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# JUMO MAERA S25

## Level probe

### Applications

#### Level and level measurements<sup>1</sup>

- In rainwater cisterns
- In gray water recycling
- Heating oil and diesel oil tanks
- In AUS32 (known in Europe as "AdBlue®", "DEF" in North America, or "ARLA 32" in Brazil)

### Brief description

The JUMO MAERA S25 level probe is used for the continuous hydrostatic level measurement of liquids. Filling heights between 2.50 mWS and 10 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 transferred as a standard signal. The signal is linearly proportional to the rising liquid column.

Any variations in air pressure are automatically compensated for using a protective hose and the surrounding pressure is therefore taken into account.

Further information on our level probes from the JUMO MAERA series can be found in the brochure "Level probes – Hydrostatic level and level measurement" in the documentation.

### Customer benefits

- **Economic**  
The standardized, constructive design and constant optimization of the production process result in an excellent price-performance ratio of the level probe.
- **Process-reliable**  
The core of the level probe is a piezoresistive measuring cell, which features high overload resistance and is particularly safe, reliable, and temperature resistant. Each level probe is tested in a fully automated measuring and calibration facility to ensure consistently high product quality. A reverse-polarity protection mechanism protects the measuring instrument against damage, ensuring maximum safety during startup.



Type 401015 with process connection 707

### Special features

- Level probe for continual level measurement in liquids
- Measuring ranges: 250 mbar to 1 bar (2.5 to 10 mWS)
- Medium temperature 0 to 50 °C
- Piezoresistive silicon sensor
- Accuracy: 0.3% MSP<sup>2</sup> (linearity)
- Sensor technology proven thousands of times over
- Reverse-polarity protection mechanism
- Suitable for indoor installation

<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

### Mechanical features

Ensure the medium durability of the material!

Process connection	
Material	
Process connection 567	Stainless steel 316 L
Process connection 707	Stainless steel 316 Ti
Measuring membranes	
Material	Stainless steel 316 L
Case	
Material	Stainless steel 304
Protective cap	
Material	Hard PVC
Weight	90 g (without cable)
Diameter	25 mm

### Output

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

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## Environmental influences

Admissible temperatures Medium	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 20 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 bar	Linearity <sup>a</sup> % MSP	Accuracy at		Long-term stability <sup>b</sup> % MSP per year	Overload capability bar	Burst pressure bar
		20 °C <sup>c</sup> % MSP	0 to 50 °C <sup>d</sup> % MSP			
0 to 0.25 bar relative pressure	0.3	0.5	1	≤ 0.3	0.75	1
0 to 0.4 bar relative pressure	0.3	0.5	1		1.2	1.6
0 to 0.6 bar relative pressure	0.3	0.5	1		1.8	2.4
0 to 1 bar relative pressure	0.3	0.5	1		3	4

<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 power

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

For this construction, a stranded PVC cable is encased in an application-oriented protective hose made from either PE or PA.

To prevent moisture penetrating into the protective hose, in this case the pressure equalization hose, the delivery includes a hose end piece with the fitting materials.

Protective hose	
Material	PE, PA <sup>a</sup>
Color	Natural
Outer diameter	8 mm
Bending radius	Approx. 120 mm It is vital to take into account that if the protective hose is kinked or pinched, this will prevent ambient pressure compensation.
Admissible medium temperatures	0 to 50 °C (depending on the medium and the level probe)
Yield stress	
PE protective hose	10 M Pa
PA protective hose	22 M Pa

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

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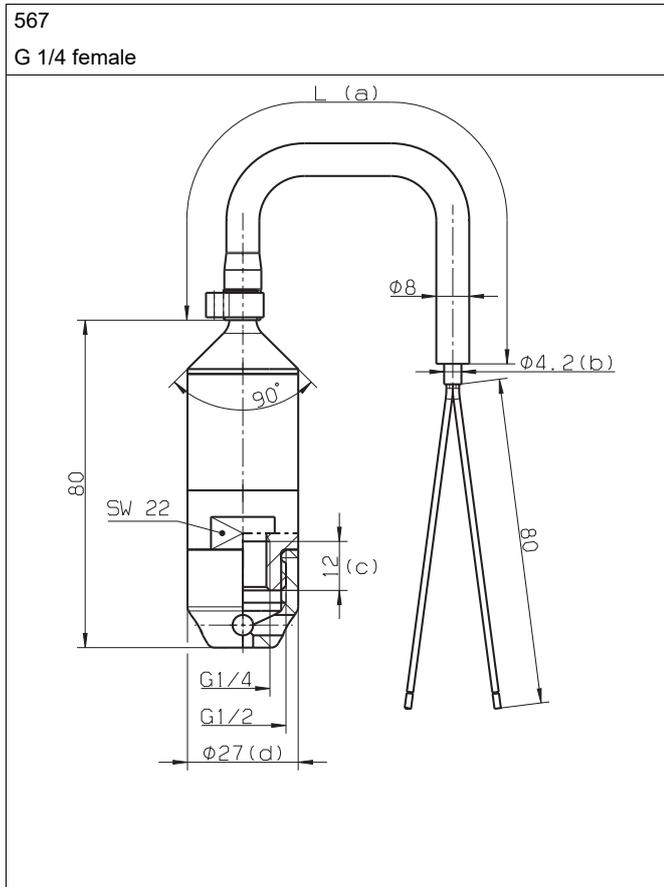
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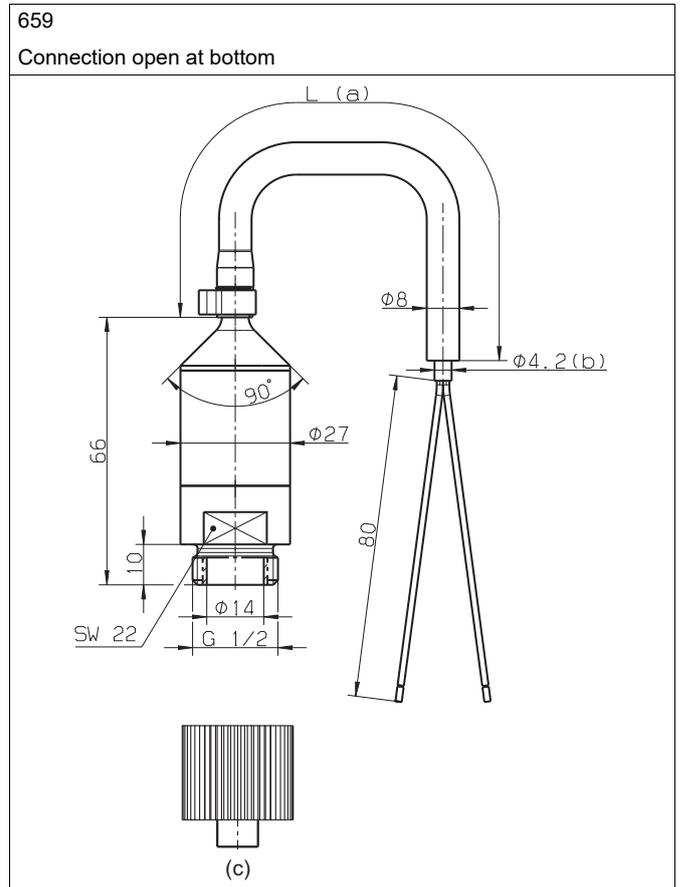


## Dimensions

### Process connection



- (a) Cable length according to customer preference
- (b) Ø 4.6 for three-wire output
- (c) Maximum screw-in depth
- (d) The protective cap has three bore holes (Ø 3) and protects the case against contact corrosion and the sensitive separating membrane.



- (a) Cable length according to customer preference
- (b) Ø 4.6 for three-wire output
- (c) The protective cap is provided for transportation and has to be removed before implementing.



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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 <sup>a</sup>
<b>4 to 20 mA, two-wire (output 405)</b>		
Voltage supply DC 10 to 30 V, Rated voltage supply DC 24 V	$U_{B/S}^{+b}$ 0 V/S-	White Brown
<b>DC 0.5 to 4.5 V ratiometric (output 412)</b>		
Voltage supply DC 5 V, Rated voltage supply DC 5 V	$U_B^b$ 0 V/S- S+	White Brown Green
<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	$U_B^b$ 0 V/S- S+	White Brown Green
<b>DC 1 to 5 V, three-wire (output 418)</b> <b>DC 1 to 6 V, three-wire (output 420)</b>		
Voltage supply DC 10 to 30 V, Rated voltage supply DC 24 V	$U_B^b$ 0 V/S- S+	White Brown Green

<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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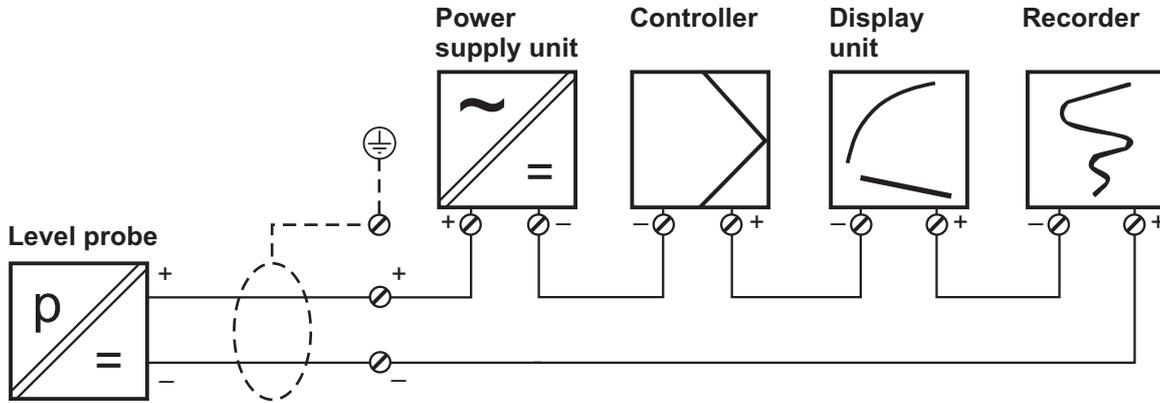
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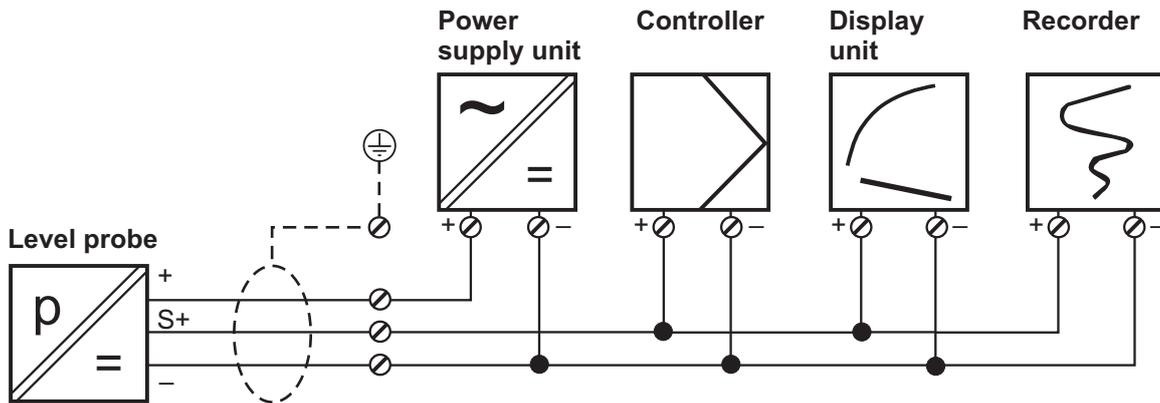


**Connection example**

Current output



Voltage output



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## Order details

<b>(1) Basic type</b>	
401015	JUMO MAERA S25 – level probe
<b>(2) Basic type extension</b>	
000	None
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
<b>(4) Output</b>	
405	4 to 20 mA, two-wire
412	DC 0.5 to 4.5 V, three-wire
415	DC 0 to 10 V, three-wire
418	DC 1 to 5 V, three-wire
420	DC 1 to 6 V, three-wire
<b>(5) Process connection</b>	
567	G 1/4 inside
659	Connection open at the bottom
707	M3 (× 0.5) inside
<b>(6) Process connection material</b>	
20	CrNi (stainless steel)
<b>(7) Electrical connection type</b>	
11	Attached cable
<b>(8) Protective hose</b>	
1	PE protective hose
2	PA protective hose
<b>(9) Cable length of the connecting cable</b>	
005	5 m
010	10 m
025	25 m
<b>(10) Extra codes</b>	
000	None
691	Improved moisture and vibration protection

Order code                    (1)                    (2)                    (3)                    (4)                    (5)                    (6)                    (7)                    (8)                    (9)                    (10)  
 Order example                401015 / 000 - 452 - 405 - 707 - 20 - 11 - 1 - 005 / 000

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## Accessories

Item	Description	Part no.
Terminal head for pressure compensation Tank cover mounting 	The terminal head is only suitable for application in the level probe variant JUMO MAERA S25 (type 401015). It is used to mount the level probes cost-effectively and in the best possible way. Protection type IP 67 is achieved. By using it locally with the tank mounting or wall mounting versions, a rapid pressure compensation can be achieved and the length of the special cable can be minimized. The costs are thereby reduced as an electric standard cable can be used as the outgoing cable from the terminal head. Furthermore, the direction (for example to the control cabinet) can be individually specified.	00602743
Wall mounting 		00602744

## Scope of delivery

Item	Description
Hose end piece 	With this device, a standard cable is encased in a protective hose suitable for the application. The hose end piece prevents the hose, which is used as a pressure compensation hose, from being cut off or bent, for example when being routed through a wall. The hose end piece may be used for example in routing through walls in masonry, clamp or cutting ring fittings in a tank, or cable glands in a control cabinet. The hose end piece is supplied with the device.