JUMO

More than sensors + automation

Member of German Water Partnership

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" sector are represented in almost all areas of water and wastewater engineering. JUMO covers nearly all applications that apply to our steadily growing community of satisfied customers. These range from highly-purified water to measuring high concentrations of acids, lyes, and salts as well as from drinking, swimming pool, or aquarium water to process water. Throughout the world many of our products make their way into measurement applications 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 strategy ensures that 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 using the given type and product group number at www.jumo.net.

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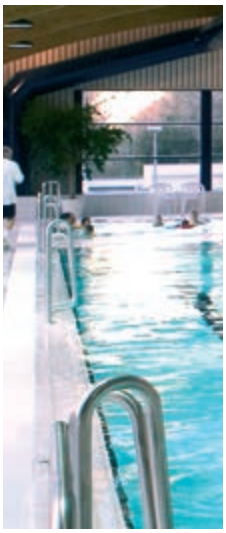
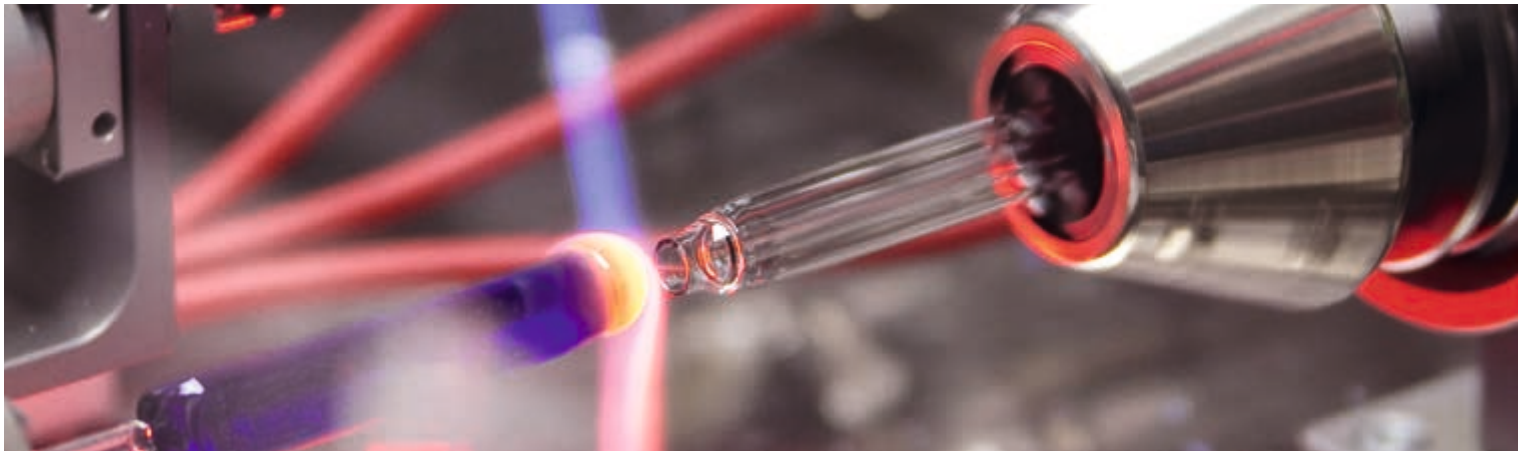




JUMO electrode manufacturing

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

JUMO electrode manufacturing

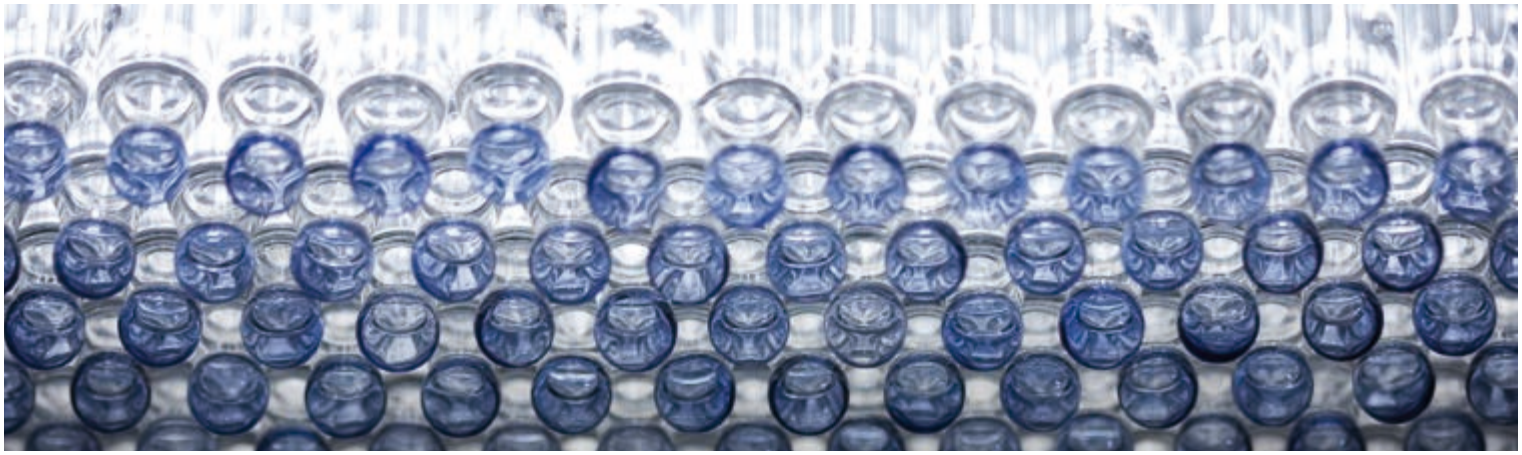
The success story of JUMO pH electrodes

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

Safe and accurate: JUMO pH and redox electrodes

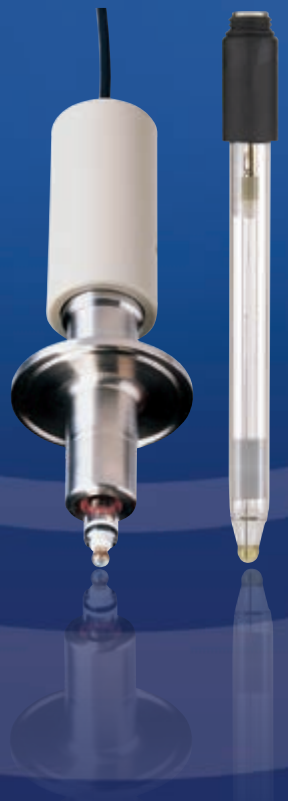
Today pH electrodes are produced in semi and fully automated work processes. This ensures consistently high quality.

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.



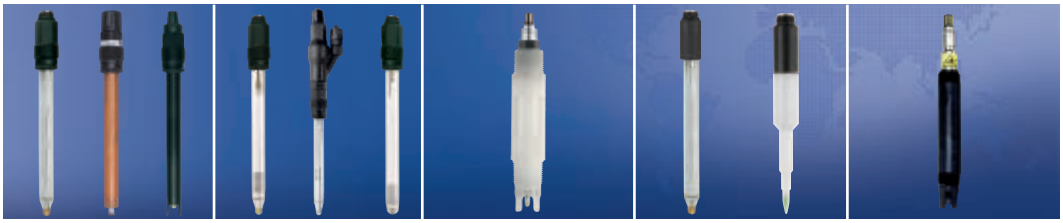
pH value and redox measurement

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



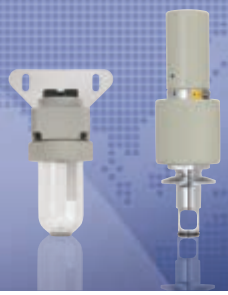
	Description	JUMO ecoLine JUMO BlackLine	JUMO tecLine JUMO tecLine HD JUMO tecLine HY	JUMO tecLine PRO	JUMO labLine	JUMO ISFET
	Type	201005, 201010	201020, 201021, 201022, 201025, 201026, 201027	201020, 201025	201030, 201035	201050
General information	Features	• For standard applications • Glass and plastic version	• For industrial applications • Also available in heavy duty and hygienic version for demanding processes • Integrated temperature sensor (optional extra for pH electrode)	• For industrial applications • High mechanical robustness • With plastic shaft • Integrated temperature sensor (optional extra for pH electrode)	• For laboratory applications	• Glassless • High mechanical robustness • Integrated temperature sensor
General information	Areas of application	• Drinking water • Greenhouse technology • Hand measuring devices • Swimming pool • Aquaristics • Surface water	• Process measurement • High temperature applications • Suspensions • Galvanic • Varnishes • Wastewater • Highly-purified water • Water • Highly-polluted media • Hygienic and sterile applications • Boiler feed water	• Wastewater treatment • Paper industry • Chemical industry	• General lab applications • Insertion measurements in food	–
Data	Diaphragm	• Ceramic • Glass fiber	• Ceramic • Glass fiber • PTFE • Perforated • Annular gap	• Annular gap	• Ceramic • PTFE • Glass fiber • Perforated	• Ceramic

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

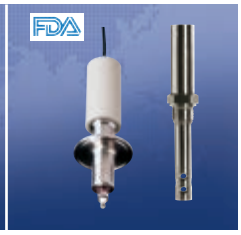
pH
mV

	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 and controller with high-quality controller functions
	Data sheet	202705	202723	202551	202560
General information	Features	• Smart electronics • Sensor and process data • Bus capable; Plug and Play • Reusable	• Easy-to-use device programming with PC setup program • Changeover relay for alarm message or control • Ideal partner for PLC	• Extremely compact design type • Multilingual plain text operation • Modular structure • Variable measured value display • P, PI, PD, and PID control functions	• Multilingual plain text operation • Graphic display with backlighting • P, PI, PD, and PID control functions
General information	Areas of application	For universal application	For universal application	For universal application	For universal application
Data	Mounting	Suitable for electrodes with: • Plug head N • Plug head VP (severable)	DIN rail	Surface or control cabinet mounting	Surface or control cabinet mounting
Data	Measurands	• pH/(ORP) redox • Temperature	• pH/redox • Temperature	• pH/redox/NH_3 • Temperature • Flow	• pH/redox/NH_3 • Temperature
Data	Outputs	• Digital interface • 1 analog output (optional)	• Up to 2 analog outputs • 1 relay	• Up to 3 analog outputs • Up to 7 relays	• Up to 2 analog outputs • Up to 2 relays
Data	Protection type	• 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**	• Protects the electrodes against breakage • Ensures correct sensor flow to prevent measurement errors	**Type 202820:** • Up to 3 sensors • Enables measurement in different immersion depths **Type 202821:** • Sturdy design • Integrated spray nozzles for sensor rinsing • Increases sensor service life • Reduces maintenance work	• Sensor replacement without interrupting the process • Installing sensors with an insertion length of 120 mm or 225 mm	• For 1 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	• Used for protecting and mounting the electrode • Suitable for use in media with increased hygienic requirements	
Data	**Material**	• PC or PP • PVC	**Type 202820:** PP **Type 202821:** stainless steel (1.4404/316L)	Stainless steel (1.4571) and FPM or PP and FPM	Stainless steel (1.4404/316L) or PVDF	Stainless steel (1.4571)	
	Immersion length (as of process connection)	–	**Type 202820:** 500 to 2000 mm **Type 202821:** 500 to 2500 mm	48 to 135 mm	71 mm	5 to 90 mm	
	Process connection	• G ½ A or bonded socket joints • Angled seat DN 20/25 • T-piece DN 32/40/50	**Type 202820:** • Flange **Type 202821:** • Flange • Retainer	• Screw-in thread G ¾ A • Screw-in thread G 1 A • Clamp DN25	Flange DN50	• Weld seam • Screw-in thread G¾ A • Taper sockets DN25/50 • Hygienic process connections: (clamp DN25/50, VARIVENT® DN40/50) • Ingold screw connection	
	Accessories	–	**Type 202820:** • Cleaning nozzle • Wetting cup **Type 202821:** • Integrated flushing nozzle	–	• T-piece installation • Controller EXmatic 460 • Cleaning valve kit	–	

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

Conductive conductivity measurement

After pH measurement, the electrolytic conductivity measurement is the most measured parameter in liquid analysis. Conductivity measurement plays an important role in many applications including seawater desalination as well as monitoring the quality of highly-purified water or cooling water. Regardless of whether two-electrode or four-electrode technology is used with JUMO, you're ready for anything.

Application example

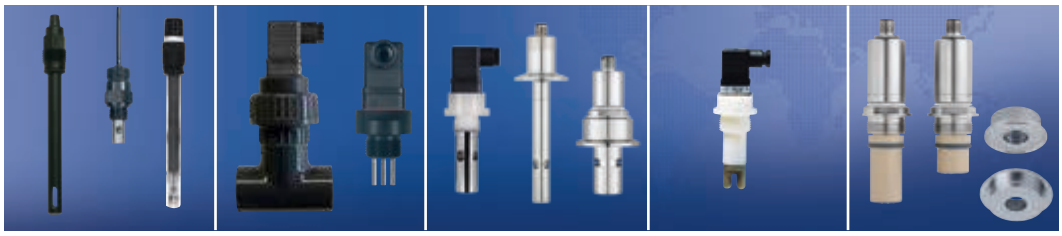
Measuring cells with "ASTM test certificate"

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-electrode and four-electrode conductivity measuring cells

µS/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	• Compact design type • Low cost version • For universal application	• Proven versions for industrial use • Implementation option with T-piece	• Wide variety of process connections • Sturdy design type • Pharmaceutical version incl. ASTM certificate	• Industrial version • Various process connections provide optimum adaptation to process conditions • With integrated temperature probe	• Very wide measuring range • CIP/SIP capability • Hygienic design • Certificate of quality included
General information	Areas of application	• Drinking water • Ion exchangers and reverse osmosis plants • Aquaristics	• Cooling and air-conditioning system technology • Drinking and swimming pool water • Industrial rinsing and process water circuits	• Pure and highly-purified water • Boiler feed water • Chip manufacturing • Ion exchangers and reverse osmosis plants • High temperature applications	• Drinking water and wastewater • Service water treatment	• 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
Data	Measuring ranges* from to	0.05 µS/cm approx. 10 mS/cm	1 µS/cm 15 mS/cm	0.05 µS/cm 1 mS/cm	10 µS/cm 15 mS/cm	1 µS/cm 600 mS/cm
Data	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 and controllers for conductivity, TDS, resistance, and temperature*

		µS/cm mS/cm			
					
	Description	**JUMO ecoTRANS Lf 01/02 Transmitter and switching device**	**JUMO ecoTRANS Lf 03 Transmitter and switching device**	**JUMO dTRANS CR 02 Transmitter and controller**	**JUMO AQUIS 500 CR Transmitter and controller**
	Data sheet	202731	202732	202552	202565
General information	**Features**	• Low cost • Ideal partner for PLC • User-friendly setup program	• Integrated LCD display with varied display units (µs/cm, ms/cm, kOhm × cm) • USP switching function according to USP<645> • Calibration certificate included	• 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>	• 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	• Conductivity • Temperature	• Conductivity • Temperature • Resistance	• Conductivity • Temperature • Resistance • TDS value	• Conductivity • Temperature • Resistance • TDS value
	Outputs	• 1 galvanically isolated analog output • 1 relay output	• 2 analog outputs • 1 relay output or 2 open collector outputs	• Up to 3 analog outputs • Up to 7 relays	• 2 analog outputs • 2 relays with changeover contact
	Protection type	IP20	IP20	IP65	IP67

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

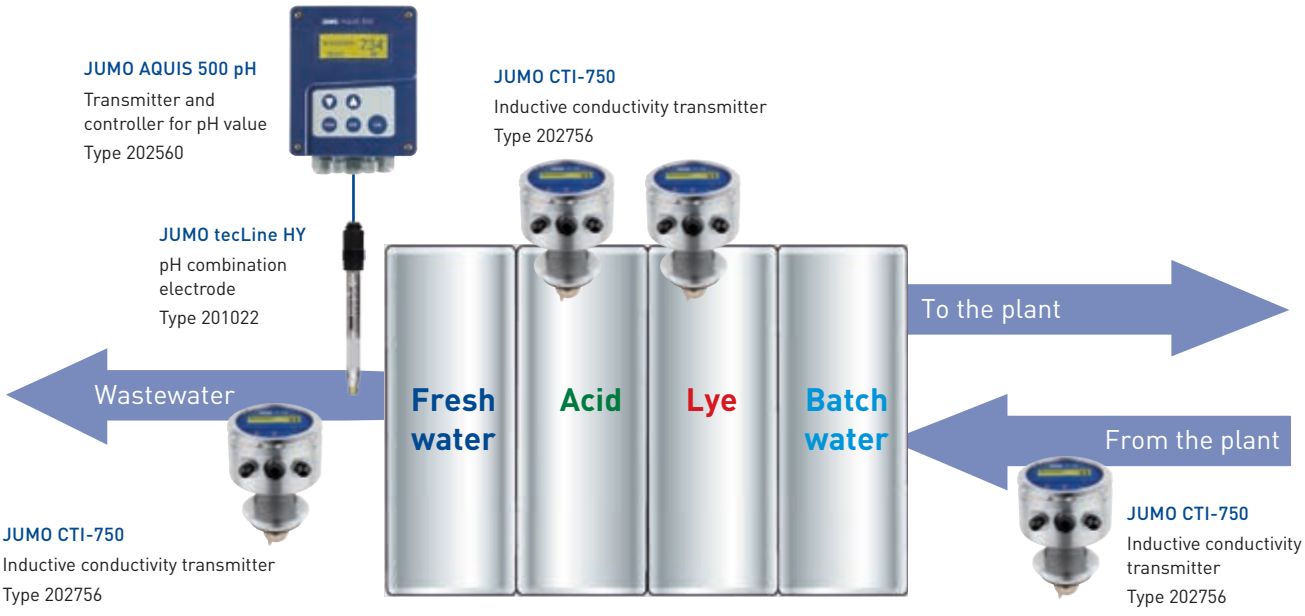
Inductive conductivity measurement

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.

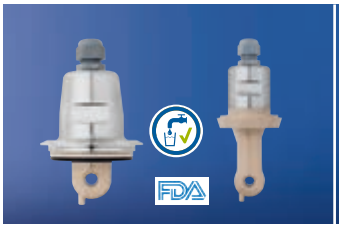
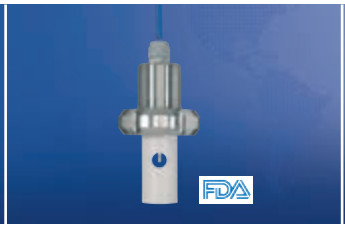
Application example

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 transmitter 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		
				
	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**	• Hygienic sensor design • Wide variety of process connections (milk cone, clamp, VARIVENT®) • Fast-response internal temperature sensor • Seal-free construction	• Wide variety of mounting measurands • Different body materials • Immersion version also available	• Maintenance-free conductivity measurement • Compact, proven sensor • Various process connections variants
General information	**Areas of application**	• Food industry (dairies, breweries, etc.) • Soft drinks manufacturing and bottling • Mineral springs • Drinking water • CIP and SIP plants • Concentration measurements of acids, lyes, and cleaning chemicals	• Liquid foods • CIP/SIP systems • Rinsing and cleaning processes	• 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
Data	**Measuring range**	0 to 2000 mS/cm**	0 to 2000 mS/cm**	0 to 2000 mS/cm**
Data	**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*

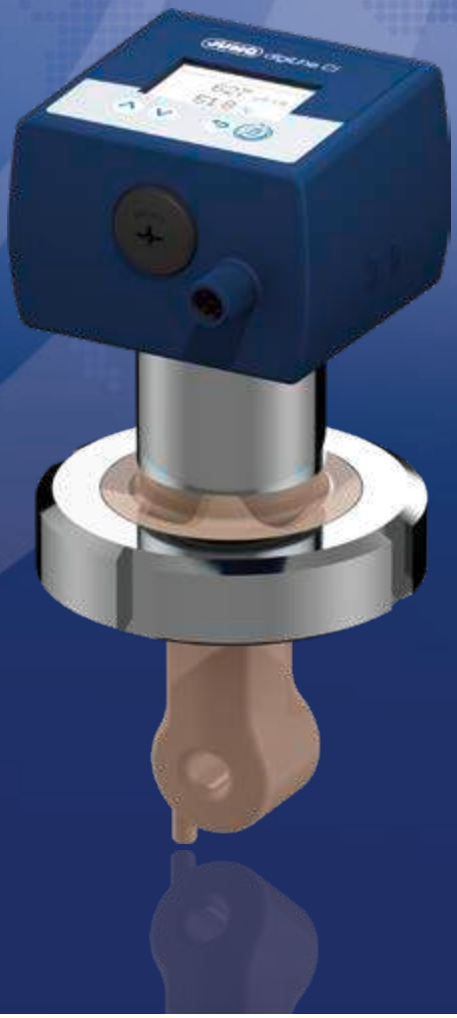
µS/cm
mS/cm

	Description	**JUMO AQUIS 500 Ci** **Transmitter and controller 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**	• Multilingual plain text operation • Graphic display with backlighting • P, PI, PD, and PID control functions	• Operation via keypad and via setup program • Up to 4 measuring ranges and temperature coefficients can be activated • Fast-response temperature sensor	• Individual characteristic line for concentration display • Easy-to-use programming options with setup program • CIP and SIP capable
	Areas of application	• Food and beverages industry • CIP and SIP plants • Concentration measurement of acids and lyes	• Water and wastewater engineering • Cooling tower monitoring (dilution control) • Rinsing baths (electroplating plants) • Wet scrubbers	• Food and beverages industry • CIP and SIP plants • Concentration measurement of acids and lyes
Data	**Measurands**	• Conductivity • Concentration of NaOH, HNO_3, H_2SO_4, HCl • Temperature	• Conductivity • Concentration of NaOH, HNO_3 • Temperature	• Conductivity • Concentration of NaOH, HNO_3 • Temperature
	Versions	Surface or panel mounting	• Combined device (transmitter and measuring cell together in one device) • Split version (transmitter and measuring cell connected by cable)	• 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	• Up to 2 analog outputs • Up to 2 relays	• 2 outputs • 2 potential-free contacts	• 2 outputs • 2 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).

Digital transmitter for inductive and conductive conductivity measurement

JUMO digiLine CR and JUMO digiLine Ci are the latest additions to the intelligent, bus-compatible JUMO digiLine system for inductive and conductive measurement of electrolytic conductivity. The smart sensors are available in compact and separate design type. In the separate design type the smart electronic components and sensor are connected via a line. As a result, problematic installation situations can be mastered. The system can be integrated either via the JUMO digiLine interface or alternatively via the IO-Link interface.



IO-Link

digiLine

Inductive conductivity sensors

			
	Description	**JUMO digiLine Ci ST10 Transmitter for separate inductive conductivity sensor**	**JUMO digiLine Ci HT10 Head transmitter with inductive conductivity sensor**
	Type	202760	202761
General information	**Areas of application (depends on sensor)**	• General water technology • Mineral springs, drinking water (ACS approval) • Air-conditioning and cooling systems • Dilution monitoring in cooling towers • Car washes • Desalination of seawater (inflow) • Swimming pool water control • Daires, breweries (use of FDA listed materials) • Soft drink produktion and filling • Production of liquid foods • CIP and SIP plants • Rinsing and cleaning processes • Concentration measurements (intensification) of acids, lyes, and cleaning chemicals	
Data	**Measuring principle**	Inductive	
	Sensor connection	Separate design	Compact design
	Sensor material	• PP • PVDF • PEEK®	
	Measuring range	50 µS/cm to 2000 mS/cm; concentration measurement in acids and lyes (e.g. NaOH, NaCl, HCl, etc.); customized characteristic line	
	Temperature compensation	• Linear • Non-linear	
	Temperature	Max. 150 °C (depends on sensor)	
	Pressure	Max. 12 bar (depends on sensor)	
	Interface	JUMO digiLine or IO-Link	

Conductive conductivity sensors

	µS/cm mS/cm				
	Description	**JUMO digiLine CR ST10 Transmitter for separate conductive conductivity sensor**	**JUMO digiLine CR HT10 Head transmitter with conductive two-electrode conductivity sensor type EC**	**JUMO digiLine CR HT20 Head transmitter with conductive two-electrode conductivity sensor type PVC**	**JUMO digiLine CR HT30 Head transmitter with conductive two-electrode conductivity sensor type VA**
	Type	202762	202763	2020764	202765
General information	**Areas of application (dependent on sensor)**	• Application in highly-purified water • Reverse osmosis • Ion exchangers • Pharmaceutical application • Rinsing processes in food, beverage, pharmaceutical, and biotechnology industry • Pharmaceuticals • Chemistry • Food technology • bottle cleaning plants • Process water	• General water technology • Drinking water, surface water, swimming pool water • Air-conditioning and cooling systems • Horticultural technology • Seawater and freshwater aquaristics • Lightly-polluted industrial rinse and cleaning water, process water • Highly-purified water monitoring • Reverse osmosis plants • EDI (electrode ionization) • Ion exchangers		• Application in highly-purified water • Reverse osmosis • Ion exchangers • Pharmaceutical application
Data	**Measuring principle**	Conductive			
	Sensor connection	Separate design	Compact design		
	Sensor material	Stainless steel 1.4571; titanium; stainless steel 1.4435; PEEK®; graphite; PVDF; PPE; PS	PPE; PS	Stainless steel (1.4571); graphite	Stainless steel 1.4435
	Measuring range	0.05 µS/cm to 600 mS/cm customer-specific characteristic line	0.1 µS/cm to 100 mS/cm customer-specific characteristic line	0.01 µS/cm to 15 mS/cm customer-specific characteristic line	0.05 µS/cm to 1 mS/cm customer-specific characteristic line
	Temperature compensation	• Linear • ASTM • USP <645>			
	Temperature	Max. 200 °C (depends on sensor)	Max. 60 °C	Max. 55 °C	Max. 200 °C
	Pressure	Max. 16 bar (depends on sensor)	Max. 6 bar		Max. 16 bar

µS/cm
mS/cm




	Description	**JUMO digiLine CR HT40 Head transmitter with conductive two-electrode conductivity sensor Type SL**	**JUMO digiLine CR HT50 Head transmitter with conductive two-electrode conductivity sensor Type PK**	**JUMO digiLine CR HT60 Head transmitter with conductive two-electrode conductivity sensor Type GT**	**JUMO digiLine CR HT70 Head transmitter with conductive four-electrode conductivity sensor Type 4P**
	Type	202766	202767	202768	202769
General information	**Areas of application (depends on sensor)**	• Application in highly-purified water • Reverse osmosis • Ion exchangers • Pharmaceutical application		• Fresh water monitoring • Water treatment • Condensate monitoring	• Rinsing processes in food, beverage, pharmaceutical, and bio technology (e.g. CIP and SIP processes, back-washing processes for ion exchangers, phase separation) • Pharmaceutical industry • Chemical • Food technology • Bottle cleaning plants • Process water
Data	**Measuring principle**	Conductive			
	Sensor connection	Compact design		Compact design	Compact design
	Sensor material	Stainless steel 1.4435		PVDF	• Stainless steel 1.4435 • PEEK®
	Measuring range	0.05 µS/cm to 1 mS/cm customer-specific characteristic line		10 µS/cm to 15 mS/cm customer-specific characteristic line	1 µS/cm to approx. 600 mS/cm customer-specific characteristic line
	Temperature compensation	• Linear • ASTM • USP <645>			
	Temperature	Max. 135 °C	135 °C (short-term 150 °C)	Max. 130 °C	Max. 120 °C (short-term 140 °C)
	Pressure	Max. 16 bar	Max. 9 bar	Max. 16 bar	

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 an optical measuring method.

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

Description	JUMO tecLine Cl2/TC/ClO2, O3, H2O2/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	• Measuring range: 0 to 50,000 mg/l** • Temperature-compensated current output (4 to 20 mA)	• Display: mg/l, ppm, pH, mV, µs/cm, etc. • Choice of display visualizations	• 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, see page 25)
Data sheet	202610	202613
Measuring principle	Amperometric	Luminescence
Features	• Measuring range: 0 to 50 mg/l • Simple, safer servicing through exchange of modules	• 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	• Measuring range: 0.01 to 999 mg/l • Simple, safer servicing through exchange of modules	• Multilingual plain text operation – graphic display with backlighting • P, PI, PD, and PID control functions	• 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).

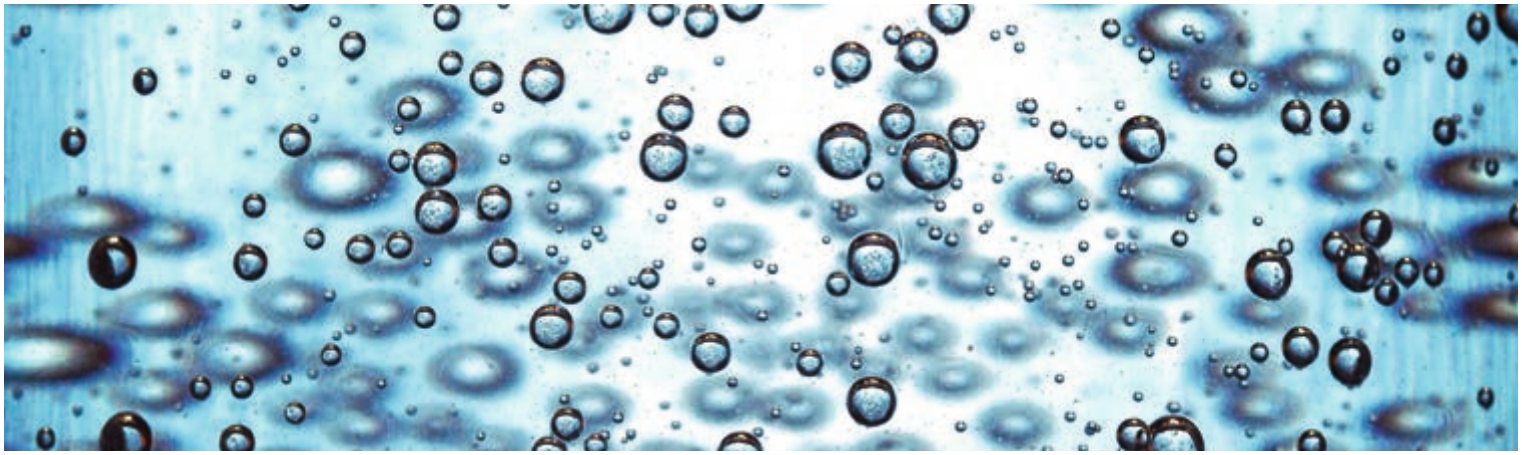
Turbidity measurement

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. The light measurement at a wavelength of 880 nm and the wide measuring range of 0 to 4000 NTU allow the sensor to be used in such areas as fish breeding, water monitoring, and wastewater control.

Turbidity measurement (NTU)

	Description	**JUMO ecoLine NTU – optical sensor for turbidity measurement**
	Data sheet	202670
General information	**Features**	Robust sensor, low maintenance, and calibration data/history saved in the sensor electronics,
	Areas of application	• 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	4 measuring ranges: • 0 to 50 NTU • 0 to 200 NTU • 0 to 1000 NTU • 0 to 4000 NTU
	Resolution	0.01 to 1 NTU (depends 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

	Description	**JUMO AQUIS 500 RS Indicating device and controller for digital sensors with Modbus protocol**
	Data sheet	202569
General information	**Features**	• 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	For universal use
Data	**Mounting**	Surface or control cabinet mounting
	Measurands	• **Dissolved oxygen** in conjunction with sensors according to data sheet 202613 • **Free chlorine** in conjunction with sensors according to data sheet 202630 • **Total chlorine** in conjunction with sensors according to data sheet 202631 • **Chlorine dioxide** and **ozone** in conjunction with sensors acc. to data sheet 202634 • **Hydrogen peroxide** and **peracetic acid** in conjunction with sensor according to data sheet 202636 • **Bromine** in conjunction with sensors according to data sheet 202637 • **Turbidity** in conjunction with sensors according to data sheet 202670
	Inputs	• 2 analog outputs • 2 switching outputs
	Outputs	• 1 digital interface • 1 analog temperature input • 1 binary input.
	Protection type	IP67



Multichannel measuring devices

Measure – display – control – record. These are terms that have been closely associated with the JUMO brand for decades. The 4 tasks have been combined into a single, innovative device series for the future global liquid analysis market: the JUMO AQUIS touch.

pH ppm l/min MΩ • cm mS/cm

µS/cm **mV** °C

Multichannel measuring devices

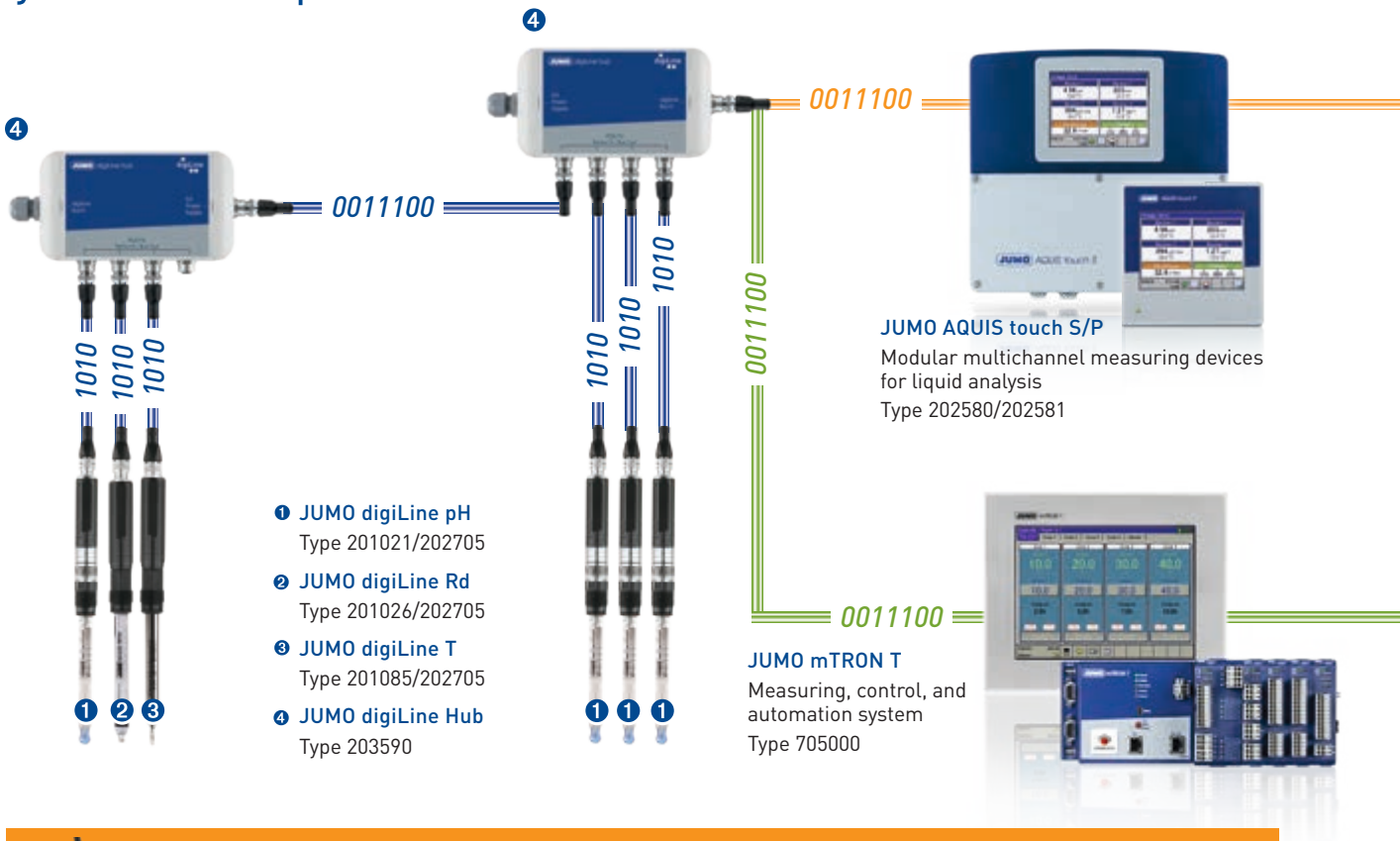
	Description	**JUMO AQUIS touch P**	**JUMO AQUIS touch S**
	Data sheet	202580	202581
General information	**Features**	• 3.5" touchscreen • 10 inputs and outputs as part of the basic package • 7 slots for input and output modules	• 5.5" touchscreen • 14 inputs and outputs as part of the basic package • 13 slots for input and output modules
		• 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 6 JUMO digiLine sensors can be connected	
	Areas of application	• 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 × 96 mm)	Surface-mounted case
	Measurands	• pH value/redox voltage/NH_3 concentration • Electrolytic conductivity (conductive) • Electrolytic conductivity (inductive) • Acid and lye concentration • Resistance (MOhm × cm; kOhm × 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 se

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



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

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

JUMO mTRON T
Measuring, control, and automation system
Type 705000

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

1) Connect sensor

2) Sensor is detected automatically

3) Sensor is linked and ready for measurement

ensors

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 recording 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 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.

digiLine

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 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 JUMO digiLine electronic components 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

JUMO offers a large selection of proven versions which are useful for maintenance, troubleshooting, and startup of pH, redox, and conductivity measuring points, technical buffer solutions, or connecting cables.

Accessories for liquid analysis





	Description	Cables, connectors, and sockets for pH, redox, and conductivity measurement	Technical buffer and cleaning solutions	Impedance converter 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	• Pre-assembled high-quality connecting cables • Highest possible protection type when fully assembled • Wide selection of special connectors/ sockets available • Customer-specific versions	• 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	• Network independent and signal stabilizing • Retrofitting is possible • Allows longer cable lengths	• Simulates a pH/redox or conductivity sensor in an application • Makes the dry startup of plants easier	• Compact design type • Min./max. value • Memory and hold function • Easy-to-operate membrane keypad • Easy to read LCD display
	Areas of application	• For use with electrochemical sensors	• For calibrating pH/ redox electrodes and conductivity measuring cells	• Converts the high-impedance signal of the pH electrode	• For startup, calibration, and inspection of pH, redox, and conductivity measuring points • For testing connecting cables and troubleshooting	• General water monitoring • Aquaristics • Fish farming
Data	Mounting	–	–	–	–	• Handheld device
	Measurands	–	–	–	–	• pH/redox • Temperature • Conductivity
	Outputs	–	–	–	–	• Indicating device
	Protection type	–	–	–	–	• IP65

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