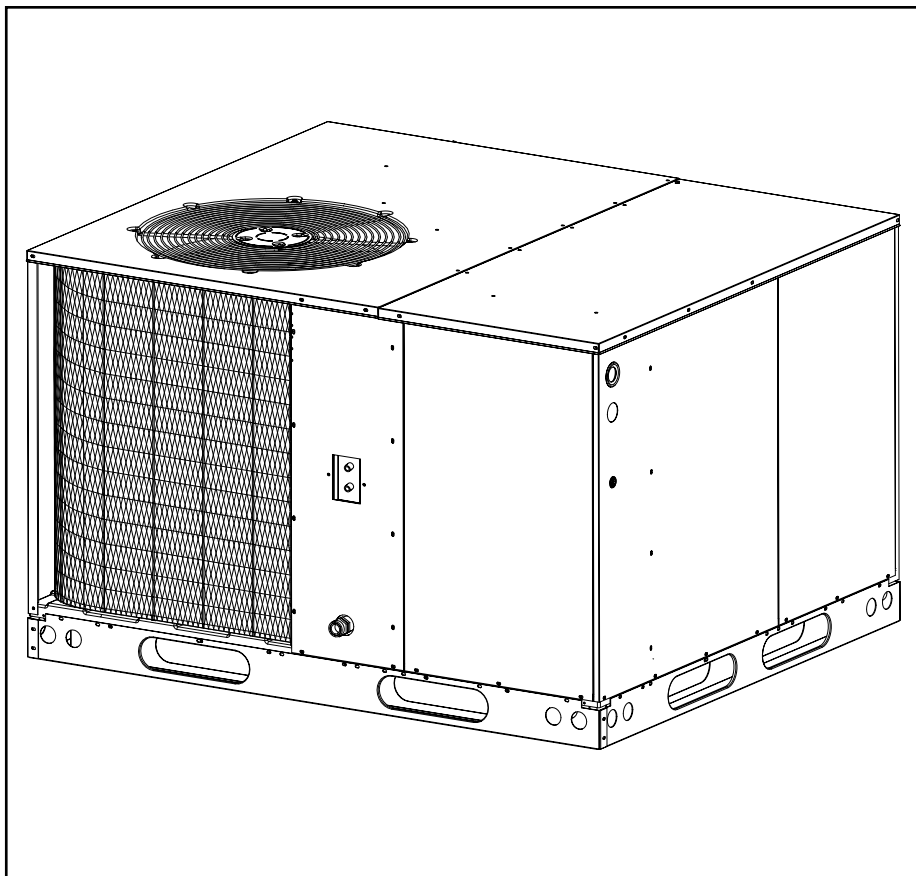


## 14 SEER Single Package Heat Pump

# Installation Instructions



## IMPORTANT

These instructions are primarily intended to assist qualified individuals experienced in the proper installation of heating and/or air conditioning appliances. Some local codes require licensed installation/service personnel for this type equipment. All installations must be in accordance with these instructions and with all applicable national and local codes and standards.

Read these instructions thoroughly before starting the installation. Follow all precautions and warnings contained within these instructions and on the unit.

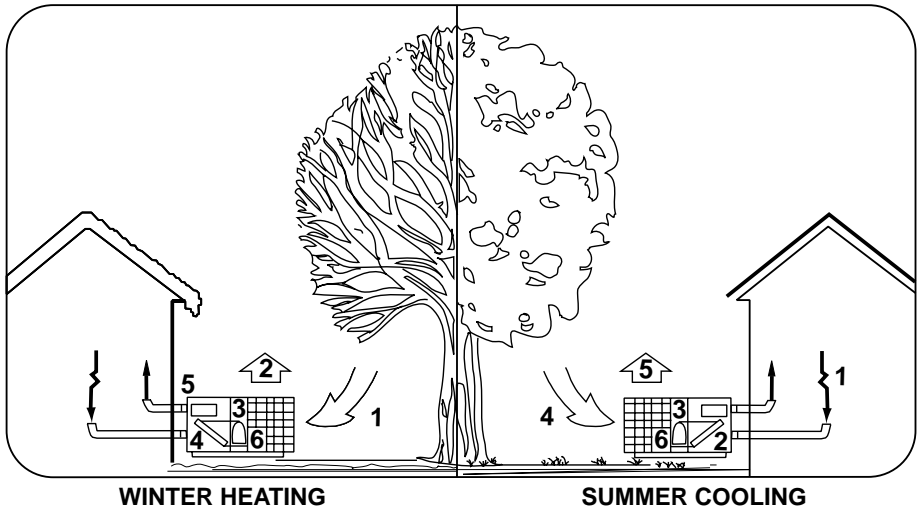
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## SECTION 1. OWNER INFORMATION



1. Outdoor air enters the heat pump.
2. The cold, heat-transfer section (outdoor coil) extracts the heat from the air as the refrigerant evaporates from a liquid to a cold gas.
3. The refrigerant, compressed to a hot gas by the heat pump, carries the heat to the heat-transfer section (indoor coil).
4. The hot, heat-transfer section (indoor coil) releases the heat as the refrigerant condenses from a gas to a liquid.
5. The blower circulates the heat throughout the home via the supply duct.
6. The refrigerant returns to the outdoor coil and evaporates once again to absorb more heat.

1. Indoor air enters the return air duct.
2. The cold, heat-transfer section (indoor coil) extracts the heat from the air as the refrigerant evaporates from a liquid to a cold gas.
3. The refrigerant, drawn to the heat pump and compressed to a hot gas, carries the heat outdoors.
4. The hot, heat-transfer section (outdoor coil) releases the heat as the refrigerant condenses from a gas to a liquid.
5. The heat pump (outdoor fan) discharges the heat to the outside air.
6. The refrigerant returns to the indoor coil and evaporates once again to absorb more heat.

It is the sole responsibility of the homeowner to make certain that heat pump has been correctly set up and adjusted to operate properly.

The Manufacturer warranty on the heat pump covers defects in material or workmanship for the warranty period. The manufacturer is not responsible for any costs resulting from 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:

1. Correcting wiring problems in the electrical circuit supplying the heat pump.

2. Resetting circuit breakers or other switches.
3. Adjusting or calibrating of thermostat.

To avoid misunderstandings at a later date, carefully review these responsibilities with your dealer or service company.

The heat pump system will heat and cool your home and save your energy dollars.

During the summer, a heat pump cools a house by absorbing heat from within the house and exhausting it outdoors. During the winter, a heat pump heats a house by absorbing heat outdoors and exhausting it indoors. This is an efficient heating means because you pay for "moving" heat from outdoors to indoors, but do not pay to generate the heat.

## OPERATING INSTRUCTIONS

### To Operate Your Heat Pump For Cooling —

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

### To Operate Your Heat Pump For Heating —

1. Set the thermostat system mode for HEAT and the thermostat fan mode to AUTO. See **Figure 1**.
2. Set the thermostat temperature selector to the desired heating temperature. The outdoor unit fan, the indoor blower, and the compressor will all cycle on and off to maintain the indoor temperature at the desired heating level.

**Emergency Heat** — Some thermostats will include a system switch position termed EM HT or AUX HT, etc. With the system 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**—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 periodically defrost itself. During the defrost cycle, the outdoor fan will stop, while the compressor continues to run and heat the outdoor coil, causing the snow and ice to melt. During defrost, there may be some steam rise from the outdoor unit as the warm coil causes some melted frost to evaporate.

## SPECIFICATIONS

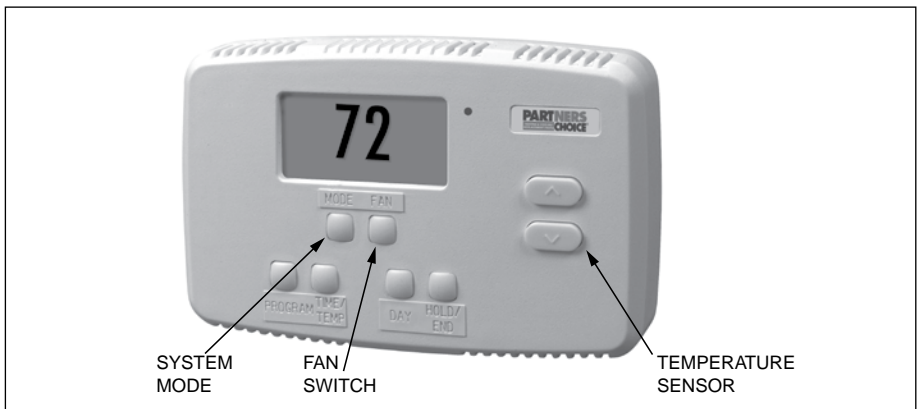
Single Package Heat Pumps are designed for outdoor rooftop or ground level slab installations. The units are shipped ready for horizontal duct connections and are easily converted for down flow applications.

All models are shipped from the factory with the following:

1. Zero clearance to combustibles
2. Variable speed direct-drive blower.
3. 2-Stage compressor.
4. Demand defrost board.
5. Horizontal or Down flow duct connections.

The unit dimensions are shown in **Figure 3**.

Optional field-installed electric heater kits are available in 5 kw through 20 kw heating capacities. A separate installation instruction document for the electric heaters and their application accompanies this one. A two stage heat 24VAC thermostat should be used with electric heater kits installed.



**Figure 1. Typical Thermostat**

## SAFETY CONSIDERATIONS

It is the responsibility of the installer to ensure that the installation is made in accordance with all applicable local and national codes.



### **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. Noncompliance may void the unit's warranty.**

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**Labels, Tags** — When working with this equipment, follow all precautions in the literature, on tags, and on labels provided with the unit and/or approved field installed kits. The type of hazard and severity are described on each label or tag.

**Pressures Within The System** — 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.



### **CAUTION:**

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

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## INSTALLATION REQUIREMENTS

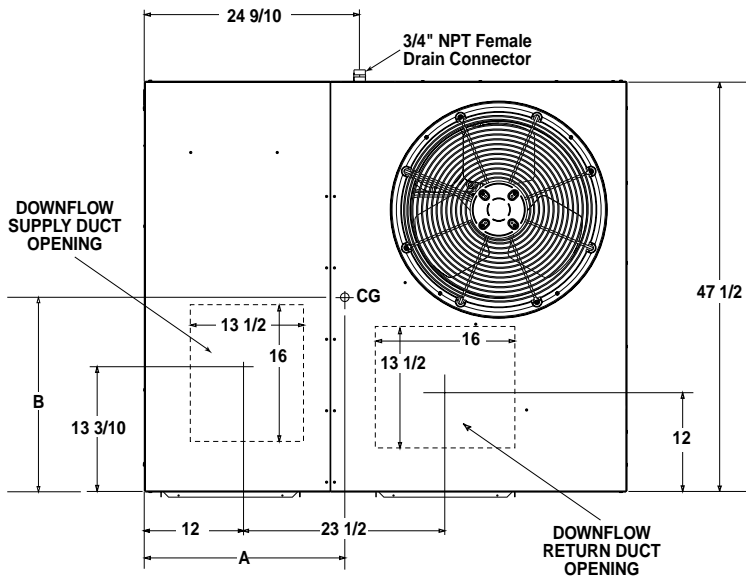
**Equipment Check** — Before beginning the installation, verify that the unit model is correct for the job. The unit model number is printed on the data label. All units have been securely packaged at the point of shipment. After unpacking the unit, carefully inspect it for apparent and concealed damage. Claims for damage should be filed with the carrier by the consignee.

**Requirements and Codes** — The installer must comply with all local codes and regulations which govern this type equipment. Local codes and regulations take precedence over any recommendations contained in these instructions. All electrical wiring must be made in accordance with local 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. Air Ducts must be installed in accordance with the standards of the National Fire Protection Association "Standards for Installation of Air Conditioning and Ventilation Systems" (NFPA 90A), "Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems" (NFPA 90B), these instructions and all applicable local codes.

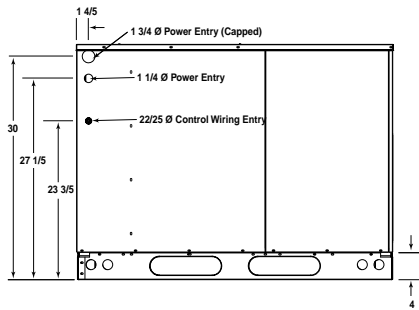
NFPA publications are available by writing:

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1 Batterymarch Park  
Quincy, Massachusetts 02169-7471  
[www.nfpa.org](http://www.nfpa.org)

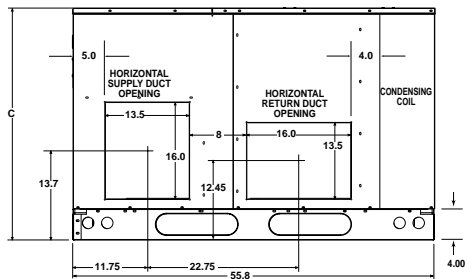
**Unit Location** — This heat pump is designed only for outdoor installations. Choosing the location of the unit should be based on minimizing the length of the supply and return ducts. Consideration should also be given to availability of electric power, service access, noise, and shade. Sufficient clearance for unobstructed airflow through the outdoor coil must be maintained in order to achieve rated performance **See Figure 4** for minimum clearances to obstructions.



**Top View**



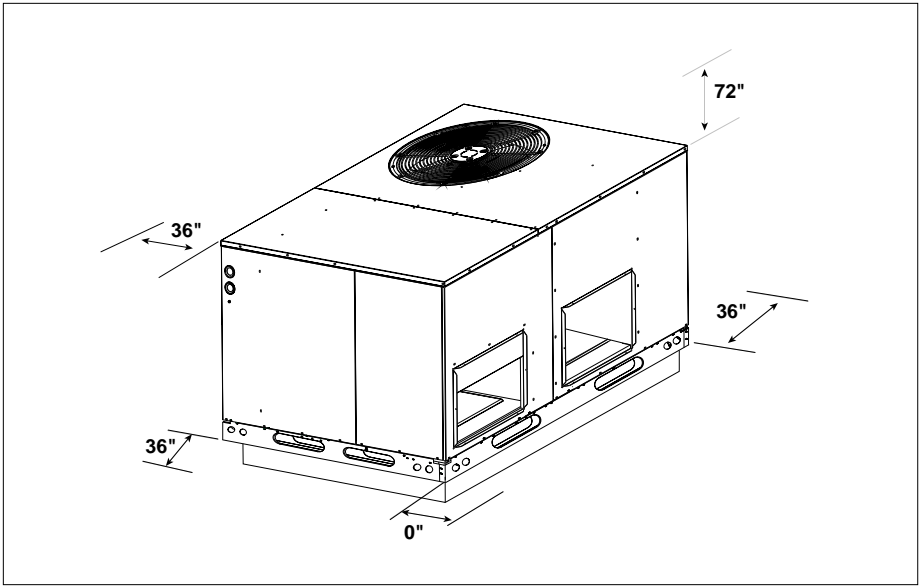
**Side View**



**Back View**

Model Number Q4SE-/PPH1SE	Unit Weight	Center of Gravity		Height (in inches)	
		A	B	C	
				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

**Figure 3. Dimensions**



**Figure 4. Minimum Clearances**

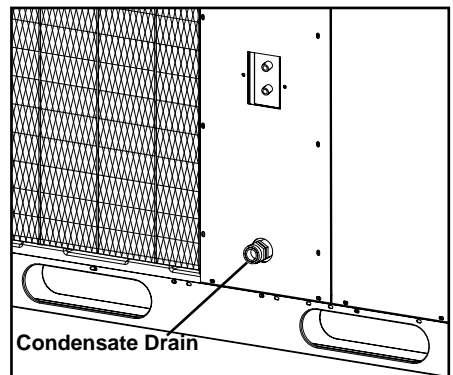
**Air Filters** — A suitable air filter must be installed in the return air system. Air filter pressure drop must not exceed 0.08 inches w.c. at 300 fpm.

**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 5.** 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.

## UNIT INSTALLATION

**Ground Level** — When installing the unit at ground level, provide a concrete mounting pad separate from the building foundation. The pad must be level to insure proper condensate disposal and strong enough to support the unit's weight. Refer to **Figure 3.** Make sure the slab is a minimum of 2" above the grade and in an area that drains well. **See Figure 6.**

**Rigging and Hoisting** — The unit should be lifted using slings and spreader bars. The spreader bars are necessary to prevent damaging the top of the unit's cabinet. Make sure that the lifting equipment is adequate for the load. Refer to **Figure 3** for unit weights. Keep the unit in an upright position at all times. **For rooftop installations, remove and discard the two supports attached beneath the unit.**



**Figure 5. Condensate Drain**

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## **WARNING:**

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To avoid the risk of property damage or personal injury; it is the rigger's responsibility to insure that whatever means are used to hoist the unit are safe and adequate.

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## **CAUTION:**

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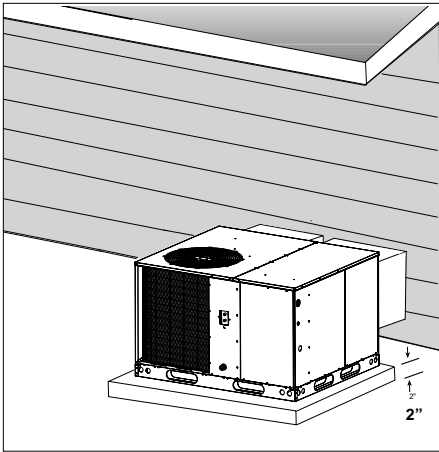
All panels must be securely in place when rigging and hoisting.

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The rigging must be located outside the unit's center of gravity. Refer to **Figure 3** for center of gravity locations.

**Roof top** — For rooftop installations use the appropriate accessory roof curb and follow all instructions included with it. Make sure the two supports beneath the unit have been removed. Locate the unit according to local building codes and ordinances. The curb must be level to insure proper condensate drainage. **See Figure 7.**

The roof must be capable of handling the weight of the unit. **See Figure 3** for unit weights. Reinforce the roof if required.



**Figure 6. Ground Level Installation**

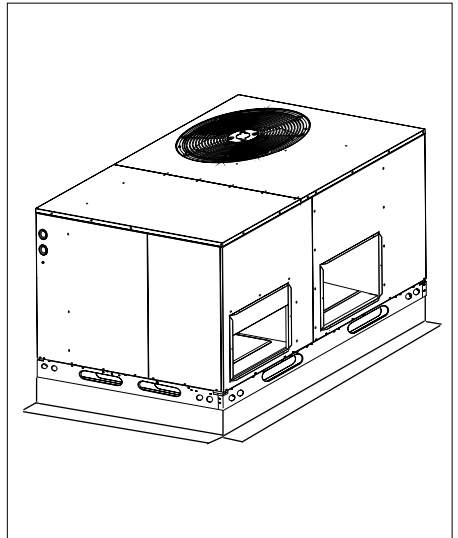
## **AIR DUCTS**

This unit is designed only for use with a supply and return duct. Air ducts should 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.

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. On roof curb installations 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.



**Figure 7. Roof Top Installation**

**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.

**Horizontal to Down flow 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. (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.

**Clearance** — These units are approved for 0 inch clearance.

## ELECTRICAL WIRING

**General** — Electrical power wiring must be made in accordance with all applicable local codes and ordinances, and with the current revision of the National Electric Code NFPA 70 or in Canada CSA C.22.1 - Canadian Electrical Code Part 1. If any of the original wire as supplied with the unit must be replaced, it must be replaced with material of the same gage and temperature rating.

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**WARNING:**

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**To avoid the 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 power supply.**

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**Line Voltage** — Before proceeding with the electrical connections, make certain that the voltage, frequency, and phase of the supply source are the same as those specified on the unit rating plate. Also verify that the service provided by the utility is sufficient to handle the additional load imposed by this equipment.

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

Use a separate branch electrical circuit for this unit. A means of electrical disconnect must be located within sight of and readily accessibility to the unit. Internally mounted circuit breakers are available as field installed options. These circuit breakers can be used as an electrical disconnect.

The unit is shipped from the factory wired for 240 volt transformer operation. For 208 volt operation, remove the lead from the transformer terminal marked 240V and connect it to the terminal marked 208V. For maximum ampacity and over current protection, see the unit rating plate.

Provide power supply (or supplies) for the unit in accordance with the unit wiring diagram, and the unit rating plate. Connect the line-voltage leads to the corresponding terminals on the contactor (or the circuit breaker when the field installed circuit breaker kits are used) inside the control compartment. Use only copper wire for the line voltage power supply to this unit. Use proper code agency listed conduit and a conduit connector for connecting the supply wires to the unit and for obtaining proper grounding. Grounding may also be accomplished by using the grounding lug provided in the control box.

# Basic Air-Flow Setting

1/2 HP Motor					1/2 HP Motor					3/4 HP Motor								
SWITCH				Nominal	SWITCH				Nominal	SWITCH				Nominal				
CFM	1	2	3		4	CFM	1	2		3	4	3.0	CFM	1	2	3	4	4.0
720	0	0	0	0	2 T O N	1080	0	0	0	1	3 T O N	1395	0	0	0	1	4 T O N	5 T O N
800	0	0	0	1		1200	0	0	0	0		1485	1	0	0	1		
810	1	0	0	1		1215	1	0	0	1		1550	0	0	0	0		
880	0	0	1	0		1260	0	1	0	1		1620	0	1	0	1		
<b>900</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>		1320	0	0	1	0		1650	1	0	0	0		
945	0	1	0	1		1350	1	0	0	0		1705	0	0	1	0		
990	1	0	1	0		1395	1	1	0	1		1710	1	1	0	1		
1035	1	1	0	0		1400	0	1	0	0		<b>1800</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>		
1050	0	1	0	0		<b>1485</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>		1815	1	0	1	0		
1150	1	1	0	0		1540	0	1	1	0		1900	1	1	0	0		
1155	0	1	1	0	1550	1	1	0	0	1980	0	1	1	0				
1265	1	1	1	0	1705	1	1	1	0	2090	1	1	1	0				

Note: 1=ON. 0=OFF

Table 1. Air Flow Selection for Variable Speed Motors

## WARNING:

The unit cabinet must have an uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur. This ground may consist of electrical wire or approved conduit when installed in accordance with existing national or local codes.

**Selecting Proper Airflow for Variable Speed Units** — Variable speed packaged heat pump units are 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 packaged heat pump units respond 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 packaged heat pump unit is configured by setting the selector switches and removing jumper connectors as directed below. **IMPORTANT! This packaged heat pump unit has been designed to give the installer maximum flexibility to optimize system performance, efficiency, and comfort. Because there are so many different ways to set up the packaged heat pump unit it is important to read and follow these directions carefully.**

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: 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: 0=Off, 1=On

Table 3. Delay Settings (all models)

**Selecting the Basic Cooling/Heat Pump Airflow—** The basic cooling/heat-pump airflow is selected by setting switches 1 through 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 1 shows the basic airflow values versus the airflow selector switch settings. Table 1 also shows the range of basic air flow settings recommended for each nominal system capacity.

**NOTE:** 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 humidity control can be found in the sections labeled "Humidistat" and "Delay Setting".

**NOTE:** If coil icing is observed, the basic cooling/heat-pump airflow selected may be too low. Double-check to be sure the setting selected is within the range shown in Table 1. Also check to be sure the system is properly charged (see charging charts). 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.

Reference Table 2 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 Table 2.

**Selecting the Delay Profile—** The delay profile is selected by setting switches 7 and 8 (see Table 3). 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 of the packaged heat pump unit the system can be optimized for energy efficiency, humidity control, and comfort.

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 be 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. "Delay B" also provides a 90 second "off" delay at 50% airflow. Select the delay profile which is most suited to the application.

The "De-Hum." delay profile may be used when humidity control is desired without the use of the optional humidistat. If the "De-Hum." delay profile is selected, the air handler will run at 75% airflow for the first 10 minutes of each cooling cycle. If the "De-Hum." delay profile is selected, the basic cooling/heat-pump speed should be selected at or near the top of the range for that nominal capacity (see Table 1).

## 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. Remove jumper connector installed between the two terminals marked "HUM" on the circuit board.

**Installation—** 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..

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## CAUTION:

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**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.**

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Check all factory wiring per the unit wiring diagram and inspect the factory wiring connections to be sure none loosened during shipping or installation.

**Comfort Alert™ Diagnostics – Faster Service And Improved Accuracy** — The Comfort Alert diagnostics module is a breakthrough innovation for troubleshooting heat pump and air conditioning system failures. 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 guides the service technician more quickly and accurately to the root cause of a problem.

**NOTE: This module does not provide safety protection! The Comfort Alert module is a monitoring device and cannot shut down the compressor directly.**

### LED Description (Figure 10)

**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. The ALERT LED will flash a number of times consecutively, pause and then repeat the process. The number of consecutive flashes, defined as the Flash Code, correlates to a particular abnormal condition. Detailed descriptions of specific ALERT Flash Codes are shown in two tables.

**TRIP LED (Red):** indicates there is a demand signal from the thermostat but no current to the compressor is detected by the module. The TRIP LED typically indicates the compressor protector is open or may indicate missing supply power to the compressor.

**Compressor Wire Routing** – The scroll compressor's run (R), common (C) and start (S) wires are routed through the holes in the comfort Alert module marked "R," "C" and "S." the

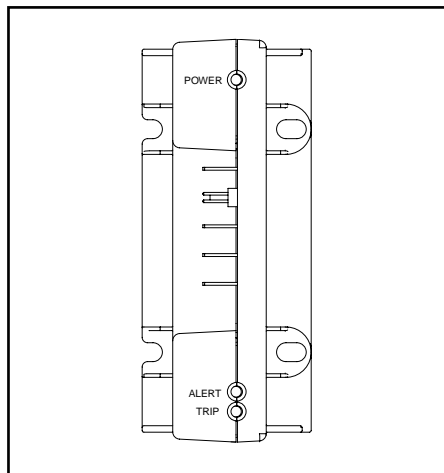
common (C) wire need not be routed through the module for it to operate properly.

## UNIT MAINTENANCE

### Thermostat Second Stage Cooling Wiring

This Comfort Alert module requires a two stage thermostat to operate properly. The Y2 thermostat wire coming into the outdoor 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. Whenever the compressor is not running, Comfort Alert will



**Figure 10. Comfort Alert Module**

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 select 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 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.

## DC SOL Connection

The two pin DC SOL connector provides a connection to the Copeland UltraTech second stage compressor solenoid. This solenoid is internal to the compressor. This 24VDC solenoid 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 LEDs

When an abnormal system condition occurs, the Comfort Alert module displays the appropriate ALERT and/or TRIP LED. The yellow ALERT 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. Every time the module powers up, the last ALERT Flash Code that occurred prior to shut down is displayed for one minute.

## Installation Verification

To verify the installation of Comfort Alert is correct, two functional tests can be performed. Disconnect power from the compressor and force a thermostat call for cooling. The red Trip LED should turn on indicating a compressor trip as long as 24VAC is measured at the Y terminal. If the red LED does not function as described, refer to **Figure 9a** to verify the wiring.

Disconnect power from the compressor and 24VAC from Comfort Alert. Remove the wire from the Y terminal of Comfort Alert, reapply 24VAC power to Comfort Alert and reconnect power to the compressor. Force a thermostat call for cooling and when the compressor starts to run the yellow Alert LED will begin flashing a Code 8 indicating a Welded Contactor. Disconnect power from the compressor and 24VAC from Comfort Alert. While Comfort Alert is off, reattach the wire to the Y terminal. Reapply power to compressor and 24VAC to Comfort Alert, the yellow Alert LED will flash the previous code 8 for 1 minute and then turn off. If the yellow LED does not function as described, refer to Figure 9a to verify the wiring.

## Troubleshooting The Installation

Depending on the 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.

## Low Voltage Connections

**Room Thermostat** — Several options are available for a room thermostat depending on the accessories installed with the unit. Select a thermostat which operates in conjunction with the installed accessories. The thermostat should be mounted about five feet above the ground on an inside wall. The thermostat should be kept away from drafts, slamming doors, lamps, direct sunlight, or in line with the supply air flow.

To install the thermostat:

1. Position the sub base on an inside wall and mark the mounting holes and thermostat cable openings.
2. Cut out the cable opening and route the thermostat cable from the unit's low voltage compartment to the thermostat location. The thermostat cable is supplied by the installer.
3. Connect the cable leads to the sub base or thermostat terminals and to the unit's low voltage terminal block as shown in **Figure 8**. A system wiring diagram is also provided on the inside of the control panel cover.
4. Secure sub base or thermostat to the wall using screws provided with the thermostat.
5. If sub base is used, install the correct thermostat housing to sub base.
6. Refer to thermostat instruction sheet for complete detailed mounting information.

**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 three preprogrammed defrost curves on the board. A jumper pin is used to switch between the different curves. The factory default setting is program two. This is the recommended setting for most standard applications.

The standard defrost cycle will terminate after 13 minutes and 39 seconds or when the coil temperature reaches its terminate temperature, whichever comes first.

Status LED	Status LED Description	Status LED Trouble shooting Information
Green "POWER"	Module has power	Supply voltage is present at module terminals
Red "TRIP"	Thermostat demand signal "Y" is present, but the compressor is not running	<ol style="list-style-type: none"> <li>Compressor protector is open <ul style="list-style-type: none"> <li>Check for high head pressure</li> <li>Check compressor supply voltage</li> </ul> </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> </ol>
Yellow "ALERT" Flash Code 1	Long Run Time Compressor is running extremely long run cycles	<ol 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 air filter)</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>Compressor Second Stage Cooling Wiring <ul style="list-style-type: none"> <li>Solenoid plug not connected</li> <li>Y2 not wired at Comfort Alert</li> </ul> </li> <li>Thermostat is malfunctioning <ul style="list-style-type: none"> <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> </ol>
Yellow "ALERT" Flash Code 2	System Pressure Trip Discharge or suction pressure out of limits or compressor overloaded	<ol 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> <li>Condenser coil poor air circulation (dirty, blocked, damaged)</li> <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> <li>Return air duct has substantial leakage</li> <li>If low pressure switch present in system, check Flash Code 1 information</li> </ol>

Status LED	Status LED Description	Status LED Trouble shooting Information
<b>Yellow "ALERT"</b> <b>Flash Code 3</b>	<b>Short Cycling</b> Compressor is running only briefly	<ol style="list-style-type: none"> <li>1. Thermostat demand signal is intermittent</li> <li>2. Time delay relay or control board defective</li> <li>3. If high pressure switch present go to Flash Code 2 information</li> <li>4. If low pressure switch present go to Flash Code 1 information</li> </ol>
<b>Yellow "ALERT"</b> <b>Flash Code 4</b>	<b>Locked Rotor</b>	<ol style="list-style-type: none"> <li>1. Run capacitor has failed</li> <li>2. Low line voltage (contact utility if voltage at disconnect is low) <ul style="list-style-type: none"> <li>• Check wiring connections</li> </ul> </li> <li>3. Excessive liquid refrigerant in compressor</li> <li>4. Compressor bearings are seized <ul style="list-style-type: none"> <li>• Measure compressor oil level.</li> </ul> </li> </ol>
<b>Yellow "ALERT"</b> <b>Flash Code 5</b>	<b>Open Circuit</b>	<ol style="list-style-type: none"> <li>1. Outdoor unit power disconnect is open</li> <li>2. Compressor circuit breaker or fuse(s) is open</li> <li>3. 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> </ul> </li> <li>4. High pressure switch is open and requires manual reset</li> <li>5. Open circuit in compressor supply wiring or connections</li> <li>6. Unusually long compressor protector reset time due to extreme ambient temperature</li> <li>7. Compressor windings are damaged <ul style="list-style-type: none"> <li>• Check compressor motor winding resistance</li> </ul> </li> </ol>
<b>Yellow "ALERT"</b> <b>Flash Code 6</b>	<b>Open Start Circuit</b> Current only in run circuit	<ol style="list-style-type: none"> <li>1. Run capacitor has failed</li> <li>2. Open circuit in compressor start wiring or connections <ul style="list-style-type: none"> <li>• Check wiring and connectors between supply and the compressor "S" terminal</li> </ul> </li> <li>3. Compressor start winding is damaged <ul style="list-style-type: none"> <li>• Check compressor motor winding resistance</li> </ul> </li> </ol>
<b>Yellow "ALERT"</b> <b>Flash Code 7</b>	<b>Open Run Circuit</b> Current only in start circuit	<ol style="list-style-type: none"> <li>1. Open circuit in compressor run wiring or connections <ul style="list-style-type: none"> <li>• Check wiring and connectors between supply and the compressor "R" terminal</li> </ul> </li> <li>2. Compressor run winding is damaged <ul style="list-style-type: none"> <li>• Check compressor motor winding resistance</li> </ul> </li> </ol>
<b>Yellow "ALERT"</b> <b>Flash Code 8</b>	<b>Welded Contactor</b> Compressor always runs	<ol style="list-style-type: none"> <li>1. Compressor contactor has failed closed</li> <li>2. Thermostat demand signal not connected to module</li> </ol>
<b>Yellow "ALERT"</b> <b>Flash Code 9</b>	<b>Low Voltage</b> Control circuit < 17 VAC	<ol style="list-style-type: none"> <li>1. Control circuit transformer is overloaded</li> <li>2. Low line voltage (contact utility if voltage at disconnect is low) <ul style="list-style-type: none"> <li>• Check wiring connections</li> </ul> </li> </ol>

**Note:** Flash Code number corresponds to a number of LED flashes, followed by a pause and then repeated.  
TRIP and ALERT LEDs flashing at same time means control circuit voltage is too low for operation.

The defrost board is equipped with a 5 minute Anti-Short Cycle Delay (ASCD). The compressor will not turn on until the minimum 5 minute off time is reached.

The control contains a forced - defrost feature, which puts the system into defrost mode every 6 ours and 4 minutes, unless the coil temperature is above 40° F.

The system can be manually put into a forced 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 or when the coil temperature is above the terminate set-point or when the “Y” input is removed, whichever occurs first.

**Field Installed Electric Heat** — These 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 noted in the instructions, 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 installation instructions that come as part of the heater kit. Follow all cautions and warnings as directed.

**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.

## START UP AND SYSTEM CHECK

### Pre-Start Check List

- Verify that the unit is level to allow proper condensate drainage.
- Verify that there is free airflow to and from the outdoor coil and that all clearance requirements are met.
- 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 all exterior panels are replaced and securely fastened.
- 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 switch set to “Off” and set the thermostat fan switch to “On.” The blower motor should run continuously. Check for air delivery at the register(s). Ensure that there are no obstructions at the registers or in the duct work. Set thermostat fan switch to “Auto.”

**Short Cycle Protection** — 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. Immediately lower the set point temperature of the thermostat to its original setting and verify that the indoor blower is energized. Verify that after approximately 5 minutes the compressor and fan energize and that the temperature of the discharge air is cooler than the room temperature. This is available only for the single phase models.

### System Cooling

1. Set the thermostat system switch to “Cool” and the thermostat fan switch to “Auto.” Gradually lower the thermostat temperature switch below room temperature and observe that the blower, compressor, and fan energize. Check that air cooler than room temperature is being discharged at the register. Listen for any unusual noises.

2. After allowing the unit to run for several minutes, set the temperature selector above room temperature.
  - The fan and compressor cycles off with the thermostat.
  - The blower should also stop unless fan switch is set to "ON" position.

**System Heating**— If the unit has been equipped with optional electric heater kits, set the system thermostat switch to HEAT and set the thermostat fan switch to AUTO. Verify that the compressor and outdoor fan are not energized but that the blower and heaters are. Check for warm air at the supply registers.

## UNIT MAINTENANCE

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 **WARNING:**

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**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.**

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**Refrigerant Charging** — Packaged heat pumps are fully charged at the factory. 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. Draw a vacuum on gauge lines to remove air before attaching them to the service ports on the unit. Refrigerant charging must be done by qualified personnel familiar with safe and environmentally responsible refrigerant handling procedures.

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 **WARNING:**

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**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.**

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 **CAUTION:**

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**Use care when removing parts from this unit. Personal injury can result from sharp metal edges present in all equipment of sheet metal construction.**

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**Routine Maintenance**— 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. At a minimum, routine maintenance should include the following:

1. Inspect and clean or replace air filters at the beginning of each heating and cooling season, or more frequently if required.
2. 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.
3. Inspect the electrical connections for tightness at the beginning of each heating and cooling season. Service as necessary.

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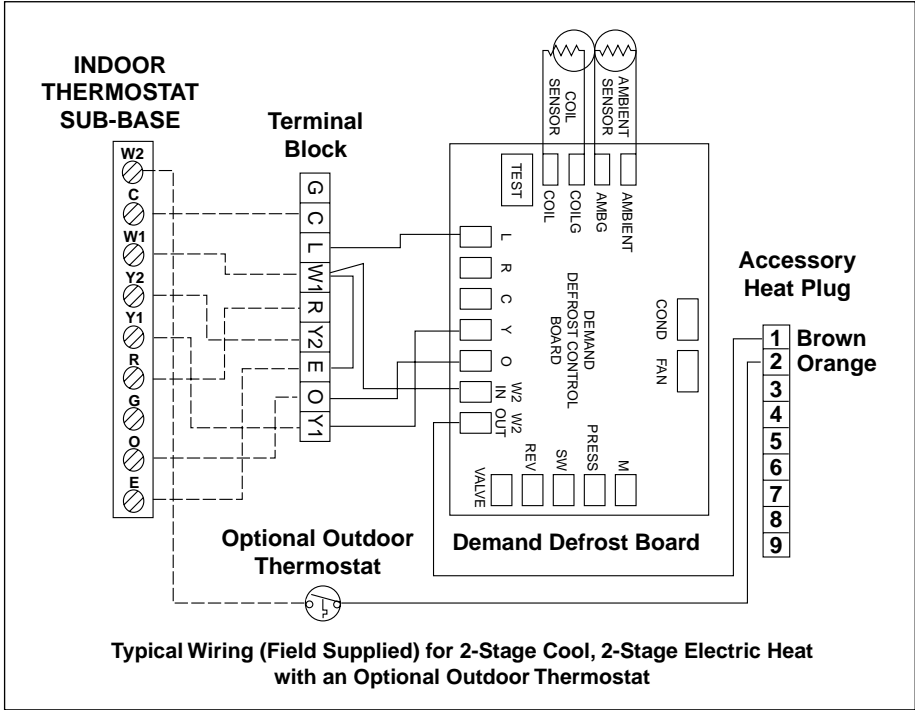
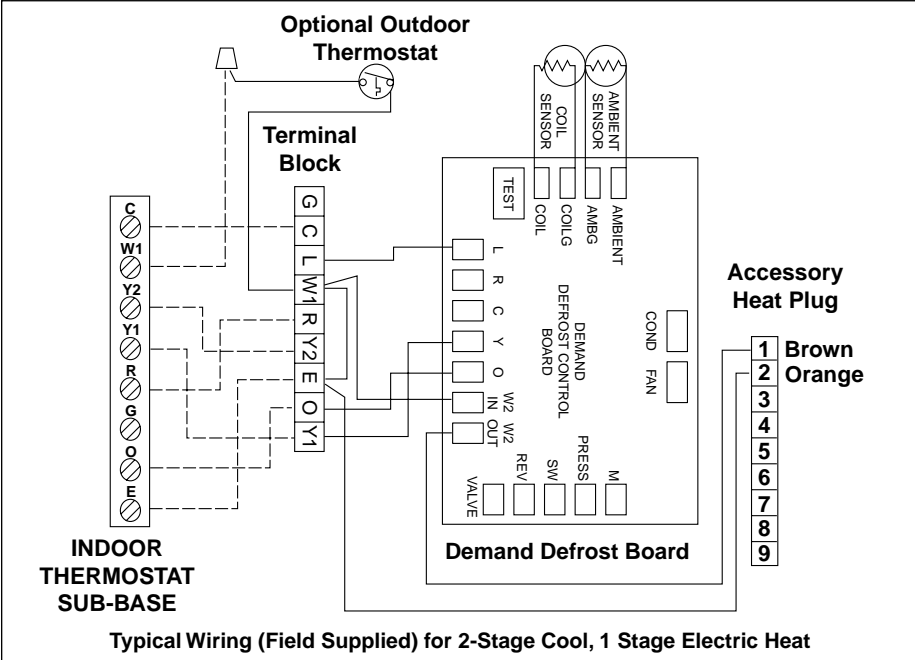
 **CAUTION:**

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

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4. 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.



**Figure 8. Typical Heat Pump Thermostat Connections**

### Convertible Packaged Heat Pump

#### 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.

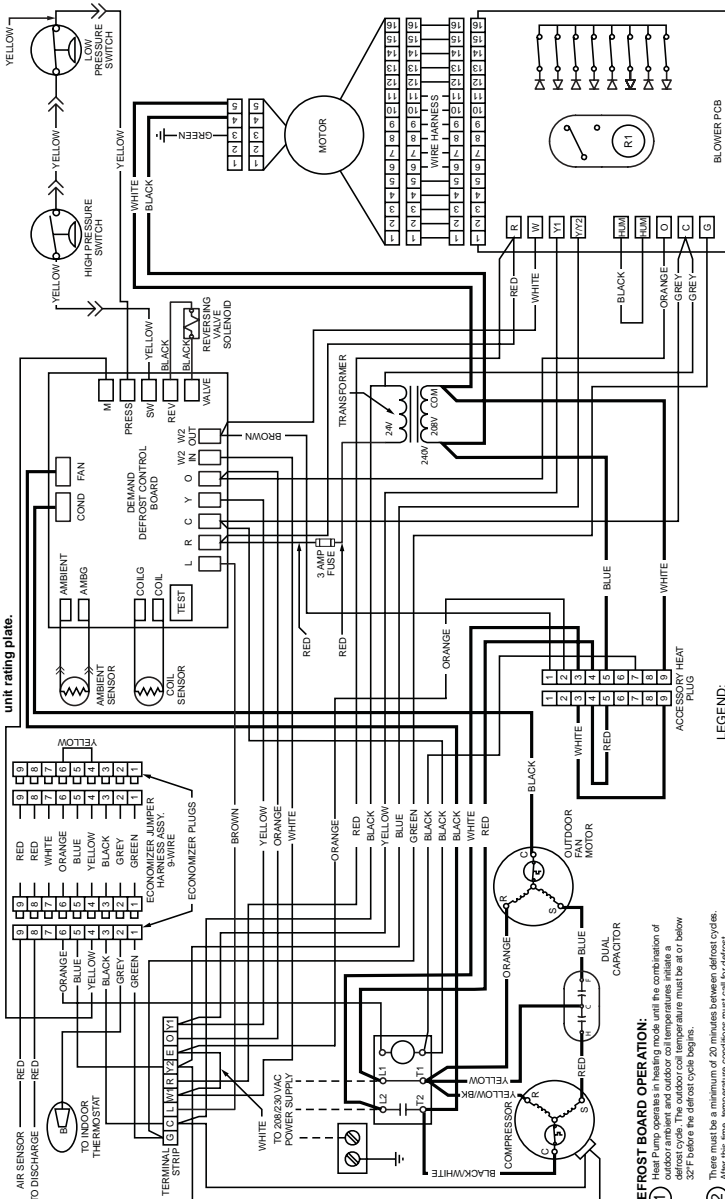
### 208/230 Volt

### Single Phase

### 60Hz.

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 l'entretien.
2. Employez uniquement des conducteurs en cuivre.
3. Ne convient pas aux installations de plus de 150V a la terre.



**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.

**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. The defrost cycle must terminate for 4.5 minutes before a defrost cycle is initiated.
- 3 The defrost cycle will terminate when the outdoor temperature reaches 32°F or the defrost terminate time of 13 minutes 35 seconds is reached.

7108420

Figure 9. Two Stage Cool, Two Stage Heat

# Convertible Packaged Heat Pump

208/230 Volt

Single Phase

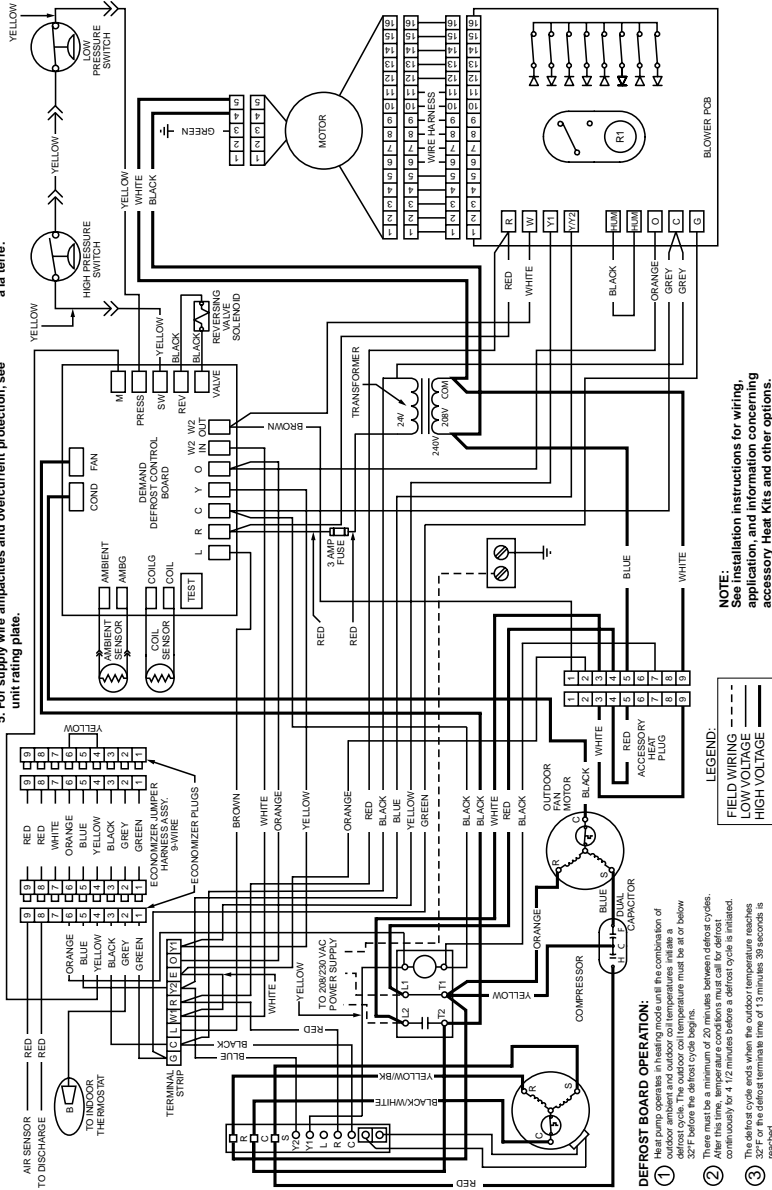
60Hz

**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 courant avant faire leretien.
8. employez uniquement des conducteurs en cuivre.
9. Ne convient pas aux installations de plus de 150V a la terre.



**NOTE:**  
See installation instructions for wiring applications and for the optional accessory Heat Kits and other options.

**LEGEND:**  
 --- FIELD WIRING  
 - - - ACCESSORY HEAT PLUG  
 - - - LOW VOLTAGE  
 - - - HIGH VOLTAGE

**DEFROST BOARD OPERATION:**  
 1. When the defrost board receives 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. After a minimum of 20 minutes between defrost cycles, the defrost board will terminate the defrost cycle.  
 3. The defrost cycle ends when the outdoor temperature reaches 32°F or the defrost terminate time of 13 minutes 38 seconds is reached.

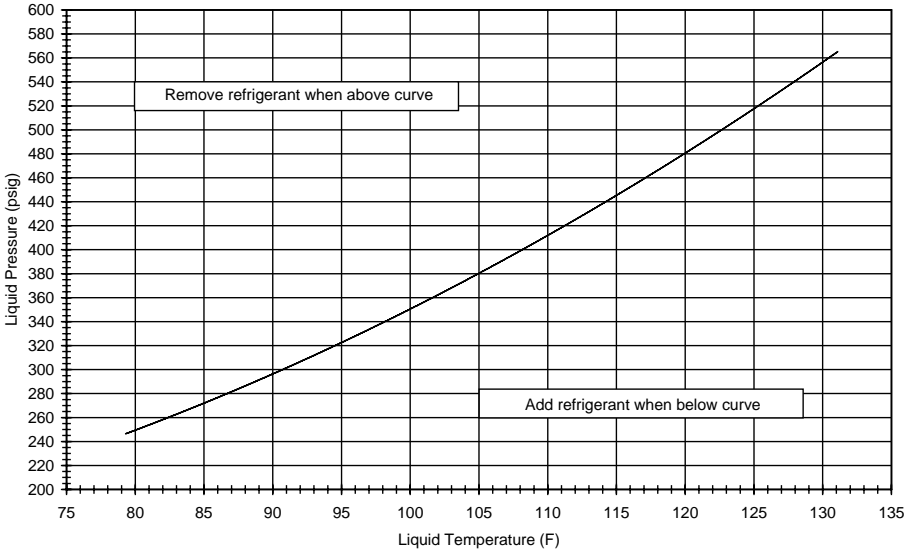
7108430

Figure 9a. Two Stage Cool, Two Stage Heat with Optional Comfort Alert

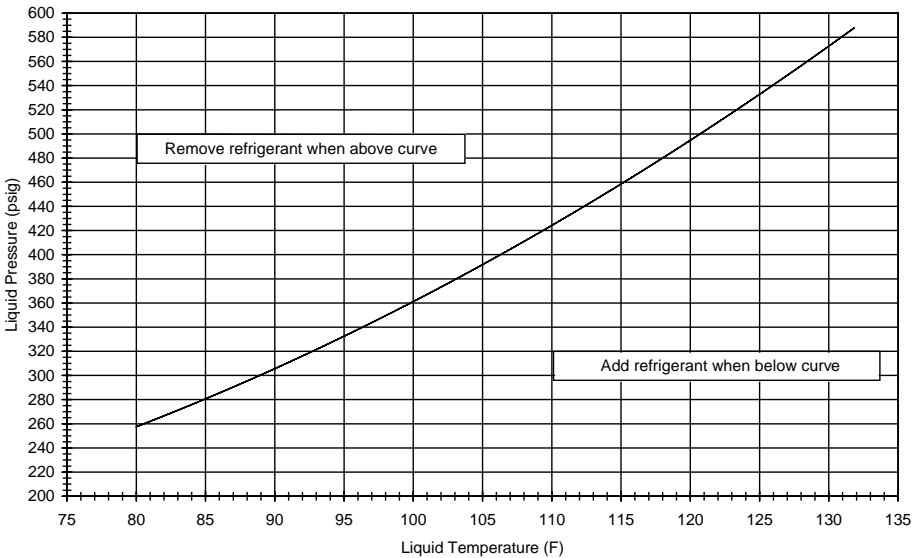
# CHARGING CHARTS COOLING - 14 SEER H.P.

## Q4SE-X24 Charging Chart

Q4SE-X24 Charging Chart - Cooling

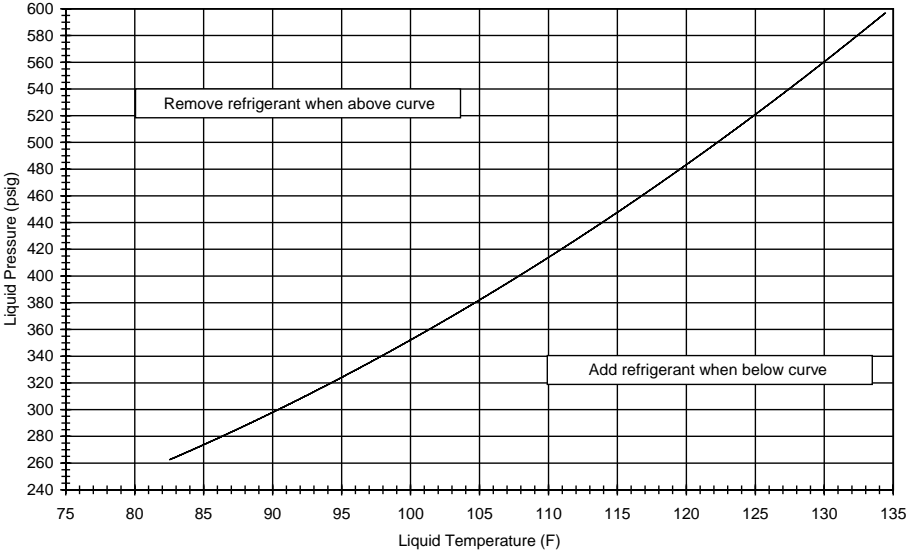


## Q4SE-X36 Charging Chart

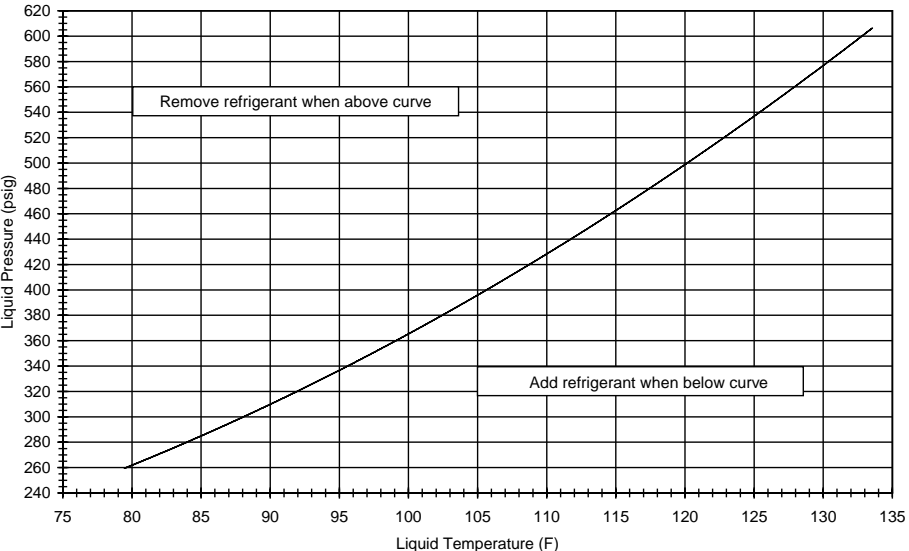


# CHARGING CHARTS COOLING - 14 SEER H.P. (CONTINUED)

## Q4SE-X48 Charging Chart



## Q4SE-X60 Charging Chart



**INSTALLER: PLEASE LEAVE  
THESE INSTALLATION  
INSTRUCTIONS WITH  
THE HOMEOWNER.**



**7089440** (Replaces 708626B)

Specifications and illustrations subject to change  
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