

# EIC SOLUTIONS, INC.

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# EIC SOLUTIONS

**THERMOELECTRIC AIR CONDITIONER INSTALLATION AND  
OPERATION MANUAL**

**FOR 400 BTU MODEL #'S**

**AAC-140B-4XT-EP  
AAC-140B-4XT-HC-EP**

***COOLING SOLUTIONS FOR MISSION-  
CRITICAL ELECTRONICS***

This manual is intended for models AAC-140B-4XT-EP and AAC-140B-4XT-HC-EP only.

For use in: Class I, Division 2, Groups A - D Hazardous Locations

Operating temperature code: T4

Ambient temperature range: -20 to 60°C

Voltage: 120V or 220V AC

These thermoelectric air conditioning units are to be mounted half outside and half inside a cabinet. The outside of the cabinet may be in outdoor atmosphere. There is a barrier in the middle of the unit separating inside and outside sections. The unit is intended to be permanently connected.

The unit meets the following standards:

ANSI/ISA-12.12.01-2012 Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations, Dated 07/09/2012.

UL 823-Issue:2006/10/20 Ed:9 Rev:2012/01/31 UL Standard for Safety Electric Heaters for Use in Hazardous (Classified) Locations.

UL1995 Standard for Safety Heating and Cooling Equipment, 4th edition, October 14, 2011

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# 1. GENERAL INFORMATION

## 1.1 PRINCIPLES OF OPERATION

In 1834 Jean Peltier discovered that by passing a current through two dissimilar conductors the junction of those materials will either absorb or release heat depending on the direction of the current flow. Thirteen years earlier Thomas Seebeck had discovered that current would flow when you placed a temperature gradient across the junction of two dissimilar metals. These two discoveries were the basis of thermoelectrics. With the advent of modern semiconductors thermoelectric devices became practical for real world applications and are now found in everything from consumer goods to spacecraft.

Your EIC Solutions Thermoelectric Air Conditioner operates on this principle so there is no compressor and no expensive, ozone depleting CFC's. EIC's air conditioners use Thermoelectric "modules" sandwiched between high performance aluminum heat sinks, high CFM axial fans, and a patented electronic design to "pump" the heat from the inside of your enclosure to the outside, without exposing your delicate electronics to any outside air or contaminants. See Figure 1.1.

EIC uses only the highest quality components in our air conditioners and you can expect years of trouble free cooling from these solid-state devices. Every unit we sell is backed by our one year parts and labor warranty.

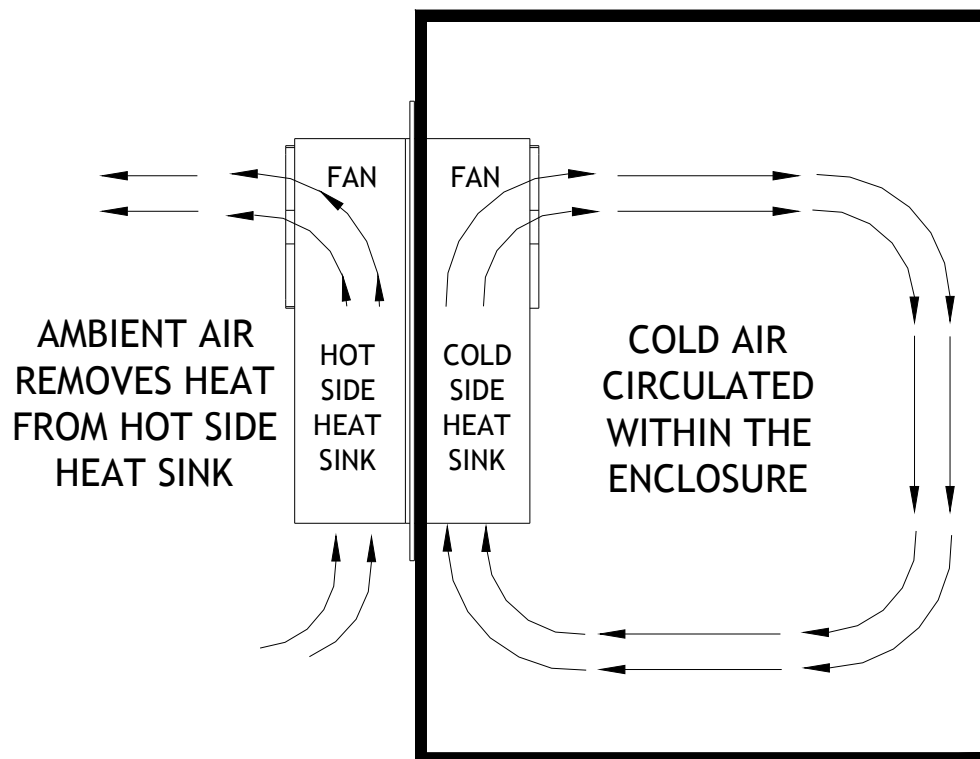


FIGURE 1.1

## 2. INSTALLATION

### 2.1 CHOOSING A LOCATION ON YOUR ENCLOSURE

When choosing a mounting location for your unit, be sure to keep air flows of both the interior and exterior heatsinks and fans in mind. Adequate clearance between the fans/heatsinks and nearby surfaces is required for unrestricted air flows which will ensure optimal performance and long, trouble free operation. The general rule is to allow a minimum of two inches between the fans or heatsinks and any surface. Refer to figure 1.1 for an air flow diagram.

Other considerations in deciding on a mounting location include; allowing access to thermostat (this will be inside the enclosure) if frequent adjustments are to be made; allowing access to the hot side heat sinks (this will be on the outside of the enclosure) for cleaning if the unit will be used in a harsh, dirty environment.

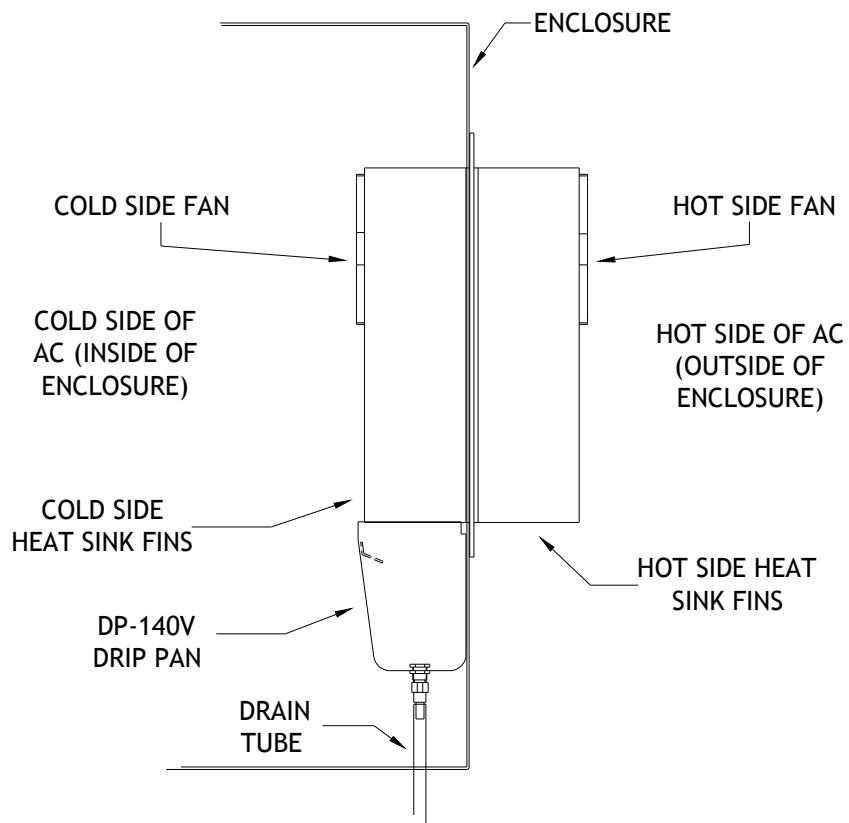
### 2.2 ORIENTATION

Your AC unit can be mounted either vertically on the front, rear or side of your enclosure. See Figure 2.1.

Vertically mounted 400 Btu units are always mounted with the exposed heatsink fins at the bottom and the fans at the top. (Fig. 2.1) Vertical installations often require the use of a Condensate Drip Pan (part # DP-140V) depending on a number of factors including internal enclosure temperatures and ambient temperatures, humidity levels, quality of enclosure seals, and frequency of enclosure opening. **We strongly recommend the use of a drip pan to protect the electronics from dripping condensate.** (Fig. 2.1)

Mounting the unit with the fins pointing to either side or straight up will cause condensate to drip in an uncontrolled manner, possibly damaging electronic equipment within the enclosure. If one of these orientations is the only possible configuration, contact the Engineering Dept. at EIC for a custom solution.

Issues regarding access should be considered and minimum clearances must be maintained as outlined in Section 2.1 of this manual.



**VERTICAL INSTALLATION OF AAC-140B-4XT, 400 BTU UNIT WITH DP-140V VERTICAL DRIP PAN AND DRAIN TUBE**

**FIGURE 2.1**

## 2.3 PREPARING THE ENCLOSURE

To mount the 400 Btu unit you will need to cut an opening in your enclosure and drill mounting holes. A cut out drawing (Fig. 2.3) showing the cut out size and hole locations has been included in this manual (see Fig. 2.3). You also received a cut out stencil with your air conditioner. The instructions for installing the air conditioner are printed below.

### TOOLS AND MATERIALS NEEDED:

- AAC-140B-4XT cut out stencil
- Center Punch
- Tape Measure and pencil
- Jigsaw or suitable alternative
- Electric drill
- # 29 drill bit (.136")
- # 8-32 tap and tap handle
- Twelve # 8-32 x 3/8" stainless machine screws (supplied)
- Twelve nylon washers (supplied)
- One neoprene gasket (supplied)

### CUT THE OPENING AND DRILL MOUNTING HOLES IN THE ENCLOSURE

1. Using the guidelines provided in the installation manual choose an appropriate location for the air conditioner on your enclosure.
2. Tape the cut out stencil to the enclosure in the location you have chosen.
3. Before marking, cutting or drilling check that the location meets the clearance requirements as specified in the installation manual.
4. Using a pencil, center punch or other method, mark the exact center point of each mounting hole on the enclosure. Also mark the four corners of the section to be cut out.
5. Remove the stencil and using a pencil or other method, connect the marks you made at the corners of the cut out, forming a rectangle.
6. Using the jigsaw, cut the opening in the enclosure.
7. Using the # 29 drill bit, drill a hole at each of the mounting hole marks you made earlier.
8. Using the 8-32 tap, tap each of the holes you have drilled.

## 2.4 INSTALLING THE AIR CONDITIONER

### INSTALL THE AIR CONDITIONER

1. Lay the air conditioner down with the cold side fan (side with the thermostat) facing up.
2. Take the supplied gasket and lay it down on the flange.
3. Take one of the supplied mounting screws and, from the under side of the flange, push it up through the top right mounting hole, and through the hole in the gasket. The gasket hole is undersized and will hold the screw in place. Repeat this on the top left mounting hole.
4. Set the AC unit in the hole you've cut in the enclosure, and using a screwdriver, carefully start the two screws you attached to the gasket to the tapped holes in the enclosure. Do not tighten these at this time.
5. Install the rest of the screws in the flange placing a nylon washer on each fastener and screw them into the tapped holes in the enclosure. Do not tighten them completely. If you have purchased a vertical drip pan, you will need to install the three long screws in the three center holes in the bottom flange.
6. Remove the two starter screws and place a nylon washer on each and reinstall.
7. Tighten all screws.

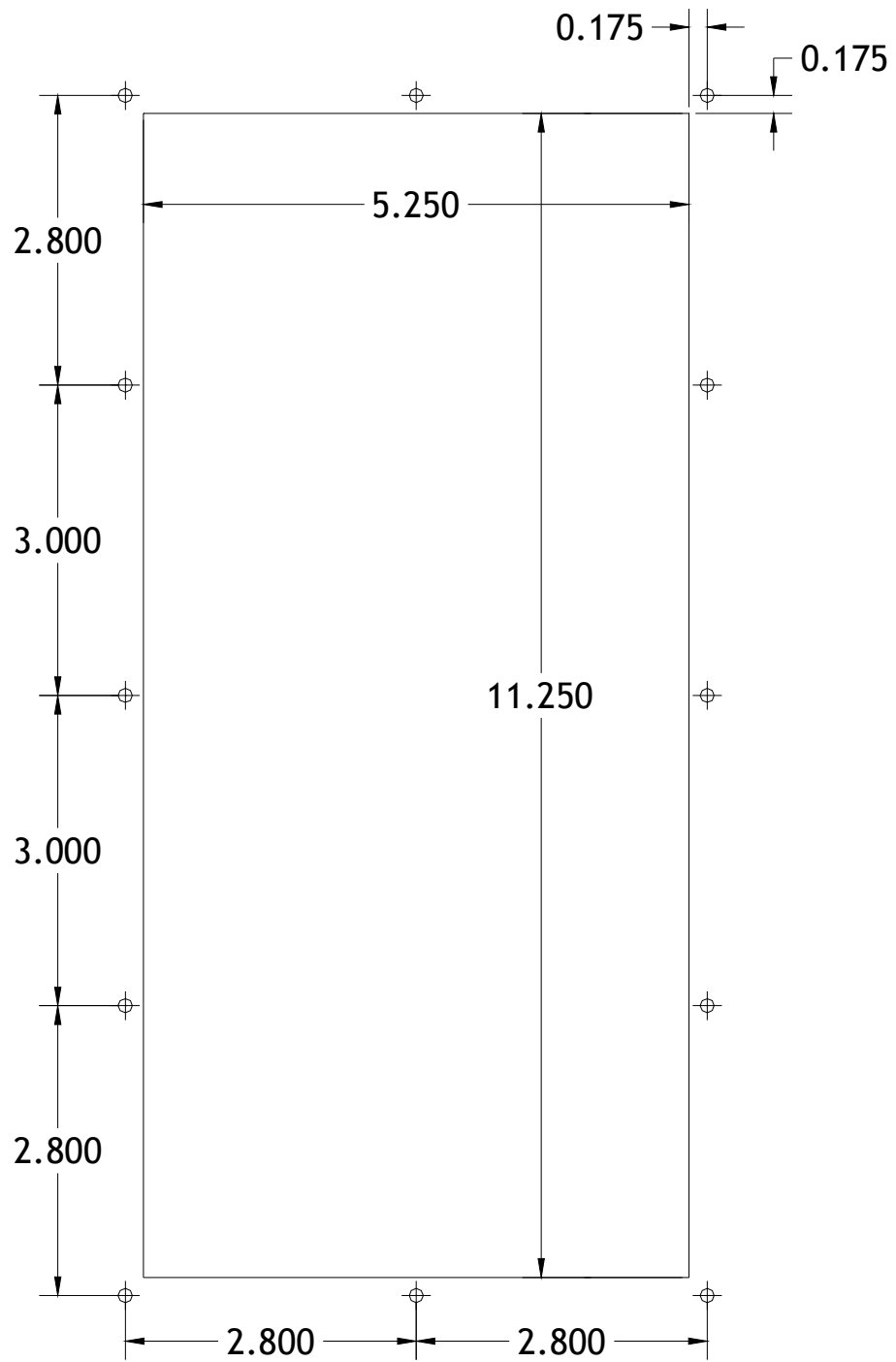


FIG. 2.3



## INSTALL THE DRIP PAN

1. Two hose fittings were provided with the drip pan, a right angle and a straight one. Choose one and install it on the drip pan. Be sure if you use the right angle fitting it is facing the desired direction prior to installing the drip pan.
2. There are three mounting holes in the drip pan, match these with the long mounting screws protruding into the enclosure at the bottom of the AC unit. Push the drip pan onto these screws.
3. Using the three 8-32 keps nuts provided, attach the drip pan to the air conditioner.
4. Attach the supplied PVC drain tube to the hose fitting on the drip pan. This tube should be routed to the bottom of the enclosure and fed through a 3/8" hole to the outside.

## APPLY POWER

Once the air conditioner is mounted, check the serial label and confirm the voltage required and then apply appropriate power as outlined below.

The unit is intended to be permanently connected. Connect the wires to an appropriate power source using standard safe wiring methods. Wire colors are as follows:

Black - line  
White - line/neutral  
Green - ground

A wiring diagram is shown in Fig. 2.4 below.  
amperage for a 220 VAC unit is 1.4 amps.

Amperage for a 120 VAC unit is 2.0 amps;



Figure 2.4

Upon applying power to the air conditioner the fan on the cold side (inside the enclosure) will come on. The hot side fan (outside the enclosure) may also run depending on where the thermostat is set. The cold side fan always runs to circulate air within your enclosure thereby eliminating any “hot spots”. The hot side fan will only run when the air conditioner is cooling - they are “pumping” the heat from the inside of your enclosure to the outside air.

# 3. OPERATION

## 3.1 THERMOSTAT SET POINTS AND HEATING/COOLING UNITS

### SETTING THE THERMOSTAT

Your EIC air conditioner is equipped with an adjustable thermostat. The set point you choose should be based on the desired internal temperature of the enclosure. The air conditioner will run until the set point temperature is achieved within the enclosure and then the hot side fans and the thermoelectric cooling modules will shut down. The cold side fan will continue to run, circulating the air to maintain a uniform temperature within the enclosure.

### HEATING AND COOLING UNITS

If you purchased an HC unit (heating and cooling), the heater operation is controlled by a fixed-point thermostat. This thermostat is set to turn the heaters on when the temperature within the enclosure falls to approximately 45° F and turn the heaters off when the temperature rises to approximately 55° F.

The cooling operation is controlled by the adjustable thermostat just as it is with a cooling only unit. To avoid having the heating and cooling on at the same time, do not set the cooling thermostat below 70° F.

## 3.2 MAINTENANCE

### MAINTENANCE

EIC Thermoelectric Air Conditioners are virtually maintenance-free. The only time maintenance is required is when a unit is installed in an extremely dirty environment. In these cases, the hot side heat sinks (outside the enclosure) should be inspected regularly for a build-up of dust or dirt. If a build-up is present on the heat sink fins, it can be easily removed as follows:

1. Disconnect the power from the unit.
2. Dry dust/dirt can be removed using compressed air to blow out the heat sinks. Do not direct any high-pressure air at the fans.
3. Your AAC-140B-4XT air conditioner is rated NEMA 4X and is designed to allow for water wash down of the hot side of the unit, which is outside of the enclosure **(never the cold side which is inside the enclosure)**. A pressure washer can be used to carefully clean the hot side heat sink fins when compressed air will not provide adequate cleaning. Never direct high-pressure water at the fans. Never direct high-pressure water at the joint formed by the mounting flange, gasket and enclosure. Never allow the cold side of your unit to get wet

Keeping the hot side heat sink fins free from any insulating build-up of dirt or dust will ensure long, trouble-free operation of your air conditioner.

**ONLY NEMA 4X UNITS, WITH MODEL NUMBERS CONTAINING “4XT”, ARE DESIGNED FOR THE HOT SIDE OF THE AIR CONDITIONER (OUTSIDE THE ENCLOSURE) TO TOLERATE EXPOSURE TO WATER. NEVER EXPOSE THE COLD SIDE OF THE AIR CONDITIONER (INSIDE THE ENCLOSURE) TO WATER.**

If you have any questions about any aspect of your EIC air conditioner, don't hesitate to call us at the numbers listed below.