

INSTALLATION INSTRUCTIONS

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



IMPORTANT

ATTENTION INSTALLERS:

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

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

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

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IMPORTANT SAFETY INFORMATION

Please read all instructions before servicing this equipment. Pay attention to all safety warnings and any other special notes highlighted in the manual. Safety markings are used frequently throughout this manual to designate a degree or level of seriousness and should not be ignored. **WARNING** indicates a potentially hazardous situation that if not avoided, could result in personal injury or death. **CAUTION** indicates a potentially hazardous situation that if not avoided, may result in minor or moderate injury or property damage.

WARNING:

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death or property damage. Improper servicing could result in dangerous operation, serious injury, death or property damage.

- Before servicing, disconnect all electrical power to the indoor blower.
 - When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.
 - Verify proper operation after servicing.
-

WARNING:

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

WARNING:

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

CAUTION:

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

WARNING:

The information listed below and on the next page 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.

- Before beginning the installation, verify that the unit model is correct for the job. The unit model number is printed on the data label.
- This equipment contains liquid and gaseous refrigerant under high pressure. **DO NOT USE ANY PORTION OF THE CHARGE FOR PURGING OR LEAK TESTING.** Installation or servicing should only be performed by qualified trained personnel thoroughly familiar with this type equipment.
- Installation of equipment may require brazing operations. Installer must comply with safety codes and wear appropriate safety equipment (safety glasses, work gloves, fire extinguisher, etc.) when performing brazing operations.
- This unit is designed for outdoor installations only and should be located in a position as shown on [page 4](#). Unit dimensions are shown in [Figure 11 \(page 13\)](#) & [Table 2 \(page 13\)](#).
- The installer should become familiar with the units wiring diagram before making any electrical connections to the unit. See the unit wiring label or [Figure 12 \(page 15\)](#), [Figure 13 \(page 16\)](#), & [Figure 14 \(page 17\)](#).
- 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.
- Use caution when handling this appliance or removing components. Personal injury can occur from sharp metal edges present in all sheet metal constructed equipment.

REQUIREMENTS & CODES

- All electrical wiring must be completed in accordance with local, state & national codes and regulations and with the National Electric Code (ANSI/NFPA 70) or in Canada the Canadian Electric Code Part 1 CSA C.22.1.
- 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.
- 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.
- Consult [Table 3 \(page 14\)](#), and the rating plate for the proper circulating air flow and temperature rise. It is important that the duct system be designed to provide the correct flow rates and external pressure rise. An improperly designed duct system can result in nuisance shutdowns, and comfort or noise issues.
- This unit is designed for outdoor installations only and should be positioned as described in Locating the Heat Pump.

GENERAL INFORMATION

This packaged heat pump is designed only for outdoor ground level installations and can be readily connected to the high static duct system of a home. This unit is completely assembled, wired, and run tested at the factory. The only connections needed for installation are the supply and return ducts, line voltage, thermostat wiring and the condensate drain.

This unit has been tested for capacity and efficiency in accordance with AHRI standards and will provide many years of safe and dependable comfort, providing it is properly installed and maintained. Use of components other than those specified may invalidate AHRI certification, Code Agency Listing, and limited warranty on the heat pump.

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 with no sharp radius bends. 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.

- Consideration should also be given to availability of electric power, service access, noise, and shade.
- 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 11 \(page 13\)](#) for unit dimensions.

Minimum Clearances

Sufficient clearance for unobstructed airflow through the outdoor coil must be maintained in order to achieve rated performance (except on supply & return duct (rear) side). However, 36” inches from blower access panel, electrical panel, and compressor panel is highly recommended for servicing and maintenance. For minimum clearances to obstructions, see [Figure 1](#). 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.

Service Access Clearance:

Blower and electrical control access panels.....	24”
Compressor compartment access panel.....	24”
Clearance from 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”

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.

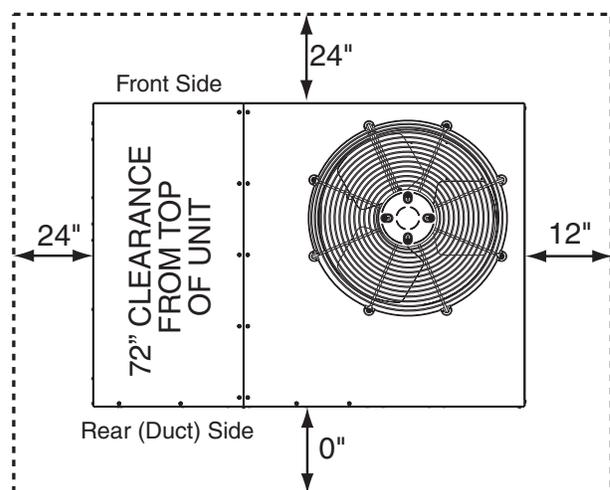


Figure 1. Minimum Unit Clearances

- 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 2](#).
- 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 or poor installation. 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.

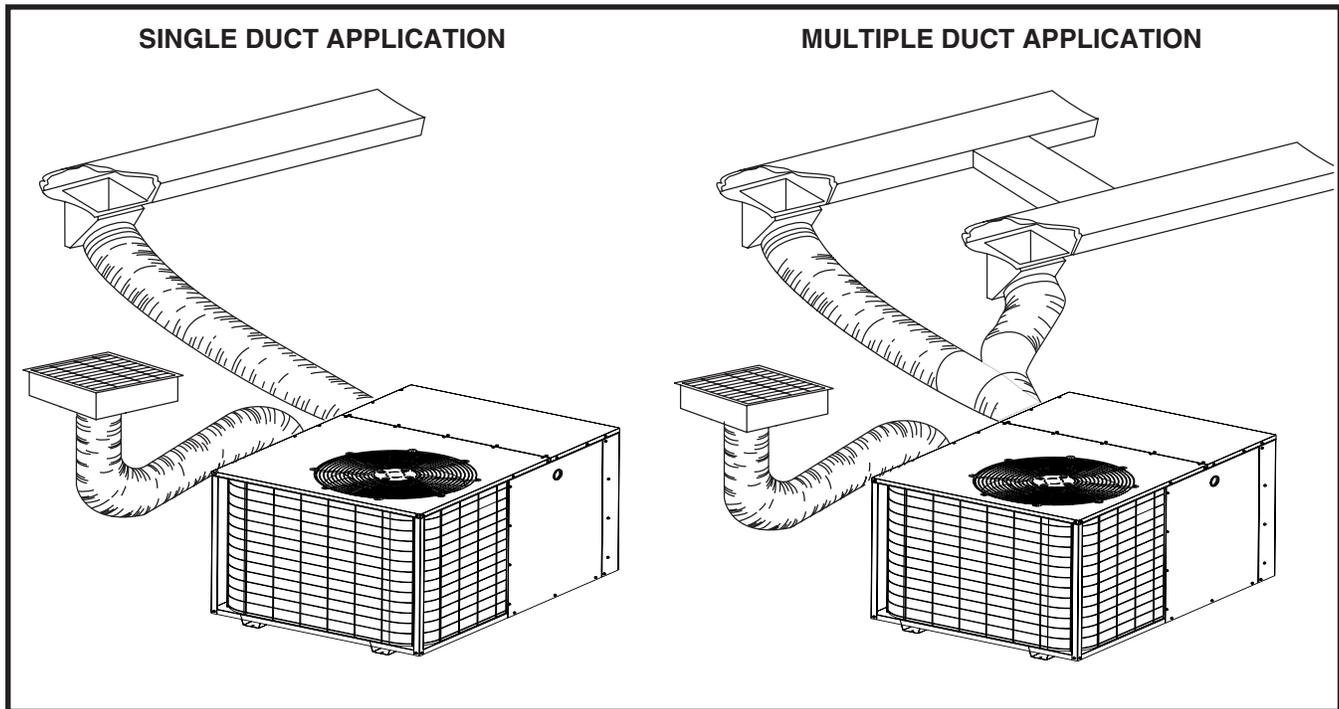


Figure 2. Single & Multiple Duct Applications

Rooftop Installation

Rooftop installations must follow local building codes or applicable safety codes and requirements:

- Prepare a supporting rack that is adequately designed to support and handle the unit weight and minimum wind loads, Reinforce the roof area for the installation if required. For unit weights, see [Table 2 \(page 13\)](#).
- The unit should be lifted using slings and spreader bars. Make sure the rigging slings and bars are in good shape and can withstand and handle the static and dynamic loads. Refer to [Table 2](#) for unit weights.
- The spreader bars are necessary for proper load stability and to prevent the unit's cabinet from being damaged. The slings should run thru the unit's bottom channels (see [Figure 3](#)) and should be adequately protected against cabinet metal edges. **NOTE:** Appropriate protection should be used between the strap and the sheet metal edge of the unit.
- The rigging must be located outside of the unit's center of gravity. Refer to [Figure 10 \(page 12\)](#) and [Table 2](#) for center of gravity locations.

CAUTION:

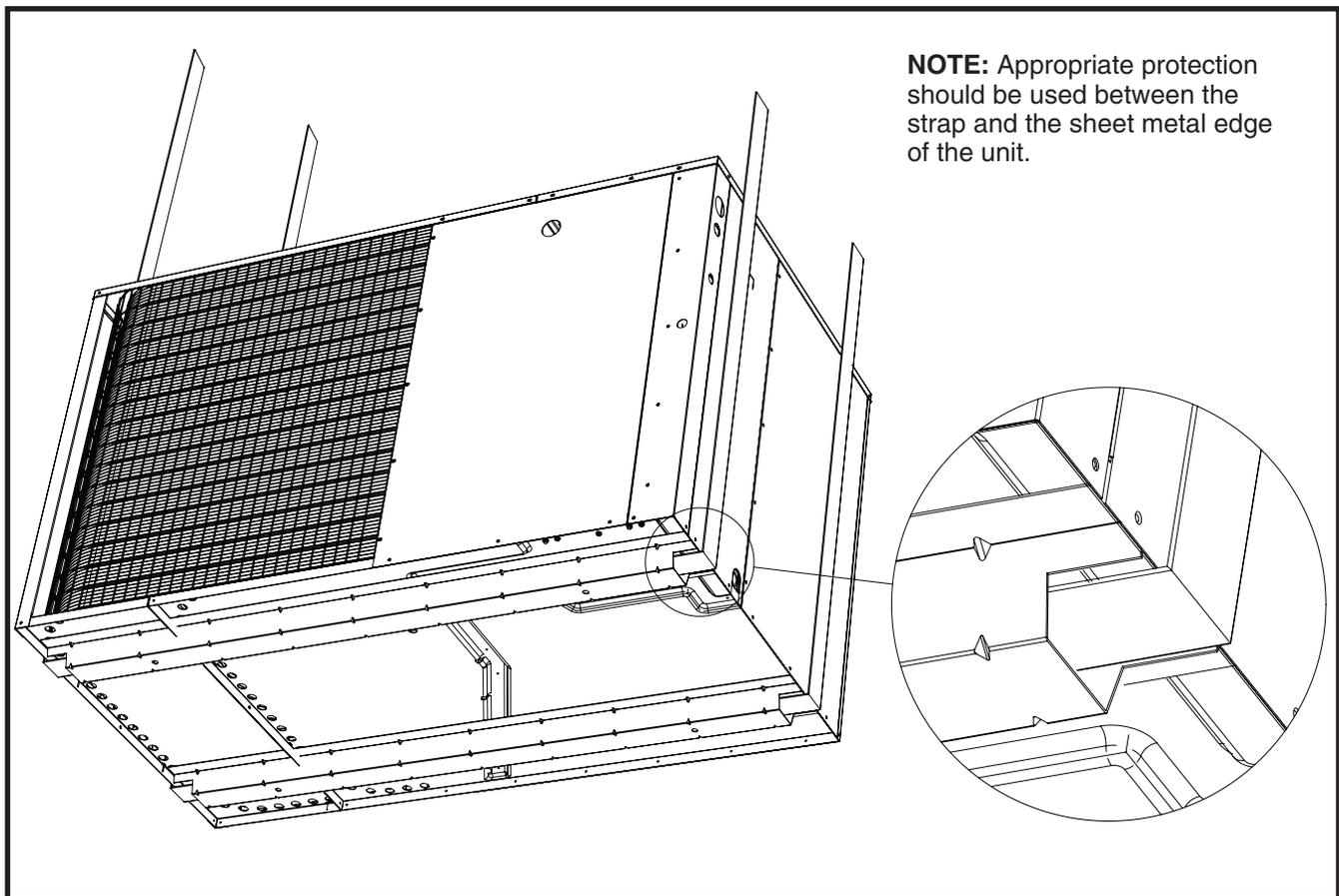
All panels must be securely in place when rigging and hoisting.

WARNING:

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

WARNING:

Never hoist the unit over people or stand below the rigged unit. The roof top unit must remain in an upright position all the time.



NOTE: Appropriate protection should be used between the strap and the sheet metal edge of the unit.

Figure 3. Slings and Bottom Channels

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 and cause damage.

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 (Optional)

Supply and return collars are not supplied with the unit but are offered as accessory item. Check with your distributor for pricing and availability. They can be easily positioned over the unit openings and secured with sheet metal screws. See [Figure 4 \(page 6\)](#).

- The diameter of the return duct collar is 14”.
- 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.

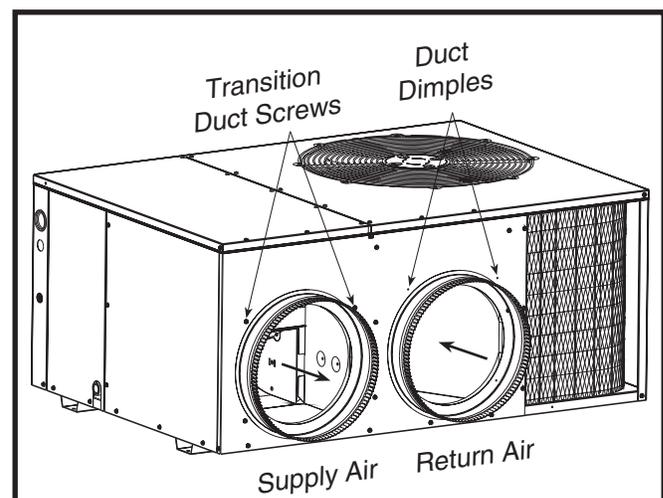


Figure 4. Return & Supply Air Collars

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 tapping screws (10-16x.5).

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.
- Ducts may be spliced with sheet metal sleeves and clamps.
- After the inner duct is connected to the proper fitting, the insulation and plastic sleeve should be pulled over the connection and clamped.
- Homes with multiple supply ducts (or special applications), a Y fitting is available to divide the supply air so it can be ducted 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. See [Figure 5](#). 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 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. Install the filter and return air grille in place.

Locating & Installing the Supply Damper(s)

CAUTION:

If installing this air conditioning system in conjunction with a furnace, a damper must be installed in the furnace base assembly to prevent cold air from being discharged around the heat exchanger. Damage to the heat exchanger and asphyxiation may occur if a damper is not installed.

Check with the furnace manufacturer for damper requirements. Failure to install the required furnace damper may invalidate code agency listing and limited warranty on the furnace.

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.

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 ([Figure 7](#)) near the drain connection.
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.

ELECTRICAL CONNECTIONS

WARNING:

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death or property damage.

Improper servicing could result in dangerous operation, serious injury, death or property damage.

- Before servicing, disconnect all electrical power to the indoor blower.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.
- Verify proper operation after servicing.

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

Pre-Electrical Checklist

- ✓ Verify that the voltage, frequency, and phase of the supply source match the specifications on the unit rating plate.
- ✓ Verify that the service provided by the utility is sufficient to handle the additional load imposed by this equipment. Refer to the unit wiring label for proper high and low voltage wiring.
- ✓ Verify factory wiring is in accordance with the unit wiring diagram. See [Figure 12 \(page 15\)](#), [Figure 13 \(page 16\)](#), & [Figure 14 \(page 17\)](#). Inspect for loose connections.

Line Voltage

- A wiring diagram is located on the inside cover of the electrical box of the unit. The installer should become familiar with the wiring diagram before making any electrical connections to 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.
- Line voltage to the unit should be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the unit. Incoming field wiring and minimum size of electrical conductors and circuit protection must be in compliance with information listed on the unit data label. 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. See [Figure 8](#). Connect **L1 & L2** directly to the contactor.
- The unit requires both power and control circuit electrical connections. Refer to the wiring diagrams [Figure 12 \(page 15\)](#), [Figure 13 \(page 16\)](#), & [Figure 14 \(page 17\)](#) for identification and location of unit field wiring interfaces. Make all electrical connections in accordance with all applicable codes and ordinances.
- 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. Use of rain tight conduit is recommended.

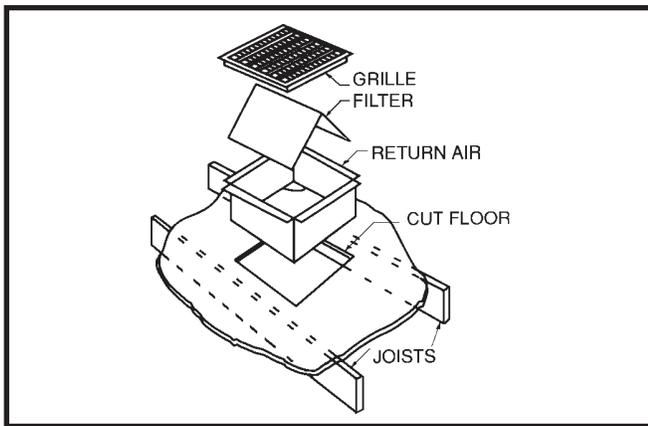


Figure 5. Typical Return Air Assembly

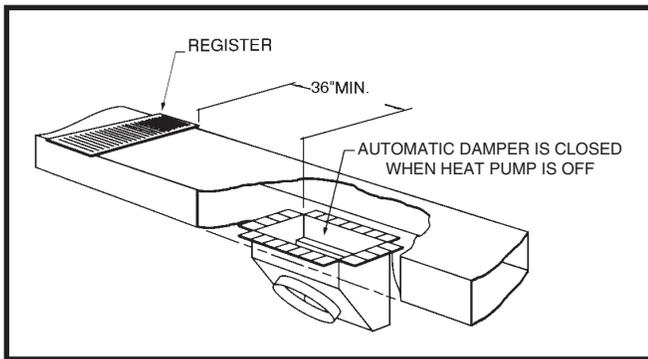


Figure 6. Typical Supply Damper

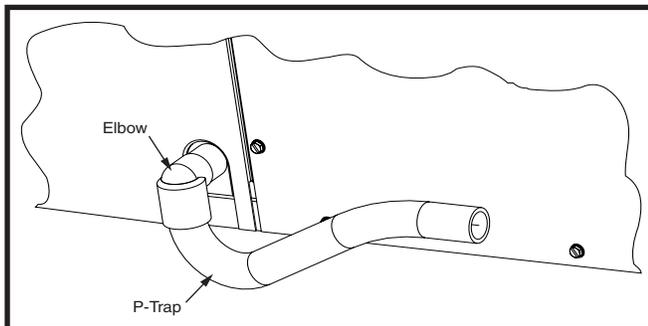


Figure 7. Drain Trap

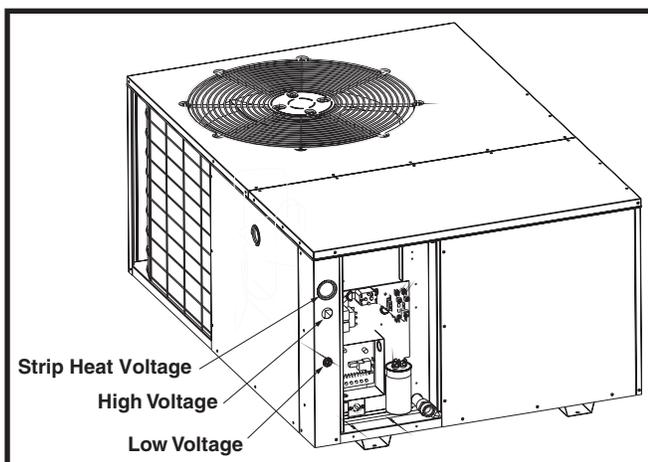


Figure 8. Power Entry

 **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.
- Optional equipment requiring connection to the power or control circuits must be wired in strict accordance of the NEC (ANSI/NFPA 70), applicable local codes, and the instructions provided with the equipment.

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

NOTE: 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.

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.

Thermostat / Low Voltage Connections

- The unit is designed to operate from a 24 VAC Class II control circuit. The control circuit wiring must comply with the current provisions of the NEC (ANSI/NFPA 70) and with applicable local codes having jurisdiction. Thermostat connections should be made in accordance with the instructions supplied with the thermostat and the indoor equipment.
- A heat pump thermostat is equipped with a system HEAT-COOL EM HEATswitch, 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. See [Figure 15 \(page 18\)](#) and the 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 Control Board Test Pins

- Placing a jumper between the test pins for less than 1 second will bypass the Anti-Short Cycle Timer.
- Placing a jumper between the test pins for more than 1 second will force the unit into a defrost cycle. As soon as the jumper is removed, the defrost cycle will end as determined by the typical criteria.
- To determine operating status or fault conditions, refer to [Table 1 \(page 11\)](#) for diagnostic description.

Clearing Defrost Board Fault Codes

- Fault codes can be removed from memory through the use of the test pins. This is accomplished by shorting the two test pins momentarily (more than 1 second) while there is no Y1 IN input present.
- Without resetting using the test pins, the fault codes will stay in the board's memory continuously (even through loss of power) for 7 days.

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 3 \(page 14\)](#) 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.

Outdoor Thermostat Options

HUD Outdoor Thermostat Option

This thermostat prevents the operation of supplemental electrical resistance heat at outdoor temperatures above 40° F, except for defrost operation. For additional info refer to Title 24: Housing and Urban Development-Subpart H, Section 3280.714, Paragraph 1, Item ii.

1. Remove the white wire between terminal W2 (on the terminal strip) and W2 IN terminal (on the defrost board) and discard. See [Figure 15 \(page 18\)](#) for additional wiring connections.
2. Move the white jumper wire from W2 terminal (between E and W2 on the terminal strip) and connect to W2 IN terminal (on the defrost board).

2nd Stage Thermostat Option

Models without an outdoor thermostat have a white wire from W2 on the terminal strip to W2 on the defrost board for the use of supplemental electrical resistance heat for a W2 or E call. For 2nd stage outdoor thermostat wiring connections, see [Figure 15](#).

A jumper wire is supplied from W2 to E on the terminal strip on all models.

Blower Speed

For optimum system performance and comfort, it may be necessary to change the factory speed setting. See [Table 3](#) 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.

⚠ 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.

1. Disconnect all electrical power to the unit and remove the service panel.
2. Verify the required speed from the airflow data found in [Table 3 \(page 14\)](#). 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 make sure no wires loosened during shipping or installation.

Ambient Sensor Mounting

For optimum performance of the heat pump system, the clip for the ambient sensor is factory installed on the control panel. The ambient sensor is inserted into the clip groove and holds it securely in place as shown in [Figure 9](#).

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 on [page 4](#)?
- ✓ 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?
- ✓ 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.

Start-Up Procedure

⚠ CAUTION:

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

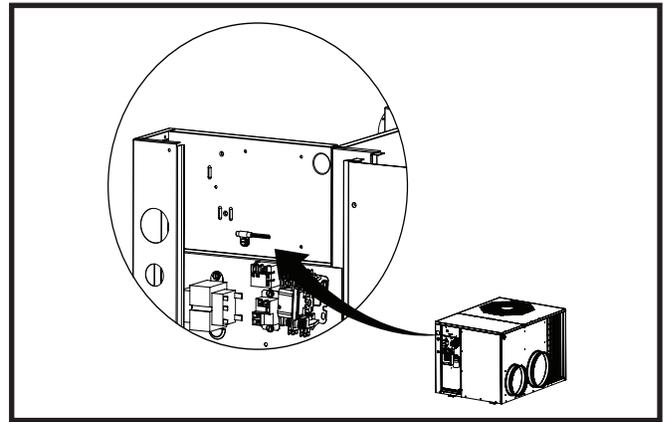


Figure 9. Ambient Sensor Mounting

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.

STATUS INDICATOR	STATUS TYPE	DIAGNOSTIC DESCRIPTION
C1	Operating Status	Cooling, 1st Stage
H1	Operating Status	Heating, 1st Stage
SC	Operating Status	Anti Short Cycle Timer
dF	Operating Status	Defrost
..	Operating Status	Power on, no call for operation
01	Fault	Pressure Switch, low
02	Fault	Pressure Switch, high
03	Fault	Temperature Sensor, Ambient
04	Fault	Temperature Sensor, Coil
05	Fault	Board
dF (flashing)	Input Error	Forced defrost - test short applied longer than 11 minutes

Table 1. Control Board Status Indicators

Emergency Heat

(Available only when Electric heat is supplied)

1. Set the thermostat's system mode to EM HT and the fan mode to AUTO (intermittent air) or ON (continuous air).
2. Set the thermostat's temperature selector above the existing room temperature and check the following:
 - The thermostat auxiliary heat is indicated as ON.
 - The compressor and the fan should not run; low voltage circuit remains energized.
 - The blower runs according to the thermostat's fan mode setting.

Forced Defrost Mode (Field Test)

- When the **TEST** terminals are shorted for more than 3 seconds, with the **Y1** input active and pressure switches closed, the ACST will be eliminated and the compressor contactor output energizes. The control will be placed into a forced defrost mode.

NOTE: The coil temperature sensor does not need to be cold when the unit is forced into defrost.

- If the short across the TEST pins exist, the unit will stay in DEFROST as long as the short remains or until the TERMINATE TIME is reached (11 minutes). This will happen regardless of coil temperature.

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.

COMPONENT FUNCTIONS

Low Pressure Switch (Select Models) - This safety 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 20 psig, then the switch will open and de-energize the unit. The switch will close again once the suction pressure increases above 35 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 - This safety 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 season. Remove any debris. Clean the coils as necessary using water or an approved all-aluminum cleaner. Rinse thoroughly with water.
- Inspect the electrical connections for tightness at the beginning of each heating and cooling season. Service as necessary.
- Inspect and clean blower housing, motor and wheel.

 **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.

REFRIGERANT CHARGING

CAUTION:

This 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.

NOTE: The refrigerant charge can be checked and adjusted through the service ports provided external to the unit. Use only gage line sets which have a "Schrader" depression device present to actuate the valve.

Charging the Unit in AC Mode

If the outdoor temperature is above 65 degrees F or higher: Charge the system following the steps below:

1. With the system operating at steady state, measure the superheat at suction line service valve.
2. Measure the outdoor dry bulb temperature (F) and indoor wet bulb temperature (F).

NOTE: The charging tables are on the inside of the unit's electrical control access panel. The tables provide superheat targets for the units.

3. Adjust the charge to match the superheat.

4. The system should be charged so that the measured superheat is within ± 1 F of the target listed in the table.
- If your measured superheat at the suction valve is **LESS THAN** the recommended superheat value in the table then **REMOVE** refrigerant.
 - If your measured superheat at the suction valve is **GREATER THAN** the recommended superheat value in the table then **ADD** refrigerant.

If the outdoor temperature is between 35 degrees F and 65 degrees F:

1. Block off the discharge of the outdoor fan. **NOTE:** One half of the unit should be covered corner to corner as shown in [Figure 10](#).
2. With the unit in cooling mode, and with the system operating at steady state, measure the superheat at suction service valve (Fixed orifice systems).
3. Measure the outdoor dry bulb temperature (F) and indoor wet bulb temperature (F).

NOTE: The charging tables are on the inside of the unit's electrical control access panel. The tables provide superheat targets for the units.

4. Adjust the charge to match the superheat.
 5. The system should be charged so that the measured superheat is within ± 1 F of the target listed in the table.
- If your measured superheat at the suction valve is **LESS THAN** the recommended superheat value in the table, then **REMOVE** refrigerant.
 - If your measured superheat at the suction valve is **GREATER THAN** the recommended superheat value in the table, then **ADD** refrigerant.

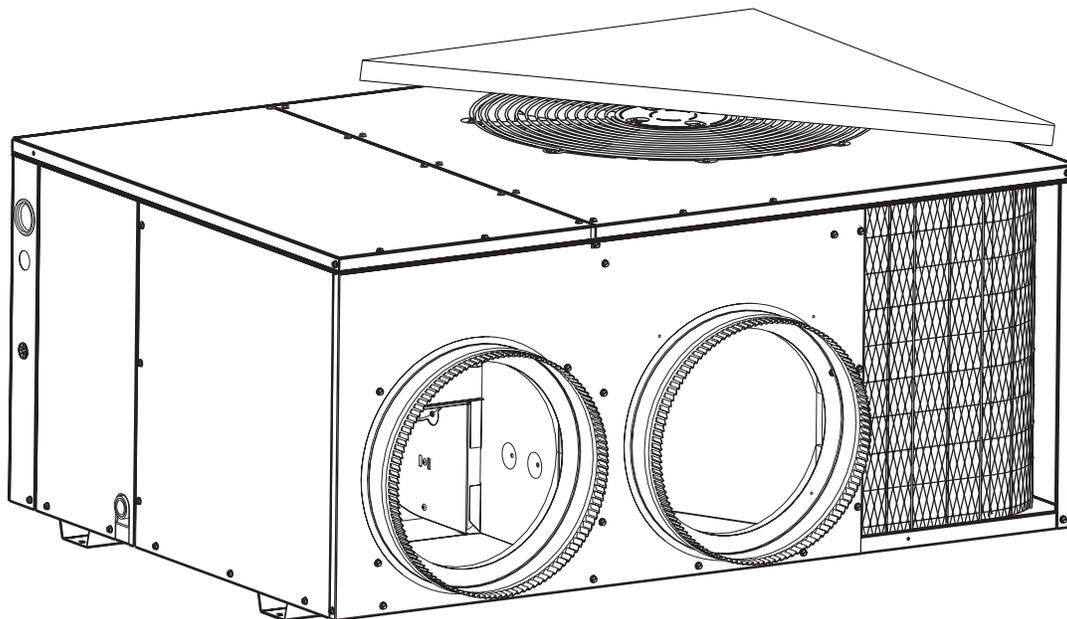


Figure 10. Q94RD With Fan Discharge Blocked Off

FIGURES & TABLES

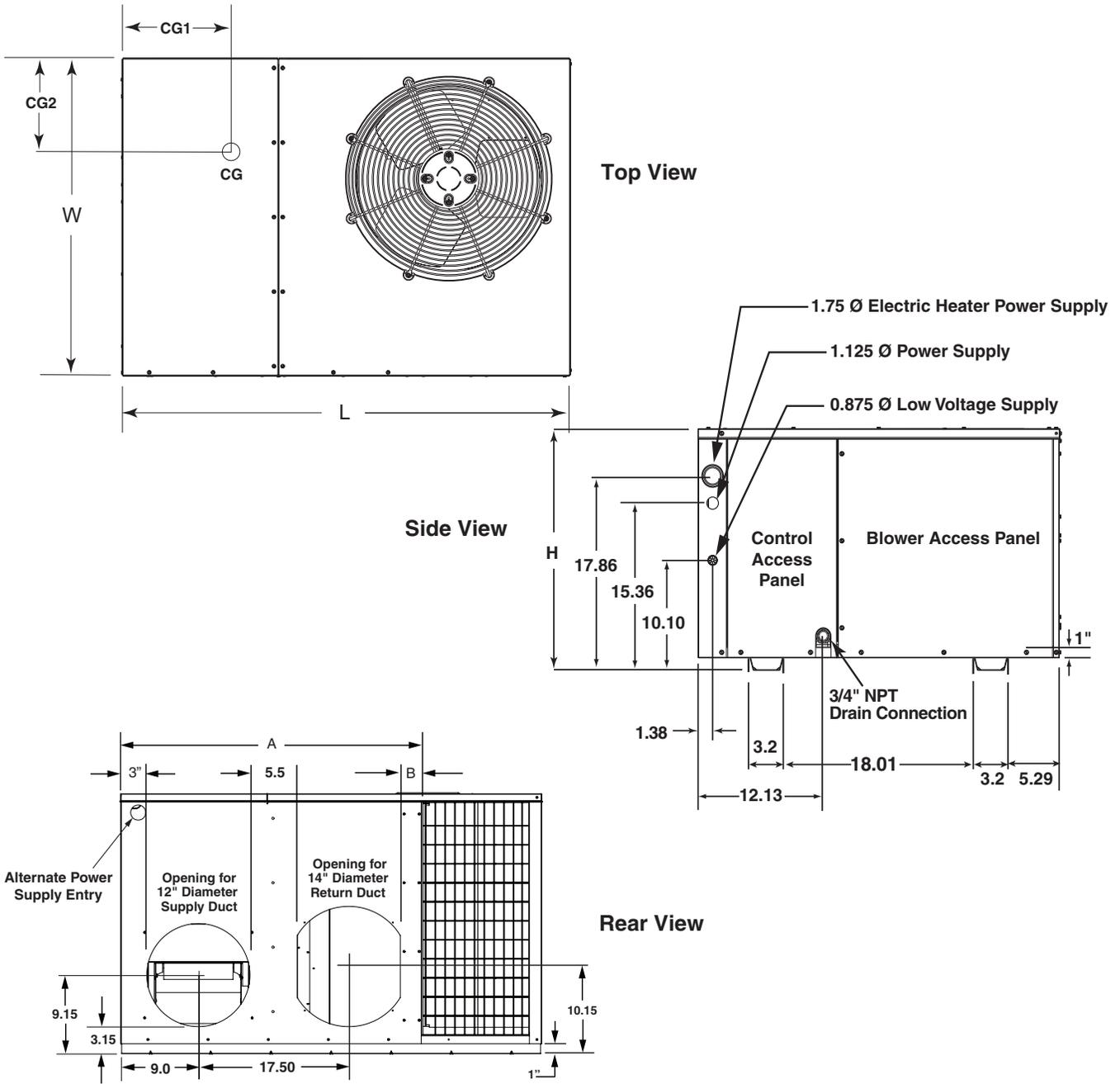


Figure 11. Unit Dimensions

Q94RD MODEL	LENGTH -L-	WIDTH W	HEIGHT -H-	-A-	-B-	-CG1-	-CG2-	SHIPPING WEIGHT (LBS)	NET WEIGHT (LBS)
024K	49	35	30.2	35.02	2.48	19.80	14.30	286	272
030K	49	35	30.2	35.02	2.48	19.80	14.30	288	274
036K	49	35	30.2	35.02	2.48	20.63	12.63	300	286
042K	63	35	38.2	35.02	2.48	23.30	14.00	348	332
048K	63	35	38.2	35.02	2.48	23.30	14.00	353	337
060K	63	35	38.2	35.02	2.48	23.30	14.00	353	337

Table 2. Physical Data

MODEL NUMBER Q94RD	BLOWER SETTING	HEAT RISE DATA (BASED ON NOMINAL 10KW ELECTRIC HEAT KIT)															
		EXTERNAL STATIC PRESSURE DROP - INCHES WATER COLUMN															
		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8	
		CFM	HEAT RISE	CFM	HEAT RISE	CFM	HEAT RISE	CFM	HEAT RISE	CFM	HEAT RISE	CFM	HEAT RISE	CFM	HEAT RISE	CFM	HEAT RISE
024K	Tap T1	1,009	31	951	33	910	35	856	37	797	40	725	44	660	48	605	52
	Tap T2**	1,146	28	1,102	29	1,049	30	1,004	31	955	33	898	35	829	38	761	42
	Tap T3*	1,198	26	1,154	27	1,107	29	1,059	30	1,010	31	959	33	895	35	827	38
	Tap T4	1,290	24	1,242	25	1,197	26	1,150	27	1,102	29	1,049	30	1,003	31	939	34
	Tap T5	1,425	22	1,383	23	1,334	24	1,287	25	1,246	25	1,194	26	1,149	27	1,092	29
030K	Tap T1	1,009	31	951	33	910	35	856	37	797	40	725	44	660	48	605	52
	Tap T2**	1,146	28	1,102	29	1,049	30	1,004	31	955	33	898	35	829	38	761	42
	Tap T3	1,290	24	1,242	25	1,197	26	1,150	27	1,102	29	1,049	30	1,003	31	939	34
	Tap T4*	1,397	23	1,353	23	1,306	24	1,262	25	1,213	26	1,168	27	1,120	28	1,060	30
	Tap T5	1,546	20	1,505	21	1,467	22	1,417	22	1,366	23	1,320	24	1,272	25	1,223	26
036K	Tap T1	1,146	28	1,107	29	1,056	30	1,004	31	960	33	910	35	842	38	782	40
	Tap T2**	1,269	25	1,232	26	1,197	26	1,146	28	1,098	29	1,056	30	993	32	932	34
	Tap T3	1,400	23	1,363	23	1,316	24	1,276	25	1,229	26	1,191	27	1,142	28	1,087	29
	Tap T4*	1,485	21	1,445	22	1,404	23	1,366	23	1,325	24	1,282	25	1,236	26	1,184	27
	Tap T5	1,612	20	1,571	20	1,530	21	1,492	21	1,453	22	1,409	22	1,364	23	1,322	24
042K	Tap T1	1,512	21	1,459	22	1,443	22	1,400	23	1,367	23	1,335	24	1,298	24	1,271	25
	Tap T2**	1,627	19	1,596	20	1,558	20	1,534	21	1,503	21	1,467	22	1,433	22	1,400	23
	Tap T3	1,734	18	1,700	19	1,670	19	1,642	19	1,606	20	1,575	20	1,543	20	1,509	21
	Tap T4*	1,840	17	1,813	17	1,780	18	1,750	18	1,716	18	1,685	19	1,650	19	1,613	20
	Tap T5	1,942	16	1,920	16	1,884	17	1,853	17	1,821	17	1,787	18	1,752	18	1,713	18
048K	Tap T1	1,474	21	1,417	22	1,379	23	1,344	24	1,304	24	1,266	25	1,230	26	1,184	27
	Tap T2**	1,590	20	1,559	20	1,519	21	1,467	22	1,439	22	1,396	23	1,360	23	1,320	24
	Tap T3*	1,749	18	1,711	18	1,665	19	1,633	19	1,589	20	1,551	20	1,514	21	1,476	21
	Tap T4	1,913	17	1,873	17	1,835	17	1,802	18	1,760	18	1,718	18	1,688	19	1,643	19
	Tap T5	2,097	15	2,052	15	2,016	16	1,980	16	1,939	16	1,894	17	1,856	17	1,814	17
060K	Tap T1	1,455	22	1,412	22	1,362	23	1,323	24	1,277	25	1,238	26	1,188	27	1,160	27
	Tap T2**	1,668	19	1,627	19	1,599	20	1,558	20	1,521	21	1,478	21	1,444	22	1,405	22
	Tap T3	1,854	17	1,809	17	1,783	18	1,745	18	1,707	19	1,667	19	1,629	19	1,593	20
	Tap T4*	2,008	16	1,976	16	1,939	16	1,904	17	1,875	17	1,833	17	1,801	18	1,760	18
	Tap T5	2,174	15	2,133	15	2,101	15	2,066	15	2,038	16	2,002	16	1,969	16	1,932	16

NOTES:

Temperature rises shaded gray are for reference only. These conditions are not recommended.

* Denotes factory set for cooling & heating speed

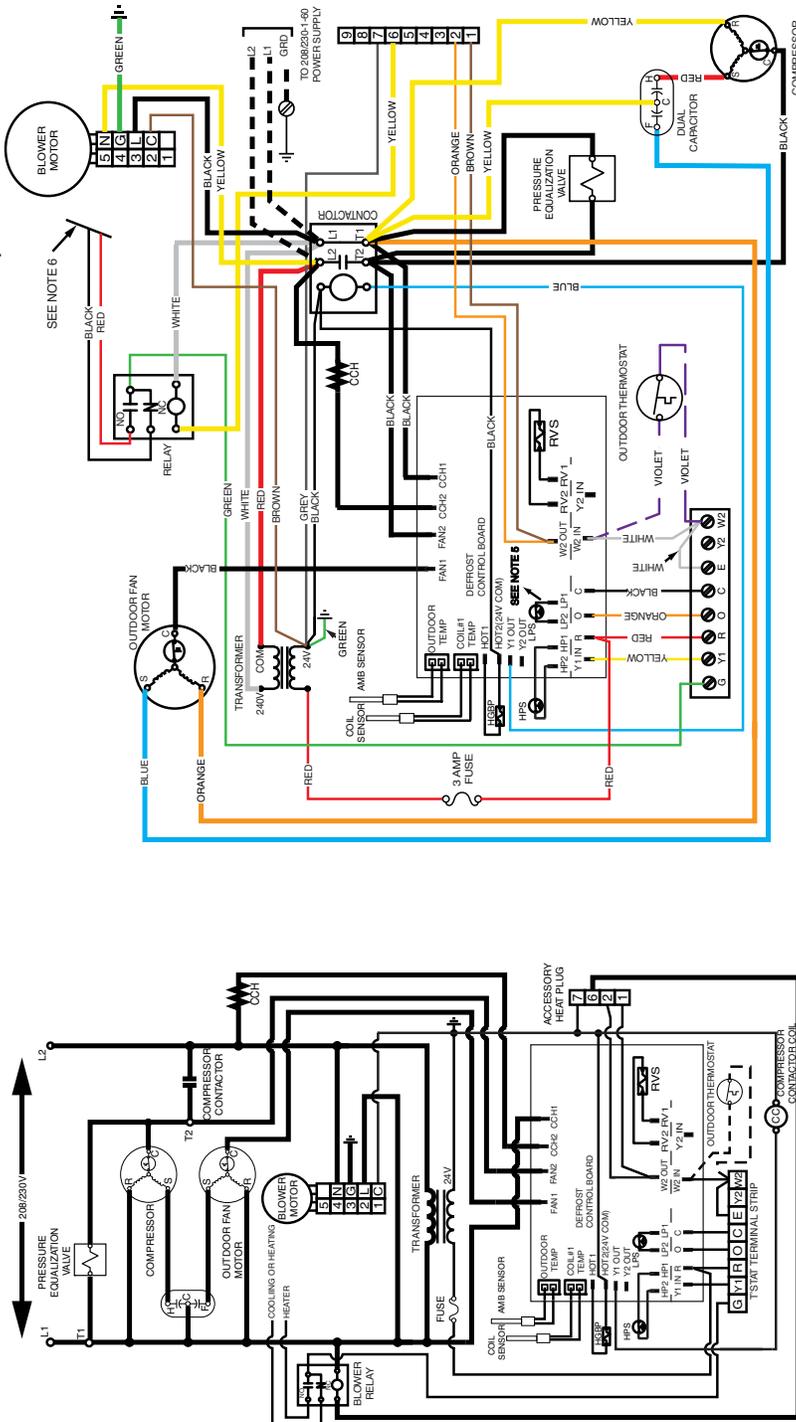
** Denotes factory set auxiliary heating speed – tested with 10KW

Table 3. Heat Rise Data

WIRING DIAGRAM

SMALL PACKAGED HEAT PUMP - SINGLE PHASE 2 AND 2.5 TON 208/230 VOLT 60HZ

1. Disconnect all power before servicing.
2. For supply connections use copper conductors only.
3. Not suitable on systems that exceed 150V to ground.
4. For replacement wires use conductors suitable for 105°C.
5. Low Pressure Switch jumpered from LP1 to LP2 (on select models)
6. See Installation Instructions for blower motor airflow setting and terminal locations.
7. Select units have factory installed HUD thermostat to limit electric heat. If Hud application see low voltage section in the unit Installation Instructions.



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Figure 12. W.D. for 2 & 2.5 Ton Models

WIRING DIAGRAM

SMALL PACKAGED HEAT PUMP - SINGLE PHASE 3.0/3.5/4.0 TON

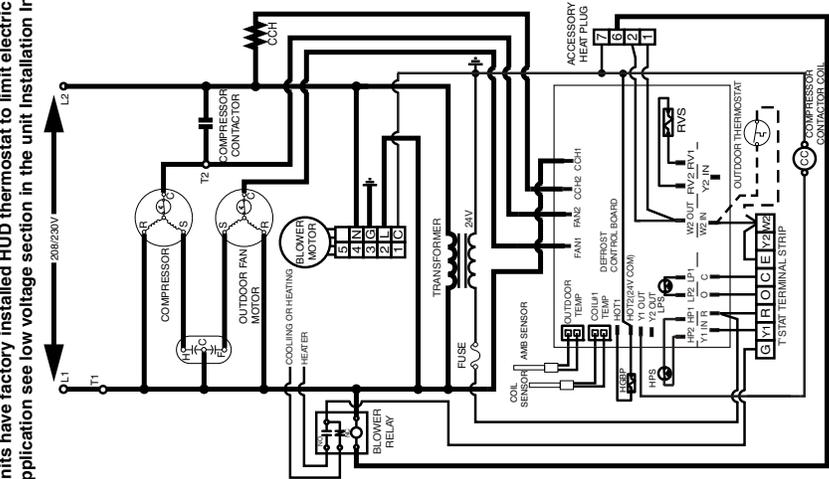
208/230 VOLT

60HZ

NOTES:

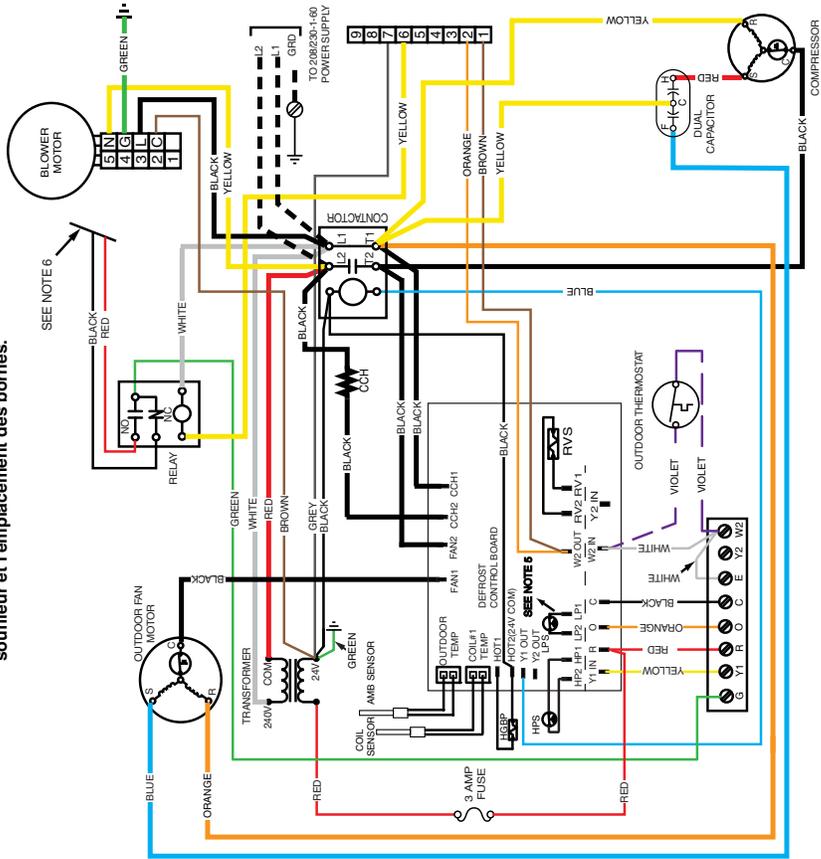
1. Disconnect all power before servicing.
 2. For supply connections use copper conductors only.
 3. Not suitable on systems that exceed 150V to ground.
 4. For replacement wires use conductors suitable for 105°C.
 5. Low Pressure Switch jumped from LP1 to LP2 (on select models)
 6. See Installation Instructions for blower motor airflow setting and terminal locations.
 7. Select units have factory installed HUD thermostat to limit electric heat.
- If Hud application see low voltage section in the unit installation instructions.

1. Couper le courant avant de faire letretine.
2. Employez uniquement des conducteurs en cuivre.
3. Ne convient pas aux installations de plus de 150V a la terre.
4. Remplacement pour installer les fils conducteurs adapté à 105°C.
5. Contacteur de basse pression sur une sélection de modèles ou ponté du LP1 et LP2.
6. Consultez les directives d'installation pour le réglage du débit d'air du moteur du souffleur et l'emplacement des bornes.



LEGEND:

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



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Figure 13. W.D. for 3, 3.5 & 4 Ton Models

WIRING DIAGRAM

SMALL PACKAGED HEAT PUMP - SINGLE PHASE 5.0 TON

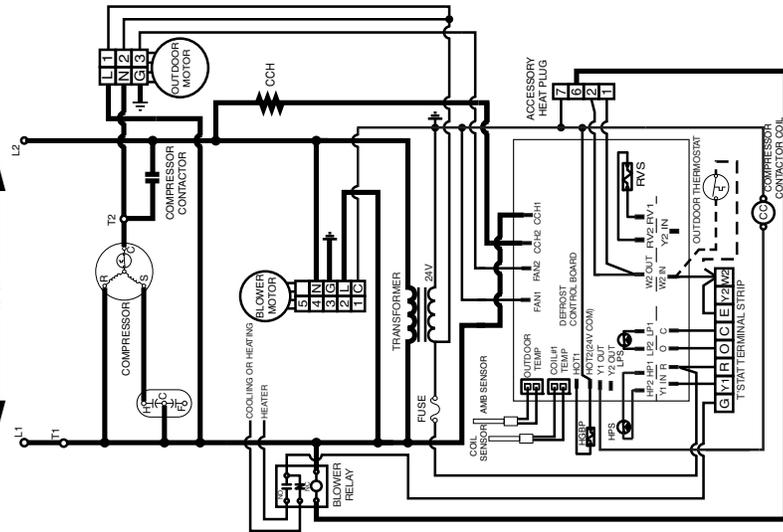
208/230 VOLT

60HZ

NOTES:

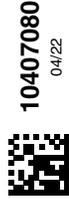
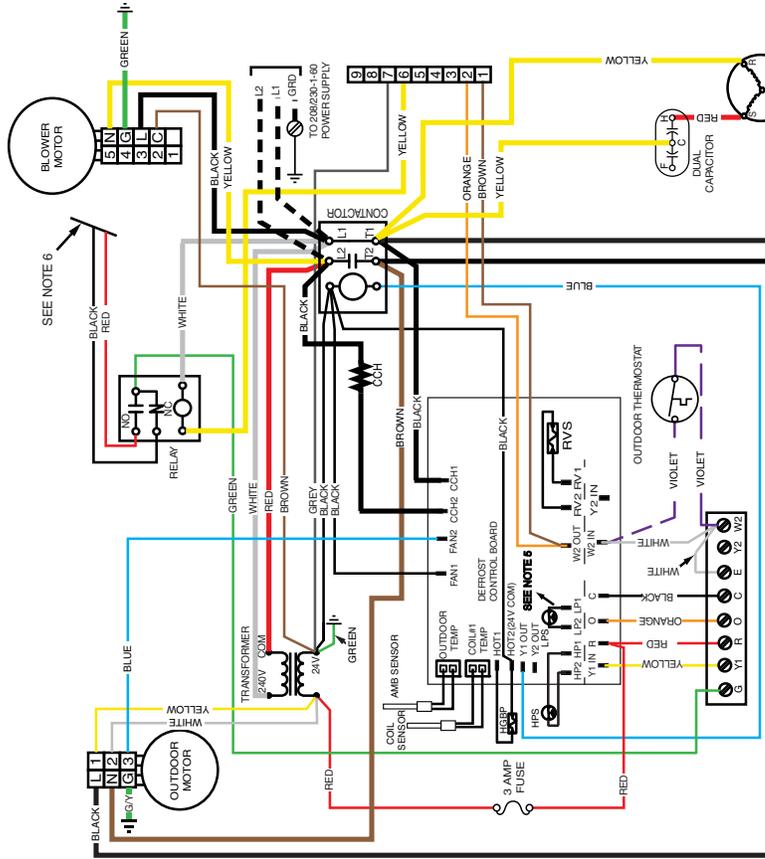
1. Disconnect all power before servicing.
 2. For supply connections use copper conductors only.
 3. Not suitable on systems that exceed 150V to ground.
 4. For replacement wires use conductors suitable for 105°C.
 5. Low Pressure Switch jumpered from LP1 to LP2 (on select models)
 6. See installation instructions for blower motor airflow setting and terminal locations.
 7. Select units have factory installed HUD thermostat to limit electric heat.
- If Hud application see low voltage section in the unit installation instructions.

1. Couper le courant avant de faire letrétine.
2. Employez uniquement des conducteurs en cuivre.
3. Ne convient pas aux installations de plus de 150V a la terre.
4. Remplacement pour utiliser les fils conducteurs adapté à 105°C.
5. Contacteur de basse pression sur une sélection de modèles ou ponté du LP1 et LP2.
6. Consultez les directives d'installation pour le réglage du débit d'air du moteur du souffleur et l'emplacement des bornes.



LEGEND:

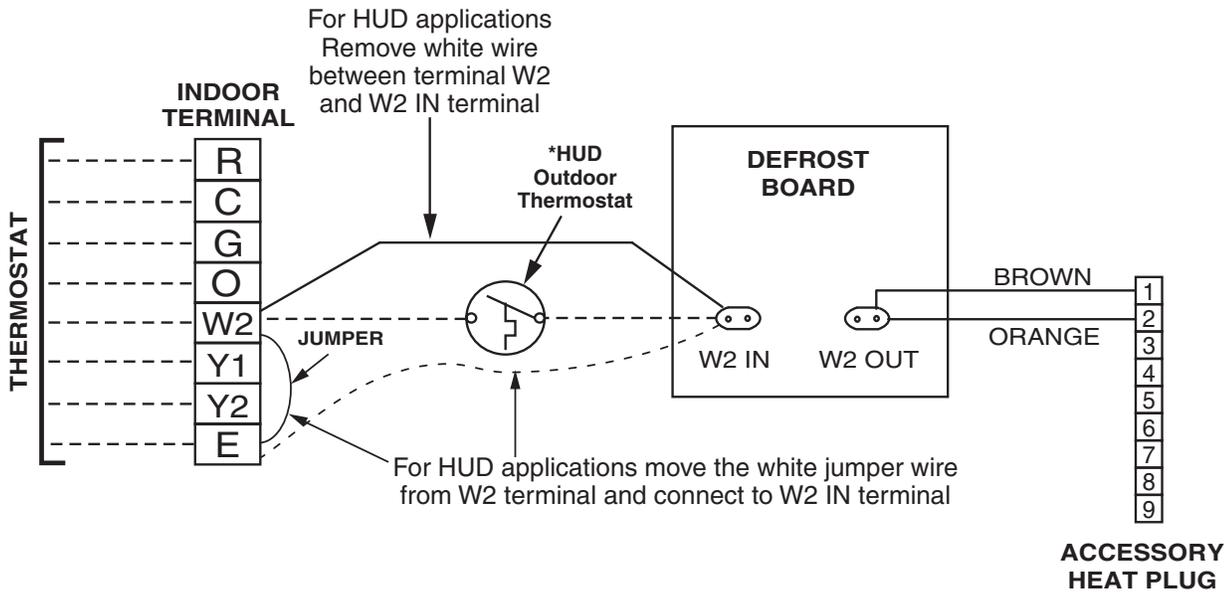
- FIELD WIRING - - - - -
- LOW VOLTAGE ———
- HIGH VOLTAGE ———



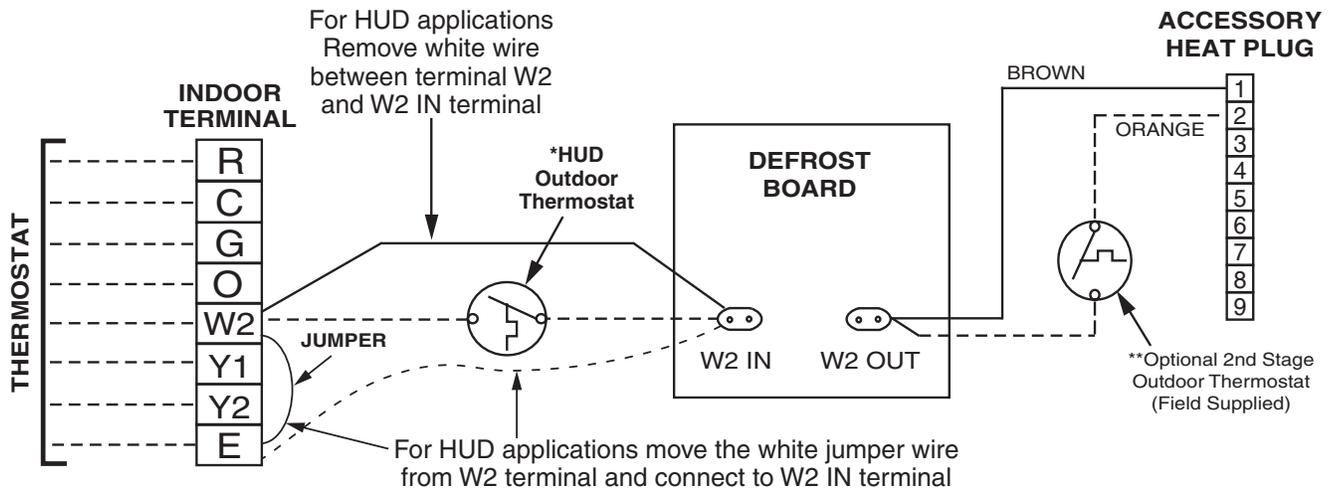
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Figure 14. W.D. for 5 Ton Models

Typical Wiring for 1-Stage Cool / Heat, 1 Stage Electric Heat



Typical Wiring for 1-Stage Cool / Heat, Optional 2-Stage Electric Heat



NOTE 1: Optional 2nd stage outdoor thermostat is field supplied.

NOTE 2: HUD outdoor thermostat is not factory installed in all models.

Figure 15. Typical Heat Pump Thermostat Connections

INSTALLATION CHECKLIST

INSTALLATION ADDRESS:		
CITY:	STATE:	
UNIT MODEL #:		
UNIT SERIAL #:		
Unit Installed Minimum clearances per Figure 1 (page 4) ?	YES	NO
INSTALLER NAME:		
CITY:	STATE:	
Has the owner's information been reviewed with the customer?	YES	NO
Has the Literature Package been left with the unit?	YES	NO

ELECTRICAL SYSTEM		
Electrical connections tight?	YES	NO
Line voltage polarity correct?	YES	NO
Rated Voltage:		
L1-L2 Voltage:		
Has the thermostat been calibrated?	YES	NO
Is the thermostat level?	YES	NO
Is the heat anticipator setting correct?	YES	NO

REFRIGERATION SYSTEM		
Was unit given 24 hr warm up period for crankcase heaters (if applicable)?	YES	NO
Ambient Temp (° F):		
Discharge Line Temp (° F):		
Stage-1 Liquid Pressure (high side):		
Stage-1 Suction Pressure (low side):		

FILTER SYSTEM		
Filter(s) secured in place?	YES	NO
Filter(s) clean?	YES	NO

