Robotically fed flow wrapper controlled over Sercos III

Tasked with the development of a robotically fed flow wrapper for a demanding food-related application, packaging machinery expert Tekpak found that motion control and automation products, Sercos III linked, were the key to producing a simple to use machine that provides the required high performance with reliability and value for money.

TECHNOLOGICAL ADVANCES have transformed the business and IT worlds, and are now doing the same for industrial automation, including the packaging industry. More intelligent machine-to-machine (M2M) communications are allowing machine performance data to be collected in real time, analysed and responded to, where required. The goals are to reduce packaging machine downtime to the minimum, whilst improving efficiencies and flexibility.

The function of the new machine by Tekpak, which was developed for a major supplier of baby nutrition products, is to remove injection-moulded plastic scoops from their moulds and then flow wrap them ready for inclusion with packs of baby food.

The highest standards of hygiene and efficiency are demanded for such applications, so the de-moulding and wrapping processes have to be carried out without human intervention – and fast.

Explained Imelda Kehoe, Tekpak's Quality Manager: 'We have had extensive experience of robotic handling and in-flow wrapping, but this is the first time that we've needed

Working reliably in real time: Tekpak's machine, which removes injection-moulded plastic scoops from their moulds and then flow wraps them ready for inclusion with packs of baby food. Sercos III was chosen to link the key automation components.

PHOTO: TEKPAK

to combine robotic handling with flow wrapping in a single machine. We quickly recognised that achieving this successfully would very much depend on choosing drive and automation products that could be very easily integrated, and which would work reliably together in real time.'

Following evaluating available options, Tekpak decided to use products from Rexroth, especially as it is a single-source supplier for all of the key items needed.

Sercos III selected

Sercos III was chosen by the company to link the key automation components because it provides easy wiring combined with the consistently high communication speeds needed for real-time operation, and because it offers both straightforward set up and commissioning.

The machine's final design involved eight motion control axes for the de-mould robot and the flow wrapper. These were implemented using an L65 PLC/motion controller with an on-board Sercos III master, complemented by IndraDrive CS multi-Ethernet servo drives and Rexroth synchronous servomotors. To provide an intuitive operator interface, a VCP colour touchscreen HMI, connected to the controller via Ethernet, was used.

'In spite of this being the first machine we had produced that combines de-moulding with flow wrapping, the drive and automation systems came together very well,' commented Imelda Kehoe.

The new machine is now in regular use and is meeting all expectations. The company is now using its design as the basis for a standard module that can readily be adapted to handle other types of products.

*Case study supplied by **Bosch-Rexroth***

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Rationale for using Sercos III

Where real time (RT) communication is necessary, it must be guaranteed that every device in the network can receive and send data at any time – on time. However, not all RT communication IE technologies are alike, and there are a number of solutions available that offer the promise of RT compatible Ethernet – in some cases with very significant differences.

Sercos provides RT communications between controllers, drives and distributed peripherals. cSercos III integrates the RT mechanisms of the Sercos interface, with Ethernet TCP/IP for non real-time communication.

At the field level – where communication between individual drives, sensors and controllers takes place – Sercos III RT functions provide the required precision. Connectivity to higher-level control systems is simple with direct access to data at the lowest production level. In addition, every Ethernet-enabled computer can be connected to a Sercos III port without any additional hardware or software being needed.

Because of the full-duplex mode, every node can call on the full range of 100 Mbit/s in RT mode. Full TCP/IP consistency is guaranteed at the same time - it is claimed - because non-real-time data packets are forwarded via a special (non-real-time) NRT channel, without compromising the guaranteed cycle times of the RT data. This allows parameterisation to be undertaken, for example, without the control system running using a standard notebook and Ethernet interface.

Third-generation Sercos features include the 100 Mbit/s data rate mentioned, as well as the use of CAT 5 copper cable - in addition to the fibre optic technology already in use in previous generations. This should help alleviate worries that engineers often have of handling fibre optic cable in the industrial environment, where termination and replacement are delicate processes. Highly efficient networks can be installed using ring or linear topologies and peer-to-peer communications.