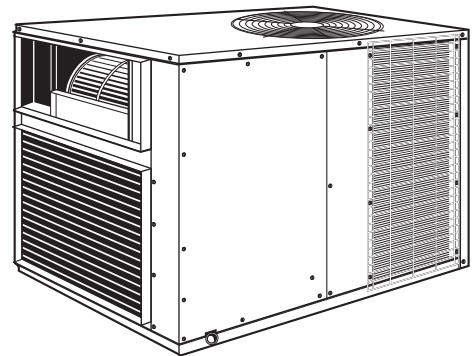


# Installer's Guide

## Single Packaged Heat Pump 14 SEER, Over/Under 2 – 3 1/2 Ton, R-410A

4WHC4024A1000B  
4WHC4030A1000B  
4WHC4036A1000B  
4WHC4042A1000B



**Note:** "Graphics in this document are for representation only. Actual model may differ in appearance."

### **⚠ SAFETY WARNING**

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

# SAFETY SECTION

**Important** — This document contains a wiring diagram, a parts list, and service information. This is customer property and is to remain with this unit. Please return to service information pack upon completion of work.

## ⚠ WARNING

### HAZARDOUS VOLTAGE!

Failure to follow this Warning could result in property damage, severe personal injury, or death.

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.

## ⚠ WARNING

### SAFETY AND ELECTRICAL HAZARD!

Failure to follow this Warning could result in property damage, severe personal injury, or death.

These servicing instructions are for use by qualified personnel only. To reduce the risk of electrical shock, do not perform any servicing other than that contained in these operating instructions unless you are qualified to do so.

## ⚠ CAUTION

### GROUNDING REQUIRED!

Failure to inspect or use proper service tools may result in equipment damage or personal injury. Reconnect all grounding devices. All parts of this product that are capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

## ⚠ WARNING

### UNIT CONTAINS R-410A REFRIGERANT!

Failure to use proper service tools may result in equipment damage or personal injury.

R-410A operating pressure exceeds the limit of R-22. Proper service equipment is required. Service using only R-410A Refrigerant and approved POE compressor oil.

## ⚠ WARNING

### SAFETY HAZARD!

Operating the unit without the access panels properly installed may result in severe personal injury or death.

Do not operate the unit without the evaporator fan access panel or evaporator coil access panel in place.

## ⚠ WARNING

### WARNING!

This product can expose you to chemicals including lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**Important:** Wear appropriate gloves, arm sleeve protectors and eye protection when servicing or maintaining this equipment.

**Important:** Air filters and media wheels or plates shall meet the test requirements in UL 900.

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# Introduction

Read this manual carefully before attempting to install, operate, or perform maintenance on this unit. Installation and maintenance should be performed by qualified service technicians only.

Packaged units are designed for outdoor mounting with a vertical condenser discharge. They can be located either at ground level or on a roof in accordance with local codes. Each unit contains an operating charge of refrigerant as shipped.

This guide is organized as follows:

- Step 1 — Inspect Shipment
- Step 2 — Determine Unit Clearances
- Step 3 — Review Location & Recommendation Information
- Step 4 — Unit Installation
- Step 5 — Unit Startup
- Sequence of Operation
- Maintenance

## Step 1 — Inspect Shipment

1. Check for damage after the unit is unloaded. Report promptly to the carrier any damage found to the unit. Do not drop the unit.

**Important:** *To prevent damage to the sides and top of the unit when hoisting, use "spreader bars".*

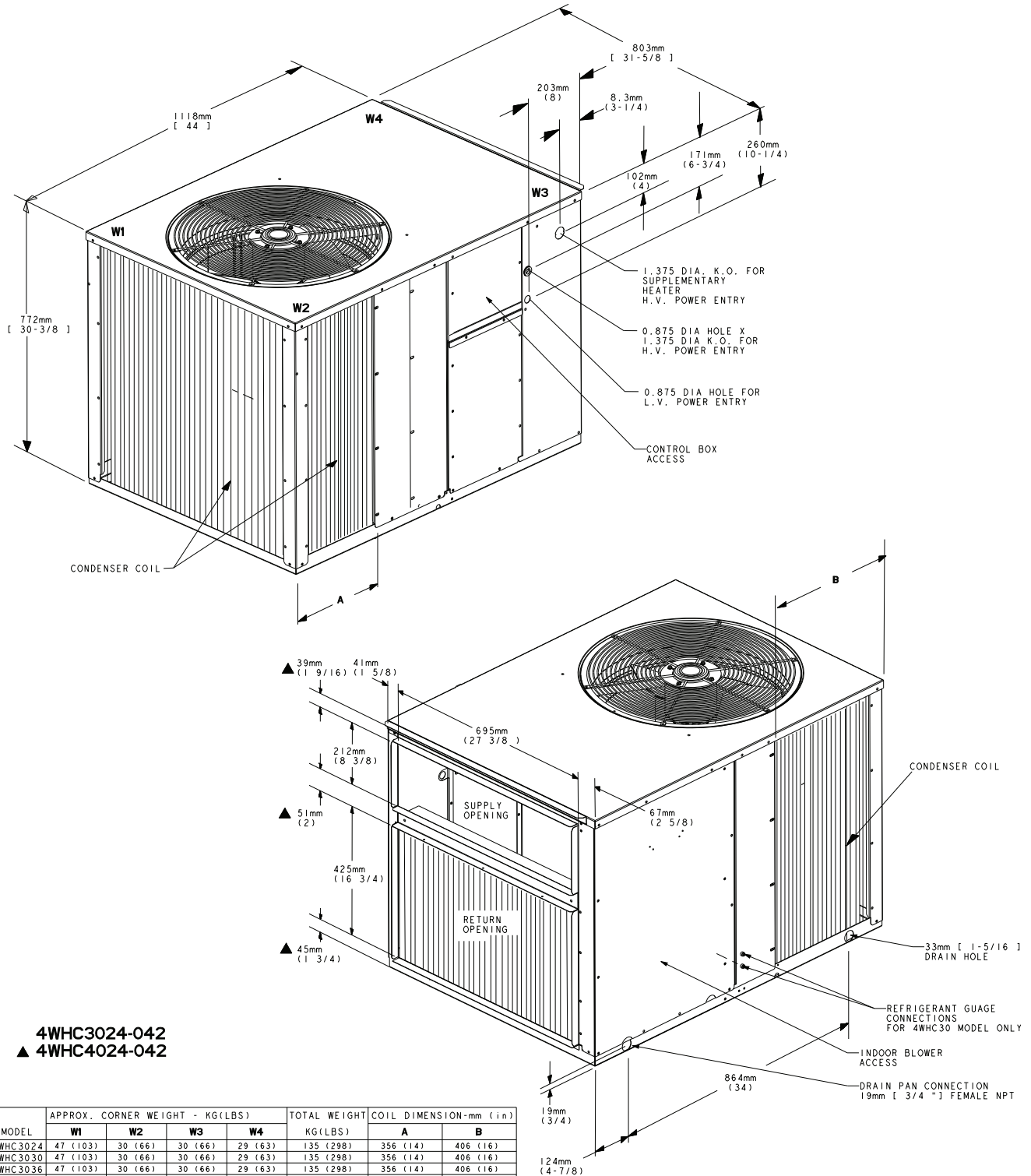
2. Check the unit's nameplate to determine if the unit is correct for the intended application. The power supply must be adequate for both the unit and all accessories.

**Note:** *If practical, install any internal accessories to the unit at the shop.*

**Note:** *The packaged units have been evaluated in accordance with the Code of Federal Regulations, Chapter XX, Part 3280 or equivalent. "SUITABLE FOR MOBILE HOME USE."*

# Step 2 – Determine Unit Clearances

Figure 1. Dimensional Drawing



MODEL	APPROX. CORNER WEIGHT - KG(LBS)				TOTAL WEIGHT KG(LBS)	COIL DIMENSION-mm (in)	
	W1	W2	W3	W4		A	B
4WHC3024	47 (103)	30 (66)	30 (66)	29 (63)	135 (298)	356 (14)	406 (16)
4WHC3030	47 (103)	30 (66)	30 (66)	29 (63)	135 (298)	356 (14)	406 (16)
4WHC3036	47 (103)	30 (66)	30 (66)	29 (63)	135 (298)	356 (14)	406 (16)
4WHC3042	39 (87)	37 (81)	30 (66)	33 (72)	139 (306)	508 (20)	406 (16)
▲ 4WHC4024	35 (78)	33 (73)	27 (59)	30 (65)	125 (275)	356 (14)	406 (16)
▲ 4WHC4030	35 (78)	33 (73)	27 (59)	30 (65)	125 (275)	356 (14)	406 (16)
▲ 4WHC4036	35 (78)	33 (73)	27 (59)	30 (65)	125 (275)	356 (14)	406 (16)
▲ 4WHC4042	39 (87)	37 (81)	30 (66)	33 (72)	139 (306)	508 (20)	406 (16)

## Step 3 – Location and Recommendation Information

1. Location of the unit must allow service clearance around it to ensure adequate serviceability, maximum capacity, and peak operating efficiency
  2. These units are designed for outdoor installation. They may be installed directly on a slab, wood flooring, or on Class A, B, or C roof covering material. The discharge air from the condenser fans must be unrestricted for a minimum of 3 feet above the unit
  3. Check the handling facilities to ensure the safety of personnel and the unit(s).
  4. The unit must be mounted level for proper drainage of water through the drain holes in the base pan.
  5. The unit should not be exposed to direct roof water runoff.
  6. Flexible duct connectors must be of a flame retardant material. All duct work outside of the structure must be insulated and weatherproofed in accordance with local codes.
  7. Holes through exterior walls or roof must be sealed in accordance with local codes.
  8. All fabricated outdoor ducts should be as short as possible.
3. Attach the supply and return air ducts to the unit as explained in the Ductwork Installation section.
  4. Flexible duct connectors must be of a flame retardant material. Insulate any ductwork outside of the structure with at least two (2) inches of insulation and weatherproof. There must be a weatherproof seal where the duct enters the structure.
  5. Do not expose the unit to direct roof water runoff.
  6. Seal all holes through exterior walls in accordance with local codes.
  7. Continue with the remaining installation sections.

### Lifting and Rigging:

**Important:** Do not lift the unit without test lifting for balance and rigging. Do not lift the unit in windy conditions or above personnel. Do not lift the unit by attaching clevis, hooks, pins, or bolts to the unit casing, casing hardware, corner lugs, angles, tabs, or flanges. Failure to observe these warnings may result in equipment damage.

1. Because of placement of internal components, the unit's weight may be unevenly distributed. Approximate unit weights are provided in the unit drawings.
2. When hoisting the unit, be sure that a proper method of rigging is used. Use slings and spreader bars for protection during lifting. Always test-lift the unit to determine the exact unit balance and stability before hoisting it to the installation location.
3. When the air ducts have been properly installed, the unit is ready to be hoisted to the roof and set in position.

### Clearances

1. The recommended clearances for single-unit installations are illustrated in "Step 2 – Determine Unit Clearances," p. 5
2. See the unit's nameplate for the absolute minimum clearance between the unit and any combustible surfaces

## Step 4 – Unit Installation

### To install the unit at ground level:

1. Place the unit on a pad the size of the unit or larger. The unit must be mounted level for proper drainage of water through the holes in the base pan.  
The pad must not come in contact with the structure. Be sure the outdoor portion of the supply and return air ducts are as short as possible.  
Unit requires vibration support as indicated in Figure 3, p. 8
2. Location of the unit must allow service clearance around it. Clearance of the unit must be given careful consideration. See "Step 2 – Determine Unit Clearances," p. 5

Any reduction of the unit clearances indicated in these illustrations may result in condenser coil starvation or the recirculation of warm condenser air. Actual clearances, which appear to be inadequate should be reviewed with a local engineer.

**Important:** The air outlet duct must have 1" clearance to combustible material downstream from the unit.

### Rooftop Installation – Flat Roof – No Frame:

For roof top applications using field fabricated ducts and sleeper rails rather than a curb or frame, use the following procedure:

1. Locate and secure the sleeper rails to the roof by bolting. Two (2) sleeper rails are required. One on each end to support the edges of the unit. See Figure 4, p. 9. Add flashing as required. Flashing must conform to local building codes.
2. Prepare the hole in the roof in advance of installing the unit.
3. Secure the airflow ducts to the roof.
4. All fabricated outdoor ducts should be as short as possible.
5. Place the unit on the rails.
6. The unit must be mounted level for proper drainage of water through the holes in the base pan.
7. Secure the unit to the rails.
8. Insulate any ductwork outside of the structure with at least two (2) inches of insulation and then

weatherproof. There must be a weatherproof seal where the duct enters the structure.

9. The unit should not be exposed to direct roof water runoff.
10. Flexible duct connectors must be of a flame retardant material. All duct work outside of the structure must be insulated and weatherproofed in accordance with local codes.
11. Access and service clearances for the unit must be given careful consideration when locating the duct entrance openings. See “[Step 2 — Determine Unit Clearances,](#)” p. 5
12. Continue with the remaining installation sections.

### Rooftop Installation — Frame Mounting

For roof top applications using field fabricated frame and ducts, use the following procedure:

1. Locate and secure the frame to the roof by bolting or welding. See [Figure 4, p. 9](#). Add flashing as required. Flashing must conform to local building codes.
2. Prepare the hole in the roof in advance of installing the unit.
3. Secure the airflow ducts to the roof.
4. All fabricated outdoor ducts should be as short as possible.
5. Place the unit on the frame.
6. The unit must be mounted level for proper drainage of water through the holes in the base pan.
7. Secure the unit to the frame.
8. Insulate any ductwork outside of the structure with at least two (2) inches of insulation and then weatherproof. There must be a weatherproof seal where the duct enters the structure.
9. The unit should not be exposed to direct roof water runoff.
10. Flexible duct connectors must be of a flame retardant material. All duct work outside of the structure must be insulated and weatherproofed in accordance with local codes.
11. Access and service clearances for the unit must be given careful consideration when locating the duct entrance openings. See “[Step 2 — Determine Unit Clearances,](#)” p. 5
12. Continue with the remaining installation sections.

### Ductwork Installation

When attaching ductwork to Roof Frame, follow these guidelines for ductwork construction:

Connections to the unit should be made with three (3) inch canvas connectors to minimize noise and vibration transmission.

Elbows with turning vanes or splitters are recommended to minimize air noise and resistance.

The first elbow in the ductwork leaving the unit should be no closer than two (2) feet from the unit, to minimize noise and resistance.

To prevent leaking, do not attach the ductwork to the bottom of the unit base.

### Attaching Ductwork to Unit

All conditioned air ductwork should be insulated to minimize heating and cooling duct losses. Use a minimum of two (2) inches of insulation with a vapor barrier. The outside ductwork must be weatherproofed between the unit and the building.

When attaching ductwork to a the unit, provide a flexible watertight connection to prevent noise transmission from the unit to the ducts. The flexible connection must be indoors and made out of heavy canvas.

**Note:** Do not draw the canvas taut between the solid ducts.

### Condensate Drain Piping

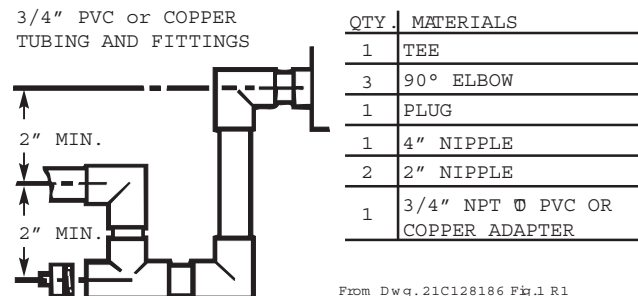
A 3/4-inch female NPT condensate drain connection is provided on the evaporator access panel end of the unit. Provide a trap and fill it with water before starting the unit to avoid air from being drawn through. Follow local codes and standard piping practices when running the drain line. Pitch the line downward away from the unit. Avoid long horizontal runs. See

**Note:** Do not use reducing fittings in the drain lines.

the condensate drain must be:

- Made of 3/4" pipe size.
- Pitched 1/4" per foot to provide free drainage to convenient drain system.
- Trapped
- Must not be connected to a closed drain system unless the trap is properly vented.

**Figure 2. Typical Condensate Drain Piping**



### Step 3 – Location and Recommendation Information

#### Air Filters

These units require filters with adequate filter area be provided in the return air duct. Refer to [Table 1, p. 8](#) for required information. The specific location of the filters depends on the type of installation and the layout of

the duct system. Be sure the owner is aware of the location of the filter and the need to change them as required. The Filter Size (Sq. Ft.) are based on 300 F.P. M. face velocity. If permanent filters are used, size per mfg. recommendation with clean resistance of .05" WC.

**Table 1. Determine Filter Size**

Unit	Nominal CFM	Filter <sup>(a)</sup> (Sq. Ft.) Size	Filter Resistance
4WHC4024A	800	2.67	0.05
4WHC4030A	1000	3.33	0.05
4WHC4036A	1200	4.00	0.05
4WHC4042A	1400	4.67	0.05

<sup>(a)</sup> Filters must be installed in the return air system. The square footages are based on 300 F.P.M. face velocity. If permanent filters are used, size per mfg. Recommendation with clear resistance of 0.05"WC.

**Figure 3. Ground Level Application**

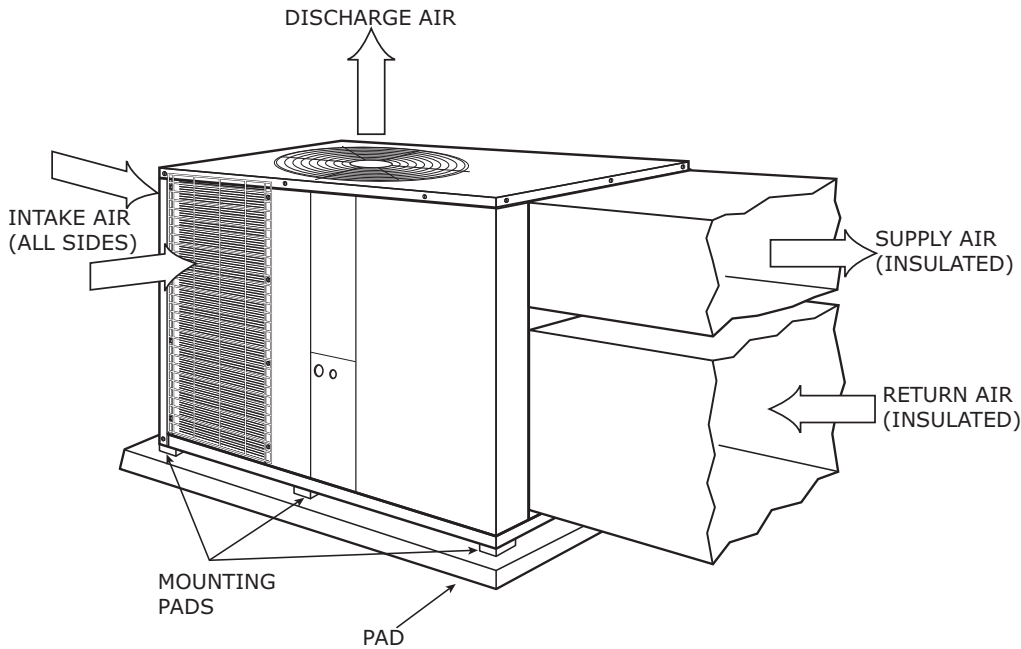
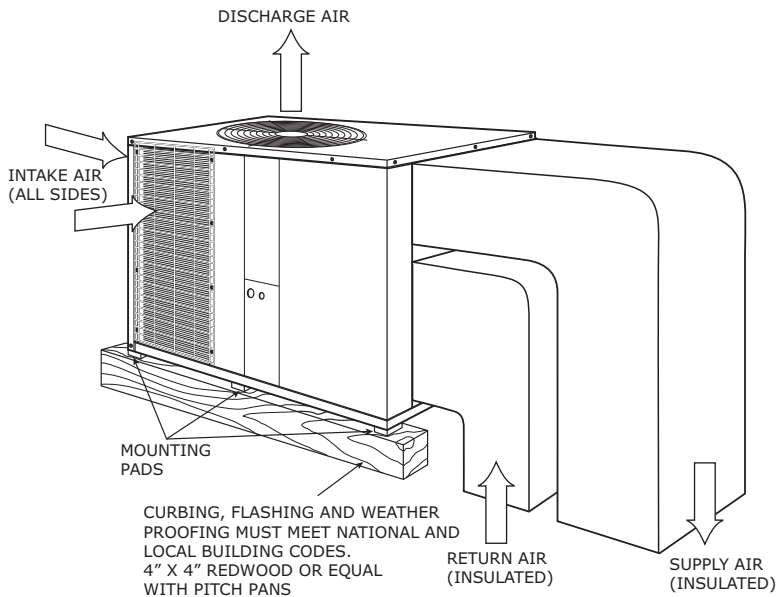




Figure 4. Typical Rooftop Frame Application



## Electrical Wiring

### ⚠ WARNING

#### INSTALLATION WARNING — HIGH VOLTAGE MOVING PARTS!

Failure to follow this Warning could result in property damage, severe personal injury, or death.

Bodily injury can result from high voltage electrical components, fast moving fans, and combustible gas. For protection from these inherent hazards during installation and servicing, the main gas valve must be turned off and the electrical supply must be disconnected. If operating checks must be performed with the unit operating, it is the technician's responsibility to recognize these hazards and proceed safely.

**Note:** This unit is factory wired for 230V. See wiring diagram for 208V conversion.

#### Electrical Connections

Electrical wiring and grounding must be installed in accordance with local codes or, in the absence of local codes, with the National Electrical Code ANSI/NFPA 70, Latest Revision.

#### Electrical Power

It is important that proper electrical power be available for the unit. Voltage variation should remain within the limits stamped on the unit nameplate.

#### Disconnect Switch

Provide an approved weatherproof disconnect within close proximity and within sight of the unit.

#### Over Current Protection

The branch circuit feeding the unit must be protected as shown on the unit's rating plate.

#### Power Wiring

The power supply lines must be run in weather-tight conduit to the disconnect and into the bottom of the unit control box. Provide strain relief for all conduit with suitable connectors.

Provide flexible conduit supports whenever vibration transmission may cause a noise problem within the building structure.

Ensure all connections are made tight.

1. For branch circuit wiring (main power supply to the unit disconnect), wire size for the length of run should be determined using the circuit ampacity found on the unit nameplate and the N.E.C.
2. For more than 3 conductors in a raceway or cable, see the N.E.C. for derating the ampacity of each conductor.
3. Wire size is based on 75 degrees C rated wire insulation.

### ⚠ CAUTION

#### GROUNDING REQUIRED!

Failure to inspect or use proper service tools may result in equipment damage or personal injury. Reconnect all grounding devices. All parts of this product that are capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

#### Accessories

## Step 3 — Location and Recommendation Information

All electrical accessories must be installed and wired according to the instructions packaged with the accessory.

### Control Wiring (Class II)

Low voltage control wiring should not be run in the same conduit with the power wiring unless Class I wire of the proper voltage rating is used. Route the thermostat cable or equivalent single leads of No. 18 AWG colored wire from the thermostat subbase terminals through the rubber grommet on the unit. See Figure 1 for the control entry location. Make connections as shown on the unit wiring diagram.

Do not short thermostat wires since this will damage the control transformer.

Recommended wire sizes and lengths for installing the unit thermostat are provided in [Table 2, p. 10](#): Thermostat Wire Size and Maximum Length. The total resistance of these low voltage wires must not exceed one (1) ohm. Any resistance in excess of one (1) ohm may cause the control to malfunction because of the excessive voltage drop.

**Important:** Upon completion of wiring check all electrical connections, including factory wiring within the unit. Make sure all connections are tight. Replace and secure all electrical box covers and access doors before leaving the unit or turning on the power to the unit.

After all electrical wiring is complete, set the thermostat system switch on the OFF position so that the compressor will not run and then apply power by closing the system main disconnect switch. This will activate the compressor sump heat. Do not change the Thermostat System Switch until power has been applied long enough to evaporate any liquid R-410A in the compressor. It is recommended that the sump heat be energized for a minimum of eight (8) hours prior to starting the unit.

**Table 2. Thermostat Wire Size and Max. Length**

Wire Size	Maximum Length
18	75
16	125
14	200

## Step 5 — Unit Startup

### ⚠ WARNING

#### SAFETY HAZARD!

Fiberglass dust and ceramic fibers are believed by the state of California to cause cancer through inhalation. Glasswool fibers may also cause respiratory, skin, or eye irritation.

#### PRECAUTIONARY MEASURES

- Avoid breathing fiberglass dust
- Use a NIOSH approved dust/mist respirator
- Avoid contact with the skin or eyes. Wear long-sleeved, loose fitting clothing, gloves, and eye protection
- Wash clothes separately from other clothing, rinse washer thoroughly
- Operations such as sawing, blowing, tear-out, and spraying may generate fiber concentrations requiring additional respiratory protection. Use the appropriate NIOSH approved respirator in these situations

#### FIRST AID MEASURES

- EYE CONTACT: FLUSH EYES WITH WATER TO REMOVE DUST. IF SYMPTOMS PERSIST, SEEK MEDICAL ATTENTION.
- SKIN CONTACT: WASH AFFECTED AREA GENTLY WITH SOAP AND WARM WATER AFTER HANDLING.

This warning complies with state of California law, Proposition 65.

#### Pre-Start Quick Checklist

- Is the unit properly located and level with the proper clearances? See "[Step 2 — Determine Unit Clearances](#)," p. 5
- Is the duct work correctly sized, run, taped, insulated, and weatherproofed with proper unit arrangement as shown in the ductwork installation section?
- Is the condensate line properly sized, run, trapped, and pitched and shown in the Condensate Drain Piping section?
- Is the filter of the correct size and quantity? Is it clean and in place? See Air Filter Installation section.
- Is the wiring properly sized and run according to the unit wiring diagram?
- Are all the wiring connections, including those in the unit tight?
- Has the unit been properly grounded and fused with the recommended fuse size?
- Is the thermostat well located, level, and correctly wired? See Electrical Wiring section
- Have the air conditioning systems been checked at the service ports for charge and leak tested if necessary?
- Do the condenser fan and indoor blower turn free without rubbing and are they tight on the shafts?

- Has all work been done in accordance with applicable local and national codes?
- Are all covers and access panels in place to prevent air loss and safety hazards?

### Starting the Unit in the Cooling Mode

**Important:** Before starting the system in the cooling cycle, turn the thermostat switch to “OFF” and close the unit disconnect switch. This procedure energizes the compressor crankcase heat (if equipped) thereby vaporizing any liquid R-410A in the crankcase. This is a precaution against foaming at start-up which could damage the compressor. Allow the heat to operate for a minimum of eight (8) hours.

**Note:** The crankcase heater is a field installed option on some models.

**Note:** See the section on “Sequence of Operation” for a description of the cooling operating sequence.

- To start the unit in the cooling mode, set the thermostat system switch to COOL. Move the thermostat COOL indicator to a setting below room temperature. The outdoor fan motor, compressor, and evaporator fan motor will operate automatically.

### Operating Pressures

After the unit has operated in the cooling mode for a short time, install pressure gauges on the gauge ports of the discharge and suction line valves. Check the suction and discharge pressures and compare them to the normal operating pressures provided in the unit's SERVICE FACTS.

**Note:** Do not use the PRESSURE CURVES from the unit's SERVICE FACTS to determine the unit refrigerant charge. The correct charge is shown on the unit nameplate. To charge the system accurately, weigh in the charge according to the unit nameplate and check subcooling against the Subcooling Charging Table in the SERVICE FACTS.

### Voltage

With the compressor operating, check the line voltage at the unit. The voltage should be within the range shown on the unit nameplate. If low voltage is encountered, check the size and length of the supply line from the main disconnect to the unit. The line may be undersized for the length of the run.

### Cooling Shut Down

- Place the system selector switch in the OFF position or reset the thermostat at a setting above the room temperature.
- Do not de-energize the main power disconnect except when the unit is to be serviced. Power is required to keep the compressor crankcase heat (if equipped) energized and boil off refrigerant in the compressor.

### Starting the Unit in the Heating Mode

**Note:** See the section on “Sequence of Operation” for a description of the heating operating sequence.

- Check to make sure that all grilles and registers are open and all unit access doors are closed before start-up.
- To start the unit in the heating mode, set the thermostat system switch to HEAT. Move the thermostat HEAT indicator to a setting above room temperature and place the fan switch in the AUTO or ON positions. The indoor fan motor will operate automatically.
- The thermostat must provide a “G” signal for fan operation. If using an auto changeover thermostat, see figures 5 and 6 for the appropriate connections.

### Heating Shut Down

- Place the system selector switch to the OFF position or place the heating selector lever at a setting below the room temperature.

# Sequence of Operation

## General

Operation of the system heating and cooling cycles is automatic when the system is in the HEAT or COOL functions (the optional automatic changeover thermostat, when in the AUTO position, automatically changes to heat or cool with an appropriate room temperature change). The fan switch can be placed in the ON position, causing continuous evaporator (indoor) fan operation or placed in the AUTO position causing fan operation to coincide with heating or cooling run cycles.

## Cooling Mode

Note that the TSH and TSC are contacts that are internal to the indoor thermostat.

With the disconnect switch is in the ON position, current is supplied to the control transformer. The cooling cycle is enabled through the low voltage side of the control transformer to the "R" terminal on the indoor thermostat. With the system switch in the AUTO position and TSC-1 contacts closed, power is supplied to the "O" terminal on the indoor thermostat to the switch-over valve coil (SOV). This energizes the switch-over valve (SOV) and places it in the cooling position (it is in the heating position when de-energized).

When the indoor temperature rises 1-1/2 degrees, TSC-2 contacts close, supplying power to the "Y" terminal on the indoor thermostat, and to the compressor contactor (CC). This starts the outdoor fan motor and compressor. The TSC-2 contacts also provide power to the "G" terminal which provides power to the indoor fan motor.

## Heating Mode

With the disconnect switch in the ON position, current is supplied to the control transformer. Starting at the "R" terminal on the indoor thermostat, current goes through the system switch (which is in AUTO position) to the TSH-1 contacts. When closed, these contacts supply power to terminal "Y" on the indoor thermostat. Power is provided from "Y" to the compressor contactor (CC) which starts the compressor and outdoor fan motor. The indoor thermostat contact TSH-1 also provides power to "G" terminal on the indoor thermostat energizing the indoor fan motor.

## Supplementary Heat

The supplementary electric heat is brought on when the indoor temperature drops 1-1/2 degrees below the thermostat setting. TSH-2 contacts close providing power to the "W" terminal on the indoor thermostat and to the supplementary heater control circuit. An outdoor thermostat may have been added to disallow

the second stage (if provided) of electric heat above a selected outdoor temperature. If the outdoor temperature falls below the setting on the outdoor thermostat this additional heater stage will come on. When the outdoor air temperature rises, and the outdoor T-stat setpoint is reached, the system will revert back to first stage electric heating.

When the indoor ambient is satisfied, TSH-2 contacts will open and the unit will revert back to the compressor only heating mode and then off. For **emergency heat** (use of supplementary electric heat only), and emergency (EMERG) heat switch is provided within the thermostat. When placed in the emergency heat position, it will disable the compressor, bypass the outdoor thermostats, if provided, and engage the supplementary electric heaters and indoor fan.

## Demand Defrost Operation

During the heating cycle, the outdoor coil may require a defrost cycle which is determined by the demand defrost control (DFC). This control continuously measures the outdoor coil temperature (CBS) and the outdoor ambient temperature (ODS-B) and calculates the difference or delta-T measurement. When the calculated delta-T is met, the demand defrost control (DFC) opens the circuit to the outdoor fan motor (ODM) and energizes the switch-over valve (SOV), placing the unit in the cooling mode to defrost the outdoor coil. The outdoor coil temperature sensor (CBS) terminates the defrost cycle, or times out after fifteen minutes in defrost, the (DFC) energizes the outdoor fan motor (ODM) and twelve seconds later de-energizes the (SOV), which returns the unit to the heating mode. Supplementary electric heat, if provided, is brought on to control indoor temperature during the defrost cycle.

## Defrost Control

The demand defrost control measures heat pump outdoor ambient temperature with sensor located outside the outdoor coil. A second sensor located on the outdoor coil is used to measure the coil temperature. The difference between the ambient and the colder coil temperature is the difference or delta-T measurement. This delta-T measurement is representative of the operating state and relative capacity of the heat pump system. Measuring the change in delta-T determines the need for defrost. The coil sensor also senses outdoor coil temperature for termination of the defrost cycle.

**Note:** Refer to the Service Facts for fault detecting, test sensor and checkout procedures.

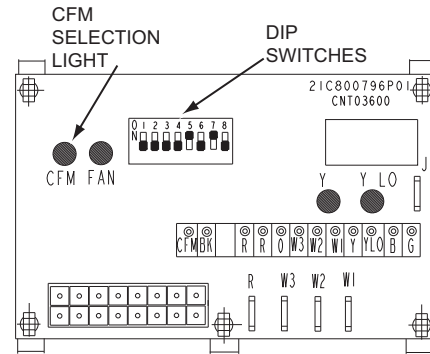
**ECM Fan Motor Adjustments (4WHC4042 ONLY)**

If the airflow needs to be increased or decreased, see the Airflow Table in the Service Facts. Information on changing the speed of the blower motor is in the Blower Performance Table.

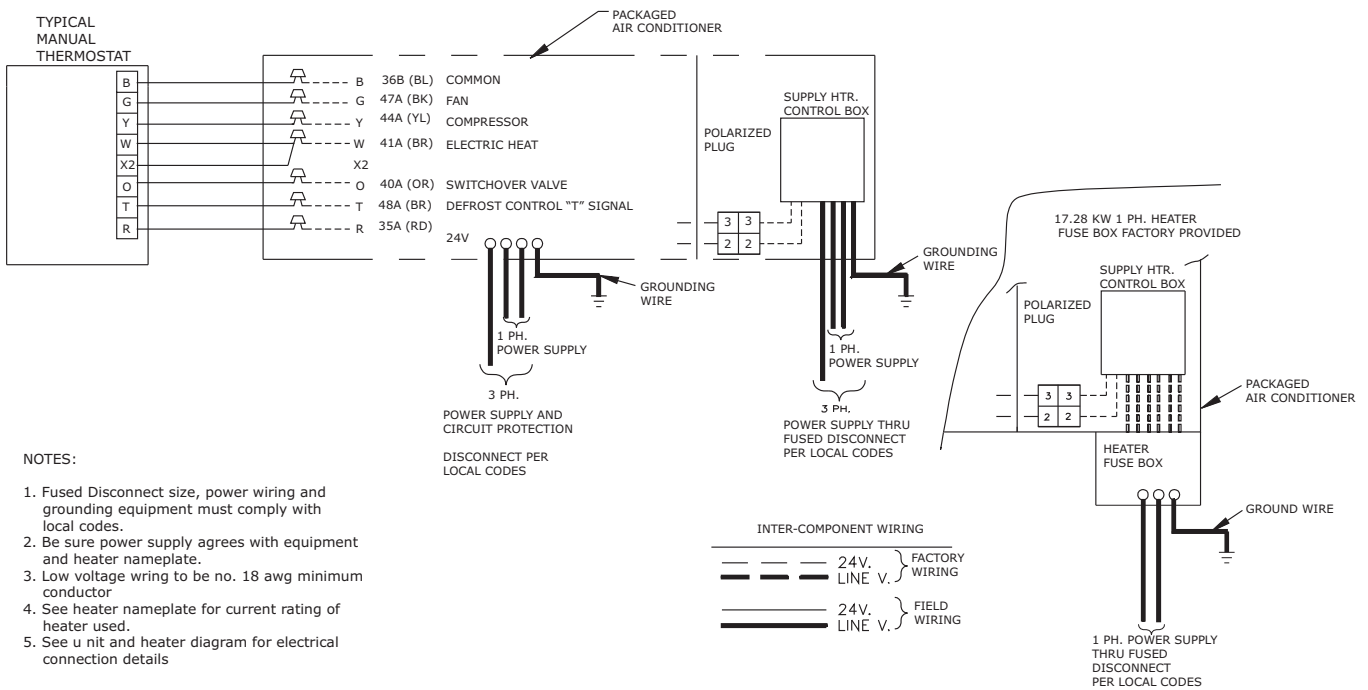
Blower speed changes are made on the ICM Fan Control mounted in the control box. The ICM Fan Control controls the variable speed motor.

There is a bank of 8 dip switches located at the upper left side of the board. The dip switches work in pairs to match the cooling/heat airflow (CFM/TON), Fan off-delay options, and electric heat airflow adjustment. The switches appear as shown in Figure 6.

**Figure 5. ECM Fan Control**



**Figure 6. Field Hookup Diagram (With Supplementary Heaters)**



**Final Installation Checklist**

**Important:** Perform a final unit inspection to be sure that factory tubing has not shifted during shipment. Adjust tubing if necessary so tubes do not rub against each other when the unit runs. Also be sure that wiring connections are tight and properly secured.

- Does the unit run and operate as described in the Sequence of Operation section in response to the room thermostat?
- Are the condenser fan and indoor blower operating correctly with proper rotation and without undue noise?
- Is the compressor operating correctly and has the system been checked with a charging chart?

- Has the voltage and running current been checked to determine if it is within limits?
- Has the thermostat been checked for calibration and the air discharge grills adjusted to balance the system?
- Has the ductwork been checked for air leaks and condensation?
- Has the heating air temperature rise been checked?
- Has the unit been checked for tubing and sheet metal rattles? Are there any other unusual noises to be checked?
- Are all covers and panels in place and properly fastened?
- Has the owner been instructed on the proper operation and maintenance of the unit? Be sure to leave this manual with the owner.

## Sequence of Operation

**Table 3. Defrost Board Sensor Table**  
**Temperature Relation to Resistance and D.C. Voltage**

TEMP (°F)	RESISTANCE	DC Voltage ± 15%
85	8.04K	0.83 VDC
80	9.10K	0.92 VDC
75	10.24K	1.01 VDC
70	11.59K	1.12 VDC
65	13.14K	1.24 VDC
60	14.93K	1.36 VDC
55	17.00K	1.50 VDC
50	19.41K	1.64 VDC
45	22.20K	1.80 VDC
40	25.45K	1.96 VDC
35	29.25K	2.13 VDC
30	33.70K	2.32 VDC
25	38.93K	2.51 VDC
20	45.08K	2.70 VDC
15	52.34K	2.90 VDC
10	60.93K	3.09 VDC
5	71.12K	3.29 VDC
0	83.27K	3.48 VDC

See Service Facts for more Information.

## Maintenance

### Owner Maintenance

Some of the periodic maintenance functions of the unit can be performed by the owner; this includes replacing the disposable or cleaning the permanent air filters, cleaning the unit cabinet, cleaning the condenser coil, and conducting a general unit inspection on a regular basis.

### Filters

When the system is in constant operation, inspect the filters at least once each month.

If the unit has disposable-type filters, replace them with new filters of the same type and size. **Do not attempt to clean disposable filters.**

Permanent-type filters can be cleaned by washing them with a mild detergent and water. Make sure that the filters are thoroughly dry before reinstalling them in the unit (or duct system).

**Note:** *It may be necessary to replace permanent filters annually if washing fails to clean the filter or if the filter shows signs of deterioration. Be sure to use the same type and size as was originally installed.*

### Condenser Coil

Be sure to keep all vegetation and debris away from the condenser coil area.

### Service Maintenance

#### Cooling Season

To keep the unit operating safely and efficiently, the manufacturer recommends that a qualified service technician check the entire system at least once each year or sooner if needed. The service technician should examine these areas of the unit:

- filters (for cleaning or replacement)
- motors and drive system components
- safety controls (for mechanical cleaning)
- electrical components and wiring (for possible replacement and connection tightness)
- condensate drain (for proper sealing and cleaning)
- unit duct connections (to see that they are physically sound and sealed to the unit casing)
- unit mounting support (for structural integrity)
- the unit (for obvious unit deterioration)

#### Heating Season

Complete the following unit inspections and service routines at the beginning of each heating season.

- Visually inspect the unit to ensure that the airflow required for combustion and condenser coil is not obstructed from the unit.
- Inspect the control panel wiring to verify that all electrical connections are tight and that the wire insulation is intact.

**Important Product Information**

Registering your products helps provide you with one of the strongest manufacturer limited warranties available. To register, go to the manufacturer’s website or contact your dealer. You will need the serial number, model number, and installation date for each product

being registered. Your dealer may have included these on your invoice or can provide a list for you to use. Please take a few moments to record the following information to ensure your product registration process is quick and easy:

Packaged Unit Serial Number \_\_\_\_\_  
Packaged Unit Model Number \_\_\_\_\_  
Date of Installation \_\_\_\_\_  
Dealer \_\_\_\_\_

**Service Information**

Call your installing dealer if the unit is inoperative. Before you call, always check the following to be sure service is required:

- 1. Be sure the main switch that supplies power to the unit is in the ON position.
- 2. Replace any burned-out fuses or reset circuit breakers.
- 3. Be sure the thermostat is properly set.

Service Phone \_\_\_\_\_

## About Trane and American Standard Heating and Air Conditioning

Trane and American Standard create comfortable, energy efficient indoor environments for residential applications. For more information, please visit [www.trane.com](http://www.trane.com) or [www.americanstandardair.com](http://www.americanstandardair.com).

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The AHRI Certified mark indicates company participation in the AHRI Certification program. For verification of individual certified products, go to [ahridirectory.org](http://ahridirectory.org).

The manufacturer has a policy of continuous data improvement and it reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.

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