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 special importance on regular new development cycles, continuous improvements in existing products and continually making production methods more economical. This is the only way we will 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 will give you an overview of JUMO products and systems for brewery technology. Of course we would also be happy to develop individual solutions for you, completely customized to your requirements.

The ultimate result of these solutions is consistently good beer quality!

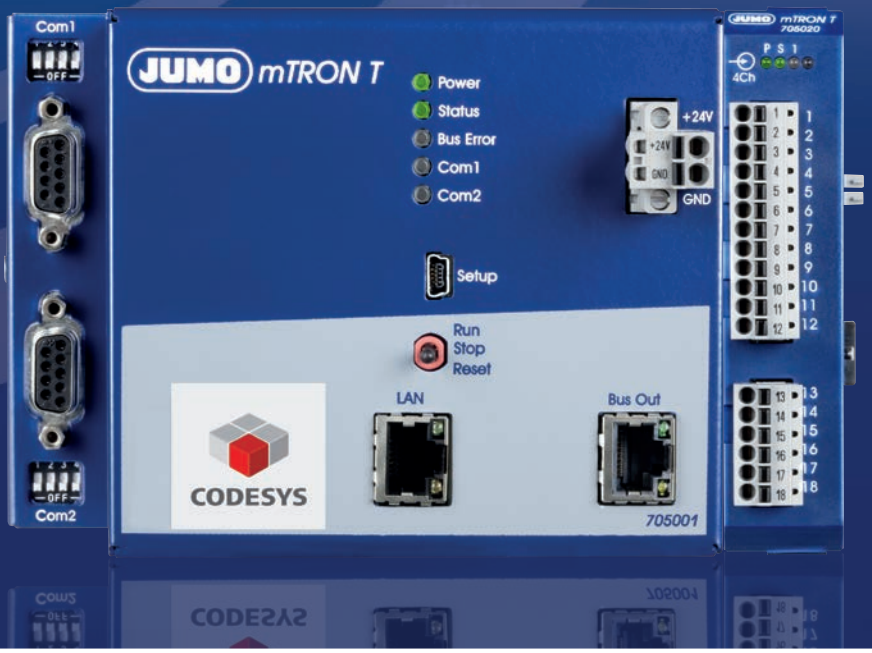
Yours,
Christina Hoffmann

P.S.: Detailed information about our products can be found under the specified type/product group number at **www.industry.jumo.info**

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 Pt 100 or Pt 1000 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

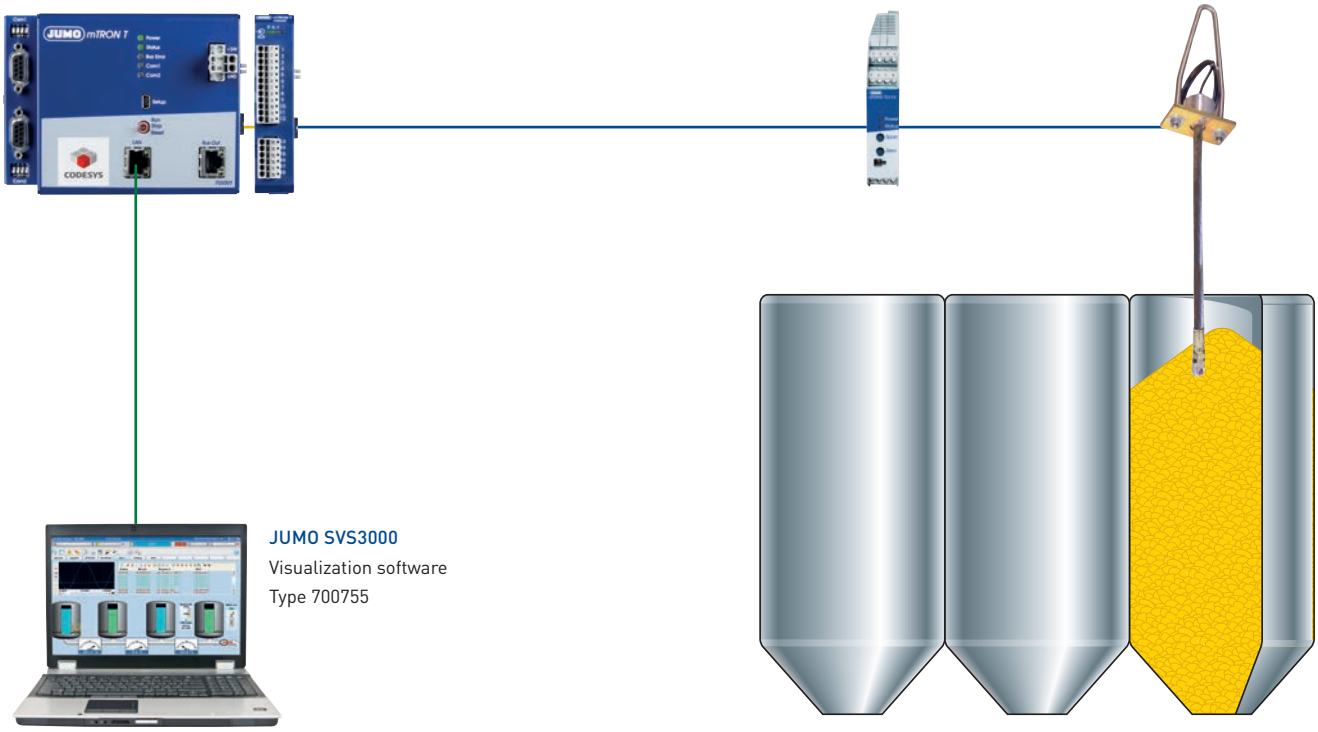
The JUMO mTRON T automation system offers several advantages for storing barley and malt. For example, all measured values can be recorded by four- or eight-channel analog input modules. Up to 120 or 240 analog signals respectively can be recorded and displayed in your control room using the SVS3000 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

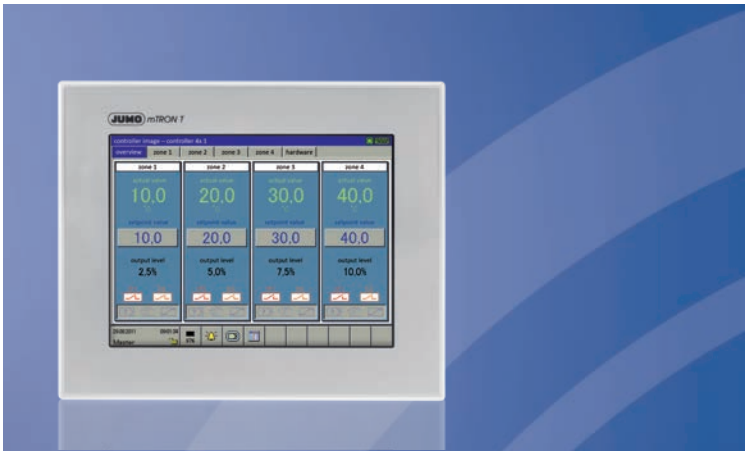
JUMO mTRON T
Analog input module 4-channel
Type 705020

JUMO dTRANS T02 Ex
Programmable 4-wire Transmitter (Smart Transmitter)
Type 707020

JUMO temperature probe
Silo probe
Type 359001



JUMO SVS3000
Visualization software
Type 700755



Steeping

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

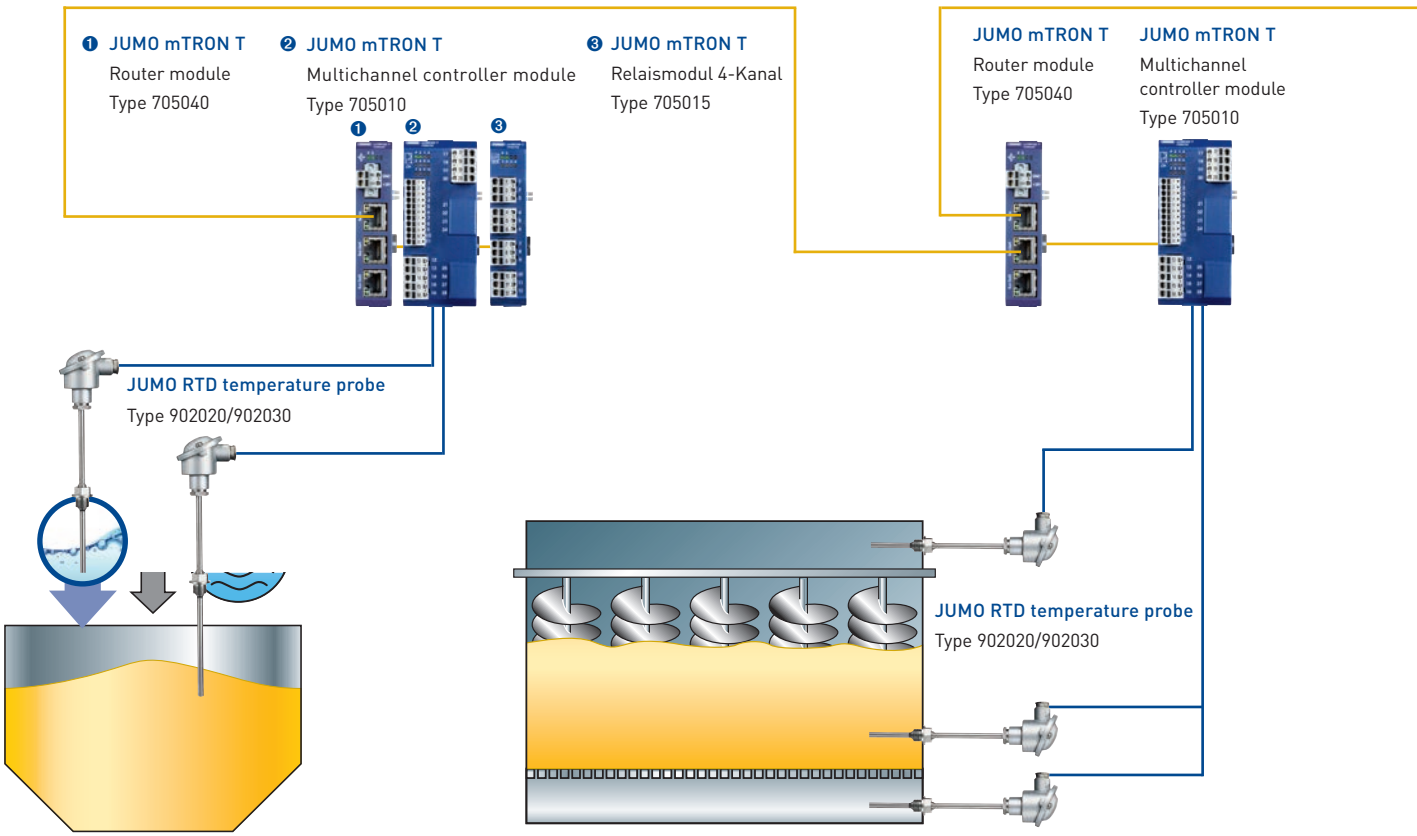
In the steep, the barley is soaked and aerated at regular intervals to promote germination. The increasing respiration caused by the added oxygen produces more CO2 and heat, which must be removed continuously. For this purpose the temperature in the steep is recorded for monitoring and displayed directly 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.



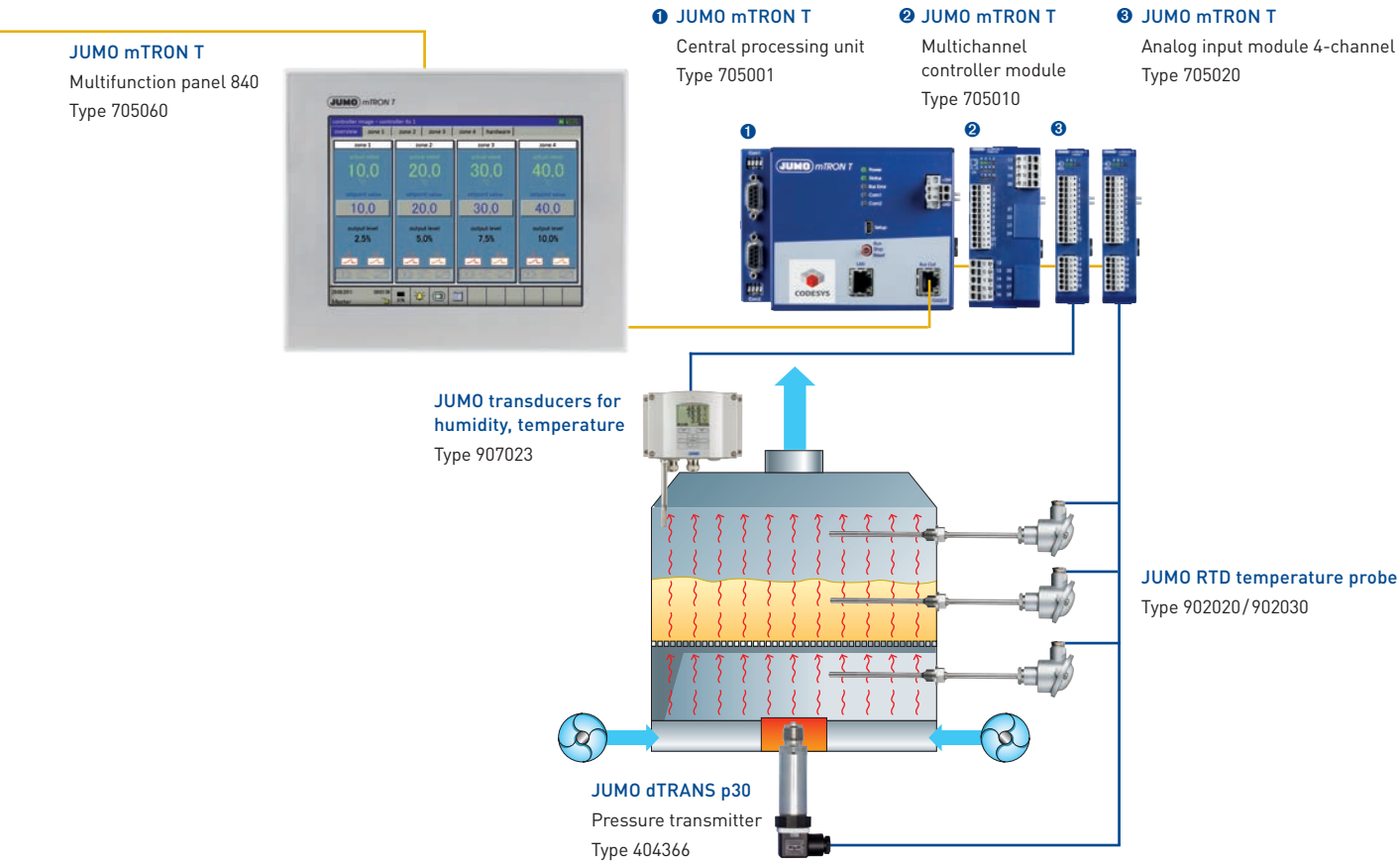
Kilning

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.



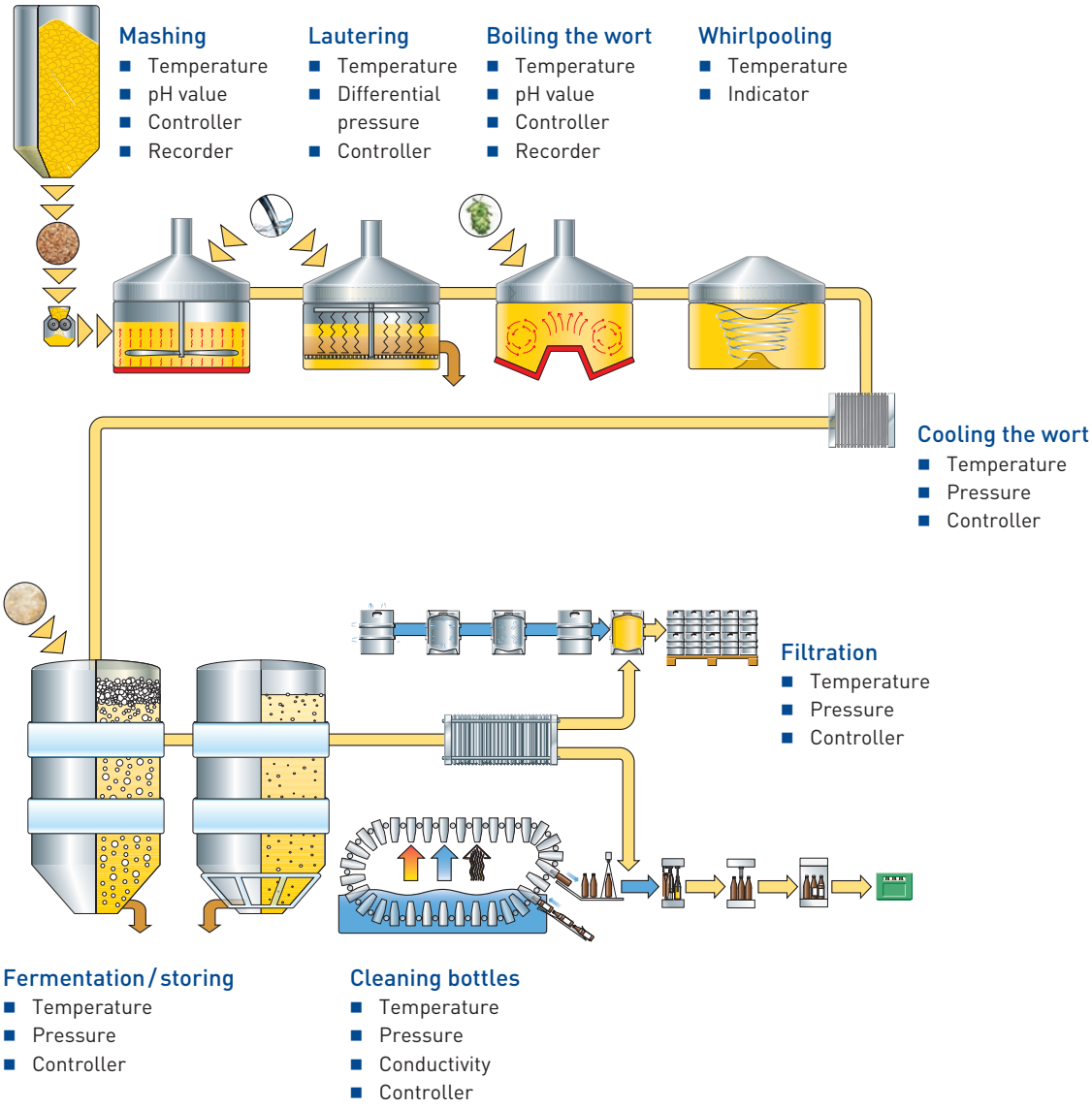
Brewing Process

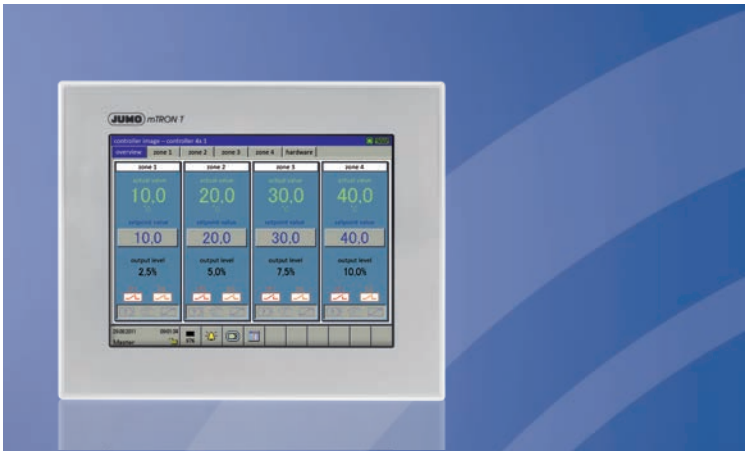
The brewing process requires time. It consists of a large number of individual details, starting with mashing and lautering, then boiling and cooling the wort and finally fermentation and filtration. In all of these individual processes you rely on precise monitoring of temperature, pressure, the pH 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.



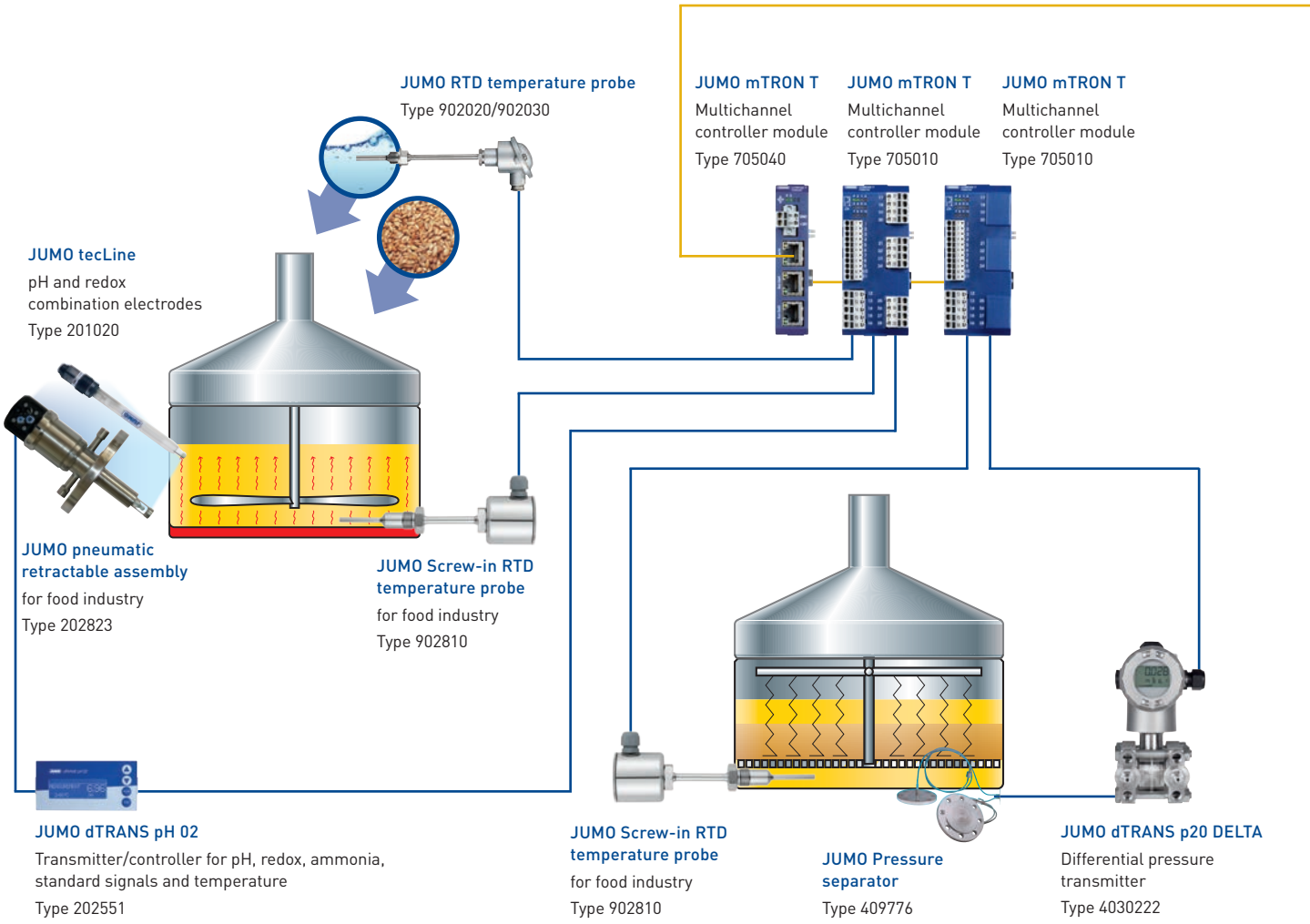


Brewhouse control

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.



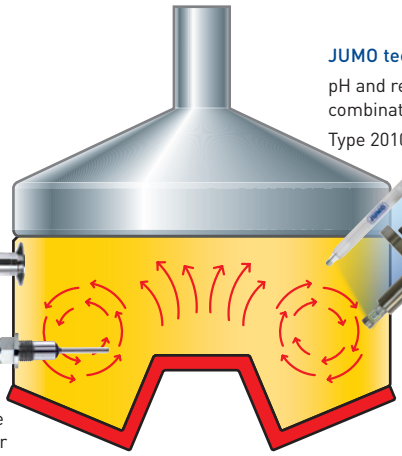
JUMO mTRON T
Multifunction panel 840
Type 705060

JUMO mTRON T
Central processing unit
Type 705001

JUMO mTRON T
Multichannel controller module
Type 705010

JUMO dTRANS p31
Pressure transmitter
Type 402050

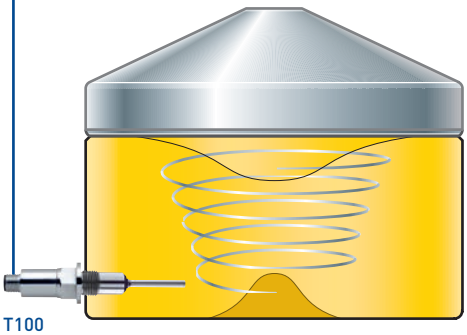
JUMO tecLine
pH and redox combination electrodes
Type 201020



JUMO pneumatic retractable assembly
for food industry
Type 202823

JUMO Dtrans T100
Screw-in temperature probe with transmitter
Type 902815

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

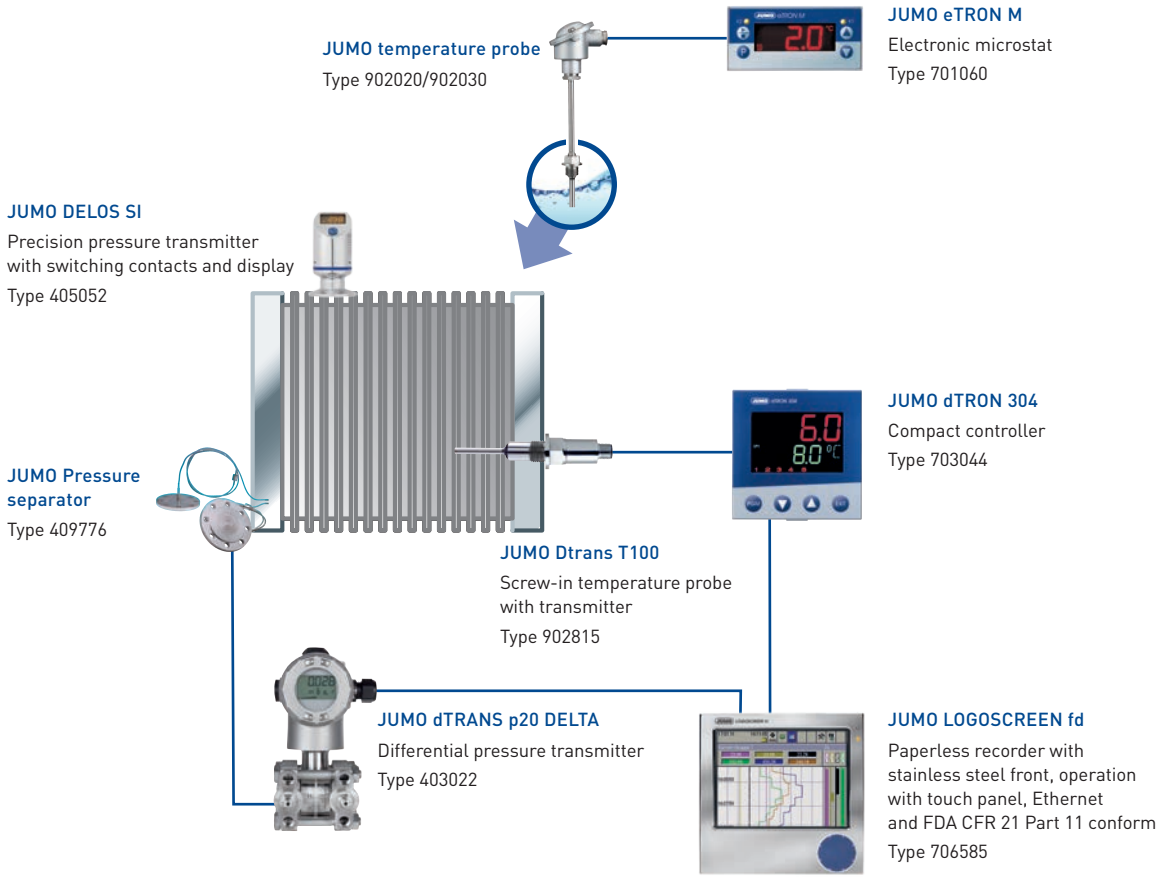


JUMO Dtrans T100
Screw-in temperature probe with transmitter
Type 902815

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.



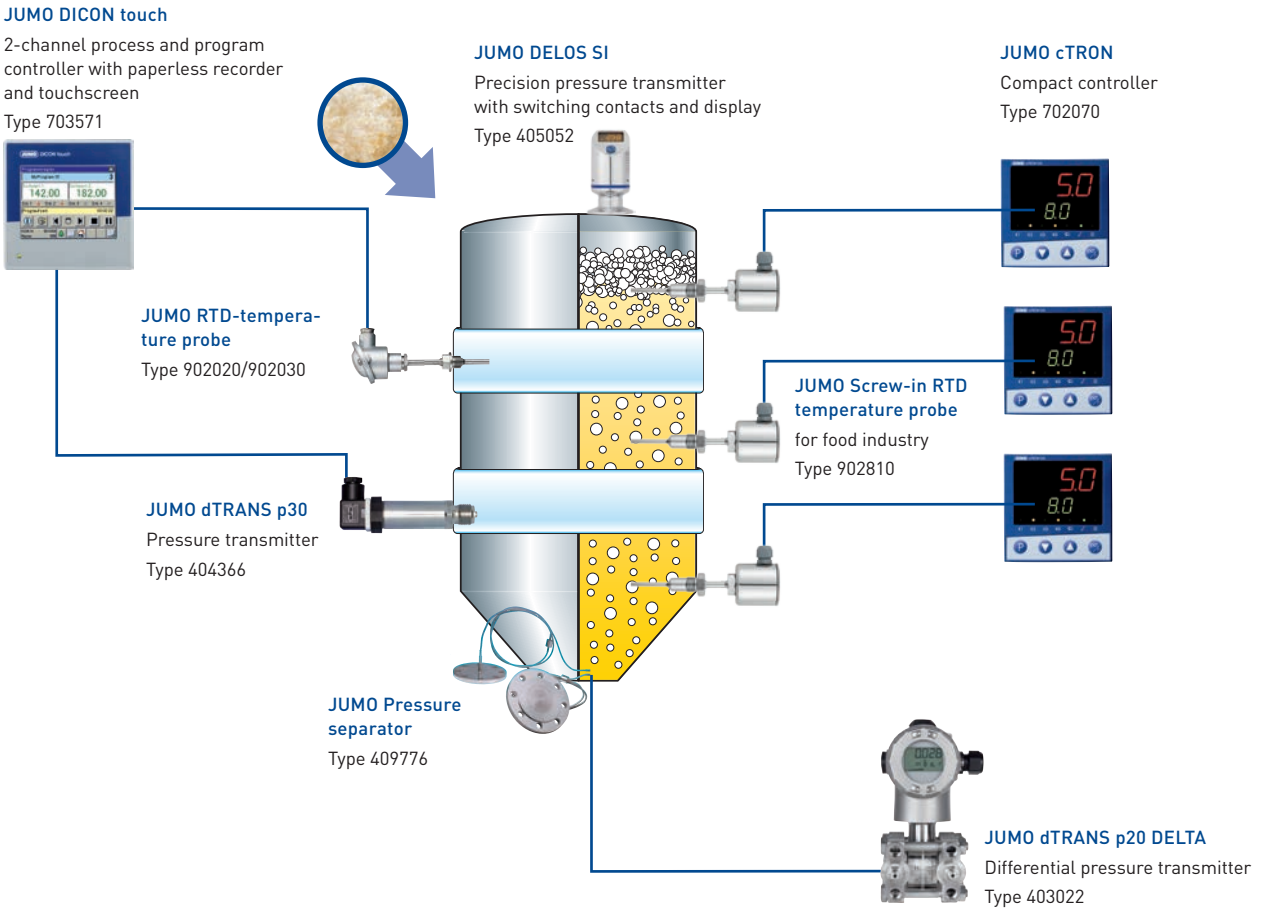
Fermenting / storing

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

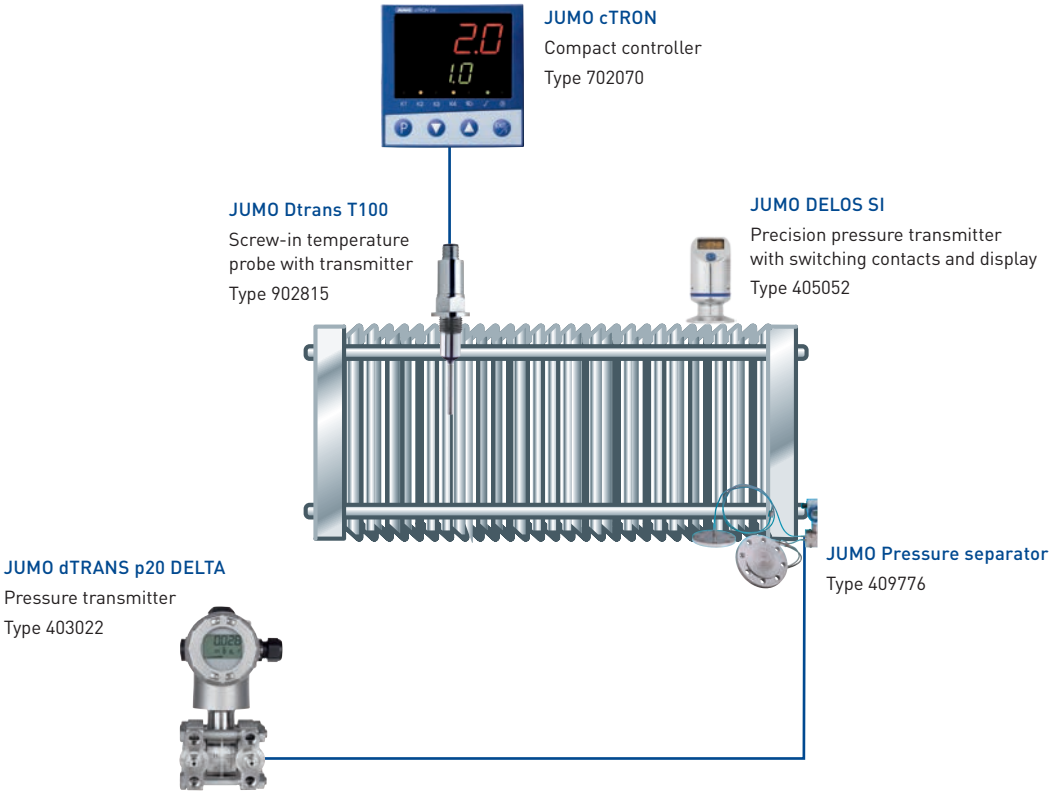
There are several cooling zones in the CCV (cylindro-conical vessel) with different temperatures to ensure that the "green" beer is agitated during the storing phase. JUMO cTRON perfectly controls the exact temperature of individual cooling zones for this task, thereby ensuring the quality of the beer.



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.



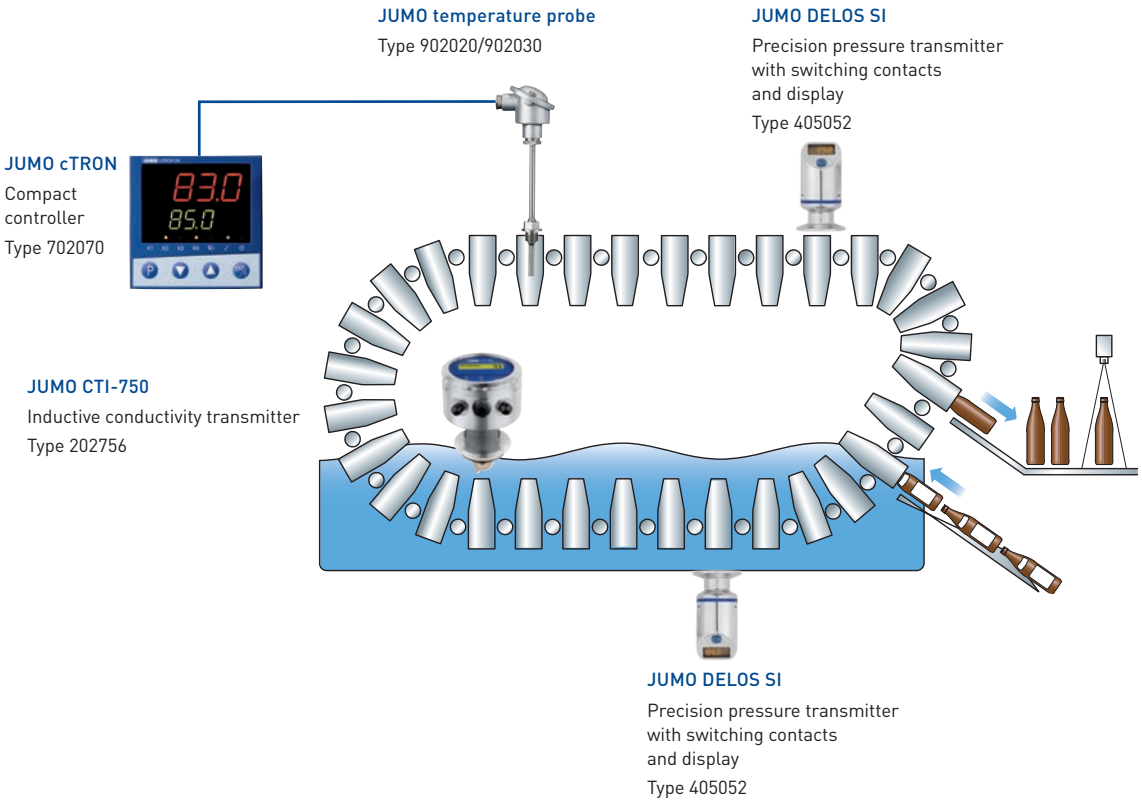
Cleaning bottles

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

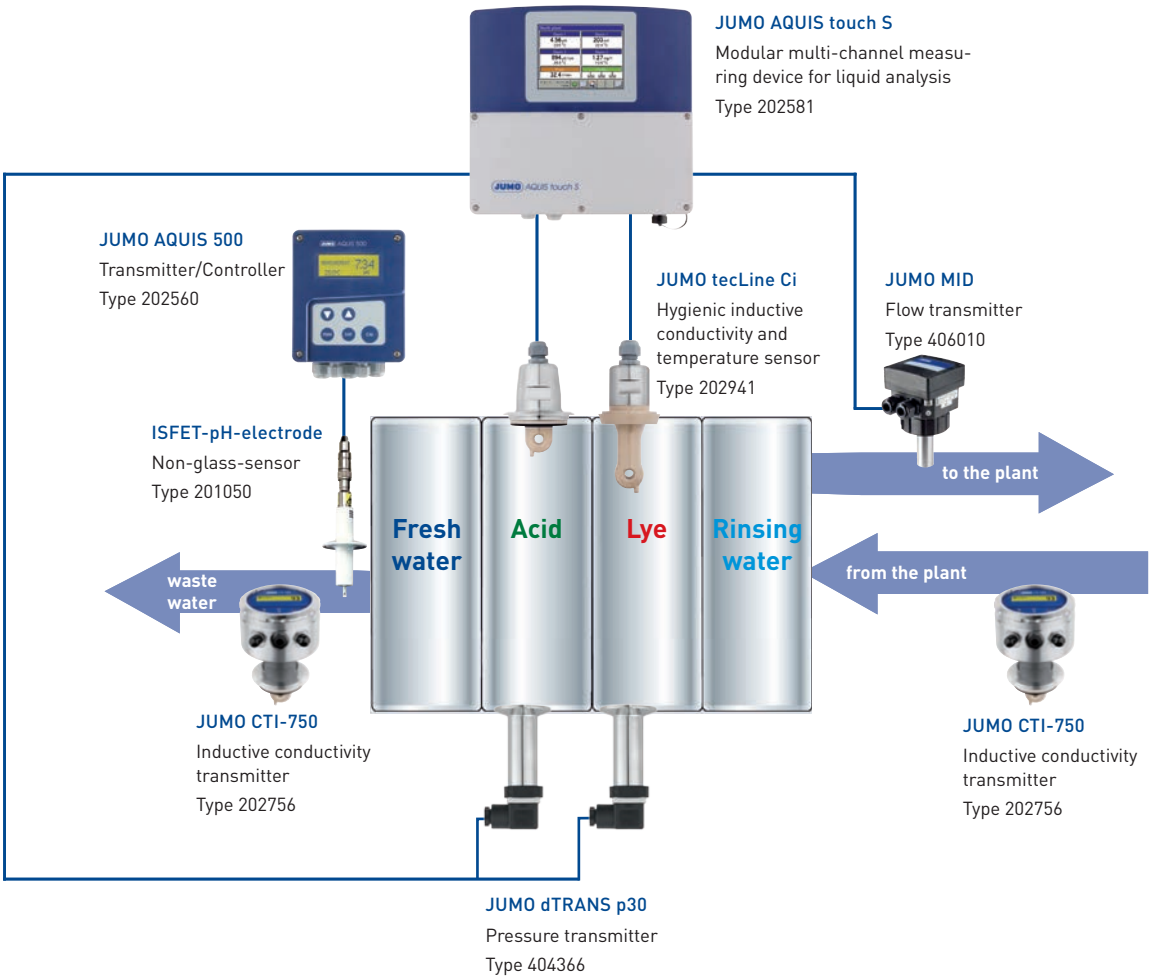
The JUMO AQUIS touch S is a modular multi-channel measuring device that allows for new approaches in CIP cleaning. For example, you can measure, control, display locally and record the concentration adjustment of acidic and lye solutions, the filling level of the two tanks and the flow velocity – all with one 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

System layout

JUMO mTRON T is modularly designed and uses an Ethernet-based system bus and integrated PLC, even for non-centralized automation tasks. The universal measuring, control, and automation system combines JUMO's extensive process know-how with a simple, application-oriented, and user-friendly configuration concept.

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

The following components are available as **input/output modules**: the four-channel analog input module with four electrically isolated universal analog inputs for thermocouples, resistance thermometers, and standard signals. These modules enable precise recording and digitizing of process variables with the same hardware which simplifies planning, resource management, and stockkeeping. Multichannel controller modules support up to four independent PID control loops with a fast cycle time and proven control algorithm without placing any load on the central unit. The system allows for simultaneous operation of up to 120 control loops and meets the needs of demanding control processes.

Optional slots can be used to extend and adapt the inputs and outputs of each controller module individually. The **multifunction panel** provides visualization of data as well as convenient operation of the controller and program generators. User-dependent access to parameter and configuration data of the overall system is also possible. Recording functions of a high-quality paperless recorder, including web server, are implemented as a special feature. Proven PC programs with standard predefined screen templates are available for reading and evaluating historical data.

A setup program is used for **hardware and software configuration** as well as project design for control tasks and recording measurement values. Users can create their own highly efficient automation solutions with CODESYS editors in accordance with IEC 61131-3. The entire application is recorded in a single project file.

Com 1
RS422/485 or RS232,
Modbus master/slave

Com 2
RS422/485 or RS422/485 or RS232,
Modbus master/slave
or PROFIBUS-DP slave

Expansion of system bus

LAN

System bus

Com 1
RS422/485 or RS232,
Modbus master/slave
connection
Barcode scanner

Com 2
RS422/485 or RS232,
Modbus master/slave

USB
Host and device

- Web browser
- Setup program
- PCA3000 PC evaluation software
- PCA communication software PCC
- Plant visualization software SVS3000
- CODESYS programming system

Expansion of system bus

www.jumo.net

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