Important: If your unit has a crankcase heater be sure that the crankcase heater has been energized for at least 24 hours prior to start-up of the unit. Double check all electrical connections before applying power. Various thermostats can be used to control the heat pump. The thermostat may have a fan switch with an Automatic and On positions, a system switch with Heat, Cool, and Off positions, and an emergency heat position with lights. The spec sheets have detailed description of the various Marvair® thermostats. Since other thermostats or remote control systems may be used, the following procedures should be viewed as guidelines for standard thermostats with system and fan switches.

3.1 Check-out of Cooling Cycle

Procedure:
Classic Heat Pump

1. Set the fan switch to "Auto" and the system switch to "Off".
2. Move the cooling set point temperature on the wall thermostat to a point higher than the room temperature. Move the heating set point temperature to a temperature that is lower than the room temperature.
3. Set the thermostats system switch to "Cool" or "Auto" position. Nothing should operate at this time.
4. Set the time delay in the control box to three minutes. Note that time delay is an option on some Classic units and may not be on your heat pump.
5. Remove the cover plate from the thermostat. Slowly lower the thermostat cooling set point temperature. Once the indoor fan turns on, allow approximately three minutes for the compressor and outdoor fan to start.

For units equipped with the low ambient control, note that the outdoor fan may not come on immediately, because it is cycled by refrigerant pressures. Some units have a time delay module which prevents the compressor from restarting immediately after interruption of power. See section 1.5 for details on the operation of the low ambient control and the time delay.

If the unit fails to operate, refer to the troubleshooting information in Chapter 4.

Classic Heat Pump with Economizer

1. Set the fan switch to "Auto" and the system switch to "Off".
2. Set the cooling set point temperature on the wall thermostat to a point higher than the room temperature. Set the heating set point temperature to a temperature that is lower than room temperature.
3. Set the thermostat system switch in the "Auto" or "Cool" position. Nothing should operate at this time.
4. Set the time delay in the **Classic Heat Pump with Economizer** control box to 3 minutes. Check the enthalpy changeover setting of the H205A or dry bulb sensor, and reset it if needed. See section 1.7.
5. Slowly lower the thermostat's cooling set point temperature. The indoor fan should operate.

Once the indoor fan comes on, allow approximately three minutes for the compressor to start. Note that the outdoor fan may not come on immediately because it is cycled by refrigerant pressures

Note: To check the system operation under different ambient conditions, the air temperature and enthalpy sensors must be "tricked". When outdoor ambient conditions are higher than the control setting, a component aerosol cooler may be sprayed directly into the enthalpy sensor to simulate low enthalpy conditions, causing the economizer damper to open.

Alternately, when outdoor conditions are lower than the set point, a source of heat such as a hair dryer can be directed on the air temperature sensor to simulate warmer conditions, which will bring on mechanical cooling and start the compressor.

If the unit fails to operate, refer to the troubleshooting information in Chapter 4.

3.2 Check-Out of Heating Cycle

Procedure:

1. Place the thermostat system switch to "Auto" or "Heat" and the fan to "Auto".
2. Raise the heating set point temperature to a setting which is higher than the room temperature. The fan and compressor should cycle on after time delay (standard on Classic heat pump with economizer and all HVP models, option on all other Classic units) has cycled.
3. Move the system switch to the "Off" position. All functions should stop.

The Blower Timed Delay Relay (BTR) keeps the blower running for 90 seconds after the unit shuts off.

Note: The damper blade should remain closed during the heating cycle (unless the minimum position potentiometer has been set for constant ventilation).

3.3 Discharge Air Temperature Adjustment of Modulating Hot Gas Reheat (HGR) Valve

Units with Hot Gas Reheat may use a valve, a PC board and temperature sensor to maintain a constant discharge temperature during reheat operation. The discharge air temperature can be adjusted by the use of a potentiometer located on the PC board. The board is located in the control box of the unit. A Digital VOM is required to adjust the potentiometer.

⚠ WARNING - ELECTRICAL SHOCK HAZARD

The setting of the discharge air temperature requires that power be applied to the unit and the unit operating. Use extreme caution when working in the control box.

1. Make sure the two sensor wires are connected to the TEMP SENSOR terminals on the board. See Figure 8.

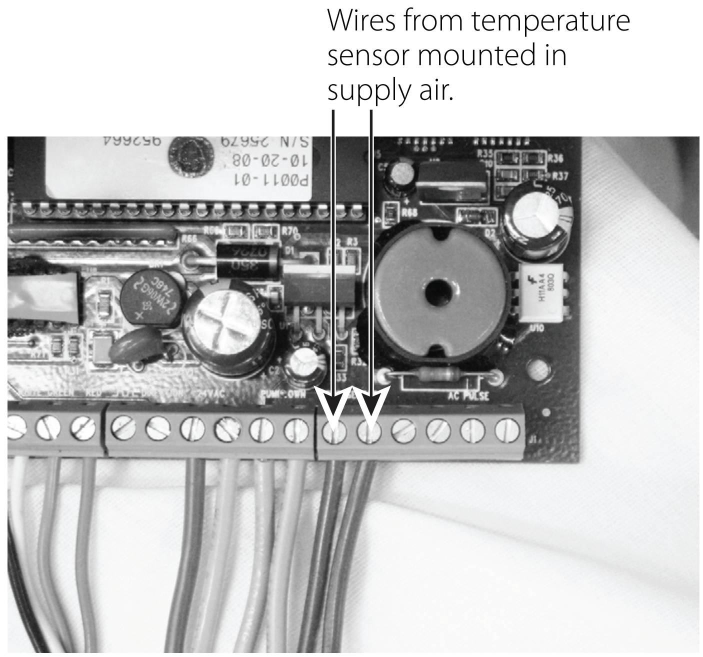


Figure 6 - Temperature Sensor Wires

2. Turn the unit on and the Hot Gas Reheat is operating.
3. Set the digital VOM for DC milliamp voltage. The milliamp voltage shown on the meter's display corresponds to the desired air temperature (ºF). Insert the probes of the meter into the negative (black) and positive (red) set point test terminals on the board. Carefully, and in small increments, turn the blue knob on the potentiometer until the volt meter displays the desired milliamp voltage (temperature). Marvair recommends 70ºF and no lower than 68ºF and no higher than 78ºF. Allow the refrigerant system to stabilize for at least five minutes and adjust the temperature as desired.

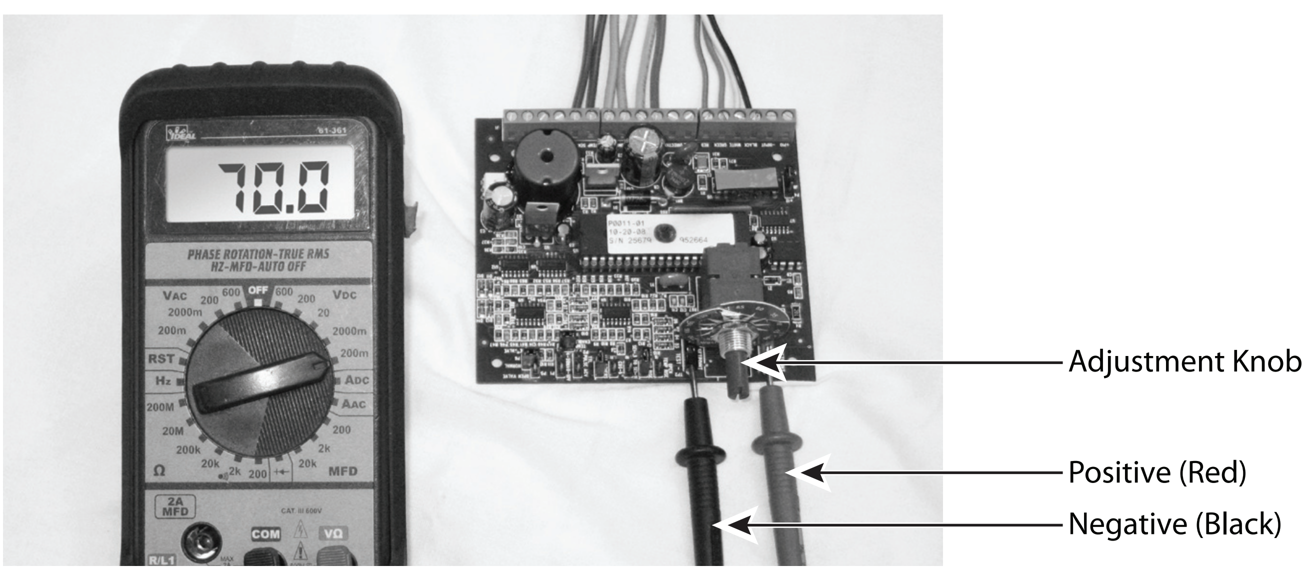


Figure 7 - Desired Temperature Set Point

3.4 Ventilation System Set-Up:

Manual Fresh Air System (Configuration N). This is the standard ventilation system in the Classic heat pump. Fresh air ventilation by means of a damper can provide up to 15% of rated air flow of outside air. The damper has four positions corresponding to 0, 5, 10 and 15% of rated air flow of outside air.

The damper only opens when the indoor fan is operating. Position the screw on the side of the damper hood for the desired air flow.

Manual Damper - 0 to 450 cfm of Outside Air, No Pressure Relief (Configuration Y). The amount of fresh air is determined by the position of the collar on the rod (*Figure 3*). To determine the desired quantity of fresh air:

a. With the indoor blower on, measure the quantity of supply air being discharged into the room with a balometer.

b. Now measure the quantity of the return air from the room. Subtract the return air from the supply air. The difference is the amount of fresh air.

c. Loosen the set screw that holds the collar onto the rod connected to the damper. Move the collar and tighten the set screw.

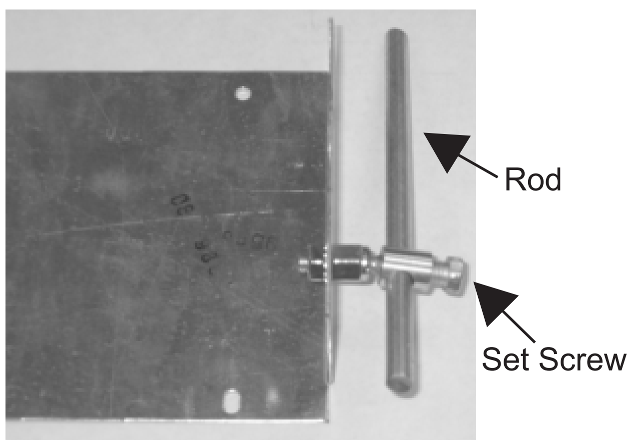


Figure 8 - Damper Adjustment

d. Repeat steps a, b and c until the desired amount of fresh air is being introduced into the room.

Important Note: Since Configuration Y does not have internal pressure relief, the fresh air must have a passage to the outside. If a passage is not available, the desired quantity of fresh air cannot be introduced into the room.

Motorized Damper - 0 to 450 cfm of Outside Air and Pressure Relief (Configuration B) and the Manual Damper with Pressure Relief (Configuration Z). The settings of the damper require a balometer and a thermometer for measuring internal and external temperatures.

a. Measure the total supply air with a balometer. If the supply air is controlled by a manual fan speed controller, make certain that the air flow is in accordance with Table 1, Air Flow (CFM) at Various Static Pressures. This CFM is referred to as "C" in the illustration and equation below.

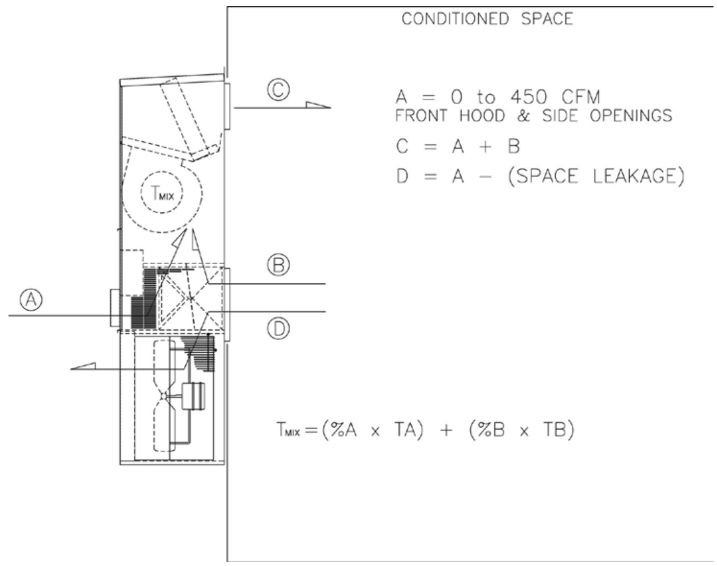


Figure 9 - Damper Air Path

b. "A" is the quantity of outside air expressed as a percentage of "C". For example, if the supply air is 1,220 CFM and 300 CFM of outside air is required, "A" is 25% (300 CFM/1,220 CFM).

   Measure the temperature of the outside air.

   Multiply the temperature by "A".

c. "B" is the quantity of return air expressed as a percentage of "C". "A" and "B" must equal 100%.

   Measure the temperature of the indoor return air.

   Multiply the temperature of the indoor air by "B".

d. Calculate what the Tmix should be with the desired quantity of outside air.

   Measure the actual temperature of Tmix at the inlet to the supply air blower or at the inlet of the supply air blower.

   Adjust the damper blade until the measured value of the Tmix equals the calculated or desired value of Tmix.

The motorized damper, Configuration B, can be controlled by an optional relay that allows additional external control with a choice of 24, 120 or 240V coils to regulate fresh air ventilation in response to a control located remote from the Classic heat pump.

GreenWheel® ERV (Configuration H). Setting the correct air flow for the GreenWheel ERV requires a balometer and a screwdriver.

a. Using best industry standards and practices, measure the fresh air that is being brought into the classroom. For units with one speed controller (std.), adjust the speed of the intake and exhaust blowers by inserting a slotted screw driver into the opening on the controller. The speed controller is located on the lower right side of the GreenWheel® ERV assembly. Access to the speed controller is through the return air grille. Measure the intake air again and adjust the speed of the blowers. Repeat as necessary to meet the fresh air requirements.

b. For units with the optional variable fan speed controller for the GreenWheel® ERV exhaust blower, first measure the air being introduced into the classroom using best industry standards and practices. Adjust the speed of the intake air GreenWheel ERV blower until the required outside air is being brought into the classroom.

c. Now measure the exhaust air from the classroom. Adjust the speed of the exhaust air GreenWheel® ERV blower until the required air is being exhausted from the classroom. The exhaust air controller is located on the lower left side of the GreenWheel ERV assembly. Access to the exhaust air controller is through the return air grille. It is usual practice to pressurize the classroom by exhausting slightly less air than is being brought into the classroom.

Evaporator Variable Fan Speed Controller (Optional)

Indoor evaporator fan controller is accessed through the return air opening. The controller is located on the GreenWheel® ERV assembly on the air separation box in a 2” x 4” “J” box.

Note: Sufficient airflow is required for proper operation of the unit.

GreenCube ERV Ventilation (Configuration Q). Setting the correct air flow for the GreenCube ERV requires a balometer and a screwdriver.

a. Using best industry standards and practices, measure the fresh air that is being brought into the classroom.

b. Now measure the air being introduced into the classroom using best industry standards and practices. Adjust the speed of the intake air GreenCube ERV blower until the required outside air is being brought into the classroom.

c. Next measure the exhaust air from the classroom. Adjust the speed of the exhaust air GreenCube® ERV blower until the required air is being exhausted from the classroom. The exhaust air controller is located on the lower left side of the GreenCube ERV assembly. Access to the exhaust air controller is through the return air grille. It is usual practice to pressurize the classroom by exhausting slightly less air than is being brought into the classroom.

Troubleshooting

4.1 Overview

A comprehensive understanding of the operation of the Classic Heat Pump is a prerequisite to troubleshooting. Please read the Chapter 1 for basic information about the unit.

Marvair® Classic Heat Pumps are thoroughly tested before they are shipped from the factory. Of course, it is possible that a defect may escape undetected, or damage may have occurred during transportation. However, the great majority of problems result from installation errors.

If you experience difficulties with the Classic Heat Pump, please review the installation steps in Chapter 2.

Much time can be saved by taking a thoughtful and orderly approach to troubleshooting. Start with a visual check - are there loose wires, crimped tubing, missing parts, etc? Begin deeper analysis only after making this initial inspection.

The troubleshooting information in this manual is basic. The troubleshooting section contains problem / solution charts for general problems, followed by a compressor section.

Not every problem can be anticipated. If you discover a problem that is not covered in this manual, we would be very grateful if you would bring it to the attention of our service department for incorporation in future revisions.

As always, please exercise caution and good judgement when servicing the Classic Heat Pump. Use only safe and proven service techniques. Use refrigeration goggles when servicing the refrigeration circuit.

The refrigerant circuit has hot surfaces, and the electrical voltages inside of the unit may be hazardous or lethal. SERVICE MAY BE PERFORMED ONLY BY QUALIFIED AND EXPERIENCED PERSONS.

⚠ WARNING

The refrigerant circuit has hot surfaces, and the electrical voltages inside of the unit may be hazardous or lethal. SERVICE MAY BE PERFORMED ONLY BY QUALIFIED AND EXPERIENCED PERSONS.

4.2 Failure Symptoms Guide

PROBLEM/SYMPTOM	LIKELY CAUSE(S)	CORRECTION
A. Unit does not run. **NOTE**: An internal anti-short-cycle timer will prevent the unit from starting for .2 to 8 minutes following start-up.	1. Power supply problem. 2. Tripped internal disconnect. 3. Shut off by external thermostat or thermostat is defective. 4. Unit off on high pressure or loss of charge. 5. Internal component or connection failure.	1. Check power supply for adequate phase and voltage. Check wiring to unit and external breakers or fuses. 2. Check circuit protection devices for continuity. 3. Check operation of wall-mounted thermostat. 4. Reset lockout. See section 1.4. 5. Check for loose wiring. Check components for failure.
B. Unit runs for long periods or continuously; cooling is insufficient.	1. Unit undersized for job. 2. Low refrigerant. 3. Component failure. 4. Dirty filter or reduced airflow.	1. Add additional units for greater capacity. 2. Check for proper charge and possible refrigerant leak. 3. Check internal components, especially compressor for proper operation. 4. Check air filter(s). Check blower operation. Remove airflow restriction.

PROBLEM/SYMPTOM	LIKELY CAUSE(S)	CORRECTION
C. Unit cycles on high pressure or loss of charge.	1. Loss or restriction of airflow.	1. Check blower assembly for proper operation. Look for airflow restrictions, e.g., the air filter. Check blower motor and condenser fan. Indoor blower fan speed control set too low.
	2. Restriction in refrigerant circuit.	2. Check for blockage or restriction, especially filter drier and capillary tube assembly.
	3. Refrigerant overcharge (following field service)	3. Evacuate and recharge to factory specifications.
	4. Defective high pressure control or loss of charge switch.	4. Check limit cutout pressures. Control is set to actuate at approximately 40 PSIG (loss of charge) and 610 PSIG (high pressure).
D. Unit blows fuses or trips circuit breaker.	1. Inadequate circuit ampacity.	1. Note electrical requirements in Chapter 2 and correct as necessary.
	2. Short, loose, or improper connection in field wiring.	2. Check field wiring for errors.
	3. Internal short circuit. Loose or improper connection(s) in unit.	3. Check wiring in unit. See wiring and schematic diagrams. Test components (especially the compressor) for shorts.
	4. Excessively high or low supply voltage or phase loss (3ø only).	4. Note voltage range limitations specific to the compressor troubleshooting section.
E. Water on floor near unit.	1. Obstruction in condensate line.	1. Check for clog or restriction.
	2. Obstruction or leak in condensate pan.	2. Check pan for leak or blockage.
	3. Unit is not level.	3. Level unit.
F. No space heating or reduced heating (units equipped with resistance elements)	1. Defective heating element(s).	1. Check resistance element(s) for continuity.
	2. Thermal limit open.	2. Check continuity across thermal limit switch.
	3. Defective heater contactor.	3. Check relay for proper operation. Replace if defective.
	4. Thermostat set too low.	4. Adjust thermostat.
	5. Compressor fault.	5. Reset the lock out relay at the thermostat.

4.3 Compressor Troubleshooting

Obtain the heat pump's model number and serial number, the compressor's model number and contact Marvair® for compressor specifications.

It is important to rule out other component failures before condemning the compressor.

The following electrical tests will aid diagnosis on single phase "HPA" units:

1. **Start-Up Voltage:** Measure the voltage at the compressor contactor during start-up. The voltage must exceed the minimum shown in Table 8, section 2.2, or compressor failure is likely. A low voltage condition must be corrected.

2. **Running Amperage:** Connect a clip-on type ammeter to the (common) lead to the compressor. Turn on the supply voltage and energize the unit. The compressor will initially draw high amperage; it should soon drop to the RLA value or less. If the amperage stays high, check the motor winding resistances.

   NOTE: Feel the top of the compressor to see if it has overheated. If it is hot, the internal overload may be open. You may have to wait several hours for it to reset.

3. **High Voltage/Insulation Test:** Test internal leakage with a megohmeter. Attach one lead to the compressor case on a bare metal tube and to each compressor terminal to test the motor windings. A short circuit at a high voltages indicates a motor defect. Do not do this test under vacuum.

4. On single phase models, check the capacitor by substitution.

4.4 Electric Heat Controls

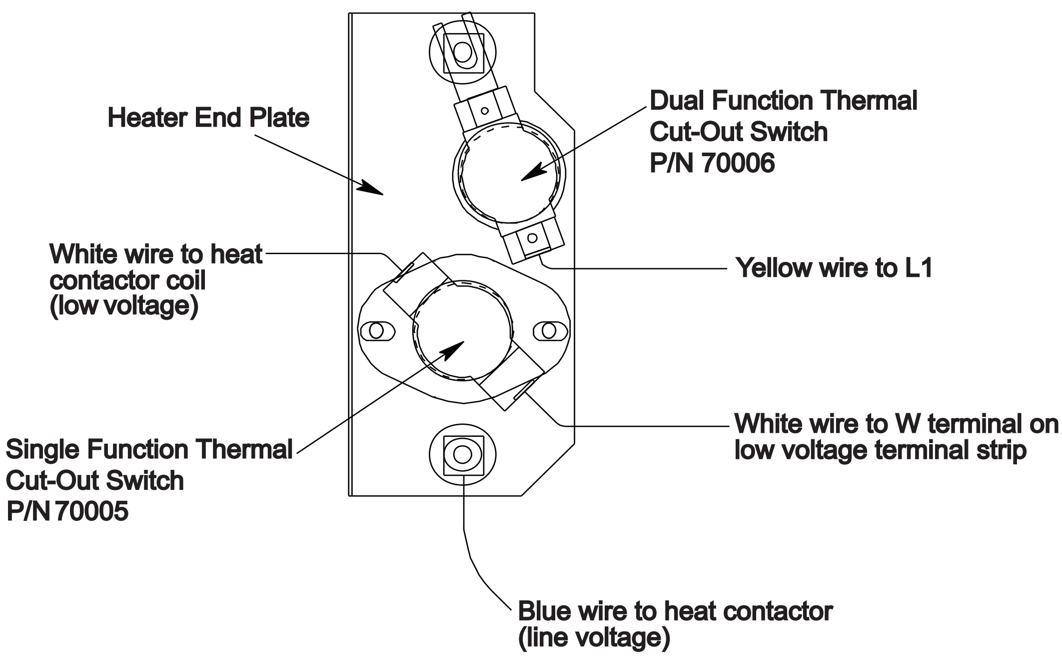


Figure 10 - Typical Configuration for Single Element Heater

The electric heater assembly can have up to three individual heating elements. Each individual heating element is protected against overheating by its own dual function thermal cut-out switch. Additionally, a separate single function thermal cut-out switch protects the entire heater assembly.

The dual function thermal cut-out switch (P/N 70006) is composed of two independent line voltage snap-disc temperature switches mounted in a single enclosure. One of these switches is an automatic reset device which cycles off at approximately 145°F and back on at approximately 115°F. Should this switch fail to open, the second switch will open the circuit if the temperature continues to increase. This second switch does not reset. If it opens (breaks the line voltage circuit to the heater assembly) the switch will have to be replaced by qualified service personnel after the source of the overheat problem is resolved.

In addition to the thermal cut-out switch described above, there is a single function thermal cut-out switch (P/N 70005) mounted on the heater frame. This switch controls the 24V AC control current to the heater contactor(s) which powers all the heating elements. This single function thermal cut-out switch operates totally independent of the dual thermal cut-out switch described above. If the single function switch senses an overheat situation, it opens the control circuit and turns off all of the installed heating elements via the heater contactor(s). Because this switch controls the heater contactor(s), only one switch is required to disconnect power from the contactor(s), regardless of the number of heater elements. This single function switch is also non-resettable, and must be replaced by qualified service personnel after the source of the overheat problem is resolved. This switch would typically open if both elements of the dual thermal cut-out switches failed.

Electrical Schematics

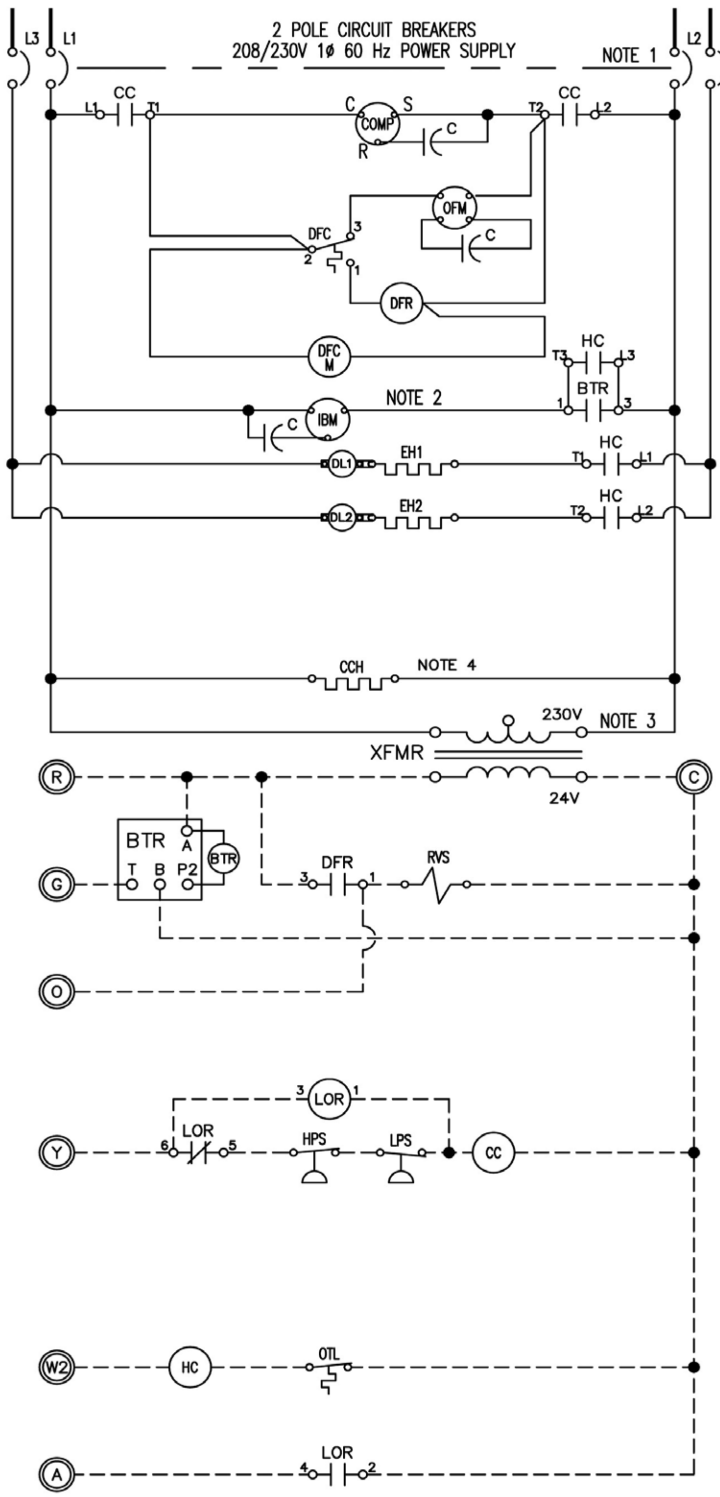
5.1 Electrical Schematics

The compressor and condenser fan are energized with a contactor controlled by a 24 VAC pilot signal.

The condenser (outside fan) motor is energized by the same contactor. However, the motor is cycled on and off by the low ambient control (see low ambient control 1.5). Note: Only on Classic heat pump with economizer.

The compressor incorporates an internal PTC crankcase heater that functions as long as primary power is available. The heater drives liquid refrigerant from the crankcase and prevents loss of lubrication caused be oil dilution. Power must be applied to the unit for 24 hours before starting the compressor. Note: Classic heat pumps with scroll compressors generally do not require crankcase heaters.

The indoor evaporator fan motor is cycled by the blower timed delay relay. See Figure 9. Due to the large number of variations and options available for the Classic heat pumps, it is not practical to include every possible wiring schematic in this manual. The following schematics are typical. Included in each Classic heat pump is the electrical schematic for that unit. Always refer to the schematic in the unit when installing or servicing the heat pump.



ELECTRICAL LEGEND:

BTR	BLOWER TIME RELAY
C	CAPACITOR
CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
COMP	COMPRESSOR
DFC	DEFROST CONTROLLER
DFR	DEFROST RELAY
DL	DUAL LIMIT
EH	ELECTRIC STRIP HEATER
HPS	HIGH PRESSURE SWITCH
HC	HEAT CONTRACTOR
IBM	INDOOR BLOWER MOTOR
LOR	LOCK-OUT RELAY
LPS	LOW PRESSURE SWITCH
OTL	ONE TIME LIMIT
OFM	OUTDOOR FAN MOTOR
RVS	REVERSING VALVE SOLENOID
XFMR	TRANSFORMER

VOLTAGE LEGEND

- ——— LINE VOLTAGE FACTORY
- ——— LINE VOLTAGE FIELD
- - - - - LOW VOLTAGE FACTORY
- - - - - LOW VOLTAGE FIELD
- —— — — —— ALT. VOLTAGE (FIELD SPEC.)

COLOR CODE

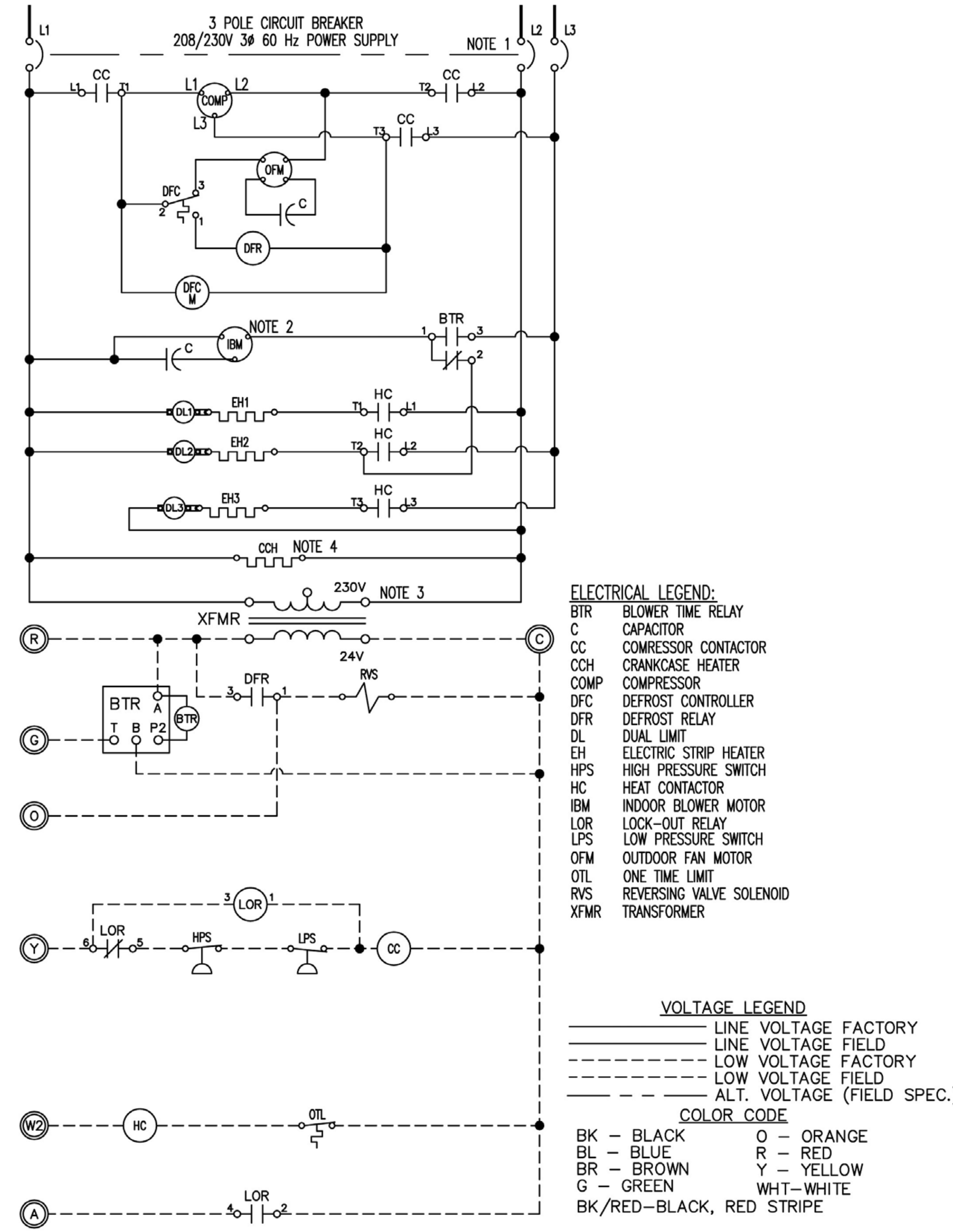
BK – BLACK	O – ORANGE
BL – BLUE	R – RED
BR – BROWN	Y – YELLOW
G – GREEN	WHT–WHITE

BK/RED–BLACK, RED STRIPE

GENERAL NOTES:

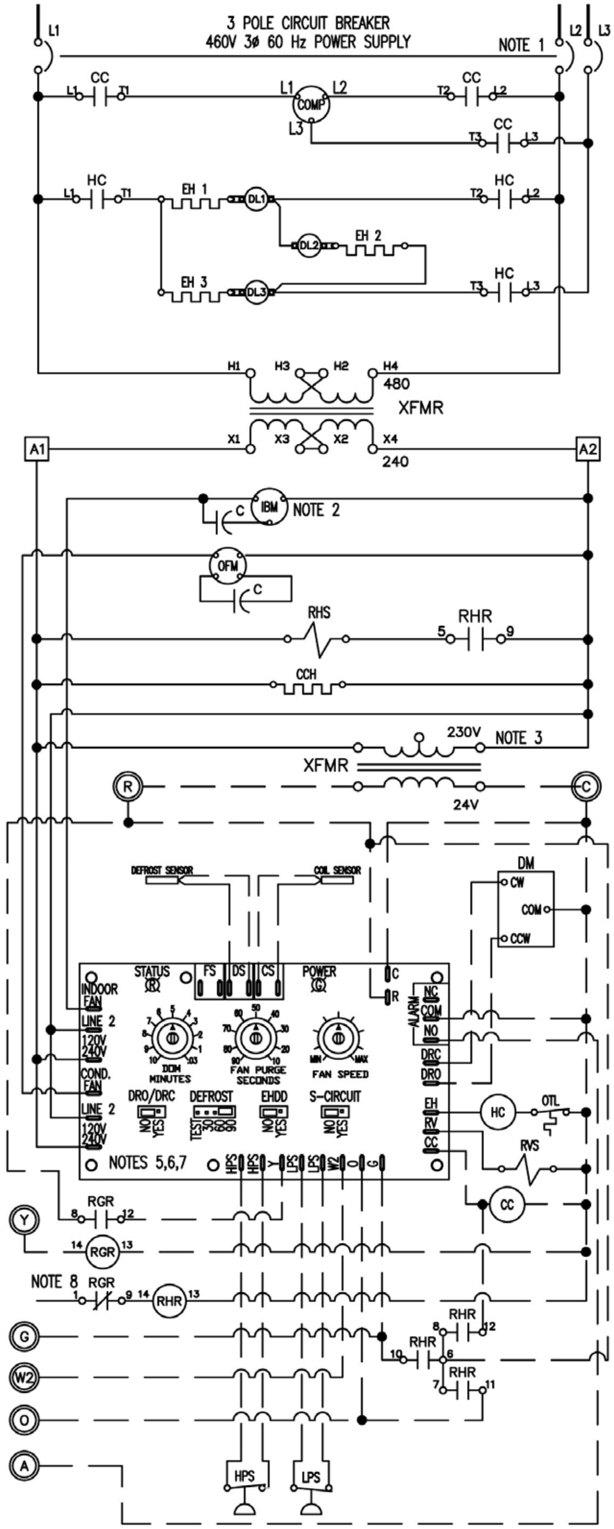
1. 208/230 VOLT 1ø 60 Hz POWER SUPPLY. SEE DATA PLATE FOR AMPACITY AND FUSE SIZE. OPTIONAL CKT BKR SHOWN.
2. SPEED TAP – SEE MOTOR NAMEPLATE FOR WIRE COLORS.
3. TRANSFORMER IS FACTORY WIRED FOR 230 VOLT OPERATION. FOR LOWER VOLTAGES, INTERCHANGE ORANGE AND RED LEADS. INSULATE UNUSED LEADS.
4. CRANKCASE HEATER IS NOT USED ON ALL MODELS.
5. PTCR IS NOT REQUIRED ON ALL COMPRESSORS.

Figure 11a - Typical 1ø Electrical Schematic Diagram
Classic Heat Pump (Models AVPA) with Manual Outside Air Damper



GENERAL NOTES:
1. 208/230 VOLT 3ø 60 Hz POWER SUPPLY. SEE DATA PLATE FOR AMPACITY AND FUSE SIZE. OPTIONAL CKT BKR SHOWN.
2. SPEED TAP – SEE MOTOR NAMEPLATE FOR WIRE COLORS.
3. TRANSFORMER IS FACTORY WIRED FOR 230 VOLT OPERATION. FOR LOWER VOLTAGES, INTERCHANGE ORANGE AND RED LEADS. INSULATE UNUSED LEADS.
4. CRANKCASE HEATER MAY NOT BE USED ON ALL COMPRESSOR

Figure 11b - Typical 208/230v. 3ø Electrical Schematic Diagram
Classic Heat Pump (Models AVPA)



ELECTRICAL LEGEND:

C	CAPACITOR
CC	COMRESSOR CONTACTOR
CCH	CRANKCASE HEATER
COMP	COMPRESSOR
DL	DUAL LIMIT
EH	ELECTRIC HEAT
HC	HEAT CONTACTOR
HPS	HIGH PRESSURE SWITCH
IBM	INDOOR BLOWER MOTOR
LPS	LOW PRESSURE SWITCH
OFM	OUTDOOR FAN MOTOR
OTL	ONE TIME LIMIT
RVS	REVERSING VALVE SOLENOID
XFMR	TRANSFORMER

VOLTAGE LEGEND

- LINE VOLTAGE FACTORY
- LINE VOLTAGE FIELD
- LOW VOLTAGE FACTORY
- LOW VOLTAGE FIELD
- ALT. VOLTAGE (FIELD SPEC.)

COLOR CODE

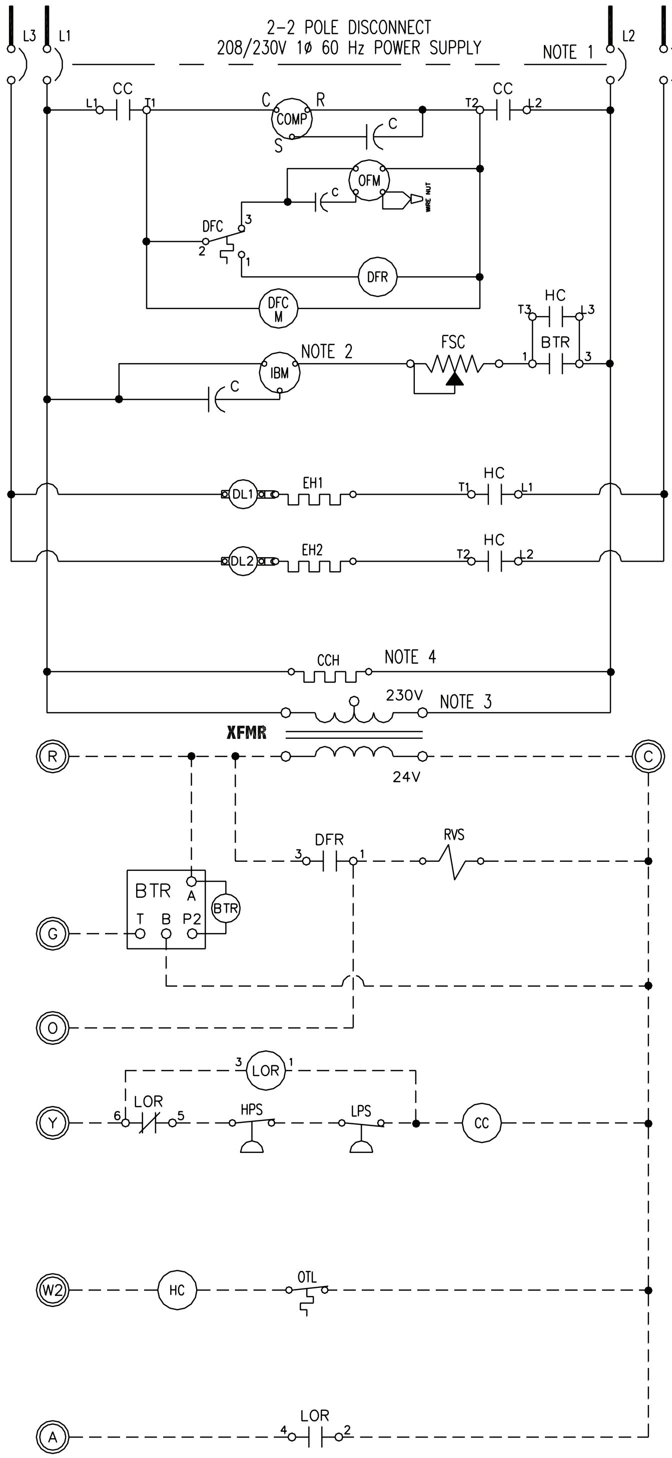
BK – BLACK	O – ORANGE
BL – BLUE	R – RED
BR – BROWN	Y – YELLOW
G – GREEN	WHT–WHITE

BK/RED–BLACK, RED STRIPE

GENERAL NOTES:

1. 460 VOLT 3ø 60 Hz POWER SUPPLY. SEE DATA PLATE FOR AMPACITY AND FUSE SIZE. OPTIONAL CKT BKR SHOWN.
2. SPEED TAP – SEE MOTOR NAMEPLATE FOR WIRE COLORS.
3. TRANSFORMER IS FACTORY WIRED FOR 230 VOLT OPERATION. FOR LOWER VOLTAGES, INTERCHANGE ORANGE AND RED LEADS. INSULATE UNUSED LEADS.
4. CRANKCASE MAY NOT BE REQUIRED ON ALL COMPRESSORS.
5. THE (STATUS LED) WILL BLINK ONE TIME AFTER THE HPS (HIGH PRESSURE SWITCH) HAS OPENED TWICE AND THE UNIT WILL LOCKOUT.
6. THE (STATUS LED) WILL BLINK TWICE AFTER THE LPS (LOW PRESSURE SWITCH) HAS OPENED TWICE AND THE UNIT WILL LOCKOUT. THE LOCKOUT CIRCUIT CONTACTS ARE LOCATED ON THE PRINTED CIRCUIT BOARD.
7. THE (STATUS LED) WILL BLINK FOUR TIMES TO INDICATE A DEFROST OR COIL SENSOR FAULT AND THE UNIT WILL CONTINUE TO OPERATE.
8. (REHEAT INPUT) CONNECT TO 24VAC DE-HUMIDISTAT DEVICE.

Figure 11c, Typical 460v. 3ø Electrical Schematic Diagram
Classic Heat Pumps, Models AVPA, with the PC Control Board



ELECTRICAL LEGEND:

BTR	BLOWER TIME RELAY	LOR	LOCK-OUT RELAY
C	CAPACITOR	LPS	LOSS OF CHARGE
CC	COMPRESSOR CONTACTOR	OFM	OUTDOOR FAN MOTOR
CCH	CRANKCASE HEATER	OTL	ONE TIME LIMIT
COMP	COMPRESSOR	RVS	REVERSING VALVE SOLENOID
COS	CHANGE OVER STAT	XFMR	TRANSFORMER
DFC	DEFROST CONTROLLER		
DFR	DEFROST RELAY		
DL	DUAL LIMIT		
EH	ELECTRIC STRIP HEATER		
HPS	HIGH PRESSURE SWITCH		
HC	HEAT CONTACTOR		
IBM	INDOOR BLOWER MOTOR		

VOLTAGE LEGEND

———— LINE VOLTAGE FACTORY
———— LINE VOLTAGE FIELD
- - - - - LOW VOLTAGE FACTORY
- - - - - LOW VOLTAGE FIELD
—— — — —— ALT. VOLTAGE (FIELD SPEC.)

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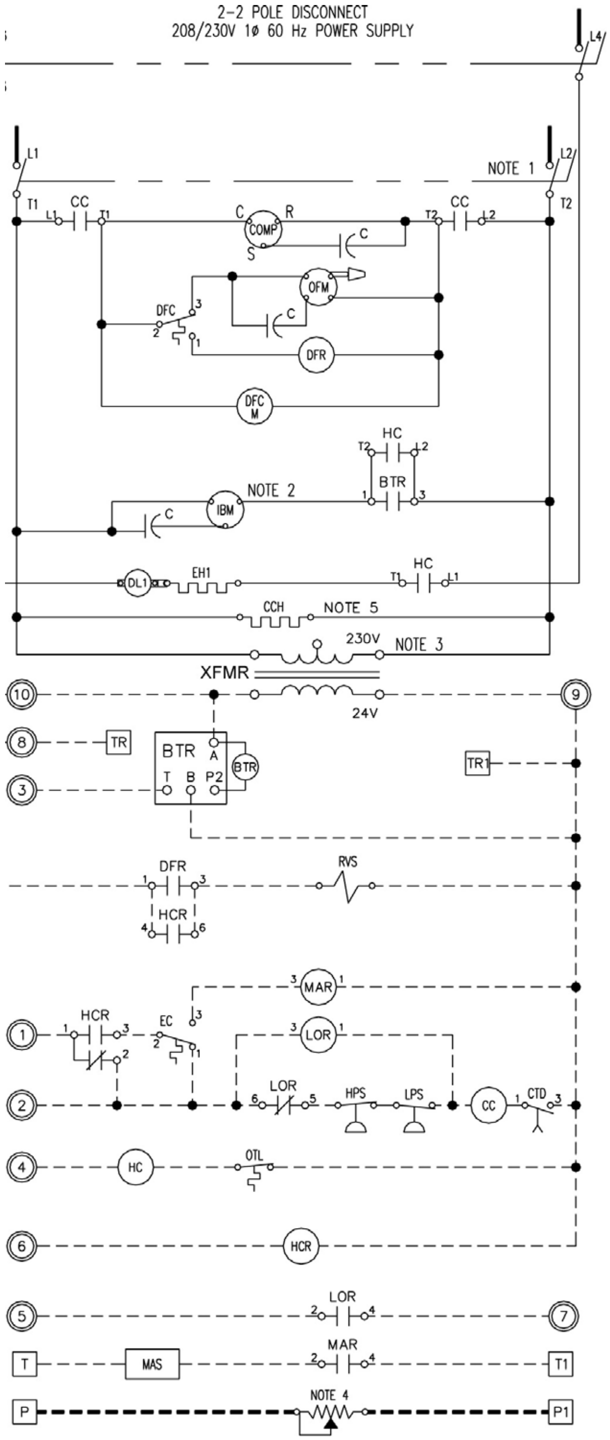
Y – YELLOW
WHT–WHITE
BK/RED–BLACK, RED STRIPE
PU – PURPLE

GENERAL NOTES:

1. 208/230 VOLT 1ø 60 Hz POWER SUPPLY. SEE DATA PLATE FOR AMPACITY AND FUSE SIZE.
2. SPEED TAP – SEE MOTOR NAMEPLATE FOR WIRE COLORS.
3. TRANSFORMER IS FACTORY WIRED FOR 230 VOLT OPERATION. FOR LOWER VOLTAGES, INTERCHANGE ORANGE AND RED LEADS. INSULATE UNUSED LEADS.
4. CRANKCASE HEATER MAY NOT BE USED ON ALL COMPRESSORS.

Figure 11d - Typical Electrical Schematic Diagram
Classic Heat Pump (Models HVPA) with Manual Outside Air Damper



ELECTRICAL LEGEND:

BTR BLOWER TIME RELAY
C CAPACITOR
CC COMRESSOR CONTACTOR
CCH CRANKCASE HEATER
COMP COMPRESSOR
DFC DEFROST CONTROLLER
DFR DEFROST RELAY
DL DUAL LIMIT
EC ENTHALPY CONTROLLER
EH ELECTRIC STRIP HEATER
EP-A ECON. PACKAGE ACTUATOR
HCR HEAT COOLING RELAY
HPS HIGH PRESSURE SWITCH
HC HEAT CONTRACTOR
IBM INDOOR BLOWER MOTOR
LOR LOCK-OUT RELAY
LPS LOSS OF CHARGE
MAR MIXED AIR RELAY
MAS MIXED AIR SENSOR
OFM OUTDOOR FAN MOTOR
OTL ONE TIME LIMIT
RVS REVERSING VALVE SOLENOID
XFMR TRANSFORMER

VOLTAGE LEGEND

———————— LINE VOLTAGE FACTORY
———————— LINE VOLTAGE FIELD
- - - - - - - - - LOW VOLTAGE FACTORY
- - - - - - - - - LOW VOLTAGE FIELD
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WHT–WHITE
BK/RED–BLACK, RED STRIPE
PU – PURPLE

GENERAL NOTES:

1. 208/230 VOLT 1ø 60 Hz POWER SUPPLY. SEE DATA PLATE FOR AMPACITY AND FUSE SIZE.
2. SPEED TAP – SEE MOTOR NAMEPLATE FOR WIRE COLORS.
3. TRANSFORMER IS FACTORY WIRED FOR 230 VOLT OPERATION. FOR LOWER VOLTAGES, INTERCHANGE ORANGE AND RED LEADS. INSULATE UNUSED LEADS.
4. OPTIONAL FIELD INSTALLED 270 OHM MINIMUM POSITION POTENTIOMETER.
5. CRANKCASE HEATER NOT BE REQUIRED ON ALL COMPRESSORS.

Figure 11e - Typical Electrical Schematic Diagram
Classic Heat Pump (Models HVPA) with Economizer

6.1 Scheduled Maintenance

Marvair® strongly recommends that the heat pump be serviced a minimum of twice a year – once prior to the heating season and once prior to the cooling season. At this time the filters, evaporator coil, condenser coil, the cabinet, and condensate drains should be serviced as described below. Also at this time, the heat pump should be operated in the cooling and heating cycles as described in Chapter 3, Start-Up. In addition to this seasonal check-out, the unit should be maintained as follows:

Air Filter

Replace the air filter whenever it is visibly dirty. Never operate the heat pump without the filters in place.

Indoor Coil

If the coil becomes clogged or dirty, it may be cleaned by careful vacuuming or with a commercial evaporator cleaning spray. DO NOT use a solvent containing bleach, acetone, or flammable substances. Turn power OFF before cleaning. Be careful not to wet any of the electrical components. Be sure the unit has dried before restarting. Use a fin comb of the correct spacing to straighten mashed or bent fins.

Outdoor Coil

Periodically inspect the outdoor coil and the cabinet air reliefs for dirt or obstructions. Remove foreign objects such as leaves, paper, etc.

If the coil is dirty, it may be washed off with a commercial solvent intended for this purpose. TURN OFF POWER BEFORE CLEANING! Be sure that all electrical components are thoroughly dry before restoring power.

Cabinet

The cabinet may be cleaned with a sponge and warm, soapy water or a mild detergent. Do not use bleach, abrasive chemicals or harmful solvents.

Drains

Regularly check the primary and secondary condensate drains. The secondary drain has a stand pipe. An obstruction will force water to dump into the middle of the unit and drain out the sides of the Classic Heat Pump, causing discoloration of the side panels. If discoloration is noted, service the drains.

If a commercial drain solvent is used, flush out the drain pan and system with plenty of fresh water to prevent corrosion.

Lubrication

Oiling of the condenser fan motor or the evaporator blower motor is not recommended.