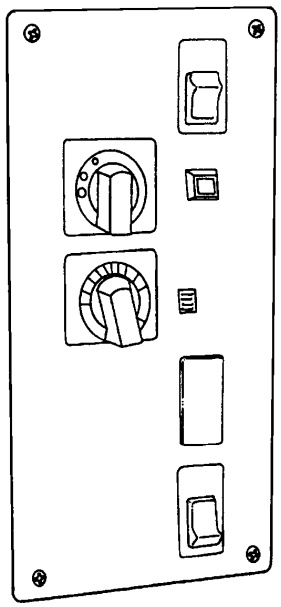

Figure 49 Sleeper Control Panel Screws

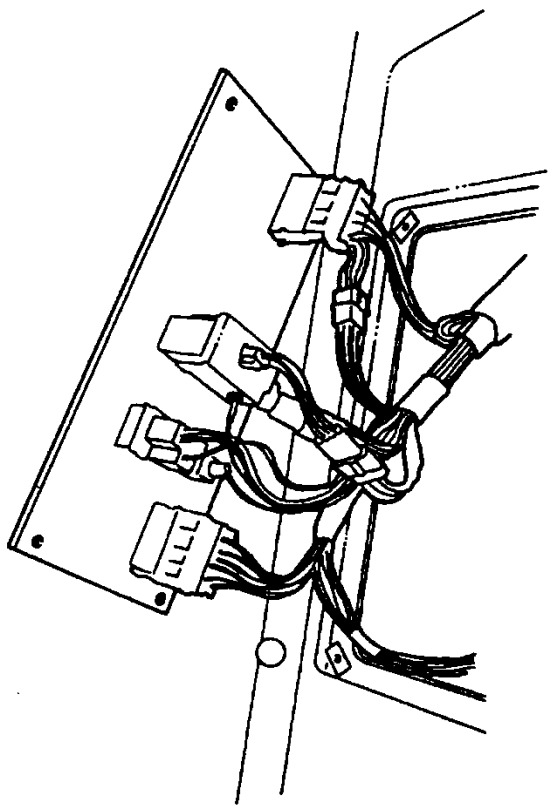

Figure 50 Sleeper Control Panel

Install

1. Install replacement components onto sleeper control panel.
2. Connect all sleeper control panel electrical connectors (Figure 50).
3. Place sleeper control panel into position.
4. Secure sleeper control panel with four mounting screws (Figure 49).

8. SYSTEM OPERATING TEST

This test is used to determine if the air conditioning system is properly charged with refrigerant and the refrigerant cycle is functioning correctly. The test is performed using a recovery/recycling/charging station (recovery station), or a manifold gauge set, and two thermometers.

WARNING – During system pressure tests the recovery station, or manifold gauge set, is only being used to read high and low pressures. DO NOT open either hand valve on the equipment for any reason. Equipment can be damaged, and personal injury can result.

CAUTION – To prevent damage to the test equipment, make sure test equipment and all connections are clear of all moving parts in the engine compartment.

Run this test under the following conditions:

- Park the vehicle so there is no solar loading and no wind.
- Position a thermometer approximately 12 to 24 inches in front of the vehicle grille to measure ambient temperature of air entering the condenser.
- Connect the recovery station, or manifold gauge set, to the air conditioning system.
- If the vehicle is equipped with a solenoid-controlled fan drive, engage it. The fan can be operated with a jumper wire or by disconnecting the solenoid valve, depending on the system.
- Slowly close the hood, being careful not to damage test equipment connections.
- Insert a thermometer into the center air conditioning duct. Do not allow the thermometer to touch the sides of the duct.
- Run the engine at 1800 RPM.
- Open both cab doors.
- Set the A/C control for maximum cooling, blower switch on HIGH and heater OFF.
- Operate the system for at least five minutes, or until the gauge readings settle. Check the gauge readings on the recovery station, or manifold gauge set. If the system is operating properly, the high and low pressure readings will be within the listed pressure range in the SYSTEM PRESSURE TEST CHART that follows. If the gauge readings are not within SYSTEM PRESSURE TEST CHART ranges, refer to s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE Manual in the Master Service Manual under DIAGNOSIS AND TESTING.

8.1. SYSTEM PRESSURE TEST CHART

Table 1 System Pressure Test Chart

Relative Humidity	Ambient Temperature		Refrigerant Pressure (PSI)		Center Air Duct Temperature	
(Percent)	(°F)	(°C)	High	Low	(°F)	(°C)
Below 30%	70	21.1	125 - 155	6 - 12	46 - 50	7.8 - 10.0
	80	26.7	150 - 180	10 - 14	52 - 56	11.1 - 13.3
	90	32.2	165 - 200	12 - 18	56 - 61	13.3 - 16.1
	100	37.8	190 - 230	16 - 20	60 - 64	15.6 - 17.8
	110	43.3	230 - 275	20 - 28	68 - 73	20.0 - 22.8
Above 30%	70	21.1	135 - 175	10 - 15	51 - 56	10.6 - 13.3
	80	26.7	155 - 185	12 - 18	53 - 57	11.7 - 13.9
	90	32.2	170 - 205	14 - 20	60 - 64	15.6 - 17.8
	100	37.8	215 - 255	20 - 25	68 - 73	20.0 - 22.8
	110	43.3	250 - 295	25 - 35	77 - 81	25.0 - 27.2

9. SPECIFICATIONS

Table 2 Specifications

Specification	CCI Compressor System	Sanden Compressor System
Refrigerant Type	R134a	R134a
Refrigerant Quantity (Full Charge)	4 lbs. (1.8 kg.)	3 lbs. (1.4 kg.)
Compressor Oil Type	Synthetic Ester Oil - P/N ZGGR725007 Non-Synthetic Ester Oil - P/N ZGG19356	Polyalkylene Glycol (PAG) Oil International P/N: ZGGR6822
System Oil Capacity	16.0 fl.oz. (473 cc) NOTE: This is a reference value only. Refer to s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE Manual in the Master Service Manual, to determine oil quantities during service.	10.1 fl.oz. (300 cc) NOTE: This is a reference value only. Refer to s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE Manual in the Master Service Manual, to determine oil quantities during service.
Compressor Oil Level* (Vertical Mounting)	1.0 to 1-3/8 inch** (25.4 to 34.9 mm)	Compressor must be removed and drained to measure oil level.

Table 2 Specifications (cont.)

Specification	CCI Compressor System	Sanden Compressor System
Compressor Oil Level* (Horizontal Mounting)	1.0 to 1-7/16 inch** (25.4 to 36.5 mm)	Compressor must be removed and drained to measure oil level.
Compressor Oil Level* (45 Degree Mounting)	1-13/16 to 2-7/32 inch** (46.0 to 56.3 mm)	Compressor must be removed and drained to measure oil level.
Lubricating Oil Type (for O-rings, threads, etc.) **CAUTION – Do not use this oil as refrigerant oil.**	Mineral Oil International P/N: ZGGR6912	
Compressor Belt Drive Tension (Except Vehicles Equipped with Auto-Tensioner) – Initial Tension (New Belt)	130 lbs. (578 N)	
Compressor Belt Drive Tension (Except Vehicles Equipped with Auto-Tensioner) – Normal Tension (Used Belt)	100 lbs. (449 N)	
Low Pressure Switch (Normally Closed)*** - Opens At	Max. 15 to 25 psi (103 to 172 kPa)	
Low Pressure Switch (Normally Closed)*** - Closes At	<5 psi (35 kPa)	
High Pressure Safety Switch (Normally Open)*** - Closes At	355 to 395 psi (2448 to 2723 kPa)	
High Pressure Safety Switch (Normally Open)*** - Opens At	Min. 150 psi (1034 kPa)	
Shutter Switch (Normally Closed)*** - Opens at	240 to 260 psi (1655 to 1793 kPa)	
Shutter Switch (Normally Closed)*** - Closes at	90 to 110 psi (621 to 758 kPa)	
Fan Drive Switch (Normally Closed)*** - Opens at	265 to 285 psi (1827 to 1965 kPa)	
Fan Drive Switch (Normally Closed)*** - Closes at	225 to 245 psi (1551 to 1689 kPa)	
Thermostatic Switch (Normally Closed)*** - Opens at	28 to 32°F (-2.2 to 0°C)	
Thermostatic Switch (Normally Closed)*** - Closes at	34 to 38°F (1.1 to 3.3°C)	
Capillary Tube Insertion Depth	11.0 Inches (27.9 cm)	

Table 2 Specifications (cont.)

Specification	CCI Compressor System	Sanden Compressor System
* Measuring the compressor oil level with a dipstick, provides a rough measure of the quantity of oil in the compressor only. NOTE: Compressor oil level is a reference value only, used to determine the total system oil level. Refer to OIL FILL GUIDELINES to determine the correct oil quantities required when servicing the system. NOTE: Compressor oil level is a reference value only, used to determine the total system oil level. Refer to s16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE Manual in the Master Service Manual to determine the correct oil quantities required when servicing the system.		
** This level equals approximately 12 oz. (355 cc) of oil: the amount present in the compressor during normal operation. Another 4 oz. (118 cc) of additional oil is distributed throughout the system when the system is operating with the full 16 oz. (473 cc) system capacity.		
*** Normally open or closed means the state of the device not being installed. The operating condition may or may not be the same. Normally open in a switch is opposite that in a valve. In a switch, the contacts are open and no current is conducted. In a valve, the poppet is open and air flows from the inlet port to the outlet port.		

10. COMPONENT LOCATIONS

Table 3 Component Locations

Component	Location
Cab Control Panel	Dash Panel
A/C Switch	Cab Control Panel
A/C and Heater Relays	Behind Center Console
Filter	Blend-Air Unit (Accessible through Filter Access Cover)
Cab Blower Motor Assembly	Blend-Air Unit
Cab Blower Motor Speed Control Resistor	Blend-Air Unit
Cab Blend-Door Assembly	Blend-Air Unit
Cab Blend-Door Actuator	Blend-Air Unit
Evaporator	Blend-Air Unit
Heater Core	Blend-Air Unit
Thermostatic Switch	Blend-Air Unit
Expansion Valve	Under Cab Floor
High Pressure Switch	Under Cab Floor/On Expansion Valve
Low Pressure Switch	Under Cab Floor/On Expansion Valve
Heater Hose Connections	Under Cab Floor

Table 3 Component Locations (cont.)

Component	Location
Bunk Blower Motor Assembly Housing	Behind Blend-Air Unit
Bunk Blower Motor Speed Control Resistor	Bunk Blower Motor Assembly Housing
Bunk Blend-Door	Blend-Air Unit
Bunk Blend-Door Actuator	Blend-Air Unit

11. TORQUE CHART

Table 4 Torque Chart

Joint No. - Refer to Figure 51 and Figure 52	Thread Size	Torque		
		Lbf-ft	Lbf-in	Nm
1	1-14	40 to 44		54 to 60
2	3/4-16	22 to 26		30 to 35
3	5/8-18	15 to 19		20 to 26
4	11/16-16	15 to 19		20 to 26
5	3/8-24	4 to 11		5 to 15
6	7/16-20	7 to 11		9 to 15
7	Oil Fill Plug	11 to 15		15 to 20
8	7/8-14	22 to 26		30 to 35
9	6 mm		80 to 90	9 to 10
10	8 mm		170 to 190	19 to 21

Lubricate all O-rings and fitting threads with MINERAL-BASED oil.

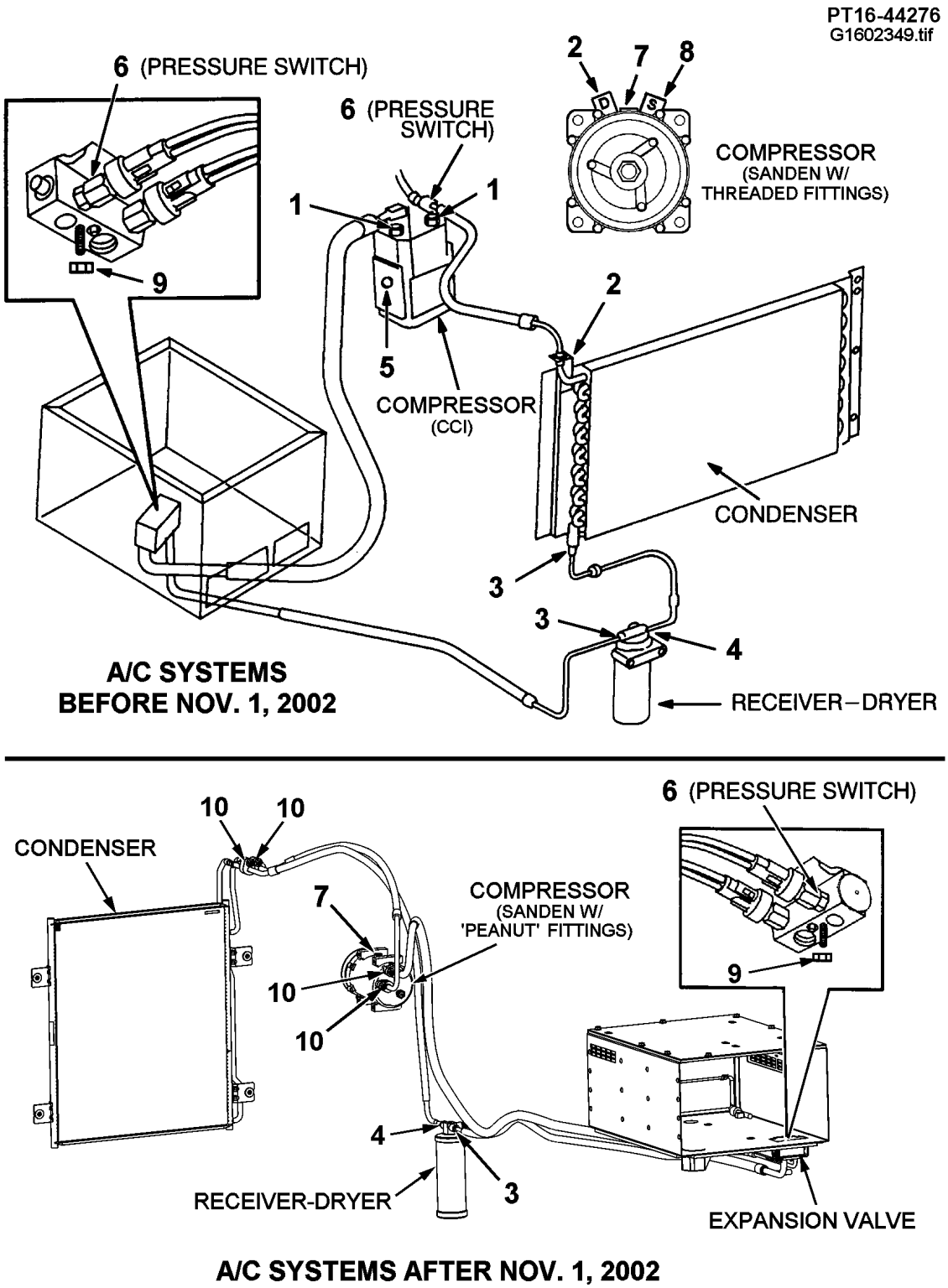

Figure 51 Torque Location Diagram

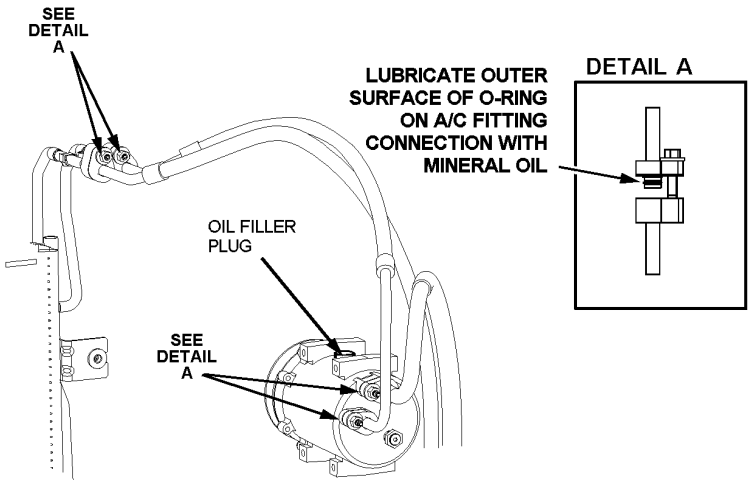

Figure 52 A/C 'Peanut' Joint Assembly – Sanden Compressor Systems After November 1, 2002