THERMAL MANAGEMENT AC & HEAT EXCHANGER CALCULATION SHEET

NOTICE: Thermal Management Products are not returnable

The following calculations have been developed for standard uninsulated metal NEMA rated enclosures for indoor applications.

Sizing Parameters

Watts = Heat Energy Produced by Electronic Equipment
Surface Area in Square Feet = Surface Area of the Enclosure that will Allow Heat Transfer

Measurements in Inches

$$\frac{[(H \times W) \times 2] + [(H \times D) \times 2] + [(W \times D) \times 2]}{144 \text{ sq. inches}}$$

$\triangle T$ = Difference between the maximum temperature outside the enclosure and the desired maximum temperature inside the enclosure.

Calculations

STEP 1: Determine the Internal Heat Dissipation of the enclosed equipment in BTU

BTU per Hour =   Watts x 3.413

STEP 2: Determine External Heat Transfer

BTU per Hour =   Surface Area (sq. ft.) x 1.25 x $\triangle$T

Note: The enclosure internal temperature must be at least 5 degrees Fahrenheit higher than the ambient temperature to select a Heat Exchange/ This will result in a negative BTU per hour in Step 2.

STEP 3: Determine the Required Cool Capacity in BTU per hour

**BTU per Hour =   Sum of Step 1 and Step 2
x 1.1 Safety Factor**

Air Conditioner Selection: Select the air conditioner that meets or exceeds the cooling capacity in BTU per hour from Step 3.

Heat Exchange Selection: Select the heat exchanger that meets or exceeds the required cooling capacity in Watts per Degree Fahrenheit. To obtain Watts per Degree Farhenheit, use the following formula:

Watts per °F = $\dfrac{\text{BTU per Hour (Step 3)}}{\text{(Max. Internal Temp - Max. Outside Temp.) x 3.413}}$