



Velteko s.r.o., based in Vlašim, Czech Republic, is a manufacturer of packaging machines and specializes in high-end packaging technologies. When the time came for a fundamental revision of the machine design and control concept for the company's hose packaging machines, Velteko decided to implement a PC- and EtherCAT-based automation solution from Beckhoff



PC-based control optimizes packaging system

Improved performance,
lower running costs



The packaging industry is faced with increasingly complex applications that require ever faster and more efficient automated systems: in addition to higher throughput and storage capacity, a wide range of communication interfaces and auto-diagnostic functions are called for. Over recent years, Velteko worked on simplifying its machine concept and standardizing individual production elements as well as the modularity of its packaging lines. Their customers can choose the best machine and most suitable accessories such as dosing systems and scales, etc. for each application. A prerequisite for meeting these requirements was the switch

from a hardware PLC to PC Control, which not only offers higher packaging throughput but is also more cost-effective.

Optimized production processes

The latest generation of vertical packaging machines from Velteko is designed for high performance in continuous operation – specifically, for packaging viscous, liquid or solid products in bags with a volume of up to 5 liters and a maximum machine capacity of 180 bags per minute. The system is controlled via a Beckhoff CP6201 Panel PC paired with TwinCAT

automation software. AX5000 Servo Drives are integrated via EtherCAT, so that the line with a default cycle of 2 ms has adequate output reserves. Frequency converters and solenoid valves are controlled via CANopen. The Industrial PC is also used for setting the parameters for the servo controllers and frequency converters.

The PC-based control system simplifies machine wiring, resulting in cost reductions and increased system reliability. All of this benefits the end-user, because due to the convenient handling offered by EtherCAT, a service technician is no longer required should the need arise to replace a servo controller or frequency converter. EtherCAT offers excellent data communication within the machine and easy integration in existing corporate networks through open interfaces. The open structure of the PC-based control solution permits convenient networking with other machine modules to form a dynamic packaging line.

Intuitive operation

The 12-inch touch screen panel used as the HMI interface enables convenient and clear system control and operation. The interface is programmed in Visual C# and operated via a labeled keyboard or intuitive symbols, so that even untrained staff can set the production parameters for bag length, bag sealing time and machine output via three buttons. The touch screen is also used to control auxiliary equipment such as dosers, automatic product filling into the hopper, dating unit, etc. A password-protected operator hierarchy enables authorized access for qualified staff or service technicians with special permissions.

Comprehensive data management

The CP6201 Panel PC also opens up new opportunities in terms of statistics and data exchange as well as system auto-monitoring. All machine events (e.g. "key pressed", "machine has used up packaging material," etc.) and all operator errors, including time information, are stored in the PC memory. Individual machine settings can be stored in up to 500 predefined program sequences, with optional data backup. In addition, the system records comprehensive statistical data (e.g. number of filled and empty bags since the machine was commissioned or for a specified period; operator identification via password; the machine start and stop times; temperature in the distributor). All data from first commissioning over the complete lifetime of the machine are stored on a 1 GB Compact Flash card that cannot be overwritten or erased.

If required, the customer can download the data via a USB or Ethernet port. Of course, the packaging machine can be linked to any standard computer network.

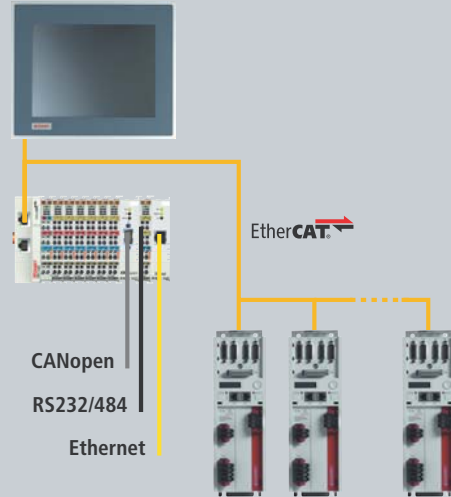
Remote operation and maintenance

A key consideration for Velteko was remote maintenance and operation, which is considerably simplified by the Ethernet interface and the Windows operating system. All settings for the automation software, the visualization as well as control and diagnostics can be implemented remotely via any common data transmission medium (Internet, e-mail, modem, etc.). The operator only requires basic knowledge of notebook computer operation and file copying; not even special software or connection cables are required. Any commercial USB flash disk is adequate for the data exchange.

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Schematic diagram of the process architecture for the vertical Velteko packaging machines, equipped with a CP6201 Panel PC from Beckhoff with Intel® Celeron® 1 GHz processor.

