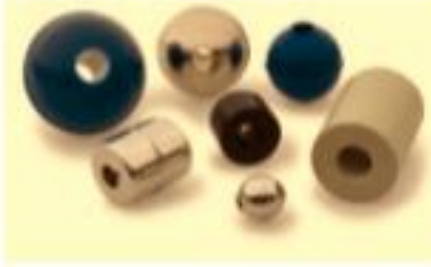
LEVEL MEASUREMENT



Industries

Process

- Power engineering
- Chemical
- Petrochemical
- Oil & Gas
- Water, waste water

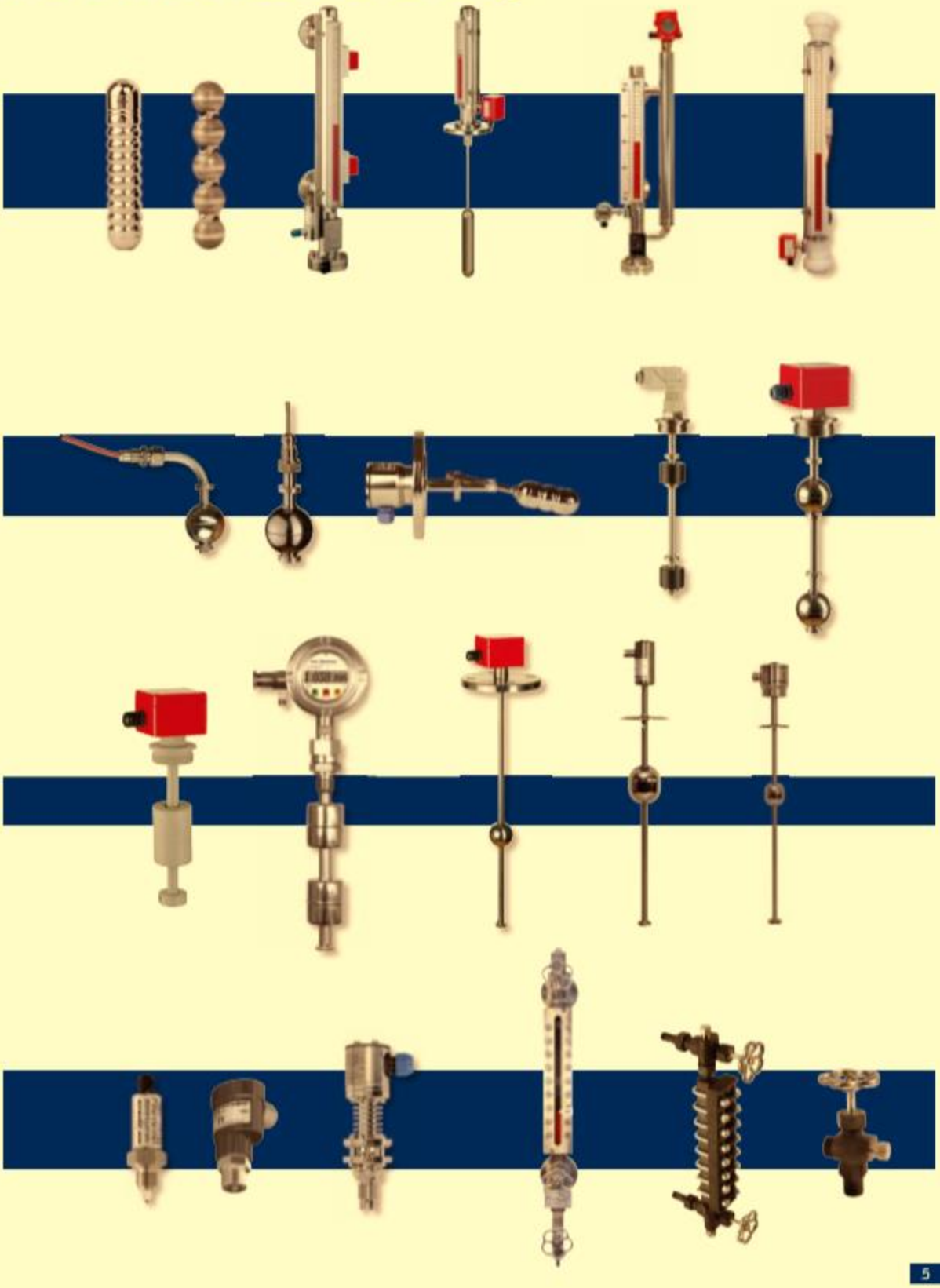
Industrial

- Machine building
- Heating, Ventilation, Air-conditioning
- Refrigeration
- Technical gases
- Semiconductor

Hygienic

- Food
- Pharmaceutical
- Beverage
- Biotechnology
- Cosmetics

KSR Product diversity



Product overview

Bypass Level Indicators model BNA

Continuous level measurement with visual indication of level without power supply

- Simple, robust, and solid design
- Display proportional to the height of the level or the contents of the vessel
- Pressure- and gas-proof separation of chamber and display
- Available for applications in all areas of industry through versatile design and corrosion-resistant materials
- Explosion-proof designs
- Interface

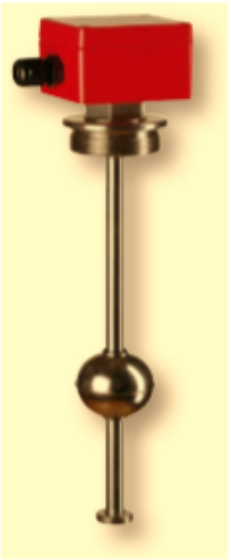
Magnetic Float Switches model FLS

Detection of one or more distinct levels of a liquid

- Suitable for virtually all liquids
- Switching operation is without direct contact with the liquid, free of wear and tear and does not require any power supply
- Universal signal processing of volt-free contacts:
  - PLC
  - Control circuit to DIN NAMUR 60947-5-6
- Multiple switch points in one unit (up to 8)
- Explosion-proof designs
- Interface
- Application specific designs available
- Simple installation and commissioning, maintenance-free

Product overview

Level Sensors model FLR/FLM



Continuous level measurement, interface measurement

- Protocols: HART, Profibus, Foundation Fieldbus ®
- Signal transmission over large distances
- Simple installation and commissioning, one-time calibration only, no re-calibration necessary
- Display proportional to the height of the level or the contents of the vessel
- Set point relays continuously adjustable over full range
- High repeatability of set points
- Interface
- Application specific designs available
- Explosion-proof designs

Opto Level Switch model OLS

Opto Level Switches are used for monitoring liquid levels

- Option: Interface
- High precision
- Independent of color, density, dielectric constant, conductivity and refactive index
- Small measurement volume
- Small size
- Explosion-proof designs

KSR – Your Partner for the Chemical and Petrochemical Industry

The manufacture of chemical products from natural gas and naphtha in refineries places high demands on the process instrumentation. In different process steps, such as cracking, condensation or distillation, the respective intermediate or finished products are manufactured under defined pressure and temperature conditions. The high precision and quality of KSR time-proven products ensures maximum plant availability here. Since the handling of the various gas mixtures and the highly flammable naphtha is not without danger, for example, our ATEX tested and certified measuring instruments make a contribution to the required safety.

Particularly in applications with aggressive media, in combination with high media temperatures, individual solutions are essential. For all application examples for level measurement, KSR offers an unrivalled programme of level measuring instruments.
Our standard product range includes products that can be used in numerous ways. Individually tailored advice and proposals, to match solutions to your needs, supplement our extensive offering of products. Our expertise and dependability, in addition to our worldwide sales and service network, has made WIKA a global contracting partner with many well-known names in the international chemical industry.

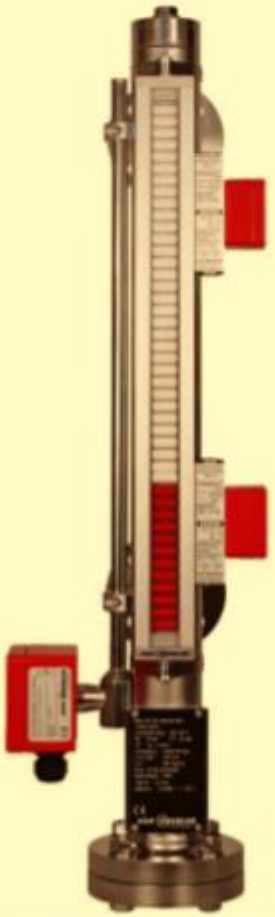
Bypass level indicator
With magnetic display
Model BNA

Applications

- Continuous level indication without power supply
- Indication of the level proportional to height
- Individual design and corrosion resistant materials make the products suitable for a broad range of applications
- Chemical, petrochemical industry, oil and natural gas extraction (on- and offshore), shipbuilding, machine building, power generating equipment, power plants
- Process water and drinking water treatment, food industry, pharmaceutical industry

Special features

- Process- and system-specific production
- Operating limits:
  - Operating temperature: T = -196 ... +450 °C
  - Operating pressure: P = vacuum to 400 bar
  - Limit density: $\rho \geq 340$ kg/m³
- Wide variety of different process connections and materials
- Mounting of level sensors and magnetic switches possible as an option
- Explosion-protected versions



Bypass level indicator, model BNA with level sensor and magnetic switch

Description

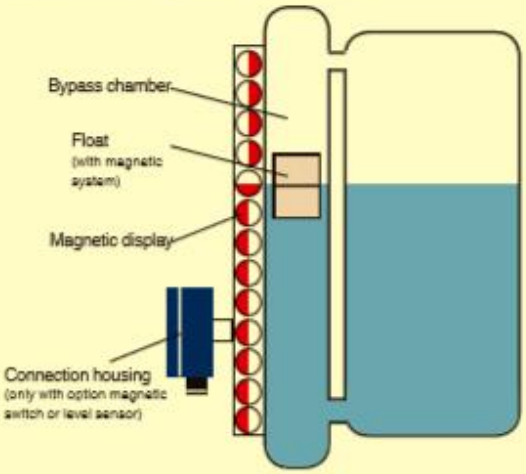
The bypass level indicator model BNA consists of a bypass chamber, which, as a communicating tube, is connected laterally to a vessel via at least 2 process connections (flanged, threaded or welded). Through this type of arrangement, the level in the bypass chamber corresponds to the level in the vessel. The float with a built-in permanent magnetic system, which is mounted within the bypass chamber, transmits the liquid level, contact-free, to the magnetic display mounted to the outside of the bypass chamber. In this are fitted, at 10 mm intervals, two-coloured plastic rollers or stainless steel flaps with bar magnets.

Through the magnetic field of the permanent magnetic system in the float, the display elements, through the wall of the bypass chamber, are turned through 180°. For an increasing level from white to red; for a falling level from red to white.
Thus the bypass level indicator clearly displays the level of a vessel **without power supply**.

Further special features

- Simple, robust and solid design, long service life
- Bypass chamber and float from stainless steel 1.4571, 1.4404 or special materials
- Pressure- and gas-tight separation between measuring and display chamber
- Measuring and indicating of the level of aggressive, combustible, toxic, hot and contaminated media
- Functioning of the magnetic display guaranteed even in the case of power failures
- By using a variety of corrosion-resistant materials, applicable for virtually all industrial applications
- Continuous measurement of levels, independent of physical and chemical changes of the media such as: Foaming, conductivity, dielectric constant, vapours, bubble formation, boiling effects
- Interface-layer level measurement from Δ density 100 kg/m³
- Special versions: Food compliant, coatings, liquid gas, heating jacket

Illustration of the principle

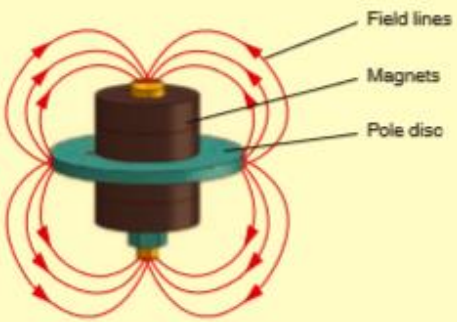


Design and operating principle

- In a communicating bypass chamber mounted to the side of a vessel a float moves with the level of the medium to be measured.
- The magnetic field of the radial-symmetric magnetic system positioned in the float activates the magnetic display attached to the outside of the bypass chamber as well as the switching and measuring elements.

Magnetic system

The magnetic system is assembled from a pole disc and various magnets. These can be individually adapted to the different chamber dimensions and for temperatures up to 450 °C.



Model overview

Bypass level indicator	Approval							Material	Max. pressure in bar	Medium temperature in °C
	without	Ex c	Ex c, GL	Ex c, DNV	GL	DNV	ABS			
Compact version, model BNA-C	x	x	x	x	x	x		Stainless steel 1.4571 (316Ti)	40	-196 ... +150
Standard version, model BNA-S	x	x	x	x	x	x	x	Stainless steel 1.4571 (316Ti), 1.4404 (316L), 1.4401/1.4404 (316/316L)	64	-196 ... +450
High-pressure version, model BNA-H	x	x	x	x	x	x		Stainless steel 1.4571 (316Ti), 1.4404 (316L)	400	-196 ... +450
Plastic version, model BNA-P	x							PP, PVDF	6	-10 ... +100
DUPlus version, standard, model BNA-SD	x	x						Stainless steel 1.4571 (316Ti), 1.4404 (316L), 1.4401/1.4404 (316/316L)	64	-196 ... +450
DUPlus version, high pressure, model BNA-HD	x	x						Stainless steel 1.4571 (316Ti), 1.4404 (316L), 1.4401/1.4404 (316/316L)	160	-196 ... +450
Liquid gas/KOPlus version, model BNA-L	x	x						Stainless steel 1.4571 (316Ti), 1.4404 (316L)	25	-60 ... +300
Special materials, model BNA-X	x	x						Stainless steel 6Mo 1.4547 (UNS S31254)	250	-196 ... +450
	x							Stainless steel 1.4571 (316Ti) with internal coating E-CTFE, ETFE or PTFE	16	depending on the medium
	x	x	x	x	x	x		Titanium 3.7035	64	-196 ... +450
	x	x	x	x	x	x		Hastelloy C276 (2.4819)	160	-196 ... +450
Heating jacket version, model BNA-J	x	x	x		x			Stainless steel 1.4571 (316Ti), 1.4404 (316L)	64	-60 ... +450

Ex approvals

Explosion protection	Ignition protection type	Model	Zone	Approval number
ATEX	Ex c	BNA-S, BNA-H, BNA-C, BNA-SD, BNA-HD, BNA-X, BNA-J	Zone 0/1, gas	KEMA 02 ATEX 2106 X II 1/2 G c T1 ... T6
	Ex c + GL	BNA-S, BNA-H, BNA-C, BNA-X, BNA-J	Zone 0/1, gas	KEMA 02 ATEX 2106 X II 1/2 G c T1 ... T6 + GL - 35 949 - 87
	Ex c + DNV	BNA-S, BNA-H, BNA-C, BNA-X	Zone 0/1, gas	KEMA 02 ATEX 2106 X II 1/2 G c T1 ... T6 + DNV - A-11451

Type approval

Approval	Model	Approval number
GL	BNA-S, BNA-H, BNA-C, BNA-X, BNA-J	GL - 35 949 - 87 HH
DNV	BNA-S, BNA-H, BNA-C, BNA-X	DNV A-11451
ABS	BNA-S	ABS 07-HG218425-1-PDA
GOST-R	all	0959333

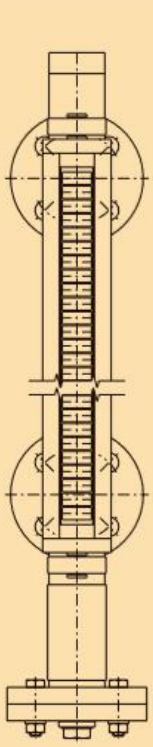
Further approvals on request

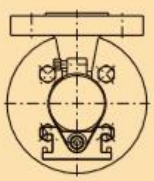
Detailed information on floats, magnetic displays, sensors (reed chains and magnetostrictive) and magnetic switches can be found in the following data sheets:

- Float; model BFT; see data sheet LM 10.02
- Magnetic display; model BMD; see data sheet LM 10.03
- Reed sensor; model BLR; see data sheet LM 10.04
- Magnetostrictive sensor; model BLM; see data sheet LM 10.05
- Magnetic switch; model BGU; see data sheet LM 10.06

Bypass level indicator, compact version, model BNA-C

Bypass chamber from stainless steel





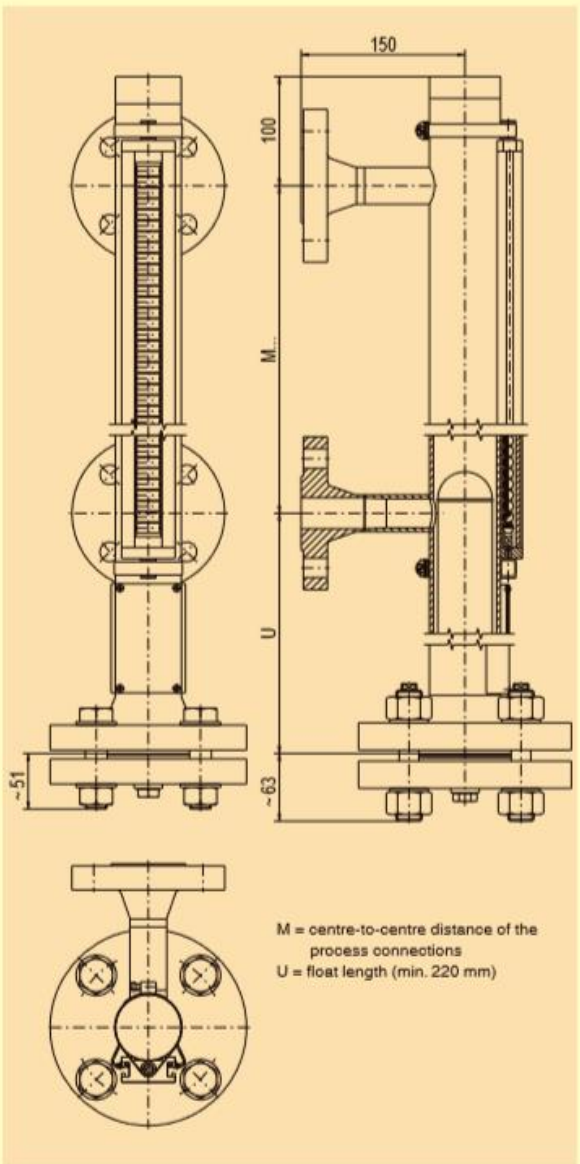
M = centre-to-centre distance of the process connections
U = float length (min. 150 mm)
X = according to process connection

Specifications	
Bypass chamber	Ø 42.2 x 2 mm, max. 40 bar
Chamber end top	Flat top, flange or threaded connection Options: (see page 14) ■ Vent screw ■ Vent valve ■ Vent flange
Chamber end bottom	Flange connection or threaded connection Options: (see page 14) ■ Drain plug ■ Drain valve ■ Drain flange
Process connections	2 x lateral (options see page 15) Flange EN 1092-1, DN 10 - DN 50, PN 6 - PN 40 Flange DIN, DN 10 - DN 50, PN 6 - PN 40 Flange ANSI B 16.5, 1/2" - 2,5", class 150 - class 300 Weld stub 1/2" - 1" Threaded bushing G/NPT 1/2" - 1" Threaded nipple G/NPT 1/2" - 1"
Centre-to-centre distance	Min. 150 mm to max. 5,000 mm
Material	Stainless steel 1.4571 (316Ti)
Nominal pressure	Max. 40 bar
Temperature range	-196 ... +150 °C
Float	Cylindrical float, model BFT-H32, see data sheet LM 10.02
Magnetic display	Magnetic display; model BMD-S; see data sheet LM 10.03
Level sensor	Reed sensor, model BLR, see data sheet LM 10.04 Magnetostrictive sensor, model BLM, see data sheet LM 10.05
Magnetic switches	Magnetic switch, model BGU, see data sheet LM 10.06
Approvals	Ex c, GL, DNV, GOST-R

Special versions on request

Bypass level indicator, high-pressure version, model BNA-H

Bypass chamber from stainless steel



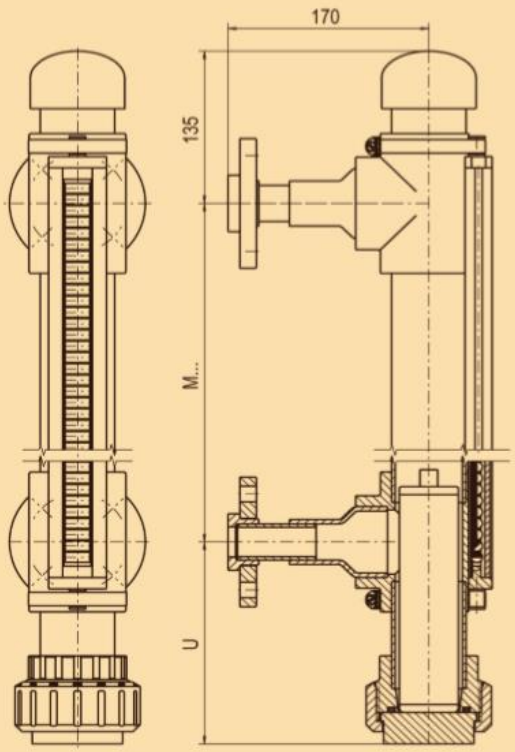
M = centre-to-centre distance of the process connections
U = float length (min. 220 mm)

Specifications	
Bypass chamber	Stainless steel 1.4571: Ø 60.3 x 3.91 mm, max. 160 bar Ø 76.1 x 5 mm, max. 160 bar Ø 71 x 7.5 mm, max. 250 bar Ø 76.1 x 10 mm, max. 420 bar Stainless steel 1.4404: Ø 60.3 x 3.91 mm, max. 100 bar Ø 60.3 x 5.54 mm, max. 150 bar Ø 73 x 7.01 mm, max. 150 bar
Chamber end top	Flat top or flange connection Options: (see page 14) ■ Vent screw ■ Vent valve ■ Vent flange
Chamber end bottom	Flange connection Options: (see page 14) ■ Drain plug ■ Drain valve ■ Drain flange
Process connections	2 x lateral (options see page 15) Flange EN 1092-1, DN 10 - DN 100, PN 63 - PN 400 Flange DIN, DN 10 - DN 100, PN 64 - PN 400 Flange ANSI B 16.5, 1/2" - 4", class 600 - class 2,500 Weld stub 1/2" - 1" Threaded bushing G/NPT 1/2" - 1" Threaded nipple G/NPT 1/2" - 1"
Centre-to-centre distance	Min. 150 mm to max. 6,000 mm (larger distances on request)
Material	Stainless steel 1.4571 (Ø 60.3 x 3.91 mm, Ø 76.1 x 5 mm, Ø 71 x 7.5 mm, Ø 76.1 x 10 mm) or stainless steel 1.4404 (Ø 60.3 x 3.91 mm, Ø 60.3 x 5.54 mm, Ø 73 x 7.01 mm)
Nominal pressure	Max. 400 bar
Temperature range	-196 ... +450 °C
Float	Cylindrical float, model BFT-H, ball-segment float, model BFT-K or foam float, model BFT-F, see data sheet LM 10.02
Magnetic display	Standard version, model BMD-S: < 200 °C High-temperature version, model BMD-F: > 200 °C, see data sheet LM 10.03
Level sensor	Reed sensor, model BLR, see data sheet LM 10.04 Magnetostrictive sensor, model BLM, see data sheet LM 10.05
Magnetic switches	Magnetic switch, model BGU, see data sheet LM 10.06
Approvals	Ex c, GL, DNV, GOST-R

Special versions on request

Bypass level indicator, plastic version, model BNA-P

Bypass chamber and float from PVDF or PP



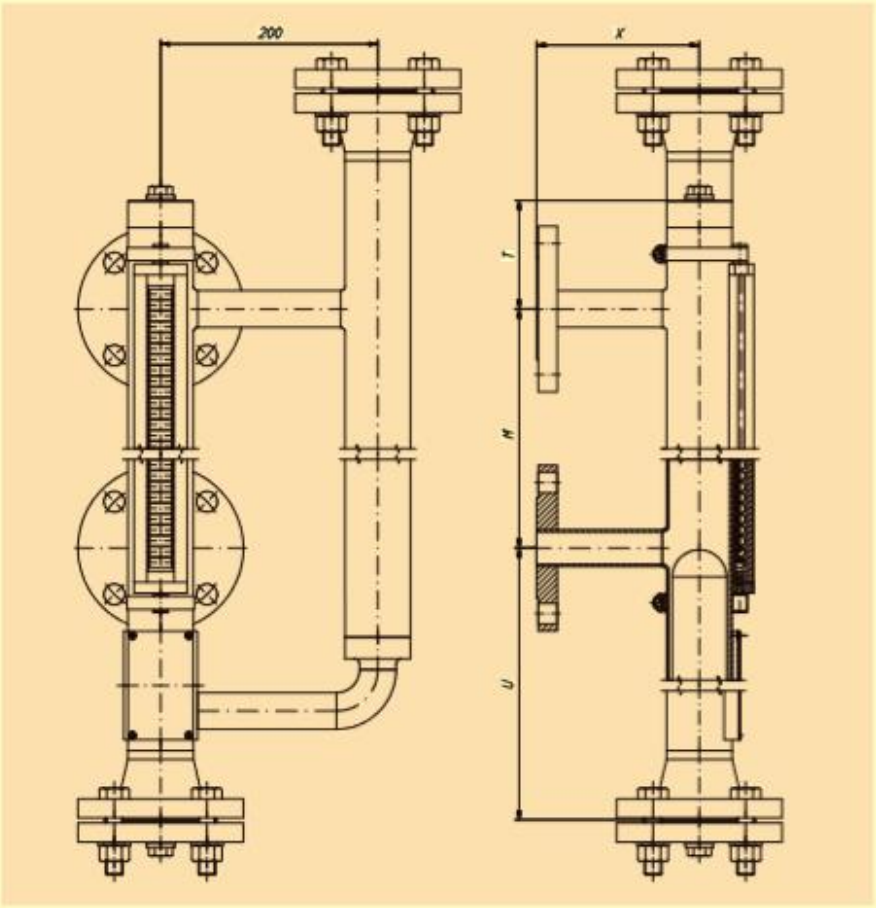
M = centre-to-centre distance of the process connections
U = float length (min. 155 mm)

Specifications	
Bypass chamber	Ø 63 x 3 mm, max. 6 bar
Chamber end top	Welding cap, threaded connection Options: (see page 14) ■ Vent screw ■ Vent valve ■ Vent flange
Chamber end bottom	Threaded connection Options: (see page 14) ■ Drain plug ■ Drain valve ■ Drain flange
Process connections	2 x lateral (options see page 15) Flange EN 1092-1, DN 15 - DN 50, PN 16 Flange DIN, DN 15 - DN 50, PN 16 Flange ANSI B 16.5, 1/2" - 2", class 150 Weld stub 1/2" - 1" Threaded bushing G/NPT 1/2" - 1" Threaded nipple G/NPT 1/2" - 1"
Centre-to-centre distance	Min. 200 mm to max. 4,000 mm (larger distances on request)
Material	PVDF or PP
Nominal pressure	Max. 6 bar
Temperature range	PVDF: -10 … +100 °C PP: -10 … +80 °C
Float	Plastic float, model BFT-P, see data sheet LM 10.02
Magnetic display	Standard version, model BMD-S, see data sheet LM 10.03
Level sensor	Reed sensor, model BLR, see data sheet LM 10.04 Magnetostrictive sensor, model BLM, see data sheet LM 10.05
Magnetic switches	Magnetic switch, model BGU, see data sheet LM 10.06
Approvals	-

Special versions on request

Bypass level indicator, DUPlus version, standard, model BNA-SD

Bypass chamber from stainless steel



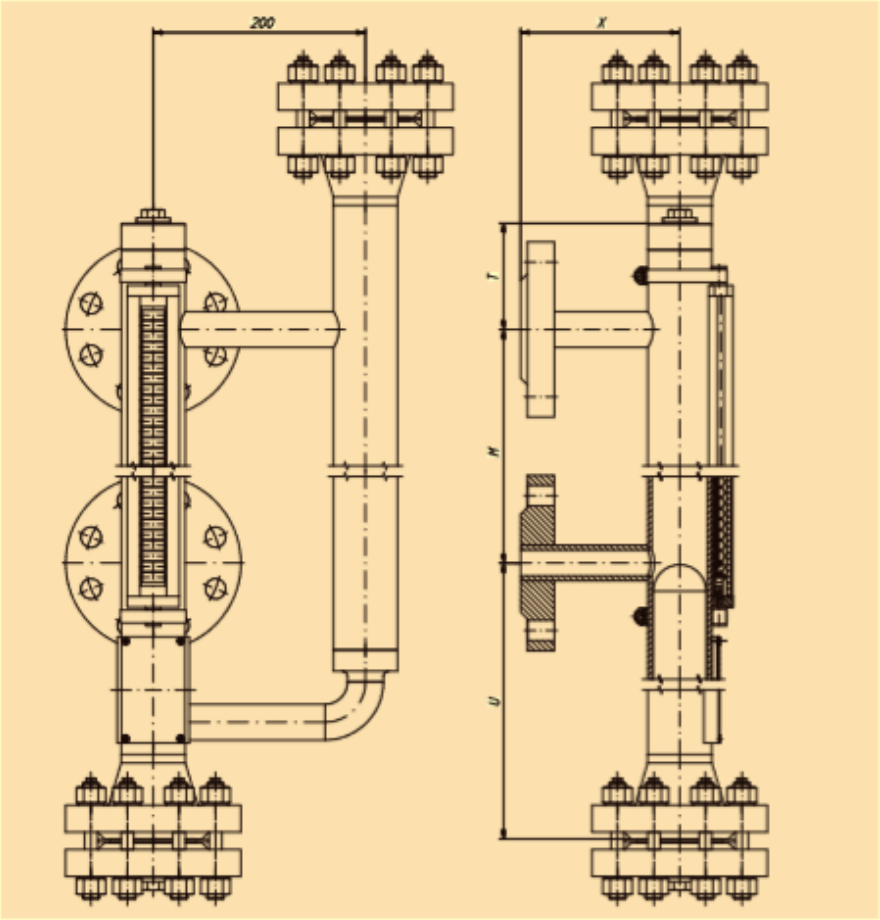
Specifications	
Bypass chamber	Ø 60.3 x 2 mm, max. 40 bar Ø 60.3 x 2.77 mm, max. 64 bar
Chamber end top	Flange connection Options: (see page 14) ■ Vent screw ■ Vent valve ■ Vent flange
Chamber end bottom	Flat top or flange connection Options: (see page 14) ■ Drain plug ■ Drain valve ■ Drain flange
Process connections	2 x lateral (options see page 15) Flange DIN, DN 10 - DN 100, PN 6 - PN 64 Flange ANSI B 16.5, 1/2" - 4", class 150 - class 600 Weld stub 1/2" - 1" Threaded bushing G/NPT 1/2" - 1" Threaded nipple G/NPT 1/2" - 1"
External sensor connection	Flange EN 1092-1, DN 50, PN 6 - PN 64 Flange DIN, DN 50, PN 6 - PN 64 Flange ANSI B 16.5, 2" class 150 - class 600 Female thread G/NPT 3/4" - 2"

Centre-to-centre distance	Min. 150 mm to max. 6,000 mm (larger distances on request)
Material	Stainless steel 1.4571, 1.4404 or 1.4401/1.4404
Nominal pressure	Max. 64 bar
Temperature range	-196 ... +450 °C
Float	Cylindrical float, model BFT-H or corrugated float, model BFT-S, see data sheet LM 10.02
Magnetic display	Standard version, model BMD-S: < 200 °C High-temperature version, model BMD-F: > 200 °C, see data sheet LM 10.03
Level sensor	Reed sensor, model BLR, see data sheet LM 10.04 Magnetostrictive sensor, model BLM, see data sheet LM 10.05 Guided wave radar, model GTR, see data sheet LM 20.05
Magnetic switches	Magnetic switch, model BGU, see data sheet LM 10.06
Approvals	Ex c, GOST-R

Special versions on request

Bypass level indicator, DUPlus version, high pressure, model BNA-HD

Bypass chamber from stainless steel



Specifications

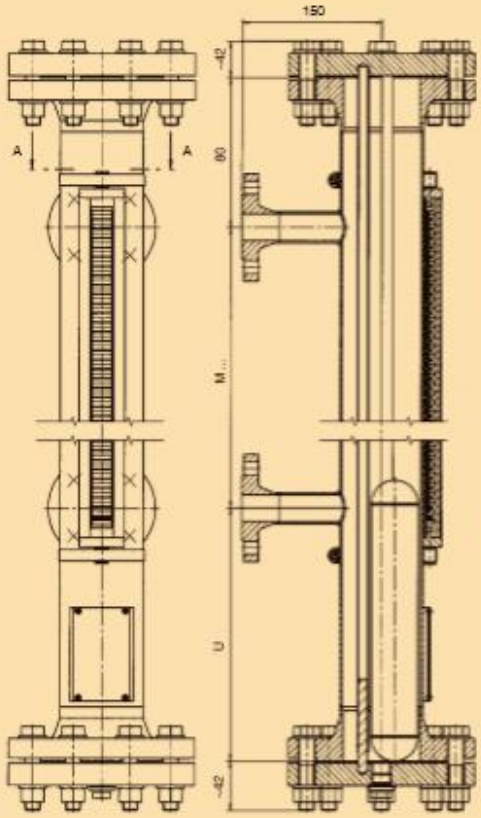
Bypass chamber	Ø 60.3 x 3.91 mm, max. 160 bar
Chamber end top	Flange connection Options: (see page 14) ■ Vent screw ■ Vent valve ■ Vent flange
Chamber end bottom	Flat top or flange connection Options: (see page 14) ■ Drain plug ■ Drain valve ■ Drain flange
Process connections	2 x lateral (options see page 15) Flange DIN, DN 10 - DN 100, PN 64 - PN 160 Flange ANSI B 16.5, 1/2" - 4", class 600 - class 1,500 Weld stub 1/2" - 1" Threaded bushing G/NPT 1/2" - 1" Threaded nipple G/NPT 1/2" - 1"
External sensor connection	Flange EN 1092-1, DN 50, PN 6 - PN 160 Flange DIN, DN 50, PN 6 - PN 160 Flange ANSI B 16.5, 2" class 150 - class 1,500 Female thread G/NPT 3/4" - 2"

Centre-to-centre distance	Min. 150 mm to max. 6,000 mm (larger distances on request)
Material	Stainless steel 1.4571, 1.4404 or 1.4401/1.4404
Nominal pressure	Max. 160 bar
Temperature range	-196 ... +450 °C
Float	Cylindrical float, model BFT-H, corrugated float, model BFT-S, ball-segment float, model BFT-K or foam float, model BFT-F, see data sheet LM 10.02
Magnetic display	Standard version, model BMD-S: < 200 °C High-temperature version, model BMD-F: > 200 °C, see data sheet LM 10.03
Level sensor	Reed sensor, model BLR, see data sheet LM 10.04 Magnetostrictive sensor, model BLM, see data sheet LM 10.05 Guided wave radar, model GTR, see data sheet LM 20.05
Magnetic switches	Magnetic switch, model BGU, see data sheet LM 10.06
Approvals	Ex e, GOST-R

Special versions on request

Bypass level indicator, liquid gas/KOPlus version, model BNA-L

Bypass chamber from stainless steel

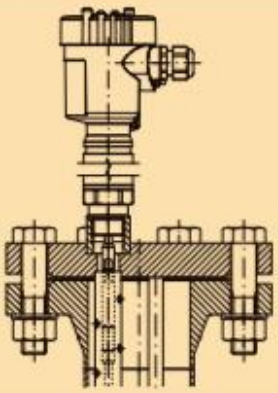


M = centre-to-centre distance of the process connections
U = float length (min. 220 mm)

Specifications	
Bypass chamber	Ø 88.9 x 2 mm, max. 25 bar Ø 88.9 x 2.9 mm, max. 40 bar
Chamber end top	Flange connection Options: (see page 14) ■ Vent screw ■ Vent valve ■ Vent flange
Chamber end bottom	Flange connection Options: (see page 14) ■ Drain plug ■ Drain valve ■ Drain flange
Process connections	2 x lateral (options see page 15) Flange EN 1092-1, DN 10 - DN 100, PN 6 - PN 63 Flange DIN, DN 10 - DN 100, PN 6 - PN 64 Flange ANSI B 16.5, 1/2" - 4", class 150 - class 600 Weld stub 1/2" - 1" Threaded bushing G/NPT 1/2" - 1" Threaded nipple G/NPT 1/2" - 1"
Centre-to-centre distance	Min. 150 mm to max. 6,000 mm (larger distances on request)
Material	Stainless steel 1.4571 (316Ti) (Ø 88.9 x 2 mm, Ø 88.9 x 2.9 mm) Stainless steel 1.4404 (316L) (Ø 88.9 x 2 mm)
Nominal pressure	Max. 40 bar
Temperature range	-60 ... +300 °C
Float	Cylindrical float, model BFT-H, see data sheet LM 10.02
Magnetic display	Standard version, model BMD-S: < 200 °C High-temperature version, model BMD-F: > 200 °C, see data sheet LM 10.03
Level sensor	Reed sensor, model BLR, see data sheet LM 10.04 Magnetostrictive sensor, model BLM, see data sheet LM 10.05 Guided wave radar, model GTR (for KOPlus version), see data sheet LM 20.05
Magnetic switches	Magnetic switch, model BGU, see data sheet LM 10.06
Approvals	Ex c, GOST-R

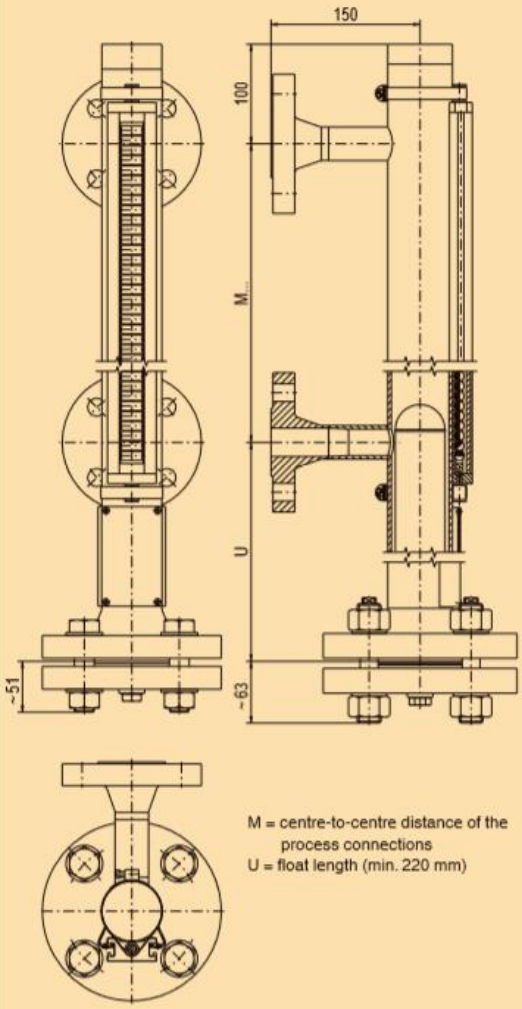
Special versions on request

KOPlus version



Bypass level indicator, special materials, model BNA-X

Bypass chamber from Titanium, Hastelloy or stainless steel 6Mo



M = centre-to-centre distance of the process connections
U = float length (min. 220 mm)

Specifications

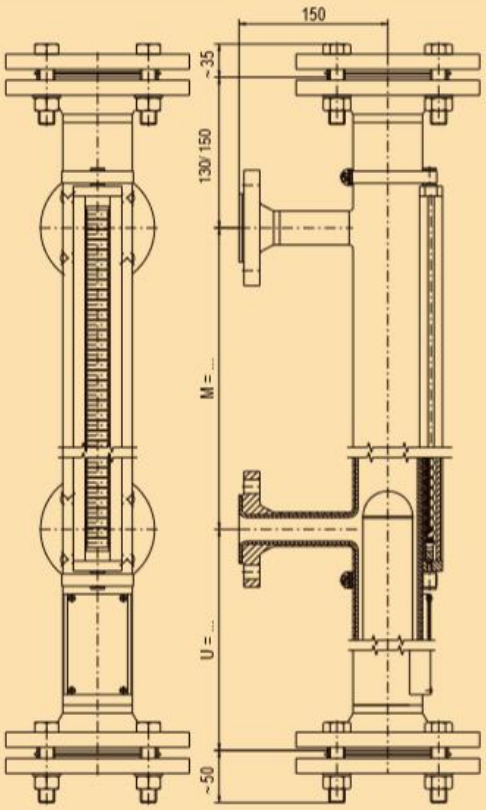
Material [1]	Titanium 3.7035	Hastelloy C276	Stainless steel 6Mo 1.4547 (UNS S31254)
Bypass chamber	Ø 60.3 x 2 mm, max. 40 bar Ø 60.3 x 2.77 mm, max. 64 bar	Ø 60.3 x 2.77 mm, max. 64 bar Ø 60.3 x 3.91 mm, max. 160 bar	Ø 60.3 x 2.77 mm, max. 64 bar Ø 60.3 x 3.91 mm, max. 160 bar Ø 60.3 x 5.54 mm, max. 250 bar
Chamber end top	Flat top or flange connection Options: (see page 14) ■ Vent screw ■ Vent valve ■ Vent flange		
Chamber end bottom	Flange connection Options: (see page 14) ■ Drain plug ■ Drain valve ■ Drain flange		
Process connections (2 x lateral, options see page 15)	Flange EN 1092-1, DN 10 - DN 100, PN 6 - PN 63 Flange DIN, DN 10 - DN 100, PN 6 - PN 64 Flange ANSI B 16.5, 1/2" - 4", class 150 - class 600	Flange EN 1092-1, DN 10 - DN 100, PN 6 - PN 400 Flange DIN, DN 10 - DN 100, PN 6 - PN 400 Flange ANSI B 16.5, 1/2" - 4", class 150 - class 2,500	Flange EN 1092-1, DN 10 - DN 100, PN 63 - PN 400 Flange DIN, DN 10 - DN 100, PN 64 - PN 400 Flange ANSI B 16.5, 1/2" - 4", class 600 - class 2,500
Centre-to-centre distance	Min. 150 mm to max. 6,000 mm (larger distances on request)		
Nominal pressure	Max. 64 bar	Max. 160 bar	Max. 250 bar
Temperature range	-196 ... +450 °C		
Float	Cylindrical float, model BFT-H or corrugated float, model BFT-S (titanium 3.7035 and stainless steel 1.4547), see data sheet LM 10.02		
Magnetic display	Standard version, model BMD-S: < 200 °C High-temperature version, model BMD-F: > 200 °C, see data sheet LM 10.03		
Level sensor	Reed sensor, model BLR, see data sheet LM 10.04 Magnetostrictive sensor, model BLM, see data sheet LM 10.05		
Magnetic switches	Magnetic switch, model BGU, see data sheet LM 10.06		
Approvals	Ex c, GL, DNV, GOST-R	Ex c, GL, DNV, GOST-R	Ex c, GOST-R

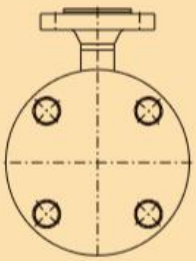
1) Other materials on request

Special versions on request

Bypass level indicator, special materials, model BNA-X

Bypass chamber from stainless steel with internal coating E-CTFE, ETFE or PTFE





M = centre-to-centre distance of the process connections
U = float length (min. 200 mm)

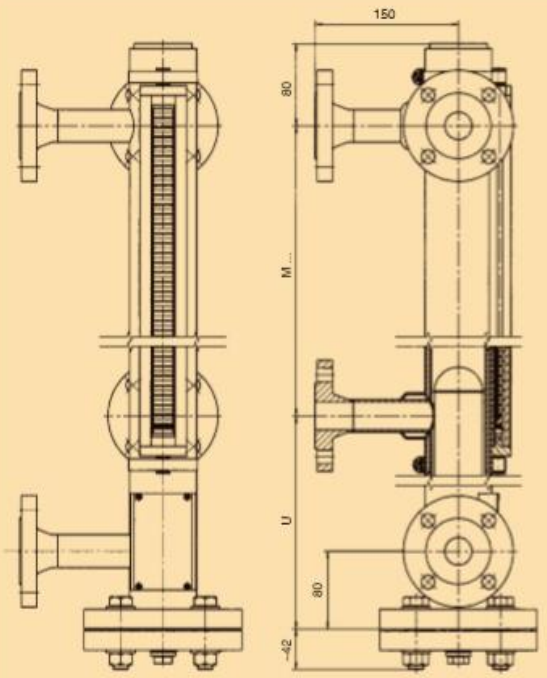
Specifications

Material	Stainless steel 1.4571 with internal coating		
	E-CTFE	ETFE	PTFE
Bypass chamber	Ø 64 x 2 mm, max. 16 bar	Ø 70 x 2 mm, max. 16 bar	Ø 70 x 2 mm, max. 10 bar
Chamber end top	Flange connection Options: (see page 14) ■ Vent flange		
Chamber end bottom	Flange connection Options: (see page 14) ■ Drain flange		
Process connections	2 x lateral (options see page 15) Flange EN 1092-1, DN 10 - DN 50, PN 6 - PN 16 Flange DIN, DN 10 - DN 50, PN 6 - PN 16 Flange ANSI B 16.5, 1/2" - 4", class 150 - class 300		
Centre-to-centre distance	Min. 150 mm to max. ... mm (overall pipe length max. 2,500 mm) With overall pipe length > 2,500 mm: Bypass chamber separated by flange connection		
Nominal pressure	Max. 16 bar	Max. 16 bar	Max. 10 bar
Temperature range	depending on the medium		
Float	Cylindrical float, model BFT-H, see data sheet LM 10.02		
Magnetic display	Standard version, model BMD-S, see data sheet LM 10.03		
Level sensor	Reed sensor, model BLR, see data sheet LM 10.04 Magnetostrictive sensor, model BLM, see data sheet LM 10.05		
Magnetic switches	Magnetic switch, model BGU, see data sheet LM 10.06		
Approvals	GOST-R		

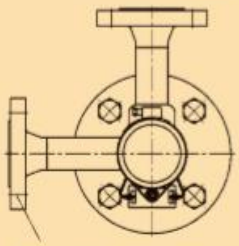
Special versions on request

Bypass level indicator, heating jacket version, model BNA-J

Bypass chamber and heating jacket pipe from stainless steel



Process connection



Heating jacket connection

M = centre-to-centre distance of the process connections
U = float length (min. 220 mm)

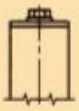
Specifications	
Bypass chamber	Ø 60.3 x 2 mm, max. 40 bar Ø 60.3 x 2.77 mm, max. 64 bar
Heating jacket pipe	Ø 70 x 2 mm
Chamber end top	Flat top Options: (see page 14) ■ Vent screw ■ Vent valve ■ Vent flange
Chamber end bottom	Flange connection Options: (see page 14) ■ Drain plug ■ Drain valve ■ Drain flange
Process connections	2 x lateral (options see page 15) Flange EN 1092-1, DN 10 - DN 100, PN 6 - PN 100 Flange DIN, DN 10 - DN 100, PN 6 - PN 100 Flange ANSI B 16.5, 1/2" - 4", class 150 - class 600 Weld stub 1/2" - 1" Threaded bushing G/NPT 1/2" - 1" Threaded nipple G/NPT 1/2" - 1"
Heating jacket connection	Flange EN 1092-1, DN 10 - DN 25, PN 6 - PN 40 Flange DIN, DN 10 - DN 25, PN 6 - PN 40 Flange ANSI B 16.5, 1/2" - 4", class 150 - class 300 Threaded bushing G/NPT 1/2" - 1" Threaded nipple G/NPT 1/2" - 1"
Centre-to-centre distance	Min. 150 mm to max. 6,000 mm (larger distances on request)
Material	Stainless steel 1.4571 with bypass chamber Ø 60.3 x 2 mm (standard version) Stainless steel 1.4404 with bypass chamber Ø 60.3 x 2.77 mm on request
Nominal pressure	Max. 64 bar
Temperature range	-60 ... +450 °C
Float	Cylindrical float, model BFT-H, see data sheet LM 10.02
Magnetic display	Standard version, model BMD-S: < 200 °C High-temperature version, model BMD-F: > 200 °C, see data sheet LM 10.03
Level sensor	Reed sensor, model BLR, see data sheet LM 10.04 Magnetostrictive sensor, model BLM, see data sheet LM 10.05
Magnetic switches	Magnetic switch, model BGU, see data sheet LM 10.06
Approvals	Ex c, GL, GOST-R

Special versions on request

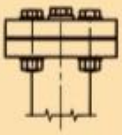
Option bypass chamber end

Bypass chamber end top (examples)

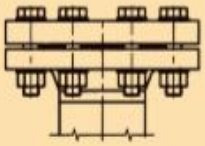
1
Flat top without venting



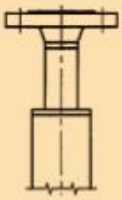
2
Flat top with vent plug G 1/2"



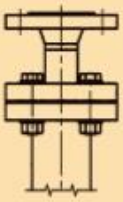
3
Flange connection with vent plug G 1/2"



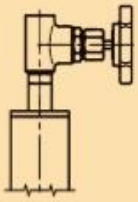
4
Flange connection e.g. sealing faces groove/tongue per DIN 2512



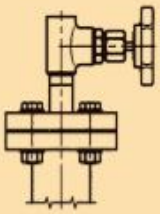
5
Flat top with vent flange



6
Flange connection vent flange



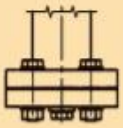
7
Flat top with vent valve



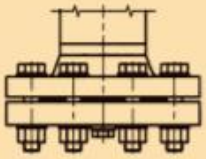
8
Flange connection with vent valve

Other ends on request

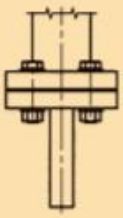
Bypass chamber end bottom (examples)



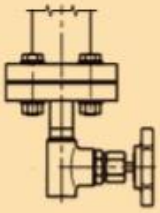
9
Flange connection with drain plug G/NPT 1/2"



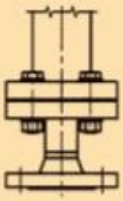
10
Flange connection e.g. sealing faces groove/ tongue per DIN 2512 with drain plug G 1/2"



11
Flange connection with drain nozzle



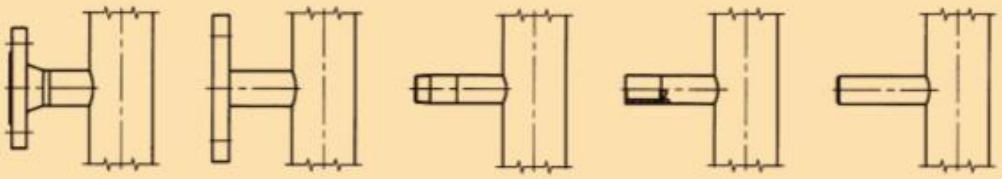
12
Flange connection with drain valve



13
Flange connection with drain flange

Other ends on request

Option process connection



14
Welding neck flange
up to DN 25

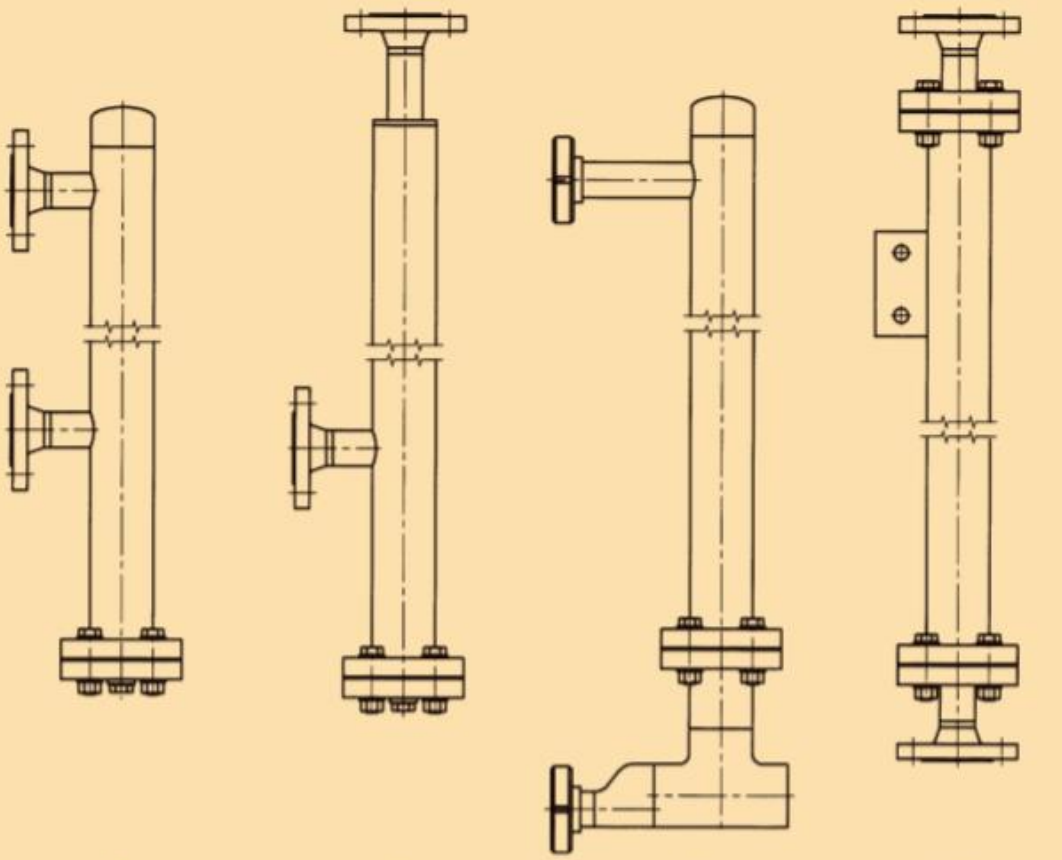
15
Blind flange
above DN 32

16
Threaded coupling
GN ... (male thread)

17
Threaded coupling
GM ... (female thread)

18
Weld stub S ...

Examples



19
Standard version
Process connections
2 x lateral

20
1 process connection lateral
1 process connection vertical
(top)

21
2 process connections
to DIN 11851
Lower process connection via
eccentric reducer

22
2 process connections
vertical (top/bottom)
Option: Support bracket

Other connections on request

CE conformity

Pressure equipment directive
97/23/EC, pressure accessory

ATEX directive (option)
94/9/EC, ignition protection type Ex c, zone 0/1, gas

Approvals

- **GL**, ships, shipbuilding, offshore, Germany
- **DNV**, ships, shipbuilding, offshore, Norway
- **ABS**, ships, shipbuilding, offshore, USA
- **GOST**, national standard for Russia, Kazakhstan and Belarus

Approvals and certificates, see website

Ordering information
Model / Approval / Material / Process specifications (operating temperature and pressure, density) / Process connection / Centre-to-centre distance M ...

Detailed information on floats, magnetic displays, sensors (reed chains and magnetostrictive) and magnetic switches can be found in the following data sheets:

- Float, model BFT; see data sheet LM 10.02
- Magnetic display; model BMD; see data sheet LM 10.03
- Reed sensor; model BLR; see data sheet LM 10.04
- Magnetostrictive sensor; model BLM; see data sheet LM 10.05
- Guided wave radar, model GTR, see data sheet LM 20.05
- Magnetic switch; model BGU; see data sheet LM 10.06

Appendix

Cross Reference BNA

Type	Description	Replaced Type
BNA-C	Compact version	BNA-../.. - M...-V42x2 - ....
BNA-S	Standard version	BNA-../.. - M...-V60x..- .... (-Ex)
BNA-H	High-pressure version	BNA-../.. - M...-V..x..- .... (-Ex)
BNA-P	Plastic version	
	PVDF	BNA-../16 - M...-PF63x3 - ....
	PP	BNA-../16 - M...-PP63x3 - ....
BNA-SD	DUPlus version, standard	BNA-/DU../.. - M...-V60x2/60x2- ....
BNA-HD	DUPlus version, high pressure	BNA-/DU../.. - M...-V..x../..x..- ....
BNA-L	Liquid gas version	BNA-../.. - M...-V88x2 - ....
	KOPlus version	BNA/KO-../.. - M...-V88x2 - ....
BNA-X	Special version	
	E-CTFE-coated	BNA-../16 - M...-VEC64x2 - ....
	ETFE-coated	BNA-../16 - M...-VET70x2 - ....
	PTFE-coated	BNA-../16 - M...-VTF70x2 - ....
	Titanium 3.7035	BNA-../.. - M...-T..x..- ....
	Hastelloy C276	BNA-../.. - M...-HC..x..- ....
	6Mo 1.4547 (UNS S31254)	BNA-../.. - M...-Mo..x..- ....
BNA-J	Heating jacket version	BNA-../.. - M...-V60/70- ....

Type Code

Code						
1		**Basic type**				
	BNA	Magnetic Level Indicator				
2		**Process connections**				
		1st Key Nom. size	2nd Key Nom. pressure		3rd Key Flange face	
.../.../...	EN...	EN 1092 DN 10 - DN 100	...	PN6 - PN400	...	Form B1, B2, C, D
	...	DIN DN 10 - DN 100		PN6 - PN400		Form, C, N, F
	...	ANSI 1/2" - 4"		Class 150 - Class 400		Form RF, SF, FF, RTJ
	JIS...	JIS DN 10 - DN 100		5 K - 63 K		Form RF, SF, FF, RTJ
	GN...	Thread male DIN				
	GM...	Thread female DIN				
	NPTN...	Thread male NPT				
	NPTM...	Thrread female NPT				
	S...	Welding stubs				
3		**Option: Level sensor**				
...	MG	Basic type without optional code				
4		**Distance centre-to-centre**				
...	M...	Distance between fl ange centres in mm				
5		**Material and chamber dimensions**				
		1st Key Material			2nd Key Chamber dimensions	
.../..x..	V	Stainless steel 1.4571	HC	Hastelloy C	..x..	Chamber OD x Wall thickness in mm
	L	Stainless steel 1.4404	MO	SS 1.4529 (6Mo)		
	VE	Stainless steel electro-polished	M	Monel		
	VTF	Stainless steel PTFE-lined	PP	Polypropylene		
	VET	Stainless steel E-TFE-coated	PF	PVDF		
	VEC	Stainless steel E-CTFE-coated				

6		Magnetic Roller Display						
		1st Key Design				2nd Key Scale		
.../...	MRA	Aluminium case with plastic rollers			SK.	with scale (plastic), graduation in cm (printed)		
	MRK	Aluminium case with ceramic rollers			SA.	Aluminium scale graved		
	MNAV	Stainless steel case with plastic rollers			SV.	Stainless steel graved		
	MNKV	Stainless steel with ceramic rollers			P.	with sight glass extender (for insulations))		
	MRAV	Stainless steel case with T-slot and plastic rollers						
	MRFV	Stainless steel case with T-slot and stainless steel flaps						
7		Option Magnetic Switches 1st Key Quantity						
		2nd Key Design				3rd Key Cable length		4th Key Options
.../.../.../...	M.	BGU	MVE.	BGU-V-E	1	1 m	R22	Pre resistance R22 for PLC
	ME.	BGU-E	MVD.	BGU-V-Exd	2	2 m	N	NAMUR circuit according DIN EN 60947-5-6
	MS12	BGU-M12	MHT	BGU-AHT	3	3 m		
	MES12	BGU-E-M12	MVHT	BGU-VHT	...	...		
	MA	BGU-A	MIL/H	BGU-AIL/H				
	MAE	BGU-A-E	MAR	BGU-AR				
	MD.	BGU-Exd	MAD	BGU-AD				
	MV.	BGU-V	MAM	BGU-AM				
8		Float (cylindrical) 2nd Key Diameter/Length in mm						
		1st Key Material			3rd Key Pressure class			4th Key Magnetic system
Z..S..	.V...	Stainless steel 1.4571	.G...	Borosilicate glass	PN16	PN16	R48H	R48H
	.T...	Titanium 3.7035	.VEC...	Stainless steel 1.4571	PN25	PN25	K92	K92
	.HC...	Hastelloy C		E-CTFE-coated	...	...	K74	K74
	.CF...	CF340	.TEC...	Titanium 3.7035			A90	A90
	.PP...	Polypropylene		E-CTFE-coated			A110	A110
	.PF...	PVDF					A125	A125
9		Approvals						
...	Ex	Ex-Design						

Ordering Example

	Basic type		Connec-tion size		Option level sensor		Distance centre-tocentre		Material Chamber dimensi-ons		Magnetic roller display		Option Magnetic switch		Float design		Certifi-cates
Code	1	-	2	-	3	-	4	-	5	-	6	-	7	-	8	-	9
	BNA	-	EN25/16/B1	-	MG	-	M1500	-	V60x2	-	MRA / SK	-	3 / M / 2	-	ZVSS185...	-	

Float
For bypass level indicators
Model BFT

Applications

- Float for the monitoring of liquids in bypass level indicators
- Individual design and corrosion resistant materials make the products suitable for a broad range of applications
- Chemical, petrochemical, natural gas, offshore, shipbuilding, machine building, power generating equipment, power plants
- Process water and drinking water treatment, food industry, pharmaceutical industry

Special features

- Sealed, pressure retaining design
- Density range from 340 kg/m^3
- Pressures up to 400 bar
- Medium temperatures from -196 ... +450 °C
- Versions for interface layer

Fig. left: Corrugated float, model BFT-S
Fig. centre: Cylindrical float, model BFT-H
Fig. right: Plastic float, model BFT-P

Description

The model BFT float serves for the monitoring of liquids in bypass level indicators. The magnetic system built into the float transmits the liquid level, contact-free, to externally mounted displays, switches and sensors. Due to its omni-directional, radial magnetic field, a guide within the tube is not needed.

The design will depend on the application, chemical resistance and the 3 physical quantities of pressure, temperature and density.

Fig. left: Foam float, model BFT-F
Fig. right: Ball-segment float, model BFT-K

Model overview

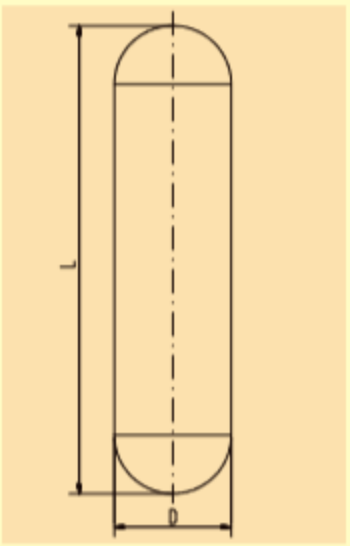
Float	Material	Density range	Pressure range	Temperature range
Cylindrical float, model BFT-H	Stainless steel 1.4571	> 470 kg/m³	Vacuum ... 100 bar	-200 ... +450 °C
	Titanium 3.7035	> 340 kg/m³		
Corrugated float, model BFT-S	Stainless steel 1.4571	> 470 kg/m³	Vacuum ... 25 bar	-50 ... +200 °C
	Titanium 3.7035	> 340 kg/m³		
Ball-segment float, model BFT-K	Titanium 3.7065	> 400 kg/m³	Vacuum ... 250 bar	-200 ... +450 °C
Plastic float, model BFT-P	PP	> 590 kg/m³	Vacuum ... 6 bar	-20 ... +80 °C
	PVDF	> 790 kg/m³		-50 ... +100 °C
Foam float, model BFT-F	Syntactic foam	> 750 kg/m³	Vacuum ... 450 bar	-20 ... +100 °C

Classification of the floats

Bypass level indicator	Suitable float				
	Model BFT-S	Model BFT-H	Model BFT-P	Model BFT-F	Model BFT-K
Standard version, model BNA-S	x	x			
High-pressure version, model BNA-H		x		x	x
Plastic version, model BNA-P			x		
Compact version, model BNA-C		x			
DUPlus version, model BNA-SD	x	x			
Heating jacket version, model BNA-SJ		x			
Liquid gas/KOPlus version, model BNA-L		x			

Cylindrical float, model BFT-H32 (with order no.)

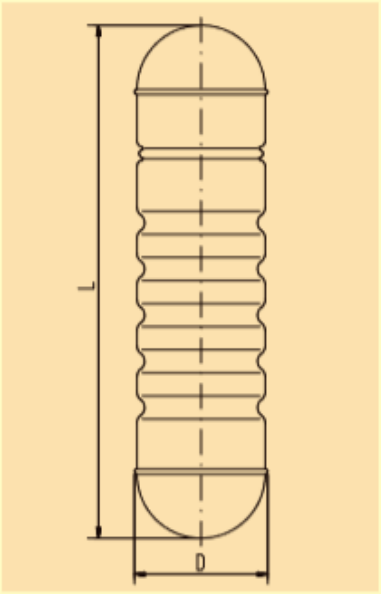
Permissible temperature: -200 ... +400 °C



PN	Density range in kg/m³	Diameter in mm	Length in mm	Material	Order no.
16	1,270 ... 2,000	32	125	Stainless steel (1.4571)	506369
	1,090 ... 1,350	32	150	Stainless steel (1.4571)	030098
	940 ... 1,110	32	180	Stainless steel (1.4571)	029781
	850 ... 980	32	210	Stainless steel (1.4571)	100430
	780 ... 880	32	245	Stainless steel (1.4571)	110570
	730 ... 800	32	285	Stainless steel (1.4571)	032023
40	1,360 ... 2,000	32	125	Stainless steel (1.4571)	506374
	1,140 ... 1,400	32	155	Stainless steel (1.4571)	030108
	1,010 ... 1,180	32	185	Stainless steel (1.4571)	029808
	900 ... 1,020	32	225	Stainless steel (1.4571)	030107
	820 ... 910	32	265	Stainless steel (1.4571)	030106
	760 ... 830	32	315	Stainless steel (1.4571)	029828
	1,130 ... 2,000	32	125	Titanium (3.7035)	029834
	900 ... 1,100	32	160	Titanium (3.7035)	029835
	770 ... 900	32	200	Titanium (3.7035)	030104
	670 ... 770	32	240	Titanium (3.7035)	030293
	610 ... 680	32	290	Titanium (3.7035)	030090
	560 ... 620	32	350	Titanium (3.7035)	030743
	530 ... 570	32	420	Titanium (3.7035)	030101
	490 ... 530	32	510	Titanium (3.7035)	031537

Corrugated float, model BFT-S50 (with order no.)

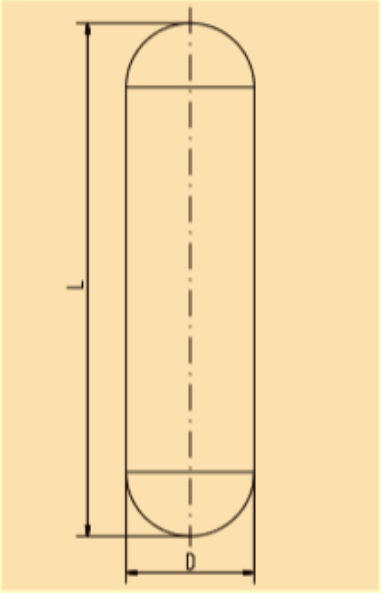
Permissible temperature: -50 ... +200 °C



PN	Density range in kg/m³	Diameter in mm	Length in mm	Material	Order no.
25	990 ... 2,000	50	150	Stainless steel (1.4571)	029044
	830 ... 1,000	50	185	Stainless steel (1.4571)	029045
	730 ... 840	50	225	Stainless steel (1.4571)	029046
	640 ... 730	50	275	Stainless steel (1.4571)	029047
	590 ... 650	50	335	Stainless steel (1.4571)	029048
	550 ... 600	50	400	Stainless steel (1.4571)	031229
	520 ... 560	50	470	Stainless steel (1.4571)	031230
	490 ... 530	50	555	Stainless steel (1.4571)	031231
	470 ... 500	50	650	Stainless steel (1.4571)	031232
	820 ... 2,000	50.8	150	Titanium (3.7035)	031235
	710 ... 850	50.8	180	Titanium (3.7035)	030683
	600 ... 710	50.8	215	Titanium (3.7035)	030684
	540 ... 610	50.8	250	Titanium (3.7035)	029034
	480 ... 540	50.8	300	Titanium (3.7035)	029035
	430 ... 490	50.8	355	Titanium (3.7035)	029036
	400 ... 440	50.8	410	Titanium (3.7035)	029037
	380 ... 410	50.8	465	Titanium (3.7035)	029038
	370 ... 390	50.8	525	Titanium (3.7035)	029039
	360 ... 380	50.8	595	Titanium (3.7035)	029040
	340 ... 370	50.8	680	Titanium (3.7035)	029041

Cylindrical float, model BFT-H

Permissible temperature: -200 ... +450 °C

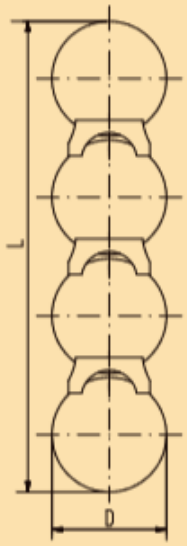


Material: Stainless steel 1.4571
Diameter: 50 mm
Length: 150 ... 650 mm (depending on pressure, density and temperature)
Weight: depending on pressure, density and temperature
Magnetic system: depending on pressure, density and temperature
Nominal density: depending on pressure, density and temperature
Density range: depending on pressure, density and temperature
Max. pressure: < 40 bar

Material: Titanium 3.7035
Diameter: 45, 50.8 or 60 mm
Length: 150 ... 650 mm (depending on pressure, density and temperature)
Weight: depending on pressure, density and temperature
Magnetic system: depending on pressure, density and temperature
Nominal density: depending on pressure, density and temperature
Density range: depending on pressure, density and temperature
Max. pressure: < 100 bar

Ball-segment float, model BFT-K

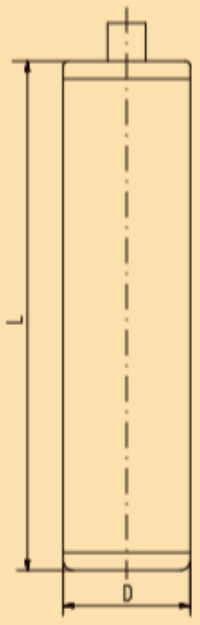
Permissible temperature: -200 ... +450 °C



Material:	Titanium 3.7065
Diameter:	45, 50.8 or 60 mm
Length:	150 ... 700 mm (depending on pressure, density and temperature)
Weight:	depending on pressure, density and temperature
Magnetic system:	depending on pressure, density and temperature
Nominal density:	depending on pressure, density and temperature
Density range:	depending on pressure, density and temperature
Max. pressure:	< 250 bar

Plastic float, model BFT-P

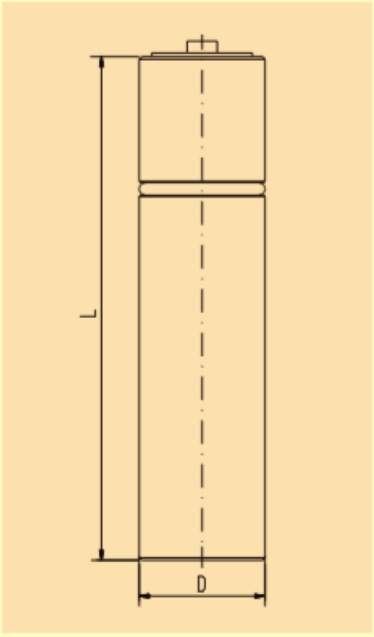
Permissible temperature: -20 ... +80 °C (PP), -50 ... +100 °C (PVDF)



Material:	PP or PVDF
Diameter:	50 mm
Length:	150 ... 450 mm (depending on pressure, density and temperature)
Weight:	depending on pressure, density and temperature
Magnetic system:	depending on pressure, density and temperature
Nominal density:	depending on pressure, density and temperature
Density range:	depending on pressure, density and temperature
Max. pressure:	< 6 bar

Foam float, model BFT-F

Permissible temperature: -20 ... +100 °C



Material:	Syntactic foam
Diameter:	40 ... 80 mm
Length:	150 ... 750 mm (depending on pressure, density and temperature)
Weight:	depending on pressure, density and temperature
Magnetic system:	depending on pressure, density and temperature
Nominal density:	depending on pressure, density and temperature
Density range:	depending on pressure, density and temperature
Max. pressure:	< 600 bar

Ordering information

To order the described product the order number (if available) is sufficient.

Alternatively:

Model / Material / Diameter / Length / Pressure rating / Magnetic system / Interface layer

Appendix

Cross Reference BFT

Replaced Type	Type	Description
ZVS	BFT-H	Cylindrical float, stainless steel
ZTS	BFT-H	Cylindrical float, titanium
ZVSS	BFT-S	Corrugated float, stainless steel
ZTSS	BFT-S	Corrugated float, titanium
ZPPS	BFT-P	Plastic float, PP
ZPFS	BFT-P	Plastic float, PVDF
ZFCS	BFT-F	Foam float
ZTKS	BFT-K	Ball-segment float
BG10xxx	Successor: BFT-.	Floats in various designs (Phönix). Please contact our Customer Service.

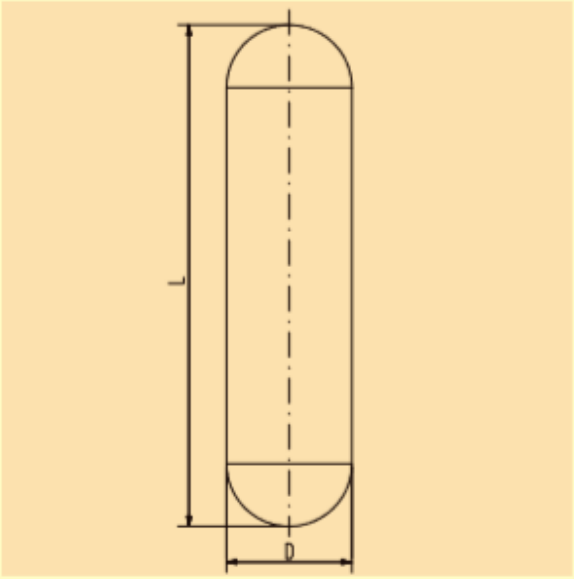
Type Code

Code		
1		**Basic type**
	ZVS	Cylindrical float, stainless steel
	ZTS	Cylindrical float, titanium
	ZVSS	Corrugated float, stainless steel
	ZTSS	Corrugated float, titanium
	ZPPS	Plastic float, PP
	ZPFS	Plastic float, PVDF
	ZFCS	Foam float
	ZTKS	Ball-segment float
2		**Diameter**
	...	in mm (omitted for OD 50 or 50,8)
3		**Length**
	...	in mm
4		**Pressure stage**
	...	in bar
5		**Magnetic system**
	...	
6		**Interface float (omitted when not required)**
	...	

Ordering Example

	Basic type		Diameter		Length		Pressure stage		Magnetic system		Interface
Code	1	-	2	-	3	-	4	-	5	-	6

BFT-H32

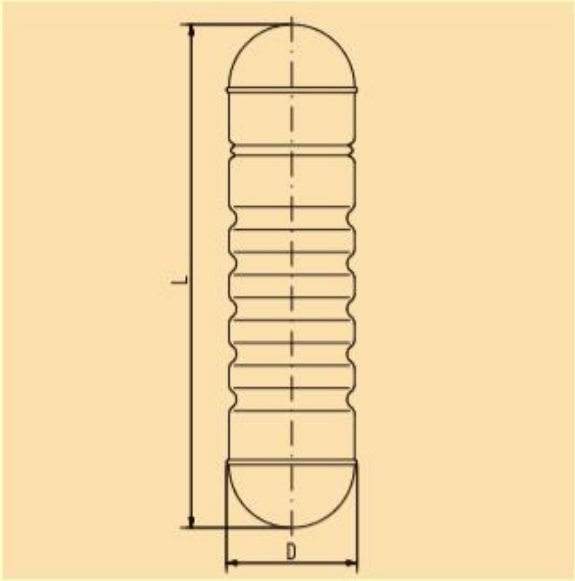


Technical Specifications

Form: Cylindrical float
Temperature: -200 ... +400°C

Type	PN	Density range [kg/m³]	Diameter [mm]	Length [mm]	Material	Order no.
ZVS32/125/PN16/A990	16	1270 – 2000	32	125	Stainless steel (1.4571)	506369
ZVS32/150/PN16/A990	16	1090 – 1350	32	150	Stainless steel (1.4571)	030098
ZVS32/180/PN16/A990	16	940 – 1110	32	180	Stainless steel (1.4571)	029781
ZVS32/210/PN16/A990	16	850 – 980	32	210	Stainless steel (1.4571)	100430
ZVS32/245/PN16/A990	16	780 – 880	32	245	Stainless steel (1.4571)	110570
ZVS32/285/PN16/A990	16	730 – 800	32	285	Stainless steel (1.4571)	032023
ZVS32/125/PN40/A990	40	1360 - 2000	32	125	Stainless steel (1.4571)	506374
ZVS32/155/PN40/A990	40	1140 - 1400	32	155	Stainless steel (1.4571)	030108
ZVS32/185/PN40/A990	40	1010 - 1180	32	185	Stainless steel (1.4571)	029808
ZVS32/225/PN40/A990	40	900 - 1020	32	225	Stainless steel (1.4571)	030107
ZVS32/265/PN40/A990	40	820 - 910	32	265	Stainless steel (1.4571)	030106
ZVS32/315/PN40/A990	40	760 - 830	32	315	Stainless steel (1.4571)	029828
ZTS32/125/PN40/A990	40	1130 - 2000	32	125	Titanium (3.7035)	029834
ZTS32/160/PN40/A990	40	900 - 1100	32	160	Titanium (3.7035)	029835
ZTS32/200/PN40/A990	40	770 - 900	32	200	Titanium (3.7035)	030104
ZTS32/240/PN40/A990	40	670 - 770	32	240	Titanium (3.7035)	030293
ZTS32/290/PN40/A990	40	610 - 680	32	290	Titanium (3.7035)	030090
ZTS32/350/PN40/A990	40	560 - 620	32	350	Titanium (3.7035)	030743
ZTS32/420/PN40/A990	40	530 - 570	32	420	Titanium (3.7035)	030101
ZTS32/510/PN40/A990	40	490 - 530	32	510	Titanium (3.7035)	031537

BFT-S50

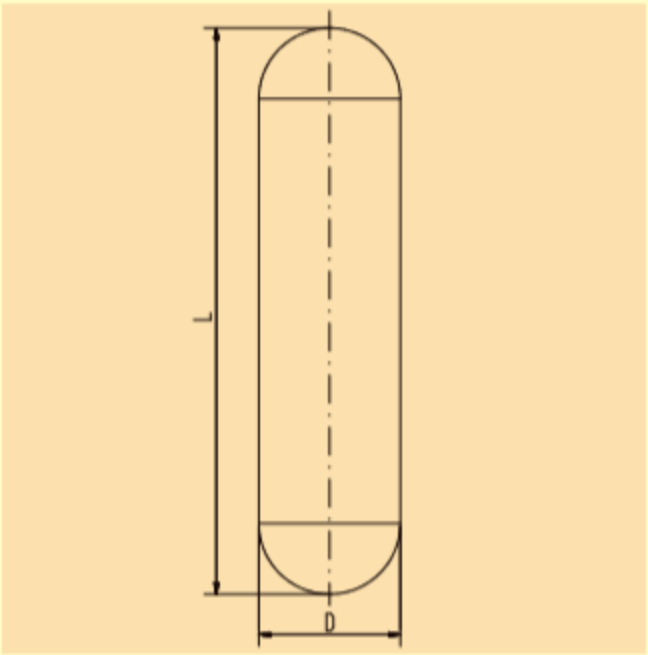


Technical Specifications

Form: Corrugated float
Temperature: -50 ... +200°C

Type	PN	Density range [kg/m³]	Diameter [mm]	Length [mm]	Material	Order no.
ZVSS150/PN25/R48H	25	990 - 2000	50	150	Stainless steel (1.4571)	029044
ZVSS185/PN25/R48H	25	830 - 1000	50	185	Stainless steel (1.4571)	029045
ZVSS225/PN25/R48H	25	730 - 840	50	225	Stainless steel (1.4571)	029046
ZVSS275/PN25/R48H	25	640 - 730	50	275	Stainless steel (1.4571)	029047
ZVSS335/PN25/R48H	25	590 - 650	50	335	Stainless steel (1.4571)	029048
ZVSS400/PN25/R48H	25	550 - 600	50	400	Stainless steel (1.4571)	031229
ZVSS470/PN25/R48H	25	520 - 560	50	470	Stainless steel (1.4571)	031230
ZVSS555/PN25/R48H	25	490 - 530	50	555	Stainless steel (1.4571)	031231
ZVSS650/PN25/R48H	25	470 - 500	50	650	Stainless steel (1.4571)	031232
ZTSS150/PN25/R48H	25	820 - 2000	50,8	150	Titanium (3.7035)	031235
ZTSS180/PN25/R48H	25	710 - 850	50,8	180	Titanium (3.7035)	030683
ZTSS215/PN25/R48H	25	600 - 710	50,8	215	Titanium (3.7035)	030684
ZTSS250/PN25/R48H	25	540 - 610	50,8	250	Titanium (3.7035)	029034
ZTSS300/PN25/R48H	25	480 - 540	50,8	300	Titanium (3.7035)	029035
ZTSS355/PN25/R48H	25	430 - 490	50,8	355	Titanium (3.7035)	029036
ZTSS410/PN25/R48H	25	400 - 440	50,8	410	Titanium (3.7035)	029037
ZTSS465/PN25/R48H	25	380 - 410	50,8	465	Titanium (3.7035)	029038
ZTSS525/PN25/R48H	25	370 - 390	50,8	525	Titanium (3.7035)	029039
ZTSS595/PN25/R48H	25	360 - 380	50,8	595	Titanium (3.7035)	029040
ZTSS680/PN25/R48H	25	340 - 370	50,8	680	Titanium (3.7035)	029041

BFT-H



Technical Specifications

Code 1 Basic type	Code 2 Diameter	Code 3 Length	Code 4 Pressure stage	Code 5 Magnetic system	[Code 6 Interface]
ZVS	[omitted]	...	PN ...	...	[...]

a. Type code

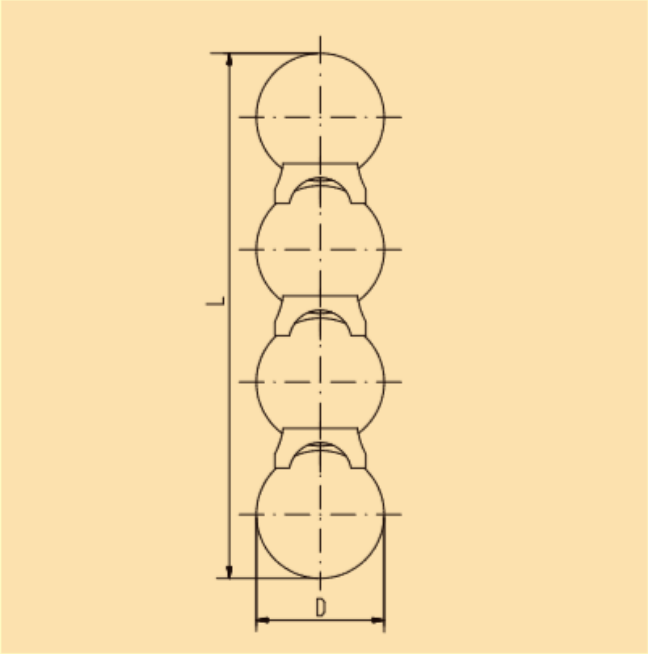
Design and float specification depending on pressure, density and temperature.

Form:	Cylindrical float
Material:	Stainless steel 1.4571
Diameter:	50 mm
Length:	150 – 650 mm (depends on pressure, density and temperature)
Max. pressure:	< 40 bar
Temperature:	-200 ... +450°C

Code 1 Basic type	Code 2 Diameter	Code 3 Length	Code 4 Pressure stage	Code 5 Magnetic system	[Code 6 Interface]
ZTS	...	...	PN ...	...	[...]

Form:	Cylindrical float
Material:	Titanium 3.7035
Diameter:	45 / 50,8 / 60 mm
Length:	150 – 650 mm (depends on pressure, density and temperature)
Max. pressure:	< 100 bar
Temperature:	-200 ... +450°C

BFT-K



Technical Specifications

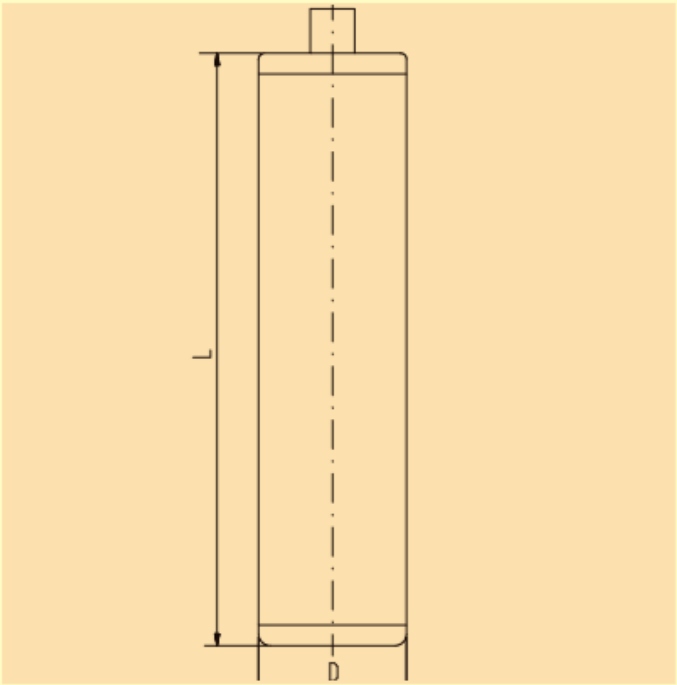
Code 1 Basic type	Code 2 Diameter	Code 3 Length	Code 4 Pressure stage	Code 5 Magnetic system	[Code 6 Interface]
ZTKS	...	...	PN ...	...	[...]

s. Type code

Design and float specification depending on pressure, density and temperature.

Form:	Ball-segment float
Material:	Titanium 3.7035
Diameter:	45 / 50,8 / 60 mm
Length:	150 – 700 mm (depends on pressure, density and temperature)
Max. pressure:	< 250 bar
Temperature:	-200 ... +450°C

BFT-P



Technical Specifications

Code 1 Basic type	Code 2 Diameter	Code 3 Length	Code 4 Pressure stage	Code 5 Magnetic system	[Code 6 Interface]
ZPPS ZPFS	[omitted]	...	PN ...	...	[...]

s. Type code

Design and float specification depending on pressure, density and temperature.

Form:	Plastic float
Material:	PP / PVDF
Diameter:	50 mm
Length:	150 – 450 mm (depends on pressure, density and temperature)
Max. pressure:	< 6 bar
Temperature:	-20 ... +80°C (PP) -50 ... +100°C (PVDF)

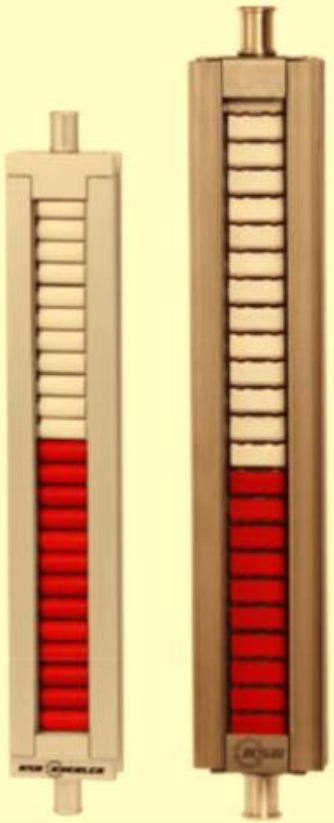
Magnetic display
For bypass level indicators
Model BMD

Applications

- Display bar for the visualisation of levels in combination with bypass level indicators
- Individual design and corrosion resistant materials make the products suitable for a broad range of applications
- Chemical, petrochemical, natural gas, offshore, shipbuilding, machine building, power generating equipment, power plants
- Process water and drinking water treatment, food industry, pharmaceutical industry

Special features

- Measured value display by means of rollers or flaps with permanent magnets
- Medium temperatures from -200 ... +450 °C
- Splash-proof
- Without power supply
- Hermetically sealed from the process



Magnetic display
Fig. left: Plastic rollers, model BMD-SA
Fig. right: Stainless steel flaps, model BMD-FR

Description

The model BMD magnetic displays are used in combination with bypass level indicators for the display of levels. A magnetic system built into the float transmits the liquid level, contact-free, to the externally mounted display. In this are fitted, at 10 mm intervals, red/white plastic rollers or stainless steel flaps with bar magnets. Through the directional magnetic field of the permanent magnetic system in the bypass float, the magnetic rollers or flaps, through the wall of the bypass chamber, are turned through 180°.
For an increasing level from white to red; for a falling level from red to white. Thus the magnetic display indicates the level of a vessel as a red column, without power supply.

An integrated T-slot serves for the fastening of further attachment parts such as scales, sensors and switches.

For selecting the optimum magnetic display (plastic rollers/ stainless steel flaps, case, scale, measuring range etc.) we offer application-related technical advice.

Model overview

Magnetic display model	Description
BMD-SA	Plastic rollers in aluminium case, with T-slot
BMD-SR	Plastic rollers in stainless steel case with T-slot
BMD-FA	Stainless steel flaps in aluminium case, with T-slot
BMD-FR	Stainless steel flaps in stainless steel case with T-slot

Options

- Scale with adhesive foil
- Scale engraved aluminium
- Scale engraved stainless steel
- Scale in cm, mm or %
- Special scale
- Acrylic sight glass extender for insulation at low temperatures
- Purge gas connection
- Display elements in the colours red, white, black and yellow (others on request)

Model overview

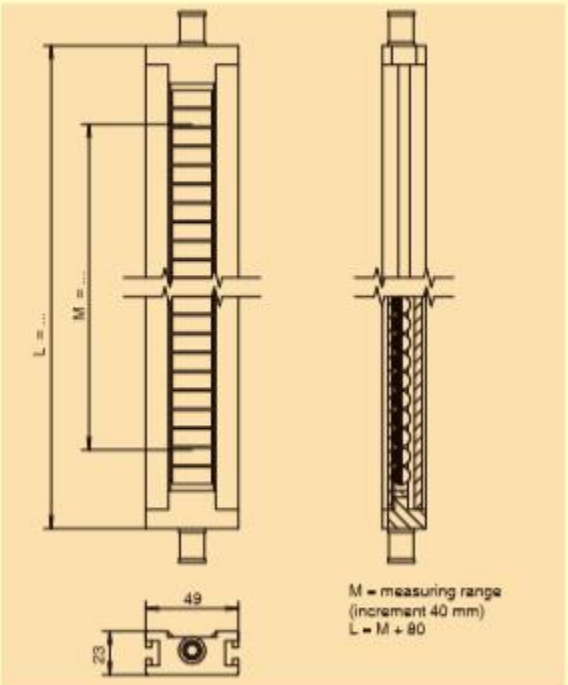
Magnetic display model	Description
BMD-SA	Plastic rollers in aluminium case, with T-slot
BMD-SR	Plastic rollers in stainless steel case with T-slot
BMD-FA	Stainless steel flaps in aluminium case, with T-slot
BMD-FR	Stainless steel flaps in stainless steel case with T-slot

Options

- Scale with adhesive foil
- Scale engraved aluminium
- Scale engraved stainless steel
- Scale in cm, mm or %
- Special scale
- Acrylic sight glass extender for insulation at low temperatures
- Purge gas connection
- Display elements in the colours red, white, black and yellow (others on request)

Magnetic display, plastic rollers in aluminium case, with T-slot, BMD-SA

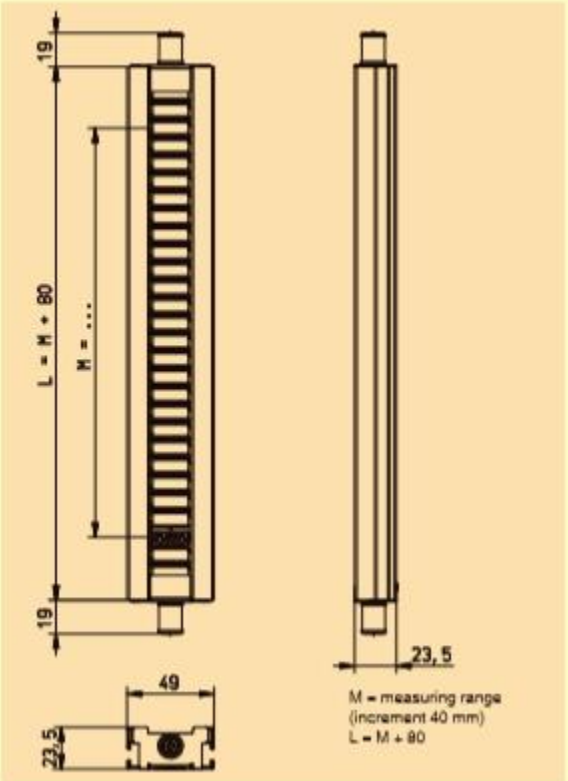
Permissible temperature: -50 ... +200 °C



Specifications	
Case	Aluminium, anodised
Length L	180 ... 6,000 mm
Display element	Plastic rollers, PBT, red/white
Indicator window	Polycarbonate

Magnetic display, plastic rollers in stainless steel case, with T-slot, BMD-SR

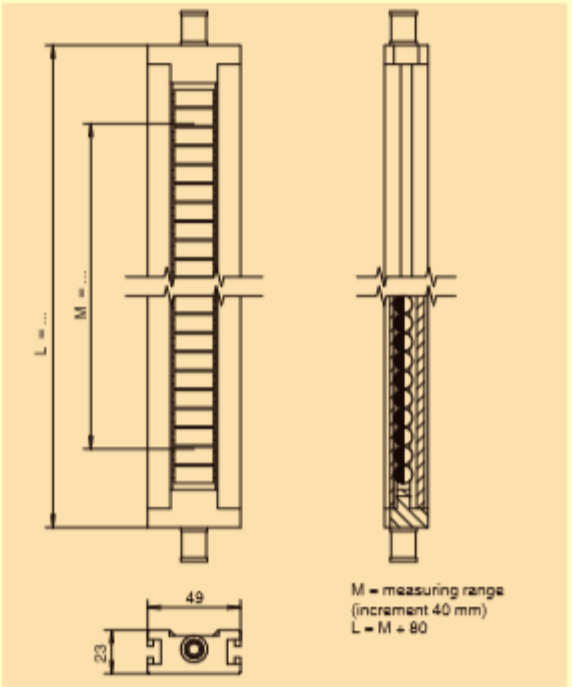
Permissible temperature: -50 ... +200 °C



Specifications	
Case	Stainless steel
Length L	180 ... 6,000 mm
Display element	Plastic rollers, PBT, red/white
Indicator window	Polycarbonate

Magnetic display, stainless steel flaps in aluminium case, with T-slot, BMD-FA

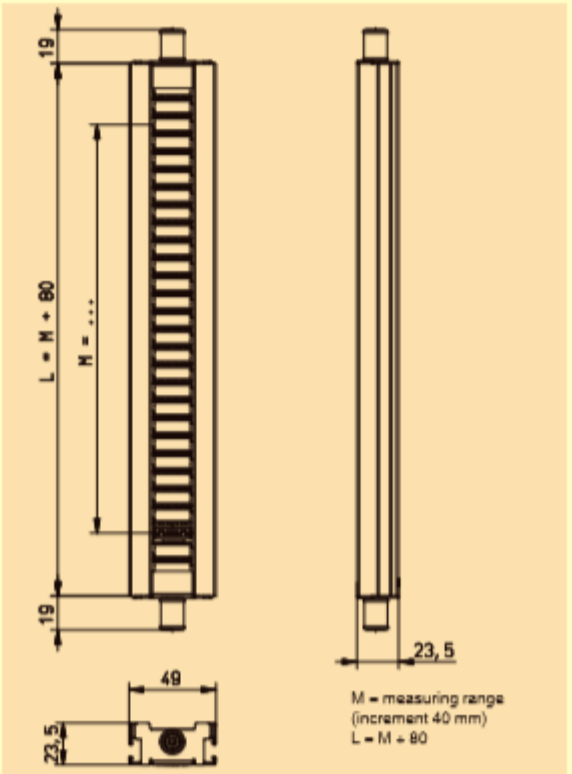
Permissible temperature: -200 ... +450 °C



Specifications	
Case	Aluminium, anodised
Length L	180 ... 6,000 mm
Display element	Stainless steel flaps, red/white
Indicator window	Glass

Magnetic display, stainless steel flaps in stainless steel case, with T-slot, BMD-FR

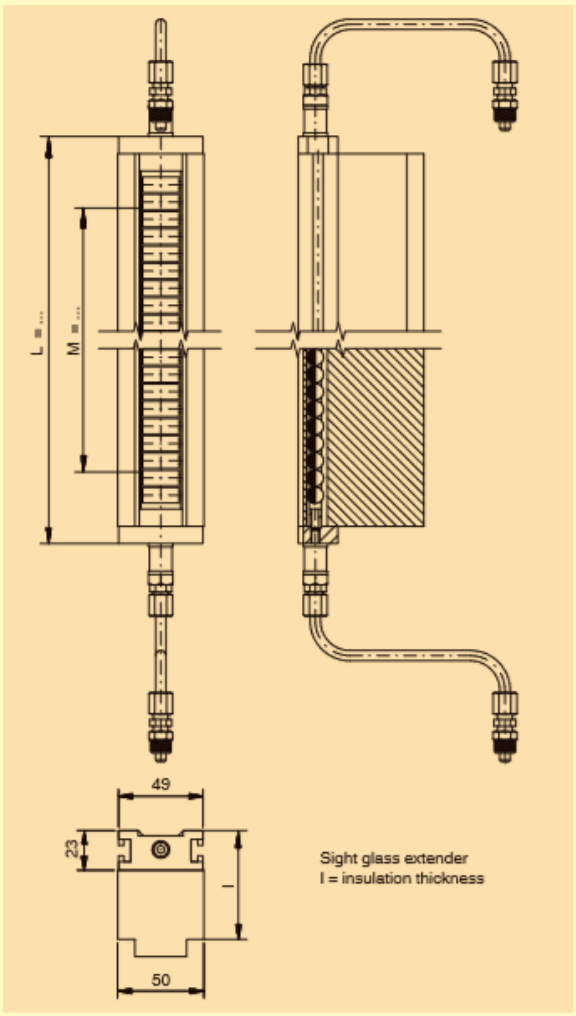
Permissible temperature: -200 ... +450 °C



Specifications	
Case	Stainless steel
Length L	180 ... 6,000 mm
Display element	Stainless steel flaps, red/white
Indicator window	Glass

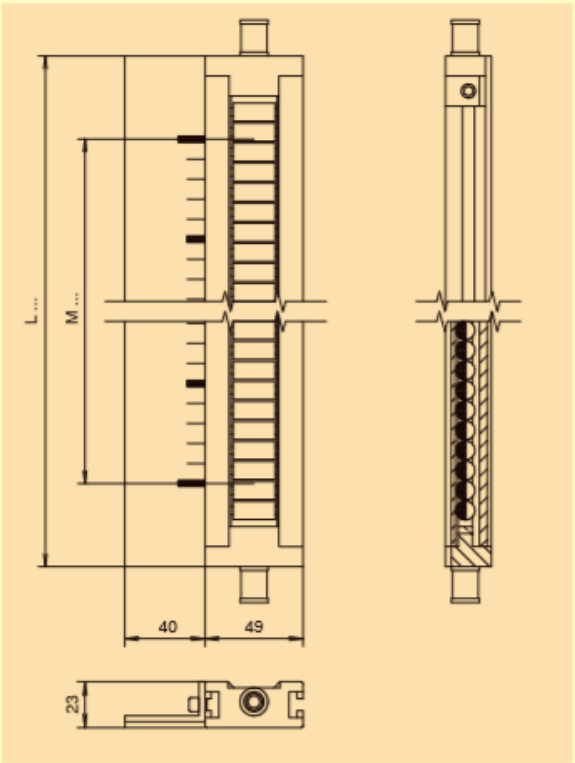
Option

With sight glass extender and purge gas connection
(with bypass chamber insulation)



Option

Scale (adhesive foil, aluminium or stainless steel)
Aluminium with adhesive foil, cm-graduation
max. ambient temperature for the adhesive foil: 100 °C
Aluminium or stainless steel engraved, graduation selectable



Ordering information
Model / Measuring range / Options

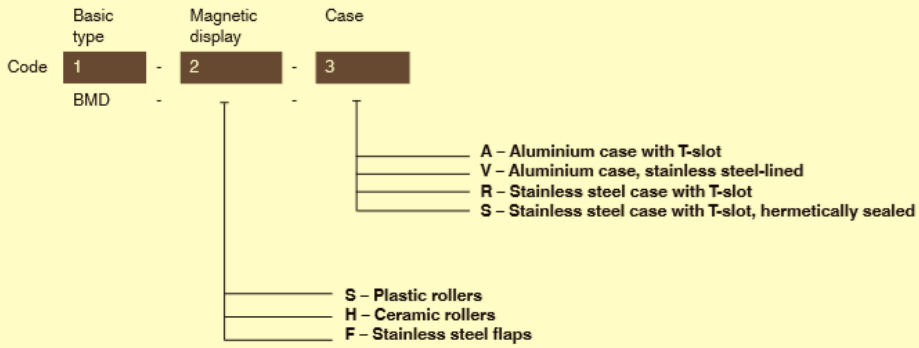
Appendix

Cross Reference BMD

Former Type	Type	Replaced by	Description
MRA	BMD-SA		Aluminium case with T-slot, plastic rollers
MRK*	BMD-HA*	BMD-FA	Aluminium case with T-slot, ceramic rollers
MRF	BMD-FA		Aluminium case with T-slot, stainless steel flaps (new)
MNAV*	BMD-SV*	BMD-SR	Aluminium case stainless steel-lined, plastic rollers
MNKV*	BMD-HV*	BMD-FR	Aluminium case stainless steel-lined, ceramic rollers
MRAV	BMD-SR		Stainless steel case with T-slot, plastic rollers (new)
MRFV	BMD-FR		Stainless steel case with T-slot, stainless steel flaps (new)
	BMD-SS		Stainless steel case with T-slot, plastic rollers, hermetically sealed (new)
	BMD-FS		Stainless steel case with T-slot, stainless steel flaps, hermetically sealed (new)
AVG2*		BMD-FS	Stainless steel rollers in glass tube, hermetically sealed (Phönix design)
AVG3*		BMD-FA	Aluminium case, stainless steel rollers (Phönix design)
AVV2*		BMD-FA	Aluminium case, stainless steel rollers (Vaihinger design)

* obsolete

Type Code



Reed sensor
For bypass level indicators
Model BLR

Applications

- Sensor for continuous level measurement of liquids in bypass level indicators
- Chemical and petrochemical industries, oil and natural gas extraction (on- and offshore)
- Shipbuilding, machine building
- Power generating equipment, power plants
- Pharmaceutical, food, water treatment, environmental engineering industries

Special features

- Installation of head-mounted transmitters in the connection housing possible
- Various contact separations selectable
- Programmable and configurable head-mounted transmitters for field signal 4 ... 20 mA, HART®, PROFIBUS® PA or FOUNDATION™ Fieldbus
- Explosion-protected versions
- Temperature ranges from -100 … +350 °C

Reed sensor, model BLR-S

Description

The model BLR reed sensors are used for continuous monitoring and recording of the liquid level in connection with transmitters. They work on the float principle with magnetic transmission (permanent magnet, reed switch and resistance measuring chain) in a 3-wire potentiometer circuit.

A magnetic system built into the float actuates, through the walls of the bypass chamber and of the sensor tube, reed contacts at a resistance measuring chain (potentiometer). The measurement voltage generated by this is proportional to the fill level.

The resistance measuring chain is made up from reed contacts and resistors soldered onto a PCB. Depending on requirements and design several different contact separations from 5 to 18 mm are available.
For selecting the optimum sensor (sensor model, connection housing, electrical connection, sensor tube (material and total length), contact separation, head-mounted transmitter, measuring range, approval) we offer application-related technical advice.

Model overview

Sensor model	Description	Approval							Temperature range
		without	Ex i	Ex d	GL	DNV	Ex i + GL	Ex i + DNV	
BLR-S	Reed sensor, standard	x			x	x			-50 ... +350 °C
BLR-S-Ex i	Reed sensor, intrinsically safe version Ex i		x				x	x	-50 ... +100 °C
BLR-S-Ex d	Reed sensor, explosion-protected version Ex d			x					-50 ... +100 °C

Ex approvals

Explosion protection	Ignition protection type	Model	Zone	Approval number
ATEX	Ex i	BLR-S-Ex i	Zone 1, gas	KEMA 01ATEX1052 X II 2G Ex ia IIC T4 ... T6 Gb
	Ex d	BLR-S-Ex d	Zone 1, gas	TÜV 09 ATEX 7632 X II 2G Ex d IIC T6
	Ex i + GL	BLR-S-Ex i	Zone 1, gas	KEMA 01ATEX1052 X II 2G Ex ia IIC T4 ... T6 Gb + GL 35949-87 HH
	Ex i + DNV	BLR-S-Ex i	Zone 1, gas	KEMA 01ATEX1052 X II 2G Ex ia IIC T4 ... T6 Gb + DNV A-11451

Type approval

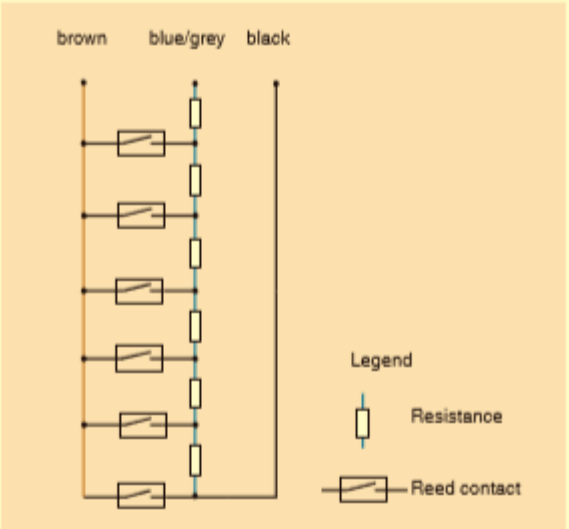
Approval	Model	Approval number
GL	BLR-S	GL - 35 949 - 87 HH
DNV	BLR-S	DNV A-11451
GOST-R	all	0959333

Further approvals on request

Options

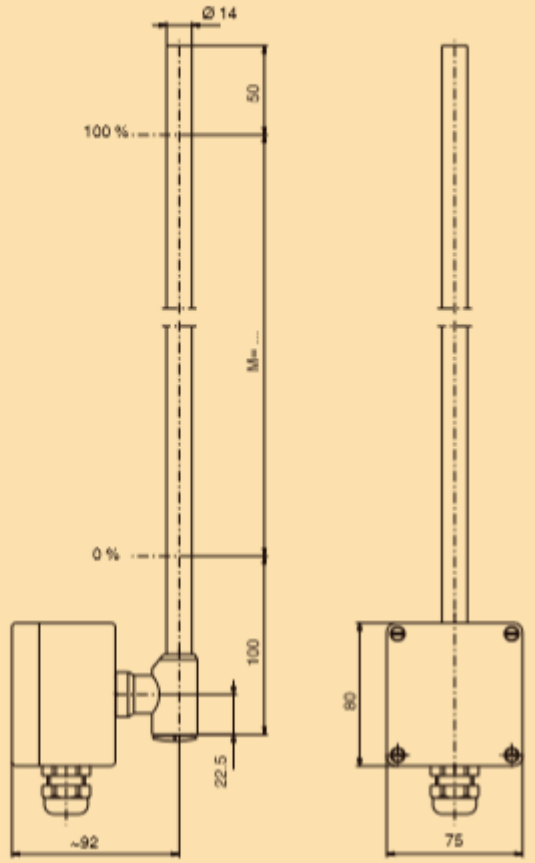
- 2-wire head-mounted transmitter in the connection housing
- Stainless steel connection housing with digital indicator

Internal circuit diagram of the reed sensors

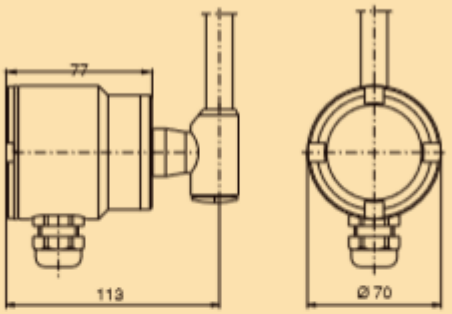


Reed sensors, models BLR-S and BLR-S-Ex i

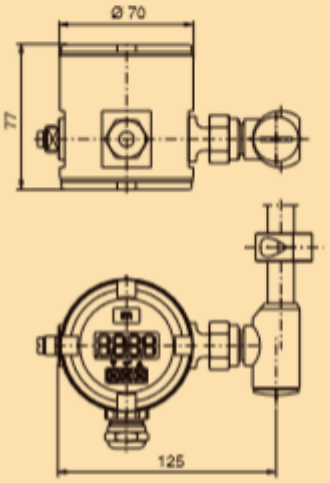
Aluminium and polyester connection housing



Stainless steel connection housing



Stainless steel connection housing with digital indicator (option)



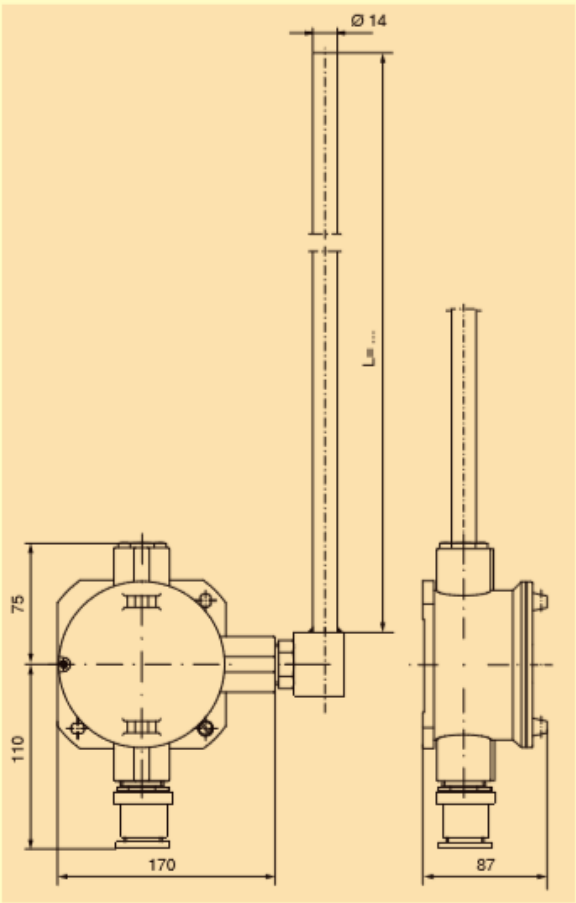
Model BLR-S

Specifications		
Connection housing	Aluminium Polyester Stainless steel 1.4571 Stainless steel 1.4571 with digital indicator	80 x 75 x 57 mm 80 x 75 x 55 mm Ø 70 x 77 mm Ø 70 x 77 mm
Sensor tube	Stainless steel 1.4571, tube Ø 14 x 1 mm	
Contact separation	18 mm, standard 15 mm, high temperature, low temperature 10 mm, standard, high temperature, low temperature 5 mm, standard, high temperature, low temperature	
Overall resistance of the measuring chain	Length and separation dependent	
Ambient temperature	Standard version High temperature version Low temperature version Standard version with Microtherm® High temperature version with Microtherm®	-50 ... +100 °C -50 ... +200 °C -100 ... +100 °C -50 ... +250 °C -50 ... +350 °C
Ingress protection	Aluminium and polyester connection housing: IP 65 Stainless steel connection housing: IP 67	

Model BLR-S-Ex i

Specifications		
Connection housing	Aluminium Polyester Stainless steel 1.4571 Stainless steel 1.4571 with digital indicator	80 x 75 x 57 mm 80 x 75 x 55 mm Ø 70 x 77 mm Ø 70 x 77 mm
Sensor tube	Stainless steel 1.4571, tube Ø 14 x 1 mm	
Contact separation	18 mm 10 mm 5 mm	
Overall resistance of the measuring chain	3.2 ... 50 kΩ	
Max. permissible surface temperature at the sensor tube	T4 +100 °C T5 +65 °C T6 +50 °C	
Ingress protection	Aluminium and polyester connection housing: IP 65 Stainless steel connection housing: IP 67	
Approval	Ex i	

Reed sensor, model BLR-S-Ex d



Specifications		
Connection housing	Aluminium	170 x 151 x 87 mm
Sensor tube	Stainless steel 1.4571, tube Ø 14 x 1 mm	
Contact separation	18 mm 10 mm 5 mm	
Overall resistance of the measuring chain	Length and separation dependent	
Max. permissible surface temperature at the sensor tube	T4 +100 °C T5 +65 °C T6 +55 °C	
Ingress protection	IP 65	
Approval	Ex d	