

INSTALLATION MANUAL

VARIABLE SPEED ECM MODULAR MULTI-POSITION AIR HANDLERS

MODELS: MVC SERIES - 208/230 V - 1 PHASE



LIST OF SECTIONS

GENERAL	1	REQUIRED CONTROL SET-UP	10
SAFETY	1	AIRFLOW AND COMFORT SETTING SELECTION	11
UNIT INSTALLATION	2	UNIT DATA	12
DUCT WORK AND CONNECTIONS	5	MAINTENANCE	18
ELECTRIC HEATER INSTALLATION	6	AIR SYSTEM ADJUSTMENT	18
LINE POWER CONNECTIONS	6	WIRING DIAGRAM	19
LOW VOLTAGE CONTROL CONNECTIONS	8	START UP SHEET	21

LIST OF FIGURES

Return Air Duct Attachment	2	Air Handler Control Board – Communications Connections	7
Typical Installation	3	Cooling Models With and Without Electric Heat Wiring	9
Coil and Air Handler Attachment Details	3	Two-Stage Heat Pump Wiring	9
Gasket Location	4	Air Handler with Communicating AC or HP	10
Dimensions and Duct Connection Dimensions	4	Multi-Wire Terminal Connection	10
Typical Horizontal Installation	5	Duct Static Measurements	18
Duct Attachment	5	Wiring Diagram - ECM - Single Phase Heat Kits	19
Duct Work Transition	6	Wiring Diagram - Three Phase Heat Kits 208-230 V	20
Line Power Connections	7		

LIST OF TABLES

Dimensions	4	Electrical Heat Only - Default Fan Speeds for FER Compliance ...	13
Low Voltage Connections	8	KW and MBH Conversions - For Total Power Input Requirement ..	13
Fault Codes	10	Electric Heat Performance Data: 208/230-1-60 and 208/230-3-60 ..	13
Heat Relays	11	Electrical Data for Single Source Power Supply: 208/230-1-60 ...	14
Comfort Setting Selection	11	Electrical Data for Multi-Source Power Supply: 208/230-1-60 ...	15
Physical and Electrical Data - Cooling Only	12	Electrical Data for Single Source Power Supply: 208/230-3-60 ...	16
Electrical Data - Cooling Only	12	Electrical Data for Multi-Source Power Supply: 208/230-3-60 ...	16
Minimum Fan Speed - Electrical Heat with Heat Pump	12	Airflow Data (CFM)	17

SECTION I: GENERAL

The MVC modular 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 or indoor coil.

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. 208-230 volt three phase kits are available from 10 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.

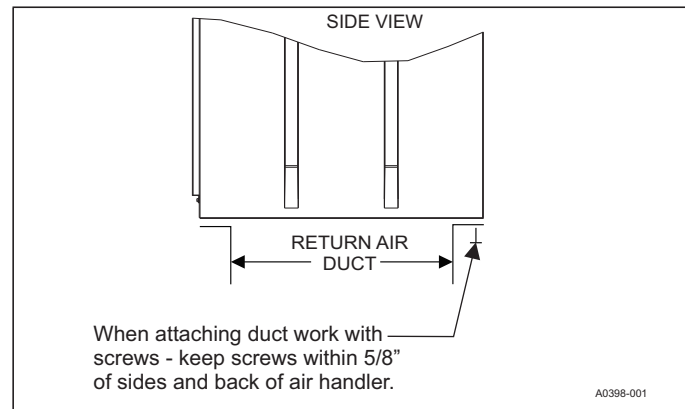
SAFETY REQUIREMENTS

- Failure to carefully read and follow all instructions in this manual can result in air handler malfunction, death, personal injury and/or property damage.
- 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.
- This air handler should be installed only in a location and position specified in the "Unit Installation" section of this Instruction Manual.
- The air handler is not to be used for temporary heating of buildings or structures under construction.
- Always install the air handler to operate within the air handler's intended maximum outlet air temperature.
- The unit rating plate displays the air handler model number. The unit dimensions for the supply air plenum are provided in Figure 5 and Table 1 of this Instruction Manual. The plenum must be installed according to the instructions. The return air duct attachment is shown in Figure 1.
- Clearance from combustible material is provided under "Clearances" in the "Unit Installation" section.
- It is necessary to maintain clearances for servicing. Access must be allowed for electric heaters and blower.
- The unit rating plate and power supply must be verified to ensure that the electrical characteristics match.
- Air handler shall be installed so the electrical components are protected from water.
- 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 and 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.

- 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****INSPECTION**

As soon as a unit is received, it 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. Also, before installation the unit should be checked for screws or bolts, which may have loosened in transit. There are no shipping or spacer brackets which need to be removed.

All accessories such as heater kits and indoor coils should be determined to be available. Installation of these accessories or field conversion of the unit should be accomplished before setting the unit in place or connecting any wiring, ducts or piping.

SECTION III: UNIT INSTALLATION**UNIT SIZING**

- 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.
- Only connect the air handler to a duct system which has an external static pressure within the allowable range.
- 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

- 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.
- 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.
- 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
208-230-1-60	187-253

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

CLEARANCES

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

- Maintenance and servicing access - minimum 36" from front of unit recommended for blower motor / coil replacement.
- The duct work connected to this unit is designed for zero clearance to combustible materials.
- 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:

- Select a location with adequate structural support, space for service access, and clearance for air return and supply duct connections.
- It is not recommended to use hanging brackets to wall mount this air handler unit.
- Normal operating sound levels may be objectionable if the air handler is placed directly over some rooms such as bedrooms, study, etc.
- If using the air handler unit with an indoor coil, select a location that will permit installation of condensate line to open drain or out-doors 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.

- 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.
- Proper electrical supply must be available.
- 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 a vapor barrier should be used.

AIR HANDLER CONFIGURATION

These air handler units are supplied ready to be installed in an upflow, downflow, horizontal right, or horizontal left position. See Figure 2. The unit requires no conversion procedures.

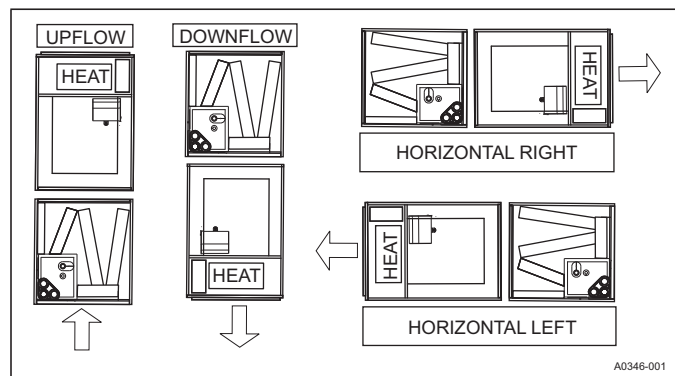


FIGURE 2: Typical Installation

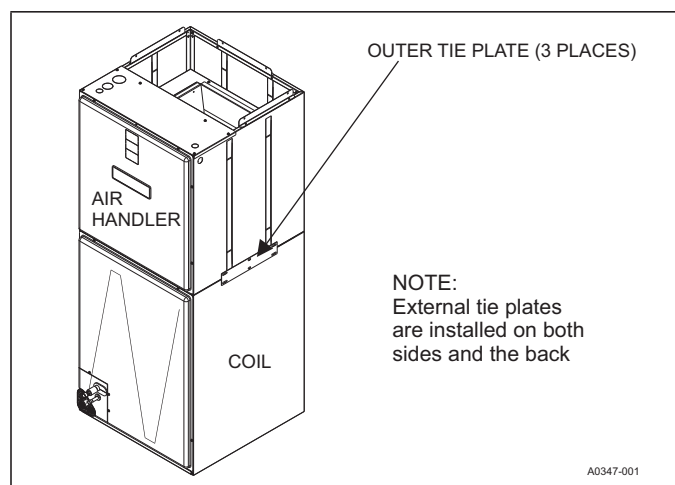


FIGURE 3: Coil and Air Handler Attachment Details

AIR HANDLER AND COIL UPFLOW, DOWNFLOW, AND HORIZONTAL POSITIONS

1. Apply neoprene gasket to the return air end of air handler.
2. Attach three tie plates to external sides and back of air handler casing using screws. See Figure 3.
3. Position blower casing over appropriate coil opening (depending on configuration). See Figure 2.
4. Attach the three tie plates to coil casing using screws. See Figure 3.
5. Remove coil access panel and coil filter door.
6. Slide the coil out of the coil cabinet, and set coil to the side.
7. Locate 2" wide foam gasket.
8. Apply foam gasket over the air handler and coil mating seams on the interior of both unit sides and back. See Figure 4.
9. Slide the coil into the housing, and install the coil access panel.



FIGURE 4: Gasket Location

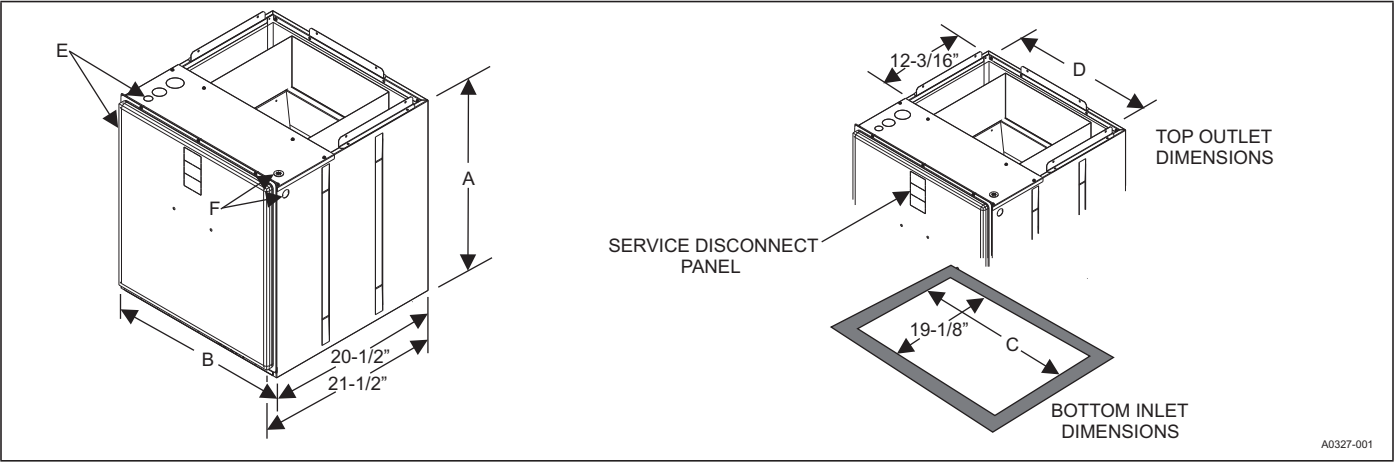


FIGURE 5: Dimensions and Duct Connection Dimensions

TABLE 1: Dimensions

Models	Dimensions ¹				Wiring Knockout Dimensions ¹	
	A	B	C	D	E	F
	Height	Width	Bottom Opening	Top Opening	Power	Control
MVC08B	21-1/2	17-1/2	16-1/2	16-1/2	7/8 (1/2) 1-3/8 (1) 1-23/32 (1-1/4)	7/8 (1/2)
MVC12B	21-1/2	17-1/2	16-1/2	16-1/2		
MVC12C	22-1/2	21	20	20		
MVC14D	22-1/2	24-1/2	23-1/2	23-1/2		
MVC16C	22-1/2	21	20	20		
MVC20D	22-1/2	24-1/2	23-1/2	23-1/2		

1. All dimensions are in inches.

SECTION IV: DUCT WORK AND CONNECTIONS

⚠ WARNING

Use only 1/2" screws to connect duct work to bottom of unit.

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

For suspension of these units in horizontal applications, it is recommended to use angle steel support brackets with threaded rods, supporting the units from the bottom, at the locations shown in Figure 6.

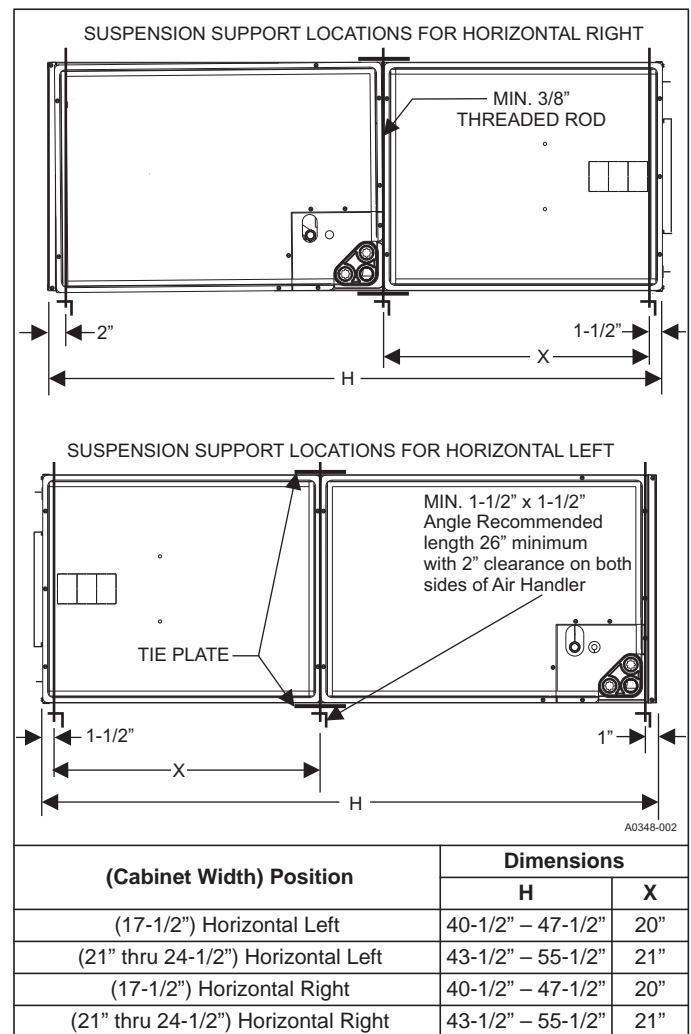


FIGURE 6: Typical Horizontal Installation

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. See Figure 7. If the flanges are not used, they may be discarded.

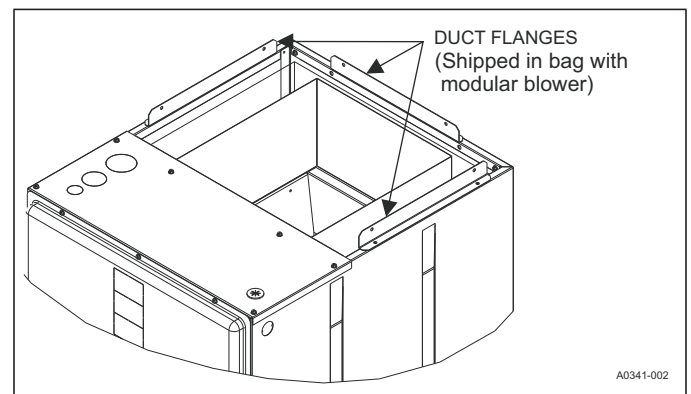


FIGURE 7: Duct Attachment

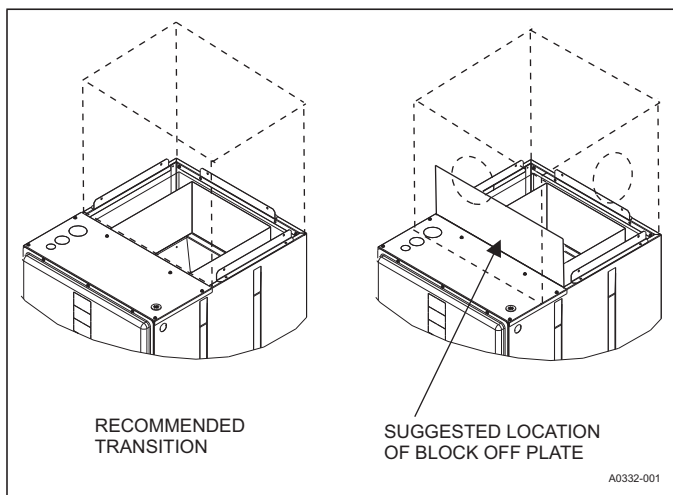


FIGURE 8: Duct Work Transition

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. See Table 1 for air handler unit inlet and outlet dimensions.

⚠ CAUTION

Use 1/2" screws to connect duct work to unit.

Duct work that is not designed to match the supply air opening can cause turbulence inside the plenum. This turbulence can change the airflow 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. See Figure 8 for 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 must be accomplished external to the unit.

⚠ CAUTION

Equipment should never be operated without filters.

SECTION V: 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 to 16 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 VI: 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. Refer to Table 7, Tables 12 to 15, and to the latest edition of the National Electrical 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.

The chosen conductor and connections all must meet or exceed the amperage rating of the overcurrent protector (service disconnect or fuse) in the circuit.

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.

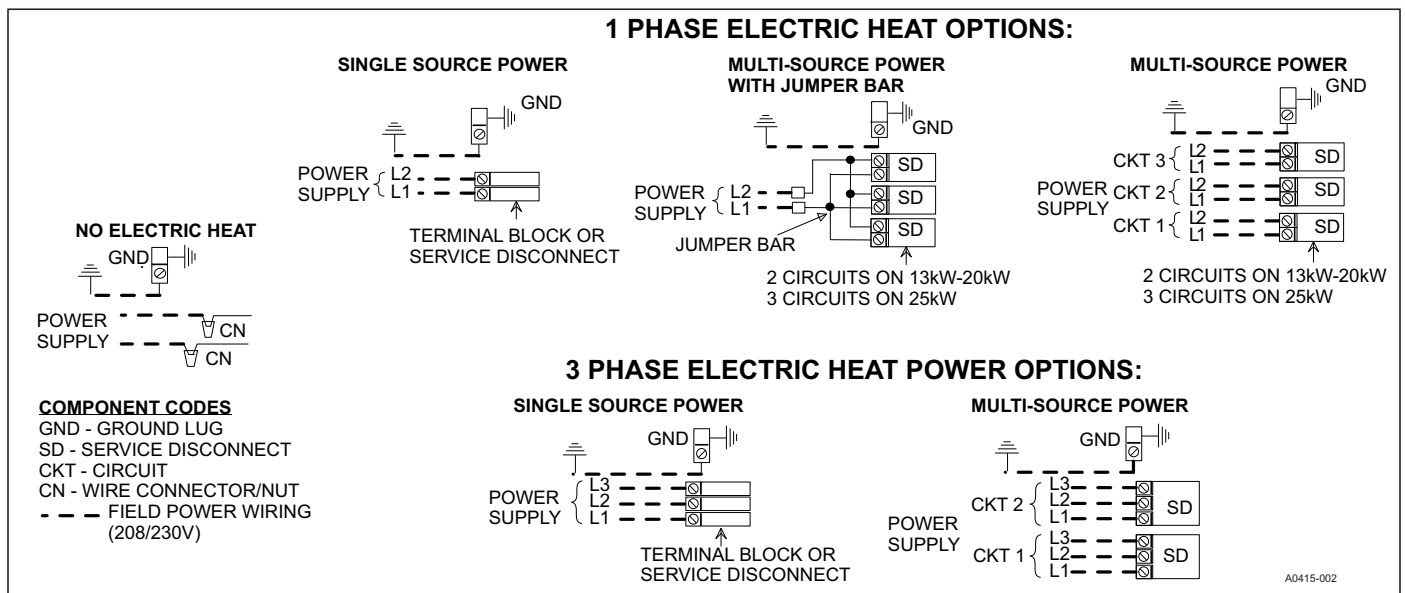


FIGURE 9: Line Power Connections

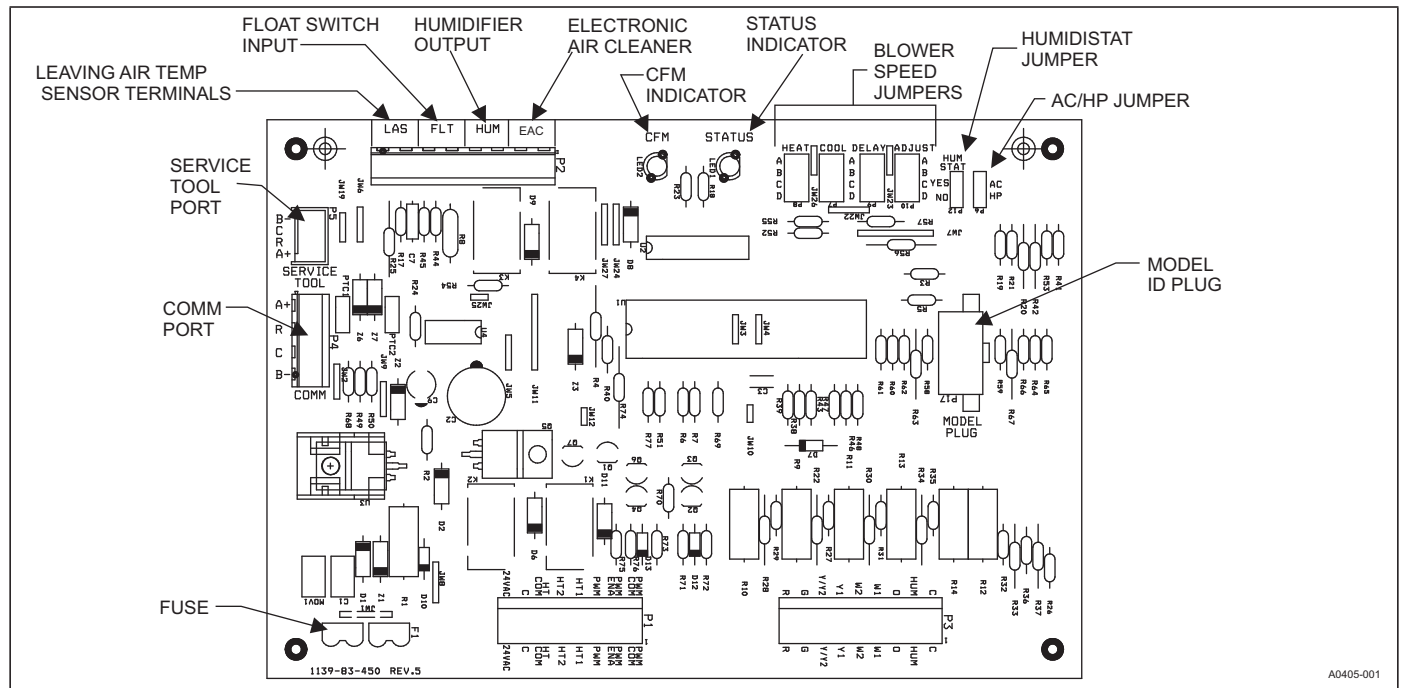


FIGURE 10: Air Handler Control Board – Communications Connections

SECTION VII: 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. Refer to 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. See Figures 11 and 12.

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 11 for additional information on heat during defrost cycle.

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 Figures 11 and 12.

NOTICE

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

TABLE 2: Low Voltage Connections

Terminal	Colors	Signals	Comment
R	Red	24 VAC power (fused)	—
G	Green	Continuous Fan operation	Fan Speed is 63% of HIGH COOL speed
Y/Y2	Yellow	Second or full stage compressor operation	—
Y1	Yellow and Black	First stage compressor operation	Not used with outdoor units that have one stage compressors
W2	Brown	Second stage heat operation	—
W1	White	First stage heat operation	—
O	Orange	Reversing valve operation	—
HUM	Purple	Humidity switch input	—
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.
COM	Blue	24 VAC common	—

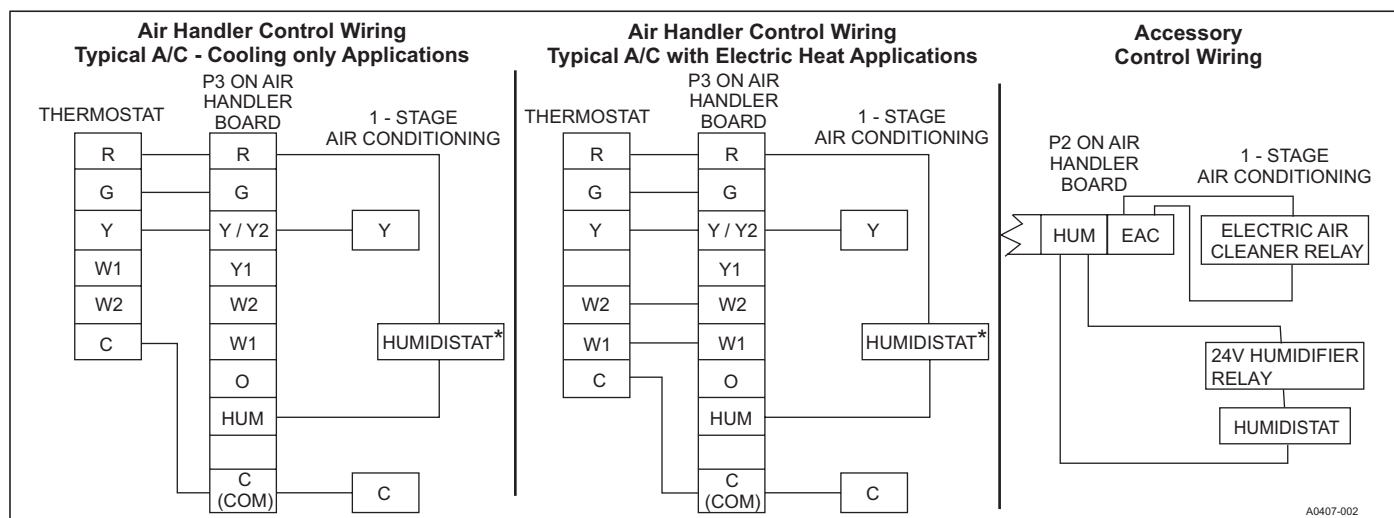


FIGURE 11: Cooling Models With and Without Electric Heat Wiring

* 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 the HUM STAT jumper on the air handler control board to the YES position if a humidistat is used.
3. For air conditioning applications, set the AC/HP jumper on the air handler control board to the AC position.

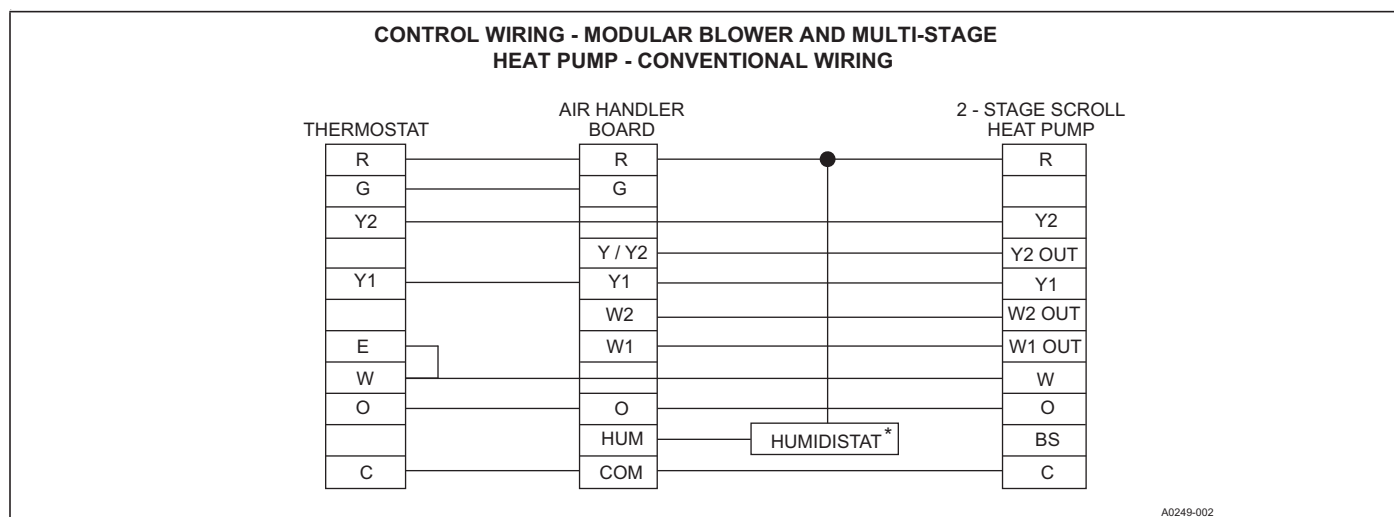


FIGURE 12: Two-Stage Heat Pump Wiring

* 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. Move the HUM STAT jumper on the air handler control board to the YES position if a humidistat is used.
3. For heat pump applications, set the AC/HP jumper on the 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 13. 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 as shown in Figure 13 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 Figures 13 and 14. 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.**

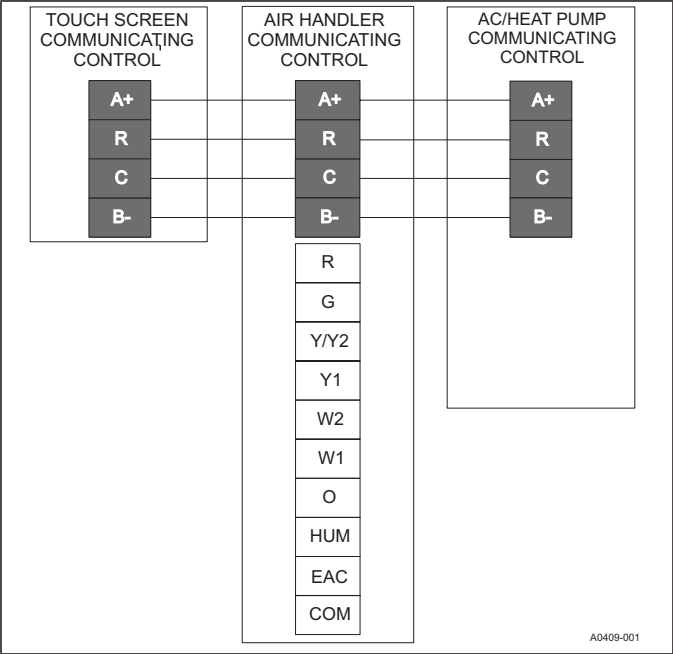


FIGURE 13: Air Handler with Communicating AC or HP

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 14.

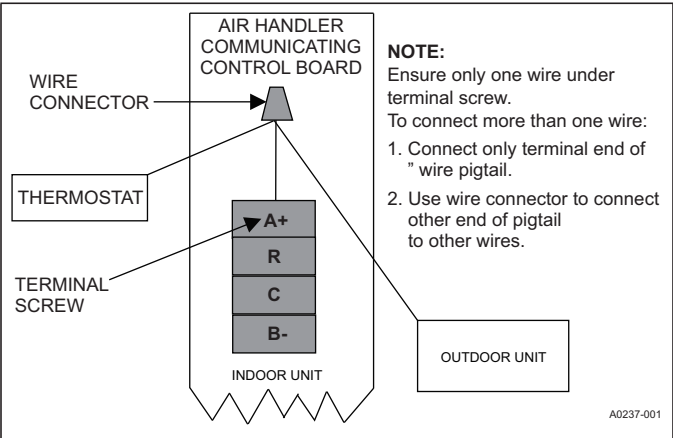


FIGURE 14: Multi-Wire Terminal Connection

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 monitor the temperature of the supply air in the plenum.

SECTION VIII: 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 IX: 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 Tables 8 and 16.

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 indoor coil. See Table 16 for the possible high speed cooling and heat pump airflow selections.

Find the recommended system airflow in Table 16 for the installed air handler model and outdoor unit.

Select the COOL airflow you need from Table 16. Set the COOL and ADJUST Jumpers on the control as indicated in Table 16.

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 10.

To Set Electric W1 Heat Airflow:

The blower speed required for 1st stage electric heat is different than cooling. See Table 16 for the possible CFM selections. See Table 8 for the minimum required airflow for the electric heater installed. Find the desired airflow in Table 16 for low heat. Set the HEAT jumper on the control as indicated in Table 16.

To Set W2 Electric Heat Airflow:

Airflow for any W2 input, which is for the second stage of electric heat, is the indicated CFM for high heat tap selection on Table 16.

⚠ CAUTION

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

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 X: UNIT DATA

TABLE 6: Physical and Electrical Data - Cooling Only

Models		MVC08B	MVC12B	MVC12C	MVC14D	MVC16C	MVC20D
Blower - Diameter x Width		10 x 8	10 x 8	10 x 8	11 x 10	11 x 10	11 x 10
Motor	HP	1/3 HP	1/2 HP	1/2 HP	1/2 HP	3/4 HP	3/4 HP
	Nominal RPM	1050	1050	1050	1050	1050	1050
Voltage		208/230	208/230	208/230	208/230	208/230	208/230
Full Load Amps @230 V		2.9	4.5	4.5	4.5	7.0	7.0
Filter ¹	Type	DISPOSABLE OR WASHABLE					
	Size	16 x 20 x 1	16 x 20 x 1	20 x 20 x 1	22 x 20 x 1	20 x 20 x 1	22 x 20 x 1
	Bottom Rack Kit	1BR01117	1BR01117	1BR01121	1BR01124	1BR01121	1BR01124
	Permanent Type Kit	1PF0601	1PF0601	1PF0602	1PF0603	1PF0602	1PF0603
Shipping/Operating Weight (lb)		52/51	52/51	68/67	75/74	68/67	75/74

1. Field supplied.

TABLE 7: Electrical Data - Cooling Only

Models	Motor FLA ¹		Minimum Circuit Ampacity		MOP ²
	208 V	230 V	208 V	230 V	
MVC08B	3.0	2.9	3.8	3.6	15
MVC12B/MVC12C/MVC14D	5.0	4.5	6.3	5.6	15
MVC16C/MVC20D	7.3	7.0	9.1	8.8	15

1. FLA = Full Load Amps

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

TABLE 8: Minimum Fan Speed - Electrical Heat with Heat Pump

Heater Kit Models ^{1,2,3}	Nom. kW @240 V	Air Handler Models					
		MVC08B	MVC12B	MVC12C	MVC14D	MVC16C	MVC20D
6HK(0,1)6500206	2.4 kW	Medium Low (D)	Medium Low (D)	Medium Low (D)	Medium Low (D)	Medium Low (D)	Medium Low (D)
6HK(0,1)6500506	4.8 kW	Medium (C)	Medium Low (D)	Medium (C)	Medium Low (D)	Medium Low (D)	Medium Low (D)
6HK(0,1)6500806	7.7 kW	Medium High (B)	Medium Low (D)	Medium High (B)	Medium (C)	Medium Low (D)	Medium Low (D)
6HK(0,1)6501006 6HK36501025	9.6 kW	Medium High (B)	Medium Low (D)	Medium High (B)	Medium (C)	Medium Low (D)	Medium Low (D)
6HK(1,2)6501306	12.5 kW	High (A)	Medium High (B)	Medium High (B)	Medium (C)	Medium Low (D)	Medium Low (D)
6HK(1,2)6501506 6HK36501525	14.4 kW	–	High (A)	Medium High (B)	Medium (C)	Medium Low (D)	Medium Low (D)
6HK(1,2)6501806 6HK36501825	17.3 kW	–	High (A)	Medium High (B)	Medium High (B)	Medium (C)	Medium (C)
6HK(1,2)6502006 6HK46502025	19.2 kW	–	High (A)	High (A)	–	Medium High (B)	Medium (C)
6HK(1,2)6502506 6HK46502525	24 kW	–	–	–	–	–	Medium (C)

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 and breaker jumper bar

3. 6HK3 = 3-phase with terminal block connectors only. 6HK4 = 3-phase with service disconnect

TABLE 9: Electrical Heat Only - Default Fan Speeds for FER Compliance

Model Number	High Sales Volume Heat Kit ^{1,2,3}	Nom. kW @240 V	Default Blower Speeds					
			w1/[w1+w2]	Heat	Max. Airflow		Continuous Fan	
					Cool	Adjust	Cool	Adjust
MVC12B	6HK(0,1)6500806	7.7 kW	w1+w2	Medium (C)	High (A)	B	Medium Low (D)	C
MVC12C	6HK(0,1)6501006	9.6 kW	w1+w2	Medium (C)	High (A)	B	Medium Low (D)	C
MVC14D ⁴	6HK(1,2)6501506	14.4 kW	w1+w2	Medium (C)	High (A)	B	Medium Low (D)	C
MVC16C ⁴	6HK(1,2)6501506	14.4 kW	w1+w2	Medium Low (D)	High (A)	B	Medium Low (D)	C
MVC20D	6HK(1,2)6502006	19.2 kW	w1	Medium Low (D)	High (A)	B	Medium Low (D)	C

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 and breaker jumper bar

3. 6HK3 = 3-phase with terminal block connectors only. 6HK4 = 3-phase with service disconnect

4. For MVC14D and MVC16C models with a 15 kW (6HK*65015**) heat kit, tie the AHU W1 and W2 thermostat inputs together for FER compliance.

TABLE 10: KW and 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
208 V	240 V	0.75
220 V	240 V	0.84
230 V	240 V	0.92

TABLE 11: Electric Heat Performance Data: 208/230-1-60 and 208/230-3-60

Heater Models ^{1,2,3}		Nominal kW @240 V	Total Heat ⁴				kW Staging			
			kW		MBH		W1 Only		W1 + W2	
			208 V	230 V	208 V	230 V	208 V	230 V	208 V	230 V
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
3PH	6HK(1,2)6502506	24	18	22	61.5	75.2	7.2	8.8	18	22
	6HK36501025	9.6	7.2	8.8	24.6	30.1	7.2	8.8	7.2	8.8
	6HK36501525	14.4	10.8	13.2	36.9	45.1	10.8	13.2	10.8	13.2
	6HK36501825	17.3	13	15.9	44.3	54.2	6.5	7.9	13	15.9
	6HK46502025	19.2	14.4	17.6	49.2	60.2	7.2	8.8	14.4	17.6
	6HK46502525	24	18	22	61.5	75.2	9	11	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 and breaker jumper bar.

3. 6HK3 = 3-Phase with terminal block connectors only, 6HK4 = 3-Phase with service disconnect.

4. For different power distributions, see Table 10.

TABLE 12: Electrical Data for Single Source Power Supply: 208/230-1-60

Air Handler Models	Heater Models ^{1,2}	Heater Amps @240 V	Field Wiring			
			Min. Circuit Ampacity		MOP. ³	
			208 V	230 V	208 V	230 V
MVC08B	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
MVC12B	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
MVC12C	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
MVC14D	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
MVC16C	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
MVC20D	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 and 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 Electrical Code or in Canada the Canadian Electrical Code and local codes to determine correct wire sizing.

TABLE 13: Electrical Data for Multi-Source Power Supply: 208/230-1-60

Air Handler Models	Heater Models	Heater Amps @240 V	Min. Circuit Ampacity						MOP. ¹					
			208 V			230 V			208 V			230 V		
			Circuit						Circuit					
			1st ³	2nd	3rd	1st ³	2nd	3rd	1st ³	2nd	3rd	1st ³	2nd	3rd
MVC08B	6HK16501306	52	22.5	37.6	-	24.4	41.5	-	25	40	-	25	45	-
MVC12B	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	—
MVC12C	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	—
MVC14D	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	—
MVC16C	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	—
MVC20D	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. MOP = Maximum Overcurrent Protection device; must be HACR type circuit breaker or time delay fuse. The 1st circuit includes blower motor amps.
Refer to the latest edition of the National Electrical Code or in Canada the Canadian Electrical Code and local codes to determine correct wire sizing.

TABLE 14: Electrical Data for Single Source Power Supply: 208/230-3-60

Air Handler Models	Heater Models ¹	Heater Amps @240 V	Field Wiring			
			Min. Circuit Ampacity		MOP. ²	
			208 V	230 V	208 V	230 V
MVC08B	6HK36501025	23.1	28.8	31.3	30	35
MVC12B	6HK36501025	23.1	31.3	33.3	35	35
	6HK36501525	34.6	43.7	47.1	45	50
	6HK36501825	41.6	51.3	55.5	50	60
	6HK46502025 ³	46.2	56.3	61.0	60	70
MVC12C	6HK36501025	23.1	31.3	33.3	35	35
	6HK36501525	34.6	43.7	47.1	45	50
	6HK36501825	41.6	51.3	55.5	55	60
	6HK46502025 ³	46.2	56.3	61.0	60	70
MVC14D	6HK36501025	23.1	31.3	33.3	35	35
	6HK36501525	34.6	43.7	47.1	45	50
	6HK36501825	41.6	51.3	55.5	55	60
MVC16C	6HK36501025	23.1	34.2	36.4	35	40
	6HK36501525	34.6	46.6	50.2	50	55
	6HK36501825	41.6	54.2	58.6	55	60
	6HK46502025 ³	46.2	59.2	64.1	60	70
MVC20D	6HK36501025	23.1	34.2	36.4	35	40
	6HK36501525	34.6	46.6	50.2	50	55
	6HK36501825	41.6	54.2	58.6	55	60
	6HK46502025 ³	46.2	59.2	64.1	60	70
	6HK46502525 ³	57.7	71.6	77.9	80	80

1. 6HK3 = 3-Phase with terminal block connections only, 6HK4 = 3-Phase with service disconnect.

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

3. The 20 kW and 25 kW heater models (6HK46502025 and 6HK46502525) come with circuit breakers standard. Single source power MCA and MOP requirements are given here only for reference if used with field installed single point power modification.

TABLE 15: Electrical Data for Multi-Source Power Supply: 208/230-3-60

Air Handler Models	Heater Models ¹	Heater Amps @240 V	Min. Circuit Ampacity				MOP. ²			
			208 V		230 V		208 V		230 V	
			Circuit				Circuit			
			1st ³	2nd	1st ³	2nd	1st ³	2nd	1st ³	2nd
MVC12B	6HK46502025	46.2	31.3	25.0	33.3	27.6	35	25	35	30
MVC12C	6HK46502025	46.2	31.3	25.0	33.3	27.6	35	25	35	30
MVC16C	6HK46502025	46.2	34.1	25.0	36.4	27.6	35	25	40	30
MVC20D	6HK46502025	46.2	34.1	25.0	36.4	27.6	35	25	40	30
	6HK46502525	57.7	40.4	31.3	43.3	34.6	45	35	45	35

1. The 20 kW and 25 kW heater models (6HK46502025 and 6HK46502525) come with service disconnects standard.

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

TABLE 16: Airflow Data (CFM)¹

High/Low Speed Cooling and Heat Pump CFM													
CFM													
Cool Tap ²	ADJ Tap ³	MVC08B		MVC12B		MVC12C		MVC14D		MVC16C		MVC20D	
		High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
A	B	1022	562	1350	878	1350	878	1425	1037	1760	1144	1935	1316
B	B	795	437	1238	804	1125	866	1425	910	1540	1001	1772	1152
A	A	900	495	1200	780	1200	780	1425	926	1600	1040	1800	1170
B	A	700	385	1100	715	1000	770	1250	813	1400	910	1575	1024
A	C	783	431	1050	683	1050	683	1268	824	1424	926	1665	1082
C	B	766	421	1125	731	984	880	1344	874	1320	858	1491	969
B	C	609	335	963	626	875	674	1113	723	1246	810	1457	947
D	B	568	312	900	585	675	506	1120	728	1100	715	1350	878
C	A	675	371	1000	650	875	782	1200	780	1200	780	1325	861
D	A	500	275	800	520	600	450	1000	650	1000	650	1200	780
C	C	587	323	875	569	766	685	1068	694	1068	694	1226	797
D	C	435	239	700	455	525	394	890	579	890	579	1110	722
m3/min													
Cool Tap ²	ADJ Tap ³	MVC08B		MVC12B		MVC12C		MVC14D		MVC16C		MVC20D	
		High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
A	B	28.9	15.9	38.2	24.8	38.2	24.9	40.4	29.4	49.8	32.4	54.8	37.3
B	B	22.5	12.4	35.0	22.8	31.9	24.5	40.4	25.8	43.6	28.3	50.2	32.6
A	A	25.5	14.0	34.0	22.1	34.0	22.1	40.4	26.2	45.3	29.4	51.0	33.1
B	A	19.8	10.9	31.1	20.2	28.3	21.8	35.4	23.0	39.6	25.8	44.6	29.0
A	C	22.2	12.2	29.7	19.3	29.7	19.3	35.9	23.3	40.3	26.2	47.1	30.6
C	B	21.7	11.9	31.9	20.7	27.9	24.9	38.1	24.7	37.4	24.3	42.2	27.4
B	C	17.2	9.5	27.3	17.7	24.8	19.1	31.5	20.5	35.3	22.9	41.3	26.8
D	B	16.1	8.8	25.5	16.6	19.1	14.3	31.7	20.6	31.1	20.2	38.2	24.8
C	A	19.1	10.5	28.3	18.4	24.8	22.1	34.0	22.1	34.0	22.1	37.5	24.4
D	A	14.2	7.8	22.7	14.7	17.0	12.7	28.3	18.4	28.3	18.4	34.0	22.1
C	C	16.6	9.1	24.8	16.1	21.7	19.4	30.2	19.7	30.2	19.7	34.7	22.6
D	C	12.3	6.8	19.8	12.9	14.9	11.2	25.2	16.4	25.2	16.4	31.4	20.4
High/Low Speed Heat CFM													
CFM													
Heat Tap	MVC08B		MVC12B		MVC12C		MVC14D		MVC16C		MVC20D		
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
A	1025	980	1225	1020	1425	1150	1425	1050	1650	1200	1825	1150	
B	960	960	1150	950	1150	1000	1325	1000	1550	1150	1775	1050	
C	725	725	950	750	925	925	1125	950	1375	1050	1570	1000	
D	580	580	725	725	675	675	900	900	1150	1000	1375	950	
m3/min													
Heat Tap	MVC08B		MVC12B		MVC12C		MVC14D		MVC16C		MVC20D		
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	
A	29.0	27.8	34.7	28.9	40.4	32.6	40.4	29.7	46.7	34.0	51.7	32.6	
B	27.2	27.2	32.6	26.9	32.6	28.3	37.5	28.3	43.9	32.6	50.3	29.7	
C	20.5	20.5	26.9	21.2	26.2	26.2	31.9	26.9	38.9	29.7	44.5	28.3	
D	16.4	16.4	20.5	20.5	19.1	19.1	25.5	25.5	32.6	28.3	38.9	26.9	

- 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.
- Low speed cooling used only with two stage outdoor units. Low Speed is preset to 65% of high speed. The MVC12C uses 65% for Tap A, 77% for Tap B, 89% for Tap C, 75% for Tap D.
- The ADJ tap does not affect the HEAT tap setting.
Dehumidification speed is 85% of jumper selected COOL tap and ADJUST tap.
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 (that is, 12 flashes is 1200 CFM) - blinks are approximate +/- 10% of actual CFM.

SECTION XI: 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, clean it with water. As an alternative to water, EVAP-Green by Nu-Calgon is the only pH neutral coil cleaner approved for use when properly diluted.

Note: Rinse coils thoroughly after use of EVAP-Green for cleaning.

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 XII: 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.

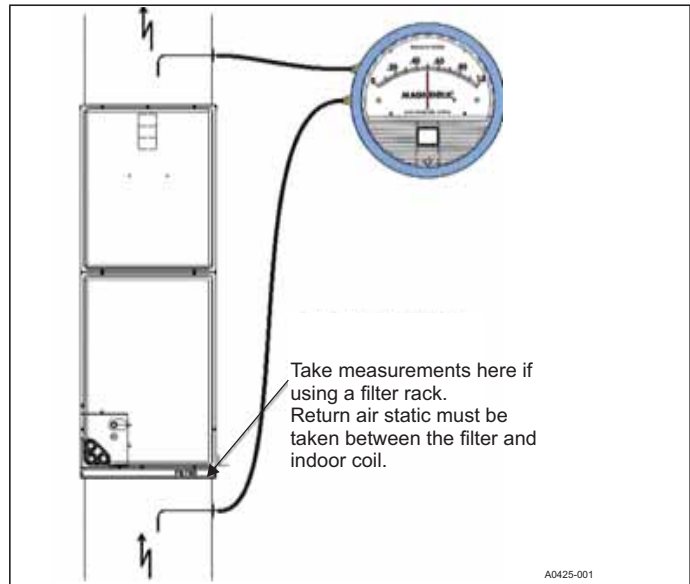
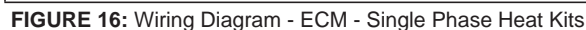


FIGURE 15: Duct Static Measurements



3 PHASE ELECTRIC HEAT KITS

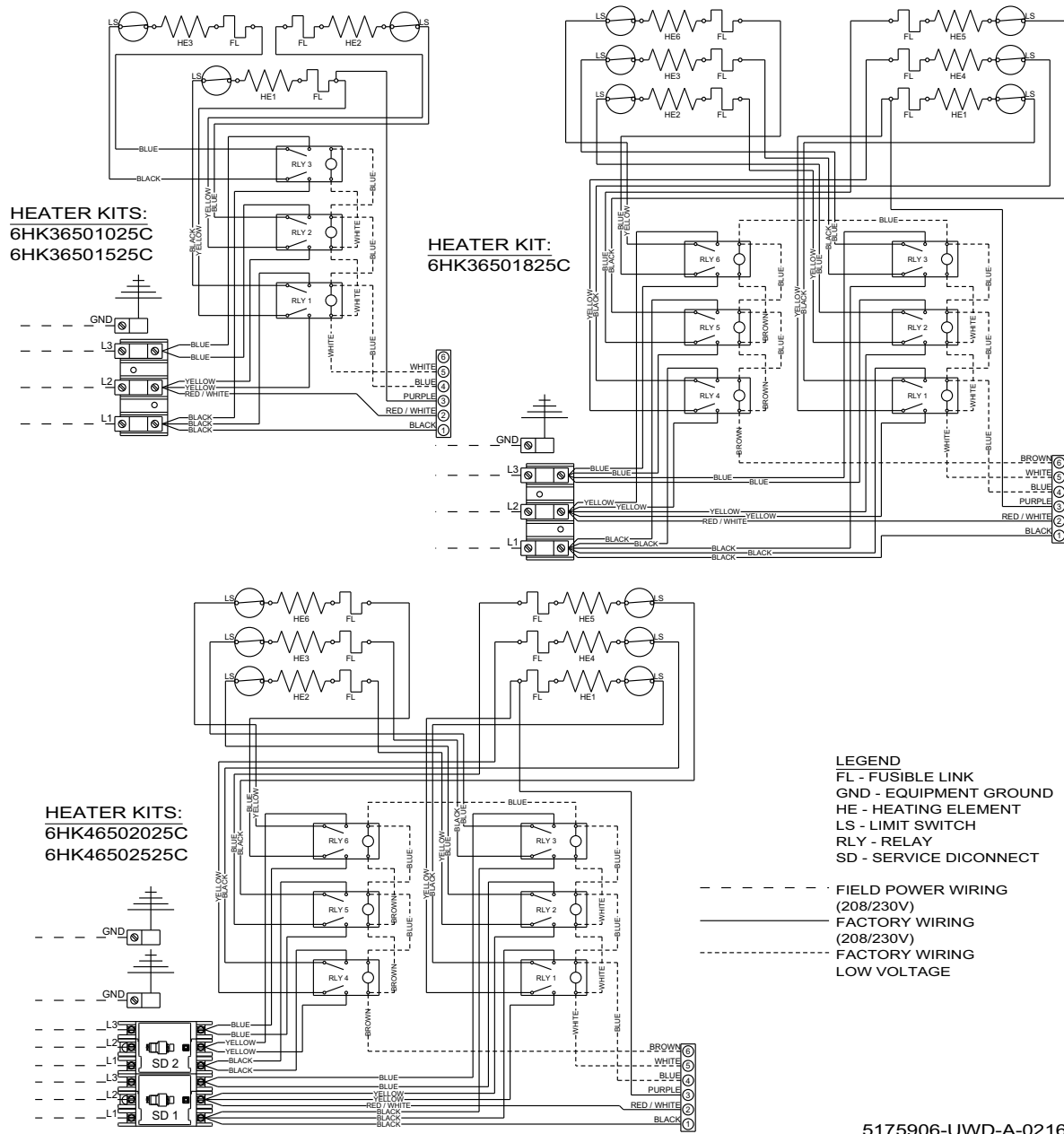


FIGURE 17: Wiring Diagram - Three Phase Heat Kits 208-230 V

SECTION XIV: START UP SHEET

<input type="button" value="Print Form"/>	Residential Air Handler with Electric Heat Start-Up Sheet				<input type="button" value="Reset Form"/>	
Proper start-up is critical to customer comfort and equipment longevity						
Start-Up Date	<input style="width: 100px;" type="text"/>	Company Name	<input style="width: 150px;" type="text"/>	Start-Up Technician	<input style="width: 150px;" type="text"/>	
Owner Information						
Name	<input style="width: 150px;" type="text"/>	Address	<input style="width: 150px;" type="text"/>	Daytime Phone	<input style="width: 100px;" type="text"/>	
City	<input style="width: 100px;" type="text"/>	State or Province	<input style="width: 100px;" type="text"/>	Zip or Postal Code	<input style="width: 100px;" type="text"/>	
Equipment Data						
Unit Model #	<input style="width: 150px;" type="text"/>	Unit Serial #	<input style="width: 150px;" type="text"/>			
General Information (Check all that apply)						
<input type="radio"/> New Construction		<input type="radio"/> Up flow		<input type="radio"/> Horizontal Left		
<input type="radio"/> Retrofit		<input type="radio"/> Down flow		<input type="radio"/> Horizontal Right		
Unit Location and Connections (Check all that apply)						
<input type="checkbox"/> Unit is level		<input type="checkbox"/> Duct connections are complete:		<input type="checkbox"/> Supply <input type="checkbox"/> Return		
<input type="checkbox"/> Condensate drain properly connected per the installation instructions				<input type="checkbox"/> Condensate trap has been primed with water		
Filters						
<input type="checkbox"/> Filters installed		Number of filters	<input style="width: 50px;" type="text"/>	Filter size	<input style="width: 50px;" type="text"/>	
Electrical Connections & Inspection (Complete all that apply)						
<input type="radio"/> 208 volts AC <input type="radio"/> 230 volt AC						
<input type="checkbox"/> Inspect wires and electrical connections		<input type="checkbox"/> Transformer wired properly for primary supply voltage		<input type="checkbox"/> Ground connected		
Line Voltage Measured (Volts AC)		<input style="width: 100px;" type="text"/>		Low voltage value between "R" and "C" at control board (Volts AC)		
<input type="checkbox"/> Thermostat wiring is complete		<input type="checkbox"/> 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)		<input style="width: 50px;" type="text"/>		Supply air dry bulb temperature		<input style="width: 50px;" type="text"/>
Return static (inches of water column)		<input style="width: 50px;" type="text"/>		Return air dry bulb temperature		<input style="width: 50px;" type="text"/>
Total external static pressure		<input style="width: 50px;" type="text"/>		Temperature drop		<input style="width: 50px;" type="text"/>
				Outside air dry bulb temperature		<input style="width: 50px;" type="text"/>
				Return air wet bulb temperature		<input style="width: 50px;" type="text"/>
				Supply air wet bulb temperature		<input style="width: 50px;" type="text"/>
Other Jumpers (Check all that apply)						
HUM STAT	<input type="radio"/> YES	<input type="radio"/> NO	AC/HP	<input type="radio"/> AC	<input type="radio"/> HP	CONT FAN
	<input type="radio"/> L	<input type="radio"/> M	<input type="radio"/> 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