1/2026

JUMO

SYSTEMS + SOLUTIONS

Water. Our most important **resource.** And our **responsibility.**

↗ How JUMO uses sensor technology and automation to help use water safely, efficiently, and sustainably worldwide.

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To improve readability, gender-neutral language has been used throughout this text. 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,

Water is one of the most valuable resources of our time – and also one of the biggest challenges facing the industrial sector, municipalities, and politics. In this issue of our customer magazine, we explore how diverse the requirements across the water cycle are today as well as the role JUMO plays in making processes safe, efficient, and sustainable.

The focus on water and wastewater fits in perfectly with our strategic focus. As a designer of systems and solutions, we develop technologies which have been working reliably in a wide range of applications for decades. In this issue, we highlight some examples, including water monitoring at the Rosenau outdoor swimming pool in Fulda, Germany, and the water tanks in our state-of-the-art SENSILO production facility.

At the same time, we are advancing innovations that provide our customers with new opportunities. Numerous new products exemplify our continuous advancement in the fields of temperature, pressure, and liquid analysis. They show how we intelligently network sensor technology, automation, and digital solutions along the entire process chain, which lays the foundation for resilient applications.

Our commitment to sustainability is also evident – not only through energy-efficient technologies, but also thanks to external acknowledgments such as the current EcoVadis award.

In this magazine, we present concrete solutions and offer inspiration for responsible water usage, more efficient processes, and a sustainable future.

We hope you enjoy it and look forward to hearing from you.

Dimitrios Charisiadis

Dimitrios Charisiadis
Chief Executive Officer

Steffen Hoßfeld

Dr. Steffen Hoßfeld
Chief Operating Officer

Water, a vital resource

Efficient processing can play a decisive role in stopping the global water crisis

The global water crisis has deteriorated dramatically in recent years due to climate change. To be sure, progress has been made in global water supply, as over 2 billion people have gained access to safe drinking water over the last 2 decades. Nevertheless, around 2 billion people around the world still have no regular access to clean water according to UNICEF.

More than two-thirds of the Earth's surface may be covered in water, but only less than 3 % of this water is drinkable. And this drinking water is also very unevenly distributed. Many places, particularly in Asia, Latin America, and Africa, are experiencing dramatic water shortages.

In many countries around the world, water consumption has increased significantly in recent decades. One reason for the increase is the growing population, but another is the rising demand for energy. As energy demand increases, the demand for cooling and the associated demand for water increases. A lot of water is often required for cooling machines, especially in industrial settings.

Climate change is exacerbating the shortage of water as a whole and may further intensify the competition for limited water resources. Refusing someone access to water – literally "turning off the taps" – means withholding the most important resource from them. This has caused conflicts throughout history up to the present day. In the future, many people will be forced to move to other regions. As a result, many countries – including those in Europe – will continue to face migration pressure.

Due to the increasing global population and the associated increasing demand for clean fresh water for people, agriculture, and industry, many regions are now experiencing a shortage. Groundwater levels are being permanently reduced. Nature can often no longer compensate for this level of consumption. In many regions, the decrease in groundwater levels is causing salty or dirty water to flow in from other deeper layers – the drinking water source is therefore no longer usable.

In principle, one solution could be effective methods for water treatment and water reuse. To ensure that water treatment remains affordable, the plants must run as automatically as possible. This goal demands smart sensor technology and reliable controls.

JUMO project for drinking water supply in India

One prime example in this area is a drinking water supply project in Solapur, India, which Matthias Kremer, Industry Manager for Water and Wastewater at JUMO, is well versed with thanks to his experience. Here, the water is taken from a dammed river. The water in the river has different levels of contamination due to the surrounding industry. ➜

Cleaning dirty water is essential for the drinking water supply.

By taking measurements at the inlet and outlet of the waterworks, industrial inputs can be documented over the long term. This procedure allows measures to be developed that ensure the water can be supplied to the population in even higher quality. Effective water treatment can therefore curb or reduce the water shortage. However, the global water crisis will undoubtedly continue to occupy us for years to come. ■

❶ *Visit to a drinking water treatment plant in Solapur.*
❷ *JUMO technician during startup of the cloud solution at the inflow in Solapur.*

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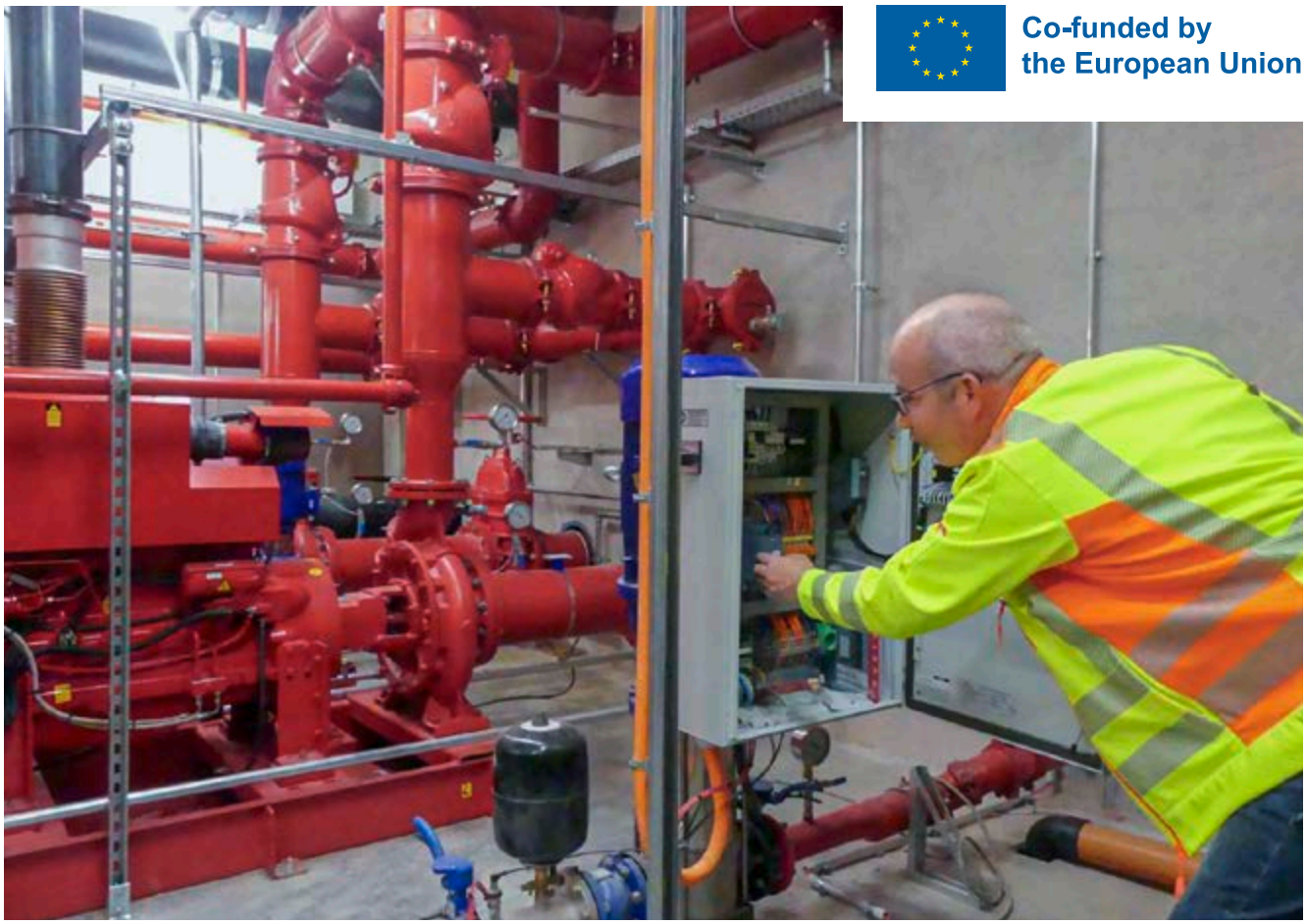
Sprinkler system effectively used as energy storage system

Sustainable energy supply in the JUMO plant SENSILO

Co-funded by the European Union



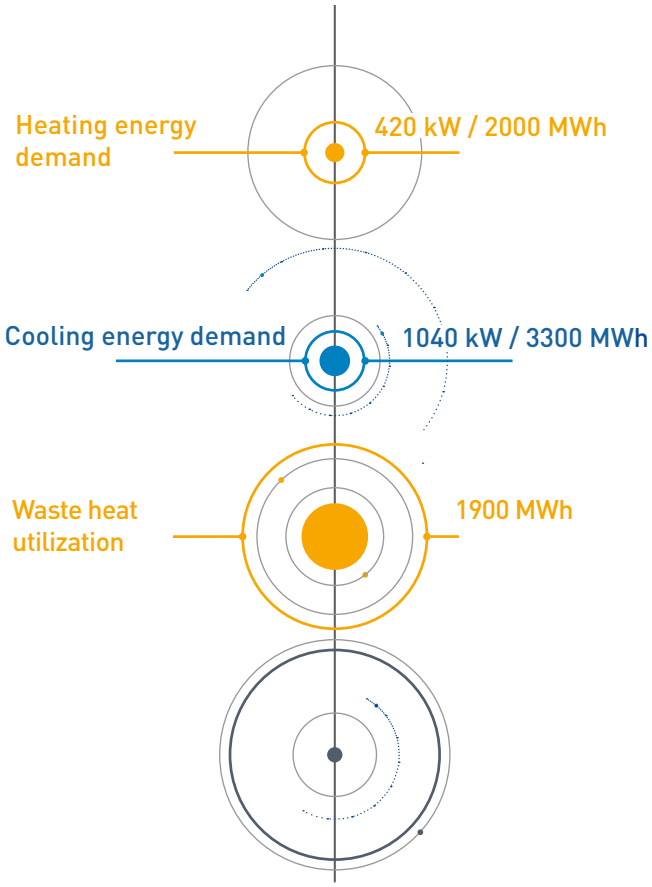
The sprinkler tank is a key element for supplying energy to the plant.

The new JUMO SENSILO plant in the Fulda-West industrial park sets new standards in sustainable energy supply and does so without using any fossil fuels. The core of the energy concept is the combination of heat pump, geothermal energy, photovoltaics, and a sprinkler tank as an energy storage system.
The innovative energy concept was co-financed by the European Union.

The sprinkler tank, which would have been required anyway, was integrated as a central heat storage system into the energy management system. With a volume of 1.25 million liters (≈ 1100 m³), it is intended as a buffer for heat and cold. ➜

- Storage of excess heat from production processes
- Use of cool night air in the summer to cool the building
- Geothermal energy compensation during production downtime – this solution reduces the demand for large geothermal fields and enables peak load coverage with just 60 kW
- The tank corresponds to an energy content of around 365 MWh and covers virtually all of the power needed for heat supply

Key technical data



Supplemented by 20 geothermal probes at a depth of 100 m and a 700 kWp photovoltaic plant.

The tank covers virtually all the power that is needed for heat supply.

The heat pump uses the sprinkler tank as a heat source and is operated with in-house PV power or CO_2-neutral mains power. The intelligent energy management system is based on the JUMO variTRON 500 platform and integrates over 400 sensors for pressure, temperature, level, and point level. The data flows into the JUMO smartWARE SCADA for visualization, analysis, and optimization. ■

Advantages of the concept

Maximum energy efficiency due to heat recovery and storage capacity

Dispensing with fossil fuels means a significant reduction in CO_2

Flexibility due to heating and cooling via the same storage system

Automated control for sustainable operation

Conclusion

The sprinkler system is therefore not just a safety feature, but also a key element of the plant's energy supply – a solution which combines functionality and sustainability.

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Monitoring of the food drying process: JUMO hydroTRANS H50

Possible applications in thermoprocess technology and fuel cells

Some devices like it hot: the JUMO hydroTRANS H50 from the JUMO hydroTRANS series is certainly one of them. It covers a wide range of temperatures and is particularly suitable for temperatures exceeding 100 °C.

Devices from the JUMO hydroTRANS series are dependable humidity and temperature transmitters with an optional CO_2 module. The device series is available with various interfaces, including Single Pair Ethernet (SPE). Moreover, it is characterized by easy installation, robustness, and reliable sensor technology. Now a new powerhouse is entering the main stage: the JUMO hydroTRANS H50.

The JUMO hydroTRANS H50 is an impressive solution even in areas with high levels of moisture or chemical contamination thanks to precise as well as stable temperature and humidity measurements. The sensors offer a wide application area of -80 to +180 °C and can withstand pressures of up to 300 bar. They not only handle a wide variety of measurement tasks, but also reduce device costs through an integrated data logger.

"The device impresses with highly precise measurement, coverage of all applications for humidity measurement, flexible connection options, and a high degree of process reliability," emphasizes Justin Heinrici, Product Manager at JUMO. *"This way, grain-drying processes can be monitored with great precision and accelerated at the same time,"* says Heinrici.

Thanks to its robustness and precision despite the high temperatures, the JUMO hydroTRANS H50 can also be used in the field of thermoprocess technology. *"In terms of energy efficiency, the focus here is on lean processes. Consequently, the JUMO hydroTRANS H50 can provide reliable data,"* Heinrici continues.

PEM fuel cells are another application area. PEM stands for "Proton Exchange Membrane" or "Polymer Electrolyte Membrane". Two types of PEM fuel cells are being developed: low-temperature cells (up to about 90 °C) and high-temperature cells (up to about 180 °C).

"In the fuel cell, the JUMO hydroTRANS H50 is used to measure the humidity in the supply lines for hydrogen and oxygen. This ensures that the membrane is always properly moistened and, as a result, the operating life and effectiveness of the fuel cell are maximized," explains Heinrici. ■

The JUMO hydroTRANS H50 with replaceable probe.

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Flexible safety limiter for demanding industrial applications: JUMO safetyM TA

Maximum safety and availability – simple and reliable integration into existing systems

The multifunctional safety limiter JUMO safetyM TA sets new standards in process reliability and plant availability. Its certified safety in accordance with SIL 2/SIL 3 (IEC 61508) and PL c/PL d (ISO 13849) makes it the ideal solution for demanding applications in thermoprocess technology, the process industry, the pharmaceutical industry, the food and beverage industry, in dairies, and in breweries.

Thanks to its universal input for pressure, flow, temperature, and level, the JUMO safetyM TA can be easily configured to a wide range of process requirements. The user configurable voting function enables safe operation even in degraded plant condition (1oo2D voting principle), thereby effectively reducing non-critical machine downtime and scrap production.
In addition, the device offers min. and max. monitoring as well as an adjustable time for degraded operation, which further maximizes plant availability.
The flexible configuration of various SIF scenarios, such as 1oo2D voting, 2oo2, and STB/STW, makes the JUMO safetyM TA a valuable addition to the JUMO Safety Performance family. Easy integration into existing systems and a high degree of compatibility with different applications benefit customers through a sustainable and efficient solution for their security requirements.
"JUMO safetyM TA offers our customers maximum safety and flexibility. The voting function ensures maximum plant availability," explains Bodo Schmitt, Product Manager at JUMO. ■

Thanks to its universal input for pressure, flow, temperature, and level, the JUMO safetyM TA can be easily configured to a wide range of process requirements.

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New standards in plant design and optimization: JUMO TAROS H48 Ex

High pressure sensor for explosion-proof applications

The JUMO TAROS H48 Ex is a high-pressure sensor for use in Ex areas. It can also be used in the renewable energy or transportation industries with applications for hydrogen refueling stations and hydrogen storage or in compressor and pipeline systems for hydrogen.

JUMO supports flexible plant design and modernization through the sensor's product variability, which reduces costs and effort. As a high-pressure transmitter, the JUMO TAROS H48 Ex offers precise pressure measurement with measuring ranges up to 1000 bar and enables test pressures greater than 1050 bar. Its wide temperature range, reliable 4 to 20 mA output signal, versatile process connections, and comprehensive approvals make it an indispensable instrument for market requirements. In addition, the device distinguishes itself through its robust construction, long life cycle, high degree of accuracy, and a zero point adjustment.

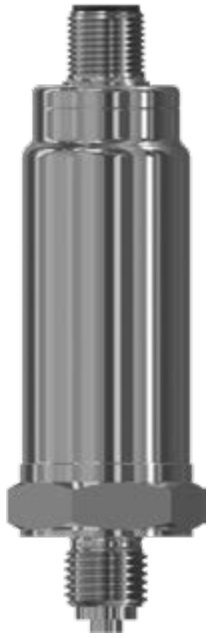
Safety through tested quality

The JUMO TAROS H48 Ex represents the highest standards of quality and reliability. Its tested quality offers planning reliability and minimizes risks during field operation. This is a decisive advantage for companies that rely on precise and reliable measured values to optimize their processes and ensure the safety of their systems. Zero point adjustment is another highlight that contributes to cost-saving startup and maintenance.

Reducing workload in global projects

JUMO TAROS H48 Ex enables companies worldwide to make their projects more efficient. The customizable measuring range and high degree of product flexibility significantly reduce the resources required for planning and implementing global projects. This not only leads to cost savings, but also to improved project management and greater customer satisfaction.

The JUMO TAROS H48 Ex is an innovative product that stands out through its versatile application possibilities and high quality. It offers companies the opportunity to plan and optimize plants more efficiently while ensuring system safety and reliability. ■



The JUMO TAROS H48 Ex is a high-pressure sensor for use in Ex areas.

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Water, waves, and pure summer vibes at the outdoor swimming pool

Straight into pure, carefree fun

August 2025 had everything – the sun was shining, temperatures hit new highs, and the air shimmered in the heat. For many people at JUMO's headquarters in Fulda there is only one place that makes this heat bearable: Rosenau outdoor swimming pool in the center of the cathedral city. Children joyfully splash about in the pool while adults relax and enjoy swimming laps or simply relish the cool water. The atmosphere at the edge of the pool and at the snack bar is very light and easy. However, while the summer visitors enjoy themselves, a complex interplay of technology and many years of technical knowledge occurs in the background. This interplay ensures the safety and wellbeing of everyone by performing the important task of monitoring and managing the water quality.

"On hot days like this which are over 30 °C, we change some technical settings. We have to rely on the technology here," says Michael Lipus, Head of Bäder Betriebs GmbH (BBG). BBG belongs to the supplier RhönEnergie in Fulda. RhönEnergie is one of the 20 biggest municipal energy suppliers in Germany. BBG now operates 8 outdoor and indoor swimming pools in the Fulda district and in the town of Schlüchtern.

Water quality: more than just clear H_2O

Ensuring a constantly high level of water quality is one of the key tasks at the Rosenau outdoor swimming pool. Both the wellbeing and the health of the pool guests are key here. After all, only perfect water quality will protect against infection, skin irritation, and other health risks. *"Monitoring and management of important water parameters such as pH value, chlorine content, redox potential, and water hardness are essential here,"* states Lipus, based on his many years of experience.

Rosenau outdoor swimming pool is the largest open-air swimming pool in the Fulda district. It was inaugurated in 1938, given a general overhaul for the first time in the 1960s, and the entire pool facility was refurbished in 2007. The total quantity of water in all 4 pools (including the children's paddling pool) is now 4078 m³, and the total water surface 2457 m².

The Rosenau outdoor swimming pool relies on vertical flow. The clean water is introduced into the bottom of the pool through clean water ducts in this process. *"The dirty water is discharged via the overflow channel,"* explains Lipus. Corresponding nozzles are required in the bottom of the pool to ensure even water distribution.

Modern measurement technology: Precision and automation

The pH value is the centerpiece of water quality. Ideally, it is between 6.5 and 7.5. If the pH value is too low, i.e. too acidic, the chlorine used is consumed too fast and metallic components (such as filter systems) may be corroded. *"On the other hand, if the pH value is too high, the chlorine loses its disinfecting effect, which can result in the water turning green and limescale deposits,"* states Matthias Kremer, Water and Wastewater Industry Manager at JUMO.

Monitoring of the chlorine content is also essential, as chlorine is used as a primary disinfectant. Optimal dosing ensures reliable germ elimination while preventing unwanted side effects like skin or eye irritation.

Another key parameter is redox potential. It indicates in millivolts (mV) how strong the germicidal effect of the disinfectant is in water. A stable redox value is a reliable indicator of water quality and the effectiveness of disinfection. Water hardness also plays a role, as it impacts the dispensing of chemicals and the formation of deposits.

> *When exposed to sunlight, the redox values decrease.*

JUMO has been successful in the field of water and wastewater for many years

For years, one of JUMO's success stories has been the JUMO tecLine pH and redox electrodes – high-precision sensors for continuous monitoring of the pH value and redox potential in pool water, as Kremer explains further. They provide reliable measured values and are particularly durable. JUMO also acts as a supplier which means that the sensors are sold by other companies under their respective labels. Continuous measurement and automatic control of these values is "state of the art" so that efficient and safe swimming pool operation is ensured. Modern systems enable operators to monitor water quality round the clock, to identify deviations right away, and counteract them specifically – often even fully automatically. Overall, 1460 m³ of water is circulated every hour at Rosenau outdoor swimming pool in full-load operation.

Technology has made a giant leap forward in 40 years

"Technology for outdoor and indoor swimming pools has made a giant leap forward over the last 40 years," Lipus says from experience. Nowadays he can only chuckle when he thinks back on the requirement in the 1970s and 1980s to wear bathing caps in swimming pools. *"Today, there are filters that effectively fish out pollutants."* Nevertheless, it is very important for good water quality that pool users take a quick shower before they go swimming or splashing around.

"When the sun is really beating down and there are a lot of guests in the pool every day, the redox values fall. We then readjust the chlorination," Lipus explains further. ➜

The redox potential is a value for the germicidal effect of disinfectants in swimming pool water.
The higher the potential, the harder it is for microorganisms in the water to survive. So, the higher the potential, the cleaner the water. At Rosenau outdoor swimming pool, water quality is tested twice a day in each pool.

Safe and cost-effective pool operation

BBG can use a mixture of systems and solutions to reliably monitor the water quality in Rosenau outdoor swimming pool, automate cleaning and disinfection processes, and therefore ensure safe and cost-effective operation. *"Here, visitors can enjoy the refreshing water without any worries – and can rely on us to ensure their safety behind the scenes using state-of-the-art technology. This ensures that their visit to the outdoor swimming pool becomes a genuinely enjoyable experience, even on the hottest days,"* Lipus concludes. ■

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❶ *The values are determined quickly with the appropriate equipment.*
❷ *In the filter room, Lipus and Kremer check the water quantities that are recirculated every hour during the summer.*
❸ *The water quality is checked twice a day in each pool.*
❹ *JUMO sensors, shown here with labeling from another company, used to measure the pH value.*

JUMO solutions for water and wastewater technology

As a specialist in measurement and control technology, JUMO offers a wide range of products and systems which have been especially developed for the field of water and wastewater or for use in swimming pools:

❶ **JUMO tecLine pH and redox electrodes:** High-precision sensors for continuous monitoring of pH value and redox potential in swimming pool water. They provide reliable measured values and are particularly durable.

❷ **JUMO AQUIS touch S/P:** A modular multichannel measuring device that enables all relevant water parameters such as pH, redox, chlorine, conductivity, and temperature to be measured, controlled, and visualized. The intuitive operation and flexible expansion options make it the centerpiece of modern water treatment.

❸ **JUMO tecLine Cl02:** Robust sensors for measuring free chlorine, total chlorine, and other disinfectants. They are especially designed for use in demanding environments and ensure precise monitoring of the disinfectant concentration.

❹ **JUMO variTRON:** The JUMO variTRON system can be used effectively for quality control in the field of water and wastewater. Thanks to the modular automation platform, various sensors and measuring devices for monitoring parameters such as pH value, conductivity, temperature, oxygen content, and turbidity can be seamlessly integrated. The acquired measurement data is processed and visualized centrally, and can be documented automatically. This way, JUMO variTRON provides gapless monitoring of water quality. ■

Future needs heritage

Glassblowing at JUMO

1948

2026

With passion, skill, fire, and flame, Natalie Müller, master glass apparatus maker, is on the case.

From glass thermometers to pH and redox sensors

The job of glass apparatus maker at JUMO combines centuries-old craftmanship with state-of-the-art technology. In sensor production, this ranges from ➜

extremely delicate manual work to fully automatic, robot-assisted production. High-precision sensors, which are used globally in water, wastewater, and pool technology, are created with "fire and flame".

Working with glass is fascinating, as it can be produced in all kinds of shapes, while its functions and applications are almost limitless. As glass apparatus makers, apprentices are part of a long tradition which has been maintained and continuously refined at JUMO for over 70 years. They work with a material that is both delicate and robust while creating products that make a real difference. What was once a glass thermometer production site has now become a state-of-the-art specialist department for electrochemical sensors used in water analysis.

The job provides variety, creativity, and the opportunity to work with cutting-edge machines and systems. Apprentices are in demand for their precision, innovation, and manual skills. The apprenticeship is exciting and varied – and who would not be proud of making a truly unique product which is used worldwide?

"Glass is varied in its functions, forms, and uses – just like the job and apprenticeship as a glass apparatus maker. I've always been passionate about my work," says Natalie Müller, master glass apparatus maker at JUMO.

Glass has a long tradition at JUMO

When Hermann Juchheim founded a factory for glass thermometers in Ilmenau in Thuringia in 1907, he surely could not have imagined what it would become. Once the adjustable glass contact thermometer had been patented in 1934, Moritz Kurt Juchheim founded the Gebr. Juchheim glass instrument factory together with his 2 brothers. This factory was also in Ilmenau.

After the turmoil of the war, Moritz Kurt Juchheim relocated to Fulda in Hesse in 1946, bringing with him a handful of loyal employees and their families – all of whom were glassblowers. This was a trade that previously had not existed in Fulda. By 1948 the moment had arrived – M. K. Juchheim GmbH was founded and the brand name JUMO was born. It still produced glass and glass contact thermometers. The business was steadily expanded. Later, in addition to switchgear manufacturing, new products such as dial thermometers and pressure measuring devices were added.

When glass thermometers passed their peak in the 1970s, JUMO was quick to shift to Pt100/Pt1000 temperature probes. At the end of the 1970s, measuring water parameters became increasingly important – existing expertise in manufacturing complex glass apparatuses was used to manufacture the first electrochemical sensors at JUMO. Since 1980, JUMO has now also been producing sensors for pH, redox, and free chlorine made from glass. Additional measurands for the water sector were also added. Conductivity, turbidity, flow, oxygen, level, and complete automation solutions up to the cloud currently form a complete all-round package for the water industry.

> *Since 1980, JUMO has been producing sensors for pH, redox, and free chlorine from glass.*

JUMO is now an important system partner for established providers of measurement and dispensing technology in the swimming pool industry. A crucial aspect here is that JUMO sees itself not just as a supplier, but as a partner offering user guidance and tailored sensor solutions. As a supplier of pH, redox, and chlorine sensors, JUMO is a reliable component supplier in Europe. ■

A look into production.

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Quieter, cleaner, smarter

How JUMO is bringing hydrogen trains back on track

The future of rail is quiet, clean, and efficient: hydrogen trains are among the most state-of-the-art and promising technologies for making rail transportation more environmentally friendly. While diesel-electric railcars remain indispensable in many regions, fuel cell propulsion systems are opening up new possibilities for nearly emission-free operation on non-electrified routes.

When hydrogen and oxygen react together, it produces electricity (and water as the only by-product) – no exhaust gases, no CO_2 emissions. This makes rail transportation significantly cleaner and the technology helps to improve air quality in the long term with each journey. In addition, hydrogen trains are remarkably quiet, which increases passengers' comfort and reduces noise in the surroundings along the railway line.

Despite these impressive advantages, hydrogen technology is no miracle solution – and it is precisely its current weaknesses that are often emphasized in public debate. One of the biggest challenges is the energy efficiency along the entire value chain. Producing green hydrogen is energy-intensive, as the power needed for electrolysis, compression, storage, and transport results in high conversion losses. Critics view this as a significant disadvantage compared to battery-electric solutions which need less energy recovery steps. In addition, truly "green" hydrogen is not available in sufficient quantities, as the expansion of renewable energies and electrolysis capacities is advancing more slowly than planned in many places. The environmental footprint of a hydrogen train now depends significantly upon how the hydrogen it uses was produced.

Costs are a critical issue

Another critical issue is the cost. Hydrogen trains are currently more expensive to purchase and operate than diesel or battery-based alternatives. The infrastructure – in particular refueling stations, compressors, storage systems, and transport logistics – is still being expanded and requires a large amount of investment. The technology itself is still in an early stage of development, which is why maintenance, spare parts, and expertise are still not available everywhere. For operators, this means ➜

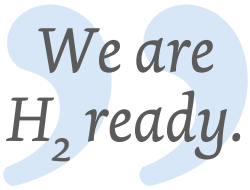
additional uncertainty when it comes to planning and cost-effectiveness. Safety also plays an important role, as hydrogen is an extremely volatile gas and therefore requires particularly thorough monitoring of pressure, temperature, and leaks.

This is precisely where JUMO's technical expertise comes into play. The challenge of handling hydrogen safely, efficiently, and reliably in mobile applications requires precise measurement and control technology.

JUMO has an extensive range for these future technologies and contributes its extensive expertise specifically to hydrogen mobility as an experienced technology partner in the rail sector. For pressure monitoring, JUMO provides special sensors whose measuring cells are designed for long-term contact with hydrogen and which provide precise values at high pressures – essential for storage tanks, lines, and fuel cell modules. Thermal management is just as important, as temperature probes and digital measuring systems from JUMO monitor the sensitive heat generation within the fuel cells as well as the various cooling circuits reliably. Precise temperature management ensures that fuel cell systems work efficiently, remain stable, and achieve their maximum operating life.

The quality of the hydrogen used plays a central role, as it directly influences the performance and durability of the fuel cells. Here, JUMO provides high-performance analytics solutions which continuously monitor the relevant process variables and therefore ensure stable operating conditions.

The systems are so reliable that they deliver consistently accurate measurement results even under the demanding conditions of a rail vehicle such as vibration, temperature fluctuations, and moisture.



JUMO sensors are H_2 ready.

The basis here are devices that are checked according to the stringent requirements of the railway standard EN 50155.

Hydrogen is a promising option, but not a guaranteed success

It is evident that hydrogen is a promising option, but not a guaranteed success. The technology offers significant opportunities for quiet, clean, and flexible railway operations, but is also faced with challenges in terms of efficiency, availability, costs, and infrastructure. JUMO makes an important contribution to ensuring that this vision of the future can be achieved safely and reliably with high-quality, standard-compliant measurement and control technology. The railway of tomorrow combines sustainability with technical excellence – and hydrogen trains could also play a key role if existing obstacles are addressed systematically. ■

Absolute safety for hydrogen refueling stations

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The future of automation

AI and edge computing open up new dimensions in industrial automation.

Christoph Trott
Product Management Department Manager at JUMO

What role does the combination of high-precision sensor technology, intelligent control, and consistent system integration play in the future of automation?

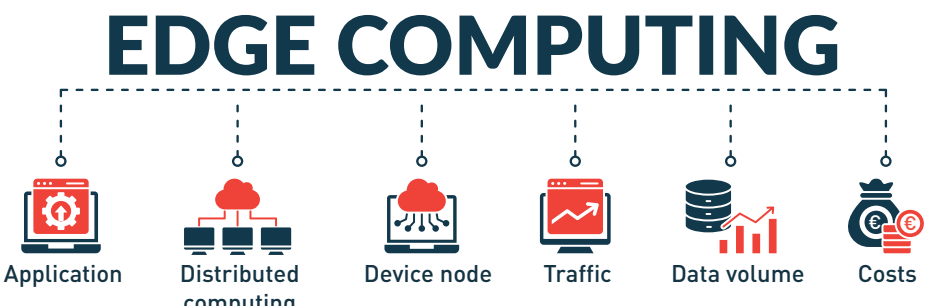
Christoph Trott: The combination of these 3 components forms the basis for modern, sustainable automation. High-precision sensor technology provides the required real-time data, intelligent control systems efficiently evaluate the data, and consistent system integration ensures seamless communication between the individual components. This synergy enables not only optimized production processes, but also a significant increase in sustainability and resource efficiency. Companies benefit from reduced reject rates, less reworking, and targeted energy use – key factors for cost-efficient and green growth.

How do complete solutions play a role in ensuring increased efficiency and reduced costs during industrial production?

Christoph Trott: Customized complete solutions which range from sensor technology to system integration offer a key advantage, as they enable consistent, holistic process optimization. Thanks to the close interrelationship between all components, there is a high degree of transparency which, in turn, improves product quality and reduces operating costs. The integration of these types of solutions reduces interface problems, simplifies startup, and increases maintainability. Particularly in industries with high quality requirements – such as food, water and wastewater, or thermoprocess technology – these systems are critical for increasing competitiveness.

What potential does the use of artificial intelligence (AI) offer in conjunction with the local evaluation of data directly at the machine or plant?

Christoph Trott: The combination of AI and edge computing – i.e. the local processing of data directly at the machine – opens up new dimensions in industrial automation. AI algorithms are able to recognize patterns in sensor data, identify anomalies early, and enable predictive maintenance, without data needing to be transferred to centralized cloud systems first. This reduces latency times, increases data security, and enables a faster reaction to process deviations.
Local evaluation offers enormous advantages, particularly in small and medium-sized companies which rely on flexible and scalable solutions: it permits individual adjustment to specific production conditions and reduces the dependence on external IT infrastructures. In conjunction with intuitive-to-use systems and a modular architecture, this results in intelligent automation solutions which are not only efficient, but also sustainable. The coming years promise major leaps in development — driven in particular by advances in AI-supported process optimization and the integration of self-learning systems into production. ■



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Hydrogen-capable gas power plants

Redefining proven technology

EnBW H2-ready fuel-switch power plant in Stuttgart-Münster – one of the first hydrogen-capable gas-turbine power plants in operation in Germany.

The Austrian band *Erste Allgemeine Verunsicherung* humorously refer to election promises as a political trick in their song *Trick der Politik*. For the purposes of this article, we prefer to view it more mildly as a political course correction. The recent change of government in Germany has prompted the Federal Minister for Economic Affairs and Energy Katherina Reiche to focus on the expansion of hydrogen-compatible gas-fired power plants. Here, the goal is to provide incentives for constructing power plants with a total of 20 GW of power by 2030. Currently, the EU has approved the construction of 12 gas power plants starting in 2026.

A hydrogen-ready gas power plant means that it can burn conventional natural gas as the primary energy source, but alternatively hydrogen as well – whenever it is available and economically viable. These plants are important for the energy transition, as they serve as a bridging technology and make the switch to a hydrogen-based future easier.

Role in the energy supply network

In the energy industry, gas power plants are important building blocks for ensuring the stability of the energy supply network. A gas power plant can react immediately to fluctuations in the power grid thanks to its short startup

Resolving the chicken and the egg problem of the hydrogen economy would be real progress for the sustainable energy industry.

time of just a few minutes. This rapid responsiveness becomes especially important when insufficient renewable energy is fed into the grid due to weather conditions. The waste heat generated by combustion can either be used for additional electricity generation via a connected steam turbine or fed into the heating network.

Operating principle of a gas power plant

The gas turbine drives a generator for electricity generation. The water-based cooling circuit drives a second turbine, the steam turbine, which is also used for electricity generation. If the waste heat is not used, the gas turbine achieves an effectiveness rate of almost 40 %. If the waste heat is used, the effectiveness increases to over 60 %.
In gas power plants, a variety of modern systems are used as measurement, control, and regulation technology:

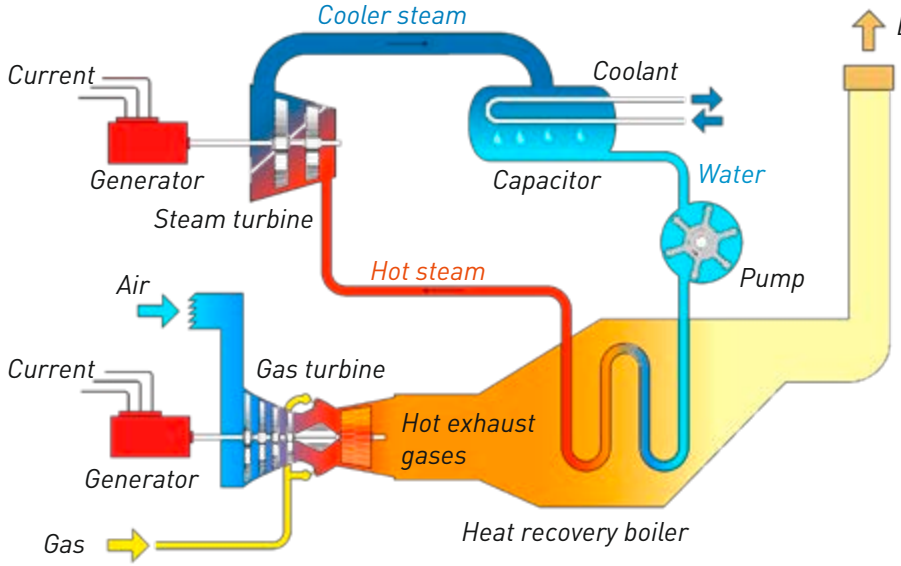
- Process control systems are intended to control and monitor all system components.
- Sensors monitor parameters such as temperature, pressure, flow, or level.
- Actuators control the gas, air, and water flows.
- Programmable logic controllers automate sub-processes. PID controllers control direct process variables such as temperature, pressure, or rotational speed.
- Safety requirements require SIL-certified systems as well as compliance with explosion protection.

JUMO product portfolio

The product portfolio consists of sensors for the measurands temperature, pressure, flow, level, and humidity. Furthermore, controllers, small control systems, proprietary SCADA systems and evaluation software as well as a PLC solution are provided. In addition, service and engineering services are part of what JUMO has to offer. JUMO is happy to take part in retrofit projects to make existing power plants fit for the future.

The bridge to the future

Hydrogen-capable gas power plants are viewed critically. Technical problems such as NOx emissions, material load, and safety risks have not yet been resolved and stand in the way of timely market maturity. This is countered by the perspective that H2-ready power plants represent a bridging technology between the present day, which is still dominated by fossil fuels, and a hydrogen-based future. Gas-fired power plants will also be useful in the energy supply network of the future, as they can buffer periods of low wind and low sunlight with flexible backup capacities.
An increase in power plants with 20 GW of power by 2030 appears very ambitious and is no longer considered achievable in specialist circles. The fact that existing gas infrastructure can be used and that a gradual transition from fossil gas to climate-neutral gas is possible represents a major advantage of this technology. ■



Functional diagram of a gas and steam combined power plant

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Precision for the perfect bite

How JUMO makes smoking ovens smart

Creating meat and sausage products is a challenging process in which quality, safety, and efficiency are the utmost priorities. A key step is smoking and maturing, as this not only produces aroma and color, but also creates the intended texture and shelf life. This smoking process has been known for centuries, but the demands of the modern food industry now require a level of precision that can only be achieved with intelligent automation and reliable sensor technology. The "maturing chamber/ smoking oven" application from JUMO addresses precisely this issue and sets new standards for the control and monitoring of these sensitive processes.

When being smoked, the product is exposed to smoke in a controlled manner to produce a characteristic aroma and appetizing color. At the same time, the smoke also has a preservative effect by protecting the product's surface against microbial influences. The process is divided into several phases, each of which places different demands on temperature and humidity. Cooking or heating takes place first, during which the core temperature of the product has to be reached precisely to ensure food safety. Exact temperature control is crucial here, as deviations may negatively affect quality or even result in hygiene risks. Drenching and cooling take place after the smoking

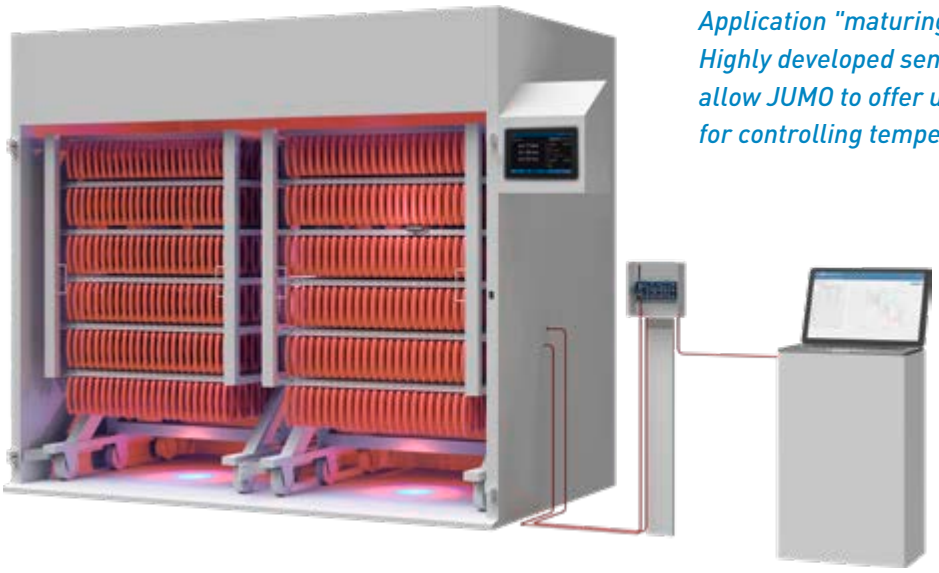
process to reduce the product temperature quickly and stabilize the intended consistency. Temperature and moisture also play a key role here. In the case of dry sausage or ham, this is followed by a longer maturing phase in which temperature and humidity have to be precisely controlled over days and weeks to prevent mold formation and achieve the intended texture. Each of these phases requires end-to-end monitoring and control, as even small fluctuations may have a significant negative impact on the product quality.

The temperature is reliably acquired

The JUMO "maturing chamber/smoking oven" application integrates state-of-the-art sensor and automation technology to make these complex processes efficient and safe. The centerpiece are the highly precise JUMO temperature sensors such as RTD temperature probes and thermocouples that reliably acquire both the product temperature and the ambient temperature in the chamber. All process parameters are controlled centrally using the modular automation platform JUMO variTRON. It enables flexible adjustment to different chamber sizes and production requirements while offering intuitive operation as well as integration into existing systems. The JUMO Cloud, which is used to reliably store all process data, ensures documentation and traceability. This makes compliance with legal regulations easier and creates transparency for audits and quality checks.

An essential tool for producers

In addition to precise control, the JUMO solution offers significant advantages in terms of efficiency and sustainability. Automating all process steps – from cooking and smoking to cooling – not only improves the product quality, but also optimizes energy consumption. Intelligent control algorithms ensure that resources are used efficiently, which reduces operating costs and increases production capacity. At the same time, the application supports the processing of vegan and vegetarian products, which makes it particularly attractive for the future of the food industry. In light of meat consumption increasing globally and the increasing demand for plant-based alternatives, the JUMO technology offers a solution which satisfies both traditional requirements and new trends. The combination of precision, automation, and energy efficiency makes the "maturing chamber/smoking oven" application an indispensable tool for producers who want to optimize their processes and also make them sustainable. It enables consistently high product quality, reduces energy usage, and lays the foundation for transparent and legally compliant production. ■



Application "maturing chamber/smoking oven": Highly developed sensors and automated systems allow JUMO to offer unparalleled accuracy for controlling temperature and humidity.

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Increased efficiency in pasteurization

The JUMO variTRON Recorder App with JUMO smartWARE Evaluation

Temperature curves can be tracked over weeks or months.

In the food and beverage industry – in particular in pasteurization – precise monitoring and end-to-end documentation of process data is essential. Temperature curves, hold times, and process sequences not only have to be monitored in real time, but also stored and evaluated on a long-term basis – both for quality assurance and for compliance with legal regulations.

This is precisely where the Recorder App ❶ of the JUMO variTRON family in combination with JUMO smartWARE Evaluation ❷ come into their own by offering a forward-looking solution that makes classic hardware concepts redundant. Figure ❸ also shows the input of batch data in which information such as product names, order numbers, or other customer information can be specified. In addition, the JUMO smartWARE Evaluation software can generate customer-specific reports. Figure ❹ provides an example.

What actually happens during the pasteurization process?

Pasteurization is a thermal method of preserving food in which it is heated for a short time to temperatures between 72 and 100 °C and then rapidly cooled down again. The aim is to kill pathogenic and spoilage-causing microorganisms, without significant negative impacts on the quality of the product. Typical areas of application are milk and dairy products, fruit and vegetable juices, liquid eggs, as well as ready meals.

As part of the pasteurization process, various process steps are carried out within a program – so-called sequences. The JUMO variTRON Program App ❺ can be used for this purpose. The typical process steps are listed below:

1. Raw product storage
Cold, unprocessed food (e.g. juice) is stored in a collecting tank at approx. 4 °C.

2. Pre-heating
The product is preheated between 57 and 68 °C by a heat exchanger (counter-current principle) using the heat from the already pasteurized product.

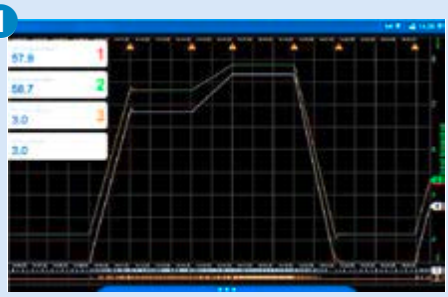
3. Heating
In the heating zone, the product is heated to at least 72 °C with hot water.

4. Holding
The products dwells at this temperature for at least 16 seconds to reliably kill microorganisms.

5. Temperature control
If the temperature falls below a setpoint, a temperature sensor integrated in the control system guides the insufficiently pasteurized product back into the inflow so that it is pasteurized again.

6. Cooling
The product emits its heat to the raw product (once more in the regenerator) and is then cooled down to 4 °C or less.

7. Vacuum breaker and filling
The pasteurized product is guided into a hygienic collecting tank via a vacuum breaker and is ready for filling. ➜

❶


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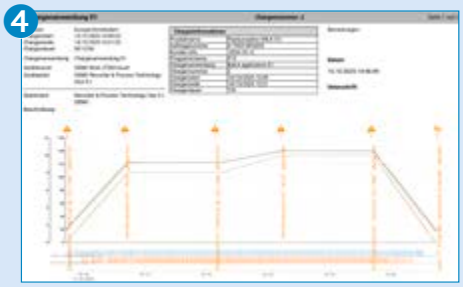

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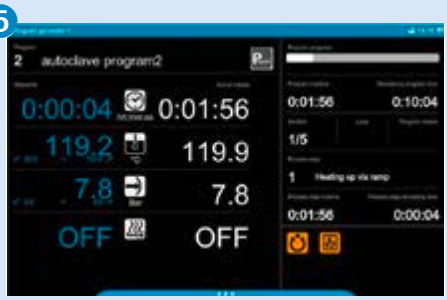

Integration instead of separation: PLC and paperless recorder in one device

Traditionally, 2 separate systems are used in pasteurization plants: one PLC for control and one separate paperless recorder for data recording. This separation not only requires additional hardware, but also involves additional installation and maintenance requirements. The JUMO variTRON Recorder App revolutionizes this concept by integrating the functionality of a fully fledged paperless recorder directly into the PLC. A separate device is therefore no longer required – a clear advantage in terms of:

- **Cost savings**
  Less hardware means lower investment costs, reduced storage, and lower maintenance costs.
- **Space advantages in the control cabinet**
  Thanks to the compact design of the JUMO variTRON control systems and I/O modules, valuable space is saved.
- **Faster startup**
  Only one device has to be installed, configured, and maintained – this saves time and reduces error sources.

Intelligent evaluation of historical data with JUMO smartWARE Evaluation

The process data acquired in the JUMO variTRON Recorder App can be analyzed seamlessly using the JUMO smartWARE Evaluation software. The high-performance evaluation software enables in-depth analysis of historical data – a key advantage for operators of pasteurization plants. For example, temperatures curves can be tracked over weeks or months, process deviations identified, and optimization potential revealed. ■

Conclusion

When it comes to audits and traceability, the combination of JUMO variTRON Recorder App and JUMO smartWARE Evaluation provides end-to-end documentation which can be exported and archived at any time. This not only increases process reliability but also improves legal certainty in dealings with authorities and customers.

Process data acquisition and evaluation with the comprehensive carefree package from JUMO.

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Switching behavior of thermostats

Use as a temperature controller and monitor

Thermostats are frequently used as temperature controllers. More commonly they have the task of detecting excess temperature or interrupting the supply of heat in the event a limit temperature is exceeded. They are then used as temperature monitors or limiters. Thermostats are popular because they are robust, inexpensive, and easy to use. However, they do not achieve the switching point accuracy of electronic systems. In many applications, this level of accuracy is not crucial – but in some cases, it is exactly what matters. This article therefore examines the switching behavior of thermostats more precisely.

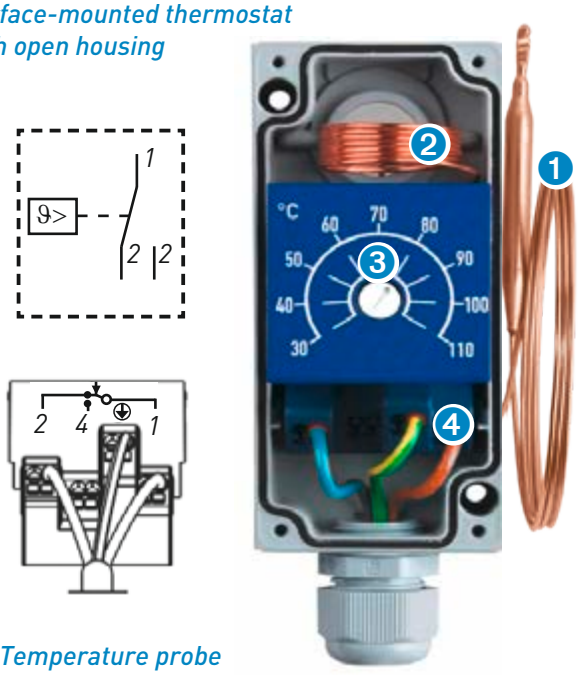
Temperature controller (TR) and temperature monitor (TW)

These 2 thermostat versions differ in that the setpoint temperature can be adjusted very easily using a rotary knob in the case of the temperature controller, while a tool is required for this in the case of the temperature monitor. The temperature range in which the setpoint value can be set is referred to as the control range.

Temperature controller and temperature monitor scale

Thermostats have a changeover contact which switches at a set temperature.
Thermostats switch their contact from (1-2) to (1-4) when the configured setpoint value is reached. The measuring system contains a filling medium that, in the unlikely event of a leak, may escape. As a consequence, the measuring system becomes depressurized and the contact of a standard device remains in position (1-2). A temperature controller then keeps on heating the system more and more. A temperature monitor never switches the system off.

Surface-mounted thermostat with open housing



❶ *Temperature probe*
❷ *Capillary (part of the measuring system)*
❸ *Setpoint adjustment (via spindle)*
❹ *Connection of the switching contact and PE*

In the case of temperature controllers and temperature monitors, the switching point accuracy is specified as a percentage of the control range (e.g. ±3 % in the top third of the scale and ±6 % at the start of the scale).

Scale of a temperature controller

The setpoint value for the temperature controller belonging to the scale is set to 40 °C and is therefore in the top third of the scale (approx. 33.5 to 50 °C). The tolerance is ±1.5 K (±50 °C × 3 %). The temperature controller switches its contact in a range of 38.5 to 41.5 °C as the temperature increases. If the setpoint adjuster is set to 0 °C, switching occurs within a range of -3 to +3 °C (as the temperature increases). ➜

Safety temperature monitor (STW) or safety temperature limiter (STB)

If a leak occurs in the measuring system of a safety device (safety temperature monitor or safety temperature limiter), both contacts (1-2 and 1-4) open. The system is switched off or remains shut down, and operation is safe. The safety temperature limiter differs from a safety temperature monitor due to one crucial point: if the safety temperature limiter deactivates the plant due to an excessively high temperature, the plant is only released when the temperature is in the valid range and the reset button has been pressed.

Scale of a safety temperature limiter with cover cap for the reset button

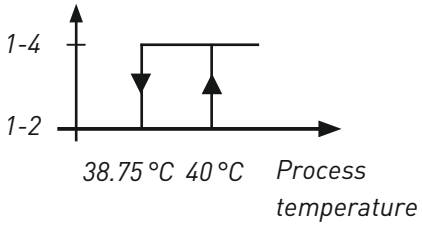
For the safety temperature monitor and safety temperature limiter, the switching point tolerance is always below the setpoint value. The scale shown belongs to a safety temperature limiter with the following specification: switching point accuracy in the top half of the scale 0/-5 K and in the bottom half 0/-8 K. The bottom half of the scale is in a range of 70 to 100 °C and the top half is in a range of 100 to 130 °C.
In the example, the setpoint value is set to 130 °C. Consequently, the safety temperature limiter switches in a range of 125 to 130 °C (with increasing temperature). For example, if the safety temperature limiter is set to 80 °C, switching is carried out in a range of 72 to 80 °C.

Influence of the ambient temperature on the switching point

The filling medium in the measuring system is not completely exposed to the process temperature. The part that is in the membrane and in the capillary adopts the ambient temperature. The ambient temperature therefore influences the system pressure and ultimately the switching point. By default, the thermostats are set to an ambient temperature of 22 °C. If the ambient temperature is not 22 °C, the switching point is shifted. Most thermostats from JUMO have ambient temperature compensation, meaning that the impact of the ambient temperature is relatively low. A typical feature of these thermostats is that the switching points shifts by -0.1 K/K in the event of a deviation from the ambient temperature of 22 °C at the thermostat housing and capillary.
If a thermostat is operated with these specifications at an ambient temperature of 37 °C, the switching points shifts by -1.5 K (-0.1 K/K × 15 K).

Hysteresis or switching differential

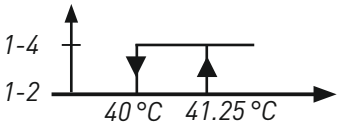
Thermostats have a switching differential. It is specified as a percentage of the control range. Since the thermostats are adjusted to increasing temperature per default, the switching differential is below the setpoint value.



Without taking the switching point tolerance into consideration, the temperature controller belonging to the scale switches at 40 °C (with increasing temperature). If the switching differential is specified at 2.5 %, the temperature controller will switch the contact back at 38.75 °C (40 °C – 50 °C × 2.5 %).

Downward adjustment of the switching point

If the temperature controller is used with the same setpoint value for cooling, it only switches on at 38.75 °C and back off at 40 °C (since the switching differential is below the setpoint value).
For applications for cooling or to monitor a minimum temperature, the thermostats can be set to a falling temperature. The switching differential is then above the setpoint value and the example temperature controller switches the contact at 40 °C with a falling temperature.
If the temperature increases again, the contact is switched back at 41.25 °C. ■



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JUMO sets sustainable standards

EcoVadis Gold and EMAS certification

JUMO has reached 2 important milestones in its commitment to sustainability: the EcoVadis Gold Medal and EMAS certificate. Both awards underscore the consistent embedding of environmental and resource protection in the corporate strategy.

EcoVadis Gold: Top 5 % globally

With its Gold Medal, JUMO is among the best 5 % of over 150 000 companies rated. EcoVadis assesses sustainability in the areas of the environment, labor and human rights, ethics, and sustainable procurement. JUMO's top result with 90 out of 100 points in the environmental area is particularly outstanding.

"This rating shows that we are on the right path in terms of environmental management and resource efficiency," emphasizes Sustainability Manager Maximilian Schlichtherle.

The award is motivation to further drive forward the strategic vision of ***"more sustainable, more digital, and more together"*** for the Chief Executive Officer Dr. Steffen Hoßfeld.

Matthias Raab *Management Systems,* ***Patricia Naujoks*** *Health Management,* ***Florian Belz*** *Environmental and Occupational Safety Management (from left to right)*

Global responsibility and strong local ties

JUMO is involved in the UN Global Compact as a member and supports the 17 Sustainable Development Goals of the United Nations. Participation in initiatives such as *Umweltallianz Hessen* and the *Charta für nachhaltiges Wirtschaften* underscore the commitment to combining environmentally friendly conduct with social responsibility and economic stability.

The EcoVadis Gold and EMAS certification allow JUMO to send a strong message: sustainability is not a project, but rather an integral part of the corporate identity – and a decisive competitive advantage for the future that benefits the customer.

A strong message for genuine sustainability.

EMAS: transparency and continuous improvement

The EMAS certification (Eco-Management and Audit Scheme) allows JUMO to meet the most demanding standards for environmental management beyond ISO 14001. The annual environmental statement ensures transparency toward customers, partners, and the public.

"Environmental and resource protection has been part of our philosophy for over 30 years," explains Dr. Hoßfeld.

The new SENSILO plant at Fulda-West Technology Park sets energy standards here:

Geothermal energy, heat recovery, and a 700 kWp photovoltaic plant ensure that the energy supply is completely free of fossil fuels.

Dr. Christian Gebhardt *Chamber of Industry and Commerce President,* ***Dr. Steffen Hoßfeld*** *COO,* ***Michael Konow*** *Chamber of Industry and Commerce Chief Executive Officer (front row, from left to right);* ***Florian Belz*** *Environmental and Occupational Safety Management,* ***Matthias Raab*** *Management Systems,* ***Maximilian Schlichtherle*** *Sustainability Management (back row, from left to right)*

New sales structure

More proximity, more service, more success for the customer

JUMO takes the next step to offer customers in the regions of Benelux and Eastern Europe even more advantages. A new optimized sales structure allows us to lay the foundations for faster reactions, improved consulting, and customized solutions – precisely where our customers need us.

Benelux: Pooled expertise

Since September 2025, **Belgium, Luxembourg**, and the **Netherlands** have been joined together to form **JUMO Benelux**.

For JUMO customers, this means:

- **One contact person for the entire region –** fewer interfaces, more clarity
- **More efficient processes** thanks to pooled resources and expertise
- **Bundling of synergies –** continuous development of innovative as well as mature applications and solutions for our customers
- **Stronger presence locally** so that we can even better understand and implement the requirements of the companies

The leadership role will be assumed by **Steven de Graaf, Chief Executive Officer of JUMO Netherlands** and an experienced industry expert. He will oversee the integration and place a clear focus on customer benefits. In other words, this means **closer, faster, and more expertise.**

Eastern Europe: A strong network for the relevant markets

In Central and Eastern Europe, we are also focused on growth and customer focus. The previously independent organizations in Austria and Poland will be joined in the future to form the Central and Eastern Europe (CEE) region. **The Baltic States and Ukraine** are new additions here.

The advantages:

- **Faster reaction times** due to centralized management and closely interconnected teams
- **Optimized resources** for complex projects in dynamic markets
- **In-depth market knowledge** so that we can meet individual requirements even more precisely

Dr. Dawid Goinski, Chief Executive Officer of JUMO Poland, will assume the leadership role – he ensures a consistent focus on customers' needs with his experience in growth regions.

What does this mean for customers?

- **Increased efficiency:** shorter distances, faster decisions
- **Increased expertise:** pooled knowledge for innovative solutions
- **Increased proximity:** stronger presence locally for personal consulting

"We are creating synergies with these changes. We benefit from all of the countries' expertise – with their respective strengths in order to provide our customers with optimum consultation and support," states Sevil Davarci, Director of Global Sales at JUMO. ■

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JUMO Xperience platform:
https://jumo.easyvtf.com/en

Knowledge that helps you get ahead

Practical training

Benefit from practical training sessions developed by technicians for technicians. Our trainers have in-depth product knowledge, decades of experience, and optimum technical expertise. This is how we ensure that you not only know your JUMO products, but can also use them optimally – online or in person on-site.

For almost 30 years, we have offered high-quality training courses which convey the basic principles and complex technical topics in an understandable and application-oriented manner. Our training courses allow you to stay at the cutting edge and use the latest technological developments to ensure your success. ■

On the JUMO Campus portal, you can find a wide range of solutions, including seminars, e-learning courses, and technical literature.

http://campus.jumo-en.info

You can also discover numerous videos with valuable tips and detailed information about our devices on our YouTube channel.

https://www.youtube.com/user/JUMO1948

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WHITE PAPER

The future of automation

with Single Pair Ethernet

Why is Single Pair Ethernet (SPE) a game changer for Industry 4.0? You can find the answers in the white paper that was created in cooperation with the Single Pair Ethernet System Alliance.

SPE is redefining industrial communication – secure, scalable, and efficient. Download the white paper free of charge now and discover the opportunities SPE has to offer!
Click here to request the white paper:

https://jmo.to/whitepaper-SPE-en

Want to find out more?
Then take a look at our webinar recordings in the JUMO media library.

Digital sensor communication:

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JUMO is a member of Single Pair Ethernet System Alliance

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