WHITE PAPERS

ADVANCED REFRIGERATION CONTROLS

New Capabilities & Best Practices

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TAKING SOLUTIONS FURTHER®

While they represent a significant capital investment, automation components, software and systems are critical to the success of any food processing or cold storage facility. But no technology—no matter how innovative—can last forever.

In this white paper, we review the signs that it's time to replace your refrigeration controls system, the benefits of newer systems, what remote monitoring can do for you, and how to get the most out of your HMIs.

IS IT TIME TO UPGRADE OR REPLACE YOUR REFRIGERATION CONTROLS?

While new refrigeration control systems are significant capital investments, their value far exceeds their cost. In large food processing or cold storage facilities, refrigeration typically accounts for more than half of the facility's total electric energy use. And with unplanned downtime costing many facilities tens of thousands of dollars per day, an aging refrigeration control system can put your business at significant risk.

IF YOU ANSWER YES TO ANY OF THE FOLLOWING QUESTIONS, IT MAY BE TIME TO UPGRADE OR REPLACE YOUR EXISTING SYSTEM

- Is your current control system more than 10-15 years old?
- Have you experienced unplanned facility downtime due to refrigeration failures?
- Are the individual components of your refrigeration controls system operating as islands, meaning they work independently and don't "talk" to each other?
- Are you still operating on a serial network that's linear, making it difficult to expand your capabilities?
- Do you have unstable suction and head pressures? Are you unable to trim fans and pumps via VFD control?
- Do you have multiple partially loaded compressors?
- Do your motors trip due to motor overload?
- Do you have difficulty finding replacement control system parts? Are your utility bills out of control due to excessive energy use?

BENEFITS OF UPGRADING YOUR REFRIGERATION CONTROLS

Modern refrigeration controls systems have truly come of age. If your controls system is more than a few years old, you might be surprised at the benefits that newer systems provide:

- Ethernet architecture — Unlike older serial networks with slower, linear structure, new control systems operate via your existing Ethernet. These networks are non-proprietary so in-house IT teams can easily troubleshoot issues, and repair and replace parts.
- Improved compressor and VFD communications — Hard-wired serial control systems are slower to communicate with your compressors and VFDs. With an Ethernet platform, the system can pull data much quicker and more efficiently.

- A single integrated platform — Old systems are often disjointed, with input/outputs, PLC hardware, VFDs, communications protocols and automation controllers all operating independently or requiring customized interfaces. Newer systems are integrated, providing you with a single, unified platform with standards-compliant methods for configuring, operating and maintaining a range of instruments and equipment.
- Increased data availability — With a single, integrated platform, you'll have increased access to energy, production, and utility cost information, leading to better decision-making at the management level. You can generate trend analyses, alarm logs, energy management data, and runtime reports in real-time to make the necessary changes and modifications to ensure your refrigeration system is running at optimal efficiency.
- Non-proprietary, open platforms — Newer systems are built on non-proprietary, open platforms, eliminating the need to support multiple protocols and providing you more options when purchasing equipment.
- Ease of maintenance and availability of replacement parts — Due to their non-proprietary platforms, newer control systems are much easier to maintain, troubleshoot and upgrade, without expensive third-party support.
- ROI — Replacing your outdated control system can have a significant impact on your bottom line. Newer systems manage the control and sequencing of all equipment to maximize energy efficiency. Newer systems will respond to the demands of the system, sequence the entire process and ensure that the system is running at optimal efficiency.

In the next post in our series on refrigeration controls systems, we'll explore the benefits of remote monitoring.

WHAT CAN REFRIGERATION REMOTE MONITORING DO FOR YOU?

The ability to remotely monitor your refrigeration system can have a significant impact on your bottom line, reducing energy, maintenance and overall operating costs. If you've recently upgraded your refrigeration controls system or are in the process of upgrading, it's important to ensure your new system offers remote access. This will allow for speedy diagnostics, offsite troubleshooting capabilities, and constant monitoring, all with a "big picture" view of the entire system.

THERE ARE THREE KEY BENEFITS OF REMOTE MONITORING

1. Diagnostics — Remote access allows your team or an outsourced consultant to monitor the system 24/7 for alerts such as refrigerant leak detection, high liquid levels, high product temperatures, high system pressure, and more. Outsourced consultants who offer a higher level of specialized expertise than your in-house team can view your entire system in real time and offer advanced insight and support.
2. Data gathering/analysis — Remote access enables your monitoring team to generate trend analyses, alarm logs, energy management data, and runtime reports in real-time. These reports allow you to identify inconsistencies and trends that could be wasting energy so you can make the necessary changes to improve efficiency.
3. Remote control — Using the data from these reports, your monitoring team can make the necessary changes and modifications at the touch of a button from the comfort of their offices or wherever they may be.

GETTING THE MOST OUT OF YOUR HMI

Your team relies on HMI screens to monitor real-time performance of your refrigeration control systems. But if your dashboards are not presenting that information in a clear, usable format, you're not getting a clear picture. Your HMI should present performance metrics in a format that's customized for your system to allow your team to effectively diagnose, analyze and manage your systems.

Your HMI screens should include an overview of the entire plant in addition to a single view of the machine room. Each piece of equipment can be animated and color-coded to show operational status, capacity, pressures, communication errors and other functions. Alarms and other critical issues are easily recognizable with pop-ups and red animation.

TO GET THE MOST OUT OF YOUR HMI

- Data should be presented on one or more well-organized overview screens, which are useful for operation, training, troubleshooting and diagnosis
- Ensure that your provider creates a graphical interface of your entire system with data displayed in a process flow layout as a functional schematic
- Historical data should be presented as graphs in order to quickly and easily identify trends, which is especially useful in forensic analysis of alarms, system shutdowns and other problems
- Equipment and data should be color-coded and animated for the most efficient monitoring.

Having a bird's eye view of your entire system is crucial to monitoring equipment capacity, obtaining historical trends and gathering data to maximize efficiency.

An efficient, custom-designed HMI application has the added benefit of allowing operators to operate, monitor and maintain your refrigeration system from a single room, without the need to constantly walk to or through the plant. This equates to efficiency in both staffing and response. Operators can also log-in and monitor the system from remote locations if necessary and view the current status of the plant.

Stellar provides state-of-the-art automation services to help clients achieve maximum efficiency for their refrigeration systems. We are the only approved Rockwell Automation Solution Partner for refrigeration controls.

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