MENSCH UND AUTOMATION

PILZ
THE SPIRIT OF SAFETY

The magazine for customers of Pilz GmbH & Co. KG Issue 1/2017

Protection of the highest calibre

Machinery and automated guided vehicles can be monitored flexibly and safely by laser scanners. Functional safeguarding of stationary and mobile applications can therefore be achieved highly efficiently. The safety laser scanner PSENscan from Pilz offers productive area monitoring – including in series!

Laser scanners have already been in use in the industrial environment for many years. The principle: a laser emits a light pulse which is reflected if it encounters an object. This reflection is detected in the laser scanner. The distance to an object is determined by measuring the time difference between the light pulse being emitted and received back. In order to detect objects in different directions, the laser beam is cast via a rotating mirror.

For laser scanners to be used in a functionally safe environment, action needs to be taken to prevent dangerous failure of the device. To assure this, the electronics of the safety laser scanner PSENscan from Pilz permanently monitor the correct functioning of the device. The duplicate electronics circuits, in other words with built-in redundancy, also constantly monitor each other.

Dust-resistant laser optics

Wherever machinery is in operation it is common to encounter conditions that are prone to high dust loads. As well as its harmful effect on equipment in general, dust presents an especially big challenge to optical systems because individual dust particles reflect light in the same way that objects and humans do, and can thus prompt detection errors. The safety laser scanner PSENscan was therefore not only designed to protection class IP65; the entire structure of the device was actually optimised so that detection errors caused by dust particles are avoided.

The software tool PSENscan Configurator is used to configure PSENscan. To that end, PSENscan is connected to the configuration computer via the Ethernet port. PSENscan Configurator can then be used to create safety and warning zones as well as perform all other device settings. The scanner uses a teach-in mode to detect solid obstacles in its surroundings, which can then be blanked out of the monitoring zones in advance. Otherwise the laser scanner would permanently detect objects in the danger zone and shut the machine down.

Continued on page 2

Editorial

Dear Readers,

Automation solutions? – Of course! We need them. But when we talk of integrated industry, there is still so much more potential to be tapped. In the age of Industrie 4.0, products will continue to connect with the manufacturer even after their delivery, and will be a source of valuable data. That will enable companies to develop additional Internet-based services and also conquer markets beyond the classic boundaries of their industry. The greatest added value potential for digitalisation resides in the development of entirely new business models and accessing markets for them. That is the core idea of this year's headline theme at the HANNOVER MESSE: "Integrated Industry – Creating Value".
And what about humans? – They will remain the crucial factor in corporate success. They will increasingly fill the role of problem-solver, decision-maker and innovator in the smart factory. That is why industry needs training measures that will prepare specialists for the new world of work 4.0. That, too, is part of value creation if we are to produce joined-up solutions. "Mensch & Automation": in this magazine, as in everything we do, we always keep sight of the human dimension. Find out more in this edition and at the HANNOVER MESSE from 24 to 28 April.

Best regards,

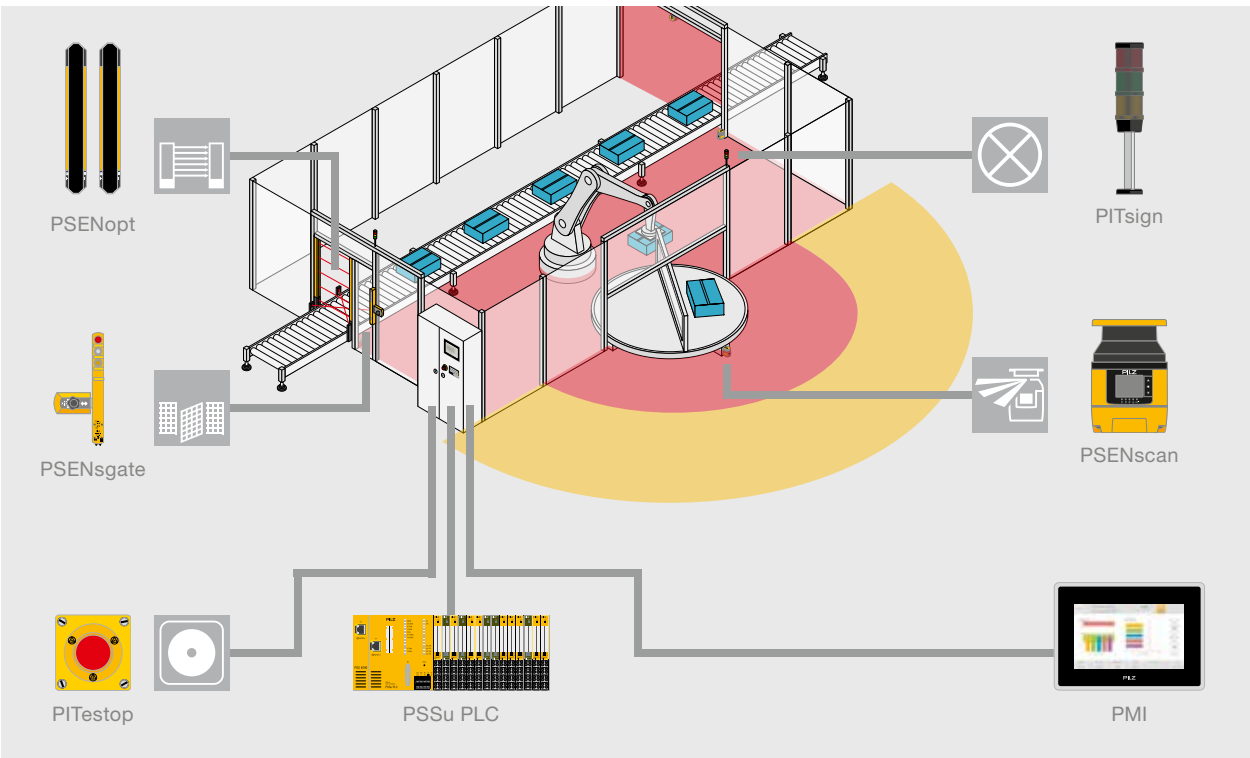
Dr. Jochen Köckler,
Member of the Managing Board of Deutsche Messe AG

360° Continued from page 1

To minimise downtimes, the entire configuration is stored on a removable memory module. If equipment needs replacing, the new scanner can be fitted with the existing memory module. No repeat configuration work is required.

Productive area monitoring – including in series

To increase productivity, up to three separate zones can be monitored simultaneously and up to 70 selectable configurations can be set up.
Series connection of up to four scanners in accordance with the master-slave principle means that you can significantly reduce your cabling and setup costs and requirements.
PSENscan has a wide opening angle of 275°. Applications where several contiguous sides of a machine or automated guided vehicle (AGV) need to be monitored can now be realised involving fewer devices, compared to a 180° scanner.



With its many years of experience in optoelectronic sensors, Pilz is an expert point of contact for safety laser scanners. From sensor technology to drive technology – with its full portfolio Pilz can offer users a complete, one-stop solution.

The device shows status information or error messages, such as a prompt to perform cleaning, on the integrated display. If there are people or objects in the warning or safety zone, this is indicated on the display by means of an alert highlighted in colour, making it easy to spot even from some distance.
To allow the scanner to be used flexibly in various situations, different zonal configurations can be stored. This allows differently sized safety and warning zones to be defined for set-up and productive operation, for example. It can equally make sense to adapt the zones to the workpiece currently needing to be machined. Specifically for automated guided vehicles, this approach can be used to safeguard travel at different speeds or cornering with different zonal configurations.

Diverse application scenarios

The big strength of PSENscan is its versatility. The range of applications extends from stationary area monitoring, through automated guided vehicles, all the way to human-robot collaboration (HRC). Above all, protection against encroachment behind the protected field has gained increasing significance in recent years. It is often not enough to safeguard merely the access area to danger zones such as a robot cell (passage control). The space behind it also needs to be monitored because a machine restart needs to be prevented for as long as persons are present in the danger zone. In contrast to key transfer systems, operation can be resumed seamlessly once the danger zone has been vacated, markedly reducing downtime. Depending on the hazard assessment, enclosures can be wholly or partially omitted in many applications; this for example permits rapid changing of the material and straightforward maintenance.
With a range of 5.5 m for the safety zone, even large areas can be covered with one device. The warning zone of up to 20 m also allows an appropriate reaction as soon as someone approaches the safety zone. A person can for example be warned in plenty of time by means of an acoustic signal before the machine is brought to a potentially costly standstill.

Safety and automation

As well as out-and-out safeguarding, the safety laser scanner PSENscan can help promote productivity. The scanner's current measurement data can be called up over an Ethernet interface for automation purposes. The measurement data can for instance be used in AGV applications to avoid persons or recognise objects from their contours.
PSENscan is the easy and reliable way to safeguard machinery and mobile applications. The free design of safety and warning zones, ease of configuration and, last but not least, the compact dimensions permit diverse application scenarios. The scope for storing several configurations also permits flexible adjustments to the machine during operation. PSENscan thus directly helps to minimise downtimes and increase system productivity.

Webcode: web181395

Online information at www.pilz.com

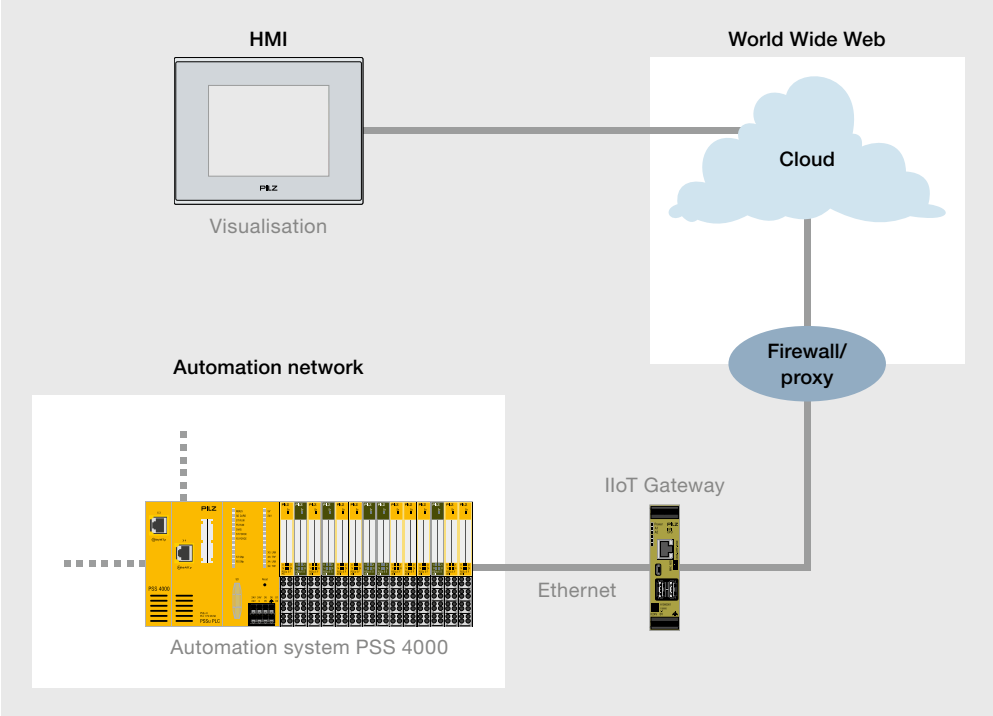
Complete solution with controller and sensor technology

With safety-related equipment on machinery it's not just the individual components that matter but the way in which they interact. In this respect, complete solutions with totally compatible components comprising safe sensor and control technology offer high potential savings.
Corresponding sensors and evaluation devices from a single manufacturer operate with compatible interfaces between the components. The user has no need to check data sheets or observe complex tests in order to ensure that the selected components interact smoothly in practice. A package of individual Pilz components spanning the areas of sensor, control and drive technology can be configured for every automation requirement.
The comprehensive product range covers the whole spectrum of safety requirements for monitoring areas and spaces.

The way to the cloud

In the shape of Industrial PI, Pilz provides a gateway for industrial Internet environments – Industrial PI makes it straightforward for users to manage digital data exchanges.

Industrial PI



To realise the smart factory, the relevant data needs to be available in digital form. The Fourth Industrial Revolution – or the "Internet of Things" – will be the next step. The goal is the smart factory, which can adapt readily to flexible processes, changing production conditions and individual batch sizes.

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. So digital data and its efficient exchange will in future define the production process and represent the actual value in the process chain. Not only will the level of integration rise; it will actually become the benchmark for progress in productivity.

The IIoT gateway Industrial PI supports businesses with realising their smart factory. As a gateway for the Industrial Internet of Things (IIoT), Industrial PI collects data in the immediate vicinity of plant and machinery, evaluates it and processes it. This gives users a permanent overview of their plant and machinery, wherever they are. Industrial PI connects the Internet of Things in the industrial environment to cloud services. It thus represents an easy-to-use solution to the implementation of Industrie 4.0 concepts.

Industrial PI is based on Raspberry Pi, which will be familiar from private domestic use, but it is equipped with a rugged housing and robust mechanics to meet the requirements of high-availability industrial automation engineering. The compute module contains the processor BCM2835 with 700 MHz and 500 MB RAM from Broadcom as well as a 4 GB eMMC flash memory. Industrial PI is protected against interference in accordance with EN 61131-2 and can be used at temperatures from -40 to +50 °C. As an IIoT gateway, Industrial PI can easily be incorporated into existing system architectures using Pilz communication modules. They merely need be connected to the gateway via a connector.

The Raspberry Pi can look back on impressive progress since its launch at the start of 2012. Over 12 million of these small, low-cost single-board computers have already been sold. The Raspberry Pi was developed by the British foundation of the same name. The basic idea was to offer a low-cost, simple-structure PC.

The development of the Raspberry Pi has earned it several prizes and awards. The bulk of the Raspberry Pi's operating scenarios are as media centres in the home, but Raspberry Pi can also increasingly be found in test environments and labs, as well as in industry.

Automation without any compromises

No compromises in automation: under the motto "We automate. Safely." Pilz will be presenting industry solutions, product innovations and services for complete automation solutions at this year's HANNOVER MESSE from 24 to 28 April 2017.

How can we safely implement genuine human-robot collaboration (HRC)? Humans and robots work together safely on the Pilz show stand without the need for guards. Pilz will be exhibiting an HRC application, which is safeguarded in accordance with the principle of power and force limiting.

Distributed plants? – Maintain an overview!

How can design engineers and users maintain an overview on modular and distributed plant and machinery? The model of a smart factory shows visitors how individualised products can be manufactured in a way that is flexible, cost efficient and user friendly. All the products are from Pilz, from the sensor and drive through to the controller. The smart factory is composed of three modules in a network, manufacturing personalised products in an intelligent assembly line – "your" personal business card holder, batch size: 1.

Marketplace for innovations

In Hannover this year Pilz will again be presenting a series of innovations from the fields of sensor, control and drive technology, along with the appropriate diagnostic and visualisation systems and software. For automation on machinery it's not just the individual components that matter, but also the way in which they interact: complete solutions with precision-coordinated components offer high potential for efficient processes.

Partner country of HANNOVER MESSE 2017 is Poland. Pilz supports its customers in this partner country via its own subsidiary in Poland and is a partner for safe automation in the Polish market.

Pilz is exhibiting in Hall 9, Stand D 17.
Further information at:
www.pilz.com/de-DE/hannover-messe

Webcode:
web180702

Online information
at www.pilz.com

In brief ...

components
SPECIAL TRADE FAIR BY INTERPACK

Pilz at interpack 2017

Pilz is exhibiting at the COMPONENTS SPECIAL TRADE FAIR BY INTERPACK 2017 in Düsseldorf. Visitors will be able to inspect flexible and economic solutions for packaging machines as well as services relating to the production process. With the help of a smart factory demonstrator at interpack 2017, Pilz will be showing how personalised products, too, can be manufactured efficiently and flexibly.

Whether you need machines with an elementary function range or interlinked plant and machinery: Pilz always offers manufacturers and operators the complete solution for safety and automation. Businesses benefit from its many years of experience in dealing with the requirements and production processes of the packaging sector.

Hall 18, Stand 18B16
www.packaging-components.de

PITestop active draws crowds at SPS IPC Drives

Successful start for the new activatable E-STOP PITestop active: visitors to SPS IPC Drives voted the product into second place in the "Standard Components & Sensor Technology" category at the "Automation Award 2016". With PITestop active, Pilz has a new range of E-STOP pushbuttons that can be activated electrically. They indicate by illumination whether or not they are active. So they ensure greater flexibility and modularisation, completely in the spirit of Industrie 4.0. The Automation Award is among the most prestigious accolades in the automation industry and is presented at the SPS IPC Drives show in Nuremberg. Exhibitors at the show can enter innovative products. A jury drawing members from the worlds of science, the trade associations VDMA and ZVEI as well as the editorial team of "elektro AUTOMATION" nominates five products in each of the categories "Control Technology & System Solutions" and "Standard Components & Sensor Technology". Visitors to the show choose their two favourites from these "top 5 products" lists.

Inside Recertification as CMSE®

Refresh your knowledge, gain a competitive edge

Particularly in the field of machinery safety, it is essential to be prepared to continue learning on an ongoing basis and to keep your knowledge up to date.

That's why recertification is a fixed component of the CMSE® qualification – Certified Machinery Safety Expert: once a certificate has been obtained, after four years experts can extend it for another four years. So anyone who successfully passed the CMSE® examination in 2013 or earlier should attend a recertification seminar in 2017.

In these one-day seminars delegates will learn about developments in the relevant laws and standards, get to grips with current safety and technology trends and refresh their knowledge of risk assessment and functional safety.

Anyone interested can find further information on recertification at www.cmse.com.

Inside Visualisation solution PASvisu now with OPC UA interface

Perfect team

Pilz is extending its web-based visualisation solution PASvisu: from the new version 1.3, an OPC UA interface enables connection to the small controllers PNOZmulti and other control systems.

Automation projects can easily be configured and optimally visualised with the web-based visualisation software PASvisu. This enables users to obtain a comprehensive overview of the plant, both locally and via remote access: displayed in a visually sophisticated way using a wide range of style sheets. Other hallmarks of the web-based software solution PASvisu are its open, platform-independent concept. Thanks to an OPC UA server connection, it can fundamentally be used for all controllers used on plant, such as the configurable control systems PNOZmulti. Controller and visualisation software are linked and all variables are taken from the controller.

With its visualisation solution PASvisu, Pilz is committed to a particularly close relationship between control and visualisation system. The more the tool is rooted in the plant or machine, the more information the system can give the user and take in itself. This provides benefits from engineering and runtime through to maintenance: automation projects can be implemented more quickly because there is no need to enter and assign variables manually.

With the next version 1.4 of the visualisation software PASvisu, users will have access to the full range of software functions including the diagnostic option thanks to a direct connection to PNOZmulti.

The perfect team for your automation projects: the web-based visualisation software PASvisu in conjunction with the small controllers PNOZmulti with convenient presentation on the visualisation panel PMIvisu.

Webcode: web150430

Online information at www.pilz.com

One-stop solution for comprehensive safety

Machine safety and productivity are the priorities for the Italian packaging machine manufacturer Senzani Brevetti. For one Spanish customer, the Italian company therefore used a complete automation solution from Pilz to strike an optimum balance between safety and productivity.

In 1953 Iro Senzani unveiled the world's first prototype of a spaghetti cutting machine. The Italian company has steadily widened its portfolio, always placing the focus on delivering innovative solutions for its customers. Senzani also came up with a custom solution for three filling lines for a major Spanish customer in the cleaning products industry. Each of the three filling lines comprises four separate packaging modules: aligning, filling and sealing, labelling and boxing, then finally palletising.

The Italian company brought the automation expert and service provider Pilz on board to realise the automation. For the three filling lines, Senzani opted for a complete solution from Pilz comprising controllers, actuators and sensors. Because it was important for Senzani to be able to supply its end customer with a tested, reliable and safe automation solution for its machinery, Pilz also took charge of the validation stage.

In the machines, the configurable control systems

Over and above the control technology, the complete solution also comprises safe sensor technology from Pilz – illustrated above, the safety gate system PSENslock – which monitors the safety gates on the Senzani machine.

PNOZmulti 2 take charge of the safe management of the E-STOP pushbuttons and all door sensors, as well as of the operating mode selector switches and enabling devices. With PNOZmulti 2 maximum flexibility is guaranteed because safety functions can easily be extended. In the case of Senzani, these include functions such as speed monitoring: the motion sequences are controlled safely by the motion monitoring modules of the configurable control system. The use of motion monitoring in the packaging machinery has not only made it possible to increase productivity, but also to accomplish safe, rapid and simple changes of format. Commissioning and diagnostics could also be simplified: with the help of the software tool PNOZmulti Configurator, the Senzani machines display the program's cyclic redundancy check (CRC), for example. The CRC ensures the project is unambiguous. This is displayed during the set-up mode together with the project name and the creation date. The status of the safety functions can be identified by means of online diagnostics. PNOZmulti 2 communicates with the higher-level operational control via a PROFIBUS module.

Sensor technology for safe packaging

Over and above the control technology, the complete solution also comprises safe sensor technology that monitors the safety gates on the machine. The filling lines incorporate on the one hand the contactless, coded safety switches PSENcode that perform both specific and general position monitoring, and on the other hand the safety gate system PSENslock. Both guarantee safety up to the highest category PL e in accordance with EN ISO 13849-1 and EN IEC 62061. Thanks to RFID transponder technology, the coded safety switches offer a very high standard of manipulation protection with compact dimensions and are an alternative to the mechanical technology formerly used. PSENslock can be installed individually or in series.

Tested safety delivers more value

The Italian packaging machine manufacturer is especially keen for the project planning and engineering of the plant to meet the highest possible standards. As Senzani knows, machine operators need absolute certainty that their safety systems are designed to meet all safety requirements and comply with national and international standards.

Because machinery standards are becoming ever more complex, validation plays a key role in safety. It is performed during the final phase of the development process and only after the risk assessment. Pilz took charge of validation of the entire machinery on behalf of Senzani. This approach gives the machine user the reassurance that their machine is fully compliant with the current safety standards. Because machine manufacturers such as Senzani know that complete one-stop automation solutions, services included, are beneficial if they aim to offer their customers added value.

With the help of the PNOZmulti Configurator, the software tool of the configurable control systems PNOZmulti, the Senzani machines display the program's cyclic redundancy check (CRC), for example.

3 minutes with ...

... Christian Erles

Vice President Sales International

Mr. Erles, you have been the new Head of International Sales since February. What is your focus?

Everything we do is focused on the customer. So at Pilz, we've raised the importance of the Regional Managers' role and also of the Business Development area. That's important not just as a means of accessing new areas of business, but also so that we can integrate customer requirements into our products even more effectively. Our subsidiaries in particular play a key role in this because they are especially close to the customer and are best placed to know their needs and requirements.

Be honest: how important an issue for the market is Industrie 4.0 really?

Particularly in Europe, the issue of Industrie 4.0 is a very important one, and rightly so. I'm convinced it will bring success to innovative companies, on an international scale. But especially in Europe, companies would be well advised to prepare their response promptly and define standards.

I believe the challenges lie in the sphere of safe data exchange, where security is the watchword. Blending safety and security presents a huge opportunity for Pilz, because that is where our customers need experienced partners who can steer them through implementation. Thanks to its experience in service and consulting, Pilz is very well positioned. In that respect, we at Pilz can and want to take on a defining role with this issue.

Where do you think German industry stands in international terms?

German industry has the strongest export focus worldwide. That is proof of the prominent status that our industry enjoys worldwide. To succeed, you need to be determined to continue developing. That's undoubtedly a hallmark of Pilz and other German companies.

What does 2017 hold in store? How are the markets developing?

It's currently becoming very clear that political stability and economic development are closely related. Uncertainty fuelled by countries such as Turkey or by the American region also impacts the propensity to invest. Reliability is of inestimable value in industry and trade.

That being the case, I am certain that Europe will continue to make good progress. China will recover, and depending on what direction America takes may fill a vacuum.

In brief ...

Distinction for Pilz as world market leader

Many companies claim to be world market leaders. But only few can supply the proof – among them, Pilz: the company is currently listed as GLOBAL MARKET LEADER CHAMPION 2017 in the Global Market Leader index compiled by the University of St. Gallen and the Academy of German World Market Leaders, under the "Electronics & Electrical Engineering" industry in the "Safety and Control Engineering for Industrial Processes" segment.

The HBM School for Entrepreneurs at the University of St. Gallen has devised a global market leader index in partnership with the Academy of German World Market Leaders (ADWM). This index researches and presents the actual world market leaders in Germany, Austria and Switzerland. The initiators follow an objective and transparent selection process, guaranteeing that all selection criteria and calculated values are disclosed and made accessible.

France's Secretary of State on Industrie 4.0 fact-finding visit to Pilz

French Secretary of State for Industry, Christophe Sirugue, paid a visit to Pilz in February. As well as sharing information on German projects and solutions connected with Industrie 4.0, the delegation's visit had the purpose of implementing German-French cooperation on Industrie 4.0.

In her discussions with the members of the delegation Renate Pilz, Chair of the Board of Pilz, stressed how important collaboration between the two countries was for the success of Industrie 4.0 in Europe: "The visit shows Europe is heading in the right direction. Together, we can shape the future."

Passed: certificates for Functional Safety Engineer – Railway

Railway engineering is an industry where safety is especially critical. Automation solutions from Pilz are therefore used on and by railways. So that we can provide customers with expert advice, eight experts from Pilz have now taken and passed the examination run by TÜV Süd to qualify as "Functional Safety Engineer – Railway".

The experts from Belgium, Germany, Italy, the Netherlands and Poland now have firm proof of their specialist knowledge, enabling them to take on responsible roles at crucial points in the safety lifecycle of automation solutions in railway engineering.

Inside Complete package for validation: force and pressure measurement system PROBms

High-performance, safe HRC

For human-robot collaborations (HRC), Technical Specification ISO/TS 15066 prescribes measurement of the force and pressure of robot movements. Because whenever humans and machinery share the same working space, collisions may well occur but injuries to humans must be excluded. With the new force and pressure measurement system PROBms Pilz provides a complete package for validation.

The technical specification ISO/TS 15066 provides limit values for each part of the body in the event of a collision between man and machine. If the application remains within these limits during contact between man and robot, it conforms to the standard.

For the necessary measurements, Pilz can now supply a complete set to increase the productivity and (with an eye to safety) also the reliability of HRC applications thanks to permanently exact measurements. The basis is a measuring system that is kept permanently up to date by a comprehensive service package, and assures high availability.

The collision measuring device is part of a complete set for the validation of HRC applications in accordance with ISO/TS 15066. As well as the measuring instrument proper, it includes the necessary pressure indicating films, the scanner, nine springs with different spring force constants to recreate the various body regions, plus the software for operating the measuring instrument and logging the measurements. The set is rounded off by a one-day product training course and a comprehensive after sales package with servicing, calibration and regular software updates.

Force and pressure measurement system PROBms

The force and pressure measurement system PROBms is available for hire from Pilz internationally. This arrangement ensures the user always has a functioning, technically up-to-date measuring system. They can thus always independently perform the new measurements that are needed whenever an HRC process is modified. PROBms is suitable for all HRC applications to ISO/TS 15066 where humans and robots share the same working space. Those include pick-&-place applications in the automotive and electrical industry, for instance.

Webcode: web10980

Online information at www.pilz.com

Profile Portrait of Pilz Poland subsidiary

Experts in demand worldwide

Poland's economy has been developing both rapidly and reliably for many years. The country is now the sixth-largest economic force in the European Union. Extensive investment in the transport infrastructure and public-sector construction projects offer opportunities for companies – among them Pilz. Poland is this year's partner country at the HANNOVER MESSE.

Pilz established its own subsidiary in Poland back in 2007, just three years after the country joined the EU. Its employee total has since grown to 30 and Pilz can provide support for its customers both from the head office in Warsaw and from regional offices in Gliwice and Poznan.

"We have built up a strong team of experts that enables us to handle both certification tasks and complex engineering projects," explains Managing Director Dariusz Kowalski by way of describing its progress. The majority of customers are from the automotive sector. For the most part they are tier 1 suppliers of the big car manufacturers. Other important sectors are the food and tobacco industries. "We have been registering strong growth in the rail industry for some years," adds Kowalski. He believes this trend will continue, because the Polish government is planning a major expansion to the railway infrastructure in Poland, with EU support.

Its expertise in railway engineering is one reason why Pilz Poland is a valued member of the Pilz Group; another of its strengths is in services. "We successfully carry out service projects on behalf of Pilz all over the world, in such countries as Bahrain, Saudi Arabia, Canada, Brazil, India, China or Thailand. For example, we offer the qualification as CMSE® – Certified Machinery Safety Expert all over the world," reports the Polish MD.

In Poland, Pilz ranks among the leading companies for safe automation engineering. "Our USP is that we can offer a complete range of products and services of unbeatable quality." Pilz can also draw on comprehensive knowledge of the relevant standards. Pilz is a member of the PKN, the Polish Standardisation

Board for machinery safety. "That role enables us not only to incorporate our knowledge from a great many customer projects into the new standards, it also gives us advance knowledge of upcoming changes to the standards and a head start in applying them in practice. We can then modify our product range early on. As a result, our customers have the reassurance of always getting the best, up-to-date support." In Poland, too, the big industry trends include the topics HRC and Industrie 4.0. Kowalski believes Pilz Poland is well equipped: "While the topic of robotics is increasingly entering the implementation phase, Industrie 4.0 is still a trend. In both cases, we are ready to take up the challenge!"

Safety and Security – two sides of the same coin

In the future, safety needs to both guarantee protection for humans and machinery, and also maintain the necessary degree of flexibility and availability in the smart factory. That calls for a holistic approach to safety & security.

Digital data and its efficient exchange will define the production process of the future. If all communication is decentralised, the demand for secure communication will rise. That encompasses aspects of machinery safety on the one hand, and requirements such as data and IT security on the other.

The term safety denotes the functional safety of machinery or, put another way, the protection of people and the environment against threats that can proceed from machinery. One option for the worst case is simply to interrupt the energy supply straight away and bring the machine to a hard stop. The traditional way of providing scope for this is by means of special safety wiring and components such as safety relays. Because this approach is very much hardware-based and therefore static, it is not particularly suitable for intelligent manufacturing processes where plant layouts continually need to be changed.

The path to dynamic safety

An alternative is offered by dynamic safety concepts based on an integrated view of changing automation processes and functional safety requirements. This changes the view of safety itself; it is regarded less as a hardware characteristic and more as a cross-device function. But the dynamic approach can only be implemented efficiently if functional safety is built into automation projects from the moment they are planned.

Security concerns the protection of a plant or machine from unauthorised access from outside as well as the protection of sensitive data from corruption, loss and unauthorised access from within. This includes explicit attacks as well as unintentional security incidents.

The background situation for security is that unlike functional safety, security mechanisms need to adapt continually to new threats, for instance by taking ad hoc updates to afford protection against new viruses, worms, Trojans and the like.

In order to respond flexibly to the prevailing threat scenario, there must also be a comprehensive security strategy comprising multiple layers to underpin the protection of safety applications: the core comprises the automation components. This is followed by the network via which these components can communicate with other networks or with an ERP (enterprise resource planning) system, for example. The outermost layer represents the factory, which is shielded from the outside world by a special firewall concept, which creates a so-called demilitarised zone.

Confidentiality versus availability

The demands that the spheres of IT and automation place on security vary considerably. While the confidentiality of information enjoys top priority in the office environment, in the production sphere data availability comes top of the list because this is a key prerequisite for smooth production processes. An international standard (IEC 62443) designed to bring both security worlds together is currently being drawn up.

For networking, the recipe for success is "defence in depth". The "zones and conduits" security model is already defined in the standard IEC 62443. It envisages dividing an automation network up into different zones in which devices are allowed to communicate with each other. Exchanges of data with devices in other zones are only possible via a single conduit that is guarded by a secure router or a firewall and blocks all irrelevant information.

All-round protection for applications

Another protective measure for safety applications involves arming the safety systems against cyber attacks. The communication data in question has already been subject to multiple safety checks upon transmission and an assortment of methods are used so that manipulation attempts can be identified far sooner by the safe end devices than with other methods of communication. But that alone is not enough. Pilz therefore also continues to work on the security aspect of its products. Aspects such as threat scenarios, strengths and weaknesses of protocols or encryption methods are taken into consideration from the outset.

But even the best security measures are worthless if they are not put into practice or – worse still – are deliberately defeated because they take up too much time or due to a lack of understanding and ignorance. So technical measures alone do not suffice – they must be backed up by organisational measures underpinned by training.

For implementation, many processes and experiences from the safety sphere are directly applicable to the security sphere. The field of safety is already characterised by considerable security of investment and legal certainty. That is partly due to the need to comply with norms and standards. Terms such as Safety Integrity Level (SIL) are clearly defined worldwide, and standard classification into hazard classes and risk estimations is possible. But it is becoming increasingly important to consider the needs of the user and limit complexity from the very outset when developing solutions. Simplicity means (operator) safety.

Webcode: web150609

Online information at www.pilz.com

Apropos ...

With Mat P. on his automation tour

Whether for applications involving packaging, automotive, transport technology or metalworking ... – Mathias P. is the expert who's on the road all over the world for Pilz with automation solutions. His wife often asks him about his trips ...

▸ Mat, tell me, that PNOZmulti, a small controller, you find it in just about every sector, don't you? How versatile is that?

You're absolutely right: in wood processing and in the packaging industry, or in sheet metal working like at Salzgitter Mannesmann Grobblech in Mülheim. We carried out a retrofit there on a huge plant for processing heavy plates, and also did a thorough safety assessment of the plant.

▸ Aha, retrofit. That can't have been easy, bringing "old" panel systems up to scratch?

Well, yes and no. Our solution turned out to be both efficient and simple. We also made sure it ultimately satisfied all the requirements of the standard EN ISO 13849 right up to the essential second-highest safety level. Our PNOZ is practically a "central safety manager": together with the PDP67 modules in the periphery it monitors all the safety-relevant signals from the E-STOP pushbuttons, safety gate systems and enabling switches.

▸ And what exactly does this "fountain of youth" bring Mannesmann?

The plant is now much safer without productivity being restricted. And because PNOZmulti is open, all the key data can now be transferred and evaluated quickly. It's now much, much simpler and quicker to locate errors and detect what has caused them.

▸ I wish getting new-for-old was always so straightforward!

Configurable control systems PNOZmulti 2: basis for large-scale projects

Larger projects can be implemented even more easily with the configurable control system PNOZmulti 2: now up to twelve safe expansion modules can be connected to the right-hand side of the base unit. The expansion modules allow more precise adaptation of the control structure to the application and therefore also cut the hardware costs.

In addition, there is a new output module with 14 semiconductor outputs for standard applications. This allows functions such as signal lamps or acoustic signals to be managed. It can also be used to transmit the safety controller signals to the operational control. Up to 1,054 logic connections are possible with the base unit PNOZ m B1 in the software tool PNOZmulti Configurator. So even large-scale projects can now be configured safely.

Webcode: web150500

Online information at www.pilz.com

Configurable compact controllers PNOZmulti Mini with POWERLINK

The fieldbus module PNOZ mmc12p PL is available as a new feature for the configurable compact controllers PNOZmulti Mini for connection to POWERLINK networks. Communication in real time with a higher-level POWERLINK master control system is now possible. More rapid diagnostics reduce downtimes and increase availability

PNOZmulti Mini can be connected to an array of other fieldbus systems, such as PROFIBUS-DP, DeviceNet, CANopen, CC-Link and EtherCAT. When expanded using the ETH communication module, PNOZmulti Mini also becomes a subscriber on Ethernet TCP/IP and Modbus. Thanks to easy configuration using the software tool PNOZmulti Configurator, it is straightforward to substitute different fieldbus systems without program changes because the CRC sum is preserved. Easy data exchange permits bidirectional signalling and control as well as comprehensive, user-defined diagnostics of the PNOZmulti system.

Webcode: web150501

Online information at www.pilz.com

New functions: safe speed monitor PNOZ s30

The speed monitor PNOZ s30 provides safe monitoring of standstill, speed and speed range, as well as of position, direction and shear pin breakage up to the highest category PL e/SIL CL 3. From version 3.0 an analogue output is now available, in addition to two safe relay contacts and six auxiliary contacts. The new analogue output passes on the safely measured speed to the controller as a proportional 0-20 or 4-20 mA signal. This allows direct use of the speed for process monitoring. No additional sensors are required for speed measurement.

Up to three safe functions such as operating stop, direction, speed range and speed monitor can be linked by AND and OR logic; AND and OR can also be combined. Users reduce error sources and save costs thanks to reduced wiring work.

Webcode: web150619

Webcode: web7992

Online information at www.pilz.com

Activatable E-STOP pushbutton PITestop active: smart and energy-efficient

With the family of electrically activated E-STOP pushbuttons PITestop, Pilz supports flexible, user-friendly solutions for machinery safety in the spirit of Industrie 4.0.

PITestop active indicates by means of a safely monitored light whether it is switched to active or passive. In the event of danger, this clearly shows which E-STOP brings which module to a halt. Its normative basis is the revised ISO 13850: for the first time it defines an “inactive” state. Users benefit from reduced energy costs, because it is now no longer necessary to keep the entire plant live in order to maintain the E-STOP functions.

PITestop active is available in a variety of types for panel or surface mounting on the machine. The surface-mounted versions are available with IP65 protection class and with M12 connector.

Webcode: web150777

Online information at www.pilz.com

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