Thermal Edge Inc.
TEMPERATURE CONTROL SOLUTIONS FOR ELECTRICAL ENCLOSURES

Enclosure Air Conditioner Sizing Calculations

There are options to choose from when considering the controlling of temperature issues inside your electrical enclosures.

- **Filtered Fan Packages** are not closed loop and therefore introduce environmental conditions into your enclosure. They can lower the enclosure temperature only if the ambient temperature is lower than the enclosure temperature.
- **Air to Air Heat Exchangers** also work when the ambient temperature is lower than the enclosure temperature and they are closed loop so as to prevent environmental particulate from entering your enclosure.
- **Ventilation** is a passive way to transfer heat to the outside but offer no real forced cooling and they are open to the environment.
- **Closed Loop, Thermostatically Controlled Air Conditioners** provide the ultimate protection and temperature controls. Our units will prevent the mixing of ambient conditions and your enclosure atmosphere and maintain a tight tolerance of temperature control including both cooling and fully integrated heat where needed.

Sizing Parameters

Watts = Heat energy produced by electronic equipment

Surface Area = surface area of the enclosure that will allow heat transfer (in square feet)

$$\frac{(H \times W) \times 2 + (H \times D) \times 2 + (W \times D)}{144 \text{ square inches}}$$

*Eliminates surface not allowing heat transfer

ΔT = Difference between the maximum temperature outside the enclosure and the desired maximum temperature inside the enclosure.

Calculations

1. Determine the internal heat dissipation of the enclosed equipment in BTU.
   BTU per hour = Watts x 3.414

2. Determine external heat transfer.
   BTU per hour = Surface area x 1.25 x ΔT

Note: The enclosure internal temperature must be at least 5° higher than the ambient temperature to select a heat exchanger. This will result in a negative BTU per hour in step 2

3. Air Conditioner Selection
   Determine the required cooling capacity in BTU per hour.
   BTU per hour = (The sum of Step 1 and Step 2) x 1.1 safety factor

   Select the air conditioner that meets or exceeds the cooling capacity in BTUH.

NOTE: These calculations are valid for indoor conditions only and for applications when the ambient temperature exceeds the desired temperature of the enclosure's internal temperature.

Please consult the factory for outdoor applications.