

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 MAERA S29 SW

Titanium level probe

Applications

Level and level measurements

- In a ballast water tank for ship building
- In the sewage sector
- In splash water containers for swimming pools
- In chloride-containing media

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 and explosion protection.

The level probe can be readily used in depths from as low as 1 mWS and 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 surrounding pressure is compensated for using a cable with an integrated pressure equalization hose. The cost-optimized titanium level probe 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".



Type 404393

Customer benefits

- Improved plant availability
- Standardized signal processing
- Resistant to climate thanks 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

- Highly resistant to chemicals thanks to the titanium version
- Measuring ranges from 100 mbar relative pressure and 600 mbar absolute pressure are available
- Explosion protection according to ATEX
- Approved for use in ships according to GL
- Proven piezoresistive silicon sensor

Approvals/approval marks



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Technical data

General Information

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

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	$R_L \leq (U_B - 16 \text{ V}) \div 0.022 \text{ A} (\Omega)$

Auxiliary energy

Voltage Supply U _B ^a	
For basic type 404393/000	DC 16 to 28 V (nominal 24 V)
For basic type 404393/062	DC 21 to 24 V (nominal 24 V)
For basic type 404393/362	DC 16 to 28 V (nominal 24 V)
For basic type 404393/662	DC 21 to 24 V (nominal 24 V)
Reverse voltage protection	Yes
Max. current consumption	23 mA
Electrical circuit	SELV

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

Cable

6-core, shielded cable with integrated pressure compensation hose, AWG 24 with ferrules

Material	
Outer sheath	FEP
Compensation hose	PA
Color	Black
Outer diameter	Approx. 8.4 mm
Conductor cross section	0.25 mm ²
Bending radius	
Moving	min. 140 mm
Fixed	min. 70 mm
Tensile force	4000 N
Mass	≈ 90 g/m
Admissible temperatures	-40 to +70 °C (depending on the medium)
UV resistance	Yes, according to DIN ISO 4892-2

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Mechanical features

Ensure the medium durability of the material!

Material	PVC
Protective cap	Titanium grade 2
Process connection	Titanium grade 2
Measuring membranes	Titanium grade 2
Case	Titanium grade 2
Shrink tubing	Polyolefin
Mass (without cable)	109 g
Diameter	27 mm

Environmental conditions

Admissible temperatures	0 to 50 °C
Medium	The level probe must not freeze in the medium! A restriction may be required depending on the medium.
Storage	-20 to +70 °C, dry
Electromagnetic Compatibility ^a	Class B
Interference emission	Industrial requirements
Interference immunity	IP68
Protection type ^b	

^a According to EN 61326-2-3

^b According to EN 60529

Measuring range and accuracy

Measuring range	Linearity ^a	Accuracy at		Long-term stability ^b	Overload capacity	Burst pressure
		20 °C ^c	0 to 50 °C ^d			
bar	% MSP	% MSP	% MSP	% MSP per year	bar	bar
0 bar to 0.1 bar relative pressure	0.35	1.2	1.9	≤ 0.2	0.3	0.4
0 bar to 0.16 bar relative pressure	0.3	0.8	1.8		0.48	0.64
0 bar to 0.25 bar relative pressure	0.3	0.8	1.7		0.75	1
0 bar to 0.4 bar relative pressure	0.3	0.7	1.7		1.2	1.6
0 bar to 0.6 bar relative/absolute pressure	0.3	0.7	1.6		1.8	2.4
0 bar to 1 bar relative/absolute pressure	0.3	0.6	1.3		3	4
0 bar to 1.6 bar relative/absolute pressure	0.25	0.5	1.3		4.8	6.4
0 bar to 2.5 bar relative/absolute pressure	0.25	0.5	1.2		7.5	10
0 bar to 4 bar relative/absolute pressure	0.25	0.5	1.2		12	16
0 bar to 6 bar relative/absolute pressure	0.25	0.5	1.2		18	24
0 bar to 10 bar relative/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

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**Approvals/approval marks**

Approval mark	Testing agency	Certificates/certification numbers	Inspection basis	Valid for
EX	At preparation stage			Type 404393/362 Type 404393/662
GL	At preparation stage			Type 404393/062 Type 404393/662

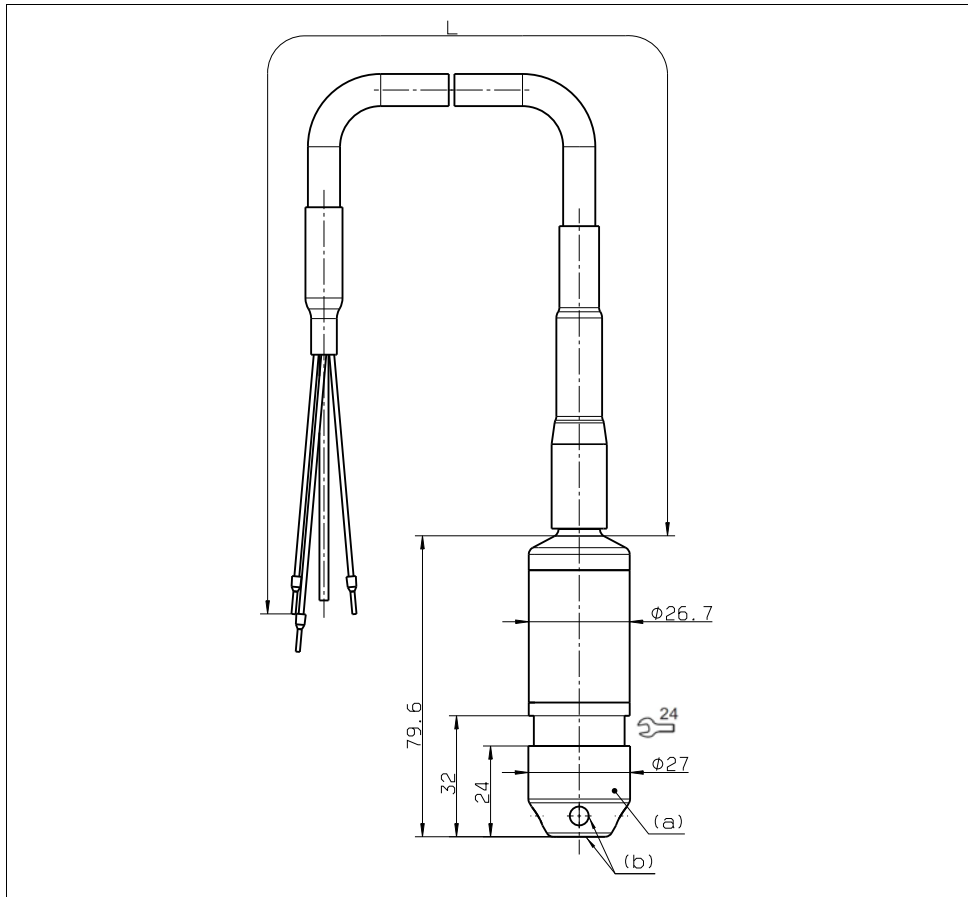
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Dimensions



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

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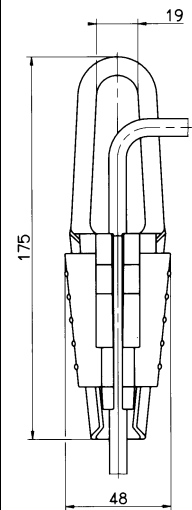
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Accessory dimensions

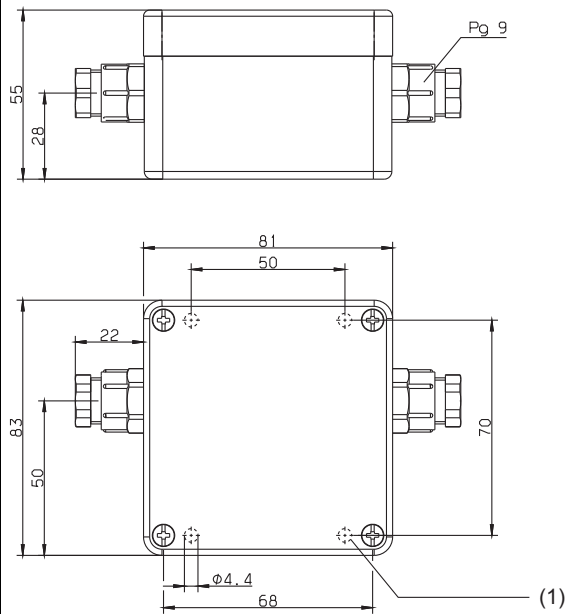
Cable clamp

Part no. 00061389



Terminal box with pressure compensation

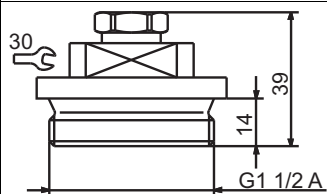
Part no. 00061206



(1) Fastening hole

Sealing screw

Part no. 00333329



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Connection diagram

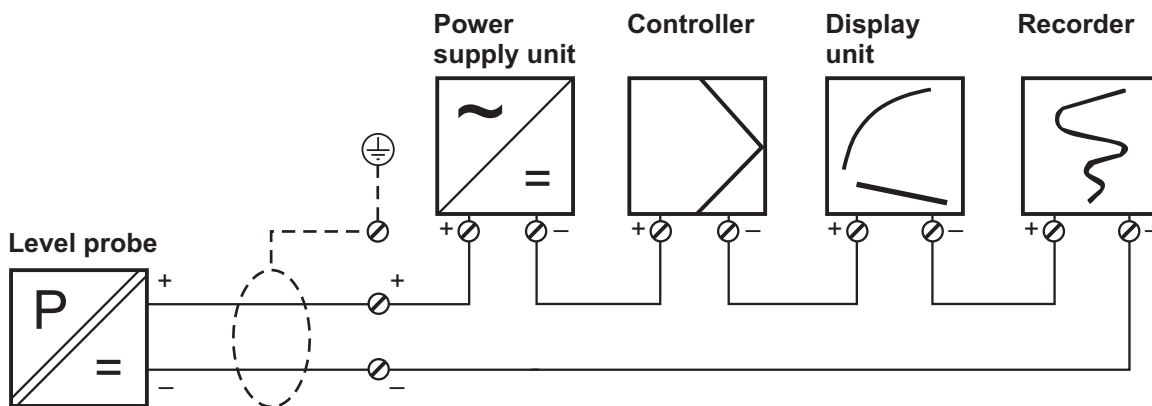
The connection diagram in the data sheet provides preliminary information about the connection options. For the electrical connection only use the installation instructions or the operating manual. The knowledge and the correct technical execution of the safety information/instructions contained in these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

Connection		Terminal assignment	
			
		Cable	
4 to 20 mA, 2-wire			
Rated voltage supply DC 24 V		U_B/S^{+a}	White
		0 V/S-	Gray
Shielding			
Caution: Ground the device!			
Ground all connected devices (such as pumps and valves) to the same potential!			
		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 – Titanium level probe
	(2) Basic type extension
000	None
062	GL approval
362	Explosion protection
662	GL approval and explosion protection
999	Special version
	(3) Input
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
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
770	Front-flush process connection with protective cap
	(6) Process connection material
60	Titanium
	(7) Electrical connection type
25	FEP cable, black, shielded, UV-resistant
	(8) Length of connecting cable
005	5 m
010	10 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

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(9) Extra codes	
000	None

^a The special measuring range is specified in plain text.

Order code	<input type="text" value="(1)"/> - <input type="text" value="(2)"/> - <input type="text" value="(3)"/> - <input type="text" value="(4)"/> - <input type="text" value="(5)"/> - <input type="text" value="(6)"/> - <input type="text" value="(7)"/> - <input type="text" value="(8)"/> / <input type="text" value="(9)"/>
Order example	404393 - 000 - 417 - 405 - 770 - 60 - 25 - 005 / 000

Accessories

The accessories are not checked according to GL requirements.

Item	Description	Parts 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>	0061389
 <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