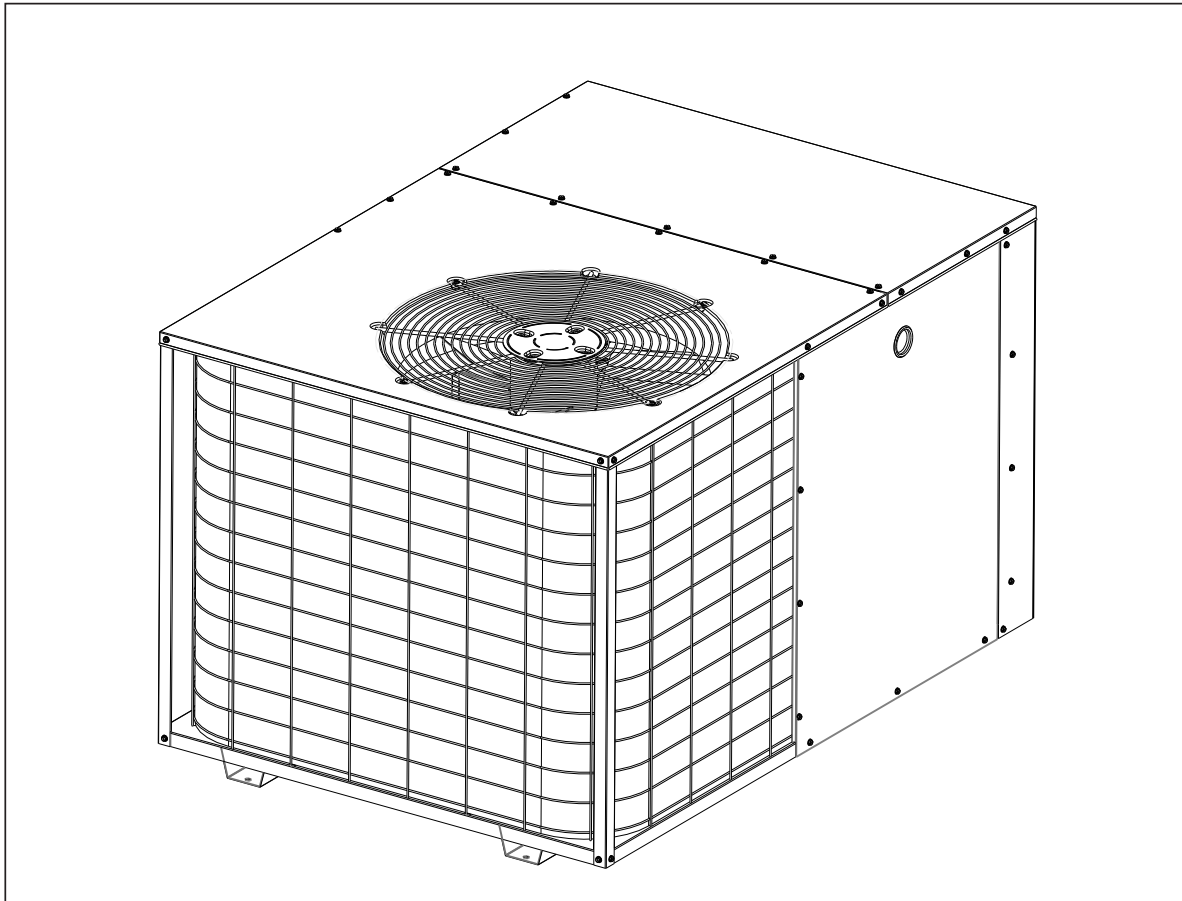


# USER's MANUAL & INSTALLATION INSTRUCTIONS

## 13 SEER Single Package Heat Pump



Single Package Heat Pump

---

### **IMPORTANT:**

---

Read this owner information to become familiar with the capabilities and use of your appliance. Keep this with literature on other appliances 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 installing contractor or distributor in your area.

---

### INTRODUCTION

Your heat pump is a unique, all weather comfort-control system appliance. The basic operation of the heating/cooling system is described and illustrated on page 1 of this manual. The surprising fact that heat exists in air even at below-freezing temperatures is actually the basic law of physics which the heat pump uses to provide energy saving heating comfort. At outdoor temperatures of 47° Fahrenheit

(or 8° Celsius), your heat pump can deliver approximately 2 to 3 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. During the cooling season, the heat pump reverses the flow of the heat-absorbing refrigerant to become an energy-efficient, central air conditioner.

---

## SECTION 1. OWNER INFORMATION

Your heat pump will heat and cool your home yearround, saving your energy dollars. During the summer, a heat pump performs like any normal air conditioner. That is, the excess heat energy inside the home is absorbed by the refrigerant and exhausted outside the home. During the winter months, a heat pump performs like an air conditioner run in reverse. That is, available heat energy outside the home is absorbed by the refrigerant and exhausted inside the home. This is an efficient heating means because 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.

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

A warranty certificate with full details is included with the heat pump. However, the manufacturer will not be responsible for any costs found necessary to correct problems due to improper setup, improper installation, adjustments, improper operating procedure on the part of the user, etc.

Some specific examples of service calls which are not included in the limited warranty are:

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

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

## OPERATING INSTRUCTIONS

### To Operate Your Heat Pump For Cooling —

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

NOTE: If the thermostat temperature level is re-adjusted, or if the thermostat system switch is re-positioned, the outdoor unit fan and the compressor may not start immediately. A protective timer circuit holds the compressor and



Figure 1. Typical Thermostat

the outdoor fan off for approximately five minutes following a previous operation or the interruption of the main electric power.

### To Operate Your Heat Pump For Heating —

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

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

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

**Defrost** — During cold weather heating operation, the outdoor unit will develop a coating of snow and ice on the heat transfer coil. This is normal and the unit will periodically defrost itself. During the defrost cycle, the outdoor fan will stop, while the compressor continues to run and heat the outdoor coil, causing the snow and ice to melt. During defrost, there may be some steam rise from the outdoor unit as the warm coil causes some melted frost to evaporate.

## SECTION 2. INSTALLER INFORMATION

### GENERAL

**Pressures Within The System** — This equipment contains R-410A refrigerant under high pressure. Installation or servicing should only be performed by qualified trained personnel thoroughly familiar with this type equipment.



### CAUTION:

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

**Read the following instructions completely before performing the installation.**

These instructions are for the use of qualified personnel specially trained and experienced in the installation of this type of equipment and related system components. Some states require installation and service personnel to be licensed. Unqualified individuals should not attempt to interpret these instructions or install this equipment.

The single packaged heat pumps are designed for outdoor installation only and can be readily connected into the high static duct system of a home. The only connections needed for installation are the supply and return ducts, the line voltage, and thermostat wiring. A complete heat pump system typically consists of:

- Single Package Heat Pump
- Home Fittings Kit
- Unit Fittings Kit
- Thermostat



### CAUTION:

**To prevent personal injury and/or equipment damage, check thermostat manufacturer's operation of fan relay circuit when in EMER HEAT. When the thermostat system switch is in the EMER HEAT position, the thermostat must energize the fan relay when the fan switch is in the AUTO position.**

The single package heat pump is completely assembled, factory wired, and factory run tested. The units are ready for easy and immediate installation.

Use of components other than those specified may invalidate ARI Certification, Code Agency Listing, and limited warranty on the air conditioner.

### PRE-INSTALLATION CHECK

Before any installation is attempted, 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.

The installer should comply with all local codes and regulations which govern the installation of this type of equipment. Local codes and regulations take precedence over any recommendations contained in these instructions. Consult local building codes and the National Electrical Code (ANSI C1) for special installation requirements.

The electrical supply should be checked to determine if adequate power is available. If there is any question concerning the power supply, contact the local power company.

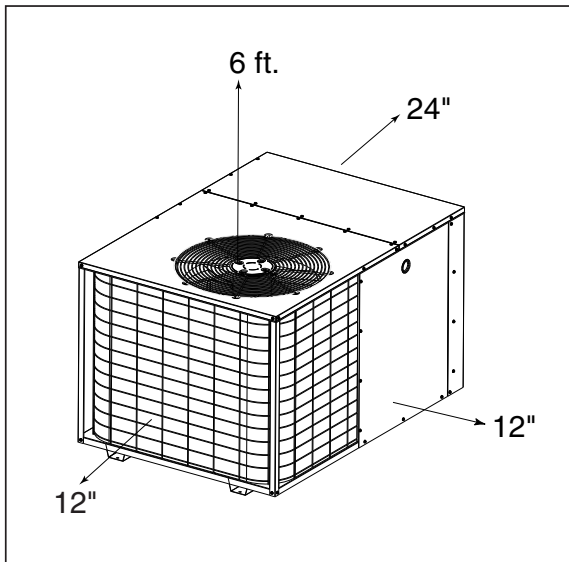
**Inspecting Equipment:** All units are securely packed at the time of shipment and, upon arrival, should be carefully inspected for damage. Claims for damage (apparent or concealed) should be filed immediately with the carrier.

### INSTALLATION

#### 1. SELECT THE BEST LOCATION FOR THE HEAT PUMP UNIT

**IMPORTANT: DO NOT PLACE UNIT UNDER THE HOME.**

- Select a solid, level position, preferably on a concrete slab, slightly above the grade level, and parallel to the home.
- 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.
- If practical, place the heat pump where it and the ducts will be shaded from the afternoon sun when the heat load is greatest.
- Try to select a site for the unit that is as close as possible to the proposed return grille location.
- Keep in mind that the length of the supply and return ducts should be kept to a minimum with no sharp radiused bends.



**Figure 2. Minimum Unit Clearances**

## 2. UNPACK 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.**

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

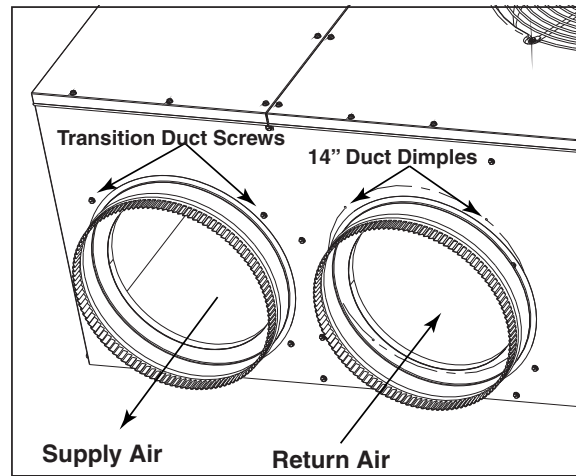
## 3. CLEARANCES

Minimum clearances, as specified in Figure 2, 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.

### Service Access Clearance:

Blower access panel side ..... 24"  
Electrical compartment access panel side ... 12"



**Figure 3. Return and Supply Air Fittings**

Clearance between overhang and top of unit .....72"  
Clearance around condenser coil area to wall or shrubs (excludes duct panel side)..... 12"

### Minimum clearance to combustible materials:

Combustible Base (Wood or Class A, B, or C roof Covering material) .....0"  
Supply and Return Air Ducts.....0"  
Duct Connection side.....0"

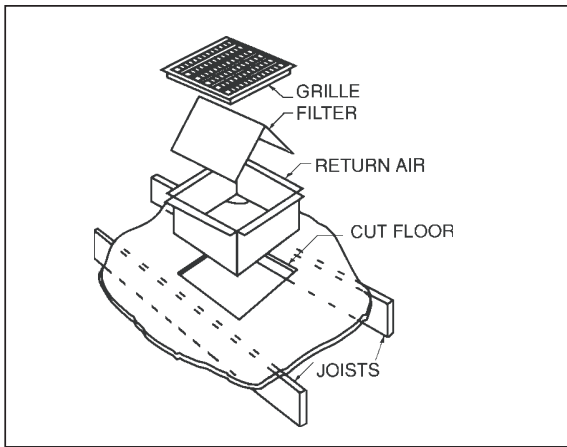
## DUCT REQUIREMENTS

The supply duct system, including the number and type of registers, will have much more effect on the performance of an air conditioning system than any other factor. The duct must be sufficiently large to conduct an adequate amount of air to each register.

## 4. INSTALL THE RETURN AND SUPPLY AIR FITTINGS ON THE UNIT

The supply and return fittings are included with select models. If supplied, the duct fittings are shipped in the supply duct. They attach to the unit openings with a flange and bead arrangement, secured with two sheet metal screws. Note: For ease of access, install fitting before positioning unit in final location.

13 SEER	Return Dia. (in)
2 Ton	12
2 1/2 Ton	14
3 Ton	14
3 1/2 Ton	14
4 Ton	14
5 Ton	14



**Figure 4. Return Air Box**

### SUPPLY DUCT

Position the supply duct collar, if supplied, so the edge of the unit opening fits between the flange and the bead. Overlap the collar ends keeping the small screw holes underneath. Align the holes in the crimped area and install one screw.

Note: It may be necessary to loosen the four screws that hold the transition duct in order to install the supply fitting. Re-tighten when installation is complete.

Tap collar as necessary to ensure engagement with unit opening and install second screw. Tighten first screw. Rotate collar clockwise so joint is near three o'clock position.

### RETURN DUCT

The 12" return duct is installed in the same manner as the supply duct. If the duct has a 14" return, follow these instructions.

Align the slots with the holes in the collar and install two screws. Position the collar over the opening and align the four notches in the collar with the four dimples in the panel. Using self-drilling screws (10-16x.5) attach the collar to the rear panel. On some models a 14" duct collar is provided for the return duct.

## 5. LOCATING AND INSTALLING THE RETURN AIR ASSEMBLY

To avoid complications, locate and install the return air assembly first. 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. If desired, the return opening can be located inside a closet with louvered doors that have

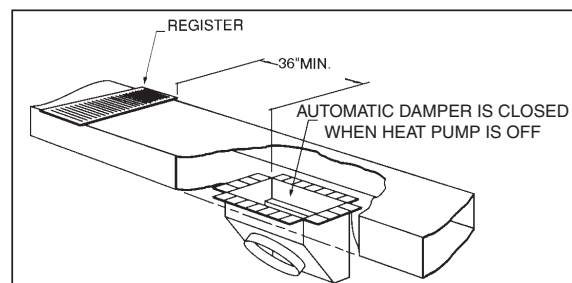
an open area equal to or greater than the 12" x 20" grille furnished. The return air grille can be placed in the wall of a closet and the air ducted into the filter box through a boxed-in area at the closet floor level. Make sure the filter is readily accessible.

After determining the location of the return air opening, start the installation from under the home by cutting a small hole in the fiber under-board to determine how the floor joist location will affect cutting the opening needed for the box. Floor joists generally are located on 16" centers, leaving 14-3/8" between joists. 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. 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.

Set the box into the opening and fasten with screws or nails. Put the filter and return air grille in place.

## 6. LOCATING AND 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 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. To locate the center of the heat duct, first cut a small hole in the fiberboard below the duct at the desired location. After locating the duct center, cut a hole approximately 3/4" larger than the damper opening in the fiberboard. Cut a 9-1/8" x 13-1/8" hole in the duct and bend over



**Figure 5. Supply Damper**



all tabs flat on the inside of the heat duct. After inserting the damper into the duct, bend over all tabs flat on the inside of the heat duct. Seal the opening between the fiberboard and damper or flexible duct.

## DUCTING SYSTEM

### DUCT REQUIREMENTS

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.

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.

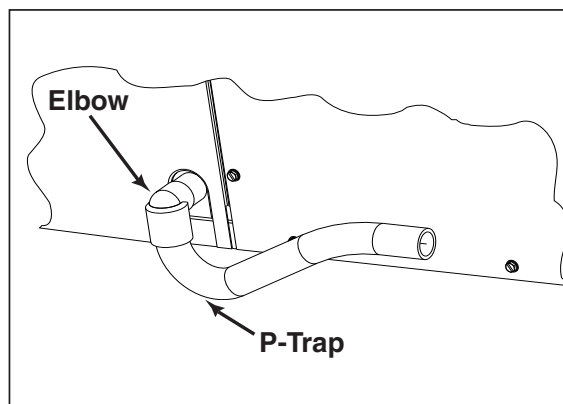


Figure 6. Drain Trap

Note: 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.

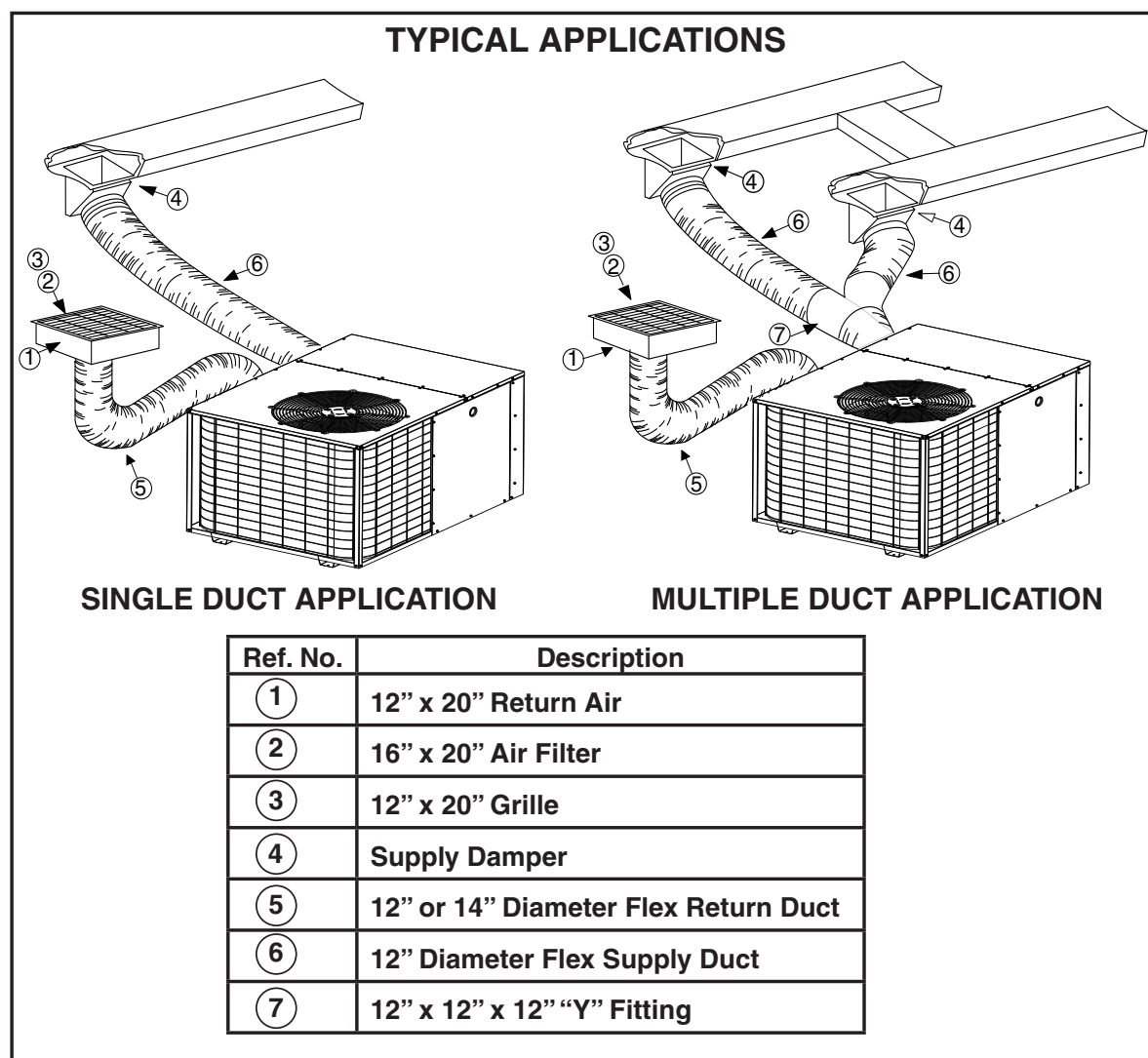


Figure 7. Typical Applications

**THE HEAT PUMP SYSTEM WILL NOT COOL OR HEAT THE HOME IF THE AIR IS LOST TO THE OUTSIDE THROUGH LEAKS IN THE DUCT SYSTEM. ALSO, DUCTS WHICH ARE COLLAPSED OR RESTRICTED BY FOREIGN OBJECTS WILL PREVENT ADEQUATE AIR FLOW.**

### CONNECTING THE RETURN AND SUPPLY AIR FLEXIBLE DUCTS

The return duct may be 12" or 14" diameter depending on unit size. (See Table on page 5)

- The supply duct for all units is twelve inches in diameter.
- The flexible ducts can be connected to the corresponding fittings with the clamps provided with the ducts. Note: All connections should be leak tight or a loss in cooling capacity will result.
- The flexible ducts may be cut to the required length, see instructions packed with duct. Keep all ducts as short and straight as possible. Avoid sharp bends.
- Ducts may be spliced with sheet metal sleeves and clamps. (See Ducting Installation Accessories page 6.)

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 Cooling Speed

\*\* Denotes Factory Set Electric Heating Speed

† Denotes Factory Set Cooling and Electric Heating Speed

**Figure 8. Motor Lead Connection**

- Once the inner duct is connected to the proper fitting, the insulation and plastic sleeve should be pulled over the connection and clamped.
- For homes with multiple supply ducts or for 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: The Y fitting should be insulated for maximum performance.

**Blower Speed** For optimum system performance and comfort, it may be necessary to change the factory set speed. See Figure 8 for factory settings. **NOTE:** The 2 Ton blower motor has three speed taps, Low, Med, High. The 2.5 ton standard blower motor has two speeds, Low and High. The 3, 3.5 and 4 ton models have High Efficiency Motors with 5 speed taps.

#### If Standard Motor (2 and 2.5 Ton)

- Disconnect all electrical power to the unit and remove the service panel.
- The blower speed is preset at the factory for operation at the same speed for heating and cooling.
- Place the desired blower speed lead on the "COM" terminal of the blower relay. Use another wire tie (field supplied) to bundle the remaining motor lead up and out of the way.

#### If High Efficiency Motor (3, 3.5, and 4 Ton)

- Disconnect all electrical power to the unit and remove the service panel.
- Locate the orange and red wires terminated to the blower motor. The orange wire controls the cooling operation and the red wire controls the heating operation.
- Verify the required speed from the airflow data found in Figure 8. Place appropriate wire on the appropriate motor speed tap for the required airflow.



## CAUTION:

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

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

## CONDENSATE DRAIN

A 3/4" condensate fitting extends out of the side of the unit. The drain trap, shipped in the electrical compartment, must be installed to prevent water from collecting inside the unit. Thread the elbow provided with the unit into the drain connection until hand tight. Install the trap into the fitting making sure it is level. Route the condensate from the trap to a suitable drain. Any tubing or hose connected must have the outlet below trap level for proper drainage.



## WARNING:

**Turn off electrical power before servicing controls. Severe electrical shock may result unless power is turned off. Unit must be installed in compliance with the National Electrical Code (NEC) and local codes.**

## ELECTRICAL CONNECTIONS

### 1. ELECTRICAL SERVICE

#### High Voltage

- Install a branch circuit disconnect of adequate size per NEC. Locate the disconnect within sight of the unit.
- Extend leads through power wiring hole provided. Connect L1 and L2 directly to the contactor. (See Figure 9.)
- Ground the heat pump unit using the green grounding screw provided in the control panel.

#### Low Voltage

- Route 24v control wires through the sealing grommet near the power entrance. (See Figure 9.)

- Connect the control wires to the defrost board and blower relay wire. (See Figure 10.)

### 2. OVERCURRENT PROTECTION

In general, the best fuse or breaker for any heat pump is the smallest size that will permit the equipment to run under normal use and service without nuisance trips. Such a device, sized properly, gives maximum equipment protection. The principal reason for specifying a time delay type is to prevent nuisance trips when the unit starts.

In the event that a fuse does blow or a breaker trips, always determine the reason. Do not arbitrarily put in a larger fuse or breaker and do not, in any case, exceed the maximum size listed on the data label of the unit.

### 3. LOCATING THE THERMOSTAT

Locate the thermostat away from drafts and slamming doors and place it where there is a free flow of air. Mount on an inside wall approximately five feet from the floor.

Do not locate near a lamp, kitchen range, direct sunlight, or in line with air flow from supply registers.

**Connect the Heat-Cool Thermostat:** 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. See thermostat instruction sheet for more detailed information. (See Figure 10).

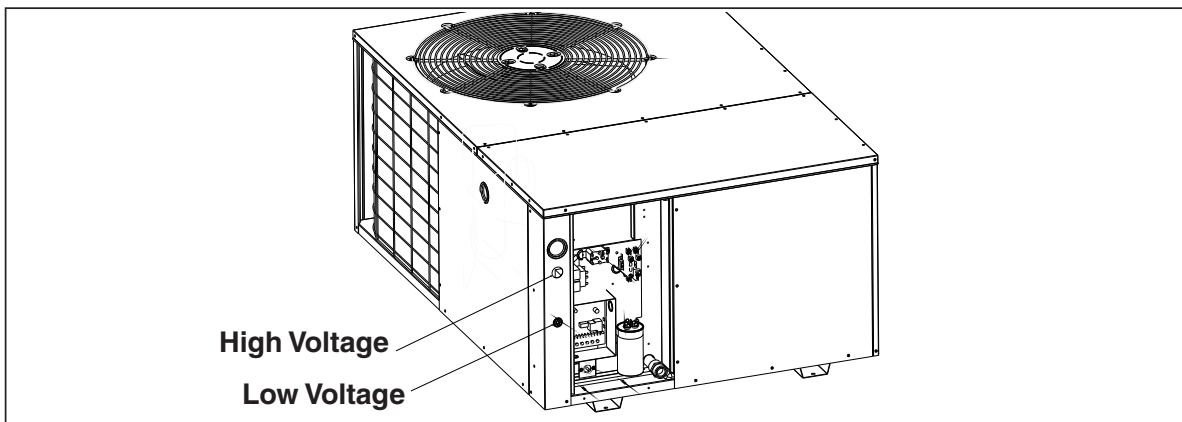


Figure 9. Power Entry



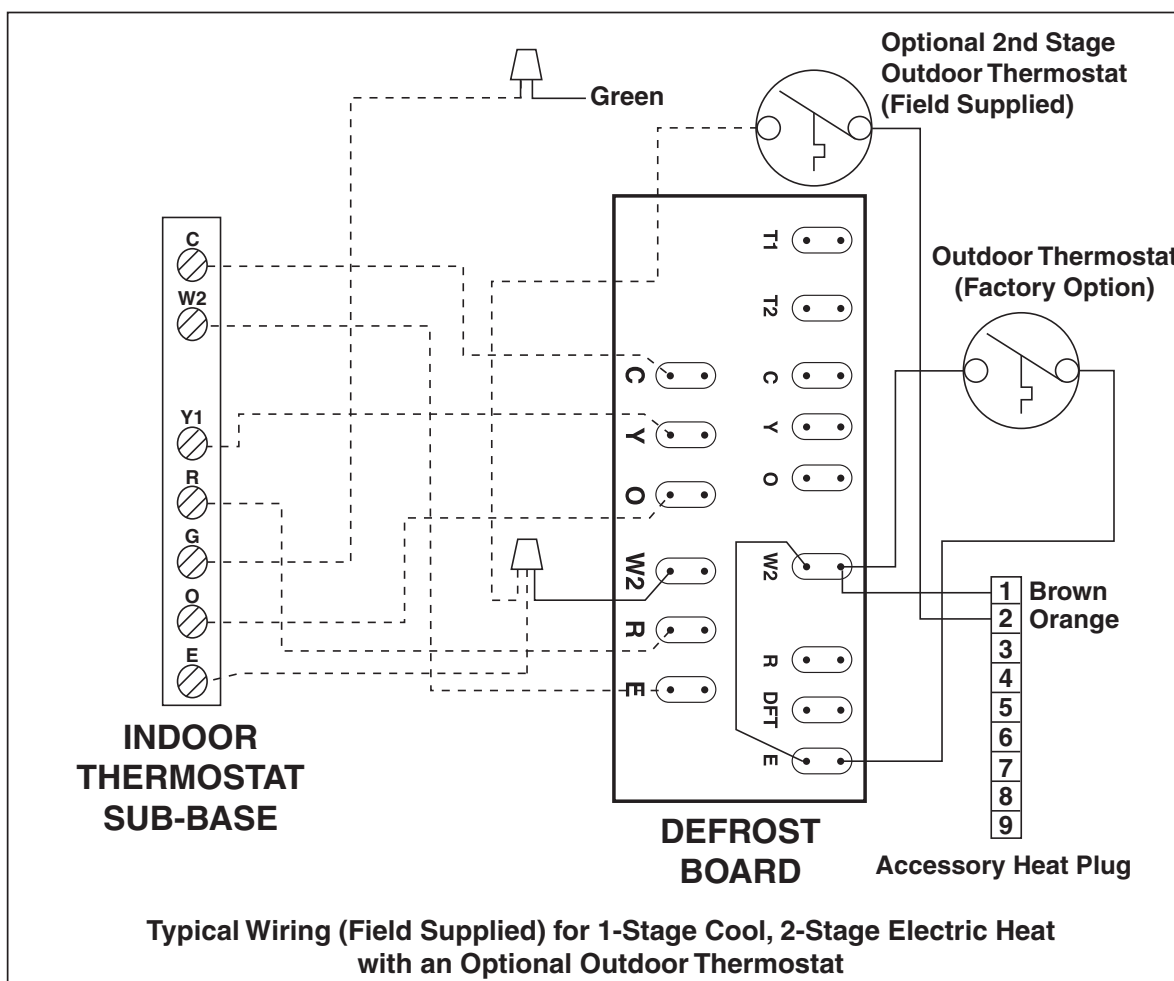
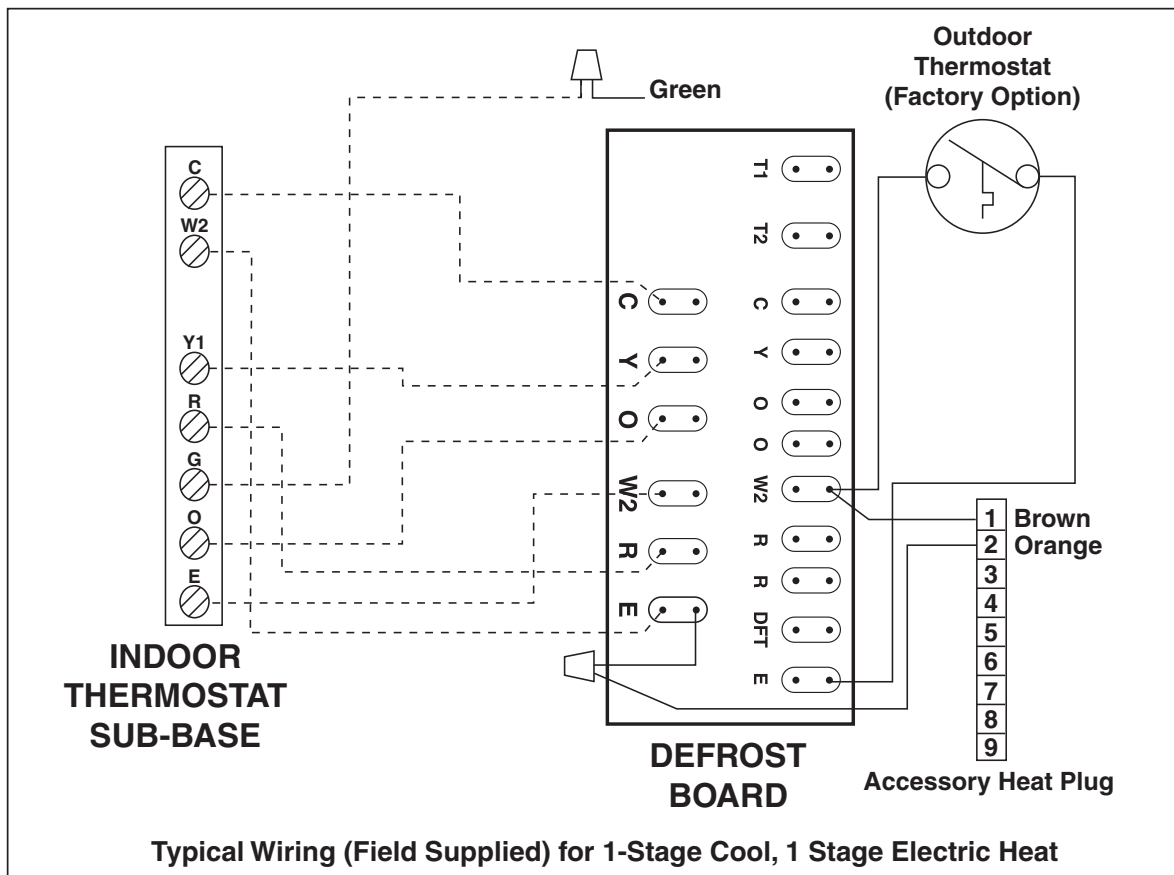


Figure 10. Typical Heat Pump Thermostat Connections

**If two stage heating is desired, an optional 2nd stage outdoor thermostat may be installed:** Connect the thermostat to the orange low voltage wire and the E terminal on the defrost board (See Figure 10 page 9). See the thermostat instructions for details on setting the outdoor thermostat.

#### 4. DEFROST CYCLE CONTROL

The defrost cycle is initiated via a signal from the defrost sensor on the outdoor coil to the defrost control board inside the control panel indicating the coil temperature is low enough to start accumulating frost. The board has interval settings of 30 minutes, 60 minutes, and 90 minutes. These time intervals represent the time elapsed before defrosting cycle starts and they are dependent on the climate conditions of the installation. A 30 minute setting would be recommended in a moist climate such as Seattle, Washington. A 90 minute setting would be adequate in a dry climate such as southern Arizona. The factory time interval setting is 30 minutes.

#### 5. OUTDOOR THERMOSTAT (Factory Option)

The outdoor thermostat prevents the electrical auxiliary heat (if used) from operating above a desired set point. The factory temperature setting is at 40°F.

#### 6. ELECTRIC HEAT PACKAGE (OPTIONAL)

The heat pumps are shipped without an auxiliary electric heat kit installed. If electric heat is desired, an accessory Heater Kit must be field installed. See Specifications Sheet for available kits and their application.

- Select the correct size heat package for the installation.
- Follow installation instructions provided with each heater kit.
- Installation is most easily accomplished before making duct or electrical connections.
- Refer to figure 8 for blower speeds.

### SYSTEM OPERATION

#### 1. PRE-START CHECK LIST

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

- ☐ Is the unit level? It should be level or slightly slanted toward the drain for proper condensate drainage.
- ☐ Is the unit installed with the proper clearances (See Figure 2)?

- ☐ 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?

#### 2. START-UP PROCEDURE

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

Set the thermostat system switch to OFF, and the thermostat fan switch to AUTO. Apply power at the disconnect switch and check the system operations:

- a. **Air Circulation** — Leave the thermostat system switch at OFF, and set the thermostat fan switch to ON. Blower should run continuously. Check the air delivery at the supply registers and adjust register openings for balanced air distribution. Examine ductwork for leaks or obstruction if insufficient air is detected.

Set the thermostat fan switch to AUTO; the blower should stop running.

- b. **System Heating** — Set the thermostat system switch to HEAT and set the thermostat fan switch to AUTO. Position the thermostat temperature selector above the existing room temperature and check for the discharge of warm air at the supply registers.
- c. **System Cooling** — Set the thermostat system switch to COOL and set the thermostat fan switch to AUTO. Position 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.
- d. **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.

**e. Emergency Heat** — (Available only when Electric heat is supplied) Set the thermostat system switch to EMHT and set the thermostat fan switch to either AUTO (intermittent air) or to ON (continuous air). Position the thermostat 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 fan switch setting.

**Refrigerant Charging** — Packaged Air Conditioners are fully charged with R410-A refrigerant at the factory. The system refrigerant charge can be checked and adjusted by removing the compressor cover panel and attaching gauge lines which have a “schrader” depression device present to activate the valve. Draw a vacuum on gauge lines to remove air before attaching them to the service ports on the unit. Refrigerant charging must be done by qualified personnel familiar with safe and environmentally responsible refrigerant handling procedures.

## **DEFROST CONTROL BOARD OPERATION AND TESTING**

1. Terminals “R”-“C” must have 24±V present between them in order for the time delay and defrost sequences to be operational.
2. Jumper the “T2”-“DFT” test pins. This will indicate to the board that the defrost T-stat is closed (if the compressor is running). Defrost T-stat is closed at 32° or below and is open at 68° or above. But its state is unknown if the temperature is between 32°F and 68°F. The defrost thermostat tells the board whether a defrost cycle needs to be started or terminated. With the DFT closed the unit will run for 30/60/90 minutes in heat mode and then defrost the outdoor coil. The defrost will turn off the outdoor fan, turn on the compressor and raise the coil temperature to 68°F. This will open the DFT and terminate the defrost. If the DFT does not open the defrost will end after 10 minutes.
3. Defrost board speed-up. With compressor running in heat mode, next jump the “Test” pin to “C” on terminal strip. This will initiate a defrost test in 5, 10 or 15 seconds (This is determined by the 30, 60 or 90 minute defrost pin settings. The factory setting will

be 30 minutes). Note that this will bypass the compressor off delay when the unit goes into defrost test and if left in defrost test, the delay will be bypassed when the test is terminated by the processor. If the jumper is removed before the test is over the processor will perform the remainder of a normal defrost. See step 2 above.

4. Remove the jumpers.

**Note:** The delay/no-delay pin concerns compressor operation during defrosts. The default setting is delay. Reciprocating compressors should only use this setting in conjunction with an approved hard start kit. Scroll compressors that have noise issues while going into or coming out of defrost should use this 30 second delay to reduce the defrost noise. To switch from no-delay to delay remove the pin from the “no-delay” pin location and shift it to the “delay” pin location.

**Speed up changes:**

Manually initiating a defrost will cause the compressor to run continually when entering defrost.

**Normal defrost operation:**

To test normal defrost operation when the temperature is above 35°F, jumper “R” to “DFT” on the 624656 board and allow the unit to run for 30 minutes. Defrost will continue until the “R” to “DFT” jumper is removed or for 10 minutes. Remove the jumper.

The 5 minute time delay feature can be shortened 1 time to 1 second by jumping the “Test” to “C” terminal. Remove the jumper and repeat as desired.

**Note:** If jumper is left on the “Test” to “common” pins permanently, the defrost cycle will become inoperable.

## **Defrost Test Procedure for 624656**

1. Jumper “T2” to “DFT” at the test terminals.
2. With unit running in heat mode, short the “TEST” terminal to the common terminal near it. This will speed up the board and cause it to enter defrost mode in 5/10/15 seconds depending on the defrost time selection. Compressor delay will not function during speed-up.
3. This test will end in 5 seconds if the “TEST”-common short is not removed.
4. Remove both the short and the “T2” to “DFT” jumper to terminate the defrost cycle. The 30 second compressor delay should operate normally.
5. Test is complete, reset thermostat to home owner preference.

# 13 SEER - Refrigerant Charging Tables for Cooling Mode of Operation

## Refrigerant Charging Chart Legend for Cooling Mode of Operation

\* Note: All pressures are listed in psig. and all temperatures in °F.



- Shaded Boxes indicate flooded conditions



- Rated Design Values. Suction Pressure will be lower than design value if indoor air flow, entering dry bulb, or entering wet bulb temperatures are lower than design.

- Discharge temperatures greater than charted values indicate an undercharged system.

2 Ton	OUTDOOR TEMPERATURE (°F)															
	70		75		80		85		90		95		100		105	
Suct. Press.	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																

2.5 Ton	OUTDOOR TEMPERATURE (°F)															
	70		75		80		85		90		95		100		105	
Suct. Press.	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																

## 13 SEER - Refrigerant Charging Tables for Cooling Mode of Operation Continued

3 Ton	OUTDOOR TEMPERATURE (°F)															
	70		75		80		85		90		95		100		105	
Suct. Press.	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																

3.5 Ton	OUTDOOR TEMPERATURE (°F)															
	70		75		80		85		90		95		100		105	
Suct. Press.	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																



## 13 SEER - Refrigerant Charging Tables for Cooling Mode of Operation Continued

4 Ton	OUTDOOR TEMPERATURE (°F)															
	70		75		80		85		90		95		100		105	
Suct. Press.	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																

5 Ton	OUTDOOR TEMPERATURE ( deg. F )															
	70		75		80		85		90		95		100		105	
Suc. Press.	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																

### 13 SEER - Refrigerant Charging Tables for Heating Mode of Operation

2 Ton																									OUTDOOR TEMPERATURE (DEG. F)																								
0					10					20					30					40					50					60																			
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. 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																													

OUTDOOR TEMPERATURE (DEG. F)																						
2.5 Ton		0			10			20			30			40			50			60		
		Suc.	Liquid	Disch.	Suc.	Liquid	Disch.	Suc.	Liquid	Disch.	Suc.	Liquid	Disch.	Suc.	Liquid	Disch.	Suc.	Liquid	Disch.	Suc.	Liquid	Disch.
Press	Press.	Temp.	Press.	Temp.	Press.	Temp.	Press.	Temp.	Press.	Temp.	Press.	Temp.	Press.	Temp.	Press.	Temp.	Press.	Temp.	Press.	Temp.	Press.	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		

### 13 SEER - Refrigerant Charging Tables for Heating Mode of Operation (continued)

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

3.5 Ton																								OUTDOOR TEMPERATURE (DEG. F)																	
0						10						20						30						40						50						60					
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. 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																					

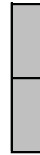
# **13 SEER - Refrigerant Charging Tables for Heating Mode of Operation (continued)**

OUTDOOR TEMPERATURE (DEG. F)																				
4 Ton																				
0			10			20			30			40			50			60		
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. 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

5 Ton		OUTDOOR TEMPERATURE (DEG. F)																						
0			10				20				30				40				50				60	
Suc. Press	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. Temp.	Suc. Press.	Liquid Press.	Disch. 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				

## **Refrigerant Charging Chart Legend for Heating Mode of Operation**

\* Note: All pressures are listed in psig. and all temperatures in °F.



- Shaded Boxes indicate flooded conditions



- Rated Design Values. Suction Pressure will vary if indoor air flow, entering dry bulb temperature varies.

- Discharge temperatures greater than charted values indicate an undercharged system.

## SMALL PACKAGE HEAT PUMP

## 208/230 VOLT

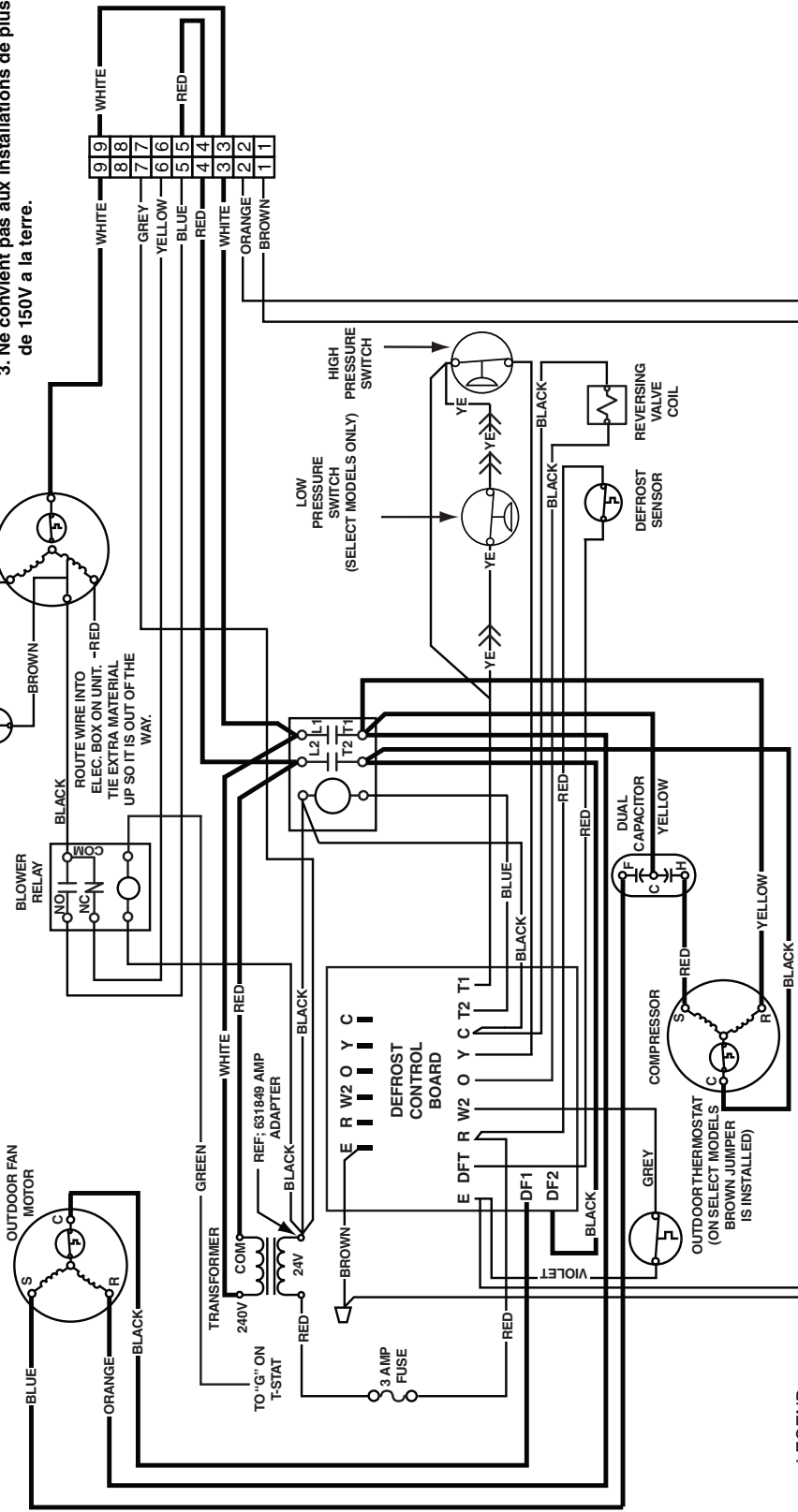
## 60HZ/SINGLE PHASE

### 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.

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



7108380



# SMALL PACKAGED HEAT PUMP- SINGLE PHASE Q5RD/GQ5RD/PPH2RD 3 TON THRU 5 TON

208/230 VOLT

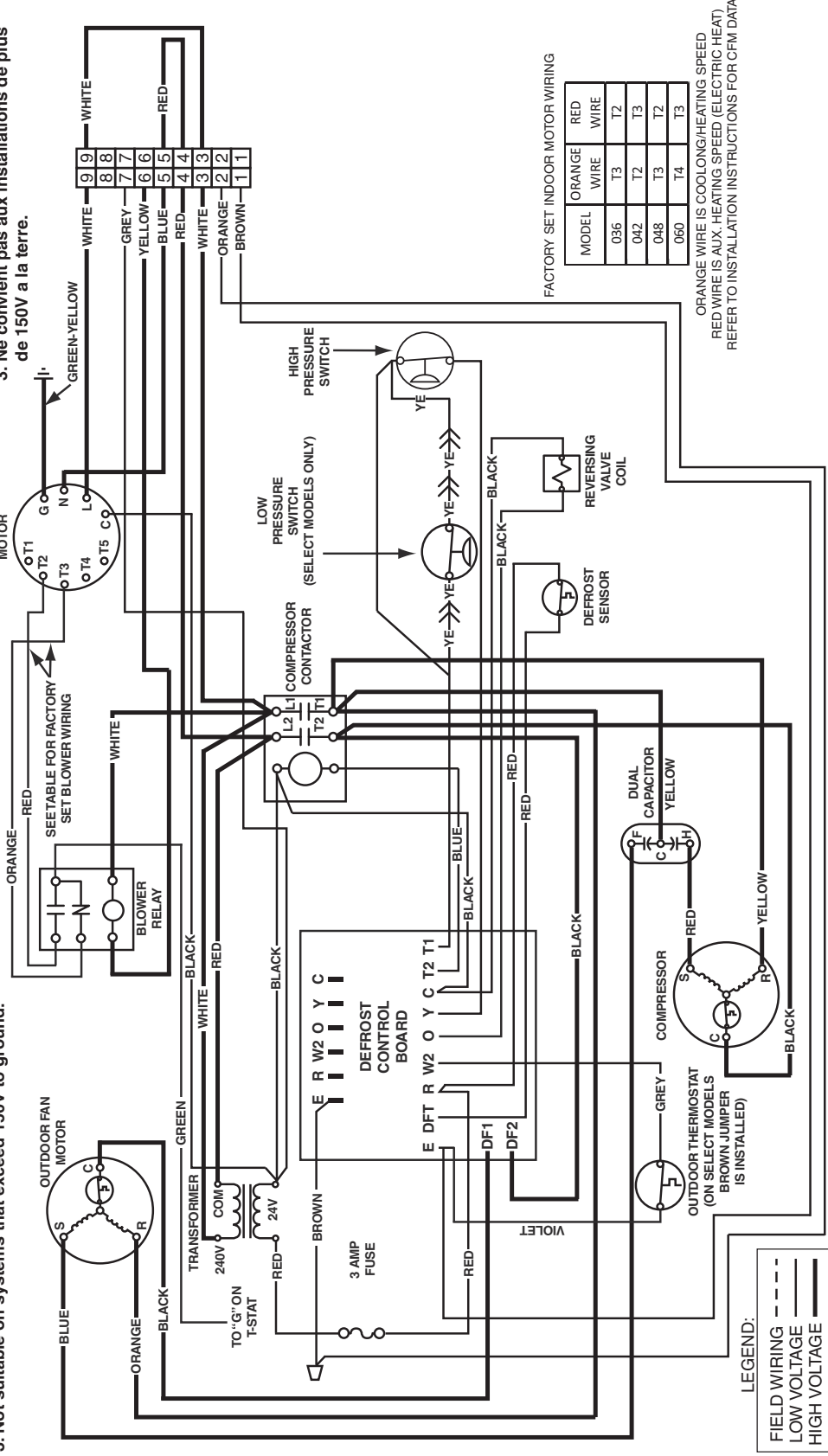
60HZ

## 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.

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



710837A

**INSTALLER**

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



**709067A**

**709067A** (Replaces 7090670)

Specifications and illustrations subject to change  
without notice and without incurring obligations. (08/09)