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# JUMO tecLine Lf-VA Electrolytic Conductivity Cells in stainless steel or titanium

## 202924 Series (formerly 2 EL6... Series)

- k 2-electrode system
- k for ranges from 0.05  $\mu\text{S}/\text{cm}$  to 1  $\text{mS}/\text{cm}$
- k large variety of process connections
- k rugged construction
- k version for pharmaceutical requirements can be supplied
- k shaft diameter 16 mm (with version 202924/20-...)

## Brief description

Conductivity cells are used in conjunction with conductivity transmitters for determining the electrolytic conductivity in liquids. The materials used for the cells are physiologically safe and conform to FDA requirements.

JUMO conductivity cells in the 202924/10... and 202924/20... series can be used in areas such as:

- pure and high-purity water applications
- pharmaceutical and chemical industries, food processing technology
- chip manufacture
- ion exchangers
- reverse osmosis plant

Conductivity cells that **meet pharmaceutical requirements** can be delivered with a surface roughness of  $<0.8\mu$ , if so requested. A standard factory test certificate to EN10 204-3.1B is included in the delivery. The electrodes are individually packed in film.

A special conductivity cell is available for **high-temperature applications**. This cell can be operated at media temperatures up to 200°C and a maximum pressure of 17 bar.

## Principle of operation

The measuring cells in the 20.2924 series are 2-electrode cells. An a.c. voltage is applied through a transmitter. The current flowing through the liquid and the electrodes is determined by the conductivity of the liquid.

## Technical data

Cell constant <sup>1</sup>	$K = 0.01$ or $K = 0.1$
Typical measuring ranges	0.1 — 20 $\text{M}\Omega\text{cm}$ or 0.05 — 10 $\mu\text{S}/\text{cm}$ (for $K = 0.01$ ) or 1 $\mu\text{S}$ — 1 $\text{mS}/\text{cm}$ (for $K = 0.1$ )
Temperature compensation	with Pt100 or Pt1000 or 2xPt100 (twin Pt100)
Process connection	thread G1/2; G3/4"; G1"; NPT3/4; NPT1/2; milk cone DN25; clamp DN25; clamp DN50
Body material	PVDF (standard); stainless steel 1.4435 (optional); stainless steel 1.4571 (optional); PEEK (optional)
Cell material	stainless steel 1.4571 (standard); stainless steel 1.4435 (optional); titanium (optional)
Operating temperature	Type 202924/10: up to +135°C; high-temperature version: up to +200°C Type 202924/20: up to +135°C
Maximum pressure	Type 202924/10: 16 bar at 25°C or 9 bar at 60°C; high-temperature version: 40 bar at 25°C or 17 bar at 200°C Type 202924/20: 16 bar at 25°C or 1 bar at 135°C
Optional certificates	factory certificate to EN 10204 2.1; EN 10204 2.2; EN 10204 3.1 (material, roughness)
ASTM test certificate:	determination of the precisely measured cell constant according to ASTM D1125-95 and ASTM D5391-99 (1-point calibration)
FDA approved:	the plastic materials used (insulator and O-rings) are FDA-listed.

<sup>1</sup> Cell constant deviations can be adjusted on the transmitter.

<sup>2</sup> The measuring ranges also depend on the transmitter used.

When used for wider ranges than the "typical" ones, measurement errors caused by polarization may occur.



Type 202924/10-xxxx-1003-105-37-88-26



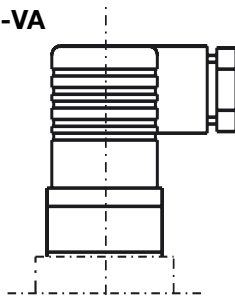
Type 202924/20-xxxx-1003-613-83-31-31

# Dimensions / Overview of types

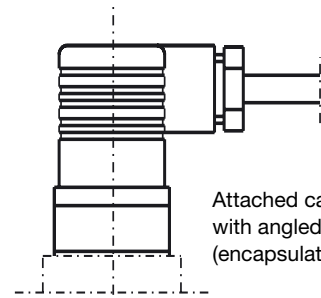
Types: JUMO teLine LF-VA

Electrical connections

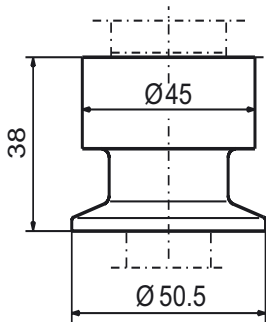
Angled connector



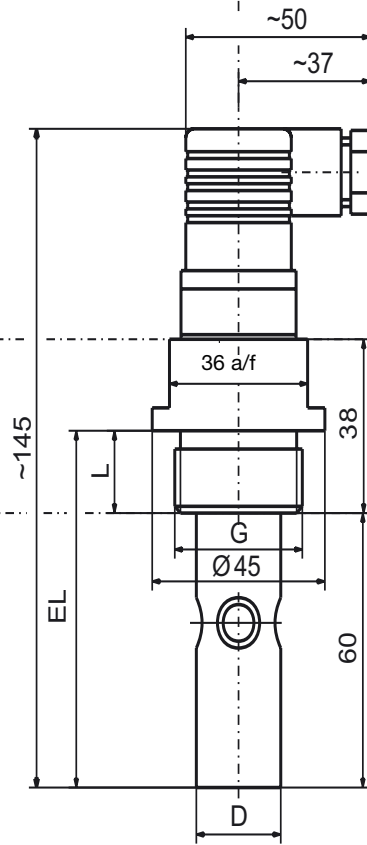
Attached cable with angled connector (encapsulated)



Process connections



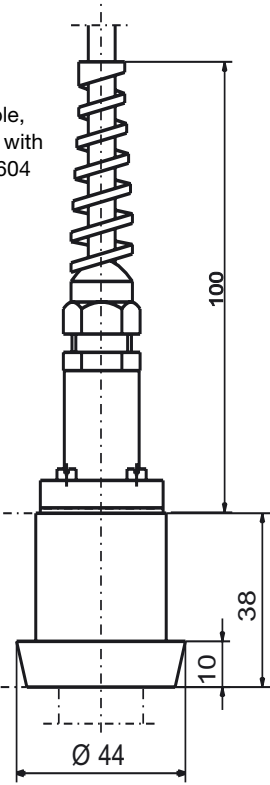
Clamp DN25



Thread

K = 0.01  
K = 0.1

Attached cable, straight, only with connection -604



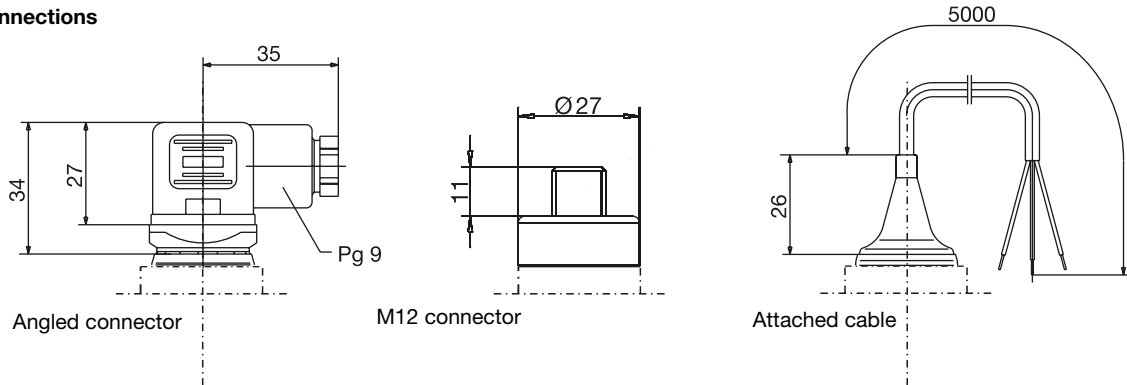
MK DN25  
(milk cone to DIN 11 851)  
(EL = 60 mm)

G (thread)	L	Shaft diameter D	EL (fitting length)
NPT3/4-14	20	22	80
G1A	18	22	78
G3/4A	16	22	76
G1/2A	14	16	74

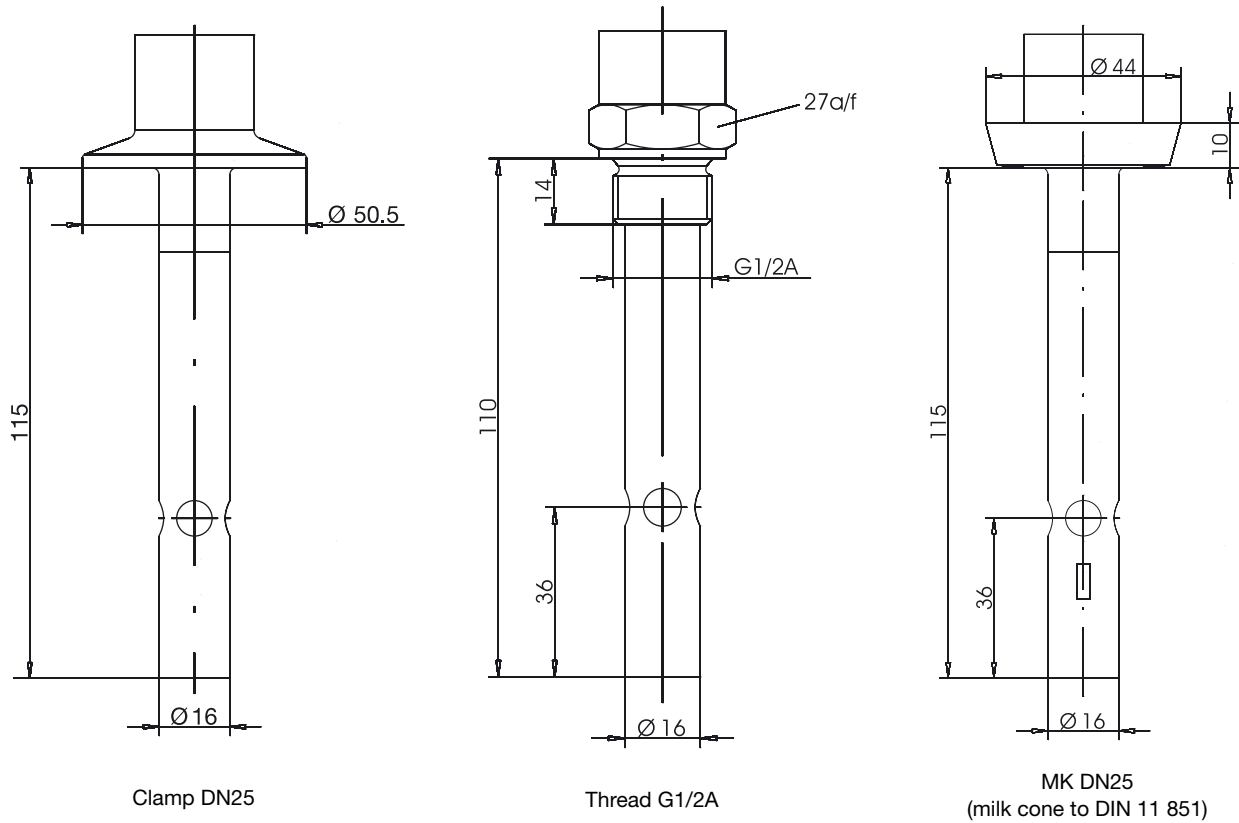
**Types: JUMO tecLine LF-VA SL (16 mm dia.)**

All process connections shown here can be combined with the electrical connections.

**Electrical connections**

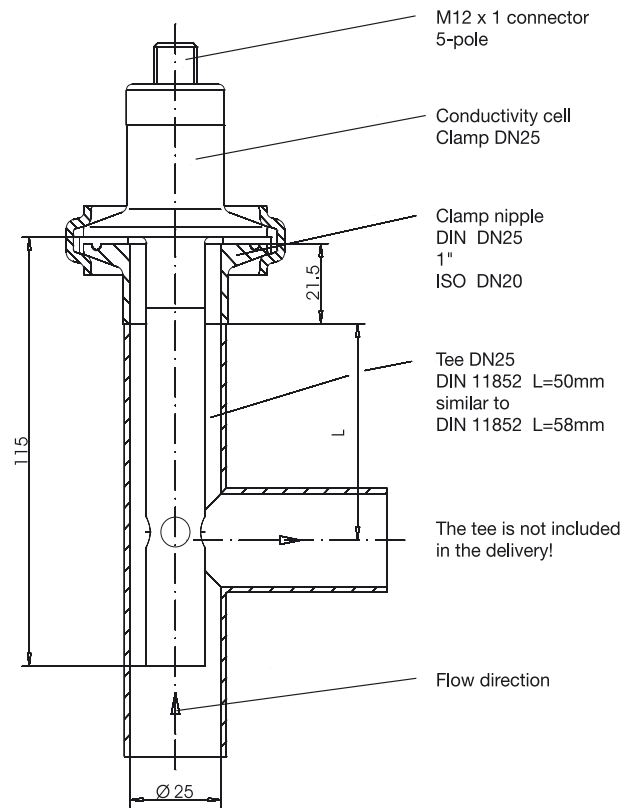
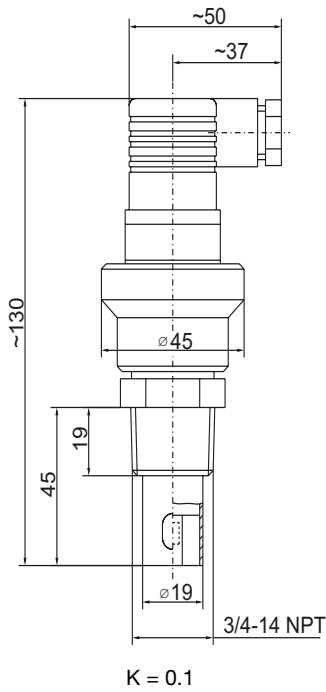


**Process connections**



Extra code /765: high-temperature version  
 (available for process connection 3/4-14NPT (145) only)

### Installation example Type 202924/20



### Electrical connection

Connection for	Connector	M12 connector	Attached cable
Outer electrode	⊕	1	white
Inner electrode	2	2	brown
Temperature compensation*	1 3	3 4	yellow green
3-wire circuit		5	

\*option

## Order details

(1) **Basic type**  
202924 Conductivity cells

(2) **Basic type extensions**

10 JUMO techLine Lf-VA  
20 JUMO techLine Lf-VA SL (16 mm dia.)

(3) **Cell constant**

0001 K = 0.01 (range 0.1 – 20MΩcm or 0.05 – 10μS/cm)  
0010 K = 0.1 (range 1μS – 1mS/cm)

(4) **Temperature sensor**

0000 none  
1003 Pt100  
1005 Pt1000

(5) **Process connection**

104 thread G1/2A  
105 thread G3/4A  
106 thread G1A  
144 1/2"-14 NPT  
145 3/4"-14 NPT  
604 taper connection DIN 11 851-DN25 (milk cone)  
613 clamp DN25

(6) **Electrical connection**

17 attached cable connection, cable length 5 m  
37 angled connector to DIN 43 650  
83 M12 connector

(7) **Body material**

26 stainless steel 1.4571  
31 stainless steel 1.4435 (similar to 316L, pharmaceutical version)  
79 PEEK<sup>1</sup>  
88 PVDF (standard)

(8) **Cell material**

26 stainless steel 1.451 (standard)  
31 stainless steel 1.4435 (similar to 316L, pharmaceutical version)  
60 titanium<sup>2</sup>

(9) **Extra codes**

000 none  
765 high-temperature version<sup>3</sup>

x = combination comes as standard  
o = combination is optional

Other versions on request.

<sup>1</sup> only with process connection -145 (3/4-14 NPT), available in conjunction with extra code /765

<sup>2</sup> only available with body material -88 (PVDF)

<sup>3</sup> only available with process connection -145 (3/4-14 NPT)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)								
<b>Order code</b>	202924	/		-		-		-		/							
<b>Order example</b>	202924	/	10	-	0010	-	0000	-	105	-	37	-	88	-	26	/	000

**Note:**

The type code is a type designation, not a modular system.

If at all possible, please choose the items listed under “Stock items” or “Production items”.

Any free combination of individual code features must be technically checked by us and released.

Please ask us in case of doubt.

## Stock items (delivery: 3 working days after receipt of order)

Sales No.	Type	Brief description
20/00300203	202924/10-0010-0000-105-37-88-26/000	K = 0.1 / G3/4A
20/00300202	202924/10-0010-1003-105-37-88-26/000	K = 0.1 / Pt100 / G3/4A
20/00338487	202924/10-0010-1003-104-37-88-26/000	K = 0.1 / Pt100 / G1/2A
20/00300204	202924/10-0001-0000-105-37-88-26/000	K = 0.01 / G3/4A
20/00300079	202924/10-0001-1003-105-37-88-26/000	K = 0.01 / Pt100 / G3/4A
20/00456809	202924/20-0001-1003-104-83-31-31/000	K = 0.01 / Pt100 / G1/2A / 16 mm dia.
20/00452527	202924/20-0010-1003-104-83-31-31/000	K = 0.01 / Pt100 / G1/2A / 16 mm dia.

## Production items (delivery: 10 working days after receipt of order)

Sales No.	Type	Brief description
20/00353041	202924/10-0001-0000-105-37-26-26/000	K = 0.01 / G3/4A / process connection 1.4571
20/00089395	202924/10-0001-1003-604-37-88-26/000	K = 0.01 / Pt100 / milk cone
20/00089389	202924/10-0010-1003-106-37-88-26/000	K = 0.1 / Pt100 / G1A
20/00089393	202924/10-0001-1003-106-37-88-26/000	K = 0.01 / Pt100 / G1A
20/00350627	202924/10-0010-0000-105-37-26-26/000	K = 0.1 / G3/4A / process connection 1.4571
20/00322533	202924/10-0010-1003-613-37-26-26/000	K = 0.1 / Pt100 / clamp DN25 / process connection 1.4571

## Certifiable conductivity cells

Sales No.	Type	Brief description
20/00392030	202924/10-0001-1003-105-37-88-26/000	certifiable version - certificates must be ordered separately
20/00392031	202924/10-0010-1003-105-37-88-26/000	certifiable version - certificates must be ordered separately

## Certificates (optional)

Sales No.	Type	Brief description
20/00365727	Materials test certificate to EN 10204 3.1 (when ordering, please specify in plain text: "material" and / or "roughness")	
20/00359893	ASTM test certificate for precisely measured cell constant (1-point calibration)	
20/00423913	FDA approval for insulator and O-rings	

## Pharmaceutical versions (incl. certificates)

Sales No.	Type	Brief description
20/00405886	202924/10-0010-1003-613-37-31-31/000	K = 0.1 / Pt100 Class A / clamp DN25 and body material Mat. Ref. 1.4435 / airtight film packaging / incl. ASTM certificate, 3.1 certificate for material and roughness <0.8 μ
20/00420617	202924/10-0001-1003-613-37-31-31/000	K = 0.01 / Pt100 Class A / clamp DN25 and body material Mat. Ref. 1.4435 / airtight film packaging / incl. ASTM certificate, 3.1 certificate for material and roughness <0.8 μ
20/00456810	202924/20-0001-1003-613-83-31-31/000	K = 0.01 / Pt100 Class A / clamp DN25 and body material Mat. Ref. 1.4435 / airtight film packaging / incl. ASTM certificate, 3.1 certificate for material and roughness <0.8 μ
20/00456812	202924/20-0010-1003-613-83-31-31/000	K = 0.1 / Pt100 Class A / clamp DN25 and body material Mat. Ref. 1.4435 / airtight film packaging / incl. ASTM certificate, 3.1 certificate for material and roughness <0.8 μ

## High-temperature version

Sales No.	Type	Brief description
20/00397615	202924/10-0010-1003-145-37-00-00/765	K = 0.1 / Pt100 / NPT3/4-14

## Accessories

Sales No.	Type	Brief description
20/00303681	connection cable 25 m	4-pole + screen
20/00304181	connection cable 50 m	4-pole + screen
20/00300478	conductivity simulator	2H-SLF-1
20/00082902	connecting cable for simulator	5-pole AMP / 1.10 m