JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
Email: mail@jumo.net
Internet: www.jumo.net

JUMO UK LTD
JUMO House
Temple Bank, Riverway
Harlow, Essex, CM20 2DY, UK
Phone: +44 1279 63 55 33
Fax: +44 1279 62 50 29
Email: info.uk@jumo.net
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
6724 Joy Road
East Syracuse, NY 13057, USA
Phone: +1 315 437 5866
Fax: +1 315 437 5860
Email: info.us@jumo.net
Internet: www.jumousa.com

JUMO BlackLine CR 4P

Conductive four-electrode conductivity sensor



Type 202931/10...

Brief description

The JUMO BlackLine CR 4P acquires the electrolytic conductivity of a measuring liquid according to the conductive four-electrode measuring principle. When combined with a suitable transmitter, precise measurements over a broad measuring range from 1 µS/cm to 300 mS/cm are ensured. A temperature probe which is integrated into the sensor (either Pt100 or Pt1000) simultaneously acquires the temperature of the measuring liquid.

Compared to 2-electrode sensors, this sensor offers a multitude of application-based advantages in the field and in the lab, and can be used both for measuring purified water and for determining ion concentrations in salty, acidic and alkaline media.

The sensor shaft is made from robust PPE blend, and a high-quality, abrasion-resistant special graphite is used for the electrode material. All of the materials used are physiologically safe.

The tried-and-tested design, with a 120-mm insertion length, 12-mm shaft diameter and the standardized Pg 13.5 process connection, enables easy installation in commercially available fittings.

The sensor is also particularly suited for connection to hand-held and laboratory measuring devices.

Application

- General water technology
- Environmental technology
- Industrial process water
- Horticultural technology
- Fish breeding, aquaristics, aquaponics
- Salt concentration measurement
- Laboratory use

Special features

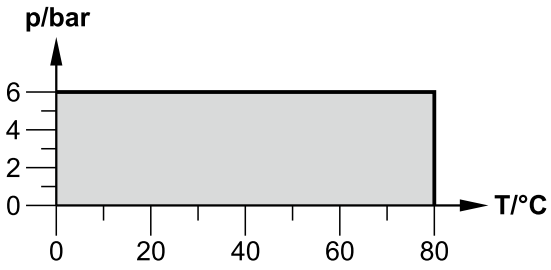
- Wide measuring range
- Suitable for both low and high conductivity
- Reliable and precise measurements
- Reduced sensitivity to pollutants
- No measurement uncertainty resulting from polarization effects
- For universal use

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
Email: mail@jumo.net
Internet: www.jumo.net

JUMO UK LTD
JUMO House
Temple Bank, Riverway
Harlow, Essex, CM20 2DY, UK
Phone: +44 1279 63 55 33
Fax: +44 1279 62 50 29
Email: info.uk@jumo.net
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
6724 Joy Road
East Syracuse, NY 13057, USA
Phone: +1 315 437 5866
Fax: +1 315 437 5860
Email: info.us@jumo.net
Internet: www.jumousa.com

Technical data

Measuring principle for conductivity	Conductive, 4-electrode measurement
Cell constant	K = 0.25 ± 5 %[a]
Typical measuring range[b]	1 µS/cm to 300 ms/cm
Temperature sensor	Either Pt100 or Pt1000 (both at least class A)
Response time t_{90}[c]	< 96 s
Process connection	Screw connection Pg 13.5
Materials[d]	
Screw head system	PPS
Sensor body	PPE + PS
Electrodes	Special graphite
Admissible temperature of medium	-5 to +80 °C
Admissible process pressure	6 bar at 80 °C 
Protection type[e]	IP65 and IP67
Electrical connection	Either securely connected cable, 5 m long, with tin-plated wire ends, or M12 connector

[a] The manufacturing-related deviation of the sensor can be equalized on the transmitter. The measuring accuracy of the overall conductivity measurement is determined by the transmitter used. Therefore, it is not possible to make a general assertion as to the accuracy of the measuring system.

[b] The measuring range also depends on the transmitter being used.

[c] DIN EN 60751.

[d] Please also refer to the dimensional drawings for the sensors.

[e] Valid for the electrical connection.

Suitable transmitters

The sensor is suitable for connection to the following transmitters/controllers:

Type	Features	Data sheet
JUMO dTRANS CR 02	Modular, compact multichannel transmitter and controller with backlit graphic display for conductivity in the panel housing or surface-mounted housing, 1 main input, 1 analog input, 2 digital inputs, other inputs via optional boards; up to 3 analog outputs, up to 7 relays	202552
JUMO AQUIS 500 CR	Transmitter and controller with backlit graphic display for conductivity, 2 analog outputs, 2 relays with changeover contacts, comprehensive controller and switching functions	202565
JUMO AQUIS touch P/S	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	202580 and 202581
JUMO digiLine CR with separate sensor	Intelligent electronic components for conductive conductivity sensors for automation systems with JUMO digiLine, IO-Link, analog or binary signals	202762

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
Email: mail@jumo.net
Internet: www.jumo.net

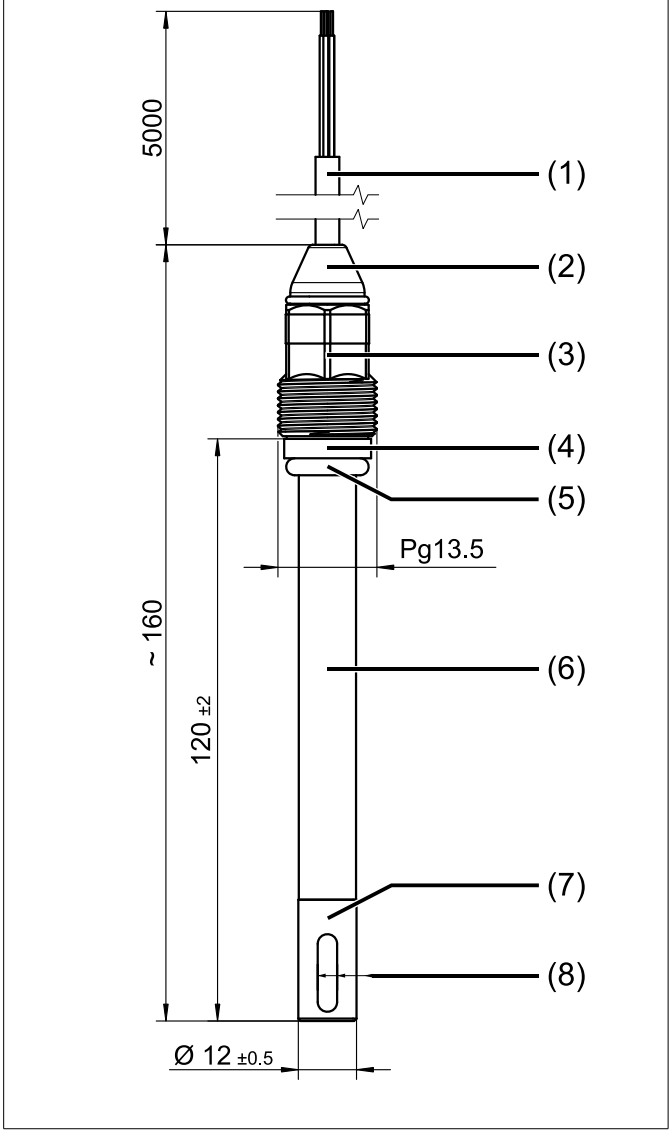
JUMO UK LTD
JUMO House
Temple Bank, Riverway
Harlow, Essex, CM20 2DY, UK
Phone: +44 1279 63 55 33
Fax: +44 1279 62 50 29
Email: info.uk@jumo.net
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
6724 Joy Road
East Syracuse, NY 13057, USA
Phone: +1 315 437 5866
Fax: +1 315 437 5860
Email: info.us@jumo.net
Internet: www.jumousa.com

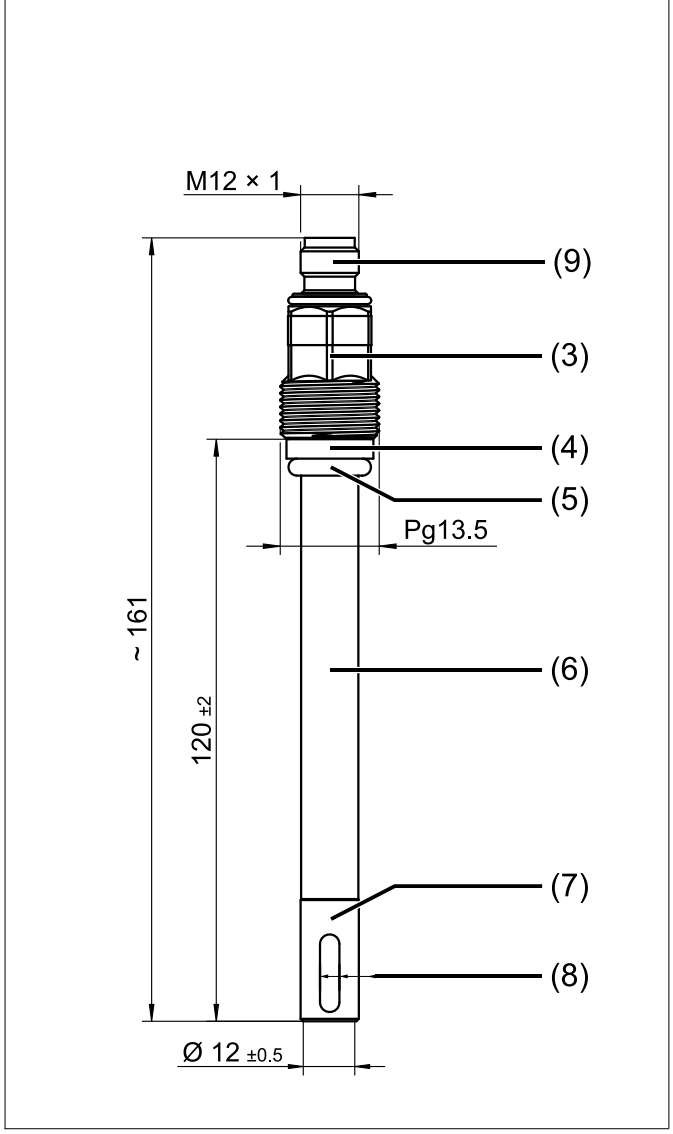
Dimensions

Connections

71 = screw head Pg 13.5 (S8), black, can be rotated



70 = screw head Pg 13.5 with M12 connector, can be rotated



1 Shielded connecting cable, 6 × 0.14, PVC
2 Fixed cable head, PPS
3 Rotatable union nut, wrench size 17, PPS
4 Ring, PSU
5 O-ring 10 × 3.5, FKM
6 Electrode shaft, PPE + PS
7 Measuring insert, PPE
8 Measuring electrodes, graphite
9 M12 connector, 8-pole, A-coded

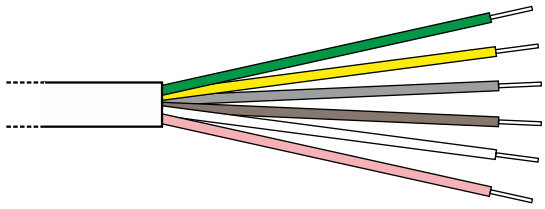
JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
Email: mail@jumo.net
Internet: www.jumo.net

JUMO UK LTD
JUMO House
Temple Bank, Riverway
Harlow, Essex, CM20 2DY, UK
Phone: +44 1279 63 55 33
Fax: +44 1279 62 50 29
Email: info.uk@jumo.net
Internet: www.jumo.co.uk

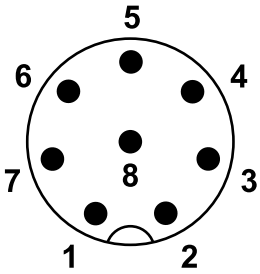
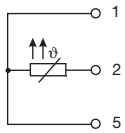
JUMO Process Control, Inc.
6724 Joy Road
East Syracuse, NY 13057, USA
Phone: +1 315 437 5866
Fax: +1 315 437 5860
Email: info.us@jumo.net
Internet: www.jumousa.com

Electrical connection

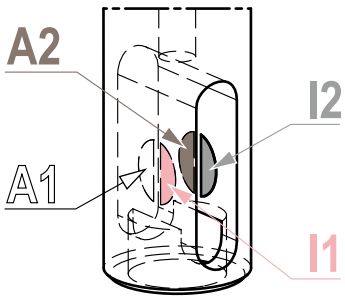
Connection 71 with fixed cable, 6 × 0.14 mm, shielded

Figure	Wire color	Function
	Green	Pt1000
	Yellow	Pt1000
	Gray	Inner electrode 2
	Brown	Outer electrode 2
	White	Outer electrode 1
	Pink	Inner electrode 1

Connection 70 with M12 connector, 8-pole, A-coded

Figure	PIN	Function	
	1	Pt100/Pt1000	
	2	Pt100/Pt1000	
	5	Pt100/Pt1000 three-wire circuit	
	3	Inner electrode 2	
	4	Outer electrode 2	
	6	Outer electrode 1	
	7	Inner electrode 1	
	8	not used	

Arrangement of the electrodes in the sensor measuring insert

Figure	Label	Function
	A2	Outer electrode 2
	I2	Inner electrode 2
	A1	Outer electrode 1
	I1	Inner electrode 1

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
Email: mail@jumo.net
Internet: www.jumo.net

JUMO UK LTD
JUMO House
Temple Bank, Riverway
Harlow, Essex, CM20 2DY, UK
Phone: +44 1279 63 55 33
Fax: +44 1279 62 50 29
Email: info.uk@jumo.net
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
6724 Joy Road
East Syracuse, NY 13057, USA
Phone: +1 315 437 5866
Fax: +1 315 437 5860
Email: info.us@jumo.net
Internet: www.jumousa.com

Order details

	(1)	**Basic type**
202931		JUMO BlackLine CR 4P – Conductive 4-electrode conductivity sensor
	(2)	**Basic type extension**
10		With internal temperature probe
	(3)	**Measuring insert**
1001		1 × Pt100 in three-wire circuit (available for connection 70)
1003		1 × Pt1000 in two-wire circuit (available for connection 71)
1006		1 × Pt1000 in three-wire circuit (available for connection 70)
	(4)	**Electrode material**
84		Special graphite
	(5)	**Connection**
71		Screw head Pg 13.5 (S8), black, can be rotated
70		Screw head Pg 13.5 with M12 connector, can be rotated
	(6)	**Cable length**
0		Without cable (for connection 70)
5000		5000 mm
	(7)	**Insertion length**
120.0		120 mm

	(1)		**(2)**		**(3)**		**(4)**		**(5)**		**(6)**		**(7)**
Order code		/		-		-		-		-		-	
Order example	202931	/	10	-	1003	-	84	-	71	-	5000	-	120

Accessories

Article	**Part 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