

Get Rolling

Intralogistics specialist SSI SCHAEFER is digitalizing its conveyor lines with the “Conveyor Control Unit” for controlling CAN roller motors – the technology behind it comes from Turck

Many people in Germany are regularly in contact with one product from SSI SCHAEFER, because the household waste garbage can they put by the roadside often come from this group of companies. However, the product diversity of the group, which coordinates the many subsidiary companies at its headquarters in Neunkirchen/Siegerland, should not be based on the prominence of its waste garbage alone. With more than 80 companies and around 8,600 employees, the Group generates sales of around 1.9 billion euros and is today one of the world’s leading solution providers for intralogistics. This is made possible by a product portfolio that today covers the entire range of logistics requirements – from sustainable container systems and conveyor technology for small and large load carriers to complex overall intralogistics solutions, including software for internal material flow and supporting services.

The Graz site of the SSI SCHAEFER Group in Austria produces and develops container conveyor technology,

among other things. At the end of 2018, conveyor control product manager Christian Steiner and his colleagues were considering what requirements the next generation of conveyor systems should meet. Steiner is also responsible as product manager for the automation and control of the conveyor technology. Hansjörg Lerchster was also part of the project team at the time as R&D product manager. Today Lerchster is product owner and business operations manager at SupplyBrain, a startup founded by SSI SCHAEFER, where he is responsible for the development of predictive maintenance solutions and other data-based services for intralogistics systems.

Digitalization of conveyor technology

The next generation of conveyor technology is to be automated and controlled digitally as much as possible. The previously used roller motors with analog control and the associated control modules could no longer

In the new generation of its conveyor systems, SSI SCHAEFER uses the CCU “Conveyor Control Unit”, a CAN I/O module developed by Turck for controlling the drum motors and recording the sensor data



»Although it was possible to also buy CAN bus controllers on the market, we wanted an SSI SCHAEFER solution that was really tailored to our needs.«

Christian Steiner | SSI SCHÄFER



Turck has customized its TBEN-LL-4RM-4DI-4DXP I/O module for the control of CAN roller motors and for the digitalization of conveyor lines exactly to meet the demanding requirements of SSI SCHAEFER

meet the increased number of requirements. The next generation of motorized roller drives therefore is to be controlled digitally throughout. Interroll, the company that was selected to supply and manufacture the motor rollers to be implemented, uses CAN bus as the fieldbus protocol and so this was also chosen for the I/O and controller technology. The power supply of the new motors also had to be changed from 24 volts to 48. The larger voltage range allows smaller cable cross-sections and longer cables on account of the lower losses, and therefore larger and more efficient power supply units.

No perfect I/O solution on the market

SSI SCHAEFER searched the market for systems that could offer a data connection to the motor rollers with a CAN interface, the required 48 volt power supply and Profinet communication for controlling the systems. The devices were required to have a robust design with protection to IP67 for direct installation on the conveyor belts. The perfect solution for this was not available on the market: "Although it was possible to also buy CAN bus controllers on the market, we wanted an SSI SCHAEFER solution that was really tailored to our needs," says Christian Steiner. After initial contact with Turck at the SPS automation trade fair in Nuremberg, the automation specialist checked whether it was possible to modify its own I/O solutions to meet SSI SCHAEFER's requirements. Long story short – it was.

CCU module saves on separate I/O modules

The TBEN-LL-4RM-4DI-4DXP I/O module for controlling CAN roller motors, which was then further developed by Turck, is known at SSI SCHAEFER as the Conveyor

Control Unit or CCU for short. Digital inputs and outputs for external trigger signals or actuators were also required in addition to the 48-volt power supply for the roller motors, 24 volts for conventional actuators, CAN communication to the motor and Profinet communication to the PLC. Besides four conventional I/Os, four DXP ports are provided on the module, which can be used either as inputs or outputs. "The module now enables us to collect more sensor data, or to be more precise, double the number of I/Os compared to the previous module. We previously had to use additional I/O modules from other manufacturers to collect the signals from the sensors," Hansjörg Lerchster explains the benefit of the new CCU. "We can now combine all this together. Bus communication also makes the solution plug-and-play compatible."

Automatic address assignment simplifies commissioning

There are also benefits gained from the easier installation and commissioning of the CCU modules. "Addresses are now assigned automatically. We have received very good feedback from the plants under construction. The CCU module is easy to install and the error handling is also very good. It directly displays which motor roller is not working. That wasn't possible with the old technology," says Steiner, describing the feedback from his colleagues.

The new motor rollers have been gradually introduced since 2021. SSI SCHAEFER produces over 100 kilometers of conveyor technology every year. The

QUICK READ

Intralogistics specialist SSI SCHAEFER is in the process of digitalizing its conveyor technology end-to-end. Energy efficiency, short time-to-market and maximum availability through predictive maintenance are the driving factors behind this. Turck supports this approach with a Profinet I/O module for the digital, decentralized control and power supply of 48V roller motors via CAN. Besides greater efficiency for assembly and the centralization of the power supply architecture of its conveyor technology, SSI SCHAEFER values the module's ability to offer digital services such as predictive maintenance thanks to the transparent data provided.



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Hansjörg Lerchster | SSI SCHAEFER

motor rollers are integrated into various product groups, from straight conveyor belts to curves and inclined rollers right through to complex alignment conveyors. Due to the extensive conversions and adjustments required in the design drawings, this type of transition does not happen overnight.

Future security and modular

Thanks to their digital control, the CCU modules offer a wide range of options for optimization and automation. The option of controlling the modules both via Profinet and via I/O signals ensures a high degree of flexibility and backwards compatibility. This flexibility enables the intralogistics specialist to retrofit older systems with the new technology. Not only can the motors be controlled more precisely via the fieldbus interface, but status data such as the temperature or operating parameters such as operating hours, can be transmitted in parallel with the cyclical process communication of the operating data.

“With the module’s new firmware, we can control this not only via Profinet, but also via the I/O signals. This enables us to also use the modules in the context

of devices with software that cannot yet work with Profinet,” Steiner adds. Even if not every option is already being used to its fullest extent today, SSI SCHAEFER appreciates the flexibility and future-proof capability that Turck’s CCU module offers.

Turck and SSI SCHAEFER launched the project in the middle of the corona virus pandemic and therefore at a time when there were supply chain problems. “Besides the improved cost efficiency and what we have achieved technically, the cooperation with Turck was crucial for me. Despite the challenges of the joint development, I found them to be very cooperative, working with us on equal terms and in a targeted way,” Hansjörg Lerchster recalls his work on the project. “We continue to be very satisfied, also with the ongoing activities such as firmware updates etc.,” his colleague Christian Steiner adds. Based on the foundations that have been laid, further joint projects cannot be ruled out.

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With the decentralized CCU module, SSI SCHAEFER conveyor lines can be set up, tested and operated much more efficiently and are easier to install – including the option of predictive maintenance



To the Point.

Turck's intralogistics specialist Frank Morassi on the trend towards digitalized conveyor lines

Modularization and digitalization are among the top issues in mechanical and plant engineering, not least in intralogistics. The best way for today's users to meet their customers' rapidly changing requirements is with modular and flexibly scalable conveyor lines. For these to also offer high availability and work ideally with zero pressure accumulation, an efficient digitalization strategy is unavoidable. The trend is moving away from massive, centrally controlled and driven lines towards decentralized control modules and roller drives directly in the field.

The digitalization of the conveyor line and decentralized, cabinet-free control concepts offer a number of advantages. First of all, there is the benefit of simple scalability. If requirements change, digitalized conveyor modules can be quickly combined to create new route layouts, all with very little wiring effort.

short cycle times. Conveyor lines fitted like this benefit from improved energy efficiency as it is possible to switch off motor rollers that are not in use almost immediately.

Last but not least, the digitalization of the conveyor line also increases its availability. Smart control modules also record in the background the status of the connected motor rollers. An increase in the power requirement above a standard value indicates an imminent failure of the drive in the foreseeable future. If these values are continuously monitored, the system issues a warning in good time, allowing the user to replace the defective motor rollers as part of a planned maintenance measure. In this way, unplanned downtimes can be kept to a minimum.

Turck's response to the trend towards the digitalization of conveyor lines is a sophisticated portfolio of robust IP67 block modules. The I/O modules of the TBEN-S and TBEN-L series for signal distribution

Users of Interroll drum motors have been able to use Turck's TBEN-L-4RMC module for some time now. It controls the motor rollers via the CAN interface and the Turck Multiprotocol enables it to communicate automatically with the controller via one of the three Ethernet languages Profinet, EtherNet/IP or Modbus TCP. The module can now also be used for motors from the manufacturers MPC and MTA.

Actuators or sensors can be connected via four digital inputs or four universal inputs or outputs (DXP ports). The user can execute various pre-programmed control routines via the module's four CAN ports, for example to easily set up zero pressure accumulation (ZPA). Specific control operations that are not included in the pre-programmed logic routines can be carried out by the user using the ARGEE code-free control logic.

»Digitalized conveyor lines offer high performance, are highly flexible, and can be set up with zero pressure accumulation in no time at all.«

Smart I/O modules on the conveyor modules not only provide the control intelligence but also inputs and outputs for sensors and actuators, the latter primarily in the form of roller motors. All devices are supplied via robust IP67 power supply units on the modules for which the voltage is looped through via M12 power cables thanks to the line topology. The connected motors require a power supply of either 48 or 24 volts.

Decentralized control modules significantly reduce data traffic and also enable

directly on the conveyor system or the TBEN-L-PLC IP67 PLC for autonomous control directly on the module are increasingly being used in intralogistics systems. A further IP67 module, which was developed specifically for controlling roller motors, is another important component for making conveyor systems more flexible and modular.

