Issue 01
2007

more@TURCK

The Magazine for Customers of the Turck Group

Interview
Production in Germany is a recipe for success, says Werner Turck **Page 14**

Knowing What's to Come

The use of RFID in industrial manufacturing offers new rationalization potential

more@TURCK

High Expectations

Companies that offer their customers highly demanding solutions should have similarly high expectations when it comes to communication with their customers. Hopefully, you have come to know that Turck is just such a partner. One who not only rates high with its innovative products, but also its strong worldwide sales offices, which offers real-time solutions to meet your needs. Even on the Internet, we back up expectations by providing customers with a plethora of information at any time. Under www.turck.com, you will find everything there is to know about the 13,000 Turck products from the fields of sensor, interface, connection and fieldbus technology for manufacturing and process automation. In this first issue of **more@TURCK**, we would like to share with you the opportunities that our Internet product database has to offer, on page 41.

With this new customer magazine, we now intend to live up to the high expectations of our relationship with our customers. **more@TURCK** replaces the TURCK report that you are already familiar with and is scheduled to be published twice a year. You can look forward to an interesting mix of current product introductions, exciting trend and application reports and much more from Turck with **more@TURCK**.

Take a mental picture of this magazine and let us know whether **more@TURCK** meets your high expectations. What do you like? What don't you like? I'm just as excited about your feedback as is the team that has been working on this magazine for the last few months. Oh, and speaking of pictures: Take part in our photo competitionsending us an exciting photo of your working environment. With a bit of luck, you might win a powerful notebook computer.

I'm keeping my fingers crossed for you and hope you enjoy reading our first issue of **more@TURCK**.

Warmest regards

Ulrich Turck

Content

For Sasol's plant in Brunsbüttel, Germany, Turck delivered more than 30 excom remote I/Os.
Page 26

A new eddy current sensor can detect different metals regardless of distance. Page 32

Turck duotec develops and manufactures customized electronic solutions. Page 36

Close to the Customer

It doesn't always have to be a trade show! Using this slogan, in addition to trade show attendences, Turck intends to rely more heavily on road shows to reach customers and potential customers directly on site. The first steps toward this goal were the first ID workshops that Turck held with its partner Banner at the beginning of the year. Customers and interested parties were able to acquire information on the manufacturer's current products and solutions as well as to talk about experiences and concrete applications concerning identification and RFID. During the meeting, the manufacturer and system integrators presented their products and discussed the solutions they have implemented. Participants also had the time and opportunity to take part in detailed application discussions.

Webcode **more10710e**

Info

You can find more information on the reports or product presentation in **more@TURCK** online under www.turck.com. Simply enter the Webcode that you find at the end of each article in the search field. Using the article page that appears next, you can navigate directly to the product database or download/send the article as a pdf.

Diagnostic Power Conditioner System

Brand new in the Turck portfolio is the Foundation Fieldbus Diagnostic Power Conditioner System (DPC-System). The DPC system has an integrated diagnostic unit that supports the user when starting up a fieldbus system, and can even detect subtle changes within individual fieldbus segments. With a corresponding alarm, plant disruptions caused by fieldbuses can be completely avoided. In order to make complex fieldbus diagnoses transparent for operators, the individual values are graphically displayed in the Asset Management System by means of a DTM (Device Type Manager). This can be integrated into as many FDT mounting frame applications as desired. The DPC system generally supplies up to 16 segments redundantly, each with 800 mA and 30 VDC.

Webcode **more10711e**

Measuring Light Curtain

Turck is expanding its optics program with the measuring light curtain called EZ-Array, produced by its partner Banner. The light curtain has a resolution of 5 mm, two switching and two analog outputs. The user may choose between PNP and NPN switching outputs, as well as between 0-10 V and 4-20 mA analog outputs. As the only device in its class, the EZ-Array can be used in a temperature range of between -40 to +70 °C. The two-part light curtain can be configured via six DIP switches. A three-digit display and an LED bar graph display the status and orientation of sender and recipient on site. The operating modes include detection of the first, last or middle beams, the number of blocked beams, the number of blocks, inversions and blanking. Among other things the device can be used to detect holes, measure contours, control edges or measure objects.

Webcode **more10712e**

For Pneumatic cylinders

▶ **At the Hanover trade show**, Turck introduced a new magnetic field sensor for querying the position of pneumatic cylinders. The BIM-UNT can reliably detect all magnets in commercial pneumatic cylinders so that it is no longer necessary to stock different sensor types. The BIM-UNT is also just as user-friendly when it comes to assembly and alignment. A pre-setting lip facilitates one-handed assembly in the T groove. The sensor can be adjusted in the groove and attached using a stable wing screw made of tool steel. The attachment screw near the cable outlet reliably prevents the sensor from being removed due to pulling on the cable. A LED indicates the switching state at all times.

▶ Webcode **more10713e**

Fieldbus Cables now Delivered just in time

▶ **As part of the** JiT 5D program, effective immediately, Turck will be delivering individual converted fieldbus and power supply cables within five business days. The customer can select cable lengths up to 5 meters in 0.5 meter increments, between 5 and 50 meters in 1 meter increments. For shorter distances, a 30 cm cable is available. In addition to 4 and 5 pole power supply cables, the 5 day just-in-time delivery program also includes fieldbus cables for Profibus DP and PA, as well as Foundation Fieldbus and DeviceNet. All cable types are available with angled or straight M12 and 7/8 plug-in connectors. With the new just-in-time delivery program, Turck is supporting the increasing customer requirements for greater machine and plant availability with low storage costs.

▶ Webcode **more10714e**

Reinforcement for PA Sales Team

In addition to PA product management, Frank Rohn now also supervises worldwide sales for this business unit

▶ **Frank Rohn** has assumed responsibility for the worldwide sales activities for the PA business unit. In the last few years, the 43-year-old engineer has decisively driven forward the expansion of the PA business unit. With a revised organization structure, Turck is underlining the growing importance of the process automation market and is taking into account the market conditions. “Like no other business, process automation is characterized by international project business, but also by the strong distinctions between applications and technologies,” explains Rohn, who represents Turck in numerous associations, including ZVEI. He is also a member of the board of the PACTware Consortium and Member in the FDT Group Executive Commitee.

Responsible for factory automation in Germany and the worldwide automotive team: Christoph Zöller

The sales and marketing activities in Turck’s factory automation business unit are not affected by the change in the PA division. Aside from the centrally controlled worldwide automotive team, Turck continues to build on regional responsibilities in the individual business units. Christoph Zöller is the sales director responsible for the German market and the worldwide automotive team.

▶ Webcode **more10715e**

ATEX Approval

Effective immediately, the pressure sensors PS400/500/600 series will be delivered at no additional charge with an ATEX approval for Zone 2 (gases and dusts). In accordance with 94/9/EC, or ATEX100a for short, the sensors are also suitable for areas where the production processes produce gases, steams and dusts that, when mixed with the surrounding air, form an ignitable compound.

Webcode **more10716e**

Added Features for Pico Guard

The fiber optic security system, Pico Guard, from Turck's partner Banner, welcomes a new addition. An optic emergency OFF switch is now available as well as heavy-duty locking switches made of stainless steel for use in raw and agressive environments. With new one-way light cabinets, access controls with 2, 3 or 4 beams can be additionally operated and used up to Ex-Zone 0.

Webcode **more10717e**

Plug & Play Fieldbus Display

Process values from Profibus PA or Foundation Fieldbus subscribers can be displayed using the new fieldbus displays directly on site. The LC display in the FD-48-T317/EX and FD-49-T317/EX models displays up to three process values that can originate from a single, as well as varying, fieldbus subscribers. The measured values are shown transparently and in a user-friendly manner, with a number amount of 30 mm and an additional 41-segment bar graph on the quasi-analog display. The values can be displayed either cyclically or through manual switching. Particular value was placed on simple operation. The fieldbus display is a "listener", and not as a classic fieldbus subscriber. So the device can be effortlessly integrated into the network without host configuration or driver files. The user can completely parameterize the display using two buttons. The power is supplied via the fieldbus (< 10 mA).

Webcode **more10718e**

Universal Flow Meter

The FCMI, a magnetic inductive flow meter, is the newest member of Turck's flow rate sensor family. With this measuring principle, the new flow meter is suitable for recording almost all electrically conductive liquids that indicate a certain minimum conductivity. The FCMI distinguishes itself through an especially high measuring span dynamic of 0…40 l/min and a measurement accuracy of 2 %. Because the sensor does not require mechanically moving parts in volume flow, it is not sensitive to contaminants in the medium. In contrast to other processes, no reduction in the tube cross-section is necessary which means that there is practically no pressure loss. The FCMI is suitable for the most varying media and a broad range of applications. It is of particular interest for applications in the machine construction industry, but for the following industries as well: water, waste water, chemical, pharmaceutical, mining, cement, paper, steel and power generation.

Webcode **more10719e**

IO Assistant 3.0 Uses FDT Technology

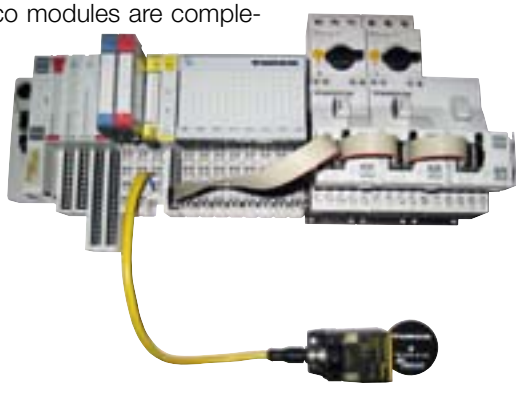
IO Assistant 3.0 is the new generation of the proven project planning, start-up and maintenance tool for fieldbus and interface systems. In contrast to previous versions, the IO Assistant 3.0 is based on the standardized FDT technology that Turck supports with many products. The modular software provides the option of using the DTM (Device Type Manager) of the IO Assistant 3.0 in varying frame applications. This reduces the complexity of many systems and makes the entire solution transparent. All relevant equipment features are visualized transparently and in a user-friendly manner. The IO Assistant 3.0 supports the Turck I/O systems BL20, BL67 and excom, as well as numerous interface solutions.

Webcode **more10720e**

"Integrator" BL20

Numerous expansions have completed the Turck BL20 I/O system for Profibus, CANopen, DeviceNet, Ethernet/IP and Modbus TCP. Now available are the new motor starter modules that can control the motors as a direct or reversing starter up to 5 kW with minimal wiring effort. New RFID modules for incorporating the BL ident systems and the CoDeSys-programmable Gateway, that can relieve higher-ranking control systems, are also available. In addition to standard modules, Turck now offers the extremely compact economy modules that can house up to 16 I/Os on only 12.5 mm width. No tools are necessary, thanks to the integrated connectors with "push-in" spring-balancing technology. The Eco modules are complemented by the new eco Gateway, which also celebrated its premiere in Hanover.

Webcode **more10721e**



Focus on Food Packaging

Dr. Bernhard Grimm is Turck's specialist for the food and packaging industry

As branch manager for the food and packaging industry, Dr. Bernhard Grimm has his sights set on the market for food and pharmaceutical packaging. Dr. Grimm has an advanced degree in physics and is responsible for expanding the existing product range into new target industries. In addition to the automobile and process engineering industry, Turck intends to make the food and packaging industry its third sales mainstay.

Webcode **more10722e**

Plug-in Connector up to 150 °C

With high temperature-resistant circular plug-in connectors, turck is meeting growing customer requirements for a higher temperature capacity. The new M12 and M8 Connectors can be used for ongoing operation in the temperature range of -20 to +150 °c. The peak temperature capacity can be as high as +200 °c. Plugs and couplings are available, both as axial and angled variants.

Webcode **more10723e**

Turck RFID package BL ident: The new programmable gateway relieves the higher-level control system

Knowing What's to Come

Whether optimization of production and logistics processes or quality assurance - the use of RFID in industrial manufacturing offers new rationalization potential

In automobile production, high temperature-resistant RFID systems facilitate the greatest amount of transparency without "monitoring gaps"

If the daily papers report on RFID applications, then it's mostly in the field of retail or logistics. What the public is unaware of is the fact that RFID has also been successfully used in production for years. And this trend continues to rise. According to a study conducted by the ARC Advisory Group, the market for RFID applications in production is growing by almost 9 percent annually. In 2006, the market recorded a total of $208.8 million, the study predicts a market total of $319.5 million for the year 2011.

Higher productivity

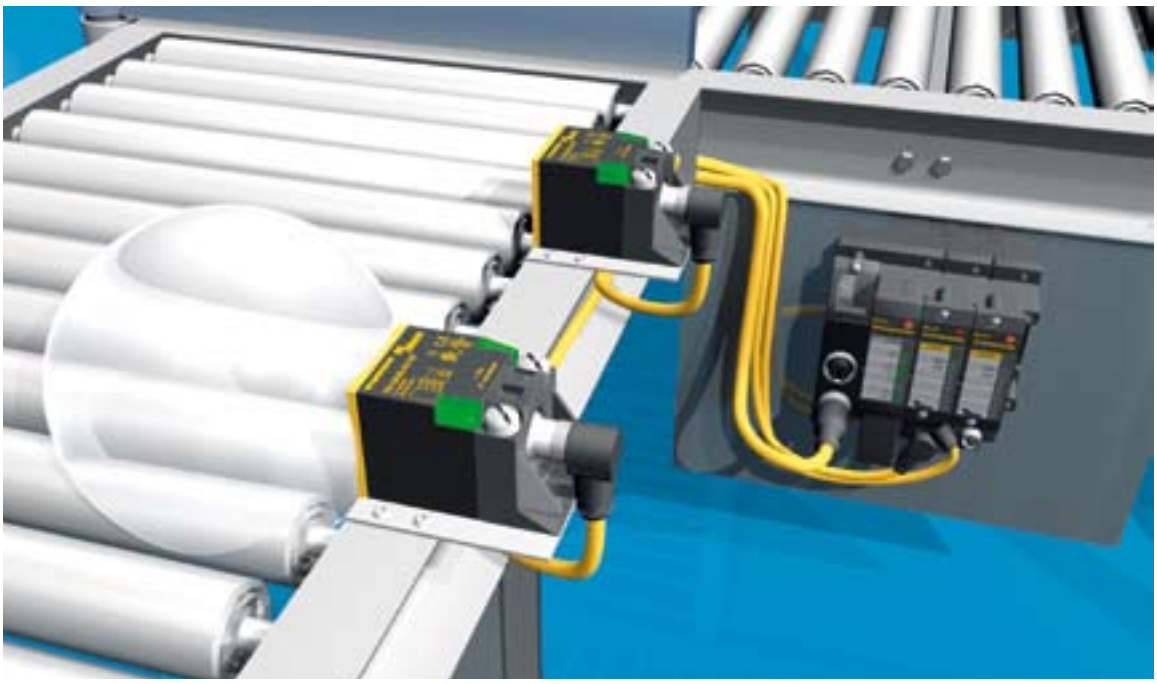
"The use of RFID can be particularly worthwhile for internal operational sequences such as production control or warehousing and logistics," explains Dr.-Ing. Marc C. Lemmel, department manager at the Bremer Institut für Betriebstechnik und angewandte Arbeitswissenschaft [Bremen Institute for Operating Technology and Applied Science]. "Even for processes already automated, there is, under certain circumstances, optimization potential such that the investment can also amortize in the short term," says Lemmel.

With RFID applications in production, it's about knowing exactly where which data carrier or which product currently is in order to then implement the corresponding processing steps. For example, in the automobile industry - where RFID systems have been used for years in about 80 percent of the automobile factories - each vehicle is assigned a transponder. It can be mounted on the chassis or on the pallet and will accompany the future vehicle along the entire production line. The transponder contains all individual production data such as model, color, customer, special equipment, etc.

RFID can also be very advantageous in quality assurance. For each product tested, the test results can be written onto the RFID tag accompanying the product, so that at the end of production, the product also comes with a detailed QM protocol that not only displays the test results, but also proves

Read quickly

Not only in logistics, but also in production, the RFID systems offer many options for making processes more efficient. However, the requirements are completely different compared to those for retail or distribution. For RFID applications in production, it's all about knowing precisely at any time which product is where, in order to implement the corresponding processing steps. To achieve this, a complete, transparent coverage of the entire production area is necessary, even in the kilns at 210 °C. At the latest at this point, most RFID solutions available on the market fail.



Flexible: BL ident permits multiplex or parallel operation of the write-read heads

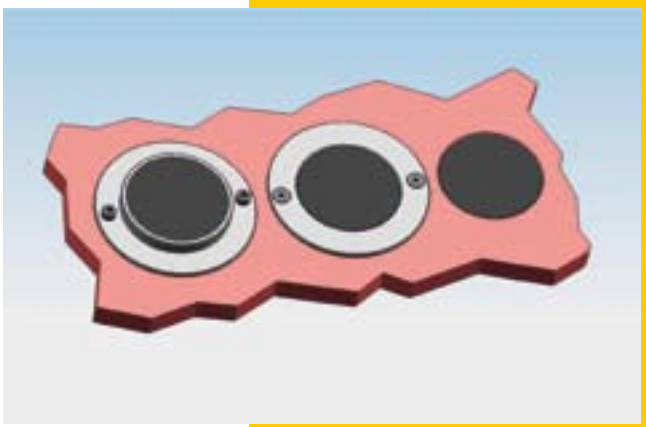
that the product was in fact tested. This means that the concept of an RFID system goes far beyond replacing a barcode. A large part of the growth in this field will take place in small and medium-sized companies. They are mostly job shops with a high vertical range of manufacturing that have considerably slimmed down their production in the last few years and they have exhausted the classic methods for improving productivity.

For this reason, RFID is often seen as the next opportunity to optimize internal processes, such as production logistics and production control. In contrast to retail applications, this approach is mostly used in a closed system. Within a determined manufacturing area, the transponder is written with the necessary data, extracted at the end and, in one loop, the new data is supplied to the next product. In such a system, the costs for an RFID tag play only a minor role. In fact, the focus is on the cost benefits after the initial investment.

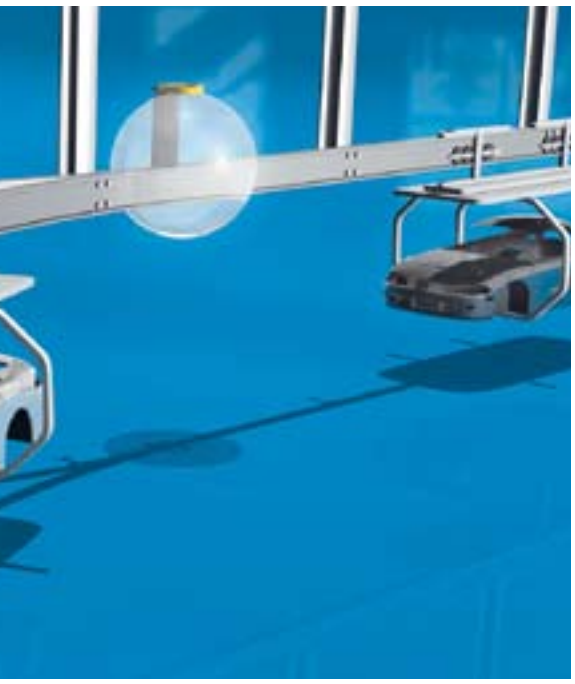
Systems for production

Transponders can be developed that best meet the special requirements for industrial use: they withstand moisture as well as dust and vibrations. The storage capacity has to be very high for the often extensive data that is necessary for production control. In some industrial applications, up to 16 Kbytes are required,

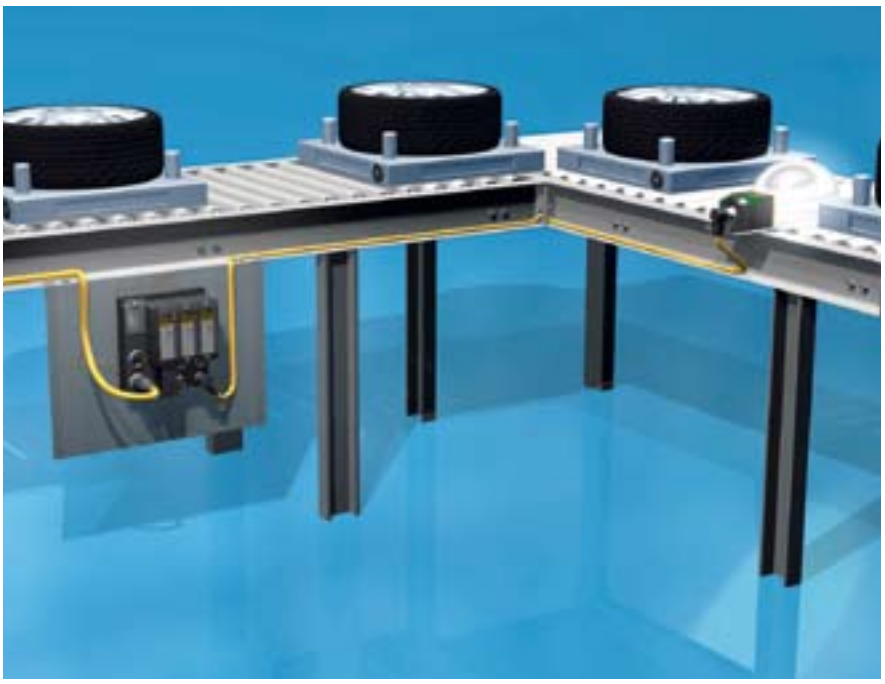
Turck enhances RFID system



At the Hanover trade show, Turck introduced enhancements to its high temperature RFID system BL ident. In addition to a write-read head with an enormous range of 50 cm for industrial applications, special write-read heads for Food & Beverage applications in M18 and M30, as well as newly developed data carriers, will be shown that can be directly mounted on or in metal. The data carriers are available in an economy and an especially flat, high-end design. While the high-end data carriers are produced with a 1 mm thick screening foil, the economy design version ensures a high casing for the necessary minimum distance of 10 mm to the metal. The new write-read head with a 50 cm range will be exhibited in Hanover as a prototype. It is suitable for the read-out of data carriers that are mounted on the underside of a vehicle. The device has a reader integrated into the antenna which makes the system insensitive to disturbances and facilitates use in a rough, industrial environment. The 50 cm write-read head should be available as a standard 350 x 350 x 25 mm housing in the third quarter.



To be tough: whether production sequence control ...



... or flow of goods, the Turck RFID package is ideal for tough industrial use

the rule is 2 Kbytes. In contrast to this, tags for distribution or retail just require between 1 bit and 32 bit. For use in production, substantially more data can be recorded, and when used in closed systems, the tags simply have to be rewritten numerous times. That's why the tags from the BL ident systems from Turck are equipped with EEPROM and FRAM memories. These rewritable memories are currently being offered in memory sizes of up to 2 kBytes. FRAMs can be written up to 10^{10} times and offer a substantially higher speed than EEPROMs, which can often endure considerably fewer write-read cycles. If considerable requirements for speed are made or if data has to be continually stored on the tags, then the only choice the user has is a data carrier with FRAM memory. If, for example, data is written in second-based rhythm, in the case of an EEPROM, the memory can no longer be securely used after six days, while a FRAM will last more than 300 years.

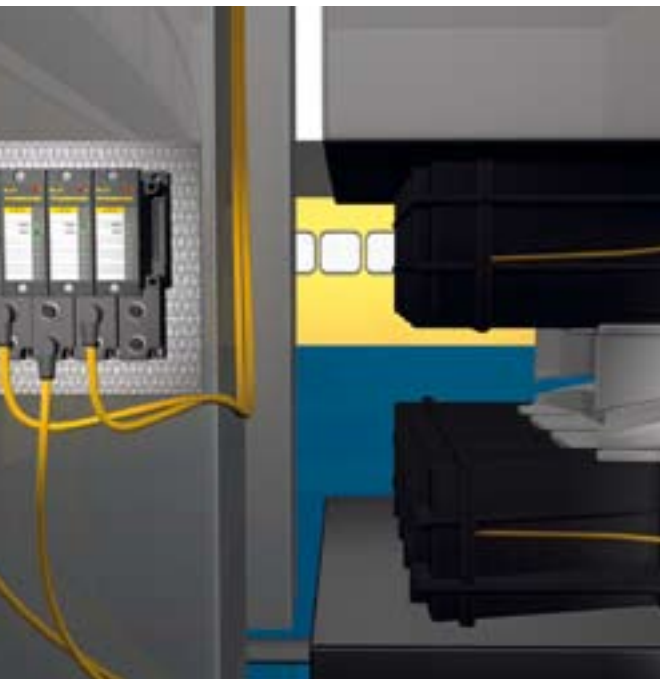
In order to be able to realize short cycle times and high processing speeds, the tags must be written and read out in the shortest time. BL ident creates write-read times of 0.5 ms per byte and is therefore one of the fastest systems on the market. That is the requirement for high cycle times and an "on-the-fly" data transfer. Previous RFID systems worked in the considerably slower 125 KHz range; modern systems use 13.56 MHz technology. Thanks to the higher frequency, considerably more information can be modulated on the carrier wave and the volume of the data to be transferred per second increases. The frequency range of 13.56 MHz is insensitive to disruptions caused by different radio waves that occur in production since industrial interfering fields that are radiated from welding machines, for example, are normally below 1 MHz.

Faster data transfer

Another technology that also increases the write-read speed is Multi-channel systems in which numerous write-read heads are connected to a single interface and currently function mostly in multiplex processes. This means the write-read heads are prompted one after the other. If the tags on the heads are continually on the fly, this leads to problems if two tags have to be read simultaneously. Conversely, the BL ident system simultaneously prompts all write-read heads; data is transferred in parallel. If the installation situation requires it, multiplex operation is also possible.

A further characteristic applies to industrial production: extreme temperatures. A paint shop is integrated into almost every production process. So that RFID tags can truly accompany the product

Ford plant in Genk, Belgium: The high temperature tag developed by Turck (circle) accompanies the skid as it moves through the Paint Shop and withstands the paint and the heat



BL ident permits a modular design

The 210°C data carrier can be written/read immediately after the oven

from the beginning to the end of production, they also have to be able to endure high temperatures of up to 210 °C. For this purpose, Turck has developed special high temperature tags that work reliably in this temperature range and can be written or read out directly behind the oven. The fact that these special tags cover an interesting market is indicated by the number of 4,500 high temperature tags that Turck installed in 2006. But even the best write-read head won't be of help if the RFID system is not optimally connected to a higher-level control-world. If delays occur in the communications channel, the reaction times and application speeds are reduced, thus unnecessarily driving up production costs.

BL ident relies on separation in this case, which means that individual commands are processed asynchronously. Therefore, read and write commands, regardless of the presence of a data carrier in the so-called "air interface" of the transceiver, can be saved in the interface modules. If a data carrier enters the "air interface", it is then processed without any delay at all. Theoretical application speeds of up to 30 m/s are therefore possible. The read data are then stored in the interface modules and requested one after the other by the overlapping control system level without a time delay occurring in the application. This is also an essential requirement for reading and writing on the fly. When connecting to the control world, BL ident additionally offers the option of falling back on standards like Profibus, DeviceNet or Ethernet used in most applications.

Programmable gateway relieves control system

Turck has developed a programmable gateway to supplement to the existing interface component of the BL ident system. It can be programmed via the programming languages common for control systems, and processes 1,000 (instruction list) commands in less than a millisecond. Through the integration of this gateway, the higher-level control system is relieved, because the entire handling of the often complex RFID communication can now be done directly and decentrally in the gateway. The functional component necessary for SPS (Proxy Ident Block) is listed on site in the programmable gateway. With the higher-level control system, only the user data has to be replaced.

By relieving the higher-level control system, the overall data processing speed in the system increases. Additionally, the RFID system can be connected to the control systems from different manufacturers without adjustment and programming efforts, even if no functional component is available for these control systems.

Author

Walter Hein is product manager for RFID at Hans Turck GmbH & Co. KG

The BL ident complete package from Turck contains all components for industrial RFID use

“RFID Investment Amortizes”

During its “EmPoR” project, the Bremer Institut für Betriebstechnik und angewandte Arbeitswissenschaft (BIBA) [The Bremen Institute for Operating Technology and Applied Science] examined the usability of current RFID systems in internal logistics. Department manager Dr.-Ing. Marc C. Lemmel explains the application options offered by RFID.

Dr. Lemmel, when will RFID replace today’s conventional barcode?
The RFID technology generally has no aspiration to replace similar systems such as the barcode. There are numerous application fields in which existing processes can also be successfully used without there being a major optimization potential.

In other words – where does RFID offer advantages in industrial applications compared to other ident technologies?
First of all, in the main sector of global transport logistics for which RFID only makes sense if all participants in a supply chain use a uniform system consistently. For medium-sized companies, on the other hand, the internal use can pay off, especially for internal sequences such as in production control or warehousing and logistics. Even with already automated processes, there is, under certain circumstances, optimization potential such that the investment can also amortize in the short term.

When is it recommended to fall back on RFID technology?
In goods identification or their positioning, RFID is particularly useful if bigger flow-rates are being operated in shorter cycle times and at a high automation level. But, as stated, using RFID systems doesn’t necessarily have to improve performance. However, there are application fields in which this technology is considerably more efficient than the barcode. For example, in a cold storage warehouse or a mill where visual identification is difficult. Or if additional information, for example, hazardous goods classes, are supposed to be stored on the label. A monitoring sensor can also be integrated with the so-called RFID-S technology. That’s how the temperature or moisture of a product can be controlled.

How does the RFID process data with such high data volumes?
When it comes to data management, there are two different approaches, both are conclusive and experts are split into two camps on the topic. One approach is similar to that of the barcode in which only one unique name, for example, the “electronic product code”, can be stored on the transponder and then this entire product description stored in a central database. This reduces the transponder costs and lowers cycle times, which is very efficient for large quantities. In the second approach, the ability to store data on the RFID transponder is taken advantage of. Thus, during the entire process chain, product data can be retrieved and added to. This approach requires more investment, but data management is easier.

What obstacles are currently blocking the use of RFID in medium-sized companies?
In addition to physical difficulties such as range, influence of metal and liquids or limited write-read speeds, the lack of standardization has to be underlined. This makes selecting the right manufacturer and covering the entire supply chain using one system especially difficult.

And the costs?
For suitable areas of application, the investment is already paying off. With increasing acceptance, the costs of the systems are dropping noticeably.

▶ Webcode **more10700e**

Dr.-Ing. Marc C. Lemmel is department manager at the Institut für Betriebstechnik und angewandte Arbeitswissenschaft at the University of Bremen (BIBA). BIBA operates a demonstration center with the most varying range of RFID applications. A concrete example is the project “EmPoR – application options and potentials of RFID in the logistics of small and medium-sized industrial companies”.

www.biba.uni-bremen.de

Werner Turck, founder and president of the Turck Group, is an absolute advocate of Germany as a production base

“We are investing heavily in Germany”

Production editor Joachim Vogl spoke with Werner Turck about the Turck Group’s recipe for success

Mr. Turck, what kind of growth rates has your company recorded in the past few years?

While many companies operate their production overseas in order to be able to offer competitive prices, Turck is absolutely competitive despite having its production base in Germany. The success of the Turck Group is demonstrated by its consolidated global sales which have enjoyed double-digit growth since the company began doing business. In 2005 we also managed to record a growth rate of considerably more than 10 percent. We achieved this goal again in 2006. What is interesting is that the contribution to this success from our overseas operations is continuously growing, which, in turn, reflects positively on Germany as a production base because we produce all our electronic components here.

Are you an advocate of Germany as a production base?

Yes, at least for our company. And there is a simple reason for that: We depend on innovation and on the high-tech products that are developed in our parent companies in Germany. And where products are developed, that's where they have to be produced because the cycle times are relatively short, especially in the electronics sector.

Do you also have production facilities overseas?

As I said, the core electronics for all Turck products are developed in direct proximity to the development process. We deliver these assembled and fully functional printed circuit boards to our assembly plants in the U.S., China and Switzerland. There, the finished devices are assembled and primarily cover the needs for those regions.

How many employees does Turck have?

We are experiencing continual growth when it comes to employees. The endless discussion of "laying off" workers is destructive and counter-productive. Our company is made up of people and it is people that represent our potential. I involve these people and I do treat them with the utmost respect – that is my philosophy. The consequence of this philosophy and this culture that I also incorporate into the company are motivated employees. People should take priority over capital and not vice versa. Unfortunately, the prevailing attitude in many companies is just the opposite: Capital and earnings are the top priority, the company shareholders want to see dividends and the companies conduct business accordingly. If an employee is laid off, the company saves costs, the share prices go up, but is not a sensible approach. I would never want to have to work for such a company. I have a different view. I believe that the employees and my cooperation with them come first. Motivated employees are my asset and guarantee the future of my company.

What have you or what will you invest in Germany as a production base?

We are investing very heavily in Germany. We are using the best technologies that we can find. In the past three years, for example, we have invested an enormous amount of money in new placement technologies. In 2007, for example, we will replace older placement machines with newer, much more modern ones. Because the new machines can be integrated much better into modern and flexible production flows, this process makes sense even if the old machines are still worth hundreds of thousands of Euros. We want to manufacture the best possible products – with the best possible quality – and, in doing so, achieve the greatest possible production intensity.

Do you also plan to invest in overseas locations?

We are investing in overseas locations more with respect to sales-oriented personnel growth and additional assembly capacities. We have just completed a new plant in China for expanded production. Also, in the U.S., we are encouraging stronger growth through corresponding investments and expansion.

How do you shape your innovation process?

Our innovation process must be shaped based on the customer's applications. That is the basic challenge. Never resting, but keeping our eyes open and monitoring future trends. To this end, you have to consider the global markets, on the one hand, and the technological developments, on the other. Then you have to bring the two in line with one another. We are a leading company in the automation industry. No other country in the world can compare to Germany in this field. To stay ahead, a well functioning innovation process is especially important.

▶ Webcode **more10730e**

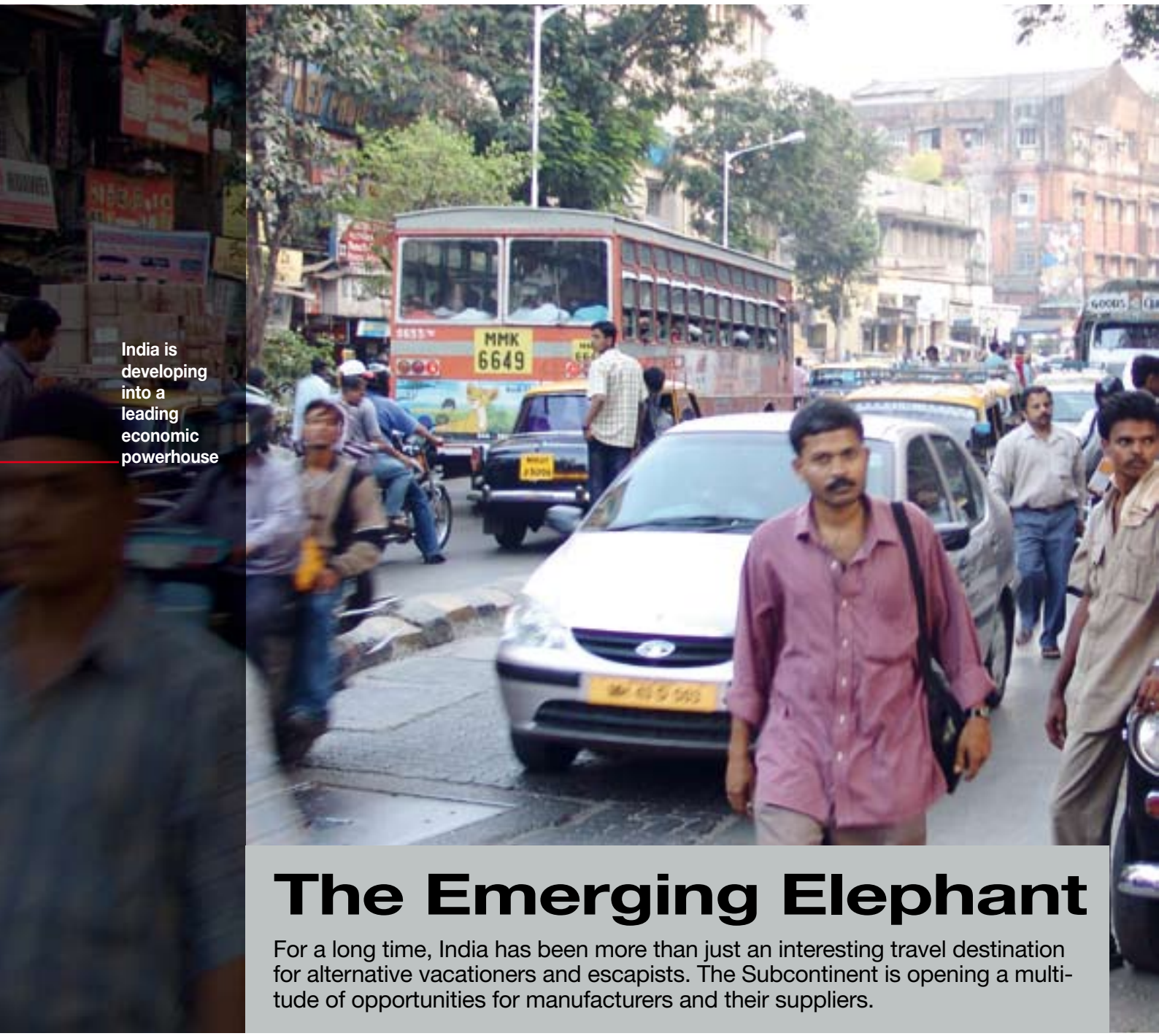
"The endless discussion of "laying off" workers is destructive and counter-productive."

Werner Turck

"Our innovation process must be shaped based on the customer's applications. That is the basic challenge."

Werner Turck

Author
Joachim Vogl is the editor of the business magazine Produktion
www.produktion.de



India is developing into a leading economic powerhouse

The Emerging Elephant

For a long time, India has been more than just an interesting travel destination for alternative vacationers and escapists. The Subcontinent is opening a multitude of opportunities for manufacturers and their suppliers.

It is hard to understand India as a whole. In the land of the holy cow – which, by the way, is being banned from more and more cities – 1.5 million students graduate each year. Yet, one in three Indians is still unable to read. Since the 70's, the caste system has been virtually abolished. In the cities, in particular, the traditional separation between the individual social groups no longer exists for the most part. In rural regions, on the other hand, the old social structures are still strongly entrenched.

About 40 percent of the population earns less than 35,000 rupees per year (that's about equal to 600 Euros), 60 million children are suffering from malnutrition. At the same time, India is the largest buyer of gold jewelry worldwide.

The economy is booming

The chances that poverty in India will soon be a thing of the past are increasing, though. The Indian economy is booming, and the extent to which it is doing so is happening in only a few other countries. After economic growth reached 8 percent in 2003, the Indian economy expanded again a considerable 7 percent in 2004, according to Deutsche Bank research. Market researchers are even assuming that the country, with its 1.1 billion inhabitants will develop into the world's third largest economy – after the U.S. and China and ahead of Japan. At the same time, a middle class with purchasing power is growing and according to national estimates, it makes up about 20 per-

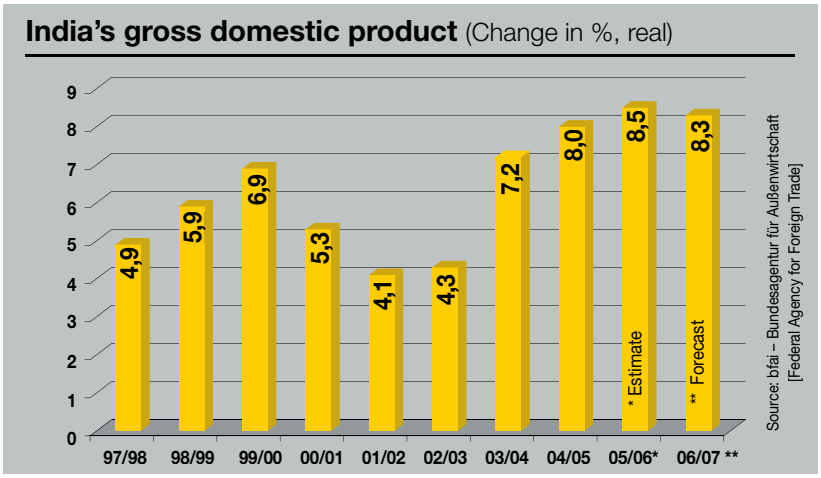
cent of the population. With these new affluent citizens, the demand for consumer goods, such as stereo systems, refrigerators and cars, is growing. According to estimates from the strategy and technology consulting firm Booz Allen Hamilton, in the coming five years, the country will move up into fifth position among the most important automobile markets worldwide. The growing income of the middle class will double passenger car sales by 2010.

Becoming an export nation

For a long time now, India has played an important role in the world economy – the Subcontinent is an important exporter of raw materials and finished

Read quickly

India is unstoppable as it forges ahead to becoming a leading economic powerhouse. The newly growing middle class is demanding more and better products, the industry is producing at a quality that is coming close to that of European standards. This country is developing a market that is becoming more and more interesting for German companies. Even Turck is showing its colors in India with its own subsidiary.



Rapid upswing: increase rates of 8 percent

goods, but also of skilled workers. Software products and software programmers come from India, and the country has a large number of skilled and well-educated workers. Germany is one of its most important trade partners: "German companies recognize our strengths," says K. Ramaswamy, chairman of the automobile supplier Roots Group. "We produce on an international standard in this country, but at competitive prices."

This means that the country is also edging on the German market. Rajeev Tandon, associate vice president of the Delhi-based Hero Group, the world's largest bicycle parts producer, underscores, "Germany is a major market that is worth entering. The Germans do value good quality and reasonable prices."

Quality requires automation

In turn, it is automation that is creating excellent opportunities for German companies to find an interesting sales market in India. Because being able to produce at this high a quality requires not only highly skilled workers, but also the most modern production machines and equipment. To this end, machine tools and automation technology from Germany are in high demand because they can be used to achieve the necessary output and produce precision products. Thus, the market for automation is growing annually by 10 to 12 percent and is exceeding the country's economic growth rates. And still, India is a net importer in most manufacturing industries, according to the German Federal Agency for Foreign Trade [Bundesagentur für Außenwirtschaft]. The quality of the Indian manufacturers is constantly increasing, machine export rose by almost 30 percent between 2003-2004 and 2004-2005.

The sales opportunities for machine tool manufacturers from overseas, according to the opinion of the "Indian Machine Tool Manufacturers Association" (IMTMA) will slip over the long term due to the increasing technological advancement of local producers. That's why it's even more important for German component manufacturers to be present with their own local facilities in order to cover the demand of Indian manufacturers for advanced technological components that are required for modern production plants.

Stabile surroundings

India offers positive location factors for establishing subsidiaries. The country's biggest advantage is its enormous pool of skilled workers. Each year about 300,000 students graduate with engineering degrees. The country also offers a high level of stability for a newly industrialized country, both in economic and political terms. In contrast to China, the Indian government is democratically elected and the strategic direction of the country meets a broad political consensus. So even a change in the governing parties – the BJP government was replaced by the Congress party – barely impacted policy.

Moreover, the Reserve Bank of India managed to maintain the value of the rupee against the US dollar even in times of regional or international turbulence. Despite a deficit of 8 percent of the gross domestic product (GDP) in 2004-2005, India has one of the world's largest transport networks. The road system (in km), in total, is double that of China. However, the conditions of the roads, from a European perspective, is catastrophic and is a frequent barrier to the country's growth. According to Prime Minister Manmohan Singh, in the coming years, India will require a total of 150 billion dollars for expanding the rail network, for building airports and seaports. The country's leading politicians are addressing the problem and have called upon domestic and foreign investors to contribute to closing the financial gaps in the country's transport infrastructure.

Traces of the Empire: India Gate in New Delhi

Author

Heinz Knabe is market development manager for India, Japan, South Korea, Taiwan and the Middle East at Hans Turck GmbH & Co. KG

“Major Opportunity for Automation Specialists”

The marketing specialist Dr. Michael Paetsch is a known expert on the Indian Subcontinent: His wife is from India, he has an Indian passport and founded a corporate consulting firm that advises international companies – Turck among them – on how to build their business in India.

Are we experiencing a new economic miracle in India?

The mood in India is, in fact, similar to that of Germany during its economic boom period. People are “hungry” and want economic success. You can feel the adrenaline in the air. During the last 15 years, the country has experienced immense development. Nowadays, it has long been a part of the world economy, as was shown by the purchase of Arcelor by Mittal.

Should we be afraid of India as an economic powerhouse?

Naturally, this country has a great deal of economic force, after all, a powerful market is emerging here. Currently, a good 300 million people rank among the affluent middle class. And these people are placing more and more value on high quality products and a broad range of offerings. This quality cannot be produced in India using manual labor, here, too, production must be automated. This is a major opportunity for German manufacturers and automation technology specialists.

Should companies who export to India or set up operations in this subcontinent expect similar problems as in China?

There is a vast difference between the culture of China and that of India – the Indians are very conscious of values and ethics, “borrowing” ideas doesn’t fit in to their mentality at all. They prefer to develop brand new products. Overall, the Indians are much more similar to us culturally than the Chinese, this makes working together considerably easier.

How do you assess Turck’s entry into the Indian market?

Turck currently has a great set-up in India. After thorough preparation prior to market entry, management pushed for rapid restructuring so that the requirements for Turck and its customers – both Indian and German – are now optimal. With a plant in Pune and offices in other important locations, the company is regionally positioned just as well as with its experienced team.

How stable is the country?

When considering India, many make the mistake of viewing the country as a whole. But you have to remember that this is a subcontinent that has many regions. India is more comparable to Europe as a whole, not to a single country like Germany. And that means the existing problems vary from region to region. So the decision of setting up shop in one region or another in India is similar to deciding whether to go to Portugal or Germany.

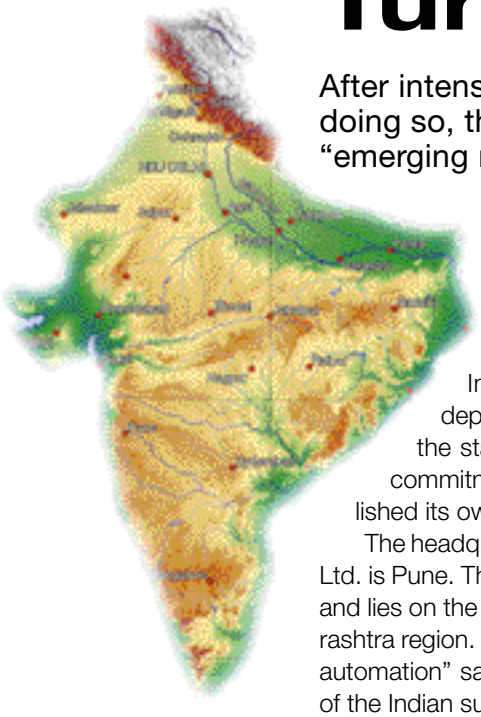
You were just talking about the growing affluent middle class in India. But the majority of Indians are still living in relative poverty. Does this not create a potential for conflict?

No, because even with the lower classes affluence is increasing accordingly. For example, nowadays, a simple farmer can afford to buy a TV, which, ten years ago, was still absolutely unthinkable. And as long as the growing wealth spreads to all levels of the population in the country, then there are no socially explosive issues. The Indian government understands that and has taken it into account in its policies.

▶ Webcode **more10740e**

Dr. Michael Paetsch is a professor of international marketing at Pforzheim College. The 44-year-old attended the universities of Mannheim, Newcastle (GB), Stanford (USA) and San Francisco (USA). He has the following degrees: Dipl.-Kfm., M.B.A. and Ph. D. Prior to his current teaching position, Paetsch worked for various telecommunications companies, more recently as President of Marketing for Vodafone D2.

Turck in India



After intense market research, Turck founded its own subsidiary in India. In doing so, the company remains true to its strategy of showing its colors in the “emerging markets“ of this world.

For many years, managers at Turck's Mülheim-based corporate headquarters have been monitoring the Indian automation market. After in-depth studies, management sounded off the starting signal last year for a sustained commitment to the Indian market and established its own subsidiary there.

The headquarters for Turck India Automation Pvt. Ltd. is Pune. The city has almost 3 million inhabitants and lies on the northwest coast of India in the Maharashtra region. “Pune is an ideal location for industrial automation” says Anuj Nijhawan, managing director of the Indian subsidiary. The automation professional has worked as a sales and marketing expert in the Indian market for over 20 years. With his comprehensive experiences in the field of process automation and his knowledge of the Indian market, Nijhawan plans to quickly turn the Indian Turck subsidiary into a major player on the Indian market.

“In the last few months, we have created a stable foundation for Turck's growth by establishing and continuing to establish branch offices and regional networks – soon we will have the entire country covered,” says Anuj Nijhawan. A growing organization such as Turck will have no trouble finding qualified workers, believes the managing director, who was responsible for the western region of India for MTL India from 1994 to 2006. “We will hire a team of motivated employees, who will help us advertise Turck products in the industry. Our goal is to receive our first major project orders as early as this 2007 fiscal year. The biggest challenge will be to ensure a consistently growing market share for Turck products and to achieve strong earnings, which will be essential for Turck's further growth in India,” explains Nijhawan.

The Pune location is, in Nijhawan's opinion, ideal for achieving these goals. “Many important companies from the automobile industry are represented here: Tata Motors, Bajaj Auto and GM Motors. In addition, many smaller companies and suppliers have also set up shop in Pune. Aside from Chennai (previously Madras) on the east coast, Pune is the hub of the Indian automobile industry.” Even the headquarters of Honeywell Automation India Pvt Ltd. is located in Pune, as is Krohne Marschall and Virgo Engineering – all companies that play an important role for Turck with regard to process automation.

Numerous customers and other interested parties take advantage of the opportunity to become more familiar with the Turck subsidiary during its grand opening celebration

“Turck has established branch offices and regional networks in India and will continue to do so – soon we will have the entire country covered.”

Anuj Nijhawan, Managing Director, Turck India Automation Pvt. Ltd.

In August 2006 Turck was able to celebrate the opening of its subsidiary in India (from left): Consultant Dr. Michael Paetsch, Anuj Nijhawan, Managing Director, Varikkath Rajan, Commercial & Administration Manager, K. Rajesha, Branch Manager for Bangalore, Sudip Sen, Business Development Manager, Kiran Shendge, FA Specialist, Christian Wolf, Executive Vice President Marketing Turck Group, Nagesh Nayak, PA Specialist, Christian Pauli, Executive Vice President Finances Turck Group, Ms. Nijhawan

Photograph and Win!

Send us your photo of industrial automation and win a Notebook.

Do you like to take photographs and have a good eye for interesting or unusual perspectives? Then take part in the **more@TURCK photo contest** by simply sending us one of your best photos on the topic of "industrial automation". The photographer of the winning picture will win a brand-new Notebook computer that is perfect for digital image processing and archiving. A jury will select the top ten photos from all the submissions that are received by July 31, 2007 which will then appear in the next issue of **more@TURCK**.

Terms of the contest

Any reader of **more@TURCK** is eligible to take part in the wolrdwide photo contest, except for Turck employees and their relatives. Participants can submit as many photos as they like, preferably by e-mail to: klaus.albers@turck.com. The photo file should have sufficient resolution for printing purposes and be sent in tiff or jpg format. By sending a photo, the sender declares that he or she owns all rights to the photo and permits Turck to use the photos submitted.

Powerful Notebook for the Best Photo

The AMILO Pa 1510 is not only impressive due to its simple elegance, but also uses the most modern technology. Thanks to CrystalView technology, you will experience the world of photos on the 15.4 inch wide-screen display in a new, breathtaking way. Pin sharp photos speak as much for themselves as the reduced power consumption and the minimized fan noise thanks to the special "silent mode" function. The long-lasting batteries and the integrated WLAN modem ensure hours of wireless mobility.

▶ Webcode **more10780e**

Product premiere: Turck shows IO-Link interface modules based on the piconet module and the first IO-Link pressure sensor in Hanover

Intelligent Down to the Last Meter

IO-Link is designed to facilitate communication between sensors/actuators from different manufacturers and higher-level systems. Broad support by leading manufacturers is the first step toward creating a standard.

Many sensors and actuators now have microprocessors that control displays and parameterize and store configuration data. To date, manufacturing automation has offered only proprietary solutions that have enabled sensor and actuator intelligence to be used for communication purposes as well. Customer acceptance has been correspondingly low.

That's why 14 manufacturers of sensors, actuators and automation systems – Turck was also involved right from the start – began an initiative with the goal of overcoming the binary standard interface shortage and making additional functionalities of modern sensors and actuators for the automation system centrally accessible. The result of this cooperation is IO-Link, a fieldbus-independent communications interface for sensors and actuators. With the IO-Link, a standard has been created that makes it possible for the actuators and sensors to communicate with the respective device, regardless of the manufacturer.

Combined operation possible

The IO-Link integrates conventional and intelligent actuators and sensors into automation systems without extra effort and expense. Devices that currently have "intelligence on board" are ideal for applications with IO-Link. With this approach, the devices can be configured, parameterized and operated via a three-way cable. Each device has an extensive parameter set and can be configured and parameterized in a time-savings manner. Simple proximity switches are not as well-suited for use with this new standard.

The IO-Link uses existing communications systems (fieldbuses or Ethernet-based systems); the last few meters to the actuators and sensors are connected in a point-to-point connection using commercial, unshielded standard cables. The IO-Link thus helps reduce the number of interfaces and the multitude of variants.

Typical intelligent actuators and sensors include valve clusters, motor starters, optical sensors, light grids, analog signals, RFID or positioners. These devices may possess application-specific parameters and data (for example, diagnosis data) that are transferred via a serial communication process. To achieve this, flexible message lengths are possible in order to be able to transfer comprehensive data sets, such as those for RFID or light grids.

No special cabling

The IO-Link enables both binary process data as well as analog signals to be transferred. With a continual IO-Link communication, there exists the possibility of operating analog and binary sensors on a joint interface module. If the binary connection was previously laid out only to transfer pure switching information, now, thanks to the IO-Link, typically 2 bytes in 2 ms cycles can each be transferred by means of a combined switching state and data channel. This opens up the "last meter" to the sensors and actuators for continuous communication. The IO-Link therefore requires no special cabling. The proven, inexpensive and unshielded industrial cables can continue to be used for connecting the sensors and actuators.

IO-Link facilitates centralized error diagnosis and location right down to the sensor and actuator level. Exact error location or maintenance requirement reduces machine downtimes, and a centralized parameter address makes it considerably easier to replace devices. This means that the standard creates an optimal, cost-effective solution for the entire chain, from actuator or sensor to integration into the automation system.

Investment guaranteed

When it comes to developing the interface, investment protection is also important for the manufacturer and user. That's why conventional sensors and actuators can be operated on an IO-Link module and, conversely, IO-Link sensors and actuators can be connected to standard switching mode on conventional digital input/output modules. That's how all currently available sensors can be used; mixed operation with enhanced intelligent products is possible. Therefore, converting an existing system to the IO-Link is not a problem. Its biggest advantage is its backwards compatibility to conventional technology, which makes it possible for users to convert their machines or plants gradually at any time.

Another important point is the integration of the IO-Link system in the fieldbus world. How can the process or the parameter data be transferred and managed? Here, the user has various options available: for customers who only want to transfer pure process data, simple GSD files are available on an input/output data basis, regardless of device. In this case, it isn't possible to parameterize. In case users intend to configure and parameterize individual devices, there are specific GSD files available that can be implemented depending on the device design or type. Data is managed in the control system. The use of device-specific DTMS is also a good solution. Users can change the configuration using an integrated FDT during operation. Operation is menu-based. This solution works regardless of fieldbus and manufacturer.

"The value of the IO-Link lies in the additional communication of information that was not previously possible using standard I/O devices. An additional advantage of the IO-Link is that it can generally be used in any I/O system and with any I/O device that is implemented in the protocol."

David W. Humphrey, ARC Advisory Group

Read quickly

The requirements for production automation are continually rising. It takes flexible production lines, detailed product tracking or close cooperation between man and machine to open up the last meters to the sensors and actuators for continuous communication. The fieldbus-independent communication interface IO-Link now offers a uniform standard that applies to all manufacturers.

Optical sensors are perfectly suitable for the IO-Link thanks to their microprocessors

Lower time expenditure

With the IO-Link, devices that are basically on site and have to be easily accessible are installed on the system close to the application, reducing installation time considerably. In this case, the centralized control system simply handles parameterizing and configuration. Due to the transfer of parameter data from the higher-level control system, the start-up times are also considerably reduced.

Thanks to continuous communication and using the IO-Link, the user can flexibly respond to new requirements even during the machine's run-time. So, for example, during a product change, the configuration settings can be changed centrally and in real time via IO-Link, reducing costly downtimes. The same applies to replacing an IO-Link sensor during a service call: The parameter and configuration data are transferred to the new device via the centralized control system.

The chances are good that this standard will spread worldwide. The original collaborators may be German companies, but they clearly have something to say to the world. Furthermore, because the IO-Link is fieldbus-neutral, it is not just a purely European solution. The process is currently underway to obtain approval for IEC standardization. These factors will help the IO-Link gain recognition outside of Europe as well.

Author

Klaus Ebinger is product manager of process sensors at Hans Turck GmbH & Co. KG

“Reduce Costs fast with the IO-Link”

As Editor-in-Chief of the trade publication SPS-Magazin, Kai Binder has been keeping a close eye on the automation market. As an automation expert, he has closely followed developments related to the IO-Link right from the start.

Mr. Binder, the concept of a new sensor/actuator interface called IO-Link was introduced to the public a year ago. What is so special about the IO-Link?

A good look at process engineering clearly explains the purpose of the IO-Link. The HART protocol comes closest to what the IO-Link intends to be: A simple interface for actuators and sensors on higher-level control systems that makes communication possible, regardless of manufacturer.

How is the new IO-Link standard integrated into existing network solutions?

A major advantage of the IO-Link is the fact that the standard uses reliable industrial cables and is compatible with conventional 3-line interfaces. IO-Link sensors can be operated in standard switching mode. Furthermore, it is possible to use both standard and IO-Link sensors on IO-Link interface modules and to transfer binary and analog signals via the IO-Link.

What are the technical cornerstones of IO-Link?

The IO-Link is a serial communications process with flexible message lengths. Thanks to this flexibility, extensive data records can be transferred. Process, service and diagnosis data can be transferred cyclically; additional parameters and data can be transferred acyclically. Communication is based on a UART protocol with 24 volt pulse modulation. The electronic standard modules used nowadays are already being used for parameterizing and are therefore available at a reasonable price.

How can the user benefit from IO-Link?

There are several user benefits. For example, the IO-Link considerably reduces the expenses for cabling analog sensors. One of the most important advantages is the parameterization and configuration of sensors that are installed on difficult-to-access areas in a machine or plant. Also, the start-up times can be considerably shortened if the parameter data are transferred from the control sytem to the sensor. With the IO-Link, the user can respond to new requirements even during the machine’s runtime. So, for example, during a product exchange or a sensor replacement, the configuration settings can be changed centrally via IO-Link. This reduces costly downtimes.

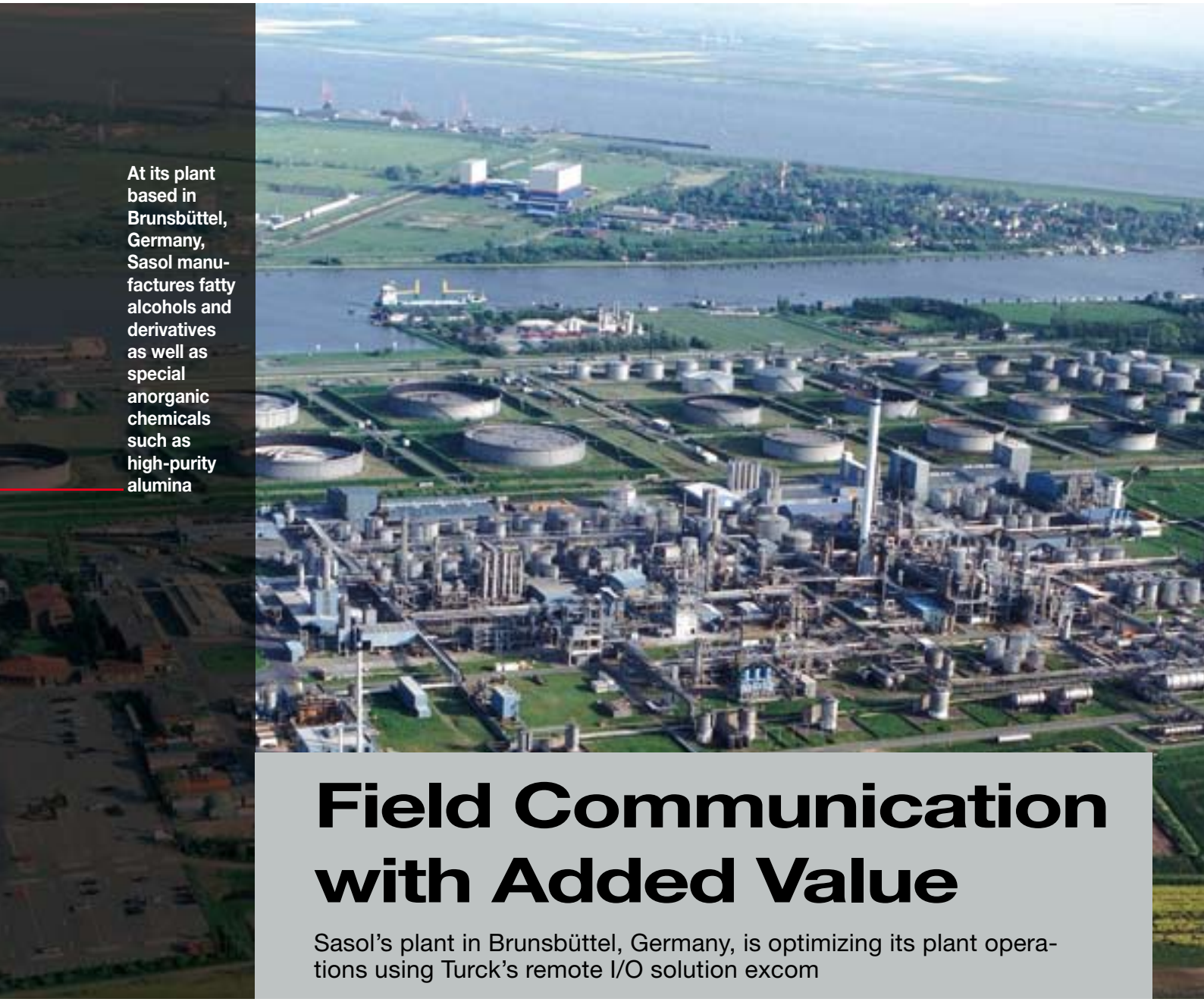
IO-Link contributes to the reduction of interfaces and the multitude of variants, claims the Profibus User Organization (PNO). Is that not a paradox? After all, the IO-Link is an additional interface.

Yes, it does sound paradoxical at the outset. At closer glance, however, something that users have been waiting for for 20 years could, in fact, emerge: a standard for the integration of sensors and actuators in the automation systems. In the end, the promoters of IO-Link include the many prominent and internationally active sensor manufacturers. Therefore, the IO-Link will be one of the hot topics at the 2007 Hanover Trade Show. Users from all industries should be on the lookout for this technology. The faster you get into this technology, the faster it will lower your costs. Should IO-Link hold to its promises, existing fieldbuses will barely be able to resist the integration pressure of the users. And then there is the formula: “More is less.”

▶ Webcode **more10705e**

For 15 years, Kai Binder has been a journalist in the automation industry. For the last 11 years, he has been editor-in-chief and publisher of SPS-Magazin. With a circulation of 26,500 copies, the trade publication is geared toward users from all industries in automation.

www.sps-magazin.de



At its plant based in Brunsbüttel, Germany, Sasol manufactures fatty alcohols and derivatives as well as special anorganic chemicals such as high-purity alumina

Field Communication with Added Value

Sasol's plant in Brunsbüttel, Germany, is optimizing its plant operations using Turck's remote I/O solution excom

When construction of Sasol plant in Brunsbüttel, Germany, began in 1962, no one was thinking about process control systems and remote I/Os. In its first years of operation, the plant, which at that time was built by the American oil company Conoco and DEA (Deutsche Erdöl-Aktiengesellschaft), produced fatty alcohols from petrochemical products. Aluminum oxide, among others, was created as a by-product from the production of fatty alcohol. The Brunsbüttel plant was able to market the powder – also known under the name alumina – so successfully that in 1983 a plant was installed that produced alumina from aluminum, separately from the fatty alcohol production.

For five years, the Brunsbüttel plant has been producing fatty alcohols and high-purity alumina under the umbrella of the South African company Sasol Ltd. The company, which is headquartered in Johannesburg, employs about 30,000 workers and ranks among the most important industrial companies in South Africa. When it comes to fatty alcohols and alumina, Sasol ranks among the leading suppliers. Fatty alcohols, among other substances, are needed for the manufacture of creams, detergents and lipsticks; high-purity alumina perform important services, such as the desulphurization of crude oils or the exhaust gas purification as a carrier material for catalytic converters. Sasol Germany, the company's German subsidiary, employs about 530 workers at the Brunsbüttel plant and over 1,500 Germany-wide.

Process optimization

Continuous further development of products and processes is essential for Sasol's Brunsbüttel plant.

Jörg Brouwer, Sasol, is satisfied: “So far, working with Turck has been a very positive experience.”

Ready to start: The fully installed excom station with redundant 230V power supply and fiber optic cable connector is ready to start up the plant.

Read quickly

As part of the continuous plant optimizing process, remote I/O solutions are gradually replacing conventional wiring solutions at Sasol’s Brunsbüttel plant. These solutions reduce not only wiring and documentation expenditure, but also increase plant capacity and create the foundation for more efficient plant operation using asset management and FDT/DTM.

This also applies to the EMSR department, which consists of electronics, measurement and control planning, the associated shops, a department for process data/information and management systems (PIMS), as well as advanced process control (APC). Five employees in the Process Control department look after all the process control systems in the Brunsbüttel plant. This primarily includes the Freelance and Melody ABB systems. The plant operators in the control rooms use the systems Operate IT and 800xA for visualization.

Until recently, Contronic P, an outdated ABB process control system, was used for alumina production. The Sasol specialists successfully replaced it as part of their continual process optimization and were able to migrate to Melody/800xA. Due to switching over to a modern process control system, additional equipment such as controllers, detectors, etc., that were previously located in the switchboard panel of the control room, also had to be converted. Even older field devices and measurement equipment had to be replaced. Sasol connected the new devices using Turck’s excom remote I/O solution. During this project alone, Turck retrofitted a total of ten control cabinets.

24V line redundant

The specialists at Sasol’s Brunsbüttel plant have been impressed by the efficiency that Turck’s modular remote I/O solution provides since the first excom stations were installed in 2005. In the meantime, remote I/Os from Turck, the Mülheim-based sensor, fieldbus and interface specialist, are working on almost every process control system at the Brunsbüttel plant to the full satisfaction of its operators.

"During our search for a remote I/O solution that met our requirements, excom was able to score points right from the first presentation with an unbeatable feature: We can operate this system in explosion-hazardous locations using 230 volts," says Jörg Brouwer, manager of the Process Control Technology department, of the decision at that time in favor of the Turck system.

It sounds banal, but it is an essential criterion in everyday operations. Conventional remote I/Os require 24 volts. If this voltage is brought into the field over distances of 300 or 400 meters, it requires huge cable cross-sections in order to compensate for the increasing voltage drop with increasing cable length and, in the end, to be able to provide the necessary output. With the use of 230 volts directly on site, these problems are eliminated, conventional cable with normal cross-sections are completely sufficient for this purpose.

"I know of only a few companies that offer such direct contact to technical support. Regardless of whether we are dealing with alternative partial solutions, optimization devices or solving problems, we have never had to wait long for a solution thanks to the direct line to the 'right' Turck employees."

Jörg Brouwer, Sasol

FDT/DTM forerunner

In addition, Turck was also able to score big with its rapid development of a DTM (Device Type Manager). Already in 2005, this complex "device driver" was available and considerably facilitated the configuration and operation of the remote I/O. Turck supported and influenced the development of FDT/DTM technology right from the start, supporting the company's claim that it ranks among the innovation leaders and market drivers in this field.

The FDT/DTM technology plays an important role in the field of plant design and construction, even if implementation is not quite as far along as originally planned. The FDT/DTM pilot project at Sasol's Brunsbüttel plant is to migrate Contronic P to 800xA, the entire plant is now being built based on an asset management system. All remote I/Os connected to the system are supposed to be managed per FDT/DTM by the asset management system.

In order to integrate the remote I/Os into the individual plant components, technicians are using the Ethernet infrastructure from the process control systems, which had been built up extensively in the entire plant – separately from the office IT. To connect the Ethernet to the PROFIBUS cables from the remote I/Os, the xEPI Gateway from Trebing and Himstedt is used. Each PROFIBUS system is connected to the Ethernet using an xEPI. All devices that are located behind the gateway are configured, calibrated or diagnosed via the corresponding DTM.

An overview of excom

excom is a modular remote I/O system that facilitates installation and drastically reduces equipment costs. This flexible system provides:

- Inherently safe gateways for connecting to the PROFIBUS DP
- Power supply units: 24 VDC, 115/230 VAC
- High availability through optional redundant gateways and power supplies
- Consistent HART parameterization from the process control system to the field device

- 128 binary or 64 analog channels under a single PROFIBUS address, with cycle times < 20 ms
- Flexible binary I/O structure through programmable effective directions
- Automatic adjustment of the outputs to valve outputs in the 10…24 V range
- Active and passive analog I/O with galvanic separation or HART consistency
- Temperature inputs for various heating elements, among them PT100 and NI100
- Fast counters for reactions in the ms range
- Exchange and expansion of all components during operation

User-friendly: A 230 V power supply is sufficient for excom. The time-consuming and – due to the required large cable diameter – expensive 24V cabling is not necessary any more

30 stations in use

Overall, Sasol has about 30 excom stations in use at the Brunsbüttel plant alone. The remote I/O system for explosion-hazardous locations offers bus-capable, decentralized input/output modules for connecting binary and analog, inherently safe field devices. The system's protection degree permits use in zones 1 and 2. The field current circuits are permitted for use up to and including zone 0.

Because many users of remote I/O systems benefit from the installation of a fieldbus structure, yet don't want to sacrifice availability, excom allows a completely redundant set-up. The power supply can be installed in 24 VDC or 230 VAC, with or without a redundancy option. All modules – including the power supply units – can be replaced in zone 1 during operation. In addition to the increased availability, hot swapping and explosion-hazardous location protection, the system permits continuous HART parameterizing of field devices via the bus.

All stations or their inheretly safe gateways with optional redundancy are connected to the higher-level bus system via the Turck fiber optic cable connector OC11Ex with PROFIBUS-DP. With it, excom connects to the process control system up to 128 binary or 64 analog field devices under a single bus address. All modules provide "Eex ia" interfaces to the process so that no further safety measures have to be taken. The binary I/O module offers one novelty: Pairwise, the channels can be configured as inputs or outputs. This means that excom is optimally compatible to the application, resulting in cost reductions.

Forum for Automation Engineers

Jörg Brouwer, responsible for process control systems at Sasol's Brunsbüttel plant has set up a forum for all questions concerning process control systems and automation. Under **www.pls-forum.de**, process and control and automation engineers and technicians can exchange ideas on process control system solutions as well as related topics such as fieldbus and remote I/O or asset management. Through this forum, Brouwer would like to make modern communications options more accessible to the automation world. Tips and tricks as well as information on manufacturer problems or snappy solutions are also in great demand.

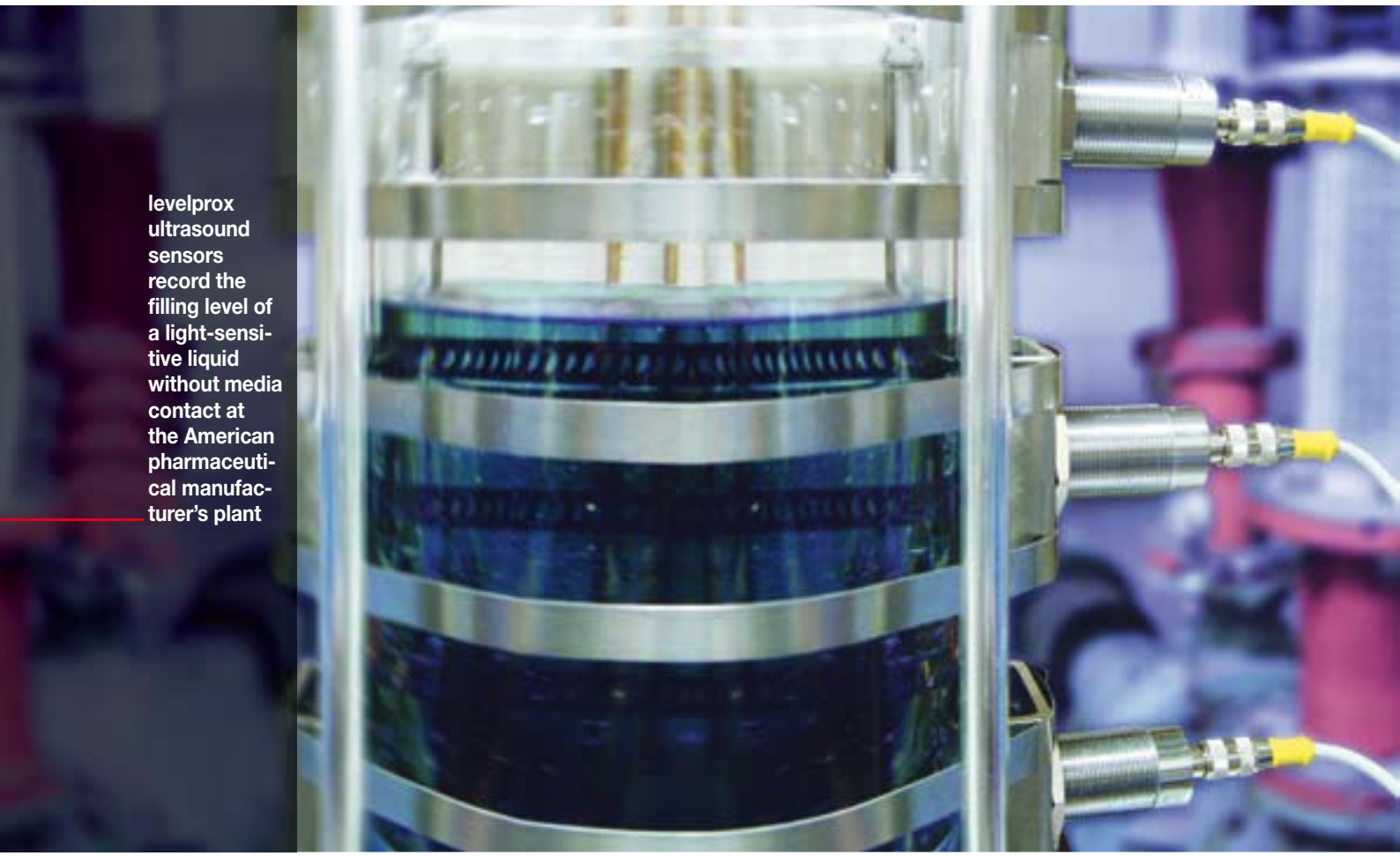
Direct line to the company

For Sasol's plant operators, the technological benefits of the excom solution were enough reason to begin working with Turck. After a year and a half, there is an additional reason for satisfaction: "I know of only a few companies that offer such direct contact to technical support," explains Jörg Brouwer. "Regardless of whether we are dealing with alternative partial solutions, optimization devices or solving problems, we have never had to wait long for a solution thanks to the direct line to the 'right' Turck employees. This makes working together very pleasant."

▶ Webcode **more10750e**

Author

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



levelprox ultrasound sensors record the filling level of a light-sensitive liquid without media contact at the American pharmaceutical manufacturer's plant

Through-the-Wall Level Sensing

American pharmaceutical manufacturer optimizes production with levelprox ultrasonic sensor

In the pharmaceutical industry, it's not uncommon for raw materials to contain volatile properties not easily managed by standard manufacturing components. Case in point: a liquid contained within a glass cylinder in a pharmaceutical manufacturing facility that can be activated by a light source.

The liquid must be protected in some way to avoid the potential problems that activation may cause. It is also important to monitor the status of the substance, as product run-dry can lead to equipment damage or failure. The amount of material in the container must therefore be accurately gauged, but the mode of measurement must not disturb the contents.

Read quickly

An American pharmaceutical manufacturer intends to record the filling level of a glass container filled with a light-sensitive liquid. Because media contact was ruled out as well as the opto-electronic solution, the conventional methods for recording filling levels did not come into consideration. Only the Turck ultrasound sensor levelprox was able to meet all specifications.

Common sensing methods not applicable

Of the sensing methods used to detect level in standard applications, the most common are probes, linear displacement transducers (LDTs), and photoelectric sensors. However, they are not acceptable for pharmaceuticals because probes are typically inserted directly into the substance being sensed and photoelectric sensors require a light source to do their work.

One pharmaceutical manufacturer decided to try capacitive level sensors. These devices sense through materials with lower dielectric properties to detect those with higher dielectric properties; like

Standards for easy assembly: The M30 design shown can be used universally

Stainless steel and tri-clamp connection: levelprox T50 design is specially tailored to meet the requirements of the food industry

sensing water inside a tank. Capacitive sensors are often used for liquid level detection in manufacturing applications. The only problem is that if the higher dielectric material sticks to the inside of a container, the capacitive sensor still senses the material as present and produces a false readout. And that was precisely what happened.

After the pharmaceutical company ruled out capacitive sensors, it turned to a unique ultrasonic sensing method that mounts to the outside of the container, rather than above it as with conventional ultrasonic sensors. Unlike traditional ultrasonic sensors, this "levelprox"-sensor can sense through the container wall. And unlike capacitive sensors, this Turck-ultrasonic is not hampered by residue that may be present on the inside of the container wall. The sensors are non-invasive and do not compromise the structural integrity of the container wall.

Principle of operation

The sensor works by generating a high-frequency ultrasonic pulse that is transferred into the container wall and influenced by the container's contents. The information is then analyzed and compared to the sensor's pre-set conditions. Turck ultrasonic see-through sensors operates in two modes: Reverb and Echo.

The Reverb Mode evaluates the ultrasonic pulse as it reverberates within the container wall. The pulse travels through the container wall until it reaches the inner wall. The Reverb Mode is best suited for liquids with low viscosity, and when stirring devices are used inside the container. The Echo Mode evaluates the ultrasonic pulse as it travels through the liquid and echoes off the opposite container wall. The Echo Mode is best suited for liquids with high viscosity, as the mode can see through media that may have coated the container's inner wall.

The ultrasonic sensor provides point level detection, as opposed to continuous level detection, where the sensor detects a single point relative to its placement. Single point detection does not provide a continuous reading or measurement, but whether the media is present or not. For the pharmaceutical application, it was necessary to determine level at three points within the glass container to distinguish between full and empty conditions. The ultrasonic sensors were mounted near the top of the glass container, near the bottom and in between those two positions. Their data prompted the controller to add or stop adding the liquid.

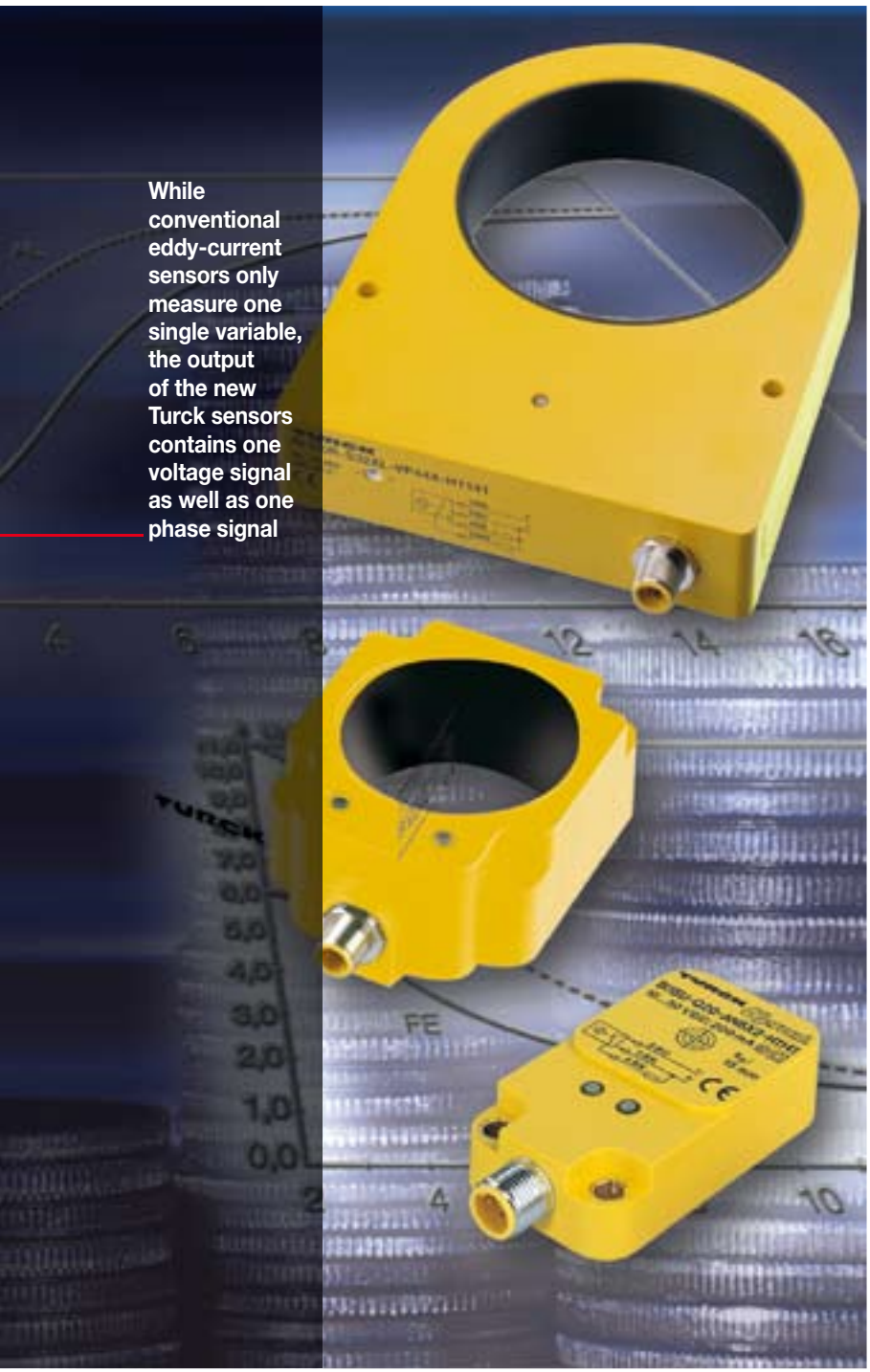
For correct operation the sensor must make solid contact with the container wall. The sensors are spring loaded, and coupling gel is applied to the transducer faces before flush mounting to the container wall. They are held in place by mounting brackets, which in turn are secured by stainless steel straps.

This type of ultrasonic sensor – the Turck levelprox – is designed for use where non-invasive level detection is desired, but capacitive sensors cannot be used: making it ideal for pharmaceutical applications. Where typical ultrasonic sensors would not be effective due to their invasive nature, this special type of ultrasonic operates. By investigating level sensing options, the pharmaceutical company was able to find the sensor best suited for their needs: one that didn't compromise the application or its contents.

▶ Webcode **more10752e**

Author

Karen Keller is marketing coordinator at Turck Inc. in Minneapolis, USA



While conventional eddy-current sensors only measure one single variable, the output of the new Turck sensors contains one voltage signal as well as one phase signal

Metal Detector

Analog eddy-current sensors can distinguish between different metals regardless of distance

The new “metal differentiation sensor” from Turck is basically an eddy-current sensor, which is nothing special in and of itself. But instead of emitting a single output signal as is usual, Turck’s new sensors emit two different signals – a phase signal and an amplitude signal.

Linking these signals to one another results in a solution, that makes it possible to measure the distance regardless of the material being sensed – in other words: a Factor 1 sensor – or permits the material to be identified regardless of the distance between the sensor and the measured object. Naturally the maxmimum sensing range can not be exceeded. This functionality makes the sensor applicable for numerous applications that until now could only have been realized with considerably more expensive measuring procedures.

The “metal differentiation sensor” is based on the eddy-current principle according to which proximity switches also work. If an electrical conductor is located in a magnetic field that changes over time or if such a conductor moves in a magnetic field, a voltage is induced into this conductor that generates an eddy current. Eddy currents, for their part, generate a magnetic field that opposes their cause and overlaps the field that is stimulated. As a consequence, the impedance of the coil changes that can be measured on the output of the sensor as a change in the voltage.

Diverse application fields

The sensor’s ability to sense all metals at the same rated distance makes it ideal for use in automatic beverage can return machines. In this case, the machine can differentiate between tin foil and aluminum cans. Because cans are often deformed when they are inserted in the automatic return machine, the ability to be able to detect the metal regardless of the distance is particularly important in order to ensure smooth functioning.

In the past, a hall sensor has frequently been used with a magnet connected upstream for this application. If a can made of ferromagnetic material comes within the sensor’s recording range, its output signal changes. The disadvantage of this solution is the lack of ability to differentiate the results. The sensor cannot tell whether this can is made of tin foil or a different ferromagnetic material or even if it is an aluminum can.

Another application that Turck engineers are working on together with a manufacturer is the detection of counterfeit coins in coin-sorting machines. The problem of conterfeit Euro coins is getting worse and worse. Just two years ago in the euro zone, almost 100,000 counterfeit coins were detected, half of which were detected in Germany alone due to the improved control methods used there. So far, the authenticity of a coin has only been checked using a standard analog sensor. Because the counterfeit coins are constantly improving in terms of their material composition, they are becoming increasingly

Together with customer SMS Meer, Turck has developed the new sensor that provides more functionalities in the manufacturing company's seamless tube plants

difficult to detect. This is where the new sensor can help because it provides precise feedback concerning the conductivity of a coin so that an exact statement concerning the material used can be made.

Also, the sensor does an excellent job when it comes to Inline quality control. It is not only able to distinguish between hardened and non-hardened material, it can also detect different stainless steel alloys. Until now, this type of non-destructive material test could only be performed using laborious and expensive measuring systems.

Small cause – big effect

SMS Meer, a company that develops and builds machines for the pipe, steel, and non-ferrous metal industry, as well as for foundries, used the new Turck sensor to increase functionality that led to market gains. The Turck sensor is used by SMS Meer in cold pilger rolling mills. It can distinguish between the pipe produced and the expanding mandrel, and thereby detect the material and diameter of the pipe. Even at high production speeds, the new solution is just as precise as in normal operation.

This was not the case with the system previously used by SMS Meer. The biggest shortcoming of the old solution was the lack of flexibility and its non-existing option of determining the diameter of the pipe. With the Turck sensor, the manufacturing company can perform the evaluation itself and make individual adjustments for each situation.

Although the new sensor development isn't a plug-and-play solution, the examples demonstrate how flexible the technology is and which options are opened up when the output signals are evaluated correctly. In close cooperation with the customer, Turck can offer, on request, customized solutions that are tailor-made precisely for the respective application.

In this context, the programmable gateway for the I/O system BL 67 offers many options. In a package with the new sensor, the gateway can accept the evaluation of the two different signals so that ready-made solutions with finished software components are conceivable for certain applications.

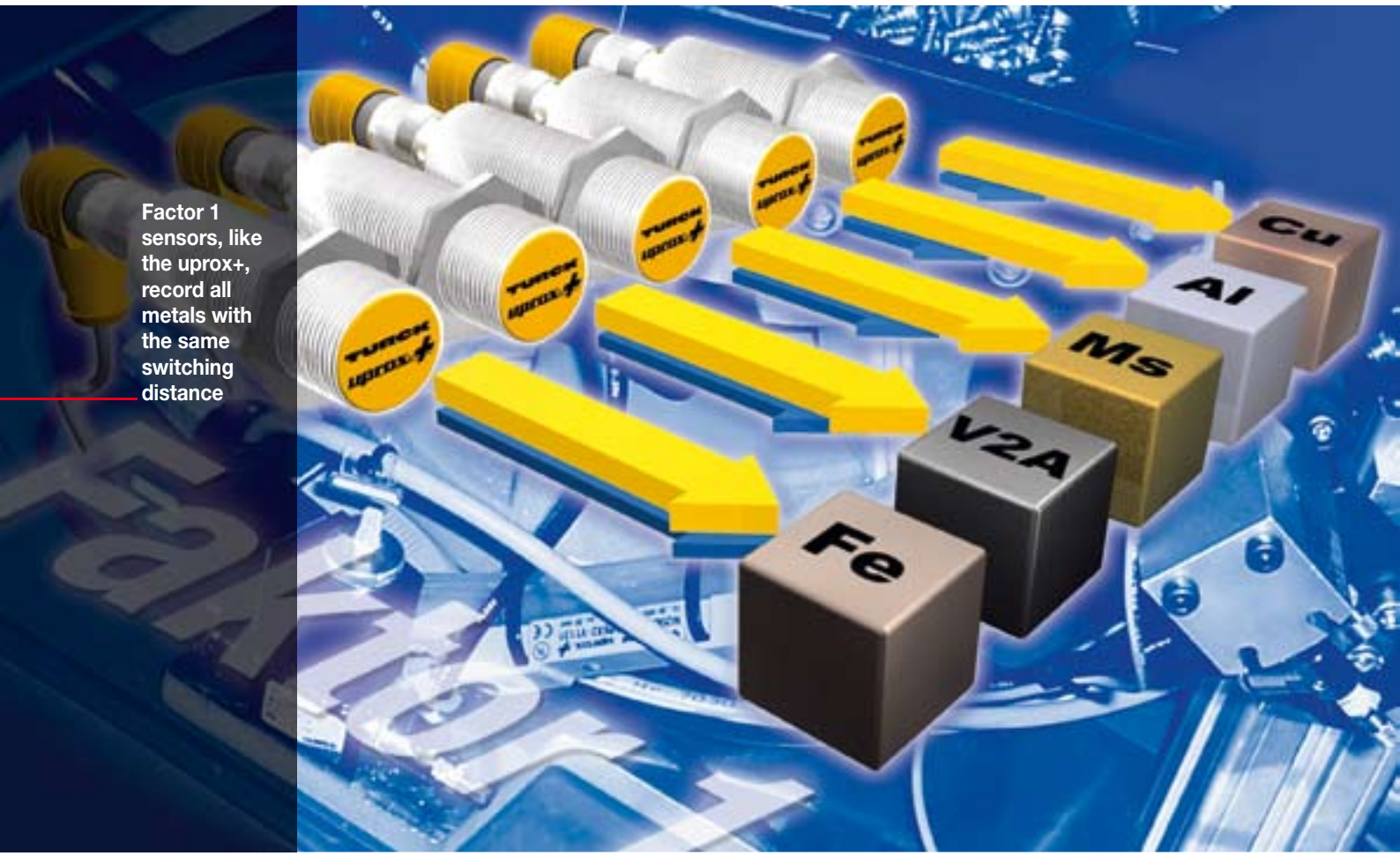
Read quickly

Sometimes, it is the small things that bring joy to the heart of an engineer – especially if these small things bring with them a broad application bandwidth. The sensor, fieldbus and interface specialist Turck has introduced one such "small thing": A sensor that not only detects the presence of a metal, but also its composition – regardless of the distance between the sensor and the object.

Webcode **more10770e**

Author

Holger Spies is OEM key account manager for customer-specific development at Hans Turck GmbH & Co. KG



Factor 1 sensors, like the uprox+, record all metals with the same switching distance

Functional Principles of... ...inductive Sensors

Part 1 of our basic series: Design, functional principles and mounting options of the most important sensor technologies

For over 40 years inductive sensors have been developed and produced in order to replace mechanical limit switches. The advantages of the contact-free sensors are impressive: Inductive sensors have no movable parts and therefore do not suffer from wear and tear. Furthermore, these sensors are characterized by reliability, high switching frequencies and longer service life, as well as a particular resistance to environmental influences.

Ferrite-core sensors

The classic inductive sensor is the ferrite sensor, which is made up of ferrite core, coil and oscillator electronics. The oscillator generates a magnetic alternating field. From the oscillation amplitude, a downstream comparator generates the switching signal with defined hysteresis. The output signal (DC 2-wire or 3-wire, AC/DC2-wire, NAMUR, analog) generates an output stage.

The inductive sensor with ferrite core functions due to interaction with the object to be recorded in the oscillating magnetic field. In a non-actuated state – if no object is in the sensors operating range – the oscillator vibrates with a very large amplitude. If a target is located in front of the sensor, it draws out energy from the coil and the oscillator vibrates with only very little amplitude – the sensor is “dampened”.

The inductive ferrite core sensor’s switching distance depends on the material of the actuation object. Maximum distance is achieved with mild steel St37, reduced switching distances are to be expected with other metals. The so-called reduction factor indicates to what fraction the switching distance is reduced when using metals other than St37. Typical values for the reduction factor of other metals are: brass between 0.35...0.5; copper between 0.25...0.45; aluminum between 0.35...0.50; and stainless steel between 0.6...1.

Factor 1 sensors

Because conventional ferrite-core sensors can maintain their high switching distances only with St37, Turck developed Factor 1 sensors. They have the same switching distance for all metals – whether iron, stainless steel, copper, aluminum or brass. A Factor 1 sensor works using a 3-coil oscillator without ferrite core. The transmitting coil is located between two receiving coils where the front receiving coil has greater inductivity. The transmitting coil generates a magnetic field which induces voltages in the receiving coils. Due to the varying inductivities, various voltages are induced in the respective coils.

If a target is located in the sensor's recording range, the magnetic field generates ring currents that, in turn, cause magnetically opposing fields and, thereby, negative field voltages in the receiving coils. The voltage in the back coil is smaller because it is further away from the object. The difference in voltages in the receiving coils are smaller and, at the switching point, it's ultimately zero.

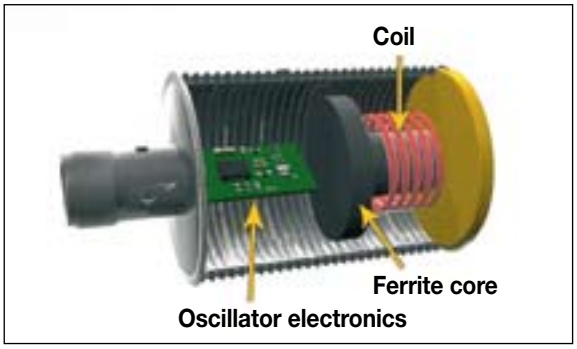
Factor 1 sensors with four coils make higher switching distances and more variable mounting options possible. The symmetrical coil arrangement of two coil pairs additionally offers high stability against mechanical forces. In a non-actuated state, the difference between the induced voltages equals zero because the effects of the transmitting coils are eliminated through the symmetrical arrangement.

In an actuated state, a voltage difference can be recorded between both receiving coils. The transmitting coils generate a magnetic field that creates ring currents in the actuation object. The ring currents, in turn, generate magnetically opposing fields and, thereby, also negative field voltages in the receiving coils. The voltage difference depends on the distance because the symmetry of the system's coil magnetic field is displaced.

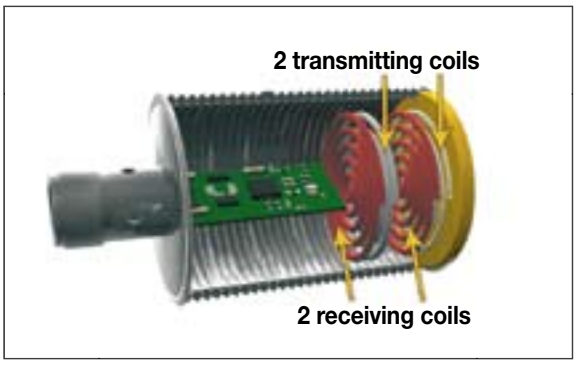
Mounting

Inductive sensors are offered in flush and non-flush mounting options. With flush sensors, the ferrite core is a pot-type core which results in a magnetic field directed not very far ahead. The flush-mounted sensors with active surface can be mounted behind the surrounding metal because the magnetic fields do not emanate to the side. The minimum distance between two flush sensors is about equal to their diameter. Their weak magnetic field, however, allows only for reduced sensing ranges.

The non-flush sensors with a "mushroom-shaped" ferrite core forms a magnetic field that emanates both to the front and to the side. That is why greater clearance is necessary when mounting in metal, as well as greater distances between adjacent sensors (minimum distance has to be double the diameter of the sensor). The advantage of this model is the inductive sensor's high sensing range.



Design of classic inductive sensor with a "mushroom-shaped" ferrite core



High switching distances: The Factor 1 sensor uprox+ works using two transmitting and two receiving coils

Read quickly

Inductive sensors as a replacement for mechanical limit switches no longer have to be ruled out of modern industry automation. They record the travel statuses to the machines, function as OFF/ON detectors for grippers or are used for component control in production processes. Their tasks are as diverse as their designs.

Switching distance

The switching distance indicates the distance of the dampened sensors to the actuation object. A reproduceable switching point is only possible at constant distance to the active surface. In order to avoid "fluttering" on the output, the power-on point when approaching and the power-off point when moving away from the object are not identical (hysteresis). These are specified in percentage of the rated switching distance Sn.

Sn is defined for the standard measurement plate. Because objects used in practice do not correspond to the standard dimensions, the switching distance deviates more or less from the catalogue value. The data concerning the material, size and surface of the target are important in determining the switching distance and thereby selecting the right sensor. With objects that are considerably smaller than the standard plate, the switching distance of a Factor 1 sensor recedes further back than with conventional ferrite sensors. Factor 1 sensors do not detect very small objects as well as conventional sensors, despite their higher rated switching distances. Factor 1 sensors are not only able to record compact material, but also ring-shaped actuation elements.

▶ Webcode **more10771e**

Author

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

The entire Group is benefiting from the innovative development and production solutions of the Turck subsidiary duotec

Tailor-Made Solutions

Turck duotec develops and manufactures customized solutions for challenging electronics applications

How do you process membrane chips with a wafer-thin membrane only 2 µm thick in large quantities without ruining them? And what is better suited – the printed circuit board or hybrid technology – for designing a sensor for a passenger car braking system that is subject to considerable accelerations and temperatures?

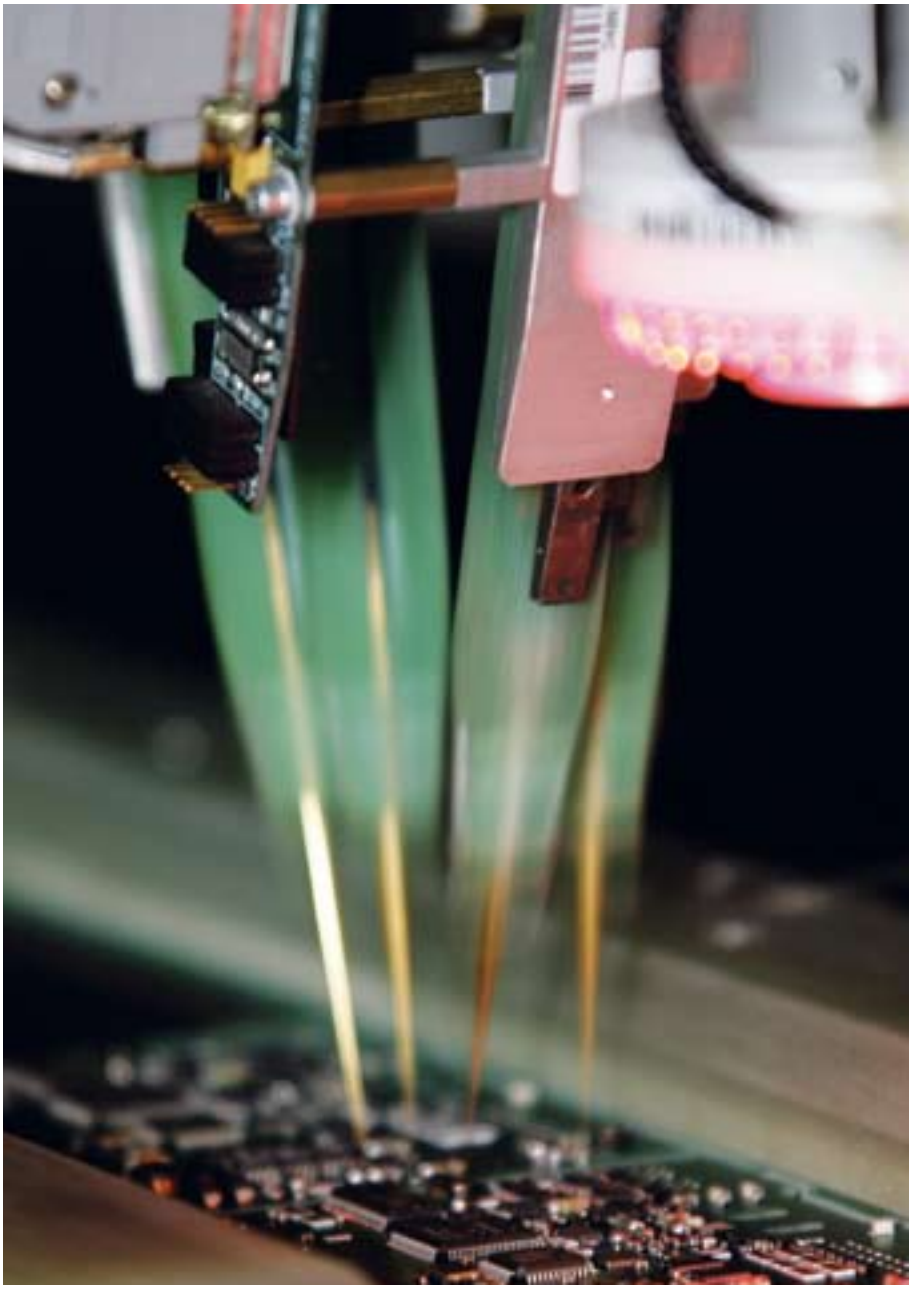
These are questions that the specialists from Turck duotec GmbH have been grappling with. “Our business is all about technologies that challenge us,” says Dr. Ralf Behrensmeier, technical director of the Turck subsidiary, who adds: “Our strength is clever solutions for special applications.”

The company specializes in customized development, production and design work in the field of electronics and has three locations: Halver (North Rhine-Westphalia), Grünhain-Beierfeld (Saxony) and Delémont in Switzerland.

It all started with hybrids

The success story of Turck duotec began in 1987. “We needed hybrids for our miniature switch production,” recalls CEO Werner Turck. “But hybrids were difficult to come by at that time. That’s why we decided to begin producing them ourselves.”

In order to produce them cost effectively, Turck decided to produce products for other companies as well as their own. At that time, the demand for them was so high that Turck duotec was able to sell the hybrids to other companies, even with complete placement, if requested. “Because we had introduced SMD placement in our factories in the early 80’s, we were also able to offer this service to our customers,” explains Werner Turck. “So we had the big advantage of being able to offer our customers both technologies – the hybrid as well as SMD circuit boards.” This emphasis on dual technology helped



determine the name of the new company: duotec became the new Turck subsidiary, and functioned as a pure sales organization for the hybrid and SMD technology. The production side of the operation still belonged to the parent company. Werner Turck explains: “We couldn’t establish a sales office for this new service the same way we had done so for our classic “yellow” Turck products in Mülheim. In order to acquire customers for the new products, the sales office had to be close to where the technology was produced. That’s why we established duotec at the Turck production and development plant in Halver.”

Initially, there was only one man who represented duotec, Dr. Kurt Elsässer, who was a physicist and well versed in the field of hybrid technologies. He was able to get “into the technology” in detail with customers. A philosophy that has remained to this day. Even Dr. Ralf Behrensmeier, who took over technical management from Elsässer in 2002, has an advanced degree in physics. “This highly technical qualification, which is embodied in duotec, is not only useful for our customers, but also for us at Turck,” underlines Werner Turck, “because our experts have to work together with customers in detail on the production

Read quickly

Founded exactly 20 years ago as the sales organization for hybrids, Turck duotec has, in the meantime, become a specialist for challenging electronics applications in the most varying of industries. The Turck subsidiary functions on the market as a competent partner for customized development, production and design projects. To carry out such projects, development and production capacities of the Turck Group are skillfully utillized, which, for its part, again benefits from large production quantities and innovative production solutions.

Twenty years ago, Werner Turck founded duotec to meet a need, now it has become a lucrative company

Johannes Schaefer, commercial director, promises the market "innovative solutions"

engineering for electronic components. Our experience acquired from this work has also benefited us in the way we produce our classic products. Moreover, duotec has enabled us to dramatically increase our production volumes and the number of mounted components. Nowadays, in Halver, we are producing far more than 50 percent of our total of 350 million components per year for duotec. This means that we can naturally also attain better prices in the purchase of components for Turck products."

Strength lies in the technology mix

"Through our high vertical range of manufacturing, we can offer various production options on the market," says Johannes Schaefer, commercial director at duotec. "For complex applications that require several of these production options, we can offer our customers hybrid, SMD or a combination of both for the greatest value." Behrensmeier emphasizes: "The technology mix that we are offering is a true unique selling point compared to many competitors. Additionally, we are not limited to certain industries or products, rather we can offer solutions for the most varying of applications. We offer special separate solutions that you don't have to purchase straight from the rack."

Behrensmeier mentions, as an example, a chip that has a large number of connections, so-called wire bonding that have to be mounted on to the printed circuit board. "Due to the high number of contacts, the limits of feasibility were exhausted when it came to structuring the printed circuit board, but also in terms of our production machines. This is the kind of project that is typical of the work we do. Together with our customers, we work out solutions that implement the customer's applications on the production side – even if we have to go to the very limits of what is possible to do so."

This requires close proximity to the customer which Behrensmeier sees as one of duotec's other strengths: "In order to find qualified solutions, close cooperation with the customer's development team is absolutely critical, this is something that competitors from Asia, for example, simply cannot offer."

With individual electronics solutions for customers from the most varying industries, Turck duotec is holding its ground on the market

Example: intelligent oil dipstick

Duotec engineers even take on complete electronic development for their customers. One current example of this is the seemingly simple oil dipstick for a well-known U.S. motorcycle brand. It is made by a German specialist for tuning and supplier parts for the automobile industry. The oil dipstick is not only supposed to display the oil level, but also the oil temperature. "The customer is a mechanical solutions specialist and has many highly innovative product ideas," explains Johannes Schaefer. "This customer had us develop the electronics that are often necessary to implement its ideas. It is a fantastic partnership where collaboration begins right at the concept phase." What resulted is an "intelligent" oil dipstick that not only displays the oil temperature at the press of a button, but also measures the exact oil level using an ultrasound sensor. The electronic measurement of the oil level was a challenge because the oil can reach temperatures of up to 150 °C; when the engine is running, foam develops that floats on top of the oil. Air bubbles and metal particles in the oil cause additional difficulties that duotec developers have all but eliminated.

"We were able to draw on unlimited resources to come up with the solution. For example, it incorporates thick film technology, adhesive technology, soldering technology and safety engineering, as well as our experience in the sensor field and in bonding technology. And the good thing about it is that this package of applied technology has made the dipstick so simple," raves Behrensmeier. Duotec was able to file the corresponding patents for this solution with high force of innovation. "Currently, there is no electronic method for checking oil like the one we have developed for this oil dipstick," says Johannes Schaefer. "Even with large engines, only mechanical processes are applied that are relatively inaccurate. The need to achieve a modern electronic solution for this is therefore quite large. Many automobile manufacturers who, in the meantime, have discovered our patent are already contacting us with inquiries."

Dr. Ralf Behrensmeier: "The technology mix that we are offering is a true unique selling point."

Yet Schaefer also has markets in mind other than just the automobile industry. Though the automotive industry with its volume and sales shares of about 50 percent is currently duotec's most important market, duotec also has products that can be found in industrial applications or in high-tech toys. Schaefer's newest idea is a solution for the furniture industry. "We are getting involved in the LED technology market. LEDs are being used more and more in the furniture industry – as the most recent furniture trade show has indicated. We are able to offer innovative solutions with our approach in this industry as well. For example, the heat loss that inevitably occurs can be elegantly diverted using ceramic substrates – a material that we are well versed in thanks to our hybrid know-how. Moreover, we are able to build more than just lights, but intelligent systems that monitor themselves." The fact that duotec's LED elements don't require any ballast elements saves space and makes furniture look elegant.

Whether for furniture lighting, braking sensors or applications that have not been invented yet, many exciting solutions are still to come from duotec's creative development teams.

▶ Webcode **more10731e**

Made by duotec: LCD gear display

Turck duotec has had a decisive impact on the development of the INDY-CATOR, an innovation created by Gaslock, a passenger car parts developer from Iserlohn, Germany. This product is a digital gear display that is easily mounted on the gearshift lever as a knob. The INDY-CATOR is a design object and display element in one, with a precise and easily readable gear display. Simply using the position of the gear knob, which is identified by the sensors, the system recognizes the gear currently engaged. Only a teach-in procedure during installation is necessary to achieve this. Thus, regardless of car brand, the INDY-CATOR is compatible with almost any gearbox systems up to 6 gears. Additional information: **www.indy-cator.de**

Author

Olaf Meier is a freelance journalist in Mönchengladbach, Germany

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.

German trade show dates

2007 schedule	Name of trade show	City
April 16 - 20	Hanover Trade Show	Hanover
June 27	MSR Special Trade Show Rhein-Main	Frankfurt
Sept. 24 - 27	MOTEK	Stuttgart
Nov. 27 - 29	SPS/IPC/Drives	Nuremberg

International trade show dates

2007 schedule	Name of trade show	City, Country
May 8 - 12	TECHNICAL FAIR	Belgrade, Serbia
May 22 - 25	MSV NITRA	Nitra, Slovakia
June 5 - 8	ROMCONTROLA	Bucharest, Romania
June 12 - 13	Vision & Robotics 2007	Ede, The Netherlands
June 21 - 24	International Exhibition of Modern Factory and Process Automation	Beijing, China
June 26 - 29	Moscow International Oil and Gas Exhibition	Moscow, Russia
Sept. 04 - 07	go.automation technology	Basel, Switzerland
Sept. 26 - 28	PTA Exhibition 2007	Moscow, Russia
Oct. 1 - 5	Elektrotechniek 2007	Utrecht, The Netherlands
Oct. 2 - 6	TIB 2007	Bucharest, Romania
Oct. 3 - 5	SMART Automation 07	Linz, Austria
Oct. 9 - 11	PA 2007	Lillestrøm, Norway
Oct. 04	M + R Trade Show for Measurement and Control Technology	Brussels, Belgium
Oct. 17 - 18	MOCON	Brussels, Belgium
Oct. 19 - 24	Busworld Europe	Kortrijk, Belgium
Dec. 11 - 13	Elektro Vakbeurs	Hardenberg, The Netherlands

▶ Webcode **more10781e**

Imprint

Publisher
Hans Turck GmbH & Co. KG
Witzlebenstraße 7
45472 Mülheim / Germany
Tel. +49 208 4952-0
more@turck.com
www.turck.com

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

PICS project management
PICS publish-industry Corporate Services GmbH
Nymphenburger Straße 86
80636 Munich

Projektleitung PICS
Jens Otte

Editorial staff
Klaus Albers, Klaus Ebinger, Walter Hein, Stefan Kappel, Karen Keller, Silke Kenzer, Heinz Knabe, Olaf Meier, Holger Spies, Joachim Vogl

Art Direction / Graphic design
Arno Krämer, Britta Fehr (Art design)

Photos
Tobias Mense, Matthias Duschner, Turck, PICS

Printing
Laupenmühlen Druck, Bochum

Visit Turck at several trade shows all around the world. Experience the “Full Range” for factory and process automation in a unique environment. Under the motto “Living Yellow”, we offer you a perfect view into the Turck topics “Sense it! Connect it! Bus it! Solve it!” 3D visualizations on touch panels open new paths into interactive communication.

Turck on the Internet

Whether for sensor, fieldbus, interface or connection technology, the product database at www.turck.com has the right solution to meet your needs. Three search functions support you in the process.

▶ Full text search
Are you looking for a certain product name, a known ID-number or a special feature? Then simply enter it in the search field on the upper left side of the screen.

▶ Menu structure
Are you looking for products from a certain group, such as inductive sensors in cylindrical design? Then click through the menu structure on the left side of the screen.

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

www.turck.com

Turck on site

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

GERMANY
Corporate headquarters
HANS TURCK GmbH & Co. KG
Witzlebenstraße 7
45472 Mülheim an der Ruhr
Phone (+ 49) (0) 208 49 52-0
Fax (+ 49) (0) 208 49 52-264
E-Mail more@turck.com

ARGENTINA
AUMECO S.R.L.
Acassuso 4768
1605 Munro
Prov. de Buenos Aires
Phone (+ 54) (11) 47 56 12 51
Fax (+ 54) (11) 47 62 63 31
E-Mail aumeco@srl.com.ar

AUSTRALIA
Micromax Pty. Ltd.
112 Beaconsfield St
NSW 2144 Auburn
Phone (+ 61) (2) 42 26 67 77
National 1300 36 26 26
Fax (+ 61) (2) 42 26 66 02
E-Mail micromax@micromax.com.au

BAHRAIN
Al Bakali Establishment
P. O. Box 1455
Manama
Phone (+ 9 73) 55 11 89
Fax (+ 9 73) 55 11 83
E-Mail albakali@albakali.net

BELGIUM
Multiprox N. V.
P. B. 71
Lion d'Orweg 12
9300 Aalst
Phone (+ 32) (53) 76 65 66
Fax (+ 32) (53) 78 39 77
E-Mail mail@multiprox.be

BRAZIL
Sensor do Brasil
Rua Jordao Schiavetto, 436
Hortolandia
SP, CEP 13184-080
Phone (+ 19) 3897 9412
Fax (+ 19) 3897 9413
E-Mail
comercial @sensordobrasil.com.br

BULGARIA
Sensomat Ltd.
VH V,App. 11.,
D-r. Ivan Penakov Str. 15-W11
9300 Dobrich
Phone (+ 3 59) (58) 60 30 23/60 30 43
Fax (+ 3 59) (58) 60 30 33
E-Mail info@sensomat.info

CANADA
Chartwell Electronics Inc.
140 Duffield Drive
Markham, Ontario L6G 1B5
Phone (+ 1) (9 05) 5 13 71 00
Fax (+ 1) (9 05) 5 13 71 01
E-Mail sales@chartwell.ca

Central America
COSTA RICA
DOMINICAN REPUBLIC
HONDURAS
PANAMA
PUERTO RICO
support by Turck USA
TURCK Inc.
3000 Campus Drive
Minneapolis, MN 55441-2656
Phone (+ 1) (7 63) 5 53 92 24
Fax (+ 1) (7 63) 5 53 07 08
E-Mail mailbag@turck.com

CHILE
Seiman S.A.
1 Norte 1511
Viña del Mar
Phone (+ 56) 32 2 69 93 10
Fax (+ 56) 32 2 69 93 18
E-Mail ventas@seiman.cl

CHINA
TURCK (Tianjin) Sensor Co. Ltd.
1 8,4th Xinghuazhi Road,
Xiqing Economic
Development Area,
300381 Tianjin
Phone (+ 86) (22) 83 98 81 88
(+ 86) (22) 83 98 81 99
Fax (+ 86) (22) 83 98 81 11
E-Mail turcktj@public1.tpt.tj.cn

COLUMBIA
Colsein Ltda.
Apartado Aéreo 55 479
Calle 82 No. 5-48
Bogotá D. E.
Phone (+ 57) (1) 2 36 76 59/6 10 26 74
Fax (+ 57) (1) 6 10 78 68
E-Mail info@colsein.com.co

CROATIA
Tipteh Zagreb d.o.o.
Peš anska 170
1000 Zagreb
Phone (+ 3 85) (1) 3816574
Fax (+ 3 85) (1) 3816577
E-Mail tipteh@tipteh.hr

CYPRUS
AGF Trading & Engineering Ltd.
Siemens Medical Solutions Cyprus.
P. O. Box 28591
2080 Nicosia
Phone (+ 3 57) (22) 31 39 00
Fax (+ 3 57) (22) 31 31 44
E-Mail agf@agfelect.com

CZECH REPUBLIC
TURCK s.r.o.
Hradecká 1151
50003 Hradec Králové
Phone (+ 420) 4 95 51 87 66
Fax (+ 420) 4 95 51 87 67
E-Mail turck@turck.cz

DENMARK
Hans Folsgaard A/S
Ejby Industrivej 30
2600 Glostrup
Phone (+ 45) (43) 20 86 00
Fax. (+ 45) (43) 96 88 55
E-Mail hf@hf.dk
Web www.folsgaard.dk

EGYPT
Egyptian Trading
and Engineering Co. (E.T.E.)
3, Hassan Sadek St., Ouroba
Heliopolis, Cairo
Phone (+ 20) (2) 2 90 83 80
(+ 20) (2) 4 18 37 31
Fax (+ 20) (2) 2 90 39 96
E-Mail ete@internetegypt.com

ESTONIA
Osauhing „System Test“
Pirita tee 20
10127 Tallinn / Estonia
Phone (+ 37) (2) 6 40 54 23
Fax (+ 37) (2) 6 40 54 22
E-Mail systemtest@systemtest.ee

FINLAND
Oy E. Sarlin AB
P. O. Box 750
00101 Helsinki 10
Phone (+ 358) (9) 50 44 41
Fax (+ 358) (9) 5 63 32 27
E-Mail sales.automation@sarlin.com

FRANCE
TURCK BANNER S.A.S.
3, Rue de Courtalin
Magny-Le-Hongre
77703 Marne-La-Vallee Cedex 4
Phone (+ 33) (1) 60 43 60 70
Fax (+ 33) (1) 60 43 10 18
E-Mail info@turckbanner.fr

GREAT BRITAIN
TURCK BANNER LIMITED
Blenheim House
Hurricane Way
Wickford, Essex SS11 8YT
Phone (+ 44) (12 68) 57 88 88
Fax (+ 44) (12 68) 76 36 48
E-Mail info@turckbanner.co.uk

GREECE
Athanassios Greg. Manias
4 Trigeta Str. & 121 Sygrou Ave.
11745 Athens
Phone (+ 30) (210) 9 34 99 03
Fax (+ 30) (210) 9 34 71 09
E-Mail info@manias.gr

HONG KONG
Hilford Trading Ltd.
Room 1102, 11/F Park-in
Commercial Centre
56, Dundas Street, Mongkok,
Kowloon, Hong Kong
Phone (+ 8 52) 26 24 59 56
Fax (+ 8 52) 27 60 89 93
E-Mail hilford@netvigator.com

HUNGARY
TURCK Hungary Kft.
Könyves Kalman Krt. 76
1087 Budapest
Phone (+ 36) (1) 4 77 07 40
Fax (+ 36) (1) 4 77 07 41
E-Mail turck@turck.hu

INDIA
TURCK India Automation Pvt. Ltd
A-603/604, 6th Floor, ICC Trade Tower
International Convention Centre,
Senapati Bapat Road,
PUNE - 411 016, Maharashtra
Phone (+ 91) (20) 25630039-
(+ 91) (20) 25630040
Fax (+ 91) (20) 25630039

INDONESIA
PT. Yabestindo Mitra Utama
JL. Pademangan IV Gg. 23 No.9
Rt02/01 Pademangan Timur
Indonesia - 14410 Jakarta Utara
Phone (+ 62) (21) 9244826
Fax (+ 62) (21) 6451044
E-Mail suyanto@rad.net.id

IRAN
Partow Ideh Pars Company (PIP Co.)
No 109, Dr Ghandi Ave..
Shahid Arabali St.,
Teheran 15549
Phone (+ 98) (21) 88535375
Fax (+ 98) (21) 88535376
E-Mail info@pipars.com

IRELAND
Tektron Electrical
Instrumentation Tramore House
Tramor Road
Cork
Phone (+ 3 53) (21) 4 31 33 31
Fax (+ 3 53) (21) 4 31 33 71
E-Mail frank.urell@tektron.ie

ICELAND
Km Stal HF
Bildshofda 16
110 Reykjavik
Phone (+ 3 52) 5 67 89-39
Fax (+ 3 52) 5 67 89-38
E-Mail kalli@kmstal.is

www.turck.com

ISRAEL
ROBKON
Industrial Control & Automation Ltd.
12-A Elimelech St.
Ramat-Gan 52 424
Phone (+ 9 72) (3) 6 73 28 21
Fax (+ 9 72) (3) 6 73 84 20
E-Mail robkonfr@inter.net.il

Nisko
Electrical Engineering & System Ltd.
2a Habarzel St.
61131, Tel-Aviv
Phone (+972) (8) 9 25 73 55
Fax (+972) (8) 9 25 73 34
E-Mail joseph.shapira@niskoeng.com

ITALY
TURCK BANNER S.R.L.
Via Adamello, 9
20010 Bareggio (Mi)
Phone (+ 39) (2) 90 36 42 91
Fax (+ 39) (2) 90 36 48 38
E-Mail info@turckbanner.it

TURCK Process Automation
Via Torta 30/A
24047 Treviglio (BG)
Phone (+ 39) (03) 6 34 61 28
Fax (+ 39) (03) 63 59 82 68
E-Mail pa-italy@turck.com

JAPAN
TURCK Japan
#202 MBD Bldg. 2F, 3-3-23,
Minami-Aoyama,
Minato-ku, 107-0062, Tokyo, Japan
Phone (+ 81) (3) 57722820
Fax (+ 81) (3) 34082571
E-Mail info@turck.jp

KOREA
TURCK Korea Co. Ltd.
Room No 406, Gyeonggi Technopark
1271-11, Sa 1-Dong, Sangnok-Gu,
Ansan-city,Gyeonggi-Do, Korea
Phone (+ 82)(31) 5 00 45 55
Fax (+ 82)(31) 5 00 45 58
E-Mail sensor@sensor.co.kr

KUWAIT
Kana Controls Company
P. O. Box 25593 Safat
13116 Kuwait
Phone (+ 9 65) 4 74 13 73
Fax (+ 9 65) 4 74 15 37
E-Mail info@kanacontrols.com

LATVIA
LASMA Ltd.
Aizkraukles 21-111
1006 Riga / Latvia
Phone (+ 371) 7 54 52 17
Fax (+ 371) 7 80 06 06
E-Mail inga@lasma.lv

LITHUANIA
Hidroteka
Chemijos pr. 29E
51333 Kaunas, Lithuania
Phone (+ 370) (37) 35 21 95
Fax (+ 370) (37) 35 19 52
E-Mail hidroteka@hidroteka.lt

LUXEMBURG
Sogel S.A.
b.p. 90
8301 Cap
Phone (+ 3 52) 4 00 50 51
Fax (+ 3 52) 4 00 50 53 05
E-Mail sogel@sogel.lu

LEBANON
Key Electronics
Jal El-Dib Square, Plaza Center
P. O. Box 60036
Jal El-Dib metn 1241-2010
Phone (+ 9 61) 4 71 52 90/1
Fax (+ 9 61) 4 71 52 92
E-Mail key@inco.com.lb

MACEDONIA
Tipteh d.o.o. Skopje
Ul. Jani Lukrovski br. 2/33
1000 Skopje
Phone (+ 389) 70 399474
Fax (+ 389) 23 174197
E-Mail tipteh@on.net.mk

MALAYSIA
Electrical Marketing SDN BHD
No 12, Lorong Brunei 3 off
Jalan Pudu
55100 Kuala Lumpur
Phone (+ 60) (3) 21 42 14 44
Fax (+ 60) (3) 2 141 84 17
E-Mail chris@elemar.com.my

MEXICO
TURCK Mexico S. DE R.L. DE C.V.
Carr. Saltillo-Zacatecas km 4.5 s/n
Parque Industrial " La Angostura"
Saltillo, COAH. 25070
Phone (+ 52) 844 482 6924
Fax (+ 52) 844 482 6926
E-Mail ventasmexico@turck.com

NETHERLANDS
TURCK B. V.
Ruiterlaan 7
Postbus 297
8000 AG Zwolle
Phone (+ 31) (38) 4 22 77 50
Fax (+ 31) (38) 4 22 74 51
E-Mail info@turck.nl

NEW ZEALAND
W. Arthur Fisher Ltd.
11 Te Apunga Place, Mt Wellington
P.O. Box 12747, Penrose
Auckland
Phone (+ 64) (9) 2 70 01 00
Fax (+ 64) (9) 2 70 09 00
E-Mail sales@waf.co.nz

NORWAY
Danyko A/S
Postboks 48
4891 Grimstad
Phone (+ 47) 37 04 02 88
Fax (+ 47) 37 04 14 26
E-Mail danyko@hf.net

SULTANATE OF OMAN
Advance Oilfields & Industrial Supplies LLC
P. O. Box 86, Postal Code 118
Sultanate of Oman
Phone (+ 9 68) 7 71 47 86
Fax (+ 9 68) 7 71 66 34
E-Mail aoisllo@omantel.net.om

AUSTRIA
Intermadox GmbH
Josef-Moser-Gasse 1
1170 Vienna
Phone (+ 43) (1) 4 86 15 87-0
Fax (+ 43) (1) 4 86 15 87 23
E-Mail imax.office@intermadox.at

PERU
NPI Peru S.A.C.
Calle Ricardo Aicardi 361
Surco
Lima 33
Phone (+ 51) (1) 273-1166
Fax (+ 51) (1) 273-1238
E-Mail npiperu@infonegocio.net.pe

PHILIPPINES
Rantrade Industrial Sales
Door 2, Vicky Tan Bldg., Zone-3,
Kauswagan Rd.
9000 Cagayan de Oro City
Phone (+ 63) (88) 8 56 85 65/
(+ 63) (88) 8 56 85 66
Fax (+ 63) (88) 22 72 64 16
E-Mail rantrade@mozcom.com

POLAND
TURCK Sp. z o.o.
Zeromskiego 1
45-053 Opole
Phone (+ 48) (77) 4 43 48 00/19
Fax (+ 48) (77) 4 43 48 01
E-Mail turck@turck.pl

PORTUGAL
Salmon & Cia. Lda.
Rua Cova da Moura, 2–6°
1350 Lisbon
Phone (+ 3 51) (21) 3 92 01 30
Fax (+ 3 51) (21) 3 92 01 89
E-Mail salmon@salmon.pt

KATAR
A.A. Engineering Services
P. O. Box 40541
Doha
Phone (+ 9 74) 4 60 02 35
Fax (+ 9 74) 4 60 02 37
E-Mail asd@aaes.net

ROMANIA
TURCK Automation Romania SRL
Str. Iuliu Tetrat nr. 18
Sector 1
011914 Bucharest
Phone (+ 40) (21) 2 30 02 79
(+ 40) (21) 2 30 05 94
Fax (+ 40) (21) 2 31 40 87
E-Mail info@turck.ro

RUSSIA, BELARUS, UKRAINE, OTHER FORMER CIS STATES
FEK Company
ul.Pionerskaja 37-A, office 10
220020 Minsk
Phone (+ 3 75) (17) 2562917
Fax (+ 3 75) (17) 2562918
E-Mail turck@infonet.by
O.O.O. TURCK Rus
Altufyevskoe shosse, 1/7
127106 Moscow
Phone (+ 7) (495) 2342661
Fax (+ 7) (495) 2342665
E-Mail turck@turck.ru
SKIF Control Ltd.
ul. M. Raskovoj 4-A, K. 409
253002 Kiev
Phone/Fax (+ 7) (44) 2 38 20 37
E-Mail scontrol@iptelecom.net.ua

SAUDI ARABIA
M.H. Sherbiny for Commerce
P. O. Box 3082
Al-Khobar 31952
Phone (+ 9 66) (3) 8 94 42 98
Fax (+ 9 66) (3) 8 64 72 78
E-Mail
sales@sherbinyforcommerce.com

SWITZERLAND
Bachofen AG
Ackerstraße 42
8610 Uster
Phone (+ 41) (44)9 44 11 11
Fax (+ 41) (44) 9 4412 33
E-Mail info@bachofen.ch

SERBIA AND MONTENEGRO
Tipteh d.o.o. Beograd
Bulevar AVNOJ-a 45D, lokal 18
11070 NOVI BEOGRAD
Phone/Fax (+381) (11) 3131057
(+381) (11) 3018326
E-Mail vecerka@ptt.yu

SINGAPORE
TURCK Singapore Pte. Ltd.
25 International Business Park
#03-22/23 German Centre
609916 Singapore
Phone (+65) 65628716
Fax (+65) 65628719
E-Mail info@turck.com.sg

SLOVAKIA
MARPEX s.r.o.
Sportovcov 672
018 41 Dubnica Nad Váhom
Phone (+ 421) (42) 4 42 69 86
Fax (+ 421) (42) 4 42 69 87
E-Mail marpex@marpex.sk

SLOVENIA
Tipteh d.o.o.
Ulica Ivana Roba 21
1000 Ljubljana
Phone (+ 3 86) (1) 2 00 51 50
Fax (+ 3 86) (1) 2 00 51 51
E-Mail damian.jager@tipteh.si

SOUTH AFRICA
R.E.T. Automation Controls (Pty.) Ltd.
P. O. Box 8378
Edenglen 1613
Phone (+ 27) (11) 4 53 24 68
Fax (+ 27) (11) 4 53 24 06
E-Mail info@retauto.co.za

SPAIN
ELION
C/Farell,5
08014 Barcelona
Phone (+34) 932 982 000
Fax (+34) 932.982.048
E-Mail: elion@elion.es

SWEDEN
TURCK Consulting Office
EA Rosengrensgata 32
42131 Västra Frölunda
Phone (+46) (31) 47 16 05
Fax (+46) (31) 47 16 30
E-Mail thomas.winemar@turck.com

TAIWAN
E-Sensors & Automation Int'l Corp.
6F-2, No. 109, Chien Kuo 1st Rd.
Kaohsiung 802
Phone (+ 8 86) (7) 7 22 03 71
Fax (+ 8 86) (7) 7 71 81 61
E-Mail ez-corp@umail.hinet.net

THAILAND
Technology Instruments Co., Ltd.
208/132-137 Moo 6 Pattanakarn Road,
Pravet
Bangkok 10250
Phone (+ 66) (2) 7 22 22 36
Fax (+ 66) (2) 7 22 30 47
E-Mail ttic@net.co.th

TURKEY
Gökhan Elektrik Malzemeleri
San. ve. Tic. Ltd. Sti.
Perpa, Elektrokent No: 694
34385 Okmeydani - Istanbul
Phone (+ 90) (2 12) 2 213236
Fax (+ 90) (2 12) 2 213240
E-Mail gokhanelektrik@superonline.com

For projects:
Dacel Mühendislik Ltd Sti.
Perpa Elektrokent Is Merkezi
Ablok Kat: 2No: 38
80270 Okmeydani/Istanbul
Rhone (+90) (212) 2107646
Fax (+90) (212) 220 5045
E-Mail info@dacel.net

UNITED ARAB EMIRATES
Dynamic Electro Mechanical Eng.
P. O. Box 5895
Dubai
Phone (+ 9 71) (4) 3 36 99 55
Fax (+ 9 71) (4) 3 36 87 22
E-Mail deme@emirates.net.ae

URUGUAY
Dreghal S.A.
Importaciones-Representaciones
Paraguay 1616 BIS
11100 Montevideo
Phone (+ 5 98) (2) 9 03 16 16
Fax (+ 5 98) (2) 9 03 16 16

USA
TURCK Inc.
3000 Campus Drive
Minneapolis, MN 55441-2656
Phone (+ 1) (7 63) 5 53 92 24
Fax (+ 1) (7 63) 5 53 07 08
E-Mail mailbag@turck.com

VENEZUELA
CADECI C. A.
Centro Comercial ARA
Nave G N°. 80-A-18
2003 Valencia, Carabobo
Phone (+ 58) (241) 8345667
Fax (+ 58) (241) 8322566
E-Mail cadeci@cantv.net


Page 08


Page 16

Page 22


Page 26


Page 30


Page 32


Page 34


Page 36

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

D900357 0407