

EIC SOLUTIONS, INC.



EIC SOLUTIONS

**THERMOELECTRIC AIR CONDITIONER INSTALLATION AND
OPERATION MANUAL**

FOR 400 BTU MODEL #'S

**AAC-140-T
AAC-140-4XT
AAC-140-T-HC
AAC-140-4XT-HC
AAC-140-XXXX**

***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, 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.

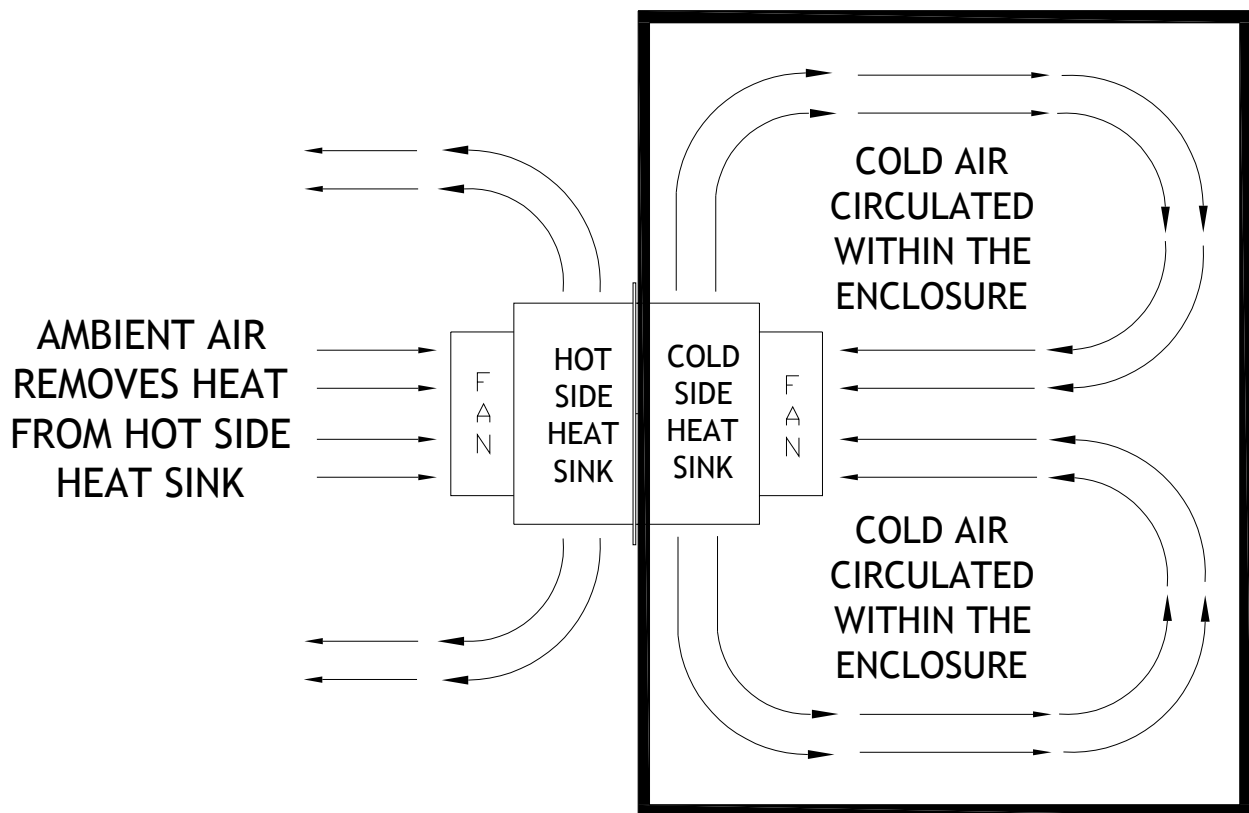


FIGURE 1.1

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.

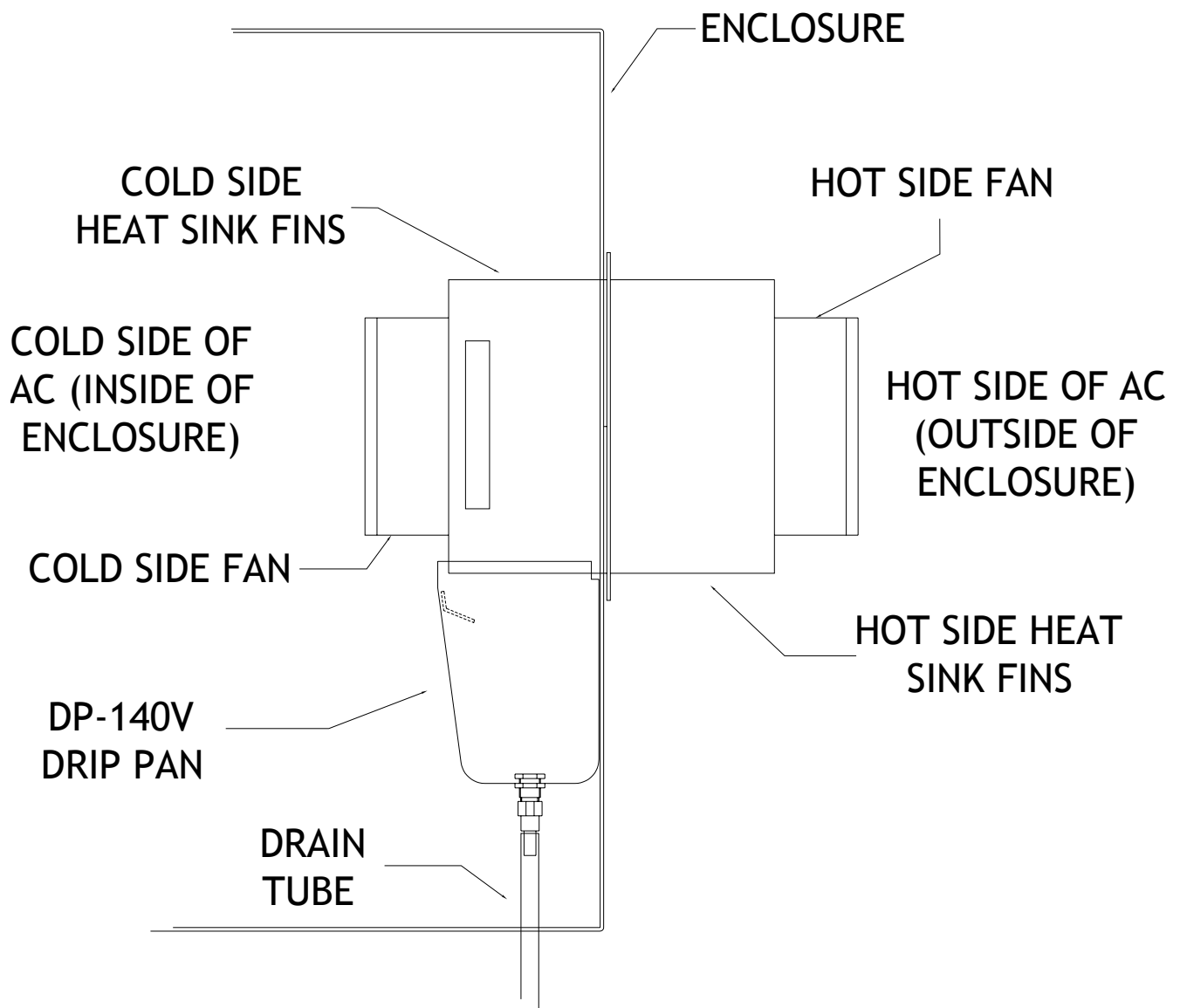
2.2 ORIENTATION

Your 400 Btu, DC powered Air Conditioner unit is designed to be 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 top and bottom and the terminal on the side. (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 temperature, ambient temperature, 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 will cause condensate to drip in an uncontrolled manner, possibly damaging the air conditioner or 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.

Model AAC-140, DC powered, 400 Btu units are not designed to be mounted on the top of an enclosure. Doing so will allow condensate to drip in an uncontrolled manner from the air conditioner on the inside of the enclosure damaging the air conditioner and the electronics within the enclosure.



VERTICAL INSTALLATION OF AAC-140, 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 showing the cut out size and hole locations has been included in this manual (see Appendix A, B). The instructions for installing the air conditioner are printed below.

TOOLS AND MATERIALS NEEDED:

- AAC-140 cut out stencil (cut out is the same for all types of this model)
- 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)
- .1875" 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. Before starting the installation be sure the power and thermostat wires are connected to the terminal strip on the side of the unit and that they are long enough to reach both the power source and the desired thermostat mounting location. This will eliminate having to access the terminal strip once the unit is installed. See the "Apply Power" section of this manual on page 7.
2. Lay the air conditioner down with the cold side fan (side with the terminal strip) facing up.
3. Take the supplied gasket and lay it down on the flange.
4. 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.
5. 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.
6. 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 long screw in the center hole in the bottom flange.
7. Remove the two starter screws and place a nylon washer on each and reinstall.
8. Tighten all screws.

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 is one mounting hole in the drip pan, match this hole with the long mounting screw protruding into the enclosure at the bottom of the AC unit. Push the drip pan onto this screw.
3. Using the 8-32 keps nut 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 AND MOUNT THE THERMOSTAT

AAC-140 air conditioners are DC powered. They are designed to operate on 24 - 28 volts, DC. Once the air conditioner is mounted, refer to the schematic supplied (see Appendix C, D) with the unit for proper power wiring.

Amperage for 24 VDC unit is 4 amps

Amperage for 28 VDC unit is 5 amps

For other voltages you will receive a separate wiring diagram showing the correct method of applying power.

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 particular air conditioner.

The unit is supplied with a separate thermostat that should be mounted inside the enclosure and wired to the unit per the supplied schematic. The thermostat can be mounted in any orientation. The ideal location for mounting the thermostat is near the particular electronic item you'd like to protect. Mounting the thermostat directly over a heat source may cause the AC unit to run continually causing the enclosure temperature to drop below the thermostat set point. Conversely, mounting the thermostat in the cool air stream from the AC unit may cause the AC unit to shut down before the main part of the enclosure has been cooled to the thermostat set point.

If you purchased a heating and cooling unit you will receive a second thermostat that should be mounted following the same guidelines used in mounting the cooling thermostat above.

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 fans 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 can be controlled by a second adjustable thermostat. **You must set the heating thermostat set-point at least 10 degrees lower than the cooling thermostat set-point to prevent both the heating and the cooling from operating at the same time.**

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 fan.
3. NEMA 4X models of our air conditioners are 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. Never direct high-pressure water at the fan or the joint formed by the mounting flange, gasket and enclosure. Never allow the cold side of your unit to get wet. Always check your serial label before proceeding with a water wash down.

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.

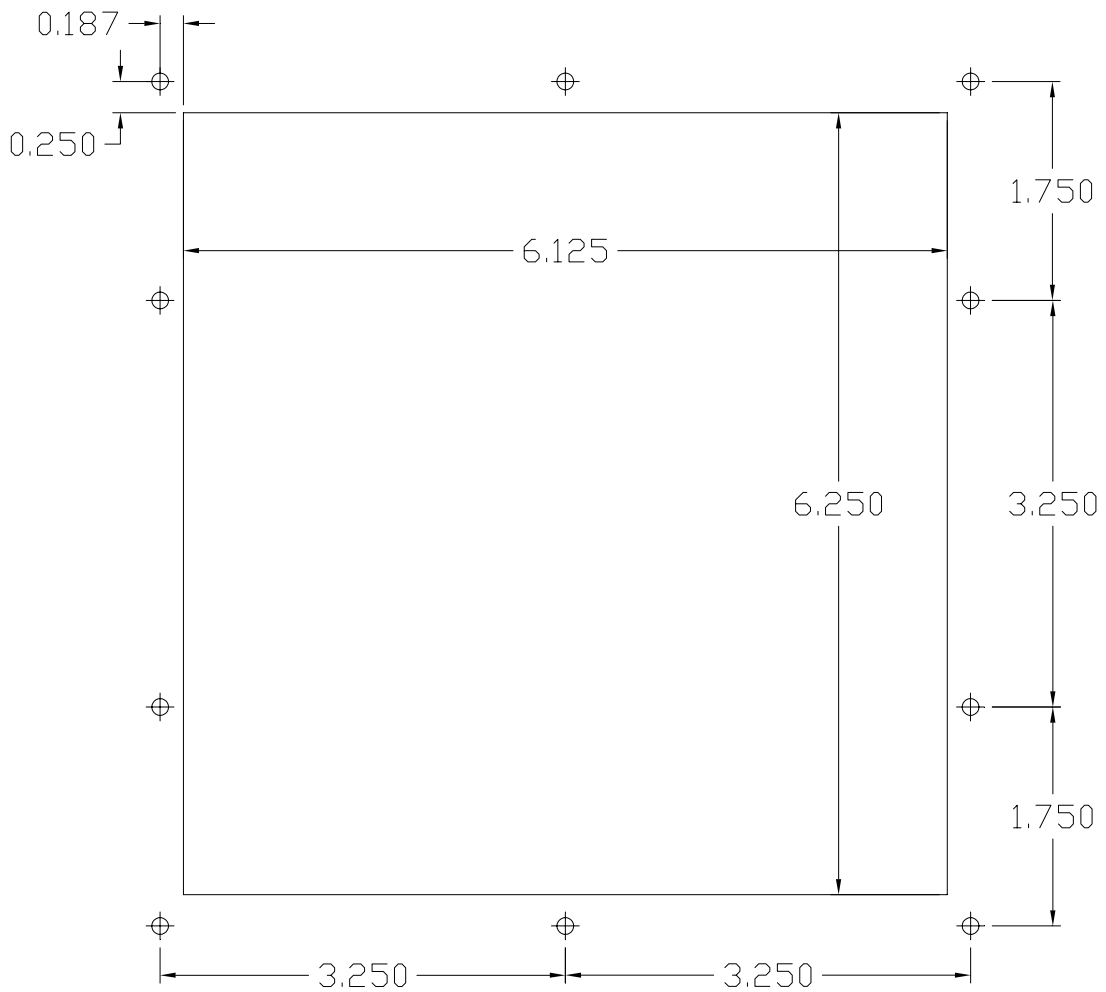
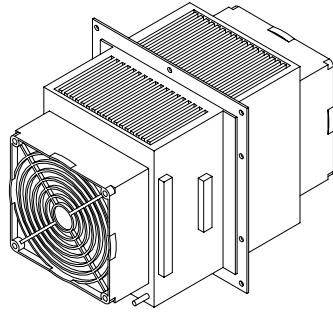
ONLY NEMA 4X UNITS, WITH MODEL NUMBERS BEGINNING WITH “AAC-140-4XT”, ARE DESIGNED FOR THE HOT SIDE OF THE AIR CONDITIONER (OUTSIDE THE ENCLOSURE) TO TOLERATE EXPOSURE TO WATER.

NEMA 12 UNITS, WITH MODEL #'S BEGINNING WITH “AAC-140-T”, ARE NOT DESIGNED TO BE EXPOSED TO WATER AND SHOULD NEVER BE WASHED DOWN.

NEVER EXPOSE THE COLD SIDE OF ANY 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.

APPENDIX A

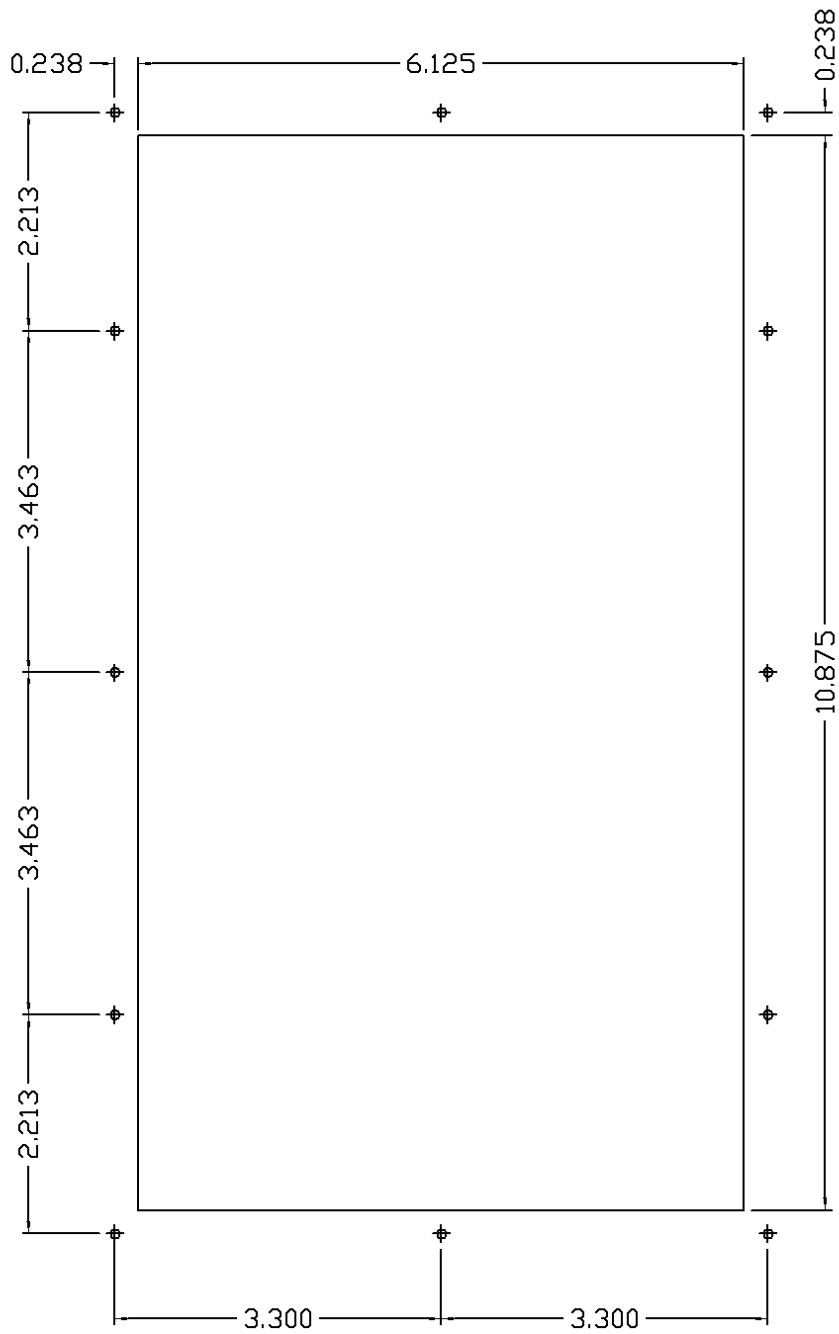


Enclosure cutout for 400 BTU air conditioner
NON-EXTENSION FRAME

Holes to be 8-32 TAP

APPENDIX B

TOP



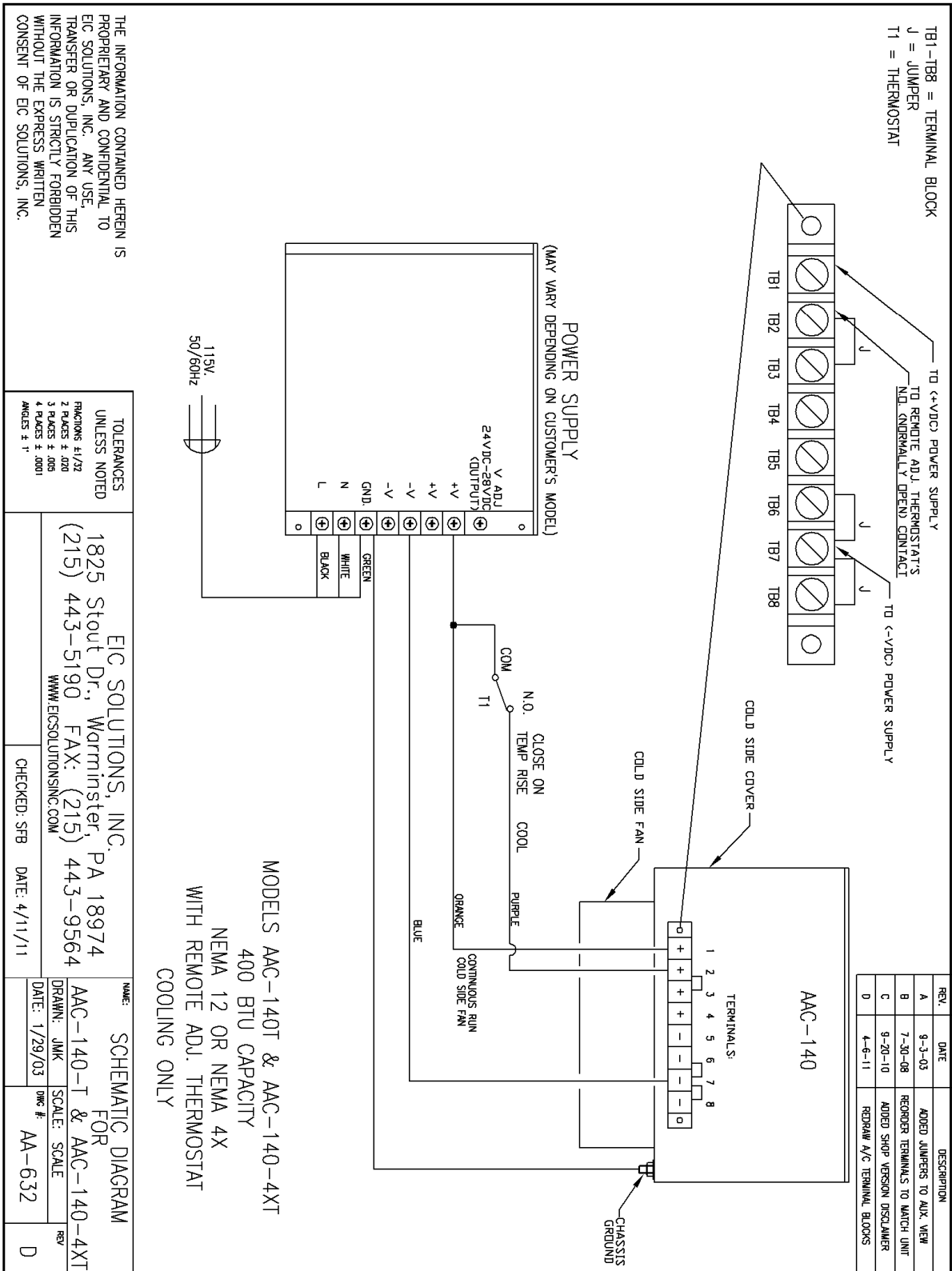
Enclosure cutout for 400 BTU air conditioner
EXTENSION FRAME OPTION ONLY

Holes to be .1875" Clearance

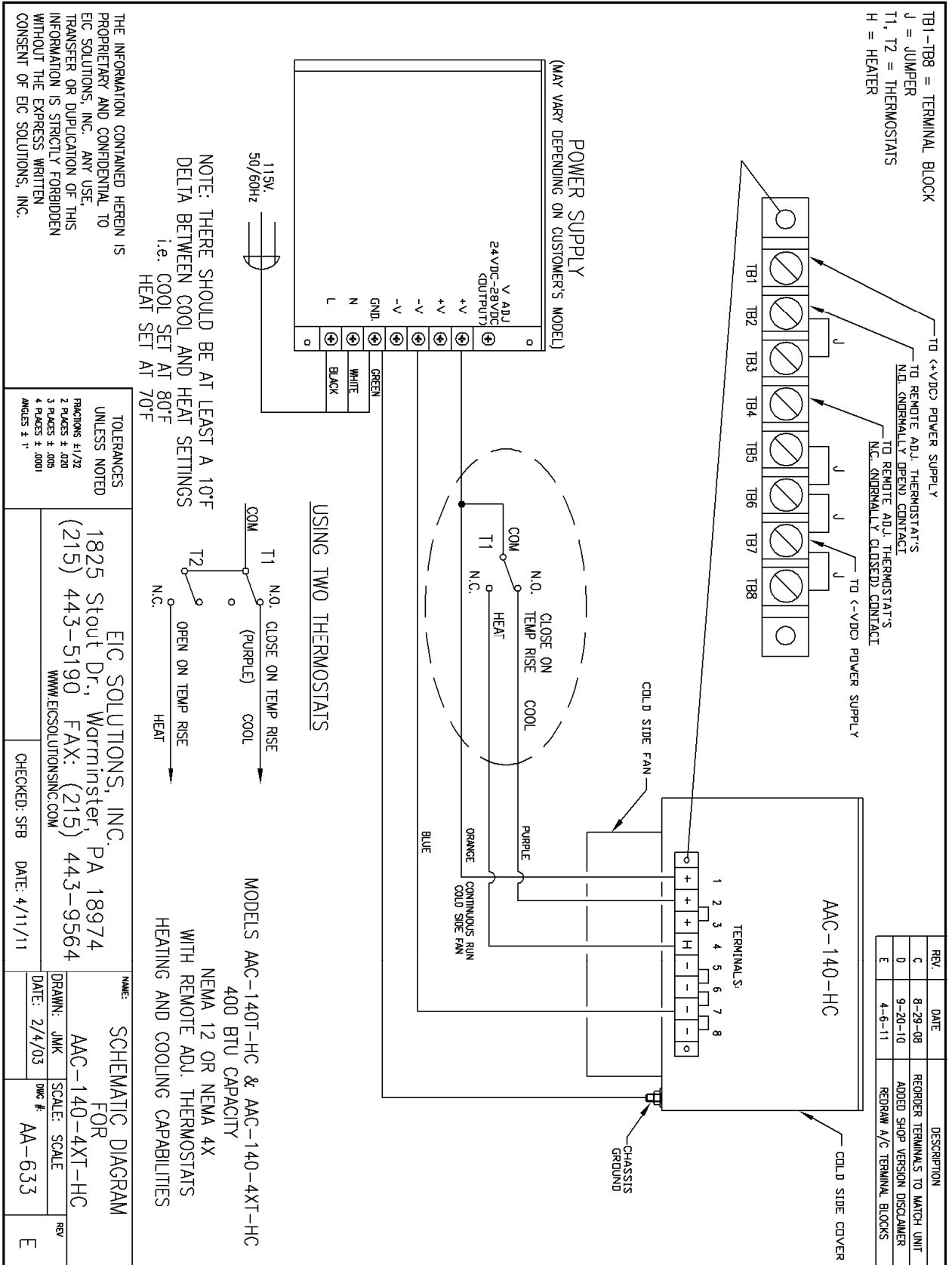
APPENDIX C

Wiring for 400 BTU Models without heat option

APPENDIX D



Wiring for 400 BTU Models with heat option



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TOLERANCES UNLESS NOTED

FRACTIONS 1/16, 1/32

2 PLACES ± .005

3 PLACES ± .005

4 PLACES ± .0001

ANGLES ± 1°

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NAME: SCHEMATIC DIAGRAM FOR AAC-140-4XT-HC

DATE: 2/4/03

SCALE: SCALE

CHK #: AA-633

REV E

CHECKED: SFB DATE: 4/11/11