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**JUMO Process Control, Inc.**  
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# JUMO tecLine CR

## Stainless steel and titanium conductive conductivity sensors

Type series 202924 (previous type series 2 EL6...)

### Typical areas of application

- Pure and highly-purified water
- Pharmaceutical industry
- Chemicals
- Food technology
- Chip manufacturing
- Ion exchangers
- Reverse osmosis plants

### Features

- 2-electrodes principle
- For measuring ranges from 0.05  $\mu\text{S}/\text{cm}$  to 1  $\text{mS}/\text{cm}$
- Sturdy design type
- Wide variety of process connections
- Various insertion lengths
- Pharmaceutical version available
- Made up of physiologically safe, FDA-compliant materials

### Brief description

JUMO conductivity sensors are used in conjunction with suitable transducers to define the electrolytic conductivity in liquids. The type series 202924 sensors work according to the 2-electrodes principle. The transducer supplies them with alternating voltage. The current that is carried through the liquid and the electrodes is defined by the medium's conductivity.

### Special versions

**Pharmaceutically-compliant conductivity sensors** with a surface roughness  $< 0.8 \mu\text{m}$  are supplied as "pharmaceutical packages" with certificates (ASTM test certificate, FDA approval for insulators and O-rings, inspection certificate 3.1). The sensors are packed air tight in foil.

A special conductivity sensor is available for **high temperature applications**. This sensor can be used for medium temperatures of up to 200 °C and a maximum pressure of 17 bar.

Furthermore, we also offer conductivity sensors as **thin versions** that have a shaft diameter of only 16 mm.



Type 202924/10... (Example)



Type 202924/20... (Example)



Type 202924/30... (Example)

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## Technical data

Type	202924/10...	202924/20...	202924/21...	202924/30...	202924/31...
Cell constants <sup>a</sup>	K = 0.01 cm <sup>-1</sup> K = 0.1 cm <sup>-1</sup>				
Typical measuring ranges <sup>b</sup>	0.05 to 10 µS/cm (when K = 0.01) 1 µS to 1 mS/cm (when K = 0.1)				
Temperature compensation	With Pt100 or Pt1000, both at least class A				
Process connections	Thread G 1/2 A, Thread G 3/4 A, Thread G 1 A, Thread 1/2"-14 NPT, Thread 3/4"-14 NPT, Taper socket for union nut DN 25 DIN 11851 (dairy pipe fitting), Clamp DN 25	Thread G 1/2 A Clamp DN 25	Clamp DN 25	JUMO PEKA Adapter: Orbital welding socket DN 25-40, VARIVENT® DN 50- 150	JUMO PEKA Adapter: Orbital welding socket DN 25-40, VARIVENT® DN 50- 150, Clamp DN 25-50, Aseptic DN 40/50, Aseptic NKS DN 40
Body materials	PVDF (default), Stainless steel 1.4571 (optional extra),  <b>High temperature version:</b> Stainless steel 1.4404 (optional extra)	Stainless steel 1.4435, similar to 316L, version for pharmaceutical industry			
Cell materials	Stainless steel 1.4571 (default), Titanium (optional extra)  <b>High temperature version:</b> Stainless steel 1.4404 (default)	Stainless steel 1.4435, similar to 316L, version for pharmaceutical industry			
Operating temperature	Up to 135 °C;  <b>High temperature version:</b> Up to 200 °C	Up to 135 °C		Up to 135 °C (standard operation); Up to 150 °C (sterilization, max. 45 min.)	
Maximum pressure	16 bar at 25 °C or 9 bar at 60 °C;  <b>High temperature version:</b> 40 bar at 25 °C or 17 bar at 200 °C;	16 bar at 25 °C or 1 bar at 135 °C		9 bar at 25 °C or 5 bar at 150 °C, max. 45 min.	
Electrical connections	Right-angle connector (default) Fixed cable (optional extra)  <b>High temperature version:</b> Right-angle connector	M12 connector (default) Fixed cable (optional extra) Right-angle con- nector (optional extra)	M12 connector		

### Certificates

ASTM test certificate	Determination of the exactly measured cell constant according to ASTM D1125-95 and ASTM D5391-99 (one-point calibration)
FDA approval	The plastics used (insulators and O-rings) are FDA-listed
Optional certificates	Certificate of compliance according to EN 10204 2.1, EN 10204 2.2, EN 10204 3.1 (material, roughness)

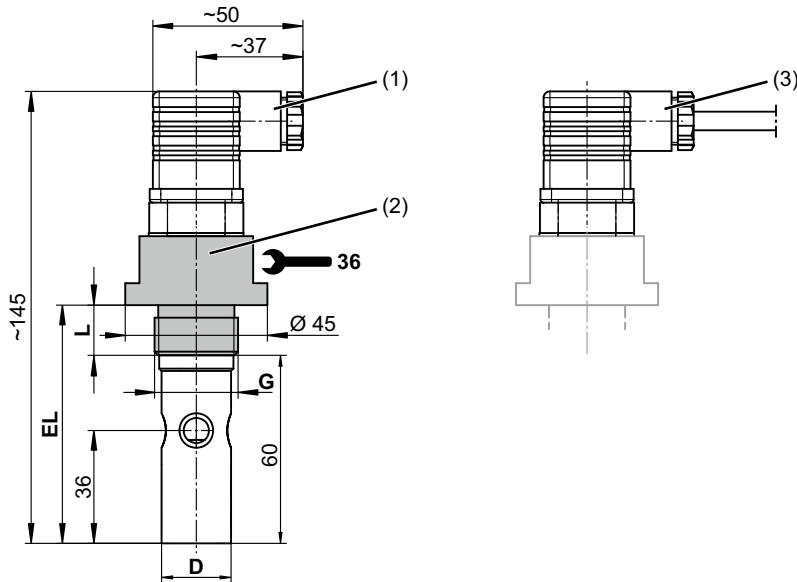
<sup>a</sup> The cell constant can differ by ±10 % of the nominal value depending on manufacturing. This deviation can be equalized on the transducer.

<sup>b</sup> The measuring ranges depend on the transducer being used. When used in measuring ranges larger than the "typical" one, incorrect measured values may occur due to polarization.



## Type 202924/10 dimensions...

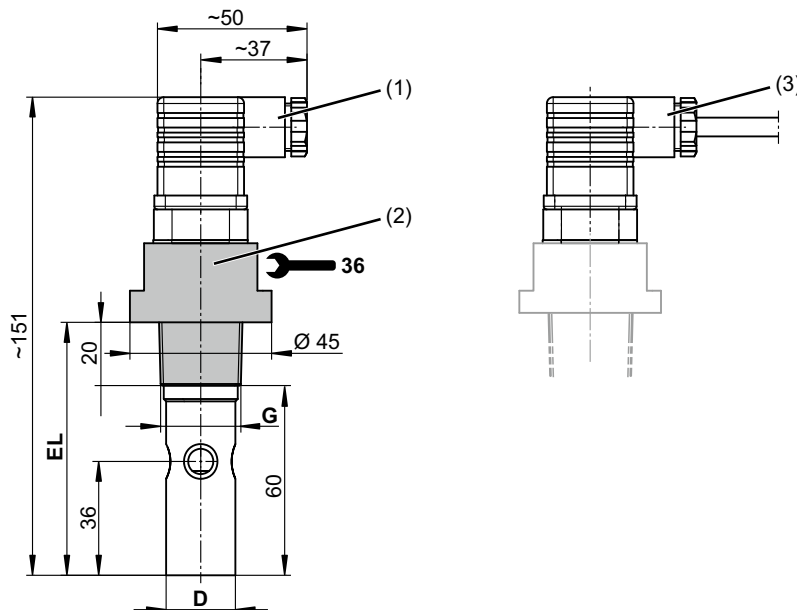
### Process connections -104, -105 und -106 (G thread)



Thread	L	Shaft Ø	Insertion length EL
G 1/2 A	14	16	74
G 3/4 A	16	22	76
G 1 A	18	22	78

- (1) Right-angle connector (default)      (3) Fixed cable (optional extra)  
 (2) Process connection

### Process connections -144 and -145 (NPT thread)



Thread	Shaft Ø	Insertion length EL
G	D	EL
1/2-14 NPT	16	80
3/4-14 NPT	22	80

- (1) Right-angle connector (default)      (3) Fixed cable (optional extra)  
 (2) Process connection

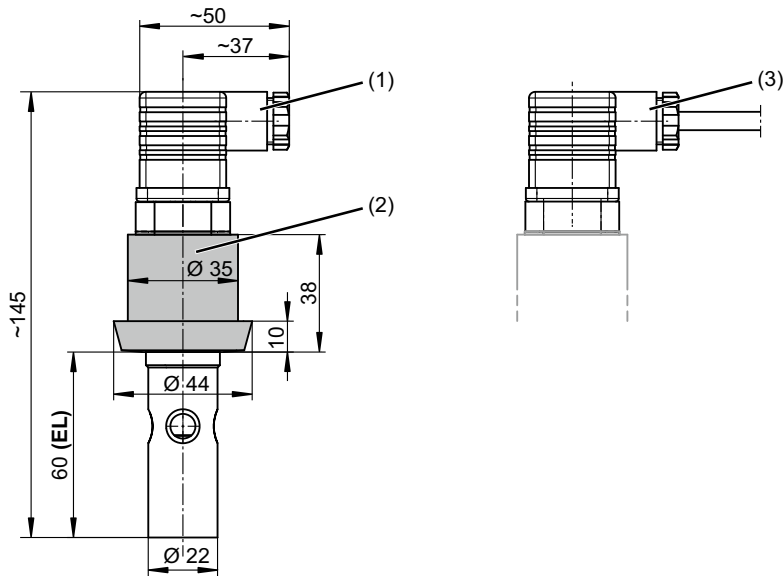
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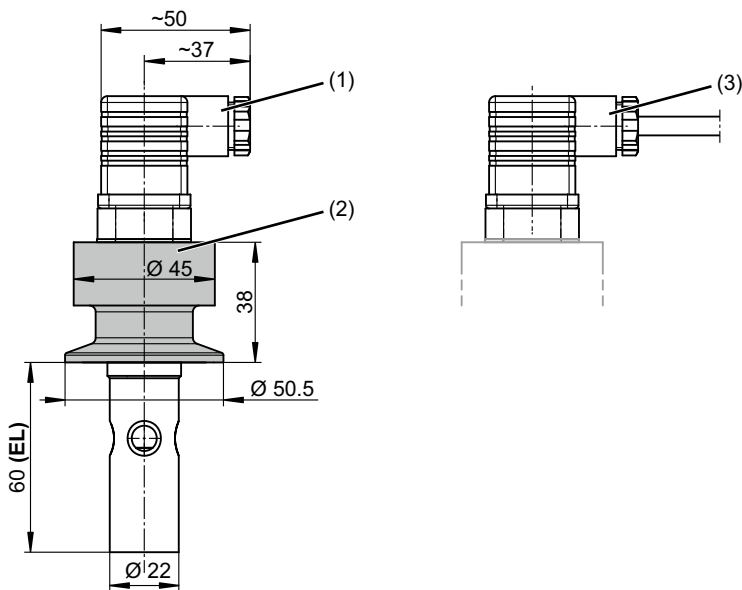


**Process connection -604 "dairy pipe fitting"  
 (taper socket with union nut DN 25 DIN 11851)**



- (1) Right-angle connector (default)
- (2) Process connection
- (3) Fixed cable (optional extra)

**Process connection -613 (clamp DN 25)**



- (1) Right-angle connector (default)
- (2) Process connection
- (3) Fixed cable (optional extra)

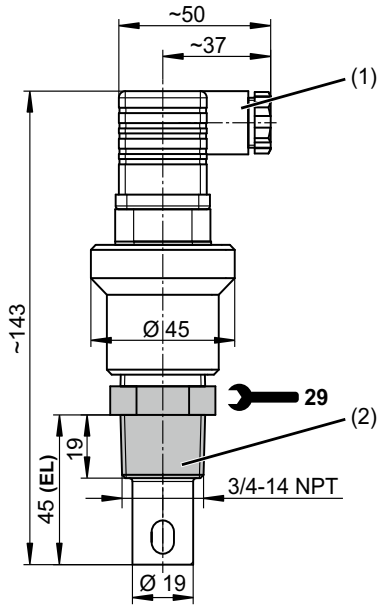
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### High temperature version (extra code -765)

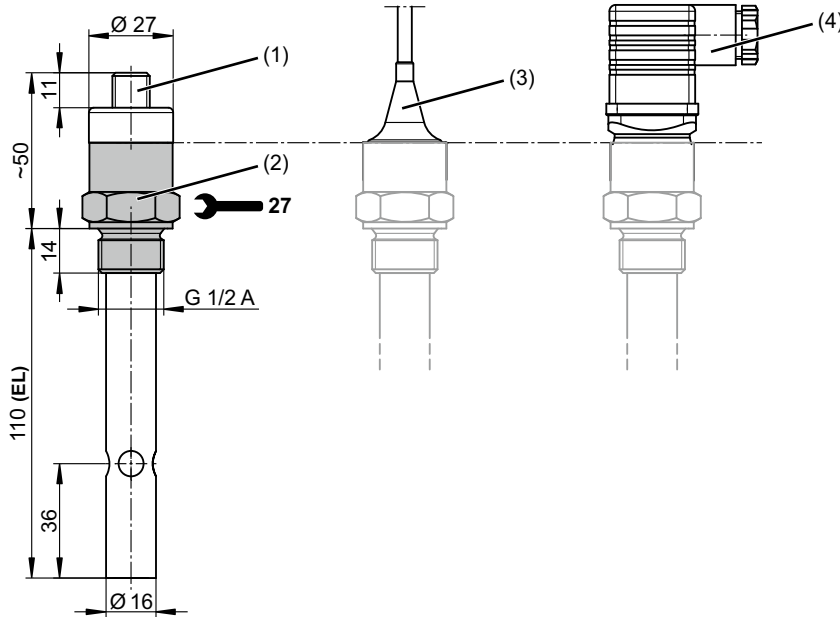


- (1) Right-angle connector
- (2) Process connection



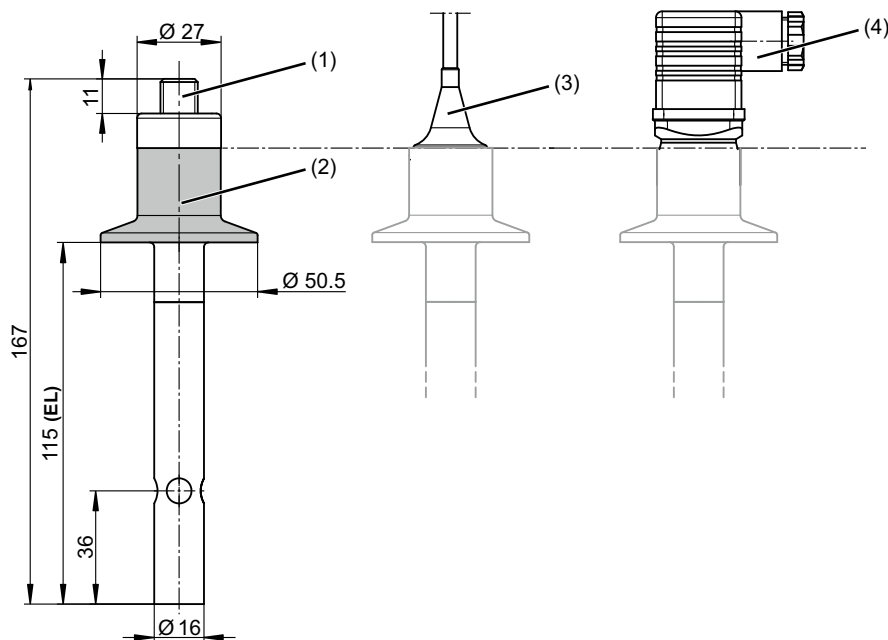
## Type 202924/20 dimensions...

### Process connection -104 (thread G 1/2 A)



- (1) M12 connector (default)
- (2) Process connection
- (3) Fixed cable (optional extra)
- (4) Right-angle connector (optional extra)

### Process connection -613 (clamp DN 25)

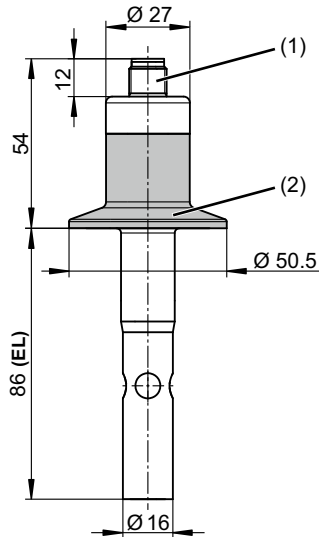


- (1) M12 connector (default)
- (2) Process connection
- (3) Fixed cable (optional extra)
- (4) Right-angle connector (optional extra)



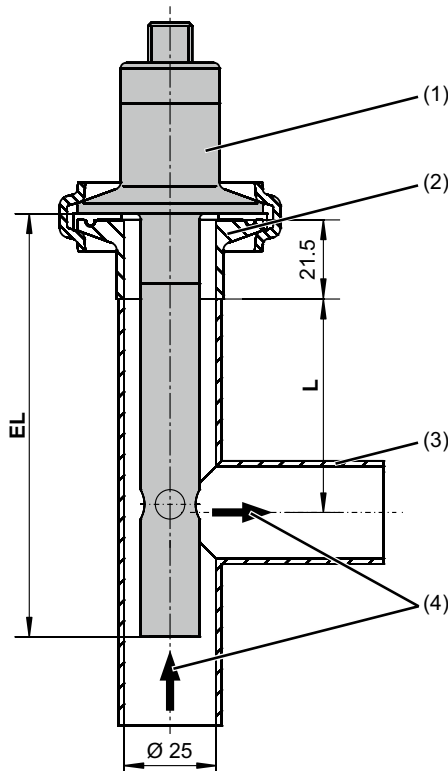
## Type 202924/21 dimensions...

### Process connection -613 (clamp DN 25)



- (1) M12 connector
- (2) Process connection

## Type 202924/20... and /21... installation example



- (1) Sensor with process connection clamp DN 25
- (2) Clamp socket DIN DN 25, 1", ISO DN 20
- (3) T-piece (**not included in the scope of delivery!**)
- (4) Flow direction

Recommended T-piece for installing the sensors

Sensor	T-piece	Length L
202924/20... EL = 115 mm	DIN 11852, DN 25	50 mm
202924/21... EL = 86 mm	Similar DIN 11852, DN 25	27 mm

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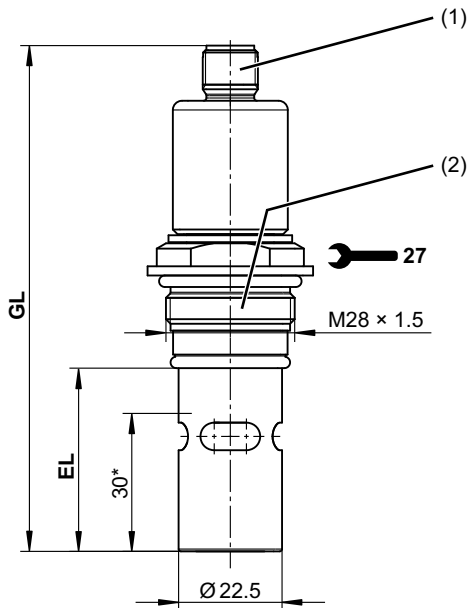
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## Type 202924/30... and /31... dimensions

### Process connection -997 (JUMO PEKA hygienic process connection)



Installation length EL	Total length GL	Sensor type
40	110	202924/30...
70	140	202924/31...

- (1) M12 connector
- (2) Process connection 997 (PEKA),  
Stainless steel 1.4435

\* Minimum immersion depth



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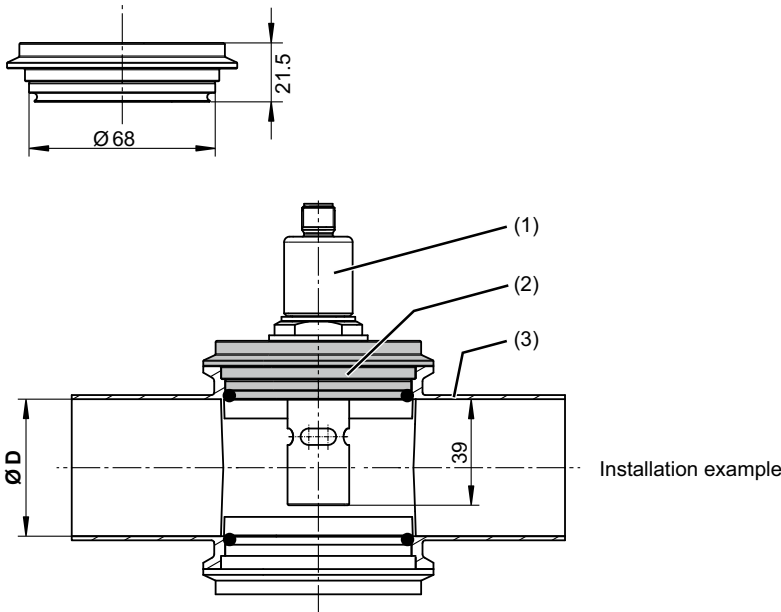
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**Process connection adapter for type 202924/30... and /31...**

**Varivent DN 40 - 150**  
 Part no.: 00577961



VARIVENT® housing DN <sup>a</sup>	Ø D	Sensor type
40	40	--
50	50	202924/30
65	70	202924/30
80	81	202924/30 <sup>b</sup> 202924/31
100	100	202924/30 <sup>b</sup> 202924/31
125	125	202924/30 <sup>b</sup> 202924/31
150	150	202924/30 <sup>b</sup> 202924/31

<sup>a</sup> To be provided by the customer.

<sup>b</sup> Preferred sensor type.

**O-ring not included in the scope of delivery!**

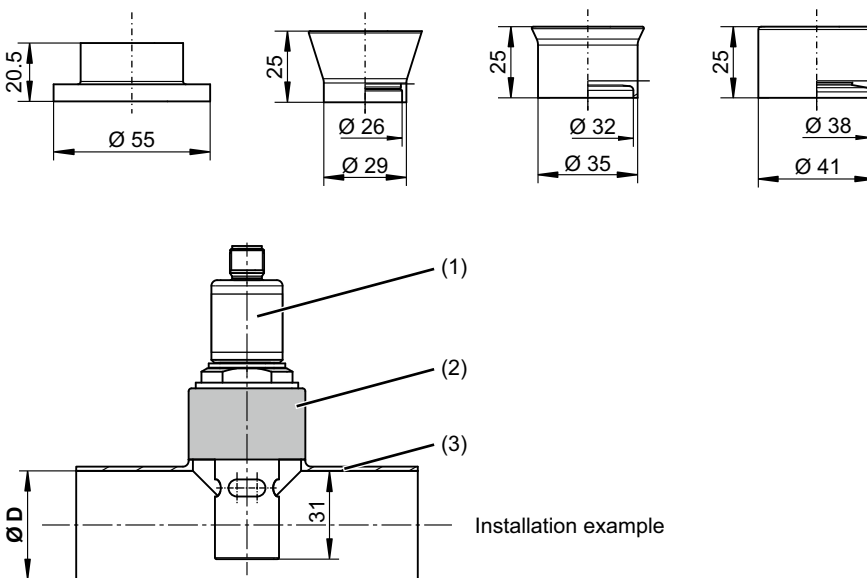
- (1) JUMO tecLine CR-PEKA sensor
- (2) VARIVENT® DN 40 - 150 process adapter
- (3) VARIVENT® housing

**Welding socket Ø 55**  
 Part no.: 00447190

**Orbital welding socket DN 25**  
 Part no.: 00530211

**Orbital welding socket DN 32**  
 Part no.: 00530212

**Orbital welding socket DN 40**  
 Part no.: 00531973



Orbital welding socket DN	T-piece DN <sup>a</sup>	Ø D	Sensor type <sup>e</sup>
25/32/40	40-25/32/40	38	202924/30
	50-25/32/40	50	
	65-25/32/40	70	
	80-25/32/40	81	202924/30 <sup>b</sup> 202924/31
	100-25/32/40	100	202924/30 <sup>b</sup> 202924/31
	125-25/32/40	125	202924/30 <sup>b</sup> 202924/31
150-25/32/40	150	202924/30 <sup>b</sup> 202924/31	

<sup>a</sup> To be provided by the customer.

<sup>b</sup> Preferred sensor type.

- (1) JUMO tecLine CR-PEKA sensor
- (2) Welding socket
- (3) Short T-piece, similar to DIN 11852

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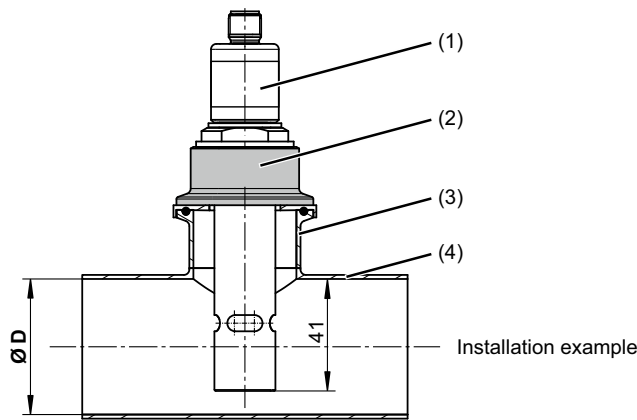
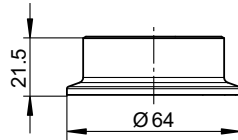
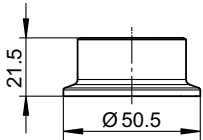
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**Process connection adapter for type 202924/31...**

**Clamp DN 25/32/40**  
 Part no.: 00577998

**Clamp DN 50**  
 Part no.: 00577997



Clamp socket DN <sup>a</sup>	T-piece DN <sup>a</sup>	Ø D
25/32/40	50 - 25/32/40	50
	65 - 25/32/40	70
	80 - 25/32/40	81
	100 - 25/32/40	100
	125 - 25/32/40	125
50	150 - 25/32/40	150
	50 - 50	50
	65 - 50	70
	80 - 50	81
	100 - 50	100
	125 - 50	125
	150 - 50	150

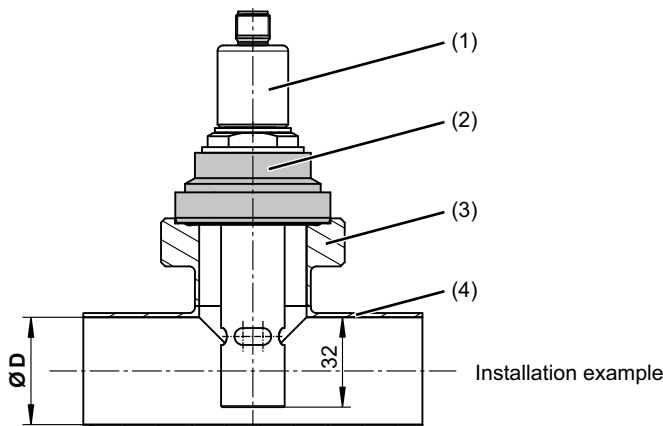
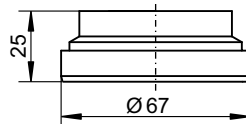
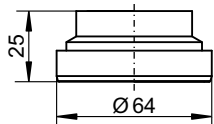
<sup>a</sup> To be provided by the customer.

**O-ring not included in the scope of delivery!**

- (1) JUMO tecLine CR-PEKA sensor
- (2) Clamp process adapter
- (3) Clamp socket DIN 32676
- (4) Short T-piece, similar to DIN 11852

**Aseptic DN 40**  
 Part no.: 00577995

**Aseptic DN 50**  
 Part no.: 00577979



Threaded connection DN <sup>a</sup>	T-piece DN <sup>a</sup>	Ø D
40	40 - 40	38
	50 - 40	50
	65 - 40	70
	80 - 40	81
	100 - 40	100
	125 - 40	125
50	150 - 40	150
	50 - 50	50
	65 - 50	70
	80 - 50	81
	100 - 50	100
	125 - 50	125
	150 - 50	150

<sup>a</sup> To be provided by the customer.

**O-ring not included in the scope of delivery!**

- (1) JUMO tecLine CR-PEKA sensor
- (2) Aseptic process adapter
- (3) Threaded connection DIN 11864-1
- (4) Short T-piece, similar to DIN 11852

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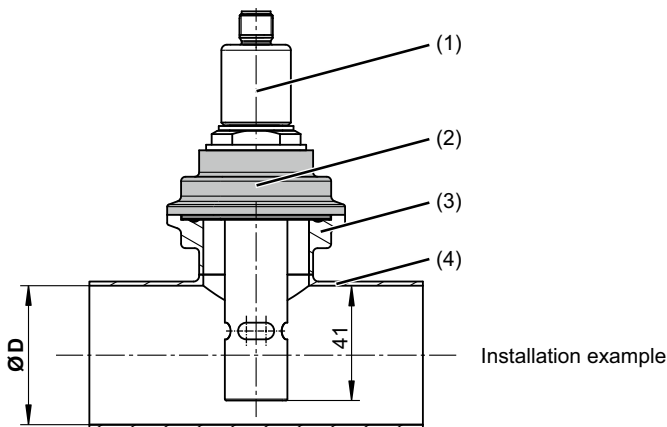
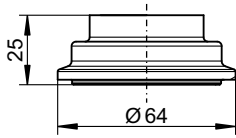
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**Aseptic NKS DN 40**

Part no.: 00577999



Collar clamp socket <sup>a</sup>	T-piece DN <sup>a</sup>	Ø D
NKS DN 40 form A	50 - 40	50
	65 - 40	70
	80 - 40	81
	100 - 40	100
	125 - 40	125
	150 - 40	150

<sup>a</sup> To be provided by the customer.

**O-ring not included in the scope of delivery!**

- (1) JUMO tecLine CR-PEKA sensor
- (2) Aseptic process adapter NKS DN 40
- (3) Collar clamp socket DIN 11864-3
- (4) Short T-piece, similar to DIN 11852


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## Electrical connection

Connection for	right-angle connector	M12 connector	Fixed cable
Outer electrode		1	White
Inner electrode	2	2	Brown
Temperature compensation (optional extra)	1	3	Yellow
	3	4	Green
3-wire circuit		5	

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## Order details

					<b>(1) Basic type</b>	
202924					Conductivity sensors	
					<b>(2) Basic type extension</b>	
10					JUMO tecLine CR-VA (Ø 22 mm and others)	
20					JUMO tecLine CR-VA SL (Ø 16 mm, insertion length 115 mm)	
21					JUMO tecLine CR-VA SL-S (Ø 16 mm, insertion length 86 mm)	
30					JUMO tecLine CR-PEKA S (Ø 22.5 mm, insertion length 40 mm)	
31					JUMO tecLine CR-PEKA L (Ø 22.5 mm, insertion length 70 mm)	
					<b>(3) Cell constant</b>	
X	X	X	X	X	0001	K = 0.01 (measuring range 0.1 to 20 MΩcm or 0.05 to 10 µS/cm) <sup>a</sup>
X	X	X	X	X	0010	K = 0.1 (measuring range 1 µS to 1 mS/cm) <sup>a</sup>
					<b>(4) Measuring insert</b>	
X	X	X			0000	None
X	X	X			1003	Pt100
X	X	X	X	X	1005	Pt1000
					<b>(5) Process connection</b>	
X	X				104	Thread G 1/2 A
X					105	Thread G 3/4 A
X					106	Thread G 1 A
X					144	Thread 1/2"-14 NPT
X					145	Thread 3/4"-14 NPT
X					604	Taper socket for union nut DN 25 DIN 11851 (dairy pipe fitting)
X	X	X			613	Clamp DN 25
			X	X	997	JUMO PEKA <sup>b</sup> hygienic process connection
					<b>(6) Electrical connection</b>	
X	X				17	Permanent cable connection, line length 5 m
X	X				37	Right-angle connector according to DIN 43650
	X	X	X	X	83	M12 connector
					<b>(7) Process connection material</b>	
X					24	Stainless steel 1.4404 (only in HT version (extra code 765))
X					26	Stainless steel 1.4571
X	X	X	X	X	31	Stainless steel 1.4435 (similar to 316L, version for pharmaceutical industry)
X					88	PVDF (default)
					<b>(8) Electrode material</b>	
X	X	X			24	Stainless steel 1.4404 (only in HT version (extra code 765))
X					26	Stainless steel 1.4571
X	X	X	X	X	31	Stainless steel 1.4435 (similar to 316L, version for pharmaceutical industry)
X	X				60	Titanium <sup>c</sup>
					<b>(9) Extra code</b>	
X	X	X	X	X	000	None
X					765	High temperature (HT) version <sup>d</sup> (Cell constant K = 0.1)

<sup>a</sup> The measuring ranges depend on the transducer being used. When used in measuring ranges larger than the "typical" one, incorrect measured values may occur due to polarization.

<sup>b</sup> Please order PEKA adapters separately, see accessories.

<sup>c</sup> Only available in connection with process connection material 88 (PVDF).

<sup>d</sup> Only available with process connection 145 (thread 3/4"-14 NPT).

**Order code**      (1) / (2) - (3) - (4) - (5) - (6) - (7) - (8) / (9)

**Order example**      202924 / 10 - 0010 - 1003 - 105 - 37 - 88 - 26 / 000

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 Email: info.us@jumo.net  
 Internet: www.jumousa.com



**Important information:**

The order code is not modular. When placing orders, if possible please select the items listed under "**Stock versions**" or "**Production versions**".  
**We must check the technical feasibility of and approve freely chosen combinations of individual code parts.**

## Stock versions

### Standard

Delivery within 3 working days after receipt of order

Order code	Brief description	Part no.
202924/10-0010-0000-105-37-88-26/000	K = 0.1/G 3/4A	00300203
202924/10-0010-1003-105-37-88-26/000	K = 0.1/Pt100/G 3/4A	00300202
202924/10-0010-1003-104-37-88-26/000	K = 0.1/Pt100/G 1/2A	00338487
202924/10-0001-0000-105-37-88-26/000	K = 0.01/G 3/4A	00300204
202924/10-0001-1003-105-37-88-26/000	K = 0.01/Pt100/G 3/4A	00300079
202924/10-0001-1003-106-37-88-26/000	K = 0.01/Pt100/G 1A	00089393
202924/20-0010-1003-104-83-31-31/000	K = 0.1/Pt100/G 1/2A/Ø 16 mm	00456809
202924/20-0001-1003-104-83-31-31/000	K = 0.01/Pt100/G 1/2A/Ø 16 mm	00452527

### Pharmaceutical packages with certificates

Order code	Cell constant	Measuring insert	Brief description	Part no.
202924/10-0001-1003-613-37-31-31/000	K = 0.01	Pt100 class A	Clamp DN 25 and object in stainless steel 1.4435, packed air tight in foil, incl. ASTM test certificate, FDA approval for insulators and O-rings, inspection certificate 3.1, R <sub>a</sub> < 0.8 µm	00420617
202924/10-0010-1003-613-37-31-31/000	K = 0.1			00405886
202924/20-0001-1003-613-83-31-31/000	K = 0.01			00456810
202924/20-0010-1003-613-83-31-31/000	K = 0.1			00456812
202924/21-0001-1005-613-83-31-31/000	K = 0.01	Pt1000 class A		00620488
202924/21-0010-1005-613-83-31-31/000	K = 0.1			00620490
202924/30-0001-1005-997-83-31-31/000 <sup>a</sup>	K = 0.01			00562982
202924/30-0010-1005-997-83-31-31/000 <sup>a</sup>	K = 0.1			00562983
202924/31-0001-1005-997-83-31-31/000 <sup>a</sup>	K = 0.01			00562984
202924/31-0010-1005-997-83-31-31/000 <sup>a</sup>	K = 0.1			00562986

<sup>a</sup> Please order PEKA adapters separately, see accessories.

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## Manufacturing versions

### Standard

Delivery within 10 working days after receipt of order

Order code	Brief description	Part no.
202924/10-0001-0000-105-37-26-26/000	K = 0.01/G 3/4 A/process connection 1.4571	00353041
202924/10-0001-1003-604-37-88-26/000	K = 0.01/Pt100/dairy pipe fitting	00089395
202924/10-0010-1003-106-37-88-26/000	K = 0.1/Pt100/G 1A	00089389
202924/10-0010-0000-105-37-26-26/000	K = 0.1/G 3/4 A/process connection 1.4571	00350627
202924/10-0010-1003-613-37-26-26/000	K = 0.1/Pt100/clamp DN 25/process connection 1.4571	00322533

### High temperature version

Order code	Brief description	Part no.
202924/10-0010-1003-145-37-24-24/765	K = 0.1/Pt100/NPT3/4-14	00397615

### Versions prepared for certificates

Order code	Brief description	Part no.
202924/10-0001-1003-105-37-88-26/000	K = 0.01/Pt100/G 3/4 A Version able to receive certificate – certificates must be ordered separately	00392030
202924/10-0010-1003-105-37-88-26/000	K = 0.1/Pt100/G 3/4 A Version able to receive certificate – certificates must be ordered separately	00392031

### Optional certificates

Item	Part no.
Inspection certificate according to EN 10204 3.1 (please clearly specify when ordering: "material" and/or "roughness")	00365727
ASTM test certificate for exactly measured cell constant (one-point calibration)	00359893
FDA approval for insulators and O-rings	00423913

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## Accessories

### Cable

Item	Part no.
Connecting cable, length 25 m, assembly by user, 4-pin + screen	00303681
Connecting cable, length 50 m, assembly by user, 4-pin + screen	00304181
Connecting cable including M12 cable socket (straight), length 10 m, 4-pin + screen	00458513
Connecting cable including M12 cable socket (straight), length 25 m, 4-pin + screen	00458514
Cable box M12 × 1, 4-pin, 713 series, angled form (cable not included in scope of delivery), gold-plated contacts	00318906

### JUMO PEKA process connection adapter

Item	Part no.
... for VARIVENT® DN 40 - 125, stainless steel 1.4435/316 L <sup>a</sup>	00577961
... for clamp DN 25/32/40, stainless steel 1.4435/316 L <sup>a</sup>	00577998
... for clamp DN 50, stainless steel 1.4435/316 L <sup>a</sup>	00577997
... for aseptic DN 40, stainless steel 1.4435/316 L <sup>a</sup>	00577995
... for aseptic DN 50, stainless steel 1.4435/316 L <sup>a</sup>	00577979
... for aseptic NKS DN 40, stainless steel 1.4435/316 L <sup>a</sup>	00577999
Welding socket M 28, Ø 55 mm, stainless steel 1.4435/316L	00447190
Orbital welding socket DN 25, stainless steel 1.4435/316L	00530211
Orbital welding socket DN 32, stainless steel 1.4435/316L	00530212
Orbital welding socket DN 40, stainless steel 1.4435/316L	00531973

<sup>a</sup> Including inspection certificate 3.1, R<sub>a</sub> < 0.8 µm