

## AAN & AEN Series - Manufactured Housing Electric Furnace



### 1. Safety Instruction

Potential safety hazards are alerted using the following symbols. The symbol is used in conjunction with terms that indicate the intensity of the hazard.



#### **WARNING**

This symbol indicates a potentially hazardous situation, which if not avoided, could result in serious injury, property damage, product damage or death.



#### **CAUTION**

This symbol indicates a potentially hazardous situation, which if not avoided, may result in moderate injury or property damage.



#### **WARNING**

Certified technicians or those individuals meeting the requirements specified by NATE may use this information. Property and product damage or personal injury hazard may occur without such background.



#### **WARNING**

All power sources should be disconnected prior to servicing. Failure to do so may cause personal injury or property damage.



#### **WARNING**

Product designed and manufactured to permit installation in accordance with local and national building codes. It is the installer's responsibility to ensure that product is installed in strict compliance with national and local codes. Manufacturer takes no responsibility for damage (personal, product or property) caused due to installations violating regulations. In absence of local/state codes, refer to National Electric Code: NFPA 90A & 90B Uniform Mechanical Code.



#### **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 ventilated.



#### **CAUTION**

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/service personnel.



#### **WARNING**

Unit is not approved for outdoor installations.



#### **WARNING**

The unit is designed for operation with 208/240 V, single phase, 60 Hz power supply. Aspen will not be responsible for damages caused due to modification of the unit to operate with alternative power sources.

### 2. Inspection

✓ On receiving the product, visually inspect it for any major shipping related damages. Shipping damages are the carrier's responsibility. Inspect the product labels to verify the model number and options are in accordance with your order. Manufacturer will not accept damage claims for incorrectly shipped product.

### 3. Installation Preparation

Read all the instructions in this guideline carefully while paying special attention to the WARNING and CAUTION alerts. If any of the instructions are unclear; clarify with certified technicians. Gather all the tools needed for successful installation of the unit prior to beginning the installation.

#### 3A. Clearances

This unit is designed for zero clearance installation on three sides and adequate clearance to provide access for service in the front. A minimum of 18" (alcove) or 6" (closet) clearance is recommended on the front end (Fig 3A-1).

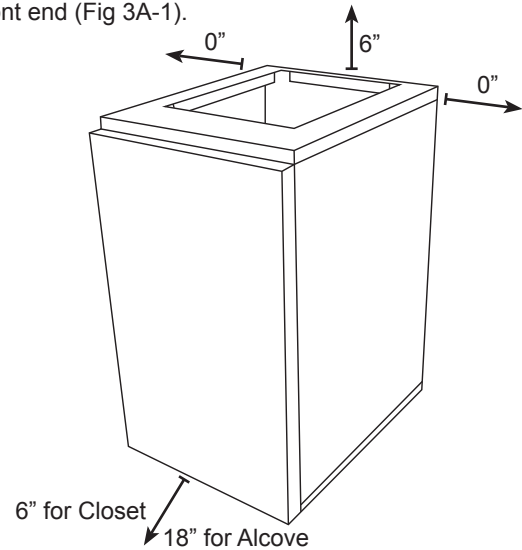


Fig 3A-1. Minimum Clearance for Electric Furnace

For closet installation, the return air opening can be on the front door, above the furnace casing on a wall, or on the electric door's louvered door (If applicable.)

A minimum clearance of six inches is required, on the return side, in order to allow for proper airflow.

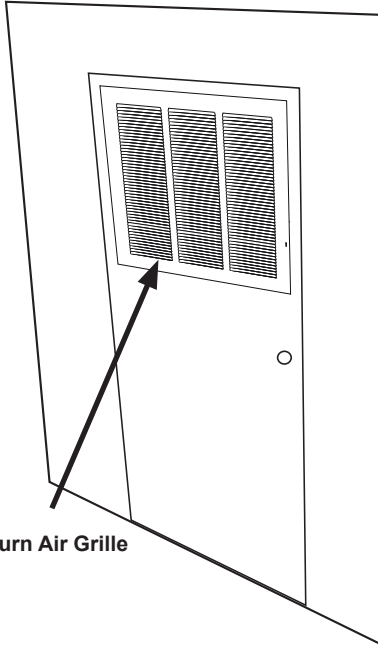
### 3B. Closet and Alcove Installation



**CAUTION** Ensure that the unit is adequately sized. The tonnage of the outdoor unit should never exceed the tonnage of this unit.

These units are designed to be installed in a closet or an alcove.

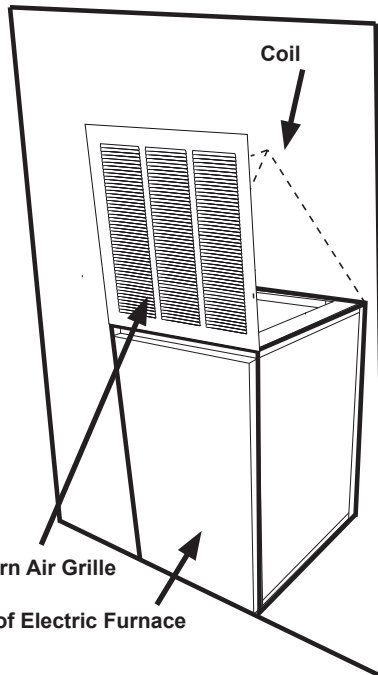
If installing the electric furnace into a closet or an alcove, the unit must leave front clearance to service the unit. The bottom of the unit should also rest on a sturdy platform or floor.



Wall Mount Return Air Grille

Fig 3B-2. Closet Installation

Airflow must be made available to the electric furnace's return. Not doing so may cause improper heating as well as premature heating element failure.



Wall Mount Return Air Grille

Front of Electric Furnace

Fig 3B-3. Alcove Installation

### 3C. Ductwork and Duct Connector

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. It is recommended that installers refer to the "Manufactured Housing Duct System Guide to Best Practices" by MHI-MHRA.

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 if poorly installed.

All main supply and return air drops should be properly sized as determined by the designer of the duct system and should not necessarily be the size of the duct flange openings of the unit. (The duct size should never be smaller than the flange openings of the electric furnace supply and return air openings.)

#### To install the duct connector:

- Attach duct connector foam gasket along the perimeter of the duct opening to seal the duct connector to the top of the duct.

- To connect the duct connector, insert it into the floor opening and bend back the tabs inside the duct. Fold the tabs over 90 degrees to ensure a secure connection. Seal around the duct connector.

- Slit the corners of the duct connector that stick up above the floor, and then bend the sides over onto the floor surface.

- Insulate between the floor base and the floor when used on a combustible floor. Be sure to cut the insulation around the perimeter of the duct connector opening.

- Install the floor base over the floor opening with the flanges on the 11 x 13 inch opening facing down.

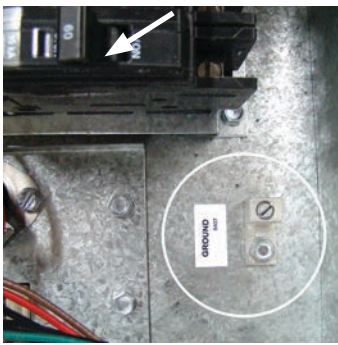
- Use four screws to secure the floor base to the floor.

It is recommended that wherever supply and return air sheet metal ducts 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.

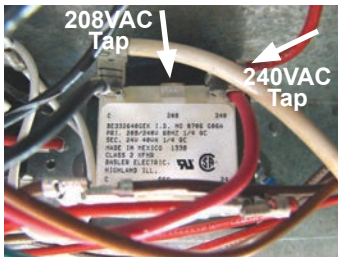
### 4. Electrical Line Voltage Wiring

These units are designed for single or three phase 208/240 volts, 60 HZ 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 special precautions relative to sizing, wire connections and corrosion protection.

All models with 5,8 or 10 kW electric heat are arranged for single circuit connections. Models larger than 10 kW are arranged for multi-circuit protection. Refer to top part of wiring diagram at the end of this guide for detailed information.



Line voltage wiring should be routed through the access holes at the top of the electric furnace. Proper electrical conduit connection fittings should be used. Connect the power wiring to the line side connections on the electric furnace. The electrical ground wire should be connected to the grounding lug. Ensure both the field supplied ground wire and electric furnace GREEN ground wire are both secured to the grounding lug of the electric furnace.



If the line voltage being supplied to the electric furnace is 208 volt single phase, the line voltage tap on the low voltage transformer needs to be moved from the 240 volt tap to the 208 volt tap. If this is not done, the secondary output voltage of the transformer will be too low.

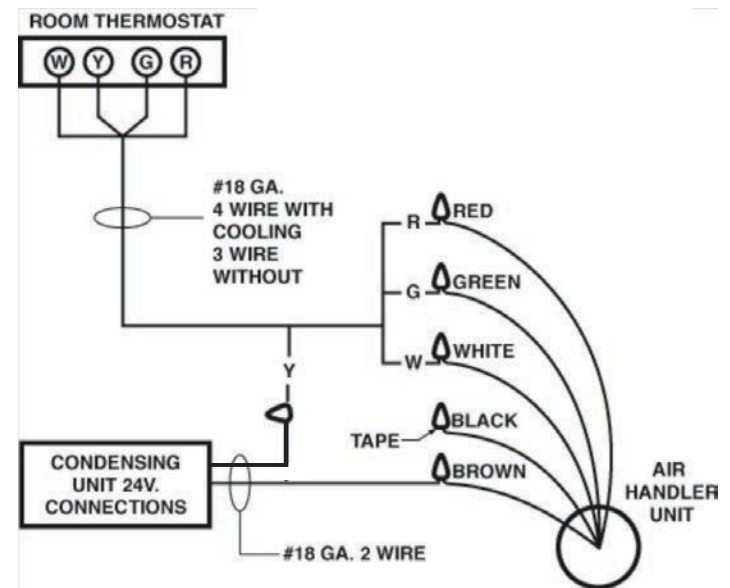


Fig 5A-2.

## 6. Air Volume Adjustment

Air volume needs to be set to the level recommended by the outdoor unit equipment manufacturer. Most systems will require around 400 CFM of indoor air for every 1 ton of system cooling capacity. The air volume must be set prior to attempting system charge.

This electric furnace uses a 240V PSC motor. The air volume level produced by the electric furnaces at varying external static pressure levels is shown in Table 6-1.

Airflow Table for AAN (PSC)													
MODEL	MOTOR SPEED	MOTOR HP	MOTOR AMP	MOTOR VOLT	CFM VS EXTERNAL STATIC PRESSURE*								
AAN 24	LO	1/2	3	240	0.1	0.2	0.3	0.4	0.5				
AAN 36	HI				860	840	820	780	740				
AAN 42	LO	3/4	4.4		1260	1240	1220	1180	1140				
AAN 48	MED				1580	1520	1480	1440	1380				
AAN 60	HI				1700	1640	1560	1520	1460				
					1800	1720	1660	1620	1560				
* - Data is with filter in place													
Airflow Table for AEN (X-13)													
MODEL	MOTOR SPEED	MOTOR HP	MOTOR AMP	MOTOR VOLT	CFM VS EXTERNAL STATIC PRESSURE*								
AEN 24	T-2	1/2	4.1	240	0.1	0.2	0.3	0.4	0.5				
AEN 30	T-3				880	840	780	720	680				
AEN 36	T-4				1120	1080	1060	1000	960				
AEN 42	T-5	1	7.6		1300	1260	1240	1200	1160				
AEN 48	T-4				1480	1420	1360	1340	1300				
AEN 60	T-5				1480	1420	1360	1320	1300				
					1860	1820	1780	1720	1640				
* - Data is with filter in place													

Table 6-1.

Use a Magnehelic Gauge with a 1" scale and two static pressure tips to measure the static pressure during the air volume adjustment procedure. The high port static pressure tip should be placed in the supply duct near the outlet of the electric furnace. The low port static pressure tip should be placed in the return air duct near the entrance to the electric furnace. The factory provided air filter should be in place inside of the electric furnace.

1. Select a starting speed tap from the CFM table.
2. Call for fan only operation at the thermostat.
3. Read the external static pressure level on the Magnehelic gauge.
4. Make speed tap selection changes to get the air volume as close as possible to the required level.
5. If the static pressure is above .5" wc , excessive turbulence or duct friction needs to be reduced. (Obstructions in the duct system can also cause excessive static pressure.)
6. When proper air volume is established, move on to the charging procedure.

## 5. Low Voltage Connections

### 5A. Single Stage Cooling with Electric Heat

The electric furnace comes factory setup for a single stage cooling system. If factory installed accessory electric heaters are pre-installed, the unit will also have a low voltage wire for the electric heat (Fig 5A-1).

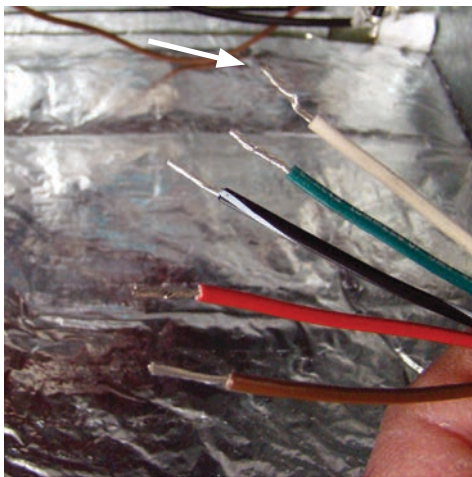


Fig 5A-1.

During cooling mode operation, the indoor blower G wire will energize a time delay relay inside the electric furnace. After a short time delay period, the time delay relay contacts will close and apply power to the blower motor. Fan delay periods are 30 seconds ON delay and 120 seconds OFF delay. (See Schematic)

The Y wire from the thermostat is not connected at the electric furnace. This wire goes directly to the outdoor unit 24 volt wiring to turn on the outdoor condensing unit when a call for cooling takes place. The 24 volt common for the outdoor unit circuits is connected at the electric furnace Brown wire.

The electric heater low voltage wiring W terminal is wired directly from the thermostat to the electric furnace. The blower will delay a heat call ON for a period of 5 seconds. The OFF delay period is 60 seconds.

## 7. System Charging



### CAUTION

An improperly charged system may cause degradation in system performance and damage the compressor. After installation of the coil, refer to the outdoor unit manufacturer for charging techniques and amount of charge. If outdoor unit manufacturers charging instructions are unavailable; then refer to instructions below to charge the system.

1. Bring airflow up to the maximum CFM possible according to Table 6-1.
2. Evacuate refrigeration system to micron level required by outdoor unit manufacturer.
3. Release system charge from outdoor unit and call for cooling.
4. Use outdoor unit equipment manufacturer specific charging charts if available and make proper charge adjustment based upon outdoor unit instructions.
5. If outdoor unit instructions and charts are not available, use Aspen provided charts. Make certain indoor air temperature is near comfort level setpoint 75F, prior to establishing superheat and subcooling levels.

## 8. Adjustment Of Heat Anticipator

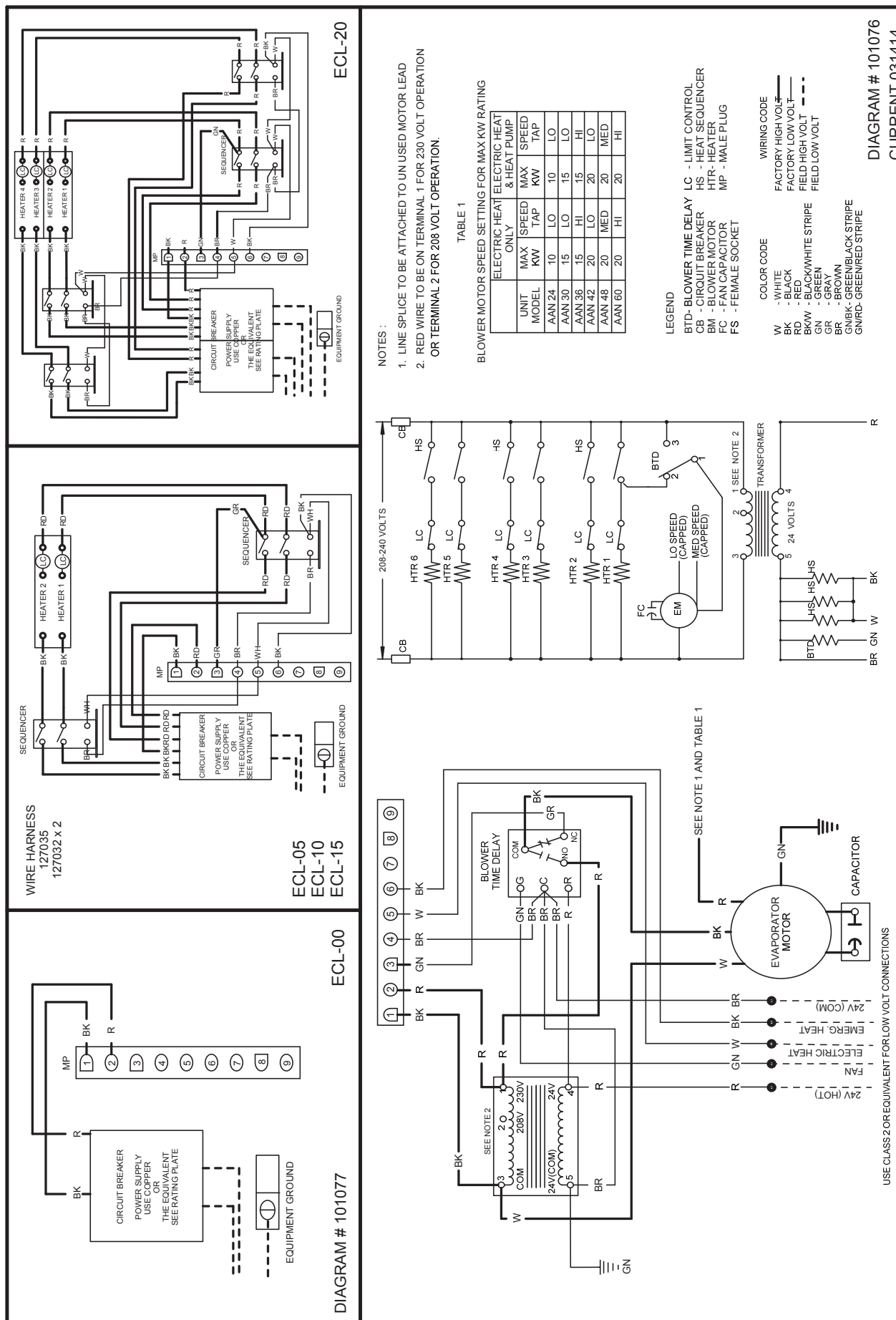
After all connections are made, start-up and checkout must be performed before proper evaluation of the entire system can be made. Make sure that heat anticipator is properly set as noted on thermostat instructions. Load requirements can vary in each residence and it may be necessary for the installer 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 0.05 amps at a time. Greater changes can cause the unit to rapid cycle or remain on excessively. Measure anticipator circuit current with electric heaters energized and set anticipator to proper level.

## 9. Final System Checkout

1. Make certain all cabinet openings are properly sealed and any grommets moved during installation are moved into proper place.
2. With cooling system operating, check for condensate leakage.
3. Perform leak detection inspection of refrigerant circuit and connecting piping.
4. Secure all cabinet doors



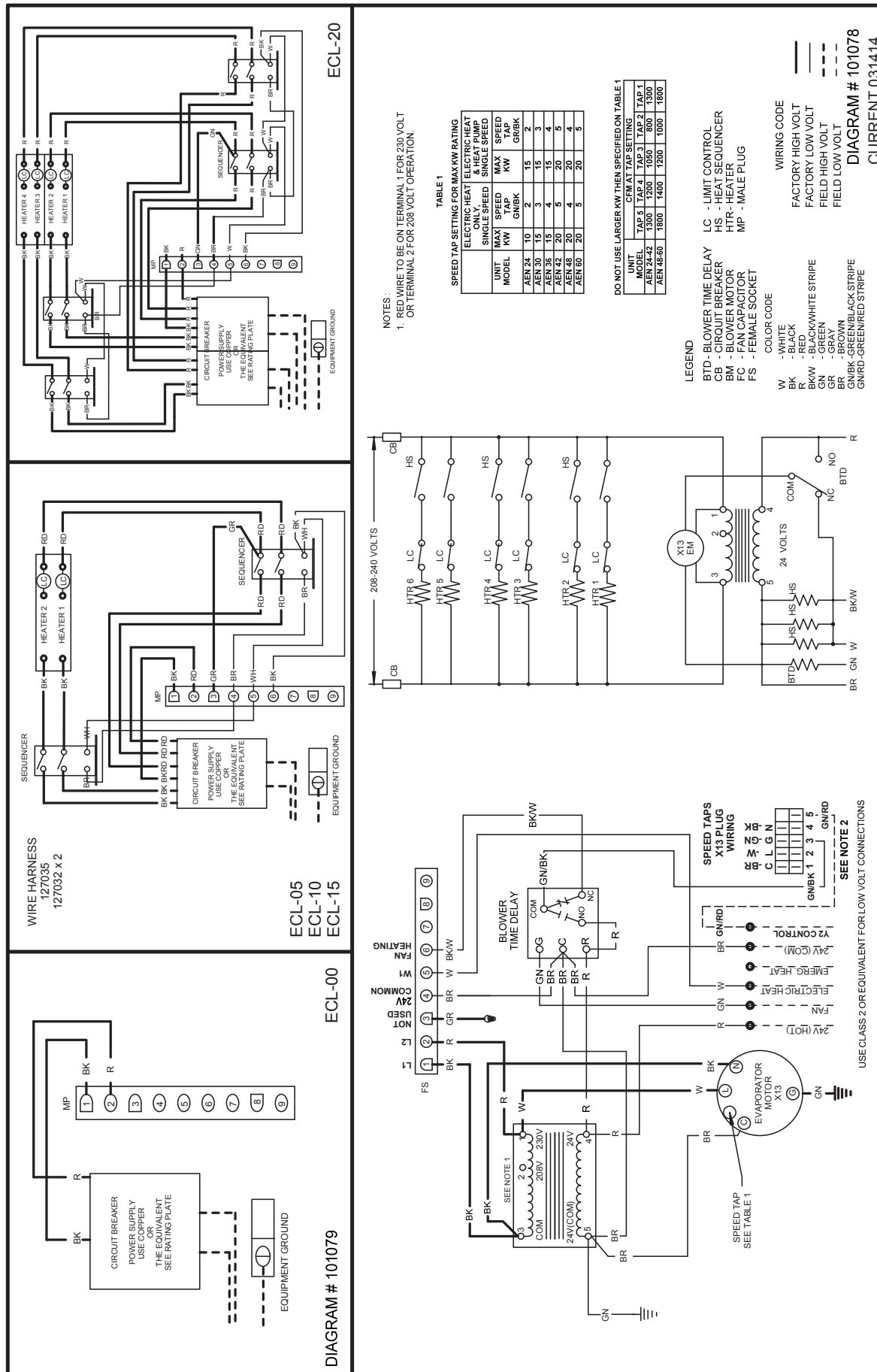
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# HIGH VOLTAGE disconnect all power sources prior to servicing. Failure might lead to safety hazard

**Fig 17-1.**

## 11. Wiring diagram for AEN models



## HIGH VOLTAGE disconnect all power sources prior to servicing. Failure might lead to safety hazard





373 Atascocita Rd.  
Humble, TX 77396  
Phone: 281.441.6500  
Toll Free: 800.423.9007  
Fax: 281.441.6510  
**[www.aspenmfg.com](http://www.aspenmfg.com)**



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