

# JUMO

More than **sensors + automation**



## Liquid analysis

Innovative solutions to meet the most stringent standards



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## Dear reader,

Perhaps you're wondering why JUMO has chosen to become a specialist in the area of analysis measurement technology in liquids. There's an easy answer. From the company's origin as a manufacturer of glass thermometers for technical processes, it moved through production of glass parts and glass sensors in the 1970s into the new area of electrochemical measurement variables, pH and ORP as well as conductivity.

Overly reckless practices with water as a resource led to increasing pollution of natural water sources. The result was regulation enacted to prevent water pollution and requirements for cleaning and detoxifying production wastewater. During this time, industry and community operators were looking for suitable sturdy measuring and control systems to determine and regulate the main variables in water analysis. Previously this had been the domain of laboratory procedures. So JUMO began providing these products to well known suppliers and plant builders from the inception of this new sector in water treatment, dosing and sewage treatment technology.

Today the components produced in the "JUMO analysis measurement technology" product line are represented in all areas of water/wastewater technology. From high purity pharmaceutical water to measuring high concen-

trations of acids, bases and salts, from drinking, swimming pool and aquarium water to process water, JUMO covers all applications of 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. JUMO is a reliable OEM supplier and partner with customers who rely on our technology.

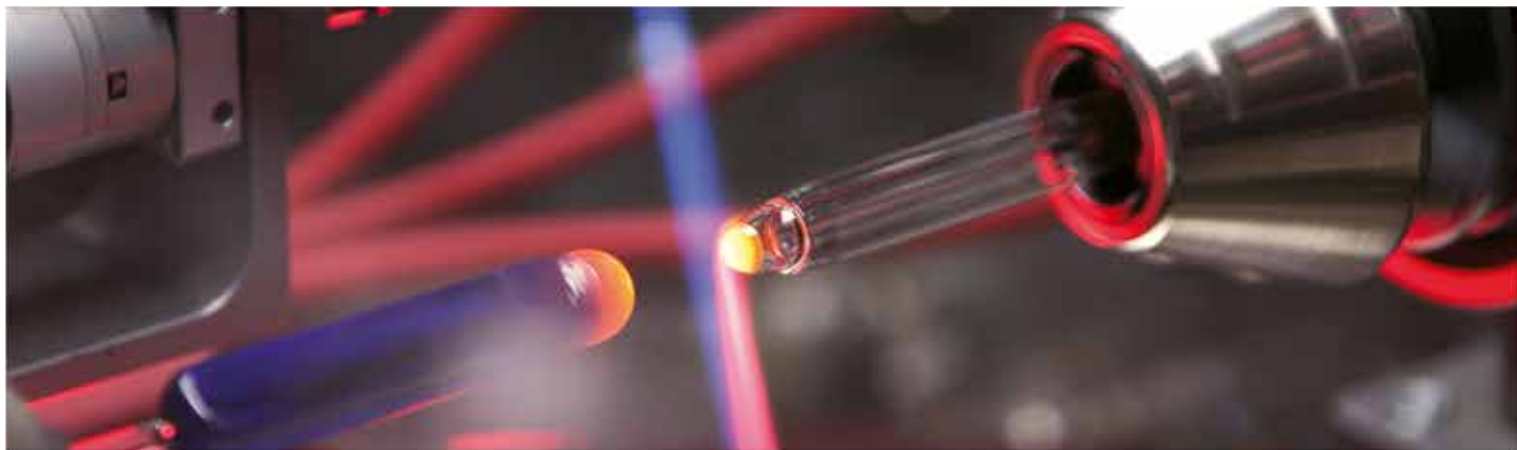
JUMO is continuously developing and improving its sensors and measuring instruments. This ensures our analysis measurement technology remains at the cutting edge and our customers and users have a reliable market position and products. We place great emphasis on ensuring production quality for highly sensitive sensor systems. Our motivation is satisfied customers whose systems and investments will protect water as a valuable resource, to be used by us all.

Detailed information about our products can be found under the specified type/product group number at [www.jumo.net](http://www.jumo.net).

## Contents



|                                     |    |
|-------------------------------------|----|
| Electrode manufacturing             | 4  |
| pH and ORP measurement              | 6  |
| Conductive conductivity measurement | 10 |
| Inductive conductivity measurement  | 14 |
| Membrane covered sensors            | 18 |
| Multichannel measuring device       | 20 |
| Accessories                         | 22 |



# Electrode manufacturing

JUMO offers the highest quality with many years of experience, internally developed electrodes and measuring systems, and modern production lines to ensure flexibility. For both the glass and plastic versions, we can address your specific needs and customize the pH and ORP electrodes during production to optimize them for your application.



## Electrode manufacturing



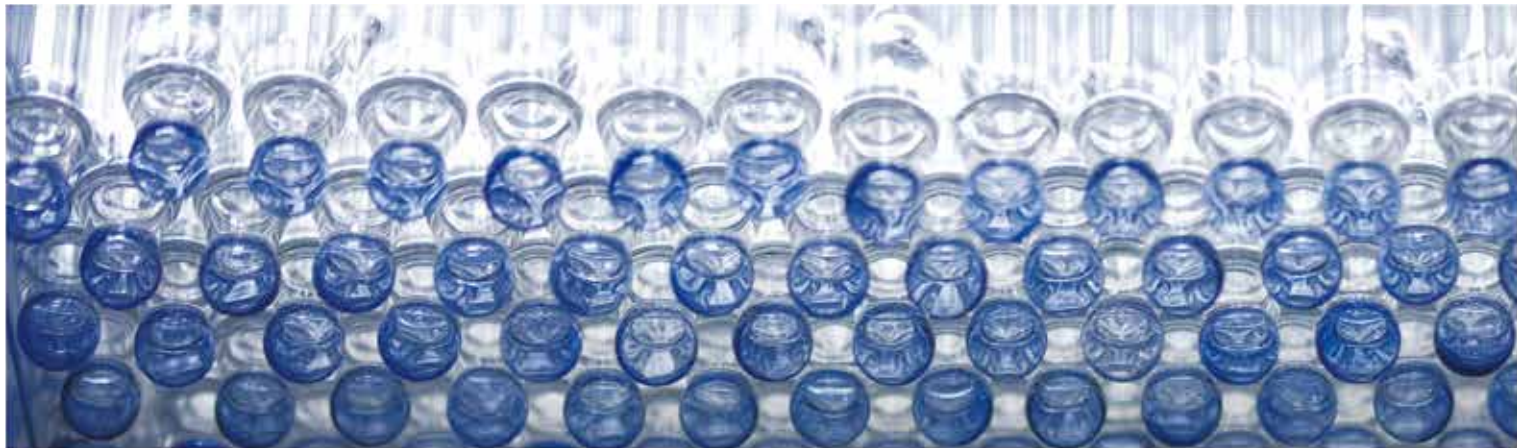
### The success story of JUMO pH electrodes

The success story of JUMO pH electrodes is closely tied to glass technology. Glass thermometers have been produced in Fulda, Germany 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 such production of OEM versions and special designs.

### Reliable and accurate: JUMO pH and ORP electrodes

Today pH electrodes are produced in semi and fully automated work processes. This ensures constant high quality. JUMO pH and ORP electrodes are used in all areas of industry today: Drinking and swimming pool water, domestic and industrial wastewater, neutralization plants, final inspections, the chemical industry, process and rinsing water, food technology, laboratory measurements, biotechnology and aquariums.

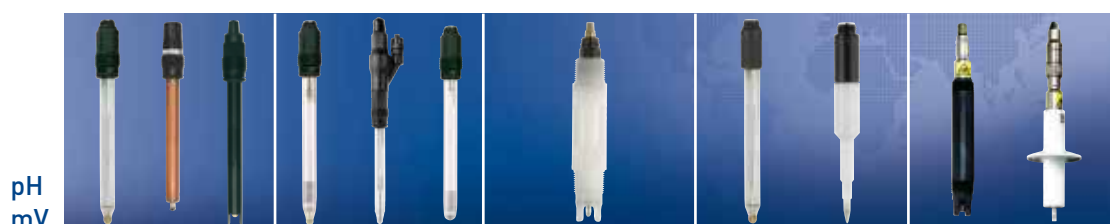


# pH and ORP measurement

The pH value is the most commonly used measurement variable used in analyzing aqueous solutions. It is enormously important in nearly all sectors of industry. Product quality in the chemical and pharmaceutical industries depends significantly on maintaining a narrow pH range. Accurate pH measurements help to improve yield and reduce the number of undesirable by-product. The pH value determines whether or not the water in a drinking water supply system will cause corrosion damage or whether the precipitation reaction of heavy metal ions will work effectively in a treatment plant for wastewater from plating. As one of the leader manufacturers of electrochemical sensors in Europe and with an experience for more than 35 years in liquid analysis, JUMO is a competent partner offering tailor-made solutions for nearly all applications.



## pH and ORP Electrodes



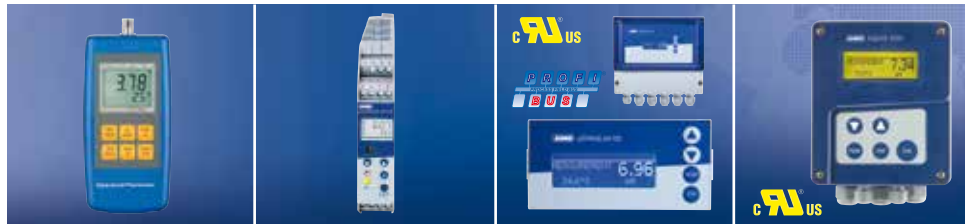
|         | Description          | JUMO ecoLine,<br>JUMO BlackLine  | JUMO tecLine   | JUMO tecLine PRO  | JUMO labLine  | JUMO ISFET*  |
|---------|----------------------|--|--|---|---|--|
|         | Data sheet           | 201005,<br>201010  | 201020,<br>201025  | 201020,<br>201025   | 201030,<br>201035   | 201050   |
| General | Features             | <ul style="list-style-type: none"> <li>- Favorable price/performance ratio</li> <li>- Version with a glass or plastic shaft</li> </ul>   | <ul style="list-style-type: none"> <li>- High quality industrial and process electrodes</li> <li>- Integrated temperature probe</li> </ul>   | <ul style="list-style-type: none"> <li>- Sturdy design</li> <li>- High mechanical and chemical resistance</li> </ul>            | <ul style="list-style-type: none"> <li>- High quality</li> <li>- Suitable for lab applications</li> </ul>                 | <ul style="list-style-type: none"> <li>- Without any glass parts</li> <li>- For hygienic production processes</li> </ul> |
|         | Areas of application | <ul style="list-style-type: none"> <li>- Drinking water</li> <li>- Greenhouses</li> <li>- Hand-held devices</li> <li>- Swimming pools</li> <li>- Aquariums</li> <li>- Surface water</li> </ul> | <ul style="list-style-type: none"> <li>- Process measurement</li> <li>- High temperature applications</li> <li>- Suspensions</li> <li>- Electroplating</li> <li>- Varnishes</li> <li>- Wastewater</li> <li>- High purity water</li> <li>- Highly polluted media</li> <li>- Hygienic and sterile applications</li> <li>- Boiler feed water</li> </ul> | <ul style="list-style-type: none"> <li>- Wastewater treatment</li> <li>- Paper industry</li> <li>- Chemical industry</li> </ul> | <ul style="list-style-type: none"> <li>- General lab applications</li> <li>- Insertion measurements in food</li> </ul>    | <ul style="list-style-type: none"> <li>- Food manufacturing</li> <li>- Hygienic and sterile applications</li> </ul>      |
| Data    | Diaphragm            | <ul style="list-style-type: none"> <li>- Ceramic</li> <li>- Glass fiber</li> </ul>   | <ul style="list-style-type: none"> <li>- Ceramic</li> <li>- PTFE</li> <li>- Glass fiber</li> <li>- Annular gap</li> <li>- Perforated</li> </ul>  | <ul style="list-style-type: none"> <li>- Annular gap</li> </ul>   | <ul style="list-style-type: none"> <li>- Ceramic</li> <li>- PTFE</li> <li>- Glass fiber</li> <li>- Annular gap</li> </ul> | <ul style="list-style-type: none"> <li>- Ceramic</li> </ul>  |

\* can be connected to JUMO AQUIS 500 pH and JUMO dTRANS pH 02



## Transmitters/Controllers for pH, ORP and Temperature

pH  
mV



|         | Description           | JUMO Handheld Meter   | JUMO ecoTRANS pH03 Compact Transmitter   | JUMO dTRANS pH 02 Transmitter, Controller, Indicator and Data Logger, all in one   | JUMO AQUIS 500 pH Transmitter/Controller with high quality controller functions   |
|---------|-----------------------|---|--|--|---|
|         | Data sheet            | 202710/20   | 202723   | 202551   | 202560  |
| General | Features              | <ul style="list-style-type: none"> <li>– Compact design</li> <li>– Min- and max-memory and hold functions available</li> <li>– Simple to operate by membrane keypad</li> <li>– Easy-to-read LC display</li> </ul> | <ul style="list-style-type: none"> <li>– Convenient device programming with PC setup program</li> <li>– Changeover relay for alarm message or regulation</li> <li>– Ideal partner for PLC</li> </ul> | <ul style="list-style-type: none"> <li>– Extremely compact design</li> <li>– Simple operation in plain text, multiple languages available</li> <li>– Modular structure</li> <li>– Variable measurement display</li> <li>– P, PI, PD and PID control functions</li> </ul> | <ul style="list-style-type: none"> <li>– Multilingual cleartext operation</li> <li>– Graphic display with background lighting</li> <li>– P, PI, PD and PID control functions</li> </ul> |
|         | Areas of application  | <ul style="list-style-type: none"> <li>– Water monitoring</li> <li>– Aquariums</li> <li>– Fish farming</li> </ul>   | Universally usable   | Universally usable   | Universally usable  |
| Data    | Mounting              | Handheld device   | DIN rail mounting  | Panel or surface mounting  | Panel or surface mounting   |
|         | Measurement parameter | <ul style="list-style-type: none"> <li>– pH/ORP</li> <li>– Temperature</li> </ul>   | <ul style="list-style-type: none"> <li>– pH/ORP</li> <li>– Temperature</li> </ul>  | <ul style="list-style-type: none"> <li>– pH/ORP/NH<sub>3</sub></li> <li>– Temperature</li> <li>– Flow</li> </ul>   | <ul style="list-style-type: none"> <li>– pH/ORP/NH<sub>3</sub></li> <li>– Temperature</li> </ul>  |
|         | Outputs               | Indicator   | <ul style="list-style-type: none"> <li>– Up to 2 analog outputs</li> <li>– 1 relay</li> </ul>  | <ul style="list-style-type: none"> <li>– Up to 3 analog outputs</li> <li>– Up to 7 relays</li> </ul>   | <ul style="list-style-type: none"> <li>– Up to 2 analog outputs</li> <li>– Up to 2 relays</li> </ul>  |
|         | Enclosure type        | IP 65   | IP 20  | IP 65  | IP 67   |





## Fittings

pH  
mV



|         | Description*       | Flow through fittings for installation in pipelines   | Immersion fittings for installation in open tanks and pools   | Manual quick-change fittings for installation in pools and tanks   | Pneumatic retractable assembly with automatic sensor cleaning   | Compact fittings for installation in tanks or pipelines  |
|---------|--------------------|---|---|--|---|--|
|         | Data sheet         | 202810  | 202820, 202821  | 202822   | 202823  | 202825   |
| General | Features           | <ul style="list-style-type: none"> <li>Protects the sensors against breakage</li> <li>Enables correct flow and avoids measurement errors</li> </ul> | <p><b>Type 202820:</b></p> <ul style="list-style-type: none"> <li>For up to three sensors</li> <li>Enables measurement in different immersion depths</li> </ul> <p><b>Type 202821:</b></p> <ul style="list-style-type: none"> <li>Sturdy design</li> <li>Integrated spray nozzles for the sensor rinsing</li> <li>Increases sensor service life</li> <li>Reduces maintenance costs</li> </ul> | <ul style="list-style-type: none"> <li>Sensor replacement without interrupting the process</li> <li>Installing sensors with an immersion length of 120 mm or 225 mm</li> </ul> | <ul style="list-style-type: none"> <li>Cleaning of the sensor (225 mm) integrated washing chamber without interrupting the process</li> <li>With pneumatic positional feedback</li> <li>Combined with cleaning automat</li> </ul> | <ul style="list-style-type: none"> <li>Used for holding and protecting of the electrode</li> <li>Suitable for media with increased hygienic requirements</li> </ul>                              |
| Data    | Material           | <ul style="list-style-type: none"> <li>PC or PP</li> <li>PVC</li> </ul>   | <p><b>Type 202820:</b> PP</p> <p><b>Type 202821:</b> 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)   |
|         | Immersion length   | -   | <p><b>Type 202820:</b> 500 to 2000 mm</p> <p><b>Type 202821:</b> 500 to 2500 mm</p>   | 48 to 135 mm   | 71 mm   | 5 to 90 mm   |
|         | Process connection | <ul style="list-style-type: none"> <li>G ½ A or solvent-weld sockets</li> <li>Inclined position DN 20/25</li> <li>T-piece DN 32/40/50</li> </ul>    | <p><b>Type 202820:</b></p> <ul style="list-style-type: none"> <li>Flange</li> </ul> <p><b>Type 202821:</b></p> <ul style="list-style-type: none"> <li>Flange</li> <li>Retainer</li> </ul>   | <ul style="list-style-type: none"> <li>Thread G ¾ A</li> <li>Thread G 1 A</li> <li>Clamp DN 25</li> </ul>  | Flange DN 50  | <ul style="list-style-type: none"> <li>Weld seam</li> <li>Thread G ¾ A</li> <li>Cone nipple DN 25/50</li> <li>Hygienic (Clamp DN 25/50, Varivent DN 40/50)</li> <li>Ingold-connection</li> </ul> |
|         | Accessories        | -   | <p><b>Type 202820:</b></p> <ul style="list-style-type: none"> <li>Cleaning nozzle</li> <li>Wetting cup</li> </ul> <p><b>Type 202821:</b></p> <ul style="list-style-type: none"> <li>Integrated spray nozzle</li> </ul>  | -  | <ul style="list-style-type: none"> <li>T-piece mounting</li> <li>Controller EXmatic 460</li> <li>Cleaning valve kit</li> </ul>  | -  |

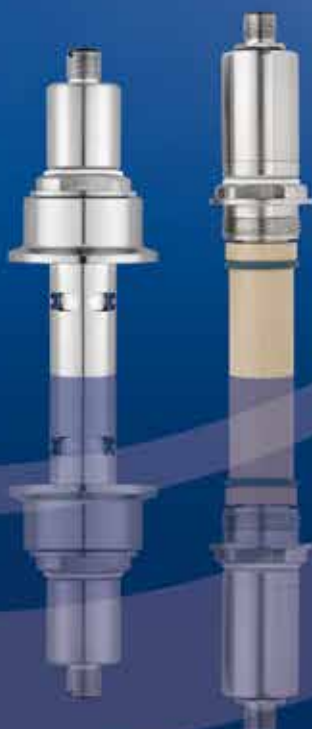
\* Fittings are not suitable for JUMO ISFET sensors and JUMO tecLine PRO electrodes.



# Conductive conductivity measurement

After the pH measurement, the conductivity measurement is the most frequently measured parameter in liquid analysis.

In desalination of seawater as well as monitoring of high purity water or cooling water quality, conductivity measurements play an important role in many applications. For 2- or 4-electrode systems, with JUMO, you're ready for anything.



## Sample application



Measuring sensors with "ASTM test certificate"

### Conductivity measurement in high purity water

The production of high purity water is one of the most important processes in the pharmaceutical industry. Most additives could not be manufactured without it, because high product quality depends on consistent quality of high purity water.






A continuous conductivity measurement makes it possible to monitor the quality of high purity water quickly and reliably. The measurement is made with conductivity sensors that work according to the two-electrode method.

In keeping with the European Pharmacopoeia (EP), the cell constant of a measuring sensor must be certified by its manufacturer. The JUMO product portfolio has featured measuring sensors meeting these requirements for many years.

Currently we are offering the conductive conductivity sensor JUMO tecLine CR in a stainless steel or titanium version with the "ASTM test certificate". The certificate indicates the precisely measured cell constant, which can be entered directly in the transmitter. The measuring sensor is then ready to use. In addition to reliable conductivity sensors, high purity water applications also require measurement and control instruments that can be mounted according to on-site requirements. JUMO offers a wide selection of models to meet this need. Customers typically choose panel mounting (JUMO dTRANS CR 02), installation in a wall mounting housing (JUMO AQUIS 500 CR) with a high protection rating (for example IP67), or a DIN rail mounting (JUMO ecoTRANS Lf 03).



## Conductive 2- and 4-Electrode Conductivity Sensors

|                    |  |   |   |    |    |   |
|--------------------|---|--|--|--|---|---|
|                    | $\mu\text{S/cm}$<br>$\text{mS/cm}$  |  |  |  |   |   |
| <b>Description</b> | 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  |   |
| <b>Data sheet</b>  | 202922  | 202923   | 202924   | 202925   | 202930  |   |
| <b>General</b>     | <b>Features</b>   | <ul style="list-style-type: none"> <li>– Compact design</li> <li>– Low cost version</li> <li>– Universally usable</li> </ul>                 | <ul style="list-style-type: none"> <li>– Well-proven sensors for industrial use</li> <li>– Insertion with tees</li> </ul>  | <ul style="list-style-type: none"> <li>– Wide variety of process connections</li> <li>– Sturdy design</li> <li>– Pharmaceutical version incl. ASTM-certificate</li> </ul>  | <ul style="list-style-type: none"> <li>– Industrial version</li> <li>– Various process connections provide optimum adaptation to process conditions</li> <li>– Integrated temperature sensor</li> </ul> | <ul style="list-style-type: none"> <li>– Very wide measuring range</li> <li>– CIP/SIP capability</li> <li>– Hygienic design</li> <li>– Certificate of quality included</li> </ul> |
|                    | <b>Areas of application</b>   | <ul style="list-style-type: none"> <li>– Drinking water</li> <li>– Ion exchangers and reverse osmosis plants</li> <li>– Aquariums</li> </ul> | <ul style="list-style-type: none"> <li>– Refrigeration and air conditioning systems</li> <li>– Drinking water</li> <li>– Industrial rinsing and process water</li> </ul> | <ul style="list-style-type: none"> <li>– Pure and high purity water</li> <li>– Boiler feed water</li> <li>– Chip production</li> <li>– Ion exchangers, reverse osmosis plant</li> <li>– High temperature applications</li> </ul> | <ul style="list-style-type: none"> <li>– Drinking water</li> <li>– Wastewater</li> <li>– Process water</li> </ul>   | <ul style="list-style-type: none"> <li>– Rinsing process in food and beverage industries, pharmaceuticals and biotechnology</li> <li>– CIP and SIP applications</li> </ul>        |
| <b>Data</b>        | <b>Cell constant</b>  | K = 0.01; 0.1 and 1.0  | K = 0.1 and 1.0  | K = 0.01 and 0.1   | K = 1.0; 3.0 and 10.0   | K = 0.3 to 0.4  |
|                    | <b>Measuring range * from to</b>  | 0.05 $\mu\text{S/cm}$<br>approx. 10 $\text{mS/cm}$   | 0<br>15 $\text{mS/cm}$   | 0.05 $\mu\text{S/cm}$<br>1 $\text{mS/cm}$  | 0.1 $\text{mS/cm}$<br>200 $\text{mS/cm}$  | 1 $\mu\text{S/cm}$<br>600 $\text{mS/cm}$  |
|                    | <b>Electrode material</b>   | JUMO BlackLine CR-GT: Special graphite<br>JUMO BlackLine CR-EC: Stainless steel (1.4571) or titanium<br>JUMO BlackLine CR-GS: Platinum       | Stainless steel (1.4571) or graphite   | – Stainless steel (1.4571 bzw. 1.4435)<br>– Titanium   | Graphite  | Stainless steel (1.4435)  |

\* Measuring ranges depend on type of measuring sensors or the cell constant.

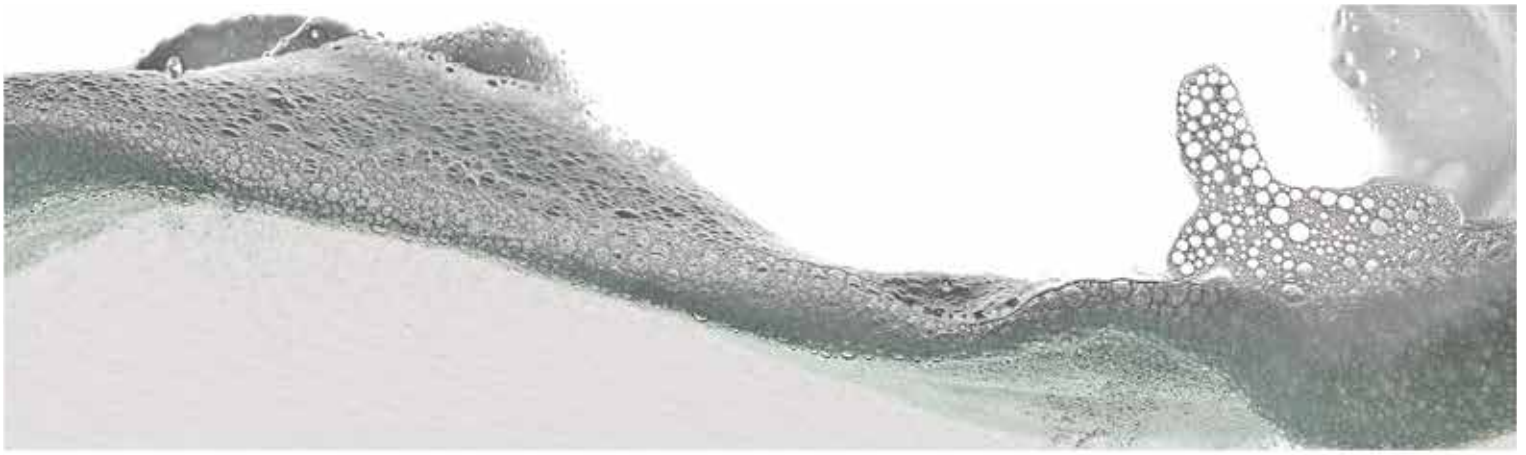


## Transmitters/Controllers for Conductivity, TDS, Resistivity and Temperature

µS/cm  
mS/cm



|         | Description           | JUMO Handheld Meter  | 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            | 202710/30  | 202731   | 202732  | 202552  | 202566   |
| General | Features              | <ul style="list-style-type: none"> <li>– Compact design</li> <li>– Min- and max-memory and hold functions available</li> <li>– Simple to operate by membrane keypad</li> <li>– Easy-to-read LC display</li> <li>– Including adjusted sensor</li> </ul> | <ul style="list-style-type: none"> <li>– Extremely compact design</li> <li>– Low cost</li> <li>– Ideal partner for PLC</li> <li>– User friendly PC setup programm</li> </ul> | <ul style="list-style-type: none"> <li>– Integrated LC display with varied display units (µS cm, mS/cm, kOhm x cm)</li> <li>– USP switching function according to USP&lt;645&gt;</li> <li>– Calibration certificate included</li> </ul> | <ul style="list-style-type: none"> <li>– Transmitter, controller, indicator and data logger in one device</li> <li>– Simple operation in plain text, multiple languages available</li> <li>– Modular structure</li> <li>– Variable measurement display</li> <li>– USP switching function according to USP&lt;645&gt;</li> </ul> | <ul style="list-style-type: none"> <li>– Multilingual clear-text operation</li> <li>– Graphic display with background lighting</li> <li>– P, PI, PD and PID control functions</li> <li>– USP switching function according to USP&lt;645&gt;</li> </ul> |
|         | Areas of application  | <ul style="list-style-type: none"> <li>– Water monitoring</li> <li>– Aquariums</li> <li>– Fish farms</li> </ul>  | Universally usable   | Universally usable  | Universally usable  | Universally usable   |
| Data    | Mounting              | Handheld device  | DIN rail mounting  | DIN rail mounting   | Panel or surface mounting   | Panel or surface mounting  |
|         | Measurement parameter | <ul style="list-style-type: none"> <li>– Conductivity</li> <li>– Temperature</li> </ul>  | <ul style="list-style-type: none"> <li>– Conductivity</li> <li>– Temperature</li> </ul>  | <ul style="list-style-type: none"> <li>– Conductivity</li> <li>– Temperature</li> <li>– Resistivity</li> </ul>  | <ul style="list-style-type: none"> <li>– Conductivity</li> <li>– Temperature</li> <li>– Resistivity</li> <li>– Flow</li> <li>– TDS</li> </ul>   | <ul style="list-style-type: none"> <li>– Conductivity</li> <li>– Temperature</li> <li>– Resistivity</li> <li>– TDS</li> </ul>  |
|         | Outputs               | Indicator  | <ul style="list-style-type: none"> <li>– 1 analog output</li> <li>– 1 relay</li> </ul>   | <ul style="list-style-type: none"> <li>– 2 analog outputs</li> <li>– 1 relay or 2 open collector outputs</li> </ul>   | <ul style="list-style-type: none"> <li>– Up to 3 analog outputs</li> <li>– Up to 7 relays</li> </ul>  | <ul style="list-style-type: none"> <li>– Up to 2 analog outputs</li> <li>– Up to 2 relays</li> </ul>   |
|         | Enclosure type        | IP 65  | IP 20  | IP 20   | IP 65   | IP 67  |



# Inductive conductivity measurement

The conductivity sensor in a CIP system must be resistant to highly aggressive and hot cleaning agents and must be suitable for occasionally very high conductivity values. Inductive measurement technology is ideal for this application, since the measuring instrument has no actual contact with the solution. JUMO offers a wide selection of inductive conductivity sensors: JUMO CTI-750 with stainless steel housing or JUMO tecLine Ci hygienic inductive conductivity sensor.



## Sample application



### Conductivity measurement in CIP cleaning

CIP cleaning is one of the standard cleaning methods for production systems in both the food and pharmaceutical industries. Automating this cleaning process allows companies to reduce costs and produce more efficiently. Inductive conductivity sensors could offer you significant advantages

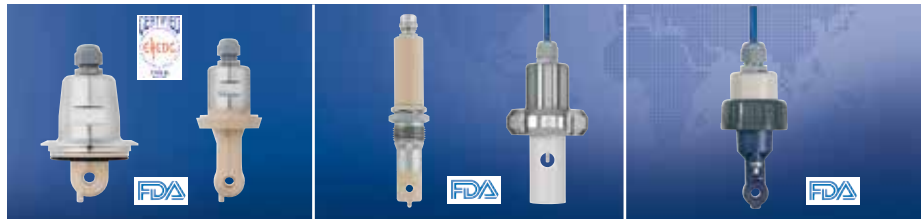
in this application. The JUMO CTI-750 conductivity transmitter supports this process with accurate measurements to ensure that cleaning proceeds quickly and reliably. The JUMO CTI-750 also monitors and controls the concentration of your cleaning agent by measuring conductivity with an inductive conductivity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





## Inductive Conductivity Sensors

μS/cm  
mS/cm



|                     | JUMO tecLine Ci<br>Hygienic Conductivity Sensor                               | JUMO tecLine Ci-S<br>Conductivity Sensor for<br>general process engineering  | JUMO ecoLine Ci<br>Inductive Sensor for<br>general water engineering   |  |
|---------------------|---|--|--|--|
| <b>Description*</b> | JUMO tecLine Ci<br>Hygienic Conductivity Sensor                               | JUMO tecLine Ci-S<br>Conductivity Sensor for<br>general process engineering  | JUMO ecoLine Ci<br>Inductive Sensor for<br>general water engineering   |  |
| <b>Data sheet</b>   | 202941  | 202942   | 202943   |  |
| <b>General</b>      | <b>Features</b>   | <ul style="list-style-type: none"> <li>– Wide variety of mounting dimensions</li> <li>– Different body materials</li> <li>– Immersion version is available</li> </ul>              | <ul style="list-style-type: none"> <li>– Maintenance-free conductivity measurement</li> <li>– Compact, proven sensor with various process connections</li> </ul> |  |
|                     | <b>Areas of application</b>   | <ul style="list-style-type: none"> <li>– Hygienic sensor design</li> <li>– Variety of process connection variants</li> <li>– Fast-response, internal temperature sensor</li> </ul> | <ul style="list-style-type: none"> <li>– Liquid foodstuffs</li> <li>– CIP/SIP systems</li> <li>– Rinsing and cleaning processes</li> </ul>                       | <ul style="list-style-type: none"> <li>– Drinking water and wastewater</li> <li>– Dilution monitoring in cooling towers</li> <li>– Seawater desalination plants</li> <li>– Rinsing baths (electroplating baths)</li> <li>– Carwashes</li> <li>– Wet scrubbers</li> <li>– Lightly polluted media</li> </ul> |
| <b>Data</b>         | <b>Sensor material</b>  | PEEK   | PVDF or PEEK   | PP or PVDF   |
|                     | <b>Measuring range</b>  | 0 to 2000 mS/cm  | 0 to 2000 mS/cm  | 0 to 2000 mS/cm  |
|                     | <b>Permissible medium temperature<br/>In operation:<br/>For short periods</b> | –10 to +125 °C<br>≤ 150 °C (≤ 60 min, ≤ 5 bar)   | –10 to +125 °C<br>≤ 140 °C   | –10 to +80 °C PP (+100 °C PVDF)<br>≤ +100 °C PP (+100 °C PVDF)   |

\* Inductive conductivity sensors are designed for connection to the JUMO AQUIS 500 Ci transmitter/controller.





## Transmitters/Controllers for Inductive Conductivity, Concentration and Temperature

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



|                |                              |   |  |  |
|----------------|------------------------------|---|--|--|
|                | <b>Description</b>           | JUMO AQUIS 500 Ci Transmitter/Controller for Inductive Conductivity, Concentration and Temperature  | JUMO CTI-500 Inductive Conductivity/ Concentration and Temperature Transmitter with switch contacts  | JUMO CTI-750 Inductive Conductivity/ Concentration and Temperature Transmitter in plastic or stainless steel housing   |
|                | <b>Data sheet</b>            | 202566  | 202755   | 202756   |
| <b>General</b> | <b>Features</b>              | <ul style="list-style-type: none"> <li>– Multilingual cleartext operation</li> <li>– Graphic display with background lighting</li> <li>– P, PI, PD and PID control functions</li> </ul> | <ul style="list-style-type: none"> <li>– Operation via keypad through setup program</li> <li>– Activation of up to 4 ranges and temperature coefficients</li> <li>– Fast-response temperature sensor</li> </ul>      | <ul style="list-style-type: none"> <li>– Freely definable concentration curve</li> <li>– Easy-to-use programming option via setup program</li> <li>– CIP and SIP capable</li> </ul>            |
|                | <b>Areas of application</b>  | <ul style="list-style-type: none"> <li>– Food and beverage industries</li> <li>– CIP/SIP systems</li> <li>– Concentration measurement of acids and bases</li> </ul>                     | <ul style="list-style-type: none"> <li>– Water and wastewater engineering</li> <li>– Cooling tower monitoring (dilution control)</li> <li>– Rinsing baths (elektroplating baths)</li> <li>– Wet scrubbers</li> </ul> | <ul style="list-style-type: none"> <li>– Food and beverage industries</li> <li>– CIP/SIP systems</li> <li>– Concentration measurement of acids and lyes</li> </ul>                             |
| <b>Data</b>    | <b>Measurement parameter</b> | <ul style="list-style-type: none"> <li>– Conductivity</li> <li>– Concentration of NaOH, HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, HCl</li> <li>– Temperature</li> </ul>             | <ul style="list-style-type: none"> <li>– Conductivity</li> <li>– Concentration of NaOH, HNO<sub>3</sub></li> <li>– Temperature</li> </ul>  | <ul style="list-style-type: none"> <li>– Conductivity</li> <li>– Concentration of NaOH, HNO<sub>3</sub></li> <li>– Temperature</li> </ul>  |
|                | <b>Versions</b>              | Panel or surface mounting   | <ul style="list-style-type: none"> <li>– Combined unit (transmitter and measuring sensor together in one unit)</li> <li>– Split version (transmitter and sensor connected by cable)</li> </ul>                       | <ul style="list-style-type: none"> <li>– Combined unit (transmitter and measuring sensor together in one unit)</li> <li>– Split version (transmitter and sensor connected by cable)</li> </ul> |
|                | <b>Montage</b>               | Panel or surface mounting   | Pipe mounting, wall mounting   | Pipe mounting, wall mounting   |
|                | <b>Mounting</b>              | <ul style="list-style-type: none"> <li>– Up to 2 analog outputs</li> <li>– Up to 2 relays</li> </ul>  | <ul style="list-style-type: none"> <li>– 2 analog outputs</li> <li>– 2 switching outputs</li> </ul>  | <ul style="list-style-type: none"> <li>– 2 analog outputs</li> <li>– 2 switching outputs</li> </ul>  |
|                | <b>Enclosure type</b>        | IP 67   | IP 67  | IP 67  |
|                | <b>Sensor material</b>       | See sensors   | PP or PVDF   | PEEK or PVDF   |



# Membrane covered sensors

Documentation of the disinfectant concentration of your system, monitoring for ammonia leakage in your refrigerating plant or controlling the oxygen content of your wastewater treatment plant – JUMO offers a wide range of solutions for many different applications, all from one source.



## Measurement of Total Chlorine, Free Chlorine, Chlorine Dioxide, Ozone, Peracetic Acid, Hydrogen Peroxide



|                             |   |  |  |
|-----------------------------|---|--|--|
| <b>Description</b>          | JUMO tecLine Cl2 / TC / ClO2, O3 / H2O2, PAA<br>Membrane covered amperometric measuring sensors   | JUMO AQUIS 500 AS<br>Indicator/Controller  | JUMO Flow-through Fitting<br>for membrane covered amperometric measuring sensors                               |
| <b>Data sheet</b>           | 202630/31/34/36   | 202568   | 202630/31/34/36  |
| <b>Features</b>             | <ul style="list-style-type: none"> <li>- Measuring range: 0 to 50.000 mg/l*</li> <li>- Temperature-compensated output (4 to 20 mA)</li> </ul> | <ul style="list-style-type: none"> <li>- Display: mg/l, ppm, pH, mV, <math>\mu</math>S/cm, etc.</li> <li>- Choice of display visualizations</li> </ul> | <ul style="list-style-type: none"> <li>- Ideal for a bypass pipe</li> <li>- Replacement vessel (PP)</li> </ul> |
| <b>Areas of application</b> | Drinking and swimming pool water  | Universally usable   | Drinking and swimming pool water   |

\* Measuring range depends on the measurement parameter.

## Dissolved Oxygen (DO) Measurement



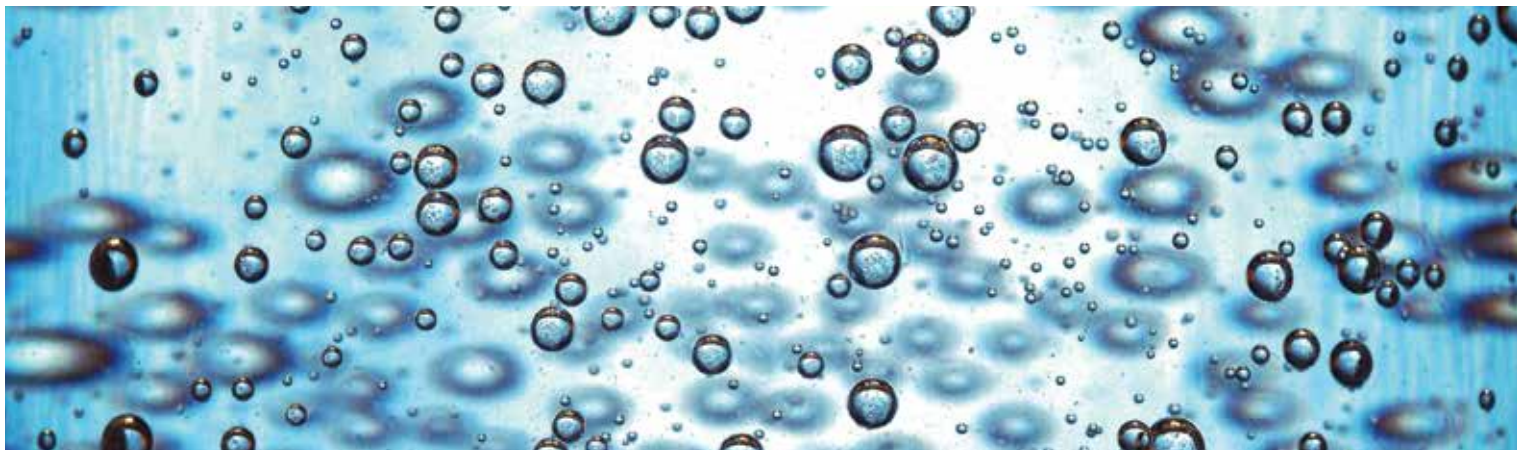
|                             |  |  |
|-----------------------------|--|--|
| <b>Description</b>          | JUMO dTRANS O2 01 2-wire Transmitter<br>for Dissolved Oxygen with operating unit   | Accessories for JUMO dTRANS O2 01 (Fittings,<br>support columns, weather protection canopy, etc.)                              |
| <b>Data sheet</b>           | 202610   | 202610   |
| <b>Features</b>             | <ul style="list-style-type: none"> <li>- Measuring range: 0 to 50 mg/l</li> <li>- Simpler, safer servicing by replacing modules</li> </ul> | <ul style="list-style-type: none"> <li>- Enables measurement in different depths</li> <li>- Protects operating unit</li> </ul> |
| <b>Areas of application</b> | Drinking water, wastewater, fish farming   | Protects the plant   |

## Ammonia Measurement



|                             |   |   |  |
|-----------------------------|---|---|--|
| <b>Description</b>          | JUMO<br>Ammonia-sensitive sensor  | JUMO AQUIS 500 pH<br>Transmitter/Controller   | JUMO retractable assembly<br>for ammonia-sensitive sensor  |
| <b>Data sheet</b>           | 201040  | 202560  | 201040   |
| <b>Features</b>             | <ul style="list-style-type: none"> <li>- Measuring range: 0.01 to 9,999 mg/l</li> <li>- Simpler, safer servicing by replacing membrane cap</li> </ul> | <ul style="list-style-type: none"> <li>- Multilingual cleartext operation</li> <li>- Graphic display with background lighting</li> <li>- P, PI, PD and PID control functions</li> </ul> | <ul style="list-style-type: none"> <li>- Simplifies handling</li> <li>- G1/8A hose connection (POM)</li> </ul> |
| <b>Areas of application</b> | Refrigerating plants*   | Universally usable  | Refrigerating plants*  |

\* Monitoring ammonia leakage (in indoor ice rinks or cold stores, for example).



# Multichannel measuring device

Measure – display – control – record: Terms that have been closely associated with the JUMO brand for decades. These four tasks have been combined into a single innovative device for a field that promises to gain importance in the future – liquid analysis: JUMO AQUIS touch.



pH

$\mu\text{S/cm}$

ppm

mV

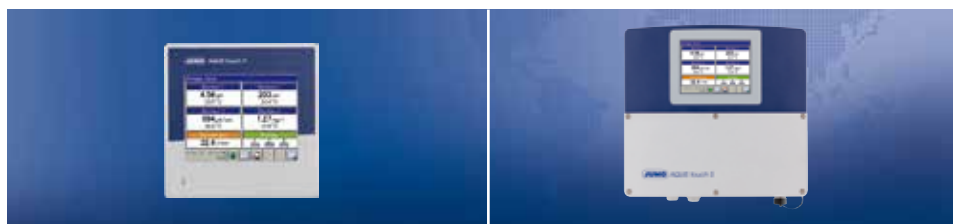
l/min

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

mS/cm

JUMO AQUIS touch S

## Multichannel measuring device



|         | Description           | JUMO AQUIS touch P   | JUMO AQUIS touch S  |
|---------|-----------------------|--|---|
|         | Data sheet            | 202580   | 202581  |
| General | Features              | <ul style="list-style-type: none"> <li>- 3.5" touchscreen</li> <li>- Modular design</li> <li>- 7 slots for input and output modules</li> <li>- 10 inputs and outputs as standard</li> <li>- Customized process screen</li> <li>- Data monitor / registration function</li> <li>- Web browser</li> <li>- Timer functions</li> <li>- Math and logic functions</li> <li>- Setup program / PCA / PCC</li> <li>- Calibration routines / calibration log books / calibration timers</li> </ul>   | <ul style="list-style-type: none"> <li>- 5.5" touchscreen</li> <li>- Modular design</li> <li>- 13 slots for input and output modules</li> <li>- 14 inputs and outputs as standard</li> <li>- Customized process screen</li> <li>- Data monitor / registration function</li> <li>- Web browser</li> <li>- Timer functions</li> <li>- Math and logic functions</li> <li>- Setup program / PCA / PCC</li> <li>- Calibration routines / calibration log books / calibration timers</li> </ul> |
|         | Areas of application  | <ul style="list-style-type: none"> <li>- Universal</li> <li>- Water and wastewater technology</li> <li>- Food and beverage industry (CIP / SIP)</li> <li>- Pharmaceuticals and biotechnology (USP, ASTM)</li> <li>- Drinking water technology / desalination of seawater</li> <li>- Process technology (rinsing tanks / galvanic equipment)</li> <li>- Swimming pool technology</li> <li>- Cooling tower control</li> <li>- Gas / air washers</li> </ul>   |   |
| Data    | Mounting              | Control cabinet assembly<br>(front dimensions 96 x 96 mm)  | Surface-mounted case  |
|         | Measurement parameter | <ul style="list-style-type: none"> <li>- pH value / redox voltage / NH<sub>3</sub> concentration</li> <li>- Electrolytic conductivity (conductive)</li> <li>- Electrolytic conductivity (inductive)</li> <li>- Resistance (mohm x cm; kohm x cm)</li> <li>- TDS value (ppm)</li> <li>- Temperature (Pt100 / Pt1000 / NTC / PTC)</li> <li>- Flow (pulse input)</li> <li>- Free chlorine, total chlorine, chlorine dioxide, ozone, hydrogen peroxide, peracetic acid</li> <li>- Universal inputs via standard signal (0 / 4 to 20 mA or 0 to 10 V) for various measurement values</li> </ul> |   |
|         | Enclosure type        | IP 66 (front side)   | IP 67   |
|         | Interfaces            | Ethernet, USB host, USB device (setup), RS422 / RS485 with Modbus protocol, PROFIBUS-DP  |   |
|         | Approval              | cULus (at preparation stage)   |   |



# Accessories

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



### Accessories



|                             |  |  |   |   |
|-----------------------------|--|--|---|---|
| <b>Description</b>          | Lines, plugs and sockets for pH, ORP, conductivity and temperature sensors   | Technical buffer and cleaning solutions  | Impedance converter for pH electrodes   | Simulators and Calibration Adapters for pH, ORP and conductivity measurement  |
| <b>Data sheet</b>           | 202990   | 202950   | 202995  | 202711  |
| <b>Features</b>             | <ul style="list-style-type: none"> <li>- High-quality preassembled connection lines</li> <li>- Highest possible protection type with factory assembly</li> <li>- Wide range of connectors/sockets and special selection</li> <li>- Customer-specific versions</li> </ul> | <ul style="list-style-type: none"> <li>- pH buffer solutions as defined by DIN 19267</li> <li>- ORP test solution as defined by ASTM D 1498</li> <li>- Referenzlösungen for conductivity can be retracted to PTN and NIST</li> <li>- Diaphragm and electrode cleaners</li> </ul> | <ul style="list-style-type: none"> <li>- Stabilizes the signal, independent of the electrical supply</li> <li>- Can be retrofitted</li> <li>- Enables the use of longer cables</li> <li>- Can also be supplied for electrodes with SMEK connection</li> </ul> | <ul style="list-style-type: none"> <li>- Simulates a pH/ORP or conductivity sensor in an application</li> <li>- Facilitates the dry-run commissioning of installations</li> </ul>                             |
| <b>Areas of application</b> | <ul style="list-style-type: none"> <li>- For the use of electrochemical sensors</li> </ul>   | <ul style="list-style-type: none"> <li>- Calibration of pH/ORP and conductivity sensors</li> </ul>   | <ul style="list-style-type: none"> <li>- Converts the high-impedance signal of a pH electrode</li> </ul>  | <ul style="list-style-type: none"> <li>- To start up, adjust, monitor and troubleshoot pH, ORP and conductivity measuring points</li> <li>- For testing connecting cables and investigating faults</li> </ul> |



[www.jumo.net](http://www.jumo.net)