The Magazine for Customers of the Turck Group Issue 2 | 2016

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Brain Gain

Compact HMI/PLC systems and robust IP67 block I/O solutions with Codesys controller bring intelligence directly to the machine

Integration Helper for RFID

Ethernet/RFID block I/O modules simplify the direct RFID integration of HF and UHF read/write heads

Sensors with Insight

Turck's capacitive BCT sensors with IO-Link offer increased functionality and enable predictive maintenance

Clever Chauffeur

Movexx automates driverless transport vehicle completely with sensors, fiber optic cables, RFID and Turck HMI controller

We Take Care of Your Data

Only a few more weeks to go and 2016 will also become history. However, before the automation community goes off on its Christmas vacation, the last high point of the year – the SPS IPC Drives in Nuremberg – still has to be successfully attended. Product management, development, sales and many other departments have worked towards this event, in order, dear reader, to show you the latest developments from our laboratories and production halls.

The following pages provide a detailed compilation of innovations that await you. The News section provides a quick overview of our major focuses when it comes to providing efficient and future-oriented solutions for your automation tasks. The major topic of the sector also this year is naturally "Industry 4.0" – and also not for the first time. However, as with the discussion about Industrial Ethernet of over decade ago, we are moving away slowly but surely from the theory stage towards reality and user relevance.

Data is the "life blood" of Industry 4.0. And this is also where Turck does its work. We supply solutions for acquiring, transferring and conditioning data – starting from the sensors to the fieldbus and control technology. In our view, IO-Link, RFID, OPC-UA and Ethernet are the four key technologies for these tasks. And in Nuremberg we will be presenting innovations which we believe can benefit you immediately when it comes to making your machines and systems fit for the future.

A major highlight here is our new IP67 block I/O module with integrated Codesys controller. A robust compact PLC with a high degree of protection, which does not require a control cabinet and creates the possibility of modular machine concepts that are completely new. Read our title story starting on page 8 to find out what the devices can do and how they can be used efficiently.

We look forward to talking to you about your requirements for efficient automation and presenting our solutions. Visit us at the fair stand or ask your Turck sales specialist.

Yours sincerely,

Oliver Merget, Vice President Business Unit Automation Systems

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Expecting Six Percent Growth in Turnover

Turck is expecting a consolidated group turnover of over 530 million euros for financial year 2016. As Turck general manager Christian Wolf reported at the annual press conference of the family-run business in Mülheim an der Ruhr, this corresponds to a consolidated group growth of around six percent compared to the previous year. The number of employees in the Turck Group increased by 3.1 percent in 2016 to around 4200 worldwide. "Based on current estimates, Turck in Germany is expected to achieve above average growth this year of around seven percent," said Wolf in his report on corporate growth at the press conference, and also described Turck's contribution to Industry 4.0: "For Industry 4.0, data is the elixir of life and Turck is offering efficient solutions for the acquisition, treatment and transfer of relevant production data." In the key technologies for Industry 4.0 – RFID, OPC-UA, IO-Link and Ethernet – the Turck Group is making major contributions, the managing director stated.
In order to be well prepared for the challenges of the future, digitized business processes are also important as well as digitized production processes. Turck has thus recently invested over 30 million euros, not only in improving the IT infrastructure and manufacturing and material logistics, but also in software systems SAP, CRM, Intranet and e-learning that are standard worldwide.
Wolf once more declared an ambitious growth target for 2017: The aim is to increase turnover by six percent to a target of over 560 million euros. Some uncertainties do exist here, which could have an effect on the general economic environment, such as Brexit, the situation in Russia and Turkey, but also the developments of the presidential election in the USA.

Compact IP67 Controller with Codesys 3

more info on page 8

Turck is presenting its TBEN-PLC Codesys 3 controller as a compact IP67 PLC for controlling small or modular machines. Thanks to its robust housing and high degree of protection, the TBEN-PLC can operate directly in the field and thus enables the implementation of machine and plant controls without the need for a control cabinet. Machine automation concepts and the use of pre-assembled cables reduce the cabling effort and simplify commissioning. The large number of communication interfaces underlines the tremendous flexibility of the new TBEN-PLC: When used as a master, the device also supports Modbus RTU, CANopen and SAE J1939 in addition to the industrial Ethernet protocols Profinet, EtherNet/IP and Modbus TCP.

Capacitive IO-Link Sensors

more info on page 18

The capacitive sensors, BCT, with IO-Link interface enable the parameters of switches, such as in level control applications, to be set easily. The internal process value of the sensor can be displayed in different damping states via FDT frameworks such as Pactware or the machine controller. This simplifies the teaching of the sensor in difficult applications and enables the diagnosis of sensor or container contamination. Alternatively, the BCT sensors can be set according to the particular model, also by teach buttons or teach cable. This last feature provides protection against unauthorized manipulation during operation. The BCT with IO-Link enables the user to carry out predictive maintenance.

Wide Range in M8

Turck offers a new range of inductive proximity switches in the M8 housing. The technology of the ferrite core sensors has been completely upgraded, thus increasing the switching distance by up to 50 percent. As a result, devices for flush mounting can now also be offered with an extended switching distance of 3 mm as well as with the conventional switching distance of 2 mm. The non-flush sensors are likewise available with a 3 or 5 mm switching distance. Thanks to the newly developed sensor electronics, Turck was also able to produce devices with an ultra-short 15 mm design. The modular development approach of the device series has led to a broad range of variants that allows users to find the optimum M8 switch for their application, without any compromises involved. The sensors are available in 15, 22, 30 and 40 mm lengths. On the output side Turck is offering M12 or M8 connectors as well as devices with a cable outlet.

Laser Distance Sensors

Turck expands its family of laser sensors with the new LTF Series. Featuring time-of-flight technology, the laser measurement sensor ensures accurate distance measurements out to 12 meters. The LTF offers the best-in-class combination of accuracy, repeatability and range. Designed with a Class 2 laser emitter with small, highly visible spot, the LTF provides easy sensor alignment and high excess gain. The same sensor that provides repeatability of less than 3 millimeters and accuracy of plus or minus 10 millimeters can also reliably detect dark targets past 7 meters and white targets at 12 meters. In addition to precision distance measurement, the LTF delivers consistent detection of targets regardless of the angle, environmental conditions or ambient light resistance.

Temperature Measuring Amplifiers

Turck has added the IMX12-TI temperature measuring amplifier to its IMX interface technology series. With a width of only 12.5 millimeters and the highest channel density on the market, the devices save valuable space in the switch cabinet. Besides a single-channel variant, which directly signals overshoots of the temperature limit value to the control system via an additional relay changeover contact, Turck is offering two two-channel versions of the IMX12-TI: One for resistance thermometers or thermocouples with a 2- or 3-wire connection, or another for 4-wire resistance thermometers. With operating temperatures up to 70 °C and operating voltages of 10 to 30 VDC, the IMX12-TI offers particularly versatile use, such as in applications with an onboard power supply, emergency power supply, or other battery-fed applications.

Compact Ethernet/RFID Interfaces in IP67

The new compact Ethernet/RFID interfaces, TBEN-L-RFID and TBEN-S-RFID, with protection to IP67 bring data from RFID read/write heads in the HF and UHF frequency band via Profinet, Ethernet/IP or Modbus TCP to the controller. Due to their high degree of protection and the possibility to connect actuators and sensors to RFID read/write heads simultaneously, the block modules are ideal for retrofitting RFID application. Switch cabinets are unnecessary and keep the wiring effort at a minimum. The ultra-compact RFID module in the TBEN-S design simplifies the PLC-integration by bringing the mapped RFID data via conventional I/Os to the controller. The Codesys programmable TBEN-L variant is somewhat bigger, but also provides controller functions and can thus already filter and pre-process RFID data, and even link it directly with higher kevel controls. More info on page 20.

Encoder with Fixed Pulse Rate

Turck is expanding its portfolio of inductive encoders by adding the INCR variant with fixed pulse rate to the QR24 series. Manual configuration of a specific resolution using Easy Teach or Pactware is no longer required with the preset QR24 models. All resolutions between 1 and 5000 pulses per revolution are available on request. Particularly common resolutions can be delivered in stand-by. This includes: 360, 512, 1000, 1024, 2048, 2500, 3600, 4096 and 5000 pulses per revolution. The following versions are also available at short notice: 1, 5, 6, 8, 10, 12, 36, 64, 100, 200, 250, 256, 400, 500, 600, 800, 1200 and 2000.

Update for TBEN-S

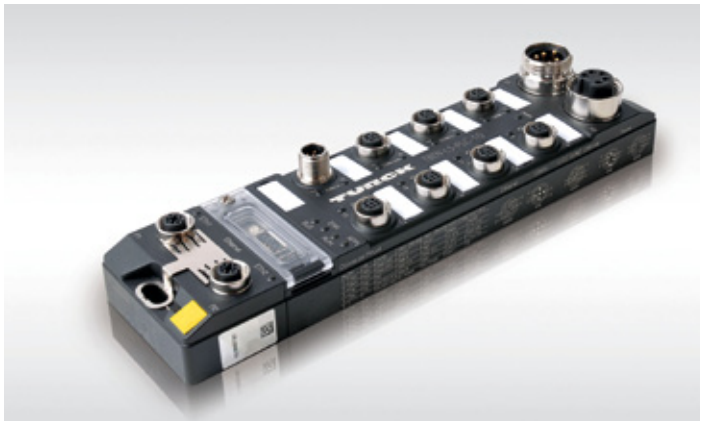
The digital block I/O, TBEN-S, will gain new functionality by free firmware update. It comprises the functions for digital filtering, pulse stretching, latched inputs, counters and PWM. All the functions are set up via the engineering software of the controller manufacturer, or alternatively via the module's own web server or Pactware.

Weld Nut Sensor Detects M5 Nuts

Weld nut sensors are now also available with a Ø4 mm sensor probe. This makes the detection of missing M5 nuts before welding even simpler. Turck has also improved the abrasion resistance of its weld nut sensors with optional titanium nitride coatings (TiN). As steel plates and nuts have to be placed onto these sensors before welding, they are exposed to a high degree of friction over their entire service life.

Ethernet-Block-I/O with Eight IO-Link Masters

Turck's IO-Link portfolio has been further expanded with the TBEN-L-8IOL multiprotocol IO-Link master with protection to IP67 and IP69K. The Ethernet block I/O module offers eight IO-Link master ports in the robust TBEN-L housing. The module supports the Class B standard at four of the eight ports. Actuators such as IO-Link valve blocks or robot grippers can thus be provided with an isolated power supply of up to 2 amperes. To switch off actuator groups during operation, the auxiliary voltage can not only be switched off permanently but also at any given time, depending on the process data. Users can thus optimize their power management through the efficient use of the connected IO-Link devices. Like all other Turck IO-Link masters of the TBEN series, the TBEN-L-8IOL also features SIDI, which stands for "Simple IO-Link Device Integration".



Angle Sensor for Ex Areas

Turck's Ri-DSU35 is the first contactless inductive angle sensor that also has ATEX and IEC-Ex approval for use in zones 1 and 21. Compared to dual sensors, the Ri-DSU35 offers considerable benefits for the position measurement of valves and stop valves in Ex areas: As it can detect valve positions in the full 360° range, it is also possible to monitor three-way valves. The contactless measuring principle of the Ri-DSU35 operates absolutely wear-free, thus ensuring a long service life and constant precision. Through the 360° detection of the valve position, the sensor also enables predictive maintenance.

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VEREINIGTE FACHVERLAGE

Brain Gain

Compact HMI/PLC systems and robust IP67 block I/O solutions with a Codesys controller bring intelligence directly to the machine

Why do more and more people hold their smartphone in front of them when phoning? Because they can. It may seem strange to all those who grew up with a spiral cable at then end of a phone receiver, but you have to admit that holding the phone to your ear is nowadays no longer absolutely necessary. As soon as the loudspeaker function or headphone are used, the device can also be held in front of you and texts can even be read at the same time. Holding the device to your ear also makes the increasingly popular practice of exchanging sound recordings via messenger services more difficult. The irritation that this kind of behavior causes in other people is the pain of separation that arises when a regular social practice dies out. It makes the fact clear that a smartphone is simply not a basic telephone. The phone function is only one of the many functions of the device, and for many people not even the most important one.

Old routines are also being shaken up in automation technology. The change to digitally networked, highly flexible and transparent industrial production, which in recent years has been given the label Industry 4.0, is presenting designers and electrical planners with new tasks and challenges. One of the routines of mechanical engineering and particularly in electrical engineering planning is the design of a control cabinet for protecting sensitive electrical and electronic equipment such as controllers, power supply units or I/O solutions from the harsh conditions at the machine.

Potential of decentralized solutions

Decentralized I/O solutions in themselves are nothing new, but are becoming more and more interesting in the light of modern automation and machine concepts, which increasingly have a modular design. The trend is moving away from the control cabinet towards installation in the field. The use of robust I/O technology with IP67 degree of protection enables users to run the cables of the field devices directly in the field to a nearby I/O distributor, which can route the signals to the control cabinet, either as a passive multipole cable junction or actively as a fieldbus device. Compared to point-to-point wiring, this saves the user considerable costs for the connection technology and the wiring. There is also a time saving benefit when the machine is set up at the customer. Instead of running several individual cables to the control cabinet, it is normally only necessary with fieldbus or Ethernet systems to run

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The Codesys programmable TBEN-L-PLC block I/O module is another step by Turck towards the decentralization of machine intelligence. The compact IP67 controller offers sufficient performance to control several tasks autonomously. Master and slave interfaces also enable it to be used as a protocol converter so that it is possible to connect existing machines with modern Ethernet-based plants. For control tasks with operating and visualization requirements, Turck is offering the TX500 HMI/PLC series.

one communication cable and power supply in order to connect the I/O level to the controller. The wiring of the periphery to the remote I/O technology can then be done in advance at the machine builder.

High performance

Turck takes the decentralization from the control cabinet to the field one step further. The TBEN-PLC Codesys-3 controller of the Mülheim automation specialist is a compact IP67 controller for use directly in the field. It is designed with three main scenarios in mind: The Codesys controller enables the customer to implement the fully autonomous control of small machines. The TBEN-L-PLC can control individual machine modules, which in turn are connected to a main controller, or it can be used as a protocol converter to interconnect machines with different Ethernet or fieldbus systems.

Multiple interfaces

These different application scenarios are made possible by the high performance and the number of communication interfaces offered by TBEN-L-PLC: When used as a master, the device also supports Modbus RTU, CANopen and SAE J1939 in addition to the industrial Ethernet protocols Profinet, EtherNet/IP and Modbus TCP. The RS232 and RS485 serial interfaces can also be used as required in Codesys. The block I/O controller also offers eight universal I/O channels for the direct connection of sensors and actuators.

The TBEN-PLC can also be run as a slave (e.g. device) in the Ethernet networks Profinet, EtherNet/IP and Modbus TCP, as well as in Modbus RTU and CANopen networks, which enables it to be used as a protocol converter. For example, the controller can operate as the CANopen manager of a machine module networked with CANopen and connect this module to a system running with Profinet. As part of the increasing digitization of industry, this enables existing machine concepts to be made fit for the challenges of closely networked, highly flexible production. Turck is thus providing an answer to the question of how existing machinery and plants can benefit from the increased efficiency, optimized transparency and production planning resulting from the evolution of Industry 4.0.

> The programmable IP67 I/O PLC modules, TBEN-L-PLC, are free of any control cabinet restrictions and make plants and machines fit for Industry 4.0 scenarios.

Turck has added TBEN-L-PLC and TX500 as new and robust high performers to its fieldbus team. With their decentralized intelligence, the devices support the trend towards machine modularization

The TBEN-PLC brings the controller to the field and enables the creation of modular machine concepts

Turck's new TX500 HMI series offers control, operation and visualization in a single device

Trend towards modularization

Another application scenario of the TBEN-L-PLC is the control of individual machine modules. The trend towards modularization has been driving some machine builders for several years. The value addition provided by smaller, autonomous units is created by the flexible combination of modules into a solution that best meets current requirements. Machine builders want to move away from one-off machine solutions, whilst still being able to provide solutions specifically tailored to customer requirements. The use of modularized machines and plants thus provides a compromise that satisfies both needs.

Particularly with machine modules, it is often necessary to decide according to the combination of modules, where the center of the machine is to be located and thus the location of the controller. With the TBEN-L-PLC, each module has its own controller on board, which can operate as a master or slave. The machine builder can thus decide from machine to machine where the intelligence of the machine is to be located. The hardware here does not present any limits. The linking of two modules only requires the connection of the two communication and power supply cables between them.

Even for these devices, a control cabinet is no longer necessary since the Turck portfolio also includes power supplies and safety technology in IP67 as well as I/O and controller technology. In its safety technology program, Turck has already presented its TBPN hybrid IP67 safety I/O module. Besides four safety I/Os for Profisafe, the module offers two universal I/Os which can be used as an input or output, as well as two I/O-Link master ports, which further increase the flexibility of the safety module.

HMI/PLC for operation and visualization

A solution is also available for machine operation: The TX500-HMI controllers with high quality touch displays and a high-speed processor offer a similar range of interfaces as the TBEN-L-PLC, and are ideal for use where the operation and visualization of processes are required as well as machine control. Each TX500 is equipped with a Profinet master and EtherNet/IP scanner, as well as a Modbus TCP and Modbus RTU master. The HMIs can also be run as slaves in both Modbus protocols.

Codesys 3 also allows the lean and straightforward programming of control and visualization functions in the TX500. The latest processor technology of the units guarantees the smooth handling of computing intensive processes right through to moving image visualizations. The high resolution TFT display with 64,000 colors enables the attractive and high performance display of graphics and animations. The front panel of the TX500 series is protected to IP66.

Two RJ45 Ethernet ports, a serial interface for RS232 or RS485 as well as two USB ports are provided on the terminal side. An additional SD card slot makes it possible to expand the 128 MB internal data memory. Turck is offering the TX500 series in three variants with different display sizes and resolutions: two 16:9 displays with 7" or 13" (TX507 and TX513) diagonals and one 10" device in 4:3 format (TX510). The two smaller displays offer 800 x 400 pixels, while the large TX513 comes with 1280 x 800 pixels.

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»Customers looking for decentralized intelligence in the field will find us to be the ideal partners.«

Christian Wolf | Managing Director

After nearly two years of building activity, Turck has moved into the rooms of its new sales and marketing headquarters. In an interview with etz magazine, managing director Christian Wolf explains the other developments that have taken place at the automation specialists over the last year.

How pleased are you with the move into your new premises in Mülheim an der Ruhr?
Very pleased. The new building was completed on time and within budget. It offers a high level of transparency. We are very pleased with the architecture and structure, which encourage good communication. Already after a few weeks, the feedback from the employees is very positive. We were able to merge different areas which we had located elsewhere due to limited space and have now accommodated 85 % of the workplaces. The offices in the previous main building are currently being upgraded so that we have sufficient space for further expansion in the coming years.

A year ago you wanted to focus international business on the BRIC countries. Not an easy task in the current economic climate.
Even though the high expectations of ten years ago have not been completely fulfilled, BRIC countries – and the ASEAN region as well – definitely continue to be our main focus. Although growth in China is now somewhat subdued, a high single digit growth rate for such a large economy is still a significant factor. Russia has also developed to be a very good growth market. We currently have a turnover there of over 8 million euros and enjoy two-digit growth every year. The fact that the Russian state owned companies are increasingly demanding greater value creation in their own country is presenting new challenges. However, we will also find a solution for this. Particularly in recent years, India has developed extremely well and always has a growth rate of between 20 % and 25 %. The Brazilian economy, however, is in recession. Although our growth there is very good, we are still not a major presence on the Brazilian market as we are relatively small players.

What is the situation in the ASEAN region, where you wanted to set up headquarters in Singapore this year?
We appointed our Korean managing director, who was very successful there, to regional manager. In order to serve the ASEAN region as efficiently and as smoothly as possible, we will soon be setting up a joint venture there with our long-standing partners Banner Engineering. We then intend to serve the markets locally in Thailand and Malaysia, and then Indonesia and Vietnam.

What is the situation in America, your largest market?
The new factory in Saltillo, Northern Mexico, has the highest number of employees in the Turck Group and offers outstanding performance. We benefit from the cost savings and the very well-trained employees. This is also important because the USA market is still suffering from the oil and gas crisis. Our sales in the USA are currently just above the level of the previous year.

How are you tackling the hot topic of Industry 4.0?
Industry 4.0 offers many opportunities. However, it is not really a revolution. Condition monitoring solutions already existed before Industry 4.0 became a buzzword. However, there are many things that still have not been sorted satisfactorily. The main application areas for end-to-end communication are predictive maintenance as well as identification. Our sensors – still the nucleus of any automation – make us ideally equipped for these tasks. All Turck devices are equipped with the appropriate communication interfaces so that we can supply data for any interfaces at any time.

People are increasingly talking about the cloud, particularly with regard to handling the large volume of sensor data. What path are you taking here?
Our strategy is open. We offer our devices with an OPC/UA and IO-Link interface. This allows connection to virtually all possible systems. If the customer wishes, we can also provide a cloud solution. However, I don't think that many customers will use multiple clouds of different component manufacturers, but it will rather be manufacturers who have to supply this data to the clouds of their customers. Security issues also play a major role. I hardly know any customers today who are willing to store or move their machine data in or to a cloud. However, the connection to an MES or ERP system is something different. We are noticing an increasing demand here from our customers. To be better prepared for this in future, we are thinking about effective collaborations or – in the case of interesting companies from the software or system integration sector – a joint venture company.

You were very successful 11 years ago in knowledge transfer in the field of RFID.
That's right. We took exactly the right step in our investment in RFID technology. We consistently invested in RFID in the industrial environment and offered the right architecture as well as a field connection. The area for us is very successful and has resulted continually in high two-digit growth in recent years. RFID technology is also ideal for Industry 4.0 applications. After all, the data from the field almost always has to be transferred to the MES or ERP system and RFID technology is the method of choice here.

One area in which Turck aims to establish itself more is safety. What can you tell us about this?
Through our long-standing partnership with Banner Engineering we already have a complete safety portfolio in our product range – from photoelectric sensors and barriers to optical sensors and laser scanners, right through to safety relays and controllers. This is enhanced with our hybrid safety IO module which we developed together with Bihl + Wiedemann. All automobile manufacturers are interested in it. We will continuously extend the areas of IO-Link safety as well as ProfiSafe and CIP Safety in particular. However, we are also working on the integration of safety functions according to PLCopen. In the field of safety we also aim to support our customers increasingly as suppliers of comprehensive solutions.

Turck's portfolio goes beyond the field level and also includes HMIs and controllers. How is the company positioning itself?
Our new claim "Your Global Automation Partner" represents our focus on being suppliers of integrated automation solutions – this is our claim and our performance promise. We focus here clearly on IP67 protection for decentralized machine control. "Customers looking for decentralized intelligence in the field will find us to be the ideal partners." We are niche suppliers in control technology and serve a large range of requirements at the field level.

Author | Frank Nolte, deputy editor in chief of the technical journal etz, conducted this interview
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After a requirements analysis and subsequent concept planning Turck supplies tailored 19-inch racks with the latest interface technology

Replacement Partners

Turck is expanding its range of I/O solutions for the process industry with a 19 inch replacement concept based on the new IMX12 interface series

Manufacturers of measurement and control technology in the process industry are faced with different challenges to automation manufacturers in the factory automation sector. For example, modification cycles in process automation tend to be longer. A new process engineering plant or even the general overhaul of a plant are much less frequent than new production lines or new plants in factory automation. In the mean time, however, developments in the technology continue incessantly. The control technology manufacturers will thus continue to offer devices for a long time, at least in their spare parts program. Manufacturers in the automation sector develop new product lines every ten to 20 years in order to drive innovation and keep up with the state of the art.

The customer normally wants to use proven technology that represents the latest state of the art. The devices they buy today are also expected to retain all the necessary approvals in ten years. However, the older a series becomes, the more the components it contains are discontinued. Manufacturers are thus forced to redesign their devices. These completely new devices must in turn be approved for all markets.

In the field of interface technology, new devices are already better because they use newer components which stay available in the long term. The international approvals can therefore be guaranteed considerably more easily in the long term. These were some of the reasons why Turck presented its completely new IMX interface technology series in 2015. The device series has been continuously growing since then. The central features include the narrow housing of only 12.5 millimeters and the flexible use of the devices. With operating temperatures up to 70 °C and operating voltages of 10 to 30 VDC, the entire IMX series offers particularly versatile use. This allows installation in mobile applications with an onboard power supply, emergency power supply or other battery-fed applications.

IMX12-TI temperature measuring amplifier

The latest member of the IMX series is the IMX12-TI temperature measuring amplifier for direct use in Zone 2. Besides a single-channel variant, which directly signals overshoots of the temperature limit value to the control system via an additional relay changeover contact, Turck is offering two dual-channel versions: One for resistance thermometers or thermocouples with a 2- or 3-wire connection, or another for 4-wire resistance thermometers. All standard thermocouples can be connected as well as resistance sensors. Like the entire device series, the IMX12-TI can also be optionally fed with power from the DIN rails via a Power Rail system, and also redundantly as well as with group fault messages for high availability applications.

The new IMX series is a market leader when it comes to its technical specifications for flexibility and channel density. However, the basic features and specifications are only one factor among many when choosing an interface technology system. They are the first filter in the search for a solution. Even if the products of different manufacturers vary in detail, there are normally still some vendors who meet the set requirements.

Products – consulting – mechanical solution – implementation

Besides products, Turck therefore offers a number of services by which the automation specialist aims to supply its customers with an all-round package. Turck advises its customer in the concept design and selection of the right system for signal transmission from the field up to the connection of the signals to the control system. Starting with an analysis of the required and actual situation, the required functions are determined and the best solution designed on this basis. This does not have to be an interface technology solution in all cases. If, for example, the entire control system of a plant is updated, it may be worthwhile investing in a system I/O solution. Turck's excom I/O system for Zone 2 can be used directly in the control room. It is connected to the control system via Profibus and thus replaces the I/O level of the control system. The signal isolation from the Ex area is already integrated in the excom system. In other cases, an interface technology solution is more suitable – for technical, financial or other reasons.

Once the optimum solution is identified, Turck also provides support with the mechanical tasks and commissioning. This includes the prewiring on terminals, the customer-specific labeling of cables, wires or terminals, as well as the assembly of connectors. Although the customer only has to deal with one

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Understanding the problems of one's customers is one of the ingredients for a good partnership to be successful. One of these problems that currently concern customers in the process industry is the replacement of the interface technology in the 19-inch card format. More than 30 years since their introduction, the discontinued interface cards can still be found today in many 19-inch racks. Together with the customer, Turck is developing a cost and time optimized replacement concept with the state-of-the-art interface technology of the new IMX series, which comes already pre-mounted on 19-inch racks.

With its offering for the process industry, Turck is showing that outdated plant sections can be made fit for the future quickly and economically with the right concepts.

contact from Turck sales, these tasks are handled by Turck mechatec, Turck's own specialist company for panel building and custom solutions.

The fourth section of the complete solution consists of the offering of additional services, such as the calculation of Ex circuits or the creation of comprehensive project documentation. Customers particularly benefit from this complete offering when having to replace 19-inch card systems. Virtually all manufacturers have now withdrawn from this segment. Furthermore, whoever has still not discontinued their products has considerably increased the prices for 19-inch cards – without developing the technology any further. Even with new cards, only the status quo can therefore be maintained and a real modernization of the plant does not take place.

State-of-the-art interface technology in a 19-inch rack

Turck is now offering a solution that combines established standards with innovative technology and fits special 19-inch racks with devices of the IMX interface technology series in order to replace obsolete 19-inch installations. For customers only a minimum of effort is thus required to modernize their 19-inch racks. The current configuration of cards and signals is discussed with Turck sales. Turck then fits a 19-inch rack with suitable devices and creates a one-to-one equivalent of the original signal combination. The interface devices are prewired on terminals at the back of the rack. Customers just have to fit the rack in the control cabinet and connect their cables to these terminals.

The IMX2-CCM monitors control cabinets and boxes, and enables predictive maintenance

CCM for control cabinet diagnostics

What 19-inch cards like interface technology lack are the modern diagnostic systems, which are normally provided on board in the fieldbus systems for process automation. Turck has thus developed the IMX12-CCM cabinet guard particularly for older systems without diagnostics or control cabinets with simple terminals. The device can be retrofitted in virtually any control cabinets or protective enclosure. A simple teach-in process enables them to be configured for the specific local conditions. The IMX12-CCM (Cabinet Condition Monitoring) cabinet guard indicates the degree of protection of the control cabinet with a single switch signal. The 12 mm wide device comes with an intrinsically safe 2-wire isolating transducer interface, thus enabling it to be used also in explosion hazardous areas. This means that only a maximum of four wires and available space on a DIN rail are required to install and commission the IMX12-CCM. The teach-in process can be carried out without the need for a computer or an additional tool. The standard HART interface is provided for additional diagnostic options, such as for reading out the absolute measured values.

Besides the interface technology, Turck's control cabinet guard offers a range of sensors which monitor the actual status of the environment: a temperature sensor, an absolute humidity sensor and a triangulation sensor were integrated in the IMX12-CCM. This last sensor measures the precise distance to the cover or door. If the door is not closed correctly, the device indicates this and the operator can rectify the fault directly.

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IO-Link Sensors with "Insight"

Turck's capacitive BCT sensors are now easier to parametrize thanks to the IO-Link interface and offer additional functions which also allow for predictive maintenance

In industrial automation, capacitive sensors detect various media and are used especially for the level monitoring of liquids or bulk material. The unique selling point of the capacitive sensor is its ability to "look through" container walls. The sensor can be set by adjusting a switch threshold, so that it can mask out container walls made from plastic, glass, paper or other non-metallic materials. This "insight" is frequently utilized by industrial users to monitor tanks, pipes or other containers. However, it is also possible to check the filling of packaging units, such as in cartons, which can thus be checked afterwards.

A capacitive sensor is similar in design to a capacitor: It consists of two plates (electrodes), between which an electric charge can be stored. Capacitive sensors that have no contact with the medium are designed so that the capacitance between the active electrode and the electrical ground potential is measured. The capacitance increases as the medium approaches the active face of the sensor and thus affects the oscillation amplitude of the oscillator. This change is interpreted as a signal.

With their IO-Link interface Turck's BCT series capacitive sensors not only offer simple parameter options but also supply diagnostic information

The switch point challenge

The key benefit of capacitive sensors is provided if the switch point of the sensor can be set. The switch point can be selected so that a certain basic capacitance, which for example comes from damping through a plastic wall, can be masked out. This works with all standard container materials. The dielectric constant of a medium is critical in order for it to be detected reliably. This view through the wall enables mounting to be carried out on the outside of the container, which is considerably easier than internal mounting. With aggressive and corrosive liquids there is often no other alternative than detection from the outside. Limit value measurement from outside is also a reliable way of preventing any possible contamination of the media.

The switch point of most capacitive sensors was previously set using a potentiometer. In applications for detecting water in a plastic container, this setting can be easily made using a screwdriver. However, if the plastic wall is thicker or the medium only has a low dielectric constant, the setting of the switch point can be difficult. If the sensor or the container wall get slightly dirty, the sensor may still switch and the limit value is no longer correctly detected.

IO-Link considerably simplifies commissioning

Turck had already simplified the parameter setting of its capacitive sensors through the single-click teach function on the BCT series. The BCT series has now

The BCT sensor reliably detects the correct filling of the plastic containers

been provided with the IO-Link intelligent communication interface, which offers full transparency for setting the sensor parameters with difficult to detect media and also allows predictive maintenance. Thanks to IO-Link, the BCT can be easily taught for the particular medium or the empty state from the controller. The setting of the sensor via DTM frameworks such as Pactware is even simpler.

A single-click teach function is provided for easy to detect media. This continues to remain possible directly on the BCT models with teach buttons. With the empty teach, the sensor sets the currently measured value as the empty state and puts the switch point just above it (or underneath it, since an undamped capacitive sensor outputs the maximum process value). A complete teach function is ideal for difficult to detect media or liquids which have to be distinguished from their foam. This teaches both extreme values, full and empty (e.g. foam). The sensor then positions the switch point in the middle of the two extreme values.

Process value display in Pactware

The display of the "virtual analog value" in Pactware or in the controller is particularly useful. The value between 0 and 2000 otherwise represents the hidden measured value of the sensor. In this case, 0 on capacitive sensors represents full damping with water and 2000 the absolutely undamped state.

The process value display supports the parameter setting and displays how much signal reserve is present between the two switch states of the sensor. The sensor features a humidity compensation function which masks out the deposits and conductive films on container walls. However, if the degree of contamination gets out of hand, the process value display shows when the cleaning of the container is unavoidable. The transparent limit value detection makes it possible to plan the cleaning according to the production process and other maintenance work.

Predictive maintenance with IO-Link

Thanks to IO-Link, Turck's capacitive BCT sensors support other features for predictive maintenance. The integrated temperature detection indicates if the limit value in the sensor is exceeded. The sensor also monitors the power supply status and indicates any irregularities as an IO-Link event. This enables wire breaks to be detected and rectified early on before they bring production to a standstill.

The intelligent data storage with IO-Link 1.1 also enables all parameter data to be stored in the IO-Link master. If a sensor has to be replaced – for example due to mechanical damage – a new sensor can be fitted in no time at all, since it fetches all parameter data directly from the IO-Link master. Any renewed teaching of the replacement sensor thus becomes unnecessary.

Limit value detection and more

Variants with teach buttons are still available for users who want to teach their sensor in the field. Besides IO-Link, all BCT devices can also be taught with teach adapters via Pin5. The two variants of the BCT series – with or without teach buttons – are available in two designs: as an M18 variant with a 5 mm standard switching distance and as an M30 variant with a 10 mm switching distance – each for flush mounting. All four devices are in turn available as NPN or PNP versions. Besides the capacitive sensors, Turck offers variants with an IO-Link interface in all other fluid sensor areas.

QUICK READ

In sensor technology, the measuring sensors were some of the first to have the intelligent IO-Link interface. Turck, with its BCT capacitive sensor with IO-Link, is showing how IO-Link usefully increases the functionality of switches. When the application involves difficult media, teaching via IO-Link is much easier, since the process value of the sensor is indicated in the controller. This makes media detection more transparent. Functions such as the integrated temperature and voltage monitoring also increase the availability of the plant.

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Integration Helper for RFID

Turck's new TBEN-S and TBEN-L Ethernet/RFID block I/O modules simplify the direct RFID integration of HF or UHF read/write heads in installations

Compact, robust and simple: Turck's new TBEN-S and TBEN-L IP67 RFID interfaces reduce the effort involved in industrial identification solutions

There are many unanswered questions for several aspects of Industry 4.0. There is, however, a consensus of agreement about the position of RFID technology in the production of the future: A highly automated, highly flexible and closely networked industrial production system requires efficient technology for the identification of employees, systems, tools, workpieces and products. Due to its specific benefits, RFID stands out from alternative solutions such as optical identification – and is therefore without doubt one of the key technologies for Industry 4.0.

The implementation of RFID in production processes is often still too complicated and time consuming in many areas. Even though this effort is worthwhile, many users, particularly in small plants, are put off by what is involved. RFID applications must become easier

to implement if they are one day to provide total transparency for industrial production.

RFID interfaces simplify integration
With its latest RFID interfaces, Turck has set itself the task of making integration considerably simpler. Previously, users could essentially choose between two types of RFID interfaces for Turck's BL20 and BL67 modular I/O systems: On the one hand the simple integration via RFID-S modules (Simple), which transfer data in the bus cycle. The volume of data here is 8 bytes per cycle – sufficient for a UID but with UHF communication or large tags with 2 kilobytes the S module requires long read times. On the other hand, the so-called A slices (Advanced) are available, which can process larger data volumes via acyclic bus communication but which require more effort for their implementation.

RFID integration without controller function blocks
The new RFID interfaces are based on IP67 block I/O devices of the TBEN-S and TBEN-L series and combine the benefits of the two previous alternatives: a simple integration, combined with high performance communication. The TBEN-S RFID interfaces in particular simplify setup in the application by eliminating the need for controller function blocks. The compact modules communicate with two RFID read/write heads in the HF or UHF frequency band and connect an additional four sensors or actuators via the integrated universal I/Os.

The key feature is the fact that the RFID ports in the controller can be treated simply like normal I/Os. The difference is simply in the fact that it is now also possible to process mapped data from read/write heads instead of the analog or digital value of a sensor. The TBEN-S interface is set up via a GSDML file instead of via separate controller function blocks. The data is transferred by the TBEN-S in a prepared table (mapping table) via the Ethernet interface and can be processed further by the controller accordingly, i.e. filtered and forwarded to higher-level systems. The handling of the HF and UHF read/write heads via the TBEN-S module is largely identical. With UHF read/write heads it is also possible to set some additional parameters.

TBEN-S: ultracompact and performant
Due to their compact design with a width of only 35 mm and the high IP67/IP69K degree of protection, the TBEN-S block I/O devices are optimally designed for retrofitting in production plants. The user does not require any additional control cabinet since the modules can be fitted directly in the field – for example, on 40 millimeter aluminum profiles. Up to two RFID read/write heads in the HF or UHF frequency band can be connected to each module. Thanks to the integrated switch, the modules can be configured in a linear topology, which saves cabling effort. Furthermore, up to 32 HF read/write heads can be linked via their RS485 interface.

Besides the signals of the two read/write heads, the Ethernet cable also brings up to four sensor or actuator signals to the controller. As multiprotocol devices, the modules detect independently whether communication is being carried out on the Ethernet cable via Profinet, Modbus TCP or Ethernet/IP and adjust themselves accordingly. The connection of sensors or actuators also couldn't be easier: The universal DXP terminals set themselves automatically to input or output, depending on whether a sensor or actuator is connected. The allocation of functions via the controller becomes unnecessary. Trigger signals can thus be integrated even faster and actuators such as signal lights can be connected in no time at all.

Both RFID block I/O modules are suitable for demanding UHF applications in logistics

Performance for UHF applications
In spite of its compact design, the TBEN-S RFID interfaces offer sufficient performance. They communicate cyclically up to 128 bytes of user data per channel with the PLC. Through the use of data fragments in the UHF data interface it is also possible for the module to process data volumes larger than 128 bytes. Over 100 UHF or HF tags with 8 kilobytes can thus be detected quickly and conveniently. This is made possible by the direct transfer of data to the memory of the TBEN-S module (16 Kbyte per channel).

The integrated web server of the TBEN-S modules enables the devices to be set up via a PC or via mobile

QUICK READ

RFID integration must get easier so that it can provide total transparency in the industrial production of the future. That is why Turck is presenting two compact Ethernet RFID interfaces based on its TBEN-L and TBEN-S block I/O series at the SPS IPC Drives fair. The multiprotocol devices bring data from HF or UHF read/write heads via Profinet, Ethernet/IP or Modbus TCP to the controller. The compact TBEN-S RFID module enables integration without programming or function blocks and thus simplifies implementation. The Codesys programmable TBEN-L variant provides controller functions and can thus already filter and pre-process RFID data, and even link it directly with the control operations.

In applications using many read/write heads, wiring effort is reduced by the possible cascading of the RFID interfaces

devices. During operation the web browser is ideally suited for the diagnostics and maintenance of the connected components and system data. All that is needed is the installation of an HTML5-capable browser on the device. Although the "S" of TBEN-S actually stands for "small" – it could also stand for "simple" on the TBEN-S-2RFID-4DXP.

TBEN-L: Codesys 3 on board

The big brother of the TBEN-S adds a bit more weight to the scales, but also provides added intelligence on board. The TBEN-L interface offers four RFID ports for HF or UHF readers alike, and eight universal DXP I/Os for sensors or actuators. The TBEN-L comes with Codesys 3, thus providing an open system for control tasks. The mapped RFID data can thus already be preprocessed and filtered on the module itself. Control tasks can also be programmed on the basis of the RFID information directly on the module. The eight universal I/Os can be addressed directly – without any rerouting via a central controller. This enables smaller machines with identification tasks to even be run entirely autonomously.

The TBEN-Lx-4RFID-8DXP-CDS can also be set to one of the Ethernet protocols – Profinet, EtherNet/IP or Modbus TCP. However, this is not automatic, but must be set in the configuration in the Codesys environment. TBEN-L runs on an 800 MHz CPU, which accesses a 128 MB DDR3-RAM. The flash memory of the module is 256 MB. Other differences are in the electrical connection of the TBEN-L. These are connected via an M12 connector to the Ethernet and supplied with power via a 7/8" connector. On the more compact TBEN-S block modules, the power supply and network connection are implemented via M8 connectors. These are the most important differences between the two modules. Other features, such as the integrated switch for linear topologies, the transfer rate (10 Mbps/100 Mbps), the degree of protection (IP67/69K) and the integrated web server are offered by both the L and also the S module.

Simple complexity

The question remains how can a module for more complex applications nevertheless be implemented and commissioned more simply. The developers at Turck have armed the module with many new functions. This means that they do not have to be extensively programmed as before. For example, the user can select the "Continuous Mode" so that the read/write head reads in data continuously and passes it to the module until the mode is switched off again. This data is then kept in the module until the higher-level controller decides to call it. Benefit: The read/write head does not have to be retriggered by the controller every time and the resulting data traffic and programming required by the user for this kind of function are unnecessary.

Another useful function is the new "Report Mode", in which the read/write head receives its command already in advance and performs it immediately, as soon as a tag enters the detection range. The action previously had to be always performed by the PLC itself and sent to the read/write head so that valuable time was lost with fast read events.

Outlook

Turck will also offer the TBEN-L RFID interface in a version with Windows Embedded Compact 2013 for system integrators. This will thus allow integrators to program middleware functions on the module in Net, C++ or C#. The communication to the higher-level system is then not implemented via an industrial Ethernet protocol but via TCP/IP. Apart from the operating system, the module will have the same performance specifications as the Codesys RFID module.

Similarly, Turck will also bring a version to the market with the open Linux operating system – likewise for integrators. The TBEN-L platform could also provide a system with an OPC-UA interface, e.g. compliant with the AIM specification for identification devices. This would thus complete the next step towards Industry 4.0. OPC-UA is the Industry 4.0 blueprint for connecting production data to higher level MES and ERP systems.

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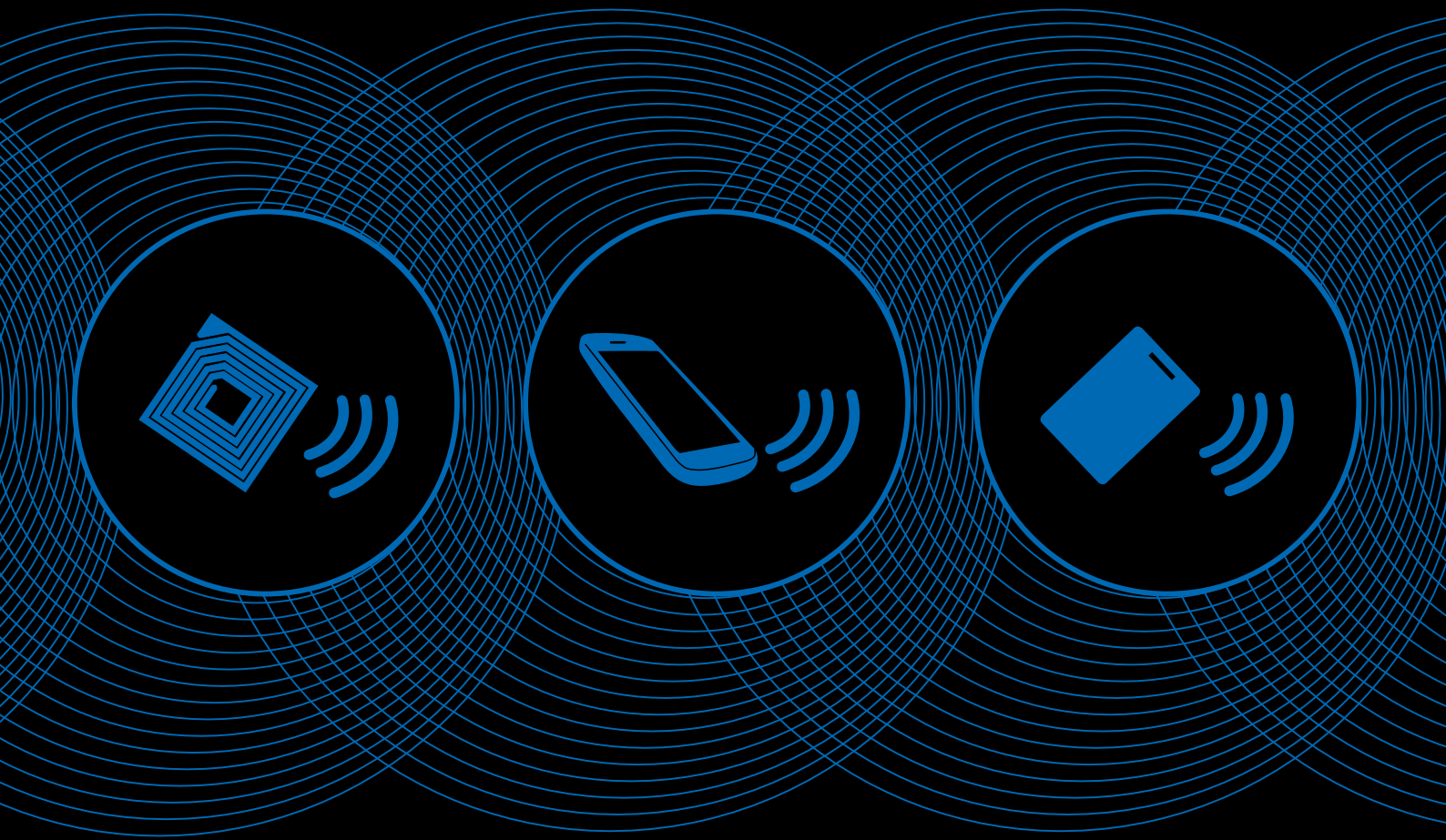

Your Source for RFID Technology News

Light Guides

With its extensive pick-to-light system Turck is demonstrating in the SmartFactoryOWL the benefits of light-controlled worker guidance in manual assembly processes

What does "smart" actually mean? The Duden German dictionary now lists "smart" as a German adjective and describes it with the words clever and intelligent. What "smart" really means today can be better found by looking for the common features of the phenomena that are described with this adjective. Whether in Smart Metering, Smart Grids, Smart Home or Smart TV; "smart" always promises a value addition and innovation by the networking of elements, as well as the use of data resulting from this network.

SmartFactoryOWL opened in April

A look at the SmartFactoryOWL in Lemgo further increases an understanding of the word "smart". In an area of approx. 2000 square meters, the model factory founded in April 2016 by the University of Applied Sciences East Westphalia-Lippe (OWL) and the Fraunhofer Institute collects different solutions that make production processes smarter. In cooperation with companies, the SmartFactoryOWL exhibits examples of innovative production technologies and assistance systems.

However, the SmartFactoryOWL is designed to be more than just an exhibition area. A team of professors, employees and students in Lemgo aim to promote the networking of industrial challenges and academic know-how in order to optimize production processes through clever planning and technology. This offering is primarily aimed at small and medium-sized companies in the region.

The workers acknowledge the removal of the indicated component by touching the K30 sensor light

Students developing process optimization
"Industrial companies from the region come to us with specific questions. We then develop tailored solutions for these companies by redesigning the work processes and workplaces," Prof. Dr.-Ing. Sven Hinrichsen explains the company's offer. "We also involve students in this development work through final study papers and project work," adds the professor, who is responsible for the areas of industrial engineering and assembly system design at SmartFactoryOWL. One example of this is mechanical engineering company Brandt Kantentechnik from Lemgo, a manufacturer of wood processing machines for gluing edge bands. The company wanted to optimize a manual assembly process that was complex with plenty of variants. It soon became clear that assistance system technologies had to be used as well as work design measures.

The employees at the SmartFactoryOWL: David Brown, Prof. Sven Hinrichsen, Tim Kleineberg, Melissa Paris

Extensive pick-to-light portfolio
Researcher David Brown therefore suggested optimizing the process with a pick-to-light solution. "The system we wanted to use had to be as flexible as possible and allow a large selection of different sensor lights. Precisely with the small C part containers, we thought that the light-controlled guidance of workers was important, since these parts are very similar to each other. We also looked for a system that we could adapt without any major programming effort required," Brown states some key criteria for selecting the pick-to-light system. The system also had to be networkable, i.e. have an Ethernet interface in order to connect it to SAP or other higher-level systems.

QUICK READ

The SmartFactoryOWL is a demonstration platform that provides support in intelligent automation for small to medium-sized companies on the way to digitized production. As a partner of the SmartFactoryOWL, Turck is represented with a pick-to-light system, which consists entirely of its own portfolio, from the sensor to connection technology and I/O technology, right through to control and visualization including programming. Thanks to an Ethernet-based end-to-end communication, it is open for connection to higher-level systems for networking the SmartFactoryOWL. This kind of pick-to-light system opens the door for manual assembly processes to the production processes of Industry 4.0.

Turck's pick-to-light system boasted an impressive range of sensor lights in Lemgo

Complete solution from the sensor to the controller

After considering these criteria and comparing different vendor solutions, the pick-to-light system from Turck and its optical sensor partner Banner Engineering was chosen. Besides the pick-to-light components used, the system approach of the solution was also impressive. Turck could not only supply different sensor lights for process control but also offer a comprehensive solution directly, which also consisted of connection and I/O technology including the controller, as well as the visual support for the worker via the HMI. "The small K30 sensor lights in particular, which we require for the integration of C parts such as screws and nuts, could not be supplied by other vendors," adds Brown.

BL67 with Codesys 3 controls the process

Turck dug deep into its box of systems to provide the complete control of the assembly process. The worker first of all reads in a 2D code via the iVu vision sensor from Banner Engineering. The connected TX513 HMI then shows the assembly process on the start screen. A programmable gateway for the IP67-rated BL67 I/O system acts here as the controller. Turck programmed the pick-to-light application on the gateway with Codesys 3, which contains the TargetVisu tool for the visualization of the individual assembly steps. The system was implemented so that users can enter new product configurations themselves without any programming required.

The BL67 system includes IO-Link master modules which each contain four IO-Link master ports. Each of these ports communicates with a compact TBIL I/O hub which can connect the inputs and outputs of eight sensor lights each. Each sensor light has an input and output signal, since workers acknowledge the removal of the required part by triggering the integrated sensor when their hand is placed in the indicated compartment. The ability of the universal TBIL DXP ports to be used as an input and output is both a unique and practical feature. The assignment of input and output functions via the controller is unnecessary, and likewise the use of Y splitters to route the input and output signal to different ports. Thanks to IO-Link, the cabling effort involved is reasonable anyway.

Flat PVD lights save space

Three different types of sensor lights are used at the workplace in the SmartFactoryOWL. The conventional K50 lights with photoelectric sensors for acknowledging, the small K30 lights with capacitive sensors for the C part containers and the flat PVD lights on the high containers, which offer little space for the shelf above it. "The possibility to also use flat lights was important since we have to stay within the maximum grip height of shorter employees to ensure ergonomic design," Brown explains.

Outlook

The pick-to-light rack in the SmartFactoryOWL also has some expansion options: One idea is to connect the material shelf to the workplace via Turck's inductive IO-Link couplers. The devices handle the contactless transfer of up to 16 digital signals and up to 7 Watts of

The small K30 lights are ideally suited to incorporating the C parts containers

How pick-to-light works

Pick-to-light systems control and monitor the work steps for manual order picking, fitting, or assembly processes. To do this, the system uses light signals to indicate precisely the storage box from which the next component has to be taken. The system then detects the successful removal of the part, either automatically via optical sensors which detect the hand of the worker, or through the acknowledgement at the sensor lights. The system then visually indicates the next box from which the operator has to take the part for the next work step. Pick-to-light sensors from the Turck program are available in a number of different designs, also for direct mounting at the compartments.

power. This enables the shelf with the components to be quickly disconnected from the assembly space. If the number of variants exceeds the capacity of a shelf, additional shelves can be docked on for different products or variant groups. The application specific tag that comes with every IO-Link product, enables the controller to check whether the correct rack is connected for the particular product group.

Another project is already being implemented: It is possible, for example, to analyze the data that the system makes available. "We are currently developing a key indicator cockpit that workers and lead personnel in production can set up as required to obtain information in real time," explains Tim Kleineberg, who also works as a researcher in the industrial engineering team. If, for example, the control of the execution time for individual assembly steps exceeds a critical value, this event indicates a problem in the installation of the components. The relevant employee is then notified of the possible problem. The automatic ordering of used components is just as possible as custom product variants, which the system represents "on the fly" as an assembly sequence and job directly after the order process.

Partnership

For Turck the Laboratory for Industrial Engineering of the OWL University of Applied Science and the SmartFactoryOWL, the project is the start of a permanent partnership. Turck can try out joint solutions together with the students and employees, test them under realistic conditions and forge contacts with students and visitors. The SmartFactoryOWL and the Laboratory for Industrial Engineering have in Turck a partner that can not only offer individual components but also automation solutions from a single source and has at its disposal extensive know-how for all levels of the automation pyramid. Professor Hinrichsen is hopeful about the future: "We already have a number of other development projects in mind and are looking forward to the further collaboration with Turck."

If you look once more at what the word "smart" means in this context, it is clear that the "smart" in SmartFactoryOWL not only means the networking of production systems and data suppliers but also the creation of smart results through the networking of partners from industry and other areas.

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Clever Chauffeur

Turck is supplying Movexx with most of the automation required for an automated guided vehicle, including the programming of the Codesys controller on the HMI VT250

A look at the operating steps taken over by the industrialization and automation of machinery will show that in the industrial revolution these were primarily operating steps requiring physical effort, which could be handled by steam engines. With the onset of automation (third industrial revolution), it was then increasingly easier but monotonous tasks that were passed on to robots and other machines, such as welding, screwing or turning. Tasks that involve a degree of flexibility are mostly still completed manually even today. The machines mainly do not have the required intelligence to make the right decision on their own.

The truck and automotive supplier VDL Weweler in Apeldoorn, Netherlands, wanted to automate a transport operation requiring physical effort, but which has to be completed at the demand of the production system. The company develops and produces leaf suspension systems and air suspension systems as well as special axles for buses, trucks and

Powerful chauffeur: The AGV receives the order wirelessly to move the frame with metal carriers to the painting line

QUICK READ

In the suspension systems production area at the Dutch company VDL Weweler, an automated guided vehicle (AGV) supplied by Movexx transports components for suspension systems from the basic production area to the paint line. Turck's HMI VT250 with a Codesys controller is controlling how the vehicle finds its destination, supported by photoelectric sensors, RFID system as well as angle sensors and status indication systems from the Turck portfolio. Turck B.V. demonstrated its genuine solution expertise by not only supplying components but also programming the controller. Since the AGVs have taken up their duties in production, the error rate for the transport of components has rapidly dropped.

truck trailers. The production area at its headquarters is mostly automated. The reliability and just-in-time availability required in the utility vehicle sector would otherwise be unachievable. Production runs 24 hours a day five days a week.

The responsible production planners saw the need for optimization in the transport of support elements and suspensions for truck trailers. Up to the middle of 2015, these components were still being transported between the basic production area and the paint line with lift trucks. At the end of the basic production process, robots place the support elements and suspensions on a frame. The fully laden frame was then fetched with lift trucks and placed at one of the two pick-up stations of the paint line. Robots here lift the components from the frame and hang them in a conveyor belt that takes them to the paint line. A suspension element weighs 35 kilos and a frame holds 36 of them. A fully laden lift truck including frame thus weighs almost two tons on the scales.

Manual transport unprecise

The disadvantage of this solution was the fact that it required a lot of physical effort from the employees: Furthermore, colleagues could not always work as precisely as an automated vehicle – with a weight of two tons on the lift truck hardly surprising. The stands always have to be placed exactly in the guide markers so that the robots can place the supports or lift them correctly. If they stood slightly wrong, the robots would collide with the frames. The rods would bend and production would have to be stopped.

In 2014, the decision makers at VDL Weweler therefore decided to automate the transport of the frames. As well as the pick-up stations (A and B) at the basic production area two offtake stations (C and D) are located at the paint line. The required transport system cannot be controlled according a fixed cycle. Sometimes a frame has to go from A to D, and sometimes an empty frame has to go from C to A and so on. "The transport solution for us had to be as flexible as possible," says Bert Eilander, shift manager in the production area at VDL Weweler.

Movexx develops new AGV

The decision makers at VDL Weweler turned to the transport specialists at Movexx International B.V. to develop an automated transport solution. Movexx is a Dutch manufacturer of industrial trucks including many customer-specific products. The manufacturer had already developed and built so-called AGVs (automated guided vehicles). However, a new solution had to be developed for this task.

"Several features of the AGV were new: The bidirectional driving capability, the extremely low construction for moving underneath the frames and the hydraulic heavy load lifting platform," explains Andreas Versteeg, product manager for AGVs at Movexx and responsible for the newly developed vehicle for VDL Weweler. The AGV must move in both directions because it is only possible to reverse out of the target stations. The hydraulic lifting platform raises the frame two centimeters from the floor in order to transport it.

> »The key factor was Turck's ability to offer a complete solution for automating the AGV.«
>
> **Andreas Versteeg | Movexx**

Comprehensive automation solution from Turck B.V.

To develop the transport vehicle, Andreas Versteeg got Turck on board already in the planning phase. Movexx had previously used the Turck sensors and LED lights in its products. However, this project also required solution expertise as well as capable components.

The greatest challenge was the bidirectional control of the AGV on the factory floor. Turck suggested a combined RFID contrast strip control. Three strips are drawn on the hall floor; a white one in the middle and a black strip on the left and right. Three fibers with connected fiber amplifiers monitor the strips and measure the degree of brightness. The threshold value is set so that the fiber amplifier can reliably detect the difference between black and white. If the AGV moves centrally on the guide strip, the right fiber sees black, the middle one white and the left one also black. If the

RFID tags that provide the AGV with position information are embedded in the floor at crossings and other key points

»The transport solution for us had to be as flexible as possible.«

Bert Eilander,
VDL Weweler

contrast strip curves to the right, the right-hand fiber sees white. This notifies the AGV to drive a right-hand curve. The appropriate control signal is sent via the controller to the actuator system of the steering shaft. The AGV thus moves in this way along its "tracks" through the factory halls. As it has to drive forward or backward, steering shafts and controller sensors are installed in duplicate.

RFID system for destination control

Optimum line tracking is combined with RFID tags which are stuck to the factory floor at key points along the lines. The tags at the turnout points indicate to the AGV, whether it is to continue driving or stop. The speed of the AGV is also controlled via these RFID tags. The slow mode is used in curves and for docking in the stations, high speed mode is used for straight sections. High speed in this case means a speed of 1 km/h. Although this is not really fast, it is perfectly satisfactory for the application and is the maximum legally permitted speed for AGVs.

The AGV does not itself make decisions. The intelligence is in the networking of the AGV with the higher-level IMS (integrated manufacturing system), which instructs the AGV to move to a specified point. The logic of the AGV translates the destination to a tag number and checks at each detected tag whether it should stop, slow down or speed up. The controller of the AGV steers and detects by means of an RFID tag when it has reached its destination position. The AGV then puts down the frame and then moves to a set position outside of the cell in order to wait for the next job. If necessary, the IMS instructs the AGV to transport an empty frame back to the production hall.

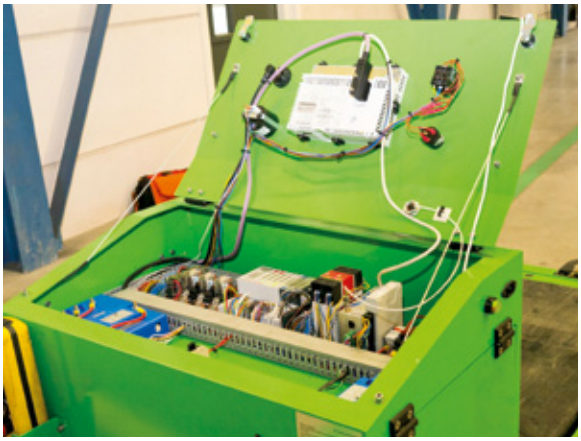
Apart from the IMS only the operators in the control station are able to give orders to the AGV. If the battery is low, they are notified by the SCADA system. They order the AGV to the charging station where they manually replace the flat batteries with a fully charged one.

Turck's VT250 HMI-PLC operates on the AGV. It communicates with the IMS via a wireless TCP/IP connection and responds as a Profibus master with a BL20 gateway containing the inputs and outputs to which all signals of the vehicle are connected.

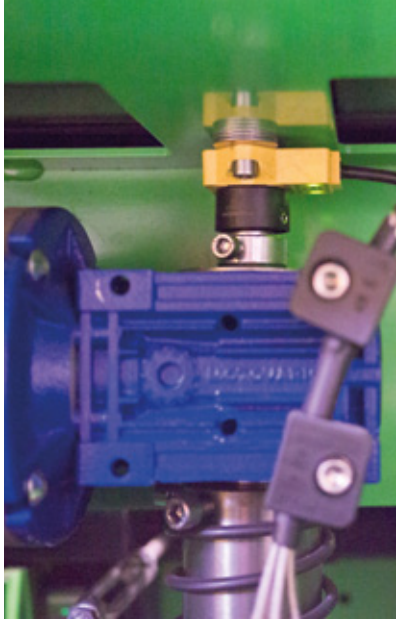
Automation solution single sourced

Movexx utilized the full Turck portfolio when equipping the transport vehicle: Besides the already mentioned fibers and fiber amplifiers from Turck's optical sensor partners Banner Engineering, Turck also supplied its compact and contactless QR14 for measuring the angles on the steering shafts. Optical sensors detect the lifting of the platform, a K50 domed indicator from Banner indicates the operating state, and a laser safety scanner detects whether any objects are present on the section driven by the AGV. Turck's RFID tags, as well as the read/write heads on the vehicle read the position of the AGV.

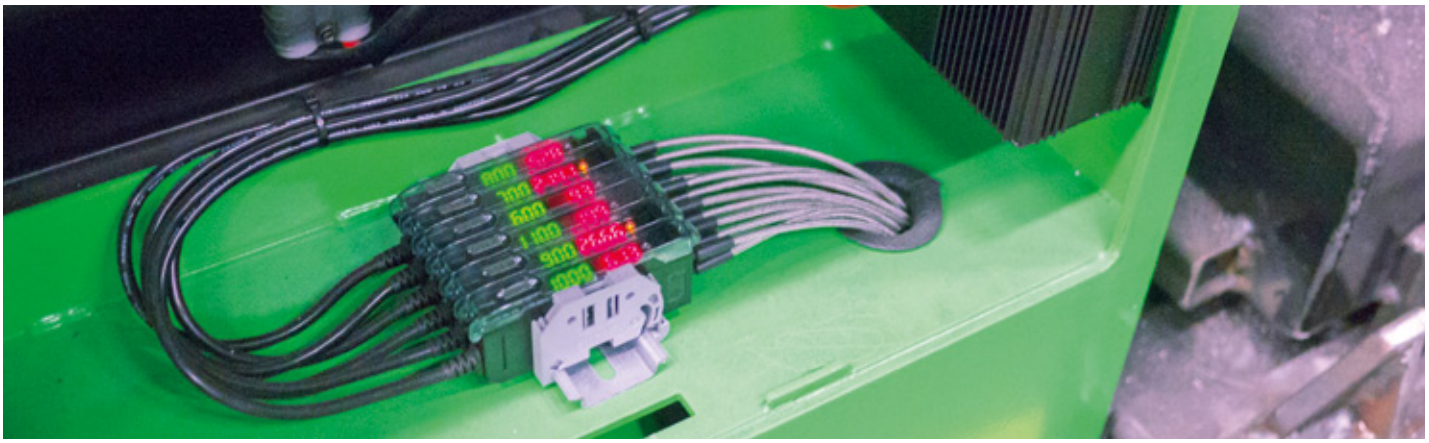
In this project Turck even programmed the controller of the AGV. All the navigation, the processing of



All inclusive: Turck's VT250 is integrated in the cover of the switch box. It communicates wirelessly via Modbus TCP with the IMS and controls virtually all systems of the vehicle



Turck's contactless angle sensor measures the angle of steer at the motor of the steering system



sensor data and the interfaces to other systems including the communication with the higher-level IMS were programmed in Codesys on the VT250.

System supplier benefit

The fact that all products come from one automation supplier makes many things easier – not only for programming but also for Movexx as the customer: "We already had the programmable BL67 and BL20 gateways as a controller for test purposes and were very pleased. We also sent inquiries to other controller suppliers for the project for VDL Weweler. Ultimately, the key factor was the fact that Turck could offer a complete solution for automating the AGV. We therefore chose the Turck solution due to the previous positive experience with them," product manager Versteeg explained his decision and adds: "I also wanted to exclude the risk of suppliers blaming each other in the event of possible faults.

Automation of raw steel supply planned

VDL Weweler also positively rates the automation of the support transport system. Colleagues are reporting that the production manager particularly appreciates the quieter and even production that has been in place since the introduction of the AGV in the middle of 2015. Previously, it was always necessary to stop and make repairs and corrections if a robot could not pick up parts because a hand cart was incorrectly positioned or if other faults led to interruptions.

Due to the positive experience with the solution VDL Weweler is already planning the automation of other transport processes. Another production section is going to be connected, from which components are also to be conveyed to the paint line. In order to process the different parts in individual batches, they must be temporarily stored beforehand, and this is also to be carried out with AGVs.

The supply of raw steel blocks from the stores to the forging furnace is also to be automated with AGVs. This also requires the supplier to be included in the project. VDL Weweler is thus using production processes which look like precursors to Industry 4.0 even if this is not used as the description. The idea that the trucks with trailers provided with VDL Weweler suspension systems are driven fully autonomously sounds like science fiction.

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Three fibers with connected fiber amplifiers are installed for the bidirectional control of each direction

The RFID tag TW-R10 is reliably protected in the metal hook against mechanical damage. In contrast to LF tags the hook has not to be slotted

Data on the Hook

Turck's BL ident HF RFID system is robust and fast enough to track and trace the meat production in a Chinese slaughterhouse.

Since meat products have become a standard in the daily diet of Chinese consumers, the quality assurance of meat production has become a key topic of discussion in the Peoples' Republic. The Chinese administration therefore decided to establish the supervision and tracking of meat production in China. It supervises the whole process from breeding, slaughtering, processing, distribution to shops, and enables the origin of the meat product to be traced so as to establish a food safety pre-alarm mechanism.

The information is reported at municipal level so as to enable the supervision authorities and the public to trace and track the whole process on this platform. This particularly applies to the slaughterhouse, the central hub of many processes and difficult to monitor. The animal arrives here alive and leaves in individual packages. Due to the higher standards of hygiene here compared to when the animals are reared or when they are later packaged after slaughter, the requirements involved are much tougher. The slaughterhouse determines the reliability of traceable meat production, and is always the weakest segment in the entire tracking management chain.

Customer requirements

To implement the tracking of the pork across all process levels, every pig is provided with an electronic earring containing the relevant data. However, the location of the electronic earring on the pig's ear is not suitable for collecting data during operation. This data is transferred to the database of the slaughterhouse when the pig arrives. As every piece of pork is hung on the same hook during the entire process it made sense to fit an RFID tag on the hook.

Several read/write heads are installed beside the production line, which can acquire the information of every piece of pork along it. The continuous correct identification of the pork depends on the correct allocation of the data on the earring to the corresponding tags on the hook. If quality issues are found already at the initial examination in the slaughterhouse, the relevant information is recorded in the RFID tag attached to the hook; and that piece of pork will also be diverted to a special storage zone to prevent any further processing.

TNSLR-Q42TWD with protection class IP69K is the ideal read/write head for use in meat production

The read/write heads read the data from the tag to track production in real time. At the final packaging stage, the pork information is transferred from the tag to a database and linked with a tag on the packaging.

Large ranges and high speeds

Thee key requirement when selecting the BL ident RFID system from Turck was its ability to read and write eight bytes of data on the fly, i.e. within the usual conveying speed. The project manager of integrator Beijing Zhihengda Sci & Tech Co. Ltd. was also impressed by the simplicity and flexibility of the system, which can be parameterized easily without the use of any function blocks. Besides the eight connected read/write heads, other analog or digital signals can be connected to each BL67 gateway, acting as an RFID interface. If additional control points are required, both RFID modules as well as standard I/O modules can be added. This considerably keeps the costs per node to a minimum. The large range of the Turck read/write heads protects tags and read/write heads from mechanical damage.

LF and UHF solutions unsuitable

Alternative frequency bands such as LF and UHF RFID solutions were not suitable for the application. The frequency of the LF RFID was very similar to that of the motors on site so that reliable RFID operation was subject to considerable interference. Moreover, the read/write distance of LF RFID was not enough. The distance between RFID read/write head and tag is only approximately 30 mm, which could not fulfill the requirement at every station. The customer therefore required a larger read/write range to prevent damage to the tag or read/write head.

The UHF RFID products are also not suitable because their range is too large and multiple tags are read simultaneously by the read/write head. This is particularly a problem at high speeds. The slaughtering production line often passes the read/write heads at high speeds of 600 pieces/hour, and so it was not possible to determine which hook is passing through the station. Turck also developed the TW-R10 tag which can be embedded in the metal of the meat hook and thus be provided with reliable protection from damage. The increased read/write range also enables the RFID readers to be fitted next to the conveyor belt where they are mechanically protected. The read/write heads are protected to IP69K and the tags to IP68. They are thus resistant to moisture and water and are also suitable for high pressure cleaning.

Turck tags can store 146 bytes. Thus all the necessary information can be saved on the tag, which increases safety in the event of a database error. Turck's HF system can detect the tags completely so that production is not slowed down through the use of RFID.

Conclusion

The adoption of the Turck HF RFID solution can not only solve all the existing problems, but also enhance the reliability and accuracy of the data acquired, so as to connect the entire tracking chain, raise production efficiency greatly and guarantee meat product safety.

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QUICK READ

In a Chinese meat production plant Turck's RFID system is showing that BL ident with protection to IP67 to IP69K can meet both the demanding requirements of the sector for a robust design as well as the fast read/write speeds required in the meat processing industry. The tags are integrated in the meat hooks so that they cannot be damaged and nevertheless read reliably and quickly.

»Compared to the devices of other manufacturers the technology of the TBEN-S modules was far superior.«

Helmut Sutterlüty, Böma

Conveyor Challenge

Thanks to their flexibility, Turck's compact TBEN-S I/O modules offer impressive performance in the Thermomix production at Vorwerk

Innovative, high quality and multifunctional – these are the three strengths of the new Thermomix® TM5 kitchen appliance from Vorwerk. With its unique design, its Guided Cooking function and its recipe chips, it has introduced the digital age of cooking. Building an efficient and economical production line for this complex product was a challenge. Vorwerk also placed its trust here in the strengths of a medium-sized company from Austria: Conveyor specialists Böma from Alberschwende in the Vorarlberg region designed and built the conveying lines between plastic injection molding and device assembly for the key components of the smart kitchen appliance.

The task is quickly explained: The product to be conveyed must be transported carefully from A to B in the correct time to the employees according to their requirements. To do this, a robot takes the different injection molded parts from the machine and places them on the conveyor belt. These parts then have to be taken to specific positions in a different hall via the individual lines. The cycle time in which a part can be taken by the workers in the assembly line was set here precisely. A time buffer therefore also had to be planned over the entire length of the conveyor belts, which were approx. 50 meters a line.

Obstacle course

The first challenge was the existing room division in the production hall. Point A was clear, point B as well. However, there were obstacles that had to be overcome in between. The Böma designers first started to fit the conveyor belts precisely in the existing halls. Some obstacles such as walls were bypassed and others gone through in order to ensure optimum use of space. Some of the existing openings could also be used.

The theoretical design of the conveyor belts had to be adapted precisely to the planning of the hall. This involved several lines and several levels. Lifting equipment was used for vertical conveying. Pneumatic rotating units were used to move the injection molded parts left or right, and depending on the situation on site, electrical or pneumatic cross conveyor shafts. The products themselves were transported by flat belt conveyors. However, Böma had to use its in-house developed toothed belt conveyor for one product. The variable system is designed precisely to the shape of this product and thus enables smooth transportation from the injection mold to the worker.

Compact I/O modules impress

Böma also took over the control of the entire system. Turck's compact TBEN-S I/O modules bring the sensor signals to the controller via the Profinet. The actuators of the plant are also connected to the TBEN-S modules. The configuration of the TBEN-S variant with four digital outputs and four digital inputs perfectly met the signal requirements at some points on the conveyor line. "We were also impressed by the flexibility of the TBEN-S. One part of the plant was not newly built but was integrated in existing plants. It was initially unclear how many input and output signals we had to

The entire conveyor plant with cross conveyor shafts and lifting equipment

bring to the controller. We used the freely configurable TBEN-S-DXP at these places. We were thus able to adapt the configuration also retrospectively to the actual requirement. We could not find any devices from other manufacturers with freely configurable inputs and outputs," explains Helmut Sutterlüty, head of design at Böma and adds: "Compared to the devices of other manufacturers the technology of the TBEN-S modules was far superior. Other systems in this design required additional coupler modules to the Profinet line, which also have to be interconnected." The size of the TBEN-S modules was also critical. With a width of only 38 millimeters, they fit perfectly on the narrow aluminum profiles of the conveyor system.

All sensors in the project come from the Turck portfolio. QS-18 through-beam sensors from Banner Engineering, Turck's partners for photoelectric sensors, were primarily used to detect the parts on the belt. Besides the long range of 7.5 meters with a small light point, allowing greater precision than comparable products, they offered an impressive performance. To detect the position of pneumatic cylinders Böma used Turck's magnetic inductive BIM-UNT switches, which could be set directly in the groove of the aluminum cylinders and detect there the position of the piston. The connection technology, especially M8 sensor/actuator cables for connecting the TBEN modules, and M8 power cables were also supplied by Turck.

QUICK READ

Anyone can easily set a straight line between two points in order to make a connection. Going round obstacles and nevertheless reaching the destination directly is what Böma has managed to do with their conveyor lines at the plants of Vorwerk Elektrowerke. The sensor and actuator signals there reach the controller via Turck's compact TBEN-S Profinet I/O modules. For Böma, their size, flexibility and independence were critical factors and make their contribution to the flexibility of the entire plant.

Bi4-M12-VP6X sensors were used for the position detection and end position switches of the lifting equipment.

Anyone with experience in projects of this magnitude knows that planning and design on the one side and the implementation in practice can be worlds apart. The close consultation between the design department, the customers and Böma personnel ensured the construction of the plant was carried out perfectly. Böma built the essential plant sections first of all in order to carry out test runs and give the customer the possibility to carry out the acceptance of the plant and obtain an initial glimpse. This saved any surprises for the customer during the construction. Thanks to Turck's I/O modules, the implementation could be carried out very swiftly as many elements could already be prewired at Böma.

When the plant was actually commissioned in the production hall, Böma could fully exploit the strengths of its in-house modular system, since it enabled fitters to also make any last minute adaptions without any problem. The different profiles all have the same groove, regardless of their width. Drilling is not required to connect the individual elements. Connectors are used for this instead. This enables minor modifications to be carried out by simply undoing the screws.

The conveying system could ultimately meet all the requirements stated. The different lines are perfectly integrated in the production hall and partly run over each other. Portals were also installed underneath the lines in order to provide easier access for employees. The individual components of the Thermomix® run at the right time from A to B, are not damaged at any point in the process and the worker can take the products directly from the conveyor line within the set cycle.

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Banner Engineering's QT50 radar sensor detects the hall roof from the roof of the cab

Air Traffic Control

Linde Material Handling offers a system for its fork lift trucks that automatically reduces the maximum speed in indoor areas as soon as the QT50 radar sensor from Banner Engineering detects a hall roof above the fork lift truck.

On public roads it's the relevant national traffic regulations that set the limits for road users. Behind factory gates, however, it's the health and safety regulations of the company itself that specify the driving code. The company also sets the maximum speed on corporate premises. However, like many car drivers, some fork lift truck drivers incorrectly estimate the risks arising from their driving style.

Excess speeds are just as much an accident risk in fork lift truck traffic as in road traffic. This is particularly the case in production halls and warehouses, since the vehicles are frequently operating in restricted conditions with many employees moving around at the same time. These are then seen too late, since vision is often impaired by machinery or shelves, walls or columns. Fork lift truck development is thus faced with

the challenge of optimally combining the requirements of safety and economy.

Manual switching of maximum speed unsatisfactory
A manufacturer of fork lift trucks that is focusing on this task is Linde Material Handling GmbH, a company belonging to the KION Group. Linde Material Handling is one of the world's leading manufacturers of fork lift trucks and storage technology devices and market leaders in Europe. Linde has been pursuing the issue of a reasonable speed for fork lift truck as an important safety feature for quite some time. Although a general speed reduction would easily be possible, "customers don't want to have their handling capacity reduced by a general speed reduction," explains Jennifer Skarabisch, who is responsible for electrical engineering in the fork lift and industrial truck department at Linde Material Handling: One initial solution enabled the manual two-stage switching of the maximum speed. The drivers had to switch to a lower maximum speed in indoor areas, which is normally around 6 km/h. However, drivers were not as consistent in switching to a reduced speed in halls as the colleagues from the safety department required.

SpeedAssist: Safety with a high handling capacity
Many customers wanted a solution that did not depend on the individual decision of the driver. Jennifer Skarabisch and her colleague Michael Fuchs, product manager for Parts in the Customer Services department at Linde Material Handling, continued to pursue the issue and developed the SpeedAssist, which reduces the maximum speed in indoor areas automatically. "The automatic switching can meet both requirements for greater safety in the indoor area, geared to the actual plant environment, whilst ensuring optimum handling capacity outdoors at the same time," product manager Fuchs explains.

The automatic reduction of maximum speed in indoor areas saves the customer from having to make any changes to the existing infrastructure. The fork lift truck itself had to provide the solution. The obvious option was for the fork lift truck to detect the hall roof with a sensor.

QT50 radar sensor meets all criteria
"We looked at various sensor technologies from different manufacturers," Skarabisch describes the selection process. "In all cases we wanted a solution that already has proven use, in order to get to the market quickly. Optical sensors frequently had problems caused by the risk of contamination. Using the radar sensor has enabled us to achieve some reliable results." The criteria here included a large range, with compact dimensions and robust design, since the sensors are used outdoors and are occasionally subject to high vibrations including shocks. Our in-house testing for these criteria found a radar sensor from the Turck portfolio to have the best results: The QT50 radar sensor developed by Turck's partner Banner Engineering.

> »The automatic switchover can connect both requirements of safety and high handling capacity.«
>
> **Michael Fuchs | Linde Material Handling**

Hall roof detection up to a height of 24 meters
The sensor of the SpeedAssist is located at the back of the cab roof and detects hall rooves up to a height of 24 meters. It indicates to the controller via a switching

QUICK READ

With its SpeedAssist system, Linde Material Handling is helping its fork lift truck customers to increase the safety of transport on company premises. The Linde SpeedAssist detects whether the fork lift truck is in a hall, and in this case reduces the maximum speed to a predefined value that can be set in the vehicle controls. Indoor operation is detected as soon as the QT50 radar sensor from Banner Engineering detects a hall roof. The sensor from the Turck portfolio offers impressive performance thanks to its robust design and variable setting options. It can thus be set to the individual requirements of virtually any factory premises.

»Our customers' operating conditions vary greatly. It's good that the sensitivity, the range and the delay time can be set directly at the sensor.«

Jennifer Skarabisch | Linde Material Handling

output whether a roof has been detected. The controller then gently slows down the driven speed or allows the higher maximum speed in the outdoor area. Linde initially launched the Speed Assist via its worldwide spares distribution network as a retrofit. However, as the system has been received so well, the SpeedAssist is now being introduced from the Aschaffenburg plant as an equipment option for all new vehicles.

Individual adaption in the field

Electrical engineer Skarabisch highlighted the sensor's ability to be adapted easily to the customer's requirements as one of the positive features: "Our customers' operating conditions vary greatly. It's good that the sensitivity, the range and the delay time can be set directly at the sensor. Together with their Linde service technician customers can adjust the system to the conditions at their particular location."

Custom setting to field conditions possible

For example at one customer, the delayed response of the sensor (up to 3 seconds) made it possible to ensure that fork lift trucks did not reduce speed in places where the vehicles passed under pipe bridges and trees. It is now possible to drive under the pipe bridges at a normal speed. The reduced speed can also be set with the support of a service technician – in the controller, however, and not in the sensor. "This customized setting feature definitely helped in securing customer acceptance of the system," adds product manager Fuchs. Despite the setting options, the system is also protected against manipulation by the driver. Once mounted the sensor does not allow any settings on the sensor to be changed. On vehicles with the Linde SpeedAssist, the controller is programmed so that the fork lift truck switches to the reduced speed if the sensor is separated from the cable.

The compact dimensions, robust design and flexibility were key factors in choosing Banner's QT50 as the SpeedAssist sensor, which was manufactured for Linde as a brand label product

Experts from Turck and Banner Engineering were always at hand to help the Linde developers in the search for the right settings. For example, a problem with accumulated condensation when setting the sensitivity of the sensor could be rectified. In spite of the dome-shaped design, water can sometimes collect on the sensor. This did not occur when it rained but when dew condensation accumulated overnight. "The meetings with the sensor experts enabled us to also gather experience, which we were able to pass on internally to our service network," Skarabisch says.

Positive customer feedback

Linde has been offering the SpeedAssist as a retrofit solution since July 2015. "Those who are already using the system are extremely positive about it," Fuchs states. Besides the SpeedAssist, Linde still has other safety features in its range. The so-called BlueSpot places importance on warning pedestrians in the plant. When reversing, a blue spot is projected on the ground at the back of the fork lift truck. Workers in the factory thus detect the fork lift truck already before they see it. The BlueSpot thus effectively helps to prevent accidents with quiet running electrically driven fork lift trucks or in noisy working environments.

Outlook

One challenge still has to be overcome: In the shipping industry the height of roofs of up to 70 meters exceeds the standards of other industrial buildings. The compact QT50 radar sensor does not detect these rooves. Developers at Banner Engineering are therefore already working on a radar sensor that also detects the highest halls. Safety for fork lift truck drivers and employees will thus in future be improved in all production and warehouse areas of this company.

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Youtube-Video SpeedAssist

Linde's SpeedAssist increases safety in factory and warehouse halls

New Sales and Marketing Center Opened

Turck invested 13 million euros in 4,200 square meters of modern office space and presentation area at its Mülheim site

"I like it a great deal. I think what has been created here is fantastic," stressed North Rhine-Westphalia's Minister President Hannelore Kraft in her speech at the official opening of the new sales and marketing center of the Turck Group in Mülheim, Germany. Turck inaugurated the new building at the official opening on September 28, 2016. Together with customers, business partners, shareholders, advisory board members and employees, the Turck managing directors Ulrich Turck and Christian Wolf opened the new building for its intended purpose. The Minister President was particularly impressed by the open and transparent design of the building, as well as the growth of the company: "Turck is an excellent example of how family-owned businesses with a long-term strategy achieve sucess by investing in new technologies and infrastructure at the right time and thus ensuring continual growth and innovation," Kraft continued.

"The fact that we had the chance three years ago to purchase the property next to our headquarters and build another office building here was a stroke of luck," said managing partner Ulrich Turck in retrospect. "This summer 90 employees could already move into the office with its floor-to-ceiling windows and modern rooms."

Managing director Christian Wolf highlighted the fact that the "Turck Group has over the past four years been on a considerable investment offensive involving

»Turck is an excellent example of how family-owned businesses with a long-term strategy achieve sucess by investing in new technologies and infrastructure at the right time and thus ensuring continual growth and innovation«

Hannelore Kraft | Minister President, North Rhine-Westphalia

over 100 million euros with the clear objective of ensuring lasting and successful corporate development." Manufacturing capacity was expanded considerably in this time not only in the manufacturing and development headquarters at Halver in the Sauerland, but also in Beierfeld, Saxony, in Delémont in Switzerland, as well as in Minneapolis (USA) and in Saltillo (Mexico).

Openness, straightforward design and transparency

On the 15,000 square meters of land directly next to corporate headquarters in Witzlebenstraße, an architecturally striking building has been completed over the past two years, containing around 4,200 square meters of office and presentation space with an extensive reception and conference area. The building offers a spacious reception and conference area on the ground floor and is surrounded by a campus-style park. The architects Eller + Eller were responsible for the planning and implementation.

"The new building stands out on account of its openness, straightforwardness and transparency – all features that also match the key aspects of the values that have been practiced and defined by the founders of our company for over 50 years," Wolf explained. "Here we were able to create an architecture that encourages communication and also provides the space required for this."

The open architecture of the building, with its large atrium, provides a great deal of transparency and supports the communication between employees

Managing directors Ulrich Turck (left) and Christian Wolf (right) welcome North Rhine-Westphalia's Minister President Hannelore Kraft in front of the new building

Trade Shows

At numerous national and international trade shows, Turck will introduce you to current product innovations and reliable solutions for factory and process automation. Be our guest and see for yourself.

Date	Trade Show	City, Country
29.11. – 01.12.2016	Elektro Vakbeurs	Hardenberg, The Netherlands
06.12. – 08.12.2016	New Industries	Gorinchem, The Netherlands
25.01. – 27.01.2017	IFAM	Celje, Slovenia
08.02. – 10.02.2017	Indumation	Kortrijk, Belgium
01.03. – 03.03.2017	SPS – Industrial Automation Fair	Guangzhou, China
07.03. – 09.03.2017	CFIA	Rennes, France
07.03. – 11.03.2017	Con Expo	Las Vegas, USA
14.03. – 16.03.2017	Logimat	Stuttgart, Germany
14.03. – 17.03.2017	Automaticon	Warsaw, Poland
21.03. – 24.03.2017	Amper	Brno, Czech Republic
22.03. – 23.03.2017	Manufacturing in America	Detroit, USA
03.04. – 06.04.2017	Pro Mat	Chicago, USA
04.04. – 07.04.2017	International Industrial Fair	Celje, Slowenien
05.04. – 06.04.2017	Automation	's-Hertogenbosch, The Netherlands
19.04. – 20.04.2017	ISA Automation Expo & Conference	Calgary, Canada
17.04. – 20.04.2017	Neftegaz	Moscow, Russia
24.04. – 28.04.2017	Hannover Messe	Hanover, Germany
04.05. – 10.05.2017	Interpack	Düsseldorf, Germany
09.05. – 11.05.2017	RFID Live	Phoenix, USA
09.05. – 12.05.2017	Industry Days	Budapest, Hungary
16.05. – 18.05.2017	Smart Automation Austria	Linz, Austria
10.05. – 12.05.2017	Industrial Automation	Beijing, China
23.05. – 25.05.2017	SPS IPC Drives Italia	Parma, Italy
23.05. – 26.05.2017	Oil. Gas. Technologies	Ufa, Russia
13.06. – 15.06.2017	Expo Pack	Guadalajara, Mexico
11.07. – 13.07.2017	Semicon	San Francisco, USA
25.09. – 27.09.2017	Pack Expo	Las Vegas, USA
03.10. – 05.10.2017	Hi - Teknologi- og Industrimesse	Herning, Denmark
09.10. – 13.10.2017	MSV	Brno, Czech Republic
25.10. – 27.10.2017	Automation	St. Petersburg, Russia
25.10. – 28.10.2017	XXXII Convencion Internacional Minera	Guadalajara, Mexico
07.11. – 11.11.2017	Industrial Automation	Shanghai, China
06.11. – 09.11.2017	Fabtech	Las Vegas, USA
28.11. – 30.11.2017	SPS IPC Drives	Nuremberg, Germany

The Net

On the Turck website and product database you will find all the relevant information about Turck's products and technologies, systems and industry solutions – from success stories to data sheets right through to the download of CAD data.

www.turck.com

Sites

With 28 subsidiaries and more than 60 branch offices, Turck is always nearby, anywhere in the world. This guarantees fast contact to your Turck partners and direct support on site.

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IMPRINT

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Hans Turck GmbH & Co. KG
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