



Innovative machine design provides maximum flexibility

Optimized with EtherCAT: horizontal conveyor is the innovative choice for food packaging

High production output, flexibility and efficiency while fending off high cost pressures are the guidelines for mechanical engineering in the food packaging business. Innovative and flexibly designed processing and packaging systems are called for in order to keep pace with current trends in the food industry. While developing its new tna roflo[®] HM 3 horizontal conveyor, tna Australia, a manufacturer of food packaging systems, chose to use a Beckhoff controller to boost system power while streamlining the architecture. The feeding and distribution system can be integrated seamlessly into a packaging line for food products and impresses end users with its high flexibility and speed of operation.



The tna roflo[®] HM 3 horizontal conveyor system developed by tna is an innovative system for transporting and distributing foodstuffs such as snacks, confections, pastries, breakfast cereals, pasta, powdered products and fresh produce. The system can be loaded at different places so that up to three products can be transported simultaneously and fed to the respective packaging modules.

tna Australia Pty Ltd., based in Silverwater, Australia, is one of the world's leading manufacturers of turnkey, integrated packaging and processing solutions for the food industry. The tna horizontal and vibrating conveyors distribute and transport products such as snacks, confections, nuts, pasta, fresh produce or pet foods and feed them to the packaging system. The most recently developed horizontal conveyor system, the tna roflo[®] HM 3, is an innovative solution for the transport and distribution of food products. "It was specially developed with a view toward simple integration in upstream or downstream seasoning, weighing and packaging modules and enables the development of customer-specific solutions. With the tna roflo[®] HM 3, different products can be conveyed at the same time on a single line and moved in different directions," explains Kerry Ball of tna Packaging Systems.

Perfect control using EtherCAT communication

The tna roflo[®] HM 3 horizontal conveyor gives the operator complete control over the speed and direction of movement of the conveyed food products by implementing control commands virtually in real-time.

With a view to performance optimization, tna's aim in developing the tna roflo[®] HM 3 was to implement a distributed control system with real-time Ethernet as the basis for communication. "Prior to the start tna had considered a range of communication options. Ultimately EtherCAT was the only system that is proven to work efficiently on standard hardware without having to install a processor board especially for the communication," Kerry Ball stresses.



tna Packaging and Processing Solutions is a globally active manufacturer of integrated food packaging solutions. More than 6,000 systems from tna are in operation in over 120 countries. The company offers a comprehensive product range, from the vertical form, fill and seal systems (VFFS) to product delivery and distribution systems to spraying systems, seasoning systems, weighing solutions, check weighers, metal detectors, case packers, etc.

The advantages of EtherCAT for the tna roflo[®] HM 3 system at a glance:

- EtherCAT offers the foundation for real-time communication in the machine modules.
- The openness of EtherCAT enables the development of a tna-designed, proprietary EtherCAT master that is perfectly tailored to the systems, equipment and philosophy of tna.
- Shortening of the necessary installation period thanks to reduced cabling work
- Simple network structure



The product is moved carefully in the pans. Once the desired position is reached the pan opens and the product is discharged.





There are further large-scale installations in Korea, with 18 axes, and in Mexico, with 19 axes. A single communication network can be used for several tna roflo[®] HM 3 systems.

The connection to the field level takes place via the EK1100 EtherCAT Coupler. Digital inputs such as level sensors and all universal inputs are connected via standard input terminals. Air-operated doors, warning lamps etc. are connected to the digital output terminals. The EK1122 branch terminals increase the topology options of the EtherCAT network in the case of larger systems for which a star topology is suitable.



Highlights of the EtherCAT solution

In the example of the system installed in France, 21 tna roflo[®] HM modules make up a distribution system that is perfectly tailored to the needs of the customer's application. A single tna "switcheroo" or "lifteroo" feed line – a mechanism that separates, tilts and turns the tna roflo[®] HM pans – is able to distribute three different products from the processing line to the waiting packaging machines. This innovative function changes the way in which processing lines are interconnected and enables the simultaneous movement of products in several directions on a single packaging line. "Previously we needed three conventional feed lines for this – with the corresponding costs and space requirements. With the EtherCAT-based controller, the 21 servo axes distributed throughout the entire factory are controlled by just one powerful computer," says Kerryn Ball outlining the advantages.

"Thanks to EtherCAT we can build and test the tna roflo[®] HM modules at our production site. All cables are located in the roflo[®] HM modules; in addition, information is exchanged over the network so that no 'spaghetti cabling' is created and the system can be designed very simply," explains Kerryn Ball.

"Since EtherCAT is an open standard protocol, we were able to develop our own EtherCAT master for real-time communication with the horizontal distribution system. The openness of the EtherCAT platform also gives us the option to use devices from different vendors. That offers both us and our customer's valuable flexibility," says Kerryn Ball.

Simplified cabling, lean control structure

tna has now installed EtherCAT into all non-stand-alone tna roflo[®] HM 3 systems worldwide. Currently, the most extensive system of this type is located in France: 21 servo axes for three production lines are controlled by just one computer.

Further Information:

www.tnasolutions.com

www.beckhoff.com.au