

**USER'S MANUAL / INSTALLATION INSTRUCTIONS****TWO STAGE R-410A SINGLE PACKAGE HEAT PUMP**

Premium Model Shown

**IMPORTANT**

Please read this information thoroughly and become familiar with the capabilities and use of your appliance before attempting to operate or maintain this unit. Keep this literature where you have easy access to it in the future. If a problem occurs, check the instructions and follow recommendations given. If these suggestions don't eliminate your problem, call your servicing contractor.

These instructions are primarily intended to assist qualified individuals experienced in the proper installation of this appliance. Some local codes require licensed installation/service personnel for this type of equipment. Please read all instructions carefully before starting the installation.

**DO NOT DESTROY. PLEASE READ CAREFULLY AND  
KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.**

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# USER INFORMATION

## IMPORTANT SAFETY INFORMATION

Safety markings are used frequently throughout this manual to designate a degree or level of seriousness and should not be ignored. **WARNING** indicates a potentially hazardous situation that if not avoided, could result in personal injury or death. **CAUTION** indicates a potentially hazardous situation that if not avoided, may result in minor or moderate injury or property damage.

## ABOUT THE HEAT PUMP

Your heat pump is a unique, all weather comfort-control appliance that will heat and cool your home year round and provide energy saving comfort. It's an unknown fact that heat is always in the air, even when the outside temperature is below freezing. The heat pump uses this basic law of physics to provide energy saving heat during the winter months. For example, If the outdoor temperature is 47° F (8° C), your heat pump can deliver approximately 3.5 units of heat energy per each unit of electrical energy used, as compared to a maximum of only 1 unit of heat energy produced with conventional heating systems.

In colder temperatures, the heat pump performs like an air conditioner run in reverse. Available heat energy outside the home is absorbed by the refrigerant and exhausted inside the home. This efficient process means you only pay for "moving" the heat from the outdoors to the indoor area. You do not pay to generate the heat, as is the case with more traditional furnace designs.

During summer, the heat pump reverses the flow of the heat-absorbing refrigerant to become an energy-efficient, central air conditioner. Excess heat energy inside the home is absorbed by the refrigerant and exhausted outside the home.

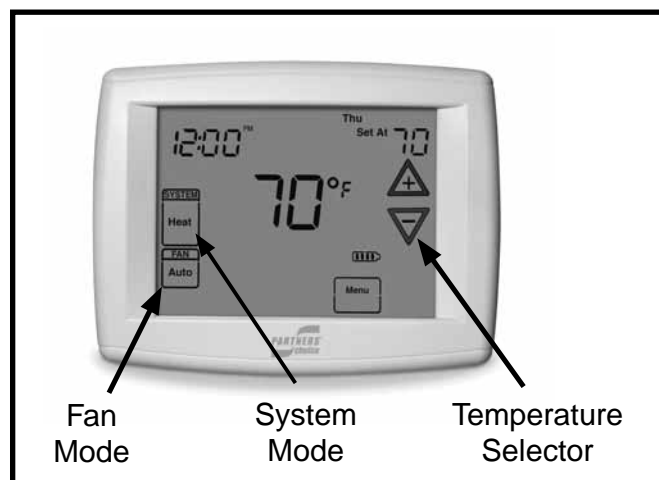


Figure 1. Digital Thermostat

## OPERATING INSTRUCTIONS

Please refer to the thermostat manufacturer's User manual for detailed programming instructions.

### Cooling Operation

1. Set the thermostat's system mode to COOL or AUTO and change the fan mode to AUTO. See Figure 1
2. Set the temperature selector to the desired temperature level. The outdoor fan, compressor, and blower motor will all cycle on and off to maintain the indoor temperature at the desired cooling level.

**NOTE:** If the temperature level is re-adjusted, or the system mode is reset, the fan and compressor in the outdoor unit may not start immediately. A protective timer circuit holds the compressor and the outdoor fan off for approximately three minutes following a previous operation or the interruption of the main electrical power.

### Heating Operation

1. Set the thermostat's system mode to HEAT or AUTO and change the fan mode to AUTO. See Figure 1.
2. Set the temperature selector to the desired temperature level. The compressor, outdoor fan, and blower motor will cycle on and off to maintain the indoor temperature at the desired heating level.

**NOTE:** If the temperature level is re-adjusted, or the system mode is reset, the fan and compressor in the outdoor unit may not start immediately. A protective timer circuit holds the compressor and the outdoor fan off for approximately five minutes following a previous operation or the interruption of the main electrical power.

### Emergency Heat

Some thermostats may include a system mode called EM HT or AUX HT, etc. This is a back-up heating mode that should only be used if a problem is suspected. With the mode set to EM HT, etc., the compressor and outdoor fan will be locked off and supplemental heat (electric resistance heating) will be used as a source of heat. Sustained use of electric resistance heat in place of the heat pump will result in an increase in electric utility costs.

### Defrost Operation

During cold weather heating operation, the outdoor unit will develop a coating of snow and ice on the heat transfer coil. This is normal and the unit will defrost itself. This unit features a Demand Defrost board that monitors ambient and coil temperatures to regulate the defrost function accordingly.

# USER INFORMATION

At the beginning of the defrost cycle, both the outdoor condenser fan and compressor will turn off. After approximately 30 seconds, the compressor will turn on and begin to heat the outdoor coil causing the ice and snow to melt.

**NOTE:** While the ice and snow is melting, some steam may rise from the outdoor unit as the warm coil causes the melting frost to evaporate. When defrost is completed, the outdoor fan motor will start, and the compressor will turn off again. In approximately 30 seconds the compressor will start up again and continue normal operation.

## Operating the Heat Pump for Automatic Cooling and Heating

1. Set the thermostat system switch to AUTO and the thermostat fan switch to AUTO. See Figure 1.

**NOTE:** Thermostat styles vary. Some models will not include the AUTO mode and others will have the AUTO in place of the HEAT and COOL. Others may include all three. Refer to the instructions supplied with your thermostat for specific instructions.

2. Set the thermostat temperature to the desired heating and cooling temperature level(s). The outdoor unit and the indoor blower will then cycle on and off in either the heating or cooling mode of operation as required to automatically maintain the indoor temperature within the desired limits.

## Operating the Indoor Blower Continuously

The continuous indoor blower operation is typically used to circulate the indoor air to equalize a temperature unbalance due to a sun load, cooking, or fireplace operation.

Set the thermostat fan mode to ON (Figure 1). The indoor blower starts immediately, and will run continually until the fan mode is reset to AUTO.

The continuous indoor blower operation can be obtained with the thermostat system mode set in any position, including OFF.

## Shutting the Heat Pump Off

Change the thermostat's system mode to OFF and the fan mode to AUTO. See Figure 1. **NOTE:** The system will not operate, regardless of the temperature selector setting.

## HEAT PUMP MAINTENANCE



### CAUTION:

**Shut off all electrical power to the unit before performing any maintenance or service on the system. Failure to comply may result in personal injury or death.**

Proper maintenance is most important to achieve the best performance from the appliance and should be performed by a qualified service technician at least once a year. Follow the maintenance schedule and the instructions below for years of safe, trouble free operation.

## Regular Cleaning

- Clean or replace the indoor air filter at the start of each heating and cooling season, and when an accumulation of dust and dirt is visible on the air filter.
- Remove any leaves and grass clippings from the coil in the outdoor unit, being careful not to damage the aluminum fins.
- Check for obstructions, such as twigs, sticks, etc.

## TROUBLESHOOTING

If the unit fails to operate, check the following:

- The thermostat is properly set. See Cooling Operation for air conditioning or Heating Operation for furnace or air handler.
- The unit disconnect fuses are in good condition and the electrical power to the unit is turned on.

## WARRANTY INFORMATION

A warranty certificate with full details is included with the heat pump. Carefully review these responsibilities with your dealer or service company. The manufacturer will not be responsible for any costs found necessary to correct problems due to improper setup, improper installation, adjustments, improper operating procedure on the part of the user, etc. Some specific examples of service calls which are not included in the limited warranty are:

- Correcting wiring problems in the electrical circuit supplying the heat pump.
- Resetting circuit breakers or other switches.
- Adjusting or calibrating of thermostat.

# INSTALLER INFORMATION

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### **WARNING:**

Improper installation, service, adjustment, or maintenance may cause explosion, fire, electrical shock or other hazardous conditions which may result in personal injury or property damage. Unless otherwise noted in these instructions, only factory authorized kits or accessories may be used with this product.

### **CAUTION:**

This unit uses refrigerant R-410A. **DO NOT** use any other refrigerant in this unit. Use of another refrigerant will damage the unit.

### **WARNING:**

Shut off all electrical power to the unit before performing any maintenance or service on the system. Failure to comply may result in personal injury or death.

### **WARNING:**

These units are fully charged with R-410A refrigerant and ready for installation. When a system is installed according to these instructions, no refrigerant charging is required. If repairs make it necessary for evacuation and charging, it should only be attempted by qualified, trained personnel thoroughly familiar with this equipment. Some local codes require licensed installation service personnel to service this type of equipment. Under no circumstances should the homeowner attempt to install and/or service this equipment. Failure to comply with this warning could result in equipment damage, personal injury, or death.

### **WARNING:**

**Do not place combustible material on or against the unit cabinet. Do not place combustible materials, including gasoline and any other flammable vapors and liquids, in the vicinity of the unit.**

### **WARNING:**

The safety information listed below must be followed during the installation, service, and operation of this unit. Unqualified individuals should not attempt to interpret these instructions or install this equipment. Failure to follow safety recommendations could result in possible damage to the equipment, serious personal injury or death.

- The installer must comply with all local codes and regulations which govern the installation of this type of equipment. Local codes and regulations take precedence over any recommendations contained in these instructions. Consult local building codes and the National Electrical Code (ANSI CI) for special installation requirements.
- This equipment contains liquid and gaseous refrigerant under high pressure. Installation or servicing should only be performed by qualified trained personnel thoroughly familiar with this type equipment.
- All electrical wiring must be completed in accordance with local, state and national codes and regulations and with the National Electric Code (ANSI/NFPA 70) or in Canada the Canadian Electric Code Part 1 CSA C.22.1.
- Installation of equipment may require brazing operations. Installer must comply with safety codes and wear appropriate safety equipment (safety glasses, work gloves, fire extinguisher, etc.) when performing brazing operations.
- Install this unit only in a location and position as specified on page 6. This unit is designed only for outdoor installations and should be located with consideration of minimizing the length of the supply and return ducts. Consideration should also be given to the accessibility of fuel, electric power, service access, noise, and shade.
- Follow all precautions in the literature, on tags, and on labels provided with the equipment. Read and thoroughly understand the instructions provided with the equipment prior to performing the installation and operational checkout of the equipment.

## GENERAL INFORMATION

This single package heat pump has been designed and tested for capacity and efficiency in accordance with A.R.I. Standards. This unit will provide many years of safe and dependable comfort, providing it is properly installed and maintained. This heat pump is designed only for outdoor installations. With regular maintenance, this unit will operate satisfactorily year after year. Abuse, improper use, and/or improper maintenance can shorten the life of the appliance and create unsafe hazards.

To achieve optimum performance and minimize equipment failure, it is recommended that periodic maintenance be performed on this unit. The ability to properly perform maintenance on this equipment requires certain mechanical skills and tools.

### Pre-Installation Check

- ✓ Before you install this unit, the cooling load of the area to be conditioned must be calculated and a system of the proper capacity selected. It is recommended that the area to be conditioned be completely insulated and vapor sealed.
- ✓ Check the electrical supply and verify the power supply is adequate for unit operation. If there is any question concerning the power supply, contact the local power company.
- ✓ All units are securely packed at the time of shipment and upon arrival should be carefully inspected for damage prior to installing the equipment at the job site. Verify coil fins are straight. If necessary, comb fins to remove flattened or bent fins. Claims for damage (apparent or concealed) should be filed immediately with the carrier.
- ✓ Please consult your dealer for maintenance information and availability of maintenance contracts. Please read all instructions before installing the unit.

### Locating the Heat Pump

- Survey the job site to determine the best location for mounting the outdoor unit.
- Choose an appropriate location that minimizes the length of the supply and return air ducts.
- Overhead obstructions, poorly ventilated areas, and areas subject to accumulation of debris should be avoided.
- Sufficient clearance for unobstructed airflow through the outdoor coil must be maintained in order to achieve rated performance. See Figure 2 for minimum clearances to obstructions.
- Consideration should also be given to availability of electric power, service access, noise, and shade.

### Field Connections for Electrical Power Supply

- All wiring must comply with current provisions of the National Electrical Code (ANSI/NFPA 70) and with applicable local codes having jurisdiction.
- The minimum size of electrical conductors and circuit protection must be in compliance with information listed on the outdoor unit data label.

- Electrical power supplied to the unit must be adequate for proper operation of the equipment. The system must be wired and provided with circuit protection in accordance with local building codes.

### Air Ducts

This unit is designed only for use with a supply and return duct. Air ducts must be installed in accordance with the standards of the National Fire Protection Association Standard for Installation of Air Conditioning Systems (NFPA 90A), Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems (NFPA 90B), and all applicable local codes. NFPA publications are available by writing to: National Fire Protection Association, Batterymarch Park, Quincy, ME 02269 or visit [www.NFPA.org](http://www.NFPA.org) on the web.

- Design the duct work according to methods described by the Air Conditioning Contractors of America (ACCA).
- The ducts must be properly sized not to exceed .2" W.C. pressure drop at 400 scfm per nominal ton of cooling capacity.
- Duct work should be attached directly to the unit flanges for horizontal applications.
- If roof curb is installed, the ducts must be attached to the curb hangers, not the unit.

### Unconditioned Spaces

All duct work passing through unconditioned space must be properly insulated to minimize duct losses and prevent condensation. Use insulation with an outer vapor barrier. Refer to local codes for insulation material requirements.

### Acoustical Duct Work

Certain installations may require the use of acoustical lining inside the supply duct work.

- Acoustical insulation must be in accordance with the current revision of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) application standard for duct liners.

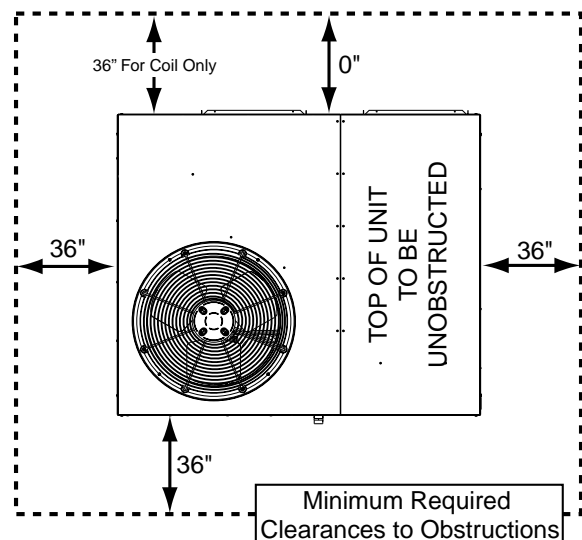


Figure 2. Clearance Requirements

- Duct lining must be UL classified batts or blankets with a fire hazard classification of FHC-25/50 or less.
- Fiber duct work may be used in place of internal duct liners if the fiber duct work is in accordance with the current revision of the SMACNA construction standard on fibrous glass ducts. Fibrous duct work and internal acoustical lining must be NFPA Class 1 air ducts when tested per UL Standard 181 for Class 1 ducts.

#### Air Filter Requirements

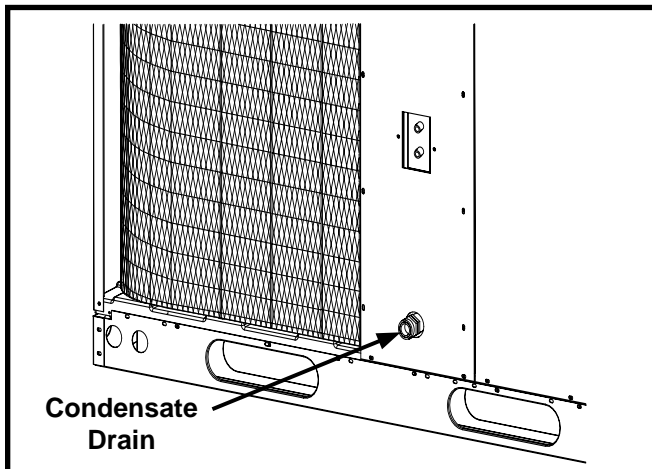
### **WARNING:**

**Never operate the unit without a filter in place. Dust and lint could accumulate on internal parts, resulting in loss of efficiency, equipment damage and possible fire.**

- This unit is not supplied with air filter(s) and has no factory equipped means for accommodating internal filter(s). A suitable air filter must be installed upstream of the evaporator coil of the return air system.
- All return air must pass through the filters before entering the evaporator coil. It is important that all filters be kept clean and replaced frequently to ensure proper operation of unit. Dirty or clogged filters will reduce the efficiency of the unit and result in unit shutdowns.
- Air filter pressure drop must not exceed 0.08 inches WC.
- Downflow Installations require an internal filter accessory kit to be installed.
- Horizontal Installations require the air filter system be installed in the return air ductwork.

#### Condensate Drain

Condensate is removed from the unit through the 3/4" female pipe fitting located on the front side of the unit (See Figure 3). Install a 2 inch condensate trap in the drain line of the same size and prime with water. When connecting rigid drain line, hold the female fitting with a wrench to prevent twisting. **Do not over tighten!** Refer to local codes and restrictions for proper condensate disposal requirements.



**Figure 3. Condensate Drain Location**

## HEAT PUMP INSTALLATION

### Packaging Removal

Remove the shipping carton and User's Manual from the equipment. Take care not to damage the tubing connections when removing the carton. For rooftop installations, remove and discard the two supports attached beneath the unit.

### Rigging and Hoisting

### **WARNING:**

**To avoid the risk of property damage, personal injury, or death, it is the rigger's responsibility to ensure that whatever means are used to hoist the unit are safe and adequate:**

- The lifting equipment must be adequate for the load. Refer to Table 7 (page 16) for unit weights.
- The unit must be lifted from the holes in the base rails using cables or chains.
- Spreader bars are required to protect the unit and ensure even loading.
- Keep the unit in an upright position at all times. The rigging must be located outside the units center of gravity. Refer to Figure 9 (page 16) for locating the center of gravity.
- All panels must be securely in place during rigging and hoisting.

### Minimum Clearance Requirements

Q4SE units are certified as combination heating and cooling equipment for outdoor rooftop or ground level installations. Figure 2 (page 6) displays the minimum clearances to obstructions for both Downflow and Horizontal discharge.

Units may be installed on Class A, B, or C roof covering material when used with bottom supply and return air ducts as long as the following requirements are met:

- If using vertical supply and return air ducts, a roof curb must be installed prior to unit installation. See Rigging and Hoisting section for setting of the unit.

### Horizontal to Downflow Conversion

The unit is shipped ready for horizontal duct connections. If down flow ducts are required, the unit must be converted following the steps below for both the supply and return ducts.

1. Remove the horizontal duct cap.
2. Locate the duct cap inside the duct openings and remove the screw holding it in place.
3. Lift the cap out of the unit. (**Hint:** The cap can be pushed up from the bottom by reaching through the fork slot).
4. Cover the horizontal duct opening with the horizontal duct cap. The insulation will be on the indoor side.
5. Fasten the cover with screws to seal.

## Ground Level

Ground level installations must be located according to local building codes or ordinances and these requirements:

- Clearances must be in accordance with those shown in Figure 2 (page 6).
- A suitable mounting pad (Figure 4) must be provided and be separate from the building foundation. The pad must be level to ensure proper condensate disposal and strong enough to support the unit's weight. The slab height must be a minimum of 2" (5cm) above grade and with adequate drainage.
- Ductwork should be attached directly to flanges on the supply and return panels.

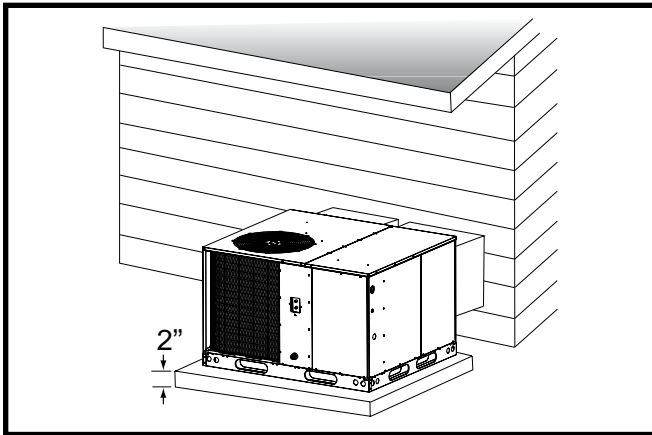


Figure 4. Ground Level Installation

## Rooftop

Rooftop installations must be located according to local building codes or ordinances and these requirements:

- The roof must be capable of handling the weight of the unit. For unit weights, see Table 7 (page 16). Reinforce the roof if necessary.
  - The appropriate accessory roof curb (Figure 5) must be installed prior to unit installation. The roof curb must be square and level to ensure proper condensate drainage.
- Please follow all instructions provided with the kit.**
- Secure roof curb or frame to roof using acceptable mechanical methods per local codes. **NOTE:** Make sure the two supports beneath the unit have been removed.

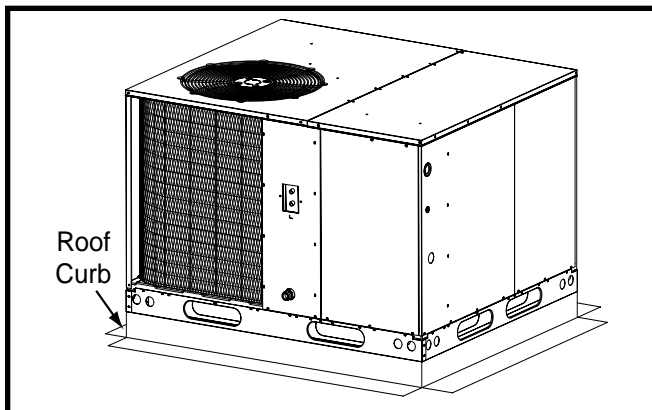


Figure 5. Roof Top Installation

## ELECTRICAL WIRING

### **WARNING:**

**Shut off all electrical power to the unit before performing any maintenance or service on the system. Failure to comply may result in personal injury or death.**

- Electrical connections must be in compliance with all applicable local codes and ordinances, and with the current revision of the National Electric Code (ANSI/NFPA 70).
- For Canadian installations the electrical connections and grounding shall comply with the current Canadian Electrical Code (CSA C22.1 and/or local codes).

### Pre-Electrical Checklist:

- ✓ Verify that the voltage, frequency, and phase of the supply source match the specifications on the unit rating plate.
- ✓ Verify that the service provided by the utility is sufficient to handle the additional load imposed by this equipment. refer to the unit wiring label for proper high and low voltage wiring.
- ✓ Verify factory wiring is in accordance with the unit wiring diagram (Figures 11 - 12, pages 18 - 19). Inspect for loose connections.

### Wiring Diagram / Schematic

A wiring diagram/schematic is located on the inside cover of the electrical box of the outdoor unit. The installer should become familiar with the wiring diagram/schematic before making any electrical connections to the outdoor unit.

### Line Voltage

- It is recommended that the line voltage to the unit be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the unit.
- **An electrical disconnect must be located within sight of and readily accessible to the unit.** This switch shall be capable of electrically de-energizing the outdoor unit. See unit data label for proper incoming field wiring. Any other wiring methods must be acceptable to authority having jurisdiction.
- Overcurrent protection must be provided at the branch circuit distribution panel and sized as shown on the unit rating label and according to applicable local codes. See the unit rating plate for maximum circuit ampacity and maximum overcurrent protection limits.
- Provide power supply for the unit in accordance with the unit wiring diagram, and the unit rating plate.
- Connect the line-voltage leads to the terminals on the contactor inside the control compartment.
- Use only copper wire for the line voltage power supply to this unit as listed in Table 1 (page 10). Use proper code agency listed conduit and a conduit connector



for connecting the supply wires to the unit. Use of rain tight conduit is recommended.

- See the unit wiring label for proper high and low voltage wiring. Make all electrical connections in accordance with all applicable codes and ordinances.

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## **CAUTION:**

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**Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.**

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- Units are shipped from the factory wired for 240 volt transformer operation. For 208V operation, remove the lead from the transformer terminal marked 240V and connect it to the terminal marked 208V.

### Grounding

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## **WARNING:**

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**The unit cabinet must have an uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur. Do not use gas piping as an electrical ground!**

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This unit must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code (ANSI/NFPA 70) or the CSA C22.1 Electrical Code. Use the grounding lug provided in the control box for grounding the unit.

### Selecting Proper Airflow for Variable Speed Units

The Q4SE packaged heat pump is equipped with a microprocessor-controlled variable speed motor that is pre-programmed to deliver optimum airflow in a variety of conditions and system configurations. The unit responds directly to the thermostat inputs, as well as the optional humidistat (if installed). During normal operation, the motor will gradually change speeds during start-up, shut down, when thermostat inputs change, and when the duct static pressure changes (vents closed or opened, filter clogging, etc.). The heat pump unit is also configured by setting the selector switches and removing jumper connectors as directed below.

**NOTE:** This packaged heat pump has been designed to give the installer maximum flexibility to optimize system performance, efficiency, and comfort. With so many different ways to set up the packaged heat pump, it is important to read and follow all directions carefully.

#### Selecting the Basic Cooling/Heat Pump Airflow

The basic cooling/heat-pump airflow is selected by setting switches 1 - 4 on the thermostat input board located on the blower. All airflows for other modes of operation (except electric heat) are determined by this basic setting.

Table 4 (page 10) lists the basic airflow values versus the airflow selector switch settings and the range of basic air flow settings recommended for each nominal system capacity.

### NOTES:

- The CFM values listed in the tables are not dependent on duct static pressure. The motor automatically compensates for changes in duct static pressure (within the limits of the motor).
- For maximum capacity and energy efficiency, select an airflow at or near the top of the range for that nominal capacity.
- For maximum dehumidification, select an airflow near the middle or bottom of the range for that nominal capacity. Additional information on humidification and dehumidification can be found on page 13.
- If coil icing is observed, the basic cooling/heat-pump airflow selected may be too low. Check the setting and make sure it is within the range shown in Table 4. Also verify the system is properly charged. See charging charts on pages 20 - 21. If icing continues to occur, raise the selected airflow one or two steps.

#### Selecting the Minimum Electric Heat Airflow

The minimum electric heat airflow is selected by setting switches 5 and 6. Selecting the minimum electric heat airflow sets the minimum air flow that will be produced whenever electric heater kits are used. When the electric heater kits are energized along with a heat pump, the airflow may be higher depending on the basic cooling/heat-pump airflow setting.

See Table 2 (page 10) for recommended minimum electric heat airflow settings. The minimum electric heat airflow setting may be set higher, but must never be set lower than the setting shown in the table.

#### Selecting the Delay Profile

Delay profile selection controls the start-up and shut-down characteristics of the packaged heat pump unit. By varying the start-up and shut-down characteristics, the system can be optimized for energy efficiency, humidity control, and comfort. The delay profile is selected by setting switches 7 & 8 (See Table 3 page 10). Select **Delay A** or **Delay B** for highest energy efficiency:

- **Delay A** has a two-step ON delay. The blower will begin operation at 31% airflow for 30 seconds. The second step operation is 75% airflow for 30 seconds. After the two-step ON delay has been completed, the blower operation will run at 100% until the thermostat has been satisfied. **Delay A** also provides a 60 second OFF delay at 50% airflow.
- **Delay B** has a single step 30 second ON delay at 50% airflow and also provides a 90 second OFF delay at 50% airflow. Select the delay profile which is most suited to the application. See Table 3.
- The **DeHum** delay profile may be used when humidity control is needed without the use of an optional

COPPER WIRE SIZE — AWG (1% Voltage Drop)				
Supply Wire Length-Feet				Supply Circuit Ampacity
200	150	100	50	
6	8	10	14	15
4	6	8	12	20
4	6	8	10	25
4	4	6	10	30
3	4	6	8	35
3	4	6	8	40
2	3	4	6	45
2	3	4	6	50
2	3	4	6	55
1	2	3	4	60

Wire Size based on N.E.C. for 60° type copper conductors.

Table 1. Copper Wire Size

Nominal KW	CFM	Switch Number							
		1	2	3	4	5	6	7	8
0-5	500					0	0		
6-10	700					1	0		
11-15	900					0	1		
16-20	1100					1	1		

**NOTE:** Switch settings: 0 = OFF, 1 = ON

Table 2. Minimum Electric Heat Airflow (all models)

Delay Description	Switch Number								
	1	2	3	4	5	6	7	8	
Delay A								0	0
Delay B								0	1
No Delay								1	0
De-Hum.								1	1

**NOTE:** Switch settings: 0 = OFF, 1 = ON

Table 3. Delay Settings (all models)

Basic Air-Flow Setting							
1/2 HP Motor	CFM	SWITCH				Nominal 2.0	
		1	2	3	4		
	720	0	0	0	0	2 T O N	
	800	0	0	0	1		
	810	1	0	0	1		
	880	0	0	1	0		
	900	1	0	0	0		
	945	0	1	0	1		
	990	1	0	1	0		
	1035	1	1	0	0		
	1050	0	1	0	0		
	1150	1	1	0	0		
	1155	0	1	1	0		
	1265	1	1	1	0		
1/2 HP Motor	CFM	SWITCH				Nominal 3.0	
		1	2	3	4		
	1080	0	0	0	1		
	1200	0	0	0	0		
	1215	1	0	0	1	3 T O N	
	1260	0	1	0	1		
	1320	0	0	1	0		
	1350	1	0	0	0		
	1395	1	1	0	1		
	1400	0	1	0	0		
	1485	1	0	1	0		
	1540	0	1	1	0		
	1550	1	1	0	0		
	1705	1	1	1	0		
3/4 HP Motor	CFM	SWITCH				Nominal	
		1	2	3	4	4.0	5.0
	1395	0	0	0	1		
	1485	1	0	0	1	4 T O N	
	1550	0	0	0	0		
	1620	0	1	0	1		
	1650	1	0	0	0		
	1705	0	0	1	0		
	1710	1	1	0	1		
	1800	0	1	0	0		
	1815	1	0	1	0		5 T O N
	1900	1	1	0	0		
	1980	0	1	1	0		
	2090	1	1	1	0		
NOTE: Switch settings: 0 = OFF, 1 = ON							

Table 4. Air Flow Settings for Variable Speed Motors

humidistat. If using this profile, the blower will run at 75% airflow for the first 10 minutes of each cooling cycle. The basic cooling/heat-pump speed should be selected at or near the top of the range for that nominal capacity. See Table 3.

### Demand Defrost Control

The demand defrost board controls the defrost cycle in response to ambient temperature, outdoor coil temperature and accumulated compressor run time. The heat pump is allowed to operate in the heating mode until the combination of outdoor ambient and outdoor coil temperatures indicate that defrosting is necessary, based on the programmed defrost curve. There are four preprogrammed defrost curves on the board.

- A jumper pin is used to switch between the different curves. The default jumper position is curve 1 and is the recommended setting for most standard applications. See Table 5 for additional defrost curves settings.
- The factory default setting does not include a 30 second compressor delay function and has a 40 ° F defrost terminate temperature. If additional defrost time is needed, a higher terminate temperature is available by selecting a different demand curve. **NOTE:** The 30 second compressor delay function is optional and based on the demand curve selected.
- The standard defrost cycle will terminate after 13 minutes and 39 seconds or when the coil temperature reaches its terminate temperature, whichever occurs first.
- The defrost board is equipped with a 5 minute Anti-Short Cycle Delay (ASCD). The compressor will not turn on until it reaches the minimum 5 minute off time.
- The control contains a forced - defrost feature, which places the system into defrost mode every 6 hours and 4 minutes, unless the coil temperature is above the selected terminate temperature.
- The system can be manually forced into defrost mode at any time by shorting the **TEST** terminals on the demand defrost board together for more than 9 seconds. The coil temperature sensor does not need to be cold when the unit is forced into defrost. After the **TEST** input is removed, the defrost mode will terminate in 13.7 minutes, if the coil temperature is above the terminate set-point, or when the **Y** input is removed, whichever occurs first.

**NOTE:** If a demand curve is selected which has a 30 second compressor time delay in defrost, the delay is reduced to 10 seconds in TEST mode.

Jumper Position	Minimum Time Between Defrosts (min)	Terminate Temperature (° F)	30 second Compressor Delay Function
1	20	40	NO
2	20	40	YES
3	20	75	NO
4	20	75	YES

**Table 5. Demand Defrost Curve Profiles**

### Optional Comfort Alert™ Diagnostics Module

The Comfort Alert™ Diagnostics Module is a breakthrough innovation for troubleshooting heat pump and air conditioning system failures. The module installs easily in the electrical box of the outdoor unit near the compressor contactor. By monitoring and analyzing data from the Copeland scroll compressor and the thermostat demand, the module can accurately detect the cause of electrical and system related failures without any sensors. A flashing LED indicator communicates the ALERT code and a diagnostic key is also imprinted on the side of the module to quickly direct the technician to the root cause of a problem. See Figure 6 (page 12).

**NOTE:** This module does not provide safety protection! The Comfort Alert™ Diagnostics Module is a monitoring device and cannot control or shut down other devices.

### 24 VAC Power Wiring

The Comfort Alert™ module requires a constant nominal 24 VAC power supply. The module cannot be powered by the **C** terminal on a defrost board or other control board without experiencing nuisance alerts. **NOTE:** The wiring to the module's **R** & **C** terminals must be routed directly from the transformer.

### Thermostat Demand Wiring

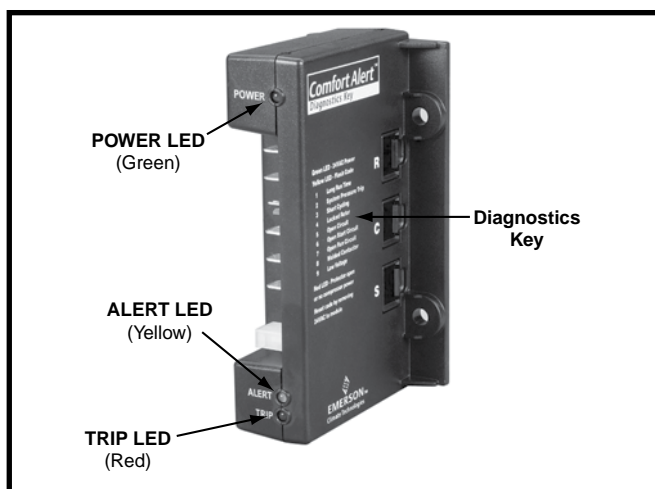
The Comfort Alert module requires a two stage thermostat to operate properly. The **Y2** thermostat wire entering the unit should be connected to the **Y2** input on the unit terminal strip.

While the compressor is running, Comfort Alert will provide power to the second stage cooling solenoid inside the compressor after **Y2** has been energized for 5 seconds. When the compressor is not running, Comfort Alert will not power the solenoid, regardless of the state of **Y2**. If Alert codes 1 or 9 appear while the compressor is running, Comfort Alert will turn off the solenoid to prevent solenoid damage from overheating conditions.

### L Terminal Wiring

The **L** connection is used to communicate Alert codes to compatible White-Rodgers thermostats. The **L** terminal of the thermostat should be connected directly to the Comfort Alert **L** terminal.

On some White-Rodgers thermostats, an icon on the thermostat display will flash at the same rate as the Comfort Alert yellow Alert LED. An advanced option on



**Figure 6. Comfort Alert™ Diagnostics Module**

these thermostats is to lock out the compressor when certain Alert codes are detected in indicating impending compressor damage. Refer to White-Rodgers thermostat manuals for more information. **DO NOT** connect the **L** terminal from the thermostat to **L** on the terminal block in the unit.

Standard thermostats with an **L** terminal which are not compatible with the Comfort Alert Module, can only be connected to **L** on the terminal strip in the unit. The **L** terminal is used for defrost board fault monitoring in these applications.

#### DC SOL Connection

The two pin **DC SOL** connector provides a connection to the Copeland UltraTech second stage compressor solenoid. This 24VDC solenoid is internal to the compressor and will not operate properly if 24VAC is applied to the compressor solenoid terminals.

To reduce the VA load of the solenoid on the system, Comfort Alert uses a phase control method to reduce the DC voltage to the solenoid to the minimum level required to keep the solenoid pulled in. As the 24VAC supply voltage varies, Comfort Alert intelligently changes the solenoid DC voltage supply to minimize power consumption. A voltmeter attached to the **DC SOL** output will measure 4 - 18VDC, when solenoid should be energized, depending on the level of the 24 VAC supply.

#### Interpreting the Diagnostic LED's

When an abnormal system condition occurs, the Comfort Alert™ module displays the appropriate ALERT and/or TRIP LED will flash a number of times consecutively, pause and then repeat the process. To identify a Flash Code number, count the number of consecutive flashes.

Each time the module powers up, the last ALERT Flash Code that occurred prior to shut down is displayed for one minute. The module will continue to display the LED

until the condition returns to normal or if 24 VAC power is removed from the module. See Table 8 (pages 22 - 23) for flash code identification or Table 9 (page 24) for module wiring troubleshooting.

#### LED Description

- **POWER LED (Green)**: indicates voltage is present at the power connection of the module.
- **ALERT LED (Yellow)**: communicates an abnormal system condition through a unique flash code. **NOTE:** The ALERT LED will flash consecutively, pause and then repeat the process. The number of consecutive flashes, referred to as the Flash Code, correlates to a particular abnormal condition. Detailed descriptions of these ALERT Flash Codes are listed in Table 8.
- **TRIP LED (Red)**: indicates a demand signal is received from the thermostat, but current to the compressor is not detected by the module. The TRIP LED typically indicates if the compressor protector is open or the compressor has no power.

The scroll compressor's **R** (run), **C** (common), and **S** (start) wires are routed through the holes in the Comfort Alert™ module marked **R**, **C**, and **S**.

**NOTE:** The common wire does not need to be routed through the module for it to operate.

#### Installation Verification

To verify the Comfort Alert is correctly installed, two functional tests can be performed.

1. Disconnect power from the compressor and force a thermostat call for cooling. **NOTE:** The Trip LED (red) should turn on indicating a compressor trip as long as 24VAC is measured at the **Y** terminal. If the Trip LED does not function as described, refer to the wiring diagram (Figure 12, page 19).
2. Disconnect power from the compressor and 24VAC from Comfort Alert.
3. Remove the wire from **Y** terminal of Comfort Alert, reapply 24VAC power to Comfort Alert and reconnect power to the compressor.
4. Set the thermostat's system mode to COOL. **NOTE:** When the compressor starts to run, the Alert LED (yellow) will begin flashing a Code 8 indicating a Welded Contactor.
5. Disconnect power from the compressor and 24VAC from Comfort Alert.
6. With Comfort Alert OFF, reattach the wire to the **Y** terminal. Reapply power to compressor and 24VAC to Comfort Alert. **NOTE:** The Alert LED (yellow) will flash the previous code 8 for 1 minute and then turn off. If the yellow LED does not function, refer to the wiring diagram (Figure 12).

#### Troubleshooting the Installation

Depending on system configuration, some ALERT Flash codes may not be active. The presence of safety switches affects how the system alerts are displayed by this module.

### Optional Humidistat

The optional humidistat may be installed in the return air duct to provide excellent humidity control when needed and maximum system capacity and energy efficiency when humidity levels are normal. The humidistat senses when humidity in the return air stream is above a preset level (field adjustable) and sends a signal to the motor to reduce the airflow so that more moisture may be removed until the humidity level drops. The packaged heat pump unit is pre-programmed for humidistat operation. **NOTE:** Remove the jumper connector installed between the two terminals marked **HUM** on the circuit board.

Install the humidistat in the return air duct as directed in the installation instructions included with the kit. Wire the humidistat through the low-voltage wire entrance in the packaged heat pump unit to the quick-connect terminals marked **HUM**. Wire the humidistat to open on rise in humidity.

### CAUTION:

**To avoid personal injury or property damage, make certain that the motor leads cannot come into contact with any uninsulated metal components of the unit.**

Check all factory wiring per the unit wiring diagram (Figure 11 or 12, pages 18 & 19) and inspect the factory wiring. Verify none of the connections loosened during shipping or installation.

### Optional Electric Heater Kits

Optional field-installed electric heater kits are available in 5 kw through 20 kw heating capacities. Single Package Heat Pumps are designed to allow optional electric heat to be field installed as required by the building's particular heating load. The options available for each unit are shown in the heater kit installation instructions. A 3-stage heat pump, 24VAC thermostat should be used when an electric heater kit is installed. As previously noted, a field installed circuit breaker kit is available as a means of electrical disconnect for the unit.

Install the heater kits as directed by the instructions supplied with the heater kit. Follow all cautions and warnings as directed.

**NOTE:** If installing a 10kw heater kit in the 2 or 3 ton capacity units, the 145° limit in the heater kit must be replaced with the 170° limit that is shipped with the unit, inside the literature packet.

### Optional Outdoor Thermostat

An outdoor thermostat can be installed in the field with 2-stage electric heat. To install the outdoor thermostat, remove the orange wire from the **E** terminal on the terminal block, and connect to the outdoor thermostat. Connect the other side of the outdoor thermostat to **W2** from the thermostat. See Figure 10 (page 17).

### Ambient Sensor Mounting

For optimum performance of the heat pump system, the ambient sensor must be mounted on the outside of the unit. See Figure 7.

1. Remove the mounting bracket wire tied to the control bracket and all hardware included in the packet.
2. Remove star bushing from 7/8" hole in corner panel of the unit. See Figure 8.
3. Route the ambient sensor through the 7/8" hole in the corner panel of the unit, and then through the 7/8" hole in the mounting bracket.
4. Route the sensor through the star bushing. Use the star bushing to secure the mounting bracket to the unit.
5. Secure the ambient sensor inside the plastic clip and secure it to the mounting bracket with the screw and nut provided.
6. Install one spacer nut between the plastic clip and mounting bracket.
7. Bend the mounting bracket into position and screw the mounting bracket to the corner panel.

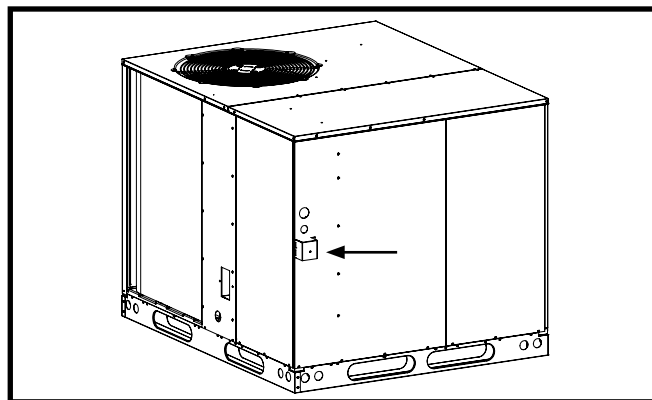


Figure 7. Ambient Sensor Location

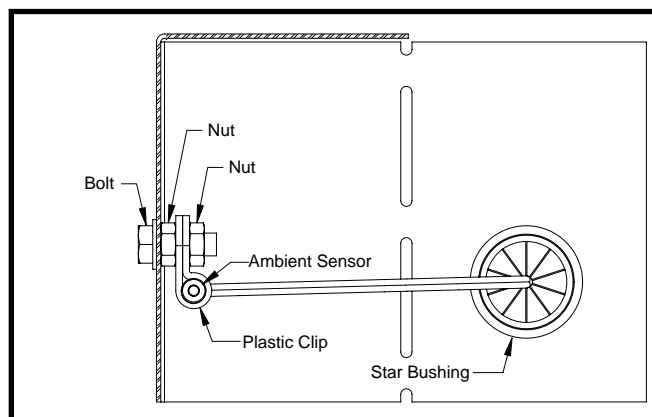


Figure 8. Ambient Sensor Mounting

## Thermostat Connections

The Q4SE heat pump requires a 2-stage heat pump thermostat that must operate in conjunction with installed accessories. A 3-stage heat pump thermostat is required if electric heat is added.

The low voltage wires must be properly connected to the units low voltage terminal block. See Figure 10 (page 17). See Table 1 for proper wire gauge and their recommended lengths for typical thermostat connections.

**IMPORTANT NOTE: The thermostat should be mounted about 5 feet above the floor on an inside wall. DO NOT install the thermostat on an outside wall or any other location where its operation may be adversely affected by radiant heat from fireplaces, sunlight, or lighting fixtures, and convective heat from warm air registers or electrical appliances. Refer to the thermostat manufacturer's instruction sheet for detailed mounting and installation information.**

Thermostat Wire Gauge	Recommended T-Stat Wire Length (Unit to T-Stat)	
	2-Wire (Heating)	5-Wire (Heating/Cooling)
24	55	25
22	90	45
20	140	70
18	225	110

**Table 6. Thermostat Wire Gauge**

## START UP & ADJUSTMENTS

### Pre-Start Check List

- ✓ Verify the unit is level and allows condensate to drain.
- ✓ Verify the outdoor coil and top of the unit are free from obstructions and debris, and all equipment access/control panels are in place.
- ✓ Verify that the duct work is sealed to prevent air leakage.
- ✓ Verify that the line voltage power leads are securely connected and the unit is properly grounded.
- ✓ Verify that the low voltage wires are securely connected to the correct leads on the low voltage terminal strip.
- ✓ Verify that the outdoor fan turns freely.
- ✓ Verify that the power supply branch circuit overcurrent protection is sized properly.
- ✓ Verify that the thermostat is wired correctly. The thermostat function switch should be set to OFF and the thermostat fan switch should be set to AUTO.

### Start-Up Procedure

Close all electrical disconnects to energize the system.

#### Air Circulation

Leave the thermostat system mode on OFF, and set the fan mode to ON. Blower should run continuously. Check the air delivery at the supply registers and adjust register openings for balanced air distribution. Examine ductwork for leaks or obstruction if insufficient air is detected. Set the thermostat fan mode to AUTO. The blower should stop running. See Figure 9 (page 16) for blower delay profile.

#### Short Cycle Protection

1. With the system operating in cooling mode, note the temperature setting of the thermostat and gradually raise the set-point temperature until the unit de-energizes.
2. Immediately lower the set point temperature of the thermostat to its original setting and verify that the indoor blower is energized.
3. After approximately 5 minutes, verify the compressor and fan energize and the temperature of the discharge air is cooler than the room temperature.

#### System Cooling

1. Set the thermostat's system mode to COOL and the fan mode to AUTO. Gradually lower the thermostat temperature setpoint below room temperature and verify the outdoor unit and indoor blower energize.
2. Feel the air being circulated by the indoor blower and verify that it is cooler than ambient temperature. Listen for any unusual noises. If unusual sounds occur, determine the source of the noise and correct as necessary.
3. Allow the cooling system to operate for several minutes and then set the temperature selector above room temperature. Verify the fan and compressor cycle off with the thermostat. **NOTE:** The blower should also stop unless fan switch is set to the ON position.

### System Heating

If the unit has been equipped with optional electric heater kits, set the thermostat's system mode to EM HEAT and the fan mode to AUTO. Verify the compressor and outdoor fan are not energized but that the blower and heaters are. Feel the air being circulated by the indoor blower and verify that it is warmer than ambient temperature. Listen for any unusual noises. If unusual sounds occur, determine the source of the noise and correct as necessary.

### Refrigerant Charging

---

## **WARNING:**

**Single Packaged Heat Pumps are shipped fully charged with R-410A refrigerant and ready for installation. When a system is installed according to these instructions, no refrigerant charging is required. If repairs make it necessary for evacuation and charging, it should only be done by qualified, trained personnel thoroughly familiar with this equipment. Some local codes require licensed installation/service personnel to service this type of equipment. Under no circumstances should the owner attempt to install and/or service this equipment. Failure to comply with this warning could result in property damage, personal injury, or death.**

The system refrigerant charge can be checked and adjusted through the service ports provided at the front panel. Use only gauge lines which have a Schrader depression device present to actuate the valve.

### **NOTES:**

- The unit must be charged while both first and second stages are operating.
- The refrigerant charging charts (Figures 13 - 16, pages 20 & 21) are applicable to listed assemblies of equipment and at listed airflows for the indoor coil.

### **Charging an R-410A Unit in AC Mode at Outdoor Temperatures Above 65F.**

1. With the system operating at steady-state, measure the liquid refrigerant pressure in psig at the service valve.
2. Measure the liquid refrigerant temperature in Fahrenheit at the service valve.
3. For the temperature measured, determine the required liquid refrigerant pressure from the appropriate charging charts in Figures 13 - 16.
4. If the pressure measured in step 1 is greater than the required liquid refrigerant pressure determined in step 4, then there is too much charge in the system. Remove refrigerant and repeat steps 1 through 3 until the system is correctly charged.

5. If the pressure measured in step 1 is less than the required liquid refrigerant pressure determined in step 4, then there is too little charge in the system. Add refrigerant and repeat steps 1 through 3 until the system is correctly charged.

### **Charging an R-410A Unit in Heating Mode**

1. Evacuate the refrigerant system.
2. Weigh in the proper charge based on the charge level noted on the rating plate. Unit charge **MUST** be verified in cooling season.
3. Verify the unit is operating properly as outlined in System Heating.

---

## **HEAT PUMP MAINTENANCE**

---

## **WARNING:**

**To prevent electrical shock, personal injury, or death, disconnect all electrical power to the unit before performing any maintenance or service. The unit may have more than one electrical supply.**

Proper maintenance is important to achieve optimum performance from the heat pump. The ability to properly perform maintenance on this equipment requires certain mechanical skills and tools. If you do not possess these skills, contact your dealer for maintenance. Consult your local dealer about the availability of maintenance contracts. Routine maintenance should include the following:

- Inspect and clean or replace air filters at the beginning of each heating and cooling season, or more frequently if required.
- Inspect the condensate drain and outdoor coil at the beginning of each cooling season. Remove any debris. Clean the outdoor coil as necessary using a mild detergent and water. Rinse thoroughly with water.
- Inspect the electrical connections for tightness at the beginning of each heating and cooling season. Service as necessary.

---

## **CAUTION:**

**The unit should never be operated without a filter in the return air system. Replace disposable filters with the same type and size.**

- The motors for the circulating air blower and the outdoor fan are pre-lubricated at the factory. No further oiling is required for the life of this product.

## FIGURES & TABLES

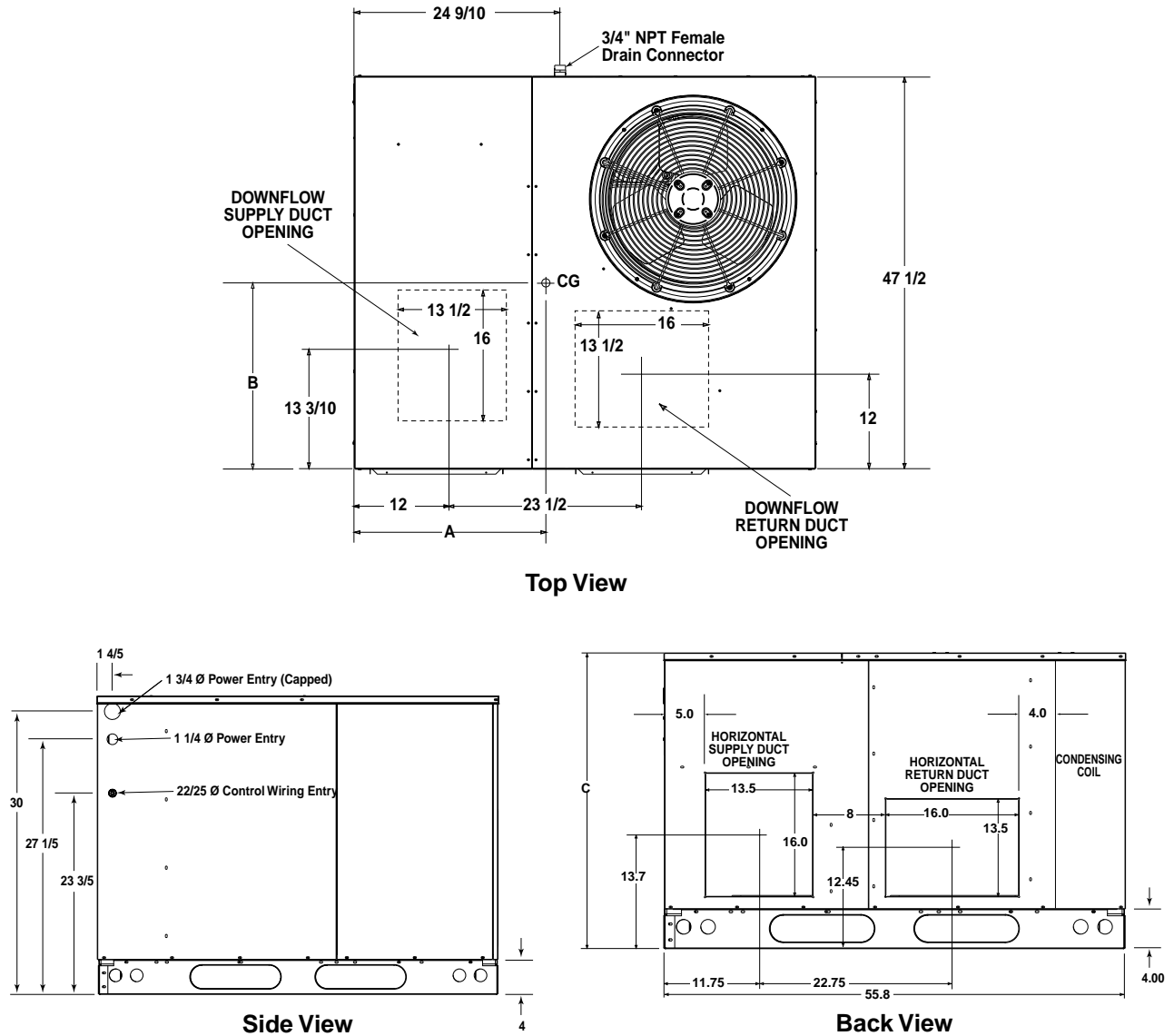


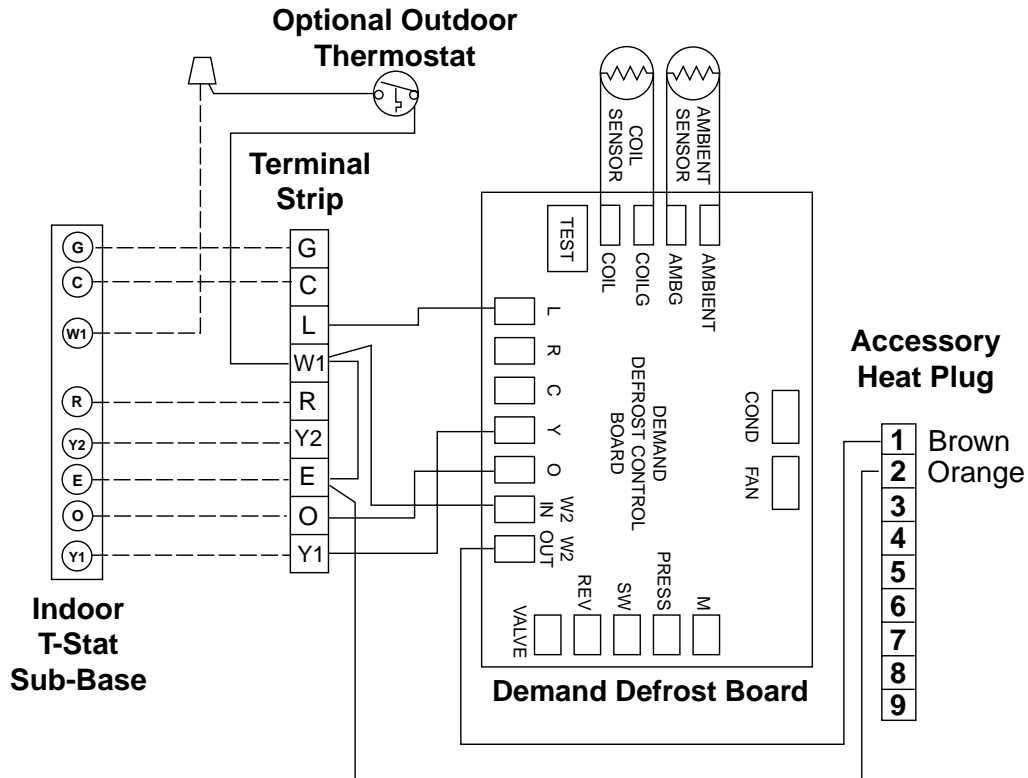
Figure 9. Q4SE Heat pump Dimensions

Model Number Q4SE-/PPH1SE	Unit Weight	Center of Gravity		Height -C- (in inches)	
		-A-	-B-	with base rails	without base rails
X24	450	28.0	25.5	39.0	35.3
X36	460	28.0	25.5	39.0	35.3
X48	570	29.5	26.0	43.0	39.3
X60	580	29.5	26.0	43.0	39.3

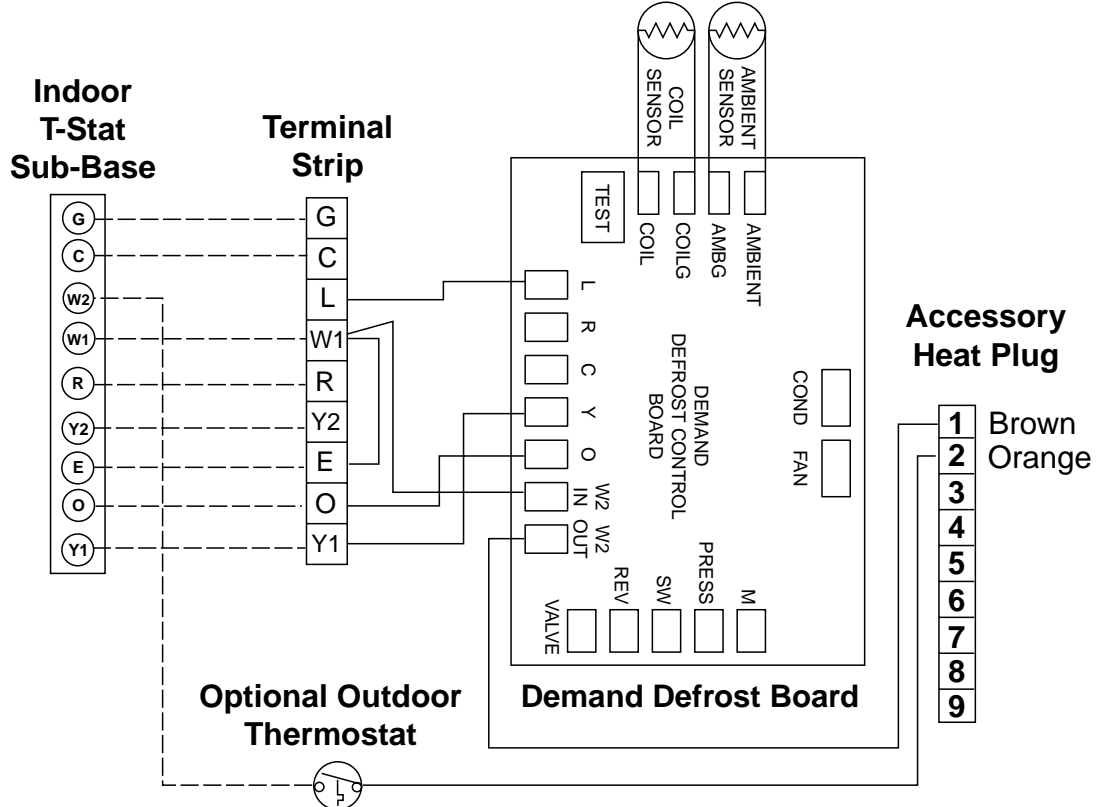
Table 7. Center of Gravity & Unit Shipping Weights



## ELECTRICAL INFORMATION



Typical Wiring (Field Supplied) for 2-Stage Cool, 1 Stage Electric Heat



Typical Wiring (Field Supplied) for 2-Stage Cool, 2-Stage Electric Heat with an Optional Outdoor Thermostat

Figure 10. Typical Heat Pump Thermostat Connections

# WIRING DIAGRAM

## Convertible Packaged Heat Pump

208/230 Volt

Single Phase

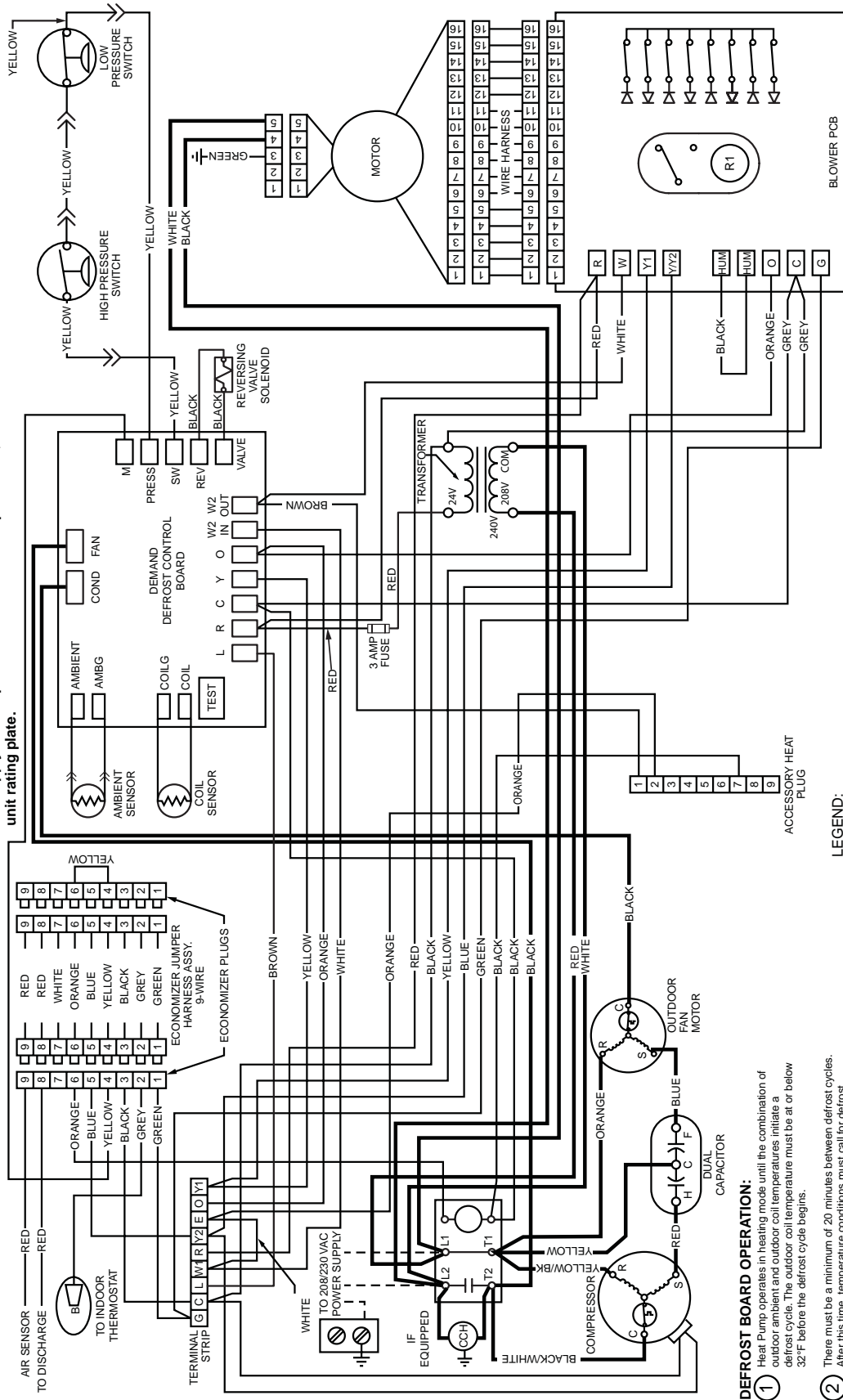
60Hz.

### NOTES:

1. Disconnect all power before servicing.
2. For supply connections use copper conductors only.
3. Not suitable on systems that exceed 150V to ground.

4. If any of the original wire as supplied with the furnace must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C.
5. For supply wire ampacities and overcurrent protection, see unit rating plate.

1. Couper le courant avant de faire le retien.
2. Employez uniquement des conducteurs en cuivre.
3. Ne convient pas aux installations de plus de 150V a la terre.



### LEGEND:

- FIELD WIRING
- LOW VOLTAGE
- HIGH VOLTAGE

NOTE: See installation instructions for wiring, application, and information concerning accessory Heat Kits and other options.



7110820  
(REPLACES 7108420)  
0310

Figure 11. Two Stage Cool, Two Stage Heat

# WIRING DIAGRAM

## Convertible Packaged Heat Pump

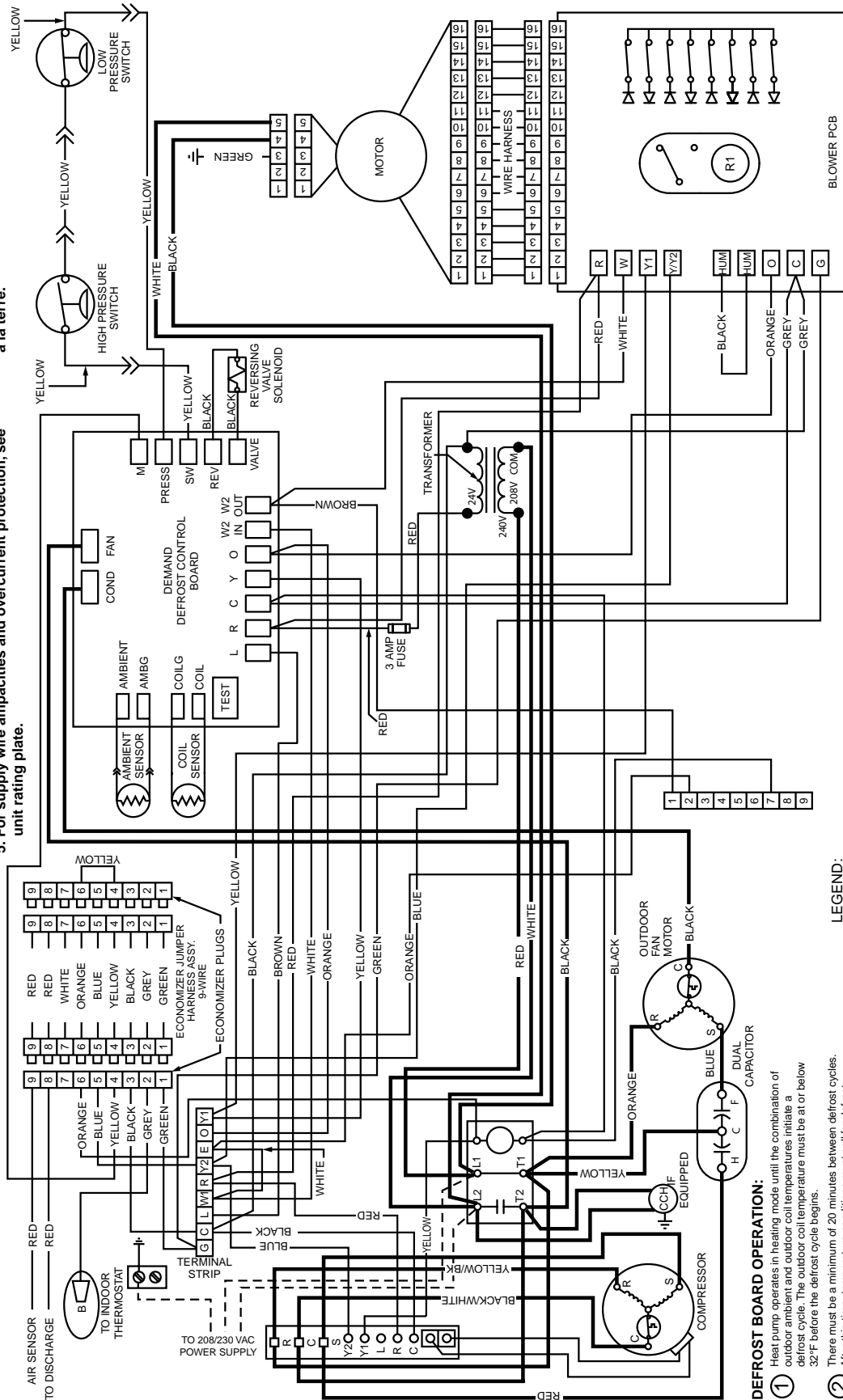
208/230 Volt

Single Phase

60Hz

- NOTES:**
1. Disconnect all power before servicing.
  2. For supply connections use copper connectors only.
  3. Not suitable on systems that exceed 150V to ground.

4. If any of the original wire as supplied with the furnace must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C.
5. For supply wire ampacities and overcurrent protection, see unit rating plate.
7. Couper le couant avant faire tretien.
8. employez uniquement des conducteurs en cuivre.
9. Ne convient pas aux installations de plus de 150V a la terre.

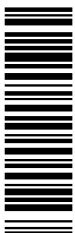


### DEFROST BOARD OPERATION:

1. Heat pump operates in heating mode until the combination of outdoor ambient and outdoor coil temperatures initiate a defrost cycle. The outdoor coil temperature must be at or below 32°F before the defrost cycle begins.
2. There must be a minimum of 20 minutes between defrost cycles. After this time, temperature conditions must call for defrost continuously for 4 1/2 minutes before a defrost cycle is initiated.
3. The defrost cycle ends when the outdoor temperature reaches 32°F or the defrost terminate time of 13 minutes 39 seconds is reached.

**NOTE:**  
See installation instructions for wiring, application, and information concerning accessory Heat Kits and other options.

**LEGEND:**  
FIELD WIRING  
LOW VOLTAGE  
HIGH VOLTAGE



**7110910**  
(Replaces 7108430)

0310

Figure 12. Two Stage Cool, Two Stage Heat with Optional Comfort Alert

## COOLING CHARGING CHARTS - 14 SEER H.P.

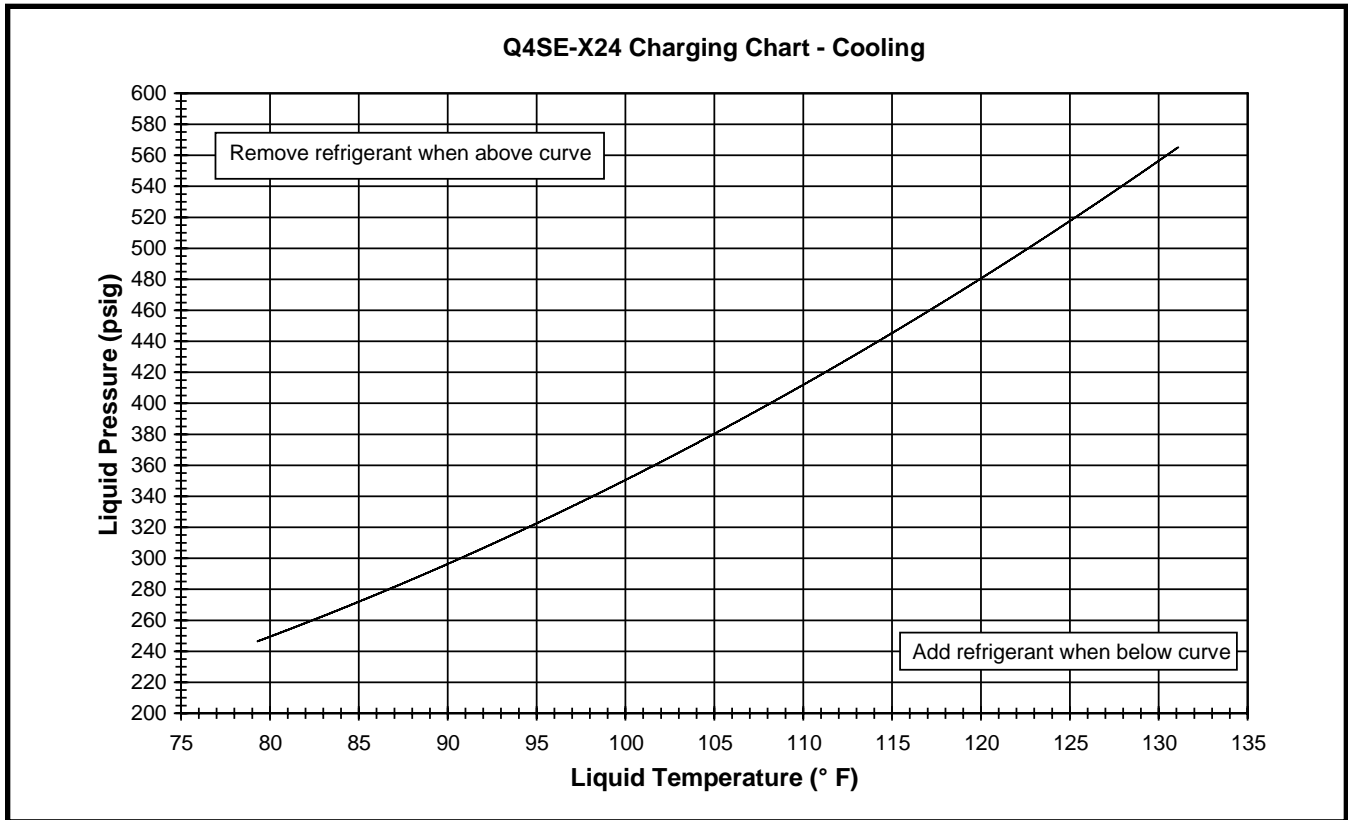


Figure 13. Charging Chart for 2 Ton Units

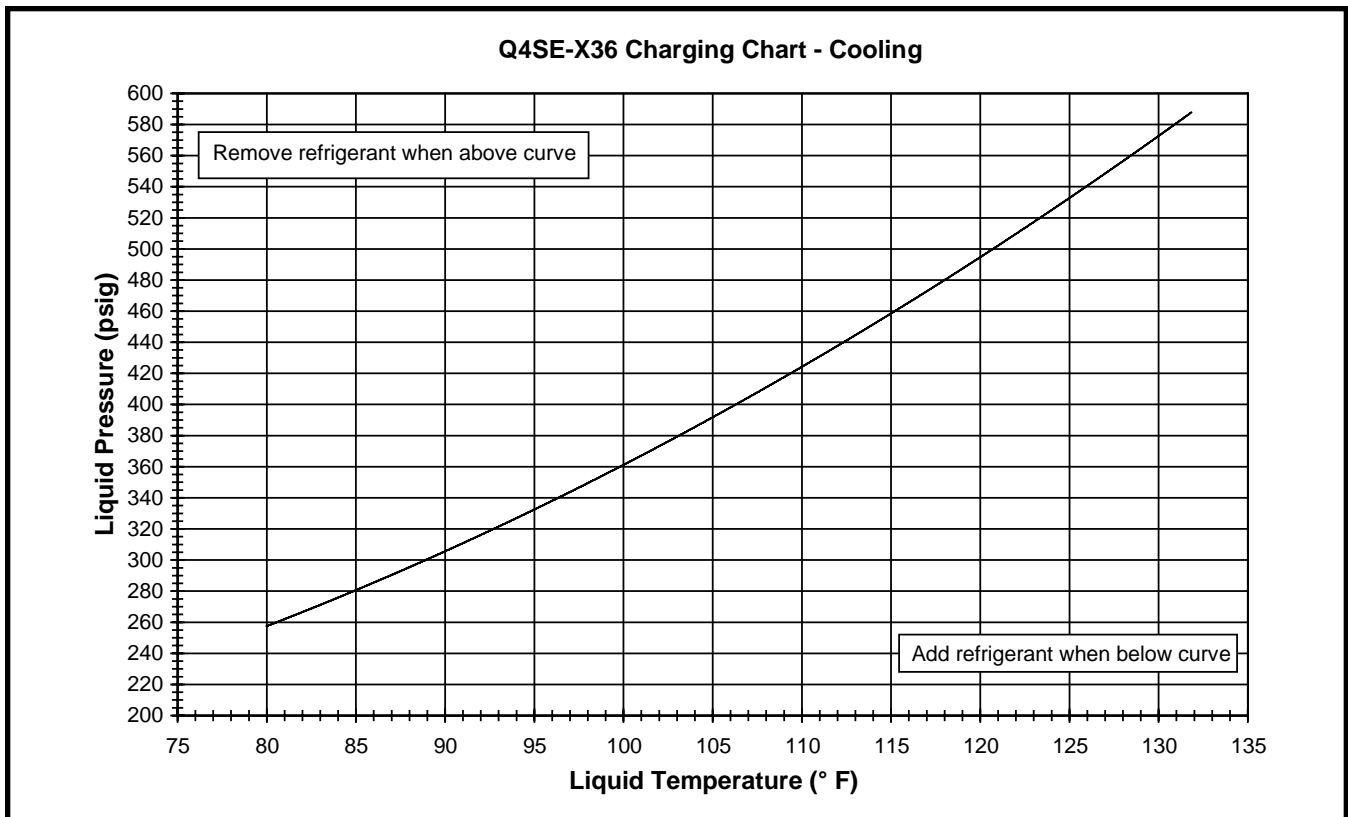


Figure 14. Charging Chart for 3 Ton Units

## COOLING CHARGING CHARTS - 14 SEER H.P. (CONTINUED)

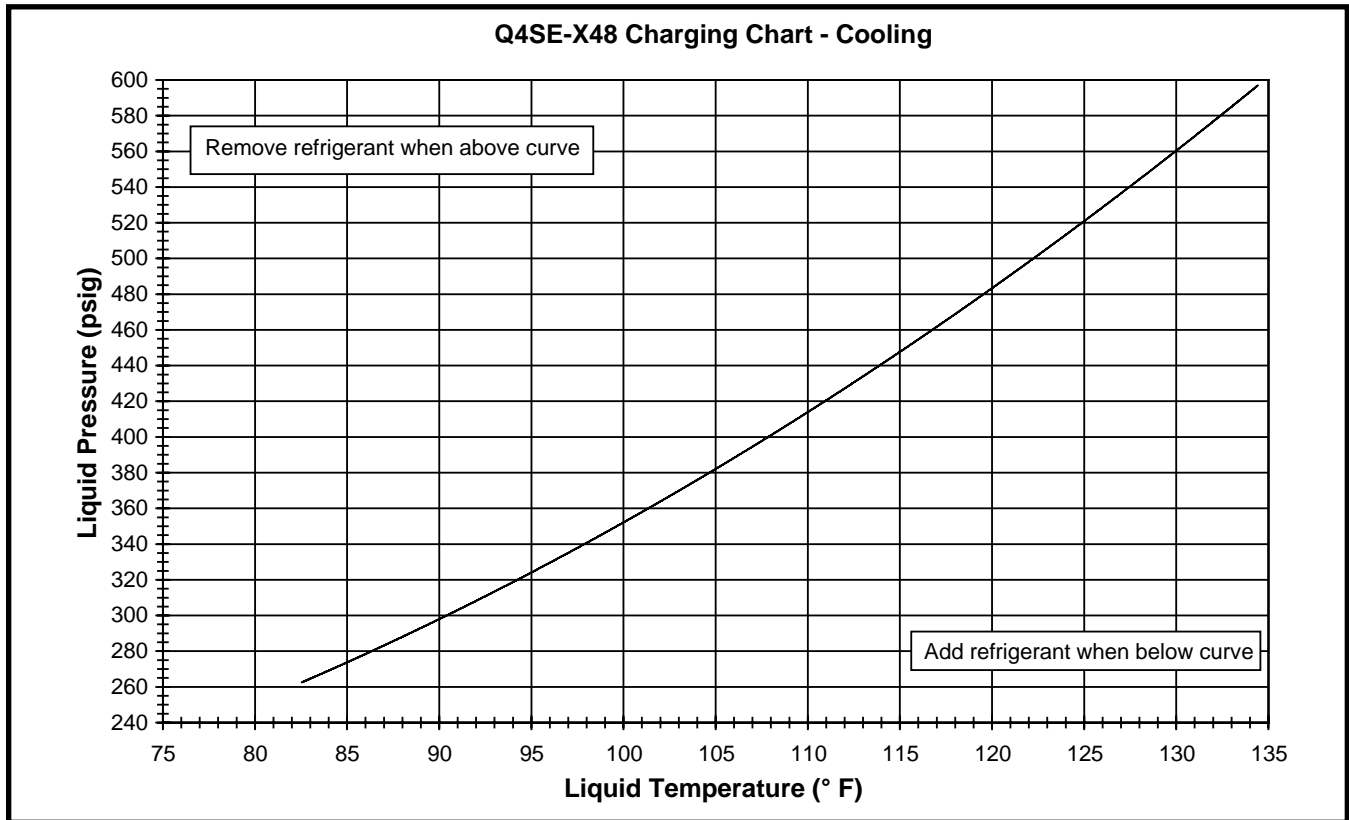


Figure 15. Charging Chart for 4 Ton Units

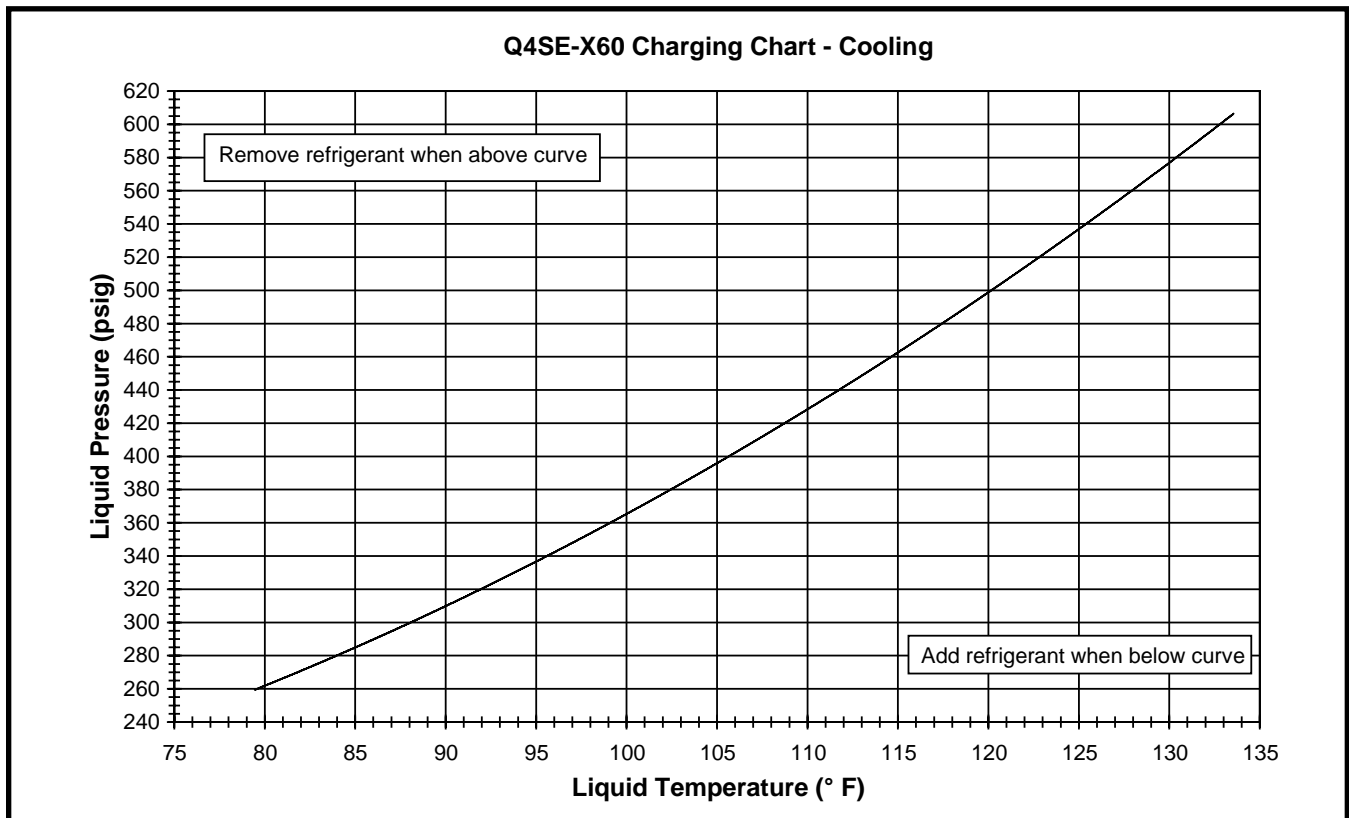


Figure 16. Charging Chart for 5 Ton Units

## TROUBLESHOOTING

Status LED	Status LED Description	Status LED Troubleshooting Information
Green "POWER"	Module has power	Supply voltage is present at module terminals
Red "TRIP"	Thermostat demand signal Y is present, but compressor is not running	<ul style="list-style-type: none"> <li>• Compressor protector is open</li> <li>• Check for high head pressure</li> <li>• Check compressor supply voltage</li> <li>• Outdoor unit power disconnect is open</li> <li>• Compressor circuit breaker or fuse(s) is open</li> <li>• Broken wire or connector is not making contact</li> <li>• Low pressure switch open if present in system</li> <li>• Compressor contactor has failed open</li> </ul>
Yellow "ALERT" Flash Code 1	Long Run Time Compressor is running extremely long run cycles	<ul style="list-style-type: none"> <li>• Low refrigerant charge</li> <li>• Evaporator blower is not running <ul style="list-style-type: none"> <li>— Check blower relay coil and contacts</li> <li>— Check blower motor capacitor</li> <li>— Check blower motor for failure or blockage</li> <li>— Check evaporator blower wiring and connectors</li> <li>— Check indoor blower control board</li> <li>— Check thermostat wiring for open circuit</li> </ul> </li> <li>• Evaporator coil is frozen <ul style="list-style-type: none"> <li>— Check for low suction pressure</li> <li>— Check for excessively low thermostat setting</li> <li>— Check evaporator airflow (coil blockages or return airfilter)</li> <li>— Check ductwork or registers for blockage</li> </ul> </li> <li>• Faulty metering device <ul style="list-style-type: none"> <li>— Check TXV bulb installation (size, location and contact)</li> <li>— Check if TXV/fixed orifice is stuck closed or defective</li> </ul> </li> <li>• Condenser coil is dirty</li> <li>• Liquid line restriction (filter drier blocked if present in system)</li> <li>• Thermostat is malfunctioning <ul style="list-style-type: none"> <li>— Solenoid plug not connected</li> <li>— Y2 not wired at Comfort Alert</li> <li>— Check thermostat sub-base or wiring for short circuit</li> <li>— Check thermostat installation (location, level)</li> </ul> </li> <li>• Comfort Alert failure</li> </ul>
Yellow "ALERT" Flash Code 2	System Pressure Trip	<ul style="list-style-type: none"> <li>• High head pressure <ul style="list-style-type: none"> <li>— Check high pressure switch if present in system</li> <li>— Check if system is overcharged with refrigerant</li> <li>— Check for non-condensable in system</li> </ul> </li> </ul>
	Discharge or suction	<ul style="list-style-type: none"> <li>• Condenser coil poor air circulation (dirty, blocked, damaged)</li> </ul>
	pressure out of limits	<ul style="list-style-type: none"> <li>• Condenser fan is not running <ul style="list-style-type: none"> <li>— Check fan capacitor</li> <li>— Check fan wiring and connectors</li> <li>— Check fan motor for failure or blockage</li> </ul> </li> </ul>
	compressor overloaded	<ul style="list-style-type: none"> <li>• Return air duct has substantial leakage</li> <li>• If low pressure switch present in system, check Flash Code 1 information</li> </ul>

**Table 8. LED Diagnostics**

Status LED	Status LED Description	Status LED Troubleshooting Information
Yellow "ALERT" Flash Code 3	Short Cycling / Compressor is running only briefly	<ul style="list-style-type: none"> <li>• Thermostat demand signal is intermittent</li> <li>• Low line voltage (contact utility if voltage at disconnect is low)</li> <li>• Excessive liquid refrigerant in compressor</li> <li>• Compressor bearings are seized</li> </ul>
Yellow "ALERT" Flash Code 4	Locked Rotor	<ul style="list-style-type: none"> <li>• Run capacitor has failed</li> <li>• Low line voltage (contact utility if voltage at disconnect is low)</li> <li>• Check wiring connections</li> <li>• Excessive liquid refrigerant in compressor</li> <li>• Compressor bearings are seized</li> <li>• Measure compressor oil level</li> </ul>
Yellow "ALERT" Flash Code 5	Open Circuit	<ul style="list-style-type: none"> <li>• Outdoor unit power disconnect is open</li> <li>• Compressor circuit breaker or fuse(s) is open</li> <li>• Compressor contactor has failed open <ul style="list-style-type: none"> <li>— Check compressor contactor wiring and connectors</li> <li>— Check for compressor contactor failure (burned, pitted or open)</li> <li>— Check wiring and connectors between supply and compressor</li> <li>— Check for low pilot voltage at compressor contactor coil</li> <li>— High pressure switch is open and requires manual reset</li> </ul> </li> <li>• Open circuit in compressor supply wiring or connections</li> <li>• Unusually long compressor protector reset time due to extreme ambient temperature</li> <li>• Compressor windings are damaged <ul style="list-style-type: none"> <li>— Check compressor motor winding resistance</li> </ul> </li> </ul>
Yellow "ALERT" Flash Code 6	Open Start Circuit Current only in run circuit	<ul style="list-style-type: none"> <li>• Run capacitor has failed</li> <li>• Open circuit in compressor start wiring or connections <ul style="list-style-type: none"> <li>— Check wiring and connectors between supply and the compressor <b>S</b> terminal</li> </ul> </li> <li>• Compressor start winding is damaged <ul style="list-style-type: none"> <li>— Check compressor motor winding resistance</li> </ul> </li> </ul>
Yellow "ALERT" Flash Code 7	Open run circuit Current only in start circuit	<ul style="list-style-type: none"> <li>• Open circuit in compressor run wiring or connections <ul style="list-style-type: none"> <li>— Check wiring and connectors between supply and the compressor <b>R</b> terminal</li> </ul> </li> <li>• Compressor run winding is damaged <ul style="list-style-type: none"> <li>— Check compressor motor winding resistance</li> </ul> </li> </ul>
Yellow "ALERT" Flash Code 8	Welded Contactor Compressor always runs	<ul style="list-style-type: none"> <li>• Compressor contactor has failed closed</li> <li>• Thermostat demand signal not connected to module</li> </ul>
Yellow "ALERT" Flash Code 9	Low Voltage Control circuit < 17VAC	<ul style="list-style-type: none"> <li>• Control circuit transformer is overloaded</li> <li>• Low line voltage (contact utility if voltage at disconnect is low)</li> <li>• Check wiring connections</li> </ul>
* Flash code number corresponds to a number of LED flashes, followed by a pause and then repeated. Trip and alert LED's flashing at same time means control circuit voltage is too low for operation.		

**Table 8. LED Diagnostics - Continued**

Miswired Module Indication	Recommended Troubleshooting Action
Green LED is not on, module does not power up	<ul style="list-style-type: none"> <li>Determine if both <b>R</b> &amp; <b>C</b> module terminals are connected.</li> <li>Verify voltage is present at module's <b>R</b> &amp; <b>C</b> terminals.</li> </ul>
Green LED intermittent, module powers up only when compressor runs	<ul style="list-style-type: none"> <li>Determine if <b>R</b> &amp; <b>Y</b> terminals are wired in reverse.</li> <li>Verify modules <b>R</b> and <b>C</b> terminals have a constant source.</li> </ul>
Trip LED is on, but system and compressor check OK	<ul style="list-style-type: none"> <li>Verify <b>Y</b> terminal is connected to 24VAC at contactor coil.</li> <li>Verify voltage at contactor coil falls below 0.5VAC when off.</li> <li>Verify 24VAC is present across <b>Y</b> &amp; <b>C</b> when thermostat demand signal is present. If not, <b>R</b> &amp; <b>C</b> are reversed wired.</li> </ul>
TRIP LED and ALERT LED flashing together	<ul style="list-style-type: none"> <li>Verify <b>R</b> and <b>C</b> terminals are supplied with 19 - 28VAC.</li> </ul>
ALERT Flash CODE 3 displayed incorrectly (Compressor short cycling)	<ul style="list-style-type: none"> <li>Verify <b>Y</b> terminal is connected to 24VAC at contactor coil.</li> <li>Verify voltage at contactor coil falls below 0.5VAC when off.</li> </ul>
ALERT Flash Code 5, 6, or 7 displayed incorrectly (Open Circuit, Open Start Circuit or Open Run Circuit)	<ul style="list-style-type: none"> <li>Verify the compressor run and start wires are routed through the module's current sensing holes.</li> <li>Verify the <b>Y</b> terminal is connected to 24VAC at contactor coil.</li> <li>Verify voltage at contactor coil falls below 0.5VAC when off.</li> </ul>
ALERT Flash Code 6 (Open Start Circuit) displayed for Code 7 (Open Run Circuit) or vice-versa	<ul style="list-style-type: none"> <li>Verify the compressor run and start wires are routed through the correct module sensing holes.</li> </ul>
ALERT Flash Code 8 displayed incorrectly (Welded Contactor)	<ul style="list-style-type: none"> <li>Determine if module's <b>Y</b> terminal is connected.</li> <li>Verify <b>Y</b> terminal is connected to 24VAC at contactor coil.</li> <li>Verify 24VAC is present across <b>Y</b> &amp; <b>C</b> when thermostat demand signal is present. If not, <b>R</b> and <b>C</b> are reversed wired.</li> <li>Verify voltage at contactor coil falls below 0.5VAC when off.</li> <li>Review Thermostat Demand Wiring (page 10) for <b>Y</b> &amp; <b>C</b> wiring.</li> </ul>

Table 9. Module Wiring Troubleshooting



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