MENSCH und AUTOMATION

PILZ
THE SPIRIT OF SAFETY

The magazine for customers of Pilz GmbH & Co. KG   Issue 1/2020

Securely interlinked

The demand for secure communication – covering aspects of what we at Pilz refer to as "safety" and "industrial security" – is growing in smart, networked production. For both manufacturers and operators, this means taking a different, enhanced approach to security. But how big are the differences, really, and how important is it to take a holistic view of things?

Industrial security describes the protection of devices, machines and plants from unauthorised access and tampering, plus the protection of both people and the environment from danger. So manufacturers of automation components have to take appropriate protective measures. An attack on a safety system's integrity can have serious consequences, which is why an amendment has been added to Section 7.4 ("Hazard and risk analysis") of the IEC 61508-1 standard. It states that a threat analysis should be performed if a security threat is considered likely.

A challenge for manufacturers …
There is already an international series of standards that comprehensively covers IT security in automation: IEC 62443. At the present time, it provides plant operators and device manufacturers with the best guidance concerning effectively implementing industrial security. But if we were to consider this standard's requirements, implementation appears to be extremely time-consuming. However, if a manufacturer follows the requirements set down in the IEC 61508 standard during product development, fully meeting the requirements set down in IEC 62443-4-1 becomes a great deal easier.

… and operators alike
Finally, in operation, a smart security concept must offer both freedom and scope for design, as well as the highest possible level of safety. Access to the machine or the process is critical here. Machinery must be secured against unauthorised access to ensure that nobody is in the danger zone while it is in operation. Safety gate systems are used to secure the access doors and combine reliable safety gate monitoring with safe guard locking in a single system, in addition to featuring safety functions such as emergency stop, escape release and a mechanical restart interlock.

Editorial

Dear Readers,

What provides protection against a dangerous virus? Cyber hygiene and common sense. But there's no such thing as 100% protection. So what do you do if there's a virus running rampant in your own system? The parallels between IT and the real world are impossible to ignore right now. Drastic measures are required to shut down, separate, clean up and vaccinate vulnerable technology. Then it'll be time to give the all-clear, right? Wrong! Why? Because no company is immune to attacks. But it has taken the right steps by implementing the right defensive measures, carefully choosing components to ensure cyber-secure operation and maintaining an aware organisation. Now, all that's left is to accept the fact that it is only a matter of time before the worst happens. People who not only prepare themselves for an emergency, but also make provisions early on to ensure they can rapidly restore everything to a workable state, are taking a sustainable approach in the interests of their customers, suppliers and employees alike. The applause for Thomas Pilz at the last German Mechanical Engineering Summit shows that transparency is absolutely vital too when it comes to dealing with such an emergency.

Best regards,

Steffen Zimmermann
VDMA Industrial Security Competence Centre

Not all security is the same!

IT security
▶ refers to the protection of technical information processing within a company's office communication, for example. Its aim is to prevent unauthorised data manipulation or information disclosure.

Industrial security
▶ relates to protecting automation facilities (e.g. machines in production) against unauthorised external access and entry, plus protecting sensitive process and machine data from falsification, loss and unauthorised access.

A plant can only be restarted when it is absolutely certain that there's nobody in the danger zone anymore. A safety gate system such as PSENmlock ensures both personnel safety and process safety and – with guard locking – provides the first industrial security building block. Information and permissions must be carefully assigned to plant operators too.

Security is a complex creature

The PITmode fusion operating mode selection and access permission system enables functionally safe operating mode selection and control of access permissions on machines and plants. So the plant is only operated and controlled by authorised individuals in defined operating modes. Each operator receives an RFID-coded

A comprehensive security concept should include both machinery safety and industrial security if it is to meet smart, networked production requirements.

key that the machine releases corresponding to their responsibilities and qualifications are stored on. This guarantees a high level of protection against accidental actions and tampering, in addition to ensuring information security.

Supplemented by the components of the modular safety gate system, a coherent machine access concept is created – and not just from a safety standpoint. Industrial security aspects are taken into account too with regard to user authentication, qualification and access protection. But if an accident or a security incident does occur at the machine, the RFID key can be read out to determine who made which change. This is particularly important if and when security incidents occur, so that targeted counter-measures can be implemented. Based on this authentication, the control system also records the time of access in the event log.

You can't have safety without industrial security

Plants have modular designs nowadays. Following the idea of the smart factory, they should be networked with one another and be remotely accessible for maintenance, diagnostics, and so on. If special protective measures aren't taken, a group of people has remote access to options that can otherwise

only be implemented locally, with physical access. The system can even be operated and tampered with too, depending on how exposed the network is. Even well-meaning plant operation or maintenance over a network could prove fatal if, for example, another employee is on site in the plant's danger zone to work on the machine too. So it is abundantly clear that a machine's safety can definitely be impaired without industrial security.

It must therefore be ensured that the control network is only accessible to authorised users and, at the same time, that local operation cannot be interrupted by access over the network. And those are precisely the features that the Pilz SecurityBridge offers. The control network is only accessible if this is in line with physical security and safety considerations. Pilz developed the SecurityBridge in a TÜV-certified process in accordance with the aforementioned IEC 62443-4-1 standard, so aspects such as threat scenarios, strengths and weaknesses are taken into account even during the development process. Access over the SecurityBridge meets today's information security requirements. No detailed information about the relevant logs is required for communication between a part of the plant protected by the SecurityBridge and other controllers. So the connection is simply released.

Industrial security is becoming a basic prerequisite for a safely operated Industrie 4.0 network comprising both machines and things. In other words, although these two aspects of automation remain independent, they must be closely coordinated. ◀

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Online information
at www.pilz.com

Common standards are required

For production to be networked, automation solutions have to offer interfaces to components from other manufacturers as well as comprehensive communication protocols. Harald Wessels, Vice President of Product Management, is familiar with the role that safety and industrial security play in current automation trends.

▶ Mr Wessels, what exactly are the Pilz "system solutions", and how are they structured?
We understand "system solutions" to mean a combination of components from our product portfolio with the appropriate services. They allow us to implement customer requirements in a highly customised manner. It's important in this regard that we design our products so that they are perfectly coordinated to one another. In other words, so that they offer suitable physical interfaces and communication protocols.

▶ And how does this benefit the user?
Since Pilz offers coordinated solutions and safety concepts for machines and plants, the user can concentrate on their core competencies and thus save time. Ease of use is crucial if concepts are to be implemented. User-friendly integration is also key to safe and productive operation. To name but one example, this includes connecting components from other manufacturers. The fact that communication protocols are becoming increasingly standardised is playing an important role in this respect, because it simplifies this connection. IO-Link for sensors and actuators is one example.

▶ You mentioned the uniform standards. What role do safety and industrial security play in the development process?
Safety and industrial security are the stars of the show! So they're taken into account early on when developing such standards. It's crucial to bear in mind that security can have an impact on functional safety! Someone might, for example, be intentionally or accidentally

tampering with a machine's data while someone else is working on the machine.
Permissions must also be assigned when creating user programs so that a code cannot be edited by an unauthorised individual. Any gaps in terms of industrial security must be closed by using the appropriate methods and functions.
Secure communication – i.e. data transmission – between different systems is another issue. Here, appropriate precautions for network security must be taken to ensure that data cannot be manipulated.

▶ One of these standards is OPC UA. What is the current situation here?
Pilz is a founding member of the Field Level Communication (FLC) Group within the OPC Foundation. This working group has set itself the goal of achieving seamless real-time communication that covers factory and process automation requirements as well as interoperable solutions based on open standards.
Our contribution is particularly based on our years of experience with SafetyNET p, our real-time Ethernet, which is characterised by secure communication. We can apply this expertise to issues related to OPC UA, safety

and the publisher/subscriber model. We're working hard with our partners on future technical solutions in this respect. For legal reasons, I can't say much about the work results achieved so far, because they're published by the OPC Foundation first.

▶ And what's the latest with IO-Link Safety?
The revised IO-Link Safety System Extension was published in April 2018. With this specification in hand, companies could start developing their very own devices with an IO-Link Safety interface. The IO-Link community has completed and published the first, and also required, "IO-Link Safety Test & Assessment Specification".
An IO-Link Safety Master Tester and an IO-Link Safety Device Tester are both being developed as I speak. These testers are a basic prerequisite for launching IO-Link Safety devices onto the market. Pilz showcased the prototype of an IO-Link Safety Master for PSSuniversal 2, our remote I/O system, for the first time at the PROFIBUS Nutzerorganisation e. V. booth at SPS. I assume that the first IO-Link Safety Masters and IO-Link Safety Devices will be available on the market at the end of this year. ◄

# The modular way of managing permissions

Access to a machine or plant is one of the most critical processes in industrial applications – and both machinery safety and industrial security should be taken into account here. A conclusive operating mode selection and access permission concept ensures efficient and secure processes in this respect.

A user-friendly and tamper-proof system is the key to secure processes. For example, PITmode fusion – the operating mode selection and access permission system – offers safety and security in a single solution. It comprises the PITreader reading unit with RFID technology and an integrated web server, as well as a safe evaluation unit (SEU). Each machine operator receives their individual access permission on an RFID transponder key, which is read

in and taught in the PITreader reading unit. Only authorised employees have access to the machine or plant – and only for predefined operating modes to boot. PITmode fusion is used in conjunction with commercially available fail-safe controllers.

A flexible system solution for safety and industrial security
The possibilities of this modular system solution range from simple releasing and operating mode selection, to authentication for machine part functions and a complex hierarchical permission matrix. These functions can be implemented particularly flexibly if the PITreader reading unit is combined with the PNOZmulti 2 configurable, safe small controllers. Why? Because the safe evaluation unit (SEU) for reading out the selected operating mode is already included as a function
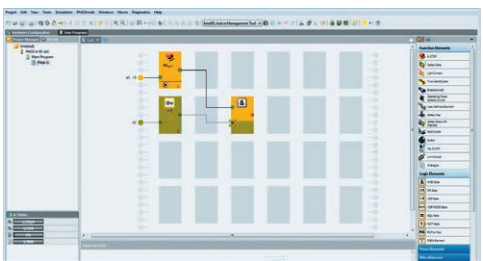
block in the PNOZmulti Configurator software tool. The operating mode is simply selected using the Pilz PIT oe4S button box or other commercially available pushbuttons.

Managing permissions in groups
If efficient permission management is required, PITreader is used as a stand-alone device with PNOZmulti 2. Then, the access permissions for machines and plants are simply configured by dragging and dropping them in the PNOZmulti

Configurator. Complex hierarchical permission matrices can also be created in the free user area. They are transferred to the RFID keys using the PITreader. From software version 10.12 of the PNOZmulti Configurator, up to four PITreaders can be connected to the PNOZ m B1 base unit.
This modular approach to controlling access permissions and operating modes allows production processes on machines and plants to be designed both efficiently and in a user-friendly way at the same time. ◄

Webcode:
web150439

Online information
at www.pilz.com

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A new procedure for publishing harmonised standards in the EU Official Journal

The European Commission has announced in the Official Journal – with the Implementing Decision (EU) 2019/436 – changes to the list of harmonised standards for machines with respect to the Machinery Directive 2006/42/EC. This updated the list of standards whose application gives rise to a presumption of conformity under the Machinery Directive. The new feature is that only changes compared to the previous document are described here; a consolidated list does not exist.

To find out what degree of presumption of conformity (full, limited or no presumption of conformity) the standards applied so far give rise to, the user must now read the original list of standards together with this implementing decision.

The industry is urging the European Commission to provide an updated, consolidated list of harmonised standards for 2006/42/EC as soon as possible to make using harmonised standards easier again. While the European Commission has committed to doing so, it has not defined a deadline yet.

Webcode: web83083

Qualification for safety experts

Are you looking to complete a globally recognised training course in the field of machinery safety? You can – with the international qualification to become a CMSE® – Certified Machinery Safety Expert. And the international community of machinery safety experts is growing steadily, as the sixth thousandth CMSE certificate in Europe was issued in March 2020.

TÜV Nord handles the certification process in all countries, and thus provides international proof of the professional expertise achieved. After successfully completing the qualification, course attendees will be familiar with the legal and statutory requirements for assessing and maintaining both new and existing machines' conformity. "One of the benefits of the internationally recognised CMSE qualification is that international safety managers can implement their company's safety policy globally in a standardised manner," said Jaime Alonso, Senior Manager for the International Services Group. This is a proper plus – especially for global companies.

Become an expert in four days
So, how do you become a member of the ever-growing community of experts? Pilz offers advanced training to become a CMSE around the world in collaboration with TÜV Nord in the form of an expert-level qualification. The content of the four-day expert course covers a machine's entire life cycle. Pilz trainers have many years of experience in the field of machinery safety. In addition to the basics of machinery safety, they teach risk assessment and how to create safety concepts and specifically implement conformity strategies. To name but one example, the course is aimed at specialists who are responsible for planning, designing, maintaining or converting machines. If they pass the test, the course attendees receive the internationally recognised CMSE – Certified Machinery Safety Expert certificate.

Detailed information, conditions of participation and registration can be found at www.cmse.com. ◀

Webcode:
web166824

Online information
at www.pilz.com
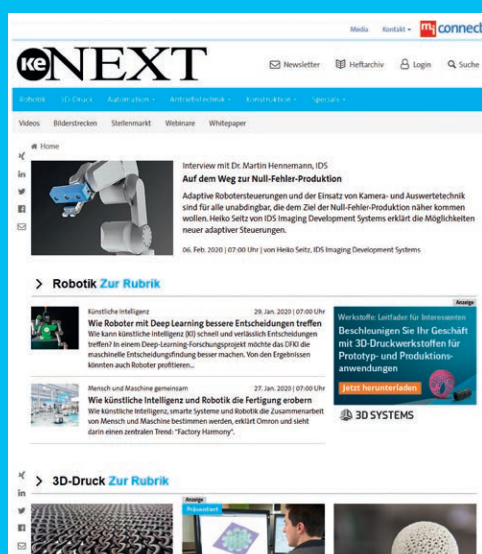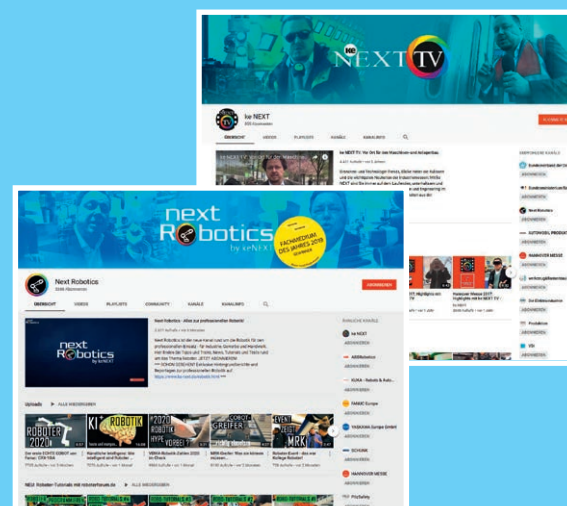
Barrier-free

At the tank factory of heating technology specialist Vaillant in Bergheim, Pilz's consultancy services culminated in an exceptional safety solution. To keep an individual positioner's loading and unloading area free from obstructive superstructures, the transmitters of PSENopt II light curtains were embedded horizontally in the floor and the receivers were mounted on a steel structure above the machine. Two older production lines could thus be secured for the coming years and operated in compliance with the standards.

One of the classic challenges in safe machine and plant design is that access to certain areas should be as free as possible due to operational and task requirements. At the same time, safety requires people to maintain minimum distances from dangerous movements. Smart safety concepts solve this dilemma so that productivity isn't restricted. A concept such as this was also in demand at the Bergheim site in North Rhine-Westphalia, where the heating, ventilation and air-conditioning technology specialist Vaillant manufactures storage tanks for hot water, among other things. A total of 54 mechanically intact tank production plants were to be retrofitted with the very latest electrical and safety engineering solutions.

Process sequences determined the safety solution

"Pilz is the only company that presented an integrated complete range and convinced us of how essential systematic risk analysis is," said Jörg Holzportz, Head of Industrial Engineering at Vaillant, explaining why the company opted for Pilz. An analysis of potential risk and optimisation that Vaillant conducted internally formed the basis of the risk assessment and the resulting safety concept. An initial pilot plant confirmed the chosen approach. But in two tank enamelling production lines, problems with the associated individual positioners became more frequent. The individual positioners are accessible from three sides and fix tanks. Electric drives rotate the tanks hanging above a basin along two rotation axes so that the cast enamel reaches every corner of the tank's interior equally. Pilz's hazard analysis revealed crushing, shearing and impact risks.

Installation method redefined

Up until that point in time, the individual positioners had been protected with pressure-sensitive mats. This solution had to be optimised due to modified standard requirements. A safety solution based on light curtains was chosen instead. In both production and logistics operations, light curtains are always the first choice when the process requires man/machine exchange. The approach of tilting the PSENopt II light curtains by 90 degrees, embedding the transmitters horizontally in the floor and mounting the receivers on


The area around the individual positioner is accessible from three sides. Easily identifiable: a tank is being fed in the background. After successful machining, a gripper (red) picks up the tank. The transmitters on PSENopt II light curtains from Pilz have been embedded into the floor for barrier-free, safe access to the plant.

the ceiling was thought up in a workshop with an interdisciplinary team from Vaillant. Pilz's PSENopt II Type 3 light curtains can be used for applications up to PL d in accordance with EN/IEC 61496-1. With finger protection resolution and 14 mm spacing between beams, the horizontally installed light curtains transmit their beams vertically to the receiver units mounted on the ceiling. This installation method allows a minimum distance from the danger source of only 96 cm or 56 cm to be implemented.

Safety calls the shots in the control cabinet

In the control cabinet, the PNOZmulti 2 configurable, safe small controller is in charge of all safety-related signals. The PSENopt II Type 3 light curtains are connected directly to the PNOZ m B0 base unit. If a machine operator interrupts the light beams emitted from the floor with their body, hand or even just a finger, or if they step on the pressure-sensitive safety mats laid out at the front, the small controller initiates the process of bringing the hazardous movement to an immediate, safe stop. There is a door in the individual positioner's rear area that can be opened for maintenance purposes. Here, the PSENmlock safety gate system combines safe interlocking and safe guard locking up to the highest category, PL e.

At Vaillant, the plants that have been modernised with regard to safety run without any interference whatsoever and therefore more productively. "The cooperation with Pilz was open and fair in each phase. We received a competent consultancy service at all times," concluded Jörg Holzportz, before going on to add: "The trick is even thinking up this kind of installation method in the first place!" And that's precisely why even more projects are already being planned and implemented with Vaillant. ◀
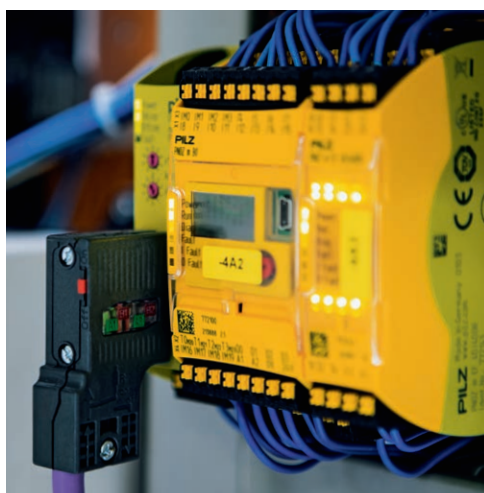
Compact in the control cabinet: the PNOZmulti 2 configurable, safe small controller from Pilz, with a communication module and an expansion module.

Three minutes with ...

... Bernd Eisenhuth

Business Area Security Manager

▶ Mr Eisenhuth, what questions do customers approach you with?
Very different questions relating to industrial security. They can be specific questions about our products' features, but also about network security or access protection. Of course, it is essential to take different sectors' requirements into account. We also frequently offer customers assistance in implementing industrial security measures at their plants.

▶ What are the biggest industrial security weaknesses in automation?
PC workstations in automation plants are the biggest weakness, because it is rare that they're integrated into the IT departments' maintenance programme. So the operating system becomes obsolete, and important updates to fix security vulnerabilities aren't installed. What's more, these workstations are often networked with an office network and the production system. This opens up the production system's doors to potential attacks.

▶ What effects can interventions in industrial security have?
Industrial security isn't just used to refer to malicious attacks. Random infections or failures caused by incorrect operation are also included. For example, a controller can quickly become paralysed because a PC in the production department is looking

for a printer. While this is indeed a banal example that doesn't pose a problem in an office network, it can definitely overload a network in production.

▶ What would you advise that companies keen to concentrate more on industrial security do?
Define processes and the corresponding responsibilities and assign roles. And be sure to constantly refine and review them too. In this way, a sustainable industrial security programme can be established for development, systems integration and operation.

Every employee must be made aware of security as an issue! Because, despite all the technical and organisational measures we take, people still play the most important role in the process.

Evaluating and tolerating faults

Up until now, a potentially dangerous failure in the process automatically meant bringing the machine to an immediate standstill. New approaches in the safety segment mean that operations could be continued in the future. A whitepaper published by the ZVEI (German Electrical and Electronic Manufacturers' Association) covers the basics.

A common everyday example is car tyres with emergency driving characteristics which, in the event of a puncture or loss of pressure, ensure that the car retains a safe grip on the hard shoulder or can be driven to the nearest workshop under certain driving conditions. The driver decides whether and, if so, how to continue driving, thus ensuring that the emergency driving characteristics are observed. If another fault occurs, coming to an immediate and safe stop is at the driver's discretion.

Diagnostics and evaluation form the foundation

This principle can be transferred to factory automation. Comprehensive and qualified diagnostics always form the foundation of appropriate system behaviour. Such diagnostics enable systematic fault evaluation, which isn't common in current implementations of "classic factory automation systems". It's necessary so that a fault-tolerant system can decide whether the detected fault can be tolerated or is so serious that immediate shutdown is necessary. A decision on the graded fault reaction can therefore only be made in appropriately designed devices or systems.

The developers and also users of a fault-tolerant device or system then also specify how long the machine can remain in operation for (in what is known as the "degraded state") and, if necessary, specify additional risk reduction measures, which then become part of the user information. In practice, this can be used to complete a processing step, for example.

Working in collaboration with Pilz and the IFA (the German Institute for Occupational Safety and Health), a working group within the ZVEI wrote the whitepaper entitled "Fault tolerance in machine safety". It describes the fundamentals of fault-tolerant devices and systems in the functional safety of machines and plants. It is aimed at machine builders and systems integrators who design and implement safety functions and subsystems for machine control. In addition, this information can be used for laying out and designing safety-related devices and systems.

The whitepaper entitled "Fault tolerance in machine safety Part I – Basics, Revision 1.0" is available in German and English at www.zvei.org. ◀

ZVEI: Die Elektroindustrie

Whitepaper
Fehlertoleranz in der Maschinensicherheit
Teil 1 – Grundlagen, Version 1.0

Fachverband Automation

Island state 4.0

Despite the general slowdown in the global economy, the economy in South-East Asia is growing steadily. Indonesia is the region's largest economy. It is a country with great potential – and not just for safe automation either!

Indonesia is the fourth most populous country in the world, as it is home to 270 million inhabitants and more than 300 ethnic groups. The Indonesian economy is currently benefiting from the country's diverse natural resources, low wages and the rise of the middle class within the population.

The island state has set itself ambitious goals to make its industry more efficient and competitive: Indonesia is expected to become one of the world's ten largest economies by 2030. Following the international trend towards Industrie 4.0, Indonesia's President Joko Widodo announced the "Making Indonesia 4.0" roadmap in 2018.

Five target industries have been identified: food and drinks, automotive, textiles and clothing, electronics, and chemicals. To promote Industrie 4.0, the government has also established overarching initiatives, which will expand the digital infrastructure, promote innovation ecosystems, strengthen SMEs and provide incentives for investment in new technologies.

Automation plays a key role in achieving these goals – as does the issue of machinery safety. The Pilz subsidiary in South-East Asia, which was established in 2016 and is headquartered in Singapore, will benefit from this. "Initially, we focused on risk and plant assessment, as well as safety concepts and evaluation. These are all topics that – in addition to our
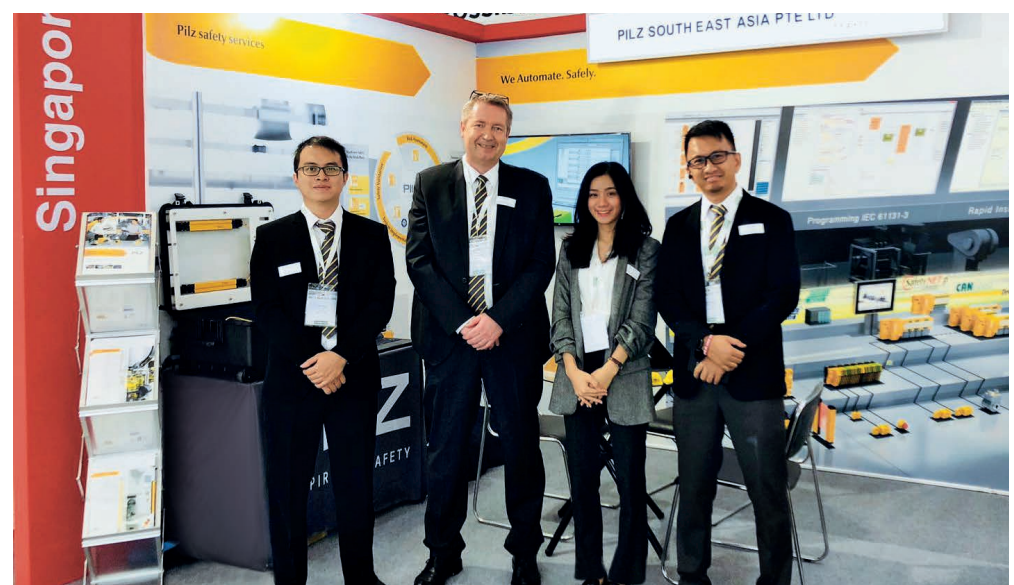
In 2018, Pilz South-East Asia showcased itself at Manufacturing Indonesia.

automation solutions – are of great interest to our customers," said Mark Meng, General Manager of Pilz South-East Asia.

Safety solutions are implemented using the PNOZx and PNOZsigma safety relays, for example. The number of networked control systems implemented using the PNOZmulti 2 configurable, safe small controllers is also increasing. Due to the target industries' requirements for "Making Indonesia 4.0", demand for safe sensor solutions is on the rise too. Mark Meng added: "We are delighted that interest in our consulting services for safety and engi-

neering is constantly growing. With our range of training courses and services, we are helping our customers to implement the right safety standards for their machines and applications."

And that commitment has paid off. In 2016 and 2017, the subsidiary was crowned winner of the Asian Manufacturing Award in the Best Machine Safety Systems Provider category. ◀


A versatile (automation) system

Robotics, presses, locks, building automation, mining, the list goes on – you'll find the Pilz PSS 4000 automation system wherever safety and automation need to come together. Its versatility is also increasingly being used in railway technology.

The digitalisation efforts in the field of rail transport are summarised under the key phrase "SmartRail 4.0". The aim is to use new technologies to enhance rail transport efficiency. Technical solutions for rail transport have been largely proprietary thus far. In other words, the technologies have been designed, developed and manufactured specifically for use in rail transport. Even today, classic relay technology with positive-guided contacts is still widely used in railway and signal engineering.

Automation solutions, such as those used in mechanical engineering or the manufacturing industry, simplify and reduce the project planning effort, improve diagnostic options and make maintenance and servicing easier.

Pilz is helping to shape the trend towards digitalisation in the railway industry and is tailoring industry-proven automation technology, such as the PSS 4000 automation system, to rail transport. Pilz developed the basic automation system in accordance with EN 61508 for industrial automation applications.

A universal approach

To meet the specific rail transport requirements, Pilz developed special modules with an -R (for "Railway") in the type description for this automation system. They are robust enough to withstand the electromagnetic interference, extreme temperatures and mechanical loads that typically occur in a railway environment. The -R modules in the PSS 4000 automation system have CENELEC approvals in accordance with EN 50126, EN 50128, EN 50129 and EN 50155. PSS 4000-R already has railway-specific safety approvals as a product feature. That makes the automation system SIL-4-capable across the whole application.

PSS 4000-R is used throughout Europe to protect barriered and unbarriered level crossings, handling control and safety functions along the Golden Pass line in Switzerland, for instance, and neuralgic station nodes of the metro system in Antwerp, Belgium. It is the central control system for the automated brake test in SBB Cargo's "Intelligent Freight Train"
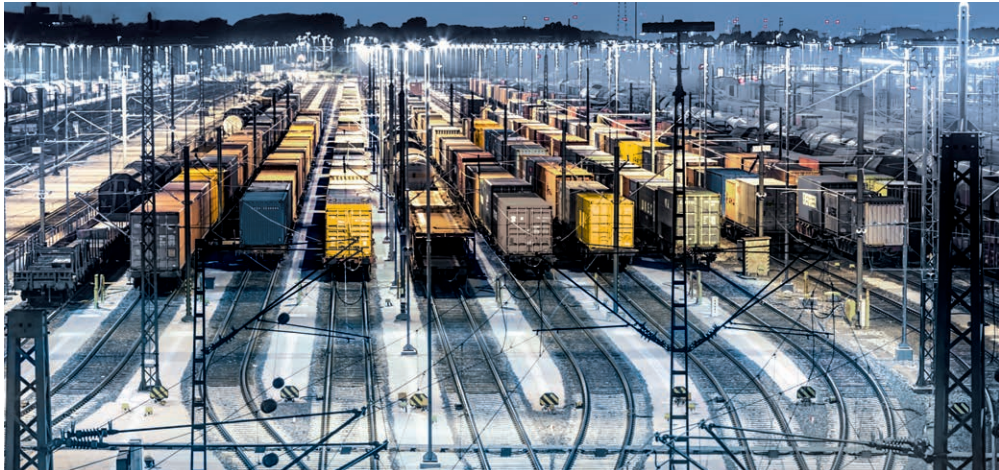
project. Together with DB Netz and its partner Thales, Pilz has already implemented projects for a programmable logic controller adaptation (PLCA) with the aim of developing a safe platform for control tasks. It is capable of efficiently replacing obsolete relay-based signal box technology. The sheer variety of applications underlines the universal approach of Pilz solutions.

Webcode:
web8485

Online information
at www.pilz.com

Apropos …

With Mat P. on his automation tour

PSS 4000
APPLICATIONS

Whether he's dealing with applications from the fields of packaging, automotive, traffic engineering or metal processing – as an expert, Mathias P. travels the world with automation solutions by and for Pilz. He often talks to his wife about his experiences …

▶ **Mat, the Swiss railways are known for their punctuality. I wonder how they do it?**
This is really exciting! The threads often come together in the station and at signal boxes. The process there has to run smoothly so that trains and their passengers reach their destinations safely and on time. That's why the railway pioneer Intelis IED developed a module for the safe handling of shunting traffic together with Pilz for the Swiss railway line Montreux Oberland Bernois (MOB).

▶ **So shunting traffic is the big secret?**
Yes, exactly. Intelis already integrated the INIS-TC remote control, based on the PSS 4000-R automation system, on the 75 km-long MOB track back in 2012. It ensures economical and safe rail operations. This is precisely why PSS 4000-R is connected to the relevant signal box at 17 stations via an integrated interface. The PSSuniversal control units then send the train traffic information to the communication server and to the safety control systems in real time.

▶ **And who evaluates this information?**
The train dispatcher can see the position and status of switches and signals and the locations of locomotives and trains on their screen. They can then intervene in train traffic if necessary. Incidentally, the integration of an additional INIS-PN module in the Zweisimmen and Château-d'Oex stations means that all shunting operations can now be remotely controlled from the relevant signal box. So MOB passengers will arrive at their destination safely and on time!

Putting know-how to global use

Robotics, presses, railway technology – Pilz is at home in many sectors. But the requirements are as diverse as the applications. To live up to its claim of being a solution provider, in future Pilz will be pooling its expertise worldwide in what are known as "competence centres".

"To be even more successful in the individual sectors, we must firstly acquire the knowledge required for these areas in a structured manner, and secondly ensure that our customers around the world can use it with the same quality," explained David Caron. In his role as Senior Industry Manager, he coordinates support for various sectors at Pilz.

Competence centres (CCs) are the ideal solution for Pilz to pool its expert knowledge. The first CCs were established in fields where Pilz sub-

sidiaries already have extensive experience in the relevant application areas: in the likes of railway technology in the Netherlands, presses and machine tools in Germany, and robotics in Spain, the Czech Republic, the USA and China.

Here, experts develop industry-specific solution packages that are then implemented by the Pilz subsidiaries. The focus in this respect is on globally exchanging valuable specialist knowledge and developing and adapting solutions in the industries worldwide.

Regular market analyses form the starting point for identifying new standardised solutions. CCs also help the subsidiaries to implement special projects. "This enables us to offer complete solutions that cover all aspects of automation," summarised Mr Caron.

More possibilities – one module at a time

PSSuniversal 2, the remote I/O system, offers an extended range of applications thanks to new input and output modules. The analogue electronic modules measure voltage and current signals. An electronic module with six digital inputs for 120 VAC signals is also available.

The fail-safe and non-safe versions of the modules can be combined as desired, are independent of the control network and can be connected to head modules with EtherNet/IP or PROFINET, for example. The IO-Link master module enables sensors and actuators to be connected via IO-Link.

The three-part system design permits a high degree of flexibility during commissioning and servicing. This allows users to exchange or configure the electronic modules during ongoing operation. Diagnostic LEDs make troubleshooting easier and increase plant availability. PSSuniversal 2 offers flexibility, openness and granularity for safety and automation.

Webcode:
web188188

Online information
at www.pilz.com

Reliably monitor movements

The PSENenco safe incremental encoder for monitoring speed, direction, acceleration and standstill complements Pilz's portfolio of speed monitors. It sends a machine's or machine parts' position changes, e.g. in machine tools or presses, to the evaluation device. The speed sensor checks the plausibility of these diverse position values. The high resolution allows it to respond quickly and take precise measurements.

PSENenco offers a complete safety solution designed to monitor movement and position in combination with the PNOZ s30 speed monitor, the PNOZ m EF xMM expansion module or the PSSu K F EI safe I/O module. The PNOZ s30 configurator or the software blocks for Pilz controllers and suitable M23 cables can be used to implement the system quickly and easily.

Webcode:
web150403

Online information
at www.pilz.com

Navigate dynamically

Using the PSENscan safety laser scanner, in addition to productive area monitoring, dynamic navigation of automated guided vehicles (AGVs) is now possible too. PSENscan provides distance data via a data interface for this purpose. Using the new ROS (Robot Operating System) module from Pilz, this data can be made available in a ROS-compliant format without any further programming effort and can feed a SLAM (Simultaneous Localisation and Mapping) algorithm, for example. This is how environment maps are created for dynamic navigation.

ROS' open, modular approach makes integrating multiple safety laser scanners into existing ROS environments extremely easy. Applications using PSENscan can be flexibly adapted to customised tasks. Pilz ROS packages meet the industrial requirements of the ROS Industrial Consortium and are developed and tested in accordance with Pilz development standards. This allows new software features to be implemented quickly.

Webcode:
web181395

Online information
at www.pilz.com

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