

Each conveyor element has its own controller: With their suitability for operation at ambient temperatures of -25 °C, Turck's TBEN-L-PLCs can be mounted directly on the line

QUICK READ

For Asbreuk Service, modularity was a key requirement when the special machine builder installed an automated shuttle transport system between the factory of a major food manufacturer and a coldstore. The intralogistics system for conveying pallets consists of elements that are remotely controlled by Turck's TBEN-L5-PLC compact IP67 modules – even at ambient temperatures of -25 °C. Multiprotocol I/O modules expand the range of inputs and outputs at specific points, while K50 lights from Banner Engineering are used to indicate any faults along the line.





Turck's FEN20 devices make the switching signals of the control consoles bus-capable

Cool Heads

Asbreuk Service B.V. equipped a Dutch logistics supplier with a fully automated and modular loading and unloading system for trucks – with the decentralized control at ambient temperatures of -25 °C provided by Turck's rugged TBEN-L-PLC IP67 modules

The products of a prestigious manufacturer of deep-frozen French fries have their own shuttle service not far from Amsterdam. The trucks of the contracted logistics supplier operate a shuttle transport service every half hour between the production plant and the gigantic coldstore located only a kilometer away. The pallets are loaded entirely automatically in no more than two minutes. The synchronized flow of material is reminiscent of scenes from the SimCity computer game series, the only difference being that coworkers still sit at the steering wheels of the trucks and initiate the loading command.

Maximum flexibility was the central aim of the collaboration between the food manufacturers and their logistics partner. The central warehouse with a capacity of 40,000 pallets now replaces the by far more complex transport processes, which involved many different third party trailers supplying the production sites directly. The goods are now allocated instead directly in the modern XXL coldstore. All customers, particularly the major restaurant chains, are supplied from here. The logistics company is not only the service provider that provides the trucks, but also runs the warehouse together with the connected conveyor and transport systems. Invoice calculations are based on each pallet processed.

Flexibility thanks to the decentralized control modules

Automatic loading and unloading is an essential process in the transport of goods over short distances. Asbreuk Service is a family owned company with its headquarters situated near Enschede in the Nether-

lands. It has an outstanding track record in planning and implementing the right technology for the customer's application. The special machine builder can draw on its many years of experience in handling projects for the drinks industry. Major breweries in this sector for example load the entire volume of products and empty bottles automatically via a truck. Key finding of projects so far: The technology should be as adaptable as the business arrangement requires. "If a contract is changed or perhaps extended or reduced in some way, it is important for a system to have a modular design – just like Lego bricks", stresses managing director Marco Asbreuk. In consultation with Turck, his company therefore developed an entire conveying system made from segments, in which both frequency transducers as well as the robust TBEN-L-PLC IP67 controllers are deployed in decentralized operation.

For Asbreuk, modularity means that these kinds of projects involving complete systems are first and foremost economical. "This is only possible if we build series elements that can be installed easily." This was the case with the latest collaboration. The installation of the new line could this time be completed faster than the removal of the centrally controlled legacy system. The modern conveyor system elements thus retain their value over the long term as they can be deployed at a different location or in a different configuration if necessary.

Robust PLC reduces cabling

Next benefit: The decentralized modules require considerably less cabling; According to Asbreuk, this enables an "enormous saving in costs, particularly in

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Marco Asbreuk | Asbreuk Service B.V.



Two control cabinets are used for manual control. These contain FEN20 multiprotocol modules, which expand the number of inputs and outputs available

the coldstore area, which requires the use of special cables." The power supply for the conveyor system is thus implemented at only four points. Turck's IP67 block modules with Codesys 3 controllers distribute the power between each other and are also connected via serial interfaces. Once fitted together, the modules detect their neighbors and determine their position in the overall system.

Their ability to be used in cold storage warehouses at ambient temperatures of -25 °C was what attracted the Dutch engineer to Turck's IP67 TBEN-L-PLCs. "For us it was important for the controller to have the ability to communicate with different bus systems and at least operate at temperatures as low as -30 °C," said Asbreuk. "There is actually only one PLC suitable for this field, and so the decision to use Turck's TBEN-L-PLC was more or less obvious from the start."

The compact controller is an important component in the shuttle transport system which consists of three areas: An automated truck loading system (ATL) is installed in the factory, together with the relevant intralogistics system that starts directly at the end of the production line. The goods traffic on the line is then

handled by trucks with special trailers on which the loading area is equipped with chain-driven conveyors. Having reached the central warehouse of the logistics partner, the drivers then press a button to start the automatic unloading of the pallets. In the mean time, the two-row loading zone at the production site then gradually fills up again. A smartphone app supplies live data from both sites so that the driver is always able to see the latest progress.

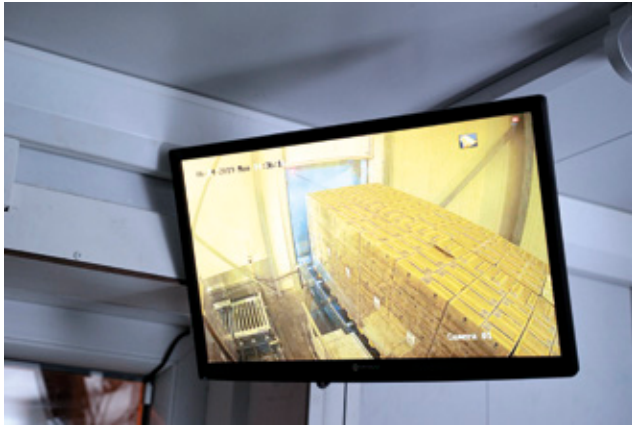
Autonomous conveyor system with pallet check

In the factory of the French fries manufacturer, Asbreuk Service provided each of the 32 line modules with their own controller. These modules include chain and roller conveyors as well as a section for inspecting pallets. Laser sensors here check whether a pallet is too wide – and is therefore incorrectly packed. The result is first of all written to a barcode label and the system then removes the relevant pallet automatically. Lasers and scanners are connected locally to the relevant Turck PLC. Only an identical TBEN-L-PLC module, which acts as a higher-level central controller and is connected via a CAN bus, is used for removing pallets.

Expansion via multiprotocol I/O devices

A conveyor element with three directions is required to transfer individual pallets from the usual line route to the buffer. As each direction requires a separate RS485 port, one Turck I/O module provides the additional range of interfaces at this node. The ultra compact TBEN-S-2COM I/O module connects the serial interfaces directly in the field to the controller via Profinet so that the RS485 functionality is retained.

Thanks to laser support and the connected TBEN-L modules, each conveyor section knows when a pallet has to be transferred. If a coworker nevertheless has to intervene in an ongoing process, this person can control line sections individually at two modular and decentralized operator panels. Functions such as a controlled stop or the running of an alternative route are possible. Multi-colored K50 lights from Turck's optoelectronic partner Banner Engineering indicate here, for example, the module where the fault is



The driver presses a button to start the fully automated conveying of the pallets from the ATL zone to the refrigerated truck



K50 LED lights from Banner Engineering provide important information about the status of the line modules



The system from Asbreuk Service can easily handle the loading of two trucks an hour

present or the conveyor section that is currently in manual operation.

Signal transmitters such as pushbutton actuators at the control consoles require additional inputs and outputs. The Dutch engineers therefore installed three IP20 I/O devices in the cabinets: Turck's FEN20-16DXP multiprotocol modules effectively make standard switching signals bus-capable in a short time. However, the use of the FEN20 modules is not only restricted to the control consoles: Central control is still retained in the automatic truck loading system (ATL), which the pallets reach by means of a hydraulic lift. The area is monitored by a centrally controlled frequency converter and a Siemens PLC. Turck's FEN20 offers additional inputs and outputs in the control cabinet and communicates with the main controller. However, Asbreuk is not excluding the possibility of soon implementing the decentralized operation of an ATL zone.

Promising market growth

Asbreuk Service is now receiving an increasing number of inquiries for similar complete systems. "The market is

growing: there is a demand everywhere for mass conveyance over short distances," says the company owner. Companies in this case would supply their customers with fewer machines but with an increasing number of functions. The specific technology required for a particular service would then be irrelevant. The flexibility and long-term usability of all elements are the priority. A modular conveyor concept optimally meets these requirements. Asbreuk is already thinking about the next steps: "We have so far only been passing on the number of pallets via the truck. The transfer of more data is possible in order to implement 100 percent goods traceability." The initial prototypes for self-driven trailers are also currently a hot topic. It's logical that autonomous transport should once more offer completely new opportunities.

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