

“Saving Energy with your NEMA Enclosures.”

Over the past few decades, electronics for automation, process controls, drives and PLC's have become more common in NEMA enclosures. The thermal management of these electronic enclosures has become very important in protecting expensive components, as well as the awareness of the cost of cooling these enclosures.

NEMA cabinets are used for protection from the harsh environments encountered in many industries, both indoor and outdoors. Without some form of cooling or heat removal, problems occur with sensitive electronics. Most electronics can handle temperatures between 40c and 50c, some more. It's always a good idea to check the manufacturer specifications regarding the heat load of the device being used; this will help in making the correct thermal decision for your applications.

The following are the most popular choices in the marketplace with some general pricing considerations and assumptions needed to make a good decision.

First, is to purchase a cabinet large enough that can use natural convection to remove the waste heat through the cabinet. You might not have the real estate for this option. This could potentially cost more money than cooling because of the cost of the metal cabinet.

Second, would be the fan and filter. This option is the most economical of all but is not preferred in dirty environments. The extra maintenance needed to clean the electronics within the cabinet defeats the cost savings and puts expensive electronics at risk.

Third, is the thermoelectric device. This solid state air conditioner provides cooling while using one watt of power to remove one watt of heat. They are typically used in small cabinets and are not very efficient.

Next are the air compressor coolers. They use plant air to create a “Cyclone” effect that cools the inside of the cabinet. The cost of plant air should be considered and if the air used is clean. They can produce an oil mist inside the cabinet.

The panel air conditioner is used more than any other method. When electronics first made their way into the plant, air conditioners had to be used because the thermal thresholds of the electronics required that the temperatures be below ambient conditions.

Now, however, the components are made to withstand more heat. Air conditioner units cost more to install and maintain and use more energy than most other options. The use of thermostats is common to regulate the operation of use in certain conditions.

Finally you have the heat exchangers or cabinet coolers. These devices are being used more and more because of energy savings and low maintenance. Most heat exchangers are designed to be sealed from dust in the air and some can protect against moisture and corrosion. They are generally easy to install and very reliable. They also can be controlled by a thermostat. Air to water heat exchangers can be used for high ambient applications where water is available.

For all outdoor applications sun load should be a consideration and most enclosure companies or thermal management companies can help with this calculation. Generally it's a good idea to consider a sun shield.

When you look at an application as an integrator or end user be mindful of the safety factors that may or may not be included in the thermal specifications. They are sometimes not necessary and can cost you energy and dollars.

Energy savings has always been a factor, but more and more a necessity with the high cost of oil and commodities in today's world. With some consideration and effort you can make the right choice for your application and customers.

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