

INSTALLATION MANUAL

VARIABLE SPEED ECM SINGLE PIECE MULTI-POSITION AIR HANDLERS

MODELS: AVC SERIES



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SECTION I: GENERAL

The single piece air handler series provides the flexibility for installation in any position. This unit may be used for upflow, downflow, horizontal right, or horizontal left applications.

These units may be located in a closet, utility room, attic, crawl space, or basement. These versatile models may be used for cooling or heat pump operation with or without electric heat.

Top or side power and control wiring, color coded leads for control wiring, easy to install drain connections, and electric heaters all combine to make the installation easy and minimize installation cost.

Electric heat kits are available as field installed accessories. Single phase kits are available from 2.5 kW to 25 kW.

SECTION II: SAFETY



This is a safety alert symbol. When you see this symbol on labels or in manuals, be alert to the potential for personal injury.

Understand and pay particular attention to the signal words **DANGER**, **WARNING**, or **CAUTION**.

DANGER indicates an **imminently** hazardous situation, which, if not avoided, **will result in death or serious injury**.

WARNING indicates a **potentially** hazardous situation, which, if not avoided, **could result in death or serious injury**.

CAUTION indicates a potentially hazardous situation, which, if not avoided **may result in minor or moderate injury**. It is also used to alert against unsafe practices and hazards involving only property damage.

WARNING

FIRE OR ELECTRICAL HAZARD

Failure to follow the safety warnings exactly could result in serious injury, death or property damage. A fire or electrical hazard may result causing property damage, personal injury or loss of life.

⚠ WARNING

The air handler area must *not* be used as a broom closet or for any other storage purposes, as a fire hazard may be created. Never store items such as the following on, near or in contact with the furnace.

1. Spray or aerosol cans, rags, brooms, dust mops, vacuum cleaners or other cleaning tools.
2. Soap powders, bleaches, waxes or other Cleaning compounds; plastic items or containers; gasoline, kerosene, cigarette lighter fluid, dry cleaning fluids or other volatile fluid.
3. Paint thinners and other painting compounds.
4. Paper bags, boxes or other paper products

Never operate the air handler with the blower door removed. To do so could result in serious personal injury and/or equipment damage.

⚠ WARNING

Improper installation, adjustment, alteration, or maintenance may create a condition where the operation of the product could cause personal injury or property damage. Refer to this manual for assistance, or for additional information, consult a qualified contractor, installer, or service agency.

⚠ CAUTION

This product must be installed in strict compliance with the installation instructions and any applicable local, state, and national codes including, but not limited to building, electrical, and mechanical codes.

SAFETY REQUIREMENTS

1. Failure to carefully read and follow all instructions in this manual can result in air handler malfunction, death, personal injury and/or property damage.
2. This air handler should be installed in accordance with all national and local building/safety codes and requirements, local plumbing or wastewater codes, and other applicable codes.
3. This air handler should be installed only in a location and position specified in the "Unit Installation" section of this Instruction Manual.
4. The air handler is not to be used for temporary heating of buildings or structures under construction.
5. Always install the air handler to operate within the air handler's intended maximum outlet air temperature.

6. The unit rating plate displays the air handler model number. The unit dimensions for the supply air plenum are provided in Figure 3 and Table 1 of this Instruction Manual. The plenum must be installed according to the instructions.
7. Clearance from combustibile material is provided under "Clearances" in the "Unit Installation" section.

⚠ CAUTION

DO NOT lift air handler by the cabinet braces. The cabinet braces are held in place by the coil channels. The cabinet braces could become disengaged from the cabinet causing the air handler to fall, potentially causing injury or damaging property. See Figure 1 for location of cabinet braces. Lift the air handler by tightly gripping the casing.

8. It is necessary to maintain clearances for servicing. Access must be allowed for electric heaters and blower.
9. The unit rating plate and power supply must be verified to ensure that the electrical characteristics match.
10. Air handler shall be installed so the electrical components are protected from water.
11. Installing and servicing heating/cooling equipment can be hazardous due to the electrical components. Only trained and licensed personnel should install, repair, or service heating/cooling equipment. Unlicensed service personnel can perform basic maintenance functions such as cleaning and replacing the air filters. When working on heating/cooling equipment, the precautions in the manuals and on the labels attached to the unit and other safety precautions must be observed as applicable.

⚠ CAUTION

These air handlers should be transported & handled in an upright, upflow position. Failure to do so may result in unit damage and personal injury. Configuration conversions should be done at site of installation.

12. These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances these instructions exceed certain local codes and ordinances, especially those who have not kept up with changing residential and non-HUD modular home construction practices. These instructions are required as a minimum for a safe installation.

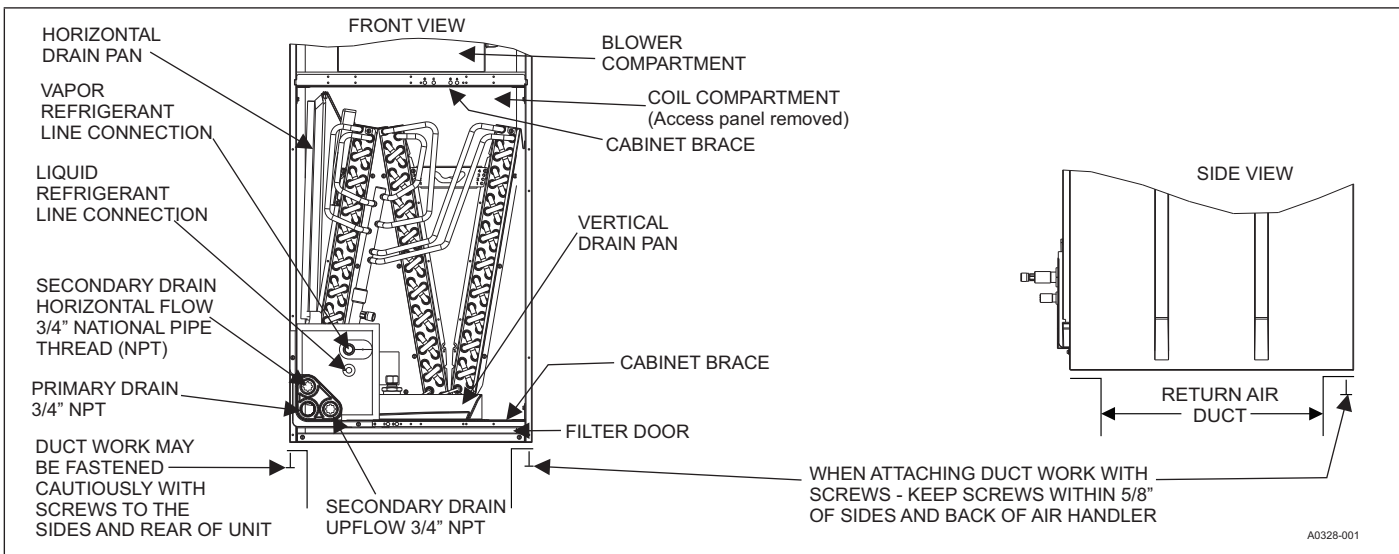


FIGURE 1: Return Air Duct Attachment & Component Location

INSPECTION

As soon as a coil is received, it should be checked to insure it is still under pressure per Figure 2. The coil should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing. The Local Distributor should be consulted for more information. The drain pan should be checked for cracks or breakage. Before installation, the unit should be checked for screws or bolts which may have loosened in transit. There are no internal shipping or spacer brackets that need to be removed.

It should be verified that all accessories such as heater kits and coils are available. Installation of these accessories or field conversion of the unit should be accomplished before setting the unit in place or connecting any wiring, duct work or piping.

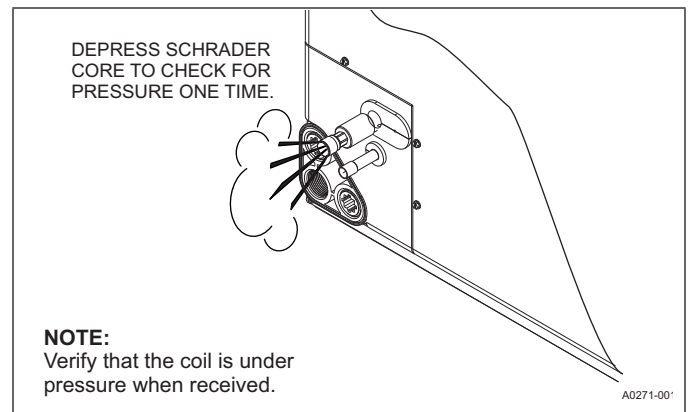


FIGURE 2: Pressure Check

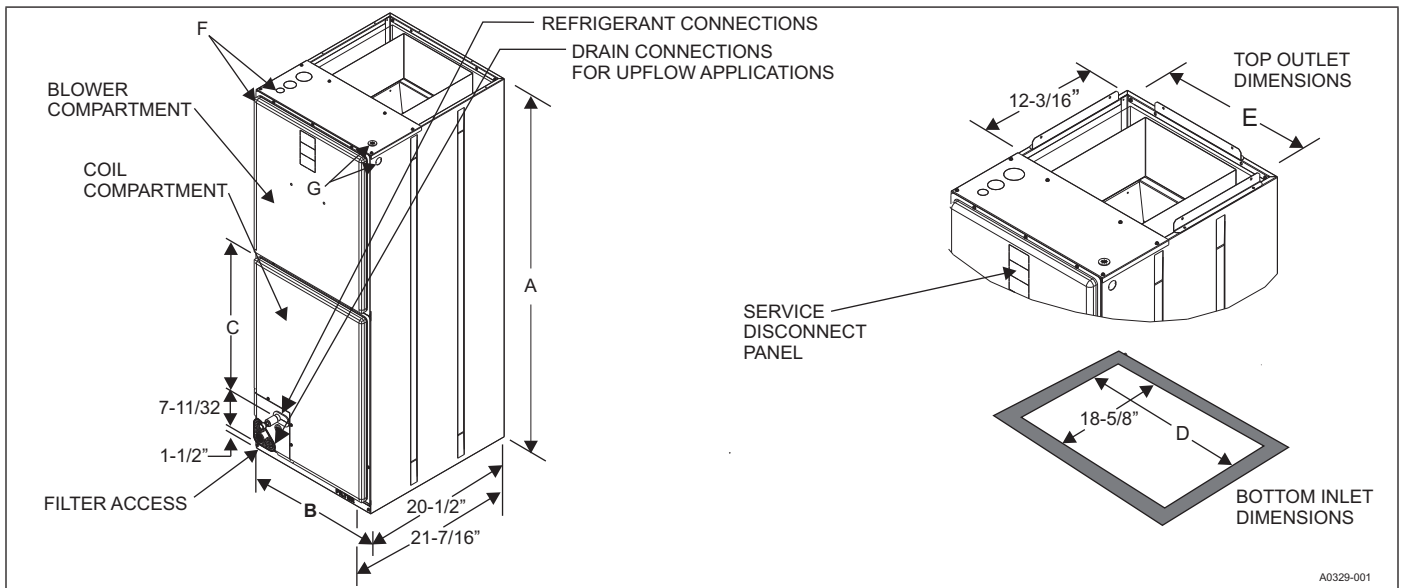


FIGURE 3: Dimensions & Duct Connection Dimensions

TABLE 1: Dimensions¹

Models	Dimensions					Wiring Knockouts ²		Refrigerant Connections Line Size	
	A	B	C	D	E	F	G	Liquid	Vapor
	Height	Width				Power (Conduit)	Control (Conduit)		
18B	41	17-1/2	12-7/8	14-1/4	16-1/2	7/8 (1/2) 1-3/8 (1) 1-23/32 (1-1/4)	7/8 (1/2)	3/8	3/4
24B	41	17-1/2	12-7/8	14-1/4	16-1/2				
30B	47-1/2	17-1/2	19-1/2	14-1/4	16-1/2				
36B	47-1/2	17-1/2	19-1/2	14-1/4	16-1/2				
36C	51-1/2	21	22-5/8	17-3/4	20				
42C	51-1/2	21	22-5/8	17-3/4	20				
48C	51-1/2	21	22-5/8	17-3/4	20			7/8	
48D	55-1/2	24-1/2	26-5/8	21-1/4	23-1/2				
60C	55-3/4	21	26-7/8	17-3/4	20				
60D	55-1/2	24-1/2	26-5/8	21-1/4	23-1/2				

1. All dimensions are in inches.
 2. Knockout size (conduit size in parentheses).

SECTION III: UNIT INSTALLATION

NOTICE

Avoid handling aluminum coil components after handling the copper line set or other tubing without first cleaning hands.

UNIT SIZING

1. The size of the unit should be based on an acceptable heat loss or gain calculation for the structure. The ACCA – Manual J or other approved methods may be used. Reference Figure 3 and Table 1.
2. Only connect the air handler to a duct system which has an external static pressure within the allowable range.
3. Airflow must be within the minimum and maximum limits approved for electric heat, indoor coils and outdoor units.

Entering Air Temperature Limits			
Wet Bulb Temp. °F		Dry Bulb Temp. °F	
Min.	Max.	Min.	Max.
57	72	65	95

4. When an air handler is installed so that supply ducts carry air circulated by the air handler to areas outside the space containing the air handler, the return air shall also be handled by duct(s) sealed to the air handler casing and terminating in the space to be cooled/heated.
5. Refer to the unit rating plate for the air handler model number, and then see the dimensions page of this instruction for supply air plenum dimensions. The plenum must be installed according to the instructions.
6. The installer must check available supply power and verify that it is within the normal operating voltage range for the unit. The acceptable voltage range for these units is as follows:

Air Handler Voltage	Normal Operating ¹ Voltage Range
208V-230V-1-60	187V-253V

1. Rated in accordance with ARI Standard 110, utilization range "A".

CLEARANCES

Clearances must be taken into consideration, and provided for as follows:

1. Refrigerant piping and connections - minimum 12" recommended.
2. Maintenance and servicing access - minimum 36" from front of unit recommended for blower motor / coil replacement.
3. Condensate drain lines routed to clear filter and panel access.
4. Filter removal - minimum 36" recommended.
5. The duct work connected to this unit is designed for zero clearance to combustible materials.
6. A combustible floor base accessory is available for downflow applications of this unit, if required by local code.

LOCATION

Location is usually predetermined. Check with owner's or dealer's installation plans. If location has not been decided, consider the following in choosing a suitable location:

1. Select a location with adequate structural support, space for service access, and clearance for air return and supply duct connections.
2. Using hanging brackets to wall mount this single piece air handler unit is not recommended.
3. Normal operating sound levels may be objectionable if the air handler is placed directly over some rooms such as bedrooms, study, etc.
4. Select a location that will permit installation of condensate line to an open drain or outdoors allowing condensate to drain away from structure.

NOTICE

The primary and secondary drain line must be trapped to allow proper drainage of condensate water. The secondary drain line should be piped to a location that will give the occupant a visual warning that the primary drain is clogged. If the secondary drain line is not used, it must be capped.

5. When an indoor coil is installed in an attic or above a finished ceiling, an auxiliary drain pan should be provided under the air handler as is specified by most local building codes.
6. Proper electrical supply must be available.
7. If unit is located in an area of high humidity (i.e. an unconditioned garage or attic), nuisance sweating of casing may occur. On these installations, unit duct connections and other openings should be properly sealed, and a wrap of 2" fiberglass insulation with vinyl vapor barrier should be used.

AIR HANDLER CONFIGURATION

These air handler units are supplied ready to be installed in an upflow or horizontal left position. Refer to Figure 4. If the unit requires either downflow or horizontal right airflow configurations, the unit must have the coil assembly repositioned. Refer the Downflow or Horizontal Right Conversion procedures.

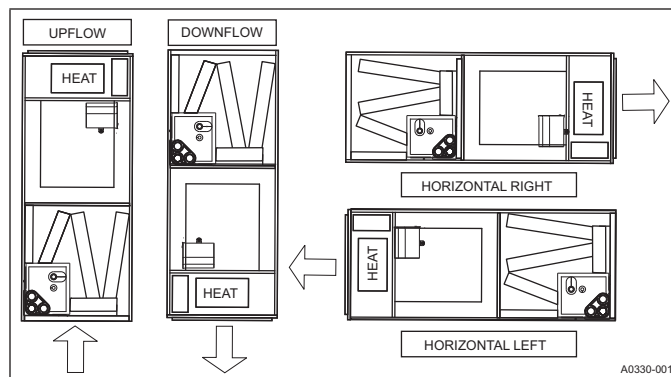


FIGURE 4: Typical Installation

DOWNFLOW OR HORIZONTAL RIGHT CONVERSION

NOTICE

Convert air handler to correct orientation prior to installation. Conversion must be made before brazing the refrigerant connections to the coil.

1. Remove coil access panel.
2. Slide coil/drain pan assembly out of air handler.

NOTICE

The center support bar for the coil/drain pan has a position identifier embossed into the cabinet structure between the two forward fingers of the support bar. There are four position identifiers: A, B, C, or D. The lettered hole location can differ from unit to unit due to the cabinet width of the air handler. After removal and reinstallation, the center support bar must be installed in the same lettered position that it was originally.

3. Note the lettered position of the center support bar for the coil/drain pan. Remove the center support bar by sliding the forward end of the support bar to the right or left until the lower finger clears the structure.

NOTICE

The position identifier for the coil slide rail is embossed into the back corner vertical angle of the cabinet structure. There are four position identifiers: 1, 2, 3, or 4. The numbered attachment location can differ from unit to unit due to the cabinet height of the air handler. After removal and reinstallation, the coil slide rail must be installed in the same numbered position that it was originally.

- Note the numbered position of the coil slide rail located at the upper right hand side of the indoor coil compartment. Remove slide rail from air handler cabinet by removing front screw and lowering bracket down to disengage hook on back of slide rail.
- Turn air handler cabinet upside down (downflow position).
- Install coil slide rail by hooking the aft end into holes at the numbered position the slide rail was originally in right rear corner post, and secure rail into right front edge of cabinet with screw in the pre-drilled hole.

NOTICE

The aft fingers of the center support bar are longer than the fingers on the forward end of the support bar.

- Install center support bar for the coil/drain pan onto the lettered position that it was originally mounted.
- For horizontal right applications, the front and back coil blow off wings must be installed (blow off wings shipped in loose parts bag). Locate 4 screws securing coil delta plates to coil drain pan. Loosen the screws. Slide each coil blow off wing between the drain pan and the coil delta plate. Tighten screws to secure coil blow off wings. Refer to Figure 5.
- Slide the coil back into the cabinet. Be sure to engage the side coil slide into the slide rail on the air handler cabinet.
- Install coil access panel. Conversion is now complete.

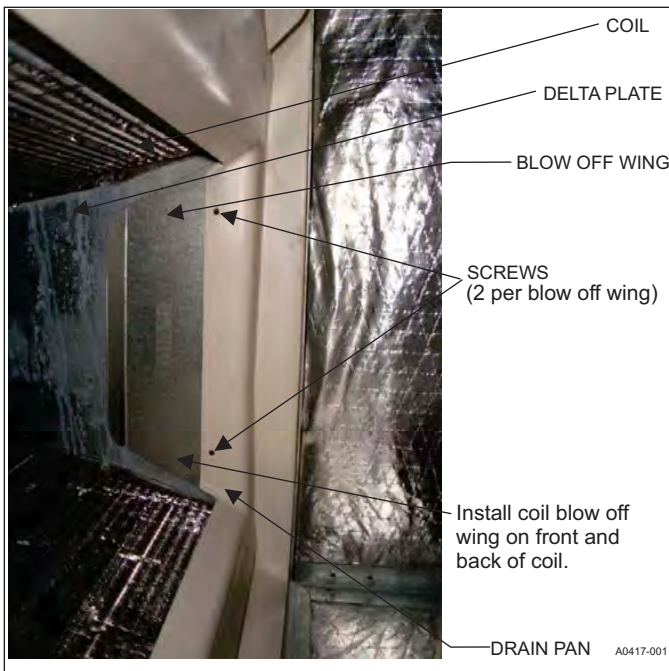


FIGURE 5: Coil Blow Off Wing Installation

SECTION IV: DUCT WORK AND CONNECTIONS

Air supply and return may be handled in one of several ways best suited to the installation. Upflow, horizontal or downflow applications may be used.

The vast majority of problems encountered with heating and cooling systems can be linked to improperly designed or installed duct systems. It is therefore highly important to the success of an installation that the duct system be properly designed and installed.

When installing a central air return grille in or near the living space, it is advisable to design the duct work so that the grille is not in direct line with the opening in the unit. One or two elbows and acoustical duct liner assures a quieter system. Operation where return air duct is short or where sound may be a problem, acoustical duct liner should be used inside the duct. Use flexible duct connectors to minimize the transmission of vibration/noise into the conditioned space.

⚠ WARNING

Do not bring in return air from a location which could introduce hazardous substances into the airflow.

Use 1/2" screws to connect duct work to cabinet. If pilot holes are drilled, drill only through field duct and unit flange.

Insulation of duct work is a must where it runs through an unheated space during the heating season or through an uncooled space during the cooling season. The use of a vapor barrier is recommended to prevent absorption of moisture from the surrounding air into the insulation.

The supply air duct should be properly sized by use of a transition to match unit opening. All ducts should be suspended using flexible hangers and never fastened directly to the structure.

Duct work should be fabricated and installed in accordance with local and/or national codes. This includes the standards of the National Fire Protection Association for Installation of Air-Conditioning and Ventilating Systems, NFPA No. 90B. Duct systems should be designed in accordance with the Air Conditioning Contractors of America (ACCA) – Manual D.

⚠ CAUTION

This unit is not designed for non-ducted (freeblow) applications. Do not operate without duct work attached to unit.

Equipment should never be operated without filters.

Use flexible duct collars to minimize the transmission of vibration/noise into the conditioned space. If electric heat is used, non-flammable material must be used.

All ducts should be suspended using flexible hangers and never fastened directly to the structure.

HORIZONTAL SUSPENSION

These air handlers may be suspended in horizontal applications. It is recommended to use angle steel support brackets with minimum 3/8" threaded rods, supporting the unit from the bottom. Attach the threaded rods at the locations shown in the Figure 6, leaving enough clearance between door and rod so that doors may be easily removed for service.

⚠ CAUTION

DO NOT lift air handler by the cabinet brace. The cabinet brace is held in place by the coil channel. The cabinet brace could become disengaged from the cabinet causing the air handler to fall, potentially causing injury or damaging property. See Figure 1 for location of cabinet braces.

NOTICE

When assembling the support structure, make sure to size to provide clearance for access door removal.

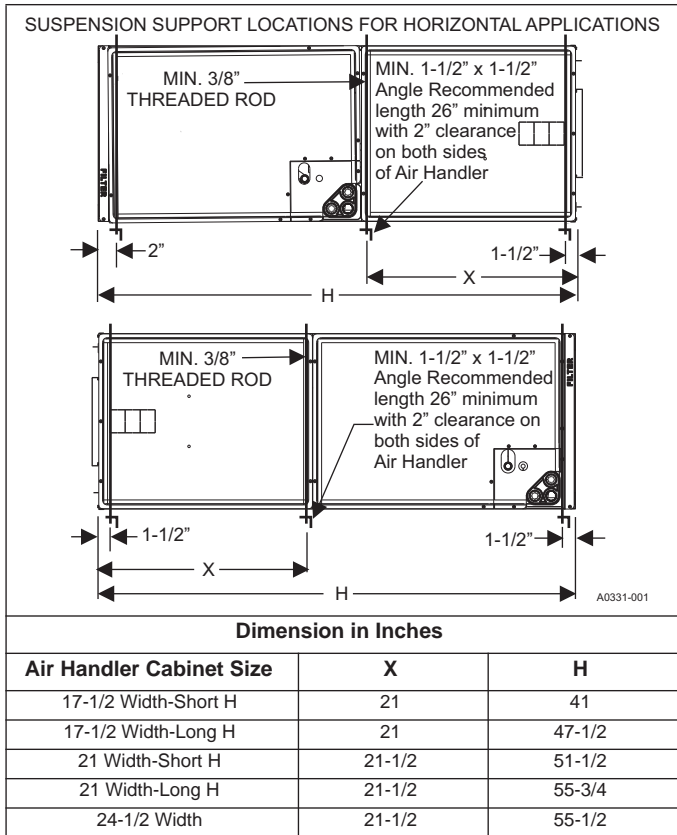


FIGURE 6: Horizontal Suspension

DUCT FLANGES

Three duct flanges are provided to assist in positioning and attaching duct work to the air handler. These flanges are included in the unit parts bag. With the screws from the parts bag, install one of the duct flanges. Duct flanges have holes on both legs with one leg longer than the other. The longer leg can be used to mate against the air handler so that different thicknesses of duct board can be made flush with the outer surface of the air handler. Repeat the procedure for the other two flanges. Refer to Figure 7. If the flanges are not used, they may be discarded.

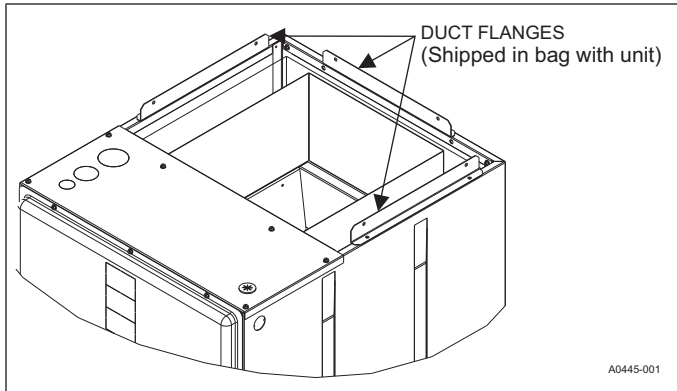


FIGURE 7: Duct Attachment

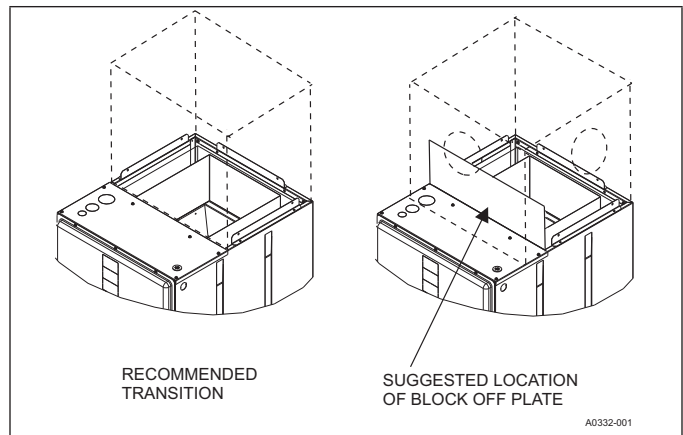


FIGURE 8: Duct Work Transition

UNIT CONNECTIONS

There are several ways to handle the supply and return air duct connections. The location and sizing of the connections depends on the situation and the method best suited to the installation. Upflow, horizontal or downflow applications may be used.

The supply air duct should be properly sized by use of a transition to match unit opening. Refer to Table 1 for air handler unit inlet and outlet dimensions.

CAUTION

Use 1/2" screws to connect duct work to unit. Longer screws will pierce the drain pan and cause leakage. If pilot holes are drilled, drill only through field duct and unit bottom duct flange.

Duct work that is not designed to match the supply air opening can cause turbulence inside the plenum. This turbulence can change the air flow patterns across the electric heater limit switches. If the factory suggested transition cannot be fabricated, it is recommended that a block off plate (approximately 8" high and running the full width of the plenum) be attached to the supply opening. Refer to Figure 8 as a visual aid. The use of this block off plate will enable better air circulation across the limit switches.

AIR FILTERS

Return air filters are required and must be field supplied. Filtration can be accomplished external to the unit or the integral filter rack may be used. A 1" filter access rack has been built into the unit. Remove filter access cover shown. Install proper size filter. Standard 1" size permanent or throw away filter may be used, or permanent washable filters are available using model numbers: 1PF0601, 602 or 603. See Table 6 for filter size.

CAUTION

Equipment should never be operated without filters.

SECTION V: COIL METERING DEVICES

A piston or a TXV is to be installed in the field. Refer to installation manual with TXV kit. It is recommended to install the piston or TXV kit prior to installation of coil in cabinet and brazing of line set. Until brazing is completed and cooled, do not install TXV sensing bulb.

Consult the technical guide for outdoor units that require a piston as a metering device for the indoor coil. The piston and the Schrader core are supplied with the outdoor unit if a TXV is not required. Install Schrader core in the suction line Schrader body and cap with the supplied plastic cap.

⚠ CAUTION

COIL UNDER PRESSURE.

Relieve pressure by depressing schrader stem. The coil requires a metering device to be added. See outdoor unit documentation for correct TXV or piston to be used.

NOTICE

To prevent moisture and contaminants from entering the system, the coil should not be open to atmosphere for extended periods of time. If the coil cannot be brazed into the refrigeration system during a routine installation period, the ends should be temporarily closed or plugged. For a short term delay, use masking tape over the ends of the copper tubing to close the tube from the air. For a longer term delay, use plugs or caps. There is no need to purge the coil if this procedure is followed.

PISTON INSTALLATION

⚠ WARNING

Failure to install Schrader Valve Core on piston applications could result in total refrigerant loss of the system!

Install Schrader Valve Core and Piston as follows:

1. After holding charge is completely discharged remove black plastic cap from equalizer fitting.
2. Install Schrader Valve Core supplied with the outdoor unit into equalizer fitting using a valve core tool.
3. Raise the distributor body approximately 2" vertically to mate up with the liquid line. Ensure liquid line can pass through the hole in the tubing access panel. Adjust as necessary.
4. Loosen and remove the liquid line connection nut and the sealing disc from the distributor assembly. Note that the fitting has right hand threads.
5. Slide the nut over the liquid line to be installed, and discard the seal disc.
6. Install required size piston into the distributor. Refer to supplied Tabular Data Sheet for specific piston size and indoor coil match up. Refer to Figure 9.
7. Verify that the Teflon washer is still in place in the distributor opening. Refer to Figure 9.

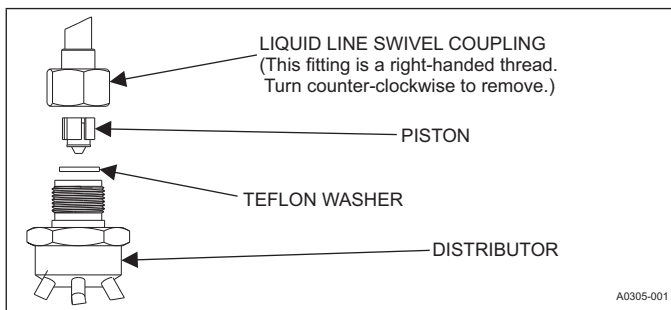


FIGURE 9: Piston Installation

⚠ CAUTION

Do not overtorque. Do not use slip joint pliers. This will distort the aluminum distributor and the brass fitting (potentially causing leaks).

8. After piston is installed, install the liquid line to the top of the piston/distributor assembly. Hand tighten, and turn an additional 1/4 turn to seal. Do not over tighten fittings.

9. Replace black plastic cap on equalizer fitting.
10. After line set is installed, leak test the system.

THERMOSTATIC EXPANSION VALVE (TXV) INSTALLATION

⚠ CAUTION

Outdoor unit model numbers ending with an "H" have a factory installed hard start kit which is required when a TXV is installed. Outdoor unit model numbers with no "H" ending do not require a hard start kit unless local regulations dictate it.

The following are basic steps for installation. For detailed instructions, refer to the Installation Instructions accompanying the TXV kit. Install TXV kit as follows:

IMPORTANT

Refer to the Technical Guide for the unit to determine the proper TXV kit to be used on this product.

1. Relieve the holding charge by depressing schrader core on the suction manifold stub out.
2. After holding charge is completely discharged, loosen and remove the Schrader core.
3. Place a backup wrench on distributor, loosen and remove brass distributor nut. Retain brass nut for use on liquid line. Keep Teflon washer in place and discard clear disc.
4. Install the thermal expansion valve to the distributor assembly with supplied fittings. Ensure Teflon washer is seated in distributor. Hand tighten and turn an additional 1/4 turn to seal. Do not over-tighten fittings. See Figure 10.

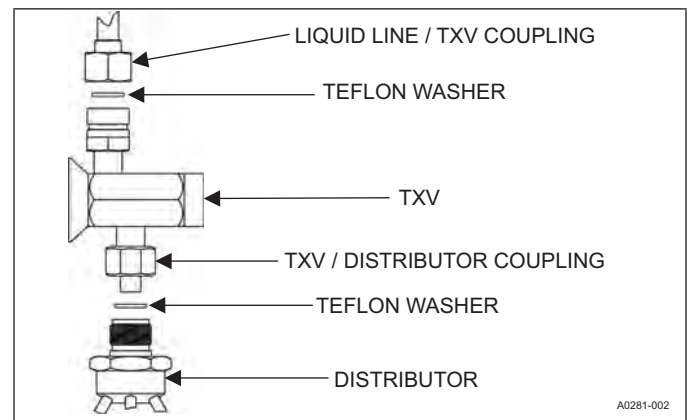


FIGURE 10: TXV Installation

⚠ CAUTION

Do not overtorque. Do not use slip joint pliers. This will distort the aluminum distributor and the brass fitting (potentially causing leaks).

5. Slide the nut removed in step 3 over the supplied liquid line. Place supplied Teflon washer from TXV kit in place on TXV, and install liquid line to the top of the thermal expansion valve. Adjust assembly so liquid line aligns with hole in access panel. Hand tighten the liquid line, and apply an additional 1/4 turn to seal.

⚠ WARNING

Schrader valve core **MUST NOT** be installed with TXV installation. Poor system performance or system failure could result.

- Install the TXV equalizer line onto the vapor line by hand tightening the 1/4" SAE coupling nut to the equalizer fitting, and apply an additional 1/3 turn to seal. See Figure 11.

▲ CAUTION

In all cases, mount the TXV temperature sensing bulb after vapor line is brazed and sufficiently cooled.

- Pass the TXV temperature sensing bulb through the suction line split grommet in the access panel.
- Install the TXV bulb to the vapor line near the cabinet, using the bulb clamp(s) furnished with the TXV assembly. Ensure the bulb is making maximum contact. See Figures 11 and 12, and accomplish the following:
 - If possible, install the temperature bulb on a horizontal run of the vapor line. Ensure that the bulb is installed at a 10 o'clock or 2 o'clock position.
 - If bulb installation is made on a vertical run, locate the bulb at least 16" (40.6 cm) from any bend, and on the tubing sides opposite the plane of the bend. Position the bulb with the tail of the bulb at the top, so that the bulb acts as a reservoir. See Figure 13.
 - Insulate the bulb using thermal insulation provided to protect it from the effect of the surrounding ambient temperature. Cover completely to insulate.
- After line set is installed, leak test the system.

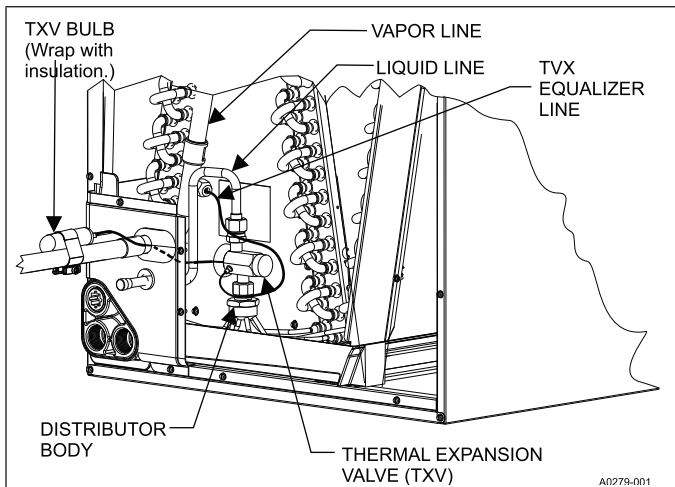


FIGURE 11: TXV Bulb Installation

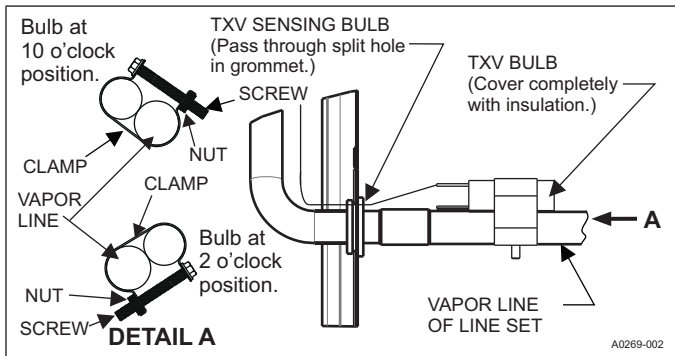


FIGURE 12: Proper Bulb Location

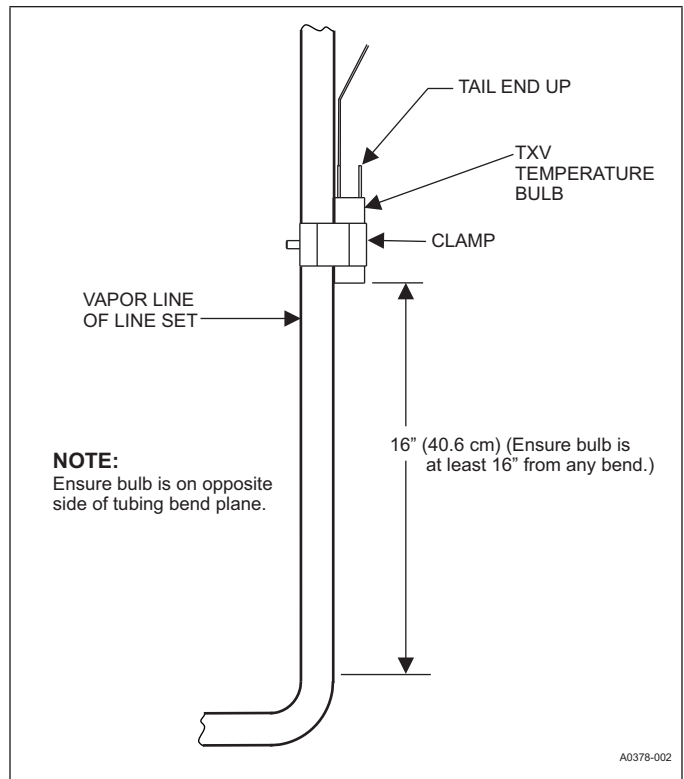


FIGURE 13: Vertical Temperature Bulb Orientation

SECTION VI: REFRIGERANT LINE CONNECTION

▲ CAUTION

Coil was shipped under inert gas pressure. Relieve any pressure remaining in coil after receiving inspection by depressing schrader core at end of suction manifold stub out. Refer to Figure 2.

▲ CAUTION

Dry nitrogen should always be supplied through the tubing while it is being brazed, because the temperature required is high enough to cause oxidation of the copper unless an inert atmosphere is provided. The flow of dry nitrogen should continue until the joint has cooled. Always use a pressure regulator and safety valve to insure that only low pressure dry nitrogen is introduced into the tubing. Only a small flow is necessary to displace air and prevent oxidation.

NOTICE

The distributor and liquid line are shipped from the factory to work with a TXV. The distributor body must be adjusted to work with a field installed piston metering device.

Connect lines as follows:

NOTICE

Route the refrigerant lines to the coil in a manner that will not obstruct service access to the coil, air handling system, or filter.

- Suction and liquid line connections are made outside the cabinet. Leave the tubing connection panel attached to the cabinet. Coil access panel should be removed for brazing. The lines are expanded to receive the field line set tubes for most outdoor unit matches.
- Remove grommets where tubes exit the cabinet to prevent the grommets from burning during brazing.
- Cut the end of the suction tube using a tube cutter. Place the tube cutter as close as possible to the end of the tube to allow as much depth as possible for the connection and brazing of the suction line. To ensure suction line fits into connection, deburr the stub out (including inner pressure protrusion from cutting).
- If coil does not have a factory installed TXV, install the required size piston or TXV kit.
- If a TXV kit is installed, connect the TXV equalizer line to the suction header.
- If the coil does have a factory installed TXV, remove the liquid line copper cap which is soft soldered onto the outside of the 3/8" stub protruding from front of the coil cabinet tubing panel as follows:
 - Screw a sheet metal screw into the center of the cap.
 - Apply a small amount of heat to the cap while pulling on the screw using slip joint pliers.
- Insert liquid and suction lines into the coil connections at the coil cabinet tubing panel.
- Wrap a water soaked rag around the coil connection tubes inside the cabinet to avoid transferring excess heat to the coil or TXV.
- Purge refrigerant lines with dry nitrogen, and continue to supply dry nitrogen through the tubing during the brazing and cooling process.

NOTICE

All indoor coil connections are copper-to-copper and should be brazed with a phosphorous-copper alloy material such as Silfos-5 or equivalent. DO NOT use soft solder.

- Braze the suction and liquid lines, and allow the joints to cool.
- Route the TXV sensing bulb through suction line opening.
- Secure sensing bulb with provided clamp. Secure equalizer line capillary tubes with nylon cable ties to prevent leaks from tubes rubbing.
- If piston is used, install schrader core into suction header, and reinstall cap.
- Re-attach the grommets to the lines carefully to prevent air leakage.
- Attach the coil access panel to the cabinet.

NOTICE

ALWAYS evacuate the coil and line set tubing to 500 microns before opening outdoor unit service valves.

- Refer to Outdoor unit Installation Manual, and accomplish evacuation, leak check and charging instructions. Check all field brazed joints and metering device connections.
- Ensure lines are sound isolated by using appropriate hangers or strapping.

SECTION VII: CONDENSATE DRAIN CONNECTIONS

All drain lines should be trapped a minimum of three inches, should be pitched away from unit drain pan and should be no smaller than the coil drain connection.

CAUTION

DO NOT use Teflon™ tape, pipe thread compound, or other sealants. The use of a sealant may cause damage and premature failure of the drain pan.

Threaded drain connection should be hand-tightened, plus no more than 1 turn.

Avoid Double Trapping of a single drain line.

Route the drain line so that it does not interfere with accessibility to the coil, air handling system or filter and will not be exposed to freezing temperatures. See Figures 21 and 22 for drain connection locations.

CAUTION

When the unit is installed in an attic or above a finished ceiling, an auxiliary drain pan should be provided under the coil as specified by most local building codes. When this exterior secondary drain pan is used that drain should be piped to a location that will give the occupant a visual warning that the primary drain is clogged.

If the coil is provided with a secondary drain it should be piped to a location that will give the occupant a visual warning that the primary drain is clogged. If a secondary drain is not used it must be plugged.

Instruct the owner that the indoor coil drain pan should be inspected and cleaned regularly to prevent odors and assure proper drainage. If a secondary drain is not used it must be plugged. See Figures 21 and 22. Coils should be installed level or pitched slightly toward the drain end. Suggested pitch should not exceed 1/4 inch per foot of coil.

The drain pan connections are designed to ASTM Standard D 2466 Schedule 40. Use 3/4" PVC or steel threaded pipe. Since the drains are not subject to any pressure it is not necessary to use Schedule 40 pipe for drain lines.

SECTION VIII: ELECTRIC HEATER INSTALLATION

If the air handler requires electric heat, install the electric heat kit according to the installation instructions included with the kit. After installing the kit, mark the air handler nameplate to designate the heater kit that was installed. If no heater is installed, mark the name plate appropriately to indicate that no heat kit is installed.

Use only 6HK Revision C or later heater kits, as listed on air handler name plate and in these instructions. Use data from Tables 8 through 13 for information on required minimum motor speed tap to be used for heating operation and maximum over-current protection device required as listed for combination of air handler and heater kit.

For Upflow, Downflow and Horizontal left-hand applications, the kits can be installed without modification.

Field modification is required for Horizontal right-hand airflow application only. Follow instructions with heater for modification.

NOTICE

In some horizontal applications, the service disconnects on the electric heat kits must be rotated 180° so the up position of the disconnect is the ON position. This service disconnect orientation change is required by UL1995, Article 26.19 (in reference to all circuit breakers).

SECTION IX: LINE POWER CONNECTIONS

Power may be brought into the unit through the supply air end of the unit (top left when unit is vertical) or the left side panel. Use the hole appropriate to the unit's orientation in each installation to bring conduit from the disconnect. The power lead conduit should be terminated at the electrical control box. To determine proper wire sizing, refer to Tables 6 through 9 and the latest edition of the National Electric Code or in Canada the Canadian electrical Code and local codes to determine correct wire sizing. To minimize air leakage, seal the wiring entry point at the outside of the unit.

All electrical connections to air handlers must be made with copper conductors. **Direct connection of aluminum wiring to air handlers is not approved.**

If aluminum conductors are present, all applicable local and national codes must be followed when converting from aluminum to copper conductors prior to connection to the air handler.

If wire other than uncoated (non-plated), 75° C ambient, copper wire is

used, consult applicable tables of the National Electric Code (ANSI/NFPA 70). The chosen conductor and connections all must meet or exceed the amperage rating of the overcurrent protector (service disconnect or fuse) in the circuit.

Additionally, existing aluminum wire within the structure must be sized correctly for the application according to National Electric Code and local codes. Caution must be used when sizing aluminum rather than copper conductors, as aluminum conductors are rated for less current than copper conductors of the same size.

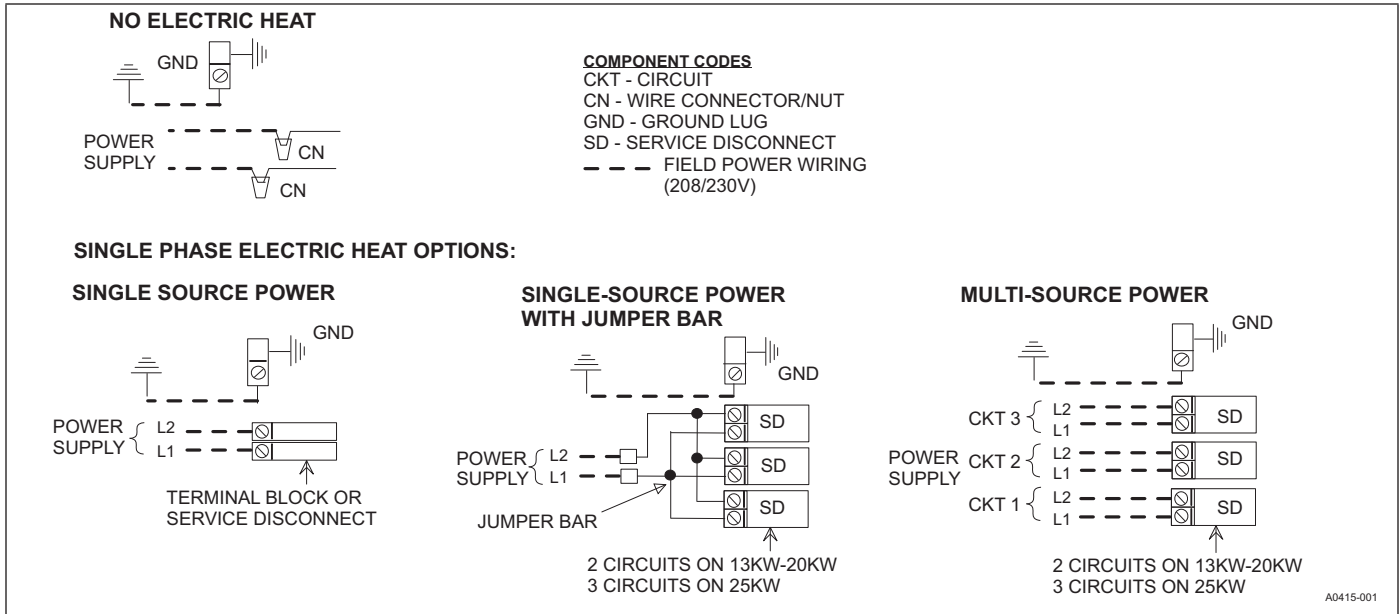


FIGURE 14: Line Power Connections

SECTION X: LOW VOLTAGE CONTROL CONNECTIONS

The 24 volt power supply is provided by an internally wired low voltage transformer which is standard on all models. However, if the unit is connected to a 208 volt power supply, the low voltage transformer must be rewired to the 208 volt tap. See the unit wiring label.

Remove desired knockout and pierce foil faced insulation to allow wiring to pass through. Use as small of a hole as possible to minimize air leakage.

Install a 7/8" plastic bushing in the selected hole and keep low voltage wiring as short as possible.

To further minimize air leakage, seal the wiring entry point at the outside of the unit.

The field wiring is to be connected with wire connectors to the wires provided. Refer to Figure 23.

NOTICE

All wiring must comply with local and national electrical code requirements. Read and heed all unit caution labels.

NOTICE

It is possible to vary the amount of electric heat turned on during the defrost cycle of a heat pump. Standard wiring will only bring on the first stage of electric heat during defrost. See Table 4 for additional information on heat during defrost cycle.

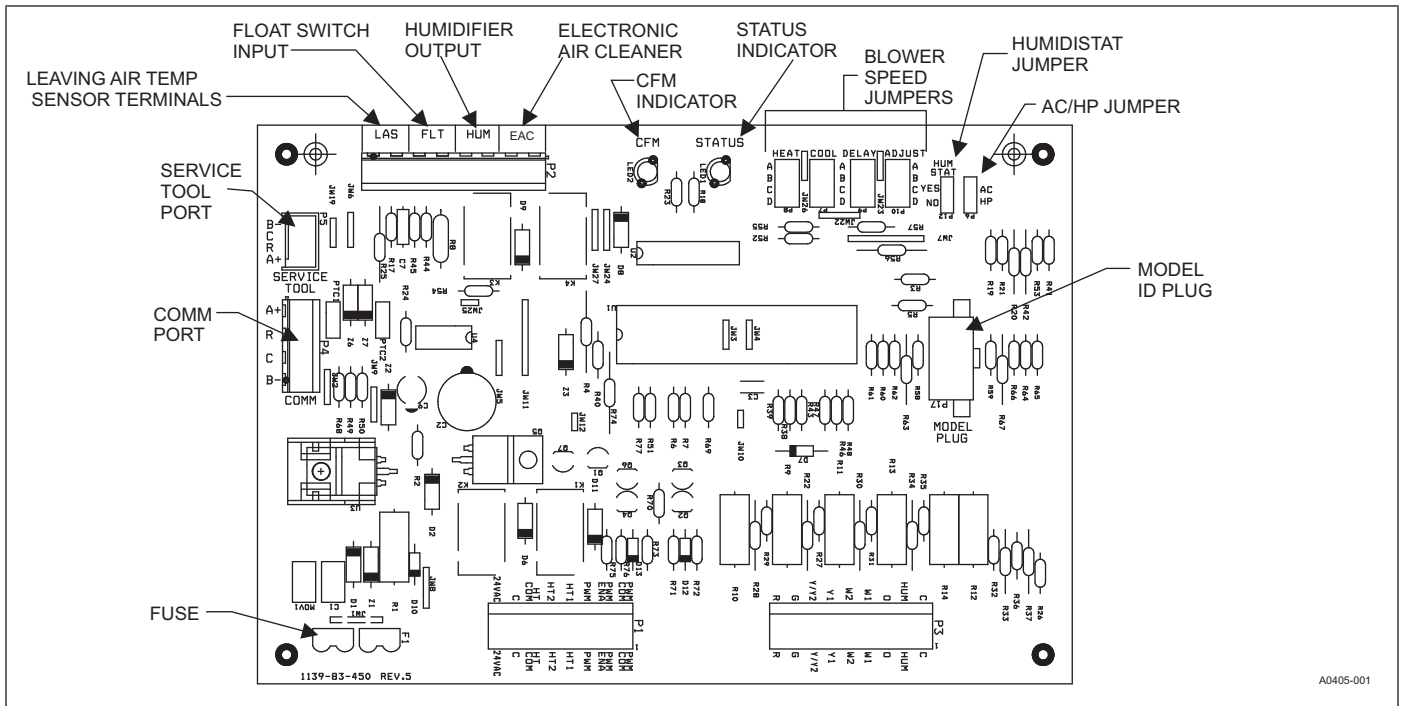


FIGURE 15: Control Board

Humidity Switch Input

The air handler control is designed to work with a humidity control that closes when the humidity is below the set-point. The control is open when the humidity is above the set-point. This humidity control may be referred to as a humidistat or a dehumidistat.

The humidity switch controls de-humidification operation of the control during cooling operation. The humidity switch should be connected to HUM wire of the control. See Figure 15.

NOTICE

All wiring must comply with local and national electrical code requirements. Read and heed all unit caution labels.

It is possible to vary the amount of electric heat turned on during the defrost cycle of a heat pump. Standard wiring will only bring on the first stage of electric heat during defrost. See Heat Output and Limit Connections and Table 4 for additional information on heat during defrost cycle.

TABLE 2: Low Voltage Connections

Wire	Colors	Signals	Comment
R	Red	24 VAC power (fused)	
G	Green	Continuous Fan operation	
Y/Y2	Yellow	Second or full stage compressor operation	
Y1	Yellow & Black	First stage compressor operation	Not used with outdoor units having one stage compressors.
W2	Brown	Second stage heat operation	
W1	White	First stage heat operation	
O	Orange	Reversing valve operation	
EAC	Field Supplied Wiring	Electric Air Cleaner	Located on P2 connector. There is 24VAC output during indoor blower operation to energize a pilot duty relay for an electronic air cleaner.
X/L	Field Supplied Wiring	Connection point for heat pump fault indicator	This terminal is a connection point only and does not affect air handler control operation.
HUM	Purple	Humidity switch input	
C (COM)	Blue	24 VAC common	

The field wiring is to be connected at the pigtails supplied with the control board harness.

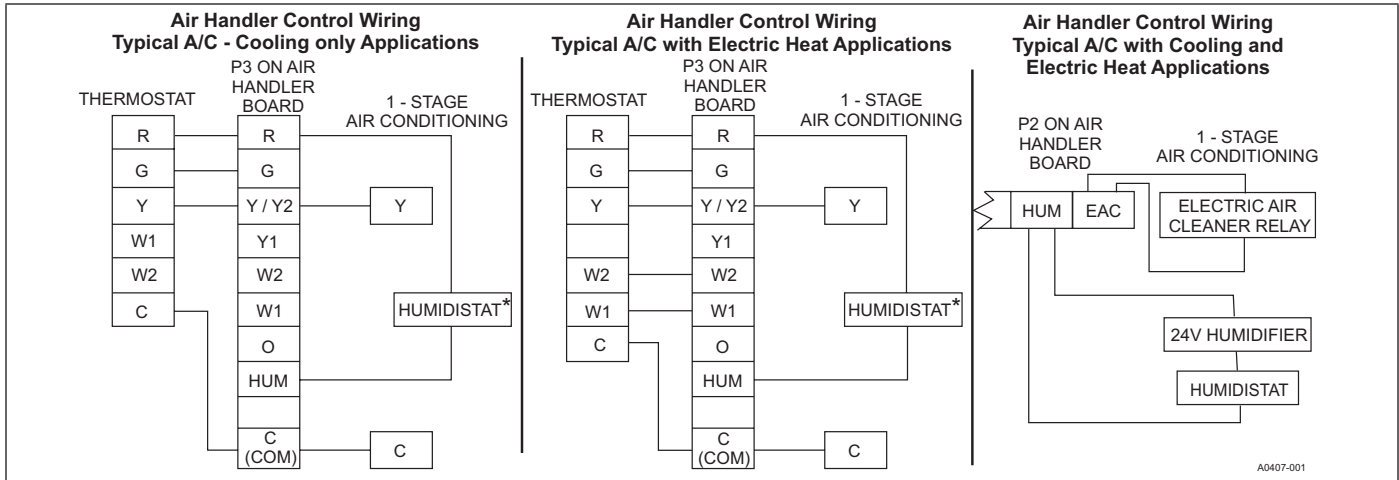


FIGURE 16: Cooling Models with and without Electric Heat Wiring

* Optional dehumidification humidistat switch contacts open on humidity rise.

NOTES:

1. "Y/Y2" Thermostat wire must be connected for full CFM and applications requiring 60 second blower off delay for SEER enhancement.
2. Move HUM STAT jumper on air handler control board to YES position if humidistat is used.
3. For heat pump applications - set AC/HP jumper on air handler control board to the HP position.

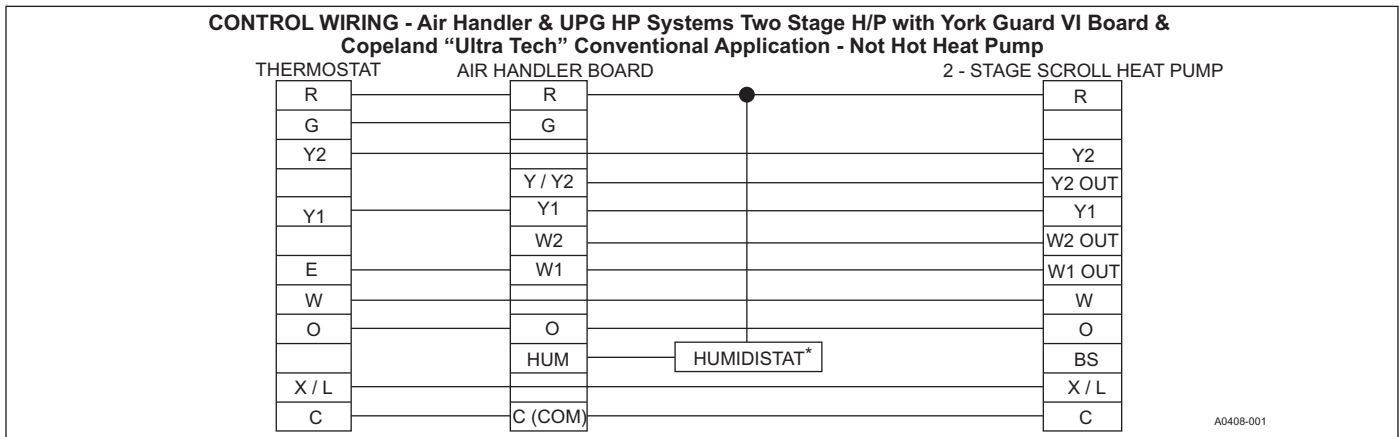


FIGURE 17: Two-Stage Heat Pump Wiring

* Optional dehumidification humidistat switch contacts open on humidity rise.

NOTES:

1. "Y/Y2" Thermostat wire must be connected for full CFM and applications requiring 60 second blower off delay for SEER enhancement.
2. Remove humidistat jumper on air handler control board.
3. For heat pump applications - set AC/HP jumper on air handler control board to the HP position.

CONTROL WIRING USING COMMUNICATING CONTROLS

The Communicating System consists of several intelligent communicating components including the Communicating Thermostat Control (touch-screen wall thermostat), variable speed air handler, air conditioner (15 and 18 SEER premium air conditioners) or heat pump (13, 15 and 18 SEER premium heat pumps), which continually communicate with each other via a four-wire connection called the A-R-C-B bus. Commands, operating conditions, and other data are passed continually between components over the A-R-C-B bus. See Figure 18. The result is a new level of comfort, versatility, and simplicity.

In order to use this air handler in full communications (COMM) mode, it **MUST** be installed with the matching touch-screen Communicating Control (wall thermostat) and an outdoor air conditioner or heat pump with a fully communicating control.

This air handler may also be used along with the touch-screen Communicating Control and a non-communicating outdoor air conditioner through the addition of a communicating AC Control board to the outdoor unit. This system allows full communication between the air handler, outdoor unit, and touch-screen Communication Control.

Use the wiring diagram below to connect the air handler control, touch-screen Communicating Control (wall thermostat) and communicating outdoor unit. Be sure that all of the "A+" terminals are connected together, all of the "B-" terminals are connected together, all of the "C" terminals are connected together and all of the "R" terminals are connected together. See Figure 18 and 19. When using a fully communicating system, removal of the low voltage signal connector at P3 is recommended (C, G, R, etc.). The four small screw terminals in the terminal block on the end of the air handler control should be used.

CAUTION

If any field-supplied wiring is to be connected to the control board, such as will be the case if the Communicating Control is used or if a humidistat, float switch or leaving air temperature switch are used, the additional wires **MUST** be routed through the hole at the lower left of the control box. **DO NOT** add any additional holes to the control box. After attaching the additional wires to the board, the remaining hole around the wires must be plugged with the sealant putty supplied or with a suitable waterproof sealant. **FAILURE TO SEAL THIS HOLE MAY ALLOW WATER TO ENTER THE CONTROL BOX AND DAMAGE THE CONTROL BOARD.**

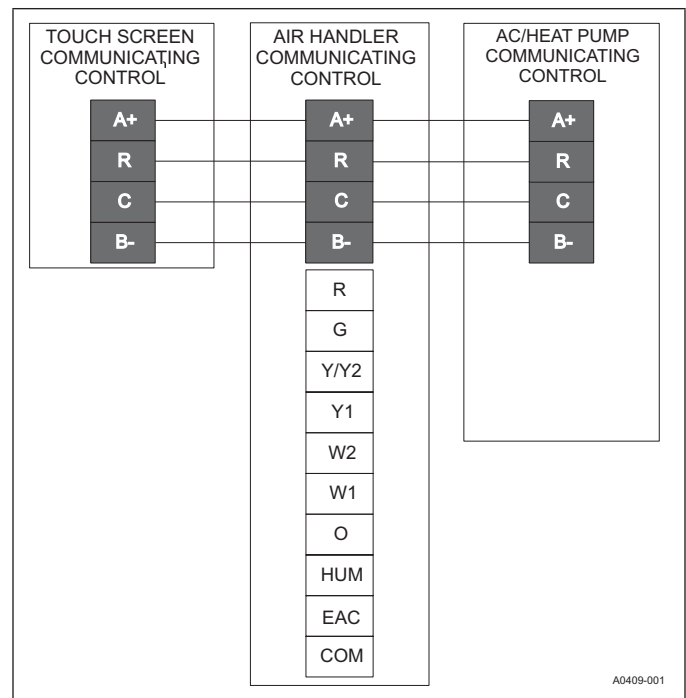


FIGURE 18: Air Handler with Communicating AC or HP

IMPORTANT

Do not place more than one wire under any single communication terminal screw (there are four communication terminal screws). If more than one wire must be connected to a terminal screw, attach only the terminal end of a one wire pigtail no longer than 6", and use a wire connector to connect the other end of the pigtail to the other wires. Failure to do this will result in nuisance communication error faults. See Figure 19

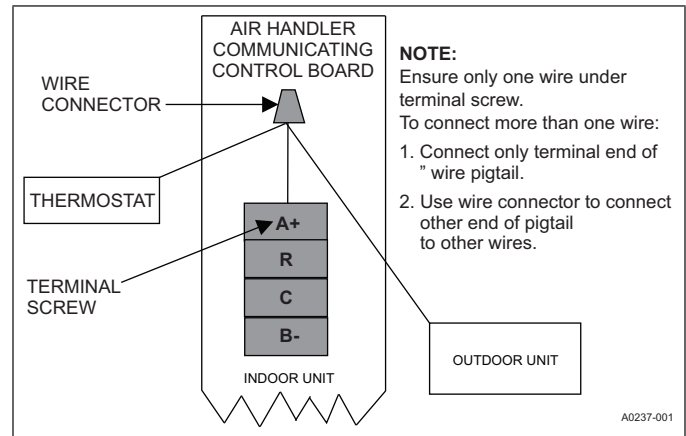


FIGURE 19: Multi-wire Terminal Connection

FLOAT SWITCH INPUT

An optional switch may be connected to the FLT terminals on the control board. This feature is only functional when used with the Communicating Control. It is intended for use with a water overflow switch.

LEAVING AIR TEMP SENSOR INPUT

A plenum air temperature sensor (thermistors) can be connected to the LAS terminals on the control board. The Communicating Control can monitor the temperature of the supply air in the plenum.

SECTION XI: REQUIRED CONTROL SET-UP

IMPORTANT

The following steps must be taken at the time of installation to insure proper system operation.

1. Consult system wiring diagram to determine proper thermostat wiring for your system.
2. If using a communicating control and a humidistat is installed, change HUM STAT jumper from NO to YES.
3. Set the MODE jumper to A/C (Air Conditioner) or HP (Heat Pump) position depending on the outdoor unit included with the system.
4. Set airflow and comfort setting jumper to proper positions.

FUNCTIONALITY AND OPERATION

Jumper Positions

Hum Stat Jumper

The HUM STAT jumper configures the control to monitor the humidity switch input. With the jumper in the NO position, the control will ignore the HUM input. With the jumper in the YES position, the control will monitor the HUM input to control the blower speed for de-humidification during cooling operation.

If the jumper is not present, the control will operate as if the jumper is in the NO position.

AC/HP Jumper

The AC/HP jumper configures the control to operate properly with an air conditioner (AC position) or heat pump (HP position). With the jumper in the AC position, the control will treat any "Y" call as a cooling call. With the jumper in the HP position, the O input signal is received from the room thermostat. This allows the control to recognize whether in the heating or cooling mode and energizes the 24 VAC HUM output when blower is on and a first stage heating call is present.

If the jumper is not present, the control will operate as if the jumper is in the HP position.

Airflow and Comfort Setting Jumpers

See separate section.

Status and Fault Codes

The control includes an LED that displays status and fault codes. These codes are shown in Table 3. The control will display the fault codes until power is removed from the control or the fault condition is no longer present.

TABLE 3: Fault Codes

Fault or Status Condition	LED1 (RED) Flash Code
Status	
No power to control	OFF
Internal control fault	ON
2 sec on 2 sec off heartbeat	Normal
0.1 sec on, 0.1 sec off	Test mode
Call for heat and cool at the same time	7
Model Plug Not inserted	8
Internal fault self-corrected, attempting normal operation	9

HUM OUT Output

The HUM OUT output can be used to drive an external relay or solenoid (24 VAC coil) to control a humidifier. The output is energized when the control has a thermostat call for heating (heat pump or electric heat).

Heat Output

The control is connected to the heater relays using pins 4,5, and 6 of connector P1. The relay outputs are 24 VAC.

The control energizes the heat relays as shown in Table 4.

TABLE 4: Heat Relays

Input	Heat Relay Output
W1	HT1
W2	HT2
W1 and W2	HT1 and HT2

Depending on the heat kit installed in the air handler, the control provides the flexibility to configure the amount of heat delivered with the first stage heating call. As an example, when the control's W1 input is connected to the room thermostat's first stage heat signal, a call for first stage heat will energize one heating element (HT1). If the control's W2 input is connected to the room thermostat's first stage heat signal, a call for first stage heat will energize one heating element (HT2). With either configuration, the control will energize two heating elements (HT1, and HT2) when it receives a first and second stage heat input from the thermostat.

Wiring Related Faults

If the control receives a simultaneous call for heating and cooling (fault code 7), the control will perform both heating and cooling operations.

SECTION XII: AIRFLOW AND COMFORT SETTING SELECTION

AIRFLOW SELECTION

When not using communicating functionality, the airflow and comfort setting selection jumpers must be set properly at the time of installation for proper system operation. Place jumpers in the proper locations based on the information shown in Table 13 and Figure 15.

Inputs to air handler control board are passed to the motor which determines the target CFM to be delivered. The following inputs will produce the CFM per the appropriate table and selected tap settings.

NOTICE

Incorrect airflow and comfort settings may result in decreased system efficiency and performance.

These variable speed air handlers are designed to deliver constant airflow (CFM) regardless of the external static pressure (ESP) in the ductwork. Therefore, if too many supply registers are closed, a filter becomes clogged, or there is a restriction in the ductwork, the motor will automatically operate at a higher speed to compensate for the higher ESP. This may result in a higher operating sound level and motor damage.

To Set Cooling Airflow:

Refer to the outdoor unit technical guide for the recommended airflow with the matching evaporator coil. Refer to Table 13 for the possible high speed cooling and heat pump airflow selections.

Find the recommended system airflow in Table 13 for the installed air handler model and outdoor unit.

Select the COOL airflow needed from Table 13. Set the COOL and ADJUST Jumpers on the control as indicated in Table 13.

To Set Heat Pump Airflow:

The heat pump airflow setting is the same as the cooling airflow setting. No additional airflow setting is required. However, you must set the AC/HP jumper to the HP position for proper system operation (See Figure 15).

To Set Electric W1 Heat Airflow:

The blower speed required for 1st stage electric heat is different than cooling. Refer to Table 13 for the possible CFM selections. Refer to Table 8 for the minimum required airflow for the electric heater installed. Find the desired airflow in Table 13 for low heat. Set the HEAT jumper on the control as indicated in Table 13.

To Set W2 Electric Heat Airflow:

Airflow for any W2 input, which is for Stages 2 & 3 of electric heat, is the indicated CFM for high heat tap selection on Table 13.



DO NOT change the ADJUST tap position on the control as this will change your cooling airflow previously selected.

Blower Ramp-Up /Ramp-Down:

To minimize the sound made by the blower when it speeds up or slows down, the blower will slowly ramp up or down from one speed to another. Changes in blower speed during A/C or heat pump heating can take up to 30 seconds. Changes in blower speed during electric resistance heating can take up to 15 seconds.

COMFORT SETTINGS**TABLE 5:** Comfort Setting Selection

DELAY TAP	COMFORT SETTING
A	Normal
B	Humid
C	Dry
D	Temperate

SECTION XIII: UNIT DATA**TABLE 6:** Physical and Electrical Data - Cooling Only

Models	18B	24B	30B	36B	36C	42C	48C	48D	60C	60D	
Blower - Diameter x Width	10 x 8	10 x 8	10 x 8	10 x 8	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10	
Motor	HP	1/3 HP	1/3 HP	1/3 HP	1/2 HP	1/2 HP	1/2 HP	3/4 HP	3/4 HP	3/4 HP	
	Nominal RPM	1050	1050	1050	1050	1050	1050	1050	1050	1050	
	Voltage	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	208/230	
	Full Load Amps @230V	2.9	2.9	2.9	4.5	4.5	4.5	7.0	7.0	7.0	
Filter ¹	Type	DISPOSABLE OR PERMANENT									
	Size	16 x 20 x 1	16 x 20 x 1	16 x 20 x 1	16 x 20 x 1	20 x 20 x 1	20 x 20 x 1	20 x 20 x 1	22 x 20 x 1	20 x 20 x 1	22 x 20 x 1
	Permanent Type Kit	1PF0601	1PF0601	1PF0601	1PF0601	1PF0602	1PF0602	1PF0602	1PF0603	1PF0602	1PF0603
Shipping / Operating Weight (lbs.)	91/85	93/87	119/113	119/113	120/114	144/136	158/150	163/153	156/146	180/170	

1. Field supplied.

TABLE 7: Electrical Data - Cooling Only

Models	Motor FLA ¹		Minimum Circuit Ampacity		MOP ²
	208V	230V	208V	230V	
18B/24B/30B	3.0	2.9	3.8	3.6	15
36B/36C/42C	5.0	4.5	6.3	5.6	15
48C/48D/60C/60D	7.3	7.0	9.1	8.8	15

1. FLA = Full Load Amps.

2. MOP = Maximum Overcurrent Protection device; must be HACR type circuit breaker or time delay fuse. Refer to the latest edition of the National Electric Code or in Canada the Canadian electrical Code and local codes to determine correct wire sizing.

Normal

The normal setting provides a ramp-up from zero airflow to full capacity and a ramp-down from full capacity back to zero airflow.

Humid

The humid setting is best-suited for installations where the humidity is frequently very high during cooling season, such as in the southern part of the country. On a call for cooling, the blower will ramp up to 50% of full capacity and will stay there for two minutes, then will ramp up to 82% of full capacity and will stay there for five minutes, and then will ramp up to full capacity, where it will stay until the wall thermostat is satisfied.

Dry

The dry setting is best suited to parts of the country where excessive humidity is not generally a problem, where the summer months are usually dry. On a call for cooling the motor will ramp up to full capacity and will stay there until the thermostat is satisfied. At the end of the cooling cycle, the blower will ramp down to 50% of full capacity where it will stay for 60 seconds. Then it will ramp down to zero.

Temperate

The temperate setting is best suited for most of the country, where neither excessive humidity nor extremely dry conditions are the norm. On a call for cooling, the motor will ramp up to 63% of full capacity and will stay there for 90 seconds, then will ramp up to full capacity. At the end of the cooling cycle, the motor will ramp down to 63% of full capacity and will stay there for 30 seconds, then will ramp down to zero.

TABLE 8: Electrical Heat: Minimum Fan Speed

Heater Kit Models ^{1,2}	Nom. kW@240V	Air Handler Models									
		18B	24B	30B	36B	36C	42C	48C	48D	60C	60D
6HK(0,1)6500206	2.4kW	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)
6HK(0,1)6500506	4.8kW	Med Lo (D)	Med (C)	Med (C)	Med Lo (D)	Med (C)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)
6HK(0,1)6500806	7.7kW	Med (C)	Med Hi (B)	Med Hi (B)	Med Lo (D)	Med Hi (B)	Med (C)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)
6HK(0,1)6501006	9.6kW	Med (C)	Med Hi (B)	Med Hi (B)	Med Lo (D)	Med Hi (B)	Med (C)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)
6HK(1,2)6501306	12.5kW	-	Med Hi (B)	Med Hi (B)	Med (C)	Med Hi (B)	Med (C)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)
6HK(1,2)6501506	14.4kW	-	-	Med Hi (B)	Med Hi (B)	Med Hi (B)	Hi (A)	Med (C)	Med (C)	Med Lo (D)	Med Lo (D)
6HK(1,2)6501806	17.3kW	-	-	-	Med Hi (B)	Med Hi (B)	Hi (A)	Med (C)	Med Hi (B)	Med (C)	Med (C)
6HK(1,2)6502006	19.2kW	-	-	-	Med Hi (B)	Hi (A)	Hi (A)	Med Hi (B)	Hi (A)	Med Hi (B)	Med Hi (B)
6HK(1,2)6502506	24kW	-	-	-	-	-	-	-	Hi (A)	-	Med Hi (B)

1. (0,1) - 0 = no service disconnect OR 1 = with service disconnect.

2. (1,2) - 1 = with service disconnect, no breaker jumper bar OR 2 = with service disconnect & breaker jumper bar.

TABLE 9: KW & MBH Conversions - For Total Power Input Requirement

For a power distribution voltage that is different than the provided nominal voltage, multiply the kW and MBH data from the table by the conversion factor in the following table.

DISTRIBUTION POWER	NOMINAL VOLTAGE	CONVERSION FACTOR
208V	240V	0.75
220V	240V	0.84
230V	240V	0.92

TABLE 10: Electric Heat Performance Data: 208/230-1-60

Heater Models ^{1,2}	Nominal kW @240V	Total Heat ³				kW Staging				
		kW		MBH		W1 Only		W1 + W2		
		208V	230V	208V	230V	208V	230V	208V	230V	
1PH	6HK(0,1)6500206	2.4	1.8	2.2	6.2	7.5	1.8	2.2	1.8	2.2
	6HK(0,1)6500506	4.8	3.6	4.4	12.3	15	3.6	4.4	3.6	4.4
	6HK(0,1)6500806	7.7	5.8	7.1	19.7	24.1	5.8	7.1	5.8	7.1
	6HK(0,1)6501006	9.6	7.2	8.8	24.6	30.1	7.2	8.8	7.2	8.8
	6HK(1,2)6501306	12.5	9.4	11.5	32	39.2	3.1	3.8	9.4	11.5
	6HK(1,2)6501506	14.4	10.8	13.2	36.9	45.1	3.6	4.4	10.8	13.2
	6HK(1,2)6501806	17.3	13	15.9	44.3	54.2	6.5	7.9	13	15.9
	6HK(1,2)6502006	19.2	14.4	17.6	49.2	60.2	7.2	8.8	14.4	17.6
6HK(1,2)6502506	24	18	22	61.5	75.2	7.2	8.8	18	22	

1. (0,1) - 0 = no service disconnect OR 1 = with service disconnect.

2. (1,2) - 1 = with service disconnect, no breaker jumper bar OR 2 = with service disconnect & breaker jumper bar.

3. For different power distributions, see conversion table.

TABLE 11: Electrical Data For Single Source Power Supply: 208/230-1-60

Air Handler Models	Heater Models ^{1,2}	Heater Amps @240V	Field Wiring			
			Min. Circuit Ampacity		MOP. ³	
			208V	230V	208V	230V
18B	6HK(0,1)6500206	10	14.6	15.6	15	20
	6HK(0,1)6500506	20	25.4	27.5	30	30
	6HK(0,1)6500806	32	38.6	42.2	40	45
	6HK(0,1)6501006	40	47.0	51.5	50	60
24B	6HK(0,1)6500206	10	14.6	15.6	15	20
	6HK(0,1)6500506	20	25.4	27.5	30	30
	6HK(0,1)6500806	32	38.6	42.2	40	45
	6HK(0,1)6501006	40	47.0	51.5	50	60
	6HK(1,2)6501306	52	60.2	66.1	70	70
30B	6HK(0,1)6500206	10	14.6	15.6	15	20
	6HK(0,1)6500506	20	25.4	27.5	30	30
	6HK(0,1)6500806	32	38.6	42.2	40	45
	6HK(0,1)6501006	40	47.0	51.5	50	60
	6HK(1,2)6501306	52	60.2	66.1	70	70
	6HK(1,2)6501506	60	68.7	75.4	70	80
36B	6HK(0,1)6500206	10	17.1	17.6	20	20
	6HK(0,1)6500506	20	27.9	29.5	30	30
	6HK(0,1)6500806	32	41.1	44.2	45	45
	6HK(0,1)6501006	40	49.5	53.5	50	60
	6HK(1,2)6501306	52	62.7	68.1	70	70
	6HK(1,2)6501506	60	71.2	77.4	80	80
	6HK(1,2)6501806	72	84.4	92.0	90	100
	6HK(1,2)6502006	80	92.8	101.3	100	110
36C	6HK(0,1)6500206	10	17.1	17.6	20	20
	6HK(0,1)6500506	20	27.9	29.5	30	30
	6HK(0,1)6500806	32	41.1	44.2	45	45
	6HK(0,1)6501006	40	49.5	53.5	50	60
	6HK(1,2)6501306	52	62.7	68.1	70	70
	6HK(1,2)6501506	60	71.2	77.4	80	80
	6HK(1,2)6501806	72	84.4	92.0	90	100
	6HK(1,2)6502006	80	92.8	101.3	100	110
42C	6HK(0,1)6500206	10	17.1	17.6	20	20
	6HK(0,1)6500506	20	27.9	29.5	30	30
	6HK(0,1)6500806	32	41.1	44.2	45	45
	6HK(0,1)6501006	40	49.5	53.5	50	60
	6HK(1,2)6501306	52	62.7	68.1	70	70
	6HK(1,2)6501506	60	71.2	77.4	80	80
	6HK(1,2)6501806	72	84.4	92.0	90	100
	6HK(1,2)6502006	80	92.8	101.3	100	110
48C	6HK(0,1)6500206	10	19.9	20.7	25	25
	6HK(0,1)6500506	20	30.8	32.7	35	35
	6HK(0,1)6500806	32	44.0	47.3	45	50
	6HK(0,1)6501006	40	52.4	56.6	60	60
	6HK(1,2)6501306	52	65.6	71.3	70	80
	6HK(1,2)6501506	60	74.0	80.5	80	90
	6HK(1,2)6501806	72	87.3	95.2	90	100
	6HK(1,2)6502006	80	95.7	104.4	100	110

TABLE 11: Electrical Data For Single Source Power Supply: 208/230-1-60 (Continued)

Air Handler Models	Heater Models ^{1,2}	Heater Amps @240V	Field Wiring			
			Min. Circuit Ampacity		MOP. ³	
			208V	230V	208V	230V
48D	6HK(0,1)6500206	10	19.9	20.7	25	25
	6HK(0,1)6500506	20	30.8	32.7	35	35
	6HK(0,1)6500806	32	44.0	47.3	45	50
	6HK(0,1)6501006	40	52.4	56.6	60	60
	6HK(1,2)6501306	52	65.6	71.3	70	80
	6HK(1,2)6501506	60	74.0	80.5	80	90
	6HK(1,2)6501806	72	87.3	95.2	90	100
	6HK(1,2)6502006	80	95.7	104.4	100	110
60C	6HK(0,1)6500206	10	19.9	20.7	25	25
	6HK(0,1)6500506	20	30.8	32.7	35	35
	6HK(0,1)6500806	32	44.0	47.3	45	50
	6HK(0,1)6501006	40	52.4	56.6	60	60
	6HK(1,2)6501306	52	65.6	71.3	70	80
	6HK(1,2)6501506	60	74.0	80.5	80	90
	6HK(1,2)6501806	72	87.3	95.2	90	100
	6HK(1,2)6502006	80	95.7	104.4	100	110
60D	6HK(0,1)6500206	10	19.9	20.7	25	25
	6HK(0,1)6500506	20	30.8	32.7	35	35
	6HK(0,1)6500806	32	44.0	47.3	45	50
	6HK(0,1)6501006	40	52.4	56.6	60	60
	6HK(1,2)6501306	52	65.6	71.3	70	80
	6HK(1,2)6501506	60	74.0	80.5	80	90
	6HK(1,2)6501806	72	87.3	95.2	90	100
	6HK(1,2)6502006	80	95.7	104.4	100	110
	6HK(1,2)6502506	100	117.3	128.3	125	150

1. (0,1) - maybe 0 (no service disconnect) or 1 (with service disconnect).

2. (1,2) maybe 1 (with service disconnect, no breaker jumper bar) or 2 (with service disconnect & breaker jumper bar).

3. MOP = Maximum Overcurrent Protection device; must be HACR type service disconnect or time delay fuse. Refer to the latest edition of the National Electric Code or in Canada the Canadian electrical Code and local codes to determine correct wire sizing.

TABLE 12: Electrical Data For Multi-source Power Supply: 208/230-1-60

Air Handlers Models	Heater Models ^{1, 2}	Total Heater Amp@ 240V	Min. Circuit Ampacity						MOP ³					
			208V			230V			208V			230V		
			Circuit						Circuit					
			1st ³	2nd	3rd	1st ³	2nd	3rd	1st ³	2nd	3rd	1st ³	2nd	3rd
24B	6HK16501306	52	22.5	37.6	-	24.4	41.5	-	25	40	-	25	45	-
30B	6HK16501306	52	22.5	37.6	-	24.4	41.5	-	25	40	-	25	45	-
	6HK16501506	60	25.4	43.3	-	27.6	47.9	-	30	45	-	30	50	-
36B	6HK16501306	52	25.0	37.6	-	26.4	41.5	-	25	40	-	30	45	-
	6HK16501506	60	27.9	43.3	-	29.6	47.9	-	30	45	-	30	50	-
	6HK16501806	72	45.3	39.0	-	48.8	43.1	-	50	40	-	50	45	-
	6HK16502006	80	49.6	43.3	-	53.5	47.9	-	50	45	-	60	50	-
36C	6HK16501306	52	25.0	37.6	-	26.4	41.5	-	25	40	-	30	45	-
	6HK16501506	60	27.9	43.3	-	29.6	47.9	-	30	45	-	30	50	-
	6HK16501806	72	45.3	39.0	-	48.8	43.1	-	50	40	-	50	45	-
	6HK16502006	80	49.6	43.3	-	53.5	47.9	-	50	45	-	60	50	-
42C	6HK16501306	52	25.0	37.6	-	26.4	41.5	-	25	40	-	30	45	-
	6HK16501506	60	27.9	43.3	-	29.6	47.9	-	30	45	-	30	50	-
	6HK16501806	72	45.3	39.0	-	48.8	43.1	-	50	40	-	50	45	-
	6HK16502006	80	49.6	43.3	-	53.5	47.9	-	50	45	-	60	50	-
48C	6HK16501306	52	27.9	37.6	-	29.5	41.5	-	30	40	-	30	45	-
	6HK16501506	60	30.8	43.3	-	32.7	47.9	-	35	45	-	35	50	-
	6HK16501806	72	48.1	39.0	-	51.9	43.1	-	50	40	-	60	45	-
	6HK16502006	80	52.5	43.3	-	56.7	47.9	-	60	45	-	60	50	-
48D	6HK16501306	52	27.9	37.6	-	29.5	41.5	-	30	40	-	30	45	-
	6HK16501506	60	30.8	43.3	-	32.7	47.9	-	35	45	-	35	50	-
	6HK16501806	72	48.1	39.0	-	51.9	43.1	-	50	40	-	60	45	-
	6HK16502006	80	52.5	43.3	-	56.7	47.9	-	60	45	-	60	50	-
	6HK16502506	100	52.5	43.3	21.7	56.7	47.9	24.0	60	45	25	60	50	25
60C	6HK16501306	52	27.9	37.6	-	29.5	41.5	-	30	40	-	30	45	-
	6HK16501506	60	30.8	43.3	-	32.7	47.9	-	35	45	-	35	50	-
	6HK16501806	72	48.1	39.0	-	51.9	43.1	-	50	40	-	60	45	-
	6HK16502006	80	52.5	43.3	-	56.7	47.9	-	60	45	-	60	50	-
60D	6HK16501306	52	27.9	37.6	-	29.5	41.5	-	30	40	-	30	45	-
	6HK16501506	60	30.8	43.3	-	32.7	47.9	-	35	45	-	35	50	-
	6HK16501806	72	48.1	39.0	-	51.9	43.1	-	50	40	-	60	45	-
	6HK16502006	80	52.5	43.3	-	56.7	47.9	-	60	45	-	60	50	-
	6HK16502506	100	52.5	43.3	21.7	56.7	47.9	24.0	60	45	25	60	50	25

1. (0,1) - maybe 0 (no service disconnect) or 1 (with service disconnect).

2. (1,2) maybe 1 (with service disconnect, no breaker jumper bar) or 2 (with service disconnect & breaker jumper bar).

3. MOP = Maximum Overcurrent Protection device; must be HACR type service disconnect or time delay fuse. The 1st circuit includes blower motor amps. Refer to the latest edition of the National Electric Code or in Canada the Canadian electrical Code and local codes to determine correct wire sizing.

TABLE 13: Air Flow Data (CFM)

High/Low Speed Cooling and Heat Pump CFM											
Cool Tap	ADJ Tap	18B		24B		30B		36B		36C	
		High	Low	High	Low	High	Low	High	Low	High	Low
A	B	810	527	1022	562	1060	731	1350	878	1350	878
B	B	675	439	795	437	1013	658	1238	804	1238	804
A	A	720	468	900	495	1000	650	1200	780	1200	780
B	A	600	390	700	385	900	585	1100	715	1100	715
A	C	630	410	783	431	875	569	1050	683	1050	683
C	B	534	347	766	421	844	548	1125	731	1125	731
B	C	525	341	609	335	788	512	963	626	963	626
D	B	450	293	568	312	703	457	900	585	900	585
C	A	475	309	675	371	750	488	1000	650	1000	650
D	A	400	260	500	275	625	406	800	520	800	520
C	C	416	270	587	323	656	427	875	569	875	569
D	C	350	228	435	239	547	355	700	455	700	455
Cool Tap	ADJ Tap	42C		48C		48D		60C		60D	
		High	Low	High	Low	High	Low	High	Low	High	Low
A	B	1596	1037	1760	1144	1760	1144	1860	1308	1935	1316
B	B	1400	910	1540	1001	1540	1001	1840	1196	1772	1152
A	A	1425	926	1600	1040	1600	1040	1750	1138	1800	1170
B	A	1250	813	1400	910	1400	910	1600	1040	1575	1024
A	C	1268	824	1424	926	1424	926	1531	995	1665	1082
C	B	1344	874	1320	858	1320	858	1581	1028	1491	969
B	C	1113	723	1246	810	1246	810	1400	910	1457	947
D	B	1120	728	1100	715	1100	715	1323	860	1350	878
C	A	1200	780	1200	780	1200	780	1375	894	1325	861
D	A	1000	650	1000	650	1000	650	1150	748	1200	780
C	C	1068	694	1068	694	1068	694	1203	782	1226	797
D	C	890	579	890	579	890	579	1006	654	1110	722
High/Low Speed Heat CFM											
Heat Tap	18B		24B		30B		36B		36C		
	High	Low	High	Low	High	Low	High	Low	High	Low	
A	850	850	1025	980	1025	850	1225	1020	1425	1150	
B	750	750	960	960	960	775	1150	950	1150	1000	
C	675	675	725	725	750	750	950	750	925	925	
D	425	425	580	580	580	580	725	725	675	675	
Heat Tap	AVC42C		AVC48C		AVC48D		AVC60C		AVC60D		
	High	Low	High	Low	High	Low	High	Low	High	Low	
A	1430	1200	1650	1200	1650	1150	1850	1250	1825	1150	
B	1375	1150	1550	1150	1600	1050	1775	1200	1775	1050	
C	1150	1050	1375	1050	1325	1000	1570	1150	1570	1000	
D	900	900	1150	1000	1125	780	1370	1050	1375	950	

NOTES:

Air handler units have been tested to UL 1995 / CSA 22.2 standards up to 0.50" wc. external static pressure.

Dry coil conditions only, tested without filters.

For optimal performance, external static pressures of 0.2" to 0.5" are recommended. Applications above 0.5" are not recommended. Above 0.5" CFM is reduced by 2% per 0.1" increase in static.

The ADJ tap does not affect the HEAT tap setting

Low speed cooling used only with two stage outdoor units. Speed is preset to 65% of high speed.

Dehumidification speed is 85% of jumper selected COOL tap and ADJUST tap

When operating in both heat pump and electric heat modes, the airflow (CFM) will be per HEAT tap CFM values only.

At some settings, LOW COOL and/or LOW HEAT airflow may be lower than what is required to operate an airflow switch on certain models of electronic air cleaners.

Consult the instructions for the electronic air cleaner for further details

Airflow (CFM) indicator light (LED2) flashes once for every 100 CFM (i.e.: 12 flashes is 1200 CFM) - blinks are approximate +/- 10% of actual CFM

SECTION XIV: MAINTENANCE

Filters must be cleaned or replaced when they become dirty. Inspect at least once per month. The frequency of cleaning depends upon the hours of operation and the local atmospheric conditions. Clean filters keep unit efficiency high.

COIL CLEANING

If the coil needs to be cleaned, it should be cleaned with water.

LUBRICATION

The bearings of the blower motor are permanently lubricated.

CONDENSATE DRAINS

During the cooling season check the condensate drain lines to be sure that condensate is flowing from the primary drain but not from the secondary drain. If condensate ever flows from the secondary drain the unit should be promptly shut off and the condensate pan and drains cleaned to insure a free flowing primary drain.

SECTION XV: AIR SYSTEM ADJUSTMENT

To check the Cubic Feet per Minute (CFM), measure the external duct static using a manometer and static pressure tips. To prepare coil for static pressure drop measurements run the fan only to assure a dry coil. Drill 2 holes, one 12" away from the air handler in the supply air duct and on 12" away from the air handler in the return air duct (before any elbows in the duct work). Insert the pressure tips and read the pressure drop from the manometer.

EXTERNAL DUCT STATIC

Measure the supply air static pressure. Record this positive number. Measure the return air static pressure. Record this negative number. Treat the negative number as a positive, and add the two numbers together to determine the total external system static pressure. If a filter rack is installed on the return air end of the air handler or indoor coil section, make sure to measure the return air duct static between the filter and the indoor coil.

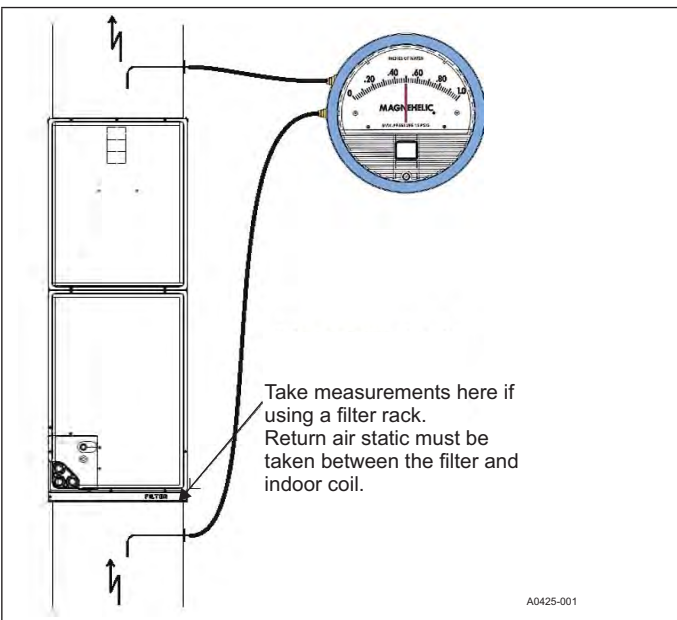


FIGURE 20: Duct Static Measurements

SECTION XVI: INSTALLATION VERIFICATION

Prior to and during the accomplishment of the installation procedures, verify all tasks are accomplished as illustrated in Figures 21 and 22.

THERMAL EXPANSION VALVE (TXV) CHECK LIST

- Is coil metering device installed correctly?
- Was the correct TXV installed per the outdoor unit Technical Guide?
- Is the TXV bulb positioned correctly?
- Is temperature bulb insulated?
- Is equalizer line connected?

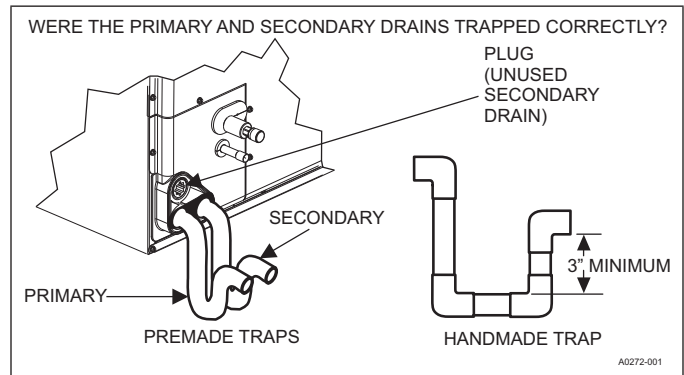


FIGURE 21: Drain Traps

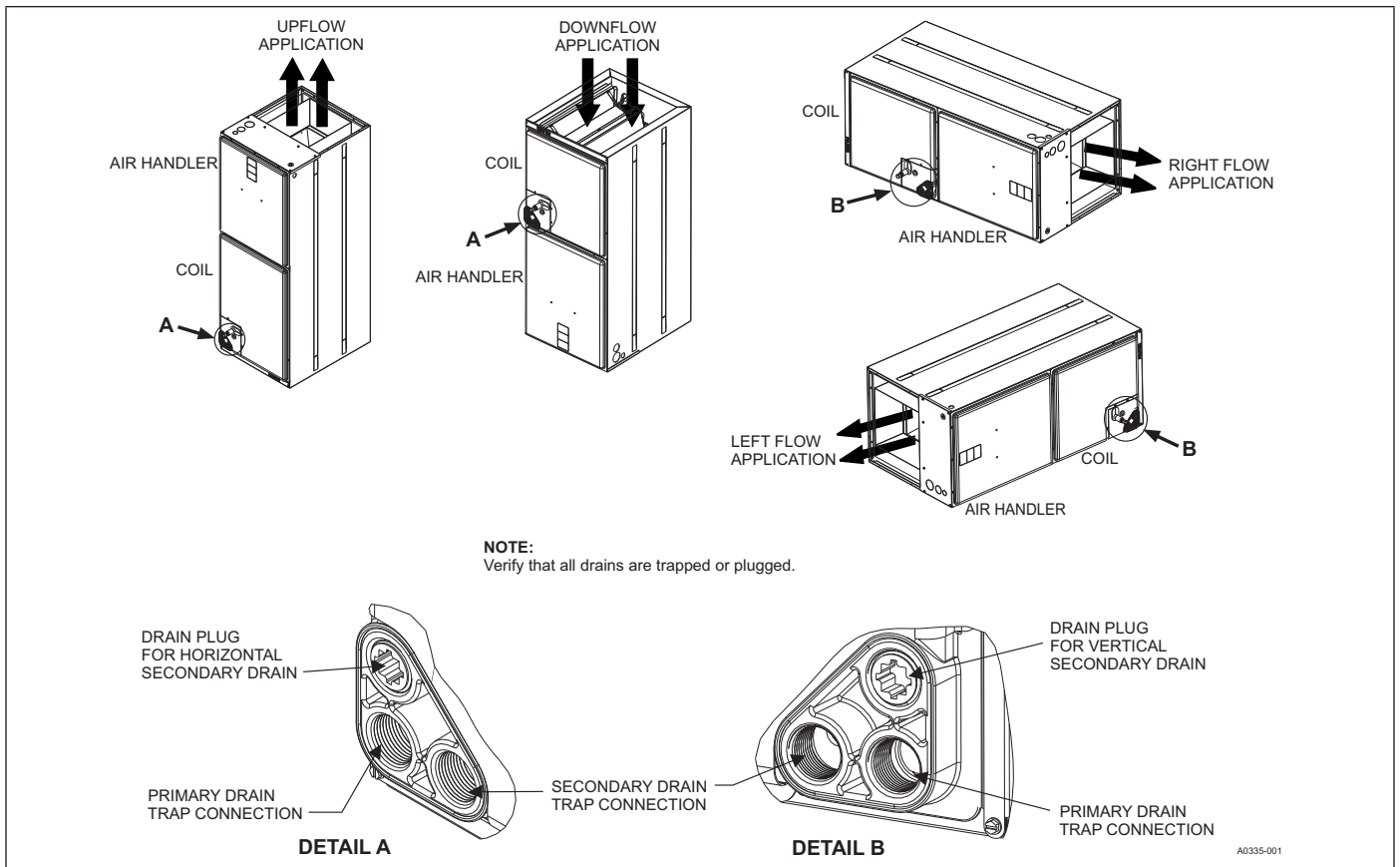


FIGURE 22: Location of Coil Trapped and Plugged Drain Connections

SECTION XVII: WIRING DIAGRAM

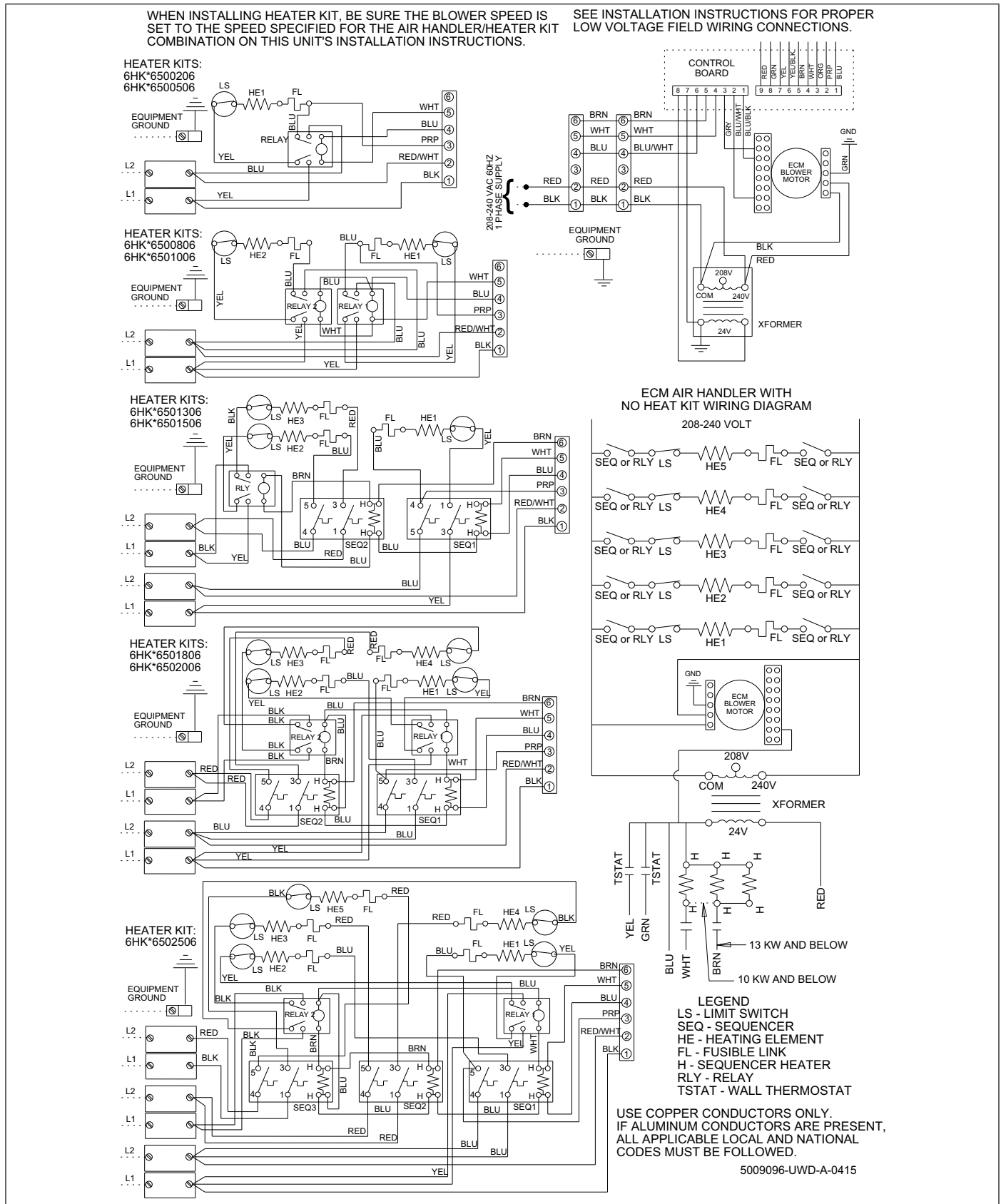


FIGURE 23: Wiring Diagram - ECM - Single Phase Heat Kits

NOTES

SECTION XVIII: START UP SHEET

Print Form

Residential Air Handler
with Electric Heat Start-Up Sheet

Reset Form

Proper start-up is critical to customer comfort and equipment longevity

Start-Up Date Company Name Start-Up Technician

Owner Information

Name Address Daytime Phone
City State or Province Zip or Postal Code

Equipment Data

Unit Model # Unit Serial #

General Information (Check all that apply)

New Construction Up flow Horizontal Left
 Retrofit Down flow Horizontal Right

Unit Location and Connections (Check all that apply)

Unit is level Duct connections are complete: Supply Return
 Condensate drain properly connected per the installation instructions Condensate trap has been primed with water

Filters

Filters installed Number of filters Filter size

Electrical Connections & Inspection (Complete all that apply)

208 volts AC 230 volt AC
 Inspect wires and electrical connections Transformer wired properly for primary supply voltage Ground connected
Line Voltage Measured (Volts AC) Low voltage value between "R" and "C" at control board (Volts AC)
 Thermostat wiring is complete Thermostat cycle rate or heat anticipator adjusted to Installation Manual specifications

Air Flow Setup

Blower Type & Set-Up	<input type="radio"/> ECM	COOL <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D
		ADJUST <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D
		DELAY <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D
		HEAT <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D
	<input type="radio"/> X-13	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5
<input type="radio"/> PSC	<input type="radio"/> Low <input type="radio"/> Medium Low <input type="radio"/> Medium <input type="radio"/> Medium High <input type="radio"/> High	

Supply static (inches of water column) Supply air dry bulb temperature Outside air dry bulb temperature
Return static (inches of water column) Return air dry bulb temperature Return air wet bulb temperature
Total external static pressure Temperature drop Supply air wet bulb temperature

Other Jumpers (Check all that apply)

HUM STAT YES NO AC/HP AC HP CONT FAN L M H

Continued on next Page

Electric Heat (Complete all that apply)

Electric heat kit - Model number <input style="width: 150px;" type="text"/>		Serial number <input style="width: 150px;" type="text"/>		Rated KW <input style="width: 50px;" type="text"/>		
Number of elements <input style="width: 30px;" type="text"/>	Measured Amperage	Heater 1 <input style="width: 50px;" type="text"/>	Heater 2 <input style="width: 50px;" type="text"/>	Heater 3 <input style="width: 50px;" type="text"/>		
		Heater 4 <input style="width: 50px;" type="text"/>	Heater 5 <input style="width: 50px;" type="text"/>	Heater 6 <input style="width: 50px;" type="text"/>		
	Measured Voltage	Heater 1 <input style="width: 50px;" type="text"/>	Heater 2 <input style="width: 50px;" type="text"/>	Heater 3 <input style="width: 50px;" type="text"/>		
		Heater 4 <input style="width: 50px;" type="text"/>	Heater 5 <input style="width: 50px;" type="text"/>	Heater 6 <input style="width: 50px;" type="text"/>		
Heating return air dry bulb temperature <input style="width: 100px;" type="text"/>		Heating supply air dry bulb temperature <input style="width: 100px;" type="text"/>		Air temperature rise <input style="width: 100px;" type="text"/>		

Clean Up Job Site

<input type="checkbox"/> Job site has been cleaned, indoor and outdoor debris removed from job site <input type="checkbox"/> Tools have been removed from unit <input type="checkbox"/> All panels have been installed
--

Unit Operation and Cycle Test (Complete all that apply)

<input type="checkbox"/> Operate the unit through continuous fan cycles from the thermostat, noting and correcting any problems <input type="checkbox"/> Operate the unit through cooling cycles from the thermostat, noting and correcting any problems <input type="checkbox"/> Operate the unit through mechanical heating cycles from the thermostat, noting and correcting any problems <input type="checkbox"/> Operate the unit through emergency heating cycles from the thermostat, noting and correcting any problems
--

Owner Education

<input type="checkbox"/> Provide owner with the owner's manual <input type="checkbox"/> Explain operation of system to equipment owner <input type="checkbox"/> Explain thermostat use and programming (if applicable) to owner <input type="checkbox"/> Explain the importance of regular filter replacement and equipment maintenance
--

Comments and Additional Job Details