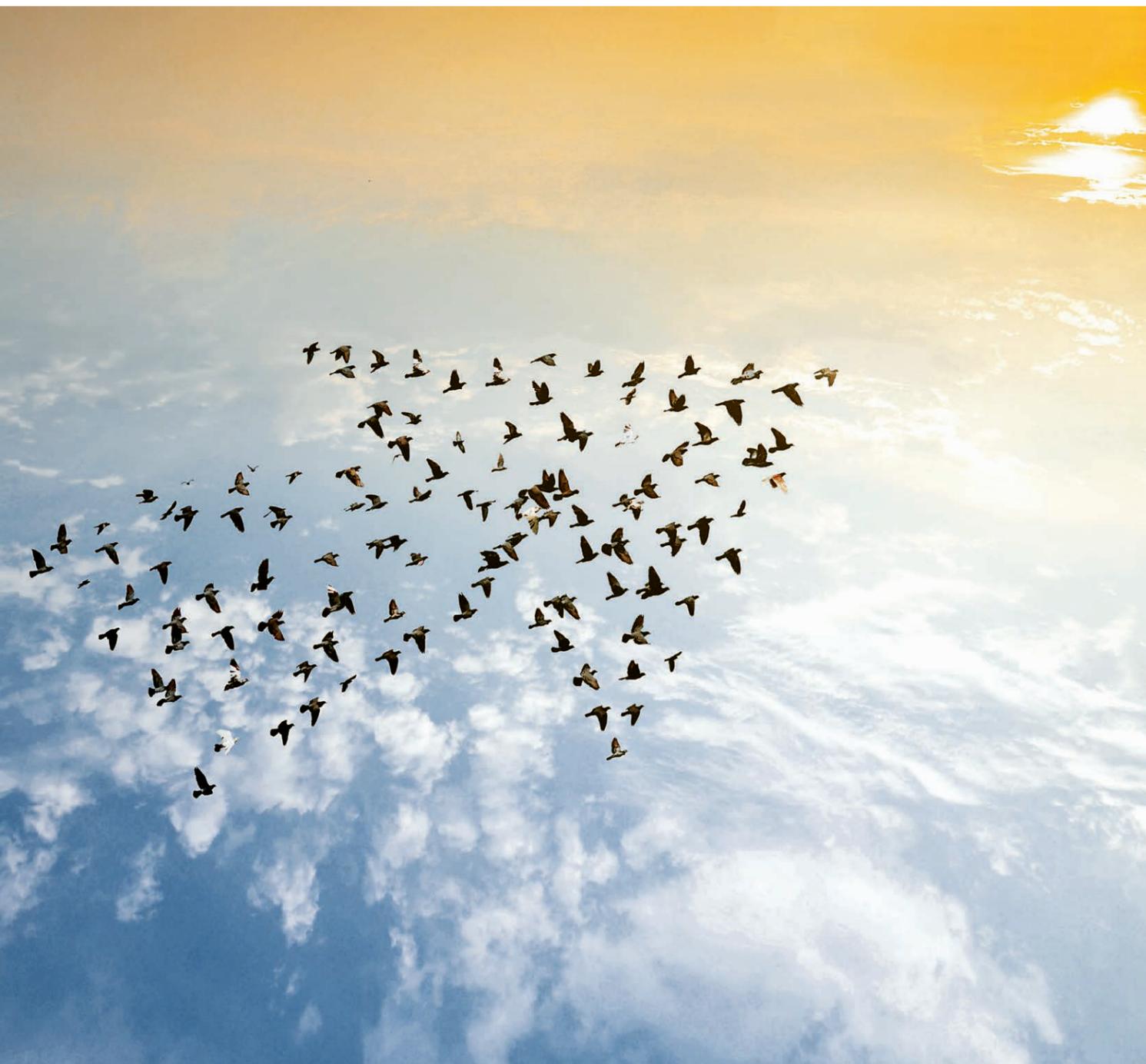


MENSCH und AUTOMATION

PILZ
THE SPIRIT OF SAFETY

The magazine for customers of Pilz GmbH & Co. KG Issue 1/2019



The United Nations of Automation

Stefan Hoppe is Chair of the OPC Foundation and gives insights into the activities around OPC UA in an interview.

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Course set for remote control

At VPS Verkehrsbetriebe Peine-Salzgitter, the automation system PSS 4000 was integrated into the control infrastructure.

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Safety and security united

The new operating mode selection and access permission system PITmode fusion combines many functions in one system.

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Working towards a common goal

Networking is a key to the future of automation. Essential components in Industrie 4.0 networks of the future are OPC UA via TSN at control and fieldbus level and IO-Link at sensor level.

We can still only hazard a guess at what possibilities will take shape when in future every machine, every plant section, every product and every factory is integrated and all the data required is permanently available in real time at the point where it is needed. Digital data and its efficient exchange will in future define the production process and represent the actual value in the process chain.

As networking increases, complexity rises, due to the large number of communication solutions from various suppliers. The protocols and data models used are often not compatible

with each other, so the user is often confronted with proprietary systems. The desire for standards is becoming ever stronger.

A common architecture

OPC UA (Open Platform Communications Unified Architecture) is a possible standard for the secure, manufacturer-independent networking of industrial plants. This communication protocol provides a standardised (IEC 62541) interface for communication between different data sources in industry. However, the OPC Foundation has not only defined a standard to

transport data, but also to semantically describe it in a machine-readable way.

But OPC UA currently lacks the necessary real-time capability for field level applications such as motion control. The OPC Foundation has therefore started an initiative to enable OPC UA for automation tasks down to the field level. A basic technology here is TSN (Time Sensitive Networking): the standards summarised under TSN define mechanisms for the transmission of data via Ethernet networks. This makes it possible to transmit applications with different real-time require-

ments simultaneously on one and the same cable.

This initiative is supported by Pilz. As a member of the OPC Foundation, Pilz employees are active in both the steering committee and the technical working teams of the Field Level Communications (FLC) group. Pilz's focus is on the working group dealing with safety (Safety over OPC UA).

Continued on page 2

Editorial



Dear Readers,

When I founded SmartFactory KL in 2005, which is essentially the mother of what is now called Industrie 4.0, it was about the network capability of all devices at the field level. A few years later, together with our partners, we brought this goal to maturity and found that we had thus created the basis for open communication on both a horizontal and a vertical level. Data and software came to the fore.

We also developed solutions for this topic in close cooperation with our partners.

Today, we have a data distribution layer that has enabled us to successfully establish multi-cloud connections: another important step towards a manufacturer-independent, open communication structure! This requires international standards on the one hand to ensure that the products are suitable for the global market and great efforts on the other hand to ensure that the solutions meet the high safety standards of industrial applications.

The large amounts of data that we can now access must ultimately be converted into knowledge. And the current hype topic of artificial intelligence will provide us with the necessary tools for this. It's going to be exciting, so let's get to it!

Best regards,

Prof. Dr. Detlef Zühlke
Chairman of the Executive Board
of the Technologie-Initiative SmartFactory KL e. V.

▶ 360° Continued from page 1



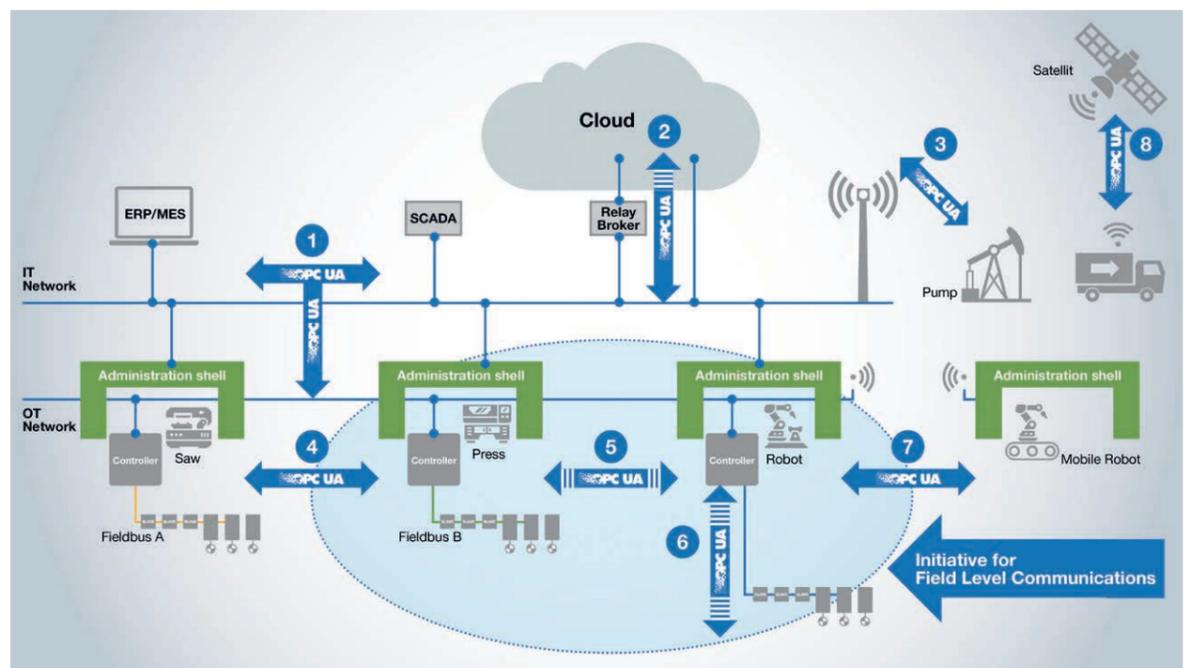
Safety included

Particularly in demand here is Pilz's expertise in the use of publisher/subscriber technology (pub/sub) in conjunction with the requirements of functionally safe fieldbus protocols: compared to the classic master/slave architecture, pub/sub allows subscribers to decide for themselves which communication relationships they want to establish with other subscribers, which data they want to receive at which intervals. This means a particularly efficient distribution of data and, in conjunction with TSN, allows "OPC UA over TSN" to be used for demanding, distributed automation tasks as well. "Pub/sub is a very powerful method of messaging. Pilz has particular expertise here, as our SafetyNET p is the only safe Ethernet-based fieldbus system

tool-supported parametrisation as well as extended diagnostic options. It is therefore an ideal complement to OPC UA over TSN. Version 1.1 of the IO-Link Safety System Extension was adopted around a year ago. As an active member of the working group, Pilz is currently developing the necessary software stacks for communication between masters (such as evaluation devices and controllers) and devices (sensors/actuators). Hand in hand with the audit authorities, the test specification and test systems as well as the certification of these communication stacks are prepared in parallel.

Simple connectivity is the aim

Simple connectivity is increasingly becoming a success factor for practical automation



The goal of OPC UA is the safe, reliable and manufacturer-independent transport of raw data and pre-processed information from the sensor and field level up to the control system and into the production planning systems.

that supports pub/sub right from the start," says Harald Wessels, responsible for networks in Product Management at Pilz. "This now offers the opportunity for an industry-wide uniform communication standard. That would indeed be historic, because that's what machine builders and operators want!" The machine builder will save engineering effort in future because he does not have to design his machines for different protocols. His machine can communicate with other subscribers without system breaks such as gateways and thus without losses, and the operators in particular benefit from this.

IO-Link as an open market standard

On the sensor level, however, IO-Link with integrated safety protocol will become the open market standard for safe sensor communication – fieldbus and system-independent. IO-Link is a powerful and standardised (IEC 61131-9) connection technology for point-to-point communication. The advantages of IO-Link are simplifications during installation (e.g. through standardised cabling and the elimination of parallel wiring), automated and

solutions. "Today and tomorrow, our customers shall sell their plant and machinery on the world market and operate it as efficiently as possible, because we automation specialists ensure simple connectivity," explains Wessels. Cloud-based services will also be easier to implement thanks to standards, as uniform data formats and uniform semantics make it easier to interpret and evaluate data. In the future, automation solutions will differentiate even more by their functionalities: how good are the user interfaces, how easy are they to use, what additional benefits do they offer? A strong innovative power is involved here and there is great potential for new applications.

More openness through expertise

At Pilz, openness and user friendliness are key characteristics of the portfolio. Pilz's commitment is to offer customers products that are always state of the art, but remain easy to use and can be added to any automation architecture. Plus Pilz considers the connectivity of products, right up to ERP systems and cloud networks.

Pilz draws the necessary knowledge from various sources: from many years of intense co-operation with customers, active participation in standards committees and, last but not least, involvement in cross-system working groups. Pilz relies on cross-manufacturer initiatives such as the OPC Foundation or the ZVEI to develop the necessary standards industry-wide and across companies.

“We are the United Nations of Automation”

Stefan Hoppe, President of the OPC Foundation, talks about the activities to establish OPC UA as an open, secure, manufacturer-independent and standardised data communication of the future.

► **Mr Hoppe, the approach of standardising communication protocols is not new. Why should it succeed now? And can OPC UA achieve this?**

First, a clarification: the OPC Foundation does not follow the approach of standardising communication protocols! OPC Unified Architecture (OPC UA) is not a protocol in the conventional sense. It is a framework for industrial interoperability for exchanging information – not only data, but also its description and meaning – with access rights and integrated security.

OPC UA has become a kind of “movement”. The goal is always a plug-and-play of standardised information that is then exchanged with OPC UA mechanisms – from the sensor to the cloud. And the results are impressive: an OPC UA-capable device such as an RFID reader or a machine such as a robot can be connected to a cloud computing platform or ERP software in just a few minutes. In the past, integrators had to be commissioned to do this.

In a nutshell: yes, I believe that OPC UA has the potential to become established wherever industrial, robust communication is required.

► **What about complex processes with real-time requirements? How can OPC UA satisfy these requirements?**

For the requirement of real-time communication in OPC UA, the OPC UA pub/sub communication model (editor’s note: see article on page 2) was already added in the first step and released

in version 1.04 at the beginning of 2018. At the same time, a sub-working group was founded to investigate the use of Time Sensitive Networking (TSN) as an extension to standard Ethernet for OPC UA. At the moment, the necessary TSN parameters for the pub/sub model are being defined.

Under the umbrella of the OPC Foundation, we have established the Field Level Communications (FLC) initiative to expand OPC UA and include TSN. TSN is only one variant as a deterministic communication channel in addition to conventional Ethernet and in future also 5G.

► **The media are talking about the “end of the fieldbus war”. How do you experience the co-operation between the different players?**

The OPC Foundation did not start with the goal of defining a new fieldbus, but with the intention of integrating existing approaches into OPC UA. Even the “big players” with their own eco-systems work with us and contribute their expertise – otherwise the project would also fail. The OPC Foundation is seen as a “neutral ground”, essentially as the “United Nations of Automation”. This spirit and the will to come to a common solution were clearly noticeable at the previous meetings.

► **What role do the topics safety and security play?**

“Security by design” has been an essential part of OPC UA since its inception. And this is much



more than just simple transport encryption! Our open source strategy helps to identify and remedy potential flaws early on and thus create trust. We are proud that OPC UA has been validated by international security experts.

With the OPC UA extension to include pub/sub, the focus at the beginning was on controller-to-controller communication as well as with the requirement to be able to provide a so-called black channel for a safety protocol. The “non-safe” communication channel is continuously

monitored for its integrity by a higher-level “safe” protocol. Since early 2018, there has been a working group for Safety over OPC UA – based on PROFSafe mechanisms – for this type of safety solution. The initial results are expected this year.

► **When will users (machine builders and operators) benefit from the work of the OPC Foundation?**

Manufacturers and customers who have banked on OPC UA from the early stages have long benefited from simple, secure plug-and-play connectivity for connecting their machines to SCADA, MES, ERP or cloud solutions.

If the question was specifically tailored to OPC UA over TSN, I need to slow down expectations: the OPC Foundation has bundled resources and is working with great commitment on the implementation. But we are also waiting for final standardisation and TSN approval under the umbrella of IEEE and IEC. After all: in the future, there will only be one TSN cable that can handle different real-time services simultaneously – including OPC UA. The visibility of certified devices in the factory will therefore be a long time coming. ◀

► Inside Hannover Messe 2019: Pilz with a focus on smart sensor technology

Experience safe automation live

Intelligent sensor technology, service robotics and Industrie 4.0 at your fingertips: at this year’s Hannover Messe, Pilz will be presenting its newest solutions and services under the motto “We automate. Safely” in Hall 9, Stand D17.

The Pilz Smart Factory, a modular production line for manufacturing batch size 1 products, can be seen on the Pilz stand in an expanded version with the Pilz Service Robotics Modules and an automated guided vehicle (AGV). The demo application is monitored by safe sensor technology, which proves its versatility in Hanover: from area and zone monitoring to the safeguarding of safety gates or human-robot collaborations. In addition, visitors to Hanover will be able to see for themselves new application areas for sensor technology in quality control, diagnostics and machine operation.

Worldwide service for more safety

Pilz supports the implementation of complex automation tasks and will be presenting its extensive service portfolio in Hanover.

The international, TÜV-certified qualification “CECE – Certified Expert in CE Marking”, for example, provides participants with the necessary

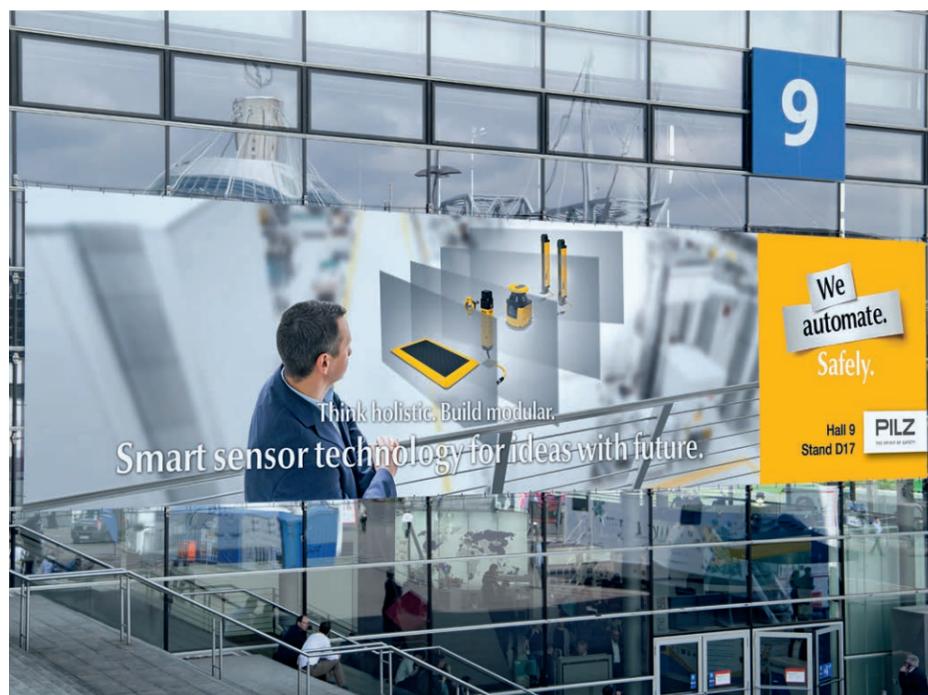
expert knowledge with which they can perform CE markings on new, existing or modified machines in accordance with the valid legislation and standards.

Expertise and trends

Pilz will be passing on its knowledge of trends and innovations at the Hannover Messe as part of the Guided Tours. The “Innovations for mechanical and plant engineering” tour, for example, provides interesting insights into automation solutions for the factory of the future. Pilz will also be present at the SmartFactory KL stand in Hall 8 as a member of the initiative. ◀

Webcode:
web180702

Online information
at www.pilz.com



In brief ...

Designated Smart Factory

The Allianz Industrie 4.0 Baden-Württemberg designated Pilz as one of the "100 places for Industrie 4.0 in Baden-Württemberg".



Industrie 4.0 | 

Every year, the network initiated and funded by Baden-Württemberg's Ministry for Economic Affairs awards prizes to companies for their forward-looking ideas, solutions and applications of Industrie 4.0. Last year, 14 companies and institutions were honoured.

Pilz convinced the jury of experts with its Smart Factory model, which represents an intelligent production line and brings Industrie 4.0 to life. Thanks to decentralised control intelligence, mobile service robotics, intelligent diagnostics and visualisation, plus a cloud connection, various personalised batch size 1 products can be produced. All of the products used in the smart factory are from Pilz – from sensor and drive through to the controller and robotics.

► Inside Complete service package for machine builders and operators

Have a good trip! US compliance for machinery

The export or commissioning of machines in the USA is subject to complex specifications that may also vary depending on the state or region. Pilz is now offering a corresponding service package for conformity assessment of machines on the US market.

IC-USA by Pilz

In the USA, a mix of product standards, fire codes, electrical directives and national laws specifies how machinery safety is to be ensured. Compliance with testing standards of UL (Underwriters Laboratories) or OSHA (Occupational Safety & Health Administration) is a mandatory requirement for market approval, for example: UL publishes safety standards. Among other things, these standards contain requirements for electrical devices and components. As an agency of the U.S. Department of Labor, OSHA requires that all electrical devices in workplaces comply with the relevant UL standards. This applies to both new as well as used and modified or expanded machinery.

Relevant for manufacturers and operators

So if you sell machinery in the USA as a manufacturer, you should therefore take care that all specifications are already taken into account in the design phase so that smooth commissioning is ensured at the machinery installation site with regard to the operating permit. Operators of

machinery in the USA are obligated to take corresponding precautions at the workplace in order to ensure that work on the machinery is safe. This includes the creation of a LOTO system to be able to safely manage hazardous energies, or the implementation of corresponding training measures.

Full one-stop service

Pilz assists manufacturers, exporters and operators who export machines to the USA or operate them there with conformity assessment. The special feature: Pilz customers all over the world have "their" contact at the respective Pilz subsidiary in their own country. The local contact coordinates the entire project from a supervisory position and draws on the expertise of recognised Pilz experts in the USA for implementation.

Specifically, Pilz creates all the necessary documents that are required to have a machine certified by the local authorities. The experts



from Pilz begin in their advisory capacity as early as the machine's design phase by assessing the design, particularly with regard to the special electrical US requirements. Pilz then carries out all the necessary measures for its customers, from risk assessment and the LOTO system to the validation report for US compliance – including coordination with the authorities on site if required. ◀

Short link: pilz.com/icusa

► Inside Interview with Klaus Stark, Senior Manager in Innovation Management at Pilz

Innovations for the factory of the future

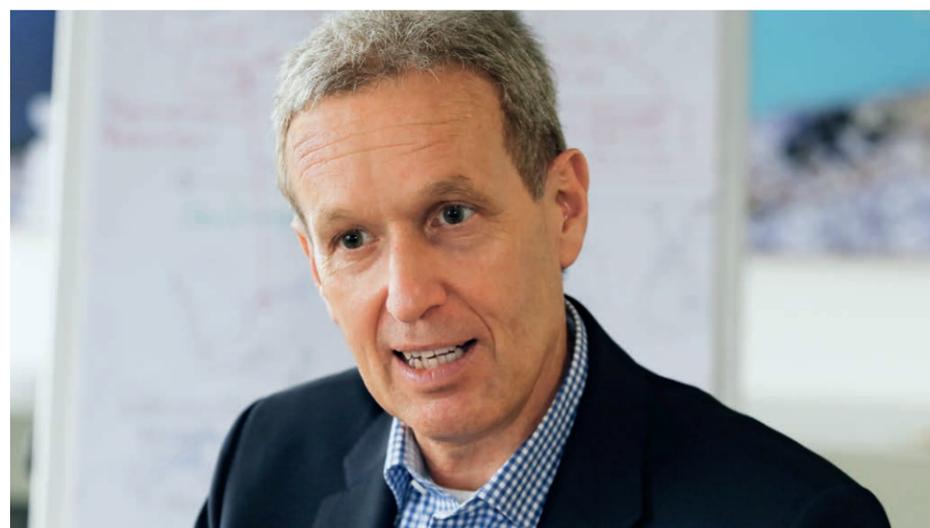
In the interview Klaus Stark, Senior Manager in Innovation Management at Pilz, talked about the challenges of Industrie 4.0 and Pilz's commitment to the technology initiative Smart Factory KL.

► What are the objectives of innovation management at Pilz?

Stark: In innovation management we identify relevant, future-oriented market and technology-related issues and introduce these to the company. This then helps to influence decisions for future projects and products. That way we can secure our technology leadership and offer our customers innovative, competitive products.

► Is Industrie 4.0 one of these technology-related issues?

Definitely! Industrie 4.0. is a whole bundle of ideas and their ultimate long-term purpose is to see Europe remain competitive. Subject areas range from end-to-end digitisation, to engineering, modularisation and customised manufacturing. In automation we will be opened up to entirely new possibilities, the details of which are not even conceivable today. The variety of products will increase, for example. We must be able to manage this through innovative automation. The number of autonomous machines and robots will rise; as a result, cooperation between robot and human will become even more important. This new form of automation must first be developed, tried out, evaluated and made suitable.



► And that's the purpose of projects such as the Smart Factory KL?

Exactly! The Smart Factory KL combines scientific theory and practice. Around 50 stakeholders from science and industry work together to implement research and development projects around Industrie 4.0 and the factory of the future. The stakeholders include renowned industrial companies or, for example, the Technical University of Kaiserslautern. The exchange with other manufacturers and users in automation is particularly helpful to us. At the heart of the

network is the demo plant at the Smart Factory, which has eight modules. Each module has been designed by different companies using their own technologies. Common standards help to create interoperability.

► What does the Pilz module demonstrate?

Our model of the Pilz Smart Factory is made up of a total of four modules, which are networked as a form of "intelligent production line", manufacturing personalised products. All the components used are from Pilz, from the sensor and

drive technology through to the controller and robotics. You can experience all the issues around Industrie 4.0: thanks to decentralised control intelligence, mobile service robotics, intelligent diagnostics and visualisation, plus a cloud connection, various personalised batch size 1 products can be manufactured. That will be the new generation of products. Even more procedures will be software-based, updates during the products' lifecycle will be the order of the day, security issues will need to be considered. Pilz supplies products that help to make this customised manufacturing possible. As a reliable and experienced partner, with our expertise we will contribute towards the development of sustainable machinery. Other issues that are conceivable include online solutions for services, the use of smart glasses and simulations. Even remote maintenance and diagnostics can be revolutionised. The quality of evaluable data will increase and be made accessible through solutions such as OPC UA, IO Link Safety. New services and products will also emerge in this context. The plant helps us, because in the Smart Factory model it is possible to implement and test existing and future technologies within the environment of the intelligent factory of tomorrow. ◀

Course set for remote control

Together with VPS Verkehrsbetriebe Peine-Salzgitter GmbH, Pilz has planned a to date unique remote control solution that implements the special considerations of the railway infrastructure. For this purpose, the automation system PSS 4000 was integrated “on-the-fly” into an existing control infrastructure.

VPS is a part of the Salzgitter Group and operates a rail network of 361 kilometres. With an annual transport volume of 43 million tonnes, it is one of the most important railway companies in Germany. The infrastructure with the main Hütte Süd signal box as well as the remote controlled Beddingen and Walzwerk signal boxes is monitored by the State Railway Authority (LEA), Lower Saxony. As is common in the railway sector, a remote control from the 1980s was in use in all three signal boxes, with which age-related malfunctions accumulated. Modernisation was therefore necessary.

Integratable remote control system

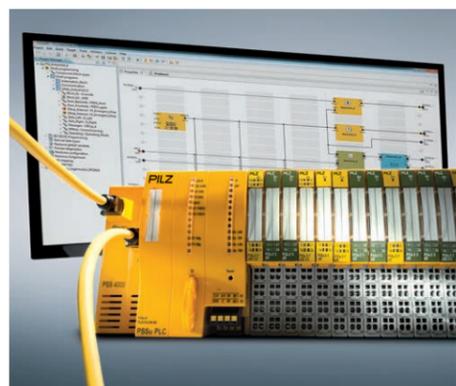
VPS wanted to retain the relay-based signal box infrastructure including the classic control desks. The integration of an automation solution into an existing infrastructure represents a challenge for all parties involved – especially if it is to take place during operation. The search was on for a control solution that could be easily integrated into the existing infrastructure. “We already had a trusting relationship with Pilz thanks to local switchpoint control with the freely programmable safety controller PSS 3000. Following InnoTrans 2016, we were able to convince ourselves of the benefits of the automation system PSS 4000,” recalls Dietmar Reinecke, Head of Signal Technology at VPS.

Solving complex automation tasks

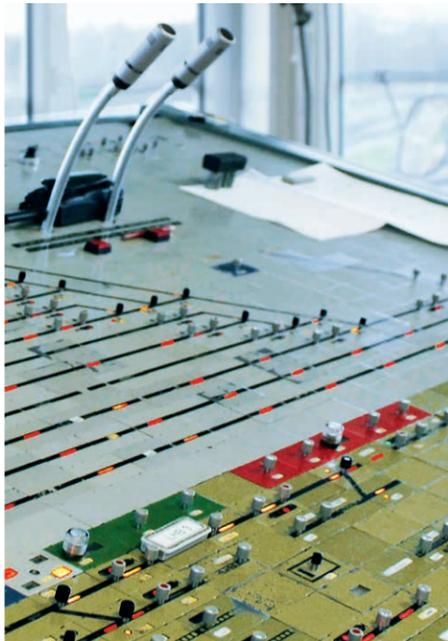
The choice was made in favour of the modular, flexible and expandable automation system PSS 4000 from Pilz. It is particularly suitable in the event of numerous automation and safety functions to be monitored in the field. All components represent an optimal interaction between hardware and software, network components and the real-time Ethernet SafetyNet p. In addition, there is a user program that makes simple handling possible. The configuring and programming tasks are handled intuitively via the software platform PAS4000. The new remote control solution for VPS uses a total of four PSSuniversal PLC controllers in the signal boxes.

Main signal box monitors unmanned auxiliary signal boxes

Together, over 1 400 safe I/Os and 600 signal outputs ensure fast, safe transmission and evaluation.



Users can assemble the automation system PSS 4000 individually to suit their own requirements. This is possible with controllers in various performance classes, a wide range of I/O modules as well as visualisation and engineering software.



Classic control desk at the Hütte Süd signal box. The green Walzwerk signal box is shown bottom right.

ation of the signals in real time. The dispatcher at the Hütte Süd control desk is thus always informed about the current state of the 41 tracks, 40 switchpoints and 44 signals in the Beddingen and Walzwerk signal boxes. Using digital input modules, switchpoint, signal or route commands are recorded and transmitted to the remote signal boxes via fibre-optic cables. There they are translated back into analogue output signals. All status messages and auxiliary operations of the remote-controlled signal boxes that are subject to counting are permanently stored and clearly displayed on an operator panel in the main Hütte Süd signal box, together with the diagnostics of the controller.

Commissioning “on-the-fly”

“Pilz has covered the entire spectrum, from planning, software programming and implementation to final commissioning and approval, very competently and from a single source. The cooperation was always open and constructive; we felt that we were well looked after,” says Dietmar Reinecke. Pilz has solved the railway-specific requirements with individual software programming, among other things. The PSS 4000 systems required for each signal box, each mounted on a frame, including the corresponding periphery such as power supply, switches and coupling relays, were tested offline for their functionality in advance. Thus, pretty much all that was necessary was removing the plugs from the old remote control and connecting them to the new automation system controller. The subsequent function tests required were carried out during operation – absolutely free of trouble and failure. The complete commissioning was finished after about a week. A flexible, safe and reliable automation and remote control solution that is also interesting for other railway applications.



Shunting locomotives from Verkehrsbetriebe Peine-Salzgitter in front of the blast furnace plant of the Salzgitter steel plant. The transport company is responsible for the internal traffic of Salzgitter AG. At the Salzgitter site, ore, coal, coke, lime, sinter, pig iron, slag, crude steel as well as semi-finished and finished steel products are mainly transported.

Three minutes with ...

... Matthias Holzäpfel

Vice President Advanced Development

► Mr Holzäpfel, how do you manage to reinvent yourself over and over again with innovations?

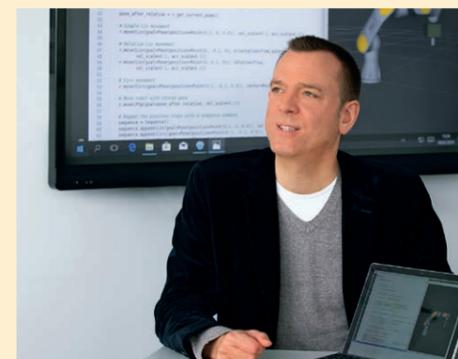
I think the most important thing is to understand our customers' problems and challenges and offer them a simple solution. Sometimes a new technology helps us to offer a better or less expensive product. Our focus is always on the person. After all, he is the ultimate user of innovations.

► Keyword simple solution: What role do connectivity and openness play in the development of Pilz products?

That is actually a highly central aspect! Our products have to work together with products from other manufacturers and that is only possible via open communication protocols. For this reason, we currently support all important fieldbuses – for the future we hope for even more standardisation via OPC with TSN.

► You are actively involved in the Field Level Communications (FLC) steering committee of the OPC Foundation. What specifically can you tell us about your work? What are you currently working on?

The aim of this working group is to enable standardised and open communication between automation components and systems based on OPC and TSN that is truly manufacturer-independent: from the field level with sensors and actuators through the control level to the cloud. With all the major manufacturers on board, true interoperability becomes



possible. This is important for the future when we think of flexible modular production facilities like in Industrie 4.0, where sensors and actuators are becoming increasingly intelligent and therefore communicate more. Our aim is to allow our customers the best possible connectivity.

In brief ...



Growth in robot standards

Two standards are available for detailed safety requirements for industrial robot systems and their integration: ISO 10218 "Safety of Industrial Robots" Part 1: "Robots" and Part 2: "Robot systems and integration". In addition to these, the International Organization for Standardization (ISO) has now published the "Technical Report ISO/TR 20218-1:2018, Robotics – Safety design for industrial robot systems – Part 1: End-effectors". This describes the state of the art in end-effectors for industrial robot systems, e.g. grippers. It thus explains the design, manufacture and integration of safety measures and their use in practice.

Standard-compliant evaluation of human-robot collaboration

The collision measurement set Pilz Robot Measuring System (PRMS) is used for force and pressure measurement to validate HRC applications in accordance with ISO/TS 15066 Method 4. Due to high customer demand, PRMS is now also available for purchase in addition to the proven rental concept. Using the associated PRMS Assistant software, the user can conveniently evaluate the measured force and pressure values. The full package includes a one-day training course, maintenance and calibration as well as software updates for PRMS. With the new compression elements made of silicone, the measuring device is now even more handy and reproduces the Shore values from ISO/TS 15066.

► Panorama Access permission and operating mode selection in one system

A gatekeeper that combines safety and security

Machine builders face various challenges in the development of plant and machinery.

One such challenge is the functionally safe control of access and permission in order to prevent accidents, mishandling and manipulation of machines.

Complex plant and machinery in particular require different access permissions and operating modes in order to guarantee functionally safe operation. Various C standards stipulate that different machine operating modes must also contain corresponding safety functions. Once the trained personnel for selecting the operating mode have been identified, safety functions can also be changed. This allows, for example, a machine for setup mode to be operated at a safely-reduced speed even when the safety gate is open. Only authorised, trained persons should therefore have access to the plant or machinery. Selected operating modes are assigned to them in order to avoid incorrect operation and manipulation.

Safety and security in one system

These authentication mechanisms are united by the operating mode selection and access permission system PITmode fusion. It enables functionally safe selection of the operating mode and controls access permission. The system can be used for plant and machinery in which it is necessary to switch between a range of control sequences and operating modes. Up to five safe operating modes can be selected, such as automatic mode, manual intervention under restricted conditions or service mode.

Modular system controls access

PITmode fusion is made up of two components: the reading unit PITreader with RFID technology and a safe evaluation unit (SEU). Authorised users receive the machine enable suited to their task on a coded RFID. This key is inserted into the control console, the SEU detects the specified operating mode and ensures functionally safe switching. Since PITmode fusion has a modular design, it can be flexibly integrated into the design of existing control consoles. Existing pushbuttons can thus be used, ensuring a better overview for the operator.

One key, many functions

If users are to be assigned additional authorisations, a large number of additional functions can be implemented in the machine control: from a simple enable and access permissions for specific machine component functions to a complex hierarchical permission matrix. In addition, writable RFID keys and PITreader can be used to implement group-based permission management. This is used to assign employees or groups of employees certain rights. RFID keys can be coded with PITreaders with company-specific programming. In order to increase manipulation protection,



PITmode fusion

all keys without company-specific coding are not accepted.

Versatile PITmode variants

PITmode is available in two additional versions. PITmode as an all-in-one device contains both buttons for operating mode selection and the SEU. The reading unit PITreader can be used flexibly to control access permissions as a stand-alone device or in conjunction with a Pilz controller. PITmode and PITmode fusion offer functionally safe operating mode selection and access permission up to PL d.

Webcode:
web150439

Online information
at www.pilz.com

► Profiles Portrait of the Pilz Scandinavia subsidiary

Swedish automation in transition

Pilz and Sweden belong together because safety is a top priority both in everyday life and in industry:

children up to the age of 15 must wear helmets when cycling, and the Swedish car manufacturer Volvo is known worldwide for its particularly safe vehicles – to name just two examples. It is therefore not surprising that Pilz enjoys an excellent reputation in the far north – not only as a supplier, but also as an expert in machinery safety.

In addition to safety, Swedish companies are also involved in the latest developments. The topics that are the focus at the stand of this

year's Hannover Messe partner country clearly demonstrate this: collaboration, innovation and digital transformation. Patrik Frivold, Country

Manager at Pilz in Sweden, observes that the Swedish entrepreneurial spirit has changed in the last two to three years: "For the Swedish automation industry, topics such as Industrie 4.0 and Smart Factory are becoming more important. With the automation system PSS 4000 and our sensor technology portfolio, we offer exactly the right solutions. In addition, our customers are increasingly interested in our range of service robotics. The technology is also finding its way into production in Sweden." This change can be felt right up to the headquarters in Ostfildern. Just a few months ago, a delegation from the German-Swedish Chamber of Commerce visited Pilz to discuss Industrie 4.0 and digitisation. Interest was very high. After all, Germany is Sweden's most important trading partner.

Representation in Sweden was therefore a logical step for Pilz. The Pilz Scandinavia subsidiary has been located in Kungsbacka, Sweden, since 1997. The most important customers include representatives from the

automotive and robotics industries, from the wood and paper industry, and also companies in metal processing and mining.

Formerly known only as a component supplier, Pilz has now also established itself in Sweden as a system and service partner for international projects. "Customers get everything from us as a one-stop shop and appreciate this customer orientation: from simple safety relays to complex railway applications, from risk assessment to fully CE-marked production lines, for which Pilz assumes full responsibility," says Patrik Frivold. And what is implemented in the Swedish production facilities is often transferred to other customer company locations, for example in North America or Brazil. Pilz's international service network is helpful in implementing this. The Swedish demand for safety is now being met on a global scale with the help of Pilz technologies and services.



Configure, simulate and you're ready to go!

In the past, simple safety circuits were created manually by wiring the hardware. If an error was made, it only came to light during commissioning. Today, software-based solutions are increasingly being used to monitor safety functions on plant and machinery. Thanks to the simulation of the user programs, commissioning now takes place without any unpleasant surprises.

The configuration tool PNOZmulti Configurator supports the user with project design, configuration, documentation and commissioning of the configurable small controllers PNOZmulti. The tool makes it possible to configure safety functions that were previously implemented via wiring on the PC. This means that even complex applications can be easily implemented.

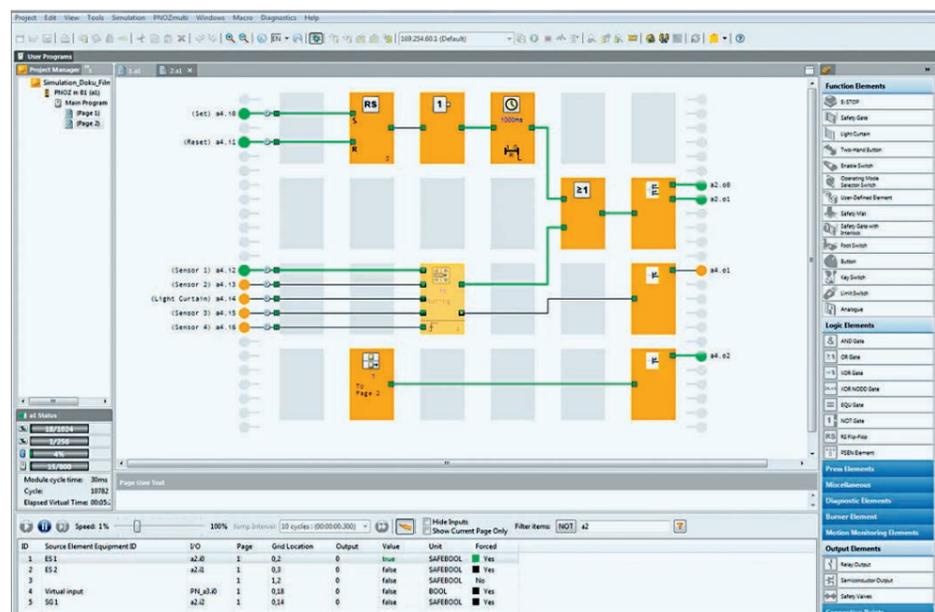
Guidance to the user program

In addition to comprehensive online help, PNOZmulti Configurator provides users with comprehensive support on the path to a safe user program. The integrated feasibility check stops the user selecting expansion modules incorrectly, for example. The created project is password-protected and transferred to the hardware via program memory such as a USB stick or chip card. Subsequent changes or adaptations can also be implemented quickly and easily in the configurator. The simple

duplication and adaptation of user programs is particularly interesting for series machine manufacturers.

Virtual endurance test before commissioning

After the configuration of the automation project has been created, it is important to carry out a thorough check before commissioning. The "Simulation" function is available for this purpose from software version 10.9 of the PNOZmulti Configurator. This allows the configured user program to be simulated offline without the need for any hardware. It is a convenient tool for early detection, analysis and rectification of planning errors. With the simulation, the users can ensure that their safety controller is configured free of errors even before live application, and that the correct function of the program logic has been verified. This not only saves time during commissioning, but also offers a higher overall quality and reliability



With the aid of offline simulation for the PNOZmulti Configurator for configuring user programs, the user can detect, analyse and rectify planning errors at an early stage before commissioning.

of the application. The EN ISO 13849-1 standard even recommends a simulation of the user program in the manner that Pilz has implemented it.

Efficient simulation

Simple logic elements, counters, operating modes such as inching and permanent cycle are automatically simulated in the first step using the PNOZmulti Configurator as a logic function and sequence. A simulation of the overall application is also possible. It is suitable for elements that cannot be simulated in the first step, for example. They are put into the required state by forcing the connecting elements, i.e. a firm assignment of the desired signal state. The

inputs do not have to be defined in detail before a simulation is carried out.

Safe implementation of complex applications

Despite growing machine sizes and increasing degrees of machine automation, application programs can be implemented in a straightforward manner using PNOZmulti Configurator and the application simulation. This is particularly beneficial with machines with complex safety devices and close man-machine interaction, where the operator must be protected by comprehensive safety mechanisms that are to be extensively designed. In addition, simple diagnostics and visualisation options reduce downtimes on plant and machinery.

Apropos ...

With Mat P. on his automation tour

Whether he is dealing with applications from the fields of packaging, automotive, traffic engineering, 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 ...



PSS 4000
APPLICATIONS

► Mat, you were going to tell me about your weekend in the Alps. Where exactly did you go skiing?

I was in the Austrian skiing area Hochfügen and promptly found myself sitting in a chairlift from the Austrian cable car manufacturer Doppelmayr/Garaventaln. In less than four minutes I rode from the valley station at 1 995 m to the mountain station at 2 312 m. No wonder, then, that the Waidoffen six-seater monocable lift can carry up to 2 600 people every hour.

► Let me guess. There is probably Pilz technology involved.

Of course! The automation system PSS 4000 performs all automation and safety-related control tasks for the cableway there and meets the requirements of the highest safety class 4 of the EN 13243 cableway standard. In addition to the safe functions, PSS 4000 also controls the entry barriers and the wind detection and recording. In other words, a complete solution!

► What does a safety function on the chairlift look like then?

The lift's restraining bars are a good example. They lock fully automatically after boarding and unlock again – also automatically – only when the mountain station has been reached.

Its autolock child restraint system also allows five children to ride safely, requiring the presence of only one adult passenger.

Webcode:
web150399
Online information
at www.pilz.com



"The success story continues!"

Since the first configurable, safe small controller PNOZmulti was launched on the market in 2002, the product family has successfully established itself as the safety standard for numerous automation environments and communication systems. PNOZmulti is used hundreds of thousands of times around the world to protect people and machines in various applications. The success story continues with PNOZmulti 2! Simple configuration, user-friendly diagnostics,

narrow width and dovetailing with safe sensor technology – all this makes the 2nd generation of configurable small controllers a future-oriented safety solution.

Webcode:
web150500
Online information
at www.pilz.com

Higher availability thanks to IO-Link technology



With the IO-Link master module PSS u2 ES 4 IOL, Pilz now offers a module for data exchange via the worldwide standardised IO technology to IEC 61131-9 for the remote I/O system PSSuniversal 2. The module can be connected to four IO-Link devices, i.e. sensors or actuators, via four IO-Link ports. One module transmits up to 128 bytes of process data via point-to-point communication. The process and device data of the devices is centrally available in the master module. The IO-Link data interface simplifies the parametrisation of intelligent field devices and

simplifies all maintenance tasks thanks to detailed device and cabling diagnostics. If a sensor is exchanged, its data is simply transferred to the new sensor and does not have to be reparametrised. Operators do not have to concern themselves with the parametrisation of sensors. This saves time, reduces errors and thus increases the availability of plants. An LED display on the module visualises the IO-Link mode, operating status and module errors.

Webcode:
web188188

Online information
at www.pilz.com

Safe vertical use!



The Pilz safety laser scanners PSENscan are now also suitable for area guarding of vertical applications, such as access protection. Thanks to integrated muting inputs, it is also possible to monitor applications in which material is transported in and out simultaneously. The material is detected by PSENscan and crosses the protected field without reducing the speed of the conveyor belt. This reduces downtime and increases productivity. With the PSENscan light, master and slave variants, up to 70 switchable configurations can be defined and the simultaneous monitoring of up to

three separate zones can be set up. Up to four safety laser scanners can be connected in series, which reduces cabling and setup work. The warning and protected fields are freely configurable. With its compact housing, PSENscan can be flexibly integrated into various applications – from stationary to mobile area guarding.

Webcode:
web181395

Online information
at www.pilz.com

Reliable voltage monitoring in accordance with UL 6420



The safe voltage monitoring relay PNOZ s60 monitors de-energised 1-phase or 3-phase supplies with neutral conductor. It is an essential component of a Safety Lockout System (SLS), which is mainly marketed in the USA and ensures safe access to hazardous machinery or machine parts. The voltage monitor can be used for plants that require UL 6420 certification. By monitoring the de-energised state, it enables the safe maintenance of plants. PNOZ s60 monitors the supply voltage supplied to the plant by measuring the voltage at the three phases. The safety circuit

is only enabled when the value falls below the previously configured threshold value – i.e. when there is no more hazardous residual energy in the plant.

With its compact housing and plug-in connectors and terminals, cabling is quick and saves space. Extended diagnostics is possible via LED.

Webcode:
web150099

Online information
at www.pilz.com

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