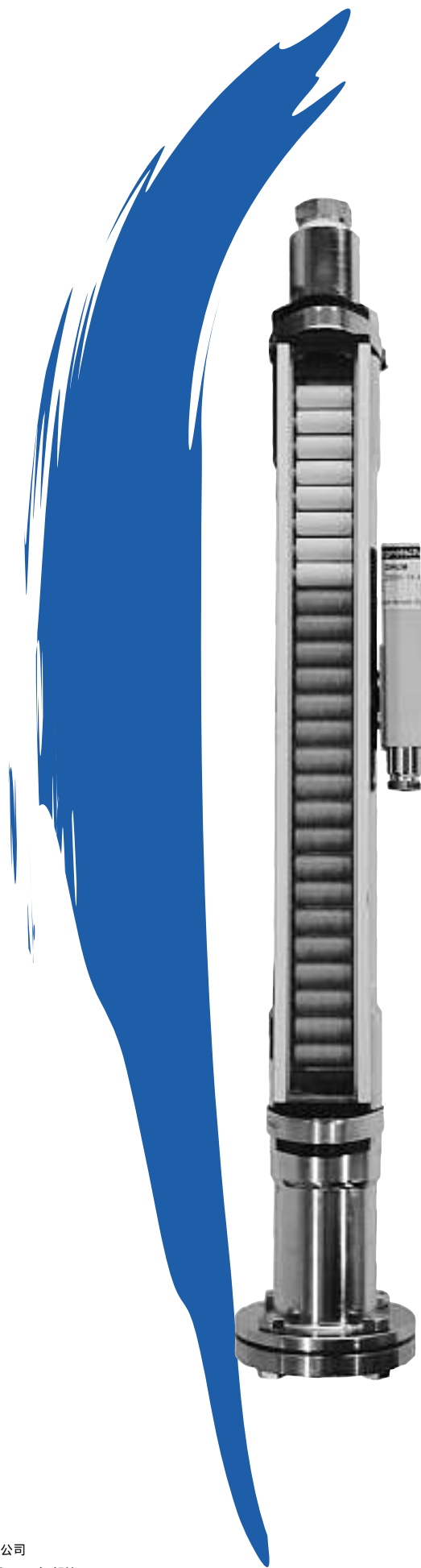




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# Mini - Bypass - Level Indicators 1015-Mini

# Mini - Bypass - Level Indicators 1015-Mini

## Table of contents

### Index

|                                             |         |
|---------------------------------------------|---------|
| Table of contents                           | 248     |
| Description and function                    | 249     |
| Certificates / Approvals                    | 250-251 |
| Mini - Bypass - Level Indicators 1015-Mini  |         |
| Stainless steel PN6                         | 252     |
| Stainless steel without lateral connections | 253     |
| Mini bypass float                           | 254     |
| Magnetic roller indicator                   | 255     |
| Scale                                       | 256     |
| Magnetic switch                             | 257     |
| Level sensor                                | 258-259 |
| Level sensor Magnetostrictive               | 260     |
| Type key                                    | 261-263 |
| Design process connections                  | 264-266 |
| Cable / Materials                           | 267     |

### Instructions for instrument selection in the catalogue

So that the customer gets the best equipment solution according to his requirements, we recommend this simple procedure using the following pages:

- Define the dimension of the fitting or interface (e.g. thread G2", DIN-flange DN25/PN16, etc.)
- Determine the electrical connection (e.g. terminal box, cable entry, plug, etc.)
- Find out the operating conditions, min. and max. operating pressure, temperature and specific gravity of the media at the max. operating temperature.
- With the size of the fitting and material of the instrument, a guide specification can be selected on pages 261 to 263.
- The full and final specification can now be generated by reference to the „type key“ on pages 261 to 263.
- With the type description and the technical operating conditions a price quotation can be made or the instrument can be ordered.
- Specification of the requested approval.

# Mini - Bypass - Level Indicators 1015-Mini

## Description and function

The mini-bypass-level indicator consists of a chamber as a communicating vessel and is connected to the side of a vessel with two process connections (flanges, threads or welding stubs).

By this way of mounting (communicating tube), the level in the chamber corresponds to the level in the vessel. The cylindrical float with a built-in magnetic system inside the chamber transmits the level of the liquid to an externally fitted magnetic roller indicator in which small red/white plastic rollers with inlaid bar magnets are spaced 10mm apart vertically.

As the float moves up or down the bunched field of the permanent magnet pulls the rollers through a rotation of 180° according to the liquid level.

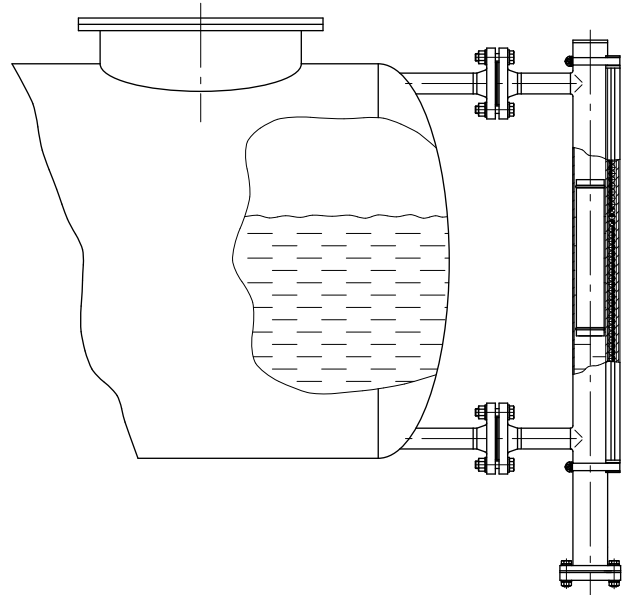
At rising level

- from white to red

At falling level

- from red to white

This means that at any given time the amount of liquid in the tank is constantly indicated by a red column without any external power supply.

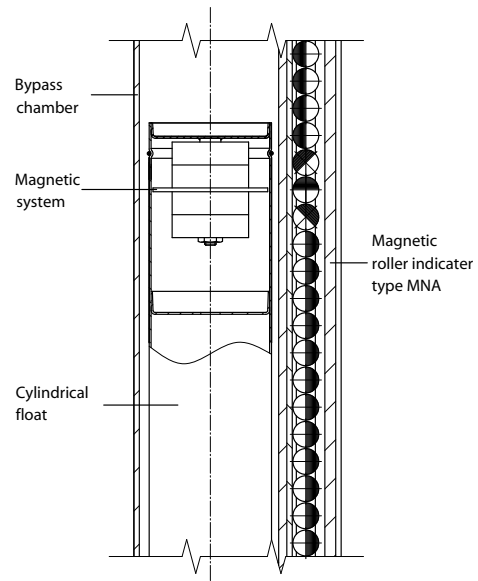


### Level Sensors

are used for the electrical continuous remote display of levels in connection with a control unit. These control units convert the resistance value of the level sensors into a standardized analogous signal which is proportional to the level.

### Magnetic Switches

are used as limit value switches for various filling levels. The obtained binary signal can be forwarded to alarms or other controls.



## Technical Advantages

- Simple, robust and solid design
- Pressure- and gas-proof separation of the level of aggressive, combustible, toxic, hot and agitated media
- Guaranteed operation of the magnetic roller indicator without requiring an auxiliary power source, even in the case of power system failures

# Mini - Bypass - Level Indicators 1015-Mini

## Certificates / Approvals

### Certificates



#### **SCHWEIZERISCHER VEREIN FÜR QUALITÄTS- UND MANagementsYSTEME**

Certified according to ISO 9000 rev. 2000



#### **SWISS TECHNICAL SERVICES AG**

Approval as production factory, welding examination and procedure qualification incl. restamping certificate for the production of pressure tanks according to SVTI-regulation 501, 201

### Approvals



#### **TECHNISCHER ÜBERWACHUNGSVEREIN DEUTSCHLAND (PED)**

Approval as production factory for manufacture of pressure tanks according to AD HP 0, PED Pressure Equipment Directive 97/23/EG



#### **SOCIÉTÉ NATIONALE DE CERTIFICATION ET D'HOMOLOGATION (ATEX)**

Approval for the production of mini-bypass-level indicators according to EU-Directive 94/9/EG



#### **GERMANISCHER LLOYD (Building of ships)**

Approval for the production of mini-bypass-level indicators according to GL-regulations



#### **BUREAU VERITAS (Building of ships)**

Approval for the production of mini-bypass-level indicators according to BV-regulations



#### **REGISTRO ITALIANO NAVALE (Building of ships)**

Approval for the production of mini-bypass-level indicators according to RINA-regulations



#### **DET NORSKE VERITAS (Building of ships)**

Approval for the production of mini-bypass-level indicators according to DNV-regulations

# Mini - Bypass - Level Indicators 1015-Mini Approvals

As an innovative manufacturer of instruments for level control, we can offer to our customers systems according to different directives. The types of approval, applications and limits of use can be taken from the following specifications.

## Approvals

### Ex

A large number of mini-bypass-level indicators from our standard range, or to customer requests, can be built according to the ATEX-Directive 94/9/EG with the protection types EEx ia IIC T3 to T6 or dust Ex/D according to the corresponding electrical components in EEx d T4 to T6. By the combination of the instruments with the type key, the catalogue shows with the Ex hexagonal logo which components can be used for Ex-instruments.

#### Medium temperature:

##### EEx ia-Instruments

|    |        |
|----|--------|
| T3 | 180 °C |
| T4 | 130 °C |
| T5 | 95 °C  |
| T6 | 80 °C  |

##### EEx d-Instruments

|    |        |
|----|--------|
| T4 | 120 °C |
| T5 | 95 °C  |
| T6 | 80 °C  |

### PED

Under the Pressure Equipment Directive 97/23/EG, any pressure vessel or instrument used within a pressurised system at 0,5 bar or above, has to conform to various categories. Depending on the design data or customer needs, manufacture of instruments is to either of the categories below.

##### Category II

|        |    |
|--------|----|
| Module | A1 |
|--------|----|

##### Category IV

|        |     |
|--------|-----|
| Module | B+D |
|--------|-----|

### GL / BV / RINA / DNV

Mini-bypass-level indicators for use in shipping can be manufactured to GL (Germanischer Lloyd), BV (Bureau Veritas), RINA (Registro Italiano Navale) or DNV (Det Norske Veritas) standards in large variety of design possibilities complete with controllers.

# Mini - Bypass - Level Indicators 1015-Mini

## Stainless steel PN6

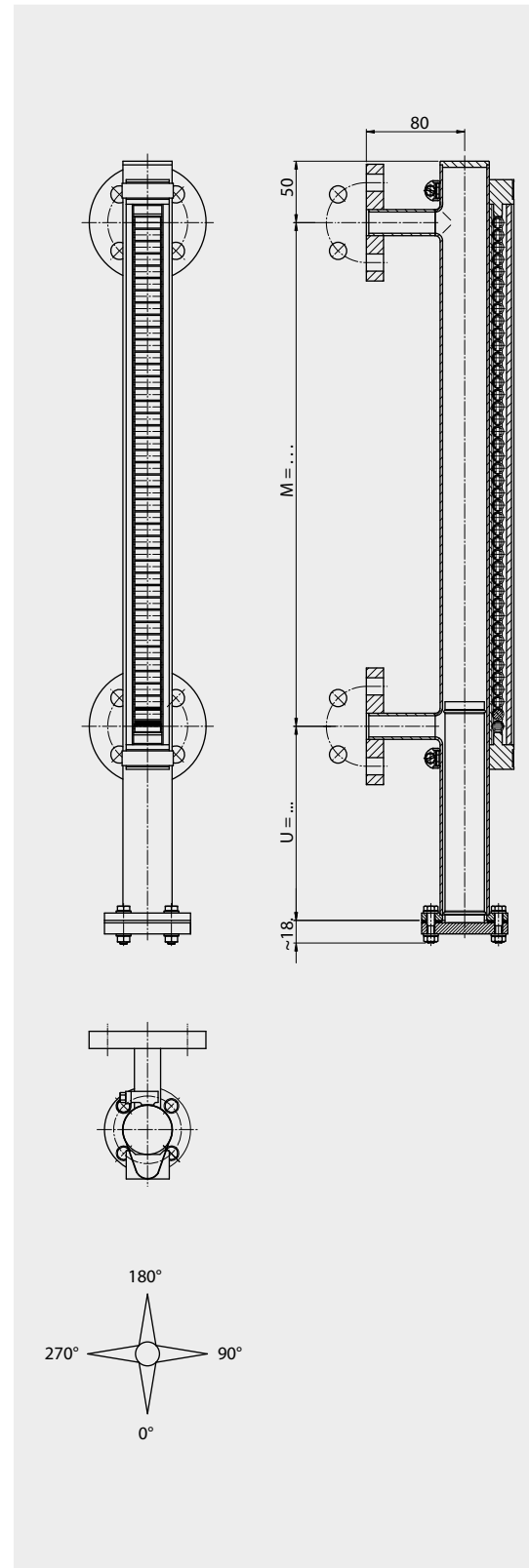
### Technical data

|                                   |                                                                                                              |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Material:</b>                  | 1.4301 / 304<br>1.4306 / 304L<br>1.4404 / 316 L<br>1.4435 / 316 L<br>1.4571 / 316 Ti                         |
| <b>Chamber:</b>                   | ø 40 mm                                                                                                      |
| <b>Chamber end top:</b>           | - Flat top                                                                                                   |
| <b>Chamber end bottom:</b>        | - Flange connection                                                                                          |
| <b>Process connections:</b>       | - Flange acc. to DIN<br>- Flange acc. to Ansi<br>- Thread female<br>- Thread male<br>- Welding ends<br>- ... |
| <b>Distance centre to centre:</b> | M = 150 mm ... 5000 mm                                                                                       |
| <b>Magnetic roller indicator:</b> | - MNA<br>- MNAV<br>- MNAN / MNAP                                                                             |
| <b>Scale:</b>                     | - ../SK / ../SG / ../VSG                                                                                     |
| <b>Magnetic switch:</b>           | - See page 257                                                                                               |
| <b>Level sensor:</b>              | - See pages 258-259                                                                                          |
| <b>Insulation thickness:</b>      | - 30 mm                                                                                                      |
| <b>Approvals:</b>                 | - See pages 250-251                                                                                          |
| <b>Float:</b>                     | - Acc. to table page 254                                                                                     |
| <b>Interface:</b>                 | - Acc. to protocol                                                                                           |
| <b>Lower chamber extension:</b>   | - U = float length<br>L -20 mm                                                                               |

### Operating parameters

|                          |                         |
|--------------------------|-------------------------|
| <b>Temperature:</b>      | -20 °C ... +150 °C      |
| <b>Pressure:</b>         | -1 ... 6 bar            |
| <b>Specific gravity:</b> | ≥ 550 kg/m <sup>3</sup> |
| <b>Accuracy:</b>         | 5 mm                    |
| <b>Repeatability:</b>    | +/- 2 mm                |

BNA - .. / .. - M .. - .. 40 - .. - Z.S ..  
BMG - .. / .. - .. - .. - .. K .. - M .. - .. 40 - .. - Z.S ..



Type combination see type key Mini - Bypass - Level Indicators

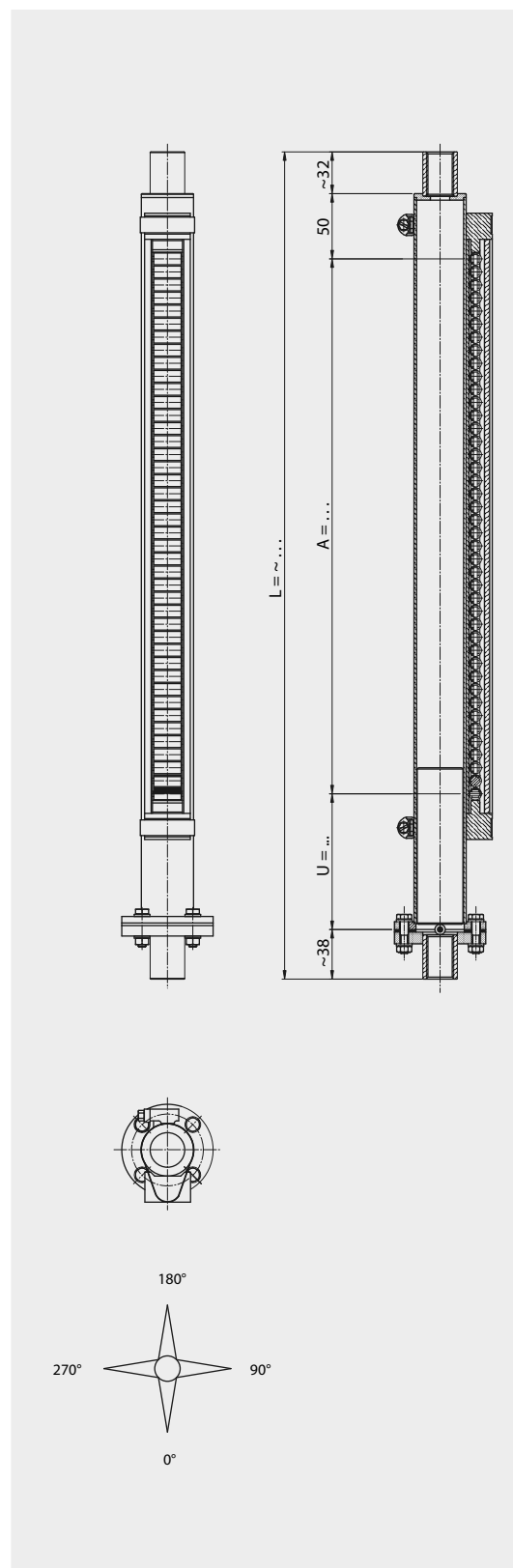
# Mini - Bypass - Level Indicators 1015-Mini Stainless steel without lateral connections

## Technical data

|                                   |                                                                                      |
|-----------------------------------|--------------------------------------------------------------------------------------|
| <b>Material:</b>                  | 1.4301 / 304<br>1.4306 / 304L<br>1.4404 / 316 L<br>1.4435 / 316 L<br>1.4571 / 316 Ti |
| <b>Chamber:</b>                   | ø 40 mm                                                                              |
| <b>Chamber end top:</b>           | - Flat top with welded socket ½"                                                     |
| <b>Chamber end bottom:</b>        | - Flat top with welded socket ½"                                                     |
| <b>Process connections:</b>       | - Without lateral connections                                                        |
| <b>Length:</b>                    | L = 300 mm .. 5000 mm                                                                |
| <b>Indicating range:</b>          | A = L - ~120 - U                                                                     |
| <b>Magnetic roller indicator:</b> | - MNA<br>- MNAV<br>- MNAN / MNAP                                                     |
| <b>Scale:</b>                     | - ../SK / ../SG / ../VSG                                                             |
| <b>Magnetic switch:</b>           | - See page 257                                                                       |
| <b>Level sensor:</b>              | - See pages 258-259                                                                  |
| <b>Insulation thickness:</b>      | - 30 mm                                                                              |
| <b>Approvals:</b>                 | - See pages 250-251                                                                  |
| <b>Float:</b>                     | - Acc. to table page 254                                                             |
| <b>Lower chamber extension:</b>   | - U = float length<br>L-20 mm                                                        |

BNA - OS - L .. - .. 40 - .. - Z.S ..

BMG - OS .. - .. - .. - .. K .. - L .. - .. 40 - .. - Z.S ..



## Operating parameters

|                          |                    |
|--------------------------|--------------------|
| <b>Temperature:</b>      | -20 °C ... +150 °C |
| <b>Pressure:</b>         | -1 ... 6 bar       |
| <b>Specific gravity:</b> | ≥ 550 kg/m³        |
| <b>Accuracy:</b>         | 5 mm               |
| <b>Repeatability:</b>    | +/- 2 mm           |

Type combination see type key Mini - Bypass - Level Indicators

# Mini - Bypass - Level Indicators 1015-Mini

## Mini bypass float

### Technical data

Material:  
Operating temperature:  
Operating pressure:  
Test pressure:  
Diameter:  
Type of float:

### Stainless steel

Stainless steel 1.4571  
-20 °C ... +150 °C  
max. 6 bar  
max. 9 bar  
32 mm  
ZVS32/ ..

### Float data:

Length L [mm]  
Volume [cm<sup>3</sup>]  
Weight [g]

| 180 | 200 | 230 | 250 | 280 | 300 | 340 | 420 | 480 | 580 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 142 | 158 | 183 | 199 | 223 | 239 | 271 | 335 | 384 | 464 |
| 127 | 142 | 148 | 156 | 168 | 177 | 94  | 227 | 252 | 294 |

| Float height<br>above liquid<br>in mm   |   | Stainless steel 1.4571 |      |      |      |      |      |      |     |     |     | Float height<br>above liquid<br>in mm |   |
|-----------------------------------------|---|------------------------|------|------|------|------|------|------|-----|-----|-----|---------------------------------------|---|
|                                         |   | 180                    | 200  | 230  | 250  | 280  | 300  | 340  | 420 | 480 | 580 |                                       |   |
| Specific gravity of the liquid ( kg/m³) |   |                        |      |      |      |      |      |      |     |     |     |                                       |   |
| 0                                       | — | --                     | --   | --   | --   | --   | --   | --   | --  | --  | --  | 0                                     | — |
| 10                                      | — | 940                    | 900  | 850  | 820  | 790  | 770  | 740  | 690 | 670 | 650 | 10                                    | — |
| 20                                      | — | 1000                   | 950  | 900  | 850  | 820  | 800  | 760  | 710 | 690 | 660 | 20                                    | — |
| 30                                      | — | 1070                   | 1000 | 940  | 890  | 850  | 830  | 790  | 730 | 710 | 670 | 30                                    | — |
| 40                                      | — | 1140                   | 1070 | 990  | 940  | 890  | 860  | 820  | 750 | 720 | 680 | 40                                    | — |
| 50                                      | — | 1230                   | 1140 | 1040 | 990  | 920  | 900  | 840  | 770 | 740 | 700 | 50                                    | — |
| 60                                      | — | 1340                   | 1220 | 1100 | 1030 | 960  | 930  | 870  | 790 | 760 | 710 | 60                                    | — |
| 70                                      | — | 1460                   | 1320 | 1170 | 1090 | 1010 | 970  | 900  | 820 | 770 | 720 | 70                                    | — |
| 80                                      | — | 1600                   | 1430 | 1250 | 1150 | 1060 | 1010 | 940  | 840 | 790 | 740 | 80                                    | — |
| 90                                      | — | 1780                   | 1550 | 1340 | 1130 | 1110 | 1060 | 980  | 860 | 810 | 750 | 90                                    | — |
| 100                                     | — | 2000                   | 1710 | 1440 | 1310 | 1180 | 1110 | 1020 | 890 | 830 | 770 | 100                                   | — |
| 110                                     | — | 2280                   | 1910 | 1560 | 1400 | 1250 | 1170 | 1060 | 920 | 850 | 780 | 110                                   | — |

### Technical data

Material:  
Operating temperature:  
Operating pressure:  
Test pressure:  
Diameter:  
Type of float:

### Buna

Buna  
-20 °C ... +80 °C  
max. 6 bar  
max. 9 bar  
35 mm  
ZBS35/ ..

### Float data:

Length L [mm]  
Volume [cm<sup>3</sup>]  
Weight [g]

| 90 | 100 | 105 | 115 | 120 | 135 | 150 | 170 | 195 | 225 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 87 | 96  | 101 | 111 | 115 | 130 | 144 | 164 | 168 | 216 |
| 73 | 76  | 77  | 80  | 81  | 85  | 89  | 96  | 108 | 110 |

|                                 |   |                                                      |      |      |      |      |      |     |     |     |     |                                 |   |
|---------------------------------|---|------------------------------------------------------|------|------|------|------|------|-----|-----|-----|-----|---------------------------------|---|
| Float height above liquid in mm |   | Buna                                                 |      |      |      |      |      |     |     |     |     | Float height above liquid in mm |   |
|                                 |   | 90                                                   | 100  | 105  | 115  | 120  | 135  | 150 | 170 | 195 | 225 |                                 |   |
|                                 |   | Specific gravity of the liquid ( kg/m <sup>3</sup> ) |      |      |      |      |      |     |     |     |     |                                 |   |
| 0                               | — | --                                                   | --   | --   | --   | --   | --   | --  | --  | --  | --  | 0                               | — |
| 5                               | — | --                                                   | --   | --   | --   | --   | --   | --  | --  | --  | --  | 5                               | — |
| 10                              | — | 950                                                  | 850  | 840  | 790  | 770  | 710  | 660 | 620 | 580 | 530 | 10                              | — |
| 15                              | — | 1000                                                 | 950  | 900  | 850  | 800  | 750  | 700 | 650 | 600 | 550 | 15                              | — |
| 20                              | — | 1080                                                 | 990  | 940  | 870  | 840  | 770  | 710 | 670 | 610 | 560 | 20                              | — |
| 25                              | — | 1170                                                 | 1050 | 1000 | 920  | 890  | 800  | 740 | 690 | 630 | 570 | 25                              | — |
| 30                              | — | 1260                                                 | 1130 | 1070 | 980  | 940  | 840  | 770 | 710 | 650 | 590 | 30                              | — |
| 35                              | — | 1380                                                 | 1220 | 1140 | 1040 | 990  | 880  | 800 | 740 | 670 | 600 | 35                              | — |
| 40                              | — | 1520                                                 | 1320 | 1230 | 1160 | 1050 | 930  | 840 | 770 | 690 | 620 | 40                              | — |
| 45                              | — | 1690                                                 | 1440 | 1330 | 1190 | 1120 | 980  | 880 | 800 | 710 | 640 | 45                              | — |
| 50                              | — | 1900                                                 | 1580 | 1460 | 1280 | 1200 | 1040 | 930 | 830 | 740 | 650 | 50                              | — |
| 55                              | — | 2170                                                 | 1760 | 1600 | 1390 | 1300 | 1100 | 970 | 870 | 760 | 670 | 55                              | — |

# Mini - Bypass - Level Indicators 1015-Mini

## Magnetic roller indicator

### Magnetic roller indicator MNA - M ..

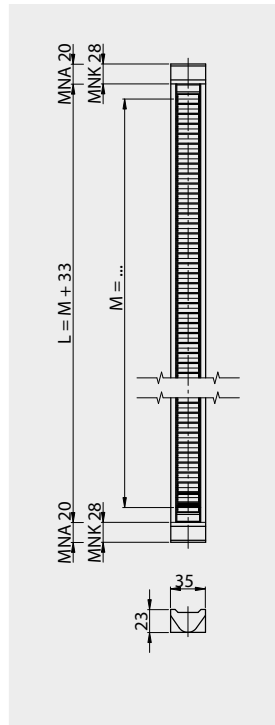
Housing:  
- aluminium anodized

Indicator rolls MNA:  
- material: pocan  
- colours: white / red

Cover:  
- macrolon (standard)  
- glass

Ambient temperature:  
- MNA -20 °C ... +150 °C

Protection rating:  
- IP 64 (optional IP 67)



### Magnetic roller indicator MNAV - M ..

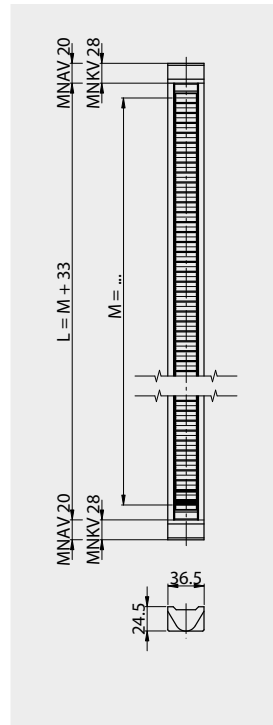
Housing:  
- aluminium  
with stainless steel covered

Indicator rolls MNAV:  
- material: pocan  
- colours: white / red

Cover:  
- macrolon (standard)  
- glass

Ambient temperature:  
- MNAV -20 °C ... +150 °C

Protection rating:  
- IP 64 (optional IP 67)



### Magnetic roller indicator MNAN - M ..

Housing:  
- aluminium anodized

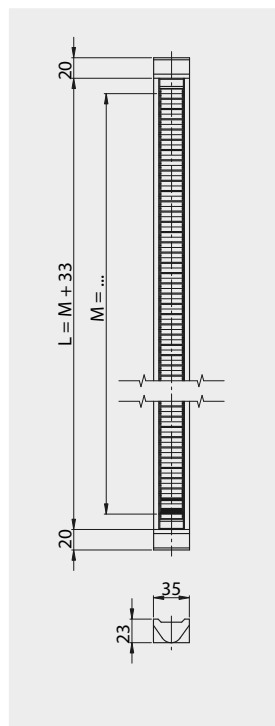
Indicator rolls MNAN:  
- material: pocan  
- colours: white / red

Shock proof design:  
- rollers turning max. 180°

Cover:  
- macrolon (standard)  
- glass

Ambient temperature:  
- MNAN -20 °C ... +150 °C

Protection rating:  
- IP 64 (optional IP 67)



# Mini - Bypass - Level Indicators 1015-Mini Scale

Scale  
.. / SK

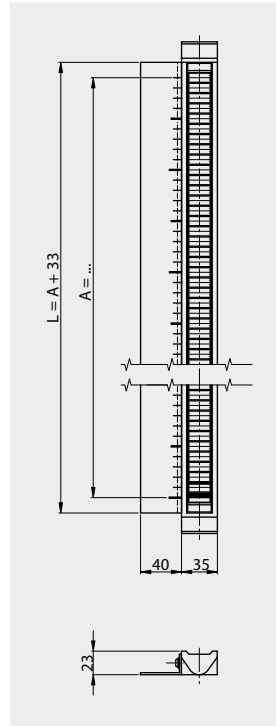
Angle profile:  
- aluminium

Width:  
- 40 mm

Scale:  
- adhesive foil

Separation:  
- in cm

Ambient temperature:  
-20 °C ... +150 °C



Scale  
.. / SG

Angle profile:  
- aluminium

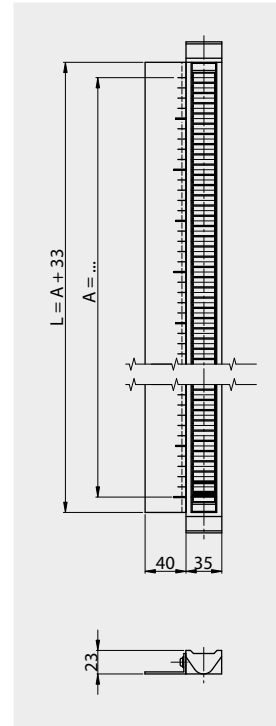
Width:  
- 40 mm

Scale:  
- engraved

Separation:  
- acc. to specification

Ambient temperature:  
-20 °C ... +150 °C

Approval  
- See pages 250-251



Scale  
.. / VSG

Angle profile:  
- Stainless steel

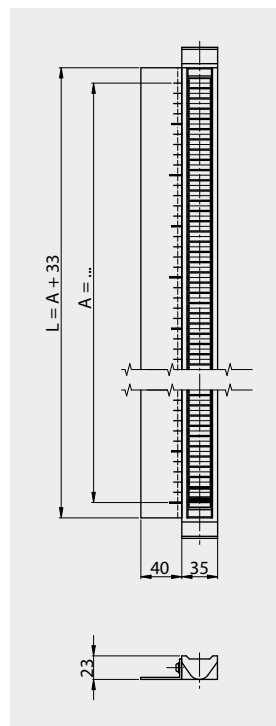
Width:  
- 40 mm

Scale:  
- engraved

Separation:  
- acc. to specification

Ambient temperature:  
-20 °C ... +150 °C

Approval  
- See pages 250-251



Type combination see type key Mini - Bypass - Level Indicators

# Mini - Bypass - Level Indicators 1015-Mini Magnetic switch

## Technical data

Housing:  
- anodised aluminium

Contact function:  
- change over

Switching action:  
- bistable

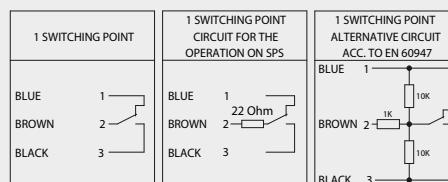
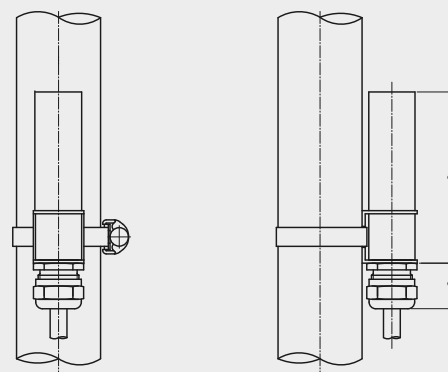
Switching capacity:  
- 230 V AC or DC / 30 VA / 0.5 A

Protection rating:  
- IP65

Ambient temperature:  
- with PVC-cable max. +80 °C

Options:  
- with code addition .. / R  
  with 22 Ohm protection resistor  
- with code addition .. / N acc. to Namur EN 60947

## RUM - AL - .. PVC



## Technical data

Housing:  
- anodised aluminium

Contact function:  
- change over

Switching action:  
- bistable

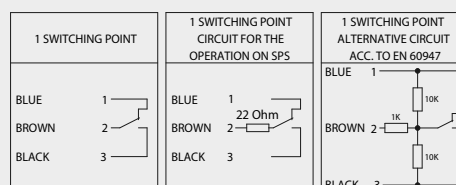
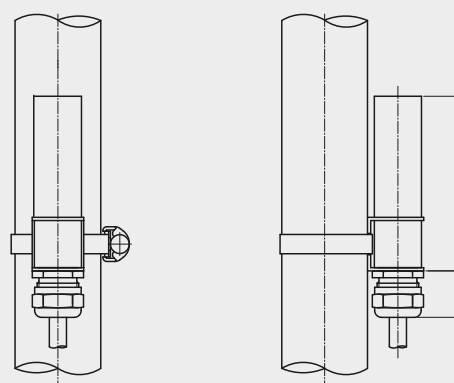
Switching capacity:  
- 230 V AC or DC / 30 VA / 0.5 A

Protection rating:  
- IP65

Ambient temperature:  
- with Silicone-cable max. +150 °C

Options:  
- with code addition .. / R  
  with 22 Ohm protection resistor  
- with code addition .. / N acc. to Namur EN 60947

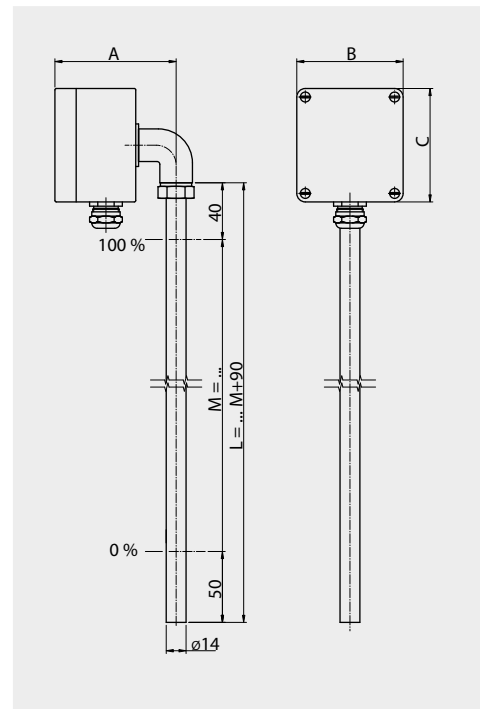
## RUM - AL - .. Sil



# Mini - Bypass - Level Indicators 1015-Mini Level sensor

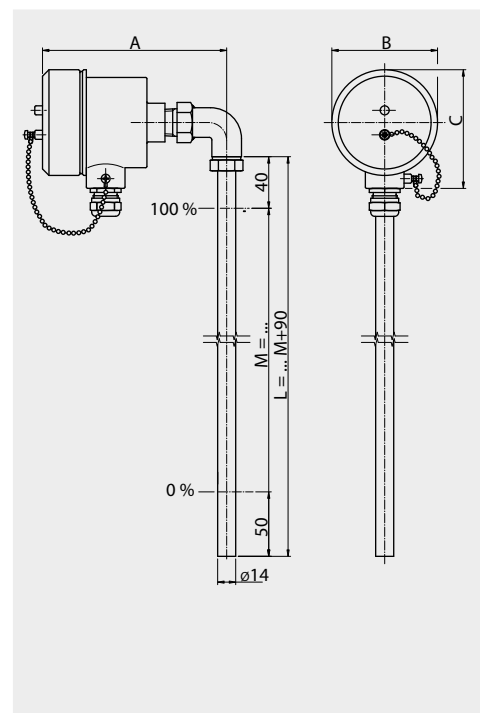
| Technical data |                                                                                                                                                                                                               |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Terminal box:  | Aluminium<br><b>A 105:</b> 80 x 75 x 57<br><b>A 101:</b> 64 x 58 x 34                                                                                                                                         |
| Dimensions:    | <b>A 105</b><br>A = 85.5 mm<br>B = 75.0 mm<br>C = 89.0 mm<br><b>A 101</b><br>A = 62.5 mm<br>B = 50.0 mm<br>C = 68.0 mm                                                                                        |
| Guide tube:    | ø 14 mm                                                                                                                                                                                                       |
| Resolution:    | 5.0 mm      -30 °C ... +130 °C<br>10.0 mm     -30 °C ... +130 °C<br>15.0 mm     -30 °C ... +130 °C<br>5.0 mm (HTF) -30 °C ... +150 °C<br>10.0 mm (HTF) -30 °C ... +150 °C<br>15.0 mm (HTF) -30 °C ... +150 °C |
| Control unit:  | TP5343A/B<br>TP5350A/B<br>TD5335A/B<br>XT-42-SI                                                                                                                                                               |

AL - .. -VK .. -M ..



| Technical data |                                                                                                                                                                                                              |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Terminal box:  | Stainless steel<br>92 x 82 x 95 mm                                                                                                                                                                           |
| Cable gland:   | Brass nickel-plated                                                                                                                                                                                          |
| Dimensions:    | A = ~145 mm<br>B = ~ 82 mm<br>C = ~ 92 mm                                                                                                                                                                    |
| Guide tube:    | ø 14 mm                                                                                                                                                                                                      |
| Resolution:    | 5.0 mm      -30 °C ... +130 °C<br>10.0 mm     -30 °C ... +130 °C<br>15.0 mm     -30 °C ... +130 °C<br>5.0 mm (HTF) -30 °C ... +150 °C<br>10.0 mm (HTF) -30 °C ... +150 °C<br>5.0 mm (HTF) -30 °C ... +150 °C |
| Control unit:  | TP5343A/B<br>TP5350A/B<br>TD5335A/B<br>XT-42-SI                                                                                                                                                              |
| Option:        | Cable gland in stainless steel                                                                                                                                                                               |

AV - .. -VK .. -M ..

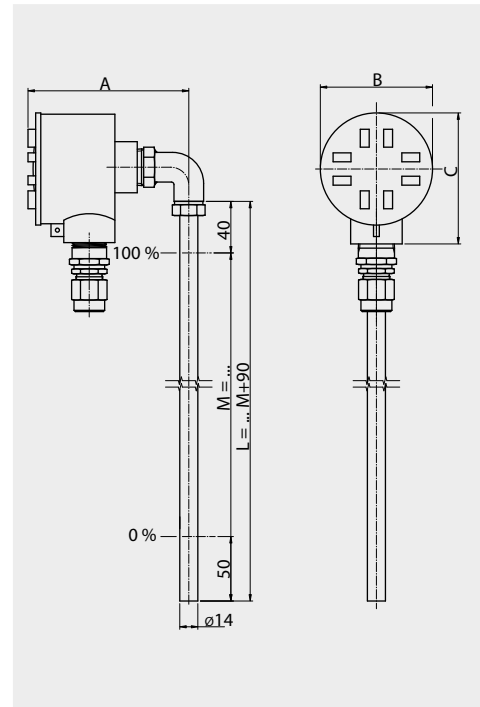


Type combination see type key Mini - Bypass - Level Indicators

# Mini - Bypass - Level Indicators 1015-Mini Level sensor

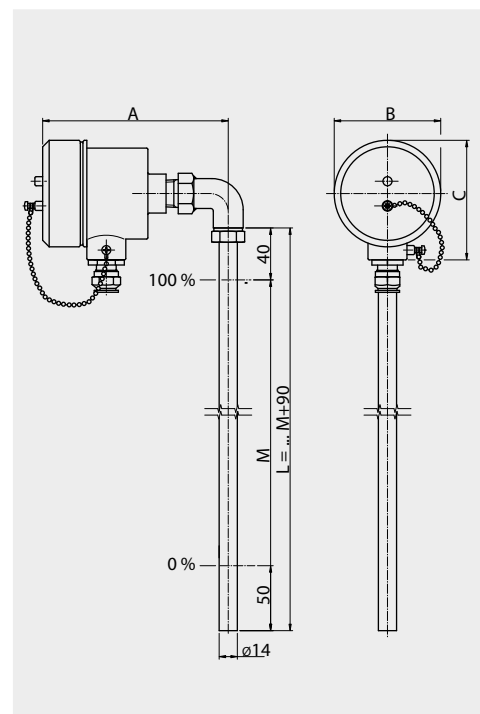
| Technical data |                                                                                       |
|----------------|---------------------------------------------------------------------------------------|
| Terminal box:  | Aluminium<br>102 x 87 x 85 mm                                                         |
| Dimensions:    | A = ~125 mm<br>B = ~ 87 mm<br>C = ~102 mm                                             |
| Guide tube:    | ø 14 mm                                                                               |
| Resolution:    | 5.0 mm -30 °C ... +120 °C<br>10.0 mm -30 °C ... +120 °C<br>15.0 mm -30 °C ... +120 °C |
| Control unit:  | TP5343A/B<br>TP5350A/B<br>TD5335A/B<br>XT-42-SI                                       |

ALDC - .. - VK .. - M .. - EExd



| Technical data |                                                                                       |
|----------------|---------------------------------------------------------------------------------------|
| Terminal box:  | Stainless steel 92 x 82 x 95 mm                                                       |
| Cable gland:   | Brass nickel-plated (standard)                                                        |
| Dimensions:    | A = ~145 mm<br>B = ~ 82 mm<br>C = ~ 92 mm                                             |
| Guide tube:    | ø 14 mm                                                                               |
| Resolution:    | 5.0 mm -30 °C ... +120 °C<br>10.0 mm -30 °C ... +120 °C<br>15.0 mm -30 °C ... +120 °C |
| Control unit:  | TP5343A/B<br>TP5350A/B<br>TD5335A/B<br>XT-42-SI                                       |
| Option:        | Cable gland in stainless steel                                                        |

AVD - .. - VK .. - M .. - EExd

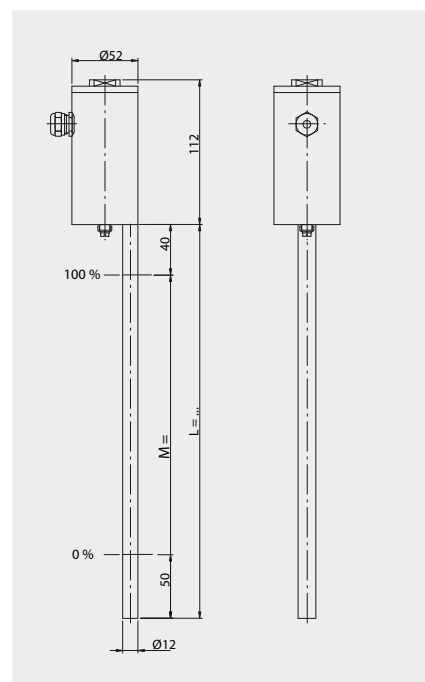


# Mini - Bypass - Level Indicators 1015-Mini

## Level - sensor Magnetostrictive

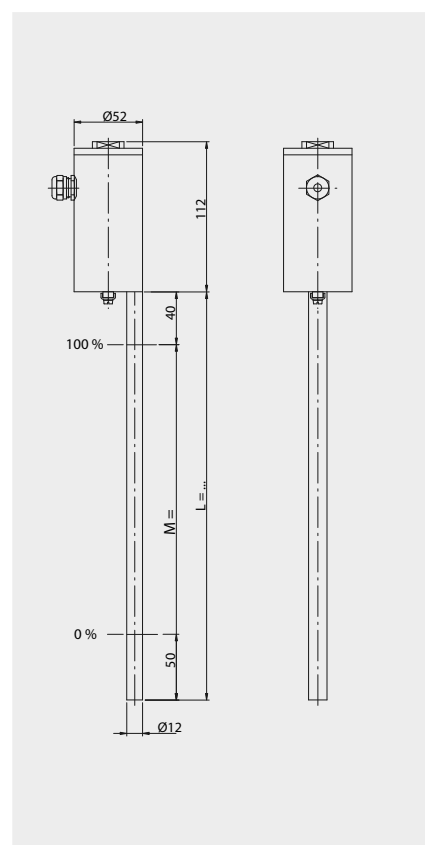
| Technical data           |                                                         |
|--------------------------|---------------------------------------------------------|
| Terminal box:            | Ø 52 x 112 mm                                           |
| Dimensions:              | A= 52 mm<br>B= 52 mm<br>C= 112 mm                       |
| Screwed cable gland:     | M16 x 1.5 mm                                            |
| Length of instrument:    | 200 ... 6000 mm                                         |
| Resolution:              | 0.1 mm -40 °C ... +125 °C<br>0.1 mm -200 °C ... +150 °C |
| Electrical connections:  | 2-wire connection<br>(Option HART®)                     |
| Electrical power supply: | 10 ... 30 V DC / 4 ... 20 mA                            |
| Ambient temperature:     | -40 °C ... +85 °C                                       |
| Measuring range:         | free adjustable                                         |
| System of protection:    | IP68                                                    |
| Material:                | Stainless steel                                         |

AMU - M ...



| Technical data           |                                                                                                                                        |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Terminal box:            | Ø 52 x 112 mm                                                                                                                          |
| Dimensions:              | A= 52 mm<br>B= 52 mm<br>C= 112 mm                                                                                                      |
| Screwed cable gland:     | M16 x 1.5 mm                                                                                                                           |
| Length of instrument:    | 200 ... 6000 mm                                                                                                                        |
| Resolution:              | Hazardous area 0 + 1<br>0.1 mm -20 °C ... +60 °C<br><br>Hazardous area 2<br>0.1 mm -20 °C ... +60 °C<br>0.1 mm (HT) -20 °C ... +150 °C |
| Electrical connections:  | 2-wire connection<br>(Option HART®)                                                                                                    |
| Electrical power supply: | 10 ... 30 V DC / 4 ... 20 mA                                                                                                           |
| Ambient temperature:     | -20 °C ... +85 °C                                                                                                                      |
| Measuring range:         | free adjustable                                                                                                                        |
| System of protection:    | IP68                                                                                                                                   |
| Material:                | Stainless steel                                                                                                                        |
| Approvals:               | TÜV Atex 1772 X, II ½ G EExia T2 - T6                                                                                                  |

AMU - M ... - Ex



Type combination see type key Mini - Bypass - Level Indicators

# Mini - Bypass - Level Indicators 1015-Mini

## Type key

| Code 1 | Key 1 |                                             | ATEX                                                                                |
|--------|-------|---------------------------------------------|-------------------------------------------------------------------------------------|
|        | BNA - | Bypass - Level Indicators                   |  |
|        | BMG - | Bypass - Level Indicators with level sensor |  |

| Code 2 | Key 1          | Design process connections                                                                  | ATEX                                                                                |
|--------|----------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|        | .. / .. / .. - | Flange norm    1. nom. width    2. nom. pressure    3. form                                 |                                                                                     |
|        |                | DIN                DN 6 .. 500                PN 6 .. 400                C, F, N, B ..      |  |
|        |                | ANSI                1/2" .. 24"                150 lbs .. 2500                SF, RTJ, RF.. |  |
|        |                | JIS B 2010                2" .. 20"                5K .. 63K                A .. T          |  |
|        |                | BSI BS 4504                DN 10 .. 500                PN 2.5 .. 400                        |  |
|        |                | S                        Special flange with outside diameter mm                            |  |
|        | G .. -         | GM thread female .."                                                                        |  |
|        |                | GN thread male .."                                                                          |  |
|        | NPT .. -       | NPTM thread female .."                                                                      |  |
|        |                | NPTN thread male .."                                                                        |  |
|        | SE .. -        | Welding ends .."                                                                            |  |
|        | OS -           | Without lateral connections                                                                 |  |

| Code 3 | Key 1  | Electrical connection                             | ATEX                                                                                  |
|--------|--------|---------------------------------------------------|---------------------------------------------------------------------------------------|
|        | AL -   | Aluminium terminal box                            |  |
|        | AV -   | Stainless steel terminal box                      |  |
|        | ALDC - | Aluminium terminal box EExd explosion proof       |  |
|        | ALD -  | Aluminium terminal box EExd explosion proof       |  |
|        | AVD -  | Stainless steel terminal box EExd explosion proof |  |
|        | AP -   | Terminal box polyester                            |  |
|        | AB -   | Terminal box ABS                                  |                                                                                       |
|        | E -    | Connection Cable                                  |  |
|        | U .. - | Connection mountend on bottom                     |  |
|        | .. -   | Various                                           |                                                                                       |

### Type combination

| Code | 1 | 2 | 3     | 4 | 5 | 6   | 7   | 8 | 9 |
|------|---|---|-------|---|---|-----|-----|---|---|
| Key  | 1 | 1 | 1/2/3 | 1 | 1 | 1/2 | 1/2 | 1 | 1 |

|         |       |           |           |        |       |       |   |             |    |
|---------|-------|-----------|-----------|--------|-------|-------|---|-------------|----|
| Example | BMG - | 15/16/C - | AL-VK10 - | M800 - | B40 - | MNA - | - | ZBS35/100 - | Ex |
|---------|-------|-----------|-----------|--------|-------|-------|---|-------------|----|

# Mini - Bypass - Level Indicators 1015-Mini

## Type key

| Code 3 | Key 2        | 2-wire control unit in terminal box                           | ATEX |
|--------|--------------|---------------------------------------------------------------|------|
|        | ZMU -        | XT-42-Si                                                      |      |
|        | ZMUP -       | 956045                                                        |      |
|        | ZMUL -       | 2251                                                          |      |
|        | TP -         | TP 5333B                                                      |      |
|        | TPA -        | TP 5333A                                                      |      |
|        | TP43 -       | TP 5343B                                                      |      |
|        | TP43A -      | TP 5343A                                                      |      |
|        | TP50 -       | TP 5350B                                                      |      |
|        | TP50A -      | TP 5350A                                                      |      |
|        | TD -         | TD 5335B                                                      |      |
|        | TDA -        | TD 5335A                                                      |      |
|        | AMU -        | AMU                                                           |      |
|        | ...          | Various                                                       |      |
|        | Key 3        | Design contact resolution in stainless steel tube             | ATEX |
|        | VK5 -        | Resolution 5.0 mm                                             |      |
|        | VK5 (HTF) -  | Resolution 5.0 mm high temperature                            |      |
|        | VK10 -       | Resolution 10.0 mm                                            |      |
|        | VK10 (HTF) - | Resolution 10.0 mm high temperature                           |      |
|        | VK15 -       | Resolution 15.0 mm                                            |      |
|        | VK15 (HTF) - | Resolution 15.0 mm high temperature                           |      |
| Code 4 | Key 1        | Distance centre to centre / length in mm                      | ATEX |
|        | M .. -       | Distance centre to centre in mm                               |      |
|        | L .. -       | Length of instrument for bypasses without lateral connections |      |
| Code 5 | Key 1        | Material of chamber and diameter                              | ATEX |
|        | B40 -        | Stainless steel 1.4301 / 1.4306 (standard)                    |      |
|        | V40 -        | Stainless steel 1.4404 / 1.4435 / 1.4571                      |      |
|        | ... -        | Various                                                       |      |
| Code 6 | Key 1        | Magnetic roller indicator                                     | ATEX |
|        | MNA / .. -   | Aluminium profile with plastic rollers                        |      |
|        | MNAN / .. -  | Aluminium profile with plastic rollers shock proof            |      |
|        | MNAV / .. -  | Stainless steel profile with plastic rollers                  |      |

### Type combination

| Code    | 1     | 2         | 3         | 4      | 5     | 6     | 7   | 8           | 9  |
|---------|-------|-----------|-----------|--------|-------|-------|-----|-------------|----|
| Key     | 1     | 1         | 1/2/3     | 1      | 1     | 1/2   | 1/2 | 1           | 1  |
| Example | BMG - | 15/16/C - | AL-VK10 - | M800 - | B40 - | MNA - | -   | ZBS35/100 - | Ex |

# Mini - Bypass - Level Indicators 1015-Mini

## Type key

|               |                 |                                                            |                                                                                       |
|---------------|-----------------|------------------------------------------------------------|---------------------------------------------------------------------------------------|
|               | <b>Key 2</b>    | <b>Scale for mountig onto magnetic roller indicator</b>    | <b>ATEX</b>                                                                           |
|               | .. / SK -       | Aluminium scale with adhesive foil, separation in cm       |    |
|               | .. / SG -       | Aluminium engraved, separation acc. to specification       |    |
|               | .. / VSG -      | Stainless steel engraved, separation acc. to specification |    |
|               | .. / P -        | Acrylic glass extender for refrigeration applications      |                                                                                       |
| <b>Code 7</b> | <b>Key 1</b>    | <b>Quantity of magnetic switches</b>                       | <b>ATEX</b>                                                                           |
|               | .. / RUM - AL - | Aluminium housing                                          |    |
|               | <b>Key 2</b>    | <b>Cable connection with length in m</b>                   | <b>ATEX</b>                                                                           |
|               | .. PVC -        | .. Polyvinylchloride PVC (PVC-grey)                        |    |
|               | .. PVC-blau -   | .. Polyvinylchloride PVC (PVC-blue)                        |    |
|               | .. Sil -        | .. Silicone                                                |    |
|               | .. PUR -        | .. Pur (partly oil resisting)                              |    |
|               | .. FEP -        | .. Teflon                                                  |                                                                                       |
|               | .. Lit -        | .. Insulated stranded wire                                 |                                                                                       |
|               | .. NiLit -      | .. Insulated nickel stranded wire with glass insulation    |                                                                                       |
|               | .. Radox -      | .. Radox                                                   |   |
|               | ..              | .. Various                                                 |                                                                                       |
|               | Options         |                                                            |                                                                                       |
|               | .. / CY         | Shielded cable                                             |  |
|               | .. / ÖL         | Oil resisting cable                                        |  |
| <b>Code 8</b> | <b>Key 1</b>    | <b>Float and Float diameter / length in mm</b>             | <b>ATEX</b>                                                                           |
|               | ZVS32/ .. -     | Stainless steel cylindrical                                |  |
|               | ZBS35/ .. -     | Buna cylindrical                                           |  |
|               | .. .. -         | Various                                                    |                                                                                       |
| <b>Code 9</b> | <b>Key 1</b>    | <b>Approvals and options</b>                               | <b>ATEX</b>                                                                           |
|               | Ex              | Intrinscally safe design acc. to EExia                     |  |
|               | EExd            | Explosion proof design acc. to EExd                        |  |
|               | Ex/D            | Intrinscally safe design acc. to EExia with dust Ex        |  |
|               | EExd/D          | Explosion proof design acc. to EExd with dust Ex           |  |
|               | GL              | Germanischer Lloyd                                         |  |
|               | BV              | Bureau Veritas                                             |  |
|               | RINA            | Registro Italiano Navale                                   |  |
|               | DNV             | Det Norske Veritas                                         |  |

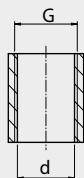
### Type combination

|                |          |           |           |          |          |          |          |             |          |
|----------------|----------|-----------|-----------|----------|----------|----------|----------|-------------|----------|
| <b>Code</b>    | <b>1</b> | <b>2</b>  | <b>3</b>  | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b>    | <b>9</b> |
| <b>Key</b>     | 1        | 1         | 1/2/3     | 1        | 1        | 1/2      | 1/2      | 1           | 1        |
| <b>Example</b> | BMG -    | 15/16/C - | AL-VK10 - | M800 -   | B40 -    | MNA -    | -        | ZBS35/100 - | Ex       |

## Mini - Bypass - Level Indicators 1015-Mini

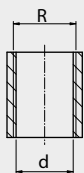
### Design process connections

Thread G ..."



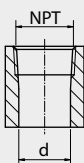
| Size   | Diameter G [mm] | Core ø d [mm] | Bore [mm] |
|--------|-----------------|---------------|-----------|
| 1/8"   | 9.7             | 8.5           | 8.0       |
| 1/4"   | 13.2            | 11.4          | 11.0      |
| 3/8"   | 16.7            | 14.9          | 14.5      |
| 1/2"   | 21.0            | 18.9          | 18.0      |
| 3/4"   | 26.5            | 24.1          | 23.5      |
| 1"     | 33.3            | 30.2          | 29.5      |
| 1 1/2" | 47.8            | 44.9          | 44.0      |
| 2"     | 59.7            | 56.6          | 56.0      |

Thread R ..."



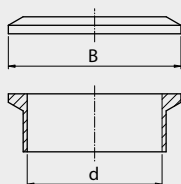
| Size   | Diameter R [mm] | Core ø d [mm] | Bore [mm] |
|--------|-----------------|---------------|-----------|
| 1/8"   | 9.7             | 8.5           | 8.0       |
| 1/4"   | 13.2            | 11.4          | 11.0      |
| 3/8"   | 16.7            | 14.9          | 14.5      |
| 1/2"   | 21.0            | 18.6          | 18.0      |
| 3/4"   | 26.5            | 24.1          | 23.5      |
| 1"     | 33.3            | 30.2          | 29.5      |
| 1 1/2" | 47.8            | 44.8          | 44.0      |
| 2"     | 59.7            | 56.6          | 56.0      |

Thread NPT ..."



| Size   | Diameter NPT [mm] | Core ø d [mm] | Bore [mm] |
|--------|-------------------|---------------|-----------|
| 1/8"   | 9.6               | 8.4           | 8.5       |
| 1/4"   | 12.8              | 11.2          | 11.0      |
| 3/8"   | 16.2              | 14.6          | 14.5      |
| 1/2"   | 19.9              | 18.2          | 18.0      |
| 3/4"   | 25.6              | 23.4          | 23.0      |
| 1"     | 31.8              | 29.8          | 29.0      |
| 1 1/2" | 46.8              | 44.2          | 44.0      |
| 2"     | 58.6              | 56.4          | 56.0      |

Flange Tri - Clamp DIN 32676

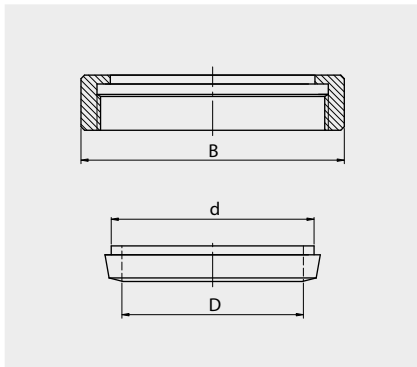


| Size  | Diameter B [mm] | Inside ø d [mm] | Bore [mm] |
|-------|-----------------|-----------------|-----------|
| DN15  | 34.0            | 16.0            | 15.0      |
| DN20  | 34.0            | 20.0            | 19.0      |
| DN25  | 50.5            | 26.0            | 25.0      |
| DN50  | 64.0            | 50.0            | 48.0      |
| DN65  | 91.0            | 66.0            | 64.0      |
| DN80  | 106.0           | 81.0            | 79.0      |
| DN100 | 119.0           | 100.0           | 98.0      |

# Mini - Bypass - Level Indicators 1015-Mini

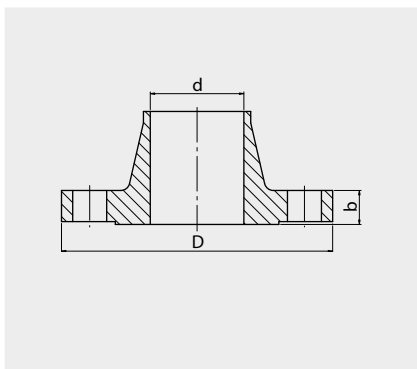
## Design process connections

### Tube connection DIN 11851



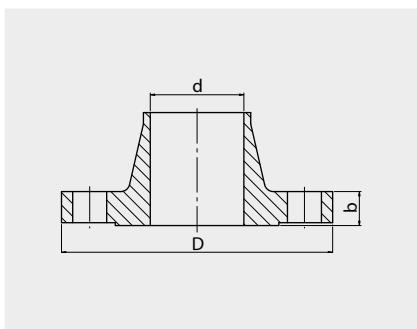
| Size  | Bore $\varnothing$<br>d [mm] | Inside $\varnothing$<br>D [mm] | Union nut<br>B [mm] |
|-------|------------------------------|--------------------------------|---------------------|
| DN10  | 18                           | 10                             | 38                  |
| DN15  | 24                           | 16                             | 44                  |
| DN20  | 30                           | 20                             | 54                  |
| DN25  | 35                           | 26                             | 63                  |
| DN40  | 48                           | 38                             | 78                  |
| DN50  | 61                           | 50                             | 92                  |
| DN65  | 79                           | 66                             | 112                 |
| DN80  | 93                           | 81                             | 127                 |
| DN100 | 114                          | 100                            | 148                 |

### Flange DIN 16 bar DIN 2633



| Size  | Flange $\varnothing$<br>D [mm] | Inside $\varnothing$<br>d [mm] | Flange thickness<br>b [mm] |
|-------|--------------------------------|--------------------------------|----------------------------|
| DN10  | 90                             | 13.6                           | 14                         |
| DN15  | 95                             | 17.3                           | 14                         |
| DN20  | 105                            | 22.3                           | 16                         |
| DN25  | 115                            | 28.5                           | 16                         |
| DN40  | 150                            | 43.1                           | 16                         |
| DN50  | 165                            | 54.5                           | 18                         |
| DN65  | 185                            | 70.3                           | 18                         |
| DN80  | 200                            | 82.5                           | 20                         |
| DN100 | 220                            | 107.1                          | 20                         |

### Flange Ansi 150 lbs B 16.5

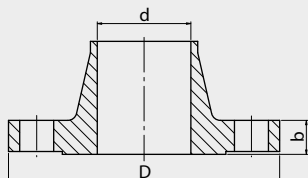


| Size | Flange $\varnothing$<br>D [mm] | Inside $\varnothing$<br>d [mm] | Flange thickness<br>b [mm] |
|------|--------------------------------|--------------------------------|----------------------------|
| ½"   | 88.9                           | 15.7                           | 11.2                       |
| ¾"   | 98.6                           | 20.8                           | 12.7                       |
| 1"   | 108.0                          | 26.7                           | 14.2                       |
| 1½"  | 127.0                          | 40.9                           | 17.5                       |
| 2"   | 152.4                          | 52.6                           | 19.1                       |
| 2½"  | 177.8                          | 62.7                           | 22.4                       |
| 3"   | 190.5                          | 78.0                           | 23.9                       |
| 4"   | 228.6                          | 102.4                          | 23.9                       |

## Mini - Bypass - Level Indicators 1015-Mini

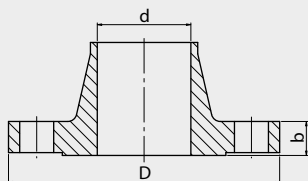
### Design process connections

**Flange DIN 40 bar  
DIN 2635**



| Size  | Flange ø<br>D [mm] | Inside ø<br>d [mm] | Flange thickness<br>b [mm] |
|-------|--------------------|--------------------|----------------------------|
| DN10  | 90                 | 13.6               | 16                         |
| DN15  | 95                 | 17.3               | 16                         |
| DN20  | 105                | 22.3               | 18                         |
| DN25  | 115                | 28.5               | 18                         |
| DN40  | 150                | 43.1               | 18                         |
| DN50  | 165                | 54.5               | 20                         |
| DN65  | 185                | 70.3               | 22                         |
| DN80  | 200                | 82.5               | 24                         |
| DN100 | 235                | 107.1              | 24                         |

**Flange Ansi 300 lbs  
B 16.5**



| Size | Flange ø<br>D [mm] | Inside ø<br>d [mm] | Flange thickness<br>b [mm] |
|------|--------------------|--------------------|----------------------------|
| ½"   | 95.2               | 15.7               | 14.2                       |
| ¾"   | 117.3              | 20.8               | 15.7                       |
| 1"   | 124.0              | 26.7               | 17.5                       |
| 1½"  | 155.4              | 40.9               | 20.6                       |
| 2"   | 165.1              | 52.6               | 22.4                       |
| 2½"  | 190.5              | 62.7               | 25.4                       |
| 3"   | 209.6              | 78.0               | 28.4                       |
| 4"   | 254.0              | 102.4              | 31.8                       |

## Mini - Bypass - Level Indicators 1015-Mini Cable / materials

| Cable          | Min. / Max.<br>temperature<br>[°C] | Material                                                     | Max. leads | Thickness of<br>lead |
|----------------|------------------------------------|--------------------------------------------------------------|------------|----------------------|
| ... PVC -      | -20 °C / +80 °C                    | Polyvinylchloride                                            | 12         | 0.25 - 0.75          |
| ... PVC-blau - | -20 °C / +80 °C                    | Polyvinylchloride                                            | 7          | 0.75                 |
| ... Sil -      | -60 °C / +180 °C                   | Silicone                                                     | 12         | 0.25 - 0.75          |
| ... PUR -      | -40 °C / +80 °C                    | Polyurethane                                                 | 10         | 0.25 - 0.75          |
| ... FEP -      | -100 °C / +200 °C                  | Fluorethylenpropylene                                        | 4          | 0.25 - 0.5           |
| ... Radox -    | -35 °C / +120 °C                   | Radox                                                        | 10         | 0.5 - 0.75           |
| ... Lit -      | -5 °C / +70 °C<br>-65 °C / +200 °C | Insulated stranded wires PVC<br>Insulated stranded wires FEP | 1<br>1     | 0.5<br>0.5           |
| ... NiLit -    | -60 °C / +450 °C                   | Insulated nickel stranded wires with glass insulation        | 1          | 0.5                  |

### Options

|          |                     |
|----------|---------------------|
| ... / CY | Shielded cable      |
| ... / ÖL | Oil resisting cable |

| Material design temperatures | Material                      | Temperature<br>min. | Temperature<br>max. |
|------------------------------|-------------------------------|---------------------|---------------------|
| V                            | Stainless steel               | - 196 °C            | + 400 °C            |
| Ti                           | Titanium                      | - 10 °C             | + 300 °C            |
| H                            | Alloy / Ni Mo                 | - 196 °C            | + 400 °C            |
| EEC                          | Stainless steel E-CTFE coated | - 78 °C             | + 150 °C            |
| PFA                          | Stainless steel PFA coated    | - 100 °C            | + 250 °C            |
| P                            | Polyvinylchloride PVC         | - 15 °C             | + 60 °C             |
| PP                           | Polypropylene PP              | - 5 °C              | + 100 °C            |
| PF                           | Polyvinylidenfluoride PVDF    | - 5 °C              | + 150 °C            |
| PA                           | Polyamide PA                  | - 40 °C             | + 110 °C            |
| M                            | Brass                         | - 196 °C            | + 250 °C            |
| AL                           | Aluminium                     | - 196 °C            | + 150 °C            |

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