

Efficient Goods Flows

Error-free logistics is an important competitive factor – manufacturers in China are thus also using Turck's BL ident UHF RFID solution



Highway to Cloud

IP67 block modules with Codesys-PLC bring intelligence to the machine and enable a direct cloud connection without an edge gateway



First Rate Climate in the IIoT

Smart condition monitoring in the control cabinet: The IM18-CCM cabinet guard transfers condition data via Ethernet directly to IT networks

»Digitalization in Our DNA«



It has now been exactly one year since the corona virus completely changed the way we live and work. A lot has happened in the past twelve months. During this time the production industry managed relatively well in spite of all the restrictions and challenges that we had to overcome. This was also the case at Turck.

Even if the return to normality cannot yet be foreseen, we are optimistic about the future. It is not a new insight that crises make us stronger, and during the last year we have also developed and implemented many ideas to stay in touch with you - as your Global Automation Partner.

During this time digitalization in particular experienced a boost that we previously could never have expected. As specialists in smart sensor technology and decentralized automation in IP67, this area is in our DNA and we are paving the way to Industry 4.0 and IIoT with digitalization and smart

data. With Turck solutions you can record, process and transfer your relevant production data from the sensor to the cloud and back again. What this exactly means is shown with several examples

in many articles of this latest customer magazine – from the fast and direct route to the cloud to the continuous monitoring of control cabinets, right through to RFID, smart sensors and a comprehensive IO-Link portfolio.

We would have been pleased to welcome you in person at Hannover Messe 21, however, this is no longer possible as a live event. We will, of course, be there for you at the HM 2021 Digital Edition. We will be glad if you take the opportunity to exchange in the chat with our experts or in our presentations about smart solutions for your automation tasks. Our “digital shop window” is available to you at www.turck.com/dip completely independently of trade fair dates. The Digital Innovation Park is our answer to the absence of opportunities to attend fairs or make visits. The website provides information about the latest automation topics, from condition monitoring right through to sensor to cloud solutions. You will also find several webinars and white papers – and naturally the opportunity to contact your experts directly.

We are looking forward to your visit!

Yours sincerely

Christian Wolf, Managing Director

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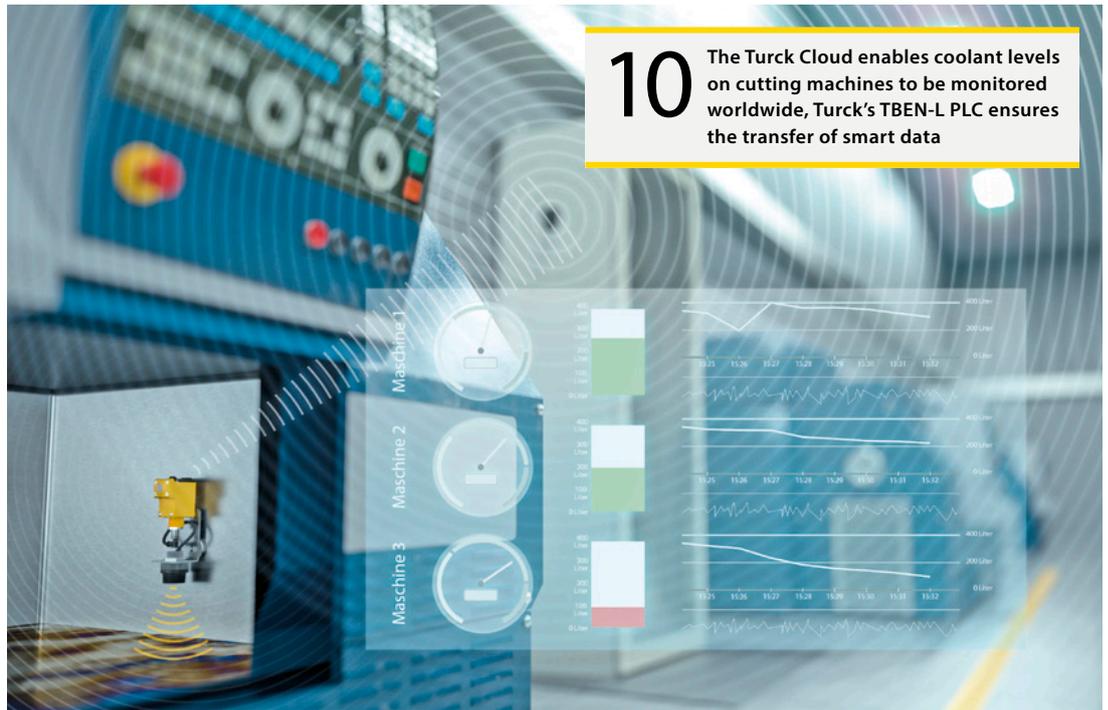
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Turck is Expanding the Executive Board



On February 1, Dr. Michael Gürtner took over the responsibility for R&D and IT in the Turck Holding GmbH. The 46-year-old has also been appointed as Managing Director of Werner Turck GmbH & Co. KG, which he will manage jointly with Michael Gröbner. Gröbner is responsible in the Holding company for the areas of Production and Supply Chain Management (SCM), while Hans Turck GmbH & Co. KG Managing Directors Christian Wolf and Christian Pauli will manage the areas of Sales and Marketing as well as Finance, HR and Legal in the Turck Holding GmbH.

Dr. Michael Gürtner studied electrical engineering at the Munich University of Applied Sciences, where he also completed a doctorate at the Institute for Measurement Systems and Sensor Technology. In the Bosch Group, he managed several R&D areas specializing in IT-related topics such as IIoT ecosystems and cloud based software as service solutions, in addition to sensor technology. As CTO at Sixt SE, Dr. Gürtner was recently responsible for the digital transformation of the company and its business processes.

“Besides having an outstanding management expertise, Dr. Michael Gürtner also offers extensive product and innovation expertise, particularly in the area of IIoT. With his experience in software and IT infrastructure projects, he is the ideal appointment for a company which is in the process of digital transformation together with its customers,” says Hans Sondermann, Chairman of the Advisory Board of the Turck Holding GmbH.



Ultra-Robust HMI Devices with All-Round IP67 Protection

The new TXF700 is an ultra-robust HMI series with complete all-round protection to IP67 for use at temperatures between -20 and +55 °C. With its high degree of protection, the modern HMI platform allows for flexible and slim mounting since, unlike previous solutions, it no longer requires installation in protective housings or control cabinets. The brilliant TFT displays are protected by a glass front and feature a capacitive touch screen that supports multi-touch capability and gesture control. This now allows the latest operating concepts from the world of smartphones and tablets to now be brought to the rugged environments of industrial automation. The TXF700 HMIs are available in display sizes from 5” to 21.5” and with a resolution of up to 1920 x 1080 pixels.

TX700 HMI/PLC Series Expanded

Turck has expanded its TX700 HMI/PLC device series with two new variants for food and beverage applications (TX700FB, Food & Beverage) and two variants with high brightness displays for sunlight readability (TX700HB, High Brightness). The FB devices are available in 7” and 15” screen diagonals and the HB variants in 7” and 10” screen diagonals. The FB devices were developed to comply with hygienic design requirements (DIN EN1672-2, EHEDG/FDA 21 CFR 177.2006) and come with a stainless steel front with a polyester coating. The device front has been designed with protection to IP69K so that the devices are waterproof at high pressure up to 80 °C. The FB products are also resistant to acids and chemicals. The HB devices with their extra bright display up to 800 Cd/m² are particularly suitable for outdoor applications.



IP67 Reader for HF/UHF RFID and 1D/2D Codes

The PD67 handheld is an all-round device for the flexible reading and writing of RFID tags in industrial environments. The handheld is protected to IP67 and runs on the future-proof Android operating system, as well as offering both HF and UHF detection. The touch display offers users convenience in moving between the two frequency ranges. One device variant also provides a 1D/2D barcode scanner. Thanks to the combined technologies, users benefit from greater handling flexibility – for example, for recording incoming and outgoing goods data, asset tracking or for mobile tool identification. Its benefits become apparent for example when using UHF in a logistics installation and HF in production areas. The PD67 comes with a pre-installed app that enables simple data transmission via Wifi or Bluetooth.



Condition Monitoring for OEM Control Cabinets



Turck is expanding its series of cabinet guards with the addition of the IM18-CCM. The integrated sensors of the narrow 18 mm device monitor temperature, air humidity and door distance, in order to send this information via Ethernet to higher-level IT systems. External devices such as vibration sensors for monitoring states can also be integrated via Modbus RTU and CAN. The IM18-CCM is particularly suitable for OEMs wishing to provide basic condition monitoring values in their IT system. It detects critical states of the control cabinet directly in the field.

Safety Sensors with OSSD Outputs



Inductive safety sensors with two OSSD (output switching signal device) outputs complete Turck's portfolio for safety technology. The proximity switches enable users to also exploit the benefits of contactless and thus wear-free position and range monitoring in safety-related applications – whether on presses, cranes, fairground machinery or machine covers. The sensors use their OSSD outputs to send switching signals to safety systems. This is used for detecting short circuits, overload, or cross-circuits and for testing switch-off capability at the same time. With SIL 2 (IEC 61508) and performance level d (EN ISO 13849), the devices meet demanding requirements in terms of functional safety.

Inductive Sensors for CFRP Detection

Turck has developed the world's first inductive sensors for detecting carbon fibres. The patent pending sensor series detects both carbon fibers as well as pressed CFRP parts. It is based on uprox technology that has been further developed and therefore offers very large switching distances as well as maximum mounting flexibility. The new sensors offer the following benefits: As optical or capacitive sensors, they are firstly more insensitive to contamination than optical or capacitive sensors, and secondly are considerably cheaper than ultrasonic sensors. The sensors are available now in three designs: as a threaded-barrel design in an M18 stainless steel housing as well as a 20 mm (QR20) or 40 mm (CK40) high rectangular variant.



Temperature Sensors with Plug & Play



Turck is expanding its innovative range of fluid sensors with IO-Link-capable sensors for flexible and reliable process temperature measurement. Both compact devices with an integrated temperature probe (TS700) as well as processing and display units (TS720) for connecting resistance thermometers or thermocouples are available.

As a member of the fluid sensor series that won the iF Design Award, the TS+ sensors also meet the growing demand for straightforward commissioning and high plant availability. This is supported by the robust stainless steel housing with touch operation instead of mechanical operating elements, which are ideally suited for use in harsh industrial environments thanks to IP67 and IP69K protection. Besides process values, the IO-Link interface provides the user with a large volume of condition monitoring data for smart IIoT applications.

To simplify commissioning, the TS+ devices also feature automatic detection of the output type (PNP/NPN or current/voltage), as is already offered by the PS+ and FS+ pressure and flow sensors. The processing units of the TS720 series also detect the type of temperature probe (TC or Pt), thus eliminating a frequent source of errors. If the TS+ has to be integrated in existing installations or replace existing sensors, the selection of different IO-Link process data profiles makes it possible to adapt the device quickly without the need for laborious modifications in the controller. The TS+ sensors are typically used in machine and plant building applications as well as in the process industry.



Ultrasonic Sensors for Level Measurement up to 130 cm

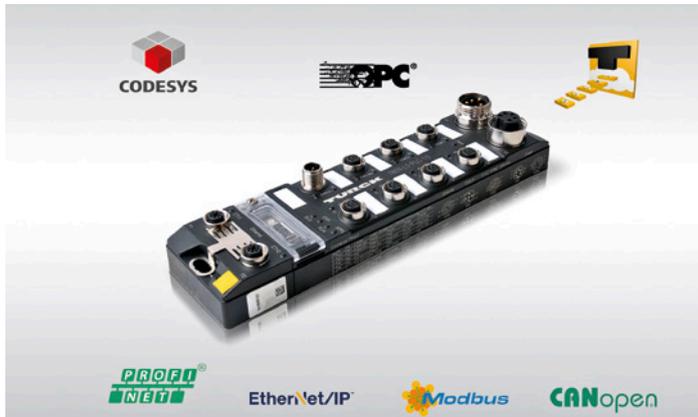
Turck is now also offering sensors for level measurement in the range up to 40 and 130 cm, which are based on the Fluid 2.0 platform and can be operated at the process connection at pressures between 0.5 and 5 bar. The new LUS211 ultrasonic sensors are thus the fourth sensor category of this robust Turck platform after the PS+ pressure sensors, FS+ flow sensors as well as the TS+ temperature sensors, which all offer a uniform look and feel. Like all sensors of the Fluid 2.0 portfolio, the high IP67/69K protection rating also enables the LUS211 devices to be used reliably in adverse conditions. The continuous signal strength evaluation and the recessed and thus protected sonic transducers of the level sensors furthermore ensure system availability. An air cushion prevents the medium from contacting the transducer.

Radar Sensors for Level Measurement up to 10 m

The IO-Link-capable radar sensors of the recently developed LRS Series complete Turck's portfolio for level measurement in the 0.35 to 10 meter range. The new devices with protection to IP67/69K are especially recommended for level applications in factory automation, in which optical or ultrasonic sensors are unsuitable due to disturbance factors such as dust, wind or light. The freely radiating LRS radar sensors also offer detailed analysis functions which were previously only possible in the high-end radar sensors used in the process industry. The absence of a metal guide probe enables the sensor to be used easily in hygiene applications and simplifies commissioning.



Robust IP67 PLC with Direct Cloud Connection



The TBEN-L PLC is the world's first IP67 controller for industrial applications, which not only offers an onboard CODESYS PLC but also enables a cloud connection and communication with different Ethernet protocols at the same time, thanks to its multiprotocol technology. The new Dual MAC mode enables the robust module to establish a connection to the automation network via one port and a securely separated internet connection to the cloud via the second port. Alternatively, if an internet connection to the cloud is not required, communication in two Ethernet networks is possible, for example as a Profinet device and as Profinet, Ethernet/IP or Modbus TCP master.

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Pressure Transmitters with IO-Link



The robust pressure transmitters from Turck's PT1000/2000 series are now also available with an IO-Link interface and two programmable switching outputs. Besides their ability to withstand shocks and changes in pressure and temperature, the sensors thus also offer all the benefits of digital communication, including enhanced diagnostics and flexible parameterization. For example, IO-Link enables users to monitor electrical short circuits, overpressures and underpressures, as well as values exceeding the maximum operating temperature. Other data for efficient condition monitoring can be supplied by an operating hours counter, a maximum and minimum pressure memory and an overpressure meter.

Turck China Honored with Career Award



Turck (Tianjin) Sensors Co., Ltd. was awarded the "Outstanding Growth Award" by ai Quality Workplace. The automation specialist competed against more than 2,900 companies. Esther Hou, HR Director, received the award at the commemoration on behalf of Turck. As she expressed, Turck always appreciates the importance of talent cultivation and development and provides its employees with diversified career paths.

Fast IO-Link Encoders

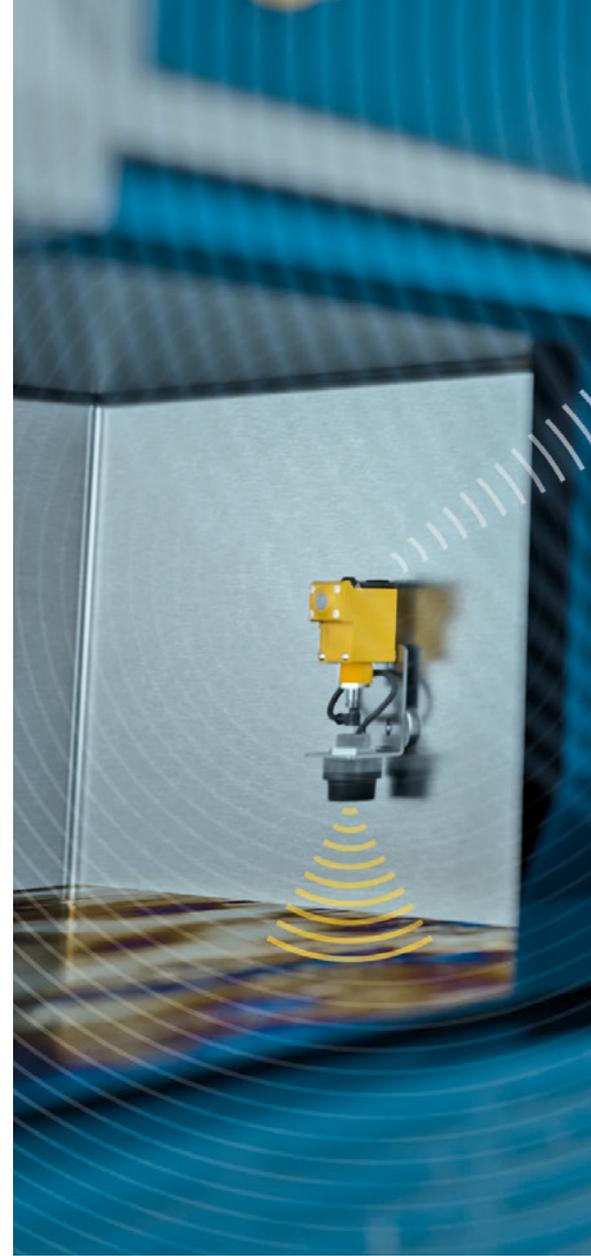
Turck has expanded its comprehensive encoder portfolio and is also now offering encoders with an IO-Link interface in the Efficiency and Advanced Lines. IO-Link models are thus now also available in the other two categories in addition to the contactless QR24 encoders of the Pro line. The new encoders support with COM3 the latest and fastest IO-Link interface on the market with a transfer rate of 230.4 Kbit/s, thus enabling a considerable improvement for control circuits. The encoders also come with integrated temperature sensors and can route already pre-processed position data to IO-Link masters if required. With their smart data, the devices support the implementation of IIoT solutions, such as for predictive maintenance. Their interlocked bearings make the encoders particularly robust against vibration or impact to the shaft.

 IO-Link



Highway to Cloud

With its Codesys PLC in the rugged IP67 block module design, Turck is bringing intelligence to the machine – a new firmware update now even enables direct cloud connection without the need for a separate edge gateway



Cloud services offer significant benefits both in the private and the professional sphere. We call up our school photos from a cloud, we share videos with friends via Dropbox – and the drafting of professional texts like this one are no longer sent back and forth by email but are shared with colleagues and stakeholders via a cloud or a network memory.

Data economy as a security issue

There is also rarely a need to explain the benefits of cloud services to users in the industrial automation sector. Potential users, however, consider very carefully what data they are prepared to transfer to a cloud and what not. For many industrial users, big data solutions that transfer all the available data of an industrial plant to a cloud are too risky, since this data enables deductions to be made about production quantities, production processes, recipes and corporate secrets. In spite of the use of encryption and firewalls, the unwillingness of know-how intensive companies to store this data on servers outside of their own company premises is understandable. This is particularly the case, as data that is stored on US or Chinese servers is not protected by the European General Data Protection Regulation (GDPR).

Data economy to save costs

Another reason for users tending towards data economy are the network resources available. In many applications, data transmission is implemented via mobile networks because, in order to minimize risks, the IT officers responsible do not at all wish to integrate external machines with cloud connections in their network. With these mobile wireless applications it is advisable to only transfer selected data to the cloud in order to reduce costs. Poor Internet connections are another reason that prevents users from outsourcing the most important data. This is not only the case in developing countries; Germany also has some areas without satisfactory bandwidths. If this data is critical for production or other in-house processes, companies prefer to store it centrally on in-house servers that offer reliable access at any time.

Preprocessing in the edge, smart data in the cloud

Smart data solutions are the alternative to the big data strategy. Data is filtered and analyzed already in the factory so that only the relevant data and results are sent to the cloud. This preprocessing is generally called edge computing. The conventional route to smart data is preprocessing in suitable controllers and



the subsequent routing of data to an edge gateway, which establishes the connection to the cloud. For this the programmer must configure at the interfaces between PLC and edge gateway which variables of the controller are to be sent to the gateway and how

this gateway is required to receive and route them to a cloud. In an integrated solution as now offered by Turck this step becomes unnecessary: The world's first IP67 PLC with an integrated cloud connection eliminates the need for separate edge gateways.

The Turck Cloud simplifies, for example, the monitoring of coolant levels on cutting machines and from anywhere in the world

QUICK READ

The TBEN-L PLC is the world's first IP67 controller for industrial applications, which not only offers an onboard Codesys PLC but also enables a direct cloud connection and communication with different Ethernet protocols at the same time, thanks to its multiprotocol technology. In Dual MAC mode the robust module can also be used simultaneously in two Ethernet networks. This makes it possible to implement decentralized and network concepts with a minimum of installation effort and expenditure. Compared to applications with a separate edge gateway, the programming of this kind of solution with an integrated cloud connection saves considerable resources since no interfaces for data exchange are required.

PLC and edge gateway in one device saves programming and mounting

As a Codesys-based IP67 PLC, Turck's TBEN-L PLC offers the performance required to carry out the analysis of data in addition to the control tasks. Turck has now provided a firmware update to upgrade the field controller with cloud integration. This enables users of a TBEN-L PLC to equip their controller with the cloud connection easily and without any additional costs and thus also upgrade the block module to the edge controller. The device can then filter, preprocess, analyze and transfer the relevant results directly to the Turck Cloud or the clouds of Amazon (AWS), Microsoft (Azure), Alibaba and many other suppliers. Possible error sources are also excluded by eliminating the need for an interface configuration. Designers, e-planners and panel builders save time in the wiring and assembly of separate control cabinets since the IP67 module can be fitted directly at the machine.

SMART CLOUD SOLUTIONS

How users of smart cloud solutions benefit is demonstrated by the example of Velco, a company based in Velbert, Germany. The pressurized vessel, rotor gunning machines and injection plants from Velco are used worldwide in blast furnaces, steelworks, foundries and in the refractory industry. In order to provide customers with rapid assistance when faults occur in their special machines, Velco today uses a



cloud-based solution from Turck, which enables worldwide remote access via PC or smartphones and is the only solution to meet all the company's requirements. The customer's employees call up the dashboard of the Velco cloud and see their machines listed in the navigation window. A map in a Google Maps view indicates the location of the individual machines. If a coworker clicks on an entry in the list, the dashboard provides a clear overview of all the relevant data. Besides analog values such as water pressure or material level, there are also digital indicators such as for operating state or the status of the emergency stop button. The user can also see an operating hours counter and other numerical displays. The dashboard can be made up very easily by the users themselves – with just a few clicks and without any programming knowledge.

Dual MAC mode: Controller and device in a single unit

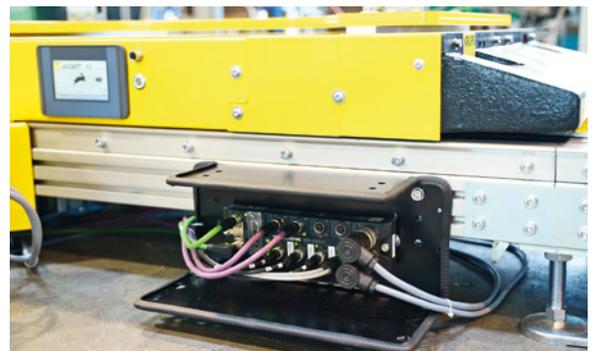
In order to ensure the security and independence of the automation network from the Internet (cloud connection), the two Ethernet interfaces of Turck's TBEN-L PLC can be separated if required. This is implemented with a mechanical switch on the module, which provides additional protection from manipulation. This once more opens up the possibility for completely new applications with the controller. Turck implemented the new Dual MAC mode at the same time. This enables the robust module to be used with different IP addresses in two different networks. It can thus establish a connection to the automation network via one port and a secure separate Internet connection to the cloud via the second port.

If no cloud connection is required, the module can be used as master or device in two networks. Devices can normally only be one or the other in controller networks. Dual MAC mode turns the Turck PLC into the ideal translator between two protocols when machines with different types of controller have to be combined in a system. As a multiprotocol device, the PLC can be used in networks with Profinet, EtherNet/IP or Modbus TCP and thus ideally network machines of different manufacturers in the same system. This function has so far only been available on the market with devices for use in control cabinets. As an IP67 PLC, the Turck module with a direct cloud connection is unique.

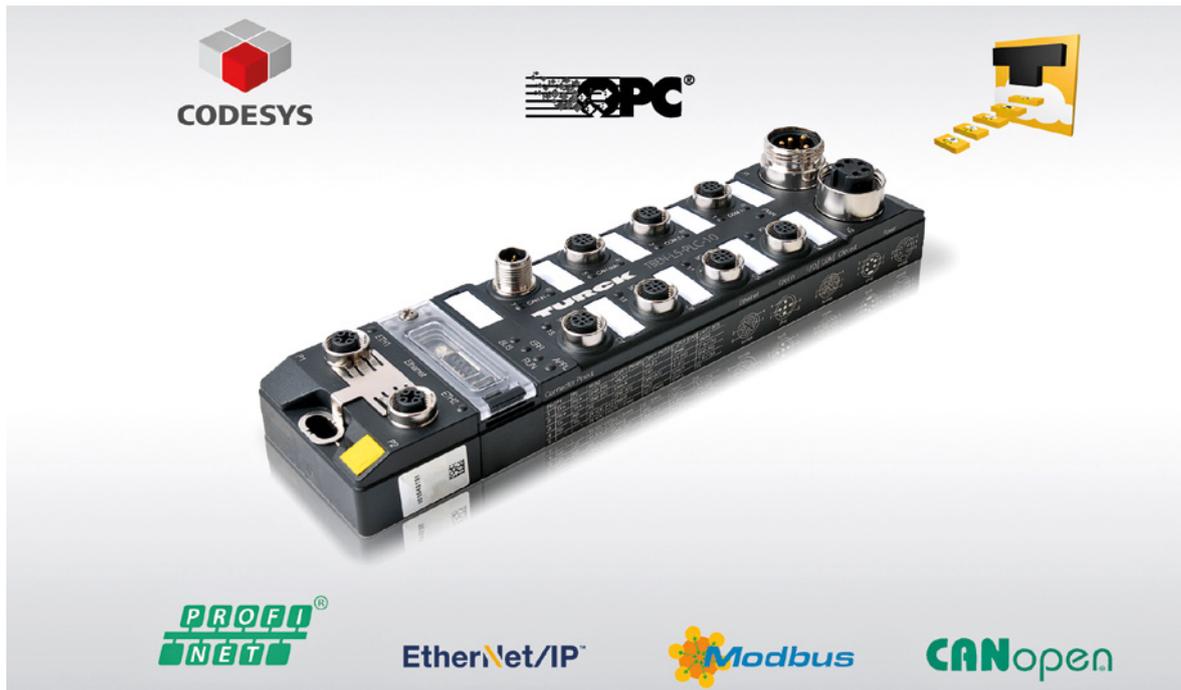
By providing this additional function via an update, Turck is consistently following the license strategy used with its Codesys controllers. The license for Codesys devices is acquired as always with the hardware. Further firmware updates from Turck are always free of charge. The devices are licensed automatically in the PLC user program since the license purchased by the manufacturer is already loaded into the devices during production. Users of other PLC systems know that updates of the programming systems always require a new license, thus requiring unwanted organization and accounting in addition to the costs.

From sensor to cloud from a single source

The TBEN-L PLC is a central product module in Turck's sensor-to-cloud strategy: The company is the ideal partner for the digitalization of the entire automation line from the sensor to the cloud, from the connection and fieldbus technology right through to the control



Customers already using Turck's robust IP67 PLC can now retrofit a cloud connection with a firmware update



Turck's cloud connection upgrades its IP67 field PLC to a PLC/edge controller in a single device and thus simplifies modular automation and remote maintenance

technology and cloud connection. Benefit for the customer: If the customer purchases a cloud-based condition monitoring solution from Turck, he can reach the right customer advisor directly when support is needed.

Conversely, Turck has the entire system fully under control as it all comes from the one company. This simplifies the setup for the customer and also enables Turck to analyze the sensor data more extensively and offer it more easily than systems using components from different manufacturers: As an edge controller, the TBEN-L PLC can not only evaluate data that is output via the standard interfaces but also for example process additional information such as internal raw data from the sensors obtained via IO-Link.

Applications

Customers who are already using the PLC can implement a remote controller for their machines by means of an update and a connection to the Turck Cloud. The monitoring of machine states via the Internet is in even more demand than the remote control of the machine. This is particularly the case for maintenance technicians and factory managers who are interested in these types of dashboards. Status information from entire machine parks or production plants around the world can be bundled and displayed clearly.

The TBEN-L PLC is particularly suitable for cabinet-free concepts and modular machines. The PLC fully supports here the creation of decentralized machine concepts. The ability to also connect the cloud as a central data storage directly to decentralized machine elements combines the best of both worlds: decentralized machine control that offers the flexibility and rapid commissioning of modular concepts, combined with limitless access to machine data and states from any terminal device worldwide.

Conclusion

Turck's IP67 PLC with its integrated edge gateway completes the automation specialist's range of products for the cloud. From data capture at the sensor to preprocessing and transfer, right through to evaluation and display in the cloud, Turck offers a seamless pathway for smart data to the cloud – and back again.

Data capture in the cloud is an important milestone, particularly for global condition monitoring and preventive maintenance. With its cloud solutions, Turck is responding to two frequent problems in the field of maintenance. Status values from machines are often not known at all or do not reach the right recipient at the critical moment. A complete toolbox is now provided for both scenarios – from the robust sensor in the machine environment right through to visualization on the smartphone.

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Further information: www.turck.com/s2c



»Turck offers a simple solution to connect sensors and actuators directly from the fieldbus level to the cloud without any additional edge gateways.«

Christian Knoop | Product Manager Factory Automation Systems

Turck's current portfolio offers integrated solutions from the sensor to the cloud. Product Manager Christian Knoop, explains how customers can benefit from this seamless concept in an interview with Anke Grytzka-Weinhold, Chief Editor of the technical journal messtec, drives Automation.

85 percent of the machines used in production have not yet been networked. Is this really the right time already for the development of sensor to cloud or sensor to Turck cloud solutions?

Definitely, the 85 percent primarily consists of existing machines that were built at a time when people thought that clouds only existed in the sky. The remaining 15 percent of the already networked machinery primarily consists of the newer solutions. This, however, first raises the question of what is meant by networking. Sometimes they "only" consist of VPN connections to access machines for remote maintenance tasks. When we speak of cloud solutions at Turck, however, we mean far more than just a basic VPN connection. These continuously provide machine data that can subsequently be used in higher-level processes. This is not only applies to monitoring tasks but also to optimization measures. We are therefore taking the sensor to cloud concept one step further. This not only involves

using the already existing machine data from the controller, but also generating useful additional data directly in the sensors, and transferring it from the sensors to the cloud.

What experience do you have in this field? How far has digitalization advanced in German production halls?

This is currently a hot topic and is widely discussed. The new concepts and possibilities have so far rarely been implemented in production halls themselves. There are several reasons for this. Existing machines mostly have a really long service lifetime, and so the majority of machinery currently used still comes from a time when cloud connections were not yet common. This does not however mean that the latest possibilities cannot be implemented on these machines. Turck also offers several easy retrofit options for existing machines, whether by means of parallel access via our Ethernet multiprotocol technology or wire-

less-based systems, which can be installed very easily without the need for additional cabling effort.

Nowadays, new machines are normally networked. The question here is only to what extent. Turck offers flexible technical solutions for different scenarios. What is implemented ultimately depends on what the machine manufacturer or operator wishes to use. The challenges involved include for example legal issues: Who owns the data, who is permitted to use what data and to what extent etc. However, a suitable business model, i.e. the commercial viability of the new services, also has to be considered. Very few customers are willing to pay more for something just because it has some of the latest features.

Turck aims to become the leading digital automation company. What other steps have you planned in the coming years apart from the Cloud Solutions?

With virtually all innovations, whether for

sensors, fieldbus modules, HMI, PLCs or also solutions from the connection technology field, we consider how we can develop additional functions to generate added value for our customers. For Turck however, the journey to becoming the leading digital automation company not only means developing innovative products. There are also many more areas in which we are active, such as in the organization of the company. For example, in recent years we have set up a worldwide CRM and ERP system, further digitalized internal processes and modernized our logistics center in order to be able to respond faster and more flexibly to the increasing requirements of our growing worldwide customer base.

Turck offers specific cloud services for industrial automation. How exactly are these solutions tailored to automation?

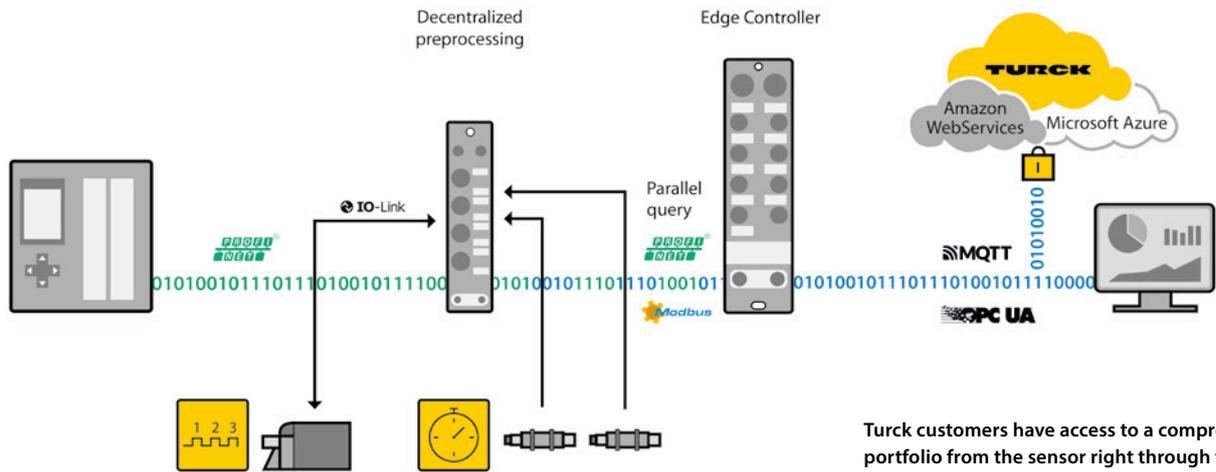
We don't just transfer individual values cyclically to the cloud. At Turck we can flexibly set the transfer of specific variables to be carried out cyclically or event driven. A temperature value, for example, is not transferred every second but only when it actually changes. Another important stand-out feature is the simplicity of our Turck Cloud Solutions. Any user able to program a PLC or create an HMI visualization can use our cloud easily. Here we have followed the "configuring not programming" principle so that no special IT knowledge is required for implementation and use.

There are also additional benefits for the user since we not only supply the software but also the required hardware. We offer special edge gateways, which can be connected to virtually any PLC. We have also integrated direct cloud capability in our products – whether this be controllers in IP67, which can be installed directly at the machine, or our HMIs, right through to fieldbus modules, which can communicate directly to the cloud without any additional edge gateway. Turck can thus offer users solutions that are plug & play.

How does Turck connect the IO-Link communication standard with the Cloud Services? What are the benefits for the user?

As previously mentioned, we not only offer edge gateways but have also integrated





Turck customers have access to a comprehensive portfolio from the sensor right through to the cloud

the cloud functionality in our controllers and fieldbus systems. Turck thus offers an easy solution to connect IO-Link sensors and actuators without additional edge gateways directly from the fieldbus level with the cloud. Particularly with the IO-Link devices, we are able to provide additional smart data, which would be impossible for us if we used conventional analog signals. For example, the reading of operating hours, signal quality, temperature or information on device type, firmware or hardware version or installation location.

Small companies in particular are less familiar with IO-Link and fear it might involve risks and costs. What sales arguments can Turck provide to address this issue?

It is always important to discuss the application with the customer in order to work out the individual benefits. However, some benefits can be outlined in general: Thanks to the standard interface, the customer no longer requires any shielded cables and does not have to observe any special pin assignments for the analog signals. The IO-Link standard also often makes it possible to reduce the number of I/O modules required and thus also the costs. In most recent applications, customers require analog input and output modules. In this case, an IO-Link master can often replace two or more modules. If different modules

were previously required for current signals and temperature measurement sensors, the possible savings are even greater.

You aim to simplify the use of IO-Link with SIDI. What can this tool do?

SIDI stands for Simple IO-Link Device Integration and makes it possible to integrate IO-Link devices directly in the Profinet engineering, so that no complex additional tools are required. This therefore makes the parameterization of sensors less complicated (through additional software tools), but also considerably simplifies it since no parameter setting is carried out directly on the sensor. The parameter values are stored centrally in the controller so that a new sensor can be reparameterized when installed as a replacement. The required parameters are automatically transferred from the controller to the sensor. This therefore also saves time and costs when a device has to be replaced.

Where is the cloud data hosted?

Wherever the customer requires. We offer different options for this: Firstly, the conventional variant hosted by Turck, in which a user just has to register and can start directly. In this case we take care of the hosting including backups, the user does not require any special personnel. Turck offers this scenario to its customers here in Germany so that the data does not leave the country. For customers in other countries, we also offer hosting in the respective country.

We offer one of our most powerful features for customers preferring to retain the data themselves and not to hand it over to an external IT center. In this case, Turck can offer special on-premises solutions so that customers can run their own cloud wherever they wish – either directly at the machine or in their own IT

center, if required also entirely without any Internet connection.

“When it must be ensured that sensitive data does not fall into the hands of competitors or foreign or national intelligence services or authorities, cloud solutions are always difficult,” explains Prof. Dr. Riehm from the University of Passau in der messtec drives Automation (10/19). How do you assess the security of data in general and the Turck cloud in particular?

The use of a cloud ultimately requires an overall integrated approach. Several factors play a role here. For example, the transmission route, which should naturally be encrypted. To transfer data without encryption would really be an act of negligence. Our proprietary Kolibri protocol offers a secure solution here. The next step would then be the data retention itself, which at Turck is fully encrypted. However, it is also important to consider issues such as user management and access authorization, both in the cloud as well as on devices in the field.

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Further information: www.turck.com/s2c

»Efficient data stream: hand in hand right up to the cloud«

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The condition data from the control cabinet enables users to prevent device failure in advance and thus increase the availability of their plant

First Rate Climate in the IIoT

Optimum device layout and smart condition monitoring prevent temperature damage in the control cabinet – for the first time Turck's smart IM18-CCM... cabinet guard transfers status data directly to the IT world

The housing of increasingly more powerful devices in ever smaller spaces is a sign of technological progress. For the control cabinet, the compact design of modern devices either means smaller outer dimensions or the possibility to house a greater number of electronic components. Innovation, however, also has its downside. In this case for all those who have to keep an eye on the possible side effects from the increasing miniaturization of technology, such as the buildup of heat. Extreme or irregular temperature conditions in the control cabinet in particular can cause power loss or even the failure of individual devices. Smart solutions for condition monitoring are therefore all the more important in addition to an effective device layout. The IM18-CCM, Turck's latest compact climate monitor and door guard, brings condition monitoring even to the IT world via Ethernet.

Making allowance for electronic “snowflakes”

A higher device and energy density in the control cabinet inevitably also increases power dissipation. By this is meant the proportion of consumed electricity that cannot be used in the process but is dissipated by electronic devices in the form of heat. Several risks arise at the same time if the components of a control cabinet are arranged so that hotspots build up or hardly any cool air can flow: Precision measuring devices may in some cases lose their accuracy, the lifespan of components may be reduced or in the worst case may fail permanently. Complex systems such as controllers are particularly susceptible to heat. Most PLCs have a maximum operating temperature of 55 °C. This is just 15 °C above the “comfort temperature” of many control cabinets.

Detecting anomalies before it's too late

Risks of heat generation can already be reduced to a certain extent when a control cabinet is being fitted with components. Arranging devices in moderately sized blocks, preventing air flow barriers caused by unfavorably laid cables or cable ducts and installing heat sensitive components as close to the bottom of the cabinet as possible – users can achieve good basic conditions already by pursuing these strategies. Even with an optimum topology or ventilation with air conditioning systems, however, it makes sense to electronically monitor the climatic conditions in the control cabinet permanently. This enables maintenance technicians to notice any anomalies early on in order to avert malfunctions – especially when devices are housed in remotely located switch boxes. This applies, for example, to outdoor areas where the weather is an external factor.

Three-in-one monitoring on the DIN rail

A few years ago Turck added cabinet guards IM12-CCM and IMX12-CCM (with Ex approval) to its portfolio as an easy-to-expand condition monitoring solution. The compact devices are mounted on the DIN rail and feature three onboard sensors for monitoring temperature, air humidity and the door gap. The IM(X)12 uses a configurable limit value function to then send a signal if values above or below the defined limit values occur. This would then indicate specifically that: a device has overheated, condensation has formed in the control cabinet, or the door was not properly closed.

The IM12-CCM features an internal data logger with a time stamp and stores data for up to two years. This enables users to also detect creeping changes over long periods and rectify the cause. An interface enables two cabinet guards to be operated in master-slave mode in order to monitor correct door closing and the other limit values simultaneously at two points in the control cabinet. The master processes the data of the slave and sends a signal to the controller. The standard IM12-CCM comes with two switch contacts and an IO-Link interface. Quick teach mode enables the user to set the limit values easily in the field. Alternatively, parameters can be set via IO-Link or an FDT framework such as PACTware.



Turck's IM18-CCM cabinet guard transfers measured values via Ethernet to IT networks and can even preprocess them remotely beforehand

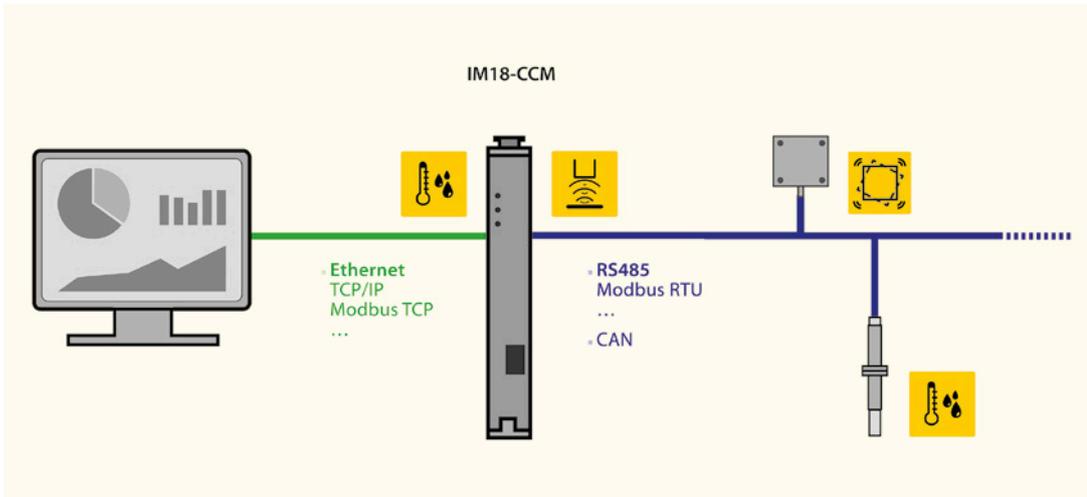
By the way, companies should not only monitor door status with regard to temperature and air humidity. Digital systems, particularly in so-called critical infrastructures (CRITIS) such as for electricity and water supplies, must be protected reliably and transparently from unauthorized access. This is stipulated by the IT security law. Turck's CCM devices with their secure control functions offer impressive performance in this area. These devices make every control cabinet fit for use in critical infrastructures without any significant outlay.

Next steps: connecting factory level and IT world

Turck's IM18-CCM takes everything one step further by making it possible to not only display the condition monitoring of control cabinets locally but to also transfer the data to the IT world. The slim 18 mm device sends the measured values of the sensors to higher-level systems via its Ethernet interface. Theoretically this

QUICK READ

There are many reasons for the excessive buildup of heat in control cabinets. Designers can often minimize the dangers resulting from incorrectly arranged devices or poor ventilation in advance. However, specific condition monitoring is needed for external factors and device anomalies. Turck's IM18-CCM cabinet guard now provides a smart solution for processing sensor data via Ethernet in the IIoT.



Turck's IM-CCM cabinet guard series offers condition monitoring solutions for end users and OEMs



Seamless connection between OT and IT: Turck's IM18-CCM makes it possible to connect external sensors and transfers measured values to higher-level systems via Ethernet

can go as far as the cloud, thus giving maintenance personnel access to actual climatic data at any time via mobile terminals. The boundary between the operative level and the IT infrastructure is thus gradually disappearing. This means: users can analyze factory floor data from their office desk.

However, this not only offers plant builders and users additional possibilities with regard to data output. Greater freedom is also provided for the collection of measured values: the RS485 interface (Modbus RTU or CAN) enables external devices such as vibration sensors to be connected to the IM18-CCM if required, in addition to the three sensors installed. In order to gain the ideal temperature image of a control cabinet, for example, multiple temperature sensors could also be installed effectively at different positions, thus eliminating the need for additional cabinet guards. The data from three temperature sensors is often enough to obtain an accurate overall picture even in large cabinets.

Flexibility for bespoke applications

Condition monitoring tasks are often as individual as the software solutions of many plant builders or users. The open Linux platform of the IM18-CCM therefore provides the possibility to install custom applications. This enables programmers to feed in specific routines into the device, for example for detecting a dew point or allowing for natural increases in temperature at the beginning of the summer months. Some users may likewise wish to upload their own cloud connector – the visualization of trends or the sending of an alarm then take place in the higher-level system.

Outlook: more interfaces, more memory

Temperature, air humidity, but also the security of control cabinets are variables that play an important role in any plant concept. With the right device layout and effective ventilation, designers can ensure the basis for the optimum availability of electronic components. Compact and easy to handle condition monitoring tools for providing information on critical measured values at any time are also available in addition to cabinet guards.

Following on from the proven devices of the IM12 series, Turck's IM18-CCM builds the bridge to the IIoT and also provides the freedom for bespoke customer solutions. Anyone wishing for an even greater variety of interfaces will be able to make use of a second device version this year. This offers an additional Ethernet input as well as universal I/Os, a USB host and additional memory.

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PREVENTING HOTSPOTS IN THE CONTROL CABINET

White paper: learn more about intelligent control cabinet design – with five strategies to minimize hazards and save energy through ventilation and air conditioning.





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»For us, vision sensors are a useful addition to conventional sensors but not a substitute«

Oliver Marks | Vice President Business Unit Automation Products

In the expert panel discussion on sensor technology, Dr.-Ing. Peter Ebert, Editor at technical journal SPS Magazin, spoke with Oliver Marks, Vice President Automation Products Business Unit at Turck, about the trends in sensor technology, from wireless sensors to vision sensors right through to 3D sensors



Cabled sensors will therefore certainly be in use for a long time. In my view, it makes much more sense to transport a large volume of signals and information to the cloud with wireless technology – such as via an edge gateway.

What is the future for IO-Link? What is happening with IO-Link Wireless?

IO-Link has now been established for several years and is an extremely important technology for industrial automation. Having initially become widely accepted as a communication standard for more complex devices, it is now also available for more basic sensors. Many sensors, even binary sensors, feature an integrated microprocessor, which enables IO-Link to be implemented at virtually no additional costs. The cost benefit ratio is also obvious for our customers since they can obtain additional information about their machinery and use this to improve the efficiency of their plant. Easy commissioning for complex sensors, which have to be parameterized, is then also possible without the need for any additional proprietary software tools. Our new radar sensors are an excellent example of this. The web server implemented in the Turck IO-Link master makes it possible to configure these sensors to perform foreground and background suppression or to suppress interference signals caused by grid structures, stirrers or similar machinery. IO-Link Wireless is certainly an interesting solution for niche applications and retrofits but nevertheless has to overcome the same challenges as already described for the wireless sensors.

To what extent will wireless solutions (5G, WiFi 6, LPWAN...) change the state of sensor technology?

Sensors offering wireless communication are another important step on the way to the widespread implementation of condition monitoring and predictive maintenance. This particularly applies to brown-field projects, since eliminating the need for retrofit cabling offers considerably time, planning and cost benefits. Two aspects of wireless communication are important in all cases: Each sensor firstly has to be provided with a power supply. Although this is possible using batteries, issues such as battery lifespan have to be taken into consideration – unless the application involves very long cycle times. This is not a problem for condition monitoring, however it is very unsatisfactory for machine control. The same applies to the issue of determinism.

To what extent will SPE (Single Pair Ethernet) become an alternative to IO-Link?

If SPE is standardized and is available at a reasonable cost, it will definitely be an alternative to sensors as a communication route for industrial automation. I am convinced that this will happen much faster than with IO-Link. In order to offer customers single-source solutions, it will also be important here that all the necessary components are fully available.

How powerful will sensors become through the use of AI?

Artificial intelligence certainly ensures the fast and effective processing of the measured values captured by sensors. Machine learning in particular plays a major role here. Wherever an individual sensor can provide enough information to ensure the effective use of AI, this can certainly take place in the sensor; otherwise it definitely

makes more sense to perform this on a downstream level. Our CCM condition monitoring module is a good example of this. Although it looks like a compact interface device for the DIN rail in the control cabinet, it is in fact a multi-sensor that measures air humidity, temperature and the door position, thus enabling the predictive maintenance of control cabinets.

Will vision sensors replace conventional sensors – or vice versa?

In some applications, vision sensors will certainly replace conventional sensors and thus represent a simple alternative. Vision sensors are clearly a benefit, particularly when several properties have to be examined simultaneously. However, this can definitely not be generalized since other factors such as ambient conditions and susceptibility to contamination also have to be taken into account. We consider vision sensors to be a good supplement to conventional sensors but not a substitute.

Will new application areas develop through the use of 3D sensors?

Thanks to the third dimension made possible by 3D vision, additional information on volume, height, position and the actual shape of an object can also be obtained. The technology is also ideal for distinguishing objects with the same color or pattern and thus enables more reliable solutions. This can be used in applications such as robot guidance or to replace tactile measurements. It is also possible to implement position measurement, position detection and completeness controls. The 3D measurement technology is also able to perform reverse engineering, by which design elements can be extracted from a finished system or an industrially manufactured product through the examination of structures, states and behaviors. A plan is then created from the finished object.

Author | The interview was conducted by Dr.-Ing. Peter Ebert, Editor at technical journal SPS-Magazin

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Efficient: the processes in the goods center were optimized with RFID communication – Turck's read/write heads (bottom left) transfer material data via UHF-RFID to the transport pallets



Pallet Power

For efficient and transparent goods flows, a Chinese energy and chemical company uses a Turck RFID system – with UHF read/write heads and compact TBEN-S interfaces

In material management, Chinese companies and service providers also have to be measured by the “six Rs” of logistics: the right product, quality, amount, place, time and cost. However, the trend in this sector towards greater automation and increasing logistics performance only started around ten years ago. One reason for this delayed development could be the handling of hazardous substances and the special safety requirements and technology associated with it. An increasing number of manufacturers, however, are catching up worldwide in order to transfer the already high degree of automation in the chemical industry likewise onto logistics tasks.

This is demonstrated by one of the largest energy and chemicals companies in China. Together with Turck

and system integrators New Trend International Logistics Technology Co., Ltd., the company installed RFID technology in a digital goods distribution center situated in the southwest of the industrial metropole of Guangzhou. The contactless detection of incoming and outgoing goods now provides those involved with considerably greater transparency of stock levels.

Inventory control in focus

The operator of petrochemical plants previously used here a combination of standardized manual steps and semiautomated computer management in the warehouse. This neither produced the required logistics efficiency nor minimized error quotas. An excessively large number of work steps were required just to place

or find material or organize the stock levels for slightly varying types of goods. In view of the increased demand for the quality of logistics services, it was particularly necessary to ensure correct purchasing and inventory controls.

More real-time ERP information with UHF RFID

When did material reach or leave the warehouse and how much? What items were involved? Where are the products stored? The ERP system has to make this information visible in real time and provide it on demand on the transported material. The Chinese system integrator therefore opted for data transmission via UHF-RFID. In brief: read/write heads use a high frequency signal to write or read a specific amount of information to or from passive RFID tags and to transfer it to the IT network via an interface. Thanks to the UHF technology the exchange is carried out between the reader and the tag over several meters. Information is also captured when objects pass at high speed.

Read/write head marries material data with the pallet

The chemicals company transports goods on returnable pallets. An RFID tag which is provided with a unique ID is embedded in each transport pallet in order to link the data closely to the material or product conveyed. This tag is written for the first time in the packaging area. It is here that Turck's TN-Q120 read/write head virtually "marries" the specific material information with the pallet before it reaches the goods center. The transmission of the cube-shaped UHF reader complies with ISO 18000-6C, and thanks to its IP67 protection type can operate if necessary in harsh environments with temperatures between -20 and +50 °C.

Other type TN-Q120 RFID readers are installed in the warehouse along the automated conveying line. They record incoming and outgoing goods movements and also register the exact position of the pallets. The TN-Q175 read/write head is used at other locations wherever a particularly high level of power is required. These enable the reliable reading of nine stacked empty pallets.

IP67 interface for direct RFID integration

Turck's TBEN-S2-2RFID-4DXP RFID interface is used between the RFID reader and the IT network in order to transfer the information from the read/write heads rapidly to a production control system in the ERP. The ultra-robust RFID module (IP67/IP69K) is designed for mounting outside of the control cabinet and allows the connection of two UHF read/write head as well as sensors and actuators at the same time. "The interface is easy to configure and powerful enough to transfer data from the RFID readers to the PLC quickly, even when multiple pallets are being read," says Han Qingyun, electronics engineer at New Trend International Logistics Technology Co., Ltd. The special feature of the compact module is its simple system integration without the need for any programming effort or function blocks. The TBEN-S also "speaks" three Ethernet protocols: Profinet, EtherNet/IP and Modbus TCP.

QUICK READ

System integrator New Trend International Logistics Technology Co., Ltd. has digitalized the goods distribution center of a Chinese power and chemicals company using RFID technology. Turck's TN-Q120 and TN-Q175 UHF read/write heads transfer the material information of transport pallets, while TBEN-S RFID interfaces enable the rapid transfer of data to the ERP system. In this way, users benefit from precise and rapid inventory control.

Conclusion: Better warehouse utilization, greater security

The data on incoming and outgoing goods enables the ERP system to continuously synchronize inventory levels. For users this is a major relief, especially since they can also access real time information about available capacity or the position of transport pallets. It enables the optimum use of space resources. Knowing where and which goods movements are taking place, however, also meets the safety requirements of the chemicals industry. Greater efficiency ultimately also has an effect on costs. In other words, far fewer manual operating steps and material costs are required for warehouse management. Identification processes via RFID are automated; and rewritable tags enable the multiple use of transport pallets.

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The TN-Q175 RFID reader is used where up to nine stacked empty pallets are read simultaneously

»The interface is easy to configure and powerful enough to transfer data from the RFID readers to the PLC quickly, even when multiple pallets are being read.«

Han Qingyun, New Trend International Logistics Technology Co., Ltd.

Hacking Guard

A gas transfer station of the Villingen-Schwenningen municipal utility company uses Turck's IMX12-CCM to monitor control cabinets and thus offers reliable protection from manipulation

"As energy suppliers we are legally required to protect our plants and data," says Rudolf Spadinger, head of the control technology department at the Stadtwerke Villingen-Schwenningen GmbH (SVS) utility company, as he passes through a gas transfer

station. The gas of the major suppliers is transferred at the transfer station to local suppliers like the SVS municipal utility company, which it then passes on in its distribution networks to industrial and domestic end consumers.

The mounting on the DIN rail is considerably easier than the mounting of a door lock with cam or solenoid switches



»I simply fit the cabinet guard on the DIN rail and link it to an indicating contact on a tele-control installation – that's it.«

Rudolf Spadinger | SVS municipal utility company



Increased security requirements for utility companies

Gas or electricity suppliers with their plants are categorized as critical infrastructure installations (CRITIS). They are subject to special security requirements and must provide their plants with an increased level of security, particularly their IT installations. As an electricity supplier, SVS has implemented an information security management system (ISMS) that ensures the security and the protection of the information technology. The system implements statutory and legal requirements such as the CRITIS regulation from the Federal Office for Information Security.

As part of the ISMS, SVS implemented several measures to reliably protect their infrastructure, including the control cabinets. In his capacity as head of control technology, Rudolf Spadinger is responsible for the security and protection of the control technology in the individual plants of SVS. He therefore searched for a solution to monitor the door locks of the control cabinets in the distribution panels of the utility company.

Fast installation of the cabinet guard on the DIN rail

"We have considered the use of a mechanical cam switch or a solenoid switch on the door – but mounting would have required considerable effort," Spadinger describes the reasons for his choice. Today SVS uses Turck's IMX12-CCM cabinet guard instead. "I simply fit the cabinet guard on the DIN rail and link it to an indicating contact on a telecontrol installation – that's it." Every opening of the control cabinet is registered in the control center. Coworkers can verify whether

openings were authorized. This additional protection is very important as the transfer station is also used by other infrastructure companies.

Another benefit compared to the mechanical solutions is the fact that in this way the monitoring of the control cabinet cannot be hacked. A mechanical contact could be blocked when the door was opened and would therefore be defeated. Besides the optical sensor for monitoring the door closure, the IMX12-CCM also features two additional integrated sensors: a temperature sensor and an air humidity sensor.

Door closure, air humidity, and temperature monitoring in a single device

The IMX12-CCM also comes with an onboard data logger. Thanks to the integrated real-time clock it can store events and data with a time stamp. If required, the cabinet guard also signals its measured values and the exceeding of taught limit values via IO-Link to PLCs or control systems.

Interface technology records pressure, temperature and volume

SVS also uses conventional interface technology from Turck in a transfer station. The devices safely separate the signals from the Ex area and then transfer them to the telecontrol installation connected to the control center. Gas pressure, temperature and volume are measured during the transfer – also in order to calculate the final price for the customer. This is not calculated in cubic meters but in kilowatt hours. To do this, the calorific value of the gas must be specified, and these measured values and others are also collected.

The upgrade of its communication systems has enabled the Villingen-Schwenningen GmbH utility company to monitor and immediately determine who has access to the control cabinets. This is also ensured by devices such as cameras or structural measures. The monitoring of control cabinet doors in the safe hands of Turck's cabinet guard series requires little effort.

QUICK READ

As operators of critical infrastructure systems, gas, electricity and water suppliers are legally required to protect their IT systems with suitable measures from manipulation and unauthorized access. Turck's IMX12-CCM cabinet guard is predestined for this task. The monitoring of the door closure with the compact rail-mounted device is faster and easier than with conventional door locks with mechanical contacts.

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Grist for the Mill

To meet the requirements of Swiss company Bühler AG with regard to its MSHA huller, Turck certified its contactless Li linear position sensor for use in the Ex area

The milling of oats and related products such as spelt, soya and sunflower seeds requires high throughput with minimum breakage. The MSHA huller supplied by Bühler AG, the machine and plant builder headquartered in Uzwil, Switzerland, meets this requirement. The long-established company was founded as far back as 1860 and today has around 13,000 employees in 140 countries. As an innovative technology partner in the food industry, Bühler also demonstrates its expertise in this niche area with the MSHA huller.

Bühler AG develops and sells process solutions and sustainable value chains for a wide range of industrial sectors. The group's operations are divided into the Grains & Food, Consumer Foods and Advanced Materials areas. The solutions of Grains & Food, which also includes milling solutions, ensure the production of safe and healthy foodstuffs. Each year, Bühler invests up to five percent of its sales in research and development, and together with its customers and partners, forms a dynamic innovation ecosystem. Bühler strives to achieve market leadership in all its key industry segments. Its global market share in the milling sector is 65 percent.

Innovation and value creation

Bühler is a model Swiss company and continues to be a family-owned business. With its technical expertise and innovation capability it has gained an outstanding reputation among producers in the food and beverage industry, the automobile industry, as well as in several other sectors all round the globe. Bühler's strengths in the food and beverage industry lie in the fact that the company with its range of services can cover and optimize entire value chains for greater efficiency.

The seamless linking of subprocesses and the constantly increasing level of automation play a central role here. Bühler is pursuing some ambitious goals also with regard to sustainability: Major investments in digitalized solutions are designed to support customers in the reduction of waste, energy and water consumption in their value chains by 50 percent.

Demanding requirements for the suppliers

Procurement has a strategic importance for Bühler and is handled by its global supply chain network.

Stroke unit: Turck's Li linear position sensor checks the position of the impact ring and was specially Ex certified for this application





»In spite of the low order volume, Bachofen has obtained Ex certification for Turck's linear position sensor. This is what we call "partnership". Other suppliers wanted to help us but couldn't with this issue.«

Vincent Behrens | Project Manager Bühler AG

The company engages suppliers who share Bühler's passion for innovation and actively participate in development processes in order to make a substantial contribution to increasing Bühler's competitive strength in global markets. However, the willingness of a partner to offer more than expected can also be a decisive factor.

Explosion risk from flour dust

The process in which the MHS huller is used is an environment with a dust-laden atmosphere. Flour dust can be explosive if there is a potential source of ignition in this atmosphere. These ignition sources can come for example from electronic devices if they do not meet specific design requirements. The design engineers therefore required a contactless linear position sensor that is certified for the Ex zone 22. During the procurement process, Bühler's project manager Vincent Behrens discovered that most sensor suppliers were not able to provide an Ex certified sensor that was priced in the required range.

Bachofen: ready to give extra

It was then that Turck representatives Bachofen, a long-standing supplier to Bühler, presented Turck's Li linear position sensor. Although this sensor met all the stated performance criteria, it did not, however, provide at the time the necessary Ex certification. Bachofen encouraged Turck to take care of the necessary certification before the contract was awarded. This goodwill from their supplier was very well received by Bühler. Vincent Behrens: "Due to their experience with similar projects, the responsible product specialist at Bachofen predicted that certification would also be possible with this sensor type and took the necessary steps immediately. It was their flexibility as well as the professional and active advisory support that made this project so successful."

Robust sensor solution

The measuring principle of Turck's Li linear position sensors is based on oscillation circuit coupling between the positioning element and the sensor. An output signal is provided here that is proportional to the position of the magnet. Thanks to its contactless operating principle, the robust sensors are both



The MHS huller in the Milling Solutions Technology Center at Bühler AG: An impact ring moves up and down under the cover during the hulling process

maintenance-free and wear-free. They offer an impressive performance due to their optimum reproducibility, resolution and linearity over a large temperature range. The innovative technology also ensures immunity to magnetic AC and DC fields.

Author | Roland Fuchs is Product Manager at Turck's Swiss representative Bachofen AG

Customer | www.bachofen.ch

Users | www.buhlergroup.com

Web code | more12151e

QUICK READ

Swiss technology company Bühler AG is a major player in the production of quality fine food and modern health products made from oats. The MHS huller is an important module in the process – a high-performance device that ensures the high-precision separation of the chaff from the oat kernel. Turck's Li contactless linear position sensor ensures the reliable positioning of the impact ring in Ex zone 22.



Painted car bumpers are placed in this LASE assembly cell to punch ultrasonic holes for parking sensors

Hand in Hand

The LASE Group in Belgium produces flexible and individual machines and assembly cells for the automotive industry – and places its trust in the close collaboration with Turck Multiprox



»Turck Multiprox is a good example of this intensive and partner-based cooperation.«
Gert Peetersem, LASE

The LASE Group, the name stands for “Labor Aiding Systems Europe”, produces machines for the manufacture of automotive interiors such as dashboards, door panels, roof windows, seating systems or central consoles. However, the company also develops solutions for mounting car bumpers, spoilers or fuel tanks. Systems for assembling drive train systems are another pillar of the company. “Around 65 percent of our sales comes from the interior and bumper systems area,” explains CEO Gert Peetersem. “Our systems are used by several OEMs.”

Peetersem founded the LASE Group in 2001 because by his own admission he felt that a solution-oriented machine builder was needed to automate the assembly of car interiors. “Although car manufacturers had a certain design of their products in mind, they were unable to implement the manufacturing process in a satisfactory automation concept”, Peetersem continued. “Our machines meet global standards, and so we have grown to become a globally active company. Today you can find our plants in all corners of the globe, from Australia to Europe, from North Africa to Russia.”

Lase originally started out with the production of assembly cells for objects in vehicle interiors. However, further solutions gradually followed, such as fuel tanks and systems for bumper assembly. The company acquired a very good reputation as its experience and growing know-how increased. “We were already

engaged with several OEMs in the design process so that we could use our solutions to rationalize the production process of the customers straightaway.”

Full vertical integration

As suppliers of turnkey solutions for the automobile industry, we have to be able to implement the requirements of customers quickly and reliably. And these requirements are continually changing. Digitalization, for example, has now become an important factor. Customers want information about the state of their processes and require a clear operator interface. At the same time, data acquisition is also becoming a more important priority on their wish list. Customers often want to manufacture several variants of the same component without any losses in production time and therefore preferably on the same machine.

The LASE Group has a specific approach to meet these requirements. Peetersem explains: “We do everything from day one with our own people. I don’t want to depend on subcontractors or be faced with suppliers that cannot keep to the deadlines. This approach enables us to achieve fast throughput times for manufacturing our machines. It is also straightforward for our customers: At LASE they have one specific customer contact who takes full responsibility for the project. This clear structure is effective and also enables us to keep our prices competitive worldwide.”

Component supplier must move forward as well

Peetersen also places demanding requirements on his component suppliers since they also have to adjust to the work method. "Turck Multiprox is a good example of this intensive and partner-based cooperation: We state the type of detection we require, specify the design and measuring distances and then work out a solution in consultation with Turck Multiprox. They are often also involved in the test phase." LASE uses a broad range of components from the Turck Multiprox offering: optical sensors, laser sensors, inductive proximity switches, I/O modules, tower lights, 2-hand controls etc. Turck's Ethernet multiprotocol I/O modules are ideal for machinery to be exported worldwide. These can communicate via Profinet, Ethernet/IP or Modbus TCP in the same module. This enables customers worldwide to use the local systems, for which they can also obtain local service and spares – a key benefit.

Integrated solution

The finishing touches to a bumper assembly cell had just been made during a visit to the production hall. The tremendous care taken in the development of these machines was clearly noticeable. For Peetersem it is very important that the cells are part of the entire production line. "Island solutions require too many logistical movements with the product, which would increase the risk of damage. This is one of the success factors of our approach." The average lead time for the development of a bumper assembly cell is 24 weeks. Everyone involved always has the overall picture in mind: the mechanical and electrical engineering, the software, the manufacturing of the parts and the assembly. All processes such as laser cutting, plasma cutting and prefabricated assembly are carried out by the LASE coworkers themselves.

Q4X laser distance sensor makes the difference

The painted bumpers are inserted in the first bumper assembly cell for punching the ultrasonic holes for the parking sensors. The brackets for the side reflectors are also fitted in this cell with ultrasonic welding. Although these side reflectors are not required for European cars, they are stipulated for cars on the US market. The machine can process all the variants without any problem and without any extensive retrofit times. This process doesn't start until after the painting has been completed, so that absolutely no processing marks are left on the bumpers. Sensors play an important role here.

In another assembly cell LASE uses the Q4X laser distance sensor from Turck's optoelectronics partner Banner Engineering. In its robust stainless steel housing this sensor plays an important role in efficient operations at the machine builder. With protection type IP67/69K, the Q4X can for one thing resist shock, overtightening or extreme vibration. The assembly cell secondly not only has to detect the presence of a bumper but also has to distinguish between a matt black and a brilliant black bumper. This is a particular challenge because black absorbs most of the light.



The Q4X laser distance sensor reliably measures the distance precisely down to one millimeter and also analyzes changes in light intensity

However, the Q4X not only has a high excess gain, but also "dual mode" detection. This enables the sensor to not only measure the distance but also analyze changes to light intensity. The Q4X therefore stands out from the sensors of other manufacturers. The sensor not only works very reliably on black objects but also on transparent objects in bright ambient light or with acute detection angles. It can measure differences in distance in a range from 25 to 300 millimeters down to one millimeter.

For Peetersem, the laser sensor is a paradigm for the good cooperation with suppliers like Turck Multiprox: fast, capable and one hundred percent reliable. "It is also thanks to these components that we manage to achieve a lead time of 30 seconds per bumper. Creating efficient, high performance machinery is what we're about," Peetersem explains.

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Turnkey solutions for the automobile industry, fast and reliable – this is the specialty of the LASE group in Herk-de-Stad in Belgium. Thanks to the large vertical manufacturing depth, the company can quickly supply individual solutions for its customers for manufacturing and assembling automotive components – supported by quality components from the extensive range of Turck's Multiprox branch in Belgium.

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