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JUMO MAERA S29 SW

Titanium or stainless steel level probe

Applications

Level and level measurements

- In tank and storage systems
- Of clarification, settling and rainwater retention basis
- In sewage lifting and pumping stations
- In splash water containers for swimming pools
- In a ballast water tank for ship building

Brief description

The JUMO MAERA S29 SW level probe is used for the continuous hydrostatic level measurement in ventilated tanks. Measuring is carried out unaffected by electrical medium features or any foam formation.

Approvals are needed for particular ship building requirements (exclusively titanium) and explosion protection.

The level probe can be readily used in depths from as low as 1 mWS. The titanium version has been designed for application in liquids with media containing chlorides. These may be found in ship building, swimming pools, or water and sewage water management.

The cost-optimized level probe made of titanium or stainless steel with a front-flush membrane offers an alternative in highly viscous media. The screwable protective cap protects the membrane.

The level probe is equipped with a reverse-polarity protection mechanism, which prevents incorrect polarity during startup.

Another benefit to the measuring system is the extensive range of accessories for an optimum design.

Further interesting information can be found in our brochure "Level Probes - Hydrostatic Level Measurement".

Customer benefits

- Improved plant availability
- Standardized signal processing
- Resistant to climate due to improved moisture and vibration protection
- Measurements in very harsh and highly viscous media thanks to the front-flush membrane
- Prevention of build up of resistance
- A complete solution for measurement points thanks to the extensive range of accessories
- Reverse-polarity protection mechanism



Special features

- Measuring ranges from 100 mbar relative pressure and 600 mbar absolute pressure are available
- Explosion protection according to ATEX
- Shipbuilding approval according to DNV GL (titanium)
- Highly resistant to chemical (titanium)
- Proven piezoresistive silicon sensor

Approvals and approval marks



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Technical data

General Information

Reference conditions	According to DIN 16086 and DIN 61298
Measuring principle	Piezoresistive sensor with separating membrane
Pressure transfer medium	Synthetic oil
Admissible load changes	> 10 million, 0 % to 100 % measuring range
Mounting position	Vertical/hanging from the cable

Input

Measuring range and accuracy

Measuring range	Linearity ^a % MSP ^e	Accuracy at		Long-term stability ^b % MSP per year	Overload capacity	Burst pressure
		20 °C ^c % MSP	10 to 50 °C ^d % MSP			
0 to 1 mH ₂ O	0.2	1.2	1.9	≤ 0.4	3	4
0 to 1.6 mH ₂ O	0.2	0.8	1.8		4.8	6.4
0 to 2.5 mH ₂ O	0.2	0.8	1.7	≤ 0.3	7.5	10
0 to 4 mH ₂ O	0.2	0.7	1.7		12	16
0 to 6 mH ₂ O	0.2	0.7	1.6	≤ 0.2	18	24
0 to 10 mH ₂ O	0.2	0.6	1.3		30	40
0 to 100 mbar relative pressure	0.2	1.2	1.9	≤ 0.4	0.3	0.4
0 to 160 mbar relative pressure	0.2	0.8	1.8		0.48	0.64
0 to 250 mbar relative pressure	0.2	0.8	1.7	≤ 0.3	0.75	1
0 to 400 mbar relative pressure	0.2	0.7	1.7		1.2	1.6
0 to 600 mbar relative/absolute pressure	0.2	0.7	1.6	≤ 0.2	1.8	2.4
0 to 1 bar relative/absolute pressure	0.2	0.6	1.3		3	4
0 to 1.6 bar relative/absolute pressure	0.25	0.5	1.3		4.8	6.4
0 to 2.5 bar relative/absolute pressure	0.25	0.5	1.2		7.5	10
0 to 4 bar sealed gauge/absolute pressure	0.25	0.5	1.2		12	16
0 to 6 bar sealed gauge/absolute pressure	0.25	0.5	1.2		18	24
0 to 10 bar sealed gauge/absolute pressure	0.25	0.5	1		30	40

^a Linearity according to limit point setting

^b Reference conditions EN 61298-1

^c Includes: linearity, hysteresis, repeatability, deviation from measuring range start (offset), and measuring range end

^d Includes: linearity, hysteresis, repeatability, deviation from measuring range start (offset) and measuring range end, thermal influences on measuring range start (offset), and measuring span

^e MSP = measuring span

Output

Analog output	
Current	
Output 405	4 to 20 mA, 2-wire
Step response T ₉₀	2 ms
Burden	
Current	
4 to 20 mA, 2-wire	$R_L \leq (U_B - 16 \text{ V}) \div 0.022 \text{ A} (\Omega)$

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Electrical data

Voltage Supply U_B^a	
For basic type extension 404393/000	DC 16 to 28 V (nominal 24 V)
For basic type extension 404393/062	DC 21 to 24 V (nominal 24 V)
For basic type extension 404393/362	DC 16 to 28 V (nominal 24 V)
For basic type extension 404393/662	DC 21 to 24 V (nominal 24 V)
Reverse voltage protection	Yes
Max. current consumption	23 mA
Electrical circuit	SELV
Requirement	The device must be equipped with an electrical circuit that meets the requirements of EN 61010-1 with regard to „Limited-energy circuits“.

^a The voltage peaks must not exceed the specified voltage supply values!

Cable

Cable	6-core, shielded cable with integrated pressure compensation hose, AWG 24 with ferrules	3-core, remote cable with integrated pressure compensation hose, AWG 24 with ferrules
Material		
Outer sheath	FEP (electrical connection 25)	PUR (electrical connection 16)
Compensation hose	PA	PA
Color	Black	Black
Outer diameter	Approx. 8.4 mm	Approx. 7.5 mm
Conductor cross section	0.25 mm ²	0.25 mm ²
Bending radius		
Moving	min. 140 mm	min. 75 mm
Fixed	min. 70 mm	min. 37.5 mm
Tensile force	4000 N	880 N
Mass	≈ 90 g/m	Approx. 60 g/m
Admissible temperatures	-10 to +70 °C	-10 to +70 °C
UV resistance	Yes, according to DIN ISO 4892-2	Yes, according to DIN ISO 4892-2

Mechanical features

Ensure the medium durability of the material!

	Titanium	Stainless steel	Stainless steel with mounted protective cage
Material			
Protective cap	PVC	PVC	-
Process connection	Titanium grade 2	Stainless steel 316 L	Stainless steel 316 L
Measuring membranes	Titanium grade 2	Stainless steel 316 L	Stainless steel 316 L
Case	Titanium grade 2	Stainless steel 316 L	Stainless steel 316 L
Shrink tubing	Polyolefin	-	-
Mass (without cable)	109 g	200 g	1700 g (max. freely suspended cable 100 m)
Diameter	27 mm	27 mm	95 mm

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Environmental influences

Admissible temperatures Medium	-10 to +60 °C The level probe must not freeze in the medium! A restriction may be required depending on the medium.	
	Ignition protection type Gb	
	Temperature class	Ambient temperature T _A
	T4	-40 to +85 °C
	T5	-40 to +70 °C
	T6	-40 to +55 °C
	Ignition protection type Db	
	Temperature class	Ambient temperature T _A
	T100 °C	-40 to +85 °C
	T85 °C	-40 to +70 °C
T70 °C	-40 to +55 °C	
Storage	-25 to +70 °C, dry	
Electromagnetic Compatibility ^a	Class B ^b	
Interference emission	Industrial requirements	
Interference immunity	Industrial requirements	
Protection type ^c	IP68	

^a According to EN 61326-2-3

^b The product is suitable for industrial use as well as for households and small businesses.

^c According to EN 60529

Approvals and approval marks

ATEX	
Testing agency	Eurofins Electrosuisse Product Testing AG
Certificates/certification numbers	SEV 17 ATEX 0136 X
Inspection basis	EN 60079-0, EN 60079-11
Valid for	Type 404393/362, Type 404393/662
DNV GL	
Testing agency	DNV GL
Certificates/certification numbers	TAA00001TH
Inspection basis	DNV GL CG-0339, November-2016
Valid for	Type 404393/062, Type 404393/662
IECEX	
Testing agency	Eurofins Electrosuisse Product Testing AG
Certificates/certification numbers	IECEX SEV 20.0010X
Inspection basis	IEC 60079-0, IEC 60079-11
Valid for	Type 404393/362, Type 404393/662

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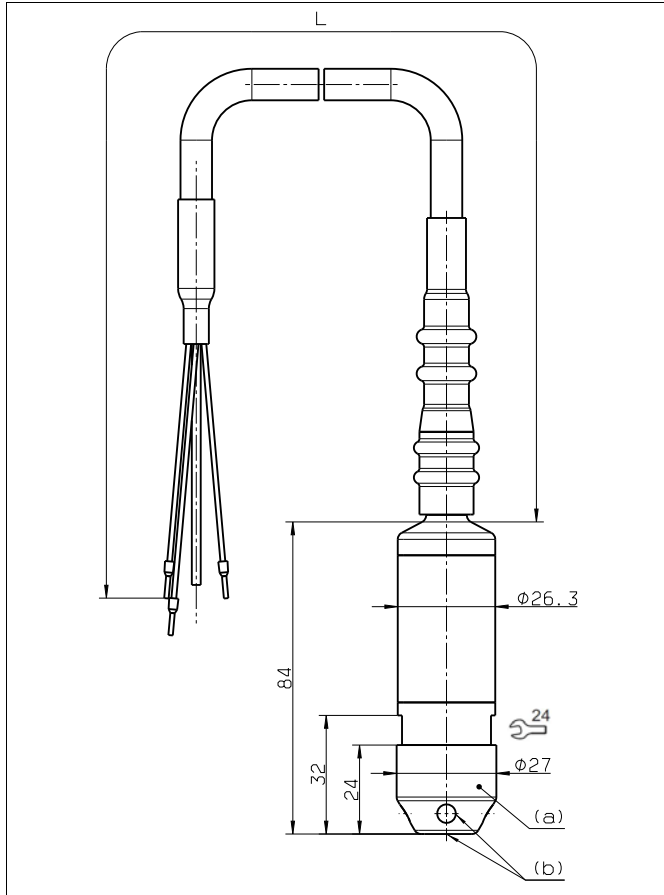
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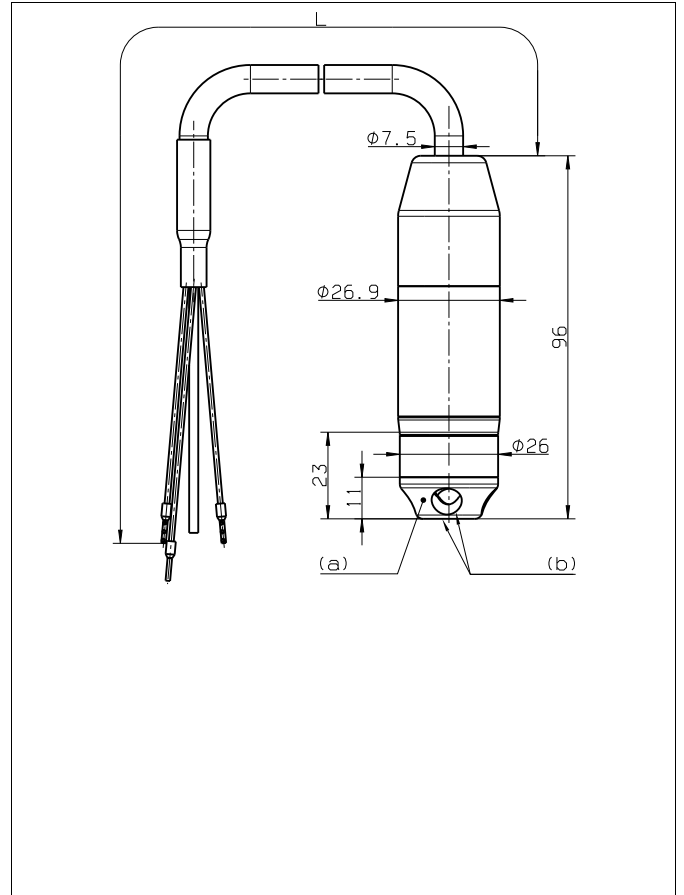
Dimensions

Titanium



- L Cable length according to customer preference
- (a) Protective cap
- (b) 5 bore holes for every $\varnothing 5$ mm

Stainless steel



- L Cable length according to customer preference
- (a) Protective cap
- (b) 5 bore holes for every $\varnothing 5$ mm

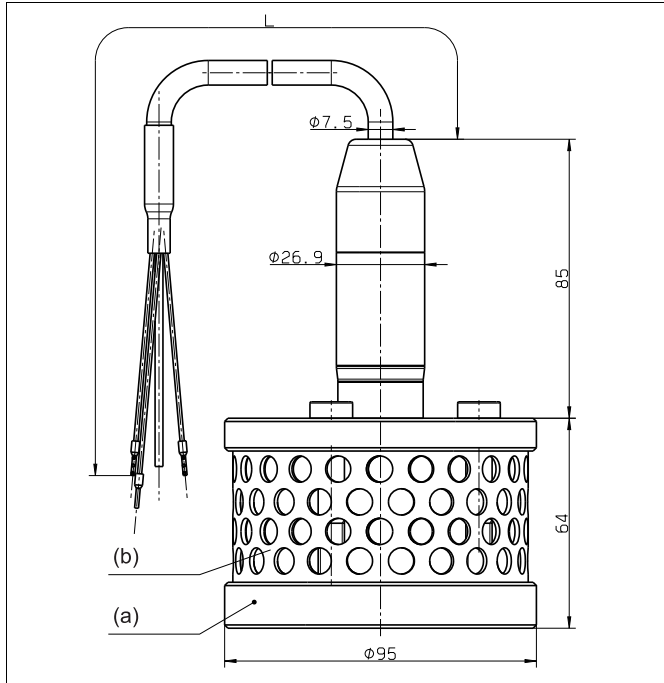
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Stainless steel with mounted cage



L Cable length according to customer preference

(a) Protective cage

(b) Perforated metal grid Ø 8 mm

The stainless steel version with mounted protective cage is designed for difficult level measurements where sludge, turbulence or currents may be present (e.g. pumping stations, wastewater lifting stations).

The additional weight reduces effects on the output signal with strongly moving media.

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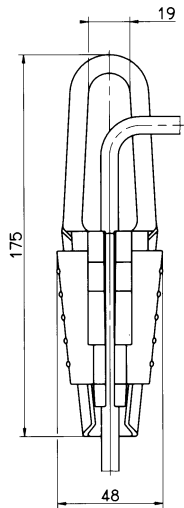
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Accessories

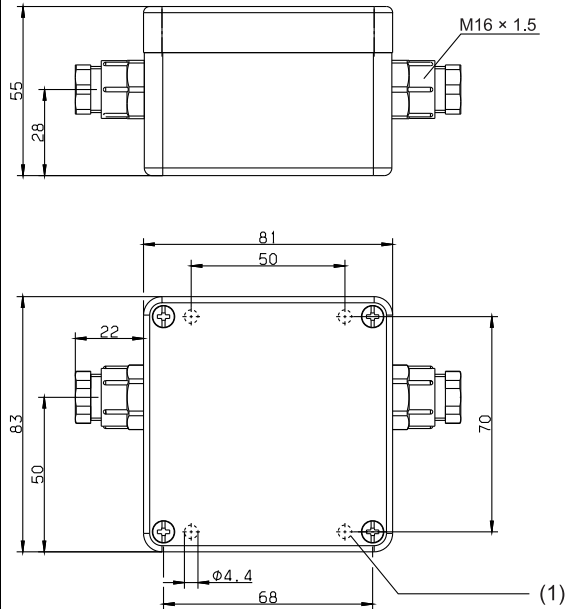
Cable clamp

Part no. 00061389



Terminal box with pressure compensation

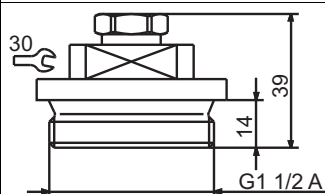
Part no. 00061206



(1) Fastening hole

Sealing screw

Part no. 00333329



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Connection diagram

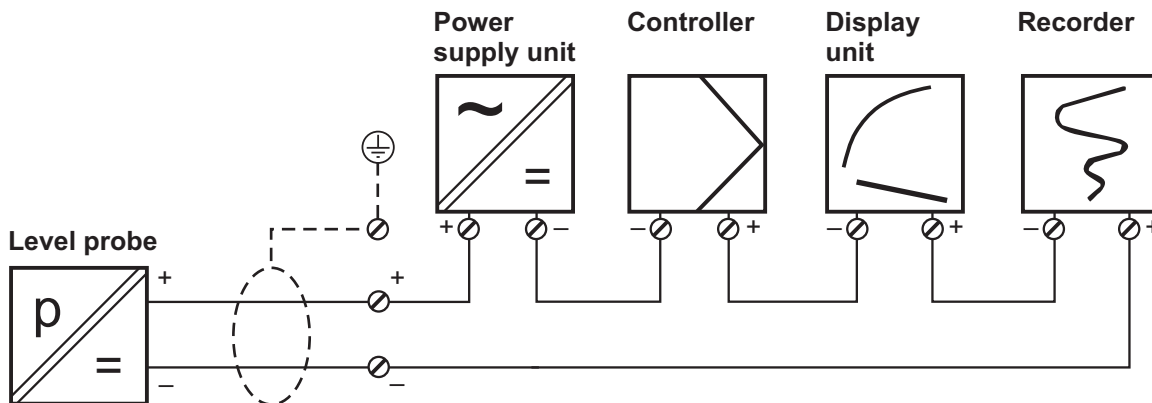
The connection diagram in the data sheet provides preliminary information about the connection options. For the electrical connection, only use the installation instructions or the operating manual. The knowledge and the correct technical compliance with the safety information and warnings contained in these documents are mandatory for mounting, electrical connection, and startup as well as for safety during operation.

Connection		Terminal assignment	
Cable		FEP (electrical connection 25)	PUR (electrical connection 16)
4 to 20 mA, 2-wire			
Rated voltage supply DC 24 V	$U_B/S+^a$ 0 V/S-	White Gray	White Brown
Shielding			
Caution: Ground the device! Ground all connected devices (such as pumps and valves) to the same potential!		Black	Black

^a The voltage peaks must not exceed or fall below the specified voltage supply values!

Connection example

Current output



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Order details

	(1) Basic type
404393	JUMO MAERA S29 SW – Level probe made of titanium or stainless steel
	(2) Basic type extension
000	None
062	Shipbuilding approval (only available in titanium version [process connection material 60])
362	Explosion protection
662	Shipbuilding approval and explosion protection (only available in titanium version [process connection material 60])
999	Special version
	(3) Input
301	0 to 1 mH ₂ O
302	0 to 1.6 mH ₂ O
303	0 to 2.5 mH ₂ O
304	0 to 4 mH ₂ O
305	0 to 6 mH ₂ O
306	0 to 10 mH ₂ O
414	0 to 100 mbar relative pressure
415	0 to 160 mbar relative pressure
417	0 to 250 mbar relative pressure
424	0 to 400 mbar relative pressure
419	0 to 600 mbar relative pressure
454	0 to 1 bar relative pressure
455	0 bar to 1.6 bar relative pressure
456	0 to 2.5 bar relative pressure
535	0 to 4 bar sealed gauge
536	0 to 6 bar sealed gauge
537	0 to 10 bar sealed gauge
487	0 bar to 0.6 bar absolute pressure
488	0 to 1 bar absolute pressure
489	0 to 1.6 bar absolute pressure
490	0 to 2.5 bar absolute pressure
491	0 to 4 bar absolute pressure
492	0 to 6 bar absolute pressure
493	0 to 10 bar absolute pressure
997	Special measuring range for sealed gauge
998	Special measuring range for absolute pressure ^a
999	Special measuring range for relative pressure ^a
	(4) Output
405	4 to 20 mA, 2-wire
	(5) Process connection
759	Mounted protection cage Ø 95 mm ^b
770	Front-flush process connection with protective cap
	(6) Process connection material
20	Stainless steel (only available with PUR cable)
60	Titanium (only available with FEP cable)

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(7) Electrical connection	
16	PUR cable, black, shielded (only available in stainless steel version [process connection material 20])
25	FEP cable, black, shielded, UV-resistant (only available in titanium version [process connection material 60])
(8) Length of connecting cable^c	
002	2 m
005	5 m
010	10 m
015	15 m
020	20 m
030	30 m
040	40 m
050	50 m
060	60 m
070	70 m
080	80 m
090	90 m
100	100 m
(9) Extra codes	
000	None

^a The special measuring range is specified in plain text.
^b Only available in conjunction with process connection material 20.
^c Other cable length available on request.

Order code (1) (2) (3) (4) (5) (6) (7) (8) (9)
 / - - - - - - - /
Order example 404393 / 000 - 417 - 405 - 770 - 60 - 25 - 005 / 000

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Accessories

The accessories are not checked according to DNV GL requirements.

Item	Description	Part no.
 <p>Cable clamp</p>	<p>The cable clamp holds the probe in the liquid at a defined depth and provides strain relief. Use of the cable clamp ensures that the cable is not deformed in an unacceptable manner.</p> <p>The cable clamp is compatible with all JUMO level probes.</p> <p>The clamping range is 5.5 to 10.5 mm. The maximum tensile strength is 2.5 kN. The case is made of hot-dip galvanized steel sheet. The clamping jaws and guide clips are made of glass fiber reinforced polyamide. A stainless steel variant is also available upon request.</p>	00061389
 <p>Sealing screw</p>	<p>For closed containers or water wells with a well head, the cable should be guided through and fastened by a sealing screw.</p> <p>The sealing screw is made up of a G 1 1/2" thread and is used to route the cable.</p>	00333329
 <p>Terminal box with pressure compensation element</p>	<p>The terminal case, is used for secure installation of the level probe cable. The end of the pressure compensation tube is always protected from deposits and condensation (IP65). The remaining distribution can be performed with a standard cable without a pressure equalization hose.</p> <p>The terminal case should be mounted as close as possible to the medium surface while still outside the medium to ensure the system is implemented cost-effectively and in the best possible way.</p>	00061206
<p>Pressure compensation filter for cable</p>	<p>The pressure compensation filter is a breathable filter that ensures aeration and exhaust-air ventilation without moisture penetrating. It is fitted at the end of the special cable.</p>	00382632
 <p>Ex-i supply/input isolating amplifier</p>	<p>The Ex-i repeater power supply / input isolating amplifier is designed for operating intrinsically safe transmitters (Ex-i) and mA current sources installed in potentially explosive (Ex) areas.</p> <p>Two-wire transmitters are supplied with energy and analog 0/4 to 20 mA measured values are transmitted from the Ex-area to the non-Ex-area. The output of the module can be operated actively or passively. Further technical data and the relevant safety requirements are available in the operating manual B 707530.0.</p>	00577948