More than sensors + automation

JUMO

Meat Processing Industry

Innovative solutions for your success

Dear Reader,

Food, including sausages and meat, is an integral part of our everyday lives. But only producers know just how much the production as well as the processing of food depends on reliable processes and accurate measurement technology.

As meat consumption decreases, the trend toward alternative proteins continues. Products made from soy and legumes such as peas or lentils are expected to play a key role in the food market of the future, especially so for meat substitutes.

Here, JUMO is at your side as a reliable partner to help when you have questions and to provide you with quick solutions. We do so regardless of whether you monitor your process through temperature, humidity, or pH value. We're also at your side for controlling the cleaning process or reducing production costs.

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 70 years. This has helped us become an expert partner for the meat processing industry.

We place great value on regular new developments, constant improvement of existing products, and on increasingly economic production methods because only this path allows us to achieve the highest degree of innovation for you.

We at JUMO offer you only the best in the meat processing industry – in particular a multitude of solutions for the most varied applications.

Our solutions support you in implementing HACCP concepts or the IFS standard.

This brochure provides an overview of JUMO's products and systems for the meat processing industry. Of course, we would also be happy to develop individual solutions that are completely customized to your requirements.

The ultimate result of these solutions is high quality that is consistent!

Detailed information about our products can be found under the product group number at **www.jumo.net**.

Table of contents

Sensor and automation solutions for the meat processing industry

Optimal solutions in the production of dry, cooked, and boiled sausages can only be ensured if the measurement and control technology is precisely tailored to the processes. JUMO systems are ideal for this task.

Sensors

Temperature sensors

Temperature is a key aspect to consider in the meat processing industry. JUMO offers a wide range of sensors to measure and monitor temperature. Our temperature sensors are tailored to the processes in meat processing and provide optimal process reliability.

Humidity sensors

In addition to temperature, humidity is another key element to consider when maturing, drying, and storing sausage products. JUMO offers hygrometric sensors to monitor the storage and maturing process as well as to ensure consistent product quality. JUMO humidity transducers equipped with a hair measuring element are sturdy, washable, and available with standardized current and voltage outputs as well as passive resistance outputs.

Pressure transmitters

We can offer you the perfect pressure transmitter for your process, regardless of whether that involves vacuum cutting or autoclaving. JUMO offers a variety of proven and reliable pressure measuring devices with different front-flush process connections to meet your requirements.

Screw-in RTD temperature probe
With connection line
Type 902050

Sensor for cutter

JUMO FOODtemp
Insertion RTD temperature probe
Type 902350

JUMO Wtrans receiver
Universal receiver for JUMO wireless measuring probes
Type 902931

JUMO Wtrans T
RTD temperature probe with wireless data transmission
Type 902930

Dial thermometers
Industry version
Type 608002

JUMO STEAMtemp
Push-in RTD temperature probe (steam-tight)
Type 902830

Hygro transducer and hygrothermal transducer
Hygrometric
Type 907031

JUMO psychrometer
Humidity measuring device
Type 903562

JUMO DELOS SI
Precision pressure transmitter with switching contact and display
Type 405052

JUMO dTRANS p30
Pressure transmitter
Type 404366

JUMO TAROS S46 H
Hygienic pressure transmitter
Type 402071

Controllers, recorder and indicating devices

Control

However different the production processes in various industries may be, one thing they all have in common is that process variables such as temperature, pressure, humidity, flow, and level often need to be controlled and regulated with the highest levels of accuracy.

The JUMO product portfolio offers the right components for each application, which spans from inexpensive electromechanical or electronic thermostats to digital compact controllers and multichannel automation systems.

Portable digital measuring device
For pH, redox, and conductivity
Type 202710

JUMO AQUIS 500 pH
Transmitter/controller
for pH value
Type 202560

JUMO variTRON
Automation system
Type 705002, 705070

JUMO diraVIEW
Digital indicators
Type 701510, 701511, 701512,
701513, 701514

JUMO diraTRON
Compact controllers
Type 702110, 702111, 702112,
702113, 702114

JUMO meroTRON
Modular one-channel/two-channel
controllers with PLC function
Type 703051, 703052, 703053, 703054

Recording and visualization, evaluating and archiving

With the JUMO LOGOSCREEN paperless recorder range, measured values that require verification can be acquired, archived, and evaluated in an easy and tamper-proof manner. Especially the new generation – with the products JUMO LOGOSCREEN 601 and 700 – features an integrated web server (online visualization on the PC) and remote alarm in the event of a malfunction. In addition, this generation includes batch documentation. The JUMO variTRON automation system allows you to benefit not only from the recor-ding in the device, but also from the intuitive visualization and evaluation in the software. JUMO smartWARE SCADA and JUMO Cloud software solutions provide process data in real time. The JUMO smartWARE Evaluation software ensures tamper-proof archiving of measured values and other data. Access to the process visualization and archived data is possible via common browsers. Manufacturing and work processes are supported by important monitoring, alarm, and planning functions.

JUMO safety M TB/TW

Temperature limiter/monitor according to DIN EN 14597, mounted on DIN-rail
Type 701160

JUMO LOGOSCREEN 700

Highly scalable paperless recorder
Type 706530

JUMO DICON touch

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

JUMO variTRON 300 and 500 as well as JUMO smartWARE Evaluation

Automation system and software for evaluation and visualization of measurement data recorded by JUMO variTRON
Type 705002, 705003, 701840

JUMO Cloud and JUMO smartWARE SCADA

Highly-scalable and high-performing IoT solutions
Type 701810, 701820

JUMO variTRON 300 and 500

Automation system

The automation system from JUMO has a modular design and is highly scalable. JUMO variTRON is based on the JUMO JUPITER hardware and software platform. CODESYS PLC transforms the system into a PLC, which can implement a wide range of control applications.

Features:

- High speed performance
- Flexible operating philosophy
- Simultaneous operation of more than 120 control loops
- Modern communication interfaces (e.g. OPC UA and MQTT)
- Integration of various fieldbus systems such as PROFINET, EtherCAT, Modbus TCP/RTU, and BACnet
- Many degrees of freedom in software and hardware
- Easy integration of new software functions via CODESYS PLC
- Easy adaptation of hardware inputs and outputs

- Customer-specific operation and visualization of several operator stations via CODESYS Remote TargetVisu and CODESYS WebVisu
- More than 30 intelligent connection modules
- Panels in various formats (portrait or landscape, 4:3 or 16:9)
- Integrated JUMO Web Cockpit
- Integrated measurement recording with up to 240 channels, up to 20 batches, and up to 10 measurement groups
- Optional wireless interface (JUMO variTRON 300)

JUMO Cloud and JUMO smartWARE SCADA

Highly-scalable and high-performing IoT solutions

Enhance JUMO variTRON with the right IoT solution: use the JUMO Cloud for worldwide access to your measurement data and benefit from data management by JUMO – including backups. Or operate JUMO smartWARE SCADA on your own servers. The software also offers many different interfaces and protocols.

Features:

- Compatible with JUMO variTRON and connectable via Ethernet (JUMO variTRON as gateway)
- Maximum transparency in your processes with customizable user rights and dashboards
- Unlimited access to the dashboards using as many end devices (clients) as required via common web browsers without having to install software, browser plug-ins, or add-ons
- More efficient reporting made possible due to outstanding report and export functions
- Alarm management through data evaluation, preparedness planning, and monitoring/remote alarm functions (text message, email, push message, phone call)

- Process visualization through editor with integrated animation and test tool as well as vector-based, self-scaling process screens
- End-to-end encryption, HTTPS, TLS, two-factor authentication (OTP)
- Extensive trend displays and reports with various diagrams, comparison functions, and export functions
- Timer and timer programs with unique events and series
- Modern drivers and protocols such as OPC UA, MQTT, and REST API

JUMO smartWARE Evaluation

Software for evaluating and visualizing the measurement data recorded by JUMO variTRON

The browser-based software solution enables intuitive evaluation and visualization of process data recorded via the JUMO variTRON automation system. Individual dashboards allow targeted and fast access to recorded process data. Manipulation detection based on digital certificates ensures a very high degree of data security.


Features:

- JUMO variTRON 300 and 500 both have an integrated recording function for all incoming measured values
- Additional recording of the measurement status according to NAMUR NE 107
- Buffering of process data recording in case of network failure
- Recording of data from CODESYS such as program variables in the JUMO variTRON system
- Recording of fieldbus data such as PROFINET, BACnet, and EtherCAT
- Convenient configuration with intuitive setup program

- Browser-based process data evaluation via customizable dashboards
- Fast navigation and dashboard selection based on intuitive device and plant overview
- Plant-wide batch evaluation with flexible filter functions
- Data archive (Datastore) with manipulation detection based on digital certificates
- "Run anywhere": can be installed on desktop, server, or cloud using Docker technology
- Reduced costs for software administration, as maintenance is only required in one place
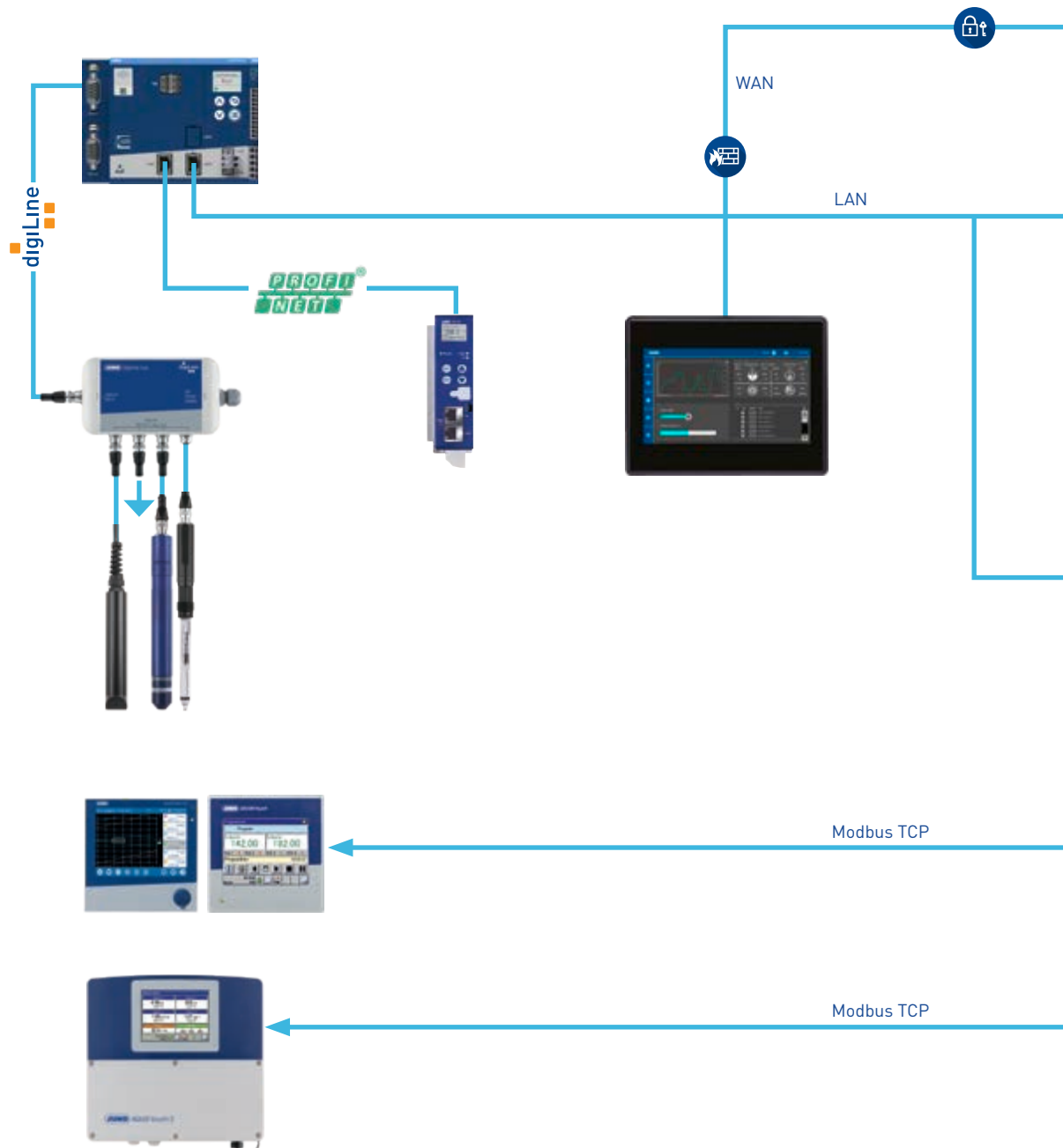
Process data reception and data storage

Recording, archiving, evaluating

JUMO variTRON automation systems allow you to record your important process data and transfer it securely via Ethernet to the Datastore ("cold data") using the REST API interface. Manipulation detection allows it to provide a high degree of security for your recorded raw data. You determine how many signals you license for evaluation. These can then be visualized and evaluated as "warm data" in Dataview with all common browsers via individual dashboards.
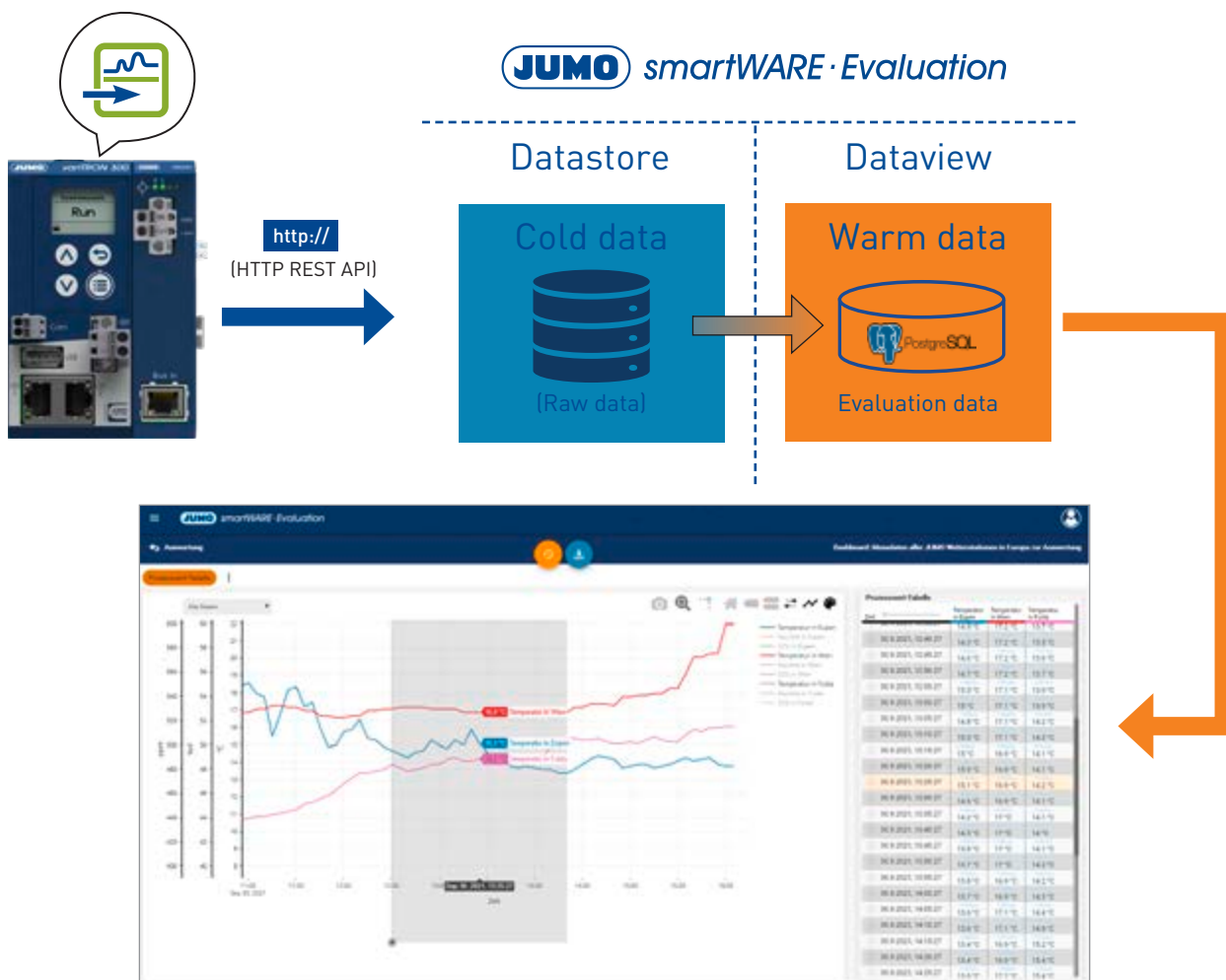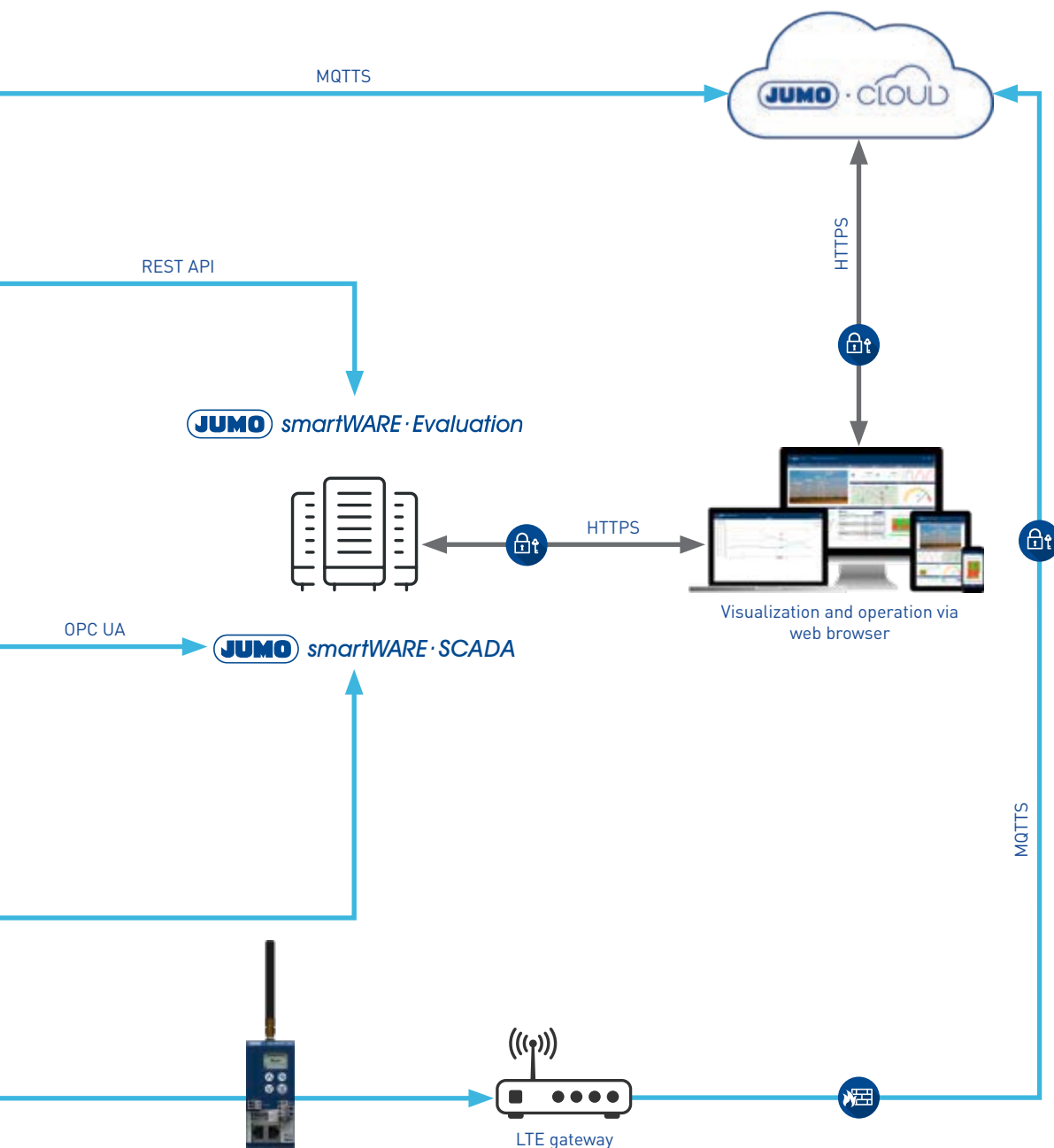
System structure – JUMO variTRON available with JUMO smar

digiLine

PROFI NET

WAN

LAN

Modbus TCP

Modbus TCP

rtWARE Evaluation, JUMO Cloud, or JUMO smartWARE SCADA

MQTTS

JUMO · CLOUD

REST API

HTTPS

JUMO smartWARE · Evaluation

HTTPS

Visualization and operation via web browser

OPC UA

JUMO smartWARE · SCADA

MQTTS

LTE gateway

Sausage special

Setpoint		Actual Values
63.0	🌡°C	68.3
39.1	🌡°C	44.4

Program Runtime: 01:28:13

Remaining Programtime: 00:31:47

Section
X/0 Heating-up

Process Step
1 Heating with steam

System solution for process engineering

Process engineering process steps are all technical processes in which a final product is produced from a raw or source material using chemical-physical or biochemical procedures. The process engineering solution was developed for the meat processing industry. Using the JUMO variTRON system and the new JUMO smartWARE Program graphical program editor customer-specific solutions can be configured with little effort and no programming skills.
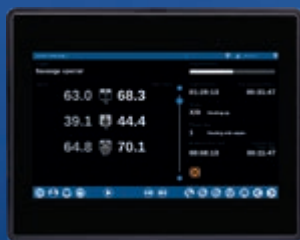
Flexible and absolutely precise

Predefined process engineering process steps are available to the user. This defines different basic functions that only need to be parameterized. The sequence of the individual defined process steps results in a process engineering sequence for the manufacturing of different products. Setpoint values, program section time, and process contacts can be defined for a process step.

In addition, the plant engineer can use the process steps in the system to ensure that the plant components are not manipulated by the end user. Plants can be controlled via a web panel. This means that a program can be started and stopped as well as created and modified. Temporary changes can also be made via the panel.

Your benefits:

- You have maximum flexibility for your plant as the functions and design can be customized
- You have outstanding process reliability through data recording and individual user rights
- Customer requirements can be implemented thanks to modular hardware and PLC functions

Intuitive and customized

The JUMO variTRON 500 automation system and the JUMO smartWARE Program graphical editor allow quick and easy recipes creation.

JUMO variTRON 500

- Automation system with the ability to run created programs, recipes, and process steps
- Connection of various panels and extension modules possible
- Upon request: one master application (software and hardware) covering all plant types and its options

JUMO smartWARE Program

- Browser-based software solution for intuitive creation and editing of process engineering programs and recipes
- Graphical user interface, which can be customized by the customer (colors, icons, logo, text)
- Simple program and recipe management with the JUMO variTRON 500 system
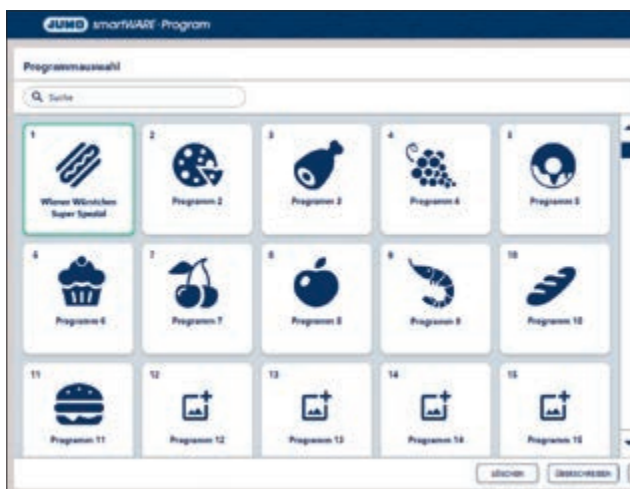
Program selection

Process steps

Steps in meat processing

The procedures in meat processing and sausage production can essentially be reduced to a small number of basic processes. Acquiring and controlling temperature is crucial here. We hope that you'll be inspired by our solutions for this industry which we will explain on the following pages.

Meat Processing Industry

Meat processing

After slaughtering and cutting up the animal, the next crucial step is to cool the meat until it is processed further. Depending on the local circumstances, the meat is transported to the next processing station in either cooled or frozen form. There, the processes of mincing, cutting, smoking, simmering, and maturing (depending on whether dry sausage, boiled sausage, or cooked sausage is being produced) play differing roles. For example, a cooking stage when producing dry sausage does not exist.

The product is handled and stored depending on the type of sausage and required shelf life. In this context, it is important to ensure the correct storage temperature. For example, sausages that have been autoclaved in jars or tins do not require any cooling. In contrast, cooling is crucial when storing boiled sausage. When it comes to smoked sausage, the smoking duration and the sausage type determine whether or not cooling is required.
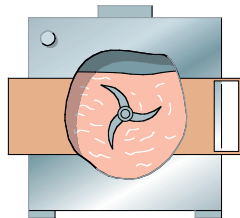
Cooling
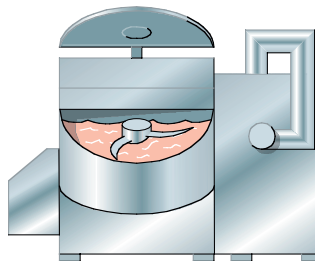- Temperature
- pH value
- Indicator
- Controller
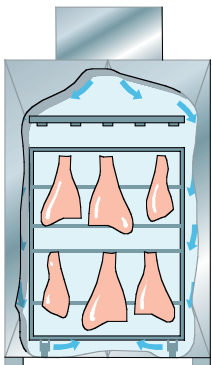
Mincing
- Temperature
- Indicator
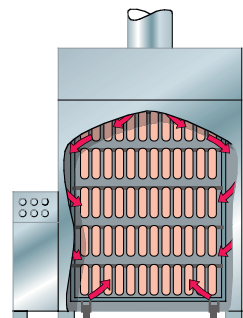- Controller

Cutting
- Temperature
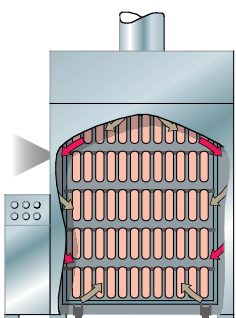- Pressure
- Indicator
- Controller

Boiling/simmering/cooking
- Temperature
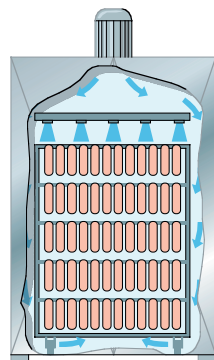- Indicator
- Controller

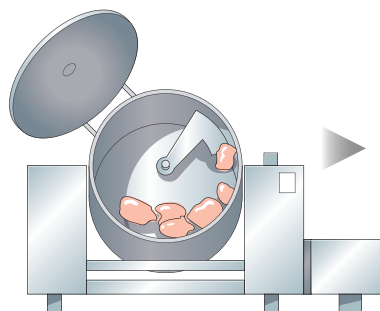### Smoking
- Temperature
- Indicator
- Controller

Maturing/storing
- Temperature
- Humidity
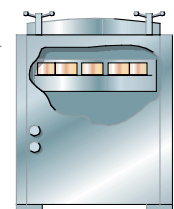- pH value
- Indicator
- Controller

Tumbling
- Temperature
- Pressure
- Controller

Autoclaving
- Temperature
- Pressure
- Indicator
- Controller

Cooling

Measuring the pH value of fresh meat using the JUMO pH insertion electrode

The pH value of meat is considered to be so important because it has a major effect on the meat's quality factors. The pH value allows conclusions to be drawn on the color, softness, taste, water binding capacity, and shelf life. This is because, once the animal has been slaughtered, biochemical processes start to break down the meat which will influence the pH value. Measuring this value allows you to obtain information about the speed of these processes and the quality of the meat.
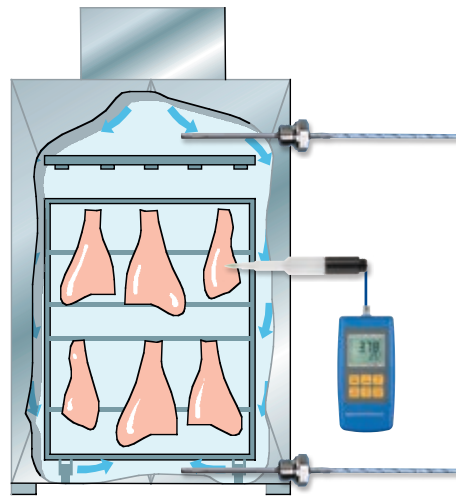
JUMO screw-in RTD temperature probe
With connection line
Type 902050

JUMO pH insertion electrode
For taking measurements in solid substances
Type 201030

JUMO portable pH measuring device
Microprocessor-controlled
Type 202710

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

Mincing

Monitoring the temperature in the cooled mincer using JUMO diraVIEW while mincing the meat

Mincing is a fundamental process in the meat processing industry. It is carried out using special devices of different sizes, ranging from manually operated mincers to large industrial versions. It is important that meat is not exposed to major temperature fluctuations, particularly not in the range above 7 °C. This is why the cooling chain needs to be observed when mincing and additional cooling must be provided if required.
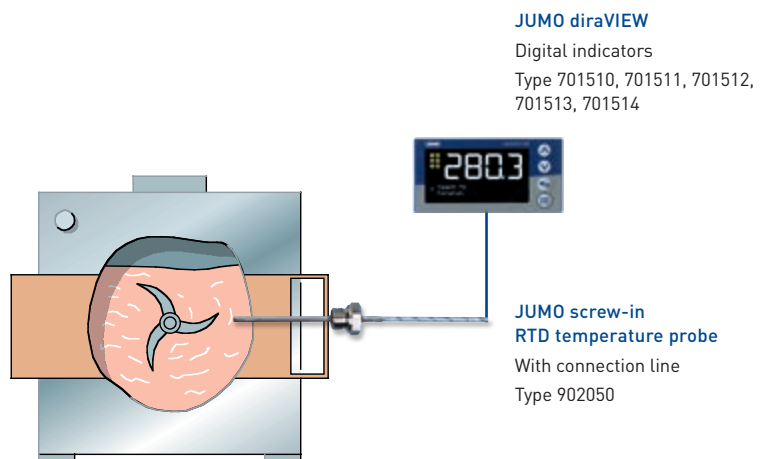
JUMO diraVIEW
Digital indicators
Type 701510, 701511, 701512, 701513, 701514

JUMO screw-in RTD temperature probe
With connection line
Type 902050

Cutting

Monitoring the temperature and pressure in vacuum cooking cutters

Vacuum cutters are ideal for ensuring meat has a better color and for cutting the meat more effectively. The use of a vacuum cooking cutter also means that the separate simmering of the meat is unnecessary (e.g. when producing cooked sausage). Temperature plays a key role in these devices since it is instrumental in determining the ultimate quality of the sausage.

JUMO dial thermometer
With bimetal measuring system
Type 608002

**JUMO screw-in
RTD temperature probe**
With connection line
Type 902050

JUMO dTRANS p30
Pressure transmitter
Type 404366

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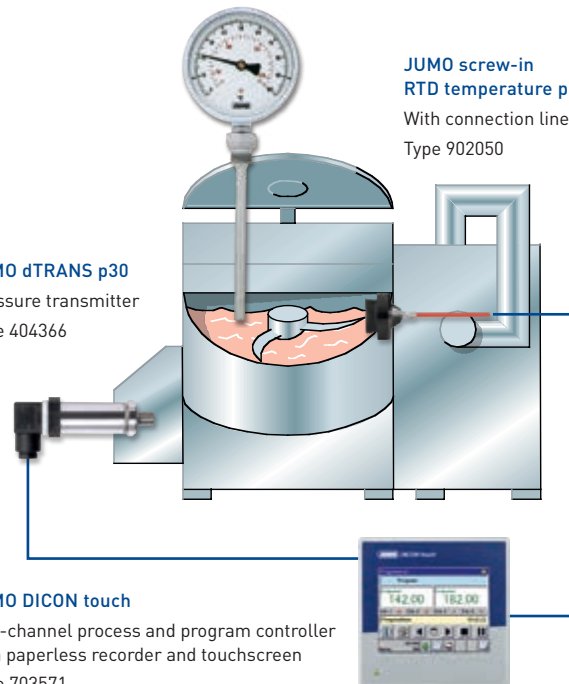
Cooking

Temperature monitoring in the cooking kettle

When boiling or scalding in kettles, the temperature of the scalding water must be controlled. The core temperature of the boiled product can also be acquired here using steam-tight insertion probes.

JUMO diraTRON
Compact controllers
Type 702110, 702111, 702112, 702113, 702114

**JUMO screw-in
RTD temperature probe**
With connection line
Type 902050
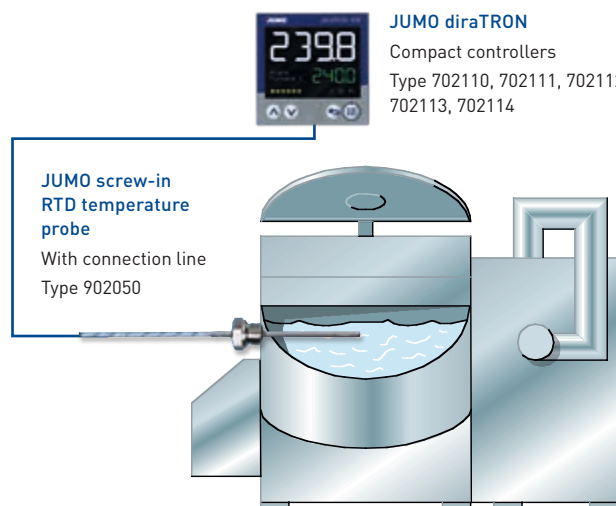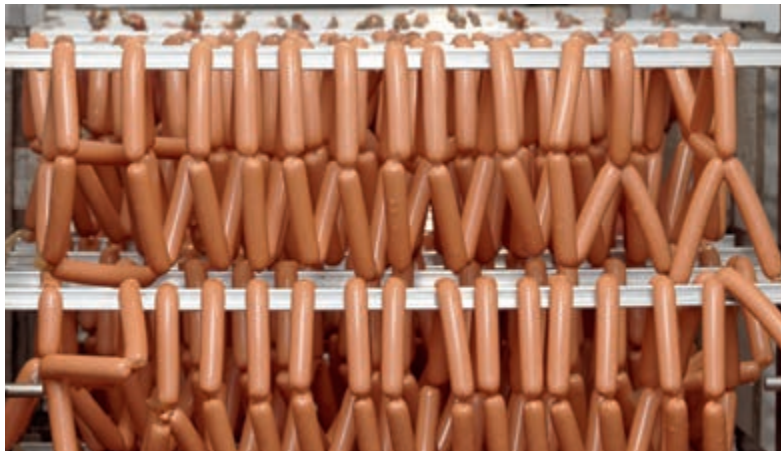
Boiling and simmering

Controlling cooking and smoking processes with the JUMO variTRON automation system

Cooking and smoking are two essential processes in sausage production. In most cases, chambers designed for either cooking or smoking are used. In large industrial plants, however, these two processes are now often also combined in what are known as continuous or semi-continuous plants. The JUMO variTRON automation system, with its special industry solution for the meat processing industry, is suitable for this purpose. JUMO variTRON can be used to operate, control, and regulate

several individually working ripening, cooking, smoking, and air-conditioning systems. The process measurement values of the central processing unit – the heart of JUMO variTRON – are provided by 9 asynchronous program generators with a pool of 90 programs. With its modular system structure and the integrated PLC, the automation system can be adapted optimally to applications for control of ripening, cooking, smoking, and air-conditioning systems.

JUMO variTRON 500
Central processing unit for an automation system
Type 705002

Modules for automation system
Type 7050xx

63.0 ⌇ 68.3
39.1 ⌇ 44.4
64.8 ⌇ 70.1

Plant 1

COM 1

COM 2

System bus

LAN

LAN

JUMO screw-in RTD temperature probe
With connection line
Type 902050

JUMO FOODtemp
Insertion RTD temperature probe with PTFE handle
Type 902350
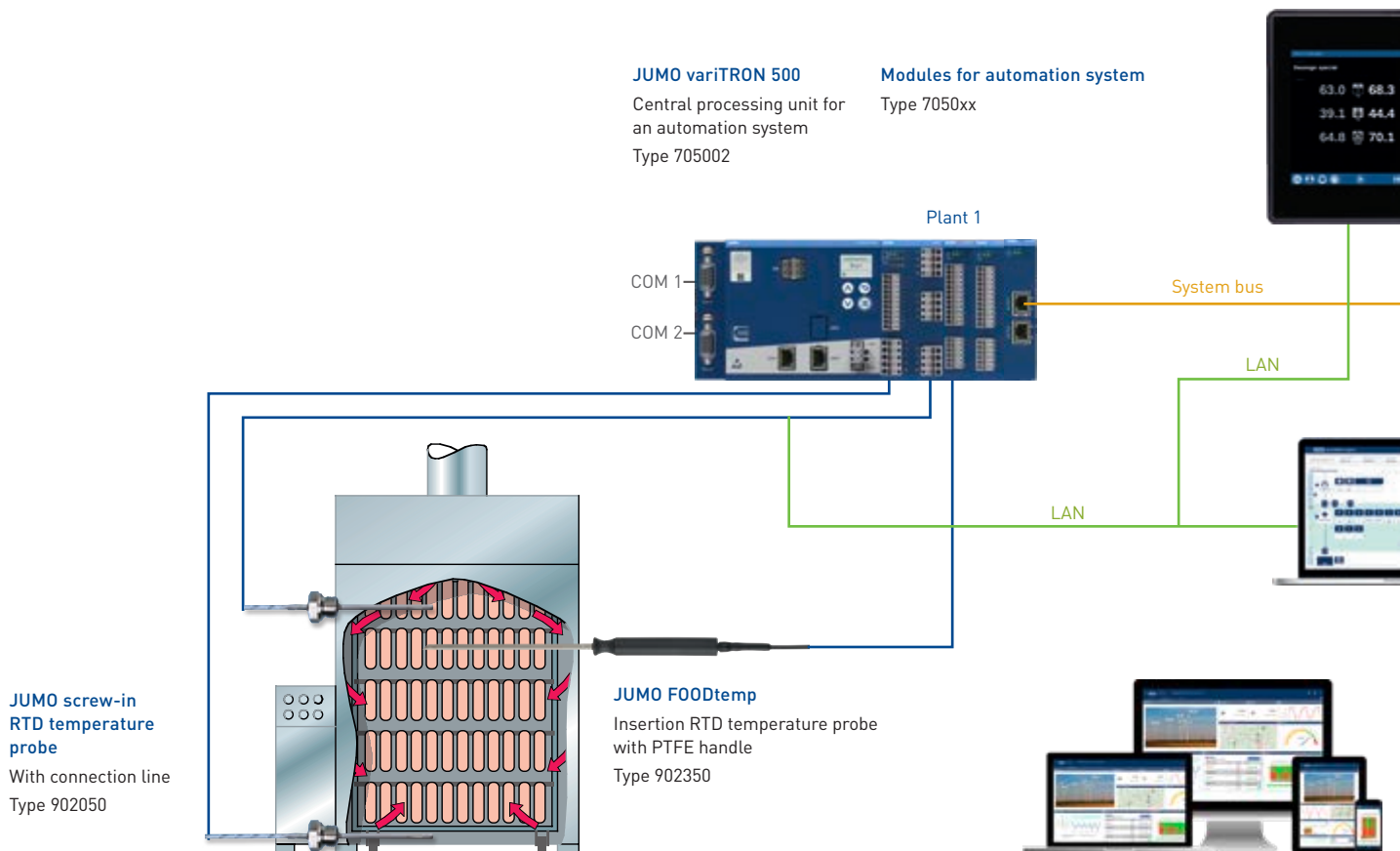
Smoking and hot smoking

Acquiring the core temperature in continuous plants

Ideally, the products can be equipped with a JUMO Wtrans radio transmitter for acquiring the core temperature. This device allows the temperature to be measured wirelessly on an ongoing basis. As such, in continuous plants it is possible to precisely and continuously determine the temperature, which is highly beneficial for documenting data and cont-

rolling the plant. Thanks to its wireless installation, the use of a JUMO Wtrans radio transmitter reduces the costs for new installations, maintenance work, and repairs. Electronic components that are resistant to high temperatures can be used in temperatures up to 125 °C.

JUMO variTRON
Web panel
Type 705070

Modules for automation system
Type 7050xx

JUMO smartWARE Evaluation
Software for evaluating and visualizing the measurement data recorded by JUMO variTRON
Type 701840

Plant 2

JUMO smartWARE Program
Software for editing process engineering programs and recipes
Type 701850

**JUMO Cloud and
JUMO smartWARE SCADA**
Highly-scalable and high-performing IoT solutions
Type 701810, 701820

*JUMO Wtrans T
RTD temperature probe with wireless data transmission
Type 902930

JUMO variTRON 300
Central processing unit for automation system with optional wireless interface
Type 705003

**JUMO screw-in
RTD temperature probe**
With connection line
Type 902050

JUMO Wtrans receiver
Universal receiver for JUMO wireless measuring probes
Type 902931

JUMO safetyM TB/TW
Temperature limiter/monitor
Type 701160

Maturing, storing, and drying

Controlled maturation when producing dry sausages

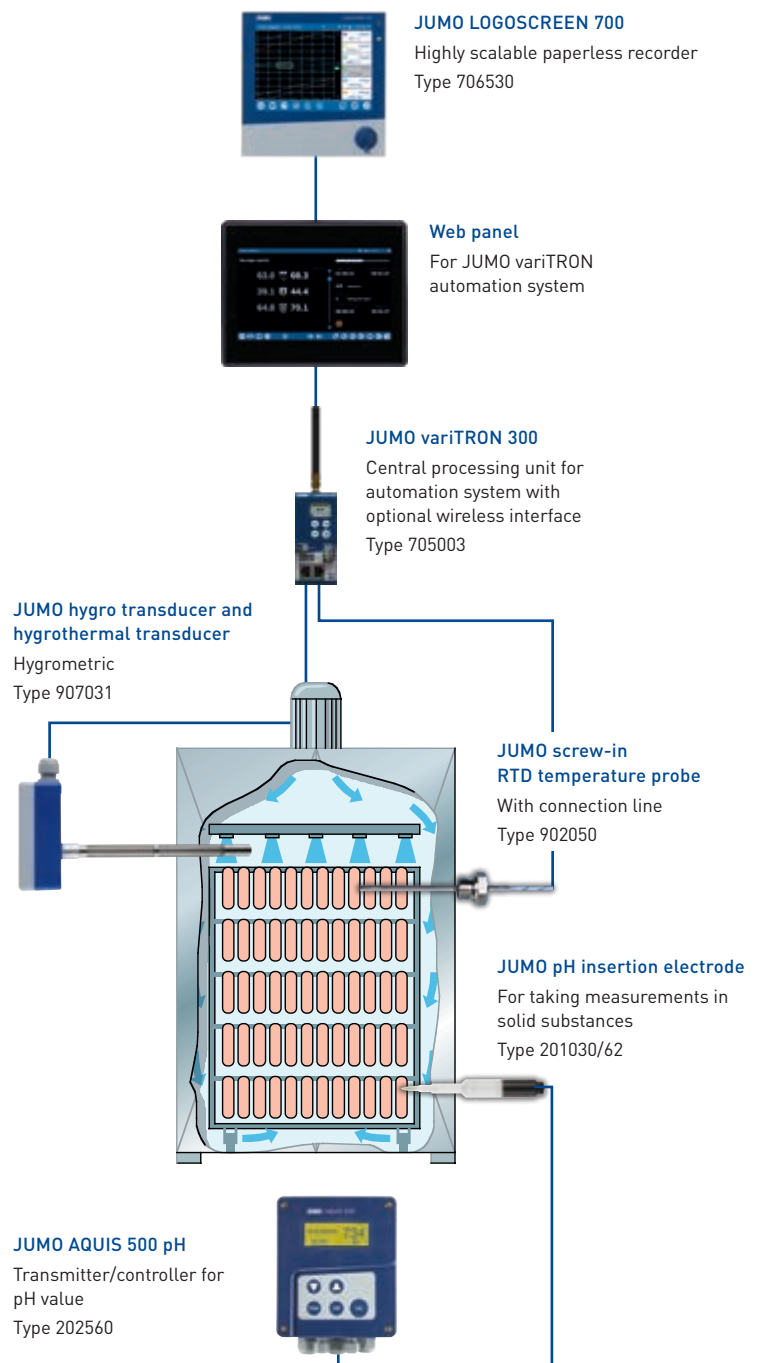When producing dry sausages, the maturation/drying phase plays the most important role of all. The products must be dried until they have a residual water content that complies with food regulations. Here, it is important that the water is released evenly and not too quickly, otherwise a high-quality end product cannot be guaranteed. To prevent drying errors, the relative humidity must be in balance with the a_w value of the dry sausage when drying starts. In addition, the relative humidity must only be lowered slowly to allow the water to escape from the inside to the outside of the sausage. The JUMO DICON touch program controller or the JUMO variTRON 300 automation system are suitable for this purpose.

Measuring the pH value in meat and sausages

The pH value of meat is linked to its water binding capacity. Meat has the lowest water binding capacity when the pH value is around 5. A standardized optimum value for producing sausages does not exist as it differs from end product to end product. When producing dry sausages, for example, the meat must have a low water binding capacity so that it can dry evenly.

JUMO LOGOSCREEN 700
Highly scalable paperless recorder
Type 706530

Web panel
For JUMO variTRON
automation system

JUMO variTRON 300
Central processing unit for automation system with optional wireless interface
Type 705003

JUMO hygro transducer and hygrothermal transducer
Hygrometric
Type 907031

JUMO screw-in RTD temperature probe
With connection line
Type 902050

JUMO pH insertion electrode
For taking measurements in solid substances
Type 201030/62

JUMO AQUIS 500 pH
Transmitter/controller for pH value
Type 202560

Tumbling

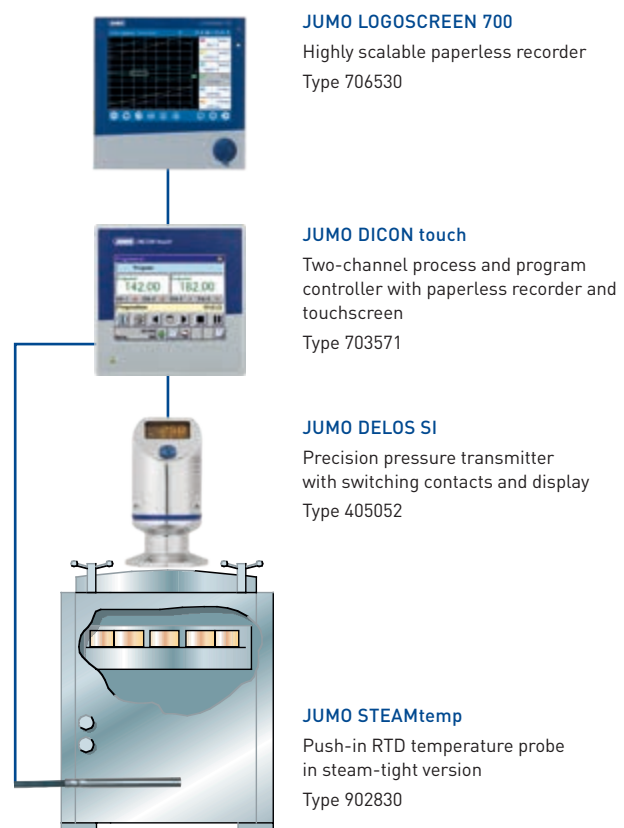## Measuring temperature and pressure in tumblers

Tumbling is a process that mixes and moves the meat. This process generally needs to be performed below a certain threshold temperature. In the meat processing industry – particularly so for producing cooked ham – the correct temperature is essential to guarantee that the end product has the best possible quality. When it comes to measuring the temperature and pressure in the tumbler, our two wireless solutions JUMO Wtrans T for measuring temperature and JUMO Wtrans p for measuring pressure are the perfect choice. The devices can be mounted anywhere on the tumbler because no cumbersome cable interfere.

Autoclaving

Monitoring the temperature time curve using the JUMO LOGOSCREEN 700 when preserving sausages

A long-established method of preservation is boiling or conserving of sausages. Such sausage types are inserted into sealed containers (glass/jar). They are then conserved in an autoclave. Ideally, even several autoclaves can be controlled using the JUMO variTRON system. This solution for the meat processing industry allows you to control different autoclaves in parallel or independently of one another.

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

JUMO Wtrans receiver
Universal receiver for JUMO wireless measuring probe
Type 902931

JUMO Wtrans T
RTD temperature probe with wireless data transmission
Type 902930

JUMO LOGOSCREEN 700
Highly scalable paperless recorder
Type 706530

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

JUMO DELOS SI
Precision pressure transmitter with switching contacts and display
Type 405052

JUMO STEAMtemp
Push-in RTD temperature probe in steam-tight version
Type 902830

JUMO Engineering

JUMO Engineering, the service division from JUMO GmbH & Co. KG, combines expertise and industry-specific experience in one team. Our engineers and technicians develop customized solutions that are strictly based on your specific requirements. The JUMO Engineering team strongly believes in personalized support and consulting for its customers – from initial contact and the development of a customized solution to its series production. When carrying out the many different industry applications we always strive for optimum results with maximum customer benefits. Our innovative engineering services allow us to achieve this goal.

Innovative system solutions with expertise

We always draw on the feedback from our customers around the world to improve our products. This strategy is reflected in our new developments. We view complex tasks as challenges that allow us to develop tailored solutions for you and at the same time improve our product portfolio. JUMO Engineering with its range of services completes this comprehensive approach.

Our services

- Feasibility analysis
- Creating a technical concept including product requirements specifications and specification sheet
- Complete project planning and documentation
- Project planning including PLC programming, visualization, network technology, etc.
- Continuous project management
- On-site startup
- Training and support

Your advantages

- As a central contact partner JUMO develops technical system solutions
- Extensive expertise with all measurement and automation devices
- Global support through experienced specialists
- Flexible, tailored solutions to suit your individual needs and applications

In a nutshell

- Precise and prompt communication channels:
  This saves you time and prevents mistakes!

- Fully developed expertise for maximum flexibility:
  For project planning that is fully reliable and safe

- Technology that has proven itself over decades reduces downtimes:
  For excellent plant availability and process reliability!

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.
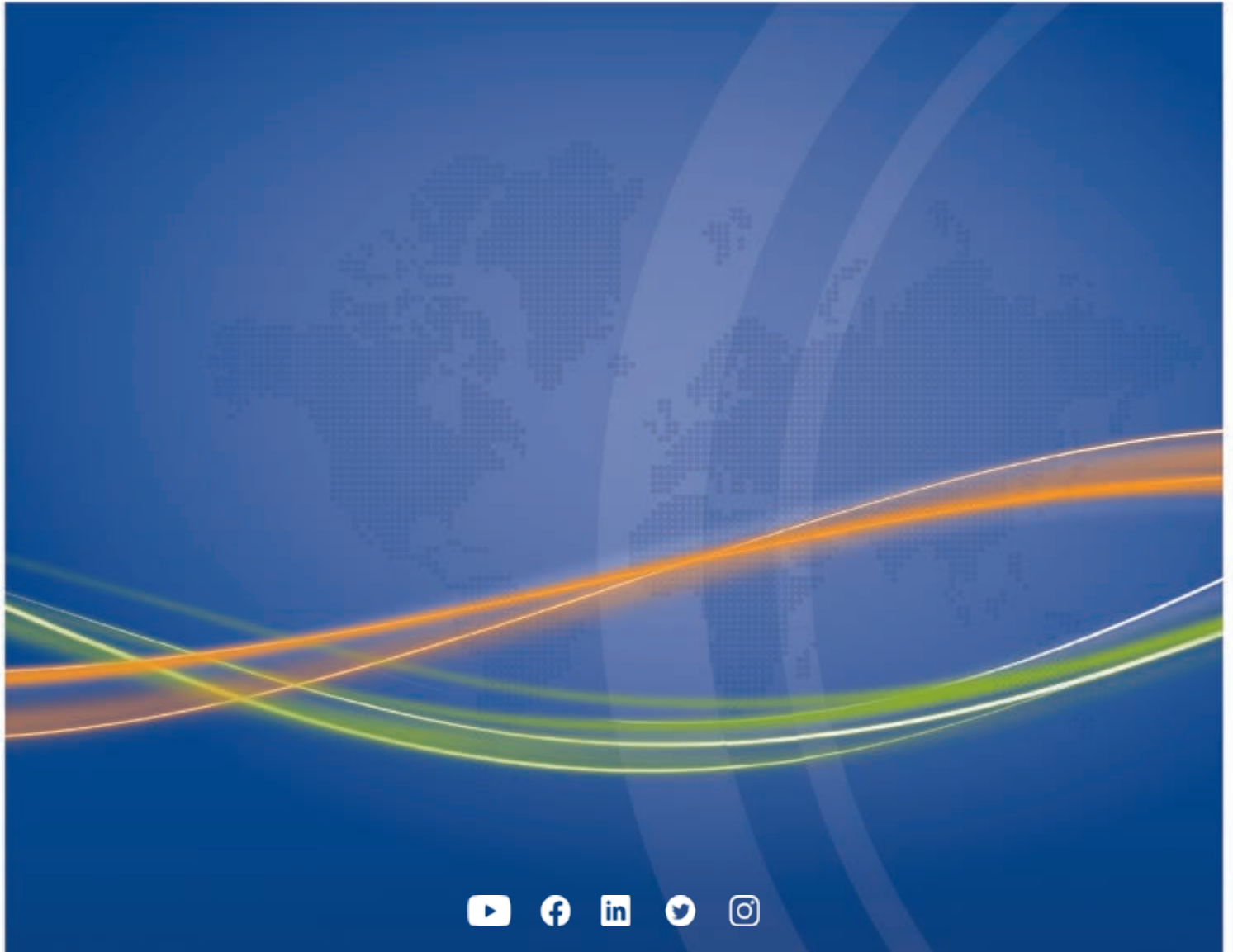
Product Service

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