



More than **sensors + automation**



Liquid Analysis

Innovative solutions for the highest requirements



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Dear Reader,

Perhaps you're wondering why JUMO – as a specialist for temperature, pressure, and automation solutions – has chosen to focus on “analytical measurement in liquids.” This question is simple to answer. JUMO began as a manufacturer of technical glass thermometers. In the 1970s the company moved on to produce glass parts and glass sensors for the new area of electrochemical pH value and redox potential measurands as well as electrolytic conductivity.

Overly reckless practices with water as a resource led to increasing pollution of natural water resources. This resulted in regulations to prevent water pollution and requirements for cleaning and detoxifying industrial wastewater. During this time, industry and municipal operators were looking for suitable sturdy measurement and control technology to determine and regulate the main variables in water analysis. Previously this had been the domain of laboratory operations. As a result, JUMO supplied renowned suppliers and plant manufacturers in the new industry of water treatment, dispensing technology, and wastewater treatment technology from the beginning.

Today the components produced in the “JUMO analytical measurement” product line are represented in almost all areas

of water/wastewater engineering. From highly-purified pharmaceutical water to measuring high concentrations of acids, lyes, and salts – and from drinking/swimming pool/aquarium water to process water – JUMO covers nearly all applications that apply to our steadily growing community of satisfied customers. Many of our products make their way into measurement applications throughout the world under our customers' brand names. As a result, JUMO is a reliable OEM supplier and partner for professional customers.

JUMO is continuously developing and improving its sensors and measuring devices. This ensures our analytical measurement technology remains at the cutting edge and that our customers as well as our users have a reliable market position and products. We place great emphasis on ensuring production quality for highly sensitive sensor systems such as this. Our motivation comes from satisfied customers whose plants and investments will protect water as a valuable resource for all humanity.

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



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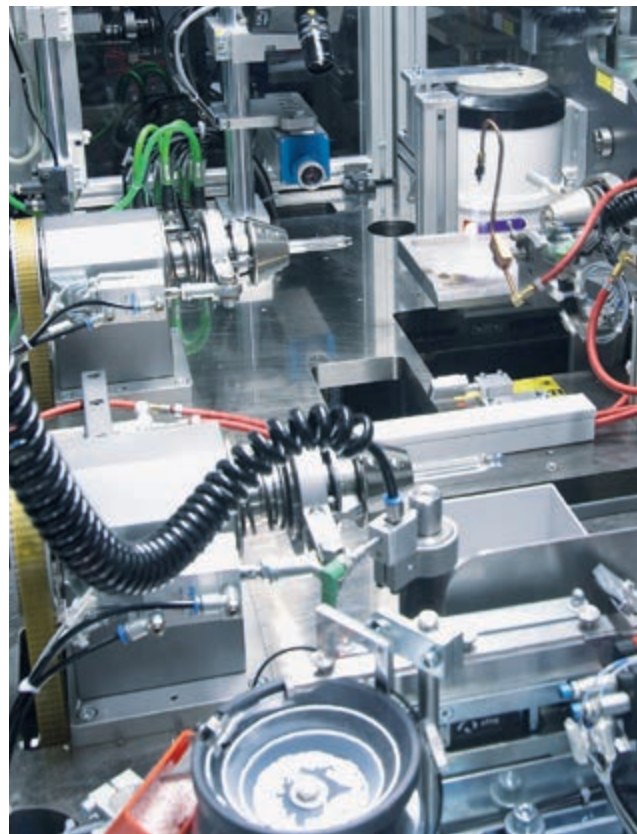


JUMO electrode manufacturing

JUMO offers the highest quality through internally developed electrodes and measuring systems, flexibility through modern production lines, and long-term experience. Whether you need glass or plastic versions, we can evaluate your needs and customize the pH and redox electrodes during production so that they are optimized to your application.



JUMO electrode manufacturing



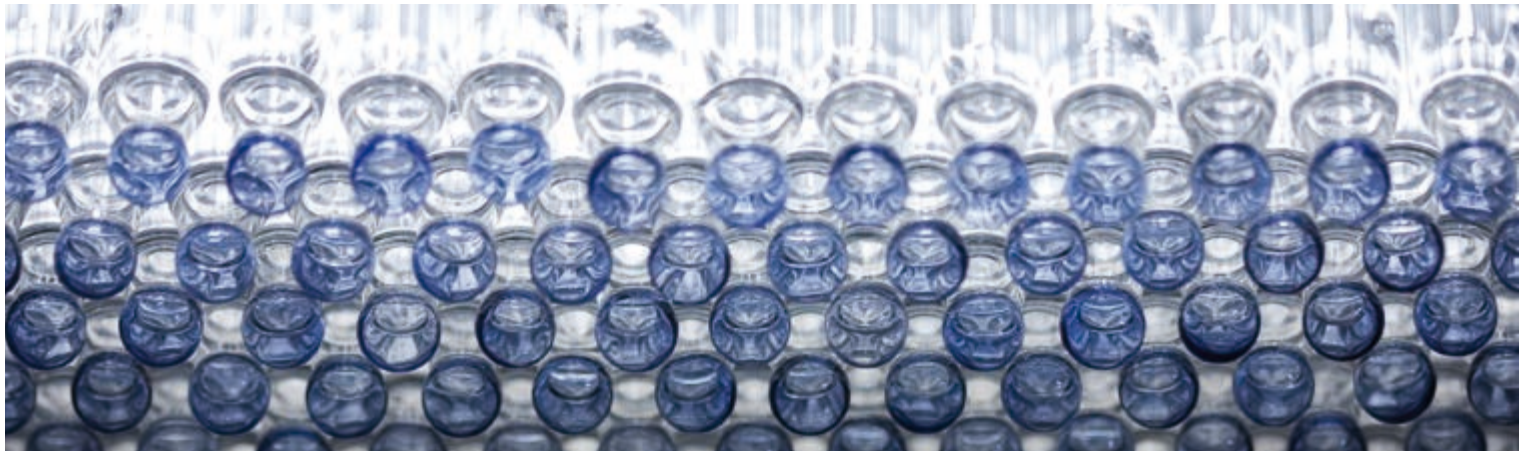
The success story of JUMO pH electrodes

The success story of JUMO pH electrodes is closely tied to glass technology. Glass thermometers have been produced in Fulda since 1947. On the basis of this experience in working with glass as a material, production of glass parts for pH electrodes began in the 1970s. Today JUMO is one of the largest producers of electrochemical sensors in Europe. Many customers purchase their electrodes from JUMO with their own company logo on the electrodes. One of our strengths is the production of such OEM versions and special designs

Reliable and accurate: JUMO pH and redox electrodes

Today pH electrodes are produced in semi and fully automated work processes. This ensures consistently high quality.

JUMO pH and redox electrodes are used in almost all areas of industry today: drinking and swimming pool water, municipal and industrial wastewater, neutralization plants, final inspections, the chemical industry, process and rinsing water, food technology, laboratory measurements, biotechnology, and aquariums.

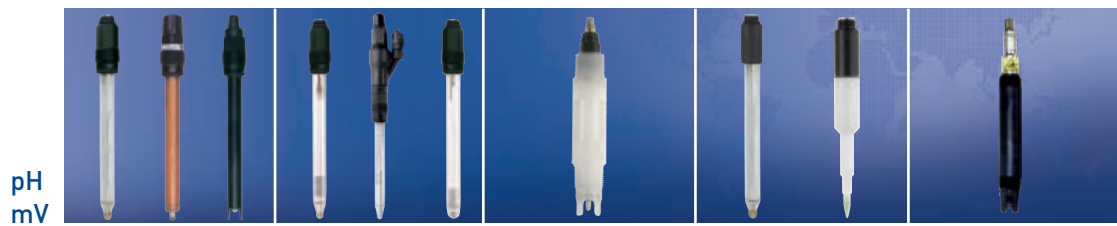


pH value and redox measurement

The pH value is the measurand most commonly used in analyzing aqueous solutions. Product quality in the chemical and pharmaceutical industries depends significantly on maintaining a narrow pH range. Accurate pH measurements help to improve the yield of the finished product and to reduce the number of unwanted by-products. As one of the largest manufacturers of electrodes in Europe and with more than 35 years of experience in analytical measurement, JUMO is a professional partner offering tailor-made solutions for nearly all applications.



pH and redox electrodes



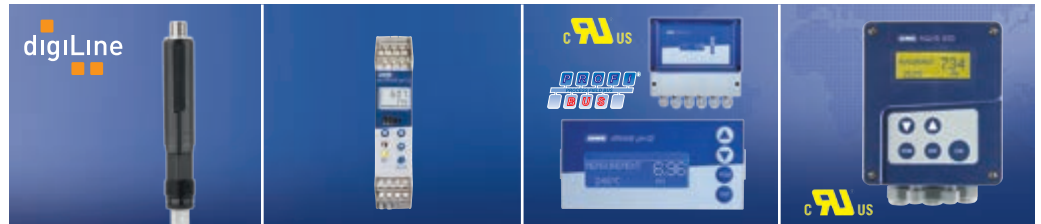
pH
mV

| | Description | JUMO ecoLine JUMO BlackLine | JUMO tecLine JUMO tecLine HD JUMO tecLine HY | JUMO tecLine PRO | JUMO labLine | JUMO ISFET |
|---------------------|----------------------|--|---|--|--|--|
| | Data sheet | 201005, 201010 | 201020, 201021, 201022, 201025, 201026, 201027 | 201020, 201025 | 201030, 201035 | 201050 |
| General information | Features | <ul style="list-style-type: none"> • For standard applications • Glass or plastic version | <ul style="list-style-type: none"> • For industrial applications • Also available in heavy duty and hygienic version for demanding processes • Integrated temperature sensor (optional extra for pH electrode) | <ul style="list-style-type: none"> • For industrial applications • High mechanical robustness • With plastic shaft • Integrated temperature sensor (optional extra for pH electrode) | <ul style="list-style-type: none"> • For laboratory applications | <ul style="list-style-type: none"> • Glassless • High mechanical robustness • Integrated temperature sensor |
| | Areas of application | <ul style="list-style-type: none"> • Drinking water • Greenhouse technology • Hand measuring devices • Swimming pool • Aquaristics • Surface water | <ul style="list-style-type: none"> • Process measurement • High temperature applications • Suspensions • Galvanic • Varnishes • Wastewater • Highly-purified water • Water • Highly-polluted media • Hygienic and sterile applications • Boiler feed water | <ul style="list-style-type: none"> • Wastewater treatment • Paper industry • Chemical industry | <ul style="list-style-type: none"> • General lab applications • Insertion measurements in food | – |
| Data | Diaphragm | <ul style="list-style-type: none"> • Ceramic • Glass fiber | <ul style="list-style-type: none"> • Ceramic • Glass fiber • PTFE • Perforated • Annular gap | <ul style="list-style-type: none"> • Annular gap | <ul style="list-style-type: none"> • Ceramic • PTFE • Glass fiber • Perforated | <ul style="list-style-type: none"> • Ceramic |



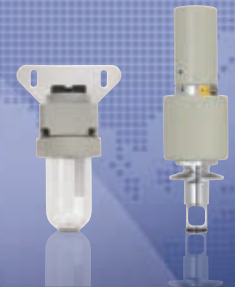
Transmitters/controllers for pH value, redox, and temperature*

pH
mV



| | Description | JUMO digiLine pH, ORP, T | JUMO ecoTRANS pH 03 Compact DIN rail transmitter | JUMO dTRANS pH 02 Transmitter, controller, indicating device, and data logger in one device | JUMO AQUIS 500 pH Transmitter/controller with high-quality controller functions |
|---------------------|----------------------|---|--|--|--|
| | Data sheet | 202705 | 202723 | 202551 | 202560 |
| General information | Features | <ul style="list-style-type: none"> • Smart electronics • Sensor and process data • Bus capable/Plug and Play • Reusable | <ul style="list-style-type: none"> • Easy-to-use device programming with PC setup program • Changeover relay for alarm message or control • Ideal partner for PLC | <ul style="list-style-type: none"> • Extremely compact design type • Multilingual plain text operation • Modular structure • Variable measured value display • P, PI, PD, and PID control functions | <ul style="list-style-type: none"> • Multilingual plain text operation • Graphic display with backlighting • P, PI, PD, and PID control functions |
| | Areas of application | For universal application | For universal application | For universal application | For universal application |
| Data | Mounting | Suitable for electrodes with: <ul style="list-style-type: none"> • Plug head N • Plug head VP (severable) | DIN rail | Surface or control cabinet mounting | Surface or control cabinet mounting |
| | Measurands | <ul style="list-style-type: none"> • pH/(ORP) redox • Temperature | <ul style="list-style-type: none"> • pH/redox • Temperature | <ul style="list-style-type: none"> • pH/redox/NH₃ • Temperature • Flow | <ul style="list-style-type: none"> • pH/redox/NH₃ • Temperature |
| | Outputs | <ul style="list-style-type: none"> • Digital interface • One analog output (optional) | <ul style="list-style-type: none"> • Up to two analog outputs • One relay | <ul style="list-style-type: none"> • Up to three analog outputs • Up to seven relays | <ul style="list-style-type: none"> • Up to two analog outputs • Up to two relays |
| | Protection type | <ul style="list-style-type: none"> • IP66 (M12) • IP68 (on the sensor plug head VP) | IP20 | IP65 | IP67 |

* See also chapter "Multichannel measuring devices" (page 22).



Fittings

| | pH mV | | | | | |
|---------------------|---|---|--|--|---|---|
| | | | | | | |
| Description* | Flow fittings for installation in pipelines | Immersion fittings for installation in open flumes, tanks, and pools | Retractable holder for installation in closed liquid runs, pools, and tanks | Pneumatic quick-change fitting with automatic sensor cleaning | Permanent fittings for installation in pipelines or tanks | |
| Data sheet | 202810 | 202820, 202821 | 202822 | 202823 | 202825 | |
| General information | Features | <ul style="list-style-type: none"> Protects the electrodes against breakage Ensures correct sensor flow to prevent measurement errors | <p>Type 202820:</p> <ul style="list-style-type: none"> Up to three sensors Enables measurement in different immersion depths <p>Type 202821:</p> <ul style="list-style-type: none"> Sturdy design Integrated spray nozzles for sensor rinsing Increases sensor service life Reduces maintenance work | <ul style="list-style-type: none"> Sensor replacement without interrupting the process Installing sensors with an insertion length of 120 mm or 225 mm | <ul style="list-style-type: none"> For one sensor (225 mm) Cleaning of the sensor in the integrated washing chamber without interrupting the process With pneumatic positional feedback Can be combined with cleaning machine | <ul style="list-style-type: none"> Used for protecting and mounting the electrode Suitable for use in media with increased hygienic requirements |
| | Material | <ul style="list-style-type: none"> PC or PP PVC | <p>Type 202820: PP</p> <p>Type 202821: stainless steel (1.4404/316L)</p> | Stainless steel (1.4571) and FPM or PP and FPM | Stainless steel (1.4404/316L) or PVDF | Stainless steel (1.4571) |
| Data | Immersion length (as of process connection) | – | <p>Type 202820: 500 to 2000 mm</p> <p>Type 202821: 500 to 2500 mm</p> | 48 to 135 mm | 71 mm | 5 to 90 mm |
| | Process connection | <ul style="list-style-type: none"> G ½ A or bonded socket joints Angled seat DN 20/25 T-piece DN 32/40/50 | <p>Type 202820:</p> <ul style="list-style-type: none"> Flange <p>Type 202821:</p> <ul style="list-style-type: none"> Flange Retainer | <ul style="list-style-type: none"> Screw-in thread G ¾ A Screw-in thread G 1 A Clamp DN25 | Flange DN50 | <ul style="list-style-type: none"> Weld seam Screw-in thread G¾ A Taper sockets DN25/50 Hygienic process connections: (clamp DN25/50, VARIVENT® DN40/50) Ingold screw connection |
| | Accessories | – | <p>Type 202820:</p> <ul style="list-style-type: none"> Cleaning nozzle Wetting cup <p>Type 202821:</p> <ul style="list-style-type: none"> Integrated flushing nozzle | – | <ul style="list-style-type: none"> T-piece installation Controller EXmatic 460 Cleaning valve kit | – |

* The fittings are not suitable for JUMO ISFET sensors and JUMO teLine PRO electrodes.



Conductive conductivity measurement

After pH measurement, the electrolytic conductivity measurement is the most measured parameter in liquid analysis. For desalination of seawater and for monitoring the quality of highly-purified water or cooling water, conductivity measurement plays an important role in many applications. Whether two or four-electrode systems: with JUMO, you're ready for anything.



Application example



Measuring cells with
“ASTM test certificate”






Conductivity measurement in highly-purified water

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. A continuous conductivity measurement enables the quality of the highly-purified water to be monitored quickly and reliably. The measurement is made with conductivity sensors that work according to the two-electrode method. According to the European Pharmacopoeia (EP), the cell constant of a measuring cell must be certified by its manufacturer. For many years the JUMO product portfolio has featured measuring cells that meet these requirements. We currently offer the

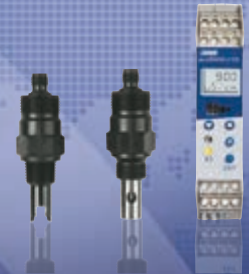
conductive conductivity measuring cell JUMO tecLine CR in a stainless steel or titanium version with the “ASTM test certificate.” The certificate indicates the precisely measured cell constant that was measured in the factory. This cell constant can be entered directly in the transmitter. The measuring cell is then ready to use. In addition to reliable conductivity sensors, highly-purified water applications also require measurement and control devices that can be mounted according to on-site requirements. JUMO offers a wide selection of models in this field. Customers typically choose panel mounting (JUMO dTRANS CR 02), installation in a surface-mounted case (JUMO AQUIS 500 CR) with a high protection type (for example IP67), or DIN-rail mounting (JUMO ecoTRANS Lf 03).







Conductive two and four electrode conductivity measuring cells

| | |  |  |  |  |  |
|----------------------------|------------------------------------|--|---|---|---|--|
| | $\mu\text{S/cm}$ mS/cm | | | | | |
| | Description | JUMO BlackLine CR-GT, -EC, -GS | JUMO ecoLine CR-PVC | JUMO tecLine CR | JUMO tecLine CR-GT | JUMO tecLine CR-4P with JUMO PEKA adapters |
| | Data sheet | 202922 | 202923 | 202924 | 202925 | 202930 |
| General information | Features | <ul style="list-style-type: none"> • Compact design type • Low cost version • For universal application | <ul style="list-style-type: none"> • Proven versions for industrial use • Implementation option with T-piece | <ul style="list-style-type: none"> • Wide variety of process connections • Sturdy design type • Pharmaceutical version incl. ASTM certificate | <ul style="list-style-type: none"> • Industrial version • Various process connections provide optimum adaptation to process conditions • With integrated temperature probe | <ul style="list-style-type: none"> • Very wide measuring range • CIP/SIP capability • Hygienic design • Certificate of quality included |
| | Areas of application | <ul style="list-style-type: none"> • Drinking water • Ion exchangers and reverse osmosis plants • Aquaristics | <ul style="list-style-type: none"> • Cooling and air-conditioning system technology • Drinking and swimming pool water • Industrial rinsing and process water circuits | <ul style="list-style-type: none"> • Pure and highly-purified water • Boiler feed water • Chip manufacturing • Ion exchangers and reverse osmosis plants • High temperature applications | <ul style="list-style-type: none"> • Drinking water and wastewater • Service water treatment | <ul style="list-style-type: none"> • Rinsing processes in the food and beverages industry as well as the pharmaceuticals and biotechnology sector • CIP and SIP applications |
| Data | Cell constant | K = 0.01; 0.1 or 1.0 | K = 0.1 or 1.0 | K = 0.01 or 0.1 | K = 1.0 | K = 0.3 to 0.4 |
| | Measuring ranges* from to | 0.05 $\mu\text{S/cm}$ approx. 10 mS/cm | 1 $\mu\text{S/cm}$ 15 mS/cm | 0.05 $\mu\text{S/cm}$ 1 mS/cm | 10 $\mu\text{S/cm}$ 15 mS/cm | 1 $\mu\text{S/cm}$ 600 mS/cm |
| | Electrode material | JUMO BlackLine CR-GT: Special graphite JUMO BlackLine CR-EC: Stainless steel (1.4571) or titanium JUMO BlackLine CR-GS: Platinum | Stainless steel (1.4571) or graphite | • Stainless steel (1.4571 or 1.4435) • Titanium | Graphite | Stainless steel (1.4435) |

* The measuring ranges depend on the measuring cell types and/or the cell constant.



Transmitters/controllers for conductivity, TDS, resistance, and temperature*

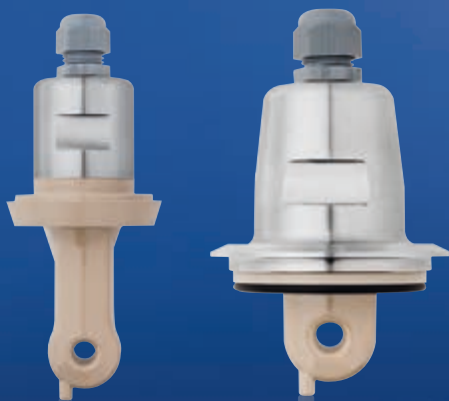
| |  |  |  |  | |
|----------------------------|---|--|---|---|--|
| | $\mu\text{S}/\text{cm}$ mS/cm | | | | |
| Description | JUMO ecoTRANS Lf 01/02 Transmitter/switching device | JUMO ecoTRANS Lf 03 Transmitter/switching device | JUMO dTRANS CR 02 Transmitter/controller | JUMO AQUIS 500 CR Transmitter/controller | |
| Data sheet | 202731 | 202732 | 202552 | 202565 | |
| General information | Features | <ul style="list-style-type: none"> • Low cost • Ideal partner for PLC • User-friendly setup program | <ul style="list-style-type: none"> • Integrated LCD display with varied display units ($\mu\text{S}/\text{cm}$, mS/cm, $\text{k}\Omega\text{m} \times \text{cm}$) • USP switching function according to USP<645> • Calibration certificate included | <ul style="list-style-type: none"> • Extremely compact design type • Transmitter, controller, indicator, and data logger in one device • Simple operation in plain text, multiple languages available • Modular structure – variable measured value display • USP switching function according to USP<645> | <ul style="list-style-type: none"> • Multilingual plain text operation • Graphic display with backlighting • P, PI, PD, and PID control functions • USP switching function according to USP<645> |
| | Areas of application | General water technology | For universal application | For universal application | For universal application |
| Data | Mounting | DIN rail | DIN rail | Surface or control cabinet mounting | Surface or control cabinet mounting |
| | Measurands | <ul style="list-style-type: none"> • Conductivity • Temperature | <ul style="list-style-type: none"> • Conductivity • Temperature • Resistance | <ul style="list-style-type: none"> • Conductivity • Temperature • Resistance • TDS value | <ul style="list-style-type: none"> • Conductivity • Temperature • Resistance • TDS value |
| | Outputs | <ul style="list-style-type: none"> • One galvanically isolated analog output • One relay output | <ul style="list-style-type: none"> • Two analog outputs • One relay output or two open collector outputs | <ul style="list-style-type: none"> • Up to three analog outputs • Up to seven relays | <ul style="list-style-type: none"> • Two analog outputs • Two relays with changeover contact |
| | Protection type | IP20 | IP20 | IP65 | IP67 |

* See also chapter "Multichannel measuring devices" (page 22).



Inductive conductivity measurement

The conductivity sensor in a CIP plant must be resistant to highly aggressive and hot cleaning agents. It must also be suitable for conductivity values that can occasionally be very high. Inductive measurement technology is ideal for this application, since the measuring device has no actual contact with the measurement solution. JUMO offers a wide selection of inductive conductivity sensors in this area. Examples are the JUMO CTI-750 with stainless steel case and the JUMO tecLine Ci hygienic inductive conductivity sensor.



Application example



Conductivity measurement in CIP cleaning

CIP cleaning is one of the standard cleaning methods for production plants in both the food and pharmaceutical industries. Automating this cleaning process allows companies to reduce costs and produce more efficiently. Inductive conductivity sensors offer significant advantages in this application. The JUMO CTI-750 conductivity transmit-

ter supports this process with accurate measurements to ensure that cleaning is performed quickly and reliably. JUMO CTI-750 also monitors and controls the concentration of your cleaning agent by measuring conductivity with an inductive conductivity sensor.



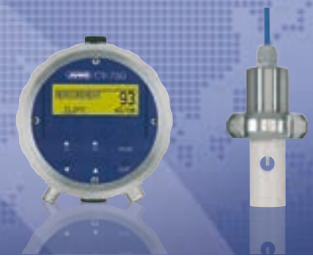


Inductive conductivity sensors

| | |  μS/cm mS/cm |  FDA |  FDA |
|----------------------------|---|---|---|--|
| | Description* | JUMO tecLine Ci Hygienic conductivity sensor | JUMO tecLine Ci-S Conductivity sensor for process technology | JUMO ecoLine Ci Conductivity sensor for water technology |
| | Data sheet | 202941 | 202942 | 202943 |
| General information | Features | <ul style="list-style-type: none"> • Hygienic sensor design • Wide variety of process connections (milk cone, clamp, VARIVENT®) • Fast-response internal temperature sensor • Seal-free construction | <ul style="list-style-type: none"> • Wide variety of mounting measurands • Different body materials • Immersion version also available | <ul style="list-style-type: none"> • Maintenance-free conductivity measurement • Compact, proven sensor • Various process connections variants |
| | Areas of application | <ul style="list-style-type: none"> • Food industry (dairies, breweries, etc.) • Soft drinks manufacturing/bottling • Mineral springs • Drinking water • CIP/SIP systems • Concentration measurements of acids, lyes, and cleaning chemicals | <ul style="list-style-type: none"> • Liquid foods • CIP/SIP systems • Rinsing and cleaning processes | <ul style="list-style-type: none"> • Drinking water and wastewater • Dilution monitoring in cooling towers • Seawater desalination plants • Rinsing baths (electroplating plants) • Car washes • Wet scrubbers • Use in media with light chemical pollution |
| Data | Sensor material | PEEK® | PVDF | PP or PVDF |
| | Measuring range | 0 to 2000 mS/cm** | 0 to 2000 mS/cm** | 0 to 2000 mS/cm** |
| | Admissible medium temperature: Brief operation | -10 to +125 °C ≤+150 °C (≤60 min, ≤5 bar) | -10 to +125 °C ≤+140 °C | -10 to +80 °C PP (+100 °C PVDF) ≤+100 °C PP (+100 °C PVDF) |

* The inductive conductivity sensors are intended for connection to JUMO AQUIS 500 Ci or JUMO AQUIS touch S/P.

** Recommended area of application: as of approx. 50 μS/cm.



Transmitters/controllers for inductive conductivity, concentration, and temperature*

μS/cm
mS/cm



| | Description | JUMO AQUIS 500 Ci Transmitters/controllers for inductive conductivity, concentration, and temperature | JUMO CTI-500 Inductive conductivity/ concentration and temperature transmitter with switching contacts | JUMO CTI-750 Inductive conductivity/ concentration and temperature transmitter in plastic or stainless steel case |
|---------------------|----------------------|--|---|--|
| | Data sheet | 202566 | 202755 | 202756 |
| General information | Features | <ul style="list-style-type: none"> Multilingual plain text operation Graphic display with backlighting P, PI, PD, and PID control functions | <ul style="list-style-type: none"> Operation via keypad and via setup program Up to four measuring ranges and temperature coefficients can be activated Fast-response temperature sensor | <ul style="list-style-type: none"> Individual characteristic line for concentration display Easy-to-use programming options with setup program CIP and SIP capable |
| | Areas of application | <ul style="list-style-type: none"> Food and beverages industry CIP/SIP systems Concentration measurement of acids and lyes | <ul style="list-style-type: none"> Water and wastewater engineering Cooling tower monitoring (dilution control) Rinsing baths (electroplating plants) Wet scrubbers | <ul style="list-style-type: none"> Food and beverages industry CIP/SIP systems Concentration measurement of acids and lyes |
| Data | Measurands | <ul style="list-style-type: none"> Conductivity Concentration of NaOH, HNO₃, H₂SO₄, HCl Temperature | <ul style="list-style-type: none"> Conductivity Concentration of NaOH, HNO₃ Temperature | <ul style="list-style-type: none"> Conductivity Concentration of NaOH, HNO₃ Temperature |
| | Versions | Surface or panel mounting | <ul style="list-style-type: none"> Combined device (transmitter and measuring cell together in one device) Split version (transmitter and measuring cell connected by cable) | <ul style="list-style-type: none"> Combined device (transmitter and measuring cell together in one device) Split version (transmitter and measuring cell connected by cable) |
| | Mounting | Surface or control cabinet mounting | Pipe mounting, wall mounting | Pipe mounting, wall mounting |
| | Outputs | <ul style="list-style-type: none"> Up to two analog outputs Up to two relays | <ul style="list-style-type: none"> Two outputs Two potential-free contacts | <ul style="list-style-type: none"> Two outputs Two potential-free contacts |
| | Protection type | IP67 | IP67 | IP67 |
| | Sensor material | See sensors | PP or PVDF | PEEK® or PVDF |

* See also chapter "Multichannel measuring devices" (page 22).



Membrane-covered sensors

JUMO offers a wide range of solutions for many different applications from one single source. These include documentation for the disinfectant concentration of your plant, monitoring for ammonia leakage in your refrigeration plant, or controlling the oxygen content of your sewage treatment plant with an amperometric or a luminescence method.



Sensors for total chlorine, free chlorine, chlorine dioxide, ozone, hydrogen peroxide, peracetic acid, and bromine



| | | | |
|-----------------------------|--|---|--|
| Description | JUMO tecLine Cl ₂ /TC/ClO ₂ , O ₃ , H ₂ O ₂ /PAA, Br membrane-covered amperometric measuring cells* | JUMO AQUIS 500 AS Indicating device/controller | JUMO flow fittings for membrane-covered measuring cells |
| Data sheet | 202630/31/34/36/37 | 202568 | 202810, 202811 |
| Features | <ul style="list-style-type: none"> Measuring range: 0 to 50,000 mg/l** Temperature-compensated current output (4 to 20 mA) | <ul style="list-style-type: none"> Display: mg/l, ppm, pH, mV, µs/cm, etc. Choice of display visualizations | <ul style="list-style-type: none"> Combination fitting and individual fitting for monitoring water disinfection |
| Areas of application | Drinking water, swimming pool water, service water | For universal application | Drinking water, swimming pool water, service water |

Oxygen measurement (DO)



| | | |
|-----------------------------|--|--|
| Description | JUMO dTRANS O2 01 – two-wire transmitter for dissolved oxygen with operating unit | JUMO ecoLine O-DO* – optical sensor for dissolved oxygen with JUMO AQUIS 500 RS indicating device/controller |
| Data sheet | 202610 | 202613, 202569 |
| Measuring principle | Amperometric | Luminescence |
| Features | <ul style="list-style-type: none"> Measuring range: 0 to 50 mg/l Simple, safer servicing through exchange of modules | <ul style="list-style-type: none"> Measuring range: 0 to 20 mg/l Long-term stability and low maintenance |
| Areas of application | Drinking water, wastewater, fish farming | |

Ammonia measurement



| | | | |
|-----------------------------|--|---|--|
| Description | JUMO ammonia-sensitive sensor* | JUMO AQUIS 500 pH Transmitters/controllers | JUMO quick-change fitting for ammonia-sensitive sensor |
| Data sheet | 201040 | 202560 | 201040 |
| Features | <ul style="list-style-type: none"> Measuring range: 0.01 to 999 mg/l Simple, safer servicing through exchange of modules | <ul style="list-style-type: none"> Multilingual plain text operation – graphic display with backlighting P, PI, PD, and PID control functions | <ul style="list-style-type: none"> Simplifies handling Hose connection G 1/8 A (POM) |
| Areas of application | Refrigeration plants*** | For universal application | Refrigeration plants*** |

* Also suitable for connecting to the JUMO AQUIS touch S/P multichannel measuring devices, see page 21/22.

** Measuring range depends on the measurand.

*** Monitoring of ammonia leakage (e.g. in indoor ice rinks or cold stores).



Turbidity measurement

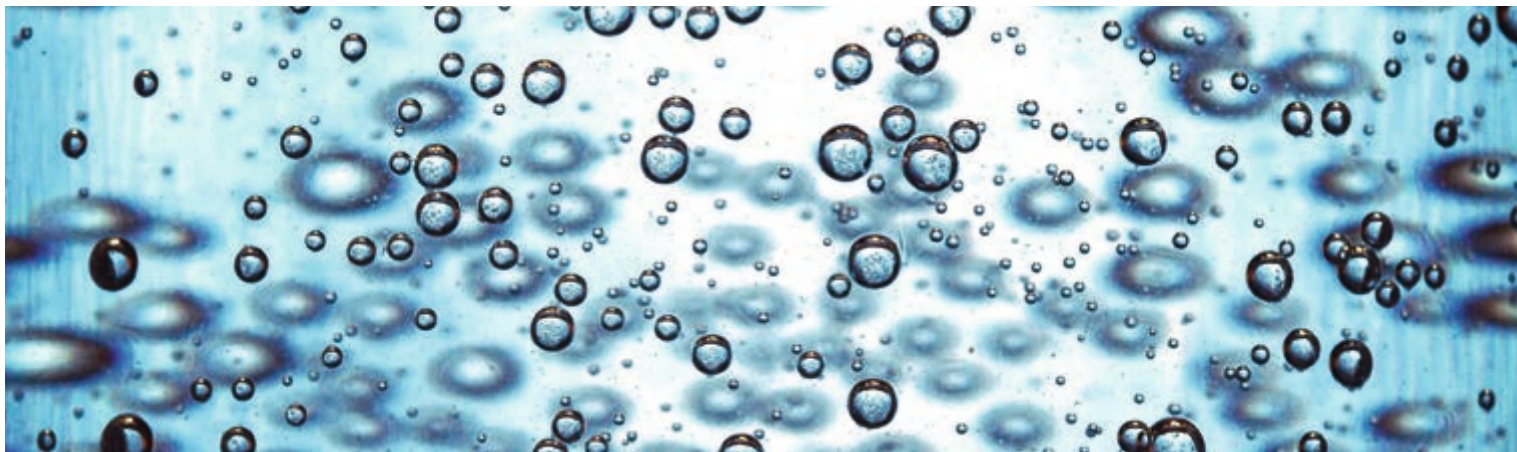
The turbidity measurement according to DIN EN ISO 7027 is a tried-and-tested method for monitoring water with low to medium levels of turbidity. The measuring principle is based on infrared light measurement according to the 90 ° scattered light method. Due to the light measurement at a wavelength of 880 nm and the wide measuring range of 0 to 4,000 NTU the sensor can be used in such areas as fish breeding, water monitoring, and wastewater control.



Turbidity measurement (NTU)

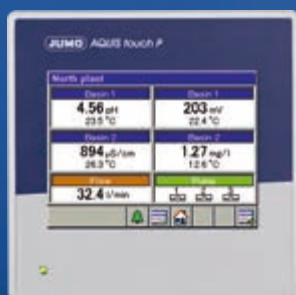


| | | |
|----------------------------|------------------------------|--|
| | Description | JUMO ecoLine NTU – optical sensor for measuring turbidity with JUMO AQUIS 500 RS indicating device/controller |
| | Data sheet | 202670, 202569 |
| General information | Features | Robust sensor, low maintenance, and calibration data/history saved in the sensor electronics, complete unit with JUMO AQUIS 500 RS (an indicating device with two integrated controller and two switching outputs) |
| | Application areas | <ul style="list-style-type: none"> • Municipal and industrial sewage treatment plants • Water protection • Fish farming companies • Process plants |
| Data | Measuring principle | Infrared measurement (880 nm) according to the 90 ° scattered light principle (according to DIN EN ISO 7027) |
| | Measuring ranges | Four measuring ranges: <ul style="list-style-type: none"> • 0 to 50 NTU • 0 to 200 NTU • 0 to 1000 NTU • 0 to 4000 NTU |
| | Resolution | 0.01 to 1 NTU (depending on the set measuring range) |
| | Measuring error | < 5 % of the displayed measured value |
| | Temperature sensor | Integrated NTC (Negative Temperature Coefficient) |
| | Operating temperature | 0 to 50 °C |
| | Interface | RS485 |
| | Voltage supply | DC 5 to 12 V |
| | Dimensions | Diameter: 27 mm, length approx. 170 mm |
| | Material | PVC |
| Max. pressure | 5 bar | |
| Protection type | IP68 | |



Multichannel measuring devices

Measure – display – control – record. These are terms that have been closely associated with the JUMO brand for decades. The four tasks have been combined into a single, innovative device series for the future global liquid analysis market: the JUMO AQUIS touch.



| North plant | |
|--|----------------------|
| Basin 1 | Basin 1 |
| 4.56 pH 23.5 °C | 203 mV 22.4 °C |
| Basin 2 | Basin 2 |
| 894 $\mu\text{S}/\text{cm}$ 26.3 °C | 1.27 mg/l 12.6 °C |
| 32.4 l/min | Flow |

pH

$\mu\text{S}/\text{cm}$

ppm

mV

l/min

$\text{M}\Omega \cdot \text{cm}$

mS/cm

JUMO AQUIS touch S

Multichannel measuring devices



| | Description | JUMO AQUIS touch P | JUMO AQUIS touch S |
|---------------------|----------------------|---|---|
| | Data sheet | 202580 | 202581 |
| General information | Features | <ul style="list-style-type: none"> • 3.5" touchscreen • 10 inputs and outputs as part of the basic package • Seven slots for input and output modules | <ul style="list-style-type: none"> • 5.5" touchscreen • 14 inputs and outputs as part of the basic package • 13 slots for input and output modules |
| | | <ul style="list-style-type: none"> • Modular structure • Customized process screen • Data monitor, registration function • Web browser with online visualization • Timer functions • Math and logic functions • Setup program, PC evaluation software (PCA3000), PCA communication software (PCC) • Calibration routines/calibration log books/calibration timers • In addition, up to six JUMO digiLine sensors can be connected | |
| | Areas of application | <ul style="list-style-type: none"> • For universal application • Water and wastewater engineering • Food and beverages industry (CIP/SIP) • Pharmaceuticals and biotechnology (USP, ASTM) • Drinking water technology/desalination of seawater • Process technology (rinsing baths/galvanic equipment, cooling tower control, gas/air scrubbers) • Swimming pool technology | |
| Data | Mounting | Control cabinet mounting (front dimensions 96 x 96 mm) | Surface-mounted case |
| | Measurands | <ul style="list-style-type: none"> • pH value/redox voltage/NH₃ concentration • Electrolytic conductivity (conductive) • Electrolytic conductivity (inductive) • Acid and lye concentration • Resistance (MΩm x cm; kΩm x cm) • TDS value (ppm) • Temperature (Pt100, Pt1000, NTC, PTC) • Flow (pulse input) • Free chlorine, total chlorine, chlorine dioxide, ozone, hydrogen peroxide, peracetic acid • Universal inputs via standard signal (0 to 20 mA; 4 to 20 mA or 0 to 10 V) for various measurands | |
| | Protection type | IP66 (front side) | IP67 |
| | Interfaces | Ethernet, USB host, USB device (setup), RS422/RS485 with Modbus protocol, PROFIBUS DP, PROFINET | |
| | Approvals | cULus, DNVGL | cULus |



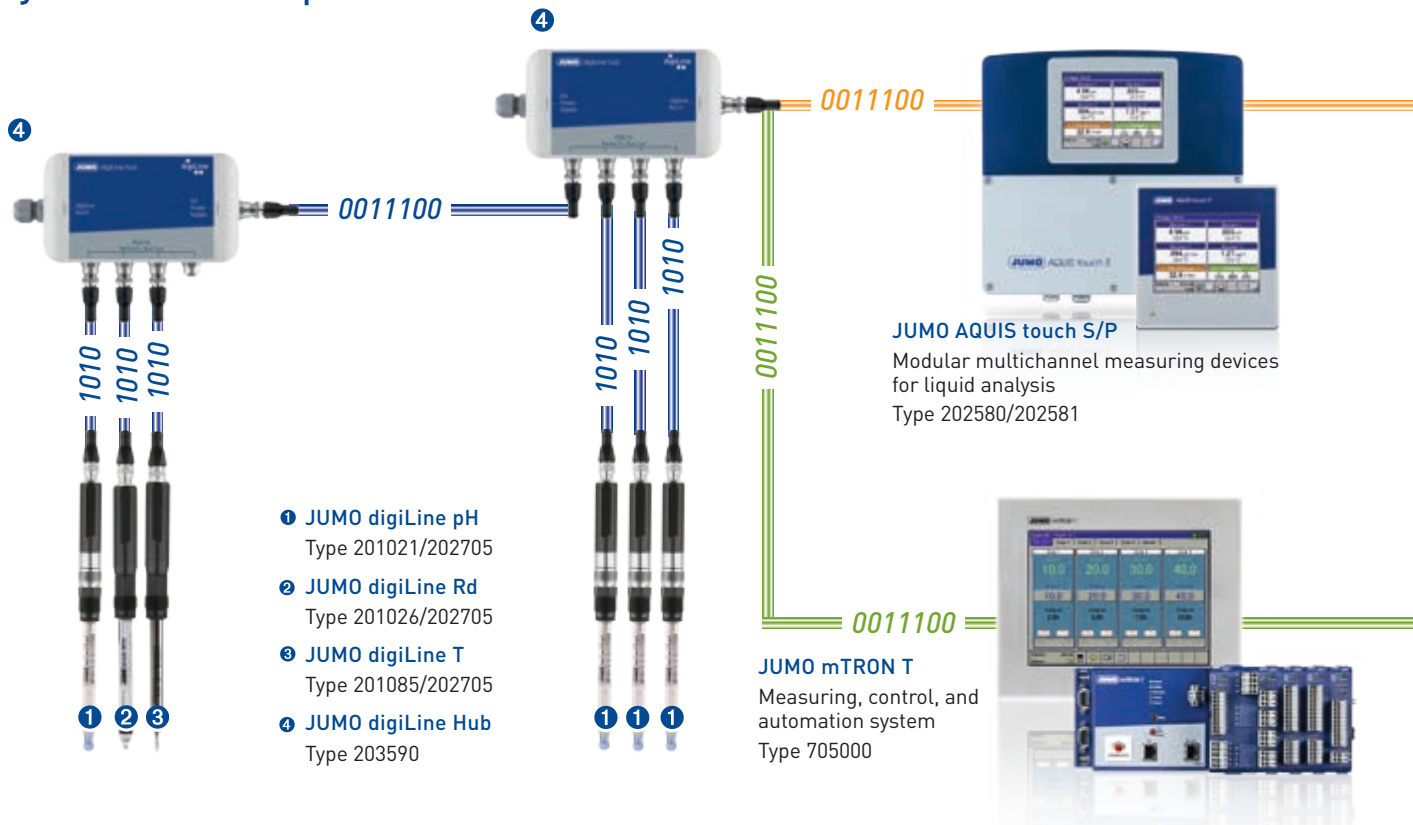
JUMO digiLine

Intelligent, bus-compatible connection system for digital sensors

With JUMO digiLine, JUMO presents a bus-compatible connection system for digital sensors used in liquid analysis which also offers Plug and Play functionality.

JUMO digiLine allows for the simple creation of sensor networks by connecting a wide array of sensors in various 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.

System example

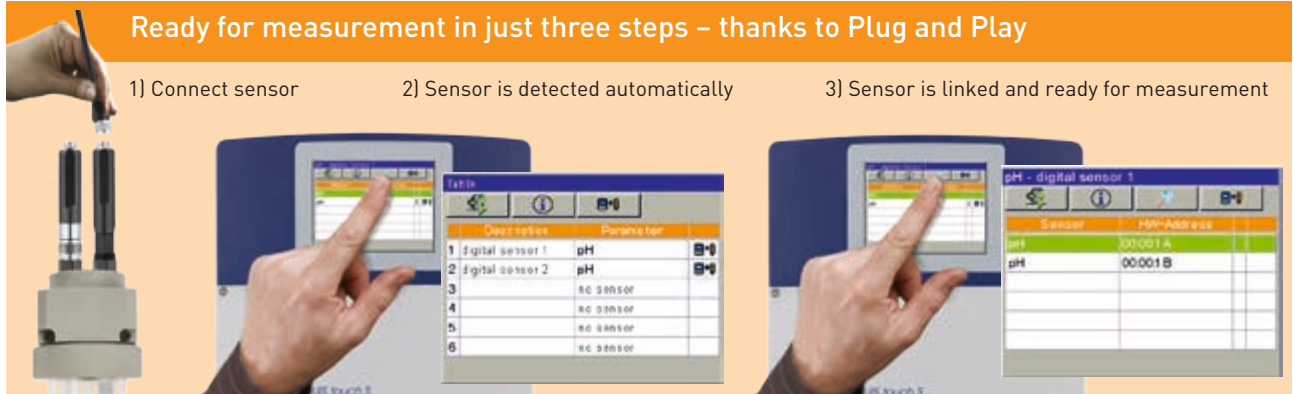


Ready for measurement in just three steps – thanks to Plug and Play

1) Connect sensor

2) Sensor is detected automatically

3) Sensor is linked and ready for measurement





Connection option 1

The multichannel measuring devices of the JUMO AQUIS touch series are especially designed for liquid analysis. They are ideal as a central platform for the display and further processing of measurement data. Up to six digiLine sensors can be connected to the modular devices and as many as 25 sensors can be connected in total using corresponding input modules and interfaces. In addition to measured value recording up to four 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 universal measuring, control, and automation system JUMO mTRON T. This means that entire automation solutions can be implemented while the scalability also enables individual adaptation to a particular task. An integrated PLC is used to integrate up to 62 JUMO digiLine sensors.

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 both individual measuring points and for setting up 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
- The digiLine electronics can still be used when the sensor becomes worn
- Simple and reliable calibration of sensors as well as comprehensive measuring point management can both be easily done on a PC with the JUMO DSM (digital sensor management) software tool



Accessories

Useful for maintenance, troubleshooting, and startup of pH/redox and conductivity measuring points, technical buffer solutions, or connecting cables – JUMO offers a large selection of proven designs.



Accessories for liquid analysis



| | Description | Cables, connectors, and sockets for pH, redox, and conductivity measurement | Technical buffer and cleaning solutions | Impedance converters for pH and redox electrodes | Simulators and calibration adapters for pH, redox, and conductivity measurement | Handheld device |
|---------------------|----------------------|---|--|---|---|---|
| | Data sheet | 202990 | 202950 | 202995 | 202711 | 202710 |
| General information | Features | <ul style="list-style-type: none"> • Pre-assembled high-quality connecting cables • Highest possible protection type when fully assembled • Wide selection of special connectors/sockets available • Customer-specific versions | <ul style="list-style-type: none"> • pH buffer solutions according to DIN 19267 • Redox test solutions according to ASTM D 1498 • Reference solutions for conductivity can be traced back to PTB and NIST • Diaphragm and electrode cleaners | <ul style="list-style-type: none"> • Network independent and signal stabilizing • Retrofitting is possible • Allows longer cable lengths | <ul style="list-style-type: none"> • Simulates a pH/redox or conductivity sensor in an application • Makes the dry startup of plants easier | <ul style="list-style-type: none"> • Compact design type • Min./max. value • Memory and hold function • Easy-to-operate membrane keypad • Easy to read LCD display |
| | Areas of application | <ul style="list-style-type: none"> • For use with electrochemical sensors | <ul style="list-style-type: none"> • For calibrating pH/redox electrodes and conductivity measuring cells | <ul style="list-style-type: none"> • Converts the high-impedance signal of the pH electrode | <ul style="list-style-type: none"> • For startup, calibration, and inspection of pH, redox, and conductivity measuring points • For testing connecting cables and troubleshooting | <ul style="list-style-type: none"> • General water monitoring • Aquaristics • Fish farming |
| Data | Mounting | – | – | – | – | • Handheld device |
| | Measurands | – | – | – | – | <ul style="list-style-type: none"> • pH/redox • Temperature • Conductivity |
| | Outputs | – | – | – | – | • Indicating device |
| | Protection type | – | – | – | – | • IP65 |



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