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The Magazine for Customers of the Turck Group

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Compact Class

Unmatched channel density of the Interface Module Backplane (IMB) ensures order in the control cabinet

Conscious Investments

Dear readers, these days, regardless of whether you are an employee or an employer, you can't avoid the financial crisis, the banking crisis, investment cutbacks, and many other related negative news topics. This means that we must find the right balance between the apocalyptic mood and calculated optimism in order to position the company, scrutinize workflows and optimize processes. We have to do all of this under the premise of meeting your needs better than ever before.

For Turck, an important factor in a successful crisis strategy is not only reducing spending – in areas where it seems to make sense – but also the conscious decision to make investments that you as our customer will benefit from now and in the future. Whether it is a new or enhanced innovative automation solution, customer proximity on site or our attendance at the Hanover and Achema trade shows, savings measures in these areas would be counter-productive, in our opinion.

And that is why, even during these tough times, we will be available to answer your questions at our trade show booths in Hanover (Hall 9, Booth H55) and in Frankfurt (Hall 10.2, Booth D3-E8). At both trade shows, due to the cancelations of other exhibitors, we were able to better position ourselves in order to show you the right solutions for your individual automation needs. To give you a taste of what awaits you, please take a look at our customer magazine **more@TURCK**. The product innovations, feature articles, and application examples from all over the world presented in the following pages focus deliberately on process automation. After all, the world's largest process automation trade show, Achema, is right at our doorstep.

Whether as a physical layer specialist in process automation or as a forward-looking partner for factory automation, I am sure that Turck will impress you with its expertise and competence in finding the right solution to meet your needs.

We are looking forward to your visit!

Warmest regards

Ulrich Turck

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Trade Show Booth Improved

▶ Despite a tense market situation everywhere, Turck will still be attending the most important trade shows in 2009. The trade show booths this year will be more accessible both at the **Hannover Messe**, as well as the **Achema** show in Frankfurt, Germany. Turck will be exhibiting current product innovations and tried-and-trusted solutions from sensor, fieldbus, interface and connectivity technology in Hall 9 at booth H55 in Hanover, Germany. At th Achema trade show in Frankfurt, the physical layer specialist will be demonstrating solutions and concepts from the fields of “point-to-point”, “point-to-bus,” and “bus-to-bus” in Hall 10.2 at booth D3-E8.

New Office in Turkey

▶ Turck is continuing its successful expansion strategy with a new sales office in Turkey. The Turck office in Istanbul is managed by automation specialist **Onur Celik**. The 34-year-old studied electrical engineering at the university in Istanbul and afterwards began working for a well-known manufacturer in the automation industry. As a location for the Turck office, the company has selected the Asian district of Istanbul because there is a major industrial area there and that is where the most of the major Turkish automobile industry players are located. Above all, Celik is currently opening the doors to numerous projects with the innovative BL ident RFID system.

2-Wire Sensors

▶ Turck has developed a new **inductive sensor** in a cuboid form that is especially designed to meet the specifications of the French Committee for Standardization of Production and Equipping (CNOMO). Equipped with a separate bracket, the flush-mounted Bi10-QN26 permits the active surface of the sensor to be positioned in four directions. This means the new sensor is suited for numerous automotive applications, especially for French automobile manufacturers Citroen, Peugeot and Renault. The bandwidth ranges from the positioning query on the conveyor belts to parts checking in assembly processes. The cuboid-shaped sensor (height: 26 mm) in unpoled 2-wire design has a rated switching distance of 10 mm and is designed for operating voltages of 10 to 65 VDC. The IP67 sensor displays the swiching distance by means of a luminous LED and thus facilitates simple function control directly on site. The new Bi10-QN26 is available as an M12 pigtail variant with cable lengths of 0.8 and 0.15 meters, as well as non-ready-made cable variants (2 m).

Single Segment Backplane for DPC

▶ The **Diagnostic Power Conditioner System (DPC)** has been expanded with the addition of a new module rack (backplane) for individual FOUNDATION fieldbus segments. After Turck recently introduced new backplanes for power supply and diagnostic of up to four H1 segments, the company is now introducing a module rack in the form of the DPC-49-1RMB, especially for smaller bus architectures. Like the module rack of the DPC-49-4RMB product line, the new single segment backplane has a redundant power supply, as well as a relay alarm contact for simple diagnostic analysis. Based on the established FF energy supply module DPC-49-IPS1, only one H1 segment, however, is selectively supplied redundantly via the module rack. The connections to the host system and the field level are made via 3-pin removable screw terminals. A shield bus or a screw clamp that is internally connected using the M5 thread bolt ensures high electromagnetic compatibility (EMC) and equipotential bonding.

Vision Sensor with Touchscreen

▶ High-performance image processing technology does not necessarily have to be expensive or difficult to handle. As proof of this, the automation specialist, Turck, will introduce its **iVu vision sensor** at the Hannover Messe. This is the first image processing system with an integrated touchscreen. This compact solution unites the sensor's easy handling with camera functionality, and, thanks to its compact housing and free software and firmware updates, it is considerably more attractive pricewise than classic image processing solutions. The Vision sensor was developed by Turck's optic partner Banner and is perfectly suited for a multitude of different detection tasks that once required time-consuming parameterizing via computer software – from code detection in the pharmaceutical industry to label inspection and content checks in the chemical and food industry. Due to its intuitive operation via the touchscreen, even inexperienced first-time users can install and learn to use the Vision sensor quickly for immediate operation.

more on page 24 ▶

Hart Modules for BL20

▶ Turck is offering new analog electronic modules for the **BL20 remote I/O System**, which is authorized for use in Atex Zone 2. The dual-channel I/O cards are Hart-compatible and facilitate the expansion of digital fieldbus communication by using existing 4 to 20 mA wiring. The Hart modules that were premiered at the Hannover Messe allow users to easily connect their analog field devices to the process control system via the universal bus terminal system and embed them in a consistent asset management concept based on FDT/DTM technology. With the addition of analog electronic modules to its fieldbus system, Turck is responding to the huge demand for efficient I/O solutions for almost all fields in processing technology. The Hart-compatible modules facilitate the interruption-free transmission of additional measured values or diagnostic data from the field via the modulated digital signal.

more on page 60 ▶

85th Birthday

▶ **Hans Turck**, one of the founders of the Germany-based sensor, fieldbus, connectivity and interface specialist celebrated his 85th birthday on January 9, 2009. After completing his engineering degree in 1950, the celebratee gained work experience in the electronics industry for ten years before he started his own engineering company in Muelheim, Germany. In 1965, Hans Turck sold his first product, an amplifier that his brother Werner produced in Halver,

Sauerland. In 1998, Hans Turck handed the reins of the company over to his son Ulrich. Today, he is enjoying retirement together with his wife; both are in good health, and they split their time between Mülheim and their second home in South Africa.

Street Car with Turck Sensors

▶ Since March 2009, a street car has been in operation in Dresden that is transporting not only passengers, but also, for the first time, delivering measured data from serial operation. In addition to Dresden's bus companies and the automobile manufacturer Bombardier, Dresden Project manager, Prof. Michael Beitelschmidt from the Technical University in TU Dresden, was able to obtain other well-known companies as partners. For the trade show street car, Turck has made ultrasound sensors available that log data on the bogies.

Dual Sensors for Manual Valves

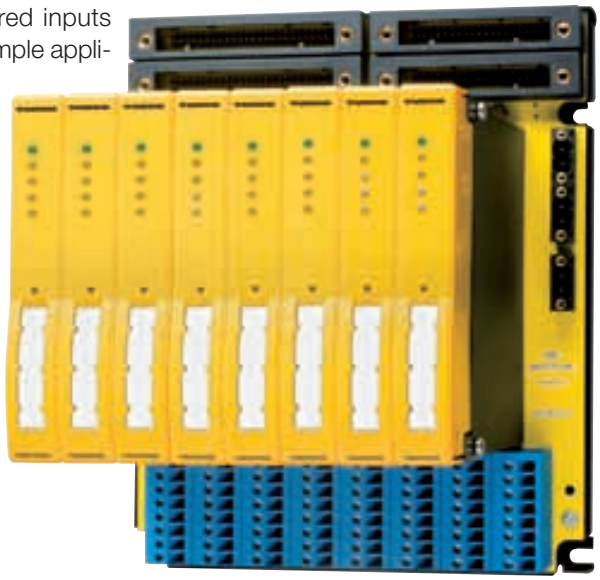
▶ Thanks to new stainless steel mounting brackets, Turck customers can now use the double sensor on hand-operated valves for easily transmitting a valve's position. The bracket is easily mounted on the valve with two screws and attached to the manual lever by a threaded bolt. The distances between the holes meet conventional standards so that the bracket can be used on most valves.

Secure in Hazardous Areas

▶ At the Achema show being held this year, Turck is launching a range of new solutions for use in hazardous areas. Besides the **RFID tags** that can be used in Zone 1, the Namur sensor product line will be the main attraction. All **inductive, capacitative, and magnetic field sensors with a standard Namur output** are now approved for Dust Zone 20 and Gas Zone 1 – many even up to Zone 0. All sensors mentioned are additionally approved for use in safety-related applications up to SIL2, in accordance with IEC 61508. Moreover, Turck is now offering sensors with the innovative TC terminal chamber concept and expanded temperature range (-40 to 100 °C) in the IP68/IP69K protection class. The customer can therefore find the right sensor for any application and can dispense with expensive special variants. Lastly, Turck has the appropriate intrinsically-safe interface devices in its product line for any sensor.

Interface Module Backplane

▶ At the Achema trade show, Turck will be presenting a rugged **Interface Module Backplane (IMB)** that combines installation space for up to 32 I/O channels with standardized system connections and a redundant power supply (24 VDC). Digital I/O modules as well as Hart-compatible analog cards and DTM configu rable temperature amplifiers complete the new point-to-point solution and integrate it into a consistent asset management system. Thanks to the lower channel price compared to DIN rail interfaces, the IMB is the ideal solution for highly expanded control cabinets with several hundred inputs and outputs as well as for simple applications with few I/Os. The Backplane offers space for up to eight interface modules on a compact basic footprint of only 175 x 210 mm. more on page 08 ▶



Correct Torque without Tool

▶ Turck's new M12Nm connector is the first plug-in connector worldwide that can be manually tightened without the aid of a torque wrench and with a defined torque. The integrated torque check ensures that the plug-in connection is tight in accordance with the IP67 protection class. The plug-in connector was developed by wiring and connection technology specialist Escha. The M12Nm functions similar to a gas cap: The user first positions the connector inside the coupling via an axial movement. Then, he or she manually tightens the lock bush made of plastic. When the defined torque is reached, the lock bush disengages. The user gets clear haptic and acoustic feedback and knows that the connection is tight at this moment and that additional compression is prevented. The male and female M12Nm connectors will be available in the second quarter as 3, 4, and 5 pin versions as as well as in straight and angled designs.

Wireless Components for the Physical Layer

▶ Turck is expanding its portfolio for the physical layer by adding versatile **gateways and node points** for wireless data transmission. The new wireless product line supports a multitude of signals: from analog data concerning binary contacts and frequency signals, to digital protocols via RS232 and RS485. To be able to transmit all data from a remote I/O station wirelessly reduces wiring costs for users and makes the supply chain more efficient. Depending on the application, the customer has the choice between a cost-effective point-to-point solution – a gateway with one node – or a network architecture in which one gateway can operate up to 99 nodes. To implement simple retroactive measurements or data transmissions, the single version is ideal, as it can transmit up to eight binary inputs and four binary outputs or four analog signals. More complex automation tasks can be implemented via the wireless network architecture using RS232 or RS485.

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Ethernet Profibus Interface with Webserver

▶ Turck is now offering the **Ethernet Profibus PB-XEPI** coupler with a diagnostic function and integrated webserver. The diagnostic unit allows users to continuously monitor, for the first time, a large number of Profibus networks in parallel during ongoing operation and makes remote maintenance over the internet possible. The interfaces are simply integrated into the Profibus networks to be monitored, and establish a communications and diagnostic infrastructure via the Ethernet protocol, thus allow ing remote maintenance for all integrated fieldbus networks via a computer web browser. The PB-XEPI can be configured as a pure listener without its own Profibus address or as an active network subscriber.

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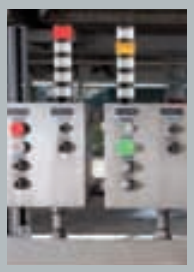
Sensor Application Award

▶ In November 2008, the most innovative sensor applications were awarded the German Sensor Application Award at the SPS/IPC/Drives trade show. The award is an initiative from Turck, the Ruhr University of Bochum and the Konradin trade publications electro Automation and KEM. The winners, **Philippe Huysentruyt** (Recticel Automobilsysteme), **Herbert Stock** (Cavitator Systems) and **Ludwig Wenninger** (Clariant), celebrated with jury members **Uwe Sticher** (Daimler) and **Werner Turck** (from left to right).

Multifunctional Signal Lights

▶ With the **EZ Light Series TL50,** Turck is launching a versatile and easy-to-install multifunction signal light. Depending on the individual application, users can chose between versions with up to five signal lights (without alarm sound) and versions with up to four signal lights and an integrated alarm sound device (maximum volume 95 dB). In both versions, pre-assembled, long-lasting LED elements ensure clearly visible system status displays – whether they are mounted on the machine, in the control cabinet or at monitored locations within the production line. The signal lights were developed by Turck's optic partner Banner.



▶ Webcode **more20910e**

Author

Ryan Kromhout is the director of product management process automation at Turck Germany in Mülheim

Webcode | **more20900e**

In addition to analog I/O cards, four-channel digital modules are available for the IMB

Compact Class

Unmatched channel density of the Interface Module Backplane (IMB) ensures order in the control cabinet

Quick read

The new Interface Module Backplane combines small space with high channel density – up to 32 I/O channels – with galvanic separation and redundant power supply, thereby creating space in the control cabinet. Hart-compatible analog cards and DTM-configurable temperature amplifier complete the new I/O solution and facilitate consistent asset management concepts for the physical layer.

Separating, remodeling, adapting, and processing – the tasks in the physical layer, which is the interface between field devices and the process control system, are just as versatile as the interface solutions used. Regardless of whether in the expansion housing for the DIN rails, as a Europe card for the 19-inch racks or as IMC cartridges in IP67 construction, two features are influencing the decision in favor of interface technology more strongly than ever: The space required in the control cabinet and the total costs per channel.

With the new Interface Module Backplane (IMB), Turck is now expanding its comprehensive portfolio with the addition of a rugged and extremely compact I/O solution for the physical layer. In a compact footprint of only 175 x 210 mm, the new module racks, which Turck will be introducing at Achema, offer space for up to eight interface modules – and, depending on the customer's needs, up to 32 digital inputs/outputs or up to 16 analog I/O channels. Users are therefore able to install control cabinets with an enormous channel density of up to 1,152 input/outputs.

The new module racks have more on the box than pure interface shafts: Using standardized analog and digital system couplings for the most common process system manufacturers, redundant voltage supply and high temperature resistance, IMBs provide a new level of flexibility in the control cabinet. Thanks to their lower channel price compared to DIN rail installations, the easy-to-handle IMB point-to-point solution is ideal both for fully expanded control cabinets with several hundred inputs and outputs, as well as for simple applications with only a few I/Os.

Minimal engineering expenditure

The highlight of the station: Because the Backplane unites the complete connection level, and the I/O channels can be galvanically separated simply by inserting the interface cards, the engineering time and effort is reduced enormously for the entire interface level – both in the case of maintenance, as well as scheduled expansions. The easily accessible,

intrinsically-safe screw or spring terminal connections, as well as the system connections separated by color or space, prevent connection errors effectively and offer “hot swap” functionality for the control cabinet.

Because the pin assignment for the system connections is adapted directly to the respective process control system, users can dispense with special connection modules and, instead, use ready-made, cost-effective, and highly available 1:1 cables – a considerable advantage with regard to the supply of the electronic components used, as well as the installation and maintenance costs of the interface level.

Safety on board

The Backplane is a purely passive component as a shunting level of the entire I/O solution. In contrast to similar systems, there is no active component on the hardware that would be able to bring the entire parting plane to a stop in case of an outage. Since each individual interface card is secured, the availability of the parting plane is ensured in case of individual channel outages.

Thanks to the IMBs, Turck is additionally including a simple redundancy concept for the connection level to the process control system. In traditional point-to-point wiring, interrupted connections were able to be compensated for only by an artificial doubling of the input-side signals, however, the redundant connections for the I/O cards in the process control systems now facilitate separate safety concepts for electronics and wiring.

The energy expended in the entire plant plays an increasingly important role for plant operators. Ultimately, the efficiency of a process rises and falls in relation to its total cost of ownership – which the energy balance produced by 4 to 20 mA transmitters can make a considerable contribution. In this case, the Turck developers have achieved a reduction in energy consumption for the transmitter menus (AIA) without impairing transmitter performance. Even the loop-fed analog input/output cards are working with enormous efficiency.

Asset Management enabled

According to its claim of not just providing products but rather comprehensive automation solutions, Turck also relies on consistent asset management strategies with its new interface module rack: Both dual-channel analog input/output interfaces, as well as the available transducer/isolating amplifiers, are Hart-compatible and facilitate the transmission of additional measurement and diagnostic data via the modulated digital signal. Based on proprietary device drivers – DTMs for short – users can parameterize the temperature amplifiers used in this way.

They can also configure the field instrumentation underneath the parting plane with the aid of a single manufacturer-independent engineering tool, like the cost-free project planning software, PACTware. The parameterizing tool can be used to easily manage DTMs independent from the bus protocol, visualize features and settings in different basic applications (frames), and parameterize the connected device to be user-friendly in just a few mouse clicks.

Above and beyond remote maintenance and central asset management, the interface cards for the new Interface Module Backplane also come with diagnostic LEDs for monitoring the respective operating statuses. Up to two colored LEDs (digital input/output cards) display the switching statuses of the monitored outputs in yellow. In case of an error in the input circuits – for actuated input circuit monitoring – the corresponding LED changes to red whereupon the relevant output relay and the alarm relay signal are de-energized. Thus, the Backplane interfaces make possible the simple function control of the I/O level directly on site in the control cabinet.

The comprehensive Turck interface product line offers the right design for any application, from cartridges to DIN rails to the 19-inch card and the brand new Interface Module Backplane

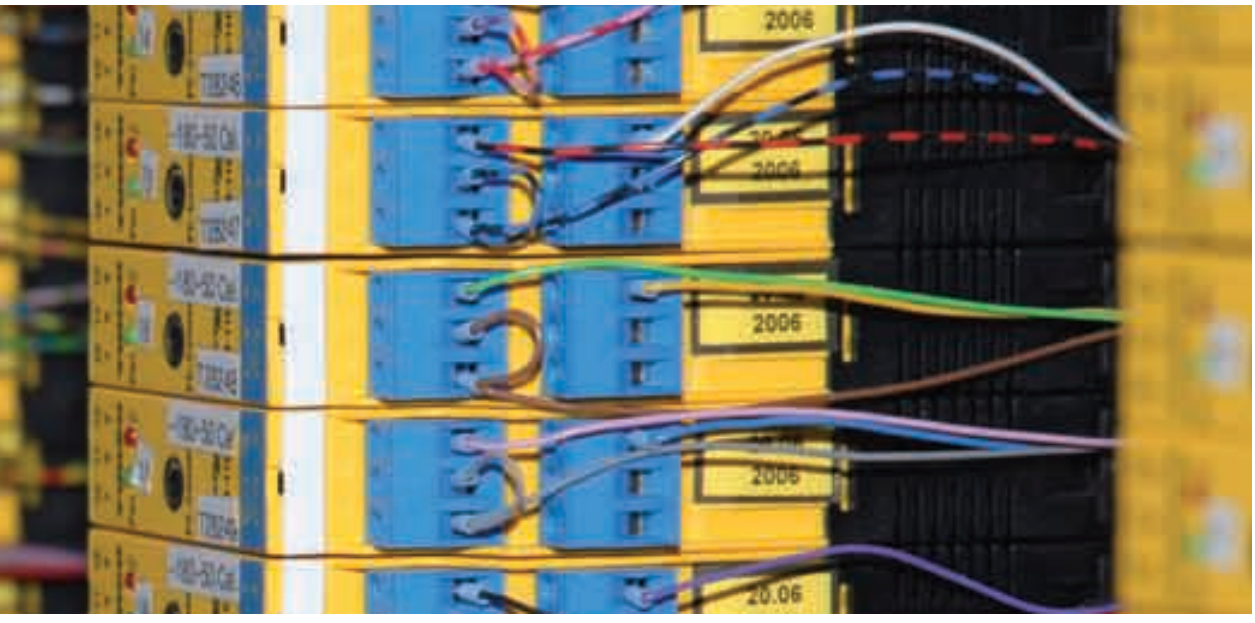
High temperature specification

Like the DIN rail interface devices, the Backplane interfaces stand out due to their high temperature specification. With an operating temperature range of -20 to +70 °C, the assembled Backplanes are suitable for installation in non-climate-controlled cabinets or in control cabinets that are heavily impacted by warm air circulation.

The design of the passive Backplane ensures efficient heat dissipation – regardless of whether the new point-to-point solution is set up horizontally or vertically. This is one benefit that not only increases flexibility in dealing with the interface solution, but also raises its average working life between outages (MTBF), and thereby its reliability as well as the capacity of all connected field devices.

Summary

With the new Interface Module Backplane and the appropriate two and four channel interface cards for up to 32 digital or 16 analog I/O channels, Turck provides a channel density in the control cabinet that is not feasible with DIN rail interfaces. Particularly in highly automated processing plants with several thousand I/O channels, the compact interface stations offer a major advantage. Integrated into a consistent asset management concept, the Interface Module Backplanes pay off even for smaller connectivity solutions. ■



Primarily for installations with a high channel density, the IMB is a true alternative to classic interface solutions

Ryan Kromhout (l.) and Frank Rohn summarize their first three years in India in a positive light

"Our Network Still Stands"

P&A editor-in-chief, Dr. Ulla Reutner, speaks with Frank Rohn, director sales process automation, and Ryan Kromhout, director product management process automation, about Turck in India

Mr. Kromhout, Turck has had an affiliated subsidiary in India for three years now. How do you meet the special needs of this market?

Kromhout: We constantly exchange ideas with our managing director in India, Anuj Nijhawan, who has a lot of experience in process automation. These exchanges have taught us a lot about the Indian market, which has many unique features that we meet in our product portfolio. In these three years, the projects that we have completed have also shown us where we still have improvements to make.

Mr. Rohn, you are responsible for sales in Asia, among other countries. What meaning does India have for you?

Rohn: I travel often to India because this market is very important. Our team in India is especially knowledgeable when it comes to process automation. All of our employees in India have a lot of experience in the process automation sector so we are rapidly advancing in this field. However, in factory automation, we had a lot more pioneering work to do. For most countries that we do business in, it is the other way around.

Where in Asia does Turck do business besides India?

Rohn: We established our own company in China several years ago and initially focused on factory automation. In 2005, we also began to focus on process automation there. At that time, we founded a subsidiary in Singapore, which represented our process automation kick-off in Southeast Asia. We have also had a sales office in Bahrain in the Middle East since 2007.

Many other process automation suppliers have been doing business in India longer than Turck. How do you plan to catch up?

Rohn: That is the bane of all medium-sized companies. You cannot enter every single market at the same time. With a workforce of 2800, we do business in 27 countries; we entered the US and Chinese markets early on and are the market leader in certain fields in both countries. This naturally ties up capacities. To get a foot in the door in India, despite our late start, we have had to operate more efficiently than other com-

panies who have a longer history. We have succeeded in recruiting professionals in process automation for all regions, in Singapore, the Middle East, India and China. It is also important to adapt products to meet Asian market needs – a process which represents a huge hurdle for many European suppliers.

You once said that a "special price" is required in India. How can a premium product supplier like Turck guarantee this?

Kromhout: Certainly not with the present product portfolio. In India, for example, point-to-point wiring is used much more widely than in the European or American markets. We accomplish this with products from the interface product line that we design as efficiently as possible in order to offer them at a competitive price as part of project business. Of course, we must not neglect the requirements of our major customers. All of our technical and production know-how flows into development. We are and remain a supplier of premium products, even in India.

This is certainly not so easy given the pressure on prices described.

Rohn: It is difficult, but possible. The demands of Indian engineers on quality are very high. Only those companies that walk the tightrope between reasonable pricing and excellent quality will survive. Our sales network in India is still standing, no project passes us by, and every large company has gotten to know Turck in the meantime. And we will continue working on adapting our product portfolio to meet the specific market requirements.

How do you manage to price your products competitively and yet maintain such a high quality?

Kromhout: With our IME interface module, for example, we have placed a high priority on efficiency. We have dispensed with certain features, such as the removable terminal block, and we have optimized housing, as well as printed circuit boards, so that we can work with components on one side. This allows us to achieve cost savings without having to compromise quality.

Rohn: Our successes in the process automation sector in India are based on excellent service. The training of our people on site, all highly qualified technicians, is very good. You can't afford inadequate technical support in India.

So, it isn't the quality and product price alone that pave the way for Turck in the Indian market?

Kromhout: No, on the contrary, especially since there are also products where direct price comparisons are not an issue. This is seen, for example, in new developments, like our backplane interface module that is characterized by a high channel density, high temperature consistency, and standard redundancy. It opens the user up to considerable savings options in the control cabinet. If you take a machine with 2,000 I/Os as a basis, these backplanes allow you to dispense with two to three control cabinets.

Does the Indian process automation industry use the total cost of ownership as a basis for their investment decisions?

Kromhout: Total cost considerations work as incentives for a new kind of automation, that is before the specifications are written because they can no longer be changed in the engineering phase. This applies not only to the backplane example. But we also begin discussing our fieldbus product line early on in the project phase. We show how our power conditioners make operating the technology more intuitive, thus making it easier to interpret the diagnostic data. This reduces the resistance in India to use fieldbuses.

Rohn: However, those who try to introduce the European-American concept of TCO to the Indian market will fail. First of all, we European manufacturers have to learn to listen to customers because they have a very deep understanding of TCO. The Indian version is a much more pragmatic approach than is common in Europe. We can learn a lot from this, particularly from discussions with EIL, Engineers India Limited. This company has helped us develop our products, particularly with a view toward the long term.

What meaning does EIL have for you?

Rohn: EIL, and of course the Reliance Group, India's largest private sector enterprise, as well, continue to gain in influence, even among control system suppliers. In India, it has been a while since European and American corporations such as Shell and Chevron have been able to dictate technological trends. ■

"For the Indian market, we are focusing on the efficient design of products in order to be able to offer them at competitive prices – without sacrificing quality."

Ryan Kromhout

"Users in India have a very deep understanding for Total Cost of Ownership. But the Indian version is a much more pragmatic approach than is common in Europe."

Frank Rohn

Author

Dr. Ulla Reutner is editor-in-chief of the trade magazine P&A
www.pua24.net

Webcode | **more20930e**

Quick read

Almost 15 years after entering the market in the middle of a stormy growth phase in the Chinese economy, Turck Tianjin is one of the most successful and advanced companies in the development zone in the Northern Pacific. The market leader in sensor technology is also benefiting from direct sales and customer-oriented support in the most heavily populated country in the world.

China's growth engine continues to steam ahead. Despite the financial crisis and rate of price increases, China remains a serious economic power house in international markets. As the third largest economy, the third largest trade nation, and, owning the largest foreign exchange reserve with over $ 1.53 billion worldwide, the People's Republic of China has become a solid player in the world economy in the thirty years since Mao's Cultural Revolution. Along with Japan, China has become a decisive economic force in the Asia Pacific Rim. In numerous manufacturing industries and production, China has long surpassed all other nations as the world's largest producer – whether in the iron or steel industry, in pit coal transport or in farming and agriculture.

The growth potential of the Chinese economy has long since been discovered by foreign companies. Alone in the first six months of 2008, many companies, including some of the largest corporations in the world, ploughed about $ 54 billion into the economy of the People's Republic. In addition to the United States, China has become a very attractive destination for direct investments.

Market entry in the reform phase

The economic situation in China looked a lot different in 1995. When the founders of Turck decided to become the first foreign supplier of automation solutions to invest in a production and sales location in China, the economy there was in the middle of a reform and high growth phase. At this time, the Chinese economy was characterized by enormous

Author

Shuxiang Liu is the Vice President of Marketing at Turck China in Tianjin

Webcode | **more20940e**

Turck employs more than 450 employees in production, marketing, and sales in China

Three Pillars of Success

Nationwide sales, local production, and individual system integration are the pillars along Turck's path to becoming the market leader in sensor technology in China

Turck is represented by a sales, production and system integration company in China

At trade shows, Turck China introduces itself to its customers on site

"In the past 14 years, we have always quickly responded to the needs of our customers. We were able to offer a service that would satisfy our customers throughout the country."

Xiaowei Peng, Vice President of Sales, at Turck China

growth in the gross national product, on the one hand, and, on the other, by an even higher rate of inflation. In no way could you call it a gold rush when the family company founded Turck Tianjin Sensor Co. Ltd., the first location in the strategically important Asian economic area.

At this time, the Technological Development Area (Teda) had already been well established for ten years in the eastern part of the city of Tianjin and offered Turck, both politically and geographically, the ideal location for the planned step of offering customers in China automation solutions and support directly on site. The city has a sea port and an airport both of which are located close to Beijing, as well as connections to eight highways leading to the northern, northeastern and eastern regions of China. As a business and development center, the coastal region was and is subsidized by the government.

Efficient direct sales

Right from the start, Turck Tianjin relied on direct sales of the innovative sensor, interface, and connection solutions through its own sales specialists. In direct meetings with Asian customers, not only were automation solutions introduced, but the distinct corporate culture and strong image of the Turck brand were also conveyed. By 1997 Turck Tianjin had already supplied 1,000 customers – commitment, sense of responsibility and the strong belief in one's own products led to the establishment of the Turck brand as the "yellow cyclone" among the trade press and customers. After fieldbus solutions were first offered in 1999 and implemented at the production facility of the FAW Volkswagen Group, for example, sales from the Chinese subsidiary broke the 100 billion Yuan mark (the equivalent of 11 million Euro) in 2000.

As in Germany, where the sales divisions are separate from the corporate headquarters, sales offices in China are divided into defined regions and industries. The advantage of this sales structure: Based on clear responsibilities, a dense sales network is emerging in which the sales employees are able to care for their specific customers effectively and individually – even for the long term. With this sales organization, Turck Tianjin has so far been able to realize annual sales increases of more than 40 million Euro. "In the past 14 years, we have always been able to react quickly to the needs of our customers," explained Xiaowei Peng, Vice President of Sales at Turck Tianjin. "We were able to offer a service that would satisfy our customers throughout the country."

Renewed growth

In order to be able to advance the company's successful establishment in the Asian market more intensely, facilitate broader business and cooperation models and reach even more customers with innovative products and total solutions from Turck, the company founded the production subsidiary Turck Tianjin Technology Corporation (TTT) and Turck

For the Asian market, Turck produces products that meet German quality standards in Tianjin, China

Automation Systems Corporation (TAS), which functions as a system integrator, in 2004. While employees from the production subsidiary Turck Tianjin Technology Co. are primarily responsible for the production of components for the Asian market, the system integrators of Turck Automation Systems Co. plan and handle the implementation of automation solutions in individual plant concepts based on customer needs and applications. For an equally comprehensive; as well as an integrative business model, the Chinese subsidiaries were honored by the city of Tianjin as the “best company with foreign investors” (2004/2005) and as the “most advanced company with foreign investors” (2007).

Success on three legs

Last but not least, due to the start-up of both subsidiaries, Turck Tianjin has been able to reach numerous key industries on the Chinese market in the past 14 years. Today, customers in the automobile industry, the iron and steel industry, the tobacco industry and many other industries rely on the know-how and solutions from the German automation supplier. ■

Even Chinese automobile manufacturers rely on the solutions of the market leaders for inductive sensor technology

Author

Frank Humpert is a product specialist for interface technology at Turck Germany in Mülheim

Webcode | **more20905e**

Regardless of whether point-to-point, point-to-bus or bus-to-bus – Turck is a one-stop shop for connectivity solutions

Wireless Transparency

Turck is expanding its portfolio for the physical layer with wireless components that offer new options for asset management

German sensor, fieldbus, interface, and connectivity specialist, Turck, is expanding its product portfolio for the physical layer by adding wireless transmission products. The wireless series that Turck is introducing at the 2009 Achema tradeshow supports a multitude of signals – from analog data to binary contacts and resistance measurements (temperature, humidity), to digital protocols via RS232 or RS485. Flexible connection architecture enables cost-effective use with simple and complex automation tasks.

Depending on the application, a customer has the choice between a point-to-point connection – a gateway with one node – or a network architecture in which one gateway can operate up to 99 nodes. To implement simple retroactive measurements or data transmissions, the point-to-point connection is the optimal solution, one that can transmit up to eight binary inputs and four binary outputs or four analog signals. More complex automation tasks can be performed in a network architecture through the wireless transmission of digital protocols via RS232 or RS485. In this way Turck provides the option of transmitting all data wirelessly to a remote I/O station.

Major automation potential

With the use of wireless technology, customers can fashion their supply chain management more effectively and reduce costs by avoiding extensive wiring. Frequently, machine operators request additional measured values, but these are often too expensive to record and transmit using classic wiring, such as in the case of lubricant monitoring in pumps. With IP67 rated gateways and nodes, such difficult and expensive-to-access machine areas can now be integrated into higher-level process control and asset management systems.

For example, feedback from valve settings offers a major automation advantages. Specifically for this application, Turck will soon be offering a combination of wireless communication and a dual sensor, which is able to detect the position of almost any drive in process automation. This will allow users to extrapolate additional measured values viably.

Quick read

The total costs of a process engineering system rise and fall with machine availability, process reliability, and the necessary transparency for this purpose. With gateways and nodes for wireless communication, Turck will soon make it possible to reliably transfer data in the physical layer without expensive cabling. Users have the choice between a simple point-to-point solution and network variants for more complex applications.

Using wireless data transmission, previously difficult-to-access machine areas can now be integrated into the asset management system

The wireless gateways can operate up to 99 node points

The wireless components authorized for Atex Zone 1 make it possible to diagnose and manage assets even in explosion-protected areas, such as temperature measurement in steam pipes, corrosion measurements or simple pressure, filling level or limit value measurements.

An additional benefit is that the components of the wireless family optimally use the generally available frequency bands. Thanks to the standardized transmission procedures TDMA (Time Division Multiple Access process) and FHSS (Frequency Hopping Spread Spectrum), data backup and reliability are no longer deal-breaker criteria for the use of wireless transmission technology in process automation.

Asset Management enabled

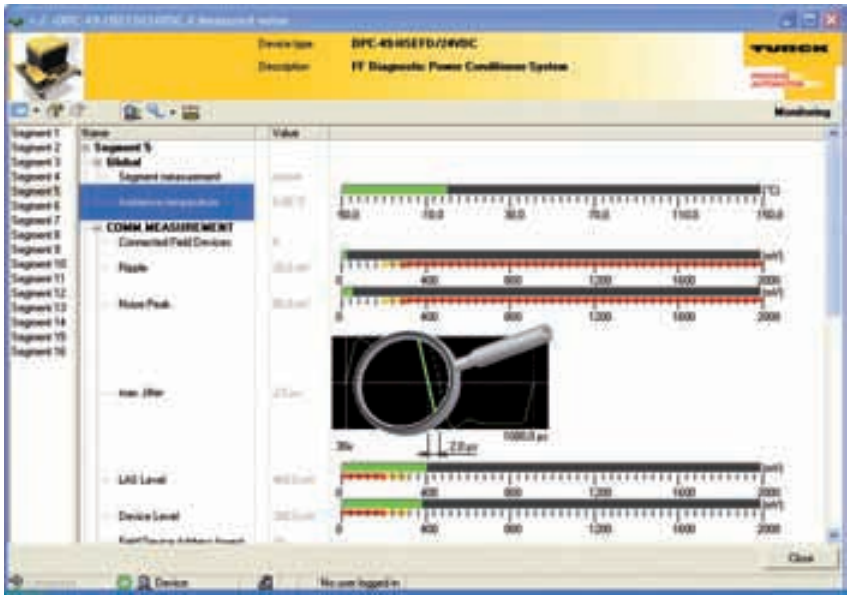
Universal asset management concepts – defined as the monitoring and management of assets used within a company – are increasingly attracting attention in process engineering and are more than just an overused catchword in the new economy.

In fact, assets have been playing a strategic role in process engineering and process automation. For many companies at locations with high operating costs, constant machine management is an important factor in being able to compete against companies based in low-wage countries. Ultimately, all processing costs will rise or fall in inverse proportion to machine capacity. In order to increase machine capacity and thereby reduce costs, operators need, in addition to reliable components for the physical layer, equally efficient management and diagnostic tools – so-called asset management systems.

The more comprehensively the system can query and manage the diagnostic information on the machines and components in use, the more efficient the system is. The fundamental principle: Based on standardized communications protocols, operators should be able to access information concerning the field devices used and components in the physical layers – meaning the interface between the field devices and the higher-level process control system – at any time and regardless of manufacturer or area of application.

Process reliability with FDT/DTM

The new wireless components from Turck also offer complete compatibility with the FDT/DTM concept, which, like the PC device manager, makes it possible to easily manage parameterizing and diagnostic data. The biggest advantage of FDT/DTM software: The user no longer has to deal with managing the diagnostic data or the incompatibility of different “drivers” (so-called DTMs). Instead, users can concentrate entirely on the content of the data obtained, and thereby the plant's status - based on a comprehensive visualization program (e. g. PACTware). ■



The FDT/DTM concept supported by numerous Turck products facilitates efficient asset management of the physical layer

“Standardization is the Name of the Game”

As editor-in-chief and publisher of the PROCESS magazine and its online portal, process.de, Gerd Kielburger is in constant dialog with manufacturers and users of wireless solutions. In this interview, the process specialist talks about the opportunities and risks of wireless communication.

Mr. Kielburger, a lot has been written and discussed on wireless communication in process automation. In the meantime, have noteworthy applications also been realized?

First of all, it must be said that wireless communication has made a major developmental advance in process automation in a relatively short period of time. The topic has arrived on the market and almost all equipment suppliers have, in the meantime, added wireless products to their portfolio. That is the positive message. On the other hand, the process industry is known to be more reserved when it comes to dealing with new technologies. In light of this, the acceptance of wireless communication in field devices is not yet as high as the marketing strategists with the equipment supply companies would like to see. We are moving right now in this field. But I am sure that acceptance will increase considerably with additional empirical values from the currently numerous pilot projects. Due to the diverse areas of application for this technology, users simply have to experience it for themselves. And most that do have come out of it with positive results.

What are considered the ideal application areas for wireless communication?

Wireless communication is still considered ideal for difficult-to-access areas out in the field, well known examples include tank farms, pipelines, or standalone pumps in water supply systems. Furthermore, there are numerous individual applications that deliver very positive results. Currently, however, no one is truly propagating massive use in existing chemical plants as a replacement for already existing cable connections.

What do you see as the limits of this technology?

If you really want to control machines via wireless systems, complex requirements must be met that are currently not yet solved. In this case, users want to know that communication works reliably even under difficult conditions and expect the corresponding statements from manufacturers. In my view, that is why the primary use is initially focused on monitoring and diagnosis tasks.

What opportunities, but also what risks, does wireless communication offer?

Opportunities for users exist wherever measuring points make sense and are necessary, but are difficult to reach, cannot be reached or can only be reached by disproportionately high expenses using cable connections. These include difficult to overcome obstacles between the measuring point and the area of need, as well as mobile or temporary applications. In this context, I would not talk about risks, rather about increased requirements. So, for the processing industry, topics like access protection, EMC compatibility, explosion protection, but also ruggedness are of absolute importance.

In your view, what homework do manufacturers still have to do?

Obviously, standardization and interoperability are essential factors concerning this topic. At the moment, users have to decide to opt for Wireless Hart or the SP 100.11a standard for their particular situation. This makes users nervous. I believe that manufacturers still have a bit of homework to do in terms of getting a handle on the real-time applications, as well as autonomous power supply in field devices. ■

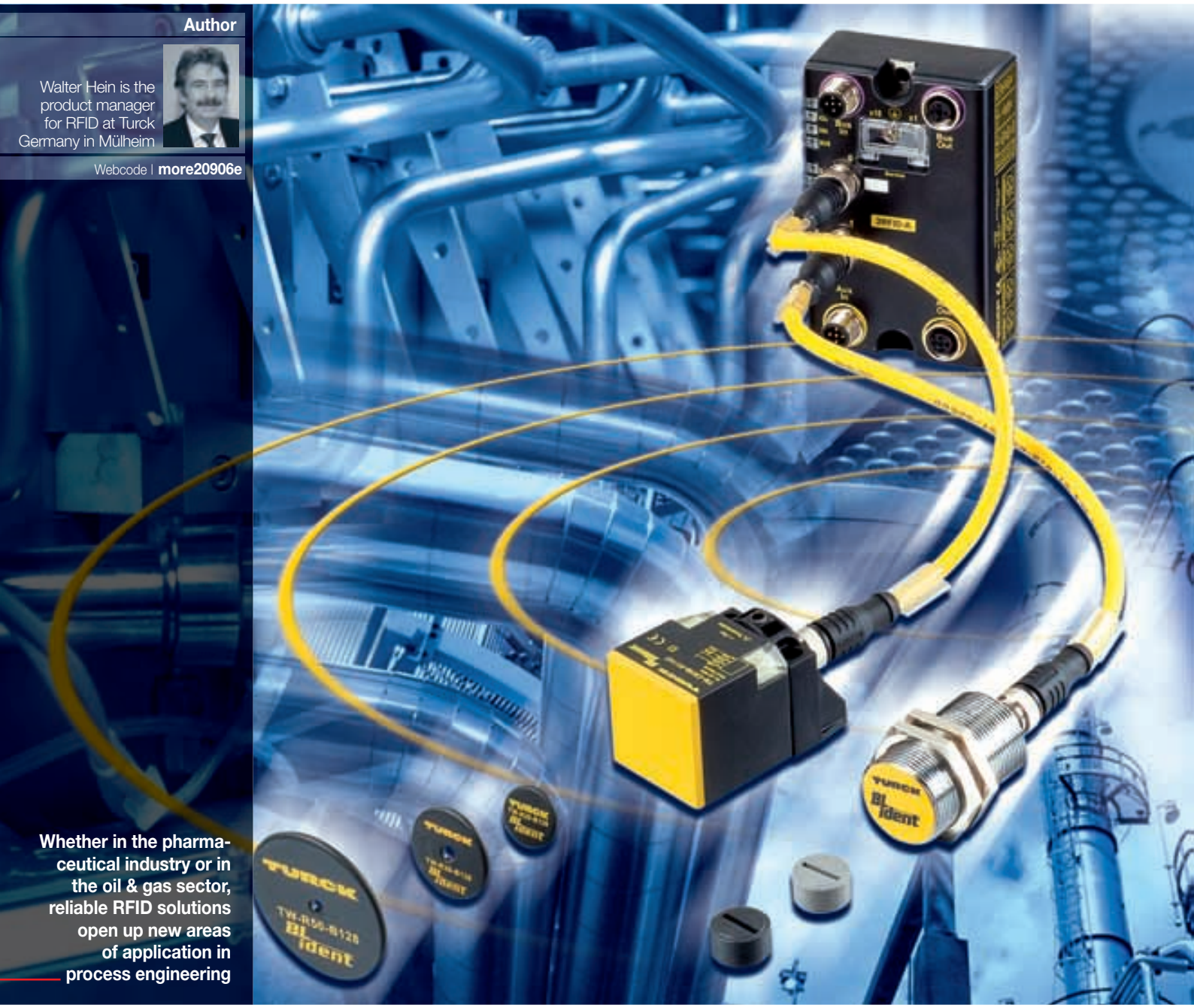
For 14 years, Gerd Kielburger has been managing PROCESS magazine and its associated online portal, process.de. After studying earth sciences, he began his career as an editor with the leading publication “WLB Wasser, Luft und Boden” in Mainz, Germany. Five years later, he switched over to the Vogel-Verlag in Würzburg, Germany, in order to build up the PROCESS brand, now operating in three languages (German, English and Chinese).

www.process.de

Author

Walter Hein is the product manager for RFID at Turck Germany in Mülheim

Webcode | **more20906e**



Whether in the pharmaceutical industry or in the oil & gas sector, reliable RFID solutions open up new areas of application in process engineering

RFID in Hazardous Areas

Radio frequency identification (RFID) opens up new options in process engineering – from intellectual property rights to preventive maintenance

While the automation and streamlining potential of RFID radio-based identification technology has long been used in factory automation, their use in process automation is still not a standard. Up until now, extreme environmental conditions, such as high temperatures, pressures, and explosion-risk atmospheres have been insurmountable obstacles, yet more and more, powerful and robust tags and read/write heads are opening up new areas of application. When it comes to intellectual property rights, production monitoring and condition monitoring, RFID offers major advantages compared to the optical identification methods, such as barcodes – and the use of this technology spans many industries, including applications in the oil & gas, chemical and the pharmaceutical and food industries.

Quick read

Thanks to temperature-insensitive tags for Zone 1, mobile reading devices and Zone 2 Remote I/Os, RFID technology can now also be used in process automation. The radio-based identification opens up many new opportunities ranging from the monitoring of coupling stations, the labeling of installation components, and the maintenance of drill piping or pipelines.

Impervious technology

Unlike conventional auto ID methods, such as barcodes or the data matrix code, the transmission of information using electromagnetic radio waves is generally less sensitive to environmental influences. While printed labels attached externally to the product become unusable by the time they are exposed to high temperatures or moisture, special RFID tags and mobile reading devices make it possible to use RFID systems even under the toughest conditions, for example, in the autoclaves of the food industry or on the drill pipes and pipelines in the oil & gas industry.

RFID solutions adapted to meet the customer's application, such as the Turck BL ident high-temperature system, offer the user additional benefits above and beyond identifying individual products, batches or machine parts. BL ident permits read/write heads to be operated simultaneously and without interruption in HF and far-ranging UHF frequency bands – using the same interface modules. The higher frequency UHF band (865 to 868 MHz) permits ranges of up to three meters. Because BL ident can also handle “group detection”, numerous tags can be detected without experiencing air interference. This feature makes RFID technology applicable in warehousing logistics, as well as for intellectual property rights in the pharmaceutical industry.

Intellectual property rights using RFID

The issue of consumer protection is more relevant than ever. According to estimates from the World Health Organization, every tenth medication sold worldwide is counterfeit. Due to the dramatic increase in product piracy in the past few years, both the American Food and Drug Administration (FDA), as well as the EU Commission, require continuous monitoring of the manufacturing and distribution chains of medications and foodstuffs.

RFID tags mounted visibly or invisibly on the packaging materials with unique tamper-proof and forgery-proof identification numbers, allow manufacturers and consumers in hospitals or pharmacies to track the medications along the entire distribution channel and to verify their authenticity. The kicker: The new UHF technology from Turck can easily be used with existing HF systems.

UHF tags are also less expensive compared to HF tags, which makes them better for applications with high volumes. The additional benefit of contact-free and “on the fly” reading is reduced defects and delays in incoming and outgoing goods, which ultimately reduces costs.

RFID solutions in process engineering are used for more than simply guaranteeing product reliability. Robust and powerful systems are also ideal for use in the main field of process reliability. In close cooperation with users in numerous fields of process engineering, Turck can develop individualized identification solutions for demanding applications. For example, Turck has worked out a solution, that facilitates ongoing asset monitoring and records the changing external parameters, such as environmental temperature or correct machine settings. This is done through the integration of RFID sensors and wireless transmission technology.

Based on the reliable BL20 fieldbus stations, Turck will be introducing a complete RFID system for use in hazardous areas at the Achema Congress

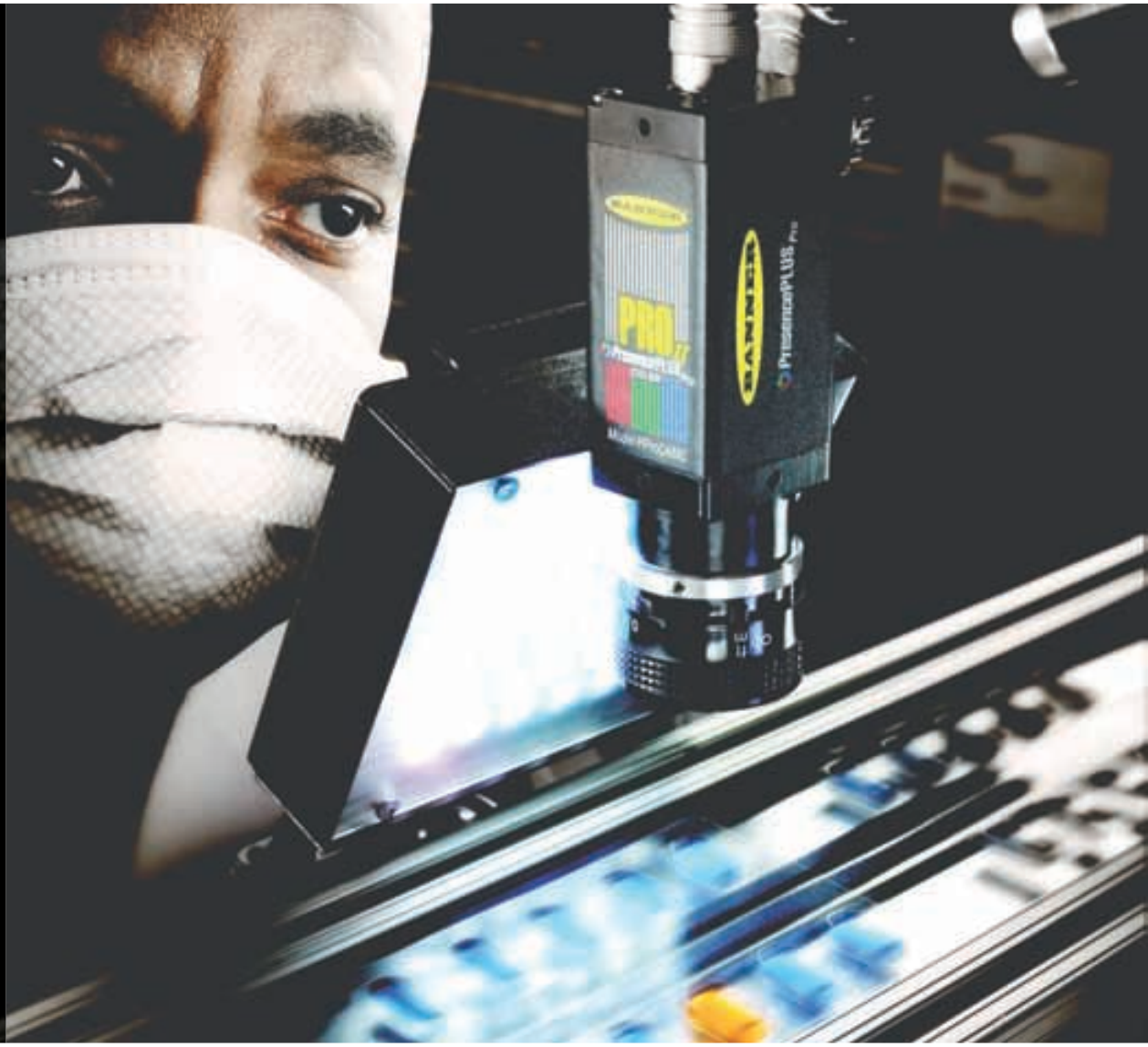
Tags for Zone 1

At the Achema trade show on Chemical Engineering, Environmental Protection and Biotechnology, Turck will introduce a complete RFID system for explosion-risk areas – among them the first intrinsically safe tags that open up numerous new application areas including use in Zone 1 – from coupling monitoring at coupling stations, to the continuous identification of proprietary installation components and including preventive maintenance of drill pipes or pipelines. ■

Author

Markus Bregulla is the product manager photoelectric and ultrasonic sensors at Turck Germany in Mülheim

Webcode | **more20907e**



The Presence Plus Pro camera system with separate evaluation unit is ideal for demanding applications in which the lowest deviations in color or form have to be controlled reliably

Visionary

New vision sensor from Turck's optic partner Banner combines camera system performance with simple sensor operation

From localization to detecting bar or data matrix codes and optical character detection, powerful image processing systems support numerous processes in production and logistics. Based on the complex interplay between optical/electronic components and the respective application environment, the use of high quality hardware is frequently associated with high initial cost and effort. Without programming skills or proprietary computer software, it is not usually possible to install or parameterize the image processing systems. Banner's vision products eliminate this problem.

Quick read

Easy to operate with the highest functionality: With the Banner Vision systems, users can individually implement certain image processing systems based on the requirements of their application without much cost and effort. The newest highlight is the iVu series that Turck introduced at the Hanover trade show. As a Vision sensor with integrated touchscreen, iVu can be configured without a computer.

Flexible complete package

With the Banner camera series Presence Plus, Turck has added to its product portfolio a flexible image processing system for demanding vision applications. Regardless of whether high resolutions are requested, particularly fast inspection speeds or the distinction between color features – the various

designs in the P4 series that can be installed horizontally and vertically (Omni, Geo, Area, Edge and BCR) are suitable for a multitude of different detection tasks. Using a pre-configured graphic user interface, users can easily set up the inspection parameters with a simple mouse click. All you have to do is focus the camera, highlight the object to be recorded and select the inspection features and tolerances – and done.

The image processing system Presence Plus Pro combines the application options of the P4 series with functions for pattern detection and counting, as well as flexible input and output configurations. The compact Vision solution, available as an option for the IP68 protection class with separate evaluation units, is ideal for demanding applications in which the lowest deviations in color or shape have to be controlled reliably and disruption-free.

Different software position, image processing and analysis tools make the Presence Plus Pro an affordable and, nevertheless, highly functional solution. With its help, users can verify, for example, whether color coded fuses of certain ampere strengths were correctly installed in the fuse boxes or whether foam upholstery and plastic screws were snugly fit into the fixtures paneling.

Parameterizing per touchscreen

With the world's first Vision sensor with integrated touchscreen, Turck has demonstrated that the use of powerful image processing solution does not necessarily have to be associated with great effort or expense. The “iVu” is simple like a sensor and powerful like a camera system. The iVu series combines the benefits of both detection technologies in one compact housing that is easy to install.

The Vision sensors consist of one camera with CMOS image processor (resolution: 752 x 480), a 2.7" LC display, as well as an 8-pin M12x1 connection for the switching output and the USB connection for uploading and downloading machine settings or updated software. Different lenses ranging from 8 to 25 mm are available, as well as different lighting systems (red, blue, green, or red) and color filters. Due to its compact structure and intuitive operation via the touchscreen, even inexperienced first-time users can install and learn to use the Vision sensor quickly. Using the menu-driven parameterizing software, all sensor functions and camera settings can be configured directly on site without the user having to rely on the computer.

Thanks to this flexibility, the Vision sensor is perfectly suited for a multitude of different detection tasks that once required time-consuming parameterizing via computer software – from code detection in the pharmaceutical industry, label inspection and content checks in the chemical industry, to checking weld nuts in the automobile sector.

Despite this high functionality, the Smart Vision system, which Turck and Banner introduced at the Hanover trade show, is considerably more appealing in terms of price than other image processing solutions, not only as far as acquisition costs go, but also due to the free software and firmware updates and also the operating costs. This means that the iVu series closes the gap between sensor-based detection solutions and powerful image processing systems.

The new Vision sensor is delivered with lighting (IR, red, blue, or green) as a standard feature, but is also available without

Summary

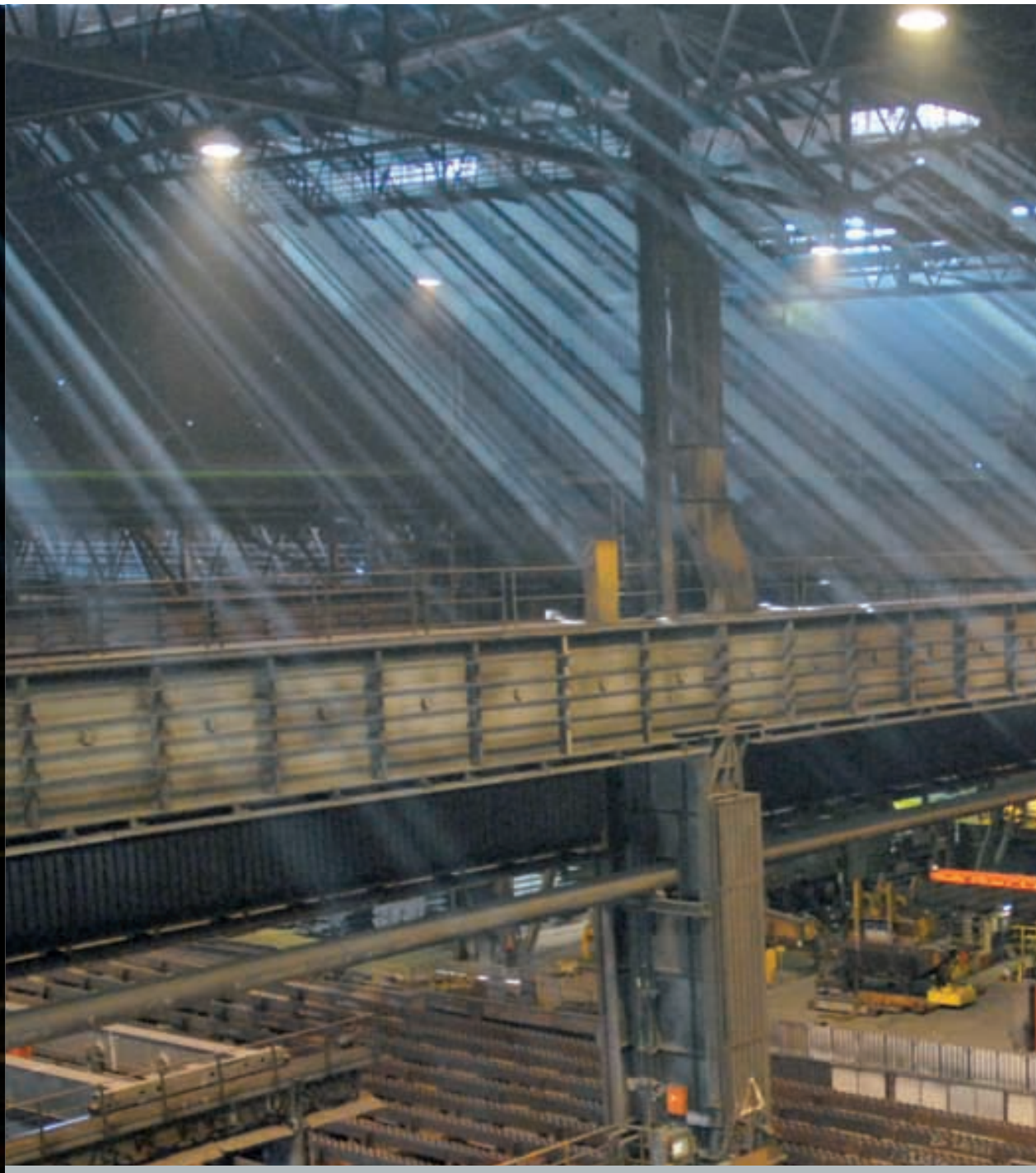
Thanks to the iVu, Turck has closed the gap between Vision cameras and opto sensors. The Vision sensor product group that emerged in this way combines the performance capacity of the camera systems with the simple handling of sensors. It takes just a few minutes for even inexperienced users to install and learn to use the iVu Vision sensor so that numerous applications can be implemented – from the label and warehouse inspection to the batch code inspection and lock detection. ■

Install – learn – detect: The new iVu is as easy to operate as a sensor

Author

Matthias Schick is a sales specialist at Turck Germany in Mülheim

Webcode | **more20950e**



HKM (Hüttenwerke Krupp Mannesmann) produces preliminary products used in steel production in Duisburg, Germany – so-called slabs or billets (round steel bars)

Sensitive Weightlifters

BL ident RFID system guarantees precise crane movement down to the centimeter at Hüttenwerk Krupp Mannesmann

It is hot at the iron and steel works company Hüttenwerke Krupp Mannesmann GmbH (HKM) in Duisburg, Germany. As one of the leading steel manufacturers in Europe, the company delivers preliminary products used in steel processing, so-called slabs or billets (round steel bars), to its partners, such as Thyssen Krupp Steel AG. In order to manufacture these products, melted metal must be transported, mixed, and processed. The raw materials required for steel production are transported in tough steel tubs, called pig iron ladles, through the huge warehouse and production halls. Depending on the ladle, between 90 and 425 tons have to be moved in the process – a task that can only be performed by a giant crane.

Overall, HKM has about 50 giant cranes in use, ten of which are used for the transport of liquid materials high above the hall floors. If something goes wrong, under the rough and dusty conditions on the steel formation, the best case scenario results in a lot of lost time; in the worst case scenario, it is damaged caused by the hot liquid material or the bulky raw iron ladles and the related costs.

Quick read

At the HKM steel and iron works in Duisburg, Germany, if the liquid raw material does not flow where it is supposed to, the resulting damage is very serious. In order to avoid this scenario, HKM verifies the position determination of a transport crane using the RFID system from Turck.

An RFID read-write head mounted near a crane rotor disk records the signals from the tag mounted on the rail

"Even if we do not completely take advantage of the comfort of the BL ident system, this solution is unbeatable for our control purposes."

Wilhelm Leurs, Hüttenwerke Krupp Mannesmann

Calibrating using RFID

Because of the high temperatures, the steel producers at HKM have therefore relied on the high temperature solutions from Turck. With the BL ident RFID system and special sensors with an expanded temperature range up to 100 °C, the hot ladles can be transported within the production halls precisely to the centimeter and tracked so that expensive errors during transport or when filling with raw material can be avoided. "According to the motto, "install and forget", the Turck products were easy to install, integrated wonderfully into the existing S7 controller and have been operating error-free so far," says Wilhelm Leurs, technician in the crane maintenance department at HKM.

Turck's BL ident RFID solution meets an important control function on the BS6L crane, which transports the emptied ladles to the filling area where they are cleaned and then reheated, if required, in order to be able to hold liquid raw material again. About 16 meters above the floor, sitting in a small cockpit, the crane operator controls the machine with the help of the monitor. There are no longer any positioners on the ground; the crane's movements and positions are visualized and displayed on the monitor. Visualization helps the crane operator position the crane when picking up and setting down loads, which requires a high level of precision from the system.

Rotary position transducer prone to slack

In order to move the crane in a controlled manner over the approximately 400 meter-long distance between the pick-up and filling location, a rotary position transducer is installed on a rotor disk which records the movements of the crane and forwards them to the main control unit. This approach is not without its problems, because the travel sensors detect the position of the crane only from the actual rotation of its huge rotor disks. And because the steel wheels of the crane run on steel rails, a certain

Reference points: The RFID tags are mounted on specified positions of the crane's travel path

The signals are transmitted from the read-write heads to the control unit via the Turck I/O system BL67

amount of slack cannot be ruled out. This results in an inaccuracy that the travel sensors cannot compensate for.

The “missing” centimeters can lead to serious errors at the pick-up and drop-off areas at the latest, but makes it impossible for the crane operator to accurately pick up or set down the ladles. This is where the BL ident RFID system comes into play: A Q80 read-write head is mounted near a crane rotor disk and records the signals of the transponder mounted at specific points on the rails, thus allowing millimeter-precise location coordination with the travel sensors in the main control unit – regardless of slack. Using the known positions of the tag, the control unit can calibrate the signal of the rotary position transducer and therefore reliably prevent any influence on possible slack. The tags are especially designed for use in high temperature environments up to 210 °C.

HKM has selected a control system with low installation and maintenance costs that always checks the signals of the travel sensor and, if necessary, can update them in the control unit. The BL ident system from Turck not only prevents serious accidents, but also makes efficient supply chain management possible. “In the spirit of complete material monitoring, it is important for us to know precisely where the crane puts its load down so that we can determine where each of the individually numbered ladles are located,” says Leurs.

The system works so reliably that the HKM is planning on equipping all of its giant cranes that are used to transport raw and end products with the BL ident solution from Turck. This amounts to 30 giant cranes that guarantee the reliable transport of material in the company's steel production halls in Duisburg, Germany. “Even if we do not completely take advantage of the comfort of the BL ident system, this solution is unbeatable for our control purposes,” summarizes Leurs.

Sensors instead of positioners

In addition to the RFID solution, Turck's inductive sensors have also proven reliable for use in this tough iron and steel works environment. Two special sensors that meet the IP68 protection class are mounted on each of the massive lifting hooks, which the crane uses to lift and transport the foundry ladles, weighing several tons. These sensors record whether the lifting bolts on the foundry ladles lie exactly and safely in the laminated hooks. Here, too, from his cockpit 18 meters above the floor, the crane operator has difficulty detecting whether the ladle is correctly placed on the hook. The use of two sensors placed at a 90° angle guarantees that the bolts are reliably placed across the entire surface of the laminated hooks.

For Leurs, the heat, shock, and vibration-resistant S 100 sensors from the BI15-K series turned out to be essential and reliable control tools. “We have never had problems with the Turck sensors and will therefore equip all cranes that transport liquid raw materials with these sensors,” adds Leurs. Especially due to their high measured switching distances of up to 15 millimeters, the Turck special sensors are suitable for use under the tough conditions in steel production where slag and fine metal dust get into the robust machines and can hinder or distort sensor readings. ■

Clever safety solution: Four Turck sensors in the laminated hooks ensure that the lifting bolts of the foundry ladles were precisely placed

Author

Qiang Lin is a RFID specialist at Turck China in Tianjin

Webcode | **more20951e**

Truck's BL ident RFID system ensures the right transparency in the high bay warehouse at the Baisha Group

Seeing through the Smoke

BL ident improves warehouse management in Chinese cigarette factories

No other country in the world produces more blue smoke than China. With a consumption rate of 1.5 billion cigarettes per year, the Chinese make up about 30 percent of the world's cigarette consumption. Although foreign tobacco companies are represented in China, the national cigarette brands still have the largest market share. Among the most famous brands is Baisha, which, among Chinese smokers, is comparable to Marlboro in Western countries.

For the company's plan to modernize their warehouse management system and to restructure their supply chain management to make it more efficient, the Baisha Group placed its trust in the automation know-how of China Post Science and Technology Co., Ltd. (CPST). The company, headquartered in Beijing, employs more than 400 people in research, consulting, and system integration.

Its scope of services includes the planning and integration of logistics and distribution systems, as well as the implementation of higher-level information and control systems. In the past few years, CPST's research and development center has also supported the Chinese government in modernizing the postal services country-wide and, in this context, completed more than 800 individual projects for RFID applications, including high-speed sorting systems and horizontal conveyor belts.

Challenge of diversity

The diversity of the products used in cigarette production quickly turned into a major automation challenge. This is because in a large tobacco factory, like

Simple assembly: Most read-write heads are available in the standard sensor configuration

Turck total package: BL20 remote I/O system (l.), engine starter (m.) and BL ident Profibus Gateway (r.)

the Baisha plant in the province of Hebei, numerous cigarette brands are produced and the multiple components of the various end products have to be constantly stored in large amounts. These include different tobacco types, cuttings, aromas and other additives, in addition to the different packaging.

In 2007, in order to structure the intralogistics of the tobacco factories more efficiently, CPST introduced the BL ident RFID solution from Turck into its numerous production facilities - besides the Baisha Group, other firms such as Jinan General Tobacco Company and Shandong Qingzhou Tobacco Company used CPST's consulting services.

The RFID technology offers plant operators many benefits in supply chain management, regardless of the respective warehouse equipment. In contrast to the previously used barcode, which enables the commodity group (e.g. tobacco container) to be identified based exclusively on a serial number, the RFID tags with a memory capacity of up to 2 kByte (FRAM) can also record relevant information such as batch, receipt date or the most recently performed processing steps.

"No programming effort"

The BL ident system, which is sold in China by the company's subsidiary Turck (Tianjin) Sensor Co. Ltd., has proven itself not only in terms of uniform information management, but also as a manageable and comprehensive solution. The modular configuration of the RFID system convinced CPST employees and warehouse operators very quickly: "The Turck products were very easy to implement," says Cunyu Li, responsible at CPST for electrical installations. "Connecting it to the controller was very easy and there was practically no additional programming effort. I would not have thought so beforehand."

In order to modernize and make warehousing and intralogistics more efficient at the Baisha Group, the CPST project manager opted for Turck's Q80 read-write heads and the reliable BL67 remote I/O system. Mounted directly adjacent to the transport belts, the Q80 read-write heads detect the tags attached to the transport containers of the incoming and outgoing warehouse goods. The read-in data is subsequently forwarded from the gateways of the I/O nodes via Profibus to the higher-level warehouse management system

Optimized to the application

For system integrators and users, the Turck complete solution offers numerous advantages: The flat tags can be easily attached to metal, the combination of suitable tags and read-write heads permits application-optimized ranges from the read-write head to the interface module, the robust components are uncomplicated to install on-site.

Moreover, the BL ident system makes future expansions in supply chain management possible. The system supports many fieldbus protocols – from Profibus-DP to DeviceNet and even Ethernet/IP – as well as numerous signal forms, such as digital and analog I/O modules, RS232/422/485 interface modules and high-speed counter modules. BL ident allows warehouse operators to also fall back on existing remote I/O structures in case of future automation plans – and thereby avoid additional implementation and warehousing costs ■

Quick read

As an external system integrator, China Post Science and Technology Co., Ltd. (CPST) creates strategies for increasing efficiency for numerous Chinese companies. In order to improve warehouse management at national cigarette factories, the specialists have been using the BL ident RFID solution from Turck.

"Connecting it to the controller was very easy and there was practically no additional programming effort.
I would not have thought that beforehand."
Cunyu Li,
China Post Science and Technology Co, Ltd.

Author

Deyou Yang is a product manager at Turck China in Tianjin

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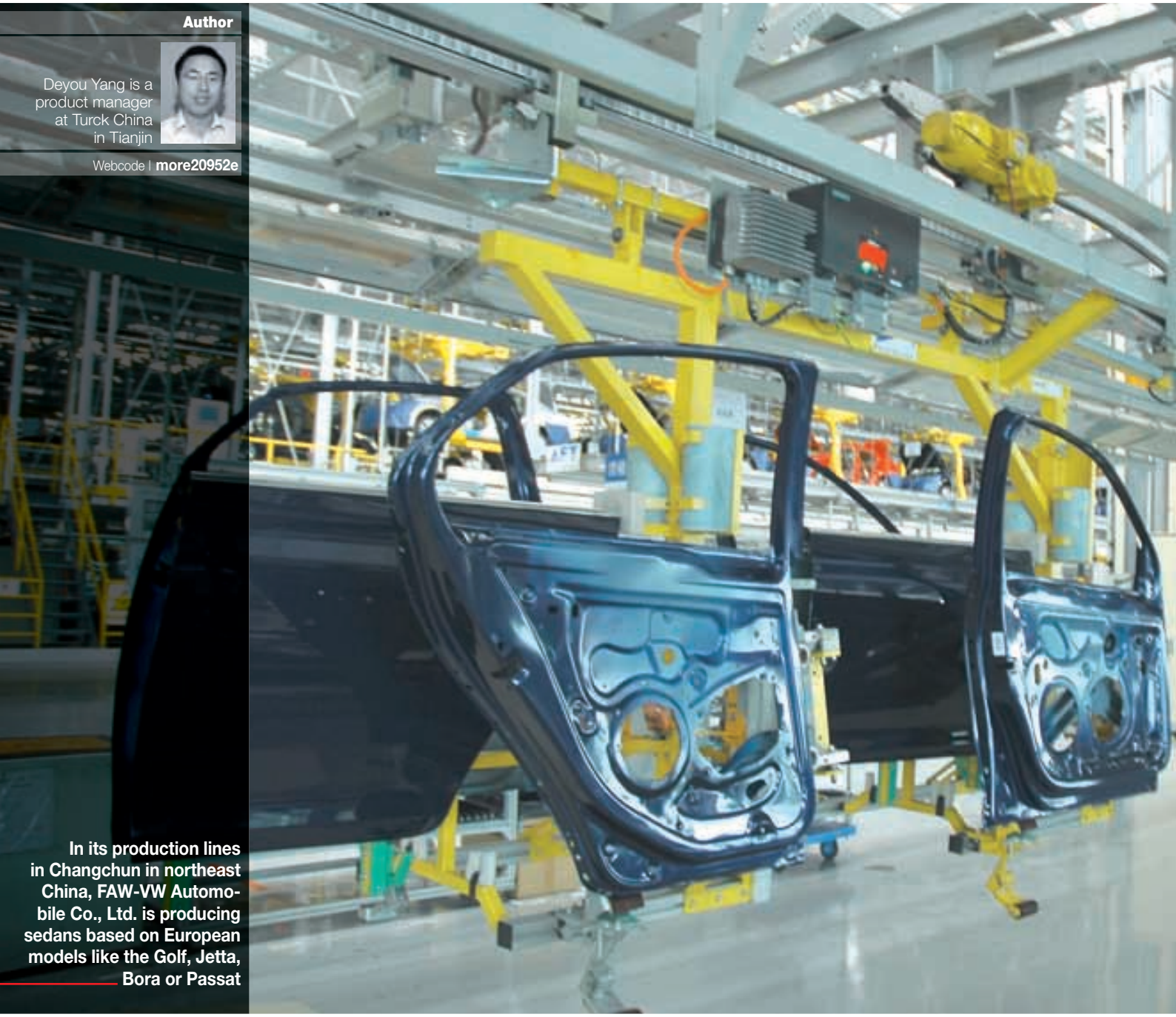

In its production lines in Changchun in northeast China, FAW-VW Automobile Co., Ltd. is producing sedans based on European models like the Golf, Jetta, Bora or Passat

To the Point

FAW Volkswagen relies on uprox+ sensors for reliable and precise welding and assembly processes at its automobile production lines in China

Steel body or aluminum frame? Magnesium interior or plastic interior? Wood trim or carbon accents? The selection of the materials used in automobile manufacturing is as great today as the expectations of the automobile purchasers. In the end, the car has become much more than a simple mode of transportation for most customers – it has become a status symbol that should be equally high-quality as well as individual.

In order to be able to meet the growing expectations of customers and simultaneously ensure efficient production, the automobile production lines have to be constantly modified, remodeled or expanded. New materials, improved production pro-

Quick read

Exclusive, high quality, and individual - with the increasing demands of the purchasers, the demands placed on automated production lines of vehicle manufactures have also risen. New materials, production technologies, and levels of automation require automation solutions to be constantly updated. For welding and assembly processes in its Chinese production plants, FAW-VW found a versatile and reliable solution in the uprox+ sensors from Turck.

Ltd. – relies on sensor technology from Turck. In its production lines in Changchun in northeast China, FAW-VW is producing sedans based on European models like the Golf, Jetta, Bora or Passat. Founded in 1991, FAW-VW has become one of the major Chinese automobile manufacturers with a plant value of approximately 3 billion Euro and a production capacity of 1,000 manufactured cars per day, as well as additional capacities for vehicle and parts export.

High demands placed on sensors

During the course of such breathtakingly rapid development in the Chinese automobile industry, customer demands have risen with regard to quality, functionality and efficiency. This has led FAW-VW – like all automobile manufacturers in the end – to use new materials and technologies in order to facilitate the flexible production of different vehicle types and models at one location. Equally high were the automobile manufacturer's requirements with regard to the sensor technology used. In order to be able to detect workpiece positions in the various stages of automated production, such as stamping, painting, welding and final assembly, the sensors have to be robust, versatile, and cost-efficient – requirements that the Factor 1 sensors from the uprox+ product line fully meet.

cesses, and expanded automation potential are also putting higher demands on the automation solutions already in use. Due to the diversity of the materials used, the production steps performed, and the machines used, in the end the efficiency of a production line stands and falls with the plant capacity and thereby with the flexibility and reliability of the automation components used.

That is why, in order to ensure the efficient production of high quality automobiles like VW's new Sagitar or the Magotan vehicle lines, FAW-VW Automobile Co., Ltd. – a joint venture between the Chinese government-owned First Automotive Works, Germany's Volkswagen AG, Audi AG and Volkswagen Automobile (China) Investment Co.,

One for all: Turck's ferrite-coreless uprox+ sensors have the same high switching distance on all metals

Even welding processes have nothing on the uprox+ sensors mounted on the robot arms

Factor 1 on all metals

Thanks to multi-spule technology, the sensors designed to meet the IP68 protection class detect all metals without a reduction factor – regardless of whether it is iron, stainless steel, copper, aluminum or brass. Not only that, in comparison to conventional ferrite core sensors, uprox+ made it possible for FAW-VW to detect all metals used in the production lines with considerably higher switching distances up to 50 mm (FAW-VW uses the Ni50U-CK40 series) – thus offering high degrees of freedom for installation and area of application. A further advantage of the Factor 1 sensors that are sold by Turck (Tianjin) Sensor Co., Ltd. (TTS) in China is the fact that with the few sensor types that are suitable for many applications within the production line, the automobile manufacturer was able to set up simple and cost-efficient warehousing.

One of the hardest areas of application in the FAW-VW plants is welding assembly. In the overall production line, the individual parts of the various sedan models run through up to 5,000 spot welding steps. For monitoring the automated motion sequences, FAW-VW relies on the sensors from Turck's MT series. Mounted on the robot arms, the special sensors coated with teflon continuously check the position of the robotics in relation to the workpieces. In welding assembly, not only high switching distances are required in order to be able to detect the position of the workpieces early on and, if necessary, correct them, but also excellent shielding against external environmental conditions. Because uprox+ sensors do not contain ferrite core, they are equally insensitive to strong magnetic fields, like those that develop during the welding process, as they are to flying sparks or mechanical wear.

Installation at any angle

For recording the position on cross-bars in final assembly and in the paint shops, FAW-VW relies on uprox+ sensors from the QV40 series, which can reliably detect the presence or absence of metals up to a distance of 50 mm. However, the square-shaped sensors that are simple and uncomplicated to install via a mounting clamp perform their services reliably not only with regard to determining the position on the cross-bars, but they can also be used literally in any angle of the production line.

Because their active surface can be positioned in five different directions manually without tools, the QV40 sensors can be comfortably and quickly adapted to the respective applications and environmental conditions. Like the MT series, the QV40 sensors allowed production engineers at FAW-VW to cover detection applications in the entire production line using a low number of product types. ■

▸ The user

The FAW-VW Automobile Co., Ltd. is a joint venture of the Chinese government-owned First Automotive Works, the German company Volkswagen AG, Audi AG, and Volkswagen Automobile (China) Investment Co., Ltd. Based on European models such as the Golf, Jetta, Bora or Passat, FAW-VW has been producing sedans and vehicle parts for the Asian market since 1991 – more than 1,000 vehicles per day.

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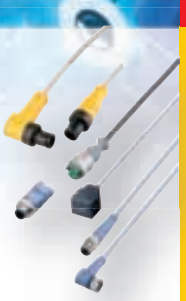

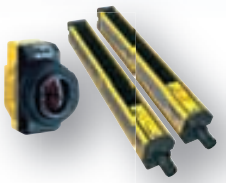

PHOTOELECTRIC

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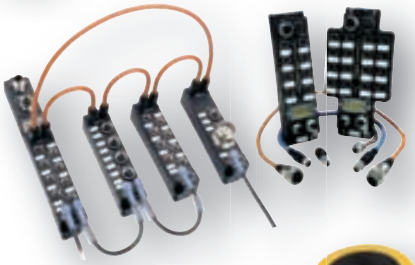
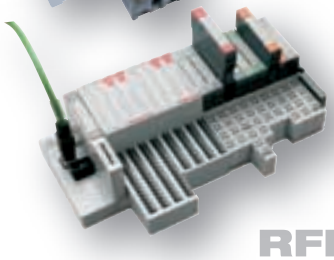


IP67



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Author

Marc DiSera is the product marketing manager in the network and interface division at Turck USA in Minneapolis

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Compared to field propagation, strictly controlled propagation conditions drastically reduce growth down to only 50 days

Minitubers at a Glance

Quantum Tubers monitors the atmospheric conditions in potato propagation using the BL67 Remote I/O from Turck

From a stem-cutting to a harvestable minituber for potato production in a maximum of 50 days – the method developed by Quantum Tubers Corporation in Wisconsin, USA, makes the propagation of minitubers possible. The automated system for growing minitubers – developed in cooperation with NASA and the University of Wisconsin – makes it possible to grow minitubers with considerably shorter propagation times and thereby also lower production costs. Compared to field propagation, this new method is not only considerably faster; the bio-manufacturing method geared toward commercial production grows pathogen-free, divisible minitubers which can serve as a year-round seed source for potato production in the right location. The use of minitubers in potato production is not new, however the previous procedure was either very expensive and not suitable for the large demand in industrial production.

Quick read

In cooperation with NASA and the University of Wisconsin, Quantum Tubers has developed a new bio manufacturing technology for producing minitubers. So that minitubers can grow quickly and be used in the harvest, the atmospheric conditions must be monitored reliably in the greenhouse facilities. In this process, Turck's BL67 fieldbus station with IP67 protection class ensures I/O communication.

Nine harvests per year

In contrast to field propagation, the sterile stem cuttings are cultured in controlled atmospheric conditions. Because the minitubers, depending on the type, can be harvested after just 40 to 50 days, up to nine harvests per year are possible.

The benefits of propagation under controlled conditions are obvious. Instead of spending years producing seed potatoes under field conditions, which can be increasingly susceptible to degradation and pathogens – due to tubers being repeatedly recycled for seed – new potatoes can be produced

for commercial production with the help of different minitubers within just two years.

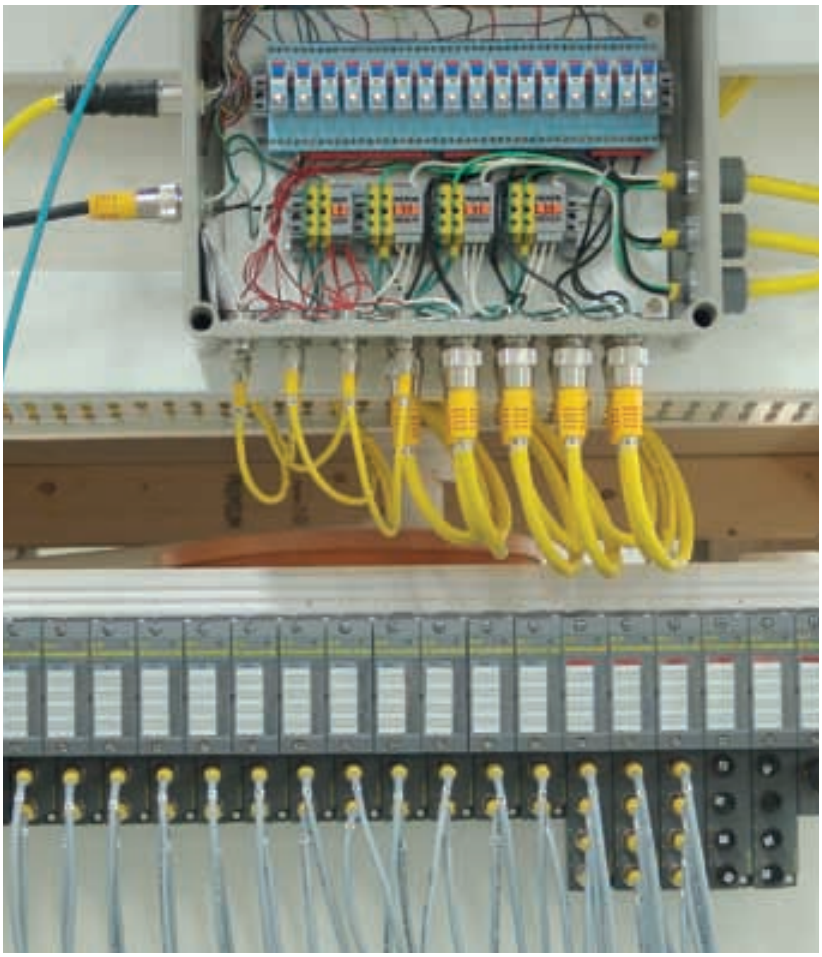
Propagation time reduced

However, the shortened propagation times of the minitubers require optimal growth conditions – factors such as humidity, light, temperature, and CO2 content must be monitored continuously and failure-free. After the originally used flow sensors and isolation switches had proven too imprecise for this task and prone to failure, the plant production specialists in Wisconsin finally began using sensor, fieldbus, and connection components from Turck.

In the largest automation market in the world, sensor market leader Turck works closely with external sales representatives who are always located near customers. One of those is Lawrence Jacob, Senior Sales Engineer at MTECH Wisconsin Inc. Jacob was able to convince Quantum Tubers of the flexibility and reliability of the Turck solutions. That is how a control system was developed that is exactly tailored to the requirements of the proprietary bio-manufacturing system. “Turck has been helpful in making sure we have the right components for our system, and has been there to help us iron out all problems,” says Bob Britt, President and CEO of Quantum Tubers. “Working with Turck saved us at least a year of development time.”

The heart of the control system is the modular BL67 remote I/O system. Made up of a gateway for fieldbus communication and easy-to-integrate I/O modules, the robust and flexible fieldbus station made it possible to record all measuring signals directly in the field and forward to the higher-level controller, as well as transmitting the controller's signals to the actuators in the opposite direction. A total of twelve analog input modules (AI) register the normalized electrical standard measuring signals for humidity, temperature, light and CO2 content via the basis module connections. They then digitalize these signals and transmit them to the gateway via the internal module bus – regardless of the higher-level fieldbus protocol. Added to the remote I/O solution are four digital output modules (DO) through which the magnet valves for CO2 content, humidity, and the fluid supply line to the spray nozzle system are controlled.

Turck's FCMI flow meter guarantees that the plants will be supplied with water and nutrients



Flexible and reliable: The BL67 remote I/O system forwards measurement and control signals directly in the field

Individual solution

With 4- and 16-channel output modules that are connected via a standard M12x1 plug-in connector with a switch box designed especially for Quantum Tubers, the BL67 station further enables decentralized control of the light banks, circulating fans and the cooling circuit. Besides standard C10 relays, there are also special C10-A15X lighting ballast relays from Releco in use that not even short-term current peaks of up to 125 Amps can harm. “Before using Turck products, we had a series of breakers in a panel chocked full of electrical equipment, and electrical fires were not uncommon because of proximity to wet conditions,” describes Britt.

In addition to the flexibility of the modular fieldbus station, the robust IP67 design as well as the quick connection concept for Ethernet, supply and field cabling were decisive factors for the selection of the Turck components. “Implementing this system saved us six months of hands on time putting the system into a big box,” explains the Quantum Tubers CEO. “The best part about the system is that it can easily be put into the hands of a third party for installation, and they will be able to implement it quite easily.” ■

“Working with Turck saved us at least a year of development time.”
Bob Britt, Quantum Tubers

Cranes with Brains

BL67 remote I/Os work reliably in huge gantry cranes from ABB – the modular fieldbus system withstands even the highest physical stresses

In operation, they make containers weighing thousands of tons appear to levitate. The meter high rectangular blocks seem to glide effortlessly from their storage locations to awaiting freight trains or goods carriages. Facades the height of houses are built only a few meters apart out of stacked freight containers awaiting further shipment. Automated rail-mounted gantry cranes (ARMG) or double rail-mounted gantry cranes are regarded as the workhorses among the industrial "weightlifters".

Gantry cranes move millions of tons of freight around the world daily. Behind this enormous transport effort is hidden a considerable amount of high-tech. Gantries with track widths of over 40 meters run virtually always automatically and can weigh between 200 and 350 tons. They can raise freight containers to lofty heights of over 20 meters. In conjunction with automatic transport systems, gantry cranes achieve a genuine tour de force in terms of freight logistics. Sophisticated automation and accessory systems ensure smooth goods handling in all major seaports.

ABB Crane Systems is one of the leading suppliers of gantry crane technology. As part of a major project, ABB is currently supplying automation systems and electrical equipment for more than 100 ship-to-shore cranes intended to increase productivity in numerous Asian ports. Function tests and final assembly are carried out at the Shanghai Zhenhua Port Machinery Company (ZPMC) in China, the largest crane manufacturer in the world. By the end

Author

Ulf Löfqvist is an applications specialist at Turck Sweden in Gothenburg

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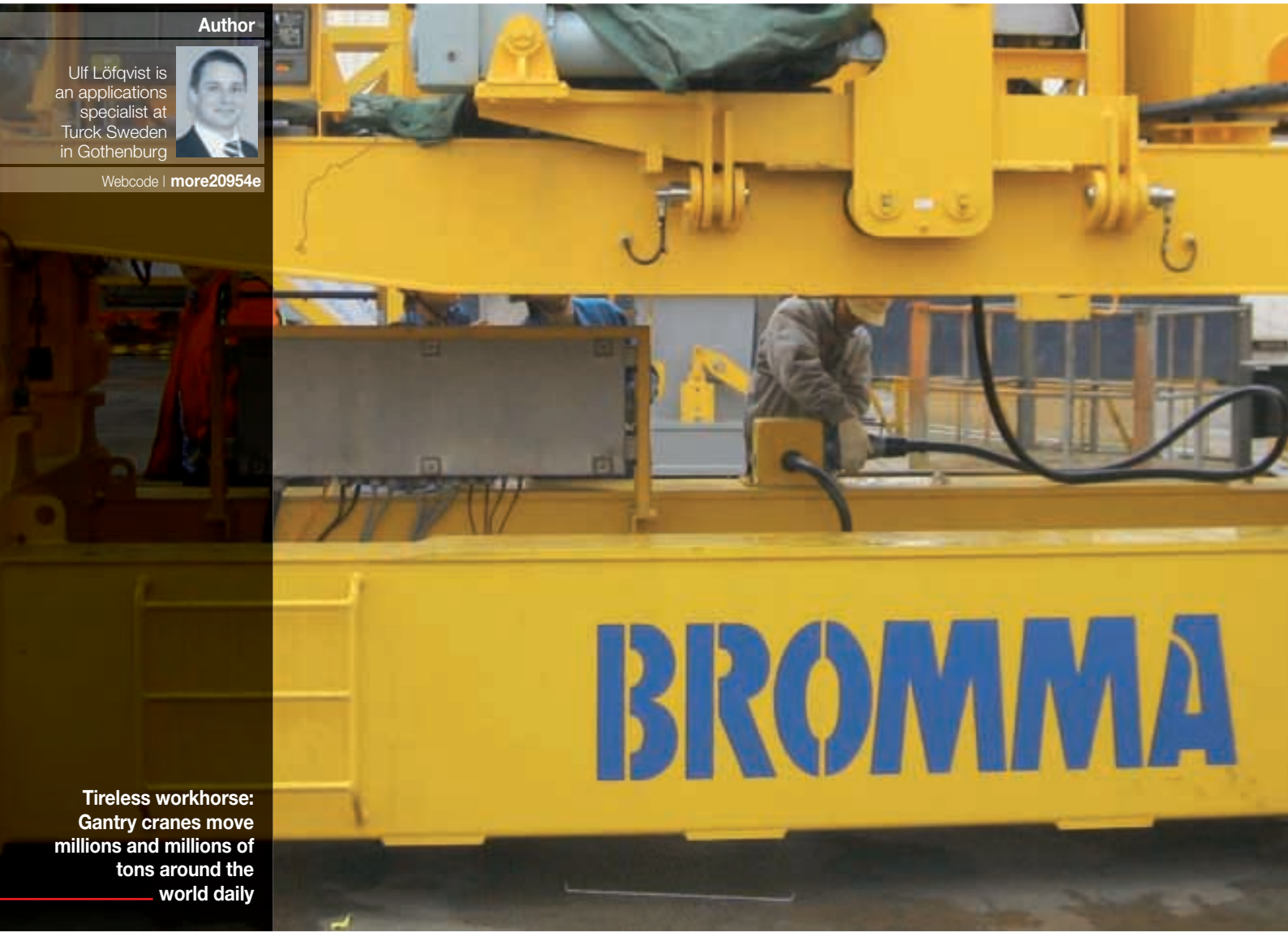

Tireless workhorse: Gantry cranes move millions and millions of tons around the world daily

of 2008, ABB had delivered 29 ARMG, two RMG and seven ship-to-shore cranes for the port of Busan, South Korea, alone. Additional projects include 20 unmanned, track-based container gantries for the Taipei Port Container Terminal Corporation in Taiwan, as well as 42 similar units and twelve ship-to-shore cranes with dual hoist systems for Hanjin Shipping, which are to be supplied for the Busan New Port in South Korea.

Reliable and safe

ABB Cranes stand for safety and reliability. It's no wonder, then, that the project managers take great care in selecting all plant components. After all, only if every individual part provides its service reliably can the entire system function reliably.

Part of this overall system is the remote I/O technology from Turck, which ensures reliable connections between the field devices and the controller level in the 73 automated gantry cranes in the port of Busan. “The fact that we opted for the Turck BL67 I/O modules is due to their high vibration resistance, as well as their drop and topple characteristics,” comments Åke Adolfson, manager of Systems Engineering & Commissioning at ABB Crane Systems. The reason for the demanding requirements: Despite sophisticated controller technology, collisions between the head blocks of the cranes and the containers can still occur. The technology must be able to reliably and durably withstand the acceleration forces produced in these cases.

The modular BL67 I/O system was manufactured with IP67 protection especially for use under extreme conditions. It consists of a gateway and expansion modules. The gateways are used for communication with the fieldbus in use and are currently available for Profibus-DP, DeviceNet, CANopen and Ethernet. Up to 32 expansion modules can be connected to the gateway. The basic modules are passive components and are simply snap-fitted into the system. This produces a compact and mechanically stable unit that can be expanded at any time. Thanks to the compact design of all BL67 components, the fieldbus nodes can be mounted in direct proximity of sensors and actuators without taking up a lot of space. ■

> “The fact that we opted for the Turck BL67 I/O modules is due to their high vibration resistance as well as their drop and topple characteristics.”
> **Åke Adolfson**
> **ABB Crane Systems**

Quick read

Automatic rail-mounted gantry cranes are the tireless industrial “workhorses”, handling millions of tons of freight worldwide and operating virtually entirely automatically. So that these giants function trouble-free, ABB Crane Systems has added remote I/Os from Turck to its own I/O solution. High vibration resistance, as well as resistance to impacts, tipped the scales in favor if the BL67 series.

Tough: Turck’s BL67 remote I/O system can take the impacts and vibrations from the gantry cranes

Author

Bo Liu is a business develoment manager at Turck China in Tianjin

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In 2004, the Tianjin Chemical Factory expanded its production capacities with a new plant that produces vinyl chloride monomer (VCM)

China is the fastest growing industrialized country in the world in the chemical industry. Between 2005 and 2007, the chemical industry of the People's Republic of China was able to increase sales by almost 70 million Euro, thus becoming the third largest chemicals manufacturer worldwide. The metropolis of Tianjin, with a population in the millions, is benefiting from this boom. In addition to numerous other chemical producers, the port city at Hai He has been home to the Tianjin Chemical Factory – the largest Chinese producer of sodium hydroxide solution – since 1938.

Whether natrium hydroxide, monochlorobenene, chloroform, epichlorohydrin or dichlorodiphenyltrichlorethane – the product portfolio of the Tianjin Chemical Factory is impressively comprehensive. These products are used in drain cleaners, solvents, two-component adhesives and insecticide.

In 2004, the Tianjin Chemical Factory expanded its production capacities with a new plant that produces vinyl chloride monomer (VCM). Vinyl chloride – the most important raw material for manufacturing PVC - is a poisonous, slightly combustible gas (igni-

The advantage of the modular design of the excom station: The up to 16 I/O modules – including the power supply packs – can be replaced during continuous operation in Zone 1

Intrinsically Safe Field Communication

In the Tianjin Chemical Factory, excom remote I/O stations transmit temperature measurement signals from the explosion-risk area reliably and efficiently

tion temperature about 435 °C), which first becomes a solid and polymerizes after peroxides are added. Because of these and other properties, temperature is the most important process parameter when manufacturing VCM. Even the actual production steps require controlled temperatures at all times. Too low a temperature would not just lower the reaction speed of the intermediate products, it can also destroy the catalysts.

That is why the Tianjin Chemical Factory uses seven type E thermo elements for temperature measurement in each of the 44 transformation systems

Quick read

In the VCM plant in the Tianjin Chemical Factory, temperature measurement signals have to be retrieved at 370 measuring points and forwarded to the controller level. Because classic point-to-point cabling would have been too expensive and time-consuming, Turck delivered both an efficient and comfortable solution in the form of its intrinsically safe remote I/O system excom.

The excom remote I/O, consisting of power supply pack, gateway, I/O modules, and racks, can be configured using 24 V DC or 230 AC voltage

"With excom, we were able to reduce the costs for cabling by 40 percent compared to our original plan."

Wang Haiwen, Tianjin Chemical Factory

in which the addition of hydrogen chloride to acetylene occurs. Including the supply piping, a total of 370 measurements have to be transmitted from the explosion-risk area to the process control level. A task that the project managers could only have completed, in the case of classic point-to-point cabling via interface technology, with high installation costs and major maintenance expenses.

230 V operation for long distances

With a total of six intrinsically safe excom remote I/Os from Turck, the Tianjin Chemical Factory was able to solve the problem efficiently and reliably. The excom stations authorized for use in explosion-risk areas for Zones 1 and 2 are marketed and sold in China by the Turck subsidiary (Tianjin) Sensor Co. Ltd. (TTS) and offered the plant operators in Tianjin a major advantage: They can be installed and operated using either 24 V DC or 230 V AC voltage.

The latter is an enormous advantage primarily with long signal paths compared to other remote I/O stations, which are operated exclusively using 24 VDC. While, in some cases, much larger cable cross-sections have to compensate for the voltage drops that occur due to the longer cable lengths, Turck's excom I/O solution guarantees a stable power supply even with cable lengths of several hundred meters. This allowed the plant operators in Tianjin to achieve considerable savings on the installation.

"With excom, we were able to reduce the costs for cabling by 40 percent compared to our original plan," explains Wang Haiwen, an employee in system management. Excom was also particularly user-friendly in case of a potential module defect. The up to 16 I/O modules can be replaced in Zone 1 during continuous operation. Thus, the remote I/Os guarantee increased plant availability in the Tianjin Chemical Factory.

Asset Management with FDT/DTM

In addition to increased availability, hot swapping, and explosion protection, the system makes it possible for operators in China to comprehensively HARD parameterize their field devices via the bus line (Profibus-DP), as well as manage and diagnose using the Field Device Tool (FDT) and Device Type Manager (DTM): As a member of the FDT Group, Turck supports the concept right from the start that, like a PC manager, allows parameterizing and diagnosis data to be managed easily. The software's biggest advantage: The user no longer has to deal with managing the diagnosis data or the incompatibility of different "drivers" (so-called DTMs). Instead, users can concentrate entirely on the content of the data obtained, and thereby the plant's status - based on a comprehensive visualization program (e.g. PACTware).

Just like the I/O modules, the constantly updated excom DTMs offer a unique modularity that reflects the flexible structure of the overall remote I/O station. With the DTMs, the plant operators at the Tianjin Chemical Factory can manage the diagnosis data for the racks (backplane) just as easily as the data on the I/O modules used or even each individual channel. This allows the plant operators to localize malfunctions in the field faster and reduce expensive downtimes in the production chain. Fortunately, such a situation has not yet occurred at the VCM plant in the Tianjin Chemical Factory. "Since installation in 2004, communication via excom has been trouble-free," says Wang Haiwen with a look of satisfaction. ■

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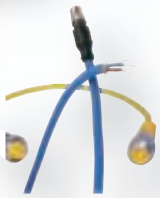

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Author

David Fazzini is the global director for the pharmaceutical industry at Turck USA in Minneapolis

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The instrinsically safe excom station facilitates the reliable reception of about 50 signals from the new filtration system

Easy Upgrade

Turck's intrinsically safe remote I/O solution excom simplified adding a new filtration vessel to an existing process

A common challenge in the process technology and engineering group of Evonik Degussa North America is how to add process equipment in existing plants smoothly and effectively without upsetting the installed process control architecture. And, of course, the engineers are expected to make those additions within budget and on time. Evonik Degussa GmbH, a global leader in specialty chemicals headquartered in Dusseldorf, Germany, operates five plants in Canada and 28 in the USA, the largest of which is in Mobile, Alabama, with some 600 employees.

Quick read

With the intrinsically safe excom remote I/O stations from Turck, Evonik Degussa North America was able to integrate signals of a new filtration system reliably and easily in Hopewell, Virginia, into existing process control systems.

Mobile is also the home of the process technology and engineering group, which was challenged in to oversee the engineering and construction of a new filtration system at the Hopewell, Virginia, site. This plant specializes in personal care and surface specialties, including betaines used for hair care and surface cleaners, fatty acid and fatty alcohol emollient esters used for sunscreens and deodorants, and silicone surfactants used in the production of polyurethane foam.

By the time the new filtration system was needed, the plant had migrated to a modern DeltaV distributed control system, which was connected to field measurement and control devices with conventional wiring carrying the I/O. Adding more of the same was not attractive to the progressive engineers of the process technology and engineering group, in part because the new filtration vessel was to be installed in a Class I, Div. 2 hazardous area, meaning all connections had to be protected to prevent the possibility of an explosion. That was one important

Evonik Degussa was able to reduce considerably the cabling and maintenance costs in its new filtration system in Hopewell, Virginia

factor mitigating the selection of a more advanced solution – the use of the Turck excom intrinsically safe remote I/O.

Excom is a state of the art system that collects discrete and analog I/O signals from remotely mounted stations located in the hazardous area and communicating that data via intrinsically safe Profibus-DP to the distributed control system located in a non-hazardous area. The remote I/O is perfectly suited for plant upgrades and equipment additions, as it can be utilized even while the rest of the plant may still be using conventional wiring between the field devices and the control room. This allows new processes to be implemented in a flexible, modular way.

Turck's excom is a rack mounted remote I/O system consisting of a Profibus-DP gateway module and I/O modules for discrete, Hart analog and raw temperature inputs. This system is designed for critical process applications where no single point of failure may be allowed to exist and all power supplies, gateways and I/O modules are hot swappable under load. Additionally, the 18-slot rack allows for Profibus-DP network line redundancy, as well as power supply and gateway redundancy. For applications subject to lightning and long network runs, such as

Status LEDs on gateway and I/O modules allow a simple function diagnosis of the excom station

tank farms, Turck offers a Profibus-DP fiber optic coupler. In addition to providing an intrinsically safe system, this approach saves space, time and money compared with traditional wired, centralized I/O.

At the plant in Hopewell, the Excom remote I/O system was installed in a purged box near the new filtration vessel. The box is air-pressurized to keep contaminants out. Wires from about 50 devices installed on and around the filtration vessel are connected to the remote I/O, which then connects to the DCS via a Profibus-DP cable.

"This is where we saved money," said Ken Mead, process control engineer with the process technology and engineering group. "We ran only one cable from the remote I/O to the DCS rack room, eliminating the need to install conduit and pairs of wires from each field device to the marshalling cabinets. This was about 35 percent less than the anticipated engineering and construction costs with traditional wiring, and we also got an intrinsically safe installation." According to Mead, Degussa will also be able to "piggy back" on the installation, using the fieldbus cable for additional I/O, if and when such a need occurs in the future.

Commissioning the new filtration unit was another positive factor, and was about as easy as any Mead had ever seen: "It didn't take any time at all. It was just like Turck told us – plug and play."

The success of this project has led Mead and the other process engineers at Evonik Degussa to look for more opportunities to use Turck's remote I/O. "The installation in Hopewell was a big cost saver for us," explained Mead. "That included savings on conduit, explosion-proof fittings and construction. We are very happy with the results, and we have some other plants where we are considering doing the same thing or something similar when new equipment is installed or older field devices are replaced. It all went so well; that was a very easy upgrade." ■

> "The installation in Hopewell was a big cost saver for us. That included savings on conduit, explosion-proof fittings and construction. It all went so well; that was a very easy upgrade."
> **Ken Mead, Evonik Degussa North America**

Author

Holger Anders is a key account manager process automation at Turck Germany in Mülheim

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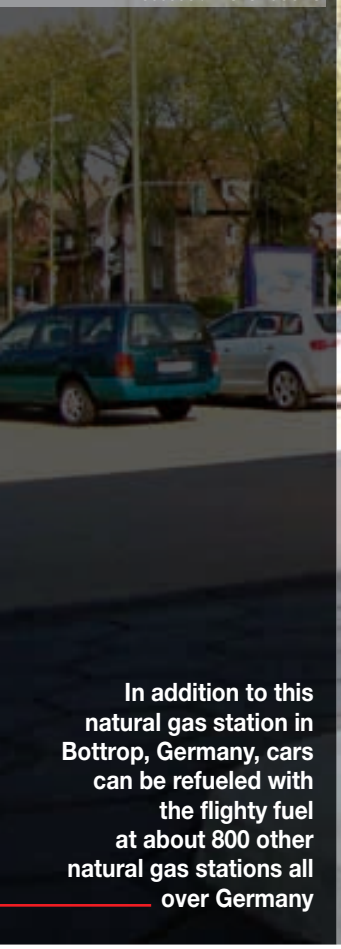


In addition to this natural gas station in Bottrop, Germany, cars can be refueled with the flighty fuel at about 800 other natural gas stations all over Germany

Accelerating Reliably

Schwelm Anlagentechnik trusts its natural gas fuel pumps and compressor stations to interface technology from Turck

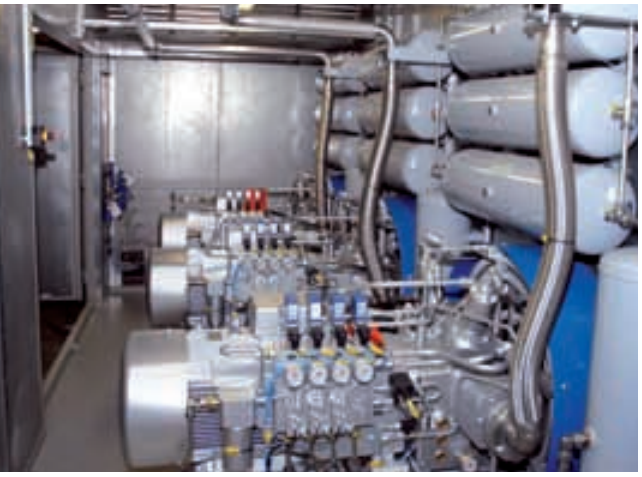
Energy-efficient, cost-efficient, and environmentally friendly - natural gas as a fuel for vehicles pays off threefold. At about 800 natural gas stations, drivers in Germany can refuel with the flighty fuel CNG (Compressed Natural Gas) – with a tax incentive of about one Euro per kilogram until 2018.

One technological obstacle blocks the way. In order to make natural gas “tank friendly”, it must be heavily compressed - which requires greater technical effort and expense, both in the refueling stations as well as in the cars. “At natural gas stations with pressures of 300 bar, the physical characteristics emerge that differ greatly from normal gas stations. You have to master this technology. That is why we support major car manufacturers in automobile development,” explains Dirk Rose, sales manager of Schwelm Anlagentechnik GmbH.

Having constructed over 400 CNG stations, the plant engineering company in the southern Ruhr region has produced almost half of all natural gas stations in Germany, as well as building stations abroad. The company assembles gas pumps through which the gas flows into the gas tank of the car, as well as compressor stations in which the gas received from the supply lines is compressed to the necessary pressure of 280 bar. Depending on the desired fueling output, Schwelm Anlagentechnik is also installing

Intrinsically safe isolating amplifiers transmit the signals from the pressure sensors to the control unit

Up to four compressors compress the natural gas to the necessary 280 bar in several stages



up to four compressors and up to 48 gas storage bottles in concrete or steel sheet containers.
In the accessible compressor stations, the natural gas is dried, cleansed, and compressed in up to four stages from low supply pressure to tank pressure, then stored in the gas bottles. “From the change in state, drying and absorption to compression, a compressor station combines almost everything that the processing technology has to offer. This makes the natural gas stations more complicated than simple gas tanks,” says Rose.

The pressure must be right

The natural gas pressure is decisive for the functioning of the fueling system. While gasoline and diesel powered cars are filled using pumps, natural gas is transported into the vehicle's tank solely by the pressure difference from gas storage. The interplay between the electronically controlled compressors and three separate gas storage tanks monitored by sensors that deliver sequentially the right filling pressure, ensures that the station functions just as reliably and efficiently at a lower capacity as it does with a higher fueling frequency.

This is where the interface solutions from Turck, the sensor, fieldbus and connectivity specialist, come into play. Operated via a single-channel HART transducer/isolating amplifier (IM33-12EX-HI), five switching amplifiers from the IM1-22Ex product line ensure, per compressor, the reliable and safe transmission of sensor signals from the explosion-risk area of the compressor stations to the control unit. The ATEXZone2 -authorized DIN rail interfaces from Turck allow users to adjust the effective direction (working or standby current), as well as broken-wire and short-circuit monitoring separately via six front-end switches. The dual-channel design also offers the plant construction company and operators the opportunity to transmit the analog sensor signal to the control unit via the galvanically separated outputs and, simultaneously, to record the process data of the storage pressures on the second channel. This means that a redundant safety concept can be implemented that also allows pressure and process monitoring even in case of a short circuit.

The intrinsically safe input circuits can be monitored separately thanks to front-end LEDs: For activated input circuit monitoring, the LEDs display the switching status in yellow. If, for example, an error arises due to a broken wire, the respective LED turns red. This is an enormous advantage because: “If an error actually does exist, the first level service must go directly to the compressor station. Remote control alone is not possible in these safety-relevant applications,” explains Rose.

In the compressor stations, Turck technology not only ensures safe and reliable signal transmission from the explosion-risk area, but also a total of four IM interfaces are used in the natural gas fuel pumps, in addition to two isolating amplifiers from the MK product line. The demands in the functionality of the devices are just as high here because “if the electronic components that are installed in fuel pumps distributed all across Germany malfunction, the expenditure would be many times higher than the price of the device,” says Rose. “Several years ago, we intensified our cooperative partnership with Turck and have been very satisfied so far. We have not yet had any malfunctions. When it came to the configuration of the interfaces as well as consulting services, Turck was simply the best fit for our concept.” ■

Quick read

In Germany, environmentally conscientious and price-conscious drivers can fill their tanks with inexpensive natural gas at more than 400 natural gas stations built by Schwelm Anlagentechnik GmbH. To ensure that the fuel always flows reliably, the company installs isolating amplifiers, limit value control gauges, and transducers from Turck.

“Several years ago, we intensified our cooperative partnership with Turck and have been very satisfied so far. We have not yet had any malfunctions. When it came to the configuration of the interfaces as well as the consulting services, Turck was simply the best fit for our concept.”
Dirk Rose, Schwelm Anlagentechnik

Author

Holger Anders is a key account manager process automation at Turck Germany in Mülheim

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Infraserv Höchst supplies around 90 companies from the pharmaceutical, chemical and biotechnological industries in the industrial park with water, energy, and media

Water for Höchst

Even when it comes to expansions, facility operator Infraserv relies on the 19-inch interface technology from Turck for water treatment

Without water, not much happens in the Höchst industrial park: Whether an urgently required solvent for chemical and pharmaceutical processes or as a medium for cooling processes, water is of fundamental importance for the research and production facility in Frankfurt, Germany. Around 400 million cubic meters of water are used annually in the Höchst industrial park: this is the equivalent of about ten times the amount of annual drinking water for the city of Frankfurt.

So it is a distinct advantage that the industrial park is located directly on the banks of the Main River. About 99 percent of the park's water demand is supplied by water from the Main River and is, in part, specially treated and reused multiple times. Only about one percent of the water comes from ground water. Infraserv Höchst supplies water to the approximately 90 companies in the pharmaceutical, chemical, and biotechnology industries that are located in the Höchst industrial park. About 22,000 people work on the 460 hectar grounds of the industrial park. Of these 1,900 employees and 121 trainees work for Infraserv Höchst.

Infraserv Höchst also supplies the companies at the industrial park with power and media, it provides waste disposal services and makes demanding technical infrastructures available. Water supply, treatment, and distribution is handled by the Energies business field. This includes a power generation plant for purified water and its associated distribution system for the pharmaceutical companies. With its guaranteed generation capacity of 240 m^3/h and 14 km of pipelines, Infraserv Höchst's the generation and distribution system is the largest of its kind worldwide and implements the most state-of-the art production and manufacturing technologies.

"We have a total of over 4,000 measuring points for binary and analog signals in the field of water treatment," says Michael Pauly, responsible for the maintenance of the electrical, measurement and instrumentation technology (EMR) in the field of water treatment. Infraserv Höchst uses analog signal separators from Turck to adapt and galvanically separate the analog signals, such as pressure

Quick read

Continual monitoring and forwarding must be performed via 4,000 measuring points so that an annual amount of 400 million cubic meters of water is treated and distributed throughout the Höchst industrial park smoothly. The operator of the industrial park, Infraserv Höchst, relies primarily on 19-inch interface technology.

"We have all kinds of different suppliers here in the industrial park – so of course we shopped around on the market. Yet, in the cost/benefit ratio, Turck came out the clear winner."
Michael Pauly, Infraserv

values, quantities, filling levels and pH values, and then bring them "cleanly" into the process control system. The engineers at Infraserv Höchst are building on the 19-inch technology that was established as the industry standard ten years ago. While many manufacturers of 19-inch technology have increasingly migrated to DIN rail devices, Turck will continue to offer modern interface technology in all configurations – from the cartridge to the DIN rail devices to 19-inch insert cards.

"In my opinion, the 19-inch technology is cleaner in terms of its configuration. Especially if you already have a rack and want to add something to it," says Pauly in explaining the decision for the insert cards. "Even if I have firm requirements on where the inputs and outputs lie, integration is still easy. Naturally, there is also a bit of a sense of tradition here."

Turck guarantees that this tradition can be continued thanks to its long-term support and further development of this configuration. "This is an important argument for Infraserv Höchst to use interface technology from Turck, because future expansions would also be planned for in 19-inch technology," says Pauly. "We have all kinds of different suppliers here in the industrial park – so of course we shopped around on the market. Yet, in the cost/benefit ratio, Turck came out the clear winner."

Filling level measurement per ultrasound

Turck not only delivers interface technology to Infraserv Höchst, some of the signals that run along the analog signal separators come from Turck or Banner devices. This includes ultrasound sensors to monitor the filling level of the additives, which are required for water treatment. The sensors have a PNP transistor output and an analog output for voltage and the measurement range is adjustable via teach-in. The sensors are easily operated via teach-in which was another factor that tipped the balance in Turck's favor. ■

Infraserv Höchst uses interface technology in the 19-inch format for numerous measurements

Ultrasound sensors from the type Banner T30UUPBQ monitor the filling level of the additives, which are required for water treatment

Author

Pavel Fateev is the managing director of Turck Russia in Moscow

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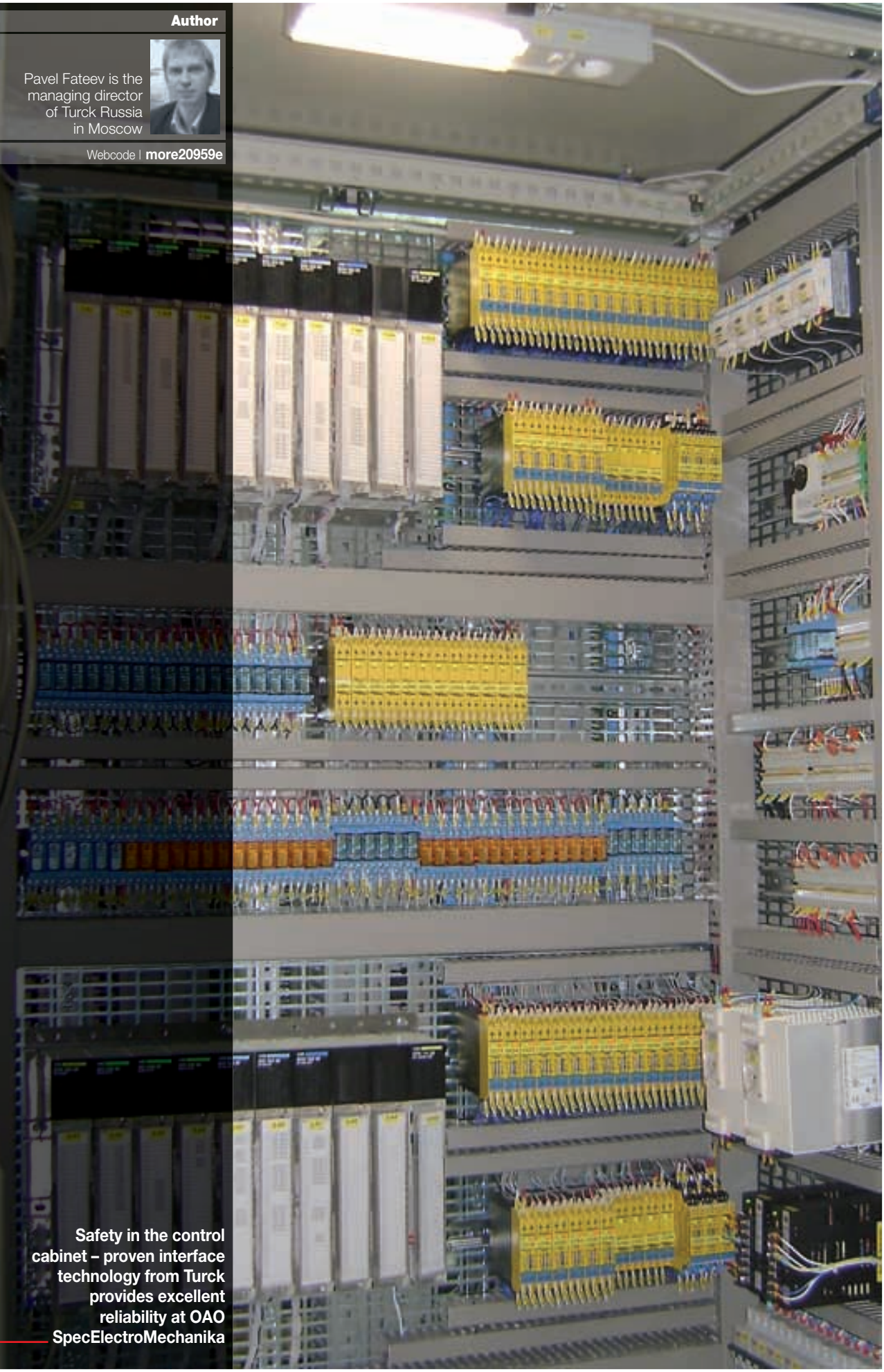


Safety in the control cabinet – proven interface technology from Turck provides excellent reliability at OAO SpecElectroMechanika

Black Gold – Yellow Technology

Measuring amplifiers from Turck guarantee reliable monitoring of the oil temperatures at Russia's largest sea port

Russia is not only the biggest country on Earth, it is the second largest oil producer worldwide after Saudi Arabia. Russia produces nearly ten million barrels of black gold a day, and turnover remains very high despite the current oil price between $40 and $50 per barrel. However, before the oil generates a profit, it has to be transported from the wellheads to one of Russia's many refineries or to an industrial port for shipment to Germany, the Czech Republic, China and many other countries.

One of the winners on the huge Russian oil market is OAO SpecElectroMechanika. The company is one of the leading Russian players in the automation sector, and it delivers factory automation solutions for the entire production chain in the oil industry, including the pre-processing, transportation and refining of this valuable resource. For more than ten years, the company, which is based in the Krasnodar region, has been producing and supplying machinery and components used to automate complex, rugged oil processing and transportation equipment. The company's portfolio includes microprocessor components, blackbox control stations, as well as automated pressure and temperature control systems. Because handling black gold can be very profitable, but also very dangerous, the components that the company builds into its automation solutions have to meet very stringent requirements. "Our overall quality standards are always very demanding," says Alexey Krasyuk, chief engineer at OAO SpecElectroMechanika. "Therefore, we try to source the components for our products exclusively from leading manufacturers."

Quick read

The demand for oil has never been higher – regardless whether it is used for light heating oil or as a lubricant. The Russian supplier SpecElectroMechanika relies on Turck interface technology for its automation systems to ensure that the black gold can be safely loaded onto tankers at the huge oil terminal in Novorossiysk, Russia's largest sea port.

Oil is loaded onto huge tankers at the Russian port of Novorossiysk – automated processing and transport systems guarantee the required safety

Turck interfaces are easy to install on DIN rails

"Even six years down the road, we are still impressed by the quality, stability, and high functionality of Turck products. MK series interface modules significantly enhance machine reliability and make our machines more user friendly."

Alexey Krasyuk, OAO SpecElectroMechanika

Temperature is decisive

Correct temperature is one of the most important process parameters during the production and transportation of this precious resource. When crude oil is converted to feedstock and then refined to produce marketable fuels, heating oil and lubricants, it must be kept at the right temperature at all times during the various production, processing and transportation steps.

SpecElectroMechanika has integrated Turck interface technology into its automation solutions to continuously monitor the temperature of the oil, even when the oil is not going through one of the refinery processes. MK32 measuring amplifiers monitor the input signals of the Pt100 temperature control sensors on the oil tanks in the huge oil terminal at Russia's largest seaport in Novorossiysk. In this Black Sea port located in the Krasnodar region at the northwest end of the Caucasus, petroleum and petroleum products brought in by train are loaded onto ships every day. These ships have a loading capacity of up to 15,000 DWT. The machinery has to be very rugged to withstand the industrial environment at the port. The partially automated systems must be immune to dust, oil, water, vibration and even impact.

Intrinsically safe MK32 measuring amplifiers with galvanic isolation between the input and output circuits reliably detect temperature-related changes in resistance in the Pt100 sensors. The subsystem operates safely in hazardous areas and sends an analog output signal to a higher level controller. The 3 or 4 wire, 1-channel measuring amplifiers also offer users extensive diagnostic, monitoring and parameterization features. For example, a switch on the front panel activates wire break detection on the input circuit. With a single switch, the user can set parameters that define current output characteristics when an error is detected in the input circuit.

If input circuit error detection is turned on, the output current is either 0 mA or 22 mA, and a red LED is switched on to indicate the fault condition. If input circuit error detection is deactivated, the output signal tracks the direction of the input signal (0 mA if a wire breaks, 22 mA if a short circuit occurs).

Reliable and functional

Turck components guarantee the necessary operational reliability in hazardous areas, while also offering excellent functionality. "Even six years down the road, we are still impressed by the quality, stability, and high functionality of Turck products. MK series interface modules significantly enhance machine reliability and make our machines more user friendly," explained Krasyuk.

Turck products are very reliable, and they cover a wide measurement range between –50 °C and +600 °C, enabling engineers at SpecElectroMechanika and oil terminal owners to reduce the installation and maintenance costs of the automation solutions. "We were particularly impressed with the good, collaborative relationship with Turck. The interface specialists deliver high quality at a reasonable price with short lead times," said Krasyuk.

Another thing the automation supplier from Russia appreciates is that the MK interfaces are easy to install on a DIN C rail, which has shortened the installation time considerably and increased machine availability. ■

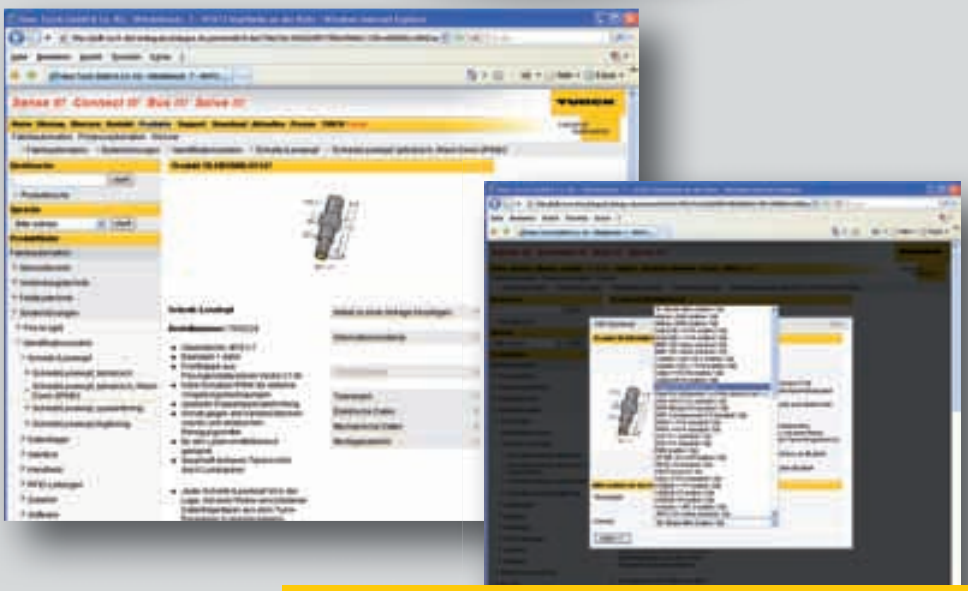
▸ Temperature sensing with the Pt100

Pt100 probes are the core element of reliable sensors that come into contact with the media. The measurement sensors have a nominal resistance of 100 ohms. They are based on changing resistance in a platinum wire or platinum layer as the temperature changes (DIN IEC 60751). During operation, the voltage drop is measured at the sensor, while the current flow through the sensor is held constant. The Turck 1-channel MK32 measuring amplifier senses the resistance changes in the Pt100 probes and sends temperature linear current signals to a higher level controller. Only a few switches are needed to set up the intrinsically safe switches for operation in the temperature range between -50 °C and +600 °C. The amplifiers offer a selection of input circuit monitoring functions.

Product Data on DVD

Fresh from the press, the new “Full Range” DVD offers you an original view of our product database on the Internet for offline use.

Regardless of what information source you use, the Turck product database on DVD or on the Internet will provide comprehensive information material focusing on Turck solutions for plant and process automation. There you can find data sheets, brochures, catalogs, and even software. Different search functions will help you find the right solution for your automation needs.



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Product Data on the Web

The Turck product database on the Internet promises all data – including CAD data – at a glance. Routine changes and additions guarantee you the most up-to-date information at all times. Find out for yourself under **www.turck.com**

Flexible Production

US manufacturer Genentech relies on rugged connection and fieldbus solutions from Turck

The United States pharmaceutical industry is rife with change. Plans to develop a new biotechnology facility that produces the cancer fighting drug Avastin resulted in five years of development, two years of construction and three changes of ownership. In the end, none of these aspects halted what would become Genentech, Inc.'s, www.gene.com, New IDEC Manufacturing Operations (NIMO) plant in Oceanside, California, located about 35 miles north of San Diego.

A team of engineers, architects and a general contractor began designing the Oceanside facility early in the decade, and coined a new "design-build hybrid" approach that implemented unique manufacturing innovations, design advancements and quality contributions to the facility.

One of the innovations, the use of fieldbus technology, was considered a breakthrough for the pharmaceutical industry at that time. "Before the Oceanside facility, it was unheard of for a biotech/pharma plant to have a significant amount of bus," said Denise Kresge with CRB Consulting Engineers, Inc., the engineering firm selected for the overall facility and manufacturing process design. "Now, that plant has become a template for almost every grassroots pharmaceutical plant CRB has been involved with in the last few years."

According to Kresge, there was considerable concern about gaining (Food and Drug Administration) FDA approval: "This concept presented certain challenges from a design perspective. One challenge was to install the cable to meet sanitation requirements and withstand the frequent washdowns in the cleanroom environment. Another was to prevent the induction of outside noise from the power supply and production equipment. The communication cables had to be shielded, and we had to follow the separation rules for cable assembly and installation." The Oceanside facility received FDA approval in 2006.

Subassemblies Lead to Efficiency

The 210,000 square-foot production area was one of the first biotech manufacturing facilities to successfully utilize large modular super skids built offsite and shipped to the plant. More than 70 process tanks and 18 fermenters were integrated into 17 large modules. This approach saved time on the original construction and reduced on-site labor.

All of the modules were built using Turck wiring systems before they were shipped to the Oceanside location. Segments were applied to 48 control panels that used DeltaV control, and included a minimum of two Foundation Fieldbus and DeviceNet segments per panel. The segments used Turck Foundation Fieldbus and DeviceNet quick-disconnect ITC (instrumentation tray cables) cables to connect approximately 95 percent of the automation instruments to the distributed

Author

David Fazzini is the global director for the pharmaceutical industry at Turck USA in Minneapolis

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The connection and fieldbus technology from Turck withstands the hard wash-down conditions in the Genentech plant

control system. Not only was wiring with ITC cables faster than wiring with conduit, it also consumes less space to run the amount of I/O required by the plant.

Two Turck DeviceNet advanced I/O module (AIM) remote I/O stations were also used within the panel. AIM stations and Foundation Fieldbus junction bricks were mounted on the process equipment and connected to the networks in the panel. AIM stations can accept 16 discrete I/O points, and each DeviceNet segment supported up to 63 AIM stations. Many of the segments did not fully utilize the maximum I/O capacity to allow room for expansions. The FF junction bricks can accept 10 to 12 analog instruments or valve controllers per segment.

The decision to use a standard panel design resulted in lower construction costs and easier panel fabrication. The implementation of both DeviceNet and Foundation Fieldbus technology reduced the amount of wiring required for commissioning and subsequently reduced panel size and cost. Conducting the wiring in the fabrication shop minimized the wiring that had to take place in the plant and greatly reduced construction and start-up time. Another advantage of using Foundation Fieldbus is faster commissioning due to the asset management tools that are available with this system.

Today, the NIMO plant has more than 16,000 instruments, including 7,291 Foundation Fieldbus and 1,230 DeviceNet devices, including Turck's AIM stations. Because Turck products meet IP67 environmental protection standards, they don't need to be enclosed in water-resistant cabinets for washdown environments, another important consideration in pharmaceutical construction.

The choice to use Turck connectivity products in the initial design paid off during construction and commissioning, as well as three subsequent plant modifications, when the facility changed ownership and had to be altered to accommodate a totally different product in 2003 and in 2005. The aggressive schedule and limited budget would have been significant issues with a traditional hardwired control system, but the flexibility of the ITC cables and quick-disconnect solution allowed the changes to be completed on time.

"For the first modification, we simply relocated instruments as required by the new process using existing distribution grids and trunk lines. Disconnecting and reconnecting cables was easy. Rewiring would have been much more expensive. The cost was appreciably lower, and the results are first-class," said Joe Hohn, Control Systems Engineer with Dynalectric, the instrument and controls (I&C) contractor.

"Errors that remain undetected until commissioning can be very expensive," Hohn explained. "We try to protect ourselves by specifying the highest quality products that promise lower installed costs." The quality of the Turck cables was a major factor in the significantly faster initial commissioning of the NIMO facility, since there were no unexpected delays due to faulty connectors or underperforming cables.

"Installed cost is the most important factor for a turnkey contractor like us," continues Hohn, "There are other factors, of course, but the control network installation and commissioning are so much faster and easier with Turck cables that the final cost of the system was dramatically lower. Compared with conventional wiring on a big project like this, the installed cost, including commissioning, is on the order of one-sixth as much." Even more impressive is the fact that Dynalectric technical personnel have yet to encounter a quality problem with Turck products. "I don't know what their quality assurance program is like where they assemble these products," Hohn said, "but we see nothing but 100 percent quality." ■

> "I don't know what their quality assurance program is like where they assemble these products, but we see nothing but 100 percent quality."
> **Joe Hohn, Dynalectric**

Quick read

More than 16,000 I/O signals are received at the Biotech plant of Genentech, Inc. in Oceanside, California, and forwarded to the control system. Because the connection solutions themselves have to function reliably in raw "wash-down" environments, the pharmaceutical producer trusts the IP67-certified fieldbus cable, DeviceNet block-modules and distributor components from Turck.

More than 90 percent of the components were connected to the control system using ready-made fieldbus cables and plug-in connectors from Turck

Author

Marco Stapelmann is an editor at Turck Germany in Mülheim

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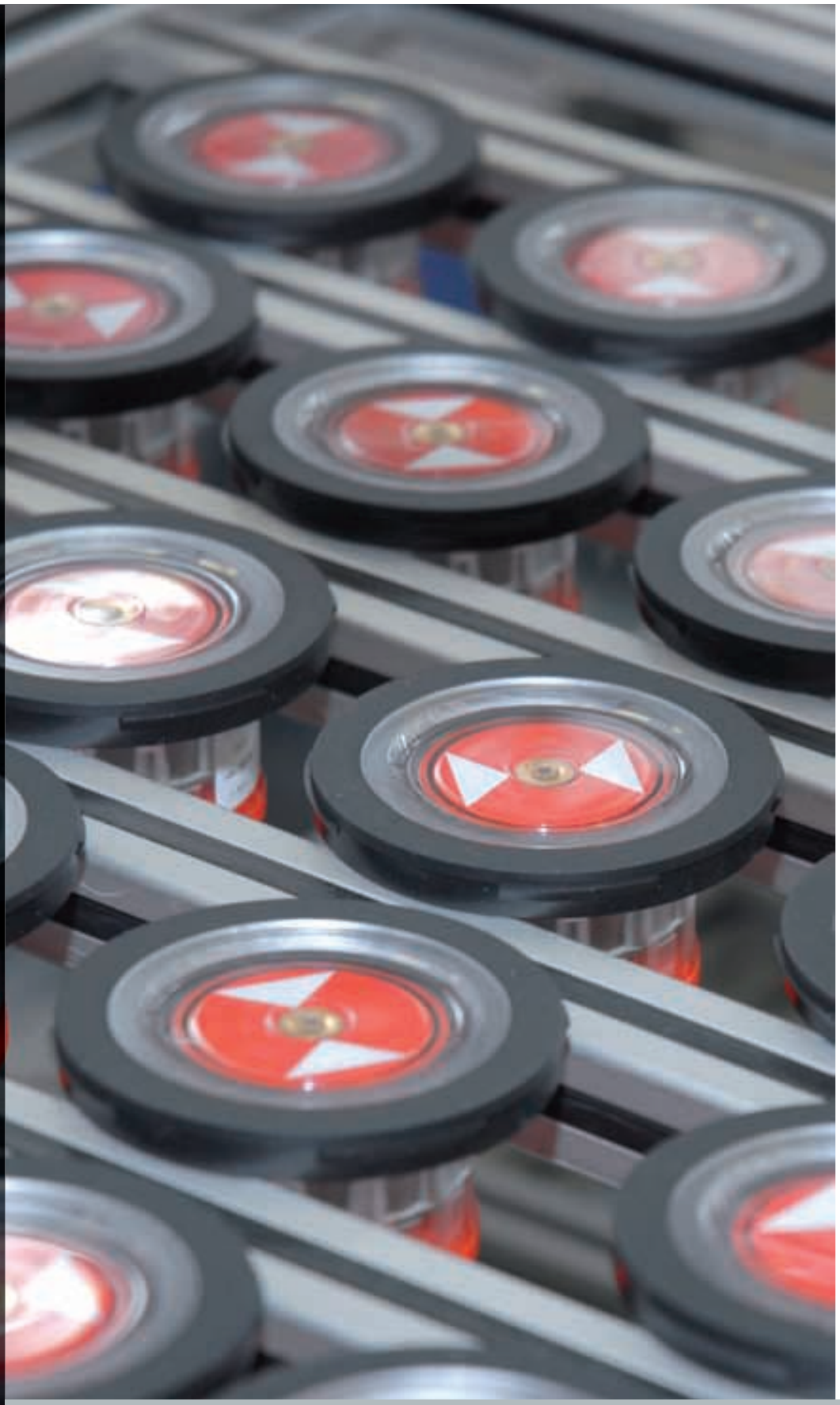


More than one million short stroke push buttons with atmospheric pressure equalization system – called Escha button for short – are in operation around the world

Touch Me

Around the world, innovative pushbuttons and LED lights from Escha TSL are opening doors for public transportion

In trains and buses, you can't walk down an aisle without passing an Escha TSL product – the product line of the Turck subsidiary ranges from door-opening buttons to warning and safety lighting and hand pole buttons

Even if you've never heard of a presskey, combikey or an MP30 timer button before, chances are if you've ever used public transport, you have pressed one at one time or another. These short stroke pushbuttons are simply called Escha buttons. They are primarily used as door-opening buttons in street cars and rail cars, but they are also used as operating elements for sinks and toilets, or as combined audio-visual signal devices. Escha TSL GmbH, located in the city of Halver in the German state of Sauerland, develops and manufactures these products found everywhere in public mainline and commuter rail systems.

As a market leader in the area of pushbutton and switching technology, this member of the Turck Group has produced the majority of door-opening buttons used in Germany, as well as manufacturing custom-made switches and LED solutions for Europe, America, India and New Zealand. “About 99 percent of all buttons used in the rail cars of Deutsche Bahn come from Escha TSL,” explains Klaus-Peter Schmauch, the company's technical director. “Our market share in Europe is about 40 percent.”

In order to be able to offer overseas customers innovative buttons, switches and LED solutions, the Turck subsidiary often uses established Turck sales channels, such as in Poland, Romania, and Belgium. Escha TSL is building up its own sales structures in the most important industrial nations, especially for the rapidly growing Chinese market. The company has founded its own production facility near the Turck Tianjin Technology company, which produces Turck products for the Asian market.

Success at the button: Lutz Höfer, general manager (l.), and Klaus-Peter Schmauch, technical director at Escha TSL

Quick read

Starting with the presskey door-opening buttons in 1986, Escha TSL is today the market leader in button and switch technology in buses and rail cars. Regardless of whether it's door openers in the trains of the Deutsche Bahn, hand pole buttons in buses or industrial LED lighting solutions – customers worldwide use the products from the specialist for buttons, switches, and lights. The factors of success include easy operation and durability.

First product launched in 1986

Two employees from the switching technology division of Escha Bauelemente GmbH laid the cornerstone for this success in 1986 with the development of the press key. With more than one million units sold, it is still the most successful and important product in the Escha TSL portfolio. The innovative short stroke push button for inside and outside doors scored points due to its flexibility with regard to design and built-in atmospheric pressure equalization system. The Escha button quickly established

Escha TSL buttons also open doors of this Alstom-Bombardier street car in Gera, Germany

itself as a high quality and durable switching solution. A small silicon hose integrated into the switching mechanism – not much thicker than a pencil lead – ensures that the air-tight sealed electronic components function reliably even at temperature or altitude-related exterior pressure changes. The key: The physically simple principle guarantees not only that the button functions smoothly under extreme temperatures of -40 to +80 °C, but also guarantees a steady and continuous actuating force. This development literally opened the doors for the switch specialists from Germany to applications exposed to extreme temperatures, such as in Scandinavia.

Business with the door-opening buttons was so successful that management at Escha Bauelemente GmbH decided to establish an independent company, Escha TSL GmbH, for this product line in 2006. A decision that paid off for both the company and the customers. “As a medium-sized company, we are able to offer extreme flexibility and provide solutions even for more complex applications within just a few weeks,” says Lutz Höfer, General Manager at Escha TSL. “And even if we had to learn Chinese for a customer within two weeks, we would manage that too,” adds Schmauch with a smile.

“About 99 percent of all buttons used in the rail cars of the Deutsche Bahn come from Escha TSL. Our market share in Europe is about 40 percent.”

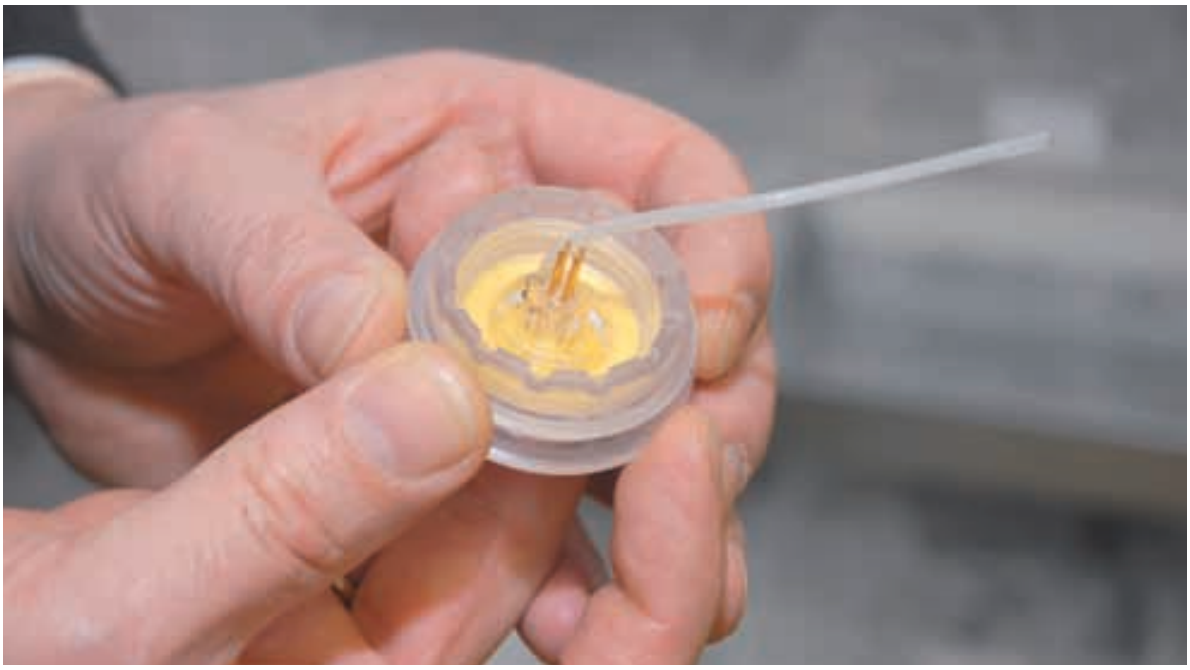
Klaus-Peter Schmauch, Escha TSL

Using all senses

With 29 employees in Halver and additional employees in overseas sales offices, the company's core competence is to develop and produce easy-to-operate pushbuttons and switches for the handicapped. “A major issue for them is barrier-free public transport,” explains Schmauch. “Our products are therefore completely geared toward optimal operability. They allow people with physical handicaps to actuate buttons and switches using different senses.”

In the meantime, Escha TSL provides its customers with 15 different design configurations of the press key with numerous pictograms and labels for the best possible operability in every day use – regardless of whether it says “please press” in the local public buses or “push here” in public restrooms or “door open” in American street cars. The compact minipress switch, the combikey with integrated sounds for actuating the switch and different signal lights for filling level displays, and safety lighting have been added to the portfolio.

The service offerings range from development and construction, to tool and prototype design, to the serial production of switch and lighting solutions – including ready-made connection options. Above all, the modern LED technology and the industrial lighting and signal equipment are an increasingly important business division for the button, switch and lighting experts from Halver. “We offer our customers 20 years of experience in dealing with LED technology. You cannot achieve the long service life of our rugged lighting solutions using inexpensive products from the home improvement store,” says Höfer.



The silicon hose of the press key compensates for pressure fluctuations and protects against vandalism and malfunctions in the button

Strong together

Regardless of whether it's industrial LED lights or a comprehensive product line of buttons and switches, Escha TSL has been supplying its customers exclusively with handcrafted quality “made in Germany” products since day one. Here, the company has benefited from its proximity to Escha and Turck. While Escha Bauelemente GmbH supplies the housing for the rugged IP67 switches and signal units, Turck contributes to the development, and produces the built-in switching electronics. “Therefore, Turck quality is also hidden in each Escha button,” summarizes Höfer. “When synergies can be taken advantage of, the people at Escha TSL are open to many ideas. That is why we are working on a current project, for example, to use the sensor housing from Turck as the housing for special LED lighting.”

Thanks to this cooperation, Escha TSL can concentrate entirely on the final assembly of its high quality products in its own production halls. The production department manned by 15 employees can produce customer-specific product solutions quickly and flexibly with batch sizes from several dozen up to several hundred units with the help of vertical integration and some automation.

Reliability over the decades

The production quality achieved through electronics, housing and tool know-how has paid off both for Escha TSL, as well as for customers all around the world. Following the standards concerning reliability of the button and switch solutions used in public transport, more and more customers want a guarantee for the durability of their products. “Our products function so reliably that one customer has already signed a subsequent delivery order with us for the year 2018,” mentions Höfer.

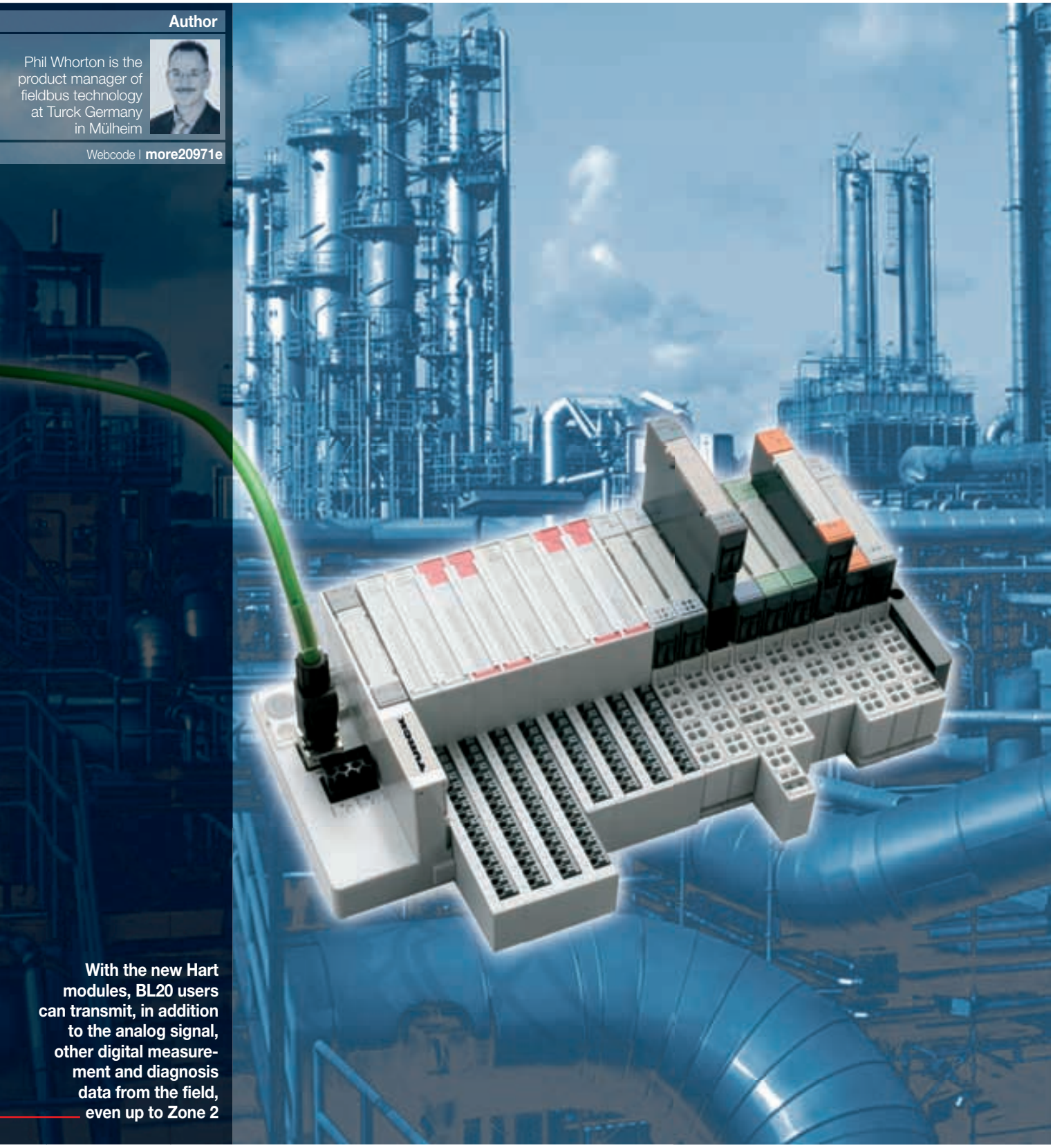
Innovative products, flexibility and customer proximity are the success factors that have made Escha TSL the market leader among rail and bus companies. Management is therefore confronting the current economic crisis with a somewhat relaxed attitude. “We achieved sales growth of 30 percent in 2008 and are expecting additional growth in 2009,” says Höfer. ■

Made in Germany: Handmade products with CAD support permits individual solutions

Author

Phil Whorton is the product manager of fieldbus technology at Turck Germany in Mülheim

Webcode | **more20971e**

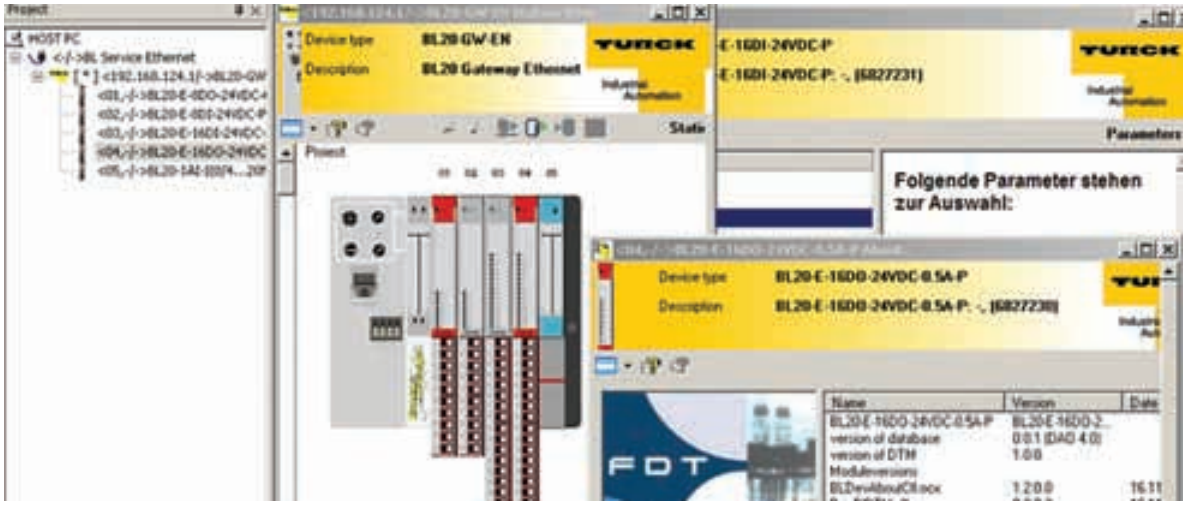


With the new Hart modules, BL20 users can transmit, in addition to the analog signal, other digital measurement and diagnosis data from the field, even up to Zone 2

It is Hart

Turck expands functionality and fields of application for the BL20 fieldbus system with Hart-compatible I/O modules

Although the Hart (Highway Addressable Remote Transducer) communications protocol has been around for almost 20 years, use of this communication solution for the "last mile" to the field devices in process automation is still wide-spread. Turck is therefore expanding its modular BL20 remote I/O system by adding new



Based on the FDT/DTM technology, analog field devices can be managed efficiently via free basic applications such as PACTware

Hart-compatible analog cards. The dual-channel input/output modules allow users to easily connect their analog field devices to the process control system via the universal bus terminal system and integrate into a continuous asset management concept based on FDT/DTM technology. The key: Digital and analog communication can be performed via Hart and using existing 4 to 2 0 mA wiring.

By adding analog Hart modules to its fieldbus system, Turck is responding to the huge demand for efficient I/O solutions for analog instrumentation in processing technology. The Hart-compatible modules make it possible to transmit additional values or diagnostic data interference-free from the field via the modulated digital signal, regardless of whether valve drives are going to be integrated into remote maintenance devices or additional temperature data is recorded. The BL20 system can be used almost anywhere, from non-explosion risk areas to Atex Zone 2.

Interactive communication

The advantages of Hart communication are widespread. Because the communications protocol makes data transmission possible via existing pipe installations, users can expand and maintain the “last mile” with little expense. Additionally, the modulated digital signal in the “Frequency Shift Keying” process (FSK) does not influence the actual analog signal, so that interference-free interactive communication between the process automation system and analog field devices can be established by combining both transmission types.

The new analog cards offer the same benefits as other Turck BL20 components. All electronic modules can be simply plugged into the passive basic modules on the BL20 system – up to 72 expansion modules can be added on a single system. To connect the fieldbus to the entire station, different gateways for Profibus DP, Profinet, Modbus TCP or Ethernet/IP are available in standard or economy models, as well as CoDeSys programmable gateways for Ethernet connections.

BL20 users have the choice between basic modules with tension springs or screw connection technology – simplifiying the handling of the IP20 fieldbus system in case of maintenance. Up to two adjacent electronic modules can be replaced – even during continuous operation in the remote I/O station.

To integrate the new analog cards in the BL20 field nodes, users can utilize Turck's free I/O assistant software. The modular project planning software supplies important information on the necessary electronics components, ranging from type labels to order numbers. Moreover, users can graphically display their fieldbus solutions and rely directly on dimensioned drawings or parameter lists, which considerably reduces order picking time.

Comfortable diagnostics

Hart modules and project planning software also support standardized FDT/DTM technology. The parameters of the connected field devices can be simply and transparently visualized and configured in a manufacturer-independent engineering tool (like PACTware). Users can diagnose and parameterize the field devices using the basic application without having to grapple with the incompatibilities between different device drivers.

The status LEDs located directly on the electronic modules are a new feature in the software diagnosis options. They help the maintenance personnel easily identify the status of module communication at a glance. ■

Quick read

Thanks to the new Hart-compatible electronic modules, Turck has expanded the areas of application for its BL20 modular fieldbus system. With FDT/DTM support, users can integrate their analog field devices efficiently into a continuous asset management system using the remote I/O system. The key: BL20 can be used in almost all areas of process engineering, even Atex Zone 2.

Author

Peter Praske is a fieldbus consultant for process automation at Turck Germany in Mülheim

Webcode | **more20972e**

Vertical continuity between the office and field devices: As a web server, the PB-XEPI opens up Profibus networks for remote maintenance and diagnosis via the Internet

Bus Diagnostics

Turck's Ethernet Profibus interface PB-XEPI monitors fieldbus communication and opens Profibus networks for remote monitoring and diagnostics via the Internet

The new Ethernet Profibus coupler, PB-XEPI, enables vertical continuity in communicating between the office and the field devices. Thanks to the intelligent interfaces, plant operators can monitor and set the parameters of their Profibus subscribers, as well as all connected field devices, centrally and independently from the control system via a computer web browser. The interfaces are easy to integrate into new or existing fieldbus structures, and thereby make an important contribution to continuous asset management and maintenance concepts.

The diagnostics unit acts as a web server, and enables users to monitor a large number of Profibus networks in parallel and continuously during ongoing operation for the first time ever. Due to system-independent Ethernet communication and license-free software, the instrumentation on the machines and their quantity do not matter. The interfaces are simply integrated vertically into the Profibus networks to be monitored. Using the Ethernet protocol, they establish a communications and diagnostic infrastructure and open all integrated fieldbus networks for remote maintenance via a computer web browser.

Access via a web browser

The PB-XEPI gives technicians, machine and plant builders, along with external service suppliers, the option of reacting quickly to fieldbus disruptions and disruptions experienced by connected subscrib-

ers at any time without having to rely on proprietary engineering tools. Single requirement: Access to the Internet.

The PB-XEPI can be used as a diagnostics unit for different monitoring or configuration applications. As a pure listener without a separate Profibus address, the interface monitors the data flow of the fieldbus network without participating in communication. In this configuration, the diagnostics unit independently identifies the disruptions occurring in the Profibus network and, in case of a malfunction, sends out an error message via e-mail.

The error message may be retrieved from any location – from the centralized maintenance department on site, via a remote service computer or using a mobile cell phone. A link included in the message allows users to access the respective diagnostics unit directly and recall detailed information and a recommended course of action. All monitoring and alarm settings can be adjusted easily using a web browser – special client software or licenses are not required. The diagnostic information can also be integrated into third-party applications via the web.

Expanded diagnostic functions

The intelligent Ethernet Profibus interface can also be configured as an active network subscriber. As a Master Class 2 with an independent station address, the PB-XEPI allows the configuration and diagnosis of the Profibus network by using FDT/DTM and OPC. The software package Profibus Scope 4.0, TH OPC server DP and AMS Suite supplement the integrated diagnostic options of the PB-XEPI by adding analysis functions for more complex error searches or expanded asset management functionalities, such as recording operating hours. Thanks to the graphic user interfaces and transparent window technology, users receive all relevant information on the state of the network in real time.

As a central bus access via the Ethernet interface, the PB-XEPI also supports the manufacturer-independent quasi standard FDT/DTM. The advantage of this combination of license-free framework application and driver software is that the relevant parameterizing and diagnostic data of the connected field devices can be simply managed and visualized based on the “driver files” - the device type managers (DTM). The user no longer has to deal with managing the diagnostic data or the incompatibility of different diagnostic tools. Instead, users can concentrate entirely on the content of the data received, and thereby on the plant status.

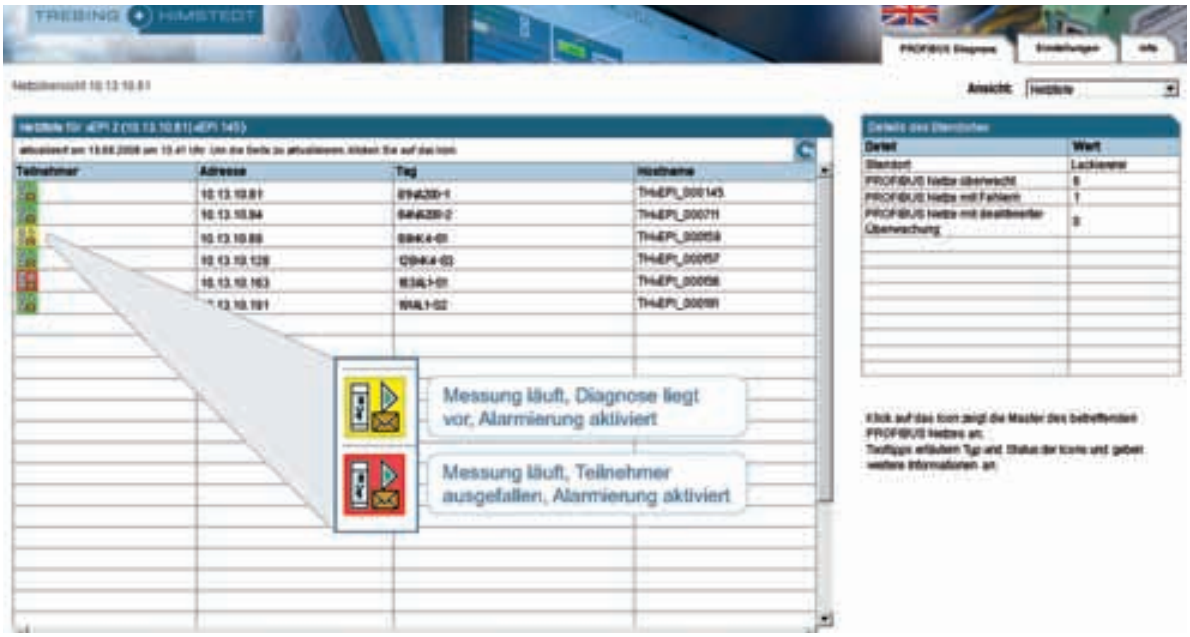
Turck offers its customers both the higher-level framework application PACTware 3.6, as well as the communications DTM, for the diagnostics unit for free download.

Quick read

The new diagnosis interface PB-XEPI enables users to continually monitor their Profibus networks, clearly identify occurring problems and react quickly and purposefully via remote maintenance using a web browser. The interface is easy to integrate into fieldbus networks.

Summary

Based on integrated diagnostic functions and additionally available analysis and parameterizing tools for all traditional standards, such as FDT/DTM, OPC and EDD, PB-XEPI, it is easy to get started in continuous asset management and maintenance concepts by providing universal Profibus access. The simple installation and operation, as well as the option of expanding the diagnostic infrastructure through additional interfaces, makes the PB-XEPI a solution for the most varying Profibus diagnosis scenarios. ■



Status report in the browser: The web server of the PB-XEPI permits network diagnosis and access via the Internet

Author

Klaus Ebinger is the product manager for process sensors at Turck Germany in Mülheim

Webcode | **more20973e**

Straight from the Turck research laboratory: The fully encapsulated pressure sensor PS300

How Pressure Sensors Function…

Part 5 of our basic series on the design, functional principles and application options of the most important sensor technologies

Regardless of whether you are driving a car or riding in an airplane, pressure information is part of our daily routine. At the same time, pressure is elusive because a pressure value always refers to a certain reference. A positive and negative overpressure measurement reflects the difference in the measured pressure compared to the respective atmospheric pressure. Therefore, most measurement devices must have an open reference connection to the atmosphere. This type of pressure is referred to as relative pressure, overpressure or gauge pressure, though they all have the same meaning.

If higher pressures – starting at about 50 bar – are measured, the measurement devices are also found with a closed reference connection, known as gauge sensors (closed overpressure). At these high pressures, the relatively low fluctuations in the atmospheric pressure do not influence the accuracy of the measured value.

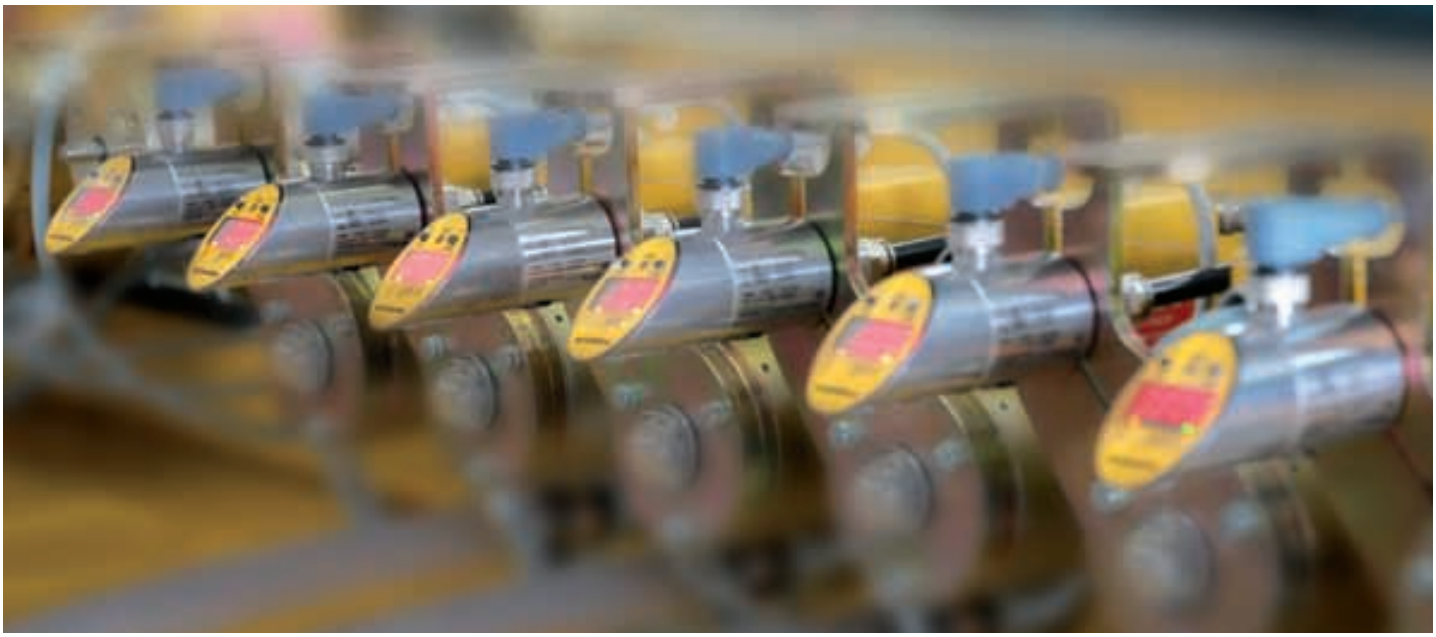
Absolute pressure, on the other hand, refers to airless space, meaning the vacuum. In practice, you evacuate the reference side of the respective measuring device and seal it off so it is air tight. The degree of the vacuum generated is decisive for the quality of the measurement. Meteorologists, for example, require absolute pressures for preparing daily weather forecasts. In the industry, the pressure and temperature compensation of gases is one of the main areas of application for this type of measurement.

With differential pressure, the process pressure is created on the reference side of the device. This enables container filling levels, flow rates and leakages in the systems to be defined. When measuring the flow rate using pressure as a measurement variable, you have to know that the differential pressure on a defined restriction acts proportionally to the flow rate speed of the medium. Occasionally, the differential pressure can be very small in contrast to the adjacent static pressure in the piping.

Making pressure visible

Pressure can be recorded by the most varying kinds of measuring devices. Most pressure sensors convert the measured pressure into a deformation force. In contrast to inductive or capacitive proximity switches, the pressure value should also be frequently displayed or converted into an analog output signal. With pressure sensing, the measured value is normally disrupted only by temperature influences – the measurement is completely unaffected by density, viscosity or chemical properties.

In general, a distinction can be made between two types of measurements: Direct and indirect measurement systems. The first refer to the physical foundation of the pressure (force per surface).



Pressure sensors in such a density are not always necessary

Pressure compensators, U-tube and inclined tube manometers work according to this principle; all mobile equipment that is used in lab applications. Only a few doctors still use the mercury column for determining blood pressure (unit: mmHg). Pressure compensators are used as primary standards in many accredited test labs. Although they are considered as unusually durable, precise and reliable, these devices have almost completely disappeared from the industrial sector.

An entirely different measuring principle is behind the indirect pressure measurements. In order to generate a signal proportional to pressure, these devices rely on different physical effects. They convert the effect of the pressure directly into a motion and supply this to the display. This can be done either with a pipe or a diaphragm pressure gauge. Thus, manometers rank among the typical mechanical pressure sensors that the industry still uses in many areas, but which are being gradually replaced by electrical measuring transducers, depending on the application.

Even when it comes to electrical pressure measurement, manufacturers resort to the most varying technologies in order to convert the pressure into an electrical signal. Among the most important representative technologies are the strain gauge strips, piezo electric, capacitive and inductive sensors or resonators. The signals that emerge here have to be mostly amplified and made linear. The big advantage of electrical device variants is in their extreme precision, excellent reproducibility, and their flexible connection options to the higher-level systems.

Quick read

The pressure measurement plays a main role in monitoring containers, recording filling levels or flow rates and in many other processes. Each individual application has its specific requirements for sensor technology. In doing so, there is a fundamental distinction to be made between the pressure effects in liquids, gases, and also air.

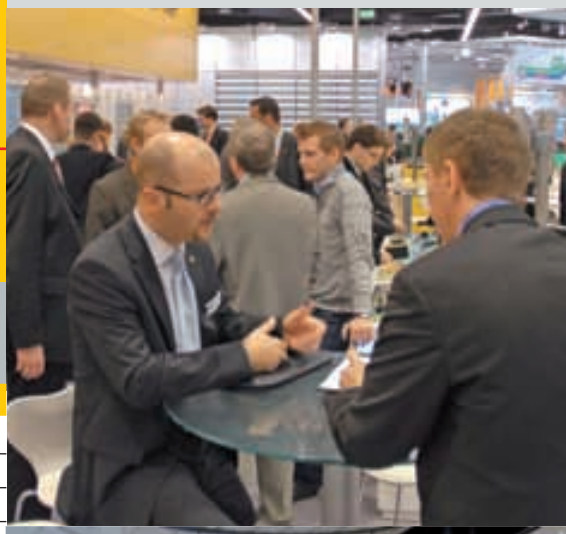
The Turck portfolio

Turck provides its customers with a broad array of products and services for numerous applications in many industries. In addition to the PK series developed with a very small housing exclusively for pneumatic and vacuum applications, Turck offers pressure sensors for gases and liquids in four categories that all function with a ceramic measuring cell. These include the PS series with a robust stainless steel housing, a four-digit, 7 segment display, as well as different variants with switching and analog output; the PC-M series with die-cast housing, 4-digit, 7 segment display and stainless steel connection; the PT series with stainless steel housing and 2-wire technology with analog output and the PC series equipped with a customer-specific switching output. Depending on the series, the precision of the sensors lies within a range 0.3 to 2 percent from the end value.

The most recent solution from Turck developers was unveiled for the first time at the Hanover trade show. The PS300 is a compact pressure sensor for hydraulic applications that is suitable for measurement ranges from -1 to 600 bar. It distinguishes itself through high resistance to overpressure, excellent precision of 0.3 percent, and a completely cast rugged evaluation unit. The PS300 additionally offers three electrical outputs for all measuring ranges. Here, too, Turck relies again on open standards. The new pressure sensors support not only the VDMA menu structure, but also the I/O link communications standard. Metal-supported sealing rings ensure a reliable process connection. ■

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.



Dates	Name of Trade Show	City, Country
20.04. - 24.04.2009	Hannover Messe	Hanover, Germany
22.04. - 23.04.2009	Verpackung Schweiz	Zurich, Switzerland
22.04. - 23.04.2009	SA	Calgary, Canada
05.05. - 07.05.2009	Packex	Toronto, Canada
07.05. - 09.05.2009	E times Automation & Instrument	Hangzhou, China
11.05. - 15.05.2009	Achema	Frankfurt, Germany
11.05. - 15.05.2009	Technical Fair	Belgrade, Serbia
13.05. - 16.05.2009	Factory/Process Automation	Beijing, China
19.05. - 22.05.2009	MSV Nitra	Nitra, Slovakia
26.05. - 29.05.2009	Bulcontrola	Sofia, Bulgaria
27.05. - 29.05.2008	ISA Expo Control	Mexico City, Mexico
28.05. - 30.05.2009	Factory Automation & Instrument	Dalian, China
23.06. - 26.06.2009	Expo Pack	Mexico City, Mexico
23.06. - 26.06.2009	Oil & Gas Show	Moscow, Russia
24.06. - 26.06.2009	PTA	St. Petersburg, Russia
20.08. - 23.08.2009	Ind. Automation & Instruments	Qingdao, China
01.09. - 04.09.2009	go. Automation Technology	Basel, Switzerland
11.09. - 13.09.2009	Machinery and Electronical Exh.	Ningbo, China
14.09. - 18.09.2009	MSV	Bruenn, Czech Republic
22.09. - 24.09.2009	Assembly Tech	Rosemount, USA
23.09. - 25.09.2009	PTA	Moscow, Russia
28.09. - 02.10.2009	Elektrotechniek	Utrecht, Netherlands
06.10. - 08.10.2009	ISA	Houston, USA
07.10. - 09.10.2009	Smart Automation	Linz, Austria
13.10. - 16.10.2009	Scanautomatic	Stockholm, Sweden
14.10. - 15.10.2009	Mocon-Hydromech	Brussels, Belgium
20.10. - 22.10.2009	Motion Control Show	Seoul, Korea
20.10. - 23.10.2009	Miconex	Shanghai, China
28.10. - 31.10.2009	TIB	Bucharest, Romania
03.11. - 07.11.2009	Industrial Automation Show	Shanghai, China
10.11. - 12.11.2009	Elektrotechnika	Ostrava, Czech Republic
15.11. - 18.11.2009	Metalform	Chicago, USA
24.11. - 26.11.2009	SPS/IPC/DRIVES	Nuremberg, Germany
08.12. - 10.12.2009	Elektrovakbeurs	Hardenberg, Netherlands

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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

Editorial Staff
Klaus Albers (responsible)
Karen Keller, Marco Stapelmann

Staff involved in this edition
Holger Anders, Markus Bregulla, Marc DiSera, Klaus Ebinger, Pavel Fateev, David Fazzini, Walter Hein, Frank Humbert, Ryan Kromhout, Qiang Lin, Bo Liu, Shuxiang Liu, Ulf Löfqvist, Peter Praske, Dr. Ulla Reutner, Matthias Schick, Phil Whorton, Deyou Yang

Art Direction / Graphic Design
Arno Kraemer, Britta Fehr (Art design)

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GERMANY
Headquarters HANS TURCK GmbH & Co. KG
Witzlebenstraße 7 ı Mülheim an der Ruhr ı (+ 49) (0) 208 4952-0 ı more@turck.com

ARGENTINA ı Aumecon S.A.
(+54) (11) 47561251 ı aumeco@aumecon.com.ar
AUSTRALIA ı TURCK Australia Pty. Ltd.
(+61) (0) 395609066 ı cameron.dwyer@turck.com
AUSTRIA ı Intermadox GmbH
(+43) (1) 4861587-0 ı imax.office@intermadox.at
BAHRAIN ı TURCK Middle East SPC
(+973) 17 570 376 ı turckmiddleeast@turck.com
BELARUS ı FEK Company
(+375) (017) 2102189 ı info@fek.by
BELGIUM ı Multiprox N. V. (TURCK)
(+32) (53) 766566 ı mail@multiprox.be
BRAZIL ı Sensor do Brasil
(+19) 38979412 ı comercial@sensordobrasil.com.br
BRUNEI ı TURCK Singapore
(+65) 65628716 ı singapore@turck.com
BULGARIA ı Sensomat Ltd.
(+359) (58) 603023 ı info@sensormat.info
CANADA ı Chartwell Electronics Inc.
(+1) (905) 5137100 ı sales@chartwell.ca
CHILE ı Seiman S.A.
(+56) (32) 2699310 ı ventas@seiman.cl
CHINA ı TURCK (Tianjin) Sensor Co. Ltd.
(+86) (22) 83988188 ı marketing@turck.com
COLUMBIA ı Colsein Ltda.
(+57) (1) 2367659 ı info@colsein.com.co
COSTA RICA ı TURCK USA
(+1) (763) 5539224 ı mailbag@turck.com
CROATIA ı Tipteh Zagreb d.o.o.
(+385) (1) 3816574 ı tipteh@tipteh.hr
CYPRUS ı AGF Trading & Engineering Ltd.
(+357) (22) 313900 ı agf@agfelect.com
CZECH REPUBLIC ı TURCK s.r.o.
(+420) 495 518 766 ı turck-cz@turck.com
DENMARK ı Hans Folsgaard A/S
(+45) (43) 208600 ı hf@hf.dk
ECUADOR ı TURCK USA
(+1) (763) 5539224 ı mailbag@turck.com
ESTONIA ı Osauhing "System Test",
(+37) (2) 6405423 ı systemtest@systemtest.ee
EGYPT ı TURCK Middle East SPC
(+973) 17 570 376 ı turckmiddleeast@turck.com
FINLAND ı Oy E. Sarlin AB
(+358) (9) 504441 ı info@sarlin.com
FRANCE ı TURCK BANNER S.A.S.
(+33) (1) 60436070 ı info@turckbanner.fr
GREECE ı Athanassios Greg. Manias
(+30) (210) 9349903 ı info@manias.gr
GREAT BRITAIN ı TURCK BANNER LIMITED
(+44) (1268) 578888 ı info@turckbanner.co.uk
HONDURAS ı TURCK USA
(+1) (763) 5539224 ı mailbag@turck.com
HONG KONG ı Hilford Trading Ltd.
(+852) 26245956 ı hilford@netvigator.com
HUNGARY ı TURCK Hungary Kft.
(+36) (1) 4770740 ı hungary@turck.com
ICELAND ı Km Stal HF
(+352) 56789-39 ı kalli@kmstal.is
INDIA ı TURCK India Automation Pvt. Ltd.
(+91) (20) 25630039 ı sales.india@turck.com
INDONESIA ı TURCK Singapore Pte. Ltd.
(+65) 65628716 ı singapore@turck.com
IRELAND ı Tektron Electrical
(+353) (21) 4313331 ı frank.urell@tektron.ie
ISRAEL ı Robkon Industrial Control & Automation Ltd.
(+972) (3) 6732821 ı robkonfr@inter.net.il
ISRAEL ı Nisko Electrical Engineering & System Ltd.
(+972) (8) 9257355 ı joseph.shapira@niskoeng.com
ITALY ı TURCK BANNER S.R.L.
(+39) (02) 90364291 ı info@turckbanner.it
JAPAN ı TURCK Japan Office
(+81) (3) 54722820 ı info@turck.jp
KOREA ı TURCK Korea Co. Ltd.
(+82) (31) 5004555 ı sensor@sensor.co.kr
KUWAIT ı TURCK Middle East SPC
(+973) 17 570 376 ı turckmiddleeast@turck.com
LATVIA ı Lasma Ltd.
(+37) (1) 7545217 ı inga@lasma.lv
LEBANON ı TURCK Middle East SPC
(+973) 17 570 376 ı turckmiddleeast@turck.com
LITHUANIA ı Hidroteka
(+370) (37) 352195 ı hidroteka@hidroteka.lt
LUXEMBOURG ı Sogel S.A.
(+352) 4005051 ı sogel@sogel.lu
MALAYSIA ı TURCK Singapore Pte. Ltd.
(+65) 65628716 ı singapore@turck.com
MACEDONIA ı Tipteh d.o.o. Skopje
(+389) 70399474 ı tipteh@on.net.mk
MEXICO ı TURCK Mexico S. DE R.L. DE C.V.
(+52) 844 4116650 ı ventasmexico@turck.com
NEW ZEALAND ı CSE-W Arthur Fisher Ltd.
(+64) (9) 2713810 ı sales@cse-waf.co.nz
NETHERLANDS ı TURCK B. V.
(+31) (38) 4227750 ı info@turck.nl
NORWAY ı HF Danyko A/S
(+47) 37090940 ı danyko@hf.net
OMAN ı TURCK Middle East SPC
(+973) 17 570 376 ı turckmiddleeast@turck.com
PANAMA ı TURCK USA
(+1) (763) 5539224 ı mailbag@turck.com
PERU ı NPI Peru S.A.C.
(+51) (1) 2731166 ı npiperu@npiperu.com
PHILIPPINES ı TURCK Singapore Pte. Ltd.
(+65) 65628716 ı singapore@turck.com
POLAND ı TURCK sp.z o.o.
(+48) (77) 4434800 ı poland@turck.com
PORTUGAL ı Salmon & Cia. Lda.
(+351) (21) 3920130 ı salmon@salmon.pt
PUERTO RICO ı TURCK USA
(+1) (763) 5539224 ı mailbag@turck.com
QATAR ı TURCK Middle East SPC
(+973) 17 570 376 ı turckmiddleeast@turck.com
ROMANIA ı TURCK Automation Romania SRL
(+40) (21) 2300279 ı romania@turck.com
RUSSIA ı O.O.O. TURCK Rus
(+7) (495) 2342661 ı russia@turck.com
SAUDI-ARABIA ı TURCK Middle East SPC
(+973) 17814920 ı turckmiddleeast@turck.com
SERBIA AND MONTENEGRO ı Tipteh d.o.o. Beograd
(+381) (11) 3131057 ı damir.vecerka@tipteh.rs
SINGAPORE ı TURCK Singapore Pte. Ltd.
(+65) 65628716 ı singapore@turck.com
SLOVAKIA ı Marpex s.r.o.
(+421) (42) 4426986 ı marpex@marpex.sk
SLOWENIA ı Tipteh d.o.o.
(+386) (1) 2005150 ı damijan.jager@tipteh.si
SPAIN ı Elion S.A.
(+34) 932982000 ı elion@elion.es
SOUTH AFRICA ı R.E.T. Automation Controls (Pty.) Ltd.
(+27) (11) 4532468 ı info@retauto.co.za
SWEDEN ı TURCK Office Sweden
(+46) (31) 471605 ı sweden@turck.com
SWITZERLAND ı Bachofen AG
(+41) (44) 9441111 ı info@bachofen.ch
TAIWAN ı Taiwan R.O.C. E-Sensors & Automation Int'l Corp.
(+886) (7) 7220371 ı ez-corp@umail.hinet.net
THAILAND ı TURCK Singapore Pte. Ltd.
(+65) 65628716 ı singapore@turck.com
TURKEY ı TURCK Consulting Office Turkey
(+90) (216) 5722177 ı onur.celik@turck.com
UKRAINE ı SKIF Control Ltd.
(+380) (44) 5685237 ı d.startsew@skifcontrol.com.ua
UNITED ARAB EMIRATES ı TURCK Middle East SPC
(+973) 17 570 376 ı turckmiddleeast@turck.com
URUGUAY ı Dreghal S.A.
(+598) (2) 9031616 ı cratti@dreghal.com.uy
USA ı TURCK Inc.
(+1) (763) 553-7300 ı turckusa@turck.com
VENEZUELA ı CADECI C.A.
(+58) (241) 8345667 ı cadeci@cantv.net
VIETNAM ı TURCK Singapore Pte. Ltd.
(+65) 65628716 ı singapore@turck.com

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Hans Turck GmbH & Co. KG
Witzlebenstraße 7
45472 Mülheim an der Ruhr
Germany
more@turck.com
www.turck.com

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