JUMO

SENSORS + AUTOMATION

Issue 1/2024

JUMO is a leading system and solution provider

Efficient orchestration with SPE, IO-Link, and sensor-to-cloud
_SPE, IO-Link, 그리고 센서-클라우드 간의 효율적인 통합

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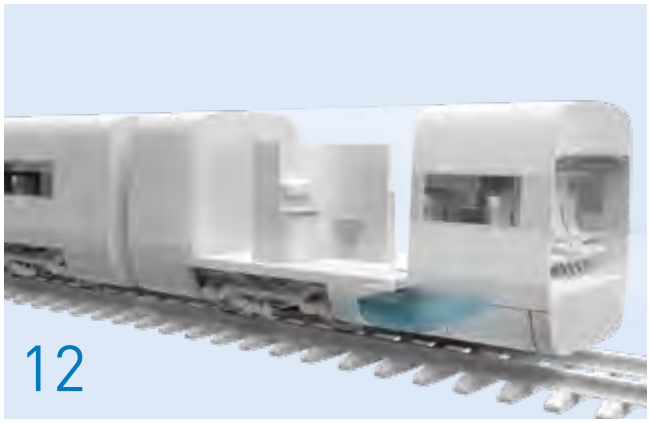
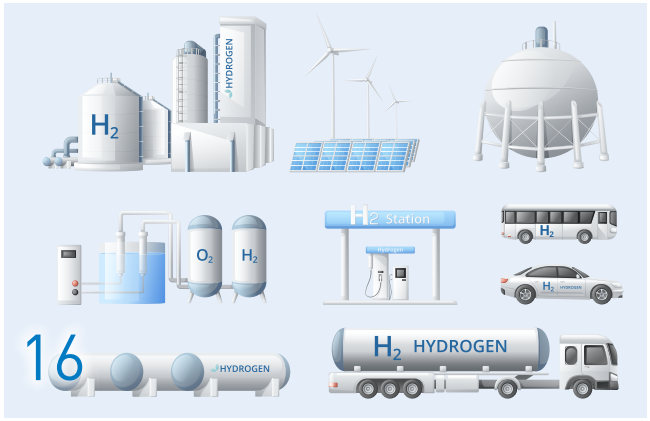




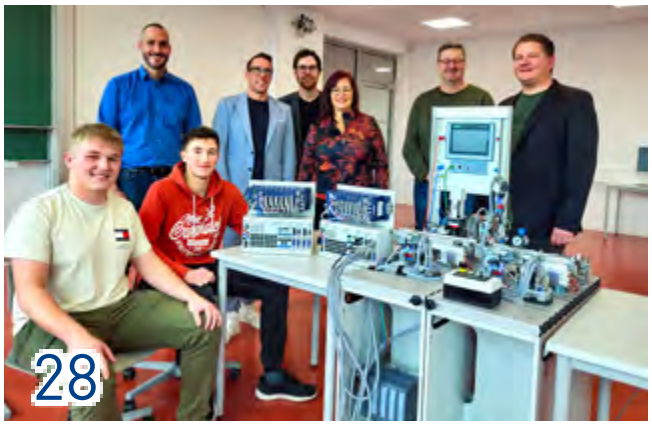
JUMO

MORE THAN SENSORS AND AUTOMATION

APPLICATIONS + KNOWLEDGE

TECHNOLOGY + PRODUCTS

COMPANY + SERVICES



To improve readability the masculine form is used for personal designations and personal nouns. These terms shall generally apply to all genders in order to be non-discriminatory. This abbreviated language is only used for editorial purposes and is not intended to suggest value judgment.

Dear Reader,

"More than sensors and automation".
바로 JUMO에서 목표하는 바입니다. 그러나 여기서 '더 많은 것(More)'이란 정확히 무엇을 의미할까요?
제품뿐만 아니라 전 세계 고객에게 추가적인 혜택을 제공합니다. 수십 년간의 전문 지식 덕분에 JUMO는 센서 및 자동화 제품을 컨트롤러, 제어 시스템과 같은 맞춤형 시스템으로 발전시켰습니다. 대형 용광로에서 고정밀 온도 및 습도 제어부터 초순수 수소 제조와 같은 정밀한 수질 분석에 이르기까지, 어떤 과제든 JUMO 시스템은 손쉽게 해결할 수 있었습니다. 이 과정에서 센서부터 클라우드까지, 자동화 피라미드 단계들을 발전 시킬 수 있었습니다.

그러나 '더 많은 것(More)'은 여기서 그치지 않습니다. 우리는 시스템 기반의 고객 맞춤형 솔루션을 만들고 있으며, 이를 통해 추가적인 서비스를 제공합니다. 이 서비스는 복잡한 자동화 응용 프로그램을 위한 포괄적인 공학 지식 뿐만 아니라 사후 서비스나 교정 옵션 등을 포함하고 있습니다. 결과적으로 우리는 항상 고객의 개별적인 요구를 충○족시킬 수 있는 완전한 서비스를 제공할 수 있습니다.

저희의 독특한 제품, 시스템 및 맞춤형 솔루션의 결합을 통해 현재의 도전적인 과제를 해결하고 클라우드 서비스와 같은 새로운 비즈니스 모델을 제공하고 있습니다. JUMO의 문제 해결 능력을 다음 페이지에서도 확인할 수 있습니다. 물론 당연히 이 페이지에서는 JUMO의 세계를 제한적으로 보여드리고 있는 것일 뿐입니다. 도전 과제를 맡겨 주세요!
우리는 여러분께 '더 많은 것(More)'이 무엇인지 정확히 보여 드릴 것입니다.

이번 매거진에서 여러분이 영감을 얻어가시길 바랍니다.

Dimitrios Charisiadis Steffen Hoßfeld

Dimitrios Charisiadis
Chief Executive Officer

Dr. Steffen Hoßfeld
Chief Operating Officer

JUMO is a leading system and solution provider

_JUMO는 시스템과 솔루션을 선도하는 기업입니다.

Efficient orchestration with SPE, IO-Link, and sensor-to-cloud

_SPE, IO-Link, 그리고 센서-클라우드 간의 효율적인 통합

Single Pair Ethernet

JUMO는 산업 센서와 자동화 기술의 주요 시스템 및 솔루션 제공 업체로서의 계속 발전해 오고 있습니다. 최신 기술인 Single Pair Ethernet(SPE),IO-Link , 그리고 센서-클라우드 통신 등이 JUMO 시스템 환경에서 네트워킹되고 통합되어 있어, 그 혁신적인 성과가 명확하게 드러나고 있습니다.

IO-Link

Further information
www.jumo.net

These technologies have enormous potential for JUMO if one looks at the numerous industries that JUMO supplies in the field of automation.

SPE is a pioneering development in the world of industrial communication technologies. Originally developed in the automotive industry, SPE offers considerable advantages for industrial automation. It uses only a single wire pair for data transmission, which enables a leaner, cheaper, and simpler infrastructure while maintaining high data transmission rates. The advantages of SPE include space and weight reduction, easier installation, lower costs, longer range, faster data transmission, and integrated power supply via Power over Data Line (PoDL).

IO-Link는 스마트 제조 구현에 중요한 역할을 합니다.

IO-Link is a communication technology that has been part of JUMO's product portfolio for many years. It ensures seamless communication between sensors, actuators, and the control system. As the first standardized IO technology for communication with sensors and actuators, IO-Link enables digital point-to-point industrial network logging.

The key features of IO-Link include bidirectional communication, device parameterization, comprehensive diagnostic capabilities, and flexibility to support a wide range of devices. IO-Link also plays a central role in the implementation of smart manufacturing and the fourth ➜

industrial revolution by providing an intelligent solution for optimizing production processes and improving production efficiency as well as occupational safety.

Machine-to-machine (M2M) communication is also a key element of Industry 4.0. It refers to the automated exchange of data between machines, plants, and devices, often via a network, without human intervention. This communication enables machines to exchange information, coordinate tasks, and make decisions based on real-time data.

M2M communication refers to the direct exchange of data between devices, machines, sensors, and control systems such as the JUMO variTRON 500. This communication usually takes place via wireless or wired networks and is a central component of automation as well as monitoring systems in various industries.

The concept is closely linked to the Internet of Things (IoT), where the focus is on the interaction of machines. SPE and IO-Link play a decisive role in M2M communication. SPE enables the fast and efficient transmission of large amounts of data via a single wire pair, which can be a great benefit in complex automation environments. By integrating SPE, machines and sensors can communicate over greater distances and transmit data more efficiently. IO-Link technology impresses by providing a robust and flexible platform for the exchange of sensor data and control signals. JUMO has recognized these advantages and successfully integrated both technologies into its product portfolio.

기계 간 상호작용에 초점을 둡니다.

At JUMO, sensor-to-cloud refers to the connection of smart sensors in industrial environments directly to the JUMO Cloud. This connection allows data from production processes to be acquired efficiently and converted into usable information. Smart sensors play a key role here, as they can send data directly to the cloud without the need for additional components. This direct data flow enables production data to be used quickly and efficiently, which increases productivity and reduces costs.

Summary

JUMO가 Single Pair Ethernet(SPE),IO-Link 및 센서-클라우드 통신과 같은 혁신적인 기술을 도입함으로써 포괄적인 시스템 및 솔루션 제공 기업으로 중요한 발전을 이루고 있음은 분명합니다. 이는 다양한 산업에 이점을 제공하며, 그 결과 JUMO 고객들에게도 긍정적인 영향을 미칩니다.

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Single Pair Ethernet (SPE)

JUMO sensors make the SPE ecosystem more efficient

_JUMO센서는 SPE 생태계를 더 효율적으로 만듭니다.

Data with SPE technology from the sensor directly to the JUMO Cloud

_SPE 기술을 사용하여 데이터를 직접 JUMO 클라우드로 전송합니다.

• "Intelligent" probing • Standstills are avoided

_지능형 네트워크 진단과 모니터링, 데이터 중단을 피할 수 있어 안정적인 통신 제공

The SPE-capable product portfolio presented at JUMO's 75th anniversary press conference in February 2023 has gone into series production. The innovative SPE technology has been integrated into 3 new JUMO sensor products:

❶ JUMO hydroTRANS S20 (Temperature, humidity, CO_2 transmitter)
❷ JUMO flowTRANS MAG H20 (Flowmeter)
❸ JUMO DELOS S02 (Pressure transmitter)

"SPE is interesting for all automation applications – and thereby for all industries. Many operational processes that need to ensure a high level of availability can benefit from end-to-end Ethernet networking thanks to SPE technology," explains Manfred Walter, product manager and SPE expert at JUMO.

As a result, the use of SPE can avoid standstills and enable even greater efficiency – which in turn enables long-term cost savings – in many application scenarios.

JUMO sensors make the SPE ecosystem more efficient. *"Intelligent probing is possible,"* as Walter points out. Important measurands such as temperature, air humidity, CO_2, flow, and pressure are forwarded with high accuracy and speed to such destinations as the JUMO Cloud. For the first time, this enables continuous Ethernet networking of the sensors based on the familiar automation pyramid right down to field level without a media break in Ethernet communication.

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Important additional diagnostic information can be easily and quickly supplied by an intelligent sensor for condition monitoring or predictive maintenance directly via the two-wire Ethernet interface – independently of the control system.

"Process control continues while the necessary maintenance data is extracted and processed independently in the background by the systems set up for this purpose," explains Justin Heinrici, product manager at JUMO.

Each of the 3 sensors is supplied via Power over Data Line (PoDL). Cable distances of up to 1000 m can be achieved when mounting and cabling the sensors. The connection is established using a SPE connector with the high protection type IP67 in M12 design. ■

Single Pair Ethernet

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Further information
product-highlights-en.jumo.info

Highly-scalable paperless recorder

JUMO LOGOSCREEN 700

_확장성이 뛰어난 페이퍼리스 레코더

Simple and intuitive to use • ICON-based operation and visualization concept

_간단하고 직관적인사용 • 아이콘기반작동및시각화 개념

A high level of scalability level allows the paperless recorder to be flexibly adapted to various customer needs: from a device version without a measurement input through to device versions with up to 18 universal measurement inputs, 3 analog outputs, 18 digital inputs, 24 individually switchable digital inputs/outputs, and 7 relay outputs.

What's more, the JUMO LOGOSCREEN 700 is characterized by its high level of connectivity. In addition to standard Ethernet, USB, mini USB, and RS232/RS485 interfaces, the recorder comes with the optional extra of a PROFINET interface. Thanks to this high level of connectivity, the JUMO LOGOSCREEN 700 is a high-performance all-rounder that can record a total of 60 channels in analog and digital form, thus enabling up to 120 external analog and digital inputs to be visualized.

In heat treatment processes used in thermoprocess technology, the JUMO LOGOSCREEN 700 meets the requirements of standards AMS2750 and CQI-9, which means that it can be used as a mobile field testing device. In addition to its high-precision thermocouple connection terminal developed especially for this purpose, the paperless recorder impresses with an intuitive browser-based TUS test. Once the test has been completed, a fully automated PDF report saves the user a huge amount of time and allows for complete documentation where proof is required.

As backing up process-relevant data is becoming increasingly important as we evolve into the age of digital technology, reliable and complete documentation is the goal of any plant operator.

The JUMO LOGOSCREEN 700 offers the highest degree of security during data acquisition through manipulation detection based on the latest hash algorithms. It allows batch reports to be created for up to 5 plants simultaneously. The batch control function also offers individual and flexible usage options here, be it by touchscreen, control signal, or interface (Modbus or PROFINET).

The Windows-based software package PCA3000/PCC allows the recorded process data to be evaluated quickly and securely with the optional extra of having reports drawn up automatically.

Customer benefits – in a nutshell

- Intuitive, easy operation thanks to ICON-based menu navigation and user-friendly setup program
- Highest degree of security during data acquisition through manipulation detection based on the latest hash algorithms with digital certificate
- Data recording compliant with FDA 21 CFR Part 11, AMS2750, and CQI-9
- Individual creation of proprietary applications thanks to the ST code option and 10 customer-specific process screens
- Flexible system connection through a multitude of different interfaces and protocols

AMS2750

CQI-9, 11, 12, 29

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The “all-rounder” for complex applications

JUMO meroVIEW

_복잡한 애플리케이션을 위한 "만능 제품"

Multifunctional digital display with PLC function • Planning reliability through modularity • High degree of interface connectivity • Suitable for numerous industries

_PLC 기능이 포함된 다기능 디지털 디스플레이 • 모듈화를 통한 계획 신뢰성 • 높은 인터페이스 연결성 • 다양한 산업에 적합

The flexible adaptation, the customizable device menu, the text-supported operation, the parameterization, and the configuration in 4 languages as well as the quick wiring in PUSH-IN terminal technology make a fast startup and versatile use of the JUMO meroVIEW in different industries possible. *"This saves the customer time and money,"* says product manager Klaus Otto.

The new series is available in the typical formats for display devices:

❶ 96 × 48 mm landscape format with 5-digit display
❷ 48 × 48 mm
❸ 48 × 96 mm
❹ 96 × 96 mm

Up to 5 universal measuring inputs allow the connection of RTD temperature probes, thermocouples, resistance transmitters, resistance potentiometers, and standard signals 0(4) to 20 mA or 0(2) to 10 V. Customer-specific linearization with 40 value pairs or a mathematical 4th order polynomial allow individual adaptation to a wide range of sensor signals. Thanks to fast pulse inputs, machine speeds or totalized flow rates (or counting pulses) can also be acquired and displayed.

The modular device concept offers flexible expansion with a wide variety of options. These include digital and analog inputs, outputs, and interfaces as well as a voltage supply for two-wire transmitters.

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A high degree of connectivity is achieved through the available interfaces, RS485 (Modbus RTU master/slave), Ethernet (Modbus TCP master/slave), and PROFINET device as well as USB host and USB device.

With standard functions such as min/max value, measured value hold, or a taring function for weighing applications, math and logic functions can be used to link analog and digital values, or to implement additional control functions via ST code (structured text).

The setup program provides an ST editor and a debug function for ST code programming. ■

PROFINET®

Modbus

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Full steam ahead!

_전속으로 나아가자!

Safe drinking water on board at all times

_항상 안전한 식수를 탑승객에게 제공합니다.

대형 선박에서는 음용수, 서비스 용수, 냉각수, 보일러 및 폐수 처리를 위한 측정 및 제어 기술이 매우 중요합니다. 해양 및 해상 응용 프로그램의 측정 및 제어 장치는 육지 기반 시스템보다 엄격한 기술 요구 사항을 준수해야 합니다. 특히 크루즈 선박에서 음용수 공급이 중단되면 심각한 문제가 발생할 수 있습니다. 엔진실 및 기타 중요 시스템에 대한 해양 승인 인증(DNV 또는 Bureau Veritas)은 오랜 역사와 신뢰성을 바탕으로 하며, 최근에는 액체 분석 장치에 점점 더 많이 도입되고 있습니다.

Ever since humans have sailed the oceans they have had to think about their supplies on board. In the early years of shipping, a considerable part of the hold was used to bunker drinking water and food for the crew and passengers. If the trip took longer due to lack of wind or the water quality in the containers dropped, the lives of the passengers and crew would soon be in jeopardy.

The demand for drinking water is particularly high on cruise ships. Megaships with over 2000 passengers are the largest group and make up 2/3 of the global fleet. The largest cruise ship offers space for almost 7000 passengers, has 19 swimming pools, and an additional 500 000 liter Aqua Theater. Reverse osmosis plants are used here to ensure that the drinking water tanks are always sufficiently filled. Large ships have a range of different water circuits that all need a reliable supply.

A distinction is made between freshwater and seawater. Freshwater is categorized into drinking water and service water (usually drinking water from other areas that has been used once) which can be used to flush the toilets.

The manufacturing and monitoring of the respective water quality requires robust as well as proven measurement and control technology. By monitoring important parameters such as pH value, chlorine content (alternatively ozone, etc.), redox potential (pools), electrolytic conductivity, pressure, flow, level, and temperature in the water treatment plants, a high level of water availability and the highest quality can be ensured.

JUMO is well represented on the market here with the JUMO AQUIS touch P, JUMO variTRON 300, JUMO NESOS R40 LSH, JUMO ZELOS C01 LS, and JUMO Ex-i isolating switch amplifier.

Devices and sensors which have been approved according to DNV have undergone an additional technical inspection and are subject to extra tests designed specifically for maritime applications. As such, these approvals are not just another bureaucratic piece of paper. Instead they verify that the components concerned meet special maritime requirements for robustness in practice. In addition to the technical requirements for their land-based counterparts, measuring and control devices intended for maritime applications need to undergo more stringent load tests. For example, the devices must not be disrupted by maritime radio communications. Likewise, they themselves must not disrupt the international emergency frequencies for maritime transport (156 to 165 MHz band). ■

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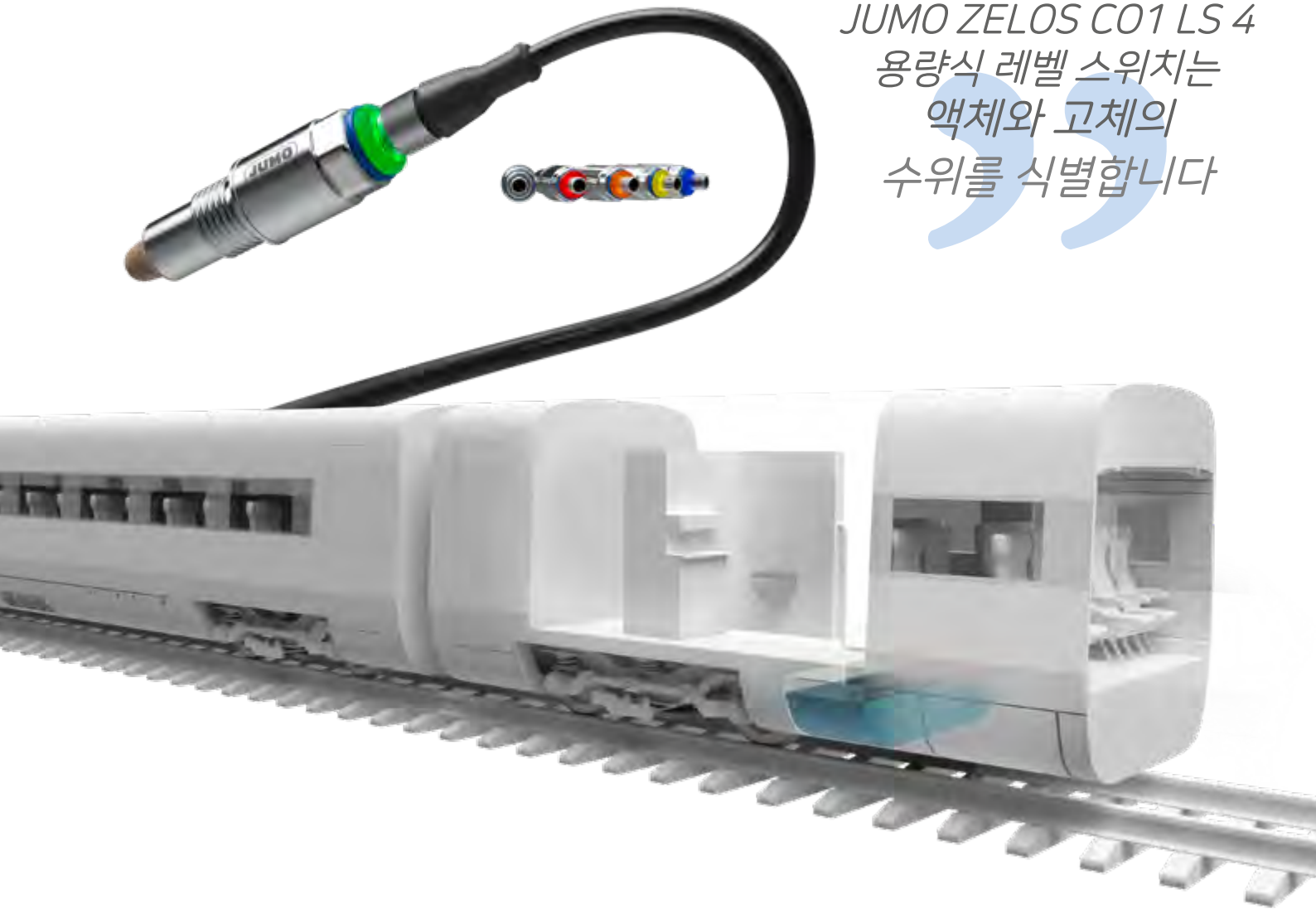
Capacitive level switches in rail vehicles

_철도에 사용되는 용량식 레벨 스위치

A revolutionary solution with the JUMO ZELOS C01 LS

_JUMO ZELOS C01 LS과 함께하는 혁신적인 솔루션



JUMO ZELOS C01 LS 4 용량식 레벨 스위치는 액체와 고체의 수위를 식별합니다

철도 운송 부문에서 액체와 분말 상품의 정확한 레벨 수준 모니터링이 원활하고 안전한 운영을 보장하는 것은 매우 중요합니다. 최근 몇 년간 용량식 레벨 스위치가 이러한 요구 사항을 충족시키기 위한 혁신적인 해결책으로 자리 잡았습니다.

Monitoring the filling level in rail vehicles is essential for various areas of use such as fuel or coolant tanks, brake and hydraulic systems, and wastewater and sewage tanks.

Accurate level measurement not only guarantees optimum system operations, but also ensures the safety and efficiency of rail transport.

Capacitive level switches use the principle of the change in capacitance between a probe and the surrounding medium to measure filling levels. Electrical capacitance occurs when an electrical field forms between the probe and the medium. This capacitance changes depending on the filling level as the medium's dielectric constant changes. This change is acquired by the level switch and converted into an electrical signal.

Short-circuit and reverse polarity protection provides additional safety for the JUMO ZELOS C01 LS. An antivalent electrical circuit enables the detection of line faults such as a cable break. A firmware update profile allows the sensor to be updated while installed so that plant downtime is minimized. PNP, NPN, push-pull, and IO-Link are available as output signals.

A 360° illuminated status display enables easy recognition of the sensor status according to NAMUR and VDI/VDE.

Benefits of using capacitive level switches in rail vehicles

- Versatility: capacitive level switches such as the JUMO ZELOS C01 LS can be used for both liquids and solids. This enables them to be used in a wide array of applications in various tanks and containers.
- Precision: capacitive measurement offers a high level of accuracy and reliability in level measurement, regardless of the medium's physical features.
- Compact design: capacitive level switches are available in compact design types, which enables them to be easily integrated in the restricted installation conditions in railway vehicles.
- Robustness: the level switches are resistant to vibrations, impacts, and temperature fluctuations, making them ideal for use in railway vehicles.

The JUMO ZELOS C01 LS capacitive level switch identifies the level of liquids and solids. This device can also be used in pressurized tanks or in pipes. During use, it showcases its advantages in applications with requirements for overflow and dry-run protection or for media detection.

JUMO ZELOS C01 LS can be used in liquids or bulk solids with temperatures between -40 and +200 °C. Thanks to the auto-calibration function, point level measurement offers both reliability and long-term stability. In addition, after configuration, the 2 switching outputs can automatically distinguish reliably between 2 measured media. Even adhesions do not present a problem for the reliable sensor. The product design contributes to miniaturization in sensor technology so that compact systems can be implemented. Mounting is easily achieved with a standard torque wrench. Since the seal to the medium goes through the sensor tip, no separate seal is required, thereby eliminating the possibility of a mix-up.

Conclusion

JUMO ZELOS C01 LS와 같은 정전용량식 레벨 스위치의 사용으로 철도 차량의 레벨 측정 영역이 크게 발전했습니다. 다용성, 정밀도, 견고성 및 사용자 친화성을 갖춘 레벨 스위치는 액체 및 고체 모니터링을 위한 안정적인 솔루션을 제공합니다.
JUMO ZELOS C01 LS는 이 기술의 대표적인 예이며 철도 차량에 최적으로 통합되어 안정적이고 효율적인 운영을 보장합니다.

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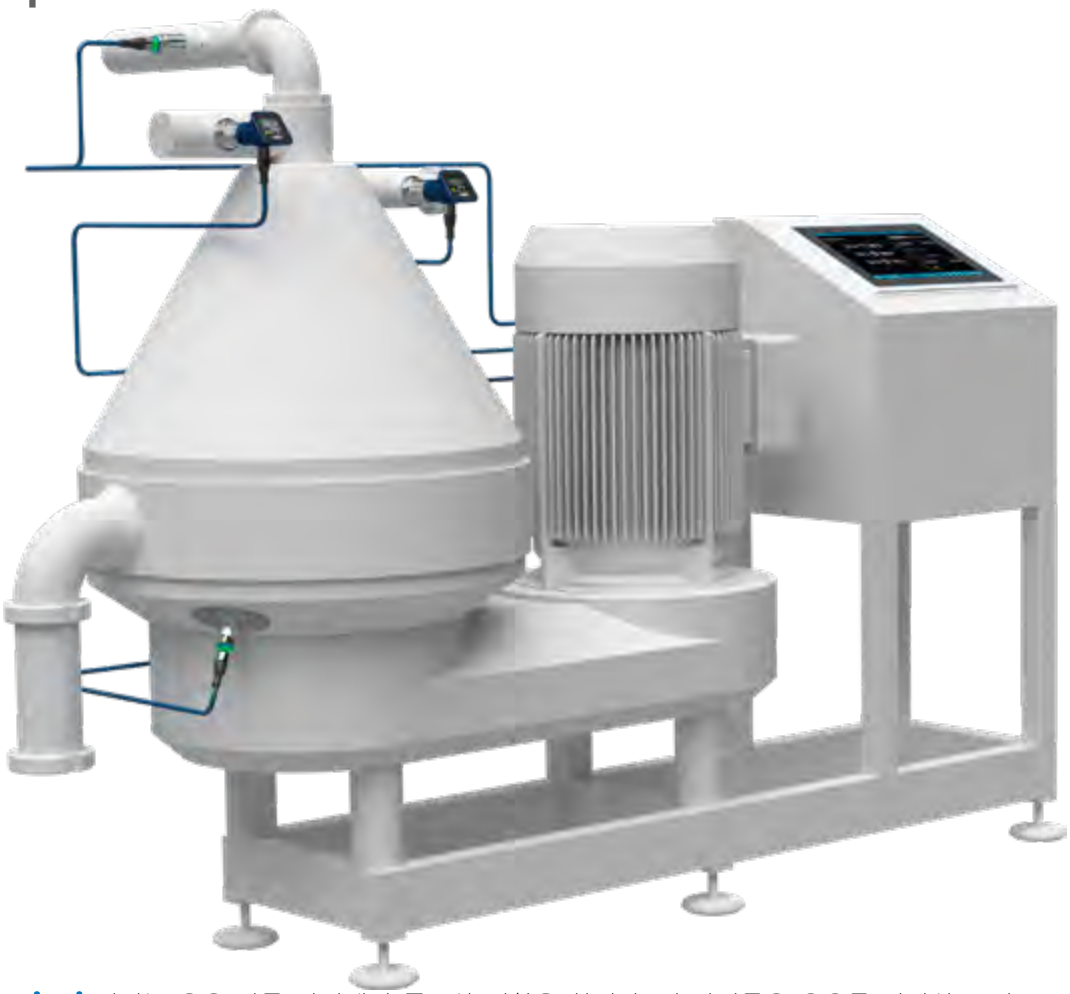
Monitoring the separation

_공정 매개변수의 정확한 획득 및 제어를 통한 식품 산업에서의 분리 모니터링

through precise acquisition and control of process parameters



유량과 압력과 같은 측정 요소의 효율적인 모니터링

분리기는 우유 가공 산업에서 중요한 역할을 합니다. 이 장비들은 우유를 다양한 구성 요소로 분리할 수 있도록 돕습니다. 양조 산업에서는 분리기가 효모를 분리하거나 필요한 탁도 값을 설정하는 데 사용됩니다. 유량이나 압력과 같은 측정 항목의 효율적인 모니터링 및 레벨 스위치 사용은 최적의 성능과 꾸준한 제품 품질을 유지하는 데 매우 중요합니다.

The precise measurement of flow in separator plants is critical for efficiently separating milk components and setting particular fat content levels throughout the entire batch process. Cutting-edge flow sensors allow for real time monitoring and control, which helps to ensure a consistent product quality. Optimum flow measurement minimizes energy consumption and maximizes plant efficiency.

The OPTIFLUX 6000 is an electromagnetic flowmeter (EMF) for hygienic applications in the food sector. The 3A

and EHEDG certified flowmeter has industry-specific insertion lengths to meet the stringent requirements of the food and beverage industry.

Pressure monitoring at the separator's inlet and outlet is key when it comes to avoiding plant downtimes and, in turn, ensuring a consistent and reproducible product quality.

As a result, it is possible to monitor operating conditions on a continuous basis. Deviations from the optimum pressure can alert the operator to problems that require immediate rectification to avoid production downtime.

This is where the JUMO DELOS S02 shows its strength. The pressure transmitter is a small, reliable "powerhouse". It is easy to configure and offers a high degree of process reliability, accuracy, and long-term stability. In addition, the pressure transmitter is also available as an Ethernet-capable version and can be used in many industries outside of the food sector. It is used to acquire relative and absolute pressures in liquid and gaseous media. Measuring ranges are from 0.1 to 100 bar relative or 0.4 to 60 bar absolute.

The successor for the current JUMO DELOS SI can be configured via Bluetooth and app or IO-Link. Thanks to the Ethernet-capable version (Single Pair Ethernet/SPE) and the cloud connection, it can be used in a wide range of industries.

The plant user is also able to view pressure values on the display on-site. When using the IO-Link variant, the sensor can be replaced quickly. The pressure transmitter does not need to be reconfigured using the setup program, which reduces possible downtimes.

Other key players in the process are level switches such as the JUMO ZELOS C01 LS. Monitoring of the inlet and outlet as well as a solids detection function are essential for interruption-free, efficient operations.

The JUMO ZELOS C01 LS capacitive level switch identifies the level of liquids and solids. It can also be used in pressurized tanks or in pipes. Typically, level switches are used in industrial environments for applications with requirements for overflow and dry-run protection or for media detection (such as yeast in separation processes).

측정 데이터를 상위 제어 시스템에 통합하기

The JUMO variTRON 500 touch is based on the JUMO JUPITER modular platform. The central processing unit, in combination with the proven input and output modules from JUMO, forms an overall system with integrated PLC (CODESYS V3.5) and enables visualization via touch panel.

Modbus or OPC UA can be used for integration into higher-level process control systems. The software JUMO smartWARE Evaluation can be used to record all data and verify it for optimization processes. ■

Conclusion

Integration of measurand monitoring into separators plays a key role in optimizing the separation process, both at dairies and in breweries. The precise measurement of flow and pressure as well as the use of level switches for product and phase detection enable operating costs to be reduced, while at the same time improving product quality and increasing overall efficiency. Investment-driven plant upgrades promise long-term benefits in re-lation to economic efficiency and competitiveness in the dairy and brewing industries.

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Promising hydrogen economy continues to gain momentum in 2024

_유망한 수소 경제는 2024년에도 계속될 것입니다.

JUMO offers efficient solutions as a development partner

_개발 파트너 JUMO가 효율적인 솔루션을 제공합니다.

JUMO는 수소를 미래의 유망한 기술로 주목하여 그 발전에 참여하고자 합니다

전세계 수소 경제의 급격한 발전은 에너지 전환의 중요한 구성 요소로서 전개되고 있습니다. JUMO는 이 발전에 참여하고자 하며 , 수소 경제의 요구 사항을 시스템 및 솔루션 제공자로서 중심으로 한 제품 포트폴리오에 일관되게 조정하고 있습니다.

청정 수소의 응용 분야

Hydrogen plays a crucial role in the energy transition for several reasons: it is a versatile energy carrier that can be produced cleanly and leaves only water as a by-product when burned or used in fuel cells. This makes it an attractive alternative to fossil fuels and helps reduce greenhouse gas emissions.

Another reason for the importance of hydrogen is its storage capacity. It can serve as long-term energy storage,

ideally for surplus current from renewable energy sources. Electrolysis is used to split water into hydrogen and oxygen, whereby the hydrogen produced can be stored and later converted back into current or heat as required.

In addition, hydrogen offers the opportunity to decarbonize sectors that are difficult to electrify. Examples include heavy goods traffic, shipping, aviation, and steel production. By using hydrogen as an energy source, these industries can drastically reduce their emissions and support the goal of climate neutrality.

Success factors for the hydrogen economy are further advances in technology, competitive costs, an improved infrastructure for the manufacturing, storage, and distribution of hydrogen as well as increased cooperation between governments, companies, and research institutions.

한 눈에 볼 수 있는 기술 요구 사항

The use of hydrogen as an energy source entails specific material requirements that play a key role in the safety, efficiency, and long life cycle of the systems. As hydrogen is handled at high pressure and in some cases at high temperatures, materials that can withstand these conditions are required.

JUMO is experiencing a significant boost in business and sees enormous growth opportunities in the hydrogen sector. The company adapts its products for use in hydrogen and certifies them where necessary. The existing production facilities were only slightly modified while the necessary increases in quantities can often be achieved from the production reserve.

Handling hydrogen requires extensive safety precau-tions and measurement technology expertise – be it in the manufacturing of ultra-pure water for feeding the electrolyzer or in monitoring electrolytic conductivity. Digital pressure and temperature sensors from JUMO ensure the monitoring of thermodynamic processes and offer safe as well as reliable technology that is also explosion-proof.

JUMO's customers include numerous DAX-listed flagships of German industry, which in turn install these systems in their plants.

The JUMO portfolio for hydrogen applications includes the conductive conductivity sensors JUMO tecLine CR and JUMO digiLine CR so that a reliable solution for this measuring task can be found. As a development partner for sensor and automation solutions, JUMO often also offers individual solutions for customer-specific electrolyzer concepts.

The JUMO safetyM safety temperature limiter/monitor is used to implement complete safety measuring chains (e.g. for monitoring the temperature of hydrogen in hydrogen refueling stations). This reduces potential hazards to a technical minimum.

The JUMO SIRAS P21 pressure transmitter measures reliably and precisely in hydrogen and other liquids, steam, and gases. It has been developed for use in safety-related plants with Safety Integrity Level (SIL). Furthermore, it has the necessary approvals for the process industry and mechanical engineering. ■

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CQI-9 and heat treatment

_ CQI-9와 열 처리

Suppliers must guarantee quality

_공급업체는 품질을 보장해야 합니다

편리한 종합 패키지 제공 –
모든 것을 한 번에 완벽하게 처리

얼마 전 미국에서는 기아 자동차 브랜드의 여러 모델에 대한 리콜 캠페인이 진행되었습니다. 피스톤 링의 잘못된 열처리로 인해 약 17만 대의 차량에서 엔진 손상이 발생할 수 있습니다. 그러나 이와 같은 리콜 사례는 절대적으로 예외적인 경우입니다.

This is because the leading manufacturers know that metals only acquire many of their important properties, such as hardness or tensile strength, through targeted and sophisticated heat treatment. To guarantee these properties, automotive manufacturers have collectively drawn up corresponding regulations for their suppliers. Nevertheless, uncertainty often prevails in the industry as to how these regulations can be implemented and how the process can be set up efficiently and cost-effectively.

The person responsible for carrying out the heat treatment process and who is under contractual obligation must demonstrably comply with these regulations. The Continuous Quality Improvement (CQI) directive is the automotive industry's absolute standard. CQI-9 governs

matters relating to heat treatment and is mandatory for all suppliers in this industry. The current 4th edition is a collaborative effort between OEMs, tier 1 suppliers, heat treatment suppliers, and calibration companies that provide services to the heat treatment industry. As a result, it is considered the gold standard in the industry, holds suppliers accountable, and ensures overall quality.

If the CQI-9 directive is aimed at heat treatment, the CQI-11 directive focuses on electroplating, the CQI-12 on surface coating, and the CQI-29 on brazing processes. Specifically, these CQI directives, on the one hand, formulate the requirements of the automotive industry for the installed systems and, on the other hand, the procedure for conducting process audits in the individual special processes.

지침은 공급 업체들에게 추가 작업과 비용을 요구합니다.

Based on its many years of practical experience and numerous discussions with company representatives, JUMO is aware of the uncertainty in the industry about how to implement CQI-9, CQI-11, CQI-12, and CQI-29 in practice. JUMO supports compliance with these guidelines through its expertise. ■

Companies need to take the following initial steps to take stock and evaluate:

1. Process audit carried out by a neutral specialist auditor / heat treatment expert to eliminate operational blindness and uncover the actual potential for improvement
2. Transfer of the identified potential for improvement into an action plan
3. Implementation of all defined measures (creation of work instructions, process instructions, parameter blocks, general operational documents, etc.)
4. Sensitization of all process participants for the correct handling of the established process management system
5. Sensitization to become a CQI-9/CQI-11/CQI-12/CQI-29 process auditor
6. Raising the awareness of maintenance staff / process participants regarding correct inspection of heat treatment systems / process lines (thermocouples, instruments, instrumentation inspection, SAT system accuracy test, TUS temperature uniformity survey)
7. Practical exercises on internal heat treatment systems / process lines (instrumentation testing, SAT, TUS)
8. Combination of process audit and raising employee sensitization as well as strict inspection of the heat treatment system or process line
9. Modification of the measurement and control technology on the heat treatment system or in the process line (controller, recorder, thermocouples, calibrator, data recorder, automation system, etc.)
10. Creation and maintenance of a thermocouple management system
11. Optimization of the process or parameter blocks
12. Maintenance of the process management system
13. Comprehensive carefree package available – everything from a single source – from the initial audit to the directive-compliant process management system!

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New JUMO products in ETIM BMEcat

_ETIM BMEcat에서 만나는 JUMO 신제품

Search quickly with one click

_한번의 클릭으로 빠른 검색

제품 데이터의 표준화는 일관된 외관을 유지하는 데 이바지합니다.

JUMO는 제품 데이터 관리와 공유를 위해 ETIM 불류 표준과 BMEcat 교환 형식을 채택합니다. 이 분류 모델의 개선과 표준화에 전념하고 있습니다.
JUMO의 새로운 ETIM BMEcat 카탈로그는 다양한 유통 업체와 다양한 적용 분야에 적합한 여러 제품을 제공합니다.

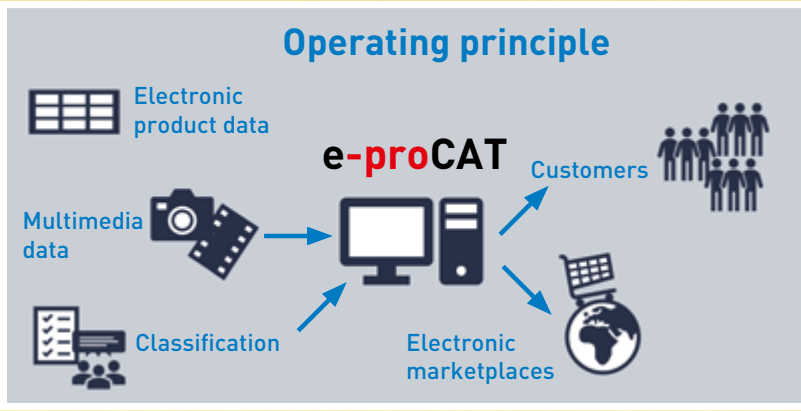
제품 정보 자동 처리는 비용을 절감시킵니다.

The world of digital product cata-logs has advanced a great deal over recent years. With the introduction of ETIM BMEcat – a standard classi-fication and standard format for ac-quiring product data – companies are now able to automate their catalogs and make them more effective. The idea behind ETIM BMEcat is simple:

Further information
data-exchange-en.jumo.info

uniform standards and automated product information processing to cut costs, save time, and minimize errors.

The ETIM classification model was developed by ETIM Deutschland e. V. ETIM also expanded the BMEcat standard to include relevant fields for the distribution industry. This relates to a product catalog based on XML that enables all product and multimedia data to be acquired, processed, and distributed. The system supports a number of languages and currencies while giving companies a quick and simple way to share their product data.



검색은 더욱 쉽고, 제품 비교도 쉬워졌습니다.

ETIM BMEcat offers a number of advantages. First and foremost, the standardization of product data has led to a uniform appearance for catalogs, which makes them easier to navigate and simplifies product comparisons. This is crucial to the area of e-commerce in particular, where consumers on the hunt for certain products often find themselves confronted with a whole host of information and options.

Another benefit of this transport medium is the automation of processes. By using standardized formats, companies are able to automatically update and sync their product data. This reduces the amount of manual work required and saves time. What is more, standardizing product data allows for its seamless integration into other systems such as ERP or CRM systems.

In addition to the automation of processes and standardization of product data, another benefit offered by ETIM BMEcat is product classification. This enables companies to organize their products into various classes and allows for effective search queries. ETIM classification is a particularly practical option for companies as it is based on a standardized classification system that is suitable for a large number of industries.

JUMO를 ETIM BME에서

ETIM BMEcat plays a central role in the digitization of business processes at JUMO as well. The BMEcat catalog currently contains approx. 1000 stock items from all of the company's production areas. These include products for measuring temperature, liquid analysis, pressure, filling levels, flow, and humidity as well as products for recording, monitoring, and controlling. As such, the BMEcat is becoming a resource for a number of different products for a huge array of applications and industries.

JUMO is also actively involved in the relevant classification committee and is committed to the enhancement and standardization of the ETIM standard. The company not only uses ETIM BMEcat to share product data with its customers and suppliers, but also to maintain its own database. As a result, information on products can be updated and published quickly and easily. ■

Conclusion

분류 모델을 사용하면 JUMO의 제품 데이터 조달, 관리 및 공유가 더욱 효율적이고 투명해졌습니다. 균일한 구조를 통해 데이터를 자동으로 처리하고 다른 시스템에 통합할 수 있습니다. 이를 통해 JUMO와 고객 모두 시간을 절약하고 오류 원인을 줄일 수 있습니다.

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Sustainable building technology reduces energy costs

_지속 가능한 건축 기술은 에너지 비용을줄입니다.

CO_2 footprint in the production process

_생산 과정에서의 CO2 발자국

우리의 목표는 CO2 발자국을 최소화하는 것입니다.

에너지 관리는 오늘날 산업에서 중요한 도구 중 하나로, 산업 프로세스의 효율성을 증대시키고 동시에 에너지 소비를 최적화하는 데 기여합니다. JUMO는 자체 에너지 관리 시스템을 사용하고 있으며, Fulda 서부 기술 공원에 새로운 공장을 건설 중에 있습니다. 이 장소에서 지속 가능한 건축 기술에 집중하고 있습니다.

The description of energy in the 19th century was strongly influenced by the scientific, technological, and industrial developments of the time. During this period, humankind experienced a significant transition from the use of predominantly mechani-cal energy to chemical and electrical energy sources. Mechanical energy started and drove the industrial rev-olution.

The energy from the movement of machines, driven by wind and wa-ter power, was often described as "mechanical work". The use of fuels (chemical energy) such as wood, coal, and later oil as well as natural gas led to the most revolutionary devel-opment of the time – steam engines, which converted thermal energy into mechanical work or electricity.

However, it should be noted that the storage of CO_2 in plants through photosynthesis as well as the thermal release of CO_2 through combustion is ultimately a recurring, sluggish, and lengthy carbon cycle. In view of the excessive demands placed on the carbon cycle by the massive combustion of CO_2 and the sluggish storage of CO_2, only a significant reduction in CO_2 can lead to a noticeable trend reversal in the CO_2 content of the atmosphere. Initially, it was thought that fuels were avail-

Further information
sensilo-en.jumo.info

able in infinite supply and at low cost. However, economic growth, competitiveness, and subsequent cost-cutting measures have revealed that energy expenses are now a major component of industrial operating costs.

에너지 관리 기술의 도입은 혁신을 이끌어냅니다.

Energy management has become one of the most important tools in today's industry for increasing the efficiency of industrial processes and optimizing energy consumption at the same time. The implementation of energy management technologies promotes and often leads to technological innovations as they know where and how the energy flows. Companies that continuously invest in energy-efficient technologies not only improve their energy balance, but also become more competitive globally.

More and more customers expect industries to provide CO_2 proof that the products they buy are produced more and more sustainably from year to year.

Many countries have also introduced laws and regulations that oblige industries to monitor and reduce their energy consumption.

An energy management system helps to meet the increasingly demanding legal requirements. By reducing its energy consumption, JUMO will further minimize the environmental impact of its production processes and contribute to a more sustainable development without compromising its productivity and quality.

*한 예로, JUMO는 Fulda 본사의 냉각기에 자체적인 에너지 관리 시스템을 개발하고 설치했습니다.*❶

Important components of this JUMO energy management system are:

- Energy management software (e.g. JUMO Cloud)
- Energy management system (e.g. JUMO smartWARE SCADA)
- Regulation (e.g. influencing a heating system on the basis of a target/actual comparison)
- Control (e.g. influencing a heating valve to influence the room temperature)
- Sensors (e.g. for temperature, pressure, performance)

However, existing older industrial buildings repeatedly push ecological footprint reduction measures to their limits. One result from this is the largest investment in JUMO's history – a new building in the Fulda-West Technology Park. JUMO is successfully setting the course for a sustainable future with around 50 million euro.

After all, around 13 000 m² (approximately the size of 2 soccer fields) will be available for the modern production of temperature and pressure sensors.

There's a wind of change when it comes to innovation, digitization, and sustainability in the new plant. Here, the current plans aim to completely eliminate fossil fuels in the future. A geothermal plant is to be used for heating support. This will cover the peak load. The base load will be covered entirely by heat recovery from the production processes.

Energy requirements for the production facilities will be largely covered by the company's own current. The new plant's cooling and ventilation systems will be predominantly operated using the company's own photovoltaic system. Overall, all energy-related processes are geared towards the goal of reducing the company's CO_2 footprint to a minimum and making full use of the available energy. ■

❶

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Risk reduction in Ex environments

_방폭 환경에서 위험 감소

Reliable pump monitoring protects lives

_신뢰할 수 있는 펌프 모니터링은 생명을 지킵니다

산업 공정에서 펌프를 모니터링하는 것은 단순히 펌프 장치를 보호하는 것 이상의 의미를 가집니다. 예방 정비와 운영 데이터 수집뿐만 아니라, 특히나 방폭 환경에서 최근 몇 년간 발화 원인 모니터링이 매우 중요해졌습니다. 정확한 위험 평가는 폭발을 예방하는 데 결정적인 역할을 합니다. 신뢰할 수 있는 펌프 모니터링만이 원활한 공정 프로세스를 보장하고, 회사의 효율성을 높이는 데 기여합니다.

Safety experts from TÜV (the German Technical Inspection Association) know the scenario: pumps without sufficient stability can quickly overheat. This heat can lead to an explosion with devastating damage to production. The company may have to pay a portion of the damage if the liability insurance company can prove negligence. In other words, pump units that are not secured represent a high economic risk. Furthermore, responsible management is committing a criminal offense if it does not comply with the legal requirements. Or in a nutshell:

reliable pump monitoring saves the management from legal action!

표준과 규제의 혼란스러운 정체

Only a few manufacturers cover the entire safety chain for measurement and control technology with their products and solutions.

However, safety in the production process is a top priority for companies. This is why numerous standards and regulations that need to be interlinked are in place. They all require consistent application, such as the Industrial Safety Regulation and TRGS 725 (Technical Guideline for Hazardous Substances).

What sounds simple and logical at first glance becomes complex as soon as you enter the jungle of standards, directives, regulations, technical rules, and manufacturer recommendations that must be observed when monitoring ignition sources.

The relevant standards for this topic are IEC/EN 60079-xx on explosion protection, DIN EN 50495 (Safety devices required for the safe functioning of equipment with respect to explosion risks), and DIN EN 14597 (Temperature control devices and temperature limiters for heat generating systems). Standard DIN EN 14597 always includes a complete measuring, control, and limiter system consisting of sensor, logic, and actuators. For example, the following tests are certified for the individual components:

- Response behavior of the sensor technology
- Reactions (modes of operation) of the evaluation electronics
- Reliability / operating life of the actuators

Additionally, the IEC/EN 61508, EN/ISO 13849, EN/IEC 62061, EN/IEC 61511, TRGS 725, and possibly other product-specific standards apply in the area of functional safety.

In the past, electrical explosion protection traditionally played a major role in safety precautions, but in recent years the focus has increasingly shifted to mechanical components as a potential source of ignition. Users need to understand this background, assess it carefully, and incorporate it into their decision-making processes. The correct application of the Ex identification marking as well as the evaluation of SIL (Safety Integrity Level) and PL (Performance Level) pose particular challenges here.

안전은 필수, 불편함은 없어야 합니다

Machine and system designers who have already come into contact with the topic of "functional safety" will already have realized the complexity and diversity of the subject.

The responsibility for the risk of damage borne by operators and planners of protective equipment is immense. They have to acquire safe components and are faced with a huge mountain of figures and formulas. In the end, they still do not know whether everything has been calculated correctly.

JUMO Safety Performance shows that this process can be easier. All JUMO products and services relating to SIL and PL can be found under this brand name. JUMO Safety Performance has been offering a certified compact system for functional safety according to SIL and PL for years. ■

JUMO guarantees ...

...표준 및 법적 준수 안전.
간단히 말해서:
완벽한 안전 시스템이 제공됩니다. 단일 소스에서 액추에이터를 작동하기 위한 센서, 로직 및 릴레이 출력으로 구성됩니다.

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Sensor technology for measuring conductivity

in aqueous solutions

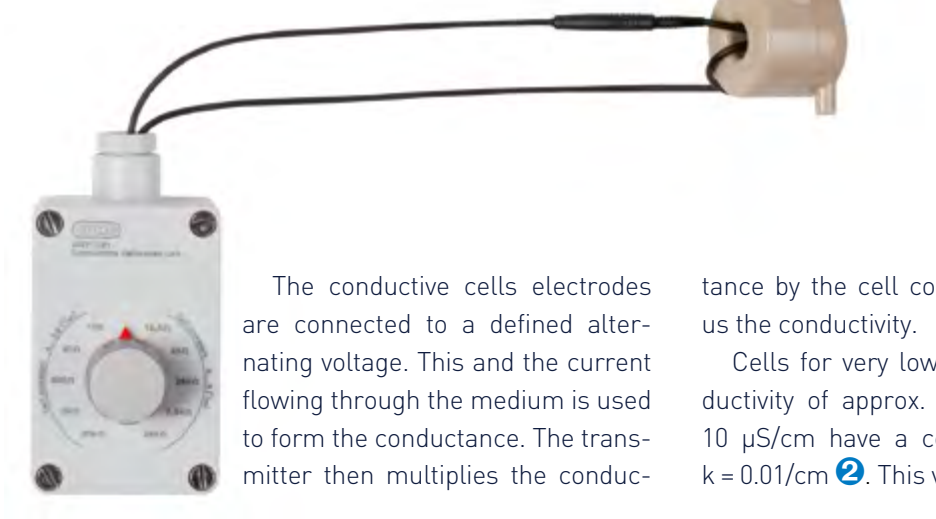
_수용액 내 전도도 측정을 위한 센서 기술

전도도는 수용액 내에 용해된 염류 농도를 측정하는 방법으로, 다양한 산업 공정에서 필수적으로 적용됩니다.
이 측정 항목은 초순수 물의 품질 평가부터 염기와 산의 농도 측정에 이르기까지 다양한 목적으로 활용됩니다.

Conductive measuring cells are used for low levels of conductivity. Depending on their geometric structure, they measure conductivity from approx. 0.05 µS/cm to 15 mS/cm.

Conductive cells for higher levels of conductivity have a measuring range of approx. 10 µS/cm to 15 mS/cm. In this case, very small graphite plates are used as electrodes. ❶

In these cells, the ratio of the distance to the plate surface is 1 cm/ 1cm² = 1/cm – this is the cell constant k.



The conductive cells electrodes are connected to a defined alternating voltage. This and the current flowing through the medium is used to form the conductance. The transmitter then multiplies the conductance by the cell constants to give us the conductivity.

Cells for very low levels of conductivity of approx. 0.05 µS/cm to 10 µS/cm have a cell constant of k = 0.01/cm ❷. This very small ratio

of distance to surface area is only possible with a concentric design. The sensors consist of one inner electrode (rod) and one outer electrode (open cylinder).

Cells for a medium measuring range of approx. 1 µS/cm to 1000 µS/cm (cell constant 0.1/cm) also feature a concentric design, but may also be equipped with rods.

It is possible for the effective cell constant to deviate from the nominal cell constant by up to +/-10 %, though the transmitter can compensate for this following calibration. During the calibration process, the sensor is placed in a test solution where the conductivity is already known and this conductivity is entered into the transmitter. The result of the calibration is the relative cell constant. For example, if the nominal cell constant is k = 1/cm and the effective cell constant is just 0.93/cm, the transmitter calculates the relative cell constant at 93 %. After being calibrated, it multiplies the measured conductance by 0.93/cm (93 % x 1/cm) instead of 1/cm. The relative cell constants must be calibrated during startup. Conductivity sensors that are soiled detect lower conductivity, which is why they must be kept clean. The relative cell constant has to be recalibrated after each clean.

Conductive measuring cells are forced to bow out for conductivity >15 mS/cm. Inductive conductivity sensors must be used in this case. They are made up of 2 coils and use the transformer principle: the primary coil is supplied with alternating voltage and the voltage is measured at the secondary coil. The coupling between the coils varies as a result of the measurement medium's conductivity. The major advantage of this system is that any coatings on the measuring system have virtually zero influence on the measuring result, which means that the sensor technology can be regarded as maintenance-free in most cases. In contaminated media, it therefore makes to use the sensor at conductivity levels <15 mS/cm. The sensor technology requires minimum conductivity of approx. 200 µS/cm. If "head transmitters" are chosen as the sensor, they are ready for use straight away.

In remote systems, a basic calibration process often has to be performed. This is achieved by inputting different loop resistance values and, as such, different conductivities.

The existing conductivity is known as the uncompensated conductivity. In drinking water, for example, this increases at approx. 2.4 %/K (or °C). At conductivity levels >10 µS/cm, temperature response can be regarded as linear.

If the measurement takes place at different temperatures, it becomes difficult to compare conductivity. For instance, as standard, transmitters use the uncompensated conductivity and the temperature to determine the conductivity of the measurement medium at 25 °C – this is known as the compensated conductivity. Per default, the transmitters require a linear response, meaning that linear temperature compensation is activated. To allow the compensated conductivity to be calculated correctly, the measurement medium's temperature coefficient must be input into the transmitter. For this calculation, the uncompensated conductivity is determined at 25 °C and at the typical operating temperature. Both value pairs are then used to calculate the temperature coefficient.

When measuring conductivity <10 µS/cm, conductivity does not increase in a linear manner with the temperature. For these applications (pure or ultra-pure water), formulae are stored in the transmitters and simply have to be activated. For example, if the temperature compensation "ASTM 1125" is activated, the compensated conductivity at extremely low conductivity levels is determined. ■

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JUMO supports school with automation systems

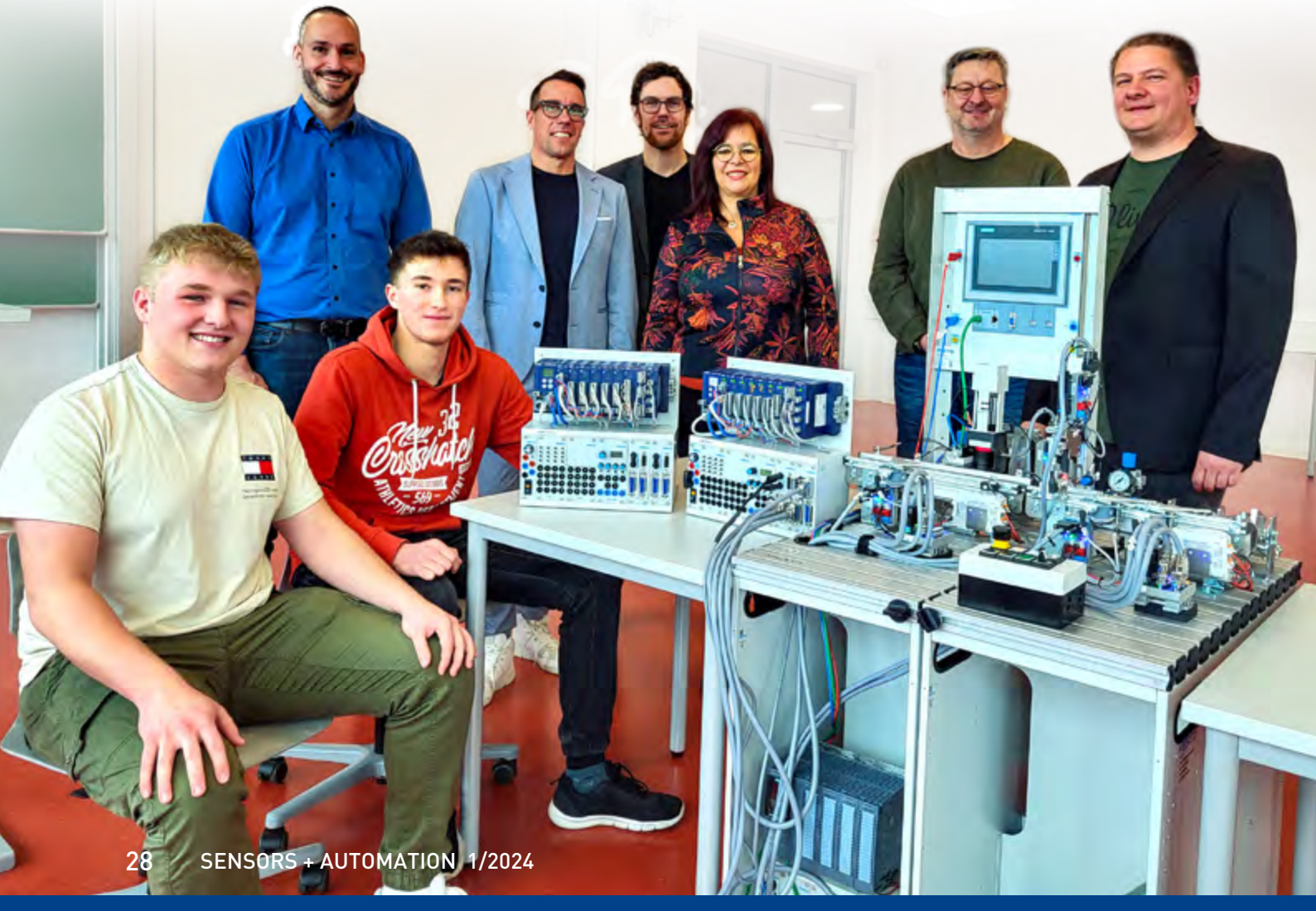
_JUMO 자동화 시스템을 통한 학교 지원

JUMO variTRON devices prepared by JUMO apprentices for use at the Ferdinand-Braun-School in Fulda

_Fulda Ferdinand-Braun 학교를 위해 교육생들이 준비한 JUMO variTRON

모두가 상생하는 시스템

JUMO 대표 Steffen Hossfeld 박사(뒷줄 왼쪽에서 두 번째)와 JUMO Sales 매니저 Ralf Kappmeyer (뒷줄 오른쪽에서 세 번째)는 Ferdinand-Braun 학교에 장비를 지원하게 되어 기쁘다는 소감을 내비쳤습니다. 학교장 Ulrike Vogler(사진 중앙)과 학생들 또한 이러한 지원에 감사의 뜻을 표했습니다.



독일 Fulda의 Ferdinand-Braun 학교 학생들이 JUMO 높은 품질의 기기를 학습에 활용할 것입니다. JUMO는 Baroque 양식의 도시인 Fulda의 상업 및 기술 직업 교육 센터에 총 14개의 variTRON 자동화 시스템을 제공했습니다.

The JUMO automation system enables machines and plants to be controlled and monitored efficiently. In January, JUMO apprentices and their trainers prepared the JUMO variTRON devices ready for use at the JUMO training center.

This resulted in a real win-win situation as emphasized by JUMO's Chief Executive Officer Dr. Steffen Hossfeld. *"Thanks to our technology, the students are ideally prepared for their future careers. And JUMO is underlining its expertise as a leading system and solution provider,"* explains Hossfeld.

Steffen Hossfeld and Ralf Kappmeyer, sales representative on the JUMO field sales team, handed over 14 units to Steffen Mehler, teacher and head of technical training at the Ferdinand-Braun-School.

"JUMO covers the entire automation pyramid. We transfer data from the sensor all the way to the cloud and offer fully connected control centers. We are delighted that young people have the chance to use our high-tech devices to train for a future-proof career", emphasizes Ralf Kappmeyer, who played a key role in driving this project.

"And it is not just the Ferdinand-Braun-School that has benefited, but the region as a whole. In JUMO, we have both a partner we can rely on, and a supplier of cutting-edge systems," says Mehler. ■

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JUMO 는 우리 주요 산업의 최신 주제에 중점을 둔 다양한 교육 과정을 개발하고 있으며, 업무에서 실질적인 가치를 발휘할 수 있도록 제공되고 있습니다.

JUMO는 산업 센서와 자동화 기술의 선도적 시스템 및 솔루션 공급 기업으로서, 실무 중심의 웨비나와 혁신적인 교육 시스템을 통해 최적화된 공정 제어와 효율성 향상, 산업 통합 시스템에 가치를 기여하는 것을 중점으로 둡니다.

우리는 기대하고 있습니다!

우리의 프리미엄 스트리밍 웨비나에서는 전문가들의 깊은 산업 지식에 접근할 수 있습니다. 또한 다른 고객들과의 활발한 소통도 할 수 있습니다.

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지식에 가까워지는 것이다.

공자, Confucius

From theory to practice – IO-Link and SPE in the JUMO brewing plant

November 6, 2024,
10:00 to 11:00 a.m.
(German version)
3:00 to 4:00 p.m.
(English version)

Registration and further information:
digitalsensors.jumo.info

In this practical-based webinar, our speakers Alexander Hof, Martin Eppinger, and Manfred Walter will use the JUMO brewing plant to explain how digital sensors are used in beverage technology and the industry as well as what benefits they can bring.

Thermoprocess technology: "Make a wish"
November 19, 2024,

1:00 to 2:00 p.m.
(German version)
3:00 to 4:00 p.m.
(English version)

Registration and requests:
thermoprocess.jumo.info

Unlike conventional webinars, we give you the opportunity to submit topics and questions – in advance – that are of particular interest or a challenge to you. Your input determines the agenda and makes this webinar a customized event that is tailored directly to your needs and interests. Take advantage of this unique opportunity to promote the issue of your choice!

Dangerous ignition sources and explosion protection

December 5, 2024,
10:00 to 11:00 a.m.
(only in German)

Registration and further information:
safety.jumo.info

In industries where every second counts and safety is paramount, adherence to functional safety is not only a legal requirement, but also a principle of responsibility. Non-compliance can have severe consequences under civil and criminal law, resulting in far-reaching effects for your company and personal career. To boost your specialist expertise in this sensitive field, we would like to invite you to our webinar "Dangerous sources of ignition and explosion protection". During the session, you will find out how you can effectively monitor plants and potential sources of ignition as well as how to mitigate risks to people, the environment, and equipment.

That's why you should definitely take part:

- A speaker with many years of experience in the area of functional safety
- Maximum expertise in just one hour
- Top ratings from former participants
- Certificate to provide proof of training

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