



MORE THAN SENSORS
AND AUTOMATION



Pharmaceuticals and Biotechnology

Innovative solutions for your success





Dear Reader,

Pharmaceutical products are an integral part of our everyday lives. But only manufacturers know just how much the production of these materials depends on reliable processes and accurate measurement technology.

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

So how do we do it? Through long-standing experience and expertise: because for more than 75 years, JUMO has been one of the leading manufacturers in the field of measurement and control technology. Consequently, JUMO is also an expert partner for the pharmaceutical industry.

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

Here at JUMO we provide only the best for your pharmaceutical and biotechnology tasks with a wide range of solutions for a variety of applications.

This brochure provides an overview of our JUMO products and systems for pharmaceuticals and biotechnology. Of course, we would also be happy to develop individual solutions that are completely customized to your requirements.

With this in mind I hope that you find many interesting new approaches in this brochure.

PS: Detailed information about our products can be found under the product group number at www.industry.jumo.info.

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Pharmaceutical water

The production of pharmaceutical water is one of the most important processes in the pharmaceutical industry. Manufacturing pharmaceuticals without pharmaceutical water would not be possible. Its quality is decisive for consistently high product quality. Whatever water quality you require for your process, JUMO products provide pure water of a quality on which you can rely.



Reverse osmosis

Highly-purified water monitoring in the reverse osmosis plant

Reverse osmosis is a process that is widely used today for manufacturing highly-purified water. The process is based on the principle of equalizing the concentration of 2 differently concentrated liquids with a semipermeable membrane and the specific osmotic pressure. JUMO provides you with various options to monitor this process with hygienic sensors and transmitters. The conductivity transmitter allows you to compensate the temperature according to ASTM D1125-95 and monitor the limit value according to USP (water conductivity <645>).

Differential pressure transmitter
Type 403022

Transmitter and controller
Type 202552

Compact controller
Type 703043

Transmitter and controller
Type 202552

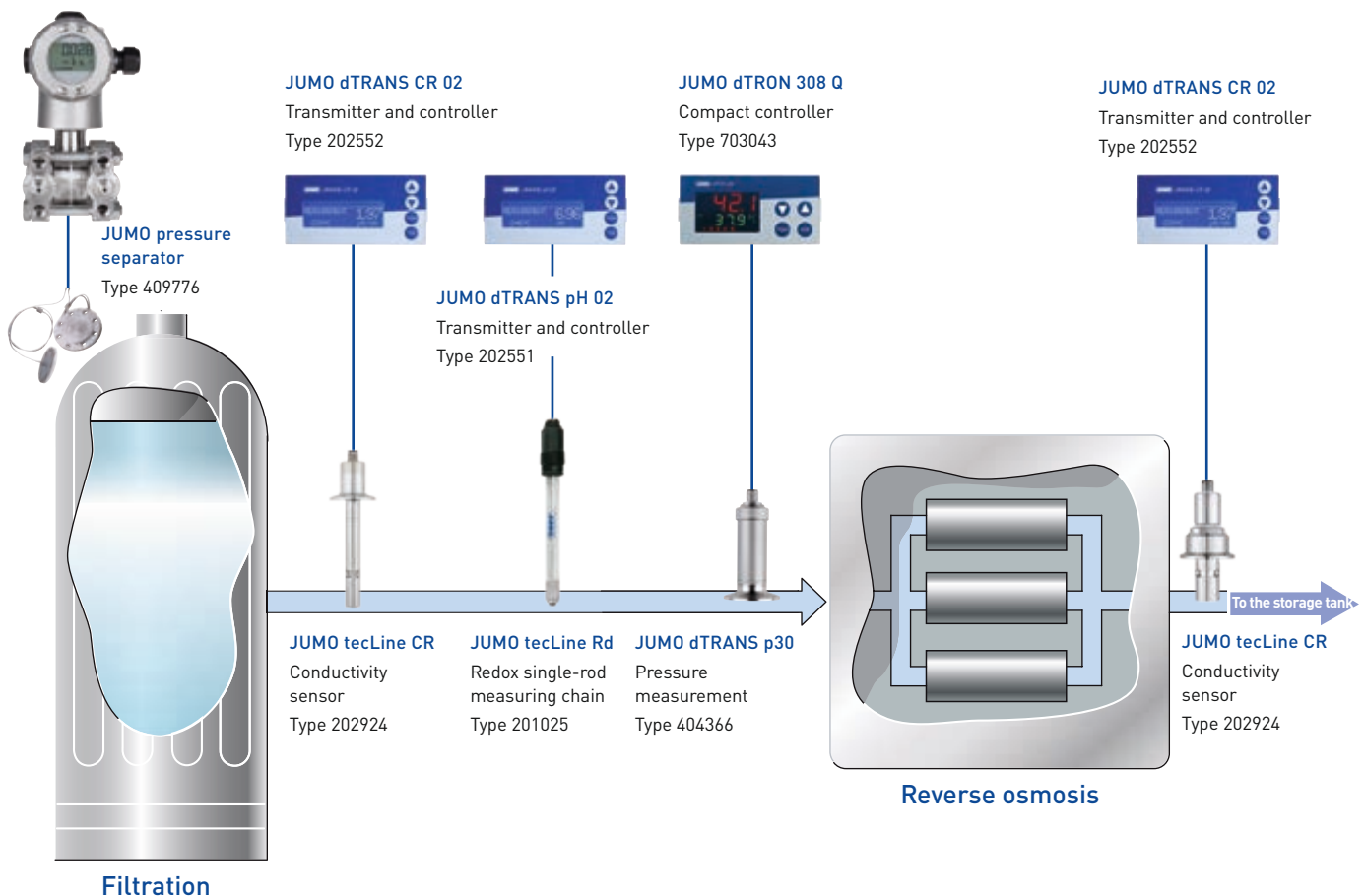
Transmitter and controller
Type 202551

Conductivity
sensor
Type 202924

Redox single-rod
measuring chain
Type 201025

Pressure
measurement
Type 404366

Conductivity
sensor
Type 202924





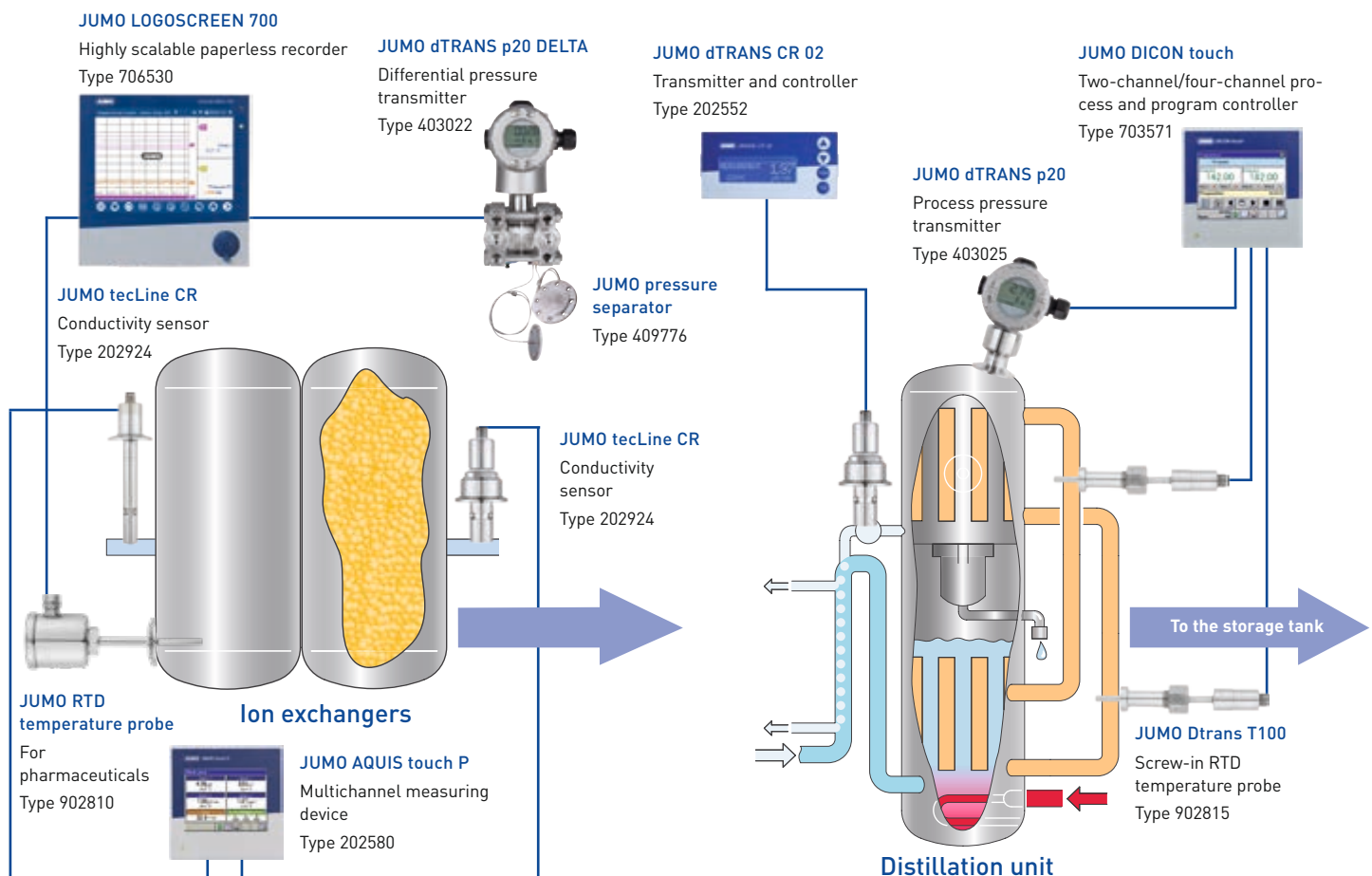
Distillation

Manufacturing high-purity water through distillation (WFI)

In Europe, distillation is the required process for manufacturing water for injection purposes (WFI) according to the European Pharmacopoeia. Distillation is used almost exclusively in the USA as well. One reason here is the high quality of water that is manufactured this way with regard to microbiological impurities. During the distillation process, water that has been previously purified (e.g. by an ion exchanger) is heated with steam produced previously and forced under pressure into the evaporator for distillation.

Temperature monitoring during distillation

Temperature is one of the most important measurands in distillation. The temperature at which a liquid boils is determined based on the pressure curve of liquids in line with the pressure. JUMO offers you special stainless steel (316L) temperature probes with a surface roughness of $\leq 0.8 \mu\text{m}$ for high-purity water installations. The temperature probes feature a high response speed and can be equipped with corresponding hygienic process connections for high-purity water installations (e.g. clamp or welding sleeve).





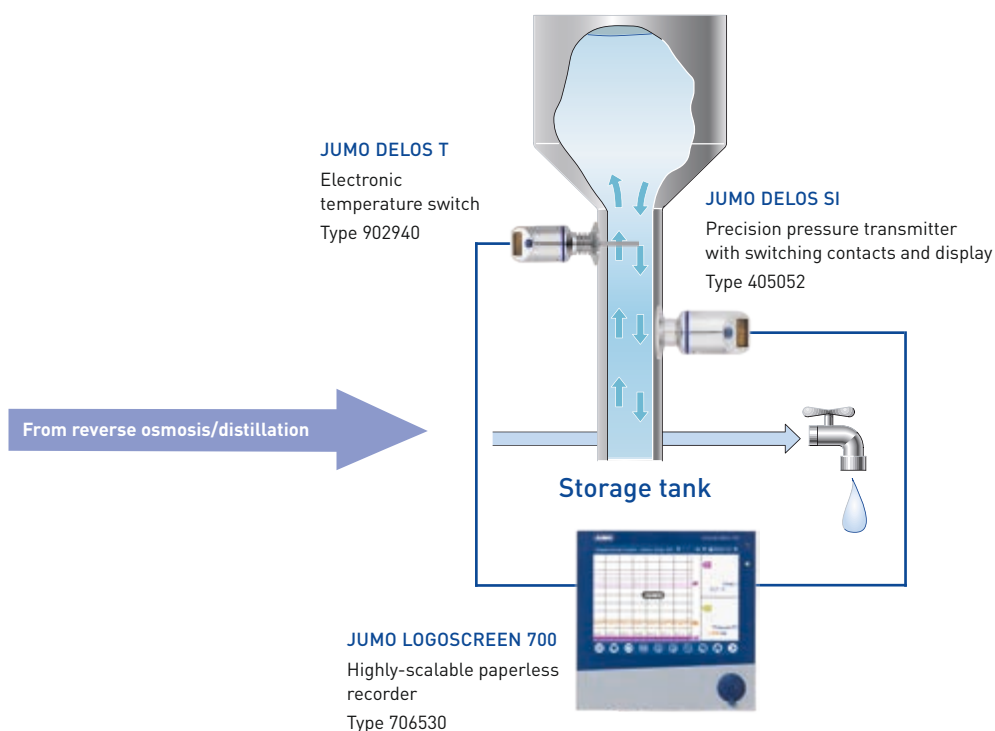
Water tank

Pressure monitoring during distillation

Pressure plays just as important a role in this process as temperature. Using negative pressure, the boiling point of the liquid to be distilled is lowered so that the entire process takes place at a lower temperature. This way, the liquid is preserved and energy is saved. The JUMO dTRANS p20, a stainless steel process pressure transmitter, is the ideal choice for this application and offers a high level of process reliability due to its high accuracy.

Level and temperature control in the water tank

A minimum temperature of 70 °C is required for the hot storage of distilled water for injection purposes according to the European Pharmacopoeia. Compliance with this lower limit must not only be continuously monitored but documented as well. The JUMO LOGO-SCREEN 700 is particularly well-suited for this task. It allows you to reliably record the process data and archive it in a tamper-proof manner. In addition, the paperless recorder offers scores of additional functions: online visualization, different types of limit value monitoring, the remote alarm in case of failure, and the simultaneous recording of 3 independent batch processes.





Sterilization of pharmaceutical products

Sterilization is a very important process in the pharmaceutical industry. Regardless of whether vapor, hot air, or gas sterilization is used for this process, temperature, pressure, and time are tremendously important factors. When performing the sterilization process, measuring devices need to respond quickly as well as work accurately and reliably. Here, too, JUMO provides solutions on which you can rely.



Sterilization

Monitoring the sterilization process with the JUMO LOGOSCREEN 700

When performing the sterilization process, measuring devices need to respond quickly as well as work accurately and reliably. To control the measurement, you can connect the measuring points to the JUMO LOGO-SCREEN 700 – a paperless recorder that documents and archives the data of the sterilization process in a tamper-proof manner. The JUMO LOGO-SCREEN 700 meets the requirements according to FDA 21 CFR Part 11. As a result, it is suitable for documenting all pharmaceutical processes.

Reliable pressure and temperature measurement

The basic idea behind sterilization is to make the products that are to be sterilized free of bioburden. This goal is achieved through the factors temperature, pressure, and time. They depend on and define each other. JUMO offers fast responding sensors for controlling and monitoring them. It also offers reliable measuring technology for a dependable sterilization result. Our products are suitable for any kind of sterilization when the appropriate steam-tight versions are used.

JUMO SVS3000

Process visualization software
Type 700755



JUMO LOGOSCREEN 700

Highly-scalable paperless recorder
Type 706530



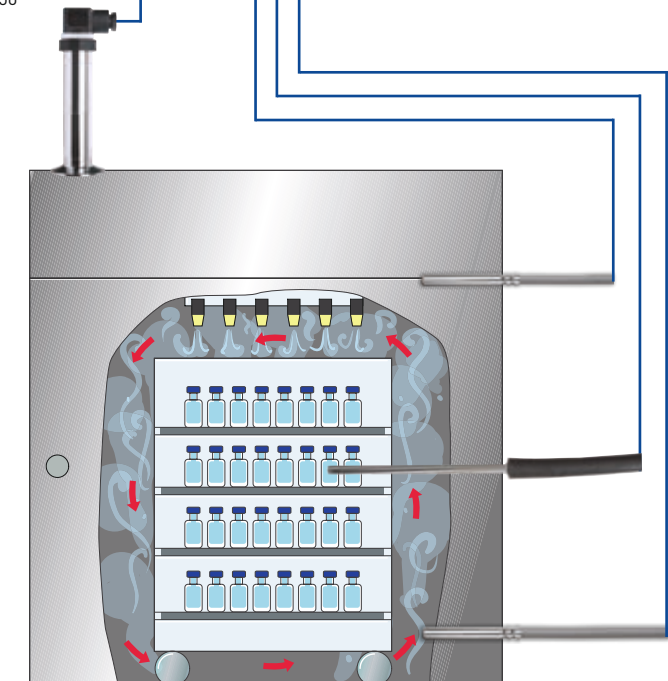
JUMO IMAGO 500

Multichannel process and program controller
Type 703590



JUMO dTRANS p31

Pressure transmitter
Type 402050



JUMO STEAMtemp

Push-in RTD temperature probes in steam-tight version
Type 902830



Biopharmaceuticals

Fermentation is a core process in pharmaceutical biotechnology. Microorganisms or enzymes are used here for manufacturing chemical or biochemical products. When manufacturing biopharmaceuticals, you rely on precision monitoring of temperature, pressure, and pH value. The first-class JUMO measuring systems have been tried and tested over many years and provide you with optimum support with this task.



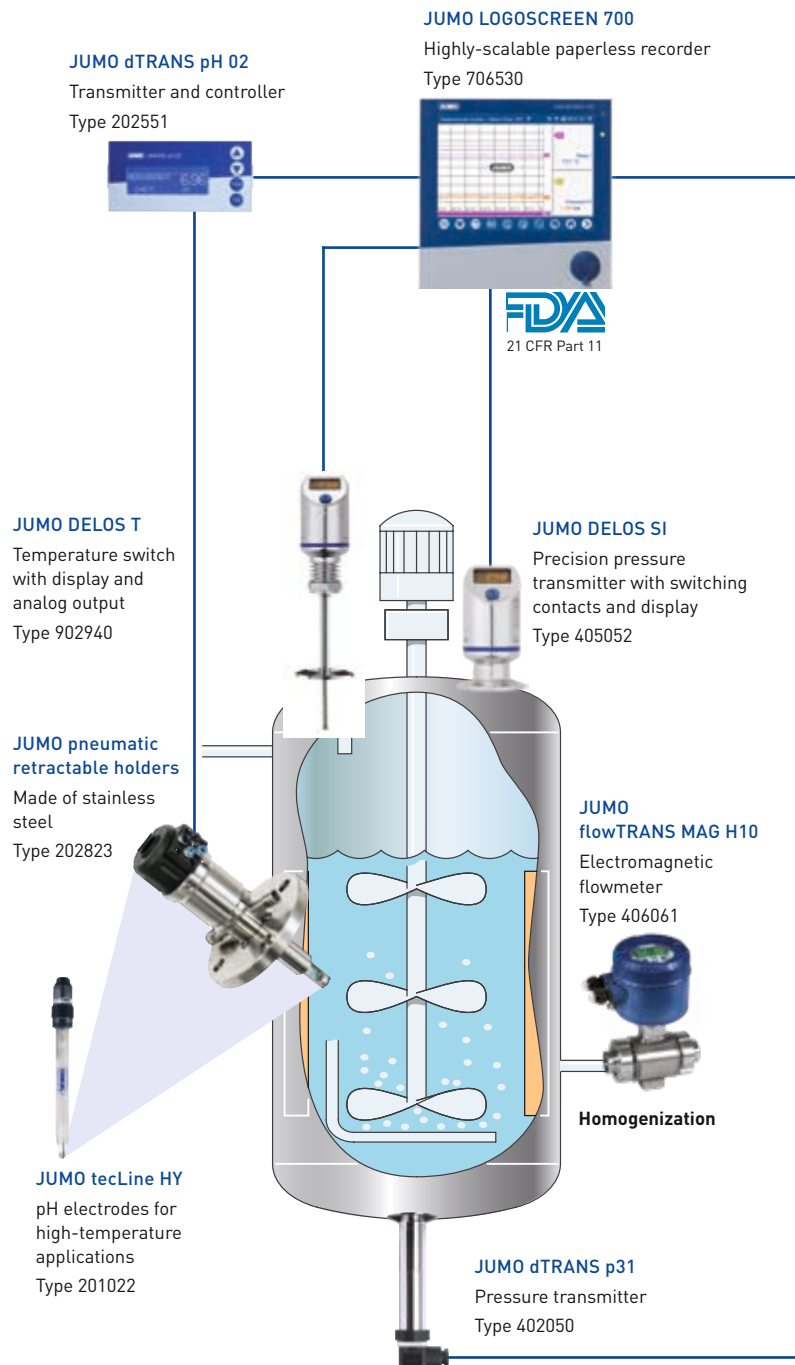
Fermentation

Monitoring the manufacturing of biopharmaceuticals

Biopharmaceuticals are highly susceptible to temperature and shearing. In addition, they are very sensitive to pH value, pressure, and contamination. To control all of these conditions in a specific manner, JUMO measuring systems enable the specific control and monitoring of the process conditions. The result is that the reproducibility of the active ingredients is ensured.

Pressure, temperature, and pH value monitoring with the JUMO LOGOSCREEN 700

During fermentation, the quality of the active ingredient to be manufactured greatly depends on the process conditions. To reliably document the process conditions, JUMO offers the LOGOSCREEN paperless recorder series, which can dependably document all measurement data in a reproducible manner. The JUMO LOGOSCREEN 700 paperless recorder is particularly well-suited for monitoring and recording your measurement data. Moreover, it has been especially designed to meet the defined FDA recording standards.





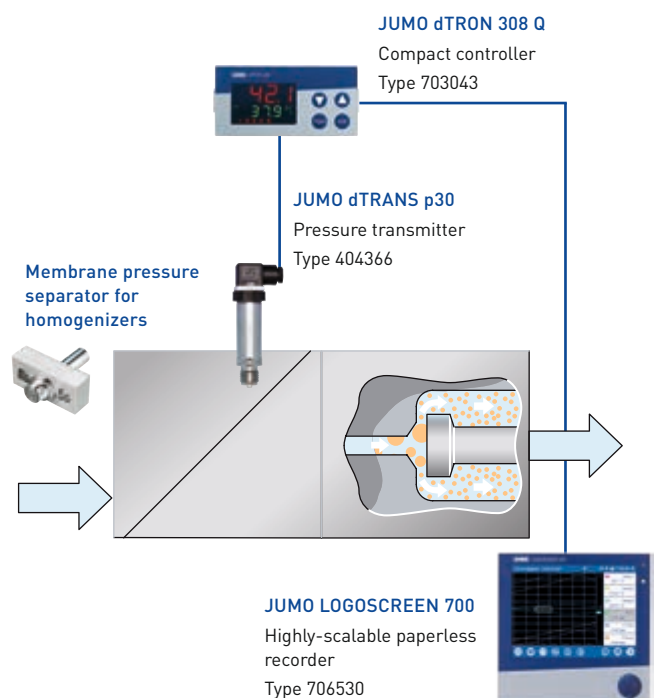
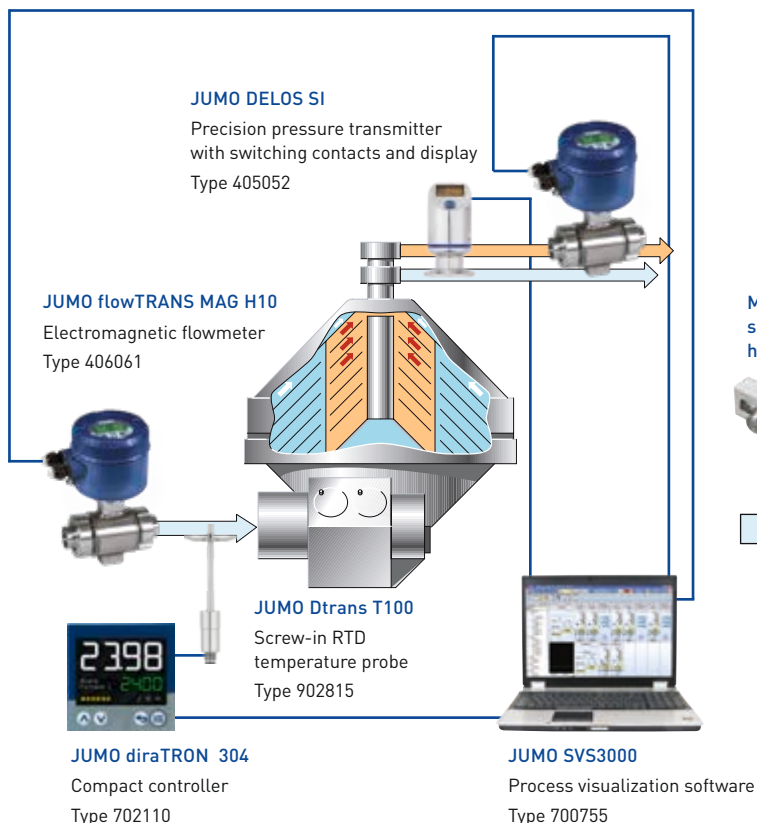
Harvesting

Controlling pressure after the separating process – with the JUMO DELOS SI

The control of the pressure in the separator outlet is important to ensure reliable results. Regardless of whether pressure or flow fluctuations occur after the separator has passed through, a constant pressure must be maintained in the outlet. JUMO DELOS SI, the electronic precision pressure switch, is a true all-rounder with switching contacts, analog output, and a vibrant LCD display for the visualization of the current process pressure and the switching contact statuses. We use high-quality stainless steel and front-flush measuring systems without seals so that you can use it in areas that are hygienically sensitive.

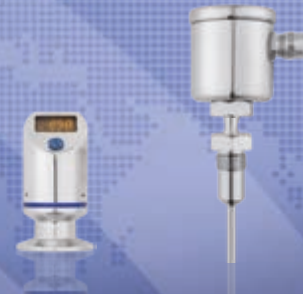
Pressure control during the homogenization process – with the JUMO IMAGO 500

The precise control and monitoring of the pressure during homogenization is a guarantee that this process is always highly efficient so that the intended result can be achieved. When manufacturing intracellular products, the biomass obtained in the separator is homogenized. The cells are disintegrated and the intracellular liquid is released. Controlling pressure with the JUMO dTRANS p30 pressure transmitter offers the safety and accuracy that you need for this process.



Pharmaceuticals and Biotechnology

Pharmaceutical water Sterilization Biopharmaceuticals Drying Refining Cleanroom CIP/SIP cleaning



Cleaning

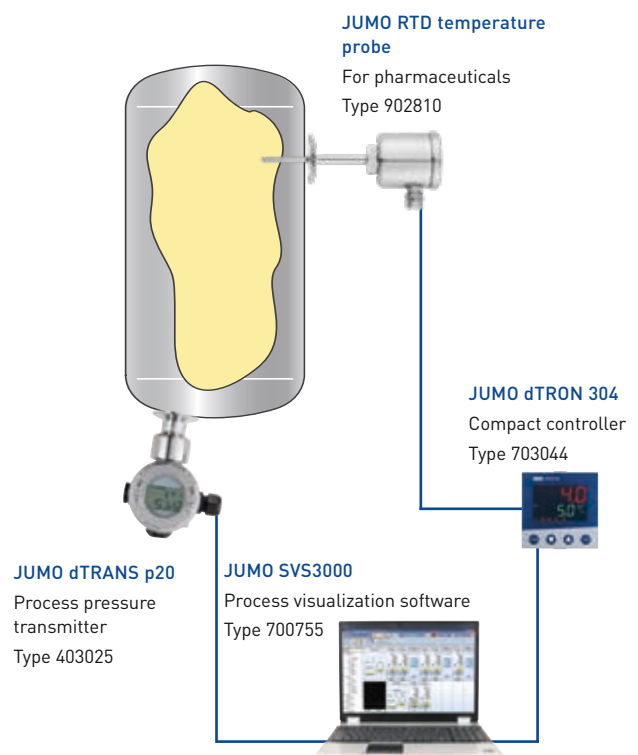
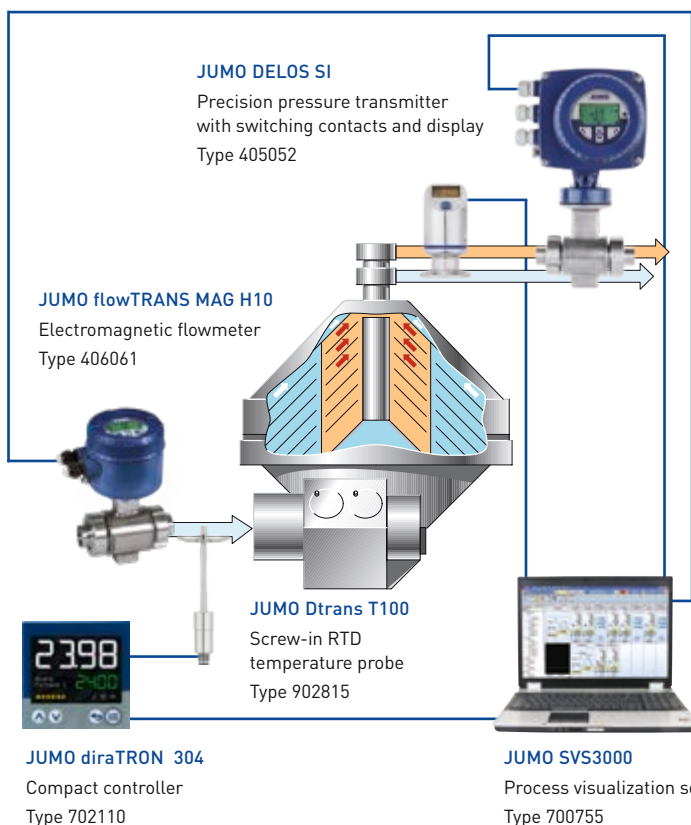
Cleaning the active ingredient in the separator

Before the active ingredient can be processed further, it must be cleaned to remove such things as cell components. That is why the active ingredient is provided with a suitable washing liquid. For optimal and reproducible process conditions, JUMO offers pressure and temperature sensors that ensure this process runs consistently and stable.

Collecting

Level control with the JUMO dTRANS p20 in collection containers

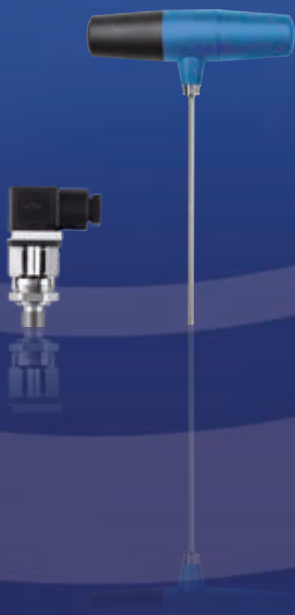
After cleaning, the manufactured active ingredient is stored in collection containers until the next processing step. Monitoring levels using the hydrostatic pressure with the JUMO dTRANS p20 helps you ensure optimum loading of the collection containers.





Drying

Different drying methods are used in the pharmaceutical industry. The most commonly used methods include freeze drying and spray drying. Freeze drying is a very gentle process. Whatever drying methods you use, the JUMO humidity, temperature, and pressure sensors support your process and ensure the consistent quality of your final product.



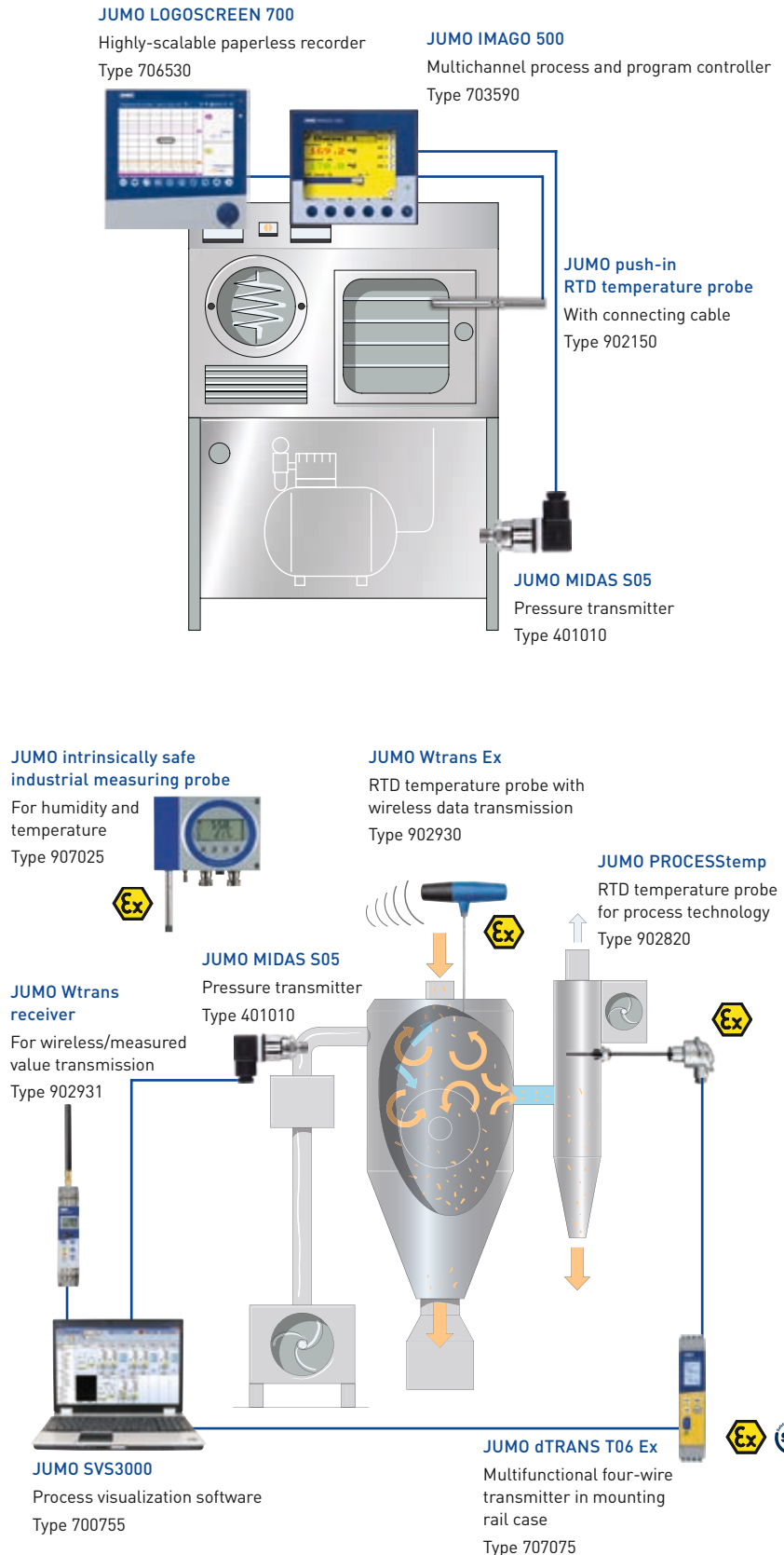
Drying

Control and monitoring freeze drying

Freeze-drying is a process that gently freezes products and dries them in a vacuum. After the product is frozen, the pressure is regulated below the sublimation pressure. Slightly heating the frozen material while maintaining the same pressure causes the water to sublime. The released water vapor freezes out at the undercooled condenser. For this process, JUMO offers temperature and pressure sensors that optimally control the freeze drying process in combination with such devices as the JUMO IMAGO 500 process controller. The JUMO LOGOSCREEN 700 paperless recorder provides increased reliability for accurately documenting your measured values.

Monitoring temperature and humidity during spray drying or fluidized-bed drying

Here, the moist surface of the liquid droplet (on the product) extracts the energy required for evaporation from the drying gas in the form of heat. The drying air cools in the process while simultaneously absorbing water vapor. JUMO offers suitable sensors and recorders for monitoring temperature, pressure, and air humidity to ensure consistently high product quality. We also offer sensors with the corresponding ATEX approvals to ensure safety in potentially explosive areas.





Refining active ingredients

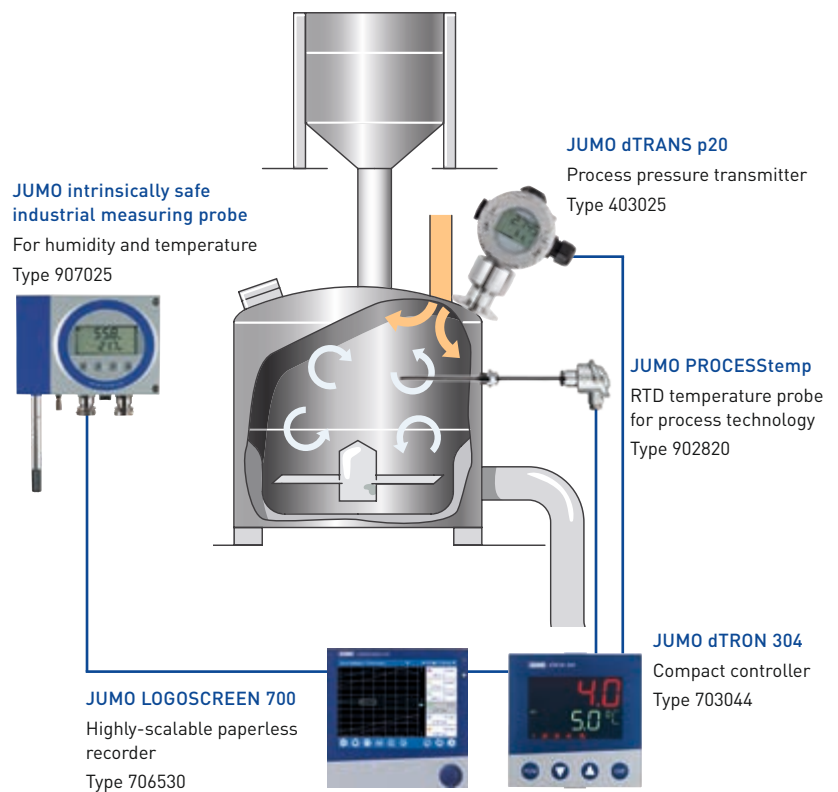
Granulation, pelletizing, and coating all involve a process for refining manufactured active ingredients. JUMO offers suitable measuring systems for controlling and monitoring temperature and pressure so that you can completely trust in a secure process.



Granulating

Pressure and temperature monitoring during granulating

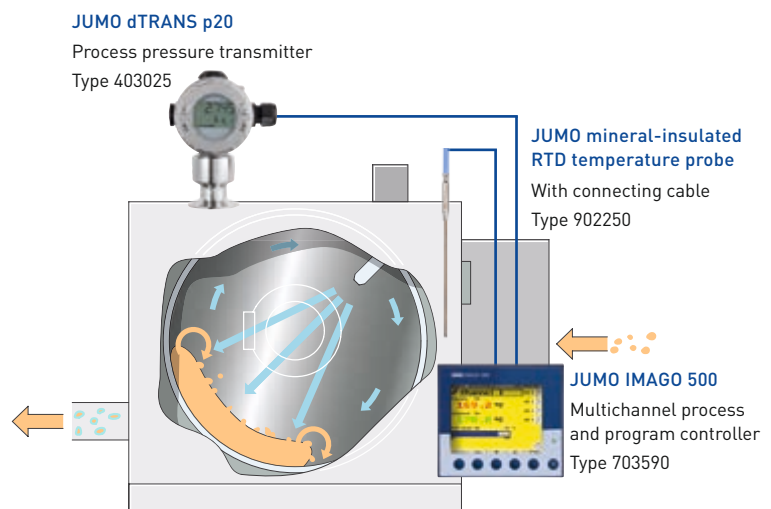
During granulation, a liquid binding agent is mixed with a powder. Agglomerates are formed which are then processed by subsequent drying into finished granulate. To ensure that you can reliably monitor your process, JUMO offers the JUMO dTRANS p20 process pressure transmitter, which provides you with perfect control of pressure shock resistance in your plant. Reliable pressure and temperature measurements are necessary for optimum process reliability – particularly when using organic binding solutions.



Coating

Temperature and pressure monitoring when coating

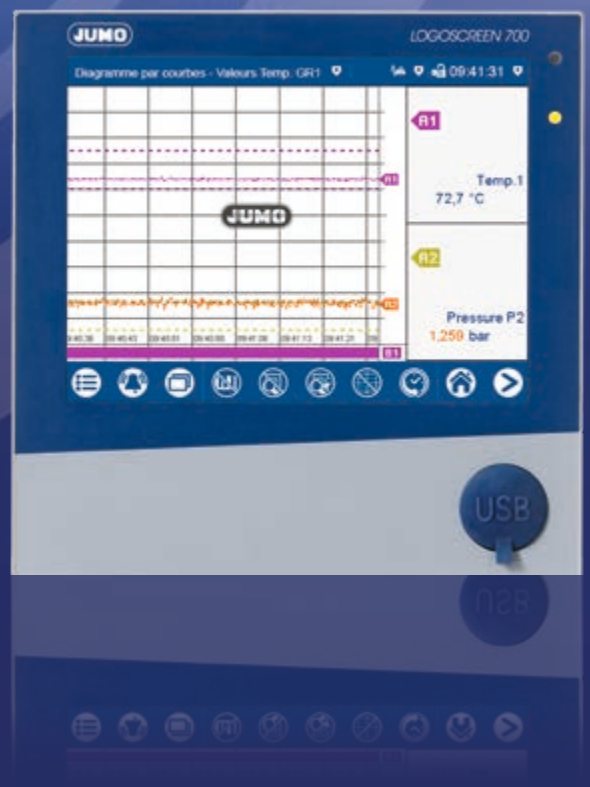
Depending on the application, the pressure and temperature must be precisely controlled when applying a coating suspension to ensure that the suspension is evenly applied. JUMO offers the optimum solution with its measuring systems. Whether you are working with low-pressure or high-pressure processes, the JUMO IMAGO 500 multichannel process controller can handle all your requirements. The user configurable screen masks allow you to display your individual process setup on site. The additional recording function ensures that you can always reproduce your process and therefore manufacture highquality products.





Cleanroom

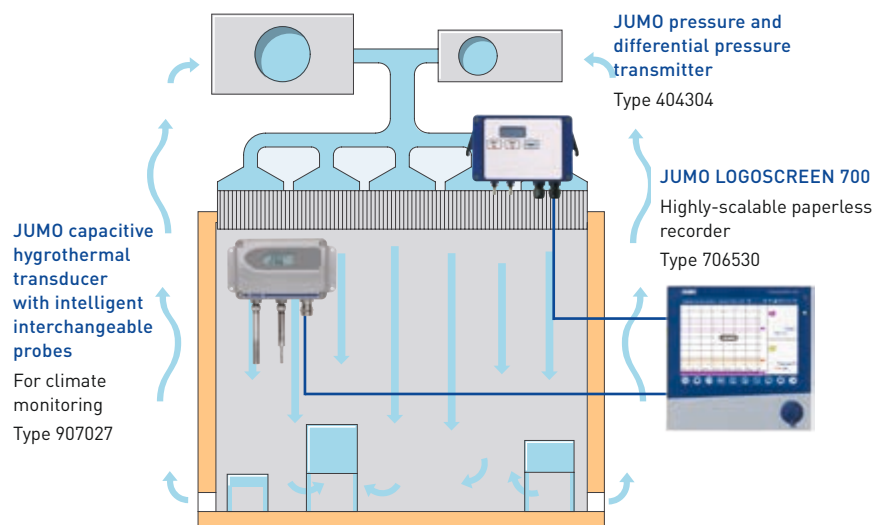
A cleanroom is designed to keep the number of airborne particles that are introduced into the room or that are created there as low as possible. Depending on the application, only the number of particles or germs is monitored. This is required, for example, when manufacturing pharmaceutical products. Other requirements for the parameters apply depending on which product is manufactured in the cleanroom. JUMO offers solutions to monitor and keep constant the parameters pressure, temperature, and humidity.



Cleanroom

Recording the relevant measurands with the JUMO LOGOSCREEN 700

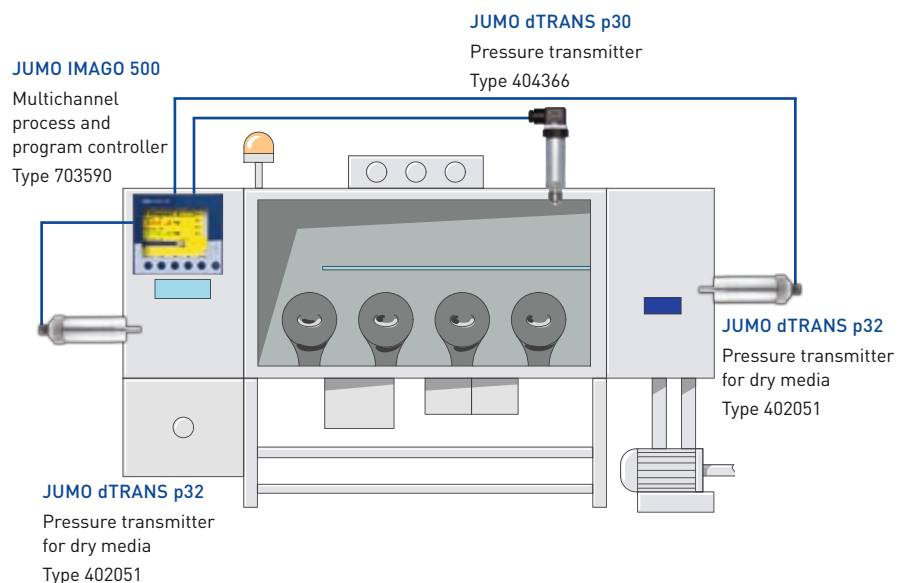
Controlling the pressure plays the central role in cleanrooms. Monitoring with the JUMO LOGOSCREEN 700 paperless recorder ensures that you are immediately notified by the integrated web server in case of a failure or malfunction. To ignore external influences when producing sensitive products, you need to continuously have reproducible climatic conditions in your cleanroom. JUMO LOGOSCREEN 700 is also suitable for controlling the parameters that are important for this task. The measurands can be recorded, displayed, and saved at the same time.



Glove box

Controlling and monitoring the pressure in glove boxes

A glove box or isolator is a container that is sealed hermetically and gas-tight to the surrounding work area. To control the lock pressure, which adapts the product to the conditions inside the glove box (e.g. by evacuating and then flooding the glove box with a mixture free of oxygen), JUMO offers the JUMO dTRANS p32 for gaseous, dry media. A piezo-resistive measuring cell forms the core of the transmitter. It features high overload resistance and stability to ensure maximum process reliability and safety.





CIP/SIP cleaning

Hygienic and perfectly cleaned plants are the foundation of any good process. This foundation is ensured by the CIP cleaning process or "Cleaning in Place". JUMO also offers first-class systems and solutions on which you can rely for this field.



Pharmaceuticals and Biotechnology

Pharmaceutical water Sterilization Biopharmaceuticals Drying Refining Cleanroom

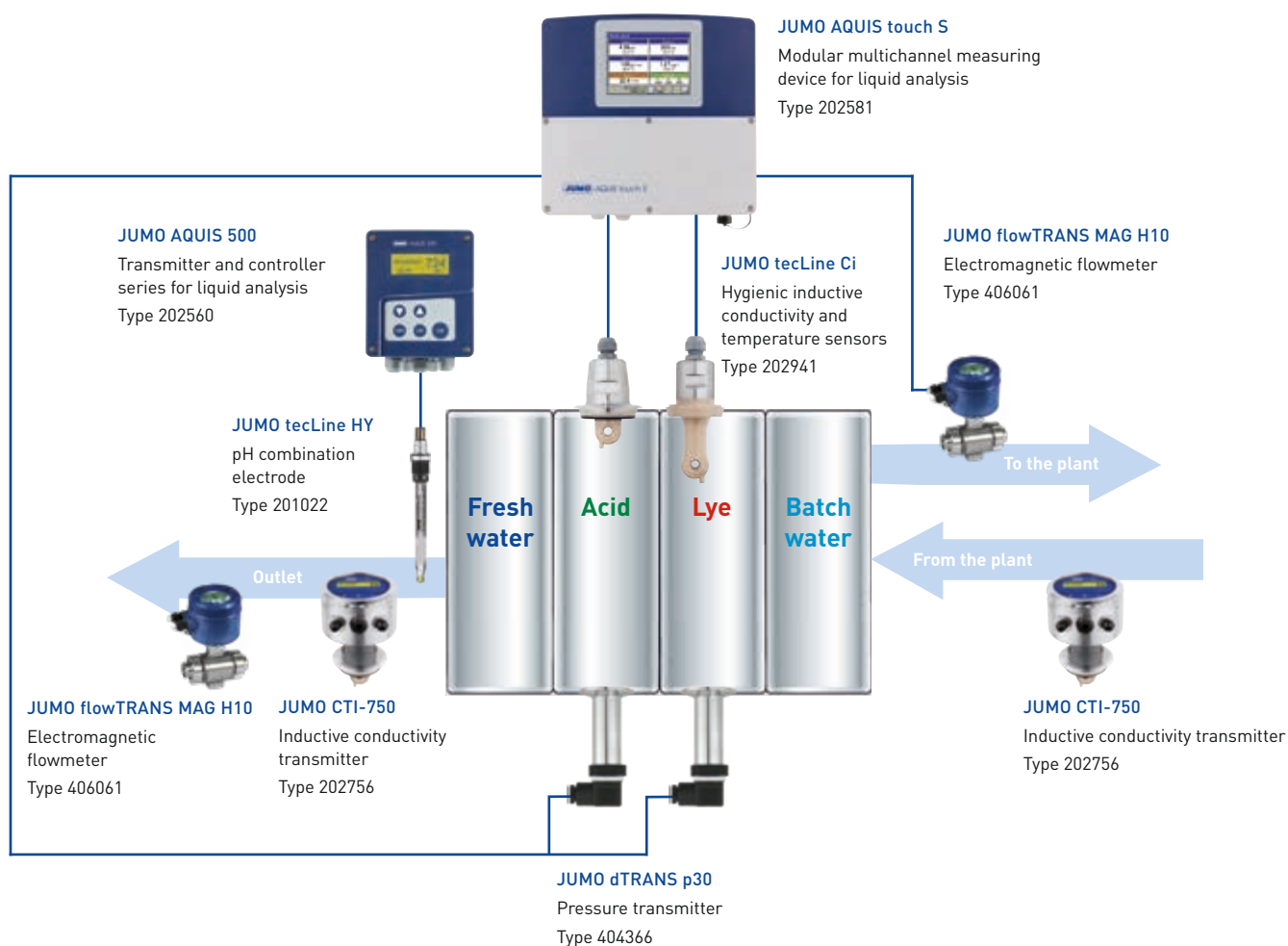
CIP/SIP cleaning

The JUMO tecLine CR-4P conductivity sensor ensures the safety and cleanliness of your plant

Today CIP is operated in all common plants. This saves time and money. The JUMO tecLine CR-4P conductive four-electrode conductivity sensor supports this process with accurate measurements to ensure that cleaning is performed quickly and reliably. The measuring sensor covers a wide measuring range, enabling you to measure conductivity from 1 $\mu\text{S}/\text{cm}$ to 600 mS/cm .

Conserve resources – reduce maintenance costs

The JUMO AQUIS touch S is a modular multichannel measuring device that paves the way for new approaches in CIP cleaning. For example you can measure, control, and display as well as record on-site the concentration setting of acid and lye solutions, the level of both tanks, and the flow velocity – all with a single device. A maximum of 4 analog analysis sensors and a total of up to 10 parameters can be measured and managed at the same time.





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