

# JUMO tecLine CR-4P Conductive 4-Electrode Conductivity Sensor

## Brief description

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

Four-pin technology makes it possible to cover a very wide measuring range from about 1  $\mu\text{S}/\text{cm}$  to 600  $\text{mS}/\text{cm}$ , with just one conductivity sensor.

The hygienic design of the sensor and the EHEDG-certified 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 conductivity 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 conductivity sensor is available in three fitting lengths, for optimum installation in different pipe diameters. The conductivity 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.).

### Operative range:

Their vast measuring range 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:

Used in combination with the JUMO AQUIS 500 CR transmitter/controller, as per data sheet 202565 and JUMO PEKA process connection adapters as per data sheet 409711.



Typ 202930  
 with JUMO PEKA adapters

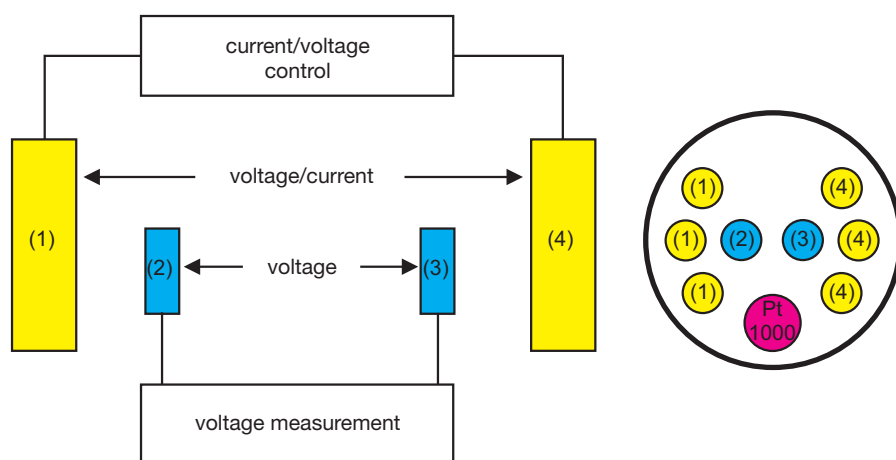
## Key features

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

## Function

The conductivity 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, in conjunction with the given current, to calculate the electrolytic conductivity value. Functionally, excitation and measurement are kept separate. This has some advantages compared to 2-electrode conductivity 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.

## Block diagram



## Approvals/marks of conformity (see Technical data)



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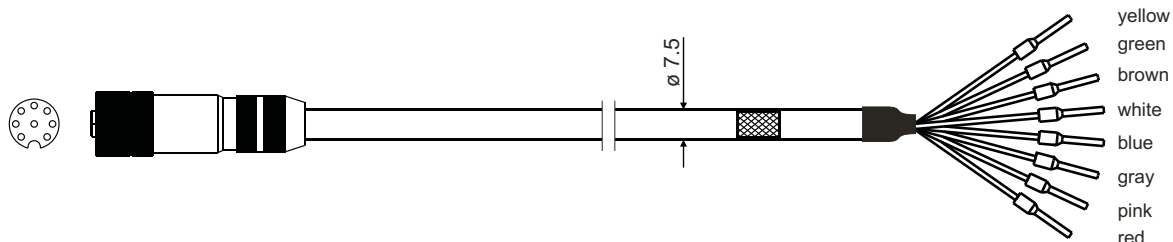
## Technical data

Typical measuring range <sup>a</sup>	1 µS/cm to approx. 600 mS/cm
Accuracy <sup>b</sup>	≤ 5 %
Cell constant <sup>c</sup>	typically, K = 0.3 - 0.4 cm <sup>-1</sup>
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 <sup>d</sup>	M12 connector
Enclosure protection	IP65
Fitting length	18 mm 38 mm 48 mm (see "Dimensions")
Materials in contact with the measuring medium	FDA compliant PEEK Stainless steel 1.4435 (316L) Stainless steel 1.4435 (316L) EPDM (other material on request)
Process connection	JUMO PEKA <sup>e</sup> (EHEDG-certified) Available process connection adapters: <ul style="list-style-type: none"> <li>• Varivent DN 40-125, stainless steel 1.4435 (316L)</li> <li>• Clamp DN 25/32/40 and DN50, stainless steel 1.4435 (316L)</li> <li>• Aseptic DN 40 and DN50, stainless steel 1.4435 (316L)</li> <li>• Aseptic NKS DN 40, stainless steel 1.4435 (316L)</li> </ul>
Sensor installation	Only possible in conjunction with JUMO PEKA adapters! <sup>e</sup>
Surface quality (roughness)	Stainless steel components ≤ 0.6 µm Plastic components ≤ 0.8 µm
Mark of conformity	The JUMO PEKA process connection is EHEDG-tested

- <sup>a</sup> Measuring ranges are also dependent on the transmitter being used.  
<sup>b</sup> Accuracy across the entire measuring range. It is possible to achieve considerably better accuracy by adjusting to the later working range.  
<sup>c</sup> See the nameplate for a measured cell constant. A cell constant deviation can be adjusted at the transmitter.  
<sup>d</sup> The CR-4P cable is required for connection (see Accessories)!  
<sup>e</sup> See data sheet 409711 and "Dimensions" on the following pages.

## Connecting cable (accessory)

**JUMO CR-4P cable, type 202990/20-53-00-xx/000**



M12 cable socket:	Metal, 8-pin
Cable diameter:	7.5 mm
Cable material:	PUR, blue
Ambient temperature:	-30 to +80 °C
Cable length:	5 m oder 10 m <sup>a</sup>

<sup>a</sup> For metrological reasons, the maximum cable length is limited to 10 m!

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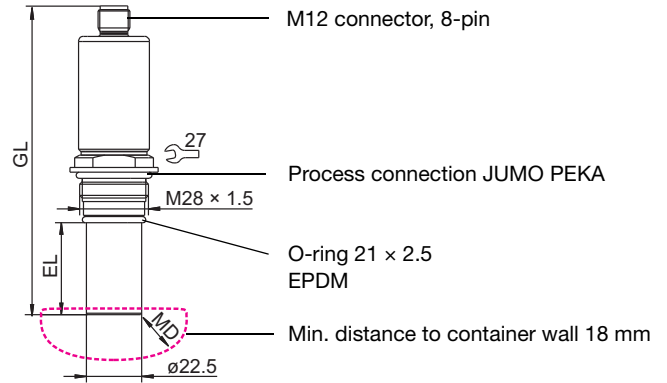
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## Dimensions

Choose the immersion length (EL) according to the installation situation.

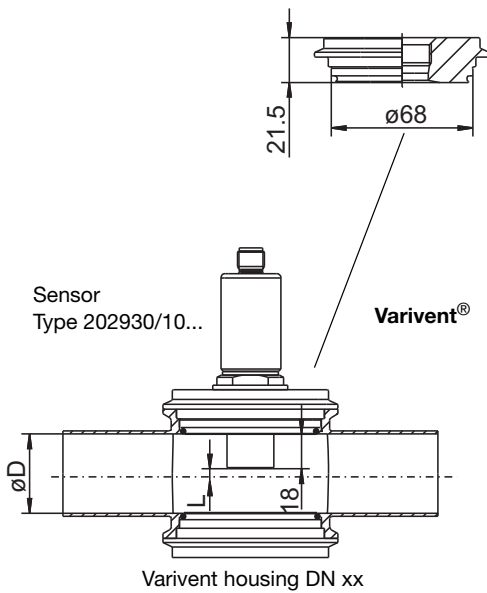
Immersion length EL	Total length GL	Type
18	126	202930/10
38	146	202930/20
48	156	202930/30



## Mounting suggestions

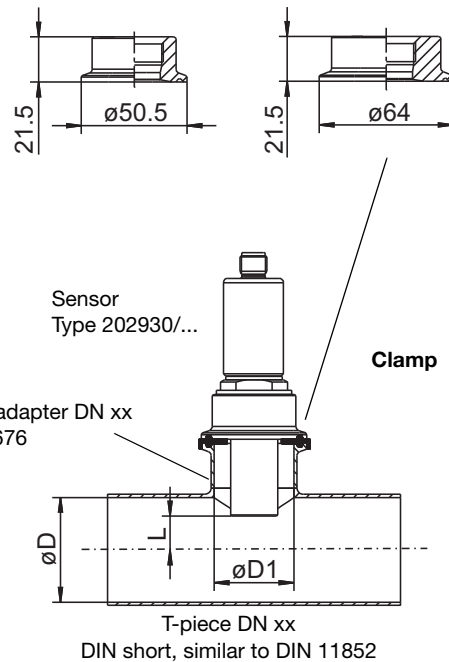
The customer must provide the T-pieces!

Process connection adapter JUMO PEKA  
 Varivent DN 40-125  
 Part no.: 00577961; Ra < 0.8 µm



Process connection adapter JUMO PEKA  
 Clamp DN 25/32/40  
 Part no.: 00577998; Ra < 0.8 µm

Clamp DN 50  
 Part no.: 00577997; Ra < 0.8 µm



Varivent housing DN	Ø D	L	Sensor Type
40	38	3	202930/10
50	50	9	
65	66	18	
80	81	24,5	
100	100	34	

Clamp adapter DN	T-piece DN	Ø D	Ø D1	L	Sensor Type
25	32-25	32 <sup>a</sup>	26	5	202930/20
	40-25	38 <sup>a</sup>		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	
	80-50	81		20	
	100-50	100		30	

<sup>a</sup> It is recommended to control the cell constant with the calibration procedure of the transmitter.

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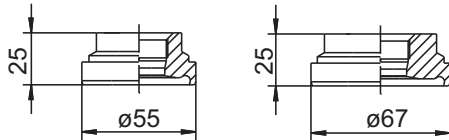
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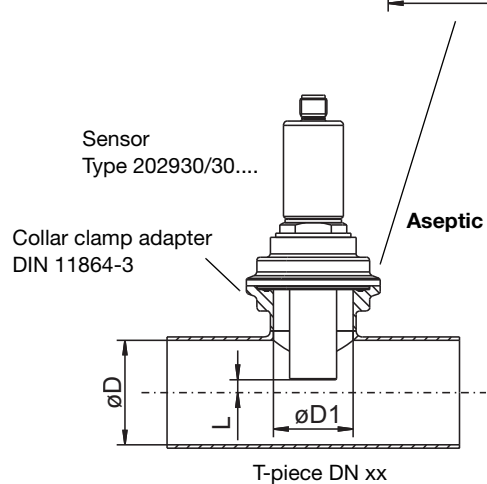
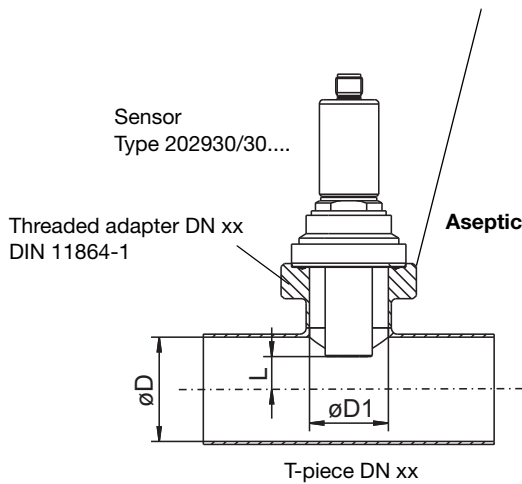
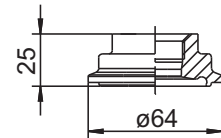
**Mounting suggestions**

The customer must provide the T-pieces!

Process connection adapter JUMO PEKA  
 Aseptic DN 40 Part no.: 00577995; R < 0.8 µm  
 Aseptic DN 50 Part no.: 00577979; Ra < 0.8 µm



Process connection adapter JUMO PEKA  
 Aseptic NKS DN 40 Part no.: 00577999; Ra < 0.8 µm



Threaded adapter DN	T-piece DN	Ø D	Ø D1	L	Sensor 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	
	80-50	81		27	
	100-50	100		37	

Collar clamp adapter DN	T-piece DN	Ø D	Ø D1	L	Sensor Type
NKS DN 40 Form A	50-40	50	38	3	202930/30
	65-40	66		13	
	80-40	81		25	
	100-40	100		35	

**Electrical connection**

Connection for		M12 sensor connection		CR-4P cable
		Pin	Assignment	Color
Temperature compensation		1 2 5		GN YE BN
Voltage tap inner electrode 2		3		PK
Current entry outer electrode 2		4		BL
Current entry outer electrode 1		6		RD
Voltage tap inner electrode 1		7		GR
NC				

**Warning:** The shielding of the cable has to be connected to the transmitter only – not to the sensor!

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**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 (316L)

**(5) Process connection<sup>a</sup>**

997 JUMO PEKA

**(6) Electrical connection<sup>b</sup>**

83 M12 connector

**(7) Extra code**

000 none

<sup>a</sup> Process connection adapters (see "Accessories") must be ordered separately!

<sup>b</sup> The CR-4P cable is required for electrical connection (see "Accessories")!

	<b>(1)</b>		<b>(2)</b>		<b>(3)</b>		<b>(4)</b>		<b>(5)</b>		<b>(6)</b>		<b>(7)</b>
<b>Order code</b>		/		-		-		-		-		-	
<b>Samlpe order</b>	202930	/	10	-	1005	-	31	-	997	-	83	-	000

Other versions on request!

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## Stock versions

Type	Brief description	Part no.
202930/10-1005-31-997-83/000	4-Electrode Conductivity Sensor; short design	00531113
202930/20-1005-31-997-83/000	4-Electrode Conductivity Sensor; medium design	00531048
202930/30-1005-31-997-83/000	4-Electrode Conductivity Sensor; long design	00531114

## Accessories

Designation	Part no.
CR-4P cable, 5 m, made up, with M12 connector	00528699
CR-4P cable, 10 m, made up, with M12 connector	00528700

Process connection adapter JUMO PEKA for	Material	Part no.
Varivent DN 40-125	Stainless steel 1.4435/316L	00445046
Varivent DN 40-125	Stainless steel 1.4435/316L; Ra < 0.8 µm with certificate EN 10204-3.1	00577961
Clamp DN 25/32/40	Stainless steel 1.4435/316L	00445047
Clamp DN25/32/40	Stainless steel 1.4435/316L; Ra < 0.8 µm with certificate EN 10204-3.1	00577998
Clamp DN 50	Stainless steel 1.4435/316L	00445037
Clamp DN 50	Stainless steel 1.4435/316L; Ra < 0.8 µm with certificate EN 10204-3.1	00577997
Aseptic DN 40	Stainless steel 1.4435/316L	00446458
Aseptic DN 40	Stainless steel 1.4435/316L; Ra < 0.8 µm with certificate EN 10204-3.1	00577995
Aseptic DN 50	Stainless steel 1.4435/316L	00445035
Aseptic DN 50	Stainless steel 1.4435/316L; Ra < 0.8 µm with certificate EN 10204-3.1	00577979
Aseptic NKS DN 40	Stainless steel 1.4435/316L	00447555
Aseptic NKS DN 40	Stainless steel 1.4435/316L; Ra < 0.8 µm with certificate EN 10204-3.1	00577999