

## **Control Issues: Thermal Management for Parking Facility Electronics**

The extraordinarily high volume of electronics in the world, their ever-smaller packaging requirements, and their increasing performance strengths always put the spotlight on the primary technology; but it is often the smaller, supportive technological innovations that really make electronics succeed.

Lighting may be more energy-efficient and stronger each year, and computers and server racks may offer dramatically faster processing speeds every two to three years, but none of these electronics succeed without thermal management controls.

Parking operations are particularly sensitive to this need. Their electronic systems (lighting, security, computers, etc.) face many challenges. For example, parking structures are generally exposed or at least partially exposed to the elements, which adds high heat, high humidity, freeze-thaw cycles, and other environmental challenges. Wind and automotive pollution add oil/vapor and particulate contamination risks. Enclosures on devices provide a fair amount of protection, but inside the enclosure the fluctuations in temperature and moisture present significant survival challenges to electronic circuitry.

Ultimately, these systems will not operate efficiently and will not be able to function in the long term without proper thermal management.

### **THE NEED FOR FLEXIBLE SYSTEMS**

Thermal management devices that protect electronics are, of course, often electronics in and of themselves. These electronic control packaging solutions are highly engineered to perform their specific function, which is to accurately monitor and respond to the many environmental fluctuations that impact enclosed electronic systems.

These thermal management tools heat, cool, ventilate, illuminate, and control temperature and humidity. Their small size and utilitarian function may make them seem simple, but they aren't. They are essential. They protect traffic control systems, lighting systems, ATMs, ticketing machines, telecommunications towers, and much more.

Georgia-based STEGO, Inc. produces a number of thermal management controls for enclosed electronics. Their product range exemplifies the variety of applications on the market and their capabilities underscore not just the impact they can have on an electronics enclosure but on the overall operations of a facility such as a parking site.

The STEGOJET, for example, is a compact powerful built-in-fan that is designed to allow precise cooling of heat sources and the airflow prevents the formation of heat pockets. To enhance how the product reacts to airflow needs, a multi-directional airflow nozzle has been engineered to offer a 360° angle of protection. This design offers a maximum rotation range therefore allowing an air output in almost any

direction. The voltage range of the STEGOJET is AC 100 – 240 V, which now eliminates the need of a user to have separate products to work with varying voltages on their site. Air flow extends up to 16 cfm.

Despite all of the complex functionality and air flow management, the STEGOJET's plastic housing unit is only 2x2x2.4 in.

Fan heaters (e.g., Stego HVI 030) deliver not just high forced air flow but plenty of customization to give energy and cost-efficient and site-specific solutions. This includes meeting a broad range of energy requirements, such as 500 W, 600 W and 700 W units, and the ability of customers to order them without a fan and instead use their own sourced axial-fan.

Finally, Hygrotherms offer temperature and humidity controls in one. Hygrotherms monitor ambient temperature and relative humidity. STEGO has recently released units with a voltage range of AC 100-240 V that still conduct both of these actions independently, which is exactly the sort of flexibility a parking facility site owner needs to meet varying environmental conditions. These units prevent dangerous condensation from building up. And the option to combine these hygrotherms with extra external measurement devices extends their value. Not every enclosure has the same critical control points; so these extensions can help optimize the overall thermal management control network to a particular site's efficiency needs.

## **GOOD THINGS IN SMALL PACKAGES**

Customers of parking garages demand personal and automotive safety and dependable (fast) ticketing and payment systems. Meeting these needs is deeply connected to the on-site electronics. From the brightness of the lighting to the ticketing and payment machines, the electronics define the customer's experience. Their efficiency and success also helps define the bottom-line for the facility owner.

Keeping the electronics secure from vandalism and damage is the function of the enclosure, but real environmental protection is only provided by the utilization of thermal management controls within those enclosures.

For parking facilities, thermal management of electronics ensures:

- Longer-lasting, better performing lighting for safety
- Decreased risk of condensation-related damage (and downtime) to ticketing and payment machines
- Increase quality control on site

Our expensive personal electronics, like the iPad, remind us not to leave them in hot or cold cars—but what about all the electronics that cannot be moved, such as the vast network of electronics in enclosures at a parking garage? That is where thermal management units come into play.

Though these systems may seem easy to overlook because they are small and they perform what many might assume is a basic function, they are indispensable. Electronics enclosure makers and end use

facility owners alike benefit greatly from them and should select them based on getting the proper flexibility and efficiency to meet the needs of their sites and clients.

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