

## USER'S MANUAL & INSTALLATION INSTRUCTIONS

SINGLE PACKAGE HEAT PUMP - 3 PHASE - R-410A



### IMPORTANT

#### ATTENTION INSTALLERS:

It is your responsibility to know this product better than your customer. This includes being able to install the product according to strict safety guidelines and instructing the customer on how to operate and maintain the equipment for the life of the product. Safety should always be the deciding factor when installing this product and using common sense plays an important role as well. Pay attention to all safety warnings and any other special notes highlighted in the manual. Improper installation of the furnace or failure to follow safety warnings could result in serious injury, death, or property damage.

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. Return these instructions to the customer's package for future reference.

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



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# USER INFORMATION

## IMPORTANT SAFETY INFORMATION

Please read all instructions before servicing this equipment. Pay attention to all safety warnings and any other special notes highlighted in the manual. 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.

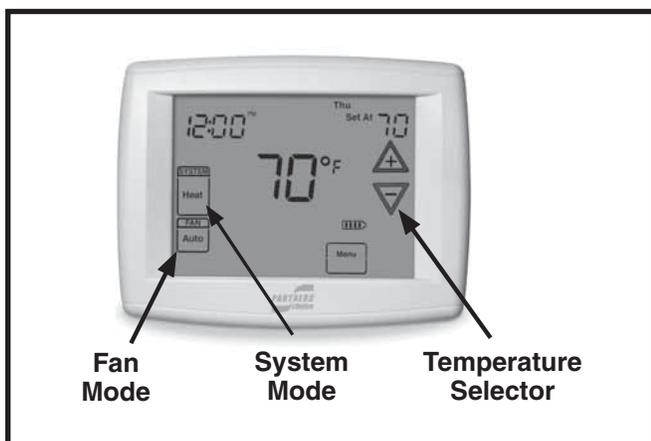


Figure 1. Digital Thermostat

## 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 three 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 Demand Defrost that monitors ambient and coil temperatures to regulate the defrost function accordingly.

**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.

# USER INFORMATION

## Operating the Heat Pump for Automatic Cooling & Heating

1. Set the thermostat system mode to AUTO and the thermostat fan mode 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's temperature selector to the desired heating and cooling temperature level(s). The unit will 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

## IMPORTANT SAFETY INFORMATION

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### **WARNING:**

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**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.**

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### **WARNING:**

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**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.**

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### **WARNING:**

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**Q6SE 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.**

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### **WARNING:**

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**Unless noted otherwise in these instructions, only factory authorized parts or accessory kits may be used with this product. 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**

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### **WARNING:**

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**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.**

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- 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 C1) 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.
- Install this unit only in a location and position as specified on [page 7](#). 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

The Q6SE series heat pump is designed only for rooftop or ground level installations. This unit has been tested for capacity and efficiency in accordance with A.H.R.I. Standards and will provide many years of safe and dependable comfort, providing it is properly installed and maintained. Abuse, improper use, and/or improper maintenance can shorten the life of the appliance and create unsafe hazards.

### 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

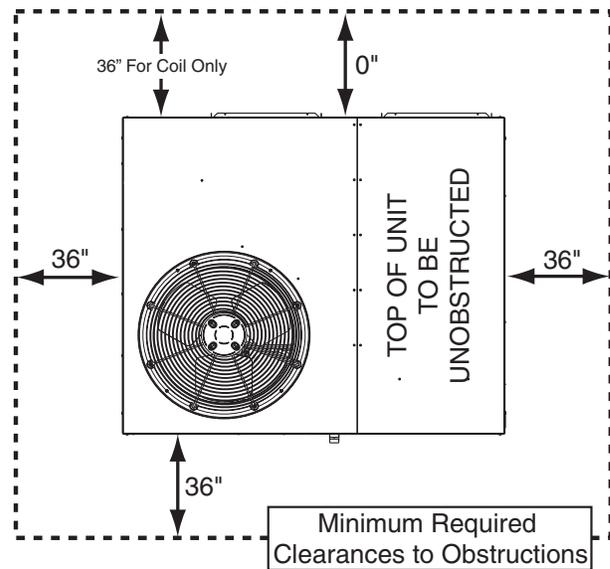
- Survey the job site to determine the best location for mounting the outdoor unit.
- Choose an appropriate location that minimizes the length of the supply and return air ducts.
- Overhead obstructions, poorly ventilated areas, and areas subject to accumulation of debris should be avoided.
- Sufficient 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.

### 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



**Figure 2. Clearance Requirements**

90B), and all applicable local codes. NFPA publications are available by writing to: National Fire Protection Association, Batterymarch Park, Quincy, MA 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.
- 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

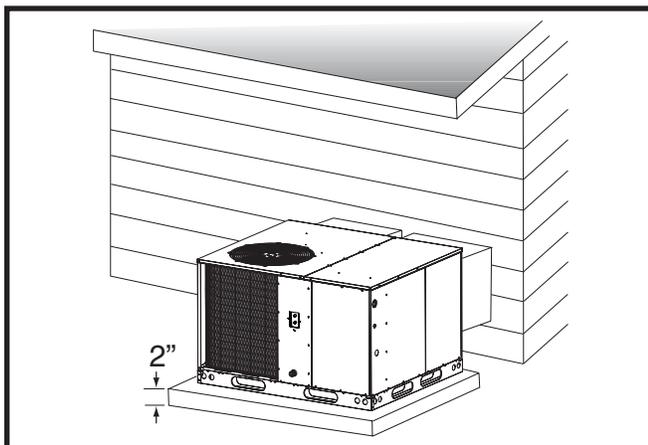
### **WARNING:**

**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. Replace disposable filters with the same type and size.**

- Air filter(s) are not supplied and must be installed in the return air system by the installer. Only three phase units are equipped with an internal filter rack assembly.
- All return air must pass through the filters before entering the unit. Recommended filter sizes are listed in [Table 1](#). **NOTE:** 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. When replacing the air filters, a suitable air filter must be installed upstream of the evaporator coil of the return air system.
- 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.

UNIT SIZE	INTERNAL FILTER SIZE
Q6SE-X36	(1) 12" x 20" x 1" and (2) 10" x 25" x 2"
Q6SE-X48 / X60	(1) 12" x 20" x 1" and (2) 12" x 25" x 2"

**Table 1. Internal Filter Sizes**



**Figure 3. Ground Level Installation**

## 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 & 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 5 \(page 15\)](#) 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 7 \(page 15\)](#) for locating the center of gravity.**
- **All panels must be securely in place during rigging and hoisting.**

### Minimum Clearance Requirements

Q6SE units are certified as combination heating and cooling equipment for outdoor installation only. [Figure 2 \(page 7\)](#) displays the minimum clearances to obstructions for both downflow and horizontal discharge.

Units may be installed on wood flooring or 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 horizontal supply and return air ducts, the horizontal roof curb kit and return air kit must be installed prior to unit installation. Horizontal roof curb is required.
- If using bottom discharge with return air ducts a roof curb must be installed prior to unit installation. See Rigging and Hoisting section for setting of the unit.

### 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](#). Also consider clearances for access to the internal filter.
- A suitable mounting pad must be provided and 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. See [Figure 3](#).

- Units require horizontal roof curb and return air kit for horizontal installations.
- Ductwork should be attached directly to flanges on panels supplied in horizontal duct conversion kits.

### 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 5 \(page 15\)](#). Reinforce the roof if necessary.
- The appropriate accessory roof curb ([Figure 4](#)) must be installed prior to unit installation. The roof curb must be square and level to ensure proper condensate drainage.
- 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.

### Removal of Internal Filter Rack

*(3 Phase Only)*

1. Remove the return air panel from the unit.
2. Remove the height adjustment screw from the inside of the rack.
3. Remove (1) screw securing the assembly to the coil located on the left leg of the rack. **NOTE:** The assembly can now be easily collapsed and removed from the unit. See [Figure 5](#) for filter rack securing screw locations.

### Removal of Internal Filter Rack

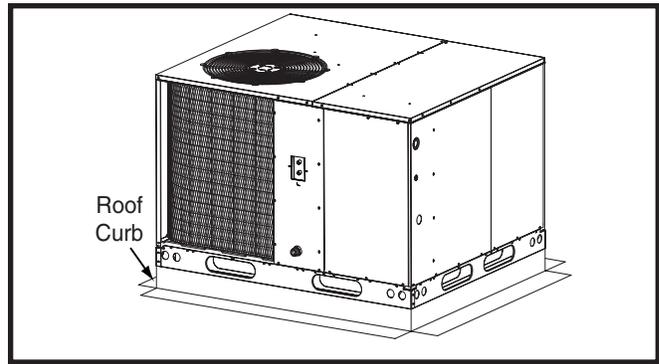
**NOTE:** If a downflow economizer is installed, an internal filter kit is not required, the economizer already has a filter.

1. Remove the return air panel from the unit.
2. Remove the height adjustment screw from the inside of the rack.
3. Remove 4 screws securing the assembly to the coil located on the left leg of the rack. **NOTE:** The assembly can now be easily collapsed and removed from the unit. The bracket secured to the top rear of the coil can remain in place. See [Figure 5](#) for filter rack securing screw locations.

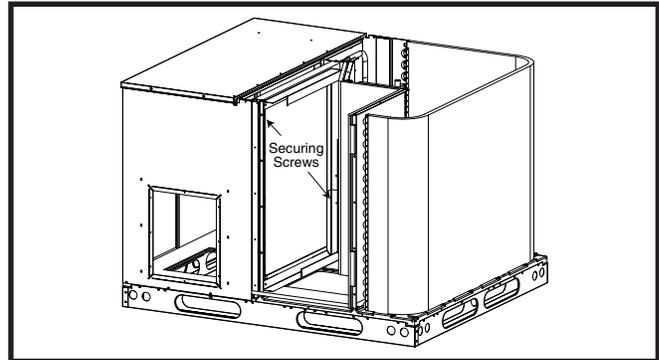
### Installing Filters in the Internal Filter Rack

*(If Equipped)*

1. Remove access panel screws from return air panel. (**Hint:** Loosen the unit's top panel screws near the top edge of the access panel. The access panel was designed to fit underneath the top panel.)
2. Slide the first filter between both guide channels of filter rack and allow the filter to drop easily into place.
3. Verify the bottom of the filter is within the channels of the rack.
4. Slide the 2nd filter (and 3rd filter on taller models) between both guide channels of filter rack.
5. Verify the top of the filter is within the channels of the rack.
6. Replace access cover by sliding the top edge of panel under the lip of the unit's top panel. Secure access panel by replacing the screws.



**Figure 4. Roof Top Installation**



**Figure 5. Internal Filter Rack Location**

### 1" to 2" Filter Conversion

Factory installed internal filter rack (3 phase models only) is set up to accept 1" filters. If conversion to 2" filters is desired, remove the two (or three) 1" filter adaptors secured in the assembly with clips by pulling straight off the frame. The filter bracket must be reoriented to accept 2" filters by removing two screws securing it to the hinge and rotating 180 degrees. See [Figure 5](#).

### Removing Filters from Internal Filter Rack

*(If Equipped)*

1. Remove access panel screws from return air panel. (**Hint:** Loosen the unit's top panel screws near the top edge of the access panel. The access panel was designed to fit underneath the top panel.)
2. Remove upper filter by gently pulling filter through the access panel opening.
3. Remove lower filter by lifting media to top of filter rack. Remove in the same manner as described in step 2.
4. Install new filter in the filter rack as described in the previous section.

### 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 the supply and return ducts.

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

## 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 6](#). 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.

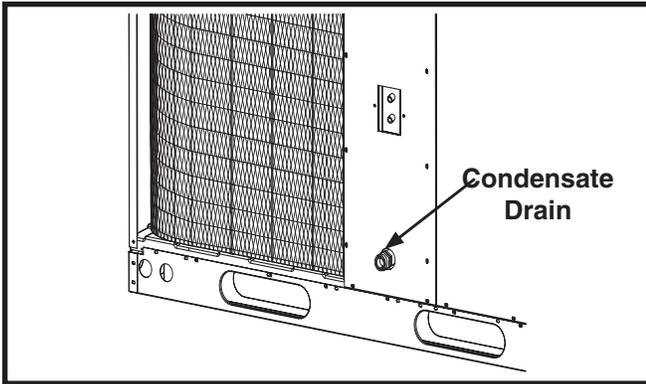


Figure 6. Condensate Drain Location

## ELECTRICAL WIRING

### **WARNING:**

**To avoid risk of 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.**

**Label all wires prior to disconnection when servicing the unit. Wiring errors can cause improper and dangerous operation**

- 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. See [Figure 10 \(page 18\)](#) & [Figure 11 \(page 19\)](#). Inspect for loose connections.
- ✓ Phase balance on 3 phase units must always be checked. See Unbalanced 3-Phase Supply Voltage section on [page 11](#).

## Line Voltage

- A wiring diagram is located on the inside cover of the units electrical box. The installer should become familiar with the wiring diagram before making any electrical connections to the outdoor 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 unit.
- Line voltage to the unit should be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the unit. Incoming field wiring and minimum size of electrical conductors and circuit protection must be in compliance with information listed on the outdoor unit data label. Any other wiring methods must be acceptable to authority having jurisdiction.
- The outdoor unit requires both power and control circuit electrical connections. Refer to the wiring diagrams for identification and location of outdoor unit field wiring interfaces. See [Figure 10 \(page 18\)](#) & [Figure 11 \(page 19\)](#). Make all electrical connections in accordance with all applicable codes and ordinances.
- 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 minimum 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 2](#). 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.
- Units are shipped from the factory wired for 230 or 460 volt operation. For 208 - 230V operation, remove the lead from the transformer terminal marked 240V and connect it to the terminal marked 208V.
- Optional equipment requiring connection to the power or control circuits must be wired in strict accordance of the NEC (ANSI/NFPA 70), applicable local codes, and the instructions provided with the equipment.

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.

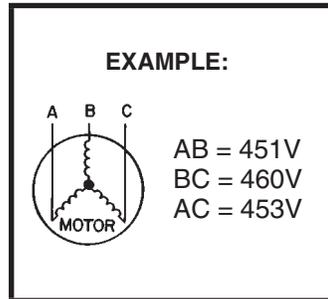
**Table 2. Copper Wire Size**

## Unbalanced 3-Phase Supply Voltage

Voltage unbalance occurs when the voltages of all phases of a 3-phase power supply are no longer equal. This unbalance reduces motor efficiency and performance. Some underlying causes of voltage unbalance may include: Lack of symmetry in transmission lines, large single-phase loads, and unbalanced or overloaded transformers. A motor should never be operated when a phase imbalance in supply is greater than 2%.

Perform the following steps to determine the percentage of voltage imbalance:

1. Check the line voltages of your 3-phase power supply where it enters the building and at a location that will only be dedicated to the unit installation. (at the units circuit protection or disconnect).



2. Determine the average voltage in the power supply.

In this example, the measured line voltages were 451, 460, and 453. The average would be 454 volts ( $451 + 460 + 453 = 1,364 / 3 = 454$ ).

3. Determine the maximum deviation:

**EXAMPLE**

From the values given in step 1, the BC voltage (460V) is the greatest difference in value from the average:

460 - 454 = 6  
454 - 451 = 3  
454 - 453 = 1

4. Determine percent of voltage imbalance by using the results from step 2 & step 3 in the following equation.

**EXAMPLE**

$$100 \times \frac{6}{454} = 1.32\%$$

$$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

The amount of phase imbalance (1.32%) is satisfactory since the amount is lower than the maximum allowable 2%. Please contact your local electric utility company if your voltage imbalance is more than 2%.

## Grounding

### **WARNING:**

**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!**

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.

### **Blower Speed**

The blower speed is preset at the factory for operation at the same speed for heating and cooling. These factory settings are listed in [Table 6 \(page 21\)](#). For optimum system performance and comfort, it may be necessary to change the factory set speed.

### **CAUTION:**

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

1. Shut off all electrical power to the unit and remove the blower panel. Locate the orange and red wires terminated to the blower motor. **NOTE:** The orange wire controls cooling operation while the red wire controls heating operation.
2. Verify the required speed from the airflow data found in [Table 6](#). Place appropriate wire on the correct motor speed tap for the required airflow point.

### **Thermostat Connections**

- The Q6SE heat pump requires a 2-stage heat pump thermostat that must operate in conjunction with installed accessories.
- If installing an economizer equipped with a HW W7220 JADE control, it is recommended to use a programmable commercial thermostat with OCCUPIED mode of operation.
- The low voltage wires must be properly connected to the units low voltage terminal block. For 208/230V units, see [Figure 8 \(page 16\)](#) or [Figure 9 \(page 17\)](#) for 460V units. Recommended wire gauge and lengths for typical thermostat connections are listed in [Table 3 \(page 12\)](#).
- 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's instruction sheet for detailed mounting and installation information.

WIRE GAUGE	RECOMMENDED MAXIMUM WIRE LENGTH (FT) FROM UNIT TO THERMOSTAT
22	45
20	70
18	115
16	180

**Table 3. Thermostat Wire Gauge**

### 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 4](#) 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.

JUMPER POSITION	MINIMUM TIME BETWEEN DEFROSTS (MIN)	TERMINATE TEMPERATURE (° F)	30 SECOND COMPRESSOR DELAY FUNCTION
<b>1</b>	<b>20</b>	<b>40</b>	<b>NO</b>
2	20	40	YES
3	20	75	NO
4	20	75	YES

**Table 4. Demand Defrost Curve Profiles**

- 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.

### Optional Electric Heater Kits

Optional electric heater kits are available in 9 kw and 15 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. 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.

## 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 system mode should be set to OFF and the thermostat fan mode should be set to AUTO.

### Start-Up Procedure

Close all electrical disconnects to energize the system.

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### WARNING:

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**If the unit is equipped with a crankcase heater, allow 24 hours prior to continuing the start up procedures to allow for heating of the refrigerant compressor crankcase. Failure to comply may result in damage and could cause premature failure of the system. This warning should be followed at initial start up and any time the power has been removed for 12 hours or longer.**

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### 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.

### 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 mode is set to ON.

### System Heating

If the unit has been equipped with optional electric heater kits, set the thermostat's system mode to 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

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### WARNING:

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**The Q6SE heat pump is 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.**

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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.

#### IMPORTANT NOTES:

- **To achieve rated capacity and efficiency the compressor must be exposed to refrigerant for at least 24 hours prior to running and then must be run for a minimum of 12 hours.**
- **The refrigerant charging charts are applicable to listed assemblies of equipment and at listed airflows for the indoor coil. Assemblies of indoor coils and outdoor units not listed are not recommended. See [Figure 12 \(page 20\)](#), [Figure 13 \(page 20\)](#), and [Figure 14 \(page 21\)](#).**

### Charging an R-410A Unit in AC Mode

(With Outdoor Temperatures Above 65° F)

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 [Figure 12 \(page 20\)](#), [Figure 13 \(page 20\)](#), and [Figure 14 \(page 21\)](#).
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 ([page 13](#)).

## 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. Unit may have more than one electrical supply.**

### **CAUTION:**

**Use care when servicing the heat pump or removing components. Personal injury can result from sharp edges present in equipment constructed with sheet metal**

### **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.**

### **CAUTION:**

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

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 and louvers 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.
- 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.

## REPLACEMENT PARTS

Replacement parts are available through your distributor. Please have the complete model and serial number of the unit when ordering replacement parts.

### ELECTRICAL:

- Capacitors
- Compressors
- Contactors
- Pressure Switches
- Relays
- Temperature Limit Switches
- Transformers

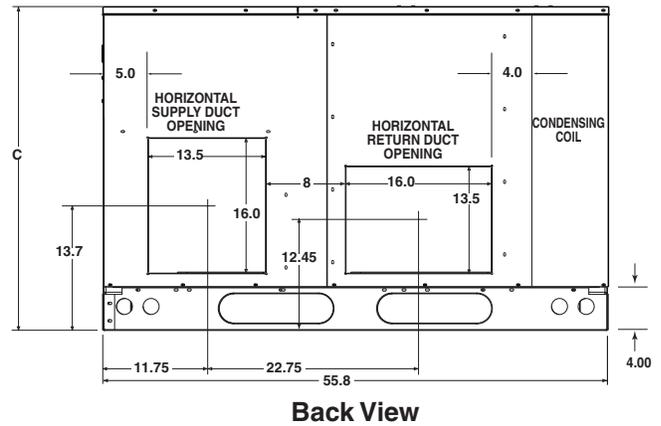
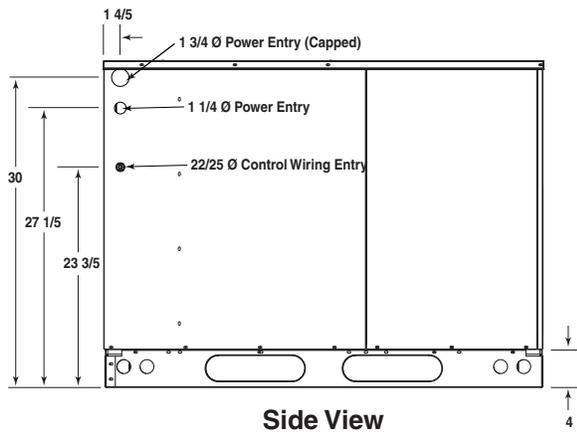
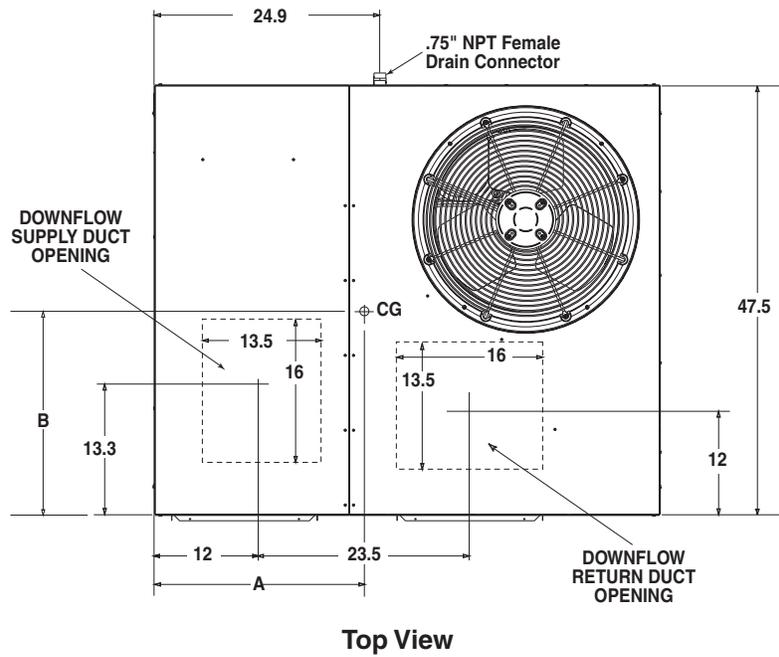
### MOTORS:

- Blower Motor
- Fan Motor

### COMPONENTS:

- Blower Assembly
- Cabinet Panels
- Expansion Valves
- Fan Grille
- Filter/Driers

## FIGURES & TABLES

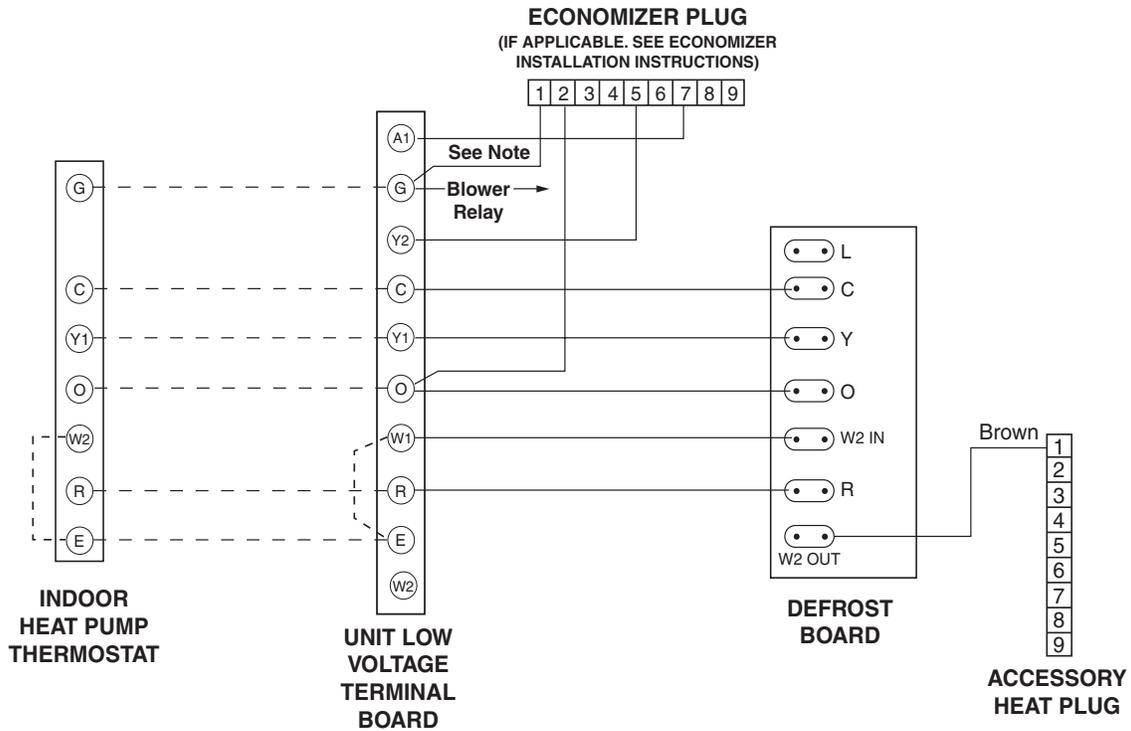


**Figure 7. Q6SE Heat pump Dimensions**

MODEL NUMBER Q6SE	UNIT WEIGHT	CENTER OF GRAVITY		HEIGHT -C- (IN INCHES)	
		-A-	-B-	WITH BASE RAILS	WITHOUT BASE RAILS
		X36	460	28.0	25.5
X48	570	29.5	26.0	43.0	39.3
X60	580	29.5	26.0	43.0	39.3

**Table 5. Center of Gravity & Unit Shipping Weights**

## Electrical Information

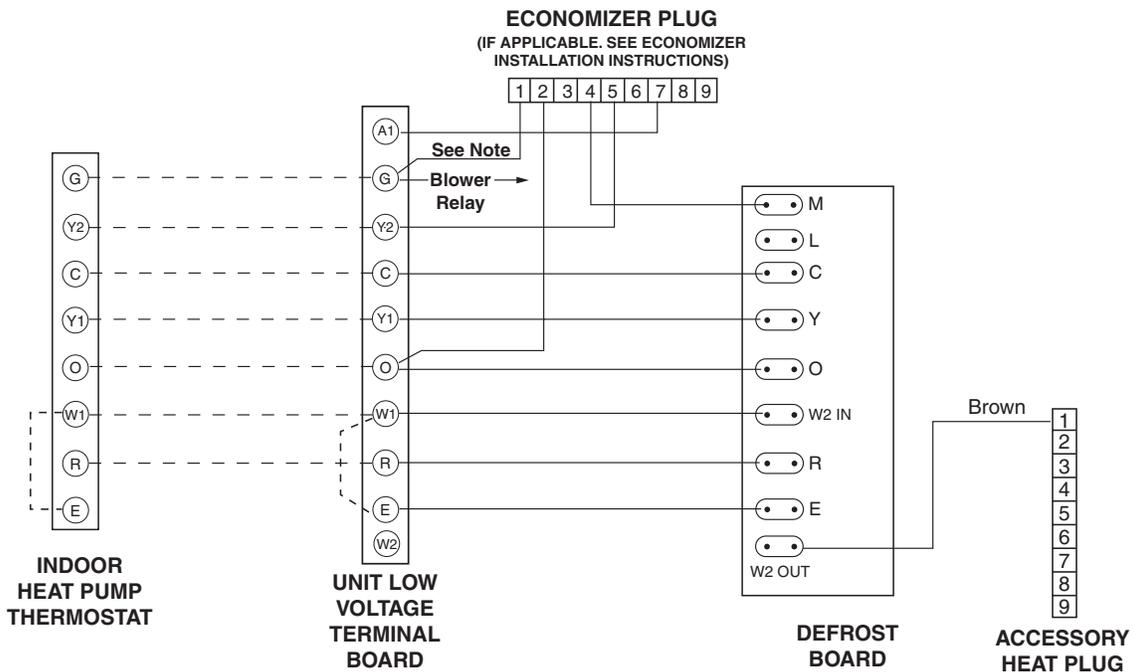


Typical Wiring for Single Stage Heat Pump Operation with Single Stage Auxillary Electric Heat

**FACTORY WIRING**  
 **FIELD WIRING**

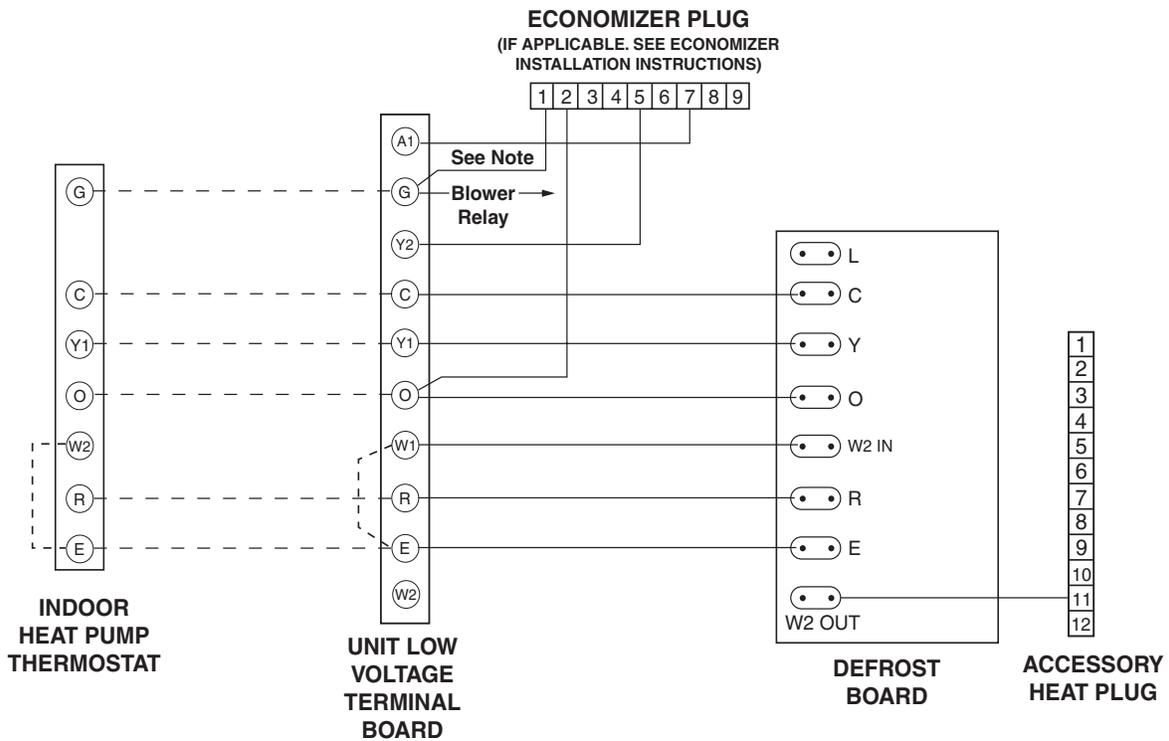
**NOTE:** If installing an economizer using the new Honeywell W7220A JADE control module, the following change **MUST** be made to the heat pump low voltage wiring:

- Green wire from economizer plug pin # 1 can be relocated from Low Voltage Terminal Board "G" to Low Voltage Terminal Board "R" for economizer operation. See economizer installation instructions for detailed information.



Typical Wiring for Two-Stage Heat Pump (Cool) Operation (Economizer + HP Cool)

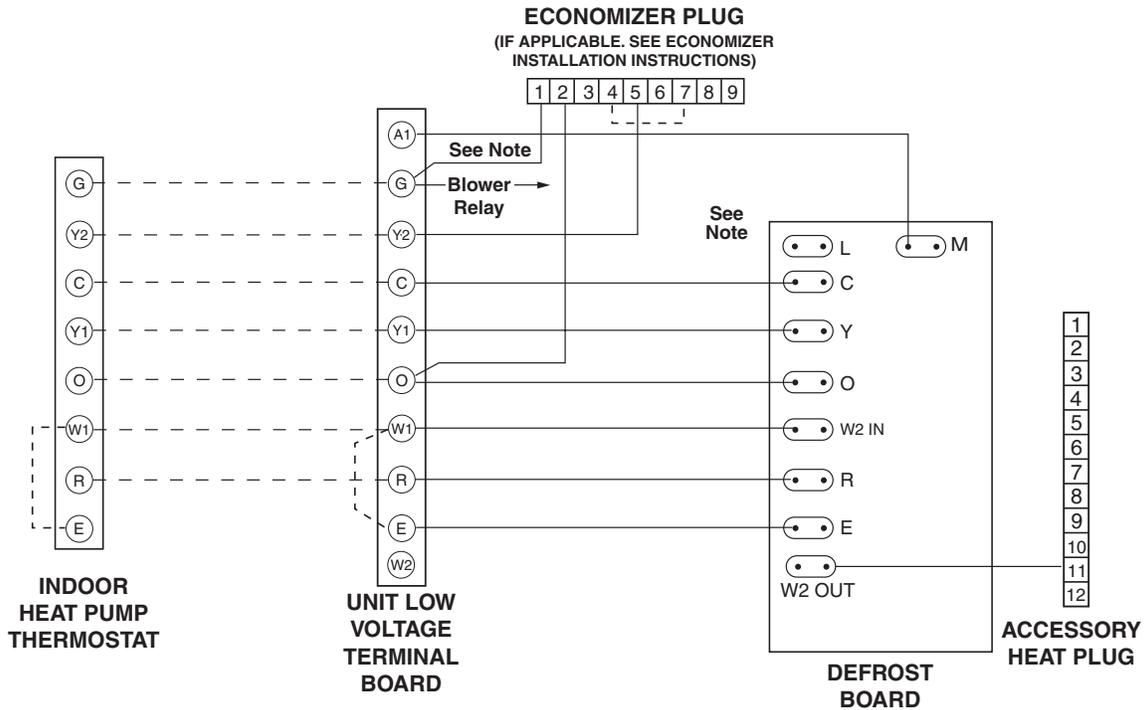
**Figure 8. Typical Heat Pump Thermostat Connections 208V / 230V**



————— **FACTORY WIRING**  
 - - - - - **FIELD WIRING**

**NOTE:** If installing an economizer using the new Honeywell W7220A JADE control module, the following change **MUST** be made to the heat pump low voltage wiring:

- Green wire from economizer plug pin # 1 can be relocated from Low Voltage Terminal Board "G" to Low Voltage Terminal Board "R" for economizer operation. See economizer installation instructions for detailed information.



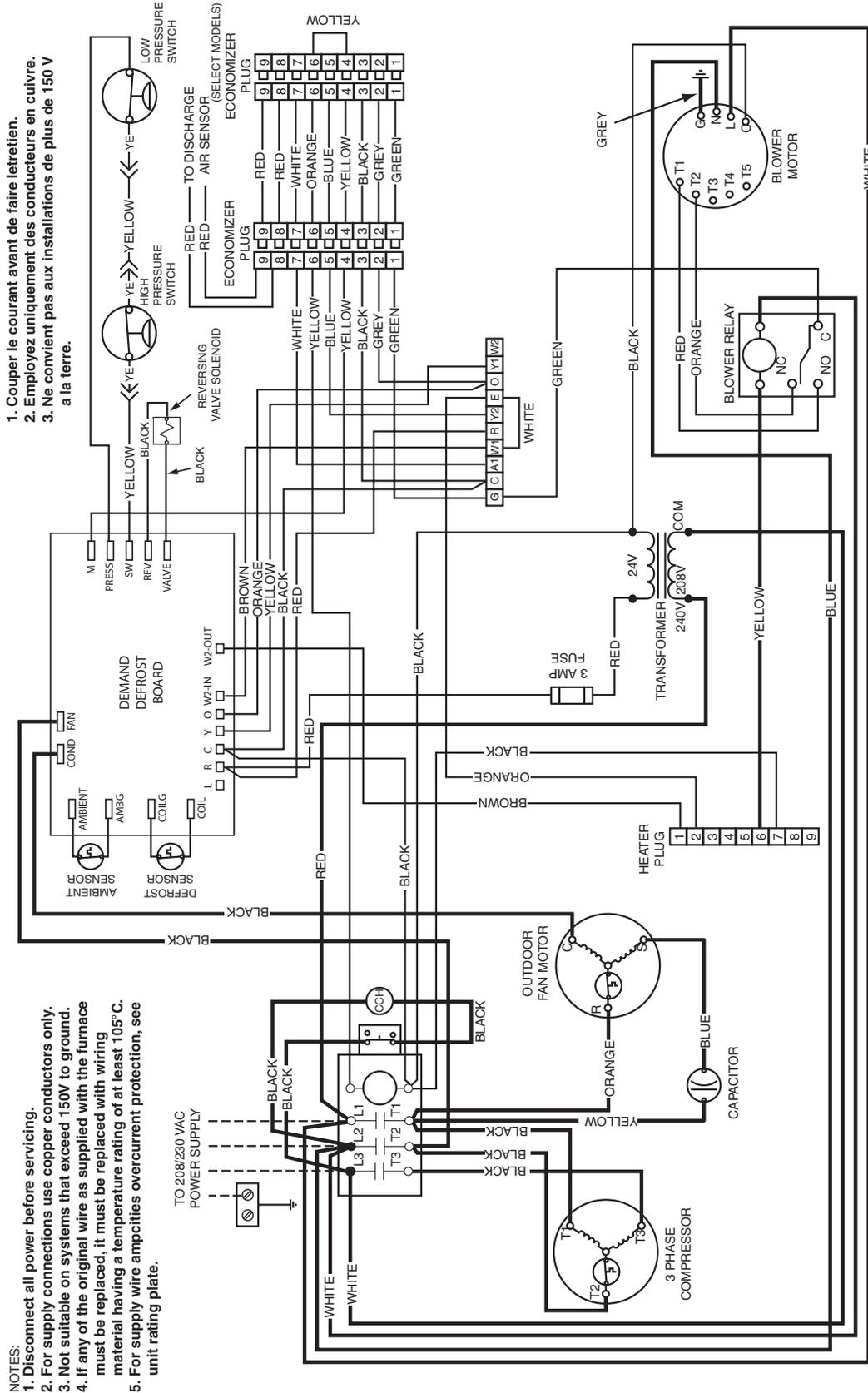
**Figure 9. Typical Heat Pump Thermostat Connections 460V**

# WIRING DIAGRAM

## Convertible Packaged Heat Pump

208/230 Volt

Three 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 overcurrent protection, see unit rating plate.

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

DEFROST BOARD OPERATION:

- 1 CLOSURES DURING DEFROST. RATING: 1 A MAXIMUM
- 2 OPENS DURING DEFROST. RATING: 2 HP AT 230 VAC MAXIMUM
- 3 CLOSURE WHEN "Y" IS ENERGIZED. OPEN WHEN "Y" IS DEENERGIZED. PROVIDES "OFF" DELAY TIME OF 5 MIN WHEN "Y" IS DEENERGIZED.
- 4 WITH DFT CLOSED AND "Y" ENERGIZED, COMPRESSOR RUN TIME IS ACCUMULATED. OPENING OF DFT DURING DEFROST OR INTERVAL PERIOD RESETS THE INTERVAL TO 0.

LEGEND:

- FIELD WIRING (dashed line)
- LOW VOLTAGE (solid line)
- HIGH VOLTAGE (thick solid line)

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

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Figure 10. Wiring Diagram for 208/230V Units

# WIRING DIAGRAM

## Convertible Packaged Heat Pump

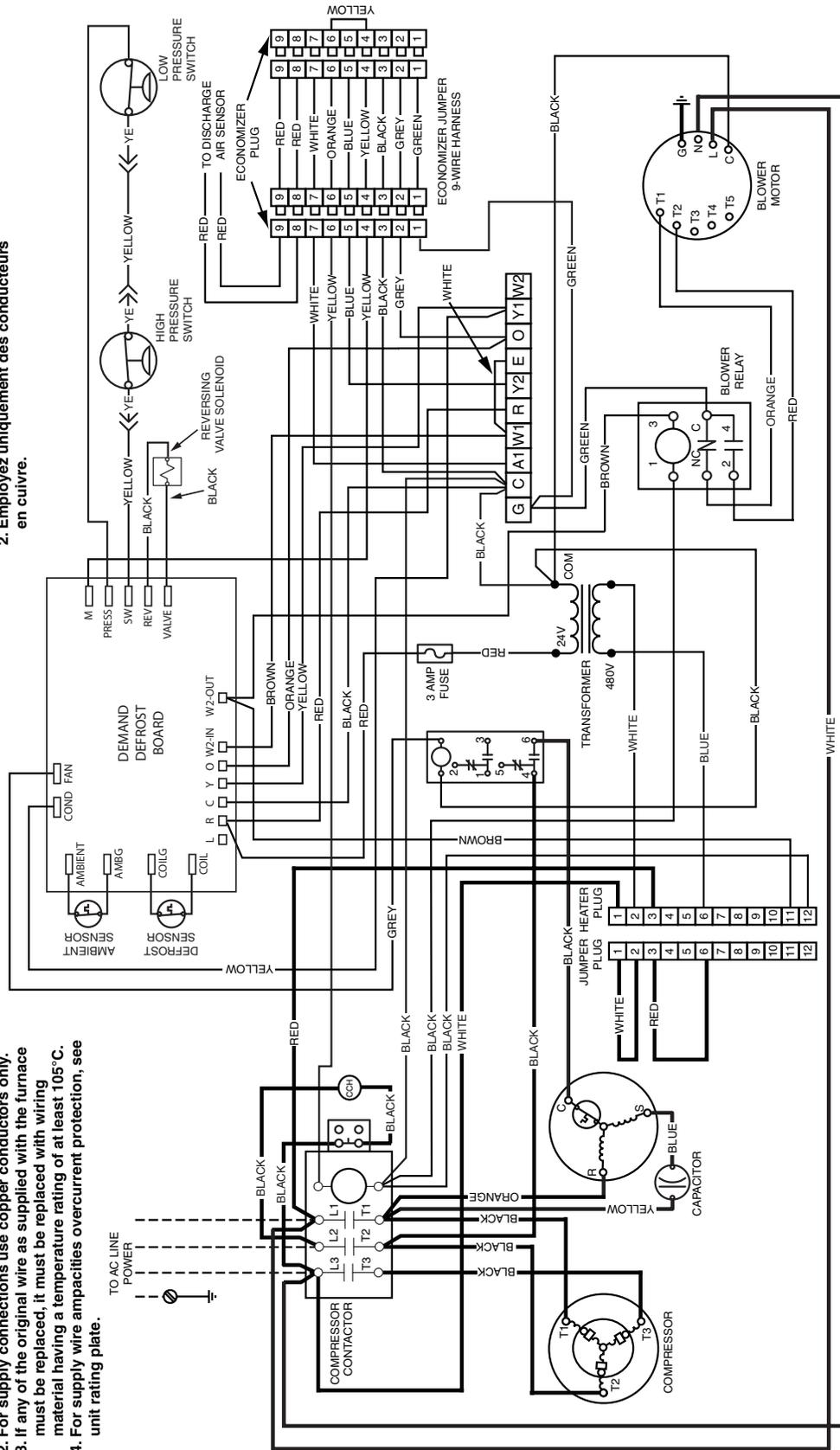
460 Volt

Three Phase 60Hz

**NOTES:**

1. Disconnect all power before servicing.
2. For supply connections use copper conductors only.
3. 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.
4. For supply wire ampacities overcurrent protection, see unit rating plate.

1. Couper le courant avant de faire leretien.
2. Employez uniquement des conducteurs en cuivre.



**DEFROST BOARD OPERATION:**

- ① CLOSES DURING DEFROST. RATING: 1 A MAXIMUM
- ② OPENS DURING DEFROST. 2 HP AT 230 VAC MAXIMUM
- ③ CLOSED WHEN "Y" IS ENERGIZED. OPEN WHEN "Y" IS DEENERGIZED. PROVIDES "OFF" DELAY TIME OF 5 MIN WHEN "Y" IS DEENERGIZED.
- ④ WITH DTF CLOSED AND "Y" ENERGIZED, COMPRESSOR RUN TIME IS ACCUMULATED. OPENING OF DTF DURING DEFROST OR INTERVAL PERIOD RESETS THE INTERVAL TO 0.

**LEGEND:**



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



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Figure 11. Wiring Diagram for 460V Units

## Cooling Charging Charts

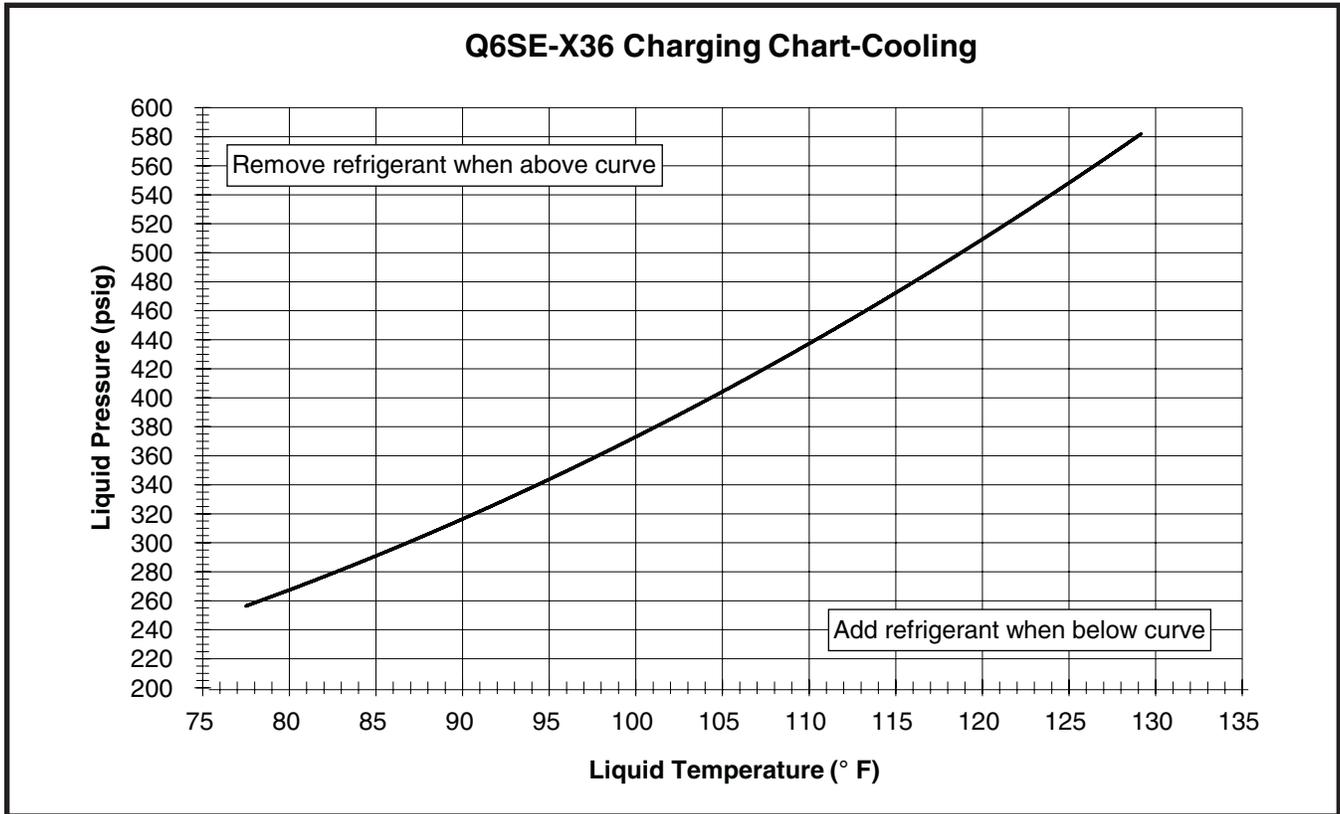


Figure 12. Charging Chart for 3 Ton Units

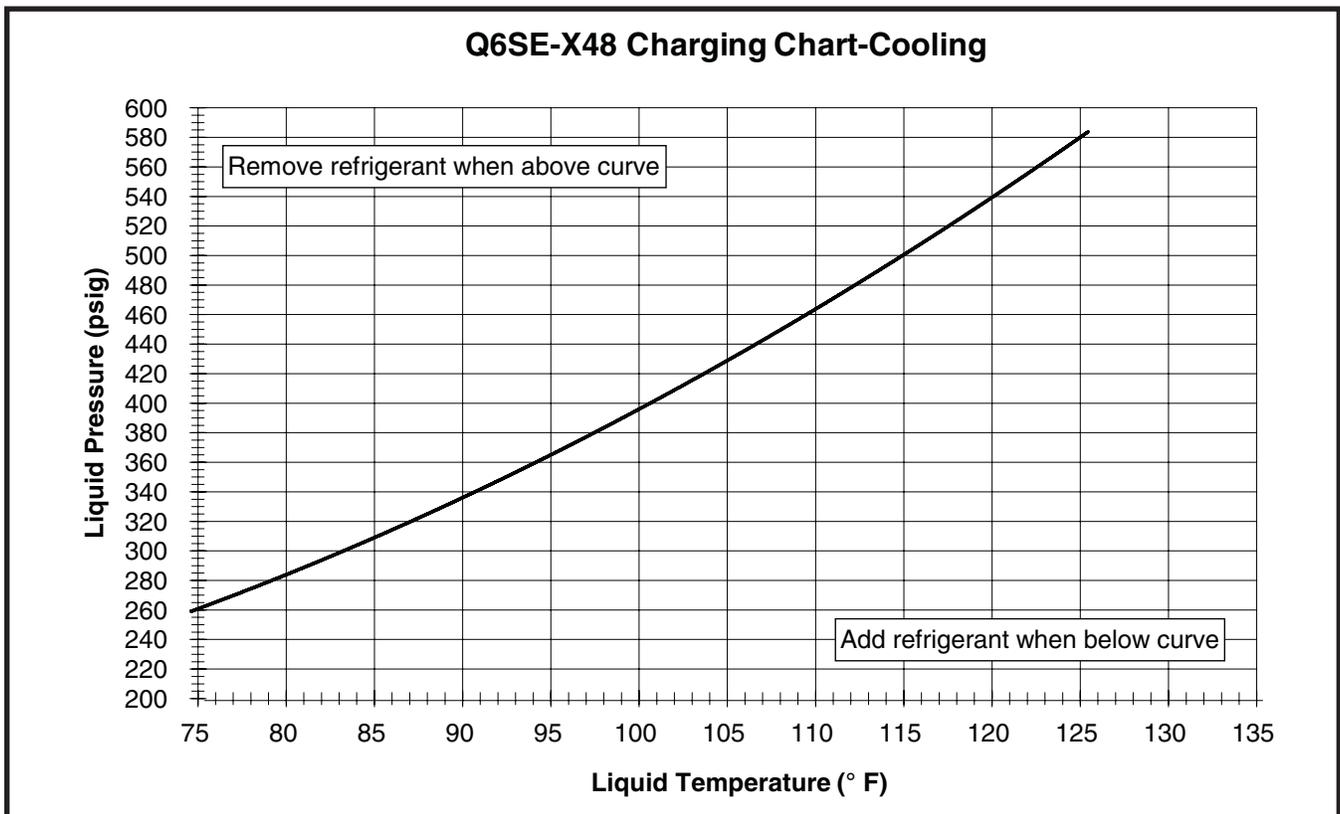
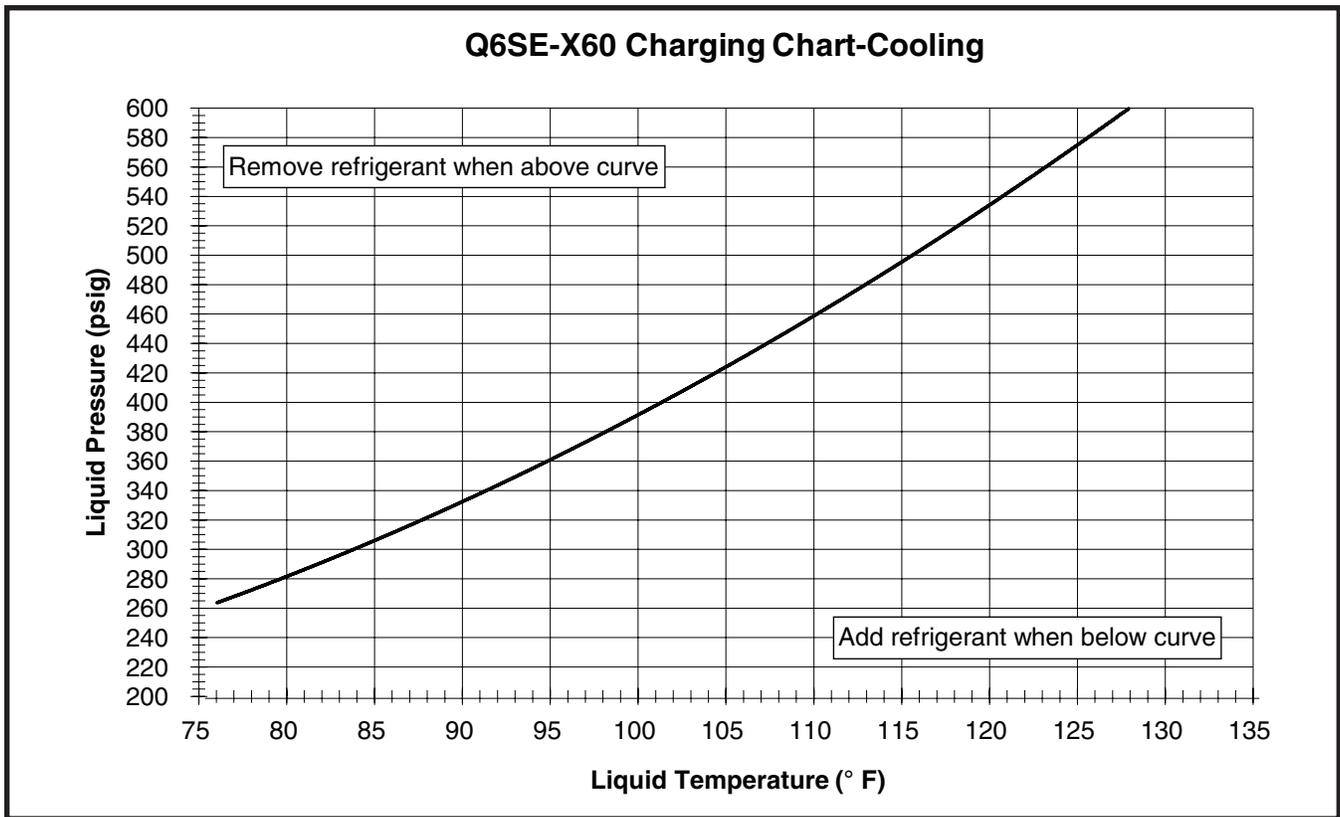


Figure 13. Charging Chart for 4 Ton Units



**Figure 14. Charging Chart for 5 Ton Units**

### Airflow Data

MODEL NUMBER Q6SE	MOTOR SPEED TAP	EXTERNAL STATIC PRESSURE DROP (INCHES WATER COLUMN)															
		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8	
X36	Tap T1	1137	25.01	1075	26.45	1012	28.10	950	29.93	863	32.95	770	36.93	694	40.97	619	45.94
	Tap T2**	1242	22.89	1187	23.95	1128	25.21	1057	26.90	993	28.63	921	30.87	827	34.38	754	37.71
	Tap T3*	1418	20.05	1370	20.76	1308	21.74	1251	22.73	1204	23.62	1123	25.32	1064	26.72	974	29.19
	Tap T4	1567	18.15	1515	18.77	1459	19.49	1397	20.35	1338	21.25	1272	22.35	1184	24.02	1107	25.69
	Tap T5	1700	16.73	1658	17.15	1596	17.82	1534	18.54	1481	19.20	1421	20.01	1358	20.94	1279	22.23
X48	Tap T1	952	29.87	901	31.56	864	32.91	728	39.06	672	42.31	583	48.77	508	55.97	-	-
	Tap T2**	1646	17.27	1593	17.85	1520	18.71	1476	19.26	1417	20.07	1349	21.08	1265	22.48	1198	23.73
	Tap T3*	1764	16.12	1705	16.68	1626	17.49	1570	18.11	1525	18.65	1451	19.60	1403	20.27	1304	21.81
	Tap T4	1962	14.49	1916	14.84	1838	15.47	1787	15.91	1720	16.53	1670	17.03	1595	17.83	1537	18.50
	Tap T5	2391	11.89	2334	12.18	2301	12.36	2242	12.68	2180	13.04	2132	13.34	2074	13.71	2017	14.10
X60	Tap T1	1088	26.13	1032	27.55	958	29.68	878	32.39	789	36.04	715	39.77	641	44.36	570	49.89
	Tap T2**	1764	16.12	1705	16.68	1626	17.49	1570	18.11	1525	18.65	1451	19.60	1403	20.27	1304	21.81
	Tap T3*	1777	16.00	1736	16.38	1680	16.93	1634	17.40	1571	18.10	1513	18.79	1447	19.65	1382	20.57
	Tap T4	2106	13.50	2059	13.81	2000	14.22	1944	14.63	1878	15.14	1828	15.55	1751	16.24	1689	16.84
	Tap T5	2391	11.89	2334	12.18	2301	12.36	2242	12.68	2180	13.04	2132	13.34	2074	13.71	2017	14.10

\* Denotes factory set cooling speed

\*\* Denotes factory set electric heating speed

**NOTE:** Airflow performance is with a dry coil

**Table 6. Blower Curves**





## INSTALLATION CHECK LIST

<b>INSTALLATION ADDRESS:</b>		
CITY:	STATE:	
UNIT MODEL #		
UNIT SERIAL #		
Unit Installed Minimum clearances as shown in <a href="#">Figure 2 (page 7)</a> ?	YES	NO
<b>INSTALLER NAME:</b>		
CITY:	STATE:	
Has the owner's information been reviewed with the customer?	YES	NO
Has the Literature Package been left with the unit?	YES	NO

VENTING SYSTEM		
Is the heat exchanger condensate drain and vent pipe installed?	YES	NO
Is pipe free of restrictions?	YES	NO
Filter(s) secured in place?	YES	NO
Filter(s) clean?	YES	NO

### ATTENTION INSTALLERS:

It is your responsibility to know this product better than your customer. This includes being able to install the product according to strict safety guidelines and instructing the customer on how to operate and maintain the equipment for the life of the product. Safety should always be the deciding factor when installing this product and using common sense plays an important role as well. Pay attention to all safety warnings and any other special notes highlighted in the manual. Improper installation of the unit or failure to follow safety warnings could result in serious injury, death, or property damage. 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.

ELECTRICAL SYSTEM		
Electrical connections tight?	YES	NO
Line voltage polarity correct?	YES	NO
Has the thermostat been calibrated?	YES	NO
Is the thermostat level?	YES	NO
Is the heat anticipator setting correct?	YES	NO
SINGLE PHASE UNITS		
Rated Voltage: ..... VOLTS		
L1-L2 Volts: ..... VOLTS		
3-PHASE UNITS		
Rated Voltage: ..... VOLTS		
L1-L2 Volts: ..... VOLTS		
L1-L3 Volts: ..... VOLTS		
L2-L3 Volts: ..... VOLTS		
Avg. Volts: ..... VOLTS		
Max. deviation of voltage from avg. volts: ..... VOLTS		
% Volt Imbalance: ..... VOLTS		

REFRIGERATION SYSTEM		
Was unit given 24 hr warm up period for crankcase heaters (if equipped)?	YES	NO
Stage-1 Liquid Pressure (high side)		
Stage-1 Suction Pressure (low side)		

