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
E-mail: 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 63 52 62
E-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.
8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
E-mail: info@jumo.us
Internet: www.jumo.us

JUMO ecoLine Ci
Inductive conductivity and temperature sensor for general water engineering

Description

The sensor detects the electrolytic conductivity of a process liquid. It uses the inductive principle of measurement. Because it uses the inductive method of measurement rather than the conductive 2-pin or 4-pin measurement method, the sensor is virtually maintenance-free. The measuring accuracy is practically unaffected by accumulations and grease or oil film on the surface of the sensor.
A (Pt1000) temperature sensor acquires the process temperature at the same time. The temperature sensor can either be exposed in a stainless steel pocket (ultra-fast response) or be located right inside the plastic body (with PVDF, only the internal option is possible). Internal installation is advisable if the sample media could chemically attack the stainless steel pocket.
The standard sensor body material is polypropylene (PP). PVDF is also available as an alternative.
A vast number of process connections are available to ensure system flexibility, even to provide spare equipment for older devices.
The JUMO ecoLine Ci sensor is designed for connection to the following transmitters: JUMO AQUIS 500 Ci (as per data sheet 202566), JUMO AQUIS touch S/P (as per data sheet 202580/202581), and JUMO digiLine Ci ST10 (as per data sheet 202760).



Type 202943/10-...

Typical areas of application:
The sensor is primarily designed for use in water engineering systems. Typical areas of application include general water engineering (drinking water and wastewater), air-conditioning and cooling plants, dilution monitoring in cooling towers, flushing tanks, carwashes, sea water desalination (inlet), monitoring swimming pool water, etc. There is an immersion variant that can be used in open channels and containers.

Product advantages:

- Practically maintenance-free conductivity measurement
- Materials are FDA/food-use approved
- A variety of process connection variants
- A fast-response temperature sensor
- A compact, proven sensor



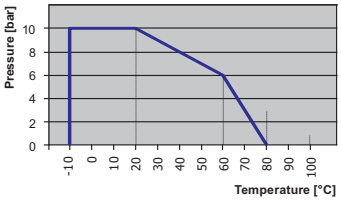
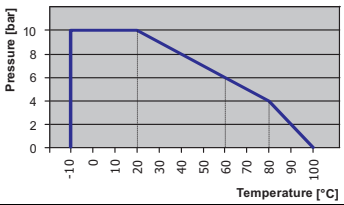
Type 202943/10-... with T-piece made from PVC

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Internet: www.jumo.us

Technical data

Type	**202943/10-...**	**202943/20-...**	**202943/30-...**
Conductivity measurement principle	Inductive		
Conductivity meas. range[a]	0 ... 1000 µS/cm to 0 ... 2000 mS/cm (depending on connected transmitter)		
Conductivity accuracy for measuring range: 0 - 1 mS/cm 0 - 10 mS/cm 0 - 50 mS/cm 0 - 100 mS/cm 0 - 1000 mS/cm 0 - 2000 mS/cm	 ≤ 1 % ≤ 0.5 % ≤ 0.5 % ≤ 0.5 % ≤ 1 % ≤ 1 %		
Cell constant	k = 6.25 1/cm		k = 4.65 1/cm
Temperature sensor	Pt1000, Class A		
t_{90} temperature[b]	≤ 6 s	≤ 2 min	≤ 10 min
Permissible ambient temperature	-10 to +60 °C		
Permissible storage temperature	-20 to +75 °C		
Enclosure protection[c]	IP68		
Permissible medium temperature[d] In operation Momentary with process connections 168 and 706 (immersion fitting)	 -10 to +80 °C ≤ +100 °C (≤ 15 min) -10 to +60 °C (pressureless)		 -10 to +100 °C ≤ +110 °C (≤ 15 min) -10 to +60 °C (pressureless)
Permissible process pressure[c] at +20 °C at +60 °C at +80 °C at -10 to +100 °C	 10 bar 6 bar 0 bar min. -0.1 bar 		 10 bar 6 bar 4 bar min. -0.1 bar 
Sensor material in contact with medium not in contact with medium	 dependent on design: stainless steel 1.4301 (304), stainless steel 1.4571 (316ti), PP, EPDM dependent on design: stainless steel 1.4301 (304), PA6, PUR, FPM, PBT/PA, CR/NBR, CuZn	 PP dependent on design: stainless steel 1.4301 (304), PA6, PUR, FPM, PBT/PA, CR/NBR, CuZn	 PVDF dependent on design: stainless steel 1.4408, PA6, PUR, PBT/PA, CR/NBR, CuZn
Process connection	see Order details / Dimensions		
Electrical connection Connection circuit Socket Socket material Cable material Cable lengths Permissible temperature	JUMO ecoLine Ci type inductive conductivity sensors are suitable for connection to JUMO AQUIS 500 Ci type inductive conductivity transmitters/controllers! non-detachable cable M12 socket, 8-pin CuZn, PA6.6 GF30, PUR outer sleeve: PUR see Order details -20 to +75 °C		
Approvals/marks of conformity	Materials in contact with the medium are approved for food use, are physiologically safe and are listed by the FDA.		

[a] Usual application range from approx. 100 µS/cm.
[b] According to EN 60751
[c] According to EN 60529
[d] **Note:** Temperature, pressure and sample medium affect the life of the cell!

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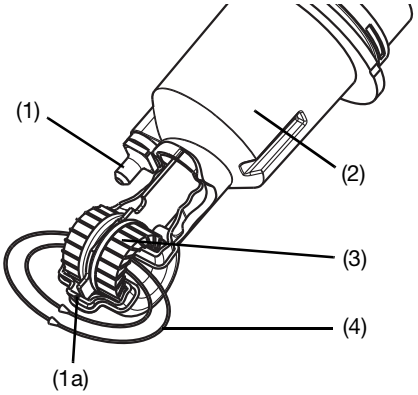
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Principle of measurement

The inductive method of measurement allows largely maintenance-free acquisition of specific conductivity, even in the toughest media conditions. Compared with the conductive method of measurement, problems such as electrode decomposition and polarization are practically non-existent.
Conductivity is measured by an inductive probe. Sinusoidal AC voltage supplies the transmitter coil. Current is induced in the receiver coil, subject to the conductivity of the liquid to be measured. The current is proportional to the conductivity of the medium.

Device description

The measuring cell of the sensor consists of a hermetically sealed polypropylene (PP) or polyvinylidene fluoride (PVDF) body, with two measuring coils arranged inside it. A flow-through opening in the measuring cell allows the sample medium to pass through. Electrical isolation between the sample medium and the actual value output is inevitable, because of the principle of measurement. The measuring cell is extremely temperature and pressure stable.

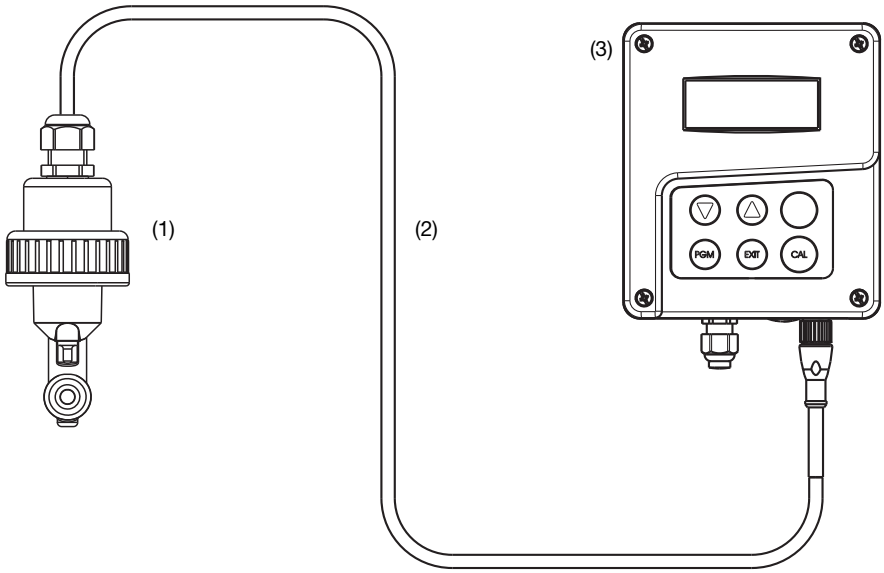


(1) exposed temperature sensor
(1a) option: internal
(2) PP cell body
(3) measuring coils
(4) liquid loop

Exposed temperature sensor:
The sensor in its stainless steel pocket reacts very quickly to changes in temperature.

Internal temperature sensor:
The sensor is integrated in the cell body. No metal comes into contact with the sample medium in this version (important for aggressive media). However, temperature acquisition is slower.

Measurement section setup



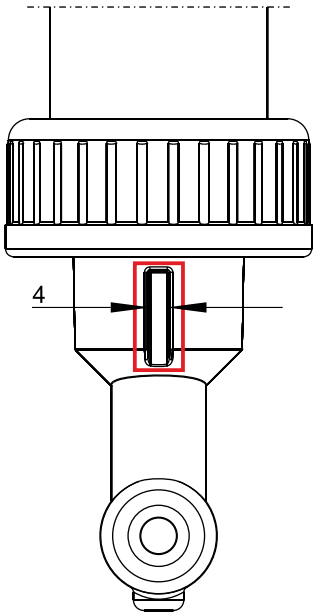
(1) JUMO ecoLine Ci, inductive conductivity and temperature sensor
(2) Cable (component part of JUMO ecoLine Ci), standard length 10 m
(3) JUMO AQUIS 500 Ci, transmitter/controller for conductivity, concentration and temperature

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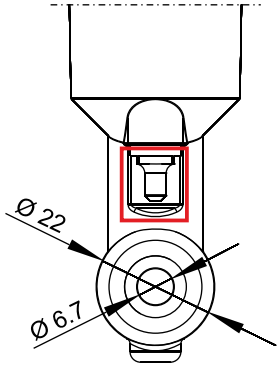
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JUMO House
Temple Bank, Riverway
Harlow - Essex CM20 2DY, UK
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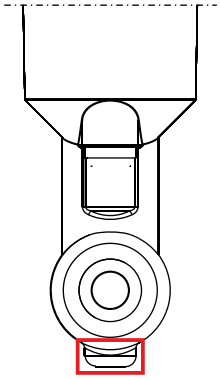
Sensor details



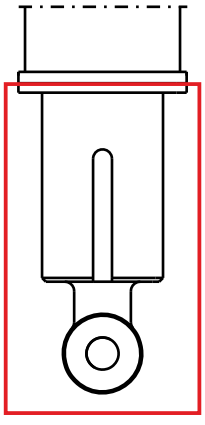
Guide slot
A lug on the T-piece (see Accessories) fits into the 4 mm wide guide slot, thus ensuring that the sensor is correctly aligned to the direction of flow.



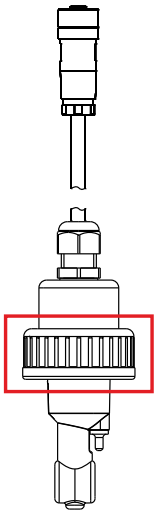
Exposed temperature sensor
This is the standard version.
Material in contact with sample medium:
stainless steel 1.4571 AISI 316ti and EPDM.



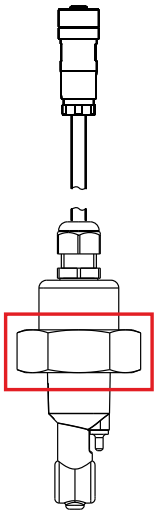
Internal temperature sensor
Basic type extension /20.
Material in contact with sample medium:
PP, suitable for food use.



PVDF sensor body
Cell constant 4.65 1/cm,
only available for process connections 168 and 169



Process connection 168
for T-piece installations,
PVC union nut (included among the items supplied)

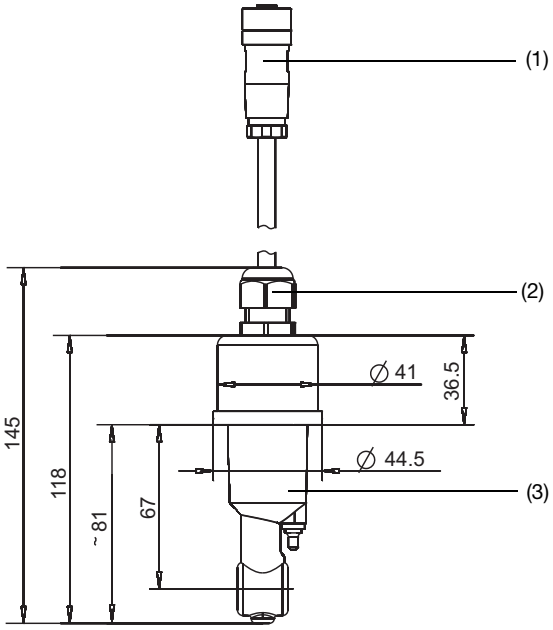


Process connection 169
for T-piece installations,
stainless steel union nut (included among the items supplied)

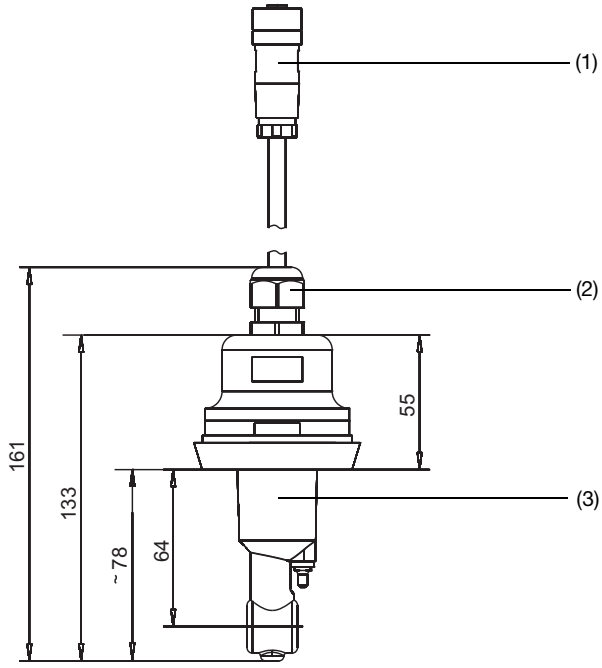
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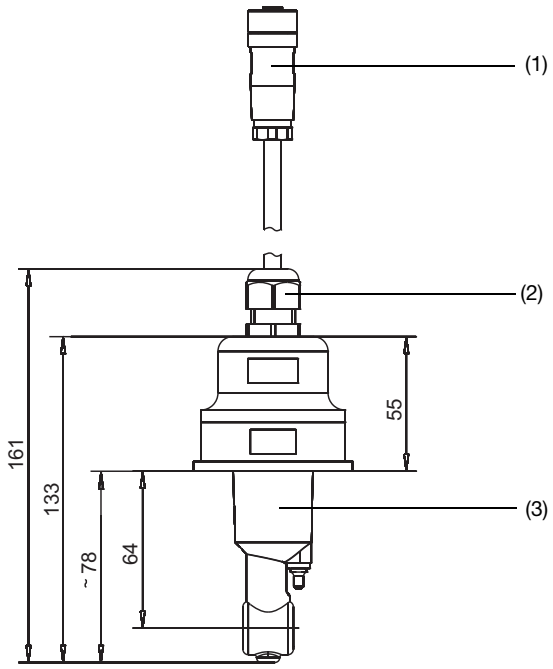
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Type 202943/10-168... or -169...
DN32 or DN40



Type 202943/10-607-...
MK DN50



Type 202943/10-690-...
2" SMS

(1) M12 socket, PBT / PA

(2) M16 screw-type cable gland
IP68 protection (to 0.2 m), PBT / PA

(3) PP

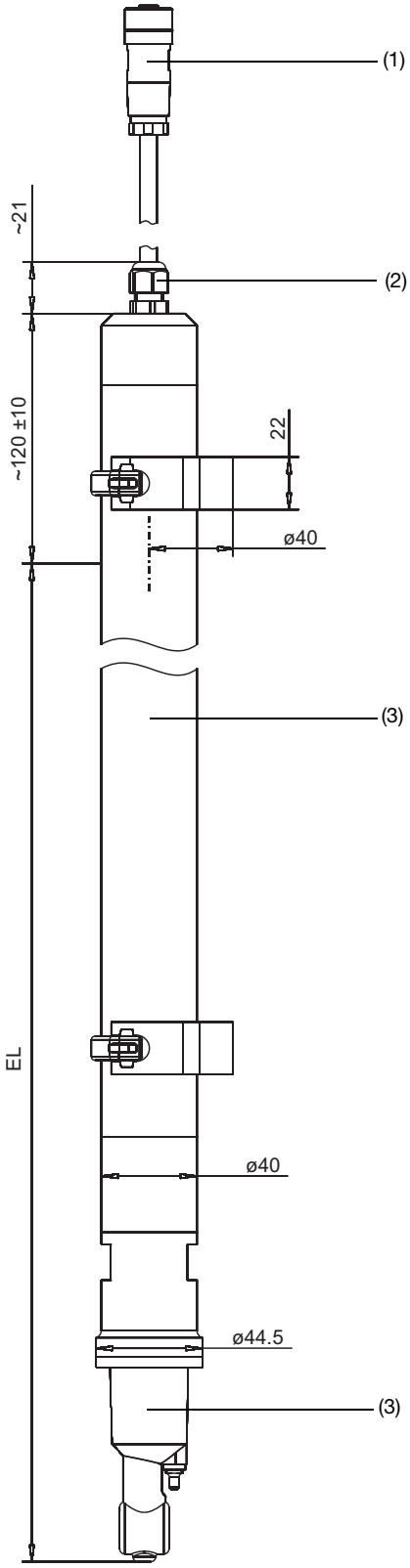
(4) 1.4301 stainless steel, AISI 304

JUMO GmbH & Co. KG
Delivery address: Mackenrodtstraße 14,
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Postal address: 36035 Fulda, Germany
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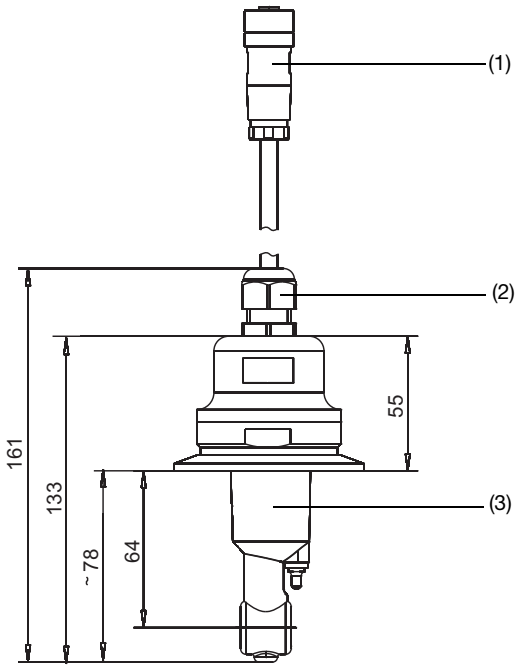
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Dimensions



Type 202943/10-706-...
Immersion version



Type 202943/10-617-... or -616-...
2" clamp or 2 1/2" clamp

(1) M12 socket, PBT / PA

(2) M16 screw-type cable gland
IP68 protection (to 0.2 m), PBT / PA

(3) PP

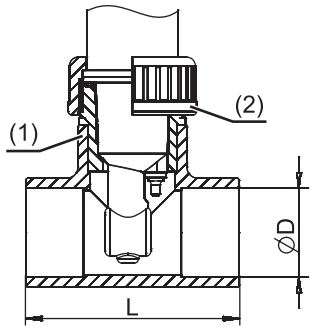
(4) 1.4301 stainless steel, AISI 304

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Accessories / Mounting examples

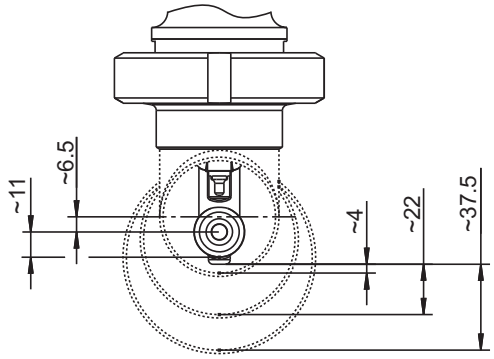


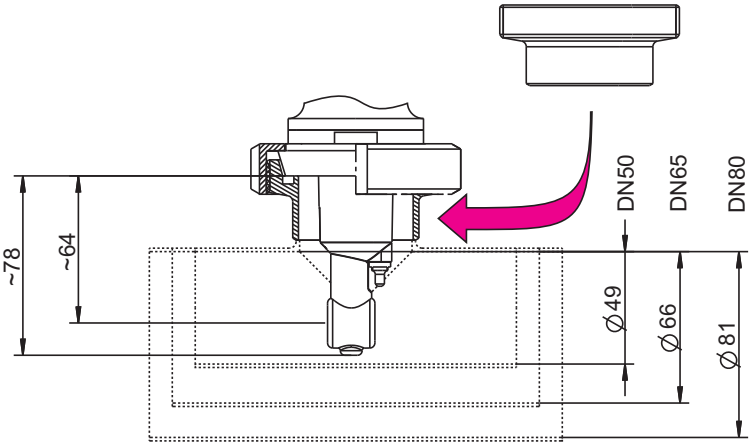
(1) Threaded socket G 1 1/2" (PVC or PP)

(2) Union nut (PVC with168) (Stainless steel with 169)

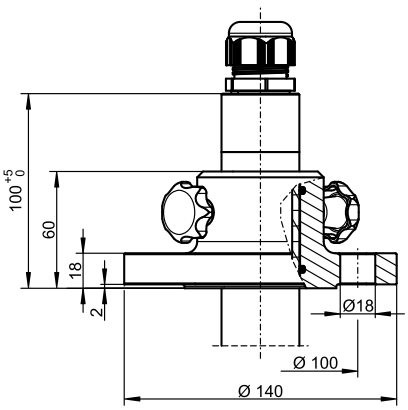
DN	ø D	L	Material	Maximum temperature	Part no.
32	40	98	PVC	60°C	00439247
40	50	118			00439249
32	40	88	PP	80°C	00449511
40	50	102			00449514
50	63	124			00449516

T-piece made from PVC or PP
suitable for process connections 168 and 169

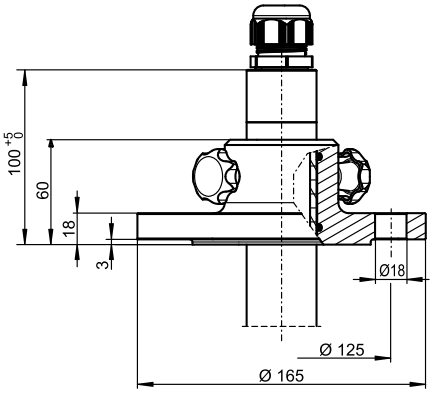




Weld-on threaded adapter DN50, DIN 11851
Part no. 00085020
suitable for process connection 607
The reducing T-piece shown, DIN, short, SSS, DN50/50, or DN65/50 or DN80/50, must be provided by the customer (not supplied by JUMO)!



DN32 flange
suitable for process connection 706
Part no. 00083375
Material: PP



DN50 flange
suitable for process connection 706
Part no. 00083376
Material: PP

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Order details

	(1)	**Basic type**
202943		JUMO ecoLine Ci – Inductive conductivity and temperature sensor for general water engineering
	(2)	**Basic type extension**
10		PP sensor body, external temperature sensor (standard)
20		PP sensor body, internal temperature sensor
30		PVDF sensor body, internal temperature sensor
	(3)	**Process connection**
168		for T-piece installations, with PVC union nut G 1 1/2
169		for T-piece installations, with stainless steel union nut G 1 1/2
607		Taper socket with union nut DN 50 DIN 11851 (dairy pipe fitting)[b]
616		Clamping socket (clamp) DN 50 (2") DIN 32676[a,b]
617		Clamping socket (clamp) 2.5" similar to DIN 32676[a,b]
690		SMS DN 2"[b]
706		Immersion version[b]
	(4)	**Immersion length (EL)**
0000		without
0500		EL = 500 mm[c]
1000		EL = 1000 mm[c]
1500		EL = 1500 mm[c]
2000		EL = 2000 mm (max. value)[c]
	(5)	**Electrical connection**
21		Fixed cable with M12 cable socket
	(6)	**Length of fixed cable**
10		10 m (standard)
20		20 m
30		30 m
	(7)	**Extra codes**
000		none

[a] Without mounting material (retaining clamps, etc.)
[b] For basic type extension 10 or 20 only.
[c] For process connection 706 only.

	(1)		(2)		(3)		(4)		(5)		(6)		(6)
Order code		/		-		-		-		-		/	
Order example	202943	/	10	-	168	-	0000	-	21	-	10	/	000

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Production versions (delivery 10 working days after receipt of order)

Type	Description	Part no.
202943/10-607-0000-21-10/000	PP, external temperature sensor, MK DN50, 10 m fixed cable	00550665
202943/10-706-1000-21-10/000	PP, external temperature sensor, immersion version 1 m, 10 m fixed cable	00556316

Accessories (delivery 3 working days after receipt of order)

Description	Part no.
Weld-on threaded adapter DN50, DIN 11851(mating piece for process connection 607)	00085020
PVC DN32 T-piece, including threaded insert (mating piece for process connection 168 or 169)	00439247
PVC DN40 T-piece, including threaded insert (mating piece for process connection 168 or 169)	00439249
PP T-piece, DN32[a] (mating piece for process connection 168 or 169)	00449511
PP T-piece, DN40[a] (mating piece for process connection 168 or 169)	00449514
PP T-piece, DN50[a] (mating piece for process connection 168 or 169)	00449516
G1 1/2 union nut, PVC	00439199
G1 1/2 union nut, stainless steel	00452039
DN50 grooved union nut, DIN 11851	00343368
SMS DN2" grooved union nut	00345162
DN32 flange[b], PP material	00083375
DN50 flange[b], PP material	00083376
Calibration adapter for inductive conductivity measurement, type 202711/21	00543395

[a] With rotation protection - the sensor can only be installed in the correct alignment.
[b] In conjunction with sensor with process connection 706 (immersion version) only.

Note

The following are required for the initial commissioning of the sensor and transmitter/controller or when replacing components:

- Transmitter/controller e. g. JUMO AQUIS 500 Ci, data sheet 20.2566
- JUMO ecoLine Ci inductive conductivity and temperature sensor
- Calibration adapter for inductive conductivity measurement, type 202711/21, data sheet 202711