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# JUMO tecLine TC

## Sensors for total chlorine

**Type 202631/44** Output signal 4 to 20 mA  
**Type 202631/52** Digital interface output signal

### Brief description

These membrane-covered amperometric sensors are used to measure the total chlorine concentration in water.

The sensors acquire the total of "free chlorine" (chlorine gas, hypochlorite, etc.) and "combined chlorine" (chloramine, organically combined chlorine).

The sensors are not suitable for detecting the absence of chlorine.

The sensors' integrated electronics provide a temperature-compensated current signal (4 to 20 mA) for the variant with an analog output signal, and a Modbus RTU signal for the variant with a digital interface. A downstream device (indicator, controller, recorder, PLC, etc.) is used for calibration.

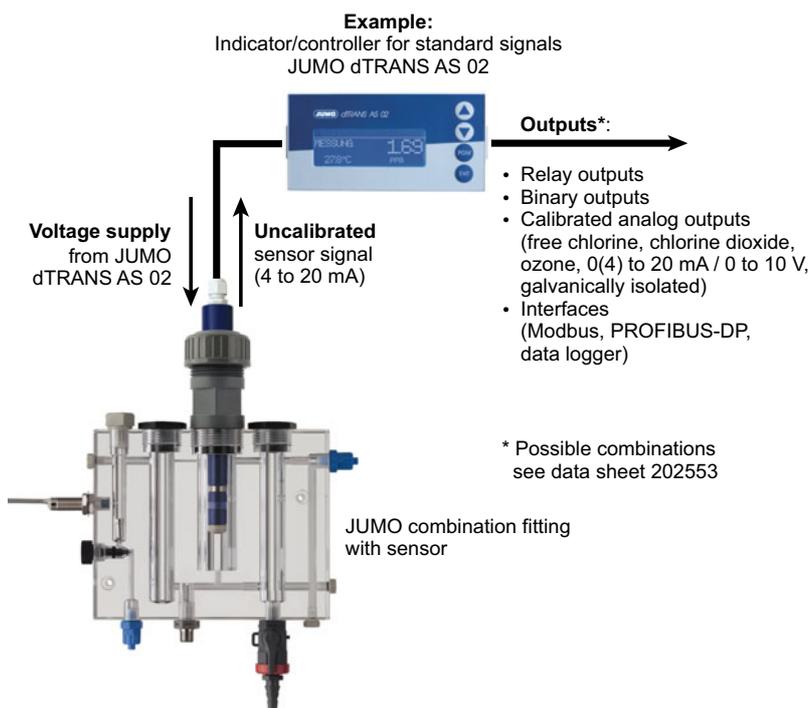
The sensors can be connected directly to various indicating devices/transmitters/controllers (see "Suitable indicating devices/transmitters/controllers", page 7). They provide the voltage required for supplying the sensors and allow for easy calibration of the measuring system.

**Application areas:** measurements in drinking water, swimming pool water, service water, sea-water.



Type 202631/52...

### Application example



### Special features

- 3-electrode principle
- Easy calibration
- Integrated temperature compensation
- Proven measuring system
- Electrical connection, analog or digital
- Connection to JUMO digiLine system optional

Additional indicating devices/controllers: "Suitable indicating devices/transmitters/controllers", page 7



## Important information

### General information

- Measuring is only possible in a suitable flow fitting (see accessories).
- The flow rate from the measurement medium must be at least 15 cm/s (0.5 l/min) in order for the sensor to work correctly. The minimum inflow can be guaranteed using the JUMO combination fitting or the JUMO individual fitting in connection with the JUMO flow monitor for disinfectant measurands (see accessories).
- For calibration, a test set is required to determine the total chlorine content using the DPD method; corresponding photo- or colorimetric test sets are commercially available.
- To make sure the sensor works correctly, only one disinfectant should be used at a time.
- The measurement medium must have either drinking water or swimming pool water quality (visually clear, no solid particles).
- The spare part set for seawater (part no. 00687805) is required for seawater applications.
- More information on the setup and use of amperometric sensors can be found in our brochure "Information on amperometric measurement of free chlorine, chlorine dioxide and ozone in water".

### Notes on slope for type 202631/44

- The slope of these sensors can vary depending on the manufacture and application by between 65 % and 150 % of the nominal slope. To determine the appropriate measuring range or appropriate sensor, it is therefore recommended that the concentration to be measured be multiplied by a factor of 1.5.

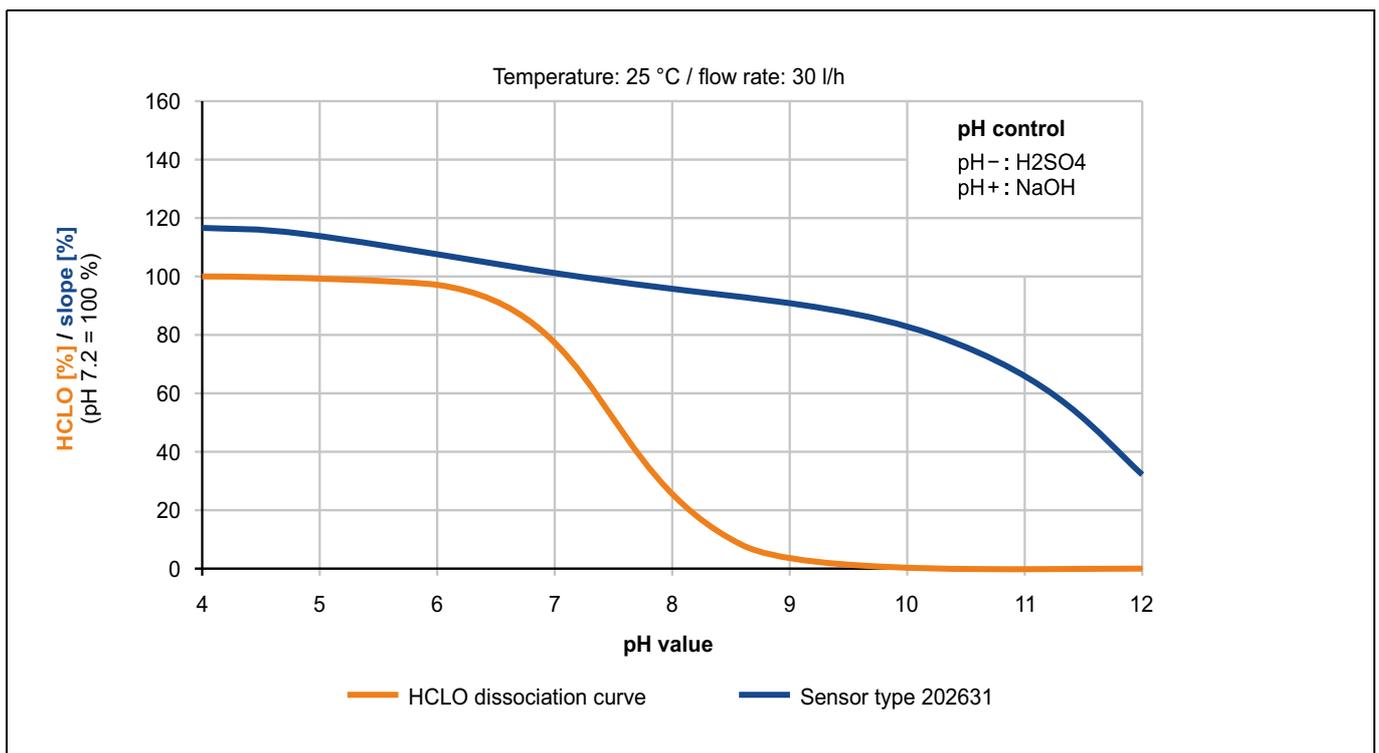
**Example:** concentration to be measured 1.6 ppm × factor 1.5 = 2.4 ppm => recommended sensor with measuring range 5 ppm

### Required components for a measuring point

The following components are required to set up a measuring point for measuring total chlorine:

- amperometric sensor, membrane-covered
- transmitter/controller
- flow monitor (optional extra, recommended)
- fitting for membrane-covered sensors

### sensor slope depending on the pH value



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## Technical data

Sensor type	202631/44 (output signal 4 to 20 mA)	202631/52 (digital interface output signal)
Measurand	Total chlorine	
Area of application	Disinfection of drinking water, swimming pool water, service water, process water, and seawater	
Suitable chlorination agents	Inorganic chlorine compounds: NaOCl (sodium hypochlorite), Ca(OCl) <sub>2</sub> , chlorine gas, chlorine produced by electrolysis	
Measuring principle	Membrane-covered, amperometric, potentiostatic three-electrode system with integrated electronics	
Measuring cable connection	2-pole terminal connection (2 × 1 mm <sup>2</sup> )	5-pole flange connector, M12
Voltage supply	U <sub>B</sub> DC 12 to 30 V (galvanic isolation required)	U <sub>B</sub> DC 22.5 to 26 V (galvanically isolated from the sensor)
Electromagnetic compatibility <sup>a</sup>	Interference emission: class B <sup>b</sup> Interference immunity: to industrial requirements	
Output signal	4 to 20 mA	Modbus RTU
Burden/current consumption	≤ (U <sub>B</sub> - 7.5 V) ÷ 0.02 A	20 mA
Settling time	Approx. 2 h for initial startup	
Inflow speed	Approx. 15 cm/s corresponds to a flow of approx. 30 l/h when installed in the JUMO flow fitting (part no.: 00392611))	
Measuring ranges <sup>c</sup>	0.05 to 0.5 mg/l (ppm) 0.05 to 2 mg/l (ppm) 0.05 bis 5 mg/l (ppm) 0.05 to 10 mg/l (ppm) 0.05 to 20 mg/l (ppm)	0.05 to 2 mg/l (ppm) 0.05 to 20 mg/l (ppm)
Resolution	0.01 mg/l	0.001 mg/l with measuring range 2 mg/l 0.01 mg/l with measuring range 20 mg/l
Accuracy <sup>d</sup>	Measuring range 2 mg/l < 2 % with 0.4 mg/l and with 1.6 mg/l Measuring range 20 mg/l < 1 % with 4 mg/l; < 3 % with 16 mg/l	
Slope drift <sup>e</sup>	Approx. < -1 % per month	
Response time t <sub>90</sub>	Approx. 2 minutes	
Operating temperature	Measurement water 0 to 45 °C <sup>f</sup> Environment 0 to 55 °C	
Temperature compensation	Automatic, using integrated temperature probe	
Zero point adjustment	Not required	
Slope adjustment	On evaluation unit/controller using analytical chlorine determination, DPD-4 method (DPD-1 + DPD-3)	
pH value area of application	pH 4 to pH 12, extremely reduced pH dependence (⇒ "sensor slope depending on the pH value ", page 2)	
Disturbances	ClO <sub>2</sub> : Factor 1 O <sub>3</sub> : Factor 1.3 Corrosion inhibitors can lead to measuring errors Water hardness stabilizers can lead to measuring errors	
Absence of the disinfectant	Max. 24 h	
Pressure resistance <sup>g</sup>	p <sub>abs</sub> max. 4 bar p <sub>rel</sub> max. 3 bar	
Materials	Microporous, hydrophilic membrane, PVC-U, PEEK, stainless steel 1.4571	
Dimensions	Dia. 25 mm, length 220 mm	Dia. 25 mm, length 205 mm
Weight	Approx. 125 g	

<sup>a</sup> EN 61326-1, EN 61326-2-3

<sup>b</sup> The product is suitable for industrial use as well as for households and small businesses.

<sup>c</sup> Other measuring ranges upon request.

<sup>d</sup> After calibration under replicable conditions (25 °C, pH 7.2 in drinking water).

<sup>e</sup> Under replicable conditions (25 °C, pH 7.2 in drinking water).

<sup>f</sup> Prerequisite: no ice crystals in the measurement medium.

<sup>g</sup> No pressure fluctuations admissible. Pressure-free operation (atmospheric pressure) recommended.

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## Maintenance, storage, and transport

<b>Maintenance</b>	
Inspection of the measuring signal	Regularly, at least once a week
Replacement of the membrane cap	Once a year (depending on the quality of the water)
Replacement of the electrolyte	Once a year
<b>Storage</b>	
Sensor	Can be stored indefinitely in a frost-free and dry place, without electrolyte and between +5 and 40 °C
Membrane cap	Used membrane caps cannot be stored!
Electrolyte	In original bottle, away from sunlight, and at a temperature between +5 and 35 °C
<b>Transport</b>	+5 to 50 °C (sensor, electrolyte, membrane cap)

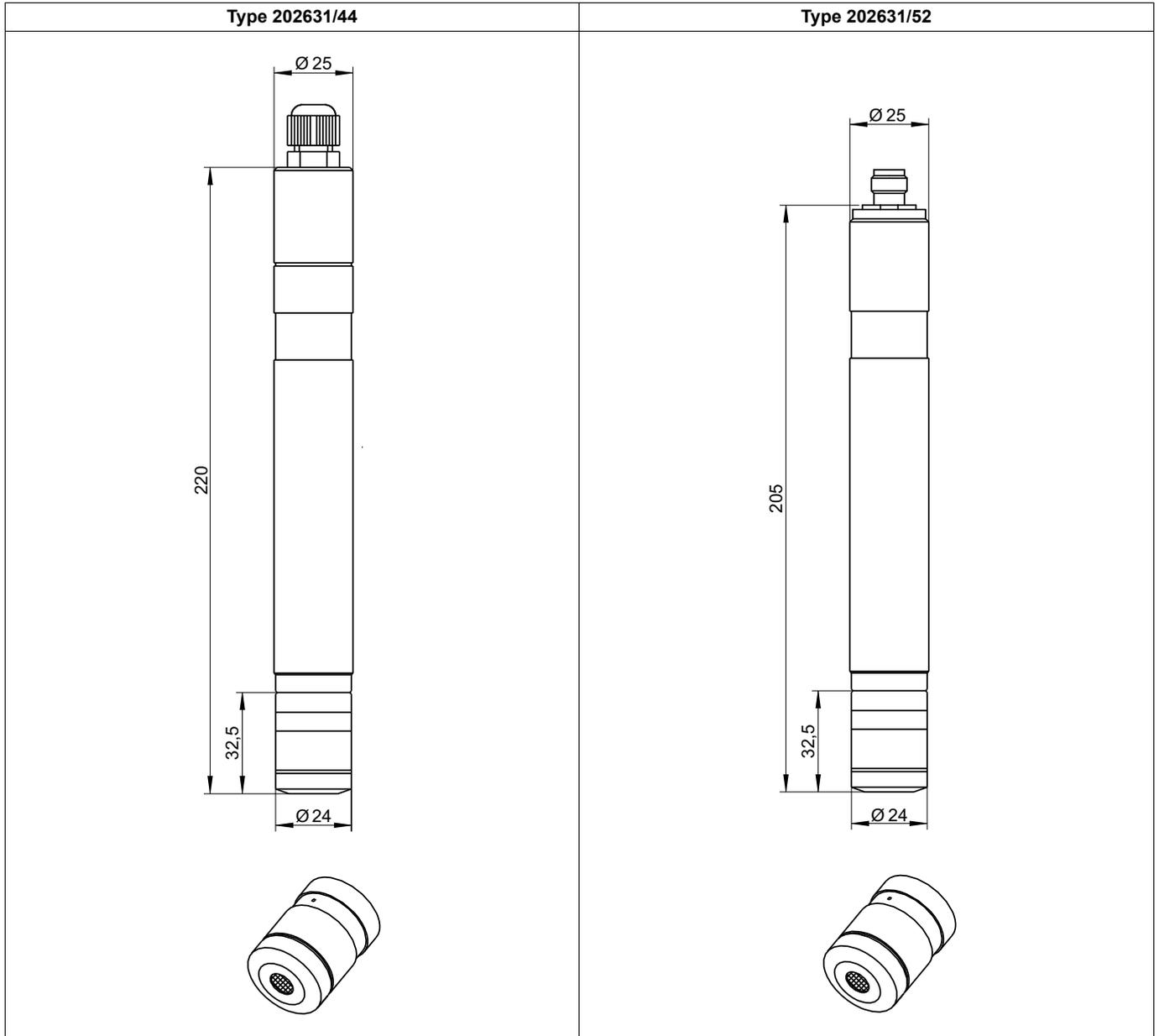
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## Dimensions



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## Electrical connection

### Type 202631/44

Function		Screw terminals
Voltage supply DC 12 to 30 V		1 L+ 2 L-
Two-wire output of 4 to 20 mA, load-independent current of 4 to 20 mA in voltage supply		1 L+ 2 L-

### Type 202631/52

Function	Pin on M12 flange connector
not connected	1
+24 V voltage supply from transmitter/controller	2
GND	3
RS 485 B (RxD/TxD-)	4
RS 485 A (RxD/TxD+)	5

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## Accessories

### Combination fitting type 202811/10

The combination fitting is intended to hold several electrochemical sensors. It is typically used for disinfection monitoring of drinking and swimming pool water as well as slightly polluted process and cooling water. Thanks to its compact design, the fitting allows for the space-saving consolidation of several sensors and is usually operated in a bypass or downstream of a tap in the main line. The sensors are easily visible through the fitting's crystal-clear design and can be visually inspected for pollutants.

In the maximum version, 2 sensors with Pg13.5 thread (for example for pH value and redox), 1 membrane-covered sensor Ø 25 mm for disinfectant monitoring and one temperature probe with thread M14 x 1.5 can be installed. Furthermore, the inflow of the measuring water contains flow monitoring with an inductive proximity switch for monitoring the inflow of the membrane-covered sensor. A ground pin can also be installed to discharge any electrostatic charges.



### Flow monitor type 202811/20

The flow monitor is integrated in the measuring water supply, in line with the disinfection sensor, and monitors the required minimum flow speed to the sensor.

It consists of a flow unit, a needle valve insert for flow control, and an inductive proximity sensor, the contact of which can control a binary input of a controller (for example JUMO AQUIS 500 AS/RS). If the inflow is too low, the controller is moved to the "HOLD" status. This helps to avoid incorrect dosages.



### Flow fitting type 202811/30

The flow fitting is intended to hold an individual membrane-covered sensor. The fitting is generally mounted in the bypass and, thanks to its special design type, provides the correct inflow for the sensor. The flow monitor type 202811/20 is recommended as an extension for monitoring the minimum inflow speed of a sensor.

The standard ground rod of the fitting enables the discharge of undesired electrical and electrostatic voltage potentials, which occur in complex plants and can distort the measured values.



### Suitable indicating devices/transmitters/controllers

Type	Features	Suitable sensors
<b>JUMO AQUIS 500 AS</b>	Single-channel (4 to 20 mA) indicating device/controller, additional temperature input, binary input, up to two analog and switching outputs	Type 202631/44 (output signal 4 to 20 mA)
<b>JUMO AQUIS 500 RS</b>	Single-channel (Modbus RTU) indicating device/controller, additional temperature input, binary input, up to two analog and switching outputs	Type 202631/52 (digital interface)
<b>JUMO dTRANS AS 02</b>	Modular multichannel transmitter/controller for standard signals, PROFIBUS-DP, RS422/485, data logger using optional boards	Type 202631/44
<b>JUMO AQUIS touch S/P</b>	Modular multichannel measuring devices for liquid analysis with integrated controller and paperless recorder, USB host, USB device, Modbus, PROFIBUS-DP, and Ethernet using optional boards	Types 202631/44 and /52

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## Order details

<b>(1) Basic type</b>	
202631	JUMO tecLine TC
	Sensor for total chlorine
<b>(2) Basic type extension</b>	
44	Output signal 4 to 20 mA
52	Digital output signal
<b>(3) Measuring range</b>	
10	0.00 to 0.500 mg/l (ppm)
20	0.00 to 2.00 mg/l (ppm)
25	0.00 to 5.00 mg/l (ppm)
35	0.00 to 10.00 mg/l (ppm)
37	0.00 to 20.00 mg/l (ppm)

<b>Order code</b>	(1)	/	(2)	-	(3)
<b>Order example</b>	202631	/	44	-	20

### Important information:

The order code is not modular. When placing orders, if possible please select the items listed under "**Stock versions**". We must check the technical feasibility of and approve freely chosen combinations of individual code parts.

## Scope of delivery

<b>Type 202631/44</b>	Two-wire sensor, incl. membrane cap, electrolyte, and special abrasive paper for cathode cleaning and operating manual
<b>Type 202631/52</b>	Modbus RTU sensor, incl. membrane cap, electrolyte, and special abrasive paper for cathode cleaning and operating manual

## Manufacturing versions

(Delivery within 10 working days after receipt of order)

Type	Part no.
202631/44-10 (total chlorine, 4 to 20 mA, 0 to 0.5 mg/l)	00687809
202631/44-20 (total chlorine, 4 to 20 mA, 0 to 2 mg/l)	00687811
202631/44-37 (total chlorine, 4 to 20 mA, 0 to 20 mg/l)	00687812
202637/71-20 (total chlorine, digital, 0 to 2 mg/l)	00649767
202637/71-37 (total chlorine, digital, 0 to 20 mg/l)	00649768

## Accessories

### Fittings

Designation	Part no.
Combination fitting for mounting several electrochemical sensors <sup>a</sup>	00607325
Individual fitting for mounting a membrane-covered sensor	00392611
Mounting bracket for individual fitting	00455706
Flow monitor for monitoring the minimum inflow <sup>b</sup>	00605507

<sup>a</sup> With integrated flow monitor, mini ball valve included.

<sup>b</sup> For flow monitoring in connection with the individual fitting.

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**Spare part sets and electrolytes**

Designation	Part no.
Spare parts set for 202631 (1 x membrane cap, fine abrasive paper)	00687804
Spare parts set for 202631 for seawater (1 x membrane cap, fine abrasive paper)	00687805
Special electrolyte for 202631 (100 ml)	00585104

**Accessories for sensors with a digital interface (type 202631/52)**

Designation	Part no.
JUMO digiLine hub <sup>a</sup>	00646871
JUMO power supply unit for JUMO digiLine hub <sup>a</sup>	00661597

<sup>a</sup> When connecting multiple sensors with a digital interface (type 20263x) to the JUMO AQUIS touch S/P, the JUMO digiLine hub and an external power supply (e.g. part no. 00661597) are required. For further accessories see data sheet 202705.

**Transmitters/controllers for sensors with an output signal of 4 to 20 mA (type 202631/44)**

Designation	Part no.
JUMO AQUIS 500 AS, type 202568/20-888-888-888-310-310-23/000 (for further versions, please refer to data sheet 202568)	00528718
JUMO dTRANS AS 02, type: 202553/01-8-01-4-0-00-23/000 (for further versions, please refer to data sheet 202553)	00550842
JUMO AQUIS touch S/P	Refer to data sheets 202580/81

**Transmitters/controllers for sensors with a digital interface (type 202631/52)**

Designation	Part no.
JUMO AQUIS 500 RS, type 202569/20-654-888-888-310-310-23/000 (for further versions, please refer to data sheet 202569)	00602275
JUMO AQUIS touch S/P	Refer to data sheets 202580/81