JUMO tecLine CR-4P

Conductive 4-electrode conductivity sensor

Type 202930



Operating Manual

20293000T90Z001K000

V2.00/EN/00502496/2026-05-11

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1 Safety information

General

This manual contains information that must be observed in the interest of your own safety and to avoid material damage. This information is supported by symbols which are used in this manual as indicated.

Please read this manual before starting up the device. Store this manual in a place that is accessible to all users at all times.

If difficulties occur during startup, please do not intervene in any way that could jeopardize your warranty rights!

Warning symbols



WARNING!

This symbol in connection with the signal word indicates that **personal injury** may occur if the respective precautionary measures are not carried out.



CAUTION!

This symbol in connection with the signal word indicates that **material damage or data loss** will occur if the respective precautionary measures are not taken.

Note symbols



NOTE!

This symbol is used in tables and indicates that further information is provided after the table.

2.1 General Information

Conductive conductivity sensors are used in conjunction with suitable transmitters in industrial analysis measurement technology to determine the electrolytic conductivity of liquids.

The JUMO tecLine CR-4P fills the gap between conductive conductivity measurement with two-electrode measuring sensors, and inductive conductivity measurement.

Four-pin technology makes it possible to cover a very wide measuring range from about 1 µS/cm to 600 mS/cm, with just one measuring sensor.

The hygienic design of both, the sensor and the system for process connection (JUMO PEKA), mean that it can be used in pharmaceutical and food technology without difficulty. JUMO PEKA is an adapter system that combines the measuring sensor with the process connection. All the materials are physiologically safe, and meet FDA standards.

Stainless steel electrodes are inserted into a circular, plastic body. The process seal provided as standard is an EPDM O-ring. A fast-response temperature probe delivers information about the process temperature to the measurement amplifier. Electrical connection is made via an M12 connector.

The measuring sensor is available in three fitting lengths, for optimum installation in different pipe diameters. The measuring sensor can also be installed in container walls. No incident flow is required to make it work, but is recommended for fast, stable measurement values and to prevent the accumulation of deposits.

A certificate of quality is included among the items supplied (exact cell constant, FDA approval for the material, typical surface roughness, etc.).

2.2 Areas of application

Their vast measuring range of 1 µS/cm to 600 mS/cm, allows the sensors to be used in washing processes in food and drink applications, pharmaceuticals and biotechnology, where the different conductivities have to be safely recorded by a measuring system (e.g. CIP/SIP applications, reverse processes in ion exchangers, phase separation, bottle cleaning plants, process water).



NOTE!

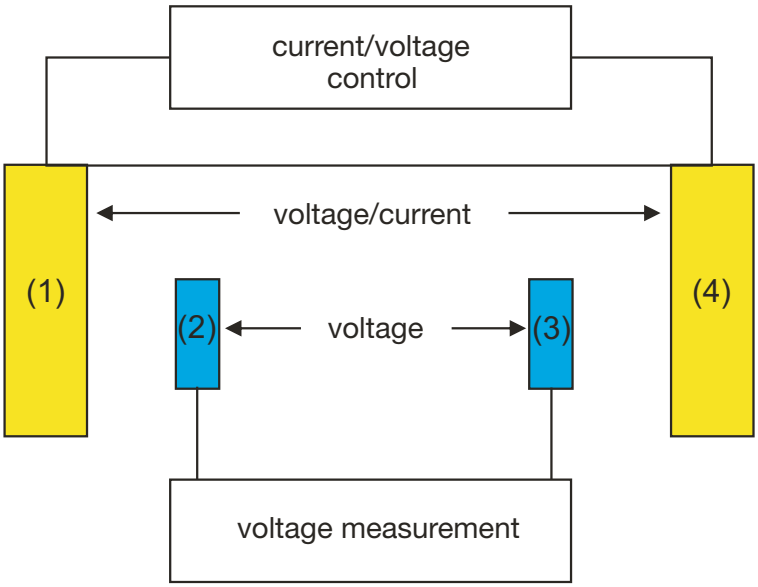
Use in combination with a suitable transmitter/controller, e.g. JUMO AQUIS 500 CR according to data sheet 202565 or JUMO dTRANS CR 02 according to data sheet 202552 or JUMO AQUIS touch S/P according to data sheets 202580/81 or JUMO digiLine CR ST10 according to data sheet 202762, as well as the JUMO PEKA process connection adapters according to data sheet 409711.

2.3 Special features

- Vast measuring range
- Hygienic process connections (clamp, Varivent®, aseptic NKS)
- CIP/SIP capability
- Design complies with EHEDG and FDA standards
- Certificate of quality included

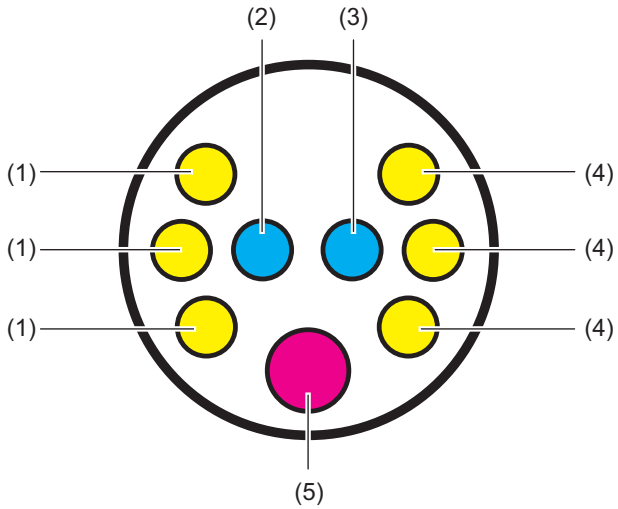
2 Introduction

2.4 Functions



The measuring sensors have two pairs of electrodes. The transmitter applies alternating current at the outer pair of electrodes. A voltage is released at the inner electrodes - subject to the conductivity of the measuring material. The transmitter acquires the voltage and uses it to calculate the electrolytic conductivity value. Functionally, excitation and measurement are kept separate. This has some advantages compared to 2-electrode measuring sensors, as the effects of polarization recede into the background. To a large extent, incoming resistances are automatically compensated. Measurement errors as a result of contamination or deposits, are reduced.

2.5 Measuring sensors



	Description	M12 connector pin
(1)	Current supply, outer electrode 1	6
(2)	Voltage tap, inner electrode 1	7
(3)	Voltage tap, inner electrode 2	3
(4)	Current supply, outer electrode 2	4
(5)	Pt1000 temperature probe	1, 2 and 5

3.1 Nameplate

On the sensor



NOTE!

The date of manufacture is encoded in „F-Nr.“ (serial number):
2610 means year of manufacture 2026/calendar week 10.

3.2 Order details

	(1)	**Basic type**
202930		JUMO tecLine CR-4P – Conductive 4-electrode conductivity sensor
	(2)	**Basic type extension**
10		Short design
20		Medium design
30		Long design
	(3)	**Temperature compensation**
1005		Pt1000
	(4)	**Electrode material**
31		Stainless steel 1.4435 (316 L)
	(5)	**Process connection**[a]
997		JUMO PEKA hygienic process connection
	(6)	**Electrical connection**[b]
83		M12 connector
	(7)	**Extra codes**
000		None

[a] Process connection adapters (see „Accessories“) must be ordered separately.

[b] A connecting cable for 4-electrode conductivity sensors is required for electrical connection (see „Accessories“).

	(1)		(2)		(3)		(4)		(5)		(6)		(7)
Order code		/		-		-		-		-		/	
Order example	202930	/	10	-	1005	-	31	-	997	-	83	/	000

3 Identifying the device version

3.3 Accessories

Article	Sales no.
Connecting cable for 4-electrode conductivity sensors M12 female connector, 8-pin (metal), to ferrules Length 5 m	00528699
Connecting cable for 4-electrode conductivity sensors M12 female connector, 8-pin (metal), to ferrules Length 10 m	00528700
Connecting cable for 4-electrode conductivity sensors to JUMO AQUIS touch S/P M12 female connector, 8-pin (metal), to ferrules, extended connection lines for Pt1000 Length 5 m	00502027
Connecting cable for 4-electrode conductivity sensors to JUMO AQUIS touch S/P M12 female connector, 8-pin (metal), to ferrules, extended connection lines for Pt1000 Length 10 m	00502029
Connecting cable for 4-electrode conductivity sensors to JUMO digiLine CR ST10, M12 female connector, 8-pin (plastic) to M12 female connector, 8-pin (plastic), Length 1.5 m	00759427
Connecting cable for 4-electrode conductivity sensors to JUMO digiLine CR ST10, M12 female connector, 8-pin (plastic) to M12 female connector, 8-pin (plastic), Length 5 m	00759428
Connecting cable for 4-electrode conductivity sensors to JUMO digiLine CR ST10, M12 female connector, 8-pin (plastic) to M12 female connector, 8-pin (plastic), Length 10 m	00759431

JUMO PEKA hygienic process connection adapter for

Article	Material	Sales no.
Varivent DN 40-125	Stainless steel 1.4435/316 L	00445046
Varivent DN 40-125	Stainless steel 1.4435/316 L; Ra < 0.8 µ, with certificate EN 10204-3.1	00577961
Clamp DN 25/32/40	Stainless steel 1.4435/316 L	00445047
Clamp DN 25/32/40	Stainless steel 1.4435/316 L; Ra < 0.8 µ, with certificate EN 10204-3.1	00577998
Clamp DN 50	Stainless steel 1.4435/316 L	00445037
Clamp DN 50	Stainless steel 1.4435/316 L; Ra < 0.8 µ, with certificate EN 10204-3.1	00577997
Aseptic DN 40	Stainless steel 1.4435/316 L	00446458
Aseptic DN 40	Stainless steel 1.4435/316 L; Ra < 0.8 µ, with certificate EN 10204-3.1	00577995
Aseptic DN 50	Stainless steel 1.4435/316 L	00445035
Aseptic DN 50	Stainless steel 1.4435/316 L; Ra < 0.8 µ, with certificate EN 10204-3.1	00577979
Aseptic NKS DN 40	Stainless steel 1.4435/316 L	00447555
Aseptic NKS DN 40	Stainless steel 1.4435/316 L; Ra < 0.8 µ, with certificate EN 10204-3.1	00577999

O-Ring 21 × 2,5	EPDM	00446162

4.1 Sensor

Typical measuring range[a]	1 µS/cm to approx. 600 mS/cm
Cell constant[b]	typically K = 0.3 to 0.4 cm^{-1}
Operating temperature	-10 to +120 °C, briefly 140 °C (sterilization)
Maximum pressure	16 bar at 25 °C 6 bar at -10 °C and +140 °C
Temperature measurement	With Pt1000, DIN EN 60751 Class A
Electrical connection[c]	M12 connector
Protection type	IP65 (when connected)
Fitting length	18 mm 38 mm 48 mm (see dimensions)
Materials in contact with the measuring medium Cell housing Electrodes Probe socket Seal	FDA compliant PEEK Stainless steel 1.4435 (316 L) Stainless steel 1.4435 (316 L) EPDM (other material on request)
Process connection	JUMO PEKA[d] (hygienic process connection) Available process connection adapters: Varivent DN 40-125, stainless steel 1.4435 (316 L) Clamp DN 25/32/40 and DN 50, stainless steel 1.4435 (316 L) Aseptic DN 40 and DN 50, stainless steel 1.4435 (316 L) Aseptic NKS DN 40, stainless steel 1.4435 (316 L)
Measuring sensor installation	Only possible in conjunction with JUMO PEKA process connection adapters[c]
Surface quality (roughness)	Stainless steel components ≤ 0.6 µm Plastic components ≤ 0.8 µm

[a] Measuring ranges are also dependent on the transmitter being used.

[b] The measured cell constant is recorded on the stem of the conductivity sensor. A cell constant deviation can be adjusted at the transmitter.

[c] The connecting cable for 4-electrode conductivity sensors is required for connection (see chapter 3.3 "Accessories", Page 8)!

[d] See chapter 5.2 "JUMO PEKA process connection adapter", Page 12 and data sheet 409711

4 Technical data

4.2 Connecting cable with wire ends (accessories)

Connecting cables for JUMO AQUIS 500 CR, JUMO dTRANS CR 02, and JUMO AQUIS touch S/P

M12 female connector	Metal, 8-pin
Cable diameter	7 ±0.3 mm
Stranded wire cross section	0.25 mm^2 each
Cable material	PU, blue
Ambient temperature	-30 to +80 °C
Cable length	5 m or 10 m

Connecting cables forJUMO digiLine CR ST10

M12 female connectors	Plastic, 8-pin, connection side of transmitter colored blue
Cable diameter	7 ±0.3 mm
Cable material	PU, blue
Ambient temperature	-30 to +80 °C
Cable length	1.5 m, 5 m or 10 m

5.1 General information

Mounting location

Find a location that ensures easy accessibility for the later calibration.

The fastening must be secure and must ensure low vibration for the instrument.

The operating conditions (temperature, pressure, chemical composition of the measuring material, etc.,) must not be allowed to damage the sensor.

The sensor must not be modified mechanically (e.g. shortened, drilled, ground).

CAUTION!

Do not touch (contaminate) the electrodes!
A **minimum distance** (MD) of 18 mm between the electrodes and the container wall must be maintained!
A **minimum distance** of at least two meters must be maintained when installing several type 202930 conductivity sensors!

Installation position

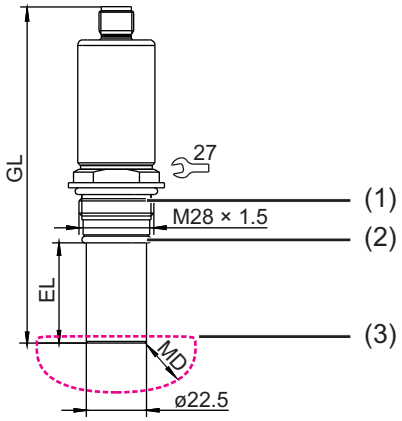
The conductivity sensor can be mounted in any position. But it is essential to make sure that the sensor electrodes are fully immersed in the measurng material.

Incident flow

No incident flow is required to make the conductivity sensor work, but is recommended for fast, stable measurement values and to prevent the accumulation of deposits. Structural measures must be taken to prevent flow separation or gas bubbles in the measuring material.

Immersion length

The immersion length (EL) of the conductivity sensor must be in keeping with the installation situation.



(1) JUMO PEKA hygienic process connection
A suitable process connection adapter is an essential requirement of installation, see below.

(2) O-ring 21 × 2.5 (EPDM)

(3) Minimum distance (MD) 18 mm to the container wall

Immersion length EL	Total length GL	Type
18	126	202930/10
38	146	202930/20
48	156	202930/30

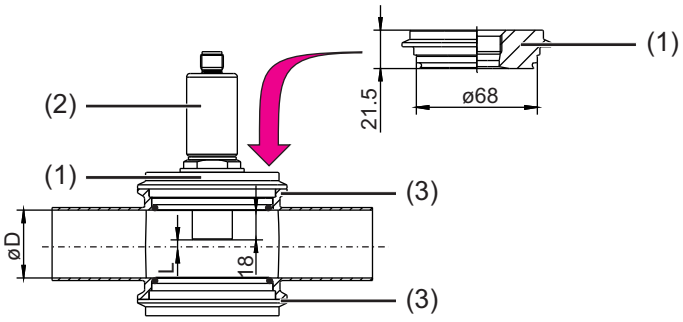
5 Mounting

5.2 JUMO PEKA process connection adapter

The hygienic system for process connection – JUMO PEKA – allows it to be used in pharmaceutical and food technology without difficulty. JUMO PEKA is an adapter system that combines the sensor with the process connection. All the materials are physiologically safe, and meet FDA standards.

5.3 Installation recommendation

Varivent®



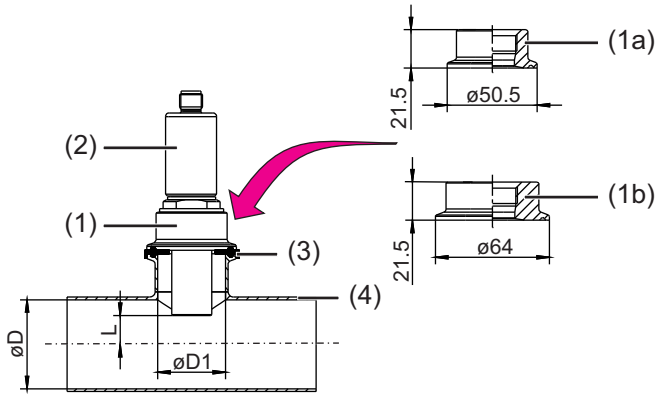
(1) JUMO PEKA hygienic process connection
Varivent® DN 40-125, sales no. 00445046

(2) JUMO tecLine CR-4P conductivity sensor

(3) The Varivent® housing DN xx
is **not** supplied by JUMO and must be provided by the customer!

Varivent® housing	**Diameter D**	**L**	**Type**
40	38	3	202930/10
50	50	9	
65	66	18	
80	81	24.5	
100	100	34	

Clamp

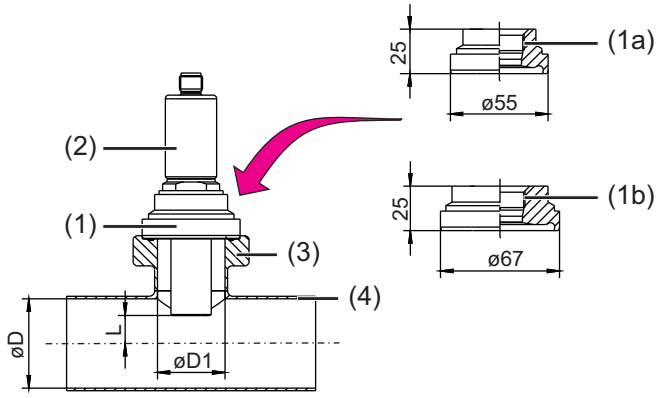


(1) JUMO PEKA hygienic process connection
(1a) Clamp DN 25/32/40, sales no. 00445046
(1b) Clamp DN 50, sales no. 00445037
(2) JUMO tecLine CR-4P conductivity sensor
(3) The DN xx clamp adapter, DIN 32676
is **not** von JUMO geliefert und ist bauseits zu stellen!
(4) The clamp DN xx T-piece, DIN short, similar to DIN 11852
is **not** supplied by JUMO and must be provided by the customer!

Clamp adapter DN	**T-piece DN**	**Diameter D**	**Diameter D1**	**L**	**Type**
25	32-25	32	26	5	202930/20
	40-25	38		0	202930/30
	50-25	50		7	
	65-25	66		15	
	80-25	81		20	
	100-25	100		30	
50	65-50	66	50	15	202930/30
	80-50	81		20	
	100-50	100		30	

5 Mounting

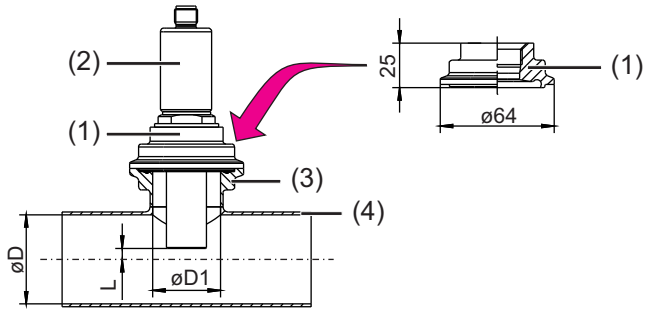
Aseptic



(1) JUMO PEKA hygienic process connection
(1a) Aseptic DN 40, sales no. 00446458
(1b) Aseptic DN 50, sales no. 00445035
(2) JUMO tecLine CR-4P conductivity sensor
(3) The DN xx threaded adapter, DIN 11864-1
is **not** supplied by JUMO and must be provided by the customer!
(4) The DN xx T-piece
is **not** supplied by JUMO and must be provided by the customer!

Threaded adapter DN	**T-piece DN**	**Diameter D**	**Diameter D1**	**L**	**Type**
40	50-40	50	38	10	202930/30
	65-40	66		18	
	80-40	81		27	
	100-40	100		37	
50	65-50	66	50	18	202930/30
	80-50	81		27	
	100-50	100		37	

Aseptic NKS



(1) JUMO PEKA hygienic process connection
Aseptic NKS DN 40, sales no. 00447555

(2) JUMO tecLine CR-4P conductivity sensor

(3) Collar clamp adapter NKS DN 40 Form A, DIN 11864-3
is **not** supplied by JUMO and must be provided by the customer!

(4) The DN xx T-piece
is **not** supplied by JUMO and must be provided by the customer!

Collar clamp adapter	**T-piece DN**	**Diameter D**	**Diameter D1**	**L**	**Type**
NKS DN 40 Form A	50-40	50	38	10	202930/30
	65-40	66		18	
	80-40	81		27	
	100-40	100		37	

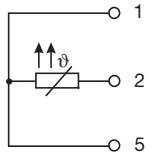
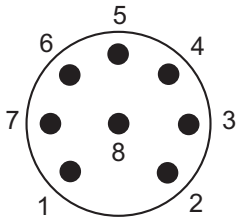
6 Installation

6.1 Electrical connection

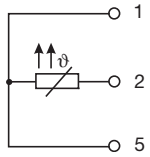
- Lay the input, output, and supply lines so they are physically separated from each other and are not parallel.
- If possible, use the connecting cable for 4-electrode conductivity sensors (see Accessories) to connect the conductivity sensor; do not lay the connecting cable close to components or lines through which current is flowing.
- The cables must have an uninterrupted run (do not route them via terminal blocks or similar arrangements).
- No other consumers can be connected to the power terminals of the instrument.
- The conductivity sensor is not suitable for installation in areas with an explosion hazard.
- It is essential to comply with the electrical connection instructions in the operating manual of the transmitter that is being used.
- Apart from faulty installation, incorrect settings on the transmitter may also affect the proper functioning of the subsequent process or lead to damage; you should therefore always provide safety equipment that is independent and it should only be possible for qualified personnel to make settings.

6.2 Terminal assignment

6.2.1 Sensor

Connection for	**M12 connector of the sensor**	
	Pin	**Assignment**
Pt1000 temperature probe for temperature compensation 	1 2 5	
Voltage tap inner electrode 2	3	
Current entry outer electrode 2	4	
Current entry outer electrode 1	6	
Voltage tap inner electrode 1	7	
NC	8	

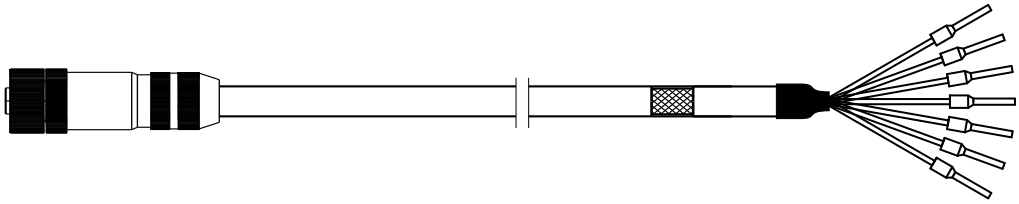
6.2.2 Connecting cable with wire ends (accessories)

Connection for	**M12 connector**	**Bare wire ends**
	Pin	**Color**
Pt1000 temperature probe for temperature compensation 	1 2 5	GN YE BN
Voltage tap inner electrode 2	3	PK
Current entry outer electrode 2	4	BU
Current entry outer electrode 1	6	RD
Voltage tap inner electrode 1	7	GR
NC	8	-
CAUTION! The shielding of the cable has to be connected to the transmitter **only** – not to the sensor!		

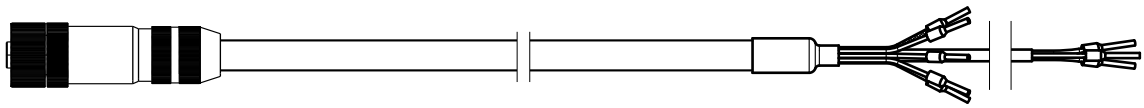
6.3 Connection to transmitters/controllers

To connect the sensor, use only the cables provided for this purpose:

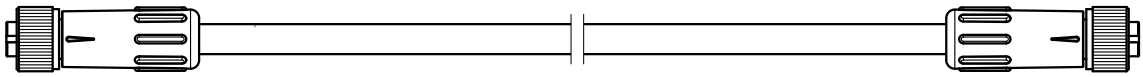
Device	Suitable connecting cable
JUMO AQUIS 500 CR	M12 female connector, 8-pin (metal), to ferrules
JUMO dTRANS CR 02	



Device	Suitable connecting cable
JUMO AQUIS touch S/P	M12 female connector, 8-pin (metal), to ferrules, extended connection wires for Pt1000



Device	Suitable connecting cable
JUMO digiLine CR ST10	M12 female connector, 8-pin (plastic) to M12 female connector, 8-pin (plastic)



Blue connector = transmitter connection side; black connector = sensor connection side.

Further information on the connecting cables	Technical data ⇨chapter 4.2 "Connecting cable with wire ends (accessories)", Page 10
	Order details ⇨chapter 3.3 "Accessories", Page 8

NOTE!

You will find the necessary information for connecting the sensor in the corresponding operating manuals of the devices.

7 Calibrate

7.1 Important information

NOTE!

Ageing and contamination (deposits) can cause the cell constant of the conductivity sensor to change. The transmitter should therefore be calibrated to the connected conductivity sensor at regular intervals (subject to the measuring material and the operating conditions)!

7.2 General information

JUMO tecLine CR-4P conductivity sensors are exactly gaged at the factory. The cell constant of every measuring sensor is documented both on the cell stem and on the calibration certificate that is also supplied.

This cell constant should be entered directly into the connected transmitter (e. g. JUMO AQUIS 500 CR).

In combination with the JUMO AQUIS 500 CR, measuring accuracy in the 20 µS/cm to 600 mS/cm range is better than 5 %. To achieve far greater measuring accuracy, calibrate the transmitter close to its later working point.

To monitor and increase the quality of measurement, the conductivity measurement chain (conductivity sensor + connecting cable + transmitter) should be regularly calibrated

Reference solutions

It is advisable to use one of the following reference solutions for calibration:

- ASTM D 1125, reference solution B: 0.1 N KCl with 12856 µS/cm
- DIN 38404, part 8, section 8.3: 0.1 mol/l KCl with 12,95x103 µS/cm

However, any calibration solution in the medium conductivity range can also be used.

7.3 Settings on the transmitter/controller

CAUTION!

The operating instructions of the transmitter/controller used must be observed!

The following settings are the minimum that have to be made:

- Cell type (type of connection): 4-electrode or four-wire
- Nominal cell constant 1.0 1/cm
- Relative cell constant as % (see sensor nameplate or certificate)

8.1 Cleaning



CAUTION!

Conductive conductivity sensors are not authorized for use in highly adherent, oily or glutinous media - we recommend using our inductive conductivity measuring instruments here!
After cleaning the conductivity sensor, always rinse it with water!



NOTE!

The conductive conductivity sensor electrodes are in direct contact with the measurement medium. **Regular cleaning must therefore be performed, relative to the contamination susceptibility of the measuring material!**
Abrasive cleaners have limited suitability! The measurement electrodes must not be damaged!

- Light contamination can be wiped off with a soft, cleansing tissue, or similar.
- Wash off sticky contamination or greasy and oily contamination with a hot rinsing agent solution and a soft cloth or soft brush; Ethanol can also be used to clean the sensor, if necessary.
- Diluted hydrochloric acid (3 % by weight) can also be used to dissolve the contamination in the event of calciferous coatings or precipitated metal hydroxides or metal oxides
- If none of the methods mentioned above remove the contamination, other solvents, acids or caustic solutions may be used, with the aid of ultrasonic baths where required;
  in this case, it is necessary to ensure that the conductivity sensor components are resistant to the cleaning agents being used, see chapter 4 "Technical data", Page 9.

8 Maintenance/Troubleshooting

8.2 Troubleshooting

When troubleshooting, all of the components of the conductivity measuring chain must always be taken into account. As well as the conductivity sensor, also check the transmitter and the connecting cable used.

Error	Possible cause	Remedy
Measured value too high or too low	Conductivity sensor dirty	Clean conductivity sensor
Transmitter does not show conductivity (e.g. display "0")	Line breakage or incorrect electrical connection	Check electrical connection
	Sensor in air (not immersed in medium)	Check installation location of sensor
		Medium present?
Conductivity displayed on transmitter too high or too low	Electrical connection of sensor not correct: Poles reversed or incorrect "right – left" allocation	Check electrical connection
Transmitter does not display temperature	Line breakage or incorrect electrical connection	Check electrical connection
Display value unstable, fluctuates	Malfunction due to incorrect/insufficiently shielded connecting cable	Use connecting cable for 4-electrode conductivity sensors for connection
	Malfunction due to gas bubbles	Check line connection and cable routing
		Check the installation location and installation position of the sensor

You can also check whether the conductivity sensor has suffered a short circuit or has internal contact problems, see chapter 2.5 "Measuring sensors", Page 6, and chapter 6.2 "Terminal assignment", Page 16.
For this you need a continuity tester (e.g. the diode tester of a multimeter).





产品组别 Product group: 202930 部件名称 Component Name	产品中有害物质的名称及含量 China EEP Hazardous Substances Information					
	铅 （Pb）	汞 （Hg）	镉 （Cd）	六价铬 （Cr(VI)）	多溴联苯 （PBB）	多溴二苯醚 （PBDE）
外壳 Housing (Gehäuse)	○	○	○	○	○	○
过程连接 Process connection (Prozessanschluss)	X	○	○	○	○	○
螺母 Nuts (Mutter)	○	○	○	○	○	○
螺栓 Screw (Schraube)	○	○	○	○	○	○

本表格依据SJ/T 11364的规定编制。
This table is prepared in accordance with the provisions SJ/T 11364.
○：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。
Indicate the hazardous substances in all homogeneous materials' for the part is below the limit of the GB/T 26572.

×：表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。
Indicate the hazardous substances in at least one homogeneous materials' of the part is exceeded the limit of the GB/T 26572.

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