INSTALLATION MANUAL

VARIABLE SPEED ECM SINGLE PIECE MULTI-POSITION AIR HANDLERS WITH FACTORY INSTALLED ELECTRONIC EXPANSION VALVE (EEV)

MODELS: AVV SERIES

AMERICAN QUALITY DESIGNED, ENGINEERED & ASSEMBLED IN THE USA

AHRI CERTIFIED www.ahridirectory.org

C US

ISO 9001 Certified Quality Management System

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IMPORTANT: The electronic expansion valve (EEV) in this unit is shipped in the closed position to protect the valve during transportation. Prior to brazing, line power must be applied to the air handler field wiring terminals for 1 minute. The initial power causes the EEV to open allowing nitrogen to flow through the system during the brazing process.

If power cannot be applied to the EEV control board prior to brazing refrigeration piping, a tool is available to manually operate the EEV. An EEV manual operating tool can be purchased from Source 1 as part number S1-02649686000. Six revolutions of the tool open the valve fully.

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 4 and Table 1 of this Instruction Manual. The plenum must be installed according to the instructions.
7. Clearance from combustible 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 Figures 1 and 2 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.

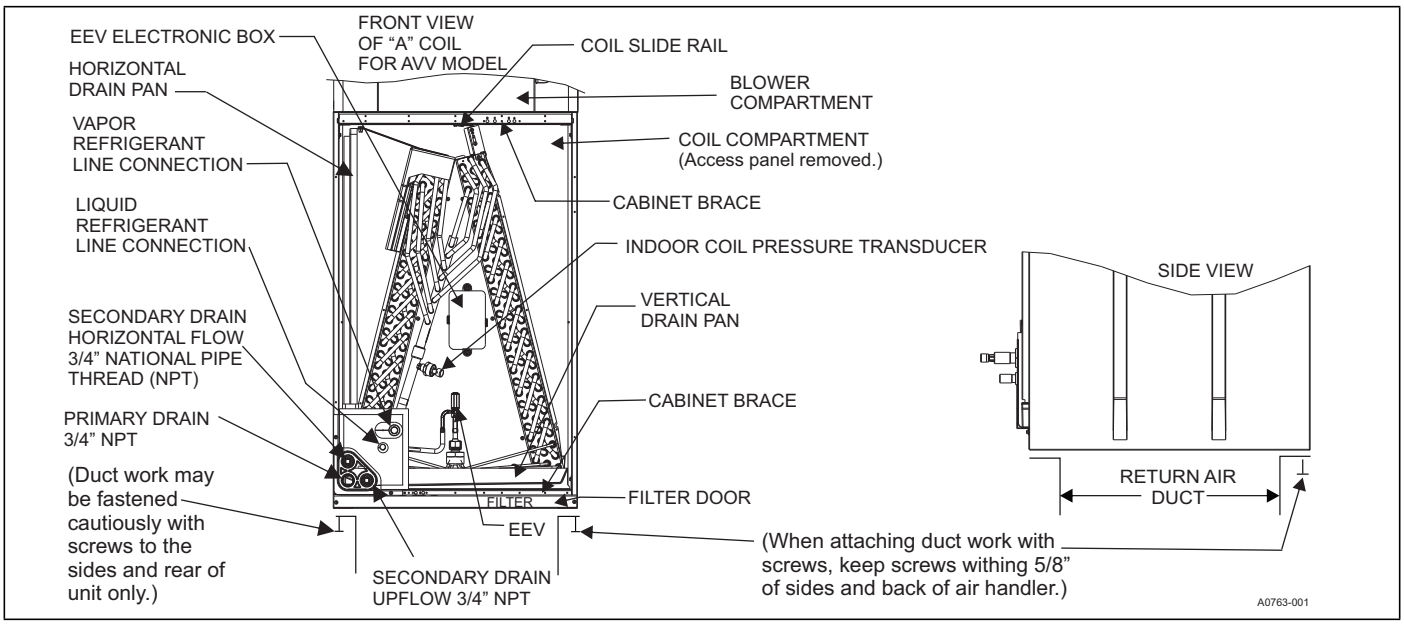


FIGURE 1: "A" Coil Return Air Duct Attachment & Component Location

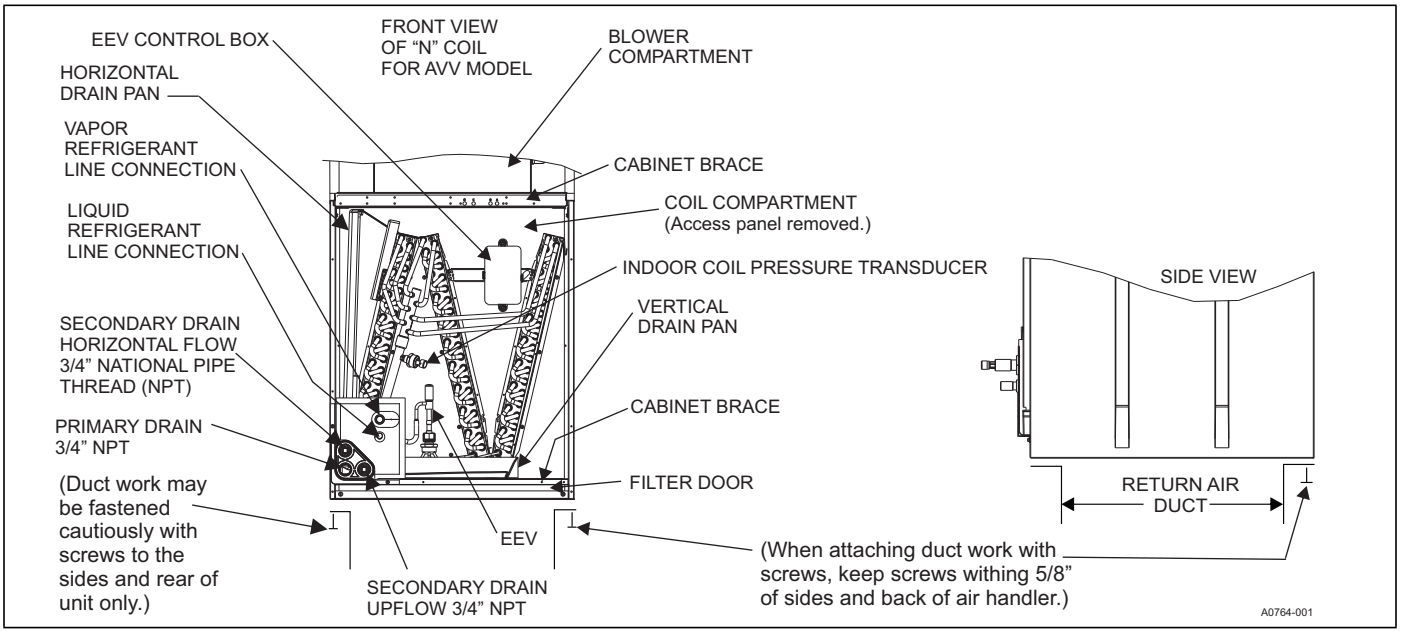


FIGURE 2: "N" Coil Return Air Duct Attachment & Component Location

INSPECTION

As soon as a coil is received, it should be checked to insure it is still under pressure per Figure 3. 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 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.

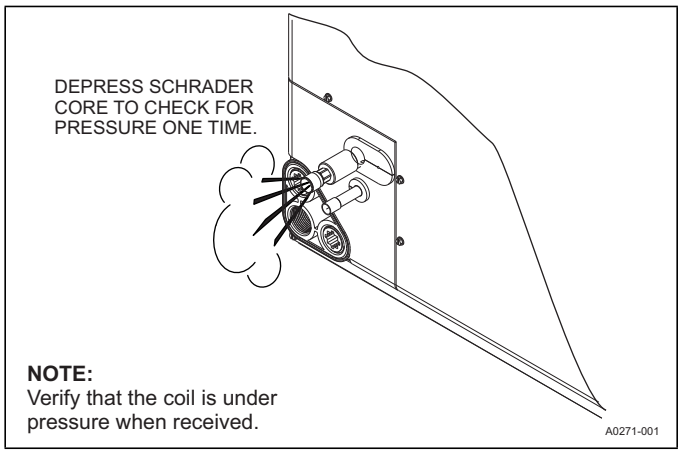


FIGURE 3: Pressure Check

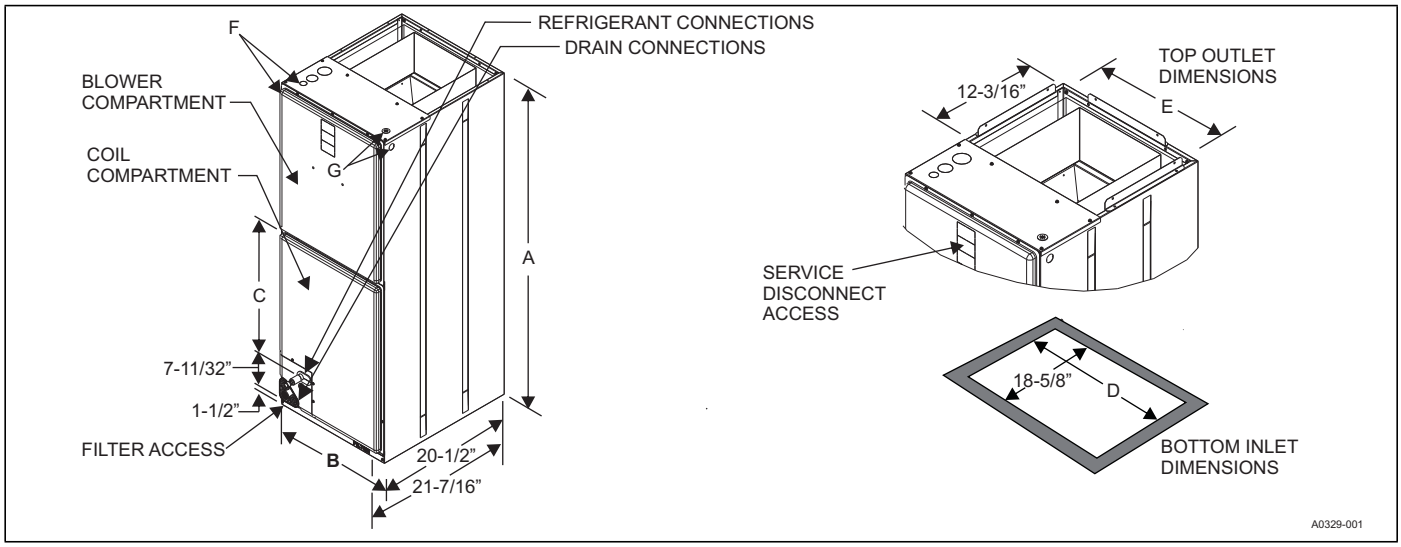


FIGURE 4: Dimensions & Duct Connection Dimensions

TABLE 1: Dimensions[1]

Models	Dimensions					Wiring Knockouts[2]		Refrigerant Connections Line Size	
	A	B	C	D	E	F	G		
	Height	Width				Power (Conduit)	Control (Conduit)	Liquid	Vapor
25B	47-1/2	17-1/2	19-1/2	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
37B	47-1/2	17-1/2	19-1/2	14-1/4	16-1/2				
37C	51-1/2	21	22-5/8	17-3/4	20				
38C	55-3/4	21	26-7/8	17-3/4	20				
49C	55-3/4	21	26-7/8	17-3/4	20				7/8
49D	55-1/2	24-1/2	26-5/8	21-3/4	23-1/2				
50C	60	21	31-3/8	17-3/4	20				
50D	60	24-1/2	31-3/8	21-3/4	23-1/2				
61C	60	21	31-3/8	17-3/4	20				
61D	60	24-1/2	31-3/8	21-3/4	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 4 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 °F		**Dry °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 5. If the unit requires either downflow or horizontal right airflow configurations, the unit must have the coil assembly repositioned. Refer to the Downflow or Horizontal Right Conversion procedures.

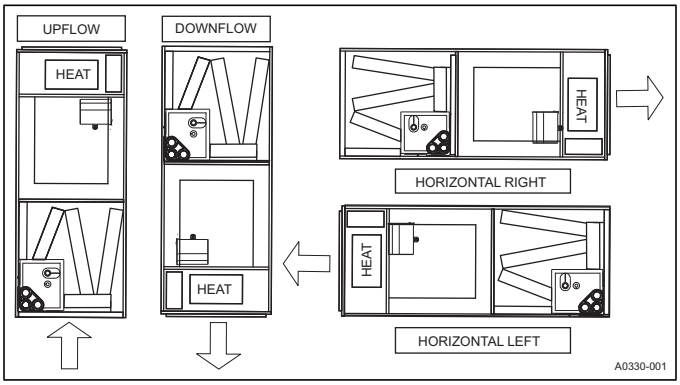


FIGURE 5: Typical Installation

Horizontal Left Conversion

NOTICE

For horizontal left applications, high airflow can prevent the collected condensate from draining properly since the direction of the airflow opposes the direction of the draining condensate. The horizontal pan must be angled properly in order to ensure proper drainage in high airflow applications. Ensure that the pan is angled properly by checking that the correct hole is used on the pan straps per TABLE 2. Use FIGURE 6 to identify the "BACK" and "FRONT" straps since, in some cases, these settings are not the same.

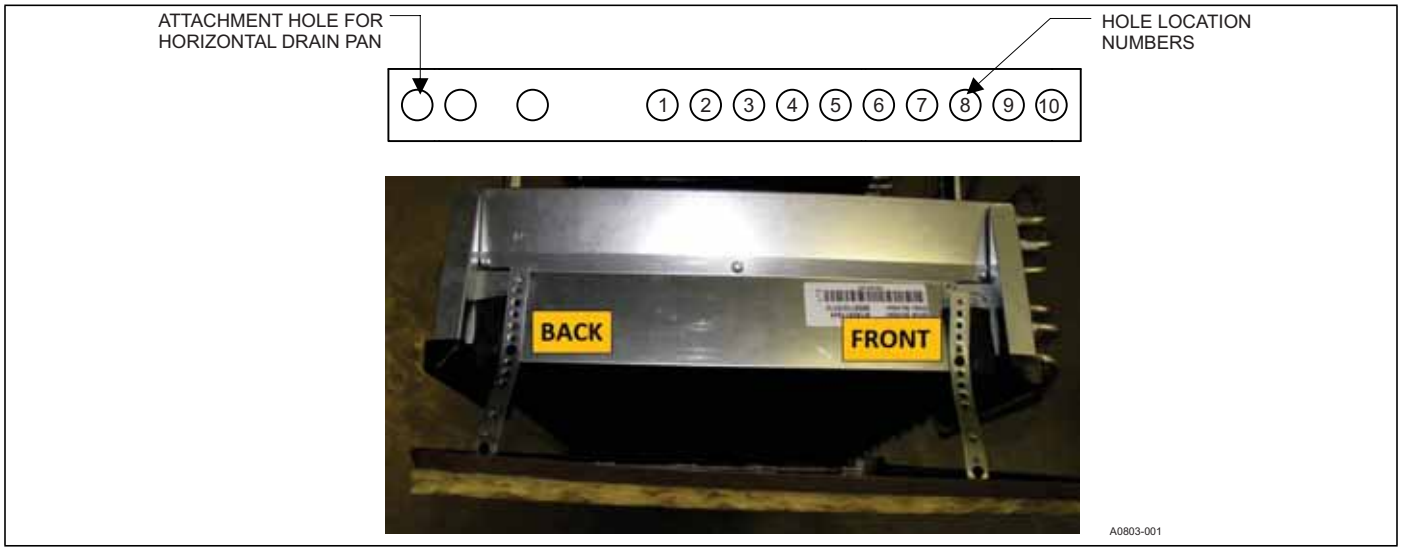


FIGURE 6: Horizontal Pan Adjustment Strap Hole Reference

TABLE 2: Horizontal Pan Strap Settings for Horizontal Left

Model						Back	Front
AP	RFCX-P2	AE	RFCX-E2	AVC	CM		
AP24B AP30B AP36B	RFCX24BP RFCX30BP RFCX36BP	AE24B AE30B AE36B	RFCX24BE RFCX30BE RFCX36BE	AVC24B AVC30B AVC36B	CM24A CM24B CM25B CM30A CM30B CM36A CM36B	2	2
AP60C	RFCX60CP	AE60C	RFCX60CE	AVC60C	CM60C	3	4
AP36C AP37C AP42C AP48C	RFCX36CP RFCX37CP RFCX42CP RFCX48CP	AE42C AE48C	RFCX42CE RFCX48CE	AVC42C AVC48C	CM42C CM48C	4	4
–	–	AE60D	RFCX60DE	AVC60D	CM64D	4	5
–	–	AE36C	RFCX36CE	AVC36C	CM37C CM30C CM36C	5	5
–	–	–	–	–	CM24C	6	6
AP18B	RFCX18BP	AE18B	RFCX18BE	AVC18B	CM18B	7	7
AP48D AP60D	RFCX48DP RFCX60DP	AE48D	RFCX48DE	AVC48D	CM30D CM36D CM42D CM48D CM60D	8	8

Downflow or Horizontal Right Conversion (A Coil Models)

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. Disconnect the EEV control board communicating cable from the main control board.
3. Slide coil/drain pan assembly out of air handler.
4. Remove the front screw from the coil slide rail.
5. Relocate coil slide rail from top side of coil cabinet to the bottom side.
6. Install coil slide rail by hooking the aft end into holes on back cabinet brace. Secure slide rail with screw removed in step 4.
7. Turn air handler cabinet upside down (in to the downflow position).
8. Slide the coil back into the cabinet. Be sure to engage the coil top into the slide rail on the air handler cabinet.
9. Route EEV control board communicating cable through the vapor refrigerant line connection hole to the outside of the air handler cabinet. Run cable on outside of air handler back into the air handler through the low voltage control wiring opening. Reconnect cable to the main control board, and seal opening in control board enclosure.
10. Install coil access panel. Conversion is now complete.

Downflow or Horizontal Right Conversion (N Coil Models)

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. Disconnect the EEV control board communicating cable from the main control board.
3. 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.

4. 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.

5. 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.
6. Turn air handler cabinet upside down (downflow position).
7. 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 predrilled hole.

NOTICE

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

8. Install center support bar for the coil/drain pan onto the lettered position that it was originally mounted.
9. For horizontal right applications (N coils only), 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 7.
10. Slide the coil back into the cabinet. Be sure to engage the side coil slide into the slide rail on the air handler cabinet.
11. Route EEV control board communicating cable through the vapor refrigerant line connection hole to the outside of the air handler cabinet. Run cable on outside of air handler back into the air handler through the low voltage control wiring opening. Reconnect cable to the main control board, and seal opening in control board enclosure.
12. Install coil access panel. Conversion is now complete.

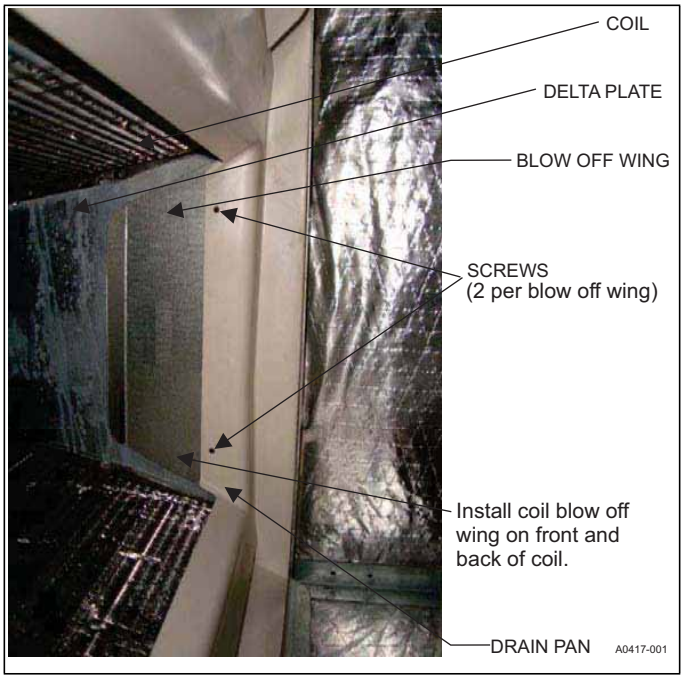


FIGURE 7: Coil Blow Off Wing Installation

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” long 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

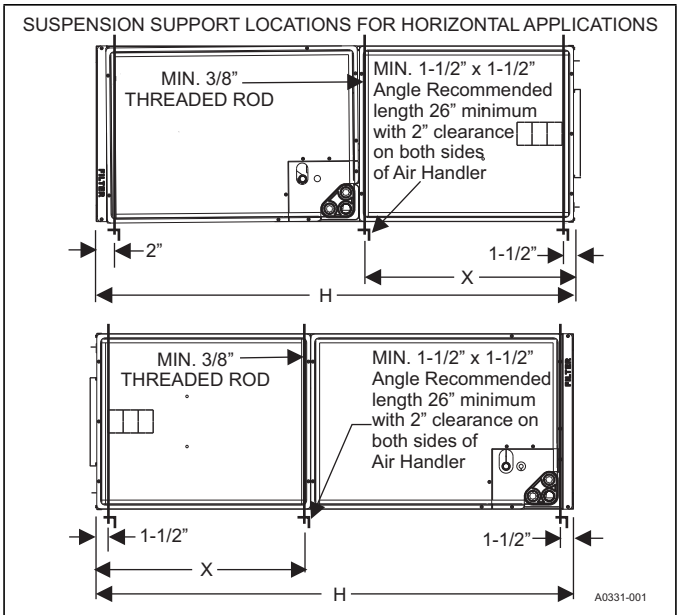
These air handlers may be suspended in horizontal applications. It is recommended to use angle steel support brackets with minimum 3/8" threaded rods, supporting the unit from the bottom. Attach the threaded rods at the locations shown in the Figure 8, leaving enough clearance between door and rod so that doors maybe 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 Figures 2 or 3 for location of cabinet braces.

NOTICE

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



Dimension in Inches

Air Handler Cabinet Size	X	H
17-1/2 Width-Short H	21	41
17-1/2 Width-Long H	21	47-1/2
21 Width-Short H	21-1/2	51-1/2
21 Width-Long H	21-1/2	55-3/4
24-1/2 Width	21-1/2	55-1/2

FIGURE 8: 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 9. If the flanges are not used, they may be discarded.

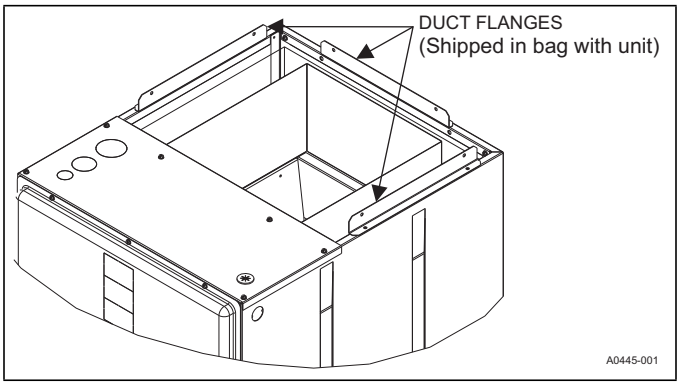


FIGURE 9: Duct Attachment

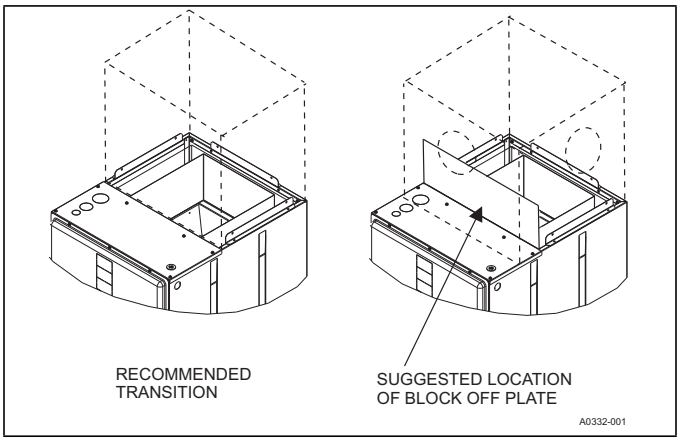


FIGURE 10: Duct Work Transition

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 though 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 10 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

⚠ CAUTION

COIL UNDER PRESSURE.
Verify that pressure has been released by depressing schrader valve core.

This unit is supplied with a factory installed Electronic Expansion Valve (EEV). The EEV, the temperature sensor, and the pressure transducer are factory wired to the control board.

NOTICE

To prevent moisture and contaminates 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.

SECTION VI: REFRIGERANT LINE CONNECTION

⚠ CAUTION

Coil is under inert gas pressure. Relieve pressure from coil by depressing Schrader core at end of suction manifold stub out.

⚠ 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

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

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, furnace flue or filter.

1. 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.
2. Remove grommets where tubes exit the cabinet to prevent burning them during brazing. In some units, the vapor line grommet may be shipped as a loose part with the unit. Refer to Figure 11.
3. 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).
4. 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:
   a. Screw a sheet metal screw into the center of the cap.
   b. Apply a small amount of heat to the cap while pulling on the screw using slip joint pliers.

IMPORTANT: The electronic expansion valve (EEV) in this unit is shipped in the closed position to protect the valve during transportation. Prior to brazing, line power must be applied to the air handler field wiring terminals for 1 minute. The initial power causes the EEV to open allowing nitrogen to flow through the system during the brazing process.

NOTICE

If power cannot be applied to the EEV control board prior to brazing refrigeration piping, a tool is available to manually operate the EEV. An EEV manual operating tool can be purchased from Source 1 as part number S1-02649686000. Six revolutions of the tool open the valve fully.

5. Insert liquid and suction lines into the coil connections at the coil cabinet tubing panel.
6. Wrap a water soaked rag around the coil connection tubes inside the cabinet to avoid transferring excess heat to the coil, the EEV, the temperature sensor or the pressure transducer.
7. Purge refrigerant lines with dry nitrogen.

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.

8. Braze the suction and liquid lines, and allow the joints to cool.
9. Re-attach the grommets to the lines carefully to prevent air leakage. In some units, the vapor line grommet may be shipped as a loose part with the unit. Refer to Figure 11.
10. Refer to Outdoor unit Installation Manual, and accomplish evacuation, leak check and charging instructions. Check all field brazed joints and metering device connections.
11. Attach the coil access panel to the cabinet.
12. Ensure lines are sound isolated by using appropriate hangers or strapping.

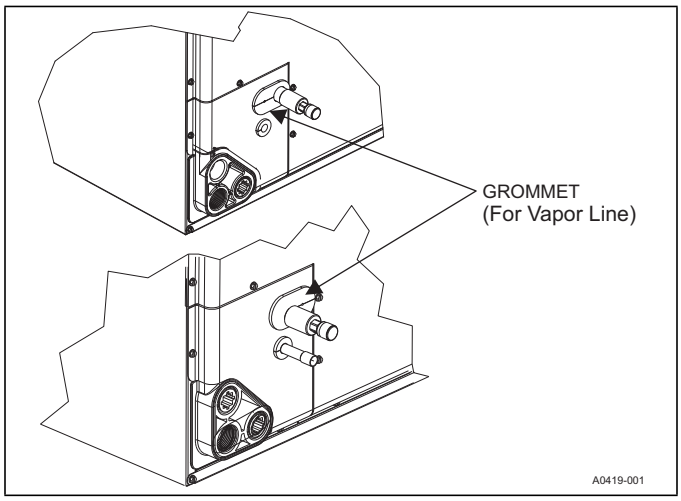


FIGURE 11: Vapor Line Grommet

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 is not exposed to freezing temperatures. See Figures 19 and 20 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.

Drain plugs can be removed using a standard 3/8 inch drive socket set ratchet.

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 evaporator 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 19 and 20.

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 7 - 14 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.

⚠ CAUTION

This is a fully communicating system. “L1” and “L2” connections MUST be the same in both indoor and outdoor equipment. Verify “L1” and “L2” connection locations in the electrical panel that feed the indoor and outdoor equipment. Failure to wire correctly may introduce noise onto the RS485 communicating system and cause communication errors.

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.

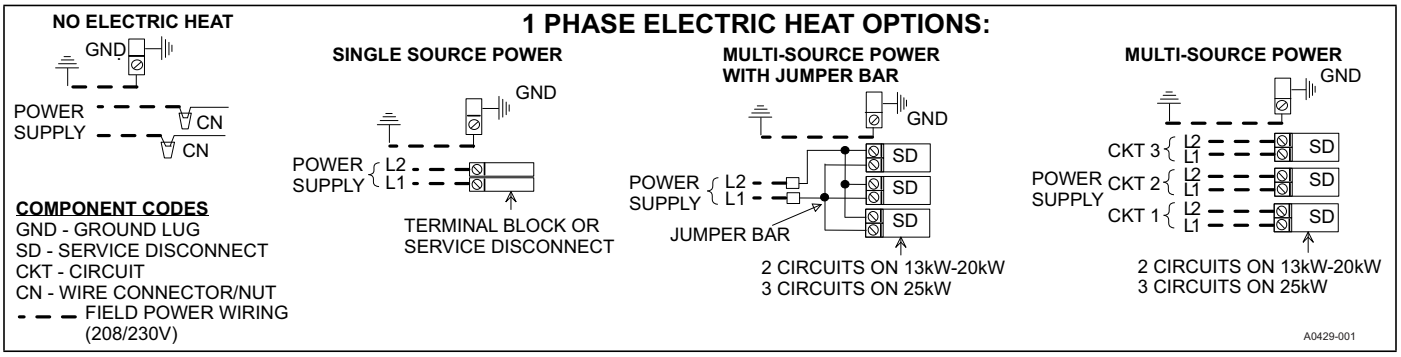


FIGURE 12: Line Power Connections

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 Figures 16 & 17.

NOTICE

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

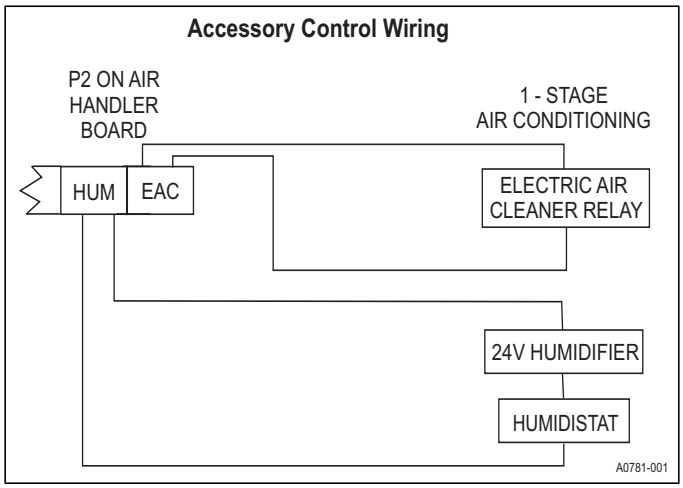


FIGURE 13: Accessory Control Wiring

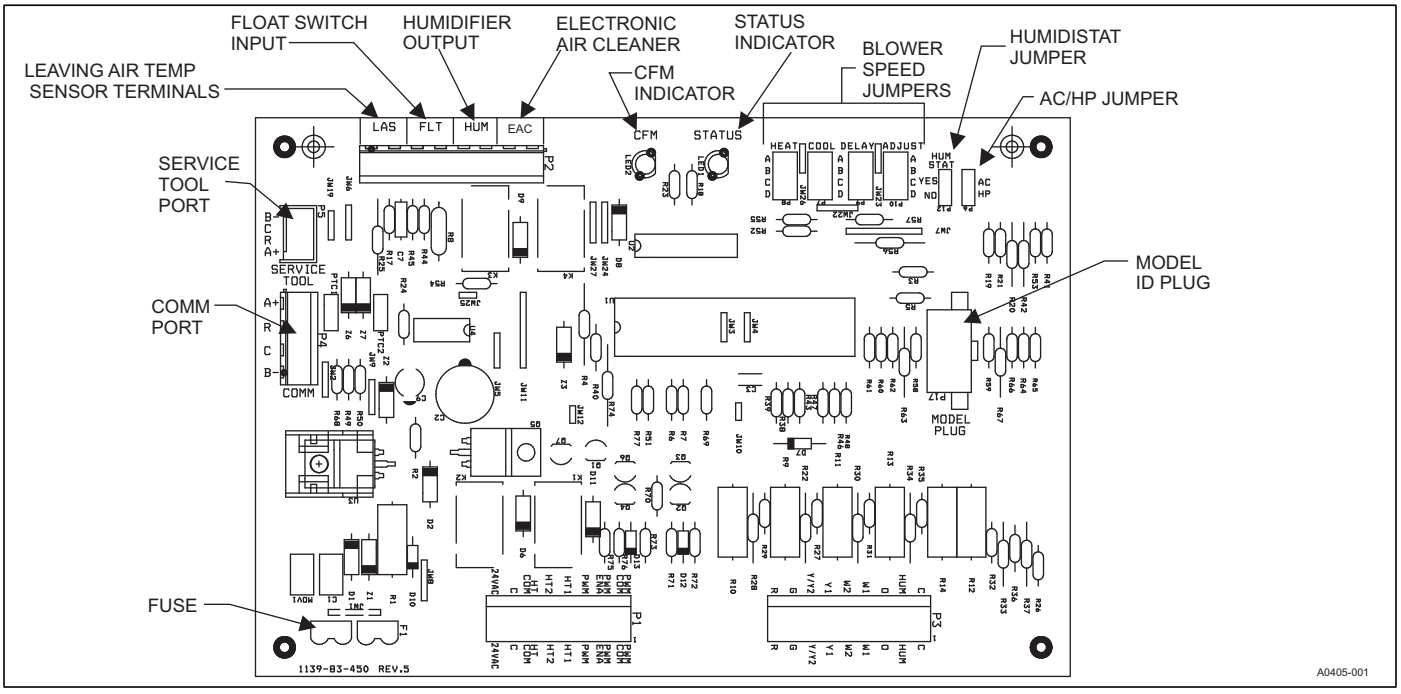


FIGURE 14: Main Control Board

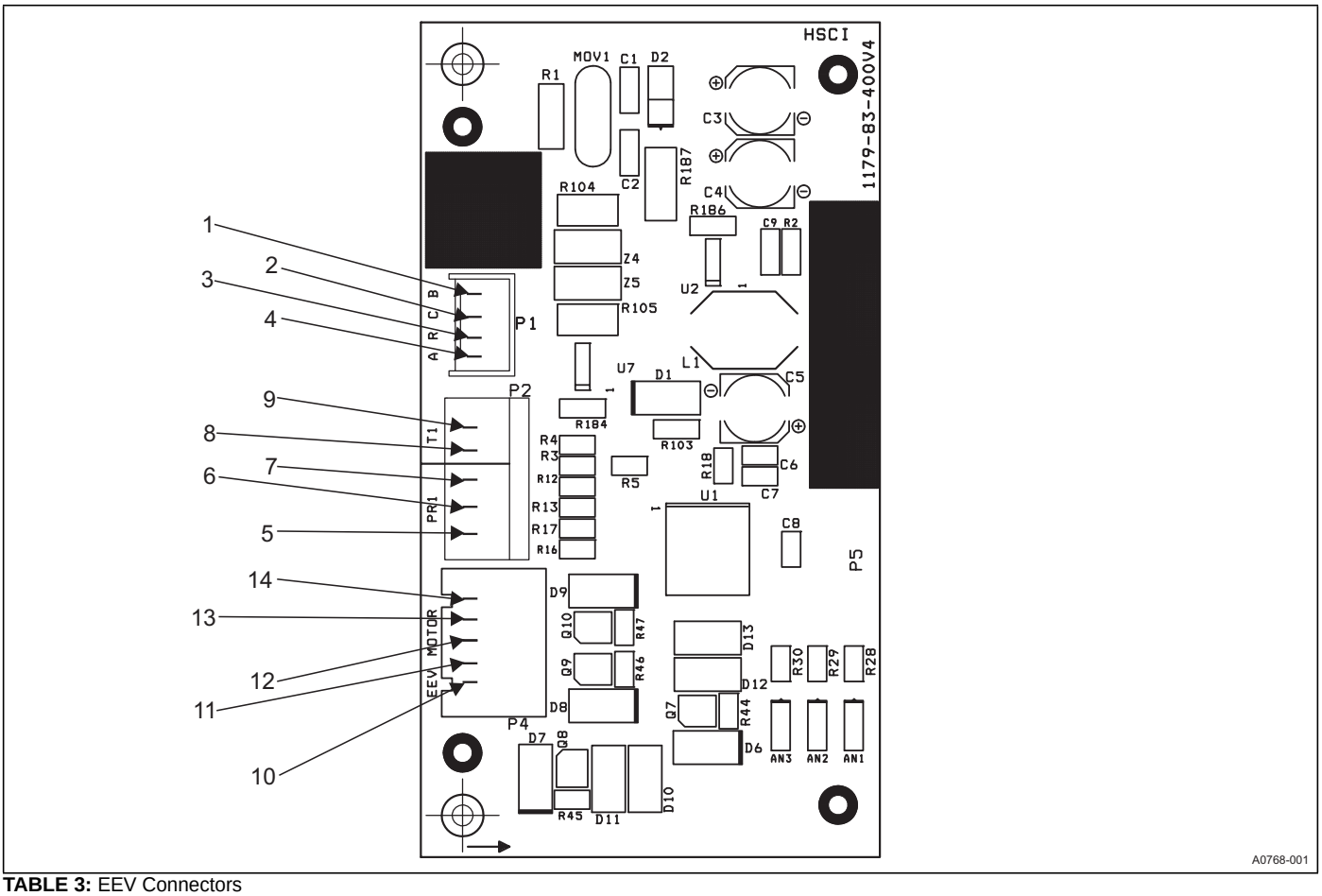


TABLE 3: EEV Connectors

ITEM	INPUT	DESCRIPTION	CONNECTOR USE	CONNECTION
1	B-	RS 485 Inverted Input	Communication Signals	Pin 1
2	C	24 VAC System Common		Pin 2
3	R	24 VAC System Power		Pin 3
4	A+	RS 485 Input		Pin 4
5	PR1	5V VCC Pressure Transducer	Indoor Pressure Transducer	Pin 1
6	PR1	0.5 – 4.5V Pressure Transducer Signal		Pin 2
7	PR1	Common Pressure Transducer		Pin 3
8	T1	10k Temperature Sensor Common	Indoor Temperature Sensor	Pin 4
9	T1	Temperature Sensor Input		Pin 5
10	EEV	EEV Phase A	EEV Motor Control	Pin 1
11	EEV	EEV Phase B		Pin 2
12	EEV	EEV Phase C		Pin 3
13	EEV	EEV Phase D		Pin 4
14	EEV	EEV 12VDC		Pin 5

CONTROL WIRING USING COMMUNICATING CONTROLS

The Communicating System consists of several intelligent communicating components including the Hx™ Thermostat, the variable speed air handler and the modulating air conditioner or heat pump. These components continually communicate with each other via the wire connections shown in Figure 16. Commands, operating conditions, and other data are passed continually between components over the A-R-C-B and A-C-B bus. The result is a new level of comfort, versatility, and simplicity.

In order to use this air handler, it MUST be installed with the matching Hx™ Thermostat and a matching modulating outdoor air conditioner or heat pump.

Use the wiring diagram in Figure 16 to connect the air handler control and the Hx™ Thermostat (wall thermostat) to the 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 both of the “R” terminals are connected together. See Figures 16 & 17. The four small screw terminals in the terminal block on the end of the air handler control should be used.

Connect a short piece of thermostat wire (18 gage minimum) to the ARCB terminals on the air handler control board. Run this wire outside the control board enclosure. Use wire connectors to connect this wire to the room thermostat wire and the outdoor unit thermostat wire. The outdoor unit contains its own control transformer. DO NOT run a thermo-

stat “R” wire to the outdoor unit. See Figure 16 for details.

⚠ 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.

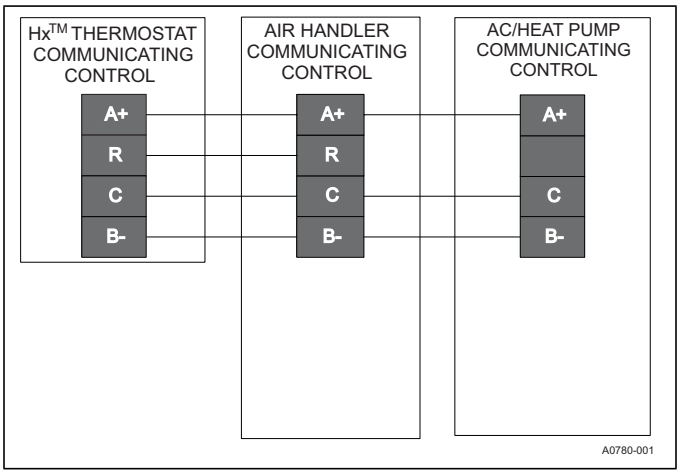


FIGURE 15: Air Handler with Communicating AC or HP

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, 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 17.

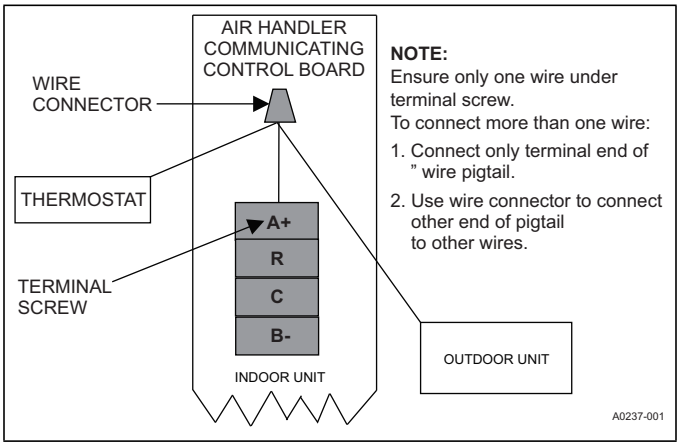


FIGURE 16: Multi-wire Terminal Connection

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 (thermistor) can be connected to the LAS terminals on the control board. The Communicating Control can the 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. The Hx™ controls the de-humidification during cooling operation and does not require the HUM STAT jumper to be changed 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 HEAT airflow jumper to proper position based on heat kit installed. Refer to Table 8 for proper position.

FUNCTIONALITY AND OPERATION

Jumper Positions

Hum Stat Jumper

The HUM STAT jumper can be set on the Hx™ thermostat. This function can lower the blower speed for de-humidification during cooling operation.

AC/HP Jumper

The AC/HP jumper configures the control to operate properly with an air conditioner (AC position) or heat pump (HP position).

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

Airflow and Comfort Setting Jumpers

The comfort profile is set on the Hx™ thermostat. Heat pump and cooling airflow is set by the outdoor unit.

Status and Fault Codes

The control includes an LED that displays status and fault codes. These codes are shown in Table 4. The control will display the fault codes until power is removed from the control or the fault condition is no longer present.

TABLE 4: 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 Hx™ communicating thermostat is also a humidistat and controls this output.

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 5.

TABLE 5: 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.

SECTION XII: AIRFLOW AND COMFORT SETTING SELECTION

AIRFLOW SELECTION AT THERMOSTAT

Inputs to air handler control board come from the thermostat which are communicated from the main control of the outdoor unit. This maintains proper sensible/latent balance during cooling and proper discharge temperature during heating.

Proper indoor unit airflow is determined by the system and requires no initial set-up by the installing contractor. If the indoor unit is using electric heat, the unit must have the electric heat airflow set at the air handler control board HEAT jumper. Refer to electric heat minimum fan speed and the air flow data tables for proper selection when operating the air handler with the electric heat section.

After the system is started during the initial set-up process using the *Hx*^{TM} thermostat, additional fine tuning of the airflow is accomplished by selecting one of the climate setting profiles. The comfort profiles include: humid, dry or normal. Select the one that best reflects the outdoor environment where the conditioned space is located. This selection adjusts how the indoor blower and the compressor work together to manage temperature and humidity.

The normal comfort setting operates the indoor blower speed as commanded by the outdoor unit. The humid comfort setting either decreases the commanded indoor blower speed or increases the compressor speed depending on the demand to best manage humidity. The dry comfort setting increases the commanded indoor blower speed in relation to the compressor speed to optimize sensible cooling.

Additional airflow fine tune adjustments are available using the *Hx* thermostat. Refer to the *Hx* thermostat manual for additional detail and the selectable “Blower Operating Profiles” available.

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) up to a maximum of 0.8 inches 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 automatically operates at a higher speed to compensate for the higher ESP. This may result in a higher operating sound level, a higher power consumption, and have a negative impact on the service life of the blower motor.

To Set Cooling Airflow:

The modulating outdoor AC or HP operate the indoor blower in conjunction with the outdoor unit compressor speed.

To Set Heat Pump Airflow:

The modulating outdoor AC or HP operate the indoor blower in conjunction with the outdoor unit compressor speed.

To Set Electric Heat Airflow:

The blower speed required for electric heat is different than cooling. Refer to Table 15 for the possible CFM selections. Refer to Table 7 for the minimum required airflow for the electric heater installed. Find the desired airflow in Table 14 for heat. Set the HEAT jumper on the control as indicated in Table 15.

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.

BLOWER OPERATING PROFILES

The blower operating profiles are to be selected on the Hx^{TM} communicating thermostat. This controls blower operation at the beginning and the end of a demand.

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.

SECTION XIII: UNIT DATA

TABLE 6: Physical and Electrical Data - Cooling Only

Models		**AVV25B**	**AVV37B**	**AVV37C**	**AVV38C**	**AVV49C**	**AVV49D**	**AVV50C**	**AVV50D**	**AVV61C**	**AVV61D**
Blower-Diameter x Width		10 x 8	10 x 8	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10	11 x 10
Motor	HP	1/2 HP	1/2 HP	1/2 HP	1/2 HP	3/4 HP	3/4 HP	3/4 HP	3/4 HP	3/4 HP	3/4 HP
	Nominal RPM	1050	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	208/230
Full Load Amps @230V		4.5	4.5	4.5	4.5	7.0	7.0	7.0	7.0	7.0	7.0
Filter[1]	Type	DISPOSABLE OR PERMANENT									
	Size	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	20 x 20 x 1	22 x 20 x 1
	Permanent Type Kit	1PF0601	1PF0601	1PF0602	1PF0602	1PF0602	1PF0603	1PF0602	1PF0603	1PF0602	1PF0603
Shipping / Operating Weight (lbs.)		119/113	119/113	120/114	158/150	158/150	163/153	175/165	180/170	175/165	180/170

NOTES:

1. Field supplied.

TABLE 7: Electrical Data - Cooling Only

Models	**Motor FLA[1]**		**Minimum Circuit Ampacity**		**MOP[2]**
	208V	**230V**	**208V**	**230V**	
25B / 37B / 37C / 38C	5.0	4.5	6.3	5.6	15
49C / 49D / 50C / 50D / 61C / 61D	7.3	7.0	9.1	8.8	15

NOTES:

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.

TABLE 8: Electrical Heat: Minimum Fan Speed

Heater Kit Models[1,2]	**Nominal kW @240V**	**Air Handler Models**									
		AVV25B	**AVV37B**	**AVV37C**	**AVV38C**	**AVV49C**	**AVV49D**	**AVV50D**	**AVV50D**	**AVV61C**	**AVV61D**
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 Lo (D)	Med (C)	Med (C)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)
6HK(0,1)6500806	7.7kW	Med Lo (D)	Med Lo (D)	Med Hi (B)	Med Hi (B)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)
6HK(0,1)6501006	9.6kW	Med Lo (D)	Med Lo (D)	Med Hi (B)	Med Hi (B)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)	Med Lo (D)
6HK(1,2)6501306	12.5kW	Med (C)	Med (C)	Med Hi (B)	Med Hi (B)	Med Lo (D)	Med Lo (D)	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)	Med (C)	Med (C)	Med (C)	Med (C)	Med Lo (D)	Med Lo (D)
6HK(1,2)6501806	17.3kW	–	Med Hi (B)	Med Hi (B)	Med Hi (B)	Med (C)	Med Hi (B)	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)	Hi (A)	Med Hi (B)	Med Hi (B)
6HK(1,2)6502506	24kW	–	–	–	–	–	Hi (A)	–	Hi (A)	–	Med Hi (B)

NOTES:

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 conversions table above.

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
AVV25B	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
AVV37B	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
AVV37C	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
AVV38C	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
AVV49C	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

Continued on next page.

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
AVV49D	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
AVV50C	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
AVV50D	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
AVV61C	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
AVV61D	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

NOTES:

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 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.

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

Air Handlers Models	Heater Models[1,2]	Heater Amps @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
25B	6HK16501306	52	25.0	37.6	–	26.4	41.5	–	25	40	–	30	45	–
37B	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	–
37C	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	–
38C	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	–
49C	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	–
49D	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
50C	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	–
50D	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
61C	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	–
61D	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

NOTES:

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 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.

TABLE 13: Air Flow Data (CFM) (When operating with electric heat section)[1, 2, 3, 4]

High/Low Speed Heat CFM										
Heat Tap	**AVV25B**		**AVV37B**		**AVV37C**		**AVV38C**		**AVV49C**	
	High	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
A	1225	1020	1225	1020	1425	1150	1430	1200	1650	1200
B	1150	950	1150	950	1150	1000	1375	1150	1550	1150
C	950	750	950	750	925	925	1150	1050	1375	1050
D	725	725	725	725	675	675	900	900	1150	1000
Heat Tap	**AVV49D**		**AVV50C**		**AVV50D**		**AVV61C**		**AVV61D**	
	High	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
A	1650	1150	1650	1200	1650	1150	1850	1250	1825	1150
B	1600	1050	1550	1150	1600	1050	1775	1200	1775	1050
C	1325	1000	1375	1050	1325	1000	1570	1150-	1570	1000
D	1125	780	1150	1000	1125	780	1370	1050	1375	950

NOTES:

1. Air handler units have been tested to UL 1995 / CSA 22.2 No. 236 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. Heating applications tested at 0.50" w.c. esp.
   Above 0.5" CFM is reduced by 2% per 0.1" increase in static.
2. The ADJ tap does not affect the HEAT tap setting.
   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.
3. All CFM are shown at 0.5" w.c. external static pressure. These units have variable-speed ECM motors that automatically adjust to provide constant CFM from 0.0" to 0.4" WC. external static pressure. From 0.4" to 0.8" external static pressure, CFM is reduced by 2% per 0.1" static pressure. Operation of these units on duct systems with external static pressure greater than 0.8" is not recommended.
4. 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.

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

⚠ CAUTION

Ensure adequate precautions are taken to protect electrical components from liquid.

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

As an alternative to water, EVAP-Green by Nu-Calgon is the only pH neutral coil cleaner approved to be used when it is properly diluted. ENSURE THE CLEANED COILS ARE THOROUGHLY RINSED AFTER USE OF EVAP-GREEN.

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.

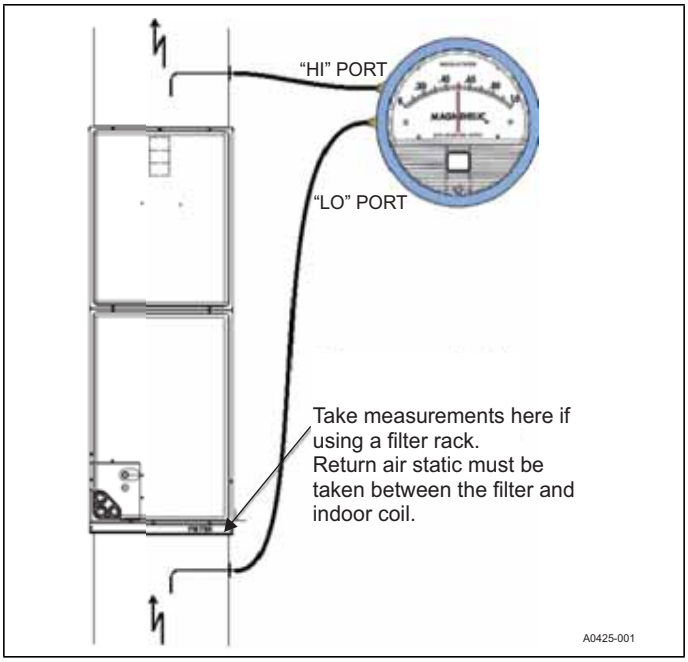


FIGURE 17: Duct Static Measurements

SECTION XVI: INSTALLATION VERIFICATION

Prior to and during the accomplishment of the installation procedures, verify all tasks are accomplished as indicated in this installation manual.

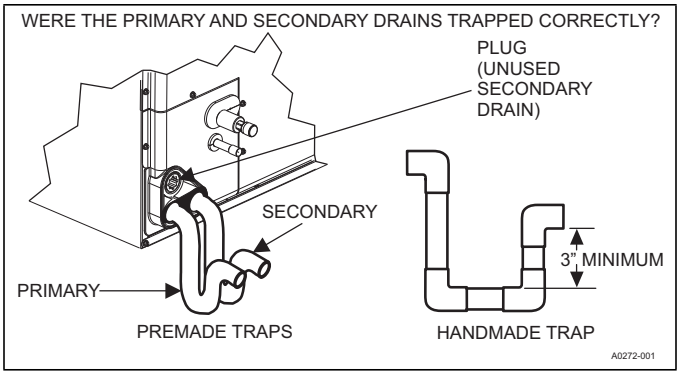


FIGURE 18: Drain Traps

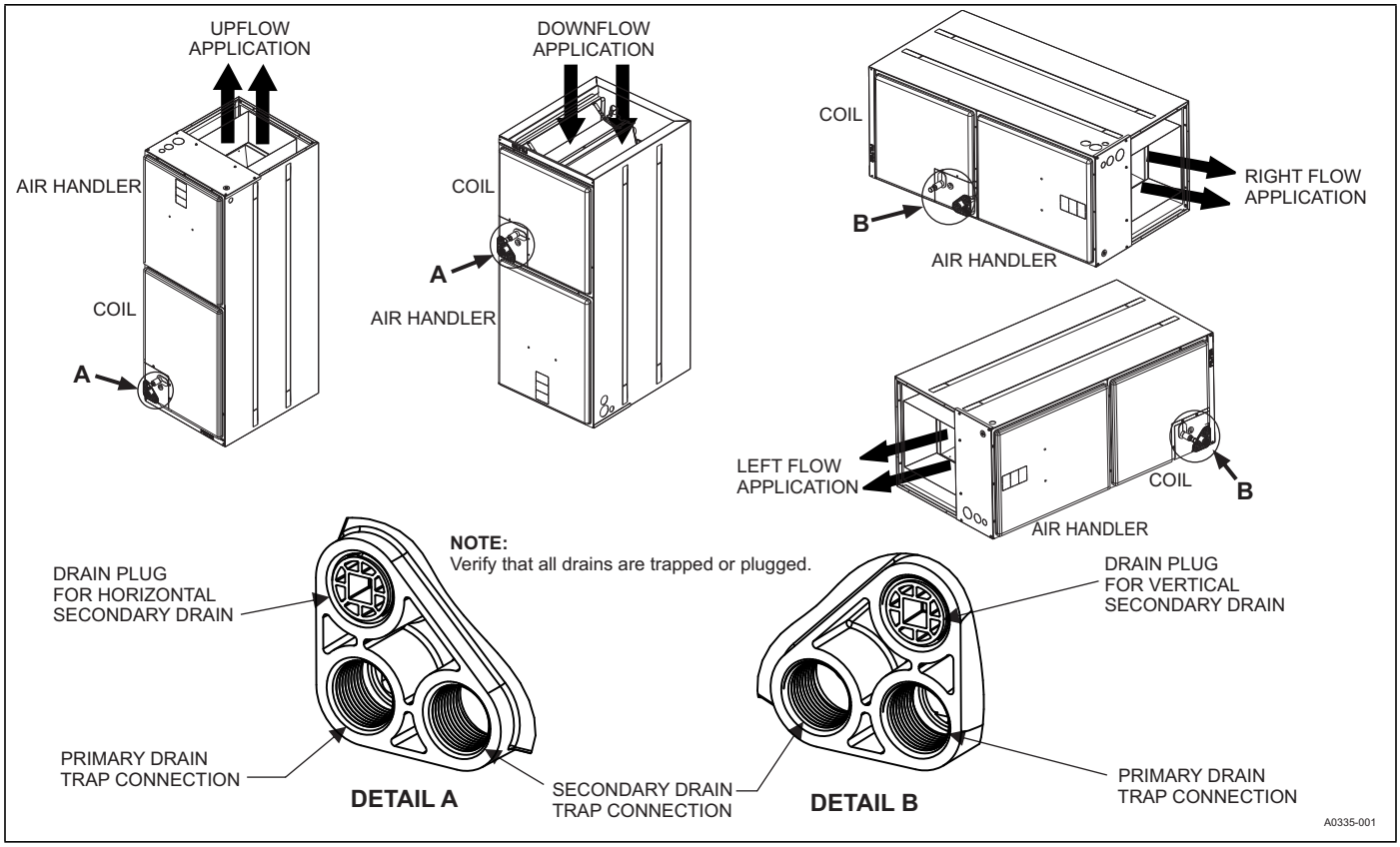
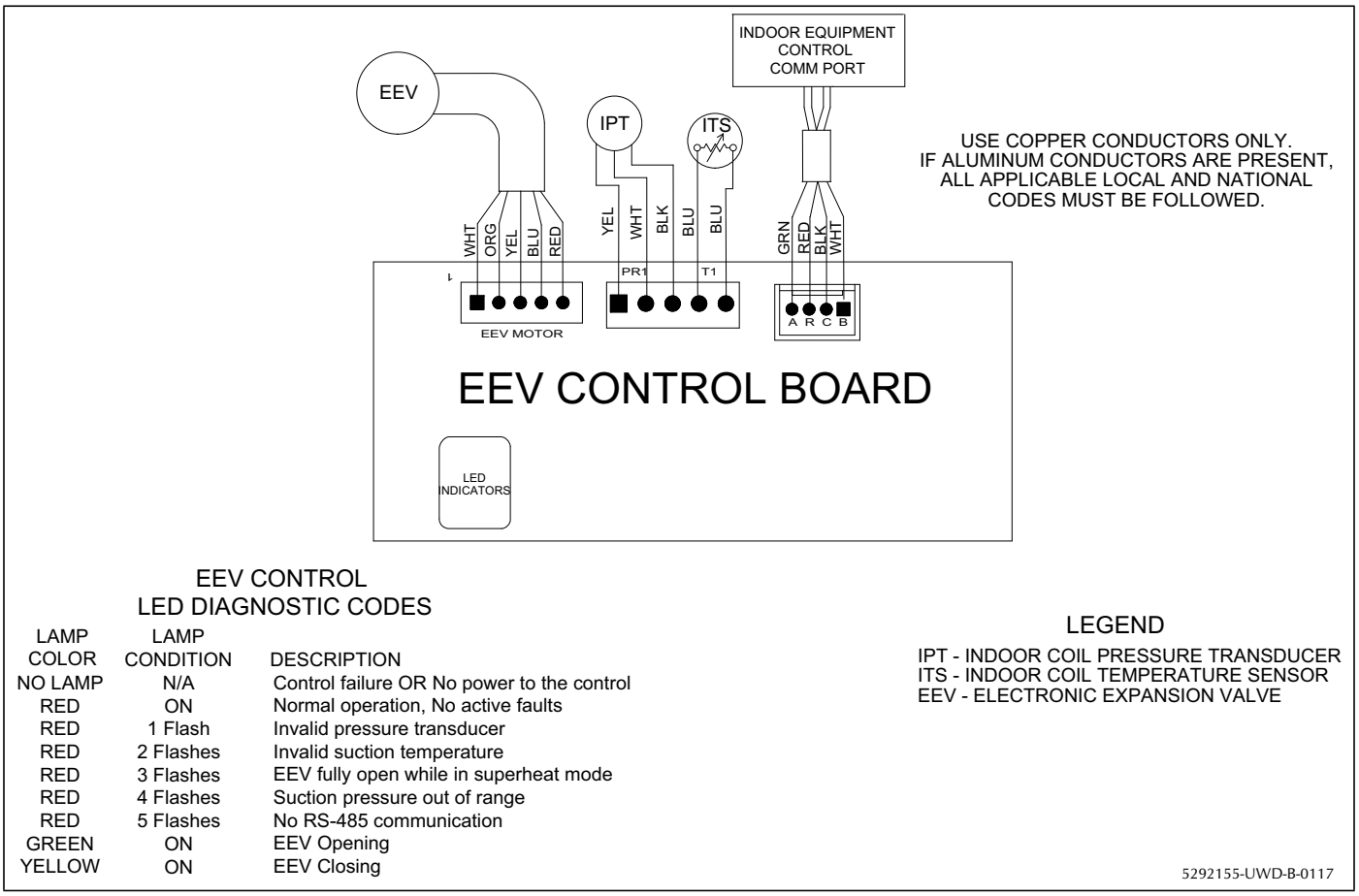


FIGURE 19: Location of Coil Trapped and Plugged Drain Connections

SECTION XVII: INSTRUCTING THE OWNER

Assist the owner with registering the unit warranty using the warranty card included with the unit, or preferably online at www.upgproductregistration.com. A complete startup sheet showing the critical readings of the unit at the time of commissioning must be uploaded as part of the online registration process.

SECTION XVIII: WIRING DIAGRAM



EEV CONTROL
LED DIAGNOSTIC CODES

LAMP COLOR	LAMP CONDITION	DESCRIPTION
NO LAMP	N/A	Control failure OR No power to the control
RED	ON	Normal operation, No active faults
RED	1 Flash	Invalid pressure transducer
RED	2 Flashes	Invalid suction temperature
RED	3 Flashes	EEV fully open while in superheat mode
RED	4 Flashes	Suction pressure out of range
RED	5 Flashes	No RS-485 communication
GREEN	ON	EEV Opening
YELLOW	ON	EEV Closing

LEGEND

IPT - INDOOR COIL PRESSURE TRANSDUCER
ITS - INDOOR COIL TEMPERATURE SENSOR
EEV - ELECTRONIC EXPANSION VALVE

5292155-UWD-B-0117

FIGURE 20: Wiring Diagram - EEV

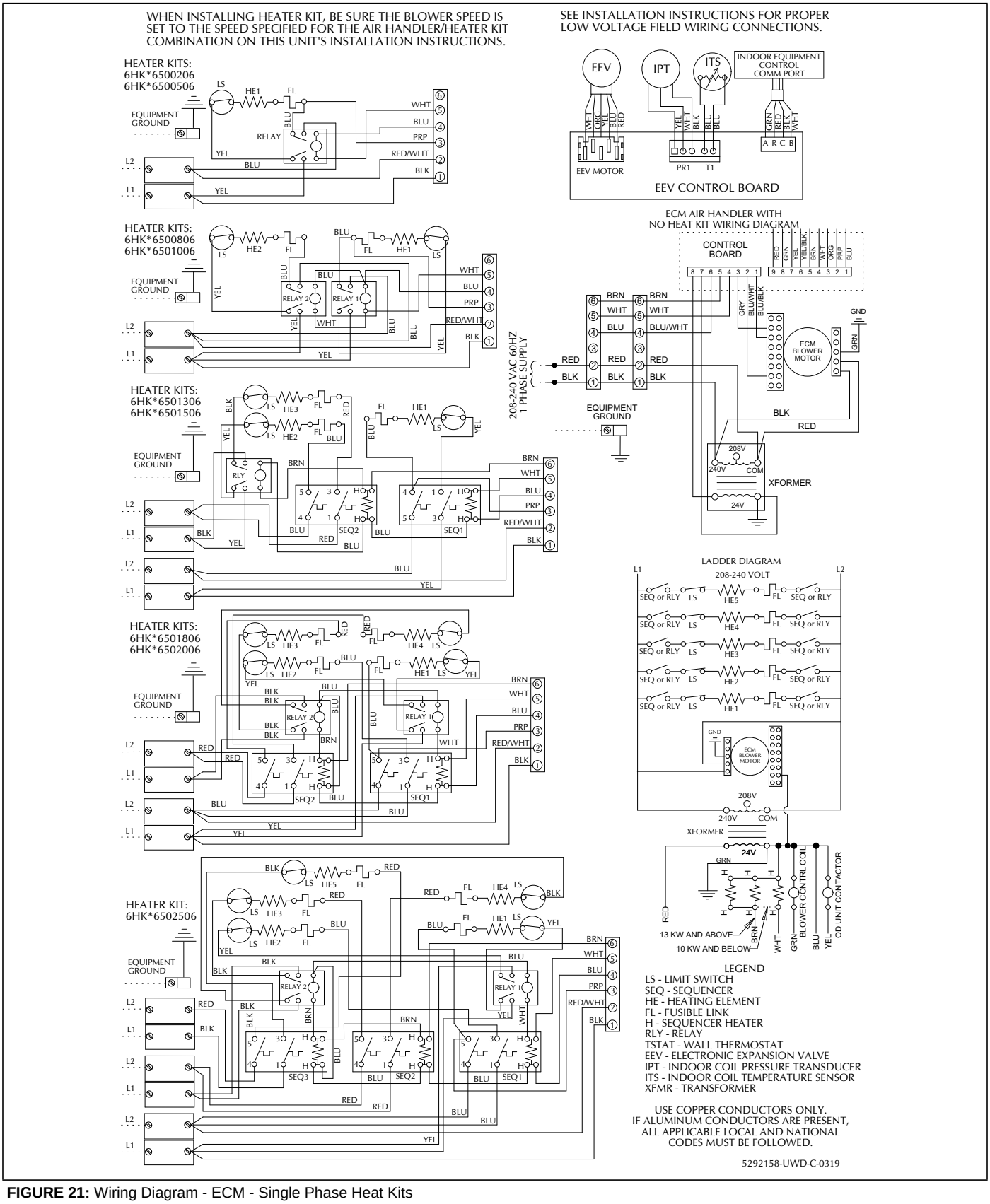


FIGURE 21: Wiring Diagram - ECM - Single Phase Heat Kits

SECTION XIX: 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						
	◯ ECM	COOL	◯ A	◯ B	◯ C	◯ D
		ADJUST	◯ A	◯ B	◯ C	◯ D
		DELAY	◯ A	◯ B	◯ C	◯ D
		HEAT	◯ A	◯ B	◯ C	◯ D
	◯ X-13	◯ 1	◯ 2	◯ 3	◯ 4	◯ 5
	◯ PSC	◯ Low	◯ Medium Low	◯ Medium	◯ Medium High	◯ 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		Serial number		Rated KW		
Number of elements		Measured Amperage	Heater 1		Heater 2		Heater 3	
			Heater 4		Heater 5		Heater 6	
		Measured Voltage	Heater 1		Heater 2		Heater 3	
			Heater 4		Heater 5		Heater 6	
Heating return air dry bulb temperature		Heating supply air dry bulb temperature		Air temperature rise		

Clean Up Job Site

- ☐ Job site has been cleaned, indoor and outdoor debris removed from job site
- ☐ Tools have been removed from unit
- ☐ All panels have been installed

Unit Operation and Cycle Test (Complete all that apply)

- ☐ Operate the unit through continuous fan cycles from the thermostat, noting and correcting any problems
- ☐ Operate the unit through cooling cycles from the thermostat, noting and correcting any problems
- ☐ Operate the unit through mechanical heating cycles from the thermostat, noting and correcting any problems
- ☐ Operate the unit through emergency heating cycles from the thermostat, noting and correcting any problems

Owner Education

- ☐ Provide owner with the owner's manual
- ☐ Explain operation of system to equipment owner
- ☐ Explain thermostat use and programming (if applicable) to owner
- ☐ Explain the importance of regular filter replacement and equipment maintenance

Comments and Additional Job Details

5373262-UIM-F-0719
Supersedes: 5373262-UIM-E-0419

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Norman, OK 73069