

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 Instrument Co. Ltd.

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

JUMO Process Control, Inc.

6733 Myers 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

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 $\mu\text{S/cm}$ 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, 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, and means that this conductivity sensor can be used, for example, with conventional pH and redox electrodes in corresponding combination fittings.

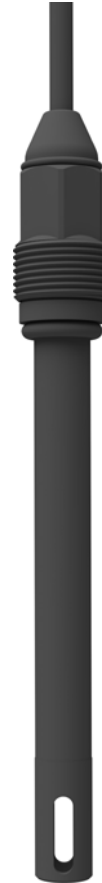
The sensor is also particularly suited for connection to hand-held and laboratory measuring devices.

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
(1 $\mu\text{S/cm}$ to 300 mS/cm)
- 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



Type 202931/10...

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

JUMO Process Control, Inc.
 6733 Myers 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 ^a	K = 0.25
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	
Sensor body	PPE, PS
Electrodes	Special graphite
Admissible temperature of medium	-5 to +80 °C
Admissible process pressure	6 bar at 80 °C
	<p>The graph shows a shaded rectangular area representing the admissible process pressure. The vertical axis is labeled 'p/bar' and ranges from 0 to 6 with major ticks every 2 units. The horizontal axis is labeled 'T/°C' and ranges from 0 to 80 with major ticks every 20 units. The shaded area is bounded by p = 0, p = 6, T = 0, and T = 80.</p>
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 cell constant can differ by ±10 % of the nominal value depending on manufacturing. This deviation can be equalized on the transmitter.
^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

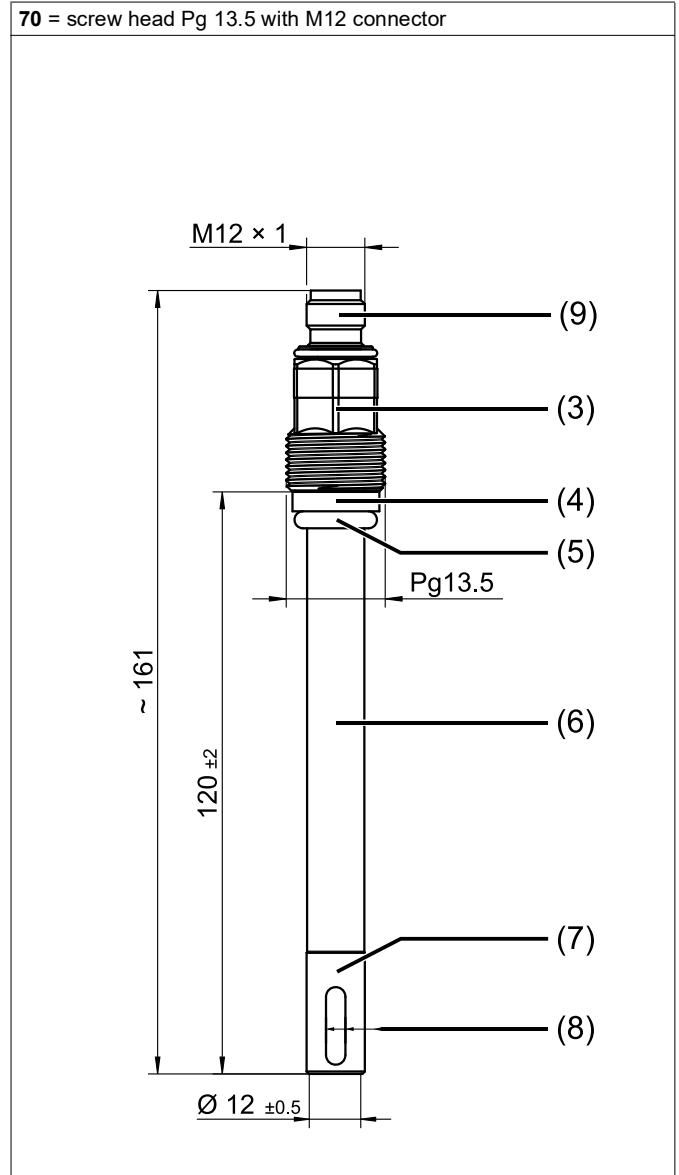
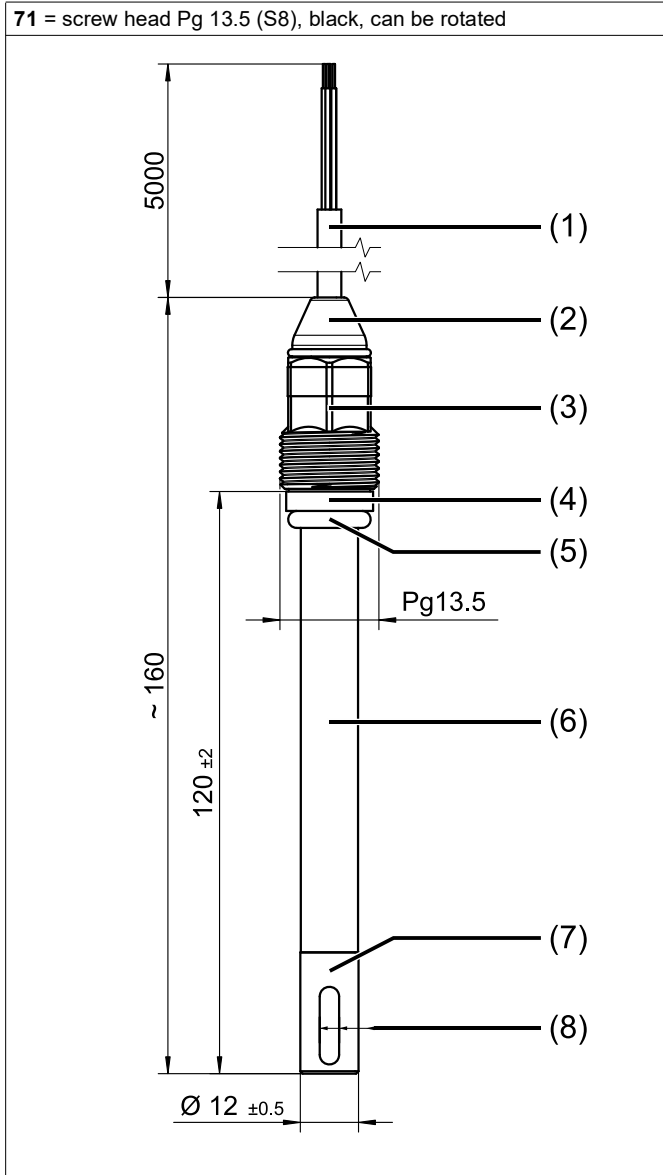
The sensor is suitable for being connected to the following transmitters:

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



Dimensions

Connections



- 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
- 7 Measuring insert, PPE
- 8 Measuring electrodes, graphite
- 9 M12 connector, 8-pole, A-coded



Electrical connection

Type 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

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

Figure	PIN	Function
	1	Pt100/Pt1000
	2	Pt100/Pt1000
	3	Inner electrode 2
	4	Outer electrode 2
	5	Pt100/Pt1000 three-wire circuit
	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 Instrument Co. Ltd.

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

JUMO Process Control, Inc.

6733 Myers 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	
1003	1 × Pt100 in two-wire circuit
1005	1 × Pt1000 in two-wire circuit
(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
(6) Cable length	
0	Without cable (for connection 70)
5000	5000 mm
(7) Insertion length	
120.0	120 mm

Order code / - - - - -
Order example 202931 / 10 - 1003 - 84 - 71 - 5000 - 120

Accessories

Item	Part no.
CR 4P-cable, 5 m, assembled, with M12 connector	00528699
CR 4P-cable, 10 m, assembled, with M12 connector	00528700
CR 4P-cable, 5 m, assembled, with M12 connector, version for connection to JUMO AQUIS touch (extended connecting cable for Pt1000)	00502027
CR 4P-cable, 10 m, assembled, with M12 connector, version for connection to JUMO AQUIS touch (extended connecting cable for Pt1000)	00502029