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ИНДИКАТОРЫ УРОВНЯ

BM 500

1.1 Level meter for hygienic applications

The level meter **BM 500** utilises the potentiometric measuring principle and can be used in all media that have a minimum conductivity of 50 µS/cm.

The device is ideal for measurements in small vessels with tough, pasty or strong adhesive media, such as ketchup, honey, and toothpaste. The integrated electronics provide a 4...20 mA output.

The device has automatic recognition of top/bottom mounting position. Even angled installation is possible.

A version with remote electronics is available for applications where the ambient temperature at the measuring point exceeds +60°C / +140°F. Due to the high temperature limit the device is well suitable for CIP and SIP processes.

The hygienic installation is guaranteed by using one of the hygienic weld-in sleeves. For more data, refer to the "Order information" chapter.

Highlights

- Process temperature: -20…+140°C / -4...+284°F
- Insensitive to build up or foam
- Not affected by adhesive media
- LED level monitoring
- Empty tank detection
- Configurable measuring range
- Ideal for small tanks

Industries

- Food & Beverage
- Pharmaceuticals
- Cosmetics

Typical applications

- Level detection of mustard
- Level detection of ketchup

1.2 Options and variants

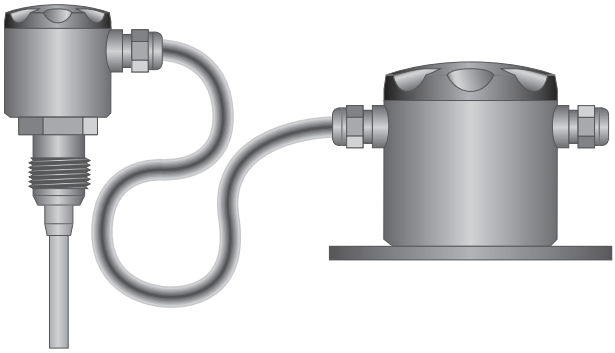
LED level monitor

The level meter can be mounted from the top or the bottom of the tank. Delivered from the factory, the 4 mA output corresponds to the tip of the rod, the 20 mA value to the end of the cylindrical part of the rod.

Measuring range of the customer can be calibrated by pressing one of the two set points keys for more than 3 seconds. The relevant LED will show a steady light. With these two buttons any empty/ full level can be configured on the entire length of the rod.

Factory setting will be valid again by pressing both keys for more than 3 seconds.

Remote version



The remote version is available for applications where the ambient temperature exceeds +60°C / +140°F.

1.3 Measuring principle

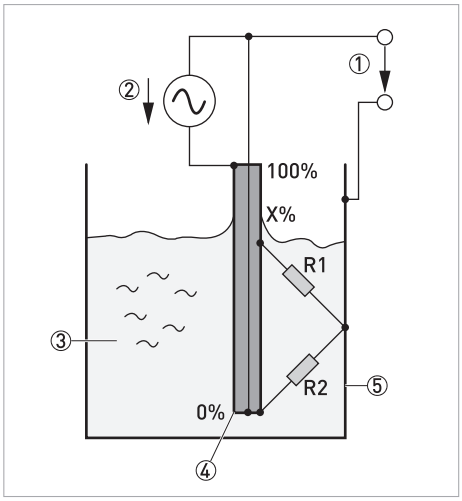


Figure 1-1: Measuring principle

① U_{out} to amplifier
② U_{gen}
③ Medium
④ Tube
⑤ Tank

The liquid is stored in a tank, connected to ground. The immersed measuring rod is a low resistance rod where the ends are powered by an AC generator operating in the lower kilohertz frequency range.

Between the rod and the tank wall is an endless amount of high level resistances. Since they connect to the same potential (the tank wall) they can be shown as two equivalent resistances, R1 and R2 connected to an imaginary center point. A high resistance input amplifier is connected between the generator and the tank wall.

Since the generator is supplying a high range current it will create a significant voltage drop across the low resistance rod. The resistances R1 and R2 form a voltage divider in range of the immersed part of the rod. Output from this divider will indicate half the level of the liquid. The amplifier then calculates the actual level of liquid from 0 to 100%.

The formula is:
U_{out} = 1/2 x media level (%) x U_{gen}
Media level (%) = U_{out}/U_{gen} x 2

The level measurement is insensitive to adhesion.

It is very essential that the media conductivity is homogeneous. Otherwise R1 will not be equal to R2 and the output voltage will be influenced.

2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Downloadcenter).*

Measuring system

Measuring principle	Potentiometric, low resistive
Application range	Level detection of all media with the minimum conductivity of 50 µS/cm in tanks.

Design

Options	Remote version for applications with ambient temperature above +60°C / +140°F
Accessories	Comprehensive range of adapters and process connections for hygienic installation. Please refer to the chapter "Order information".

Measuring accuracy

Accuracy	± 0.5% of full measuring length
Repeatability	± 0.1%

Operating conditions

Temperature	
Ambient temperature (compact)	-20...+60°C / -4...+140°F
Ambient temperature (remote)	-20...+100°C / -4...+212°F
Process temperature	-20...+140°C / -4...+284°F
Medium conductivity	≥ 50 µS/cm
Min. measuring range	50 mm / 2", configurable by push-buttons
Pressure	
Ambient pressure	Atmospheric
Process pressure	≤ 16 bar / 232 psi
Other conditions	
Ingress protection (acc. to EN 60529)	IP67 equivalent to NEMA 4X

Installation conditions

Installation	Installation from top or bottom (automatic position detection)
Probe length	200...3000 mm / 0.6...10 ft
Cable length	1000...5000 mm / 3.3...16.4 ft (only for remote version)
Dimensions and weights	For more data, refer to the "Dimensions and weights" chapter.

Materials

Probe	Stainless steel 1.4404 / AISI 316 L
Housing	Stainless steel 1.4301 / AISI 304
Process connection	Stainless steel 1.4404 / AISI 316 L
Sensor insulation	PEEK, FDA conform
Electrical connection	M16 cable glands: Plastic
	M12 plug: Nickel-plated brass

Process connections

Standard	Hygienic G 1
Other	For other hygienic process connections, e.g. Tri-Clamp®, DIN 11851, VARIVENT® – refer to the "Order information" chapter.

Electrical connections

Power supply	18...36 VDC; max. 200 mA
Resolution, input	15 bit
Output	4...20 mA; max. load 500 ohms
Status signal, "dry"	2.4 mA
Status signal, "full"	21.6 mA
Response time	T_{66} < 10 ms
Cable entry	M16 cable glands, M12 plug

Approvals and certifications

CE	This device fulfils the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE marking.
Other standards and approvals	
Electromagnetic compatibility (EMC)	EN 61326-1 (2006)
Vibration resistance	IEC 60068-2-6, GL test 2
Hygiene	3A, FDA conform materials

2.2 Dimensions

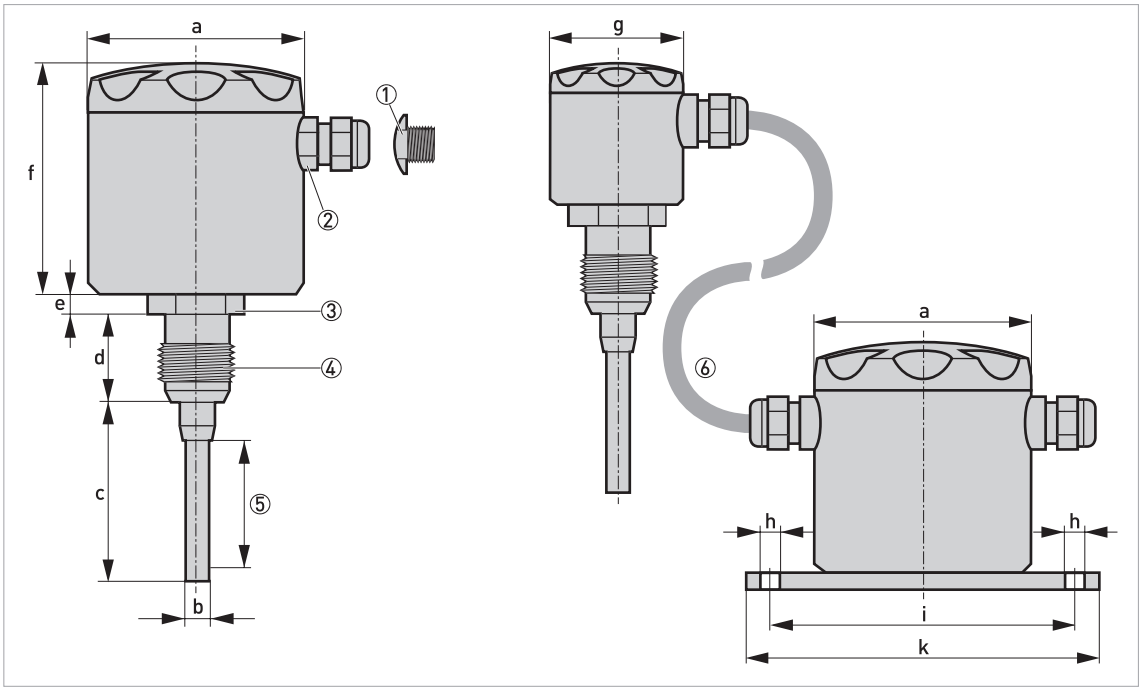


Figure 2-1: Dimensions of compact (left) and remote (right) version

① M12×1 plug
② M16×1.5 cable gland
③ WS 36
④ G 1
⑤ Active zone
⑥ Connecting cable (please specify length on ordering (min.: 1 m / 3.3 ft; max.: 5 m / 16.4 ft))

Dimensions in mm

	a	b	c	d	e	f	g	h	i	k
BM 500	89	10	L ①	33	8	92	55	8	125	145

① Ordered rod length

Dimensions in inches

	a	b	c	d	e	f	g	h	i	k
BM 500	3.5	0.49	L ①	1.30	0.31	3.62	2.17	0.31	4.92	5.71

① Ordered rod length

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