Recording and Control of cold storage monitoring
Monitoring and reporting of accurate temperature control

Measurement made easy

Enables compliance with regulatory requirements.

Introduction

Wherever perishable products are stored before final distribution, there is a general requirement for the temperature and humidity of the storage conditions to be recorded and controlled.

The application

Companies are obliged to monitor cold storage areas, particularly those used for storing frozen foods such as ice cream, meat and fish and chilled products, such as yoghurts, prepared meals and cheeses.

Examples of typical storage temperatures include:
– For frozen foods, such as ice cream, frozen vegetables, meat and fish, a minimum temperature of -18°C should be maintained to help prevent deterioration
– Chilled foods, such as prepared meals, cheeses, dairy products and other perishable goods, should be stored at 5°C to help slow down or prevent deterioration

The obligation to monitor can also extend to areas that are also used for food preparation. An example of this is an area used for preparing meat and fish, where products must be weighed, sliced and packed at temperatures of around 7°C (45°F). It is also normal to monitor and record ambient storage conditions.

The challenge

The conditions under which food is stored and prepared are subject to strict legislation, with severe penalties likely to be imposed where these conditions are not observed. In the UK alone, companies are obliged to comply with The Food Safety Act 1990, Quick-Frozen Foodstuffs Regulations 1994 and the Food Safety (Temperature Control) Regulation 1995, all of which stipulate the conditions under which products should be stored and the measures that need to be taken to ensure conditions are maintained. Similar regulations apply throughout the world.

Equally, equipment supplied for the recording of temperature and humidity levels must also comply with legislation, such as EN 12830. Entitled 'Temperature recorders for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream – tests, performance and suitability', the standard sets down the main functional and performance criteria that recorders need to meet, to enable them to be used in cold storage applications.

Furthermore, for recorded data to be accepted as valid proof of compliance with the various standards relating to food production and storage, it is necessary to eliminate any potential for unauthorized adjustment or tampering with that data.

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The solution

The challenge (continued)

Whereas tampering with paper charts can be easily spotted, it is less obvious where electronic data is concerned. For this reason, any electronic data recorder needs to incorporate a full range of security features, including:

– Restricted access to authorized individuals
– Password protection to protect against unauthorized access
– Audit trail facility to independently attribute a time and date every time a record is create, modified or deleted
– The ability to protect against unwanted loss of recorded data
– Use of digital signatures to show that the device has only been used by authorized persons
– Satisfies supermarket quality inspections

It is also necessary to ensure that recorded data cannot be altered when downloaded to a PC or other device for review.

The solution

In a typical cold storage application, multiple temperature probes will be installed around the storage or preparation area. The exact number of probes used will vary according to the size of the area being monitored.

Data from these probes can be used to help ascertain the ambient temperatures in the measured areas to help ensure they are within the required limits. Signals from the probes can be taken into controllers on the refrigeration equipment to either lower or raise temperatures as required.

For traceability purposes, some of these probes should also be connected to one or more data recorders, to enable the temperature conditions in the area to be recorded. Relative humidity (RH) is also often recorded. By enabling operators to establish whether food products were stored and/or prepared in the correct conditions, this data can prove invaluable in the event of a potential food quality or safety issue. The configuration of high and low alarms makes excursions highly visible.

What can ABB offer?

ABB's ControlMaster range offers a wide range of control and indicator functions in just four easy to specify versions.

Featuring full color TFT displays, all devices in the ControlMaster range provide operators with a clear and comprehensive overview of process status and key information. These displays can be tailored to show specific process data, while a chart display provides short term trending information.

Configuration is also straightforward. Menus are displayed in clear text, with no complex codes or abbreviations, whilst built-in application templates permit operators to select the best template for their requirements, with the ControlMaster automatically configuring its display and control strategy to suit. Configuration can also be performed via industry standard DTM-based PC configuration software.

SM500F Field mountable videographic recorder

The world's first field mountable videographic recorder, the SM500F gives users localized access to operational data. Highly versatile and simple to use, the SM500F is a seven channel recorder that can be used anywhere, anyhow and by anyone. A choice of mounting options means that the SM500F can be installed in virtually any location – from panel to wall and pipe mounting. Featuring a fully sealed IP66 and NEMA 4X enclosure, it's ideal for use in even the most hostile environments, including hosedown applications.

ABB's ControlMaster range

What can ABB offer?

An ideal replacement for paper recorders, the SM500F provides secure, powerful recording, while delivering reduced costs of ownership compared to those of paper chart recorders.

SM1000 Videographic recorder

The SM1000 couples the ScreenMaster range's state of the art technology with simplicity of operation. Capable of recording up to 12 channels and offering additional inputs & outputs (I/O) such as relays and transmitter power supplies, the SM1000 can be specified to meet the requirements of demanding recording applications.

SM3000 Multi-point videographic recorder

The SM3000 enables up to 36 channels to be recorded. A total of six process groups are provided, allowing channels to be grouped together and individual displays created for different processes.

Process data can be easily viewed on the SM3000's large 31cm (12.1in) display in a wide variety of formats, including a circular chart and a combined overview format showing all six process groups.

DataManager Pro

ABB's DataManager Pro analysis software offers a powerful tool for reviewing recorded data. Using the software,

SM500F Videographic recorder

operators can review data from multiple recorders. Functions include the ability to compile graphical charts comparing multiple parameters, plus a dual cursor function enabling operators to review data for specific periods of time and specific recorders.

ABB's ScreenMaster series videographic recorders feature Ethernet communications, allowing users to access the recorders from any web browser. Information can be automatically retrieved and placed in DataManagerPro for further analysis.

DataManager Pro also offers a range of presentation possibilities, including the ability to annotate specific alarms and present recorded data as a combined graph accompanied by tables and statistics.

ControlMaster controllers

The ControlMaster range offers a choice of communications options. Ethernet communications provide the ability for users to be automatically notified of critical process events via email or remotely monitor the controller and process via the ControlMaster's integrated webserver, by simply using a standard web browser. For integration with larger control systems, the Modbus (RTU or TCP) options enable access to real time data on process values, device status and set-point values.

Other features include additional control options alongside the standard cascade, ratio and feedforward control functions to help bring even the trickiest processes under control. Added control efficiency is enabled by the inclusion of adaptive control, which allows the ControlMaster to automatically adjust its control response to suit variations in process response. Dual loop control makes it possible to use one ControlMaster to control two processes. The inclusion of additional auto tuner, math, logic, gain scheduling, totalizer, custom linearizer and delay timer functions provide powerful problem-solving functionality.

Find out more

For more information about ABB's products for cold storage applications, please email: **moreinstrumentation@gb.abb.com** ref 'cold storage'.

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