

Mini - Bypass - Level Indicators 1015-Mini

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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.

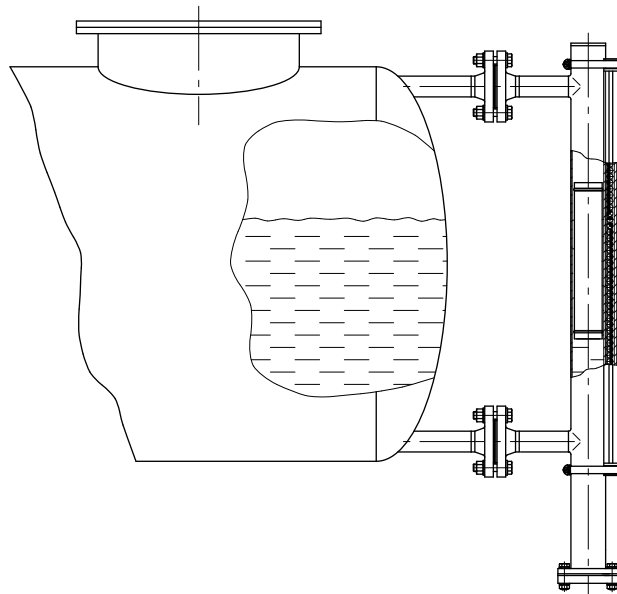
At rising level

- 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.

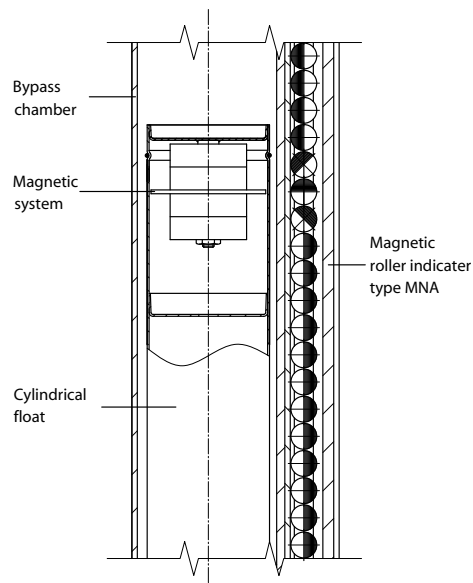


Level Sensors

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 TS

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

The company Heinrich Kübler AG can manufacture mini-bypass-level indicators to most national and industrial approvals. Therefore a wide range of instruments with approvals requirements can be produced according to customer's requests.



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



SOCIETE 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

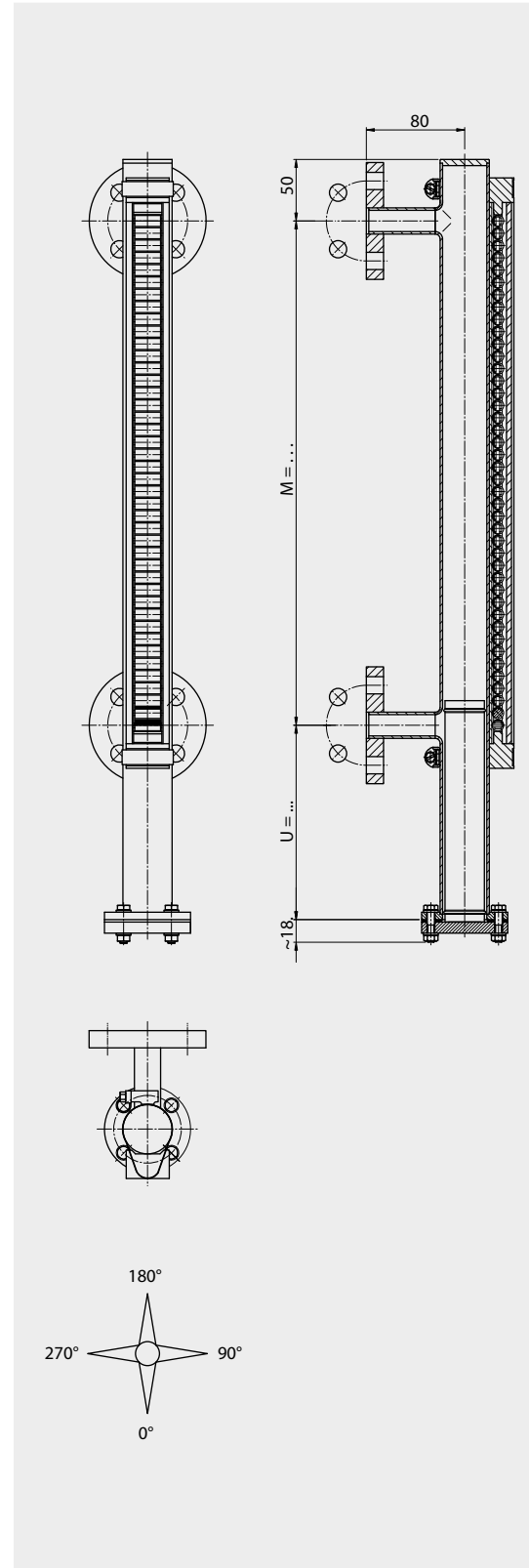
Mini-bypass-level indicators for use in shipping can be manufactured to GL (Germanischer Lloyd), BV (Bureau Veritas), RINA (Registro Italiano Navale) or DNV (Det Norske Veritas) standards in large variety of design possibilities complete with controllers.

Mini - Bypass - Level Indicators 1015-Mini Stainless steel PN6

Technical data

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

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



Operating parameters

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

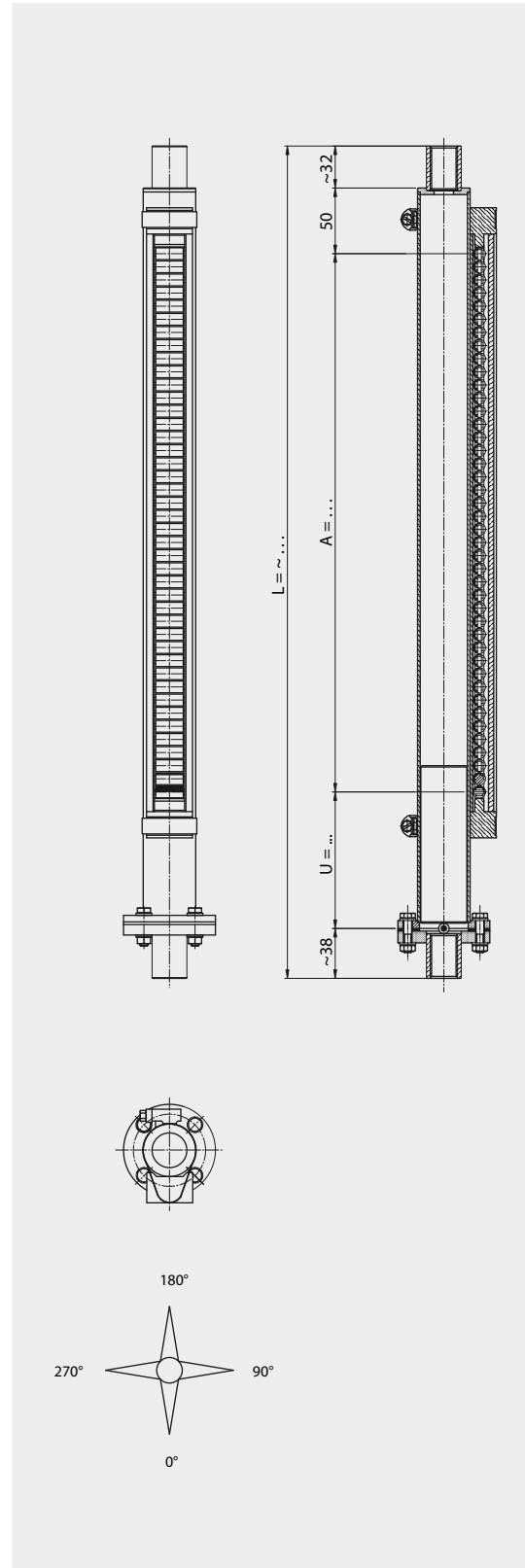
Type combination see type key Mini - Bypass - Level Indicators

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

Technical data

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

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



Operating parameters

Temperature:	-20 °C ... +150 °C
Pressure:	-1 ... 6 bar
Specific gravity:	≥ 550 kg/m³
Accuracy:	5 mm
Repeatability:	+/- 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 [cm³]
Weight [g]

	180	200	230	250	280	300	340	420	480	580
Length L [mm]	180	200	230	250	280	300	340	420	480	580
Volume [cm ³]	142	158	183	199	223	239	271	335	384	464
Weight [g]	127	142	148	156	168	177	94	227	252	294

Float height above liquid in mm	Stainless steel 1.4571										Float height above liquid in mm
	180	200	230	250	280	300	340	420	480	580	
	Specific gravity of the liquid (kg/m ³)										
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 [cm³]
Weight [g]

	90	100	105	115	120	135	150	170	195	225
Length L [mm]	90	100	105	115	120	135	150	170	195	225
Volume [cm ³]	87	96	101	111	115	130	144	164	168	216
Weight [g]	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 ³)										
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 ..

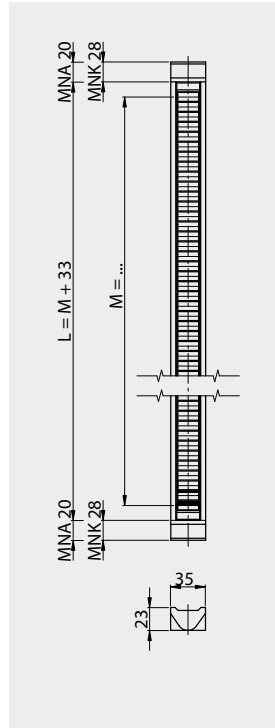
Housing:
- aluminium anodized

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 ..

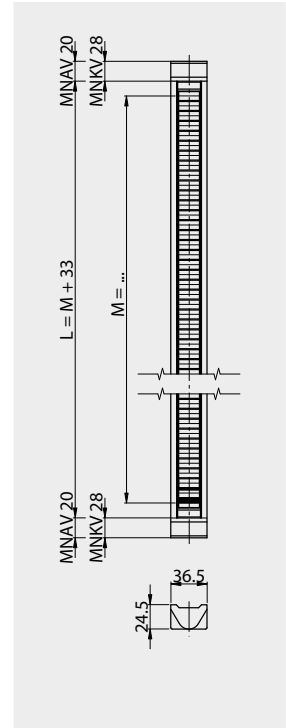
Housing:
- aluminium
with stainless steel covered

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

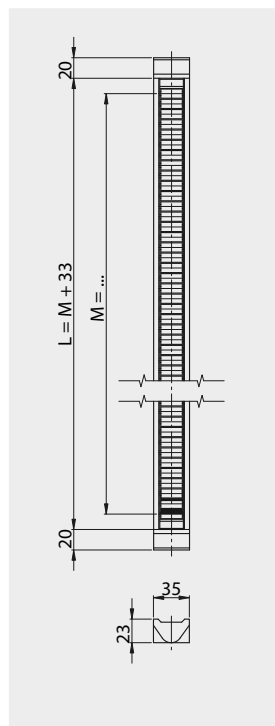
Indicator rolls MNAN:
- material: pocan
- colours: white / red

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)



Type combination see type key Mini - Bypass - Level Indicators

Mini - Bypass - Level Indicators 1015-Mini Scale

**Scale
.. / SK**

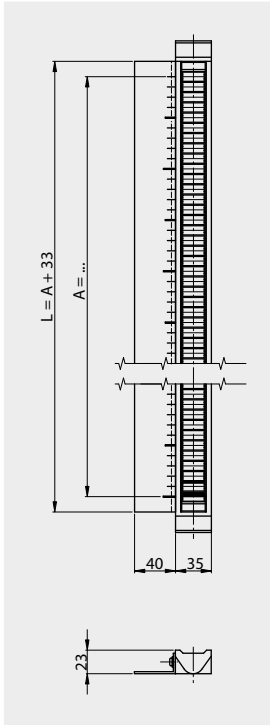
Angle profile:
- aluminium

Width:
- 40 mm

Scale:
- adhesive foil

Separation:
- in cm

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



**Scale
.. / SG**

Angle profile:
- aluminium

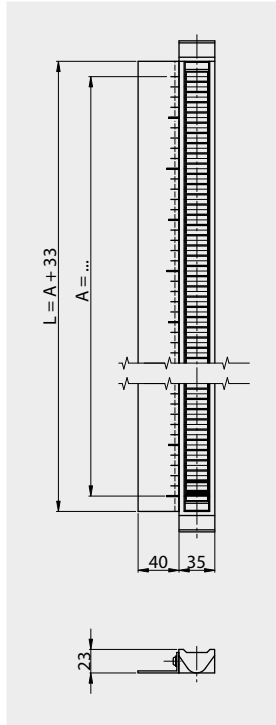
Width:
- 40 mm

Scale:
- engraved

Separation:
- acc. to specification

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

Approval
- See pages 250-251



**Scale
.. / VSG**

Angle profile:
- Stainless steel

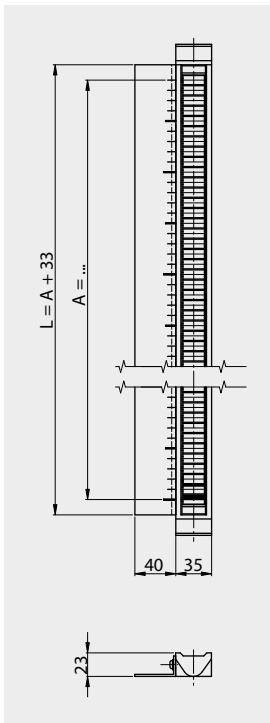
Width:
- 40 mm

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

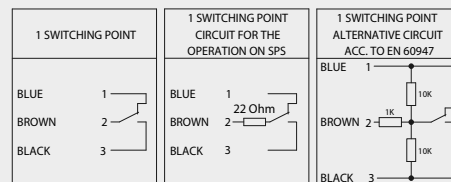
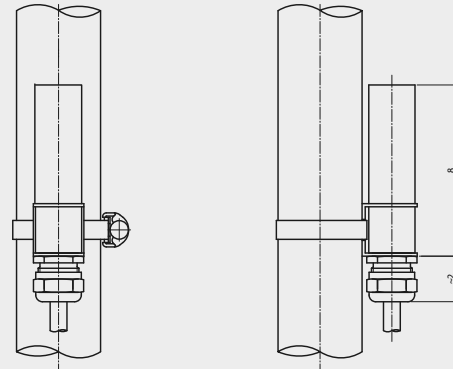
Options:

- 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

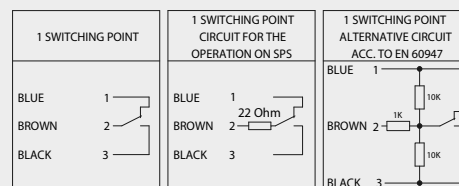
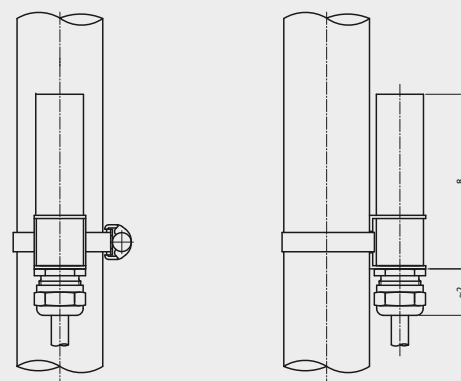
Options:

- with code addition .. / R

with 22 Ohm protection resistor

- with code addition .. / N acc. to Namur EN 60947

RUM - AL - .. Sil

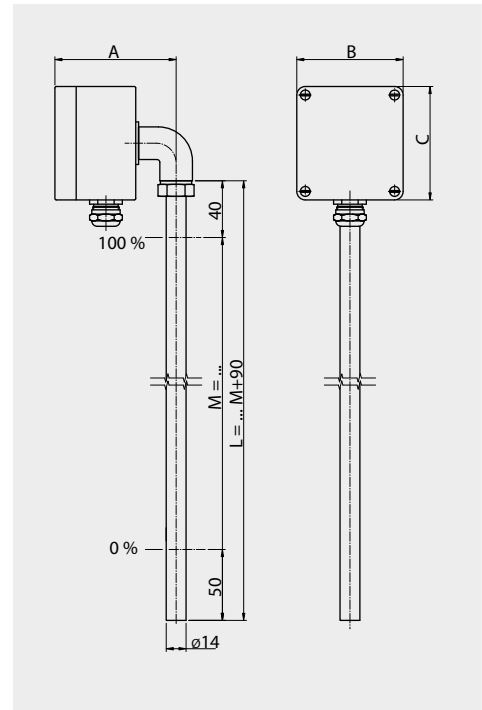


Type combination see type key Mini - Bypass - Level Indicators

Mini - Bypass - Level Indicators 1015-Mini Level sensor

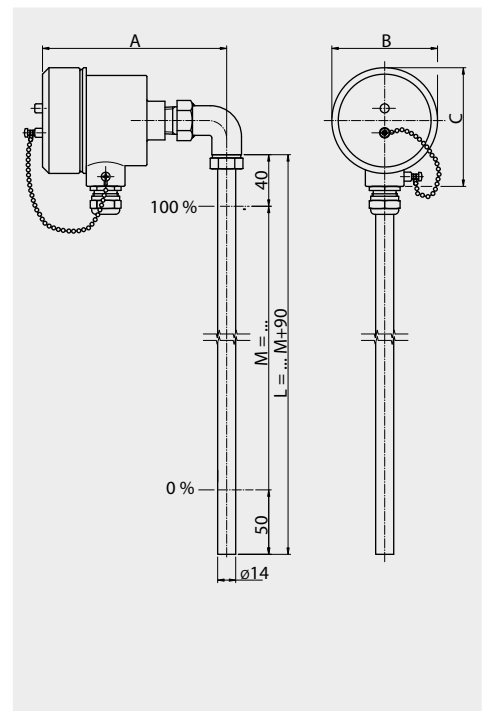
Technical data	
Terminal box:	Aluminium
	A 105: 80 x 75 x 57 A 101: 64 x 58 x 34
Dimensions:	A 105 A 101 A = 85.5 mm A = 62.5 mm B = 75.0 mm B = 50.0 mm C = 89.0 mm C = 68.0 mm
Guide tube:	ø 14 mm
Resolution:	5.0 mm -30 °C ... +130 °C 10.0 mm -30 °C ... +130 °C 15.0 mm -30 °C ... +130 °C 5.0 mm (HTF)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

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



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

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

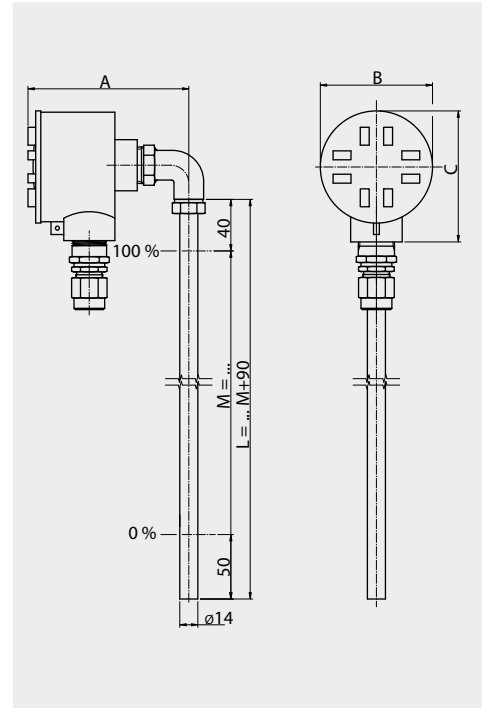


Type combination see type key Mini - Bypass - Level Indicators

Mini - Bypass - Level Indicators 1015-Mini Level sensor

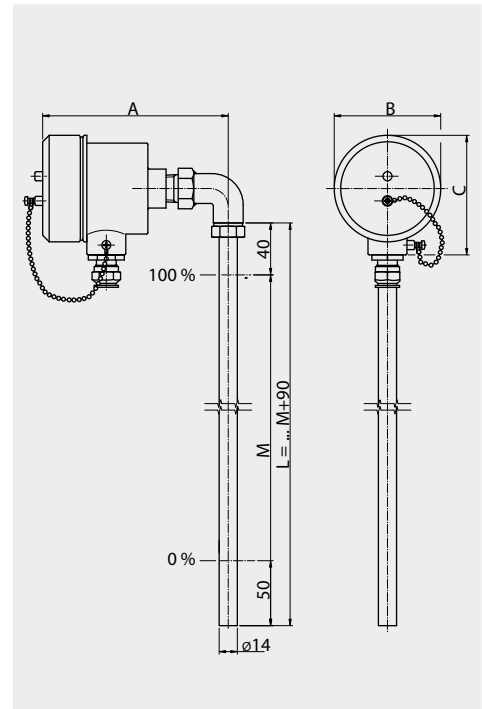
Technical data	
Terminal box:	Aluminium 102 x 87 x 85 mm
Dimensions:	A = ~125 mm B = ~ 87 mm C = ~102 mm
Guide tube:	ø 14 mm
Resolution:	5.0 mm -30 °C ... +120 °C 10.0 mm -30 °C ... +120 °C 15.0 mm -30 °C ... +120 °C
Control unit:	TP5343A/B TP5350A/B TD5335A/B XT-42-SI

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 B = ~ 82 mm C = ~ 92 mm
Guide tube:	ø 14 mm
Resolution:	5.0 mm -30 °C ... +120 °C 10.0 mm -30 °C ... +120 °C 15.0 mm -30 °C ... +120 °C
Control unit:	TP5343A/B TP5350A/B TD5335A/B XT-42-SI
Option:	Cable gland in stainless steel

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

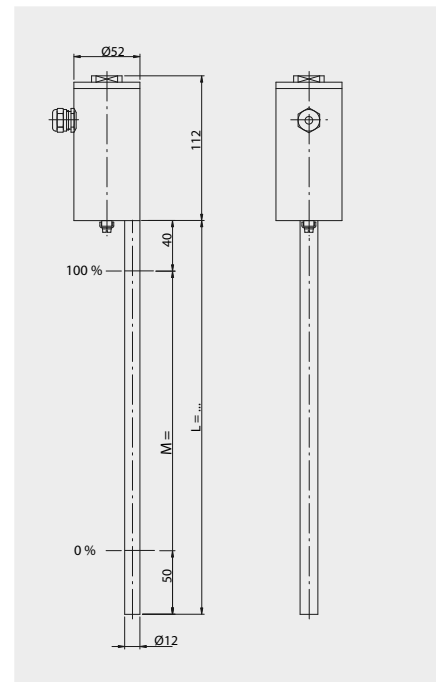


Type combination see type key Mini - Bypass - Level Indicators

Mini - Bypass - Level Indicators 1015-Mini Level - sensor Magnetostrictive

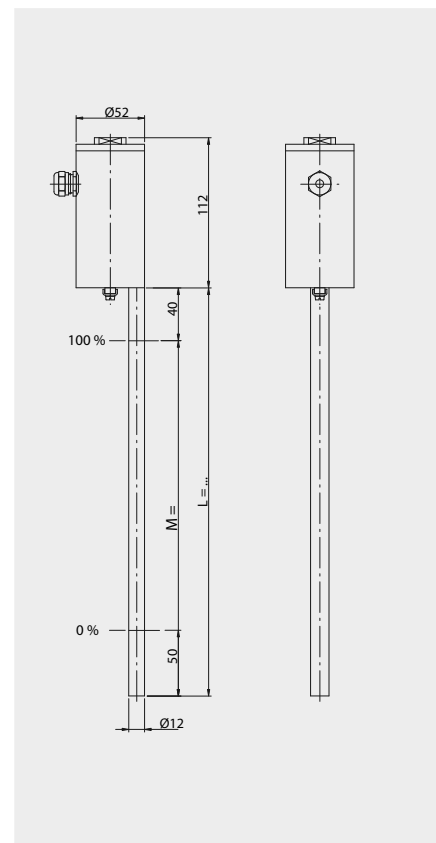
Technical data	
Terminal box:	Ø 52 x 112 mm
Dimensions:	A= 52 mm B= 52 mm C= 112 mm
Screwed cable gland:	M16 x 1.5 mm
Length of instrument:	200 ... 6000 mm
Resolution:	0.1 mm -40 °C ... +125 °C 0.1 mm -200 °C ... +150 °C
Electrical connections:	2-wire connection (Option HART®)
Electrical power supply:	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 B= 52 mm C= 112 mm
Screwed cable gland:	M16 x 1.5 mm
Length of instrument:	200 ... 6000 mm
Resolution:	Hazardous area 0 + 1 0.1 mm -20 °C ... +60 °C Hazardous area 2 0.1 mm -20 °C ... +60 °C 0.1 mm (HT) -20 °C ... +150 °C
Electrical connections:	2-wire connection (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

	Key 2	Scale for mountig onto magnetic roller indicator	ATEX
	.. / 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	
Code 7	Key 1	Quantity of magnetic switches	ATEX
	.. / RUM - AL -	Aluminium housing	
	Key 2	Cable connection with length in m	ATEX
	.. 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	
Code 8	Key 1	Float and Float diameter / length in mm	ATEX
	ZVS32/ .. -	Stainless steel cylindrical	
	ZBS35/ .. -	Buna cylindrical	
 -	Various	
Code 9	Key 1	Approvals and options	ATEX
	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	

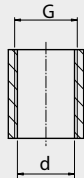
Type combination

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

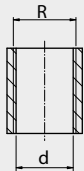
Design process connections

Thread G ..."



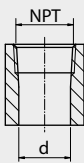
Size	Diameter G [mm]	Core ø d [mm]	Bore [mm]
1/8"	9.7	8.5	8.0
1/4"	13.2	11.4	11.0
3/8"	16.7	14.9	14.5
1/2"	21.0	18.9	18.0
3/4"	26.5	24.1	23.5
1"	33.3	30.2	29.5
1 1/2"	47.8	44.9	44.0
2"	59.7	56.6	56.0

Thread R ..."



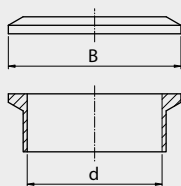
Size	Diameter R [mm]	Core ø d [mm]	Bore [mm]
1/8"	9.7	8.5	8.0
1/4"	13.2	11.4	11.0
3/8"	16.7	14.9	14.5
1/2"	21.0	18.6	18.0
3/4"	26.5	24.1	23.5
1"	33.3	30.2	29.5
1 1/2"	47.8	44.8	44.0
2"	59.7	56.6	56.0

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

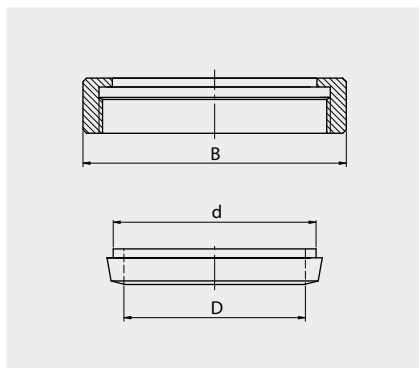


Size	Diameter B [mm]	Inside ø d [mm]	Bore [mm]
DN15	34.0	16.0	15.0
DN20	34.0	20.0	19.0
DN25	50.5	26.0	25.0
DN50	64.0	50.0	48.0
DN65	91.0	66.0	64.0
DN80	106.0	81.0	79.0
DN100	119.0	100.0	98.0

Mini - Bypass - Level Indicators 1015-Mini

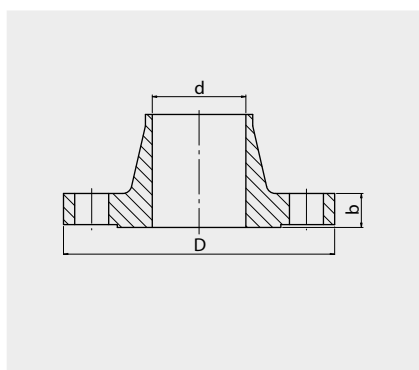
Design process connections

Tube connection DIN 11851



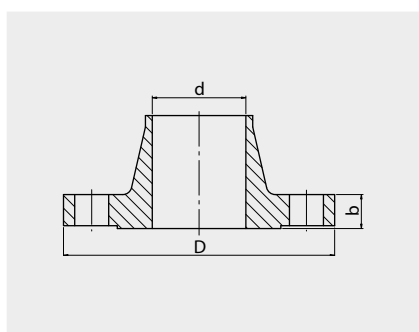
Size	Bore \varnothing d [mm]	Inside \varnothing D [mm]	Union nut B [mm]
DN10	18	10	38
DN15	24	16	44
DN20	30	20	54
DN25	35	26	63
DN40	48	38	78
DN50	61	50	92
DN65	79	66	112
DN80	93	81	127
DN100	114	100	148

Flange DIN 16 bar DIN 2633



Size	Flange \varnothing D [mm]	Inside \varnothing d [mm]	Flange thickness 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

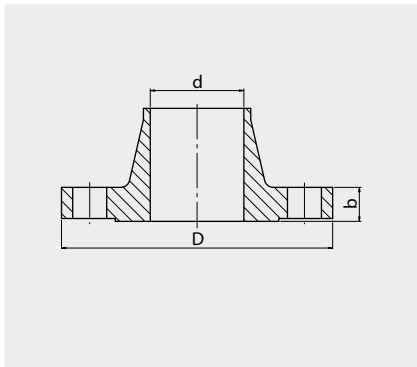


Size	Flange \varnothing D [mm]	Inside \varnothing d [mm]	Flange thickness b [mm]
½"	88.9	15.7	11.2
¾"	98.6	20.8	12.7
1"	108.0	26.7	14.2
1½"	127.0	40.9	17.5
2"	152.4	52.6	19.1
2½"	177.8	62.7	22.4
3"	190.5	78.0	23.9
4"	228.6	102.4	23.9

Mini - Bypass - Level Indicators 1015-Mini

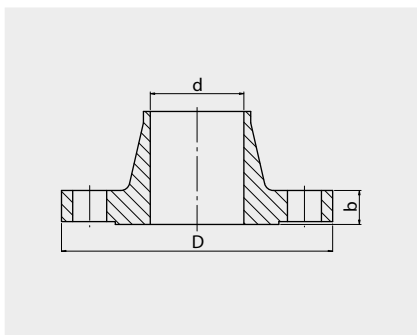
Design process connections

Flange DIN 40 bar DIN 2635



Size	Flange \varnothing D [mm]	Inside \varnothing d [mm]	Flange thickness 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 \varnothing D [mm]	Inside \varnothing d [mm]	Flange thickness 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. temperature [°C]	Material	Max. leads	Thickness of 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 -65 °C / +200 °C	Insulated stranded wires PVC Insulated stranded wires FEP	1 1	0.5 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 min.	Temperature 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