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JUMO MAERA S25

Level probe

Applications

Level and level measurements[1]

- 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.



Type 401015 with process connection 707

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.

Special features

- Level probe for continual level measurement in liquids
- Measuring ranges: 0.25 bar to 1 bar (2.5 to 10 mWS)
- Medium temperature 0 to 50 °C
- Piezoresistive silicon sensor
- Accuracy: 0.3% MSP[2] (linearity)
- Sensor technology proven thousands of times over
- Reverse-polarity protection mechanism
- Suitable for indoor installation

[1] 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.

[2] 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

Measuring range and accuracy

Measuring range bar	Linearity[a] % MSP[e]	Accuracy at 20 °C[c] % MSP	 0 to 50 °C[d] % MSP	Long-term stability[b] % MSP per year	Overload capability bar	Burst pressure bar
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

[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, 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_{90}	≤ 10 ms
Burden	
Current	
4 to 20 mA, two-wire (output 405)	$R_L \leq (U_B\text{-}10\ V) \div 0.02\ A\ (\Omega)$
Voltage	
DC 0.5 to 4.5 V, three-wire (output 412)	$R_L \geq 20\ k\Omega$
DC 0 to 10 V, three-wire (output 415)	$R_L \geq 10\ k\Omega$
DC 1 to 5 V, three-wire (output 418)	$R_L \geq 10\ k\Omega$
DC 1 to 6 V, three-wire (output 420)	$R_L \geq 10\ k\Omega$

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Mechanical features

Ensure the medium durability of the material!

Process connection	
Material	Stainless steel 316 L (G 1/4 inside [process connection 567]) Stainless steel 316 Ti (M3 (× 0.5) inside [process connection 707])
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

Environmental influences

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

[a] According to EN 61326-1

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

[c] According to EN 61326-2-3

[d] According to EN 60529

Auxiliary power

Voltage supply U_B[a]	
4 to 20 mA, two-wire (output 405)	DC 10 to 30 V, nominal voltage DC 24 V
DC 0.5 to 4.5 V, three-wire (output 412)	DC 5 V
DC 0 to 10 V, three-wire (output 415)	DC 11.5 to 30 V, nominal voltage DC 24 V
DC 1 to 5 V, three-wire (output 418)	DC 10 to 30 V, nominal voltage DC 24 V
DC 1 to 6 V, three-wire (output 420)	DC 10 to 30 V, nominal voltage DC 24 V

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

Reverse voltage protection	Yes (except DC 0.5 to 4.5 V, three-wire [output 412])
Max. current consumption	25 mA
Electrical circuit	SELV
Requirements	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[a]
Color	Natural (PE + PA, not UV resistant)[b], black (PA, UV resistant)
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 PA protective hose	 10 M Pa 22 M Pa

[a] Depending on the version ordered

[b] The non UV-resistant cable is not suitable for outdoor use.

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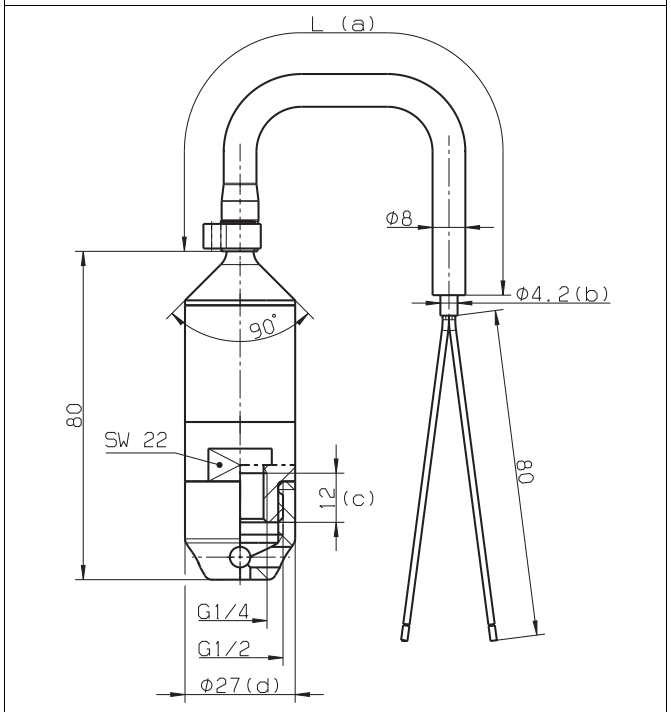
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Dimensions

Process connection

567

G 1/4 female



(a) Cable length according to customer preference

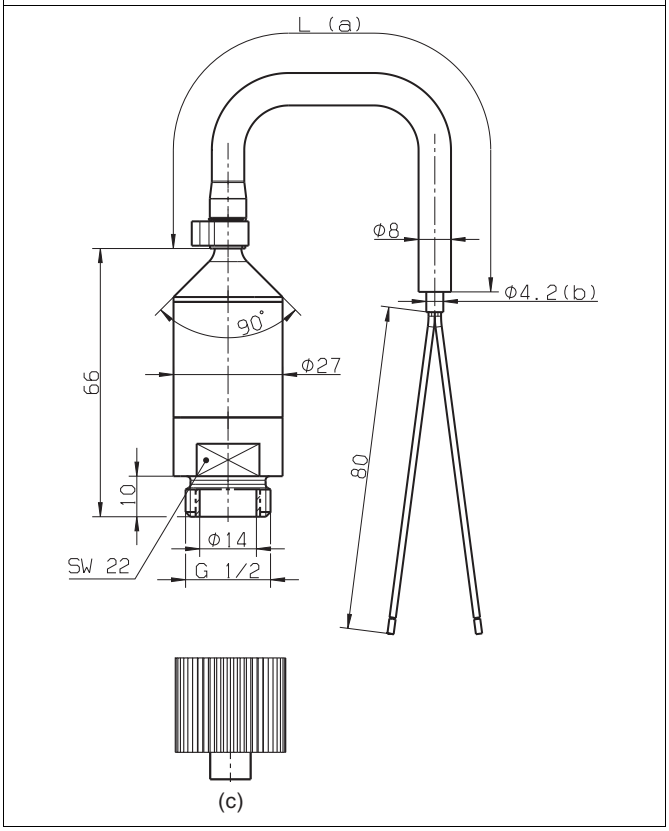
(b) Ø 4.6 for three-wire output

(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.

659

Connection open at bottom



(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.

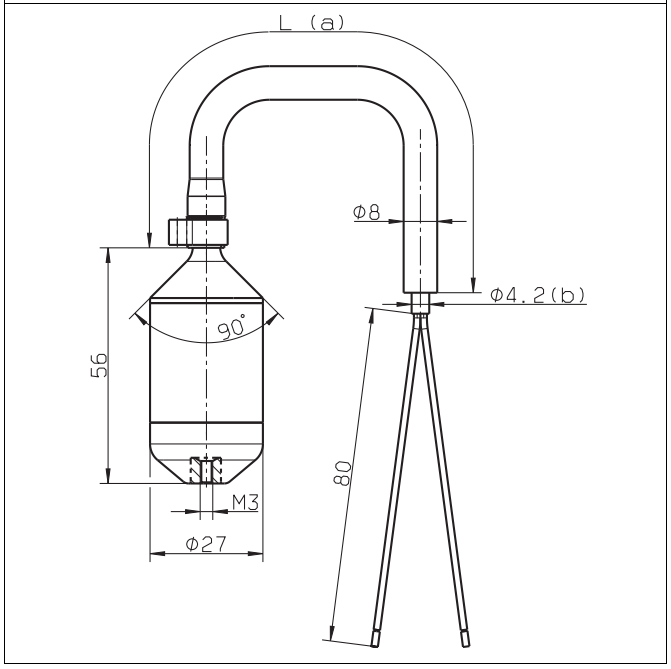
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707

M3 (× 0.5) female



(a) Cable length according to customer preference

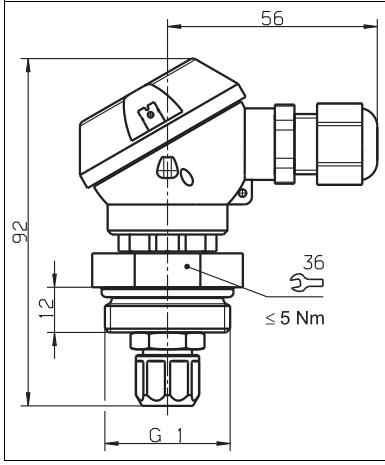
(b) Ø 4.6 for three-wire output

Accessories

Terminal head for pressure compensation

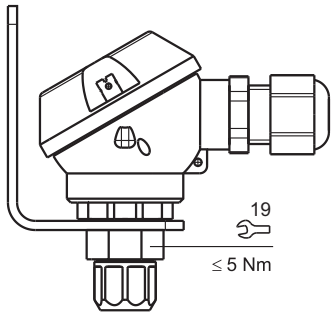
Tank cover mounting

Part no. 00602743



Wall mounting

Part no. 00602744



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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[a]
4 to 20 mA, two-wire (output 405)		
Voltage supply DC 10 to 30 V, Rated voltage supply DC 24 V	$U_{B/S}$+[b] 0 V/S-	White Brown
DC 0.5 to 4.5 V ratiometric (output 412)		
Voltage supply DC 5 V, Rated voltage supply DC 5 V	U_B[b] 0 V/S- S+	White Brown Green
DC 0 to 10 V, three-wire (output 415)		
Voltage supply DC 11.5 to 30 V, Rated voltage supply DC 24 V	U_B[b] 0 V/S- S+	White Brown Green
DC 1 to 5 V, three-wire (output 418) **DC 1 to 6 V, three-wire (output 420)**		
Voltage supply DC 10 to 30 V, Rated voltage supply DC 24 V	U_B[b] 0 V/S- S+	White Brown Green

[a] For cable specifications, see installation instructions B 401015.4, chapter 6 "Installation and mounting".

[b] The voltage peaks must not exceed or fall below the specified voltage supply values!

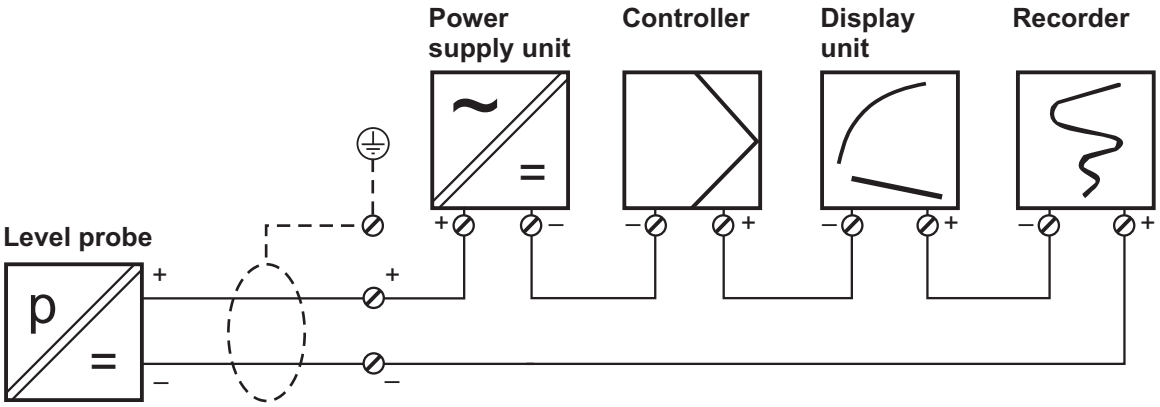
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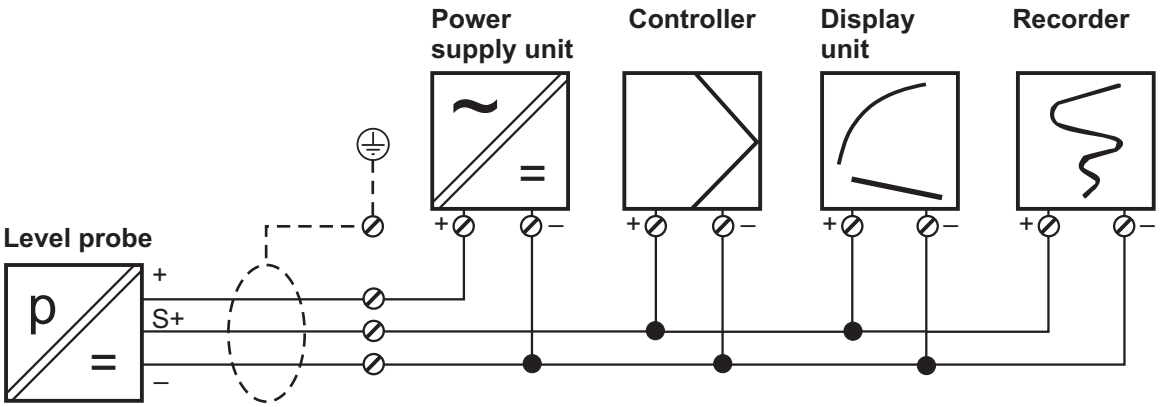
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Connection example

Current output



Voltage output



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Order details

	(1)	**Basic type**
401015/000		JUMO MAERA S25 – level probe
401015/999		JUMO MAERA S25 – level probe, special version
	(2)	**Input**
451		0 to 0.25 bar relative pressure
452		0 to 0.4 bar relative pressure
453		0 to 0.6 bar relative pressure
454		0 to 1 bar relative pressure
	(3)	**Output**
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
	(4)	**Process connection**
567		G 1/4 inside
659		Connection open at the bottom
707		M3 (× 0.5) inside
	(5)	**Process connection material**
20		CrNi (stainless steel)
	(6)	**Electrical connection type**
11		Attached cable
	(7)	**Protective hose**
1		PE protective hose (not UV resistant)[a]
2		PA protective hose (not UV resistant)[a]
3		PA protective hose (UV resistant)
	(8)	**Cable length of the connecting cable**
005		5 m
010		10 m
025		25 m
	(9)	**Extra codes**
000		None
691		Improved moisture and vibration protection

[a] The non UV-resistant cable is not suitable for outdoor use.

	(1)		**(2)**		**(3)**		**(4)**		**(5)**		**(6)**		**(7)**		**(8)**		**(9)**
Order code		-		-		-		-		-		-		-		/	
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.