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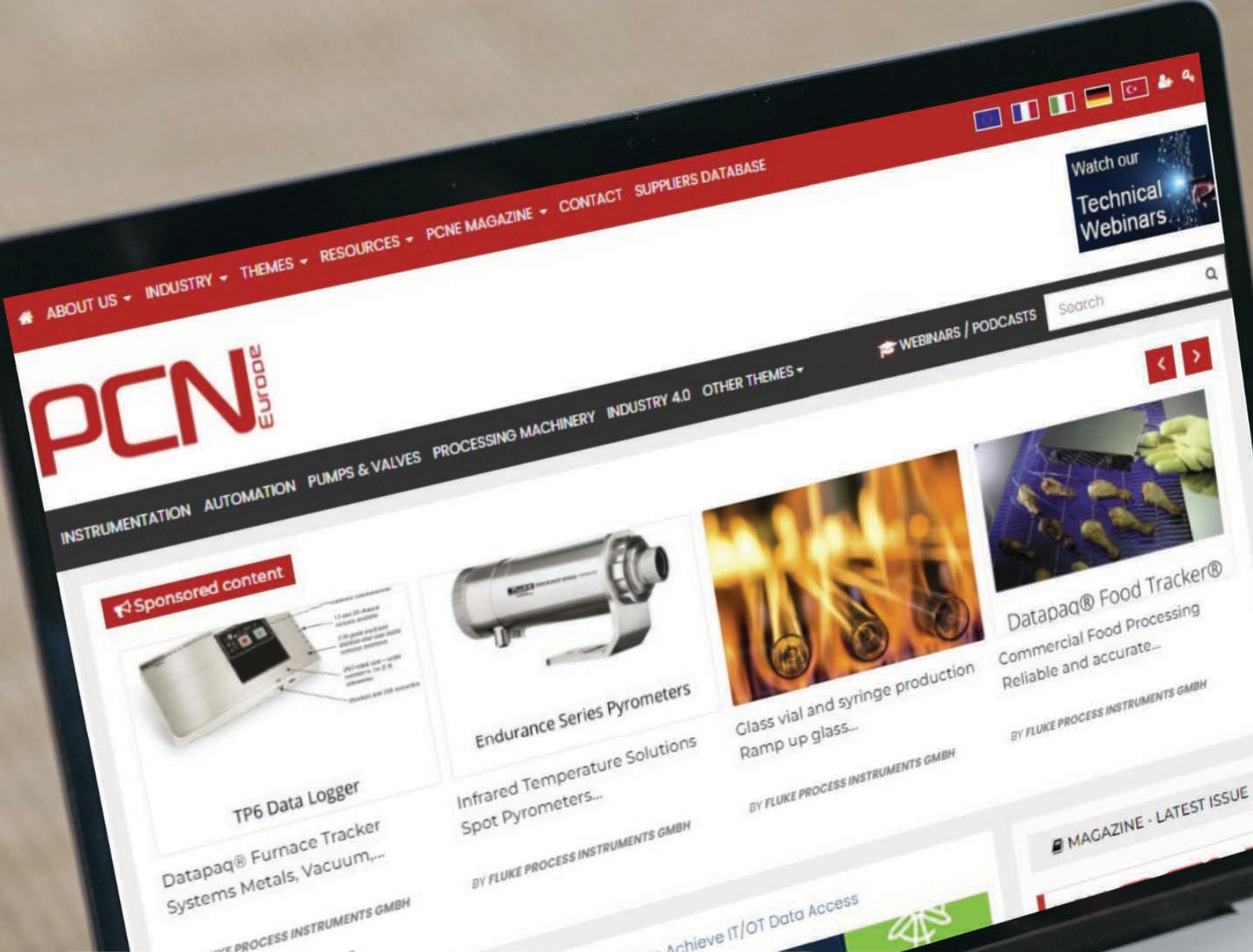
Page 18



08 Interview with Rob Watkinson, Resolve Optics

16 **PROCESSING MACHINERY:**
Industrial Machine Builders See New Opportunities From New High Power Density Motors

22 **SPECIAL FOOD & BEVERAGE:**
Sensor Technology for the Future of Retail



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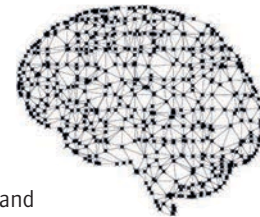


Kay Petermann
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Dear Reader,

this is the only time ChatGPT is mentioned in this issue. Even if Artificial Intelligence is one of the topics covered in this issue. More and more manufacturers are integrating AI into their products and applications for various reasons. Either to replace experts who are expensive and hard to find when it comes to making products smarter. Therefore they are looking for intelligent components and devices that help their existing staff getting production processes to the next level. An example for how this can work, you can find on page 17.

However, it is also important that intelligent products are able to identify trends in applications and thus identify errors that only become apparent in the future of a system. Thus, they surpass even experienced specialists who have built up a feeling for a particular production area of a plant for years and know it exactly. More about this you find on page 18.



In addition, we offer interesting news in our Food & Beverage Special starting on page 20, such as special brewing equipment for a company anniversary, how sensors can be used for distribution and retail and what the tasks of thermal imaging cameras in the food industry are.

I wish you an interesting read!

Editor of PCN Europe

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Next Issue: September 2023

CO₂ Reduction, Renewables and Circular Economy
IT/OT: Communication, Integration and Safety
Special: Bulks & Solids

5
Industry News

6
New Products

8
Exclusive Interview: Long-Term Operation Under Particularly Harsh Conditions. Rob Watkinson, Customer Support Manager at Resolve Optics about the design for optics able to withstand the high levels of radiation

10



10
PROCESSING MACHINERY:
Industrial Machine Builders See New Opportunities From New High Power Density Motors

DIGITAL TRANSFORMATION & SOFTWARE

12
Load Test of a Realistic Setup Confirms Performance

14
Digital Data Chain Saves Time and Money

16
The Easy Way to Digital Fluid Management From a Single Source

17
Unleashing the Full Potential of Shop Floors with AI

18
AI-Based Early Detection of Abnormalities to Increase Maintenance Efficiency of Gas Chromatographs

26
ENERGY & RENEWABLES:
Industrializing the Production of Electrolyzers and Fuel Cells



26

28
New Products

30
Index

FOOD & BEVERAGE SPECIAL

20
Thermal Imaging in the Food Industry

22
Sensor Technology for the Future of Retail

24
A Refreshing Pilsner for an Anniversary Celebration



24



Envalior Enters the Engineering Materials Market

Envalior, a leading global engineering materials business, celebrates its official launch as a new company at April 3, 2023. With a turnover of around EUR 4 billion, and a highly skilled, diverse global workforce of around 4,000 employees worldwide, Envalior ranks among the top engineering materials companies globally. Envalior emerges from the combination of two highly complementary industry leaders in engineering materials – DSM Engineering Materials (DEM) and LANXESS High Performance Materials (HPM) – under the ownership of global private equity firm Advent International and specialty chemicals company LANXESS. The new company builds on a 100-year track record of customer-focused innovation and a strong global footprint in Asia, Europe, and the US, and will offer its customers a unique portfolio of leading product brands and recycled and bio-based materials, combined with deep application and materials expertise. The company's high-performance solutions enable the transformation of key industries, such as automotive and new mobility, electronics and electrical, and consumer goods sectors. The new corporate brand reflects a combination of characteristics that best summarizes Envalior's ambition: EN (engaging, enterprising, engineering, environment) and VALIOR (value-driven and value-creating).



New CEO for NETZSCH Pumpen & Systeme GmbH



Felix Kleinert will leave the pump manufacturer after 24 years on June 30, Andreas Denker will take over position as CEO after transition phase. Andreas Denker has become a further CEO of NETZSCH Pumpen & Systeme GmbH in Waldkraiburg on April 1,

2023. Together with the current CEO Felix Kleinert, there will be a transition phase until mid-May, after which he will take over the management of the global Pumps & Systems Business Unit. At the same time, Andreas Denker will become a new member of the global management team (GMT) of the NETZSCH Group. NETZSCH Pumpen & Systeme GmbH is the strongest-selling and most profitable business unit of the globally active family-owned company. Felix Kleinert, CEO in Waldkraiburg since 1999, will retire on June 30, 2023, after 24 years with the company.

Andreas Denker has 20 years of management experience in internationally operating technology companies such as Airbus and Mannesmann. Great thanks go to Mr. Felix Kleinert. After successful realignment and global expansion of the Pumps & Systems Business Unit, he built the company into a leading global player in the pump industry.

Strategic Merger in the Field of Gas Sensors and Analyzers

smartGAS Germany and SIGAS merge to optimize industrial chains and open up the global market. For more than 15 years, Heilbronner Zukunftsfonds has accompanied smartGAS Mikrosensorik GmbH as a financial investor from a start-up to a mature company. Now it was time for smartGAS to gain not only a financial but also, from a strategic point of view, an important technical partner for the future. The acquisition of the Heilbronn Future Fund's shares by SIGAS Measurement Engineering Corp. opens up new opportunities for both partners in terms of global brand entry, product and technology developments, and the expansion of international partnerships. In this context, the focus is also on the growth of the Heilbronn/Germany site. As part of the acquisition, there will also be a change in the management team to drive forward the transformation of smartGAS. With the appointment of Sissi Chen and Tobias Henrich as new managing directors, smartGAS can draw on their concentrated experience in the industry. Sissi Chen is founder and CEO of SIGAS Measurement Engineering Corp. and also has many years of experience in the measurement industry. Tobias Henrich, as Head of Sales, further developed his previous company into a force in the industry and has many years of experience in international sales.



Inauguration of Valves Technology Centre

SISTO Armaturen S.A., a member of the KSB Group, inaugurated a newly built technology centre in Echternach, Luxembourg that includes testing facilities specifically tailored to the needs of the pharmaceutical industry and biotechnology. Furthermore, this building also features modern office space for the technical departments. The testing facilities also include a custom-built test stand for sterile process valves. This allows practical testing of valves for sterile processes. Here, developers are able to simulate all the necessary cleaning (CIP) and sterilisation (SIP) processes under original conditions. All common cleaning products (CIP), ultra-pure steam (SIP), compressed air, and vacuum are used, as well as cold and hot water. The tests can be performed according to ASME BPE standards or according to individual specifications of the end user. The building covers an area of 350 square metres and has two floors. As part of its sustainability policy, SISTO Armaturen S.A. has designed the building to be climate-neutral. On completion, the building will require neither heating nor cooling. The inauguration of the multi-million euro building took place on 27 February in the presence of Franz Fayot, the Luxembourg Minister of the Economy.



EASY-TO-USE RADAR LEVEL TRANSMITTER

Bluetooth-interface for simplified commissioning



Emerson introduces the Rosemount™ 3408 Level Transmitter, a non-contacting radar device designed to optimise ease-of-use at every touchpoint, leading to increased site and worker safety and enhanced plant performance. While the benefits of radar level measurement are widely acknowledged, leading to the technology's fast-growing adoption across multiple industries, radars are still sometimes perceived as being complex to commission, operate and

maintain. Addressing this concern, the device provides a range of functions that reduce complexity throughout its lifecycle, including a highly intuitive interface, Bluetooth® wireless technology remote capabilities, predictive alerts, in-situ verification, data historian and an upgradeable design. The user interface provides clear pictorial instructions, allowing operators to be easily guided through installation, commissioning, proof-testing, operation and maintenance. The new device enables extremely accurate and reliable measurement, even in challenging process environments. It is also suitable for use in critical safety applications such as overflow prevention, as it is Safety Integrity Level (SIL) 2-certified and designed according to the IEC 61508 standard relating to functional safety. The proprietary Smart Meter Verification software provides an easy means of verifying device health.

▶▶ 63276 at www.pcne.eu

NON-INVASIVE FLOWMETER FOR STEAM

Compact ultrasonic measurement for up to 180 °C



FLEXIM introduced the FLUXUS G532 ST-LT, the latest model of its non-invasive steam meters. The compact ultrasonic system measures the flow of saturated steam up to 180 °C. Non-invasive steam flow measurement means measurement without any interruption to operation and supply. Since the clamp-on ultrasonic transducers are simply clamped onto the outside of

the pipe, installation requires minimal effort and, above all, no opening of the pipe. FLUXUS G532 ST-LT works with the proven transit-time difference method. This offers extraordinarily high measurement dynamics, regardless of the direction of flow, and also records the lowest flow speeds. Due to this large measuring range (flow velocities from 0.01 m/s up to 60 m/s) there is no need to constrict the pipe cross-section, as is required for vortex and orifice measurements to achieve a minimum flow velocity. As a result, it is now possible to record steam quantities from the lowest to very high flow rates with one and the same instrument. The new steam meter is suitable for consumption measurements and balancing in supply networks for heating or process steam. It is the instrument of choice when it comes to absolute hygiene, for example in applications in the pharmaceutical or food industries.

▶▶ 63103 at www.pcne.eu

HYGROMETERS FOR TRACE MOISTURE

Live pressure compensation for increased accuracy



The new Pura Advanced Online 2 Hygrometer from **Michell Instruments** combines highly accurate measurements of trace moisture with live pressure compensation. Designed for control of moisture in high purity

gas applications, the hygrometer features a clear, intuitive touchscreen interface for set-up and operation. The ability to combine moisture and live pressure compensation is a key enhancement, as knowledge of the system pressure is essential to calculate moisture content from dew point. The option to include a pressure sensor alongside the moisture sensor means the Pura Advanced Online 2 Hygrometer offers users the benefit of increased accuracy when it comes to these calculated parameters. The Pura is based on Michell's latest ceramic metal oxide moisture sensing technology, which offers a fast response and high accuracy of ± 1 °Cdp. With a measurement range of -120 up to -40 °C frost point, the hygrometer displays data in °C dew point, °F dew point, ppmV, lb/mmscf or g/m³ at pressures up to 240 bar. Additionally, the hygrometer also provides 3-channel 4...20 mA analog outputs, Modbus RTU digital outputs and 4 user-configurable alarm outputs. As well as the 4-color display, the hygrometer can be configured remotely via application software.

▶▶ 63388 at www.pcne.eu

COMPACT MASS FLOW CONTROLLER

Lightweight and versatile device with high accuracy



The SFC6000 is **Sensirion's** next-generation mass flow controller, impressing with an unbeatable price-performance ratio and a very attractive delivery time of eight weeks. The SFC6000 is very compact and lightweight; it therefore allows the customer to optimize their devices in terms of

size and weight. This is a decisive advantage, especially for portable devices. Furthermore, it offers great performance in terms of repeatability, accuracy, control range and speed. The SFC6000 is highly integrated and has a very robust supply chain due to how few electronic components are used. It is best suited for analytical instruments (gas chromatography or bioreactors), semiconductor applications (front-opening unified pods or glass coatings and treatment) and process automation. Based on the principle of thermal mass measurement and using the proven CMOSens® MEMS technology, Sensirion builds revolutionary mass flow controllers with best-in-class performance and speed which — unlike most other devices on the market — do not drift and do not require in-service re-calibration. If you are looking for a mass flow meter, the SFM6000 is a valve-less sister variant of the SFC6000 that offers the same performance at an even lower price.

▶▶ 63562 at www.pcne.eu



SMALL ROTARY SCREW COMPRESSORS

Focus on air purity and efficiency



The **Kaeser CSG** series provides highly efficient compressed air generation, yet requires 19 percent less floor space than its predecessor range. Models are available with air- or water-cooling, with integrated refrigeration dryer or i.HOC (Heat of Compression dryer), and for flow rates ranging from 4 to 15 m³/min. For applications with fluctuating compressed air demand, speed-controlled "SFC" versions are available. The CSG

series is equipped with high-quality, durable airends featuring the energy-efficient Kaeser Sigma Profile. The rotors now feature an innovative new wear-free PEEK coating, which is also particularly temperature-resistant. Biocompatible, FDA-certified and in compliance with European requirements for food contact materials, this coating is perfectly adapted for the pharmaceuticals and foodstuff industries. When it comes to energy efficiency, the CSG series is leading its class, as the design is uncompromising in its pursuit of efficiency for drive, cooling and compression systems. Therefore, the range is equipped with IE5 Ultra Premium Efficiency synchronous reluctance motors and water jacket cooling on both compression stages - on both air- and water-cooled systems.

▶▶ 63594 at www.pcne.eu

COMPACT SAFETY LIGHT BARRIERS

Series in hygienic design with IP69 degree of protection



Schmersal has developed a new series of safety light barriers that are suitable for hygiene-sensitive applications in the packaging and food-processing industries, such as milk and meat processing. With a diameter of 62 mm and a height of 115 mm, the single-beam light barriers in the SLB series are extremely compact. This makes them ideal for thermoforming machinery for

food packaging, for use on cutting equipment or on other machinery with narrow installation spaces. SLB440 light barriers have been designed along the lines of the SLC/SLG440 IP69 safety light curtains and grids, which have been widely used in the food-processing and packaging industries for years. Thanks to a sophisticated, detailed design, the series achieves IP69 degree of protection and is thus protected against ingress of water during close-range high-pressure and -temperature spray downs. This means that the external and internal seals on this contactless active protective device (AOPD) meet very strict requirements and are able to withstand frequent cleaning with alkali solutions, foam or high-pressure jets. The new AOPD product line has also been created based on the principles of hygienic design. The locking caps on the SLB440 are made of stainless steel (V4A) as are the cable inlet, pressure equalisation diaphragm and fastening parts.

▶▶ 63447 at www.pcne.eu



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SAFE CYCLE LOCK FOR POWDERS

Customized discharging and metering solution for solids



EBRO ARMATUREN has developed a customisable solution for discharging and metering powdery substances. The cycle lock "TS" is used whenever discharge from silos, weighing tanks, filtering systems or big bags and feed into downstream production processes such as vacuum reactors, sieving machines or mixers cannot be realised with standard valves. The EBRO cycle lock "TS" is available with nominal diameters from DN 50 to DN 1200. Its chamber volume

and the geometry of the filling pipe can be adapted to suit the customer's specific requirements. Capacitance sensors are available for the purpose of monitoring the filling level; in the case of relatively simple substances, oscillating rod limit switches can be used. Furthermore, the opening of the inlet and outlet valves can also be time-controlled. For actuation purposes, a higher-level PLC or, optionally, an EBRO control system can be used. The cycle locks "TS" are gas-tight and ATEX-certified. Thus, they constitute a safe solution for use as passive explosion venting systems with nominal diameters from DN 50 to DN 600 in installations with differential pressures of up to 10 bar. They can also be used as inerting tanks. Moreover, they are approved for contact with food and are pressure surge-resistant in compliance with EN 14460.

▶▶ 63669 at www.pcne.eu

RATIO PYROMETER FOR HIGH TEMPERATURES

For non-contact measurement up to 3000 °C



The new **Optris CSvision** is equipped with the innovative Smart Ratio Mode (SRM) and can thus master even challenging applications with variable emissivity ratios. The built-in video sight and the motorized focus, which can be operated via software or app, allow the CSvision

novelties to be focused very conveniently on the respective object. The switchable two-stage brightness reduction filter ensures optimum viewing conditions even with very hot and therefore bright objects. Together with the cross-hair laser, which is also standard, this ensures simple sensor alignment under all conditions. The CSvision R1M offers an optical resolution of up to 150:1 and a measuring range of 600 to 3000 °C with a spectral range of 0.8 to 1.1 μm - in harsh industrial environments up to 65 °C without cooling. The R2M has an optical resolution of 75:1 and a spectral range of 1.45 to 1.75 μm. This allows temperatures to be measured from as low as 300 °C to 1400 °C (up to 60 °C without cooling). The infrared thermometers have an interface to the IRmobile Android app and CompactPlus Connect software. This allows easy video alignment and real-time process monitoring. Two analog outputs are available for process integration, as well as digital interfaces such as RS485 or Modbus RTU.

▶▶ 63520 at www.pcne.eu

Optics for Monitoring in Environments Subject to Radiation

PCN Europe interviewed Rob Watkinson, Customer Support Manager at Resolve Optics about the design for optics able to withstand the high levels of radiation found in and around nuclear plants.

PCN Europe: Could you please give a general overview of the applications in the nuclear industry your specialist lenses are used for? What are the challenges in this field?

Rob Watkinson: Our non-browning lenses are used for a variety of applications in both nuclear power stations and waste reprocessing plants. Typically, our radiation tolerant lenses are used as part of a camera or sensor system for visual inspection and general surveillance in parts of the nuclear plant subject to higher levels of ambient radiation. They are also used in other areas of the facility so that in the case of an emergency, remote surveillance of the building would still be possible. Draw-

ing upon approaching 30-years' experience of the nuclear industry, Resolve Optics has built a strong reputation for specialist lens design and manufacture of smaller production quantities of radiation tolerant lenses and optical products on time to strict quality and target price guidelines.

PCN Europe: What adjustments have to be made, e. g. in the materials to meet the industry standards for use in the nuclear industry?

Rob Watkinson: The metal components of a lens are not detrimentally affected by radiation, so standard materials can be used. The main consideration when designing a lens for



Rob Watkinson, Customer Support Manager at Resolve Optics



A selection of Resolve Optics radiation tolerant lenses

deployment in nuclear plant areas subject to radiation is the optical glass used. Standard glass will turn brown or grey when it is exposed to gamma or x-ray radiation which will quickly (days / weeks) render the lens unusable. As a consequence - radiation-resistant cerium doped glasses must be used. These specialist optical glasses resist the radiation browning effect for much longer – typically years. In a radioactive area of a nuclear plant you do not want to have to be regularly replacing elements of your surveillance / monitoring systems.

PCN Europe: Can you give us an estimate of the lifespan that can be achieved for these radiation tolerant lenses in a typical application you described?





Resolve Optics Model 357 10x zoom radiation tolerant lens for colour CMOS cameras

Rob Watkinson: All our radiation tolerant lenses are rated to an accumulative dose of 108 rad. The location and application use of the lens in a nuclear facility will dictate how much radiation it is exposed to per month. This in turn will determine exactly how long it will remain usefully operational. The majority of our many radiation tolerant camera lens installations remain operational for years.

PCN Europe: Are there changes and trends that you can see in optical products for the nuclear industry? Or are the requirements so specific that this does not happen?

Rob Watkinson: Traditionally radiation hard camera systems used in the nuclear industry have been based on tube technology. However, while tube cameras offer excellent tolerance to radiation, they provide limited resolution and just monochromatic images. More recently we have seen a move by the nuclear industry towards using higher resolution colour CMOS sensors that provide the operators with better images. This desire from nuclear plants for clearer and brighter images has in turn spurred our development of a new generation of radiation tolerant lenses. Resolve Optics is now able to offer radiation tolerant lenses that can produce clear, sharp images free of the strong yellow tint of standard cerium doped lenses

that traditionally has been a limiting issue particularly when used on colour sensors. An example of this new generation of high-resolution radiation tolerant lenses is our Model 357. Operating at f/3.6, the Model 357 lens is able to provide high image resolution and minimum geometric distortion from 400 to 770 nm, and can image objects from 1.5 m to infinity.

PCN Europe: Are there other fields of application for which you manufacture radiation tolerant lenses that benefit from the experience gained in this field?

Rob Watkinson: Other than the wide range of monitoring and surveillance applications across the nuclear industry, our radiation tolerant lenses are also used in medical research as targeting elements in synchrotron radiation therapy machines and also in commercial x-ray instrumentation. Another rapidly growing application for radiation tolerant lenses is in spaceborne applications including key imaging optics in micro satellites and planetary landers.

PCN Europe: Space is an exciting application field that also uses radiation tolerant lenses. Are there other key factors that make optics "ready for lift-off"?

Rob Watkinson: Using only 'space ready'

optics is widely recognised as a vital factor in ensuring the performance and reliability of next generation satellite systems. For a lens or optical system to be considered 'space ready' it must meet some very strict requirements. These requirements typically flow down from international space agencies, such as NASA or the ESA, with the aim of ensuring that any optical components that are to be used in spaceborne applications must withstand the rigors of launch and the harsh environmental conditions found in space. These key environmental considerations when designing 'space ready' optics includes how they react to the vibration and shock of launch as well as extremes of temperature, high vacuum and cosmic radiation encountered in space. We have considerable experience of designing, producing and testing lenses and optical systems to withstand these challenges.

PCN Europe: Resolve Optics has a standard range of radiation tolerant lenses - why would a nuclear industry customer instead invest in a customized lens?

Rob Watkinson: Many of the lenses from our standard radiation resistant lens range were designed for use with tube cameras. We still sell a lot of these because tube cameras are resistant to far higher radiation doses than colour CMOS sensors. Reflecting the move towards higher resolution colour sensors, customers can now select our next generation Model 357 10x zoom lens that utilises clearer non-browning glasses. However, when it comes to an application that optically requires something a little more demanding such as high performance, high-resolution, compactness or a large format image the off-the-shelf market will force you to accept a compromise in one or more aspects of optical performance. In such cases a custom lens can be optimised to exactly fit the available space envelope, matched to your sensor to provide top performance and motorised to provide increased operational versatility.

PCN Europe: Thank you for these interesting insights.

►► 63563 at www.pcne.eu



Industrial Machine Builders See New Opportunities From New High Power Density Motors

The latest generation of motors create new opportunities for machine builders – with higher power density, excellent dynamic response, and a broader scope for machinery applications. Author: Daniel Eberli, Head of Portfolio Management IEC Low Voltage Motors, ABB Motion

In the competitive machine-building space, businesses must continually improve their offering amid tight cost constraints. Success depends on understanding the issues end users face and adopting appropriate technologies to overcome them. Fortunately, advances in motor technology enable a range of improvements in motor-driven equipment designs.

TODAY'S CHALLENGES

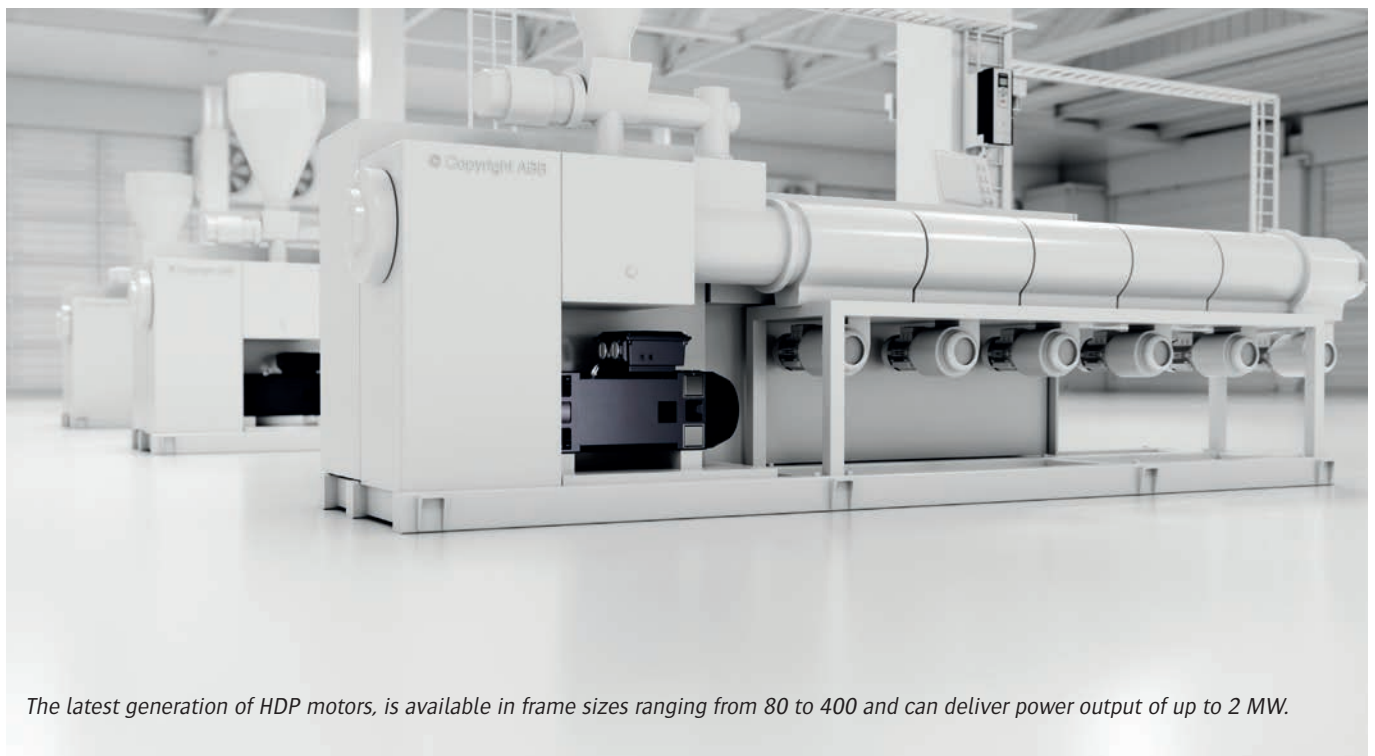
Modern-day machine builders face increasingly demanding end user and application requirements to meet space constraints, increased uptime and higher throughput.

These requirements demand highly reliable, powerful motors with long life and low maintenance. This makes large, traditional, and lower-powered DC motors less suitable. The carbon brushes in the DC motors that many machines still use are prone to wear, shortening the machinery's lifetime. DC motors can also be complex to maintain. Furthermore, many standard AC motors have relatively high rotor inertia. This results in less precise control, which is particularly challenging in extrusion and injection molding applications. Overall, customers expect greater design

flexibility and customization from their machine purchases.

HOW HDP INDUCTION MOTORS CAN HELP

Specialized AC motors, such as ABB's HDP motors, also known as square frame induction motors, offer even greater power density than traditional AC motors. This enables a more compact installation footprint. The latest generation of HDP motors, is available in frame sizes ranging from 80 to 400 and can deliver power output of up to 2 MW. They are available in square, cross-section frame designs and can be equipped with mechani-



The latest generation of HDP motors, is available in frame sizes ranging from 80 to 400 and can deliver power output of up to 2 MW.



cal integrated brakes and feedback devices. Modern HDP motors are designed for use with a variable speed drive (VSD). This combination delivers high energy efficiency and superior machine performance. ABB offers matching motor-drive packages across the frame size range. These packages are commonly used in several applications, including extrusion, injection molding, lifting, conveyors, winders, machine tools, and test benches – among many others.

HDP motors also have advantages in terms of their low rotor inertia, high overload capacity, and outstanding dynamic response. Low rotor inertia enables faster reversion of the motor's rotational direction, which speeds up the machine's back-and-forth motion. This is a critical factor for safe and smooth maneuvering or machine control.

Further, because they are brushless and contain fewer moving parts than DC motors, they are more reliable and easier to maintain. Manufacturers have designed variations of HDP motors specifically for industrial machine use.

ACCESSING THE BENEFITS OF HIGH POWER DENSITY

Machine builders can take advantage of these motors' high power density in both retrofit applications and new designs.

Existing machines can be retrofitted with a stronger HDP motor as a drop-in replacement. To minimize the engineering work required, it is important to match the frame size of the



Machine builders can now select compact, high-torque HDP motors where they would typically have used larger, lower-torque models before

existing motor and its replacement.

In many cases, installing the replacement HDP motor only takes minutes. The motors are designed with easily accessible connection points and straightforward installation of accessories, such as encoders, brakes, and cooling fans. ABB's motors also come with adjustable key components, enabling the flexible mounting of the terminal box. This makes it easier to connect cables in machine-specific space constraints.

A motor's compactness has a significant impact on a machine's overall size in many types and categories. In new designs, OEMs can now select compact, high-torque HDP motors where they would typically have used larger, lower-torque models before. This

is because the more compact HDP motor can achieve the same output as the older, larger motor, enabling a more compact overall design. For example, at the same IP rating, the new model of ABB HDP motor is at least one frame size smaller than a traditional induction motor. For any build with space constraints, the motor occupies less space, accommodating other components.

The HDP motors' flexible design features are also ideal for machine builders. In addition to a variety of frame sizes, high-speed and water-cooled models are available – for dusty environments. OEMs can also pass flexibility on to end-users, such as including programmable encoders. This enables end-users to adapt the motor's properties to their changing needs.

A WORLD OF OPPORTUNITIES FOR MACHINE BUILDERS

The latest HDP induction motors achieve high power density. This, combined with the full range of frame sizes, technology variants, and customizations, unlocks significant potential for machine builders. Whether retrofitting existing models or designing new ones, both machine builders and end-users benefit from advances in HDP technology. Learn more about ABB's high dynamic performance motors.

Learn more: new.abb.com/motors-generators/iec-low-voltage-motors/high-dynamic-performance-motors

▶▶ 63483 at www.pcne.eu

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Performance data AG03/1 – 50 W, 3,2 Nm, 200 min⁻¹



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Load Test of a Realistic Setup Confirms Performance

Expectations in the process industry for the new physical layer are enormous. Now, Ethernet-APL has shown that it can meet these expectations. The instrumentation manufacturer Endress+Hauser successfully conducted two load tests of a realistic Ethernet-APL setup with components from various manufacturers. The results confirm the new technology's reputation as a game-changer in industrial communication.

The load tests were designed according to customer specifications to prove that components from different manufacturers can be combined to create a reliable and robust system based on Ethernet-APL. The global chemical company BASF defined the requirements from the customers' point of view. On the hardware suppliers' side, Endress+Hauser stood next to Pepperl+Fuchs, Honeywell and ABB. Their components were confirmed to work together in harmony.

SUCCESSFUL LOAD TESTS PROVE MARKET READINESS OF ETHERNET-APL

The first test was set up with nearly 240 Endress+Hauser measuring devices, includ-

ing flow, pressure, temperature and level sensors. They were integrated into a system with Pepperl+Fuchs' field switches and a Honeywell control system, all using Ethernet-APL and PROFINET. For the second test ABB provided the control system and was tested along with the previous field switches and measuring devices.

The test results were conclusive: Ethernet-APL can be used under realistic circumstances. The test cases were carried out with maximum network layout, and the scalability and fault tolerance were successfully verified. All relevant requirements like total netload or redundancy switch-over times were met or exceeded.

The Endress+Hauser Open Integration partner program unites more than a dozen manufacturers that want to ensure the streamlined interaction of their complementary products. The partners test and document the integration of their offerings and how digitalization may be fully utilized within typical process automation applications. "The load tests proved that Ethernet-APL can be used for real. We are proud that the close cooperation with our Open Integration partners made it possible to validate this technology," states Jörg Reinkensmeier, head of the Open Integration partner program at Endress+Hauser.

NEW POSSIBILITIES FOR DATA USE

Ethernet-APL enables the use of Ethernet at the field level of process plants. The 2-wire technology with power and communication over the same wire pair meets the requirements of even harsh process environments. Fast and digital data transmission with high bandwidth is now possible over long distances and in explosive atmospheres. Easy access to data from field instruments can lift process automation to a new level of efficiency and professionalism.

With the success of the load test, BASF, Endress+Hauser, Pepperl+Fuchs, Honeywell and ABB have taken a significant step towards a technological infrastructure that is open, future-proof and ready for the Industrial Internet of Things (IIoT). This will enable customers to create more flexible, efficient and cost-effective industrial systems and more benefits for the industry.



238 Endress+Hauser field devices were integrated into an Ethernet-APL system using Pepperl+Fuchs' field switches and Honeywell controls. Ethernet-APL offers a bandwidth and speed that lift field data transmission to a completely new level. Maintenance and plant managers benefit from new insights.

►► 63638 at www.pcne.eu



INTEGRATION OF PRODUCTION DATA

New file read functionality of XML files



Softing's dataFEED OPC Suite Extended is a solution for OPC communication and cloud connectivity, providing access to controllers and IoT devices of leading manufacturers. With the new File Read functionality, the suite ensures access to brownfield PLCs, devices and machines that deliver data via XML files. File Read allows process values from XML files to be integrated quickly and securely into production control applications such as MES or OEE via the standard OPC Classic or OPC UA interfaces. The production data can also be integrated into IIoT cloud solutions via MQTT or REST. Furthermore, there is the option of data logging for documentation, analysis, or verification in a separate database. The suite enables access to the controllers of leading manufacturers such as SIMATIC S7, Rockwell ControlLogix, B&R, Mitsubishi as well as Modbus controllers. It acts as a gateway between the two OPC standards so that existing OPC Classic components and applications can be integrated into modern OPC UA solutions for Industry 4.0 applications. Production data is transferred to IoT Cloud or Big Data applications via the MQTT and REST protocols. The suite supports the storage of production data in a file, in an SQL database, or in MongoDB and CouchDB. Thanks to the extensive data pre-processing functionality, data can be easily and flexibly customized.

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CONDITION MONITORING FOR PUMPS

Monitoring of temperature, vibration and seal condition



For cost reasons, smaller, inexpensive pumps were often not taken into account regarding condition monitoring by sensor technology. However, these small pumps are also capable of bringing a process to a standstill. **BestSens** wants to use this market potential and delivers a cost-effective OEM solution for intelligent pumps with the DOT platform. The platform consists small, cost-effective

multi-sensor nodes - the DOTs -- that are mounted directly on the pump's bearing carrier, for example. With PoE (Power over Ethernet), the measuring nodes supply themselves with energy via the data line. The operator gets a direct insight into the status of his pumps on his smartphone by simply connecting to the DOT app. The status data flows into existing SCADA and cloud systems via the standardised OPC UA and MQTT communication protocols. BestSens will start market entry with selected OEMs in mid-2023 with the vibDOT and in autumn with the sealDOT. The vibDOT sensor node measures vibrations in 3 axes + temperature at the bearing. The sealDOT node additionally monitors the condition of the mechanical seal with patented BestSens SAW technology and temperature at the mechanical seal.

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Functional Safety – Hassle-Free!



<http://jsp-en.jumo.info>

00053

JUMO Safety Performance (JSP)

The brand for increased safety when it comes to SIL and PL

- Certified measuring chain protection up to SIL 3/PL e possible
- The highest degree of flexibility when selecting SIL components thanks to the comprehensive delivery program
- SIL no longer needs to be calculated by the user when the JUMO safetyM is used in combination with JUMO temperature probes
- Suitable for different measurands such as temperature, pressure, and level
- Individual assessment of the safety chain and advice provided by the experienced JUMO Safety Performance team of experts



More than **sensors + automation**

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Digital Data Chain Saves Time and Money

Industry pilot project with digital pressure transmitters at German site. For reliable product identification with ID link and quick access to extensive digital product information.

Making product data for plant components available digitally and at all times – that is the basic idea of the so-called Digital Data Chain (DDC). Siemens is a pioneer in mapping the entire digital data chain as the company has now supplied Bayer's Crop Science Division with several SITRANS P320 pressure transmitters with standardized ID links for unique object identification. In this way, the associated instance-specific, digital documentation according to VDI standard 2770 could be transferred directly to the ERP system used by Bayer. "With the digital data chain, plant operators save a lot of time and money," says Axel Lorenz, CEO Process Automation at Siemens. "Currently, plant maintenance personnel spend most of their working time searching for relevant information. In

the future, components at the field level can be identified quickly and reliably via mobile devices. At the same time, all information about the component is immediately available digitally – for example for operation or maintenance."

MANUFACTURER INFORMATION ON PLANT COMPONENTS CRUCIAL FOR OPERATION

Various technical goods, plant components and equipment are used in process plants. For their correct planning, installation, commissioning, operation, cleaning, maintenance and servicing over the entire life cycle, information is required that is contained in the manufacturer's specifications. This information can now be read out in the cloud in a standardized manner via a digital data chain

and made available regardless of location. Behind the Digital Data Chain is the Digital Data Chain Consortium (DDCC), a cross-industry association of more than 50 companies in the process industry founded in 2021. The aim is to create standards and platforms for the exchange of information among each other. In the future, all physical plant objects will be identifiable as an instance via a digital nameplate – for a lifetime and across all stages of the product life cycle.

TRANSFER ALL INFORMATION TO THE ERP SYSTEM VIA SCAN

Three technologies underlie the data consistency of the digital data chain: the automatic identification of plant components (according to IEC 61406-1), digital manufacturer information (according to VDI guideline 2770) for standardized data provision and a cloud-based information platform (IEP – Information Exchange Platform). The minimum requirements for a globally unique identification of physical objects are specified in the international standard IEC 61406-1. Based on this standard, Siemens is delivering more and more devices with such an ID link, which enables access to a cloud-based backend via which the product information is provided. "The digital data chain makes it possible for manufacturer specifications of components to be transferred directly to the recipient's ERP during the scan in goods receipt," says Lorenz. In addition to the SITRANS P320 pressure transmitter, Siemens has made further products DDC-compliant, such as the DQ 16 digital output module of the SIMATIC S7-1500 controller.



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CYBER-SECURE RADAR SENSOR

Level sensor compliant with IEC 62443-4-2



VEGA in January 2023 delivered to customers what is unquestionably the world's first level sensor with built-in cyber security features. With this new development VEGA wants to send a strong message that it recognizes the increasing threat of cyber criminality in industry and is taking action to combat it.

From the outside, you wouldn't see anything different or unusual: The VEGAPULS 6X radar sensor, together with its documentation is shipped to the customer as usual. But what the customer receives is something quite different from level sensors previously available in the market. For the first time the sensor comes with cyber protection as an integral component. It was developed in compliance with the Standard IEC 62443-4-2 and thus meets the highest standards currently implemented in the process industry. Especially when it comes to cyber security, plant operators want equipment they can depend on in order to stay one step ahead of the latest threats. VEGA doesn't want to rest after having developed one instrument in compliance with IEC 62443. With its certification as a guide, the company plans to develop future products in accordance with all existing security requirements right from the start. Protective measures will be consistently expanded to create a reliable basis for secure plant operation in the future.

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VALVE POSITION INDICATOR

Maintenance-free unit for hygienic valves



The **Alfa Laval ThinkTop V20** is the first pure valve-sensing unit that is maintenance-free and does not require manual adjustment or programming. It enables 360° LED visual status indication from all directions. It also provides convenient control-room monitoring of the real-time status of Alfa Laval hygienic valves used across the dairy, food, beverage, pharmaceutical, and many other industries. Purpose-designed to digitalize essential on-off valve monitoring, the ThinkTop V20 sensing unit provides a pragmatic approach to enhancing the reliability of valve status and position. This new addition to the advanced Alfa Laval ThinkTop V-series paves the way to a higher level of process control for manufacturers who rely on visual and signal feedback of the open or closed valve positions. A few seconds is all it takes to commission the ThinkTop V20 by simply installing, activating and deactivating the unit. Live setup is fast and intuitive. Sensors automatically recognize the valve type and size, calibrate and record valve opening and closing distances, and complete setup without requiring manual interaction. Moreover, replacing or hot swapping the valve top is easy without disrupting production. No expertise, training, adapters or special tools are required.

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▶▶ 63521 at www.pcne.eu



FREE DIGITAL SUBSCRIPTION

INDICATOR FOR PORTABLE MEASUREMENTS

With probes for temperature, humidity and more



Vaisala launched the new portable Vaisala Indigo80 Handheld Indicator designed for industrial spot checking, short-term data logging, field sampling, data analysis and diagnostics. In conjunction with the Indigo80, the company announced Vaisala

HUMICAP Handheld Humidity and Temperature Probe Series HMP80 and Vaisala DRYCAP Handheld Dew Point and Temperature Probe Series DMP80, both designed for portable use, operating seamlessly with the Indigo80 handheld indicator. The Indigo80 handheld combines leading-edge technology and ultramodern industrial design. Special attention has been paid to its look and feel, customer experience, and usability. It must be easy to take along and operate reliably in varying measurement environments, while being as durable as fixed installed devices. The design features of Vaisala Indigo80 received last year an honorary award in one of the most prominent design competitions in Finland, the Fennia Prize. The list of features includes support for up to two Indigo-compatible probes or transmitters simultaneously. Its rechargeable lithium-ion battery ensures typically 10h operation time without charging, and its intuitive user interface supports 10 languages. In addition to the two newly launched probes, Indigo80 operates together with Vaisala's other Indigo compatible probes.

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PRECISE TURBIDITY MEASUREMENT

Sensor system for accurate measurements of liquids



The smart and precise **Micro-Epsilon CFO100 colorSENSORS** impress in liquid turbidity measurements with their high color accuracy and repeatability. Liquids are ubiquitous in industrial manufacturing processes, for example in sewage treatment

plants, drinking water treatment, the chemical & pharmaceutical industry or in food production. The color or turbidity of the liquids allows conclusions to be drawn about both process and product quality. The colorSENSOR CFO100 controller is used together with the CFS3-A30 transmission sensor for this application. When water is pumped via a secondary arm through a glass tube, which is illuminated from behind with the transmission fibers of the CFS3 sensor. The controller analyzes and classifies the color opacity. The determined color value is then output directly to the process control. The measurement can be carried out either from the outside on the pipe or directly in the water. The sensors for the turbidity measurement reliably detect minor color changes, which means that the sensors contribute to maintaining the highest quality standards. In addition, they significantly simplify testing processes, since laborious and cost-intensive sampling with laboratory analysis is no longer necessary. Up to 320 colors in 254 color groups can be taught. Operation is intuitive via the web interface.

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The Easy Way to Digital Fluid Management From a Single Source

New IIoT compatible radar sensor for cloud platform brings new opportunities for remote monitoring

ProMinent has launched DULCOLEVEL, a new radar level sensor, which provides continuous information on tank liquid levels. This ensures tanks can be refilled on time without any process interruption and makes chemical inventory management remarkably straightforward.

ProMinent is taking the next step towards holistic, digital fluid management with the launch of DULCOLEVEL, an IIoT-compatible radar level sensor. In parallel to this, a specific Inventory Management module has been added to DULCONNEX, the cloud platform that has proven its worth for several years. Thanks to both innovations, operators of water and wastewater technology as well as chemical distributors and service providers in the disinfection sector can now obtain a complete digital fluid management system from a single source. All the products required, from the sensor and pump to the measuring and control technology, are perfectly matched and networked in next to no time.

REMOTE MONITORING

In practice, this allows any number of sites with pump installations to be monitored, operated and supplied remotely in real time via the cloud platform. Liquid levels, pump outputs and consumption is automatically available, along with complete reports. At the same time, smartphone alerts provide early warning of low levels or potential system downtimes.

DULCOLEVEL can be seamlessly

integrated into existing metering systems. The new sensor is mounted on or above the chemical tank and can be configured intuitively and conveniently via smartphone using a free app. The app and sensor recognise each other automatically and pair via Bluetooth once a PIN is entered. As no additional wiring is required, retrofitting in existing applications is both straightforward and inexpensive.

The new radar level sensor also increases workplace safety. Contact with hazardous

media is avoided, via contact-free measurement, while the smartphone app eliminates the need to touch the sensor during configuration.

FLEXIBLE CONNECTING OPTIONS

Depending on the specific site conditions, the radar level sensor can be integrated into existing liquid level applications in three different ways:

The radar sensor can be connected to a programmable logic controller (PLC) in the usual way via a 0/4-20 mA interface.

Alternatively, the sensor can communicate with standard process control systems via the pump by means of a Profibus, Modbus or Profinet interface.

All data from the radar level sensor can be accessed worldwide via the IIoT platform. All compliance standards are therefore met and a 24/7 media consumption report is continuously generated.

The data can be conveniently accessed remotely via mobile phone thanks to the app, which is free to download from the Google and Apple app stores.

Connecting the sensor is particularly easy with a tank and metering pump from ProMinent. The measuring range covers volumes of 30 to 1500 litres for ProMinent tanks, or indeed for any tank of up to 15 metres in height, with an accuracy of ± 5 mm.



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Unleashing the Full Potential of Shop Floors with AI

The innovative data science tool, MELSOFT MaiLab (Mitsubishi Electric AI Laboratory) helps companies drive productivity improvements on manufacturing lines. The new solution offers an intuitive, operator-centric platform that leverages artificial intelligence (AI) to automatically optimise operations while maximising equipment monitoring, visibility and diagnostics.

MELSOFT MaiLab acts as a dedicated virtual AI data scientist, helping companies to overcome the challenges of missing budgets and non-existent data analysts or AI specialists and is empowering them to realise future-oriented manufacturing strategies. Quick to deploy and with minimal training required, the solution bases recommendations and actions on intelligence derived from both live and historic data, without requiring users to have any specialist expertise. In effect, the platform uses machine learning (ML), a subfield of AI, to automate data gathering across a variety of systems, predictive model creation, analysis and the mining of large volumes of data.

AN INTELLIGENT ASSISTANT FOR QUALITY-ORIENTED MANUFACTURING

Ease of use start right from the installation, as the platform is accessed in a browser-based environment that does not require any additional software. It can run on any industrial PC, including Mitsubishi Electric's MELIPC edge-computing solution.

Once installed, the MELSOFT MaiLab features an intuitive user interface with clear web-based visualisations. To further assist users without extensive programming skills, step-by-step guidance is provided. Also, the software helps users to understand what the data are suggesting while supporting them throughout all phases of a data analysis project. This is achieved by having the datasets being processed and analysis models created based on end goals selected by operators. In particular, these activities within the AI data science tool use Mitsubishi Electric's proven Maisart AI.

Connected to the manufacturing system, the



MELSOFT MaiLab was developed to support a wide range of different application scenarios and can also be tailored to each individual setup.

More precisely, it can be used in off-line mode to feed existing empirical data to develop or refine suitable predictive models and customised using open Python scripts. The tool can then be used for real-time diagnostics, providing the data generated as the production line operates to the algorithms and returning insights on the status of the line, its performance and how it can be optimised.

The platform can also offer additional infor-

mation and functions to address the needs and requirements of various departments as well as subject matter experts (SMEs). In addition, the information being processed and produced is used to continuously increase the accuracy of its algorithms to enhance its outputs and help companies drive productivity over time, in line with futureproof continuous improvement strategies. Even more, flexible licensing schemes are also available to address the specific needs of a company. For example, these include yearly subscription models or one-off payment options.

►► 63662 at www.pcne.eu



New Software for Gas Chromatograph Maintenance Support

AI-based early detection of abnormalities to increase maintenance efficiency for GC8000 process gas chromatograph -

Yokogawa Electric announced the release of a gas chromatograph AI (Artificial Intelligence) maintenance support tool (hereafter "GCAI tool") that increases maintenance efficiency for the GC8000 process gas chromatograph, a product in the OpreX™ Analyzer family. This software is capable of detecting slight changes in measurement data that are an indication of an impending instrument failure before this can begin to have an impact on measurements. By allowing maintenance to be performed in a timely manner, downtime is reduced.

DEVELOPMENT BACKGROUND

At production sites, the stable operation of instruments and other equipment is key to product quality. And while proper maintenance is required to ensure stable operation, production sites must also deal with issues such as shortages of highly experienced personnel and the need to streamline operations.

The Yokogawa GC8000 gas chromatograph is an instrument that plays an important quality control role at production sites by measuring the composition of the individual components

in mixes of gases and volatile liquids. Dozens of GC8000s are often used at large oil and petrochemical plants, and the largest facilities may have several hundred units.

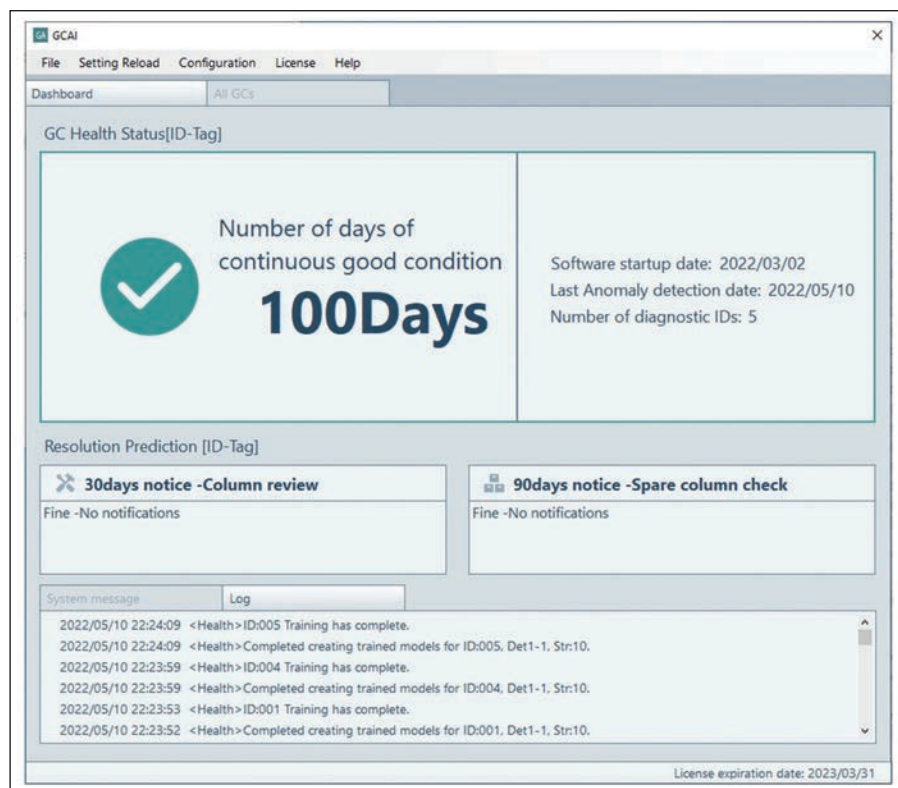
Gas chromatographs and their sample handling systems contain components such as filters, valves, pressure regulator, columns, and detectors that require regular maintenance. The degree of wear of these components differs greatly depending on the usage environment. In addition, the specifications and maintenance timing for each gas chromatograph will differ depending on what is being measured and the process. Abnormalities have conventionally been prevented by having highly experienced operators look at the measurement data to identify the best maintenance timing or simply setting maintenance schedules with plenty of leeway. When losses from sudden downtime are relatively low, the devices have even been used until they begin to deteriorate and produce obvious variances in the measurement values.

In light of these needs, Yokogawa has developed the GCAI tool for the GC8000 gas chromatograph. Based on the record of the measurements shown in a chromatogram, it uses AI to make predictions on the soundness of the instrument's measurements. For this AI tool, Yokogawa has utilized its proven abnormal sign detection AI function and modified it for ease of use with the GC8000.

FEATURES

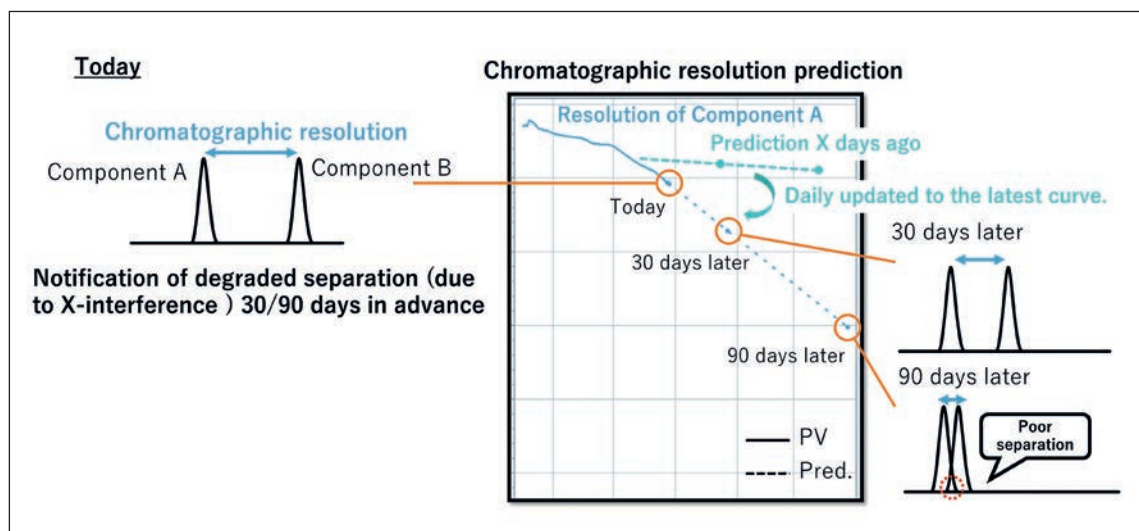
1. Data-based detection of measurement soundness

Slight changes shown in the chromatogram data appear even before the wearing out of a component or some other issue begins to im-

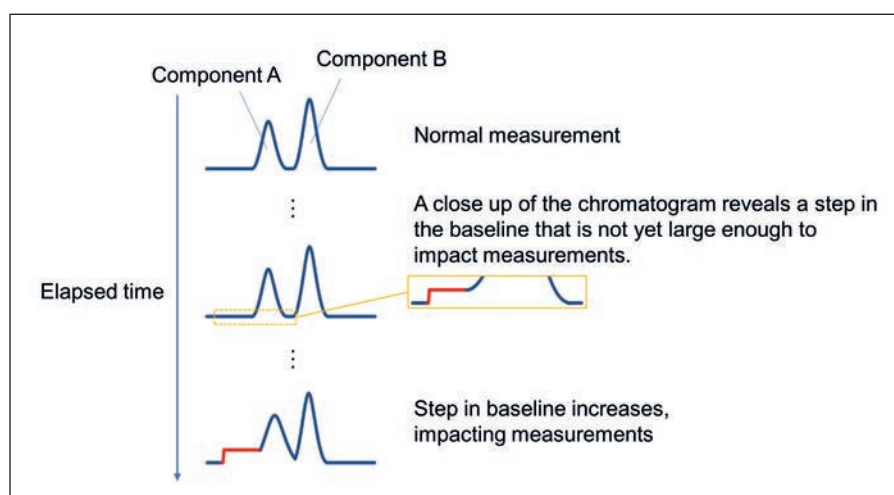


GCAI tool screenshot





Example showing the prediction of measurement soundness 90 days in advance



Example of data that appears normal at first glance and changes that can be detected when the chromatogram is enlarged

compact measurements. Though visible, they can have many different patterns, and their position on a time axis may differ depending on the instrument, meaning that only highly-experienced operators can distinguish between them.

The GCAI tool uses a machine learning model

that configures individual GC8000 units. This model is used to detect anomalies by identifying variances from normal measurements, as shown in a chromatogram. Each time a variance from a normal state is identified, the model analyzes the degree of variance. It can pick up even slight changes, and by determin-

ing the soundness each time a measurement is performed, it provides information that can be used to plan and implement maintenance before any deterioration in performance can have an impact on measurement values.

2. Prediction of measurement soundness 90 days in advance

With chromatographs, gases are separated and measured on a time axis, and poor separation of the gas components impacts measurement quality. Using this degree of separation as an index, the GCAI tool can predict when maintenance will be required. Based on changes in the degree of separation, it can predict the degree of separation 90 days in advance, and provide notification when a predefined degree of separation is about to be reached. Knowing in advance when maintenance will be required makes it possible to identify which replacement components need to be ordered and to create an appropriate and effective maintenance plan for the instrument, thus helping to reduce downtime.

3. No need for consulting or complex device configuration

For the GCAI tool to automatically detect and record changes in the measurement data, users need only to set a reference date, area to be monitored, and notification threshold. This AI solution for predicting the soundness of measurements is easy to use and requires no special consulting or complex device configuration. The import and pre-processing of data used for machine learning is also automated. And as this software is offered on an annual subscription basis, users do not need to make a large initial investment.

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ABOUT OPREX

OpreX is the comprehensive brand for Yokogawa's industrial automation (IA) and control business. The OpreX name stands for excellence in the technologies and solutions that Yokogawa cultivates through the co-creation of value with its customers, and encompasses the entire range of Yokogawa's IA products, services, and solutions. This brand comprises the following five categories: Transformation, Control, Measurement, Execution, and Lifecycle. The GC8000 is part of the OpreX Analyzers product lineup, which is aligned under the OpreX Measurement category. The OpreX Measurement category includes field equipment and systems for highly precise measurement, data collection, and analysis.



FREE DIGITAL SUBSCRIPTION

N° 5 - MAY 2023

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Thermal Imaging in the Food Industry

In the food industry, it's essential to carefully control the temperature of perishable goods throughout production, transportation, storage, and sales. Repeated warnings about illnesses due to tainted and improperly cooked foods highlight the need for tighter process control. Because this almost always involves a human factor, food processors need tools that automate crucial operations in a way that helps minimize human error while holding down costs.

Thermal imaging cameras are such a tool. Using thermal imaging cameras, you can make automated non-contact temperature measurements in many food processing applications. Analog video outputs can be viewed on video monitors, and digital temperature data, including MPEG4 video outputs, can be routed to a computer via Ethernet.

HOW IT WORKS

The main elements doing non-contact temperature measurements in the food processing industry are a thermal imaging camera and associated software. They act as "smart" non-contact sensors to perform 100% inspec-

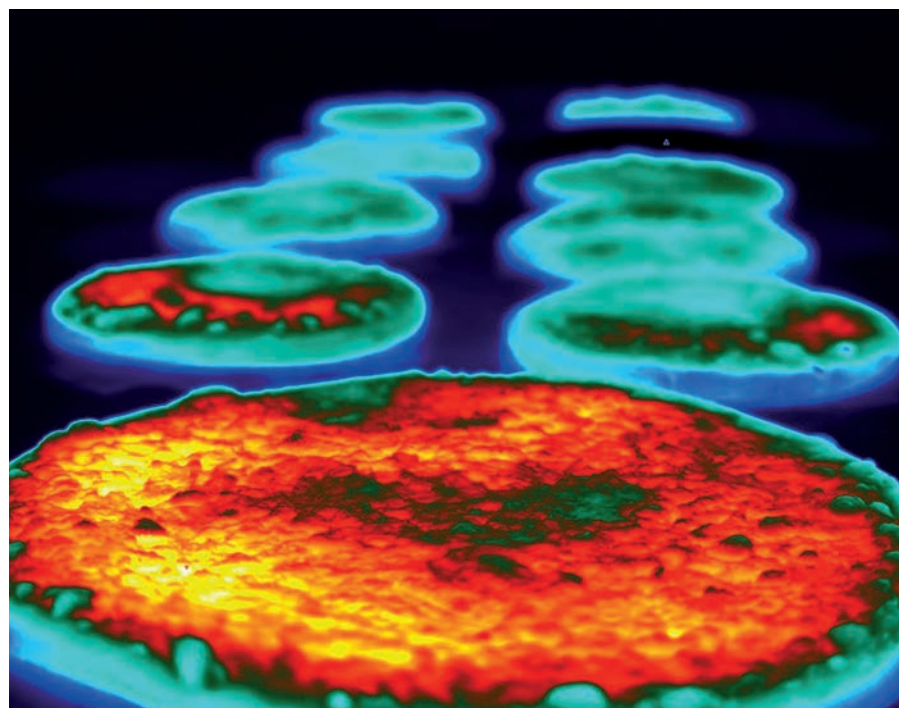
tions, measuring the temperature of equipment, refrigerated products, and cooked foods as they exit the cooking process.

Thermal imaging cameras are easy to use, small, and can be positioned almost anywhere as needed. They can also be used to inspect package sealing, and improve efficiency in other food processing operations.

FLIR thermal imaging cameras have firmware and communication interfaces that enable their use in automated process control. Third-party software makes it easy to incorporate these tools into automated machine vision systems without the need for extensive custom-written control code.

The use of thermal imaging cameras in food processing is growing for applications such as:

- Oven baked goods
- Microwave cooked meats
- Microwave drying of parboiled rice and other grains
- Inspecting ovens for proper temperature
- Proper filling of frozen meal package compartments
- Checking integrity of cellophane seals over microwave meals
- Inspecting box flap glue of overwrap cartons
- Monitoring refrigerator and freezer compartments



Thermal pictures of pizzas coming from the oven

THERMOGRAPHY FOR QUALITY ASSISTANCE AND PRODUCT SAFETY

Thermal imaging is first and foremost a quality assurance (QA) tool. Controlling the quality and safety of cooked meat products is an excellent use of this technology. A permanently mounted thermal imaging camera can record the temperature of, for example, chicken tenders as they exit a continuous conveyor oven. The objective is to make sure they are done enough but not over-cooked and dried out. Reduced moisture content also represents yield loss on a weight basis. Thermal imaging cameras can also be used for inspection on microwave precooking lines. Besides improving product quality and safety, overall throughput can be increased. An additional benefit is reduced energy costs.

In addition to cooked food inspections, thermal imaging cameras can monitor conveyor ovens. They can even be part of a feedback loop to help control oven temperature.



PACKAGING INSPECTIONS

Software is available that allows thermal imaging cameras to locate objects and patterns in the images. One application for pattern matching is in the production of frozen meals. Thermal machine vision can use pattern recognition software to check for proper filling of food tray compartments.

A related application is automated 100% inspection of the heat-sealed cellophane cover over finished microwave meals. A thermal imaging camera can see heat radiating from the lip of the container where the cellophane heat-seal is formed. The temperature along the entire perimeter of the package can be checked by using the thermal image with machine vision software. This type of program matches the geometric pattern in the image and its temperatures against the temperatures in a pattern stored in a computer memory. An added function in such a system could be laser marking of a poorly sealed package so it can be removed at the inspection station.

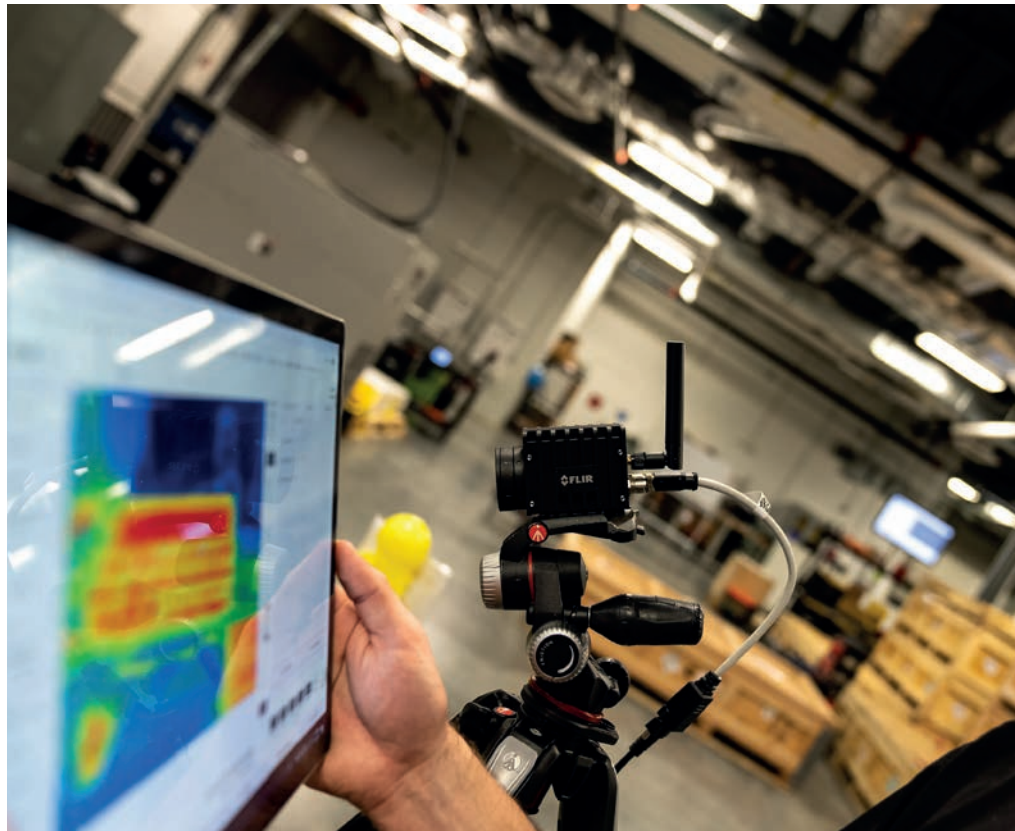
Yet another application for thermal imaging cameras is monitoring container filling operations. Although this is seldom a product safety issue, it does affect yield and compliance with regulations. Different areas on the bottle can be defined and used to trigger an alarm and remove bottles that are over-or under-filled. Thermal imaging cameras are a better alternative to visible light cameras when a bottle or jar is made of dark colored glass or plastic.

AUTOMATING MEASUREMENTS

Application software currently available for thermal imaging cameras includes a wide



FLIR A50/A70 thermal imaging camera for monitoring in the food industry.



variety of functions that support automated food processing applications. This software complements and works in conjunction with firmware built into thermal imaging cameras. The imaging tools and libraries in these packages are hardware- and language-independent, making it easy for food processing engineers to quickly implement thermal monitoring and control systems.

Thermal imaging cameras themselves provide the user with different operating modes that support correct temperature measurements under various conditions. Two functions commonly found in these cameras are a spotmeter and area measurements.

The spotmeter finds the temperature at a particular point. The area function isolates a selected area of an object or scene and usually provides the maximum, minimum, and average temperatures inside that area. The temperature measurement range typically is selectable by the user.

As an adjunct to the temperature range selection, most cameras allow a user to set up a color scale or gray scale to optimize the camera image.

In conveyor oven applications, the area

function is typically used because pieces of cooked product are often randomly located on the conveyor. The camera can be programmed to find and measure the minimum and maximum temperatures within the defined area. If one of those setpoint temperatures were to fall outside the user-defined limits, an application program running on a PC or PLC would instantly trigger an alarm, alerting the operator to check the thermal image on a video monitor or PC to find and remove the bad product, and/or adjust the cooking temperature.

In the case of local monitoring, an IR camera's digital I/O can be used to directly trigger an alarm device without additional software. However, food processing often benefits from higher level analytics that are available in third-party software that runs on a PC.

These out-of-the-box solutions do not require the writing of application source code. By adhering to commonly used machine vision interface standards such as GigE Vision® and GenICam,™ a wide range of functionality is supported by this software.

▶▶ 63671 at www.pcne.eu



FREE DIGITAL SUBSCRIPTION

Sensor Technology for the Future of Retail

The distribution logistics in food retail are changing: To overcome the challenges posed by online retail, more and more retailers are using micro-fulfillment centers (MFCs), meaning that orders are picked in proximity to the customer. The sensor technology needed for the order picking must meet certain requirements. Leuze offers tailored solutions for this application.

MORE ONLINE IN THE FUTURE

Ordering food online is still unusual in Europe, where the market share of online supermarkets is currently 2.5 percent, according to market research company IDG Europe. In the United States, the share is 3.4 percent, while in the Asia-Pacific region it is already 7.5 percent. The trend is growing: Experts predict that customers will be doing around 20 percent of their supermarket shopping online by 2030. This is due, on the one hand, to the fact that there is, in Germany as well, an increasing number of food retailers who offer a combination of online shop and delivery service and, thus, compete with stationary retailers. On the other hand, it is due to the growing in-

fluence that megatrends such as digitization have on commerce and society.

FRESH MERCHANDISE WITH JUST A CLICK

Retailers who wish to remain competitive must respond to these trends sooner or later. Those that allow customers to buy products – including fresh food – online, face certain challenges:

- Short delivery times: System gastronomy and delivery services set the benchmark for this and in some cases offer delivery within the hour.
- Direct delivery from the warehouse to the customer: Delivery routes to the customer

must be direct, short and efficient to keep merchandise fresh and transport costs low.

- Reduction of personnel costs: Routine processes involved in orders must be automated because manual processing is not cost effective.
- High availability: The desired merchandise should always be available in the online shop. Otherwise, customers will soon take their business elsewhere, as competitors are only a click away.

HIGHLY FLEXIBLE WAREHOUSE

To meet these requirements, suppliers must control their supply chains and orders must be picked in proximity to the customer. A solution to these challenges are micro-fulfillment centers (MFCs) – highly flexible, automated order picking warehouses only a short distance from the customer. Ideally, they should be located in the same building as the supermarket. This makes it possible to incorporate them into a hybrid model and thereby combine the advantages of an online shop and a supermarket: The MFC area or “black store” can be found in the rear part of the building. Here, the merchandise is stored and, as necessary, made available for the delivery service fully automatically. The front part of the building remains a conventional supermarket for on-site purchasing. Furthermore, there is the option for customers to order merchandise online and collect it themselves. Employees pick the merchandise and give it to the customer at a collection point. The warehouse responsible for the supermarket supplies the supermarket as well as the MFC as an additional warehouse.



A micro-fulfillment center (MFC) is a highly flexible, automated order picking warehouse only a short distance from the customer. A hybrid model provides MFC and retail space with pickup station in one building.





TAILORED SENSOR TECHNOLOGY FOR EACH AREA

Special sensor technology is required to ensure that MFC operation is efficient and automated. The key tasks carried out in such logistics centers are identification, detection and guarding. The sensors used must be very compact because the use of space in MFCs is planned extremely efficiently. In addition, an MFC is divided into various areas that place different requirements on the sensor technology: Fresh and deep-freeze area, standard area, order picking area, receiving area and shipping area.

FRESH AND DEEP-FREEZE AREA: DETECTION USING PHOTOELECTRIC SENSORS

In this area, detection is the main task. This requires sensor technology that is not sensitive to low temperatures or condensation – for example, when the warehouse shuttle moves from the deep-freeze area into the standard area or to the order picking area. For this application, Leuze offers small,



Small, fast and powerful optical series, such as the 3C or 25C series developed by the Sensor People from Leuze, function reliably even in the deep-freeze area and with fast movements.



FREE DIGITAL SUBSCRIPTION



The stationary bar code readers of the BCL 300i series communicate with the control without the need for an external interface. This is possible thanks to the "integrated connectivity" function

powerful optical series such as the 3C and 25C series. This technology functions even in the deep-freeze area and with fast movements. For simple applications, cost-optimized series such as the 5 and 23 series are also suitable.

STANDARD AREA: IDENTIFICATION USING BAR CODE READERS

Compact scanners with a relatively short range can be used to identify merchandise containers. Ideally, these scanners should be mounted directly on the conveyor system. It is crucial that the system operator does not need to align the scanners before use. In fact, the scanners should be functional as soon as they are installed. Therefore, Leuze has developed "integrated connectivity" for its BCL 300i series: This function enables the stationary bar code readers to communicate directly with the control without the need for an external interface. Commissioning takes place automatically as soon as the device is connected to the software.

ORDER PICKING: GUARDING USING SAFETY LIGHT CURTAINS

Picking stations must be guarded reliably, even when there are large quantities of them. Safety light curtains such as the ELC 100 from Leuze are suitable for this application. Where man and machine work "hand in hand", the safety light curtains can be used vertically as hand and finger protection, as access guarding as well as horizontally as area guarding.

SUMMARY

The digital transformation of the food retail industry requires a high level of innovation. Supermarkets and manufacturers of storage systems must redesign existing logistical processes, in some cases to a large extent. Micro-fulfillment centers can be the key to long-term competitiveness. They can be optimally planned and efficiently implemented using sensor technology that is already available today – Leuze assists with this process by contributing its expertise and powerful solutions.

►► 63660 at www.pcne.eu

A Refreshing Pilsner for an Anniversary Celebration

As an innovative technology leader, JUMO has been supplying high-quality measurement and automation technology for the food industry for decades. So it was an obvious idea to have our own anniversary beer created for the 75th anniversary in 2023. In the brewing process, all relevant JUMO products that are supplied to the brewing industry were to be combined in one application. The choice therefore fell on an in-house, modern, and highly efficient brewery plant.

In search of engineering expertise and a regional brewery capable of building such a plant and brewing such a beer, JUMO quickly came across Burkard und Gärtner (B+G), a specialist in plant design and plant engineering – as well as the company “Hunfelt Braeu”. This young brewery on the outskirts of Fulda was founded in 2017 as a hobby in a garage. It has grown steadily since then and now produces 10 different specialties. “Hunfelt Braeu” sees itself as a small, regional brewery of specialty beers. Varieties include a stout, an India pale ale, and a barrel-aged Bock beer. The idea of a “mini brewery” came about because Sebastian Gärtner, who is 1 of the 3 brewers, is also one of the owners of B+G on a full-time basis. So it made sense to combine JUMO’s expertise with the expert knowledge of B+G and “Hunfelt Braeu” in a completely new plant in which the JUMO anniversary beer was then to be brewed.

BREWERY PLANT IS A CLASSIC 3-UNIT BREWHOUSE

The planning of the plant on the basis of an intelligent 3D CAD model using the latest CAD/CAE software and manufacturing methods such as orbital welding technology meant that the project – which was mainly managed by trainees – was completed in just a few months.

This has resulted in a fully automated brewery plant in compact skid design which is completely made of stainless steel, has an output of 100 liters of cold wort, and which features an automated CIP function (Cleaning in Place). The brewery plant is a classic 3-unit brewhouse with lauter tun. Potential brew size is approximately 100 liters. Depending



JUMO had its own modern and highly efficient brewery plant built as a collaborative project to mark its 75th anniversary. © JUMO

on the type of beer, this corresponds to a malt pour of approximately 20 kg.

In addition to the mash tun, lauter tun, and wort kettle, the plant was also equipped with a hot water tank. Apart from the lauter tun, all containers are electrically heated via the inner wall of the vessel. JUMO TYA 202 power controllers are used to control the heating elements. The power controllers are extremely important for efficient energy use.

Furthermore, the plant has a pump for water and the CIP function as well as another frequency-controlled pump for the mash or wort. In both pumps the JUMO ZELOS C01 LS level switch is used as dry-run protection.

The 2 motors for the mash tun stirrer and the lauter tun chopper are also frequency controlled.

When measuring the level of the hot water tank, mash tun, and wort kettle the new JUMO DELOS S02 pressure transmitter is used. The differential pressure measurement in the lauter tun was implemented with the JUMO TAROS S46 H.

JUMO flowTRANS W02 is used for quantity measurement of the main pour and the post pours. After the wort cooler, the new JUMO flowTRANS MAG HT20 measures both the totalized flow rate and the temperature. Temperature in the respective containers is deter-





mined with the JUMO dTRANS T1000. The sensors were installed in the plant with the process connections G ½ (hygienic), JUMO PEKA (EHEDG certified), and clamp. It was integrated via SPE, IO-Link, or with 4 to 20 mA signal.

HIGH DEGREE OF PROCESS RELIABILITY DURING BREWING

At the beginning, the hot water container is filled with water and brought to the required mashing-in temperature. The water is then pumped into the mash tun and the malt grist is added manually. Water quantities (main pour) are determined with the JUMO flowTRANS US W01/02.

The mashing-in process should be completed in a time frame of less than 15 minutes and the stirrer should be running at maximum rotational speed. Enzymes contained in the malt now start the respective degradation processes. Part of the proteins are degraded by the proteinases down to amino acids while the starch is degraded to sugar by alpha and beta amylase. Enzymes work in a substrate-specific manner and place special demands on the reaction medium with regard to viscosity, pH value, and temperature.

The various pauses when having reached the respective optimal temperature are now



The new JUMO flowTRANS MAG HT20 measures both the totalized flow rate and the temperature

© JUMO

passed through in accordance with the required beer type. A common mash process for pale beer today would be to mash in at 62 °C, after 50 minutes increase to 72 °C, and after another 20 minutes heat up to 78 °C. The heating process should take place with a temperature rise of 1 °C per minute. "The interaction of all these JUMO products and solutions ensures a high level of process reliability," says B+G manager Sebastian Gärtner.

After that, the lautering follows. In this process step, the liquid and solid components are sep-

arated from each other. When the lauter tun, which is equipped with a sieve bottom, is filled, the solids settle to the bottom to form a filter layer. The initially cloudy wort is pumped back into the lauter tun. When the wort is clear, a switch is made to the wort kettle. During the lautering process, the JUMO TAROS S46 H measures the differential pressure under the drop bottom to control the rotational speed of the frequency-controlled pump and to switch on the chopper if necessary.

After the main pour has been completed the post pours follow. The quantity of the individual post pours is acquired again via the JUMO flowTRANS US W01/02. Post-pouring is intended to remove any remaining extract from the spent grains. The sum of the extract that can be washed out and degraded should be less than 1 %.

In the subsequent process step, the wort is boiled for approximately 70 to 90 minutes. Boiling evaporates the water to obtain the required original wort, expels unwanted aroma substances, sterilizes the wort, inactivates enzymes, and forms aroma as well as colorants. If you are interested in the missing process steps needed for this special brew read on at: <https://www.pcne.eu/bingo/63663>.



Operation of the plant takes place via the JUMO variTRON 500 touch controller and the JUMO smartWARE SCADA software for process monitoring and control.

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Industrializing the Production of Electrolyzers and Fuel Cells

The world is facing a fundamental change to its entire energy supply. All current methods of generating energy are under scrutiny. Nuclear energy has fallen into disrepute for a number of reasons. Meanwhile, hydropower has its own limitations in terms of scope, one of which is its immense impact on the landscape and the associated consequences for flora and fauna. Biomass is another option, but it competes with food production and is also a limited resource.

For these reasons, fossil fuels such as oil, gas, and coal have been the energy carriers of choice—until now. Contrary to past predictions, they are still widely available, inexpensive, and versatile. These fossil fuels have not just been used for energy generation—they are also used as raw materials for chemicals, pharmaceuticals, and many other products. Over the past 20 years, two “renewable ener-

gies” have become the forerunners in terms of generating electrical energy. Disregarding the fact that energy is not technically “renewable,” wind and solar energy are the first candidates to come to mind here—as energy carriers that appear to be free of charge. In fact, there have been astonishing developments in this area over the past two decades, both in terms of scale and cost.

Have all problems with these technologies now been solved? Not at all: There are still fundamental problems that have unfortunately been negligently underestimated over a long period of time. Germany is one country in the world with a reliable supply of electrical energy at all times. This is not necessarily a matter of course, even in highly developed countries. The supply system was designed to always cover absolute maximum demand, even if this is only incurred for one hour a year. Energy generation therefore depends on demand—not only in terms of time, but also space. That is why it made sense to build large power plants near large energy consumers. These may be highly populous cities or heavy industry facilities, for example.

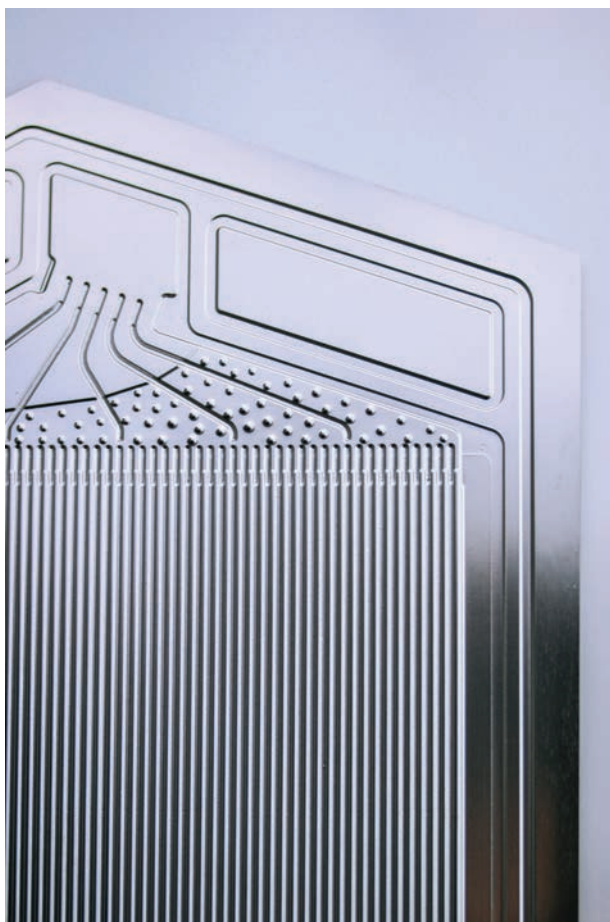
Using solar and wind power as energy sources does not meet these requirements. The position of wind turbines depends on the available space and the “wind supply.” In turn, installing PV modules depends heavily on the willingness of private individuals to invest. The supply of energy from these systems also depends on weather conditions.

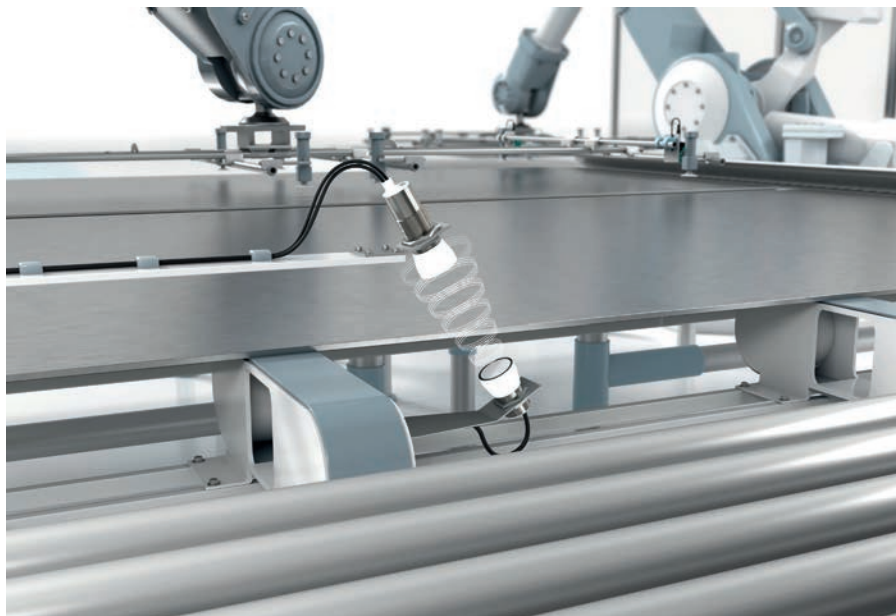
Germany has been afforded the luxury of having two energy supplies for years to compensate for the problems described above. Even though current figures indicate that we are generating 46 % of our electricity from renewable sources, on certain days of the year it is barely more than 20 %. The fewer conventional power plants we have, the more likely it is that we are heading toward an uncontrollable situation.

We therefore need to find a balance between supply and demand, not only in the short term, but also seasonally. It goes without saying that more energy is needed in winter than in summer. This means that a medium is required that can store energy over any period of time, is eas-

Bipolar plate embossed in stainless steel

©Fraunhofer IWU





A UDC ultrasonic sensor for detecting double layers.

Nevertheless, the aim in both cases is to significantly increase the number of production units to meet massively growing demand and sustainably reduce costs. A key factor here is therefore industrializing production process, i.e., using automation. The core components are the bipolar plates (BPP) and the membrane electrode assembly (MEA). In terms of the latter, a distinction is made between 3-, 5-, and 7-layer MEAs. In this case, catalyst layers are applied that are required for the electrolytic processes.

The Fraunhofer Institute for Machine Tools and Forming Technology IWU in Chemnitz is currently launching the "Reference-Factory.H2" project, the aim of which is to optimize the production of these components. The project will test, investigate, and optimize all processes, from the production of bipolar plates and the functionality of seals through to the assembly of the complete stack.

Initial practical applications have shown that checking for potential double layers may be a criterion. Ultrasonic sensor technology has proven itself as effective in this application. In principle, these sensors can accurately measure distances to a tenth of a millimeter and detect multiple layers or even cracks. One particular benefit of ultrasonic technology is that it works irrespective of the object's material composition; therefore, properties like color, luster, and transparency will have no effect. This offers great advantages, especially for metallic and translucent materials.

Sensors of the F77 series can deliver height measurements that are accurate within 0.2 mm. UDC double sheet controls can detect multiple layers by detecting boundary layers, i.e., the last layer before an air gap. Last but not least, the supplied components can simply be checked for their presence or position.

These modern sensors have a standardized IO-Link interface that can be used to adjust settings and query status data. The interface modules (masters) that are also available transfer the data via OPC UA to other units of the IT infrastructure. This means that all the prerequisites for an architecture in accordance with Industry 4.0 are met.

►► 63661 at www.pcne.eu

ily transportable, and can be used for various applications, including for reconversion.

If we look at Germany as an example, however, only around 20 % of the country's total energy requirements are met by electricity: The far greater share is therefore actually supplied using oil, gas, and coal. This includes the entire transport sector, heating market, and industry, especially sectors such as steel, chemicals, cement, and glass. It's easy to sit and philosophize about the extent to which these industries can be "electrified," but only time will tell—it will very much depend on cost and availability.

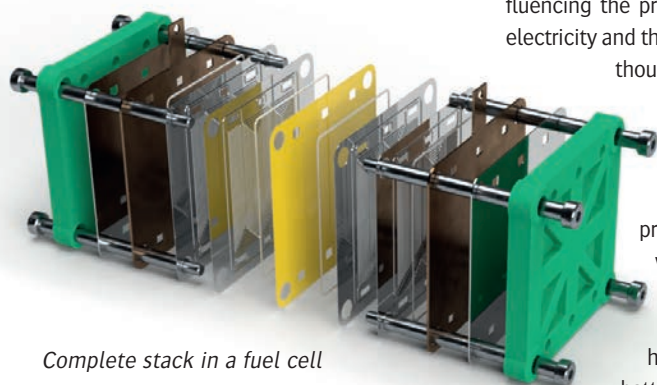
The trump card in this game is hydrogen. There is currently unanimous agreement about this across the world. As a storage medium, it can compensate for the erratic fluctuations in wind and solar energy, and its known derivatives can replace fossil fuels in all applications as a raw material. How exactly this can be implemented in practice goes beyond

the scope of this article. However, the fact is that gigantic amounts of "green" hydrogen are now required. "Green" hydrogen is produced by electrolysis, which involves running an electric current through water. The water is split into hydrogen and oxygen. This process takes place in an electrolyzer: It can then be reversed in a fuel cell. In this case, the hydrogen serves as the fuel and combines with oxygen to generate energy. The "waste product" is water.

As a raw material, water is available on our planet in almost limitless amounts in the oceans. However, electricity must be generated. If this process can be completed in a climate-neutral manner, it will be possible to convert our energy supply so that CO₂ generation and absorption is brought back into balance, preventing the continual warming of the atmosphere.

The use of hydrogen and its derivatives will therefore depend on availability and price in the near future. There are two major factors influencing the production process: the price of electricity and the cost of purchasing plants. Although they use very similar technology, electrolyzers and fuel cells play in different leagues. Electrolyzers have a unique selling point in the production of green hydrogen, while fuel cells compete with other processes. In heavy goods transport, for example, hydrogen drives compete with battery-powered electric motors.

hydrogen drives compete with battery-powered electric motors.



Complete stack in a fuel cell

©Fraunhofer IWU



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HYGIENIC ELECTRONIC PRESSURE SWITCH

Highly accurate switch with EHEDG and 3-A certification



WIKa's PSD-4 electronic pressure switch is the universal solution for industrial automation tasks - also in hygienic applications and under harsh conditions. Thanks to EHEDG and 3-A certification, the pressure switch is also suitable for industries with high hygienic requirements. Due to an accuracy of $< \pm 0.5\%$ and minimal long-term drift, it permanently ensures an accurate representation of the process

pressure for more than 100 million load cycles. The pressure switch is available with digital output signal as well as switchable and scalable analogue output. In addition, it can also be easily monitored via the self-diagnostics. Condition data and the diagnostic functions allow consistent monitoring. Pressure or temperature values that are above or below the specifications are displayed directly in the system. The data also allow conclusions to be drawn about changing process conditions. Additional information helps to check the loading. The scalable analogue output enables the measuring range to be adapted at a ratio of 5:1. In addition, the output signal can be configured specifically for the application. Thus the PSD-4 can be used flexibly.

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OIL-FLOODED SCREW COMPRESSOR

Reliable Compressors for gas compression



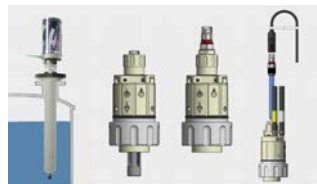
With the VMY836H, **AERZEN** is expanding its successful series with a package for volume flows of up to 23,500 Nm³/h at 60 Hz, thus, setting a new benchmark in the field of process gas compression. It is the company's largest oil-injected compressor and delivers more than twice

the volume flow of size VMY 536, the previous flagship. The package achieves volume flows of up to 23,500 Nm³/h at 60 Hz and is designed for a maximum operating pressure of 25.0 bar (abs.) and inlet temperatures of -60 °C and above. Volume flow control is as convenient as usual thanks to the integrated control slide. As option, frequency inverter operation is possible. Efficient partial load operation and flexible adaptation to dynamic process parameters are, thus, guaranteed. Hydrodynamic axial tilting pad bearings guarantee maximum operational safety and service intervals. The rotor is not driven via timing gears as in oil-free compressors, but via direct power transmission of the driven rotor. The oil injection quantity regulates the outlet temperature and enables the highest efficiencies through efficient gap sealing. A double-acting, oil-purged mechanical seal on the drive shaft guarantees 100% machine sealing. Like all VMY compressors, the VMY836H is designed for years of continuous operation and maximum reliability.

►► 63116 at www.pcne.eu

SENSOR ADAPTER WITH LOCK FUNCTION

Adapter for safe and thorough cleaning



The new **Knick** sensor adapter ARD75 with gate function provides a remedy and ensures thorough cleaning without interfering with the process. In the chemical treatment of

wastewater, hard means are used. Among other things, companies often use milk of lime to neutralize the very acidic wastewater. The problem is that the sensors, which are supposed to monitor the process in the water itself, can be covered with a layer of lime within a few minutes. This severely impairs the sensor's function. The industry is looking for a way to carry out the sensor cleaning process without manual interruption inside the surrounding medium. The solution lies in a sensor adapter with lock function that works in combination with established immersion fittings: Through the airlock, the cleaning of the sensors takes place completely separated from the medium in a cleaning chamber. Due to the plastic material used, the fitting is metal-free and can thus also be used in highly corrosive processes. No process media can escape from the fitting during the sensor movement. This increases occupational safety in the process. In addition, the adapter is suitable for use in highly aggressive processes that require very frequent and thorough cleaning of the sensors. Users who only use sensors for short-term measurements can keep the sensor safe and cleaned in this chamber during the non-measurement phases.

►► 63487 at www.pcne.eu

AIRFLOW SENSORS

ATEX-certified flow monitors for zones 2 and 22



The new ATEX-certified airflow monitors from the LC 518 GSP-EX22 series from **EGE** are used for flow monitoring of gaseous media in exhaust and supply air lines that require category 3 sensors. The stainless-steel sensors are designed for a 0.5 m/s to 20 m/s detection range. In applications with a specified air flow, users can easily adjust the limit

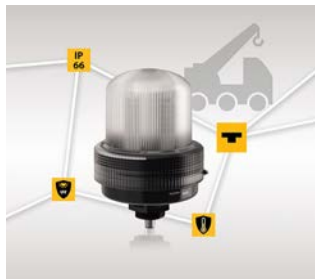
value during operation via an onboard potentiometer. The flow state is indicated by a three-color light on the housing front and transmitted for further processing by a PNP switching output. When the limit value is exceeded, the light changes from red to yellow, a further increase in the flow velocity is signaled by a green light. The 80 mm long sensors are mounted directly in the wall of the ventilation duct with mounting nuts included in the scope of delivery. The M18 thread, which runs over the entire length of the housing, allows optimal positioning at different wall thicknesses. If the airflow is sufficient in the edge area, the measuring surface can be installed on a level with the inner wall of the duct. The sensors are designed in protection class IP67 and connected via a 2 m long PUR cable.

►► 63670 at www.pcne.eu



PROGRAMMABLE MULTICOLOR INDICATORS

Configurable LED indicators with optional audible alarm



Turck is expanding its portfolio of LED lights with the robust LED indicators of the K100 series. The 100 mm beacons developed by Turck's partner Banner Engineering are available in two configurations. The Pro Daylight Visible beacon model offers 12 audible options and has a clear lens that

avoids false indications, even in sunlight. It offers bright indication in both indoor and outdoor environments. The model's clear lens provides distinct indication, even in sunlight, avoiding false indications. It features three color options (green, yellow, and red) for status indication, operator guidance, and other functions. The K100 Pro Indicator model has a diffused lens that appears white when inactive, thereby preventing false indication. It features 14 color options that can be used for status and indication applications. Animations include options such as flash, intensity sweep, and wave. Both beacon models can include an optional audible alarm and have an IP66 environmental rating for dust, rain, and snow. The beacon series is discretely controlled and ideal for users who do not have IO-Link but want control and customization capabilities to communicate information visually. The PC-based interface makes it easy to configure a beacon for a range of indication or displaying applications.

▶▶ 63261 at www.pcne.eu

STAINLESS-STEEL SENSOR CONNECTORS

Circular corrosion protected M12-connectors



binder offers M12 connectors as stainless-steel variants, for example, the 713/763 and 715/766 product series with panel mount connectors and overmolded cable parts as well as wireable connectors for environments where the components are exposed to humidity, may come into contact with aggressive media or are

subject to regular cleaning processes with corrosive agents. M12 panel mount connectors are available as stainless-steel versions as either male or female parts, which can be screwed onto the front or rear, with different pin counts, and both with or without wires. These connectors are available with A, B and D coding. As a special feature, binder also offers panel mount connectors with protective caps. Overmolded cable parts are also available with stainless-steel threaded locking rings - instead of zinc die-cast. In these cases, the respective locking ring features a hexagon contour allowing the M12 thread of the connector to be easily attached and the torque to be applied. The stainless-steel locking rings are available for both male and female parts, in straight and angled designs. To provide connectors in the food and beverage industry with the mandatory protection against detergents, appropriately resistant plastics are used for their cables and overmoldings.

▶▶ 63452 at www.pcne.eu



FREE DIGITAL SUBSCRIPTION

H2S IN LIQUIDS MONITORING

Process Analyzer for continuous monitoring



The 205 PermaStream H₂S in Liquids Process Analyzer from **KECO** offers an accurate quantification of hydrogen sulfide (H₂S) in sample streams of crude oil as part of environmental compliance, safety, and quality control practices. The inline analyzer measures H₂S in light/medium/heavy crude oil, dirty/clean water, diesel, fuel oil

and drilling fluid in real time. Accurate quantification of H₂S is necessary for its efficient removal from crude oil. Due to its opacity and complex structure, it cannot be visually measured. The most effective measurement method requires stripping H₂S from the liquid into gas for analysis by an analyzer or a sensor. The Model 205 Process Analyzer efficiently and reliably separates H₂S from the liquid sample for measurement in the gas phase without false positives as it only detects H₂S. A simple device, the 205 PermaStream continuously provides an ultra-clean and dry sample to the H₂S sensor for real-time and accurate measurement. Dependable in operation, the analyzer requires no field calibration, sample conditioning, filters nor pumps. Incorporating KECO Membrane Technology, the ultra-low-maintenance device addresses the shortfalls of headspace stripping columns used for this purpose that were problematic because of oil clumping and high maintenance.

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COMPACT VACUUM PUMPS FOR HYGIENIC PROCESSES

Pumps in hygienic design for easy regular cleaning



Vacuum systems used in food and packaging processes must contribute to safe and efficient food supply. With the new wash-down vacuum pumps DV 650 and DV 800 FP-r of the established, dry-running

DRYVAC series, **Leybold** has developed two models for these industrial processes. Their use facilitates production, increases food safety and extends the shelf life of foodstuffs. In addition, they can be washed down inside and outside in any installation position. Their compact size and low noise level enable uncomplicated, near-machine installation in the immediate vicinity of the production line. The advantage for users: during daily cleaning of the system, the DV 650/800 FP-r pumps can be washed down with the production equipment in one process. This results in fewer system downtimes, better cycle times, less maintenance, a higher standard of hygiene and higher filling and packaging outputs. In line with the requirement profile in most applications, their use also guarantees a high pumping speed from atmospheric pressure to low pressure ranges. Thanks to modern, oil-free pump technology, the risk of contamination of pumped media with lubricants is minimal.

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A	ABB	10, 11							
	AERZENER MASCHINENFABRIK	28							
	ALFA LAVAL	15							
	ANALYTICAL SYSTEMS KECO	29							
B	BESTSENS	13							
C	CO.RA	32							
E	EBRO ARMATUREN	7							
	EGE-ELEKTRONIK SPEZIAL-SENSOREN	28							
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	ENDRESS+HAUSER	12							
F	FLEXIM	6							
	FRANZ BINDER	29							
H	HANS TURCK	29							
J	JUMO	13, 24							
K	K.A. SCHMERSAL	7							
	KAESER KOMPRESSOREN	7							
	KNICK ELEKTRONISCHE	28							
L	LEUZE ELECTRONIC	22							
	LEYBOLD	29							
M	MICHELL INSTRUMENTS	6							
	MICRO-EPSILON	15							
	mitsubishi electric	17							
O	OPTRIS	7							
P	PEPPERL + FUCHS	26							
	PROMINENT	16							
R	RESOLVE OPTICS	8							
S	SENSIRION	6							
	SIEMENS	14							
	SIKO	11							
	SOFTING INDUSTRIAL AUTOMATION	13							
T	TELEDYNE FLIR	20							
V	VAISALA OYJ	15							
	VEGA	15							
W	WIKA	28							
Y	YOKOGAWA	18							

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