JUMO

digiLine

Member of
German Water Partnership

Water and Wastewater Engineering

Innovative solutions for your success

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*"Water is a friendly element to whomever
is familiar with it and knows how to treat it."*

Johann Wolfgang von Goethe

Dear Reader,

Clean, usable water is a scarce commodity. The decreasing availability and simultaneous increase in consumption due to the growing world population, industrialization, and agrarianization require intelligent water management and effective treatment technologies. People have long been talking about Water 4.0 as a systematic implementation of the Industry 4.0 approaches for the water and wastewater market. The necessary significant increase in recycling rates up to "Zero Liquid Discharge" (ZLD) requires smart automation solutions and intelligent sensor technology.

JUMO offers suitable sensor and automation technology for all related tasks. Whether individual measuring points or complete water data management with IIoT cloud connection are required – let us implement your project requirements together.

Water surrounds us practically everywhere. And you can use JUMO products everywhere. Of course, they come with the associated certificates and approvals. Equipping water, process, and wastewater treatment plants with high-quality measurement and control components will be an area to which increased attention will be paid within the framework of Industry 4.0.

Here, increased demands towards operational safety as well as ecological and economic aspects play just as much a part as the trend towards a wastewater-free water cycle (ZLD – Zero Liquid Discharge).

The most important industries:

- Highly-purified water for pharmaceuticals, biotechnology, and medicine
- Highly-purified and purified water for rinsing and cleaning systems
- Drinking and bathing water monitoring (disinfection)
- Cooling water (industrial cooling tower, furnace construction)
- Cooling water in laser, energy, and fuel cell technology
- Water for agricultural areas, fish and algae farming
- Process water from a wide range of industries (food, electroplating, surface technology, etc.)
- Wastewater from industrial sources and the municipality

Detailed information about our products can be found using the provided product group number at industry.jumo.info.

**MORE THAN SENSORS
AND AUTOMATION**

Table of contents

Liquid analysis

The beginnings of JUMO are closely tied to glass processing for the production of technical measuring devices in temperature measurement. Based on this more than 70 years of experience in glass processing, electrochemical glass sensors for measuring the important water parameters pH and redox potential have been produced since the 1980s. Later JUMO added sensors for measuring electrolytic conductivity and for disinfection measurands such as free and combined chlorine, chlorine dioxide, and ozone as well as hydrogen peroxide and peracetic acid. For the first time, a Plug and Play compatible galvanic sensor for dissolved oxygen featuring very easy maintenance was brought to the market in the mid-1990s. Today, JUMO also offers optical sensors for dissolved oxygen and for turbidity that are used in wastewater

or in fish farms, thereby completing the program. The JUMO digiLine system (see page 6 and 7) meets the highest requirements for easy startup, safe operation, and digital access. The digital networking of sensors for liquid analysis enables a higher level of automation and functionality. Many sensors for measurands pertaining to water analyses require proper fittings for installation into the process. The fittings protect the sensors against mechanical or hydraulic loads, ensure the correct inflow for measurement, and allow the removal/installation of the sensor without process interruption (retractable fittings). Automatic cleaning of the sensors can also be implemented with the appropriate fittings. This way, service life and the metrological availability of the sensors can be significantly increased in critical processes.

JUMO tecLine pH/Rd
pH and redox combination electrodes
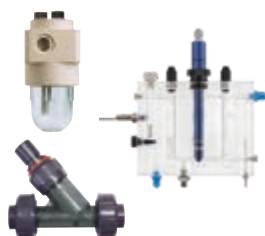Type 201020, 201025, 201021, 202026

JUMO ecoLine/BlackLine/tecLine/digiLine
Conductivity sensors – conductive and inductive
Type 202760, 202761, 202922, 202923, 202924, 202925, 202928, 202930, 202931, 202941, 202942, 202943

JUMO immersion fitting
Type 202820, 202821

JUMO retractable fitting, manual/pneumatical
Type 202822, 202823

JUMO ecoLine NTU
Optical sensor for turbidity measurement with JUMO AQUIS 500 RS indicating device and controller
Type 202569, 202670

JUMO flow fittings
Type 202810, 202811

JUMO tecLine Cl2/TC/ClO2, O3, Br, H2O2, PAA
Sensors for measuring free chlorine, chlorine dioxide, total chlorine, ozone, bromine, peracetic acid, and hydrogen peroxide
Type 202630, 202631, 202634, 202636, 202637

Pressure – Temperature – Level – Flow

Water and wastewater must be able to move through pumps. Containers and treatment plants must be able to be filled and emptied automatically. The transported liquid amounts must be monitored or controlled. Robust and proven measuring devices as well as built-in sensors are available for these important parameters. Solutions with ATEX approval are also available. Check out the successful and proven device series JUMO dTRANS p and JUMO MIDAS for pressure and diffe-

rential pressure, the level probes in the JUMO MAERA series, float switches of the JUMO NESOS series for level and point level measurement, or from the highly-precise flowmeter program in the JUMO flowTRANS MAG series. A high material and variant diversity allow the user to select the right sensor for the respective application. As a result, an optimal operating life of the implemented sensors is achieved and the availability as well as reliability is increased.

JUMO dTRANS p20
Process pressure transmitter
type 403025

JUMO dTRANS p30
Pressure transmitter
Type 404366

JUMO MIDAS C18 SW
OEM seawater pressure transmitter
Type 401012

JUMO PINOS L02
Calorimetric flow sensor
Type 406041

JUMO flowTRANS MAG S10
Electromagnetic flowmeter
Type 406060

JUMO flowTRANS US series
Ultrasonic flowmeters
Type 406050, 406051

JUMO MAERA series
Level probes
Type 402090, 404391, 404392, 404393, 404753

JUMO NESOS series
Float switches and
level transmitters
Type 408301, 408302, 408303,
408304, 408320, 408340

JUMO digiLine

Intelligent, bus-compatible connection system for digital sensors used in liquid analysis

JUMO digiLine is a bus-compatible connection system for digital sensors used in liquid analysis which simultaneously offers Plug and Play functionality. JUMO digiLine allows for the simple establishment of sensor networks in which a wide variety of sensors can be interconnected in different bus topologies (linear, star). A single shared signal line is used for communication with the next evaluation unit or controller. This way plants in which several parameters need to be measured at the same time in different places can be wired efficiently and quickly.

Measure various liquid analysis measurands with just one system

- Measurands: pH value, temperature, redox potential, conductivity, oxygen concentration, turbidity, disinfection measurands

- For industrial applications in the process, food, pharmaceutical, and water industry

- Fail-safe digital data transfer for optimal process monitoring

- Modular system: for individual measuring points as well as for establishing sensor networks

- Plug and Play function for connection to transmitters from the JUMO AQUIS touch series: facilitates the replacement of expended sensors or the brief exchange of sensors for calibration purposes

- JUMO digiLine electronic components can continue to be used even when the sensor becomes worn

- Simple and reliable calibration of sensors as well as comprehensive measuring point management: both can be easily done on a PC with the JUMO DSM (Digital Sensor Management) software tool

Ready for measurement in just 3 steps – thanks to Plug and Play

1) Connect sensor

2) Sensor is detected automatically

3) Sensor is linked up and ready for measurement

System structure digiLine

JUMO AQUIS touch P/S
Modular multichannel measuring devices
for liquid analysis
Type 202580, 202581

JUMO variTRON
Automation system
Type 705002, 705070

❶ **JUMO digiLine pH**
Type 201021, 202705

❷ **JUMO digiLine Rd**
Type 201026, 202705

❸ **JUMO digiLine T**
Type 201085, 202705

❹ **JUMO digiLine hub**
Type 203590
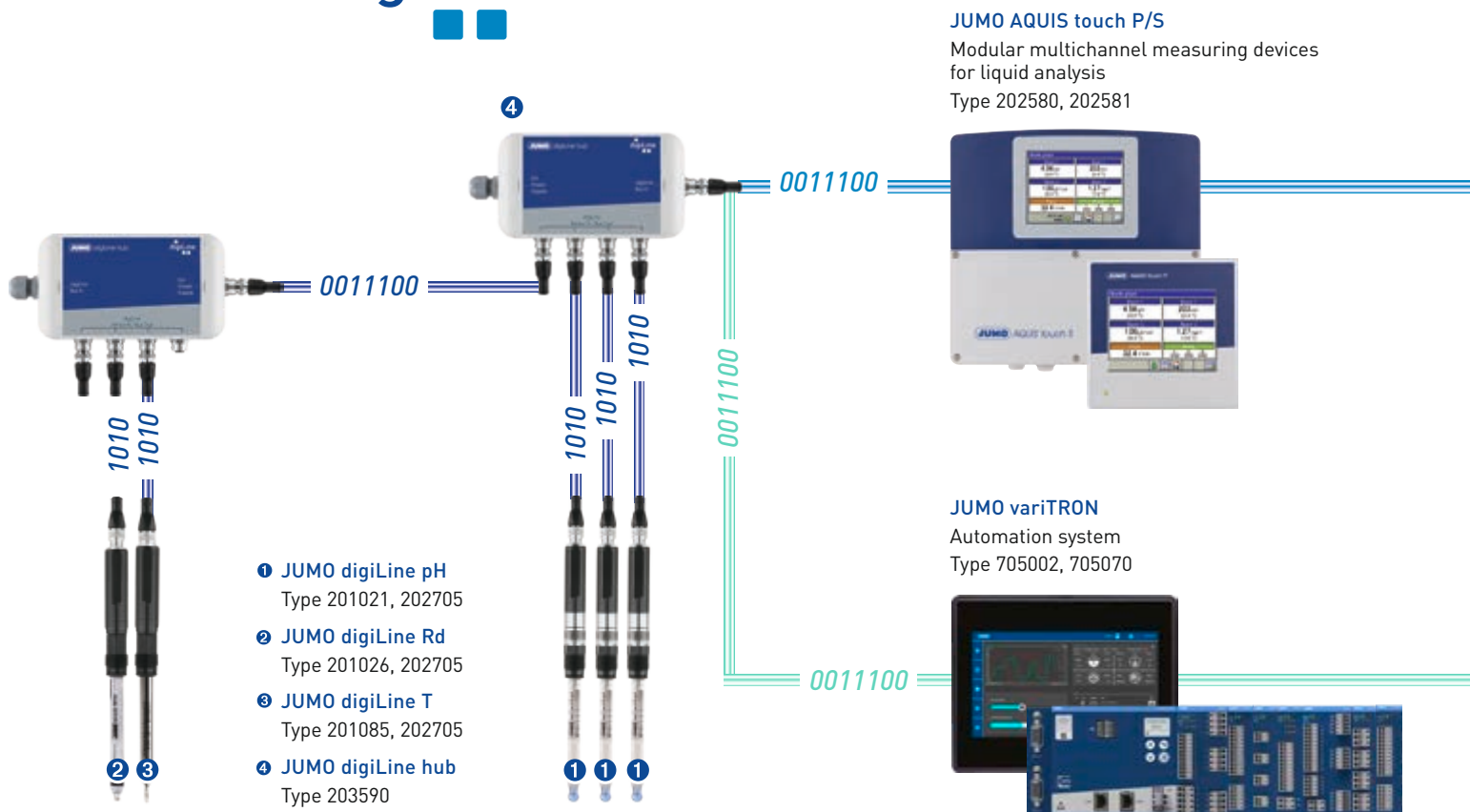
Connection option 1

The multichannel measuring devices in the JUMO AQUIS touch series were designed especially for liquid analysis. They are ideal as a central platform for the display and further processing of measurement data. Up to 6 JUMO digiLine sensors can be connected to the modular devices and as many as 25 sensors can be connected using corresponding input modules and interfaces. In addition to measured value acquisition, up to 4 independent control loops can be implemented and process values can be recorded in a tamper-proof manner with an integrated paperless recorder.

Connection option 2

JUMO digiLine sensors can also be connected to the JUMO variTRON automation system. This way entire automation solutions can be implemented. Thanks to its scalability, the system can be individually adapted to the respective task. An integrated PLC is used to include up to 62 JUMO digiLine sensors.
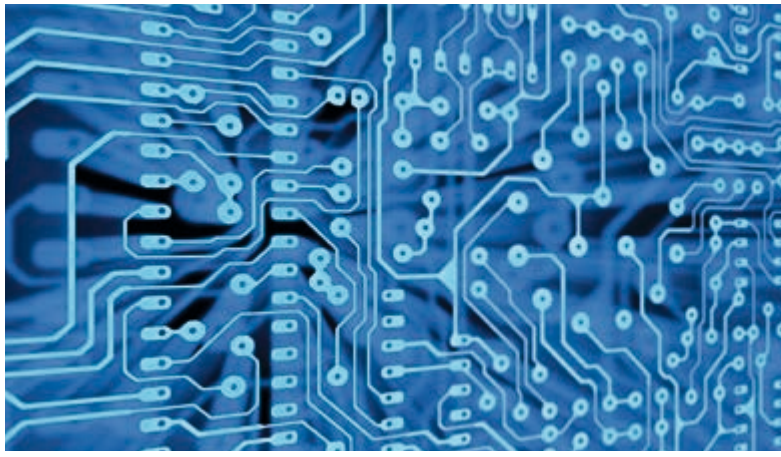
Measuring – Displaying – Controlling

Other than reliable sensor technology, effective processing of the measuring signals is an important part in a water and wastewater plant. For all measurands the appropriate display, switch, and control devices are available. Different installation types (DIN-rail, control cabinet, or on-site installation with high protection class) as well as single channel and multichannel variants can be selected. JUMO measurement and control devices can be used internationally due to the multilingual user interface. It is available through proven key operation or through modern touchscreens. PID control algorithms enable effective process sequences through perfect control results. Modern process interfaces or fieldbus systems are possible depending on the measurand and device family. JUMO offers solutions here such as Ethernet, Modbus, HART®, PROFIBUS, PROFINET, CAN bus, IO-Link. Wireless transmission of pressure and temperature values is also possible.

JUMO AQUIS 500 pH/CR/Ci/AS

Transmitters and controllers for pH value, redox potential, ammonia concentration, chlorine, chlorine dioxide, ozone, conductive and inductive conductivity, and temperature
Type 202560, 202565, 202566, 202568, 202569

JUMO AQUIS touch P/S

Modular multichannel measuring devices with integrated controllers and recording function
Type 202580, 202581

JUMO CTI-500 and CTI-750

Inductive conductivity transmitter with conductivity transmitters in plastic or stainless steel case
Type 202755, 202756

JUMO ecoTRANS pH/Lf 03

Transmitter and switching device for pH value, redox potential, conductivity, and temperature
Type 202723, 202732

JUMO dTRANS pH/CR/AS 02

Transmitters and controllers for pH value, redox potential, chlorine, chlorine dioxide, ozone, conductive conductivity, and temperature
Type 202551, 202552, 202553

Recording – Automatization

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 en- sures 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 LOGOSCREEN 601
Paperless recorder with touchscreen
Type 706521

JUMO LOGOSCREEN 700
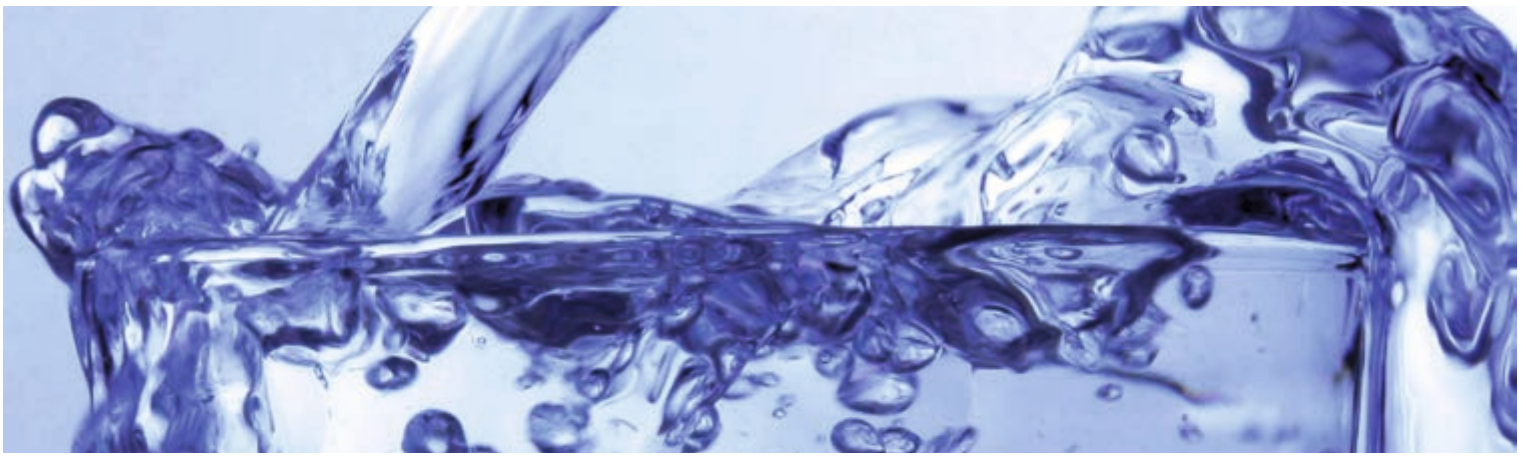Highly-scalable paperless recorder
Type 706530

JUMO variTRON
Automation system
Type 705002, 705070

JUMO Cloud, JUMO smartWARE SCADA, and JUMO smartWARE Evaluation
Highly-scalable and high-performance IoT solutions with browser-based process data evaluation
Type 701810, 701820, 701840

Drinking water

Drinking water is humanity's most important food resource which cannot be replaced by other substances. JUMO pH, conductivity, and level sensors support your process and ensure that your drinking water is of a consistent quality no matter which method of water treatment you use.

Measuring pH in drinking water

Different parameters are measured to ensure that the drinking water is reliably monitored. One of the most important parameters is the pH value. The pH value of drinking water should not be less than 6.5 and not more than 9.5. pH in drinking water is measured by JUMO tecLine pH electrodes in conjunction with the JUMO AQUIS 500 pH transmitter/controller.

Level measurement in groundwater

In ground or well water the fill level should be measured regularly via changes in hydrostatic pressure using a level probe. The JUMO MAERA S28 level probe with a piezoresistive measuring cell is particularly suited for this task. It has overvoltage protection which protects the electronic components of the level probe from an indirect lightning strike. Additional high overload resistance and long-term stability allow the device to provide a high level of safety.

Turbidity measurement in groundwater

Continuous turbidity measurement with JUMO ecoLine NTU is an easy method of monitoring the raw water quality for undissolved substances in water. Furthermore, knowing the turbidity of the raw water makes the estimation of flocculating agents and the energy input in the flocculation stage easier.

JUMO tecLine pH/Rd

pH and redox combination electrodes
Type 201020, 201025, 201021, 202026

JUMO tecLine CR

Conductive two-electrode conductivity sensor
Type 202924

JUMO tecLine Cl2

Sensor for free chlorine
Type 202630

JUMO AQUIS 500 pH/CR/Ci/AS

Transmitters and controllers for pH value, redox potential, ammonia concentration, chlorine, chlorine dioxide, ozone, conductive and inductive conductivity, and temperature
Type 202560, 202565, 202566, 202568, 202569

JUMO dTRANS pH/CR/AS 02

Transmitters and controllers for pH value, redox potential, chlorine, chlorine dioxide, ozone, conductive conductivity, and temperature
Type 202551, 202552, 202553

JUMO AQUIS touch S/P

Multichannel measuring devices for liquid analysis
Type 202580, 202581

JUMO ecoLine NTU

Optical sensor for turbidity measurement with JUMO AQUIS 500 RS indicating device and controller
Type 202569, 202670

JUMO flowTRANS MAG S10

Electromagnetic flowmeter
Type 406060

JUMO MAERA series
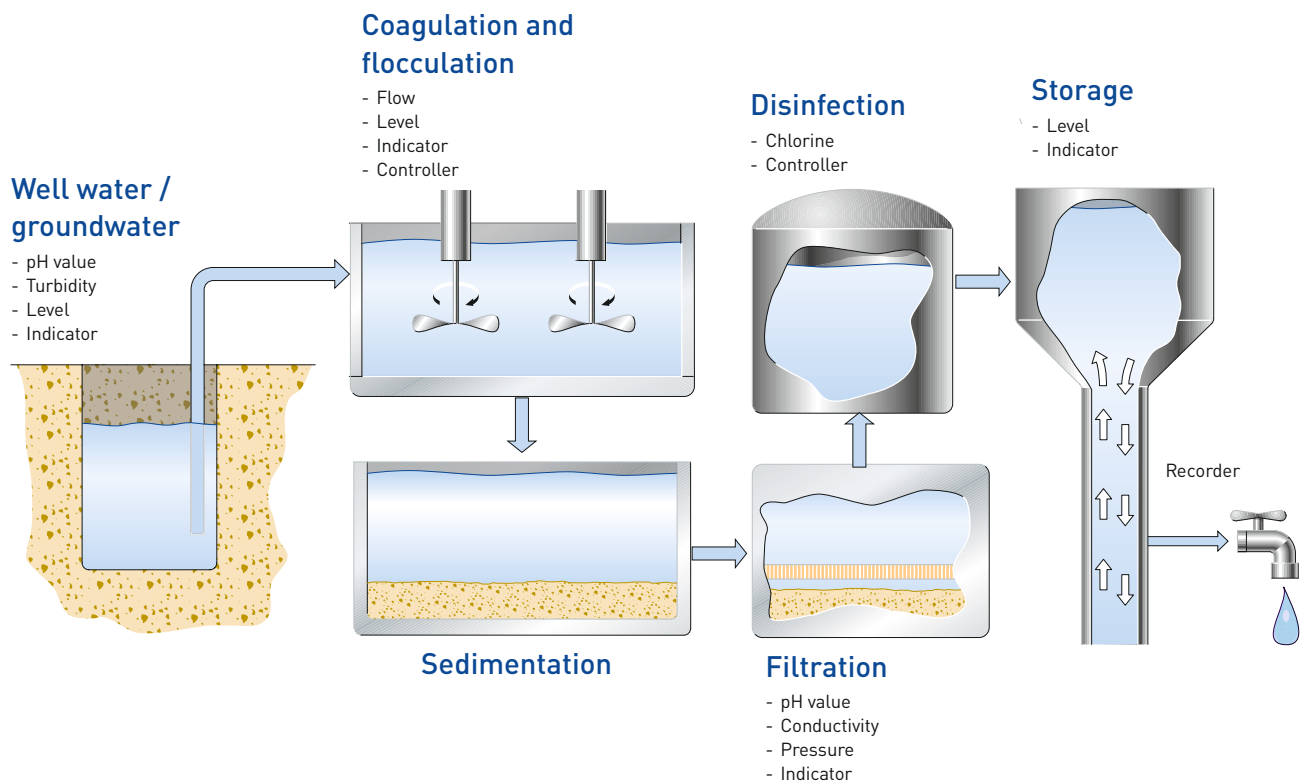
Level probes
Type 402090, 404392

Groundwater

Where does our drinking water come from?

Drinking water treatment refers to the treatment of spring water, surface water, or groundwater. Spring water refers to water that emerges out of the earth from underground water sources. Surface water is taken from standing or flowing bodies of water above ground. Dam reservoir water, lake water, and river water are three types of surface water. Groundwater is part of the natural water cycle. It comes predominantly from rainwater seeping through the soil and the subsoil into the aquifer.

From groundwater to drinking water

Most drinking water comes from groundwater. The treatment of drinking water involves a number of different processes. Flocculation is a process of wastewater and drinking water treatment that reduces existing turbidity. The finest, suspended, or colloidal particles in the water coagulate and then settle or can be filtered. The solid matter and turbidities can be isolated by sedimentation. Filtration describes the process whereby a solid matter/liquid mixture in the water or wastewater can be separated or segregated by filters. Disinfection either removes microorganisms from the water or kills them so that hygienically perfect water is attained.

Coagulation and flocculation
- Flow
- Level
- Indicator
- Controller

Disinfection
- Chlorine
- Controller

Storage
- Level
- Indicator

Well water / groundwater
- pH value
- Turbidity
- Level
- Indicator

Sedimentation

Filtration
- pH value
- Conductivity
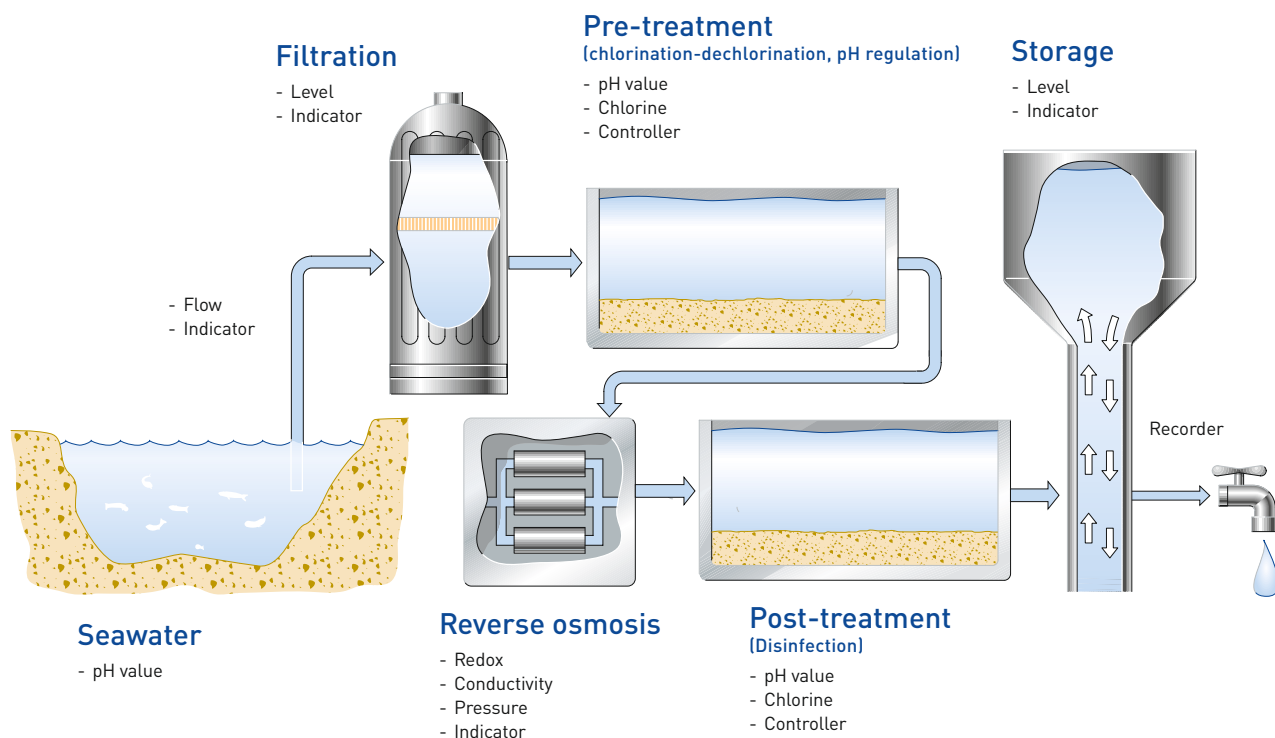- Pressure
- Indicator

Recorder

Brackish water and seawater

Desalination of brackish water and seawater

According to UNESCO the supply of drinking water is highly problematic in many parts of the world. A limited amount of water is available on our planet and 97.5 % of the water in the world is salty. Because the availability of drinking water is limited, seawater is an important source of drinking water. Seawater desalination is defined as the attainment of drinking water or process water from seawater by reducing the salt content.

## Pressure measurement before reverse osmosis

The crucial element in seawater desalination plants is the reverse osmosis (RO) unit. During reverse osmosis the seawater is pushed through a semi-permeable membrane at high pressure. This membrane acts like a filter and only allows certain ions and molecules to pass through. Because seawater has such high salinity, a pressure of 60 to 80 bar is required. To ensure safe system operation, the pressure before reverse osmosis must be monitored. The obvious choice for this task is the JUMO MIDAS C 18 SW pressure transmitter.

Filtration
- Level
- Indicator

Pre-treatment
(chlorination-dechlorination, pH regulation)
- pH value
- Chlorine
- Controller

Storage
- Level
- Indicator

- Flow
- Indicator

Recorder

Seawater
- pH value

Reverse osmosis
- Redox
- Conductivity
- Pressure
- Indicator

Post-treatment
(Disinfection)
- pH value
- Chlorine
- Controller

Swimming pool water

Swimming is a popular and healthy leisure activity – as long as the water has the right quality. To keep it consistent, swimming pools are continuously monitored and controlled. Here, too, JUMO provides solutions on which you can rely.
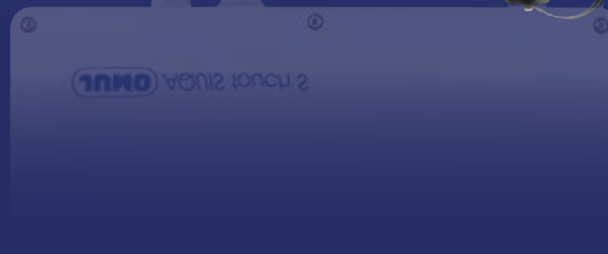
Measuring pH in swimming pools

The pH value is one of the most important parameters in swimming pool water. The optimum pH value for swimming pool water lies between 7.2 and 7.8. pH values that are too low or too high cause various problems as well as the risk of corrosion and skin/eye irritation.

JUMO provides the following solution for monitoring the pH value: JUMO tecLine pH electrodes in conjunction with the JUMO AQUIS 500 pH transmitter and controller.

Concentration of the disinfectant

In addition, disinfectant content can be determined on a weekly basis. With chlorine, for example, this content ideally lies between 0.3 and 0.6 mg/l (free chlorine). JUMO amperometric measuring cells for free chlorine, chlorine dioxide, and ozone (type 202630) with the JUMO AQUIS 500 AS transmitter and controller are particularly suitable for this task.

JUMO tecLine pH/Rd

pH and redox combination electrodes
Type 201020, 201025, 201021, 202026

JUMO tecLine Cl2

Sensor for free chlorine
Type 202630

JUMO AQUIS 500 pH/CR/Ci/AS

Transmitters and controllers for pH value, redox potential, ammonia concentration, chlorine, chlorine dioxide, ozone, conductive and inductive conductivity, and temperature
Type 202560, 202565, 202566, 202568, 202569

JUMO dTRANS pH/CR/AS 02

Transmitters and controllers for pH value, redox potential, chlorine, chlorine dioxide, ozone, conductive conductivity, and temperature
Type 202551, 202552, 202553

JUMO AQUIS touch S/P

Multichannel measuring devices for liquid analysis
Type 202580, 202581

JUMO ecoTRANS pH/Lf 03

Transmitter and switching device for pH value, redox potential, conductivity, and temperature
Type 202723, 202732

JUMO flowTRANS MAG I02, JUMO flowTRANS PW I01

Flowmeters for liquids
Type 406011, 406020

Surface-mounted double thermostat

ATH series
Type 603026

Swimming pool water treatment

Swimming pools include certain risks such as infections so that they must always have a guaranteed water quality. As a result, all swimming pools have to be continuously monitored and controlled. Water is primarily treated to kill or reduce the microorganisms within it (bacteria, viruses, etc.). This process can also be called disinfection or sterilization. Chlorination is the most commonly used method for water disinfection.
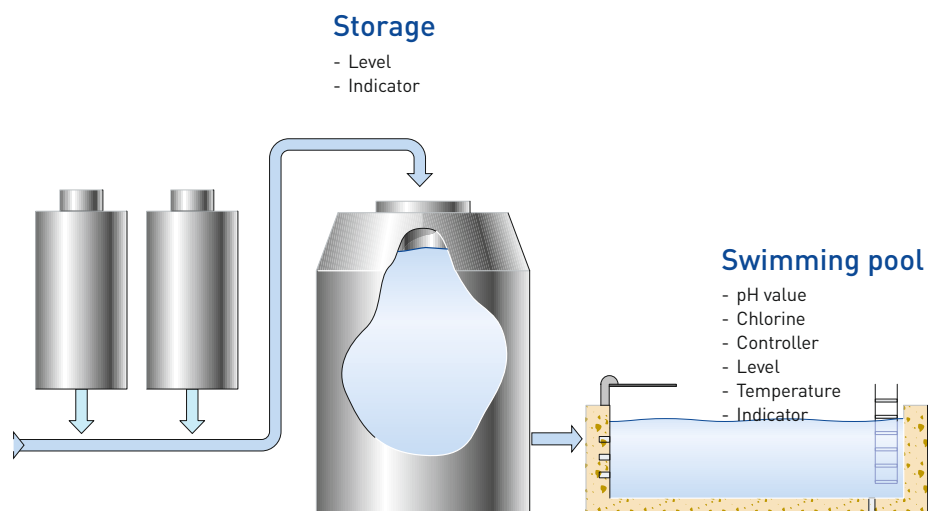
The usual practical procedure is to first prepare a chlorine gas or hypochlorite solution in water and then to add an appropriate quantity of it to the water to be treated. When the water is treated the aim is to get as few undesirable byproducts as possible to be formed by disinfection. To a certain extent this outcome can be controlled by the conditions (amount of chlorine, temperature, pH value) prevailing at the time of disinfection.

Flocculation

Disinfection
- Chlorine
- Controller
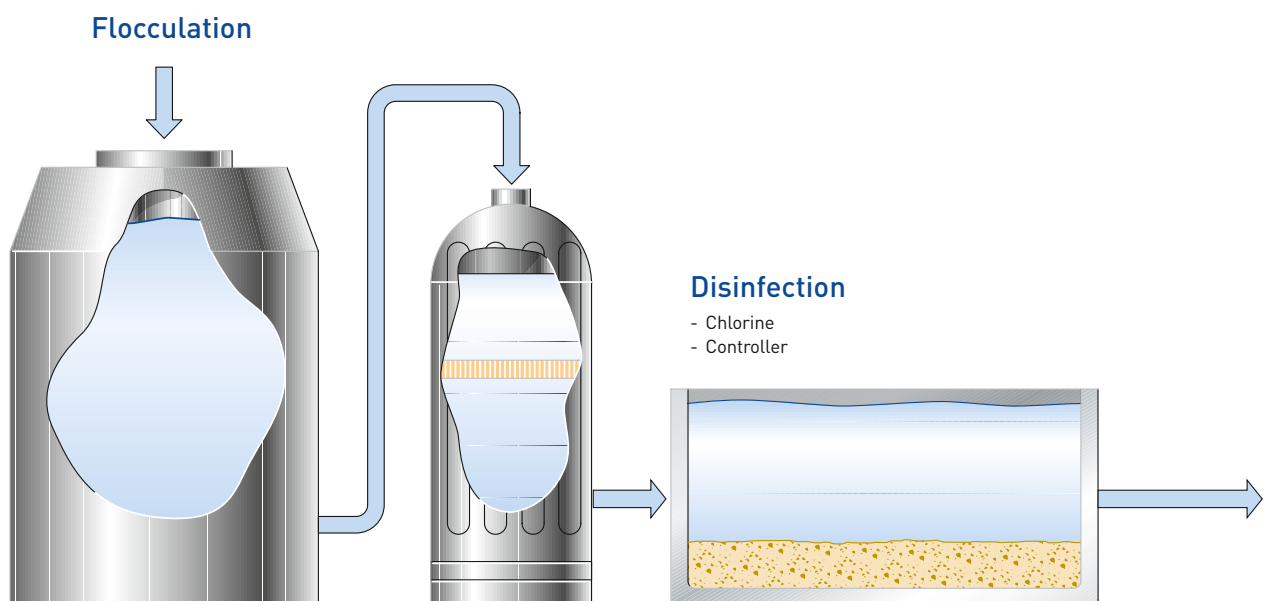
Level measurement

The term "pool hydraulics" refers to the continuous circulation of water in swimming pools. Good pool hydraulics ensure good distribution of disinfectants. Pool hydraulics include not only the economical skimmer system to remove water from the surface, but also the more effective overflow system. Here the water that is pushed into the pool by the jets is directed over the edge of the pool into an overflow channel from where it goes to a splash water tank. This tank is designed so that when the pool is used the tank can hold the volume of water that is displaced – and when the pool is not used it has sufficient water stored for back washing. Level measurement in the backwash water tank protects the filter pump against dry-running if not enough water is available. Such a measure causes fresh water to be added to the swimming pool when too little water is in it as a result of backwashing. Level measurement also reactivates the pump if too much water is in the splash water / overflow tank. Level measurement can occur hydrostatically. For this purpose level probes are available in unpressurized or open tanks. Level probes are pressure measuring devices that are especially developed for level assessment. In coordination with your specified guidelines JUMO offers a wide variety of level probes out of stainless steel, titanium, or plastic. These have different process or electrical connections as well as special cables.

Storage
- Level
- Indicator

Swimming pool
- pH value
- Chlorine
- Controller
- Level
- Temperature
- Indicator

pH regulation
- pH value
- Controller

Highly-purified water

Highly-purified water is required in a wide variety of production processes such as a cleaning agent in the semiconductor industry, as a cleaning operation after the actual washing with cleaning agents in the food industry, and for cleaning and dilution purposes in the pharmaceutical industry. Whatever water quality you require for your process JUMO products provide pure water of a quality on which you can rely.

pH measurement in highly-purified water

In some areas a pH measurement in highly-purified water is mandated. But the low conductivity and low ionic strength of highly-purified water cause technical problems when measuring the pH value. JUMO's solution here is the refillable JUMO tecLine pH electrode with a KCl storage vessel.

Conductivity measurement

The monitoring of ultra-pure water's quality via conductivity is the safest and most reliable method. A complete measurement chain for conductivity in highly-purified water consists of a highly-purified water transmitter/ controller – JUMO AQUIS 500 CR, JUMO dTRANS CR 02, or JUMO eco-TRANS Lf 03 – a conductivity sensor with the integrated JUMO tecLine CR temperature probe, and a connecting cable. JUMO highly-purified water measurement converters offer you an exact entry of the cell constants, temperature compensation according to ASTM D 1125-95, and limit value monitoring according to USP (water conductivity <645>).

Point level measurement

Stainless steel float switches are used to monitor storage tanks with highly-purified water and to implement a reliable and robust solution. Variants as of a G 1/8 process connection are available even for the smallest installation situations.

JUMO tecLine pH

pH combination electrode with liquid KCl filling, refillable
Type 201020

JUMO dTRANS pH/CR/AS 02

Transmitters and controllers for pH value, redox potential, chlorine, chlorine dioxide, ozone, conductive conductivity, and temperature
Type 202551, 202552, 202553

JUMO tecLine CR

Conductive two-electrode conductivity sensor
Type 202924

ASTM certificate

JUMO MIDAS C18 SW

OEM seawater pressure transmitter
Type 401012

JUMO ecoTRANS pH/Lf 03

Transmitter and switching device for pH value, redox potential, conductivity, and temperature
Type 202723, 202732

JUMO AQUIS touch S/P

Multichannel measuring devices for liquid analysis
Type 202580, 202581

Manual retractable fittings and stainless steel process fittings for pH and redox electrodes
Type 202822, 202825

JUMO NESOS R01 LS

Float switch in miniature version
Type 408301

JUMO flowTRANS MAG S10

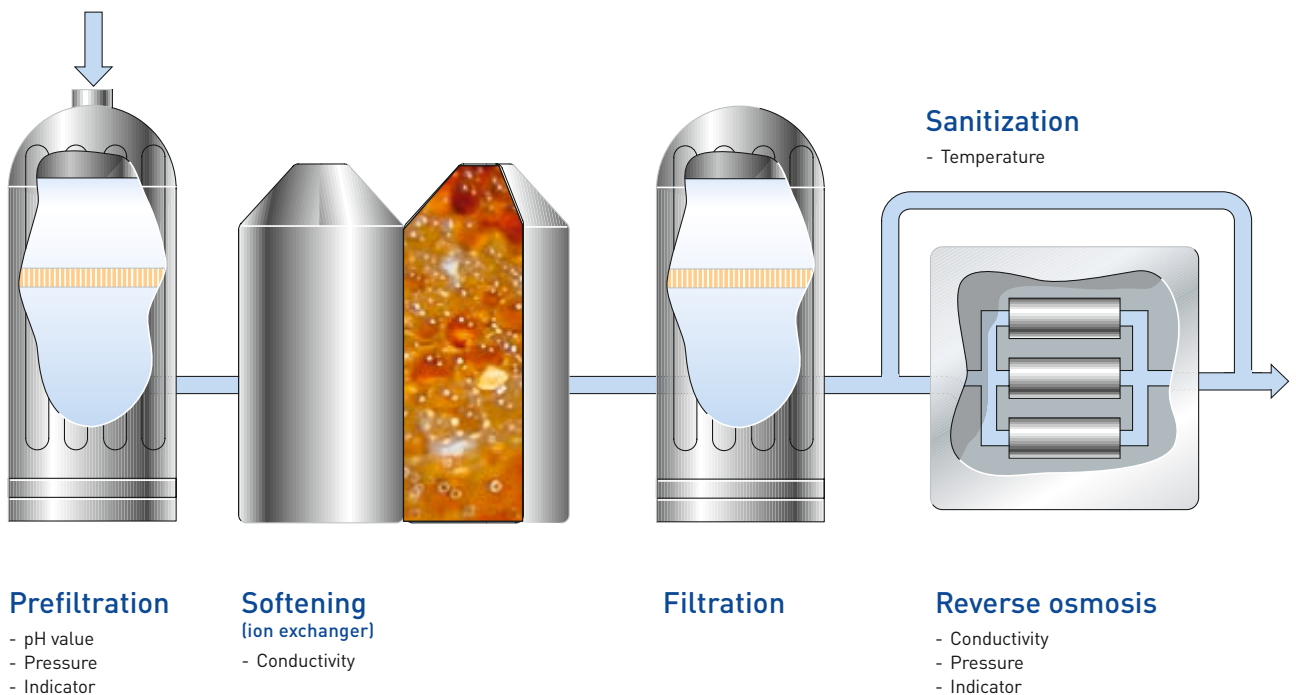Electromagnetic flowmeter
Type 406060

Highly-purified water in the pharmaceutical industry

The production of highly-purified water is one of the most important processes in the pharmaceutical industry. Without it, the manufacture of most substances would not be possible as highly-purified water quality is the prerequisite for a consistently high product quality. The monitoring of ultra-pure water's quality via conductivity is the safest and 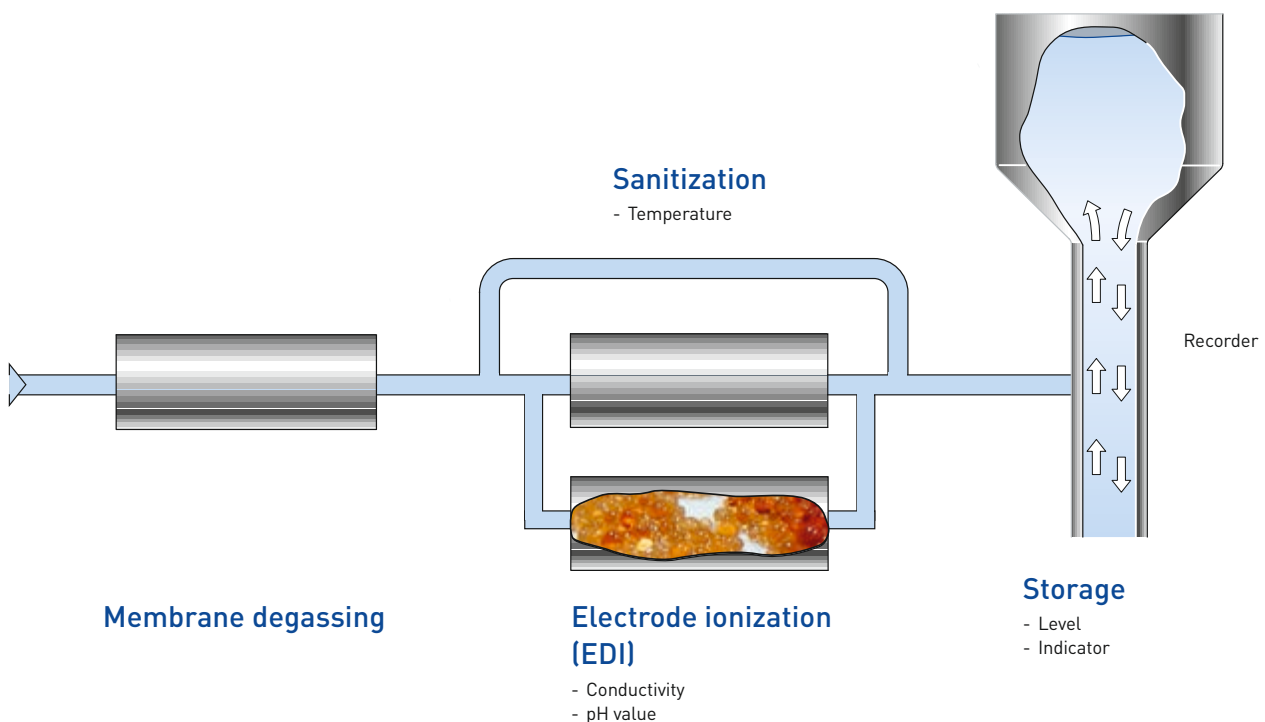most reliable method. The quality of highly-purified water (pure water, high purity water, water for injection, etc.) is described in several standards and recommendations. These include ASTM International (American Society For Testing and Materials), EP (Pharmacopoea Europaea, Ph. Eur.), USP (United States Pharmacopeia), and DIN or ISO standards. The JUMO tecLine CR conductive conductivity sensor meet all requirements for use in highly-purified water.

Sanitization

- Temperature

Prefiltration

- pH value
- Pressure
- Indicator

Softening
(ion exchanger)

- Conductivity

Filtration

Reverse osmosis

- Conductivity
- Pressure
- Indicator

Highly-purified water production

Highly-purified water is required in a wide variety of production processes such as a cleaning agent in the semiconductor industry, as a cleaning operation after the actual washing with cleaning agents in the food industry, and for cleaning and dilution purposes in the pharmaceutical industry. Depending on the demands on highly-purified water, different processing steps have to be upstreamed or downstreamed. Common production processes include reverse osmosis, ion exchanger, ultrafiltration, and electrochemical deionization. Ion exchangers contain mobile ions.

Their chemical structure enables them to exchange these ions for other ions charged in the same way. Ultrafiltration is a typical membrane process. The pores are very large for ultrafiltration. Matter is excluded by size so that components larger than the membrane pores are retained. Electrochemical deionization is the latest technology in highly-purified water production. When a voltage is applied across the anode and cathode, the anions and cations combine and the resulting ions are removed with ion exchangers from the water stream.

Sanitization
- Temperature

Recorder

Membrane degassing

Electrode ionization (EDI)
- Conductivity
- pH value

Storage
- Level
- Indicator

Cooling water

Heat has to be dissipated in many industrial plants. Here, cooling water is used as the heat carrier in technological processes. Monitoring water quality makes sense in all applications where water or aqueous solutions is/are used as the cooling medium or as a cooling additive. Inductive conductivity sensors by JUMO are the ideal solution for this task.

Water and Wastewater Engineering

Sensor and automation technology Drinking water Swimming pool water Highly-purified water **Cooling water** Wastewater
Water data management Engineering

Measurement technology for the hygienic operation of cooling towers

As of January 2015, a new technical guideline (VDI2047, Sheet 2) has been established for manufacturers and operators to safeguard the sanitary operation of evaporative cooling towers. In addition, a legislative initiative was proposed. This directive and the planned law make operators liable for hygienic maintenance, care, and operation. These regulations are meant to apply retrospectively for existing installations.

JUMO not only supplies suitable measurement and control devices to equip new cooling towers, but also for retrofitting and converting existing plants. The JUMO AQUIS touch modular multichannel measuring device designed for liquid analysis is designed to ideally suit the recommendations of the VDI Directive. In addition to the desalination of the cooling tower through conductivity measurement, the device also enables controlled dosing of biocides for cooling tower hygiene. The desalination lock during biocide dosing, the compliance with exposure time of the biocide, and limit value monitoring of all important parameters are also controllable.

Level detectors of the JUMO NESOS series can also be used for cooling electrical systems. They detect a leak in the system to emit a warning message or control a valve for replenishment.

JUMO tecLine pH/Rd
Redox combination electrodes
Type 201025, 201026

JUMO tecLine Cl2/Br
Sensor for free chlorine or for bromine
Type 202630

JUMO dTRANS pH/CR/AS 02
Transmitters and controllers for pH value, redox potential, chlorine, chlorine dioxide, ozone, conductive conductivity, and temperature
Type 202551, 202552, 202553

JUMO AQUIS touch S/P
Multichannel measuring devices for liquid analysis
Type 202580, 202581

JUMO AQUIS 500 pH/CR/Ci/AS
Transmitters and controllers for pH value, redox potential, ammonia concentration, chlorine, chlorine dioxide, ozone, conductive and inductive conductivity, and temperature
Type 202560, 202565, 202566, 202568, 202569

JUMO CTI-500
Inductive conductivity transmitter with switching contacts in plastic housing
Type 202755

JUMO ecoTRANS pH/Lf 03
Transmitter and switching device for pH value, redox potential, conductivity, and temperature
Type 202723, 202732

JUMO NESOS R03 LS
Float switch with chamber
Type 408303

JUMO flowTRANS MAG S10
Electromagnetic flowmeter
Type 406060

Wastewater

Wastewater is treated in sewage treatment plants. Biological and chemical processes as well as mechanical ones are used here. Whether pressure, level, or flow: with JUMO, you are ready for everything. Our pressure measuring devices can be adapted to all wastewater engineering processes.

Controlling the oxygen supply in the aeration tank

To create optimum living conditions for the bacteria, the aeration tank must be continuously supplied with oxygen (O_2). Because ventilation – with a power consumption of 50 to 80 % – is the single greatest energy user in a sewage treatment plant, the first and obvious starting point for saving energy is the oxygen content in the aeration tank. Determining and continuously regulating the oxygen content in the aeration tank is absolutely essential. The JUMO dTRANS O2 01 two-wire transmitter provides a sturdy and cost-effective measuring device.

Monitoring digestion

To survive in the digester the bacteria need a constant temperature of 35 to 37 ºC. As a result, monitoring the temperature in the digester is absolutely essential. The JUMO PROCESStemp RTD temperature probe with ATEX approval is exactly the right product for this purpose. Additional measurands to be monitored in the digester are level and pressure. The JUMO dTRANS p20 pressure transmitter and the JUMO dTRANS p33 level probe are the ideal solution for measuring the pressure and level in Ex areas. To monitor measurements, the measuring points can be connected to the JUMO LOGOSCREEN 601 recorder.

JUMO tecLine pH/Rd
Redox combination electrodes
Type 201025, 201026

JUMO AQUIS touch S/P
Multichannel measuring devices for liquid analysis
Type 202580, 202581

JUMO digiLine O-DO S10, JUMO ecoLine NTU
Optical sensor for dissolved oxygen and for turbidity measurement with indicating device and controller for digital sensors JUMO AQUIS 500 RS
Type 202614, 202670, 202569

JUMO ecoTRANS pH/Lf 03
Transmitter and switching device for pH value, redox potential, conductivity, and temperature
Type 202723, 202732

JUMO MIDAS S21 Ex
Pressure transmitter for use in Ex areas
Type 404710

JUMO dTRANS p20
Process pressure transmitter
Type 403025

JUMO flowTRANS MAG series
Electromagnetic flowmeters for industrial and hygienic applications
Type 406060, 406061

JUMO MAERA S29
Level probe made of titanium or stainless steel
Type 404393

JUMO dTRANS p33
Pressure transmitters and level probe for Ex areas
Type 404753

JUMO exTHERM-AT
Explosion-protected surface-mounted thermostat
Type 605055

JUMO LOGOSCREEN 601
Paperless recorder with touchscreen
Type 706521

JUMO PROCESStemp
RTD temperature probes for process technology with Ex approval
Type 902820

Industrial wastewater

Industrial wastewater refers to the wastewater that arises from industrial production processes (e.g. in the food, paper, chemical, textile, and metal industries). The composition of the industrial wastewater can vary greatly depending on which branch of industry is involved. Wastewater in the paper industry contains organic substances that are not easily degradable. Oils, greases, and heavy metals are found in metalworking. Industrial wastewater must be cleaned before disposal. The treated water can either be returned to the production process or discharged into the sewers.
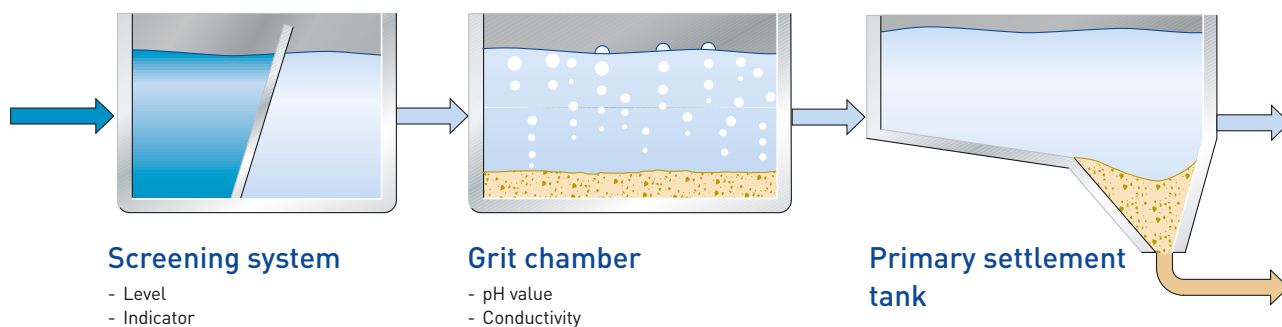
Example: treating wastewater from electroplating

In an electroplating bath, objects made of base metals such as zinc or iron are given a protective finish. This coating can consist of chemical elements such as copper or nickel. The first wastewater treatment stage for plating wastewater is cyanide and chromate detoxification. Detoxification is performed in continuous-flow systems. Once detoxification is complete the next stages take place: neutralization precipitation, removal of the precipitation products, and disposal of the sludge. At this point the cleaned wastewater is delivered to the sewer system.

pH measurement in electroplating plants

A pH value of at least 10 is necessary for cyanide detoxification. Chromate is removed from the wastewater in the acidic range. Here, pH measurement is used to monitor the electroplating baths and the detoxification processes. The JUMO tecLine pH electrodes with the JUMO AQUIS 500 pH transmitter and controller are the right products for this task.
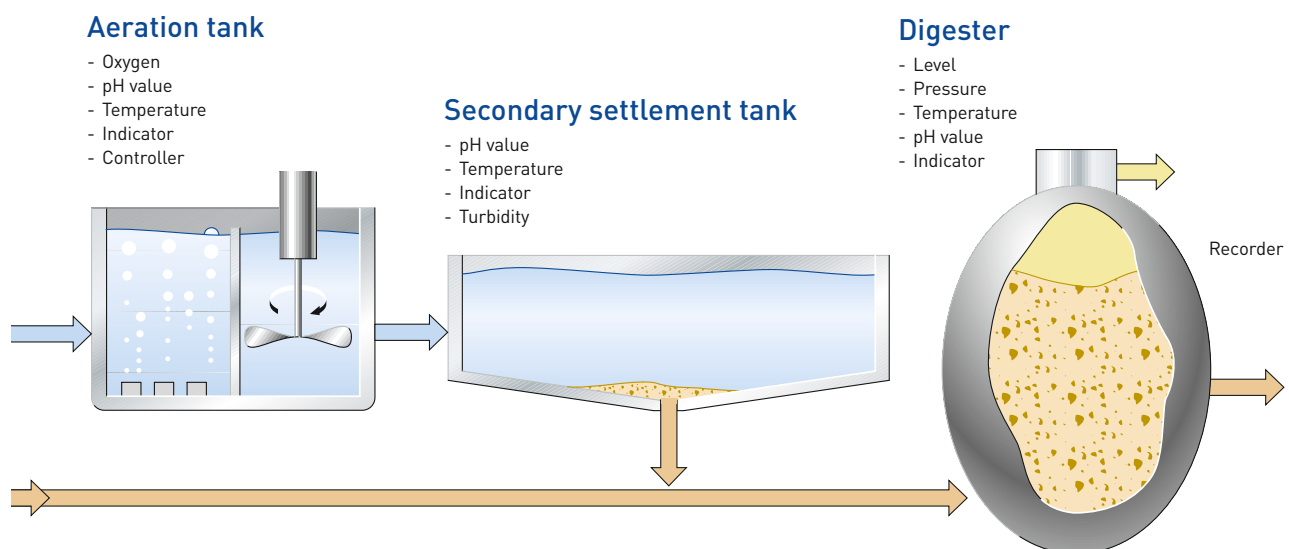
Sewer system

Screening system
- Level
- Indicator

Grit chamber
- pH value
- Conductivity

Primary settlement tank

Municipal wastewater

Wastewater is treated in sewage treatment plants. Biological and chemical processes as well as mechanical ones are used here. Most of the clogging material is caught by the screening system. In the grit chamber, heavy materials such as entrained sand particles should sink. The final station of the mechanical treatment stage is the primary settlement tank. All the lighter materials that are still in the wastewater and which have not been removed in the grit chamber settle to the floor of this tank to form so-called raw sludge. While the pretreated water is forwarded to the aeration tank the raw sludge is conveyed to the digesters. The biological treatment of the wastewater takes place in the aeration tank. Before the wastewater gets to this tank

the wastewater is mixed with activated sludge. This sludge contains countless microorganisms (e.g. bacteria) that are able to break down the finely divided organic contaminants that are dissolved in the wastewater. The activated sludge settles in the secondary settlement tank and collects at the bottom. The collected sludge is removed and returned to the aeration tank as return sludge or it is sent to the digesters as excess sludge. Digestion is the last station of the biological treatment stage. The sludge is stabilized in the digester. Stabilization refers to the most advanced anaerobic degradation of organic compounds with the aid of specific bacteria. These bacteria convert the organic components of the anaerobic digested sludge into biogas.

Aeration tank

- Oxygen
- pH value
- Temperature
- Indicator
- Controller

Secondary settlement tank

- pH value
- Temperature
- Indicator
- Turbidity

Digester

- Level
- Pressure
- Temperature
- pH value
- Indicator

Recorder

Water data management

For monitoring important wastewater/water parameters in municipalities or industrial applications, JUMO presents not only robust online sensor technology but also secure (IIot) data management as a cloud or SCADA solution.

JUMO is a comprehensive supplier of a smart and scalable system solution: from the sensor to the cloud or to a SCADA. Software with local server – the data is available worldwide in the same look and feel.

For this purpose, individually designed dashboards can be created and plant-related specifics can be taken into account. Evaluation, control, and monitoring is possible via PC, tablet, or cell phone from a wide range of global locations. The number of users is not limited.

Digital sensor technology and the JUMO variTRON automation system form the core of the system solution. For example, IO-Link-based measurands such as temperature, pressure, or flow are available.

The most important analysis parameters such as pH, redox, oxygen, turbidity, or conductivity are integrated via the JUMO digiLine sensor network. Sensors with wireless transmission complete the picture. The connection of conventional analog sensors is also possible.

In addition to control technology tasks, a gateway to a SCADA software such as JUMO smartWARE SCADA or the JUMO Cloud is also included. Secure "state of the art" data protocols are used. Manual data (e.g. from laboratory controls) can also be stored and evaluated in the cloud or SCADA database. This is easily done via cell phone, tablet, or PC from anywhere in the world.

Networking with other databases for such purposes as the exchange of geodata (GIS) or environmental and weather data is also intended. The JUMO smartWARE Evaluation software package makes data management and evaluation child's play. Maximum availability and data security are the benchmark here.

Water and Wastewater Engineering

Sensor and automation technology   Drinking water   Swimming pool water   Highly-purified water   Cooling water   Wastewater
Water data management   Engineering

IIoT cloud and SCADA solution for water and wastewater – theory and practice
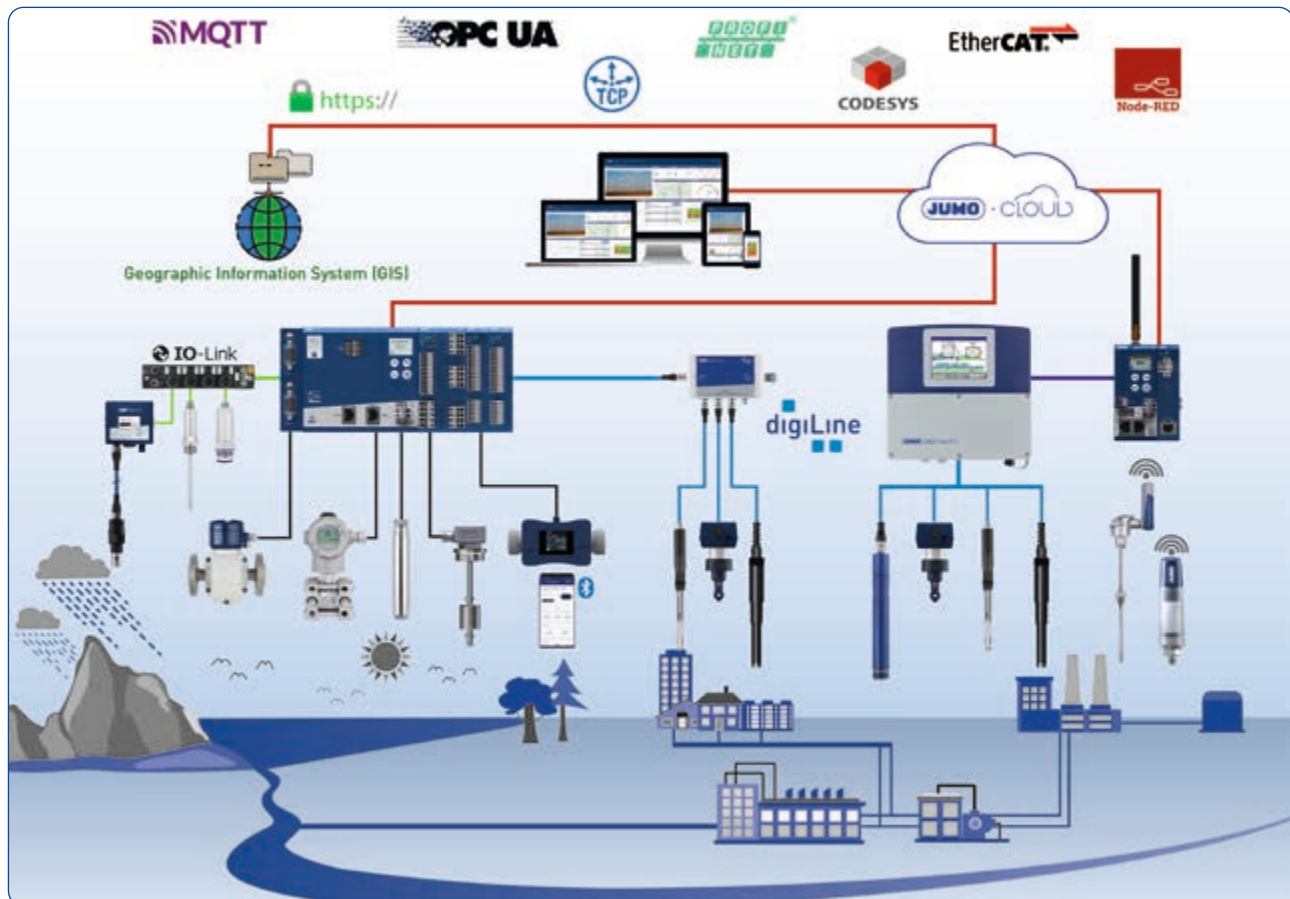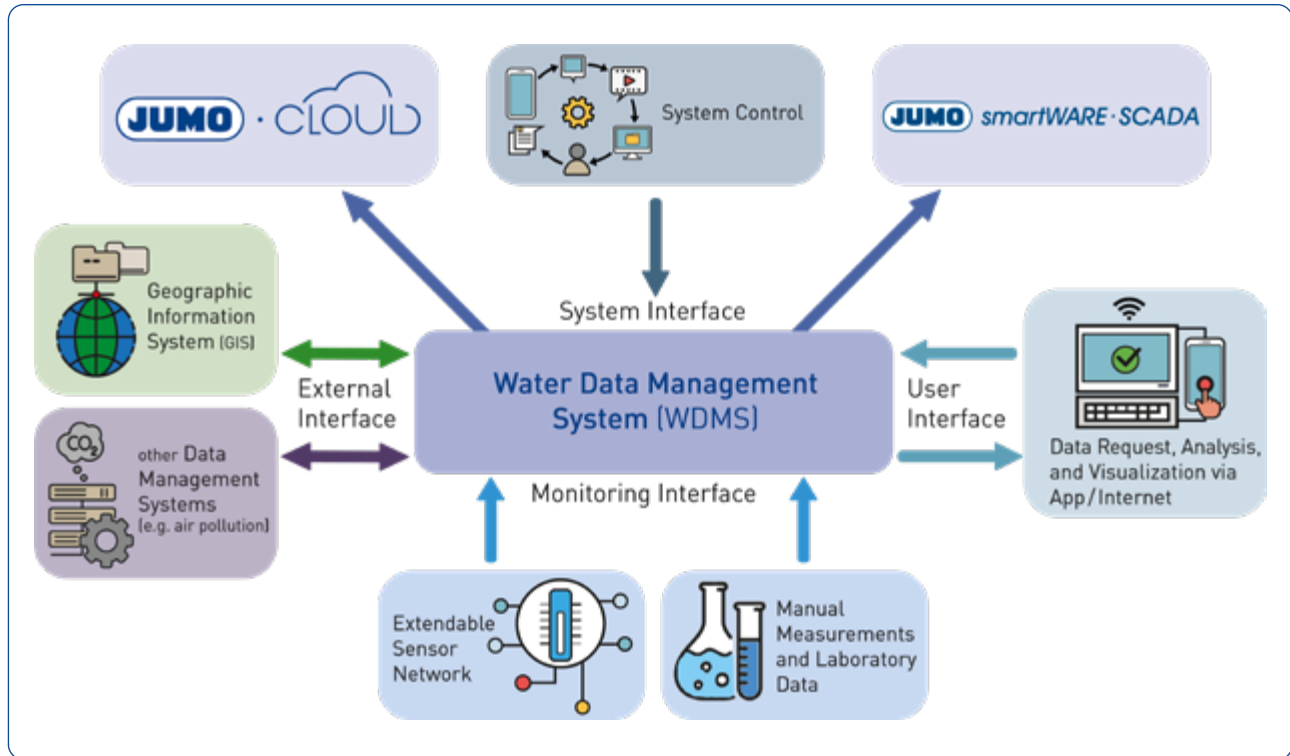
JUMO Engineering

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 which specific 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!

- Highly developed expertise for maximum flexibility:
  For fully reliable and proven project planning!

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

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