



MAGNUM FIRST

REFRIGERATION CONTROL & MONITORING



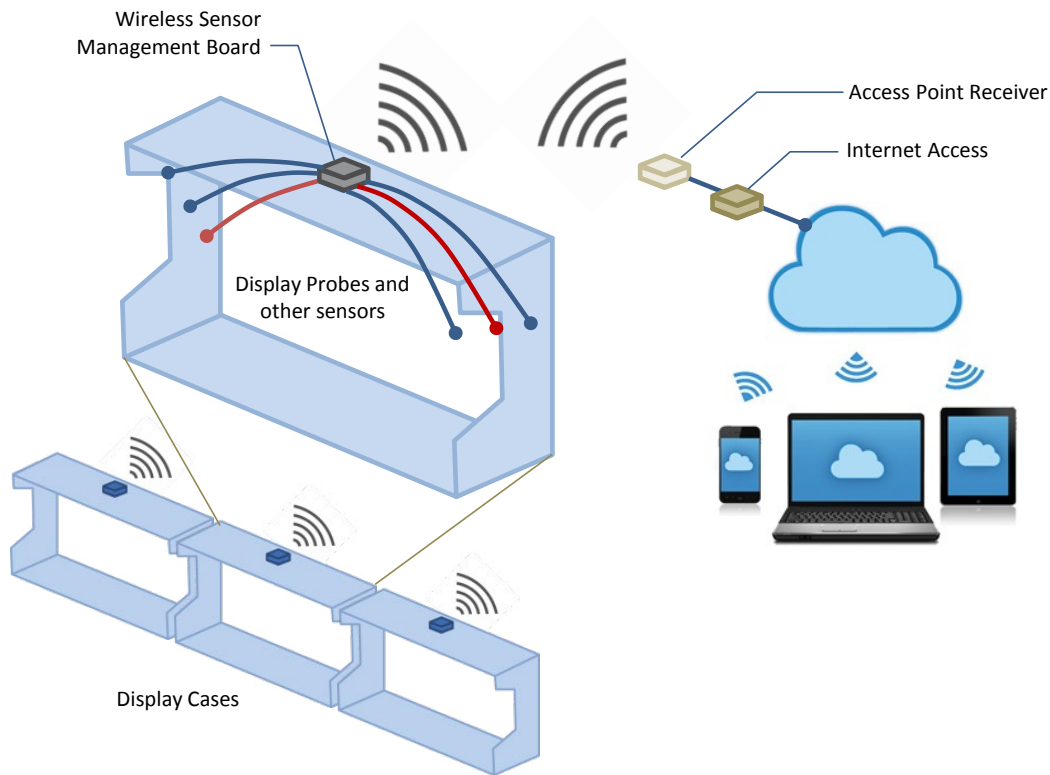
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IN AMERICA



MAGNUM
OPUS



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Improving Retail Performance

Temperature Surveillance is the most critical application running on Magnum's Energy Harvesting Wireless Platform, an environmentally-conscious solution for sensing, measuring, monitoring, and controlling equipment and environments at food retail.

It assists retailers in maintaining the freshness and quality of food products by helping them quickly address any temperature issues. By maintaining food quality, temperature monitoring can help reduce waste and food safety risks, increase sales and support brand loyalty.

Magnum Temperature Surveillance helps store and service personnel quickly identify, analyze and resolve temperature events before they become serious. Event screens are created to help personnel understand the root cause of a product temperature issue. This contributes to faster resolution and helps eliminate nuisance alarms and unnecessary service calls.

System Components

There are three basic components in the Magnum Temperature Surveillance system:

- 1) Sensor Management Devices (SMDs) that collect and wirelessly transmit sensor data (three models available). SMDs serve as connection points to industry standard temperature sensors (e.g., NTC-10K).
- 2) Wireless receivers or Access Point devices that capture wireless data from the SMDs and send it to a server via a local network or the Internet.
- 3) Software application which processes and presents the organized data to users via computer or mobile device.

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M9-RTS3



M9-MCB



M9-RSB-12



M9-AP2, M9-EBOX, M9-CBOX



M9-EDWS

Sensor Management Boards

There are three types of Sensor Management Devices available.

M9-RTS3: This board can be used with up to three NTC-10K temperature sensors. It has a solar panel, which provides enough energy to capture and transmit data.

M9-MCB: The Magnum Temperature / Humidity / Pressure Sensor Controller includes 2 digital inputs, 3 digital outputs and 1 analog output. When a 24 VAC power source is connected to the Magnum Sensor Controller, the controller automatically makes the 3 relays, pressure sensors, 0-10 Volts, and two digital inputs available.

M9-RSB-12: This model is powered by 24 VAC, which can come from the case or from an independent source. It allows up to ten NTC-10K temperature sensors. It can power and receive data from two 5 VDC signal pressure transducers. It also has two digital inputs, three relay outputs and one 0-10 VDC control output.

M9-EDWS: Wireless window / door sensors send the current status to the Gateway (EBOX, CBOX, AP2).

Access Point (TCP/IP) EBOX (BACnetIP) CBOX (AWS IoT)

The Access Point / EBOX / CBOX acts as a receiver for the wireless data coming from the Sensor Management Devices. It collects the data and forwards it through an Ethernet port to a local network or to the Internet via a router, ultimately to be stored and/or viewed by specified personnel. The Access Point uses a power adapter, or it can be powered over the Ethernet (PoE).

Cellular Network Option

Magnum Temperature Surveillance provides the option to use a cellular modem to transmit temperature data through a secure cellular private network. This eliminates the need to connect the Access Points directly into the store's networking equipment. Low-cost data plans are available and can be incorporated into the service.

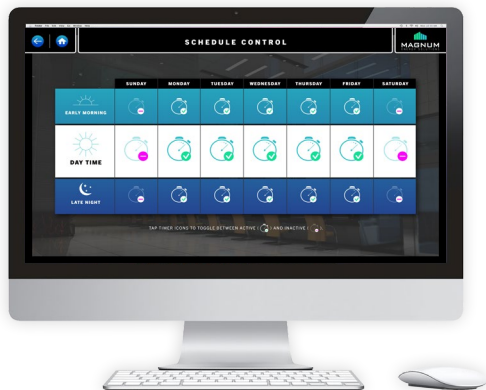
Software Application

Once data is collected by the sensors, transmitted by the SMDs and received and forwarded by the Access Point, it can be accessed and viewed using a web browsing software application for both computers and mobile devices (VenergyUI).

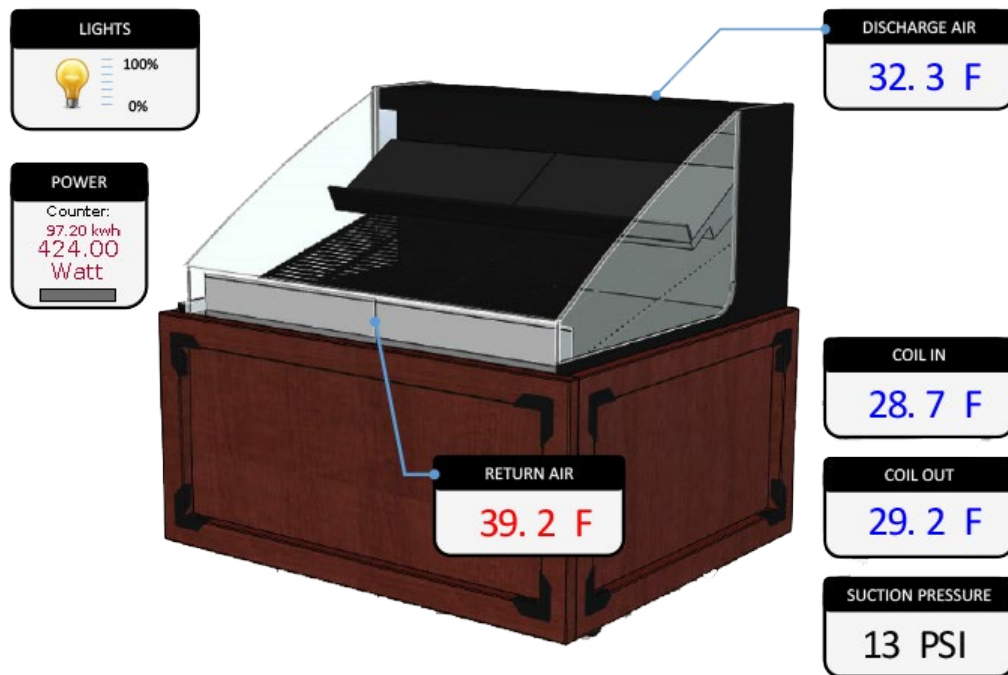
Magnum's Temperature Surveillance app can be accessed using a smart phone. It was designed to address the needs of store personnel who are responsible for the freshness, quality, and safety of food.

Event Screens

By deploying this system, store personnel can receive an "Event Screen" automatically following an alarm condition. The Event Screen provides information that can help determine the root cause of an alarm and whether a service person should be immediately dispatched. It also provides relevant technical information to facilitate fast issue resolution.



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Value: Food Freshness & Safety

Magnum Temperature Surveillance helps retailers quickly address issues related to food freshness and safety. Prioritized messages consider the temperature related impact on food, prompting immediate action to avoid food spoilage.

Value: Low Cost Solution

The cost of installing low-power, 24 VAC devices is kept low because no electrician is required. And, because the system is wireless, there is no need to run cables to the equipment room, which also keeps installation costs down. Finally, the solar powered devices consume no electricity and battery utilization is only for back-up.

Value: Labor Productivity

Temperature Surveillance helps retailers increase store personnel productivity by eliminating manual collection of temperature data and by reassigning personnel to more productive tasks, such as servicing customers.

Value: Rapid Problem Resolution

The immediate performance data provided by the Magnum Temperature Surveillance system, along with relevant technical and diagnostic information, allows retailers to make informed service decisions. This helps eliminate nuisance alarms.

Future Expansion Possibilities

In addition to basic temperature and pressure monitoring, the Magnum Energy Harvesting Wireless Platform will allow expansion to monitor other types of sensors, such as light, motion or CO2 sensors.

Along with the custom software, the system could be used to interface with other systems, such as HVAC or lighting. And, data from the system could be integrated into larger Building Automation Systems.