

**JUMO GmbH & Co. KG**

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**JUMO Instrument Co. Ltd.**

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**JUMO Process Control, Inc.**

8 Technology Boulevard  
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1-800-554-JUMO  
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Internet: www.jumo.us



# JUMO tecLine Ci-S

## Inductive conductivity and temperature sensor for general process engineering

### Brief description

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

The sensors in this data sheet add some generally established variants in different engineering versions to the wide range of inductive JUMO conductivity sensors. The variants are made from different materials (PVDF or PEEK) and have different sensor geometries.

PEEK sensors with process connections /955 and /956 are installed in the process via process adapters (e.g. clamp, SMS, milk cone) using a sealing cone system. The really small design also allows them to be used in small cross-section pipes.

The PVDF variants have a larger sensor body and a choice of an exposed temperature sensor (in a stainless steel pocket) or an internal temperature sensor. The PVDF versions are used when it is not possible to use other measuring cell materials for chemical reasons.

All the sensors are made from hygienically safe materials and have proved to be reliable in typical food and drinks industry cleaning processes (e.g. CIP).

A vast number of process connections are available to ensure flexibility in systems, and can even be used as spare equipment for older instruments. 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 JUMO AQUIS 500 Ci transmitter, as per data sheet 202566.

### Typical areas of application:

Liquid foodstuffs, CIP/SIP systems, other rinsing and cleaning processes, measuring the concentration of acids, lyes and cleaning chemicals, etc.

### Product advantages:

- Different mounting dimensions allow a variety of applications
- Materials are FDA/food-use approved
- Numerous process connection variants
- Fast-response temperature sensor
- Different body materials, depending on the requirement



Type 202942/10-690-...



Type 202942/20-955-...

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## Technical data

Type	202942/10-...	202942/20-...
<b>Conductivity measurement principle</b>	Inductive	
<b>Conductivity measuring range</b>	0 - 1000 µS/cm to 0 - 2000 mS/cm (depending on connected transmitter)	
<b>Conductivity accuracy</b> for measuring range:		
0 - 1 mS/cm	≤ 1%	
0 - 10 mS/cm	≤ 0.5%	
0 - 100 mS/cm	≤ 0.5%	
0 - 1000 mS/cm	≤ 1%	
0 - 2000 mS/cm	≤ 1%	
<b>Cell constant</b>	k = 5.45 1/cm	k = 6.1 1/cm (for process connection 955) k = 6.0 1/cm (for process connection 956)
<b>Temperature sensor</b>	Pt1000, Class A	
<b>t<sub>90</sub> temperature<sup>1</sup></b>	≤ 6 s	≤ 36 s
<b>Permissible ambient temperature</b>	-10 to +60°C	-10 to +60°C
<b>Permissible storage temperature</b>	-20 to +75°C	-20 to +75°C
<b>Enclosure protection<sup>2</sup></b>	IP67	IP67
<b>Permissible medium temperature</b> In operation Briefly (max. 15 min)	<b>Note:</b> the temperature, pressure and sample medium affect the service life of the measuring cell! -10 to +125°C ≤140°C	
<b>Permissible process pressure</b> at +20°C at +60°C at +125°C at +140°C (max. 15 min) at -10 to +140°C	10 bar 6 bar 2 bar unpressurized min. -0.1 bar	<p>Pressure [bar]</p> <p>Temperature [°C]</p>
<b>Sensor material</b> in contact with medium	dependent on design: PVDF, stainless steel 1.4301, AISI 304, stainless steel 1.4435, AISI 316L, EPDM	dependent on design: PEEK, stainless steel 1.4301, AISI 304, EPDM
not in contact with medium	dependent on design: stainless steel 1.4301, AISI 304, PA6.6 GF30, PUR, FPM, CuZn	dependent on design: stainless steel 1.4301, AISI 304, stainless steel 1.4305, AISI 303, CuZn, PA6, CR/NBR, PUR, FPM
<b>Process connection</b>	see Order details / Dimensions	
<b>Electrical connection</b> Connection type Socket Socket material Cable material Cable lengths Permissible temperature	JUMO tecLine Ci-S type conductivity sensors are suitable for connection to JUMO AQUIS 500 Ci type inductive conductivity transmitters/controllers! fixed connection cable M12 socket CuZn, PA6.6 GF30, PUR outer sleeve: PUR see Order details -20 to +75°C	
<b>Approvals/marks of conformity</b>	Materials in contact with the medium are approved for food use, are physiologically safe and are listed by the FDA.	

<sup>1</sup> EN 60751

<sup>2</sup> EN 60529

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## Principle of measurement

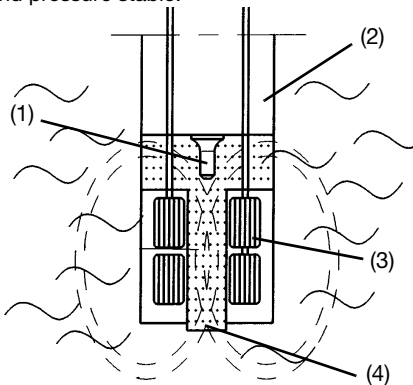
The inductive method of measurement allows largely maintenance-free acquisition of specific conductivity, even in the toughest media conditions. Compared with the conductive method of measurement, problems such as electrode decomposition and polarization are practically non-existent. Conductivity is 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.

## Instrument description

### Measuring cell

The measuring cell 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) external temperature sensor
- (2) PEEK or PVDF cell body
- (3) measuring coils
- (4) liquid loop

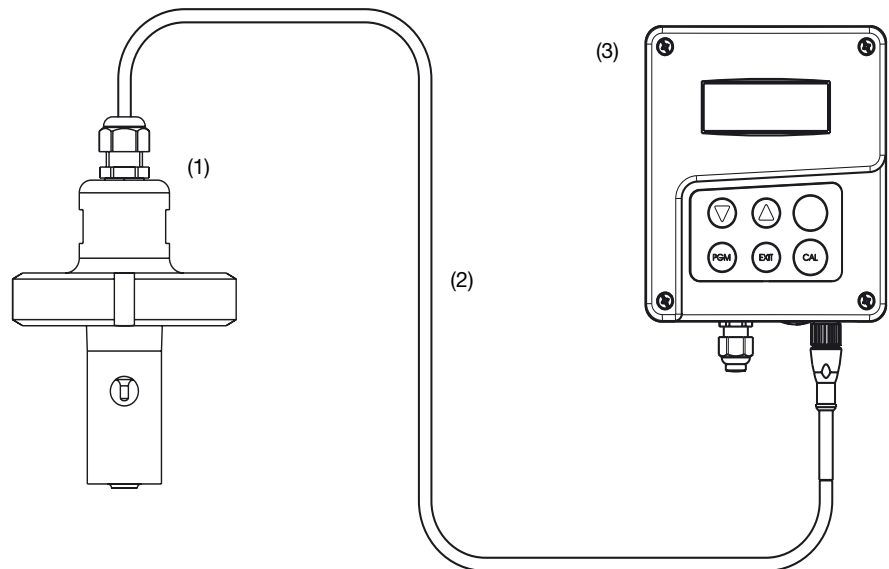
### Exposed temperature sensor:

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

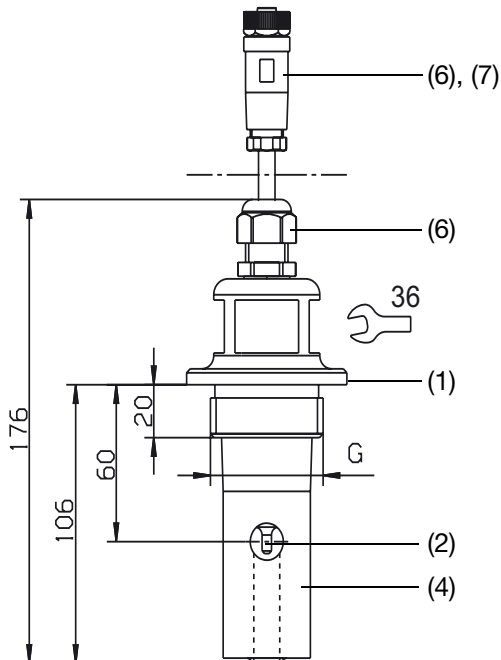
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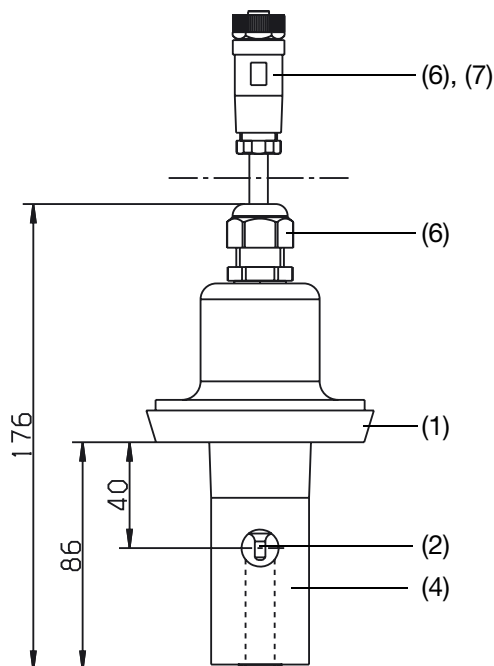
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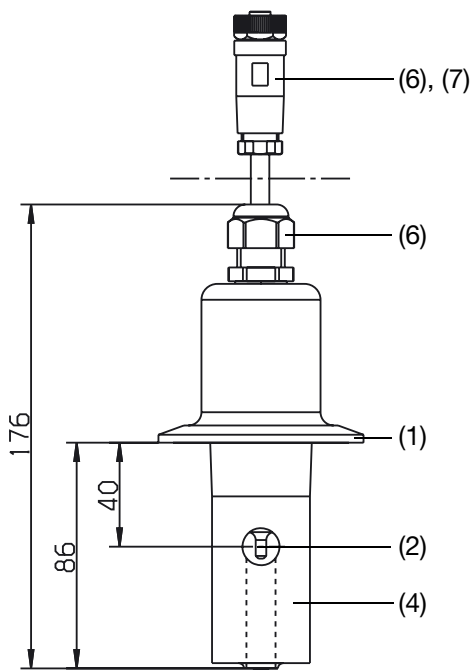
**Dimensions/process connections (separate sensor)**



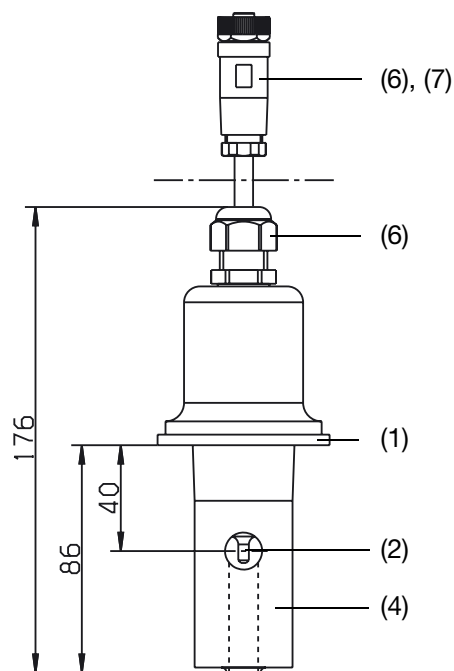
Version with process connection  
 107 = engaged thread G1 1/4A  
 108 = engaged thread G1 1/2A  
 110 = engaged thread G2A  
 and extra code 768



Remote version with process connection  
 606 = MK DN40  
 607 = MK DN50  
 608 = MK DN65  
 609 = MK DN80  
 and extra code 768  
 (union nut not included among the items supplied)



Remote version with process connection  
 617 = 2 1/2" clamp  
 and extra code 768  
 (retaining clamp not included among the items)



Remote version with process connection  
 690 = 2" SMS  
 and extra code 768  
 (union nut not included among the items supplied)

(1) = stainless steel 1.4301 (2) = stainless steel 1.4435 (4) = PVDF

(6) = PA6

(7) = PPS GF40

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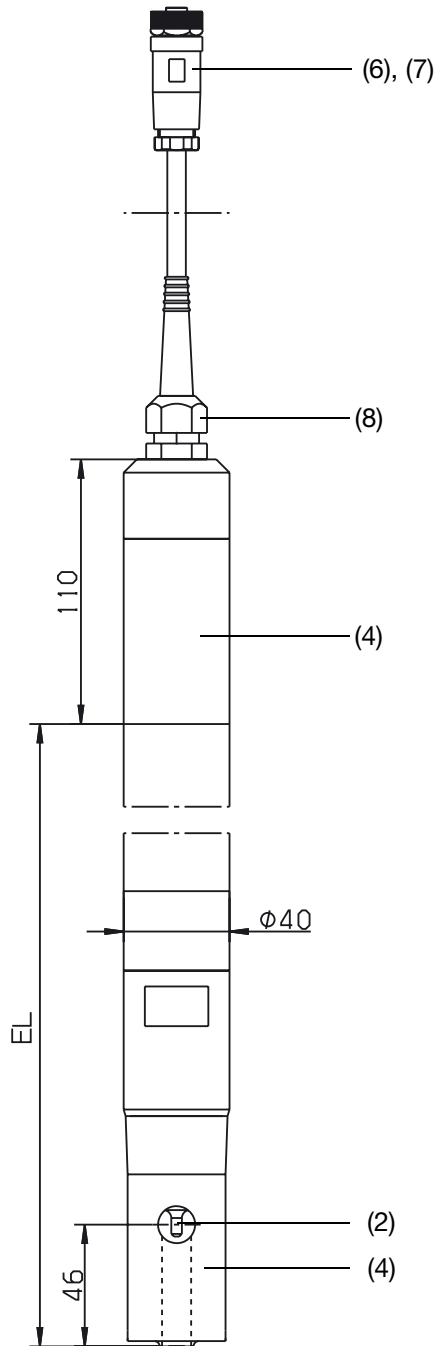
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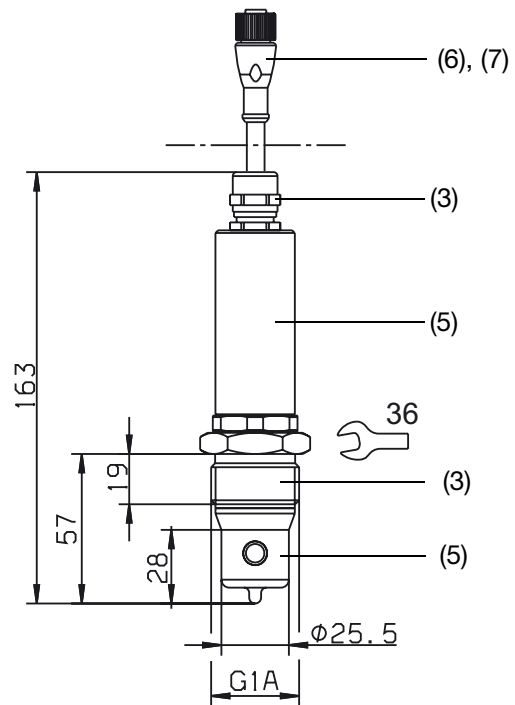
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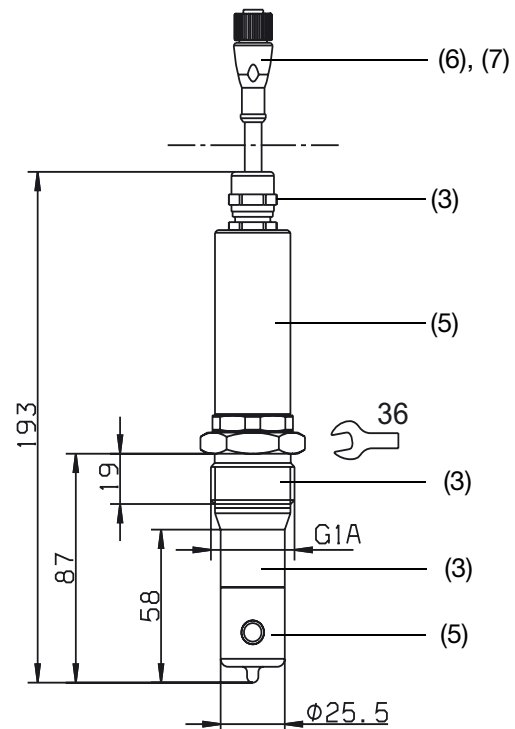
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Remote version with process connection 706  
Immersion version  
(pipe clamps not included among the items supplied)



Remote version with process connection  
955 = pressure screw G1", maximum immersion depth  
(EL) = 57 mm



Remote version with process connection  
956 = pressure screw G1", maximum immersion depth (EL) = 87 mm  
and extra code 767

(2) = stainless steel 1.4435    (3) = stainless steel 1.4305    (4) = PVDF    (5) = PEEK    (6) = PA6    (7) = PPS GF40    (8) = nickel-plated brass and EPDM

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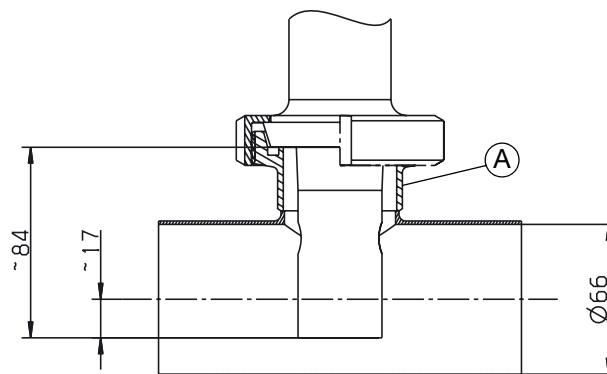
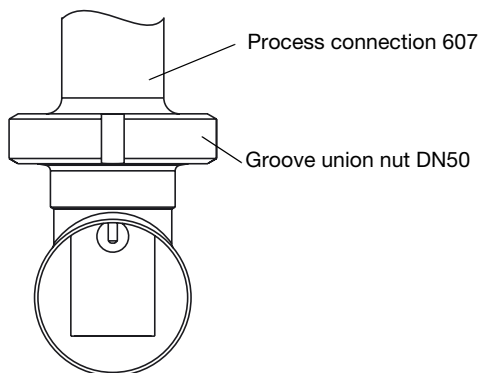
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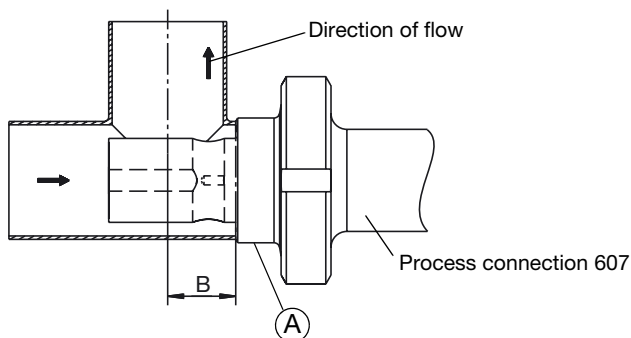


## Mounting examples

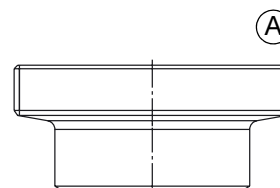
### Weld-on threaded adapter



Reducing T-piece, DIN, short, SSS DN65/50  
 (to be provided by customer; not supplied by JUMO)

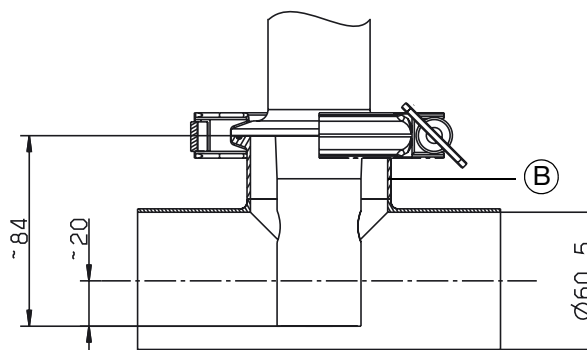
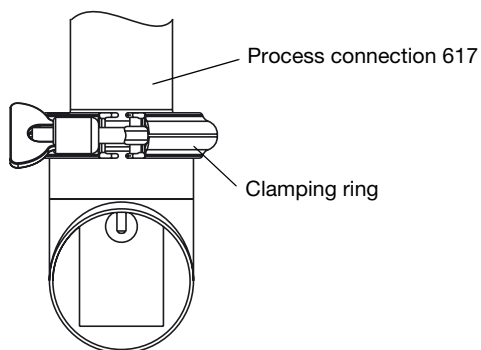


T-piece, DIN 11852, SSS DN50  
 Dimension B reduced to 30 mm  
 (to be provided by customer; not supplied by JUMO)



Weld-on threaded adapter  
 DN50, DIN 11 851  
 (mating piece for process connection 607)  
 Sales no.: 20/00085020

### Clamp



T-piece, short, SSS DN2.5"  
 (to be provided by customer; not supplied by JUMO)

B "inch" threaded adapter, SSS DN2.5"

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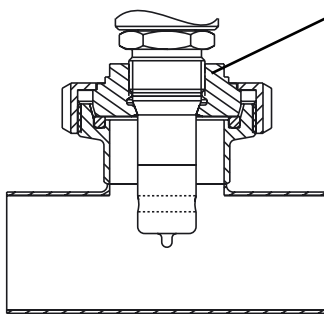
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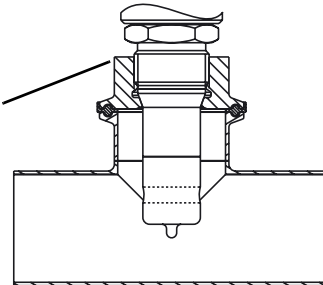
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**Pressure screw G1**

Process connection adapter  
Pressure screw G1A on pipe union DN50  
Sales No.: 20/00530355

Reducing T-piece, DIN, short, SSS DN65/50  
(to be provided by customer; not supplied by JUMO)

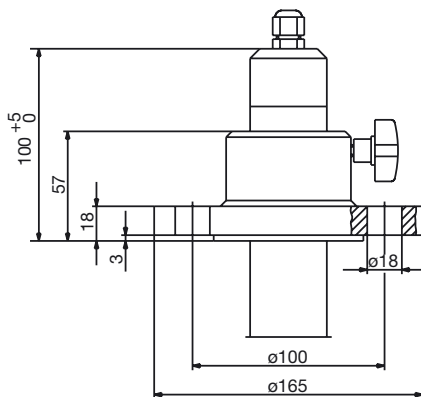
Process connection adapter  
Pressure screw G1A on 1" and 1.5" clamp  
Sales No.: 20/00530354



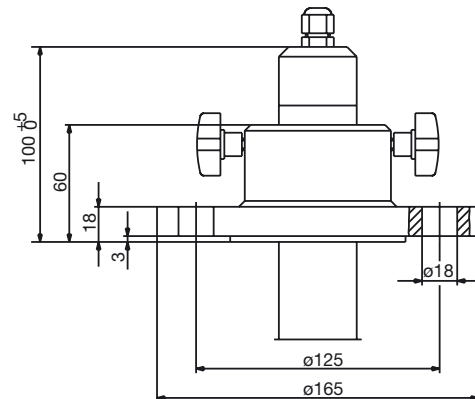
Reducing T-piece, DIN, short, SSS DN65/50  
(to be provided by customer; not supplied by JUMO)

**DN32 flange**

suitable for process connection 706  
Sales No. 20/00083375  
Material: PP

**DN50 flange**

suitable for process connection 706  
Sales No. 20/00083376  
Material: PP



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**Order details:** **JUMO tecLine Ci-S**  
**Inductive conductivity and temperature sensor**

**(1) Basic type**

202942 JUMO tecLine Ci-S  
 Inductive conductivity and temperature sensor for general process engineering

**(2) Basic type extension**

10 PVDF sensor body  
 20 PEEK sensor body (internal temperature sensor)

**(3) Process connection**

107 G1 1/4A thread<sup>1</sup>  
 108 G1 1/2A thread<sup>1</sup>  
 110 G2A thread<sup>1</sup>  
 606 Pipe union DN40, DIN 11 851(MK DN40, milk cone)<sup>1,3</sup>  
 607 Pipe union DN50, DIN 11 851(MK DN50, milk cone)<sup>1,3</sup>  
 608 Pipe union DN65, DIN 11 851(MK DN65, milk cone)<sup>1,3</sup>  
 617 2 1/2" clamp<sup>1,3</sup>  
 690 2" SMS<sup>1,3</sup>  
 706 Immersion version<sup>1,3</sup>  
 955 Pressure screw G1A, maximum immersion depth (EL) = 57 mm<sup>2</sup>  
 956 Pressure screw G1A, maximum immersion depth (EL) = 87 mm<sup>2</sup>

**(4) Immersion depth**

0000 without  
 0500 maximum immersion depth (EL) = 500 mm<sup>1,3,4</sup>  
 1000 maximum immersion depth (EL) = 1000 mm<sup>1,3,4</sup>  
 1500 maximum immersion depth (EL) = 1500 mm<sup>1,3,4</sup>  
 2000 maximum immersion depth (EL) = 2000 mm<sup>1,3,4</sup>

**(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  
 268 Internal temperature sensor

<sup>1</sup> For basic type extension 10 only (PVDF sensor body).  
<sup>2</sup> For basic type extension 20 only (PEEK sensor body).  
<sup>3</sup> Without mounting material (union nuts, retaining clamps, etc.)!  
<sup>4</sup> For process connection 706 only.

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



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**Stock versions** (delivery 3 working days after receipt of order)

Type	Designation	Sales No.
202942/10-607-0000-21-10/000	PVDF, pipe union DN50, DIN 11 851 (MK DN50, milk cone), 10 m fixed cable	20/00558364
202942/10-690-0000-21-10/000	PVDF, 2" SMS, 10 m fixed cable	20/00558365

**Accessories** (delivery 3 working days after receipt of order)

Designation	Sales No.
Weld-on threaded adapter DN50, DIN 11851 (mating piece for process connection 607)	(PG 209791) 20/00085020
Groove union nut DN50, DIN 11851	(PG 209791) 20/00343368
Groove union nut DN65, DIN 11851	(PG 209791) 20/00362956
Groove union nut SMS DN2"	(PG 209791) 20/00345162
DN32 flange <sup>1</sup> , PP material	(PG 202820) 20/00083375
DN50 flange <sup>1</sup> , PP material	(PG 202820) 20/00083376
Process connection adapter pressure screw G1A on pipe union DN50, DIN 11851 (MK DN50, milk cone)	(PG 209791) 20/00530355
Process connection adapter pressure screw G1A on 1" and 1.5" clamp	(PG 209791) 20/00530354
Calibration adapter for inductive conductivity measurement, type 202711/21	(PG 202711) 20/00543395

<sup>1</sup> 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 202566
- JUMO tecLine Ci-S inductive conductivity and temperature sensor
- Calibration adapter for inductive conductivity measurement, type 202711/21, data sheet 202711