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**JUMO Process Control, Inc.**  
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# JUMO MAERA S26

## Level probe

### Applications

#### Level and filling level measurement<sup>1</sup>

- in storage tanks or reservoirs
- for gray water recycling
- in heating oil and diesel oil tanks

### Brief description

The JUMO MAERA S26 level probe is used for the continuous hydrostatic level measurement of liquids. Filling heights between 2.5 mWS and 25 mWS (water column) can be achieved in ventilated tanks.

When the level probe is immersed into a liquid, a liquid column emerges above the probe. The liquid column increases as the probe is immersed deeper into the liquid and creates a hydrostatic pressure on the measuring system by the force of its weight. The measured pressure is transmitted as a standard signal. The signal is linearly proportional to the rising liquid.

The surrounding pressure is realized using a special cable with an integrated pressure equalization hose. Any variations in air pressure are thereby automatically compensated for and the surrounding pressure is therefore taken into account.

The level probe is approved for use in drinking water.

Further information about our JUMO MAERA series level probes can be found in the the "Level Probes – Hydrostatic Level and Level Measurement" brochure under Documentation.

### Customer benefits

- **process reliable**  
The core of the level probe is a piezoresistive measuring cell, which features high overload resistance, and is particularly stable in the long term, reliable, and temperature resistant. The level probes are manufactured entirely from stainless steel and are therefore resistant to many media. A reverse-polarity protection mechanism protects the measuring instrument against damage, ensuring maximum safety during startup.
- **versatile**  
The level probe is available in numerous variants for several measuring ranges. The version with several cable materials and process connections provides maximum possible flexibility. A model with greater measuring accuracy is also available, which also meets the most stringent requirements.



Type 402090/... with process connection  
658

### Special features

- level probe for continuous level measurement in liquids
- measuring ranges: 250 mbar to 2.5 bar (0.2 % MSP<sup>2</sup> also available) (2.50 mWS to 25 mWS)
- medium temperature: 0 °C to 50 °C
- piezoresistive silicon sensor
- accuracy: 0.3 % MSP (linearity) (0.2 % MSP also available)
- excellent long-term stability
- high overload resistance
- reverse polarity protection
- suitable for indoor mounting

<sup>1</sup> These recommendations are based on many years of experience; however, in individual cases they may not be fully applicable. We would be happy to provide further information, including regarding additional applications.

<sup>2</sup> MSP = measuring span

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## Technical data

### General information

Reference conditions	DIN 16086 and DIN EN 60770
Measuring principle	Piezoresistive sensor with stainless steel separating membrane
Pressure transfer means	Synthetic oil
Admissible load changes	> 10 million, 0 to 100 % measuring range
Mounting position	Vertical/hanging from the cable

### Output

Analog output Current Output 402 Output 405 Output 406 Voltage Output 412 Output 415 Output 418 Output 420	0 to 20 mA, three-wire 4 to 20 mA, two-wire 4 to 20 mA, three-wire DC 0.5 to 4.5 V, three-wire, ratiometric 10 to 90 % of the voltage supply DC 0 to 10 V, three-wire DC 1 to 5 V, three-wire DC 1 to 6 V, three-wire
Step response $T_{90}$	$\leq 10 \text{ ms}$
Burden Current 0 to 20 mA, three-wire 4 to 20 mA, two-wire 4 to 20 mA, three-wire Voltage DC 0.5 to 4.5 V, three-wire DC 0 to 10 V, three-wire DC 1 to 5 V, three-wire DC 1 to 6 V, three-wire	$R_L \leq (U_B - 12 \text{ V}) \div 0.02 \text{ A } (\Omega)$ $R_L \leq (U_B - 10 \text{ V}) \div 0.02 \text{ A } (\Omega)$ $R_L \leq (U_B - 12 \text{ V}) \div 0.02 \text{ A } (\Omega)$ $R_L \geq 50 \text{ k}\Omega$ $R_L \geq 10 \text{ k}\Omega$ $R_L \geq 10 \text{ k}\Omega$ $R_L \geq 10 \text{ k}\Omega$

### Mechanical features

Ensure the medium durability of the material!

Process connection	
Material	Stainless steel 316 Ti
Measuring membrane	
Material	Stainless steel 316 L
Case	
Material	Stainless steel 316 Ti
Sealing cone	
Material	FPM EPDM, NTS 917
Weight	200 g (without cable)
Diameter	25 mm

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## Environmental conditions

Inadmissible temperatures Medium/environment	0 to 50 °C The device must <b>not</b> freeze in the medium! A restriction may be required depending on the medium.
Storage	-20 to +80 °C, dry
Electromagnetic compatibility Interference emission <sup>a</sup> Interference immunity <sup>b</sup>	Class B Industrial requirements
Protection type <sup>c</sup>	IP68, submersible to 60 m

<sup>a</sup> According to EN 61326-1

<sup>b</sup> According to EN 61326-2-3

<sup>c</sup> According to EN 60529

## Measuring range and accuracy

Measuring range	Linearity <sup>a</sup>	Accuracy at		Long-term stability <sup>b</sup>	Overload capacity	Burst pressure
bar	% MSP	20 °C <sup>c</sup> % MSP	0 to 50 °C <sup>d</sup> % MSP	% MSP per year	bar	bar
0 to 0.25 bar relative pressure	0.3	0.5	1.6	≤ 0.3	0.75	1
0 to 0.4 bar relative pressure	0.3	0.5	1.6		1.2	1.6
0 to 0.6 bar relative pressure	0.3	0.5	1.3		1.8	2.4
0 to 1 bar relative pressure	0.3	0.5	1.1		3	4.8
0 to 1.6 bar relative pressure	0.3	0.5	1.1		4.8	7.5
0 to 2.5 bar relative pressure	0.3	0.5	1.1		6.4	10

<sup>a</sup> Linearity according to limit point setting

<sup>b</sup> Reference conditions EN 61298-1

<sup>c</sup> Includes: linearity, hysteresis, repeatability, deviation from measuring range start (offset), and measuring range end

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

## Auxiliary energy

Voltage Supply U <sub>B</sub> <sup>a</sup>	
0 mA to 20 mA, three-wire (output 402)	DC 11.5 V to 30 V, nominal voltage DC 24 V
4 mA to 20 mA, two-wire (output 405)	DC 10 V to 30 V, nominal voltage DC 24 V
4 mA to 20 mA, three-wire (output 406)	DC 11.5 V to 30 V, nominal voltage DC 24 V
DC 0.5 V to 4.5 V, three-wire (output 412)	DC 5 V
DC 0 V to 10 V, three-wire (output 415)	DC 11.5 V to 30 V, nominal voltage DC 24 V
DC 1 V to 5 V, three-wire (output 418)	DC 10 V to 30 V, nominal voltage DC 24 V
DC 1 V to 6 V, three-wire (output 420)	DC 10 V to 30 V, nominal voltage DC 24 V

<sup>a</sup> Residual ripple: the voltage peaks must not exceed or fall below the specified voltage supply values!

Reverse voltage protection	Yes (except output 412)
Max. current consumption	≤ 25 mA
Electrical circuit Requirements	SELV The device must be equipped with an electrical circuit that meets the requirements of EN 61010-1 with regard to "Limited-energy circuits".

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**Electrical connection**

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

Material	
Outer sheath	PE, PUR, FEP <sup>a</sup>
Pressure compensation hose	PA
Color	
PE-, FEP cable	Black
PUR cable	Pebble gray
Outer diameter	Approx. 8.4 mm
Conductor cross section	0.25 mm <sup>2</sup>
Bending radius	
Moving	160 mm
Fixed	120 mm
	It is vital to take into account that if the protective hose is kinked or pinched, this will prevent ambient pressure compensation.
Tensile force	Up to 400 N
Weight	
PE, PUR cable	Approx. 115 g/m
FEP cable	Approx. 90 g/m
Admissible medium temperatures	-20 to +60 °C (depending on the medium)
UV resistance	PE and PUR cable according to VDE 0207, test method EN 60811 part 2-1, section 8 FEP cable according to DIN ISO 4892-2

<sup>a</sup> Depending on the version ordered

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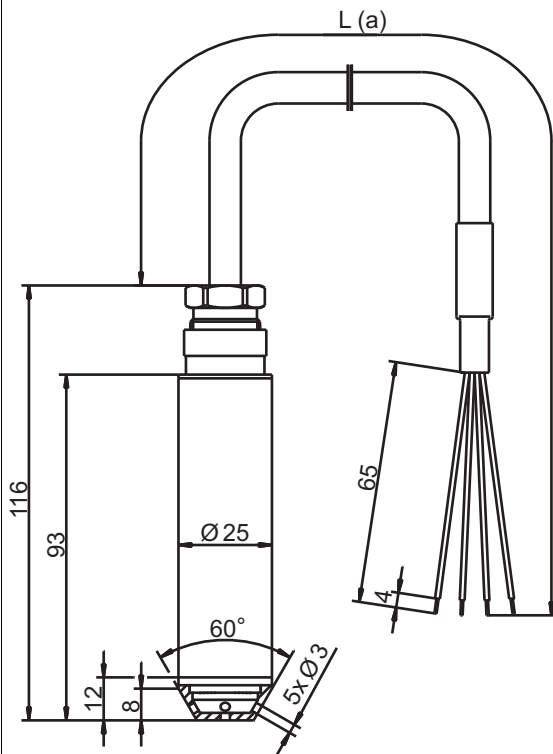
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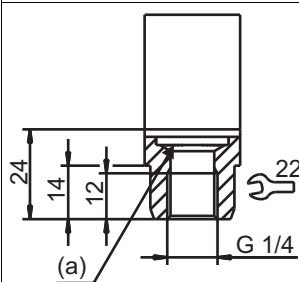
## Dimensions

### Process connection

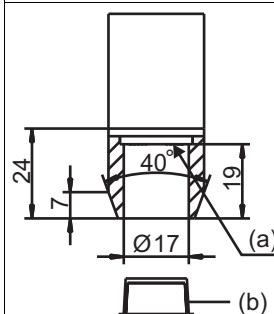
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567



659



- L (a) Cable length according to customer preference
- (a) Sensitive membrane
- (b) Protective cap

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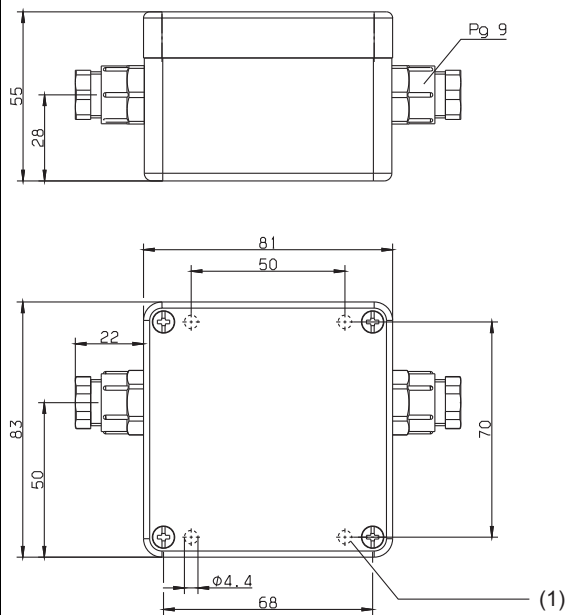
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## Accessory dimensions

### Terminal box with pressure compensation

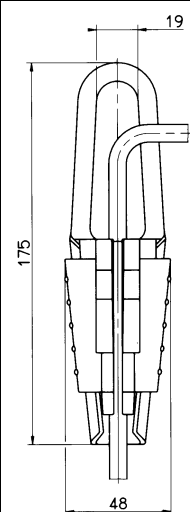
Part no. 00061206



(1) Fastening hole

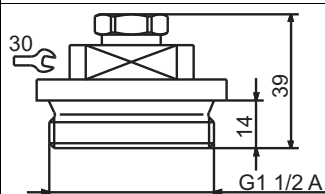
### Cable clamp

Part no. 00061389



### 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 <sup>a</sup>
<b>0 to 20 mA, three-wire (output 402)</b>		
Voltage supply DC 11.5 to 30 V Rated voltage supply DC 24 V	$U_B$ 0 V/S- S+	White Gray Yellow
<b>4 to 20 mA, two-wire (output 405)</b>		
Voltage supply DC 10 to 30 V Rated voltage supply DC 24 V	$U_{B/S+}$ 0 V/S-	White Gray
<b>4 to 20 mA, three-wire (output 406)</b>		
Voltage supply DC 11.5 to 30 V Rated voltage supply DC 24 V	$U_B$ 0 V/S- S+	White Gray Yellow
<b>DC 0.5 to 4.5 V ratiometric (output 412)</b>		
Voltage supply DC 5 V Rated voltage supply DC 5 V	$U_B$ 0 V/S- S+	White Gray Yellow
<b>DC 0 to 10 V, three-wire (output 415)</b>		
Voltage supply DC 11.5 to 30 V Rated voltage supply DC 24 V	$U_B$ 0 V/S- S+	White Gray Yellow
<b>DC 1 to 5 V, three-wire (output 418) DC 1 to 6 V, three-wire (output 420)</b>		
Voltage supply DC 10 to 30 V Rated voltage supply DC 24 V	$U_B$ 0 V/S- S+	White Gray Yellow
<b>Shielding</b>		
Caution: Ground the device! Ground all connected devices (such as pumps and valves) to the same potential!		Black

<sup>a</sup> For cable specifications, see installation instructions B 401015.4, chapter 6 "Installation and mounting".

<sup>b</sup> The voltage peaks must not exceed or fall below the specified voltage supply values!

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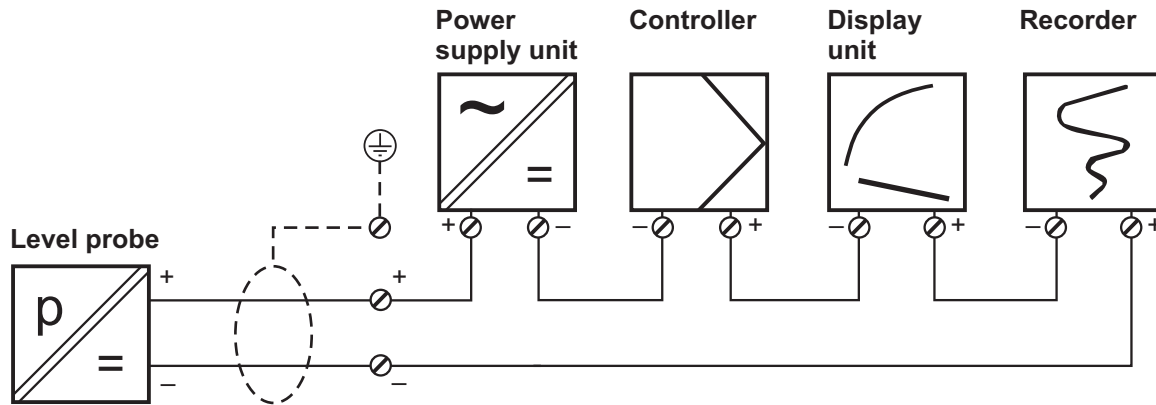
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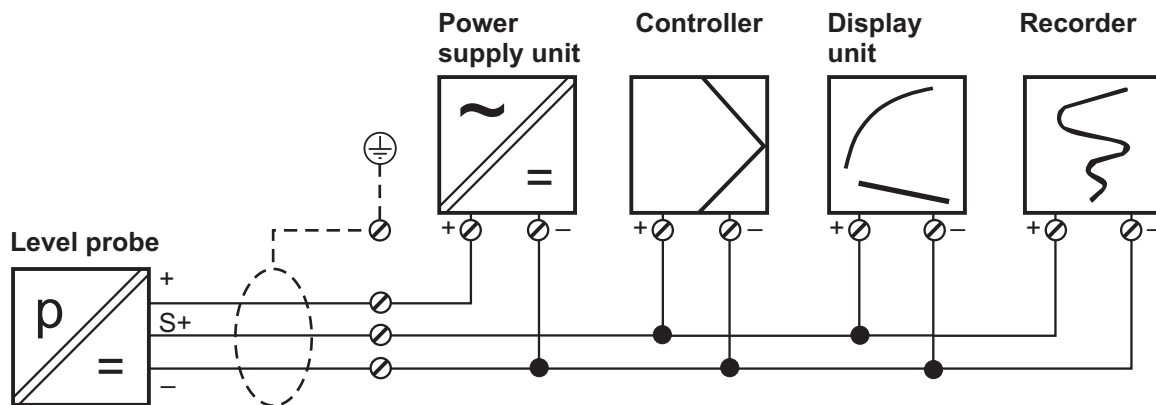


## Connection example

Current output



Voltage output





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## Order details

<b>(1) Basic type</b>	
402090	JUMO MAERA S26 – Level probe
<b>(2) Basic type extension</b>	
000	None
023	With improved accuracy <sup>a</sup>
999	Special version
<b>(3) Input</b>	
451	0 to 250 mbar relative pressure
452	0 to 400 mbar relative pressure
453	0 to 600 mbar relative pressure
454	0 to 1 bar relative pressure
455	0 to 1.6 bar relative pressure
456	0 to 2.5 bar relative pressure
999	Special measuring range for relative pressure
<b>(4) Output</b>	
402	0 to 20 mA, three-wire
405	4 to 20 mA, two-wire
406	4 to 20 mA, three-wire
412	0.5 to 4.5 V, three-wire
415	0 to 10 V, three-wire
418	1 to 5 V, three-wire
420	1 to 6 V, three-wire
<b>(5) Process connection</b>	
567	G 1/4 inside
658	Connection closed at the bottom
659	Connection open at the bottom
<b>(6) Process connection material</b>	
20	CrNi (stainless steel)
<b>(7) Electrical connection type</b>	
14	PUR cable, gray, shielded, as suitable for use in water (lake, water well, and mine water), as well as coolant, and lubricant (UV-resistant)
15	PE-LD cable, black, shielded, as suitable for use in water (lake, water well, and mine water, and UV-resistant)
25	FEP cable, black, shielded, as suitable for use in water (sea, lake, water well, and mine water) and in different oils, fuels, and solvents (UV-resistant)
<b>(8) Cable length of the connecting cable</b>	
005	5 m
010	10 m
...	...
100	100 m
<b>(9) Extra codes</b>	
000	None
593	Cutting ring fitting (preparation for protection tube)
631	Improved moisture and vibration protection
881	With drinking water approval <sup>b</sup>
917	With EPDM seal

<sup>a</sup> Measuring devices with improved accuracy can only be delivered with inputs greater than 600 mbar and an output of 4 to 20 mA, two-wire.

<sup>b</sup> Only with extra code 917 (EPDM seal) and electrical connection 15 (PE-LD cable)

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Order code                      (1)                      (2)                      (3)                      (4)                      (5)                      (6)                      (7)                      (8)                      (9)  
    [ ] / [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] / [ ]  
 Order example                      402090                      /                      000                      -                      454                      -                      405                      -                      659                      -                      20                      -                      15                      -                      010                      /                      000

## Accessories

Item	Description	Part no.
Terminal box with pressure compensation element 	<p>The terminal box is used for secure installation of the level probe cable. The end of the pressure equalization hose is always protected from precipitate and condensation (IP65). The remaining distribution can be performed with a 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
Cable clamp 	<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 mm 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
Sealing screw 	<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
Pressure compensation filter for cable	<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