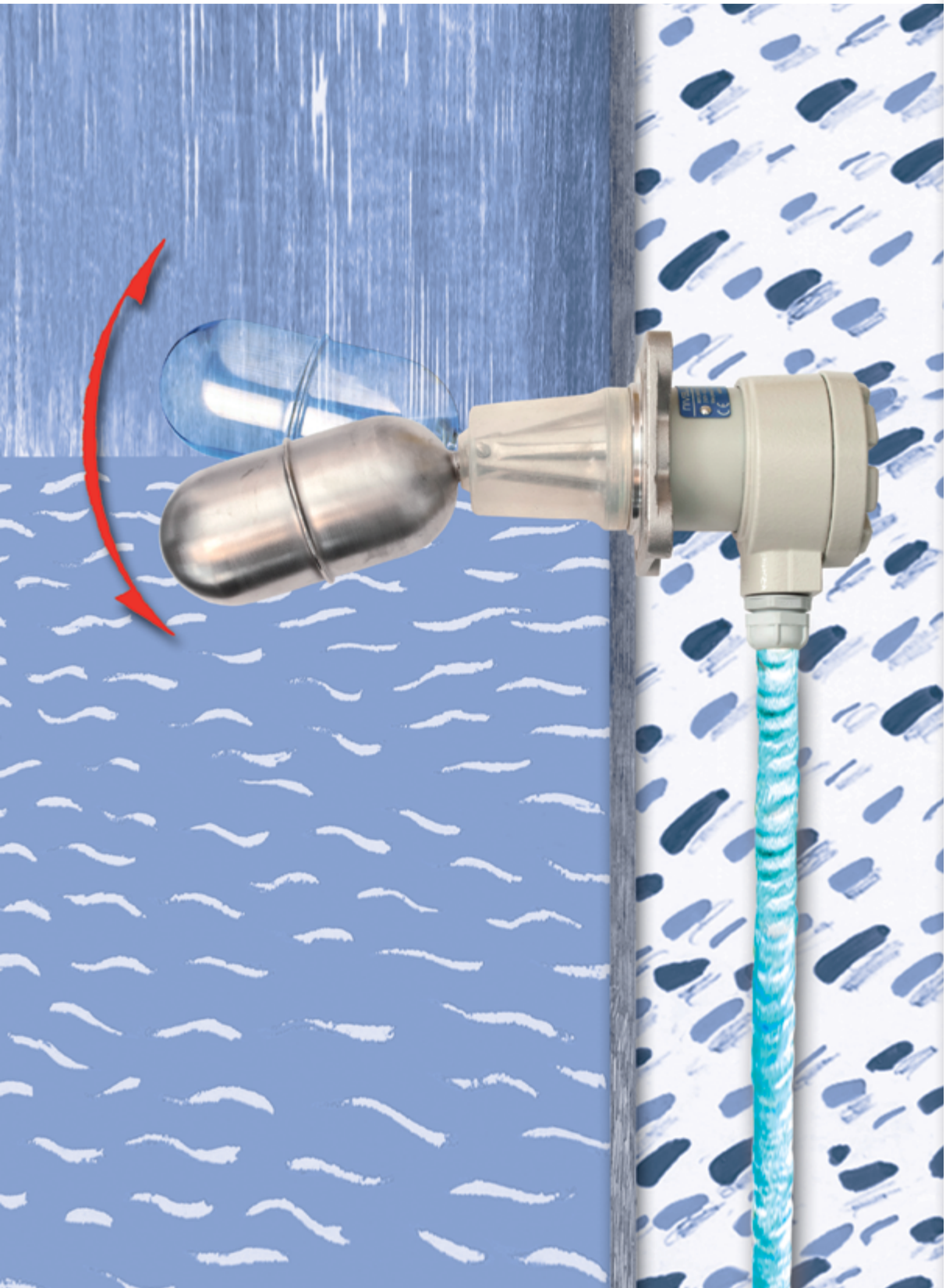
NIVOMAG

MAGNETIC COUPLING LEVEL SWITCHES

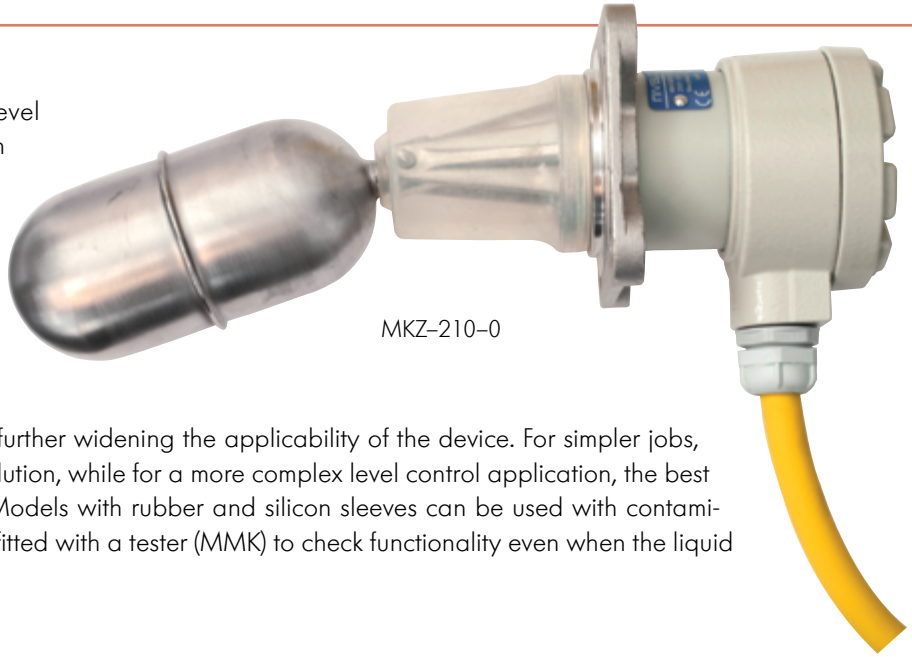


5 YEARS WARRANTY

NIVELCO

LEVEL SWITCHES

The **NIVOMAG MK–200** magnetic float level switches are used for point-level detection and level control of liquids in all types of containers.



MKZ–210–0

OPERATING PRINCIPLE

The float's magnet activates the output switch via a non-contact coupling system. The device is available in numerous side and top-mounted versions, further widening the applicability of the device. For simpler jobs, fixed hysteresis models offer an affordable solution, while for a more complex level control application, the best choice is the adjustable hysteresis variants. Models with rubber and silicon sleeves can be used with contaminated liquids. The NIVOMAG switch can be fitted with a tester (MMK) to check functionality even when the liquid levels are not changing.

FEATURES

- Magnetic coupling between switch and float
- Operation w/o external power supply
- Side and top mounted versions
- Underwater version
- Fixed or variable hysteresis
- Up to +250 °C (+482 °F) process temperature
- Flame-proof version
- IP65 / IP68

VARIANTS

The following tables and diagrams help select the appropriate model for the job. When selecting a model, liquid density, mounting position, process connection, and the need for adjustable or fixed hysteresis or a rubber sleeve must be considered.

Additional technical data				
Arm length	0…100 mm (0…4")	200 mm (7.85")	300 mm (11.8")	1…3 m (3.3…10 ft)
Maximum float Ø	Minimum liquid density (kg/dm³)			
52 mm (2")	0.7	0.8	0.85	–
64 mm (2½")			0.8	–
124 mm (5")	–	–	–	0.7

APPLICATIONS

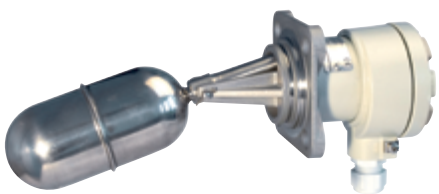
- Overflow protection
- Level controls
- Supplementary fail-safe switch if combined with other devices
- Water tanks, feedwater tanks
- Fuel tanks
- Power plants

	MK□–21□	MK□–22□	MK□–23□
Fixed switching differential	■	–	–
Adjustable switching differential		■	■
Straight arm	■	■	■
"L" or "Z" arm	■	■	–
Side mounted	■	■	–
Top mounted	■ (1)	■ (1)	■
Submersible	■	■	■
Protective Rubber Sleeve	■	–	–
Flanged process connection	■	■	■ (2)
Threaded process connection	■	–	
Ex variant	■	■	■
Tester	■	■ (3)	–

(1) With "L" arm (2) Only with 92 × 92 mm (3.6" × 3.6") flange (3) Only with special counter flange

CERTIFICATES

- ATEX (Ex d e mb G)
- IEC Ex (Ex d e mb G)
- INMETRO (Ex d e mb G)
- DNV
- Bureau Veritas (BV)
- SIL 1 (Safety Integrity Level)



MKA–210–□

MKA–220–□

TECHNICAL DATA

		Cylindrical float (side and top mounting)				Ball float (top mounting)
		MKA–21☐	MKA–22☐	MKU, MKV, MKZ–21☐	MKS, MKG–21☐	MK☐–23☐
Nominal pressure		25 bar (363 psi) [MKU, MKV, MKZ: 2 / 25 bar (29 psi / 363 psi)]				16 bar (232 psi)
Medium temperature		See Temperature diagram		0…+80 °C (32…+176 °F)	MKS: 0…+200 °C (32…+392 °F) MKG: 0…+100 °C (32…+212 °F)	See Temperature diagram
		Ex variant: see Temperature specification table and Temperature diagram				
Ambient temperature		–20…+80 °C (–4…+176 °F), Ex variant: see temperature specification for Ex version table and Temperature diagram				
Liquid density		Minimum 0.7…0.85 kg/dm³ see "Additional technical data" table				
Switching differential		Fixed	Adjustable	Fixed		Adjustable
Insertion length		202…521 mm (7.95…20.5")	254…573 mm (10…22.5")	202…521 mm (7.95…20.5")		1265…3265 mm (4.15…10.7 ft)
Material of wetted parts		Stainless steel ((1.4571, 1.3960, 1.4404 [316Ti, 316LN, 316L]); MKG, MKV: rubber (NBR); MKS, MKZ: silicone				
Housing material		Powder-coated aluminum				
Microswitch		1 microswitch with 1 closing and 1 opening contact (NO and NC)[1]				
Switch rating	Standard	250 V 10 A AC12; 220 V 0.6 A DC13				
	Ex variant	250 V 2.5 A AC12; 220 V 0.3 A DC13				
Electrical connection		M20×1.5 cable gland, cable diameter: Ø6…12 mm (Ø0.24…0.47") (Ex version: Ø10…14 mm [Ø0.39… 0.55"]), wire cross section: 5 × 0.75…2.5 mm² (5 × AWG18…14) (MKU, MKV, MKZ: integrated cable NSSHöu-J 5 × 1.5 mm², Ø14mm [AWG16, Ø0.6"])[2]				
Ingress protection		IP65 (MKU, MKV, MKZ: IP68 up to 20 m [65.6 ft] underwater)				
Electrical protection		Class I				
Safety integrity level		SIL 1				
Ex marking	ATEX	⟨Ex⟩ II 1/2 G Ex d e mb IIC T6…T2 Ga/Gb				
	IEC Ex	Ex d m e IIC T6…T2				
	INMETRO	Ex d e mb IIC T6…T2 Ga/Gb				
Weight		~1.8…3.5 kg (~3.95…7.7 lb)				

[1] NO and NC terminals must be connected to an equipotential circuit.

[2] Cable length must be specified when ordered.

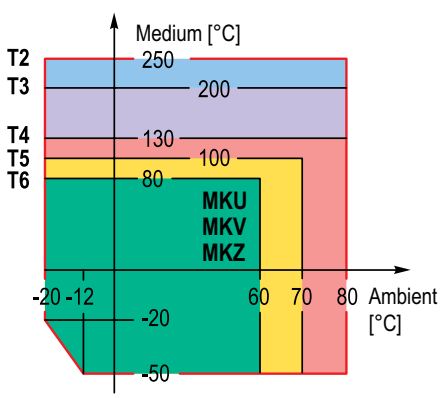
Ex INFORMATION

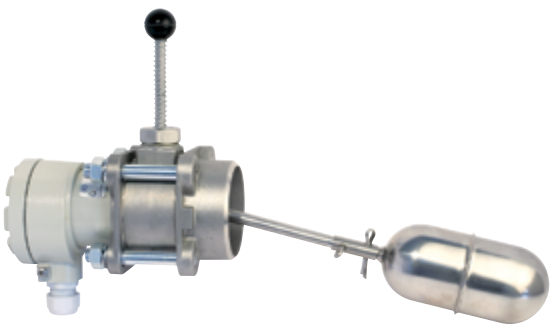
Temperature specification for Ex variants[3]

Temperature classes		T6	T5	T4	T3	T2
Ambient temperature range		–20…+60 °C (4…+140 °F)	–20…+70 °C (–4…+158 °F)	–20…+80 °C (–4…+176 °F)		–20…+80 °C (–4…+176 °F)
Medium temperature range	MKA	–50…+80 °C (–58…+176 °F)	–50…+95 °C (–58…+203 °F)	–50…+130 °C (–58…+166 °F)	–50…+200 °C (–58…+392 °F)	–50…+250 °C (58…+482 °F)
	MKG	0…+80 °C (+32…+176 °F)	0…+95 °C (+32…+203 °F)	–	–	–
	MKS			0…+130 °C (+32…+266 °F)	0…+200 °C (+32…+392 °F)	–
	MKU, MKV, MKZ		–	–	–	–

[3] *The applicable process temperature range is limited according to the temperature diagram.*

TEMPERATURE DIAGRAM



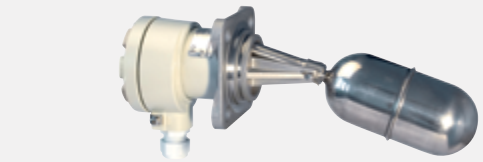


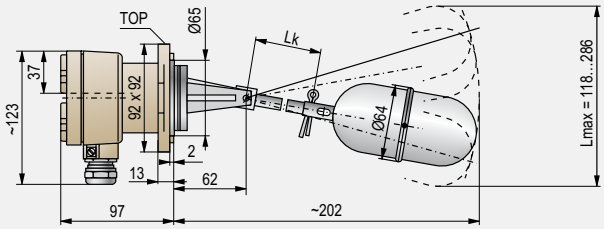
MKA–210–☐ + MMK–1☐0 (tester) + MFF–1☐1 (counter flange)

VARIANTS

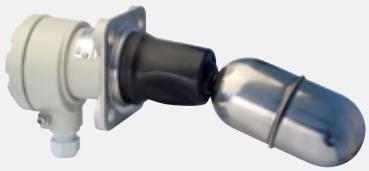
Devices with fixed hysteresis

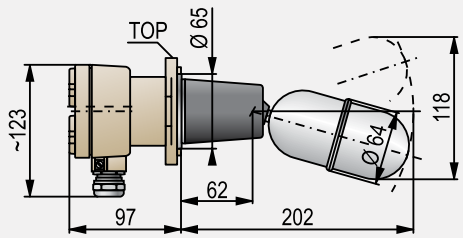
Side mounting [MKA–21□–□]





With rubber sleeve [MKG–210–□]



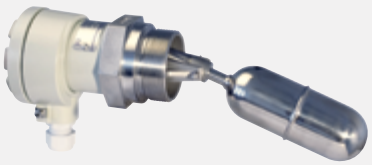


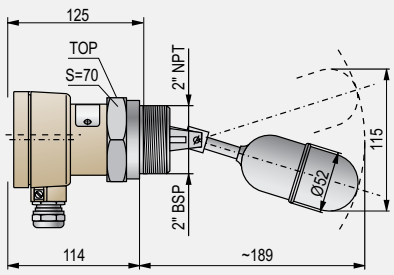
Switching points (mm [inch]) for models with fixed hysteresis and straight arm [MK□–21□]

Lk = arm length	0	100 [3.93"]	200 [7.87"]	300 [11.8"]
L = insertion length	202 [7.95"]	321 [12.63"]	421 [16.57"]	521 [20.51"]
Lmax = maximum displacement	118 [4.65"]	180 [7.08"]	234 [9.21"]	286 [11.25"]
X1 = upper switch point	12 [0.47"]	30 [1.18"]	46 [1.81"]	62 [2.44"]
X2 = lower switch point	12 [0.47"]	30 [1.18"]	46 (1.81")	62 (2.44")

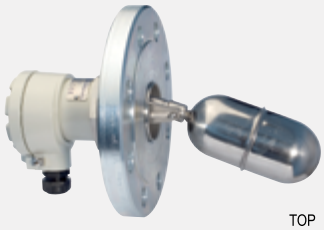
Note: values for water @+20 °C (+68 °F)

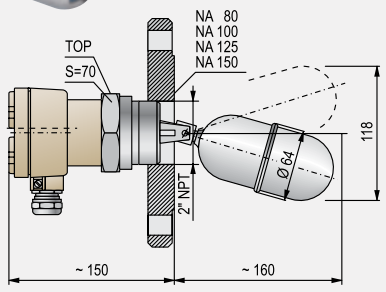
Threaded process connection [MKA–21B / MKA–21N–□]





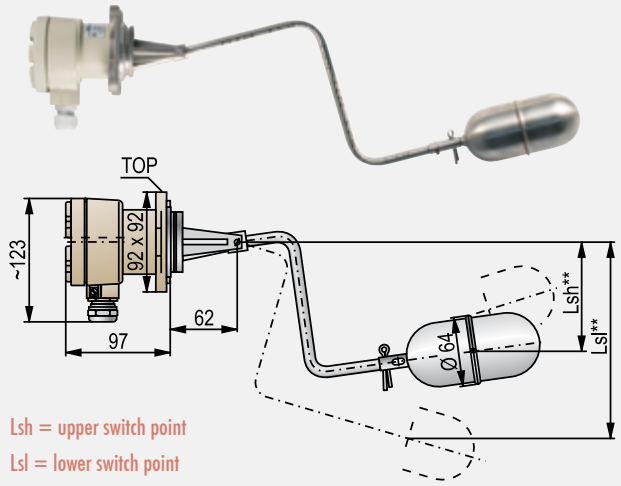
Flanged process connection [MKA–21□–□]





Devices with fixed hysteresis

Side mounting, "Z" arm [MKA–210–4]

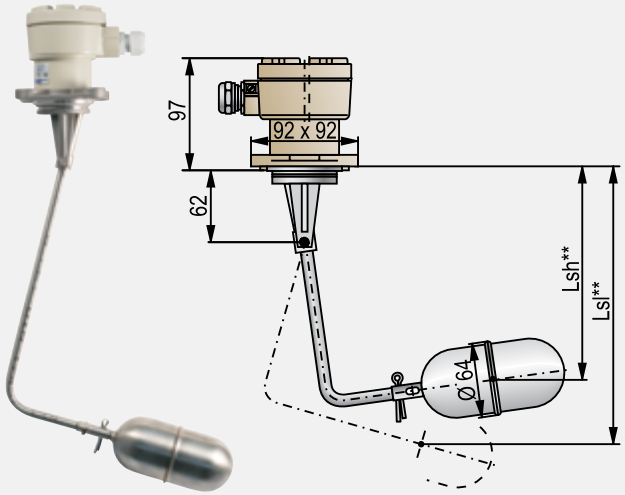


Lsh = upper switch point

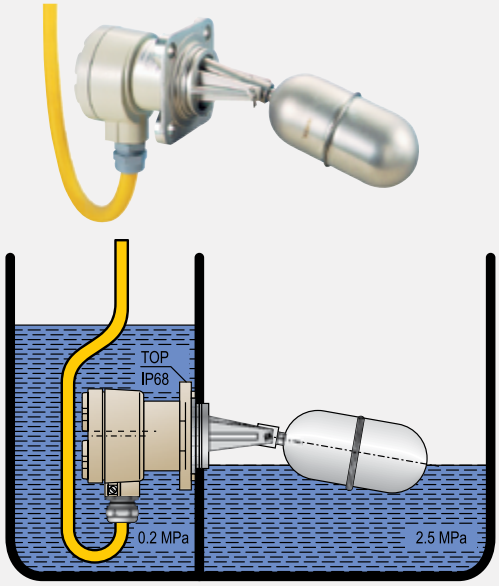
Lsl = lower switch point

**only one of the values can be specified*

Top mounting, "L" arm [MKA–210–4]



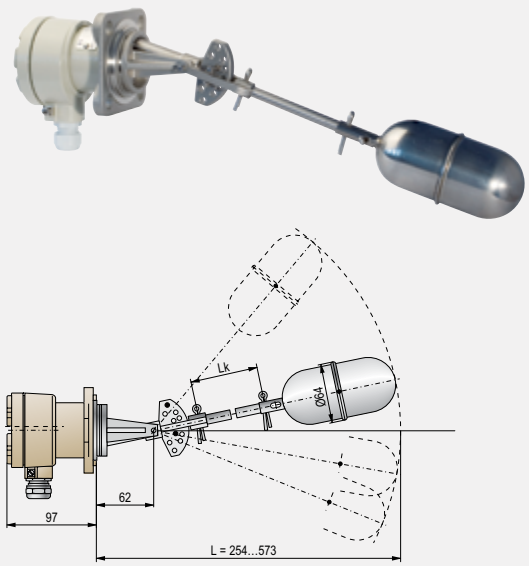
Submersible construction [MKU–210–☐]



VARIANTS

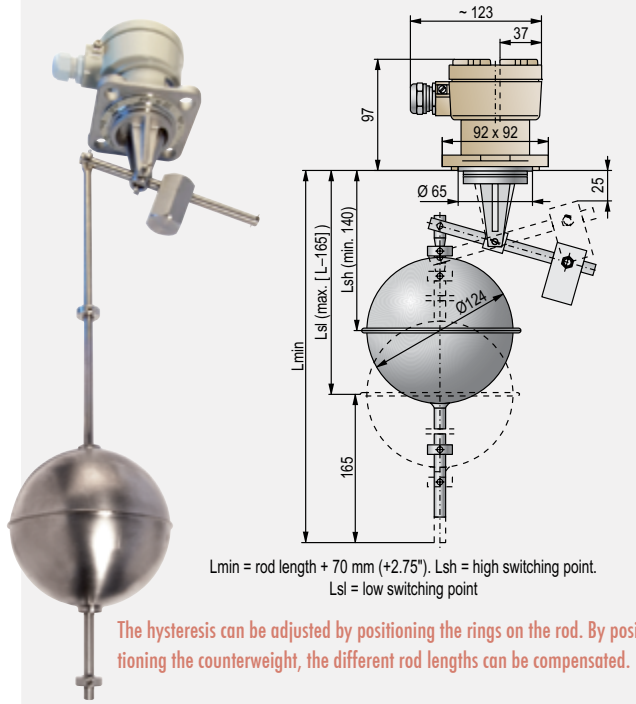
Devices with adjustable hysteresis

Side mounting [MKA–22□–□]



The hysteresis can be adjusted between the maximum and minimum values of the range by changing the position of the pins.

Top mounting [MKA–23□–□]



Lmin = rod length + 70 mm (+2.75"). Lsh = high switching point.
Lsl = low switching point

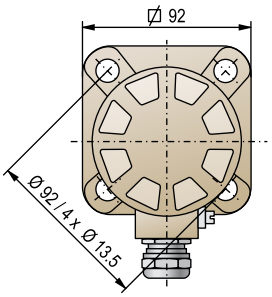
The hysteresis can be adjusted by positioning the rings on the rod. By positioning the counterweight, the different rod lengths can be compensated.

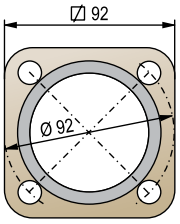
Switching points (mm [inch]) for models with adjustable hysteresis, and side mounting [MK□–22□]				
Lk = arm length	0	100 [3.93"]	200 [7.87"]	300 [11.8"]
L = insertion length	254 [10"]	373 [14.68"]	473 [18.62"]	573 [22.56"]
X1 = minimal switching point	28 [1.1"]	55 [2.16"]	78 [3.07"]	100 [3.93"]
X2 = minimal switching point	28 [1.1"]	55 [2.16"]	78 [3.07"]	100 [3.93"]
Y1 = maximal switching point	100 [3.93"]	193 [7.6"]	270 [10.63"]	350 [13.78"]
Y2 = maximal switching point	100 [3.93"]	193 [7.6"]	270 [10.63"]	350 [13.78"]

Note: values for water @+20 °C (+68 °F)

ACCESSORIES

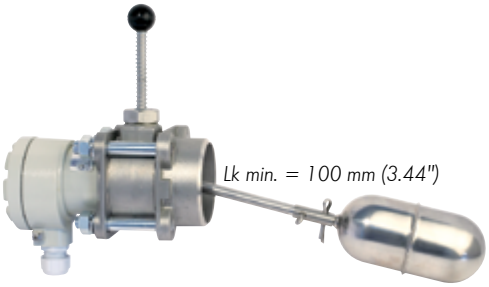
Mounting points on the housing



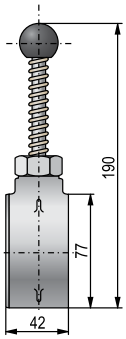


Tester

MMK tester device can be mounted between the housing and the counter flange. The tester is used to check the correct operation of switch without dismantling or true level change.



MKA–210–☐ + MMK–1☐0 (tester)
+ MFF–1☐1 (counter flange)



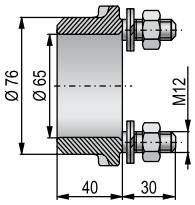
MFF–110
(counter flange)

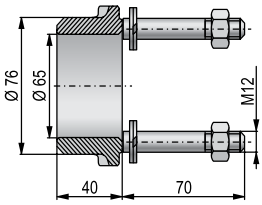
MFF–111 (counter flange)
+ MMK–120 (tester)

Counter flange

The counter flange is to be welded to the tank. Screws are connected to the housing.

MFF–110
(Counter flange)

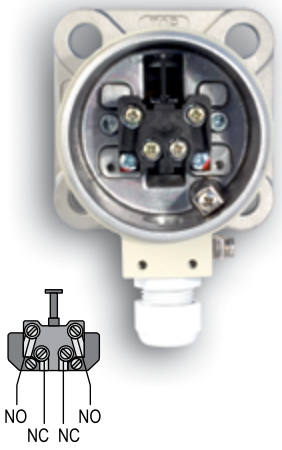




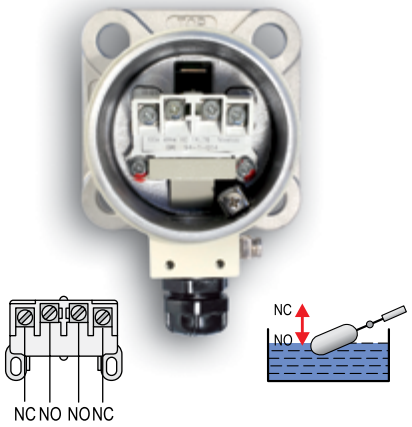
MFF–111
(Counter flange for tester)

WIRING

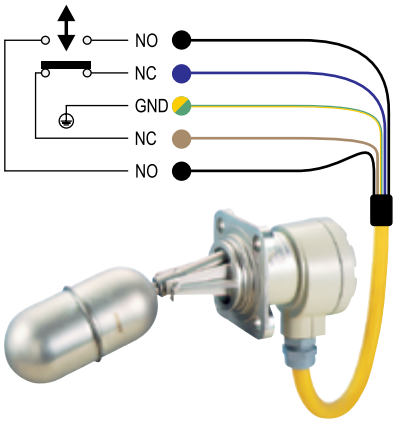
Standard variant



Ex variant



Submersible variant – cable assignment



mk20lq22en09b

ORDER CODES (NOT ALL COMBINATIONS AVAILABLE)

NIVOMAG – Magnetic Coupling Level Switches

NIVOMAG MK■–2■■–■(1)

Type	Code
Standard	A
With rubber protective sleeve	G
With rubber protective sleeve	S
Underwater (IP68)	U
Underwater (IP68) + rubber protective sleeve	V
Underwater (IP68) + silicon protective sleeve	Z

Version	Code
Fixed switch differentia	1
Adjustable switch differential	2
Adjustable switch differential, ball float	3

Process connection	Code
☐ 92 x 92, PN square flange	0
DIN DN80, PN40 / 25 / 16 / 10 (carbon steel)	1(2)
DIN DN100, PN40 / 25 (carbon steel)	2(2)
DIN DN80, PN40 / 25 / 16 / 10, 1.4571 stainless steel	5(2)
DIN DN100, PN40 / 25, 1.4571 stainless steel	6(2)
2" BSP	B(2)
2" NPT	N(2)

Code		Arm length MK–21, 22	Arm length MK–23	Code	
Standard variant	0	0 mm	1000 mm	1	Standard variant
	1	100 mm	2000 mm	2	
	2	200 mm	3000 mm	3	
	3	300 mm	1000 mm	5	Ex varian
	4	"Z" or "L" arm(3)	2000 mm	6	
Ex variant	9	0 mm	3000 mm	7	
	5	100 mm			
	6	200 mm			
	7	300 mm			
	8	"Z" or "L" arm(3)			

(1) Ex versions are marked "Ex" right after the type designation on the label
(2) Not available with protection sleeve
(3) Switching point must be specified in text of the order

ACCESSORIES

Counter Flange

NIVOMAG MFF–1■■

Material	Code
Steel (1.7218)	1
Stainless steel (1.4409)	2

Version	Code
Standard	0
For units with MMK–1☐0 tester	1

Tester

NIVOMAG MMK–1■0

Material	Code
Steel (1.7218)	1
Stainless steel (1.4409)	2

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