

Measurement & Automation: High-Precision Pressure Measurement in CIP Processes

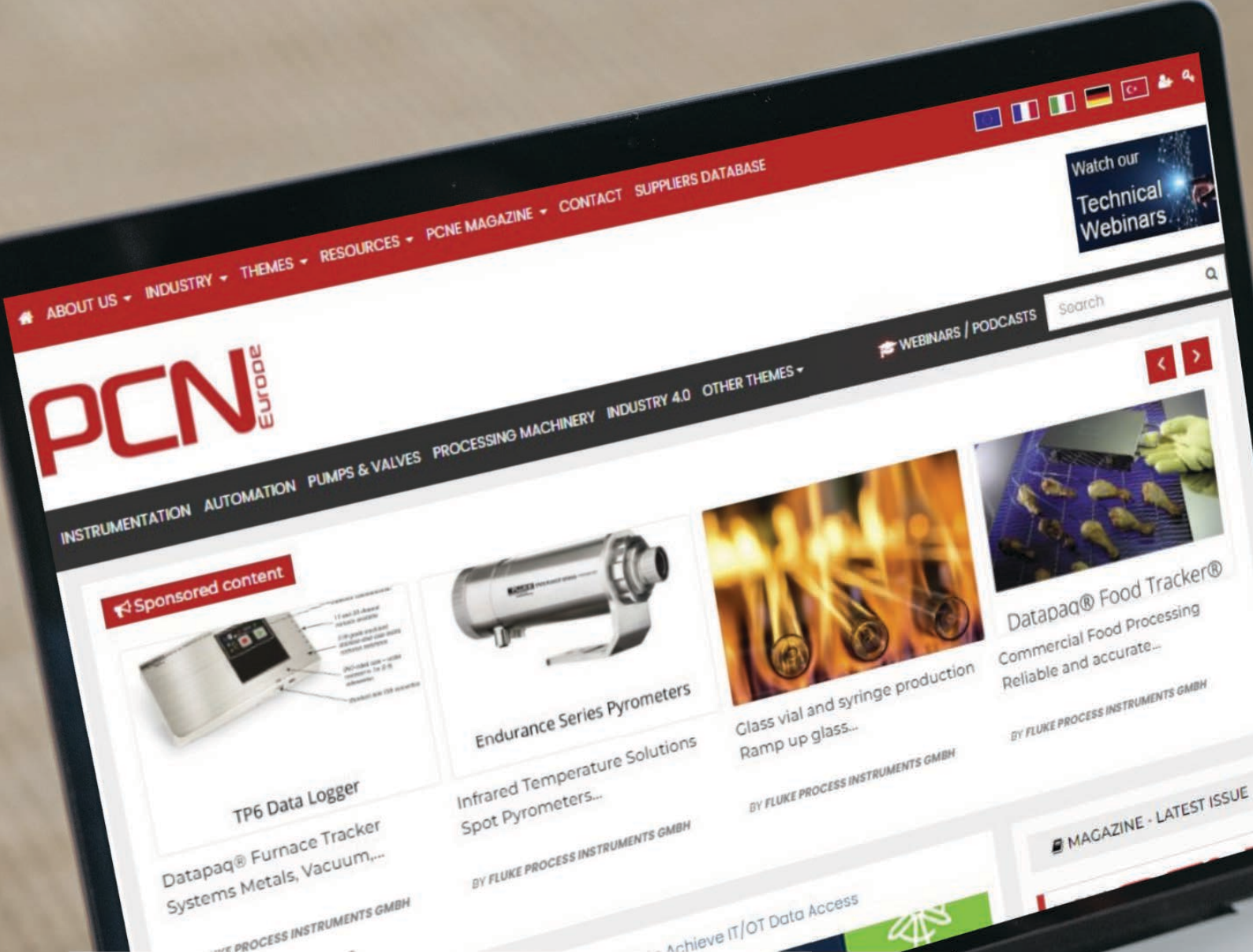
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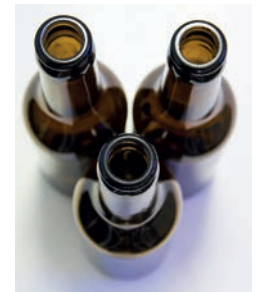


Kay Petermann
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Dear Reader,

Some weeks ago I was attending the press event of JUMO. Among other interesting products they introduced a fully automated brewery system in a compact skid design – entirely made of stainless steel – with an output of 100 litres of cold wort and an automated CIP (Cleaning in Place) function. The system was built together with Burkard und Gärtner (B+G), a specialist in plant planning and construction – and the company “Hunfelt Braeu” used the system to create and brew a special anniversary beer for the 75th JUMO anniversary.

The idea of a “mini brewery” arose because Sebastian Gärtner, one of the three brewers, is also one of the owners of B+G. It was therefore obvious to combine the know-how of JUMO with the expert knowledge of B+G and “Hunfelt Braeu”. Not only the compact system but also the product were very impressive. This is an example for a regional collaboration bringing together industrial expertise from different areas and combining them on the highest level. We wish all the best for at least the next 75 years.



Our editorial on page 10 describes a larger-scale measurement solution for automated cleaning in a brewery. We also show you how a new technology is used for time saving and higher efficiency with the online-analysis of metals in lithium manufacture on page 12.

Interesting news about Ethernet APL brings the editorial on page 16 in our focus “Digitalization for Process Industries”. It gives insights on how to adopt the technology and what are the first steps that should be taken to ensure success in practice.

I wish you an interesting read!

Editor of PCN Europe

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DIGITALIZATION IN PROCESS INDUSTRIES:

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The promise of a network in the field of process plants with Ethernet-APL as enabling technology causes users to develop high expectations. This article provides insights into how to adopt the technology and the first steps that they should be taking in order to ensure success in practice.

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Successful Fiscal Year 2022 for ystral

Ystral is a German specialist for mixing, dispersing and powder wetting machines and for process systems in a wide range of industries. The company has three subsidiaries in Singapore (since 2011), India (since 2013) and China (since 2018). The order intake of 52.2 million euros achieved in the fiscal year 2022 is divided approximately equally between ystral's home market of Germany, the rest of Europe and North America, as well as the Asian countries. With the increase of 13%, ystral was able to build on the strong growth of the previous year. "Against the background of a geopolitically and economically difficult environment, we are very satisfied with the course of the past fiscal year," says Karl Prem, Managing Director Operation & Finance at ystral. One of the most important developments for ystral in the past fiscal year was the start of cooperation with the Fraunhofer Research Institution for Battery Cell Production FFB in Münster / Germany. ystral supports the project Battery Cell Research Manufacturing ("Forschungsfertigung Batteriezelle") with a mixing and dispersing system in the "FFB PreFab" (currently under construction), which is intended for testing manufacturing processes as well as new recipes for battery cell production. The start of the test operation on the ystral system is scheduled for the end of this year.



First Pump Assembled in the New Netzsch Plant

With the assembly of the first pump at the new NETZSCH Campus in Waldkraiburg, a new era has begun for the global specialist in complex fluid management on January 9th. After almost two years of construction, the day finally arrived: The first pump was assembled at the NETZSCH Campus in Waldkraiburg and afterwards prepared for shipment. Unsurprisingly, it was a progressing cavity pump, as the manufacturer of various positive displacement pumps is a world leader in this technology. With the opening of assembly at the new location, the course was set for a successful corporate future: "Today is a milestone in the history of NETZSCH Pumps & Systems. With the opening of the assembly on our new campus in Waldkraiburg, we are getting closer to our goal of operating the most efficient positive displacement pump factory in the world", explained managing director Jens Heidkötter underlining the ambitious goals. The new NETZSCH Campus unites the three locations in Waldkraiburg. It thus makes a decisive contribution to the fact that various processes, such as logistics, can be made significantly more efficient.



Change of Management at Analytik Jena

A change is taking place at the top at Analytik Jena. Managing Director Ulrich Krauss has decided to assume other responsibilities outside of Analytik Jena. The Endress+Hauser Group therefore handed over the management of the subsidiary specializing in laboratory analysis to Oliver Klaeffling as of February 1, 2023. Ulrich Krauss joined the Analytik Jena management team in 2015 and took over as managing director in 2016. "We would like to express our thanks to Mr Krauss for his commitment, in particular leading and overseeing the extensive reorganization processes at Analytik Jena, which contributed to the success of the Endress+Hauser Group," said Matthias Altendorf, CEO of the Endress+Hauser Group. His successor, 53-year-old Oliver Klaeffling, studied industrial engineering at the Technical University of Berlin's school of technical chemistry. He has held various positions in Germany and the US for pharmaceutical company Merck since 2004. He was most recently head of the Merck Innovation Center in Darmstadt, Germany. "We are convinced that Mr Klaeffling will continue to grow and lead Analytik Jena into a solid future," emphasized Matthias Altendorf.



Change of Management at Bürkert Fluid Control Systems

Heribert Rohrbeck has been with Bürkert Fluid Control Systems for almost three decades – 18 years of them as CEO. He left at the end of 2022 and retired. His successor Georg Stawowy is already waiting in the wings and will be taking over leadership of Bürkert from April 2023 as CEO. The employees of fluidics specialist Bürkert Fluid Control Systems bid farewell to their long-term CEO Heribert Rohrbeck during a works council meeting at the beginning of December. His successor Georg Stawowy, member of the Board for Innovation and Technology at Lapp Holding AG in Stuttgart, was also introduced to the staff at this time. "Each person is the most important in their place" – these words sum up what Heribert Rohrbeck wants to leave his Bürkert team with.

It is an aspect that is close to his heart: the mutual appreciation and respect for the contribution of each and every individual. Besides taking on responsibility, holistic thinking and working as part of the special Bürkert culture play a significant role here – and, according to Rohrbeck, are essential to preserve: "It would be ideal to achieve the size of a global group while also maintaining the culture of a family-owned enterprise."



PORTABLE MULTI-GAS ANALYZER

With QAL1 certification for measuring SO₂



ENVEA's portable multi-gas analyzer MIR 9000P is now QAL1 certified for SO₂ according to EN 15267-4, with the lowest range of the market (0 - 143 mg/m³), for an AMS-P. The instrument has successfully passed the lab and field tests made by TUV Rheinland Energy GmbH and the report has

been approved by the certification committee. Following the usual process, the official QAL1 certificate will be issued in early 2023. In consequence, the MIR 9000P is QAL1 certified for a large range of parameters: CO, NO_x, N₂O, CO₂, O₂ and SO₂. The analyzer has been designed to meet the specific needs of on-site regulatory measurement providing superior mobility, robustness, accuracy and compliance. All this makes up for a unique gas emission monitor offering high productivity and low operational cost. It measures simultaneously 8 gases - NO_x, SO₂, CO, CO₂, CH₄, N₂O, O₂ and residual H₂O - and uses the non-dispersive infrared method (NDIR-GFC) with gas filter correlation. O₂ is measured by a built-in SRM paramagnetic sensor.

►► 63102 at www.pcne.eu

MULTI-CHANNEL CONTROL UNIT FOR GAS

Measurement of moisture in gas, liquids and trace oxygen



The new **Michell** Multi-Channel Control Unit (MCU) provides up to four independent measurement channels with any combination of moisture in gas, moisture in liquids or oxygen concentration. Installed indoors in a safe area, the MCU allows operators to monitor these crucial parameters from multiple hazardous area-installed analyzers. It is designed for use with any combination of the Michell Promet I.S. process moisture analyzer, the Liquidew I.S. moisture in liquids analyzer and Ntron Minox-i oxygen transmitter. The new MCU features up to four 2.8" color touch-screen LCDs with a clear, easy-to-use interface. This allows for set-up and control of dew point or trace moisture in gases or liquids, as well as oxygen measurement, directly from the control room. The unit displays moisture content in ppm, dew point, % O₂, ppmv O₂ plus analysis pressure. Alarm status and a choice of ISO or IGT#8 calculations are also displayed for each channel. The digital or analog outputs are user configurable. Promet I.S. and Liquidew I.S. are industrial hygrometer systems for measurement of high

pressure, process gases and vaporized liquids in natural gas production and processing, transmission pipeline monitoring, fiscal metering of gas, hydrogen production, storage and transportation as well as gas generation industries.

►► 63009 at www.pcne.eu

PRECISE AND FLEXIBLE INFRARED CAMERA

Providing high measuring accuracy and resolution



One model in the **InfraTec** portfolio of infrared cameras with cooled focal-plane array photon detectors is the ImageIR® 8300 hs, a high-speed infrared camera, which measures in the mid-infrared range. It combines an image format of (640 × 512) IR pixels with the exceptionally high

frame rate of 1,105 Hz and thus sets high standards. The results are thermographic images of excellent quality, even of extremely fast moving objects or highly dynamic thermal processes. The high-end thermography system from InfraTec is based on an innovative detector: T2SLS with HOT long-life technology, which allows high-speed thermography in full frame format and achieves an impressively high thermal resolution of 20 mK. Another special feature of the ImageIR® 8300 hs is the relatively large area of the individual detector elements, which are arranged in a grid (pixel pitch) of 25 µm. The sensitivity of the detector is therefore particularly high, which means that short integration times and high frame rates can also be used for measurement objects with low temperatures. Via an industrial 10 GigE interface the radiometric image data are transferred with loss-free intelligent real-time compression to a standard notebook for storage, control and analysis - without having to use internal memory.

►► 63430 at www.pcne.eu

SUBSEA PRESSURE TRANSMITTER

Gas and liquid measurement in submersible applications



Positek has launched a new pressure transmitter specifically aimed at gas and liquid pressure measurement in submerged instruments and equipment used in marine and offshore applica-

tions. With its protection rating of IP68 sealed to 10bar/IP69K. The new S401 series brings together a robust and durable 35 mm diameter, 316 stainless-steel housed construction and a high accuracy piezo resistive sensing element coupled with the latest ASIC circuitry. The pressure transmitter is available with gauge pressure measurement ranges set to customer requirements from 0.6 to 2000 bar and with a wide choice of high level radiometric voltage, current outputs. The S401 series has a specified range accuracy of less than 0.5% and a stated non-linearity of less than 0.15% of range. The transmitter is designed for use in temperatures from -40 to +125°C (compensated range -20 to +85°C) with temperature coefficients at less or equal to 0.15% for both offset and range. These specifications combine with a fast response time and generous burst and overpressure ratings plus exceptional shock and vibration characteristics to ensure precise and stable pressure measurement with an estimated life of more than 10 million pressure cycles. Installation flexibility is aided by a choice of 1/4" NPT or G1/4" threads for the wetted components and electrical interfacing is via a moulded cable.

►► 63112 at www.pcne.eu



TRANSMITTER FOR MULTIPLE SENSORS

Space-saving installation for up to 6 sensors per module



In numerous process-related tasks, many parameters must be recorded simultaneously in order to monitor and control the process. This can be achieved in a space-saving and cost-efficient manner

using a solution from **Knick**: With the new MSU4400-180 module for the Protos II 4400(X) transmitter, users can now connect up to three Memosens sensors simultaneously. And since the transmitter has space for two of these modules, a total of up to six sensors is possible. This means, an existing measuring point can be expanded without the need for an additional transmitter. Memosens sensors for the measured variables pH value, ORP, conductivity or oxygen concentration can be connected. The high-resolution graphic display of the Protos II provides the most important information about sensor condition, and maintenance requirements of all connected Memosens sensors at a glance. The sensor diagram allows the operator to monitor all relevant sensor data, such as zero-point, slope, impedances, operating time, wear, calibration interval, etc. Messages for maintenance or failure of a sensor, for example, are output in accordance with NE107. During measurement, the display can show the last 100 measured values. The logbook integrated in the transmitter additionally records at least 20,000 entries with time stamp, status, and messages.

▶▶ 63013 at www.pcne.eu

CHEMICALLY RESISTANT FLOW METERS

Oval gear meters for high pressures and low volumes



Titan Enterprises supplies high-pressure Oval Gear liquid flow measuring devices for oil and gas related processes where accurate measurement is critical. Unlike other types of flowmeter, measurement accuracy of Oval Gear flow meters improves as the liquid viscosity increases, from a nominal 1% of reading to around 0.1%

of reading at higher viscosities. The range of flowmeters include ATEX compliant IP67/NEMA 4 protection models, designs that can be pressure tested in-house up to 1200 bar, and devices that offer intrinsically safe options to be used in potentially explosive atmospheres. These flow meters offer excellent chemical resistance whilst maintaining high performance and 0.1% repeatability. Titan's proprietary oval gear design ensures these flow meters give reliable, high performance in high pressure applications. Titan's standard Oval Gear models used in additive injection are manufactured with options in materials compatible with the presence of strongly acidic or basic chemicals, such as 316 stainless steel, aluminium, and non-metallic PEEK, with pressure ratings from 10 bar to 950 bar (for custom-designed models). Benefiting from a compact, rugged design, Titan's Oval Gear flowmeters are proven to operate reliably even at high pressures and at temperatures up to 150°C, providing long-term performance with minimal maintenance.

▶▶ 63062 at www.pcne.eu



FREE DIGITAL SUBSCRIPTION

PORTABLE TURBIDIMETER

Mobile turbidity measurement with laboratory accuracy



With a few simple steps, results with the accuracy of laboratory instruments are now available using a portable solution. And in the lab, water samples with low and high turbidity ranges can be detected without dilutions. With

the new TB350 from **Lovibond**[®], users in drinking water applications, environmental analysis and laboratories become more flexible than ever. The everyday challenges of turbidity measurements, such as inaccuracies due to stray light, complicated handling and time-consuming calibration, are now eliminated. The TB350 is an advanced portable turbidimeter with brand new technology, unprecedented measuring range and unsurpassed accuracy. Multipath 90° BLAC[®] is the new, patented sensor technology. The special feature: Highest accuracy is guaranteed in the lowest turbidity range from 0.01 NTU and also maintains the outstanding precision level in the highest turbidity range up to 4,000 NTU. The recently developed optical system works with two ingeniously arranged 90° detectors and thus ensures a purely nephelometric measuring principle. During the turbidity measurement, two different path lengths of the incident light beam through the sample are cleverly exploited. Various particle sizes and shapes are thus detected with the highest measurement accuracy - even where the particle size distribution deviates from the calibration standard.

▶▶ 63113 at www.pcne.eu

CHEMISTRY FLOWMETER FOR LABORATORIES

For improved accuracy and reproducibility of reactions



For labs looking to improve accuracy, reproducibility, and yield from liquid phase chemical reactions - **TESTA** has developed the Chemistry flowmeter. Without accurate flow measurement, too much or too little chemical can be injected into a reaction. Also, if

the rate of addition of reagents is not constant this can also result in adverse outcomes, expensive reagent overuse, lower final product yield and safety issues. Designed to be fully compatible with most solvents, acids, and bases - the Chemistry flowmeter sets a new standard for continuous, non-invasive measurement of the flow rate of pumps being used to add liquid reagents to chemical reactions. Compact in size, and conveniently powered via a USB connection, the TESTA Analytical Chemistry flowmeter uses a thermal flow sensor that is extremely accurate, sensitive, and high-resolution. As the sensor is non-invasive it can operate over a wide dynamic range and has been demonstrated to be the perfect real-time flow measurement tool for monitoring both batch and flow chemistry reagent addition pumps. The Chemistry flowmeter uses a highly intuitive PC-based app for continuous recording, display and storage of the measured flow rates. The current flow rate is also displayed on the devices OLED Display, ensuring the accuracy and consistency of reagent addition is readily controlled.

▶▶ 63073 at www.pcne.eu

Technological Opportunities for Today's and Tomorrow's Industry

We spoke to Hubertus von Monschaw, Global Director HANNOVER MESSE at Deutsche Messe AG about HANNOVER MESSE 2023 in a challenging environment

PCN EUROPE: HANNOVER MESSE came back last year as a live event after a two-year pandemic break. What lessons did you learn from this come back and did it meet your expectations?

V. MONSCHAW: After such a long break with many restrictions on group gatherings and travel, it will take a long time for a large international trade fair like HANNOVER MESSE to return to pre-corona levels. Nevertheless, we are on the right track: at HANNOVER MESSE 2023, we expect around 4,000 exhibiting companies from all over the world. The pandemic and the war in Ukraine have completely changed global economic and political environments. Industry therefore faces many new challenges today, with energy shortages, supply chain disruptions, a shortage of skilled workers, and climate change at the top of the list. One key to solving these problems lies in the consistent use of technology; another is proper economic policy. HANNOVER MESSE

2023 focuses on both: Technologies for a networked and climate-neutral industry as well as discourse between industry, politics, science, and society.

PCN EUROPE: How do you evaluate the pertinence and efficiency of the digitalization of the products showcased as well as the use of your networking tool? Is it a strategy to be reconducted during the further events to come?

V. MONSCHAW: We staged a 100% digital HANNOVER MESSE in 2021 because a face-to-face event was not possible. We use the experience we gained to provide digital elements that complement the face-to-face trade fair. In 2023, for example, we offer live streaming from almost every stage at HANNOVER MESSE. In addition, visitors can take part virtually in the various guided tours and network virtually with exhibitors and other visitors. Networking tools are now standard at our trade fairs.



Hubertus von Monschaw, Global Director HANNOVER MESSE at Deutsche Messe AG

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PCN EUROPE: Can you tell us more about HM 2023 lead theme Industrial Transformation – Making the Difference, and the industry trends to be discussed?

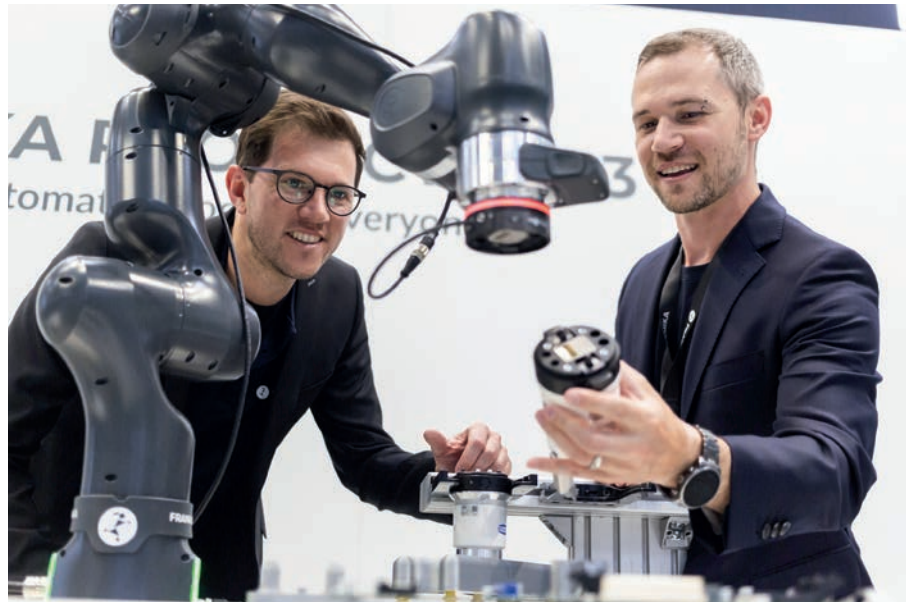
V. MONSCHAW: HANNOVER MESSE is the only event in the world where leading companies from the mechanical and electrical engineering sectors join those from the IT, software and energy branches to collectively present solutions for a climate-neutral industry.

From digitalizing and automating complex production processes to tapping hydrogen to operate entire production plants to using software to record and reduce carbon footprints, HANNOVER MESSE delivers a complete picture of the technological possibilities for the industry of today and tomorrow. HANNOVER MESSE showcases innovative solutions to many current challenges while spotlighting global megatrends.

For example, artificial intelligence (AI) plays an increasingly important role in industry. In addition to optimizing processes, the manufacturing industry increasingly relies on AI in simulation and product development. So-called generative AI will also find its way into industry. Systems such as ChatGPT or DALL-E can already provide support with text, programming and design. It is conceivable that AI will design machines in the future. On the subject of AI, HANNOVER MESSE offers a comprehensive range of visitor tours, forums and presentations of AI tools and use cases from exhibitors.

PCN EUROPE: In the times of energy shortages, climate change and supply chain problems, companies are eager to find solutions through technology. Can you tell us more about what is to come in regard with the solutions to be presented to answer these challenges?

V. MONSCHAW: Unregulated motors in pumps, fans, compressors and machines are still part of everyday life in many factories. Without intelligent control technology and the interaction of electrical engineering and IT, improvements in energy efficiency are almost impossible. In Hannover, providers of energy management solutions show smart energy monitoring systems that determine and op-



timize energy consumption at machine level and thus reduce the CO₂ emissions.

HANNOVER MESSE focuses on green hydrogen, too, because industry wants to free itself from its dependence on fossil energy. Germany's Ministry for Economic Affairs and Climate Protection describes hydrogen as a key energy source that is essential for the long-term success of the energy transition and for climate protection. But there are challenges, because producing green hydrogen is complex and expensive. In Hannover, more than 500 companies present hydrogen solutions for industry and experts explain and discuss issues such as availability, transportation and large-scale storage. For this reason, HANNOVER MESSE is the world's biggest and most important hydrogen platform.

However, these are only two examples. HANNOVER MESSE provides a comprehensive overview of all industry trends from technological, economic and sociological points of view.

PCN EUROPE: This year's partner country is Indonesia. What are they bringing to the event and how will they be represented?

V. MONSCHAW: Indonesia, which recorded economic growth of more than five percent in 2022, has reaped significant benefits from high commodity prices. By 2030, Indone-

sia aims to be one of the world's ten largest economies. The Indonesia Pavilion is located in Hall 2 at HANNOVER MESSE. The Indonesia-German Business Summit takes place on 17 April. In addition, Indonesia stages a program of conferences, seminars and matchmaking events.

PCN EUROPE: "Making Indonesia 4.0" is the country's motto for HM 2023. Do you expect many exhibitors from this economically dynamic part of the world? What technologies do you expect them to bring?

V. MONSCHAW: Indonesia wants to attract more labor-intensive manufacturing. Because of this, it will present itself at HANNOVER MESSE as a modern production location. Liberalized investment and labor laws have opened numerous sectors of the economy to foreign investors. In addition, new tax incentives direct funds into export production. Under the motto "Making Indonesia 4.0", more than 150 companies from Indonesia will participate in HANNOVER MESSE. In addition to "Making Indonesia 4.0", areas of emphasis include foreign investment and industrial parks, sustainability and energy transition, startups and innovation, and human capital.

►► 63438 at www.pcne.eu



High-Precision Pressure Measurement in CIP Processes

The basis for the CIP cleaning process is an optimized interaction of the factors mechanics, time and chemistry. Cleaning agents and rinsing solutions are applied to the surfaces of the plant components via a spray head integrated into the equipment. The movement of the spray head ensures that the cleaning solutions completely wet all surfaces and thus clean them.

Overall, a CIP system comprises concentrate tanks, user tanks, measuring and dosing technology, and a heat exchanger. One concentrate tank contains acid (e.g. 65% nitric acid), another contains caustic solution (e.g. 55% caustic soda solution). Both concentrates are adjusted to the concentration of the user solution (e.g. 2.5% for caustic soda) in so-called user tanks with water. The viscosity of a caustic solution increases with decreasing temperature - a property that can be a hindrance to the cleaning process, especially in winter. For this reason, the caustic tank is connected to a heat exchanger to maintain the temperature. Furthermore, the CIP system includes tanks with rinsing water and - depending on the application - one

each with disinfectant (e.g. peracetic acid), ultrapure water or the option of final steam sterilization.

The cleaning process is divided into several process steps in which various factors must be taken into account. These include the degree of contamination in the production plant and the manufactured product.

During CIP cleaning, the focus is on measuring conductivity and also pH. Depending on the application, inline pH electrodes may be installed in the process and must withstand CIP cleaning.

However, temperature, flow and pressure must also be closely monitored throughout the process to ensure optimal cleaning results.

ROLE OF THE "PRESSURE" PARAMETER

The correct pressure plays an important role in various CIP process steps. For example, pressure transmitters are used to monitor the cleaning circuit with regard to blockages and possible leaks. The feed pressure also determines effective cleaning. A control system analyzes the measured values and adjusts the pressure to the setpoint of the section to be cleaned, as required. In addition, pressure transmitters are often used for level monitoring in the CIP tanks.

HIGH REQUIREMENTS

The pressure measurement technology used must meet special requirements. The housings must be made of stainless steel and have a particularly smooth surface to prevent build-up. For example, JUMO generally uses 316 L stainless steel with a surface roughness $\leq 0.8 \mu\text{m}$ for sensors used in the food industry, and also resistant to aggressive cleaning agents. The design must meet hygienic requirements and allow easy cleaning.

In pressure measuring devices, the sensor and transmitter always form a unit. Piezoresistive sensors are predominantly used as pressure sensors. This makes it possible to cover the measuring ranges typical for the food industry very well. Standard devices are designed for use at media temperatures between -30 and $+120^\circ\text{C}$. For CIP (Cleaning in Place) systems and sterilizable systems, hygienic process connections are optionally available for media temperatures of up to 200°C .

Various solutions are available for the electrical connection, depending on the degree of protection required. To comply with protection class IP65, a cable socket to DIN EN 17 5301



In the beverage industry, "Cleaning in Place" (CIP) is one of the standard cleaning methods for production plants. Pressure measurement plays a special role in this process



is sufficient. To comply with protection class IP67, either a connection with a fixed connecting cable or an M12 round plug is used.

HIGH-PRECISION PRESSURE MEASUREMENT IN HYGIENIC AREAS

The JUMO TAROS S46 H pressure transmitter is an ideal partner for the food industry, CIP and SIP applications, sterilizers and autoclaves, and for all hygienic pressure measurement applications. Protection classes from IP65 up to IP69 allow use in all areas regardless of the ambient conditions. The use of FDA-compliant materials and hygienic process connections (Clamp, VARIVENT, JUMO PEKA) guarantees safety and good cleanability.

The factory-set measuring ranges for the JUMO TAROS S46 H are between 0 and 100 bar. An autoclavable version is offered for special applications. The medium temperature can be between $-40\text{ }^{\circ}\text{C}$ and $+125\text{ }^{\circ}\text{C}$. For a maximum of one hour per day, the medium temperature may even be $140\text{ }^{\circ}\text{C}$, which is ideal for CIP and SIP applications. The linearity and long-term stability are both very low at 0.1%. The overall accuracy at $20\text{ }^{\circ}\text{C}$ is a maximum of 0.25% of the measuring span. Zero correction can be easily performed with a magnet, for example after the autoclave process. In this way, the pressure transmitter provides reliable measured values even over a long period of time.

INTELLIGENTLY COMBINED - THE EVALUATION UNIT

The constantly increasing demands for more efficient and low-maintenance cleaning as well as the fulfillment of hygienic requirements and environmental standards make high process reliability and monitoring of the same essential. With the use of a multi-channel measuring instrument, all tasks of CIP cleaning are combined in one device.

The JUMO AQUIS touch S multi-channel measuring device is characterized by the fact that all the important parameters to be measured can be recorded with one device. For example, the JUMO AQUIS touch S has four analysis inputs that can be assigned to conductivity in the flow and pH value in the return in CIP cleaning. Additional analog inputs can be used, for example, for the fill levels of the stor-



age tanks, the turbidity of the return flow, and the flow rate. The multi-channel measuring device has numerous binary inputs and outputs with which it can, for example, control the flow rate via a frequency measurement, monitor limit values, take over PID controls and switch alarms. It is thus quite conceivable that the device could also take over the control of the valves for the individual cleaning stages depending on the measurement parameters.

The integrated calibration timers ensure smooth plant operation and reduce maintenance costs. Two wash timers are used for the regular cleaning of pH electrodes. Specific functions can be triggered recurrently at a pre-

settable interval. Wash timers can, for example, trigger binary outputs to switch on a cleaning process in the plant. Regular cleaning of the sensors ensures the highest possible measurement reliability. The calibration timer regularly reminds the operator to recalibrate sensors. Corresponding alarms and event list entries can be configured individually. A calibration logbook is available for the analog inputs IN 6 to IN 12, in which all successfully completed calibration procedures are recorded with date, time and many other details. This means that the plant operator always has an overview of the calibration history of the analysis sensors. With the additional recording function, all measurement data can be recorded and stored. The great advantage is that the device can thus also fulfill official recording obligations. Using the two software packages JUMO PCC and JUMO PCA, the registered data can be transferred to a database via Ethernet, for example, and stored there.

In practice, it is common for all data to be controlled in a central PLC. Often, this is not designed for the large volume of data and reaches its performance limits over time. The use of the multi-channel measuring device also offers advantages here, because the PLC is relieved and becomes more efficient.



JUMO AQUIS touch S with process image for CIP cleaning

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N° 3 - MARCH 2023

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Online-Analysis of Metals in Lithium Manufacture

Chemical dosing based on reliable real-time data in Finnish pilot plant

Sensmet, founded in 2017 as a university spin-off following several years of research on micro-discharge analyser technology and related application development, has launched a new technology that dramatically improves the production efficiency of lithium – the most crucial component of a Li-Ion battery. Sensmet's automated online measurement technology enables the optimal dosing of chemicals during lithium production, which improves revenues and reduces costs. Sensmet CEO Dr Toni Laurila, explains: "We bring the analytical performance equivalence of laboratory ICP-OES next to the production process where real-time metal concentration results are acutely

needed. In comparison with laboratory analysis, Sensmet's technology provides robust, fully automated online measurement, which offers enormous advantages for process management and quality control."

Traditionally, battery metal manufacturers had to rely on batch sampling and laboratory analysis to control their processes, but this is costly, labour intensive, and typically incurs a delay of 4–10 hours. In contrast, Sensmet's technology, Micro-Discharge Optical Emission Spectroscopy μ DOES[®], is able to measure multiple metals, such as any battery metal and their impurities, in real-time. In addition to lithium manufacture, the technology is also suited to the 'black mass' re-

cycling of battery metals. Strict online monitoring and control is implemented to reduce impurity levels and thereby prevent the cost and delay incurred by retreatment.

PILOT TEST CONFIRMS EXCELLENT RESULTS

Keliber is a Finnish mining and battery chemical company seeking to implement the sustainable production of battery-grade lithium hydroxide, utilising its own ore. Keliber's product is an essential component in lithium-ion batteries, which enable the electrification of transportation, the storage of renewable energy and the acceleration of digitalisation.

Keliber ran a pilot-scale test programme in 2022 to evaluate the μ DOES[®] analyser in the continuous optimisation of precipitation chemical dosing during lithium production. Nearly 80 samples were drawn from the process with sodium and lithium concentrations analysed in parallel using both the μ DOES[®] continuous analyser and a laboratory ICP-OES. The results showed an excellent degree of correlation between the methods. Keliber's Sami Heikkinen said: "Chemical dosing based on reliable real-time data brings stability to the process, which is very important because it avoids drift and optimises both yield and quality while minimising cost."

The ability to conduct continuous, simultaneous measurements of multiple metal species in an aqueous matrix offers battery metal manufacturers the opportunity to improve process efficiency, lower costs, increase throughput, avoid waste and improve the quality of the final product.



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POWER-OVER-ETHERNET FLOW TRANSMITTER

Small, cost-effective and scalable PoE transmitter



Emerson introduces its first Power-over-Ethernet (PoE) Coriolis flow measurement device for the food and beverage, life sciences and chemical industries. The Micro Motion 1600 Coriolis Transmitter is designed to be a scalable solution for facilities wanting to make a gradual transition to

remote flow data collection, monitoring and configuration. With traditional Ethernet, optional PoE and an additional licensable configurable output, the 1600 delivers a powerful solution for customers looking for a flow measurement device that will grow with their process. PoE can deliver power and data over a single Ethernet cable, which means no new cabling will need to be installed, saving customers up to 50% in installation and maintenance costs. The transmitter can use just PoE or have a separate direct current (DC) power input, depending on wiring availability. The device is available in aluminium or hygienic stainless steel. The compact size and lightweight design are an added space-saving benefit for skid designers. The transmitter is equipped with a multi-language four-line local operator interface (LOI), a suite of advanced software solutions including Smart Meter Verification, Data Historian, Concentration Measurement and Advanced Phase Measurement, as well as an additional licensable channel that can be configured for analogue, frequency or discrete output and a USB-C service port.

▶▶ 62964 at www.pcne.eu

STAINLESS-STEEL ULTRASONIC FLOW METER

1" or 2" connections for measuring ranges up to 1000 l/min



The **ifm** SU Puresonic flow meter works with ultrasonic technology. This means that no interfering structures are necessary inside the measuring pipe, which is made entirely of stainless steel. It is equipped with an operating status LED that can signal different status messages: e.g. a deterioration of the signal

quality due to air bubbles, particles or deposits, a failure of the electronics or the presence of a short circuit. In addition to green and red, the LED can also light up blue according to Namur NE107 in order to indicate a change in the process. As the flow meter consists of a stainless steel pipe with no components built in or protruding into it, the customer's choice is very simple. Time-consuming selection of the appropriate meter, for example on the basis of the wetted parts or the sealing materials depending on the process parameters, can be dispensed with. The flow meter is available in two sizes with process connections of 1" and 2"; the measuring ranges of the models are 1...240 l/min and 5...1,000 l/min respectively. The measuring accuracy, which is guaranteed over the entire temperature range, is $\pm 1\%$ of the measured value / $\pm 0.5\%$ of the VMR. Ultra-pure water, water or water-based media containing additives of up to 10% are suitable as media for the SU Puresonic.

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OPTICAL INLINE PROCESS REFRACTOMETER

For liquid measurements in a wide applicational range



Vaisala unveiled the Polaris™ process refractometer platform. The products are designed to optimize industrial manufacturing processes and enhance productivity in various industries. The platform brings together the company's long-term measurement excellence with the latest liquid measurements expertise. Polaris product family is designed to work seamlessly, out of the box, with

Vaisala's Indigo520 transmitters for process refractometers, combining liquid and gas measurement possibilities. The refractometers are used for inline liquid concentration measurements for various industries, installation positions, and applications. The real-time measurement data they produce of the process enable advanced and accurate process control enhancing the manufacturing process. Vaisala's process refractometer can measure various liquid concentrations through refractive index, inline, real-time. The version Vaisala Polaris™ PR53GC Process Refractometer is optimized to chemical industry, where it measures concentrations of acids, alkaline solutions, alcohols, hydrocarbons, solvents, and various other solutions. But even more versions for different specific applications are available.

▶▶ 63398 at www.pcne.eu

FLEXIBLE MAGNETIC-INDUCTIVE SENSORS

Accurate measurement for low and medium flow rates



With the SM89x-SM9xx series **ipf electronic** introduces electromagnetic sensors for flow measurement, dosing and temperature measurement of conductive media, which are suitable for highly flexible use even under demanding environmental conditions. The devices of the series, which are completely made of stainless steel, consist of a compact unit of sensor and evaluation electronics and are

primarily used for measuring small and medium flow rates in pipelines. They are offered in seven device variants for a wide range of process connections, covering measuring ranges from 0.01 l/min to 100 l/min. In addition, the sensors have a precise response times of sometimes less than 100 milliseconds, for example, when monitoring dosing. Almost all settings can be made using the four keys on the easy-to-read color digital display. Functions such as dosing or temperature measurement (PT1000) can be assigned to quick-select keys to avoid having to navigate through individual menu levels when making selections. The display also offers numerous options for on-site configuration and calibration. If desired, the display warns of limit value violations with changing color and visualizes additional information in addition to the measured value of the corresponding unit (l/min, l/h, m³/h, l/s, gal/m, gal/h, °C).

▶▶ 62967 at www.pcne.eu

Configuration Environment to Support FDT3 and Expands Device Integration Model



New PACTware release to help accelerating the digital manufacturing journey

FDT Group™ announced that the PACTware consortium released its latest software version, PACTware 6.1, based on the latest FDT3 standard. PACTware 6.1 is one of the first FDT3 stand-alone device configuration environments available. The software tool's source code is available to the PACTware Consortium membership consisting of 22 automation vendors who offer the FDT-enabled hosting product to the user community at no cost. PACTware 6.1 users will enjoy the ability to support their current FDT DTM install base and support modern FDT3 web-based DTMs

that are scalable for IIoT architectures. This release also supports integration with FDI Device Packages.

Suppliers of industrial automation systems and devices want to provide solutions that enable the Industrial Internet of Things (IIoT). To meet their customers' needs, it is vital for suppliers to enhance their system and device offerings with standards-based, platform-independent, information-driven business models. The new FDT3 standard is accelerating the digital manufacturing journey by enabling an ecosystem of

FDT-based solutions providing a unified environment for industrial device management with IT/OT data-driven operations. In addition to the new FDT3 standard that fully describes the FDT Desktop environment and FDT web-based device DTM, the standard also defines a cloud-based FDT Server environment for distributed control. The new FDT3 DTM and FDT Server are OPC UA- and -mobile ready without any coding, allowing users an easy to use and scalable migration path of OT data to IT enterprise applications.

▶▶ 63316 at www.pcne.eu

SECURE OT/IT COMMUNICATION

Additional security for data integration with OPC UA



The **Softing** dataFEED OPC Suite Extended is an all-in-one solution for OPC communication and cloud connectivity, providing access to controllers and IoT devices of leading manufacturers. With the new OPC UA Reverse Connect functionality, the suite ensures secure communication between OPC UA components separated by firewalls or DMZs.

OPC UA Reverse Connect avoids traditional client-server connections where the client establishes the connection to the server. Instead, the server actively connects to the client. This is important for networks where the server is in a protected environment, such as the production network of a factory. There is no need to open firewall ports from the IT network to the OT network. The risk of an attack on the production network is thus eliminated, as the firewall remains closed. The dataFEED OPC Suite enables access to the controllers of leading manufacturers. It acts as a gateway between the two OPC standards so that existing OPC Classic components and applications can also be integrated into modern OPC UA solutions. Production data is transferred to IoT Cloud or Big Data applications via MQTT and REST protocols. The suite also supports the storage of production data in a file or SQL database.

▶▶ 62972 at www.pcne.eu

EXPLOSION-PROOF 5G SMARTPHONE

Powerful solution with 48 MP camera and Push-to-Talk



i.safe MOBILE introduces the IS540.1 smartphone. The company announces it as the world's first ATEX and IECEx Zone 1/21 approved smartphone with widely supported 5G frequency bands and Wi-Fi 6 connectivity. The Qualcomm® QCM6490 gives IS540.1 users a future-proof mobile device with robust 5G and Wi-Fi 6 connectivity, advanced camera quality and multimedia capabilities. The high-performance chipset has powerful AI and compute capabilities that can process demanding applications without compromising power efficiency. Further special features in the technical equipment are the 48 MP main camera for highest image quality. The amplified loudspeaker guarantees clear and secure communication even in noisy industrial environments - not only in PoC/PTT applications. The updatable, up-to-date operating system Android 12 guarantees - in conjunction with the high-quality processor - fast data processing for the most demanding requirements in the industrial environment (predictive maintenance, communication, security). The IS540.1 scores with its 16-pin ISM interface, which offers connection to accessories such as the IS-TH2xx.1 (barcode scanner) or the IS-HS2.1 (audio accessories) and also with standards such as NFC, Bluetooth 5.2 and Wi-Fi 6.

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3D-PRINTED DIAPHRAGM VALVES

Alloyed material for the pharmaceutical industry



KSB Group company **SISTO Armaturen S.A.**, based in Luxembourg, is the first valve manufacturer to supply series-produced additively manufactured (3D-printed) diaphragm valves made of a special alloyed material for

one of Germany's largest pharmaceutical companies. These days, modern substance manufacturing facilities are planned and constructed in such a way that they can be used for the most diverse of products. Accordingly, the components installed have to be made of a very high-quality nickel-based alloy, e.g. alloy 2.4605. This also applies to the highly complex multiway diaphragm valve units that can often be found in such plants. Conventionally, valve bodies are machined from solid forged material. In this case, the manufacturer relies on suitable forging bars being available, which may cause long delivery times, particularly for special materials. Shorter delivery times can be realised with powder bed fusion. But this is only one of the benefits of valves manufactured using this method. It also enables geometries with undercuts, such as integrated cooling channels, which would not or hardly be possible using a milling process. Body parts made by additive manufacturing have further got a higher material homogeneity. Also, components designed for 3D printing are significantly lighter than conventionally manufactured components.

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NEW DISTRIBUTED CONTROL SYSTEM RELEASE

Increased performance through plant-wide digitalization



ABB has launched its latest release of **ABB Ability™ Symphony® Plus** distributed control system (DCS) to further support digital transformation for power generation and water industries.

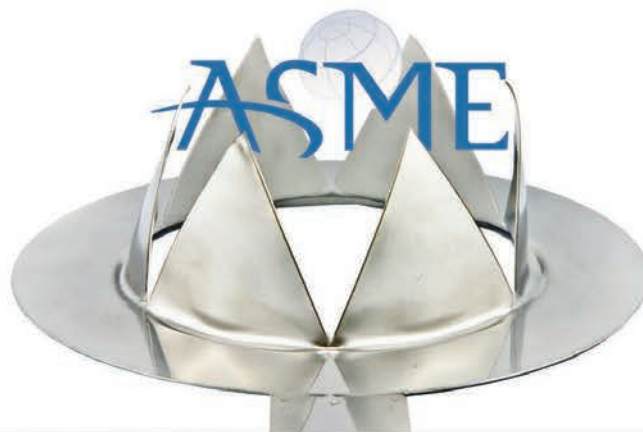
With more than 40 years' experience of total plant automation, the latest version of **Symphony® Plus** will further support customers' digital journey through a simplified and secure **OPC UA** connection to the Edge and Cloud, without interfering with core control and automation functionalities. The new **Symphony® Plus** delivers customers access to digital solutions, such as fleet asset management enabled by **ABB Ability™ Genix Asset Performance Management**. It also enables users to access process and alarm data from mobile devices through the **ABB Mobile Operations** application, allowing them to stay updated to react faster, reduce downtime, and save costs. Critical data can now be viewed anywhere, anytime, thanks to **HTML5** web-based operation and engineering tools, promoting collaboration, improving plant uptime and performance. A newly added **SD Series e-Class** process controller offers a low-risk, low-disruption retrofit solution for traditional **Harmony Rack (HR)** installations. It brings increased speed, higher capacity, and more functionality to **HR** systems. In doing so it delivers innovation with continuity, enabling plant-wide digitalization while minimizing impact on process operations and system infrastructure.

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Ready for Deployment

The promise of a network in the field of process plants with Ethernet-APL as enabling technology causes users to develop high expectations. This article provides insights into how to adopt the technology and the first steps that they should be taking in order to ensure success in practice.

Users expect a network to the field of process plants to be the platform of the future, the foundation for digitalization, seamless integration of all assets into a single system. End users look to simplify device diagnostics and integrate functional safety, all with the purpose of a good user experience when handling complex instruments. Plant builders are looking for data integration across their systems, which will help them to marry actual device tags to the master tag list and thus increase speed and quality of loop checks. Device replacement should be simpler than the current best practice with 4-20 mA and HART technologies. Ethernet-APL is the data highway to the field of process plants.

ETHERNET SPECIFICALLY FOR PROCESS PLANTS

The Advanced Physical Layer – or APL for short – is Ethernet at 10 Mbit/s hardened and

adapted for the distinct features expected in applications different to regular Ethernet in an industrial or office environment. APL is based on a heritage of many decades which has seen shielded two-wire connectivity with 4 to 20 mA loops, HART and serial fieldbus techniques. Otherwise, it's the same pluggable and fixed connection options from field instrumentation in use in process applications today.

The spur length of 200 metres allows installations where the junction box is put in an easy to reach place. Intrinsic safety techniques for the connection of field devices mean a simplified approach to planning, commissioning, maintenance and subsequent upgrades of the installation. Validation is simplified through standardized values that suppliers keep. All that is left for the user is to document the selected power class for switches and instruments and the cable used.

The power supply to APL field switches include

optional redundancy. The Ethernet communication is possible with both fiber optic and regular CAT-cables. The up to four uplink ports offer flexible options such as ring redundancy back to the control room, and the ability to design for communication distances of many kilometres depending on SFP selection and home run cable choice.

The first Ethernet APL field switches offer connections for up to 24 devices with multiple switches possible in a ring topology. They are installed in the safe area or Zone 2, and future versions for Zone 1 are expected – bringing them even closer to the field instrumentation in the most hazardous of environments in heavy process applications with intrinsically safe instrument connections.

SIL SAFETY OUT OF THE BOX

Ethernet-APL opens the opportunity to fully integrate available safety concepts into an overall communication infrastructure. All industrial protocols today offer safety data embedded into the regular telegram. Additional measures such as time stamps, message counters and a very strong check sum provide for a certification of the communication to be SIL 3 out of the box. The entire infrastructure between controller and safety instrument can be considered a "black channel". Planners will evaluate the communications infrastructure for availability requirements, only as it does not require ratings or evaluation for safety, thus simplifying design, engineering and verification of the safety function.

Plant asset management, which accesses detailed diagnostics will allow for longer and/or more flexible schedules for maintenance and safety checks. This type of safety communica-



Ethernet-APL enables digitalization and safety of process plants



Reference cable	Well-known, two-wire type 'A' Up to 200 m between switch and instrument				
Interoperability	Well-defined port concepts with power over the network Intrinsic safety up to Zone 0/Div. 1 standardized				
Application fit	Resilience through point-to-point connections Usage in any hazardous and non-hazardous areas				
Connection technology	Robust terminals and connectors for simple installation				
Surge protection	Defined and included				
EMC	Resilience to electro-magnetic interference				

Main benefits and founding members of Ethernet-APL

tion is well established in the manufacturing industries and can now become part of any Ethernet-APL based plant. Utilizing this concept will greatly simplify design and implementation of safety systems. It will also reduce costs while maintaining a superior safety level to protect both employees and the plant itself.

ENGINEERING KNOWLEDGE INCLUDED

Users find all relevant information for planning and installation in the APL Engineering Guideline. It covers the three important components for an APL system: the field switches, cables and field devices. Written for engineering and planning teams, they can evaluate example applications and topologies, as well as the specifying text for projects that use this new technology. Furthermore, classes for power, ports, and intrinsically-safe protection simplify the selection of APL field devices, and facilitate intrinsic safety verification. Installation and commissioning teams will find useful and detailed information relating to the installa-

tion of APL networks, including cable routing, connection and shielding steps. With over 100 pages, the guideline is a practical reference for both greenfield and brown-field projects, and even includes migration examples. A free download is available from all manufacturers' websites.

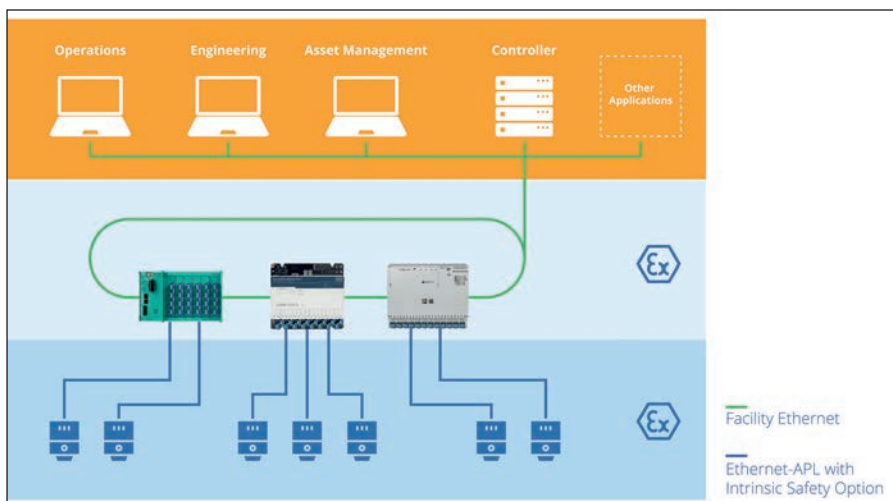
USERS' VOICES

Sven Seintsch, Bilfinger Engineering & Maintenance GmbH and Chairman of NAMUR working group 2.6 "Digital Process Communication" stated at the recent NAMUR 2022 General Assembly Meeting: "Ethernet-APL topology is open for a manufacturer independent interoperable infrastructure". He considers it an application benefit that "Safety is a success factor for Ethernet-APL – since the same SIL-rated devices and field switches can be used for both operation and safety", and that "Future requirements for the digitalization of plants can only be achieved with Ethernet-APL". He recommends asking vendors when they

will be able to supply APL switches and field devices, confirm that the devices and hosts support the NAMUR NE 107, and devices are also supplied with an FDI-package. FDI packages are standardized device descriptions independent of the communications protocol or the system used. Field Device Integration (FDI) is a collaborative project between the well-known process communication interface standards organizations, and is being created by experts of the FieldComm Group, ODVA, OPC-Foundation and PI International describing representation of devices. Sven states: "Homework for end users is now clear: Do your research [...] and start to use Ethernet-APL!"

DEPLOYMENT NOW!

The authors of this article share the conviction that Ethernet-APL will become the physical layer of choice for process plants. For the first time in history, 12 leading suppliers of process technology and four standards organizations (SDO) joined forces to develop and standardize this new common physical layer based on IEEE and IEC standards. Ethernet-APL is based on over 30 years of experience with digital communication combined with today's most advanced digitalization and explosion protection concepts. This provides the user with the most powerful tool currently available for state-of-the-art plants. With these prerequisites significant market growth can be expected. The SDOs provide access to the technology for suppliers to expand their instrument portfolio to include Ethernet-APL communication and enabling smart devices that will provide users with insights for excellence in plant performance.



Field switches enable simple and transparent topology between control room and field devices

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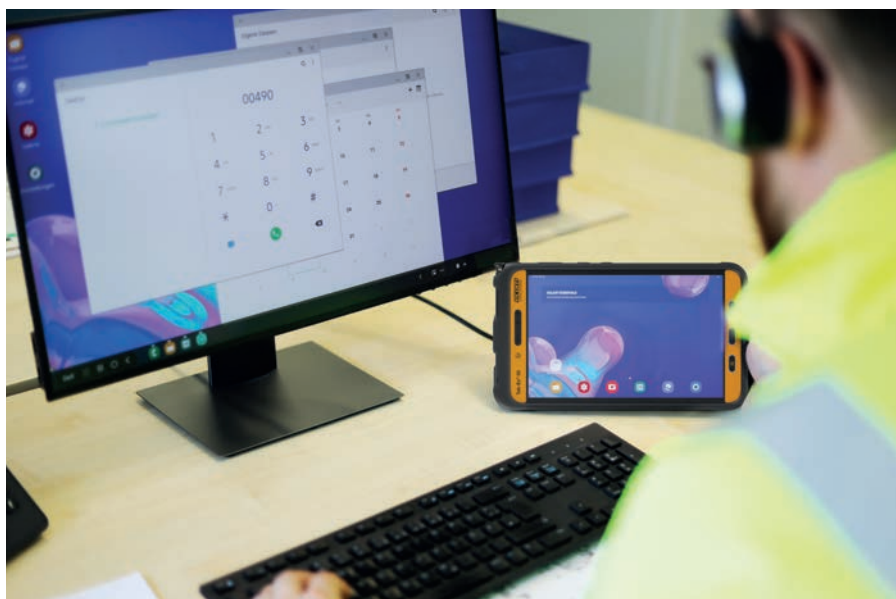
Third tablet generation fit for ATEX zone 1/21

8-inch Android tablet with pen input, and a wide range of functions and suitable peripherals.

The Tab-Ex® 03 tablet from the Pepperl+Fuchs brand ECOM Instruments is the third generation of Samsung devices in variants for industrial use in harsh environments. The Tab-Ex® 03 hardware is available since November in the DZ1 variant for use in ATEX/IECEx zone 1/21. It is thus suitable for use in areas where an explosive atmosphere may arise from a mixture of air with flammable substances. After the Tab-Ex® 03 was already introduced at the beginning of the year in the variants DZ2 (for ATEX zone 2/22 & Division 2) and D2 (for Division 2), ECOM Instruments completes its latest generation of tablets and thus consistently continues the success story of the 8-inch Tab-Ex® series.

It works with Android 12 and an update guarantee, Samsung Knox ensures high data and device security. The Samsung DeX feature supports a quick switch from mobile to desktop use by connecting the tablet to an external monitor to use a desktop-like user interface. In addition, the tablet offers larger RAM and external storage than previous models.

The Tab-Ex® 03 DZ1 delivers industry-leading performance in mobile devices for hazardous locations. It is easy to operate with gloves or the S Pen stylus. The wide range of functions and suitable peripherals for industrial use make the Tab-Ex® 03 DZ1 the perfect companion for a modern mobile worker. Digital products and services such as automated pre-configuration, comprehensive mobile device management and device analytics from ECOM Instruments complete the multifaceted solution: The tablet can be easily configured, managed and updated at any time - even over-the-air. This means that the Tab-Ex® 03 DZ1 can be fully adapted to individual requirements and challenges and offers optimum support in everyday work.



MORE EFFICIENCY AND SECURITY FOR MOBILE WORKERS

Compared to the previous version in international use, the third-generation tablet offers enhanced data and device security, for example through the latest Samsung Knox Enterprise Edition. It offers full support for all functions such as mobile login, configuration, management and E-FOTA (Enterprise Firmware-Over-The-Air). This ensures basic protection against malware and data protection hacks.

In Tab-Ex® 03, mobile workers get a tablet with the latest specifications, which saves a lot of time and expense in their daily work. For photo and video recording, the device is equipped with a 13 megapixels camera with autofocus and LED flash on the back and a 5 megapixels camera on the front. The tablet

is also optionally available without a camera. Thanks to the integrated Google ARCore, the tablet is designed for comprehensive augmented reality applications, e. g. scanning of the environment or the identification of objects – for digital plant management or predictive maintenance of components. Digital workflows ensure high process and product quality and minimize risks in the production. For power supply and data transfer, the Tab-Ex® is equipped with a USB-C port. The battery with a capacity of 5,050 mAh ensures flawless operation and a long operating time with a runtime of up to 11 hours. The Tab-Ex® 03 DZ1 is also equipped with an individually programmable button, for example for an alarm, emergency calls or push-to-talk (PTT).

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ISOLATING SWITCHING AMPLIFIERS

High signal density & configurable splitter function



Turck presents the IM18-4DI compact, four-channel isolating switching amplifier for non-Ex areas and IMX18-4DI for Ex areas. With four signals on an 18 millimeter module width, the devices offer a high channel density that can make a tremendous difference with installations in small control cabinets and decentralized or modular automation systems.

Users benefit also from the flexibility of the device. For example, the IM(X)-4DI also features a splitter that can be configured as a dual 1:2, 1:3 or 1:4 splitter. The effective direction of the switching outputs is also reversible. With the new isolating switching amplifiers, Turck is meeting the increasing demand for especially compact solutions for modular machines. With a width of 18 millimeters for four channels, the IMX18-4DI devices need almost a third less space on the DIN rail than similar installations with two-channel devices. The SIL2 certification of the devices together with Turck's SIL proximity switches enable the creation of safety-related applications. The signal cables are mechanically connected with spring-loaded or screw terminals. The Power-Bridge variants can also be supplied from the rear via the DIN rail. A group fault signal contact makes it possible to indicate error messages, which with the Power Bridge variants can be implemented via the DIN rail.

▶▶ 63068 at www.pcne.eu

DIFFERENTIAL PRESSURE SENSORS

Level, density and DP measurement without capillaries



With OPTIBAR 5060 eDP, **KROHNE** adds an electronic differential pressure (eDP) version to the OPTIBAR family. It aims at level, density and differential pressure applications within closed vessels as well as density compensated level measurement in open tanks. Compared to classic DP installations with diaphragm seal and capillaries, OPTIBAR 5060 eDP provides a cost-efficient connection to and installation on the vessel: it requires smaller process connections, and the connection between taps is realised via an electronic signal cable instead of oil filled capillaries. OPTIBAR 5060 eDP starts from G½ process connections, and allows for a maximum distance of up to 25 m / 75 ft between top and bottom tap. For the eDP version, many of the features of the regular OPTIBAR 5060 series are available, e.g. optional Bluetooth communication via smartphone or tablet. It can be configured with metallic or ceramic process diaphragms, a wide range of (hygienic) process connections, various communication options up to FF and Profibus-PA, and housing materials from plastic to stainless steel. OPTIBAR 5060 eDP also features an integrated static pressure measurement for additional process information. It comes with various industry-specific approvals and is SIL 2/3 certified.

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SMART CORIOLIS FLOWMETER

For maximum accuracy in the oil & gas industry



Promass Q, the high-tech Coriolis flowmeter from **Endress+Hauser**, is now also available for larger pipe sizes with maximum flow rates between 850 and 2400 t/h (6700 and 18 900 bph).

Furthermore, the implementation of the revolutionary 4-tube technology opens up numerous promising applications in the oil and gas industry - for example, as a highly accurate duty meter for custody transfer and fiscal metering, or as a precision reference device (master meter) for on-site verification measurements. The flowmeter offers best measuring accuracy ($\pm 0.05\%$ o.r.) and exceptional repeatability ($\pm 0.025\%$) over the entire measuring range, tested and confirmed on various external, accredited oil and gas calibration facilities. It offers excellent measuring performance for liquids with microbubbles thanks to patented MFT (Multi-Frequency Technology) and outstanding density measuring accuracy (tested by H&D Fitzgerald/UK): ± 0.2 kg/m³. The process temperatures for use go up to 205 °C or in the low temperature range down to -196 °C. A revolution in the flow market, 4-tube technology offers customers advantages. Compared to Coriolis flowmeters with two measuring tubes, four tubes allow up to 25% higher flow rates. This speeds up all transactions in the oil and gas business and thus saves money by reducing, for example, standstill times for loading and unloading oil tankers, resulting in lower port charges.

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Efficient Digitalization of Functional Safety

New plug-ins support efficient and flexible safety controller programming

Digitalization delivers its full benefits when an increasing number of different technologies are networked with each other. Ideally, you should be able to view plants holistically in all phases of their lifecycle, from planning through construction to commissioning and operation, in order to increase their efficiency throughout their entire life. This is particularly true for complex plants operating in the process industry, and safety plays an essential role in this context. However, the demand for safe and flexible programming solutions tailored to the customer's specific needs often leads to excessively long development cycle times when, for example, lengthy test processes slow down plant engineering. A modular approach provides a valuable solution to address this concern.

It is increasingly complex for plant operators to manage functional safety, which is why HIMA has developed a comprehensive digitalization strategy to support them. Digitalization is not an end in itself; it is an enabler of real added value for customers. The philosophy is to digitize what is needed to enable Digitalization to generate specific and actionable insights.

Safety systems are increasingly becoming data hubs that handle and distribute data in addition to the safety functions that they perform. An independent and open safety platform with a comprehensive security concept enables plant operators to effectively manage change, efficiently engineer, and be confident of end-to-end compliance.

Yet because time is money when building

new plants, another priority alongside safety is the development of tools that enable efficient planning and programming of safety controllers. SILworX®, a fully integrated, safety-related engineering, programming and diagnostic tool, allows all HIMA controllers and remote I/O systems to be programmed and configured efficiently. Fault diagnostics are also presented via the same intuitive user interface. The tool helps to avoid systematic faults during the development of the application. This, in turn, accelerates engineering. Users can put the safety system into operation earlier and adapt it more quickly and flexibly to meet new requirements.

So far, the tool has focused on the core functions required for configuring, programming and operating safety systems. A significant aspect of this has been the dedicated safety certification of the tool, which has now been significantly expanded in its range of functions.

MODULAR APPROACH BRINGS SAFETY AND FLEXIBILITY

To enable users to create IEC 61511-compliant safety-related automation solutions in conjunction with HIMA's certified safety controllers, SILworX also comes with IEC 61508 certification. However, this also has a flip side. For certification to be granted, all changes to the development and engineering tool must first be checked and certified by an accredited body. This cannot be done overnight. The associated testing and approval processes extend development times. Implementing new functionalities can slow down the overall development, which is not in the interest of the users. Therefore, an alternative solution was developed.



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HIMA digitalizes functional safety with added value.



With the new plug-in concept, users now have access to a range of new functionalities.



The new approach is modular. Not all functionalities are safety-relevant and require a corresponding certificate. For this reason, SILworX core and SILworX i4.0 features will be considered separately. Core functions will still need and receive all safety certificates, while plug-ins will not. The new version of the programming tool offers an interface that allows users to integrate various (non-safe) plug-ins such as scripts, programs or functions. As a result, SILworX can be flexibly tailored to serve user needs. Ready-to-use plug-ins are offered for typical use cases. The interfaces are also open for users with individual requirements who prefer to design and implement their own plug-ins.

SAFETY CONTROLLERS AS PART OF THE WHOLE

The new SILworX version will be released this year with an interface to integrate non-

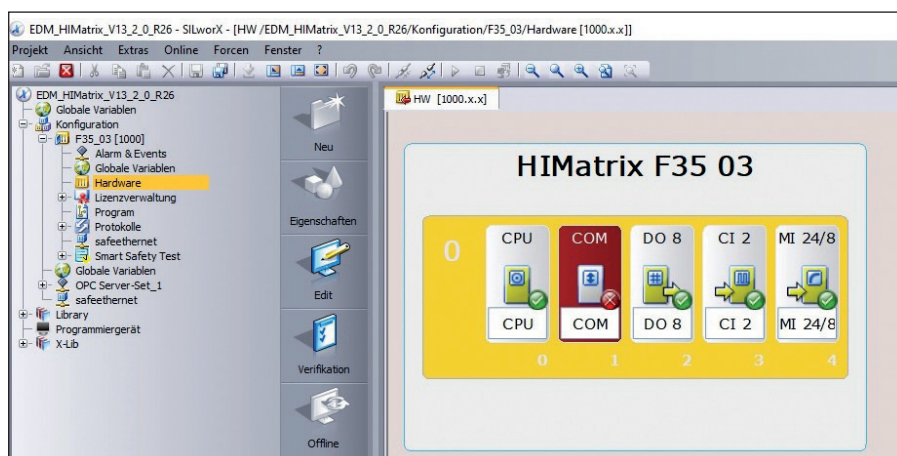
safety-related plug-ins into automation projects. A range of plug-ins will be progressively added. Plans for plug-ins include features such as the External Communication Configurator, Digital Inventory Manager, and Digitalized Engineering. The latter aims to help users digitalize the entire engineering process from specification and programming through to verification and validation. Increasing staff shortages coupled with tighter schedules require ever more automated procedures in plant development. This is a problem that this plug-in can help to solve.

To reliably comply with applicable safety regulations, it is also necessary to increasingly digitalize the lifecycle of functional safety. Much work in this area has been done with PDF documents, Excel lists or even paper plans. The Safety Lifecycle Management plug-in digitalizes this process end-to-end, optimizing processes and reducing the costs

of functional safety.

A different plug-in meets supports the market trend of modular plant engineering. The Module Type Package (MTP) interface description comes up time and again in industrial circles. MTP enables efficient integration of individual components of different automation systems by describing the process modules in a standard and manufacturer-independent way. The MTP Generator plug-in helps to develop such Module Type Packages in accordance with VDI/VDE/Namur 2658.

The new range of plug-ins significantly expands the functional scope of safety controllers. Digitalization means that safety controllers will no longer be considered in isolation. Via the plug-in concept, they become the heart of a comprehensive digitalization solution, without letting safety certifications be lost as a result of this flexibility.



SILworX allows all HIMA controllers and remote I/O systems to be programmed and configured efficiently.

NEW APPROACH WITH MANY BENEFITS

While the initial task of SILworX was to translate user-configured functions into specific safety-related machine code and load it into the controller, the functionality of the safety-related engineering tool has expanded significantly from version to version over the years. With the new plug-in concept, users now have access to a range of new functionalities.

Additional functions can be instantly integrated, accelerating time-to-market. Further benefits for users are more flexible programming, increased efficiency, and greater time and cost savings.

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N° 3 - MARCH 2023

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New Version of Web-Based Control System and Controller Available

Extended functionalities for modular systems based on MTP standard

Digitalization, sustainability, shortage of skilled workers: Companies in the process industry are currently facing major challenges. To prepare their plants for the future, Siemens believes that operators must rely on a highly flexible process control system. Against this backdrop, Siemens has now launched both a new software version and new hardware components for its Simatic PCS neo web-based process control system. With version 4.0, Simatic PCS neo is now ready for plant capacities and large-scale projects of up to 64,000 process objects and 56 controllers – making it suitable for industrial plants of all sizes. As completely web-based system, the process control system enables location-independent teamwork – whether from the home office or the office, on mobile devices or desktop computers.

In version 4.0, Simatic PCS neo supports all parts of the MTP standard (Module Type Package) defined and released jointly by NAMUR and ZVEI up to now. Plant modules can thus be integrated even more easily into the process control system and can be described, configured, and automated independently of the manufacturer. In addition, version 4.0 offers workflow improvements that further reduce the engineering effort.

NEW CONTROLLER GENERATION AVAILABLE

With the Simatic S7-4100 automation system, Siemens is also presenting the new generation of controllers for the process industry. The first release will be available exclusively for Simatic PCS neo. Compared to the current model, which will continue to be available in the long term, the new controller is 30 percent smaller and thus saves



space in the control cabinet. In addition, Simatic S7-4100 offers extended communication options with up to six Profinet or Profibus interfaces. The use of the latest Siemens chipsets reduces the energy consumption of these controllers by up to 50 percent. In addition, the S7-4100 controller is absolutely robust and maintenance-free: When operating at ambient temperatures of minus 25 to plus 70 degrees Celsius, no fan is necessary, and no batteries are required to buffer the system data in the event of a power failure. Parallel to Simatic PCS neo V4.0, Siemens is introducing the fully integrated Simatic CN 4100 communication gateway, which

enables simple and secure process data exchange with Simatic PCS neo both at the control level and in parallel at the visualization level. It plays the role of a convenient data switch, which makes it possible to configure data from the plant only once and then feed it to the controller, the process control system, or both at the same time. Supported protocols include Modbus TCP and OPC UA, and more protocols are planned. This relieves process control, simplifies engineering, and increases plant security by separating the networks.

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3/2-WAY BALL VALVE FAMILY

Versatile possible applications in mixing and distribution



GEMÜ is expanding its product range of industrial ball valves. Due to its multi-functional properties, the newly developed GEMÜ BB07 3/2-way ball valve family is suitable for the most varied areas of application including chemical processes, industrial water treatment, power generation and environmental systems. The BB07 3/2-way ball valve is the ideal valve when it comes to mixing and

distribution tasks of media flows, like in the trouble-free change-over of sensitive media in the area of energy or auxiliary materials in the food-processing industry. A further advantage is that the new ball valve types are available with the threaded socket connection type, which ensures trouble-free installation of the shut-off valve. The BB07 multi-port ball valves represent a cost effective solution, as multiple valve seats are generally required for mixing and distribution tasks. These seats are combined to make just one subassembly through the use of multi-port ball valves. Thanks to the top flange acc. to ISO 5211, simple actuator mounting is possible. The seat seal is made of PTFE. The newly developed ball valve family is automation-capable, low maintenance and can be used for a vacuum. The new ball valve is selectable as a T or L ball, and is therefore flexible and versatile.

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SPEED CONTROL FOR DIAPHRAGM PUMPS

Energy efficient in accordance with class IE5+



In many applications, metering ingredients in the pharmaceutical or food industry for example, pumps are required that not only can be precisely controlled in terms of flow rate and dosing time, but also convey the ingredients particularly gently. To enable the proven pump units of the ecodos series from **LEWA** to fulfill this demanding task with even more flexibility and energy efficiency in the future, the manufacturer is expanding the portfolio to include a

new form of wide-range speed control. Alongside asynchronous motors and servomotors, permanent magnet synchronous motors, or PMSMs for short, are also used now. They are characterized by high energy efficiency and a control range greater than 1:200. This significantly expands the range of applications. With PMSMs, it is no longer necessary to use several pumps for different flow rates or oversize asynchronous motors for low speeds. Since PMSMs can be designed without a fan, they remain compact and easy to clean. The latter feature predestines them for hygienic applications. High efficiency rating over the complete control range in accordance with energy efficiency class IE5+ also reduces energy costs, thus ensuring a lower total cost of ownership (TCO).

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MODULAR BIG BAG PALLET UNLOADER

Optimal unloading, even of poor flowing powders



Gericke and **Indus**, both well respected companies in the industry saw a gap in the market and decided to invest time and money to help customers become more sustainable, flexible and work more efficiently within their factories. These pallets are a practical design that offers a highly efficient method to reliably store, transport and discharge products from big bags. The system is suitable for emptying big bags in tight spaces, for positioning big bags safely

on the discharge station without a crane and when several big bags need to be stacked safely without having to use racks. Bulk materials with difficult flow properties require reliable discharge aids. The innovative unique design of the Gericke/Indus Big Bag Pallet Unloader is a modular based system which can be equipped with a combination of a vibrating motor, pneumatic under massagers and stretch system. These different modular options are decided based on your product flowability. The more difficult the product the more modular options you would require. And another big asset is that these unloaders are suitable for low building height requirements from 2.6 meters and up. These products have been engineered for safety and efficiency in mind and can comply with the latest hygienic requirements and certifications.

►► 63232 at www.pcne.eu

ELECTRIC PART-TURN ACTUATORS

For operational temperature range of -30 °C to +70 °C



The **Rotork** CK range of modular electric valve actuators has been extended to include a new part-turn variant, known as the CKQ. CK actuators provide flow control in non-hazardous locations and are especially suited for diverse applications in the water and power markets. This new part-turn variant is especially well suited

for harsh and demanding environments and has an operational temperature range of -30 °C to +70 °C. The IP68 enclosure protection is maintained even when the actuator terminal housing is removed (by using a double-sealing system around both parts of the plug and socket connection). This contributes to its ideal suitability for use within the water market. Continuous mechanical valve position indication is provided (even without power) and the CKQ provides up to 60 starts per hour at a rate up to 1 start every 6 seconds. All options within the CK range provide oil bath lubrication for extended life, mounting in any orientation and motor-independent handwheel operation available. The modular structure of actuators in the CK range means a wide variety of options and features are available. This includes the CK Standard actuator, the sophisticated Centronik (for intelligent, integral control) and the Atronik option for intermediate modest and robust control.

►► 63111 at www.pcne.eu

ELECTRONIC MIXER FOR TECHNICAL GASES

Precise gas mixtures even at high flow



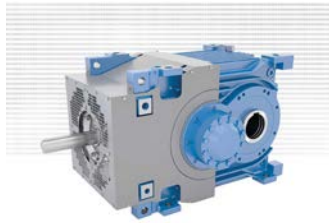
For applications needing high flow rates of gas mixtures, such as steel production or the chemical industry, **WITT** offers the MG 2000-ME ERC+ electronic gas mixer. Precisely and reliably, the device generates high-quality gas mixtures of two technical gases, even when the flow rate is fluctuating. Inside the new model is an electronically operated propor-

tional valve that achieves a maximum mixed gas output of up to 2,180 Nm³/h. The system is controlled either remotely via Ethernet or analogue output, or directly via touchscreen. The seamless mixture adjustment is thus particularly precise, and stored specifications can be easily reproduced. When operated remotely, the user can control and see the system status at any time and from anywhere. The system keeps the mixture and outlet pressure stable when flowrates are changing. In this way, the user obtains a precise mixture over the entire output range, even with cycling flowrates. Pressure fluctuations in the gas supply are compensated by a constant pressure control and have no influence on the mixture quality. Optional pressure and temperature transmitters monitor the gas supply. Excessively low inlet pressures or temperatures generate an alarm and shut down the system. The setting of the mixing valve is maintained even when the mixer is switched off.

▶▶ 63024 at www.pcne.eu

DURABLE DRIVES FOR BELT CONVEYORS

For high thermal limits and mechanical load capacities



NORD DRIVESYSTEMS specially developed the MAXXDRIVE® XT industrial gear unit for the requirements of bulk and mineral industries. It provides output torques of 15 to 75 kNm with speed ratios from 6.3 to 22.4 and is offered in seven sizes for

powers from 22 to 2,100 kW. The power and speed ranges of the two-stage right-angle gear unit have been specially designed for industries in which low speed ranges are required in combination with high powers - such as the bulk goods and mineral industries. A special sealing concept reduces maintenance. Large roller bearings and centre distances increase the load capacity and service life of the components. As standard, the industrial gear unit is equipped with a heavily ribbed UNICASE housing and an integrated axial fan. Due to the increased surface and the airflow covers, the cooling airflow is optimised and a very high thermal limiting power is achieved. In many cases, additional cooling is not required. **NORD** also offers innovative predictive maintenance concepts for heavy industrial gear units. **NORD** drives networked via the frequency inverter communicate their status data via the control system or directly into a secure Cloud. With optional vibration monitoring, condition changes can be detected at an early stage and predictive maintenance can be scheduled in good time.

▶▶ 63064 at www.pcne.eu

MODULAR LASER PARTICLE SIZER

Available in two different measuring ranges



The **FRITSCH A-22 NeXT Nano** is a laser particle sizer with highest accuracy and sensitivity even with the smallest particles in a range from 0.01 to 3800 µm. And as Micro version an economy

alternative for a smaller measuring range from 0.5 to 1500 µm. Both are designed with just one laser and a number of patented features for maximum durability with minimum maintenance. Installation is easy via plug and play, thorough cleaning without tools with just few simple steps. The high-performance software, delivered free of charge, offers unique options for evaluation and documentation and meets the requirements of 21 CFR Part 11. The measuring results are delivered quickly and reliably in under a minute. The results are highly accurate and exceed ISO 13320. The particle sizers are wear free and need only minimum maintenance once a year. Functional modules are available for dry and wet dispersion, the Ultrasonic box for even finer adjustment of the wet dispersion to the respective sample - ideal if you frequently measure sample materials that tend to agglomerate. Additionally a pH measurement module and a special conversion kit for problem-free measurement when using aggressive organic solvents such as benzene or hexane.

▶▶ 63104 at www.pcne.eu

ROTARY VANE PUMP

Hermetically sealed pump prevention of contamination



Pfeiffer Vacuum introduces the first rotary vane pump for mass spectrometry with a hermetically sealed pump housing. The SmartVane serves as a backing pump for mass spectrometers (ICP-MS, LC/MS), for applications in environmental and food analytics, as well as in pharmaceutical and

clinical analytics. This vacuum pump is designed to ensure that no oil leaks occur therefore preventing any contamination. Thanks to the integrated motor, no conventional seal is needed, which means that the SmartVane has longer maintenance intervals thanks to the combination of advantages of the rotary vane pump principle with a sealed design to avoid oil leaks. The low noise of the SmartVane ensures ideal conditions in the laboratory. With its typical operating pressure of less than 10 hPa, it is quieter than other pumps used for this type of application. This makes it possible to carry out even challenging tasks in a pleasant working environment. Its compact design makes it easy to incorporate in existing systems. In addition, the pump offers intelligent communication options and can be used as a plug-and-play solution in combination with existing devices. The SmartVane has an integrated energy-efficient IPM motor with a stand-by function. Its low power consumption automatically reduces the operating costs and CO₂ footprint.

▶▶ 63025 at www.pcne.eu



INTELLIGENT EXPLOSION PREVENTION

Fast detection of pyrolysis gases & temperature changes



With the GSME and HOTSPOT detectors from **REMBE**, an artificial intelligence has been created that detects fire and explosion events at an early stage. The HOTSPOT X20 measures surface temperatures using an intelligent evaluation system, which divides the field

of view into detection zones. A separate temperature threshold value can be set for each individual zone in order to tailor the detection as far as possible. The HOTSPOT X20 can even identify small temperature increases (1°C) and enables to warn the operator of a fire or glowing embers at extremely early stages. The HOTSPOT X20 can also be used in explosion atmosphere up to zone 20 and under high dust loads and monitors a temperature range in the standard version of 0-200°C (higher temperatures possible, but typically not required). Mainly hydrocarbon compounds are released when many substances thermally decompose. If there is incomplete burning without a flame and a low oxygen supply, carbon monoxide is created as well. The GSME X20 pyrolysis gas detector, for instance, has been designed for detecting these gases, even as they develop. With the aid of an intelligent evaluation algorithm, a process behaviour can be ideally mapped and normal off-gasing be adopted.

▶▶ 63008 at www.pcne.eu

PROTECTIVE HOUSING FOR IR-CAMERAS

For use of cameras under harsh outdoor conditions



In order to be able to use the infrared cameras of the PI and Xi series, even under adverse conditions, **Optris** now offers a new outdoor housing that ensures optimum protection for the sensitive devices. The new housing offers for the first

time the possibility to integrate an infrared camera and an HD video camera together in one compact system. A compact USB server is also integrated in the housing. The new housing complies with protection class IP66 and can therefore also be used in dusty or humid environments without any problems. In order to be able to use the infrared camera even at very low temperatures, an electrical heating element is included that switches on automatically at temperatures below +15 °C. A ventilation fan distributes the warm air evenly within the housing. In warmer areas of use, temperatures up to +50 °C are possible. The optionally available air purge unit, which continuously purges the protective window of the housing with compressed air, ensures that no dust or condensing moisture can collect there. The infrared camera thus always has optimum visibility and can measure temperatures reliably. Together with the optional video camera with a resolution of 1280 x 720 pixels, combined thermal and optical condition monitoring or fire protection applications can be ideally implemented.

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SCREW BLOWER IN NEW SIZES

For improved energy efficiency and minimum costs



AERZEN rotary lobe compressors, also known as screw blowers, combine the advantages of blower and compressor technology in a single system and offer a wide range of performance for the most different process requirements. The assemblies are primarily designed for oil-free

conveying of air and cover an extremely wide range of key industrial applications - from pneumatic conveying and homogenisation to wastewater treatment. Thanks to an innovative compressor stage with new high-efficiency screw profiles, internal flow optimisation, coupled with motors of energy efficiency class IE4 as standard, optimised guiding of cooling and exhaust air as well as a self-tensioning belt drive with an efficiency of over 98% in conjunction with a pinpoint design, outstanding energy savings of up to 30% are achieved compared with a conventional blower. The extended control range of 1:5 is also trend-setting. The patented bearing enables a service life of 70,000 hours and more. An effective sealing concept for the driving shaft and the conveying chamber minimises natural wear and also guarantees oil-free operation in accordance with ISO 8573-1 class0. The four new assembly sizes cover volume flows from about 2 to 30 m³/min and driving power from 7.5 to 55 kW.

▶▶ 63399 at www.pcne.eu

COMPACT THERMAL CAMERA

Pocket-sized thermal camera for use in hot working zones



Teledyne FLIR launched the Cx5, a new pocket-portable thermal camera for condition monitoring in hazardous environments. The FLIR Cx5 has a rugged ATEX-compliant case, which allows users of this camera to safely monitor electrical or mechanical assets in hot working zones. Potentially explosive environments, such as oil and

gas plants or chemical plants, need to be protected from ignition sources. That's why electronic devices used in these hot work environments need to comply with ATEX Product Regulations or similar regulations (e.g. UKEX and IECEx). The 160 x 120-pixel Cx5 is mounted in a rugged enclosure, which enables users to work confidently while maintaining safety. The camera has all the ruggedized features that will enable it to survive the toughest day on the job. The case has shock absorbers and the lens is protected by a Germanium window with anti-reflective coating. The 3.5-inch color display is protected by armored glass and is touchscreen compatible. A rugged lanyard point can be removed in safe environments to reach the data storage and charging port. The Cx5 features a FLIR Lepton[®] thermal imaging sensor and FLIR-patented MSX[®] (Multi-Spectral 1/2 Dynamic Imaging) technology, which embosses visible scene details onto thermal images.

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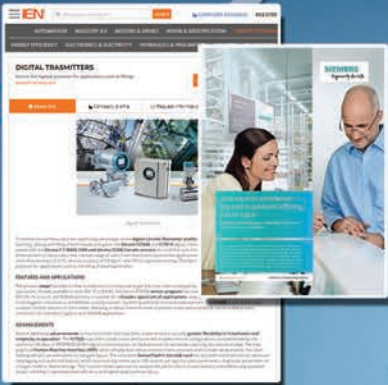
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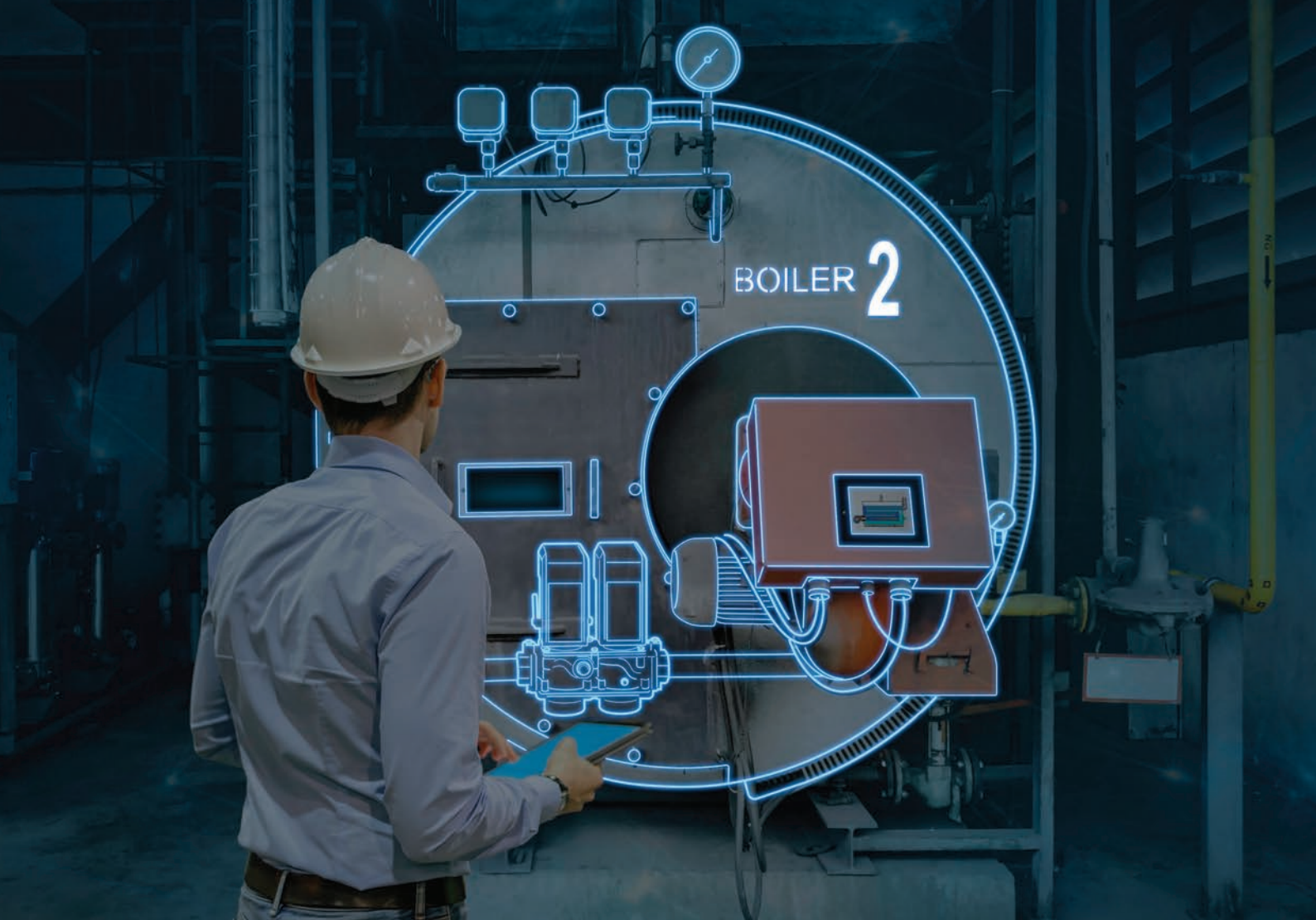
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