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sensors + automation

The Customer Magazine from JUMO

JUMO

Sensors that have a say!

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IO-Link

JUMO

Sensors that have a say!

Temperature and pressure sensors with IO-Link – simple, direct, secure

- Optimization of the production process through communication down to the lowest field level
- Reduction of mounting and startup times
- Increase of plant efficiency due to maximum transparency
- Reduction of maintenance and service costs with simultaneous increase in plant availability

IO-Link connects!

Welcome to JUMO.

http://io-link.jumo-en.info

Dear Reader,

Successful communication always involves networks that function well. This is, of course, just as true for the private and commercial sectors, as it is for modern technology. This means, for example, that a television set can display pictures from a laptop or a digital camera, with everything being controlled by a smartphone, which also happens to be monitoring the heating system and your personal fitness regime at the same time.

Networking is also one of the main themes at "Industry 4.0". To achieve horizontal and vertical integration of all individual systems in a company, these systems must exchange information as quickly and simply as possible. There is a wealth of options to choose from. PROFIBUS, DeviceNet, HART®, or Modbus are just a few established examples from the fieldbus level.

For a long time, this has been more difficult at the sensor/actuator level. A variety of connection options, which also usually differed from continent to continent, impeded the development of measurement and control technology that could communicate universally. In this context, IO-Link is somewhat a light at the end of the tunnel, and is a step in the right direction to achieve a sustainable connector standard at the fieldbus level.

This is why we have made this extremely interesting technology the focus of the current edition of our customer magazine and are introducing the first IO-Link enabled sensors from JUMO at SPS IPC Drives in Nuremburg.

Alongside this central topic, you will, as always, find interesting application reports in this edition. Product presentations, news from the JUMO group, as well as important trade fair and upcoming seminar events are, of course, also included.

We hope you enjoy reading this issue.

Your Managing Partners,

Bernhard Juchheim *Michael Juchheim*

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JUMO GmbH & Co. KG
36035 Fulda, Germany
Phone +49 661 6003-0
Fax +49 661 6003-500
mail@jumo.net
www.jumo.net

Sensors that have a say!

IO-Link is on the move

"Life just keeps getting more complicated!" Surely anyone who has ever tried to set up a modern smartphone or to configure a Wi-Fi router will identify with this modern grievance. However, consumer electronics are nothing compared to the problems facing a manufacturer trying to develop products which can be used all around the globe in a simple and straightforward way. IO-Link has stepped into the world of sensors and actuators to make daily life a little easier for developers and users. JUMO is also counting on the future-oriented communication concept.

PNP, NPN, PP, or IO-Link?

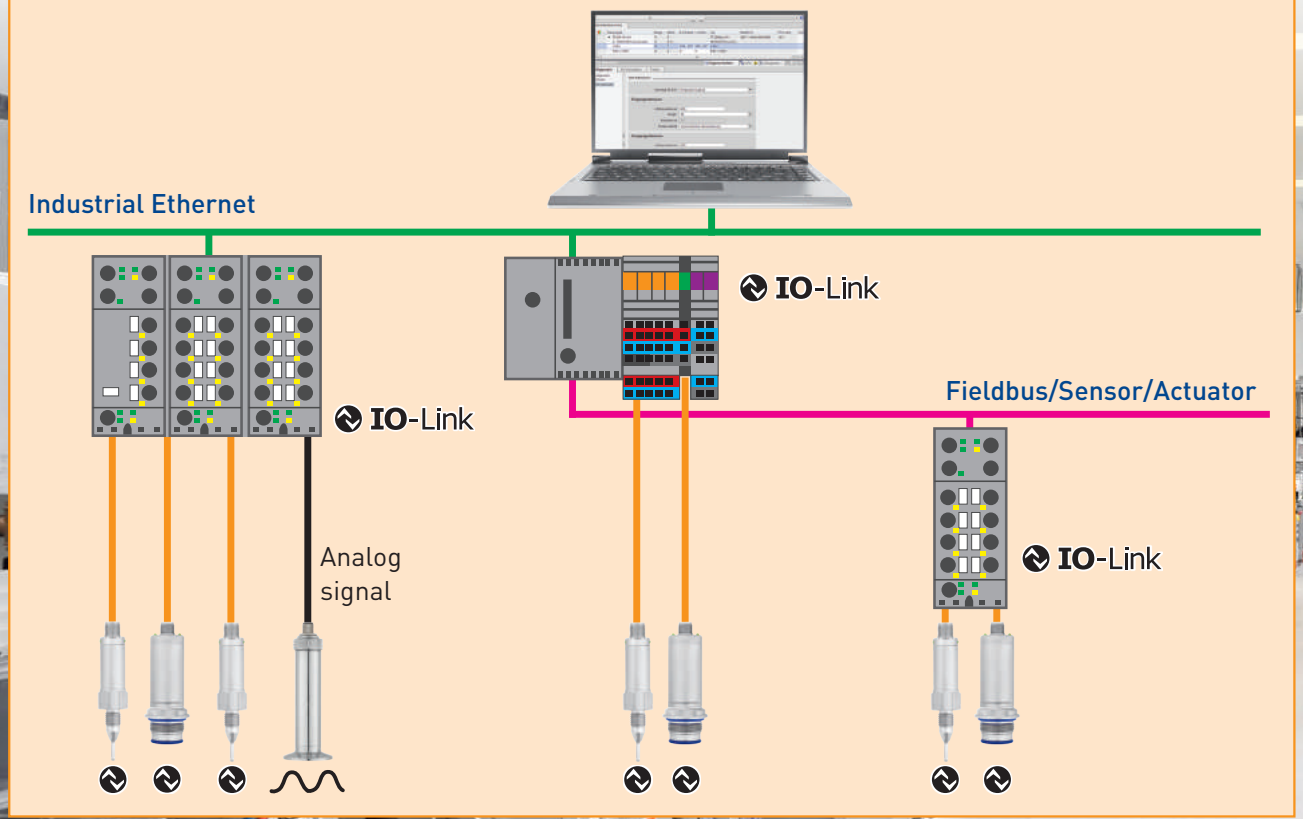
There really is no lack of digital output variants for different countries when it comes to sensors and actuators. While the PNP standard is preferred in Europe, the NPN variant is more widespread in the North American and Asian markets. Other markets, meanwhile, want the PP output. For developers and producers, this variety usually means high production costs to enable them to satisfy all preferences. This issue is also evident at the fieldbus level, with systems such as DeviceNet, PROFIBUS DP, PROFINET, or Modbus. IO-Link has established itself as a communication system for connecting intelligent sensors and actuators to an automation system under the motto "Universal – Smart – Easy". To clear up a common misunderstanding, IO-Link is a serial, bidirectional point-to-point connection for signal transmission and energy supply within any number of networks. It is therefore not a new fieldbus system.

The goal is to be able to integrate digital sensors into networks regardless of their make. This is all organized by what is referred to as the IO-Link community, which companies can join. Currently there are around 120 members, with approximately 3.5 million IO-Link nodes installed worldwide. The annual growth rates are impressive.

Standardized communication

But how does it all work? An IO-Link system consists of an IO-Link master and one or more IO-Link devices (sensors or

Plant architecture with IO-Link (example)



actuators). The IO-Link master provides the interface for higher-level control and controls communication with the connected IO-Link devices.

An IO-Link master can have 4, 8, or 16 IO-Link ports, but only one IO-Link device can be connected to each port. The connection is made using a simple three-lead connection with an M12 plug connection. Three pins are used to enable the IO-Link communication and to supply the devices with a 24 V and maximum 200 mA power supply.

Each IO-Link device contains identification data, parameter data, as well as process and diagnostic data. This means that parameters can be modified during ongoing operation by such means as a PLC. A non-proprietary software tool is required to load the IODD (IO Device Description). The IODD contains information on identification, device parameters, process and diagnostic data, communication properties, and a product image.

JUMO is on board!

Industry 4.0 component

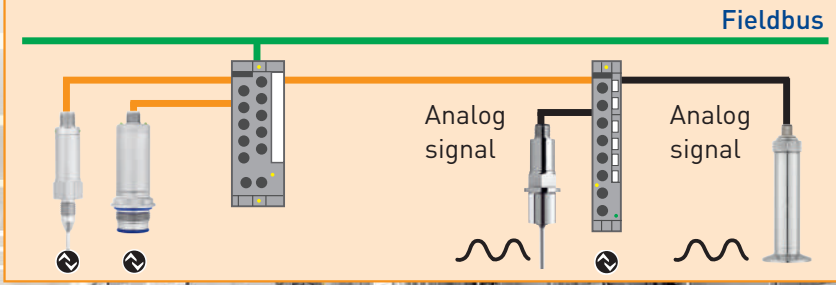
Users particularly appreciate IO-Link due to its simple installation and parameterization as well as its independence from the fieldbus. The result is that the need for wiring is significantly decreased and that each sensor always has its own "ID card" due to consistent parameter data retention. This greatly reduces the amount of work involved in any troubleshooting required. This makes IO-Link the optimum solution for many companies to connect products to a wide range of systems and controls. IO-Link is a future-proof system as well. The vertical integration from the sensor level to the management level is particularly indispensable for Industry 4.0.

IO-Link offers the option of exchanging cyclical as well as anticyclical data with superordinate levels. For example, parameter data can be downloaded to a sensor or, alternatively, diagnostic data can be extracted. As IO-Link is integrated in all significant automation systems, a connection to the ERP level is already possible today. This makes IO-Link the only technology available for the intelligent linking of sensors and actuators, which is urgently required for a digital plant. IO-Link bridges the last gap from the input/output module to the sensor or actuator.

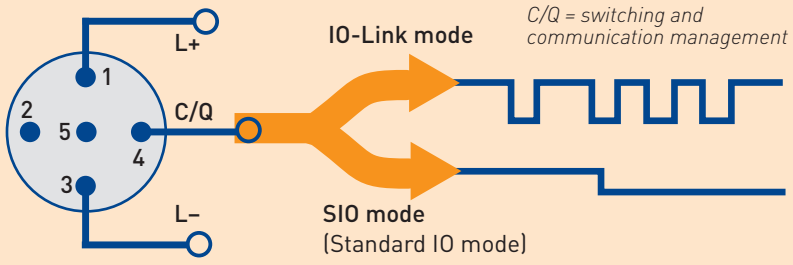
Prepared for the future!

Further information
+49 661 6003-326
rainer.staaf@jumo.net

IO-Link point-to-point connection



Terminal assignment IO-Link device



"As a manufacturer of innovative measurement and control technology, JUMO sees itself as a door opener for Industry 4.0. This is why the company has joined the IO-Link community and is now introducing the first IO-Link sensors for pressure and temperature."

Rainer Staaf
Product Manager

Perfectly connected!

JUMO introduces its first products with IO-Link

The first JUMO products with an IO interface are now coming to market with the JUMO dTRANS p35 pressure sensor and the JUMO dTRANS T1000 temperature sensor. Both sensors have a wide spectrum of applications, ranging from tool machines to the food industry.

IO-Link is a pioneering communication system for connecting intelligent sensors and actuators to automation systems. This standardization covers the electrical connection data and a digital communication protocol which is used by the sensors and actuators to exchange data with an automation system.

An IO-Link system consists of an IO-Link master and one or more IO-Link devices (sensors or actuators). The IO-Link master provides the interface for higher-level control and controls communication with the connected IO-Link devices. The system offers clear benefits: a three-wire connection with an M12 plug connection enables simple integration into established fieldbus systems and, therefore, communication to the lowest field level. Sensors can be replaced much more easily and machines as well as plants can be started up more quickly. The cabling work is also significantly reduced.

For the first time, JUMO is introducing two new products with IO-Link for pressure and temperature measurement. The JUMO dTRANS p35 pressure sensor covers a measuring range from –1 to +600 bar. Its accuracy at an ambient temperature of +20 °C is 0.5 % of the measuring span and its long-term stability is less than 0.2 %.

The JUMO dTRANS T1000 temperature sensor works with a tried-and-tested Pt1000 element sensor from JUMO. The measuring range is between –50 and +260 °C.

Both sensors have different switching functions such as switching point, adjustable hysteresis, switching delay, or window function.

Numerous process connections can be supplied for the new IO-Link products. The PEKA process connection adapter system from JUMO enables the pressure sensor to also be used in the pharmaceutical industry and in food industry applications such as drink bottling plants.

Further information
+49 661 6003-326
rainer.staaf@jumo.net

JUMO dTRANS T1000
Temperature sensor
Type 902915

JUMO dTRANS p35
Pressure sensor
Type 402058

JUMO tecLine Cl2
Sensor for free chlorine
Type 202630

JUMO LOGOSCREEN 600
Paperless recorder with touchscreen
Type 706520

Contact dial thermometer
With microswitch
Type 608530

JUMO digiLine sensor network continues to grow

By introducing digiLine, JUMO presents an innovative, bus-compatible connection system for digital sensors in liquid analysis with integrated sensor management. The system allows for operation of up to six digital sensors on the JUMO AQUIS touch S (P) transmitter or up to 62 on the JUMO mTRON T measurement, control, and automation system. This makes it possible to have individual measuring points and to develop sensor networks. Only a single digital signal line runs to one of the evaluation units or controller. This enables faster and more efficient cabling of plants in which several parameters need to be measured simultaneously at various locations.

JUMO is now also offering digital sensor variants, which can be connected to a digiLine network, for the most important parameters of water disinfection such as free chlorine, total chlorine, ozone, hydrogen peroxide, and peracetic acid. Typical areas of application include the monitoring of swimming pool, drinking, service, process, and cooling water. Thanks to the DSM (digital sensor management) software which is part of the system, the required parameterization of the sensors and documentation of the measuring point can be easily carried out in the lab.

Further information
+49 661 6003-493
reinhard.manns@jumo.net

JUMO LOGOSCREEN 600 Now with certified data security

JUMO LOGOSCREEN 600 combines JUMO's long-standing paperless recorder experience with a new control and visualization concept. The new "Manipulation detection with digital certificate" option (extra code 887) provides the device with a TÜV approved function to ensure data security. A digital device certificate provides proof that the recording data has not been manipulated in the device, during transfer, or during the evaluation. This provides the user with secure validation during critical audits that no manipulation of the recorded process data occurred.

Thanks to the equally new extra code 888 "FDA 21 CFR Part 11 with digital certificate", the paperless recorder also satisfies all FDA requirements for paperless digital process data recording in the pharmaceutical and food industries. The PC security manager software allows for administration of up to 50 users per device. An electronic signature can be assigned to a batch report, a time range, or for logging off. Issuing authenticated commentaries on the device highlights the flexibility offered when recording processes requiring verification. The use of a digital certificate ensures secure manipulation detection in this case as well.

Further information
+49 661 6003-498
manfred.walter@jumo.net

JUMO dicoTEMP 800 High-quality contact dial thermometer

Contact dial thermometers with microswitches from the 608530 series are new in the JUMO product range. The devices have a temperature controller with an actual value display and are characterized by a particularly small mounting depth, a high-quality stainless steel design, and a display range of -50 to +500 °C. Contact dial thermometers with microswitches are devices for temperature measurement, control, and monitoring that can be used universally. The temperature-dependent volume change in a measuring system filled with liquid or the temperature-dependent pressure change in a measuring system filled with gas is converted to a rotational movement of the actual value indicator by a bourdon tube without requiring transmission gearing. The microswitch is actuated by the rotational movement of the indicator shaft via a tap system. The new contact dial thermometers with microswitches are RoHS-compliant and cadmium-free.

Further information
+49 661 6003-326
rainer.staaf@jumo.net

Plastic in perfect shape

Temperature and pressure measurement in injection molding

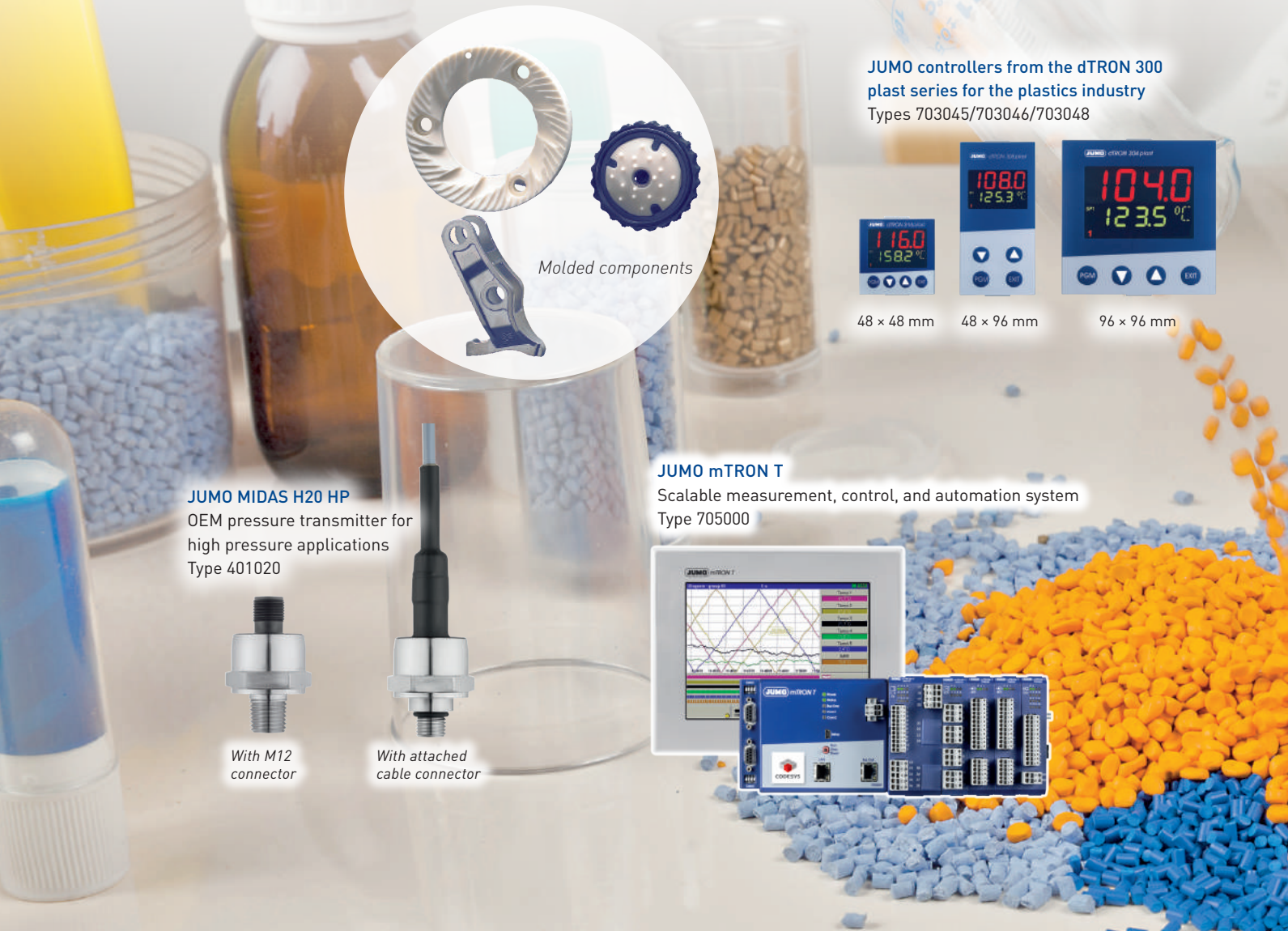
Temperature and pressure are the most important measurands in the plastic and packaging industry. They have an effect on the utilized materials, are decisive for product quality, and must therefore be operated and controlled with precision.

One of the most common processing methods for plastic is injection molding. The benefit of this process is the relatively low cost. Normally, the majority of the investment goes towards the tool molds, although these can then be used to produce several million parts. Furthermore, almost no limit exists to the shape or surface structure of the parts produced in an injection molding process.

Accurate temperature measurement throughout the entire processing chain plays a decisive role in the manufacturing of technical and highly-technical plastic parts. Thermal process stability is not only extremely important for an injection molding machine or an extruder, but continues to be so for the hot runner, the tools, and the mold inserts.

Pressure control is one of the technical prerequisites for a safe process sequence such as in injection mold machines. On the other hand, the correct pressure in extruders ensures correct shaping and compliance with the visual product details. This means that this measurand has a direct influence on the quality of the manufactured products and must therefore be monitored continuously.

During the injection molding procedure, the temperature is measured in the screw, while the melt pressure is also measured in the tool itself. In addition, the hydraulic oil pressure is measured in the clamping unit. When it comes to achieving reliable temperature measurements, devices such as JUMO temperature probes that were especially developed for use in the plastics industry can be used.



A thermally insulated ceramic probe tip allows for exceptionally precise temperature measurements between 0 and 400 °C. The JUMO 4 ADM-35 is perfectly suited to measure pressure inside the injection unit. This pressure transmitter is particularly robust and can emit either an analog 4 to 20 mA standard signal or a digital CANopen signal. This allows the sensors to be directly connected to conventional standard or fieldbus signals for control systems and indicating devices. Developed especially for this type of application, a brand new JUMO pressure transmitter can be installed in an injection molding machine's clamping unit. The JUMO MIDAS H20 HP is available in protection types up to IP69K (steam jet proof) and stands out due to its high resistance to vibrations and impacts combined with an insulation voltage of AC 500 V. The device is available in variable measuring ranges from 100 to 1000 bar relative pressure and medium temperatures from –40 to +125 °C. The compact and robust design (starting at 35 mm in length) of the JUMO MIDAS H20 HP allows great flexibility in application. The tried-and-tested thin film sensor guarantees outstanding long-term stability and high accuracy even when temperature conditions fluctuate. Welded sensor technology and high bursting strength make the pressure transmitter impervious to pressure peaks. These two features successfully prevent the discharge of oil or other measured media during application. The new pressure transmitter is also well-suited for applications where pressure levels can change quickly.

This advantage should not be underestimated, particularly in injection molding machines where the pressure signal can change within a matter of milliseconds. The analog signaling path from the JUMO MIDAS H20 HP guarantees a consistently high signal quality and reliably protects against quantization errors.

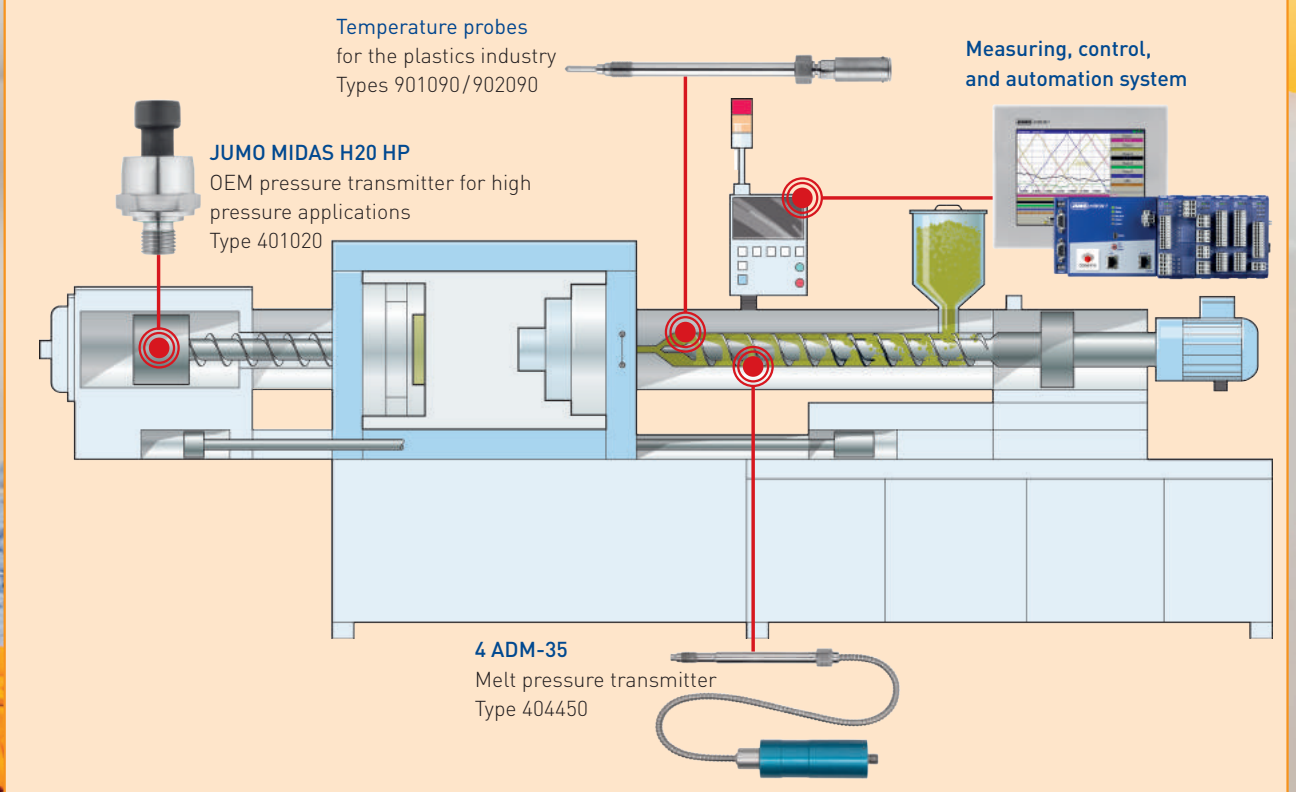
According to requirements, the signal can be limited per default to achieve disruption-free operation for the whole system. This is useful in cleaning processes where the entire system is required to run outside of normal operating conditions for a short time.

Thanks to the new JUMO MIDAS H20 HP, JUMO can now provide complete sensor technology for temperature and pressure measurement in injection molding systems. When combining it with tried-and-tested JUMO controllers such as the JUMO dTRON 300 plast series or the JUMO mTRON T automation system the user receives a universal package of components perfectly tuned to one another for this demanding application.

Further information

+49 661 6003-9144
rene.krug@jumo.net

Diagram of an injection molding machine equipped with JUMO technology



Flexible electrical heating solutions for potentially explosive areas

Now also possible with SIL 3

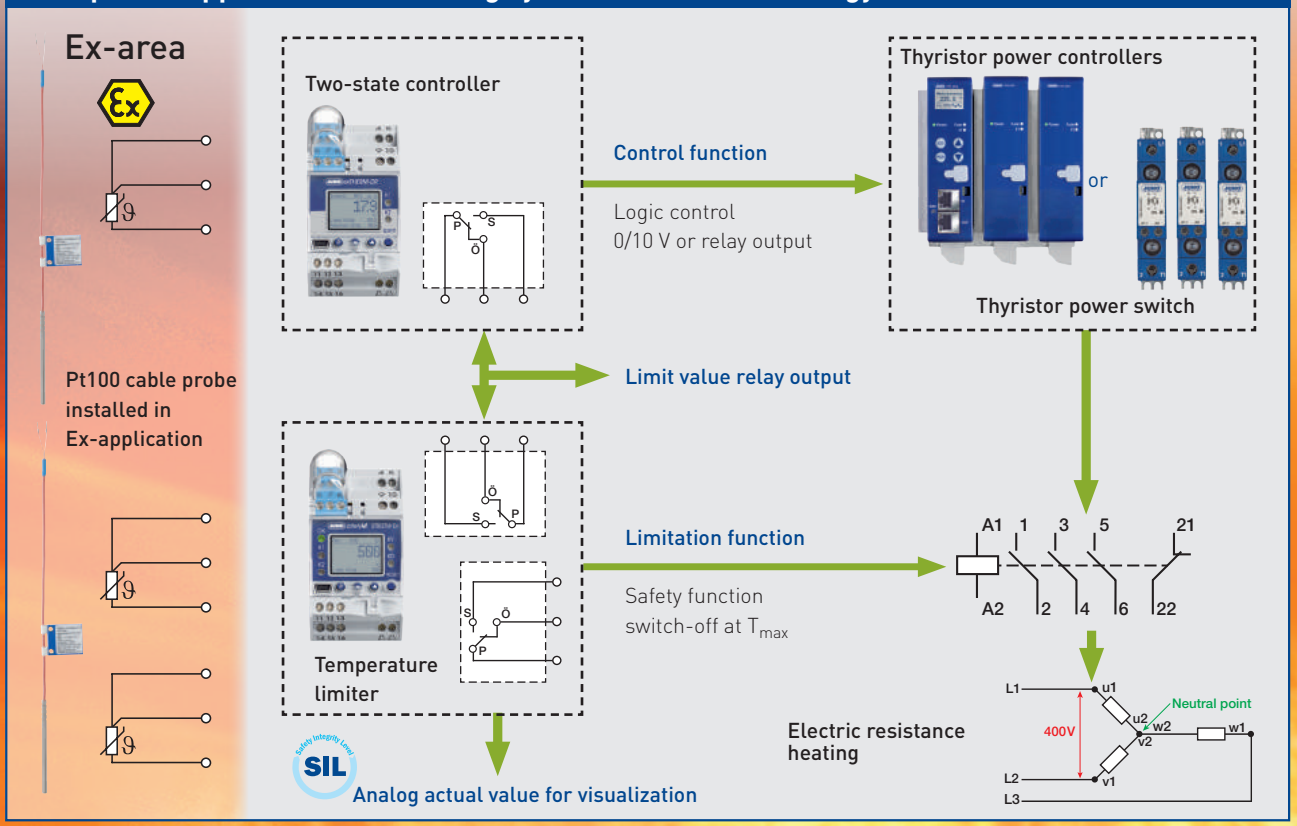
These days, auxiliary heating is needed to maintain or increase temperatures, particularly in chemical processes or process engineering, to optimize the increasingly complex processes that are used in modern industrial facilities. Flexible electrical heaters are not restricted here to individual industries or special applications. Instead, they can be universally applied.

Through the basic physical property of resistance heating, it is possible to use electrical heaters in precisely the places where they are needed and also only when auxiliary heating is necessary. Even existing plants or process sequences can be easily retrofitted with an electrical heater using little technical effort. The Winkler company, based in Heidelberg, Germany has been designing and building flexible electrical heaters for 40 years. In addition to many standard solutions, Winkler has created special, customer-specific heating solutions, especially when it comes to explosion-proof heater systems.

This product range, which is primarily influenced by directives, regulations, and standards, has grown tremendously in recent years. In this case the products have a system certification. With this certification, the operator is no longer required to perform additional acceptance of the delivered heaters for a potentially explosive plant, as the manufacturer (Winkler) has already certified the device in advance. Informative documentation is also part of the scope of delivery.

As part of a compliance evaluation process according to the directive 2014/34/EU and an ignition hazard assessment, the installed explosion-relevant components have also been subjected to a special selection process. That is why Winkler has always installed

Examples of applications for heating systems in SIL 3 technology



EC-type certified Pt100 RTD temperature probes from JUMO in its flexible explosive-proof heaters. The Pt100 RTD temperature probes are an important safety component in the heaters, since the installed resistance heating conductor would exceed the maximum admissible temperature without appropriate controllers and limiters. Exceeding the maximum temperature would not only damage the heater itself, but would also become a hazardous source of ignition. Here, a temperature limit must work independently of the temperature control to switch the heating system off permanently before the maximum admissible surface temperature (on the heater conductor) is exceeded.

The system cannot be switched back on until the system operator is certain of the reason why the safety equipment was activated and is sure that the corresponding maximum temperature of the Ex-area is no longer exceeded. The temperature sensor must be positioned at the hottest point in the process. This hot spot could, for example, be on a heating hose between the heating conductor and the object to be heated, which is the base hose (see application example). This way, not only operating temperatures of the process can be controlled, but also ignition sources that come about in the heater due to uncontrolled excess temperatures can be avoided.

In addition to proper installation and correct positioning of the RTD temperature probes in the flexible heater, corresponding process stability is also decisive here. This process stability depends primarily on the utilized evaluation unit.

The JUMO safetyM STB/STW safety temperature limiter/monitor is particularly well-suited for this task. It enables a compact single-channel safety control with selectable redundant input signals for standard signals and temperature sensors. This solution is especially ideal for smaller functional applications such as special machines and individual applications with a low density and number of signals. The JUMO safetyM STB/STW Ex is also ATEX-approved.

In addition to low investment costs, the advantages here include low parameterizing effort for each application. Three different analog and binary functional outputs are available. In connection with special JUMO temperature probes, which are also available in ATEX variants, the whole SIL safety chain has already been evaluated and corresponding certificates up to SIL 3 can be issued by JUMO.

Further information

+49 661 6003-2583
matthias.garbsch@jumo.net

Example of the sensor position in an analyzer line/heating tube

ATEX/IECEx RTD temperature probe
With connecting cable according to DIN EN 60751
Type 902821

1. Ex "i" – screw-in RTD temperature probe
2. Ex "i" – push-in RTD temperature probe
3. Ex "i" – mineral-insulated RTD temperature probe

JUMO safetyM STB/STW Ex
Safety temperature limiter/monitor acc. to DIN EN 14597 and SIL 2/3, PLd/e
Type 701155

Applications for winkler.eu

JUMO exTHERM-DR
Two-state controller with Ex (ia) input according to ATEX
Type 701055

JUMO TYA 203
Three-phase thyristor power controller
Type 709063

Pure fun in the water

Smart sensors in swimming pool technology

Whether in a swimming pool, spa center, or medicinal spa – people of all ages love to swim and bathe. Germany alone has around 6,700 public indoor and outdoor pools. To make sure visitors can enjoy the water at its purest, pool operators require an extensive range of measurement and control technology.

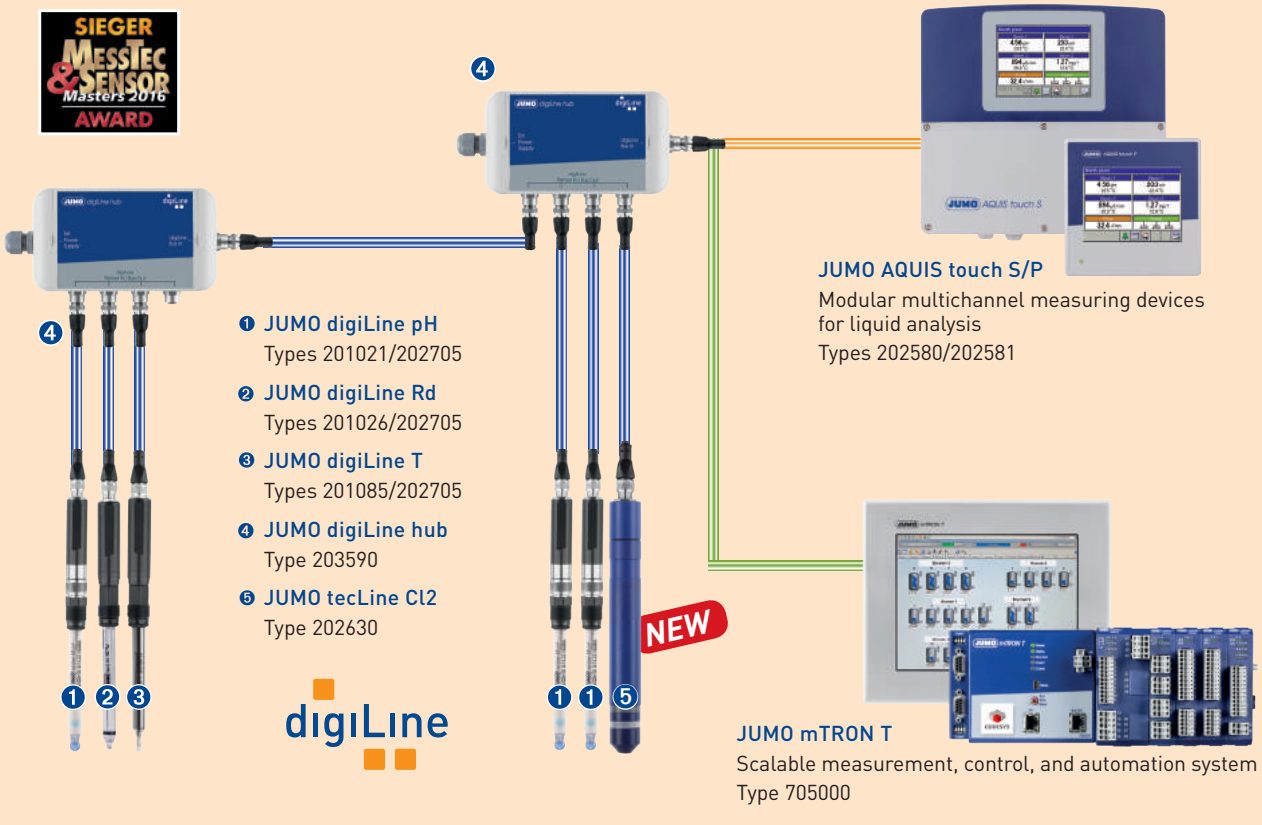
Chlorine content, turbidity, temperature, flow, or filling level have to be examined carefully at every stage of the pool water treatment process – starting with flocculation and filtration through to disinfection and pH regulation. This can quickly amount to an overwhelming number of sensors, particularly when you have to look after more than one pool.

In the past, this always involved a great deal of work when it came to laying the cables and commissioning the system. A special coaxial cable with a particular type of insulation has to connect every single sensor to a transmitter, which tends to be digital these days. In general, this is used as a display and control device for chemical dosages or to convert the sensor signal (mV) into an industrial standard signal (e.g. 0(4) to 20 mA).

This is then sent to further devices such as recorders or control consoles/PLCs. Transmitters are used for a number of reasons, including to conduct regular, mandatory calibrations at the measuring location.

On the road to Industry 4.0, these classic forms of liquid measurement also have to be put under the microscope. The digitalization and parameter storage of a sensor in a transmitter that is located a few meters away can still be optimized. Moving part of the digitalization electronics closer to the sensor enables easier connection to the data network and the sensor/actuator. Instead of digitizing the sensor signals in a measuring or control device, the major trend in recent years has been to bring these as close as possible to the analog sensor element. This enables any signal

JUMO digiLine system (application example)



❶ JUMO digiLine pH
Types 201021/202705

❷ JUMO digiLine Rd
Types 201026/202705

❸ JUMO digiLine T
Types 201085/202705

❹ JUMO digiLine hub
Type 203590

❺ JUMO tecLine Cl2
Type 202630

JUMO AQUIS touch S/P
Modular multichannel measuring devices for liquid analysis
Types 202580/202581

JUMO mTRON T
Scalable measurement, control, and automation system
Type 705000

changes or malfunctions on the path from the sensor to the downstream measuring device to be further minimized or prevented altogether.

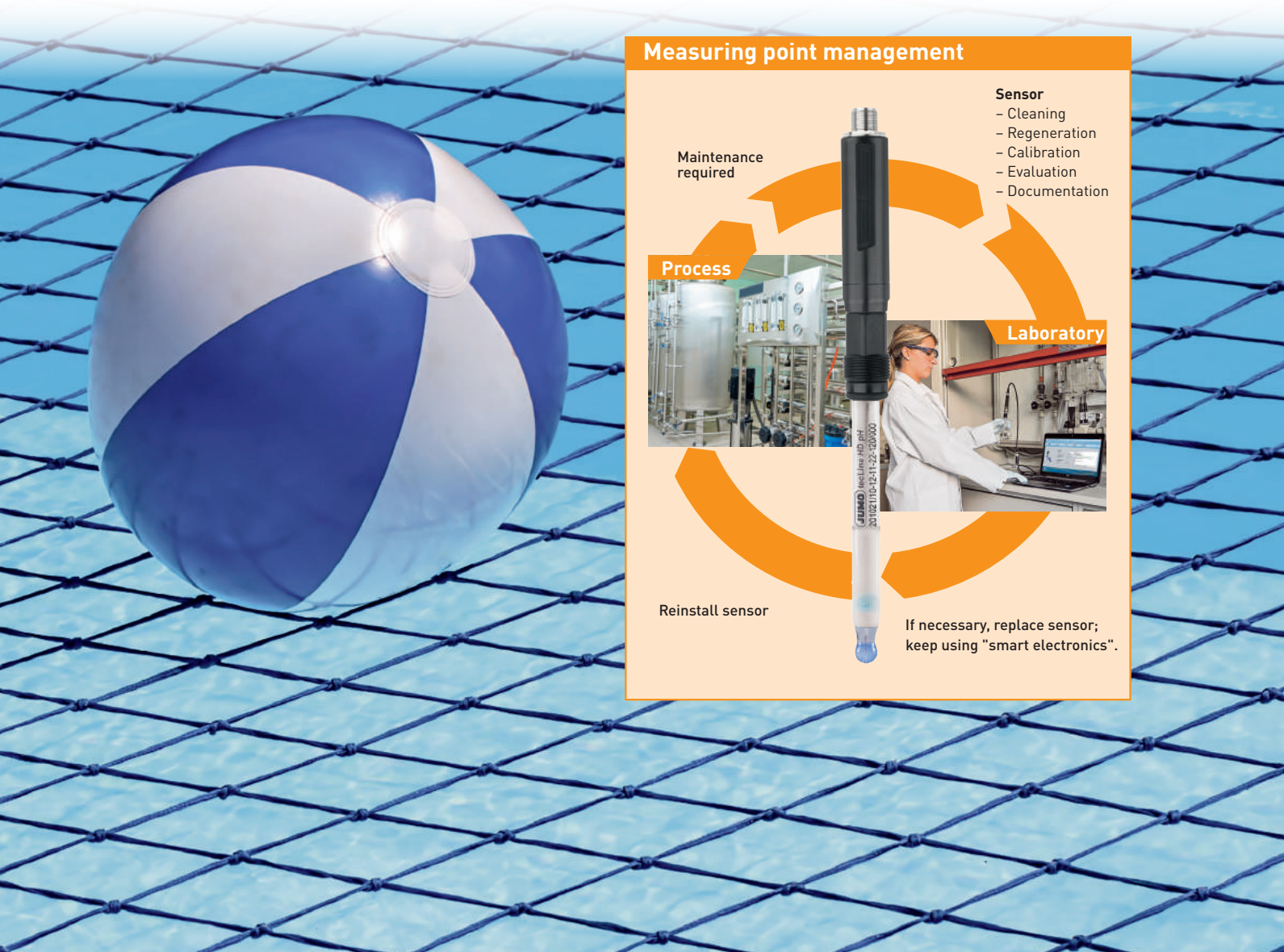
A poor solution would be to "cram" the wearing part (i.e. the pH electrode or redox electrode) full of electronics. In principle, this should not present any problems nowadays. These types of solutions are offered by several manufacturers. If a sensor's performance fails over a period of weeks or months or the sensor breaks before any of these times then the valuable transmitter electronics also have to be disposed. This is unacceptable from an economical and environmental perspective.

JUMO has therefore developed the JUMO digiLine. It is a conventional electrode with a small, removable, and reusable electronics attachment. But the system can do even more than that. It also allows users to create intelligent sensor networks. The central evaluation unit or controller then receives just one single digital signal line. This enables more efficient and faster cabling of plants in which several parameters need to be measured simultaneously at various locations. As a result, the system ideal for use in swimming pools. Thanks to the system's intelligence, the sensors are detected and log on to downstream electronics almost automatically. The system's DSM software (Digital Sensor Management) is also brand new. The necessary parameterization and calibration of the pH or redox probe can be carried out conveniently in the laboratory using a PC or laptop, a USB interface converter, and the JUMO digiLine software. Calibration data and the evaluation of the sensor status are stored directly in the sensor and enable seamless documentation over the entire lifecycle. Precalibrated sensors can be installed quickly thanks to the Plug and Play design. If one sensor in the system bus fails the others continue to work. Greater plant availability is therefore guaranteed. JUMO digiLine sensors can also be supplied with a 4 to 20 mA output signal for integration into existing installations.

Furthermore, JUMO digiLine sensors can be integrated directly into the JUMO mTRON T automation system. The number of sensors which in theory can be connected then increases to up to 62 (31 per interface). JUMO mTRON T also includes a soft PLC with which even relatively complex plants and procedures for water, process water, and wastewater technology can be achieved.

Further information

+49 661 6003-402
matthias.kremer@jumo.net



Documented temperature monitoring in refrigerating rooms

Requirements for storing food

Particularly stringent hygiene requirements, which have been regulated in different country-specific guidelines, apply to storing food in refrigerating rooms. These guidelines assist refrigerating room operators primarily in their consideration of the general hygiene requirements as well as when developing a self-monitoring concept according to the principles of HACCP (Hazard Analysis Critical Control Point).

The temperature must be monitored and recorded regularly. If the actual value is exceeded, measures must be taken and also recorded. The goal is to maintain a cooling chain which is free of gaps because an increase in temperature decreases the value of the products and the best-before date can no longer be maintained. The point where the goods are transferred in and out of storage is a high area of risk for compliance with these standards. Changes in temperature can be caused by regularly opening and closing doors in particular. JUMO technology for temperature control is used in ten refrigerating rooms for a large manufacturer of pet food. This is based on room temperature sensors which are fitted in the refrigerating rooms. These are each connected with one JUMO DICON touch two channel process and program controller which monitors and records the room temperature. If a predefined limit value is exceeded or is not reached, there is a notification by email with an alarm message to a selected group of people. Consistent documentation is possible as the recording data is saved to a server via Ethernet using the evaluation software PCC. The recording view enables the employee to check the status of the refrigerating room immediately on site.

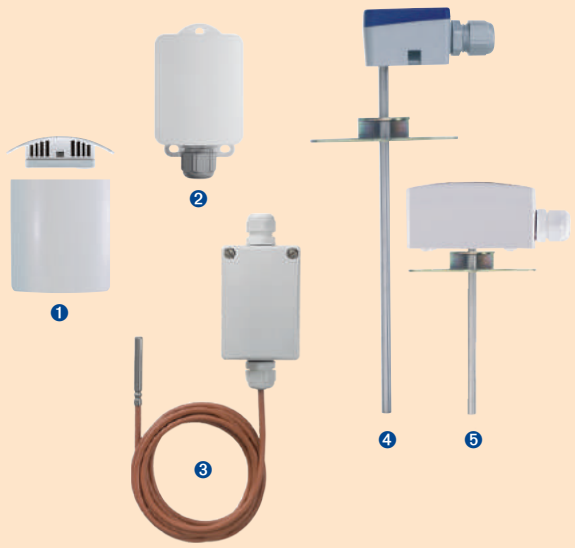
Moreover, a binary input and a door contact switch can be used to affect an alarm delay. A pre-alarm and a visual signal inform the employee that they need to close the door. The advantage of this solution for the user is considerably less cabling when connected to a superordinated PLC. In addition, the independent system can be put into operation quickly and without problems.

JUMO DICON touch
Two-channel process and program controller with paperless recorder and touchscreen
Type 703571

Further information

+49 661 6003-562
klaus.otto@jumo.net

Indoor, outdoor, and channel RTD temperature probes



1. Indoor RTD temperature probe Type 902520/10
2. Wall RTD temperature probe Type 902520/21
3. Wall RTD temperature probe Type 902520/24
4. Channel RTD temperature probe Type 902524/25
5. Channel-RTD temperature probe Types 902524/31

JUMO corporate news

And action – five years of JUMO on YouTube

The experts agree – the future of communication is in moving pictures. YouTube was founded only 11 years ago and is now the second largest Internet search engine after Google. With a market share of 52 %, YouTube is the largest video platform in Germany as well.

Above all, YouTube has considerable influence on the younger generation. Two thirds of 10 to 19-year olds use the video platform daily while television, newspapers, and books losing more and more ground. It is not viewed purely for entertainment purposes. YouTube is increasingly being used to present technology, share information, and give tips. For example, operating instructions or connection tips for a number of products can now be found in video format.

JUMO has been on YouTube since 2011. Originally we started by publishing training videos, which we presented on our own channel **www.youtube.com/user/JUMO1948.** Our range has since expanded considerably, especially in the last few months. The 73 videos currently available include films about JUMO apprenticeships, subsidiary companies, or product presentations.

For the Hannover Messe (Hanover Fair) in 2016, we produced our first professional trade fair video. This way, JUMO customers and interested parties who were unable to attend the trade fair were provided with an overview of the most important new developments. The "JUMO reporter" presents the various products in an entertaining and informative way while always having a twinkle in his eye. The video has since had more than 10,000 views on YouTube and JUMO's Facebook page. It's definitely worth checking out. **The link:** **https://www.youtube.com/watch?v=KLU0ItXEn9s**

German Water Partnership – JUMO is a member

The water and wastewater industry is increasingly important for JUMO. Innovative products and solutions ensure clean drinking water and purified wastewater around the globe. To further strengthen international cooperation and to intensify contact with science and research, JUMO has become a member of the "German Water Partnership".

Member of
German Water Partnership

350 private and public companies from the water sector as well as trade associations and institutions from business, science, and research have joined together in this association. This initiative, founded in 2008, is supported by the five German federal ministries for environment, research, development, the economy, and the German Federal Foreign Office.

The "German Water Partnership" unites the activities, information, and innovations of the German water sector to strengthen the competitive position of the economy and research in international markets. The network drives innovations and contributes towards solving water-related problems throughout the world using adapted, integrated, and sustainable approaches.

This means, for example, that association members are supported in their efforts to establish communication as well as business links abroad. At the same time, the expertise and unique selling points of the German water industry and research are presented at international symposia and conferences.

Setting the right track

Proven JUMO technology for the railway industry

Sensors and transmitters for railed vehicles must be robust and reliable. JUMO meets these stringent requirements with its array of different products. For example, JUMO thermostats are certified according to DIN EN 50155, DIN EN 50121, and DIN EN 45545. In addition, they are exceptionally durable.

The **panel-mounted thermostats** from the JUMO EM-series have passed a test in which they completed 5.3 million switching processes without a single fault. This corresponds to an operating life of approximately ten years for standard operation. Among other things, these panel-mounted thermostats are used within the railway industry for tasks such as monitoring and controlling air curtain systems. They are also used inside doors or for climate monitoring.

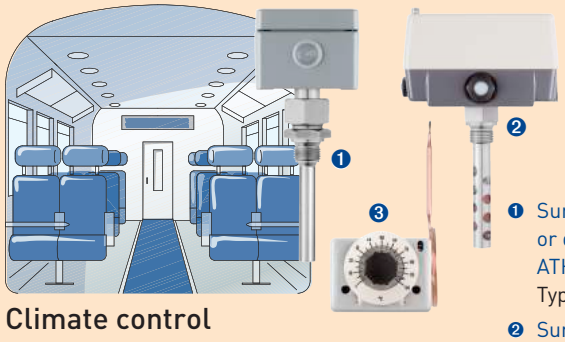
JUMO surface-mounted **thermostats** from the type series AMTHF can be used not only for air conditioning, but also to regulate and monitor the temperature in oil transformers. ATH-SW series surface-mounted thermostats are particularly well-suited for anti-freeze monitoring in service water, wastewater, and quench water tanks. They qualify for the protection type IP65 thanks to the painted die-cast case.

All JUMO **RTD temperature probes** are also certified according to the latest level of standardization. For example, the screw-in RTD temperature probe with bayonet fastener, model 902815, can be used within a temperature range from –50 to +150 °C, with an extension tube up to +260 °C, for monitoring the temperature in compressed air or in air conditioning systems. Depending on the version, the screw-in RTD temperature probes with a connecting cable can be supplied for temperature ranges from –50 to +400 °C and can, for example, reliably measure the medium temperature in cooling circuits such as transformers.

Wheelset drives and wheel bearings are subject to particularly demanding environmental conditions. The temperature of bearings can be measured using the JUMO wheelset RTD temperature probe with protection type IP68, which was developed especially for this measuring task.

JUMO has the optimum solution for railed vehicles in terms of **pressure and level measurement**. The certified JUMO MIDAS DP10 differential pressure transmitter is used to acquire the differential pressure in liquid and gaseous media as well as slightly aggressive media. The measurement range covers 0 to 40 mbar and 0 to 16 bar differential pressure. Areas of application include pressure monitoring in brake circuits or level measurement in service water, wastewater, and quench water tanks.

Selecting JUMO products for railway technology



Climate control

Wheelset transmission

❶ Surface-mounted single or double thermostat ATH-SW series
Type 603035

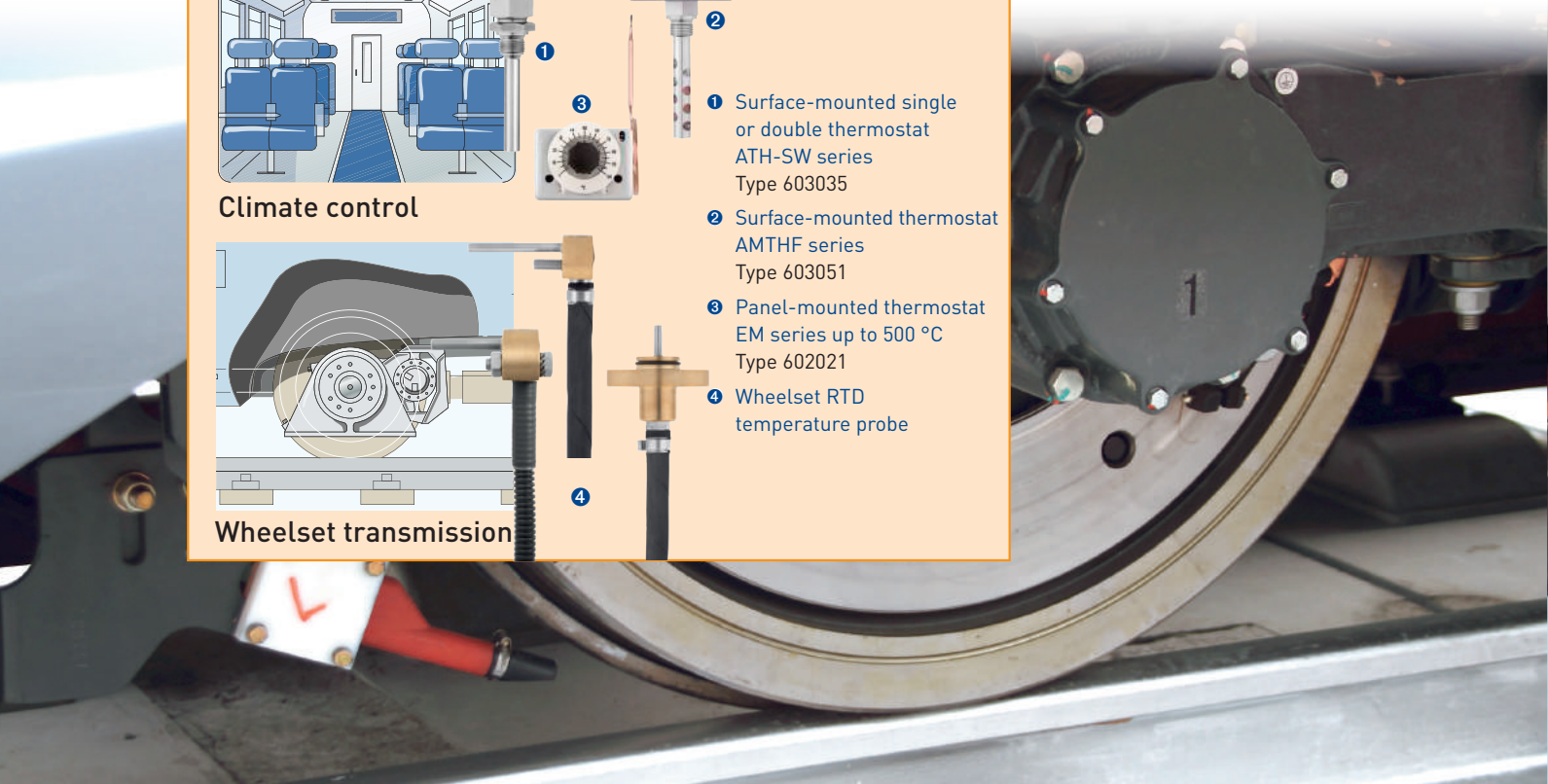
❷ Surface-mounted thermostat AMTHF series
Type 603051

❸ Panel-mounted thermostat EM series up to 500 °C
Type 602021

❹ Wheelset RTD temperature probe

Further information

+49 661 6003-2722
walter.wueest@jumo.net



Calibration of temperature display devices

Accreditation enhancement for DAkkS laboratory

The regular calibration of temperature sensors and display devices is an indispensable requirement for end product quality. After an accreditation enhancement, temperature display devices can be calibrated without temperature sensors in JUMO's DAkkS calibration laboratory and supplied with a calibration certificate. Thanks to this new service, JUMO also meets the stringent requirements of the automotive or aviation industry as an external calibration service provider.

The accredited temperature range for calibration of temperature display devices is between -270 and +2500 °C. The smallest measurement uncertainty which can be indicated is between 0.03 and 0.60 K, depending on the simulated sensor type.

The temperature display devices are calibrated either in the in-house accredited calibration laboratory **or on-site with the customer.** This means machine and plant downtimes can be minimized while saving time and costs. Ideally, the temperature display device is calibrated together with the temperature sensor as a complete unit. If this is not possible, the individual components can also be calibrated isolated from each other by tracing them back to the national standards. This "isolated" calibration is often required during thermal treatment processes (see CQI-9 or AMS 2750E).

The calibration principle

A temperature display device (for example a control, display or recording tool) transforms the electric signal from the temperature sensor into an equivalent temperature value. During calibration, the temperature sensor is replaced by a voltage or resistance sensor. Using standardized basic value tables, the electric output variable of the sensor is determined for the target calibration point and set at the measuring probe. This simulated input temperature is compared with the display value, the deviation is determined and documented in an internationally recognized DAkkS calibration certificate.

Further information

http://calibration.jumo.info
+49 661 6003-9785
stefan.krummeck@jumo.net

Requirements according to CQI-9 (example)

Schematic representation of SAT (System Accuracy Test)

SAT

Quarterly inspection of the complete measuring chain consisting of:
- Controller
- Compensation element
- Control thermocouple

Exchange standard type:
- annually (>760 °C) or every two years (<760 °C)

Exchange/recalibration
Stainless steel type:
- Every two years

Mineral-insulated thermocouple
Type 901210

JUMO IMAGO 500
Multichannel process and program controller
Type 703590

JUMO LOGOSCREEN nt
Paperless recorder
Type 706581

Quarterly recalibration of:
- Control devices
- Indicating devices
- Recording devices

Using a process calibrator

New: JUMO webinars

Experience technology online

To help you keep your professional knowledge and skills base fresh, and to make the most of your JUMO product, we have extended our range of training options to include webinars.

What are webinars?

Essentially, a webinar is an online seminar. All participants and lecturers enter a virtual seminar room. The lecturer splits his/her screen to enable all participants to see his/her presentation (for example PowerPoint). At the same time, all participants are connected using the integrated audio conference, enabling them to listen to what the lecturer is saying. In addition, the lecturer can turn on his/her webcam to enable all participants to see him/her.
The participants can also ask questions throughout by using the chat function and the lecturer can even conduct surveys.

All webinars are recorded so that they are available for interested parties to view after the initial session.

Advantages for our customers

- All JUMO webinars are free
- You can participate comfortably from your work station without traveling at all
- All that you need is a computer with Internet access and a telephone or headset for the computer

Application areas

Webinars should not be considered a replacement for local training courses on-site – they do, however, provide an important supplement to our seminars. They offer customers a first glimpse into a selected topic over the course of about an hour.
To provide more in-depth knowledge of the subjects, we continue to offer a wide range of seminars in Fulda or exclusive training courses at your company.

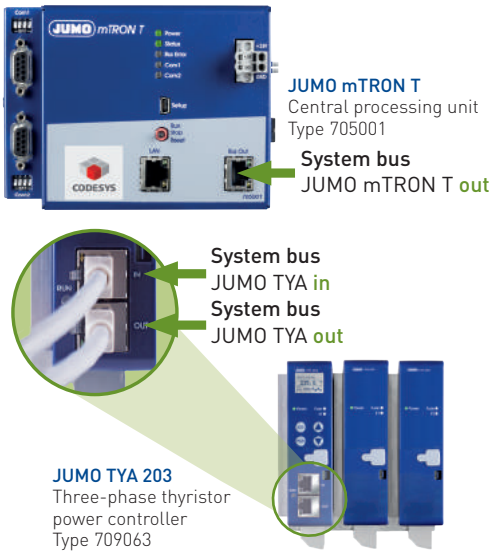
Our webinars
http://seminars.jumo-en.info

Top tip of the month

Perfect partners: JUMO thyristor power controllers and JUMO mTRON T automation system

JUMO provides with mTRON T a system for controlling, recording, and automation.

In addition to a central processing unit and a multifunction panel, the JUMO mTRON T consists of up to 30 E/A modules for recording measured values in addition to controlling and outputting analog and digital variables. Actuators are, as a rule, activated using analog signals and any required feedback from the actuator is also sent using analog values.
Effective immediately, the thyristor power controllers in the JUMO TYA 200 series can be connected using the JUMO mTRON T system bus. This technical option is very interesting for applications in which the electrical parameters of the thyristor power controller need to be further technically controlled. Examples include the calculation and recording of the electrical work in kilowatt hours for each treatment step or the further processing of the information using control technology through a defective heating element in the JUMO mTRON T. All electrical parameters (output at the load, load voltage, load current, etc.) and diagnostics information of the actuator are available with this option in JUMO mTRON T without the need for additional cabling.



Trade fair dates 2017

We look forward to your visit!

Visit us at numerous trade fairs and keep in touch with our latest product developments and innovations.

AUSTRIA

SMART Automation Austria
Trade fair for industrial automation
May 16-18 *Linz*

AZERBAIJAN

Caspian Oil & Gas
Trade fair for oil and gas production
June 06-09 *Baku*

BELARUS

Automation.Electronics
International fair for automation
February 07-10 *Minsk*

BELGIUM

INDUMATION
Trade fair for industrial automation technologies and solutions
February 08-10 *Kortrijk*

M+R Antwerp
Trade fair for industrial automation
March 29-30 *Antwerp*

CHINA

China Refrigeration
International exhibition for refrigeration, air-conditioning, heating and ventilation, frozen food processing, packaging, and storage
April 12-14 *Shanghai*

IE Expo
Leading trade fair for environmental technology solutions, water, wastewater, air, and soil
May 04-06 *Shanghai*

P-MEC
Trade fair for pharmaceutical technology
June 20-22 *Shanghai*

CZECH REPUBLIC

AMPER
International trade fair of electrotechnics, electronics, automation and communication technology
March 21-24 *Brno*

GERMANY

ISH
World's leading trade fair for the combined topic of water and energy
March 14-18 *Frankfurt am Main*

HANNOVER MESSE
World's premiere industrial technology showcase
April 24-28 *Hanover*

SENSOR + TEST
The measurement fair
May 30 - June 01 *Nuremberg*

KAZAKHSTAN

KIOGE
International oil & gas exhibition and conference
October 04-06 *Almaty*

NETHERLANDS

AQUANED
Exhibition for water treatment and water management
March 21-23 *Gorinchem*

NORWAY

NOR-SHIPPING
Exhibition for ship technology
May 30 - June 02 *Oslo*

RUSSIA

NEFTEGAZ
Oil & gas exhibition
April 17-20 *Moscow*

SPAIN

Expoquimia
International chemistry exhibition
October 02-06 *Barcelona*

TURKEY

IFAT
Trade fair for environmental, water, and wastewater technology
February 16-18 *Istanbul*

WIN World of Industry - WIN Eurasia
Leading trade fair for automation, electrotech, hydraulic and pneumatic systems, and materials handling
March 16-19 *Istanbul*

UNITED KINGDOM

Thermal Engineering Show
Show about thermal interface materials, refractory engineering, cooling and heating technologies, and thermal analysis
April 27 *Roundhouse, Derby*

UNITED STATES

AHR Expo
International exhibition for air conditioning, ventilation, heating, and refrigeration
January 30 - February 01 *Las Vegas, NV*

Sensors Expo and Conference
Leading industry event exclusively focused on sensors and sensor-integrated systems
June 28-29 *San Jose, CA*

UZBEKISTAN

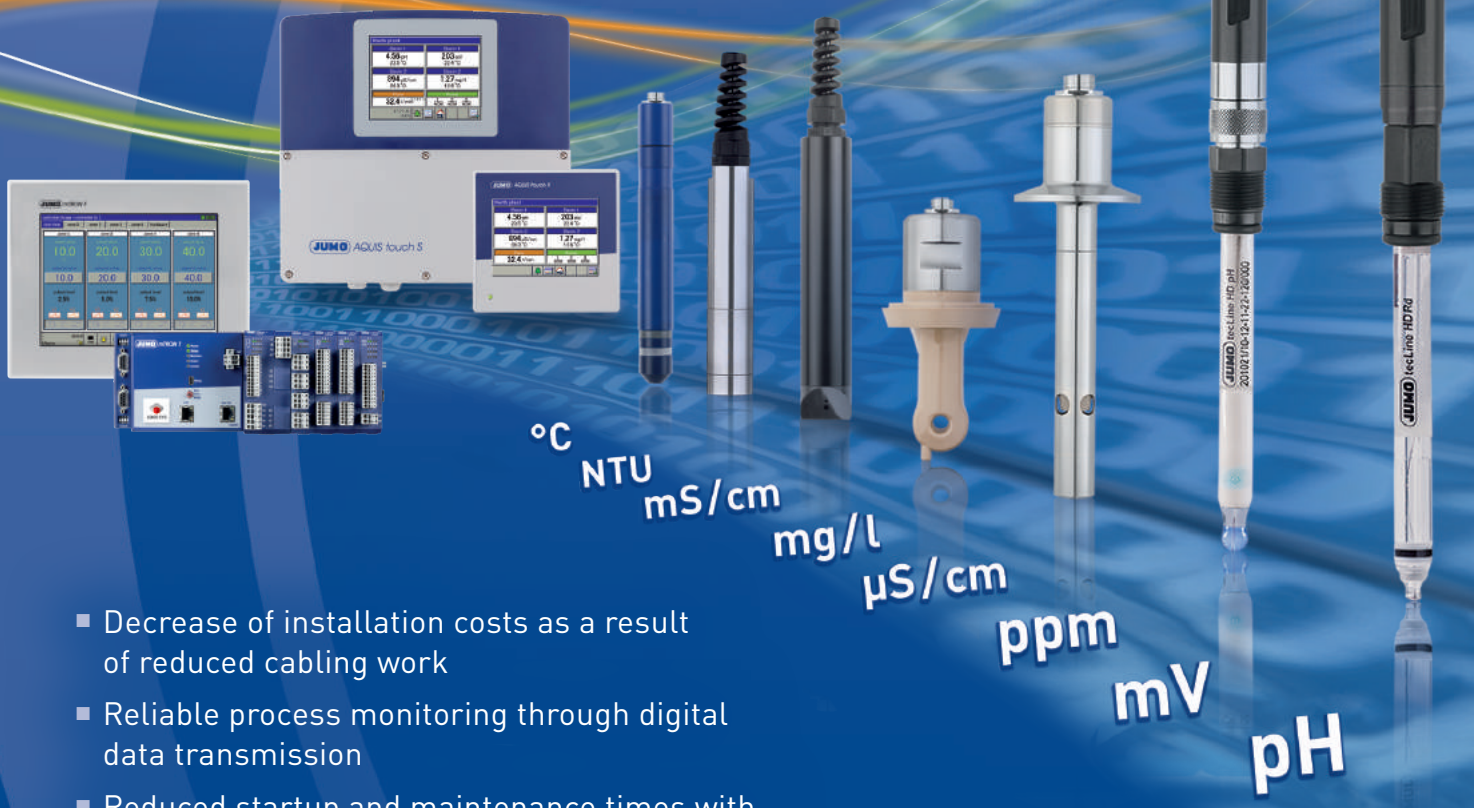
OGU – Oil and Gas Uzbekistan
Trade fair for oil and gas
May 17-19 *Tashkent*

Find out more trade fair dates
http://fairs-international.jumo.info

www.jumo.net

Intelligent, bus-compatible connection system for digital sensors used in liquid analysis.

JUMO digiLine



- Decrease of installation costs as a result of reduced cabling work
- Reliable process monitoring through digital data transmission
- Reduced startup and maintenance times with the automatic recognition of the connected sensors (Plug and Play)
- Easy management of the sensor data through JUMO DSM (Digital Sensor Management)

http://digiline-en.jumo.info