



SENSORS AUTOMATION

Issue 1 / 2019

On to JUPITER!

JUMO products are entering the digital future with the new hardware and software platform

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Dear Reader,

"I don't know whether it will get better if it changes. But it has to change for it to get better." This quote from Georg Lichtenberg perfectly expresses the situation in which most companies currently find themselves. We all know that, with digitalization, we are dealing with a topic that will fundamentally change the face of our industry.

But on the other hand, we also notice time and time again that this topic causes a lot of uncertainty for people. Are the gloomy forecasts true that in the next 20 years, every other job that still exists today will disappear? And will we only need IT specialists in the future, rather than skilled workers?

The answer can be found in the quote at the beginning. No matter what the future brings, it's a road we must take, because standing still or going back is not an option. However, it's important that we take everyone with us when going down this road. JUMO is tackling this challenge head-on and as a result has initiated a whole array of projects that deal with digital transformation.

A key point in this process of change is communication with our partners, which is why we have completely revamped the layout and content concept of the JUMO customer magazine. You now have your hands on the very first edition and we are looking forward to hearing your thoughts on the new magazine. You are welcome to send your feedback to pressestelle@jumo.net.

We hope you enjoy reading this issue.

Handwritten signatures of Bernhard and Michael Juchhheim.

Bernhard and Michael Juchhheim
Managing Partners

Jupiter is the largest planet in the solar system. Due to its chemical composition Jupiter belongs to the gas planets.

IN THE SPOTLIGHT



On to JUPITER!

JUMO products are entering the digital future with the new hardware and software platform.

The platform approach brings numerous advantages when developing products and is already the standard approach in many industries today. JUMO has also been relying on this strategy for a long time. The pioneer for the new JUPITER platform is the JUMO variTRON 500 automation system. Further products will follow.

The automotive industry is leading the way: at the VW Group, over 40 different car models are produced on just one platform. The advantages here are obvious: shorter development times, lower costs, and faster production cycles. The platform from JUMO will be launched under the name of JUPITER. The basis is a hardware platform that has an i.MX6 processor with 800 MHz which is used as a single, dual, or quad core variant, depending on the application. An SRAM of up to 512 kB, a working memory of up to 1 GB, high-resolution LCD and TFT displays with a parallel RGB interface, LVDS interfaces, and a touch controller are grouped around this processor on the motherboard via I²C, SPI, or USB interface. —→

JUMO variTRON 500

- Process mapping for up to 30 input/output modules
- Ethernet interface with integrated web server
- Up to 64 intelligent connection modules possible
- All CODESYS V3.5 levels of freedom
- Up to 10 panels can be connected via Ethernet
- Individual customer-specific operation via CODESYS Remote TargetVisu and WebVisu
- Provision of visualization libraries by JUMO



Modular, flexible, and sustainable

The result is a modular, flexible, and above all sustainable hardware platform. Another factor that guarantees flexibility and connectivity is the integration of all important fieldbus systems and connections (such as Ethernet CAN, USB, or HDMI). Altogether, the system can have up to eleven external and five internal interfaces.

The software also has a modular structure based on a Linux platform and enables very good scalability for performance, memory, and interfaces. High standards in Internet security and cryptography enable users to always be on the safe side – an invaluable advantage in times of increasing cloud computing.

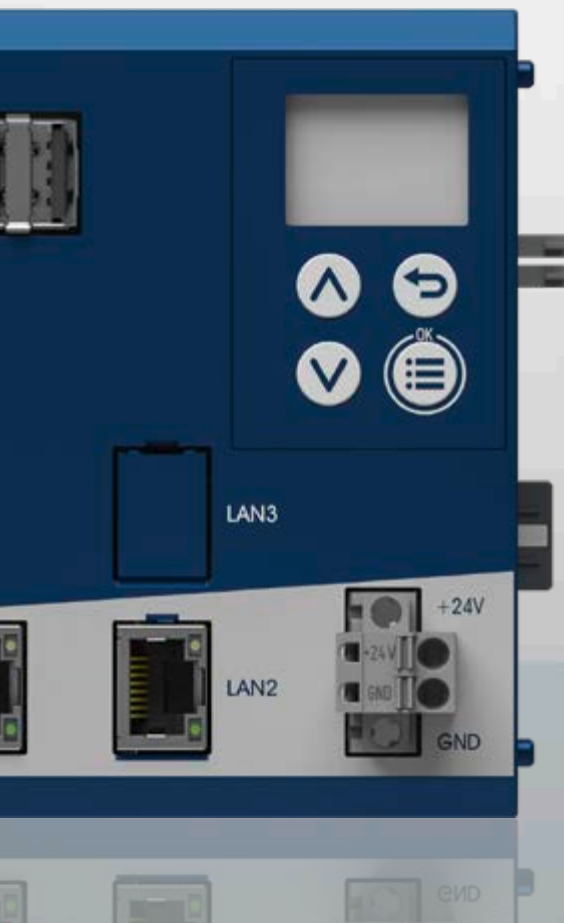
The JUPITER platform also keeps with the times when it comes to connectivity. Wi-Fi and Bluetooth are standard. State-of-the-art displays can also be connected. Intuitive operating concepts, multi gesture control, and animated image transitions are therefore standard features.

The JUPITER platform will be used for the first time in 2019 within the JUMO variTRON 500 automation system. It will ensure a considerable leap into the future. The new version of the central processing unit features all levels of freedom that the PLC CODESYS version 3.5 has to offer. CODESYS is now being used by over 10,000 application developers across the globe and is available for more than 100,000 different applications.

On a JUMO variTRON CPU up to 64 intelligent connection modules can be switched. A maximum of five operating panels in various formats can be connected via Ethernet. Additional Ethernet interfaces can be made available via an USB Ethernet adapter.

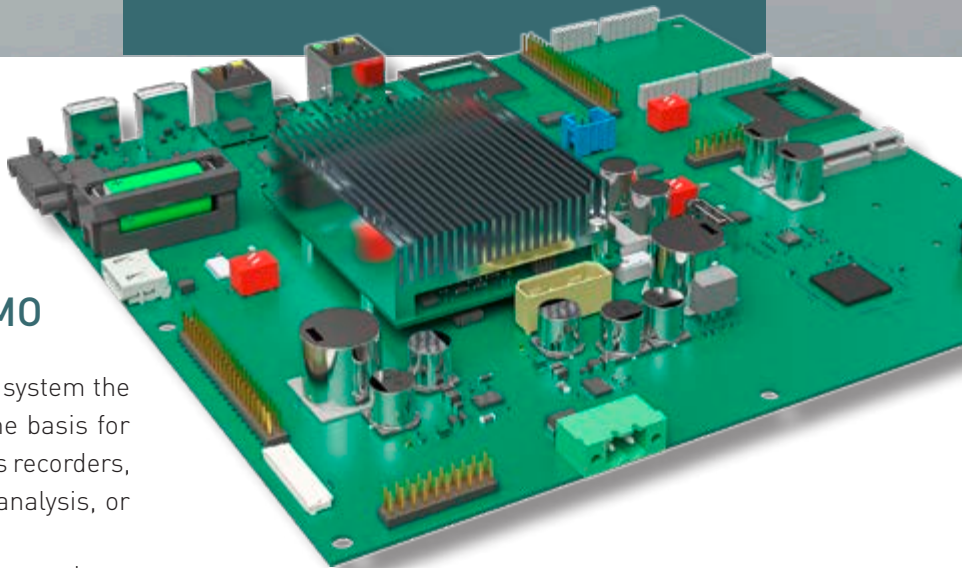
JUMO provides visualization libraries for individual customer-specific operation via CODESYS Remote TargetVisu and WebVisu. Using a PROFINET interface, you can not only connect to higher-level control systems but also couple two JUMO variTRON systems as "master" and "slave". In addition to the numerous modules provided for the automation system, a new router module and a 32-channel digital I/O module are available.





The facts

- i.MX6 processor with 800 MHz as single, dual, quad core
- SRAM up to 512 kB
- 8 to 32 GB eMMC (NAND)
- DDR3-800/LVDDR3-800 memory up to 1 GB
- LCD and TFT displays with parallel RGB interface
- Linux operating system
- Touch controller via I²C, SPI or USB interface
- Touch controller on the motherboard
- Modularized software architecture



JUPITER as "modular transverse matrix" for JUMO

After its launch in the JUMO automation system the JUPITER platform will gradually become the basis for many other JUMO products such as paperless recorders, multichannel measuring devices for liquid analysis, or process and program controllers.

This means that, in the future, all of these products will be able to benefit from shorter startup times, higher processor speeds, and noticeably improved flexibility. Connectivity in terms of "third party controls" as well as existing JUMO products, such as digital sensors, are also

improved. New functionalities and technologies can be integrated into the JUPITER platform in a short space of time, thereby enabling efficient implementation of industry-specific solutions.

"The JUPITER platform allows us to set the course for the digital future of the industry."

Harald Schöppner
Head of JUMO Engineering



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

JUMO news

- The JUPITER platform will be presented to the public in 2019 at the IFFA trade fair from May 4-9 in Frankfurt/Main, Germany.
- The platform will then gradually become the basis for further JUMO products.

JUMO innovations

Six products in one sweep





1 Hygienic pressure transmitter **JUMO TAROS S46 H**

Due to its high-level protection type and fully welded, compact design, the JUMO TAROS S46 H pressure transmitter enables cleaning processes that leave no residue and a high degree of temperature compatibility for SIP and CIP cleaning processes. Its excellent active temperature compensation ensures exact pressure measurement and thereby improved process reliability. The pressure transmitter series is rounded off with an autoclavable version.

2 Smart tube **JUMO dicoTEMP 100**

This smart tube for temperature measurement combines the strengths of several JUMO devices. As a result, diverse temperature measurement can be implemented with a thermostat or dial thermometer and a platinum-chip temperature sensor at only one measuring point. The resistance signal can be converted into an analog or digital signal via a transmitter. The new solution allows users to continue using any devices that are already part of the process at the same measuring point and, at the same time, extend them functionally with electrical temperature measurement.

3 Process and program controller **JUMO DICON touch** – new expansion stage

The time-tested process and program controller with registration function and touchscreen is enhanced with several useful features in the new expansion stage. These include, among others, the option of having up to four editable process screens and up to four control channels, as well as eight analog and four digital registrable values. Also part of the new functional range are an integrated program controller with 32 programs and 16 operating contacts, as well as six device languages that can be retrieved right at the device.

4 Electronic thermostat **JUMO eTRON T100**

The electronic thermostat for DIN-rail mounting was especially designed for temperature control and monitoring. Other signals for additional process variables (such as 4 to 20 mA) can be processed. The device impresses due to its compact size and diverse functionalities. As well as possessing UL approval, the JUMO eTRON T100 also meets the standards for the railway industry DIN EN 50155 for Category 1. The use of PUSH IN terminals enables an especially fast startup.

5 Thyristor power controller **JUMO TYA S201 / S202**

The one-phase thyristor power controller JUMO TYA S201 and the three-phase thyristor power controller JUMO TYA S202 are the gateway to the world of JUMO power controllers. The devices can be used in simple heating applications for currents of 20 to 250 A – in such fields as in industrial furnace construction or in plastic processing. Both power controllers have a PROFINET interface. Configuration is simple and intuitive using the keyboard or the setup program.

6 Highly-scalable paperless recorder **JUMO LOGOSCREEN 700**

Due to the high scalability level of the JUMO LOGOSCREEN 700 paperless recorder, the device can easily be adapted to various customer requirements: from a device version without a measurement input through to device versions with up to 18 measurement inputs, 3 analog outputs, 18 digital inputs, 24 individually switchable digital inputs/outputs, and 7 relay outputs. When acquiring data, the latest hash algorithms with a digital certificate can guarantee the highest level of reliability, which has been confirmed by the TÜV (Technical Inspection Association in Germany). The visualization of the plant or depiction of process states takes place with up to 10 customer-specific process screens. Finally, the flexibility of the recorder is rounded off by application adaptations supported by the ST code. ■

Plastic sensor technology is on the move

In the fall of 2017, JUMO presented plastoSENS technology, an innovative and globally unique process for the production of temperature measurement technology from high-performance plastics.

The first interesting customer projects are presented here.



**JUMO webinar**

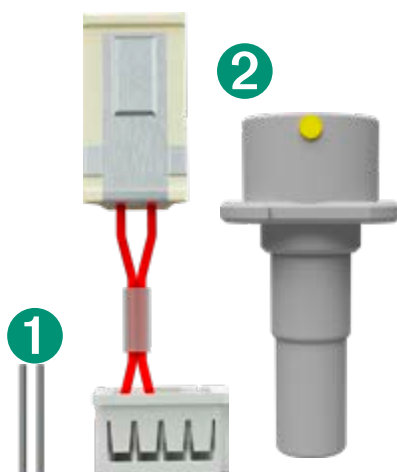
Plastic sensor technology with
JUMO plastoSENS T
June 05, 2019

Plastic sensor technology opens up totally new possibilities.

The JUMO plastoSENS T temperature probes are voltage and vibration resistant as well as absolutely waterproof. Furthermore, they are characterized by their design freedom and adapt to the respective installation situation. In addition to 4 standard products for different application areas, various special versions are now also available. These JUMO plastoSENS products are developed in close cooperation with customers. The process starts with a feasibility test and a design proposal, followed by the design and simulation of the temperature probes and ultimately leads to the manufacture of the injection-molded tools. The tests start after a sampling phase. The end stage includes a functional prototype and series production.

Special production for motor windings ①

Sensors that are installed in insulating hoses have been usually used up to now for temperature measurement in motor windings. These sensors had to be produced manually in a complex process. This often resulted in a lack of tightness and the sensor was very much at risk of breaking. Another problem was the comparatively low electric strength. In collaboration with various well-known manufacturers, JUMO has developed a plastoSENS T probe that does not have all these disadvantages. The probe can be used in temperature ranges between -70 and +200 °C, can easily be glued into the motor winding, and has a pulse voltage resistance of up to 8 kV. The production is partially or even fully automatic.



In addition, the probe makes an impact with a shock resistance of more than 100 g and can be used as a standard-compliant measuring probe according to DIN EN 61800-5-1: 2017.

Temperature measurement in premium washing and drying machines ②

In industrial-scale laundries, the temperature in washing and drying machines has to be monitored with the highest level of accuracy. JUMO has developed 2 plastoSENS T products for this application. To measure the surface temperature in washing machines a probe that can be automatically loaded in the customer's production facility and that is optimized for robot handling was designed. A material mix of a heat conducting and a poor heat conducting plastic, which are absolutely firmly connected together, is used here. To measure the dryer temperature a cost-effective and installation-friendly probe with 2 sensors was developed. It has very good thermal conductivity and therefore responds extremely quickly. The sensors come in the form of NTC glass diodes, that – similar to platinum thin-film sensors – can be used in the optimized injection molding process.

4 innovative plastic sensors for very different industries.

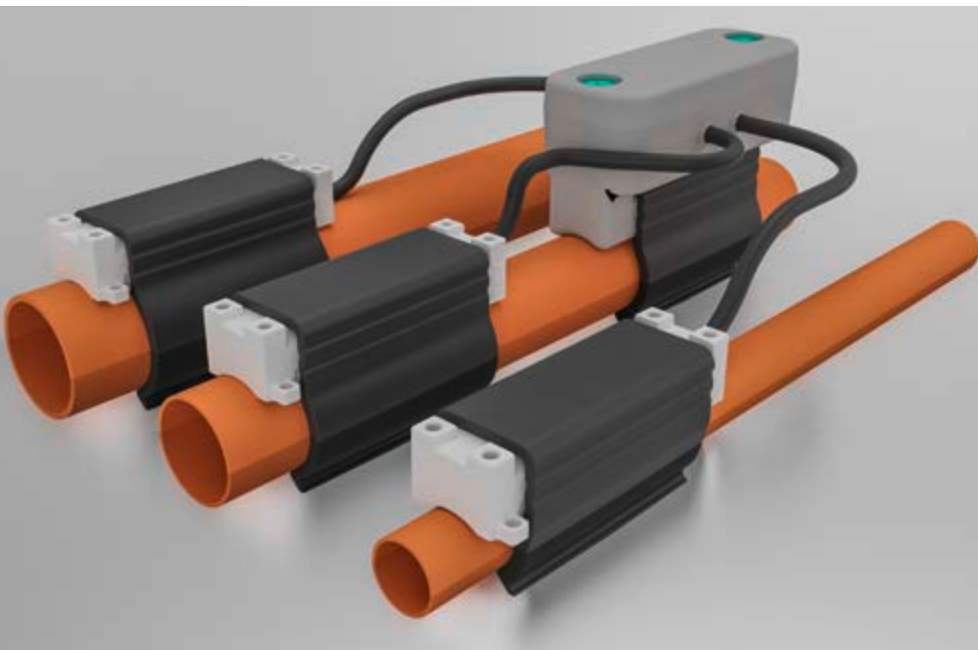
③



Energy harvesting

Energy harvesting refers to extracting small amounts of electrical energy for low-power mobile devices from sources such as ambient temperature, vibrations, or air flows. The structures used in this process are also referred to as nano-generators.

In the case of wireless technologies, energy harvesting prevents restrictions that could be caused by cable-based power supplies or batteries.



DFM – digital free-form multisensor technology ③

This project allows JUMO to look a long way into the future of plastic sensor technology. The main question concerns the requirements that sensors need to fulfill with regard to the coming wave of digitalization. This also relates to how individual solution approaches can result in entirely new business models. The solution devised by JUMO is a modular system, whereby sensor technologies for various measurands (such as temperature, moisture, and force) are all installed within one plastic case. "Energy harvesting" allows the modules to supply themselves with current. The sensor signals are transmitted wirelessly via a Bluetooth interface. Up to 16 such sensor modules can then be connected to a gateway receiver. The system is configured via a newly developed tool that can also display and process the measured values further. The first planned development with this technology entails the extension of the existing JUMO plastoSENS T04 pipe

surface probe through a DFM module. Up to 3 pipe surface probes each could then be operated without auxiliary energy using a module that would transmit the measurement signals wirelessly. ■

JUMO news

Patented, global innovation

At first glance, JUMO plastoSENS products may look like conventional temperature probes. But upon a closer look they reveal themselves to be an innovation in temperature probe production. The metal that has been previously used for temperature probes is replaced by a new type of thermoplastics. This development opens up an almost infinite amount of possibilities for the most diverse installation situations.

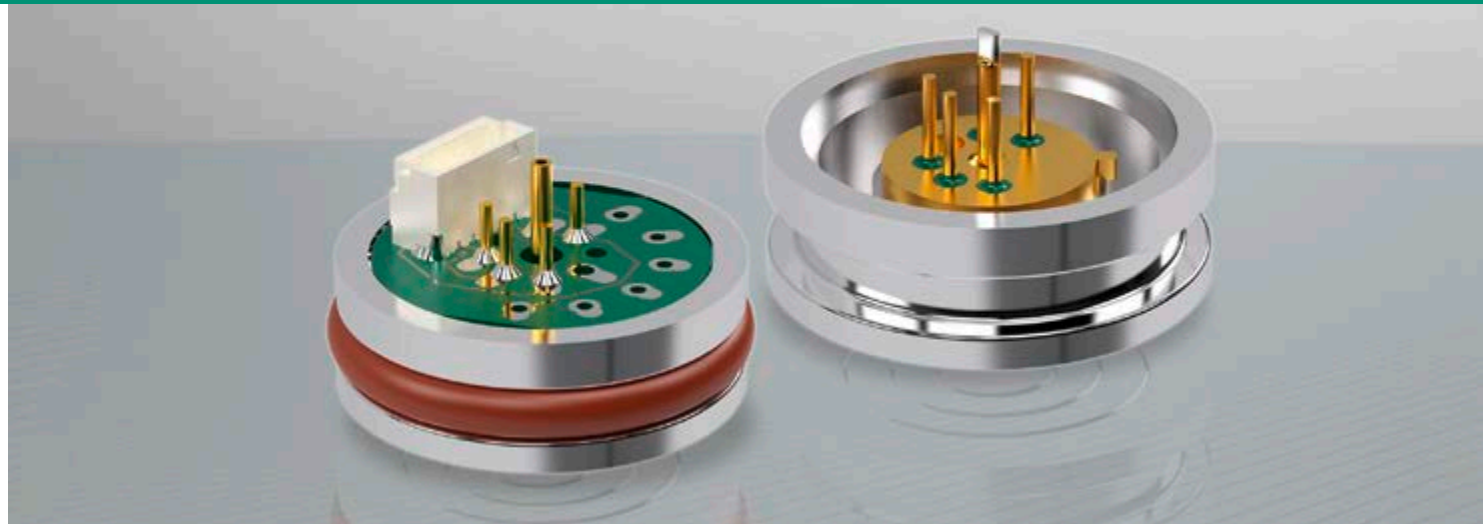
**JUMO webinar**

Introduction to electronic pressure measurement technology

September 17, 2019

Digital pressure measuring cells

Components with great potential for new applications.



JUMO has been producing pressure transmitters, pressure transducers, and pressure measuring cells in different variants for several decades. Due to mature technologies in the areas of semi-conductor production and micromechanics, customer-specific versions can be produced in large quantities.

These pressure measuring cells do not usually exhibit industry-suitable output signals and are not yet temperature compensated or aligned. This is less relevant for users purchasing complete pressure transducers or pressure transmitters. The specifications on the data sheet with regard to material, pressure, overload and bursting areas, temperature limits, and accuracy specifications simply have to meet these users' requirements.

On the other hand, it is a completely different story for users who only buy the pressure measurement cells and process them into finished products themselves. Until now, they have had to carry out their own pressure and temperature compensation procedures and calibrations, which requires expensive measurement equipment (pressure controller, climate cabinets), as well as the appropriate expertise and plenty of time. It is not unusual for complex alignment processes to take considerably more than 12 hours.

Pressure measurement with integrated signal processing

With the pressure measuring cell module JUMO CEROS S01M, the complex and long-winded compensation adjustment and calibration process is now a thing of the past for these users as well. The actual pressure measurement cell in the module is fitted with an additional signal processing function, which enables it to deliver the industry-suitable standard signal 0.5 to 4.5 VDC, or rather the I²C protocol. The temperature compensation is already carried out in

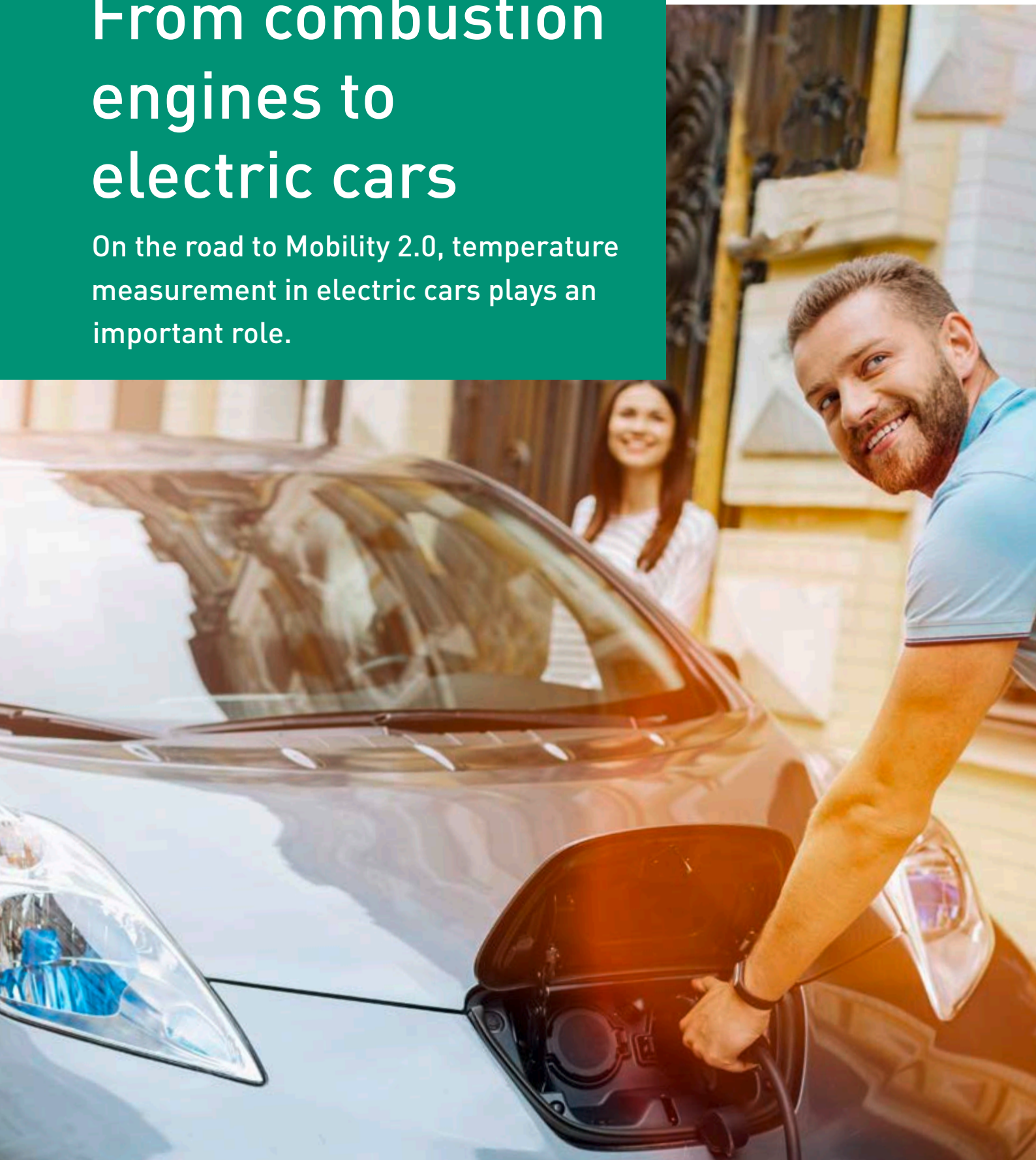
the factory. The user can install these types of modules immediately, couple them with their intended electronic components, and start using them straight away.

This means that completely new applications are now possible and feasible which had failed so far because they could not meet the necessary alignment requirements. As a result, pressure measuring cells can now be installed on site to valves, water meters, etc. and be directly connected to integrated controls. ■

***JUMO CEROS
opens up a
new world of
applications.***

From combustion engines to electric cars

On the road to Mobility 2.0, temperature measurement in electric cars plays an important role.



**JUMO basic course**

Electrical temperature measurement for practitioners

March 21, 2019 + September 10, 2019

The topic of e-mobility is a perennial issue. The German government will most likely have to postpone their ambitious goal of putting a million electric cars on German roads by 2020 by up to two years. However, considering the ambitious targets for this energy transition, the use of electric cars seems unavoidable. And now it is not just electric vehicles for personal use that are the main topic of conversation because more and more consideration is being given to electrically powered public transport. The largest market for e-mobility is currently in China. But we are also seeing a growing number of producers in the USA. Having hesitated for a long time, the German automotive industry now also appears to be jumping into "electric" gear.

Whenever the technical aspects of e-mobility are the topic of conversation, it tends to relate to batteries and range. On the other hand, it is not widely known that, in this regard, the temperature measurement of very different measurement points also plays a vital role.

Batteries have to feel well

The power electronics of an electric car are the "brain" of the vehicle, so to speak. They are responsible for ensuring that the energy supplied by the traction battery is delivered to the motor in a controlled manner. To ensure that the power electronics function reliably and to prevent overheating, temperature measurement is absolutely essential here.

The ambient temperature of the lithium-ion traction batteries is crucial for ensuring that it produces maximum electric power and has a maximum lifespan. The "feel-good temperature" of the battery is the same as for humans. The temperature range should be between 20 and 40 °C and must be controlled permanently.

As the electric motor does not produce enough of its own heat, an additional heating device for the passenger

One million electric vehicles are estimated to be on German roads by 2020.



compartment is necessary. Various heating systems are used for this purpose, including the possibility of using high-voltage heaters. NTC or PTC temperature probes are used to control the temperature of these heater types.

Durable JUMO sensors

JUMO supplies the sensor technology required for these systems to various automotive suppliers. NTC probes are used for temperature ranges up to 150 °C. PTC probes are used beyond this range.

The quality requirements for these types of temperature probes are extremely high. On top of delivering reproducible measurement results and low response times, the products have to be extremely vibration resistant and durable.

JUMO VIBROtemp probes are particularly suitable for this demanding area of application. Even under pressure, these screw-in RTD temperature probes are reliable at measuring the correct temperature in vehicles, construction machinery, agricultural machinery, motors, compressors, and in many machines from the railway technology field. The vibration-resistant construction achieves excellent long-term stability even in tough operating conditions.

Different plug connections are available to suit the specific application area. When plugged in, protection type IP67/IP69 or IP69K is fulfilled.

As a standard feature a Pt100 temperature sensor according to DIN EN 60751, class B, in a two-wire circuit is used as the measuring insert. Versions with Pt500 or Pt1000 as well as PTC or NTC temperature sensors are also possible.

From the container fresh to the table

Fish will become increasingly important as a food source in the future. One innovative company wants to futureproof supply with an entirely new concept.



**JUMO device course**

JUMO AQUIS touch S/P – modular multichannel measuring devices for liquid analysis

May 22, 2019

Fish that does not come from the sea but that rather is bred in containers. A concept that at first may sound like a fishy tale is actually a spin-off company of the University of Applied Sciences and Technology in Saarbrücken in Saarland, Germany founded by a group of young entrepreneurs. SEAWATER Cubes GmbH has developed a compact fish breeding plant that is housed in recycled ship containers and by means of which farmers, restaurateurs, grocers, and private fish aficionados can breed salt-water fish inland. JUMO measurement and control technology is also used here.

The SEAWATER Cube site is made up of discarded shipping containers that have been comprehensively prepared for reuse. All of the operations within the plant are designed to run with maximum energy savings. Up to seven tonnes of sea fish can be bred in one single 100 square-meter SEAWATER cube per year. The cube is integrated into three ship containers that are all linked together. This compact concept is modular and can be reproduced flexibly.

High degree of automation

The SEAWATER cube makes use of an innovative automation concept to manage all of the control and monitoring tasks as well as to ensure that the process parameters are within the specified range. This automation means that the plant can run more or less completely unsupervised and reduces the work outlay required from the plant operator down to an average of 1.5 hours per day. In addition, the cube is integrated into the company Cloud, thereby enabling real-time access to all data for the company and providing users with optimal support during their production process. The water in the SEAWATER cube is essentially normal tap water that has

Germany has over 3,000 aquaculture production businesses.



been salted with a special blend of minerals based on those found in the sea. The circulation pump pushes the water through the filter units three times per hour, so that any residue that occurs is completely removed.

As well as the production pool, the SEAWATER Cube has several physical and biological filter stages. The filter technology is optimized in such a way that only less than 1 % of the process water needs to be replaced per day.

JUMO controls the water quality

To inspect the water quality, the company uses JUMO AQUIS touch, a modular multichannel measuring device for liquid analysis as well as JUMO digiLine sensors for measuring conductivity, temperature, and oxygen content. JUMO digiLine is a bus-compatible connection system for digital sensors that gives users the ability to build intelligent sensor networks. All important measurement parameters for liquid analysis can be measured and processed with this system. Furthermore, the system uses JUMO tecLine sensors to measure the chlorine dioxide and ozone level.

With the help of the SEAWATER Cube, sea fish can thereby be offered regionally as well. Long, costly routes between the coast and consumer that damage the environment can be avoided and natural stocks are preserved. The fish are not put under any stress and it is possible to completely avoid the use the medicines that are often necessary in conventional aquacultures. ■

Lightweight wheels – heavy manufacturing

Heating of aluminium low-pressure die-cast holding furnaces



**JUMO basic course**

3 days in compact form: Measuring. Controlling. Recording.

April 09-11, 2019 + September 24-26, 2019

In 2017, the total aluminum production worldwide was around 62 million tonnes. About 35 % of the material is used in vehicle construction. Due to its low melting temperature of just 660 °C, aluminum is perfectly suited for casting. A distinction is made between the die-casting and low-pressure die-casting processes. The aluminum rim is a typical component created in low-pressure die-casting. 170 million wheels are produced every year and around 60 percent of all cars in Germany currently run on fancy rims.

In low-pressure die-casting, the aluminum melt is pressed from the bottom into the mold cavity of the die-casting mold mounted at the top, typically through a riser pipe. The upward motion of the liquid metal against gravity is typically achieved by the gas pressure principle.

Complex furnace control

Holding furnaces play an important part in this process. They are typically equipped with three to six SIC heating elements with a total output of 10 to 50 kW. One-channel or two-channel temperature controllers are deployed for temperature control. The maximum temperature of the heating elements and the furnace chamber temperature are controlled. To control the holding furnaces, JUMO offers the entire range of products required. These include thyristor power controllers, controllers, safety temperature limiters, and thermocouples.

One temperature control option is to only monitor the furnace chamber temperature and use the power controller to limit the maximum heating output without considering the surface temperature of the heating elements. This, in turn, reduces the service life of the heating elements. Cascade control is a better solution. It involves the internal control loop handling temperature control of the heating

JUMO offers the complete range for monitoring and control.



elements and acquiring their surface temperature. Based on the surface temperature, the maximum heating output for the power controller is defined. The external control loop controls the furnace temperature. The two-channel process and program controller JUMO DICON touch meets all the designated requirements here. All important process parameters can be displayed on a process screen. Communication with a higher-level PLC via fieldbus is also possible.

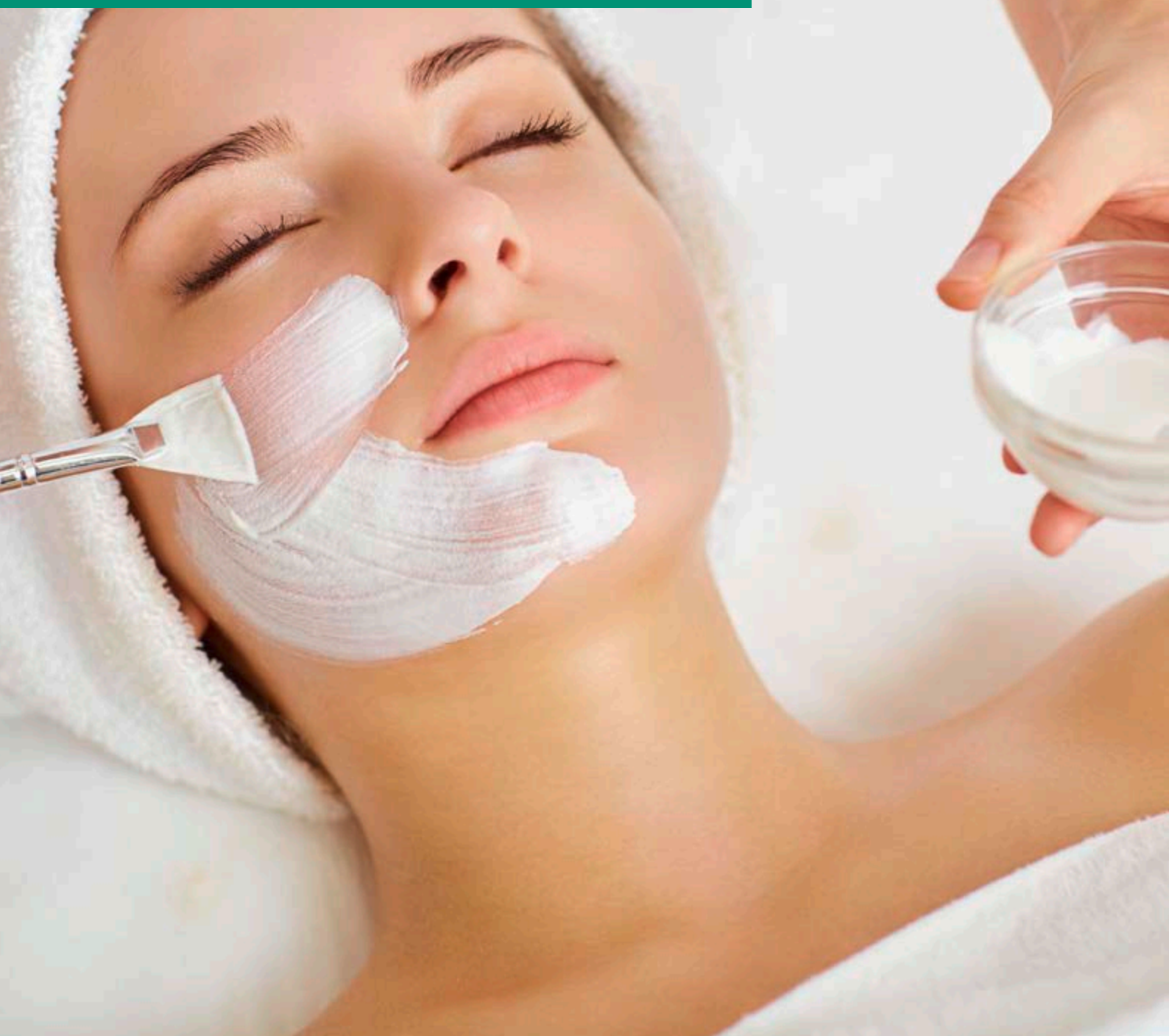
Protection against overheating

In the event of a defective controller or power controller, a safety temperature limiter protects the furnace from blowing. The JUMO safetyM TB/TW is the best choice here. JUMO thermocouples type B for temperatures up to 1600 °C are used to measure the heating element temperature. Type J or K thermocouples are required for the safety temperature shut-off in the furnace chamber.

The thyristor power controllers are crucial to the entire process, as they regulate the heat output of the holding furnaces. JUMO TYA power controllers are extremely reliable and particularly easy to operate. Additionally, all important process parameters can be extracted via the display or fieldbus. As a result, the user always has optimum process reliability.

Beauty from the bioreactor

Automation of a microalgae breeding facility



**JUMO basic course**

Analytical measurement technology
for practitioners

May 21, 2019 + November 05, 2019

Algae are true all-rounders and have already been dubbed the fuel of the future. There are around 70,000 different types of algae around the world, but only 30,000 of these have actually been researched. In general, the distinction is made between macroalgae and microalgae.

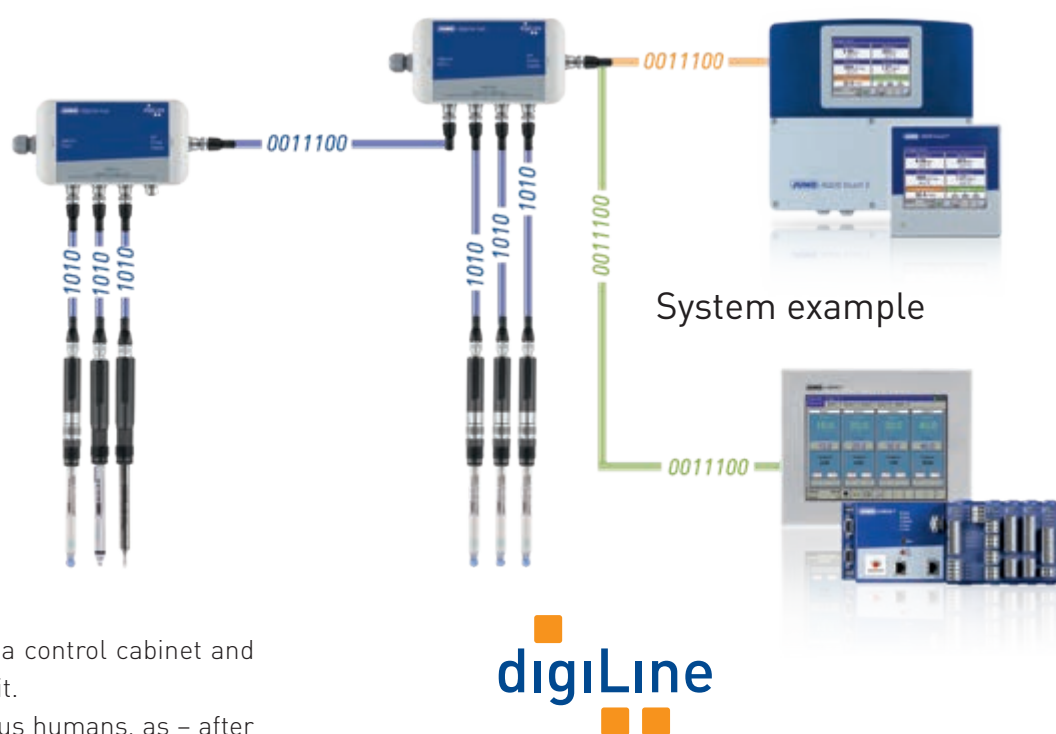
Whereas macroalgae can be seen with the naked eye, microalgae are tiny microscopic organisms. Weber GmbH from Aschaffenburg, Germany is currently constructing a microalgae production plant. The entire design and construction of the plant and the startup was carried out in collaboration with the JUMO Engineering team. All of the JUMO components are installed inside a control cabinet and delivered as ready-to-connect unit.

Algae are a pure blessing for us humans, as – after all – they produce up to 90 % of all the oxygen on earth. Their productivity rate is seven times that of corn, due to their sugar, starch, oil, and omega-3 fatty acids content. The organisms also bind carbon dioxide (CO₂), which they require to grow.

From tank to table and into the lab

Biomass is a very sought-after commodity within the cosmetics industry, in food production, for fish food, and in the pharmaceutical industry. In the USA, the biodiesel that can be extracted from algae is even being treated as the fuel of the future. The algae that grow in the bioreactors at Weber GmbH are used in cosmetic products. It is marine algae in particular that are used in cosmetics, whereas fresh water algae play a primary role in food. Marine algae are considerably better at storing active substances than land plants and are rich in minerals, vitamins, amino acids, micronutrients, and proteins. They are easily absorbed by the skin, have a revitalizing and remineralizing effect, and can also stimulate circulation and cell

Small wonders: food, fuel, medicine, and cosmetics.



regeneration. Algae proteins provide energy to the skin cells and protect them from drying out.

These algae are produced in photobioreactors. The growing algae use the CO₂ supplied to them and sunlight to photosynthesize. The subsystem of the bioreactor that was automated by the JUMO Engineering team consists of several tanks, which are arranged one after the other. In front of the first tank is a reservoir into which fresh water is supplied via a solenoid valve. The water is pumped out of this storage tank into the first tank via a further solenoid valve. Any overflow from the tanks is cascaded, so that the water flows from tank to tank.

At the end is a collecting tank with two level switches. This collection tank has a drain that leads to the pipe below, which is where the measurement technology for the pH value, conductivity, turbidity, oxygen, and temperature, as well as the circulation pump are located. This pipe is fed back to the first tank via a standpipe. The standpipe contains a second pH measuring point. All of the sensors are equipped with the JUMO digiLine interface and connected to JUMO mTRON T automation system.



Let's go to space!

There are even plans to send microalgae into space. The ESA (European Space Agency) is currently developing a bioreactor designed for space travel, which will be used to help convert CO₂ into oxygen and which is needed, for example, in missions to Mars.



defined. Examples include if the dosing pump malfunctions or if the limit values are exceeded. Via the JUMO PCC communication software, the registered data is downloaded directly from the multifunction panel and can be analyzed on a computer. The JUMO PCC runs on a company-internal PC or server and downloads the data from the multifunction panel in cycles that can be set.

With this combination it is very easy to implement smart sensor networks. The JUMO mTRON T system does not

just monitor all measured values, but also controls the filling of the system, the "harvest" of the microalgae, and the production operations. In the latter, the control of the pH value and the conductivity is managed by the automation system. The start and end of the harvest is regulated by the measured turbidity and oxygen values.

Complex control of measurement and control values.

Simple operation

To a large extent, the plant is operated centrally via the JUMO mTRON T multifunction panel with touchscreen. For this purpose, JUMO has created standard displays and individual process screens. Via the panel you can access a data registration function as well as an alarm and event list. For this purpose, various alarms have been

JUMO news

—> JUMO Engineering develops tailored applications for a wide range of industries.

—> Examples include the food industry, water and wastewater engineering, the pharmaceutical industry, the heating and air-conditioning industry, the chemistry industry, or renewable energy.

—> The services offered by the Engineering team range from running feasibility analyses and workshops through to drawing up specifications/specification sheets and even complete project management of tailored automation solutions.

**JUMO basic course**Pressure and level measurement technology –
basic course

September 19, 2019

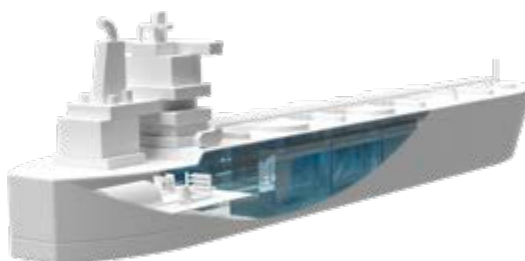
Seafaring, energy, process engineering

Wide range of application possibilities for
point and continuous level measurement



With the product series NESOS, it is the first time that JUMO has brought to market devices for point level measurement using floats and reed contacts, and for level measurement using floats and reed chains. In these devices, a float with an integrated magnet uses its magnetic field to switch one or more reed contacts with rising or falling levels. The tried-and-tested measurement method excels due to its robust technology, cost-effective installation, and mounting. It is also maintenance-free and has a very good price-performance ratio.

The application possibilities for the "new old technology" are diverse. In the shipbuilding industry, one use of these devices is for low-level alarms in plant cooling. In confined spaces, as is often the case on ships, side mounting of the switch by means of a chamber, which is connected to the tank via pipes, is possible. If the level sinks over time, a signal will sound after it reaches a critical point, which indicates that either the systems should be switched off or more liquid added.



Reliability for many industries

Another example can be found in energy technology. The tank level is monitored using a point level measurement via several contacts in a diesel generator. The float switch in the diesel tank can also be connected to an indicating device such as from the JUMO diraVIEW series.

A third example comes from process engineering. In injection molding, tempering equipment is used to heat tools. These devices contain float switches that monitor the point level of the water or oil. In this process, water is heated and creates water vapor. If, for example, the water level falls due to leakage, the float switch gives off a signal so that the tempering equipment activates and opens a valve for refilling the fluid.

**JUMO basic course**

Correct recording and calibration of the measurands temperature, pressure, and humidity

September 12, 2019

3 Misconceptions about calibration

Temperature probes are subject to a natural aging process. Only through regular calibration can the performance capability of the overall system be guaranteed. At the same time, calibration is the basic requirement for precise measurement results. Misunderstandings frequently occur here.



JUMO calibration expert

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Misconception 1: Anyone can and is allowed to calibrate

As soon as a company is certified according to the DIN ISO 9000 standard, traceability must be ensured for the quality-related test equipment. Due to the high demand for calibrated devices and the variety of devices to be calibrated, the industrial sector has set up and operates calibration laboratories accredited by Germany's National Accreditation Body (Die Deutsche Akkreditierungsstelle GmbH, DAkkS). These are the only laboratories that meet the demand for calibration that is based on national standards as demanded, for example, in ISO 9000. JUMO's DAkkS calibration laboratory has been performing calibrations for the measurand temperature since 1992. This is not only possible for in-house products, but for sensors from other manufacturers as well.

calibrations are also offered by JUMO for all temperature probes, regardless of the brand.

Misconception 3: One annual recalibration is sufficient

Even equipment such as thermometers and electronic temperature indicators are subject to an aging process. This way, maximum operating temperatures, temperature change loads, and also mechanical forces influence the operating life. To recognize these – in part very gradual – process changes in good time, it is strongly advised to carry out a routine comparison measurement between DAkkS-calibrated thermometers and the working standard used in your own production. Here, too, JUMO offers the corresponding products and services.

Misconception 2: Calibrations must always take place in the laboratory

The calibration of the temperature probe alone is not enough in many cases because other components are still involved in the temperature acquisition and the display that influence the measurement result. These components include connection cables for the temperature probe, the measuring point changeover switch, and evaluation electronics. An on-site calibration can evaluate all influential factors correctly and include them in the calibration result. JUMO also has the DAkkS accreditation for the on-site calibration of temperature probes at its disposal. These

Brief explanation:

TEMPERATURE CALIBRATION

As part of a DAkkS calibration, the thermometer is measured at different temperatures. Using the measurement data, characteristic parameters are calculated and a certificate is issued on the measurements that are carried out. Here it is important that the thermometer can be calibrated. This includes, in particular, testing the nominal value stability after annealing in the operating temperature range as well as testing the leakage resistance.



JUMO webinar

Using "structured text" in the ST editor

September 25, 2019 + September 26, 2019



JUMO device technology with PLC functionality

With the JUMO diraTRON compact controller and the digital JUMO diraVIEW indicator, JUMO is the first to offer compact devices with PLC functionality.

Programmable JUMO components come with a wide range of functionalities that are highly valued by users and that, by means of the configuration program settings, are very easy to use. The devices themselves, however, are not user programmable and limits exist for functionally demanding applications. The limit of what is possible is raised through proven math and logic functions. Depending on the device type, up to 16 user-definable formulas are used.

ST editor

The ST editor offers a range of functionalities that are typical of a PLC – such as the basic arithmetic options and numerical/logical functions. Various special functions make it possible to control display texts and modify the control parameters from the PLC. It is easy to use function blocks without a declaration. Through instructions (such as IF and CASE), sequence controls are also possible.

PLC functionality

Through a PLC functionality, JUMO automation components in applications with increased control requirements now offer a cost-effective solution. The PLC functionality is programmed in the ST editor. However, the compact devices are still put into operation with the configuration program and, for standard applications, the PLC does not appear.

Configuration program

The configuration program has inputs and outputs for the ST editor. All of the required variables in the ST editor are allocated to these input and outputs in the configuration program. The ST editor is started from the configuration program and the PLC source code is programmed in the "structured text".

Diagnostic options

The program is checked in the ST editor through a range of diagnostics options. When the editor is closed, the PLC program is transferred to the configuration file of the setup program. Saving the entire project is carried out by means of the setup file.

When it comes to programming, the JUMO Campus team supports customers through seminars and webinars. JUMO telephone support provides assistance with the project creation and, if required, the JUMO Engineering team can also take over the entire project. ■

Brief explanation: ST editor

Structured text (ST) is a programming language for programmable logic controllers (PLC).

JUMO customer survey 2018

To continuously improve its products and services, JUMO regularly carries out customer surveys.

Several hundred customers took part in the last survey in November 2018. The results are evidence of a high level of satisfaction and at the same time are an incentive to further improve this level of quality in all areas.

Positive feedback was received especially for seminars from JUMO Campus.

92% praise the friendliness of their contact person at JUMO.

93% of all those surveyed are very happy or happy with JUMO.

Expertise + consultation have received a particularly positive evaluation.

87% indicate that they receive prompt support when faced with problems.

88% agree with the statement that the quality of JUMO products is excellent.

Image + products and responsiveness to reported problems is rated above average.

89% would recommend JUMO without hesitation to a friend or to another company.

90% thought it particularly positive that they had the same contact persons for several years.

Over two thirds of all those surveyed gave such high ratings that they can be considered as fans or supporters. These are ratings that are far above the average for companies.



The JUMO Campus team



from left to right:

**Sabine Häcker, Manfred Schleicher, Carmen Zimmer,
Marcell Bräutigam, Selina Körber**

*"If you stop trying
to improve, one
day you will
stop being
good."*

(Philip Rosenthal)

True to this motto we wish to continue assisting you in keeping your technical knowledge up-to-date and to make the most of your JUMO product.

Seminars and webinars

JUMO has been providing seminars "by practitioners for practitioners" for over 20 years: all of our speakers are proven practitioners who have in-depth knowledge about their areas of specialization and our JUMO products. We have set ourselves the goal of providing training courses of the highest quality.

Furthermore, we offer free JUMO webinars which provide a first glimpse of a selected subject area in about 1 hour. Due to the very positive feedback we have received, we have once again expanded the range of courses for 2019. New dates for courses are also frequently published during the year. We'll be happy to keep you up to date – simply sign up for our newsletter:

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

topic that is especially tailored for you or that deals with a particular issue. Your advantage: no travel expenses are necessary, making this type of online training highly efficient and cost-effective. Almost all of these training courses are also available in English.

E-learning and technical literature

In addition, we offer a number of e-learning courses, webinar recordings, and technical literature that deal with the entire subject of measuring and control technology for you to study on your own.

Exclusive training courses and webinars

We would be happy to provide all our seminars as individual exclusive training courses at your company. We also offer exclusive webinars online. These generally last for 1 to 2 hours. They give you a compact overview of a

JUMO Campus portal

In our JUMO Campus portal you will find our complete range of training courses in a clearly laid out manner. Thanks to various filter and search functions you can easily find relevant training courses for your product or subject area.

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