

# EIC SOLUTIONS, INC.

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# EIC SOLUTIONS

**THERMOELECTRIC AIR CONDITIONER INSTALLATION AND  
OPERATION MANUAL**

**FOR 1500 BTU MODEL #'S**

**AAC-145A-4XT  
AAC-145A-4XT-HC  
AAC-145A-4XT-XXXXX**

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

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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 and high CFM axial fans 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.

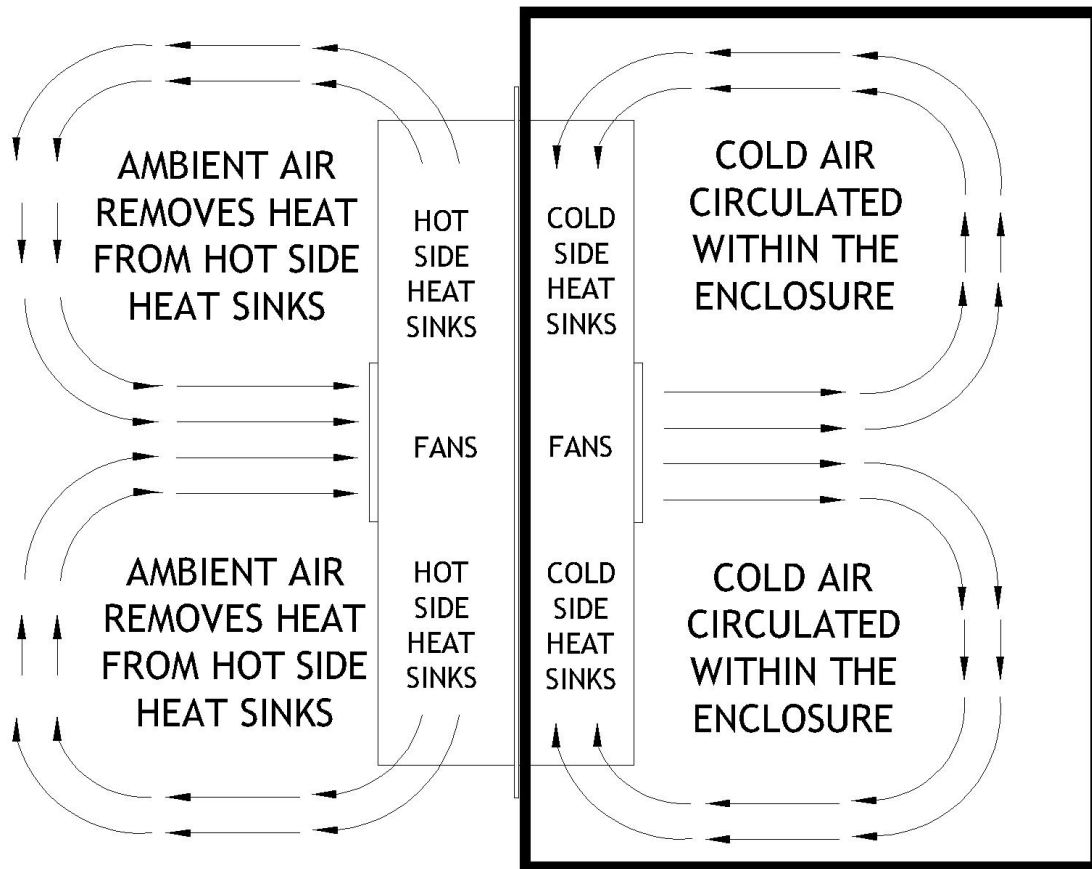


FIGURE 1.1

## 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

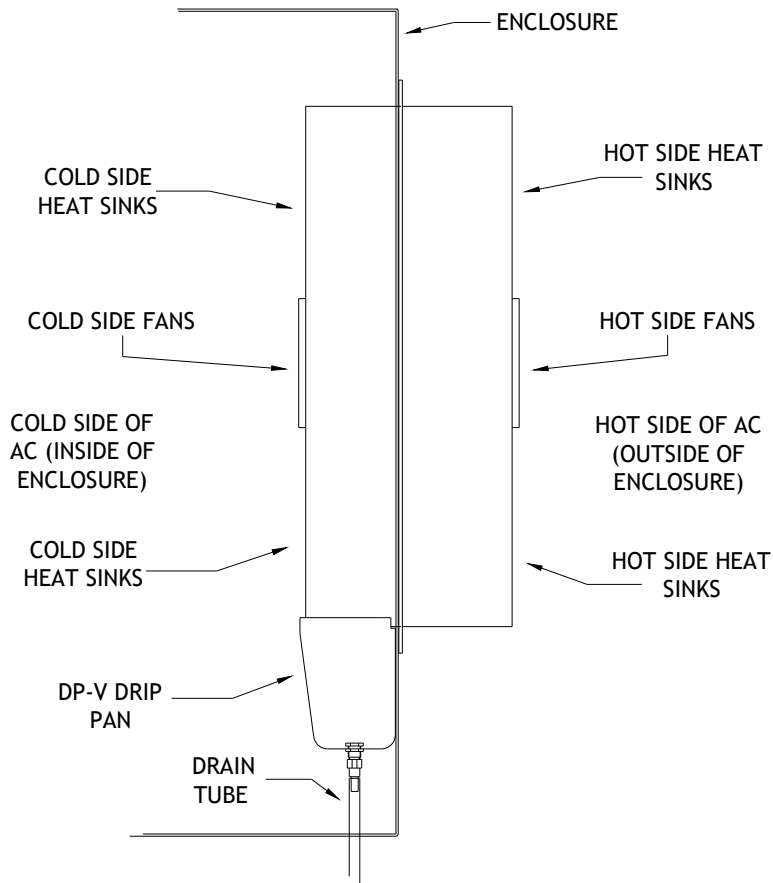
Your AC unit can be mounted either vertically on the front, rear or side of your enclosure or horizontally on the top of your enclosure. See Figure 2.1 and 2.2.

Vertically mounted 1500 Btu units are always mounted with the exposed heatsink fins facing up and down, never left and right. (Fig. 2.1) Vertical installations often require the use of a Condensate Drip Pan (part # DP-V) 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 horizontally on the side of an enclosure, will cause condensate to drip in an uncontrolled manner, possibly damaging electronic equipment within the enclosure. If this orientation is the only possible configuration, contact the Engineering Dept. at EIC for a custom solution.

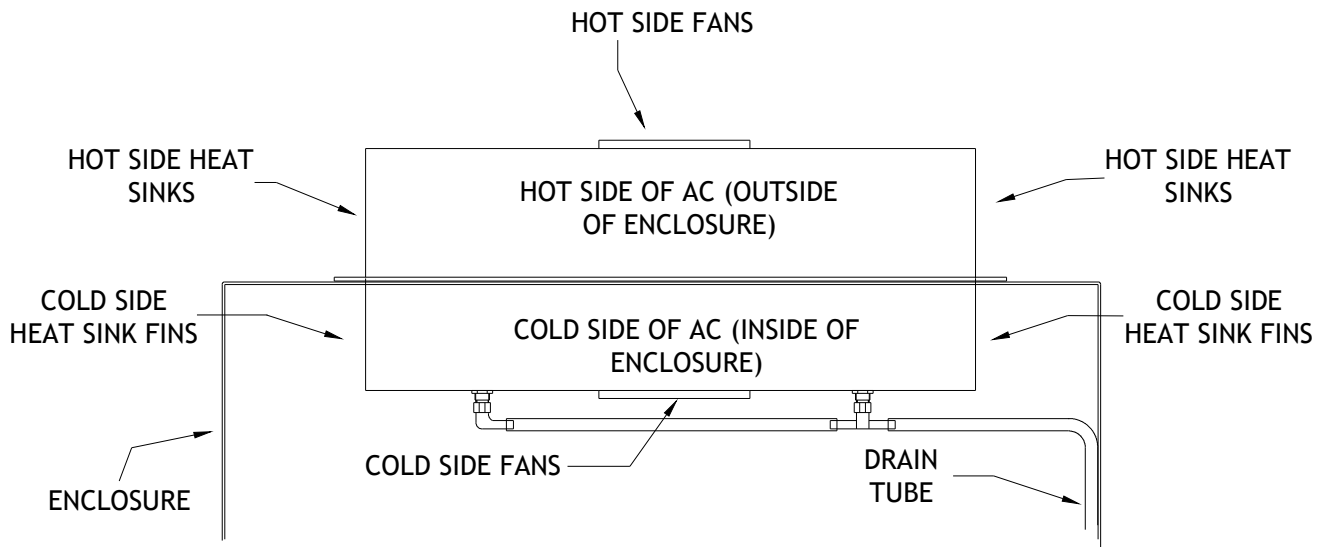
**Horizontally mounted 1500 Btu units always require a factory installed drip pan (part # DP-145H) to prevent dripping condensate from damaging electronic equipment.** (Fig. 2.2)

In either orientation, issues regarding access should be considered and minimum clearances must be maintained as outlined in Section 2.1 of this manual.



**VERTICAL INSTALLATION OF 1500 BTU UNIT WITH  
DP-V VERTICAL DRIP PAN AND DRAIN TUBE**

**FIGURE 2.1**



**HORIZONTAL INSTALLATION OF 1500 BTU UNIT WITH  
INTERNALLY MOUNTED DP-145H DRIP PAN AND DRAIN TUBE**

**FIGURE 2.2**

## 2.3 PREPARING THE ENCLOSURE

To mount the 1500 Btu unit you will need to cut an opening in your enclosure and drill mounting holes. Cut out drawings showing the cut-out size, hole locations, and hole sizes have been included in this manual (see Appendix). The instructions for installing the air conditioner are printed below.

### TOOLS AND MATERIALS NEEDED:

- AAC-145A-4XT cut out stencil
- Center Punch
- Tape Measure and pencil
- Jigsaw or suitable alternative
- Electric drill
- # 29 drill bit (.136") (Not used for extension frame option)
- # 8-32 tap and tap handle (Not used for extension frame option)
- .203" drill bit (Extension frame option only)
- # 8-32 x 3/8" stainless machine screws (supplied)
- 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 appropriate 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 (standard frame models only).

## 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 are using a vertical drip pan, you will need to install the long screw in the center hole in the bottom flange.

6. Remove the two starter screws and place a nylon washer on each and reinstall.
7. Tighten all screws.

#### INSTALL THE DRIP PAN

1. Two hose fittings were provided with the drip pan, a right angle and a straight fitting. 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 holes with the long mounting screws protruding into the enclosure at the bottom of the AC unit. Push the drip pan onto this screw.
3. Using the 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.
5. If you mount the unit horizontally, the drip pan is pre-installed and you will only need to remove the existing hole plug and install the hose fitting and PVC drain hose.

#### 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.

##### Universal voltage units:

For 120 VAC power plug the supplied IEC 320-C13 to NEMA 5-15P cord into the unit. Plug the other side into a standard 120 volt, grounded outlet. Amperage for the unit at 120 VAC is 6.0 amps.

For 220 - 240 VAC power either remove the NEMA 5-15P plug from the supplied power cord for a non-supplied plug or use a non-supplied IEC 320-C13 cord. Amperage for the unit at 220 VAC is 4.0 amps.

##### DC voltage units:

This unit will have a supplied power cord. Connect the wires to an appropriate power source using standard safe wiring methods. Wire colors are as follows:

- Red - Positive
- Black - Negative

If you purchased a Digital Temperature Controller with your AC unit, a separate wiring diagram has been provided which will show the correct method of applying power to your air conditioner.

Upon applying power to the air conditioner turn the power switch to the ON position. 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 when the unit is powered on to circulate air within your enclosure thereby eliminating any "hot spots". The hot side fan will only run when the air conditioner is cooling.

# 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 in degrees Fahrenheit. 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. Cooling will prevent the heating function from turning on. For example, if the cooling thermostat is set to 40 °F then the unit will cool to 40 °F, then switch directly to heating until the cooling turns back on.

If the air conditioner is operating in an ambient environment that may drop below 45F, it is not recommended that the cooling thermostat be set lower than 50F. Setting the thermostat lower than 50F in this environment could result in ice forming on the cold side of the unit.

## 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-145A-4XT air conditioner 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.



**NEVER EXPOSE THE COLD SIDE OF THE AIR CONDITIONER (INSIDE THE ENCLOSURE) TO WATER.**

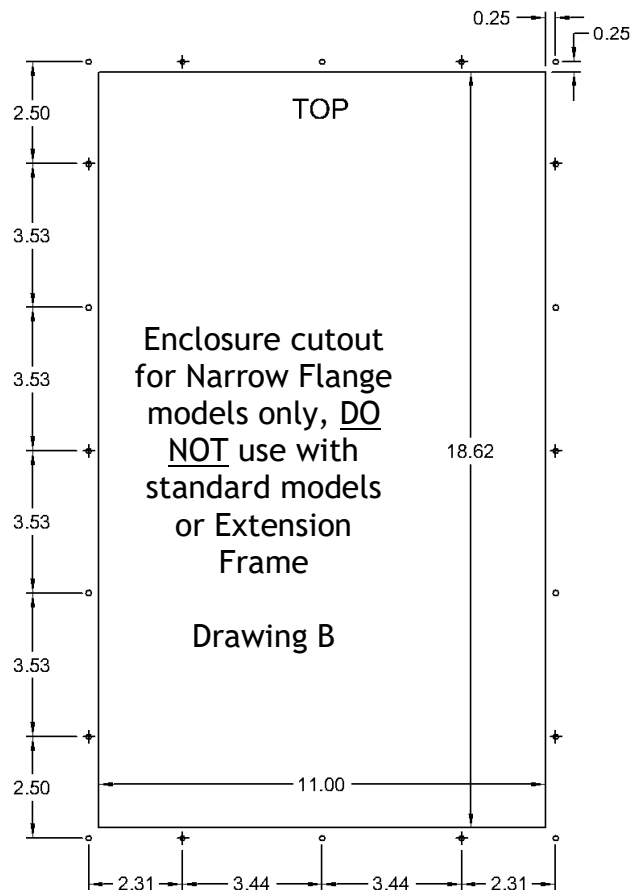
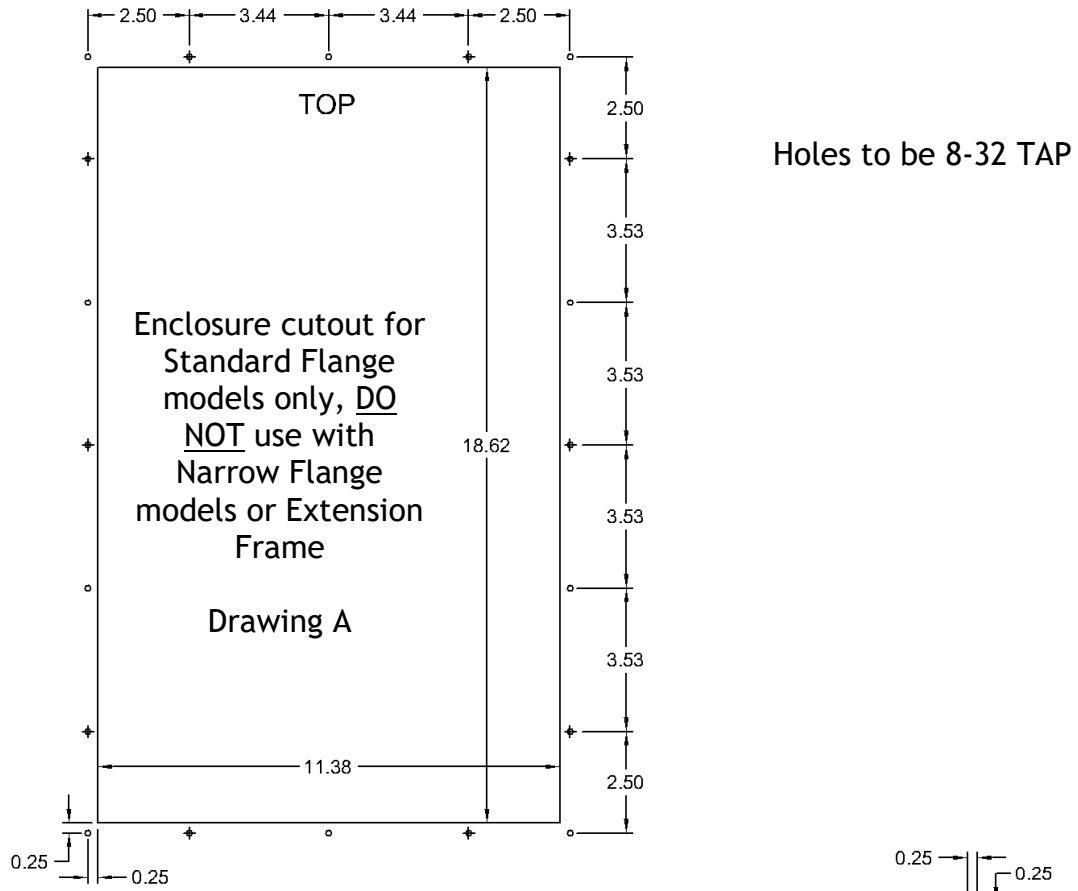
If you have any questions about any aspect of your EIC air conditioner, don't hesitate to call us at the numbers listed below.

# 4. SPECIFICATIONS

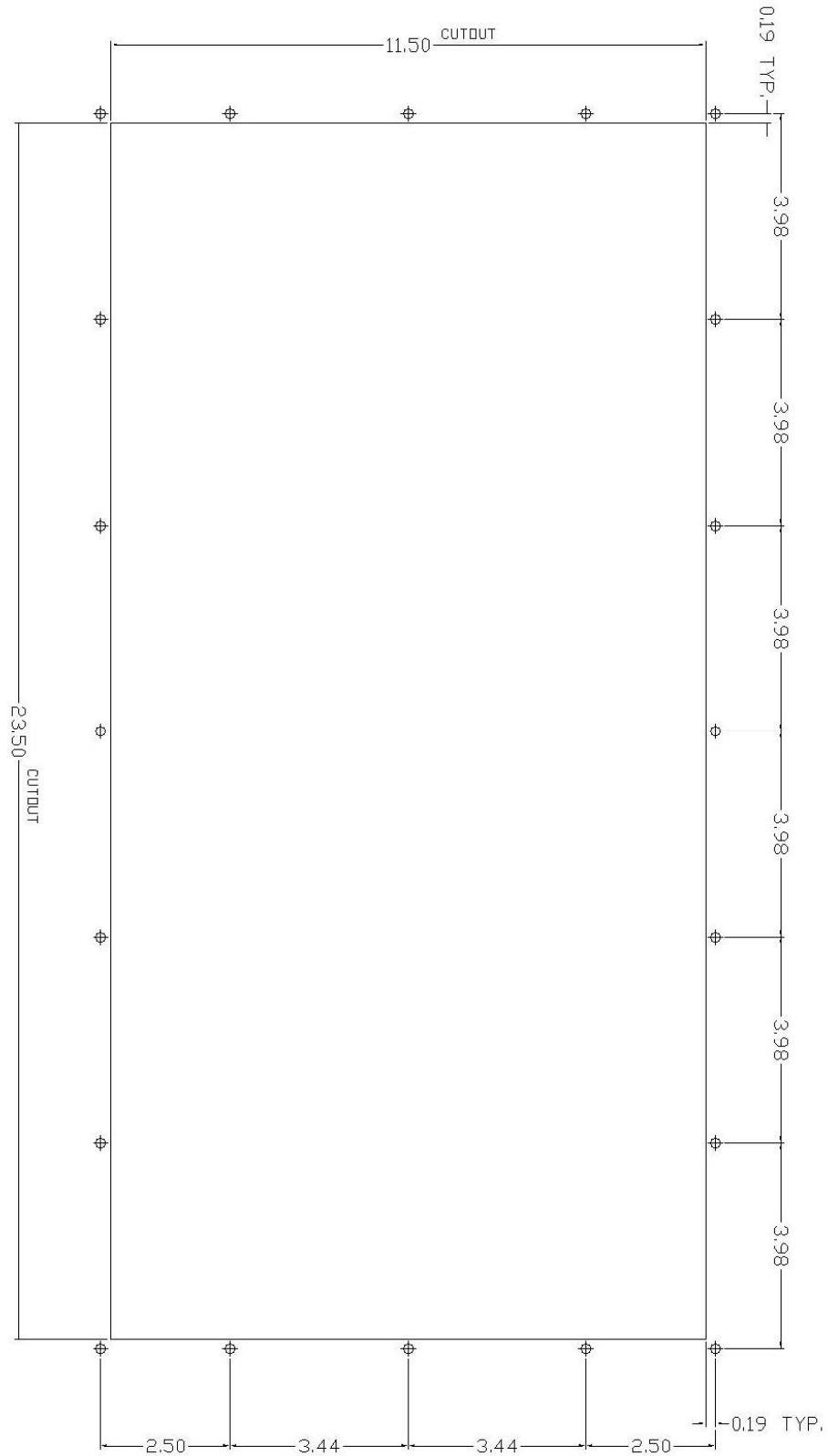
## 4.1 STANDARD SPECIFICATIONS

|                                   |                                    |
|-----------------------------------|------------------------------------|
| Cooling Power                     | 1700 BTU/hr.<br>500 W              |
| Available Voltage                 | 120 / 220 V                        |
| Input Voltage Range               | 100 - 240 V                        |
| Current                           | 6.0 A                              |
| Heating Capability -HC Units Only | 1360 BTU/hr.<br>400 W              |
| Weight                            | 25 kg.<br>55 lbs.                  |
| Cold Side Airflow                 | 95 cfm<br>160 m <sup>3</sup> /hr.  |
| Hot Side Airflow                  | 140 cfm<br>235 m <sup>3</sup> /hr. |
| Sound Level at 1 meter            | 62 dBA                             |
| Operating Temperature Range       | -4 to 140 °F<br>-20 to 60 °C       |
| Storage Temperature Range         | -4 to 185 °F<br>-20 to 85 °C       |
| Cooling Thermostat Accuracy       | ±1.0 °F<br>±0.6 °C                 |

APPENDIX A AND B



# APPENDIX C



Enclosure cutout for 1500 BTU air conditioner  
EXTENSION FRAME ONLY

Holes to be .203"