JUMO

More than sensors + automation

Industrial Furnace Construction

Innovative solutions for your success

Dear Reader,

Glass, ceramic, clay, and steel are the materials we encounter every day. However, only manufacturers are aware of the requirements the furnaces have to meet and the kinds of extreme process conditions they have to withstand during manufacturing and processing.

JUMO is at your side as a reliable partner to help when you have questions and to provide you with quick solutions on such matters. This is so regardless of whether the temperature in the furnaces you manufacture has to be controlled, adjusted, monitored, recorded, or visualized.

So how do we do it? By applying years of experience and professional expertise. JUMO has been a leading manufacturer of measurement and control technology for more than 60 years. This has helped us to become an expert partner for industrial furnace construction.

We place special importance on making regular new developments, on constantly improving existing products, and on continually making production methods more economical. This is the only way that we can achieve the highest level of innovation.

For industrial furnace construction JUMO offers you a range of innovative solutions for different applications.
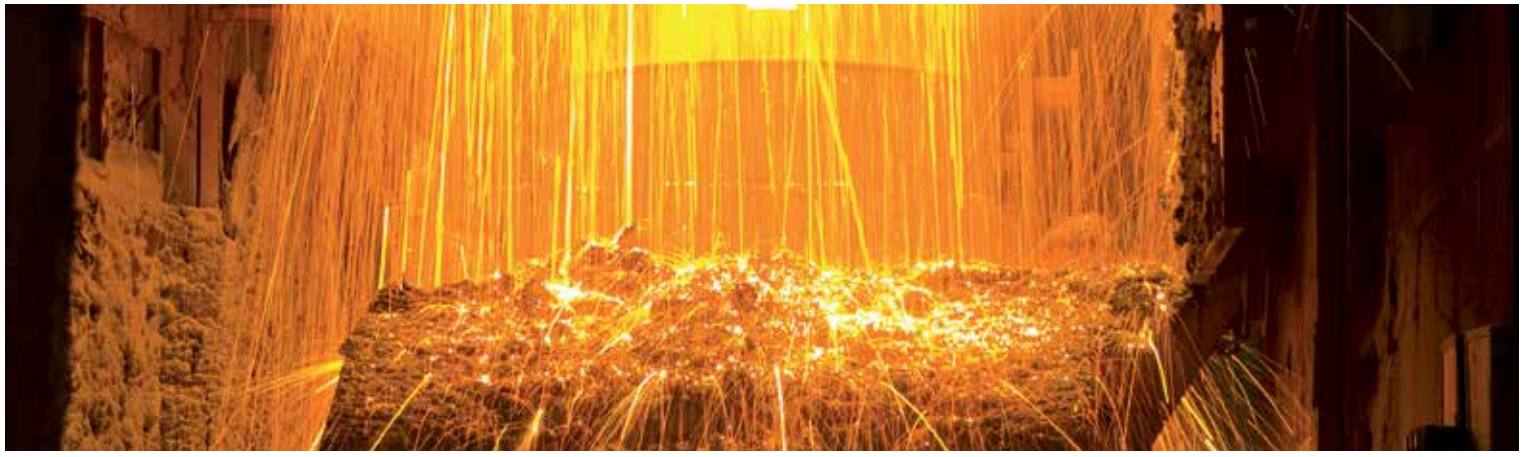
This brochure provides you with an overview of JUMO products and systems for industrial furnace construction. Of course, we would also be happy to develop individual solutions that are completely customized to your requirements.

For detailed information about our products arranged by type and product group number please visit www.industry.jumo.info.

Contents

Temperature

Temperature is the most important measurand for industrial furnaces since it affects the materials being manufactured and must be regulated and monitored precisely to avoid quality variations in the end product. Products from JUMO support you in this task.

Temperature sensors for industrial furnaces

The high temperatures in industrial furnaces make it necessary to use thermocouples with the following combinations: "type L" and "type J" Fe-CuNi, "type K" NiCr-Ni, "type S" Pt10Rh-Pt, "type B" Pt30Rh-Pt6Rh, and "type" N NiCrSi-NiSi. Depending on the operating location – batch/continuous/test furnaces or smelters – different materials are used for the protection tube. Metal protection tubes are made of steels, some of which have a high percentage of nickel and chromium for reducing or oxidizing atmospheres. Some of the protection tube materials used here include: steel X18 CrNi 28, material-no. 1.4749 and steel X15 CrNiSi2520, material-no. 1.4841. These materials are suitable for use at temperatures of up to +1150 °C. In addition, various coatings and materials, such as HASTELLOY®, Kanthal®, Alloy 20, Inconel 600, and zirconium oxide, are used. Temperature sensors with ceramic protective tubes measure the temperature of gaseous mediums up to +1600 °C.

The tubes are made of gas-proof ceramics out of C610, which contains a high percentage of aluminium oxide (for temperatures of up to +1300 °C) and C799, a highly fireproof material (for temperatures of up to +1600 °C). Even temperatures of up to +1800 °C are possible.

The different thermocouples meet the AMS2750E and CQI-9 requirements which thereby increases the process reliability of the plant.

Generally, temperature sensors can be supplied with plant or DAkkS certification (German national accreditation body). Our certified laboratory guarantees impartial measured values and a consistently high level of quality.

To ensure the highest safety levels in industrial furnaces, JUMO calculates the entire SIL safety chain for temperature sensors used in connection with JUMO safetyM devices and is able to provide the relevant certification with up to SIL 3/PL e approval.

JUMO mineral-insulated thermocouples
According to DIN 43710 and DIN EN 60584
Type 901250

JUMO mineral-insulated thermocouples
With standard tab connector according to DIN 43710 and DIN EN 60584
Type 901240

JUMO thermocouples
For DIN EN 14597 tested devices and plants
Type 901006

JUMO push-in thermocouples
with form A terminal head
Type 901110

JUMO push-in thermocouples
With form B terminal head
Type 901120

Controlling

High quality solutions for industrial furnaces can only be guaranteed when,
apart from sensor technology, the controlling of the measurands is also correct.
JUMO systems are perfect for this task.

Controlling – precise and efficient

Precise temperature curves are absolutely crucial during what are often highly complex processes when firing, annealing, or tempering various different materials.

The use of JUMO PID control algorithms has proven to be highly successful in industrial furnaces, regardless of whether they are used in continuously running or batch furnaces. The type of heating used (oil, gas, or electricity) is not an important factor. Schedule programs make it possible to accurately depict the firing curves or process screen.

Connections can be established with the JUMO SVS3000 visualization software via fieldbus interfaces, allowing the measurement data to be recorded and analyzed for each batch.

Devices such as JUMO mTRON T or JUMO LOGOSCREEN nt/fd are supplied with an integrated batch function and batch reporting.

JUMO process controllers ensure that the most diverse of processes are controlled in an energy-efficient manner. Particularly manufacturers that produce plants for the aerospace and automobile industry can find devices according to AMS2750E or CQI-9 at JUMO. Devices can be supplied with certification according to the above-mentioned directives upon request.

JUMO IMAGO 500

Multichannel process and program controller
Type 703590

JUMO dTRON 304/308/316

Compact controller with
program function
Types 703041/42/43/44

JUMO DICON touch

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

JUMO mTRON T – Central processing unit

Measuring, control, and automation system with controller module and input/output modules
Type 705000

**JUMO mTRON T –
Multifunction panel 840**

Measuring, control, and automation system
Type 705060

Recording

Are you familiar with JUMO's solutions for secure data recording? With the devices in the JUMO LOGOSCREEN family of paperless recorders and the JUMO mTRON T measured value recording system you are ideally equipped to collect, archive, and evaluate measured values subject to verification in an easy, tamper-proof way.

Recording, archiving, and evaluating

Using the devices in the JUMO LOGOSCREEN family of paperless recorders and JUMO mTRON T, process data is collected quickly as well as smoothly and then archived in a tamper-proof manner. Data can be evaluated directly on the device itself or on a computer by using JUMO PCA3000 evaluation software.

JUMO paperless recorders come in different power ratings. They start from simple 3/6 channel devices with the JUMO LOGOSCREEN 500 cf type designation, followed by the 18-channel variant, JUMO LOGOSCREEN nt/fd, and the series is currently rounded off with the 54-channel JUMO mTRON T. All recorders provide the following options:

online visualization of process data, various limit value monitoring methods, a remote alarm in case of a malfunction, and the simultaneous recording of batch processes.

JUMO paperless recorders offer the highest levels of security in measured data recording, data archiving, and data evaluation. This level of security enables you to optimize process parameters and still guarantee the same level of product quality.

Moreover, JUMO mTRON T and JUMO LOGOSCREEN nt/fd systems meet the measurement technology requirements stated in AMS2750E and CQI-9.

JUMO LOGOSCREEN 500 cf

Entry-level paperless recorder with CompactFlash® card as storage medium and lifecycle data management
Type 706510

JUMO LOGOSCREEN nt/fd

Paperless recorder with TFT display, CompactFlash® card, and USB interfaces
Types 706581, 706585
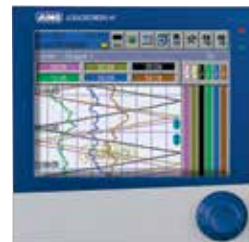
JUMO mTRON T – Central processing unit

Measuring, control, and automation system with controller module and input/output modules
Type 705000

JUMO mTRON T – Multifunction panel 840

Measuring, control, and automation system
Type 705060

Monitoring

Ensuring the safety of people, the machine, and the product plays a key role in furnace construction. The manufacturing process inside the furnace is also influenced considerably by the temperature. JUMO offers a range of products which monitor the furnace temperature using state-of-the-art technology.

Plant monitoring with the JUMO safetyM series

Using compact and configurable temperature limiters/ monitors or safety temperature limiters/monitors you can – early and safely – detect and avert dangers that could cause injury to people, be harmful to the environment, or destroy production plants and products.

The devices are primarily built to monitor thermotechnical processes accurately and switch the systems to an operational safe status in the event of malfunctions. Here, the basis is DIN EN 14597.

To ensure that our devices meet safety requirements all over the world, we have created our safety temperature limiters/monitors to comply with DIN EN 61508 (SIL) and DIN EN ISO 13849-1 (Performance Level).

The JUMO safetyM series offers you clear benefits:

The alarm relay switches the furnace into safe operating mode in the event of a malfunction. The limiting function allows the furnace to be enabled once more for operation when an internal or external unlocking button is actuated.

In addition, furnace process values can be transmitted to a recorder, controller, or superior control system via the analog output.

JUMO safetyM STB/STW

Safety temperature limiter, safety temperature monitor according to DIN EN 14597
Type 701150

JUMO safetyM TB/TW

Temperature limiter, temperature monitor according to DIN EN 14597 as a DIN rail device
Type 701160

JUMO safetyM TB/TW

Temperature limiter, temperature monitor according to DIN EN 14597 as a built-in device
Type 701170

JUMO safetyM STB/STW Ex

Safety temperature limiter, safety temperature monitor according to DIN EN 14597
Type 701155

JUMO exTHERM-AT

Explosion-proof surface-mounted thermostat
for zones 1, 2, 21, and 22
Type 605055

Automation and Visualization

Smooth processes require reliable systems, including their actuators. Given the various types of furnaces and thermal methods available, it is important for you that energy can be supplied reliably and safely so that power also reaches the place where you need it.

Keeping an eye on all of the key data is also essential to ensure that different components interact as smoothly as possible with each other. This is where high-performance plant visualization software from JUMO comes into play.

Power under control with the JUMO SCR power switch and controller

The maximum temperature that can be reached when heating electrically powered industrial furnaces – such as furnaces for case hardening, electric arc furnaces, or even smelting furnaces – depends on the kinds of heat sources used.

JUMO offers you SCR power switches and controllers suitable for resistive and resistive-inductive loads.

As a result, you can actuate heating elements using a cold resistance/hot resistance ratio of 1:16 and also actuate the various different infrared emitters that are, for example, used in drying processes.

Plant visualization software JUMO SVS3000

The plant visualization software SVS3000 with batch-related data reporting and evaluation enables efficient operation, visualization, and documentation. Preprogrammed graphic elements are stored in a library so that JUMO devices can be connected. This significantly reduces software project planning time. Per plant batch reporting, an alarm and event list, recipes, group and flow charts, eight week timetables, and 16 trend pictures are available. You can also export your reporting data to another program such as Excel® using an export function.

JUMO TYA-201/TYA-202
SCR power controller
Types 709061, 709062

JUMO TYA-432
SCR power switch
Type 709010

JUMO TYA-432
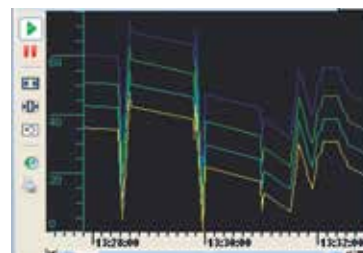SCR power switch
Type 709020

JUMO SVS3000
Plant visualization software with batch-related data reporting and evaluation in the network
Type 700755
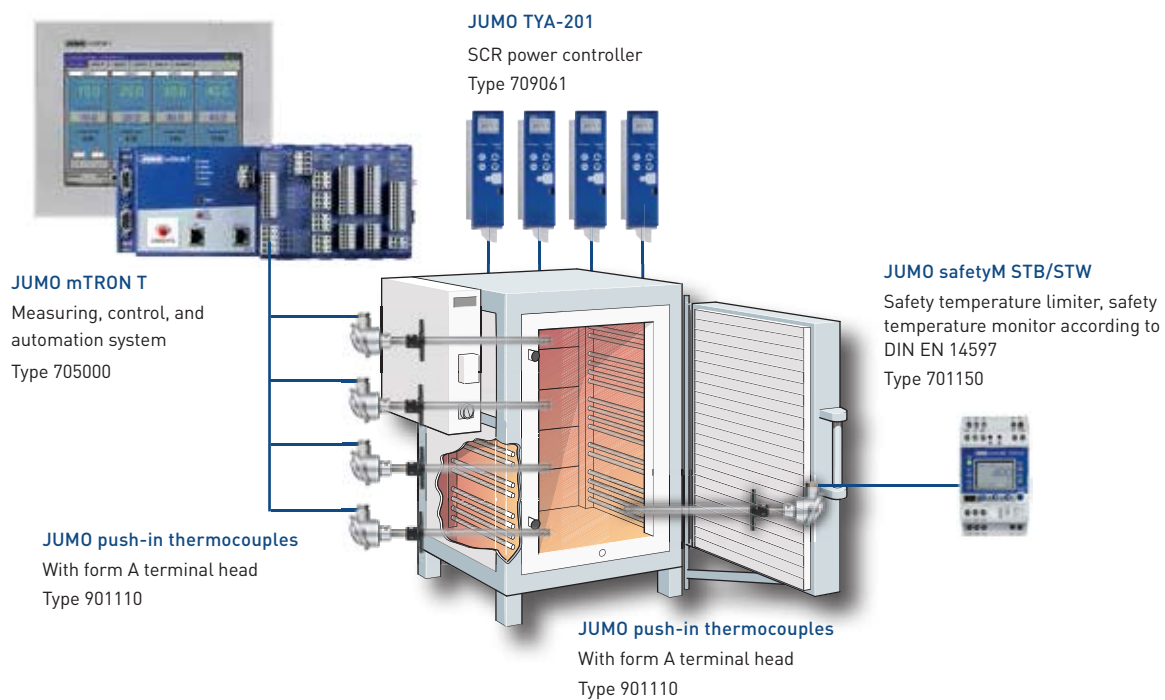
Integrated batch reporting

Manageable group pictures

Maximization of trend pictures

Industrial heat treatment with JUMO according to AMS2750E and CQI-9

Increasing requirements for process reliability, data recording, and logging always introduce new challenges to users of modern measurement and control technology. Safe, reproducible operating procedures are required particularly in sensitive areas such as the aerospace or automobile industry.

With JUMO products your daily operating processes are in safe hands. Even the AMS2750E and CQI-9 requirements are no problem at all.

Both of these specifications set standards in accuracy and data security for operators as well as manufacturers of measurement and control technology. With the controller programs such as JUMO mTRON T and JUMO DICON touch along with digital recorder solutions such as JUMO LOGO-SCREEN nt, JUMO offers – in combination with precise RTD temperature probes or thermocouples – the full spectrum for all applications of heat treatment.

In our own DAkkS-accredited laboratory (German national accreditation body) JUMO is able to calibrate the temperature probes as well as the entire measuring chain and provide certification of the calibration.

All in keeping with our motto: **everything from a single source!**

JUMO TYA-201

SCR power controller
Type 709061

JUMO mTRON T

Measuring, control, and
automation system
Type 705000

JUMO safetyM STB/STW

Safety temperature limiter, safety
temperature monitor according to
DIN EN 14597
Type 701150

JUMO push-in thermocouples

With form A terminal head
Type 901110

JUMO push-in thermocouples

With form A terminal head
Type 901110

Develop plants with up to 120 control areas. Control, data recording, and monitoring devices from JUMO assist you in your work. The requirements for devices stated in the specifications generally stipulate that a SAT test be carried out before devices are used for the first time as proof that they meet the required criteria.

JUMO helps you to meet the strict AMS2750E and CQI-9 standards.

Your benefits in a nutshell

- One supplier for all products
- Tamper-proof data recording
- Up to 120 control loops
- Fast startup
- Improved process transparency

- Easy to combine with other JUMO devices such as SCR power controllers and safety temperature limiters
- More efficient process management
- Expert support
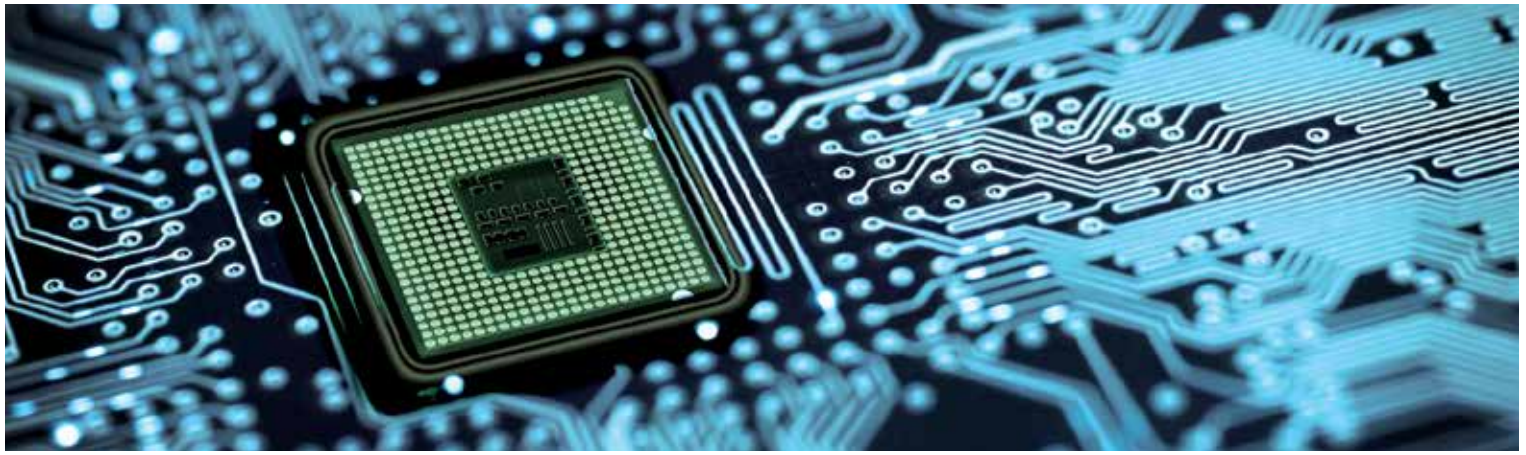
Software

The professional PC evaluation software PCA3000 can be used to manage, archive, visualize, and evaluate historical process data recorded by the JUMO mTRON T automation system or the paperless recorder series JUMO LOGOSCREEN.
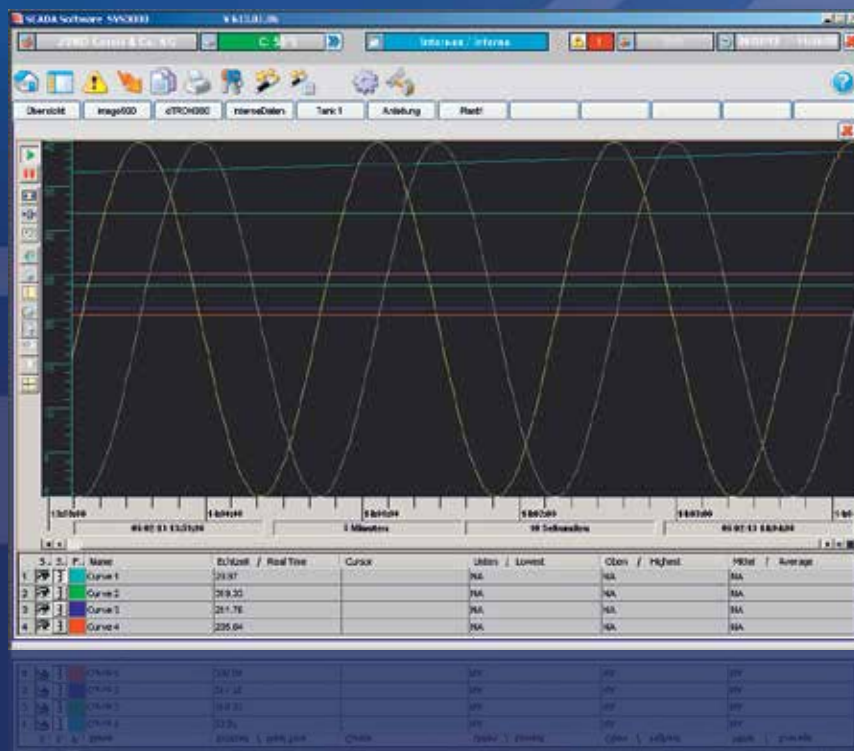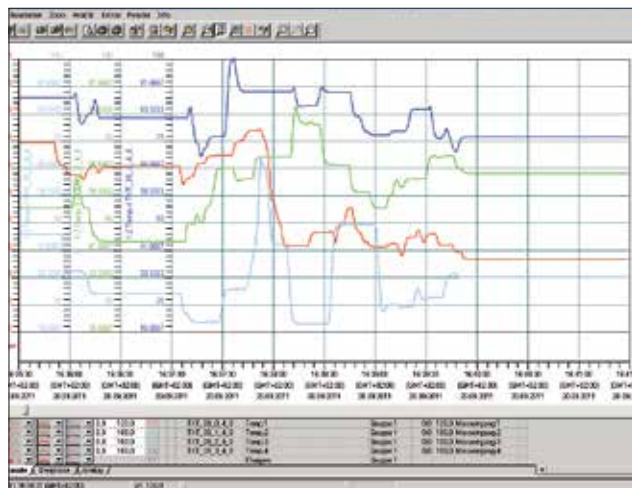
PCA3000 evaluation software

The PC-based, professional evaluation software PCA3000 can be used to manage, archive, visualize, and evaluate historical process data (measurement data, batch data, notifications, etc.). The data can be imported using a USB memory stick or a memory card. It can also be made available for central data processing via the PCC communication software.

- Easy, straightforward backup and archiving of all process data in a data file
- Archived data can be read and visualized directly from a CD ROM or DVD
- Graphic measured value processing: evaluation of measured data using a min./max. search and zoom function (magnifying glass icon)
- Data export with PCA3000 form issued in a range of formats (CSV, HTML, PDF)

PCA communication software (PCC)

PCC communication software is ideally geared towards PCA3000 and allows for easy data extraction via Ethernet, a serial interface (USB, RS485), or modem.

- Time-controlled, automatic data extraction via interface or modem
- Easy, straightforward backup and archiving of all process data in a data file on a hard disk drive or a network server
- Diagnosis function (display of current process data, e.g. via modem or Ethernet)
- Can be launched as a Windows® system service
- Email notification in the event of communication failure
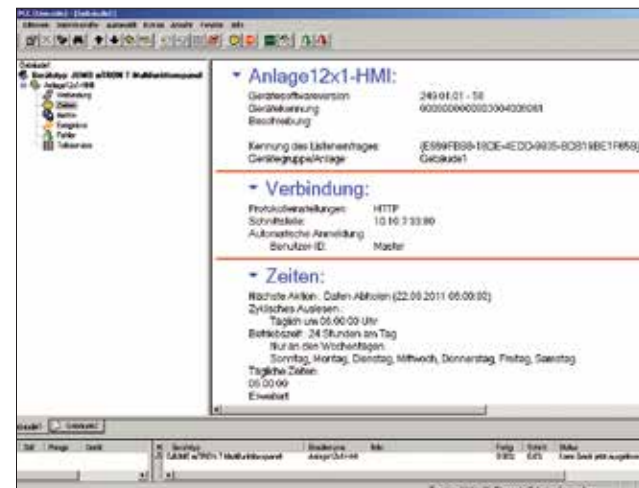
Services & Support

It is the quality of our products that is responsible for such a high level of customer satisfaction. But our reliable after-sales service and comprehensive support are also valued. Let us introduce you to the key services we provide for our innovative JUMO products. You can count on them – anytime, anywhere.

JUMO Services & Support – so that it all comes together!

Manufacturing Service
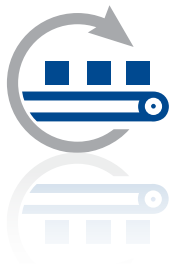
Are you looking for a competitive and efficient system or component supplier? Regardless of whether you seek electronic modules or perfectly fitting sensors – either for small batches or mass production – we are happy to be your partner. From development to production we can provide all the stages from a single source. In close cooperation with your business our experienced experts search for the optimum solution for your application and incorporate all engineering tasks. Then JUMO manufactures the product for you.

As a result you profit from state-of-the-art manufacturing technologies and our uncompromising quality management systems.

Customer-specific sensor technology

- Development of temperature probes, pressure transmitters, conductivity sensors, or pH and redox electrodes according to your requirements
- A large number of testing facilities
- Incorporation of the qualifications into application
- Material management
- Mechanical testing
- Thermal test

Electronic modules

- Development
- Design
- Test concept
- Material management
- Production
- Logistics and distribution
- After-sales service

Metal technology

- Toolmaking
- Punching and forming technology
- Flexible sheet metal machining
- Production of floats
- Welding, jointing, and assembly technology
- Surface treatment technology
- Quality management for materials

Information & Training

Would you like to increase the process quality in your company or optimize a plant? Then use the offers available on the JUMO website and benefit from the know-how of a globally respected manufacturer. For example, under the menu item "Services and Support" you will find a broad range of seminars. Videos are available under the keyword "E-Learning" about topics specific to measurement and control technology. Under "Literature" you can learn valuable tips for beginners and professionals. And, of course, you can also download the current version of any JUMO software or technical documentation for both newer and older products.

Product Service

We have an efficient distribution network on all continents available to all of our customers so that we can offer professional support for everything concerning our product portfolio. Our team of professional JUMO employees is near you ready to help with consultations, product selection, engineering, or optimum use of our products. Even after our devices are commissioned you can count on us. Our telephone support line is available to give you answers quickly. If a malfunction needs to be repaired on site our Express Repair Service and our 24-hour replacement part service are available to you. That provides peace of mind.

Maintenance & Calibration

Our maintenance service helps you to maintain optimum availability of your devices and plants. This prevents malfunctions and downtime. Together with the responsible parties at your company we develop a future-oriented maintenance concept and are happy to create all required reports, documentation, and protocols. Because we know how important precise measurement and control results are for your processes we naturally also professionally calibrate your JUMO devices – on site at your company or in our accredited DAkkS calibration laboratory for temperature. We record the results for you in a calibration certificate according to EN 10 204.

www.jumo.net