

Cooling with Care

Cold Stores for the Long-Term Storage of Vegetables

In earlier times storage pits or cellars were used for the long-term, cool and moist storage of fruit and vegetables. Many food products can be preserved for long periods by means of mechanical cooling in cold storage warehouses or deep freezers. However, this cannot be used for the long-term storage of fresh fruit or vegetables as this has particular requirements. When the air humidity is high and the temperature is low, vegetables slow down their metabolic activity, which means that they can be stored longer. Fieles Dithmarscher Kältetechnik, a company based in Marne, is a successful specialist in the field of refrigeration technology, air conditioning and ventilation, and designs special systems for vegetable storage. At Fieles the control systems implemented for the long-term storage of vegetables are primarily based on Eaton products: Besides HMI/PLCs connected to SmartWire-DT, easy control relays, busbar trunking systems, enclosures, DIL contactors and contactor relays are used, as well as PKZM motor-protective circuit-breakers, RMQ-Titan control circuit devices and EMR safety relays.



The Eaton XV102 touch display PLC is programmed with XSoft-CoDeSys-2.



SmartWire-DT in operation: mounting times are shortened considerably, maintenance and service work simplified.



Remote operator station: XV102 touch display PLC, 5.7", also with optional web server.

The company: www.fieles.de

Products: SmartWire-DT
XV102 5.7" touch display PLCs
DIL contactors
ESR5 safety relays
24V power supply

Quicklink ID: ES2416 [www.eaton.com/moellerproducts]

Fieles Dithmarscher Kältetechnik designs and builds vegetable cold storage warehouses including insulated chambers and refrigeration systems for different types of vegetables. Whether for storing potatoes or onions, with a drying unit or cooling device for various applications, such as for sauerkraut (pickled cabbage) or for shipping warehouses, the Fieles systems for agricultural production and sales are used in both Germany and in Eastern Europe. Fieles relies on high quality certified components for use in its plants. The control technology required is therefore designed and manufactured to meet the specific requirements.

Long-term vegetable cold storage warehouse with high functionality

The Fieles refrigeration system used here, built for the H.R. Thiessen agricultural holding in Kronprinzenkoog, consists of two piston compressors, one condenser with three fans, four air coolers (evaporators), each with four fans as well as several valves, regulators and sensors. The interplay of these components ensures a constantly optimum chamber climate so that the vegetables stored can stay fresh for several months up to the next harvest.

In all, the system receives 33 digital data elements and eight analog signals from the system. After processing this information, the controller supplies 31 system components. At

the same time, all components are monitored and disconnected individually in the event of a fault. These faults are stored in the system and can be analyzed during servicing.

An Eaton touch display PLC from the XV102 series (5.7 inch) was used, which is housed in the central switching cabinet, and which is connected to a remote operator panel (HMI XV102). The controller regulates all pressure and temperature parameters within the cooling system and ensures regular automatic defrosting of the four air coolers using the so-called hot gas defrosting system with reduced compressor output. This ensures that energy required for the cooling system is used efficiently. The central HMI/PLC XV102 is linked to a SmartWire-DT gateway for connecting the SmartWire-DT communication system to standard fieldbus systems – in this case CANopen.

SmartWire-DT is the seamless connection and communication technology from Eaton and is designed as an open system. The central XV102 in conjunction with SmartWire-DT considerably reduces the wiring requirement, and enables end users to scan all the parameters of the vegetable cold store, thus eliminating the need for several individual control circuit devices or temperature displays.

Fieles Dithmarscher Kältetechnik GmbH, headquartered in Marne, is a successful company in the field of refrigeration, air conditioning and ventilation. The company's customers come from the chemical industry, food industry, vegetable producers,

printers, medicine technology and catering. The company's sphere of operations stretches from Dithmarschen, to all of Schleswig-Holstein, right through to the whole of Germany and overseas.

CONCLUSION

Michael Gliszczynski, head of the electrical workshop and electrical engineering at Fieles Dithmarscher Kältetechnik, had this to say: "As we only use top quality certified components in our systems, the robust and quality Eaton products were a first choice. Like other Eaton products, the touch panels are connected to SmartWire-DT. Thanks to SmartWire-DT, our construction times have become shorter, whilst maintenance and service work have become simpler. We can offer our customers teleservice options if required. All customers can operate our long-term vegetable store simply – all data/temperatures can be called up directly by touch panel. As touch panels are now available with an integrated SmartWire-DT master, we will be using these in future, thus eliminating the need for another device in the switching cabinet."

The vegetable cold store: Long-term storage of fresh fruit or vegetables presents particular challenges for the control engineering.

