



KSR Magnetic Level Indicators / Gauges

1015-2





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Approvals

Pressure Equipment Directive 97/23/EC



Germany

Germanischer Lloyd

Netherlands



KEMA

Norway



Det Norske Veritas

France



**Laboratoire Central des Industries
Electriques**

Denmark



DEMKO

Russia



**Gosgortekhnadzor
OGS Oil & Gas Safety**

USA






Factory Mutual Research Corporation

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KSR Magnetic Level Indicators / Gauges



Operating Principle

A communicating bypass chamber is flanged to the side of a vessel, and as the liquid level in the tank rises or falls, a float with a built-in magnetic system inside the chamber rises or falls with it. The chamber is completely sealed so that the only moving part of the apparatus in contact with the liquid is the float itself (see below).

On the 'dry side' of the chamber is the KSR Magnetic Roller Display, a column of magnetic rollers which are white on one side and red on the other. The rollers are made from plastic (MRA) or ceramics (MRK) with a distance of 10 mm between their axes. As the float moves up or down the bunched field of the permanent magnet mounted in its top section 'pulls' the rollers through a rotation of 180°, thus changing their colour. As the float rises the rollers are turned from white to red, and as the float falls, they are changed back to white again. This means that at any given time the amount of liquid in the tank is constantly represented by a red column without any external power supply.

Technical Advantages

- Simple, robust, and solid design
- Pressure- and gas-proof separation of chamber and display
- Measuring and indicating of the level of aggressive, combustible, toxic, hot, agitated, and contaminated liquids
- KSR Magnetic Roller Displays without external power supply
- Available for applications in all areas of industry through use of highly corrosion-resistant materials
- Designs for a pressure range from full vacuum to 420 bar
- Designs for temperatures from -160°C to +450°C

Special Designs

- Food industry design
- Interface measurement
- enamelled

Options

As options the following devices can be attached to a KSR Magnetic Level Indicator to monitor and control the level of the liquid.

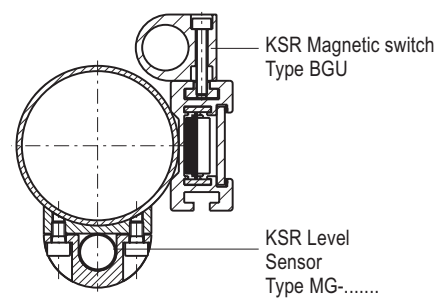
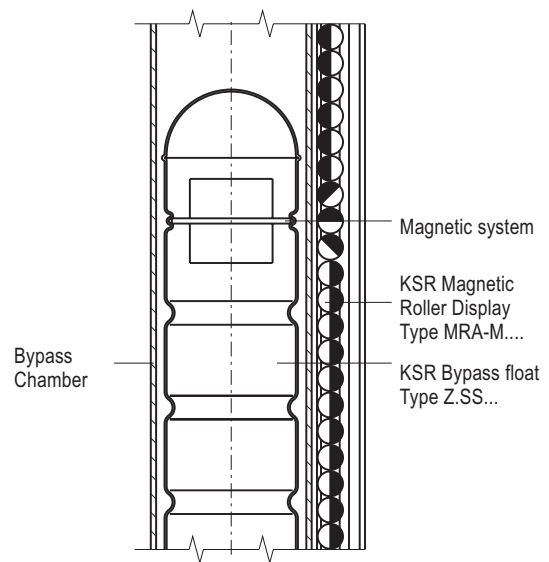
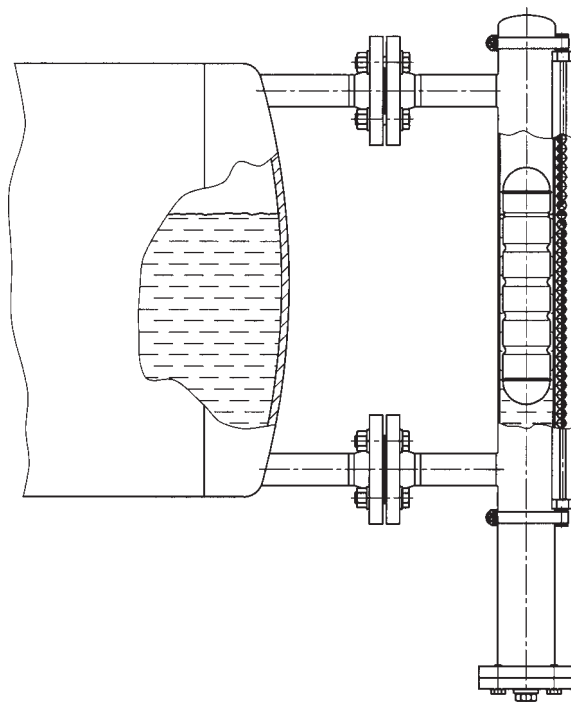
KSR Level Sensors

KSR Level Sensors are used to measure and transmit the level in conjunction with a KSR control unit. This control unit converts the resistance value of the level sensor to a proportional analogue signal.

KSR Magnetic Switches

KSR Magnetic switches are used to monitor certain limits of the level. The obtained binary signal can be forwarded to trigger alarms or other controls.

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KSR Magnetic Level Indicators / Gauges

Type code



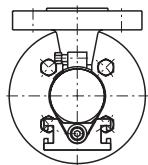
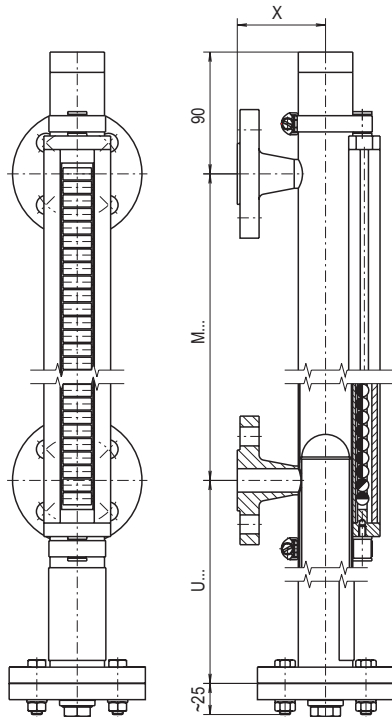
Code

1	Basic type					
	BNA	Magnetic Level Indicator				
2	Process connections					
.../.../...	.../	Flange 1 st Key = Nom. size	.../	2 nd Key = Nom. pressure	.../	3 rd Key = Flange face Standard optional
DIN		DN 10 - DN 100		PN 6 - PN 400		Form C E, A, F, N
ANSI		1/2" - 4"		Class 150 - 2500		Form RF RTJ, FF, ST, SG
JIS		3/8" (DN 10) - 4" (DN 100)		5 K - 63 K		Form RF RTJ, FF, ST, SG
		Thread or Welding stubs	.../	1 st Key M or N	.../	2 nd Key Thread size
	G../..	Thread acc. to DIN	M	female		e.g. GM 1"
	NPT../..	Thread acc. to NPT	N	male		e.g. NPTN 1"
	S..	Welding stubs		Key for welding stub-OD e.g. S 3/4"		
3	Option Level Sensor (see separate type code page 28)					
...	MG	Basic type without optional code				
4	Distance centre-to-centre					
...	M...	Distance between flange centres in mm				
5	Material and chamber dimensions 1 st Key = Material			2 nd Key = Chamber dimensions		
.../...x..	V	Stainless steel 316 Ti	HB	Hastelloy B	...x..	Chamber
	VE	Stainless steel electro-polished	HC	Hastelloy C		OD x Wall thickness in mm
	VTF	Stainless steel PTFE-lined	MO	Stainless steel (6Mo) 1.4529		
	VET	Stainless steel E-TFE-coated	P	PVC		
	VEC	Stainless steel E-CTFE-coated	PP	Polypropylene		
	L	Stainless steel 316 L	PF	PVDF		
	T	Titanium Grade 2	G	Borosilicate glass		
6	Magnetic Roller Display					
.../...	MRA	Aluminium housing with plastic rollers	MNAV	Stainless steel housing with plastic rollers		
	MRK	Aluminium housing with ceramic rollers	MNKV	Stainless steel housing with ceramic rollers		
	MRAN	Aluminium housing with plastic rollers - shock-proof				
		Optional code				
	/SK	with scale (plastic), graduation in cm (printed)	/VSG	with scale (Stainl. Steel engraved), graduation selectable		
	/SG	with scale (Aluminium engraved), graduation selectable	/P	with sight glass extender (for insulations)		
7	Option Magnetic Switches, 1 st Key = Quantity magnetic switches, 2 nd Key = Magnetic switch type					
.../.../...	M	BGU-1 PVC	MAE	BGU-A-E	MI	STMI (initiator)
	MT	BGU-1 Sil	MAGL	BGU-A-GL	MV	BGU-V-1 PVC
	ME	BGU-1 PVC blue	MD	BGU-EEEx d-1 PVC	MVT	BGU-V-1 Sil
	MGL	BGU-GL-1 LMGSS	MDT	BGU-EEEx d-1 Sil	MVE	BGU-V-E-1 PVC blue
	MSt	BGU-S 716	MDG	BGU-EEEx d-1 PUR	MVD	BGU-V-EEEx d-1 PVC
	MESSt	BGU-E-S 716	MDGA	BGU-EEEx d-1 PURA	MVDT	BGU-V-EEEx d-1 Sil
	MA	BGU-A	MHT	STMU	MVDG	BGU-V-EEEx d-1 PUR
		Optional code				
	.../...	Cable length in meters	/R..	with resistor 22 Ohm (connected to PLC)	/N	NAMUR circuit
8	Float (cylindrical) 1 st Key = Float material, 2 nd Key = Float length in mm					
Z..S..	.V...	Stainless steel 316 Ti	.P...	PVC	.VET...	Stainless steel 316 Ti
	.T...	Titanium Grade 2	.PP...	Polypropylene		E-TFE-coated
	.HB...	Hastelloy B	.PF...	PVDF	.VED...	Stainless steel 316 Ti
	.HC...	Hastelloy C	.TF...	PTFE		PFA-coated
	.CF...	CF340	.G...	Borosilicate glass	.VEC...	Stainless steel 316 Ti
					.TEC...	E-CTFE-coated
						Titanium Grade 2
						E-TFE-coated
						Titanium Grade 2
						PFA-coated
						Titanium Grade 2
						E-CTFE-coated
9	Approvals					
...	Ex	Ex-Design	GL	Germanischer Lloyd	DNV	Det Norske Veritas

Ordering examples

Code	Basic type	Connection size	Option Level sensor	Distance centre-to-centre	Material Chamber dimensions	Magnetic Roller display	Option Magnetic switch	Float design	Certificates
	1	2	3	4	5	6	7	8	9
	BNA	10 / 6 / C	MG	M1500	V60x2	MRA / SK	3 / M / 2	ZVSS250	

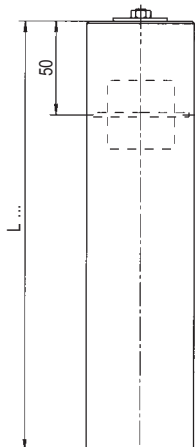
Type: BNA - ../.. - M.... - V40x1 - MRA



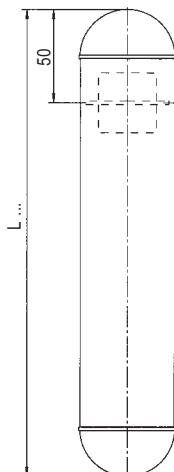
M = Centre-to-centre process connection
 U = Length of float -30
 X = Dep. on process connection

Float type ZBS35/...

Float type ZTS35/...



Magnetic system



Magnetic system

Technical data

Chamber	OD 40 x 1 mm
Chamber end top	Welding cap Options: (see page 32) - Vent plug BSP1/2" - Vent valve - Vent flange
Chamber end bottom	Flanged with drain plug BSP1/2" Options: (see page 32) - Drain valve - Drain flange
Process connection	side-side (Options see page 33) Flanges DN10 - DN25, PN6, DIN 2631 DN10 - DN25, PN16, DIN 2633 DN10 - DN25, PN40, DIN 2635 DN32 - DN100, DIN 2527 1/2" - 4", ANSI B 16.5 Class 150 or Class 300 Thread or welding stubs GM/... = thread female / size GN/... = thread male / size S... = welding stubs / OD
Distance centre-to-centre M...	min. 150 mm to max. 2000 mm
Material	Stainless steel 316 Ti (1.4571)
Nominal pressure	max. 16 bar (according to float design)
Temperature range	max. 150°C (according to float design)
Float	Type ZTS35/185 Material Titanium Grade 2 S.G. min. 800 kg/m ³ Pressure max. 16 bar Temperature max. 150°C Type ZBS35/120 Material Buna S.G. min. 800 kg/m ³ Pressure max. 6 bar Temperature max. 80°C
Magnetic roller display	Type MRA-M... for technical data and further designs and options see page 22 and 23
Further options:	
Magnetic switches	see page 24, 25, 26 and 27
Level sensors	see page 28, 29, 30 and 31

KSR Magnetic Level Indicators / Gauges PN6 - PN40

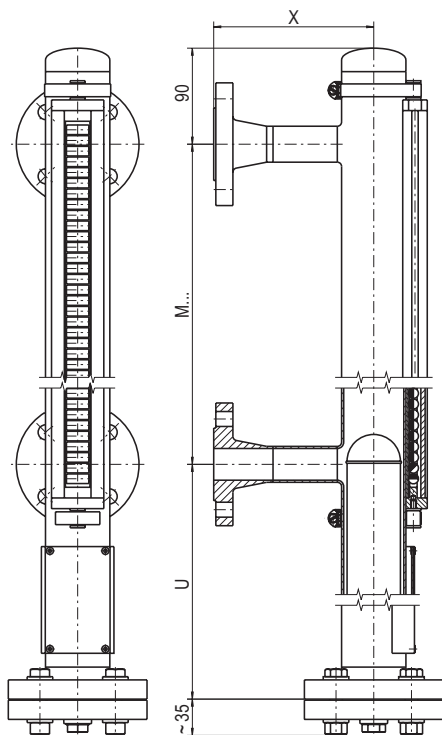


Type: BNA - ../. - M... - V..x.. - MRA (-Ex)

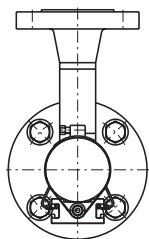
Type code Ex only:

II 1/2G c T2-T6 KEMA 02 ATEX 2106 X

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M = Centre-to-centre process connection
U = Length of float -30
X = Dep. on process connection



Technical data

Chamber	OD 60.3 x 2 mm or OD 64 x 2 mm	
Chamber end top	Welding cap or flat top or flanged Options: (see page 32) - Vent plug BSP1/2" - Vent valve - Vent flange	
Chamber end bottom	Flanged with drain plug BSP1/2" Options: (see page 32) - Drain valve - Drain flange	
Process connection	side-side (Options see page 33) Flanges DN10 - DN25, PN6, DIN 2631 DN10 - DN25, PN16, DIN 2633 DN10 - DN25, PN40, DIN 2635 DN32 - DN100, DIN 2527 1/2" - 4", ANSI B 16.5 Class 150 or Class 300 Thread or welding stubs GM/... = thread female / size GN/... = thread male / size S... = welding stubs / OD	
Distance centre-to-centre M...	min. 150 mm to max. 6000 mm (other dimensions on request)	
Material	Stainless steel (316 Ti, 316 L, 904 L) Titanium Grade 2 Hastelloy C Hastelloy B	
Nominal pressure	max. 40 bar (according to flange design)	
Temperature range	-160°C to +450°C (according to design)	
Ex - Design	Temperature class	Max. operating temperature
	T2	300°C
	T3	200°C
	T4	135°C
	T5	100°C
	T6	85°C
Float	Type Z.SS... P = < 16 bar (Titanium Grade 2) P = < 20 bar (Stainless steel 316 Ti) Length of float depending on S.G. technical data (see page 18) Type Z.S /.../.../.../.../... Float design according to process parameters S.G., pressure and temperature (see type code page 19)	
Magnetic roller display	Type MRA-M... < 200°C Type MRK-M... > 200°C	for technical data and further designs and options see page 22 and 23
Further options:		
Magnetic switches	see page 24, 25, 26 and 27	
Level sensors	see page 28, 29, 30 and 31	
Electrical trace heating	on request	
Chamber insulation	on request	

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KSR Magnetic Level Indicators / Gauges PN64, PN100

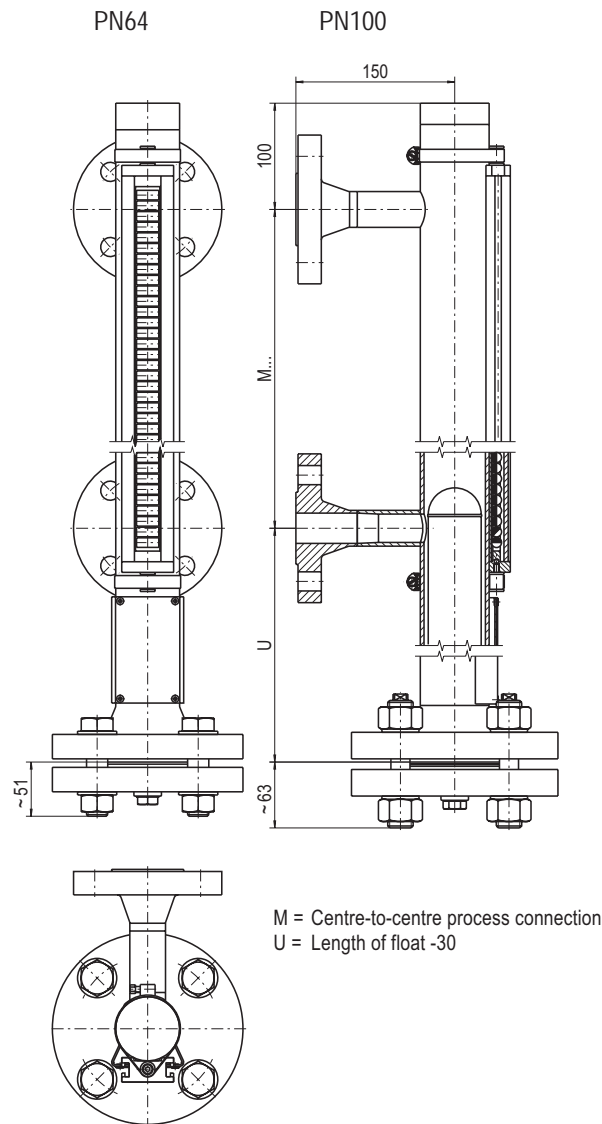


Type: BNA - ../.. - M.... - V..x.. - MRA (-Ex)

Type code Ex only:

II 1/2G c T2-T6 KEMA 02 ATEX 2106 X

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Technical data

Chamber	PN64	OD 60.3 x 2 mm or OD 60.3 x 2.6 mm
	PN100	OD 65 x 3.5 mm
Chamber end top	Welding cap or flat top or flanged	
	PN64	DN50 PN64 or ANSI 2", Class 600
	PN100	DN50 PN100 or ANSI 2", Class 600
	Options: (see page 32)	
	- Vent plug BSP1/2"	
	- Vent valve	
	- Vent flange	
Chamber end bottom	Flanged	
	PN64	DN50 PN64 or ANSI 2", Class 600
	PN100	DN50 PN100 or ANSI 2", Class 600 with drain plug BSP1/2"
	Options: (see page 32)	
	- Drain valve	
	- Drain flange	
Process connection	side-side (Options see page 33)	
	Flanges	
	DN10 - DN25, PN100, DIN 2637	
	DN10 - DN25, DIN 2527	
	1/2" - 3", ANSI B 16.5, Class 600	
	Thread or welding stubs	
	GM/... = thread female / size	
	GN/... = thread male / size	
	S... = welding stubs / OD	
Distance centre-to-centre M...	min. 150 mm to max. 6000 mm (other dimensions on request)	
Material	Stainless steel 316 Ti (1.4571)	
Nominal pressure	PN64	max. 64 bar
	PN100	max. 100 bar
Temperature range	-30°C to +300°C (according to design)	
Ex - Design	Temperature class	Max. operating temperature
	T2	300°C
	T3	200°C
	T4	135°C
	T5	100°C
	T6	85°C
Float	Type Z.S /.../.../.../.../.../... Float design according to process parameters S.G., pressure and temperature (see type code page 19)	
Magnetic roller display	Type MRA-M...	< 200°C
	Type MRK-M...	> 200°C
	for technical data and further designs and options see page 22 and 23	

Further options:

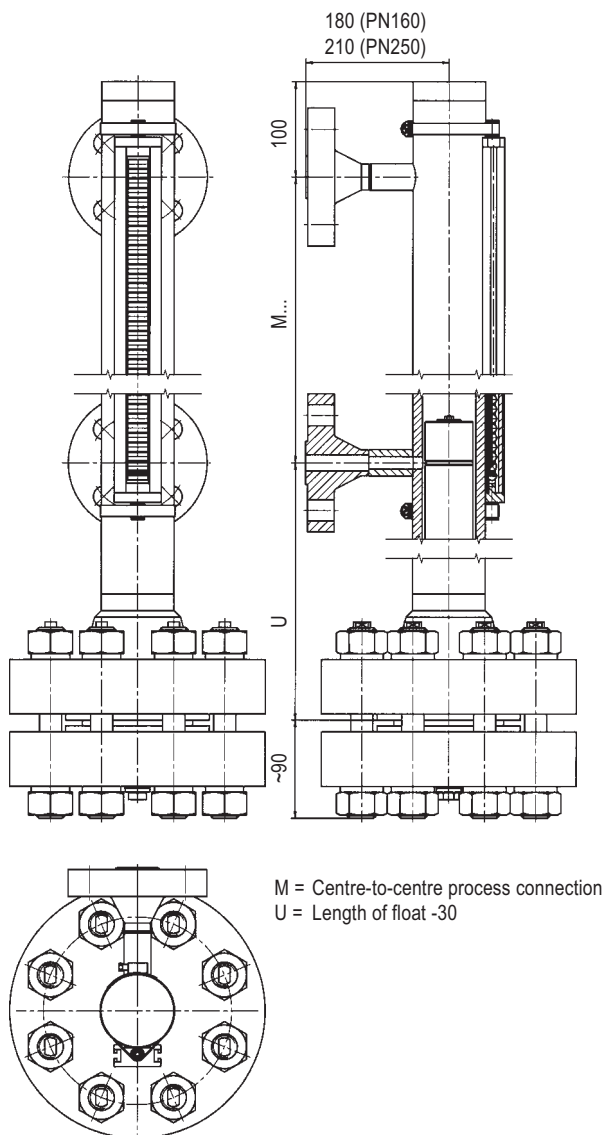
Magnetic switches	see page 24, 25, 26 and 27
Level sensors	see page 28, 29, 30 and 31
Electrical trace heating	on request
Chamber insulation	on request

KSR Magnetic Level Indicators / Gauges PN160, PN250



Type: BNA - ../.. - M.... - V..x.. - MRA

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Technical data

Chamber	PN160	OD 73.03 x 5.16 mm
	PN250	OD 71 x 7.5 mm
Chamber end top	Flat top or flanged ANSI 2 1/2", Class 1500 Options: (see page 32) - Vent plug BSP1/2" - Vent valve - Vent flange	
Chamber end bottom	Flanged ANSI 2 1/2", Class 1500 with drain plug BSP1/2" Options: (see page 32) - Drain valve - Drain flange	
Process connection	side-side (Options see page 33) Flanges PN160 DN10 - DN25, DIN 2638 PN250 DN10 - DN25, DIN 2628 DN10 - DN50, DIN 2527 1/2" - 2 1/2", ANSI B 16.5, Class 1500 Thread or welding stubs GM/... = thread female / size GN/... = thread male / size S... = welding stubs / OD	
Distance centre-to-centre M...	min. 150 mm to max. 6000 mm (other dimensions on request)	
Material	Stainless steel 316 Ti (1.4571)	
Nominal pressure	PN160	max. 160 bar
	PN250	max. 250 bar
Temperature range	PN160	-30°C to +285°C
	PN250	-30°C to +200°C (according to design)
Float	Type Z.S /.../.../.../... Float design according to process parameters S.G., pressure and temperature (see type code page 19) Type ZCFS... Solid body material, leakage-proof (see type code page 19)	
Magnetic roller display	Type MRA-M...	< 200°C
	Type MRK-M...	> 200°C
	for technical data and further designs and options see page 22 and 23	
Further options:		
Magnetic switches	see page 24, 25, 26 and 27	
Level sensors	see page 28, 29, 30 and 31	
Electrical trace heating	on request	
Chamber insulation	on request	

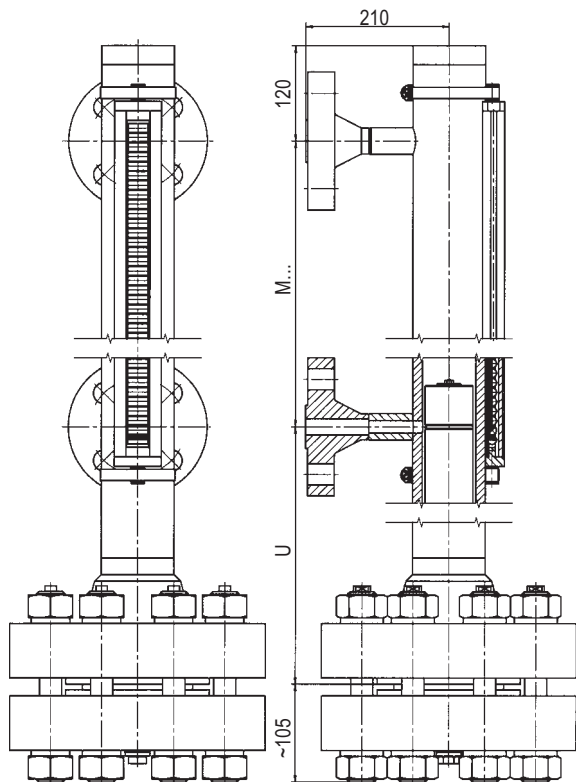
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KSR Magnetic Level Indicators / Gauges PN400

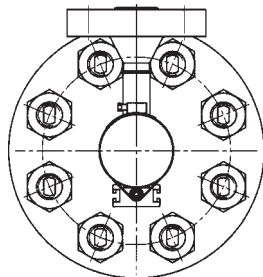


Type: BNA - ../.. - M... - V76x10 - MRA

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M = Centre-to-centre process connection
U = Length of float -30



Technical data

Chamber	OD 76 (OD 76.1) x 10 mm
Chamber end top	Flat top or flanged ANSI 2 1/2", Class 2500 Options: (see page 32) - Vent plug BSP1/2" - Vent valve - Vent flange
Chamber end bottom	Flanged ANSI 2 1/2", Class 2500 with drain plug BSP1/2" Options: (see page 32) - Drain valve - Drain flange
Process connection	side-side (Options see page 33) Flanges DN10 - DN15, PN400, DIN 2627 DN10 - DN50, DIN 2527 1/2" - 2 1/2", ANSI B 16.5, Class 2500 Thread or welding stubs GM/... = thread female / size GN/... = thread male / size S... = welding stubs / OD
Distance centre-to-centre M...	min. 150 mm to max. 6000 mm (other dimensions on request)
Material	Stainless steel 316 Ti (1.4571)
Nominal pressure	max. 400 bar
Temperature range	-30°C to +70°C (according to design)
Float	Type Z.S /.../.../.../.../... Float design according to process parameters S.G., pressure and temperature (see type code page 19) Type ZCFS... Solid body material, leakage-proof (see type code page 19)
Magnetic roller display	Type MRA-M... for technical data and further designs and options see page 22 and 23
Further options:	
Magnetic switches	see page 24, 25, 26 and 27
Level sensors	see page 28, 29, 30 and 31
Electrical trace heating	on request
Chamber insulation	on request

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KSR Magnetic Level Indicators / Gauges with heating jacket

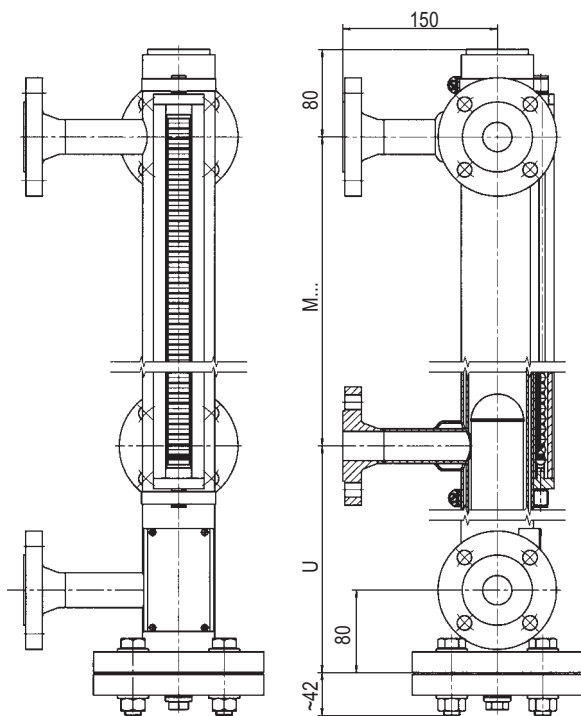


Type: BNA - ../.. - M.... - V60/70 - MRA (-Ex)

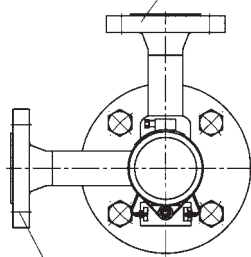
Type code Ex only:

Ex II 1/2G c T2-T6 KEMA 02 ATEX 2106 X

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Process connection



M = Centre-to-centre process connection
U = Length of float -30

Heating jacket connection



Technical data

Chamber	OD 60,3 x 2 mm
Heating jacket pipe	OD 70 x 2 mm
Chamber end top	Welding cap Options: (see page 32) - Vent plug BSP1/2" - Vent valve - Vent flange
Chamber end bottom	Flanged with drain plug BSP1/2" Options: (see page 32) - Drain valve - Drain flange
Process- and heating jacket connections	side-side (Options see page 33) Flanges DN10 - DN25, PN6, DIN 2631 DN10 - DN25, PN16, DIN 2633 DN32 - DN100, DIN 2527 1/2" - 4", ANSI B 16.5, Class 150
Process connection options	Flanged DN10 - DN25, PN40, DIN 2635 1/2" - 4", ANSI B 16.5, Class 300 Thread or welding stubs GM/... = thread female / size GN/... = thread male / size S... = welding stubs / OD
Distance centre-to-centre M...	min. 150 mm to max. 6000 mm (other dimensions on request)
Material	Stainless steel 316 Ti (1.4571)
Nominal pressure	Process max. 16 bar or max. 40 bar (according to flange design) Heating jacket max. 16 bar
Temperature range	-60°C to +450°C (according to design)
Ex - Design	Temperature class Max. operating temperature T2 300°C T3 200°C T4 135°C T5 100°C T6 85°C
Float	Type Z.S /.../.../.../.../... Float design according to process parameters S.G., pressure and temperature (see type code page 19)
Magnetic roller display	Type MRA-M... < 200°C Type MRK-M... > 200°C for technical data and further designs and options see page 22 and 23
Further options:	
Magnetic switches	see page 24, 25, 26 and 27
Level sensors	see page 28, 29, 30 and 31

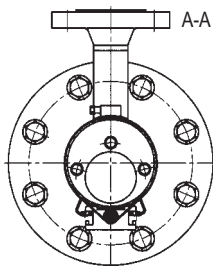
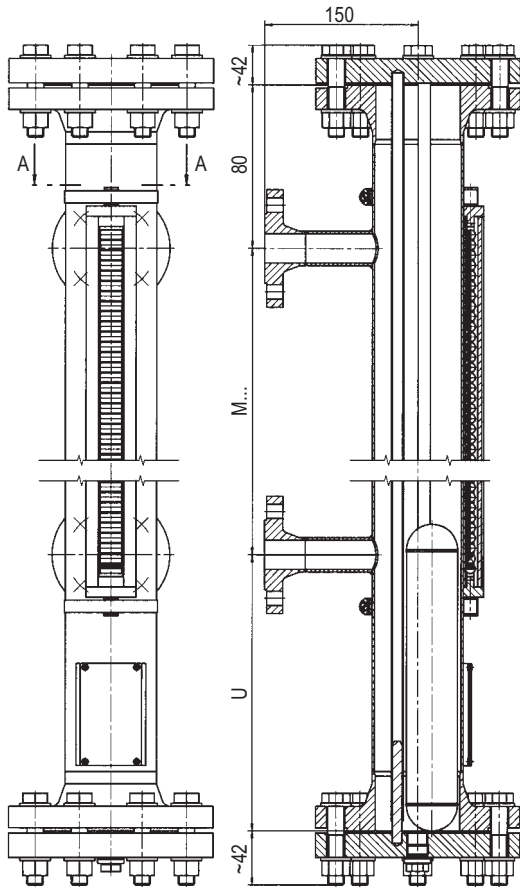
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KSR Magnetic Level Indicators / Gauges liquid gas design



Type: BNA - ../.. - M.... - V88x2 - MRA

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M = Centre-to-centre process connection
U = Length of float -30

Technical data

Chamber	OD 88.9 x 2 mm
Chamber end top	Flanged DN80 Options: (see page 32) - Vent plug BSP1/2" - Vent valve - Vent flange
Chamber end bottom	Flanged DN80 with drain plug BSP1/2" Options: (see page 32) - Drain valve - Drain flange
Process connection	side-side (Options see page 33) Flanges DN10 - DN25, PN16, DIN 2633 DN10 - DN25, PN40, DIN 2635 DN10 - DN100, DIN 2527 1/2" - 4", ANSI B 16.5 Class 150 or Class 300 Thread or welding stubs GM/... = thread female / size GN/... = thread male / size S... = welding stubs / OD
Distance centre-to-centre M...	min. 150 mm to max. 6000 mm
Material	Stainless steel 316 Ti (1.4571)
Nominal pressure	max. 25 bar (according to flange design)
Temperature range	-60°C to +300°C (according to design)
Float	Type Z.S./.../.../.../.../... Float design according to process parameters S.G., pressure and temperature (see type code page 19)
Magnetic roller display	Type MRA-M... < 200°C Type MRK-M... > 200°C for technical data and further designs and options see page 22 and 23
Further options:	
Magnetic switches	see page 24, 25, 26 and 27
Level sensors	see page 28, 29, 30 and 31
Electrical trace heating	on request
Chamber insulation	on request

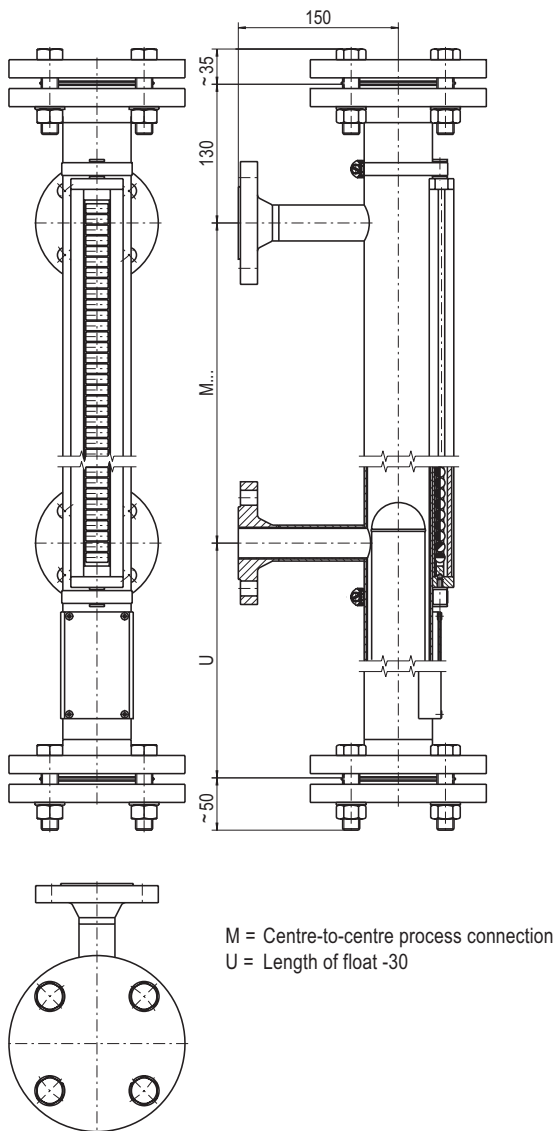
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KSR Magnetic Level Indicators / Gauges E-CTFE-coated



Type: BNA - ../16 - M.... - VEC64x2 - MRA

Pressure Equipment Directive 97/23/EC



Technical data

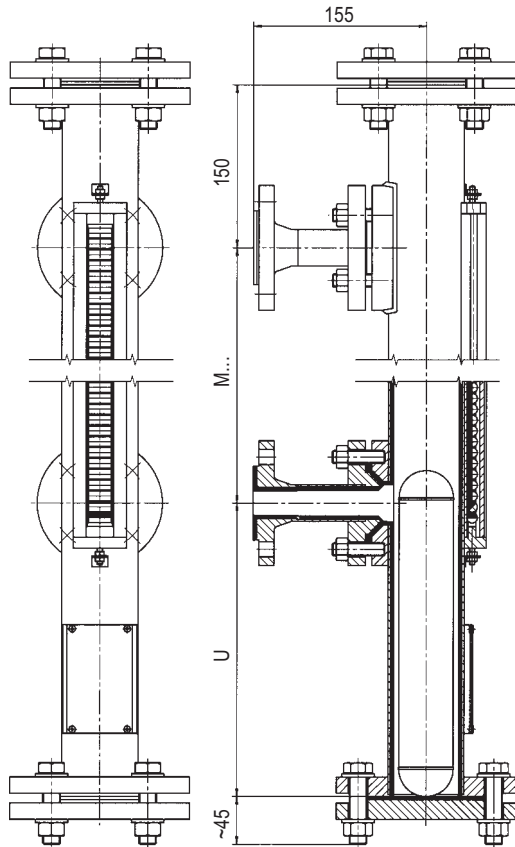
Chamber	OD 64 x 2 mm
Chamber end top	Flanged Options: (see page 32) - Vent flange
Chamber end bottom	Flanged Options: (see page 32) - Drain flange
Process connection	side-side Flanges DN25, PN16, DIN 2633 DN32 - DN100, DIN 2527 1" - 4", ANSI B 16.5, Class 150
Distance centre-to-centre M...	min. 150 mm to max. ... mm (overall chamber length max. 4000 mm) on dimensions > 4000 mm - chamber separated with flange
Material	Stainless steel 316 Ti (1.4571) coated E-CTFE internally Option: anti-static
Nominal pressure	max. 16 bar
Temperature range	dep. on liquid
Float	Type Z.ECS../...../B152 .V... = Material Stainless steel 316 Ti E-CTFE-coated .T... = Material Titanium Grade 2 E-CTFE-coated Float design according to process parameters S.G., pressure and temperature (see type code page 19)
Magnetic roller display	Type MRA-M... for technical data and further designs and options see page 22 and 23
Further options:	
Magnetic switches	see page 24, 25, 26 and 27
Level sensors	see page 28, 29, 30 and 31
Electrical trace heating	on request
Chamber insulation	on request

KSR Magnetic Level Indicators / Gauges PTFE-lined



Type: BNA - ../16 - M.... - VTF70x2 - MRA

Pressure Equipment Directive 97/23/EC



M = Centre-to-centre process connection
U = Length of float -30

Technical data

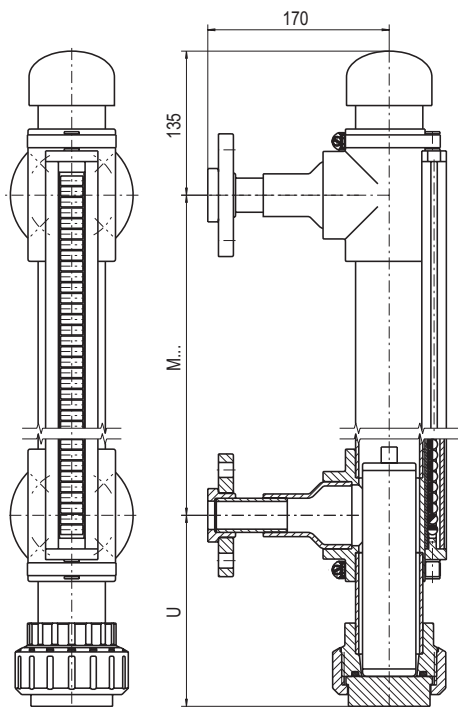
Chamber	OD 70 x 2 mm
Chamber end top	Flanged Options: (see page 32) - Vent flange
Chamber end bottom	Flanged Options: (see page 32) - Drain flange
Process connection	side-side Flanged DN25, PN16, DIN 2633 with reducing flanges DN32 - DN100, PN10, DIN 2848 / 2874
Distance centre-to-centre M...	min. 150 mm to max. ... mm (overall chamber length max. 4000 mm) on dimensions > 4000 mm - chamber separated with flange
Material	Stainless steel 316 Ti (1.4571) coated PTFE internally Lining 3 mm wall thickness, vacuum-proof Option: anti-static
Nominal pressure	max. 10 bar
Temperature range	depending on liquid
Float	Type Z.ECS../.../.../.../B104 .V... = Material Stainless steel 316 Ti E-CTFE-coated .T... = Material Titanium Grade 2 E-CTFE-coated Type Z.EDS../.../.../.../B104 .V... = Material Stainless steel 316 Ti PFA-coated .T... = Material Titanium Grade 2 PFA-coated Float design according to process parameters S.G., pressure and temperature (see type code page 19)
Magnetic roller display	Type MRA-M... for technical data and further designs and options see page 22 and 23
Further options:	
Magnetic switches	see page 24, 25, 26 and 27
Level sensors	see page 28, 29, 30 and 31
Electrical trace heating	on request
Chamber insulation	on request

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KSR Magnetic Level Indicators / Gauges PVDF, PP, PVC



Type: BNA - ../16 - M.... - PF63x3 - MRA
 Type: BNA - ../16 - M.... - PP63x3 - MRA
 Type: BNA - ../16 - M.... - P63x3 - MRA



M = Centre-to-centre process connection
 U = Length of float -30 (min. 155 mm)

Technical data

Chamber	OD 63 x 3 mm
Chamber end top	Welding cap Options: (see page 32) - Threaded fitting - Vent valve - Vent flange
Chamber end bottom	Threaded fitting Options: (see page 32) - Drain valve - Drain flange
Process connection	side-side Flanged DN15 - DN50, PN16 Dimensions: ISO/DIN 1/2" - 2", ANSI B 16.5, Class 150 Dimensions: ANSI B 16.5 Material: UP - GF
Distance centre-to-centre M...	min. 200 mm to max. 4000 mm
Material	PVDF, PP or PVC-U
Nominal pressure	max. 4 bar
Temperature range	PVDF max. 80°C PP max. 60°C PVC max. 40°C
Float	Type Z..S... .PF... = Material PVDF .PP... = Material PP .P... = Material PVC-U Length of float depending on S.G. technical data see page 17
Magnetic roller display	Type MRA-M... for technical data and further designs and options see page 22 and 23

Further options:

Magnetic switches see page 24, 25, 26 and 27
 Level sensors see page 28, 29, 30 and 31

KSR Bypass Floats

PVDF, PP, PVC



Material
Working Temperature
Working Pressure
Test Pressure
Diameter
Type Code

PVDF				
+ 80 °C				
max. 6 bar				
max. 9 bar				
50 mm				
ZPFS...				

PP				
+ 60 °C				
max. 6 bar				
max. 9 bar				
50 mm				
ZPPS ...				

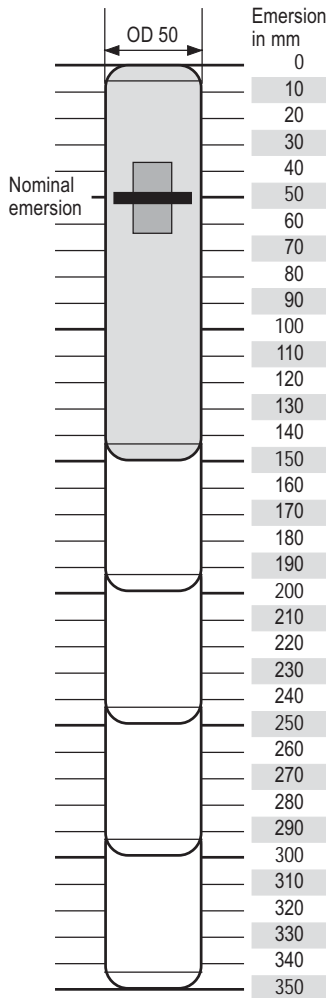
PVC				
+ 40 °C				
max. 6 bar				
max. 9 bar				
50 mm				
ZPS ...				

Float Length (mm)
Volume (cm ³)
Weight (g)

150	200	250	300	350
295	393	491	589	687
290	335	385	435	480

150	200	250	300	350
295	393	491	589	687
260	285	310	335	360

150	200	250	300	350
295	393	491	589	687
245	265	290	310	335



Immersion depth table in relation to specific gravity of the liquid (kg/m³)

Emersion in mm	150	200	250	300	350
0	-	-	-	-	-
10	-	-	-	-	-
20	-	-	-	-	-
30	1230	1000	890	820	760
40	1340	1070	930	850	790
50	1480	1140	980	890	810
60	1640	1220	1030	920	840
70	1850	1310	1090	960	870
80	2110	1420	1150	1010	910
90	2460	1550	1230	1050	940
100	2950	1710	1310	1110	980
110	-	1900	1400	1170	1020
120	-	2130	1510	1230	1060
130	-	2440	1630	1300	1110
140	-	2840	1780	1380	1160
150	-	-	1960	1480	1220
160	-	-	2180	1580	1290
170	-	-	2450	1700	1360
180	-	-	2800	1850	1440
190	-	-	-	2010	1530
200	-	-	-	2220	1630
210	-	-	-	2460	1750
220	-	-	-	2770	1880
230	-	-	-	-	2040
240	-	-	-	-	2220
250	-	-	-	-	2440
260	-	-	-	-	2720
270	-	-	-	-	-
280	-	-	-	-	-
290	-	-	-	-	-
300	-	-	-	-	-
310	-	-	-	-	-
320	-	-	-	-	-
330	-	-	-	-	-
340	-	-	-	-	-
350	-	-	-	-	-

Emersion in mm	150	200	250	300	350
0	-	-	-	-	-
10	-	-	-	-	-
20	-	-	-	-	-
30	1100	850	720	630	570
40	1200	910	750	660	590
50	1320	970	790	680	610
60	1470	1040	830	710	630
70	1660	1120	880	740	650
80	1890	1210	930	780	680
90	2210	1320	990	810	710
100	2650	1450	1050	850	730
110	-	1610	1130	900	760
120	-	1810	1210	950	800
130	-	2070	1320	1000	830
140	-	2420	1440	1070	870
150	-	2900	1580	1140	920
160	-	-	1750	1220	960
170	-	-	1970	1310	1020
180	-	-	2260	1420	1080
190	-	-	2630	1550	1150
200	-	-	-	1710	1220
210	-	-	-	1900	1310
220	-	-	-	2130	1410
230	-	-	-	2440	1530
240	-	-	-	2840	1670
250	-	-	-	-	1830
260	-	-	-	-	2040
270	-	-	-	-	2290
280	-	-	-	-	2620
290	-	-	-	-	-
300	-	-	-	-	-
310	-	-	-	-	-
320	-	-	-	-	-
330	-	-	-	-	-
340	-	-	-	-	-
350	-	-	-	-	-

Emersion in mm	150	200	250	300	350
0	-	-	-	-	-
10	-	-	-	-	-
20	-	-	-	-	-
30	1040	790	670	580	530
40	1130	840	700	610	550
50	1250	900	740	630	570
60	1390	960	780	660	590
70	1560	1040	820	690	610
80	1780	1120	870	720	630
90	2080	1230	920	750	660
100	2500	1350	980	790	680
110	-	1500	1050	830	710
120	-	1690	1140	880	740
130	-	1930	1230	930	780
140	-	2250	1340	990	810
150	-	2700	1480	1050	850
160	-	-	1640	1130	900
170	-	-	1850	1210	950
180	-	-	2110	1320	1000
190	-	-	2460	1440	1070
200	-	-	2950	1580	1140
210	-	-	-	1750	1220
220	-	-	-	1970	1310
230	-	-	-	2260	1420
240	-	-	-	2630	1550
250	-	-	-	-	1710
260	-	-	-	-	1900
270	-	-	-	-	2130
280	-	-	-	-	2440
290	-	-	-	-	2840
300	-	-	-	-	-
310	-	-	-	-	-
320	-	-	-	-	-
330	-	-	-	-	-
340	-	-	-	-	-
350	-	-	-	-	-

KSR Bypass Floats

Stainless steel, Titanium

Design with beads



Material
Working Temperature
Working Pressure
Test Pressure
Diameter
Type Code

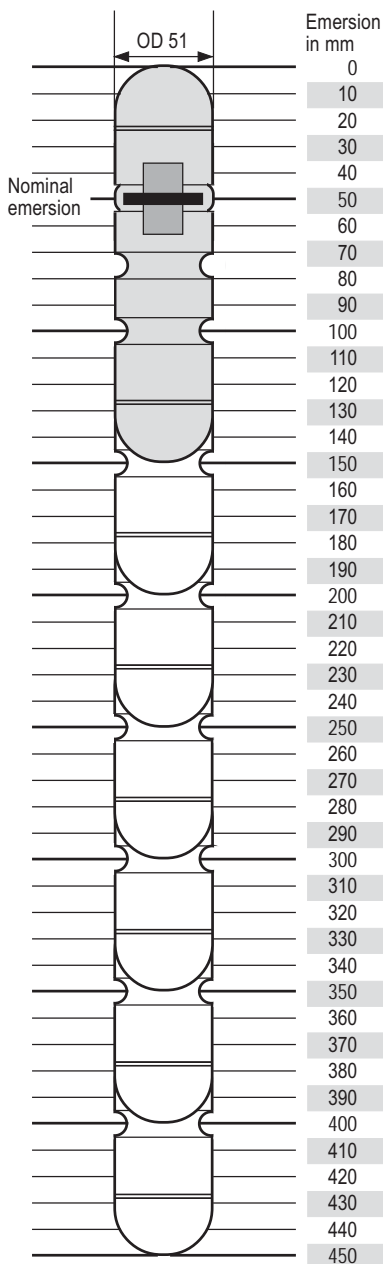
Stainless steel 316 Ti (1.4571)						
- 40°C to + 250°C						
max. 20 bar						
max. 30 bar						
50 mm						
ZVSS ...						

Titanium Grade 2 (3.7035)						
- 40°C to + 250°C						
max. 16 bar						
max. 20 bar						
50 mm						
ZTSS ...						

Float Length (mm)
Volume (cm³)
Weight (g)

150	200	250	300	350	400	450
262	360	458	556	654	753	851
256	300	332	368	415	455	485

150	200	250	300	350	400	450
262	360	458	556	654	753	851
169	240	265	287	312	342	368



Immersion depth table in relation to specific gravity of the liquid (kg/m³)

0	10	20	30	40	50	60
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
1170	950	800	720	680	640	600
1280	1010	840	740	700	660	610
1420	1080	880	780	720	680	630
1600	1160	930	810	750	700	650
1820	1260	980	850	780	720	660
2110	1370	1050	890	810	740	680
2520	1500	1110	930	840	770	700
-	1670	1190	980	870	790	720
-	1870	1280	1030	910	820	740
-	2130	1390	1090	950	850	770
-	2480	1510	1160	1000	890	790
-	2960	1660	1240	1050	920	820
-	-	1840	1320	1100	960	850
-	-	2070	1420	1160	1000	880
-	-	2360	1540	1230	1050	910
-	-	2740	1680	1310	1090	940
-	-	-	1840	1390	1150	980
-	-	-	2040	1490	1210	1020
-	-	-	2290	1610	1280	1070
-	-	-	2620	1740	1350	1110
-	-	-	-	1890	1430	1170
-	-	-	-	2080	1530	1220
-	-	-	-	2310	1640	1290
-	-	-	-	2590	1760	1360
-	-	-	-	2950	1900	1440
-	-	-	-	-	2080	1530
-	-	-	-	-	2280	1630
-	-	-	-	-	2530	1740
-	-	-	-	-	2840	1880
-	-	-	-	-	-	2030
-	-	-	-	-	-	2210
-	-	-	-	-	-	2430
-	-	-	-	-	-	2690
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

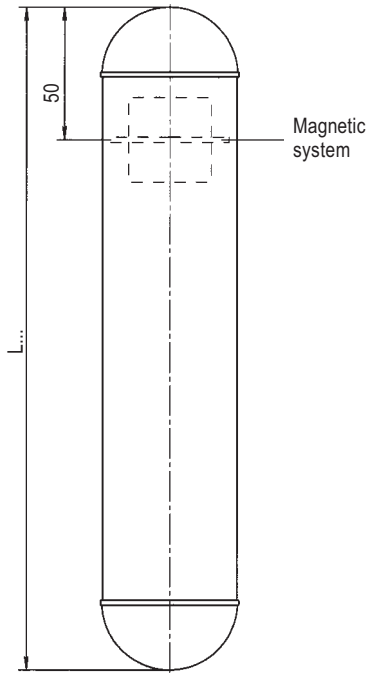
0	10	20	30	40	50	60
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
770	760	640	560	510	480	460
850	810	670	580	530	500	470
940	860	700	600	540	510	480
1050	930	740	630	560	530	490
1200	1000	790	660	580	540	500
1400	1090	830	690	610	560	520
1670	1200	890	720	630	580	530
2070	1330	950	760	660	600	550
2720	1500	1030	800	690	620	570
-	1710	1110	850	720	640	580
-	1980	1210	900	750	670	600
-	2370	1330	960	790	690	620
-	2930	1470	1030	830	720	640
-	-	1650	1110	870	750	670
-	-	1880	1200	930	790	690
-	-	2190	1310	980	820	720
-	-	2610	1440	1050	860	740
-	-	-	1590	1120	910	780
-	-	-	1790	1210	960	810
-	-	-	2040	1310	1010	850
-	-	-	2370	1420	1080	890
-	-	-	2830	1560	1150	930
-	-	-	-	1730	1230	980
-	-	-	-	1950	1320	1030
-	-	-	-	2220	1430	1090
-	-	-	-	2580	1560	1160
-	-	-	-	-	1710	1240
-	-	-	-	-	1900	1320
-	-	-	-	-	2130	1420
-	-	-	-	-	2430	1540
-	-	-	-	-	2820	1680
-	-	-	-	-	-	1840
-	-	-	-	-	-	2040
-	-	-	-	-	-	2290
-	-	-	-	-	-	2620
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

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KSR Bypass Floats



High pressure design

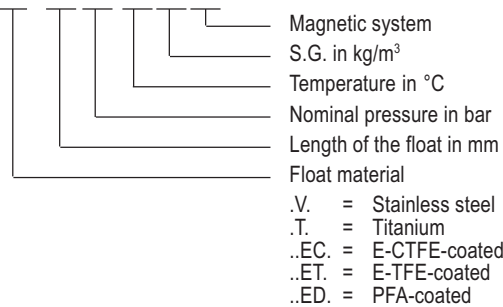


Type Z...S/.../.../.../.../...

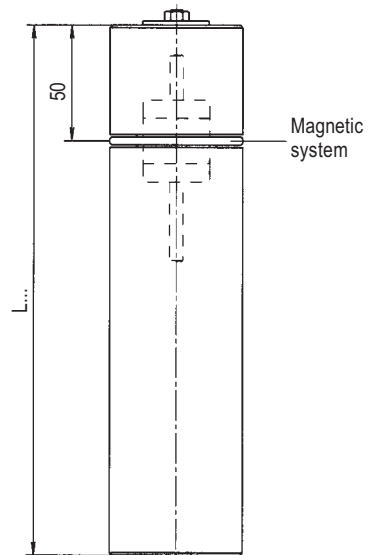
- Material Stainless steel 316 Ti (1.4571)
- Options E-CTFE-, E-TFE- or PFA-coated
- Material Titanium Grade 2
- Options E-CTFE-, E-TFE- or PFA-coated
- Pressure range Stainless steel > 20 bar to 40 bar
- Titanium > 16 bar to 130 bar
- Temperature dependent

Type code

Z..S / ... / ... / ... / ... / ... / ...



- Distinction between low pressure type
 - straight body -
- Design depending on 3 parameters
 - Pressure, Temperature and S.G.-
- Compression strength
 - with reinforcement-discs
 - sealed design -
- Magnetic system (radial symmetric)
 - according to pressure and temperature
- Length of the float
 - according to S.G. of liquid and weight of float



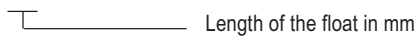
Type ZCFS/...

Solid body material, leakage-proof, on request

- Max. nominal pressure 420 bar
- Max. nominal temperature 100°C

Type code

ZCFS / ...



The following has to be specified in case of an order:

Max. nominal pressure (PN) bar
Test pressure	PN x 1.3 PN x 1.5
Max. nominal temperature °C
Min. S.G. of the liquid kg/m ³

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KSR Top Mounted Level Indicators



Operating Principle

The KSR Top Mounted Level Indicator is mounted on the top of the tank by means of a suitable process connection (flange or thread). It consists of a chamber and a float with guide rod and magnetic system attached to it. As the liquid level in the tank rises or falls, the float and the magnet will move with it.

On the 'dry side' of the chamber is the KSR Magnetic Roller Display, a column of magnetic rollers which are white on one side and red on the other. The rollers are made from plastic (MRA) or ceramics (MRK) with a distance of 10 mm between their axes. As the float moves up or down the bunched field of the permanent magnet mounted in its top section 'pulls' the rollers through a rotation of 180°, thus changing their colour. As the float rises the rollers are turned from white to red, and as the float falls, they are changed back to white again. This means that at any given time the amount of liquid in the tank is constantly represented by a red column without any external power supply.

Technical Advantages

- Simple, robust, and solid design
- Pressure- and gas-proof separation of chamber and display
- Measuring and indicating of the level of aggressive, combustible, toxic, hot, agitated, and contaminated liquids
- KSR Magnetic Roller Displays without external power supply
- Available for applications in all areas of industry through use of highly corrosion-resistant materials
- Designs for a pressure range from full vacuum to 64 bar
- Designs for temperatures from -60°C to +300°C

Options

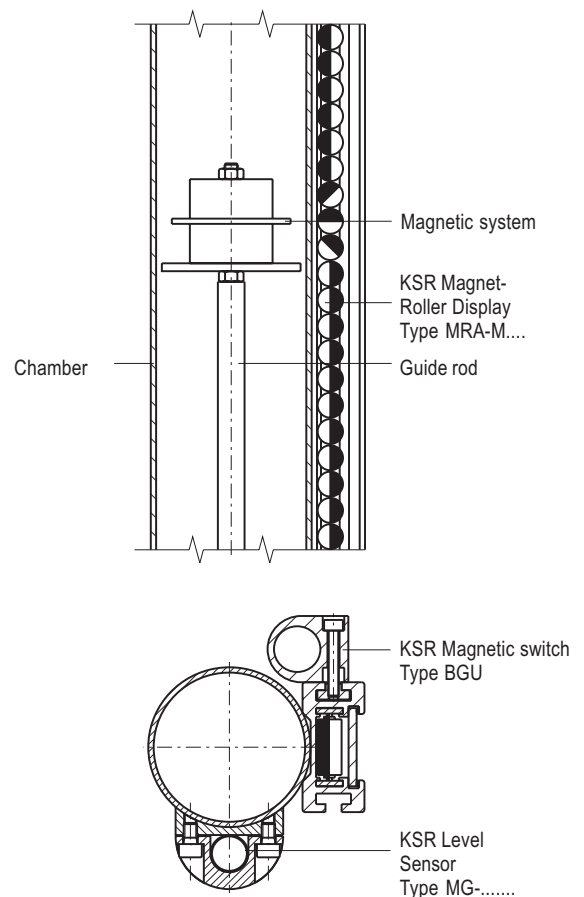
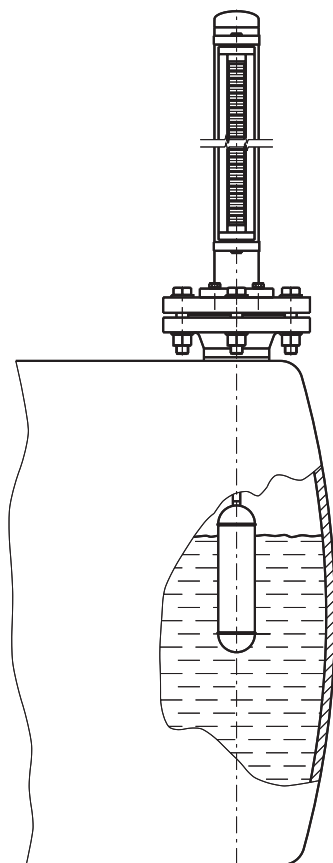
As options the following devices can be attached to a KSR Top Mounted Level Indicator to monitor and control the level of the liquid.

KSR Level Sensors

KSR Level Sensors are used to measure and transmit the level in conjunction with a KSR control unit. This control unit converts the resistance value of the level sensor to a proportional analogue signal.

KSR Magnetic Switches

KSR Magnetic switches are used to monitor certain limits of the level. The obtained binary signal can be forwarded to trigger alarms or other controls.



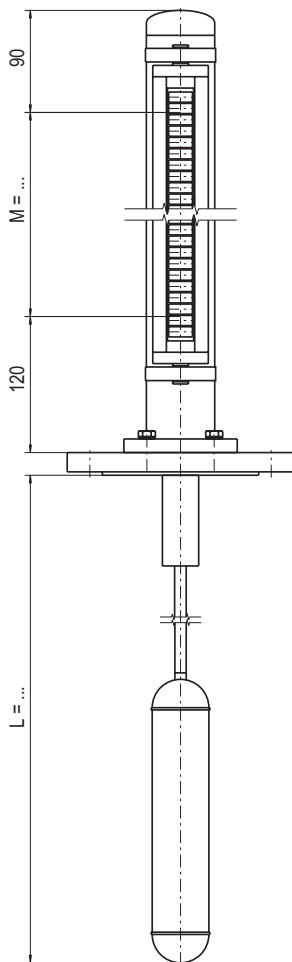
1015-2

KSR Top Mounted Level Indicators



Type: UTN - ../.. - L..../M.... - V.. - MRA

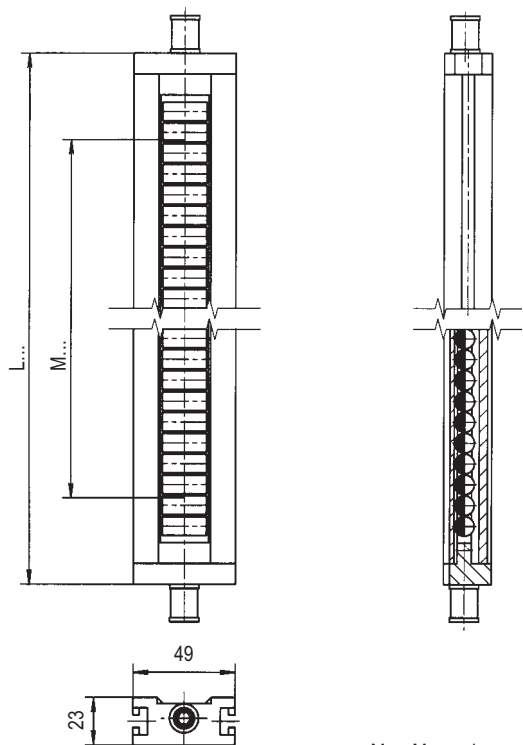
CE Pressure Equipment Directive 97/23/EC



Technical data

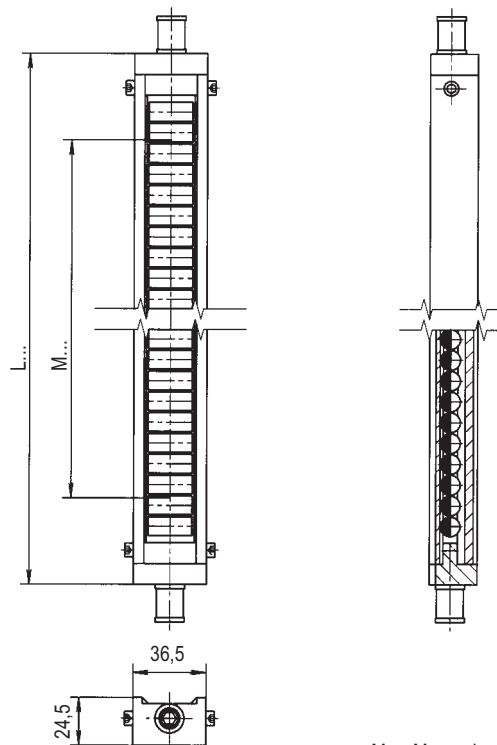
Chamber	OD 60.3 x 2 mm or OD 60.3 x 2.6 mm
Chamber end top	Welding cap or flat top or flanged Options: (see page 32) - Vent plug BSP1/2"
Process connection	Flanges: DIN 2527 DN50 - DN250, PN6 - PN64 Flanges: ANSI B 16.5 2" - 10", Class 150 - 600 Threaded: BSP 2"
Material	
Chamber	Stainless steel 316 Ti or 316 L
Process connection	Stainless steel 316 Ti or 316 L
Guide rod	Titanium
Float	Stainless steel 316 Ti or Titanium
Nominal pressure	max. 64 bar (according to design)
Temperature range	-60°C to +300°C (according to design)
Float	Bypass floats in Stainless steel 316 Ti or Titanium OD 50 - OD 100 mm Spherical float in Stainless steel 316 Ti or Titanium OD 80 - OD 120 mm Float design according to process parameters S.G., pressure and temperature and insertion length L...
Magnetic roller display	Type MRA-M.... < 200°C Type MRK-M.... > 200°C for technical data and further designs and options see page 22 and 23
Further options:	
Magnetic switches	see page 24, 25, 26 and 27
Level sensors	see page 28, 29, 30 and 31
Electrical trace heating	on request
Chamber insulation	on request
Stilling tube or cage	on request

1015-2



M = Measuring range
L = M + 83

Type MRA-M....
Type MRK-M....

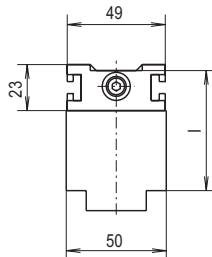
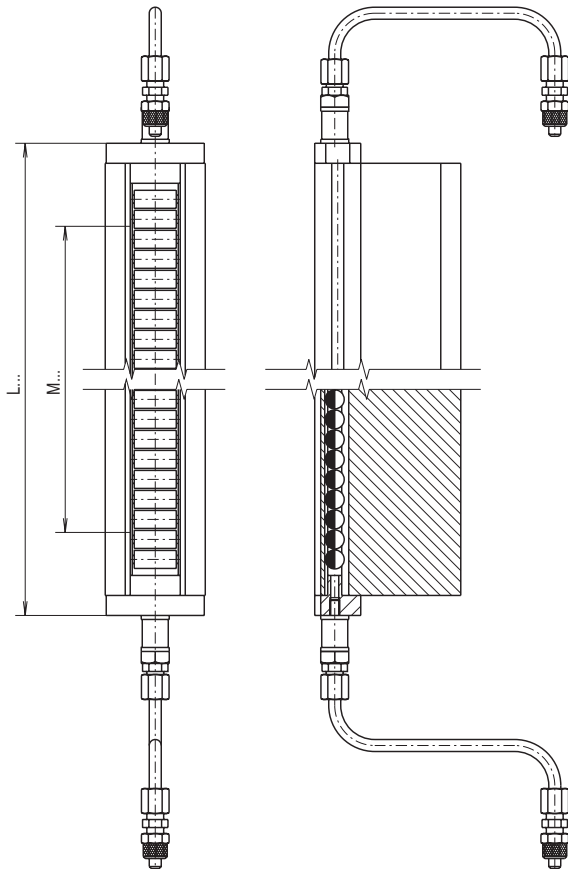


M = Measuring range
L = M + 83

Type MNAV-M....
Type MNKV-M....

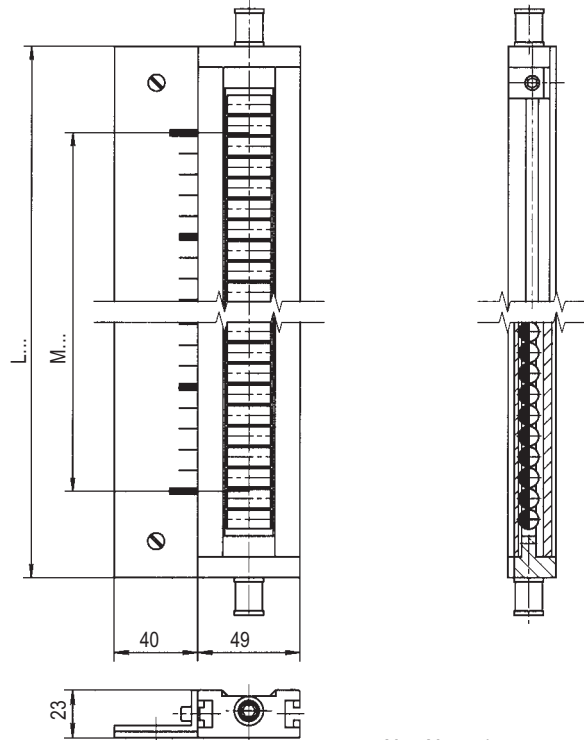
Technical data	MRA	MRK
Housing	Aluminium anodised	
Rollers	Material Crastin PBT red and white	Material Ceramics red and white
Cover	Makrolon PC	Glass
Max. ambient temperature	200°C	450°C
Housing protection	IP65	

Technical data	MNAV	MNKV
Housing	Aluminium Stainless steel-lined	
Rollers	Material Crastin PBT red and white	Material Ceramics red and white
Cover	Makrolon PC	Glass
Max. ambient temperature	200°C	450°C
Housing protection	IP65	



Sight glass extender
 M = Measuring range
 L = M + 83
 I = Insulation thickness

Code adder /P = with sight glass extender and purge (for chamber insulations)



M = Measuring range
 L = M + 83

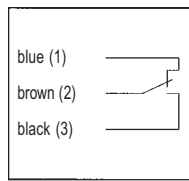
Code adder /SK = Aluminium with adhesive foil, cm-graduation ambient temperature for the adhesive foil max. 100°C

/SG = Aluminium engraved, graduation selectable

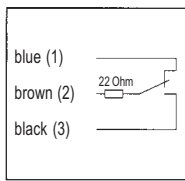
/VSG = Stainless steel engraved, graduation selectable

KSR Magnetic switches are used to monitor certain limits of the level. The obtained binary signal can be forwarded to trigger alarms or other controls.

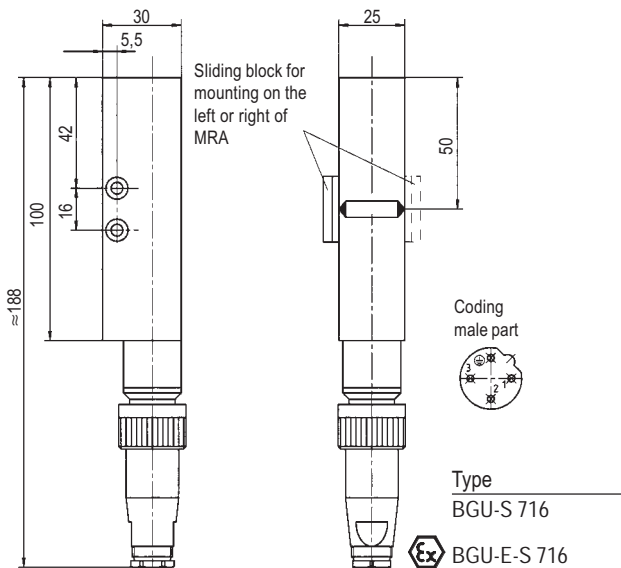
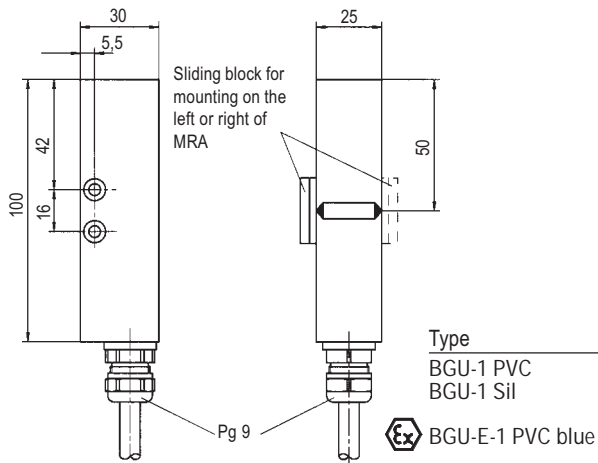
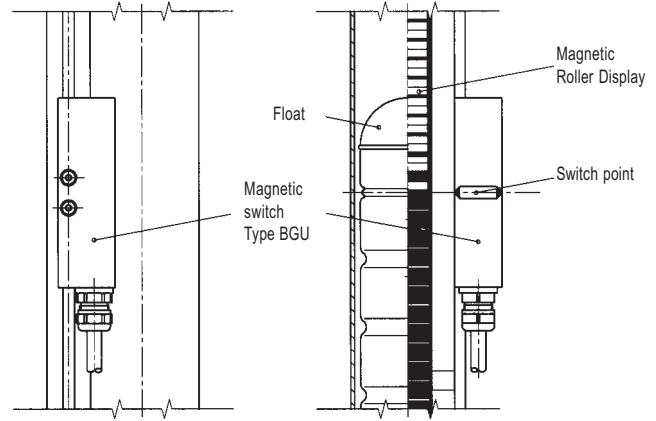
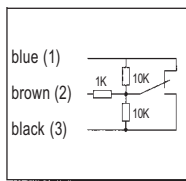
Connection diagram
1 switch point



1 switch point
Circuit for use on
PLCs



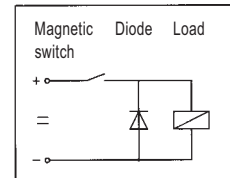
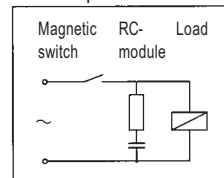
1 switch point
Initiator
Equivalent circuit to
DIN EN 60947-5-6

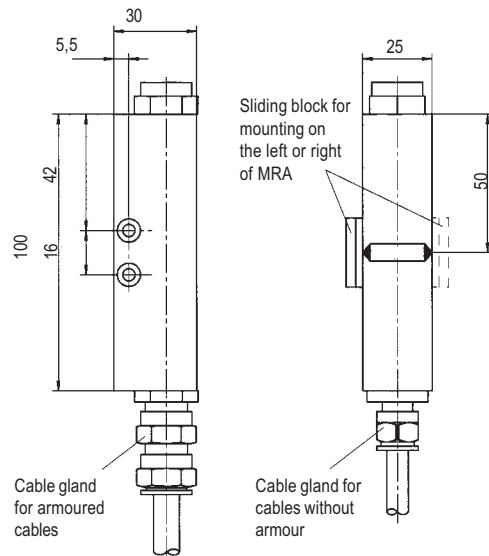
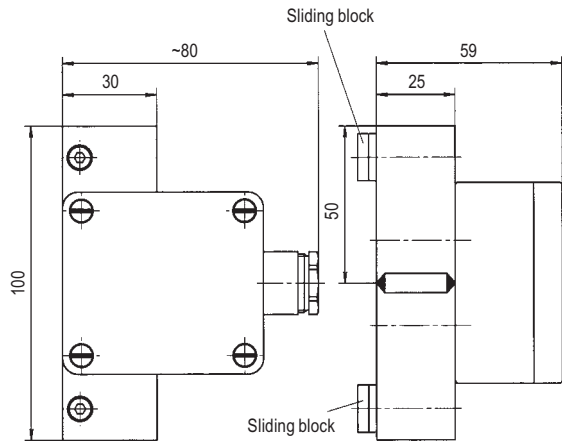


Code	Type
M	= BGU-1 PVC
MT	= BGU-1 Sil
MSt	= BGU-S 716
Ex ME	= BGU-E-1 PVC blue
MESSt	= BGU-E-S 716

Technical data	
Contact	Reed contact
Contact type	1 SPDT
Contact behaviour	bistable
Switch rating	
Code M, MT and MSt	230 V AC, 60 VA, 1 A 230 V DC, 30 W, 0.5 A for use in intrinsically safe circuit only with max. 100 mA and max. 30 V for use in control circuits to DIN EN 60947-5-6
Code ME and MESSt	adder /N
Max. ambient temperature	
Code M	90°C
Code MT	150°C
Code MSt	85°C
Code ME and MESSt	T6 to 85°C
Connection cable	3 x 0.75 mm ²
Code M	1 m PVC grey
Code MT	1 m Silicone
Code ME	1 m PVC blue
Connection plug	
Code MSt and MESSt	
Housing	Aluminium, anodised
Housing protection	IP65
Intrinsically safe	Code ME and MESSt only
(Marking)	Ex II 1 G EEx ia IIC T6 - T3 LCIE 01 ATEX 6047 X

Contact protection measures





Code	Type
MA	= BGU-A
MAE	= BGU-A-E

Code	Type
MD	= BGU-EE d-1 PVC
MDG	= BGU-EE d-1 PUR
MDGA	= BGU-EE d-1 PURA
MDT	= BGU-EE d-1 Sil

Technical data

Contact	Reed contact
Contact type	1 SPDT
Contact behaviour	bistable

Switch rating

Code MA	230 V AC, 60 VA, 1 A
Code MAE	230 V DC, 30 W, 0.5 A
adder /N	for use in intrinsically safe circuit only with max. 100 mA and max. 30 V for use in control circuits to DIN EN 60947-5-6

Max. ambient temperature

Code MA	150°C
Code MAE	T6 to 85°C T5 to 100°C T4 to 135°C T3 to 150°C

Housing	Aluminium, anodised
---------	---------------------

Housing protection	IP65
--------------------	------

Intrinsically safe	Code MAE only
--------------------	---------------

(Marking)	II 1 G EEx ia IIC T6 - T3 LCIE 01 ATEX 6047 X
-----------	--

Contact protection measures see page 24

Technical data

Contact	Reed contact
Contact type	1 SPDT
Contact behaviour	bistable

Switch rating	230 V AC, 60 VA, 1 A
adder /N	230 V DC, 30 W, 0.5 A for use in control circuits to DIN EN 60947-5-6

Max. ambient temperature

Code MD, MDG and MDGA	T6 to 85°C
Code MDT	T6 to 85°C T5 to 100°C T4 to 135°C T3 to 150°C

Code MD	3 x 0.75 mm ² 1 m PVC grey
Code MDG	1 m PUR yellow
Code MDGA	1 m PUR yellow armoured
Code MDT	1 m Silicone

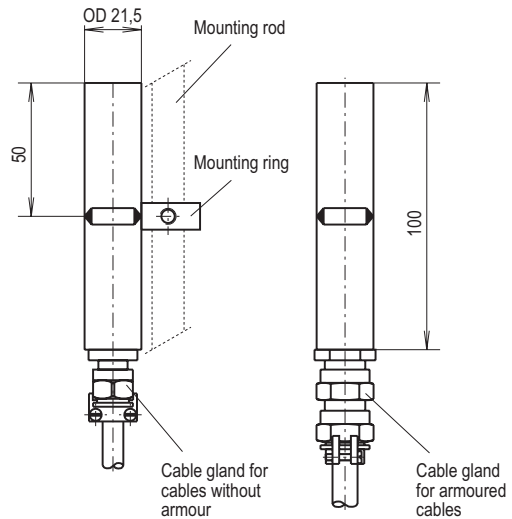
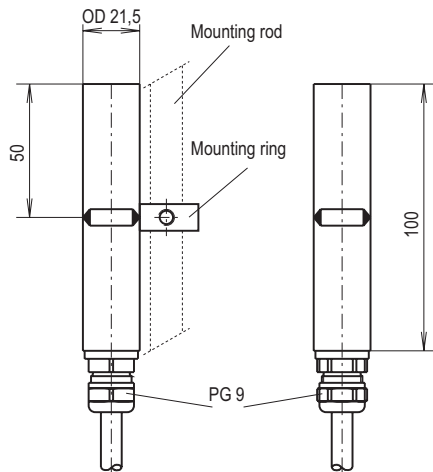
Housing	Aluminium, anodised
---------	---------------------

Housing protection	IP68
--------------------	------

Intrinsically safe	
--------------------	--

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

Contact protection measures see page 24



Code	Type
MV	= BGU-V-1 PVC
MVT	= BGU-V-1 Sil
MVE	= BGU-V-E-1 PVC blue

Technical data

Contact	Reed contact
Contact type	1 SPDT
Contact behaviour	bistable

Switch rating

Code MV and MVT	230 V AC, 60 VA, 1 A 230 V DC, 30 W, 0.5 A
Code MVE	for use in intrinsically safe circuit only with max. 100 mA and max. 30 V for use in control circuits to DIN EN 60947-5-6
adder /N	

Max. ambient temperature

Code MV	90°C
Code MVT	150°C
Code MVE	T6 to 85°C
Connection cable	3 x 0.75 mm ²
Code MV	1 m PVC grey
Code MVT	1 m Silicone
Code MVE	1 m PVC blue

Housing	Stainless steel
Housing protection	IP65
Intrinsically safe	Code MVE only

(Marking) II 1 G EEx ia IIC T6 - T3
LCIE 01 ATEX 6047 X

Contact protection measures see page 24

Code	Type
MVD	= BGU-V-EEx d-1 PVC
MVDG	= BGU-V-EEx d-1 PUR
MVDGA	= BGU-V-EEx d-1 PURA
MVDT	= BGU-V-EEx d-1 Sil

Technical data

Contact	Reed contact
Contact type	1 SPDT
Contact behaviour	bistable

Switch rating	230 V AC, 60 VA, 1 A 230 V DC, 30 W, 0.5 A
adder /N	for use in control circuits to DIN EN 60947-5-6

Max. ambient temperature

Code MVD, MVDG and MVDGA	T6 to 85°C
Code MVDT	T6 to 85°C T5 to 100°C T4 to 135°C T3 to 150°C

Connection cable	3 x 0.75 mm ²
Code MVD	1 m PVC grey
Code MVDG	1 m PUR yellow
Code MVDGA	1 m PUR yellow armoured
Code MVDT	1 m Silicone

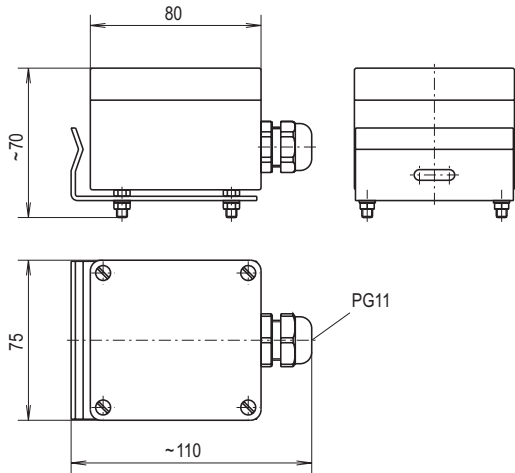
Housing	Stainless steel
Housing protection	IP68

Intrinsically safe

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

Contact protection measures see page 24

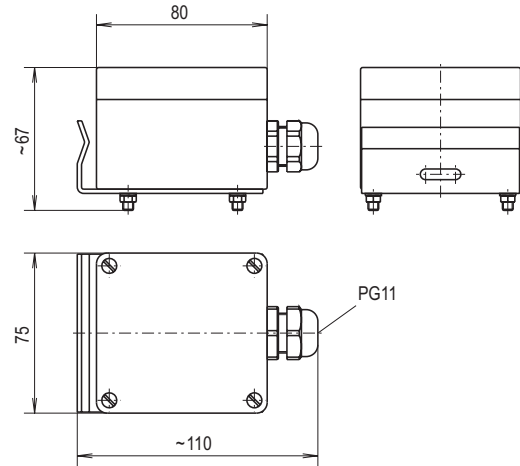
1015-2



Code Type
MHT = STMU

Technical data

Contact	Reed contact
Contact type	1 SPDT
Contact behaviour	bistable
Switch rating	230 V AC, 60 VA, 1 A 230 V DC, 30 W, 0.5 A for use in control circuits to DIN EN 60947-5-6
adder /N	
Max. ambient temperature	380°C
Housing	Aluminium
Housing protection	IP65
Contact protection measures see page 24	



Code Type
MIH = STMI-H
MIL = STMI-L

Technical data

Contact	Inductive proximity sensor SJ 3.5-SN	
Contact behaviour	bistable	
Code MIH	Function	High alarm
Code MIL	Function	Low alarm
Nominal voltage	8 V DC (Ri approx. 1 kOhm)	
Max. ripple	< 5 %	
Supply voltage U _B	5 - 25 V	
Power consumption	active area	free
	active area	covered
Connection cable - max. resistance	< 100 Ohm	
Self-inductance	160 µH	
Self-capacitance	20 nF	
Ambient temperature	-40°C to +100°C	
Housing	Aluminium	
Housing protection	IP65	

1015-2

KSR Level Sensors are used to measure and transmit the level of liquids in conjunction with a KSR control unit. It is based on the float principle with magnetic transmission in a 3-wire potentiometer circuit.

A float with a built-in magnetic system actuates small reed contacts through the walls of the bypass chamber. These reed switches form a resistance measuring chain that continuously generates a voltage proportional to the height of the level. The resistance measuring chain is closely stepped and is made up from small chips soldered onto a PCB. Due to this assembly the generated voltage is approximately continuous.

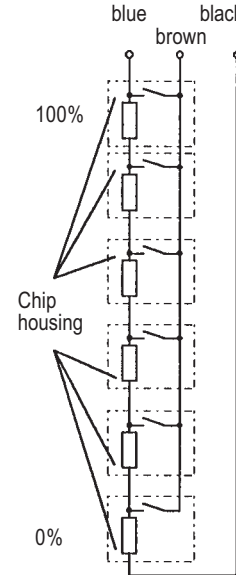
Depending on requirements and design several different contact separations are available.

Options:
Installation of 2-wire transmitter in terminal box possible (see catalogue 1011).

Advantages:

- standard signal (4 - 20mA) in the field, interference-free
- signal transmission over large distances possible
- use in hazardous areas possible

Internal circuit diagram level sensors



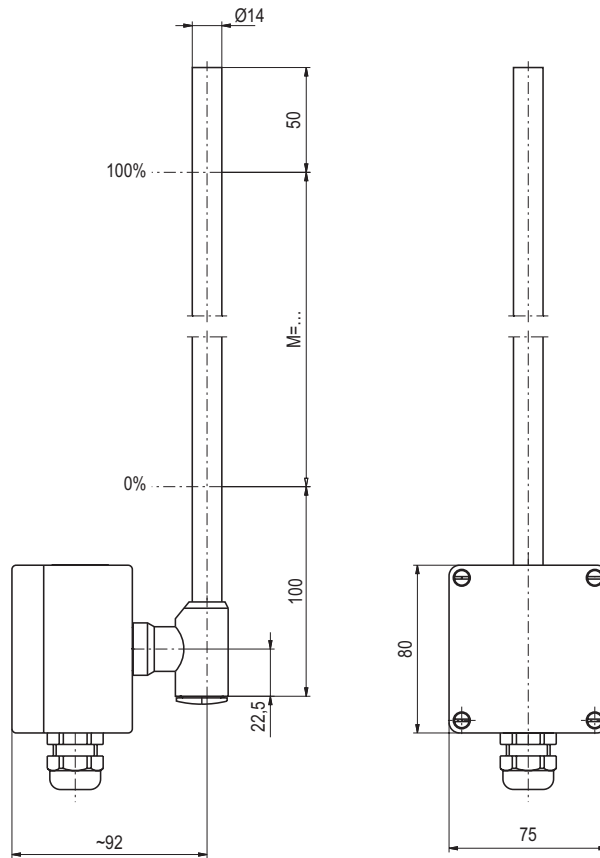
Type code

Code

3	Basic type					
MG	Level sensor					
3.1	Electrical connection (terminal box)					
...	A	Aluminium - top	APL	Polyester - top (Ex-design)	ALCD	Aluminium - top with digital display
	AU	Aluminium - bottom	APLU	Polyester - bottom (Ex-design)	ALCDU	Aluminium - bottom with digital display
	AP	Polyester - top	AV.	Stainless steel - top	AVLCD	Stainless steel - top with digital display
	APU	Polyester - bottom	AV.U	Stainless steel - bottom	AVLCDU	Stainless steel - bottom with digital display
3.2	1 st key Material sensor tube		2 nd key Contact separation		Optional code	
.../...	V	Stainless steel	K18	18 mm	/HT..	contact separation 5 / 10 / 15 mm only
			K15	15 mm	/TT..	High temperature +120°C ... +200°C
			K10	10 mm		Low temperature -10°C ... -80°C
			K5	5 mm		
3.3	Option: Head mounted transmitter in terminal box (see catalogue 1011)					
...	TS	Standard design type TS				
	TE	Ex-design type TE				
	TEH	Ex-design type TEH-HART®				
	TD	Profibus/Foundation Fieldbus type PR 5350 B				
3.4	1 st key Sensor tube length		2 nd key Measuring range		3 rd key Sensor tube dimensions	
.../.../...	L../	Length in mm	M../	Range in mm	14	OD 14 mm
3.5	Optional code					
...	-	none, resistance of measuring chain: depending on length and contact separation				
	Ex	Control circuit EEx ib IIC or EEx ia IIC, resistance of measuring chain: 3.2 kOhm ... 50 kOhm				

Ordering example:

Code	Basic type	Electrical connection	Material Sensor tube Contact separation	Option Head-mounted transmitter	Sensor tube-length Measuring range Sensor tube-dimensions	Optional code					
	3	-	3.1	-	3.2	-	3.3	-	3.4	-	3.5
	MG	-	AU	-	VK10	-	TE	-	L1650 / M1500 / 14	-	Ex



Type MG-A.VK../.-L.../M.../14

Technical data

Terminal box	A. = Aluminium, 80 x 75 x 57 mm AP. = Polyester, 80 x 75 x 55 mm AV. = Stainless steel
Sensor tube	V = Stainless steel 316 Ti Tube Dia. 14 x 1 mm
Contact separation	K18 = 18 mm K15 = 15 mm (also HT or TT) K10 = 10 mm (also HT or TT) K5 = 5 mm (also HT or TT)
Resistance of measuring chain	Standard design depending on length and contact separation
Ambient temperature at sensor tube	Standard design -10°C ... +120°C
Type code	HT +120°C ... +200°C
Type code	TT -10°C ... -80°C

Type MG-A.VK../.-L.../M.../14-Ex

II 2G EEx ia IIC T4-T6 KEMA 01 ATEX1052X
II 2D T 80°C IP6X

Technical data

Terminal box	A. = Aluminium, 80 x 75 x 57 mm APL. = Polyester anti-static, 80 x 75 x 55 mm AV. = Stainless steel
Sensor tube	V = Stainless steel 316 Ti Tube Dia. 14 x 1 mm
Contact separation	K18 = 18 mm K15 = 15 mm K10 = 10 mm K5 = 5 mm
Resistance of measuring chain	Standard design 3.2 kOhm ... 50 kOhm
Maximal permissible surface temperature at sensor tube	T4 +100°C T5 +65°C T6 +50°C

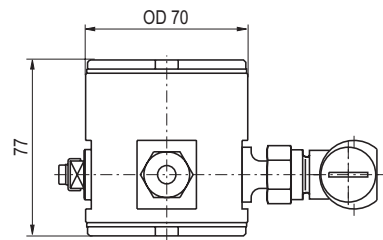
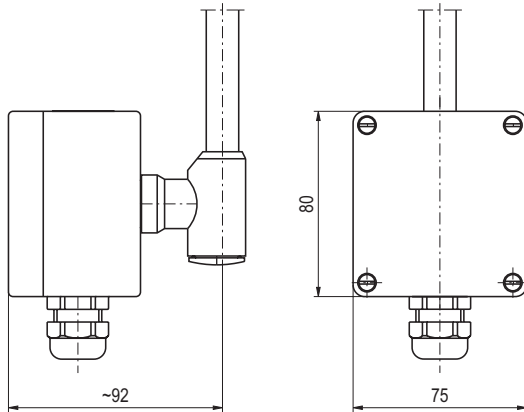
1015-2

KSR Level Sensors Housing options

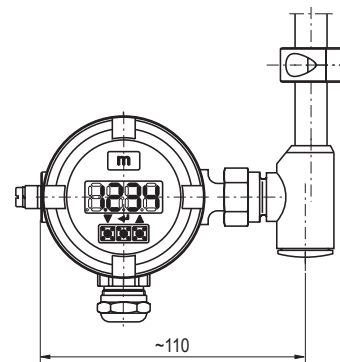
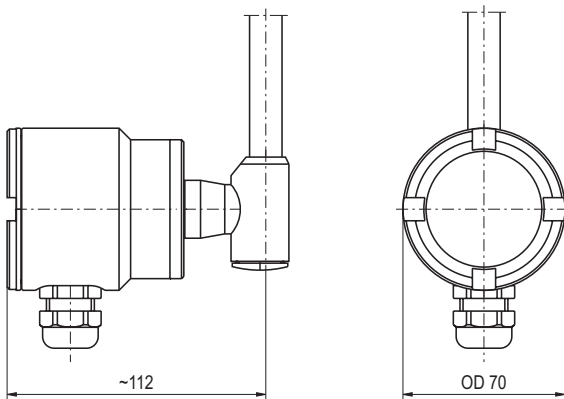


Type code A. = Aluminium 80 x 75 x 57 mm
 Type code AP. = Polyester 80 x 75 x 55 mm
 Type code APL. = Polyester 80 x 75 x 55 mm, anti-static

Type code ALCD. = Aluminium with digital display
 Type code AVLCD. = Stainless steel with digital display

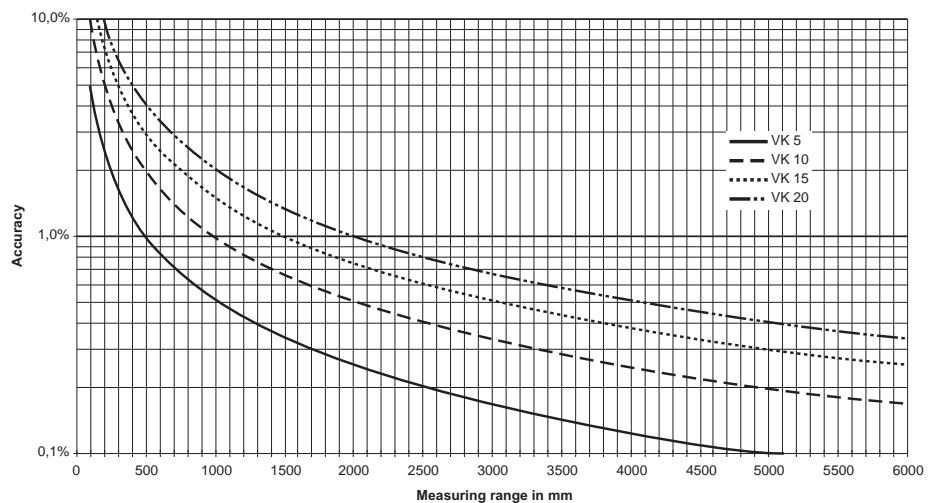


Type code AV. = Stainless steel



1015-2

Accuracy of
KSR Level Sensors

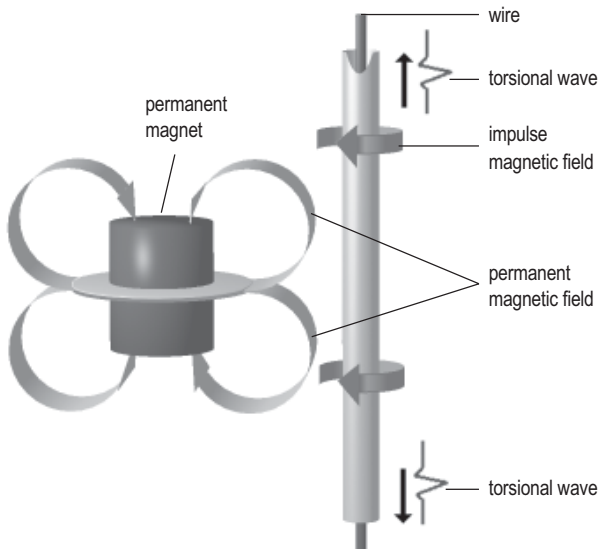


KSR High-Tech Sensor



The KSR Level Sensors range FFG-T... is used for continuous, remote liquid level measurement and based on position monitoring of a magnetic float following the magnetostrictive principle.

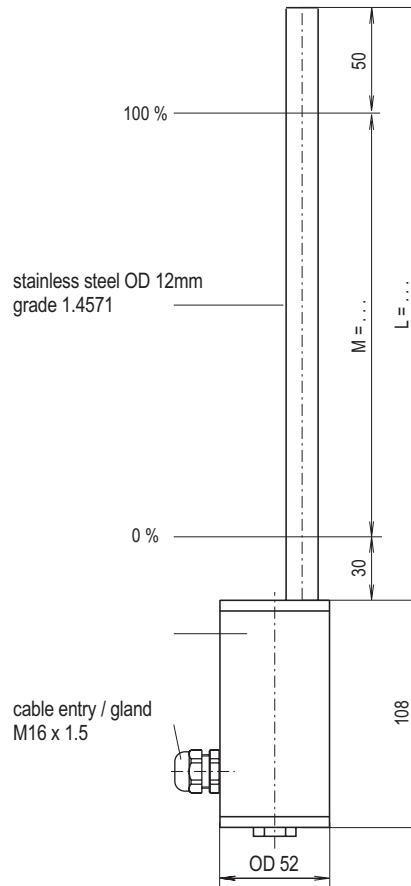
The sensors are mounted externally on a KSR Bypass Level Indicator. The measuring process is initiated by a current impulse. This current generates an axial magnetic field along the length of a wire made of magnetostrictive material, which is held under tension inside the sensor tube. The Bypass Level Indicator float, which sits on the liquid surface, is fitted with permanent magnets. The magnetic field of the float is at right angles to the impulse magnetic field. When the pulse reaches the float the two magnetic fields interact and a torsional force results. A torsional stress wave is induced in the wire. A piezoceramic pick-up in the sensor housing at the end of the wire converts this into an electrical signal. By measuring the elapsed transit time, it is possible to determine the start point of the torsional stress wave and therefore the float position with a high degree of accuracy.



Typ FFG-BT-V-L.../M.../12

Technical Data

Sensor Housing	Stainless steel 1.4301, ingress protection IP68, cable entry M16 x 1.5	
Sensor Tube	OD 12 x 1 mm, stainless steel 1.4571	
Sensor Length	200 mm ... 6000 mm	
Permissible ambient temperature		
Sensor Tube	-45°C ... +125°C	Standard-Design
	-200°C ... +200°C	HT-Design
Sensor Housing	-40°C ... +85°C	
Connection	2-wire	
Supply Voltage	10 ... 30 VDC	
Output Signal	4 ... 20 mA	
Error Signal	Adjustable to 3.6 mA or 21.5 mA	
Accuracy	better ±0.5 mm	
Resolution	< 0.1 mm	
Linearity	± 0.1 % (20°C) + 0.005 % / K	
Load	900 Ohm at $U_B = 30V$ DC 650 Ohm at $U_B = 24V$ DC 100 Ohm at $U_B = 12V$ DC	



Typ FFG-BT-V-L.../M.../12-Ex

Ex II 2G EEx ib IIC T3-T6 IBE XU 02 ATEX 1124X

Technical Data

in addition to standard type

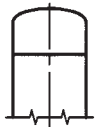
Permissible ambient temperature		
Equipment category 2	Sensor Tube	Sensor Housing
T6	-25°C ... +85°C	-40°C ... +40°C
T5	-25°C ... +100°C	-40°C ... +55°C
T4	-25°C ... +135°C	-40°C ... +85°C
T3	-25°C ... +150°C	-40°C ... +85°C
Permissible circuit values		
Type of protection	intrinsically safe EEx ib IIC	
$U_i < 30V$	$I_i < 200mA$	$P_i < 1W$
$L_i < 250\mu H$	$C_i < 5nF$	

1015-2

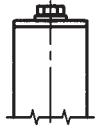
Options Chamber ends

with dampening spring on request

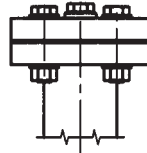
Chamber end top



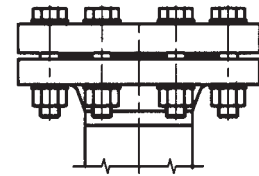
1
Welding cap



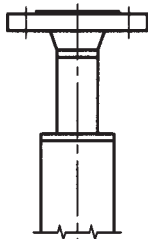
2
Flat top with
vent plug BSP 1/2"



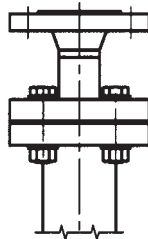
3
Flanged with
vent plug BSP 1/2"



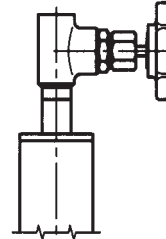
4
Flanged e.g. flange
facings with groove and
tongue acc. to DIN 2512



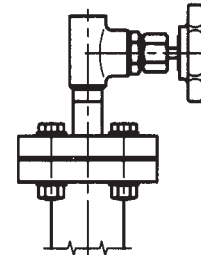
5
Flat top with
vent flange



6
Flanged with
vent flange

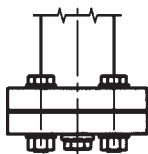


7
Flat top with
vent valve

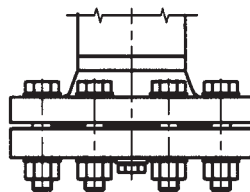


8
Flanged with
vent valve

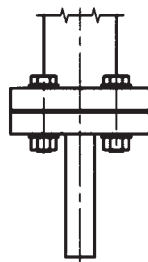
Chamber end bottom



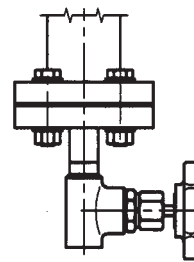
9
Flanged with
drain plug BSP 1/2"



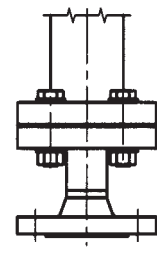
10
Flanged with drain plug
BSP 1/2" e.g. flange facings
with groove and tongue
acc. DIN 2512



11
Flanged with
drain nozzle

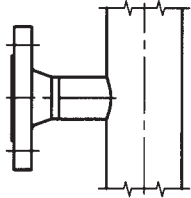


12
Flanged with
drain valve

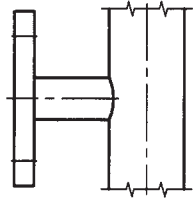


13
Flanged with
drain flange

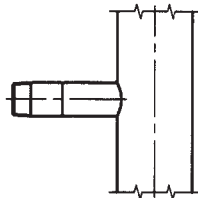
Options Process connection



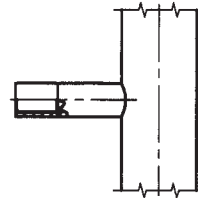
14
Welding neck flanges
up to DN 25 (1")



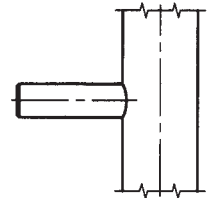
15
Blind flange
above DN 32 (1 1/4")



16
Threaded GN...
(Male)

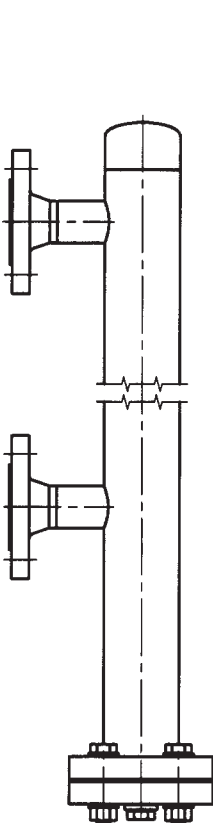


17
Threaded GM...
(Female)

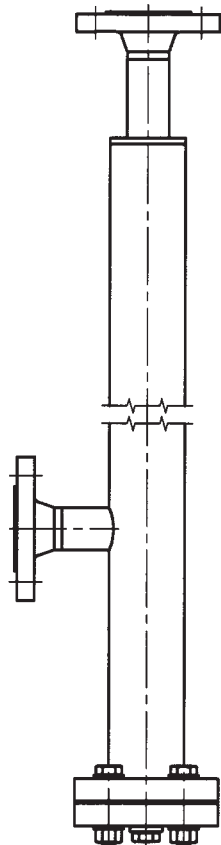


18
Welding stub S...

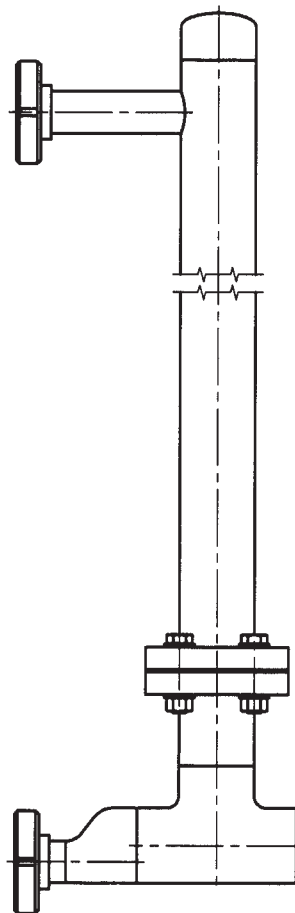
Examples Process connection



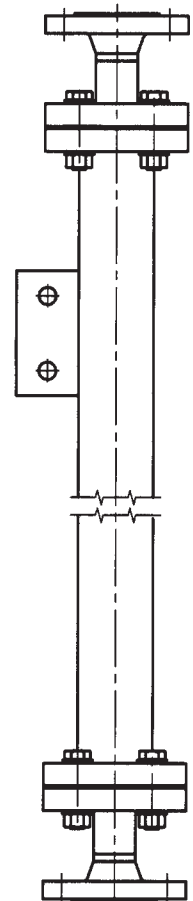
19
Standard
2 process connections
side-side



20
Process connections
top and side



21
2 process connections side-side
threaded acc. to DIN 11851
lower process connection with
eccentric reducer



22
Process connections
top and bottom
Option: Support brackets

1015-2





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