## SERVICE MANUAL SECTION

# AIR CONDITIONING - HEATER SYSTEM: 9200, 9300, 9400, 9900 Pro Sleeper, and 9800 Models

**Model: 9200**
**Start Date: 05/01/1997**

**Model: 9300**
**Start Date: 05/01/1997**

**Model: 9400**
**Start Date: 05/01/1997**

**Model: 9800**
**Start Date: 07/01/1997**

**Model: 9900**
**Start Date: 10/01/1998**

**S16020**

**03/17/2006**

# Table of Contents

# 1. AIR CONDITIONING SYSTEM SERVICE

Use S16015 (CTS-5070J), 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 S16023, AIR CONDITIONING - HEATER SYSTEM: for all 9100i, 9200i, 9400i, 9900i and 9900ix Models.

## 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 Blend-Air heating and air conditioning system is a combination unit (Figure 1). Both the heater and air conditioner are housed in one unit and use common air ducts and blowers. The term "Blend-Air" refers to 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.

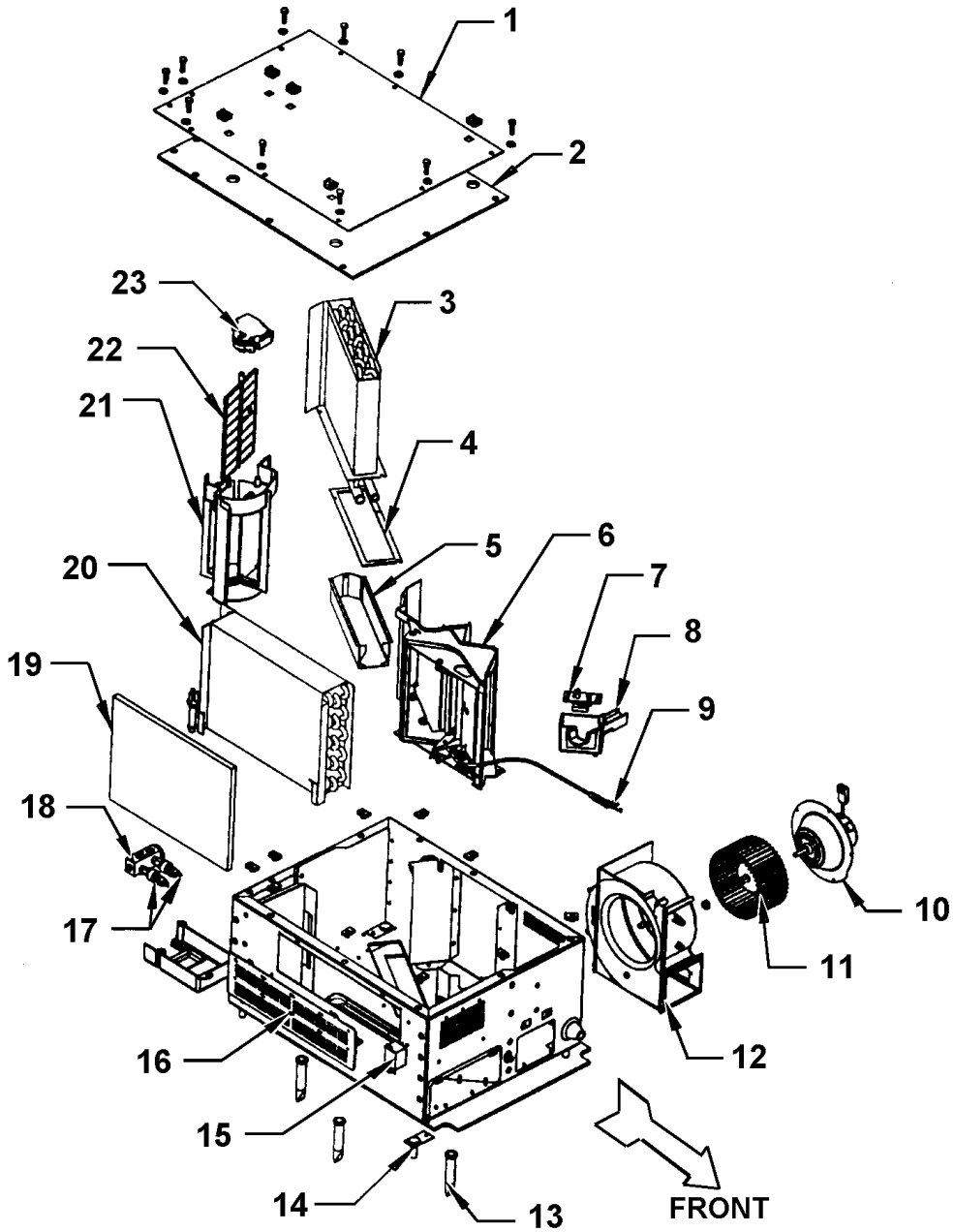


**Figure 1 Blend-Air Heating and A/C Unit**

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

The system is integrated into the cab to provide a built-in appearance. The heater, evaporator core, 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 motor 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)
- s16022y, AIR CONDITIONING PROTECTION AND DIAGNOSTICS SYSTEM (APAds™)
- s16017x, AIR CONDITIONING COMPRESSOR AND CLUTCH (CCI Type)
- GROUP 8 ELECTRICAL CIRCUIT DIAGRAMS
- GROUP 8 ELECTRICAL SYSTEM TROUBLESHOOTING GUIDE
- GROUP 8 HEATING, VENTILATION AND AIR CONDITIONING (HVAC) TROUBLESHOOTING GUIDE

## 3. OPERATION

The control assembly mounted to the instrument panel provides the means of operating the system (Figure 2). The levers operate push-pull cables that are connected between the control assembly and the Blend-Air door and the defrost door that control heating, cooling and defrosting.

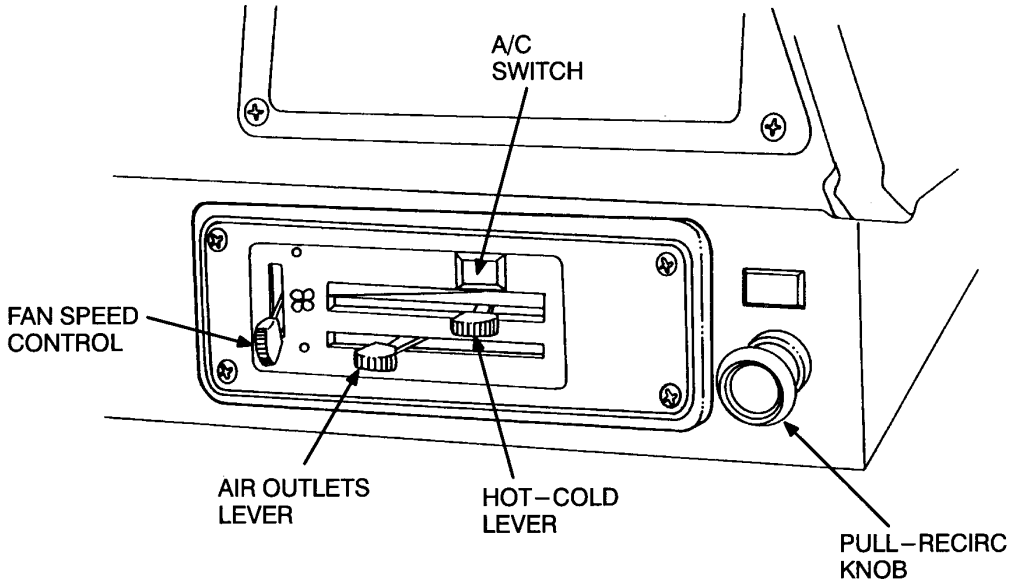


**Figure 2 Blend-Air System Control Assembly**

A push-pull knob on the dash controls fresh air ventilation.

A toggle type A/C switch and a lever type three-speed fan control are also included with the control assembly.

## 3.1. FRESH AIR VENTILATION

Fresh air is controlled by pushing the PULL-RECIRC knob on the instrument panel (Figure 2). With the HOT-COLD lever in the cold position and the A/C switch off, fresh air flows through the outlet selected by the AIR OUTLET lever. To increase the amount of fresh air entering the cab in the ventilation mode, the blower can be used. The fan speed and the air outlets can be adjusted to obtain the desired air flow.

## 3.2. HEATING

### Cab

Heating is controlled with the HOT-COLD lever (Figure 2). The full right position provides the maximum heat. Move the AIR OUTLETS control lever to the cab position or to either of the other two detent positions in order to obtain the desired air flow distribution between cab heat and defrost requirements. Floor heat outlets can also be opened to direct more heat to the floor area for the driver and or passenger. For the maximum air flow, set the fan control to the HI position. The heater will also operate with the fan motor in the OFF position. Air flow is provided by ram air when the vehicle is moving and the PULL-RECIRC knob is pushed in. The RECIRC knob should always be pushed in during heater operation during the winter.

### Sleeper Compartment

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

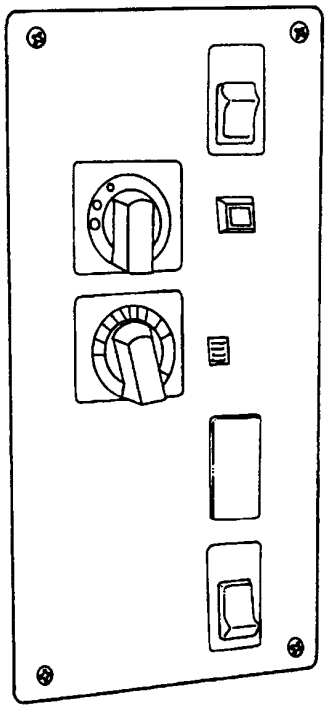

**Figure 3 Sleeper Compartment Control Unit**

## 3.3. COOLING

### Cab

To properly cool the cab in warm weather, close both the driver and passenger floor heat outlets and open the instrument panel outlets. Close all windows. Push the A/C switch to start the air conditioning system. Set the AIR OUTLET lever to CAB position and the HOT-COLD lever to COLD. For maximum cooling, set the fan control on the HI position. (The fan must be ON for A/C operation.) Adjust the instrument panel outlets to evenly distribute the air around the occupant's head, chest and belt areas.

### 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 maximum cold position (Figure 3).

## 3.4. DEFROSTING

To obtain maximum defrosting, move the HOT-COLD lever to the HOT position and place the AIR OUTLET lever on 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 at HI speed before moving the AIR OUTLETS lever to the DEF position. This will decrease 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. The push-pull RECIRC knob should always be pushed in during heater operation during the winter.

## 3.5. DEHUMIDIFYING

Dehumidifying can be accomplished by operating the air conditioner and heater simultaneously. To obtain maximum dehumidification, push in the PULL-RECIRC knob, push the A/C switch ON, place the FAN control to HI, and adjust temperature. The air conditioner will remove the humidity while the heater keeps the cab comfortable.

# 4. SYSTEM DIAGNOSIS

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)
- s16022y, AIR CONDITIONING PROTECTION AND DIAGNOSTICS SYSTEM (APAds™)
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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 fasteners that hold filter-access cover to side of Blend-Air unit (Figure 4).
2. Reach inside Blend-Air unit and pull old filter from unit. Note orientation of filter (Figure 5).

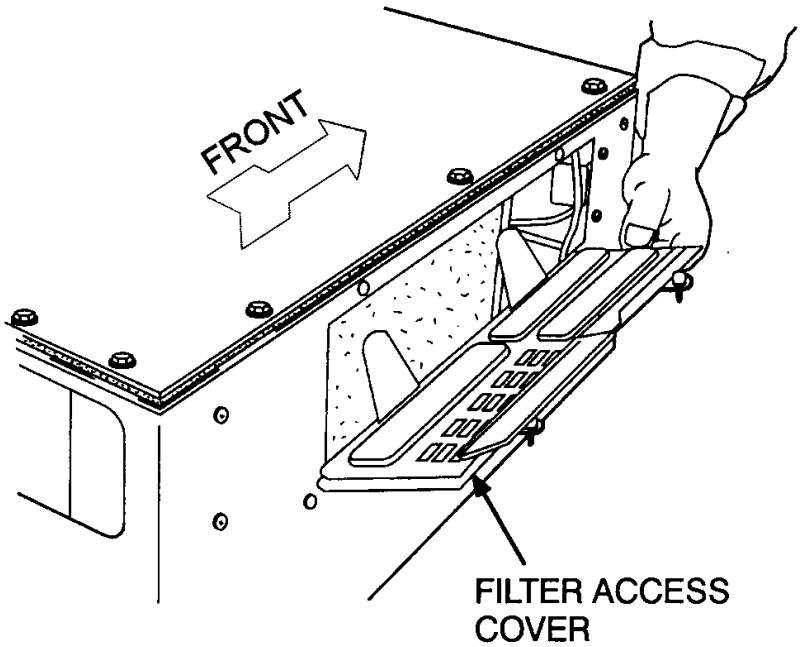


**Figure 4 Filter Access Cover**

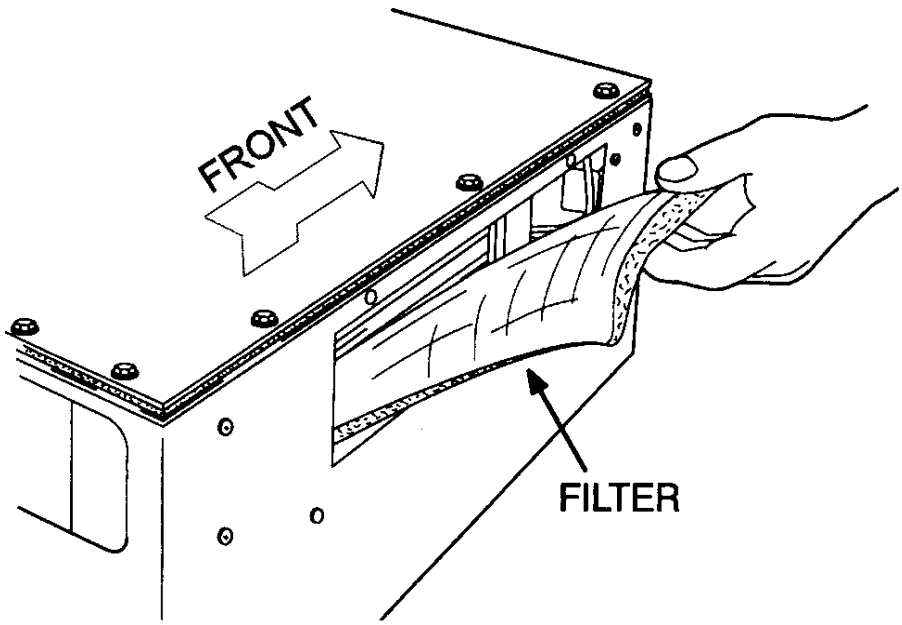


**Figure 5 Blend-Air Unit Filter**

## Install

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

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

2. Re-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. Note cable routings during removal. Where necessary, cables should make sweeping curves. Sharp bends tend to increase resistance to bowden wire movement and sometimes cause kinks, which render the cable inoperative.

3. 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.

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

5. Replace the receiver-dryer on any system which is opened for more than a very short period (>30 minutes), when the system is flushed, and/or when the compressor is replaced due to an internal failure, causing system contamination.

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

7. The air conditioning system must be flushed and purged 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.

8. It is critical that the system oil level be maintained whenever the refrigerant system is serviced. Refer to S16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual.

9. All refrigerant hose and tubing openings should be immediately capped 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. Remove 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).

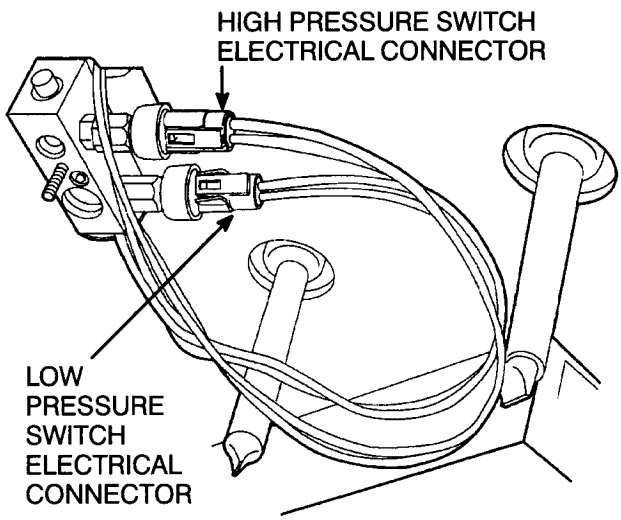


**Figure 6 Low and High Pressure Switches (Refrigerant Lines not Shown)**

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.

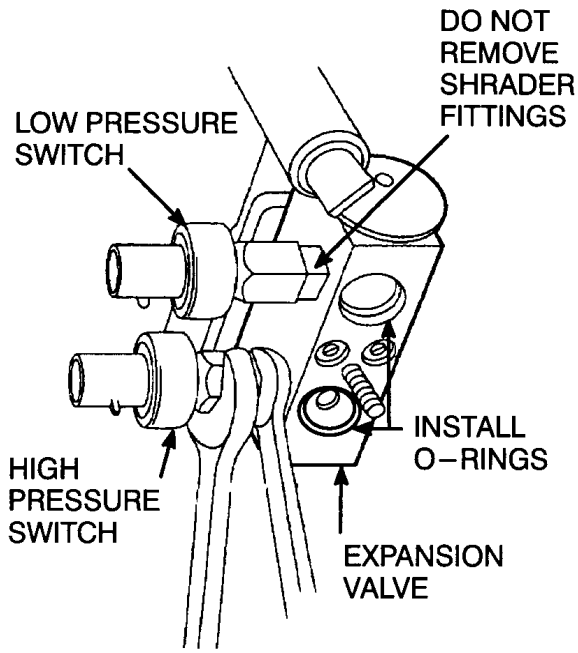


**Figure 7 Use Backup Wrench When Removing/Installing Pressure Switches**

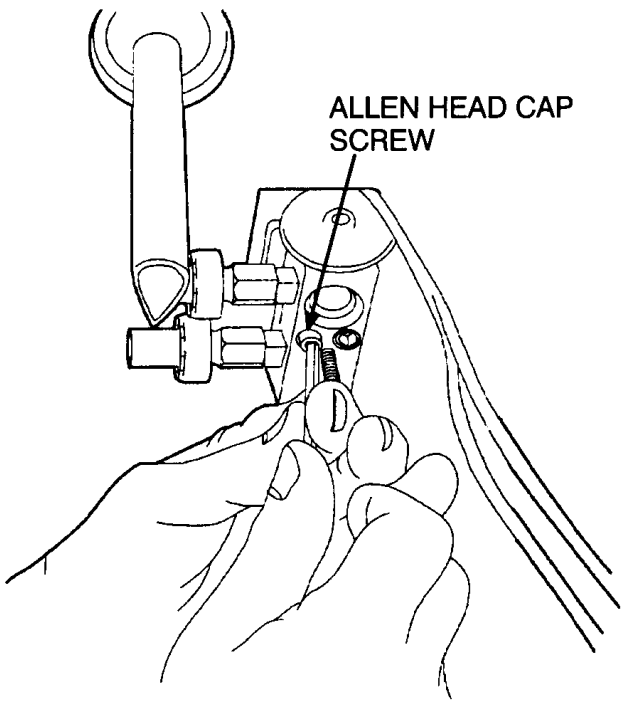


**Figure 8 Expansion Valve Mounting**

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).

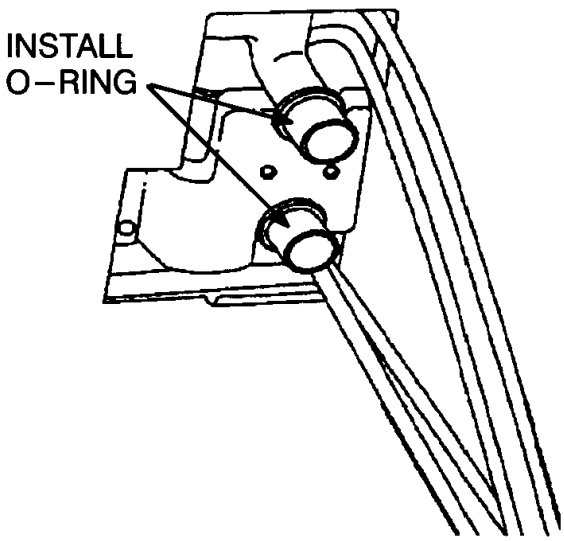


**Figure 9 Install O-Rings on Evaporator Tubes**

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 (6 mm thread size), 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 must be performed inside the Blend-Air unit. Perform the following procedure to remove and install the Blend-Air unit cover.

### Remove

Refer to Figure 10 and Figure 11.

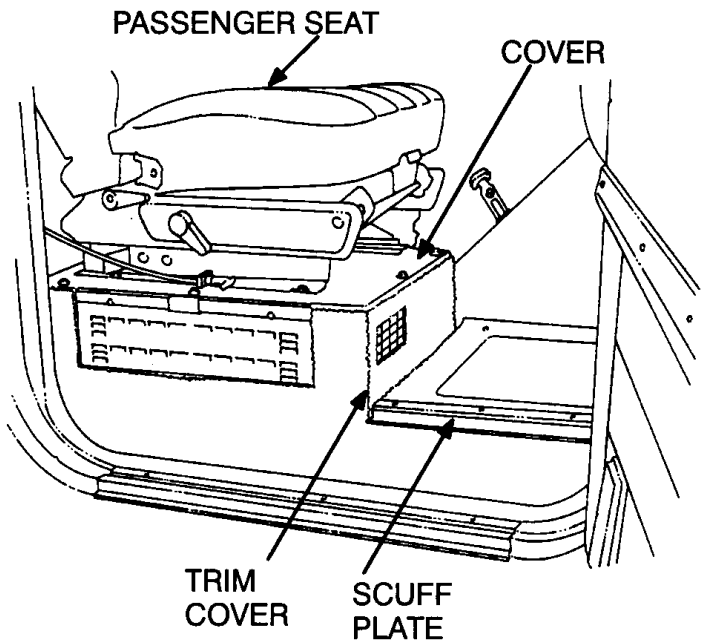


**Figure 10 Blend-Air Unit Cover**

1. Remove the passenger seat.

2. Remove cover mounting screws.

**NOTE – On 9800 models, remove the two blower motor mounting screws from the Blend-Air Unit (Figure 11).**

3. Remove cover from the Blend-Air unit (Figure 12).

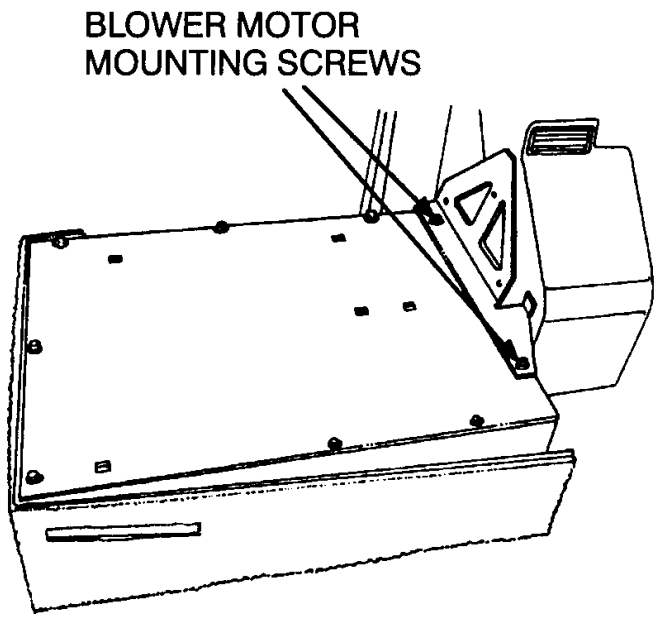


**Figure 11 Blower Motor Mounting Screws (9800 Models Only)**

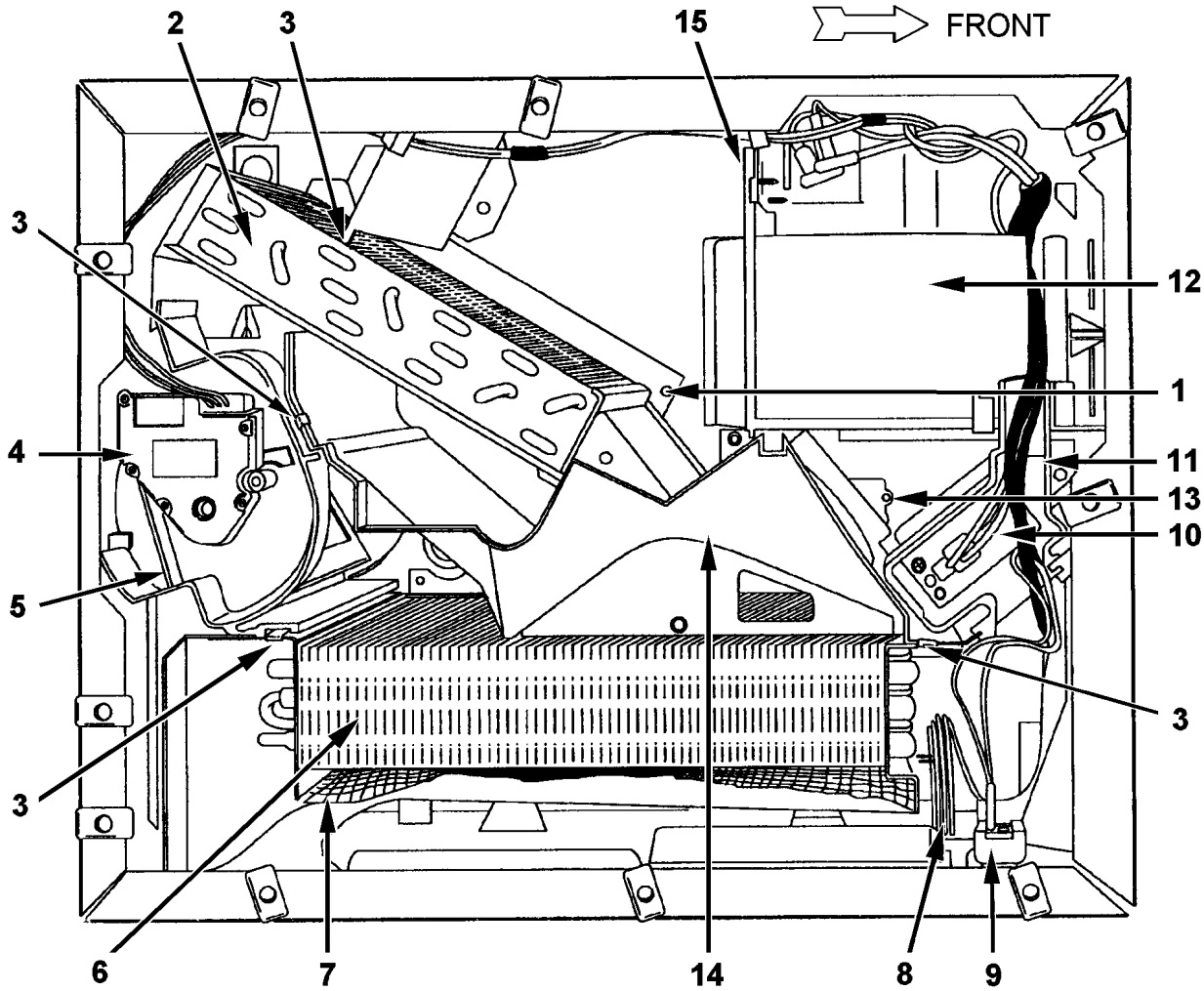


**Figure 12 Blend-Air Unit Components**

1. HEATER CORE MOUNTING NUT
2. HEATER CORE
3. CLIP
4. BUNK BLEND-DOOR ACTUATOR
5. BUNK BLEND-DOOR ASSEMBLY
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

### Install

Refer to Figure 10 and Figure 11.

1. Install cover on the Blend-Air unit.
2. On 9800 models, install the two blower motor housing screws.
3. 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. 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 S16019, AIR CONDITIONING BASIC 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 13).

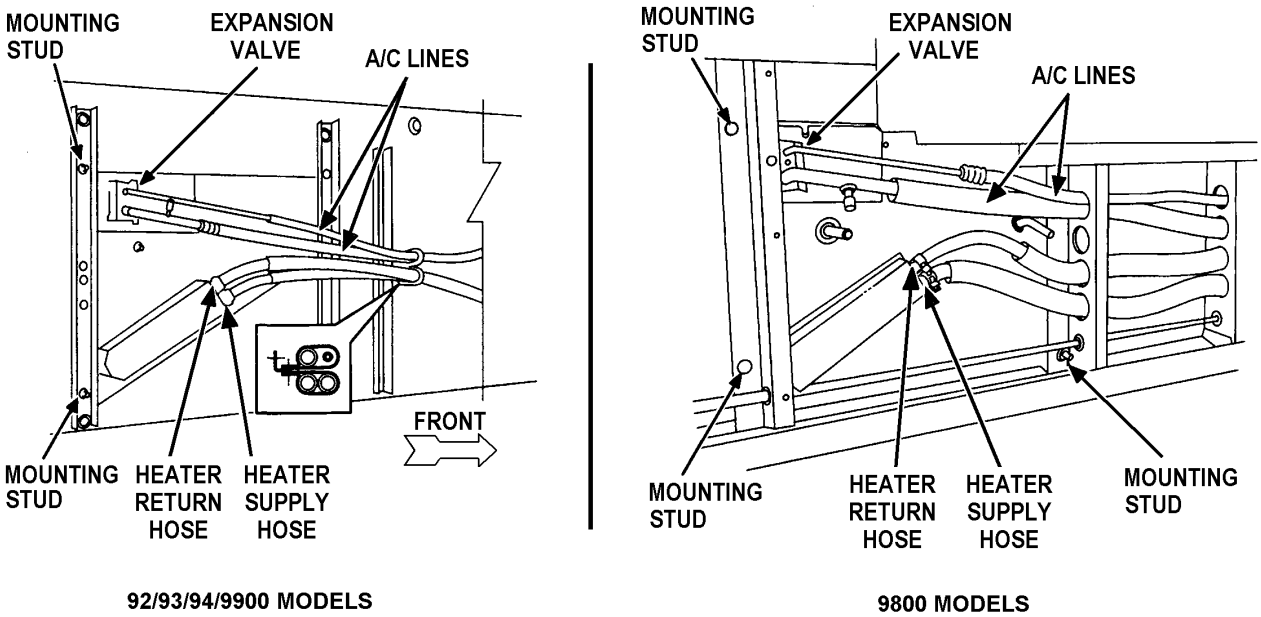


**Figure 13 Components Located Under the Cab**

**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 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 13). 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 13).

### 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 14).

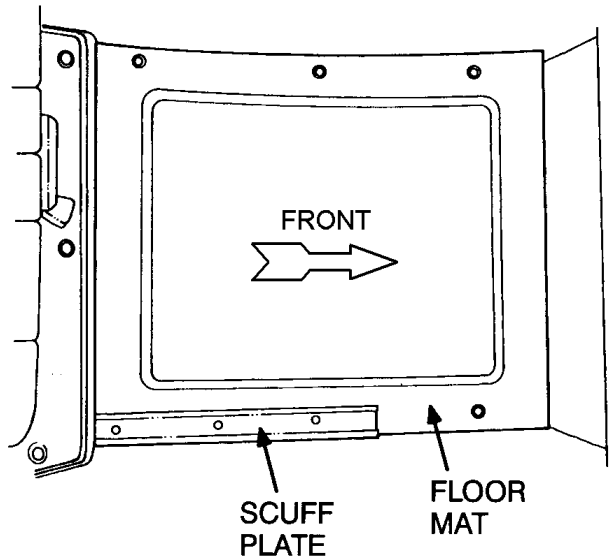


**Figure 14 Floor Mat Remove/Install**

b. Remove the floor mat (Figure 14).

c. Remove the screws securing the floor panel (Figure 15).

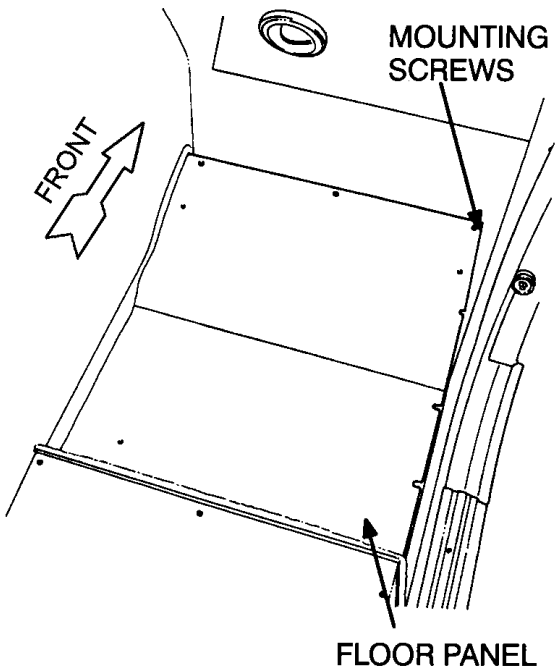


**Figure 15 Floor Panel Remove/Install**

d. Take out the floor panel, exposing the air ducts (Figure 16).

3. Remove the sheet metal screws securing the air ducts at the Blend-Air unit (Figure 16).

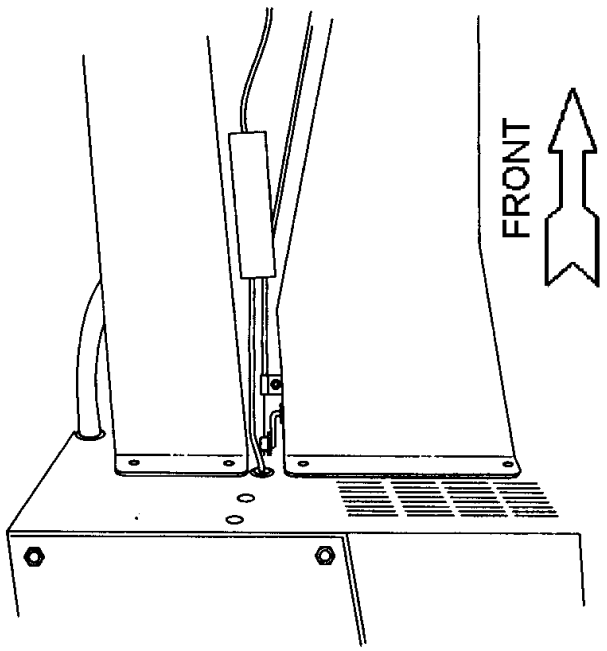


**Figure 16 Air Ducts to Blend-Air Unit**

4. (Models 92/93/94/9900) Disconnect the HOT-COLD cable at the control assembly as follows (Figure 17).
   a. Remove switch panel, located above HVAC control assembly, from dash. (It is not necessary to disconnect the electrical harness.)
   b. Access the HOT-COLD cable end through the hole in the dash where the switch panel was located.
   c. Remove screw securing cable to control assembly and detach cable end from control assembly lever.
5. (Model 9800) Disconnect the HOT-COLD cable at the control assembly as follows (Figure 17).
   a. Remove mounting screws securing control assembly to the dash.
   b. Slide control assembly out of dash to access the HOT-COLD cable.
   c. Remove screw securing cable to control assembly and detach cable end from control assembly lever.

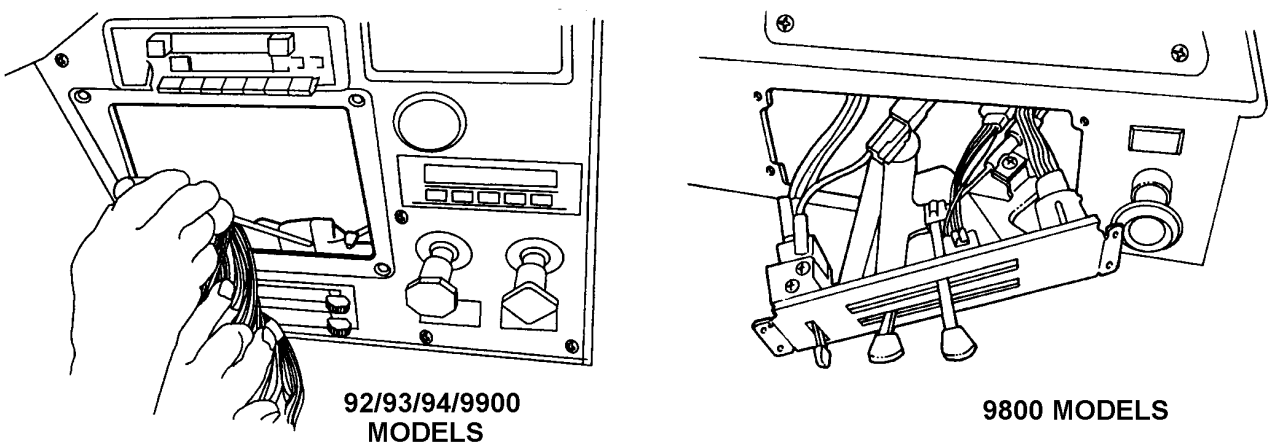


**Figure 17 Disconnect Hot-Cold Cable**

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

7. Disconnect the Blend-Air unit electrical harness from the cab harness located behind the kick panel (Figure 18).

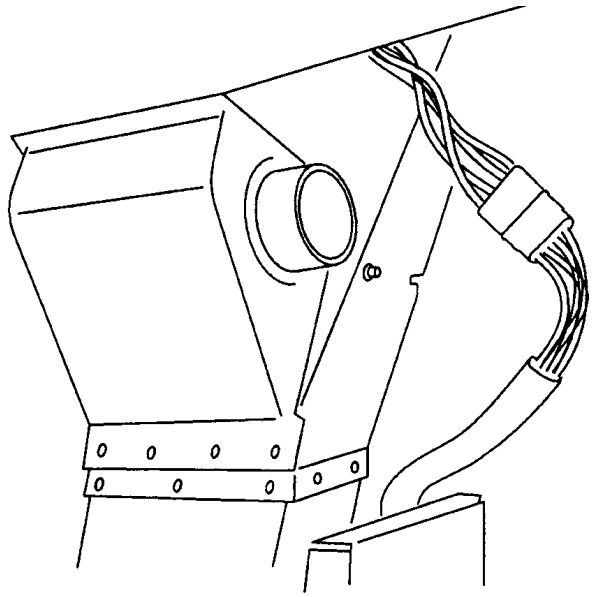

**Figure 18 Blend-Air Electrical Harness and Cab Harness Behind Kick Panel**

8. 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.

9. 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.

### Install

Position the Blend-Air unit housing assembly in the cab with mounting studs, tubes and pipes protruding through the floor. Insure that any electrical harnesses and/or control cables are routed correctly, and are not pinched.

### Install - Under the Cab

1. Install washer and nuts on the mounting studs (Figure 19). 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 19).

3. If the expansion valve must be installed, refer to EXPANSION VALVE, Install (See Install, page 13).

**CAUTION – In the following step, do not over-tighten the 10 mm lock nut (6 mm thread size). 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 19 and Figure 7). Install the 10 mm lock nut and tighten to 80 to 90 lbf-in (9 to 10 Nm).

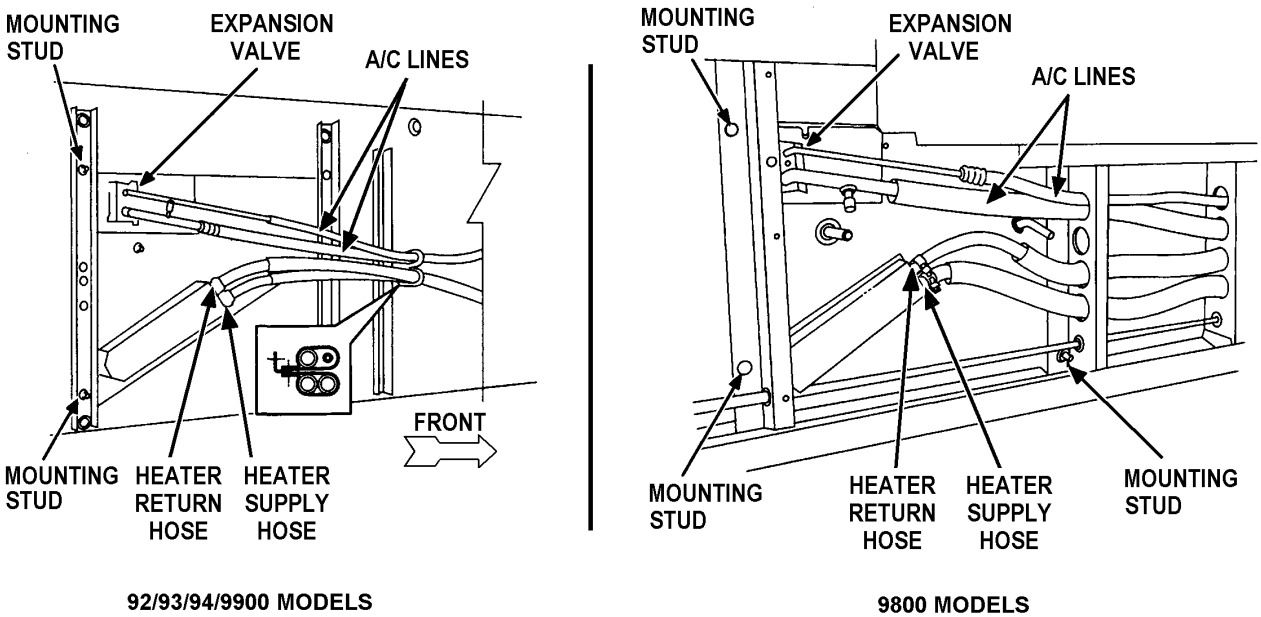


**Figure 19 Under Cab Heater A/C Routing**

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 electrical wiring harness to the cab harness in the area of the passenger side kick panel (Figure 18).

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

3. Install kick panel.

4. Secure air ducts in place with sheet metal screws (Figure 16).

5. Install floor panel (Figure 15).

6. Install floor mat (Figure 14).

7. (Models 92/93/94/9900) Connect the HOT-COLD cable at the control assembly as follows (Figure 17).

a. Attach the cable end to the control assembly lever, then install screw to secure cable to control assembly.

b. Install switch panel into dash.

c. To adjust the cable, refer to Control Cable - Adjustment (92/93/94/9900) (See Control Cable - Adjustment, page 51).

8. (Model 9800) Connect the HOT-COLD cable at the control assembly as follows (Figure 17).

   a. Attach the cable end to the control assembly lever, then install screw to secure cable to control assembly.

   b. Slide control assembly into dash and secure with four mounting screws.

   c. To adjust the cable, refer to Control Cable - Adjustment (9800) (See Control Cable - Adjustment, page 57).

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

10. Evacuate and charge the air conditioning system as described in S16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE.

**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.**

11. Run engine and check system for leaks and proper operation.

12. 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 14).

3. Remove the two electrical connectors from the thermostatic temperature control switch (Figure 20).

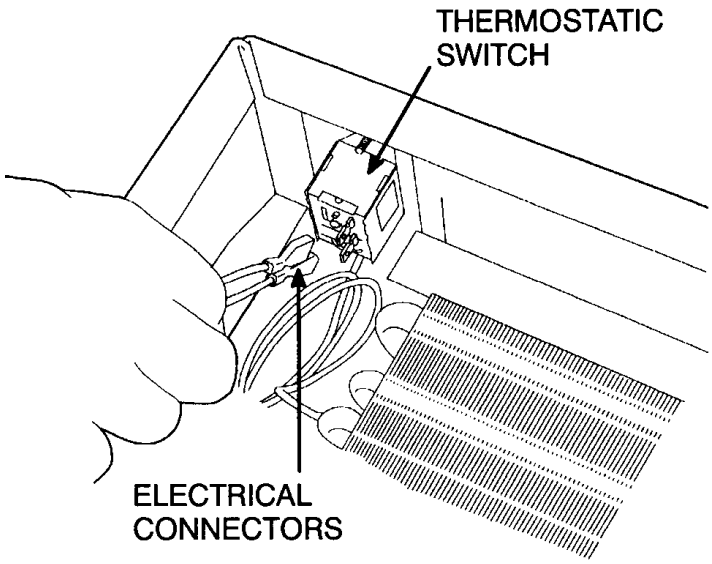


**Figure 20 Thermostatic Temperature Control Switch**

4. Remove the two screws that secure the switch to the side of the Blend-Air unit (Figure 21).

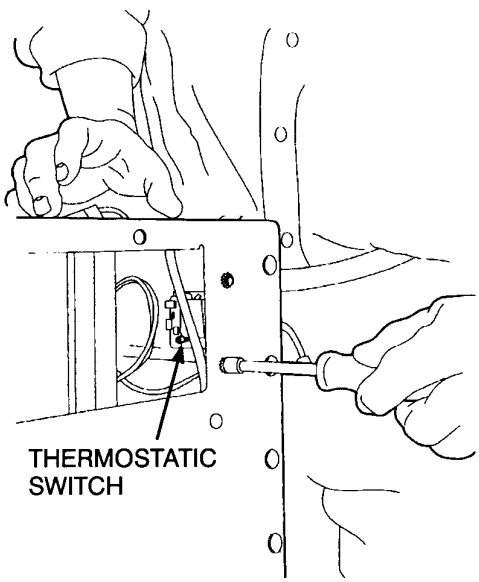


**Figure 21 Thermostatic Switch Mounting**

**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 22).

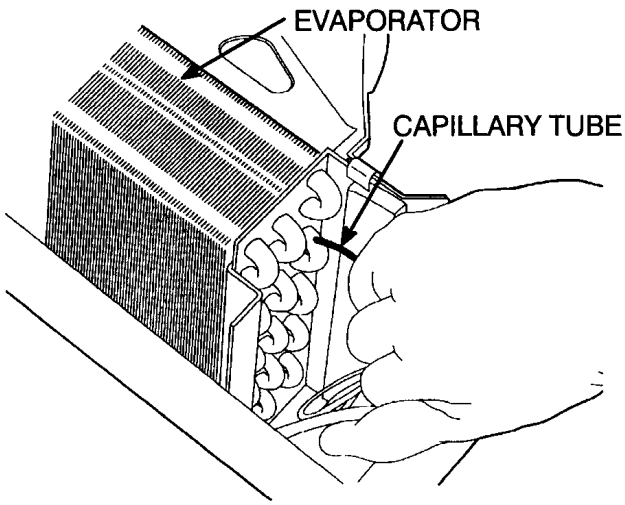


**Figure 22 Thermostatic Switch Capillary Tube**

### 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 22), 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 21).

3. Connect the two electrical connectors to the switch (Figure 20).

**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 17).

## 7.5. BUNK BLEND-DOOR ACTUATOR

### Remove

1. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 14).

2. Disconnect the electrical connector from the actuator (Figure 23).

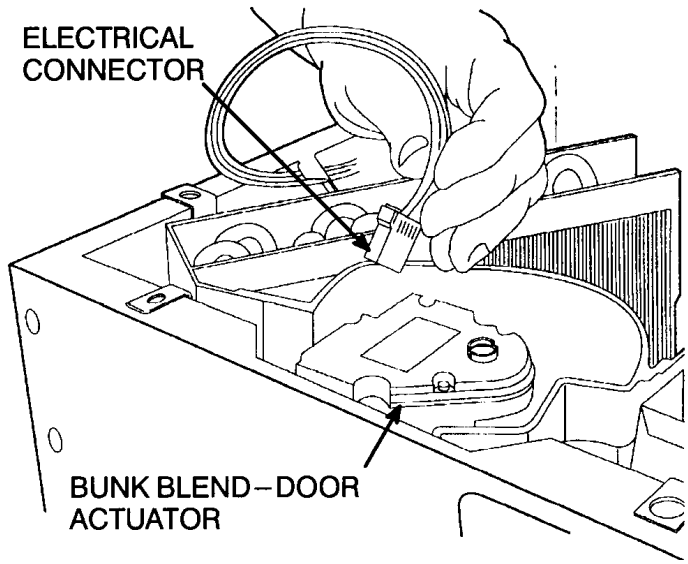


**Figure 23 Actuator Connector**

3. Remove two screws that secure the actuator to the top of the bunk blend-door assembly (Figure 24) and lift the actuator off the blend-door shaft (Figure 25).

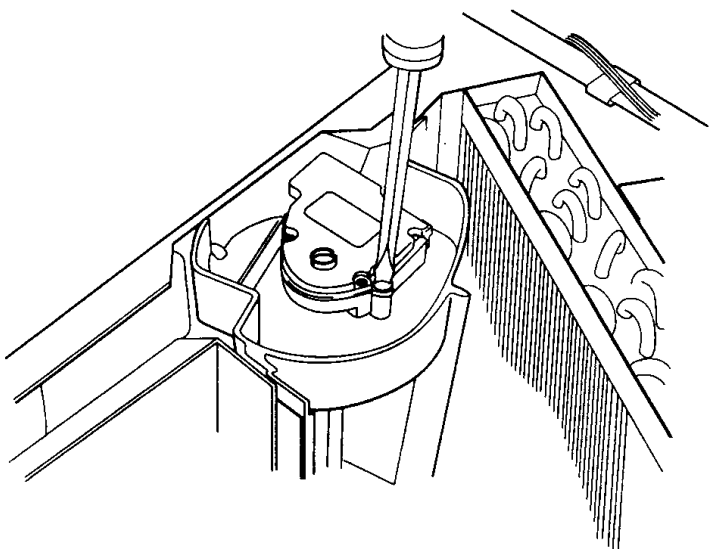

**Figure 24 Actuator Mounting Screws**

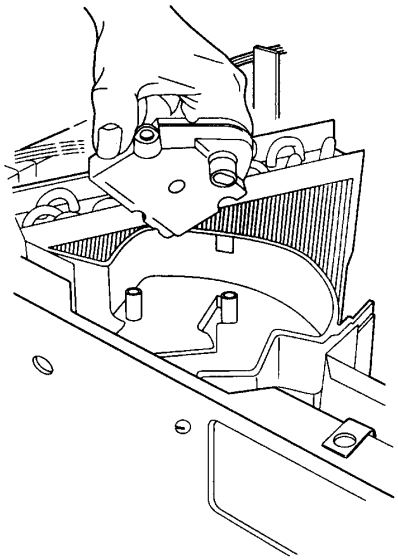

**Figure 25 Actuator Remove/Install**

### 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 24).
3. Connect the electrical connector to the actuator (Figure 23).
4. Install Blend-Air unit cover and passenger seat. Refer to BLEND-AIR UNIT COVER, Install (See Install, page 17).

## 7.6. BUNK BLEND-DOOR ASSEMBLY

### Remove

1. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 14).
2. Disconnect the electrical connector from the actuator (Figure 23).
3. Remove the clip that secures the bunk blend-door assembly to the cab blend-door assembly (Figure 26).

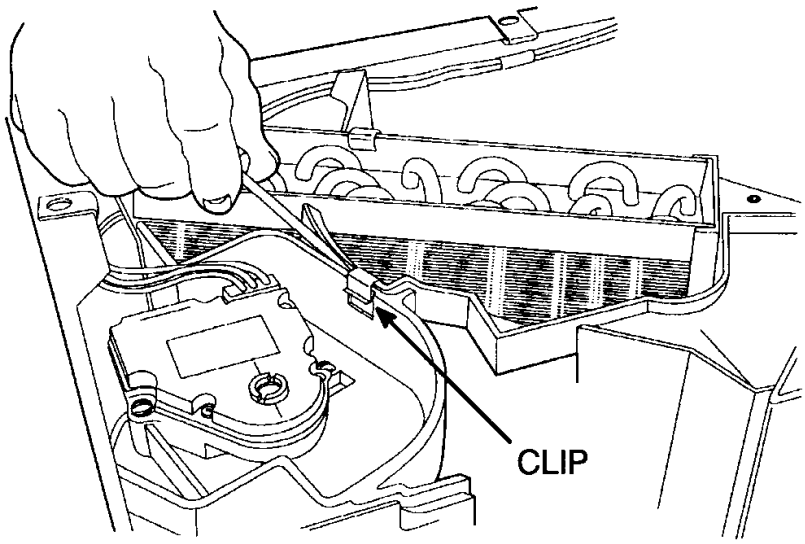


**Figure 26 Clip Securing Bunk Blend-Door Assembly to Cab Blend-Door Assembly**

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 27).
6. Lift the bunk blend-door assembly straight up and out of the Blend-Air unit (Figure 28).

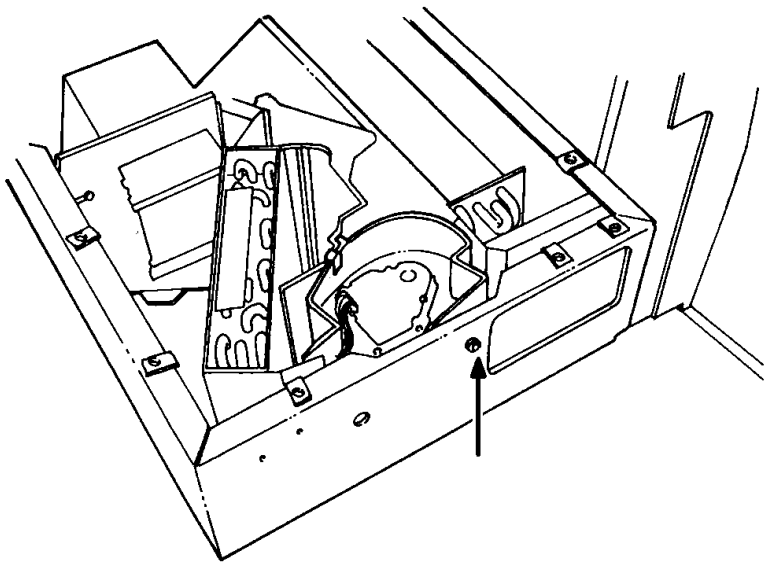

**Figure 27 Screw on Back Side of Blend-Air Unit**

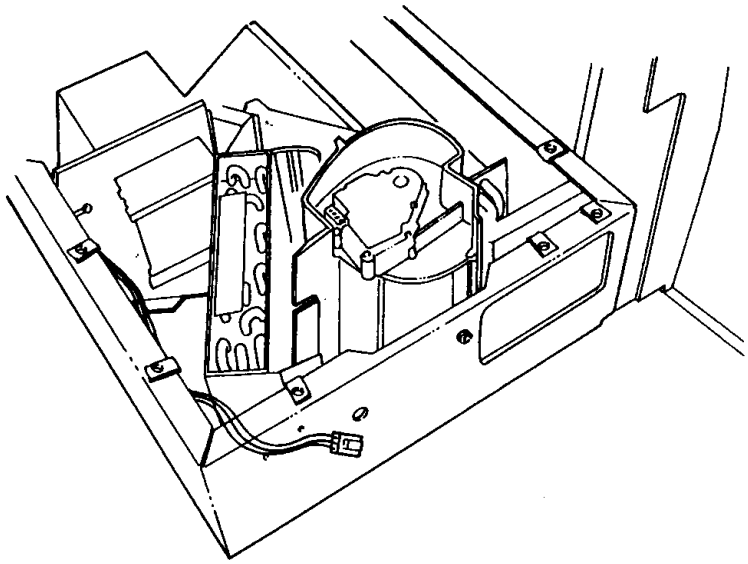

**Figure 28 Bunk Blend-Door Assembly**

### Install

1. Slide bunk blend-door assembly into Blend-Air unit (Figure 28).
2. Secure to back side of unit with screw removed previously (Figure 27).
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 26).
5. Plug the electrical connector into the actuator (Figure 23).

**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.**

6. Test operation.
7. Install Blend-Air unit cover and passenger seat. Refer to BLEND-AIR UNIT COVER, Install (See Install, page 17).

## 7.7. 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 14).
3. Remove two clips: one securing the cab blend-door assembly to the evaporator (Figure 29), and one securing the cab blend-door assembly to the bunk blend-door assembly (Figure 26).

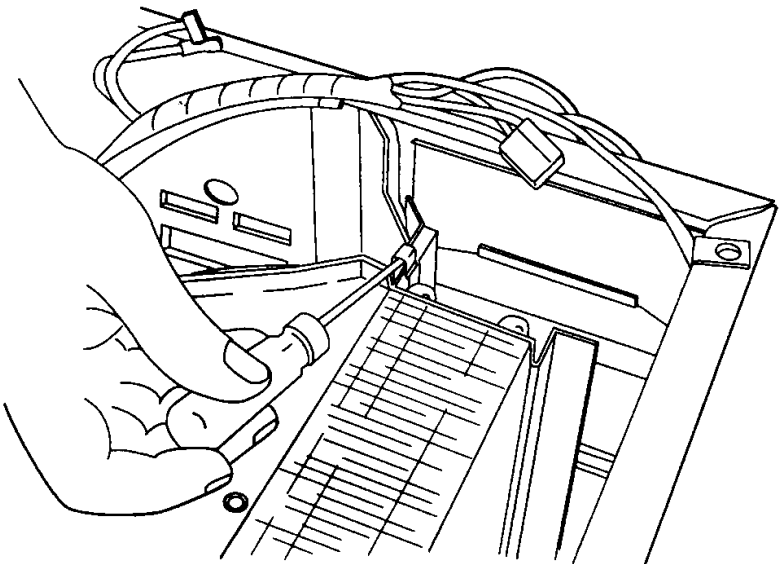

**Figure 29 Clip Securing Cab Blend-Door Assembly to Evaporator**

4. Remove the clip that secures the HOT-COLD cable in position on the cab Blend-Air door (Figure 30).

5. Remove the hold down clamp for the HOT-COLD cable and remove the cable from the blend-door (Figure 30).

6. Remove the five nuts that secure the cab blend-door assembly to the bottom of the Blend-Air unit and lift the cab blend-door assembly straight up and out of the Blend-Air unit (Figure 31).

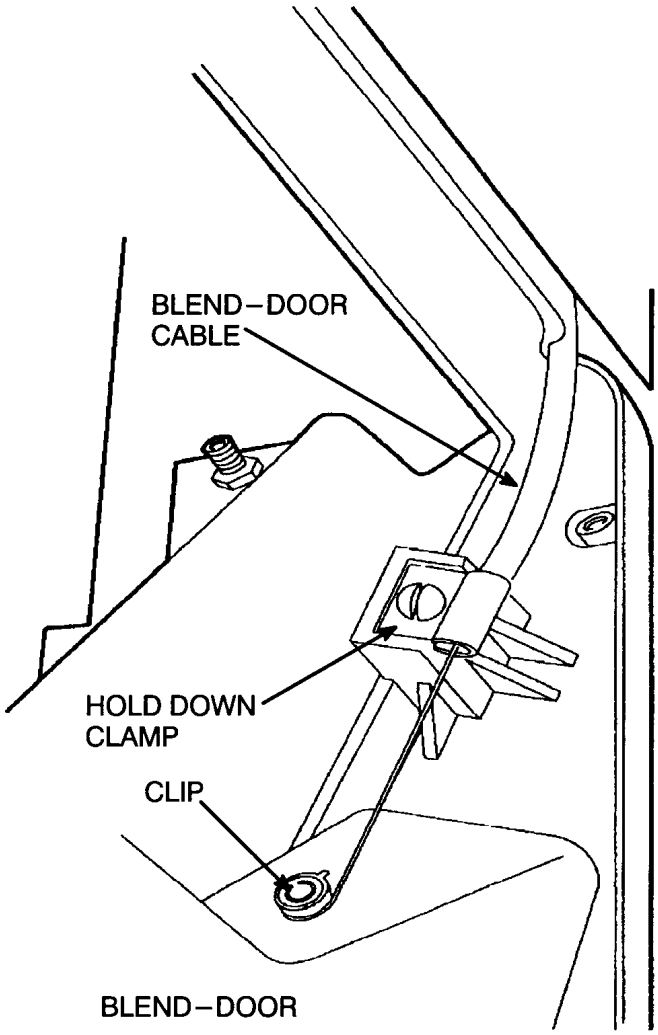


**Figure 30 Connection of HOT-COLD Cable to Cab Blend-Door Assembly**

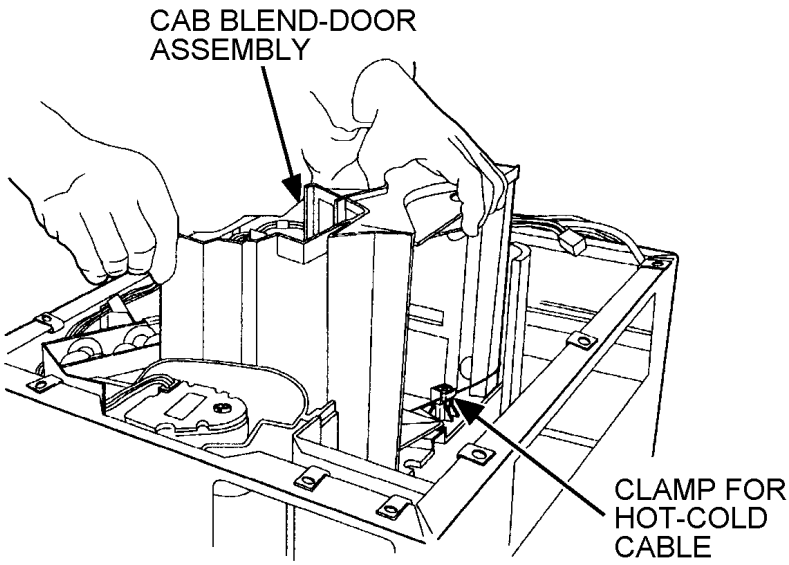


**Figure 31 Cab Blend-Door Assembly**

### Install

1. Install the cab blend-door assembly into the Blend-Air unit (Figure 31).
2. Install the five nuts that secure the cab blend-door assembly to the bottom of the Blend-Air unit. Tighten to 13 lbf-in (1.46 Nm).
3. Install the two clips securing the cab blend-door assembly to the evaporator and the bunk blend-door assembly (Figure 29 and Figure 26).
4. Connect the HOT-COLD cable to the blend-door and secure in place with the clip (Figure 30).
5. Install the clamp to secure the HOT-COLD cable in place (Figure 30).

**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 17).

## 7.8. 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 32).

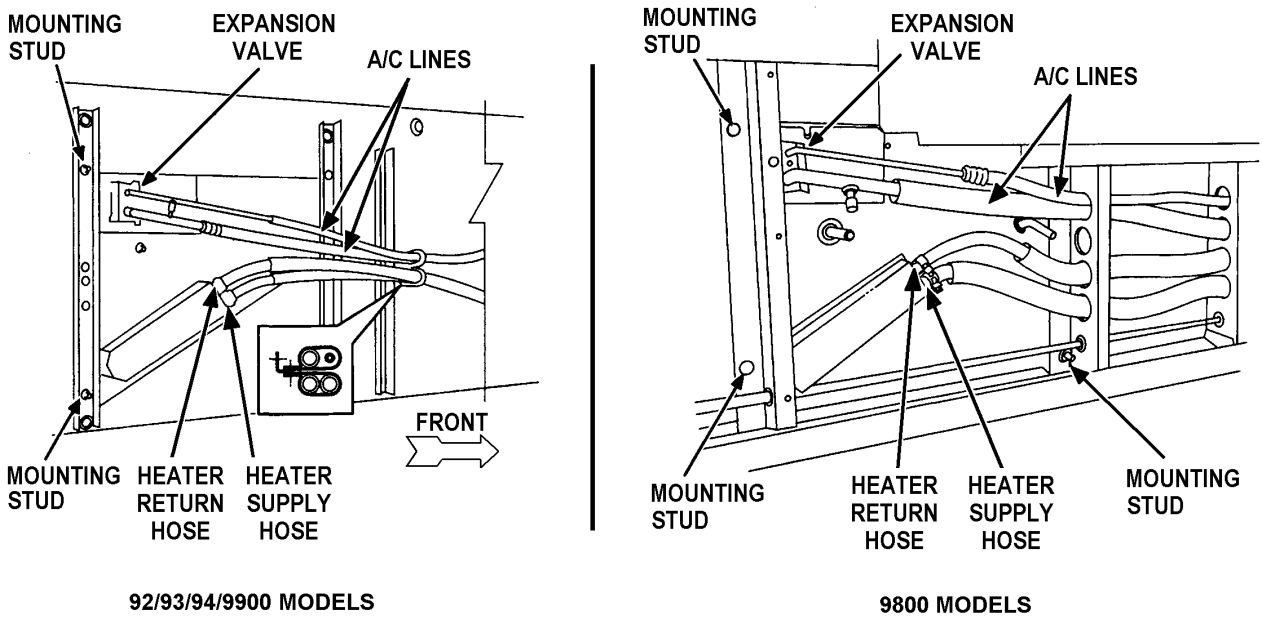


**Figure 32 Under Cab Heater A/C Routing**

4. Remove the Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 14).

5. Remove the cab blend-door assembly. Refer to CAB BLEND-DOOR ASSEMBLY, Remove (See Remove, page 29).

6. Remove the bunk blend-door assembly. Refer to BUNK BLEND-DOOR ASSEMBLY, Remove (See Remove, page 27).

7. Remove the two nuts that secure the heater core to the bottom of the Blend-Air unit (Figure 12).

8. Remove the clip that secures the heater core to the inside of the Blend-Air unit (Figure 33).

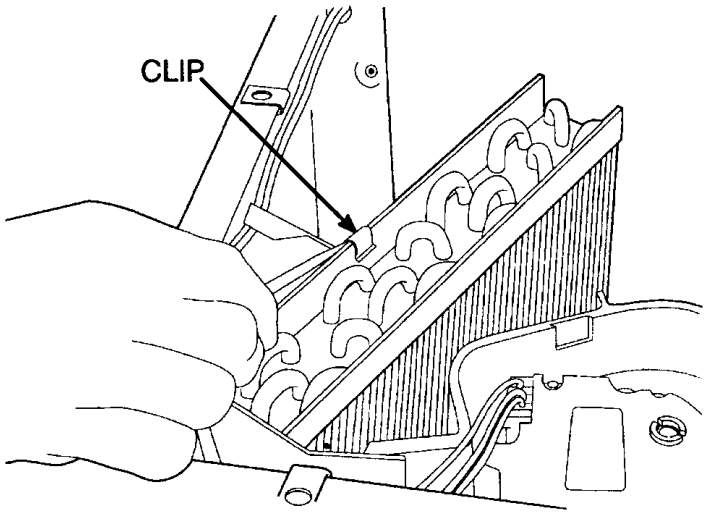


**Figure 33 Heater Core Clip**

**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 Blend-Air unit (Figure 34).

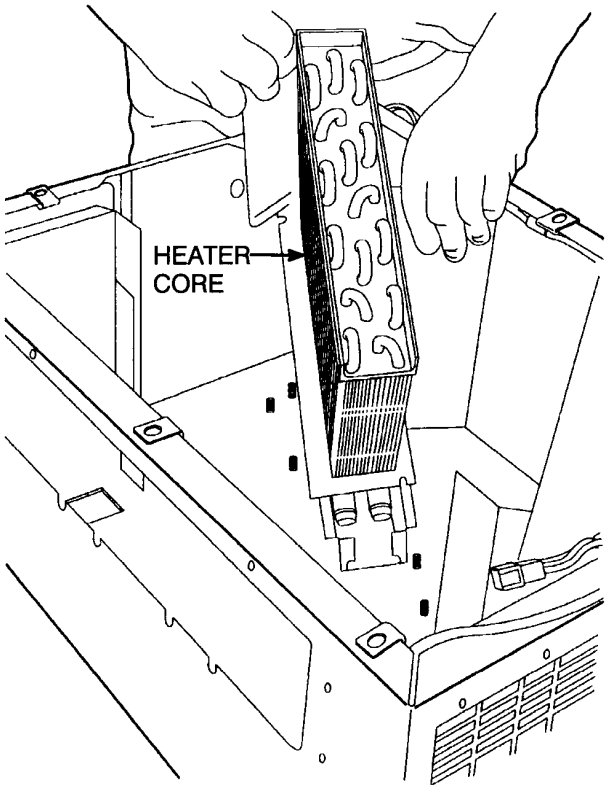


**Figure 34 Heater Core Remove/Install**

## 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 34).
2. Install the clip that secures the heater core inside the Blend-Air unit (Figure 33).
3. Install the two nuts that secure the heater core to the bottom of the Blend-Air unit (Figure 12). Tighten to 13 lbf-in (1.46 Nm).
4. Install the bunk blend-door assembly. Refer to BUNK BLEND-DOOR ASSEMBLY, Install (See Install, page 29).
5. Install the cab blend-door assembly. Refer to CAB BLEND-DOOR ASSEMBLY, Install (See Install, page 32).
6. Under the cab, connect the heater hoses to the inlet and outlet tubes on the heater core (Figure 32). The inlet hose (smaller hose) should be on the tube closest to the center of the cab. 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 check for leaks at the hose connections.

10. Install Blend-Air unit cover and passenger seat. Refer to BLEND-AIR UNIT COVER, Install (See Install, page 17).

## 7.9. 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 14).

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 23). 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 in the blend-air unit (Figure 35) and pull the evaporator up out of the unit (Figure 36).

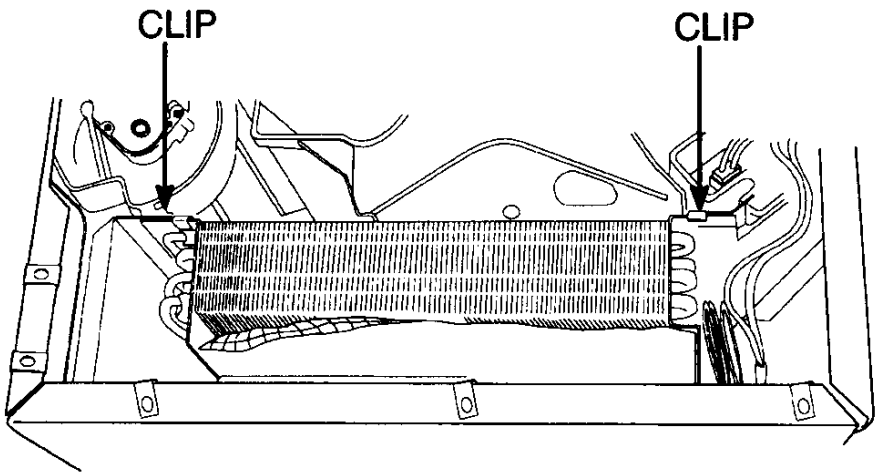


**Figure 35 Evaporator Clips**

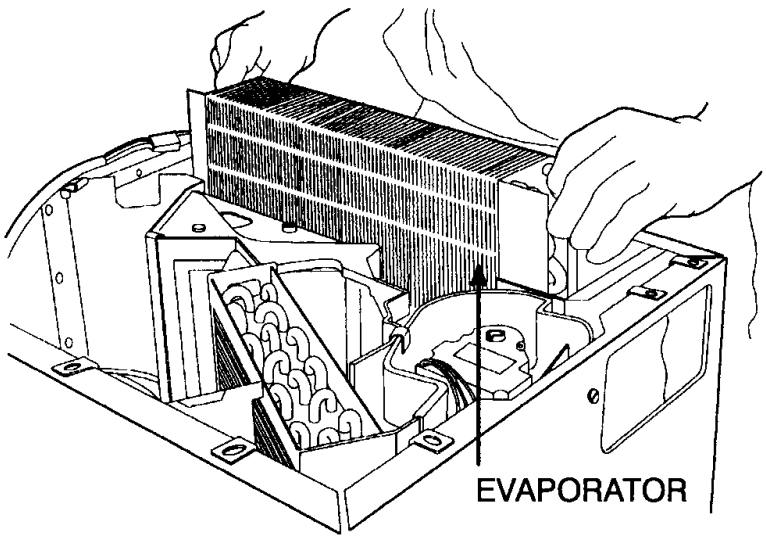


**Figure 36 Evaporator Remove/Install**

## Install

1. Install the evaporator in the Blend-Air unit (Figure 36).
2. Install the two clips that secure the evaporator in the blend-air unit (Figure 35).

**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 25).

4. Install the Blend-Air unit filter.

5. Under the cab, install the expansion valve. Refer to EXPANSION VALVE, Install (See Install, page 13).

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 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 17).

## 7.10. 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 14).

3. Remove two screws from the front side of the Blend-Air unit (Figure 37).

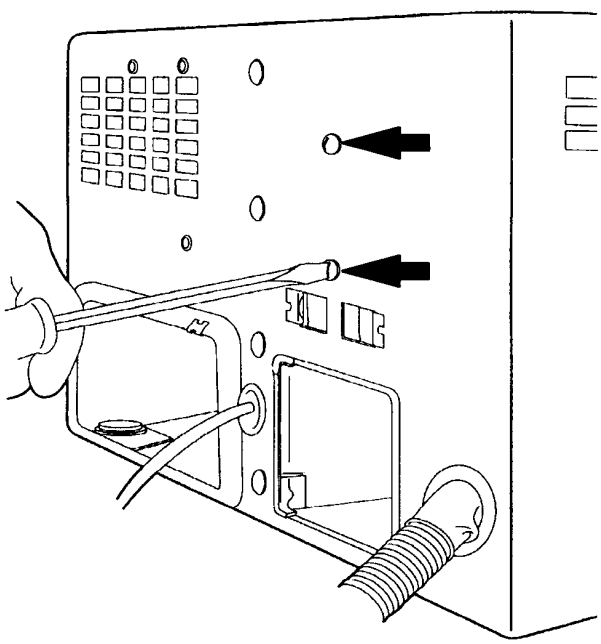

**Figure 37 Cab Blower Mounting Screws**

4. Remove two screws from the blower motor housing where it is fastened to the inside of the Blend-Air unit (Figure 38).

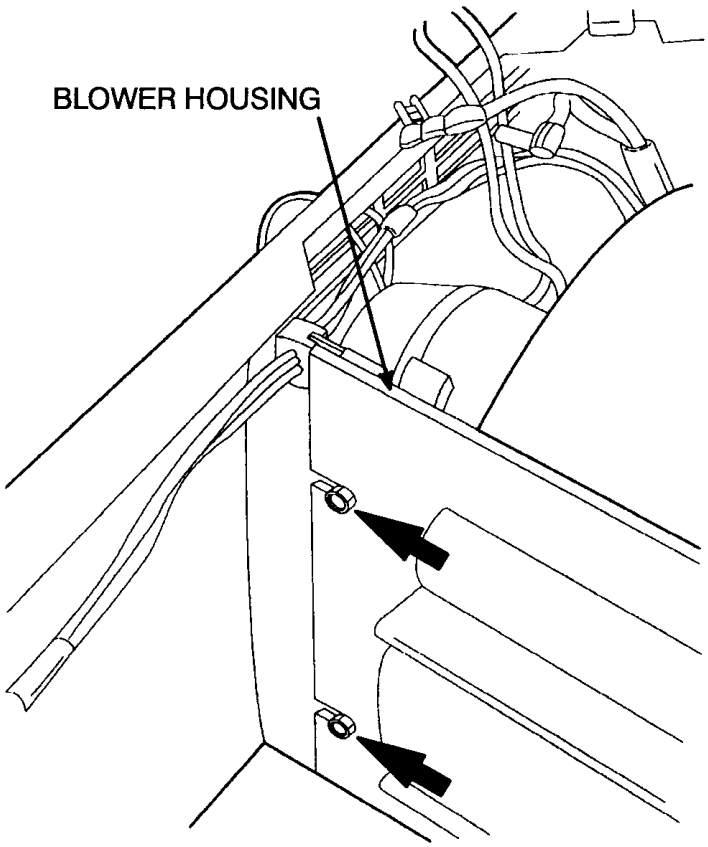


**Figure 38 Blower Motor Housing Screws**

5. 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.**

6. Slide the blower speed resistor housing up and out of the Blend-Air unit and lay it out of the way (Figure 41).

7. Slide the blower housing back and up to remove (Figure 39).

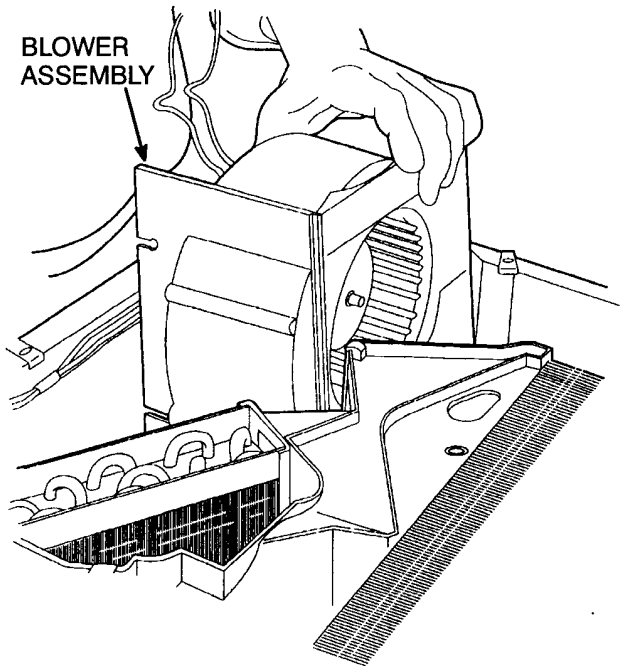


**Figure 39 Blower Housing Assembly Remove/Install**

8. 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 40).

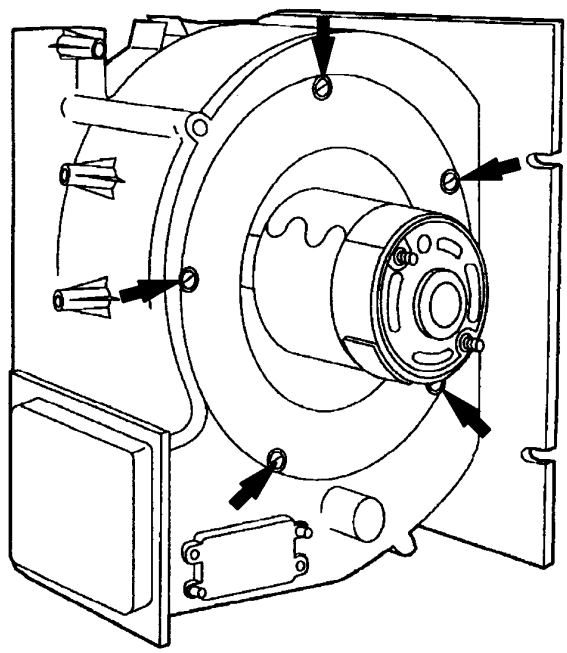

**Figure 40 Screws Securing Blower Motor Assembly**

9. 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.

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

### 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 in the blower housing with the five screws removed in Step 8 of Remove above (Figure 40).

3. Position blower motor housing in Blend-Air unit (Figure 39), 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 37).

5. Install and tighten the two screws that secure the blower motor housing to the inside of the Blend-Air unit (Figure 38).

6. Slide the blower speed resistor housing back into the Blend-Air unit (Figure 41).

**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.**

7. Test operation of blower unit.

8. Install Blend-Air unit cover and passenger seat. Refer to BLEND-AIR UNIT COVER, Install (See Install, page 17).

## 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 14).

3. Slide the blower speed resistor housing up and out of the Blend-Air unit (Figure 41).

4. Disconnect the electrical connector from the resistor pack (Figure 42).

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

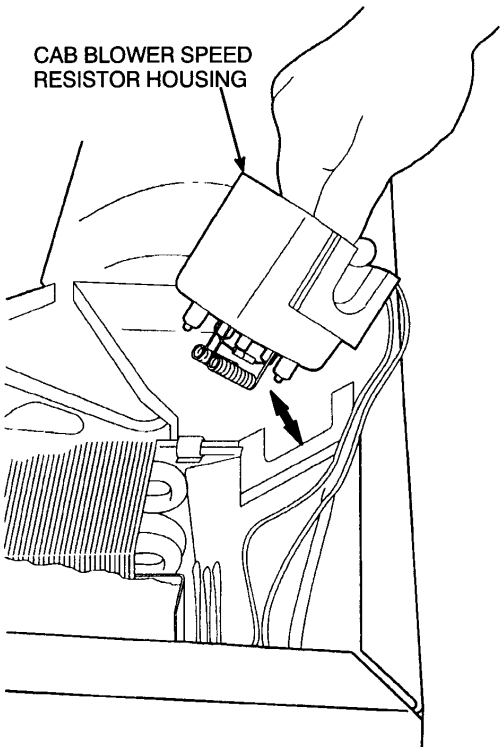


**Figure 41 Blower Speed Resistor Housing Remove/Install**

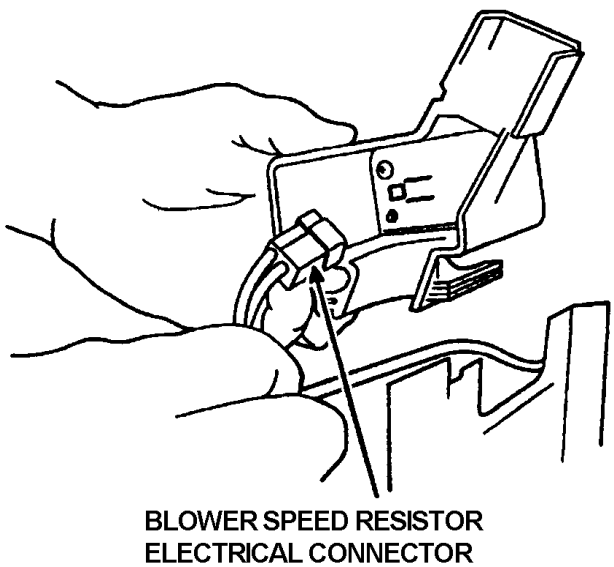


**Figure 42 Electrical Connector in Resistor Pack**

## Install

1. Secure a new resistor pack to the resistor housing with the screws removed in Step 5 of Remove.
2. Connect the electrical connector to the resistor pack (Figure 42).

3. Slide the resistor housing into its opening in the Blend-Air unit (Figure 41).

**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 17).

## 7.12. BLOWER MOTOR ASSEMBLY – SLEEPER COMPARTMENT (92/93/94/9900)

### Remove

Refer to Figure 43.

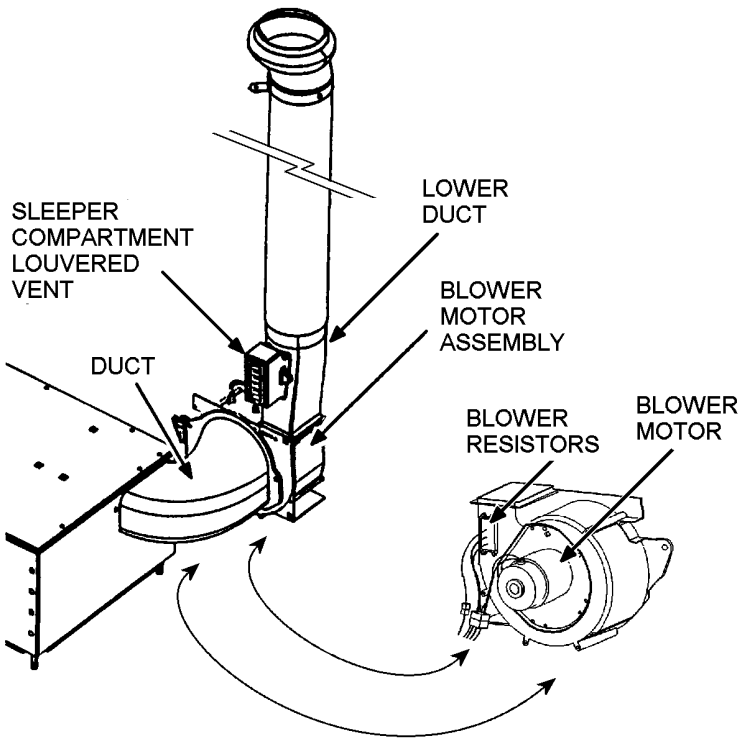


**Figure 43 Blower Motor Assembly - Sleeper Compartment (92/93/94/9900)**

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 connector(s) 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 43.

1. If removed, install the duct to 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 connector(s) to the blower motor assembly.
5. Install and tighten the mounting screws for the duct section between the blower motor and the blend air unit.
6. Carefully position the trim panel around the duct and install the screws.
7. Install the seat belt restraining bracket.

## 7.13. BLOWER RESISTORS – SLEEPER COMPARTMENT (92/93/94/9900)

### Remove

1. Make sure the key switch and A/C switch are OFF.
2. Refer to BLOWER MOTOR ASSEMBLY – SLEEPER COMPARTMENT (92/93/94/9900), Remove, to gain access to the bunk blower motor assembly.
3. Disconnect the electrical connector for the resistor (Figure 43).
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 (Figure 43).
2. Connect the electrical connector to the resistor assembly.
3. Check blower motor operation.
4. Refer to BLOWER MOTOR ASSEMBLY – SLEEPER COMPARTMENT (92/93/94/9900), Install, to complete installation.

## 7.14. BLOWER MOTOR ASSEMBLY – SLEEPER COMPARTMENT (9800)

### Remove

1. Make sure the key switch and A/C switch are OFF.
2. Remove cover from bunk blower housing (Figure 44).

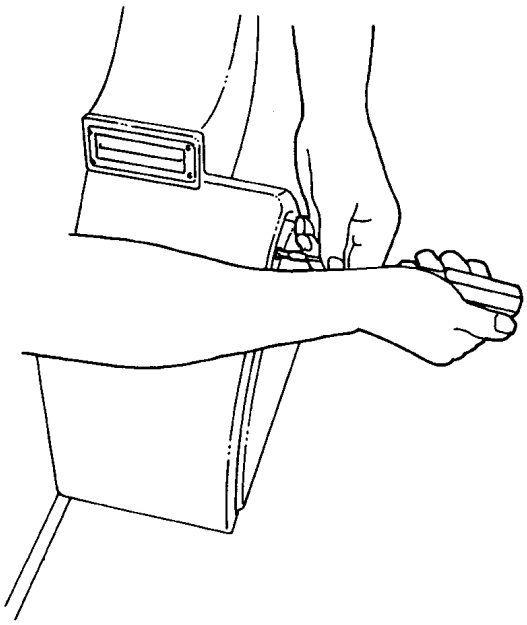

**Figure 44 Bunk Blower Housing Cover (9800)**

3. Disconnect the electrical connector for the blower motor.
4. Remove the five screws that secure the blower motor assembly in the housing (Figure 45).
5. Remove the blower motor assembly from the housing.

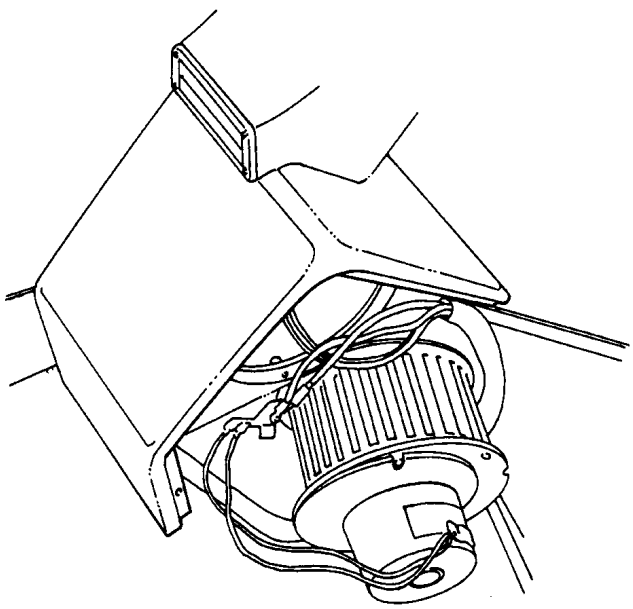

**Figure 45 Screws Holding Blower Motor Assembly in Housing**

6. If the motor is to be replaced, remove the spring clip from the end of the motor shaft and slide the blower wheel off the shaft.

7. If the blower motor resistor assembly is to be replaced, remove it at this time from inside the blower motor housing.

### Install

1. If the motor was replaced, slide the blower wheel onto the motor shaft and secure in place with the spring clip removed in Step 6 of Remove above.

2. Install the blower motor resistor assembly, if removed.

3. Install the blower motor into the blower motor housing using the five screws removed in Step 4 of Remove above (Figure 45).

4. Connect the electrical connector to the motor.

5. Test the motor.

6. Install cover on blower housing (Figure 44).

## 7.15. BLOWER RESISTORS – 9800 SLEEPER COMPARTMENT

Refer to BLOWER MOTOR ASSEMBLY – SLEEPER COMPARTMENT (9800) for blower resistor removal and installation procedures.

## 7.16. AIR CONDITIONING AND HEATER CONTROL ASSEMBLY – CAB (92/93/94/9900)

### 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).

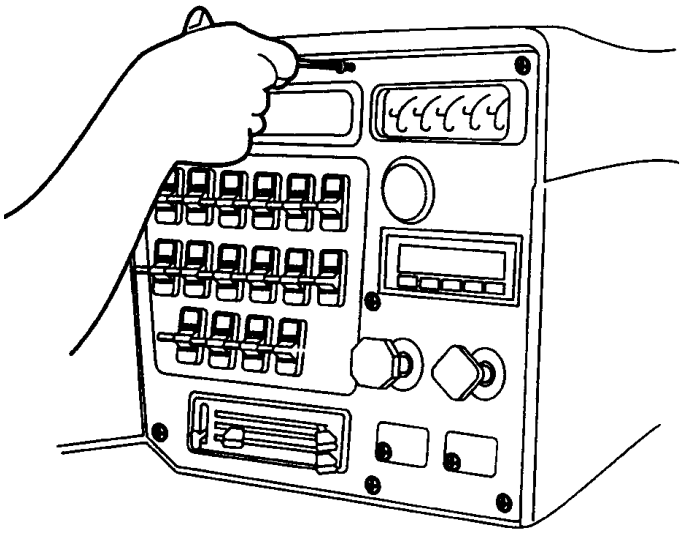

**Figure 46 Dash Cover Panel Remove/Install (92/93/94/9900)**

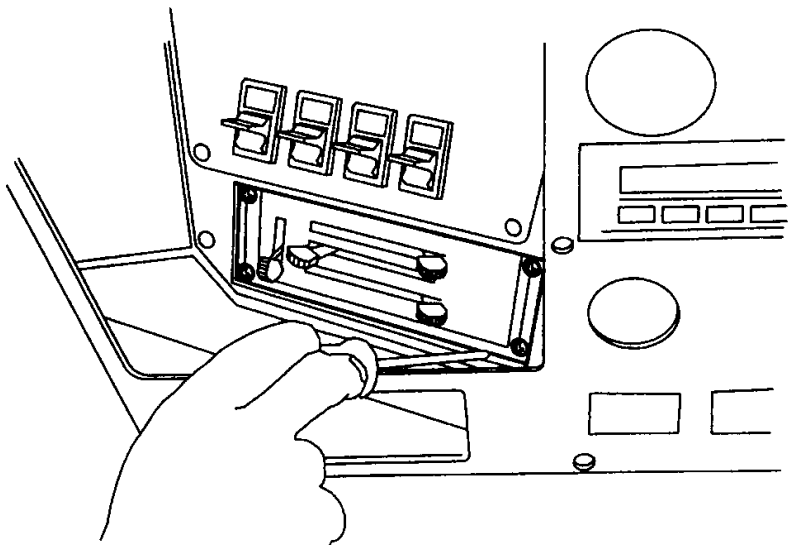

**Figure 47 Cab Control Assembly Mounting Screws**

3. Carefully slide control assembly out of dash (Figure 48).

4. Disconnect electrical connectors from rear of cab control assembly.

5. Remove screws securing control cables to control assembly and detach cables from control assembly levers (Figure 49).

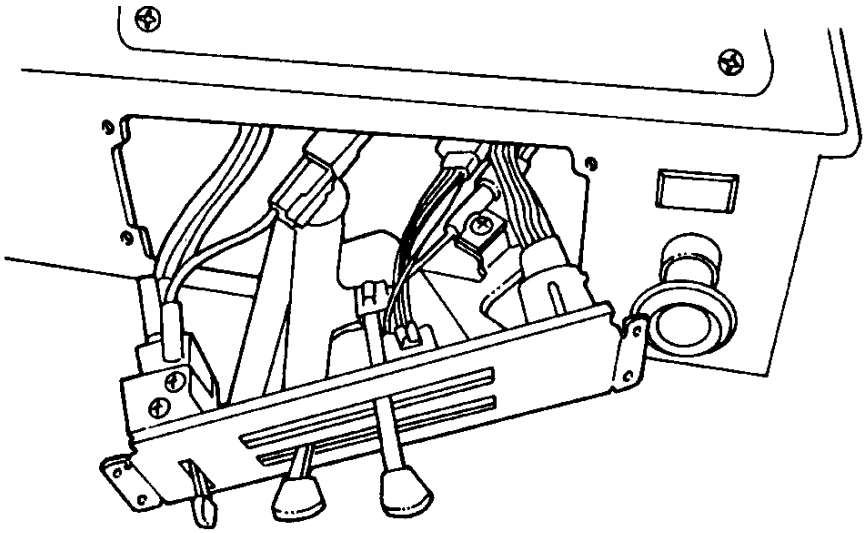

**Figure 48 Cab Control Assembly Remove/Install**

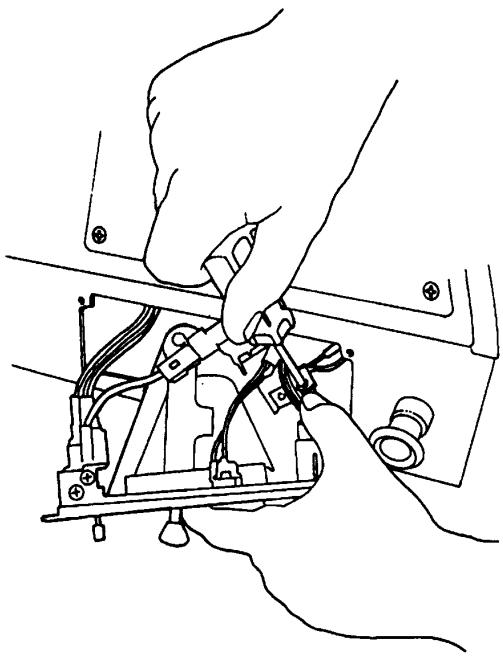

**Figure 49 Control Cable End Remove/Install**

## Install

1. Attach control cable end to control assembly lever, insert screw and tighten (Figure 49).
2. Connect electrical connectors to rear of control assembly.
3. Slide control assembly into position in dash (Figure 48).
4. Install four control assembly mounting screws (Figure 47).

5. Install dash cover panel (Figure 46).

## 7.17. AIR CONDITIONING AND HEATER CONTROL CABLE (92/93/94/9900)

### Remove

**WARNING – Batteries expel explosive gases. Keep sparks, flames, burning cigarettes, or other ignition sources away at all times. Always wear safety glasses and a face shield when working near batteries to prevent personal injury.**

1. Disconnect negative battery cable.
2. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 14).
3. Remove floor mat (Figure 50).

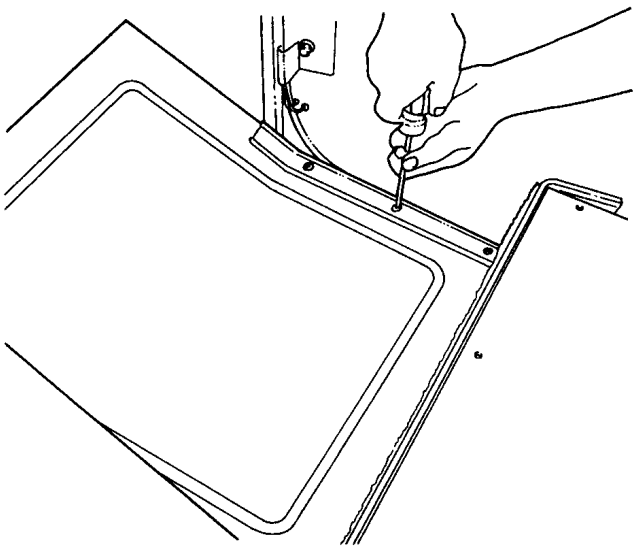

**Figure 50 Floor Mat Remove/Install**

4. Remove screws from dash cover panel (Figure 46). Remove cover panel.
5. Remove four screws from cab control assembly (Figure 47).
6. Carefully slide control assembly out of dash (Figure 48).
7. Remove screw securing HOT-COLD control cable to control assembly (Figure 49).
8. Remove control cable end from HOT-COLD cable lever.
9. Inside Blend-Air unit, remove hold down clamp for HOT-COLD cable. Refer to Figure 51 and Figure 1.

10. Inside Blend-Air unit, remove clip that secures HOT-COLD cable to cab Blend-Air door, and disconnect cable from door (Figure 51 and Figure 1).

11. Remove HOT-COLD cable from Blend-Air unit and dash, taking note of cable routing and clipping.

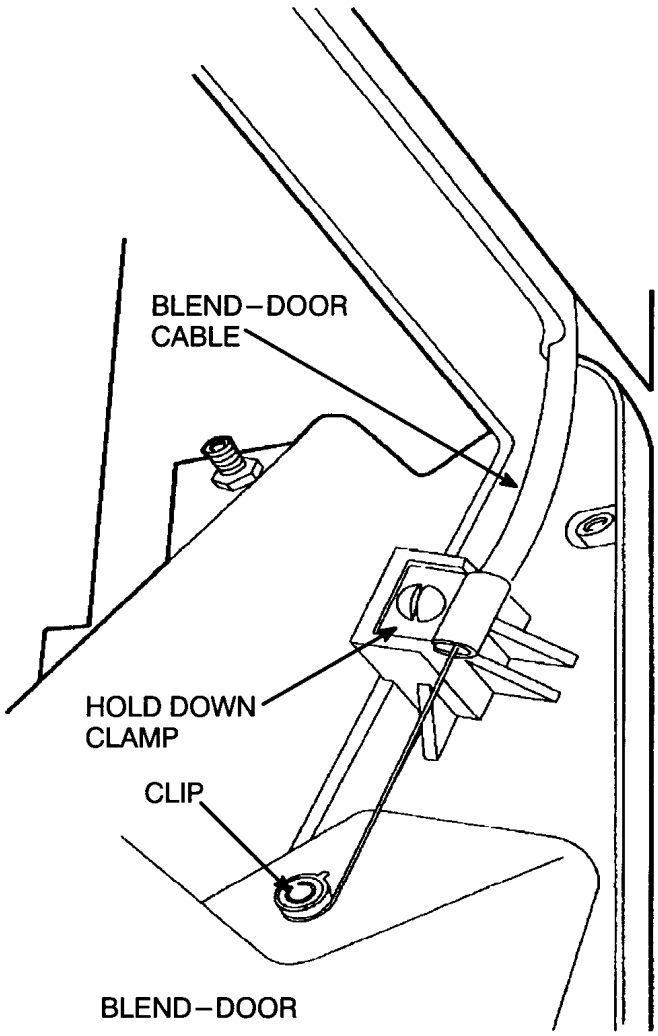


**Figure 51 Connection of HOT-COLD Cable to Cab Blend-Door Assembly**

## Install

**IMPORTANT –** In the following step, adjuster end of cable must be located at dash control assembly.

1. Route HOT-COLD cable from dash to Blend-Air unit as previously removed.

2. Verify cable works freely and is free of kinks and tight bends.

3. Connect cable end to HOT-COLD cable lever on control assembly (Figure 49).

4. Install screw securing HOT-COLD control cable to control assembly.

5. Slide control assembly into dash and secure with four mounting screws (Figure 47).

6. Install dash cover panel (Figure 46).

7. Inside Blend-Air unit, attach end of HOT-COLD cable to cab Blend-Air door and secure with clip removed previously. Refer to Figure 51.

8. Inside Blend-Air unit, install hold down clamp for HOT-COLD cable (Figure 51).

9. Verify that the HOT-COLD cable is routed and secured as it originally was.

10. Install floor mat using mounting hardware previously removed (Figure 50).

11. Install the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Install (See Install, page 17).

12. Adjust HOT-COLD cable as indicated in the following steps.

13. After adjustment is completed, connect negative battery cable.

### Control Cable - Adjustment

1. Remove dash switch panel to access top of dash control assembly (Figure 52). It should not be necessary to disconnect switch panel electrical harness.

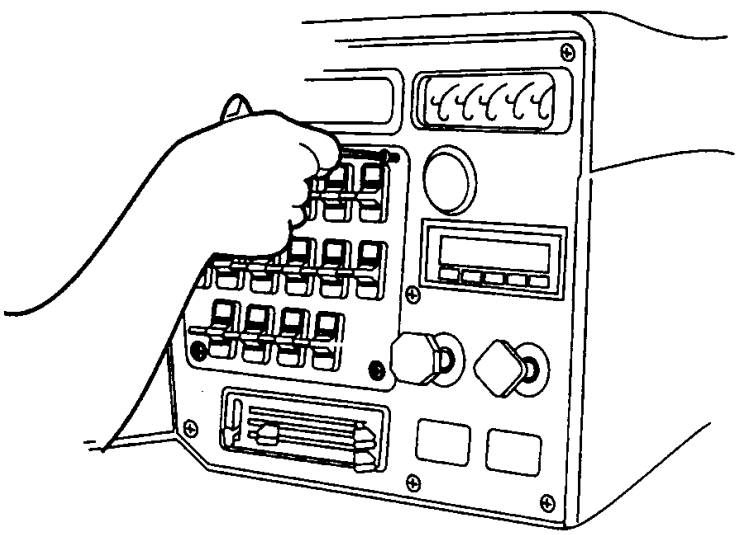

**Figure 52 Dash Switch Panel Remove/Install**

2. Set HOT-COLD lever to full HOT position.

3. With dash switch panel removed, access cable adjuster through hole in dash (Figure 53).

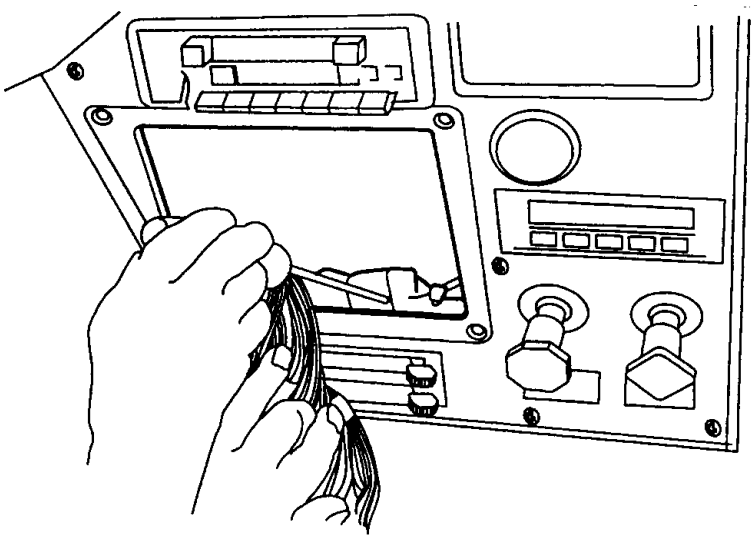

**Figure 53 With Switch Panel Removed, Access Control Cable Adjuster**

4. Turn cable adjuster so lever is near end of slot but not touching end of slot.
5. Move lever to maximum COLD position.
6. Turn cable adjuster again so that lever is the same distance from the slot end in both directions.
7. Install dash switch panel (Figure 52).

## 7.18. AIR CONDITIONING AND HEATER CONTROL ASSEMBLY – CAB (9800)

### Remove

1. Remove four screws from cab control assembly (Figure 54).
2. Carefully slide cab control assembly out of dash (Figure 55).

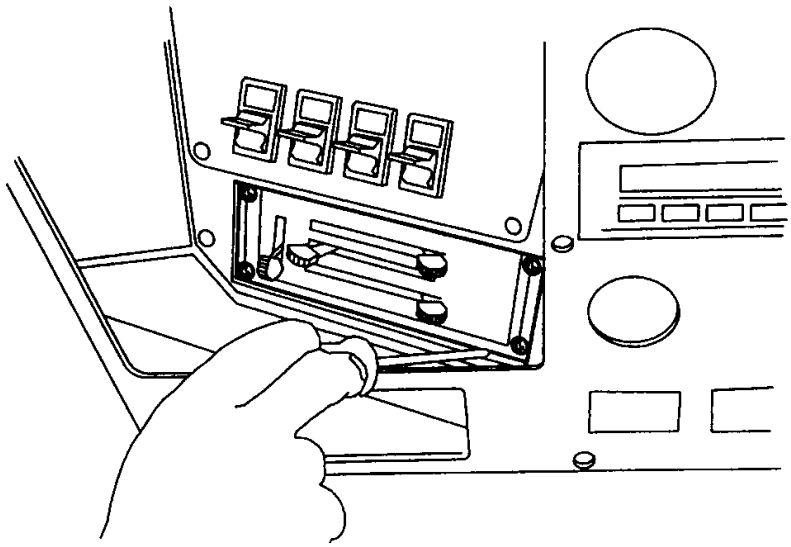

**Figure 54 Cab Control Assembly Mounting Screws**

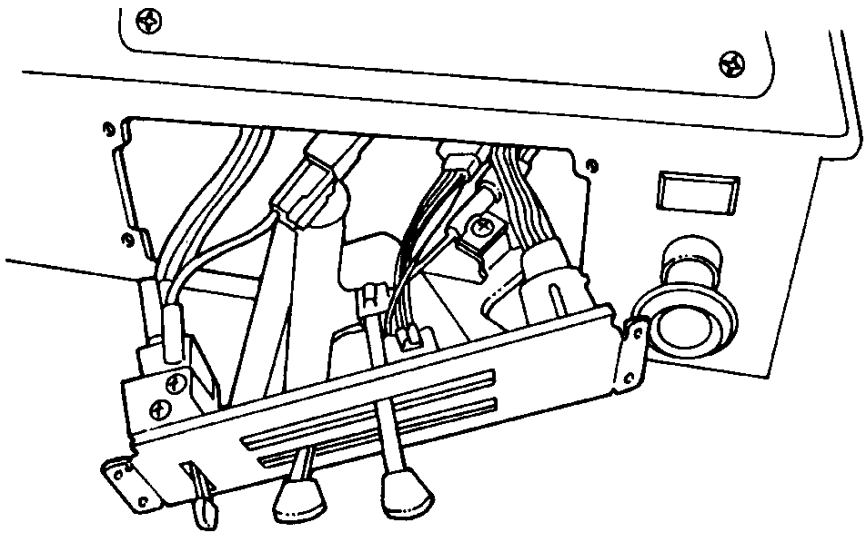

**Figure 55 Cab Control Assembly Remove/Install**

3. Disconnect electrical connectors from rear of cab control assembly.

4. Remove screws securing control cables to control assembly and detach cables from control assembly levers (Figure 56).

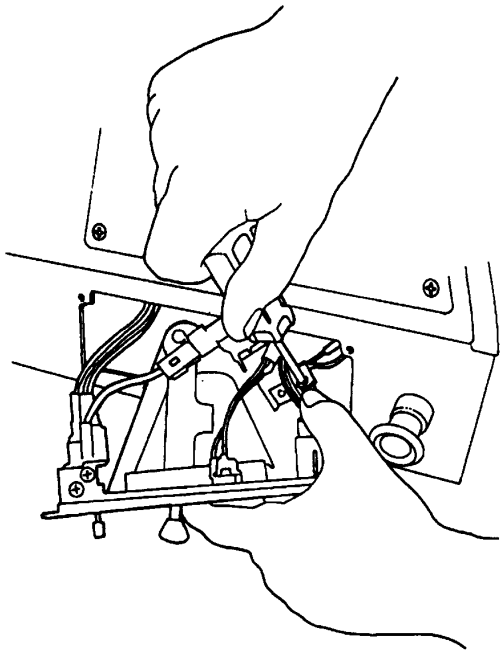

**Figure 56 Control Cable End Remove/Install**

### Install

1. Attach control cable end to control assembly lever, insert screw and tighten (Figure 56).
2. Connect electrical connectors to rear of control assembly.
3. Slide control assembly into position in dash (Figure 55).
4. Install four control assembly mounting screws (Figure 54).

## 7.19. AIR CONDITIONING AND HEATER CONTROL CABLE (9800)

### Remove

**WARNING – Batteries expel explosive gases. Keep sparks, flames, burning cigarettes, or other ignition sources away at all times. Always wear safety glasses and a face shield when working near batteries to prevent personal injury.**

1. Disconnect negative battery cable.
2. Remove the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Remove (See Remove, page 14).
3. Remove floor mat (Figure 57).

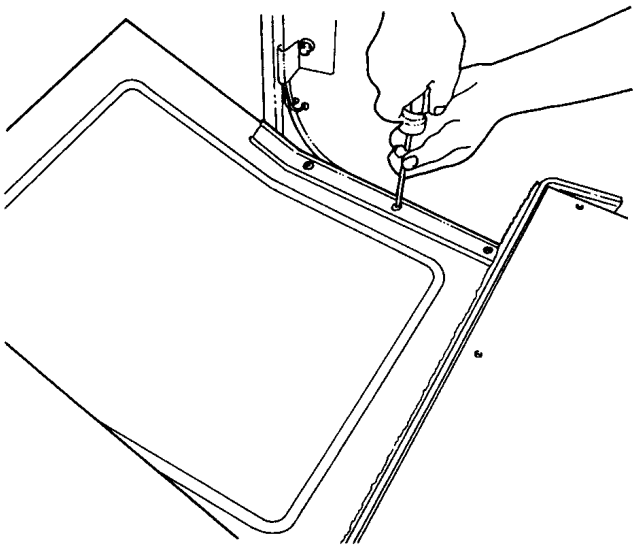

**Figure 57 Floor Mat Remove/Install**

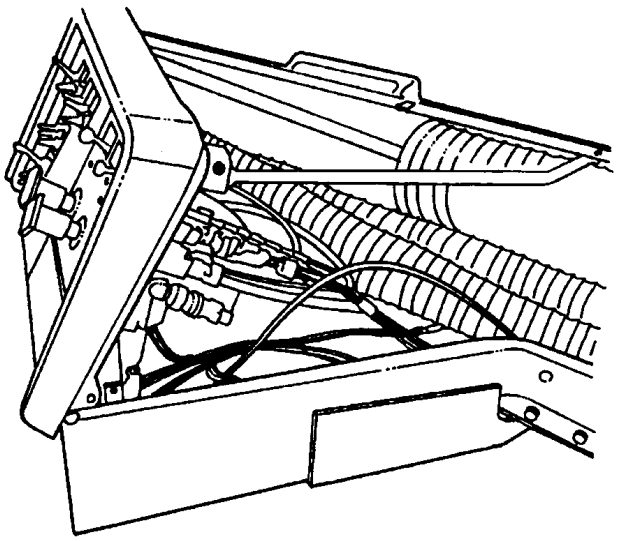

**Figure 58 Dash Panel Remove/Install (9800)**

4. Remove dash panel (Figure 58).
5. Remove four screws from cab control assembly (Figure 54).
6. Carefully slide control assembly out of dash (Figure 55).
7. Remove screw securing HOT-COLD control cable to control assembly (Figure 56).
8. Remove control cable end from HOT-COLD cable lever.
9. Inside Blend-Air unit, remove hold down clamp for HOT-COLD cable. Refer to Figure 59 and Figure 1.

10. Inside Blend-Air unit, remove clip that secures HOT-COLD cable to cab Blend-Air door, and disconnect cable from door. Refer to Figure 59 and Figure 1.

11. Remove HOT-COLD cable from Blend-Air unit and dash, taking note of cable routing and clipping.

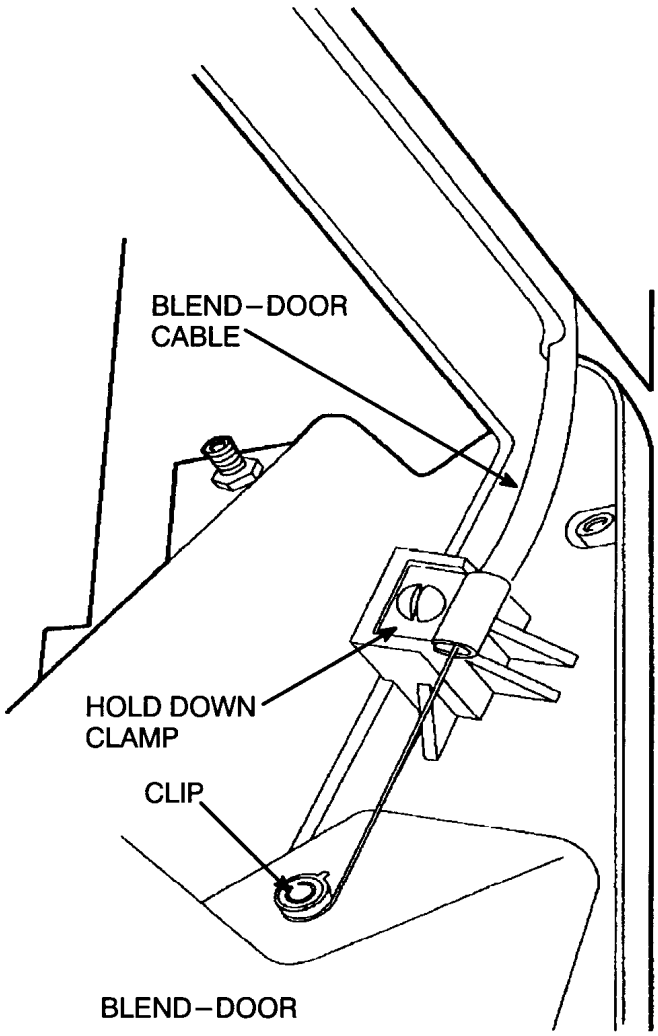


**Figure 59 Connection of HOT-COLD Cable to Cab Blend-Door Assembly**

## Install

**IMPORTANT –** In the following step, adjuster end of cable must be located at dash control assembly.

1. Route HOT-COLD cable from dash to Blend-Air unit as previously removed.

2. Verify cable works freely and is free of kinks and tight bends.

3. Connect cable end to HOT-COLD cable lever on control assembly (Figure 56).

4. Install screw securing HOT-COLD control cable to control assembly.

5. Slide control assembly into dash and secure with four mounting screws (Figure 54).

6. Inside Blend-Air unit, attach end of HOT-COLD cable to cab Blend-Air door and secure with clip removed previously. Refer to Figure 59.
7. Inside Blend-Air unit, install hold down clamp for HOT-COLD cable (Figure 59).
8. Verify that the HOT-COLD cable is routed and secured as it originally was.
9. Install dash panel (Figure 58).
10. Install floor mat using mounting hardware previously removed (Figure 57).
11. Install the passenger seat and Blend-Air unit cover. Refer to BLEND-AIR UNIT COVER, Install (See Install, page 17).
12. Adjust HOT-COLD cable as indicated in the following steps.
13. After adjustment is completed, connect negative battery cable.

### Control Cable - Adjustment

1. Remove four screws from cab control assembly (Figure 54).
2. Carefully slide control assembly out of dash (Figure 55).
3. Set HOT-COLD lever to full HOT position.
4. Turn cable adjuster so lever is near end of slot but not touching end of slot.
5. Move lever to maximum COLD position.
6. Turn cable adjuster again so that lever is the same distance from the slot end in both directions.
7. Slide control assembly into dash and secure with four mounting screws (Figure 54).

## 7.20. BLOWER SWITCH – CAB

### Remove

Refer to Figure 60 and Figure 61.

1. On 92/93/94/9900 models only, remove screws from dash cover panel, and remove panel (Figure 60).
2. Remove four screws from cab control assembly (Figure 61) and carefully slide assembly out of dash.
3. Remove electrical connector from blower switch.
4. Remove blower switch mounting screws. Remove switch.

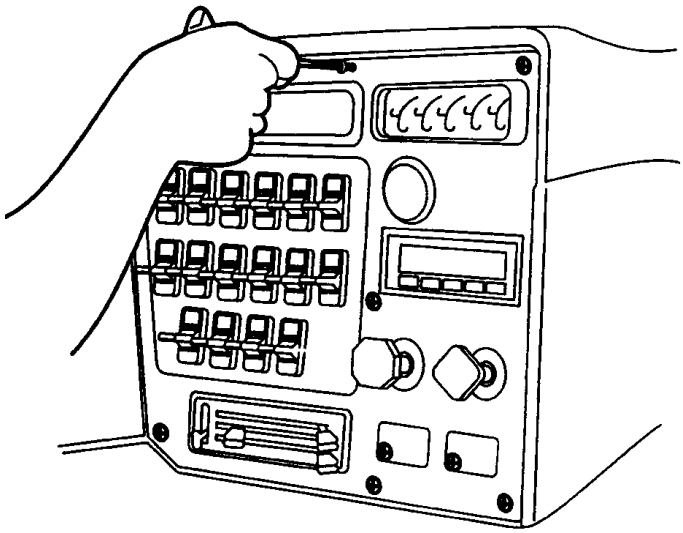

**Figure 60 Dash Cover Panel Remove/Install (92/93/94/9900 Models)**

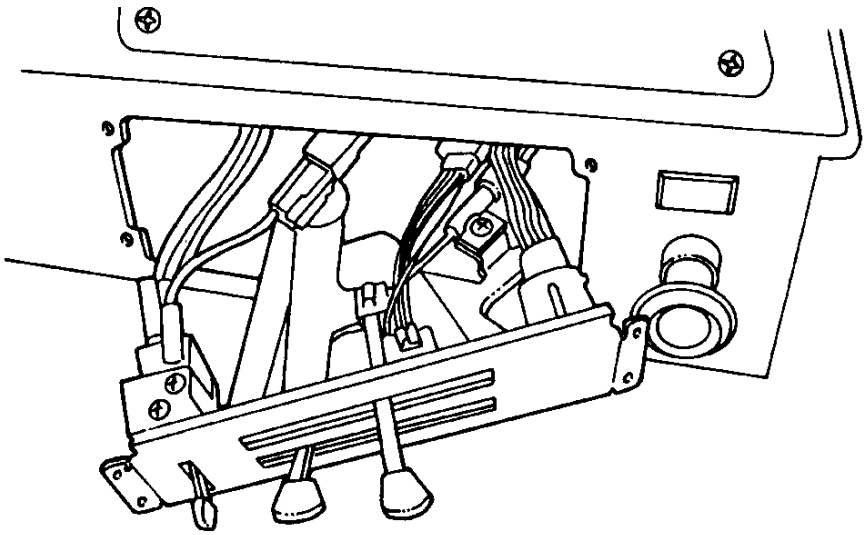

**Figure 61 Cab Control Assembly**

## Install

1. Install blower switch to control assembly with screws.
2. Install electrical connector to blower switch.
3. Slide cab control assembly into position in dash and secure with four mounting screws.
4. On 92/93/94/9900 models only, install dash cover panel and secure with mounting screws removed previously (Figure 60).

## 7.21. AIR CONDITIONING AND HEATER CONTROL ASSEMBLY – SLEEPER

### Remove

Refer to Figure 62 and Figure 63.

1. Remove four screws from sleeper control assembly (Figure 62).
2. Carefully slide sleeper control assembly out (Figure 63).
3. Remove and replace individual components as necessary.

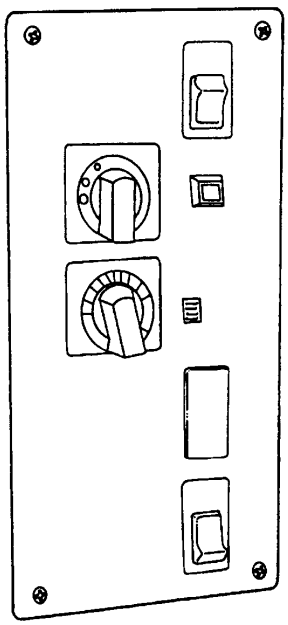

**Figure 62 Sleeper Control Assembly Screws**

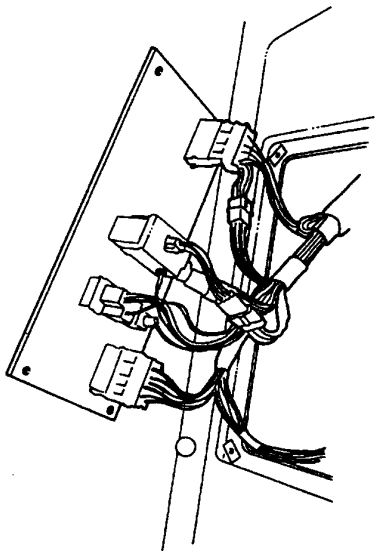

**Figure 63 Sleeper Control Assembly**

### Install

1. Install replacement components onto sleeper control assembly.
2. Connect all sleeper control assembly electrical connectors (Figure 63).
3. Slide sleeper control assembly into position.
4. Install four mounting screws (Figure 62).

## 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 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.) |

**Table 2 Specifications (cont.)**

| Specification | CCI Compressor System | Sanden Compressor System |
|---|---|---|
| Compressor Oil Type | Synthetic Ester Oil<br>- P/N ZGGR725007<br><br>Non-Synthetic Ester Oil<br>- P/N ZGG19356 | Polyalkylene Glycol (PAG) Oil<br>International P/N: ZGGR6822 |
| System Oil Capacity | 16.0 fl.oz. (473 cc)<br><br>NOTE: This is a reference value only. Refer to S16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual, to determine oil quantities during service. | 10.1 fl.oz. (300 cc)<br><br>NOTE: This is a reference value only. Refer to S16019, AIR CONDITIONING BASIC THEORY, SYSTEM DIAGNOSIS AND SERVICE in the Master Service Manual, to determine oil quantities during service. |
| Compressor Oil Level* (Vertical Mounting) | 1 to 1-3/8 inch**<br><br>(25.4 to 34.9 mm) | Compressor must be removed and drained to measure oil level. |
| Compressor Oil Level* (Horizontal Mounting) | 1 to 1-7/16 inch**<br><br>(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**<br><br>(46.0 to 56.3 mm) | Compressor must be removed and drained to measure oil level. |
| Lubricating Oil Type (for O-rings, threads, etc.)<br><br>**CAUTION – Do not use this oil as refrigerant oil.** | Mineral Oil<br><br>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) | |

**Table 2 Specifications (cont.)**

| Specification | CCI Compressor System | Sanden Compressor System |
|---|---|---|
| High Pressure Safety Switch (Normally Open)*** - Opens At | Min. 150 psi (1034 kPa) | |
| Shutter Switch (Normally Closed)*** - Opens at | 90 to 110 psi (621 to 758 kPa) | |
| Shutter Switch (Normally Closed)*** - Closes at | 240 to 260 psi (1655 to 1793 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) | |
| * Measuring the compressor oil level with a dipstick, provides a rough measure of the quantity of oil in the compressor only.<br><br>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 fl.oz. (355 cc) of oil: the amount present in the compressor during normal operation. Another 4 fl.oz. (118 cc) of additional oil is distributed throughout the system when the system is operating with the full 16 fl.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 |
|---|---|
| Bunk Blend-Door Actuator | Blend-Air Unit |
| Bunk Blend-Door | Blend-Air Unit |
| Evaporator | 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 |
| Filter | Blend-Air Unit |

**Table 3 Component Locations (cont.)**

| Component | Location |
|---|---|
| Thermostatic Switch | Blend-Air Unit |
| Cab Blower Motor Assembly | Blend-Air Unit |
| Bunk Blower Motor Assembly Housing | Behind Blend-Air Unit |
| Cab Blend-Door Actuator | Blend-Air Unit |
| Cab Blend-Door Assembly | Blend-Air Unit |
| Cab Blower Motor Speed Control Resistor | Blend-Air Unit |
| Bunk Blower Motor Speed Control Resistor | Bunk Blower Motor Assembly Housing |
| Heater Core | Blend-Air Unit |
| Cab Control Assembly | Dash Panel |
| A/C Switch | Cab Control Assembly |
| Heater Hose Connections | Under Cab Floor |
| A/C and Heater Relays | Behind Center Console |

## 11. TORQUE CHART

**Table 4 Torque Chart**

| Joint No. - Refer to Figure 64 | 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 |

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

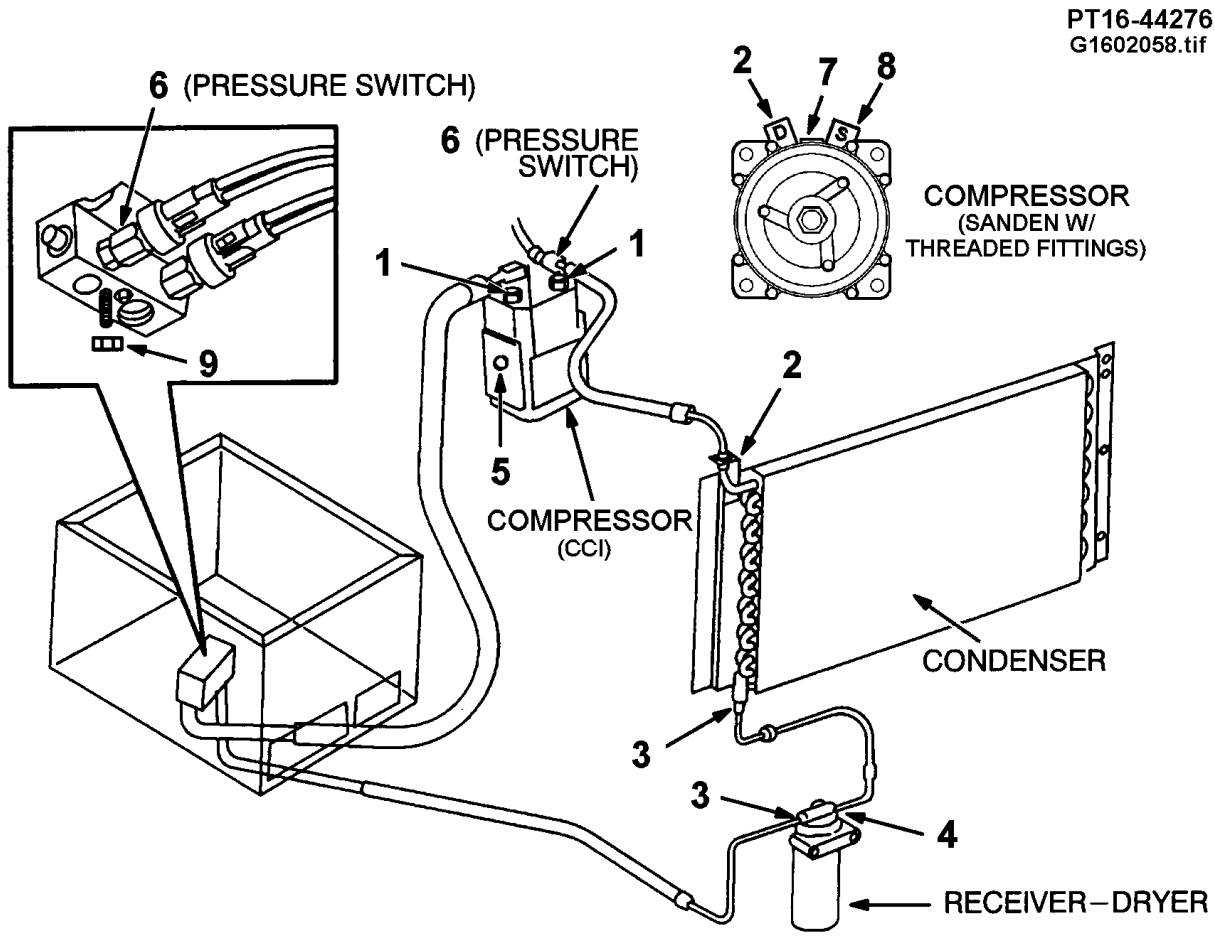


**Figure 64 Torque Locations**