

Digitalization of Work Procedures – Get Real Work Done Digitally

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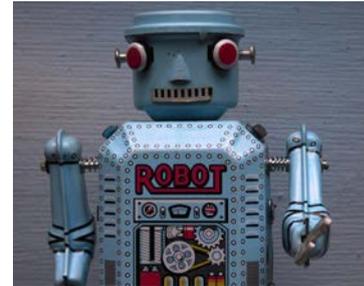
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Dear Reader,

Do you know Marvin the Paranoid Android? He is a character, originally developed by Douglas Adams for the BBC radio comedy and later book series "The Hitchhiker's Guide to the Galaxy". He is a hyper-intelligent and sophisticated piece of technology, but as he is only allowed to do basic jobs in the space ship he works at, he is depressed and very bored.



In this issue we want to introduce to you a very, very distant relative of Marvin. The IECEx/ATEX certified EXR-2 robot is less capable than the fictional character, but still can be very helpful when it comes to autonomous inspection in harsh environments. More details about how it works you can find on page 12.

What the specialists at Siemens are presenting as their concept of digital work in the process industry you can find at page 8. And additionally we have two very interesting interviews in this issue, one with Glen Schulz from FDT about their new developments at page 14 and the second with Pepperl+Fuchs' Andreas Hennecke about the new Ethernet-APL technology and the advantages it can bring to the process industry.

Stay safe and have an interesting read

Editor of PCN Europe

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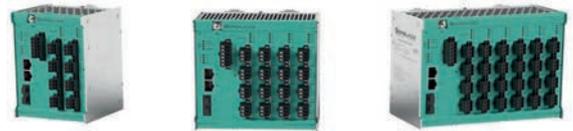


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Endress+Hauser and Hahn-Schickard Founded Joint Venture for Fast Molecular Analyses

The research and development service provider Hahn-Schickard has been working closely for many years with the Department of Microsystems Engineering at the University of Freiburg to develop rapid diagnostic tests that can detect extremely small concentrations of infectious pathogens with portable instruments. The joint venture is now aiming to transfer this technology from the field of medical diagnostics to industrial process and laboratory automation applications. During the first few months, Endress+Hauser BioSense will operate in spaces located at the university and Hahn-Schickard. Next year the company will move into the university's innovation center, FRIZ, currently under construction on the campus of the Faculty of Engineering. The start-up will thus expand Endress+Hauser's activities in Freiburg, where developers are already working on new sensor technologies, biosensors and Industry 4.0 solutions. In the development of equipment and methods for molecular analyses for process and laboratory environments, Endress+Hauser BioSense will be working closely with IST Innuscreen GmbH in Berlin, which is also part of the Endress+Hauser Group. IST Innuscreen offers a broad portfolio of nucleic acid isolation and molecular diagnostics products and among other things supplies kits and assays for PCR diagnostics.



Specialist for Stainless Steel Tanks Starts Pharma Unit

Gpi Group, specialist for the construction of stainless-steel tanks has established a new business unit tanks to serve customers better and faster. Gpi Pharma unifies all Gpi's experts in the design and production of pharmaceutical high-quality storage and process tanks. The Gpi Group has 25 years of experience in the pharmaceutical industry and is familiar with all design and production requirements. Whether for process vessels, mobile reactors or WFI tanks, Gpi engineers know the rules and regulations, e.g., ASME-BPE and the European Pressure Equipment Directive (PED), through and through. With Gpi Pharma, the company wants to respond faster and more focused to pharmaceutical producers' special requirements and needs. The pharmaceutical industry has been in great demand from investors for years now, and substantial investments are made everywhere. The coronavirus pandemic has further accelerated this development, especially in the production of vaccines. Gpi Pharma sees great growth potential and will continue to invest in the business unit over the coming years.



HRS Heat Exchangers Acquired by Exchanger Industries Limited

Canadian company Exchanger Industries Limited (EIL), designer and manufacturer of heat transfer products for the energy, petrochemical, industrial and clean power generation sectors, has acquired HRS Heat Exchangers Ltd (HRS). Financial terms have not been disclosed. HRS is a specialist global supplier of heat exchangers and custom process systems across the environmental, food, beverage, chemical and pharmaceutical sectors. The acquisition by EIL creates new opportunities by combining HRS's capabilities and market sectors with EIL's accelerating expansion into power generation, Liquefied Natural Gas (LNG), renewable energy, power storage and biofuels applications. The combined business is positioned to create market growth by providing its customers with environmentally sustainable heat exchange solutions. The seasoned HRS management team will be retained by EIL and will play a critical role in executing plans for robust international expansion afforded by the strategic combination of two distinct, yet complementary industry leaders. Mark el Baroudi, CEO of EIL, stated that the acquisition of HRS Heat Exchangers provides EIL an extraordinary opportunity to expand their exposure to an impressive international customer base.



Consolidation of Know-How for CO₂-Neutral Energy Solutions

With the foundation of NEA GREEN GmbH & Co. KG, the NEUMAN & ESSER GROUP (NEA GROUP) is further expanding its portfolio as a solution provider for "green gases" and strong partner for the decarbonisation of energy and industrial systems. NEA GREEN consolidates the production, engineering and service know-how of the NEA GROUP for the production, storage and transport of green hydrogen. The focus is on products and services for the intelligent, safe and efficient production and use of hydrogen as an energy carrier. NEA GREEN thus covers the growing demand of companies for consulting, feasibility studies, concepts, project development, implementation and sales support for CO₂-neutral hydrogen systems. NEA GREEN is the latest unit with which NEA GROUP is strategically aligning its ENERGY SOLUTIONS business division to the decarbonisation of the economy. It had already started the upgrading of its energy division in 2020, with a reinforcement by "AEDS - AE Driven Solutions GmbH", "ARCANUM Energy Systems GmbH & Co. KG, HYTRON Energy & Gas and INFINIUM. The technological expertise along the green hydrogen value chain thus ranges from electrolysis and compression to biomethane, fuel cell and e-fuel applications.



SEAL-LEAK MONITORING MASS FLOW METER

Monitoring for dry seal centrifugal gas compressors



Engineers who monitor natural gas compressors for seal leaks of methane (CH₄) for safety, plant efficiency and to meet environmental regulations will find the ST75 Series Thermal Mass Flow Meter from **Fluid Components International (FCI)** provides precision measurement in small lines for the detection of hazardous, non-compliant and costly gas leaks. The continuous monitoring of gas compressor equipment for seal leaks

is essential for safety, predictive maintenance, operational efficiency and to meet various federal and state environmental regulations. FCI's ST75 Series Air/Gas Flow Meter is well suited for small line, low flow measurements in various applications throughout oil and gas industry's production, processing, transportation and storage industry segments. It measures air or gases from 0.01 to 559 SCFM (0.01 to 950 NCMH) depending on line size and actual process conditions. The ST75 is factory calibrated and can provide a flow turndown range up to 100:1; surpassing the capabilities of other flow meter technologies. With built-in temperature compensation, the ST75 Flow Meter offers highly repeatable performance in harsh industrial process environments. It features accuracy to $\pm 2\%$ of reading with $\pm 0.5\%$ repeatability over varying process temperatures and pressures in line sizes from 0.25 to 2 inches (6 to 51 mm).

►► 60890 at www.pcne.eu

DIGITAL PRESSURE GAUGE WITH IO-LINK

24 Vdc version, optionally available as battery device



Kobold have released the latest version of their electronic digital pressure gauge; model MAN-SC for battery powered, and model MAN-LC for 24Vdc power with IO-link. Outwardly the two versions are similar in appearance and share most of

the screen functionality features which are now accessed via capacitive Touchpads. The new alpha-numeric 14-segment reflective LC display screen is impressive, with a full 5-digit display, and digit height of 16mm. The electronic screen module can now be rotated in 90° increments; ideal for side mounted or inverted installations. Battery life with 9V Lithium is now increased to 22,500 hours (2.5 years). Measuring ranges are now available from -1...0...+1600 Bar. The range of process connection threads has also been substantially increased and now include metric threads. Additionally, from the options list Kobold are able to assemble diaphragm and hygienic process connections. The new MAN-LC model comes with IO-Link, and is possibly the only Digital Pressure Gauge worldwide with IO-Link at the moment. Many of the standard features included in the battery powered MAN-SC model are typical, however, the MAN-LC is 24Vdc powered and therefore further features are included, most noticeable the backlit LC-display, that provides a clarity which traditional digital barrel transmitters cannot provide.

►► 60925 at www.pcne.eu

INFRARED LINESCANNER

Realtime non-contact temperature imaging and analysis



Fluke Process Instruments introduces the MP Linescanner Series, which delivers continuous, accurate, edge-to-edge thermal images and temperature measurements for high-speed manufacturing processes. The series

features Fluke's widest selection of spectral and temperature ranges to accommodate a variety of industrial applications. The new imagers provide real-time imaging at scan speeds up to 150 or even 300 Hz; three shortwave models deliver maximum scan rates of 300 lines per second; these are geared primarily at the metals industry. The new MP Linescanners can measure up to 1024 temperature points across a scan line at a rate of up to 300 lines per second, allowing manufacturers to better control their continuous moving processes, automate temperature measurements, and ensure product quality. The versatile MP Linescanner Series features rotating optics and a 90-degree field of view that quickly renders a 2D image on a PC. The scanners are equipped with high-quality brushless motor (MTBF 40,000 h) for a long product life. They have built-in Ethernet TCP/IP communications, a PC-independent alarm output and PC-independent 4 - 20 mA interfaces (3 outputs). The I/O module has PC-independent support for up to 10 sectors/zones.

►► 60703 at www.pcne.eu

DIGITAL TOROIDAL CONDUCTIVITY-SENSOR

For use in aggressive media with large measuring range



Knick has introduced the new SE656N-digital conductivity sensor. With a large measuring range of 0 to 2,000 mS/cm (resolution: 0.002 mS/cm), the sensor is an all-rounder that is suitable for almost any application. The sensor material,

PFA, is also extremely resistant to chemicals and thus particularly protected from aggressive process media such as high-concentration acids, e.g., hydrofluoric, nitric, and sulfuric acid, as well as concentrated bases and strongly oxidizing media. The digital data transmission is compatible with the Memosens protocol and protected from interference due to cable length or the operating environment. The analog measured value is converted into a digital signal with galvanic isolation in the sensor head. This means that measured values can be reliably provided to the transmitter over long distances without interference, even with simple wiring. In addition, the calibration data is stored directly in the sensor head, enhancing process reliability and reducing maintenance needs. On the SE656N-digital, the digital functions are directly integrated in the sensor, which is equipped with a captive cable. Toroidal sensors measure the conductivity of a liquid electromagnetically using two coils, which are galvanically isolated and never in direct contact with the process medium.

►► 61016 at www.pcne.eu



ULTRASONIC LEVEL SENSORS

IO-Link-sensor for bulks and liquids



The new **microsonic** crm+ level sensors are equipped with IO-Link interface version 1.1. The IO-Link interface transfers measured distance values as well as identification, status and diagnosis values. It can easily be set with IO-Link maximum distances

or switching points. The robust sensors cover a measuring range from 30 mm to 8 m with its five detection ranges. The Push-Pull switching output is used in standard-IO mode or switching output (pnp or npn). The crm+ sensors in M30 stainless steel housing detect continuously levels of liquids and all kinds of bulk materials that reflect sound. This enables non-contact level control regardless of color or transparency.

▶▶ 60690 at www.pcne.eu

MOBILE LEAK AND FLOW TEST SYSTEM

For testing of up to 16 ports simultaneously



Chell Instruments have announced their newest development, the PIT 100, a self-contained automated leak and flow test system. Pipe-work integrity (the PIT 100) is the first instrument of its kind and performs a number of tests to determine the integrity of pressurised pipework, looms or harnesses. Chell's PIT 100 has been created to test both a single port or

up to 16 ports simultaneously, so it can be used for both small and large operations. Its three main functions are leak testing, continuity testing and flow testing. It can perform leak tests by applying pressure to all the ports in use, isolating the pipework or harness from the supply and then measuring any pressure decay. For continuity testing, the PIT 100 can also test multi-way looms.

▶▶ 60924 at www.pcne.eu

HIGH PRESSURE FLOWMETER

In different materials for high chemical compatibility



Titan Enterprises reports that its High Pressure Oval Gear (OG4) flowmeters provide an ideal solution for applications, within the oil and gas industry, that require a highly accurate and chemically resistant measurement device, such as metering high pressure additive injection.

Titan's OG4 flowmeters are proven to operate reliably even at high pressures, providing long-term performance with minimal maintenance. OG4 flowmeters are able to operate at temperatures up to 150°C. They handle pressures up to 700 bar and up to 950 bar for custom-designed models. With a standard flow range of 0.25 to 50 litre/min on 30cSt oil, OG4 flowmeters are able to regularly achieve outstanding repeatability (0.1%) and accuracy (0.75%).

▶▶ 60815 at www.pcne.eu



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ELECTRONIC FLOW SWITCH WITH DISPLAY

Flexibility for flow monitoring of liquid media



The switch points of the new **WIK**A model FSD-4 can be freely configured very easily via the 3-button operation directly on the instrument or optionally via IO-Link. The model FSD-4 can output both absolute values in various units and relative flow values and display them on the digital indicator. While a flow rate

value is assigned to the first switch point, it can be defined at the second switching output whether the switch should switch at a second flow value or at a specific temperature value for the medium. The wide range of parameterisation options makes the model FSD-4, with only three basic variants, an economical flow switch for a wide variety of applications and installation situations.

▶▶ 60931 at www.pcne.eu

MICRO PUMPS FOR CORROSIVE LIQUIDS

For safe and precise delivery of ammonia solution



A continuous mixing unit consisting of several static mixers is supplied with eight liquids of different viscosities. Micro annular gear pumps of the hermetically inert series and the high-performance series from **HNP Mikrosysteme** are

used for the smaller volume flows of highly corrosive liquids. Aqueous ammonia (NH₃ 25 % aq.) is a special technological challenge. Here the hermetically inert pump mzm-6355-cs works in a material combination of ceramic and stainless steel. In this application, the micro pump delivers volume flows between 4 and 7 ml/min. The system produces mixtures with different polymer concentrations. The continuous mixing system is fully automated.

▶▶ 60696 at www.pcne.eu

ROBUST MINIATURE PRESSURE SENSORS

Stainless-steel sensor with 1/4 inch process connection



The miniature pressure sensors of the **ifm** PL54 series feature a flush diaphragm seal, directly welded to the sensor with G1/4 thread. The compact and robust housing is made from high-grade stainless steel and has a width across its flats of 19 mm.

In addition, the pressure sensors have high protection ratings of IP 67/IP 69K and are thus suitable for use in very harsh environmental conditions. The integrated pressure measuring cell offers a high measuring accuracy of <math>< \pm 0.5\%</math> and a repeatability of <math>< \pm 0.05\%</math>. The pressure sensors provide a standard output signal of 4...20 mA and are available with different measuring ranges from 0...60 bar up to 0...400 bar.

▶▶ 60803 at www.pcne.eu

Digitalization of Work Procedures - Get Real Work Done Digitally

The world is going digital - this applies to our private lives as well as to large parts of our work. In the process industries, the focus is often on end-to-end digital engineering, the analysis of big data, or the utilization of legacy data. But in what way can digitalization change daily work routines and increase work efficiency? A practical example is provided by the specialty chemicals company Lanxess, which has abandoned the classic clipboard, thus demonstrating very clearly what digitalization actually means and what benefits it offers.

Digitalization projects are often thought of on a large scale, for example, completely digital production or the digital twin of the plant. The added value that is ultimately achieved is initially theoretically determinable, but the path to it is not always predictable. Digitalization is never an end in itself; the return on investment (ROI) should ideally be foreseeable and precisely quantifiable. This is much more possible with smaller digitalization projects.

Time, effort, and cost are predictable, and the benefits are often verifiable after a short time. In addition, such steps make a significant contribution to continuously increasing the digital maturity of plants. Above all, these measures are not only easy to scale,

but can also be placed in a larger context. In this way, very specific tasks can be solved in a goal-oriented manner. Let's look at some of the fundamental challenges the process industries are facing: The growing pressure to cut costs, combined with the significant increase in the shortage of specialists, is leading to the use of external skilled workers in many areas. Just like in-house employees, they are increasingly dependent on easily accessible data, operating and work instructions as plants become larger and more complex.

Against this backdrop, paper, clipboard, and pen, which are still ubiquitous in many phases of the plant lifecycle today, appear to be exceedingly ineffective tools.

THE DIGITAL WORKER

Commissioning, maintenance work, safety inspections - checklists that serve to document work procedures can be found everywhere. Since these documents often have legal value as evidence, the paper documents are kept and, depending on their use, are also converted into a (partially) electronic form. This is time-consuming and error-prone. Above all, such a procedure is contradicting with data integrity, transparency, and the easiest possible access to information, which today - in the digital age - is not only possible but also sometimes necessary. To this end, it is required to equip the personnel deployed with appropriate documentation tools. The analog employee thus becomes a digitally empowered worker. In the future, they will no longer need to know all the details of the plant but will be guided by the system to their place of work. There, they will no longer carry out their work with a paper checklist, pen, and clipboard, but with a mobile end device: laptop, tablet, smartphone, or data glasses. These tools not only allow information to be entered directly into central databases, but in turn provide access to relevant data necessary for proper workflows. A system that enables a worker to work digitally must meet appropriate requirements: In addition to an intuitive user interface, it should above all be able to connect to as many different data sources as required, because in many plants data is distributed in many different places, for example in enterprise resource planning, engineering, or distributed control systems. Not only do they all provide valuable information, but they also benefit from data input straight from the field.



Step-by-step digitalization: Lanxess is on its way to mobile operations management and maintenance in production and is getting rid of clipboards, pens, and paper.



APPLICATION ORIENTED TOOL

With the concept of the “Digital Worker”, Siemens summarizes this form of digital working in technological terms. An application server, which can run either cloud-based or on-premises, forms the data hub and ensures data management and consolidation of information. The Digital Worker provides targeted support for very specific applications: Loop checks and commissioning of field devices during commissioning, process and quality controls as well as safety inspections and extensive maintenance support during operation, turnaround or shutdown management and many more. Depending on the use case, the system not only provides task-specific information, the output on the mobile devices is also adapted to the tasks. This also includes augmented reality services that enrich the real environment with digital content. For example, process values can be overlaid on real components such as bioreactors or pumps, and all plant equipment can be reliably identified.

THE END OF THE PAPER ECONOMY

As in other chemical companies, printed checklists ruled the day-to-day lives of many operating and maintenance crew members



at specialty chemicals company Lanxess for decades: Every year, the Cologne-based company came up with around 400,000 operating and maintenance checklists. Today, these are filled out via tablets and smartphones. For the digitalization of the templates and the IT infrastructure, Lanxess relies on the support of Siemens and the Moby.Check software solution. Today, pump maintenance, regular checks of critical safety equipment and process documentation no longer require a single sheet of paper. A suitable digital checklist is available for each procedure. Entries made by specialists on site are forwarded directly in

the correct format to the relevant IT systems via the application server after secure user authentication. The Moby.Check digital checklists are directly linked to Lanxess’ maintenance and enterprise resource planning systems via interfaces. This end-to-end integration into workflows saves duplication of effort. In addition, the templates and interfaces ensure that data is transferred correctly. Automatic archiving ensures the legally secure storage of the data. Moby.Check is also offline-capable for smooth and operational use: If there is no server connection, data is temporarily stored locally until the mobile device connects to the server again.

EASY TO USE, OPEN TO NEW IDEAS

When implementing the digitized operating procedures, the focus was on ease of use. When digitizing the checklists, Lanxess specialists checked that they were up to date and made suggestions as to how processes could be made even more efficient in the future. The implementation was supported by Siemens in an advisory capacity, and the checklists themselves could be conveniently created by Lanxess employees thanks to the easy-to-use checklist editor. Working with the digital equivalents required little rethinking, and so the system was rolled out plant-wide with less than a day of training. Roll-out for 65 operating sites worldwide is imminent. For Lanxess and other customers, one thing is certain: the “Siemens Digital Worker” is an application-oriented, flexible, and open solution that can be used to bring previously paper-based workflows into the digital age. This not only simplifies these procedures and takes less time, but also significantly increases data quality and integrity. The system is up and running very quickly and can be easily adapted to new operations. In cooperation with its customers, Siemens is continuously expanding the number of use cases covered.



Example of a tank truck take over with decentralized 4-eye check

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Spot-on Timing for a Plant Conversion Project

Process plants are often very extensive. Many of the plant components are interlinked and their functions coordinated. People who work in this area of plant construction know that there is generally less effort and expense involved in building a new plant, rather than adapting the existing one to meet new requirements. Despite the numerous challenges – and the restrictions imposed by the Corona pandemic and its consequences – the new and renovated production reactors went into operation again right on schedule.

With its construction of a new TDI plant in Ludwigshafen (TDI - toluene diisocyanate), BASF decided to stop production of this chemical in Schwarzheide and shut down parts of the TDI plant there. This was one reason why some sections of the works, situated in the Lusatia area north of Dresden, were out of action for just under ten weeks in summer 2020 – the time was also used as an opportunity to implement various conversions and new construction projects. Because the TDI plant is interlinked with the infrastructure of the works and with other production chains, as well as decommissioning and dismantling this involved extensive conversion work.

PLANNING AND ENGINEERING OF ELECTRO-TECHNOLOGY AND AUTOMATION

To realize this complex project BASF cooperated closely with various external planning and installation enterprises. The engineering of the automation technology was entrusted to Rösberg Engineering GmbH, the process automation specialist and manufacturer-independent system integrator. The automation experts took on the engineering of documentation and assembly documents for electrotechnology and automation. They also optimized the logic diagrams for programming, drew up intrinsic safety (IS) certificates, wiring diagrams and detail and basic engineering. Christian Pöschke works as Head of Engineering Service Schwarzheide at Rösberg and took on the project management on their behalf. He comments: "We carried out numerous as-built surveys on the spot, to get an overview of the present state of the plants. Comparing the existing documentation with the as-built state was very important in or-

der to be familiar with the present situation and use it as a basis for planning. If any unclear points arose, we clarified them with our customer. But good communication was also necessary in the other direction to ensure that installation went as smoothly as possible and could take place without hold-ups. It was an advantage for the project that BASF has been cooperating with the automation experts for many years now and that Rösberg, as well as its local branch office, also maintains its own office on the plant premises.

MASTERING CHALLENGES

Planning for the automation in this large-scale project began early in 2019. A few fig-

ures will serve to illustrate the size of the project: more than 50 items of machinery were moved to new positions, more than 1000 I&C devices were connected and more than 300 pipelines were laid. These sheer quantities alone already represented a challenge. But the fact that the different sub-projects of dismantling, conversion and new construction were all interlinked generated an enormous degree of complexity, meaning that it was essential to retain an overview at every point in the project – even more so when unforeseen problems suddenly cropped up and plans had to be changed at short notice. Due to the many parallel but interlocking projects, the necessary effort in-



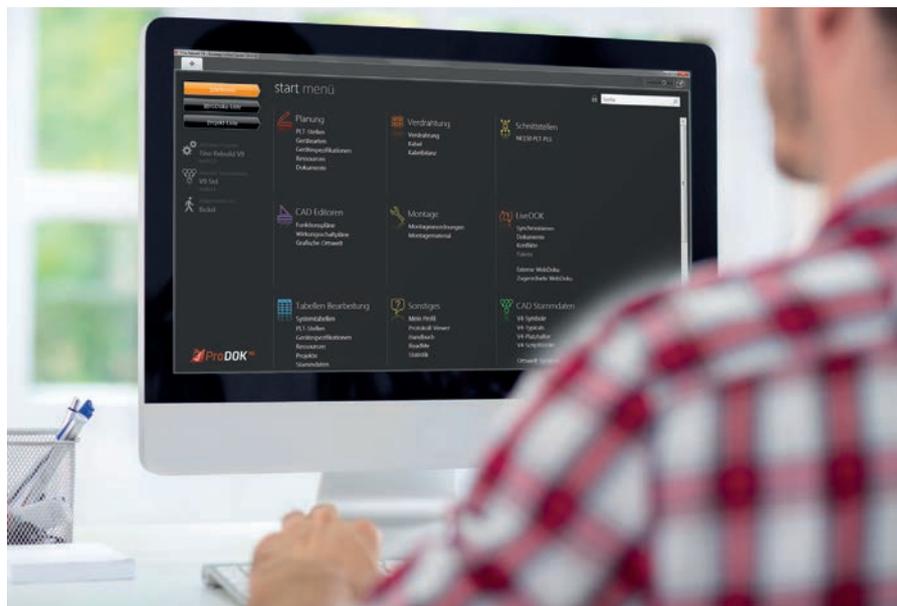
In the summer of 2020, production in the o-NT in the BASF works in Schwarzheide stopped for ten weeks. In this time extensive dismantling, conversion and new construction work was carried out – a project that required effective coordination between customer, planners and installation teams. (copyright: BASF)



vested in coordination and communication was enormous.

However, another of the project's main challenges is not reflected in these figures. Pöschke explains: "In many places, the current documentation status had to be checked against plant reality. So before we could make a start on planning and on clarifying which parts of the plant were still needed and which were to be dismantled, there had to be a detailed check of the documentation" – because before any dismantling could take place, the question of which parts of the TDI plant complex would still be needed in future had to be reliably disentangled.

Moreover, the time window of ten weeks for the conversion did not exactly give much time to spare. And the active conversion phase coincided with the height of the Corona epidemic in spring 2020, meaning that appropriate rules had to be observed on the building site. "In fact it wasn't so much the aspect of Corona that influenced our planning as the trades involved", Pöschke recalls. "One challenging organizational as-



Rösberg took on the planning of documentation and installation documents for electrotechnical and automation engineering. (c) Fotolia luckybusiness

pect was that depending on which stage we had reached in the project, between three and ten of our people were needed in our work area. Thus great flexibility was needed here, and the concept we introduced several years ago, of bringing in colleagues from our other German locations as required, proved effective once again."

ANY PLANT IS ONLY AS GOOD AS ITS DOCUMENTATION

Our experience with the conversion demonstrates once again how important it is to have correct plant documentation. This equally concerns conversion projects and reliable operation. Basically, a project in the process industry only counts as completed once the as-built documentation has been handed over to the customer. Here it was an advantage for the automation experts that BASF in Schwarzheide works with the PLT-CAE-System ProDOK NG for documentation. The system was developed by Rösberg in-house, using the input of its extensive project planning in process engineering. Pöschke sums up: "As the tool is used consistently throughout planning and implementation, hardly any additional effort for documentation is needed after the end of the project. All the plans, installed components and necessary documents are recorded in ProDOK NG during planning and realization and they are available immediately after the project is finished. This means final completion can take place sooner."

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THE PLT-CAE SYSTEM PRODOK NG

Modern process plants can only be effectively operated if the data from the engineering phase are also available for operation, maintenance and modernization. As-built plant reality has to reliably match the documentation at all times. Only if all data are consistent can costly new entries and the unnecessary use of engineering resources be avoided. This is exactly where the I&C-CAE system ProDOK comes in. It ensures an integrated planning process with unified rules. Because all the data are collected and exchanged within the same system, there is no more trouble with tiresome data transfer errors. Functions include basic planning, detail planning, functional planning, electrical engineering, process technology in the area of piping and instrumentation, implementation planning and installation planning for new construction projects, plant alterations and extensions, as well as operational support. Thus support covers the whole life cycle of the plant. By its continuous, consistent documentation ProDOK ensures that the documentation really does reflect plant reality at all times.



FREE DIGITAL SUBSCRIPTION

N° 9 - SEPTEMBER 2021

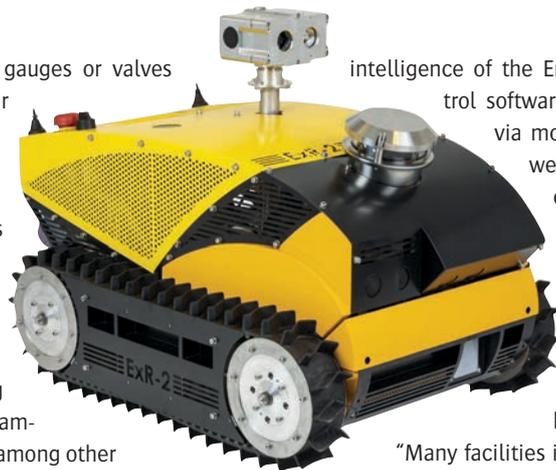
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ATEX-Certified Autonomous Robot for Plant Inspections

Energy Robotics, the developer of software solutions for mobile inspection robots, is expanding its range with the latest development from hardware partner ExRobotics, the leading manufacturer of commercially deployed inspection robots with IECEx/ATEX zone 1 certification. The EXR-2 reliably performs repetitive tasks and is therefore particularly suitable for inspection or monitoring tasks.

The predecessor model ExR-1 was already successfully used more than 30 mobile inspection robots at 9 customers. With the ExR-2, Energy Robotics and ExRobotics are now taking a further step in their partnership: the new generation of IECEx/ATEX-certified inspection robots is equipped with LiDAR sensors (short for light detection and ranging or light imaging, detection and ranging) in addition to a GPS for the first time. This is a form of three-dimensional laser scanning which, in addition to creating high-resolution maps, is also used in the control and navigation of autonomous vehicles. With the help of the sensors, the ExR-2 recognises its location in the terrain and also avoids sudden obstacles. In addition, the ExR-2 is able to independently target inspection points such as thermom-

eters, pressure gauges or valves and check their indications or condition using machine vision. For this purpose, the robot was equipped by ExRobotics with a rotating and elevating camera, which has, among other things, a thermal imaging camera. Via other installed sensors, the ExR-2 can also monitor noises, detect leaks or map the concentration of gases in the air. The recorded values are read out by the integrated artificial

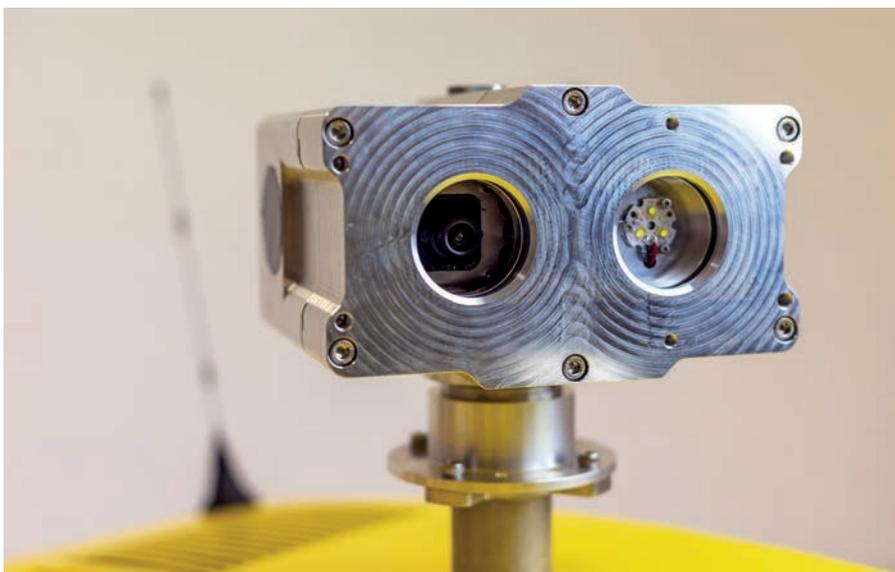


intelligence of the Energy Robotics control software and sent securely via mobile network to the web-based interface of the employee in the control centre. On this basis, they can make informed decisions without exposing themselves to health risks.

"Many facilities in the oil and gas industry are unmanned and usually function smoothly that way. Nevertheless, they require regular checks, which until now have mostly been carried out by humans. However, this entails certain risks, both in terms of health and quality. Just like its predecessor, the ExR-2 is built to take on repetitive inspection tasks in such harsh environments," explains Iwan de Waard, Co-Founder and Director from ExRobotics. "In combination with the control software from our partner Energy Robotics, companies are able to monitor their plants remotely with the ExR-2 and carry out inspection rounds completely autonomously. In this way, they minimise the risks for their employees, detect gas leaks or accidents at an early stage and can thus usually avoid them."

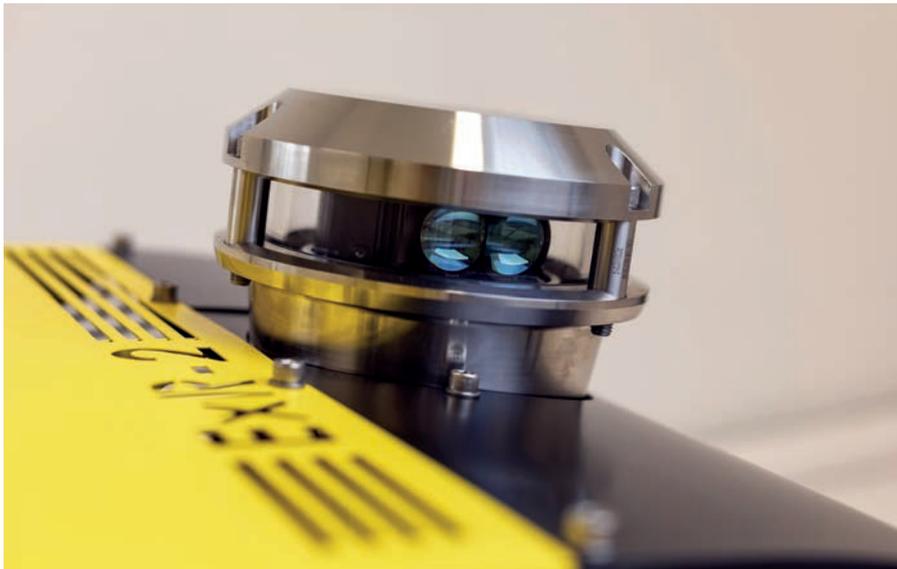
COLLEAGUE ROBOT ON THE MOVE AUTONOMOUSLY

The EXR-2 and its sensors are taught using the teach-and-repeat principle. With the help of Energy Robotics' control software, users complete this process from their own location via the web-based user interface. A Digital Twin, based on the environmental data



For independent inspection of indications or condition of thermometers, pressure gauges or valves, machine vision is used.





With the LiDAR sensors the ExR-2 scans the surroundings and avoids sudden obstacles.

captured by the robot, allows the user to track the ExR-2's current position in the plant on the screen. This allows inspection routes to be planned precisely and inspection points to be targeted accurately. No installation is required to commission the intuitive software. Users simply connect to the robot and run the inspection round once. To save inspection points, the sensors are aligned with the corresponding points. Users then select the type of inspection (visual, thermal, auditory, etc.) and the playback medium (audio, video, etc.). Individual measuring points can be specified by naming them, and different inspection rounds can also be defined. The user interface also provides quick access to live video images and sensor data during later autonomous operation. These are sent from the ExR-2 to the user dashboard via the mobile network, protected by special security systems, whose access is additionally encrypted. The management of multiple inspection robots is also possible via the interface.

SAFE INSPECTION IN HIGH-RISK AREAS

ExRobotics is the leading manufacturer of commercially deployed IECEx/ATEX zone 1

certified inspection robots and has designed its latest model so that its electronics are completely built inside. This ensures that the ExR-2's electronics will not ignite gases in sensitive and explosive industrial environments, the chain drive will not spark and sensors will not generate potentially dangerous heat. This means the robot is certified for use in IECEx and ATEX Zone 1 areas. A Zone 1 area is classified as a place in which an explosive atmosphere consisting of a mixture with air

or flammable substances in the form of gas, vapour or mist is likely to occur in normal operation occasionally. IECEx is an international standard that regulates trade in equipment and services for use in potentially explosive atmospheres in compliance with the required safety levels, ATEX is the European counterpart to this standard.

"Inspection robots like the ExR-2 from ExRobotics relieve humans from working in dangerous environments. They take on tasks that humans should no longer be exposed to by now - not only because they involve a certain risk for them, but also because they for example have to carry heavy equipment over a longer distance to do so," knows Marc Däsler, Chief Executive Officer, Energy Robotics. "Our concern is to make the necessary work in such occupations more pleasant and safer. We enable robots to do this - with the help of our control software, they become intelligent enough to do so."

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ABOUT ENERGY ROBOTICS

Founded in 2019 as a spin-off from the Technical University of Darmstadt, Energy Robotics is a pioneer in mobile robots for autonomous inspection of industrial facilities. The start-up offers the first commercially available software platform that brings together a hardware-independent robot operating system, cloud-based fleet management and AI-driven data analysis for industrial applications.

Energy Robotics software-equipped mobile robots are used for remote inspection and monitoring in demanding environments such as the oil, gas, petrochemical, security and energy industries. More than 30 robots with a total of more than 25,000 operating hours are already in operation on four continents. Energy Robotics was funded at TU Darmstadt by the EXIST research transfer programme of the Federal Ministry for Economic Affairs and Energy (BMWi) and the European Social Fund. (ESF).



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The Built-in OPC UA Capabilities are a Powerful Addition to the FDT Server

Glenn Schulz, Managing Director at FDT Group, gives us the details of the FDT 3.0 IIoT ecosystem, as well as insights on smart manufacturing and mobility, CIP security enhancements and 5G technology

Can you tell us more about the FDT 3.0 IIoT ecosystem? How can this help optimize next generation automation solutions?

The IIoT ecosystem designation comes because in this architecture we have now placed a server. The FDT server is highly scalable. It fits all the classic IoT requirements and capabilities, and our ecosystem continues to expand. We are, in one sense protocol agnostic. In the larger sense, what this part of the ecosystem means to the end user is that they can remain essentially oblivious to what network of particular devices on when they're talking with, it doesn't matter how many layers deep it is. They are able to directly access that device. And then another part of the ecosystem with FDT 3.0 is all the toolkits and capabilities that we make available for developers, so that basically, they can go to market much quicker with their FDT enabled products. In terms of the optimization of next generation automation solutions, in the fact that you can access all of the information from FDT, wherever you are, the mobility aspect of it, in consideration of the type of solutions that can be offered with, end users can do optimization around these considerations. For instance, some more senior engineer or senior technician can remotely access information to help a junior person to troubleshoot a problem or to commission a line without having to physically travel into the facility. In the context of COVID-19, it is a pretty important deal.

What kind of contribution does the FDT group brings to smart manufacturing, and mobility?

The FDT group is a standards organization. What we do is providing the underlying capabilities for smart manufacturing and mobility. For example, in the era of smart manufacturing, the world is pretty much standardized on OPC UA, in terms of how we want to access data from different systems to be able to leverage that data elsewhere in the enterprise. The new FDT server architecture

includes an OPC UA server. The data is available across the enterprise because of the FDT standard and is now freely accessible for other uses within that enterprise through OPC UA. For example, you might have a request where a production manager asked for a dashboard to be put together to monitor a new production line. Well, that is trivial if you can immediately get all that information through OPC UA without having to reprogram the PLC or intervene with the DCS because the FDT standard sits side by side at a peer level with the PLC and DCs so it can offer up all of that information to elsewhere in the enterprise without disrupting the control environment. The same is true for mobility: the FDT server, or the user interface can now be accessed through any browser.

A few weeks ago, the ODVA announced CIP Security enhancements to support resource-constrained Ethernet/IP Devices. What does this bring to the FDT 3.0 FITS platform?

It brings more security to the overall solution, obviously. First, I have to compliment the ODVA, I think they are showing the industry what is necessary to develop and enhance a secure communications protocol. We do not have any parallels for that in the industry. CIP security is so important for our industry in general, for us as a standards organization. This means that when we are connecting using these protocols, then we can be ensured of a more completely secure solution. Without that you can have a network that is unsecured that is talking to a highly secured environment like the FDT server. And that is not optimal from a security perspective. So as the ODVA organization continues to ratchet up the security that they make available through CIP security, this is only going to benefit the industry and FDT enabled solutions as a result.

In this critical time of the pandemic, how can your solutions give a hand to companies work-



Glenn Schulz, Managing Director FDT Group

ing with reduced staff or remotely? For example, how can the FITS standard can help them?

The new FDT server features an internal web browser, so that any web browser can attach to it. We have enhanced the user interface that is aware of the dimensions of the screen, whether there is a physical keyboard or touchscreen. It has a responsive UI. "Secondly, a remote solution is great" a remote solution is great. But if you do not wrap that tightly with the secure remote solution, then it is not really a workable feature in a standard like ours. We have spent a great deal of time to look at the underlying architecture related to security, so that when people do work remotely with our new standard, whether that is because of reduced staff, whether it is because of some domain expertise, they can connect securely to that remote server. When you are doing online banking, we are all conditioned now to look at the URL bar and make sure that I am really talking to the server I think I am talking to, which is my bank, and it is not somebody fishing and trying to get me to give up my credentials on some other site. I think we are familiar with that. Certainly, the FDT standard has that capability built in. But there are also cases where the IT or OT department when these people work remotely, may not want to allow them to use just any device to access that remote server, but may require that it be an authorized device from the company, or one that has been secured by the company. Therefore, they can turn on an additional feature in the FDT server that will ensure that only authorized clients can even



connect to the server. If you were under those circumstances, pick up your personal smartphone, even though you know the address of that server, when you try to connect it will simply refuse the connection. So, you would not even get to the point of being able to use your login credentials. It would be more like the server is not even there, is not going to talk with you at all, because you do not have an authorized client device. Thus, if we layer these kinds of features into the standard depending on the security profiles that the company wishes to maintain, they can turn on these enhanced features to ratchet up that security. Once you are in a confident, secure environment, you can log into that server. And you can do virtually anything you could do if you were standing physically in that same facility, so you can look at the health of your network, you can look at the health of your devices, you can get real time data from your devices, you can browse the manuals for the devices, you can set parameters on them.

In your opinion, what changes will bring 5G in industrial communication? What benefits will it bring to the factory? How can the FDT group can benefit from 5G?

5G, at its core, brings more of what the promise of IoT is, which is just smart devices connected

with physical networks wired up to some controller, but also devices that have no wire at all and are just sitting on a simple Wi Fi type network, for example, or Bluetooth network with its limited capabilities. You particularly can see these examples when you start thinking about AI applications, distributed DCs applications, or even in a classic industrial control environment where you wish to add additional sensing, additional monitoring capabilities to some process, instead of having to use hardware to do such. These devices can now have a 5G connection. And I think the real advantage here is simply the bandwidth and the additional security that 5G brings. The other advantage of 5G is that architecturally you can go up to the cloud with that device instead of necessarily having to go directly to a PLC or DCs.

From a FDT perspective, we immediately benefit from 5G because it is largely transparent to our standard. All the 5G capabilities can immediately be leveraged through the FDT standard. It does not matter what is the underlying protocol of that remote devices. Because we support all those protocols. Thus, it will be just a natural extension to the FDT standard.

Do you have anything more to say to our readers?

The thing that we continue to see as one of the highest levels of interest, beyond just the mobility capabilities, is the whole built-in OPC UA capabilities. Since we already have direct lines of communications to all the devices, and we can see the health of all the underlying networks, it really is a powerful addition when you bring the FDT server into a control environment. Suddenly, all that working used to be done to get the information routed through the PLC up to the ERP or some other application now becomes almost a trivial exercise, because you can attach to the FDT server if you have the right credentials, and you can browse the data structure of the facility. You do not even have to necessarily know that particular device name. You can use the OPC UA capabilities, just browse, find the device, find what information is available to get that information integrated into your application. Yes, I think that this has driven a lot of conversations for end users about the capabilities of the new FDT standard. I think everybody is very comfortable with all the things we continue to do because of our legacy of configuration, diagnostics. The OPC UA capabilities are really an eye opener for people.

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COMPACT MEASURING DEVICES

With smaller connections for the pharmaceutical industry



Pharmaceutical resources are becoming increasingly expensive, which is why plants are built in such a way that as little as possible is lost - for example, with especially compact containment systems. When it comes to metrology, particularly high-quality and precise measuring, devices with small process connections are required, such as the PASCAL CV4 by **Laborn**. The electronic pressure transmitter with high-resolution graphic display, intuitive operator

guidance, backlighting and an accuracy $\leq 0.15\%$ meets all the usual requirements in pharmaceutical production. Its high accuracy enables precise dosing in the filling process, so that none of the valuable product is lost. The PASCAL CV4 is also ideally equipped to meet the ever-stricter hygiene requirements: It can be combined with a selection of easy-to-clean hygienic diaphragm seals in a variety of sizes and designs. These process connections protect against product loss and ensure that the systems are easy to clean. Connections suitable for CIP and SIP make residue-free cleaning possible with designs that are free of dead spaces and excellent surface properties.

►► 60791 at www.pcne.eu

CONTROL HEAD WITH IO-LINK

Decentralized automation of hygienic processes



Control heads now assume complete control of pneumatic valves, including feedback and diagnostic functions, for decentral automation concepts. They are used, for example, in the pharmaceutical, beverage and food industries, as well as in biotechnology. In order to meet requirements in the future, **Bürkert** has now upgraded its proven, intelligent control head Type 8681 with an IO-Link interface. The control head is

equipped with a universal actuator adapter. As such, the most hygienic process valves available on the market can be connected to the control level via IO-Link and Industrial Ethernet or fieldbus systems. Through the use of standard connection technology, the field devices can be integrated into the controller and started up with little wiring effort. Also re-parameterisation in case of device exchange, e.g. during maintenance, is quick and easy, since the device configuration is stored centrally and can be retrieved automatically. Process valves that are used to control process and auxiliary media, e.g. for cleaning-in-place (CIP), can be automated and operated effectively and efficiently. In addition to process data, e.g. the set-point position, additional device data and diagnostic information, can be exchanged digitally between the controller and the shutoff valves via IO-Link Master.

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HUMIDITY AND TEMPERATURE SENSOR

IP65 enclosure with interchangeable sensing module



The EE212's sensing head accommodates a sensing module with **E+E Elektronik's** latest generation high-precision humidity and temperature sensing element. The proprietary sensor coating and the sealed solder pads improve measuring performance and extend the sensing elements life in harsh

environment. The electronics inside the module is encapsulated and therefore best protected against condensation. A wide choice of different filter caps is available for the sensing probe. One major benefit of the EE212 for use in a heavily polluted and aggressive environment is the modular probe design. It enables easy replacement of the sensing module with just a few steps and completely without tools. The EE212 can be flexibly adapted to the measurement task for versatile use. In addition to accurate measurement of the humidity and temperature, the sensor calculates various humidity-related parameters such as dew point temperature, absolute humidity and mixing ratio. The measured values are available on two configurable analogue outputs. Three other physical quantities can be displayed on the optional graphic display. Thanks to the free EE-PCS configuration software, the measurands assignments, output scaling and display can be adjusted. A wall version and a duct version of the EE212 are available.

►► 60807 at www.pcne.eu

POSITIONER WITH HART COMMUNICATION

Low-wear positioning for linear and rotary movements



Dosing, mixing, filling - the number of control applications in the process industries is steadily growing and demands high-performance positioners for process valves. Nowadays, extensive diagnostic options such as a pressure-assisted partial stroke test are vital for reliable operation.

The new positioner CMSH from **Festo** for single-acting and double-acting actuators is therefore the perfect highly dynamic, low-wear positioning system for linear and rotary movements. Its 2-wire technology supports HART communication and condition monitoring functions. The positioner is suitable for a broad range of applications for large and small actuators thanks to its high air flow rate. It is characterised by low internal air consumption, which makes it very energy efficient. The safety functions are already integrated, resulting in cost savings of up to 30%. It offers extensive integrated functions for self-monitoring and diagnostics with clear recommendations for action. This includes numerous standard diagnostic options such as position monitoring and counters for control interventions and positioner changes. Integrated pressure sensors enable intelligent diagnostic functions like continuous monitoring of the break-away pressure of a process valve. The positioner can be used at ambient temperatures from -40 to 80°C .

►► 60979 at www.pcne.eu



OPTICAL DISSOLVED CO₂ SENSOR

Maintenance-free measurement for bioreactors



With a goal of giving bioproduction scientists and engineers greater control to measure, monitor, and automate fermentation processes, **Hamilton Process Analytics** announced the launch of a new optical dis-

solved carbon dioxide (DCO₂) sensor for use in R&D, pilot, and production bioreactor applications. Dubbed "CO₂NTROL" (simply pronounced "CON-TROL"), the DCO₂ probe leverages a solid-state, optical measurement principle and requires no maintenance outside of simple calibration. Unlike other DCO₂ measurement technologies such as off-line blood-gas analyzers and maintenance-heavy electrochemical (Severinghaus) electrodes, CO₂NTROL sensors offer the ideal combination of real-time, in-situ data that is accurate, precise, and not labor-intensive. With a measurement range of 5 - 1,000 mbar (0.5 to 100 %-Vol or 7.5 - 1,500 mg/L), CO₂NTROL also comes with standard Hamilton Arc technology, boasting an integrated micro-transmitter that stores calibration and quality data and makes calibration possible in a controlled metrology lab. The robust sensor is ready for CIP, SIP, and auto-clave. Hamilton's portfolio now includes six key critical process parameter measurements for the bioreactor: pH (and oxidation-reduction potential, or redox), dissolved oxygen, conductivity, viable cell density, total cell density, and now dissolved carbon dioxide.

▶▶ 60982 at www.pcne.eu

MONITORING OF GAS SCRUBBERS

Realtime monitoring of different measurands



Environmentally harmful, corrosive or toxic gases are used in a large number of industrial processes. To protect people and the environment, the treatment of these gases is subject to strict regulations, in particular which

purification criteria a gas scrubber must achieve. Ensuring the complete conversion of toxic components while using scrubbing liquid efficiently is often a challenge for process engineers, as it depends on exact dosage. To enable an exact determination of the concentration of the scrubbing liquid and the salts, two physical measurands have to be combined. Conventional measuring methods often map only one measurand and neglect the influence of the resulting salts. In addition, in many cases the process is monitored in a very time-consuming manner by sampling and titration. The LiquiSonic® process measuring system from **SensoTech** analyzes both concentrations, that of the washing liquid and of the salt, in real time. This allows exact dosing and adjustment of the washing liquid. The washing process thus becomes much more efficient and safer. Thanks to the explosion-proof inline measuring system, no intervention in the process is necessary. The maintenance-free measuring devices are very durable and can be easily integrated into the process control system. LiquiSonic reduces hazards for the environment and employees and ensures efficient, time-saving process.

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COMPACT INFRARED IMAGER

Auto hotspot finder and motor focus enable optimal use



The new **optris** compact infrared camera Xi 410 combines the benefits of infrared cameras and infrared thermometers. Alongside the usual use of an IR camera with a PC and software, this camera also works fully autonomously as a smart, target-seeking pyrometer with analog/alarm output. The Xi 410 has a fast ethernet interface and can conveniently be

powered via PoE. The integrated auto hotspot finder function can be used to reliably measure moving objects without having to readjust the camera. If the network connection is disrupted or there is a problem in the connected PC, the camera takes on the job fully autonomously and ensures a thorough, reliable alarm if a problem is detected. This feature makes the Xi 410 ideal for all safety-relevant applications in the fields of preventive fire safety and the condition monitoring of machines and equipment. As well as the ethernet interface, the Xi 410 also has a USB 2.0 interface for the rapid configuration as well as direct 0/4-20 mA analog output. An external process interface can be used to forward up to 9 freely definable measurement fields as analog outputs (choice of 0/4-20 mA or 0-10 V). The camera's resolution is 382 x 240 pixels with an image frequency of 25 Hz. The Xi 410 is calibrated for temperature measurements from -20 to 900 °C.

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Which enclosure cooling measures for Food & Beverage?



To guarantee an adequate corrosion protection and easily cleaning, Fandis offers a **stainless steel hose-proof hood UL Type 4X for filter fans**, that effectively safeguards against water jets and foreign particles by securely sealing the ventilation openings (FDA-compliant).



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Efficiency Booster for Liquid Filling Machines

8% increased machine speed and boosted machine efficiency to 91% after upgrading from a PLC system to a motion control solution. These are the impressive numbers the liquid filling sachet and tube packaging solutions provider Unette presents after integration of Trio Motion Technology's complete machine control package including controller, servo drives and motors, to improve its overall productivity.

Founded in 1962, Unette builds and operates bespoke machinery for a form, fill and seal process unique within the packaging industry. Covering all types of liquid filling including toiletries, nutraceuticals and medicines, Unette's customers include global household brands who choose Unette for the speed and quality of service and professionalism. Based in Cheshire, UK with a team in excess of 50, the plant has capacity for 1.85 million dosing cycles per week. The group also has a facility in New Jersey, USA, with a further 250 staff.

THE CHALLENGE

Historically using cam-operated machines, Unette began to combine motion control with

servo and stepper motors to improve speed and accuracy. With its two-axis filling and printing machine, tubes are formed individually before cyclically filled with product. They are then die cut shaped, multi coded and any appendages attached.

The cam indexer moves the rotating carousel that holds the tubes until the plate is in the correct position. At that stage, one servo axis controls the motion of the filling heads that dispense the media, the other controls movement of the film for applying brand and product information on the tubes. These two actions have to be synchronized to the main cam and must be coordinated at precisely the right time to ensure accuracy of filling and over printing.

This process also has to be implemented at high speed in order to meet demanding productivity rates.

Previously, Unette used a PLC with a servo package from multiple vendors to achieve the motion control. However, to improve productivity, the accuracy of fill and print registration needed to be increased, as well as the speed of control. Accumulated errors also decreased reliability and using different vendors for the various components within the system resulted in a lack of compatibility.

"Allowing the PLC to coordinate the motion created problems in accuracy and reliability. We wanted a stable approach with more productivity," says Martyn Hudson, Founder and Chief Engineer, Unette.

"Not only was the level of control not achievable with a PLC, we couldn't get the PLC and the servo drives to talk to each other reliably at speed and neither vendor could resolve the issues," adds Martyn. "We wanted a simpler approach. Using a motion controller has not only proved to be more effective, it has also saved us money and made changes easier by less skilled staff."

INCREASED PRODUCTIVITY

Trio installed a complete machine solution, including its highly compact Flex-6 Nano motion coordinator with dual core processor, combined with two Trio DX4 servo drives and Trio MX series servo motors. The Flex-6 Nano controls the entire process, including packaging and filling, from infeed to outfeed.

Efficiency has increased through Trio's fully integrated motion control solution that has reduced downtime, improving productivity as a result. Not only has machine speed increased



Machine speed increased by 8% and efficiency raised to 91% after installing Trio's machine solution.





by 8%, daily efficiency of the machine has risen to 91% and Unette is confident that this figure can be further improved.

Trio's coordinator has not only enhanced the machine's motion control, but it can also command the required logic functions.

"The Trio motion coordinator now manages the areas of process control formerly taken care of by the PLC," says Martyn. "This means that the motion coordinator can also control the timers and counters, for example managing shift registers for the in-line process control to make sure we don't have any faulty packs coming out of the finished delivery chute, which would otherwise involve more downtime or reduce batch quality."

FAST, SIMPLE SET-UP

The machine's original motion control commands have been replicated by Trio's motion coordinator, combined with replication of all PLC controls which were added via IEC 61131-3 programming. Set up of the controller and drives takes place within Trio's Motion Perfect software, and with no special programming required, the application runs on the Trio controller's standard functions. For Unette, it was an advantage that the Trio system is managed by

a single software programme.

"The software achieves what we were previously attempting with several individual platforms. As the software interconnects the controller and servo, it's more user-friendly and will hopefully save us a lot of time and cost in installation and commissioning future machines."

Trio's interconnected machine solution reduces the requirement for hard wiring as no cross-addressing is necessary between equipment from different vendors. In terms of programming, the new solution provides a considerable saving for Unette, which typically reprogrammes its machines every few days depending on the requirement of its customers.

"In future, there'll be less and less need to develop new code. This will save us a lot of time and enable faster development for each new application," says Martyn.

EASY INTEGRATION

In addition to rapid commissioning, physically the Trio hardware integrates easily into Unette's existing machine. The pocket-sized Flex-6 Nano is just 147 mm in height and is the width of an I/O slice, while the servo drives are among the most compact for their rating.

Trio's products are also backwards compatible with support ongoing for 20 years-plus, and this remains the case for many of Trio's early controllers that are still in service. This is a crucial area for Unette.

"We over engineer machines to keep them flexible and for use in the field for a long time, so we need a guarantee of support and compatibility for legacy products, including backwards compatibility," says Martyn. "For example, we've just taken a machine offline after being installed in 1966, so we need long-term support."

FUTURE DEVELOPMENT

With over 20 machines in total, Unette now has three machines operating with a full Trio solution and the company will begin to migrate its other machines to Trio. Unette will also implement additional controls such as pick-and-place for inserts into flexible packaging.

While Unette is confident of long-term efficiency gains in man-hours and reliability, a saving has already been made at outset with the company reporting that the package is around 8% more economical than other vendors.

►► 61074 at www.pcne.eu



Flexible Cobot for the Packaging Industry

Packaging Machine Manufacturer Schubert has developed a collaborative robot unit, especially for the requirements of packaging. The use of image processing with underlying artificial intelligence makes it extremely flexible and exceptionally easy to program.

With a long history in robot integration for the packaging industry, the new tog cobot for the first time will be able to automate simple manual processes outside of the highly efficient machine sequences and can be adapted to new tasks very quickly without requiring any programming knowledge. Ralf Schubert, Managing Partner of Gerhard Schubert GmbH, describes the rationale: "We developed the tog.519 for pick & place applications with lightweight products, where previous cobots would be out of their depth." The tog simplifies and accelerates packaging processes even further: "With one of our cobots, manufacturers will be able to react much more flexibly in the future to changing market situations and requirements."

FAST AND USER-FRIENDLY

A high working speed and remarkably simple operation are essential to deliver this extraordinary flexibility. To ensure speed throughout the process the manufacturer recommends using a protective cell when space is limited. However, the Cobot also offers the ability to operate without a protective cell while maintaining a high level of safety. When operating as a free-standing robot, the Schubert cobot does not work directly together with humans (collaborative). But it does work in an environment with them. Such cobots are referred to as cooperative or coexistent and call for a very different safety concept. When approached by employees, it gradually reduces its speed



Image processing with artificial intelligence makes the Schubert cobot extremely flexible and exceptionally easy to program.

until it comes to a complete standstill. It is only through the vision system that the fast cycle rate is possible when reaching into disorder or for the simple adaptation to new tasks.

ARTIFICIAL INTELLIGENCE

The prerequisites here are provided by a neural network with artificial intelligence (AI) developed in-house by Schubert, which precisely matches specific industry requirements in terms of safety, speed and programming. To program a specific product, the network is trained using product photos in

the Schubert Cloud and then loaded onto the cobot as a format. To reliably recognise new products, the AI only needs a handful of images and three days' time. In the future the customers will be able to create new formats and products themselves without

being experienced in image processing or programming. The tog 5.19 is the first of a whole family of cobots that will follow in the coming years. Key areas of application for the new products will be in the food sector, as well as in cosmetics and pharmaceuticals. In other words, wherever lightweight products have to be fed very quickly into a system. High volumes can also be processed in kit assembly, where different products need to be combined into a single kit, or in product finishing.

►► 61013 at www.pcne.eu





CENTRIFUGAL SIFTERS ENSURE QUALITY

For safe manufacturing processes without foreign bodies



Gericke has developed its range of Centrifugal Sifters to ensure the products leaving the factory are of the highest quality. Not only are Gericke's sifting solutions designed to give the maximum efficiency with yields of

99.99% often expected, they serve and protect the manufacturing process. There are many types of foreign bodies that can appear in a factory and an effective HACCP can work to minimize these to a certain extent. Examples are; hair nets, pens with metal detectable parts and general GMP and also there are a number of technical solutions such as magnets and X-ray that can be utilised. However, not all foreign bodies are the same. Insects, paper, string and fragments of wood are often too small to be detected with many having a size of less than 1 mm. Whilst a simple process, machine configuration and process know-how, allow Gericke to produce machines capable of processing up to 100,000 kg/h removing foreign bodies as small as 0.1 mm. The Sifter itself can be situated either in a gravity fed configuration under Silo, Sack or FIBC emptying or can also be within inline processes such as a pneumatic conveying line. The sifting screen can be inspected in place without removal and can be interchanged if required in a matter of minutes. A range of different size Sifter units are offered to suit all operational needs of different sized companies.

▶▶ 61104 at www.pcne.eu

HOPPER PUMP WITH CUTTING DEVICE

Combination of cutting and conveying in one aggregate



NETZSCH Pumps is complementing its product portfolio of progressing cavity pumps by a model with attached hopper and cutting device. The NEMO® BO/SO progressing cavity pump is equipped with a hopper and a coupling rod with feeding screw

and force-feed chamber, which also houses the cutting unit. The pump can be used in many industries, but foremost in food processing, where continuous, pressure-stable, gentle and low-pulsation conveyance of prior cut media is required. The attached hopper ensures an efficient supply of the medium to the conveying elements. By passing the cutting unit in the feeding chamber larger pieces of the medium are cut immediately. The cutting unit contains a rotating knife fixed on the coupling rod, which is equipped with three blades and a variable number of stationary knives. The number of knives can be adapted to the size and consistency of the particles. Optionally the pump can be equipped with an additional cutting unit at the discharge flange of the pump. With its perforated disc and rotating knife it allows for further fine definition of the particle size. The NEMO® BO/SO can dose the conveyed medium in proportion to the speed of rotation. As well in compact block construction with a flanged drive as with a bearing housing the pump is available for a wide range of drives.

▶▶ 60991 at www.pcne.eu



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▶▶ 61183 at www.pcne.eu



ULTRASONIC CONCENTRATION MEASUREMENT

For permanent process control in hygienic design



Teqwave H from **Endress+Hauser** enables users to analyze and monitor fluids in the food and beverage industry reliably. State-of-the-art algorithms and a flexible application concept guarantee optimal process control even for changing batches. A liquid analysis in the process with Teqwave H offers many advantages. Concentration data sets for the most common beverages and cleaning agents

enable using the same sensor with no reprogramming, even for batch changes. It is also possible to read in additional parameters, such as the acid content. Teqwave H uses these to calculate concentrations with even greater accuracy thanks to the latest algorithms. Thus, it ensures reliable processes and transparency of product quality in real time. The variety of measurands enable flexible use in various applications. In soft drink and fruit juice production, it assures product quality by reliably determining sugar and invert sugar content. In production of distilled beverages, it ensures consistent alcohol content, simultaneously measuring sugar content. The device is especially developed for hygienic applications in the food and beverage industry.

►► 60761 at www.pcne.eu

COMPACT LEVEL SWITCH WITH IO-LINK

Capacitive limit switch for viscous or abrasive media



VEGA has developed the front-flush level switch VEGAPOINT 24 especially for use with very sticky, viscous or abrasive products. Its focus is on the greatest possible robustness. Even with the strongest buildup, it reliably detects the level of

coverage and indicates it with a coloured illuminated ring that is visible from afar. Thanks to its robustness, VEGAPOINT 24 is a real plug-&-play sensor. It can be installed very easily in just a few simple steps. Flexible production systems with frequent and fast product changes benefit from the fact that it detects all media with the help of the default setting without adjustment. And extended functions, such as interface detection or foam blanking, can be configured particularly easily. The device is specifically targeting the beverage, food and pharmaceutical sectors, where mixing and conveying are all about efficiency and safety, even with demanding liquids and bulk solids. Especially the front-flush design of VEGAPOINT 24 ensures universal application possibilities. The flat, all-metal measuring tip makes the device robust and durable when it comes to tank cleaning. Tests performed by the manufacturer have shown an extended service life by a factor of 4, compared to plastic. With its versatile process fittings and adaptors, the level switch fits like a glove - even in already existing systems.

►► 61020 at www.pcne.eu

IO-LINK RADAR LEVEL TRANSMITTER

Non-contacting IO-Link device for food & beverage



Emerson has developed the Rosemount™ 1408H Level Transmitter, the world's first non-contacting radar device designed specifically for the food and beverage industry. Dedicated features include a hygienic compact design, fast sweep technology, exceptional radar beam focusing and IO-Link communications, helping manufacturers to optimise the efficiency of their operations, reduce product losses and ensure food safety. The compact and robust form makes it a suitable solution

for the small tanks and space-constrained skids commonly used in food and beverage production. The hygienic antenna is flush with the process connection that ensures the removal of process residue during clean-in-place and sterilise-in-place processes and is insensitive to condensation and build-up. The hygienically approved, IP69-rated device has a stainless steel housing with minimal crevices to withstand external washdowns and ensure cleanability. The 1408H is the first level transmitter to use 80 GHz frequency modulated continuous wave technology on a single electronic chip with embedded smart algorithms. This enables exceptional radar beam focusing, so that internal tank obstructions such as agitators can be avoided, and greater measurement accuracy achieved.

►► 60913 at www.pcne.eu

DRAW WIRE SENSOR LEVEL MEASUREMENT

Continuous monitoring of filling levels on barrel pumps



Consumables such as greases, silicones and pastes must be continuously available in numerous production lines. This task is performed by barrel pump systems, which squeeze these consumable components out of a barrel via a hydraulic

pressing system. In order not to interrupt the industrial production process, draw-wire displacement sensors from **Micro-Epsilon** can continuously measure the fill level of barrels, to assure the change at exactly the right time. For this measurement task, the barrel stands on the platform of the hydraulic press. There is one hydraulic cylinder each on the left and right and a piston, which is pressed into the barrel in the middle. A wireSENSOR WDS-P60 draw-wire sensor is mounted on the outside of the crossbar. The wire exits downwards and is attached to the base of the cylinder tube. The two outer cylinders are now filled with hydraulic oil and the pistons move slowly down into the cylinder tubes. As a result, the piston is pressed into the barrel at the center of the crossbar and the consumable component is pressed upwards by the pressure created in the barrel. The wire shortens and the sensor thus measures the decreasing lifting height of the cylinder via the potentiometer. Subsequently, the analog output signal is transferred to a controller for continuous monitoring

►► 60946 at www.pcne.eu





HIGH-SHEAR GRANULATOR

Compacting powdery foodstuffs for the perfect aroma



Lödige Process Technology has developed a granulator especially for compacting bulk goods such as tea or cocoa and coffee. It is based on the Mixing Granulator type MGT, a vertical system for mixing and granulation of powders and granules. A specially developed compaction tool rotates in the cylindrical mixing vessel at a close distance from the vessel wall and

base to achieve the necessary bulk density and a homogeneous mixing quality. In addition, the mixing vessel is equipped with a cooling double jacket to ensure that the full aroma of the material is retained. The product can be flavoured in accordance with the recipe parameters directly in the processing vessel of the Mixing Granulator. This process can be carried out manually or automatically. The machine requires only three minutes to mix and compress, for instance, one batch of ground coffee. Even product changes are quick and simple: The machine is designed for quick, manual dry cleaning. Experience has shown that this takes approx. 15 minutes. The system is designed to fit seamlessly into the production line. After all, Lödige can supply complete production lines from mixing/compacting equipment to container handling, screw conveyors, weighing systems as well as the control system.

►► 61029 at www.pcne.eu

ENERGY-EFFICIENT REFRIGERATOR DRYERS

Non-combustible refrigerant for easier handling



Hi-line Industries has released the 2021 version of its energy-efficient Tundra refrigeration dryers. Most notable among the enhancements is a switch of refrigerant to R513a in models up to and including Tundra 115 (115 cfm, 195 m³/hr capacity).

A HFC/HFO blend, R513a refrigerant has no ODP (Ozone Depletion Potential) and a much reduced CO₂ impact in comparison with the previous R134a refrigerant. As a result, customers can rest assured that Hi-line is continuing its commitment to sustainability in manufacturing by minimising its carbon footprint. R513A is widely viewed as the optimum replacement, as it is an A1 safety group refrigerant and is neither toxic nor combustible. Unlike flammable refrigerants, R513a is subject to less stringent regulations in handling, maintenance intervals and compulsory leak tests, thus saving time and money. Reduced energy consumption is vital in today's ultra-competitive marketplace, which is why Hi-line has worked hard to offer customers a dryer solution that drives down energy costs. The company's integrated Direct Expansion technology delivers a constant +3°C dewpoint, unlike a chilled mass dryer, which can be as high as +10°C during its thermal cycle.

►► 60802 at www.pcne.eu



FREE DIGITAL SUBSCRIPTION

RFID READ/WRITE HEAD FOR EX ZONE 1/21

for contactless identification in explosion-protected areas



Turck is presenting the TN-R42/TC-Ex as the world's only HF RFID read/write head certified for direct use in ATEX Zone 1/21. Turck is expanding its Industry 4.0 portfolio into explosion-protected areas and is thus underlining its commitment to being a supplier of end-to-

end IIoT solutions in the process industry. The read/write head stands out from flameproof identification solutions for Zone 1/21 on account of its extremely compact dimensions and can therefore also be installed in applications where space is restricted. The slim-line TN-R42/TC-Ex is therefore ideal for the contactless identification of correct hose and flange connections. The interface connection of the TN-R42/TC-Ex operates like a standard read/write head for the safe area. HF RFID tags with a password function are also available for applications with demanding requirements with regard to data security and access protection. The read/write head is simply connected to Turck's BL20 or TBEN RFID interface series and can also be installed in protective housings in Zone 2/22 if required. It can also process other information in addition to hose identification, such as socket, data, time or the degree of hose contamination. Turck's multiprotocol technology enables data transfer to the control system via three Ethernet protocols - Profinet, EtherNet/IP and Modbus TCP.

►► 60801 at www.pcne.eu

EXTERNAL POWDER FLOW SENSOR

Monitoring flow in thin flexible pipelines



ENVEA's new FlowJam T is a sensor for powder flow monitoring in flexible pipelines. Due to its small size, it can be easily mounted around thin hose lines. It can be used for all pipelines made of electrically non-conductive material, such as plastic or rubber, with outside diameters between 4 and 25 mm.

The FlowJam T detects all types of solid streams that moves through the detection area. Detection is achieved, regardless of the direction of movement, by the triboelectric discharges of the particles. The material movement in non-metallic pipelines is displayed as a trend at the analogue output and as a switching state at the relay. Via the trend output, whether more or less material is conveyed through the tube, for example, can be displayed. The material flow can also be observed for uniform distribution. In addition, the relay contact output provides additional Flow/NoFlow information. The FlowJam T is a compact device and is connected via an 8-pin plug. For parameterisation of the sensor, a Modbus-USB converter and software can be provided to the user. The sensor has an IP 64 protection and is able to operate in ambient temperatures from -20...60 °C

►► 60980 at www.pcne.eu

Instrumentation Clearly In View

We interviewed **Andreas Hennecke, Pepperl+Fuchs Product Marketing Manager and Ambassador for Ethernet-APL** about the development and possibilities of Ethernet-APL for the process industry.

PCN Europe: Pepperl+Fuchs is one of the industrial partners of the Ethernet APL project from the start. Could you please give a short description of the history of the project and the main players involved in it?

A. Hennecke: The APL Project is probably one of the very unique collaborations in process industries. Five DCS companies, three infrastructure providers and four instrument manufacturers – competitors in their respective fields – came together to develop and promote a single physical layer that is fit for process industries.

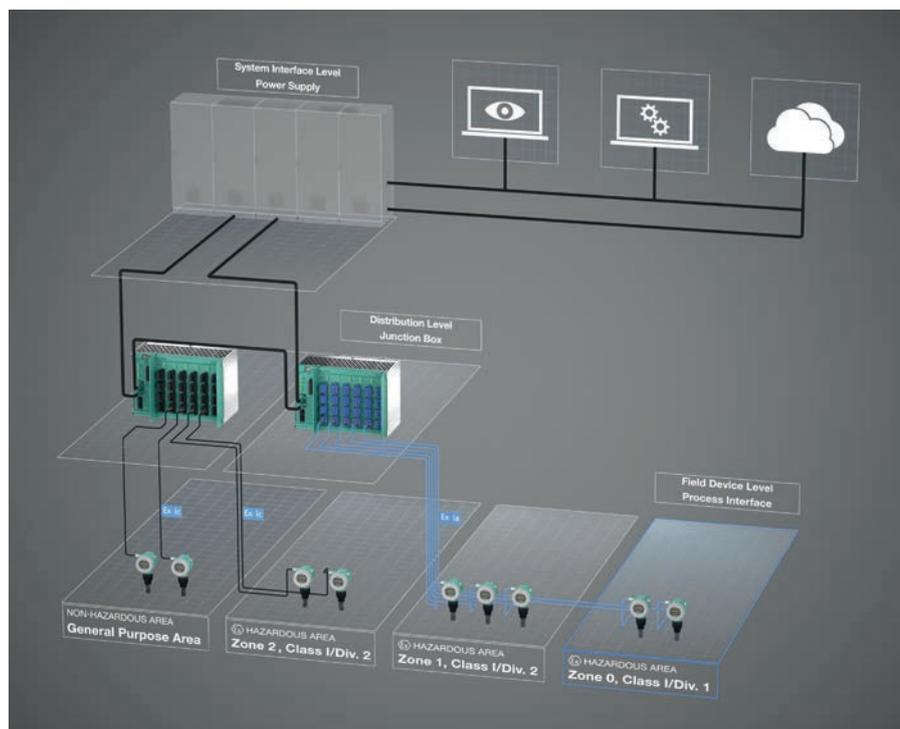
At Pepperl+Fuchs we discussed first ideas for

an Ethernet in the field already in 2009. 2015 was big break through where multiple solutions showed concepts that it can be done. The suppliers and user organizations signed contracts for a joint standardization and development project in 2018. Now we promote the technology to users inviting them to test the technology in practices. We are extending an invitation to all manufacturers to integrate Ethernet-APL into their technologies and products and to users to explore and deploy the technology.

PCN Europe: What would you describe as the main technology and benefits of Eth-



Andreas Hennecke, Pepperl+Fuchs Product Marketing Manager and Ambassador for Ethernet-APL

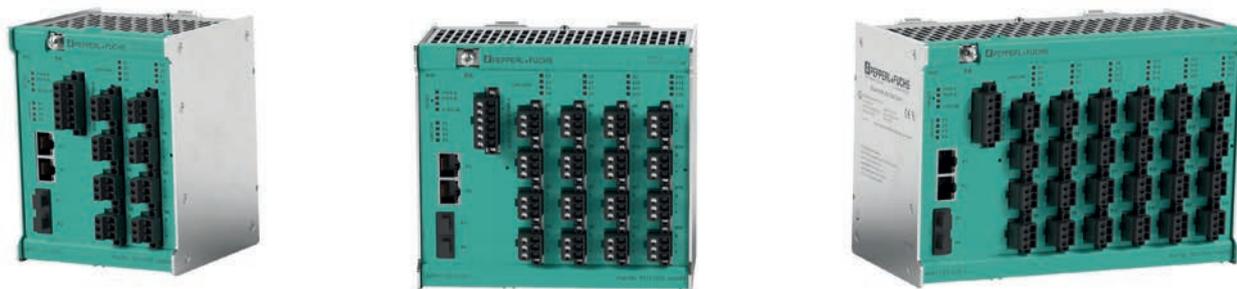


Seamless connection from any hazardous area to the enterprise network

ernet-APL from your point of view, for the professionals in process automation?

A. Hennecke: Ethernet-APL is a physical layer only. A technology that in general physical handling is pretty similar to what our users are already accustomed to, say 4-20 mA technology. It carries power, communication and explosion protection on two wires with the robustness and ease of handling that our users in process industries require. This makes adoption of the technology a rather evolutionary process. The significant change and departure from analogue signals is that Ethernet-APL provides for barrier-free digital communication from enterprise all the way to the field. No more gateways, no more protocol transla-





The Ethernet-APL Rail Field Switch from FieldConnex connects Ethernet and PROFIBUS PA instrumentation simultaneously.

tions. At first this seems rather uninteresting, but it is very close to a revolutionary change how we work with instrumentation. To explore this, we need to look beyond the physical layer and include the features and benefits of communications protocols such as EtherNet/IP, OPC UA, Profinet or HART IP. Already established in factory automation, the combination of these technologies provide the potential for reducing cost and risk while improving quality and speed.

Consider a project with 1200 or more instruments: The vendors deliver instrumentation on site with name plates and digital tag information. The installation teams install them into the piping and connect the wiring. So far so good! Here is where the game changes: With Ethernet-based communication, the instrument connects as soon as the network powers up. Via the respective protocols, the engineering station picks up the digital tag from the instrument and registers it automatically. The device provides its driver package for upload eliminating searches for compatible EDD, GSD, FDI, FDT files. The engineering tool can keep the documentation up to date including the configuration. This high degree of automation during commissioning reduces risks for manual faults and thus provides the potential for very high-quality work.

During operations the DCS has normal access to cyclic data, while authorized personnel can access status and diagnostics, e.g. via their smart phone or tablet. From anywhere! The potential for integration of information to improve workflows is endless. New applications will emerge because access to instrumentation is so much easier.

PCN Europe: Process industry covers a lot of different industrial areas and plant sizes from small to very large. Is it possible to cover all these different requirements with

Ethernet-APL in an efficient and economical way?

A. Hennecke: Absolutely. When defining the technology the experts look for and include the many different requirements for the applications to cover. For Ethernet-APL the main ingredients are those that are required for successful deployment in process plants. Just to mention a few:

1. Cable distances up to 1000 m per segment. Spurs to instruments with 200 m. This can be easily adopted to any plant layout.
2. Explosion protection with intrinsic safety, which provides interoperability and is simple to deploy. 2-WISE is short for 2-wire, intrinsically safe Ethernet and a new chapter of IEC 60079. Ethernet can reach into any area up to Zone 0 and Division 1. The engineering and documentation steps include validation without calculation.
3. Screw- and clamp connectors support cable glands. This is well known installation technology.

Vendors follow strict tests to certify compliance. This is not only reassuring, it ensures interoperability thus reducing risks of faults from the technology. It provides for a smooth deployment process ultimately leading to reliable operations.

PCN Europe: Enabling IIoT-projects in the process industry and IT/OT convergence are important points speaking about Ethernet APL. Does this mean that the technology is only working for new installations? Or how could the brownfield profit from the technology?

A. Hennecke: Far from it! This is the first time in the history of process plants, that a new technology comes with a clear path for migration. Ethernet-APL utilizes type 'A' cables with millions if not billions of kilometres installed. Pepperl+Fuchs invented dual-pur-

pose ports for the instruments. Aside from native Ethernet-based communication – let us assume via Profinet – the ports can detect Profibus PA devices and automatically adapt communication. Then a small setup routine and a little bit of software magic allows users to convert the Profibus communication to Profinet. Addressing of the PA device happens in the background and is also automatic. Choosing Ethernet-APL and FieldConnex enables users to operate two distinctly different communications technologies via a single infrastructure.

Investment in cables and instruments is protected while simultaneously affording users with the ability to choose the latest technology. Planners choose or upgrade the communications technology for every instrument individually. Every plant has their critical few instruments, so operators may want to keep them on a tighter leash with diagnostics. This would be an obvious choice for an instrument with high-speed, Ethernet interface. This is now all transparent and possible with Ethernet-APL.

Speaking of high speed: Radar curves update within seconds, which saves a lot of time. This practically eliminates the forced recesses that technicians have to endure today when calibrating instruments to tanks or pipes. "No more waits and too much coffee!" This is what I heard them say already during first tests. The same is true for parameter sets, which download in seconds. This provides large efficiencies during plant commissioning, but also during product change overs and device exchange.

This interview goes on, if you want to learn more about the Ethernet-APL technology, please visit: www.pcne.eu/bingo/61152

▶▶ 61152 at www.pcne.eu



First Dual-Mode Desalination Plant Helps Tackle Water Scarcity in Singapore

Daily production set for up to 30 million gallons of fresh drinking water

The United Nation's (UN) World Water Development Report recently stated that nearly six billion people will suffer from clean water scarcity by 2050.

So it's time to turn our attention to the global water crisis facing cities around the world struggling with increasing demand for water, reduction of water resources and increasing water pollution, all driven by dramatic world population growth which is expected to reach 9.7 billion by 2050.

Singapore is using desalination as part of the solution to their water supply issue to provide enough clean drinking water for its ever-growing population of 5.5 million. Though surrounded by water, having enough drinking water has always been a challenge for this island state. Currently the demand for drinking water is up to 430 million gallons a day. The Keppel Marina East Desalination

Plant (KMEDP) is the latest step of Singapore using advanced technology to help address their water challenge.

PROCESSING THE EQUIVALENT OF 45 OLYMPIC SWIMMING POOLS – EVERY DAY

In operation since June 2021, KMEDP is one of the most advanced desalination plants in the world and one of the first in the world with a dual-mode facility. The plant will produce 30 million gallons of clean water every day, enough to fill 45 Olympic-size swimming pools and 7 percent of Singapore's daily water demand. It has also been designed sustainably in that the treatment facility is underground, freeing up 20,000m² of green rooftop and community recreation space.

Singapore's water comes from four sources; reservoir water, imported water from Malaysia, ultra-clean, high-grade reclaimed water

(branded NEWater in Singapore) and desalinated water. Desalination therefore plays a strategic role in Singapore's vision for a diversified and sustainable supply of water and is expected to meet up to 30 percent of water demand by 2060. Yet desalination is an energy-intensive process, so a modern method is needed to boost efficiency and sustainability.

PROCESSING OF RESERVOIR AND SEAWATER FOR MORE FLEXIBILITY

Located at the Marina East area of Singapore, the KMEDP, about twice the size of a football field, can either draw water from the surrounding sea during periods of dry weather or treat water from the Marina Reservoir during periods with heavy rain. With the plant's dual intakes, when the water level in the reservoir is low, sea water can be pumped into the plant to be desalinated. When the reservoir water levels are high, the plant can treat water from the reservoir. The option to switch to treating reservoir water results in more effective water use, operational flexibility and optimized operational costs, as reservoir water treatment consumes only one-third the energy required for seawater desalination.

The plant is operating with a host of cutting-edge technology from ABB including automation and control systems as well as instrumentation and water analyzers. With ABB's supply of energy efficient motors, variable speed drives and switchgears, together with process optimization aimed at increasing efficiency, the gains to be realized could potentially help reduce electricity consumption by up to 40 percent. A range of smart



ABB's WaterMaster electromagnetic flowmeters reliably monitor water flow rates and help to lower OPEX



sensors and water-monitoring equipment is also being used in the plant.

UNIFORM PROCEDURES FOR IMPROVED OPERATIONAL PROCESSES

KMEDP's plantwide control systems are unified under an ABB Ability™ System 800xA distributed control system, a user-friendly digital platform that gives engineers wide visibility

and precise control from a central command center. The intelligent and integrated solution allows uniformity of procedures and helps improve quality of operational processes. Data is seamlessly transferred from field instruments to the control system for analysis and diagnostics. With its fully digital-ready control system, the plant's operations can be extended from device to edge to cloud.

KMEDP is operated by Keppel Seghers Pte. Ltd, a subsidiary of Keppel Infrastructure Holdings Pte. Ltd. The Design-Build-Own-Operate project (DBOO) was initiated by Public Utilities Board (PUB), Singapore's national water agency, which manages the country's water supply.

"ABB has decades of experience in creating integrated solutions for desalination plants worldwide, and ABB's products and systems are found in all of Singapore's water plants in one way or another. We are proud to be a part of Singapore's water story as we continue to develop our long-standing relationship with PUB," said JianYuan Ling, ABB's Energy Industries Division Manager in Singapore.

KMEDP became the first industrial plant in Singapore to be awarded the highest tier of PUB's ABC Waters Certification (Gold) in 2019, which recognizes the public area's creative ecological design and exceptional Active, Beautiful and Clean features. Recently, it was also named "Desalination Plant of the Year" at the Global Water Awards 2021.



▶▶ 61150 at www.pcne.eu

NEXT-GEN EXPLOSION ISOLATION VALVES

Easier integration with higher flexibility of positioning



RICO Sicherheitstechnik AG is launching the next generation of the proven VENTEX® explosion protection valve and offering customers a wide range of innovations and optimizations in the field of explosion isolation. The valve now features a

flow velocity of at least 30 m/s in all nominal sizes, thus ensuring an even higher level of process reliability and flexibility. The valve can be placed directly upstream or downstream of pipe bends in the pipeline; double pipe bends or combinations of pipe bends in different directions are also no problem. This is a significant advantage for plant design, as customers do not have to reserve as much space and a straight pipe section is not a requirement. The installation distance in the area of organic dusts has been extended and is between 2 m and 15 m, depending on the nominal size. These two innovations result in increased flexibility in the use of the passive explosion protection valve. For processes involving metallic dusts, the new VENTEX is also certified in nominal size DN400. Moreover, the new generation also achieves up to 20% better values in terms of pressure drop. In addition, RICO has responded to customer suggestions: The DN250 nominal size, which was not offered previously, has been added to the VENTEX portfolio and is now available as standard.

▶▶ 61103 at www.pcne.eu



FREE DIGITAL SUBSCRIPTION

ATEX CERTIFIED SCROLL PUMPS

For safe pumping of potentially explosive gas mixtures



The new **Pfeiffer Vacuum** pumps in the HiScroll ATEX range meet the requirements of the European directive 2014/34/EU and are marked according to ATEX II 3/-G Ex h IIC T4 Gc X +5° C ≤ Ta ≤ +40 °C. This identifies the HiScroll ATEX as suitable for pumping potentially explosive gas mixtures. This allows all

gases up to and including explosion group IIC to be pumped. It is even possible to pump hydrogen. Explosion-protected devices are used in many sectors, including in industrial processes such as generating and pumping hydrogen. The HiScroll ATEX is also used in laboratories for pumping solvent-based liquids and gases which can produce combustible vapors. The ATEX certification is awarded since the HiScroll ATEX has no sources of ignition for potentially hazardous gas mixtures. The scroll pumps offer high pumping speeds during pump-down, even at atmospheric pressure. The completely dry and hermetically sealed vacuum pumps achieve a nominal pumping speed of 6 to 20 m³/h. They are characterized by their compact design and extremely quiet, low-vibration operation (<47 dB[A], in stand-by mode <42 dB[A]). They have a high water vapor tolerance, and condensation in the vacuum pump is therefore prevented from the start.

▶▶ 61120 at www.pcne.eu

VERSATILE BUTTERFLY VALVES

Performance with a minimized environmental footprint



Neles is introducing a new versatile butterfly valve product range that enables easy valve configuration for an extensive range of applications in all process industries. The product range offers superior process efficiency with a minimized environmental footprint.

Customers can easily pick the features, functionalities and materials they need to create a robust and reliable butterfly valve that meets their exact requirements. The product platform offers reliable solutions for a wide range of applications, including a high-cycling valve to handle high-purity gases and valves for abrasive service or corrosive media. The cross-compatible components and standardized parts make it easy to upgrade valve performance without the need to replace the entire valve. The versatile butterfly valve range offers longer lasting tightness, lower torque need, less wear and high flow rate. Along with high performance, the valves are also designed for maintenance, which means they are easy to put together and take apart. Serviceability increases the lifetime and safety of the valve and also minimizes waste. The valve range enables an immense number of configurations from Neles' field-proven product families, Neles™ Neldisc™ metal seat and Jamesbury™ Wafer-Sphere™ soft seat.

▶▶ 60889 at www.pcne.eu

PRECISE AND LIGHTWEIGHT CONTROL VALVE

Small sliding gate control valve with diaphragm actuator



Schubert & Salzer has developed a particularly compact, lightweight and energy-efficient solution for all areas of the process industry that require a highly precise control of liquid, gaseous or vaporous media, the type 8028 sliding gate valve. In addition, with a pneumatic 80 mm diaphragm actuator and digital positioner, the control

valve is very fast, almost wear and maintenance-free as well as low-noise operation. The sliding gate technology used in the type 8028 controls the flow in milliseconds, whereby two slotted discs arranged vertically to the direction of flow slide over each other in a linear movement. The actuator must therefore only overcome the sliding friction between both discs. The required actuating force is 90 per cent lower than for globe valves with the same nominal size at the same differential pressure. Short actuator travels of just 6 to 9 millimetres also reduce the wear from the packing and drive of the control valve. The type 8028 sliding gate valve is offered in nominal sizes from 15 to 150 millimetres. It controls media with temperatures from -60 to 350 °C and can be used at ambient temperatures from -30 to 100 °C. The maximum operating pressure is up to 40 bar depending on the nominal size.

▶▶ 61000 at www.pcne.eu

ACTUATOR FOR SAFE VALVE AUTOMATION

ATEX certified actuators for use in harsh environments



AUMA's new TIGRON actuators combine the highest level of explosion protection, robust design, outstanding ease of operation, and the latest trends in digitalisation. The versatile all-rounder provides safe and reliable valve auto-

mation across all application sectors, including oil and gas production, pipelines, tank farms and refineries. TIGRON actuators are ATEX and IECEx certified for the highest gas group IIC, which includes the highly flammable hydrogen. Other approvals will follow. The actuators are designed to withstand the harshest environmental conditions, they provide IP68 protection and cover a particularly wide temperature range from -65 °C to +75 °C. For installation in hard-to-reach locations or where vibration is a problem, the controls can be mounted separately, up to 100 m away from the actuator. Excellent usability is another feature of TIGRON actuators. Particularly striking are the large display and the robust Combi-Switch, which can be operated easily even when wearing gloves. An on-board commissioning assistant guides the operator safely through the setting procedure. TIGRON actuators work with all types of valves. As a multi-turn actuator, TIGRON is ideal for gate valve automation. It is available in six sizes, providing torques from 10 Nm up to 1,000 Nm.

▶▶ 61024 at www.pcne.eu

FUNCTIONALLY SAFE PRESSURE SENSING

PL:d compliant sensor version for hydrogen processing



Variohm EuroSensor's recently launched SMO31H2 series pressure sensors, designed for critical measurement and monitoring tasks in hydrogen processing and logistics, are now available with a variant with Performance Level 'd' certification. The sensor

The SMO31H2-PL:d features stainless steel construction with IP67 protection class as standard or optional IP69K. Its high resistance to shock and vibration and a temperature range spanning -40 to +125 °C contribute, along with additional EMI/RFI protection, low static and thermal errors, to exceptional endurance and long-life against harsh environment use. The PL:d variant is available in 20 range options from 1.0 bar up to 1000 bar with a choice of M16 or ¼ NPT pressure port configurations (NPT limited to 500 bar). Its 4...20 mA output from a 10 to 32 V DC supply has defined safety limits which can be read into the safety system or ECU to detect faults and there is internal failure detection within the sensor's signal conditioner for broken bond wires, internal EEPROM errors and Watchdog etc., that cause an output signal outside of the safety limits. The silicon-free design has no internal O-rings and generous burst and overpressure specifications mean maximum reliability is assured. Pressure measurement range availability is up to 5000 bar with an abundance of pressure port and output options.

▶▶ 60934 at www.pcne.eu



EX-PROTECTED SIGNALLING DEVICES

Audible, visual and combined warning devices



With YODALEX/2, the explosion protection specialist **R. STAHL** has elevated its successful YODALEX signalling device range, certified according to IECEx and ATEX, to a new level of performance. The visual, audible and combined signal

units in the new generation stand out thanks to their expanded range of functions, which have been standardised for all device series, significantly increasing their versatility in use. For the visual and visual-audio signalling devices in the FL60, FL6S, FX15, YL60 and YL6S signalling devices, the manufacturer has now launched multi-functional LED flashing beacons with an efficient luminous intensity up to 387 cd, joining its xenon-based versions, which boast a significantly increased, efficient light intensity of 136 cd. All LED variants can be operated in any model and in the continuous, flashing, blinking and all-round lighting controllable signal modes. An extensive selection of pre-configured functions make it simple for users to set their required signal levels. These include full or dimmed continuous light, blinking at 1 Hz, 1.5 Hz or 2 Hz, and single, double or triple flashing light at frequencies of 1 Hz or 2 Hz. Pre-configured functions are also available for rotating lights at speeds of 90, 120 or 180 rpm and for chaotic light. All series are equipped with integrated line monitoring.

►► 60908 at www.pcne.eu

CAST PIPELINE BASKET STRAINERS

6 PED-compliant sizes available for equipment protection



Complementing its manual pipeline strainer line, the Filtration Division of **Eaton** has developed a new range of cast pipeline basket strainers available in six standard sizes. The Simplex 72X pipeline strainer range conforms to the

Pressure Equipment Directive (PED) with superior sealing and surface finish characteristics to legacy models. The strainer range is CE-marked to PED and is compliant with the EN13445 and AD 2000 pressure vessel codes. The Simplex 72X strainers provide full bypass-free filtration which protects process equipment. Typical applications for the strainers include chemical, petrochemical and water pipelines where temporary shutdown for cleaning or change-out is possible. With improved O-ring sealing underneath the basket and the same legacy stainless steel strainer baskets in perforated plate and mesh they can remove solids from 1 cm and larger down to as low as 40 µm. As is standard, the Simplex 72X strainer is cast in ductile iron and is suitable for applications up to 10 bar at operating temperatures up to 120 °C. Where required, a stainless steel (CF8M) version is available for pressures up to 16 bar. Both types feature either DIN or ANSI flanges in six standard sizes, from 1 inch up to 6 inches. Additionally, BSP threaded models are available in ductile iron in sizes 1 inch, 1.5 and 2 inches.

►► 61002 at www.pcne.eu



FREE DIGITAL SUBSCRIPTION

DOUBLE-DIAPHRAGM GAS PUMPS

Oil-free pump series with design for increased safety



The N 630 is an all-rounder within the **KNF** modular system. The oil-free diaphragm gas pump transfers and compresses gases and vapors and generates a vacuum without contaminating the media. Therefore, it finds use in many applications in research, energy

technology, process manufacturing, and the chemical and petrochemical industry. Six new models with double diaphragms are geared towards users who work with valuable and hazardous gases. Even if the working diaphragm should fail, no gas will escape, thanks to the safety diaphragm installed underneath. All of the new models can be equipped with an external sensor to monitor the state of the working diaphragm. Based on actual field data, pump gas tightness can be modified from the normal 5×10^{-5} mbar \times l/sec to an increased 6×10^{-6} mbar \times l/sec. The high gas tightness of N 630 is particularly well suited for transporting helium and its rare/costly isotopes. The N 630 with a double diaphragm securely transfers the uncontaminated noble gas for recycling. Different options are available for application-specific requirements. Users can choose between Ex and non-Ex versions of the double-diaphragm N 630, each available in a single-head model or a model with two heads connected in parallel or in series.

►► 61019 at www.pcne.eu

PINCH VALVES FOR SINGLE-USE APPLICATIONS

Motorized and pneumatic operated, in different material



This series includes the **GEMÜ** Q50 eSyStep, a motorized version of the new pinch valves, alongside the Q30 and Q40 piston actuators, in plastic and stainless steel respectively, which are both pneumatically

operated. The valves are specially designed for single-use applications and facilitate fast and simple replacement of media-conveying tubes. A compressor is used to control or regulate the flow of media in the tube. The specially developed contour of the compressor ensures the pressure applied to the tubes is very gentle. This minimizes the stress and extends the service life. The new pinch valves are designed to allow fast, simple replacement of tubes without tools. At the same time, a circlip prevents accidental opening of the tube bracket. The tube holder also serves as a safety guard during operation. One valve size can be used for several nominal tube sizes. Should you need to change the size of the tube within a valve size, the tube holder and the compressor can be replaced afterwards. The actuators remain in the system and must not be removed. For panel mounting of the valves, in a cleanroom for example, an optional flange plate in stainless steel is available. The GEMÜ Q series is suitable for a wide variety of applications such as media mixing, fermentation or cell harvesting. Further applications may include purification, filtration or chromatography.

►► 61022 at www.pcne.eu

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