

# Magnetostrictive level transmitter

## Version with local indication

### Models BLM-TB and BLM-TH

WIKA data sheet LM 10.07



For approvals, see  
page 4

#### Applications

- High-accuracy level detection for almost all liquid media in the process industry
- Suitable for interface layer applications or processes with heavy foaming
- Chemical, petrochemical industry, natural gas, offshore, shipbuilding, power generating equipment, power plants

#### Special features

- Insertion length 100 ... 6,000 mm [3.94 ... 236.22 in] (flexible version up to 22,000 mm [866.14 in])
- Version with LC display for local indication of the level (Version with heatable LC display for lower ambient temperatures on request)
- High accuracy of up to  $\pm 0.2$  mm [ $\pm 0.008$  in] or  $\pm 0.01$  % over the entire measuring range
- Very high resolution of  $< 0.1$  mm [0.004 in]
- Version for hazardous areas



Level transmitter with LC display, model BLM-TB

#### Description

The model BLM-TB magnetostrictive level transmitter is used for high-accuracy, continuous level detection of liquids, also with long insertion lengths.

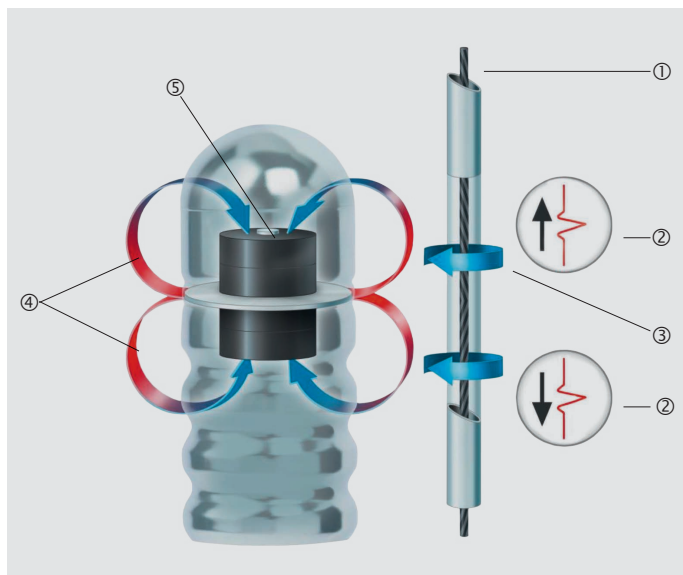
The model BLM-TB has a local LC display. For particularly low ambient temperatures, the model BLM-TH version can be used, which has a heated LC display.

Furthermore, the model BLM-TB and BLM-TH level transmit-

ters with LC display are available as both an intrinsically safe version and a version with flameproof enclosure.

# Specifications

## Functionality



- ① Wire
- ② Torsional wave
- ③ Impulse magnetic field
- ④ Permanent magnetic field
- ⑤ Permanent magnetic field

## Design and operating principle

- The measurement process is triggered by a current impulse. This current produces a circular magnetic field along a wire made of magnetostrictive material which is held under tension inside the corrugated tube.
- At the point being measured (liquid level) there is a float with permanent magnets acting as a position transducer.
- The superposition of these two magnetic fields triggers a mechanical torsional wave in the wire.
- This is converted into an electrical signal at the end of the wire in the sensor housing by a piezoceramic converter.
- The measured propagation delay enables the origination point of the mechanical wave, and thus the float position, to be determined with high accuracy.



## Overview of versions

Model	Display	Electrical connection	Ex version
BLM-TB	LC display	Cable gland	-
BLM-TBI	LC display	Cable gland	Ex ia
BLM-TBD	LC display	Cable gland	Ex ia/db
BLM-TH	LC display with integrated heating	Cable gland	-
BLM-THI	LC display with integrated heating	Cable gland	Ex ia
BLM-THD	LC display with integrated heating	Cable gland	Ex ia/db



Basic information		
<b>Connection housing</b>		
Material	Stainless steel 1.4404 (316L), safety glass	
<b>Sensor tube</b>		
Material	Stainless steel 1.4571 (316Ti) Further materials such as Hastelloy on request	
Diameter	12 mm [0.47 in]	
Sensor length	Rigid version	100 ... 6,000 mm [3.937 ... 236.221 in]
	Flexible version (with corrugated tube)	1,500 ... 22,000 mm [59.055 ... 866.142 in]
Upper dead band (sensor housing)	100 mm [3.94 in]	
Lower dead band (sensor end)	50 mm [1.97 in]	
Measuring range	Sensor length – upper and lower dead band (150 mm [5.91 in])	
<b>Accuracy specifications</b>		
Level	Up to $\pm 0.2$ mm [0.008 in] or $\pm 0.01$ %	
Resolution (HART®)	0.1 mm [0.004 in]	
Mounting fixture <sup>1)</sup>	<ul style="list-style-type: none"> <li>■ Welded retaining bracket</li> <li>■ Tightening straps</li> <li>■ Tightening straps with welded retaining bracket</li> </ul>	
<b>Output signal</b>		
Output signal	4 ... 20 mA (3.8 ... 20.5 mA) / HART® version 6	
<b>Residual current</b>		
Residual current	3.6 mA or 21.5 mA (adjustable)	
<b>Electrical connection</b>		
Connection type	2-wire	
Cable diameter	5 ... 10 mm [0.2 ... 0.39 in]	
Supply voltage	Standard (non-Ex)	DC 12 ... 50 V
	Intrinsically safe version (Ex ia)	DC 12 ... 30 V
	Flameproof version (Ex db)	DC 12 ... 50 V
	Heating (model BLM-TH)	DC 24 V ( $\pm 10$ %)
Electrical output	<ul style="list-style-type: none"> <li>■ Cable bushing M20 x 1.5</li> <li>■ Cable gland M20 x 1.5</li> <li>■ ½ NPT thread for conduit wiring</li> </ul>	
<b>Operating conditions</b>		
Ambient temperature range	BLM-TB	-20 ... +85 °C [-40 ... +185 °F]
	BLM-TH	-55 ... +85 °C [-67 ... +185 °F] (with integrated heating)
Storage temperature range	-40 ... +85 °C [-40 ... +185 °F]	
Surface temperature range of the sensor tube	Normal temperature (NT)	-40 ... +125 °C [-40 ... +257 °F]
	High temperature (HT)	-40 ... +250 °C [-40 ... +482 °F]
	Highest temperature (HHT)	-40 ... +450 °C [-40 ... +842 °F]
	Low temperature (LT)	-65 ... +125 °C [-85 ... +257 °F]
Ingress protection per IEC/EN 60529	IP66/68	

1) Mounting fixture for installation of the level transmitter at a model BNA bypass level indicator, see data sheet LM 10.01


## Approvals

Logo	Description	Region
	<b>EU declaration of conformity</b>	European Union
	EMC Directive EN 61326 emission (group 1, class B) and immunity (industrial environments)	
	RoHS directive	
	<b>UKCA</b>	United Kingdom
	Electromagnetic compatibility regulations	
	Restriction of hazardous substances (RoHS) regulations	

## Optional approvals

Logo	Description	Region
	<b>EU declaration of conformity</b>	European Union
	ATEX directive Hazardous areas - Ex i Zone 0 gas Zone 0/1 gas Zone 1 gas Zone 1 dust - Ex db Zone 0/1 gas Zone 1 gas Zone 1 dust II 1G Ex ia IIC T6 ... T1 Ga II 1/2G Ex ia IIC T6 ... T1 Ga/Gb II 2G Ex ia IIC T6 ... T1 Gb II 2D Ex ia IIIC TX °C Db (see thermal data on approval certificate) II 1/2G Ex ia/db IIC T6 ... T1 Ga/Gb II 2G Ex db ia IIC T6 ... T1 Gb II 2D Ex ia tb IIIC TX °C Db (see thermal data on approval certificate)	
	<b>IECEX</b>	International
	Hazardous areas - Ex ia Zone 0 gas Zone 0/1 gas Zone 1 gas Zone 1 dust - Ex db Zone 0/1 gas Zone 1 gas Zone 1 dust Ex ia IIC T6 ... T1 Ga Ex ia IIC T6 ... T1 Ga/Gb Ex ia IIC T6 ... T1 Gb Ex ia IIIC TX °C Db (see thermal data on approval certificate) Ex ia/db IIC T6 ... T1 Ga/Gb Ex db ia IIC T6 ... T1 Gb Ex ia tb IIIC TX °C Db (see thermal data on approval certificate)	

## Manufacturer's declaration

Logo	Description
	<b>SIL 2</b> Functional safety
-	<b>China RoHS directive</b>

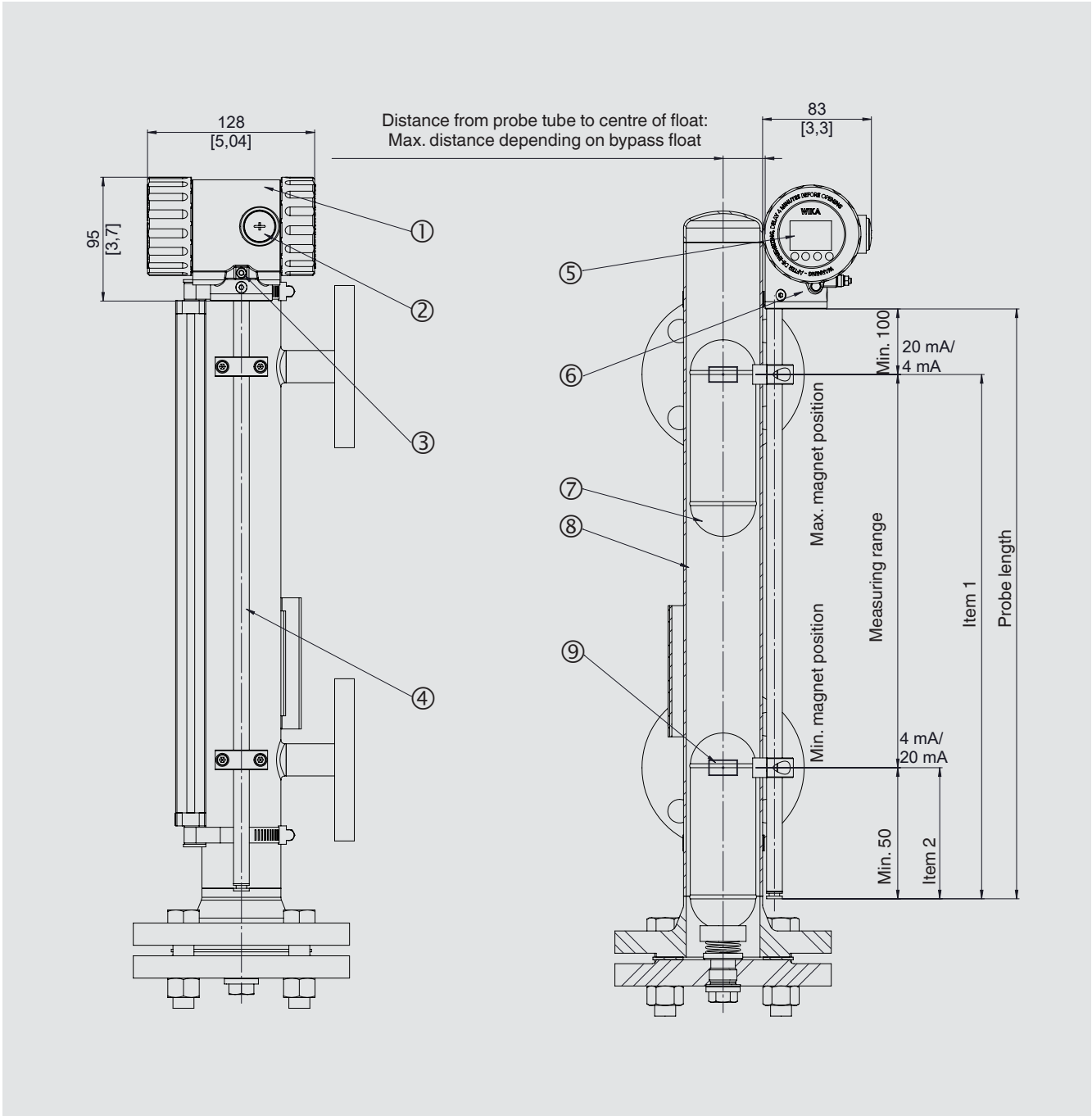
## Certificates

Certificates	
<b>Certificates</b>	<ul style="list-style-type: none"> <li>■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy)</li> <li>■ 3.1 inspection certificate per EN 10204 (e.g. material proof for wetted metal parts, indication accuracy, calibration certificate)</li> </ul>

→ For approvals and certificates, see website

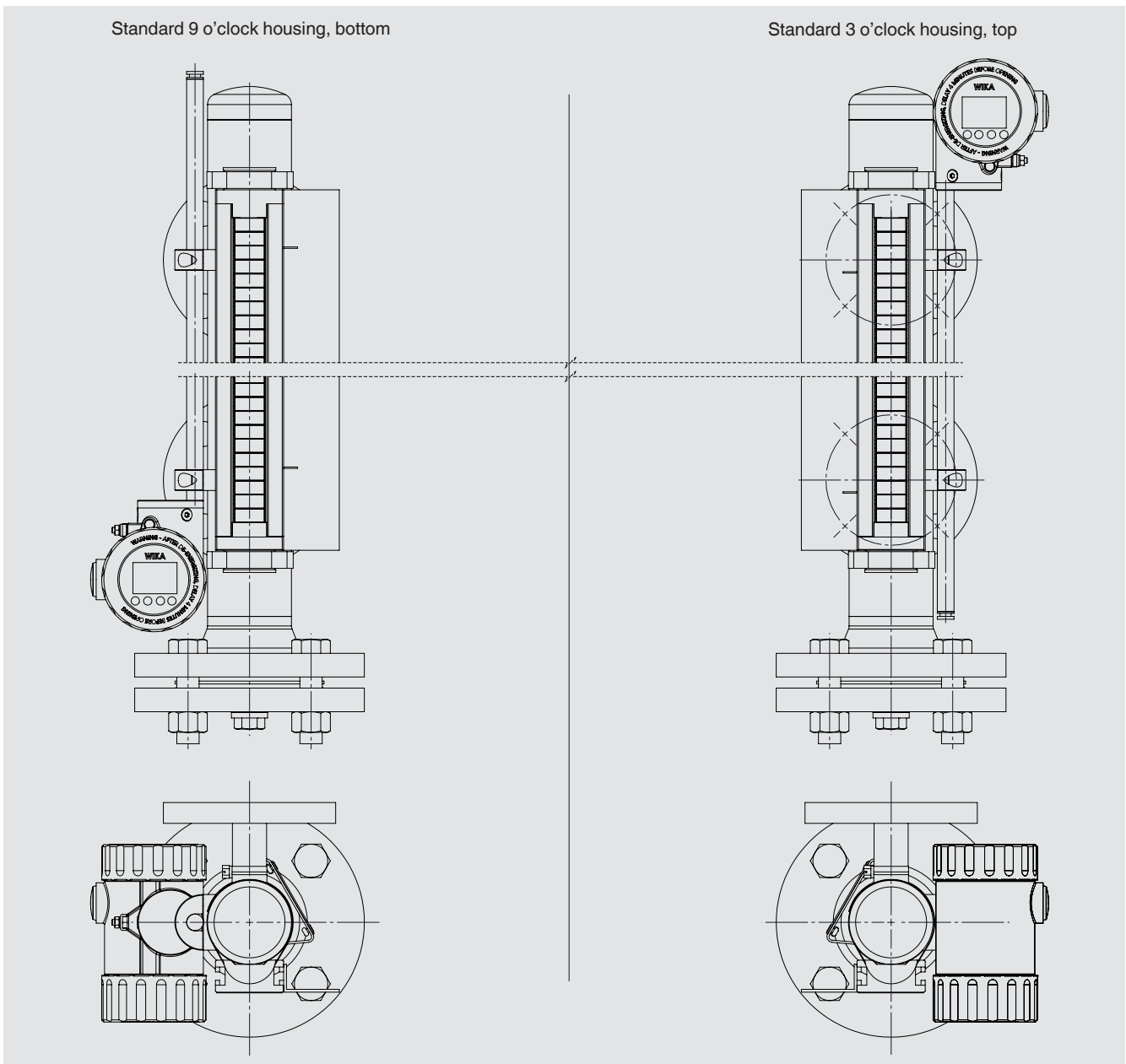
# Dimensions in mm [in]

## Version with process connection flange



- ① Probe head
- ② Plug screw M20 x 1.5
- ③ Grounding connection
- ④ Probe tube, mounted free of tension (not deformed)
- ⑤ Display unit
- ⑥ Lock screw
- ⑦ Bypass float
- ⑧ Bypass tube
- ⑨ Magnet position

## Orientation of BLM-TBD



HART® is a registered trademark of HART® Communication Foundation.

### Ordering information

Model / Version / Electrical connection / Process connection / Guide tube diameter / Guide tube length L / 100 % mark L1 / Measuring range M (span 0 ... 100 %) / Process specifications (operating temperature and pressure, limit density) / Options

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