

# INSTALLATION & OPERATING INSTRUCTIONS AEM SERIES VARIABLE SPEED MULTI-POSITION ELECTRIC HEAT AIR HANDLER



MODEL  
(INCLUDING HEATER MODEL #) \_\_\_\_\_

SERIAL # \_\_\_\_\_

INSTALLER \_\_\_\_\_

INSTALLATION DATE \_\_\_\_\_

**These instructions should be retained and kept adjacent to the unit for future use**

## GENERAL INFORMATION

### APPLICATION VERSATILITY

- Upflow or horizontal left as shipped (field-convertible for downflow or horizontal right applications)
- May be located in closet, utility room, attic, crawl space or basement
- Can be ARI matched with most brands of air conditioners or heat pumps.

### CABINET CONSTRUCTION

- Sturdy, galvanized steel cabinet with painted front panels
- Cabinet fully insulated with 1/2" faced insulation to prevent sweating and mold growth, to encapsulate glass fibers, and to provide excellent R-value.
- Stick pins ensure insulation remains in place
- Units ship with disposable filter in unit

### ELECTRICAL CONTROLS:

- Units available with either circuit breakers or terminal blocks.
- Controls easily accessible from the front for easy service.
- Fan time delay relay standard for increased efficiency.
- Electrical connections can be made from the top, left, or right.

### ELECTRIC HEATERS:

- Available from 3 to 30 KW.
- Models with electric heat include sequencers and temperature limit switches for safe, efficient operation.
- Electric heat modules easily installed in the field using molex plugs or can be ordered factory-installed

### WARNING

WHEN THIS UNIT IS INSTALLED IN AN ENCLOSED AREA, SUCH AS A GARAGE OR UTILITY ROOM WITH ANY CARBON MONOXIDE PRODUCING DEVICES (i.e. AUTOMOBILE, SPACE HEATER, WATER HEATER, ETC.) ENSURE THAT THE ENCLOSED AREA IS PROPERLY VENTED.

**APPLICABLE CODES** IN ABSENCE OF LOCAL/STATE CODES REFER TO: **NATIONAL ELECTRIC CODE: (NEC/NFPA70) FIRE PREVENTION CODE: NFPA 90A & 90B UNIFORM MECHANICAL CODE**

### WARNING

FAILURE TO FOLLOW THESE INSTRUCTIONS, LOCAL CODES OR NATIONAL CODES MAY CAUSE FIRE, EXPLOSION, ELECTRIC SHOCK, PERSONAL INJURY OR PROPERTY DAMAGE

### WARNING

READ THESE INSTRUCTIONS COMPLETELY BEFORE ATTEMPTING TO INSTALL OR SERVICE THIS UNIT AND FIELD INSTALLED ACCESSORIES.

### BLOWER

- Direct drive variable speed, constant torque blowers circulate air quietly and efficiently.
- X13 motor allows for constant torque at various static pressures maintaining required airflow. X13 motor can be programmed for different torque profile.
- X13 motor improves SEER rating and efficiency.
- Blowers mounted on rails so they can be easily removed for service

### DX COIL:

- High efficiency rifled copper tubes/enhanced aluminum fins provide maximum heat transfer.
- All coils immersion tested at 500 psi then nitrogen pressurized and factory sealed for maximum reliability.
- Liquid-line Schrader allows pre-installation pressure testing.
- Available with either orifice or TXV metering device. Field-installable bolt-on TXVs are also available.
- Rugged GLP drain pan holds minimal condensate while eliminating the possibility of corrosion. Drain pan is UV safe.
- All drain connections are 3/4" NPT. Access door allows for coil cleaning.
- Certified for use with either R22 or R410a.

### Accessories (Field or Factory Installed)

- Electric Heating Kit
- Freeze protection thermostat
- Expansion Valve

### WARNING

ONLY FACTORY AUTHORIZED KITS AND ACCESSORIES SHOULD BE USED WHEN INSTALLING OR MODIFYING THIS UNIT, UNLESS IT IS SO NOTED IN THESE INSTRUCTIONS. SOME LOCALITIES MAY REQUIRE A LICENSED INSTALLER/SERVICER.

### WARNING

THIS UNIT IS NOT APPROVED FOR OUTDOOR INSTALLATION. IT IS APPROVED FOR INSTALLATION IN ALCOVE, BASEMENTS, ATTICS OR CRAWL SPACE, AND IS DESIGNED FOR CONNECTION TO AN AIR DISTRIBUTION DUCTWORK.

### WARNING

PRIOR TO SHIPMENT, THIS UNIT WAS TESTED AND INSPECTED FOR DAMAGE AT THE FACTORY. UNPACK CAREFULLY AND IF DAMAGE IS FOUND, REPORT IT TO THE TRANSPORTATION COMPANY

## MODEL NOMENCLATURE

### Air Handler Chassis Nomenclature

A	A	M	18	F	-001
Air Handler					
<u>Voltage</u>					
A = 240V PSC Motor					
B = 120V PSC Motor					
E = 240V X13 Motor					
F = 120V X13 Motor					
<u>Configuration</u>					
C = Ceiling Mount (under development)					
M = Multi-Position					
L = Multi-Position Electric Furnace					
W = Wall Mount (under development)					
Nominal tonnage (MBTUH)					
<u>Metering device</u>					
4 = non-bleed A/C or H/P R410 TXV (ref: X5-3, X5-5)					
B = 20% bleed A/C or H/P R22 TXV (ref: X-3, X-5)					
F = Flo-rater					
X = non-bleed A/C or H/P R22 TXV ref: X2-3, X2-5)					
Option Code					

### Electric Heat Kit Nomenclature

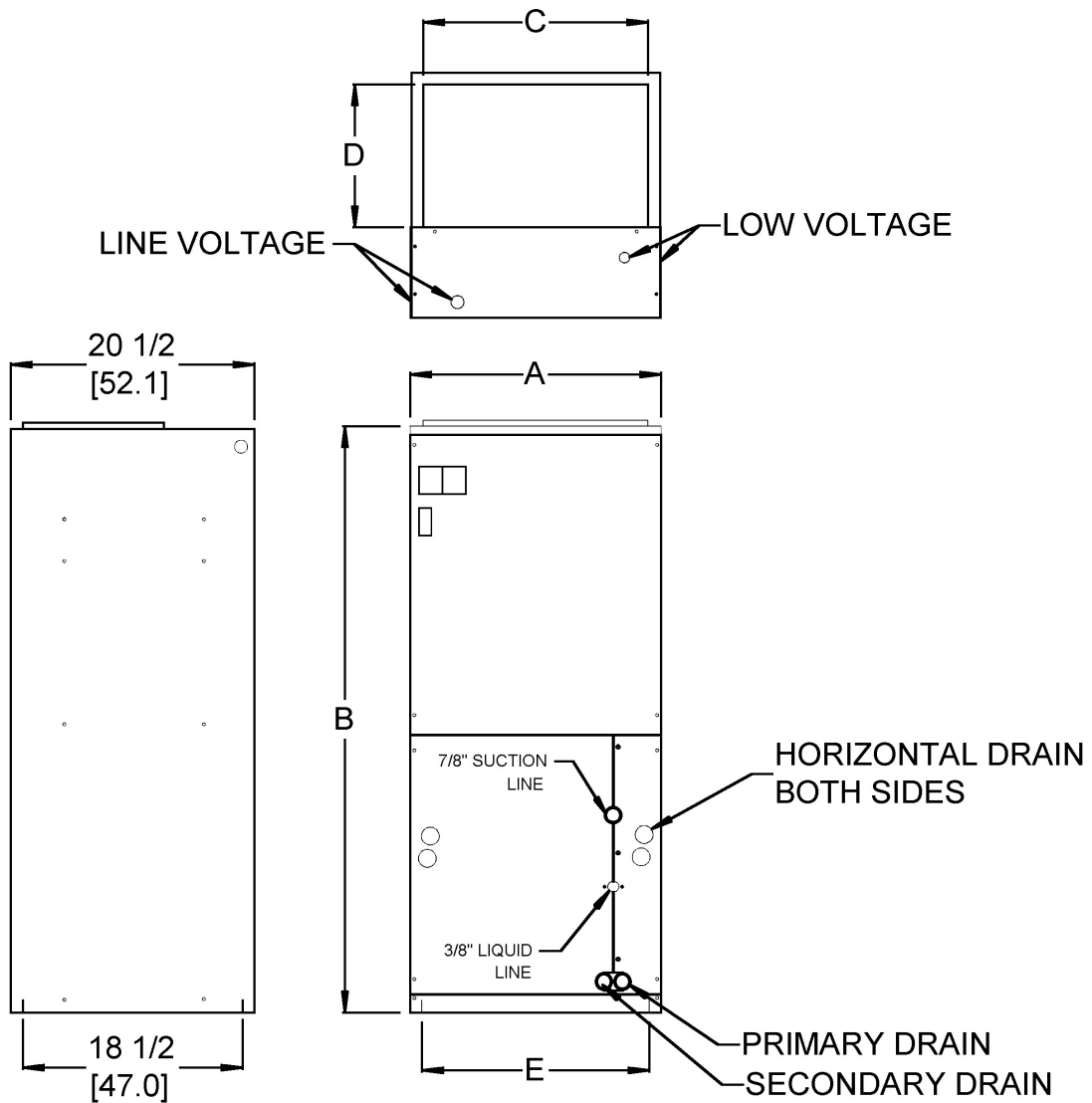
E	C	S	10		
Electric Heat Kit					
<u>Power Connection</u>					
C = Circuit Breaker					
T = Terminal Block					
P = Circuit Breaker W/Single Point Block					
3 = 3-phase Circuit Breaker					
4 = 3-phase Terminal Block					
X = None of the above (std. with Base Air Handler)					
S = SMALL CABINET 18-36					
L = LARGE CABINET 42-61					
<u>Heat Strip</u>					
00 = NO Heat					
03 = 3 KW					
05 = 5 KW					
06 = 6 KW					
08 = 8 KW					
10 = 10 KW					
12 = 12 KW 3-phase Circuit Only					
15 = 15 KW					
20 = 20 KW					
24 = 24 KW 3-phase Circuit Only					
25 = 25 KW					
30 = 30 KW					

### Hydronic Heat Kit Nomenclature

W	C	2	S	P	
Hydronic Heat Kit					
<u>Power Connection</u>					
C = Circuit Breaker					
T = Terminal Block					
3 = 3-phase Circuit Breaker					
<u>Hydronic Coil Rows</u>					
2					
3					
4					
<u>Coil Dimensions</u>					
S = Fits Small Chassis (18, 24, 30, 36)					
L = Fits Large Chassis (42, 48, 60, 61)					
<u>Pump</u>					
P = with Pump and Check Valve					
L = Less Pump and Check Valve					

**PHYSICAL DIMENSIONS**

MODEL	WIDTH		HEIGHT		DUCT OPENING		FILTER SIZE	PISTON SIZE	SHIP WEIGHT (LBS)	SKID QUANTITY
	A	B	C	D	E					
AEM18/19	21 [53]	40 [102]	18-3/4 [48]	12 [30]	18-1/2 [47]	16X20	.055	99	8	
AEM24/25	21 [53]	40 [102]	18-3/4 [48]	12 [30]	18-1/2 [47]	16X20	.059	100	8	
AEM30/31	21 [53]	49 [125]	18-3/4 [48]	12 [30]	18-1/2 [47]	16X20	.074	118	4	
AEM36/37	21 [53]	49 [125]	18-3/4 [48]	12 [30]	18-1/2 [47]	16X20	.074	147	4	
AEM42/43	24-1/2 [62]	57 [145]	22-1/4 [57]	10-1/2 [27]	22 [56]	20X20	.080	153	3	
AEM48/49	24-1/2 [62]	57 [145]	22-1/4 [57]	10-1/2 [27]	22 [56]	20X20	.084	180	3	
AEM60/61	24-1/2 [62]	57 [145]	22-1/4 [57]	10-1/2 [27]	22 [56]	20X20	.092	200	3	



## BLOWER DATA

AIR HANDLER MODEL	BLOWER D x W	Unit size (tons)	X13 MOTOR HP	PROGRAMMED CFM			MOTOR VOLT	MOTOR AMP.		
				TAP 1	TAP 2	TAP 3		TAP 1	TAP 2	TAP 3
AEM18/19	9X6	1-1/2	1/3		600		240		1.4	
AEM24/25		2	1/3	800			240	2.8		
AEM30/31	10X8	2-1/2	1/2		1000		240		2.5	
AEM36/37		3	1/2	1200			240	4.1		
AEM42/43	12X9	3-1/2	1			1400	240			3.4
AEM48/49		4	1			1600	240		4.3	
AEM60/61		5	1	2000			240	7.6		

## REPLACEMENT PARTS

Replacement parts are available through local distributors. When ordering replacement parts, provide the complete model number (including heater model number) and serial number on the rating plate

## INSTALLATION

THE TONNAGE CAPACITY OF THE OUTDOOR UNIT (CONDENSER OR HEAT-PUMP) SHOULD NEVER EXCEED THE CAPACITY OF THIS UNIT (THE INDOOR UNIT)

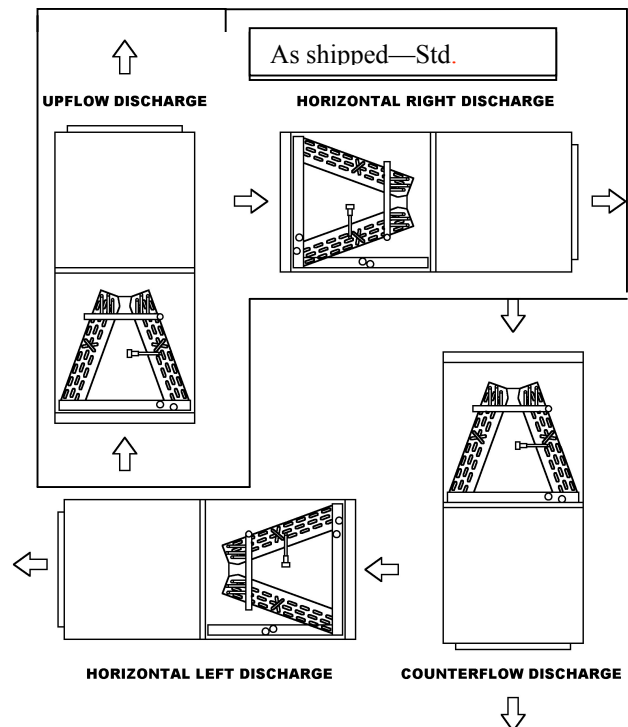
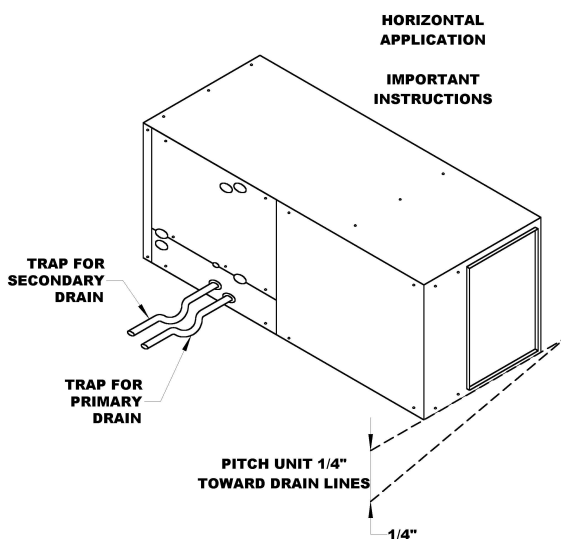
This unit can be installed in the vertical or right horizontal position without modification. This unit is designed for zero clearance on three sides and adequate access for service in the front.

An auxiliary drain pan must be installed under the unit to protect surrounding area from condensate leak or main drain blockage. The primary and secondary drain lines must be pitched at least 1/4" per foot away from the unit to assure proper drainage. Closed cell insulation should be applied to the drain lines where sweating may occur.

For units installed in garages, warehouses or other areas where they may be subjected to mechanical damage, Suitable protective barriers must be installed. Unit must be installed 18" away from any ignition source.

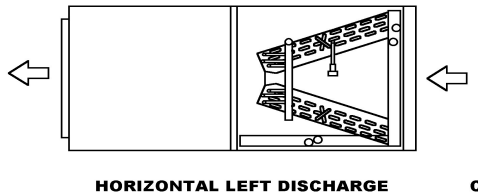
When this unit is installed in the vertical up flow position, horizontal drain pan may be removed. In case of counter flow installation the horizontal drain pan must be removed.

## AIR FLOW ORIENTATION



## HORIZONTAL LEFT-HAND INSTALLATION

- With Air Handler in vertical position remove all access panels.
- Remove horizontal drain pan from right hand side. Disconnect any drain connections.
- Relocate the removed horizontal drain pan on to the left side and reconnect the drain connections.
- "P" traps must be installed on primary and secondary drains of the horizontal drain pan.
- Reinstall all access panels to the unit.
- In all cooling application an auxiliary drain pan must provided and installed by the installer under the entire unit with separate drain line properly sloped and terminated in an area visible to the occupant.
- NOTE: The A coil contains 150 psig of air pressure.
- Failure to follow this installation requirement will void the product warranty.



## COUNTER FLOW INSTALLATION

- Before putting the Air Handler in the counter flow position, remove lower access panels. Remove and discard horizontal drain pan. Horizontal drain pan is not required for counterflow application.
- Remove coil with vertical drain pan from the unit.
- Turn Air Handler to the counter flow position.
- Install coil deck. In effect, coil and two lower access panels will be assembled 180 degrees from their former position.
- Place 3"x 16" flat insulation retainer on bottom of each coil slab against the aluminum fins as shown. This will reduce the potential for water blow-off into the air stream.
- Install coil assembly (with drain pan attached) to the coil deck into Air Handler. NOTE: Push coil pan assembly all the way to the rear of the air handler unit until it locks under the bracket in the rear. Install lower access panels to match the tubing and drains.
- If the air handler has circuit breakers, they must be snapped out of the bracket and inverted to reflect "up" as the "on" position and "down" as the "off" position.

## CONDENSATE REMOVAL

THIS UNIT EMPLOYS A DRAW THROUGH COIL. A TRAP MUST BE INSTALLED IN THE DRAIN LINE(S) TO ALLOW FOR PROPER CONDENSATE DISPOSAL.

- For trap configuration and requirements see fig. # 3.
- Condensate drain lines must be min. 3/4" NPT for each unit. Precautions must be used to not over tighten the adapter at the drain pan connection; this will prevent damage to the plastic drain pan. A joint compound may be used to achieve seal.
- All condensate drain lines and drain traps should be adequately insulated.
- The unit and the auxiliary drain and must be adequately elevated to insure proper drainage.
- Use of a condensate removal pump is permitted when necessary. This condensate pump should have provision to shut-off, should a blocked drain occur.
- In all cooling applications, a secondary drain pan should be provided by the installer and placed under the entire unit with a separate drain line properly sloped and terminated in an area visible to the occupant. As expressed in our product warranty, Aspen will not be responsible for any structural damage due to the failure to follow this installation requirement.

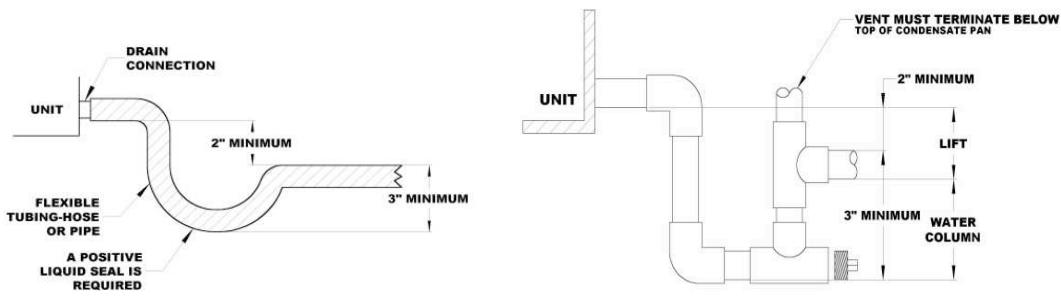


Fig. 3

**REFRIGERANT PIPING**

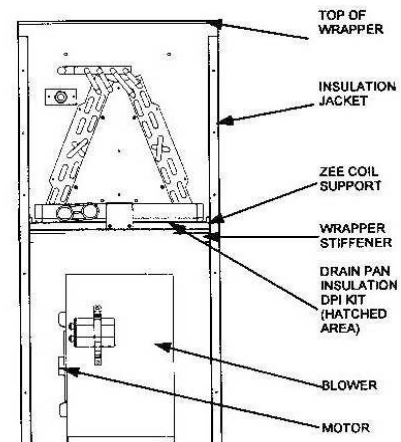
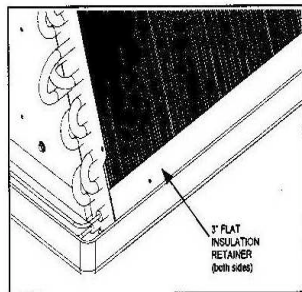
Refrigerant piping should follow the recommended procedures set forth in the appropriate manual. Refrigerant piping consists of 3/8" liquid lines and 7/8" suction lines and manifold. Consideration should be given to routing refrigerant lines during installation, so bottom door can be removed for access. Insulation on the suction line must extend into cabinet and continue as far as possible to eliminate condensation from dripping on to access door insulation

**DUCT INSTALLATION**

- Duct systems should be installed in accordance with standards for air-conditioning systems, National Fire Protection Association Pamphlet No. 90A or 90B. They should be sized in accordance with National Environmental System Contractors Association Manual K, or whichever is applicable.
- On any job, non-flammable flexible collars should be used for the return air and discharge connections to prevent transmission of vibration. Although these units have been specially designed for quiet vibration-free operation, air ducts can act as soundboards and could, if poorly installed, amplify the slightest vibration to the annoyance level.
- All main supply and return air drops should be run full size as determined by the

designer of the duct system and should not necessarily be the size of the duct flange openings of the unit

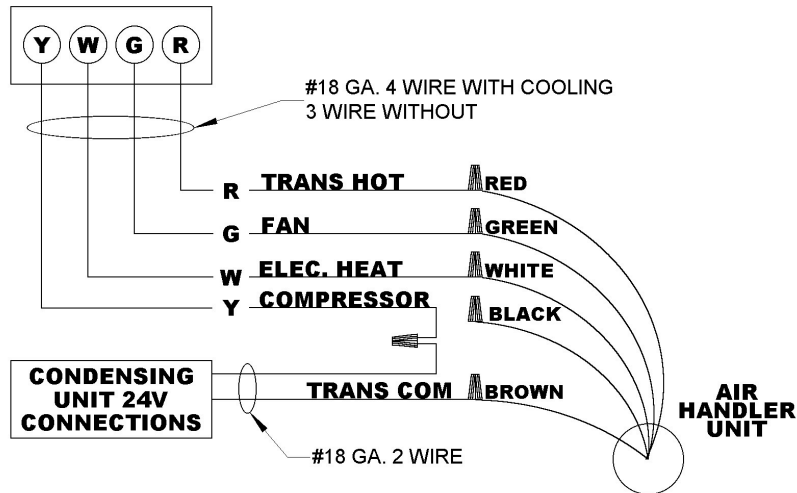
- When installing a central air return grille in or near the living space, it is advisable to design the ductwork so that the grille is not in direct line with the opening in the unit. One or two elbows and acoustical duct liner will also assure a quieter installation and system.
- It is recommended that wherever supply and return air sheet metal duct pass through unconditioned areas, they be insulated to prevent excessive heat loss during heating operation. When applied in conjunction with summer air conditioning, sheet metal duct routed through unconditioned areas should be insulated and have an outside vapor barrier to prevent formation of condensation.



## ELECTRICAL INSTALLATION

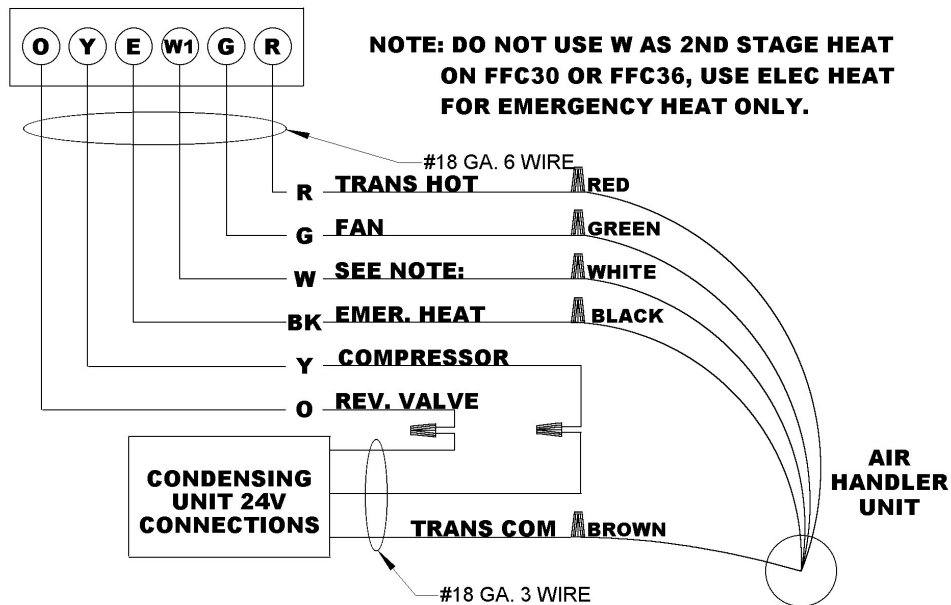
These units are designed for single or three phase 208/240 volt 60 Hertz power supply. Wire selection and wiring must be in accordance with the National Electric Code and/or local codes. Unit terminals are designed to accommodate copper and aluminum wiring. If aluminum wiring is used, please observe the special precautions relative to sizing, handling, wire connections and corrosion protection. All models with 5, 8, or 10 KW electric heats are arranged for single circuit connection. Models larger than 10 KW are arranged for multi-circuit connection.

### ROOM THERMOSTAT



### ROOM THERMOSTAT

### HEAT PUMP 2 STAGE HEAT





## START UP

Make sure the X13 motor is pre loaded with program from factory

After all connections are made, start up and check out of the unit must be performed before proper evaluation of the entire system can be made. Make sure that heat anticipator is properly set as noted on thermostat instructions.

Load requirements can vary in each residence and it may be necessary for the installer or homeowner to make slight adjustments to the heat anticipator setting for longer or shorter cycles. It is recommended to change the setting no more than plus or minus .05 amps. at a time. Greater changes can cause the unit to rapid cycle or remain on excessively. To properly check the unit's operation, the installer should have an electrical current measuring device (0-10 amp Amprobe, Fluke), air pressure measuring device (0-1.0 in slope gauge), and a temperature-measuring device (0-200°F thermometer).

Install the Amprobe to measure blower current, the slope gauge to measure static air pressure at the units and the temperature device to measure unit supply and return air temperature. Before taking measurements, be sure that all registers, grilles and dampers are open or are set to their proper positions. Be sure that clean filters are in place. Temperature measuring device must be installed to obtain average

temperature at both inlet and outlet. For outlet, measure temperature of each main trunk at a location far enough away to avoid heater radiation and read the average temperatures.

## ELECTRIC HEAT CONTROLS:

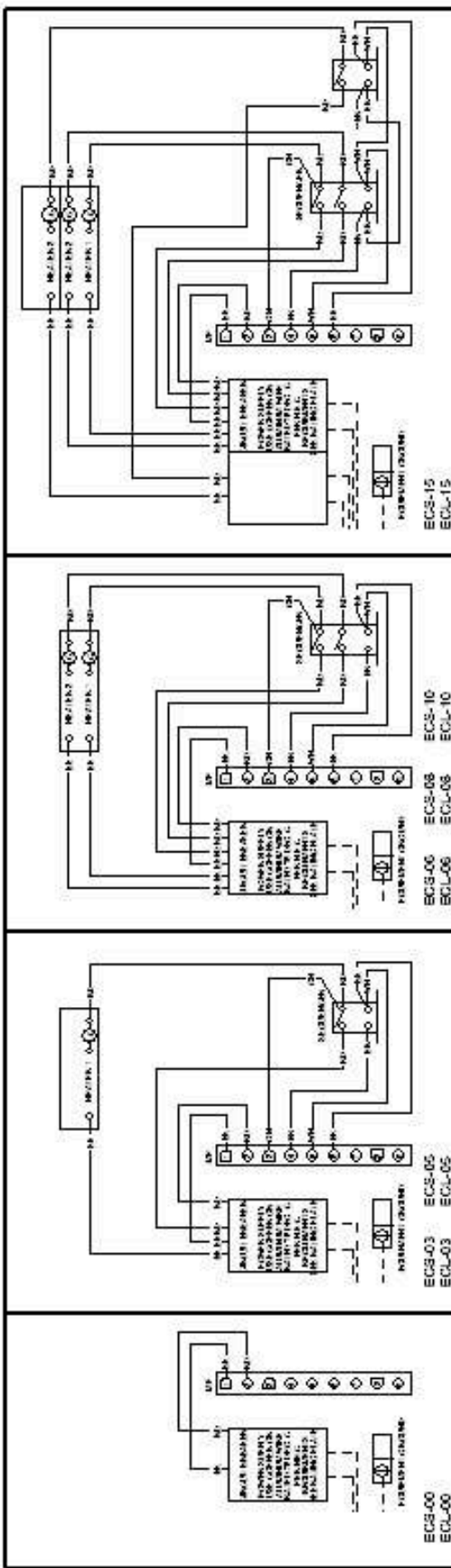
1. Turn on power supply. Set thermostat fan switch to on. Set the cooling indicator to maximum, heating to minimum. System switch may be on heat or cool. Check slope gauge measurement against appropriate air flow chart. Make damper, register and motor speed adjustments to obtain required airflow.
2. Set thermostat fan switch to auto, system to heat and thermostat heating indicator to maximum heat. Blower should start and all heat be energized.
3. Check air flow using temperature rise method.

$$\text{CFM} = \frac{\text{OUTPUT (BTUH)}}{1.08 \times \text{TEMP RISE}}$$

NOTE: BTUH output should be computed by VOLT x AMPS x 3.4 = BTUH OUTPUT. Since line volt can vary, do not use nameplate rating to determine output.

## OPERATION AND MAINTENANCE

- 1) Room Thermostat- this is the device that controls that operation of your heating and/or cooling unit. It senses the indoor temperature and signals the equipment to start or stop maintaining the temperature you have selected for your comfort. The room thermostat should be in a central, draft free inside wall location for best operation. Do not place any heat producing apparatus such as lights, radio, etc., near the thermostat as this will cause erratic operation of the comfort system. The thermostat can accumulate dust or lint, which can affect its accuracy. It should be cleaned annually.
- 2) Air Filter(s) - All central air moving comfort systems must include air filter(s). These filters will be located either in the equipment or in the return air duct system upstream of the equipment. The filter(s) removes dust and debris from the air thus helping to keep your air-conditioned space clean. More important, the filter keeps dust and debris from collecting on the heat transfer surfaces thus maintaining optimum equipment efficiency and performance. Inspect and clean or replace filters every month. This routine maintenance procedure will pay big dividends in reduced operating cost and reduced service expense. Never operate comfort equipment without filter(s).
- 3) Fuses and/or Circuit Breakers- This comfort equipment should be connected to the building electric service in accordance with local and National Electric codes. This electrical connection will include over current protection in the form of circuit breakers. Have your contractor identify the circuits and the location of over current protection so that you may be in a position to make inspections or replacements in the event the equipment fails to operate.
- 4) WARNING
  - a) Do not store combustible materials or use gasoline or other flammable liquids or vapors in the vicinity of this appliance.
  - b) Do not operate the comfort equipment with panels removed.
  - c) Have your contractor point out and identify the various cut-off devices, switches, etc., that serve your comfort equipment. There is a main switch that will cut off energy to your heating system. Know where they are so that you may cut off the flow of energy in the event of overheating.
- 5) Periodic Checkup and Service- This product is designed to provide many years of dependable, trouble-free comfort when properly maintained. Proper maintenance will consist of annual check-ups and cleaning of the internal electrical and heat transfer components by a qualified service technician. Failure to provide periodic checkup and cleaning can result in excessive operating cost and/or equipment malfunction.
- 6) Lubrication- Direct drive blower motors are equipped with permanently lubricated bearings and do not require further lubrication.
- 7) Air filter replacement: An air filter can restrict the airflow of air to the fan coil if it is not cleaned or replaced periodically. When replacing the air filter, always replace with the same type and size as originally furnished with the unit.



NOTES:  
 1. LINE SPACE TO BE ATTACHED TO UNUSED MOTOR LEADS  
 2. FIELD WIRE TO BE ON TERMINAL 1 FOR 230 VOLT OR TERMINAL 2 FOR 208 VOLT OPERATION  
 3. SEE INSTALLATION INSTRUCTIONS FOR PROPER LOW VOLTAGE FIELD WIRING CONNECTIONS.

TABLE 1

UNIT MODEL	ELECTRIC HEAT ONLY		ELECTRIC HEAT & HEAT PUMP	
	MAX KW	SPEED TAP	MAX KW	SPEED TAP
AEMW18	10	2	10	2
AEMW24	10	1	10	1
AEM30	15	2	10	2
AEM36	10	2	10	2
AEM56	15	1	15	1
AEM36	10	1	10	1
AEM42	30	3	20	3
AEM48	30	2	25	2
AEM60	30	1	30	1

TABLE 1  
 TAP BOARD SPEED SETTING FOR MAX KW RATING

LEGEND

- BTD - BLOWER TIME DELAY
- CB - CIRCUIT BREAKER
- EM - EVAPORATOR MOTOR
- FC - FAN CAPACITOR
- LC - LIMIT CONTROL
- HS - HEAT SEQUENCER
- HTR - HEATER

COLOR CODE

- WH - WHITE
- BR - BLACK
- RD - RED
- BL - BLUE
- GN - GREEN
- BR - BROWN
- YL - YELLOW
- GR - GRAY
- FA - FACTORY
- FL - FIELD
- HI - HIGH VOLT
- LO - LOW VOLT

WIRING CODE

- FACTORY
- FIELD
- HIGH VOLT
- LOW VOLT

