

JUMO GmbH & Co. KG

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JUMO Instrument Co. Ltd.

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JUMO Process Control, Inc.

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JUMO tecLine Ci-S

Inductive conductivity and temperature sensor for general process engineering

Application

- Liquid foodstuffs
- CIP/SIP systems
- Other rinsing and cleaning processes
- Measuring the concentration of acids, lyes and cleaning chemicals, etc.

Brief description

The sensor detects the electrolytic conductivity of a process liquid. The sensor uses the inductive principle of measurement. An integrated (Pt1000) temperature probe acquires the process temperature at the same time.

The sensors alternatively possess an exposed temperature sensor (in a stainless steel pocket) or an internal temperature sensor. The body material of the sensor is made of polyvinylidene fluoride (PVDF) as standard.

The sensors in this data sheet add some generally established variants in different engineering versions to the wide range of inductive JUMO conductivity sensors.

A vast number of process connections are available to ensure flexibility in systems, and can even be used as spare equipment for older devices. There is an immersion variant that can be used in open tanks and channels.

Because it measures inductively, the sensor is practically maintenance-free, compared with the conductive method; deposits and grease or oil film on the surface of the sensor have virtually no effect on measuring accuracy.

JUMO tecLine Ci-S sensors are 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).

Product advantages

- Different mounting dimensions allow a variety of applications
- Materials are FDA/food-use approved
- Numerous process connection variants
- Fast-response temperature sensor



Type 202942/10-690-...

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Technical data

Principle of conductivity	Inductive
Measuring range of conductivity ^a	0 to 1000 µS/cm up to 0 to 2000 mS/cm (depending on the connected transmitter)
Accuracy of conductivity in the measuring range	
0 to 1 mS/cm	≤ 1 %
0 to 10 mS/cm	≤ 0.5 %
0 to 100 mS/cm	≤ 0.5 %
0 to 1000 mS/cm	≤ 1 %
0 to 2000 mS/cm	≤ 1 %
Cell constant	k = 5.45 1/cm
Temperature sensor	Pt1000, Class A
t _{0.9} temperature ^b	≤ 6 s
Admissible ambient temperature	-10 to +60 °C
Admissible storage temperature	-20 to +75 °C
Protection type ^c	IP67
Admissible medium temperature	
In operation	-10 to +125 °C ^d
briefly (max. 15 minutes)	≤ 140 °C ^d
Admissible process pressure ^a	
at 20 °C	10 bar
at 60 °C	6 bar
at 125 °C	2 bar
at 140 °C (max. 15 minutes)	unpressurized
at -10 to +140 °C	minimum -0.1 bar
Sensor material according to design type	
in contact with medium	PVDF, stainless steel 1.4301, AISI 304, stainless steel 1.4435, AISI 316L, EPDM
not in contact with medium	Stainless steel 1.4301, AISI 304, PA6, CR/NBR, PUR, FPM, CuZn
Process connection	See order details/dimensions
Electrical connection	JUMO tecLine Ci type inductive conductivity sensors are suitable for connection to the following transmitters/controllers: JUMO AQUIS 500 Ci, JUMO AQUIS touch S/P, JUMO digiLine Ci ST10!
Connection type	Non-detachable cable
Socket	M12 socket
Socket material	CuZn, PA6.6 GF30, PUR
Cable material	Outer sleeve: PUR
Cable lengths	See order details
Admissible temperature	-20 to +75 °C

^a Typical application range from approx. 100 µS/cm.

^b According to EN 60751, value applies to exposed temperature probe.

^c According to EN 60529

^d Max. 80 °C (pressureless) with process connection 706.

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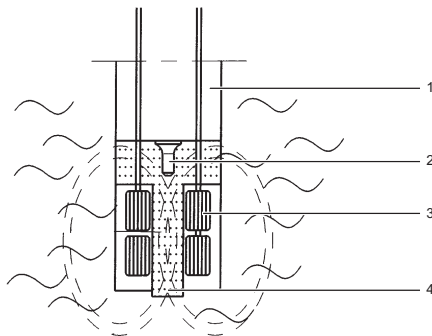
Measuring principle

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 polyvinylidene fluoride (PVDF) body, with two measuring coils arranged inside it. A flow-through opening in the sensor 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 sensor cell is extremely temperature and pressure stable.



- 1 PVDF sensor body
- 2 Exposed temperature probe
- 3 Measuring coils
- 4 Liquid loop

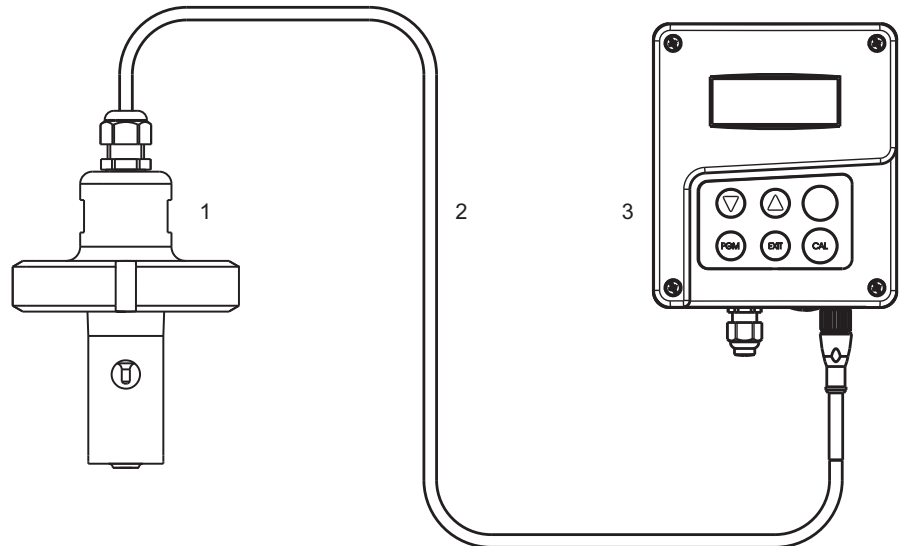
Exposed temperature probe

The temperature probe in its stainless steel pocket reacts very quickly to changes in temperature.

Internal temperature probe

The temperature probe 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.

Example setup of a measuring path



- (1) JUMO tecLine Ci-S
- (2) Connecting cable (an integral part of the JUMO tecLine Ci-S)
- (3) JUMO AQUIS 500 Ci

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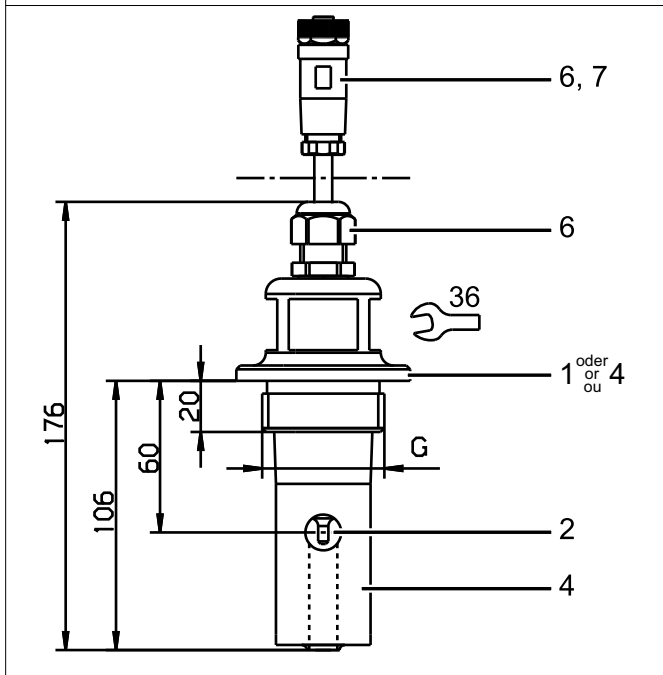
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Dimensions

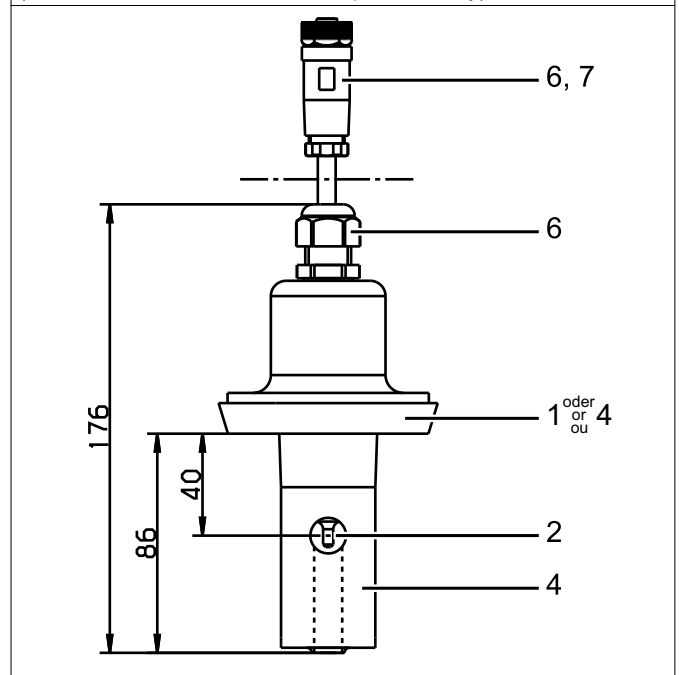
Process connections

107 = Screw connection G 1 1/4
 108 = Screw connection G 1 1/2
 110 = Screw connection G 2



1 Stainless steel 1.4301
 4 PVDF
 7 PPS GF40

606 = Taper socket with union nut DN 40
 607 = Taper socket with union nut DN 50
 608 = Taper socket with union nut DN 65
 609 = Taper socket with union nut DN 80
 (union nut is not included in the scope of delivery)

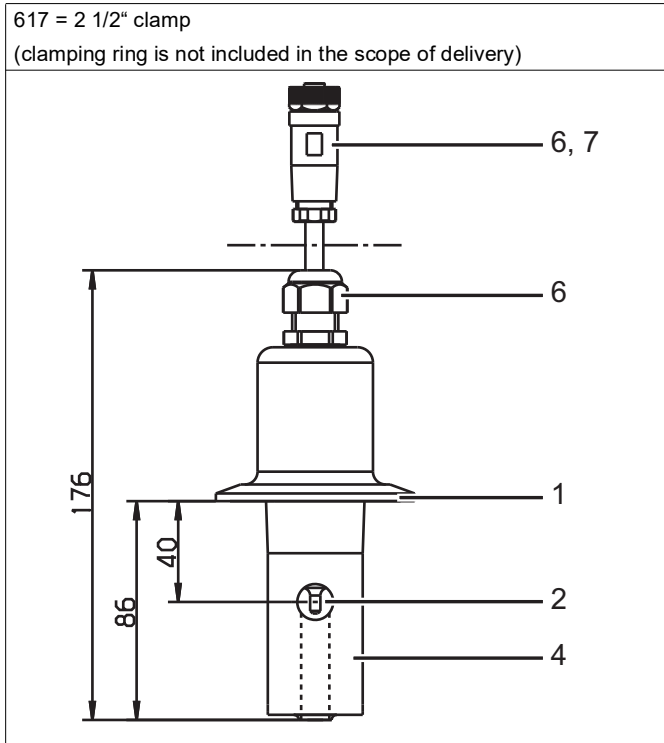


2 Stainless steel 1.4435
 6 PA6

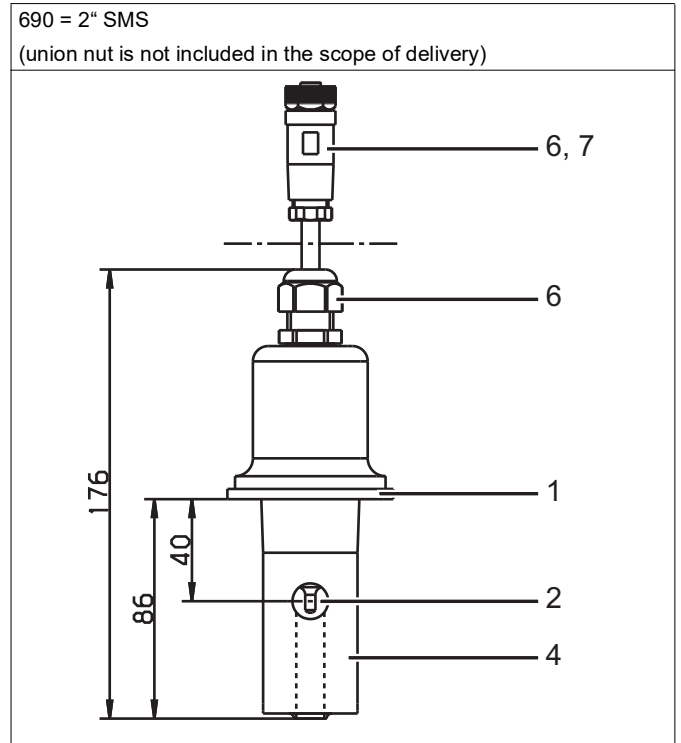
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- 1 Stainless steel 1.4301
- 4 PVDF
- 7 PPS GF40

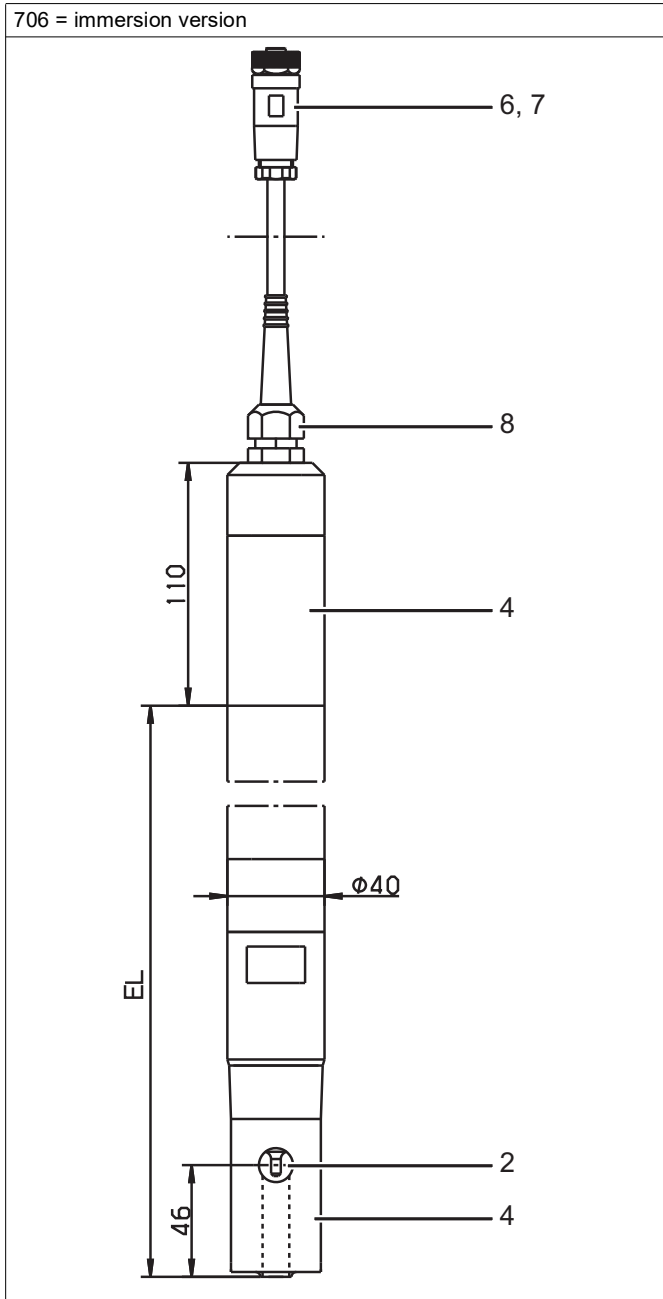


- 2 Stainless steel 1.4435
- 6 PA6

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- | | | | |
|---|------------------------------|---|----------|
| 2 | Stainless steel 1.4435 | 4 | PVDF |
| 6 | PA6 | 7 | PPS GF40 |
| 8 | Nickel-plated brass and EPDM | | |

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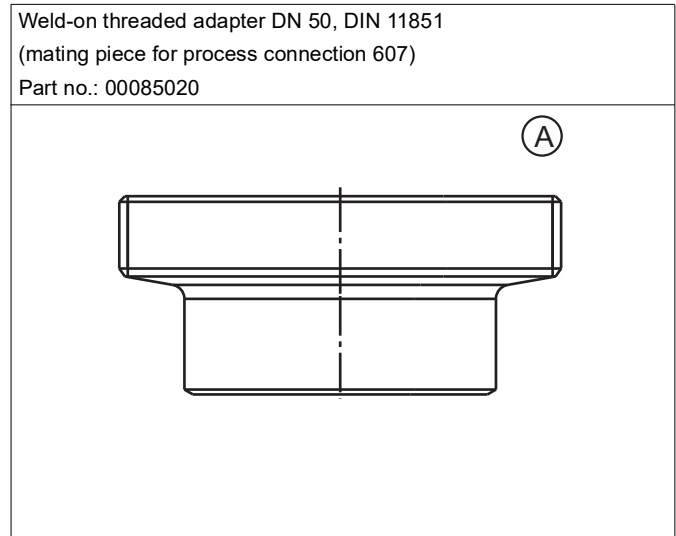
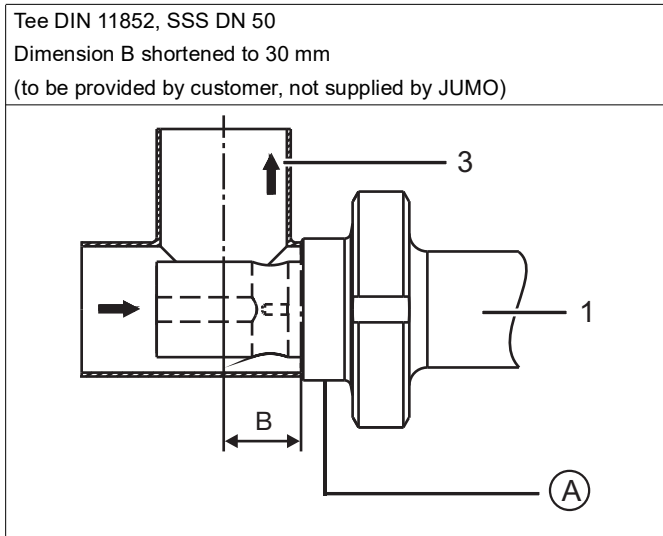
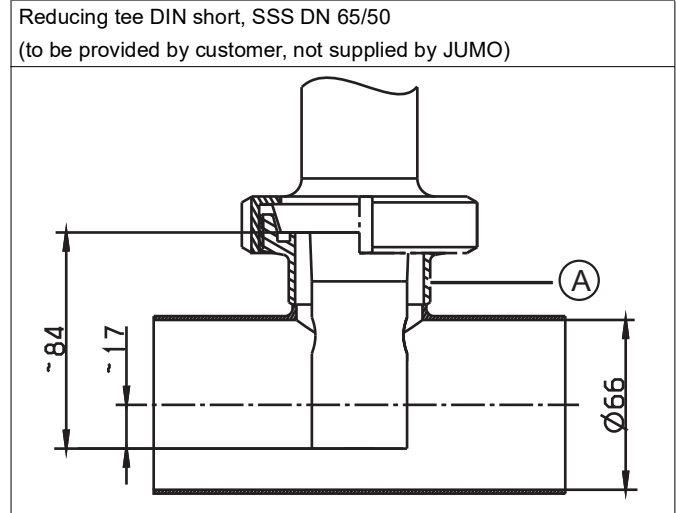
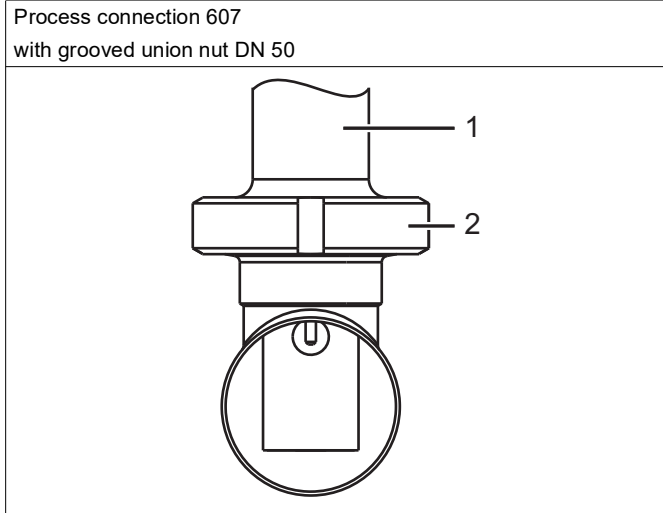
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Mounting examples

Weld-on threaded adapter



- 1 Process connection 607
- 2 Grooved union nut DN 50
- 3 Flow direction

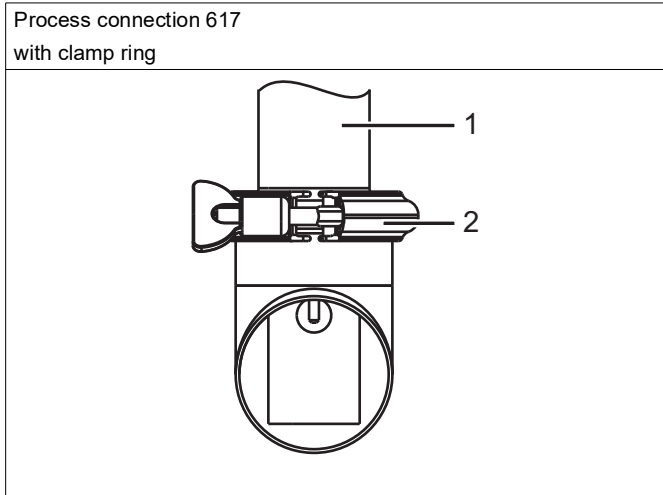
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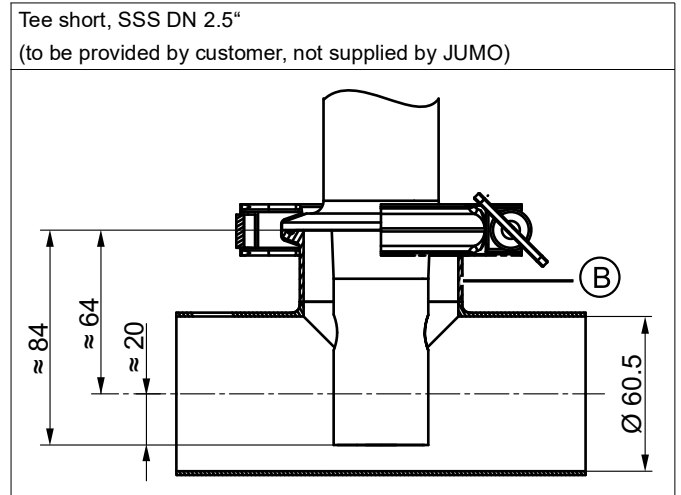
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Clamp

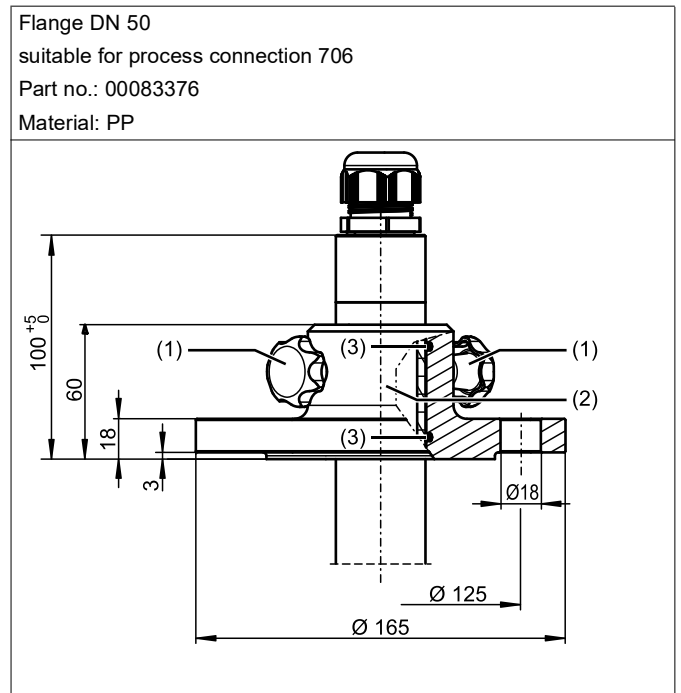
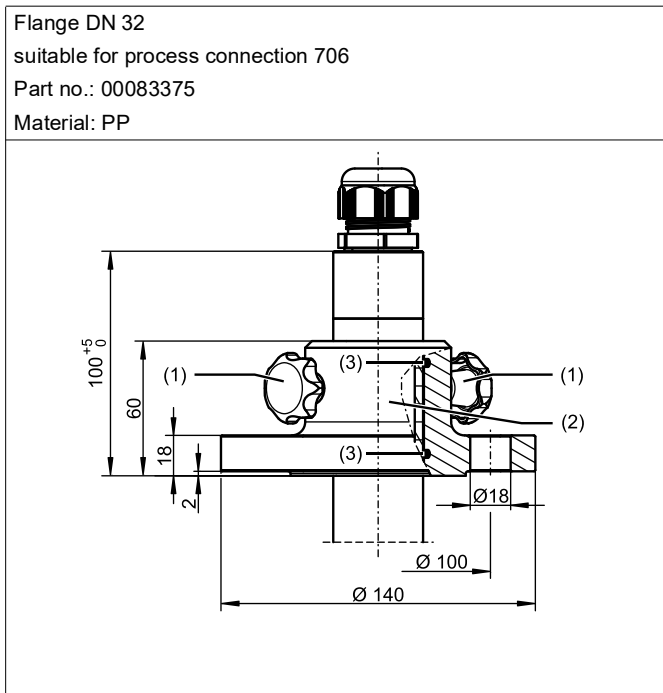


- 1 Process connection 617
- 2 Clamp ring



- B Clamping socket DN 2.5" short

Flange DN 32 and Flange DN 50



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Order details

(1) Basic type	
202942	JUMO tecLine Ci-S – Inductive conductivity and temperature sensor for general process applications
(2) Basic type extension	
10	PVDF sensor body
(3) Process connection	
107	Screw connection G 1 1/4
108	Screw connection G 1 1/2
110	Screw connection G 2
606	Taper socket with union nut DN 40, DIN 11851 (dairy compression fitting)
607	Taper socket with union nut DN 50, DIN 11851 (dairy compression fitting)
608	Taper socket with union nut DN 65, DIN 11851 (dairy compression fitting)
609	Taper socket with union nut DN 80, DIN 11851 (dairy compression fitting)
617	Clamping socket (clamp) 2,5" similar to DIN 32676
690	SMS DN 2
706	Immersion version
(4) Insertion length	
0000	Without
0500	500 mm ^a
1000	1000 mm ^a
1500	1500 mm ^a
2000	2000 mm ^a
(5) Electrical connection	
21	Fixed cable with M12 connector
(6) Length of fixed cable	
10	10 m
20	20 m
30	30 m
(7) Extra code	
000	Without
268	Internal temperature probe ^b

^a Only possible with process connection 706

^b If this extra code is selected, the process connection of the sensor is made of PVDF, except for types 617 and 690, where the process connection is always made of stainless steel

	(1)	/	(2)	-	(3)	-	(4)	-	(5)	-	(6)	/	(7)
Order code	<input type="text"/>	/	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	/	<input type="text"/>
Order example	202942	/	10	-	607	-	0000	-	21	-	10	/	000

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Accessories

Item	Part no.
Flange DN 32 complete for type 202820/40 and 202755/xx-706	00083375
Flansch DN 50 complete for type 202820/40 and 202755/xx-706	00083376
Weld-on threaded adapter with PTFE sealing ring	00085020
Grooved union nut DN 50	00343368
Grooved union nut SMS DN 2	00345162
Grooved union nut F 65	00362956
Calibration adapter for inductive conductivity, type 202711/21	00543395

NOTE!

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

- Transmitter/controller e.g. JUMO AQUIS 500 Ci, data sheet 202566
- JUMO tecLine Ci-S inductive conductivity and temperature sensor
- Calibration adapter for inductive conductivity measurement, type 202711/21, data sheet 202711