JUMO

More than sensors + automation

Brewery Technology

Innovative solutions for your success

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Dear Reader,

Brewing beer is an art in itself. As a brewer, you depend on your technical knowledge as well as reliable and accurate measurements with monitoring and a central control unit.

JUMO, your reliable partner, is always at your side to help when you have questions and to provide quick solutions. Whether you want to monitor the quality of your beer by pressure, temperature, conductivity or the pH value, or whether you want to control cleaning or reduce production costs.

How can we accomplish that for you? Through many years of experience and professional competence. JUMO has been a leading manufacturer of measurement and control systems for more than fifty years. This has helped us become a competent partner for the beverage industry.

We place particular importance on regular new developments, on continuous improvements in existing products, and on continually making production methods more economical. These steps are the only way to achieve the highest level of innovation.

JUMO also offers only the best for you in brewery technology: a wide range of solutions for the most diverse applications.

Brewing incorporates many time-honored elements, for example in Germany the Reinheitsgebot or "Purity Law", which dates to 1516 and limits the ingredients of beer to water, barley and hops. Today quality is also achieved through instrumentation and controlling engineering at the latest state of the art.

This brochure provides an overview of JUMO's products and systems for brewery technology. Of course, we are also happy to work together with you to create customized solutions for individual requirements.

PS: Further information about our products can be found at **www.industry.jumo.info** using the specified type/product group.

Contents

Malting Process

As an experienced brewer you know that the quality of beer depends on many factors. If you work with reliable JUMO automation systems in the early phase of production, the malting process, you can rely on producing a high-quality malt at the end of the process.

Storing

Exact temperature monitoring with bin probes from JUMO

JUMO bin probes feature several Pt100 or Pt1000 sensors fitted at regular intervals. This makes it possible to measure the temperature at several places in the bin at the same time, using only one probe.

Measured values are transferred safely and reliably to the detection system via an explosionproof temperature transmitter.

All measuring points are covered by one system

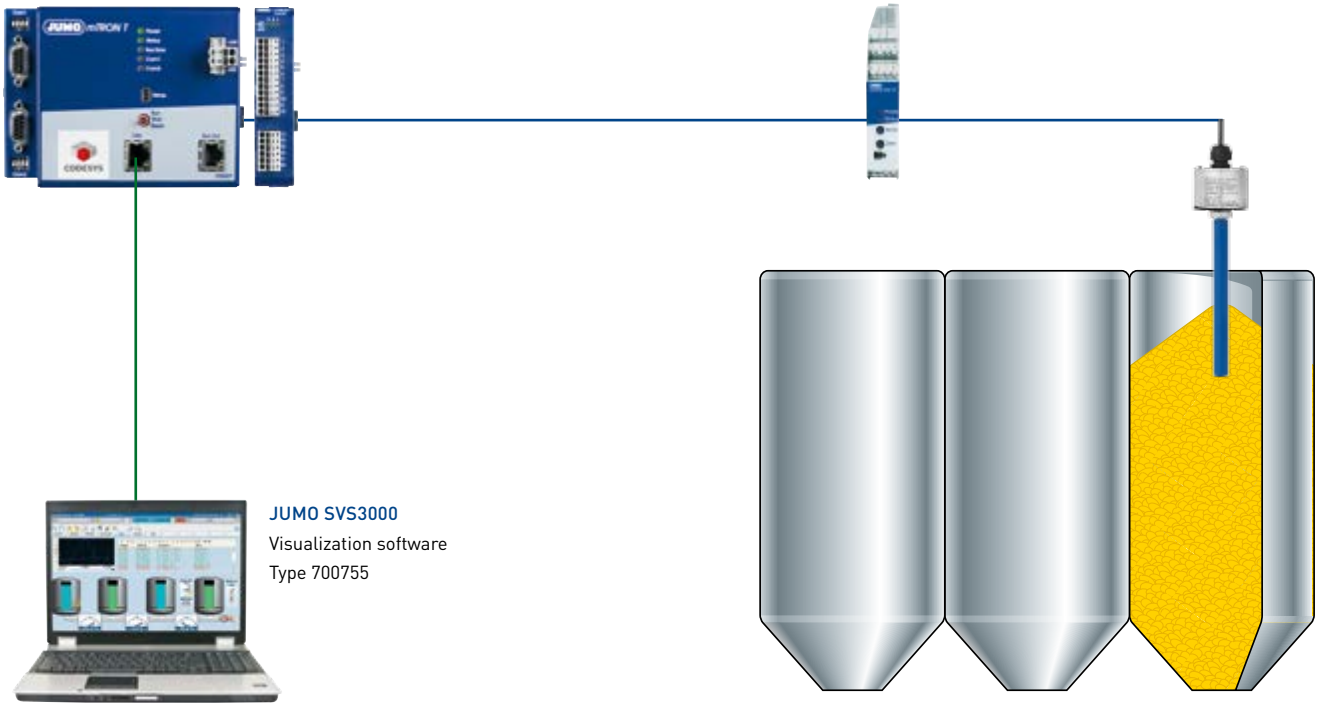
The JUMO mTRON T automation system offers several advantages for storing barley and malt. For example, all measured values can be recorded by four- or eight-channel analog input modules. Up to 120 or 240 analog signals respectively can be recorded and displayed in your control room using the SVS3000 plant visualization software. This allows you to display all temperature measured values at a glance. Furthermore, in case of an error you can immediately see in which silo problems occur.

JUMO mTRON T
Central processing unit
Type 705001

JUMO mTRON T
Analog input module 4-channel
Type 705020

JUMO dTRANS T02 Ex
Programmable
4-wire transmitter
Type 707020

Multipoint RTD temperature probe
(Silo monitoring)
Type 903530



JUMO SVS3000
Visualization software
Type 700755

Steeping

Precise control of air and water supply to the steep with JUMO mTRON T

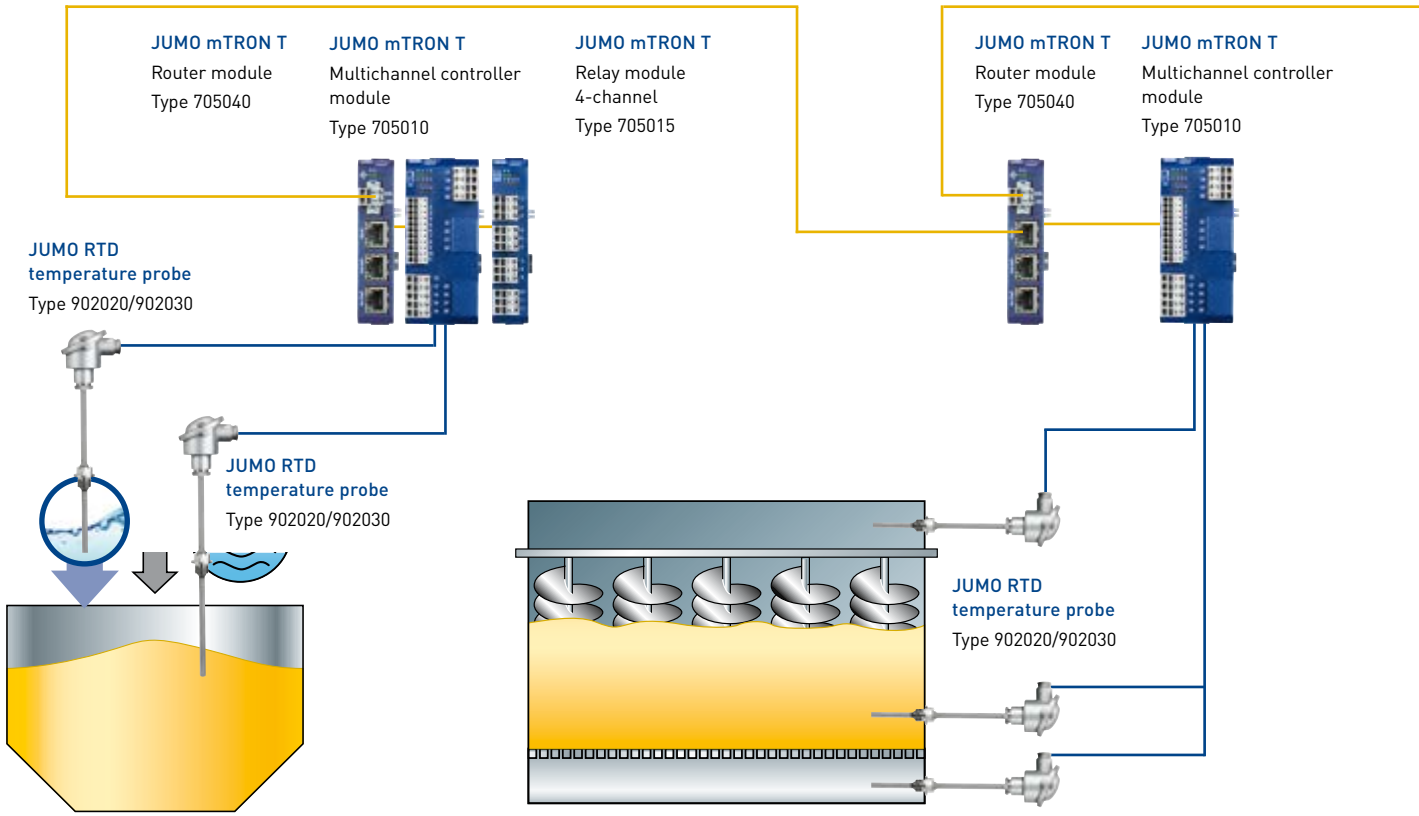
In the steep, the barley is soaked and aerated at regular intervals to promote germination. The increasing respiration caused by the added oxygen produces more CO_2 and heat, which must be removed continuously. For this purpose the temperature in the steep is recorded for monitoring and displayed directly on site when required.

With the JUMO mTRON T automation system you can control the air and water supply reliably. But there's more: Depending on the size and requirement you can also record, control and display the entire malting process.

Germination

Reliable temperature monitoring during termination with the JUMO mTRON T automation system

During germination, the enzymes that will later be needed to make the beer are formed. It is crucial that the air being introduced has been sufficiently moistened to prevent the barley from drying out and instead to maintain a relatively constant moisture content. This is exactly what the JUMO mTRON T automation system does: You can use it to monitor the temperature and humidity of the outside air simply and easily and then show the results with the multifunction panel or the visualization program.

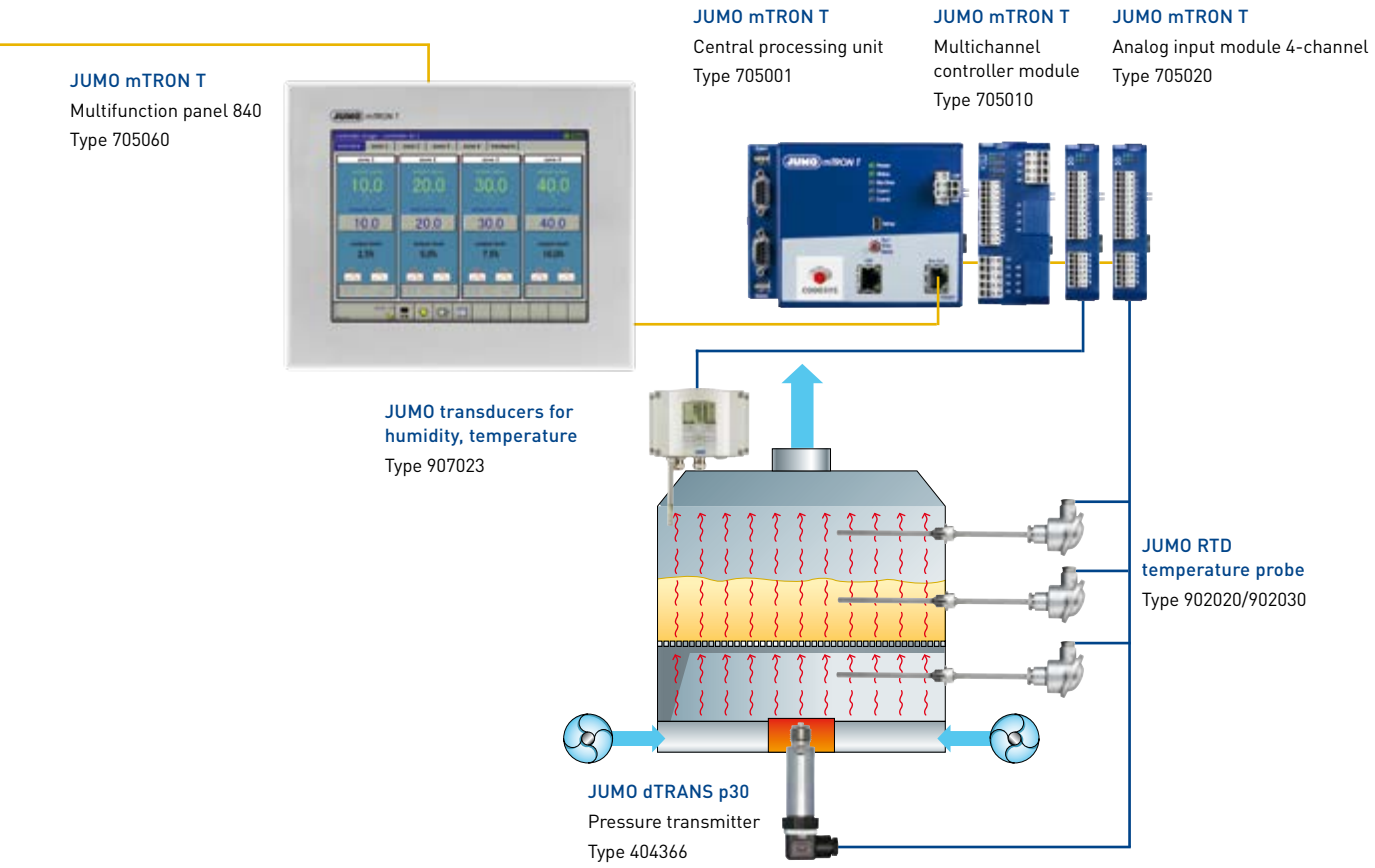


Kilning

Optimum temperature control in the malt kiln

During kilning, the malt is dried until it is stable for storing. Constant temperature control is extremely important as this is the only way to ensure that the malt is completely dried through but does not burn, which would destroy the enzymes in the malt.

The sections are also controlled by the JUMO mTRON T automation system. It controls the heating registers in relation to the temperature above the rack. The ratio of fresh air to ambient air is also adjusted to ensure optimum drying. You can record negative pressure as an additional measurement value with the JUMO dTRANS p30 to verify the seal of the heat exchanger. This will prevent burner exhaust gas from getting into the product.



Brewing Process

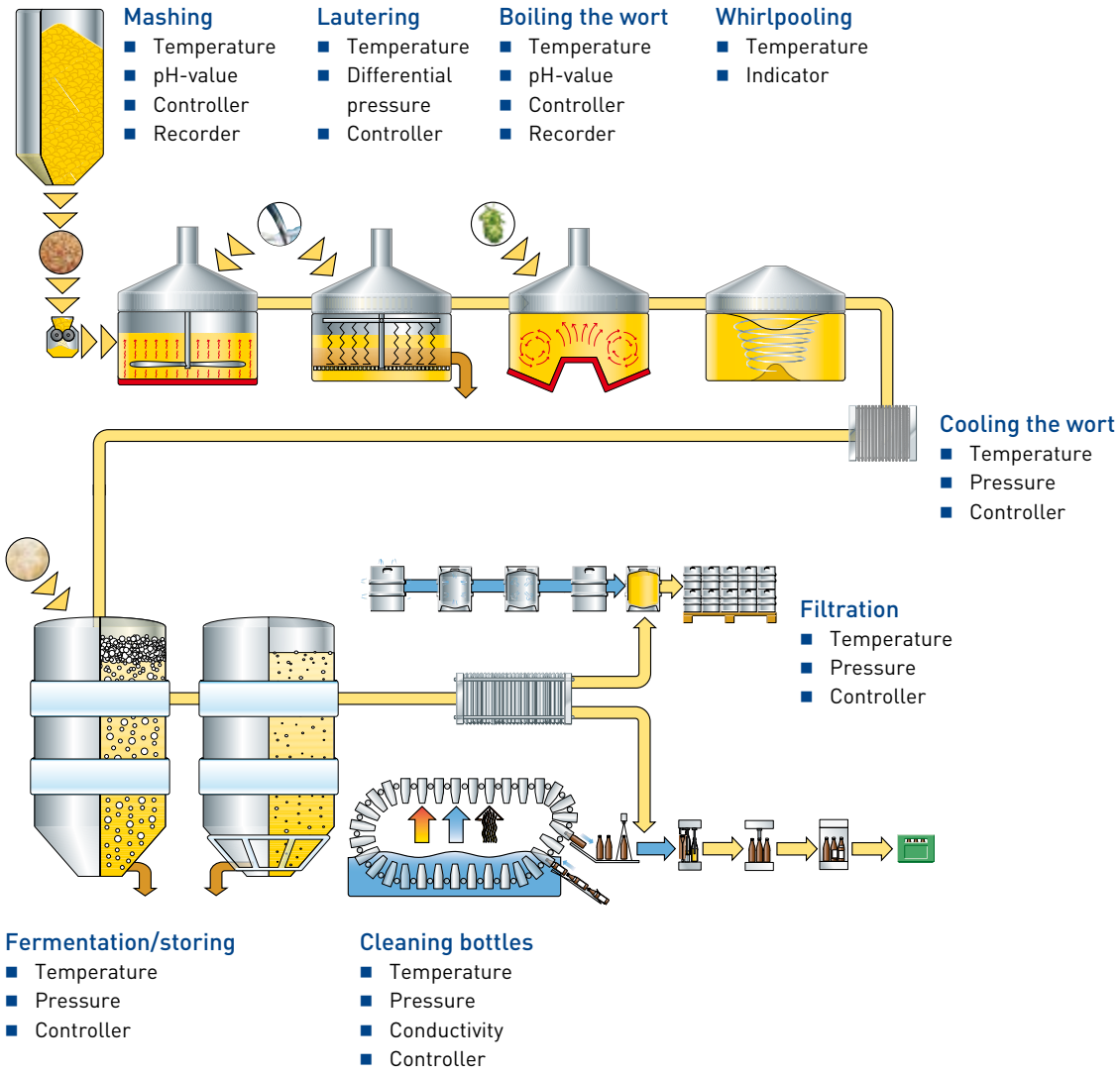
The brewing process requires time. It consists of a large number of individual details, starting with mashing and lautering, then boiling and cooling the wort and finally fermentation and filtration.
In all of these individual processes you relay on precise monitoring of temperature, pressure, the pH value or conductivity, etc. Top-class JUMO automation systems have been proven over many years in this application. They provide perfect support in these monitoring tasks along the entire process chain.

Overview of the brewing process

Temperature control and regulation

Temperature is one of the most important process variables in brewing. Precise control of processes and regulation of temperature is the only way to ensure the important processes – mashing, boiling and cooling the wort, fermentation, and storing – run reliably and reproducibly. With exact temperature measurements and regularly calibrated temperature sensors you can also optimize your costs and avoid excess heat output. For example, with a difference in temperature of just 1°C you can cut your energy costs considerably.

Look for some approaches to a solution for your processes on the following pages. We would be happy to work out a complete solution with you, fine-tuned precisely to your process.

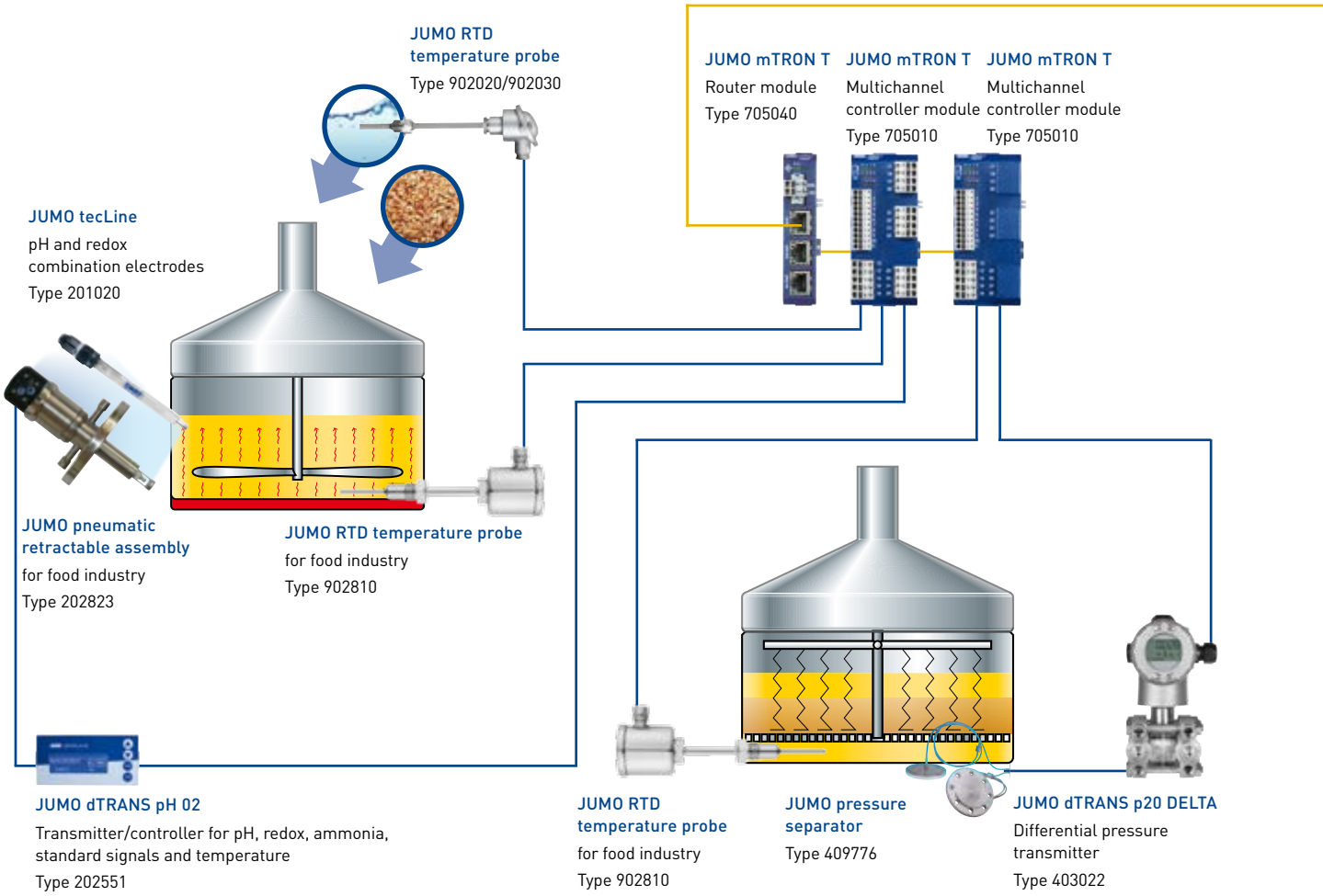


Brewhouse control

JUMO mTRON T – the brewhouse control system

With JUMO mTRON T we offer you one system that is capable of mastering the majority of measurement and control tasks in a brewhouse. Up to nine program generators ensure independent control of mashing, lautering and wort cooking. As a result, you can macerate the next ingredient while the wort is cooking.

While the temperature/time programs of the two processes are running, JUMO mTRON T records all the data you specify, such as temperature, pressure, pH value, flow rate, steam temperature and stirring speed. The PLC programming system CODESYS gives you a full range of options for automating processes according to your criteria.



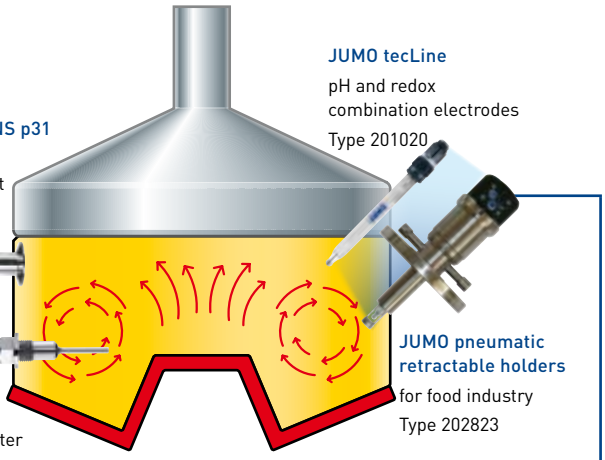
JUMO mTRON T
Multifunction panel 840
Type 705060

JUMO mTRON T
Central processing unit
Type 705001

JUMO mTRON T
Multichannel controller module
Type 705010

JUMO dTRANS p31
Pressure measurement
Type 402050

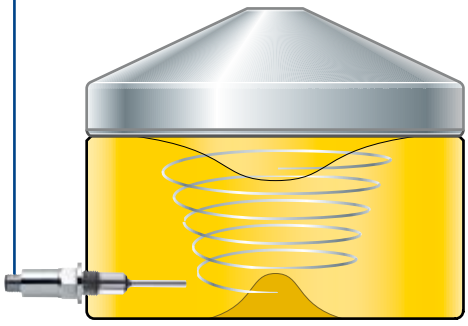
JUMO tecLine
pH and redox combination electrodes
Type 201020



JUMO pneumatic retractable holders
for food industry
Type 202823

JUMO Dtrans T100
Screw-in RTD temperature probe without/with transmitter
Type 902815

JUMO dTRANS pH 02
Transmitter/controller for pH, redox, ammonia, standard signals and temperature
Type 202551

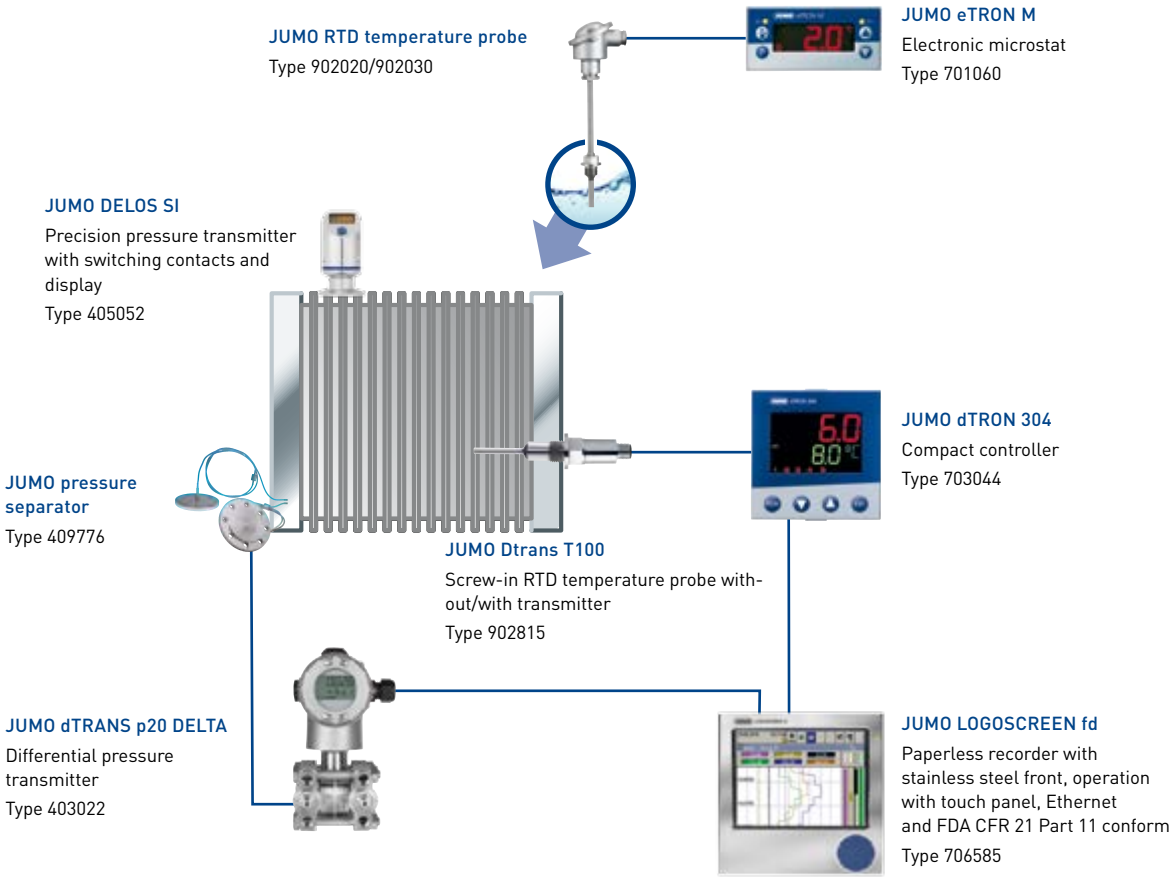


JUMO Dtrans T100
Screw-in RTD temperature probe without/with transmitter
Type 902815

Cooling the wort

Comprehensive control of wort cooling with JUMO dTRON

The flow rate of beer is controlled by its temperature: The warmer the beer, the more slowly it flows through the cooler. To ensure meticulous control, you should carefully monitor the temperature of the beer and the differential pressure with a recording instrument. This is the perfect job for JUMO LOGOSCREEN fd. Because of its versatile functionality, it can generate an alarm in case of malfunction or even total failure of the cooling system, thus ensuring high efficiency and availability of the plant.



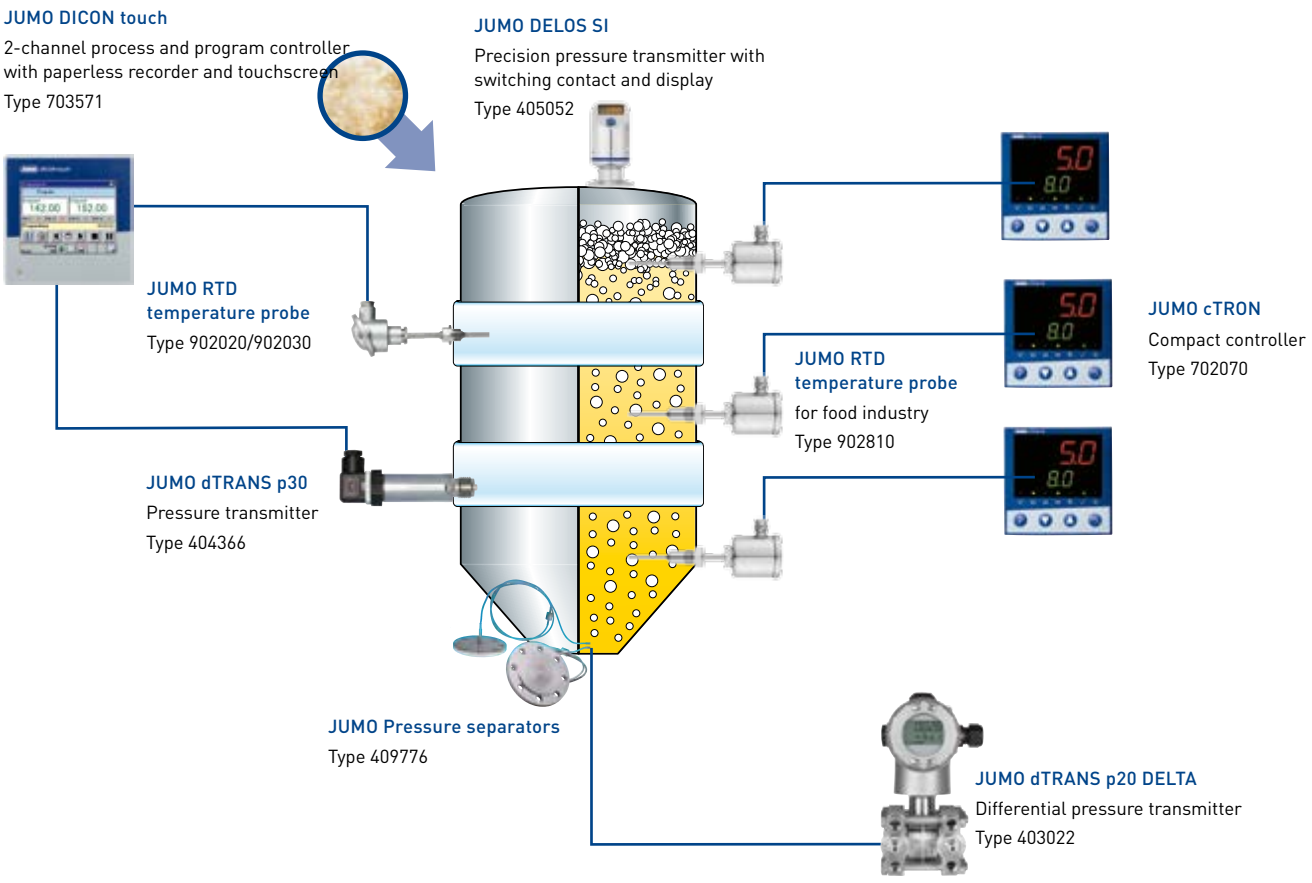
Fermenting/storing

Reliably determining CO_2-top pressure with the JUMO DELOS SI pressure transmitter

Fermentation produces carbon dioxide, which collects in the top of the tank and is removed to a CO_2 recovery plant above a certain pressure. Our JUMO DELOS SI electronic pressure transmitter with display and hygienic process connection provides ideal support for this process.

Precise nonitoring of cooling zones with the JUMO cTRON process controller

There are several cooling zones in the CCV (cylindro-conical vessel) with different temperatures to ensure that the "green" beer is agitated during the storing phase. JUMO cTRON perfectly controls the exact temperature of individual cooling zones for this task, thereby ensuring the quality of the beer.

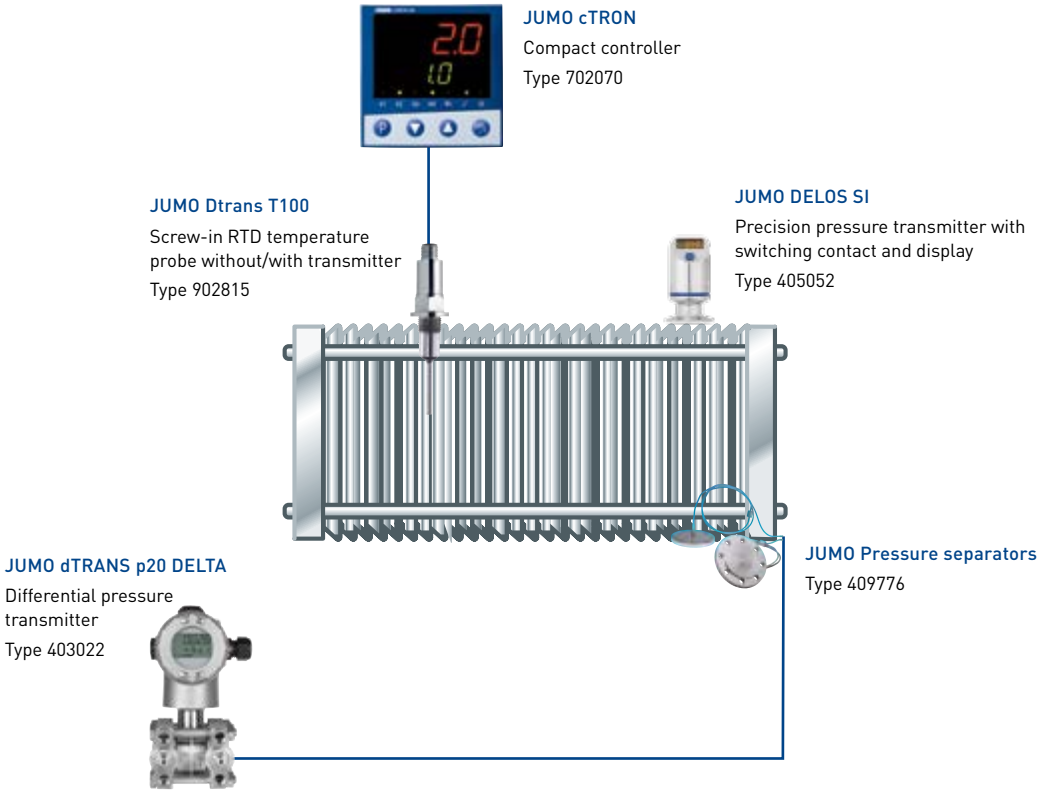


Filtration

Efficient monitoring of filtration with the JUMO dTRANS p20 DELTA differential pressure transmitter

After the yeast has been extracted, the beer is moved to filtration, where it is made durable by removing residual yeast cells and other particles that cause turbidity. The filtration may be based on layer or sieve filters. Filter materials include diatomaceous earth, although it is being gradually replaced by newer technologies such as crossflow filtration with membrane filters.

During filtration, the pressure increases gradually at the filter. To a certain extent, this pressure is related to the purity of the beer. You can use the JUMO dTRANS p20 DELTA differential pressure transmitter to measure precisely how long the filter can still be used by determining the increase in differential pressure. In this way you can ensure the quality of your beer and make optimum use of your filters.



Cleaning bottles

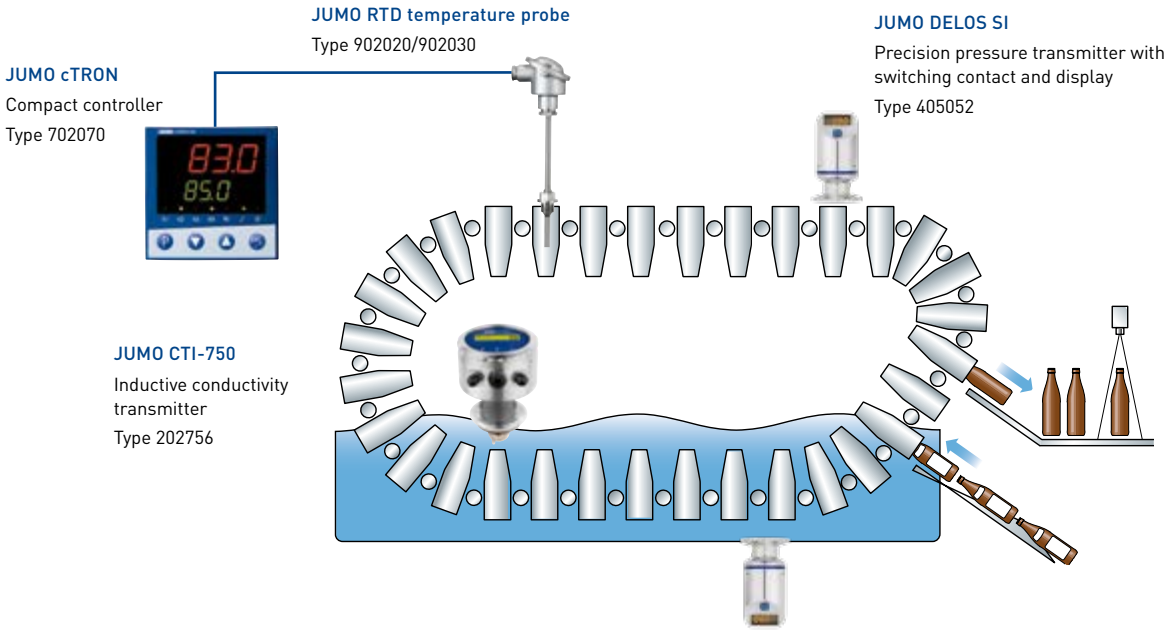
Optimum setting and monitoring with the conductivity transmitter JUMO CTI-750

In the bottle cleaning plant, glass bottles are cleaned by a warm lye solution and then rinsed with water at a different temperature. However, the caustic solution is continually diverted by this process, which changes the concentration of the lye. The JUMO CTI-750 is at home for this task: It continually adjusts the concentration of the caustic solution based on conductivity. This ensures reliable cleaning of glass bottles with consistently high quality.

Temperature control in the bottle cleaning plant

Slow warming of glass bottles is important especially in winter. Special pre-rinsing baths are available for this in cleaning plants. The temperature rises slowly in these baths to minimize the danger of the glass breaking on contact with the caustic solution, which is at 80°C.

The JUMO cTRON compact controller is ideally suited for monitoring and controlling temperatures in the cleaning plant.



Cleaning in Place (CIP)

Hygienic and perfectly cleaned plants are the basis of any good beer brewing process. This is ensured by CIP or „Cleaning in Place“. JUMO also offers top-class systems and solutions you can rely on for this application.

Measure – control – display – record

New possibilities with JUMO AQUIS touch S

The JUMO AQUIS touch S is a modular multi-channel measuring device that allows for new approaches in CIP cleaning. For example, you can measure, control, record, and display the concentration setting of acid and lye solutions on site in addition to the level of both tanks as well as the flow speed – and all that with a single device.

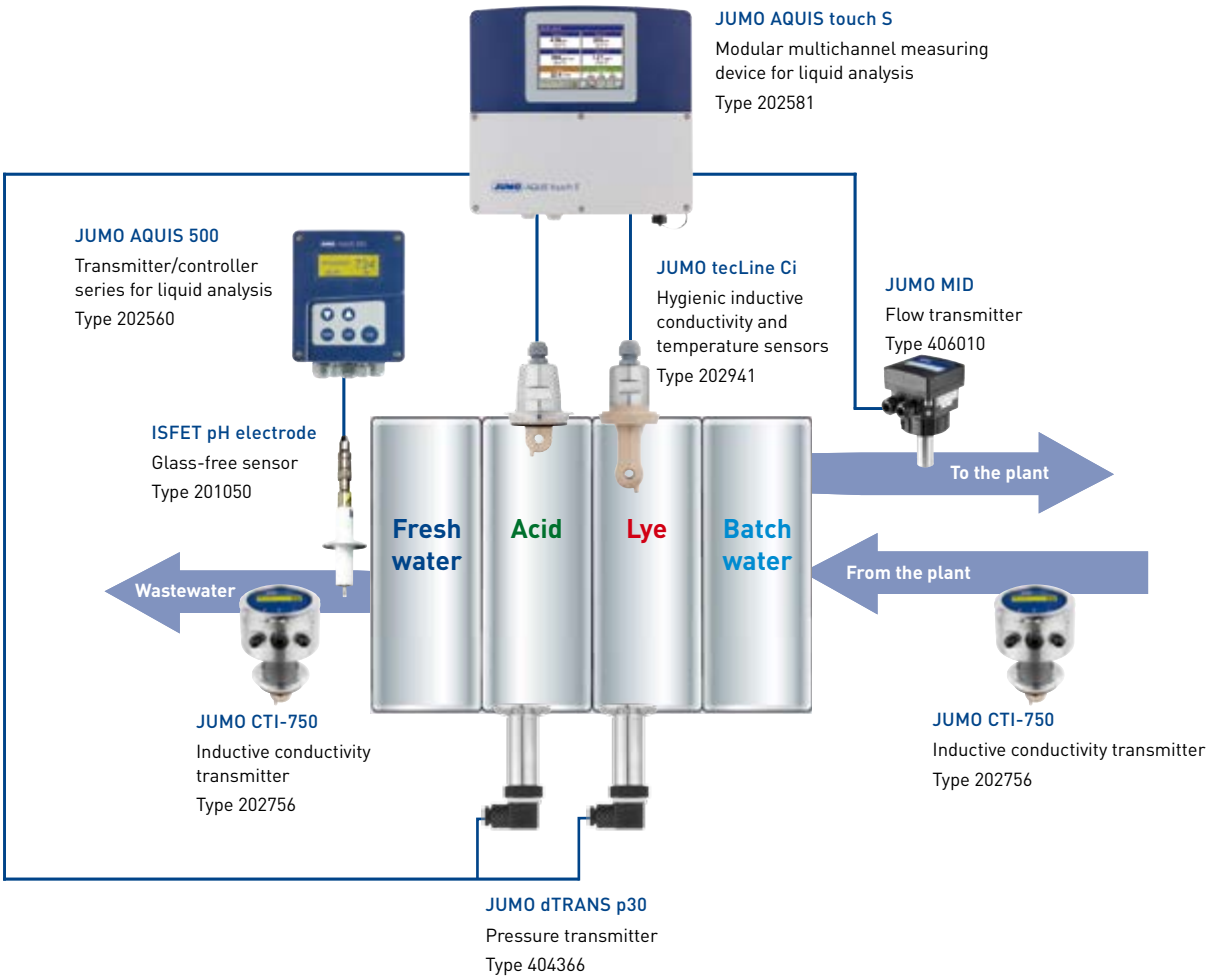
Normally up to four analog analysis sensors and as many as ten parameters can be measured and managed simultaneously.

In addition to numerous alarm, limit value or time-controlled switching functions, up to four higher-order loops can be defined simultaneously in the JUMO AQUIS touch S.

Protect resources – reduce maintenance cost

Whichever system you choose, the modular multi-channel device JUMO AQUIS touch S or the proven inductive conductivity transmitter JUMO CTI-750, you have made an excellent investment.

Both systems have impressive advantages. For example, the JUMO CTI-750 is the ideal solution if you are working with a PLC in the background. On the other hand, the JUMO AQUIS touch S works as a standalone solution. The low-maintenance sensor and highly accurate, inductive measurement of conductivity help preserve resources and cut down on the maintenance overhead of your system.



JUMO mTRON T – Your System

The scalable measuring, control, and automation system

JUMO mTRON T combines a universal measured value recording system with a precise control system offering intuitive operation. It can also be expanded into a complete automation solution. The scalability of the JUMO mTRON T allows it to be individually adapted to a particular task. Tamper-proof data recording is just one of its outstanding features. Control and data recording therefore meet the requirements of the AMS 2750 and CQI-9 specifications.

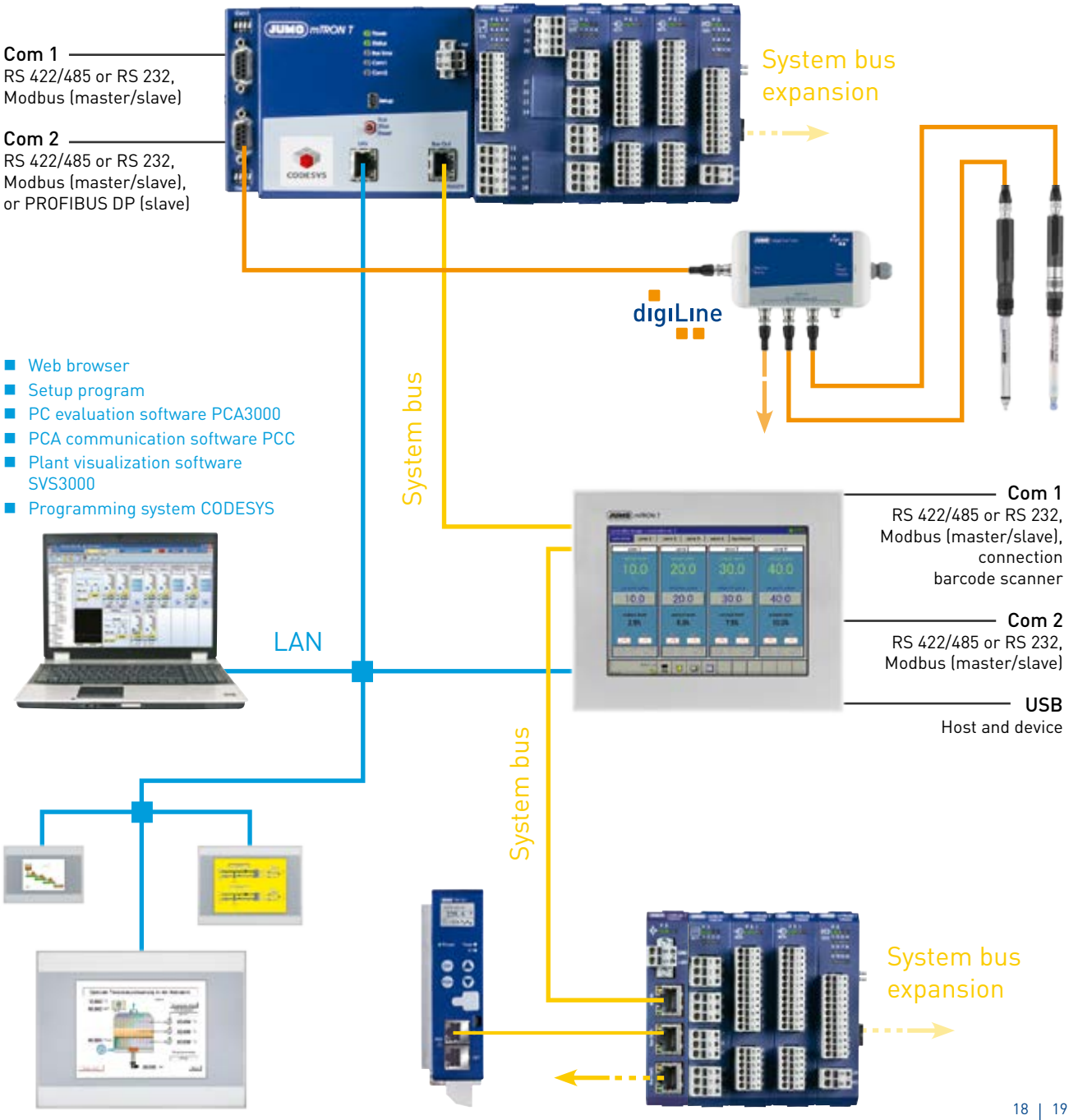
The heart of the JUMO mTRON T is a **central processing unit** with a process map for up to 30 input/output modules. The CPU has superordinated communication interfaces including web server functionality. For individual control applications, the system has a **PLC (CODESYS V3)**, program generator, and limit value monitoring functions as well as math and logic modules.

Various components are available as **input/output modules** (e.g. **analog input modules** with galvanically isolated universal analog inputs for thermocouples, RTD temperature probes, and standard signals). As a result the same hardware can be used to precisely record and digitize a highly diverse range of process variables. Every **multichannel controller module** supports up to four PID control loops with a fast cycle time and proven control algorithms. The control loops here operate fully independently which means that they do not require resources from the central processing unit. Overall the system allows for simultaneous operation of up to 120 control loops so that it can also be used for sophisticated processes. Through expansion slots the inputs and outputs of each controller module can be individually expanded and adapted. **Power controllers** can also be connected directly via the system bus.

A **multifunction panel** visualizes the measured values and enables convenient operation of the overall system. User-dependent access to parameter data and configuration data can also be set up. Using standard predefined screen masks, startup times are considerably reduced. The recording functions of a fully-fledged paperless recorder, including additional web server functionality, are also implemented in the multifunction panel. The data recording function is tamper-proof and also provides comprehensive batch reporting. Proven PC programs are available for extracting and evaluating historical data. If required, the JUMO mTRON T can be made even more flexible with **additional operating panels**.

A setup program is used for **hardware and software configuration** as well as for project planning of the measurement and control tasks. Users can also develop their own highly efficient automation solutions with CODESYS editors according to IEC 61131-3. And last but not least, **JUMO digiLine sensors for liquid analysis** can also be connected directly to the JUMO mTRON T via PLC application.

System structure



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