# Bypass level indicator with magnetic roller display Model BNA



## Applications

- Continuous level measurement with visual display of the filling level, without power supply.
- Volume- or depth-proportional display of the filling level
- Individual design and corrosion resistant materials enable a wide spectrum of application
- Chemical industry, petrochemical industry, natural gas, offshore, shipbuilding, machine building, power generating equipment, power stations
- Process water and drinking water treatment, food and beverage industry, pharmaceutical industry

## Special features

- Process- and system-specific solutions possible
- Operating limits:
  - Operating temperature: T = -160 ... +450 °C
  - Working pressure: P = Vacuum to 420 bar
  - Limit S. G.: $\rho \geq 400$ kg/m³
- Wide variety of different process connections and materials
- Level sensor or magnetic switch mounted externally (option)
- Explosion-protected version (optional)

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

## Description

The WIKA model BNA bypass level indicator consists of a bypass chamber, which, as a communicating interface, is connected laterally to a vessel via 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 cylindrical float (with a permanent magnet system, mounted within the bypass chamber) transmits the liquid level, contact free, to the outside via the magnetic roller display mounted on the bypass chamber. In this are fitted, at 10 mm intervals, red/white plastic or ceramic rollers with bar magnets.

Through the directional magnetic field of the permanent magnet system in the cylindrical float, the magnetic rollers, 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 displays the level of a vessel **without a power supply** - visible as a red column.

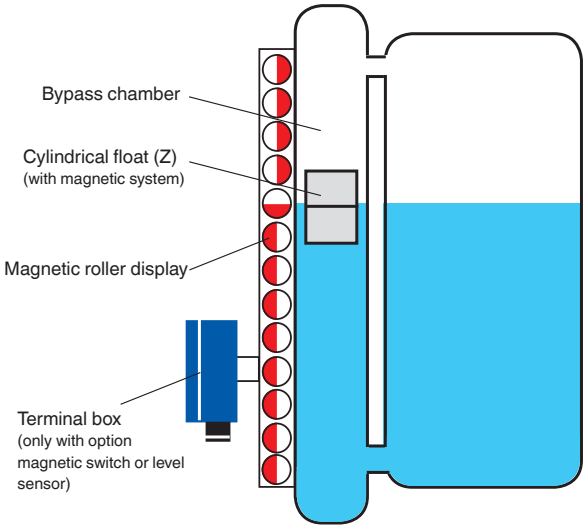
## Further special features

- Simple, robust and solid design, long service life
- Bypass chamber made of stainless steel 1.4571
- Pressure- and gas-tight separation between measuring and display chamber
- Measuring and indicating of the level of aggressive, combustible, toxic, hot, agitated and contaminated media
- Without power supply the functioning of the magnetic roller display is guaranteed even in the case of power failures
- Available for applications in all areas of industry through use of highly corrosion-resistant materials
- Continuous measurement of the liquid levels irrespective of physical or chemical changes of state of the measured media, such as: foaming, conductivity, dielectric constant, pressure, vacuum, temperature, vapour, condensation, blistering, effects of boiling
- Volume-proportional or depth-proportional display of the filling level
- Interface layer measurement and overall level from Δ-density of more than 50 kg/m³

## Options

- Explosion-protected versions
- Customer-specific solutions
- Bypass chamber and float made of different materials
- Magnetic switch or level sensor mounted externally
- Bypass chamber end

## 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 liquid level of the medium to be measured.
- The radial-symmetric magnetic system, which is positioned to immersion height inside the float, simultaneously activates the magnetic roller display, which is fixed to the outside of the bypass chamber, and the switching and measuring elements through its magnetic field.

**Example**

**Mounted bypass level indicator, model BNA**

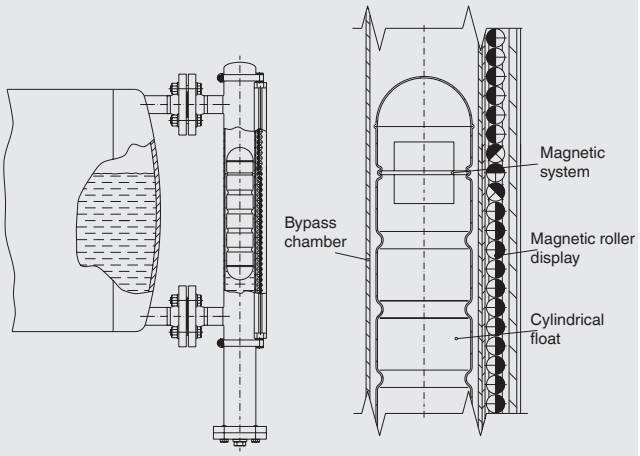
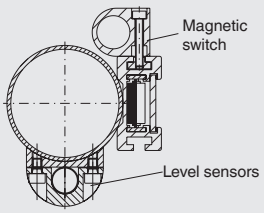
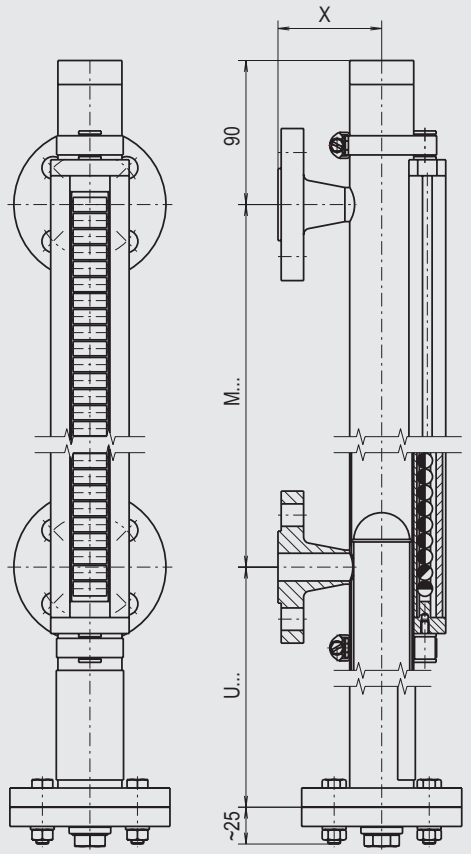



**Illustration with option magnetic switch and level sensor**



# Mini bypass level indicator

Bypass chamber made of stainless steel 1.4571



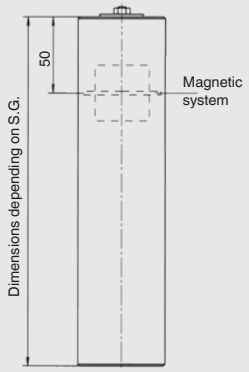

M = centre-to-centre distance of the process connections
U = dependent on float
X = according to process connection

## Specifications

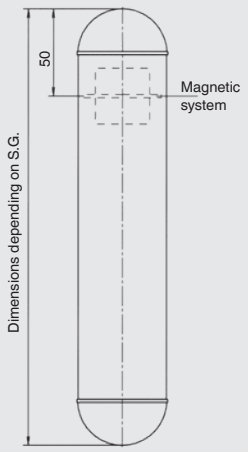
| | |
|---|---|
| Bypass chamber | Ø 42 x 2 mm |
| Chamber end top | Flat top<br>Options: (see page 24)<br>■ Vent plug G 1/2"<br>■ Vent valve<br>■ Vent flange |
| Chamber end bottom | Flange connection with drain plug G 1/2"<br>Options: (see page 24)<br>- Drain valve<br>- Drain flange |
| Process connections | Side-side (options see page 23)<br>Flanges<br>DN 10 - DN 25, PN 6, DIN 2631<br>DN 10 - DN 25, PN 16, DIN 2633<br>DN 10 - DN 25, PN 40, DIN 2635<br>DN 32 - DN 100, DIN 2527<br>1/2" - 4", ANSI B 16.5<br>class 150 or class 300<br>Thread or weld stubs<br>GM /... = female thread / size<br>GN /... = male thread / size<br>S /... = weld stubs / Ø |
| Centre-to-centre distance | Min. 150 mm to max. 2000 mm |
| Nominal pressure | Max. 16 bar<br>(according to float design) |
| Temperature range | Max. 150 °C<br>(according to float design) |
| Float | Model ZTS<br>- Material titanium 3.7035<br>- S.G. min. 800 kg/m³<br>- Pressure max. 16 bar<br>- Temperature max. 150 °C<br>Model ZBS<br>- Material Buna<br>- S.G. min. 800 kg/m³<br>- Pressure max. 6 bar<br>- Temperature max. 80 °C |
| Magnetic roller display | Model MRA<br>For specifications and further designs and options see page 16 |
| Further options:<br>Magnetic switch<br>Level sensor | <br>See page 17 ... 20<br>See page 21 and 22 |

**Float**

Model ZBS (material Buna)

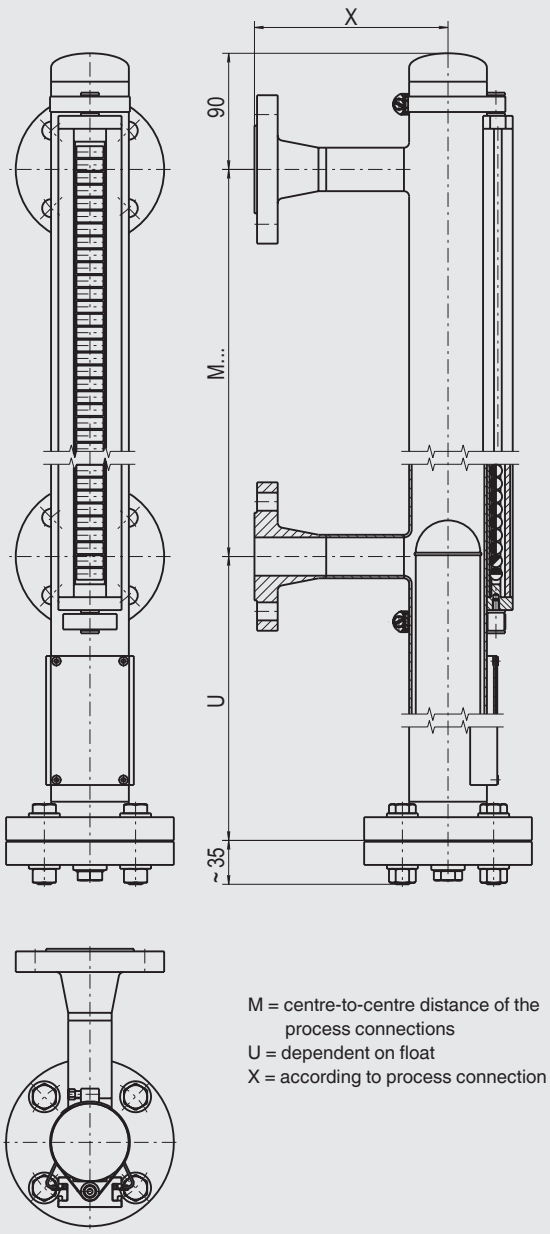



Model ZTS (material titanium)



## Version PN 6 - PN 40

Bypass chamber made of stainless steel 1.4571
Option: Explosion-protected version




M = centre-to-centre distance of the process connections
U = dependent on float
X = according to process connection

### Specifications

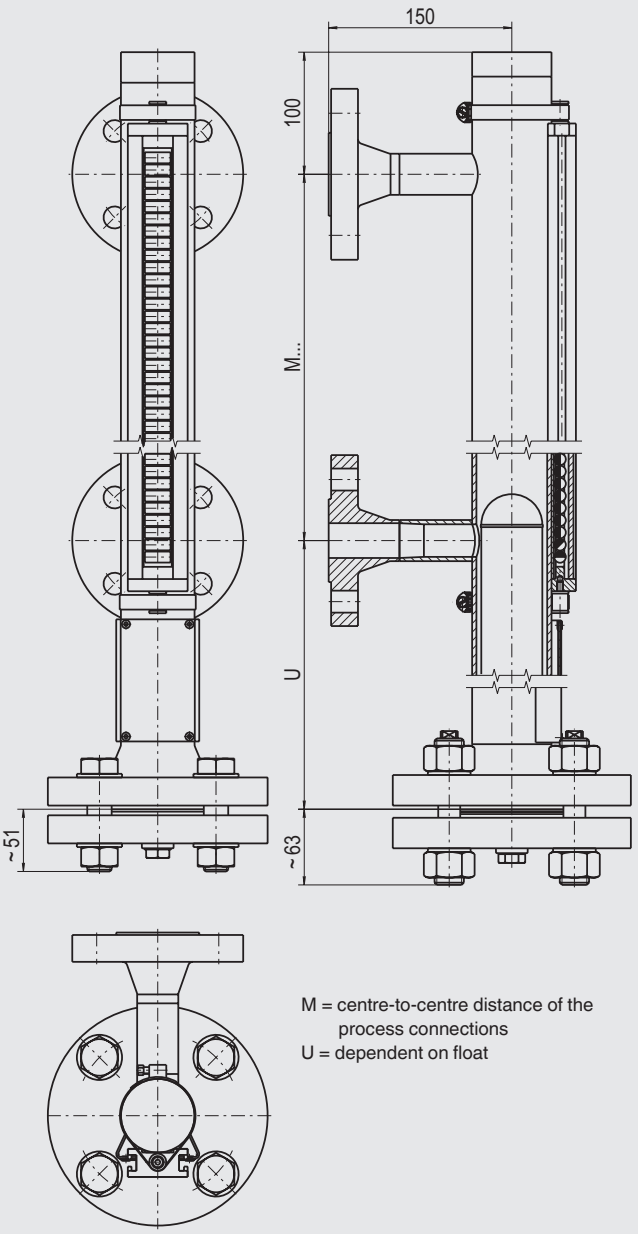
| | |
|---|---|
| Bypass chamber | Ø 60.3 x 2 mm or Ø 64 x 2 mm |
| Chamber end top | Flat top, welding cap or flange connection<br>Options: (see page 24)<br>■ Vent plug G 1/2"<br>■ Vent valve<br>■ Vent flange |
| Chamber end bottom | Flange connection<br>with drain plug G 1/2"<br>Options: (see page 24)<br>- Drain valve<br>- Drain flange |
| Process connections | Side-side (options see page 23)<br>Flanges<br>DN 10 - DN 25, PN 6, DIN 2631<br>DN 10 - DN 25, PN 16, DIN 2633<br>DN 10 - DN 25, PN 40, DIN 2635<br>DN 32 - DN 100, DIN 2527<br>1/2" - 4", ANSI B 16.5<br>class 150 or class 300<br>Thread or weld stubs<br>GM /... = female thread / size<br>GN /... = male thread / size<br>S /... = weld stubs / Ø |
| Centre-to-centre distance | Min. 150 mm to max. 6000 mm<br>(larger distances on request) |
| Nominal pressure | Max. 40 bar<br>(according to flange design) |
| Temperature range | -196 °C ... +450 °C |

| Temperature class | T1 | T2 | T3 | T4 | T5 | T6 |
|---|---|---|---|---|---|---|
| Max. process temperature | 320 °C | 240 °C | 160 °C | 108 °C | 80 °C | 68 °C |

| | |
|---|---|
| Float | Model ZTSS / ZVSS<br>- P ≤ 25 bar (titanium 3.7035, stainless steel 1.4571)<br>- Float length depending on S.G.<br>- Specifications (see page 14)<br>Model ZTS / ZVS<br>- Float design according to process parameters S.G., pressure and temperature (see page 15) |
| Magnetic roller display | Model MRA: < 200 °C<br>Model MRK: > 200 °C<br>For specifications and further designs and options see page 16 |
| Further options: | |
| Magnetic switch | See page 17 ... 20 |
| Level sensor | See page 21 and 22 |
| Electrical trace heating | On request |
| Bypass chamber insulation | On request |

## Version PN 64 - PN 100

Bypass chamber made of stainless steel 1.4571
Option: Explosion-protected version



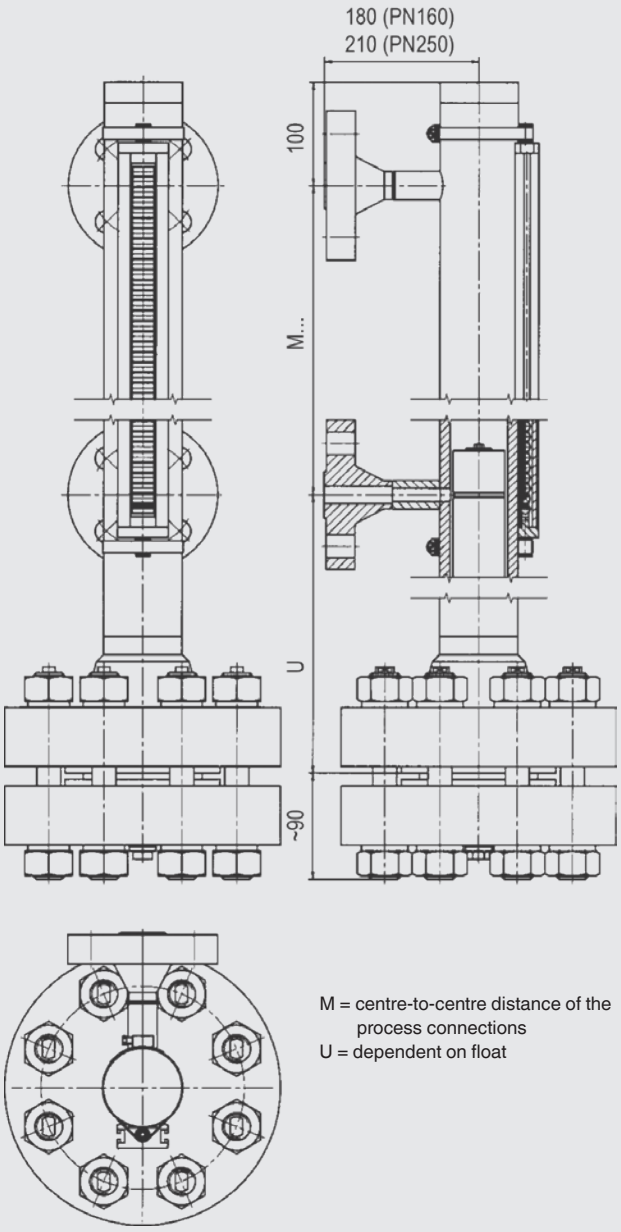

M = centre-to-centre distance of the process connections
U = dependent on float

### Specifications

| | |
|---|---|
| Bypass chamber | ■ PN 64: Ø 60.3 x 2 mm or Ø 60.3 x 2.6 mm<br>■ PN 100: Ø 65 x 3.5 mm |
| Chamber end top | Flat top, welding cap or flange connection<br>■ DN 50, PN 64 or ANSI 2", class 600<br>■ DN 50, PN 100 or ANSI 2", class 600<br>Options: (see page 24)<br>■ Vent plug G 1/2"<br>■ Vent valve<br>■ Vent flange |
| Chamber end bottom | Flange connection<br>■ DN 50, PN 64 or ANSI 2", class 600<br>■ DN 50, PN 100 or ANSI 2", class 600<br>with drain plug G 1/2“<br>Options: (see page 24)<br>- Drain valve<br>- Drain flange |
| Process connections | Side-side (options see page 23)<br>Flanges<br>DN 10 - DN 25, PN 64, DIN 2637<br>DN 10 - DN 25, PN 100, DIN 2637<br>1/2" - 3", ANSI B 16.5, class 600<br>Thread or weld stubs<br>GM /... = female thread / size<br>GN /... = male thread / size<br>S /... = weld stubs / Ø |
| Centre-to-centre distance | Min. 150 mm to max. 6000 mm<br>(larger distances on request) |
| Nominal pressure | ■ PN 64: max. 64 bar<br>■ PN 100: max. 100 bar |
| Temperature range | -30 °C ... +300 °C (according to design) |
| Temperature class<br>Max. process temperature | T1 T2 T3 T4 T5 T6<br>320 °C 240 °C 160 °C 108 °C 80 °C 68 °C |
| Float | Model ZTS<br>- Float design according to process parameters S.G., pressure and temperature (see page 15) |
| Magnetic roller display | Model MRA: < 200 °C<br>Model MRK: > 200 °C<br>For specifications and further designs and options see page 16 |
| Further options:<br>Magnetic switch<br>Level sensor<br>Electrical trace heating<br>Bypass chamber insulation | <br>See page 17 ... 20<br>See page 21 and 22<br><br>On request<br><br>On request |

## High pressure version, PN 160 and PN 250

Bypass chamber made of stainless steel 1.4571

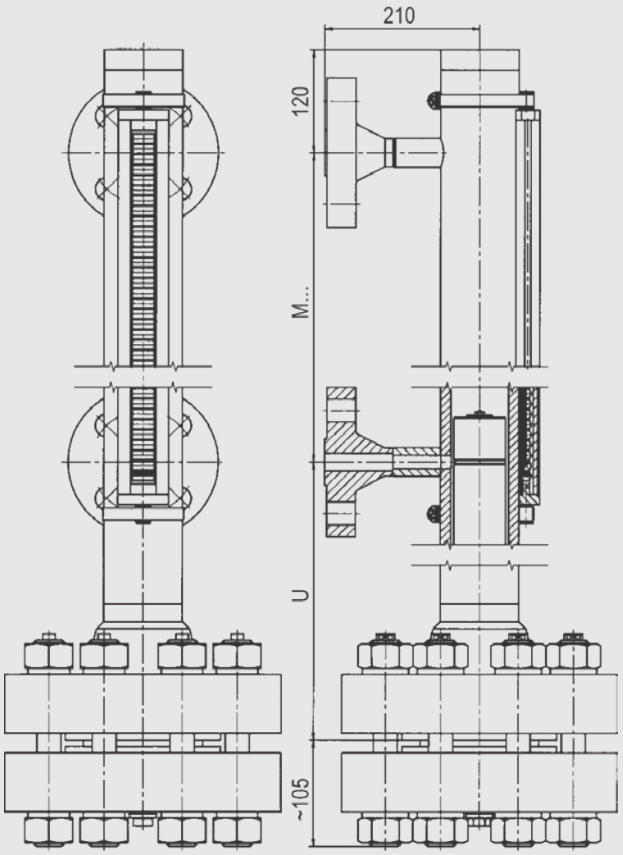



M = centre-to-centre distance of the process connections
U = dependent on float

| Specifications | |
|---|---|
| Bypass chamber | ■ PN 160: Ø 73 x 5.2 mm<br>■ PN 250: Ø 71 x 7.5 mm |
| Chamber end top | Welding cap or flange connection<br>■ ANSI 2 1/2", class 1500<br>Options: (see page 24)<br>■ Vent plug G 1/2"<br>■ Vent valve<br>■ Vent flange |
| Chamber end bottom | Flange connection<br>■ ANSI 2 1/2", class 1500<br>with drain plug G 1/2"<br>Options: (see page 24)<br>- Drain valve<br>- Drain flange |
| Process connections | Side-side (options see page 23)<br>Flanges<br>DN 10 - DN 25, PN 160, DIN 2638<br>DN 10 - DN 25, PN 250, DIN 2628<br>DN 10 - DN 50, DIN 2527<br>1/2" - 2 1/2", ANSI B 16.5, class 1500<br>Thread or weld stubs<br>GM /... = female thread / size<br>GN /... = male thread / size<br>S /... = weld stubs / Ø |
| Centre-to-centre distance | Min. 150 mm to max. 6000 mm<br>(larger distances on request) |
| Nominal pressure | ■ PN 160: max. 160 bar<br>■ PN 250: max. 250 bar |
| Temperature range | ■ PN 160: -30 °C ... +285 °C<br>■ PN 250: -30 °C ... +200 °C<br>(according to design) |
| Float | Model ZTKS<br>Model ZCFS (solid body material, leak-proof)<br>- Float design according to process parameters S.G., pressure and temperature (see page 15) |
| Magnetic roller display | Model MRA: < 200 °C<br>Model MRK: > 200 °C<br>For specifications and further designs and options see page 16 |
| Further options: | |
| Magnetic switch | See page 17 ... 20 |
| Level sensor | See page 21 and 22 |
| Electrical trace heating | On request |
| Bypass chamber insulation | On request |

## High pressure version, PN 400

Bypass chamber made of stainless steel 1.4571

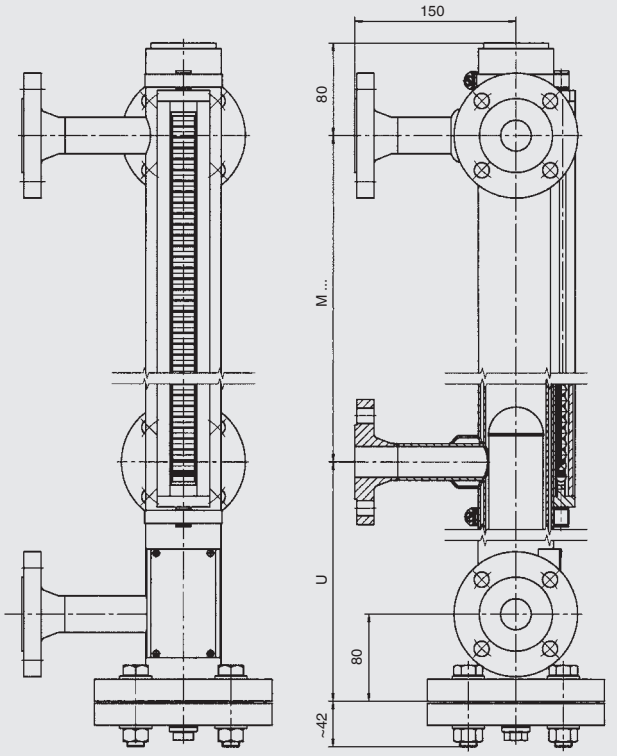



M = centre-to-centre distance of the process connections
U = dependent on float

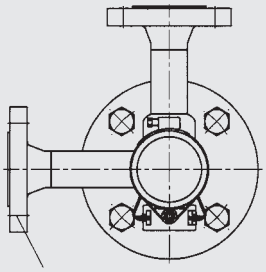
| Specifications | |
|---|---|
| Bypass chamber | Ø 76 x 10 mm |
| Chamber end top | Welding cap or flange connection<br>■ ANSI 2 1/2", class 2500<br>Options: (see page 24)<br>■ Vent plug G 1/2"<br>■ Vent valve<br>■ Vent flange |
| Chamber end bottom | Flange connection<br>■ ANSI 2 1/2“, class 2500<br>with drain plug G 1/2"<br>Options: (see page 24)<br>- Drain valve<br>- Drain flange |
| Process connections | Side-side (options see page 23)<br>Flanges<br>DN 10 - DN 25, PN 400, DIN 2627<br>DN 10 - DN 50, DIN 2527<br>1/2" - 2 1/2", ANSI B 16.5, class 2500<br>Thread or weld stubs<br>GM /... = female thread / size<br>GN /... = male thread / size<br>S /... = weld stubs / Ø |
| Centre-to-centre distance | Min. 150 mm to max. 6000 mm<br>(larger distances on request) |
| Nominal pressure | max. 400 bar |
| Temperature range | -30 °C ... +70 °C<br>(according to design) |
| Float | Model ZTKS<br>Model ZCFS (solid body material, leak-proof)<br>- Float design according to process parameters S.G., pressure and temperature (see page 15) |
| Magnetic roller display | Model MRA<br>For specifications and further designs and options see page 16 |
| Further options: | |
| Magnetic switch | See page 17 ... 20 |
| Level sensor | See page 21 and 22 |
| Electrical trace heating | On request |
| Bypass chamber insulation | On request |

## Version with heating jacket

Bypass chamber and heating jacket pipe made of stainless steel 1.4571
Option: Explosion-protected version




Process connection



Heating jacket connection

M = centre-to-centre distance of the process connections
U = dependent on float


### Specifications

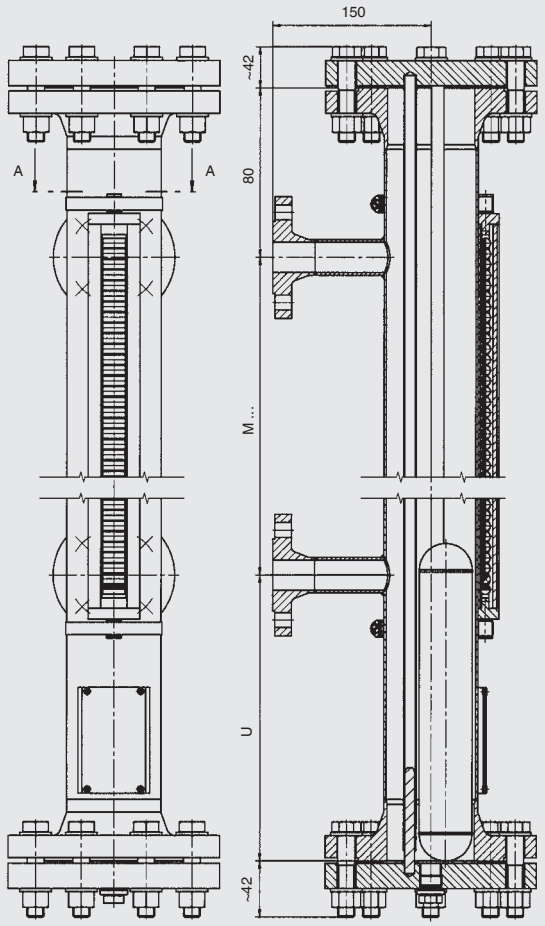
| | |
|---|---|
| Bypass chamber | Ø 60.3 x 2 mm |
| Heating jacket pipe | Ø 70 x 2 mm |
| Chamber end top | Welding cap<br>Options: (see page 24)<br>■ Vent plug G 1/2"<br>■ Vent valve<br>■ Vent flange |
| Chamber end bottom | Flange connection with drain plug G 1/2"<br>Options: (see page 24)<br>- Drain valve<br>- Drain flange |
| Process connections | Side-side (options see page 23)<br>Flanges<br>DN 10 - DN 25, PN 6, DIN 2631<br>DN 10 - DN 25, PN 16, DIN 2633<br>DN 32 - DN 100, DIN 2527<br>1/2" - 4", ANSI B 16.5, class 150<br>DN 10 - DN 25, PN 40, DIN 2635<br>1/2" - 4", ANSI B 16.5, class 300<br>Thread or weld stubs<br>GM /... = female thread / size<br>GN /... = male thread / size<br>S /... = weld stubs / Ø |
| Centre-to-centre distance | Min. 150 mm to max. 6000 mm<br>(larger distances on request) |
| Nominal pressure | Process: max. 6 bar or max. 40 bar<br>(according to flange design)<br>Heating jacket: max. 16 bar |
| Temperature range | -60 °C ... +450 °C (according to design) |

| Temperature class | T1 | T2 | T3 | T4 | T5 | T6 |
|---|---|---|---|---|---|---|
| Max. process temperature | 320 °C | 240 °C | 160 °C | 108 °C | 80 °C | 68 °C |

| | |
|---|---|
| Float | Model ZTS and ZVS<br>- Float design according to process parameters S.G., pressure and temperature (see page 15) |
| Magnetic roller display | Model MRA: < 200 °C<br>Model MRK: > 200 °C<br>For specifications and further designs and options see page 16 |
| Further options:<br>Magnetic switch<br>Level sensor | <br>See page 17 ... 20<br>See page 21 and 22 |

## Design for liquid gas applications

Bypass chamber made of stainless steel 1.4571

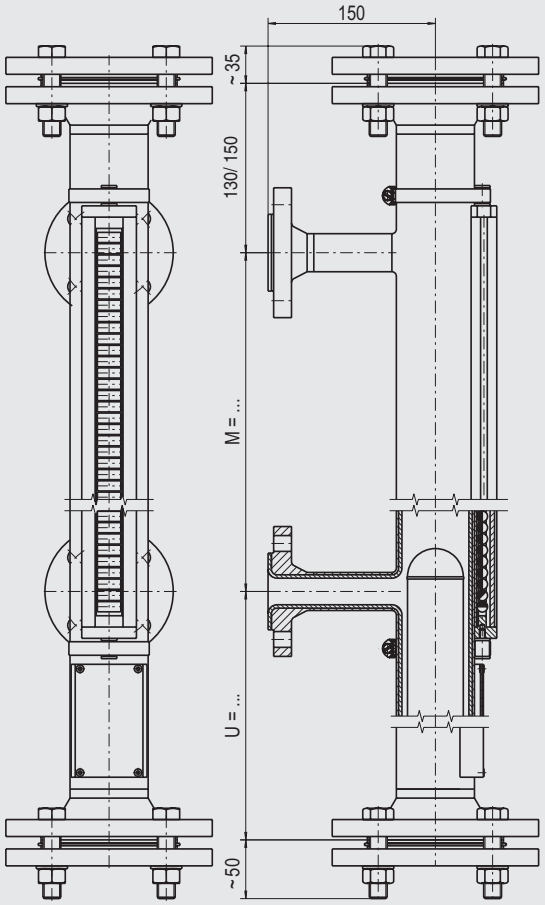



M = centre-to-centre distance of the process connections
U = dependent on float

| Specifications | |
|---|---|
| Bypass chamber | Ø 88.9 x 2 mm |
| Chamber end top | Flange connection<br>■ DN 80<br>Options: (see page 24)<br>■ Vent plug G 1/2"<br>■ Vent valve<br>■ Vent flange |
| Chamber end bottom | Flange connection<br>■ DN 80<br>with drain plug G 1/2"<br>Options: (see page 24)<br>- Drain valve<br>- Drain flange |
| Process connections | Side-side (options see page 23)<br>Flanges<br>DN 10 - DN 25, PN 16, DIN 2633<br>DN 10 - DN 25, PN 40, DIN 2635<br>DN 10 - DN 100, DIN 2527<br>1/2" - 4", ANSI B 16.5<br>Thread or weld stubs<br>GM /... = female thread / size<br>GN /... = male thread / size<br>S /... = weld stubs / Ø |
| Centre-to-centre distance | Min. 150 mm to max. 6000 mm |
| Nominal pressure | max. 25 bar<br>(according to flange design) |
| Temperature range | -60 °C ... +300 °C (according to design) |
| Float | Model ZTS and ZVS<br>- Float design according to process parameters S.G., pressure and temperature (see page 15) |
| Magnetic roller display | Model MRA: < 200 °C<br>Model MRK: > 200 °C<br>For specifications and further designs and options see page 16 |
| Further options: | |
| Magnetic switch | See page 17 ... 20 |
| Level sensor | See page 21 and 22 |
| Electrical trace heating | On request |
| Bypass chamber insulation | On request |

## Version E-CTFE or E-TFE coated

Bypass chamber made of stainless steel 1.4571

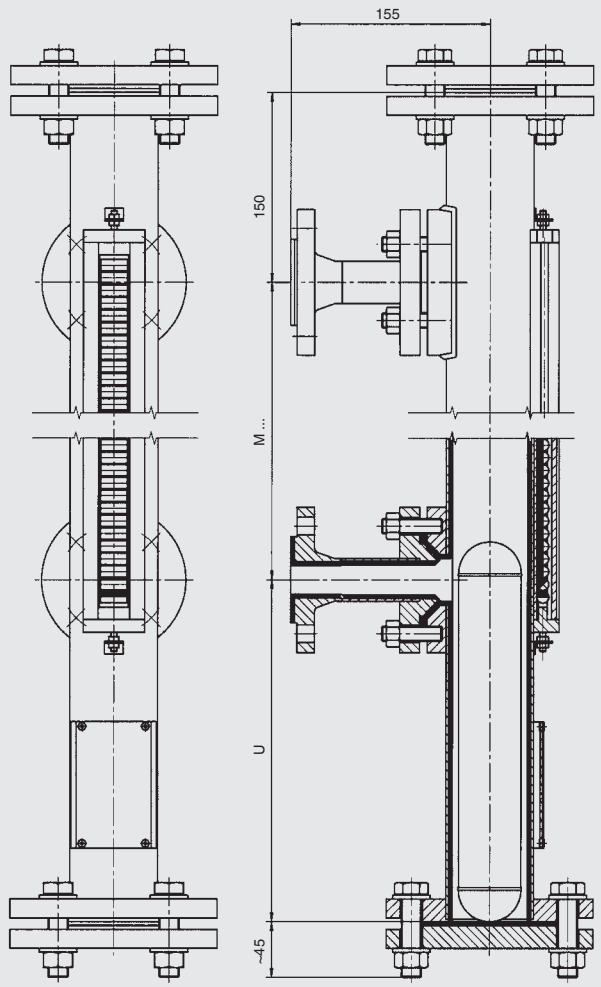



M = centre-to-centre distance of the process connections
U = dependent on float

| Specifications | |
|---|---|
| Bypass chamber | ■ E-CTFE coated: Ø 64 x 2 mm<br>■ E-TFE coated: Ø 70 x 2 mm |
| Chamber end top | Flange connection<br>Options: (see page 24)<br>■ Vent flange |
| Chamber end bottom | Flange connection<br>Options: (see page 24)<br>- Drain flange |
| Process connections | Side-side<br>Flanges<br>DN 25, PN 16, DIN 2633<br>DN 32 - DN 100, DIN 2527<br>1/2" - 4", ANSI B 16.5, class 150<br>Thread or weld stubs<br>GM /... = female thread / size<br>GN /... = male thread / size<br>S /... = weld stubs / Ø |
| Centre-to-centre distance | Min. 150 mm to max. 1900 mm<br>(overall pipe length max. 2900 mm)<br>With overall pipe length > 2900 mm: Bypass chamber separated with flange connection |
| Nominal pressure | max. 16 bar |
| Temperature range | depending on the medium |
| Float | Model ZTECS (material stainless steel 1.4571, E- CTFE coated)<br>Model ZVECS (material titanium 3.7035, E- CTFE coated)<br>- Float design according to process parameters S.G., pressure and temperature (see page 15) |
| Magnetic roller display | Model MRA-M<br>For specifications and further designs and options see page 16 |
| Further options: | |
| Magnetic switch | See page 17 ... 20 |
| Level sensor | See page 21 and 22 |
| Electrical trace heating | On request |
| Bypass chamber insulation | On request |

## Design PTFE lined

Bypass chamber made of stainless steel 1.4571
PTFE lining: thick-walled 3 mm, vacuum-tight, option: anti-static

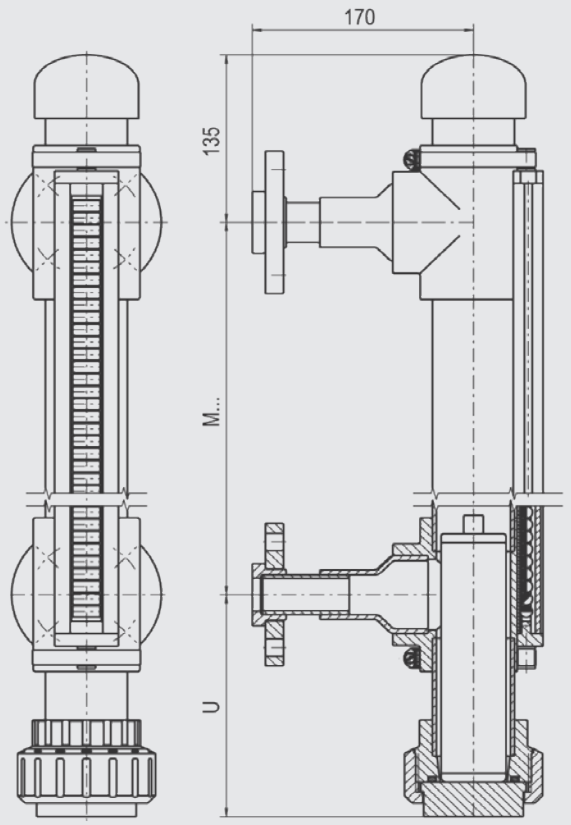



M = centre-to-centre distance of the process connections
U = dependent on float

| Specifications | |
|---|---|
| Bypass chamber | Ø 70 x 2 mm |
| Chamber end top | Flange connection<br>Options: (see page 24)<br>■ Vent flange |
| Chamber end bottom | Flange connection<br>Options: (see page 24)<br>- Drain flange |
| Process connections | Side-side<br>Flanges<br>DN 25, PN 16, DIN 2633<br>with reducing flange<br>DN 32 - DN 100, PN 10, DIN 2848 / 2874 |
| Centre-to-centre distance | Min. 150 mm to max. 1500 mm<br>(overall pipe length max. 2000 mm)<br>With overall pipe length > 2000 mm: Bypass chamber separated with flange connection |
| Nominal pressure | max. 10 bar |
| Temperature range | depending on the medium |
| Float | Model ZTECS (material stainless steel 1.4571, E- CTFE coated)<br>Model ZVECS (material titanium 3.7035, E- CTFE coated)<br>- Float design according to process parameters S.G., pressure and temperature (see page 15) |
| Magnetic roller display | Model MRA-M<br>For specifications and further designs and options see page 16 |
| Further options: | |
| Magnetic switch | See page 17 ... 20 |
| Level sensor | See page 21 and 22 |
| Electrical trace heating | On request |
| Bypass chamber insulation | On request |

## Plastic version

Bypass chamber and float made of polypropylene or PVDF




M = centre-to-centre distance of the process connections
U = dependent on float

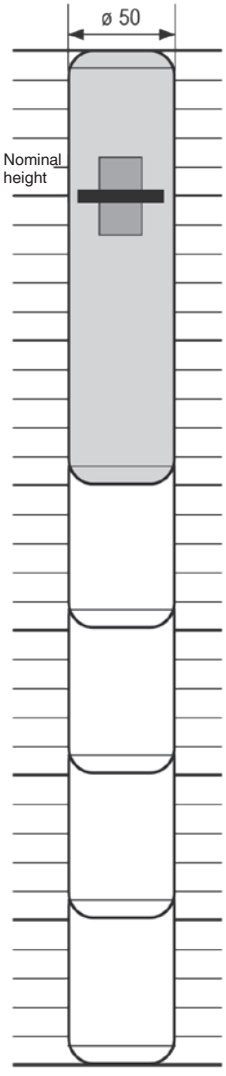
| Specifications | |
|---|---|
| Bypass chamber | Ø 63 x 3 mm |
| Chamber<br>end top | Flat top<br>Options: (see page 24)<br>■ Vent plug G 1/2"<br>■ Vent valve<br>■ Vent flange |
| Chamber<br>end bottom | Fitting<br>Options: (see page 24)<br>- Drain valve<br>- Drain flange |
| Process connections | Side-side flanges<br>DN 15 - DN 50, PN 16<br>Connection dimensions: ISO/DIN<br>1/2“ - 2“, ANSI B 16.5, class 150<br>Connection dimensions: ANSI B 16.5<br>Material: UP - GF |
| Centre-to-centre distance | Min. 200 mm to max. 4000 mm |
| Nominal pressure | max. 4 bar |
| Temperature range | ■ Polypropylene max. 60 °C<br>■ PVDF max. 80 °C |
| Float | Model ZPPS (material Polypropylene)<br>Model ZPFS (material PVDF)<br>- Float length depending on S.G.<br>For specifications see page 14 |
| Magnetic roller display | Model MRA-M<br>For specifications and further designs and options see page 16 |
| Further options:<br>Magnetic switch<br>Level sensor | <br>See page 17 ... 20<br>See page 21 and 22 |

# Plastic cylindrical float

made of polypropylene or PVDF

| | PVDF | PP |
|---|---|---|
| Material | | |
| Operating temperature | + 80 °C | + 60 °C |
| Working pressure | Max. 6 bar | Max. 6 bar |
| Test pressure | Max. 9 bar | Max. 9 bar |
| Diameter | 50 mm | 50 mm |
| Float model | ZPFS ... | ZPPS ... |

| Float L (mm) | 150 | 200 | 250 | 300 | 350 | 150 | 200 | 250 | 300 | 350 |
|---|---|---|---|---|---|---|---|---|---|---|
| Volume ($cm^3$) | 295 | 393 | 491 | 589 | 687 | 295 | 393 | 491 | 589 | 687 |
| Weight (g) | 290 | 335 | 385 | 435 | 480 | 260 | 285 | 310 | 335 | 360 |




**Immersion depth table in relation to the specific gravity of the medium ($kg/m^3$)**

| Emersion height in mm | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | - | - | - | - | - | - | - | - | - | - |
| 10 | - | - | - | - | - | - | - | - | - | - |
| 20 | - | - | - | - | - | - | - | - | - | - |
| 30 | 1230 | 1000 | 890 | 820 | 760 | 1100 | 850 | 720 | 630 | 570 |
| 40 | 1340 | 1070 | 930 | 850 | 790 | 1200 | 910 | 750 | 660 | 590 |
| **50** | **1480** | **1140** | **980** | **890** | **810** | **1320** | **970** | **790** | **680** | **610** |
| 60 | 1640 | 1220 | 1030 | 920 | 840 | 1470 | 1040 | 830 | 710 | 630 |
| 70 | 1850 | 1310 | 1090 | 960 | 870 | 1660 | 1120 | 880 | 740 | 650 |
| 80 | 2110 | 1420 | 1150 | 1010 | 910 | 1890 | 1210 | 930 | 780 | 680 |
| 90 | 2460 | 1550 | 1230 | 1050 | 940 | 2210 | 1320 | 990 | 810 | 710 |
| **100** | **2950** | **1710** | **1310** | **1110** | **980** | **2650** | **1450** | **1050** | **850** | **730** |
| 110 | - | 1900 | 1400 | 1170 | 1020 | - | 1610 | 1130 | 900 | 760 |
| 120 | - | 2130 | 1510 | 1230 | 1060 | - | 1810 | 1210 | 950 | 800 |
| 130 | - | 2440 | 1630 | 1300 | 1110 | - | 2070 | 1320 | 1000 | 830 |
| 140 | - | 2840 | 1780 | 1380 | 1160 | - | 2420 | 1440 | 1070 | 870 |
| **150** | - | - | **1960** | **1480** | **1220** | - | **2900** | **1580** | **1140** | **920** |
| 160 | | - | 2180 | 1580 | 1290 | | - | 1750 | 1220 | 960 |
| 170 | | - | 2450 | 1700 | 1360 | | - | 1970 | 1310 | 1020 |
| 180 | | - | 2800 | 1850 | 1440 | | - | 2260 | 1420 | 1080 |
| 190 | | - | - | 2010 | 1530 | | - | 2630 | 1550 | 1150 |
| **200** | | - | - | **2220** | **1630** | | - | - | **1710** | **1220** |
| 210 | | | - | 2460 | 1750 | | | - | 1900 | 1310 |
| 220 | | | - | 2770 | 1880 | | | - | 2130 | 1410 |
| 230 | | | - | - | 2040 | | | - | 2440 | 1530 |
| 240 | | | - | - | 2220 | | | - | 2840 | 1670 |
| **250** | | | - | - | **2440** | | | - | - | **1830** |
| 260 | | | | - | 2720 | | | | - | 2040 |
| 270 | | | | - | - | | | | - | 2290 |
| 280 | | | | - | - | | | | - | 2620 |
| 290 | | | | - | - | | | | - | - |
| **300** | | | | - | - | | | | - | - |
| 310 | | | | | - | | | | | - |
| 320 | | | | | - | | | | | - |
| 330 | | | | | - | | | | | - |
| 340 | | | | | - | | | | | - |
| **350** | | | | | - | | | | | - |

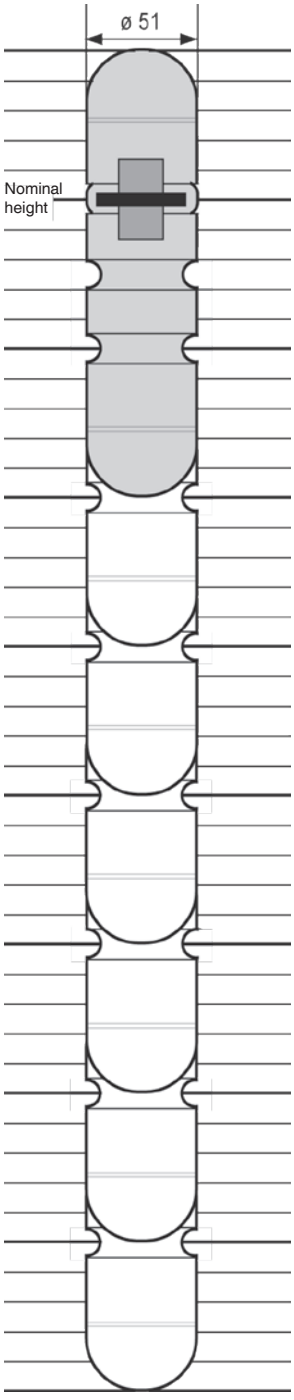
Note: The optimum float will be selected after a feasibility test carried out by WIKA.

# Cylindrical float, design with beads

made of stainless steel or titanium

| Material | Stainless steel 1.4571 | Titanium 3.7035 |
|---|---|---|
| Operating temperature | - 40 °C to + 250 °C | - 40 °C to + 250 °C |
| Working pressure | Max. 30 bar | Max. 30 bar |
| Test pressure | Max. 45 bar | Max. 45 bar |
| Diameter | 50 mm | 50 mm |
| Float model | ZVSS ... | ZTSS ... |

| Float L (mm) | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 150 | 200 | 250 | 300 | 350 | 400 | 450 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume ($cm^3$) | 262 | 360 | 458 | 556 | 654 | 753 | 851 | 262 | 360 | 458 | 556 | 654 | 753 | 851 |
| Weight (g) | 256 | 300 | 332 | 368 | 415 | 455 | 485 | 169 | 240 | 265 | 287 | 312 | 342 | 368 |




| Emersion height in mm | Immersion depth table in relation to the specific gravity of the medium (kg/$m^3$) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 20 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 30 | 1170 | 950 | 800 | 720 | 680 | 640 | 600 | 770 | 760 | 640 | 560 | 510 | 480 | 460 |
| 40 | 1280 | 1010 | 840 | 740 | 700 | 660 | 610 | 850 | 810 | 670 | 580 | 530 | 500 | 470 |
| **50** | **1420** | **1080** | **880** | **780** | **720** | **680** | **630** | **940** | **860** | **700** | **600** | **540** | **510** | **480** |
| 60 | 1600 | 1160 | 930 | 810 | 750 | 700 | 650 | 1050 | 930 | 740 | 630 | 560 | 530 | 490 |
| 70 | 1820 | 1260 | 980 | 850 | 780 | 720 | 660 | 1200 | 1000 | 790 | 660 | 580 | 540 | 500 |
| 80 | 2110 | 1370 | 1050 | 890 | 810 | 740 | 680 | 1400 | 1090 | 830 | 690 | 610 | 560 | 520 |
| 90 | 2520 | 1500 | 1110 | 930 | 840 | 770 | 700 | 6070 | 1200 | 890 | 720 | 630 | 580 | 530 |
| **100** | **-** | **1670** | **1190** | **980** | **870** | **790** | **720** | **2070** | **1330** | **950** | **760** | **660** | **600** | **550** |
| 110 | - | 1870 | 1280 | 1030 | 910 | 820 | 740 | 2720 | 1500 | 1030 | 800 | 690 | 620 | 570 |
| 120 | - | 2130 | 1390 | 1090 | 950 | 850 | 770 | - | 1710 | 1110 | 850 | 720 | 640 | 580 |
| 130 | - | 2480 | 1510 | 1160 | 1000 | 890 | 790 | - | 1980 | 1210 | 900 | 750 | 670 | 600 |
| 140 | - | 2960 | 1660 | 1240 | 1050 | 920 | 820 | - | 2370 | 1330 | 960 | 790 | 690 | 620 |
| **150** | - | - | **1840** | **1320** | **1100** | **960** | **850** | - | 2930 | **1470** | **1030** | **830** | **720** | **640** |
| 160 | | - | 2070 | 1420 | 1160 | 1000 | 880 | | - | 1650 | 1110 | 870 | 750 | 670 |
| 170 | | - | 2360 | 1540 | 1230 | 1050 | 910 | | - | 1880 | 1200 | 930 | 790 | 690 |
| 180 | | - | 2740 | 1680 | 1310 | 1090 | 940 | | - | 2190 | 1310 | 980 | 820 | 720 |
| 190 | | - | - | 1840 | 1390 | 1150 | 980 | | - | 2610 | 1440 | 1050 | 860 | 740 |
| **200** | | - | - | **2040** | **1490** | **1210** | **1020** | | - | - | **1590** | **1120** | **910** | **780** |
| 210 | | | - | 2290 | 1610 | 1280 | 1070 | | | - | 1790 | 1210 | 960 | 810 |
| 220 | | | - | 2620 | 1740 | 1350 | 1110 | | | - | 2040 | 1310 | 1010 | 850 |
| 230 | | | - | - | 1890 | 1430 | 1170 | | | - | 2370 | 1420 | 1080 | 890 |
| 240 | | | - | - | 2080 | 1530 | 1220 | | | - | 2830 | 1560 | 1150 | 930 |
| **250** | | | - | - | **2310** | **1640** | **1290** | | | - | - | **1730** | **1230** | **980** |
| 260 | | | | - | 2590 | 1760 | 1360 | | | | - | 1950 | 1320 | 1030 |
| 270 | | | | - | 2950 | 1900 | 1440 | | | | - | 2220 | 1430 | 1090 |
| 280 | | | | - | - | 2080 | 1530 | | | | - | 2580 | 1560 | 1160 |
| 290 | | | | - | - | 2280 | 1630 | | | | - | - | 1710 | 1240 |
| **300** | | | | - | - | 2530 | 1740 | | | | - | - | 1900 | 1320 |
| 310 | | | | | - | 2840 | 1880 | | | | | - | 2130 | 1420 |
| 320 | | | | | - | - | 2030 | | | | | - | 2430 | 1540 |
| 330 | | | | | - | - | 2210 | | | | | - | 2820 | 1680 |
| 340 | | | | | - | - | 2430 | | | | | - | - | 1840 |
| **350** | | | | | - | - | 2690 | | | | | - | - | 2040 |
| 360 | | | | | | - | - | | | | | | - | 2290 |
| 370 | | | | | | - | - | | | | | | - | 2620 |
| 380 | | | | | | - | - | | | | | | - | - |
| 390 | | | | | | - | - | | | | | | - | - |
| **400** | | | | | | - | - | | | | | | - | - |
| 410 | | | | | | | - | | | | | | | - |
| 420 | | | | | | | - | | | | | | | - |
| 430 | | | | | | | - | | | | | | | - |
| 440 | | | | | | | - | | | | | | | - |
| **450** | | | | | | | - | | | | | | | - |

Note: The optimum float will be selected after a feasibility test carried out by WIKA.

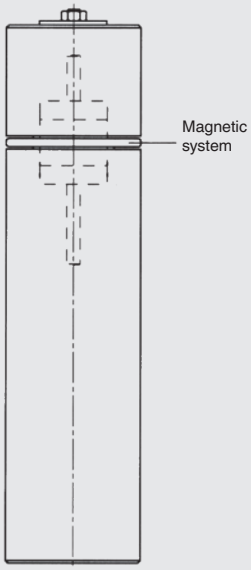
## Cylindrical float, high pressure version

made of stainless steel, titanium or solid body material

**Stainless steel or titanium**


Option: E-CTFE-, E-TFE- or PFA coated
Max. working pressure:
Stainless steel > 20 bar to 40 bar
Titanium > 16 bar to 130 bar
Temperature-dependent (high temperature version up to 400 °C)

**Solid body material**




absolutely leak-proof

Max. working pressure 420 bar
Max. operating temperature 100 °C

**Distinctive feature compared to low pressure range**

- Straight cylinder

**Design depending on the 3 physical parameters**

- Pressure, temperature and S.G.

**Pressure strength**

- Through reinforcement segments
- Sealed design

**Magnetic system (radial-symmetric)**

- According to pressure and temperature

**Float length**

- According to S.G. of medium and weight of float

**Ordering information**

| | |
|---|---|
| Max. working pressure (PN) | .... bar |
| Test pressure | PN x 1.3 / PN x 1.5 |
| Max. operating temperature | .... °C |
| Min. S.G. of the medium | .... kg/m³ |

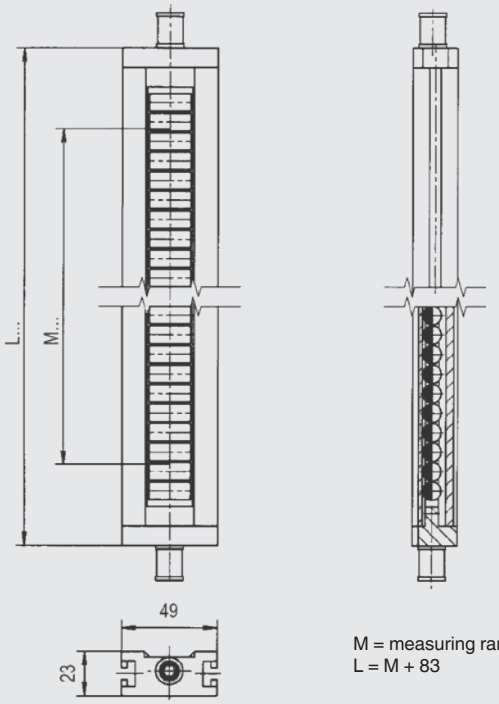
Note: The optimum float will be selected after a feasibility test carried out by WIKA.

## Magnetic roller displays (red and white)

Material Crastin PBT and ceramic, ingress protection IP 65

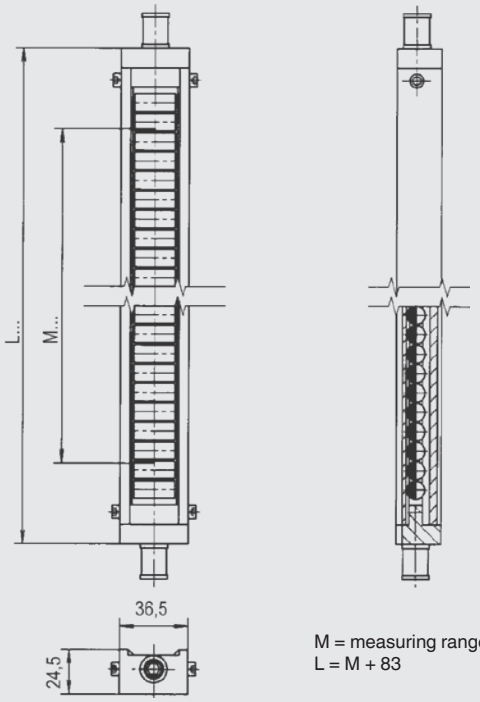
| Display roller material | Crastin PBT | Ceramic |
|---|---|---|
| Cover | Makrolon PC | Glass |
| Max. ambient temperature | 200 °C | 450 °C |

### Housing anodised aluminium



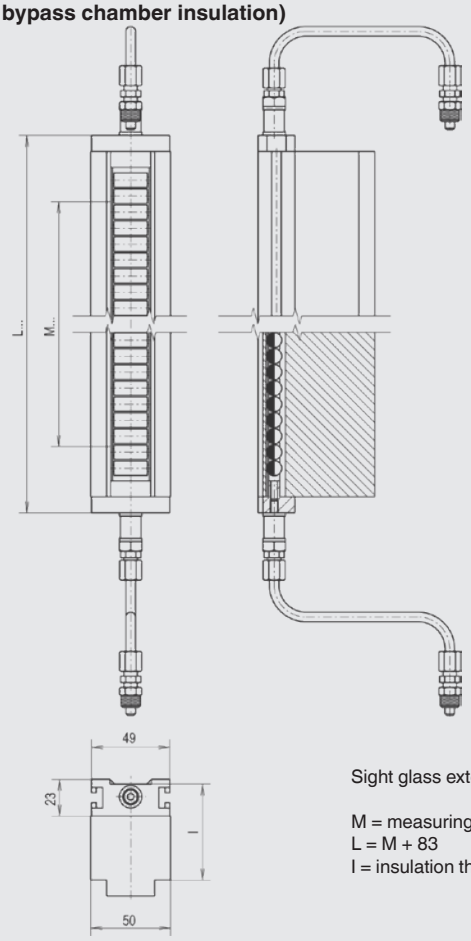

M = measuring range
L = M + 83

### Housing aluminium, stainless steel sheathed




M = measuring range
L = M + 83

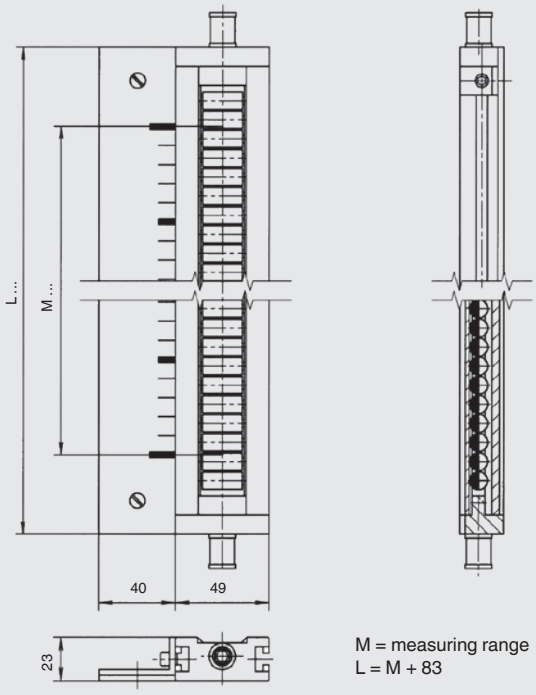
### with sight glass extender and purge
**(with bypass chamber insulation)**




Sight glass extender

M = measuring range
L = M + 83
I = insulation thickness

### Aluminium with adhesive foil, cm-graduation
**max. ambient temperature for the adhesive foil: 100 °C**
**Aluminium or stainless steel engraved, graduation selectable**



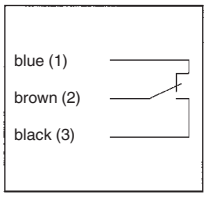

M = measuring range
L = M + 83

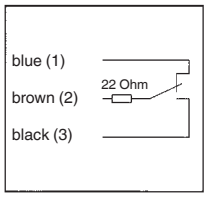
## Option magnetic switch

Magnetic switches serve to detect the limits of filling levels. They generate a binary signal which can be transmitted to downstream monitoring and control devices.

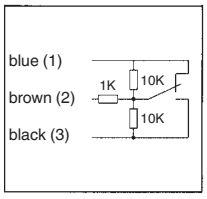
**Connection diagrams**

1 switch point
Wiring for operation with a PLC

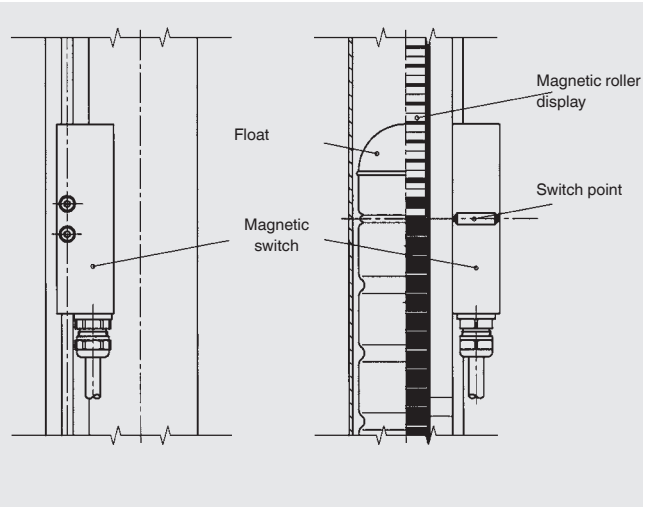



1 switch point
Initiator equivalent circuit per EN 60947-5-6

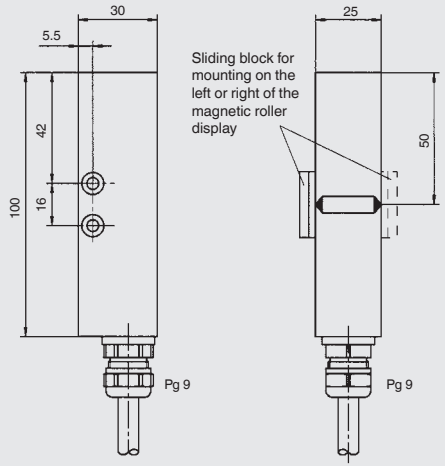



**Example for mounting**

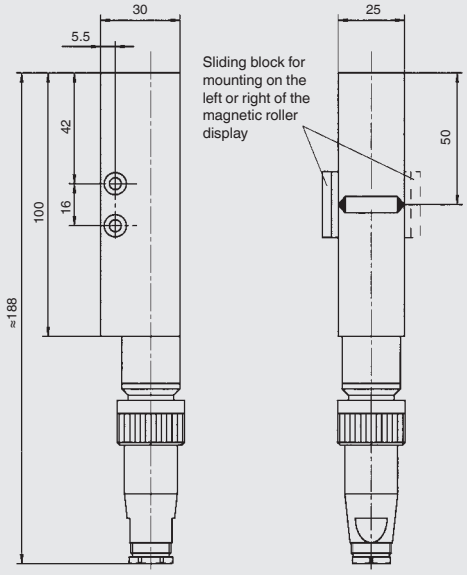



## Standard version

**with connection cable**

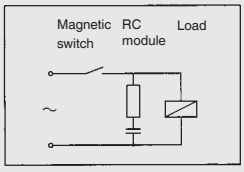


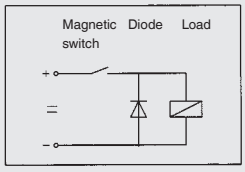

**with coupler plug**



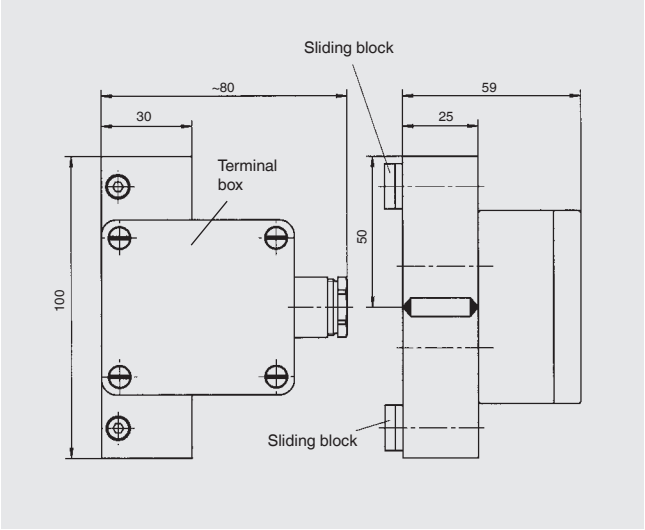

| Specifications | |
|---|---|
| Contact | Reed contact |
| Contact type | 1 change-over contact |
| Switch behaviour | Bistable |
| Contact rating | AC 230 V, 60 VA, 1 A<br>DC 230 V, 30 W, 0.5 A |
| NAMUR circuit | For connection to control circuit per EN 60947-5-6 |
| Option Ex version | Only for connection to a certified intrinsically safe circuit with max. 100 mA and max. 30 V<br>Ignition protection type:<br>II 1 G EEx ia IIC T6 - T3<br>LCIE 01 ATEX 6047 X |
| Ambient temperature | Standard: max. 90 °C<br>with silicone cable: max. 150 °C<br>with coupler plug: max. 85 °C<br>Ex version: T6 to 85 °C |
| Electrical connection | Connection cable (3 x 0.75 mm²)<br>■ 1 m PVC grey<br>■ 1 m PVC blue<br>■ 1 m PUR<br>Coupler connector |
| Housing | Aluminium, anodised |
| Ingress protection | IP 65 per EN 60529 / IEC 529 |

**Contact protection measures**



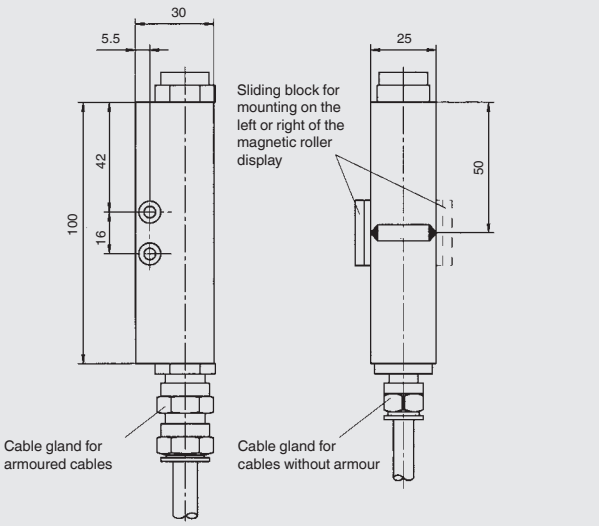
## Version with terminal box




| Specifications | |
|---|---|
| Contact | Reed contact |
| Contact type | 1 change-over contact |
| Switch behaviour | Bistable |
| Contact rating | AC 230 V, 60 VA, 1 A<br>DC 230 V, 30 W, 0.5 A |
| NAMUR circuit | For connection to control circuit per EN 60947-5-6 |
| Option Ex version | Only for connection to a certified intrinsically safe circuit with max. 100 mA and max. 30 V<br>Ignition protection type:<br>II 1 G EEx ia IIC T6 - T3<br>LCIE 01 ATEX 6047 X |
| Ambient temperature | Standard: max. 150 °C<br>Ex version: T6 to 85 °C<br>T5 to 100 °C<br>T4 to 135 °C<br>T3 to 150 °C |
| Electrical connection | Terminal box |
| Housing | Aluminium, anodised |
| Ingress protection | IP 65 per EN 60529 / IEC 529 |
| For contact protection measures see page 17 | |

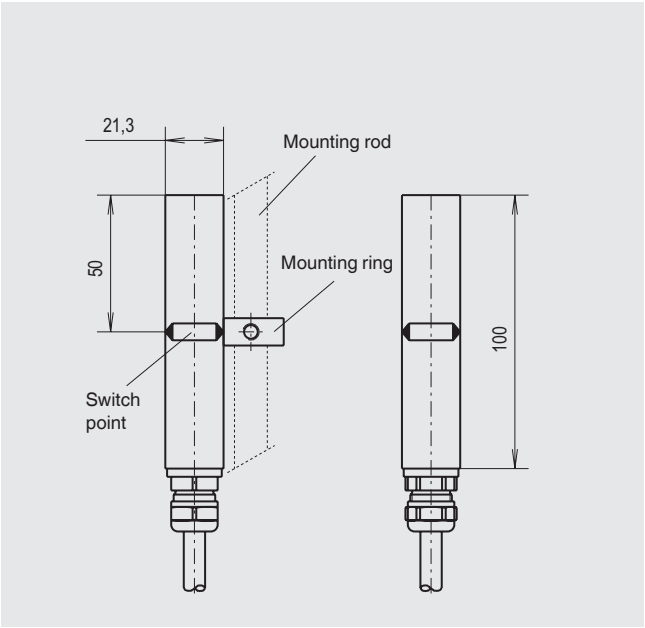
## Explosion-protected version, flameproof enclosure (aluminium)

II 2 G EEx d IIC T6 - T3
LCIE 01 ATEX 6047 X




| Specifications | | |
|---|---|---|
| Contact | Reed contact | |
| Contact type | 1 change-over contact | |
| Switch behaviour | Bistable | |
| Contact rating | AC 230 V, 60 VA, 1 A<br>DC 230 V, 30 W, 0.5 A | |
| NAMUR circuit | For connection to control circuit per EN 60947-5-6 | |
| Ambient temperature | T6 to 85 °C<br>T5 to 100 °C<br>T4 to 135 °C<br>T3 to 150 °C | |
| Electrical connection | Connection cable (3 x 0.75 mm²) | ■ 1 m PVC grey<br>■ 1 m PVC blue<br>■ 1 m PUR yellow<br>■ 1 m PUR yellow with armour<br>■ 1 m silicone |
| Housing | Aluminium, anodised | |
| Ingress protection | IP 68 per EN 60529 / IEC 529 | |
| For contact protection measures see page 17 | | |

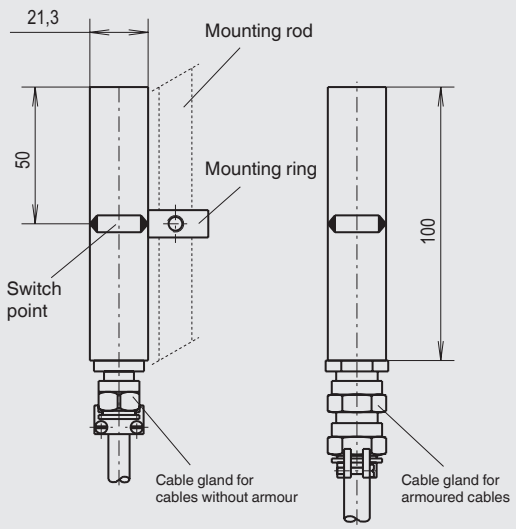
## Stainless steel version




| Specifications | | |
|---|---|---|
| Contact | Reed contact | |
| Contact type | 1 change-over contact | |
| Switch behaviour | Bistable | |
| Contact rating | AC 230 V, 60 VA, 1 A<br>DC 230 V, 30 W, 0.5 A | |
| NAMUR circuit | For connection to control circuit per EN 60947-5-6 | |
| Option Ex version | Only for connection to a certified intrinsically safe circuit with max. 100 mA and max. 30 V<br>Ignition protection type:<br>II 1 G EEx ia IIC T6 - T3<br>LCIE 01 ATEX 6047 X | |
| Ambient temperature | Standard:<br>with silicone cable:<br>Ex version: | max. 90 °C<br>max. 150 °C<br>T6 to 85 °C |
| Electrical connection | Connection cable<br>(3 x 0.75 mm²) | ■ 1 m PVC grey<br>■ 1 m PVC blue<br>■ 1 m silicone |
| Housing | Stainless steel 1.4571 | |
| Ingress protection | IP 65 per EN 60529 / IEC 529 | |
| For contact protection measures see page 17 | | |

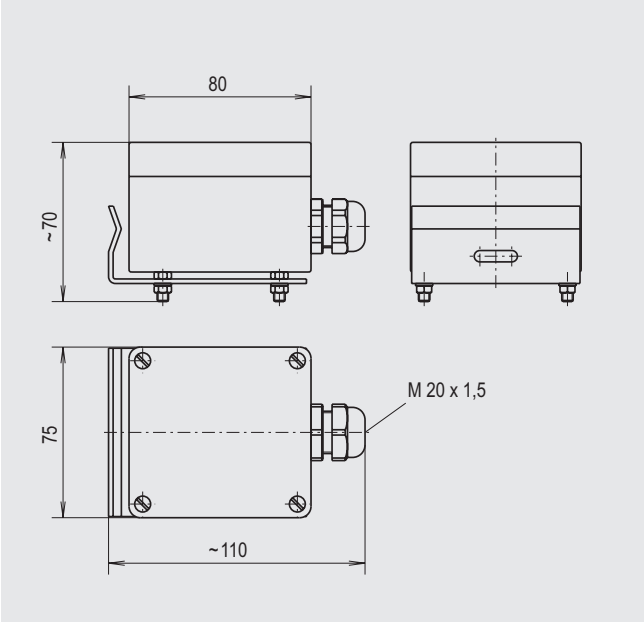
## Explosion-protected version, flameproof enclosure (stainless steel)

II 2 G EEx d IIC T6 - T3
LCIE 01 ATEX 6047 X




| Specifications | | |
|---|---|---|
| Contact | Reed contact | |
| Contact type | 1 change-over contact | |
| Switch behaviour | Bistable | |
| Contact rating | AC 230 V, 60 VA, 1 A<br>DC 230 V, 30 W, 0.5 A | |
| NAMUR circuit | For connection to control circuit per EN 60947-5-6 | |
| Ambient temperature | T6 to 85 °C<br>T5 to 100 °C<br>T4 to 135 °C<br>T3 to 150 °C | |
| Electrical connection | Connection cable<br>(3 x 0.75 mm²) | ■ 1 m PVC grey<br>■ 1 m PUR yellow<br>■ 1 m PUR yellow with armour<br>■ 1 m silicone |
| Housing | Stainless steel 1.4571 | |
| Ingress protection | IP 68 per EN 60529 / IEC 529 | |
| For contact protection measures see page 17 | | |

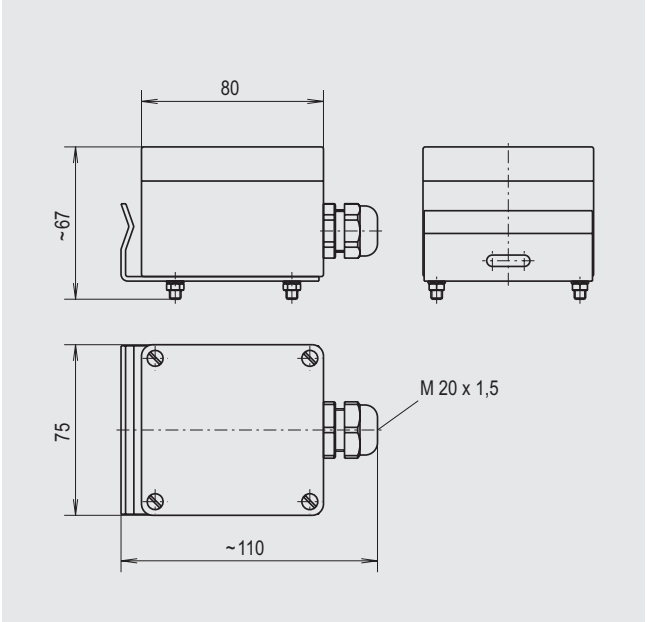
## High temperature version




| Specifications | |
|---|---|
| Contact | Reed contact |
| Contact type | 1 change-over contact |
| Switch behaviour | Bistable |
| Contact rating | AC 230 V, 60 VA, 1 A<br>DC 230 V, 30 W, 0.5 A |
| NAMUR circuit | For connection to control circuit per EN 60947-5-6 |
| Ambient temperature | max. 380 °C |
| Electrical connection | Terminal box |
| Housing | Aluminium |
| Ingress protection | IP 65 per EN 60529 / IEC 529 |

For contact protection measures see page 17

## Inductive proximity sensor design




| Specifications | |
|---|---|
| Contact | Inductive proximity sensor SJ 3.5-SN |
| Contact type | ■ High alarm<br>■ Low alarm |
| Switch behaviour | Bistable |
| Nominal voltage | DC 8 V (Ri~1 kOhm) |
| Max. residual ripple | < 5 % |
| Power supply $U_B$ | 5 ... 25 V |
| Current supply<br>active area free<br>active area covered | <br>> 3 mA<br>< 1 mA |
| Control cable - max. resistance | < 100 Ohm |
| | 160 µH |
| | 20 nF |
| Ambient temperature | -40 °C to +100 °C |
| Housing | Aluminium |
| Ingress protection | IP 65 per EN 60529 / IEC 529 |

Other versions on request

## Option level sensor

**Reed switch chain technology**
Guide tube material made of stainless steel 1.4571

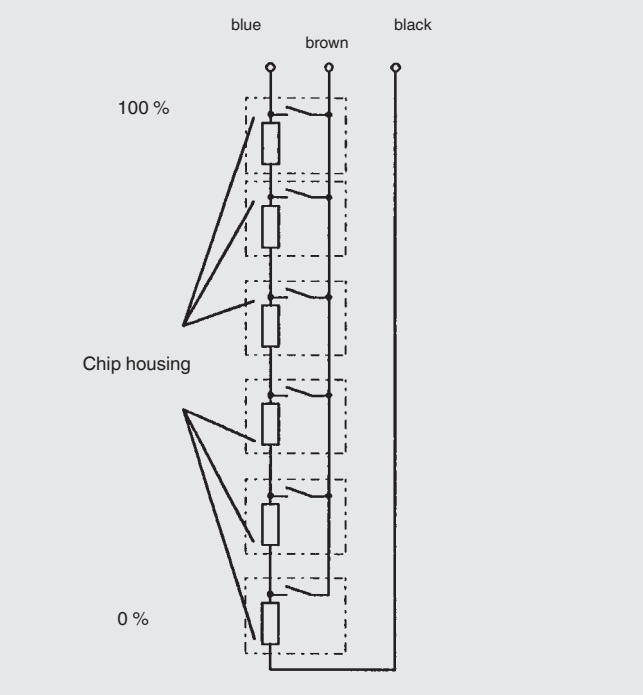
Level sensors with reed switchchain technology act as measured value transmitters for continuous level measurement of liquids in combination with transmitters. They are based on the float principle with magnetic transmission (permanent magnet, reed switch and resistance measuring chain) in a 3-wire potentiometer circuit.

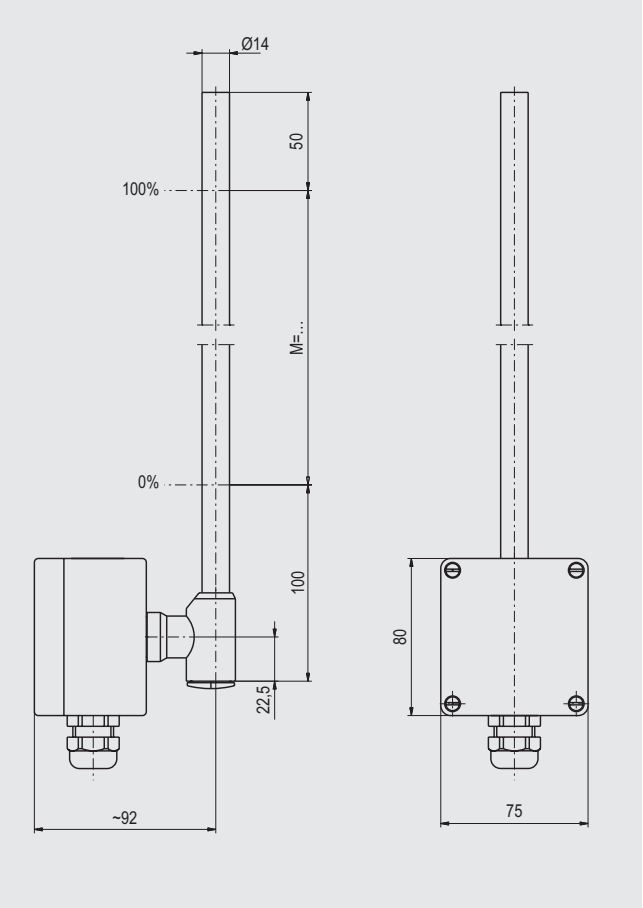
A magnetic system built into the float actuates, through the walls of the bypass chamber and of the sensor tube, very small reed contacts. These reed contacts form a resistance measuring chain (potentiometer) that continuously generates a voltage proportional to the height of the level.

**Option**
Installation of a 2-wire head-mounted transmitter in the terminal box

**Benefits**
- Interference-free standard signal (4 ... 20 mA) already in the field
- Signal transmission over large distances possible
- Explosion-protected versions

**Internal circuit diagram**




| Specifications | | |
|---|---|---|
| Electrical connection | Terminal box | ■ Aluminium top<br>■ Aluminium bottom<br>■ Stainless steel top<br>■ Stainless steel bottom<br>■ Polyester top<br>■ Polyester bottom |
| Contact separation | K 18 = 18 mm<br>K 15 = 15 mm<br>K 10 = 10 mm<br>K 5 = 5 mm | |
| Transmitter | ■ without<br>■ standard<br>■ intrinsically safe<br>■ HART® intrinsically safe<br>■ FOUNDATION™ Fieldbus / PROFIBUS® PA | |

Other versions on request

## Option level sensor

**Magnetostrictive, high-resolution measuring principle**
Guide tube material made of stainless steel 1.4571

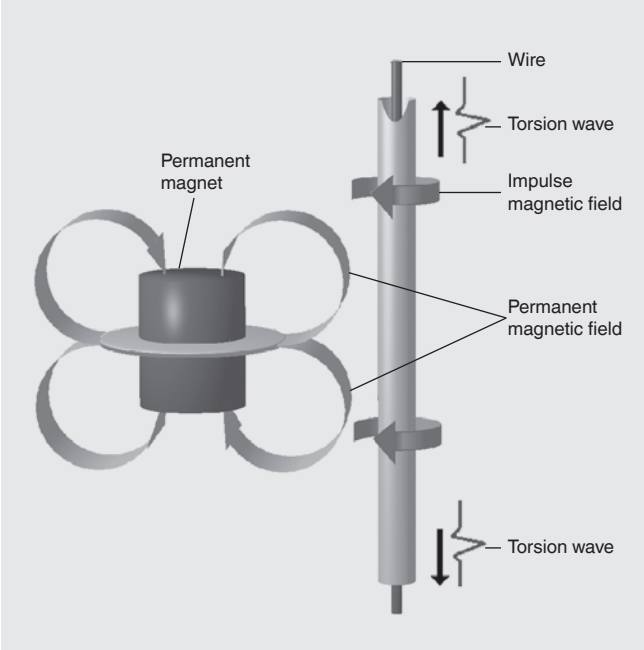
Level sensors with a magnetostrictive, high-resolution measuring principle act as measured value transmitters for continuous level measurement of liquids and are based on identifying the position of a magnetic float following the magnetostrictive measuring principle. The sensors are mounted externally on a bypass level sensor.

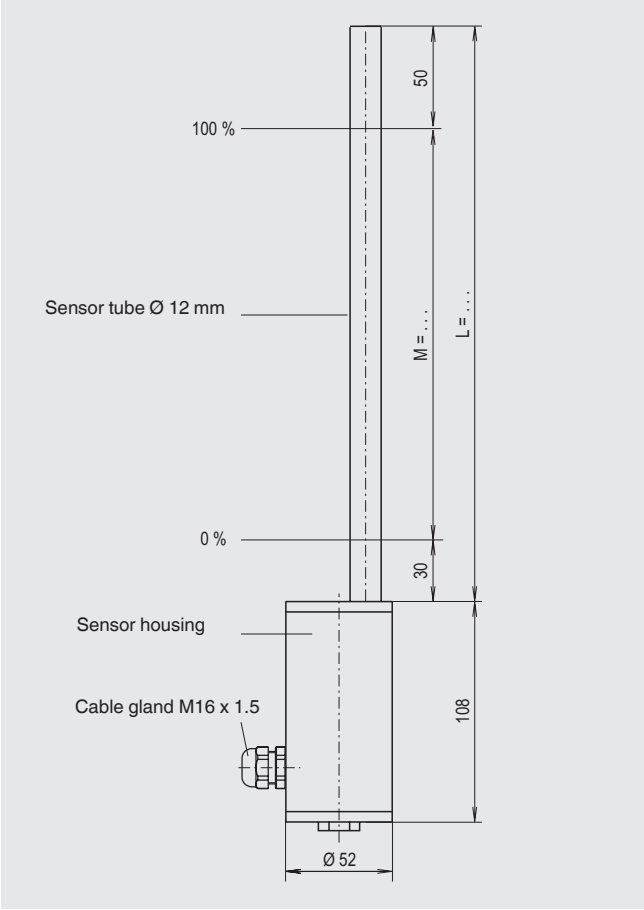
The measuring process is initiated by a current impulse. This current generates an axial magnetic field along the length of a wire made of magnetostrictive material, which is held under tension inside the sensor tube. The bypass level indicator float, which sits on the liquid surface, is fitted with permanent magnets. The magnetic field of the float is at right angles to the impulse magnetic field. When the pulse reaches the float, the two magnetic fields interact and a torsional force results. A piezoceramic pick-up in the sensor housing at the end of the wire converts this into an electrical signal.

The measured propagation delay enables the origination point, and thus the float position, to be determined with high accuracy.

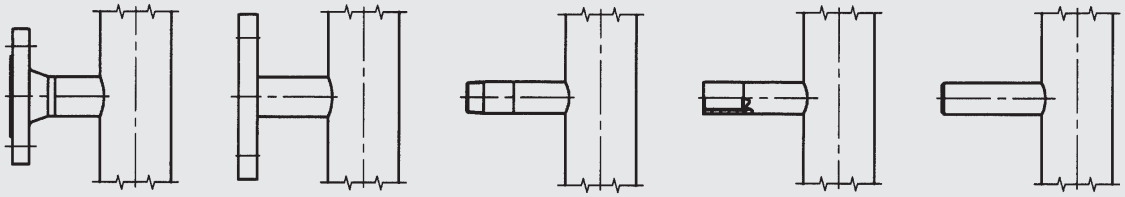
| Specifications | | | | |
|---|---|---|---|---|
| Electrical connection | Sensor housing ■ Stainless steel 1.4301 | | | |
| Sensor tube diameter | 12 mm | | | |
| Sensor tube length L max. | 6000 mm | | | |
| Temperature range standard | Medium: -45 ... +125 °C<br>Sensor housing: -40 ... +85 °C<br>Option<br>■ High and low temperature version: -200 ... +200 °C | | | |
| Ex version:<br>Temperature class<br>Process temperature, max.<br>Ambient temperature at the sensor housing, max. | T3<br>85 °C<br>40 °C | T4<br>100 °C<br>55 °C | T5<br>135 °C<br>85 °C | T6<br>150 °C<br>85 °C |
| Ex version:<br>Signal and supply circuit | In intrinsically safe version EEx ib IIC<br>Ui < 30 V ; Ii < 200 mA ; Li < 250 µH ;<br>Ci < 5 nF | | | |
| Output signal | 4 ... 20 mA, 2-wire | | | |
| Power supply | DC 10 ... 30 V | | | |
| Error message | Adjustable to 3.6 mA or 21.5 mA | | | |
| Measuring accuracy | < ±0.5 mm | | | |
| Resolution | < 0.1 mm | | | |
| Analogue component | ±0.1 % (20 °C) + 0.005 % / K | | | |
| Load | 900 Ohm at $U_B$ = DC 30 V<br>650 Ohm at $U_B$ = DC 24 V<br>100 Ohm at $U_B$ = DC 12 V | | | |
| Ingress protection | IP 68 per EN 60529 / IEC 529 | | | |

**Illustration of the principle**



## Option process connection



1
Welding neck flange
up to DN 25

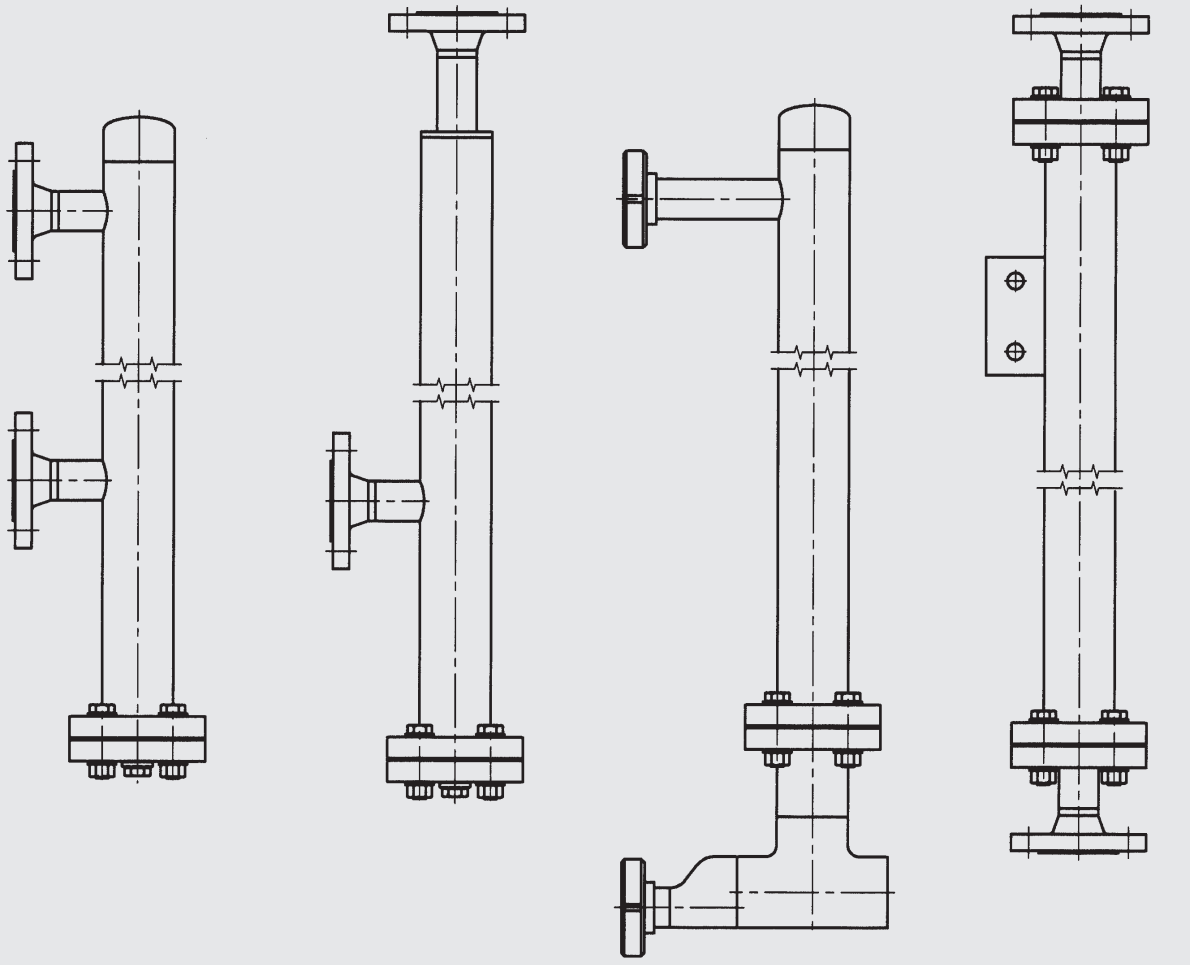
2
Blind flange
above DN 32

3
Threaded coupling GN ...
(male thread)

4
Threaded coupling GM ...
(female thread)

5
Weld stub S ...

**Examples**



6
**Standard version**
process connections
side-side

7
1 process connection side
1 process connection
vertical (top)

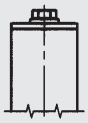
8
2 process connections
to DIN 11851
Lower process connection via
eccentric reducer

9
2 process connections
vertical (top/bottom)
Option: support bracket

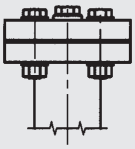
## Option bypass chamber end (on request with dampening spring)

### Upper bypass chamber end

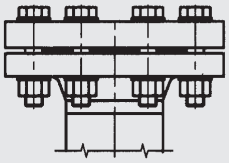
1
Welding cap



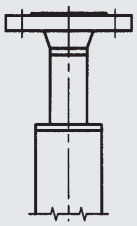
2
Flat top with
vent plug G 1/2"



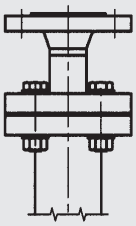
3
Flange connection with
vent plug G 1/2"



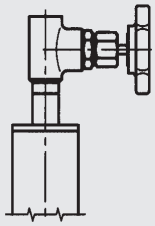
4
Flange connection
e.g. sealing faces
groove/tongue per DIN 2512



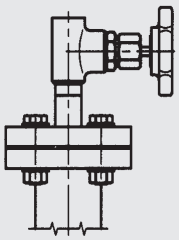
5
Flat top with
vent flange



6
Flange connection
vent flange

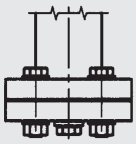


7
Flat top with
vent valve

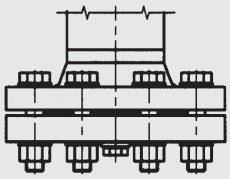


8
Flange connection
with vent valve

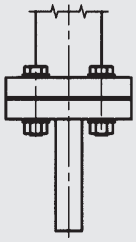
### Lower bypass chamber end



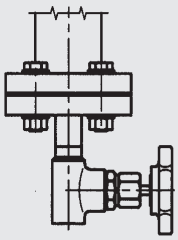
9
Flange connection
with drain plug G 1/2"



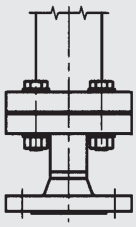
10
Flange connection e.g.
sealing faces groove/tongue
per DIN 2512 with
drain plug G 1/2"



11
Flange connection
with drain nozzle



12
Flange connection
with drain valve



13
Flange connection
with drain flange

**Ordering information**

Model / Version / Process connection / Bypass chamber diameter / Centre-to-centre distance M ... / Process specifications (operating temperature and working pressure, S.G.) / Contact separation / Electrical connection / Options





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