

JUMO GmbH & Co. KG

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JUMO Instrument Co. Ltd.

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JUMO MAERA S25

Level Probe

Applications

Level and liquid level measurements¹

- in rainwater cisterns
- for graywater recycling
- in heating oil and diesel oil tanks
- in AUS32 (better known under the designation „AdBlue®“ in Europe, „DEF“ in North America, or „ARLA 32“ in Brazil)

Brief description

The JUMO MAERA S25 level probe can be used for hydrostatic liquid level measurement in tanks, for levels from 2.50 m to 10 mWC (water column).

There is usually a pressure compensation tube integrated in the cable to compensate for ambient pressure. A cost-optimizing approach has been adopted for this level probe, by encasing a standard cable in a protective tube. The protective tube then implements the pressure compensation.

For additional, interesting information, see the "level probes - hydrostatic level and liquid level measurement" brochure.

Customer benefits

- **Economy**
Development is based on sensor technology that has proved its worth a thousand times over in the pressure transmitters of the JUMO MIDAS product family. Digital compensation and calibration of the sensor assembly save time and cost. Optimum use is made of materials by keeping dimensions small. A standard cable is encased in a protective tube suitable for the application. The result of all this is an excellent price/performance ratio.
- **Process safety**
Because the measuring and calibrating system is fully automatic, the high level of quality of every level probe is assured throughout. The crucial element is a piezoresistive measuring cell, safe and reliable with a high overload resistance.
- **2-wire polarity reversal protection**
Polarity reversal protection ensures maximum safety on startup for level probes with a 2-wire output, protecting the measuring instrument from destruction during startup.



Type 401015 with
process connection 707

Key features

- Measuring ranges: 0 to 0.25/0.4/0.6/1 bar (0 to 50 °C)
- Piezoresistive sensor
- Sensor-technology that has proved its worth a thousand times over
- 2-wire polarity reversal protection

¹ Although these recommendations are based on many years of experience, deviation is possible in some cases. We would be happy to provide you with additional information or details of other applications.

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Technical data

General information

Reference conditions	DIN 16086 and EN 60770
Principle of measurement	Piezoresistive sensor with stainless steel separating diaphragm
Pressure transfer medium	Synthetic oil
Permissible load change	> 10 million, 0 to 100 % measuring range
Mounting location	Vertical/suspended on the cable

Measuring range

Relative pressure	The measuring ranges start at 0 bar.				
Measuring range	0.25	0.4	0.6	1	bar
Overload capacity	0.75	1.2	1.8	3	bar
Bursting pressure	1	1.6	2.4	4	bar

Output

Analog output	
Current	
Output 405	4 to 20 mA, 2-wires
Voltage	
Output 412	DC 0.5 to 4.5 V, 3-wires, ratiometric 10 to 90 % of the supply voltage
Output 415	DC 0 to 10 V, 3-wires
Output 418	DC 1 to 5 V, 3-wires
Output 420	DC 1 to 6 V, 3-wires
Jump response	
T ₉₀	≤ 10 ms
Burden	
Current	
4 to 20 mA, 2-wires	$R_L \leq [(U_B - 10 \text{ V}) \div 0.02 \text{ A}] (\Omega)$
Voltage	
DC 0.5 to 4.5 V, 3-wires	$R_L \geq 20 \text{ k}\Omega$
DC 0 to 10 V, 3-wires	$R_L \geq 10 \text{ k}\Omega$
DC 1 to 5 V, 3-wires	$R_L \geq 10 \text{ k}\Omega$
DC 1 to 6 V, 3-wires	$R_L \geq 10 \text{ k}\Omega$

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Mechanical properties

It is vital to note the resistance of the materials to the medium!

Process connection	
Material	
Process connection 567	Stainless steel 316 L
Process connection 707	Stainless steel 316 Ti
Measurement diaphragm	
Material	Stainless steel 316 L
Housing	
Material	Stainless steel 304
Protective cap	
Material	Rigid PVC
Weight	90 g (without cable)
Diameter	27 mm

Ambient conditions

Permissible temperatures	
Medium	0 to 50 °C The instrument must not be allowed to freeze in the medium! The medium may make it necessary to impose a restriction.
Storage	-20 to +80 °C, dry
Electromagnetic compatibility	
Interference emission ^a	Class B
Interference immunity ^b	Industrial requirements
Enclosure protection ^c	IP68, immersible to 20 m

^a as defined by EN 61326-1

^b as defined by EN 61326-2-3

^c as defined by EN 60529

Accuracy

Relative pressure					
Measuring range	0.25	0.4	0.6	1	bar
Linearity ^a	0.3	0.3	0.3	0.3	% of FS
Accuracy at 20 °C ^b	0.5	0.5	0.5	0.5	% of FS
Overall accuracy at 0 to 50 °C ^c	1	1	1	1	% of FS
Long-term stability ^d	0.3 % of FS per year				

^a linearity based on limit point setting

^b includes: linearity, hysteresis, repeatability, deviation from initial (offset) and final values of measuring range

^c includes: linearity, hysteresis, repeatability, deviation from initial (offset) and final values of measuring range, thermal effect on initial value of measuring range and span

^d reference conditions as defined by EN 61298-1

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Auxiliary power

Supply voltage U_B^a	
4 to 20 mA, 2-wires (output 405)	DC 10 to 30 V, nominal voltage DC 24 V
DC 0.5 to 4.5 V, 3-wires (output 412)	DC 5 V
DC 0 to 10 V, 3-wires (output 415)	DC 11.5 to 30 V, nominal voltage DC 24 V
DC 1 to 5 V, 3-wires (output 418)	DC 10 to 30 V, nominal voltage DC 24 V
DC 1 to 6 V, 3-wires (output 420)	DC 10 to 30 V, nominal voltage DC 24 V
Reverse polarity protection	yes (2-wire)
Max. power consumption	≤ 25 mA
Circuit	SELV

^a Peak voltages must not exceed or fall below the values specified for the power supply!

Electrical connection

Stranded core PVC cable, encased in a LD-PE or PA protective tube (in contact with the medium)

Because of ambient pressure compensation, the mounting of the level probe must not pinch the protective tube encasing the cable. A hose endpiece is included among the items supplied. It is also essential to ensure that moisture cannot get into the protective tube.

Protective tube	
Material	PE, PA
Color	Natural
External diameter	8 mm
Bending radius	Approx. 120 mm It is vital to take into account that if the protective tube is kinked or pinched, this will prevent ambient pressure compensation.
Permissible medium temperatures	-5 to +80 °C (subject to the medium and the level probe)
Yield stress	
PE protective tube	10 M Pa
PA protective tube	22 M Pa

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Connection diagram

Connection		Terminal assignment
		Cable
4 to 20 mA, 2-wires (output 405)		
Voltage supply DC 10 to 30 V Nominal voltage DC 24 V	$U_B/S+^a$ 0 V/S-	white brown
DC 0.5 to 4.5 V ratiometric (output 412)		
Voltage supply DC 5 V Nominal voltage DC 5 V	U_B^a 0 V/S- S+	white brown green
DC 0 to 10 V, 3-wires (output 415)		
Voltage supply DC 11.5 to 30 V Nominal voltage DC 24 V	U_B^a 0 V/S- S+	white brown green
DC 1 to 5 V, 3-wires (output 418) DC 1 to 6 V, 3-wires (output 420)		
Voltage supply DC 10 to 30 V Nominal voltage DC 24 V	U_B 0 V/S- S+	white brown green

^a Die Spannungsspitzen dürfen die angegebenen Werte der Spannungsversorgung nicht über- bzw. unterschreiten!

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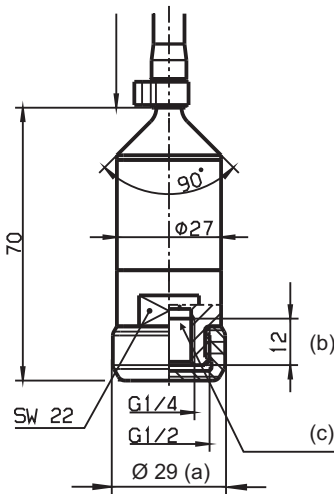
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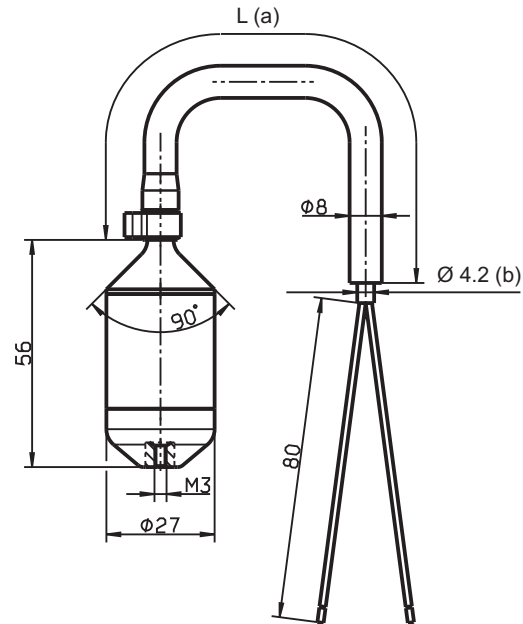
Dimensions process connection

Process connection 567



- (a) The protective cap has three holes ($\text{Ø } 3$) and protects the housing against contact corrosion, and the sensitive separating diaphragm
- (b) Max. depth of engagement
- (c) Sensitive diaphragm

Process connection 707



- (a) Cable length as required by customer
- (b) $\text{Ø } 4.6$ for three-wire output

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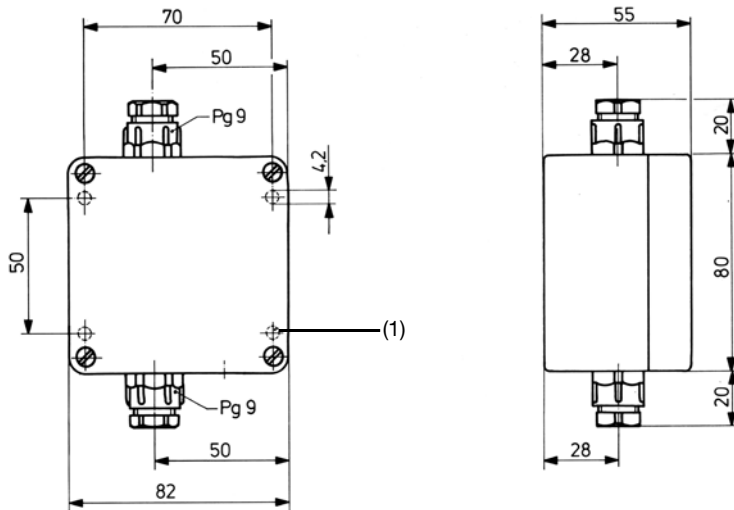
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Dimensions of accessories

Terminal box with pressure compensation

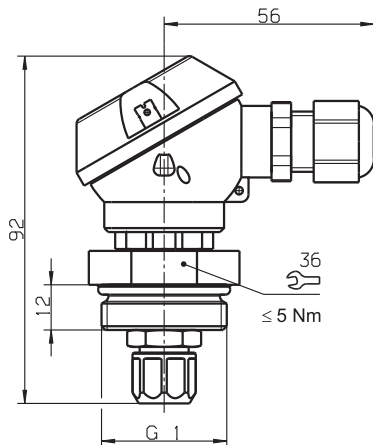
Part no. 00061206



(1) Mounting hole

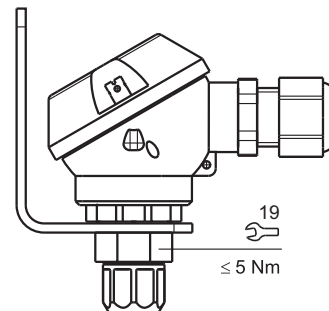
Tank cover mounting

Part no. 00602743



Wall mounting

Part no. 00602744



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Order details

(1) Basic type	
401015/000	JUMO MAERA S25 - Level probe
401015/999	JUMO MAERA S25 - Level probe, special design
(2) Input	
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
(3) Output	
405	4 to 20 mA, 2-wires
412	DC 0.5 to 4.5 V, 3-wires
415	DC 0 to 10 V, 3-wires
418	DC 1 to 5 V, 3-wires
420	DC 1 to 6 V, 3-wires
(4) Process connection	
567	G 1/4 internal
659	Connection open underneath
707	M3 (x 0.5) internal
(5) Process connection material	
20	CrNi (stainless steel)
(6) Electrical connection	
11	Attached cable
(7) Protective tube	
1	PE protective tube
2	PA protective tube
(8) Length of connecting cable	
005	5 m
010	10 m
025	25 m
(9) Extra codes	
000	None
691	Higher humidity and vibration protect

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

Accessories

Article	Part no.
Terminal head form J with pressure compensation	
Tank cover mounting	00602743
Wall mounting	00602744
Terminal box with pressure compensation (can only be used with the hose endpiece)	00061206