

more@TURCK

The Magazine for Customers of the Turck Group

Pharma

Pharmaceutical customers benefit from global communications, says David Fazzini p. 14



Food

Winkler und Dünnebier use the BL ident RFID system for mold management p. 28



Oil & Gas

BP Lingen modernizes temperature measurement with the IM34 transducer p. 36



All Networked

BL remote integrates subnets such as DeviceNet, CANopen or IO-Link in fieldbus and Ethernet structures

Focus on the Customer



“The customer is the focus of our thoughts and actions” – dear Reader, you will surely have heard of this slogan, indeed, it is announced by many suppliers as a means to distinguish themselves from the competition! But how do these suppliers breathe life into this claim? Do you see a difference?

For Turck, this focus on our customers is of the utmost priority in our sales strategy – this is what you should measure us by! We know that the ideal solution to problems faced by discerning customers is not always achieved by a selection of standard products, even if our portfolio boasts over 15,000 of them. Therefore, some time ago now, Turck created an additional sales unit for customized product developments, and one for customized automated solutions. Both these units support our sales specialists on site if necessary, enhancing both traditional full-spectrum sales and vertical sales activities to attend to our target markets - the automotive and packaging industries and process automation.

You, the customer, benefit from an expert advisory team, which provides you with the ideal solution to your automation task – from the standard product through a customized product solution right up to an integral approach to your automation concept.

So if you would like to discuss how to solve your problems with our expert team, please go ahead – we look forward to the challenge. And if you want to see what other customers have to say about Turck, take a look under APPLICATIONS on page 24. I hope you enjoy reading these application reports, and gain a lot of other useful information from this issue.

Warmest regards,

A large, stylized handwritten signature in black ink that reads "C. Zöller".

Christoph Zöller, Director of Sales, Germany



NEWS

Turck at the Interpack	04
RFID Package Expanded	04
Compact Analog Sensor	05
Plug-in Connectors with M12 Quick Connection	05
Foundation Fieldbus and Profibus Junction Boxes	06
Capacitive Sensors for "tough" Cases	06
Robust Sensors for Commercial Vehicles	07
Welding Nut Sensors	07

COVERSTORY

FIELDBUS TECHNOLOGY: All Networked	08
With BL remote, Turck integrates subnets such as DeviceNet, CANopen, IO-Link or SmartWire in fieldbus and Ethernet structures	

INSIDE

FOCUS PHARMA: "Global Communication"	14
Anke Geipel-Kern, Department Manager of Process PharmaTEC, talked to David Fazzini, Global Director of Pharmaceuticals, about Turck's portfolio	

WORLDWIDE

RUSSIA: Eastward Expansion	16
For more than two years, Turck Rus OOO has been successfully responding to the rising demand for automated solutions in the Russian market	

TREND

INTERFACE TECHNOLOGY: Revamping 19-inch Technology	20
Asset management with FDT/DTM is made easy by modernizing installed 19-inch technology using fieldbus, remote I/O or interface solutions	

APPLICATIONS

RFID: Guide	24
The BL ident RFID system keeps goods flowing smoothly at the Brax-Leineweber Logistics Center	
RFID: Perfectly Molded	28
Turck's BL ident RFID system used in Winkler und Dünnebier confectionery machines to ensure transparency in mold logistics	
CONNECTION TECHNOLOGY: Giant from the Rhine	32
Completely encapsulated actuator sensor boxes from Turck inside the highest aerial work platform ensure climate-resistant connections	
INTERFACE TECHNOLOGY: To the Rails	36
BP Lingen oil refinery modernizes temperature measurement with Turck IM34 temperature transducer for DIN rail assembly	

TECHNOLOGY

WELDING NUT SENSOR: Double Agent	40
Location pins with integrated sensor reliably identify and secure welding nuts and sleeves	
BASICS: How Capacitive Sensors Work	43
Part 3 of our basic series: Design, functional principles and mounting options of the most important sensor technologies	

SERVICE

CONTACT: The Fast Lane to Turck	46
Whether on the Internet, at trade shows or directly on site, we will show you how, when and where Turck is there for you	
CONTACT: Publishing Information	46



Brax-Leineweber trusts in Turck's BL ident RFID system at its logistics center **Page 24**



Turck boxes with rapid plug-in systems on Wumag's aerial work platforms are extremely leakproof **Page 32**



IM34 compact temperature measuring transducers replace old 19-inch cards at BP Lingen **Page 36**

Turck to Attend Interpack



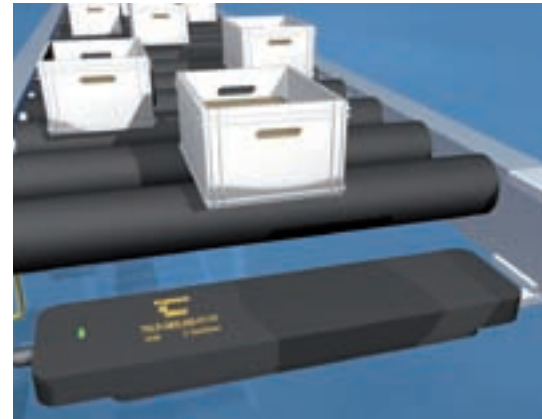
► **TURCK will exhibit** its portfolio for the food industry and custom machine manufacturing at booth E61 in hall 13 at the Interpack trade show. The BL ident RFID system can also be seen at the following Turck partner booths: Winkler und Dünnebieber Süßwarenmaschinen (3, C07), Agathon (2, D15) and Pester Pac Automation (6, D61-D73). When it comes to the modular RFID system, Turck will introduce additional features for the food and packaging industry, such as special data carriers for use in autoclaves,



as well as read/write heads for roller conveyors with distances of up to 50 mm or wash-down design. Also on show will be the new Factor-1 sensors with terminal changer from the uprox+ wash-down series (see photo), which promise to provide a high level of flexibility in assembly. Like the sensors, the terminal chamber is resistant to cleansing agents and high-pressure cleansers and meets the FDA requirements for foodsafe materials. The same applies to Fbplus plug-in connectors as well as the new completely metal M25 U Ultrasound sensor from Banner, which is highly resistant to chemical and mechanical influences.

RFID Package Expanded

► **With numerous innovations**, Turck has enhanced its high-temperature RFID system BL ident. At the Hanover trade show, the company exhibits an RFID I/O module for simple Plug & Play connection compatible with all conventional control systems. The new RFID module is available for the BL67 and BL20 I/O systems with a maximum data flow of eight bytes. Turck is now introducing a read/write head for use in roller conveyors. The TNLR-Q80L400 fits precisely between the rollers of an 80 cm wide standard roller conveyor. This ensures that the overall width of the conveyor is reliably measured. A special highlight of the new product: it can detect numerous data carriers simultaneously. Among the newest developments for data carriers are the FRAM tags with 8 kbyte memory, data carriers with 50 mm diameter that can be directly mounted on metal; as well as screw-on data carriers for use in autoclaves that resist the combination of heat, moisture, and pressure.



Ethernet Profibus Interface with DTM

► **xEPI, the FDT/DTM-supported** Ethernet Profibus coupler, facilitates communication from the office to the field devices on various levels, for example, HART via Profibus PA. This gives users the option centrally monitoring their Profibus network and centrally parameterizing the field instruments. xEPI is another contribution to asset management that can also be used as an active Profibus master (class 2) or as a pure listener on the bus that is not actively participating in the bus traffic. As a master class 2, the xEPI communicates with TCP/IP via the standard Ethernet. With the free ComDTM and an FDT mounting frame application such as PACTware, a connection to Profibus subscribers can be established. As a listener, xEPI becomes a permanently installed unit with the software tool "ProfibusS cope," which permits diagnosis of Profibus networks.

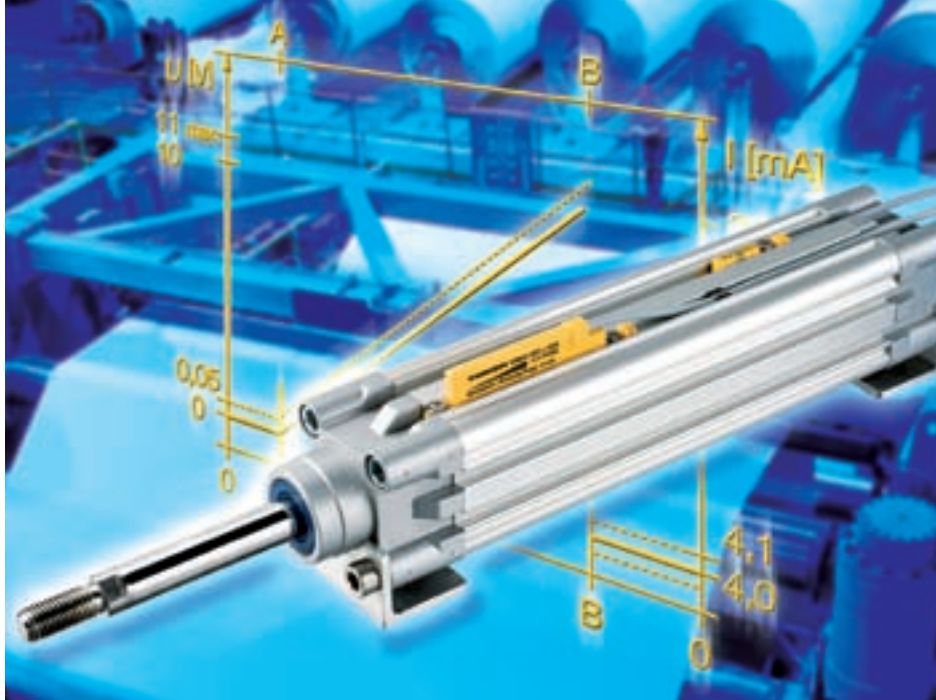


Automation Award Success

► **Having won second place** at the Automation Award 2007, once again a Turck solution was able to successfully hold its ground in a competition. After the top 10 nomination by an independent jury of experts, visitors to the SPS/IPC/Drives trade show in Nuremberg awarded the metal detection sensor from Turck second place in the "most innovative automation product" category last



year. Product specialist Michael Troska accepted congratulations and the certificate from Andrea Kimmich, advertising sales manager, and Stefan Ziegler (r.), editor-in-chief of the trade publication elektro Automation.



Compact Analog Sensor

► **A compact magnetic field sensor** with an analog output will be on display at the Turck booth during the Hanover trade show. With the WIM45-UNT model, the piston position in the pneumatic cylinders can also be determined at any time between the end positions so that, for example, the penetration depths or feed movements can be precisely detected. Such measurements are useful for numerous applications, such as ultrasound welding, hot-air riveting, screws, pressing, clamping, cutting or for quality control. The new Turck sensor represents an efficient alternative to mechanically sophisticated solutions prone to wear and tear with potentiometers or expensive linear path systems. Only 72 mm long and with a housing width of 5 mm, the WIM45-UNT is the most compact sensor on the market with an analog output. Almost all the accessories for the BIM-UNT family are also compatible with the WIM45-UNT.

M12 Quick Connection Plug-in Connectors

► **For its M12 quick plug-in** concept, Turck is now offering connector versions with an extruded connection cable. Depending on the coupling, connectors are also available in a straight or angled design. The M12 quick plug-in connector is compatible with all M12 threads, even badly diecast threads are no longer a problem. The connection is assembled 85 percent faster than a comparable M12x1 standard plug-in connector and is the fastest connection on the market. The quick plug-in connector which comes in 3, 4, and 5-pin variants, meets the IP67 degree of protection.



Product Database Online

► **Customers** and interested parties can find more information on Turck solutions quicker in the product database on the Internet (www.turck.com). In order to accommodate the growing requirements for this communication path, Turck has restructured its product database. Users can now expect more transparency in data collection, which holds information and data sheets for more than 15,000 products and solutions.



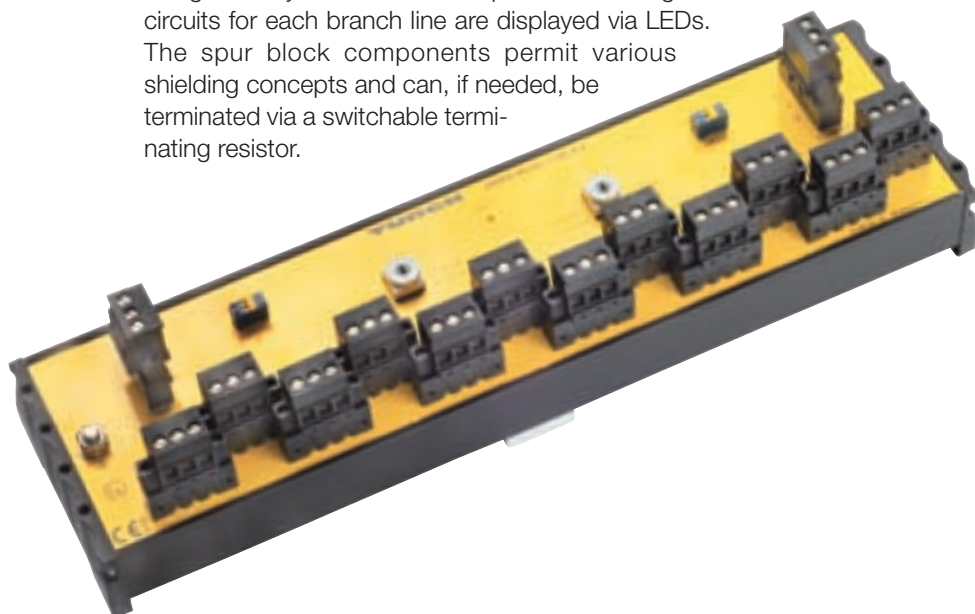
Users have the option of selecting between the application areas, factory automation and process automation. In the subsequent levels, comprehensive structures ensure a clear and intuitive product arrangement, depending on the selected application area.



While products for process automation are represented in the Point-to-Point (interface technology), Point-to-Bus (Remote I/O) and Bus-to-Bus (fieldbus technology) categories, parties interested in factory automation will find sensor technology, connection technology, fieldbus technology and system solution categories. Also, the download area has now been consistently integrated into the logic structure of the product database.

FF and Profibus Junction Boxes

► **A 12-channel distributor** is a welcome addition to the JRBS series from Turck, which had until now only consisted of 4-, 6- and 8-channel versions. The IP20 spur box components can be horizontally and vertically mounted on DIN rails and are also immediately available with removable screw terminals instead of the traditional spring-type terminal. JRBS spur blocks for use in Zone 2 and Zone 1 comfortably and reliably connect Foundation Fieldbus or Profibus PA to field devices. Users can individually adjust short circuit current using a rotary coded switch. Operational voltage and short circuits for each branch line are displayed via LEDs. The spur block components permit various shielding concepts and can, if needed, be terminated via a switchable terminating resistor.



Capacitive Sensors for “tough” Cases

► **With the encapsulated** BCF10 Q20L60, Turck is now offering a square-shaped capacitive sensor with a cable or M12 plug output. The new BCF sensors with IP67 protection have an intelligent close-up range fade-out, which, together with an electrode and compensation optimization, guarantees reliable detection even under the most difficult conditions. The BCF10 Q20 is also suitable for measuring the filling level of highly viscous liquids, such as cleansing solutions in plastic containers. While residue sticking to the wall of the container leads to problems for other sensors during measurement or even makes measurement impossible, the new Turck sensor reliably records the filling level. One compensation sensor generates a signal in the close-up range of the sensor surface that counteracts the main signal.





Robust Sensors for Commercial Vehicles

► **Turck has developed a new series** of inductive sensors that are specially tailored to the tough requirements of commercial vehicle transport. High switching distances and robust housing, together with application optimized electronics and the newest production technology, ensure long-term stability. The Federal Motor Transport Authority has confirmed that these sensors are suitable for commercial vehicle use by issuing an e1 type approval. The new Turck sensors work in an expanded temperature range of -40 to +85 °C with a voltage of 8.4-65 VDC so that they can be used in 12 and 24 V on-board electrical systems. Thanks to its robust housing (V4A threaded pipe and PBT-GF30 for square shaped components), it is vibration and shock resistant, and offers high resistance against rapid temperature changes and salt spray. The sensors offer increased switching distances and can be installed flush, which protects against mechanical damage.

Welding Nut Sensors

► **Turck has a process-reliable** and inexpensive alternative to visual inspection procedures with its new sensor for detecting welding nuts and spacer sleeves. The sensor is surrounded by a stainless steel centering bushing that offers mechanical protection and simultaneously accommodates nuts and bushings. The sensors are able to detect ferro-magnetic material through non-ferro-magnetic stainless steel bushings. With the help of a teach adapter, the sensor is easy to program via pin 2 of the M12x1-plug-in connection. The welding nut sensors have a brass housing and meet the requirements for IP67 degree of protection. LEDs reliably indicate the current switching status, including both the presence of the target as well as errors that have arisen.



Winners of Sensor Application Award



► **For the sixth time already**, the most innovative sensor application was honored with the German Sensor Application Award at the SPS/IPC/Drives trade show. The award is an initiative from Turck, the Ruhr University of Bochum as well as the Konradin-trade publications elektro Automation and KEM. Jury member Werner Turck congratulated the successful award winners Ludwig Wenninger (Clariant), Dr. Peter Heiligensetzer (MRK-Systeme), and Michael Wolff-Oberbanscheid (Gustav Wolff Maschinenfabrik).

PDF and ePaper



For additional information or electronic versions of the reports and feature articles in **more@TURCK**, please visit www.turck.de. Simply enter the Webcode in the search field. The following article page takes you directly to the product database or you can download or send the article as a PDF. The customer magazine is also always available to you as an ePaper on the Internet. Follow the link on the start page and you can scroll through the online issue just like in a booklet.

► Webcode

more10810e

Solution for the
“last mile”: Under
the name BL remote,
Turck is launching
a subnet master as
a gateway or block
module



All Networked

BL remote integrates subnets such as DeviceNet, CANopen, IO-Link and SmartWire into fieldbus and Ethernet structures





When alternative telecommunications suppliers began to woo traditional Telekom customers after the liberalization of the telephone market, the “last mile” soon became an important topic. While setting up a backbone network was relatively easy for the suppliers to achieve, major challenges were encountered on the way from the exchange to the customer’s wall socket, in other words, the last mile. Automation engineers are faced with similar challenges when it comes to making their own last mile as efficient as possible – in their case the connections to sensors and actuators.

As a specialist in sensor, fieldbus, interface and connection technology, Turck has relevant expertise in all the areas that are relevant for the last mile, allowing them to offer exceptional benefits to customers. True to its motto “Sense it! Connect it! Bus it! Solve it!”, the company is increasingly focusing on complete solution concepts. This is ably demonstrated by the BL ident RFID system and the CoDeSys programmable gateways – a kind of compact control solution – for the BL67 and BL20 remote I/O systems, which have been available for some time.

DeviceNet Master

BL remote is a brand new component in Turck’s solution portfolio. Under this general designation, the company now offers solutions that enable subnets for sensor/actuator communication to be integrated into higher-level fieldbus and Ethernet structures. The first member of the BL remote family to be launched by Turck is a DeviceNet master, available either as a block module or as a gateway for the BL67 system.

At the Hanover trade fair, the company also presented its first solutions for other subnet types that can frequently be encountered when it comes to networking the last mile. They include a SmartWire link for the BL20 control cabinet remote I/O system. A CANopen master in the form of a BL67

► Quick read

Efficient solutions in automation are always made up of a huge variety of components. Sensors, actuators and controllers all need to be combined in a sensible way and linked to higher automation levels. With BL remote, Turck is presenting a concept that can integrate the different standards for the “last mile” to sensors and actuators.



Standardized variety: The BL remote concept allows the optimum subnet to be used for the last mile with no compromises



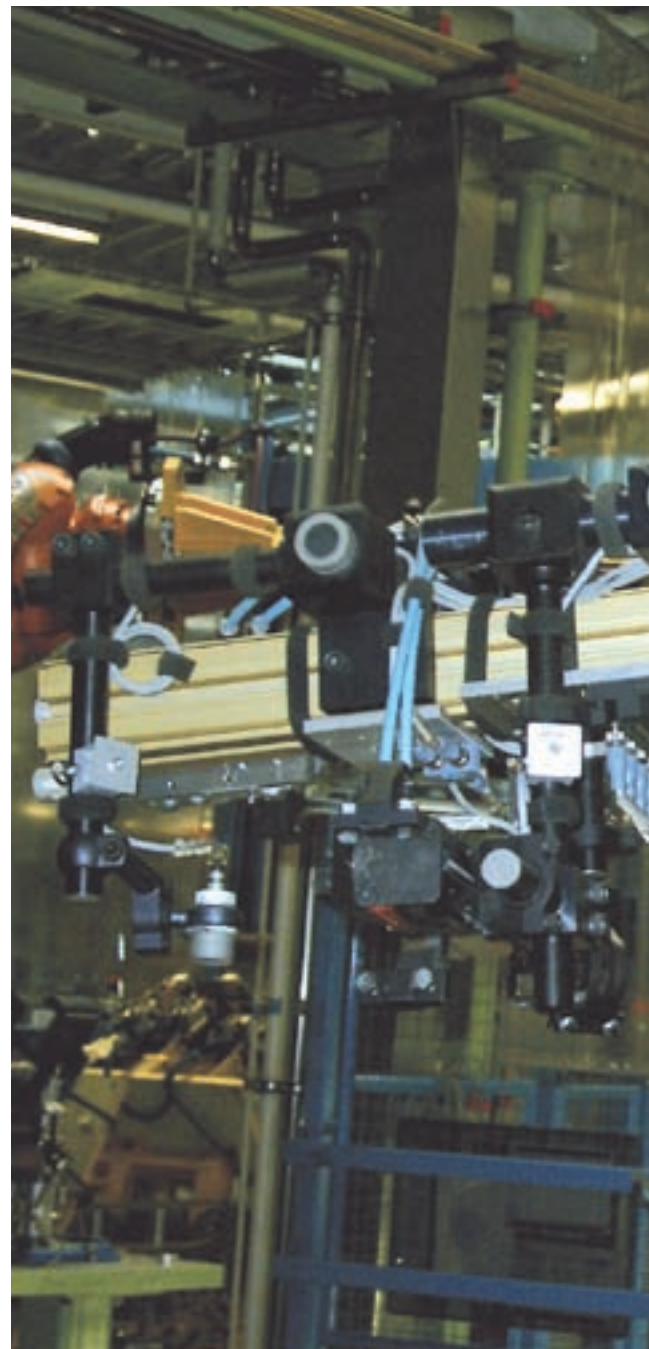
“BL remote is our “Solve it” strategy for the last mile, where we find different approaches in terms of the bus systems being used.” BL remote allows us to use any of these – regardless of whether it is DeviceNet, CANopen or SmartWire.”

Norbert Gemmeke,
director of business
unit fieldbus and
systems, Turck

module that can be used to connect valve clusters is also available. SmartWire is a subnet that is primarily used in motor starters. Ultimately, the IO-Link standard, which is currently on everyone’s lips, is nothing more than a subnet for sensor/actuator communication that can also be integrated using BL remote.

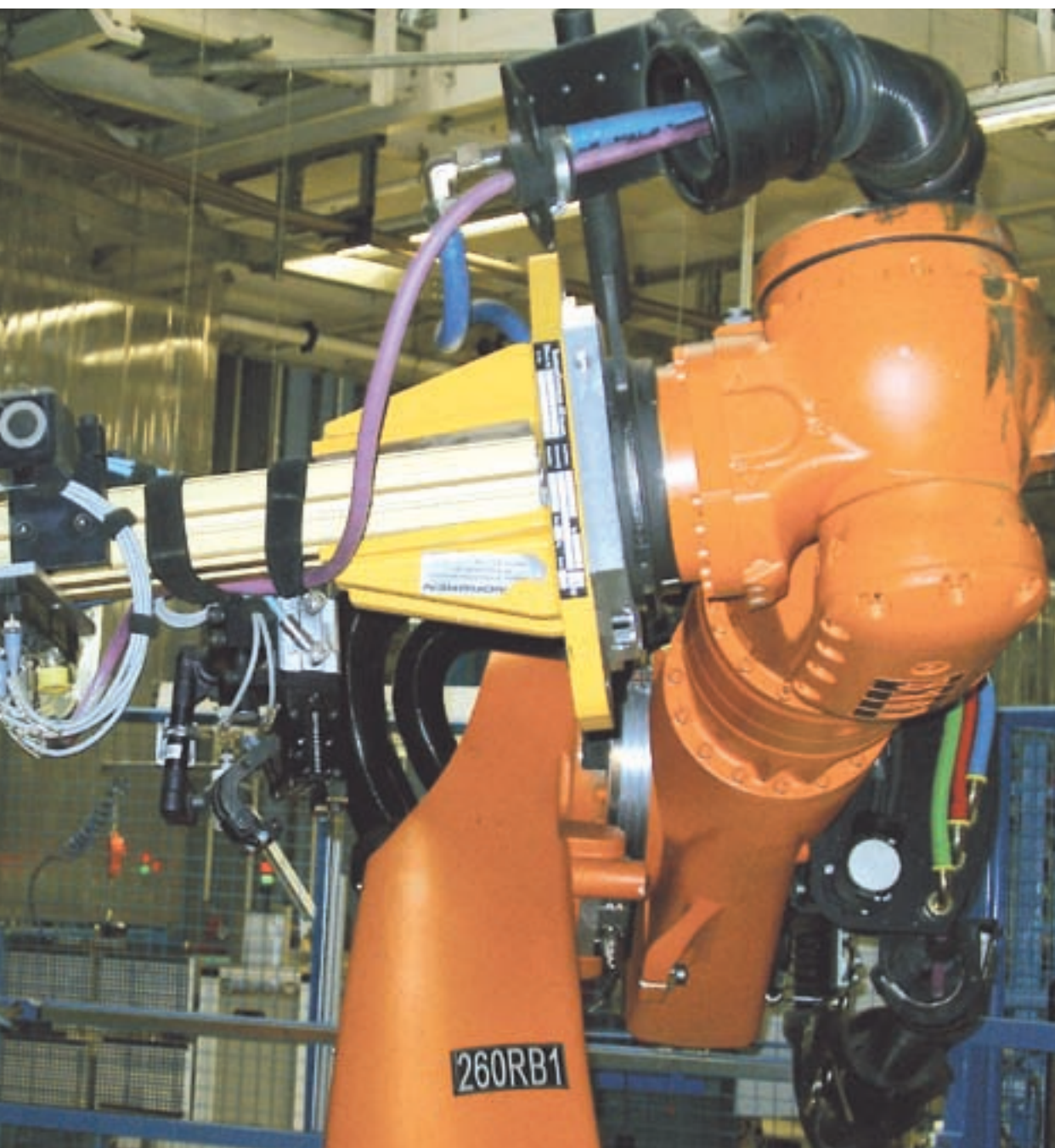
The main applications of the BL remote DeviceNet master are in decentralized control solutions. It enables various devices – from different manufacturers if required – to be connected to the remote I/O stations via the BL remote gateways and integrated into the overall automation architecture. The key benefit for the user quickly becomes clear – while previous solutions for these applications only allowed the available IO modules to be used, the DeviceNet master can also use signals from other devices such as barcode readers, valve assemblies and converters. The integrated DeviceNet master thus enables a subnet below BL67 to collect the required signals and feed them to the control process.

The variety of different digital and analog signal forms, diverse technology and interface modules and the additional diagnostic and configuration options mean that Turck components can be tailored to meet almost any requirements in industrial DeviceNet applications. The DeviceNet master from the BL remote range also allows additional field devices – from different manufacturers if necessary – to be integrated, provided they have a DeviceNet connection. As a result, almost any signal form or field device can be connected to the Turck block module or BL67 gateway.



Increased flexibility for robots

Another application where the new BL remote concept offers significant benefits – in the form of a DeviceNet master in this case – is in integrating robots for automotive engineering. In this sector, Ethernet is increasingly being used instead of conventional fieldbuses. Different manufacturers use either Profinet or Ethernet/IP. However, both systems struggle to handle robots with interchangeable tools. The run-up time of a bus component plays an important role here. With Interbus, DeviceNet or Profibus it is just tens of milliseconds but with Profinet or Ethernet/IP it can easily reach and, in some cases, considerably exceed 500 milliseconds. This



When changing tools on robots, standard Ethernet start-up times of up to 500 ms are unacceptable. BL remote allows tools to be changed more quickly in the subnet before it is connected to Ethernet/IP or Profinet at the robot stand

can mean having to use more robots to achieve the cycle times required in the automotive industry. This permanently raises the costs of a production plant.

With the BL remote DeviceNet master, on the other hand, the robot can easily be “internally” fitted with a so-called multibus line as far as the tool itself. The underlying multibus system was jointly developed three years ago by Turck, the robot manufacturer Kuka, the cable specialist E&E and Daimler. It enabled the hose packages for a robot to be standardized, regardless of whether Interbus, Profibus or DeviceNet would be used in the robot. A multibus cable not only supplies the robot and its tools with power, it also carries all of the data lines for the different bus systems.

Turck has developed a compatible fieldbus station with twelve inputs and four outputs, with the multibus cable connected using an M23 connector. An electronic bus terminating resistor, which was used for the first time in the multibus modules, allowed tool changes with different I/O configurations to be carried out with no problems. For welding robot applications, the fieldbus stations also enable analog constant current regulation signals used to monitor the welding quality to be connected. Turck's DeviceNet master allows this system to be retained, even if the rest of the system is networked using Profinet or Ethernet/IP.

A compact Ethernet station is simply installed on the robot stand, with the DeviceNet master act-



BL remote and the DeviceNet master give Turck customers a complete solution for signaling the positions of valves from a single source – from the dual sensor to the bus line to the maintenance software

ing as a gateway to the robot bus. It then provides the “upward” connection to Profinet or Ethernet/IP. The PLC or robot controller receives the user data and diagnostic information for the entire robot as a package via the new Ethernet protocols, while the connection times within the robot remain very short.

Benefits in process automation

As well as the use of robots in automotive production, there are numerous other conceivable applications where the BL remote DeviceNet master can connect individual components to provide an efficient overall solution. One example from the Turck portfolio is the dual sensors, which are used in large numbers in process automation for returning the position of valves and ball cocks. In close collaboration with customers, Turck has developed a version of its dual sensors fitted with DeviceNet connections. This enables entire batteries of valves, as can often be found in pharmaceutical applications for example, to be scanned and actuated using the simplified bus cabling. With BL remote and the DeviceNet master, Turck customers can now obtain

this complete solution from a single source – including the dual sensor, the bus line and the DeviceNet master, along with all of the maintenance and servicing software. It would also be possible to realize a control task in which the system is supplemented with a programmable gateway. Upwards – away from the DeviceNet master – the application would then be open for a variety of bus systems, including Ethernet protocols that are becoming increasingly widespread in process automation.

Summary

With BL remote, Turck has created a concept that can be used to incorporate a wide range of subnets, including DeviceNet, CANopen, SmartWire and IO-Link, into modern automation architectures via fieldbus and Ethernet. Users benefit from the variety of components that Turck can provide for diverse tasks and also has the option, where required, of incorporating components from other manufacturers and combining them into a single overall solution.

Author



Jörg Kuhlmann is director of fieldbus division at Hans Turck GmbH & Co. KG

“Subnets have their strengths”

Stefan Ziegler has been a respected observer and commentator on the automation scene for 17 years. As an expert in industrial communication, he is convinced that homogeneous solutions are somewhat unrealistic in the foreseeable future.

Mr. Ziegler, Ethernet is constantly being touted as the sole solution for industrial networking. Is the age of incompatibility and system discontinuity at an end?

Definitely not. Of course, every user would like to see this kind of uniformity. But the idea that this can be achieved in the foreseeable future is a fallacy. Communication requirements in plants and machines are simply too heterogeneous for a single system to offer an optimum solution. This is particularly true for the last mile to sensors and actuators. The specialized subnets have clear strengths in this area. However, they need to integrate as efficiently and consistently as possible into the higher-level automation structure – and this is where there is a good opportunity for concepts like BL remote.

There are an increasing number of examples of applications with a uniform communication structure. Is that just a sham?

No, it's not a sham. Sometimes, they may well be demo projects, similar to the multi-vendor plants that are used in the reverse case to demonstrate sufficient interoperability but rarely occur with the same level of complexity in practice. Standardization can really make sense if the application is just right – normally limited to one machine and with the appropriate automation components, by which I mean intelligent sensors and actuators. However, the majority of applications still have heterogeneous communication. There is a good reason why so many new products are still being developed for these. Good examples would be the IO-Link interface standard and the first multi-protocol Ethernet system solutions for shared use of communication protocols.

Does this mean that automation engineers need to say goodbye to the prospect of simple engineering?

Not necessarily. The automation suppliers need to help, by providing convenient tools for engineering and diagnostics and also with powerful gateway solutions. Even with the full order books at the moment, I constantly hear users say “we need the new technology but we don't have time for it.”

Nevertheless, the excellent transmission capacity of Industrial Ethernet offers indisputable advantages. Does this mean that the end is nigh for fieldbuses?

In actual fact, Industrial Ethernet is repeating the history of fieldbus technology, which achieved great things in the 1980s after a weak start. Back then, an unmanageable variety of protocols were developed and only a fraction of them remain today. With Industrial Ethernet, all the proprietary developments mean that there are now more than 30 versions. Despite this, fieldbuses are not on the way out. The best way to explain the life cycle of a communication technology is to use the example of climbing a mountain. Today, open fieldbuses are approaching the summit, right in the middle of the phase with the maximum market penetration and sales figures still increasing significantly. Meanwhile, proprietary systems have already gone beyond the summit and have entered the valley of market overcrowding. In this picture, Industrial Ethernet is still right at the beginning of the launch valley and is only just starting to climb up towards the summit. I believe that it will not reach the position that fieldbuses now occupy for at least five years, probably closer to around ten years.



Stefan Ziegler studied electrical engineering at the Technical University in Kaiserslautern and has been working as a journalist in the industry since 1991. In 1995, he moved to the Konradin publication “elektro AUTOMATION”, one of the first automation journals and still a leading title today, and he has been its editor-in-chief since 1998. Last year, he also produced the building technology journal BUILDING CONTROL.

www.ea-online.de

David Fazzini is familiar with the special challenges in the pharmaceutical and biotech industry



“Global Communication”

Anke Geipel-Kern, Pharma Department Manager of the process PharmaTEC, spoke with David Fazzini, Turck's Global Director of Pharma, about their portfolio for the pharmaceutical industry

Mr. Fazzini, Turck has been able to record double-digit growth rates in the past few years. How has the pharmaceutical industry contributed to this?

The pharmaceutical industry plays an important key role for Turck in its growth strategy for process automation. The pharmaceutical and biotech industry is enjoying healthy global growth. We have a comprehensive range of products to meet the special project requirements of our customers, such as very tight building lead times, cost reductions or the implementation of highly developed process control systems. Furthermore, we also continue to support both the end customers as well as the engineering

agencies and project managers with all necessary project management services, from basic engineering to detail engineering and commissioning.

The pharmaceutical industry is primarily project-driven. What strategies do you intend to implement to meet its demands?

Coordination and communication on a global basis are a must for successfully completing a pharmaceutical project. For example, it is quite conceivable for an end customer to be located in Europe, but the detailed specification prepared in the USA, the plant delivered by several global suppliers, and the building site located in Ireland or Singapore. In the final stage, the

plant is built and commissioned by a local company in compliance with local building codes and procedures. With such a scenario, there may be no limitations that disturb the process, and the information must be able to flow unhindered, precisely, and rapidly. For this purpose, first and foremost, a global, flexible, and highly specialized technical project team that can reliably complete the project from its conception to final commissioning is indispensable.

What products and services does Turck offer the pharmaceutical industry?

For the implementation of a digital fieldbus network such as FOUNDATION fieldbus

or PROFIBUS PA, Turck offers diagnostic systems that improve the power supply quality ("Diagnostic Power Conditioning") both for non Ex/Exd installations as well as for multibarriers and FISCO applications. For customers who want to rapidly upgrade or to exchange machines, we have a complete range of connection technology for sensors and actuators for processing technology as part of our product portfolio. We offer different sensing technologies for flow rate and filling level detection as well as position detection for rotational valves. As an interface between conventional signals and a digital fieldbus network, Turck offers a complete line of remote I/O products that can be mounted inside or outside the control cabinet. Furthermore, we offer intrinsically safe remote I/O and point-to-point interface solutions for hazardous areas. One product that has gained a lot of attention in the pharmaceutical industry is our RFID System BL ident.

What opportunities does the FDA's PAT Initiative open up for Turck as a process automation provider and sensor manufacturer?

The goals of PAT (Process Analytical Technology) are better production process control and optimization. One of the keys to this is to automate processes because doing so provides better information and thereby more process and machine knowledge. In addition to their actual functionality, many Turck products offer diagnosis tools such as tools for documenting configurations, which directly supports the PAT goals. Those who automate their plants using Turck products thereby have every opportunity to integrate diagnosis and configuration tools into the plant's operational and maintenance strategy. In other words, Turck products facilitate asset management even between the field device and guidance system.

The pharmaceutical market is primarily USA-driven. What regions is Turck currently focusing on?

The majority of our major end customers in the pharmaceutical industry as well as the associated plant builders and engineering companies are located on the east and west coasts of the USA. In addition to the pharmaceutical industry's strongholds like the USA, Ireland, Puerto Rico and Singapore, we are seeing the emergence of important growth markets in the Pacific Rim and eastern Europe.

How does the American market differ from the European market?

The difference lies in the general level of government involvement in the pharmaceuticals industry. Companies in the USA are not as heavily exposed to environmental impact liability, they pay lower taxes, enjoy greater patent protection for investments in research and development, and are generally not subject to price controls in the sale of drugs. In total, this has allowed the industry to flourish financially which has resulted in further incentives in research and development as well as growth and innovation.

The percentage of biopharmaceutical substances continues to grow. Which systems are particularly suited for fermenters and bioreactors?

Our core products for the production area are the flow rate and filling sensors as well as sensors for position detection. Also included are interfaces for hazardous areas, a complete assortment of remote I/Os and machine connection lines as well as plug-in connectors for sensors and actuators. Furthermore, Turck delivers a broad spectrum of products for implementing highly developed fieldbuses such as the Profibus DP/PA, FF, ASi, DeviceNet and Ethernet. This core assortment is constantly modified and expanded in order to meet special customer needs.

What important trends are, in your opinion, going to dominate pharmaceutical production in the coming years?

The key trends are the increasing use of fieldbus systems such as the Foundation fieldbus and Profibus PA, the increased use of diagnostic tools as well as the outsourcing of planning services and constructions in a modular design. All these trends are driven by the need for cost competitiveness, the lack of well trained machine operators and the desire for rapid product marketing before the patents expire. The former "supplier relationship" between component manufacturers and machine operators has increasingly transformed into trusting partnerships with long-term relationships. Through the specific support of its customers, companies like Turck are ensuring that the end customer can successfully launch its products on the market.

▶ Webcode

more10830e



“Coordination and communication on a global basis are a must for successfully completing a pharmaceutical project. For this purpose, a flexible and technologically highly specialized project team that can reliably complete the project from its conception to final commissioning is indispensable.”

David Fazzini



“The key trends are the increasing use of fieldbus systems such as the foundation fieldbus and profibus PA, the increased use of diagnosis tools as well as the outsourcing of planning services and constructions in a modular design.”

David Fazzini



Author

Anke Geipel-Kern is the department manager for the pharmaceutical industry at Pharma-TEC, a branch division of the industry publication Process www.process.de

Country without end:
Inhabitants of the largest country on earth have to live with ten different time zones



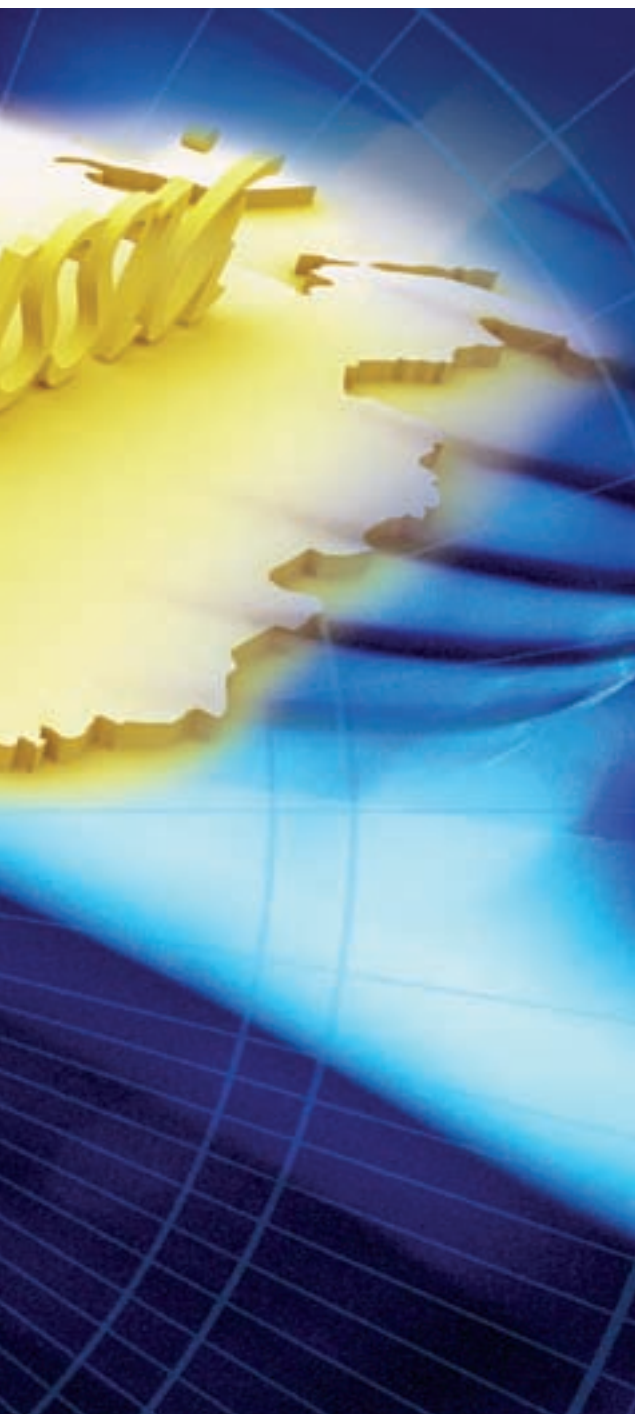
Eastward Expansion

For more than two years now, Turck Rus OOO has been successfully responding to the rising demand for automated solutions in the Russian market

While many see China and India as the world's biggest growth regions, Russia is perceived rather as a political trouble spot. But the world's largest state in terms of area, covering over 10.5 million square miles, has evolved to become one of the world's fastest growing economies. Since the founding of the Russian Federation in January 1992, the country has already had to overcome both political and economic challenges. Today, Russia is among the countries whose gross domestic product experiences the highest growth rates. Its GDP has consistently reached six to seven percent in recent years.

Germany is Russia's most important trading partner. While Russia is Germany's largest supplier of crude oil, what this giant imports, above all, is industrial finished products "Made in Germany". Despite its importance as a crude oil supplier, Russia's share in the global trade of commodities lies at only around two percent, while Germany is at the peak of export statistics in this area at around ten percent.

Turck also makes a modest but constantly growing contribution to these export figures. Besides the USA and China, where the company established itself as a market leader some time ago, Turck also has its own subsidiaries in numerous other coun-



The office building in which Turck Russia has its headquarters is situated in the north of Moscow, a subsidiary was recently opened in St. Petersburg



The team – now numbering twelve – and Russia CEO Pavel Fateev (left) have gotten off to a successful start

tries. Just over two years ago, the sensor, fieldbus, interface and connection technology specialist also opened a national office in Russia. CEO Pavel Fateev faced a major challenge when he started working at the Moscow branch with Alexey Borisov at the end of 2005. Today, a workforce now numbering twelve in Moscow and St. Petersburg is making sure that the Turck brand gains a similar ranking in the Russian market to that enjoyed in many other countries.

Unlike most other nations, in Russia the principle focus of the automation landscape is process automation. “Process automation is one of Russia’s most

Quick read

When Turck first established its own subsidiary in Russia more than two years ago, CEO Pavel Fateev faced a major challenge. With commitment, expertise and a market-oriented, strategic approach, today Turck Rus OOO is so successful that an office has been opened in St. Petersburg in addition to the Moscow headquarters – an important milestone in the world’s largest country.



“We understand our customers’ requirements and quickly transform these into practical solutions”

**Pavel Fateev,
Turck Rus OOO**

important industries,” says CEO Pavel Fateev. “If you want to succeed here as a supplier of automated systems, you have to have something to offer in this field. Our strategy of offering not just individual components but complete solutions is well received in the market.” Commitment, a sophisticated range of products, and employees who are able to offer their customers efficient solutions whatever their task might be are some of the ingredients in Turck’s recipe for success – this applies both to the Russian team and the other 2,700 employees worldwide.

In order to reach as many customers as possible in this enormous country, Fateev uses distributors and system integrators, in addition to direct sales. Sales activities are supported, above all, by trade fair exhibits. Turck Rus OOO has taken part in numerous exhibitions in the first two years of its existence. And Turck regularly has a large booth at the well-known Moscow Oil & Gas Show. “We have also organized a series of in-house exhibitions and have attended many factory automation events,” explains the Russian general manager.

Technical support

However, to achieve lasting market success you need more than trade fair exhibits and good sales specialists: above all, you need competent technical support. For this reason, three of the twelve Turck-Rus employees are experienced engineers from different backgrounds. One of them is Roman Timer-Bulatov, who brings experience from the field of textile machine automation: “Unlike my previous job, at Turck the work is extremely varied. Yesterday, for example, I helped with an RFID installation in an automotive plant, today I am testing interface modules in a refinery, and tomorrow I’ll be facing further challenges in an iron and steel works plant. Thanks to our close cooperation with our colleagues at Turck Germany, we can find a solution to any task in almost any sector,” says Timer-Bulatov.



Pumping stations with Turck interface modules ensure that there is always sufficient oil pressure in the pipelines leading to the West



The Turck engineers spend a not inconsiderable amount of their time on certifying products for the Russian market. According to Pavel Fateev, the certificates that are generally accepted in Europe are not acknowledged: “Here, most customers require GOST-R certification. Products that are used in explosion-protected areas required a special Gos-Technadzor permit. This is basically the Russian equivalent of the Atex certification that is common in Europe.” Today, Turck Rus has all the necessary certificates for most sensors, interface modules and fieldbus solutions.

Expert sales

The sales team at Turck’s Russian office also brings experience from diverse sectors, such as energy, chemicals, iron & steel and oil & gas. “Thanks to this rich background, our sales specialists are competent, trustworthy contacts for our customers,” says Fateev. “Above all, successful sales are based on good personal relationships and ensuing trust.”



At large trade fairs such as the Moscow Oil & Gas Show, Turck specialists like Alexey Peder demonstrate to Russian users their expertise in the field of sensors, fieldbus, connection systems and, above all, interface technology

This point is also underlined by Turck salesman Denis Evdokimov, who helped to modernize an iron and steel works plant, among other successes: "You have to understand the project and your customer's specific requirements. This doesn't happen with just a couple of visits and a product presentation. Besides a good personal relationship, the supplier must provide the right project organization and technical support. And what's more, in the iron and steel branch you need a lot of patience - it's just not a fast industry."

But Turck Rus has already been able to report significant successes in "faster industries", too. One automobile manufacturer has changed most of its portfolio of inductive and temperature sensors to yellow, for example. "Following some initial skepticism, the customer quickly became convinced of the benefits of our uprox+ sensors," asserts Fateev, "but good communication with our employees also played a part in his decision to change suppliers." The dry run monitoring of regional long-distance heat suppliers' numerous pumps is another example of an efficient,

customer-focused solution. Now, instead of using expensive pressure sensors as before, the cheaper flow measurement solution is increasingly used.

Special requirements

Although Turck's product portfolio now includes over 15,000 products, customized solutions are sometimes unavoidable. For example, working together with the Turck specialists in Moscow, developers in Germany have designed an interface module that responds to the specific needs of Russian temperature measurement processes. "This Russian version from the IM series shows why Turck is so successful here: we understand our customers' requirements and quickly transform these into practical solutions," says CEO Pavel Fateev. "With our technical marketing approach and sales-driven strategy, in just a short time we have been able to successfully position Turck Rus OOO in the market."

► Webcode

more10840e

Author



Lars Schmidt is Market Development Manager for Russia, Eastern Europe and Latin America at Hans Turck GmbH & Co. KG

Using FDT/DTM-supported fieldbus, remote I/O and interface solutions, Turck has made continuous asset management possible even in the physical layer, meaning the bond between field device and process control system



Revamping 19-inch Tec

Asset management with FDT/DTM is made easy by modernizing installed 19-inch technology using fieldbus, remote I/O or interface solutions



In the 1980's, 19-inch racks and plug-in cards became the standard for the parting plane for explosion protection in chemical companies. Accordingly, interface technology also found its way into the control cabinets of numerous control rooms in the form of 19-inch plug-in cards. The advantages were obvious because the standard format permitted not only space-saving installation in the control cabinet, but up to eight channels on one 19-inch card were not unusual, which, with a placement of 21 cards per rack, meant up to 168 channels. In addition, the technology also facilitated the simultaneous use of electronics from various manufacturers in a standardized housing format.

During decades of successful operation, 19-inch solutions have grown almost everywhere in the infrastructure of process automation. That is why there are now countless 19-inch cards in plants that have to be modernized and, if possible, made ready to handle growing requirements. These days, the constant pressure on plant operators to make their plants more efficient is pressing down even more.

Increasing plant efficiency only succeeds when the individual "values" – the so-called assets – of a plant are optimally used and processes are optimized using current status information. That's why most plants now have an asset management solution in place even if the opportunities offered by this technology have yet to be exploited to their fullest. While major assets are usually well integrated, it is the small field devices or the physical layer, that is, the bond between the field device and the process control system, that are frequently lacking.

Data acquisition for asset management

If an operator decides to take on the task of modernizing older plant components and develop asset management, he has to be able to record and process measured values and diagnostic information. In order to acquire additional data from these plant components, in principle, the plant operator has three alternatives to choose from: Point-to-point connection, remote I/Os or fieldbus technology.

The classic signal transmission model is point-to-point wiring, also referred to as interface technology.

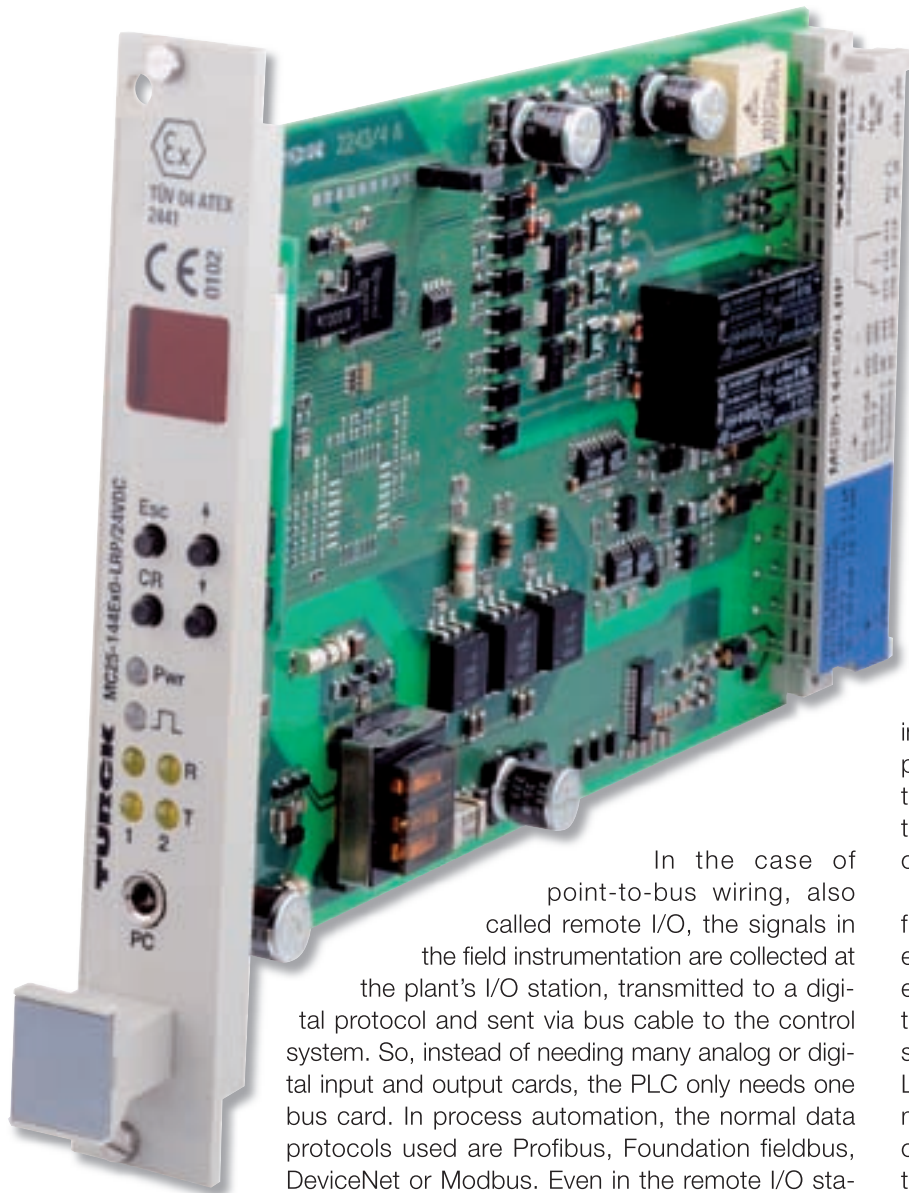
► Quick read

Interface cards in the 19-inch format have been successfully used in process automation for decades. This 19-inch format has long been considered state-of-the-art technology and has performed successfully. Yet increasing cost pressure has confronted plant operators with the task of operating under continuous asset management and, thereby, modernizing the tried-and-trusted 19-inch technology. Turck supports this trend with a diverse portfolio of FDT/DTM-based interface solutions in many configurations – from the DIN rail module to the modern 19-inch card.

hnology

Turck is one of the few manufacturers to offer its customers modern FDT/DTM-supported interface technology also in the 19-inch format

With this alternative, the individual measuring signal from one measuring instrument in the field is transmitted directly to the control system. The signals are galvanically separated, formatted and transformed before they arrive from the field to the PLC or the process control system. The purpose of this parting plane is to protect the control system from disruptive signals or undesired transmissions from the field, and to support the explosion protection concept of the respective plant operator. For this purpose, the control system must have at its disposal a corresponding number of signal inputs and outputs.



In the case of point-to-bus wiring, also called remote I/O, the signals in the field instrumentation are collected at the plant's I/O station, transmitted to a digital protocol and sent via bus cable to the control system. So, instead of needing many analog or digital input and output cards, the PLC only needs one bus card. In process automation, the normal data protocols used are Profibus, Foundation fieldbus, DeviceNet or Modbus. Even in the remote I/O sta-

tions, the signals are galvanically separated before being transmitted to the digital protocol.

The most modern of the three alternatives is the bus-to-bus connection, also called fieldbus technology. In this alternative, the field instrumentation is directly coupled to the bus via the communications protocol – either Profibus or Foundation fieldbus. Each field device is thereby an independent subscriber of the communication bus.

Modernization concept

Those who are considering modernizing their plants should closely examine the advantages and disadvantages of the individual connection concepts, taking into account the necessary modifications. Think about which features speak in favor of one or the other alternatives. How much of the already existing structure can continue to be used, and how much additional information from the field is required to be able to practice good asset management?

For all three connection alternatives, the following applies: The operator should obtain useful additional data that enables him to conduct anticipated maintenance and/or schedule maintenance before a possible disruption occurs in plant operation.

Bus-to-bus: Accessing asset management data requires the field instrumentation to be upgraded if the fieldbus alternative is selected. For this purpose, the measuring points have to be up-graded with evaluation electronics that offer the desired bus protocol – such as Foundation fieldbus or Profibus – as the interface. The existing wiring of the field instrumentation can only continued to be used for supplying power to the individual measuring points. Control cabinets are no longer required for housing a control system because the bus signals are transmitted on a direct path to the process control system.

A special cable is used to transmit signals to the fieldbus technology. The field devices are already equipped with a fieldbus-specific connector which excludes voltage reversal. The “physical layer” has to be planned accordingly, from the number of bus subscribers per cable to output and load resistances. Limits are placed on the signal density of an individual measuring point through the cycle times of the protocol. Fieldbus installation thus facilitates the unlimited transmission of all data located in the device.

Ready for HART

Transmitters in the field level today are almost, without exception, able to transmit additional information in addition to primary measurement. These “smart transmitters” are also able to be parameterized via the HART standard. In many cases, this information cannot be used because communication via HART was not intended in the parting plane installed many years ago. In such cases, there is talk of stranded HART signals. In order to avoid this, remote I/O and interface solutions are required that support HART communication and allow corresponding signals to pass.



Point-to-bus: In many cases, field devices are already able to communicate additional information via the HART protocol. Continuous asset management requires installation technology so that HART signals entering the remote I/O station are able to translate to a digital protocol.

With point-to-bus wiring, the existing wiring can be allocated per remote I/O after on-site preparation, without a great deal of time and effort. However, the bus cables from the I/O stations to the process control systems have to be re-laid. In the case of many remote I/Os, control cabinets become redundant because they were designed for field use with the IP67 degree of protection.

Point-to-point: Modernization of existing 19-inch technology with modern plug-in cards or interface devices in other configurations is, for many applications, the least expensive alternative for modernizing a plant. Compared to other processes, the advantage is that the existing infrastructure – cabling, control cabinet, and field instrumentation – can continue to be used in most cases. If replacing a 19-inch card, the existing infrastructure can remain untouched as a whole because the modern evaluation electronics in the control cabinet are plugged into the same slot.

Modern 19-inch cards from Turck now provide all relevant data for anticipated maintenance. Additional features, like result-controlled call tracing within an

interface module, offer the plant operator capabilities that are frequently not available even on a digital fieldbus. In this case, the operator can retroactively diagnose a disruption in the pre-defined go-status and thereby initiate an investigation into the cause of an emerging disruption.

A further advantage in replacing old 19-inch cards with modern solutions affects the human factor: The service personnel will immediately find their way in an unchanged signal transmission structure. Only the additionally accessed data has to be explained and interpreted.

Summary

In order to modernize plant parts and ready them for asset management, the existing infrastructure does not necessarily have to be disassembled and equipped with fieldbus cables. Modern interface technology based on FDT/DTM technology offers a reasonable alternative in this case – mostly by recycling the existing infrastructure. Turck has the right solutions in its product portfolio for any and all applications – whether fieldbus, remote I/O or interface components. The latter is available in various configurations, from DIN rail devices to cartridge solutions, to brand new 19-inch cards that are simply plugged in to replace old cards.

► Webcode

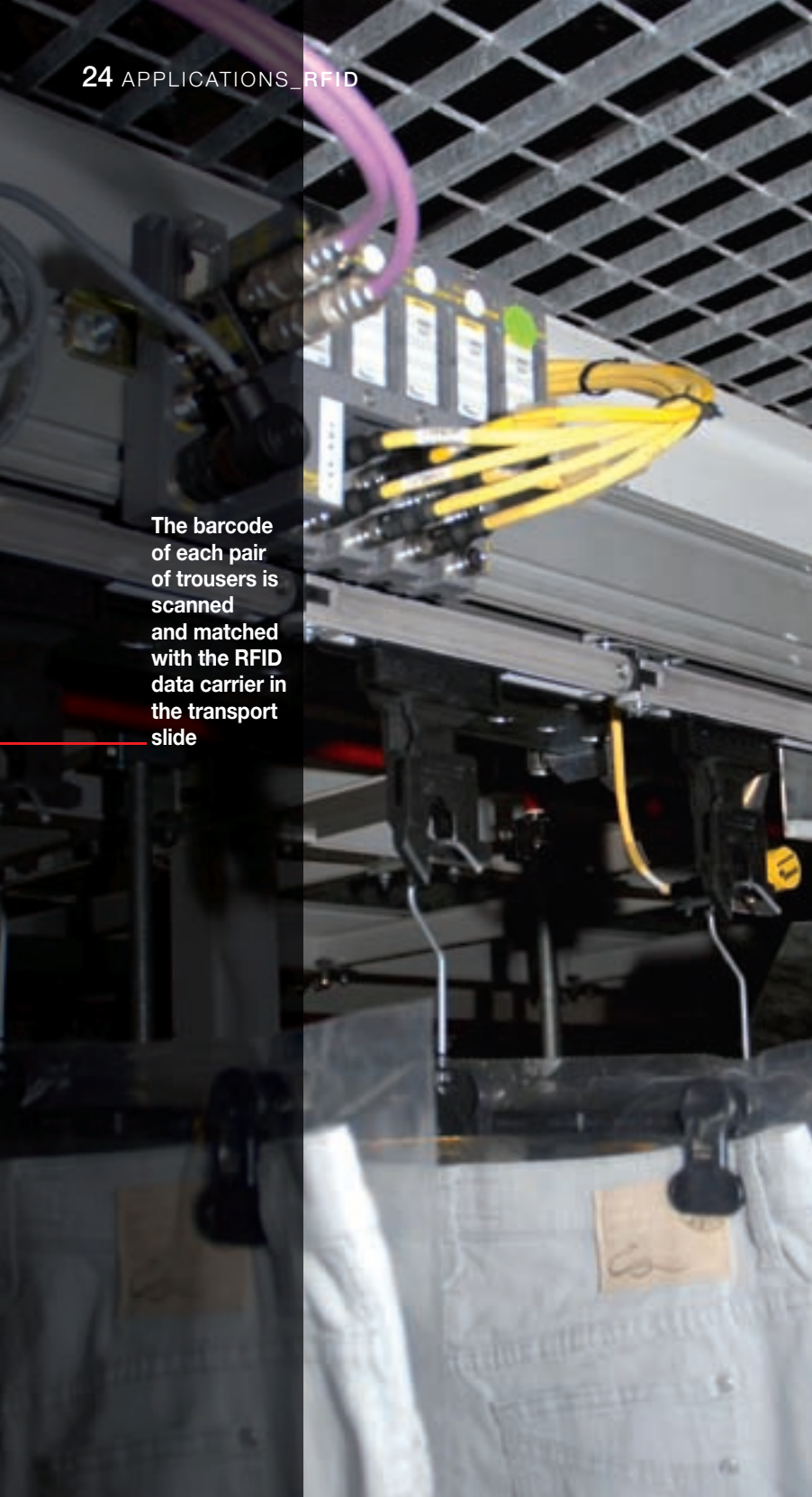
more10805e

The Turck interface product line offers the right design for any application, from cartridges to DIN rails to the 19-inch card

Author



Ryan Kromhout is product manager interface technology at Hans Turck GmbH & Co. KG



The barcode of each pair of trousers is scanned and matched with the RFID data carrier in the transport slide

Guide

The BL ident RFID system keeps goods flowing smoothly at the Brax-Leineweber Logistics Center



With its Brax brand, the Leineweber group is one of Europe's best known clothing manufacturers. Reputed as a trouser specialist, the company has expanded its product range in recent years. With its independent brands Brax, Brax Golf, Eurex by Brax, Raphaela by Brax and Braxactive, the German company's claim is to make "fashion for people with a positive, active love of life."

In order to satisfy the increasing demands facing the distribution of merchandise, Leineweber opened its central Logistics Center for hanging garments ten years ago at its headquarters in Herford in eastern Westphalia. The fully automated system can process up to 750,000 articles on seven levels. The trousers



The BL ident RFID system ensures transparency in the organization and consignment of goods at the Brax-Leineweber Logistics Center



“Together with Leineweber, we examined RFID solutions from different manufacturers, and came to the conclusion that the Turck system was the best.”

Dirk Schöning,
HMR-Rautec

are conveyed along a rail system with an overall length of over 15 miles, and prepared for consignment in accordance with orders received.

As part of its program of continual process optimization, it was decided at the beginning of 2007 to replace the control technology that was previously used. “We wanted to replace the old S5 control system with a modern, PC-based solution,” says Bernd Hettig, who is responsible for implementing this project at Leineweber. At the same time, they wished to replace their proprietary path tracking system with standard technology. Here, a wireless identification solution proved to be the most practical choice. To put this project into action, Leineweber used the Bielefeld-based system integrator

▶ Quick read

In its central logistics center for hanging garments in Herford, clothing manufacturer Leineweber sorts out Brax trousers destined for distribution all over the world. These trousers find the way to their destination in a fully automated system that can process up to 750,000 individual items – all thanks to the BL ident RFID system from Turck.

HMR-Rautec, which had already been advising the company for years on automation matters. “Together with Leineweber, we examined RFID solutions from different manufacturers and came to the conclusion that the Turck system was the best,” says Dirk

When the right pair of trousers comes past, within just 350 ms the control system sends a command to the ejector (above right), which directs the transport slide to an ejection rail



The data carriers, with a diameter of 20 mm, are integrated in the transport slide



Schöning, Project Manager at HMR-Rautec. "Above all, we were impressed with the modular design and comprehensive philosophy of the BL ident system, from configuration through programming right up to integration in the new control system," adds Hettig.

Installation at the weekend

Once the decision had been made to use Turck as the RFID supplier, it was now a question of putting this into practice. Because a central logistics center cannot simply be shut down for long periods while new technology is installed and brought into operation, careful preparation was essential. First of all, the functionality of the system was tested under the usual operating conditions using a test rig. Once these tests had been successfully completed, system installation could commence. The specialists from HMR-Rautec and Leineweber then had to install the RFID system and integrate it in the process all in a single weekend.

"After it was started up on Monday morning, the system ran without problem," declares Bernd Hettig happily. "Here, good preparation paid off." The engineers installed 28 read/write heads in total, which are linked to the control system via seven I/O stations with Profibus interfaces. The clear identi-

fication of each item of clothing is ensured by 1,700 data carriers, which were installed in the transport slides for the trousers. The distance between the data carriers is just 250 millimeters. At a system transport speed of 34 m/min and an operating time of 16 hours a day, the RFID system reads the UID – the data carrier code number – 130,560 times in all.

As this application is concerned purely with identification, the UID is the only information on the data carrier. Therefore, there is no need for information to be written onto the data carrier. At reading stations, the code numbers are collected together

“Above all, we were impressed with the modular design and comprehensive philosophy of the BL ident system, from configuration through programming right up to integration in the new control system.”

**Bernd Hettig,
Leineweber**

The system integrator

The Bielefeld-based system integrator, HMR-Rautec, offers innovative solutions in the rapidly growing market of system automation in the production and process automation industry. A particular focus for HMR-Rautec is batch production. Its customers are found in the rubber, chemicals, pharmaceuticals, foodstuffs, iron and steel industries, and even in plant engineering and break-bulk conveyor technology. For more info, visit www.rautec.de



Seven I/O stations with Profibus interface cover a total of 28 read/write heads, which read the UID of the data carriers

with the barcode on the trouser packaging. To achieve this, two scanners read the barcode stuck to the protective sleeve, and just a few centimeters later, an RFID read/write head scans the UID of the transport slide.

Ejection command in 350 ms

The data is collected in the control system, which defines the route for each pair of trousers. In accordance with this route plan, the slides bearing the respective trousers are conveyed out of the goods flow and prepared for delivery, as ordered. The goods are ejected by an electromagnetic ram, which pushes the transport slide onto the siding.

The data do not have a great deal of time to cover the distance from the read head to the ram; there are just 20 centimeters between the data acquisition and the ram command. Therefore, the RFID system faces exacting requirements: the time between the reading of the data carrier and the execution of the ejection command is 350 milliseconds maximum. With its programmable Profibus gateway and a CoDeSys program developed especially for Leineweber, here, too, Turck was able to provide the right solution. The program automatically writes the data carrier UID in the Profibus output register of the gateway, as soon as the read/write head records

a data carrier. In this way, the PLC does not have to send read commands first, but simply reads out the Profibus register. Only in this way is it possible to eject the goods via Profibus and SQL database within 350 milliseconds.

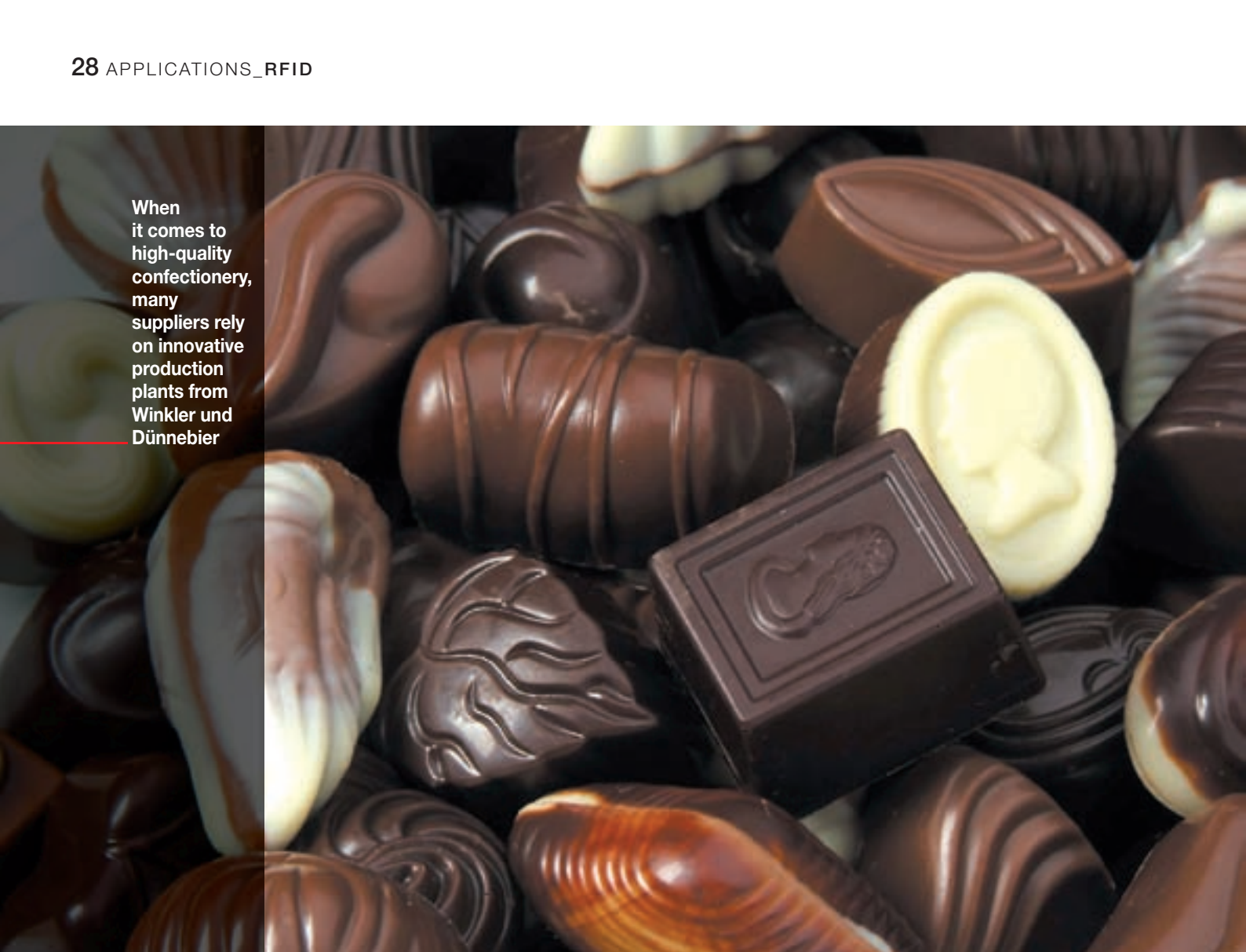
The challenge of EMC

It became apparent that another challenge had to be overcome in this special application: the countless plastic sleeves that are intended to protect the trousers can rub against one another during their passage through the system, and therefore pick up static charge. In the initial phase, this led to isolated malfunctions in the read/write heads. "Each read head carries out around 500,000 readings a week, so it was difficult to determine why one of these readings was not successful," says Bernd Hettig, explaining the problem. "Here, we really have to say that Turck was extremely helpful and offered us assistance wherever possible. Turck didn't leave us out in the cold, and even sent developers to us who looked into the problem and solved it for us." Now that the read heads have been replaced by metal versions, there have been no more incorrect readings at Brax-Leineweber.

Author



Rolf Rathmann
is sales specialist
at Hans Turck
GmbH & Co. KG



When it comes to high-quality confectionery, many suppliers rely on innovative production plants from Winkler und Dünnebier

Perfectly Molded

Turck's BL ident RFID system used in Winkler und Dünnebier confectionery machines ensures transparency in mold logistics

Santa Clauses made of chocolate, Easter rabbits filled with nougat or the finest chocolate candy – many of the production systems turning out such sweet delicacies come from Rengsdorf in Germany's Rhineland-Palatinate. It is in this

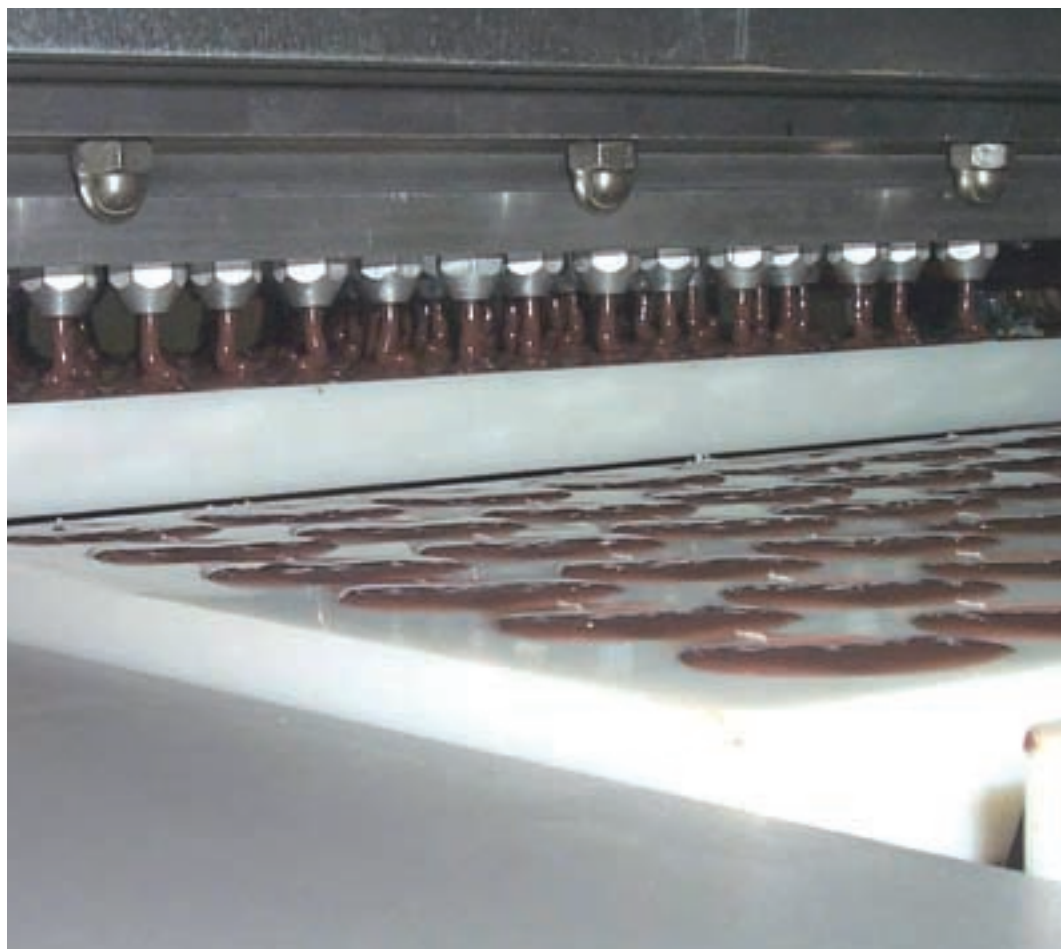
town near Neuwied, that Winkler und Dünnebier Süßwarenmaschinen GmbH (WDS) manufacture machinery for the confectionery industry. At this site the company also works on developing new molding/depositing processes and optimizing existing techniques.

Growing international demand for confectionery has ensured the worldwide popularity of WDS machines for years. An extremely wide range of products is available: molding lines for hard candies and toffee products, shelling molding systems for filled and solid chocolate products, mogul plants for all starch-molded products, machines for flat chocolate products and universal piston extruders for plastically formable masses. In addition, Rengsdorf also supplies laboratory depositors for product development catering for a wide range of applications.

► Quick read

With its high-quality production plants for the confectionery industry, Winkler und Dünnebier (WDS) has become one of the world's most sought-after mechanical engineering companies in this sector. Besides tradition and quality, it owes its success to constant innovation. Today the company can offer its customers maximum plant efficiency, safety and control, thanks to optimum mold logistics. Here data defining the latest status of every mold is supplied by Turck's RFID BL ident system.

WDS is now equipping all plastic molds with RFID data carriers – sometimes totaling several thousand depending on the plant



Production process for chocolate

Producing a filled chocolate article such as chocolate candy, involves many different processes. The first of these is the so-called mold insert station. It is here that the molds, loosely lying on feed chains, set off on their journey round the production plant. The molds are moved either inter-

mittently or continuously by means of aligner chains depending on the application and output.

Once the molds have been heated sufficiently with hot air or an infrared radiator, the first molding machine deposits a carefully metered amount of chocolate mass into the mold to produce the shell

for the product. The molds are then, shaken to distribute the sweet filling evenly and to remove any air bubbles. Then they are turned upside down and spun carefully while being cooled at the same time. The so-called chocolate shells are left in the cooling cabinet to harden.

The second molding line supplies typical fillings such as nougat or fondant (a crystalline sugar mass).



mittently or continuously by means of aligner chains depending on the application and output.

Once the molds have been heated sufficiently with hot air or an infrared radiator, the first molding machine deposits a carefully metered amount of chocolate mass into the mold to produce the shell

The principle is the same: Heating before filling, cooling down afterwards. The smooth underside of the chocolate candy – the lid so to speak – is then produced by melting a second application of chocolate, removal of the superfluous mass and final cooling. At the end of the line, the product is dislodged from its

At the changing station the machine operator can introduce molds for a new batch and eject the old ones. Every movement is directly recorded in the central database



“We were won over by the industrial-strength hardware and the option of combining Turck's RFID system with the bus systems such as Profibus, DeviceNet and Modbus IP in use at our plant, as well as the scope offered for future bus systems.”

**Bernd Plies,
Winkler und
Dünnebier**

envelope by light blows to the back of the mold with pneumatic hammers. While a conveyor belt takes the finished item to the packaging line, the molds initially remain in the production cycle. They are transported to a changing station, where they are checked for product residues and replaced by new empty molds if required. The entire installation is managed by a PLC, as well as motion controllers for the servo section. Operator PCs or CE Clients, which are linked to a central server, can be found at every molding machine.

All molds at a glance

In view of the numerous industrial production processes and sequences that are already optimized and managed by non-contact RFID transponders (tags), Winkler und Dünnebier Süßwarenmachines GmbH decided to also introduce this innovative NFC technology to its confectionery production.

All plastic molds – and that may be several thousand depending on the plant – are equipped with RFID data carriers for this purpose. Permanently installed read/write heads in the production lines and mobile acquisition systems at warehouses and production areas allow the progress of each mold to be traced from a central station. Within the production lines, the database-oriented RFID system helps to ensure optimum mold and product tracking, as well as process optimization and improvement of production statistics.

The readers used by Turck, the RFID specialist from Mülheim, Germany, are integrated in the fieldbus system via BL ident I/O modules so that the latest data is available for control of the WDS installation at all times. The read/write heads are typically installed

at the mold changing stations, the molding/depositing machines and optionally at weighing or other control units.

All information acquired by the control system is transmitted to a local database on the plant's operator server, which stores the data for all molds currently in the production cycle of the line. The information produced is synchronized with a server for comprehensive mold management and tracking. A complete RFID system not only includes the reading points on production machinery, but also read heads on mold washing stations and storage systems. If wished by the customer, WDS will even retrofit third-party installations with RFID readers from Turck.

Data with added value

Today Turck's RFID systems ensure that the central server database of every WDS machine contains valuable information that can be used to optimize both plant productivity and production quality. There is a wide range of possible applications for the data pool, including optimizing logistics. With a click of the mouse, the system will show the location of every single mold or trace the route it has taken within the production plant. This allows potential error sources to be easily located.

Production-specific data can also be determined: For example, it is possible to easily identify molds or even complete mold sets that produce above-average levels of scrap, and sort them out automatically. Another application could be comparing mold sets and production characteristics of a specific batch.

The data pool provides a wide range of applications for in-plant monitoring of quality or hygiene





The RFID monitoring system instantly emits an alarm if inserted molds are not suitable for the production process underway

guidelines, not least in terms of quality management. The system can easily identify whether a cleaning cycle has been correctly followed. Today it is possible to closely track production sequences, such as pushing together molds in the cooling cabinet or exchanging them for special test samples during operation, thanks to RFID. This technology also instantly emits an alarm if inserted molds are not suitable for the production process currently underway. Even a "flying" product change is possible.

Here, new molds are introduced to the system while old ones are ejected. Even production scenarios with mold sets mixed at random are possible to increase flexibility.

Successful together

Following initial attempts involving a competitive product, we subsequently opted for Turck: "The BL ident system offers hardware with standardized interfaces that are suitable for industrial applications," explained Bernd Plies, head of Electrical Engineering and Automation Technology at WDS. "We were won over by the option of combining Turck's RFID system with the bus systems, such as Profibus, DeviceNet and Modbus IP, in use at our plant, as well as the scope offered for future bus systems." Another important factor was the wide range of read heads suitable for industrial applications.

As expected, integration of the system in plants ready to go on line did not present any problems. "Implementation went really smoothly," recalls Plies. "All components supplied were swiftly incorporated in the first WDS application, which was realized with Step7. And when one or two queries did crop up, they were quickly sorted out on the telephone."

According to Plies, another advantage was the close cooperation between the two companies: "Cooperation with Turck has been constructive at all times." Turck staff are always open to new ideas and try to put customer wishes directly into practice or develop alternatives. "The close contact with Turck's developers was of great benefit to us", adds Plies.



Thanks to RFID support the user always keeps an overview of the wide range of different molds that have to be used, stored and managed for the various products

Author



Frank Paluch is sales specialist at Hans Turck GmbH & Co. KG

With a working height of 103 meters, the Wumag WT 1000 is the tallest aerial work platform in the world





60 tons power:
The Faun crane chassis with Wumag aerial work platforms can even be transported without special approval in road traffic

Giant from the Rhine

The highest aerial work platform in the world comes from Krefeld – inside it, completely encapsulated actuator sensor boxes from Turck ensure climate-resistant connections

Superlative is one word to describe the grounds of the Krefeld company, Wumag Elevant GmbH, one of the most well-known manufacturers of commercial truck work platforms in Europe. Wumag Elevant manufactures truck-mounted platforms with working heights between 11 and 103 meters, along with telescope devices with and without basket boom as well as articulated telescopic systems. A normal vehicle length is 16.2 meters, weighing a total of 60 tons, with an aluminum work cage at a height of 100 meters above ground. These are only a few of the characteristics that make up Wumag's flagship fleet, the WT 1000. A working height of 103 meters makes the WT 1000 the largest aerial work platform in the world.

Installations at a breezy height

The incentive for developing the WT 1000 came from customer requests for a very high working height. That's how the giant from the Rhine came to be used for installing and maintaining chemical plants, broadcasting towers, skyscrapers, and church towers.

However, its main use is for the assembly and maintenance of wind energy plants whose continuously increasing construction heights created the need for a correspondingly high aerial work platform.

Because many deployment locations do not have sufficiently firm subsoil, the Wumag developers needed a suitable weight-bearing vehicle with unlimited traction and maneuverability on the ground. At the same time, the permissible total weight of 60 tons should not be exceeded so that the motor vehicle approval can be issued Europe-wide without a special permit. While these requirements could be implemented only after major modifications to serial chassis from all major truck manufacturers, the Krefeld engineers came upon the Tadano Faun ATF110G-5-AT crane chassis. The all-wheel undercarriage has a five-axle configuration (of them, four are controllable) and 10x8 traction as well as so-called crab steering for laterally shifting the vehicle. With its 390 kW (530 HP) powerful Mercedes-Benz diesel engine, it can reach a speed of 85 kilometers per hour.

In the meantime, interest in this Goliath among aerial work platforms has grown wherever wind parks



“There is no way that rain, condensation or traces of moisture can penetrate the encapsulated I/O boxes from Turck. Even its ease of assembly with the M12 Push-Pull quick plug-in connectors impressed us immediately.”

Kai Hoenig,
Wumag Elevant

Quick read

Whether at -20 °C in Siberia or at 80 °C in sweltering hot Dubai, aerial work platforms from Wumag Elevant GmbH are being used around the world. Completely sealed actuator and sensor boxes with particularly tight M12 rapid plug-in systems from Turck guarantee secure connections and do not allow any moisture ingress.



Wumag project engineer Kai Hoenig has extensively tested the completely encapsulated Turck boxes prior to their production start



Tight: The actuator sensor box with M12-Push-Pull plug-in connectors meets IP69K degree of protection

around the world are being planned. At the same time, the global demand is also continuously raising the quality requirements for practically all components and assemblies. Today, the “made in Germany” platforms must withstand extreme temperature fluctuations. For example, they must function just as smoothly in the desert climate of Dubai at 80 °C as in the Siberian town of Irkutsk with temperatures of -20 °C; also in subtropical regions with high humidity and heavy rainfall as well as in coastal areas where aggressive salt-containing aerosols continuously attack the electronics.

Small box, big effect

The fact that unexpected problems will arise under such extreme conditions was something that Kai Hoenig, a project engineer with Wumag Elevant,

experienced personally several years ago. It began with a new arrangement for the valve structure. “We wanted to install black/white valves and PWM valves (Pulsewidth modulated valves) on one area and collect the signals from individual devices using passive actuator-sensor boxes and forward them to the process control unit via a central cable,” says Hoenig.

What first seemed to be a simple and transparent job of wiring the peripheral equipment, unexpectedly, turned into a difficult project. Despite a higher degree of protection against the moisture penetration (IP67), water kept getting into the distributor boxes that were initially installed. Once condensation got into the electronics, inexperienced technicians on the other end of the world repeatedly tried to repair the sensitive quick plug-in system using rough water pump pliers. The results were always the same: Moisture kept getting into the distributor, thus causing

Connection technology for any purpose

Turck offers a broad range of passive actuator sensor boxes that are produced by Escha, a company of the Turck Group. These make it possible to collect signals in the field and to forward them to a centralized control system. This permits the peripherals to be transparently cabled. Overall, in the field of actuator sensor boxes alone, there are more than 100 different product models available, among them are eightfold, fourfold, Y, and block distributors in various construction forms (M12x1, M8x1, M16x0,75, M23x1), as well as varying connection options (8 mm, 1/2“, 7/8“). All boxes are robust, completely encapsulated and meet the IP67 degree of protection. In crowded surroundings, the handling of PVC and halogen-free products are facilitated by a two-rowed construction design. Furthermore, Turck offers customized plug-in connectors for almost any use in rugged process peripherals. The product assortment covers couplings, plug-in connectors, flange couplings and flange plugs, self-configurable couplings and plugs, as well as connection cables. Plug-in connectors with molded connection cables are offered in standard lengths: two, five and ten meters. Connection cables can be delivered in standard lengths between one and five meters. Customized lengths and different cable qualities can be purchased upon request.



The cabling is securely housed in the telescopic arms between the work platform and the chassis



Emergency operation on the device control block: The actuator sensor boxes withstand wind and weather as well as temperatures between -20 and +80 °C

short circuits, which, in turn, paralyzed the entire system. "It was very annoying," recalls Hoenig, "if the technicians on site were unable to repair the damage, then, in extreme cases, our technicians had to travel half way around the world in order to solve the problem." No less customer-friendly for Wumag Elevant was the reaction from the ex-supplier who was unable to solve the problem in the end.

Not a chance for moisture

Turck was quickly able to impress the managers at Wumag with its know-how and customized solutions. The Mülheim sensor, fieldbus, interface, and connection technology specialist not only has a broad range of passive actuator sensor boxes in its product line, but also the know-how to meet the individual needs of the customer. What made the tough Turck boxes with the IP67 degree of protection so attractive was the fact that the entire distributor is completely encapsulated with plastic. "There is no way that rain, condensation or even just traces of moisture can penetrate the completely encapsulated I/O boxes from Turck. Also, its ease of assembly with the M12 Push-Pull quick plug-in connectors impressed us immediately," says Hoenig in explaining its decision to purchase the Turck product.

The completely encapsulated I/O boxes may have impressed the developers at Wumag Elevant quickly, however, extensive tests on the Turck distributors as well as those from other manufacturers proved the reliability of the Turck products in no uncertain terms and sealed the deal. Also, the maintenance-friendly and particularly leak-proof Push-Pull plug-in system on the Turck boxes met the needs of the customer, who had bad experiences with the previous process that involved fastening screws that had

to be screwed and unscrewed using a special torque wrench. In addition to the boxes that Turck produces in a customer-specific version without LEDs, ready-made cables – both to the boxes as well as from the boxes to the valves – are part of the solution package from the connection technology specialist. The cables are individually customized for Wumag Elevant by Turck subsidiary mechatec. Turck mechatec offers customer-specific complete electro-mechanical solutions ranging from cables to completely pre-installed control cabinets for all areas of industrial automation technology.

Excellent cooperation

Actuator sensor boxes from Turck have been used at Wumag Elevant since 2006. "So far, there have been no noticeable problems or failures," says control expert Hoenig with a smile. "Maintenance friendliness, customer friendliness, impermeability and long-lasting service life, Turck products are our first choice," praises Hoenig, who also values the excellent cooperation between the two companies. "I have to say that the cooperative relationship was very positive. Even with very individual needs, Turck always came through."

Due to often extreme climatic conditions that the Wumag work platforms are subject to, it is very seldom that products were able to be immediately used right off the rack, so to speak. "For our work platforms, standard products very often require modifications. The contact person at Turck never had problems meeting our requirements and making their products available for longer testing. That worked out very well," added Hoenig.

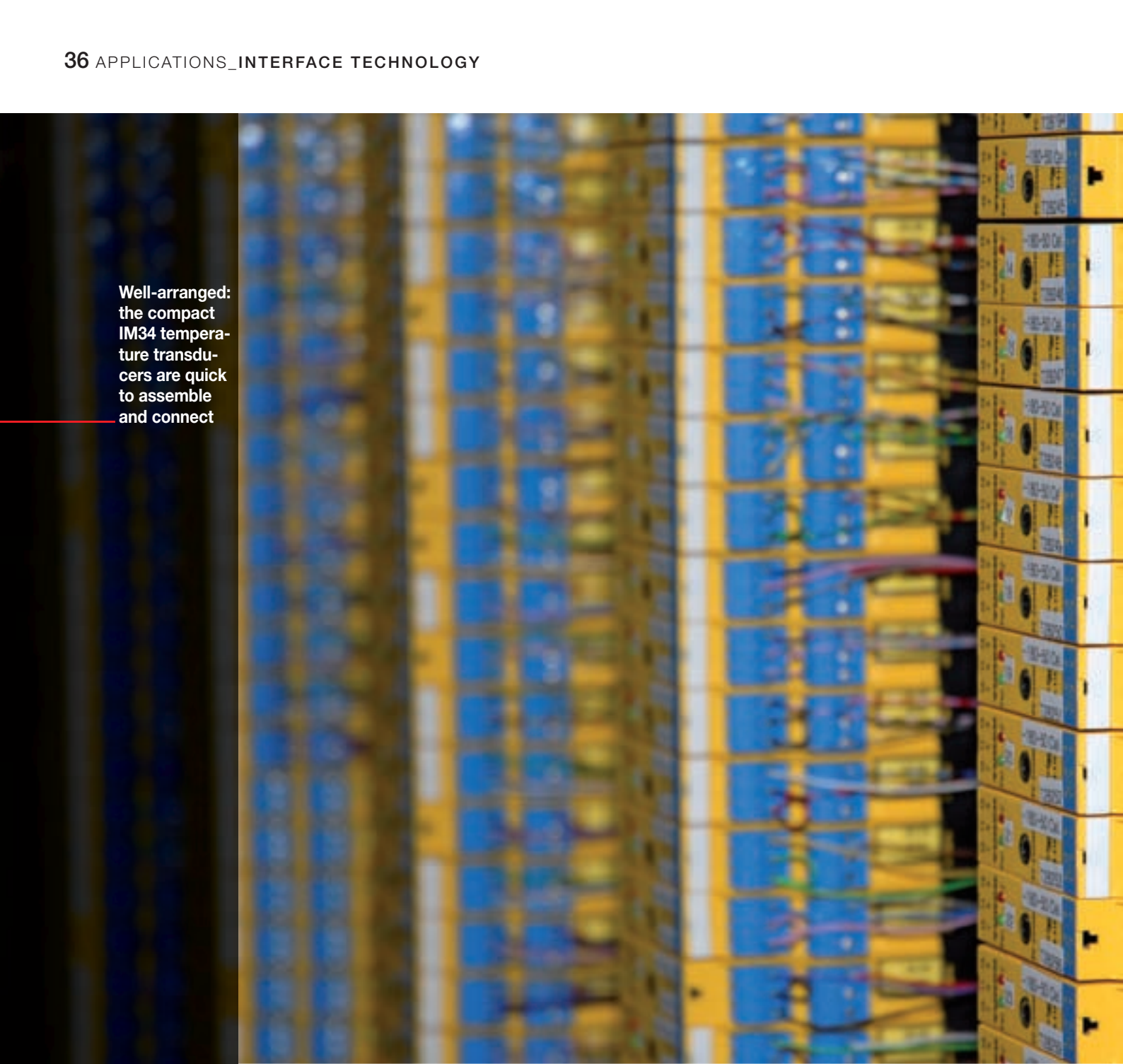
► Webcode

more10853e

Author



Willibald Tschlatscher is sales specialist at Hans Turck GmbH & Co. KG



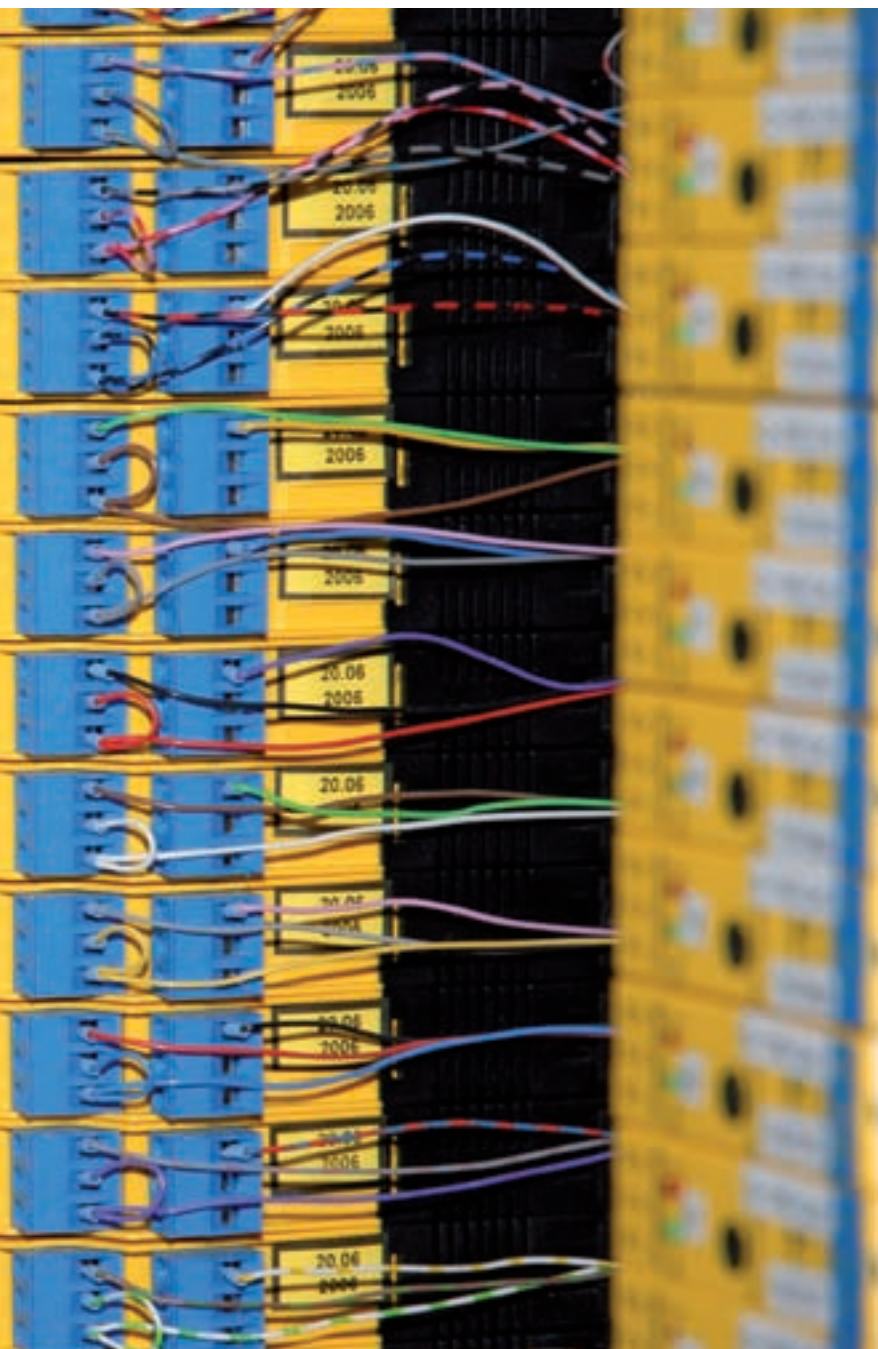
Well-arranged:
the compact
IM34 tempera-
ture transdu-
cers are quick
to assemble
and connect

To the Rails

BP Lingen oil refinery modernizes temperature measurement with Turck IM34 temperature transducer for DIN rail assembly

Rectification, distillation, hydrotreating, reforming, cracking – even the terms used to refer to the various processes required to turn crude oil into a finished product like gasoline, kerosene or chemical primary products sound complicated. Many of these processes are based on heating up and cooling down the oil and its intermediate products – temperature is therefore one of the most important process parameters for refining crude oil.

“When our refinery was built over 50 years ago, the number of temperature measurements was still straightforward. With increasing automation and process complexity, the number has rapidly risen” says Holger Nitschke, who handles the issue of temperature measurement in EMSR technology at BP Lingen. The refinery in Lingen, Northern Germany, was optimized for the production of fuels thanks to continual modernization and expansion efforts in its processing plants. With its high processing depth,



The BP Lingen Emsland oil refinery primarily produces gasoline and diesel fuels, jet fuel, light heating oil and chemical primary products



Holger Nitschke, BP Lingen, is impressed by the compact design and the simple assembly of the Turck IM34 temperature transducer

even difficult crude oils are able to be refined into high quality products in Lingen. To do so, a reliable, robust, and state-of-the-art measurement technology is required.

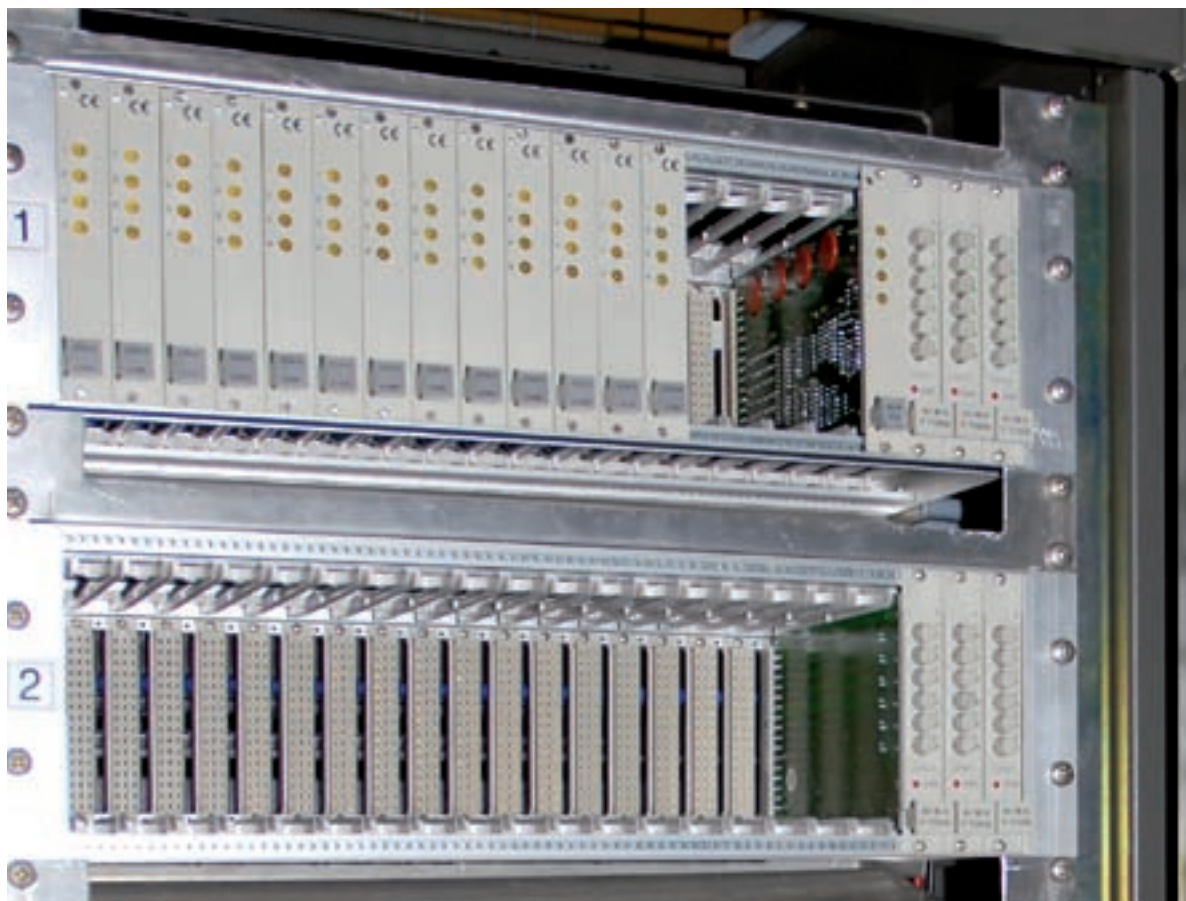
DIN rail replaces 19-inch technology

Replacing the temperature transducers installed in the 1980's has also been a topic for about three years. In contrast to the 19-inch transducers used during

Quick read

When it comes to refining oil, temperature ranks among the most important process parameters. That is why higher demands are being made on temperature measurement in order to operate refineries more efficiently. At the BP refinery in Lingen, the EMSR specialists are relying on the universal IM34 temperature transducer from Turck as part of the company's plant modernization efforts.

More space:
BP Lingen is
replacing more
and more old 19-
inch temperature
transducers with
DIN rail devices
from Turck



“In addition to an excellent cost/benefit ratio, the compact design and the simple assembly were important for us because space in the control room is becoming increasingly expensive.”

Holger Nitschke,
BP Lingen

its time in the control room, in this project, BP Lingen is upgrading to modern interface devices for DIN rail assembly. “The 19-inch technology is disappearing from our plants more and more because a DIN rail solution in our case is simply more cost effective and the assembly time considerably lower,” says Nitschke. “When necessary, I can replace devices from different manufacturers without any problem – I simply remove the old device from the rail and place the new one on it, add voltage supply, signal input and output, and finished.”

Despite the many products to choose from, when replacing their 19-inch technology, the BP specialists intentionally selected the IM34 temperature transducer from Turck: “At that time, we looked at the products from leading suppliers and subsequently decided in favor of Turck,” explains Holger Nitschke. “In addition to an excellent cost/benefit ratio, the compact design and the simple assembly were important for us because space in the control room is becoming increasingly expensive.”

Modernizing temperature measurement technology does not necessarily have to mean a completely new installation, as the example of the Lingen refinery shows. With the right technology, today’s requirements can be met by simply replacing the temperature transducer. “In the past, we performed many temperature measurements via type K thermocouples. That is why even in the older plants there is a high number of nickel-chromium/

Data logger in the IM34

One highlight of the IM34 temperature transducer is the integrated data logger. The freely parameterizable memory offers 8,000 measuring points and provides a powerful tool for process diagnosis. Thus, the user can determine the time frame for entering the measured data, parameterize a trigger event and finally read out the data per FDT/DTM. This also enables the route between field device and process control system to be monitored. The IM34 interface module continually describes the integrated data memory for that purpose. Thanks to the non-volatile memory, data remain intact even during a power outage so that an interface device essentially becomes a transient recorder.





At the Lingen BP refinery, several hundred IM34 universal temperature transducers from Turck are ensuring modern measured data processing

nickel cables between the control rooms and the plant. All of the existing wiring in the plant – including the sensors – can continue to be used,” explains Nitschke.

IM34 processes various input signals

In addition to thermocouples, Pt100 temperature sensors, based on the resistance change in platinum under the influence of temperature, are being increasingly used in process automation today. As a resistance thermometer for the temperature range of -200 to 500 °C, the Pt100 is more precise than a thermocouple. In contrast, the thermocouple, is suitable for a larger temperature range. Regardless of which measurement process is used, as a universal temperature transducer, the IM34 processes input signals from Ni100/Pt100 resistances, as well as thermocouples or millivolt signals. The device combines this universal capability with the high functionality of a freely parameterizable data logger and a PC interface for simple programming. The DTM (Device Type Manager) for the IM34 was developed in accordance to the current design guidelines of the FDT group.

“We use PACTware as a programming frame,” says Holger Nitschke. The term stands for “Process Automation Configuration Tool” and is an open configuration software into which any manufacturer can integrate the operation of its field devices. A configuration using DIP switches or rotary encoding

switches was not an option for Nitschke because: “How many DIP switches do you need to be able to adjust all the options that you want to adjust these days? With a temperature transducer like the IM34, there is already an array of parameters that would probably break the rack if adjustments were made via DIP switches, especially as there would barely be any space for all the DIP switches with the desired compact design. Even if the switches are set on the side, I first have to remove the devices from the rail before assembling the DIN rail. In this case, a PC interface is obviously much more comfortable.”

Good cooperation counts

It wasn't just the device's technology and the price that influenced Nitschke's decision to stick with using the IM34 from Turck, he was also impressed by the company's service mentality. “When we installed the first devices about three years ago, there was suddenly a problem with the firmware. In such cases, you see how good the cooperation is between customer and supplier. Turck's service was 100% in this case,” acknowledges Nitschke. “In a short time, all installed devices were equipped with a new firmware. Since then, all IM34 devices – and there are several hundred of them – are running completely smoothly. That is the best reference you can give for such a device.”

► Webcode

more10854e

Author



Stefan Kappel is key account manager for process automation at Hans Turck GmbH & Co. KG



Welding nut sensors from Turck replace expensive optical control process

Double Agent

Location bolt with integrated sensor reliably identify and secure welding nuts and sleeves

Spacer sleeves and welding nuts are used to ensure that vehicle components such as frames, U-beams, car seats or tanks are assembled to meet the design requirements. If even one single nut or bushing is missing from its intended location, production comes to a standstill and the work goes into the scrap pile. Considerable costs are incurred if errors are not detected and the faulty parts remain on the production line. Even a complete chassis can become unusable for further assembly if the stabilizing elements are not welded on.

Visual checking is prone to errors

To avoid these considerable costs, it is critical to continually check that the welding nuts and sleeves are present. Fiber-optic sensors or vision systems detect the metal bolts which retain either a nut or a sleeve at a determined position.

One approach to solving the component inspection problem is the use of fiber optics which can sense the bolts laterally. However, because the weld spatter that builds up can impair the fiber optic functions and even disable them, this process is



The new welding nut sensors are primarily used in chassis construction in the automotive industry



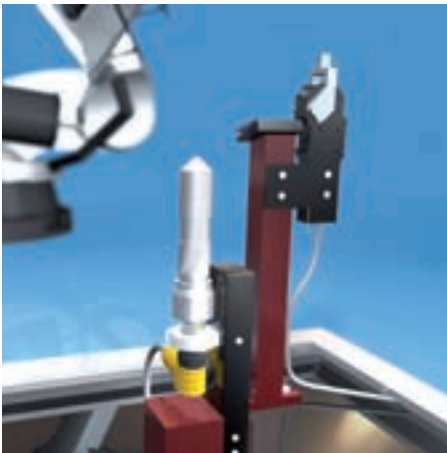
The magnetic field sensor forms the heart of the “smart location bolt”

expensive and unsuitable. Laser sensors are widely used for this purpose, but this too is an expensive and unreliable process. Adjusting the sensors is relatively

time-consuming and the dirt build-up caused by the welding functions can also lead to the optics rapidly becoming blocked. Image processing systems repre-

► Quick read

To join sheet metal, the automobile industry frequently uses spacer sleeves. In order to ensure a smooth and zero-error production process, continuous monitoring is necessary to ensure the presence of these parts. With the new welding nut sensor, Turck is now offering an affordable and process reliable alternative to previously used and expensive optical detection methods that are prone to error or malfunction.



A sheathed stainless steel centering bushing secures the welding nuts and provides additional mechanical protection



After the operator has placed a welding nut on the location bolt, the sensor sends a signal to the PLC



After release by the PLC, the welding robots score the nuts and bushings on the sheet metal

sent the most expensive solution. In addition, they are very time-consuming to program and particularly sensitive to changing light conditions. This method uses optical sensors or cameras and can guarantee process reliability only on a very limited basis.

Process reliable sensors

Because all optical systems are prone to malfunction, customer requests for an affordable and process reliable sensor became more and more frequent. This was incentive enough for Turck to develop a robust sensor for detecting welding nuts.

An ingenious solution has been developed that not only detects metal, but also replaces the location bolt. The sensor is designed for damping caused by welding nuts and detects ferro-magnetic components such as bushings, nuts, and disks. It has a brass housing and meets the requirements for IP67 protection. LEDs reliably indicate the current switching status, including both the presence of the target as well as errors that have occurred.

Because the welding nut query takes place in a harsh environment and employees do not always work carefully, the sensor must be sufficiently protected mechanically. Protection is provided by a stainless steel centering bushing that is inserted onto the sensor and secured by the nut. Together, the sensor and the stainless steel bushing form the location bolt. The welding nut sensors can detect ferro-magnetic material through non-ferro-magnetic stainless steel bushings so that they emit a signal only in the case of magnetic metals. Because the welding nuts are made of steel, they represent an excellent target for sensors.

The new Turck sensor can be programmed to sense only the nut and not the sheet metal via pin 2 of the M12 x 1 plug-in connector and an additional teach adapter (VB2-SP1). At the press of a button, the sensor "learns" both the status of just the sheet metal as well as the status of the sheet metal and welding nut so that it can reliably detect their pres-

The welding process

The chassis sheet metal part to be processed is first placed in the corresponding machine. After a clamp has secured the sheet metal, the operator places the nut or a sleeve on the centering pin. The sensor now has to detect the welding nut or the sleeve so that a missed welding position can be immediately displayed on the control unit. As soon as all welding nuts are in their proper places, the robots begin to score the welding nuts on to the sheet metal.

ence. Once the programing has been learned, it remains intact until a new teach process is initiated. The major temperature changes caused by the welding process are intercepted by temperature compensation.

The "welding nut sensors" come in two different designs with various sensor signal strengths and diameters. This allows components with heavily varying material properties and diameters to be detected. A component to be detected must be located within the so-called sensitive zone in order to be detected.

Summary

Turck's welding nut sensor was developed for harsh environmental conditions in the welding zone so that it can be reliably used in the automobile industry. The sensor can be easily integrated into production lines and adapts to the environmental conditions in no time through an uncomplicated teach-in process. The sensor detects the welding nuts just as easily as sleeves. This guarantees a smooth production run without software, expensive programming and other electronics.

Author



Silke Kenzer is product specialist for positioning and proximity sensors at Hans Turck GmbH & Co. KG



Universal:
capacitive
sensors
can detect
metallic and
non-metallic
materials

How Capacitive... ...Sensors Work

Part 3 of our basic series: Design, functional principles and mounting options of the most important sensor technologies

Capacitive sensors function contact-free and non-reactively and can detect both metallic as well as non-metallic targets. A decisive factor in their functioning is their capacitor-like design with two plates between which an electronic charge can be stored. The change in this charge quantity – the capacity – is used for metrological measurement purposes. It

can result from a change in the plate distance, the effective plate surface or the dielectric. With non-conducting materials, the change in the dielectric has the effect that the plates are formed on the one hand by a probe and, on the other hand, by the surroundings. With conducting materials, the change in material functions like the change in the plate distance.



Difficulties with cleansing brine: The capacitive BCF sensor from Turck can eliminate disruptions and reliably detect the filling level

For bulk goods such as wood pellets, capacitive sensors are ideal for measuring the filling level



Diverse uses

Capacitive sensors can handle a multitude of tasks as if they were child's play. Because they also detect non-conducting materials, the sensors are ideal for application areas in which the inductive principle fails. Application examples for capacitive sensors include, in addition to distance and positioning measurements, the detection of warping, thickness, eccentricity, concentricity, deformation, wear and tear, oscillations and, above all, filling level.

The real switching distance of capacitive sensors can heavily differ because it is dependent on the dielectricity constants of the object being detected. The sensors achieve a maximum switching distance with metallic objects. Reduction factors dependent on the type of metal, such as conventional inductive factors, are not to be taken into consideration here. With other metals, the switching distance drops

Quick read

Capacitive sensors are truly "jacks of all trades". They are used in the most diverse applications as proximity switches or limit signal transmitters because they can measure and detect both liquid as well as solid materials. But above all, capacitive sensors can – compared to inductive sensors – not only detect metallic, but also non-metallic materials.

depending on the dielectricity constants of the object being detected. The higher its value, the higher the switching distance. With the help of a potentiometer, the switching distance can be adapted to almost all capacitive sensors.

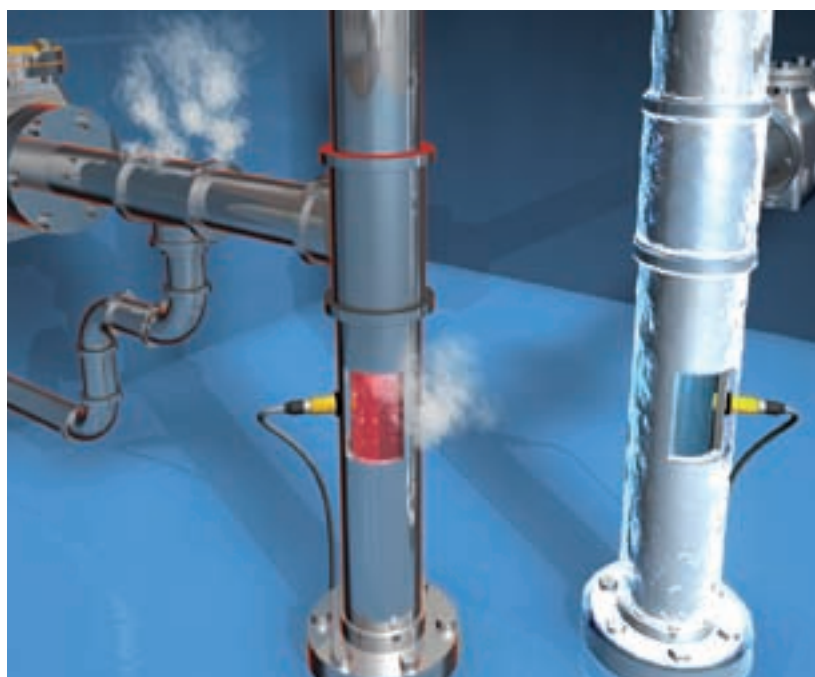
Standard capacitive sensors can be used within a temperature range of -25 to $+70$ °C, for higher temperature requirements, Turck offers special sensor models for which even 100 °C is not a problem. In general, with capacitive sensors, somewhat larger temperature drifts can be expected than with inductive sensors. If an object made of a conducting material with ground potential is connected, the response distance increases minimally. This influence can be corrected, if necessary, using the adjustment potentiometer.

Disruptions

Because capacitive sensors react to all materials with a dielectricity constant greater than 1, this can result in disruptions in practical operation, for example, through moistening, thawing or ice forming on the sensor surface. The sensor may also incorrectly detect dirt build-up and moisture. In order to avoid this effect, a compensation probe generates a signal in close range of the sensor surface that counteracts the main signal. Ideally, an area originates near the electrode in which the targets can be located without being detected. Thanks to a new kind of switching technology in Turck sensors, this close range masking functions also with conducting deposit build-ups.

Turck has also found a solution for the EMC sensitivity that emerges depending on the principle. With conventional sensors, the potentiometer for adjusting the switching distance is located in the sensitive generator area and is therefore susceptible to disruptions. With Turck sensors, the potentiometer is located in a less sensitive section of the switch-

Even in a stainless steel hopper tank, the embedded BCF sensor can measure the filling level



Can stand the heat: When things start to heat up, certain capacitive Turck sensors can withstand temperatures of 100 °C

ing unit. Furthermore, the new BCF sensors are equipped with an electronic filter that makes them absolutely resistant to radiating and conducting HF and burst disruptions.

Measuring filling levels in problem cases

Due to their capacity to detect non-metal materials, capacitive sensors are ideal for measuring filling levels contact-free. For difficult cases, there have not yet been satisfactory results because most traditional sensors have so far been unable to offer sufficient detection reliability. Detection problems and even complete failures have occurred especially in cases of conducting coatings due to highly viscous deposit build-up. An example of such a difficult application is a plastic container filled with

a cleansing brine. The brine leaves a slow-draining conducting briny film behind on the inside of the container. The deposits left behind by this medium lead either to a delayed measuring of the filling level or make measuring it impossible. With a new switching technology and electrode and compensation optimization, Turck has now achieved a break-through. The newly developed capacitive sensors from the BCF series are able to overcome the above problems because the close range masking function also works with conducting lubricating films.

With the help of the BCF sensors, the filling level can be reliably measured with little effort not only in the case of liquids, but also with bulk materials. These sensors are thus ideal for measuring and detecting wood pellets, for example. The perfect solution for alternative energy suppliers in the field of heat recovery. There used to be only a few processes for measuring the filling level. These included the revolving switch or manual control via portholes.

Unavoidable dirt deposits caused by dust particles inside the storage container can cause major problems with these processes. To keep dirt deposits to a minimum, most manufacturers use hopper tanks that are usually made of a textile. In this case, the use of capacitive sensors is practically a must since they can be simply placed in a side pocket sewn onto the outside of the tank's fabric. This process guarantees simple and inexpensive sensor placement that protects it against dirt deposits.

Functional principle

A generator stimulates both probes with a signal in the megahertz range. The signal difference between the measuring probe and the compensation probe of the sensor element is 0 in an idle state. The approach of a target disrupts the sensor element and brings about a signal change. In the subsequent stage, this is reinforced and filtered and demodulated by a demodulator. In order to adjust the sensitivity of the sensor, the triggering level of the Schmitt trigger can be changed using a potentiometer. If the triggering level is exceeded, this actuates the discharge of material.

Author



André Brauers is product specialist for capacitive, ultrasound and travel sensors at Hans Turck GmbH & Co. KG

► Webcode

more10871e

Turck at trade shows

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

Trade shows in Germany

Dates	Name of trade show	City
21.04. - 25.04.2008	Hannover Messe	Hanover
24.04. - 30.04.2008	Interpack	Düsseldorf
13.05. - 15.05.2008	Euro ID	Cologne
22.09. - 25.09.2008	MOTEK	Stuttgart
25.11. - 27.11.2008	SPS/IPC/DRIVES	Nuremberg

International shows

Dates	Name of trade show	City, Country
15.04. - 18.04.2008	Elcom	Kiev, Ukraine
16.04. - 20.04.2008	Iran Oil show	Teheran, Iran
21.04. - 24.04.2008	Romcontrola	Bucharest, Romania
12.05. - 16.05.2008	Belgrade Technical Fair	Belgrade, Serbia
14.05. - 16.05.2008	PTA St. Petersburg	St. Petersburg, Russia
20.05. - 23.05.2008	Het Instrument	Utrecht, Netherlands
20.05. - 23.05.2008	Agrokomplex	Nitra, Slovakia
26.05. - 29.05.2008	Eliaden	Lillestrøm, Norway
04.06. - 06.06.2008	ISA Expo Control	Mexico City, Mexico
10.06. - 13.06.2008	12th Int. Automation Exhibition	Beijing, China
17.06. - 19.06.2008	RAX	Tel Aviv, Israel
19.06. - 22.06.2008	Assembly Technology	Bangkok, Thailand
23.06. - 27.06.2008	Oil & Gas Show	Moscow, Russia
02.09. - 04.09.2008	Automatik	Brøndby, Denmark
15.09. - 19.09.2008	MSV	Brno, Czech Republic
16.09. - 18.09.2008	Focus Technology Forum	Zurich, Switzerland
25.09. - 28.09.2008	Automation	Mumbai, India
30.09. - 03.10.2008	Aandrijftechniek	Utrecht, Netherlands
01.10. - 03.10.2008	PTA Moscow	Moscow, Russia
02.10. - 02.10.2008	M+R	Brussels, Belgium
07.10. - 09.10.2008	Processteknik & Miljöteknik	Göteborg, Sweden
07.10. - 10.10.2008	Vienna-Tec	Vienna, Austria
07.10. - 11.10.2008	TIB	Bucharest, Romania
09.10. - 10.10.2008	Motion Control Show	Seoul, Korea
14.10. - 15.10.2008	Mocon-Hydromech	Gent, Belgium
15.10. - 17.10.2008	Pumps & Valves	Antwerp, Belgium
20.10. - 24.10.2008	Expoquimia	Barcelona, Spain
28.10. - 01.11.2008	Matelec	Madrid, Spain
11.11. - 13.11.2008	Elektrotechnika	Ostrava, Czech Republic
02.12. - 04.12.2008	PTA Ural	Yekaterinburg, Russia
09.12. - 12.12.2008	Automatisation	St. Petersburg, Russia

Imprint

Publisher

Hans Turck GmbH & Co. KG
Witzlebenstraße 7
45472 Mülheim an der Ruhr
Germany
Tel. +49 (0)208 4952-0
more@turck.com, www.turck.com

Responsible

Klaus Albers, -149
klaus.albers@turck.com

All rights reserved. We reserve the right to make technical changes or correct errors.
Reprint and electronic processing permitted with written approval from the publisher.

Staff involved in this edition

André Brauers, Anke Geipel-Kern, Stefan Kappel,
Karen Keller, Silke Kenzer, Ryan Kromhout,
Jörg Kuhlmann, Frank Paluch, Rolf Rathmann,
Lars Schmidt, Willibald Tschlatscher

Art Direction / Graphic design

Arno Krämer, Britta Fehr (Art design)

Printed by

Laupenmühlen Druck, Bochum



Turck on the I

Whether sensor, fieldbus, interface or connec-
www.turck.com you will find the right solution
search functions will help you.



“Sense it! Connect it! Bus it! Solve it!” – see it for yourself: Turck's solution-oriented competence in industrial automation. We await you at several trade shows around the world



► **Full text search** Are you looking for a product name, a known identification number or a special feature? Then simply enter it in the above left search field.

► **Hierarchic structure** Are you looking for products from a certain group, such as inductive sensors in cylindrical design? Then click through the menu structure on the left.

► **Power Search** Are you looking for a product that meets very specific technical parameters? Then use the feature search that specifically leads to your solution.

www.turck.com

nternet

tion technology, in the product database on to your needs at the touch of a button. Three

Turck on site

With 25 subsidiaries and numerous branch offices, Turck is always nearby, anywhere in the world. This guarantees fast contact to your Turck contact partners and direct support on site.

GERMANY

Corporate headquarters HANS TURCK GmbH & Co. KG

Witzlebenstraße 7 | Mülheim an der Ruhr | (+ 49) (0) 208 4952-0 | more@turck.com

- **ARGENTINA** | Aumecon S.A.
(+54) (11) 47561251 | aumecon@aumecon.com.ar
- **AUSTRALIA** | TURCK Australia Pty. Ltd.
(+61) (0) 395609066 | cameron.dwyer@turck.com
- **AUSTRIA** | Intermax GmbH
(+43) (1) 4861587-0 | imax.office@intermax.at
- **BAHRAIN** | TURCK Middle East SPC
(+973) 17814920 | turckmiddleeast@turck.com
- **BELARUS** | FEK Company
(+375) (17) 2562917 | turck@infonet.by
- **BELGIUM** | Multiprox N. V. (TURCK)
(+32) (53) 766566 | mail@multiprox.be
- **BRAZIL** | Sensor do Brasil
(+19) 38979412 | comercial@sensordobrasil.com.br
- **BRUNEI** | TURCK Singapore
(+65) 65628716 | singapore@turck.com
- **BULGARIA** | Sensomat Ltd.
(+359) (58) 603023 | info@sensomat.info
- **CANADA** | Chartwell Electronics Inc.
(+1) (905) 5137100 | sales@chartwell.ca
- **CHILE** | Seiman S.A.
(+56) (32) 2699310 | ventas@seiman.cl
- **CHINA** | TURCK (Tianjin) Sensor Co. Ltd.
(+86) (22) 83988188 | turck@public1.tpt.tj.cn
- **COLUMBIA** | Colsein Ltda.
(+57) (1) 2367659 | info@colsein.com.co
- **COSTA RICA** | TURCK USA
(+1) (763) 5539224 | mailbag@turck.com
- **CROATIA** | Tipteh Zagreb d.o.o.
(+385) (1) 3816574 | tipteh@tipteh.hr
- **CYPRUS** | AGF Trading & Engineering Ltd.
(+357) (22) 313900 | agf@agfelect.com
- **CZECH REPUBLIC** | TURCK s.r.o.
(+420) 495518766 | czeche@turck.com
- **DENMARK** | Hans Folsgaard A/S
(+45) (43) 208600 | hf@hf.dk
- **ECUADOR** | TURCK USA
(+1) (763) 5539224 | mailbag@turck.com
- **ESTONIA** | Osauhing "System Test",
(+373) (2) 6405423 | systemtest@systemtest.ee
- **EGYPT** | Egyptian Trading and Engineering Co. (E.T.E.)
(+20) (2) 2908380 | ete@internetegypt.com
- **FINLAND** | Oy E. Sarlin AB
(+358) (9) 504441 | sales.automation@sarlin.com
- **FRANCE** | TURCK BANNER S.A.S.
(+33) (1) 60436070 | info@turckbanner.fr
- **GREECE** | Athanassios Greg. Manias
(+30) (210) 9349903 | info@manias.gr
- **GREAT BRITAIN** | TURCK BANNER LIMITED
(+44) (1268) 578888 | info@turckbanner.co.uk
- **HONDURAS** | TURCK USA
(+1) (763) 5539224 | mailbag@turck.com
- **HONG KONG** | Hilford Trading Ltd.
(+852) 26245956 | hilford@netvigator.com
- **HUNGARY** | TURCK Hungary Kft.
(+36) (1) 4770740 | hungary@turck.com
- **ICELAND** | Km Stal HF
(+352) 56789-39 | kall@kmstal.is
- **INDIA** | TURCK India Automation Pvt. Ltd.
(+91) (20) 25630039 | sales.india@turck.com
- **INDONESIA** | TURCK Singapore
(+65) 65628716 | singapore@turck.com
- **IRAN** | Partow Ideh Pars Company (PIP Co.)
(+98) (21) 88535375 | info@pipars.com
- **IRELAND** | Tektron Electrical
(+353) (21) 4313331 | frank.urell@tektron.ie
- **ISRAEL** | Robkon Industrial Control & Automation Ltd.
(+972) (3) 6732821 | robkonfr@inter.net.il
- **ISRAEL** | Nisko Electrical Engineering & System Ltd.
(+972) (8) 9257355 | joseph.shapira@niskoeng.com
- **ITALY** | TURCK BANNER S.R.L.
(+39) (02) 90364291 | info@turckbanner.it
- **ITALY** | TURCK Process Automation
(+39) (03) 6346128 | pa-italy@turck.com
- **JAPAN** | TURCK Japan Office
(+81) (3) 54722820 | info@turck.jp
- **KOREA** | TURCK Korea Co. Ltd.
(+82) (31) 5004555 | sensor@sensor.co.kr
- **KUWAIT** | Kana Controls Company
(+965) 4741373 | info@kanacontrols.com
- **LATVIA** | Lasma Ltd.
(+37) (1) 7545217 | inga@lasma.lv
- **LEBANON** | Key Electronics
(+961) 4715290 | key@inco.com.lb
- **LITHUANIA** | Hidroteka
(+370) (37) 352195 | hidroteka@hidroteka.lt
- **LUXEMBOURG** | Sogel S.A.
(+352) 4005051 | sogel@sogel.lu
- **MALAYSIA** | TURCK Singapore
(+65) 65628716 | singapore@turck.com
- **MACEDONIA** | Tipteh d.o.o. Skopje
(+389) 70399474 | tipteh@on.net.mk
- **MEXICO** | TURCK Mexico S. DE R.L. DE C.V.
(+52) 8444826924 | ventasmexico@turck.com
- **NEW ZEALAND** | W. Arthur Fisher Ltd.
(+64) (9) 2700100 | sales@waf.co.nz
- **NETHERLANDS** | TURCK B. V.
(+31) (38) 4227750 | info@turck.nl
- **NORWAY** | HF Danyko A/S
(+47) 37090940 | danyko@hf.net
- **OMAN** | Advance Oilfields & Industrial Supplies LLC
(+968) 7714786 | gopinath@aoisllc.com
- **PANAMA** | TURCK USA
(+1) (763) 5539224 | mailbag@turck.com
- **PERU** | NPI Peru S.A.C.
(+51) (1) 2731166 | npiperu@npiperu.com
- **PHILIPPINES** | TURCK Singapore
(+65) 65628716 | singapore@turck.com
- **POLAND** | TURCK sp.z o.o.
(+48) (77) 4434800 | poland@turck.com
- **PORTUGAL** | Salmon & Cia. Lda.
(+351) (21) 3920130 | salmon@salmon.pt
- **PUERTO RICO** | TURCK USA
(+1) (763) 5539224 | mailbag@turck.com
- **QATAR** | A.A. Engineering Services
(+974) 4600235 | asd@aaes.net
- **ROMANIA** | TURCK Automation Romania SRL
(+40) (21) 2300279 | romania@turck.com
- **RUSSIA** | O.O.O. TURCK Rus
(+7) (495) 2342661 | russia@turck.com
- **SAUDI-ARABIA** | M.H. Sherbiny for Commerce
(+966) (3) 8944298 | sales@sherbinyforcommerce.com
- **SERBIA AND MONTENEGRO** | Tipteh d.o.o. Beograd
(+381) (11) 3131057 | vecerka@ppt.yu
- **SINGAPORE** | TURCK Singapore Pte. Ltd.
(+65) 65628716 | singapore@turck.com
- **SLOVAKIA** | Marpex s.r.o.
(+421) (42) 4426986 | marpex@marpex.sk
- **SLOWENIA** | Tipteh d.o.o.
(+386) (1) 2005150 | damian.jager@tipteh.si
- **SPAIN** | Elion S.A.
(+34) 932982000 | elion@elion.es
- **SOUTH AFRICA** | R.E.T. Automation Controls (Pty.) Ltd.
(+27) (11) 4532468 | info@retauro.co.za
- **SWEDEN** | TURCK Consulting Office
(+46) (31) 471605 | sweden@turck.com
- **SWITZERLAND** | Bachofen AG
(+41) (1) 9441111 | info@bachofen.ch
- **TAIWAN** | Taiwan R.O.C. E-Sensors & Automation Int'l Corp.
(+886) (7) 7220371 | ez-corp@umail.hinet.net
- **THAILAND** | Technology Instruments Co., Ltd.
(+66) (2) 7222236 | ttic@net.co.th
- **TURKEY** | Gokhan Elektrik Malzemeleri
(+90) (212) 2213236 | gokhanelektrik@superonline.com
- **TURKEY (project contact)** | Dacel Mühendislik Ltd. Sti.
(+90) (212) 2107646 | info@dacel.net
- **URUGUAY** | Dreghal S.A.
(+598) (2) 9031616
- **USA** | TURCK Inc.
(+1) (763) 5539224 | mailbag@turck.com
- **UNITED ARAB EMIRATES** | Dynamic Electro Mech. Eng. (+971)
(4) 3369955 | deme@emirates.net.ae
- **VENEZUELA** | CADECI C.A.
(+58) (241) 8345667 | cadeci@cantv.net
- **VIETNAM** | TURCK Singapore
(+65) 65628716 | singapore@turck.com



Page 16



Page 20



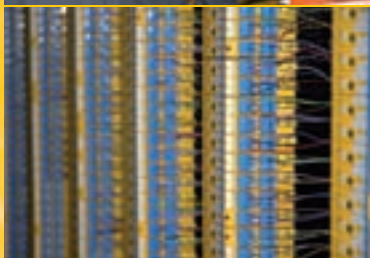
Page 24



Page 28



Page 32



Page 36



Page 40



Page 43