

Friesen's offers wash-down capable check weighers for application in all areas of food production, including packaging and stacking.

Precise weight control with PC-controlled weighing systems



The American company Friesen's supplies material handling systems for the food industry, with particular focus on meat processing applications. By using open PC- and EtherCAT-based Beckhoff controllers in their weighing systems Friesen's was able to increase the process speed significantly while at the same time offering high precision.

Recipe for success: EtherCAT helps makes food processing faster

Key functions in food production naturally include accurate and precise product weighing, recipe management, the production process itself and packaging. Friesen's Inc., based in Detroit Lakes, Minnesota, specializes in innovative weighing systems for application in food production. The check weighers guarantee precise product weights, irrespective of product changes or packaging size. "Our check weighers in wash-down design also meet all hygiene requirements specified by the USDA (U.S. Department of Agriculture)," said Kari McAllister, Product Development Manager at Friesen's Inc. "In the past, check weighers were mainly installed at the packaging level. However, there is increasing demand for check weighers that can be used during processing, i.e. at the start the production chain, so that waste can be determined and monitored better."

Customers need maximum flexibility

Friesen's has developed two different weighing systems in order to meet the diverse demands of their end customers. The "Mach series" and the "F series" are suitable for application in all phases of food production. The Mach series can process more than 100 parts per minute and comprises simple and dual electromagnetic scales as well as a digital product weigher and high-speed weighers with precision control. The F series for applications with less than 100 parts per minute, comprises an Analog Product Scale, an in-motion check weigher, an Analog Case Scale and Static Scales. "Our check weighers can be quickly adapted to varying requirements, including processing of raw pork, chicken, cheese, bakery products or even ground coffee," said Kari McAllister.

Scalable control solution and open interfaces

"In the past individual adaptation and scaling of the control solution could be tricky tasks," said McAllister. "In my view, some of the major controls vendors in this space are too proprietary in nature and fail to provide interfaces for third-party systems. The elimination of such 'stumbling blocks' was one of the main reasons for our decision in favor of the open control architecture from Beckhoff."

Friesen's uses the high-performance CX1020 Embedded PC with TwinCAT software PLC for automating their check weighers. A Beckhoff CP69x2 built-in Control Panel is used for machine visualization. "Flexibility and support of modular control programming through TwinCAT and the complementary TwinCAT libraries were critical design requirements for Friesen's," said Kari McAllister. "The TwinCAT System Manager supports a wide variety of fieldbuses, ensuring fast and simple integration of various components and devices," said Derek Hanson, Technical Director at Friesen's.

The Beckhoff control platform manages data acquisition from various weighing functions, validates and logs product weight, deals with reject products and runs all the conveyors. The CX1020 Embedded PC enables Friesen's to run the application software and the HMI software on a single CPU via TwinCAT ADS. An Ethernet TCP/IP interface and InduSoft Web Studio are used for interfacing with the MES/ERP system. This results in a significant reduction of hardware components and – accordingly – costs. "The reduc-

terminal into the EtherCAT terminal system, TwinCAT System Manager automatically recognizes it," said Kari McAllister. "With TwinCAT and EtherCAT, adding devices is a piece of cake – unlike in other systems, where this is often a time-consuming procedure."

Competitive advantages:

higher throughput, shorter downtime

The use of EtherCAT also resulted in higher system speed and check weigher performance. "On the one hand we wanted to speed up the product weighing process and on the other, we wanted increase the speed of the discharge devices. EtherCAT provided the solution for both requirements," said Kari McAllister. "Not only were we able to significantly reduce downtime and commissioning time for the check weighers, we also increased the process speed by 31 %. This means that we can offer our customers increased throughput and differentiate from our competitors." The lean control architecture also has a beneficial effect on costs and commissioning due to reduced installation time. "Another benefit of the PC-based control system is the almost unlimited flexibility in terms of data storage and data streaming," said Derek Hanson. The PC-based control platform also improves automated troubleshooting. "The functional status of our check weighers is now much easier to detect, so that errors can be rectified more quickly," said Derek Hanson.



Beckhoff CX1020 Embedded PCs with the TwinCAT PLC automation software and EtherCAT I/Os are used as the control platform for the check weighers from Friesen's.



The weighing systems are visualized using a Beckhoff CP6902 Control Panel with 15-inch touchscreen.



Through the application of PC- and EtherCAT-based controllers, Friesen's was able to reduce check weigher downtime by 22 % while increasing process speed by 31 %.

tion of system components increases the reliability of our scales and also reduces the space requirements in control cabinets," said Derek Hanson.

EtherCAT simplifies communication

Friesen's uses EtherCAT I/O terminals to great effect in their check weighers. "EtherCAT offers high-performance, and at the same time we are able to communicate with a wide range of industrial equipment," said Kari McAllister. "TwinCAT and the EtherCAT communication terminals enable straightforward connection with practically all Ethernet TCP/IP, Serial RS232 and CANopen devices. This also simplifies the system design."

The improvements in terms of flexible connectivity range from the Ethernet connection and the I/O terminals right to the software. "If we insert a new

Outlook

Friesen's now uses Beckhoff controllers in all of their check weighers. "In the future we intend to use the Beckhoff CP69xx Control Panel with stainless steel casing, which was specially designed for use in the food industry and in wash-down applications, throughout our operations," said Kari McAllister. In addition, Friesen's intends to equip the majority of future machine axes with the dynamic AX5000 EtherCAT Servo Drives from Beckhoff.

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