
Foreword

This service manual is the result of the dedication of The Dometic Corporation and its engineers in giving service people the necessary instruction for making accurate analyses of certain conditions. Provided is a diagnostic chart leading a qualified mechanic into the service manual pages to locate and solve symptoms which may occur. Dometic has continued its commitment in providing service people with this, the most up-to-date information about servicing Dometic RV accessories.

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This program will address the most common system problems associated with the Duo-Therm Heat Pumps supplied by The Dometic Corporation. Our intent is to provide you with a guideline of checks to make, should you encounter one of the following symptoms.

SYMPTOM	CAUSE	REFER TO	STEP
1. MECHANICAL CONTROL Unit does not run; no fan, no compressor.	Operating Instructions AC voltage Breaker Selector switch Wiring	1.1 2.1 2.2 4.1 2.3	
2. ELECTRONIC & BIMETAL CONTROL Unit does not run; no fan, no compressor.	Operating Instructions AC voltage DC Voltage Breaker Wiring Thermostat Relay board Cable Assembly	1.2 or 1.3 2.1 3 2.2 2.3 4.2 4.5 4.3	B or C
3. MECHANICAL CONTROL Fan operates; compressor will not come on (does not hum).	Wiring Selector Switch Thermostat Changeover thermostat Compressor	2.3 4.1 4.2 4.4 4.11	A
4. ELECTRONIC & BIMETAL CONTROL Fan operates; compressor will not come on (does not hum).	Wiring Changeover thermostat Cable assembly Thermostat Relay Board Compressor	2.3 4.4 4.3 4.2 4.5 4.11	B or C
5. MECHANICAL, ELECTRONIC & BIMETAL RELAY CONTROL Fan operates; compressor tries to start, cycles OFF and hums again, or blows circuit breaker.	AC voltage PTCR or start relay Start or run capacitor Compressor	2.1 4.6 4.7 & 4.8 4.11	
6. MECHANICAL, ELECTRONIC & BIMETAL RELAY CONTROL Fan operates; compressor runs for a short while, cycles off, cycles back on, but doesn't run.	Short cycle Air Flow obstruction Condenser fan Compressor Refrigerant system	5.1 5.2 6.5 4.11 7.1	
7. MECHANICAL CONTROL Compressor runs, no fan.	Wiring Selector Switch Run Capacitor Motor	2.3 4.1 4.8 4.9	
8. ELECTRONIC & BIMETAL CONTROL Compressor runs, no fan.	Wiring Run Capacitor Motor Thermostat Relay Board Cable Assembly Relay, Fan Speed	2.3 4.8 4.9 4.2 4.5 4.3 4.13	B or C

SYMPTOM	CAUSE	REFER TO	STEP
9. MECHANICAL CONTROL Fan runs; but not on all speeds	Selector Switch Wiring Motor	4.1 2.3 4.9	B or C
10. ELECTRONIC & BIMETAL CONTROL Fan runs; but not on all speeds	Wiring Motor Thermostat Relay Board Cable Assembly	2.3 4.9 4.2 4.5 4.3	
11. MECHANICAL, ELECTRONIC & BIMETAL CONTROL WITH AIR DISTRIBUTION BOX Evaporator freezes up.	Ambient Temperature Air Flow Obstruction Low Charge Capillary Tube Blockage Evaporator Blockage	6.1 5.2 7.1 7.2 7.2	
12. ELECTRONIC & BIMETAL CONTROL WITH DUCT IN CEILING Evaporator freezes up.	Ambient Temperature Air Distribution System Low Charge Capillary Tube Blockage Evaporator Blockage	6.1 5.3 7.1 7.2 7.2	
13. MECHANICAL, ELECTRONIC & BIMETAL CONTROL WITH AIR DISTRIBUTION BOX Insufficient cooling or heating; compressor runs constantly.	Air Flow Obstruction Heat Gain/Heat Loss Refrigerant System Compressor	5.2 6.2 7.1 4.11	A
14. ELECTRONIC & BIMETAL CONTROL WITH DUCT IN CEILING. Insufficient cooling or heating; compressor runs constantly.	Air Distribution System Heat Gain/Heat Loss Refrigerant System Compressor	5.3 6.2 7.1 4.11	
15. MECHANICAL CONTROL Unit operators in wrong mode (cool instead of heat pump or reversed)	Operating Instructions Thermostat Changeover Thermostat Relay, Double Throw Reversing Valve	1.1 4.2 4.4 4.10 4.12	
16. ELECTRONIC & BIMETAL CONTROL Unit operate in wrong mode (cool instead of heat pump or reversed)	Operating Instructions Thermostat Changeover Thermostat Relay, Double Throw Reversing Valve	1.2 or 1.3 4.2 4.4 4.10 4.12	
17. MECHANICAL, ELECTRONIC & BIMETAL RELAY CONTROL WITH AIR DISTRIBUTION BOX: Insufficient cooling; compressor cycles off occasionally.	Thermostat Air Flow Obstruction	4.2 5.2	A, B or C
18. ELECTRONIC & BIMETAL CONTROL WITH DUCT IN CEILING: Insufficient cooling; compressor cycles off occasionally	Air Distribution System Thermostat Relay Board	5.3 4.2 4.5	B or C

SYMPTOM	CAUSE	REFER TO	STEP
19. MECHANICAL, ELECTRONIC & BIMETAL CONTROL WITH AIR DISTRIBUTION BOX Insufficient cooling or heating; compressor often cycles off.	Short Cycle	5.1	A
20. ELECTRONIC & BIMETAL CONTROL WITH DUCT IN CEILING Insufficient cooling or heating; compressor often cycles off.	Short Cycle Air Distribution System	5.1 5.3	B
21. MECHANICAL, ELECTRONIC & BIMETAL CONTROL WITH AIR DISTRIBUTION BOX Insufficient cooling or heating with reduced air output.	Air Flow Obstruction Blower Wheel	5.2 6.5	
22. ELECTRONIC & BIMETAL CONTROL WITH DUCT IN CEILING Insufficient cooling with reduced air output.	Air Distribution System Blower Wheel	5.3 6.5	
23. MECHANICAL CONTROL Excessive cooling or heating.	Thermostat	4.2	A
24. ELECTRONIC & BIMETAL CONTROL Excessive cooling or heating.	Thermostat Relay Board	4.2 4.5	B or C
25. MECHANICAL, ELECTRONIC & BIMETAL RELAY CONTROL Noisy operation.	Loose Parts Fan Blades Hitting Tubing Vibration	6.3 6.5 6.4	
26. MECHANICAL, ELECTRONIC & BIMETAL RELAY CONTROL Water leaks into RV.	Installation Drain Hole Plugged Air Conditioner Loose Mounting Gasket Damaged Evaporator Bulkhead Leak	6.6 6.7 6.6 6.6 6.8	

SECTION 1

OPERATION

The heat pump operates in two different modes: cooling and heating.

The same mechanism is used for both cycles, but the travel or flow of refrigerant is reversed to change from cooling to heating. The items used to accomplish this are a compressor, an inside coil, an outside coil, capillary tube or tubes (the metering device/s), a series of copper lines (refrigerant grade tubing), a reversing valve, an air movement system (motor and wheel or blades), and refrigerant (R22).

THE COOLING MODE: To cool the air inside a structure, heat is removed from the inside air and released to the outside air or ambient.

To accomplish this, first air flow is established to pass over both coils (inside and outside). Next, a refrigerant cycle is established to cause refrigerant (R22) to flow through both coils.

The refrigerant cycle starts at the compressor. Its function is to take the low pressure R22 vapor and discharge it as high pressure vapor. As the refrigerant (R22) is compressed, it gives off heat causing the discharge line to be quite warm or hot to the touch in hot weather.

The R22 high pressure vapor leaves the compressor through the discharge line and enters the reversing valve. The reversing valve routes the high pressure vapor to the outside coil. In the cooling mode, the outside coil is a condenser coil.

The high pressure R22 vapor enters the outside coil (condenser). Here it is cooled and condensed into liquid R22 by passing through the coil. The heat removed from the refrigerant is expelled to the outside air. The refrigerant leaves the outside coil as high pressure liquid.

As the high pressure liquid R22 leaves the outside coil (condenser) it passes through the small capillary tube or tubes. This is the metering or flow control device in the sealed system. It determines the amount and force of which the R22 enters the inside coil. It is **imperative** that the capillary tube's length and diameter not be altered. If the tube is altered, the unit will not operate as efficiently as it should.

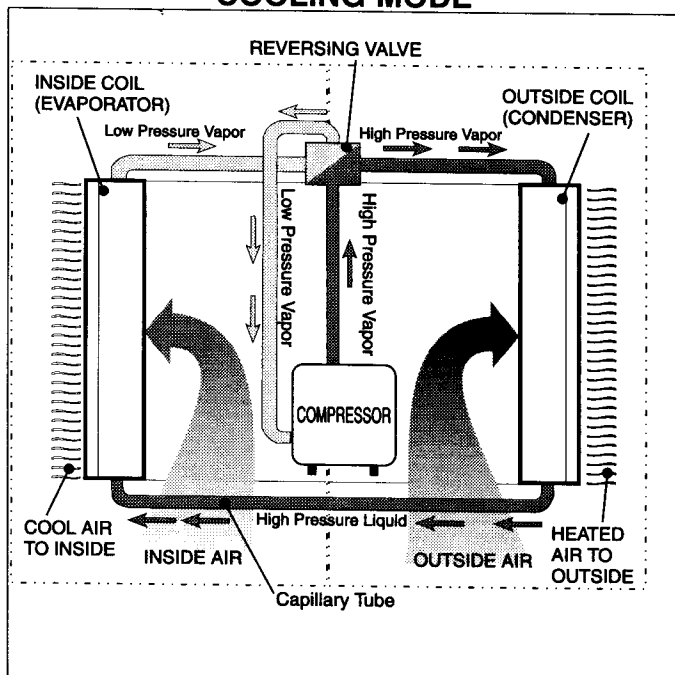
The high pressure liquid R22 enters the inside coil in a controlled amount from the capillary tube. When the liquid enters the low pressure atmosphere of the inside coil (evaporator) it evaporates into vapor. When the evaporative process takes place, heat is removed from the air flowing through the inside coil (evaporator). The air with the heat removed is returned to the inside of the structure via the air movement system (blower assembly).

From the inside coil (evaporator), the low pressure refrigerant (R22) vapor returns to the reversing valve. The reversing valve routes the low pressure vapor to the compressor through the suction line to start the cooling process again.

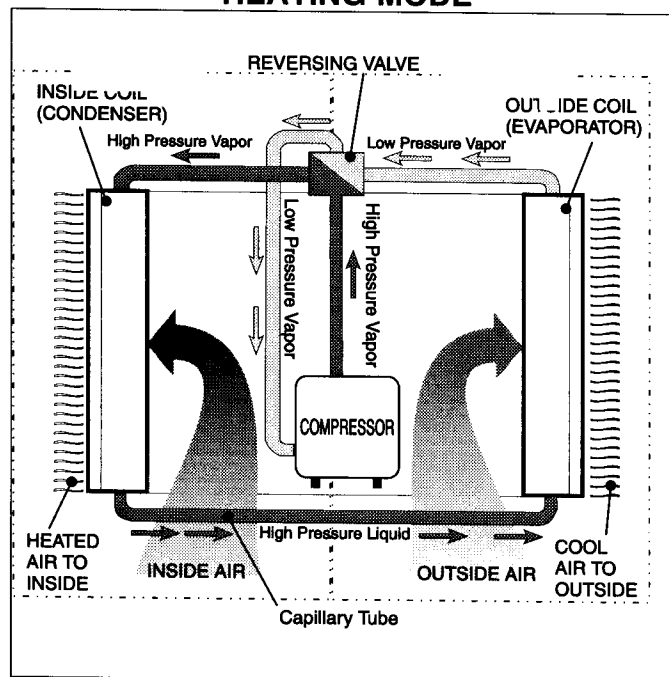
THE HEATING MODE: To heat the air inside a structure, heat is removed from the outside air or ambient and released to the inside air.

To accomplish this, first air flow is established to pass over both coils (inside and outside). Next, a refrigerant cycle is established to cause the refrigerant (R22) to flow through both coils.

COOLING MODE



HEATING MODE



The refrigerant cycle starts at the compressor. Its function is to take the low pressure R22 vapor and discharge it as high pressure vapor. As the refrigerant (R22) is compressed, it gives off heat causing the discharge line to be quite warm to the touch.

The R22 high pressure vapor leaves the compressor through the discharge line and enters the reversing valve. The reversing valve routes the high pressure vapor to the inside coil. In the heating mode the inside coil is a condenser coil.

The high pressure R22 vapor enters the inside coil (condenser). Here it is cooled and condensed into liquid R22 by passing through the coil. The heat removed from the refrigerant is expelled to the inside air. The refrigerant leaves the inside coil as high pressure liquid.

As the high pressure liquid R22 leaves the inside coil (condenser) it passes through the small capillary tube or tubes. This is the metering or flow control device in the sealed system. It determines the amount and force of which the R22 enters the outside coil.

It is imperative that the capillary tube's length and diameter not be altered. If the tube is altered, the unit will not operate as efficiently as it should.

The high pressure liquid R22 enters the outside coil in a controlled amount from the capillary tube. When the liquid enters the low pressure atmosphere of the outside coil (evaporator) it evaporates into vapor. When the evaporative process takes place, heat is removed from the air flowing through the outside coil (evaporator). The air with the heat removed is returned to the outside air (ambient) via the air movement system (blower assembly).

From the outside coil (evaporator), the low pressure refrigerant (R22) vapor returns to the reversing valve. The reversing valve routes the low pressure vapor to the compressor through the suction line to start the heating process again.

GENERAL INFORMATION

The roof-top heat pump was designed to operate in a MILD GEOGRAPHICAL AREA for heating where the heat loss is minimal. The heat pump was designed to operate down to an outside ambient temperature of 40°F. At 40°F., the outdoor thermostat will turn off the heat pump circuit and start up the coach's main furnace. As long as the temperature remains below 40 degrees, the main furnace will heat your home. As the outside temperature increases to 45°F., the outdoor thermostat switches back to the heat pump circuit.

NOTE: Model 59126.501 does not have an outdoor thermostat. When outdoor temperature is at or below 40°F., use the main furnace to heat your home.

The advantages of the heat pump are:

1. User friendly; only one unit for both heating and cooling;
2. Heat pump heating uses campsite electrical hookup and saves on trips to refill L.P. tanks;
3. When used in mild climates where the outdoor temperature range is 40 degrees or higher, an LP furnace is not needed.

NOTE: Geographical location usage should be determined before omitting a central furnace.

TO MAINTAIN DESIRED TEMPERATURE:

The ability of the air conditioner mode to maintain the desired inside temperature depends on the heat gain of the RV. Some preventative measures taken by the occupants of the RV can reduce the heat gain and improve the performance of the air conditioner. During extremely high outdoor temperatures, the heat gain of the vehicle may be reduced by:

- a. Parking the RV in a shaded area
- b. Using window shades (blinds and/or curtains)
- c. Keeping windows and doors shut or minimizing usage
- d. Avoiding the use of heat producing appliances

Starting the air conditioner early in the morning and giving it a "head start" on the expected high outdoor ambient will greatly improved its ability to maintain the desired indoor temperature.

NOTE

The manufacturer of this heat pump will not be responsible for damage caused by condensed moisture on ceilings or other surfaces. Air contains moisture and this moisture tends to condense on cold surfaces. When air enters the RV, condensed moisture may appear on the ceiling, windows, metal parts, etc. The heat pump removes this moisture from the air during normal operation. Keeping doors and windows closed when this heat pump is in operation will minimize condensed moisture on cold surfaces.

Operating instructions can change from one model to another.

Be sure you are familiar with the proper operating instructions for the specific model of heat pump you are diagnosing. An installation and operating manual is packaged with each heat pump system.

1.1 MECHANICAL CONTROLS

This type of heat pump has an air distribution box that has a mechanical selector switch and thermostat installed in it.

NOTE: Remember to check the installation and operating instructions for the specific model you are diagnosing.

CONTROLS:

The **Selector Switch** has eight positions including "OFF". This controls fan speed, heating mode and cooling modes.

The **Thermostat** controls the temperature range from 65°F. on the coldest side to 90°F. on the warmest side. In the cooling/heating mode, the compressor ON/OFF is controlled by the thermostat setting.

COOLING OPERATION:

Set the thermostat at the desired temperature level.

Select the fan speed that best satisfies your needs:

- HIGH COOL:** Selected when maximum cooling and dehumidification required.
- LOW COOL:** Selected when room is at desired comfort level and needs to be maintained. Normally this speed is used for nighttime operation.

NOTE: The blower runs continuously to circulate air and maintain an even temperature. The compressor will come on when cooling is required to maintain the selected temperature level.

! WARNING

AFTER SHUTTING THE HEAT PUMP DOWN WITH EITHER SELECTOR SWITCH OR THERMOSTAT, WAIT AT LEAST TWO (2) MINUTES BEFORE RESTARTING. THIS ALLOWS THE REFRIGERANT PRESSURE TO EQUALIZE AND COMPRESSOR TO RESTART EASILY.

FAN OPERATION:

This will circulate the air in your RV without cooling or heating. There are two positions: HIGH FAN or LOW FAN to select from, depending upon personal choice.

HEATING OPERATION:

NOTE: This heat pump will not replace a furnace for heating your RV in cold weather. The intent is to remove the chill on cool days or mornings.

- Turn the selector switch to "HEAT PUMP";
- The Fan and Compressor will come on and begin heating.
- When desired temperature level in RV is reached, the blower will run continuously to circulate air and maintain an even temperature. The compressor will cycle as required to maintain selected temperature.

OFF POSITION: This position turns the unit off.

1.2 ELECTRONIC (DIGITAL) CONTROLS

This type of heat pump is controlled by a DIGITAL wall-mounted thermostat. The air distribution can be an air distribution box or a ducted air system.

NOTE: Remember to check the installation and operating instructions for the specific model you are diagnosing.

DIGITAL THERMOSTAT OPERATION

Your heat pump is operated from the control panel of the electronic wall thermostat. When the furnace is connected to this thermostat, it will operate from the same control panel.

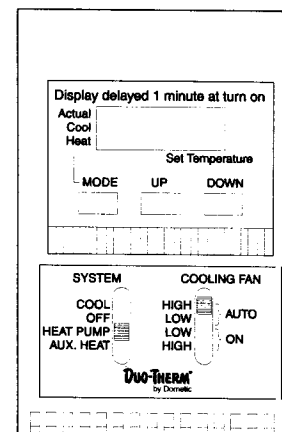
Identification and operational descriptions for all control panel switches and display are listed below:

- A. **Liquid Crystal Display:** This display will be illuminated any time the system is in operation. **NOTE:** When switching from OFF to any other mode, the liquid crystal display may not illuminate for approximately three minutes.

The display shows the operator both the mode of the display (indicated by the arrow at the left side of the display), and the temperature for that mode.

There are three display modes: ACTUAL, COOL and HEAT.

DIGITAL



The operator may choose the mode he desires to view by depressing the "MODE" switch. Each time the MODE switch is depressed, the display advances to the next mode. If the display is left in either COOL or HEAT, the thermostat will automatically return the display to ACTUAL in approximately three minutes.

A description of the three modes is:

ACTUAL: When in actual mode, the display is indicating current room temperature.

COOL SET: When in COOL mode, the display is indicating the current cooling set-point temperature. At this time the cooling system set-point temperature may be adjusted up or down to meet the individual's comfort level. See "Adjusting Set-Point" for further instructions.

HEAT SET: When in the HEAT mode, the display is indicating the current heating system set-point temperature. At this time, the heating system set-point temperature may be adjusted up or down to meet the operator's comfort level. See "Adjusting Set-Point" for further instructions.

All three display modes can be accessed without affecting the operation of the system. The system operation will remain normal unless a change is made to the set-point to force a change in the system operation.

B. System Switch: The system switch has four positions to control the operation of the heating and cooling systems. They are as follows:

COOL: When in the COOL position, the compressor will cycle from the cooling system set-point. Blower operation will be controlled by the position of the Cooling Fan Switch.

HEAT: When in the heat position, the heating system will cycle from the heating system set-point. The heating blower will operate per the heating system manufacturer specifications.

OFF: When in the OFF position, no thermostat or system operation will occur. The liquid crystal will indicate room temperature until backup power is depleted (approximately two minutes).

AUXILIARY HEAT:

- 1) Set the system switch to AUX;
- 2) Set the FAN switch AUTO;

NOTE: The AUXILIARY HEAT position is only used if:

- a) You have a factory installed furnace operating from the heat pump system thermostat.
- b) The outside temperature is above 40°F. and you wish to operate your furnace.
- c) For quick interior warm-ups.
- d) There is no 115 volt AC power available to operate your heat pump and you must operate the furnace for your comfort.

C. FAN SWITCH: The Fan Switch has four positions to control the operation of the heat pump blower. It controls the operation of the blower only after the system switch is placed into the COOL or HEAT PUMP position.

HIGH AUTO: When in the high auto position, the heat pump blower operates at high speed and cycles off and on with the compressor.

LOW AUTO: When in low auto position, the heat pump blower operates at low speed and cycles off and on with the compressor.

HIGH and LOW ON: When in the high or low position, the heat pump blower operates continuously. The compressor cycles off and on as needed.

MOMENTARY SWITCHES: There are three momentary switches. Momentary switches are activated by depressing the center of the switch. A description of these three switches follows:

MODE: Depressing this switch advances the display mode from ACTUAL to COOL, HEAT and back to ACTUAL. When using this switch, you are indicating your desire to check or adjust the set-point temperatures for cooling or heating. The cool setting determines the temperature at which the air conditioner will start to operate. The heat setting determines the temperature at which the heating system will start to operate.

UP: Depressing this switch increases the temperature set-point.

DOWN: Depressing this switch decreases the temperature set-point.

To adjust the set-point for heating or cooling, press the MODE button until the arrow on the display indicates the desired set-point you wish to change: COOL or HEAT. The display will indicate the current set-point of the thermostat. Press UP or DOWN to change the set-point. Once the new desired set-point is displayed, press the MODE button until the arrow is pointing to ACTUAL. If the thermostat is left in the COOL or HEAT mode, the display will return to ACTUAL in about three minutes. After the display returns to ACTUAL, it takes 15 to 30 seconds for the thermostat to recognize the changes made to the set-point.

1.3 BIMETAL CONTROLS

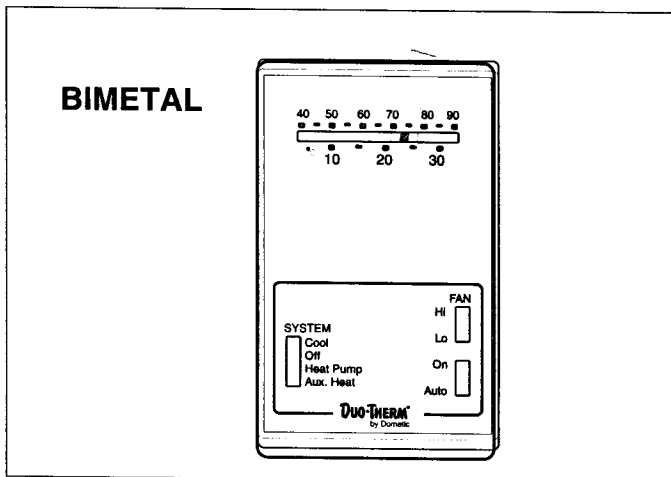
This type of heat pump is controlled by a Bimetal type wall thermostat. The air distribution can be an air distribution box or a ducted air system.

NOTE: Remember to check the installation and operating instructions for the specific model you are diagnosing.

BIMETAL THERMOSTAT OPERATION:

COOLING:

- A. Set the System Switch to Cool;
- B. Set the Temperature Lever to your comfort level.
- C. Set the Fan Switch to:
 - 1) **AUTO:** The fan will cycle off and on with the compressor.
 - 2) **ON:** The fan will run continuously. The compressor will cycle off and on with the thermostat demand.



HEATING

- A. Set the System Switch to HEAT PUMP.
- B. Set the Temperature Lever to your comfort level.
- C. Set the Fan Switch to:
 - 1) **AUTO:** The fan will cycle off and on with the compressor.
 - 2) **ON:** The fan will run continuously. The compressor will cycle off and on with the thermostat.

AUXILIARY HEAT:

- A. Set the System Switch to AUX. HEAT.
- B. Set the Fan Switch to AUTO.
- C. Set the temperature lever to your comfort level.

NOTE: The auxiliary heat position is only used if:

- 1) You have a factory installed furnace operating from the heat pump system thermostat.
- 2) The outside temperature is above 40°F. and you wish to operate your furnace.
- 3) For quick interior warm-up.
- 4) There is no 115 volt AC power available to operate your heat pump and you must operate the furnace for your comfort.

FAN:

To circulate air without heating or cooling:

- A. Set the System Switch to OFF.
- B. Set the Fan Switch to ON.

HIGH/LOW:

HIGH: Fan speed position.

LOW: Fan speed position.

SECTION 2

AC VOLTAGE REQUIREMENTS

2.1 AC VOLTAGE

The heat pump is a 115V AC, 60 Hz. appliance. The proper operation range is between 103 volts and 126.5 volts. The voltage reading should be taken at the heat pump power supply leads. One test should be performed when the heat pump is turned OFF and another with it under a load. If the voltage is not within the proper operating range, it must be corrected before operating the heat pump.

! WARNING

THIS IS AN ENERGIZED CIRCUIT. SHOCK CAN OCCUR IF NOT TESTED PROPERLY. TESTING TO BE DONE BY A QUALIFIED SERVICE TECHNICIAN.

2.2 BREAKER

! WARNING

MAKE SURE THAT THE POWER SUPPLY TO THE UNIT IS DISCONNECTED BEFORE PERFORMING ANY WORK ON THE UNIT TO AVOID THE POSSIBILITY OF SHOCK INJURY OR DAMAGE TO THE EQUIPMENT.

The heat pump circuit is to be protected by a 20 amp time delay fuse or HACR (heating, air conditioner, refrigerator) breaker. By taking an amp reading at the heat pump's AC voltage supply line, you can determine if the breaker is tripping prematurely. Place a clamp-on type ammeter around the black wire from the breaker going to the heat pump; turn on the heat pump and record amp draw. If the breaker trips before the rated amperage, replace the breaker.

2.3 WIRING

! WARNING

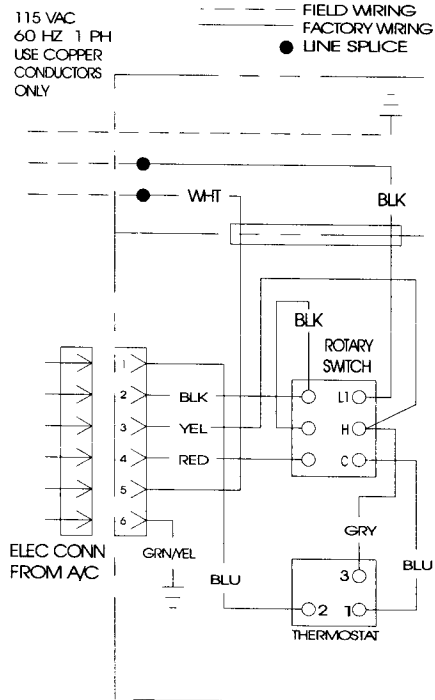
MAKE SURE THAT THE POWER SUPPLY TO THE UNIT IS DISCONNECTED BEFORE PERFORMING ANY WORK ON THE UNIT TO AVOID THE POSSIBILITY OF SHOCK INJURY OR DAMAGE TO THE EQUIPMENT.

With the line circuit breaker turned OFF, check to see if the heat pump is wired correctly. Each heat pump is supplied with a wiring diagram. Check all wires for proper location. If you have difficulty in reading wiring diagrams or schematics, please enroll in an electricity course at your local school or college.

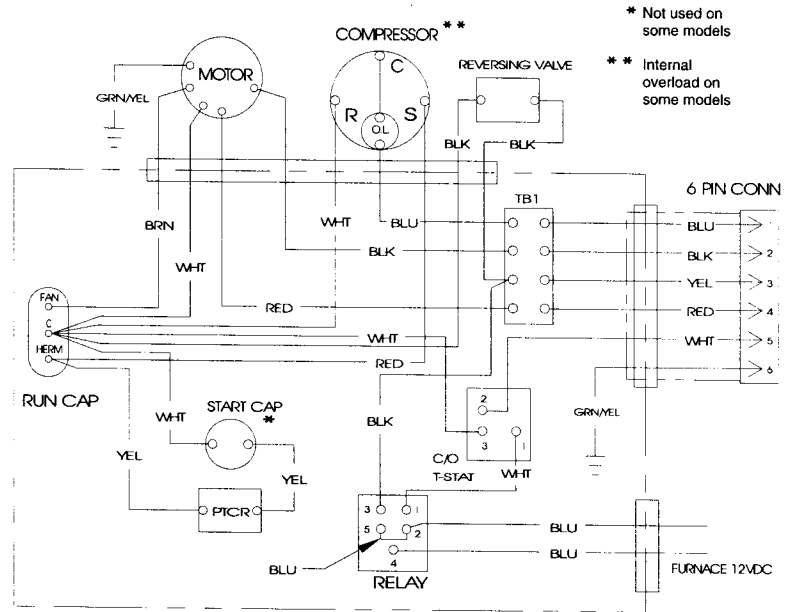
NOTE: BE SURE TO USE THE WIRING DIAGRAM FOR THE SPECIFIC MODEL OF UNIT YOU ARE DIAGNOSING.

TYPICAL MECHANICAL CONTROL WIRING DIAGRAM

AIR BOX WIRING DIAGRAM

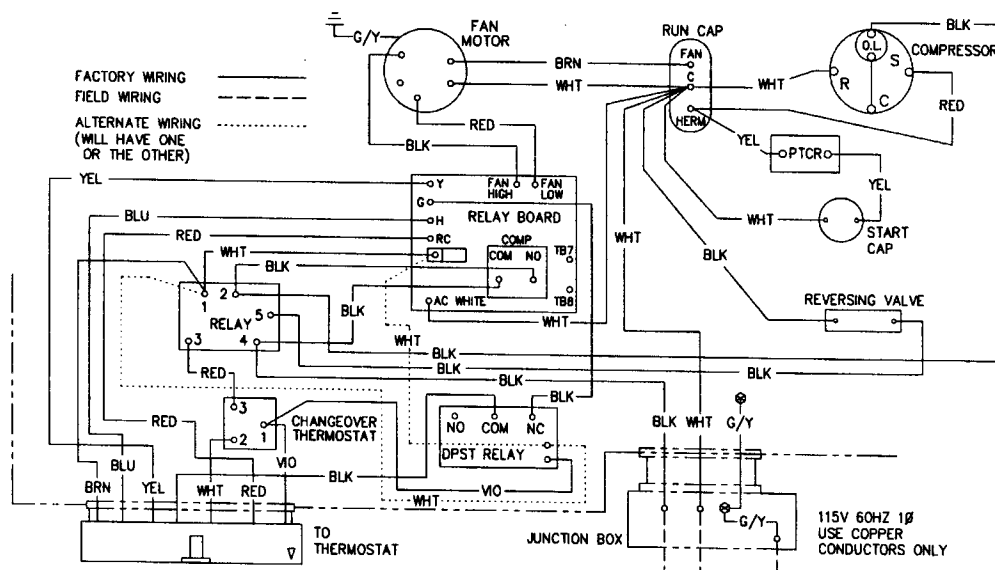


ELECTRICAL BOX WIRING DIAGRAM



TYPICAL ROOF MOUNTED REMOTE THERMOSTAT CONTROL WIRING DIAGRAM

NOTE: See Section 4.2B & C for
Thermostat Wiring



SECTION 3

DC VOLT REQUIREMENTS

3.1 DC VOLTS

On certain models of electronic heat pumps, a DC volt supply is wired to the control board. The operating range is 10 to 16 volts. If voltage is below 10 volts, you could experience improper operation of the components within the heat pump.

NOTE: See Section 4.2B & C for Thermostat Wiring.

SECTION 4

COMPONENTS

! WARNING

MAKE SURE THAT THE POWER SUPPLY TO THE UNIT IS DISCONNECTED BEFORE PERFORMING ANY WORK ON THE UNIT TO AVOID THE POSSIBILITY OF SHOCK INJURY OR DAMAGE TO THE EQUIPMENT.

4.1 SELECTOR SWITCH

The selector switch in a mechanical heat pump has several positions. The various switch positions can be tested for continuity with a volt/ohm meter set on the highest ohm scale.

A. MODEL 59126.501

First turn the 20 amp heat pump breaker to OFF. Next, remove the wires from the switch. With the switch in the OFF position, you should not have continuity between Terminal L1 and any other white numbered terminal.

In the HIGH 2 FAN position, you should have continuity between Terminal L1 and Terminal 4 only.

In the HIGH 1 FAN position, you should have continuity between Terminal L1 and Terminal 2 only.

In the LOW FAN position you should have continuity between Terminal L1 and Terminal 1 only.

In the LOW COOLING position, you should have continuity between Terminal L1 and Terminal C; and Terminal L1 and Terminal 1 only.

In the HIGH 1 COOLING position, you should have continuity between Terminal L1 and Terminal C; and Terminal L1 and Terminal 2 only.

In the HIGH 2 COOLING position, you should have continuity between Terminal L1 and Terminal C; and Terminal L1 and Terminal 4 only.

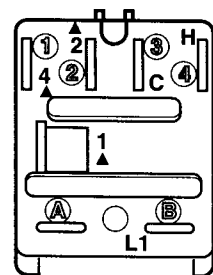
In the HEAT PUMP position, you should have continuity between Terminal L1 and Terminal H; and Terminal L1 and Terminal 4 only.

NOTE: The terminals are identified with white ink.

Be sure to check the switch in all positions and be sure you have continuity only on the terminals for the selected position. Lack of continuity or continuity on incorrect terminals designates a defective switch, and it must be replaced.

NOTE: The numbers without circles are the white ink-stamped numbers.

POSITION	TERMINALS
OFF	
HIGH 2 FAN	L1 and 4
HIGH 1 FAN	L1 and 2
LOW FAN	L1 and 1
LOW COOLING	L1 and C; L1 and 1
HIGH 1 COOLING	L1 and C; L1 and 2
HIGH 2 COOLING	L1 and C; L1 and 4
HEAT PUMP	L1 and H; L1 and 4



BACK VIEW OF TYPICAL
SELECTOR SWITCH

B. MODEL 59126.502, 630025

First, turn the 20 amp air conditioner breaker to OFF. Next, remove the wires from the switch. With the switch in the OFF position, you should not have continuity between Terminal L1 and any other white numbered terminal.

In the 1st HIGH FAN position you should have continuity between Terminal L1 and Terminal 1 only.

In the 2nd HIGH FAN position, you should have continuity between Terminal L1 and Terminal 2 only.

In the LOW FAN position you should have continuity between Terminal L1 and terminal 4 only.

In the 1st HIGH COOLING position you should have continuity between Terminal L1 and Terminal H; and Terminal L1 and Terminal 1 only.

In the 2nd HIGH COOLING position, you should have continuity between Terminal L1 and H; and Terminal L1 and Terminal 2 only.

In the LOW COOLING position, you should have continuity between Terminal L1 and Terminal H; and Terminal L1 and Terminal 4 only.

In the 1st HIGH HEATING position, you should have continuity between Terminal L1 and Terminal C; and Terminal L1 and Terminal 1 only.

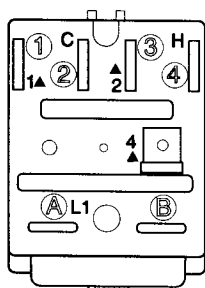
In the 2nd HIGH HEATING position, you should have continuity between Terminal L1 and Terminal C; and Terminal L1 and Terminal 2 only.

In the LOW HEATING position, you should have continuity between Terminal L1 and Terminal C; and Terminal L1 and Terminal 4 only.

Be sure to check the switch in all positions and be sure you have continuity only on the terminals for the selected position. Lack of continuity or continuity on incorrect terminals designates a defective switch, and it must be replaced.

NOTE: Numbers without circles are the white ink stamped numbers.

POSITION	TERMINALS
OFF	
1st HIGH FAN	L1 and 1
2nd HIGH FAN	L1 and 2
LOW FAN	L1 and 4
1st HIGH COOLING	L1 and H; L1 and 1
2nd HIGH COOLING	L1 and H; L1 and 2
LOW COOLING	L1 and H; L1 and 4
1st HIGH HEATING	L1 and C; L1 and 1
2nd HIGH HEATING	L1 and C; L1 and 2
LOW HEATING	L1 and C; L1 and 4



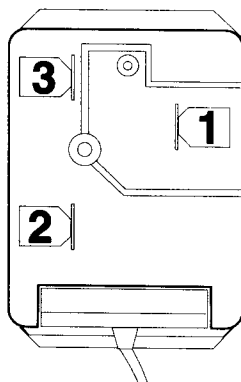
BACK VIEW OF TYPICAL SELECTOR SWITCH

4.2 THERMOSTAT

There are three types of thermostats used on heat pump units. Each type is explained in this section.

A. MECHANICAL

This type is used on the mechanical series of heat pumps. The thermostat controls the ON/OFF cycling of the compressor. It has three terminals. The air temperature around the sensor tube should be between approximate 65°F. and 90°F. To check the thermostat for operation, turn the heat pump circuit breaker off, and disconnect the wires to the thermostat. Turn the control knob to COOLER. You should have continuity between Terminals 2 to 3 and **no** continuity between Terminals 2 to 1. Turn the thermostat to WARMER. You should **not** have continuity between Terminals 2 to 3; and have continuity between Terminals 2 to 1. If you have incorrect readings, replace the thermostat. If you have the readings as indicated above, DO NOT replace the thermostat.



B. DIGITAL

This thermostat is designed to operate 12V DC single-stage heat pump and an independent single-stage auxiliary heat system. It is a manual changeover thermostat between heating, cooling and auxiliary heat. It also incorporates time delay circuitry to protect against system short cycling.

There is a time delay of approximately three minutes between OFF and ON cycles.

Default temperatures of 65°F. for Heat and 75°F. for Cool have been incorporated into this thermostat. If the thermostat is without power for 10 to 15 seconds, it will default to these temperatures.

Operating temperatures for both heating and cooling systems are changeable to suit the comfort needs of the occupants.

This thermostat is used as a remote wall mounted thermostat. The heat pump can have an air distribution box or a ducted system. To check the operation, refer to Section 1.2.

Next, verify the wiring to the thermostat is correct.

Thermostat Wiring for DIGITAL Thermostat: Route the (10) conductor cable from the 14" x 14" opening to the thermostat location. Route a two conductor cable from the coach's 12 volt DC power source to the thermostat location. Connect 12 volt **positive** lead to the green wire on the thermostat cable.

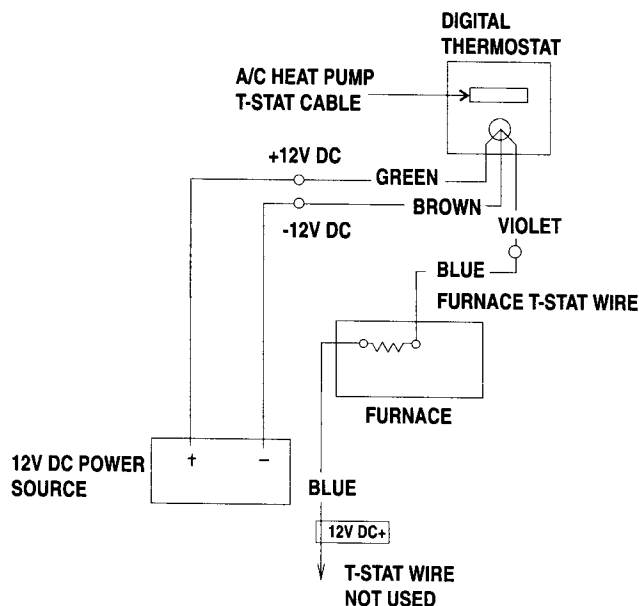
Connect the 12 DC volt **negative** lead to the brown lead. Secure both connections using wire nuts.

NOTE: The DC volt connections are needed to power the liquid crystal display (LCD) and thermostat in the AUX. HEAT mode when 115 volt AC is not available.

At the thermostat location, leave about six (6") inches of cable extending through the wall. Plug the thermostat cable into the thermostat connector.

When an auxiliary furnace is used with the heat pump, a single-wire conductor must be routed from the furnace to the thermostat location. Connect this wire from the furnace to the violet pigtail at the thermostat and secure with wire nut. Tuck the excess wire back into the wall and fill opening with insulation to prevent drafts that could affect the thermostat operation. Using the two screws provided, secure the thermostat to the wall.

THERMOSTAT CONNECTIONS



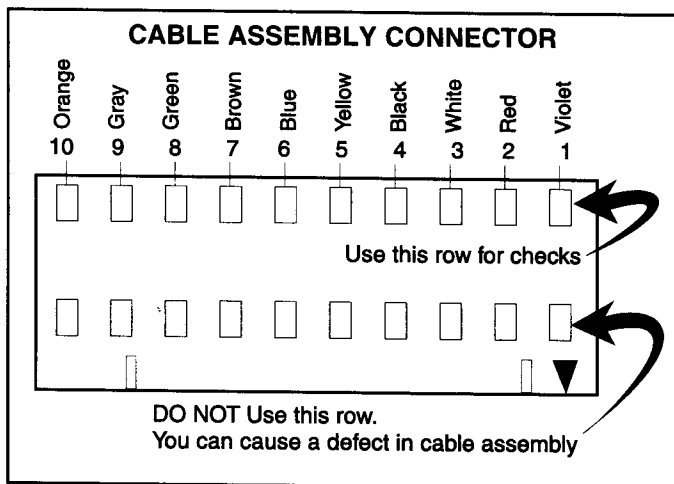
NOTE: The furnace has two wires for thermostat connections. One wire should be marked 12V DC or (+) and the other wire may be unmarked, or labeled "thermostat". The wire marked 12V DC or (+) should be capped and not used with the heat pump setup. The wire marked "thermostat" or the unmarked wire is the wire to connect to the violet thermostat pigtail.

If the 12V DC(+) is hooked to the violet wire at the thermostat, the heat pump fan motor will NOT operate in any mode.

Before checking the thermostat for operation, first determine that the thermostat is receiving DC power from the relay board then disconnect the cable assembly from the back of the thermostat.

Next, use a DC voltmeter and check from red wire or Pin 2 on cable assembly (positive [+] lead from voltmeter) to brown wire or Pin 7 (negative [-] lead from voltmeter). You should get a voltage reading of approximately 12V DC. Next, move the negative (-) lead from the voltmeter to each of the following wires or pins:

Blue (Pin 6), Yellow (Pin 5), Black (Pin 4) White (Pin 3). You should get a voltage reading of approximately 12V DC on each wire. This indicates the relay board and cable assembly are providing proper power and circuits to the thermostat.



NOTE: Pin 2 (red wire) is positive DC volts when ambient (outside) air is above 40°F. Pin 1 (violet wire) is positive DC volts when ambient (outside) air is below 40°F. When ambient (outside) air is below 40°F., only "FAN LO ON" and "HI ON" will operate in the heat pump.

If the above voltage checks are correct and the unit does not operate correctly, check the thermostat.

If the above voltage checks are not as described, check the relay board (Section 4.5) and the cable assembly (4.3).

To check the thermostat, first verify positive (+) DC is to red wire (Pin 2), and negative (-) DC is to brown wire (Pin 7) at the back of the thermostat. Operating range is 10 to 16 volts DC.

With System Switch in COOL, Fan Switch in HI AUTO and room temperature ABOVE set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4), yellow wire (pin 5) and blue wire (Pin 6). You should **NOT** have voltage between brown wire to violet or white wires. With room temperature BELOW set-point temperature, you should **NOT** have voltage between brown wire to violet, white, black, yellow or blue wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

With System Switch in COOL, Fan Switch in LO AUTO and room temperature ABOVE set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4) and yellow wire (P5). You should NOT have voltage between brown wire to violet, white or blue wires. With room temperature BELOW set-point temperature, you should NOT have voltage between brown wire to violet, white, black, yellow or blue wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

With System Switch in COOL, Fan Switch in LO ON and room temperature ABOVE set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4) and yellow wire (Pin 5). You should NOT have voltage between brown wire to violet, white or blue wires. With room temperature BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4). You should NOT have voltage between brown wire to violet, white, yellow or blue wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

With System Switch in COOL, Fan Switch in HI ON and room temperature ABOVE set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4), yellow wire (Pin 5) and blue wire (Pin 6). You should NOT have voltage between brown wire to violet or white wire. With room temperature BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4) and blue wire (Pin 6). You should NOT have voltage between brown wire to violet, white or yellow wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

With System Switch in the OFF, Fan Switch in HI AUTO or LO AUTO and room temperature ABOVE or BELOW set-point temperature, you should NOT have voltage between brown wire to violet, white, black, yellow or blue wires.

With System Switch in OFF, Fan Switch in LO ON and room temperature ABOVE or BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4). You should NOT have voltage between brown wire to violet, white, yellow or blue wires.

With System Switch in OFF, Fan Switch in HI ON and room temperature ABOVE or BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4) and blue wire (Pin 6). You should NOT have voltage between brown wire to violet, white or yellow wires.

With System Switch in HEAT PUMP, Fan Switch in HI AUTO and room temperature ABOVE set-point temperature, you should NOT have voltage between brown wire to violet, white, black, yellow or blue wires. With room temperature BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to white wire (Pin 3), black wire (Pin 4) and blue wire (Pin 6). You should NOT have voltage between brown wire to violet or yellow wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

With System Switch in HEAT PUMP, Fan Switch in LO AUTO and room temperature ABOVE set-point temperature, you should NOT have voltage between brown wire to violet, white, black, yellow or blue wires. With room temperature BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to white wire (Pin 3) and black wire (Pin 4). You should NOT have voltage between brown wire to violet, yellow or blue wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

With System Switch in HEAT PUMP, fan switch in LO ON and room temperature ABOVE set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4). You should NOT have voltage between brown wire to violet, white, yellow or blue wires. With room temperature BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to white wire (Pin 3) and black wire (Pin 4). You should NOT have voltage between brown wire to violet, yellow or blue wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

With System Switch in HEAT PUMP, Fan Switch in HI ON and room temperature ABOVE set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4) and blue wire (Pin 6). You should NOT have voltage between brown wire to violet, white or yellow wires. With room temperature BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to white wire (Pin 3), black wire (Pin 4) and blue wire (Pin 6). You should NOT have voltage between brown wire to violet or yellow wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

Before checking the thermostat for operation in AUX.

HEAT, verify that DC volts (10 to 16) are available between the green wire (+) and brown wire (-) at the back of the thermostat.

With System Switch in AUX HEAT, Fan Switch in HI AUTO and room temperature ABOVE set-point temperature, you should NOT have voltage between brown wire to violet, white, black, yellow or blue wires. With room temperature BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to violet wire (Pin 1). You should NOT have voltage between brown wire to white, black, yellow or blue wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

With System Switch in AUX HEAT, Fan Switch in LO AUTO and room temperature ABOVE set-point temperature, you should NOT have voltage between brown wire to violet, white, black, yellow or blue wires. With room temperature BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to violet wire (Pin 1). You should NOT have voltage between brown wire to white, black, yellow or blue wires.

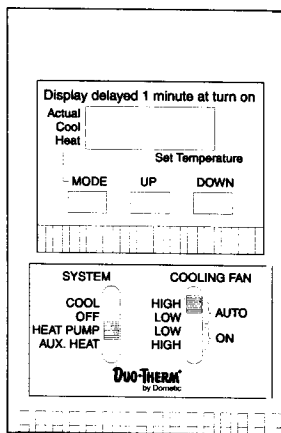
NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

With System Switch in AUX HEAT, Fan Switch in LO ON and room temperature ABOVE set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4). You should NOT have voltage between brown wire to violet, white, yellow or blue wires. With room temperature BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to violet wire (Pin 1) and black wire (Pin 4). You should NOT have voltage between brown wire to white, yellow or blue wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

With System Switch in AUX HEAT and fan switch in HI ON and room temperature ABOVE set-point temperature, you should have voltage between brown wire (Pin 7) to black wire (Pin 4) and blue wire (Pin 6). You should NOT have voltage between brown wire to violet, white or yellow wires. With room temperature BELOW set-point temperature, you should have voltage between brown wire (Pin 7) to violet wire (Pin 1), black wire (Pin 4) and blue wire (Pin 6). You should NOT have voltage between brown wire to white or yellow wires.

NOTE: When set-point temperature is changed above or below room temperature, there will be a three (3) minute delay in "active" terminals.

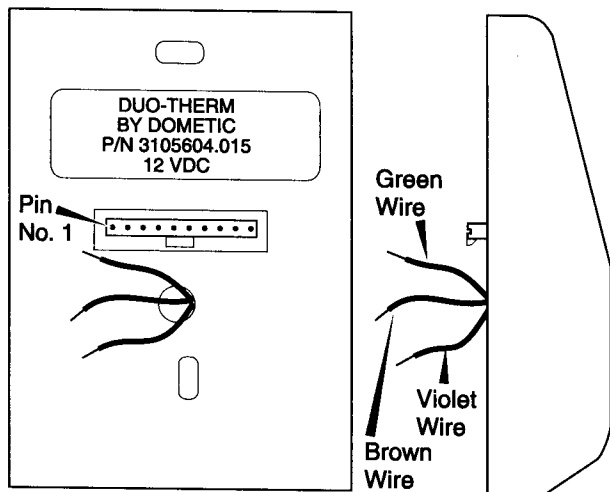


SWITCH COMBINATIONS AND THEIR CORRESPONDING "ACTIVE" TERMINALS

SWITCH COMBINATIONS		If room Temp. is Above/ Below set-point temp:	Terminals that are "ON"				
System Switch	Fan Switch		Pin 3 White	Pin 1 Violet	Pin 5 Yellow	Pin 6 Blue	Pin 4 Black
COOL	HI Auto	Above			✓	✓	✓
		Below					
	LO Auto	Above			✓		✓
		Below					
	LO On	Above			✓		✓
		Below					✓
OFF	HI Auto	Above					
		Below					
	LO Auto	Above					
		Below					
	LO On	Above					✓
		Below					✓
HEAT PUMP	HI Auto	Above					
		Below	✓			✓	✓
	LO Auto	Above					
		Below	✓				✓
	LO On	Above					✓
		Below	✓				✓
AUX HEAT	HI Auto	Above					
		Below		✓			
	LO Auto	Above					
		Below		✓			
	LO On	Above					✓
		Below		✓			✓
AUX HEAT	HI On	Above				✓	✓
		Below		✓		✓	✓

TO CHECK "ACTIVE" TERMINALS: Place the negative (–) lead from the voltmeter on Pin 7 or Brown wire and the positive (+) lead from the voltmeter to the "ACTIVE" pin or wire to read DC voltage.

After set-point temperature is changed, there could be a three (3) minute delay on some "ACTIVE" terminals.



C. BIMETAL

This thermostat is designed to operate 12V DC single-stage heat pump and an independent single-stage auxiliary heat system. It is a manual changeover thermostat between heating, cooling and auxiliary heat. Operating temperatures for both heating and cooling systems are changeable to suit the comfort needs of the occupants.

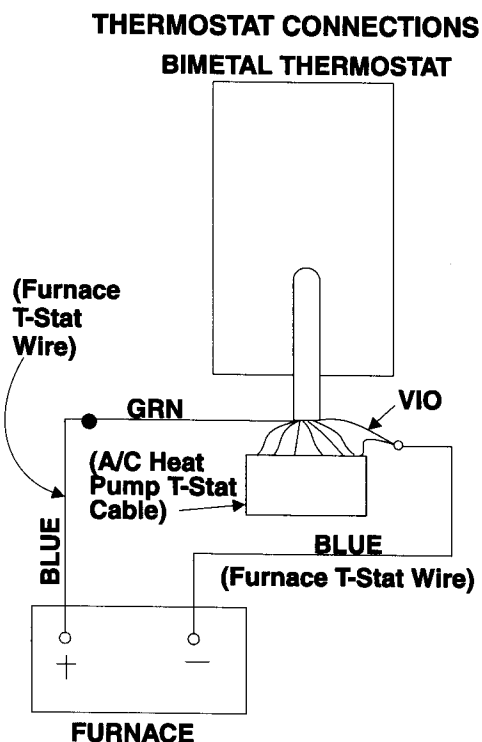
This thermostat is used for a remote wall mounted thermostat. The heat pump can have an air distribution box or a ducted system. To check the operation refer to Section 1.3. Next, verify the wiring to the thermostat is correct.

Thermostat Wiring for Dometic Bimetal Thermostat:

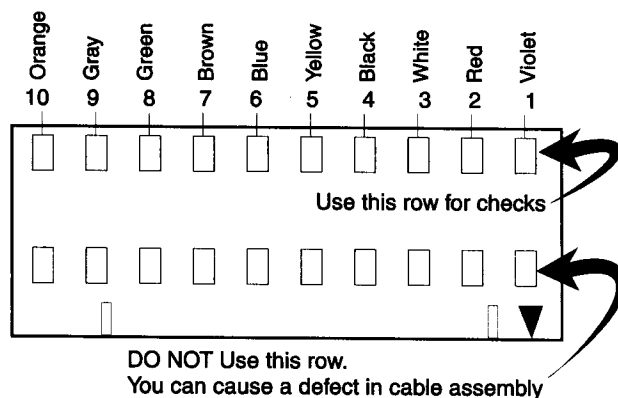
Route the (10) conductor cable from the 14" x 14" opening to the thermostat location. Leave enough cable within the 14" x 14" opening to connect to the low voltage cable. At the thermostat location, leave about six (6") inches of cable extending through the wall. Plug the thermostat cable into the thermostat connector cable.

When an auxiliary furnace is used with the heat pump, a two conductor cable must be routed from the furnace to the thermostat location. Connect one wire from the furnace to the violet wires with a wirenut. Connect the other wire from the furnace to the green wire in the thermostat cable and secure with a wire nut. Tuck the excess wire back into the wall and fill opening with insulation to prevent drafts that could affect the thermostat operation. Secure the thermostat to the wall using the two screws.

NOTE: Verify the heat anticipator is set properly for the auxiliary furnace. Failure to set the anticipator can cause incorrect operation or failure of thermostat in AUX HEAT or HEAT PUMP setting.



CABLE ASSEMBLY CONNECTOR



Before checking the thermostat for operation, first determine that the thermostat is receiving DC power from the relay board then disconnect the cable assembly from the back of the thermostat.

Next, use a DC voltmeter and check from red wire or Pin 2 on cable assembly (positive [+] lead from voltmeter) to brown wire or Pin 7 (negative [-] lead from voltmeter). You should get a voltage reading of approximately 12V DC. Next, move the negative (-) lead from the voltmeter to each of the following wires or pins:

Blue (Pin 6), Yellow (Pin 5), Black (Pin 4) White (Pin 3). You should get a voltage reading of approximately 12V DC on each wire. This indicates the relay board and cable assembly are providing proper power and circuits to the thermostat.

NOTE: Pin 2 (red wire) is positive DC volts when ambient (outside) air is above 40°F. Pin 1 (violet wire) is positive DC volts when ambient (outside) air is below 40°F.

If the above voltage checks are correct and the unit does not operate correctly, check the thermostat.

If the above voltage checks are not as described, check the relay board (Section 4.5) and the cable assembly (4.3).

To check the thermostat, first remove it from its mounting on the wall. Then disconnect the thermostat assembly from the cable assembly in the wall. Now you are ready to do a continuity check on the thermostat assembly. Place the positive (+) lead from the ohm meter on red wire (Pin 2) and negative (-) lead from the ohm meter to the active pin or wire to read continuity. **POLARITY IS IMPORTANT FOR A PROPER CHECK TO BE DONE.**

With System Switch in COOL, Fan Switch in HI AUTO and room temperature ABOVE set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4), yellow wire (Pin 5) and blue wire (Pin 6). You should NOT have continuity between red wire to violet or white wires.

With room temperature **BELOW** setpoint temperature, you should **NOT** have continuity between red wire to violet, white, black, yellow or blue wires.

With System Switch in **COOL**, Fan Switch in **LOW AUTO** and room temperature **ABOVE** setpoint temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4) and yellow wire (Pin 5). You should **NOT** have continuity between red wire to violet, white or blue wires. With room temperature **BELOW** setpoint temperature, you should **NOT** have continuity between red wire to violet, white, black, yellow or blue wires.

With system switch in **COOL**, Fan Switch in **LOW ON** and room temperature **ABOVE** set-point temperature you should have continuity between red wire (Pin 2) to black wire (Pin 4) and yellow wire (Pin 5). You should **NOT** have continuity between red wire to violet, white, or blue wires. With room temperature **BELOW** set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4). You should **NOT** have continuity between red wire to violet, white, yellow or blue wires.

With System Switch in **COOL**, Fan Switch in **HI ON** and room temperature **ABOVE** set-point temperature you should have continuity between red wire (Pin 2) to black wire (Pin 4), yellow wire (Pin 5) and blue wire (Pin 6). You should **NOT** have continuity between red wire to violet or white wires. With room temperature **BELOW** set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4) and blue wire (Pin 6). You should **NOT** have continuity between red wire to violet, white or yellow wires.

With System Switch in **OFF**, Fan Switch in **HI AUTO** or **LOW AUTO** and room temperature **ABOVE** or **BELOW** set-point temperature, you should **NOT** have continuity between red wire to violet, white, black, yellow or blue wires.

With System Switch in **OFF**, Fan Switch in **LOW ON** and room temperature **ABOVE** or **BELOW** set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4). You should **NOT** have continuity between red wire to violet, white, yellow or blue wires.

With System Switch in **OFF**, Fan Switch in **HI ON** and room temperature **ABOVE** or **BELOW** set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4) and blue wire (Pin 6). You should **NOT** have continuity between red wire to violet, white or yellow wires.

With System Switch in **HEAT PUMP**, Fan Switch in **HI AUTO** and room temperature **ABOVE** set-point temperature, you should **NOT** have continuity between red wire to violet, white, black, yellow or blue wires. With room temperature **BELOW** set-point temperature, you should have continuity between red wire (Pin 2) to white wire (Pin 3), black wire (Pin 4), and blue wire (Pin 6). You should **NOT** have continuity between red wire to violet or yellow wires.

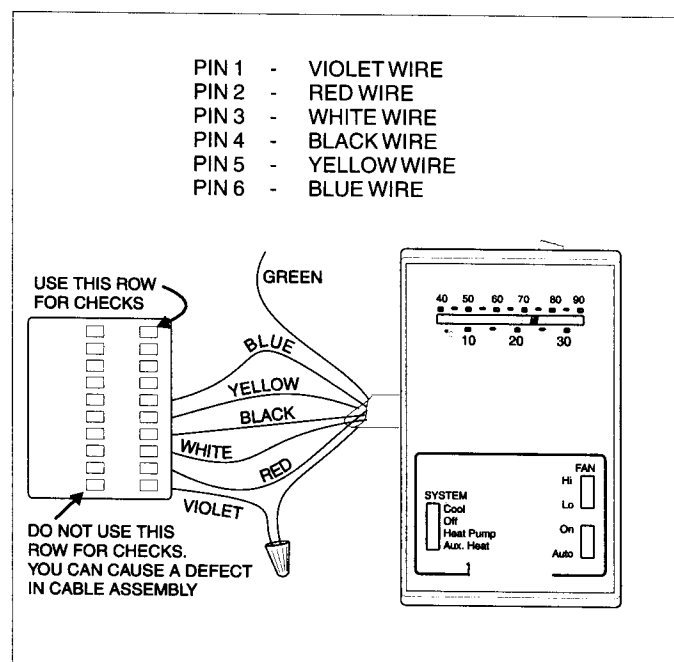
With System Switch in **HEAT PUMP**, Fan Switch in

LOW AUTO and room temperature **ABOVE** set-point temperature, you should **NOT** have continuity between red wire to violet, white, black, yellow or blue wires. With room temperature **BELOW** set-point temperature, you should have continuity between red wire (Pin 2) to white wire (Pin 3) and black wire (Pin 4). You should **NOT** have continuity between red wire to violet, yellow or blue wires.

With System Switch in **HEAT PUMP**, Fan Switch in **LOW ON** and room temperature **ABOVE** set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4). With room temperature **BELOW** set-point temperature, you should have continuity between red wire (Pin 2) to white wire (Pin 3) and black wire (Pin 4). You should **NOT** have continuity from red wire to violet, yellow or blue wires.

With System Switch in **HEAT PUMP**, Fan Switch in **HI ON** and room temperature **ABOVE** set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4) and blue wire (Pin 6). You should **NOT** have continuity between red wire to violet, white or yellow wires. With room temperature **BELOW** set-point temperature, you should have continuity between red wire (Pin 2) to white wire (Pin 3), black wire (Pin 4) and blue wire (Pin 6). You should **NOT** have continuity between red wire to violet or yellow wires.

With System Switch in **AUX HEAT**, Fan Switch in **HI AUTO** and room temperature **ABOVE** set-point temperature, you should **NOT** have continuity between red wire to violet, white, black, yellow or blue wires. With room temperature **BELOW** set-point temperature, you should have continuity between violet wire (Pin 1) and green wire. You should **NOT** have continuity between red wire to violet, white, black, yellow or blue wires.



With System Switch in AUX HEAT, Fan Switch in LOW AUTO and room temperature ABOVE set-point temperature, you should NOT have continuity between red wire to violet, white, black, yellow or blue wires. With room temperature BELOW set-point temperature, you should have continuity between violet wire (Pin 1) and green wire. You should NOT have continuity between red wire to violet, white, black, yellow or blue wires.

With System Switch in AUX HEAT, Fan Switch in LOW ON and room temperature ABOVE set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4). You should NOT have continuity between red wire to violet, white, yellow or blue wires. With room temperature BELOW set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4) and between violet wire (Pin 1) to green wire. You should NOT have continuity between red wire to violet, white, yellow or blue wires.

With System Switch in AUX HEAT, Fan Switch in HI ON and room temperature ABOVE set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4) and blue wire (Pin 6). You should NOT have continuity between red wire to violet, white or yellow wires. With room temperature BELOW set-point temperature, you should have continuity between red wire (Pin 2) to black wire (Pin 4) and blue wire (Pin 6) and between violet wire (Pin 1) and green wire. You should NOT have continuity between red wire to violet, white or yellow wires.

SWITCH COMBINATIONS AND THEIR CORRESPONDING "ACTIVE" TERMINALS

To check "ACTIVE" terminals, place the positive (+) lead from the ohm meter on Pin 2 or red wire and negative (-) lead from ohm meter to the "active" pin or wire to read continuity.

With System Switch in AUX HEAT and room temperature BELOW set-point temperature, continuity will exist between violet wire and green wire. With room temperature ABOVE set-point temperature, continuity will NOT exist between violet and green wire.

SWITCH COMBINATIONS		If room Temp. is Above/ Below set-point temp:	Terminals that are "ON"				
System Switch	Fan Switch		Pin 3 White	Pin 1 Violet	Pin 5 Yellow	Pin 6 Blue	Pin 4 Black
COOL	HI Auto	Above			✓	✓	✓
		Below					
	LO Auto	Above			✓		✓
		Below					
	LO On	Above			✓		✓
		Below					✓
	HI On	Above			✓	✓	✓
		Below				✓	✓
OFF	HI Auto	Above					
		Below					
	LO Auto	Above					
		Below					
	LO On	Above					✓
		Below					✓
	HI On	Above				✓	✓
		Below				✓	✓
HEAT PUMP	HI Auto	Above					
		Below	✓			✓	✓
	LO Auto	Above					
		Below	✓				✓
	LO On	Above					✓
		Below	✓				✓
	HI On	Above				✓	✓
		Below	✓			✓	✓
AUX HEAT	HI Auto	Above					
		Below					
	LO Auto	Above					
		Below					
	LO On	Above					✓
		Below					✓
	HI On	Above				✓	✓
		Below				✓	✓

4.3 CABLE ASSEMBLY

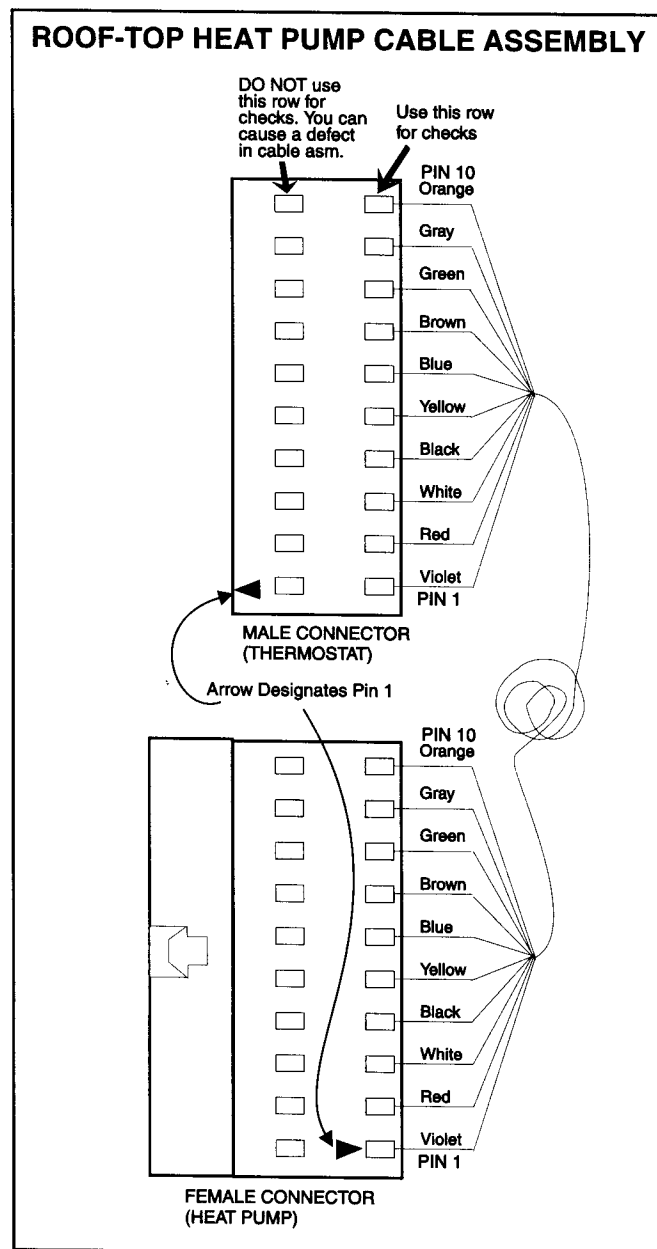
This is a group of ten (10) wires used with remote wall mounted thermostats. It connects the wall mounted thermostat (bimetal and electronic thermostat assemblies) to the relay board mounted in the Roof-Top Heat Pump.

The cable assembly for the Roof-Top Heat Pump is available in 15, 25 and 30 foot lengths. This cable assembly has a male connector on one end (thermostat connection) and a female connector on the other end (heat pump connection).

The cable assembly has 10 wires. The arrow on each connector designates Pin 1.

To check the cable assembly, disconnect each end of the cable assembly and check for continuity on each wire in the assembly.

Also, check each connector for bent pins or loose wires. Each wire has a receptacle that snaps into the connector.

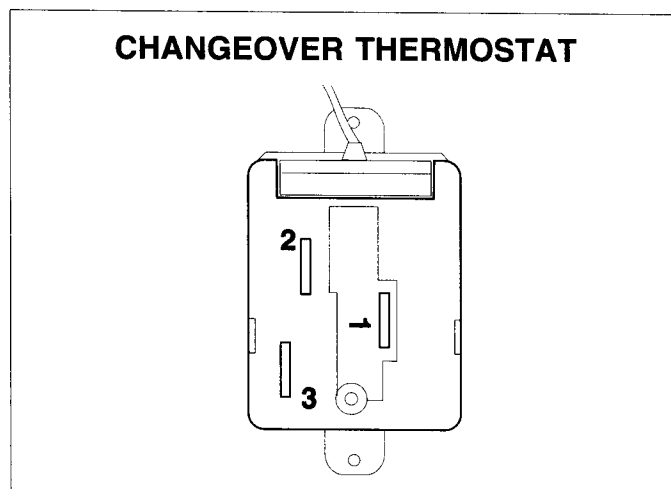


4.4 CHANGEOVER THERMOSTAT

The changeover thermostat is a capillary tube/bellows-type switch. Its function is to allow the compressor to operate only when outside ambient is 40°F. or warmer.

To check the changeover thermostat, first verify the air temperature at the capillary tube. If the temperatures are above 45°F., continuity should be between terminals 2 to 3 and no continuity between terminals 2 to 1. For temperatures below 40°F., continuity should be between terminals 2 to 1 and no continuity between terminals 2 to 3.

NOTE: A defective changeover thermostat can keep the compressor from operating in the COOL or HEAT PUMP modes.



4.5 RELAY BOARD

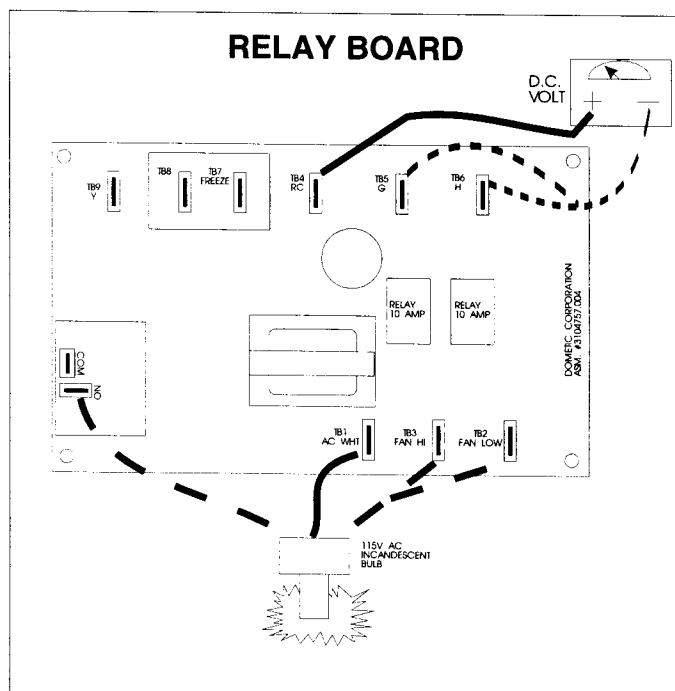
The relay board consists of a transformer, compressor relay, two fan relays and other components. If any one of these are defective, the complete relay board must be replaced.

The relay board completes circuits to the fan motor and compressor depending on what mode switch and temperature setting is on the thermostat.

Remove the cover from the electric box and verify the red wire is on terminal RC, black wire is on terminal G, blue wire is on terminal H and yellow wire is on terminal Y.

With AC power to the relay board, check between terminals RC and G or H. There should be 12 volts DC. If no voltage is detected, the transformer on the relay board is defective. Replace the relay board.

If 12 volts DC is available, disconnect power to the heat pump and remove the HI FAN wire (black) and the LOW FAN wire (red) and the compressor wire (large black) from the NO terminal on the compressor relay on the relay board.



Next, remove the red, yellow, black and blue wires from terminals RC, Y, G and H on the relay board. Place a jumper from terminal RC to terminal Y. Provide power to the heat pump. Using an incandescent bulb, check from AC white terminal (one lead from bulb) to NO terminal on compressor relay on the relay board (other lead from bulb). The bulb should illuminate. Remove the jumper and the bulb would NOT illuminate. Next, place a jumper from terminal RC to terminal G. Now place one lead from bulb to AC white terminal and the other lead from bulb to LOW FAN terminal. The bulb should illuminate. Remove the jumper and the bulb should not illuminate. Next, place a jumper from terminal RC to terminals G and H. Now place one lead from bulb to AC white terminal and the other lead from bulb to HIGH FAN. The bulb should illuminate. Remove the jumper and the bulb should not illuminate. If these tests are correct, the relay board is good. DO NOT replace it. If any one of these tests are incorrect, replace the relay board.

4.6 PTCR DEVICE OR START RELAY

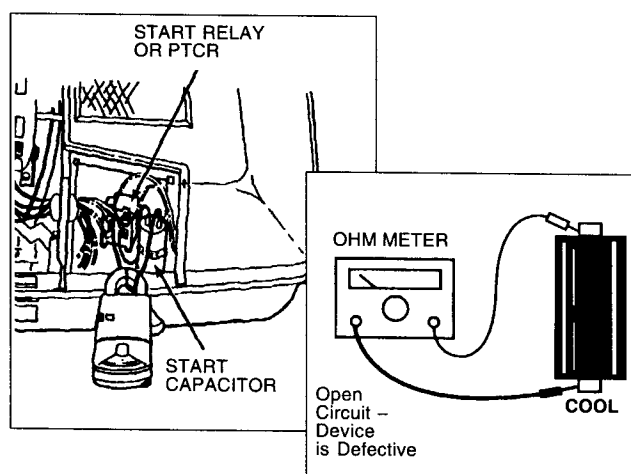
The positive temperature coefficient resistor, or PTCR, has replaced the compressor start relay and the start capacitor, on some models of air conditioners. It should be checked in two different ways:

The first check that should be made is continuity. Turn the air conditioner circuit breaker to OFF. Disconnect the PTCR from the circuit. Check for continuity. If there is no continuity, replace the PTCR, and connect it back into the circuit.

! WARNING

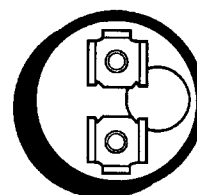
THIS IS AN ENERGIZED CIRCUIT. SHOCK CAN OCCUR IF NOT TESTED PROPERLY. TESTING TO BE DONE BY A QUALIFIED SERVICE TECHNICIAN.

The second check to take is an amperage reading. This check can also be used for the start relay. Clamp an ammeter around the wire from the PTCR to the capacitor. Turn the air conditioner circuit breaker to ON and start the air conditioner. When the compressor starts, there will be an amperage reading for approximately one second or less. If there is no reading, or if there is a prolonged reading, the PTCR or start relay is faulty and must be replaced.



4.7 START CAPACITOR

The start capacitor should be checked with a capacitor tester. Follow the tester manufacturer's testing procedures. If one is not available, an ohm meter may be used. Turn the air conditioner circuit breaker to OFF. Disconnect the wires to the capacitor. The start capacitor does need to be manually discharged (see Sec. 4.8). Use only an analog or dial type ohm meter. Set the ohm meter to the proper scale and connect the probes to the capacitor terminals. The reading should show continuity and slowly return to infinity. You should then reverse the leads and check again. If there is no reading or a reading of "0" ohms, the start capacitor should be replaced.



4.8 RUN CAPACITOR

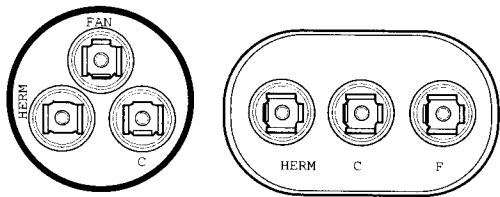
The run capacitor may be one of two different kinds: Either a single capacitor for the fan or compressor, or a combination capacitor for both the fan and the compressor.

The run capacitor should be checked with a capacitor tester. Follow the tester manufacturer's testing procedures. If one is not available, an ohm meter may be used. Turn the air conditioner circuit breaker OFF. Disconnect the wires to the capacitor.

! WARNING

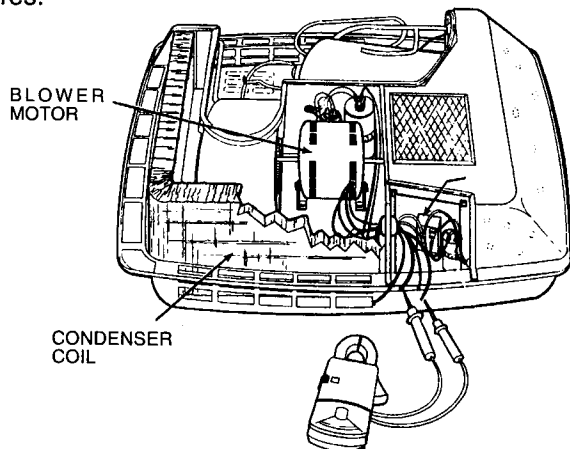
THERE MAY BE A CHARGE ON THE CAPACITOR UNTIL DISCHARGED.

The run capacitor must be manually discharged. Using an AC voltmeter set at the 500 volt scale or higher, connect meter leads to the terminals of the capacitor. After discharging the capacitor, set the VOM meter to the highest ohm scale and connect the probes to the capacitor terminals. The reading should rapidly move toward continuity and slowly return to infinity. You should reverse the leads and repeat the procedure. If there is no reading, or a prolonged reading, replace the run capacitor. The combination run capacitor has three terminals. The terminals are marked "F", "C" and "HERM". To check the combination run capacitor, follow the discharge procedures above. Again, make sure you test from "C" (common) to "F" (fan), and "C" (common) to "HERM" (compressor).



4.9 BLOWER MOTOR

To check the blower motor, turn the air conditioner circuit breaker to OFF, and disconnect the five wires. Set your ohm meter to its highest scale for these tests. Check for continuity between the white wire and each of the other wires.



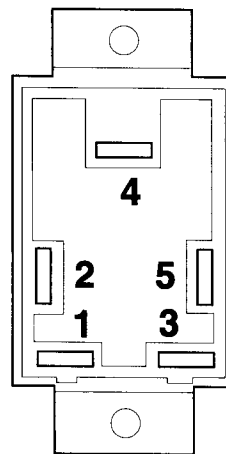
Lack of continuity between the white wire and any of the other wires indicates an open circuit and requires that the motor be changed. Next, scrape some paint off the motor casing and check for continuity between each wire and the motor casing. If you get continuity between any of the wires and the motor casing, you have a grounded motor and it must be replaced.

4.10 RELAY, DOUBLE THROW

The relay controls AC power to the reversing valve. There are two different relays used. One relay has a 12V DC rated coil and is used on all Duo-Therm Heat Pumps except the mechanical control types. The mechanical control Duo-Therm Heat Pumps use a relay that has a 120V AC rated coil. Both relays have five (5) terminals. Terminals 1 and 3 are the coil terminals. When the coil (terminals 1 and 3) is not energized (no power to terminals 1 and 3), continuity should exist between terminals 4 to 5; and no continuity between terminals 2 to 4.

When the coil (terminals 1 and 3) is energized (power to terminals 1 and 3), continuity should exist between terminals 2 to 4 and no continuity between terminals 4 to 5.

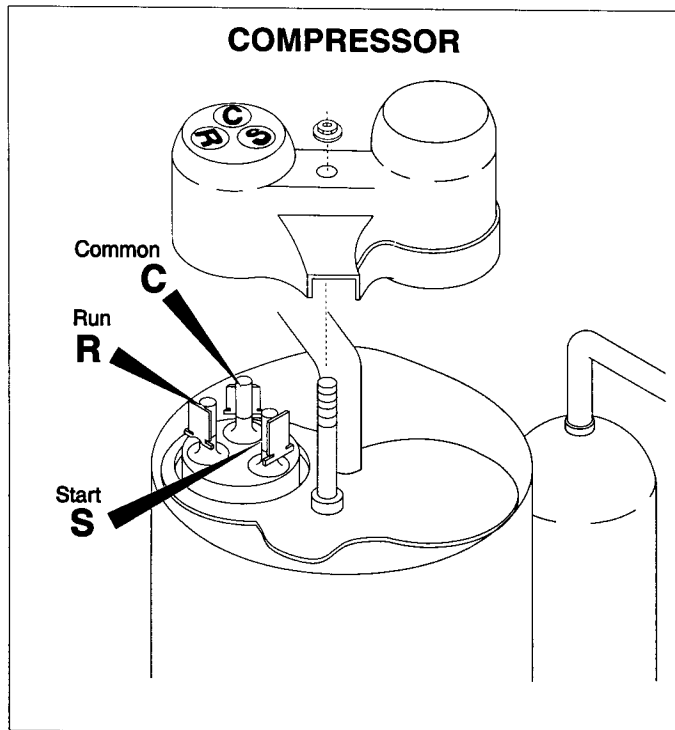
RELAY



4.11 COMPRESSOR

To check compressor, turn the air conditioner circuit breaker to OFF. Disconnect the wires from the COMMON, START and RUN terminals. With the ohm meter set on the lowest ohm scale, check for continuity between all three terminals. Lack of continuity between any of the terminals

indicates faulty windings in the compressor, and the compressor should be replaced. Next, scrape some paint off the casing of the compressor and check for continuity between each terminal and the casing. If a reading is obtained, the windings are shorted to the casing and the compressor must be replaced.



4.12 REVERSING VALVE

The reversing valve is the heart of a heat pump. It directs refrigerant flow to the coils to achieve proper direction of flow that allows the same system to supply heated or cooled air to enter the inside atmosphere of the structure according to occupants' desires.

The reversing valve's solenoid can be energized in either HEAT or COOL mode of operation. Duo-Therm Heat Pumps that are roof-mounted units have the solenoid energized in the COOL mode of operation.

One way to check the reversing valve is to feel the refrigerant line at the top of the inside coil. In the COOL mode, this line will be cool or cold to the touch. In the HEAT mode, this line will be warm or hot to the touch. If you do not achieve these results, direction of refrigerant flow is not correct. Check the relay (see Section 4.10), wiring (see Section 2.3) and thermostat (see Section 4.2). Refer to Section 1 for Principles of Heat Pump Operation.

The ohms resistance of the reversing valve solenoid coil is approximately 465 ohms plus or minus ($\pm$) 10%.

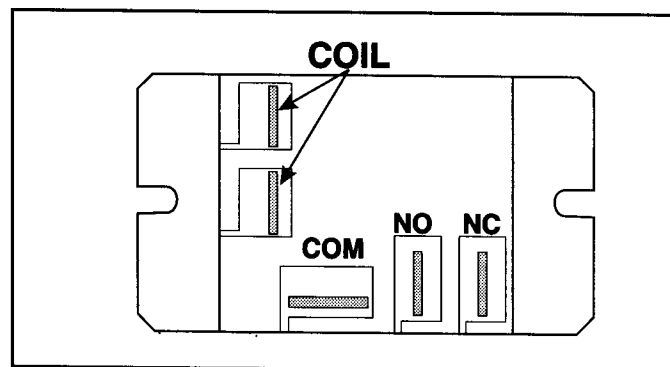
4.13 RELAY, FAN SPEED (DPST)

The relay is a double pole, single throw and controls the fan motor in the roof mounted unit. When the AUX HEAT mode is selected or the outside temperature is too cold for HEAT PUMP operation and automatically goes to auxiliary operation, the relay will interrupt the circuit to the fan motor.

When COOL, OFF and HEAT PUMP modes are selected, the relay coil is not energized. When AUX. HEAT mode is selected the relay coil is energized with 12V DC.

To check the relay, first remove the wires from COM and NC terminals. Next verify the relay coil is not energized (no DC power), continuity should exist between terminals COM and NC and no continuity between terminals COM and NO. Next energize the relay coil with DC volts (10 to 16). Continuity should exist between terminals COM and NO and no continuity between COM and NC. If the above checks are correct, the relay is good – DO NOT replace it. If the above checks are not correct, the relay is defective and should be replaced.

NOTE: Verify the thermostat is wired properly from the furnace, as incorrect polarity on the furnace thermostat wires will energize the relay coil and keep the fan motor from operating in the roof mounted unit.



SECTION 5 AIR FLOW

5.1 SHORT CYCLE

A. AIR DISTRIBUTION BOX INSTALLATIONS

Short cycle is caused by conditioned air being drawn back into the intake side of the air conditioner before it is mixed with the warmer room air. The capillary tube of the thermostat senses this conditioned air and will make the compressor shut off. This may also cause the evaporator coil to freeze up.

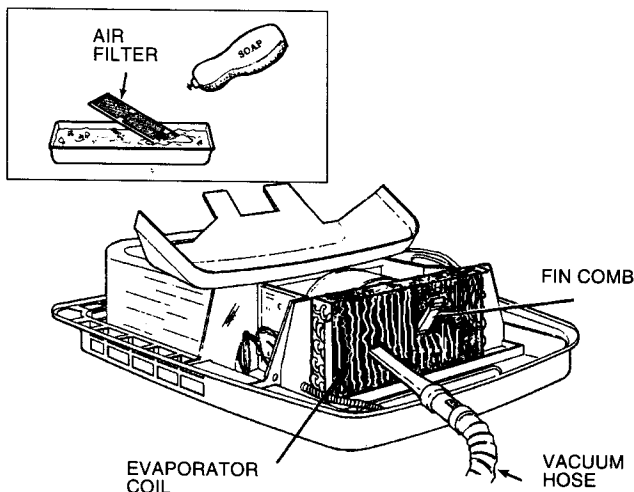
Two possible causes of this condition are the air box and the discharge duct. If the air box is not sealed tightly against the ceiling, it will allow conditioned air to cross over into the return air portion of the air box, and affect the temperature at the capillary sensor tube. Also, if the discharge duct is not installed properly, it can allow air to cross over into the return portion of the heat pump. Make sure you have the correct discharge duct for the thickness of the roof. Seal all problem areas as necessary. You may need to use tape to seal the discharge duct. Also, make sure the discharge louvers are not restricted.

B. DUCT IN CEILING UNITS

Short cycle could be caused by cold air being circulated directly on the wall control unit. Make sure you do not have a ceiling register too close to the wall control. Verify the duct connection at the air conditioner is not leaking cold air into return air. Seal all problem areas.

5.2 AIR FLOW OBSTRUCTION

The coils and filters must be kept clean. Obstructions reduce the amount of air passing through the coils. Dirt acts as an insulator reducing the heat transfer across the fins. Turn the air conditioner circuit breaker to OFF. Brush the fins with a soft bristle brush, and vacuum up the residue. The filters should be cleaned in a soap solution and rinsed in clean water. Air-dry the filters before reinstalling; a wet filter can cause insufficient operation or freeze-up.



5.3 AIR DISTRIBUTION SYSTEM

The Installer of this air conditioner system must design the air distribution system for his particular application. Several requirements for this system **MUST** be met for the air conditioner to operate properly. These requirements are as follows:

- A. Roof cavity thickness must be between 1.75" to 4.50". This distance is measured between roof and ceiling surface.
- B. The total **Cross-Sectional Discharge Area** of outlet ducts from the plenum area under the air conditioner must be a minimum of 21.0 sq. inches.
- C. Duct sizing requirements are as follows:

	Min.	Max.
1. Duct Depth	1.50"	2.50"
2. Duct Width	7.00"	10.00"
3. Total Duct Length	12'	36'
4. Duct Length (short run)	1/3 Total Length	
- D. Register requirements as follows:

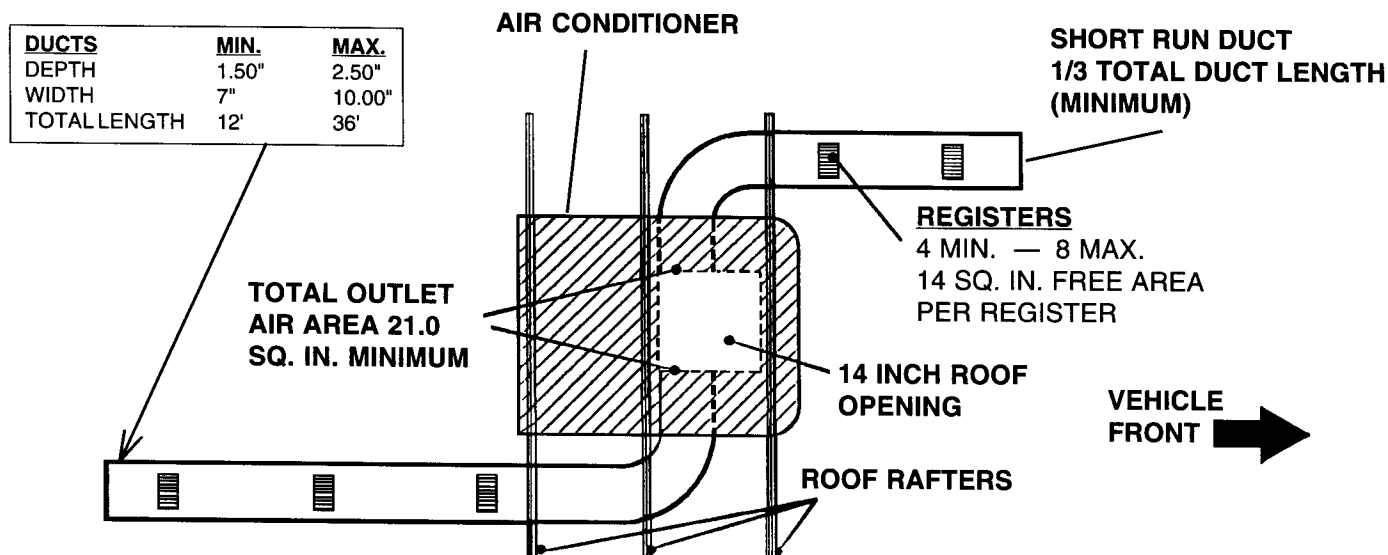
	Min.	Max.
1. Distance from duct end	5"	8"
2. Distance from end of elbow	15"	—
3. Distance between registers	24"	—
4. Total number required	4	8
5. Number required per run	2	—
6. Free area per register	14 sq.in.	—
- E. The duct material must meet or exceed any agency or RVIA Standard that may be in existence at the time the RV is produced.

NOTE: IT IS THE RESPONSIBILITY OF THE INSTALLER OF THIS SYSTEM TO INSURE THE DUCTWORK WILL NOT COLLAPSE OR BEND DURING OR AFTER THE INSTALLATION.

- F. All discharge air ducts must be properly insulated to prevent condensation from forming on their surfaces or adjacent surfaces during operation of the air conditioner. This insulation must be R-7 minimum.
- G. Ducts and their joints must be sealed to prevent condensation from forming on adjacent surfaces during operation of the air conditioner.

NOTE: THE DOMETIC CORPORATION WILL NOT BE HELD LIABLE FOR ROOF STRUCTURAL OR CEILING DAMAGE DUE TO IMPROPERLY INSULATED OR SEALED DUCTWORK.

- H. Return air opening must have 40 sq. in. minimum free area including the filter.
- I. Return air to the air conditioner must be filtered to prevent dirt accumulation on the air conditioner cooling surface.
- J. Total system pressure must be between 0.40 to 1.10 in. W.C. This is to be determined with the air conditioner blower operating on high speed and return air filter and grill in place.



NOTE: IT IS THE RESPONSIBILITY OF THE INSTALLER OF THIS AIR CONDITIONER SYSTEM TO INSURE THE STRUCTURAL INTEGRITY OF THE RV ROOF.

- K. The thermostat must be located on an inside wall of the RV, 60 inches above the floor. The thermostat must not be located near a heat source.

SECTION 6 OTHER

6.1 AMBIENT TEMPERATURE

Running the air conditioner at a temperature below 75 degrees Fahrenheit may cause the evaporator, inside coil, to freeze up. The most common time for this to occur is at night. Even after the ambient temperature has gone up, the coils will remain frozen. Therefore, to assist the defrosting of the evaporator coils, turn the air conditioner to HI FAN mode; set the temperature selector to a higher setting and let the air conditioner run until the coils are defrosted.

Running the unit in heat pump mode with certain conditions, can cause the evaporator (outside coil) to freeze up. Even after the certain conditions have changed, the coil could remain frozen. Therefore, to assist the defrosting of the evaporator coils, turn the unit to HI FAN mode; set the temperature selector to a lower setting and let the unit run until the coil is defrosted.

6.2 HEAT GAIN/HEAT LOSS

HEAT GAIN can be caused by several factors: A hot, humid and sunny day; a large number of people in the coach; frequent opening of the door; excessive showering and cooking, etc.

Other factors to be taken into consideration as possible heat gain causes are the size of the air conditioner relative to the size of the coach; the "R" factor of insulation; and the size and placement of windows.

HEAT LOSS can be caused by several factors:

Loose windows or no storm windows, frequent opening of the door, or anything that would allow excessive heat loss to the outside atmosphere.

Other factors to take into consideration as possible heat loss causes are the size of the unit relative to the size of the coach, the "R" factor of the insulation and the size and placement of windows.

The manufacturer of the RV should be consulted for recommendations on HEAT GAIN or HEAT LOSS.

6.3 LOOSE PARTS

Loose parts can cause the air conditioner to operate noisily. Check for any loose bolts, any component rubbing against its housing, or any plastic parts which might be cracked. Repair or replace parts as necessary to correct any noise problems.

6.4 TUBING VIBRATION

If any of the copper tubing is rubbing against itself or any other part, verify that the proper tubing has been installed. Duo-Therm air conditioners are designed to avoid this problem if the correct tubing is used. Replace or position tubing as necessary.

6.5 CONDENSER OR BLOWER FAN

The blower motor will have either a squirrel-cage or blade-type fan attached to it. Turn the air conditioner circuit breaker to OFF. Adjust the component to make sure it is not rubbing against the bulkhead. If it is a blade-type fan, the blades should be half through the opening for proper operation. Replace the blade fan or squirrel-cage if necessary.

6.6 INSTALLATION

The installation must be according to manufacturer's instructions for the specific model.

The air conditioner must not be installed in a valley on the roof; water may pool around the drain holes and be drawn into the air conditioner.

Make sure the air conditioner is tightened to the specifications. Overtightening can cause the unit to leak. Use caution not to damage the mounting gasket when placing the air conditioner over the opening as this can allow water to leak into the coach.

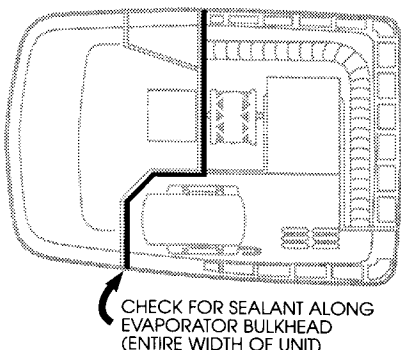
The air conditioner may be installed across a roof seam, but make sure this area is properly sealed to prevent leakage.

6.7 DRAIN HOLE PLUGGED

Some drain pan problems may be caused by a blockage or restriction of the drain holes. This could be a piece of styrofoam or dirt, etc., in or around a drain hole causing water to accumulate in the drain pan and be sucked up into the unit. Remove any blockage as necessary.

6.8 EVAPORATOR BULKHEAD LEAK

The rear section of the air conditioner which contains the compressor, blower motor and condenser coil is designed to dispose of any water which may enter. However, to ensure that no water enters the evaporator section, a watertight seal must exist along the entire evaporator bulkhead which separates the two compartments. Check for sealant along this entire section and add sealant at any area where none is visible. Note that the sealed portion extends up the sides of the unit.



SECTION 7

SEALED SYSTEM

7.1 RECHARGING

NOTE: The *Clean Air Act* of 1990 set guidelines in regard to recapturing or disposition of refrigerants. Check with local authorities for proper handling or evacuation of refrigerants.

NOTE: DO NOT attempt to check high and low side pressures below 75° ambient (outside) temperature.

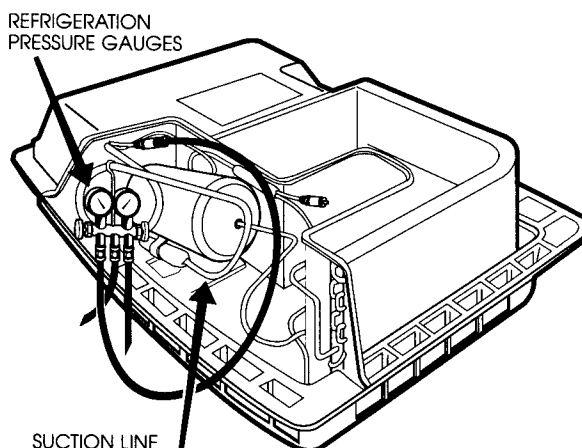
The equipment items needed to properly evacuate and recharge a sealed system are: a piercing type clamp-on saddle valve; a braze-on processing valve; a core removal tool; a process tube fitting; a set of compound gauges; a vacuum pump; equipment to weigh a precise amount of refrigerant; R-22 refrigerant; gas welding equipment; a R-22 refrigerant leak detector and recapturing or recycling equipment. **If you have not been properly trained in sealed system repairs, do not attempt this procedure.**

NOTE: This is not a thorough sealed system repair training program. For additional information or training, you may want to attend a basic air conditioning course at your local college.

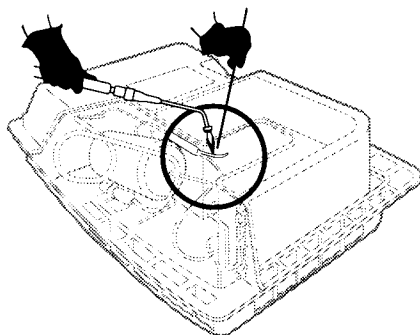
To drain the R-22 refrigerant, attach a clamp-on saddle valve on the low side process tube. If the air conditioner does not have a low side process tube, attach a saddle valve at the point where you will add a process tube.

Slowly drain the R-22 refrigerant by using recapturing or recycling equipment. Do not leave the clamp-on saddle valve on the unit as it will cause leaks.

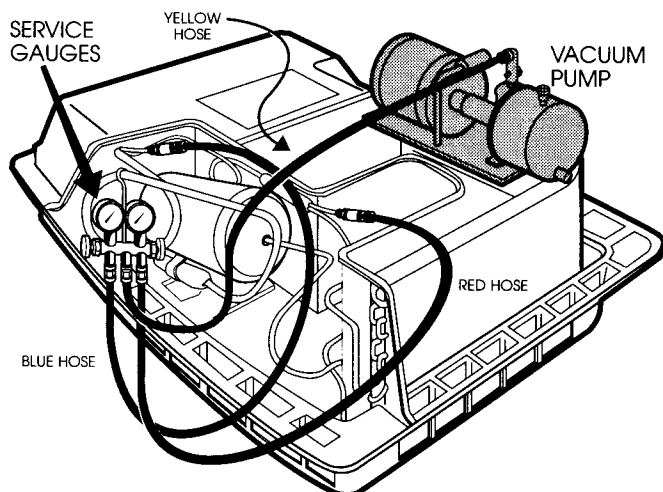
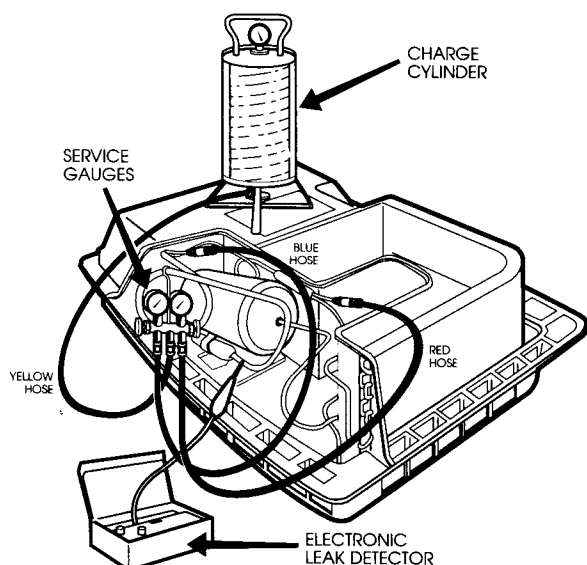
If you are going to use the braze-on processing valve, once the refrigerant has been drained, use a tubing cutter and cut the tube near the end. Do this on both the low and high side processing tubes.



Next weld the process tube in place. We recommend using a brazing material which melts between 950° and 1450° Fahrenheit, and contains a minimum of 2% silver, and 5% to 10% phosphorous. This type of brazing material does not require the use of a flux to join copper to copper. If you are using the weld on the process valve, be sure the valve core is removed before any heat is applied.



Connect the blue colored low pressure line of the compound gauges to the charging port on the low side pressure tubing. Next, connect the red colored high pressure line of the compound gauges to the charging port on the high side pressure tubing.



Next, connect the yellow colored line of the compound gauges to the charging cylinder and add 2 or more ounces of R-22 refrigerant to the sealed system and check all weld joints for leaks. Allow the refrigerant to stay in the system for at least 10 minutes. If a leak is detected, drain the system and repair the leak before you proceed.

When you are certain the system is sealed, drain any refrigerant from the system and connect the yellow common line of the compound gauges to the vacuum pump.

Open the pressure relief valve on the vacuum pump. This allows the major contaminants from the sealed system to escape into the atmosphere rather than enter the oil in the vacuum pump.

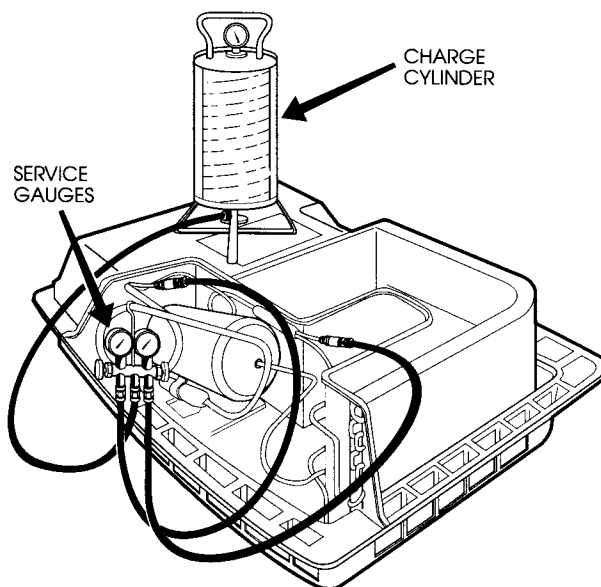
Both the low and high side valves on the compound gauge set should be opened and the vacuum pump turned on.

After five minutes, close the pressure relief valve on the vacuum pump. Check the blue gauge after running the vacuum pump for 10 minutes. A vacuum reading of zero to 10 inches would indicate a leak in the system or the hose connections. Check all hose connections for tightness. If the low side gauge does not change, there is a leak in the sealed system. Locate the leak and correct it before proceeding.

If the blue low side gauge is well below 10 inches of vacuum, continue the evacuation for at least 40 to 45 minutes or until **you have a dry system**.

At this time there should be a good, deep evacuation, or dry atmosphere inside the sealed system. Close both the low and high side valves on the compound gauge set and turn off the vacuum pump.

Disconnect the yellow colored hose at the vacuum pump and connect it to the bottom port or connection on the charging cylinder. Open the valve on the cylinder.



For the correct amount of R-22 refrigerant charge, check the data plate of the air conditioner you are working on. To compensate for the red liquid line, on the gauge set (approx. 30—36 inches long), add one ounce to the data plate amount. You are now ready to do a weighted charge.

The air conditioner charge is critical and must be exact for proper cooling. The proper charge is noted on the data plate of the unit.

Allow the refrigerant charge to equalize by waiting 10 minutes before starting the system. After 10 minutes, do a cooling performance test to determine whether the problem was in the amount of charge or within the components of the system.

Now the blue low side and the red high side lines should be disconnected. Make sure that the air conditioner connection is sealed before removing the lines. The process tube can be pinched off in two places; the charging port cut off, and the end of the tube brazed for a hermetically sealed system.

7.2 SEALED SYSTEM PROBLEMS

One mechanical problem you may encounter is refrigerant flow restriction. There are two types of restrictions, high side and low side. The basics to use to determine a restriction are amp draw and pressure. This check will only work above 75°F.

To determine the high side pressure, add 32 degrees to your ambient temperature. Find that temperature on the chart on Page 27. The pressure listed to the right of the temperature should be your correct high side pressure, plus or minus 7 PSIG. For the low side pressure, divide the high side pressure by four. This will be the low side pressure, plus or minus 3 PSIG.

High side restriction will cause higher than normal amp draw, drastically higher than normal high side pressures, and slightly higher than normal low side pressures.

Low side restriction will cause lower than normal amp draw, drastically lower than normal low side pressures and slightly lower than normal high side pressures.

A restriction that would not follow these basic conditions is a liquid line restriction, which is in the high side of the air conditioner. It will give the same results as a low side restriction.

The most common restriction is the capillary tube or tubes. If there is a restriction in the liquid line, there will be a temperature drop from one side of the restriction to the other side.

In the case of a capillary tube restriction, one tube would be normal (warm to the touch) and the restricted tube would be cool or cold to the touch, and could even sweat if operated long enough.

A restriction in the filter-drier would cause a temperature drop at the point of the restriction. A buildup of frost or sweat could be evident if operated long enough.

Refrigerant leaks can occur from an improper weld, a broken line or other damage. Compressor oil will often be noticeable at the location of major leaks.

Replace any parts that are found to be bad. Whenever a component is replaced in the sealed system, or the system has been opened to the atmosphere, a good, deep evacuation and an exact weighted charge is required.

REFRIGERANT VAPOR PRESSURES (PSIG)

Temp. Deg. F.	Pressure PSIG R-22	Temp. Deg. F.	Pressure PSIG R-22	Temp. Deg. F.	Pressure PSIG R-22	Temp. Deg. F.	Pressure PSIG R-22
20	43.0	57	96.1	94	179.1	131	300.7
21	44.1	58	97.9	95	181.8	132	304.6
22	45.3	59	99.8	96	184.6	133	308.6
23	46.4	60	101.6	97	187.4	134	312.6
24	47.6	61	103.5	98	190.2	135	316.6
25	48.8	62	105.4	99	193.0	136	320.7
26	50.0	63	107.3	100	195.9	137	324.8
27	51.2	64	109.3	101	198.8	138	328.9
28	52.4	65	111.2	102	201.8	139	333.1
29	53.6	66	113.2	103	204.7	140	337.3
30	54.9	67	115.2	104	207.7	141	341.5
31	56.2	68	117.3	105	210.3	142	345.8
32	57.5	69	119.4	106	213.8	143	350.1
33	58.8	70	121.4	107	216.9	144	354.5
34	60.1	71	122.5	108	220.0	145	358.9
35	61.5	72	125.7	109	223.2	146	363.4
36	62.8	73	127.8	110	226.4	147	367.8
37	64.2	74	130.0	111	229.6	148	372.4
38	65.6	75	132.2	112	232.8	149	376.9
39	67.1	76	134.5	113	236.1	150	381.5
40	68.5	77	136.7	114	239.4	151	386.2
41	70.0	78	139.0	115	242.7	152	390.9
42	71.5	79	141.3	116	246.1	153	395.6
43	73.0	80	143.6	117	249.5	154	400.4
44	74.5	81	146.0	118	253.0	155	405.2
45	76.0	82	148.4	119	256.4	156	410.0
46	77.6	83	150.8	120	259.9	157	414.9
47	79.2	84	153.2	121	263.5	158	419.9
48	80.0	85	155.7	122	267.0	159	424.8
49	82.4	86	158.2	123	270.6	160	429.9
50	84.0	87	160.7	124	274.3	161	434.9
51	85.7	88	163.2	125	278.0	162	440.1
52	87.4	89	165.8	126	281.7	163	445.2
53	89.1	90	168.4	127	285.4	164	450.4
54	90.8	91	171.0	128	289.2	165	455.7
55	92.6	92	173.7	129	293.0		
56	94.3	93	176.4	130	296.8		