



 PEPPERL+FUCHS

News for Process Automation

2/2016

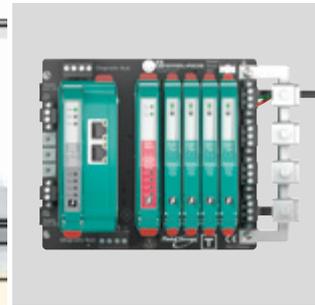
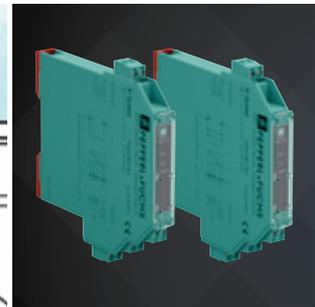
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Dear Reader,

Change is the only constant in life—this well-known phrase still holds true. Every year brings advances that could not have been dreamed of just a few years before. With its constant innovation, modern medicine is the perfect example. From treating everyday headaches to curing severe diseases, medicine transforms our lives. But before a drug can treat our symptoms, it has to take a long journey through pharmaceutical process plants. In this issue, we invite you to join us as we trace a drug's path and discover how Pepperl+Fuchs ensures that all of the processes involved are constantly monitored and controlled.

At Pepperl+Fuchs, we can also look back at a long journey when it comes to explosion protection. What began more than 60 years ago with a few individual components has grown into complex, complete solutions for a wide range of projects. We also continue to discover completely new areas where our products can be used. Examples range from a massive, 19 m wide tunnel-boring machine that eats through mountains to sewage treatment plants that process wastewater and feed it back into the water cycle.

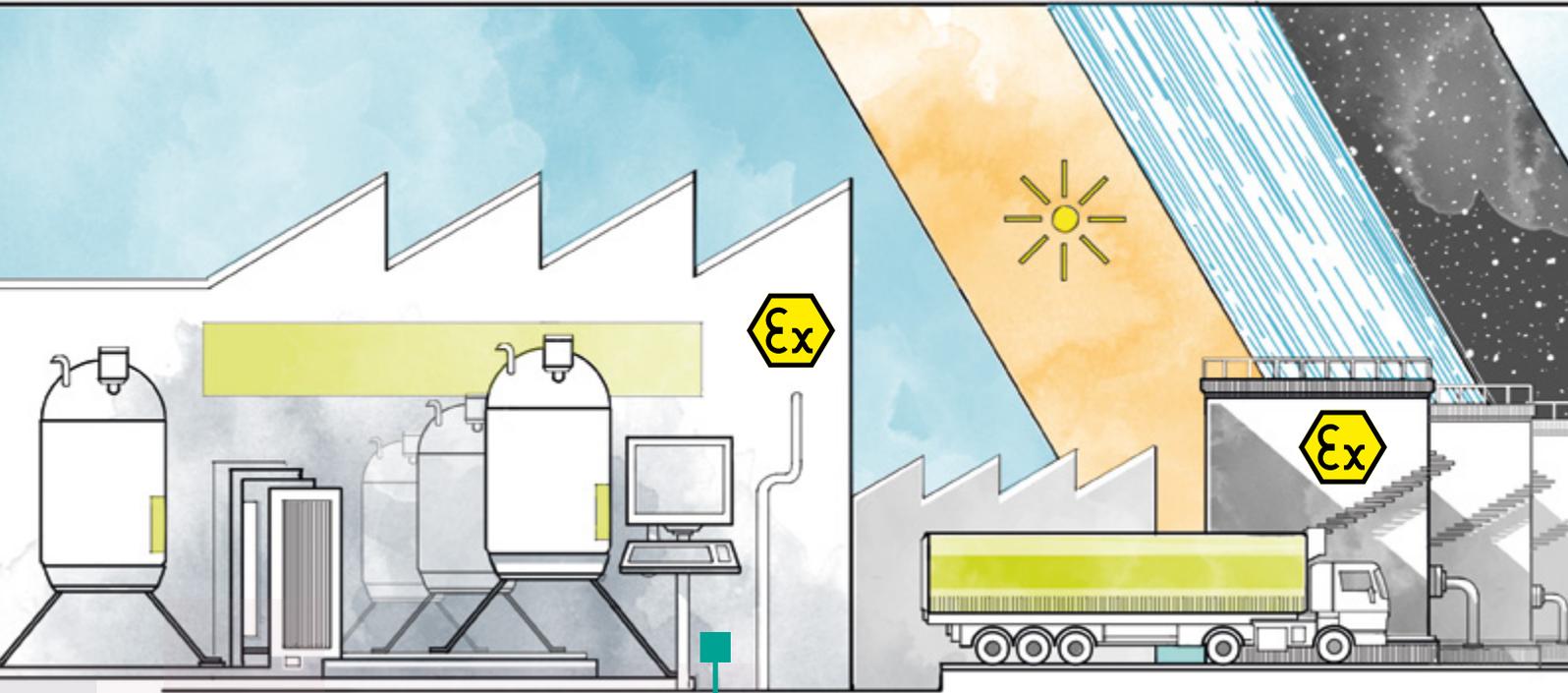
As you can see, the world of Pepperl+Fuchs is filled with innovations. I hope you enjoy reading and discovering!

Lutz Liebers

President Division Process Automation Pepperl+Fuchs GmbH

We look forward to receiving your feedback on this issue.

Please e-mail any comments to newsletter@pepperl-fuchs.com



Focus



The VisuNet GXP is a modular, lightweight remote monitor designed for applications in the life sciences industry.

From Herbal Medicine to HMI

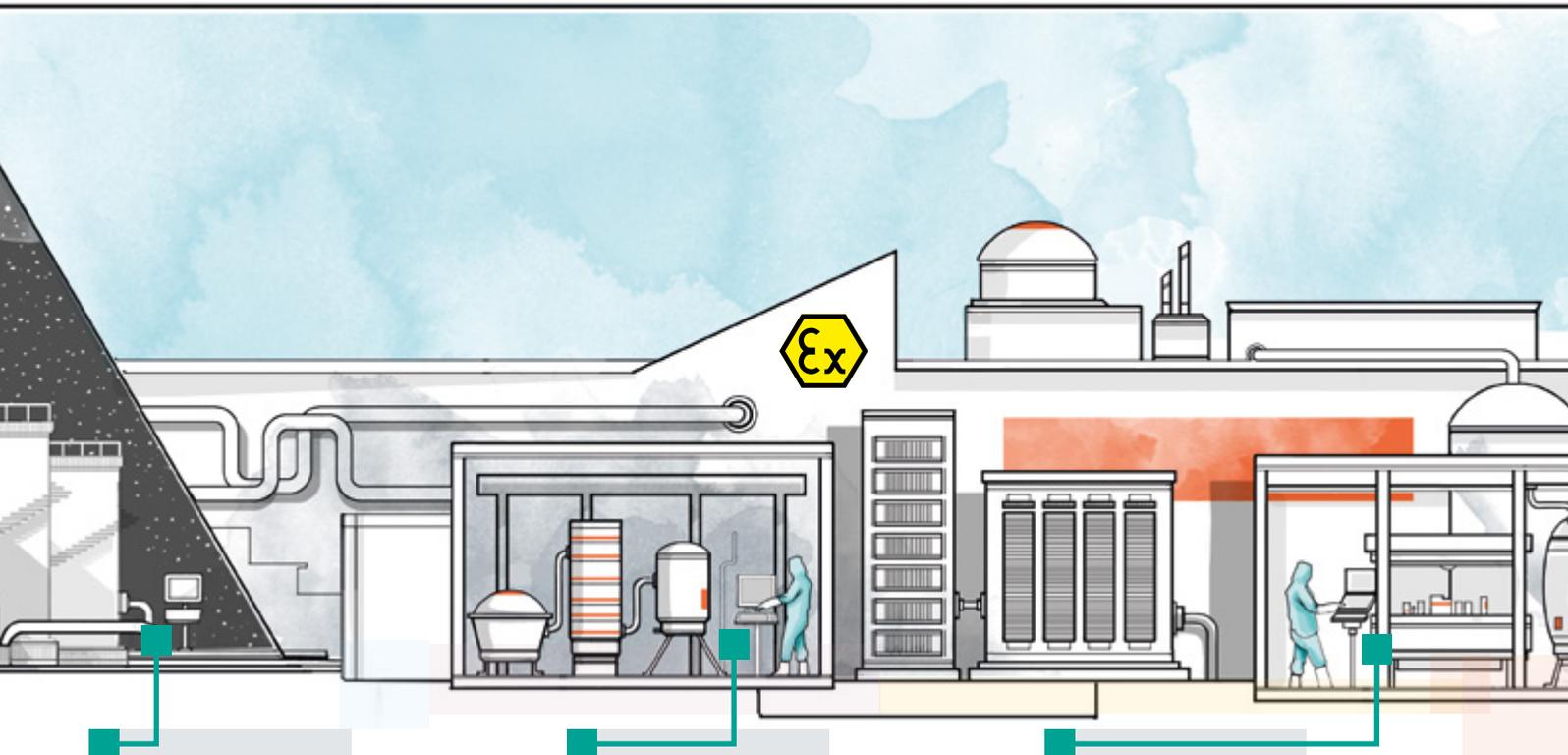
Whether as sugar-coated pills, capsules, or powders, or contained in ampules and syringes, medications based on chemicals are as diverse in their appearance as they are in their effect. “Human Machine Interfaces” (HMI) are an integral part of their manufacturing. These interfaces are used to visualize relevant data throughout the process or to control procedural steps manually. Because strict pharmaceutical regulations and explosion protection requirements are combined with the most advanced production approach possible, these operating and monitoring systems have to meet special requirements.

The history of medicine is as old as humanity itself. A discipline that largely consisted of monastic herbal lore in Europe from the Middle Ages onwards has in the 21st century become a high-tech process that, due to its complexity, involves an abundance of related data—and

this data volume is continuing to grow: “As a result of Industrie 4.0, it is also becoming increasingly important to allow decentralized access to information and control functions. And pharmaceutical production is no exception. Increasingly, companies are relying on multipurpose plants that are designed for the most efficient possible production of various medicinal products,” explains Business Development Manager Stefan Sittel. His colleague, Dr. Marc Seißler, Product Portfolio Manager, adds: “Networked HMI systems are essential for achieving sustainable, efficient manufacturing in the pharmaceutical industry. However, they must also comply with regulatory requirements for pharmaceutical production, the GMP (Good Manufacturing Practices) directives, and, in some cases, explosion protection directives.”

Fine Chemistry for a Powerful Effect

If you were to accompany medications on a typical journey through their manufacturing process, you would encounter various Pepperl+Fuchs operating and monitoring systems along the way that solve this problem. The spectrum of operating locations begins with the upstream suppliers



For outdoor applications, like in tank farms, the VisuNet IND family offers a durable solution that is not prone to the effects of weather.



For production of active pharmaceutical ingredients, the GMP regulations have to be considered. The VisuNet GMP complies with these regulations and enables the operating companies to pass the GMP audit.



A VisuNet GMP with DUPLEX display allows access to both DCS and MES on one HMI.

from fine chemistry, who provide the basic materials to the pharmaceutical manufacturers in what is known as the “upstream phase” of pharmaceutical production. To obtain these substances, every detail—such as the purity of the various components, the storage temperature, and the pH value—must be correct. Only in this way can it be ensured that they will achieve the desired effect during the subsequent synthesis of the active ingredients. The latest development from Pepperl+Fuchs in this field can be seen in the form of VisuNet GXP—a thin-client-based remote monitor that can be used to display process information and control functions and is fully aligned with the needs of fine chemistry. It is built to be resistant to liquids, dirt, bacteria, and aggressive cleaning processes, while its extremely lightweight and modular design allows for high flexibility in the field.

In addition, the VisuNet GXP is suitable for the potentially explosive atmospheres that occur in these process stages due to dust or detergents and solvents containing alcohol. During batch or dosage control, it reliably displays information transmitted via Ethernet from the control system or MES—directly in ATEX Zones 1 and 21 or Zones 2 and 22.

“Whether it is connected with conventional PC workstations and servers via the network infrastructure or used on future-oriented, virtualized PCs and servers plays no role in the integration into the automation architecture. Our new firmware VisuNet RM Shell 4.1 supports the latest remote services such as Microsoft® RDP 8.1 or Emerson’s DRDC and therefore both approaches,” Sittel explains.

Under Open Skies

Pepperl+Fuchs has also equipped its other highly specialized, Ethernet-capable operating and monitoring systems with the RM Shell 4.1. This includes the VisuNet IND product family, which is used in tank farms for pharmaceutical substances. In these potentially explosive atmospheres—corresponding to Zone 2 and Class I, Div. 2 respectively—where basic chemicals from fine chemistry are temporarily stored, the filling and emptying of the tanks must be monitored and controlled. Wind and weather also take their toll on the equipment used. “The VisuNet IND shows process-critical information about fill levels and temperatures on the display in a clear format. ☒



 www.pepperl-fuchs.com/news-hmi



Saving cost, energy, and space: the industrial box thin client “BTC” gets placed right in a workspace drawer at the laboratory, for example.

It therefore helps the tank farm personnel make decisions and provides a real gain with regard to process safety and availability. When used in conjunction with integrated identification systems from our portfolio, it can also provide reliable identification of truck drivers making deliveries and of loading orders,” Sittel explains.

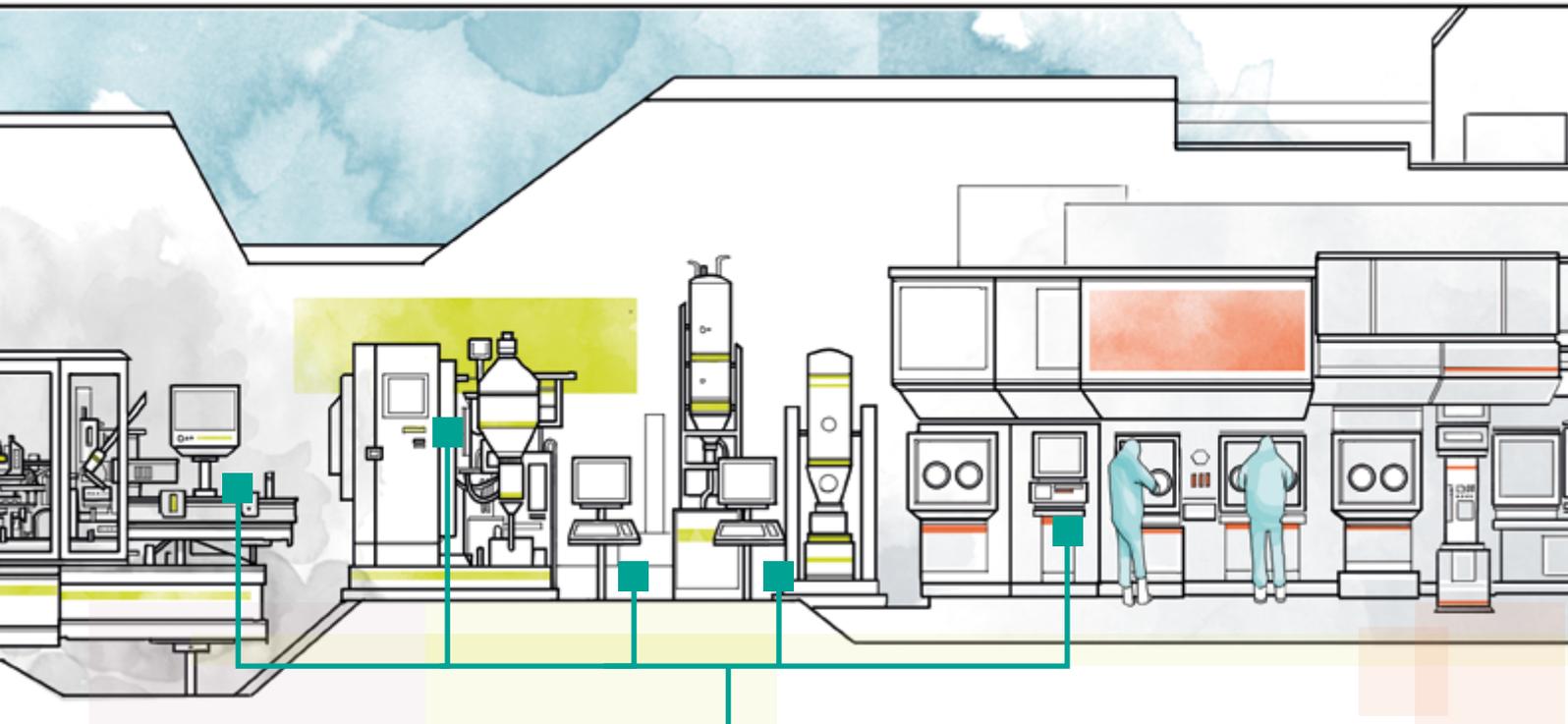
“As outdoor solutions, remote monitors from the VisuNet IND family have displays that are visible in daylight and are designed to be rain-proof. The temperature range in which they can be operated extends from a wintry -20°C to $+50^{\circ}\text{C}$ in the summer sun,” says Seißler, describing the design features. As for the software level, he says, “The Ethernet connection of HMIs is particularly advantageous in outdoor areas. Thanks to digital communication between the remote monitor and host system, consistently high image quality can be maintained without the comprehensive configuration required for the formerly prevalent analog KVM systems. Additionally, the possible transmission range via the network infrastructure is not limited as with a KVM system.”

Hand in Hand

During the subsequent batch-oriented production of “intermediates” — that is, the interim products needed for the actual medicine— numerous manual inputs are required at the plant; as a result, operating and monitoring systems are everywhere. VisuNet GXP also offers a suitable solution for these scenarios: in addition to an antibacterial

membrane keyboard with a capacitive touch pad or optical trackball, it is equipped with a large Full HD multitouch panel, which allows personnel to operate it without any problems even when wearing gloves. According to Seißler, this illustrates how the interaction between human and machine can look in Industrie 4.0 environments: “With the GXP, the qualified personnel are given an operator workstation that is completely tailored to the numerous manual interventions required in the life science sector. Since the RM Shell 4.1, which is a supplement to this, and the additional management tool VisuNet Control Center greatly streamline the commissioning, administration, and support of these operator workstations, there is a double gain in efficiency.”

In fact, thanks to Control Center, production technicians can connect with any VisuNet Remote Monitor from a distance, which allows them to support plant operators without having to enter the sensitive production areas at all. As a result, the monitors can be set up faster and more efficiently than ever before. “The commissioning engineer connects to a remote monitor in the clean room via ‘session shadowing,’ creates a new profile on it, and transfers this profile to any number of additional monitors via the Ethernet network,” Seißler says by way of example. He continues: “Further, thanks to the VisuNet Control Center, possible faults or interference in the connection between remote monitors and their host computer can be detected immediately. A process engineer then supports the employee on-site from a distance or, if necessary, takes over control via password-protected access.”



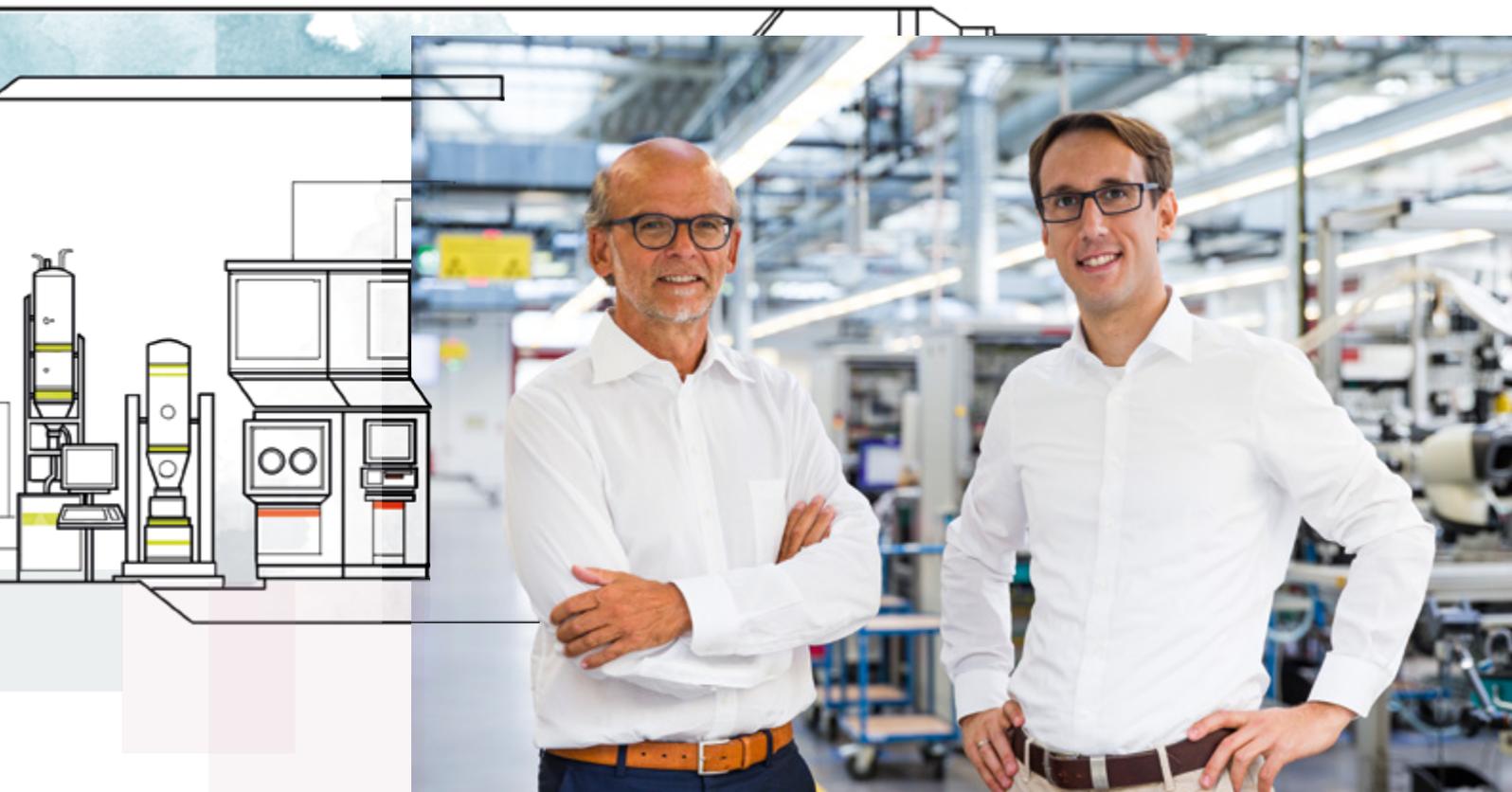
Highly specialized OEM suppliers require individual solutions: based on the VisuNet product families, Pepperl+Fuchs provides a broad portfolio according to your individual needs.

At Home in the Clean Room

Following the pharmaceutical process further to the production of the active substance, referred to as the “Active Pharmaceutical Ingredient” (API), there is a decrease in the frequency of potentially explosive atmospheres, accompanied by an increase of caution regarding contaminants. This caution is justified because, in the worst case, the remnants of a previous production process, contaminants adhering to shoes, or a single human hair can render an entire batch unusable. Such environments, which often include pharmaceutical clean rooms in accordance with GMP directives, require operator workstations for interacting with the process or production control system that are designed specifically for chemical and mechanical robustness and can be properly cleaned. With the VisuNet GMP, Pepperl+Fuchs provides a product family that—as the name suggests—has been developed specifically for these operating conditions. “Ease of cleaning, chemical resistance, and an antibacterial keyboard make the VisuNet GMP a specialist for clean-room environments in the production of APIs. To meet the different conditions at our customers’ locations, it is available in two basic versions: either as a remote monitor equipped with RM Shell 4.1 in a slim, stainless-steel housing with a foot or a wall bracket or as a panel-mount version for installation either in wall-mounted control panels or machine-operating panels,” says Sittel of the supplement for the VisuNet GXP, which is also suitable for clean rooms. He adds: “If a potentially explosive atmosphere is present in special cases, the VisuNet GMP can also be used in a version that has been certified for Zones 2 and 22.”

The Solution in the Box

According to Sittel, there is also a high demand for information in the nonclassified production areas and on the periphery of active substance production, such as in the controlling laboratories: “Anyone looking for a lean industrial solution for workplaces with visual displays in a production or laboratory environment would be well advised to use our industrial box thin client ‘BTC.’” A glance at the handy BTC unit supports his recommendation: enclosed by a metal housing, it combines the advantages of a narrow footprint without fans or hard disks with extraordinary robustness in the face of ambient temperatures of up to +60°C. The housing, which is IP41 rated, also protects the interior from dust. “The BTC can be used either as a conventional desktop solution or attached to a mounting wall inside a housing. Without needing much installation space, a device could be mounted in a workspace drawer, for example, and visualize process-relevant information on four screens in the laboratory rooms at the same time. It is difficult to imagine providing information in an industrial environment in a more cost-effective and space-saving way,” Sittel explains. Like the VisuNet Remote Monitors, the BTC is also equipped with the RM Shell 4.1, which means it can be set up very quickly. And users who prefer other management software for thin clients can still rely on the BTC: “To ensure maximum flexibility, we also offer the BTC in a version that is compatible with the ACP ThinManager, which is used particularly in large American pharmaceutical plants,” says Sittel, emphasizing the customer focus in the development of the BTC. ❏



Always in close cooperation: industry expert Stefan Sittel and Product Portfolio Manager Dr. Marc Seißler.

» Downstream to the Finished Medication

This focus on the customer is also apparent in the final process steps in the pharmaceutical industry: once production of the active ingredient is complete, it is still not ready to be given to patients. "This 'downstream section' involves additional physical process steps, for which highly specialized machines from OEM companies are often used," explains Sittel. Accordingly, Pepperl+Fuchs provides VisuNet solutions in stainless-steel housings for machines and plants from these OEM suppliers, as well as panel-mount remote monitors that can be integrated for DCS/MES operation or panel PCs for PLC connection. These visualization systems and operating devices, which are often based on the GMP product family, are needed to display information in the subsequent, complex process steps and to control recipes. Through centrifuging, chromatography, and drying, the carriers are removed in these stages and the active substance is further processed—for example, by grinding it, dissolving it in liquid, or by granulation and applying the "coating" to the carriers. Here, the portioned medication is given the form we are familiar with as a tablet, salve, or solution, before being packaged for shipping in blister packs, tubes, ampules, syringes, or packets.

Close to the Industry

Whether Pepperl+Fuchs is commissioned by the pharmaceutical manufacturer itself or by its integrator or a machine-and-plant manufacturer, the crucial factor is that not only components are required but complete GMP-capable, functional systems. This requires specialists who bring with them equal amounts of practical experience, advisory expertise, and engineering know-how. Sittel provides an example:

"With pharmaceutical production becoming increasingly paperless, we experienced on-site that our customers have to display both MES and DCS functions on monitors in the field ever more often. This can be resolved in the first instance using an HMI solution with dual display—which our VisuNet GMP offers in the duplex version. However, we also discussed this with our software experts. They then enhanced RM Shell so that our customers can now switch between DCS and MES on a single monitor."

Marc Seißler summarizes: "As in pharmaceuticals itself, there is no universal panacea for operating and monitoring systems. By using different connection and protocol types for connecting with control panels and PCs, as well as different housings, keyboards, mice, or mounting components, the Pepperl+Fuchs HMI systems can be flexibly adapted to individual application requirements. Our industry experts and the worldwide Solution Engineering Centers are well positioned for this. The VisuNet product families, BTC, RM Shell 4.1, and VisuNet Control Center, provide unique operating and monitoring solutions, which are an ideal fit for modern, networked pharmaceutical production in the truest sense of the word." ■

Triple Protection in Case of Emergency



Emergency situations in process plants call for quick responses. Sirens, warning lights, or active cooling systems must be safely activated in line with “energized to safe” (ETS), while engine controls or emergency shutdown valves are switched off according to “de-energized to safe” (DTS).

This requires reliable switch contacts. “For control systems used in the process industry, the safety-critical digital outputs are usually checked at intervals via diagnostic routines. But these diagnostic procedures must never lead to accidental activation of the field devices. Otherwise, the safety of personnel and machines is no longer guaranteed, or subsequent costs will arise as a result of unintended triggering of the safety function,” warns Friedrich F \ddot{u} ß, Product Portfolio Manager of Interface Technology at Pepperl+Fuchs. To address this problem, Pepperl+Fuchs has developed new safety relays that not only ensure galvanic isolation but also check the compatibility of the control system with the field devices. The input of these relays, which are part of the DIN-rail-based K-System

interface family, filters the test pulses from the digital output cards of the control systems in operation. This prevents the field device from being unintentionally activated by a diagnostic measure or a line fault in the control system being unintentionally displayed. In addition, the input allows current coming from the output card to flow by providing a minimal load in the on mode and allowing a trickle current in the off mode. The switch function is not affected by this.

Optimal reliability of the safety relays is achieved through a “1oo3” (one out of three) architecture, using triple-redundant contacts. Connected in series in DTS applications and arranged in parallel in ETS applications, they offer the advantage that, even if there is a failure in two contacts, the safety function will still be main-

tained. The proof intervals of the relay modules can also be extended using the proof test inputs available. Based on 10% of PFD (probability of failure on demand), these are 32 years for DTS systems and ten years for ETS systems. “Our new safety relays combine reliability with cost efficiency and also offer advantages in operation: if a device is tested using a digital output card from one control system, all other related modules of the safety relay are also compatible,” F \ddot{u} ß sums up. ■



Green Light for Data Flow

Kilometers of pipelines winding through the plant like multilane highways. Countless valves controlling busy intersections like traffic lights—just like street traffic, process plants require a reliable communications infrastructure to make processes run smoothly and provide optimal protection for personnel and plants.

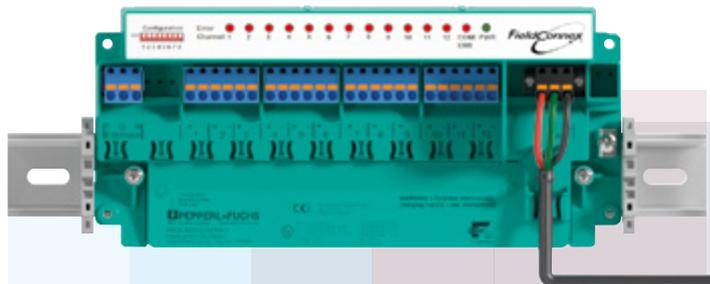


The data highway transmits process data and diagnostic information that shows the exact state of the plant at all times, ensuring optimal operation. Maintenance teams are able to detect possible disruptions early and take appropriate action. This additional information allows for proactive plant management, which in turn plays a crucial role in realizing the highest possible safety and availability.

“The new FieldConnex® PROFINET Power Hub provides the user with this crucial information in real time,” explains Product Marketing Manager Andreas Hennecke. “For the first time, the Power Hub creates a consistent and transparent bridge from PROFIBUS PA to Ethernet-based communication with PROFINET, allowing fast and seamless access to all process and diagnostic data—even for applications that generate big data. With this functionality, the Power Hub paves the way for process automation in line with Industrie 4.0.”

For users of the SIMATIC PCS 7 process control system, the driver specifically developed by Siemens allows for the first time typical process automation functions such as NAMUR color indication or fail-safe functionality. The design of the engineering and the operation is extremely simple—without any additional manual effort required.

While the FieldConnex Power Hub ensures smooth data transfer between the field and the control room, the new FieldConnex Multi-Input/Output (MIO) functions as a reliable link between simple, intrinsically safe signals and the digital control panel. It combines four different functions in a single device: in addition to the familiar valve control, along with integrated breakaway and runtime monitoring, it now also counts pulses. “The optimized design of the MIO also makes cable connection much easier,” Hennecke explains, adding, “our users appreciate being able to bring simple analog and binary signals into the control system efficiently with the FieldConnex process interface. This saves an enormous amount of time and expense—from planning to installation.” ■





The Source of Efficiency

Oil and gas extraction in scorching hot deserts, extensive chemical plants, or wave-beaten offshore platforms—Pepperl+Fuchs solutions and products have been valued in these settings for decades. However, our expertise in explosion protection is also in demand outside of these “traditional” areas, for instance, in sewage treatment plants. High cost pressure and an abundance of regulations put demands on owners and personnel. How can a comprehensive automation solution provide relief in this difficult situation?

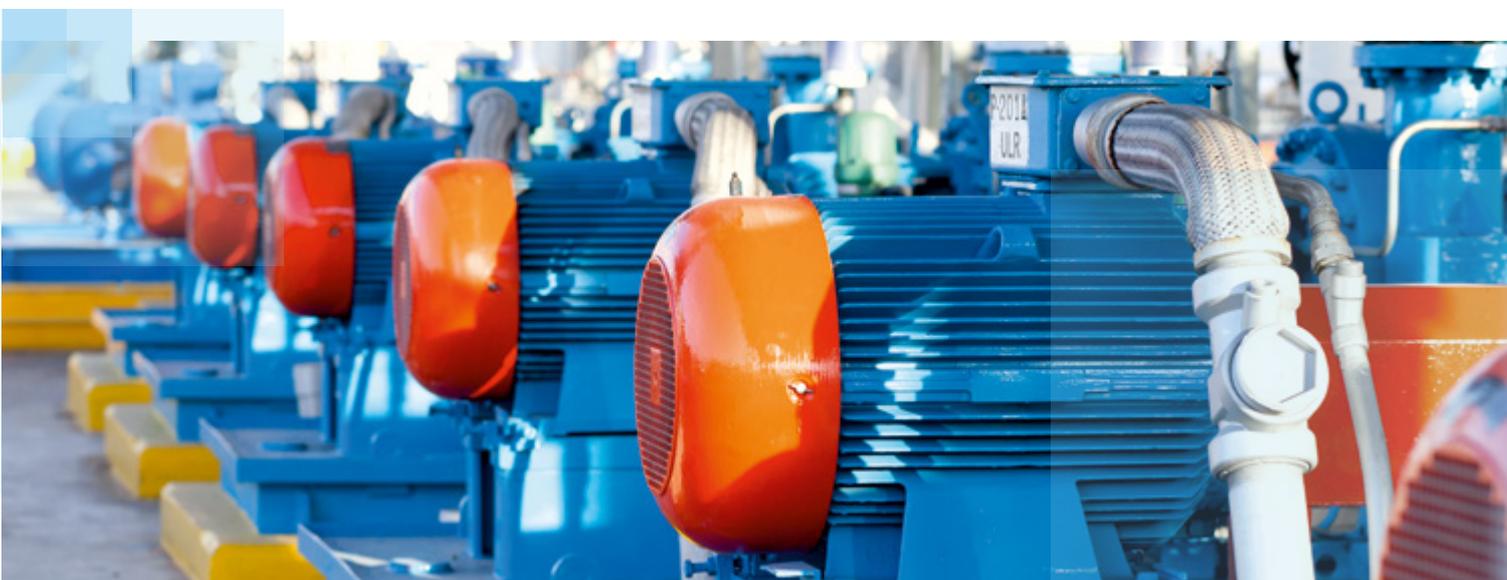
Problem Case: Pump

“Even before the sewage treatment itself, namely during the transport of water to the plant, automation technology offers great advantages because deviations and disruptions are recognized early,” says Tobias Rischer, Product Specialist in the Commercial Sales Office at Pepperl+Fuchs. “Particularly, when feed pumps are used to compensate for a lack of natural inclines. These pumps regularly have to contend

with solid objects that are difficult to break down, such as wet wipes or branches,” he continues. In these cases, a frequency converter provides relief: “In cooperation with one of our binary sensors, it acts as a rotation speed monitor for the pump motor and allows for quick reaction. This ensures that a blockage of the pump does not cause complications in the plant itself,” Rischer says.

The Need for Continuous Monitoring

A maxim that applies to the entire process becomes clear at this point: an increase in efficiency depends on continuous monitoring of the various stages. In a sewage treatment plant, this is closely tied to level measurement. “Together with our expertise in various interface technologies, our portfolio of level sensors offers the basis for efficiently monitoring a sewage treatment plant. We cover an extremely wide variety of applications with hydrostatic probes, float switches, and special components such as conductive switch amplifiers and trip amplifiers,” says Business Development Manager Martin Holdefer, explaining the product lineup he manages. »





01

72% of the earth's surface is covered with water; 97% of this water is saltwater



03

In the earth's atmosphere, there is more freshwater than in all the world's rivers combined



02

90% of the earth's freshwater resources are located in Antarctica



04

The world's largest treatment plant is located near Chicago; it processes on average 5,700,000 m³ of wastewater every day



05

663 million people lack access to clean water



06

According to the European Union, 20% of all surface water in Europe is seriously threatened by pollution

» **At Home in Three Worlds**

Pepperl+Fuchs solutions rely on both analog and digital technology for communication between the field and control level. "Whether traditional point-to-point wiring, remote I/O systems, or complete digital fieldbus infrastructure—they all have their own advantages. We work with customers to find the ideal connection of field devices for each individual sewage treatment plant. There is no standard, out-of-the-box solution," says Rischer, explaining the customer-focused approach. For certain applications, it is important for components to be certified for use in explosion-hazardous areas. "With our decades of experience in electrical explosion protection, we are the right people to turn to when, for instance, reliable measurements need to be taken on a screening rake or an aerated sand trap," Rischer promises.

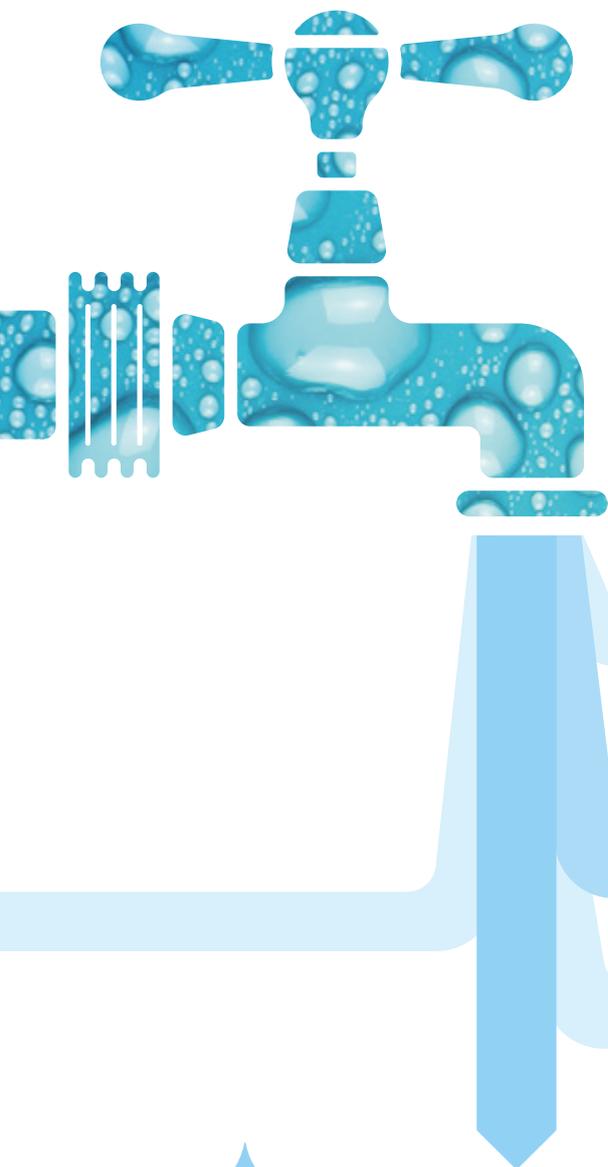
The Fourth Dimension: HART

Another part of effective operation of sewage treatment plants is the use of HART field devices. Greater information density can be achieved throughout the entire sewage treatment process by reading out the HART variables available with these devices, thus increasing plant availability. For direct conversion of digital HART values into 4...20 mA signals—

even out of explosion-hazardous areas—the HART loop converter from Pepperl+Fuchs offers a reliable solution. Additionally, the experts have also given thought to the asset management of HART field devices. "A fully implemented HART multiplexer system allows the asset management system to communicate with up to 7,936 HART field devices. That should answer any questions about the price-to-performance ratio," notes Andreas Grimsehl, Product Marketing Manager for Interface Technology, with a grin.

Wireless for More Flexibility

But what happens if new field devices need to be placed in a sewage treatment plant and the switch cabinets and cable trays are already packed full? "WirelessHART offers a solution in such scenarios," says Sabrina Weiland, Product Marketing Manager for remote I/O systems and WirelessHART. "By connecting a 4...20 mA or HART-capable field device with an adapter, data can be transmitted to the control panel wirelessly." Another common problem in sewage treatment plants can also be avoided this way. "If one of our battery-operated WirelessHART adapters is installed on the bridge of a rotating rake in the intake basin, expensive sliding contacts, which are subject to wear, are no longer



07
91% of the world's population has access to clean water



10
According to UNESCO, only 20% of the world's wastewater is treated properly



09
World Water Day takes place every year on **March 22** to draw attention to this issue



08
The feeling of thirst sets in at a water loss of only 1%

necessary. The principle can also be applied to other moving system components," Weiland demonstrates. Thanks to the adapters or temperature converters, data can also be transmitted from difficult-to-reach areas such as the digestion tower, since they can be mounted at a distance of up to 250 m.

Sewage Sludge as an Energy Source

The methane generated in this digestion tower is a key factor in energy efficiency and is more than just a waste product: in modern sewage treatment plants, combined heat and power units burn the gas obtained from sewage sludge and then use the resulting energy to operate the sewage treatment plant. Various kinds of data are required for this process, including temperature, fill level, pressure, and gas quality. To connect the necessary measuring instruments to the control system in a conventional way, interface modules like those from the proven K-System, which consists of various components for DIN rail mounting, are recommended. This system provides users with both explosion-protected and non-explosion-protected components from a single product family. As a result, operation is always the same, saving valuable time during commissioning and maintenance.

"Our products follow the water through the entire process—from the delivery of the sewage to the conversion of the sewage sludge into energy. This is only possible as a result of the pervasiveness of our solutions across different technologies," Rischer summarizes. Real-world applications prove his point: even the containers where sludge is held prior to incineration contain Pepperl+Fuchs ultrasonic sensors for monitoring the fill level. ■

Breaking Through Barriers

High up in the mountains or down in the unseen depths of the earth: tunnels break through entire mountain ranges and pass under rivers and seas. They shorten routes and reduce traffic on our roads. They connect cities, countries, or even continents. Pepperl+Fuchs supports its customers when it comes to establishing a safe and easy path to a destination—all over the world.

The tremor feels like an earthquake, and the noise is deafening. Gigantic machines are eating through the rock piece by piece with brute force. Tunnel construction is often not a fine art. Whether the tunnel is used for vehicles or a rail network, vast quantities of rock must be removed until the workers can see a light at the end of the tunnel. Tunnel-boring machines (TBM) such as those manufactured by Herrenknecht are used for this work. These machines can be several hundred meters long and have impressive diameters of up to 19 m. At a number of different sites, Pepperl+Fuchs has been securing the explosion protection conditions required for using these machines since the introduction of new regulations.

Underground Challenges

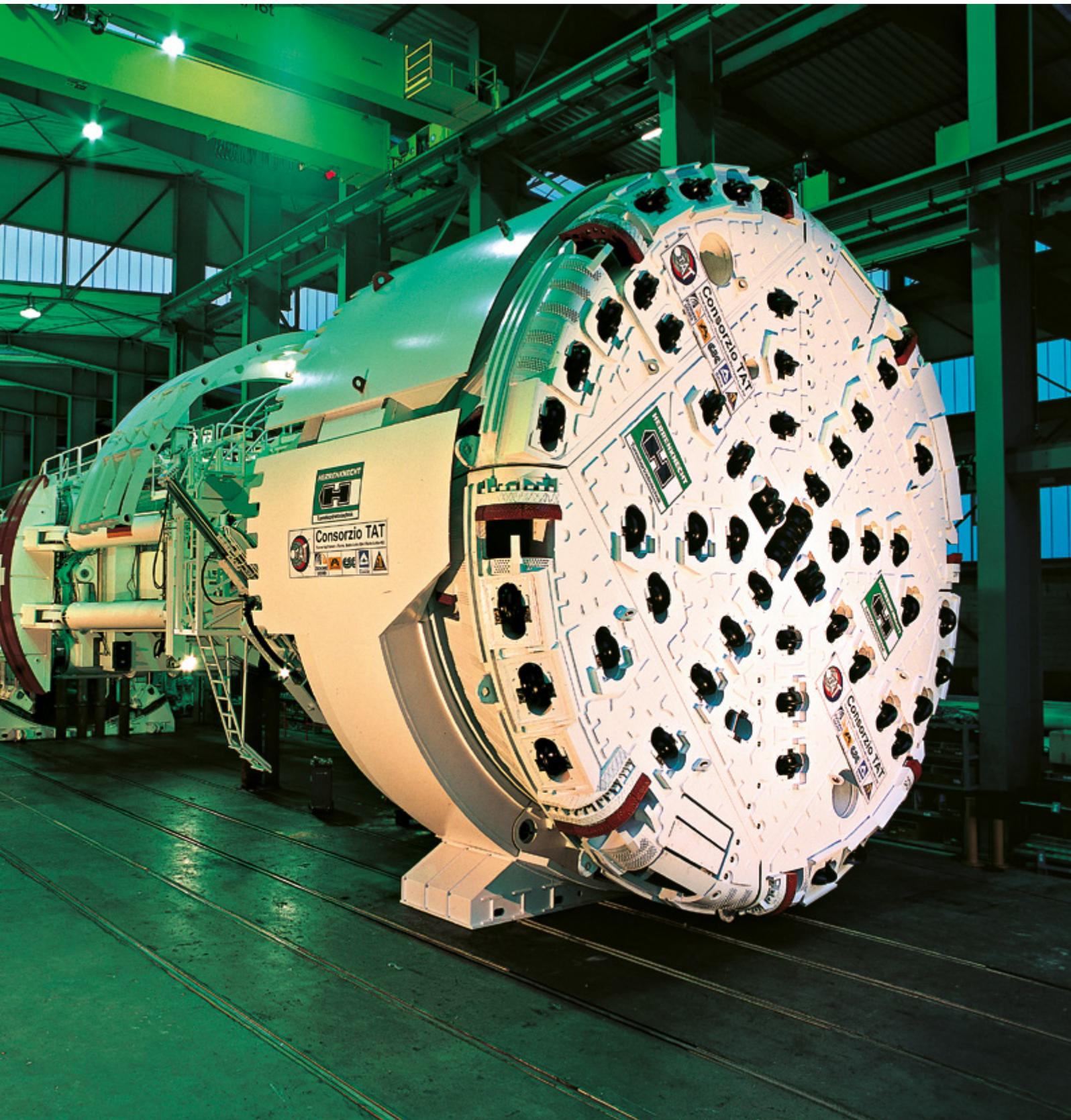
Tunnel construction involves some special conditions: if gaseous rock and soil formations emit a concentration of methane gas that is too high and thus poses an explosion hazard, boring is automatically stopped and the power supply is switched off. This setup not only stops the drill drives; it also switches off all communication systems. However, this is problematic for the important navigation unit and the emergency evacuation system of the TBM since both are crucial for safety.

Enormous Dimensions, Millimeter-Level Precision

The laser-controlled navigation system manufactured by VMT GmbH, part of the Herrenknecht Group, constantly records the exact position and movement pattern of the TBM in real time and therefore provides essential information for the machine operator and for precise control. However, all saved data would be lost in the event of a short, unplanned interruption of the system, which is fatal for the progress of the construction work. To prevent data loss from the navigation unit during a gas leak, an uninterruptible power supply (UPS) serves as an emergency reserve for the machine memory. The UPS keeps the computer running until a controlled shutdown can take place.

The emergency evacuation systems of the TBM are just as important in the event of an explosion hazard. According to regulations, this system must remain switched on for at least 60 minutes to ensure a safe evacuation of the tunnel. As soon as the energy supply is interrupted, another UPS kicks in so that systems like the lighting along rescue routes still function reliably during the hazardous conditions. »





Twice the Level of Safety: Backing Up the Back-Up Plan

Since the UPS itself can represent a potential ignition source in an explosive atmosphere in the tunnel, both companies were looking for a partner experienced in explosion protection methods. Pepperl+Fuchs has the right solution: installed in a robust housing with a flameproof enclosure (Ex d), the UPS is reliably protected. Control stations connected in increased safety (Ex e) enclosures simplify access to terminals and signal cables.

These Ex de combinations were planned, manufactured, and certified at the Solution Engineering Center (SEC) in Bühl, Germany. "When installed in the Ex d housing, the UPS cannot be an ignition source for the surrounding atmosphere in the tunnel. The systems can continue

to function and deliver the necessary data or facilitate evacuation," explains Christian Strohle, Project Consultant at Pepperl+Fuchs in Bühl. Neither personnel nor machine is endangered. "Even if an explosive atmosphere were to penetrate the robust Ex d housing, it would retain the resulting pressure internally in the event of an explosion and prevent transfer to the surrounding environment." With these systems, machine operators have access to all of the relevant information during the construction process to enable precise control of the machines. At the same time, the emergency evacuation systems function reliably and show workers a safe route to the non-hazardous area.



© Herrenknecht AG

Globally Unique

From consulting on what type of protection is the most suitable for the individual application, plus solution proposals and project plans, through to production and certification: customized solutions, like the scenario involving the UPS, require local partnerships with customers. On the one hand, this ensures that the necessary project support can be provided. On the other hand, it is necessary to understand and be able to implement regionally specific requirements.

On-Site in Shanghai

Pepperl+Fuchs confronts these challenges at its 3,000 m² SEC in Shanghai. The resident specialists are authorized to test manufactured solutions themselves on-site and confirm compliance with the NEPSI regulations relevant in China by attaching certified nameplates. This arrangement means that customers do not need to wait until official licensing offices have checked the manufactured system; instead, the SEC gives them a solution that is ready to install from a single source. "Communication with our customers is

especially important to us in Shanghai and in general across China," explains Holger Fink, Head of the SEC in Shanghai. "Particularly when it comes to the more unusual solutions, regular discussions between our project engineers and our customers are very important. Working on an explosion protection solution involves teamwork between the SEC and the customer; this approach applies as much in Bühl, Germany, as it does in Shanghai." This is also a reason why it would be difficult to support the Chinese market from Europe, as Fink continues to explain. With the SEC on-site, the experts can communicate more effectively with customers and exchange ideas. "Just the language barrier and the time difference between Europe and Asia alone would be a major obstacle for communication. With our approach of adapting the SEC to local conditions, we solve these problems," Fink explains. For instance, visiting customers is much easier. "Companies also often come to visit us at the SEC to find out more about explosion protection. If we were only able to carry out business from Mannheim or Bühl, it would be much more difficult and require much more effort."



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From the Far East to the Wild West

The topic of distance also played an important role when choosing the site for the SEC that opened in Houston, Texas, in 2013. Here, Pepperl+Fuchs tackles the individual needs of its customers in the American market, more than 8,000 km away from the company's headquarters. Based in close proximity to one of the most important transshipment ports for the oil industry, Pepperl+Fuchs advises and supports plant builders, control system manufacturers, and system integrators on the implementation of regional explosion protection guidelines. This approach is successful only when NEC expertise in addition to local and highly industry-specific requirements are understood and can be implemented. The construction of a new, larger building started in June 2016 to ensure that the SEC is also prepared for future challenges and able to offer even faster customer service. Together with the US distribution center, the SEC in Houston will open in 2017 with a modern, 10,200 m² production and storage facility.

"The expanded SEC will offer a new level of service for our customers," says David Hohenstein, Head of the SEC in Houston. "While the individual certification of explosion protection solutions can take weeks or months, at the new SEC, we will be able to plan, manufacture, and certify solutions based on our international system certificates in just a few days. After all, we'll soon have everything under one roof." Thanks to the connection with the logistics center, solutions that are ready to install can be shipped directly from here to all locations. This is how Pepperl+Fuchs partners with its customers worldwide to protect personnel and machines—regardless of whether it is an oil refinery in North America, a tunnel-boring machine in Europe, or a chemical plant in Asia. ■



www.pepperl-fuchs.com/news-sec



In Shape for Success

It started with a pilot project in Mannheim preproduction in 2007. Today, LOOP—Pepperl+Fuchs' lean management system—is an integral component of the corporate philosophy. True to the “less is more” motto, this helps us avoid inefficiency along the value chain and systematically align all activities to the benefit of our customers. Join us for a look behind the scenes at our formula for success.

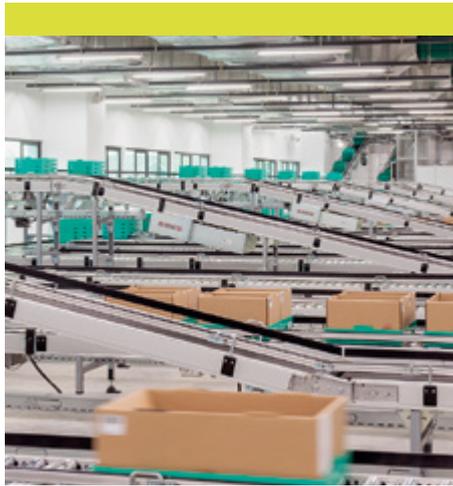


The quickest route to the goal does not always have to be the direct one; it is often the looping detours that lead to success. The best example is LOOP: Lean Operation and Organization in Production. With its lean management system, Pepperl+Fuchs implements the flow, rhythm, pull principles, and the zero-error principle in its own unique way—always with the goal in mind of fulfilling customer needs efficiently and flexibly. In doing so, the focus is on designing stable and transparent processes without any kind of waste. “LOOP is a continuous process, which—as the name itself says—runs through loops,” explains Christian Schwöbel, Director of the department for Global Lean and Technology Management. “Our team is always looking for solutions that help prevent waste and increase value creation for our customers and for us.” To achieve this goal, detailed analyses of the processes, operations, and workspaces are necessary.

The principle seems simple: separate wasteful activities from value-adding ones. But what is waste and what causes it? “Time and resources are the main things that can be wasted—on a small and a large scale,” answers the LOOP expert. “This could be disorder in the workspace or careless coordination of entire process chains. A consequence could be overproduction, high inventories, and waiting times. To say nothing of ineffective work processes and rework.” It is important to recognize these and similar weak points and to remedy them. Particularly in the era of Industrie 4.0, peak operational performance is demanded every day in order to meet the customer’s desire for individuality, availability, and, of course, the highest production quality. ❧

» “A real-world example: at our facility in Ho Chi Minh City in Vietnam, we were able to use LOOP to improve the processing time and productivity in manufacturing our L2 series sensors by more than 25%,” Schwöbel outlines. To achieve this, the LOOP team shifted, linked, and optimized entire process steps. The result is a production process according to the one-piece-flow principle. “Once the raw material has been put in motion, production should preferably not stop at all until the product has been packaged at the end and can be delivered directly to the customer,” Schwöbel explains. “Unavoidable interruptions, such as hardening or drying processes, are integrated into the process as optimally as possible.”

All levels at Pepperl+Fuchs work closely together—both top down and bottom up—to recognize and make use of these and other potential improvements. The Shop Floor Management (SFM) also takes on a key role here. “As a valuable management tool, it helps to visualize weaknesses, optimize processes, schedule resources, and solve problems where they occur—quickly, directly, and without bureaucracy,” Christian Schwöbel says, adding: “This, in turn, considerably increases our adherence to delivery dates.” For this purpose, team leaders and employees meet daily at fixed times for “SFM cockpits.” A ritual that the responsible managers incorporate into day-to-day operation. The ongoing, direct exchange and rapid decision-making channels also act as a driving force for greater commitment and initiative among employees.



Positive Interim Result

LOOP was introduced at Pepperl+Fuchs more than nine years ago. Today, the expert sees a positive interim result: “Cooperation with our facilities around the world is working very well. Our tips have been taken on board and implemented successfully.” An international team now consisting of 15 experts works steadily and purposefully every day to get a little bit closer to the ideal of waste-free production. In other company divisions, such as the European Distribution Center in Mannheim, the new Global Distribution Center in Singapore, or our worldwide Solution Engineering Centers, the proven LOOP methods are also being adopted with great success—and things are expected to progress even further.

To continue the success story and implement lean management throughout the company, the lean management team has been separated from the Global Lean and Technology Management department and placed under the leadership of Stefan Klein, directly under the management board. “Our mission is to promote consistent and optimized alignment of all our business processes throughout the organization while focusing on the value stream, thereby introducing a profound change—to practically embed the lean approach in the company DNA,” Klein as Director of Global Lean Management says enthusiastically. Schwöbel adds: “Because customers are ultimately the focus of all company departments, we are all pulling together for them, aiming to serve them faster and more reliably in the future. LOOP, together with other lean management strategies, is laying the foundation to make Pepperl+Fuchs even more dynamic—almost like a ‘fitness program’ for our customers’ benefit.” ■



新加坡

Singapore

All of Asia in One Country

Considered the gateway to Asia: Singapore, as multifaceted as a country can be. In 1979, Pepperl+Fuchs ventured into the Far East for the first time with the foundation of a subsidiary in the Southeast Asian city-state. Today, the automation company from Mannheim has strong roots in the “Lion City” and appreciates the local culture and rich traditions.

Lively alleys in Chinatown, the scent of exotic spices in Little India, hustle and bustle at the bazaar in the Arab Quarter, and finally the impressive Marina Bay—Singapore is a diverse melting pot, characterized by a wide variety of cultures, a colorful mix of Asian traditions, and an ultramodern business hub. Anyone who visits the city-state in the south of the Malaysian Peninsula will be equally impressed by rituals, temples, and foods from all parts of Asia as by the futuristic skyscrapers and cutting-edge technologies. It is no wonder that nearly 1,500

German companies have settled here to serve the Asian market—because the cultural diversity in Singapore promotes understanding of other Asian countries.

Numerous Reasons Attract Companies to Singapore

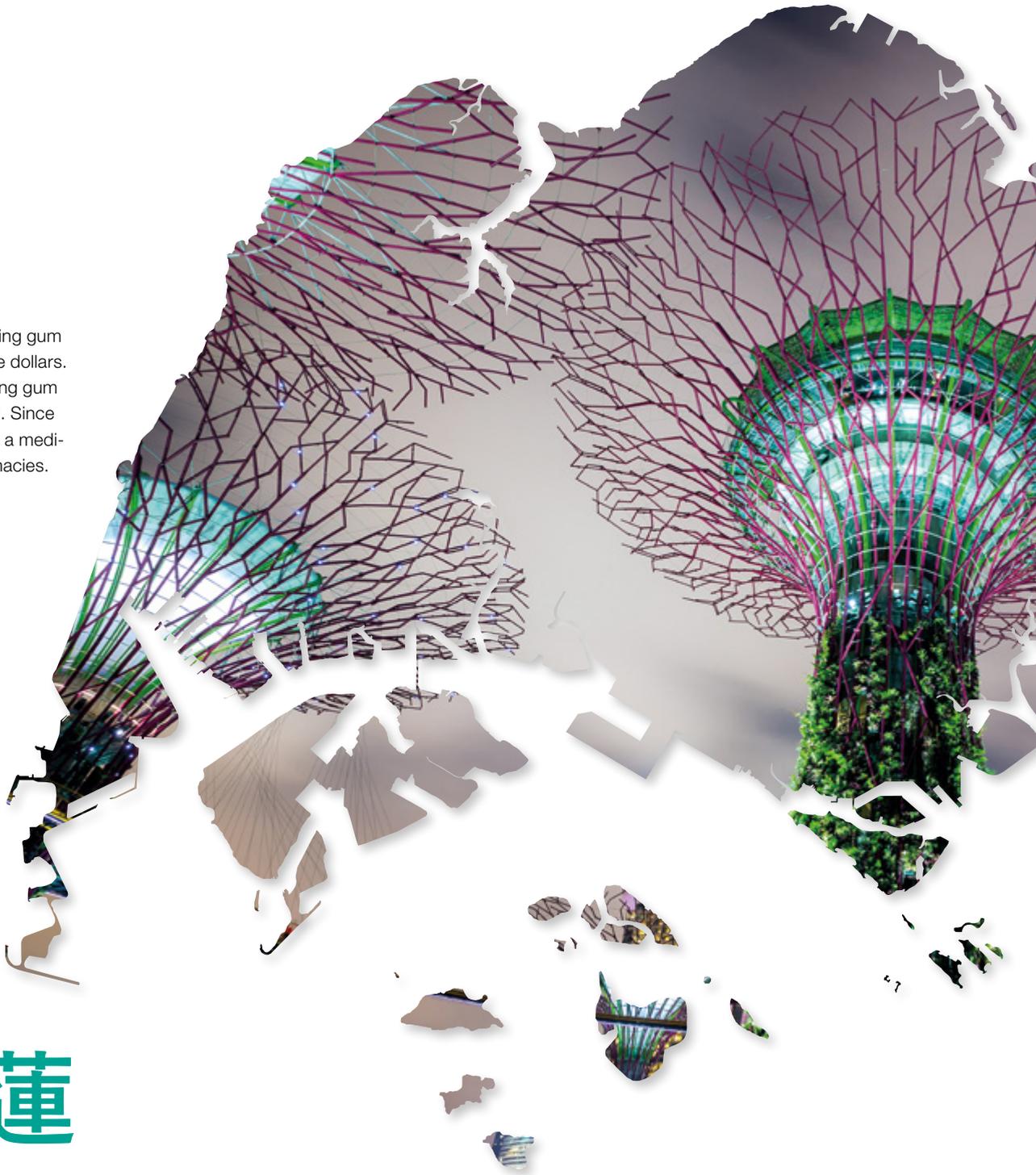
In 1979, Pepperl+Fuchs founded its first subsidiary outside Europe with its own production in Singapore. The city-state was chosen as the first facility in Asia not only because of its diversity. 📄

獅城

Lion City. The English name of Singapore is an Anglicization of the native Malay name for the country, Singapura, which originates from Sanskrit, meaning "Lion City." The state's ideals, represented by the five stars in the flag, are democracy, peace, progress, justice, and equality.

膠

Chewing Gum. Spitting gum costs you 500 Singapore dollars. Until 2004, selling chewing gum was generally prohibited. Since then, you can buy it with a medical prescription in pharmacies.



榴蓮

Durian. The country's delicacy and stinking fruit durian is prohibited in the metro. It tastes like a blend of melon, banana, and kiwi fruit.

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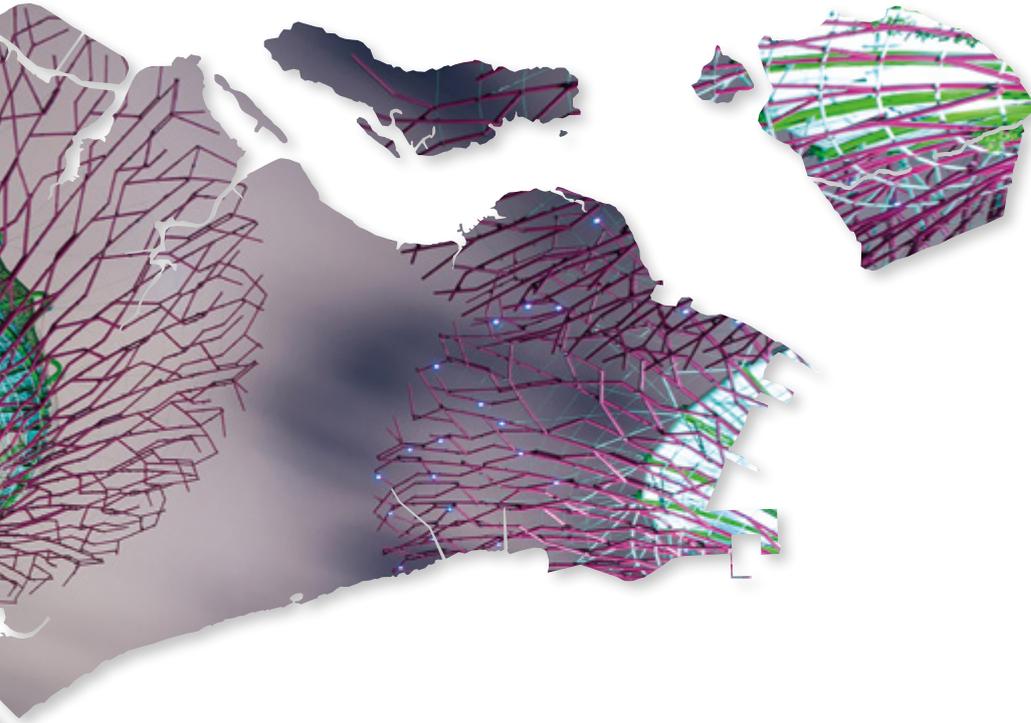
Cost of Living. Singapore is one of the most expensive cities in the world.

國歌

National Anthem. You can find the national anthem in microtext on the back of the 1,000-dollar note.

Figures+Facts

Capital	Singapore
Area	718.3 km ²
Population	5,498,000
Form of government	Republic
Head of state	President Tony Tan Keng Yam
Head of government	Prime Minister Lee Hsien Loong
GDP	270.8 billion US dollars (2011)
National anthem	Majulah Singapura



Edwin and Kafka are the first generation of “Poly-goes-UAS” students at Pepperl+Fuchs in Mannheim.



» “Political stability, anticorruption measures, and also the stable legislative environment were important points for us even back then, and Singapore fulfilled them,” explains Mehmet Hatiboglu, Managing Director for Production, Logistics, and IT at Pepperl+Fuchs. These aspects remain true. Singapore is still one of the countries that affords the best protection of intellectual property rights, as Hatiboglu further explains. This is a key advantage for companies whose products are often copied abroad.

In logistical terms, Singapore is ideal because the country excels with outstanding infrastructure: the Port of Singapore is among the busiest transshipment ports in the world, and approximately 1.8 million tons of freight are transported through Changi Airport every year. “In matters of logistics, Singapore is the central hub in Asia,” reports Jürgen Seitz, Director of the Singapore facility. “The government also supports

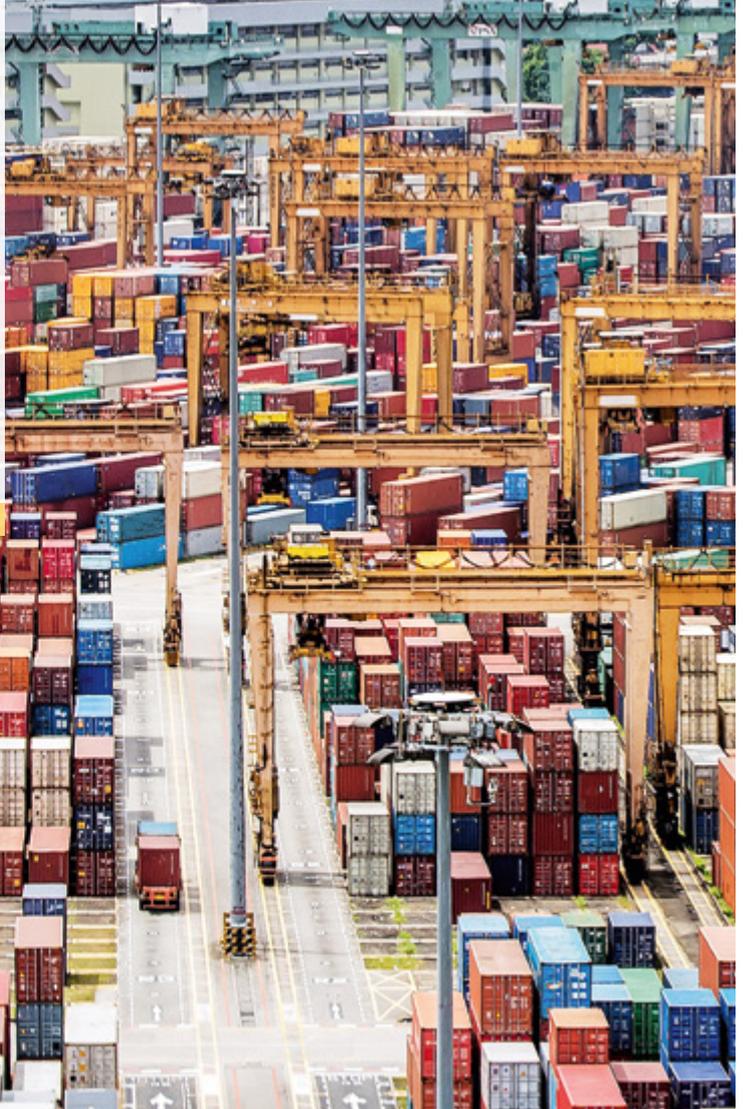
companies in the import and export of goods. The regulations are very business-friendly, so they considerably simplify logistical efforts,” Hatiboglu adds. For these reasons, the decision to establish the Global Distribution Center (GDC) in Singapore was also an easy one. Pepperl+Fuchs products will travel all over the world from the newly built logistics center with a total area of 20,000 m².

Investment in the Specialists of Tomorrow

Out of 2,400 employees in the Asia region, approximately 1,000 are at the Singapore facility today. For the future, Pepperl+Fuchs is also focusing on training qualified young professionals here. For example, the company is working together with the government agency Singapore Economic Development Board (EDB) and other German companies in the “Poly-goes-UAS” program. The partnership allows young people from Singapore to pursue dual engineering studies in Germany. »



» Once they have passed the hurdle of the selection process, students first attend a German course in Singapore before they get their first taste of Pepperl+Fuchs air in Mannheim in a pre-study internship. The subsequent three-year course of study at Baden-Wuerttemberg Cooperative State University includes multiple phases at the company so that the students are always in contact with practical applications and get to know the business in all its facets. Graduates of the program are highly qualified to work for the Mannheim company in Singapore. “In addition to a dual university degree, participants also have the necessary understanding of Asian cultures and markets—and at the same time are familiar with the roots of Pepperl+Fuchs,” explains Seitz. “This is a big advantage for all participants when it comes to communication and mutual understanding and allows us to strengthen the Singapore facility for the long term.” ■



Singapore

Is Asia for Beginners

Eddy Wijaya

Production Representative SEA

Eddy Wijaya has been working as a Production Representative at Pepperl+Fuchs in Mannheim since May 2016. Before that, he worked for the German company at its Singapore facility for 17 years. In an interview, he told us more about his duties and experiences at Pepperl+Fuchs.



Mr. Wijaya, you have been in Germany since May.

Have you settled in well?

I have settled in very well, but it has not been too hard. I had already lived in Germany for eight years during my studies at Technische Universität Darmstadt. So I knew what to expect (*laughs*).

So you must like Germany if you are back again?

I like Germany very much; Europe in general fascinates me. There are so many beautiful places to be discovered here and so many traditional things: a castle here, a château there. It's possible to drive into the countryside, visit a wine festival in the Palatinate region, run, ride a bicycle, and enjoy nature and culture. In contrast, in Singapore people always want to enter another air-conditioned building quickly due to the temperature. People spend their free time completely differently.

But is there anything that you miss?

Honestly, the food: simply going to a food court and eating some noodles with meatballs—I do miss that. But when I'm in Singapore, I miss *doner kebab*. And, of course, the hearty cuisine: *Handkäs' mit Musik*, a German specialty cheese, *Saumagen*, stuffed pig's stomach, and wine spritzers (*laughs*).

What are some of your responsibilities as a Production Representative?

I work in the product transfer section. Even when I started working for Pepperl+Fuchs in 1999, I was involved in the transfer of ultrasound products from Mannheim to Singapore. Now, I'm here to bring an Asian point of view to the planning and preparation of product transfers. Thanks to my experience in this area, but also to my understanding 📖

個熔爐



of how things work in the Asian market, I can draw attention to things that otherwise would only be noticed later and have to be changed. At the same time, I can promote more understanding in Singapore by explaining things that the local colleagues there might not be familiar with and understand. So my job has a lot to do with communication and understanding, both in Mannheim and in Singapore.

What brought you to Pepperl+Fuchs in 1999?

After studying in Germany, I returned to Asia. As a company, Pepperl+Fuchs offered me the perfect combination: on the one hand, because it's a German company and I studied in Germany and, on the other hand, because it fit my field of study, electrical engineering. Right at the first interview, I noticed that the chemistry was good, and it has stayed that way. Colleagues were incredibly accommodating, and I am still in contact with many of them today. I also meet up with many of them again here in Mannheim.

In your opinion, what is the advantage of companies having a facility in Singapore?

Singapore is Asia for beginners (*smiles*). Back then, Pepperl+Fuchs was one of the pioneers that made the leap to Asia. Many attractive conditions were created—for companies as well as for employees. That's why many well-educated people come to Singapore even now, which is naturally good for companies. In addition, Singapore

has a good strategic location. It is central, all of Asia is within easy reach, and there are many advantages in terms of logistics. Singapore also has a very Western orientation, so it gives companies from all over the world easier access to all of Asia. Singapore is ... like New York. A melting pot.

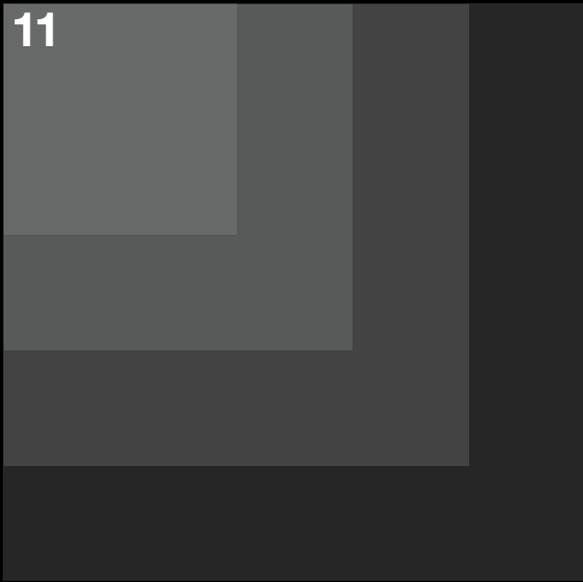
Final question: coffee or tea?

(*laughs*) Both. I definitely need a cup of coffee in the morning and also while I work. But in the evening, I also enjoy drinking a cup of tea.

Thank you very much, Mr. Wijaya! ■



EVENTS 2016/17



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Automation Fair

November 9 – 10, 2016

Location 718

Atlanta, Georgia, USA

Measurement and Control Show

November 9 – 11, 2016

Tokyo, Japan

SPS IPC Drives

November 22 – 24, 2016

Hall 7a, Booth 330

Nuremberg, Germany

Valve World 2016

November 29 – December 01, 2016

Hall 4, Booth 4A22

Düsseldorf, Germany

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2017

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CFIA

March 7 – 9, 2017

Rennes, France

M+R Antwerpen

March 29 – 30, 2017

Antwerp Expo

HANNOVER MESSE

April 24 – 28, 2017

Hall 9, Booth D76

Hanover, Germany

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