JUMO

More than sensors + automation

Member of German Water Partnership

Liquid Analysis

Innovative solutions for the highest requirements

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Dear Reader,

Liquid analysis has a long history at JUMO. It began with the foundation of the company and the manufacturing of technical glass thermometers. The expertise and experience in glass processing have been applied to the manufacturing of glass sensors and parts since the 1970s. These are still required today for what was then the new field of electrochemical measurands pH value, redox potential, and electrolytic conductivity.

Overly reckless practices with water as a resource led to increasing pollution of natural water reserves. This resulted in regulations to prevent water pollution as well as 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 has supplied renowned equipment and plant manufacturers in the new industry of water treatment, dosing technology, and wastewater treatment technology from the beginning.

Today, the components and systems for analytical measuring technology are represented in almost all subsectors of water and wastewater engineering. Throughout the world many of our products make their way into measurement applications under our customers' brand names. Consequently, JUMO is a reliable partner and OEM supplier.

We place great emphasis on ensuring the production quality for such sensitive sensor technology. 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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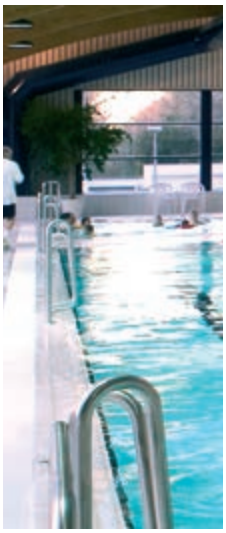
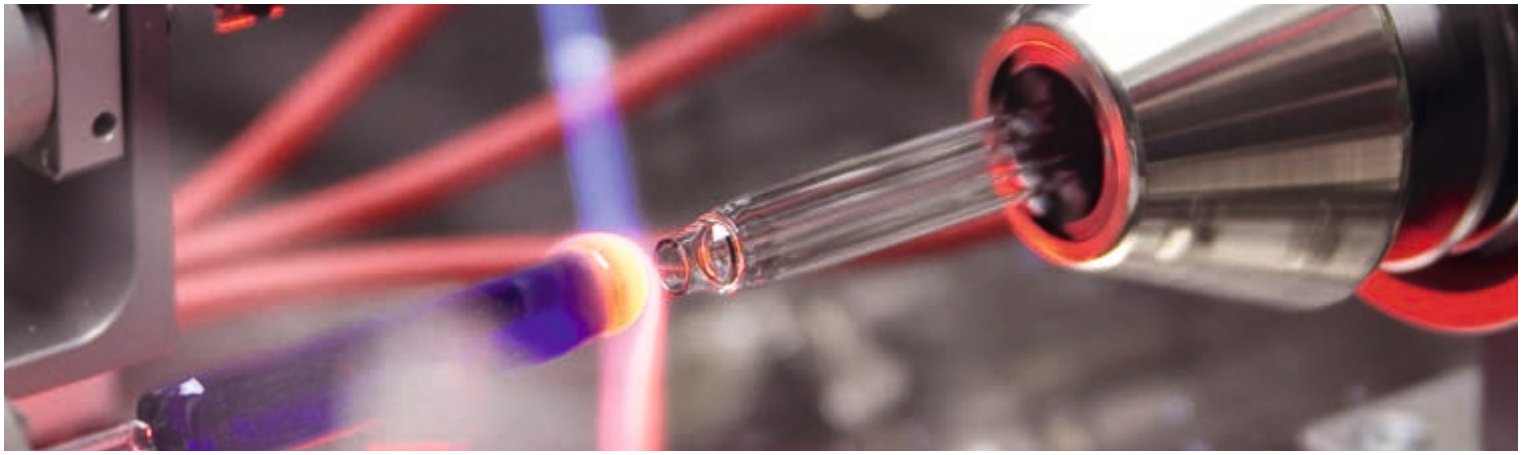




JUMO electrode manufacturing

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

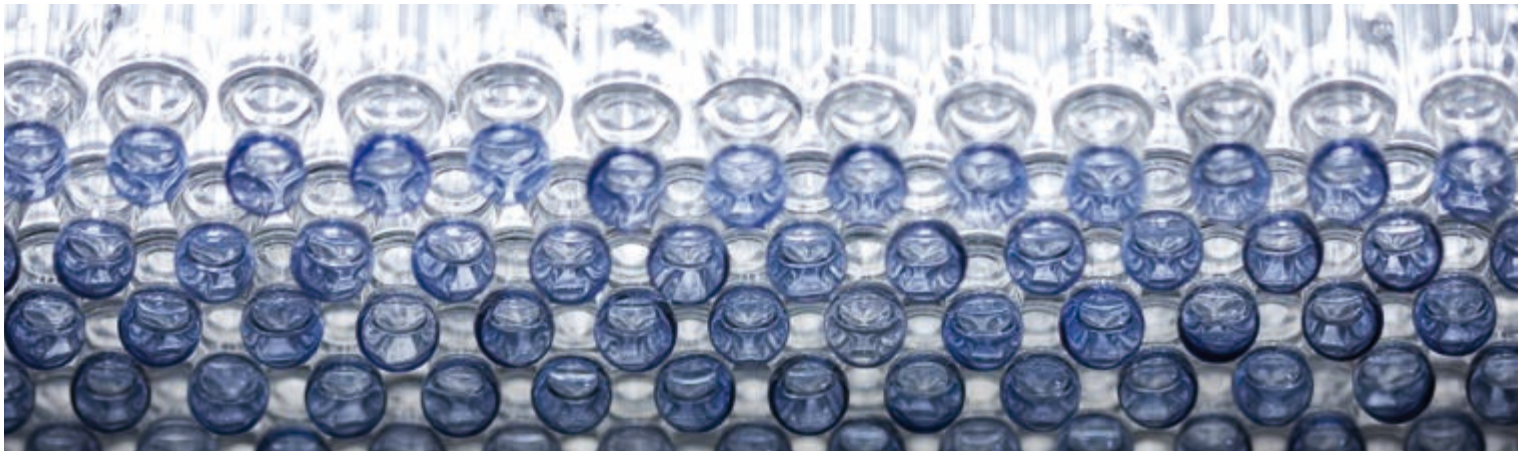
The success story of JUMO pH electrodes

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 design types.

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 measurement helps to increase the number of high-quality end products and reduce unwanted by-products. This is why you should rely on the proven quality of one of the largest electrode manufacturers in Europe. JUMO is at your side as an expert partner with over 35 years of experience in analytical measurement technology. Together we develop the ideal solution for your application.

pH and redox electrodes

pH
mV

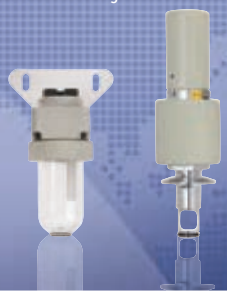
	Designation	JUMO ecoLine JUMO BlackLine	JUMO tecLine JUMO tecLine HD JUMO tecLine HY	JUMO tecLine PRO	JUMO labLine	JUMO ISFET
	Data sheet	201005, 201010	201020, 201021, 201022, 201025, 201026, 201027	201020, 201025	201030, 201035	201050
General information	Features	• For standard applications • Glass 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 degree of mechanical robustness • With plastic shaft • Integrated temperature sensor (optional extra for pH electrode)	• For lab applications	• Glassless • High degree of 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 • Constantly-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

	Designation	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 signal 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 (plug head VP on the sensor)	IP20	IP65	IP67

* See also "Multichannel measuring devices" (page 28).



Fittings*

pH
mV

	Designation	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	• G½ A or bonded sockets • Angled seat DN 20/25 • T-piece DN 32/40/50	**Type 202820:** • Flange **Type 202821:** • Flange • Retainer	• Screw-in thread G¾ A • Screw-in thread G1 A • Clamp DN 25	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 value, electrolytic conductivity is the most frequently measured parameter in liquid analysis. Conductivity measurement plays a major role in many applications. Examples include seawater desalination and monitoring the quality of highly-purified water or cooling water. JUMO offers measuring cells for a wide range of applications with two-electrode and four-electrode technology as well as hygienic and robust designs.

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 on the two-electrode method. According to the European Pharmacopoeia (EP), the cell constant of a measuring cell must be certified by its manufacturer. JUMO has many years of experience in measuring cells manufacturing that meet this requirement. We currently offer the conductive conductivity measuring cell JUMO tecLine CR in the stainless steel or titanium version with the so-called “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 surface-mounted housing (JUMO AQUIS 500 CR) with a high protection type (e.g. IP67), and DIN-rail mounting (JUMO ecoTRANS Lf 03).

Conductive two-electrode and four-electrode conductivity measuring cells

µS/cm
mS/cm

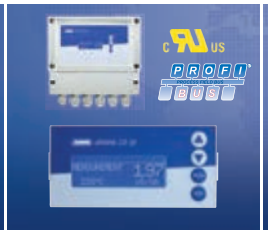




	Designation	JUMO BlackLine CR-GT, -EC, -GS, -4P	JUMO ecoLine CR-PVC	JUMO tecLine CR und CR S01	JUMO tecLine CR-GT	JUMO tecLine CR-4P with JUMO PEKA adapters
	Data sheet	202922, 202931	202923	202924, 202928	202925	202930
General information	Features	• Compact design type • Low cost version • For universal application	• Proven versions for industrial use • Implementation option with T-piece	• Wide variety of process connections • Sturdy design type • Pharmaceutical version incl. ASTM certificate • For high-temperature applications	• Industrial version • Wide variety of process connections • With integrated temperature probe	• Very wide measuring range • CIP/SIP capability • Hygienic design • Certificate of quality included
	Areas of application	• Drinking water • Ion exchangers and reverse osmosis plants • Aquaristics • Slightly contaminated rinsing and purification baths • General water technology	• Cooling and air-conditioning system technology • Drinking and swimming pool water • Industrial rinsing and process water circuits	• Purified water and highly-purified water • Chip manufacturing • Ion exchangers and reverse osmosis plants • Slightly contaminated industrial rinse and process water • General water technology	• Drinking water and wastewater • Service water treatment	• Rinsing processes in the food, beverage, pharmaceutical, and biotechnology industries • CIP and SIP applications
Data	Cell constant	K = 0.01; 0.1, 0.25 or 1.0	K = 0.1 or 1.0	K = 0.01; 0.1 or 1.0	K = 1.0	K= 0.3 to 0.4
	Measuring ranges* from to	0.05 µS/cm approx. 10 mS/cm	1 µS/cm 15 mS/cm	0.05 µS/cm 5 mS/cm	10 µS/cm 15 mS/cm	1 µS/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 **JUMO BlackLine CR-4P:** Graphite	Stainless steel (1.4571) or graphite	• Stainless steel (1.4571, 1.4435 or 1.4404) • 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			
					
	Designation	**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 "Multichannel measuring devices" (page 28).

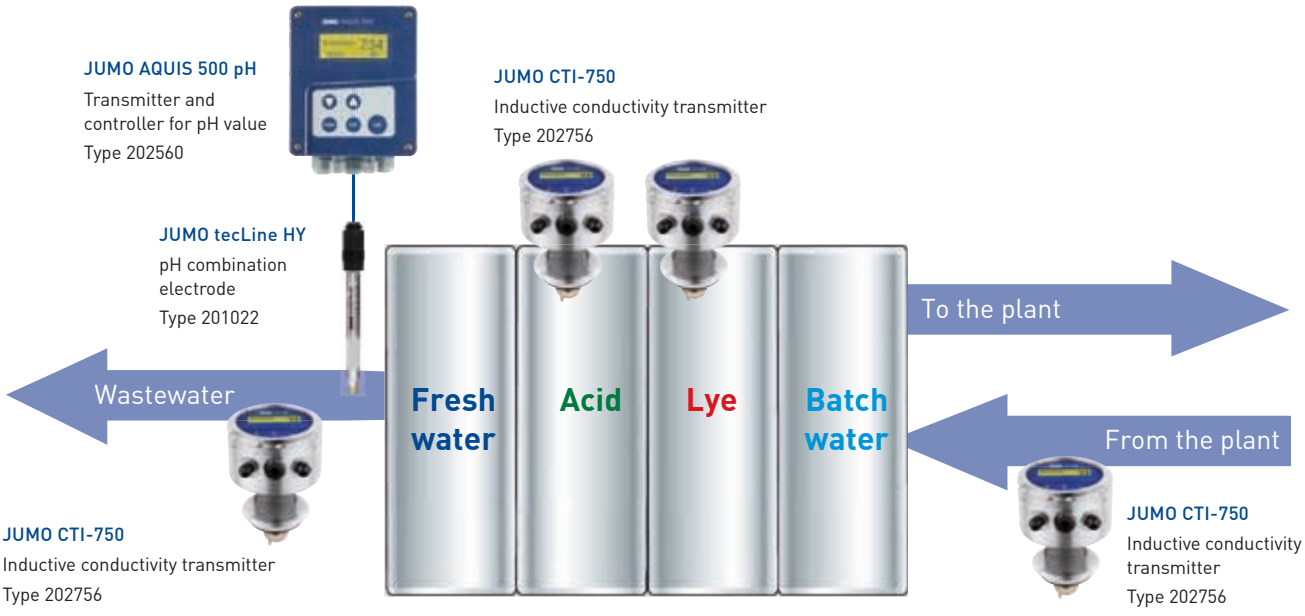
Inductive conductivity measurement

The conductivity sensor in a CIP plant has to withstand 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.

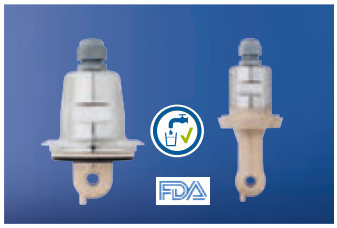
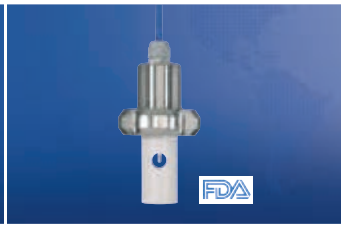
Application example

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. The JUMO CTI-750 conductivity transmitter supports this process with accurate measurements to ensure that cleaning is performed quickly and reliably. For this purpose, JUMO CTI-750 monitors and controls the concentration of your cleaning agents by measuring conductivity with an inductive conductivity sensor. As a result, you save cleaning agents and a large amount of water. This contribution to sustainability also pays off for your company.



Inductive conductivity sensors*

		µS/cm mS/cm		
				
	Designation	**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 (dairy pipe fitting, clamp, VARIVENT®) • Fast-response internal temperature sensor • Seal-free construction	• Wide variety of installation sizes • 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 filling • Mineral springs • Drinking water • CIP and SIP plants • Concentration measurements of acids, lyes, and cleaning chemicals	• Liquid foods • CIP and SIP plants • Rinsing and cleaning processes	• Drinking water and wastewater • Salt dilution control in cooling towers • Seawater desalination plants • Rinsing baths (galvanic 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		
				
	Designation	**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
General information	**Areas of application**	• Food and beverage industry • CIP and SIP plants • Concentration measurement of acids and lyes	• Water and wastewater engineering • Cooling tower monitoring (salt dilution control) • Rinsing baths (galvanic plants) • Wet scrubbers	• Food and beverage 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
Data	**Versions**	Surface or panel mounting	• Combined device (transmitter and measuring cell together in one device) • Remote design type (transmitter and measuring cell connected by cable)	• Combined device (transmitter and measuring cell together in one device) • Remote design type (transmitter and measuring cell connected by cable)
Data	**Mounting**	Surface or control cabinet mounting	Pipe mounting, wall mounting	Pipe mounting, wall mounting
Data	**Outputs**	• Up to 2 analog outputs • Up to 2 relays	• 2 outputs • 2 potential-free contacts	• 2 outputs • 2 potential-free contacts
Data	**Protection type**	IP67	IP67	IP67
Data	**Sensor material**	See sensors	PP or PVDF	PEEK or PVDF

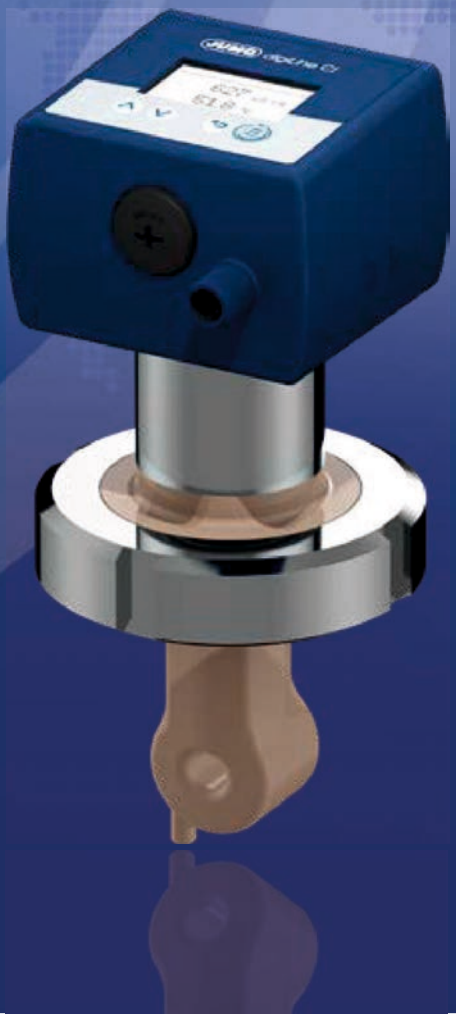
* See also "Multichannel measuring devices" (page 28).

Digital transmitter for inductive and conductive conductivity measurement

When measuring conductivity, benefit from the intelligent, bus-capable JUMO digiLine system. The smart sensors JUMO digiLine CR and JUMO digiLine Ci are available in compact or separate design types. The electronic components and sensor are connected via a line in the separate design type. 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

	Designation	**JUMO digiLine Ci ST10 Transmitter for separate inductive conductivity sensor**	**JUMO digiLine Ci HT10 Head transmitter with inductive conductivity sensor**
	Data sheet	202760	202761
General information	**Areas of application (depending on sensor)**	• General water technology • Mineral springs, drinking water (ACS approval) • Air-conditioning and cooling systems • Salt dilution control in cooling towers • Car washes • Seawater desalination (inflow) • Swimming pool water control • Dairies, breweries (use of FDA listed materials) • Soft drinks manufacturing 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 (depending on sensor)	
	Pressure	Max. 12 bar (depending on sensor)	
	Interface	JUMO digiLine or IO-Link	

Conductive conductivity sensors

	µS/cm mS/cm				
	Designation	**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**
	Data sheet	202762	202763	2020764	202765
General information	**Areas of application (depending 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 contaminated industrial rinsing 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 (depending on sensor)	Max. 60 °C	Max. 55 °C	Max. 200 °C
	Pressure	Max. 16 bar (depending on sensor)	Max. 6 bar		Max. 16 bar

µS/cm
mS/cm

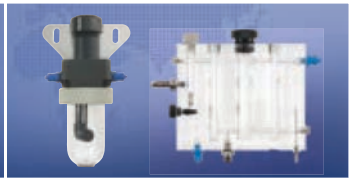



	Designation	**JUMO digiLine CR HT40 Head transmitter with conductive two-electrode conductivity sensor Type SL**	**JUMO digiLine CR HT50 Head transmitter with conductive two-electrode conductivity sensor Type PK**	**JUMO digiLine CR HT60 Head transmitter with conductive two-electrode conductivity sensor Type GT**	**JUMO digiLine CR HT70 Head transmitter with conductive four-electrode conductivity sensor Type 4P**
	Data sheet	202766	202767	202768	202769
General information	**Areas of application (depending on sensor)**	• Application in highly-purified water • Reverse osmosis • Ion exchangers • Pharmaceutical application		• Fresh water monitoring • Water treatment • Condensate monitoring	• Rinsing processes in food technology, beverage technology, pharmaceutical technology, and biotechnology (e.g. CIP and SIP processes, backwashing processes for ion exchangers, phase separation) • Pharmaceutics • 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	

Disinfection measurands and ammonia

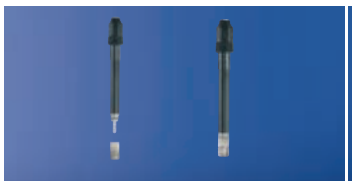
Precise and reliable measurement is essential to achieve an optimum disinfection concentration in the plant. The same is true for monitoring ammonia leakage from your refrigeration plant. JUMO offers you a wide range of solutions for measuring, controlling, and documenting the concentration of chlorine, chlorine dioxide, ozone, hydrogen peroxide, peracetic acid, bromine, and ammonia.

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



Designation	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

Ammonia measurement

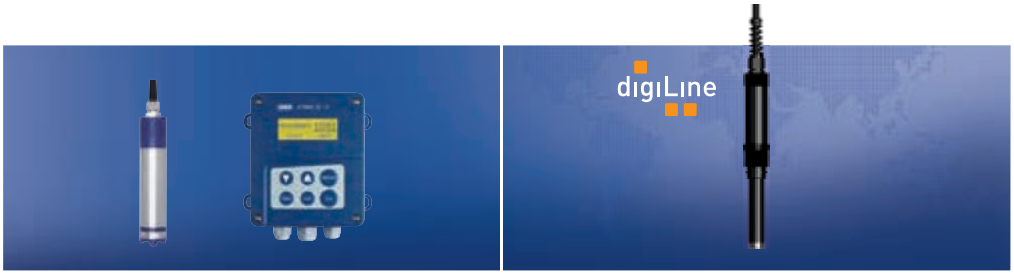


Designation	JUMO ammonia-sensitive sensor*	JUMO AQUIS 500 pH Transmitters/controllers	JUMO quick-change fitting for ammonia-sensitive sensor
Data sheet	201040	202560	201040
Features	• Measuring range: 0.01 to 999 mg/l • Simple, safer servicing through exchange of modules	• Multilingual plain text operation – graphic display with backlighting • P, PI, PD, and PID control functions	• Simplifies handling • Hose connection G1/8 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 28/29
** Measuring range depends on the measurand.
*** Monitoring of ammonia leakage (e.g. in indoor ice rinks or cold stores).

Oxygen measurement (DO)

Exact measurement of the dissolved oxygen is essential for the precise control of the oxygen content in your fish farm or sewage treatment plant. JUMO offers high-quality sensors for your application in water treatment. You can choose between the amperiometric and optical measuring methods.



	Designation	**JUMO dTRANS O2 01** **Two-wire transmitter for dissolved oxygen with operating unit**	**JUMO digiLine O-DO S10** **Digital optical sensor for dissolved oxygen in aqueous solutions***
	Data sheet	202610	202614
General information	**Features**	• Reliable one-point calibration • Simple, safer servicing through exchange of modules	• Self-diagnostic function
	Areas of application	• Drinking water • Wastewater • Fish farming companies	• Water and wastewater treatment (e.g. sewage treatment plants, fish breeding, aquaristics, and aquaponics • Surface water • Universities and teaching institutions
Data	**Measuring principle**	Amperometric	Luminescence
	Measuring range	0 to 50 mg/l	0 to 20 mg/l or 0 to 200 % Sat
	Operating temperature	0 to 50 °C	-5 to +50 °C
	Maximum pressure	Max. 6 bar at 20 °C	0 to 5 bar (relative)
	Temperature measurement	Resistance output Pt1000	NTC (22 kΩ)
	Temperature compensation	0 to 50 °C	Automatic
	Response time	t90 < 180 s (at 25 °C)	t90 < 60 s
	Diameter	Sensor shaft: 40 mm	Sensor shaft: 20 mm Threaded shaft: 30 mm
	Materials in contact with the medium	PVC, PC	PVC, PC
	Resistances	–	CO_2, H_2S, SO_2, ethylene oxide and gamma sterilization
	Process connection	Various installation fittings available	Rp 1“
	Output	4 to 20 mA	**Analog:** 4 to 20 mA in two-wire technology **Digital:** RS485 with Modbus RTU

* Also suitable for connecting to the JUMO AQUIS touch S/P multichannel measuring devices, see page 28/29

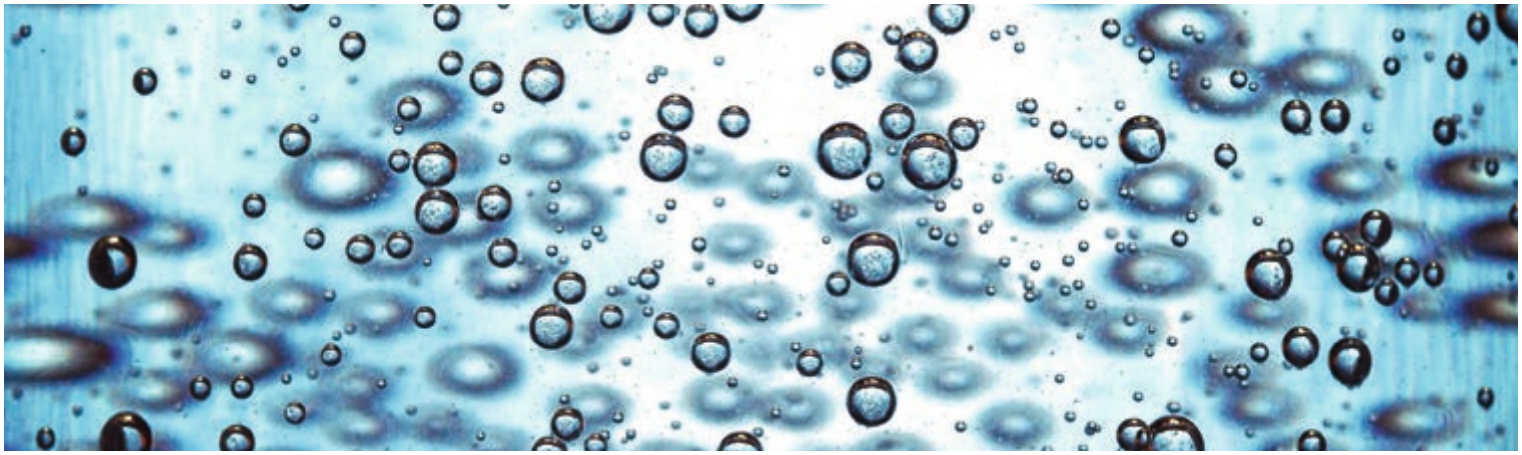
Turbidity measurement

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)

	Designation	**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) using 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 (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

	Designation	**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 202614 • **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 sensors 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 digital 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

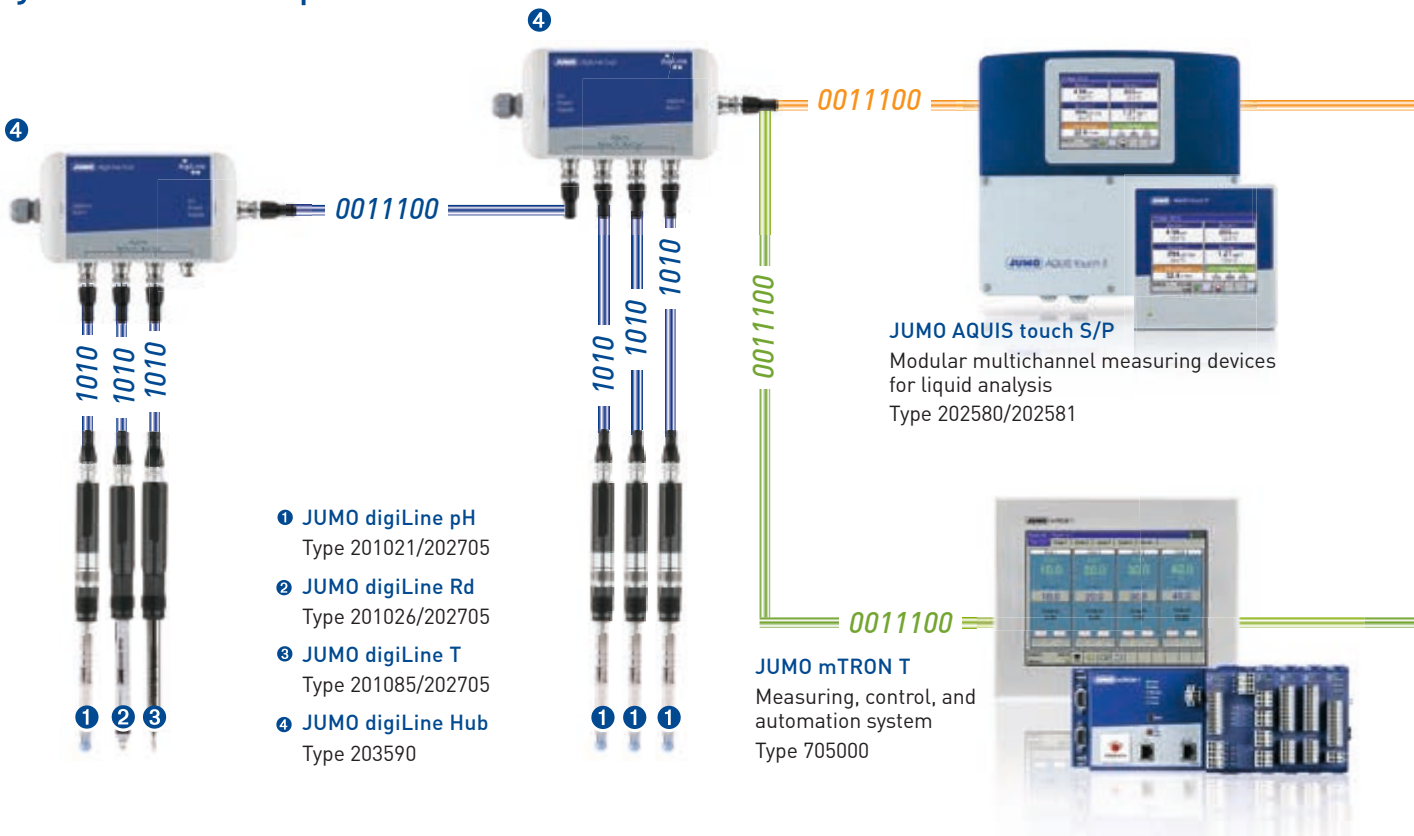
	Designation	**JUMO AQUIS touch P**	**JUMO AQUIS touch S**
	Data sheet	202580	202581
General information	**Features**	• 3.5" touchscreen • 10 inputs and outputs as part of the basic package • 7 slots for input and output modules	• 5.5" touchscreen • 14 inputs and outputs as part of the basic package • 13 slots for input and output modules
		• Modular structure • Customized process screen • Data monitor, recording 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 logbooks, calibration timers • In addition, up to 6 JUMO digiLine sensors can be connected	
	Areas of application	• For universal use • Water and wastewater engineering • Food and beverage industry (CIP/SIP) • Pharmaceuticals and biotechnology (USP, ASTM) • Drinking water technology, seawater desalination • Process technology (rinsing baths, galvanic plants, 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 potential, 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 establishment of sensor networks in which a wide variety of sensors can be interconnected in different bus topologies (linear, star). A single shared signal line is used for communication with the next evaluation unit or controller. This way plants in which several parameters need to be measured at the same time in different places can be wired efficiently and quickly.

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

Useful helpers for startup, calibration, and maintenance of pH, redox and conductivity measuring points, technical buffer solutions, and connecting lines: JUMO offers a wide range of proven products.

Accessories for liquid analysis

						
	Designation	**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 lines • Highest possible protection type when installed in the factory • 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 cleaner	• Network independent and signal stabilizing • Subsequent mounting possible • Allows longer line 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 keyboard • 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 lines and troubleshooting	• General water monitoring • Aquaristics • Fish farming
Data	**Mounting**	–	–	–	–	• Manual measuring device
	Measurands	–	–	–	–	• pH/redox • Temperature • Conductivity
	Outputs	–	–	–	–	• Indicating device
	Protection type	–	–	–	–	• IP65

Services & Support

It is the quality of our products that is responsible for such a high level of customer satisfaction. But our reliable after-sales service and comprehensive support are also valued. Let us introduce you to the key services we provide for our innovative JUMO products. You can count on them – anytime, anywhere.

JUMO Services & Support – so that it all comes together!

Manufacturing Service

Are you looking for a competitive and efficient system or component supplier? Regardless of whether you seek electronic modules or perfectly fitting sensors – either for small batches or mass production – we are happy to be your partner. From development to production we can provide all the stages from a single source. In close cooperation with your business our experienced experts search for the optimum solution for your application and incorporate all engineering tasks. Then JUMO manufactures the product for you.
As a result you profit from state-of-the-art manufacturing technologies and our uncompromising quality management systems.

Customer-specific sensor technology

- Development of temperature probes, pressure transmitters, conductivity sensors, or pH and redox electrodes according to your requirements
- A large number of testing facilities
- Incorporation of the qualifications into application
- Material management
- Mechanical testing
- Thermal test

Electronic modules

- Development
- Design
- Test concept
- Material management
- Production
- Logistics and distribution
- After-sales service

Metal technology

- Toolmaking
- Punching and forming technology
- Flexible sheet metal machining
- Production of floats
- Welding, jointing, and assembly technology
- Surface treatment technology
- Quality management for materials

Information & Training

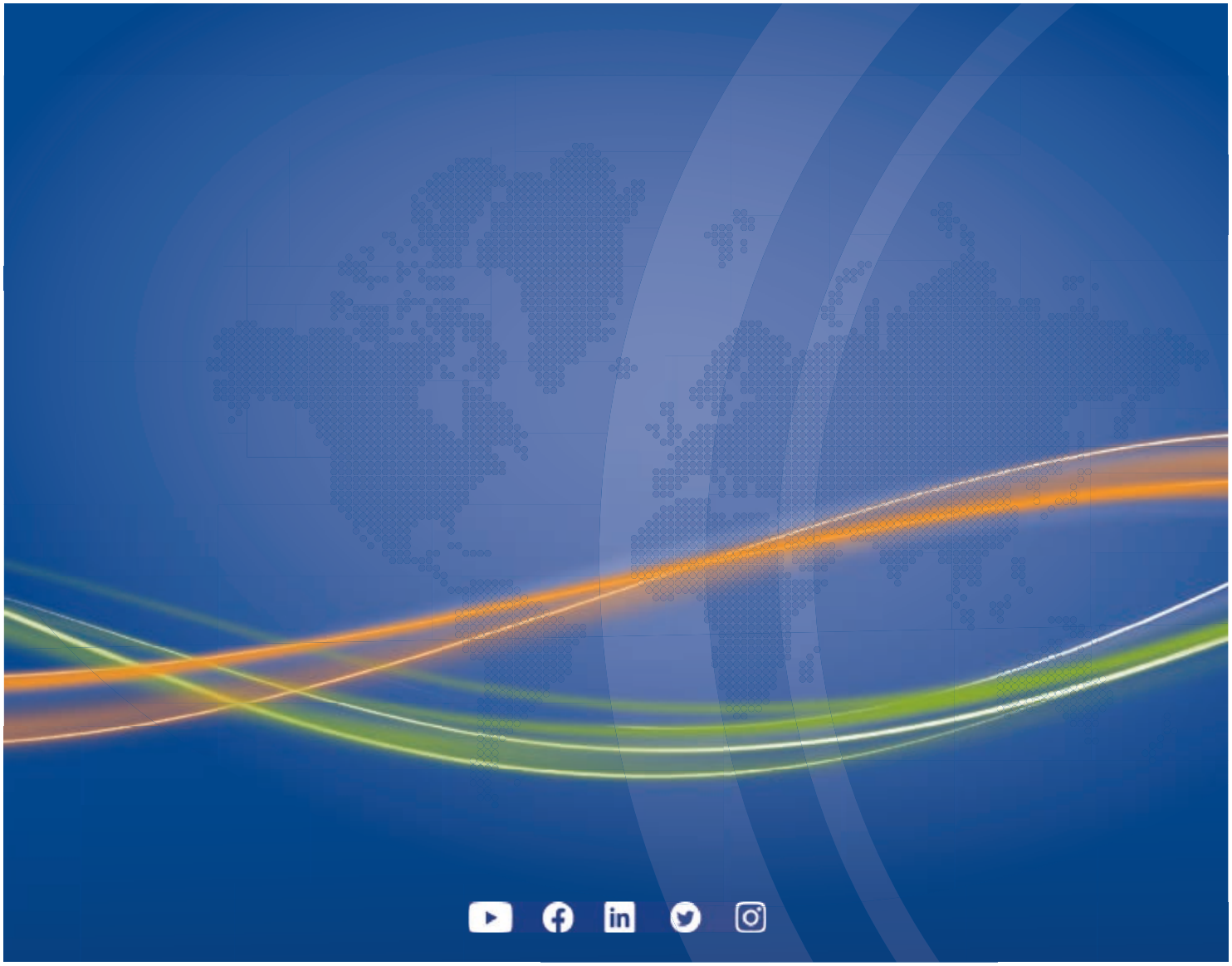
Would you like to increase the process quality in your company or optimize a plant? Then use the offers available on the JUMO website and benefit from the know-how of a globally respected manufacturer. For example, under the menu item “Services and Support” you will find a broad range of seminars. Videos are available under the keyword “E-Learning” about topics specific to measurement and control technology. Under “Literature” you can learn valuable tips for beginners and professionals. And, of course, you can also download the current version of any JUMO software or technical documentation for both newer and older products.

Product Service

We have an efficient distribution network on all continents available to all of our customers so that we can offer professional support for everything concerning our product portfolio. Our team of professional JUMO employees is near you ready to help with consultations, product selection, engineering, or optimum use of our products. Even after our devices are commissioned you can count on us. Our telephone support line is available to give you answers quickly. If a malfunction needs to be repaired on site our Express Repair Service and our 24-hour replacement part service are available to you. That provides peace of mind.

Maintenance & Calibration

Our maintenance service helps you to maintain optimum availability of your devices and plants. This prevents malfunctions and downtime. Together with the responsible parties at your company we develop a future-oriented maintenance concept and are happy to create all required reports, documentation, and protocols. Because we know how important precise measurement and control results are for your processes we naturally also professionally calibrate your JUMO devices – on site at your company or in our accredited DAkkS calibration laboratory for temperature. We record the results for you in a calibration certificate according to EN 10 204.



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