Q5RD SERIES **13 SEER**

USER's MANUAL & INSTALLATION INSTRUCTIONS

Single Package Heat Pump - Single Stage, R-410A

IMPORTANT

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

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

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

USER INFORMATION

IMPORTANT SAFETY INFORMATION

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

INSTALLER INFORMATION

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.

Operating 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.

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 (if installed). 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 defrost itself. This unit features Demand Defrost that monitors ambient and coil temperatures to regulate the defrost function accordingly.

At the beginning of the defrost cycle, both the outdoor condenser fan and compressor will turn off. After approximately 30 seconds, the compressor will turn on and begin to heat the outdoor coil causing the ice and snow to melt. **NOTE:** While the ice and snow is melting, steam may rise from the outdoor unit as the warm coil causes the melting frost to evaporate. When defrost is completed, the outdoor fan motor will start, and the compressor will turn off again. In approximately 30 seconds the compressor will start up again and continue normal operation.

System Shutdown

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.

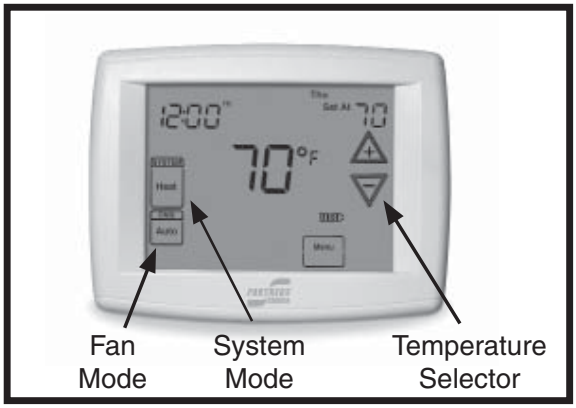

Figure 1. Digital Thermostat

IMPORTANT SAFETY INFORMATION

⚠ WARNING:

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

- The installer must comply with all local codes and regulations which govern the installation of this type of equipment. Local codes and regulations take precedence over any recommendations contained in these instructions. Consult local building codes and the National Electrical Code (ANSI CI) for special installation requirements.
- This equipment contains liquid and gaseous refrigerant under high pressure. Installation or servicing should only be performed by qualified trained personnel thoroughly familiar with this type equipment.
- All electrical wiring must be completed in accordance with local, state and national codes and regulations and with the National Electric Code (ANSI/NFPA 70) or in Canada the Canadian Electric Code Part 1 CSA C22.1.
- 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

Single packaged heat pumps are ready for easy and immediate installation and can be readily connected into the high static duct system of a home. This unit is completely assembled, wired, and run tested at the factory. **This heat pump is designed for outdoor installation only.** The only connections needed for installation are the supply and return ducts, the line voltage, and thermostat wiring. Use of components other than those specified may invalidate ARI Certification, Code Agency Listing, and limited warranty on the air conditioner.

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 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. Select a solid, level position, preferably on a concrete slab, slightly above the grade level, and parallel to the home. If possible, select a site for the unit that is as close as possible to the proposed return grille location. **DO NOT PLACE UNIT UNDER THE HOME.**
- The unit should be located with consideration of minimizing the length of the supply and return ducts. If practical, place the heat pump and its ducts in an area where they will be shaded from the afternoon sun, when the heat load is greatest.
- The length of the supply and return ducts should be kept to a minimum with no sharp radius bends.
- Overhead obstructions, poorly ventilated areas, and areas subject to accumulation of debris should be avoided. The hot condenser air must be discharged up and away from the home, and if possible, in a direction with the prevailing wind. Do not place the unit in a confined space. See Figure 9 & Table 4 (page 13) for unit dimensions.
- Sufficient clearance for unobstructed airflow through the outdoor coil must be maintained in order to achieve rated performance. See Figure 2 (page 5) for minimum clearances to obstructions.
- Consideration should also be given to availability of electric power, service access, noise, and shade.

Minimum Clearances

Minimum clearances MUST be maintained from adjacent structures to provide room for proper servicing and air circulation. DO NOT install unit in a confined or recessed area that will allow discharge air from the unit to re-circulate into the condenser air inlet, through the coil. See Figure 2.

Service Access Clearance:

Blower access panel side .....24”

Electrical compartment access panel side … 12”

Clearance between overhang and top of unit ..... 72”

Clearance around condenser coil area to wall or shrubs (excludes duct panel side) ...12”

Clearances to Combustibles:

Combustible base - wood or Class A, B, or C roof covering material ..... 0”

Supply & return air ducts..... 0”

Duct connection side..... 0”

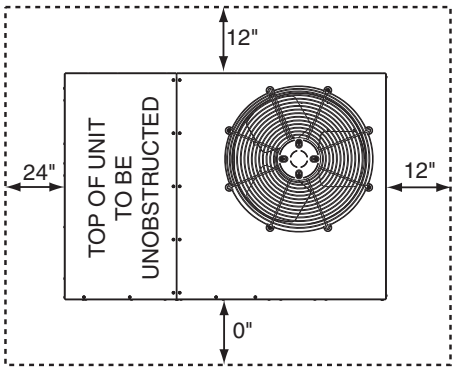

Figure 2. Minimum Unit Clearances

Air Duct System

Air ducts should be installed in accordance with the standards of the National Fire Protection Association “Standard 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 codes. NFPA publications are available by writing to: National Fire Protection Association, Batterymarch Park, Quincy, ME 02269 or visit www.NFPA.org on the web.

- Design the duct work according to methods described by the Air Conditioning Contractors of America (ACCA).
- The supply duct system, including the number and type of registers, will have much more effect on the performance of the system than any other factor. The duct must be sufficiently large to conduct an adequate amount of air to each register. See Figure 5 (page 7).
- Duct work should be attached directly to the unit flanges for horizontal applications.
- For highly resistive duct systems it may be necessary to add an additional return air duct and or supply to achieve maximum performance and prevent coil icing and refrigerant flood back.
- **The heat pump system will not cool or heat the home if air is lost to the outside through leaks in the duct system. Ducts that are collapsed or restricted by foreign objects will also prevent adequate air flow.**
- 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.

HEAT PUMP INSTALLATION

Unpacking the Unit

It is recommended that the unit be unpacked at the installation site to minimize damage due to handling.

⚠ CAUTION:

Do not tip the unit on its side. Oil may enter the compressor cylinders and cause starting trouble. If unit has been set on its side, restore to upright position and do not run for several hours. Then run unit for a few seconds. Do this three or four times with five minutes between runs.

1. Remove the bands from around the unit.
2. Unfold the top and bottom cap flanges.
3. Carefully remove the top cap and tube.

Installing Return & Supply Air Collars

If the supply and return collars are supplied with the unit, they will be located in the supply duct. They can be easily positioned over the unit openings (Figure 3, page 6) and secured with sheet metal screws.

- The diameter of the return duct collar is 14”. **NOTE:** 2 ton units are designed with 12” returns.
- The diameter of the supply duct collar is 12”.
- Before permanently installing the collars, it is recommended you pre-fit them over the openings first to determine best fit and alignment.

Supply Duct

1. Assemble the collar by overlapping the two ends. **NOTE:** One end of the collar is slotted and the opposite end has two small holes. Position the end with small screw holes underneath the slotted end.

2. Fasten the collar ends with two self drilling sheet metal screws.
3. Position the collar over the opening and align the 4 holes in the collar with the 4 holes (or dimples depending on model) in the rear panel.
4. Using self-drilling screws (10-16x.5), secure the collar to the rear panel.

Return Duct

1. Assemble the collar by overlapping the two ends. **NOTE:** One end of the collar is slotted and the opposite end has two small holes. Position the end with small screw holes underneath the slotted end.
2. Fasten the collar ends with two self drilling sheet metal screws.
3. Position the collar over the opening. Align the four holes in the collar with the four dimples or holes (depending on unit model) in the panel.
4. Secure the collar to the rear panel using self drilling screws (10-16x.5).

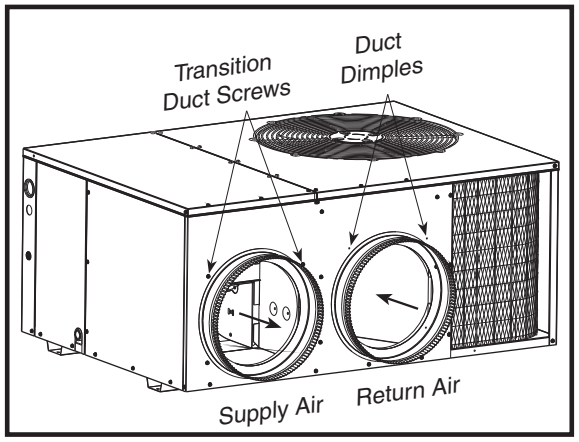

Figure 3. Return & Supply Air Collars

Connecting Return & Supply Air Flexible Ducts

- Flexible ducts may be cut to the required length and spliced with sheet metal sleeves and clamps. **Keep all ducts as short and straight as possible. Avoid sharp bends.** Please follow all instructions packed with duct.
- Flexible ducts can be secured to the corresponding collars with the provided clamps. After the inner duct is connected to the collar, pull the insulation and plastic sleeve over the connection and clamp. **NOTE:** To prevent a loss in cooling capacity, make sure all connections are tight.
- Homes with multiple supply ducts (or special applications), a Y fitting is available for dividing the supply air to different areas of the home for more efficient cooling. **NOTE:** For maximum performance, insulate the Y fitting.

Locating & Installing the Return Air Assembly

To simplify installation, locate and install the return air assembly first. If desired, the return opening can be located inside a closet with louvered doors that has an open area equal to or greater than a 12" x 20" grille. The return air grille can be placed in the wall of a closet and the ducted into the filter box through a boxed-in area at the closet floor level. **Make sure the filter is readily accessible.**

NOTE: The return air box with grille and filter (Figure 4) should not be located in heavy traffic areas like hallways or center of rooms. A good spot is in a corner or under a table, if a minimum two inch clearance is available.

1. Start the installation from under the home by cutting a small hole in the sub-floor. Determine how the floor joist location will affect cutting the opening needed for the return air box. **NOTE:** Floor joists are generally located on 16" centers, leaving 14-3/8" between joists.
2. After measuring the return air box (approximately 12-1/4" x 20-1/4"), cut the hole through the floor so that the box will fit between the floor joists. Care should be taken when cutting through carpeting to avoid snags. **NOTE:** In most installations it will be necessary to cut a similar hole in the fiberboard directly under the hole in the floor. However, if the floor is more than ten inches deep, it will only be necessary to cut a hole for the collar on the return air box or for the insulated duct.
3. Set the box into the opening and fasten with screws or nails.
4. Put the filter and return air grille in place.

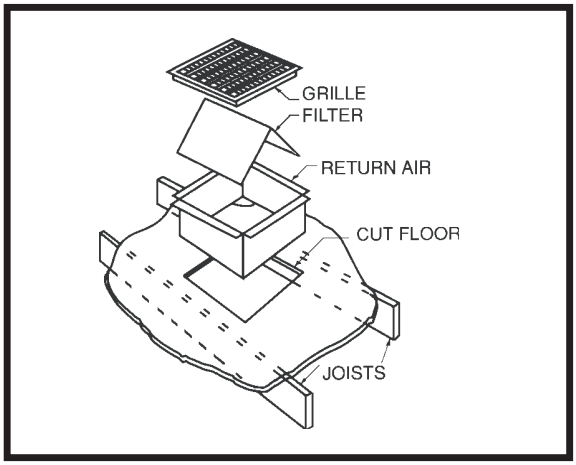

Figure 4. Return Air Box

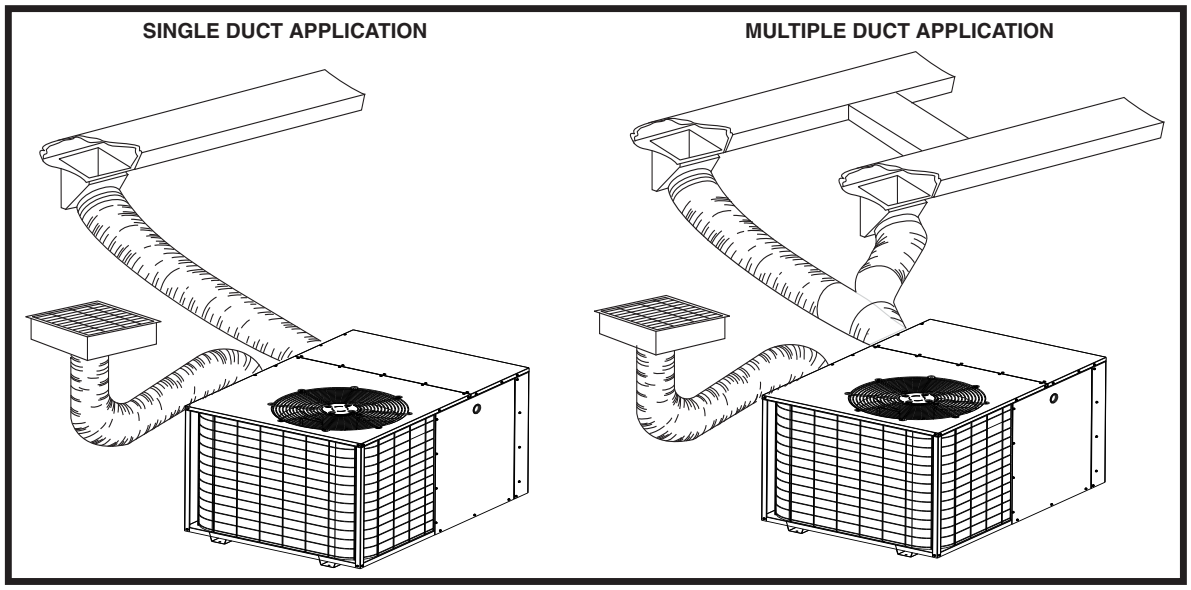

Figure 5. Typical Duct Applications

Locating & Installing the Supply Damper(s)

When locating the supply damper(s), carefully check floor joists and frame members that could interfere with the installation of the damper or flexible duct. Ideally, the damper (Figure 6) should be located in the bottom of the main duct, forward of center of the home, at least three feet from the nearest register. The round supply opening in the slanted side of the damper should face the side of the home where the heat pump is located.

1. Locate the center of the heat duct by cutting a small hole in the fiberboard below the duct at the desired location.
2. Cut a hole approximately 3/4" larger than the damper opening in the fiberboard.
3. Cut a 9-1/8" x 13-1/8" hole in the duct and bend over all tabs flat on the inside of the heat duct.
4. Insert the damper into the duct and bend over all tabs flat on the inside of the heat duct.
5. Seal the opening between the fiberboard and damper or flexible duct.

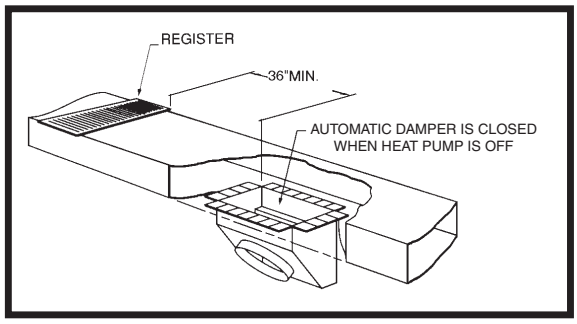

Figure 6. Supply Damper

Condensate Drainage

A 3/4" condensate fitting extends out of the side of the unit as shown in Figure 7. The drain trap, shipped in the electrical compartment, must be installed to prevent water from collecting inside the unit.

1. Thread the elbow provided with the unit into the drain connection until hand tight.
2. Connect the condensate tubing onto the fitting, forming a trap near the drain connection. See Figure 7.
3. Route the condensate tube from the trap to a suitable drain. **NOTE:** For proper drainage, make sure the trap is level to the ground and tubing outlet is below trap level.

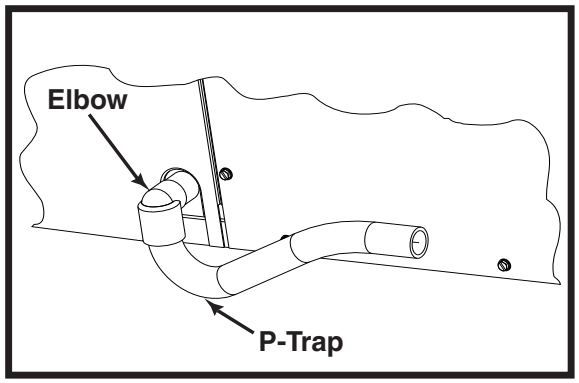

Figure 7. Drain Trap

⚠ WARNING:

To avoid electric shock, personal injury, or death, turn off the electric power at the disconnect or the main service panel before making any electrical connections.

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

Pre-Electrical Checklist:

√ Verify that the voltage, frequency, and phase of the supply source match the specifications on the unit rating plate.

√ Verify that the service provided by the utility is sufficient to handle the additional load imposed by this equipment. Refer to the unit wiring label for proper high and low voltage wiring.

√ Verify factory wiring is in accordance with the unit wiring diagram (Figures 10 & 11, pages 20 & 21). Inspect for loose connections.

Line Voltage

- It is recommended that the line voltage to the unit be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the unit.
- **An electrical disconnect must be located within sight of and readily accessible to the unit.** This switch shall be capable of electrically de-energizing the outdoor unit. See unit data label for proper incoming field wiring. Any other wiring methods must be acceptable to authority having jurisdiction.
- 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. Extend leads through power wiring hole (Figure 8). Connect **L1** & **L2** directly to the contactor.
- Use only copper wire for the line voltage power supply to this unit as listed in Table 1. Use proper code agency listed conduit and a conduit connector for connecting the supply wires to the unit. Use of rain tight conduit is recommended.
- See the unit wiring label for proper high and low voltage wiring. Make all electrical connections in accordance with all applicable codes and ordinances. See Figures 10 & 11 (pages 20 & 21)

⚠ CAUTION:

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

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

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

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

Table 1. Copper Wire Size

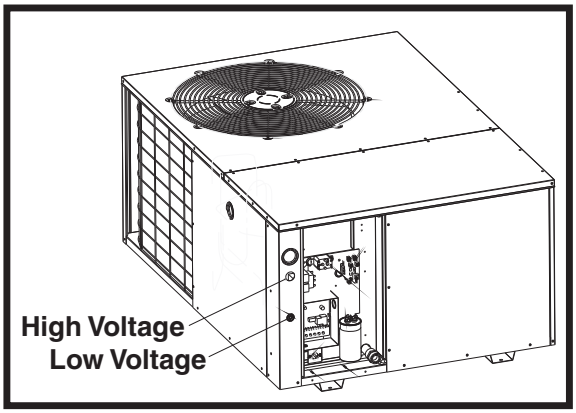

Figure 8. Power Entry

Overcurrent Protection

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. Generally, the best fuse or breaker for any heat pump is the smallest size that will permit the equipment to run under normal usage and provide maximum equipment protection. Properly sized fuses and breakers also prevent nuisance trips during unit startup. **If a fuse blows or a breaker trips, always determine the reason. Do not arbitrarily install a larger fuse or breaker and do not, in any case, exceed the maximum size listed on the data label of the unit.**

Blower Speed

For optimum system performance and comfort, it may be necessary to change the factory speed setting. See Table 2 for factory settings.

⚠ WARNING:

To avoid electric shock, personal injury, or death, turn off the electric power at the disconnect or the main service panel before making any electrical connections.

1. Disconnect all electrical power to the unit and remove the service panel.

⚠ CAUTION:

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

⚠ CAUTION:

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

2. Verify the required speed from the airflow data found in Table 2. Place appropriate wire on the appropriate motor speed tap for the required airflow.
3. Check all factory wiring per the unit wiring diagram and inspect the factory wiring connections to be sure none loosened during shipping or installation.

Model Q5RD	Wire Color / Speed Tap	Motor Speed	Air Flow (0.3 In. WC)
024K	T6	Low	490
	Black/T5	Med †	802
	T4	High	1133
030K	Red	Low	770
	Black	High †	1064
036K	T1	Low	750
	Red/T2	Med/Low **	1000
	Orange/T3	Medium *	1140
	T4	Medium/High	1300
	T5	High	1450
042K	T1	Low	1340
	Orange/T2	Med/Low *	1450
	Red/T3	Medium **	1500
	T4	Medium/High	1650
	T5	High	1970
048K	T1	Low	1340
	Red/T2	Med/Low **	1450
	Orange/T3	Medium *	1500
	T4	Medium/High	1650
	T5	High	1970
060K	T1	Low	1300
	T2	Med/Low	1400
	T3	Medium**	1500
	T4	Medium/High*	1650
	T5	High	1950

* Denotes Factory Set Low Speed Cooling/ Heating
** Denotes Factory Set High Speed Cooling/ Heating
*** Denotes Factory Set Electric Heating Speed

Table 2. Motor Lead Connection

Thermostat Connections

- The heat-cool thermostat is equipped with a system HEAT-COOL switch, which provides a positive means of preventing simultaneous operation of the heating and cooling units. The thermostat is also equipped with an ON-AUTO fan switch which allows the home owner to operate the indoor blower when air circulation is desired.
- Connect the low voltage wires to the respective terminals on the thermostat base (Figure 12, page 22). See thermostat instruction sheet for more detailed wiring information.
- The thermostat should be mounted about 5 feet above the floor on an inside wall. DO NOT install the thermostat on an outside wall or any other location where its operation may be adversely affected by radiant heat from fireplaces, sunlight, or lighting fixtures, and convective heat from warm air registers or electrical appliances. Refer to the thermostat manufacturer's instruction sheet for detailed mounting information.

Defrost Cycle Control

The Demand Defrost controls the defrost cycle in response to an adaptive demand algorithm that uses coil temperature and ambient temperature. It provides user selectable defrost termination temperatures (50° F - 80° F coil temperature).

Electric Heat Package (optional)

This heat pump is shipped without an auxiliary electric heat kit installed. If electric heat is desired, an accessory Heater Kit must be field installed. Refer to Table 2 (page 9) for blower speeds.

- Select the correct size heat package for the installation. See specifications sheet for available kits and application. Install the heater kit according to the to the installation instructions provided with the kit.
- Installation is most easily accomplished before making duct or electrical connections.

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.

STARTUP & ADJUSTMENTS

Pre-Start Checklist

The following check list should be observed prior to starting the unit.

√ Is the unit level? Unit should be level or slightly slanted toward the drain for proper condensate drainage.

√ Is the unit installed with the proper clearances as listed in Figure 2 (page 5)?

√ Is the wiring correct according to the wiring diagram and electrical codes?

√ Are all the wiring connections tight? Check the condenser fan to make sure it turns freely.

√ Is the overcurrent protection properly sized?

√ Is the thermostat wired correctly? Is it installed in a proper location?

Start-Up Procedure

The control circuit consists of an anti-short cycle timer that will not let the compressor re-start before 5 minutes have elapsed.

1. Set the system mode to OFF and the temperature mode to its highest setting.
2. Turn power on at the disconnect switch.
3. Set the system mode to ON or COOL.
4. Set the temperature mode below room temperature. Verify that the indoor blower, outdoor fan, and compressor energize and the cooling function starts.
5. Verify the discharge air grilles are adjusted and the system air is balanced.
6. Verify the duct work has no air leaks.
7. Verify the condensate drain is installed correctly and functions properly.
8. Set the temperature mode above room temperature. The unit should stop.
9. Instruct the homeowner on unit and thermostat operation and filter servicing.

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 ducts for leaks or obstruction if insufficient air is detected.

Set the thermostat fan mode to AUTO. The blower should stop running.

System Heating

Set the thermostat system mode to HEAT and the fan mode to AUTO. Change the thermostat temperature selector above the existing room temperature and check for the discharge of warm air at the supply registers.

System Cooling

Set the thermostat's system mode to COOL and the fan mode to AUTO. Change the thermostat

temperature selector below the existing room temperature. Allow the cooling system to operate for several minutes and check for the discharge of cool air at the supply registers.

Short Cycle Protection

The control circuit is equipped with a time-delay feature for protection against short cycling. With the system operating in the cooling mode, gradually raise the thermostat temperature setting until the whole system de-energizes. Immediately lower the thermostat temperature to the original setting and verify that the indoor blower is energized. After approximately 5 minutes the compressor and the outdoor fan will energize.

Emergency Heat

(Available only when Electric heat is supplied) Set the thermostat's system mode to EM HT and the fan mode to either AUTO (intermittent air) or to ON (continuous air). Change the thermostat's temperature selector above the existing room temperature and check the following:

1. The thermostat auxiliary heat light (RED) should be on.
2. The heat pump compressor and the fan should not run; low voltage circuit remains energized.
3. The blower will run according to the thermostat's fan mode setting.

Defrost Test Procedure

1. Terminals **R** & **C** must have 18 - 30V between them for defrost sequences to initiate.
2. With thermostat in heat mode (**Y** connected to **R**), short (and hold) the TEST pins together. **NOTE:** This energizes the reversing valve to initiate a forced defrost, bypass the ASCD, and allow the high stage compressor to turn on immediately (if the REMOVE FOR NO DELAY jumper at **P6** is removed). If the jumper at **P6** is installed, the compressor will energize after a 30 second delay.
3. Remove the short on the TEST pins.

- If the Coil temperature is above the Terminate Temperature setting, the defrost cycle will terminate (reversing valve de-energizes).
- If the coil temperature is below the Terminate Temperature setting, the defrost cycle will continue for 14 minutes (or until the coil temperature rises above the Terminate Temperature setting). Short the TEST pins for 1 second or more to force the control out of defrost and back to heating mode (reversing valve de-energized). Compressor will start immediately (if the REMOVE FOR NO DELAY jumper is removed). **NOTE:** If the jumper is installed, the compressor will energize after a 30 second delay.

Anti Short Cycle Timer Test

The 5 minute time delay feature can be bypassed by shorting the TEST pins together.

Heating Mode

When the TEST pins are shorted together for more than 1 second, the control will switch between defrost mode and heating mode.

Cooling Mode

When the TEST pins are shorted together for more than 1 second, the Anti Short Cycle Timer will be bypassed.

Adjustment of Refrigerant Charge

⚠ CAUTION:

The Q5RD heat pump contains liquid and gaseous refrigerant under pressure. Adjustment of refrigerant charge should only be attempted by qualified, trained personnel thoroughly familiar with the equipment and safe responsible refrigerant handling procedures. 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.

- The unit must be charged while both first and second stages are operating.
- 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. See refrigerant charging charts for cooling mode operation (Tables 5 - 10, pages 14 - 16).

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 (° F) at the service valve.
3. For the temperature measured, determine the required liquid refrigerant pressure from the appropriate charging charts.

- 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.

- 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 as shown on the unit rating plate. Use the charging charts for heating mode of operation as a guide (Tables 11 - 16, pages 17 - 19). Tables reflect conditions at high speed operation. Unit charge MUST be verified in cooling season.
3. Verify the unit is operating properly according to the System Heating section on page 10.

COMPONENT FUNCTIONS

Low Pressure Switch

The low pressure switch is factory installed and located in the suction line internal to the unit. The switch is designed to protect the compressor if a loss of charge occurs. Under normal conditions, the switch is closed.

If the suction pressure falls below 5 psig, then the switch will open and de-energize the unit. The switch will close again once the suction pressure increases above 20 psig. The low pressure switch interrupts the thermostat inputs to the unit. **NOTE:** When the switch opens and then closes, there will be a 5 minute short cycling delay before the unit can energize.

High Pressure Switch

The high pressure switch is factory installed and located in the compressor discharge line internal to the unit. The switch is designed to de-energize the system when very high pressures occur during abnormal conditions. Under normal conditions, the switch is closed.

If the discharge pressure rises above 650 psig, the switch will open and de-energize the unit. The switch will close again once the discharge pressure decreases to 460 psig. The high pressure switch interrupts the thermostat inputs to the unit. **NOTE:** When the switch opens and then closes, there will be a 5 minute short cycling delay before the unit can energize.

UNIT MAINTENANCE

⚠ WARNING:

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

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

- Inspect and clean or replace air filters at the beginning of each heating and cooling season, or more frequently if required.
- Inspect the condensate drain and outdoor coil at the beginning of each cooling season. Remove any debris. Clean the outdoor coil 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.

⚠ CAUTION:

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

- Do not attempt to add additional oil to motors unequipped with oil tubes. The compressor is hermetically sealed at the factory and does not require lubrication.

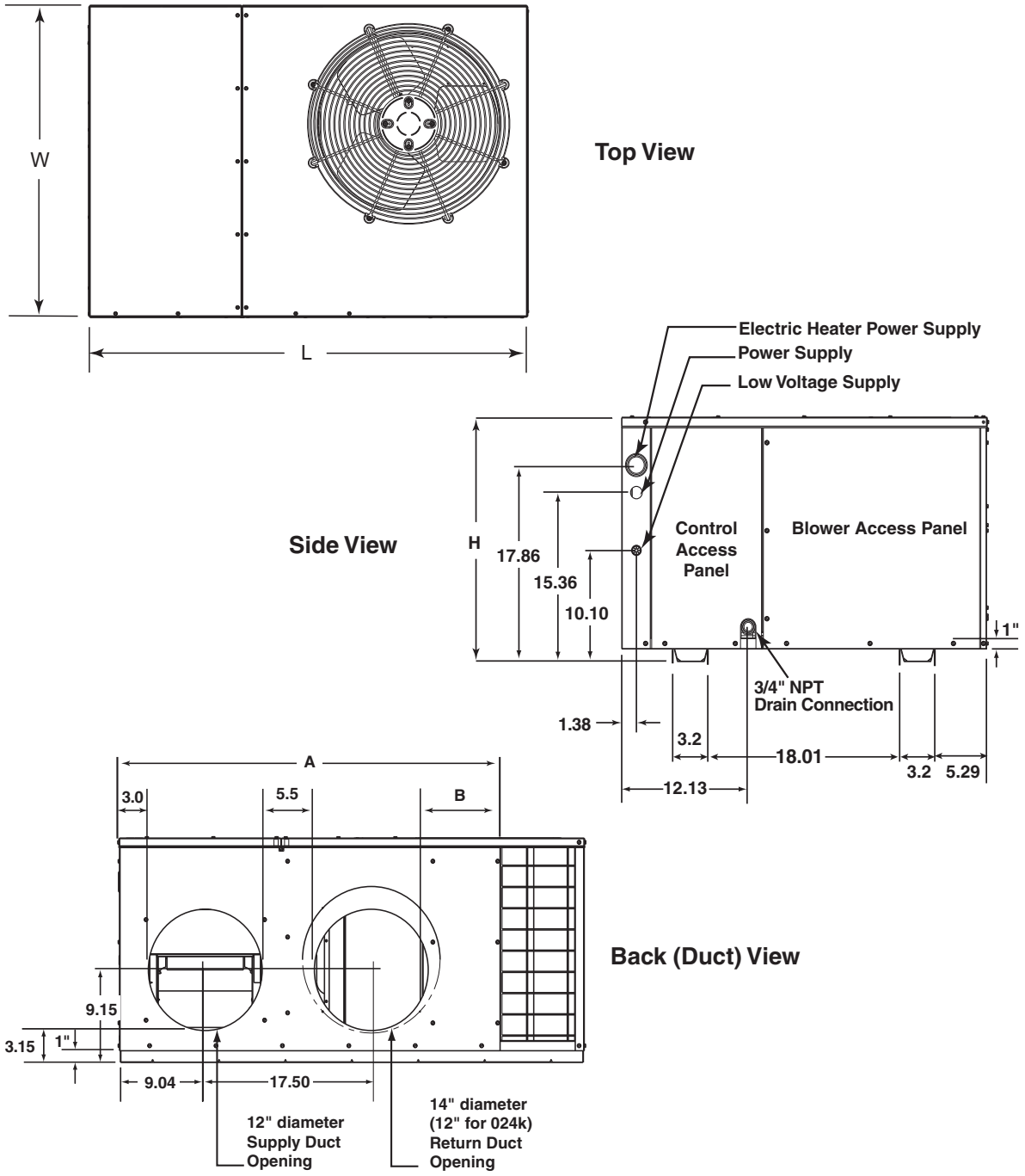

Figure 9. Q5RD Unit Dimensions

Q5RD-	Length (L)	Width (W)	Height (H)	A	B
024K	49	35	22.2	40.15	7.61
030K	49	35	30.2	40.15	7.61
036K	49	35	30.2	35.02	2.48
042K	49	35	30.2	35.02	2.48
048K	49	35	34.2	35.02	2.48
060K	49	35	38.2	35.02	2.48

Table 4. Q5RD Physical Data

REFRIGERANT CHARGING TABLES - COOLING MODE

Shaded boxes indicate flooded conditions.

Rated design values. The suction pressure will be lower than design value if indoor air flow, entering dry bulb, or entering wet bulb temperature are lower than design.

1. All pressures are listed psig and all temperatures in °F
2. Discharge temperatures greater than charted values indicate an undercharged system.

Suct. Press.	OUTDOOR TEMPERATURE (° F)															
	70		75		80		85		90		95		100		105	
	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
136	260	136														
138	262	142	283	140												
140	265	147	285	145	306	143										
142	270	146	288	150	309	148	330	147								
144	274	148	293	150	311	153	332	152	353	151						
146			296	154	315	155	334	156	355	155	376	155				
148					319	158	338	159	357	160	378	159	399	159		
150							342	163	361	163	380	163	401	163	422	163
152							345	167	364	167	383	167	403	167	424	167
154									368	171	387	171	406	171	426	170
156											390	175	410	175	429	175
158													413	179	432	179
160															436	183
162																

Table 5. Charging Table for Q5RD-024K Series (2 Ton Units)

Suct. Press.	OUTDOOR TEMPERATURE (° F)															
	70		75		80		85		90		95		100		105	
	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
139	258	115														
141	260	121	281	121												
143	262	126	283	126	304	126										
145	266	129	285	131	306	131	327	132								
147	269	131	289	134	308	136	329	136	350	137						
149			292	137	312	139	331	141	352	142	373	143				
151					315	143	334	145	354	146	375	147	396	148		
153							338	148	357	150	377	151	398	152	419	154
155							341	152	361	154	380	155	400	156	421	157
157									364	158	384	159	403	161	423	161
159											387	163	407	165	426	166
161													410	169	430	170
163															433	175
165																

Table 6. Charging Table for Q5RD-030K Series (2.5 Ton Units)

REFRIGERANT CHARGING TABLES - COOLING MODE

Shaded boxes indicate flooded conditions.

Rated design values. The suction pressure will be lower than design value if indoor air flow, entering dry bulb, or entering wet bulb temperature are lower than design.

1. All pressures are listed psig and all temperatures in °F
2. Discharge temperatures greater than charted values indicate an undercharged system.

Suct. Press.	OUTDOOR TEMPERATURE (° F)															
	70		75		80		85		90		95		100		105	
	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
138	267	113														
140	269	118	290	119												
142	271	123	292	124	314	125										
144	272	131	294	129	316	130	337	131								
146	276	133	296	135	318	135	339	136	360	137						
148			300	138	320	140	341	141	362	142	384	143				
150					323	143	344	145	364	146	386	147	407	148		
152							347	148	367	150	388	151	409	152	430	154
154							351	152	371	154	391	155	411	156	432	157
156									374	158	395	159	415	161	434	161
158											398	163	418	165	439	166
160													422	169	442	171
162															445	175
164																

Table 7. Charging Table for Q5RD-036K Series (3 Ton Units)

Suct. Press.	OUTDOOR TEMPERATURE (° F)															
	70		75		80		85		90		95		100		105	
	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
134	269	129														
136	271	135	293	134												
138	274	140	295	139	316	138										
140	279	139	297	144	318	143	340	143								
142	282	142	302	145	320	148	342	148	363	148						
144			305	148	325	150	344	152	365	152	387	153				
146					328	154	348	155	367	156	389	157	410	157		
148							351	159	371	160	391	161	412	161	434	162
150							355	163	374	164	394	165	414	165	436	166
152									378	168	398	169	417	170	438	170
154											401	173	421	174	440	174
156													424	178	444	179
158															447	183
160																

Table 8. Charging Table for Q5RD-042K Series (3.5 Ton Units)

REFRIGERANT CHARGING TABLES - COOLING MODE

Shaded boxes indicate flooded conditions.

Rated design values. The suction pressure will be lower than design value if indoor air flow, entering dry bulb, or entering wet bulb temperature are lower than design.

1. All pressures are listed psig and all temperatures in °F
2. Discharge temperatures greater than charted values indicate an undercharged system.

Suct. Press.	OUTDOOR TEMPERATURE (° F)															
	70		75		80		85		90		95		100		105	
	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
133	280	143														
135	282	149	305	147												
137	285	154	307	152	330	151										
139	290	153	309	157	332	156	355	155								
141	293	156	314	158	334	160	357	159	380	158						
143			318	161	339	163	359	164	382	163	405	163				
145					342	166	363	167	384	167	407	167	430	167		
147							367	170	388	171	409	171	432	171	455	171
149							370	174	391	175	412	175	434	175	457	175
151									395	179	416	179	437	179	459	178
153											419	183	440	183	461	183
155													444	187	465	187
157															468	191
159																

Table 9. Charging Table for Q5RD-048K Series (4 Ton Units)

Suc. Press.	OUTDOOR TEMPERATURE (° F)															
	70		75		80		85		90		95		100		105	
	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.	Liq. Press.	Dis. Temp.
124																
126	274	101														
128	276	112	295	111												
130	277	124	298	121	318	119										
132	279	129	300	131	320	128	340	128	360	130						
134	280	146	303	136	326	128	344	134	363	137	383	136				
136			304	150	327	141	350	133	367	145	387	142	406	141		
138					329	155	352	145	374	145	391	149	410	148	430	148
140							354	159	376	153	398	148	415	154	434	153
142									378	164	401	158	423	153	439	159
144											403	168	425	163	447	158
146													428	172	450	167
148															452	176
150																

Table 10. Charging Table for Q5RD-060K Series (5 Ton Units)

REFRIGERANT CHARGING TABLES - HEATING MODE:

Shaded boxes indicate flooded conditions.

Rated design values. The suction pressure will vary from design value if outdoor air flow, entering dry bulb, or entering wet bulb temperatures vary.

1. All pressures are listed psig and all temperatures in °F
2. Discharge temperatures greater than charted values indicate an undercharged system.

OUTDOOR TEMPERATURE (° F)																			
0			10			20			30			40			50			60		
Suc. Press	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.
37	209	114	51	232	121	65	254	127	78	277	133	94	292	142	110	322	154	127	353	165
38	216	112	52	238	119	66	259	125	79	281	131	95	299	140	111	329	149	128	360	159
39	223	110	53	244	117	67	264	123	80	284	129	96	306	137	112	336	145	129	367	153
40	230	108	54	250	115	68	269	121	81	288	127	97	313	134	113	343	140	130	374	147
41	237	106	55	255	113	69	274	119	82	292	125	98	320	131	114	350	136	131	381	140
42	244	104	56	261	111	70	278	117	83	295	123	99	327	128	115	357	131	132	388	134
43	251	102	57	267	109	71	283	115	84	299	121	100	334	125	116	364	127	133	395	128

Table 11. Charging Table for Q5RD-024K Series (2 Ton Units)

OUTDOOR TEMPERATURE (° F)																			
0			10			20			30			40			50			60		
Suc. Press	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.
47	226	137	55	235	134	62	245	130	69	254	126	85	260	131	109	286	143	134	313	155
48	233	135	56	241	132	63	250	128	70	258	124	86	267	128	110	293	138	135	320	149
49	240	133	57	247	130	64	254	126	71	262	122	87	274	125	111	300	134	136	327	143
50	247	131	58	253	128	65	259	124	72	265	120	88	281	122	112	307	129	137	334	137
51	254	129	59	259	126	66	264	122	73	269	118	89	288	119	113	314	125	138	341	130
52	261	127	60	265	124	67	269	120	74	273	116	90	295	117	114	321	120	139	348	124
53	268	125	61	271	122	68	274	118	75	276	114	91	302	114	115	328	116	140	355	118

Table 12. Charging Table for Q5RD-030K Series (2.5 Ton Units)

REFRIGERANT CHARGING TABLES - HEATING MODE:

Shaded boxes indicate flooded conditions.

Rated design values. The suction pressure will vary from design value if outdoor air flow, entering dry bulb, or entering wet bulb temperatures vary.

1. All pressures are listed psig and all temperatures in °F
2. Discharge temperatures greater than charted values indicate an undercharged system.

OUTDOOR TEMPERATURE (° F)																			
0			10			20			30			40			50			60		
Suc. Press	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.
34	216	127	49	234	128	63	251	129	78	269	130	93	275	135	109	294	145	124	313	154
35	223	125	50	240	126	64	256	127	79	272	128	94	282	133	110	301	140	125	320	148
36	230	123	51	246	124	65	261	125	80	276	126	95	289	130	111	308	136	126	327	142
37	237	121	52	251	122	66	266	123	81	280	124	96	296	127	112	315	131	127	334	136
38	244	119	53	257	120	67	270	121	82	283	122	97	303	124	113	322	127	128	341	129
39	251	117	54	263	118	68	275	119	83	287	120	98	310	121	114	329	122	129	348	123
40	258	115	55	269	116	69	280	117	84	291	118	99	317	118	115	336	118	130	355	117

Table 13. Charging Table for Q5RD-036K Series (3 Ton Units)

OUTDOOR TEMPERATURE (°. F)																			
0			10			20			30			40			50			60		
Suc. Press	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.
33	217	136	48	239	137	63	261	138	78	283	139	92	295	144	107	319	154	121	343	163
34	224	134	49	245	135	64	266	136	79	287	137	93	302	141	108	326	149	122	350	157
35	231	132	50	251	133	65	271	134	80	290	135	94	309	139	109	333	145	123	357	151
36	238	130	51	257	131	66	275	132	81	294	133	95	316	136	110	340	140	124	364	145
37	245	128	52	262	129	67	280	130	82	298	131	96	323	133	111	347	136	125	371	139
38	252	126	53	268	127	68	285	128	83	301	129	97	330	130	112	354	131	126	378	133
39	259	124	54	274	125	69	290	126	84	305	127	98	337	127	113	361	127	127	385	126

Table 14. Charging Table for Q5RD-042K Series (3.5 Ton Units)

REFRIGERANT CHARGING TABLES - HEATING MODE:

Shaded boxes indicate flooded conditions.

Rated design values. The suction pressure will vary from design value if outdoor air flow, entering dry bulb, or entering wet bulb temperatures vary.

1. All pressures are listed psig and all temperatures in °F
2. Discharge temperatures greater than charted values indicate an undercharged system.

OUTDOOR TEMPERATURE (° F)																			
0			10			20			30			40			50			60		
Suc. Press	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.
33	218	127	46	236	129	59	254	131	72	272	133	87	285	139	105	315	148	122	346	158
34	225	125	47	242	127	60	259	129	73	276	131	88	292	136	106	322	144	123	353	151
35	232	123	48	248	125	61	264	127	74	279	129	89	299	133	107	329	139	124	360	145
36	239	121	49	254	123	62	268	125	75	283	127	90	306	131	108	336	135	125	367	139
37	246	119	50	259	121	63	273	123	76	287	125	91	313	128	109	343	130	126	374	133
38	253	117	51	265	119	64	278	121	77	290	123	92	320	125	110	350	126	127	381	127
39	260	115	52	271	117	65	283	119	78	294	121	93	327	122	111	357	121	128	388	121

Table 15. Charging Table for Q5RD-048K Series (4 Ton Units)

OUTDOOR TEMPERATURE (° F)																			
0			10			20			30			40			50			60		
Suc. Press	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.	Suc. Press.	Liq. Press.	Dis. Temp.
31	203	134	44	233	139	57	264	143	70	294	148	84	313	162	100	344	186	116	375	210
32	210	132	45	239	137	58	269	141	71	298	146	85	320	159	101	351	182	117	382	204
33	217	130	46	245	135	59	273	139	72	302	144	86	327	156	102	358	177	118	389	198
34	224	128	47	251	133	60	278	137	73	305	142	87	334	154	103	365	173	119	396	192
35	231	126	48	257	131	61	283	135	74	309	140	88	341	151	104	372	168	120	403	186
36	238	124	49	263	129	62	288	133	75	313	138	89	348	148	105	379	164	121	410	180
37	245	122	50	269	127	63	293	131	76	316	136	90	355	145	106	386	159	122	417	173

Table 16. Charging Table for Q5RD-060K Series (5 Ton Units)

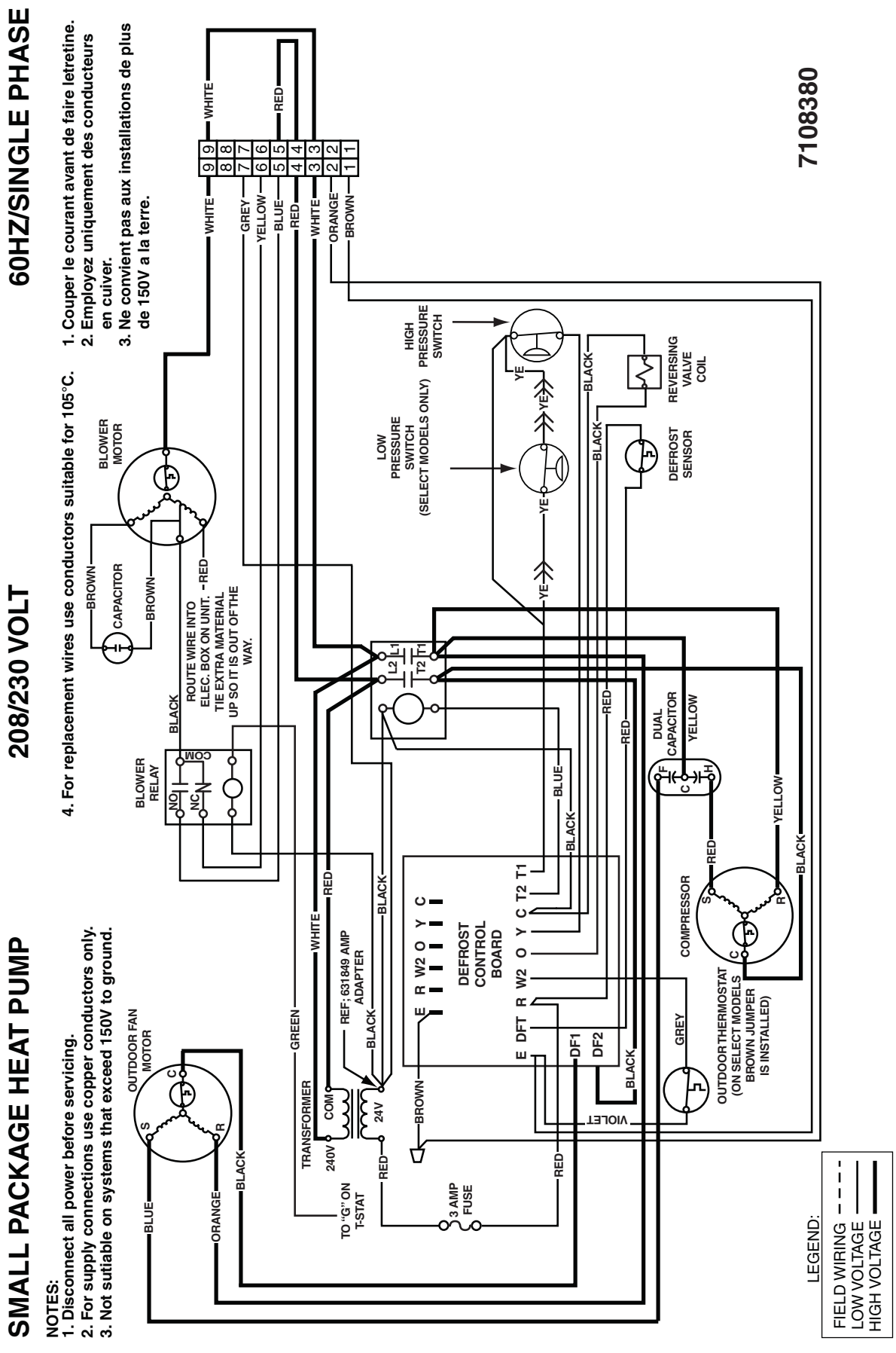

Figure 10. Q5RD / PPH2RD Series Wiring Diagram - 2 & 2.5 Ton Units

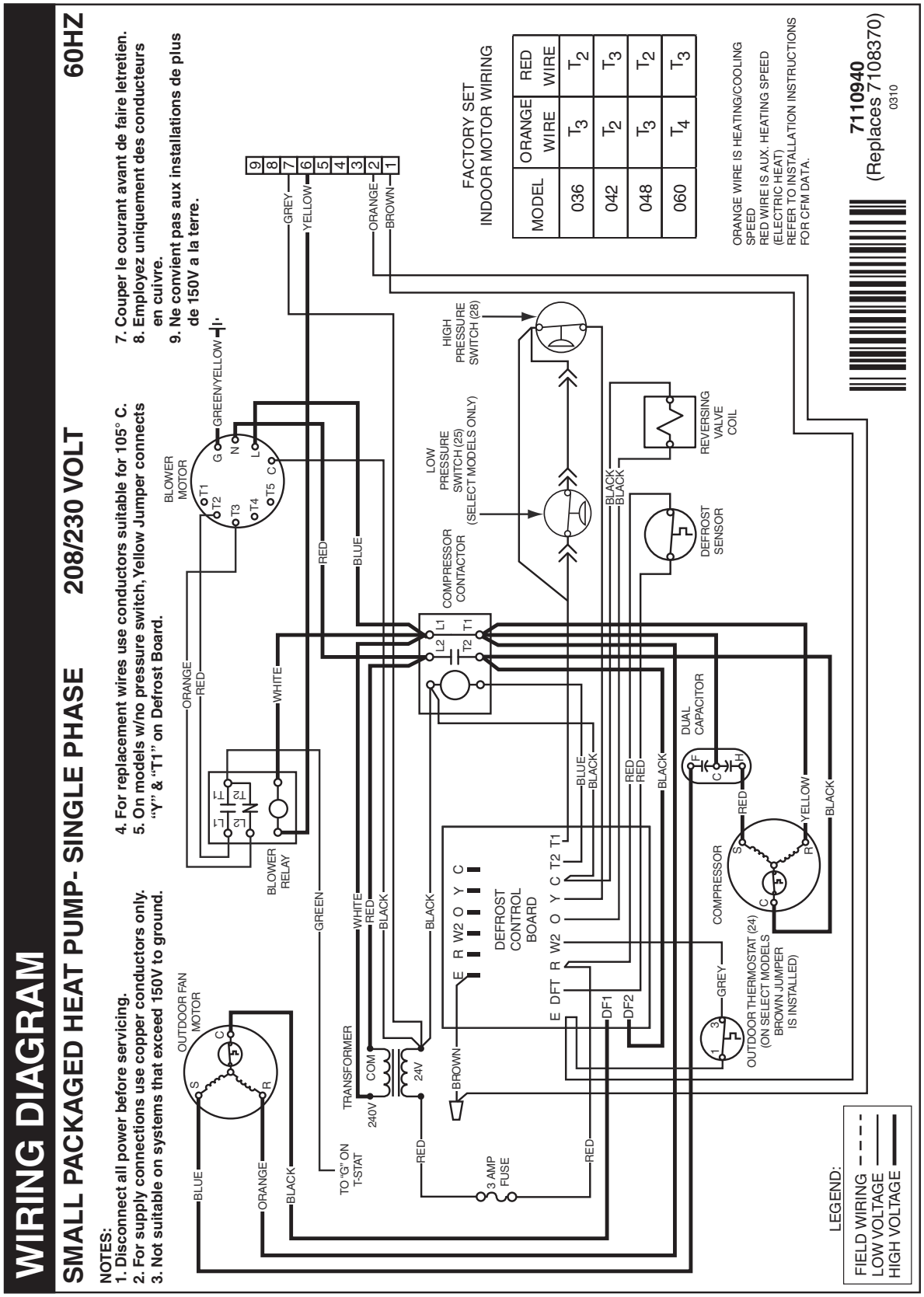

Figure 11. Q5RD / PPH2RD Series Wiring Diagram - 3, 4 & 5 Ton Units

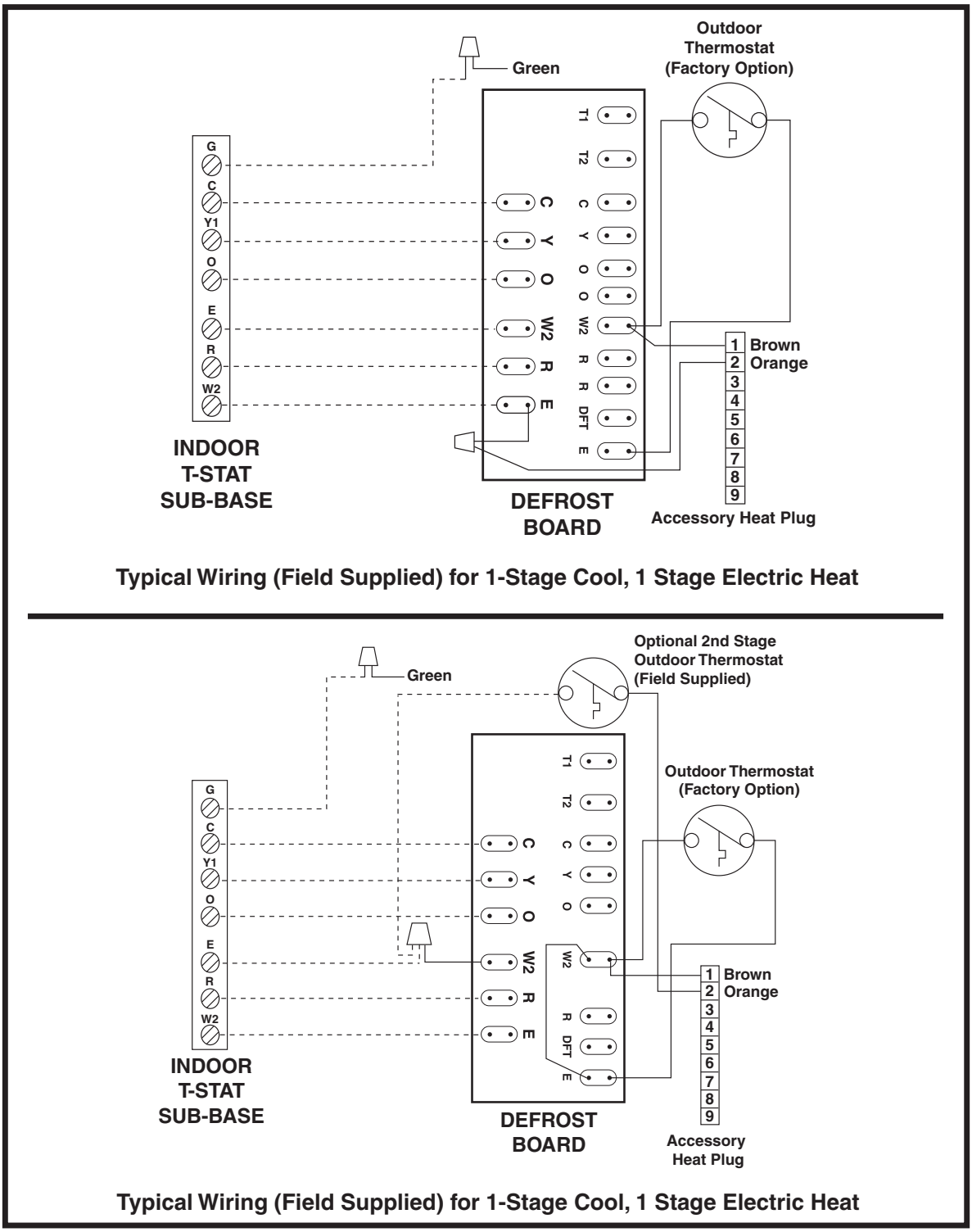

Figure 12. Typical Thermostat Connections

INSTALLATION / PERFORMANCE CHECK LIST

INSTALLATION ADDRESS:		
CITY _____	STATE _____	
UNIT MODEL # _____		
UNIT SERIAL # _____		
Unit Installed Minimum clearances per Figure 2 (page 5)?	YES	NO
INSTALLER NAME:		
CITY _____	STATE _____	

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.

⚠ WARNING:

PROPOSITION 65 WARNING: This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

REFRIGERATION SYSTEM:		
Was unit given 24 hr warm up period for crankcase heaters (if applicable)?	YES	NO
Stage-1 Liquid Pressure (high side) _____		
Stage-1 Suction Pressure (low side) _____		
Has the owner's information been reviewed with the customer?	YES	NO
Has the Literature Package been left with the unit?	YES	NO

ELECTRICAL SYSTEM:		
Electrical connections tight?	YES	NO
Line voltage polarity correct?	YES	NO
Rated Voltage: _____ VOLTS		
L1-L2 Volts: _____ VOLTS		
Avg. Volts: _____ VOLTS		
Max. deviation of voltage from avg. volts: _____ VOLTS		
% Volt imbalance: _____ VOLTS		
Blower Motor HP: _____ Sheave Setting _____ # Turns		
Has the thermostat been calibrated?	YES	NO
Is the thermostat level?	YES	NO
Is the heat anticipator setting correct? (If Applicable)	YES	NO

INSTALLER: PLEASE LEAVE THESE INSTALLATION INSTRUCTIONS WITH THE HOMEOWNER.

NORDYNE
COMPLETE COMFORT. GENUINE VALUE.

Specifications & illustrations subject to change without notice or incurring obligations.
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