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The Magazine for Customers of the Turck Group

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Solutions for Process Automation

Partners for Process Automation

When it comes to implementing industrial processes and operations as efficiently as possible, Turck the automation specialist has shown itself to be a reliable partner for almost 50 years. Regardless of whether factory or process automation is involved, our declared aim has always been to supply you the customer not only with products, but also with solutions that are optimally tailored to the automation task at hand. Your responses and in no small part the growth of our company have confirmed that with this commitment and the resulting close customer relations, we have been on the right track.

Turck has established itself in all areas of process automation such as the oil and gas, chemical and pharmaceutical sectors. We talk to the decision makers of the process industry, not only about conventional products such as intrinsically safe interface devices or Namur sensors, but also about innovations in the remote I/O and fieldbus areas, right through to collaborative developments or adaptions of these technologies. The aim is always to significantly increase the productivity in the installations. With new technologies such as RFID, this also results in completely new approaches that have considerable consequences for the installation concept. Only those suppliers are successful here that can go far beyond conventional concepts, and as suppliers increasingly present themselves as partners or advisors. Turck therefore not only has a full knowledge of galvanic isolation and connection technology, we have also developed our extensive expertise over decades in process control technology, the associated I/O level and the fieldbus technology, in order to offer competent advice and advance our own innovations with vision.

See for yourself what Turck can offer. In this special Process Automation edition of our **more@TURCK** customer magazine, several customers explain why they have chosen Turck solutions. Showing the full range of our solutions, you will find here application examples from many sectors of the process industry, clearly presented and collated in a single publication.

We shall be glad if these examples can give you some ideas, or if you wish to speak with our process automation specialists about your specific requirements.

Wishing you interesting and informative reading.

Yours sincerely,

Frank Rohn, Vice President Sales Process Automation

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TECHNOLOGY

APPLICATIONS

At its Burghausen site, WACKER is using Turck's BL ident RFID system for reliable detection in its tumbler screening systems in the dust Ex zone 22. **Page 06**

Robust connectors, cables and the BL20 remote I/O system optimize the modular plant concept of the oil & gas specialists Enerflex. **Page 24**

GAW Technologies in Austria has been relying on Turck dual sensors for position feedback signaling of butterfly valves and ball valves. **Page 48**

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

RFID in Hazardous Areas

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

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

Quick read

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

optical identification methods, such as barcodes – and the use of this technology spans many industries, including applications in the oil & gas, chemical and the pharmaceutical and food industries.

Impervious technology

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

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

Intellectual property rights using RFID

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

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

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

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

Based on the reliable BL20 fieldbus stations, Turck provides a complete RFID system for use in hazardous areas

Tags for zone 1

Turck is extending its RFID system BL ident continuously, also for use in hazardous areas. An example is intrinsically safe tags for use in zone 1 and 21 or read/write heads for use in zone 2 or 22. That opens up numerous new application areas – from coupling monitoring at coupling stations, to the continuous identification of proprietary installation components and including preventive maintenance of drill pipes or pipelines. ■

Safe Screening

At its Burghausen site, WACKER is using Turck's BL ident RFID system for reliable detection in its tumbler screening systems in the dust Ex zone 22

If screed is flowing well and tile adhesive is particularly flexible, it's highly likely that a WACKER product has something to do with it. The globally operating chemical company with around 17,200 employees has 25 production facilities, 20 technical centers of excellence and 53 sales offices worldwide.

The most important production site for WACKER is the plant in Burghausen, idyllically situated on the Austrian border, in the so-called 'Bavarian chemical triangle'. The chemical plant, covering a two kilometer area, employs 10,000 people in around 150 facilities, and produces thousands of different products. These products also include dispersion powders that are added to tile adhesives, plaster, screeds and other building materials so that they are given particular properties. To produce the end product, a liquid is dried in a drying tower at the end of the production process. The resulting powder then has to be vibrated through a screen before it can then be packaged. This ensures that the product concerned has the required grain size.

In order to increase transparency and traceability in the production of dispersion powder, the production plant expressed the wish for the automatic detection

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WACKER has equipped several tumbler screens at the Burghausen site with Turck's RFID solution for the dust Ex zone

User www.wacker.com

of the screen size used in the tumbler screens. "The correct screen size was previously measured manually by colleagues in the plant," Michael Holzapfel, plant engineer responsible for electrical engineering in the Construction Polymers division, explains. "In order to exclude the possibility of human error, the screen used for each batch now has to be measured automatically. This enables us to not only guarantee the 100% quality of the ongoing process, but also to have a retrospective record of the correct screening process."

Quick read

Depending on the application, dispersion powder must be manufactured in different grain sizes. To ensure and document this process, WACKER in Burghausen has for the past year been identifying the mesh width of its tumbler screens with Turck's BL ident RFID system, which is also approved for use in dust hazardous areas. As a result of its good experience with this system, the company is also now equipping the first coupling stations with it.

Continuous vibration requires a wireless solution

Holzapfel soon discarded his original idea of using a coding in conjunction with inductive sensors: "The screen is continuously vibrating, over almost the entire year, and so cable-based solutions are not feasible. We already have first-hand experience of this. Every month we have to replace the grounding cables of the screens in order to ensure that they don't break, even though highly flexible cables are used."

We therefore gradually came to the idea of using an RFID solution. Due to the particular environmental conditions at Burghausen, the solution nevertheless had to be approved for use in the dust Ex zone. "Turck was the only manufacturer that could offer us an RFID system that is Ex-approved for zone 22 dust," Holzapfel describes the original reason for choosing the system of the Mülheim automation specialist.

Up to now WACKER has fitted four tumbler screens with a type TNLR-Q80-H1147-Ex read/write head that is approved for use in Ex zones 2 and 22. All the screens used there were fitted with a TW-R50-B128-Ex tag on which the mesh width is stored. The disk-shaped tag is fitted at the edge of the screen, directly under a strap with the optical marking of the mesh width. The read/write head reads the mesh width and passes on the data to the process control system via Profibus using one of three BL20 I/O stations.

During the course of the installation yet one other hurdle had to be overcome: "The function block supplied with the RFID system is programmed for a Siemens S7 PLC and not for a Siemens PCS7 process control system like we use here," Holzapfel explains. "However, our software specialists worked in close collaboration with Turck Support to quickly adapt the S7 function block so that it can now also run on the PCS7."

An Ex read/write head reads out the mesh width of the screen from the tag on the screen (left)

The screen data reaches the PCS7 process control system via Profibus and Turck's BL20 I/O system

New project: coupling station

The system has been in operation at WACKER for the past year to the customer's complete satisfaction. Due to the good experience he has had with his supplier, Holzapfel has already started to tackle the next project. "The Turck RFID system works so well in the tumbler screens, so that we are now expanding the system for use in our coupling stations, as dust-Ex approval is also required here," the plant engineer describes the next step. Around 20 targets and nine sources are to be recorded via RFID in order to guarantee the transparency of the process.

For this purpose, each of the 20 DN80 hoses will be provided with a tag containing the individual hose number. Each target is fitted with a compact read/write head. When a hose is connected, the system reads the appropriate number and enables operation if it is connected correctly. Via its subsidiary mechatec, Turck is supplying the coupling station project with a ready-to-connect solution which is provided with a customized male connector and is fully encapsulated. ■

"The Turck RFID system works so well in the tumbler screens, so that we are now expanding the system for use in our coupling stations, as dust-Ex approval is also required here."

Michael Holzapfel, Wacker Chemie AG

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Primary-screening: In three spraying units, the plants are sprayed automatically with the substance that is about to be tested to see if there is any effect

User www.bayercropscience.de **Integrator** www.tectrion.de

Efficient Control

Bayer CropScience tests new active components with RFID-support from Turck

In their research laboratories in Monheim, Germany, scientists at Bayer CropScience are continuously looking for new active components with the help of new and modern machines. After a lengthy process, these active components are developed into efficient agricultural pesticides for worldwide use. One of the first steps in this process is called primary-screening.

Quick read

Scientists from Bayer CropScience AG test new active components for their suitability as agricultural pesticides by spraying them onto plants in an automated system. The RFID-system, BL ident, from Turck guarantees transparency and the clear identification of each plant.

During this process, the newly developed substances are tested for their effectiveness by applying them onto plants automatically. Depending on the effect of the application, further research is conducted in the laboratory, then in the greenhouse and finally outdoors.

Fully automatic primary-screening

Bayer CropScience developed a fully automatic spraying line for the primary-screening process that manages more than 25,000 spraying operations every year. During each application cycle, three plant sets are sprayed with three different test components simultaneously. The plant sets contain the host plants for eight plant diseases. "During the primary-screening process, we spray up to 100 new substances in different concentrations onto the plants on a daily basis," says Bernd

After the plant pots leave the spray units, all the relevant data is written onto the RFID tag in the middle of the plant pot

Schulten, operating engineer at Bayer CropScience. "To not lose the general view and the control, we use software support for our tests. We get the test series designs from the data processing service center. We import them here, execute them and send back the results," says Schulten.

The most important factor during this process is the clear identification of the plant sets and the correlation to the substances applied to them. Originally, barcode-stickers were used, but the machines were recently updated with contact-free RFID-technology. "In cooperation with the industrial supplier Tectrion, who maintains and updates all our machines in Monheim, we updated our machines with a third spraying booth and the whole system with a new SPS. Previously, only single machine processes, like the spray booth, conveyor and pipette machines, could exchange signals, but now we can control and monitor everything via SPS," Schulten explains. "In this context we wanted to get rid of the barcode-stickers, because they were not ideal for the wavy design of the plant pots and the environmental conditions they were exposed to. Also, the printer was high-maintenance."

During the search for the ideal RFID-solution, the technical project-team considered various different systems and providers. In the end, the decision was made in favor of the BL ident RFID system from Turck. "We wanted an RFID system that is easy to handle, robust and cost-saving in comparison to other products. We found all this with the system from Turck," Schulten comments.

Easy handling with CoDeSys

For Volker Bachmann, a specialist for controls in the Robotik department at Tectrion, BL ident has another unbeatable advantage: "Turck's RFID-System is programmable with CoDeSys and therefore creates the flexibility to outsource complex actions to the controls on-site. That is how we unburden the computer that controls the test procedure." During the change to RFID, the technicians from Tectrion had to equip about 1,000 plant pots with a tag that was glued to the center of the pot. Each tag has a memory space of 128 Byte and contains all the information regarding the specific plant. "Originally, we considered saving only the ID-Number on the tag, but that wouldn't ensure enough flexibility. Now, where all the information is saved on the tag, the machine can work self-sufficient and every single plant pot is identifiable, even without a central computer," says Bachmann.

A Turck Q80 combined read/write RFID head writes and reads the data directly after the plant pots have left the spraying units. Another read/write head is located at the spot where the plant pots leave the machine. If the machine fails or the pots have to be identified for some other reason, Bayer employees can read the current status of the pots with a handheld RFID reader. The read/write heads send RFID signals to the BL20 modular remote I/O system. With the help of a special RFID disc, the data is collected and transferred to a gateway that carries out the local RFID communication, so that only reference data has to be sent to the main computer via Modbus TCP.

"Working with the system from Turck was very comfortable," Bachmann adds. "It was not difficult to program and I could rely on established standards, like Ethernet, so that we could integrate the system into the machine easily. Because of the modular concept, we also could set up everything exactly as we wanted to." ■

The BL20 gateway is programmable with CoDeSys and carries out the RFID communication

"Turck's RFID-System is programmable with CoDeSys and therefore creates the flexibility to outsource complex actions to the controls on-site. That is how we unburden the computer that controls the test procedure."

Volker Bachmann, Tectrion

A Seamless Package

Turck's extended excom remote I/O family allows complete fieldbus installations from the safe area to zone 1

When several fieldbus devices in a processing plant have to be connected to the distributed control system (DCS), the system planner basically has several alternatives: interface solutions, remote I/O solutions and exclusively fieldbus solutions. The classical method of signal transmission is point-to-point wiring, i. e. interface technology. This transfers the individual measuring signal from a measuring instrument in the field directly to the PLC. With point-to-bus wiring – also called remote I/O – the signals of the field instrumentation are collected on an I/O station in the plant, converted to a digital protocol and forwarded to

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The new member of the excom family offers a more compact module rack and new power supply units for use in zone 2

the control system via a bus cable. In this way, the DCS only requires a single communication interface instead of several analog or digital input and output cards.

The third variant is the bus-to-bus connection, i. e. complete fieldbus technology. In this variant, the appropriate field instrumentation is linked directly to the bus via the communication protocol, such as Profibus PA or Foundation Fieldbus. Each field device here is an independent station on the bus, but must also be provided with its own fieldbus connection. This requirement is not possible for many installations since the topology is more complex compared to a remote I/O solution. Very often the signal density is too high for complete fieldbus solutions, or binary signals are required – such as from Namur sensors – in addition to analog process values. In such cases a remote I/O connection is the most efficient solution with the result that the entire fieldbus-based instrumentation is not yet today's standard.

Complete physical layer portfolio

With its comprehensive physical layer portfolio, Turck is offering, for any connection variant, the right solution that can be optimized to the specific requirements. As well as a broad range of interface solutions in commonly available housing styles and numerous components for Foundation fieldbus and Profibus PA installations, Turck has now extended the range of remote I/O solutions with the BL20 and excom product families. The modular BL20 I/O system originally comes from factory automation, but was further developed with HART-compatible I/O modules and a redundant power supply for the requirements of the process industry. As many field devices can communicate additional information via the HART protocol, the HART compatibility of the installed connection technology is becoming increasingly more important, so that it is possible for a remote I/O station to convert incoming HART signals to a digital protocol.

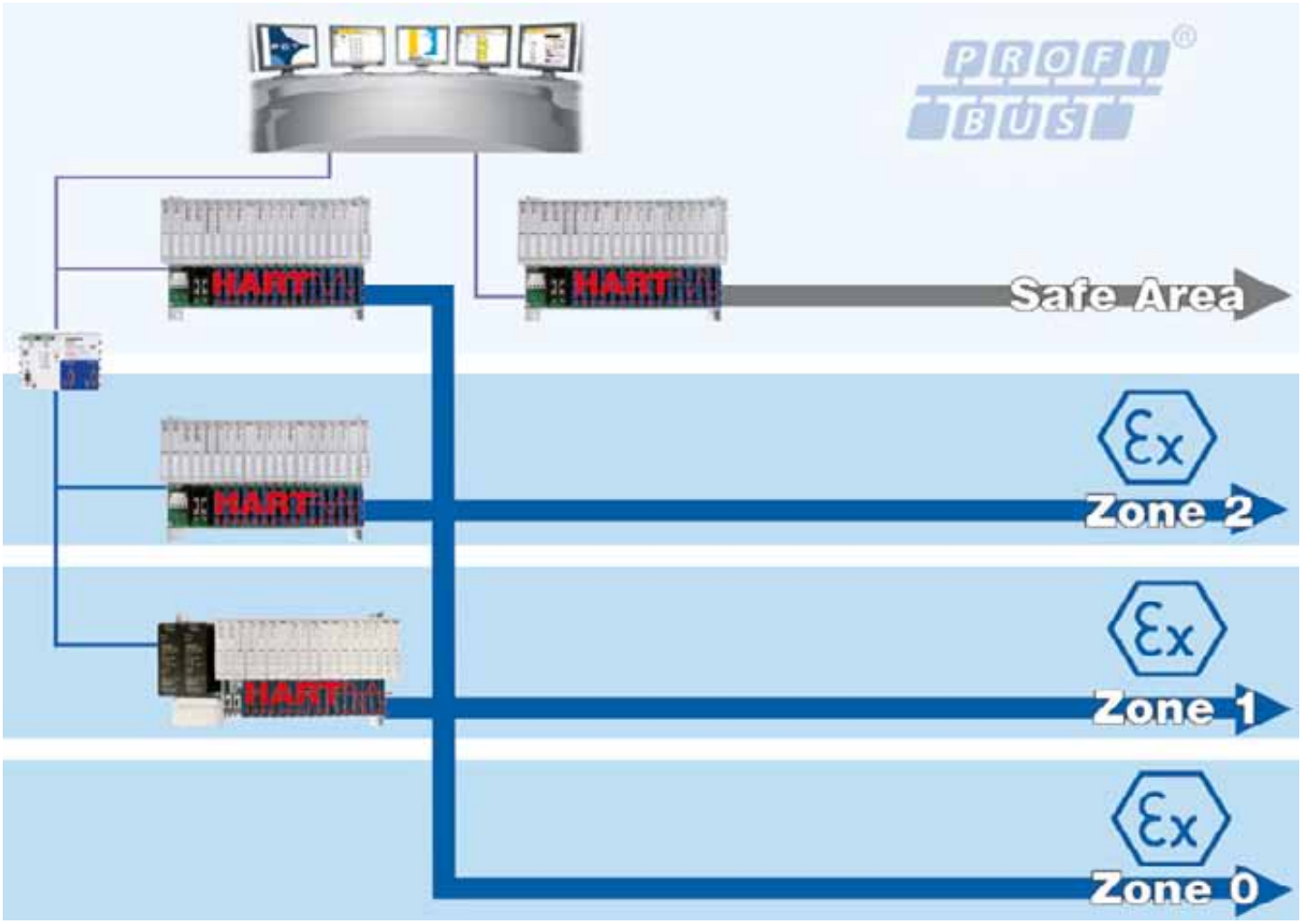
Turck has been offering excom as a remote I/O system for use in zone 1 for the past twelve years, and this has now been expanded to a system family with a compact module rack and new power supply units for use in zone 2. The system transfers process and diagnostics data from the periphery and communicates with the HART field instrumentation if required. The control system is thus provided directly with additional information about process values, diagnostics and asset management in digital form. Furthermore, this is provided in a topology that requires considerably fewer bus cables than the H1-based Foundation Fieldbus and Profibus PA fieldbus systems.

Free choice of installation location

With the expansion of the excom family now presented, the user can choose the installation location without any restrictions. The system can be installed in zone 1, zone 2 or in the safe area. This benefits the user not only in terms of components optimized for a particular zone, but also because of the stan-

Quick Read

Turck has now optimized its excom remote I/O system for zone 1 also for use in zone 2, and has considerably expanded its system functions. Due to the fewer requirements, the system can now be operated in zone 2 with smaller power supply units and a more compact module rack. The new excom family thus enables mixed as well as exclusive zone 1 installations. The connected field instrumentation can even be started up without being connected to the control system beforehand.



Free choice: The excom family offers now tailor-made modules for any location

dard concept for configuring and parameterizing the periphery and field instrumentation.

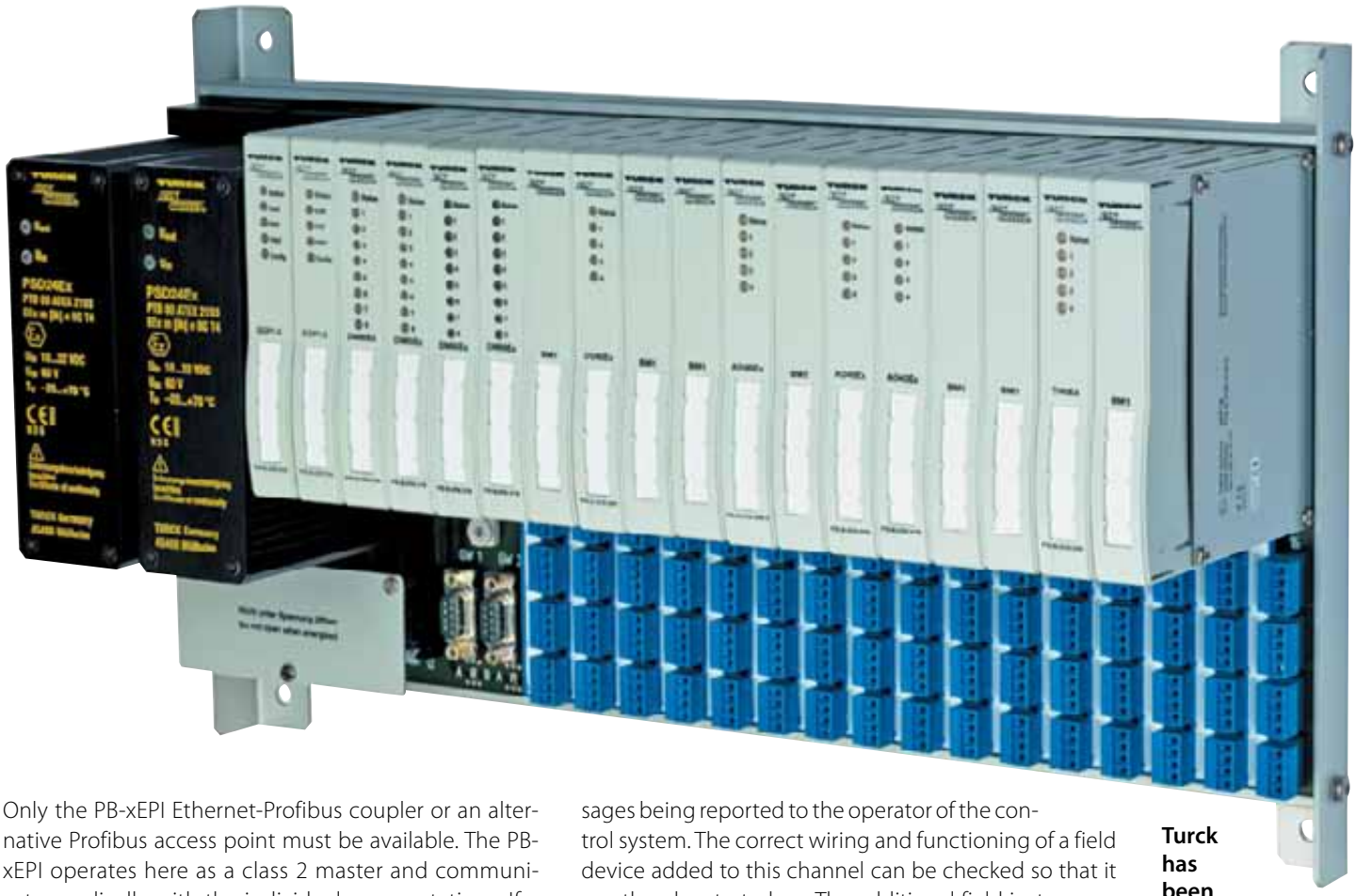
The functions and handling are the same for all types of installation. There is a standard structure and operating philosophy, both for the configuration using GSD files or DTMs, and for asset management. The system can in all cases be maintained and modified during operation. This applies both to adding individual measuring points as well as to extending a system with additional modules. The tried and tested redundancy options of excom are also fully supported.

A standard Ex-i periphery supports the signal processing and field device control from zones 0, 1 and 2. If this periphery is installed in zones 1 and 2, a specially optimized power supply unit is available that generates the intrinsically safe system voltage so that the signals can be received as close to the instrumentation as possible. The interface to the fieldbus, in this case Profibus DP is also intrinsically safe. This configuration enables the entire system to be fully maintained during operation in the Ex area.

The identical Ex-i periphery can now, however, also be used in the safe area. A new module rack offers the possibility of operating up to 24 I/O modules, which further reduces the basic installation costs. As Turck has also developed a special power supply unit for this application area, the entire system is considerably more compact. In the housings previously used in excom installations in zone 2, the available space can now be used for additional components, such as valve blocks or load switches. A special gateway provides the necessary protection of the Ex-i periphery to the bus so that a separate segment coupler is not required for implementing the intrinsically safe physical bus characteristics of RS485-IS. Even with exclusively safe area applications, the user benefits from the further developments of the excom family – particularly with the digital outputs: For example, an additional relay output is also provided that allows the switching of outputs with up to 0.5 A.

Independent startup with DTM

Previously, remote I/O systems had to be linked to the control system in order to test and set up the connected field instrumentation. As this always requires both systems to be available at the same time, waiting periods frequently occur if this is not the case – particularly with larger new installations. The new excom DTM and extended communication mechanisms in the gateway enable excom stations to offer a solution: the user can simply start up the periphery and field instrumentation via the Profibus network without the presence of a higher-level class 1 master of the control system. The installation of an additional service bus for this is unnecessary.



Turck has been offering the excom I/O system for use in zone 1 for the past twelve years

Only the PB-xEPI Ethernet-Profibus coupler or an alternative Profibus access point must be available. The PB-xEPI operates here as a class 2 master and communicates cyclically with the individual excom stations. If a class 1 master is running cyclical communication with other Profibus stations at the same time, this can continue undisturbed and without any restrictions. An additional engineering of the PB-xEPI in the control system is not necessary. In this way, any section of an installation can be started up at any time.

By using an FDT Frame such as PACTware, all the systems present on the Profibus can be scanned and transferred to the project tree of the frame application. The startup engineers can then access all peripheral modules and HART field devices online. This makes it possible to check the entire cabling of the fieldbus, and also diagnose and configure the HART field devices with their associated DTMs. In this way, a validated transfer of the field installation to the control system is possible.

Adding measuring points

The new excom family provides the user with additional functions for changing the configuration during operation, for example by using the hot configuration in run (HCIR) functionality: Gateway and DTM now also support the ability to startup and test new measuring points or additional modules during operation before the transfer to the DCS. Without having allowed for the change in the control system engineering, this enables only those installation extensions that have already been validated to be selectively incorporated into the control system.

The DTM makes it possible to temporarily activate individual channels of the I/O modules that were previously deactivated without unnecessary diagnostic messages being reported to the operator of the control system. The correct wiring and functioning of a field device added to this channel can be checked so that it can then be started up. The additional field instrumentation can then be integrated easily into the process after the startup is successfully completed. This scenario is incidentally not restricted to a measuring point, as completely new I/O modules can be incorporated into the system during operation.

Firmware updates via DTM

As the innovation cycles of excom normally involve enhancements in the functionality of the gateway, excom now also enables firmware updates to be completed in the field. The update is carried out using the excom DTM and the existing network infrastructure that is required for the DTM-based operation of excom. In this way, new functions can be added to the system smoothly from a central location and without any downtime. ■

▶ Fit for HART

Transmitters in the field level are now almost without exception able to transfer additional information as well as the actual measuring signal. The so-called smart transmitters are usually parameterized according to the HART standard. In many cases, however, this information cannot be used, since communication via HART was not planned for in the isolation level installed many years before. Such cases result in what are called stranded HART signals. In order to prevent this, remote I/O solutions are required that support HART communication and can let the relevant signals pass. In this way, the excom system brings the HART functionality directly to the control system via Profibus.

Cards on the Table

Elantas Beck modernizes 19" interface cards with the compact remote I/O system, excom, from Turck

The products made by Elantas Beck are found in numerous electrical devices, including household appliances, television sets, wind turbines, computers and lighting. The company develops, produces and sells impregnation resins, potting compounds and encapsulating resins (thin or thick layer), that are used in electric motors, transformers, generators, capacitors, printed circuit boards and sensors. Elantas Beck is part of the Elantas Electrical Insulation of Altana AG, one of the leading developers of specialty chemicals.

At the company's headquarters southeast of Hamburg, approximately 120 employees develop and produce several thousand tons of resins for the electrical industry every year. During production, the products run through reactor line where the synthetic resins are heated, condensed and processed in vacuum. To carry out this process reliably, numerous monitoring stations are installed. During the construction of the plant, the analog and binary measuring signals were sent to 19" interface cards installed in large racks.

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The excom remote I/O system from Turck provides 128 binary or 64 analog channels in a very small space

User www.elantas.de **Integrator** www.eab-automation.de

Fieldbus instead of 19“ cards

After many years of use, the cards became susceptible to defects. Since new cards were more and more difficult to obtain, an alternative was sought out. The decision was made to modernize the interface technology for one reactor line first and use the still intact cards as spare parts for the other reactor lines. Thomas Pölking, head of maintenance, chose from different alternatives, like modern 19“ cards or DIN rail devices, and decided on a fieldbus solution in the end. “We wanted an easy and modern solution, with integrated Ex-separation and easy, direct connection to our S7-PLC,” Pölking explains. “Before the modification, the connection worked only indirectly. The signals were sent to Ex-barriers, then to an old PLC and only then via Profibus to the S7.”

After the fundamental decision for a remote I/O system was made in the summer of 2008, the search for a qualified provider began. EAB Automation, a company that specializes on modernizations, extensions and new constructions of procedural and manufacturing automation plants, was retained to aid in the search. EAB employees and manager, Jochen Ahrend, support their customers during the design and control engineering realization of the projects, create the software and the switching cabinets and carry out the assembly and the startup.

Assembly in 19” rack

Within the search for a remote I/O system provider, EAB compared solutions from different manufacturers before the decision was made in favor of the excom remote I/O system from Turck. "With the excom system from Turck, we found a remote I/O solution that is really easy to handle and so compact that we could install it into

Quick read

Elantas Beck produces liquid impregnation resins and varnishes in Hamburg, and is one of the leading manufacturers in this market. On their way to the end product, the resins run through a reactor line that is equipped with numerous monitoring stations for temperatures, pressures and more process relevant parameters. The 19” interface technology was installed in the 1990's and there are only few spare parts available today. That is why the company upgraded the first reactor line with modern technology – Turck's excom remote I/O system.

In the reactor lines at Elantas, numerous analog and binary signals are forwarded from the switching room to the interface cards and the excom system to the controls

Thomas Pölking, head of maintenance at Elantas, wanted a compact and modern solution that could be connected directly to the control system without a detour over the PLC

Since the modernization of the plant, the 19" rack (in the back) hosts two excom systems instead of the interface cards

In only one weekend, EAB Automation installed the new excom systems into the 19" racks

"With the excom system from Turck, we found a remote I/O solution that is really easy to handle and so compact that we could install it into the already existing 19"-racks, together with all 150 I/Os."

Jochen Ahrend, EAB Automation

the already existing 19" racks, together with all 150 I/Os," Jochen Ahrend says. The excom systems fulfills another requirement of Elantas, because the additional PLC for the reactor line is no longer necessary. "Now the signals are sent to the excom system from Turck and then directly to the S7, so we can save a detour over another control," Pölking states.

Even though this was the first project where EAB implemented excom, the plan was as successful as the realization. In the fall of 2008, employees were able to install and start the system over the course of only one weekend, so the plant was fully operational again on Monday morning. "We had no experience with the product then, insofar the support from Turck helped a lot," Ahrend explains. "Even the description was particularly good, and all our additional questions were answered by the specialists from Turck quickly so we could continue on our project successfully."

Flexible system

Even though the remote-I/O system wasn't installed in a hazardous area for this project, it is possible to install excom in zones 1 and 2. The field circuits are approved for the use up to zone 0. The IP20 rated I/O modules offer four analog or four to eight binary inputs or outputs at a width of 18.2 mm. Two redundant power supplies, two redundant gateways and up to 16 E/A-modules can be installed on an area of 43.2 cm by 20.6 cm by 11 cm. In this configuration, up to 128 binary or

The SC12Ex segment coupler is used for intrinsically safe separation of RS485 and RS485-IS

64 analog channels are available in a very small space. All modules have "EEx ia" interfaces, so that no further protective measures are needed. The energy supply is available in 24 VDC or 230 VAC. All modules – including the power supplies – can be replaced during full operation, even in zone 1. In addition to increased availability, hot swapping and ex-protection, the system allows a general HART-parameterization of the fieldbus devices via bus. ■

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Mick McCarthy monitors whiskey production with up-to-date plant data transferred to the control system via Turck's excom remote I/O system

User www.irishdistillers.ie

Tradition and Modernity

In the Irish Distillers whiskey distillery, Turck's excom remote I/O proves that traditional manufacturing processes can also benefit from state-of-the-art fieldbus communication

The art of making Whiskey is believed to have been brought to Europe through Irish missionary monks. Production of ‚Uisce Beatha', meaning ‚water of life' in Gaelic, began over 800 years ago The knowledge of distilling spread through the Church and eventually reached beyond the monastery walls.

The Old Midleton Distillery was founded in the early seventeenth century by brothers James and Jeremiah Murphy when they bought and converted an old woolen mill. The distillery is located in the town of Midleton approximately 20 kilometres east of Cork

Quick read

According to the legend, Midleton is the birthplace of Irish whiskey. Even today, the heart of the Irish whiskey industry is still beating in this small town south of Cork. Close to the historical Old Distillery, which still serves today as a museum, the Irish Distillers Limited (IDL) produces the most famous distillates of the Irish Republic, including Jameson, Paddy and Powers. The traditional manufacturing process has since recently been supported by the latest I/O technology: Twelve excom remote I/O stations from Turck ensure the safe and transparent communication between the control system and field devices in Ex zone 1.

"The high signal density of the MT18 module rack was one of the reasons we chose excom. The hot swap functionality also impressed us, as we can now remove and fit all modules during ongoing operation – without having to interrupt fieldbus communication."

Mick McCarthy, Irish Distillers Limited

City in the south of Ireland. The Irish whiskey industry was booming at the time and the distillery soon had 200 people employed and produced 1.5 million litres of whiskey a year. The world's largest pot still is in this distillery holding 32,000 gallons.

In 1975 production at the Old Midleton Distillery was moved to the New Midleton Distillery which was built right next to the original one. The new distillery was built by the newly formed Irish Distillers Group. In 1988, Irish Distillers group was bought by Pernod-Ricard, and with access to their global marketing and distribution network sales for Irish Whiskey grew, with Jameson Irish Whiskey now the fastest growing international whiskey in the world.

As a result, production at the distillery in Midleton is being maximized, with expansion plans in place to increase the output potential of the plant. It is planned in the coming years to double the output production capacity of the plant. Part of these expansion plans was a full upgrade of the VAT House automation system, which has recently completed.

Profibus for the VAT House

The old automation system in the VAT house consisted of three ITT PLC systems, with conventional wiring via barriers to the hazardous area. Irish Distillers have previous experience of utilizing fieldbus with Profibus DP and PA networks installed elsewhere on the site, and so it was not surprising that it was decided to utilize Fieldbus in this upgrade.

DeviceNet was selected for use with Motor Control Stations, and Profibus DP for communication of all field automation signals. Irish Distillers selected Turck's Excom Profibus DP for zone 1 hazardous areas as the best solution for the interface of the automation signals. Turck excom systems were supplied by Turck's Irish Distributors Tektron, based in Cork, Ireland, who also provided technical advice to the project.

High channel density and hot swap

Mick McCarthy, IDL E&I Manager for this project, selected excom over other Hazardous area remote I/O vendors, "due to the high density that can be achieved in the MT18 module rack. The hot swap functionality also impressed us, as we can now remove and fit all modules during ongoing operation – without having to interrupt fieldbus communication." Another benefit: the automatic adjustment of power from the DO40Ex digital output card regardless of the voltage and current enabled IDL use this single type of I/O card for all Digital Output cards thereby reducing specification and design engineering.

The ease of implementing full communication and power redundancy was an obvious factor. IDL have chosen to utilize communications redundancy from the outset. However, they have not implemented power redundancy for the present and see that it is a big advantage that they can implement power redundancy simply by fitting an additional power supply to the MT18 rack.

LED indication for every device on the rack was another feature which led to excom being selected. The Turck stainless steel field panels have a viewing window to allow the operator or maintenance engineer see the status of a card or channel without opening the door. IDL have taken this a step further by fitting a printed matrix to each door, which details the card and channel no, identifying the relative instrument tag number.

High channel density: As well as the redundant power supply, the excom module rack can take up to 128 binary or 64 analog inputs/outputs

IDL has fitted all twelve excom cabinets with a terminal layout, showing the allocation of each output to a field device

The project size was in the region of 800 I/O, with the integration works carried out by Rockwell Engineering, Cork, using an Allen Bradley PLC. The Project required 12 new excom remote I/O stations (MT18). To ensure the maximum speed available (1.5 MBaud) could be achieved, four Turck SC12Ex segment couplers were used, providing four sets of redundant intrinsically safe Profibus segments in the field, which allowed the design engineers ensure that the maximum Profibus DP cable length was less than 200 m. The Remote I/O panel locations were selected to ensure good distribution and that instrument cable lengths were kept to a minimum.

The VAT house is an important part of the distillery process. It was critical that as much of the installation work and in-fact testing and commissioning be carried out before disconnecting the existing system. This was easier to implement due to the use of excom remote I/O panels as the new automation cabling could be installed without obstructing production.

Conclusion

Irish Distillers now have the capability to utilize the diagnostic tools available to them over the Profibus Network. Channel, Module and Panel diagnostics are now available via the Allen Bradley Master and can be visualized in the new control room. The operators and maintenance staff now have a more efficient plant, and will be able to implement predictive maintenance procedures which will assist in increasing the efficiency and the production from this part of the plant.

Once the project was complete, and the VAT House returned to full production, the task of stripping out the redundant tray work, cabling and panels associated with the old system could began. Four large rubbish skips of cabling alone were removed from the site. Areas where it had been impossible to gain access due to large cable trays, were now accessible, making the building a more efficient working environment, assisting in the overall drive to increase efficiency, reduce downtime and increase production. ■

Mick McCarthy is delighted with the support provided by Tektron sales specialist Adrian O'Mahony (r.)

Intrinsically Safe Field Communication

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

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

A few years ago, the Tianjin Chemical Factory expanded its production capacities with a new plant that produces vinyl chloride monomer (VCM). Vinyl chloride – the most important raw material for manufacturing PVC – is a poisonous, slightly combustible gas (ignition temperature about 435 °C), which first becomes a solid and polymerizes after peroxides are added. Because of these and other properties, temperature is the most important process parameter when manufacturing VCM. Even the actual production steps require controlled temperatures at all times. Too low a temperature would not just lower the reaction speed of the intermediate products, it can also destroy the catalysts.

That is why the Tianjin Chemical Factory uses seven type E thermo elements for temperature measurement in each of the 44 transformation systems in which the addition of hydrogen chloride to acetylene occurs. Including the supply piping, a total of 370 measurements have to be transmitted from the explosion-risk area to the process control level. A task that the project managers could only have completed,

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

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

in the case of classic point-to-point cabling via interface technology, with high installation costs and major maintenance expenses.

230 V operation for long distances

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

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

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

Asset management with FDT/DTM

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

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

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

Wang Haiwen, Tianjin Chemical Factory

Quick read

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

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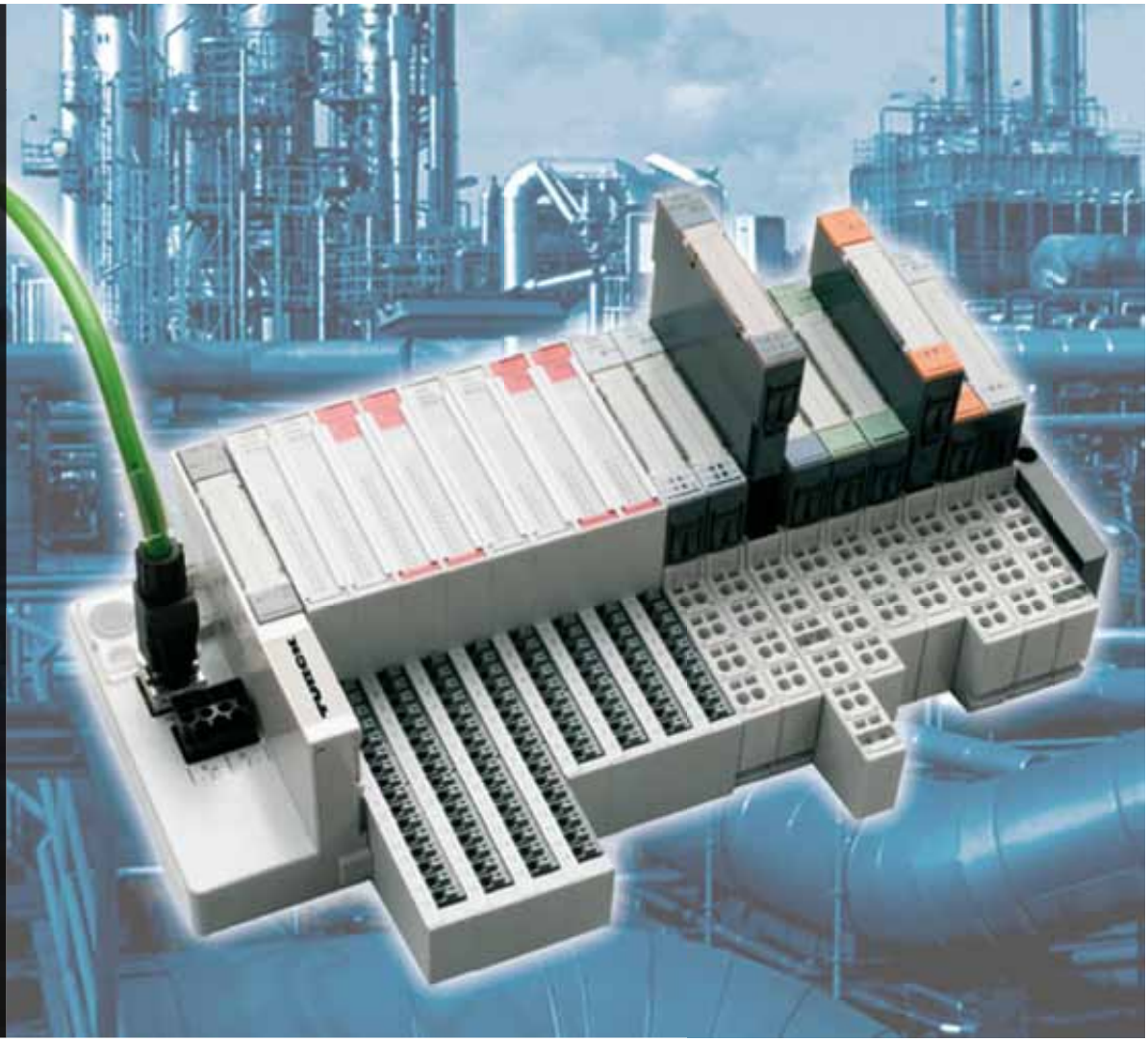


With the Hart modules, BL20 users can transmit, in addition to the analog signal, other digital measurement and diagnosis data from the field, even up to zone 2

They Call it Hart

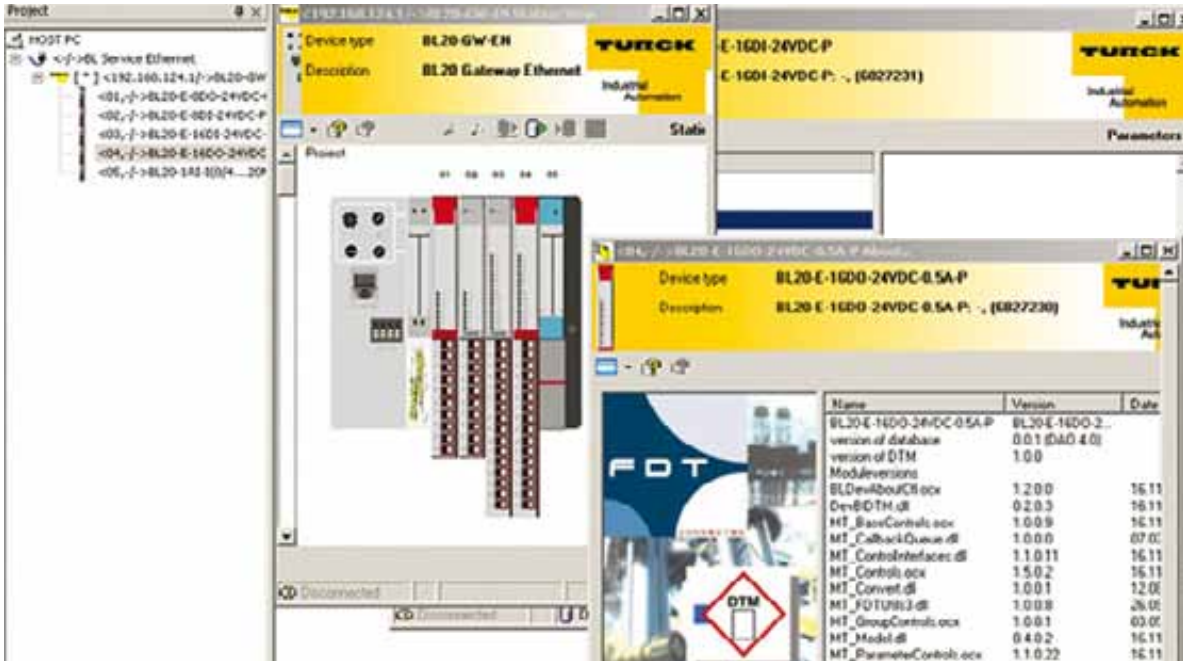
Turck expands functionality and fields of application for the BL20 fieldbus system with Hart-compatible I/O modules and redundant power supply

Although the Hart (Highway Addressable Remote Transducer) communications protocol has been around for almost 20 years, use of this communication solution for the "last mile" to the field devices in process automation is still wide-spread. Turck is therefore expanding its modular BL20 remote I/O system by adding new Hart-compatible analog cards. The dual-channel input/output modules allow users to easily connect their analog field devices to the process control system via the universal bus terminal system and integrate into a continuous asset management concept based on FDT/DTM technology. The key: Digital and analog communication can be performed via Hart and using existing 4 to 2 0 mA wiring.

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

Interactive communication

The advantages of Hart communication are widespread. Because the communications protocol makes data transmission possible via existing pipe installations, users can expand and maintain the "last mile" with little expense. Additionally, the modulated digital signal in the "Frequency Shift Keying" process (FSK) does not



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

influence the actual analog signal, so that interference-free interactive communication between the process automation system and analog field devices can be established by combining both transmission types.

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

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

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

Comfortable diagnostics

Hart modules and project planning software also support standardized FDT/DTM technology. The parameters of the connected field devices can be simply and transparently visualized and configured in a manufacturer-independent engineering tool (like PACTware). Users can diagnose and parameterize the field devices using the basic application without having to grapple with the incompatibilities between different device drivers. The status LEDs located directly on the electronic modules are a new feature in the software diagnosis options. They help the maintenance personnel easily identify the status of module communication at a glance.

Redundant power supply

The new redundant power supply concept enables redundant power supply modules to be incorporated into the IP20 I/O system without any additional effort, thus ensuring greater system availability. Should a module or its power supply fail, the redundant module will automatically take over the supply of power to the connected stations. An integrated diagnostic function indicates the failure via LEDs and diagnostic messages to the controller so that the module can be replaced immediately in order to restore redundancy.

Depending on the specific application, as many redundant power supply module pairs can be integrated for each station as required. The first module pair supplies the fieldbus gateway and the first I/O modules. If the maximum power supply output is reached, another pair of redundant power supply modules can be installed which supplies the I/O modules installed to the right. The so-called Bus Refreshing modules provide two voltages: 5 V for the electronics of the I/O modules and 24 V for the I/Os. ■

Quick read

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

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Enerflex chose Turck's armored 8 port process junction blocks with 7/8" connectors

User www.enerflex.com

Plug & Work

Turck's hazardous area quick disconnect wiring system and the BL20 remote I/O system support the modular concept of Enerflex's production facilities for oil and gas

The Canadian oil and gas company Enerflex, based in Calgary, Alberta, has divisions for both services and products. While the service side lists instrumentation and controls, as well as mechanical services for compression in its offerings, the products side includes oil and gas production processing, compression and environmental services. Enerflex Production and Processing (P&P) is responsible for the design and construction of complete, ready to commission modular production facilities for the oil, natural gas and chemical industries. Products, such as line heaters, liquid separators and even full amine sweetening and dehydration plants are offered.

Enerflex P&P, located in Nisku, Alberta, has sold products to China, Pakistan, Oman and the United States, just to name a few. When a plant is built in

Quick read

The Calgary based oil and gas specialist Enerflex initially builds its modular production facilities to test the systems and pre-commission the facility, before it will be broken down into container sized loads for shipping. In order to realize the benefits of this modular concept, the Enerflex engineers rely on Turck's hazardous area quick disconnect wiring system and the BL20 remote I/O system.

western Canada and needs to go to Oman or other locations far and wide, it will need to be modular, so it can be broken down into container sized loads for shipping efficiency. Enerflex has been able to design the mechanics of a plant to break down into container sized parts for years using flanges and brackets, but the instrumentation has always been a trade-off.

The company wires the plant in the factory, which allows them to test the control systems and pre-commission the facility, but all that wiring needs to be disconnected from the instruments and rolled back to the points where the modular sections (skids) are joined. This wiring, unwiring and rewiring at the final construction location is time consuming and very costly, when you need to fly skilled manpower around the world and house them in a foreign country while the plant is completed and commissioned. Additionally, there is always the issue of wiring mistakes occurring throughout the process that can delay the startup further, which can cost thousands of dollars and lost production.

Improving the physical layer

Matthias Reissner, lead engineer of the instrumentation design team for Enerflex P&P, is always striving for continual design improvement. That can come from using a new sensor technology to measure flow, pressure or level, but other design improvements are possible starting with something that has been overlooked for years: the physical layer of the plant. Matthias had been looking for a way to improve upon an old and cumbersome wiring system that had remained unchanged for decades. That system was proven and reliable, but required many man hours to install and did not lend itself to modular construction where components need to be disassembled for transport.

This is where Turck has been able to help. The Turck quick connector system is innovative in that it allows for the use of a rugged connector system to terminate to process instruments in the field and consolidate those signals at a pre-made junction box. From the junction box, a multi-conductor home run cable is installed across skid joints back to a control cabinet. This connector system could solve the issues involved with pre-wiring a facility for testing while gaining the ability to reconnect the system once the component parts were re-assembled at the final production site.

This type of quick disconnect wiring has been in use in factory automation for years, but only with additional approvals it would be allowed for use in a potentially explosive environment. Turck got both an American and a Canadian approval (FM and CSA) on their connector system. Despite strong competitors for Turck in North America, Matthias says, "The decision to go with Turck was made easy because of the complete line of product, as well as the local technical and sales support available."

The first project started in 2008, when an American oil and gas company wanted Enerflex P&P to build a complete amine gas sweetening facility for processing natural gas. The customer wanted a facility ready to commission within four months. The new amine plant has approximately 300 inputs and outputs including discrete, 4-20mA, RTD's and thermocouples. The facility is laid out into four main groups for hardware and I/O. These units are separated by long distances, which

The connection process takes just minutes and saves days compared to the old method of single point wire termination

Comfortable: It took less than a day to complete the task of wiring, configuring and pre-commissioning all 70 instruments on the workbench

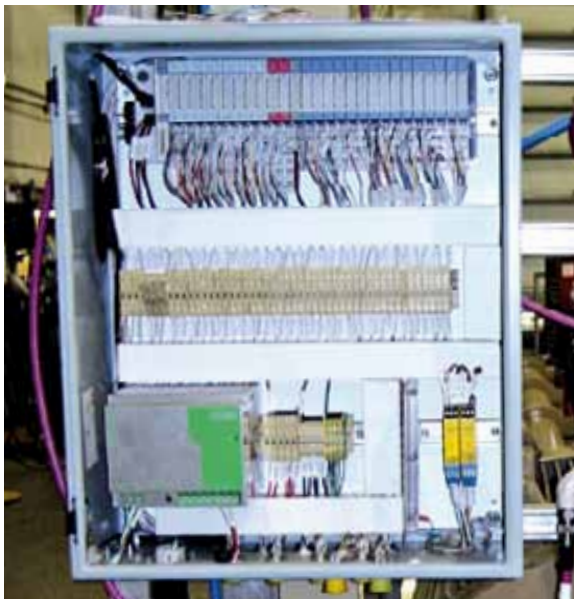
requires large numbers of signals to be sent over 100 meters back to the PLC. Enerflex convinced them that the Turck system would allow the customer a quicker delivery and less expensive start-up.

Quick disconnect and remote I/O

Matthias and his lead process technician Darcy Guderjan decided to use the Turck hazardous area quick disconnect wiring system and the BL20 remote I/O system. BL20 is a cost effective and easy to configure system for process remote I/O solutions in hazardous locations. There are about 150 signals that had to be transferred using a single Ethernet cable back to the PLC from the three remote sections of the plant. They chose BL20 I/O running the EtherNet/IP protocol, which has a worldwide Division 2/zone 2 approval, to consolidate the temperature, 4-20mA and discrete signals and send them at 100 Mbps to the PLC.

Another major hurdle to cross was the design of the instrumentation wiring on the four parts of the plant. The design needed to accommodate a large number of signals and still reduce the wiring footprint while maintaining the 20 percent customer specified spare capacity. Turck and the Enerflex design team decided to separate the analog signals from the discrete signals for future identification purposes and to conform with what is standard practice in Canada. Enerflex chose Turck's armored 8-port process junction blocks (P-8 RKFV 40-CSV19) with 7/8-inch connectors. They also chose a tray-rated 8 twisted shielded pair cables for signals from the junction blocks to the PLC cabinet and armored single twisted pair cables to connect from the junction block to the instruments.

The instruments are connected to the junction block with armored single twisted pair cables



With Turck's BL20 I/O system about 150 signals are transferred via EtherNet/IP to the PLC

The bottom two ports on each junction block remains open to serve as a 25 percent spare capacity for future use. If needed, the two spare ports could be wired back to the PLC cabinet and could be accessed very quickly, as the wiring is already pre-terminated onto the PLC. This use of pre-made junction blocks reduced the wiring footprint and the amount of cable tray required. There is no longer the need to run all the cables back to the PLC individually, but instead what used to be 8 wires has been combined into one single cable. Because of the small size of the home run cable receptacles, the size of the PLC cabinet, where all the signals eventually terminate, was also reduced, resulting in an additional cost saving.

Wire up on a workbench

For the connector in the instruments, Enerflex chose Turck's CSA and FM approved explosion-proof feed-through receptacles. The advantage of having a connector at the instrument was that Enerflex was able to pre-wire and configure all 70 transmitters before they ever went onto the piping. It was much easier and safer to wire and test an instrument on a warm workbench than out in the cold Canadian winter at -40 °C while 5 meters up a ladder. The efficiency of this process was evident in that it took less than a day to complete the task of wiring, configuring and pre-commissioning all the instruments.

The new system meant that cables had to be measured and ordered based on calculations done with the aid of a new engineering software tool used for drafting layout drawings. Enerflex could not wait for the electricians to measure the finished skid and have the Turck factory in the United States build the desired cables. This process of using the new software design tool was successful with a less than 1 percent error rate. The new cable measurement system worked and the cables were installed with limited difficulty and on time.

The installation of the wiring on the skid went quickly and is easy to trace and troubleshoot. The BL20 remote I/O was configured using Turck I/O Assistant software before it was installed in the remote I/O panels. Once installed in the panels, the instruments were terminated and tested with I/O Assistant before they were connected to the PLC for commissioning. BL20 reduced the cable count and cost significantly compared to conventional point to point wiring.

The PLC cabinet with the Turck home run receptacles was built in a different city and shipped to the Enerflex site to install onto the main skid. When the home run cables from the Turck junction blocks were connected to the PLC cabinet, the commissioning could begin. This connection process took minutes and saved days compared to the old method of single point wire termination as signals were run from transmitters.

Once the wiring, PLC programming and plant commissioning was completed at the Enerflex factory, the entire skid was broken down into smaller sections for shipping. This meant that the home run cables from the junction blocks were disconnected and rolled back to the skid break point and capped off for transport. Once onsite and reassembled by local workers, the process of testing all the signals was very short because of the keyed nature of the connectors. These keyed connectors meant that the job was done with no mistakes, further increasing efficiency and reducing onsite expenses.

Satisfied customer

After the initial two plants were installed in 2008, there have been three other virtually identical plants ordered, all with the Turck hazardous area quick disconnect system specified by the customer. Enerflex was able to increase the productivity of their factory floor by doing multiple parts of the construction process in parallel, as well as provide their customer with a superior product for commissioning and ongoing maintenance. ■

"The decision to go with Turck was made easy because of the complete line of product, as well as the local technical and sales support available."

Matthias Reissner, Enerflex

Once the wiring, PLC programming and plant commissioning is completed at the Enerflex factory, the entire skid is broken down into smaller sections for shipping

Intelligent Water Treatment

Water treatment plants from WJP Solutions are used in many Australian buildings – now they are working with DeviceNet fieldbus technology from Turck

As specialists for water treatment plants that deal with waste water and water for domestic use, WJP Solutions, headquartered in Melbourne, Australia, has completed various large projects in Victoria, New South Wales and Queensland. WJP Solutions' water treatment plants are mainly found in public buildings, shopping malls, universities and golf courses. With a team of approximately 25 employees, WJP Solutions is able to implement entire projects – from the design stage all the way to installation, commissioning, fine-tuning and maintaining of the complete system.

WJP Solutions' latest project was to design and implement a waste water treatment plant at the South East Queensland Correctional Facility in Gatton. This plant was first built in a modular fashion at WJP Solutions site in Melbourne and then shipped to the location in Queensland. To use the modular concept efficiently, Petar Bijelac, the electrical automation manager of the company and his colleague, Aleksandar Stanojevic, made the strategic decision to utilize fieldbus technology to replace the conventional methods used in the design and implementation of their projects. Compared to the conventional methods, fieldbus solutions cost less and are faster to install – especially with regard to the modular installation during reconstruction on site.

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WJP Solutions relies on fieldbus technology from Turck for their new water treatment plants

User www.wjpsolutions.com.au

The motor starters, which are connected with a BL20 DeviceNet gateway, are installed in no time at all

Comprehensive portfolio

After Bijelac and his team compared the current products on the market, they decided on Turck. "We assessed similar systems from other manufacturers and we found the solution offered by Turck to be the best in terms of ease of integration and cost. Support of the product has played an important role in selecting Turck as a supplier, as well," says Bijelac. Since the beginning of the project, Turck has provided support from software or CAD-data to specific device configurations. In addition to the support Turck provides, the functionality, reliability and price-performance ratio Turck offers with its robust IP67-rated components is exactly what WJP Solutions needed for its project.

For the project in Gatton, Turck delivered 16 digital and analog advanced I/O modules (AIM stations) and 27 motor starters for its BL20 distributed I/O system. The motor starters can be easily installed next to each other within the control cabinet, and are connected to the plant via three BL20 DeviceNet gateways.

With the robust connection technology from Turck, WJP Solutions was able to connect the pumps, valves and numerous sensors, including the devices that measure pH-value and chlorine, easily and reliably. WJP Solutions is also using Turck products for a project at the Westfield Sydney City Shopping Center. Turck is supplying this project with 16 AIM stations, both digital and analog, as well as two BL67 distributed I/O systems with analog output modules. Both systems utilize DeviceNet cables, splitters and connectors from Turck.

DeviceNet on board

Another advantage of the fieldbus solution from Turck is the fact that each I/O station can be connected directly to the DeviceNet network. The systems are easily integrated into the network controlled by an Allen Bradley PLC with a DeviceNet master. The alternative, a central DeviceNet station where the sensors are connected in a star topology, becomes superfluous. ■

"We assessed similar systems from other manufacturers and we found the solution offered by Turck to be the best in terms of ease of integration and cost. Support of the product has played an important role in selecting Turck as a supplier, as well."

Petar Bijelac, WJP Solutions

Quick read

To support the modular concept of their water treatment plants, the Australian company WJP Solutions replaced conventional wiring with fieldbus technology. Their partner from the beginning was Turck, because of its comprehensive portfolio of compact and modular I/O systems for DeviceNet.

Author

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

Bus Diagnostics

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

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

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

Access via a web browser

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

tions experienced by connected subscribers at any time without having to rely on proprietary engineering tools. Single requirement: Access to the Internet.

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

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

Expanded diagnostic functions

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

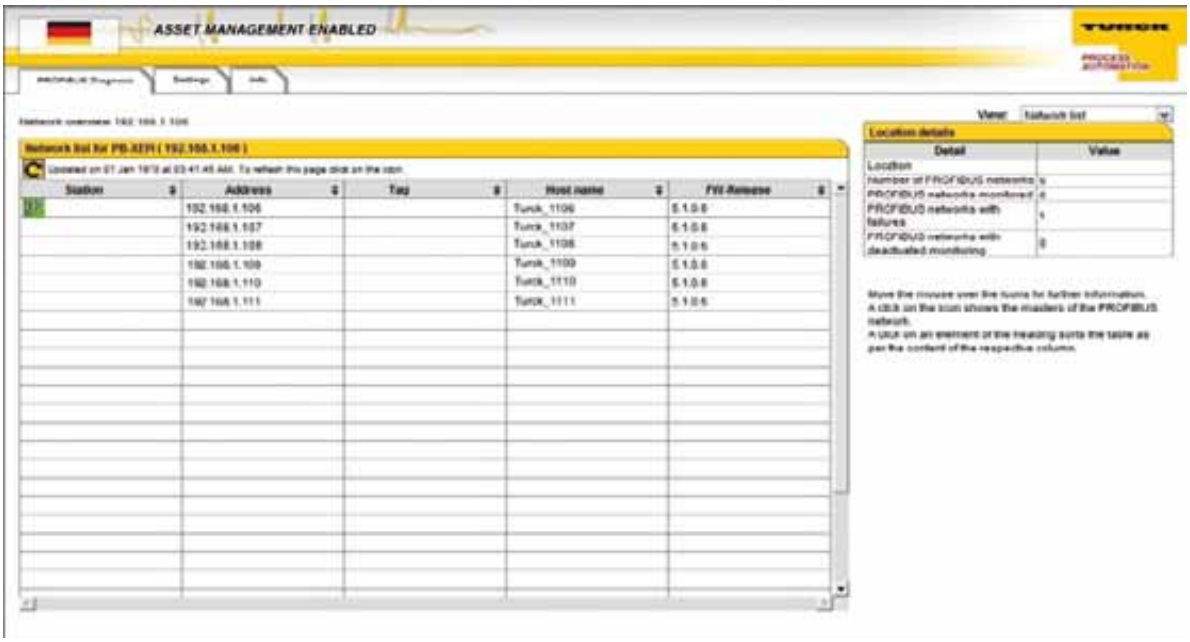
As a central bus access via the Ethernet interface, the PB-XEPI also supports the manufacturer-independent quasi standard FDT/DTM. The advantage of this combination of license-free framework application and driver software is that the relevant parameterizing and diagnostic data of the connected field devices can be simply managed and visualized based on the "driver files" - the device type managers (DTM). The user no longer has to deal with managing the diagnostic data or the incompatibility of different diagnostic tools. Instead, users can concentrate entirely on the content of the data received, and thereby on the plant status. Turck offers its customers both the higher-level framework application PACTware 3.6, as well as the communications DTM, for the diagnostics unit for free download.

Quick read

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

Summary

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



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

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With about 30 million tons of iron ore and coal, the plant from EECV is one of the biggest bulk handling installations in Europe

User www.eecv.nl

Easy Listening

Ertsoverslagbedrijf Europoort C.V. installed the Ethernet-Profibus-Interface, PB-XEPI, from Turck for constant monitoring of the fieldbus communication

At the harbor of Rotterdam, Ertsoverslagbedrijf Europoort C.V. (EECV) runs one of Europe's biggest bulk handling installations. On an area of about 82 hectare, every year roughly 23 million tons of iron ore and up to 5 million tons of coal are unloaded, stored temporarily and loaded from sea-going vessels onto smaller transport ships for the transportation into the Ruhr area. Size and age of the plant – the facility is modernized and has been updated consistently for the last 40 years – are a challenge for the logistics, as well as for the automation technology of the robust load cranes, conveyer belts and loading installations. Because the communication between the automated equipment components and the superior controls has to be very robust and reliable, EECV relies on the Profibus protocol. Fiber optics lines have to bypass large dis-

tances of up to one kilometer which makes the fieldbus communication susceptible to failures.

Easy to diagnose

Last summer, the general wish was expressed to monitor the overall 20 Profibus networks and all participants centrally, to recognize and avoid failures at an early stage. During their research for a powerful surveillance tool, the responsible staff from the electrotechnical office found the Ethernet-Profibus-Interface, PB-XEPI, from Turck. The decisive factor for the decision was mainly the diagnostics functionality: "The Ethernet-Profibus-Interface from Turck is ideal for us, because you can figure out where the mistake lies – down to the single participants," John van Hoorn, planning engineer, explains.

So far, EECV uses five interfaces for diagnosis, seven more are already scheduled and eight additional interfaces could be in use for the coal facility soon too. The interfaces make an important contribution to the vertical communication and maintenance concept over the office to the single field components. With the new interfaces, the staff of EECV is able to monitor the connected Profibus networks simultaneously, constantly and centrally for the first time. Unlike the local proprietary diagnostic tools, the PB-XEPI, that is acting as a webserver, allows the remote maintenance over a PC webbrowser – the equipment or number of participants of the plant isn't important. "You assign an IP-address for the interface, connect the Profibus-cable and it works," van Hoorn exclaims.

Error message by e-mail

At the Profibus network of the huge bulk handling installation, Turck's PB-XEPI's are configurated merely as listeners. Without an own Profibus address, the diagnose units monitor the data flow of the networks without taking part in the communication. In the case of a malfunction of the network communication, the interface concerned records an error message independently or sends it by e-mail. Over an attached link, the maintenance staff can access the interface and retrieve detailed information and instructions.

Thanks to the system-independent communication via Ethernet and integrated webserver, there is no special software or license needed to reach the full diagnostic functionality – a webbrowser is all that is needed. "Some time ago, a PB-XEPI showed so called repeats from an old part of the facility. I could read the error report in my office and immediately replace a part of the cable before there was a bigger failure."

Future-proof functionality

As a universal interface for the Profibus-net, PB-XEPI supports the standard FDT/DTM. Thanks to the license free software PACTware and fitting "device drivers" for the field components (so called Device Type Manager) the user can easily visualize and manage the diagnose data of the participants. The easy handling also supports future upgrades of the fieldbus net and turns the diagnose interface into a future proof enrichment for automation technology. ■

"Some time ago, a PB-XEPI showed so called repeats from an old part of the facility. I could read the error report in my office and immediately replace a part of the cable before there was a bigger failure."

John van Hoorn, Ertsoverslagbedrijf Europoort C.V.

Quick read

At the harbor of Rotterdam, numerous field devices in robust load cranes, conveyer belts and loading installations communicate with the controls via Profibus protocol. As soon as failures of the fieldbus communication are signaled, the maintenance staff can identify and fix the problem centrally with the help of a webbrowser – thanks to the support of the Ethernet-Profibus-Interface PB-XEPI from Turck.

Ethernet-Interface and webserver of the PB-XEPI allow a central monitoring of the Profibus network

If the PB-XEPI is configurated as a listener, the diagnose-tool is able to monitor the whole network without an own Profibus address

Efficient Diagnosis

Turck's Diagnostic Power Conditioner System detects faults in the Foundation Fieldbus segments

The Foundation Fieldbus Diagnostic Power Conditioner System (DPC) from Turck is able to detect long-term faults such as jitter or noise in Foundation fieldbus segments. Plant faults or failures caused by the fieldbus can be completely prevented with appropriate alarm signaling. The DPC system also supports the user with fast troubleshooting during the commissioning of a fieldbus installation.

The DPC system provides a redundant primary supply for up to 16 segments with a maximum output current of 800 mA and a maximum output voltage of 30 VDC for each segment. This enables users of the system to run long-distance segments of up to 1,900 meters in length. The ADU (Advance Diagnostic Unit) records the fieldbus signal with its characteristics without any feedback. The system is electrically isolated on all sides to ensure this. After all, it wouldn't make sense to diagnose the bus and add a new error source at the same time. It is therefore important not only to isolate the individual segments from each other, but also to guarantee this isolation between the segments and the power supply, between the segments

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The DPC (Diagnostic Power Conditioner) system enables Turck to offer plant operators entirely new possibilities for managing Foundation Fieldbus networks

and the ADU, as well as between the segments and the bus system that transfers the diagnostics data to the higher-level system.

Separate diagnostic bus

In order to ensure that the transmission of the recorded diagnostics data to the higher-level system is safe, the Foundation fieldbus H1 cannot be used. For one thing, the diagnostic function is required to detect faults in the H1 segment. Furthermore, this would produce too much diagnostics information on each H1 segment, which would overload the limited band width of 31.25 Kbit/s. The developers at Turck have therefore implemented High Speed Ethernet (HSE) for use as a separate diagnostic bus.

The protocol for this remains the same and only the physical layer is different. The Foundation Fieldbus High Speed Ethernet is used today as an interface to the control system and to connect up multiple H1 segments, which are converted to HSE using linking devices, to the control system via an interface card. A second use is the connection of HSE linking devices to asset management systems. In this case only diagnostics data, alarms and parameters are taken from the H1 segments and transferred to the asset management system via HSE. This enables the asset management system to exchange all data with the individual Foundation fieldbus devices via a standard Ethernet interface.

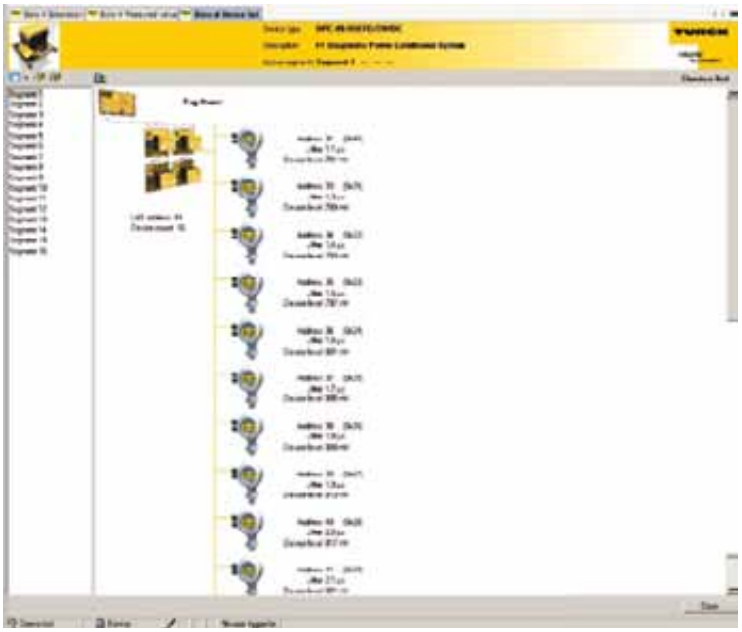
The interface to the asset management in the diagnostic power conditioner system is an HSE field device. This field device also contains Foundation Fieldbus function blocks in which the individual diagnostics values are mapped. In this way the physical layer diagnostics data can be transferred to the higher-level system via the same block library – a practice that years before was only customary with pressure, temperature, level or flow transmitters. The segment diagnostics data is therefore transferred to the higher-level system using the same protocol but via a separate bus (HSE). As the segment diagnostics is provided by an HSE field device, the values are transferred via standard function blocks and the alarm signalling with standard FF alarms.

In order to diagnose the Foundation Fieldbus H1, the DPC system measures all the data providing information on the quality of a segment such as jitter, noise, ripple and signal amplitude. As the electrical measured values mostly change during the runtime of the installation, the DPC system must be able to detect the deviations reliably. The same applies to the communication parameters, such as the number of frame errors or token sequence errors. For the plant operator it is also useful to see online whether sufficient free communication time is available for an additional field device on a segment.

Open thanks to FDT/DTM

The individual values and parameters are graphically presented by an HSE field device DTM developed by Turck, so that the operator does not have to view unimportant fieldbus diagnostics information. This can be shown in a wide range of FDT frames, which can be used as stand-alone tools or embedded in modern asset management systems. The DTM enables offline and online parameterization, a display of the individual measured values, and the visualization of the different statistics using pie charts. ■

The DPC system continuously monitors the entire periphery and displays faults such as voltage drop or temperature drift



The device list shows the address, the signal location, jitter and signal amplitude for each individual field device connected to the segment

Quick read

Using established standards such as FDT/DTM as a basis, Turck is offering a wide range of products for managing even components on the physical layer, i.e. the infrastructure for connecting fieldbus devices and control systems, in asset management systems. The Diagnostic Power Conditioner system for supplying and monitoring Foundation fieldbus networks is a tried and tested product from this portfolio.

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In Abu-Qir, 60 DPC-49-4RMB diagnostic power conditioner systems supply and monitor the 220 Foundation Fieldbus segments

User www.abuqir.com **Integrator** www.uhdeservices.com

Field Transparency

Uhde Services relies on Turck's Foundation Fieldbus portfolio with diagnostic functions for the modernization of the fertilizer complex Abu Qir II in Egypt

The Abu Qir Fertilizers and Chemical Industries Company (AFC) in Alexandria, Egypt, is one of the leading manufacturers of nitrogenous fertilizers in Egypt, Africa and the Middle East. The company has more than 3,300 employees and relies on international standards during production and quality management, including ISO 9001/2000. To guarantee environmentally friendly and efficient production, the plants in Alexandria are continuously being upgraded and optimized. The use of modern automation solutions for ammonia plants is critical in the fertilizer industry because it provides increases in production and energy savings.

"With the Abu-Qir-revamp-project, a large fertilizer plant in North Africa is being converted into an ultra-modern automation solution for the first time", says Dr. Bernd Jordan, Head of Electrical and Instrumentation at Uhde Services. The service provider Uhde, a fully owned subsidiary of ThyssenKrupp AG, develops individual concepts for industrial plants worldwide for modernization and increased production, for maintenance, compliance with environmental standards, and increased cost and performance efficiency. The focus of Uhde lies with the power plant technology, mineral oil processing, chemical, as well as the petrochemical industry.

High requirements

Because of the geographical position of the fertilizer complex, the Foundation Fieldbus wiring as well as the Foundation Fieldbus system components must meet very high standards. The ambient temperature usually lies between 3° and 45 °C and the surface temperature can rise up to 75 °C in direct sunlight. A relative humidity of about 85 percent as well as the chemical and the mechanical demands through urea, ammonium nitrate, dust and sand complete the profile of requirements.

The revamp-project can be divided into two parts: Foundation Fieldbus loops for measurements and process control as well as ESD-loops for fail-safe plant monitoring. All in all, 350 devices in hazardous classified areas and 1,050 devices in unclassified areas had to be connected via Foundation Fieldbus, divided into 220 segments – 60 each in the ammonia plant, the nitric acid plant and the utilities and factory services, plus 40 more for the visualization. After a search for a suitable solutions partner for the Foundation Fieldbus installations in Abu Qir, the general contractor Uhde Services and the operator of the plant selected Turck, the sensor, fieldbus, and interface specialist. "Turck wasn't just able to provide us with an extensive Foundation Fieldbus portfolio, but also with detailed diagnostic functions that make a new Foundation Fieldbus installation all the more efficient", says Markus Mahlandt, Project Engineer E&IC Engineering, Uhde Services.

Universal Foundation Fieldbus portfolio

To supply and monitor all 220 segments, Turck delivered 60 preconfigured diagnostic-power-conditioner-systems (DPC) in control cabinets. The DPC-systems

Quick read

To update their fertilizer production in Alexandria, Egypt, the Abu Qir Fertilizers and Chemical Industries Company (AFC) assigned the revamping of their existing plants to Uhde Services. In cooperation with Honeywell Process Solutions as supplier for control systems and physical-layer-specialist Turck, Uhde Services converted the complex to Foundation Fieldbus, including detailed diagnostic functions for a comprehensive asset management system.

supply FF H1-segments with power and offer comprehensive diagnostic capabilities for monitoring, which allow a plant-wide asset management. The start-up of a fieldbus plant is already supported by the DPC-system. During operation, the solution even recognizes gradual changes within single fieldbus segments over an extended period of time. So disturbances or failures that develop slowly can be prevented.

One DPC-system can supply up to 16 segments redundantly with up to 800 mA output current and 30 VDC output voltage. It consists of one or more DPC-49-4RMB module racks with up to eight DPC-49-IPS1 power supply modules and one DPC-49-ADU diagnostic module. Per module rack, up to four H1-segments can be operated and monitored redundantly. The diagnostic data from the H1-segments can be transferred via a FF-HSE-field device DPC-49-HSEFD/24VDC to a higher level asset-management-application – in this case an Experion PKS from Honeywell.

165 JBBS junction boxes and 110 multi-barriers from Turck are responsible for the safe and secure connection of the field devices to the DPC-systems in Abu Qir. The eight channel JBBS junction boxes are equipped with an adjustable short circuit limit (30, 35, 45 and 60 mA). Common shielding concepts can be realized with the help of two switches on the circuit board, and a terminating resistor for the bus can be switched on. The enclosure is IP67 rated and made of powder coated aluminum with a breather to prevent internal condensation. Despite their high ingress protection rating, Turck placed the junction-boxes in additional protective housings to ensure their ability to defy the harsh ambient conditions.

Multi-barriers MBD49-T415/Ex are applied for connection to field devices in hazardous classified areas. The multi-barriers increase the maximum number of fieldbus nodes per segment up to 32. The number of nodes is extended by the explosion protected fieldbus supply which can be daisy chained from multi-barrier to multi-barrier in Zone 1. Each fieldbus node in Zone 0 and Zone 1 is supplied by one of the four intrinsically safe and galvanically isolated outputs of each multi-barrier. Galvanic isolation exists between the trunk line and the output circuits as well as between the four output circuits themselves. For the customer, the use of multi-barriers has clear cost advantages. All field devices in a single fieldbus segment can be operated in the hazardous classified area; there are no costs for additional bus couplers, or a new segment card with its integration and parameterization. There is no need for additional supply wiring as the power supply of the multi-barriers takes place over the bus with the support of Turck.

Local support

Even with the complete package from Turck, there were a few obstacles to overcome at the beginning of the project, which contained 200 kilometers of fieldbus lines. "It is normal that some problems arise when it comes to a project of this size", Dr. Jordan explains. But ultimately the first two reconstruction phases were completed on time and to the satisfaction of the operator. Today AFC operates one of the world's most modern and most efficient fertilizer plants. ■

"Turck wasn't just able to provide us with an extensive Foundation Fieldbus portfolio, but also with detailed diagnostic functions that make a new Foundation Fieldbus installation more efficient."

Markus Mahlandt, Uhde Services

In hazardous areas, multi-barriers MBD49-T415/Ex with four intrinsically safe and isolated outputs are used

165 eight channel JBBS-49SC-T815 junction boxes from Turck guarantee a safe connection between the field devices and the DPC-systems

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In the Frankfurt plant, Basell was able to install the first Foundation Fieldbus lines with Turck multibarriers in record time

User www.lyondellbasell.com/frankfurt

Flexible Thanks to the Fieldbus

Turck power conditioners and multibarriers ensure plant operation at the Frankfurt-Hoechst Basell plant

The polyethylene production plants at the Hoechst Industrial Park in Frankfurt have been in operation for more than 50 years. What started under the management of Hoechst AG is now operated by Basell Polyolefine GmbH. The Basell Group was founded a few years ago by a joint venture between BASF and Shell, and is one of the leading suppliers of polyethylene, polypropylene, high-performance polyolefins and polyolefin catalysts. Basell has several production facilities in Germany, among them are plants in Wesseling near Cologne, Münchsmünster near Ingolstadt and in Frankfurt. At the Frankfurt facility, the employees produce raw materials for plastic film, small and large containers such as tablet packaging or drums, special pipes or netting. Basell has also concentrated its research activities in Frankfurt.

Quick read

In order to take over the production of another site at short notice, Basell Polyolefine GmbH was able to upgrade its Frankfurt-Hoechst plant within three months by installing the Foundation Fieldbus system. Central elements of the new installation are the Turck power conditioners and multibarriers which offered more impressive features than just their channel-specific galvanic isolation.

Plant rebuilt in record time

Production at the Frankfurt plant was actually meant to be ramped down at the beginning 2006 by moving sections of the plant to Poland. However, an explosion

at the Münchsmünster plant in December 2005 put an end to this plan. The plant was completely destroyed, so instead of dismantling line 2 at the Frankfurt plant as originally planned, the line was modernized and operations from Münchsmünster were transferred there. The highly flexible production facility in Frankfurt is now in operation, producing more than 30 different products, including all the products from Münchsmünster.

For Harald Liebisch, team leader for automation at Basell in Frankfurt, an exciting phase started in December 2005 when the polymerization plant had to be rebuilt in record time: "Once the initial decisions regarding the new plant had been made at the end of the year, things moved very quickly", Liebisch summarizes. "We were able to update the plant within three months and equip it with Foundation Fieldbus lines."

Liebisch had already had some initial experience with multibarriers, though he was not entirely satisfied with the results. When the Turck solution was presented, the decision was made very quickly: "We were immediately impressed by the full galvanic isolation of the Turck multibarriers," the automation manager explained, "it was exactly this feature that was missing before."

The Turck MBD-49-T415/Ex multibarrier allows for the installation of Ex-i drop lines up to 120 m in length. The full galvanic isolation is provided both between the trunk line and the output circuits as well as between the four output circuits. This prevents compensation currents from developing due to potential differences. The integrated short-circuit protection is activated if a short-circuit occurs at a fieldbus node. Only the output affectet is disconnected – the trunk line and the other outputs of the affected fieldbus segment remain in operation.

Actual planning was able to be completed just as quickly as the decision process, thanks to the configuration tool from Turck. "We used the tool to make a preliminary plan of the segments. The length of the fieldbus lines, the division of the fieldbus barriers, the assignment of inputs to multibarriers – the configuration tool allowed us to define all these points very quickly," Liebisch explained.

Broad base

A total of nine fieldbus lines are currently in operation at the Basell polymerization plant. Power conditioners connected upstream from each one are provided for supplying the fieldbus segments. The scope of this project also includes plans for expanding the Foundation Fieldbus network to 15 segments. "We are very happy with the Turck products," Harald Liebisch says. "In addition to the galvanic isolation, their reliability and simple operation are outstanding. Since we have completely migrated to Turck, we have not had any more difficulties. We therefore also intend to implement the next expansion stage using Turck products."

Despite the time pressure under which the project was completed and the absence of a test phase, installation of the new technology was largely trouble-free. Rapid support was only required once in the initial phase when the first line could not be put into operation. This problem was caused by an insufficient power supply for the three multibarriers due to the internal power conditioners of the Rosemount interfaces used in Frankfurt. These interfaces connect the FF segments to the ABB Symphony control system.

We were able to rectify the problem within a few days. "Turck was a big help in solving it. The short communication routes within the company were very helpful," reflects Liebisch on his experience. "Our problem was taken seriously and dealt with immediately. With the short implementation time available for the project, it was very important that we found a solution quickly."

The multibarriers are now supplied with external Turck power conditioners that not only provide enough power, but also allow a clean separation between the interface converter and the fieldbus.

Conclusion

The changeover to fieldbus technology has enabled the installation planners at Basell in Frankfurt to create the basis for a flexible response to market requirements. The speed at which the installations can be adapted has already been put to the test with the first FF project. The installation in the polymerization plant had to be made operational as quickly as possible without a test phase.

With its high-performance power conditioners and multibarriers with channel-specific galvanic isolation, Turck has provided the most suitable technology for the demanding Basell application. However, it was also the "soft facts" – from the configuration tool to easy handling to prompt availability – which enabled the Mülheim fieldbus, sensor and interface specialists to make such an impression that Turck has also remained supplier of choice for the planned expansions. ■

"We are very happy with the Turck products. In addition to the galvanic isolation, their reliability and simple operation are outstanding."

Harald Liebisch, Basell

Because the integrated power conditioners of the Rosemount interfaces (top left) were not powerful enough, external Turck power conditioners now feed the FF lines

Interface Technology 2.0

The high channel density of the Interface Module Backplane (IMB) ensures space in the control cabinet

Turck's Interface Module Backplane (IMB) adds a robust and extremely compact I/O solution to its comprehensive portfolio. With a footprint of only 175 x 210 mm, the backplane provides space for eight interface modules and thus up to 32 digital or 16 analog inputs/outputs – as required by the customer. Depending on the application, this enables users to implement control cabinets with a very high channel density of up to 1,152 channels.

The new module racks come with a host of smart features: with standardized analog and digital system couplings for the Honeywell C300, Emerson DeltaV and Yokogawa Centum process control systems, a redundant power supply and a high temperature resistance, the IMBs enable a new level of flexibility in the control cabinet. Thanks to their low price per channel compared to DIN rail installations, the easy-to-handle IMB point-to-point solution is ideal both for fully expanded control cabinets with several hundred inputs and outputs, and for less complex applications with only a few I/Os.

Minimum engineering expenditure

The main benefit of the station: because the Backplane unites the entire connection level, and the galvanic isolation of the I/O channels can be implemented simply by inserting the interface cards, the engineering effort is reduced enormously for the entire interface level – both for maintenance and for scheduled expansions. The easy to access screw or spring terminal connec-

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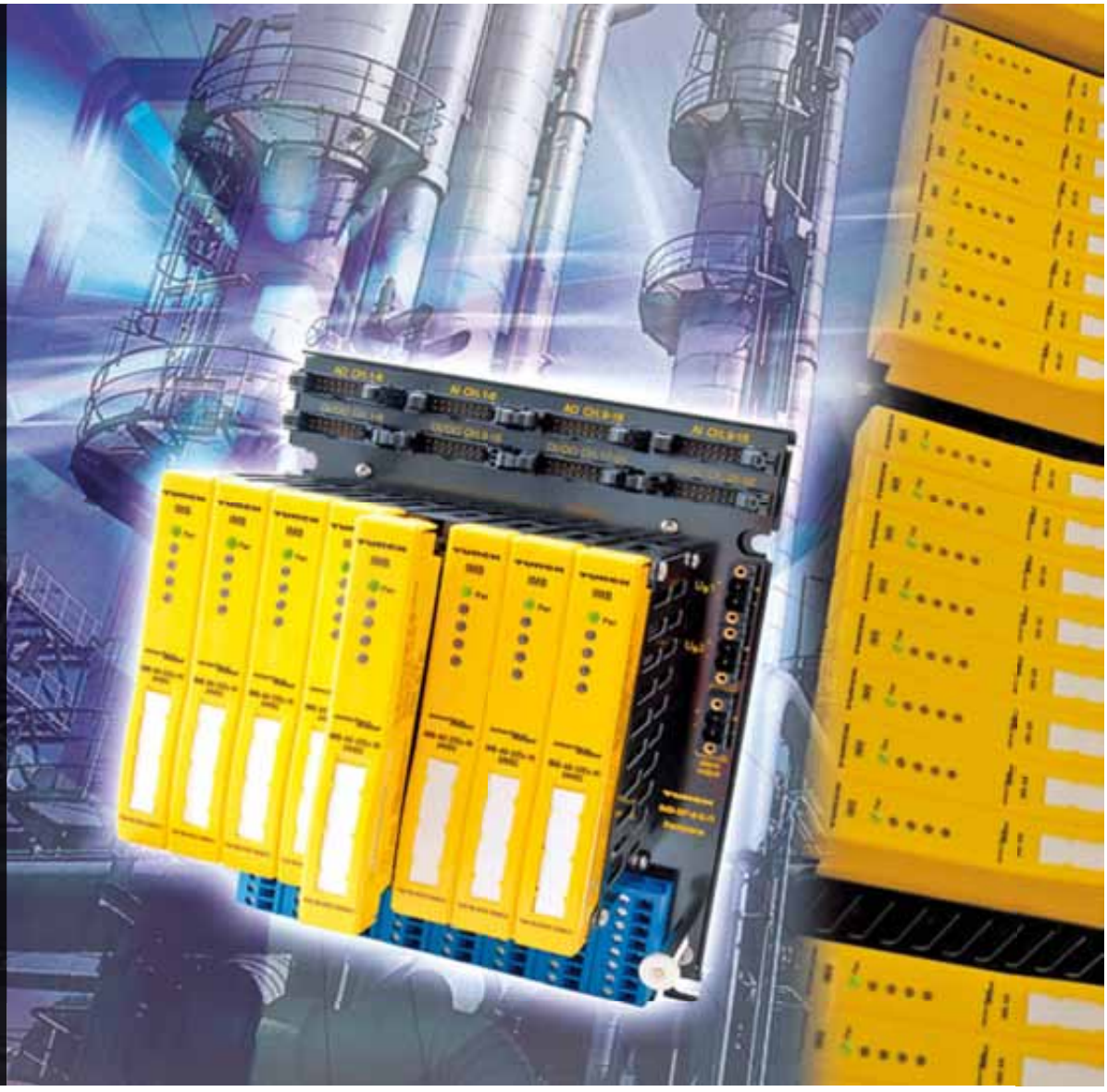

With the Interface Module Backplane, Turck has created a new generation of interface technology

Quick read

Turck's Interface Module Backplane combines up to 32 I/O channels with galvanic isolation and a redundant power supply in a minimum of space, thus creating more space in the control cabinet. HART-compatible analog cards and temperature measuring amplifiers that can be parameterized via a DTM complement the I/O solution, thus providing a seamless concept for the level between field devices and process control system.

tions, as well as the color coded and spatially separated system connections, effectively prevent connection errors. In addition to this is the convenient "hot swap" functionality offered by the system.

The pin assignment of the system connections is adapted directly to the relevant process control system, so that users no longer require special connection modules, and can instead use inexpensive prefabricated 1:1 cables that are readily available – a considerable benefit in terms of the supply of the electronic components used, as well as the installation and maintenance costs of the interface level.

Safety on board

The backplane is the jumpering level for the entire I/O solution and is a completely passive component. Unlike similar systems, there is no active component on the hardware which could shut down the entire isolation level in the event of a failure. As each interface card is also protected individually, the availability of the isolation level is also ensured even if individual channels fail. Turck's IMB also offers a simple redundancy concept for the connection level to the control system. While conventional point-to-point cabling only allowed broken connections to be compensated for by doubling the input signals, the redundant terminals for the I/O cards of the process control systems allow the implementation of separate safety concepts for electronics and cabling.

The energy requirement of a plant is becoming an increasingly important factor for the plant operator, in addition to the availability of the interface level and consequently that of the entire plant. The efficiency of a process ultimately depends on the total cost of ownership, in which the energy requirement of loop powered 4…20 mA transmitters can play a significant part. Here developers at Turck have been able to reduce the energy consumption of the isolating transducers (AIA) without a reduction in power. The loop powered analog input/output cards are also highly energy efficient.

Transparency down to the field level

Both dual-channel analog input/output interface cards and the available isolating transducers are HART-compatible. A HART signal modulated on the analog signal enables additional information from the field device level to be accessed directly. Using special device drivers, the so-called DTMs, users can thus parameterize the temperature measuring amplifiers in use and the field instrumentation below the isolation level with a single vendor-neutral engineering tool, such as the free PACTware configuration tool. With just a few clicks of the mouse, the parameterization tool ensures the easy and user-friendly management of the DTMs, regardless of the bus protocol, the visualization of features and settings, and the parameterization of the connected devices.

The interface cards also provide diagnostic LEDs for indicating the relevant operating states. Up to four dual-colored LEDs (digital input/output cards) indicate in yellow the switching states of the monitored outputs. When the input circuit monitoring is activated, the appropriate LED changes to red if a fault occurs in the input circuit, and the corresponding output relay and alarm relay are switched. The interface cards therefore make it possible to monitor the functioning of the I/O level directly at the device in the control cabinet.

Particularly for installations with a high channel density, the IMB is a good alternative to conventional interface solutions

High temperature specification

Just like the DIN rail interface devices, the IMB interface cards also stand out on account of their high temperature specification. With an operating temperature range of -20 to +70 °C, the backplanes fitted with cards are also suitable for installation in non-climate-controlled cabinets or in the upper areas of control cabinets where there is more exposure to warm air from fans. The design of the passive backplane ensures efficient heat dissipation – regardless of whether the devices are arranged horizontally or vertically. This benefit not only increases flexibility in handling the IMB but also increases its Mean Time Between Failures (MTBF), and thus its reliability.

Conclusion

With the Interface Module Backplane (IMB) and the associated two and four channel interface cards for up to 32 digital or 16 analog I/O channels, Turck makes it possible to implement a channel density in the control cabinet that is not possible with DIN rail interfaces. Particularly in processing plants involving several thousand I/O channels, the compact backplane solutions are a major benefit. ■

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Well-arranged: the compact IM34 temperature transducers are quick to assemble and connect

User www.bp-lingen.de

To the Rails

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

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

"When our refinery was built over 50 years ago, the number of temperature measurements was still straightforward. With increasing automation and process complexity, the number has rapidly risen" says Holger Nitschke, who handles the issue of temperature measurement in EMSR technology at BP Lingen. The refinery in Lingen, Northern Germany, was optimized for the production of fuels thanks to continual modernization and expansion efforts in its processing plants. With its high processing depth, even difficult crude oils are able to be refined into high quality products in Lingen. To do so, a reliable, robust, and state-of-the-art measurement technology is required.

Quick read

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

DIN rail replaces 19-inch technology

Replacing the temperature transducers installed in the 1980's has also been a topic for about three years. In contrast to the 19-inch transducers used during its time in the control room, in this project, BP Lingen is upgrading to modern interface devices for DIN rail assembly. "The 19-inch technology is disappearing from our plants more and more because a DIN rail solution in our case is simply more cost effective and the assembly time considerably lower," says Nitschke. "When necessary, I can replace devices from different manufacturers without any problem – I simply remove the old device from the rail and place the new one on it, add voltage supply, signal input and output, and finished."

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

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

Modernizing temperature measurement technology does not necessarily have to mean a completely new installation, as the example of the Lingen refinery shows. With the right technology, today's requirements can be met by simply replacing the temperature transducer. "In the past, we performed many temperature measurements via type K thermocouples. That is why even in the older plants there is a high number of nickel-chromium/nickel cables between the control rooms and the plant. All of the existing wiring in the plant – including the sensors – can continue to be used," explains Nitschke.

IM34 processes various input signals

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

"We use PACTware as a programming frame," says Holger Nitschke. The term stands for "Process Automation Configuration Tool" and is an open configuration software into which any manufacturer can integrate the operation of its field devices. A configuration using DIP switches or rotary encoding switches was not an option for Nitschke because: "How many DIP switches do you need to be able to adjust all the options that you want to adjust these days? With a temperature transducer like the IM34, there is already an array of parameters that would probably break the rack if adjustments were made via DIP switches, especially as there would barely be any space for all the DIP switches with the desired compact design. Even if the switches are set on the side, I first have to remove the devices from the rail before assembling the DIN rail. In this case, a PC interface is obviously much more comfortable."

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

Holger Nitschke, BP Lingen

Good cooperation counts

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

▸ Date logger in the IM34

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

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

User www.schwelm-at.de

Accelerating Reliably

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

Energy-efficient, cost-efficient, and environmentally friendly – natural gas as a fuel for vehicles pays off threefold. At about 800 natural gas stations, drivers in Germany can refuel with the flighty fuel CNG (Compressed Natural Gas) – with a tax incentive of about one Euro per kilogram until 2018. One technological obstacle blocks the way. In order to make natural gas "tank friendly", it must be heavily compressed – which requires greater technical effort and expense, both in the refueling stations as well as in the cars. "At natural gas stations with pressures of 300 bar, the physical characteristics emerge that differ greatly from normal gas stations. You have to master this technology. That is why we support major car manufacturers in automobile development," explains Dirk Rose, sales manager of Schwelm Anlagentechnik GmbH.

Having constructed over 400 CNG stations, the plant engineering company in the southern Ruhr region has produced almost half of all natural gas stations in Germany, as well as building stations abroad. The company assembles gas pumps through which the gas flows into the gas tank of the car, as well as com-

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

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

pressor stations in which the gas received from the supply lines is compressed to the necessary pressure of 280 bar. Depending on the desired fueling output, Schwelm Anlagentechnik is also installing up to four compressors and up to 48 gas storage bottles in concrete or steel sheet containers.

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

The pressure must be right

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

This is where the interface solutions from Turck, the sensor, fieldbus and connectivity specialist, come into play. Operated via a single-channel HART transducer/isolating amplifier (IM33-12EX-HI), five switching amplifiers from the IM1-22Ex product line ensure, per compressor, the reliable and safe transmission of sensor signals from the explosion-risk area of the compressor stations to the control unit. The Atex zone 2 -authorized DIN rail interfaces from Turck allow users to adjust the effective direction (working or standby current), as well as broken-wire and short-circuit monitoring separately via six front-end switches. The dual-channel design also offers the plant construction company and operators the opportunity to transmit the analog sensor signal to the control unit via the galvanically separated outputs and, simultaneously, to record the process data of the storage pressures on the second channel. This means that a redundant safety concept can be implemented that also allows pressure and process monitoring even in case of a short circuit.

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

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

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

Dirk Rose,
Schwelm Anlagentechnik

Quick read

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

One For All

Extensive dual sensor series from Turck monitors flap and valve positions reliably to suit the application

Binary position feedback signals, such as the "open" / "closed" signals from butterfly valves and ball valves are extremely common in process engineering. The sensors required for this are generally installed in a plastic housing with a somewhat complex mechanical construction. The large diversity of individual components increases the price, usually requires costly readjustment work in order to set the switch points. The Atex guideline also stipulates that all the different components such as the housing, sensors or microswitches including their associated wiring, must be tested separately. Testing in compliance with the SIL Directive IEC 61508 further increases the testing effort and expense involved.

When combined with the well thought-out actuating elements, Turck's dual sensors considerably simplify the detection of binary positions. The dual sensors come in a compact housing and offer an optimum range of connection options as well as being easy to install. The most important series of the dual sensor range is the DSC26 housing style for the food industry and the DSU35 series for the chemical, petrochemical and pharmaceutical industry.

One puck for two rotation directions

Depending on the safety position, both 'spring opening' and 'spring closing' drives are used in installations.

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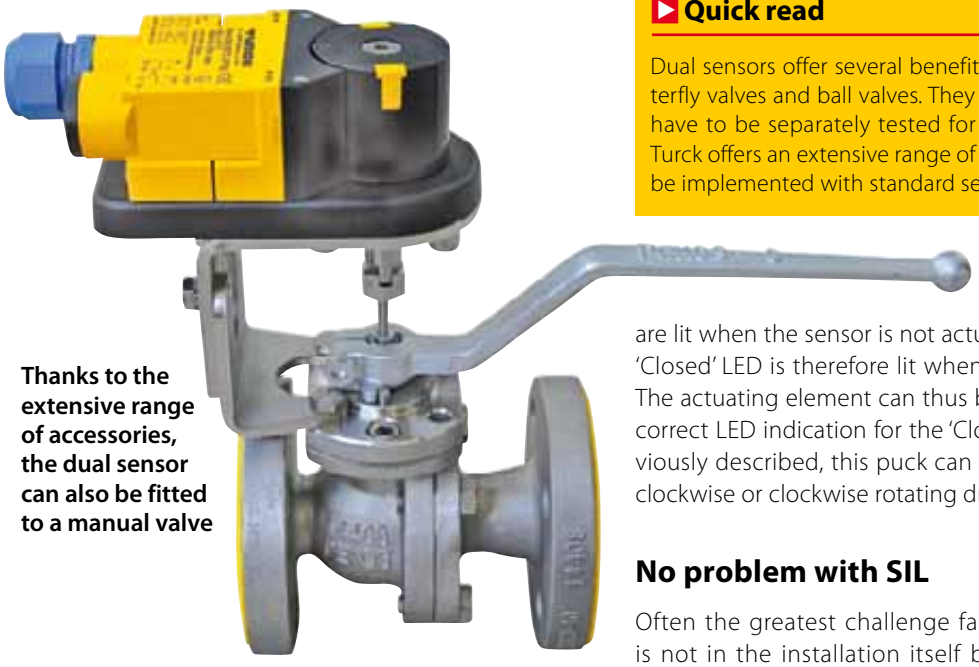
Well thought-out concept: The compact dual sensors from Turck can be fitted and commissioned quickly and reliably



Thanks to the extensive range of accessories, the dual sensor can also be fitted to a manual valve

Quick read

Dual sensors offer several benefits for the position feedback of automated butterfly valves and ball valves. They do not require a separate housing and do not have to be separately tested for compliance with Atex and SIL requirements. Turck offers an extensive range of accessories to enable even special solutions to be implemented with standard sensors.

In this case, around ten percent of the drives are clockwise rotating with the 'spring opening' function. For these special cases, customers of other manufacturers either have to use different actuating elements (pucks) or assemble the actuating elements manually. Both options have associated disadvantages, and often lead to unnecessary long downtimes when maintenance and service is due.

Turck has the solution for both these requirements: The BTS-DSU35-EB1 actuating element can detect both rotation directions. It has two actuating pins so that it can be used easily for both anticlockwise and clockwise rotating drives. It can also be read easily if it is has to be mounted horizontally due to lack of space. The position indication of the puck is clearly visible from all sides and can be moved by 90° without any tools required. This prevents any possible confusion and simplifies troubleshooting.

Turck offers BTS-DSU35-EBE3 for cases when the application in a plant requires the opening and closing switch points to be readjusted, as is the case with rubberized valves for example. This enables the switch points to be adjusted as required over a 360° range. The LEDs of the dual sensors ensure simple and reliable adjustment.

Changing the switch point easily

Another special actuating element from Turck provides a solution for another special case: Sometimes applications require the use of NC monitoring. In such cases, it would also be possible to use specially designed sensors with an NC output. However, using Turck's actuating element with an undampened end position (BTS-DSU35-EU2) is much easier. This inverts the detection of the end position and eliminates the need to change the sensor. This actuating element for undampened end positions can also be used to change the LED function of the Namur sensors. The LEDs on Namur sensors are lit when the sensor is not actuated. In this case, the 'Closed' LED is therefore lit when the valve is opened. The actuating element can thus be used to ensure the correct LED indication for the 'Closed' position. As previously described, this puck can also be used for anticlockwise or clockwise rotating drives.

No problem with SIL

Often the greatest challenge facing plant engineers is not in the installation itself but in the office: The approval of the designs is often more complex than the designs themselves. Also here, the dual sensors are one step ahead of similar products: The SIL Directive IEC 61508 calls for an increasing number of position feedback signals. Modular housings mostly fail here due to their mechanical complexity. Customized solutions are often difficult to handle due to their manufacturer-specific characteristics, and any 'second source' suppliers available are often not approved or are restricted to one type. In contrast, all standard Namur sensors from Turck are suitable and TÜV-certified for use in safety systems, including SIL2 in accordance with IEC 61508. 100% compatibility with all standard Namur processor devices or (safety) PLC systems with Namur inputs is thus guaranteed. Naturally this applies to all dual sensor series.

The extensive range of accessories for the Turck dual sensors considerably expands their application range. The various actuating elements make it possible to meet a wide range of application requirements. Special stainless steel brackets enable the sensors to be fitted to even manual valves without any problem. A simple threaded bolt ensures that the actuating element is connected securely with the valve, and a mounting area with standard drill holes is provided for mounting a Turck dual sensor. In this way, the sensors can be fitted robustly, quickly and inexpensively to manual valves and butterfly valves, so that reliable position monitoring via the central process control system can. ■

The yellow signal pin on the puck indicates the valve position from the side at a glance

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Several hundred dual sensors operate at the GAW plants for years

User www.gaw.at

Quick read

The Austrian plant manufacturer, GAW Technologies, is known worldwide for its reprocessing plants for chemicals and coating colors for the paper and cardboard industry. To monitor the status of their innumerable valves efficiently and reliable, the company relies on dual sensors from Turck.

Dual Sensors

The Austrian plant manufacturer, GAW Technologies, relies on dual sensors from Turck for position feedback of their valves

For more than 60 years, the name GAW stands for capacity and quality in industrial plant manufacturing. The family enterprise, based in Graz in Austria, is the center of the international operating group of companies – GAW Group – whose activities concentrate on four different business areas: paper and cardboard, automobile, chemical and environmental technologies. The GAW group offers procedural solutions for all of those areas, beginning with research and development, consulting, engineering and manufacturing, to logistics, construction and start-up, to training and after sales service. All the solutions are customized.

In1951, Erhard Pildner-Steinburg founded GAW (Grazer Armaturen Werke) as an individual enterprise for the production of special valves. It quickly developed into a worldwide market leader for procedural plants. Today, the focal point is the development and construction of coating color machines and reprocessing plants for chemicals for the paper and cardboard industry. With 130 employees, the company has a transaction volume of 35 million Euro. While the Austrian paper and pulp industry was in the foreground in the early years, the market slowly relocated to Asia. These days, the family enterprise (the Voith-group holds a share of one-third of the business) makes 80 to 85 percent of its deals in China. India and Korea also rank among the most important markets.

Innumerable valves

In the reprocessing plants, fresh water, waste water and chemicals that are needed for the coating color and other machines are processed. Therefore, the plants need a large amount of pneumatic and manual shut-off valves and ball valves. For a smooth manufacturing process, it is necessary to receive as many status reports about every single valve as possible. In 2003, GAW was looking for an economic and secure solu-

The terminal chamber with a removable terminal block allows easy installation and maintenance

Even dirt or moisture can't harm the encapsulated dual sensor

tion for the final surveillance of their instruments. Turck was the answer for the pneumatic valves.

Usually position feedback is handled by sensors in expensive and complex individual cases. Turck uses a dual sensor instead that easily attaches to the top of the power unit. "The dual sensor by Turck meets our requirements perfectly", explains the purchasing manager of GAW, Josef Eder, who has also worked in project management for GAW. "Especially the integrated terminal chamber of the sensor and the simple construction were the reasons why we chose the products of Turck. They have a lot of well thought-out details like removable terminal blocks and the connection for electromagnetic valves."

The terminal chamber allowed GAW to reduce the amount of device types, resulting in less complicated purchasing and storage. Furthermore, the sensors are easier and faster to install, compared with models that need a fix wiring. The customers of GAW benefit as well, because the regular maintenance of the engines is much faster and more secure with the removable terminal blocks. Without the terminal block, every single lead needs to be disconnected and reattached. That takes a long time and easily leads to errors.

This is not the situation with sensors from Turck. The single connections stay fixed and the opening of the terminal chamber separates the terminal block from the electronics. A protective cover guarantees that the electrical connections are re-established again by simply closing the case. Next to the status reports of pneumatic actuators, GAW uses sensors from Turck also for other applications. Several hundred two-way sensors operate at the GAW plants.

Competitive factor: Proximity to customers

The product characteristics are not the only reason why the Austrian plant manufacturer relies on the dual sensors from Turck. Explains Eder, "The spare parts distribution is easy, as well because Turck's products are available worldwide. The company always has reacted fast and straightforward to our special wishes and requirements, like with DC-two-wire-electronic or special actuating elements (puck) that can be used for both directions of the drive. We got to know Turck as a reliable partner that supports the optimization of our plants actively. Therefore, we will choose Turck as our supplier for future times as well." ■

"Especially the integrated terminal chamber of the sensor and the simple construction were the reasons why we chose the products of Turck. They have a lot of well thought-out details like removable terminal blocks and the connection for electromagnetic valves."

Josef Eder, GAW Technologies

Offshore-Sensors

Streicher uses Atex-certified, inductive Namur-sensors from Turck for its offshore drilling rig

Even with the decline of the resources, the market for oil and gas is still vital, which means that the petroleum industry has new challenges to face. They have to find access to new oil. Especially offshore, specialists suspect there is enough oil to make drilling profitable, even with the rising price for oil. Due to the offshore-boom, oil companies and plant manufacturers are building new platforms, and refurbishing existing offshore platforms.

The Streicher group, located in Deggendorf, Germany, is currently building its first drilling rig that can be used in water. The company has many years of experience in the development and production of rigs and platform technology. Their range of services in the rig and platform technology includes machines for deep drilling for petroleum, petroleum gas and geothermal energy, as well as horizontal drilling machines for the laying of piping without the need to dig. One of the most important customers for Streicher is their subsidiary company DrillTec GUT GmbH Großbohr- und Umwelttechnik, that is established in the field of exploration of hydrocarbon and geothermic resources and as a company for HDD-major projects.

Modular concept

For a long time, Streicher developed and produced only onshore-construction projects, but about two years ago, the company started to develop and construct their first offshore solution. This solution was ordered by a Norwegian company named Seawell, a well established drilling and well services company. The benefits of the of the Streicher construction is its modularity and the maximum weight of 11 tons per module, which ensures that the cranes on the platforms are able to lift the modules onto the platform safely.

Therefore, the construction is especially suitable for updating and exchanging older systems. "In the North

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Webcode | **more51263e**

Ten inductive sensors measure the current status of the pipe handler

User www.streicher.de

The Atex-certified Namur-sensors from Turck have to defy the weather conditions of the ocean

To be able to operate two inductive sensors in close proximity, Turck developed a sensor with a shifted oscillator frequency

Sea, there are plenty of old platforms where the drilling rigs are not efficient any longer," explains Hans-Peter Murr, who is responsible for the automation technology in the field of platform and rig technology. "To update those machines and adept them to the newest standards would be extremely expensive, so it is cheaper for the customer to install new machines and constructions on the platforms."

Employees assemble the single modules in a hall at the Streicher premises in Deggendorf first. After those preparations, the whole construction is built on open-air ground. After function and security checks and a training course for the customer, the construction is disassembled again and finally delivered to its destination. "With our modular concept, old offshore platforms can be converted to a new standard faster than with any other solution," says Murr. "The whole construction is tested, which guarantees high safety and only few disturbances at the start-up. The modular concept allows a fast installation on the platform within twelve days."

Namur-Sensors for the Ex-area

To measure the final positions of the innumerable movable elements on the oil rig reliably, Streicher uses inductive sensors from Turck. About 60 sensors are used for the new construction. The cuboid-shaped proximity switches have a higher operating distance of 20mm on steel targets and fulfill all requirements for the offshore use. The Namur-sensors are approved for the Atex category II 2 G, Ex zone 1 and fulfill the SIL 2 criteria in accordance with IEC 61508. Because of their special terminal chambers, the sensors are easy to install. "We already used sensors from Turck for our onshore-constructions, because the company was one of the first manufacturers that could support us when it came to SIL and offer Atex-able SIL 2 sensors," Murr explains. "Until now everything is going smoothly, Turck has not disappointed us."

Solution-orientated partner

Turck could not only prove itself because of the reliability of its products, but also as an innovative, solution-orientated partner, especially when it came to a special challenge. To meet the SIL3- requirements, it was necessary to operate two parallel SIL 2-sensors at the drilling construction to check and monitor the position. Since the space in such construction is very small, the sensors had to be installed close to each other. This usually brings complications because inductive sensors influence each other.

"Turck supported us very well by constructing a sensor with a shifted oscillator frequency, so that we could install and operate two inductive sensors within close proximity without any problems. To recognize the changes of the sensor electronics at first sight under the tough offshore conditions, Turck marked the sensors with a different color," says Murr. "And because of the good cooperation so far, it was easy for us to continue our teamwork with Turck for the current projects." ■

"Turck supported us very well, by constructing a sensor with a shifted oscillator frequency, so that we could install and operate two inductive sensors within close proximity without any problems."

Hans-Peter Murr, Streicher

Quick read

To upgrade old offshore platforms in the North Sea to the newest standard, Streicher developed a drilling rig that is cost-saving, easy and safe due to its modular system and the maximum weight of 11 tons per module. Atex-certified, inductive sensors from Turck measure numerous end positions.

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